Wellhead and Source Water Protection – Part 2: Wellhead Protection Plan

Prepared for:
City of Lakeville, Minnesota

April 2014

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

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Wellhead and Source Water Protection – Part 2: Wellhead Protection Plan Amendment Lakeville, Minnesota April 2014

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PUBLIC WATER SUPPLY PROFILE

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GENERAL INFORMATION

UNIQUE WELL NUMBER(S) 207708, 207727, 212650, 161409, 161439, 433296, 554192, 554193, 554215, 562991, 596650, 603073, 651737, 655907, 694913, 745558, 686288

PUBLIC WATER SUPPLY ID # 1190015

SIZE OF POPULATION SERVED 55,954 (2010 census)

COUNTY Dakota

DOCUMENTATION LIST

Step	Date Performed
Scoping Meeting II Held (4720.5340, subp. 1)	May 24, 2012
Scoping II Decision Notice Received (4720.5340, subp. 2)	June 21, 2012
Remaining Portion of Plan Submitted to Local Units of Government (LUGs) (4720.5350)	January 16, 2014
Review Received From Local Units of Government (4720.5350, subp. 2)	January 17 to March 18, 2014
Review Comments Considered (4720.5350, subp. 3)	January 20 to March 21, 2014
Public Hearing Conducted (4720.5350, subp.4)	April 7, 2014
Remaining Portion WHP Plan Submitted (4720.5360, subp. 1)	April 18, 2014
Final WHP Plan Review Received (4720.5360, subp. 4)	July 21, 2014

Executive Summary

The Wellhead and Source Water Protection Plan (the Plan) for the City of Lakeville (the City) addresses the 17 municipal water supply wells operated by the City. The original Lakeville Wellhead Protection Plan received final approval from the Minnesota Department of Health in 2004. This Plan amendment was prepared in accordance the applicable portions of the State of Minnesota Wellhead Protection Rules (Minnesota Rules 4720.5100 through 4720.5590).

The Lakeville municipal water supply system includes 17 wells: Wells 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, and 19. These 17 municipal water supply wells pump from a total of four different aquifers. Wells 2, 3, 4, 6, 7, 8, 15, and 16 are open to the Jordan Sandstone aquifer. Wells, 9, 10, 11, 12, 13, 14, 17, and 19 are open to both the Prairie du Chien Group aquifer and the Jordan Sandstone aquifer. Well 18 is open to the Tunnel City Group (formerly known as the Franconia Formation) and Wonewoc Sandstone (formerly known as the Ironton and Galesville Sandstones) aquifers. Well 3 (Out Long Term) and Well 7 (Emergency Backup) are the only wells in the system not used as primary water supply wells. In accordance with Minnesota Rules 4720.5550, Lakeville Wells 3, 4, 8, and 15 are classified as vulnerable to contamination from the surface while the rest of the Lakeville municipal wells were identified as being not vulnerable to contamination from the surface.

The Plan consists of two parts. In Part 1 of the Plan, wellhead protection areas (WHPAs) for the Lakeville water supply wells were delineated as were the associated drinking water supply management areas (DWSMAs). Two DWSMAs were delineated for Lakeville. A small DWSMA was delineated around Lakeville Well 3 while a separate, much larger DWSMA was delineated around the other 16 Lakeville municipal wells. The large, main DWSMA extends into portions of Apple Valley and Farmington and overlaps the central Apple Valley DWSMA (see Figure 1). The small DWSMA associated with Well 3 lies entirely within the Lakeville city limits. Geologic conditions in and around the City's DWSMAs result in the uppermost source water aquifer vulnerability being classified as High in approximately 17% of the area in the main DWSMA. The aquifer vulnerability is classified as Moderate in approximately 11% of the area in the main DWSMA, and as Low in approximately 72% of the area in the main DWSMA. In the Well 3 DWSMA, the aquifer vulnerability is classified as High throughout the entire DWSMA.

This document comprises Part 2 of the Plan and includes the following information:

- A review of data elements identified by the Minnesota Department of Health as applicable to the DWSMAs.
- Results of an inventory of potential contaminant sources within the DWSMAs.
- Review of changes, issues, problems, and opportunities related to the public water supply and the identified potential contaminant sources.
- A discussion of potential contaminant source management strategies and the goals, objectives, and action plans associated with these management strategies.
- A review of the Wellhead and Source Water Protection evaluation program and Lakeville's alternative water supply contingency strategy.

Potential contaminant sources identified in the DWSMAs include non-municipal wells, potential Class V wells (consisting of properties associated with automotive repair and large scale septic systems likely serving more than 20 people), hazardous waste generators, chemical storage sites, storage tanks, old dump sites, and spill sites.

The goals and objectives of this Plan focus on reducing the potential contaminant pathways to the source water aquifer that may be provided by private wells, educating City staff, property owners and water supply users regarding wellhead and source water protection, and working with the Cities of Apple Valley and Farmington to ensure, to the extent possible, proper management of the portions of the main DWSMA that extend into these cities.

The following goals have been identified for implementation of this Plan:

- The City will work to maintain or improve the current level of water quality so that the municipal water supply will continue to meet or exceed all applicable state and federal water quality standards.
- The City will provide information and promote activities that protect the source water aquifers that provide water to the municipal system. This will include increasing public awareness of the Wellhead and Source Water Protection Program and groundwater-related issues, and management of the identified potential contaminant sources within the DWSMAs.
- The City will continue to collect data to support future wellhead and source water protection efforts.

Actions identified to accomplish these goals include the following:

- Privately-owned wells

1. Promoting proper management of existing active wells in the DWSMA.
2. Encouraging the proper sealing of all unused wells within the DWSMAs.

- Potential contaminant source properties
    1. Encouraging proper handling of chemicals/wastes
    2. Providing information to owners of properties that may contain Class V wells,
    3. Encouraging proper operation and maintenance of storage tanks,
    4. Providing information to owners of properties where ISTS are located
    5. Periodically obtaining updated information on potential contaminant sources in the DWSMAs from the regulating agencies to maintain an up-to-date potential contaminant source database for the DWSMAs and allow timely recognition of potential issues that could affect the Lakeville municipal water supply or DWSMA.
- Public education
    1. Distribution of the Lakeville Consumer Confidence Report for the water supply system,
    2. Posting Wellhead Protection Program information on the City of Lakeville website (http://www.ci.lakeville.mn.us/)
    3. Inclusion of wellhead and source water protection into the City's planning process,
    4. Working with the cities of Apple Valley and Farmington, to the extent practicable, to identify appropriate public education opportunities for any residents within the portions of the main Lakeville DWSMA that extend into these jurisdictions.
- Continued data collection
    1. Recording static and pumping water levels in the Lakeville municipal wells,
    2. Collection of additional local geologic and hydrogeologic data as it becomes available from public sources.

1.0 Introduction

1.1 Background

The City of Lakeville (City) has 17 municipal water supply wells that pump from a total of four different aquifers. Aquifers from which one or more of the Lakeville municipal wells pump are as follows: Prairie du Chien Group, Jordan Sandstone, Tunnel City Group (formerly known as the Franconia Formation), and Wonewoc Sandstone (formerly known as the Ironton and Galesville Sandstones). Well unique numbers along with well construction, status, aquifer(s), and vulnerability information for all 17 of Lakeville's municipal water supply wells is presented in Table 1. Well and Drinking Water Supply Management Area (DWSMA) locations are shown on Figure 1. Minnesota Department of Health (MDH) well records for all the Lakeville municipal wells are presented in Appendix A.

Per the Minnesota Wellhead Protection Rules (Minnesota Rules 4720.5100 through 4720.5590), the addition of new wells to the City's water supply system and the age of the City's Wellhead Protection Plan (WHPP) necessitated the amendment of the City's Plan. Part 1 of the City of Lakeville WHPP was amended to incorporate the following three municipal water supply wells constructed after the original Lakeville wellhead protection areas were delineated: Well 17 (unique number 694913), Well 18 (unique number 745558), and Well 19 (unique number 686288). Wells 17 and 19 are open to the Prairie du Chien Group and Jordan Sandstone aquifers. Well 18 is open to the Tunnel City Group and Wonewoc Sandstone aquifer (formerly known collectively as the Franconia Formation-Ironton Sandstone-Galesville Sandstone, or FIG, aquifer). All three of these municipal wells are classified as Active, Primary supply wells. The amendment also incorporated fracture-flow analysis into the WHPA delineations. The Part 1 WHPP amendment was approved by the Minnesota Department of Health (MDH) in April 2012 (MDH, 2012a).

In the Part 1 WHPP amendment, two separate DWSMAs were delineated for Lakeville. In addition to the delineation of the Wellhead Protection Areas (WHPAs) and the DWSMAs, Part 1 of the WHPP includes an assessment of the vulnerability of the Lakeville municipal wells and the source water aquifers in the associated DWSMAs to contamination. In accordance with Minnesota Rules 4720.5550, Lakeville Wells 3, 4, 8, and 15 are classified as vulnerable to contamination from the surface while the rest of the Lakeville municipal wells were identified as being not vulnerable to contamination from the surface (see Table 1 and Appendix B). Lakeville Well 3 is Out Long Term and Well 7 is used as an emergency supply well. The status of the Lakeville wells is shown in

Table1. In the Part 1 report, the vulnerability to contamination of the uppermost source water aquifer within the DWSMAs was identified as ranging from Low to High (Barr, 2012). Figure 1 shows the aquifer vulnerability zones in the Lakeville DWSMAs. The Lakeville Part 1 WHPP amendment is presented in Appendix B.

1.2 Description of the Public Water Supply System

The City is located in western Dakota County. Lakeville currently has 15 primary supply wells, one well out long term, and one emergency well in the municipal water supply and distribution system for Public Water Supply #1190015. Locations of the wells are shown on Figure 1 and general construction details for the Lakeville municipal wells are summarized in Table 1. Copies of the MDH well records for the Lakeville municipal wells are presented in Appendix A.

In the 2010 census Lakeville had a population of 55,954. According to population projections prepared by the Metropolitan Council and incorporated in the City of Lakeville's Comprehensive Plan (NAC, 2008), the City's population is projected to reach 78,400 by 2020 and 88,800 by 2030. The projected 2030 average day and maximum day water demands used in the City's Comprehensive Water Plan (SEH, 2008) are approximately 7,810 gallons per minute (gpm) (11.25 million gallons per day (Mgpd)) and 22,650 gpm (32.62 Mgpd), respectively. In 2007, the average day and maximum day demands were 6.92 Mgpd and 19.91 Mgpd (Lakeville, 2008). During the period 2007-2011, the daily demand on the Lakeville water system averaged about 6.5 Mgpd. The current permitted capacity of the system is 19,300 gpm (approximately 27.8 Mgpd).

The City treats water pumped from the municipal wells in a 26.5 Mgpd capacity water treatment facility. In the water treatment facility, potassium permanganate and chlorine are added to the raw water to bring iron and manganese into suspension. Iron/manganese sludge is discharged from this facility to the sanitary sewer. Orthophosphate for corrosion inhibition and fluoride are also added to the water supply in the treatment plant.

Lakeville currently has four elevated water storage tanks and one ground storage tank. The City also has one clear well at the water treatment facility. These storage structures have a combined storage capacity of 8.85 million gallons.

The City anticipates construction of up to 10 additional wells to meet ultimate demand (Lakeville, 2013). It is anticipated that these wells would be constructed in the aquifers from which existing Lakeville wells pump. Additional wells would be constructed as needed to meet growing water demand.

As discussed in Barr (2012), pumping information from the City for the period 2006 through 2010 and City water use projections were used to develop pumping rate projections for use in delineating the WHPAs. Annual volume of water pumped by each of the City's municipal water supply wells during the period 2006 through 2010 is shown in Table 2.

1.3 DWSMAs

In Part 1 of the WHPP, WHPAs and DWSMAs associated with the Lakeville municipal wells were delineated. The DWSMAs encompass the 10-year groundwater time of travel WHPAs around the City's wells. Both porous media flow and fracture flow evaluations were done to delineate the Lakeville WHPAs (Barr, 2012).

Lakeville has two DWSMAs. As shown on Figure 1, a small DWSMA was delineated around Lakeville Well 3 while a separate, much larger DWSMA was delineated around the other 16 Lakeville municipal wells. The main Lakeville DWSMA is found in Township 114N Range 21W Sections 1, 12, 13, 14, 24, and 25; Township 114N Range 20W Sections 1 through 12, 14 through 22, 29, and 30; and Township 115N Range 20W Sections 32, 33, 34, and 35. The large, main DWSMA extends into portions of Apple Valley and Farmington. As shown on Figure 1, the main Lakeville DWSMA overlaps the central Apple Valley DWSMA. The small DWSMA associated with Well 3 lies entirely within Township 114N Range 20W Section 33.

In the Part 1 report, the vulnerability of the uppermost source water aquifer within the majority of the main Lakeville DWSMA was classified as Low with smaller areas in which the vulnerability was classified as Moderate or High while the vulnerability of the uppermost source water aquifer within the small DWSMA around Lakeville Well 3 was classified as High (Barr, 2012).

2.0 Identification and Assessment of Data Elements

The Minnesota Wellhead Protection Rules specify data elements that must be addressed in wellhead protection plans. For the WHPP amendment, MDH staff met with City staff on two occasions to discuss the data elements that are specified in the Minnesota Rules 4720.5400. Results of these scoping meetings were transmitted to the City via two Scoping Decisions dated June 9, 2011 (MDH, 2011) and June 20, 2012 (MDH, 2012b).

The first Scoping Meeting was held on June 1, 2011. At this meeting, the data elements related to delineation of the WHPAs and DWSMAs and assessment of well and aquifer vulnerability were discussed. The second Scoping Meeting was held on May 24, 2012. At this meeting, the data elements required to support development of Part 2 of the WHPP (this document) which identifies potential contaminant sources within the DWSMAs and identifies management strategies to help safeguard the municipal water supply from identified potential contaminants were discussed. Data elements that pertain to the Lakeville WHPP have been identified. An assessment of these data elements, as required by the Minnesota Wellhead Protection Rule, is presented in Appendix C.

3.0 Inventory of Potential Contaminant Sources

In Part 1 of the WHPP, WHPAs and the DWSMAs were delineated. The main Lakeville DWSMA covers the central and northeastern portions of the City and extends into the cities of Apple Valley and Farmington (see Figure 1). As shown on Figure 1, the small DWSMA around Lakeville Well 3 is entirely within the Lakeville city limits. The DWSMAs encompass the 10-year groundwater time of travel WHPAs around the City's wells. Both porous media flow and fracture flow evaluations were done to delineate the Lakeville WHPAs (Barr, 2012).

As shown in Appendix C, as of 2010 (the last year for which a land use map was available) numerous land uses were present within the DWSMAs including various types of residential use, commercial and retail, industrial and utilities, extractive, offices, parks and recreation, undeveloped, and various transportation-related uses. Mining is no longer active in the small area identified as extractive land use in the northeastern portion of the main Lakeville DWSMA.

Per the June 20, 2012 Scoping Decision, the City performed a Potential Contaminant Source Inventory (PCSI) within the DWSMAs.

3.1 Inventory Process

At Scoping Meeting No. 2, the types of potential contaminant sources that must be inventoried in the Lakeville DWSMAs Area were discussed. As discussed in Appendix C, sources of data accessed for the potential contaminant source inventory include Dakota County, Minnesota Department of Agriculture (MDA), MDH, MDNR, Minnesota Department of Public Safety (MDPS), Minnesota Geological Survey (MGS), Minnesota Land Management Information Center (LMIC), Minnesota Office of Pipeline Safety (MnOPS), Minnesota Pollution Control Agency (MPCA), and U.S. Environmental Protection Agency (EPA) databases.

Aquifer vulnerability in the Lakeville DWSMAs varies (Figure 1). Aquifer vulnerability in the majority of the main DWSMA is classified as Low and there are smaller areas in which aquifer vulnerability is classified as Low or High. In the small Well 3 DWSMA the aquifer vulnerability is classified as High throughout the area. In the areas of Low aquifer vulnerability, the types of potential contaminant sources inventoried include wells (active and sealed) and potential Class V disposal wells (defined by the U.S. EPA as cesspools, large-scale septic systems serving more than 20 people, or potential automotive maintenance waste disposal wells/pits). In the areas of moderate aquifer vulnerability, the types of potential contaminant sources inventoried include wells (active and

sealed), potential Class V disposal wells, and storage tanks. In areas of high aquifer vulnerability, the types of potential contaminant point sources inventoried include wells (active and sealed), chemical storage sites, potential Class V disposal wells, dump and spill sites, hazardous waste generators, leaking tank sites, individual sewage treatment systems (ISTS; a.k.a., septic systems), and registered storage tank sites.

The first step in the inventory was to determine if there were any potential contaminant sources in the Inner Wellhead Management Zone (IWMZ) or the Emergency Response Zone (ERZ) around each of the Lakeville wells. The IWMZ is defined as the area within a 200-foot radius of each municipal well. The most recent IWMZ inventory for each of the Lakeville municipal wells is presented in Appendix C. The ERZ is defined as the area within which the travel time of groundwater to a municipal well is one year or less. The inventory was then expanded out to the boundaries of the DWSMAs.

Potential contaminant sources were assigned a priority based on the relative risk they pose to the public water supply. The evaluation of risk related to a potential contaminant source type is based on the locations of potential contaminant sources of that type. Higher priority was assigned to those potential contaminant sources that would pose the highest risk to the municipal water supply should a contaminant release occur.

As shown in Table 3, potential contaminant sources were assigned a priority based on the relative risk they pose to the public water supply. The evaluation of risk related to a potential contaminant source type is based on the locations of potential contaminant sources of that type. Higher priority was assigned to those potential contaminant sources that would pose the highest risk to the municipal water supply should a contaminant release occur.

3.2 Inventory Results

A more detailed discussion of the potential contaminant sources within the DWSMAs is presented in Appendix C. The inventory results are summarized in Table 3.

The Wellhead Protection rules require that at least 25 locations of each type of potential contaminant source identified during the PCSI be verified during preparation of the plan. The rules also require that if there are fewer than 25 of a particular potential contaminant source type that all locations of that type be verified. During the preparation of this Plan, all potential contaminant source locations identified during the PCSI were verified to the extent possible based on available information. Verification procedures used included matching mapped locations with addresses on MDH Well

Records, published business addresses, property parcel addresses, local knowledge of City staff, and/or information from City files (note that not all verification procedures were used for each type of potential contaminant source). Verified locations are identified in the tables in Appendix C. New information developed on contaminant sources in the future will be verified as they are discovered as part of the WHPP implementation.

4.0 Impact of Changes to the Public Water Supply Wells

In accordance with the requirements of Minnesota Rules 4720.5220, anticipated changes in the physical environment, land use, surface water, and groundwater in the DWSMAs within the next ten years and the impact of these changes on the source water aquifers are discussed in this section.

4.1 Potential Changes Identified

4.1.1 Physical Environment

Currently, significant or large-scale changes in the physical environment that might affect the DWSMAs, are not anticipated in the next ten years. Any changes are expected to be the result of development or redevelopment of properties or localized infrastructure changes. Such changes would not be expected to significantly affect the source water aquifers. Any minor changes to the physical environment will likely not affect the management strategies for the Lakeville DWSMAs presented in this WHPP.

The City of Lakeville's Comprehensive Water Plan (SEH, 2008) calls for the addition of new wells to meet future water demand as needed. Addition of these new wells may change the boundaries of the DWSMAs and would require amendment of this WHPP if the wells are put into service within the next ten years.

The main Lakeville DWSMA extends into portions of the cities of Apple Valley and Farmington and overlaps the central Apple Valley DWSMA. The City of Lakeville plans to work to the extent practicable with these cities to manage the portions of the DWSMA that fall within the boundaries of these cities.

4.1.2 Land Use

As discussed in the City's Comprehensive Land Use Plan (NAC, 2008), Lakeville is classified as a developing city and will not reach full development until after 2030. As noted above in Section 3, current land uses in the Lakeville DWSMAs include various types of residential use, commercial and retail, industrial and utilities, extractive, offices, parks and recreation, undeveloped, and various transportation-related uses. Projected future land uses within the City are anticipated to include many of the land uses currently present within the DWSMAs.

A land use map for the year 2010 and a projected year 2030 land use map are shown on Figures 2 and 3, respectively. Projected land use in Lakeville in 2030 is expected to be consistent with the

City's current growth planning. Projected land use in the portions of Apple Valley and Farmington that are within the main Lakeville DWSMA is expected to be consistent with the current growth planning of those cities. Comparison of the year 2010 land use with the projected future land use indicates that, in general, the currently undeveloped properties within the DWSMAs will be developed.

All land uses anticipated during the next ten years within the DWSMAs are currently present in the areas covered by this WHPP. As a result, adjustments in the land use within the DWSMAs such as those projected for the year 2030 will be adequately addressed by the management strategies put forth in this WHPP.

The City plans to work with Apple Valley and Farmington to the extent practicable to manage the portions of the main DWSMA that fall within the boundaries of these other cities.

4.1.3 Surface Water

There are surface water bodies and wetlands within the Lakeville DWSMAs. Lakeville's Water Resources Management Plan (Barr, 2008), City ordinances, and zoning address these surface water bodies and wetlands. Lakeville's management of surface water bodies and wetlands is not expected to adversely affect the management strategies for the DWSMAs. Rather, the City's management of surface water bodies and wetlands is consistent with the objectives of this Plan.

The City is not aware of any plans to alter the course or location of any surface water bodies currently present within the DWSMAs in the next ten years.

4.1.4 Groundwater

As the population of Lakeville grows, water demand in the City will grow. As discussed in the Lakeville Comprehensive Water Plan (SEH, 2008), it is anticipated that additional municipal wells will be installed as the City's water demands grow. These wells will likely be installed in the aquifers from which the City currently pumps water.

City staff inspect the municipal wells regularly. The MDH inspects all wells annually. This inspection includes sampling of all wells to ensure they comply with applicable regulatory standards. In addition, Lakeville uses a SCADA system to measure the volume of water pumped from a well, the instantaneous pumping rate for each well, and the water level (static or pumping) in each well. The SCADA system can produce reports summarizing the data from each of the municipal wells.

Based on the available static water level data from the City's water supply wells and available water level data from the City's observation wells, there does not appear to be any downward trend in water levels in the source water aquifers over the last several years.

In the next ten years it is possible that new business or industrial developments in or near the Lakeville DWSMAs may seek to construct privately-owned high capacity wells completed in one of the aquifers currently used by the City. Such wells could potentially affect the DWSMA boundaries, depending on their location and pumping rate. Chapter 5 under Title 7 of the Lakeville City Code requires that properties be connected to the municipal water supply system, if it is available, to provide water for human consumption to the property. The City of Lakeville plans to work with the cities of Apple Valley and Farmington, to the extent practicable, to manage the installation of any new high capacity water supply wells in the source water aquifers within the portions of the main Lakeville DWSMA that extend into each of these cities. At the time this plan was prepared, the City was not aware of any proposed developments with plans for privately-owned high capacity wells within or near the DWSMAs.

Available information from the Minnesota Department of Natural Resources' (MDNR) State Water Used Data System (SWUDS) database indicates that there are 47 high capacity wells within a zone that includes the DWSMAs and extends one mile beyond the boundaries of the DWSMAs. High capacity wells are defined as wells that pump more than 1,000,000 gallons per year or more than 10,000 gallons per day. High capacity wells outside of the DWSMA were identified because changes in operation of these wells could, potentially, affect the DWSMA boundary. Seventeen of the high capacity wells in or within one mile of the DWSMA are the Lakeville municipal wells. Of the remaining 30 wells, seven are used for some type of irrigation, six are used for some type of industrial processing, 15 of the wells are municipal water supply wells, and two of the wells are private waterworks. The high capacity wells in the DWSMAs and within one mile of the boundaries of the DWSMAs are shown on Figure 4 and summarized in Table 4. Additional information on these wells can be found in Appendix C.

Beyond the installation/operation of additional Lakeville municipal wells, no significant changes regarding groundwater use within the DWSMA are anticipated to occur within the next ten years.

4.2 Impact of Changes

4.2.1 Water Use

The 2030 maximum day water demand (the largest daily water use in a given year) predicted in the Lakeville Comprehensive Water Plan is approximately 22,650 gpm or 32.62 Mgpd. The City's maximum day water demand is currently approximately 22 Mgpd. The City's current average day water demand is approximately 6.5 Mgpd (based on Lakeville's 2007-2011 appropriations reports to the MDNR). The City's water distribution system is currently supplied with water from 17 wells, with a total permitted operating capacity of 19,300 gpm (16.8 Mgpd).

To meet increasing water demand as population increases, Lakeville plans to install additional wells, likely in the Prairie du Chien-Jordan and Tunnel City-Wonewoc aquifers (i.e., the aquifers from which the City's wells currently pump). As these additional wells go into service, the City will have to review and, likely, update their WHPAs and DWSMA to take into account the new wells.

The placement of an additional high capacity well in or near the DWSMAs or significant changes in current groundwater appropriations by existing wells could have an impact on the aquifer and local water supplies. Such changes could also affect the identified WHPAs and DWSMAs for the existing City of Lakeville wells or change the static water levels in the wells. The City will work with the MDH Source Water Protection Unit to identify proposed high capacity wells in the vicinity of the Lakeville DWSMAs and provide interaction with the proposed well owner to minimize potential problems.

To conserve valuable water resources and to mitigate, to the extent possible, drought impacts, the City has permanent controls on outdoor water usage. Section 7-5-12-2 in Chapter 5 of the Lakeville City Code limits use of water from the municipal water supply system for lawn and garden sprinkling and irrigation to an odd-even schedule corresponding to property address effective each year from May 1 to September 30 with sprinkling and irrigation prohibited between the hours of 11:00 a.m. and 5:00 p.m. daily. Homeowners associations and apartment complexes with common irrigation systems are allowed to water only every other day as defined in paragraph B of section 7-5-12-2 of the city code.

4.2.2 Influence of Existing Water and Land Government Programs and Regulations

As noted above, to conserve valuable water resources and address drought impacts, the City has permanent controls on outdoor water usage specified in the City Code. The City also provides water conservation information on their website and has a tiered billing structure for water use. These programs

are designed to assist residents and businesses with water conservation strategies through incentives and educational information.

Lakeville's storm water management program is described in the City's Water Resources Management Plan (Barr, 2008). Title 7, Chapter 7, Section 7-7-1 of the Lakeville City Code notes that the water resources management plan is adopted and incorporated completely in this chapter of the City Code. The water resources management plan incorporates the MDH guidance on siting of storm water infiltration basins within DWSMAs. The City believes that their existing plan is sufficient to address storm water within the city limits.

County and city ordinances, the MDNR Division of Waters' appropriations permitting program, the MPCA's storage tank permitting program and hazardous waste generator permitting program, the State of Minnesota Well Management and Drinking Water Supply Programs, the Dakota County Well Management Program, State and County individual sewage treatment system rules, and the U.S. EPA's rules regarding Class V wells will be relied upon for assistance in regulating the installation of new wells, the operation of wells, water appropriation permitting, the proper sealing of unused wells, proper maintenance and operation of storage tanks, and addressing Class V wells. In addition, Lakeville is aware of and supports the Dakota County well sealing cost sharing program which provides reimbursement to well owners for 50% of costs related to the proper sealing of unused wells up to a maximum of $2,000. Lakeville believes that the current level of regulations and oversight by various governmental entities are adequate to address these issues.

Land use control and land disturbing activities outside of the City of Lakeville will be governed by the local unit of government with jurisdiction in a particular area. This WHPP has been developed to protect the interests of the City of Lakeville and, to the extent practicable, to have no adverse effect on the plans and strategies developed for adjacent communities. Lakeville's main DWSMA extends into portions of the cities of Apple Valley and Farmington. This WHPP will be provided to these cities as a resource for future land development planning. Other city ordinances and plans related to land use will be relied upon for the management of the portion of the City's main DWSMA that extends into these other cities. The Wellhead Protection Manager will, to the extent feasible and practicable, communicate the goals and objectives of this WHPP to these cities.

The City of Lakeville will continue to rely on Federal, State, County, and local agencies and regulations and programs to handle issues outside of the City's boundaries regarding water conservation, water appropriations, and well drilling. City staff will look to the MDH and Dakota

County for continued regulation of the installation of wells and proper sealing and abandonment of old wells and to Dakota County to provide funds to private well owners to offset a portion of the cost of sealing unused private wells.

The programs identified above have proven to be effective. City staff will cooperate with these agencies, to the extent practicable, as issues arise in the future.

4.2.3 Administrative, Technical, and Financial Considerations

The City expects to have adequate resources available to manage their source water aquifers within their DWSMAs. Funds to support ongoing wellhead and source water protection efforts will come from the City's utilities budget. Wellhead and source water protection activities will be evaluated on an annual basis, and any changes in the focus of the tasks will also be evaluated to determine if additional funding will be necessary to accommodate the changes. When appropriate, the City may apply for grants from the MDH Source Water Protection Grant Program to fund implementation of management activities described later in this Plan.

For this WHPP to be effective, the City will need to keep the public aware of the issues affecting the public water supply through public educational programs. Therefore, the wellhead and source water protection actions described later in this Plan will include public education. Routine administrative duties will be directed or performed by the Wellhead Protection Manager. Specific tasks and strategies will be performed by the Wellhead Protection Manager or delegated by the Manager to City staff or outside resources.

Increasing water demand resulting from an increasing population will make it necessary for the City to expand its public water supply system in the future. City staff continues to evaluate the water distribution system as the community grows. In addition to constructing additional municipal wells, additional storage reservoirs, additional or expanded water treatment facilities, and an expanded water distribution system will likely be needed as well.

The installation and operation of any additional municipal wells in the source water aquifers by the City in the next ten years will likely affect the size and shape of Lakeville's WHPAs and DWSMAs. The City intends to amend and update its Wellhead Protection Plan, as required by the Wellhead Protection Rules, at least every 10 years or after new wells are constructed and put into service, on a schedule specified by the MDH.

Lakeville will work, to the extent practicable, with the cities of Apple Valley and Farmington to manage the portions of the main DWSMA that extend into these cities. In addition, the City intends to work in conjunction with Dakota County to protect the source water resources as much as possible when it is beneficial and logistically and economically feasible.

5.0 Issues, Problems, and Opportunities

In accordance with Minnesota Rules chapter 4720.5230, this section discusses issues, problems, and opportunities related to land use, comments from local units of government and the general public, the data elements and local, state, and federal programs and regulations.

5.1 Land Use Issues, Problems, and Opportunities

5.1.1 Source Water Aquifer

As shown on Figure 1, the aquifer vulnerability classification in the Lakeville DWSMAs ranges from Low to High. In the main DWSMA the aquifer vulnerability in the majority of the area (approximately 72%) is classified as Low. Approximately 17% of the area in the main DWSMA has an aquifer vulnerability classification of High and approximately 11% of the area in the main DWSMA has an aquifer vulnerability classification of Moderate. Aquifer vulnerability in the entirety of the small DWSMA around Well 3 is classified as High.

The City currently has 17 water supply wells (Table 1). However, Well 3 is out long term and Well 7 is used only as an emergency supply well.

As Lakeville installs additional municipal wells in the source water aquifers in the future the delineated WHPAs and DWSMAs will likely need to be updated. The addition of high capacity wells within or near the DWSMAs (either municipal wells or private wells) could produce changes in the groundwater flow system (e.g., flow direction, static water level, etc.) which could result in changes to the shape and extent of the WHPAs and DWSMAs delineated for this WHPP. The City will work with the Wellhead Protection Consultant and MDH to amend this WHPP as necessary when additional high capacity wells are installed within or near the DWSMAs.

As discussed elsewhere in this Plan, potential sources of contamination that could affect the source water aquifers were identified during the PCSI. These potential contaminant sources include wells, storage tanks, hazardous waste generators, dump and spill sites, chemical storage locations, and potential Class V well locations. As indicated in Table 3, the only potential contaminant source identified in an Inner Wellhead Management Zone around a Lakeville well is the chlorine storage at Well 3. This chemical storage is managed as part of the operation of the Lakeville municipal water supply system so no additional management actions related to the chemical storage are necessary. A few of the identified potential contaminant source locations fall in the Emergency Response Zones (ERZs) around the municipal wells. The entities in the various potential contaminant source

categories are regulated by County or State programs. The lack of City jurisdiction over the potential contaminant source entities poses a potential problem for protection of the source water aquifer. However, the jurisdictional issues also provide the City of Lakeville with an opportunity to develop working relationships with County and State agencies that regulate the potential contaminant source entities. Therefore, the City will work with the appropriate County and State programs, to the extent practicable, to address the potential contaminant sources within the DWSMAs.

Lakeville has plans in place that include policies for managing growth of the City, the allowable land uses, water supplies, and wells (NAC, 2008; SEH, 2008). Policies identified in these plans will protect the City's source water aquifer. Lakeville will work with the cities of Apple Valley and Farmington, to the extent practicable, to develop management policies that will protect the source water aquifer in the portions of the main DWSMA that extend into these cities.

5.1.2 Groundwater Quality

Lakeville has always placed a high priority on the safety of the municipal water supply system. In order to safeguard the municipal water supply system, Lakeville strictly limits access to their wells and associated infrastructure to Lakeville staff.

Groundwater pumped from the source water aquifers by the Lakeville wells is currently free of pathogens and disease-causing organisms. In addition, the water Lakeville supplies to its customers currently meets or exceeds the water quality requirements of the Federal Safe Drinking Water Act as documented in the City's Water Quality Reports. Copies of Lakeville's Water Quality Reports for 2011 and 2012 are presented in Appendix D. Reports from other years can be found on the City's website at http://www.ci.lakeville.mn.us/index.php?option=com_content&view=article&id=635&Itemid=1025. No contaminants have been reported in water samples from the Lakeville wells at concentrations that exceed applicable federal health-related standards.

As discussed in Appendix C, potential contaminant sources identified in the Lakeville DWSMAs include chemical storage sites, potential Class V well locations, dump sites, hazardous waste generators, individual sewage treatment systems (ISTS), spill locations, storage tanks, and wells. Table 3 provides a summary of the numbers of these potential contaminant sources identified in the DWSMAs during development of this Plan. Development of this Plan provides Lakeville with an opportunity to prepare and implement a program to track potential contaminant source locations within the DWSMAs and educate the public regarding source water protection.

5.1.3 DWSMAs

Current land uses within the DWSMAs include residential uses, parks/recreational/preserve uses, institutional uses, industrial and utility uses, commercial uses, undeveloped land, and agricultural uses. Lakeville Wells 3, 4, 8 and 15 have been classified as vulnerable to contamination while the other Lakeville municipal wells have been classified as not vulnerable to contamination (Table 1). The vulnerability to contamination of the portion of the source water aquifers encompassed by the DWSMAs has been classified as ranging from Low to High. Current and future land uses could potentially affect the management strategies for Lakeville's DWSMAs. No issues, problems, or opportunities, other than the potential contaminant sources previously discussed, have been identified regarding land uses in the DWSMAs.

Information gathered for this WHPP provides the City with the basis for tracking potential contaminant sources within the DWSMAs. Thus, the City has an opportunity to catalog and track potential contaminant sources and stay informed of land use changes or potential future threats to the source water aquifers.

As discussed elsewhere in this Plan, portions of the main DWSMA extend into the cities of Apple Valley and Farmington. Lakeville will work with these cities to the extent practicable to establish requirements regarding management of the portions of the main DWSMA within each jurisdiction.

The presence of privately owned wells within the DWSMAs provides potential pathways for contaminants to reach the source water aquifers if they are not properly constructed, maintained, or, if unused, sealed. Locations of wells (both active and sealed) identified within the DWSMAs during the PCSI are shown in Appendix C.

5.2 Issues, Problems, and Opportunities Disclosed at Public Meetings and in Written Comments

At the beginning of this wellhead protection planning process, the City of Lakeville sent a notification to surrounding local units of government of its intention to initiate work on an amendment to its wellhead and source water protection plan. After approval by the MDH in April 2012 (MDH, 2012), Lakeville sent information on the WHPAs, DWSMAs, and aquifer and well vulnerability to the local units of government whose jurisdictions overlay some portion of the Lakeville DWSMAs.

The City of Lakeville held a public information meeting on May 21, 2012 to receive comments from the general public regarding Part 1 of the WHPP. The local units of government whose jurisdictions

overlay the DWSMAs were notified of the public information meeting. No comments on the Part 1 Wellhead Protection Plan were received from the local units of government or the general public at the Public Information Meeting.

As required by the Wellhead Protection Rules, the City provided local units of government whose jurisdictions overlap the DWSMAs a copy of the draft Part 2 Wellhead Protection Plan. The Metropolitan Council provided the City with a written acknowledgement of their review of the Draft Part 2 WHPP (Appendix E). This written acknowledgement contained no comments on the Plan that needed to be addressed. The City received no other communications regarding the draft Part 2 Plan from local units of government whose jurisdictions overlap the DWSMAs.

The City of Lakeville held a Public Hearing on the WHPP on April 7, 2014. The local units of government whose jurisdictions overlap the DWSMA were notified of the Public Hearing. No comments on the WHPP were received from the local units of government or the general public at the Public Hearing.

Since the DWSMAs associated with the Lakeville municipal wells extends into other governmental jurisdictions, the City will be working, to the extent practicable, with representatives of the appropriate governmental units to develop procedures that are consistent with this Plan for managing portions of the DWSMAs that extends beyond the city limits.

5.3 Issues, Problems, and Opportunities Related to the Data Elements

Beginning with the WHPAs and DWSMAs delineations (i.e., Part 1 of the WHPP) and continuing in this document, the required data elements have been addressed. As discussed in Appendix C, available local and regional information was used in compiling and assessing the data elements. Lakeville intends to continue collecting data from the municipal wells as well as other applicable information from public data sources, as it becomes available, during the life of this Plan. At a minimum, this Plan will be revised/updated in ten years, as required by the Wellhead Protection Rules. Each time this Plan is revised/updated the most recent and accurate data available will be used.

5.4 Issues, Problems, and Opportunities Related to Local, State, and Federal Programs and Regulations

State and local units of government currently enforce land use ordinances, zoning laws, sewer ordinances, well permitting regulations, and groundwater appropriation permit regulations. The City

will work with the Cities of Apple Valley and Farmington, to the extent practicable, to ensure proper management of the portions of the main DWSMA that extends into these cities. Lakeville will work to promote the use of best management practices for potential contaminant source properties within the DWSMAs. It is anticipated that local issues will be adequately addressed through these existing processes and adoption of best management practices.

Neighboring cities whose jurisdictions overlap Lakeville's main DWSMA use the same source water aquifers as Lakeville for their municipal water supplies. Implementation of this Plan will provide Lakeville with the opportunity to work with the neighboring cities whose jurisdictions overlap the main DWSMA to cooperatively manage their shared source water resource.

6.0 Wellhead Protection Goals

In accordance with Minnesota Rules chapter 4720.5240, this section discusses the goals for present and future water use and land use to provide a framework for WHPP objectives and related actions.

Goals presented in this section were selected based on the information gathered and compiled from the data elements, delineations of the WHPAs and DWSMAs, results of the vulnerability assessments, results of the PCSI, expected changes in land and water uses, identified issues, problems, and opportunities, and evaluation of this information.

Through the years, the City has met water demands with a sufficient and safe water supply. Lakeville intends to continue providing a safe water supply to its residents and businesses and other customers into the future by implementing this WHPP. Implementation of this WHPP will help ensure that the City will meet this goal.

As shown in Table 1, Wells 3, 4, 8, and 15 are the Lakeville municipal well that are classified as being vulnerable to contamination. As shown on Figure 1, aquifer vulnerability in most of the main Lakeville DWSMA is classified as Low with aquifer vulnerability classified as Moderate or High in smaller portions of the DWSMA. The aquifer vulnerability in the entire Well 3 DWSMA is classified as High. The main Lakeville DWSMA extends beyond the Lakeville city limits into portions of the cities of Apple Valley and Farmington. The goals and objectives of this WHPP will focus on reducing the potential contaminant pathways to the source water aquifers that may be provided by private wells, educating property owners and water supply users, and working with the neighboring jurisdictions, to the extent practicable, to ensure proper management of the portions of the main DWSMA in each jurisdiction.

Lakeville has identified the following goals for implementation of this WHPP:

- The City will work to maintain or improve the current level of water quality so that the municipal water supply will continue to meet or exceed all applicable state and federal water quality standards.
- The City will provide information and promote activities that protect the source water aquifers that provide water to the municipal system. This will include increasing public awareness of the Wellhead and Source Water Protection Program and groundwater-related issues, and management of the identified potential contaminant sources within the DWSMAs.

- The City will continue to collect data to support future wellhead and source water protection efforts.

7.0 Objectives and Plans of Action

In accordance with Minnesota Rules chapter 4720.5250, this section discusses the objectives and plans of action to goals for Lakeville's Wellhead and Source Water Protection Program.

7.1 Establishing Priorities

Within the DWSMAs, the vulnerability to contamination of the source water aquifers from which the City of Lakeville wells draw their water ranges from Low to High (Barr, 2012). The June 20, 2012 Second Scoping Decision Notice from the MDH required Lakeville to evaluate the following types of potential contaminant sources in the PCSI: chemical storage sites, potential Class V well locations (per the U.S. EPA, Class V wells include cesspools, large-scale septic systems serving more than 20 people, or potential automotive maintenance waste disposal wells/pits), dump and spill sites, hazardous waste generators, individual sewage treatment systems (ISTS; a.k.a., septic systems), storage tank sites (registered storage tanks and leaking underground storage tank sites), and wells The number of each type of potential contaminant source in the DWSMAs is shown in Table 3.

The City of Lakeville has identified the objectives and corresponding actions described in the following sections for accomplishing the wellhead and source water protection goals discussed above in Section 6. These goals for the City of Lakeville's Wellhead and Source Water Protection Program will be achieved through the following existing and planned programs:

- Privately-owned wells
  - Promoting proper management of existing active wells in the DWSMAs.
  - Encouraging the proper sealing of all unused wells within the DWSMAs.
- Potential contaminant source properties
  - Encouraging proper handling of chemicals/wastes
  - Providing information to owners of properties that may contain Class V wells,
  - Encouraging proper operation and maintenance of storage tanks,
  - Providing information to owners of properties where ISTS are located
  - Periodically obtaining updated information on potential contaminant sources in the DWSMAs from the regulating agencies to maintain an up-to-date potential contaminant source database for the DWSMAs and allow timely recognition of potential issues that could affect the Lakeville municipal water supply or DWSMA.

- Public education
  - Distribution of the Lakeville Consumer Confidence Report for the water supply system.
  - Posting Wellhead Protection Program information on the City of Lakeville website (http://www.ci.lakeville.mn.us/)
  - Inclusion of wellhead and source water protection into the City's planning process.
  - Working with the cities of Apple Valley and Farmington, to the extent practicable, to identify appropriate public education opportunities for any residents within the portions of the main Lakeville DWSMA that extend into these jurisdictions.
- Continued data collection
  - Recording static and pumping water levels in the Lakeville municipal wells.
  - Collection of additional local geologic and hydrogeologic data as it becomes available from public sources.

7.2 Well Management

The well management objectives outlined in this section consist of promoting the proper sealing of any unused, unmaintained, damaged, or abandoned wells and promoting proper management of active wells within the DWSMAs. To achieve these objectives, the City will work with the neighboring jurisdictions into which the main DWSMA extends.

7.2.1 Distribution of Well Operation and Maintenance Information

The MDH has developed a handbook of information on proper well construction, operation, and maintenance titled "The Well Owner's Handbook". This handbook is available on the MDH website. Lakeville will provide the handbook information to all owners of active wells within the DWSMAs. To accomplish this, a link to the MDH website page where the handbook can be found will be added to the City's website and the City will notify well owners within the DWSMAs via mail that the information is available through the City's website. After this initial handbook information distribution, the cities of Apple Valley and Farmington will be asked to provide the handbook information to any new well owners that take up residence in the portion of the main DWSMA within their jurisdictions. Lakeville staff will track the number of well owners to whom they provide information regarding the Well Owner's Handbook.

7.2.1.1 Source of Action

Lakeville staff will obtain the website information for the handbook from the MDH. City staff will then mail the website information to appropriate addresses within the DWSMAs, include a link to the

MDH website on the City's website, have a copy of the handbook available in a publicly accessible location in the Lakeville City offices, and request that other cities within the main DWSMA provide a link to the MDH website page where the handbook can be found on their websites.

7.2.1.2 Cooperators

City staff and Apple Valley and Farmington staff.

7.2.1.3 Time Frame

Distribution of the information to owners of will be done within 1 year after approval of this WHPP.

7.2.1.4 Estimated Cost

Approximately $1,000 to $2,000. Costs will include City staff time, postcard printing and postage costs, and handbook printing costs.

7.2.1.5 Goals Achieved

Through the MDH handbook, well owners will be educated concerning the proper operation and maintenance of wells. Proper operation and maintenance of wells will reduce the potential risk of these wells becoming pathways for contaminants to travel from the ground surface to the source water aquifer.

Success criterion: Notification of well owners in the DWSMAs by mail that information on the proper operation and maintenance of private wells is available through the City's website will be completed within one year of MDH approval of the WHPP and tracking of the number of well owners to whom the notification is sent.

7.2.2 Promote the Proper Sealing of Unused, Unmaintained, Damaged, or Abandoned Wells Within the City

City staff will promote the proper sealing of unused privately owned wells within the DWSMAs. As indicated in Table 3, the highest priority will be placed on those wells that are completed in one of the source water aquifers from which the Lakeville municipal wells pump.

Proper sealing of unused wells can be promoted by periodically mailing a reminder to owners of wells that unused wells should be properly sealed and/or by posting a reminder on the City's website. The reminder will include a notification of the Dakota County cost share program for the sealing of unused wells. Proper sealing of unused wells at properties on which new developments are built or as properties are redeveloped can be promoted as part of the City's development approval process. City staff will work with staff from the other cities into which the main DWSMA extends, to the extent

practicable, to promote the proper sealing of unused privately owned wells in the portions of the DWSMA within their jurisdictions.

7.2.2.1 Source of Action

City of Lakeville staff and staff from Apple Valley and Farmington.

7.2.2.2 Cooperators

City of Lakeville staff and staff from Apple Valley and Farmington.

7.2.2.3 Time Frame

The Wellhead Protection Manager, or designated representative, will meet with representatives of the other cities within the main DWSMA to request their assistance in promoting proper sealing of unused wells and to invite their participation in a Wellhead Protection Coordination Committee within 1 year of approval of this WHPP.

The first reminders to owners of wells identified as high priority will occur within 1 year of approval of this Plan. Subsequent reminders will include owners of wells identified as high and moderate priority and will be mailed approximately every three years beginning in year four of Plan implementation.

7.2.2.4 Estimated Cost

Approximately $1,000-$2,000 for each well sealing reminder mailing event. City staff time and costs for preparing and mailing reminders to well owners.

7.2.2.5 Goals Achieved

As this action is implemented, the City's goal of eliminating potential pathways for contaminants to travel from the ground surface to the source water aquifer will be realized.

Success criterion: The first reminder distributed to well owners in the DWSMA within one year of MDH approval of the WHPP and subsequent reminders distributed every three years thereafter for the life of the Plan and tracking of the number of reminders distributed.

7.2.3 Identify New High-Capacity Wells Within or Near the DWSMA

City staff will identify new high-capacity wells that are proposed for construction in or near Lakeville's DWSMAs, and/or major changes to groundwater appropriations for existing high-capacity wells, to determine whether the pumping of said wells will affect the groundwater flow

direction, static water level, or groundwater availability within the DWSMAs or alter the current boundaries of the DWSMA delineations or other portions of the City's WHPP.

7.2.3.1 Source of Action

City staff will request that the MDH and Regional MDNR office provide information on any newly proposed/constructed high capacity wells within or near the DWSMAs or any changes to existing appropriations permits for existing, nearby high capacity wells. City staff will also request assistance from the Wellhead Protection Consultant and the MDH to evaluate whether proposed pumping (or changes to pumping) will change the boundaries of the DWSMAs delineated for Lakeville's wells.

The City will also ask the other cities within the main DWSMA to notify them when new high capacity wells are proposed in their jurisdiction.

7.2.3.2 Cooperators

City staff, MDH, MDNR, other cities in the main DWSMA, and the Wellhead Protection Consultant.

7.2.3.3 Time Frame

Request information from the MDH and MDNR at least annually; evaluation of potential changes to the DWSMA boundary as needed.

7.2.3.4 Estimated Cost

Approximately $3,000-$10,000 for each event of identifying new wells or changes to existing appropriations permits and evaluating how the changes may affect the DWSMA boundary. City staff time and, potentially, Wellhead Protection Consultant time.

7.2.3.5 Goals Achieved

As this action is implemented, the City's WHPA/DWSMA delineations will remain current. New well owners will also be identified and educational materials identified/developed as part of other well management strategies can be provided to these new well owners.

Success criterion: Annual determination of whether there are new high capacity wells in or near the DWSMAs and if there have been any major changes in permitted appropriations for existing high capacity wells in or near the DWSMA.

7.3 Potential Contaminant Source Properties

The management objectives outlined in this section consist of promoting proper operation of storage tanks, maintaining an up-to-date database of storage tank properties in the portions of the DWSMAs where aquifer vulnerability is classified as High or Moderate, providing owners of properties where Class V wells may be, or may have been, with information on Class V wells and associated regulations, promoting proper handling of chemicals and wastes, reduction of waste streams at potential contaminant source properties within DWSMAs, promoting proper operation and maintenance of ISTS in the portions of the DWSMAs where aquifer vulnerability is classified as High, maintaining the Inner Wellhead Management Zone (IWMZ) around each well so that potential contaminants are prevented from entering the IWMZs, and working with the cities of Apple Valley and Farmington, to the extent practicable, to promote similar activities at potential contaminant source properties within the portions of the main Lakeville DWSMA in these cities.

7.3.1 Information for Registered Storage Tank Owners

With the assistance of the MPCA, the City will prepare an information packet for owners of properties within the High and Moderate vulnerability zones of the DWSMAs that have registered storage tanks. Information packets will not be sent to owners of properties for which available information indicates that the storage tanks have been removed. This information packet will include information on the City's Wellhead and Source Water Protection Program (the Program) and MPCA publications on proper operation and maintenance of storage tanks. Since there are properties where storage tanks are located in the portion of the main DWSMA that extends into Apple Valley, City staff will contact Apple Valley staff for assistance in distributing the information packets to owners of storage tank properties in the High vulnerability zone of the main DWSMA in their jurisdiction. Copies of the information packet materials will be retained by the City.

7.3.1.1 Source of Action

City staff, possibly with the assistance of the Wellhead Protection Consultant, will obtain from the MPCA publications on proper storage tank operation and maintenance for the information packet. City staff, possibly with the assistance of the Wellhead Protection Consultant, will prepare general information regarding the Wellhead Protection Program and contact staff from the City of Apple Valley for assistance in distributing the information packets to owners of storage tank properties in the High vulnerability zones of the main DWSMA in their jurisdiction.

7.3.1.2 Cooperators

City staff, staff from the City of Apple Valley, the MPCA and, possibly, the Wellhead Protection Consultant.

7.3.1.3 Time Frame

The information packet will be sent to owners of active tanks on properties where aquifer vulnerability is classified as High or Moderate within two years of approval of this Plan. City staff will request that the City of Apple Valley provide assistance with the distribution of information packets to tank property owners in the portion of the DWSMA in their jurisdiction. The City will also request that the City of Apple Valley provide the information packet to new registered storage tank owners within the targeted portion of the main DWSMA when identified. Targeted registered storage tank owners will receive an updated information packet five years after the initial packet is provided to them.

7.3.1.4 Estimated Cost

Approximately $1,000-$2,000 each time information packets are distributed to owners of registered tanks. Estimated costs include City staff time, MPCA staff time, information packet production and postage costs and, potentially, Wellhead Protection Consultant costs.

7.3.1.5 Goals Achieved

Targeted property owners will be educated concerning the Wellhead and Source Water Protection program and on the issues associated with storage tanks and the requirements necessary to maintain a safe and secure system. Property owners will be encouraged to use best management practices regarding their storage tanks, and report any releases of contaminants to the city in which their property is located (in addition to any other actions required by applicable regulations). The property owners will also be educated about groundwater protection principles, and steps that everyone can take to protect the City's municipal water supply. This information packet provides the City the opportunity to heighten the awareness of wellhead and source water protection with these property owners.

Success criterion: Distribution of information packets completed according to the schedule outlined in section 7.3.1.3 and tracking of the number of information packets distributed.

7.3.2 Tracking of Registered Storage Tanks

The City will annually request from the MPCA information on the status of registered storage tanks in those portions of the Lakeville DWSMAs in which the aquifer vulnerability is classified as High

or Moderate. This information will allow the City of Lakeville to update the PCSI database and maintain current information regarding these potential contaminant sources in the DWSMAs.

7.3.2.1 Source of Action

City staff, or the Wellhead Protection Consultant on behalf of the City, will contact MPCA staff to obtain the information on the status of registered storage tanks.

7.3.2.2 Cooperators

City staff, possibly the Wellhead Protection Consultant, and the MPCA.

7.3.2.3 Time Frame

This information will be requested from the MPCA annually starting one year after approval of this Plan.

7.3.2.4 Estimated Cost

Approximately $500-$1,000 annually. Estimated costs include City staff time and, possibly, Wellhead Protection Consultant time.

7.3.2.5 Goals Achieved

By tracking the status of registered storage tanks within the target areas, the City of Lakeville will remain aware of the current status of these potential contaminant sources. This will allow the City to identify potential impacts to the municipal water supply and give the City time to determine the best response to any potential impacts before the municipal water supply is compromised.

Success criterion: Submittal of an annual request to the MPCA for information regarding the status of registered storage tanks in those portions of the DWSMA where aquifer vulnerability is classified as Moderate and completion of any updates to the PCSI database necessitated by the new information.

7.3.3 Potential Class V Wells

During the PCSI, 17 properties where Class V wells may be located were identified within the DWSMAs. Lakeville will work with the MDH, the U.S. EPA, and the other local units of government into which the main DWSMA extends to provide information packets regarding what a Class V well is and the federal requirements associated with Class V wells to owners of these properties. Lakeville staff will track the number of information packets they distribute.

7.3.3.1 Source of Action

Lakeville staff will compile the information on what constitutes a Class V well and what federal requirements are associated with Class V wells with the assistance of MDH staff, U.S. EPA, and, possibly, the Wellhead Protection Consultant. Lakeville staff will mail the information to targeted property owners in the DWSMAs and, if necessary, work with staff from the other local units of government into whose jurisdictions the main DWSMA extends to distribute the information.

7.3.3.2 Cooperators

Lakeville staff, potentially staff from the other cities in the main DWSMA, MDH, U.S. EPA, and, potentially, the Wellhead Protection Consultant.

7.3.3.3 Time Frame

Distribution of the information on Class V wells will occur within two years of approval of this Plan.

7.3.3.4 Estimated Cost

Costs for the preparation and distribution of the information packet will include Lakeville staff time, printing and postage costs and, potentially, Wellhead Protection Consultant costs and are estimated to be approximately $1,000 to $1,500.

7.3.3.5 Goals Achieved

Property owners will become aware of their responsibilities related to Class V wells. Compliance with the applicable regulations regarding Class V wells by the property owners will reduce the potential for groundwater contamination and impact to the source water aquifer.

Success criterion: Distribution of information packets completed according to the schedule outlined in section 7.3.3.3 and tracking of the number of information packets distributed.

7.3.4 Individual Sewage Treatment Systems

Title 7, Chapter 5, Section 16 of the City Code incorporates (with minor modifications) the requirements of Dakota County ordinance 113 for the regulation of individual sewage treatment systems. There are a limited number of operating ISTS within the City limits and the City has no jurisdiction in other cities or townships within the main DWSMA.

City staff will bi-annually request updates from Dakota County on the status of ISTS within the DWSMAs. However, City staff will rely on County ordinance 113 and State rules for regulation of ISTS within the DWSMAs.

The City will provide links on their website to ISTS information on the Dakota County website.

The City will send a postcard or letter notifying owners of ISTS of the website link to the Dakota County website. The notification will include a request for the property owners to assist Lakeville in their efforts to protect their water supply by properly maintaining their septic system.

7.3.4.1 Source of Action

City staff, perhaps with the assistance of the Wellhead Protection Consultant, will prepare the mailing and send it to the appropriate addresses within the DWSMAs. City staff will bi-annually request updates on the status of individual sewage treatment systems within the DWSMAs from Dakota County.

7.3.4.2 Cooperators

City Staff, Dakota County, and, possibly, the Wellhead Protection Consultant

7.3.4.3 Time Frame

The informational mailing will be sent out within 180 days of approval of this Plan. Updates on the status of ISTS within the DWSMAs will be requested from Dakota bi-annually. If one of these updates from Dakota County identifies a new owner of a property within the DWSMAs containing an ISTS the City will send a copy of the informational mailing to the new property owner.

7.3.4.4 Estimated Cost

City staff time, mailing preparation and postage costs, possibly Wellhead Protection Consultant costs. The cost of preparing and sending the initial mailing is estimated to be approximately $800 to $1,400. The estimated cost of bi-annual review of ISTS information received from Dakota County is approximately $200 to $600.

7.3.4.5 Goals Achieved

The primary goals are to make the ISTS owners aware of the issues related to system operation and maintenance and how these issues relate to wellhead protection, provide information on ISTS maintenance to the system owners, and to track the operational status of septic systems within the DWSMAs.

Success criterion: Distribution of information completed according to the schedule outlined in section 7.3.4.3 and tracking of the number of information packets distributed.

7.3.5 Information for Chemical Storage and Hazardous Waste Generator Properties

Through direct mail contact, the City will encourage the owners of the potential contaminant source properties associated with chemical storage or hazardous waste generator permits (that are not associated with LUSTs or existing storage tanks) within the high vulnerability zones within the DWSMAs to participate in self-audits of their chemical storage and waste generation and handling. The direct mail contact from the City will also encourage these businesses to request a site visit from the Minnesota Technical Assistance Program (MnTAP). MnTAP helps Minnesota businesses implement industry tailored solutions that maximize resource efficiency, prevent pollution and reduce costs to improve public health and the environment.

As noted on their website (www.mntap.umn.edu), MnTAP helps Minnesota businesses protect the environment and stay competitive by providing practical alternatives to prevent pollution of land, air and water. By reducing waste and increasing efficiency, businesses can save on disposal and raw material costs, decrease the regulatory compliance burden, and make working conditions healthier and safer for their employees.

7.3.5.1 Source of Action

City staff will prepare and distribute the direct mail notice.

7.3.5.2 Cooperators

None.

7.3.5.3 Time Frame

Distribution of the direct mail notice will occur within 180 days of approval of this Plan. Annually thereafter the direct mail notice will be sent to owners of any newly identified properties within the High vulnerability portions of the DWSMAs that are associated with chemical storage or hazardous waste generator permits.

7.3.5.4 Estimated Cost

Costs for the preparation of the direct mail notice will include City staff time, printing, and postage costs and are estimated to be $800 to $1,200.

7.3.5.5 Goals Achieved

Business owners will become aware of issues related to their chemical storage or waste generation and handling and learn of available assistance for identifying ways to minimize and properly dispose their hazardous waste.

Success criterion: Contact of property owners according to the schedule outlined in section 7.3.5.3.

7.3.6 Inner Wellhead Management Zone Management

The Inner Wellhead Management Zone (IWMZ) is defined in the Minnesota Rules as that area within a 200-foot radius of a public water supply well. The City will monitor setbacks in the IWMZs, possibly with the assistance of the MDH, to ensure that the IWMZ around each Lakeville municipal well remains free of potential contaminant sources. City staff will document each IWMZ inspection and any actions taken to remove potential contaminant sources from an IWMZ.

7.3.6.1 Source of Action

Lakeville staff.

7.3.6.2 Cooperators

City staff and, possibly, the MDH

7.3.6.3 Time Frame

The monitoring of setbacks within the IWMZs will be done at least annually after approval of this Plan.

7.3.6.4 Estimated Cost

Costs for monitoring the IWMZ setbacks include Lakeville staff time estimated as $800.

7.3.6.5 Goals Achieved

By monitoring the IWMZ setbacks, Lakeville will be able to keep the IWMZ around each well free of potential contaminant sources and ensure that any new regulated activities will meet required setbacks.

Success criterion: Completion of IWMZ potential contaminant source inventories keeping the IWMZ free of potential contaminant sources.

7.3.7 Old Dump Sites

Two old dump sites were identified during the PCSI. While these locations currently have buildings on them and no evidence of dump materials they are located upgradient of Lakeville Well 3. These locations are also located outside the 1-year groundwater time of travel zone around Well 3. In order to determine if there are any impacts to the groundwater pumped by Well 3 from these sites, the City will collect a groundwater sample from Well 3 and analyze the sample for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs)

and the eight RCRA metals. Results of the sampling will be used to determine if any additional actions should be considered.

7.3.7.1 Source of Action

Lakeville staff, potentially with the assistance of the Wellhead Protection Consultant.

7.3.7.2 Cooperators

City staff and, possibly, the Wellhead Protection Consultant

7.3.7.3 Time Frame

Collection of the groundwater sample will be completed within 18 months after the approval of this plan.

7.3.7.4 Estimated Cost

Costs for sample collection and analysis and evaluation of the results is estimated as $1,200 to $1,500.

7.3.7.5 Goals Achieved

Obtaining analytical results for the groundwater sample from Well 3 will provide Lakeville with information to determine if the identified dump sites may be impacting the groundwater pumped by Well 3. The information will allow the City to evaluate if any additional actions should be considered to address the dump sites.

Success criterion: Collection and analysis of the groundwater sample from Well 3 and evaluation of the analytical results.

7.3.8 Transportation Corridors, Pipelines, and Emergency Response

Establish communication and create awareness among Lakeville city staff about transportation corridor and pipeline issues that may affect the public water supply and the procedures in place to address spills and prevent released contaminants from entering the municipal water supply. The Wellhead Protection Manager will work with City staff to ensure that procedures that will protect the municipal water supply are part of the City's emergency response program.

7.3.8.1 Source of Action

Lakeville staff.

7.3.8.2 Cooperators

None

7.3.8.3 Time Frame

Within 18 months of approval of this plan.

7.3.8.4 Estimated Cost

Costs for this action will include City staff time and is estimated to be $1,200.

7.3.7.5 Goals Achieved

Local emergency responders will work with and assist County and State first responders in the handling of spills in transportation corridors or from pipelines to ensure, to the extent possible, released contaminants from entering the environment and impacting the municipal water supply.

Success criterion: Emergency responder awareness of the City's DWSMAs.

7.4 General Public Education

Public education concerning the DWSMAs associated with Lakeville's municipal wells will include: inclusion of Wellhead and Source Water Protection Program information in the City's *Messages* newsletter, distribution of the Lakeville Drinking Water Annual Reports to residents of Lakeville, providing information on the City of Lakeville website at http://www.ci.lakeville.mn.us/, and inclusion of wellhead and source water protection into the City's planning process.

7.4.1 Wellhead Protection Information

The City will develop information regarding the Wellhead and Source Water Protection Program for inclusion in the City's *Messages* newsletter. The newsletter is available to all City residents.

7.4.1.1 Source of Action

City staff will prepare information on wellhead protection for the City's newsletter. If necessary, the Wellhead Protection Consultant will be contacted for assistance in preparing this information for the newsletter. The newsletter is available on the City's website.

7.4.1.2 Cooperators

City staff and, if necessary, the Wellhead Protection Consultant.

7.4.1.3 Time Frame

At least annually upon approval of this WHPP.

7.4.1.4 Estimated Cost

Approximately $500 - $1,000. Costs will include City staff time for preparing the information and costs for Wellhead Protection Consultant assistance (as needed).

7.4.1.5 Goals Achieved

The information in the newsletter will educate owners of property within the DWSMAs, and the general public, about the City's Wellhead and Source Water Protection Program, groundwater protection principles, and steps that everyone can take to protect the City's municipal water supply.

Success criterion: Annual distribution of information related to groundwater and wellhead protection via the City's newsletter.

7.4.2 Drinking Water Quality Report

The City will continue to annually prepare and distribute the Drinking Water Quality Report to all Lakeville residents. The report provides residents with information regarding the City's municipal water supply and its water quality.

7.4.2.1 Source of Action

City staff.

7.4.2.2 Cooperators

None.

7.4.2.3 Time Frame

Annually as required by Federal regulations.

7.4.2.4 Estimated Cost

Costs include preparation of the report and preparing a notification for inclusion with utility bills that the report is available on the City's website. Estimated annual cost for preparation and distribution of the report is $1,500.

7.4.2.5 Goals Achieved

The residents of Lakeville will become more aware of the federal water quality requirements for public water supplies. Residents will also become more aware of the overall water quality of Lakeville's municipal water supply.

Success criterion: Annual publication/distribution of the Water Quality Report and tracking of the number of reports distributed

7.4.3 City of Lakeville Website

The City will post information on the Wellhead and Source Water Protection Program on the City's website at http://www.ci.lakeville.mn.us/. If necessary, the Wellhead Protection Consultant will be asked to assist with the preparation of information to be posted on the website.

7.4.3.1 Source of Action

City staff.

7.4.3.2 Cooperators

City staff and Wellhead Protection Consultant (as needed).

7.4.3.3 Time Frame

To begin within 120 days of approval of this WHPP. Information on the website will be updated annually thereafter.

7.4.3.4 Estimated Cost

Approximately $500-$2,500. City staff time and, potentially, Wellhead Protection Consultant costs.

7.4.3.5 Goals Achieved

The residents of Lakeville will become more aware of wellhead and source water protection issues and the actions Lakeville is taking to protect the municipal water supply. Education of the residents should lead to a better awareness of pollution prevention among the City's population.

Success criterion: Posting of Wellhead and Source Water Protection Program information on the City's website according to the schedule identified in section 7.4.2.3.

7.4.4 Inclusion of Wellhead and Source Water Protection in the Planning Process Within the DWSMA

Copies of this WHPP will be supplied to the City Planner and Planning Department so that they are aware of the Wellhead Protection Program. The Wellhead Protection Manager will work with the City Planner and Planning Department to determine the best way to ensure that the City's planning process is consistent with the goals and objectives of this WHPP. Options that may be discussed could include developing checklists related to wellhead protection for use in the planning review

process, development of guidelines (based on MDH guidance) regarding when to allow storm water control facilities in the DWSMAs, adjustments to zoning, and amendments to the City Code.

7.4.4.1 Source of Action

City staff.

7.4.4.2 Cooperators

None.

7.4.4.3 Time Frame

The Wellhead Protection Manager and those responsible for City planning will determine, within one year of approval of this WHPP, how best to incorporate wellhead and source water protection into the normal zoning and planning review process.

7.4.4.4 Estimated Cost

Approximately $3,000-$4,000. Costs to complete this task will include staff time to develop a process for including wellhead protection in the planning process and to review proposals that could affect the municipal wells and associated DWSMAs.

Success criterion: Implementation of a method for incorporating wellhead and source water protection into the normal zoning and planning review process.

7.4.4.5 Goals Achieved

Wellhead and source water protection will be incorporated into future planning efforts. Potential pollution risks to the source water aquifers will be reduced.

7.5 Data Collection

Lakeville will continue to collect and maintain local geologic and hydrogeologic data as it becomes available in order to improve and augment current information and to provide additional data for future revisions of this WHPP. Lakeville will also continue to collect information on potential contaminant sources within the DWSMAs.

7.5.1 Monitoring Static and Pumping Levels in Municipal Wells

The City will continue to routinely measure the static and pumping water levels in the municipal wells. These water levels will be recorded daily by the SCADA system and summarized in the reports obtained from the SCADA system. In addition, manual water level measurements will be collected on a weekly basis.

7.5.1.1 Source of Action

City staff.

7.5.1.2 Cooperators

None.

7.5.1.3 Time Frame

Ongoing.

7.5.1.4 Estimated Cost

Approximately $2,000-$4,000 annually

7.5.1.5 Goals Achieved

Routine collection of groundwater levels in the municipal wells will provide data for the evaluation of groundwater elevation trends over time. These data can also be used to verify the groundwater flow field in the source water aquifer.

Success criterion: Compilation of a long term groundwater elevation dataset that can be used to evaluate groundwater elevation trends.

7.5.2 Other Geologic and Hydrogeologic Data Collection

The City will collect local geologic and hydrogeologic data for the Lakeville area as it becomes available from other public sources. The City will also support, whenever possible, future data collection efforts by other governmental entities (e.g., MGS, MDH, MDA, MDNR, MPCA, watershed management organizations, and Dakota County).

7.5.2.1 Source of Action

City staff.

7.5.2.2 Cooperators

State and Dakota County agencies conducting geologic and hydrogeologic studies, well drilling companies, Wellhead Protection Consultant, and others.

7.5.2.3 Time Frame

Ongoing beginning with approval of this WHPP.

7.5.2.4 Estimated Cost

Approximately $1,000 for compiling data from other public sources.

7.5.2.5 Goals Achieved

More accurate hydrogeologic data will be available for use in siting future wells and for future revisions of the delineated WHPAs and the DWSMAs for existing and proposed municipal wells. Updated and more accurate vulnerability assessments may be possible as a result of new information.

Success criterion: Compilation of a geologic/hydrogeologic dataset that can be used in the future.

7.5.3 Updating of the Groundwater Model Used in the WHPA Delineation

Any new local geologic and hydrogeologic data for the Lakeville area will be reviewed to determine if the groundwater model used in the WHPA delineations will need to be updated. In addition, pumping from high capacity wells often changes over time. Changes in pumping from high capacity wells in or near the Lakeville DWSMAs could affect the DWSMA boundaries. Therefore, the City will work with the Wellhead Protection Consultant to review available information and update the groundwater flow model so that future WHPA/DWSMA delineations will be consistent with available information.

7.5.3.1 Source of Action

City staff

7.5.3.2 Cooperators

City staff and the Wellhead Protection Consultant

7.5.3.3 Time Frame

Five to seven years after approval of this Plan

7.5.3.4 Estimated Cost

Approximately $1,000 to $5,000 depending upon the magnitude of the revisions needed to make the groundwater flow model consistent with available information.

7.5.3.5 Goals Achieved

The groundwater flow model used in the WHPA delineations will be consistent with available information. Since the groundwater flow model used to delineate the WHPAs will be consistent with current information updating of the WHPAs in the future can be done more efficiently.

Success criterion: An updated groundwater flow model that can be used for future updates to Part 1 of the City's WHPP.

7.5.4 Potential Contaminant Source Database

The City will periodically update the information on potential contaminant sources within the DWSMAs collected during the development of this WHPP, perhaps with the assistance of the Wellhead Protection consultant – if needed. The City will add information to the potential contaminant source database as additional potential contaminant source sites are identified or as sites are closed through working with the MPCA, the MDH, the MDNR, and Dakota County. New information for the database will be obtained by contacting appropriate MPCA, MDH, MDNR, and County programs on an annual basis regarding any new information on potential contaminant sources that may be available.

7.5.4.1 Source of Action

City staff.

7.5.4.2 Cooperators

MPCA, MDH, MDNR, Dakota County staff, City staff, and the Wellhead Protection Consultant, if needed.

7.5.4.3 Time Frame

Annually beginning with approval of this WHPP.

7.5.4.4 Estimated Cost

Approximately $500-$2,000 annually. City staff time and, if needed, Wellhead Protection Consultant costs. Actual annual costs will depend upon the amount of new potential contaminant source location information that must be added to the potential contaminant source database.

7.5.4.5 Goals Achieved

This database will be a useful tool to track, catalog, and document the status of potential contaminant sources within the DWSMA.

Success criterion: Maintaining an up to date potential contaminant source database.

7.5.5 Potential Contaminant Source Verification

Potential contaminant sources were identified within the DWSMAs during the PCSI. As part of the development of this WHPP, locations of identified potential contaminant sources were verified by the Wellhead Protection Consultant to the extent possible based on the available data. Any new potential sources identified during the implementation of this WHPP will be verified by the City with the assistance of the Wellhead Protection Consultant, if needed.

7.5.5.1 Source of Action

City staff.

7.5.5.2 Cooperators

City staff and the Wellhead Protection Consultant if needed.

7.5.5.3 Time Frame

Annually after approval of this WHPP and as new potential contaminant sources in the DWSMA are identified.

7.5.5.4 Estimated Cost

Approximately $500-$3,000. City staff time and Wellhead Protection Consultant, if needed. Actual annual costs will depend upon the number of new potential contaminant source locations that must be verified.

7.5.5.5 Goals Achieved

Verification of the location of newly identified potential contaminant sources within the DWSMA will allow the City to remain in compliance with the requirements of the State of Minnesota's Wellhead and Source Water Protection Program. Verification of the newly identified locations will also ensure that the City uses the most accurate data on type and location of potential contaminant sources as implementation of this WHPP proceeds.

Success criterion: All potential contaminant source locations in the database are verified to the extent possible.

7.5.6 Tritium Sampling

Tritium (^3H), a radioactive isotope of hydrogen, whose atmospheric concentrations rose in the 1950s and early 1960s due to atmospheric hydrogen bomb testing, has been used extensively to date groundwater. Tritium activities peaked during atmospheric hydrogen bomb testing of the 1950s and 1960s, and values of ^3H in precipitation reached a maximum of approximately 10,000 T.U. (tritium units) in 1963 (Mazor, 2004). Natural production of ^3H in the upper atmosphere introduces approximately 5 T.U. to precipitation each year (Mazor, 2004). The presence of tritium at concentrations above 1 tritium unit in a groundwater sample indicates the presence of a significant fraction of post-1954 (i.e., recently infiltrated) water in the sample. The MDH has sampled selected City wells for tritium in the past. Sampling of City wells for tritium at regular intervals will allow for tracking of tritium concentrations over time. If a tritium concentration in a groundwater sample from

a well is significantly higher than the concentration in a previous sample from the same well it could be an indication that there is a pathway such as an unused, unsealed well in the vicinity that allows water to move from the surface to the source water aquifer faster than before the pathway became available. Going forward, the City will ask the MDH to sample Wells 2, 4, 8, 14, 15, and 17 for tritium every five years. The MDH has previously been sampled these wells for tritium. Since the MDH already has a program to sample municipal wells for tritium the City would rely on the MDH to collect the samples and have them analyzed for tritium.

7.5.6.1 Source of Action

City and MDH staff.

7.5.6.2 Cooperators

MDH

7.5.6.3 Time Frame

Beginning withn five years after approval of this plan and then every five years thereafter.

7.5.6.4 Estimated Cost

At the time this plan was prepared, cities were not charged by the MDH for tritium sampling and analysis.

7.5.2.5 Goals Achieved

Obtaining data to evaluate if pathways that allow for relatively rapid movement of water from the surface to the source water aquifer are present.

Success criterion: Collection of groundwater samples from the selected City wells and analysis of these samples for tritium on the schedule outlined in section 7.5.6.3.

8.0 Evaluation Program

Per Minnesota Rule 4720.5270, the progress in implementing a WHPP must be evaluated routinely to determine the effectiveness of the WHPP in terms of accomplishment of goals. Monitoring and evaluation measures to ensure effectiveness of the management strategies are detailed below.

Evaluation activities discussed in this WHPP include the following:

- Track the implementation of the objectives, activities, and tasks discussed above in Section 7.0.
- Determine the effectiveness of specific management strategies for the protection of the Lakeville municipal water supply.
- Identify possible changes to the management strategies to improve overall effectiveness.
- Determine the adequacy of financial resources and staff availability to perform and implement the management strategies planned each year.
- Update the WHPP if new wells are added to the municipal water supply system.

The City of Lakeville will continue to cooperate with the MDH in the annual monitoring of the City's municipal water supply to determine if the management strategies presented in this WHPP are having a positive effect on water quality and to identify any water quality problems that may arise and need to be addressed.

The Lakeville Wellhead Protection Manager will provide a bi-annual report to the City Council summarizing the progress in implementing the management strategies and objectives in this WHPP. The report will be completed using the MDH Wellhead Protection Program Evaluation form (Appendix F). The City will retain a copy of the report in its Wellhead Protection file and send a copy of the report to the MDH Source Water Protection Unit in St. Paul. The intent of the bi-annual reports is to compile a comprehensive review of the implementation of the source management strategies for use when the City updates or revises this WHPP. As specified by the Wellhead Protection Rules, this WHPP will be updated a minimum of every 10 years, or more often as required due to changes to the municipal water supply system.

9.0 Alternative Water Supply Contingency Strategy

The purpose of a contingency plan is to establish, provide, and keep updated certain emergency response procedures and information for the public water supply, which may become vital in the event of a partial or total loss of public water supply services as a result of natural disaster, chemical contamination, civil disorder, or human-caused disruptions.

The City's procedures for responding to water emergencies and the City's water conservation plan are presented in the City's 2008 Water Supply Plan (Lakeville, 2008). As required, the Water Supply Plan was submitted to the MDNR Division of Waters – Appropriation Permit Program and the Metropolitan Council for review and approval. The Water Supply Plan was adopted by the City Council on November 17, 2008 and the Water Supply Plan Certificate of Adoption was received by the MDNR on December 2, 2008. The Water Supply Plan is incorporated in the City's Comprehensive Water Plan (SEH, 2008). A copy of the Water Supply Plan and the Certificate of Adoption are presented in Appendix G. A copy of the Comprehensive Water Plan can be obtained from the City upon request.

10.0 References

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Minnesota Department of Health (MDH), 2012a. Letter from Stephen W. Robertson to Chris Petree approving the Part 1 Wellhead Protection Amendment, April 9, 2012.

Minnesota Department of Health (MDH), 2012b. Second Scoping Decision Notice – City of Lakeville – PWSID 1190015 – Amendment of the Wellhead Protection Plan, Letter from Karen Voz of MDH to Chris Petree of City of Lakeville, June 20, 2012.

Northwest Associated Consultants (NAC), 2008. Comprehensive Land Use Plan, prepared for the City of Lakeville, December 2008.

Short Elliott Hendrickson, Inc. (SEH), 2008. City of Lakeville Comprehensive Water Plan, prepared for the City of Lakeville, SEH No. A-LAKEV0701.00, February, 2008.

Tables

Table 1

Lakeville Municipal Well Construction Summary
City of Lakeville

Well Name	Unique Number	Status/ Use[1]	Year Constructed/ Reconstructed	Total Depth (ft bgs)	Casing Diameter (in.)	Depth to Top of Open Interval (ft bgs)	Well Vulnerability Status[2]	Aquifer
Well 2	207708	A, P	1964	517	24x16	434	Not Vulnerable	Jordan SS
Well 3	207727	A, OLT	1968	460	24x16	363	Vulnerable	Jordan SS
Well 4	212650	A, P	1969	505	24x16	434	Vulnerable	Jordan SS
Well 6	161409	A, P	1980	682	24x16	591	Not Vulnerable	Jordan SS
Well 7	161439	A, E	1984	479	24x18	375	Not Vulnerable	Jordan SS
Well 8	433296	A, P	1989	615	24x18	522	Vulnerable	Jordan SS
Well 9	554192	A, P	1994	608	24x18	406	Not Vulnerable	Prairie du Chien Gp/Jordan SS
Well 10	554193	A, P	1994	616	24x18	425	Not Vulnerable	Prairie du Chien Gp/Jordan SS
Well 11	554215	A, P	1996	637	24x18	415	Not Vulnerable	Prairie du Chien Gp/Jordan SS
Well 12	562991	A, P	1997	585	24x18	380	Not Vulnerable	Prairie du Chien Gp/Jordan SS
Well 13	596650	A, P	1999	611	24x18	416	Not Vulnerable	Prairie du Chien Gp/Jordan SS
Wels 14	603073	A, P	2001	600	24x18	365	Not Vulnerable	Prairie du Chien Gp/Jordan SS
Well 15	651737	A, P	2001	515	24x18	412	Vulnerable	Jordan SS
Well 16	655907	A, P	2003	570	24x18	466	Not Vulnerable	Jordan SS
Well 17	694913	A, P	2004	607	24x18	415	Not Vulnerable	Prairie du Chien Gp/Jordan SS
Well 18	745558	A, P	2007	864	18x12	667	Not Vulnerable	Tunnel City Gp/Wonewoc SS
Well 19	686288	A, P	2009	545	24x18	341	Not Vulnerable	Prairie du Chien Gp/Jordan SS

[1] A = Active
P = Primary water supply well
E = Emergency well
OLT = Out Long Term

[2] See Barr, 2012
bgs = below ground surface

Table 2

Annual Volume of Water Pumped
City of Lakeville

		Total Annual Withdrawal (gal/yr)				
Unique Number	**Well Name**	**2006**	**2007**	**2008**	**2009**	**2010**
207725	1	0	0	0	0	0
207708	2	534,760,000	443,890,000	499,530,000	289,860,000	190,990,000
207727	3	0	6,060,000	90,000	0	0
212650	4	308,550,000	568,670,000	296,660,000	291,330,000	247,470,000
241440	5	0	0	0	0	0
161409	6	22,650,000	17,100,000	10,560,000	4,230,000	0
161439	7*	20,000	30,000	0	0	0
433296	8	323,710,000	317,570,000	311,900,000	201,070,000	7,090,000
554192	9	172,570,000	231,700,000	185,610,000	64,600,000	0
554193	10	327,990,000	231,470,000	430,640,000	442,520,000	300,220,000
554215	11	91,340,000	71,970,000	28,860,000	100,300,000	0
562991	12	62,050,000	108,580,000	93,950,000	199,150,000	218,360,000
596650	13	90,290,000	148,480,000	84,620,000	73,400,000	148,490,000
603073	14	77,040,000	114,700,000	58,180,000	104,360,000	98,210,000
651737	15	63,180,000	76,930,000	52,390,000	45,560,000	66,460,000
655907	16	64,550,000	67,960,000	89,250,000	42,850,000	0
694913	17	215,000,000	130,920,000	100,000,000	106,330,000	34,640,000
745558	18	0	17,490,000	201,970,000	192,330,000	177,970,000
686288	19	0	0	0	230,040,000	603,050,000
	Totals	2,353,700,000	2,553,520,000	2,444,210,000	2,387,930,000	2,092,950,000

Source: Lakeville's MDNR Annual Appropriation Reports

Table 3

Summary of Potential Contaminant Sources Within the DWSMAs and Assigned Management Priority
City of Lakeville

Potential Contaminant Source Category	Total Number in DWSMA	Number Within IWMZ and Priority Assigned	Number Within ERZ and Priority Assigned	Number Within Remainder of the DWSMA and Priority Assigned
Chemical Storage Sites	4	HVZ – 1[1]; Low	HVZ – 0	HVZ – 3; High
Dump Sites	2	HVZ – 0	HVZ – 0	HVZ – 2; High
Spill Sites (not including LUST sites)	2	HVZ – 0	HVZ – 0	HVZ – 2; High
Hazardous Waste Generators	39	HVZ – 0	HVZ – 2; High	HVZ – 37; High
ISTS	2	HVZ – 0	HVZ – 0	HVZ – 2; High
Leaking Tank Sites				
Closed	6	HVZ – 0 MVZ – 0	HVZ – 0 MVZ – 0	HVZ – 3; Low MVZ – 3; Low
Potential Class V Wells[2]	17	HVZ – 0 MVZ – 0 LVZ – 0	HVZ – 0 MVZ – 0 LVZ – 1; Moderate	HVZ – 7; High MVZ – 3; Moderate LVZ – 6; Low
Registered Storage Tank Sites				
Status = Active	20	HVZ – 0 MVZ – 0	HVZ – 0 MVZ – 0	HVZ – 11; High MVZ – 9; Moderate
Status = Inactive or Not Available	5	HVZ – 0 MVZ – 0	HVZ – 0 MVZ – 0	HVZ – 3; High MVZ – 2; Moderate
Wells (status = Active, Inactive, or Unknown)				
Completed in source water aquifers	35	HVZ – 0 MVZ – 0 LVZ – 0	HVZ – 0 MVZ – 0 LVZ – 4; High	HVZ – 0 MVZ – 5; High LVZ – 26; High
Not completed in or penetrating source water aquifers	150	HVZ – 0 MVZ – 0 LVZ – 0	HVZ – 2; Moderate MVZ – 0 LVZ – 10; Moderate	HVZ – 17; Moderate MVZ – 27; Moderate LVZ – 94; Moderate
Wells (Status = Sealed)	368	HVZ – 0 MVZ – 0 LVZ – 0	HVZ – 13; Low MVZ – 0 LVZ – 37; Low	HVZ – 35; Low MVZ – 86; Low LVZ – 197; Low

HVZ High aquifer vulnerability zone MWZ Moderate aquifer vulnerability zone LWZ Low aquifer vulnerability zone
ERZ Emergency Response Zone: defined as portion of the WHPA within the 1-year groundwater time of travel area.
IWMZ Inner Wellhead Management Zone: defined in MR4720.5100 subpart19 as the area within 200 feet of a public water supply well.
[1] Chlorine storage at Lakeville Well 3. Management priority low since it is already managed as part of system operation.
[2] Fifteen of the 17 potential Class V well locations identified in the DWSMA are properties associated with automotive repair. Two properties in the DWSMAs appear to have large-scale septic systems serving 20 or more people. No cesspools were identified in the DWSMAs.

Table 4

High Capacity Wells Within One Mile of the DWSMAs
City of Lakeville

Map ID[1]	Unique No.	Well Owner	Status	Use	Aquifer
2	207708	City of Lakeville	Active	Municipal Waterworks	CJDN
3	207727	City of Lakeville	Active	Municipal Waterworks	CJDN
4	212650	City of Lakeville	Active	Municipal Waterworks	CJDN
6	161409	City of Lakeville	Active	Municipal Waterworks	CJDN
8	433296	City of Lakeville	Active	Municipal Waterworks	CJDN
9	554192	City of Lakeville	Active	Municipal Waterworks	OPCJ
10	554193	City of Lakeville	Active	Municipal Waterworks	OPCJ
11	554215	City of Lakeville	Active	Municipal Waterworks	OPCJ
12	562991	City of Lakeville	Active	Municipal Waterworks	OPCJ
13	596650	City of Lakeville	Active	Municipal Waterworks	OPCJ
14	603073	City of Lakeville	Active	Municipal Waterworks	OPCJ
15	651737	City of Lakeville	Active	Municipal Waterworks	CJDN
16	655907	City of Lakeville	Active	Municipal Waterworks	CJDN
17	694913	City of Lakeville	Active	Municipal Waterworks	OPCJ
18	745558	City of Lakeville	Active	Municipal Waterworks	CTCW
19	686288	City of Lakeville	Active	Municipal Waterworks	OPCJ
21	126526	Cross Nurseries Inc	Active	Nursery	MTPL
100	526581	Ind. Sch. Dist. #194	Active	Landscaping/Athletic Fields	NA
115	530065	Crystal Lake Golf Club	Active	Golf Course Irrigation	NA
253	664152	Queen Anne Court	Active	Private Waterworks	OPDC
261	207767	Queen Anne Court	Standby	Private Waterworks	OSTP
127263	127263	City of Apple Valley	Active	Municipal Waterworks	CJDN
127277	127277	City of Apple Valley	Active	Municipal Waterworks	CJDN
127297	127297	City of Apple Valley	Active	Municipal Waterworks	CJDN
151563	151563	City of Apple Valley	Active	Municipal Waterworks	CJDN
161439	161439	City of Lakeville	Active	Municipal Waterworks	CJDN
205820	205820	City of Apple Valley	Active	Municipal Waterworks	CJDN
205823	205823	City of Apple Valley	Active	Municipal Waterworks	OPCJ
205824	205824	City of Apple Valley	Standby	Municipal Waterworks	CJDN
207675	207675	North Star Concrete Co.	Active	Non-Metallic Processing	CJDN
207677	207677	City of Apple Valley	Active	Municipal Waterworks	CJDN
235586	235586	City of Farmington	Active	Municipal Waterworks	CJDN
236156	236156	Northern Gopher Golf, Inc.	Active	Golf Course Irrigation	MTPL
433284	433284	City of Apple Valley	Active	Municipal Waterworks	CJDN
449257	449257	City of Apple Valley	Active	Municipal Waterworks	CJDN

Table 4

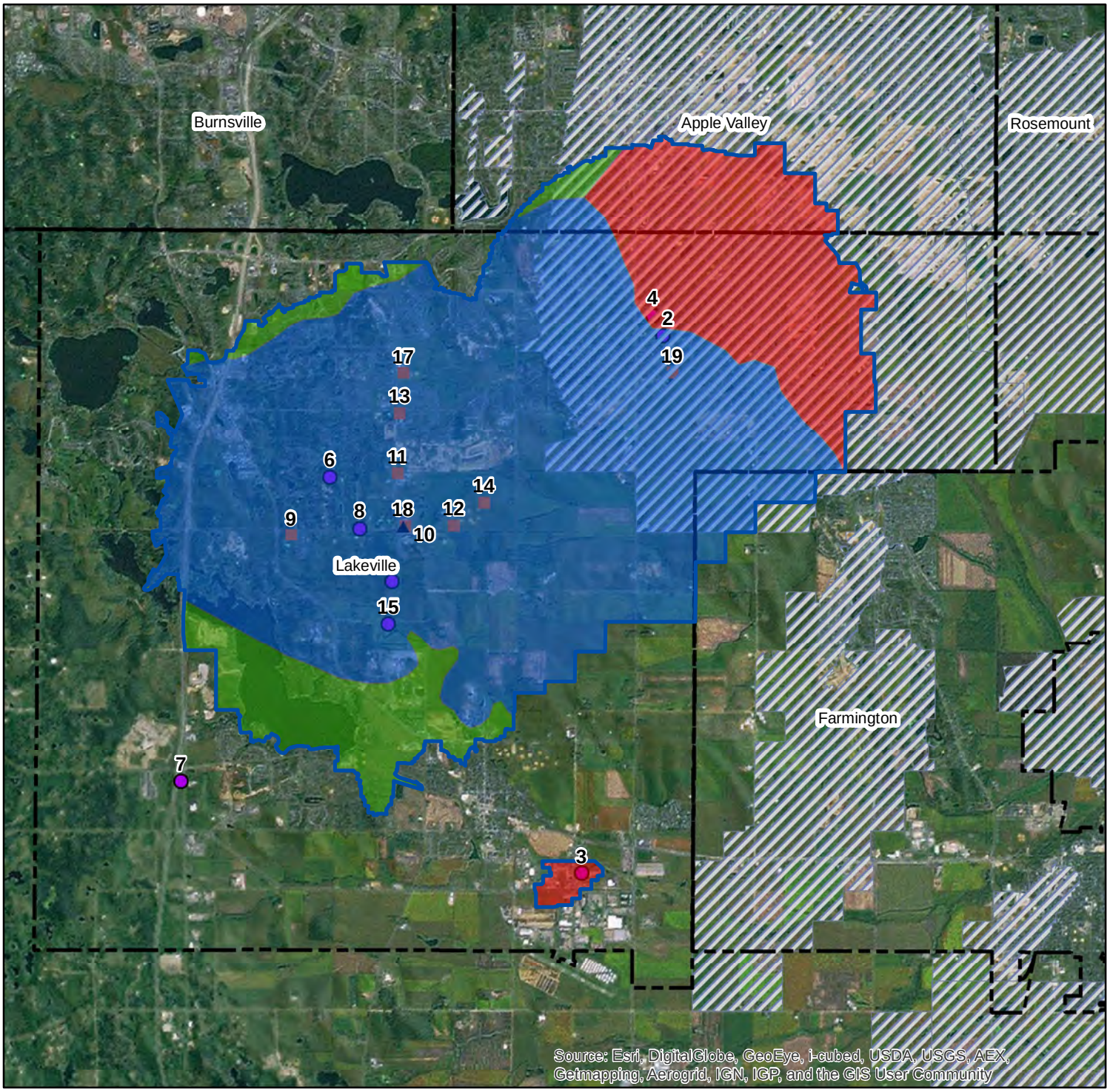
High Capacity Wells Within One Mile of the DWSMAs
City of Lakeville

Map ID[1]	Unique No.	Well Owner	Status	Use	Aquifer
497931	497931	Fisher Sand & Aggregate	Active	Sand and Gravel Washing	NA
497932	497932	Fisher Sand & Aggregate	Active	Sand and Gravel Washing	NA
497933	497933	Fisher Sand & Aggregate	Active	Sand and Gravel Washing	NA
509056	509056	City of Apple Valley	Standby	Municipal Waterworks	CMTS
519955	519955	City of Apple Valley	Standby	Municipal Waterworks	CMTS
561802	561802	Model Stone, Inc.	Active	Non-Metallic Processing	OPDC
561802	561802	Model Stone, Inc.	Active	Other Industrial Processing	OPDC
603075	603075	City of Apple Valley	Active	Municipal Waterworks	CJDN
694923	694923	Ind. Sch. Dist. #194	Active	Landscaping/Athletic Fields	NA
694924	694924	Ind. Sch. Dist. #194	Active	Landscaping/Athletic Fields	NA
731113	731113	City of Apple Valley	Active	Municipal Waterworks	CJDN
751646	751646	City of Lakeville	Active	Landscaping/Athletic Fields	NA

Aquifer Codes:
CJDN = Jordan SS
CMTS = Mt. Simon SS
CTCW = Tunnel City Gp to Wonewoc SS
MTPL = Multiple aquifers (not identified)
OPCJ = Prairie du Chien Gp and Jordan SS
OPDC = Prairie du Chien Gp
OSTP = St. Peter SS
NA = Not Available

[1] Map ID refers to Figure 4

Figures



Barr Footer: ArcGIS 10.1, 2013-01-28 13:08 File: I:\Projects\23\19\1110\Maps\Reports\WHPP\Fig01 DWSMA Locations.mxd User: jcg

Lakeville DWSMA

Municipality

DWSMAs Near Lakeville

Muncipial Wells

- Tunnel City Group - Wonewoc Sandstone
- Jordan Sandstone
- Prairie du Chien Group - Jordan Sandstone

Aquifer Vulnerability

- High
- Moderate
- Low

N

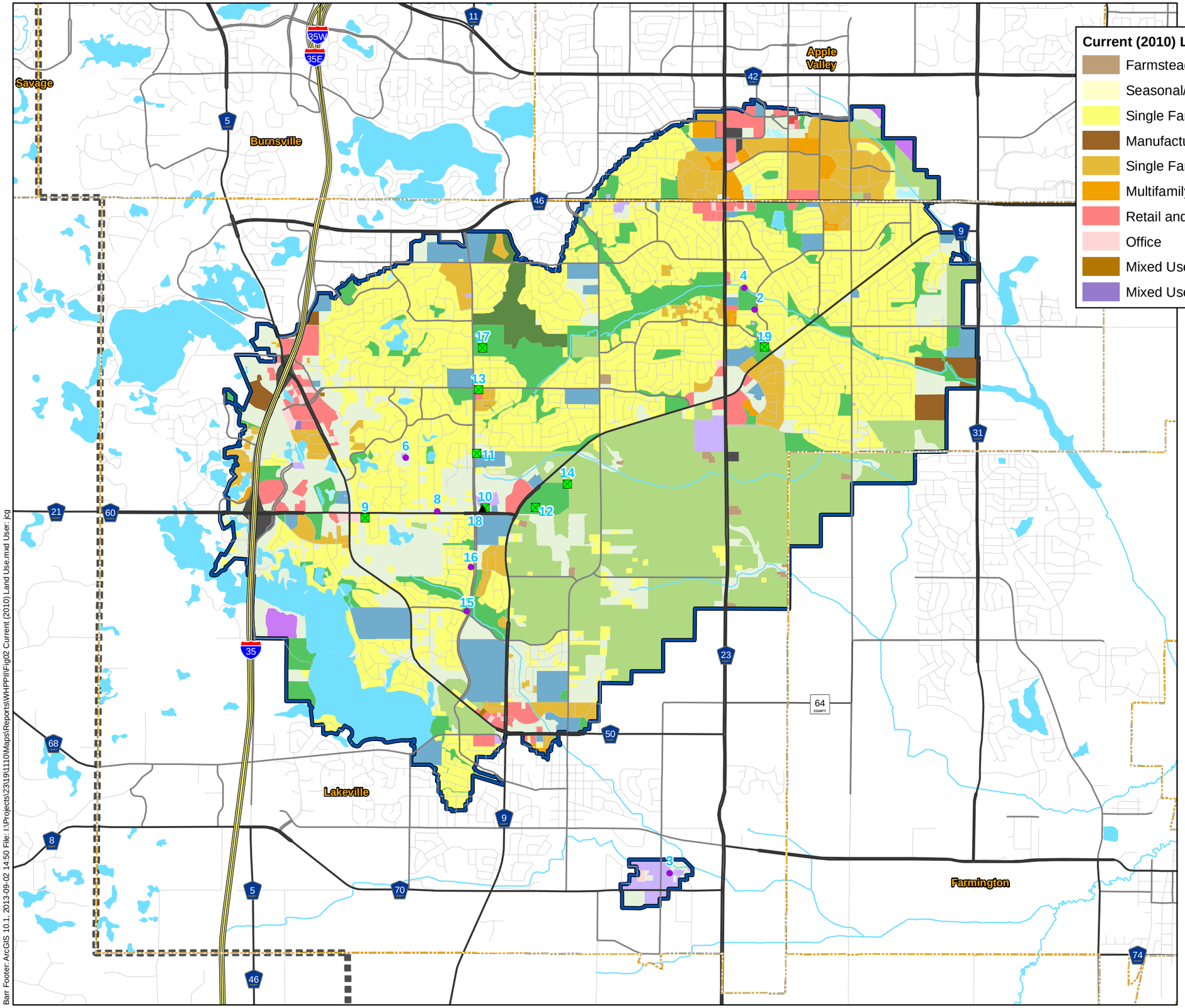
Feet

0 5,000 10,000

BARR

Figure 1

MUNICIPAL WELLS, DWSMAs AND AQUIFER VULNERABILITY
City of Lakeville
Dakota County, MN



Current (2010) Land Use

- Farmstead
- Seasonal/Vacation
- Single Family Detached
- Manufactured Housing Park
- Single Family Attached
- Multifamily
- Retail and Other Commercial
- Office
- Mixed Use Residential
- Mixed Use Industrial
- Mixed Use Commercial and Other
- Industrial and Utility
- Extractive
- Institutional
- Park, Recreational or Preserve
- Golf Course
- Major Highway
- Agricultural
- Undeveloped
- Water

Municipal Wells

- Tunnel City Group - Wonewoc Sandstone
- Jordan Sandstone
- Prairie du Chien Group - Jordan Sandstone
- Lakeville DWSMA
- Municipal Boundary
- County Boundary

3 - Municipal Well Location Map ID (Map ID refers to Table C-2)

Land Use Data (Metropolitan Council 2010 Generalized Land Use)

N

Feet

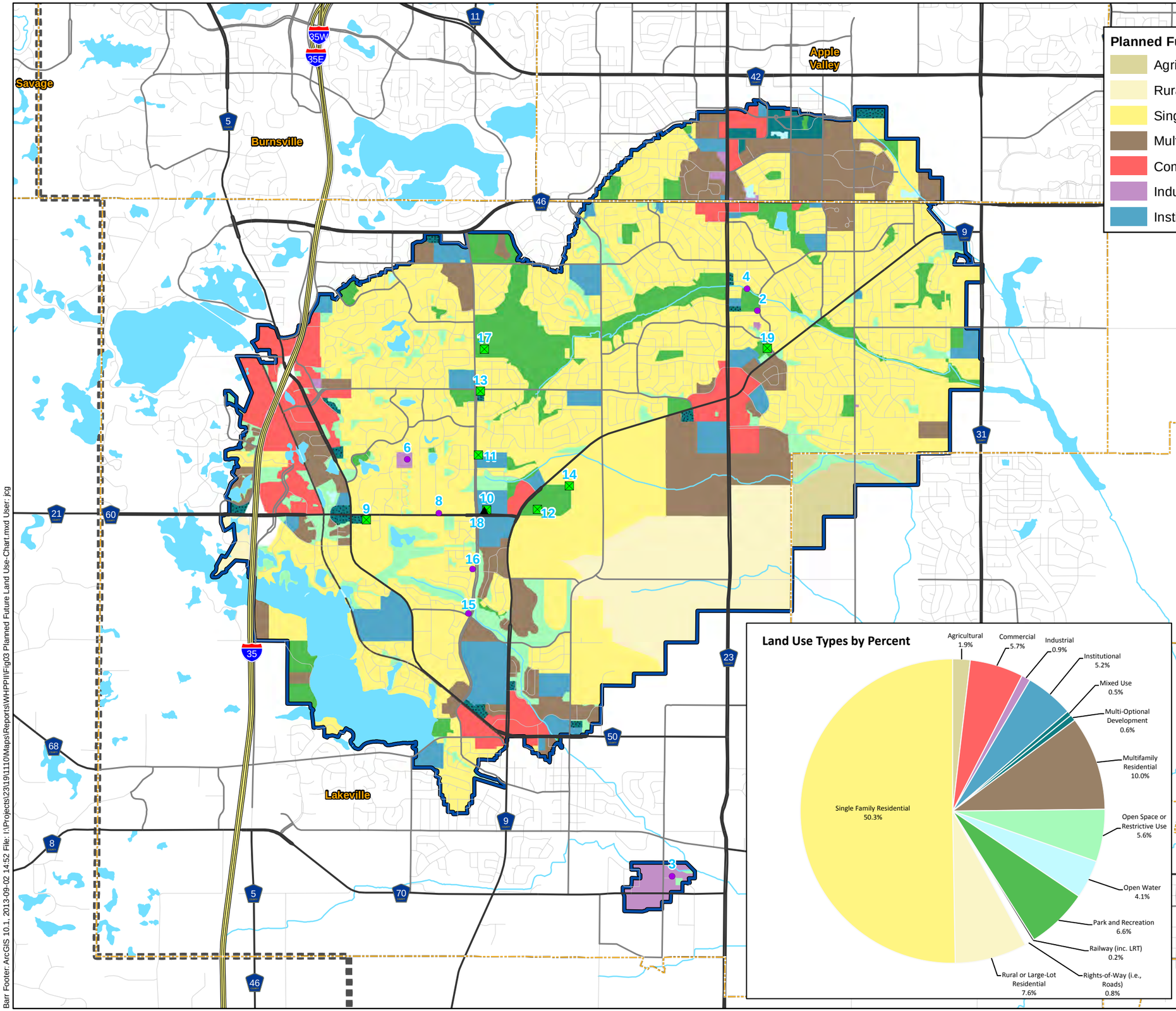
4,000 0 4,000

BARR

Figure 2

CURRENT (2010) LAND USE
City of Lakeville
Dakota County, MN

Barr Footer: ArcGIS 10.1, 2013-09-02 14:50 File: I:\Projects\23\19\1110\Maps\Reports\WHPP\Fig02 Current (2010) Land Use.mxd User: jcg



Planned Future Land Use

- Agricultural
- Rural or Large-Lot Residential
- Single Family Residential
- Multifamily Residential
- Commercial
- Industrial
- Institutional
- Mixed Use
- Multi-Optional Development
- Park and Recreation
- Open Space or Restrictive Use
- Rights-of-Way (i.e., Roads)
- Railway (inc. LRT)
- Open Water

Municipal Wells

- Tunnel City Group - Wonewoc Sandstone
- Jordan Sandstone
- Prairie du Chien Group - Jordan Sandstone
- Lakeville DWSMA
- Municipal Boundary
- County Boundary

3 - Municipal Well Location Map ID
(Map ID refers to Table C-2)

Planned Land Use Data (Metropolitan Council)

N

Feet

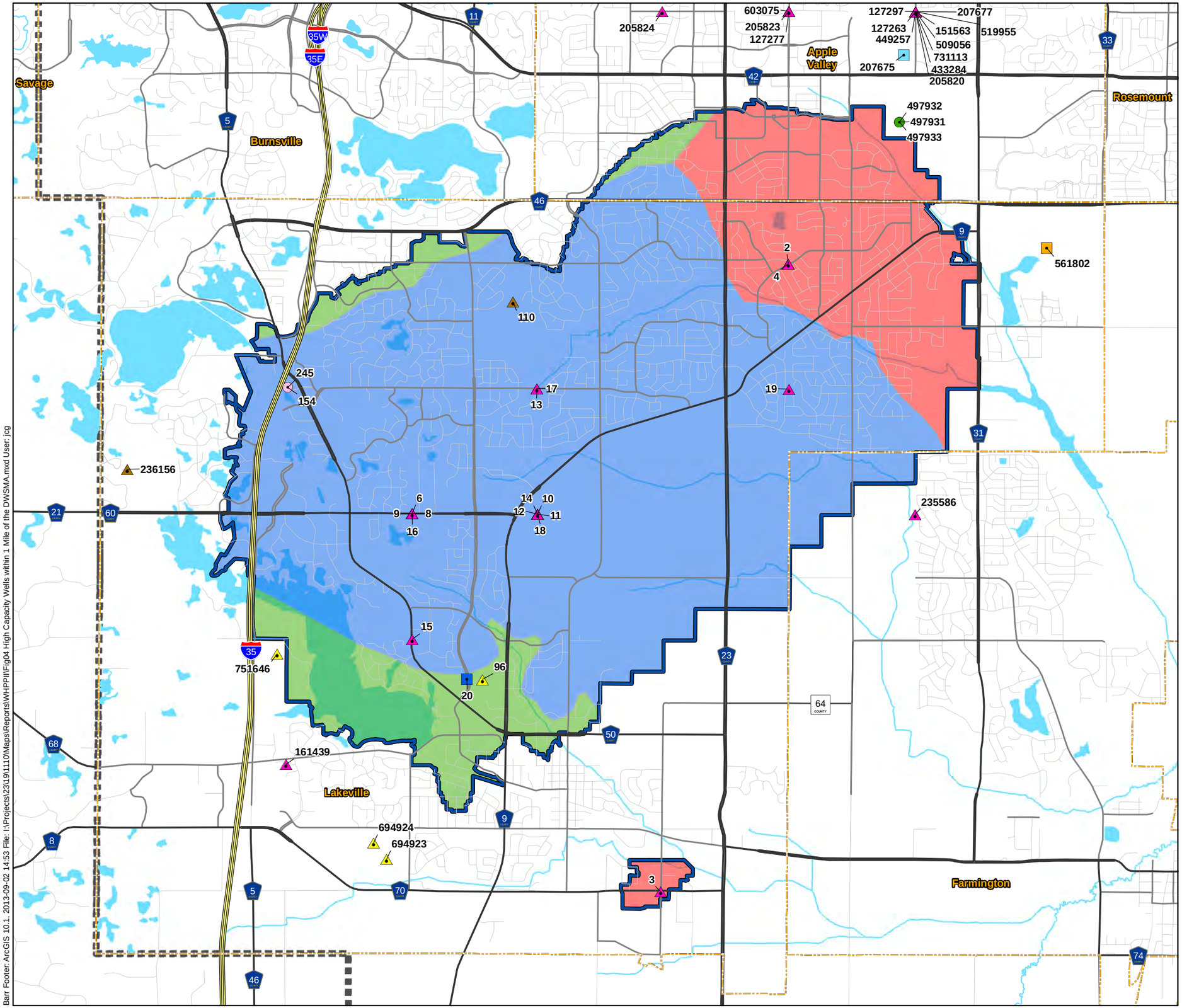
4,000 0 4,000

BARR

Figure 3

PLANNED FUTURE LAND USE
City of Lakeville
Dakota County, MN

Barr Footer: ArcGIS 10.1, 2013-09-02 14:52 File: I:\Projects\23\19\1110\Maps\Reports\WHPPII\Fig03 Planned Future Land Use-Chart.mxd User: jcg



Permitted Water Appropriations (SWUDS) Within 1 Mile of DWSMA

- Golf Course Irrigation
- Landscaping/Athletic Fields
- Municipal Waterworks
- Non-Metallic Processing
- Nursery
- Other Industrial Processing
- Private Waterworks
- Sand and Gravel Washing
- Lakeville DWSMA
- Municipal Boundary
- County Boundary

Aquifer Vulnerability

- High
- Moderate
- Low

2 - SWUDS Location Map ID
(Map ID refers to Table C-X)

N

Feet
4,000 0 4,000

BARR

Figure 4

HIGH CAPACITY WELLS WITHIN ONE MILE OF THE DWSMAs
City of Lakeville
Dakota County, MN

Barr Footer: ArcGIS 10.1, 2013-09-02 14:53 File: I:\Projects\23\19\1110\Maps\Reports\WHPP\IFig04 High Capacity Wells within 1 Mile of the DWSMA.mxd User: jcg

Appendix A

MDH Well Records

Minnesota Unique Well No.

207708

County Dakota
Quad Farmington
Quad ID 88B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 10/19/1990
Update Date 12/30/2004
Received Date

Well Name LAKEVILLE 2

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	3	CCADDB	**Elevation Method**	964 ft. Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
517 ft.	517 ft.	07/17/1964

Drilling Method --

Well Address
GERDING PA
LAKEVILLE MN 55044

Drilling Fluid --

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

Use Community Supply **PWS ID** 1190015 **Source** S01

Geological Material	Color	Hardness	From	To
GLACIAL DRIFT			0	37
PLATTEVILLE LIMESTONE			37	65
ST. PETER SANDSTONE			65	210
SHAKOPEE-ONEOTA DOLOMITE			210	417
JORDAN SANDSTONE			417	517

Casing Type Steel (black or low carbon) **Joint** No Information **Drive Shoe?** ☐ Yes ☐ No **Above/Below** 0 ft.

Casing Diameter	Weight	Hole Diameter
24 in. to 33 ft.	lbs./ft.	
16 in. to 434 ft.	lbs./ft.	

Open Hole from 434 ft. to 517 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
56 ft. from Land surface Date Measured 04/17/1964

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

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

REMARKS
SOIL DEVELOPED BY DYNAMITING AND BAILING 176 YDS OF SAND.

Grouting Information Well Grouted? ☐ Yes ☐ No

Grout Material: Neat Cement from 0 to 434 ft. 50.5 yrds.

Located by: Minnesota Geological Survey
Method: GPS Differentially Corrected
Unique Number Verification: Information from owner
Input Date: 04/10/2000
System: *UTM - Nad83, Zone15, Meters*
X: 483142 **Y:** 4950194

Nearest Known Source of Contamination
__feet __direction __type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP 0 Volts
Length of drop Pipe __ft. Capacity __g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

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

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Tri-state Well Co.	27118	BENEKE, R.

First Bedrock Platteville
Last Strat Jordan
Aquifer Jordan
Depth to Bedrock 37 ft.

County Well Index Online Report **207708** Printed 6/22/2011 HE-01205-07

Minnesota Unique Well No.

207727

County Dakota
Quad Farmington
Quad ID 88B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 10/19/1990
Update Date 12/30/2004
Received Date

Well Name LAKEVILLE 3

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	33	ACBDA	951 ft.	Elevation Method: Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
460 ft.	460 ft.	09/30/1968

Drilling Method --

Well Address
HAMBURG AV
LAKEVILLE MN 55044

Geological Material	Color	Hardness	From	To
GLACIAL DRIFT			0	120
SHAKOPEE-ONEOTA DOLOMITE			120	347
JORDAN SANDSTONE			347	459
ST. LAWRENCE SHALE			459	460

Drilling Fluid --

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

Use Community Supply **PWS ID** 1190015 **Source** S02

Casing Type Steel (black or low carbon) **Joint** No Information **Drive Shoe?** ☐ Yes ☐ No **Above/Below** 0 ft.

Casing Diameter				Weight	Hole Diameter
24	in. to	125	ft.	lbs./ft.	
16	in. to	363	ft.	lbs./ft.	

Open Hole from 363 ft. to 460 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
21 ft. from Land surface Date Measured 09/30/1968

PUMPING LEVEL (below land surface)
53 ft. after hrs. pumping 1400 g.p.m.

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

NO REMARKS

Located by: Minnesota Geological Survey
Method: GPS Differentially Corrected
Unique Number Verification: Information from owner
Input Date: 04/10/2000
System: *UTM - Nad83, Zone15, Meters*
X: 482055 **Y:** 4942986

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 363 ft. 0

Nearest Known Source of Contamination
_feet _direction _type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

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

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Tri-state Well Co.	27118	RAUSCHER, R.

First Bedrock Prairie Du Chien Group
Last Strat St.Lawrence
Aquifer Jordan
Depth to Bedrock 120 ft.

County Well Index Online Report **207727** Printed 6/22/2011 HE-01205-07

Minnesota Unique Well No.

212650

County Dakota
Quad Farmington
Quad ID 88B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 10/19/1990
Update Date 12/30/2004
Received Date

Well Name LAKEVILLE 4

Township Range Dir Section Subsections Elevation 954 **ft.**

114	20	W	3	CBDBCD	**Elevation Method**	Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
505 **ft.**	505 **ft.**	05/30/1969

Drilling Method --

Well Address
167 ST
LAKEVILLE MN 55044

Drilling Fluid --

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

Use Community Supply **PWS ID** 1190015 **Source** S03

Geological Material	Color	Hardness	From	To
SAND GRAVEL	BROWN		0	18
FINE SAND	YELLOW		18	22
LIMEROCK	YELLOW		22	34
LIMEROCK + SHALE	BLUE		34	45
LIMEROCK + SHALE	BLUE		45	50
ST. PETER SANDSTONE	YELLOW		50	100
ST. PETER SANDSTONE	BROWN		100	150
ST. PETER SANDSTONE	GRAY		150	195
SHAKOPEE	WHITE		195	200
SHAKOPEE	GRAY		200	300
SHAKOPEE	TAN		300	410
JORDAN SHALE	LIGHT		410	412
JORDAN	GRAY		412	422
JORDAN	WHITE	HARD	422	485
JORDAN SHALE	GRAY		485	505

Casing Type Steel (black or low carbon) **Joint** No Information **Drive Shoe?** ☐ Yes ☐ No **Above/Below** 0 **ft.**

Casing Diameter	Weight	Hole Diameter
24 in. to 37 ft.	lbs./ft.	
16 in. to 434 ft.	lbs./ft.	

Open Hole from 434 ft. to 505 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
40 ft. from Land surface Date Measured 05/30/1969

PUMPING LEVEL (below land surface)
125 ft. after hrs. pumping 1920 g.p.m.

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

REMARKS
M.G.S. NO.533.

Located by: Minnesota Geological Survey

Method: GPS Differentially Corrected

Unique Number Verification: Information from owner

Input Date: 04/10/2000

System: *UTM - Nad83, Zone15, Meters*

X: 483011 **Y:** 4950471

Grouting Information Well Grouted? ☐ Yes ☐ No

Nearest Known Source of Contamination
_feet _direction _type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP 0 Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

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

Cuttings Yes
First Bedrock Platteville
Last Strat Jordan
Aquifer Jordan
Depth to Bedrock 22 **ft.**

Well Contractor Certification

Renner E.H. Well	71015	
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report **212650** Printed 6/22/2011
HE-01205-07

Minnesota Unique Well No.

161409

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 12/27/1989
Update Date 12/30/2004
Received Date

Well Name LAKEVILLE 6

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	18	BA		1161 ft.
					Elevation Method	Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
682 ft.	682 ft.	08/13/1980

Drilling Method Cable Tool

Well Address
185 ST N
LAKEVILLE MN 55044

Drilling Fluid
--

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

Use Community Supply **PWS ID** 1190015 **Source** S04

Geological Material	Color	Hardness	From	To
CLAY + ROCKS			0	234
SANDROCK		HARD	234	383
SHAKOPEE			383	574
SANDROCK			574	667
ST. LAWRENCE			667	682

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** 3 **ft.**

Casing Diameter			Weight	Hole Diameter		
24	in. to	234 ft.	94.62 lbs./ft.	23	in. to	591 ft.
16	in. to	591 ft.	62.58 lbs./ft.	16	in. to	682 ft.

Open Hole from 591 ft. to 682 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
265 ft. from Land surface Date Measured 08/13/1980

PUMPING LEVEL (below land surface)
280 ft. after 24 hrs. pumping 1400 g.p.m.

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

REMARKS
M.G.S. NO.2081.

Located by: Minnesota Department of Health **Method:** GPS Differentially Corrected
Unique Number Verification: N/A **Input Date:** 04/10/2000
System: *UTM - Nad83, Zone15, Meters* **X:** 478685 **Y:** 4948299

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 591 ft.

Nearest Known Source of Contamination
__feet __direction __type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

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

Cuttings Yes
First Bedrock St.Peter
Last Strat St.Lawrence
Aquifer Jordan
Depth to Bedrock 234 **ft.**

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Bergerson-Caswell	27058	HENRICH, E.

County Well Index Online Report **161409** Printed 6/22/2011
HE-01205-07

Minnesota Unique Well No.

161439

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 07/10/1989
Update Date 12/30/2004
Received Date

Well Name LAKEVILLE 7

Township Range Dir Section Subsections Elevation 1030 **ft.**

114 21 W 25 CBAACD **Elevation Method** Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
479 **ft.**	479 **ft.**	08/30/1984

Drilling Method Cable Tool

Well Address

LAKEVILLE MN 55044

Drilling Fluid --

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

Use Community Supply **PWS ID** 1190015 **Source** S05

Geological Material	Color	Hardness	From	To
CLAY	GRAY	SOFT	0	120
CLAY	BROWN	HARD	120	180
SHAKOPEE-ONEOTA	GRAY	HARD	180	360
JORDAN	GRAY	SOFT	360	475
ST. LAWRENCE	GRAY	SOFT	475	479

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** 4 **ft.**

Casing Diameter		Weight	Hole Diameter		
24 in. to	171 ft.	94.62 lbs./ft.	23 in. to	375 ft.	
18 in. to	375 ft.	70.59 lbs./ft.	17 in. to	479 ft.	

Open Hole from 375 ft. to 479 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
110 ft. from Land surface Date Measured 08/24/1984

PUMPING LEVEL (below land surface)
136 ft. after 20 hrs. pumping 1500 g.p.m.

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

REMARKS
M.G.S. NO.2013. GAMMA LOGGED 5-28-84.
200 YDS S. OF KENRICH & CR 64

Located by: Minnesota Geological Survey **Method:** GPS Differentially Corrected

Unique Number Verification: Information from owner **Input Date:** 04/10/2000

System: *UTM - Nad83, Zone15, Meters* **X:** 476686 **Y:** 4944222

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 375 ft. 30 yrds.

Nearest Known Source of Contamination
120 feet E direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

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

Cuttings Yes **Borehole Geophysics** Yes
First Bedrock Prairie Du Chien Group **Aquifer** Jordan
Last Strat Jordan **Depth to Bedrock** 180 **ft.**

Well Contractor Certification

Bergerson-Caswell	27058	HENDRYCKS, R.
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report **161439** Printed 6/22/2011 HE-01205-07

Minnesota Unique Well No.

433296

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 06/26/1992
Update Date 12/29/2004
Received Date

Well Name LAKEVILLE 8

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	18	ACDDCB	**Elevation Method**	1095 **ft.** Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
615 **ft.**	615 **ft.**	07/21/1989

Drilling Method Cable Tool

Well Address

LAKEVILLE MN 55044

Drilling Fluid --

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

Use Community Supply **PWS ID** 1190015 **Source** S06

Geological Material	Color	Hardness	From	To
CLAY	BROWN	SOFT	0	17
CLAY AND GRAVEL		SOFT	17	117
SHALE		MEDIUM	117	163
SAND, GRAVEL, AND CLAY		SOFT	163	245
SAND		SOFT	245	250
SANDROCK		SOFT	250	395
LIMEROCK		HARD	395	505
SAND (JORDAN)		MEDIUM	505	615

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☐ Yes ☐ No **Above/Below** 2 **ft.**

Casing Diameter	Weight	Hole Diameter
24 in. to 252 ft.	94.6 lbs./ft.	23 in. to 522 ft.
18 in. to 522 ft.	70.6 lbs./ft.	17 in. to 615 ft.

Open Hole from 522 ft. to 615 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
201 ft. from Land surface Date Measured 07/17/1989

PUMPING LEVEL (below land surface)
220 ft. after 3 hrs. pumping 1200 g.p.m.

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

REMARKS
M.G.S. NO.3369.
WELL AT ITALY AVE. AND 185TH ST. W.

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 522 ft. 30 yrds.

Located by: Minnesota Geological Survey
Method: GPS Differentially Corrected
Unique Number Verification: Information from owner
Input Date: 04/10/2000
System: *UTM - Nad83, Zone15, Meters*
X: 479084 **Y:** 4947612

Nearest Known Source of Contamination
800 feet North East direction Other type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

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

Cuttings Yes
First Bedrock St.Peter
Last Strat Jordan
Aquifer Jordan
Depth to Bedrock 250 **ft.**

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Keys Well Co.	62012	KEYS, G.

County Well Index Online Report **433296** Printed 6/22/2011 HE-01205-07

Minnesota Unique Well No.

554192

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 02/20/1995
Update Date 11/18/2003
Received Date

Well Name LAKEVILLE 9

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	18	CBBADA	**Elevation Method**	1098 **ft.** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
608 **ft.**	608 **ft.**	199412

Drilling Method Cable Tool

Well Address
185TH ST
LAKEVILLE MN 55044

Drilling Fluid --

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

Use Community Supply **PWS ID** 1190015 **Source** S07

Geological Material	Color	Hardness	From	To
SANDY CLAY	BROWN	SOFT	0	22
CLAY W/SAND & GRAVEL	BROWN	SOFT	22	237
SAND	BROWN	SOFT	237	246
SANDSTONE	BROWN	SOFT	246	256
SAND	BROWN	SOFT	256	280
SANDSTONE (GRAY)	GRAY	MEDIUM	280	355
LIMESTONE	GRAY	HARD	355	494
SANDSTONE	TAN	MEDIUM	494	603
SHALE & SANDSTONE	GRAY	MEDIUM	603	608

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** 0 **ft.**

Casing Diameter	Weight	Hole Diameter
24 in. to 283 ft.	lbs./ft.	
18 in. to 406 ft.	lbs./ft.	

Open Hole from 406 ft. to 608 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
187 ft. from Land surface Date Measured 199412

PUMPING LEVEL (below land surface)
223 ft. after 8 hrs. pumping 1390 g.p.m.

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

REMARKS
M.G.S. NO. 3638.

Located by: Minnesota Department of Health
Method: Digitization (Screen) - Map (1:24,000)
Unique Number Verification: Information from owner
Input Date: 11/18/2003
System: *UTM - Nad83, Zone15, Meters*
X: 478164 **Y:** 4947527

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 406 ft. 546 bags

Nearest Known Source of Contamination
100 feet N direction Septic tank/drain field type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

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

Cuttings Yes
First Bedrock St.Peter
Last Strat Jordan
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 280 **ft.**

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Keys Well Co.	62012	UNERTL, F.

County Well Index Online Report **554192** Printed 6/22/2011 HE-01205-07

Minnesota Unique Well No.

554193

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 02/20/1995
Update Date 12/30/2004
Received Date

Well Name LAKEVILLE 10

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	17	BCCDBD	Elevation Method	1085 ft. Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
616 ft.	616 ft.	199412

Drilling Method Cable Tool

Well Address
185TH ST
LAKEVILLE MN 55044

Drilling Fluid --

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

Use Community Supply **PWS ID** 1190015 **Source** S08

Geological Material	Color	Hardness	From	To
SAND & GRAVEL	BROWN	SOFT	0	18
HARDPAN	GRAY	MEDIUM	18	28
CLAY	GRAY	SOFT	28	118
CLAY & GRAVEL	GRAY	SOFT	118	199
GRAVEL	GRAY	SOFT	199	210
SAND	TAN	SOFT	210	216
SANDROCK	TAN	SOFT	216	249
SANDROCK & DOLOMITE	GRAY	MEDIUM	249	290
SANDROCK & DOLOMITE	GRAY	MEDIUM	290	376
LIMESTONE	GRAY	HARD	376	506
SANDROCK	GRAY	MEDIUM	506	616

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☐ Yes ☐ No **Above/Below** 0 **ft.**

Casing Diameter	Weight	Hole Diameter
24 in. to 250 ft.	94 lbs./ft.	
18 in. to 425 ft.	71 lbs./ft.	

Open Hole from 425 ft. to 616 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
180 ft. from Land surface Date Measured 199412

PUMPING LEVEL (below land surface)
212 ft. after 12 hrs. pumping 1500 g.p.m.

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

REMARKS
M.G.S. NO. 3578.

Located by: Minnesota Department of Health
Method: Digitization (Screen) - Map (1:24,000)
Unique Number Verification: Information from owner
Input Date: 11/18/2003
System: *UTM - Nad83, Zone15, Meters*
X: 479694 **Y:** 4947651

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 425 ft. 528 bags

Nearest Known Source of Contamination
225 feet S direction Septic tank/drain field type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

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

Cuttings Yes
First Bedrock St.Peter
Last Strat Jordan
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 216 **ft.**

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Keys Well Co.	62012	SAMPSON, J.

County Well Index Online Report **554193** Printed 6/22/2011 HE-01205-07

Minnesota Unique Well No.

554215

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 10/25/1996
Update Date 12/30/2004
Received Date

Well Name LAKEVILLE 11

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	17	BBBBBD	Elevation Method	1102 ft. Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
637 ft.	637 ft.	07/26/1996

Drilling Method Cable Tool

Well Address
IPAVA AV
LAKEVILLE MN 55044

Drilling Fluid Water

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

Use Community Supply **PWS ID** 1190015 **Source** S09

Geological Material	Color	Hardness	From	To
CLAY/GRAVEL	GRAY	SOFT	0	160
CLAY/SAND	GRAY	SOFT	160	178
SHALE	GREEN	SOFT	178	183
SANDSTONE	YEL/WHT		183	345
DOLOMITE/SHALE/SAND	VARIED	MEDIUM	345	375
LIMESTONE	TAN	HARD	375	526
SANDSTONE	WHITE	MEDIUM	526	637

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** 0 **ft.**

Casing Diameter	Weight	Hole Diameter
24 in. to 186 ft.	94.62 lbs./ft.	23 in. to 420 ft.
18 in. to 415 ft.	70.59 lbs./ft.	17 in. to 637 ft.

Open Hole from 415 ft. to 637 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
201 ft. from Land surface Date Measured 02/22/1996

PUMPING LEVEL (below land surface)
224 ft. after 10 hrs. pumping 1500 g.p.m.

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

REMARKS
M.G.S. NO. 3733.

Located by: Minnesota Department of Health
Method: Digitization (Screen) - Map (1:24,000)
Unique Number Verification: Information from owner
Input Date: 11/18/2003
System: *UTM - Nad83, Zone15, Meters*
X: 479589 **Y:** 4948353

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 415 ft. 756 bags

Nearest Known Source of Contamination
50 feet W direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☑ Not Installed Date Installed 07/18/1996
Manufacturer's name GOULDS Model number 12CHC HP 125 Volts 460
Length of drop Pipe 290 ft. Capacity 1300 g.p.m Type Submersible Material Steel (black or low carbon)

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

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

Cuttings Yes
First Bedrock Glenwood
Last Strat Jordan
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 178 **ft.**

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Keys Well Co.	62012	UNERTL, S.

County Well Index Online Report **554215** Printed 6/22/2011 HE-01205-07

Minnesota Unique Well No.

562991

County Dakota
Quad Farmington
Quad ID 88B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 05/09/1997
Update Date 08/01/2006
Received Date

Well Name LAKEVILLE 12

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	17	BDDDAA	**Elevation Method**	1078 **ft.** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
585 **ft.**	585 **ft.**	05/01/1997

Drilling Method Cable Tool

Well Address
18500 DODD RD
LAKEVILLE MN 55044

Drilling Fluid Bentonite

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

Use Community Supply **PWS ID** 1190015 **Source** S10

Geological Material	Color	Hardness	From	To
CLAY	YELLOW	V.SOFT	0	20
SAND & GRAVEL	YELLOW	HARD	20	25
CLAY & STONES	GRAY	HARD	25	145
CLAY/ROCKS	YELLOW	HARD	145	165
CLAY	GRAY	MEDIUM	165	180
SAND/GRAVEL	VARIED	MEDIUM	180	216
ST. PETER SANDSTONE	VARIED	HARD	216	275
SHAKOPEE/ONEOTA	GRAY	HARD	275	485
JORDAN	TAN/WHT	SFT-MED	485	581
ST. LAWRENCE	GREEN	MEDIUM	581	585

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** 0 **ft.**

Casing Diameter	Weight	Hole Diameter
24 in. to 241 ft.	94.62 lbs./ft.	24 in. to 380 ft.
18 in. to 380 ft.	70.59 lbs./ft.	18 in. to 585 ft.

Open Hole from 380 ft. to 585 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
178 ft. from Land surface Date Measured 05/01/1997

PUMPING LEVEL (below land surface)
215 ft. after 8 hrs. pumping 1980 g.p.m.

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

REMARKS
M.G.S. NO. 3749.

Located by: Minnesota Department of Health **Method:** Digitization (Screen) - Map (1:24,000)

Unique Number Verification: Information from owner **Input Date:** 11/18/2003

System: *UTM - Nad83, Zone15, Meters* **X:** 480343 **Y:** 4947659

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Bentonite from 0 to 380 ft. 18 yrds.

Nearest Known Source of Contamination
__feet __direction __type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☑ Not Installed Date Installed 11/00/1997
Manufacturer's name LAYNE-HATACHI Model number 15DRC-3 HP 125 Volts 460
Length of drop Pipe 260 ft. Capacity __g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

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

Cuttings Yes
First Bedrock St.Peter
Last Strat St.Lawrence
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 216 **ft.**

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Renner E.H. Well	71015	SIGAFOOS, R.

County Well Index Online Report **562991** Printed 6/22/2011 HE-01205-07

Minnesota Unique Well No.

596650

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 12/28/1999
Update Date 08/01/2006
Received Date

Well Name LAKEVILLE 13

Township	Range	Dir	Section	Subsections	Elevation	Elevation Method
114	20	W	8	CBBBAB	1078 ft.	7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
611 ft.	611 ft.	07/02/1999

Drilling Method Cable Tool

Well Address
175TH ST
LAKEVILLE MN 55044

Geological Material	Color	Hardness	From	To
SAND & GRAVEL	BROWN	SOFT	0	30
CLAY	GRAY	SOFT	30	40
SAND, GRAVEL & CLAY	BRN/GRY	SOFT	40	167
SANDSTONE	WHT/GRY	MEDIUM	167	322
LIMEROCK	BRN/TAN	HARD	322	497
SANDSTONE	YEL/WHT	MEDIUM	497	600
SHALE	GRN/GRY	MEDIUM	600	611

Drilling Fluid Water

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

Use Community Supply **PWS ID** 1190015 **Source** S11

Casing Type Steel (black or low carbon) **Joint** Threaded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** ft.

Casing Diameter	Weight	Hole Diameter
24 in. to 184 ft.	94.62 lbs./ft.	24 in. to 416 ft.
18 in. to 416 ft.	70.59 lbs./ft.	18 in. to 611 ft.

Open Hole from 416 ft. to 611 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
17 ft. from Land surface Date Measured 03/17/1999

PUMPING LEVEL (below land surface)
195 ft. after 8 hrs. pumping 1500 g.p.m.

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

REMARKS
M.G.S. NO. 3993.

Located by: Minnesota Department of Health **Method:** GPS SA On (averaged)
Unique Number Verification: Information from owner **Input Date:** 08/16/1999
System: *UTM - Nad83, Zone15, Meters* **X:** 479614 **Y:** 4949163

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 416 ft. 1176 bags

Nearest Known Source of Contamination
100 feet W direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 07/01/1999
Manufacturer's name GOULD Model number 14RJLC HP 125 Volts 460
Length of drop Pipe 260 ft. Capacity 1200 g.p.m Type Submersible Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

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

Cuttings Yes
First Bedrock St.Peter
Last Strat St.Lawrence
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 167 ft.

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Keys Well Co.	62012	UNERTL, S.

County Well Index Online Report **596650** Printed 6/22/2011
HE-01205-07

Minnesota Unique Well No.

603073

County Dakota
Quad Farmington
Quad ID 88B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 01/24/2002
Update Date 08/01/2006
Received Date

Well Name LAKEVILLE 14

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	17	ACAAAA	**Elevation Method**	1070 **ft.** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
600 **ft.**	600 **ft.**	07/11/2001

Drilling Method Cable Tool

Well Address
KING PARK
LAKEVILLE MN 55044

Drilling Fluid Water

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

Use Community Supply **PWS ID** 1190015 **Source** S12

Geological Material	Color	Hardness	From	To
DRIFT	GRAY		0	143
SANDSTONE	YELLOW		143	262
SHALEY SANDSTONE	GRAY		262	275
SHALE	GRAY		275	287
LIMESTONE	GRY/TAN		287	490
SHALEY S.S.	GRAY		490	502
SANDSTONE	WHITE		502	595
SHALE	BLU/GRN		595	600

Casing Type Steel (black or low carbon) **Joint** No Information **Drive Shoe?** ☑ Yes ☐ No **Above/Below** **ft.**

Casing Diameter	Weight	Hole Diameter
24 in. to 144 ft.	94.62 lbs./ft.	24 in. to 365 ft.
18 in. to 365 ft.	70.59 lbs./ft.	17 in. to 600 ft.

Open Hole from 365 ft. to 600 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
180 ft. from Land surface Date Measured 03/16/2001

PUMPING LEVEL (below land surface)
205 ft. after 24 hrs. pumping 2000 g.p.m.

Well Head Completion
Pitless adapter manufacturer MONITOR Model 10PS1820
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

REMARKS
M.G.S. NO. 4075.

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 365 ft. 1176 bags

Located by: Minnesota Department of Health

Method: Digitization (Screen) - Map (1:24,000)

Unique Number Verification: Information from owner

Input Date: 11/18/2003

System: *UTM - Nad83, Zone15, Meters*

X: 480749 **Y:** 4947962

Nearest Known Source of Contamination
500 feet W direction Other type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 07/06/2001
Manufacturer's name GOULD Model number 14RJLC HP 125 Volts 460
Length of drop Pipe 300 ft. Capacity 1550 g.p.m Type Submersible Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

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

Cuttings Yes
First Bedrock St.Peter
Last Strat St.Lawrence
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 143 **ft.**

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Keys Well Co.	62012	SAMPSON, J.

County Well Index Online Report **603073** Printed 6/22/2011
HE-01205-07

Minnesota Unique Well No.

651737

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 01/22/2002
Update Date 03/11/2005
Received Date

Well Name LAKEVILLE 15

Township Range Dir Section Subsections Elevation 1017 **ft.**

114 20 W 19 ADAABC **Elevation Method** Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
517 **ft.**	515 **ft.**	02/28/2001

Drilling Method Other

Well Address
192ND ST
LAKEVILLE MN 55044

Drilling Fluid Water

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

Use Community Supply **PWS ID** 1190015 **Source** S13

Geological Material	Color	Hardness	From	To
SANDY CLAY	BROWN	SOFT	0	12
GRAVEL ROCKS	BROWN	SOFT	12	27
GRAVEL	GRAY	SOFT	27	30
SANDY CLAY	GRAY	SOFT	30	58
SANDY CLAY	BROWN	SOFT	58	70
ROCKS	BLK/BRN	MEDIUM	70	73
SANDSTONE	GRAY	MEDIUM	73	151
SANDSTONE & SHALE	GRAY	MEDIUM	151	153
SANDSTONE	GRAY	SOFT	153	177
SANDSTONE & SHALE	GRAY	MEDIUM	177	182
LIMESTONE	GRAY	MED-HRD	182	406
SANDSTONE	GRAY	MEDIUM	406	420
SANDSTONE	GRAY	SOFT	420	460
SANDSTONE	GRAY	SFT-MED	460	480
SANDSTONE SHALE	GRY/GRN	MEDIUM	480	510
SHALE	GREEN	MEDIUM	510	515

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** **ft.**

Casing Diameter	Weight	Hole Diameter
24 in. to 192 ft.	lbs./ft.	24 in. to 192 ft.
18 in. to 412 ft.	lbs./ft.	18 in. to 515 ft.

Open Hole from 412 ft. to 515 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
106 ft. from Land surface Date Measured 02/28/2001

PUMPING LEVEL (below land surface)
133.33 ft. after 1 hrs. pumping 1400 g.p.m.

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

NO REMARKS

Located by: Minnesota Department of Health **Method:** Digitization (Screen) - Map (1:24,000)

Unique Number Verification: Information from owner **Input Date:** 11/18/2003

System: *UTM - Nad83, Zone15, Meters* **X:** 479463 **Y:** 4946335

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 413 ft.

Nearest Known Source of Contamination
__feet __direction __type

Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

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

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Traut M.J. Well Co.	71536	TONY/ED

First Bedrock St.Peter
Last Strat St.Lawrence
Aquifer Jordan
Depth to Bedrock 73 **ft.**

County Well Index Online Report **651737** Printed 6/22/2011 HE-01205-07

Minnesota Unique Well No.

655907

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 03/03/2003
Update Date 01/16/2007
Received Date

Well Name LAKEVILLE 16

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	18	DDDADC		1059 ft.
					Elevation Method	Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
570 ft.	570 ft.	02/00/2003

Drilling Method Cable Tool

Well Address
18988 IRON RIVER TR
LAKEVILLE MN 55044

Drilling Fluid Water

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

Use Community Supply **PWS ID** 1190015 **Source** S14

Geological Material	Color	Hardness	From	To
CLAY & GRAVEL	GRAY	SOFT	0	140
SHALE & SAND	YELLOW	SOFT	140	184
SANDSTONE & SHALE	YEL/WHT	MEDIUM	184	208
SANDSTONE	WHITE	MEDIUM	208	250
LIMESTONE	GRAY	HARD	250	450
SANDSTONE	WHITE	MEDIUM	450	565
SHALE	GREEN	MEDIUM	565	570

Casing Type Steel (black or low carbon) **Joint** No Information **Drive Shoe?** ☑ Yes ☐ No **Above/Below** ft.

Casing Diameter	Weight	Hole Diameter
24 in. to 184 ft.	lbs./ft.	24 in. to 466 ft.
18 in. to 466 ft.	lbs./ft.	18 in. to 570 ft.

Open Hole from 466 ft. to 573 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
139 ft. from Land surface Date Measured 10/14/2002

PUMPING LEVEL (below land surface)
176 ft. after 12 hrs. pumping 1400 g.p.m.

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

REMARKS
M.G.S. NO. 4236.

Located by: Minnesota Department of Health
Method: Digitization (Screen) - Map (1:24,000)
Unique Number Verification: Information from owner
Input Date: 11/18/2003
System: *UTM - Nad83, Zone15, Meters*
X: 479516 **Y:** 4946901

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 466 ft. 588 bags

Nearest Known Source of Contamination
50 feet South West direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 02/00/2003
Manufacturer's name GOULD Model number 13CMC HP 125 Volts 460
Length of drop Pipe 300 ft. Capacity 1400 g.p.m Type Submersible Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

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

Cuttings Yes
First Bedrock St.Peter
Last Strat St.Lawrence
Aquifer Jordan
Depth to Bedrock 184 ft.

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Keys Well Co.	62012	GALVIN, M.

County Well Index Online Report **655907** Printed 6/22/2011
HE-01205-07

Minnesota Unique Well No.

694913

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 0
Update Date 07/19/2007
Received Date 07/26/2004

Well Name LAKEVILLE 17

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	8	BBCACC	1082 ft.	Elevation Method: Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
607 ft.	607 ft.	06/01/2004

Drilling Method Cable Tool

Well Address
17100 IPAVA AV
LAKEVILLE MN 55044

Drilling Fluid Bentonite

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

Use Community Supply **PWS ID** 1190015 **Source** S15

Geological Material	Color	Hardness	From	To
HARD DRY CLAY	BROWN	MEDIUM	0	15
ROCKS/GRAVEL	BROWN	MEDIUM	15	23
CLAY & GRAVEL	BROWN	HARD	23	248
RUBBLE/ST. PETER	GRAY	MEDIUM	248	266
ST. PETER S.S.	LT. GRY	MEDIUM	266	316
SHAKOPEE DOLOMITE	GRAY	HARD	316	499
JORDAN SANDSTONE	GRY/WHT	MEDIUM	499	599
SANDY SHALE	BLU/GRN	MED-HRD	599	607

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** ft.

Casing Diameter	Weight	Hole Diameter
24 in. to 272 ft.	94.63 lbs./ft.	24 in. to 415 ft.
18 in. to 415 ft.	70.59 lbs./ft.	19 in. to 607 ft.

Open Hole from 415 ft. to 607 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
176.1 ft. from Land surface Date Measured 03/30/2004

PUMPING LEVEL (below land surface)
206.31 ft. after 24 hrs. pumping 2000 g.p.m.

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

REMARKS
M.G.S. NO. 4310.

Located by: Minnesota Department of Health **Method:** GPS SA Off (averaged)
Unique Number Verification: Information from owner **Input Date:** 08/23/2004
System: *UTM - Nad83, Zone15, Meters* **X:** 479668 **Y:** 4949702

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from to 415 ft. 22 yrds.

Nearest Known Source of Contamination
200 feet N direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 06/00/2004
Manufacturer's name GOULDS Model number 13CHC-4 HP 125 Volts 480
Length of drop Pipe 290 ft. Capacity 1400 g.p.m Type Submersible Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

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

First Bedrock St.Peter
Last Strat St.Lawrence
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 266 ft.

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Renner E.H. Well	71015	COLBURN, S.

County Well Index Online Report **694913** Printed 6/22/2011
HE-01205-07

Minnesota Unique Well No.

745558

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 01/05/2007
Update Date 10/09/2007
Received Date 04/04/2007

Well Name LAKEVILLE 18

Township	Range	Dir	Section	Subsections	Elevation Method	Elevation
114	20	W	17	BCCDBC	7.5 minute topographic map (+/- 5 feet)	1093 ft.

Well Depth	Depth Completed	Date Well Completed
864 ft.	864 ft.	02/00/2007

Drilling Method Dual Rotary

Well Address
18400 IPAVA AV
LAKEVILLE MN 55044

Drilling Fluid Water

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

Geological Material	Color	Hardness	From	To
CLAY	BROWN	SOFT	0	5
SAND & GRAVEL	BROWN	SOFT	5	28
CLAY	GRAY	SOFT	28	47
SAND & GRAVEL	BROWN	SOFT	47	61
SANDY CLAY	GRAY	MEDIUM	61	76
CLAY	GRAY	SOFT	76	86
SAND & GRAVEL	VARIED	SOFT	86	96
CLAY	GRAY	MEDIUM	96	166
CLAY & GRAVEL	BROWN	SOFT	166	174
GRANITE BOULDER WHT RED BLACK	VARIED	HARD	174	176
CLAY	GRAY	MEDIUM	176	198
SAND & GRAVEL	VARIED	SOFT	198	209
SAND & GRAVEL	VARIED	SOFT	209	211
FINE SAND	GRAY	SOFT	211	221
FINE SANDSTONE	GRAY	SOFT	221	243
SANDSTONE & SHALE LAYERS	VARIED	SOFT	243	247
SANDSTONE & SHALE	TAN/GRY	MEDIUM	247	248
SANDSTONE & SHALE	GRAY	MEDIUM	248	250
SANDSTONE	GRAY	MEDIUM	250	254
SANDSTONE & SHALE	TAN/GRY	MEDIUM	254	274
SANDSTONE	TAN	MEDIUM	274	279
SANDSTONE	TAN/GRY	MEDIUM	279	284
SANDSTONE & SHALE	TAN/GRY	MEDIUM	284	289
SANDSTONE & PYRITE	GRAY	HARD	289	294
SANDSTONE	GRAY	HARD	294	301
LMS W/TAN SANDST. LAYER 304-304.5	GRAY	HARD	301	306
LMS	GRAY	HARD	306	311
LMS W/TAN SANDSTONE LAYERS	GRAY	HARD	311	316
LMS	GRAY	HARD	316	324
SANDSTONE	TAN	HARD	324	326
LMS W/TAN SANDSTONE LAYERS	TAN	HARD	326	331
LMS	GRAY	HARD	331	341
LMS & SANDSTONE LAYERS	GRAY	HARD	341	346
LMS W/BRN LAYER (348-348.5)	GRAY	HARD	346	351
LMS	GRAY	HARD	351	361
LMS	TAN	HARD	361	366
LMS	TAN/GRY	HARD	366	386
LMS W/TAN SANDST. LAYER 389-389.5	TAN/GRY	HARD	386	391
LMS W/FEW TAN SANDSTONE LAYERS	TAN/GRY	HARD	391	396
LMS W/PYRITE	TAN/GRY	HARD	396	401
LMS W/PYR. ONE TAN SS LAYER 402-04	TAN/GRY	HARD	401	406
LMS W/PYRITE	BRN/GRY	HARD	406	411
LMS W/PYRITE, BRN/TAN/GREY		HARD	411	416
LMS W/PYRITE	TAN/GRY	HARD	416	421
LMS W/TAN SANDSTONE LAYERS	TAN/GRY	HARD	421	426
LMS W/TAN SANDSTONE LAYERS	GRAY	HARD	426	431
LMS W/TAN SANDSTONE LAYERS	TAN/GRY	HARD	431	436
LMS	GRY/TAN	HARD	436	451
LMS	TAN	HARD	451	491
LMS	GRAY	HARD	491	497
LMS	GRAY	HARD	497	498
SANDSTONE	GRAY	HARD	498	503
SANDSTONE W/LMS LAYER 503-503.5	GRAY	HARD	503	508
SANDSTONE & GREEN SHALE	GRAY	HARD	508	523
SANDSTONE	GRAY	HARD	523	538
SANDSTONE & GREEN SHALE	GRAY	HARD	538	548
SANDSTONE	GRAY	HARD	548	573
SANDSTONE & GREEN SHALE	GRAY	HARD	573	593
SANDSTONE	GRAY	HARD	593	603
SANDSTONE W/GREEN SHALE LAYERS	GRAY	HARD	603	618
SANDSTONE W/GREEN SHALE LENSES	GRAY	HARD	618	628
SILTSTONE	GRAY	HARD	628	633

Use Community Supply **PWS ID** **Source**

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** **ft.**

Casing Diameter	Weight	Hole Diameter
18 in. to 254 ft.	70.59 lbs./ft.	18 in. to 254 ft.
12 in. to 667 ft.	49.56 lbs./ft.	17 in. to 864 ft.

Open Hole from 667 ft. to 864 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
214 ft. from Land surface Date Measured 02/14/2007

PUMPING LEVEL (below land surface)
378 ft. after 12 hrs. pumping 600 g.p.m.

LMS	GRAY	HARD	633	648
LMS	GRY/TAN	HARD	648	657
SILTSTONE	GRY/TAN	HARD	657	663
SANDSTONE & GREEN SHALE	GRAY	HARD	663	668
SANDSTONE & GRN. SHALE W/SILTSTONE	GRAY	HARD	668	673
SANDSTONE & GREEN SHALE	GRAY	HARD	673	688
SANDSTONE & GRN SHALE, GRY/BRN LAY	GRY/BRN	HARD	688	693
LMS	VARIED	HARD	693	695
SANDSTONE & GREEN SHALE	GRAY	HARD	695	720
SANDST & GRN. SHALE, GRY/TAN LAYER	GRY/TAN	HARD	720	775
SANDSTONE	TAN/GRY	HARD	775	780
SANDSTONE & GREEN SHALE	GRY/TAN	HARD	780	785
SANDSTONE	GRY/TAN	HARD	785	790
SANDSTONE & GREEN SHALE	GRY/TAN	HARD	790	795
SANDSTONE & GREEN SHALE	GRAY	HARD	795	808
SANDSTONE & GREEN SHALE	GRAY	HARD	808	809
SANDSTONE	GRAY	HARD	809	844
SANDSTONE & GREEN SHALE	GRAY	HARD	844	864

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

REMARKS
GAMMA LOGGED 1-4-2007. M.G.S. NO. 4653. LOGGED BY JIM TRAEN.

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from to 667 ft. 28 yrds.

Located by: Minnesota Geological Survey **Method:** Digitization (Screen) - Map (1:24,000)

Unique Number Verification: Info/GPS from data source **Input Date:** 01/05/2007

System: *UTM - Nad83, Zone15, Meters* **X:** 479663 **Y:** 4947647

Nearest Known Source of Contamination
20 feet N direction Sewer type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

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

Cuttings Yes **Borehole Geophysics** Yes

First Bedrock St.Peter **Aquifer** Franconia-Ironton-Galesvill

Last Strat Ironton-Galesville **Depth to Bedrock** 209 **ft.**

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Mark J Traut Wells, Inc.	1404	MATTHEW/TONY

County Well Index Online Report **745558** Printed 6/22/2011
HE-01205-07

Minnesota Unique Well No.

686288

County Dakota
Quad Farmington
Quad ID 88B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 09/25/2008
Update Date 05/13/2009
Received Date

Well Name LAKEVILLE 19

Township Range Dir Section Subsections Elevation 992 **ft.**

Township	Range	Dir	Section	Subsections	Elevation Method
114	20	W	10	BACACB	7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
545 **ft.**	545 **ft.**	05/00/2009

Drilling Method Cable Tool

Well Address
17191 GERDINE PA
LAKEVILLE MN 55068

Drilling Fluid Bentonite

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

Use Community Supply **PWS ID** **Source**

Geological Material	Color	Hardness	From	To
TOP SOIL	BLACK	SOFT	0	5
SAND & CLAY	YELLOW	SOFT	5	10
CLAY	YELLOW	SOFT	10	15
CLAY	GRAY	SOFT	15	59
CLAY & GRAVEL/ROCKS	GREEN	SOFT	59	165
CLAY & SANDROCK	GREEN	SOFT	165	170
CLAY	GRAY	MEDIUM	170	175
SANDROCK	YELLOW	MEDIUM	175	235
LIMEROCK	GRAY	HARD	235	445
SANDSTONE	GRAY	MEDIUM	445	535
SHALE & SANDROCK	BLU/GRY	MEDIUM	535	545

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** **ft.**

Casing Diameter	Weight	Hole Diameter
24 in. to 195 ft.	94.71 lbs./ft.	24 in. to 341 ft.
18 in. to 341 ft.	70.65 lbs./ft.	17 in. to 545 ft.

Open Hole from 341 ft. to 545 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
95 ft. from Land surface Date Measured 12/18/2008

PUMPING LEVEL (below land surface)
132 ft. after 24 hrs. pumping 1200 g.p.m.

Well Head Completion
Pitless adapter manufacturer BAKER Model 11PS1820
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

REMARKS
M.G.S. NO. 4919.

Located by: Minnesota Department of Health **Method:** GPS SA Off (averaged)
Unique Number Verification: N/A **Input Date:** 07/21/2008
System: *UTM - Nad83, Zone15, Meters* **X:** 483267 **Y:** 4949707

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from to 341 ft. 14 yrds.

Nearest Known Source of Contamination
250 feet S direction Body of water type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 05/12/2009
Manufacturer's name GOULDS Model number 13CMC HP 125 Volts 460
Length of drop Pipe 262 ft. Capacity 1250 g.p.m Type Submersible Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

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

Cuttings Yes
First Bedrock St.Peter
Last Strat Jordan-St.Lawrence
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 175 **ft.**

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Keys Well Drilling Co.	1347	ALLAN, J.

County Well Index Online Report **686288** Printed 6/22/2011
HE-01205-07

Appendix B

Part 1 Wellhead Protection Plan

resourceful. naturally.
engineering and environmental consultants

BARR

February 10, 2012

Mr. Steve Robertson
Drinking Water Protection Section
Minnesota Department of Health
625 Robert Street N.
P.O. Box 64975
St. Paul, MN 55164-0975

Re: Amendment to City of Lakeville Part 1 Wellhead Protection Plan

Dear Mr. Robertson:

On behalf of the City of Lakeville, this letter is intended to amend Part 1 of the Lakeville Wellhead Protection Plan and to fulfill the current requirements of Minnesota Rule 4720.5570.

As you know, the City of Lakeville's existing WHPP was last updated in November 2002. Since then the City has constructed three new municipal water supply wells (unique well numbers are shown in parentheses in the following list): Well 17 (694913), Well 18 (745558), and Well 19 (686288) (see Attachment A for well records). Well 7 (161439) is currently out long term and projected pumping rates to use in a delineation are zero gallons per minute; therefore no formal delineation of the wellhead protection area was conducted. Rather, only an Inner Wellhead Protection Zone of 200 feet has been delineated around Well 7. Also, since the last delineation of the City's Wellhead Protection Area (WHPA) and Drinking Water Supply Management Area (DWSMA) the Minnesota Department of Health (MDH) has instituted additional requirements for inclusion of fracture-flow analysis.

This amendment summarizes work completed to update the WHPA and DWSMA for the City of Lakeville. This work consists of including the new municipal wells in the groundwater flow model used for WHPA delineation, updating projected pumping rates for high capacity wells in the Lakeville area, and the delineation of fractured and porous-media flow capture zones for all wells. Based on this work, a new WHPA and DWSMA were delineated. Well and aquifer vulnerabilities were also reassessed and updated.

Wellhead Protection Area Delineation

Delineation of the WHPA for the Lakeville municipal wells involved the evaluation of both porous-media flow and fractured-media flow. First, the capture zones for each well were delineated based on porous-media flow and then the capture zones were also delineated according to the procedures described in the MDH guidance for WHPA delineations in fractured and solution-weathered bedrock (MDH, 2005).

Data Elements

The following highlights data elements identified in the Scoping Decision Notice Number 1 (MDH, 2011a) that have changed since the previous plan was prepared or were not considered in the previous plan.

Precipitation

The average monthly and annual precipitation for the last five years is shown in Table 1. Recharge for the groundwater flow model was determined using the SWB recharge model (Westenbroek et. al., 2010) of the Twin Cities Metropolitan Area (Metropolitan Council, 2009).

Geology

The bedrock geology of the Lakeville area is shown on Figure 1. The stratigraphy of the glacial drift aquifer is complex and consists of several thick sequences of till with large outwash sand and gravel lenses. Geologic cross-sections are presented on Figures 2 and 3. The hydrologic conceptual model is presented in Metropolitan Council (2009). Aquifer transmissivity as determined from aquifer tests was used for updating the WHPA (see section *Criteria for Wellhead Protection Delineation* below). Well records from the Minnesota Geological Survey's County Well Index (CWI) were reviewed during construction of the groundwater flow model and for the assessment of aquifer vulnerability. Well Records for the City's wells are presented in Attachment A.

Soils

Maps of soils, along with information on each soils hydrologic group (A, B, C, D) from the Natural Resources Conservation Service (NRCS) and Soil Survey Geographic Database (SSURGO) were used in the SWB recharge model to help define recharge rates used in the groundwater flow model. Surficial geology from Meyer (2007) was used for assessing aquifer vulnerability.

Land Use

Land cover data from the United States Geological Survey (USGS, 2003) was used in the SWB recharge model. Property parcels were used in delineating the DWSMA.

Public Utility Services

The projected daily volume of water pumped by Lakeville's municipal wells used for WHPA delineations was calculated based on historical pumping records. First, a projected water use for 2016 was estimated based on the City's Water Supply Plan (City of Lakeville, 2008). Second, total annual volume pumped by the City's wells was determined for the period 2006 through 2010 from Minnesota Department of Natural Resources (DNR) State Water Use Data System (SWUDS) information.

Once the total annual volume was determined for the period 2006 through 2010, the projected pumping of each well for the year 2016 was determined. Projected annual pumping for the year 2016 from each of the City's wells was determined by distributing the projected 2016 total annual volume amongst the wells using estimated annual percentage for each well (Table 2). Table 2 summarizes the historical and projected distribution of the annual withdrawal among Lakesville's municipal wells. Table 2 also indicates that Well 7 is an emergency backup well. Unaccounted for water is typically around 6% of total usage.

Surface Water Quantity

Baseflow measurements for the Vermillion River and the Minnesota River were used during calibration of the Twin Cities Metropolitan Area Regional Groundwater Flow Model Version 2.0 (Metro Model II) developed by Barr Engineering for the Metropolitan Council (Metropolitan Council, 2009). The Metro Model II groundwater flow model was used as the base model for this study. For details about the different baseflow reaches in the model and how they were used during model calibration see Metropolitan Council (2009).

Groundwater Quantity

High capacity wells with water use permit records maintained by the DNR through the SWUDS database were included in the groundwater flow model. Pumping rates for wells within ten miles of Lakeville were updated using the average pumping rate from 2006 to 2010. Pumping rates for high capacity wells farther from Lakeville were set at the pumping rate used in the Metro Model II (i.e., average reported water use from 2003-2007). The Metropolitan Council has identified Lakeville as an area of potential concern for well interference and impact to trout habitat (Metropolitan Council, 2010). Several monitoring wells have been installed to facilitate collection of data for evaluating drawdown related to pumping of the City's wells.

Surface Water and Groundwater Quality

Surface water and groundwater quality data are submitted to the appropriate public agency (e.g. MDH, MPCA, Dakota County Soil and Water Conservation District, and Vermilion River Watershed Joint Powers Organization). No additional, unreported data are known.

Criteria for Wellhead Protection Area Delineation

Time of Travel

A 10-year time of travel was used to delineate the new WHPA for the City of Lakeville.

Flow Boundaries

The major groundwater flow boundary in the area is the Minnesota River to the north. The Vermillion River to the south likely acts as a flow boundary for groundwater flow at the water table and upper bedrock but likely has little influence on the deeper bedrock conditions (Metropolitan Council, 2009). Details on the groundwater flow boundaries used for groundwater flow modeling are presented in Metropolitan Council (2009). Major rivers and lakes within the model domain are simulated using the River Package within MODFLOW.

Daily Volume

The projected daily pumping rate for each well was determined for year 2016 as described above and shown in Table 2. For each well, the greater of the projected 2016 pumping or the maximum pumping observed during the period 2006 through 2010 was used as the pumping rate for the WHPA delineation.

Groundwater Flow Field

The groundwater flow field used for delineation of the WHPA was determined by the groundwater flow model (Figures 4 to 6).

Aquifer Transmissivity

Pumping tests were conducted at Well 18 (Tunnel City – Wonewoc Aquifer) and Well 19 (Prairie du Chien – Jordan Aquifer). The transmissivity of the Prairie du Chien – Jordan Aquifer as determined from the Well 19 pumping test ranged from 640 m^2/day to 890 m^2/day. The transmissivity estimated from the recovery phase of the pumping test (640 m^2/day) was deemed to be most reliable. The transmissivity of the Tunnel City – Wonewoc aquifer as determined from the Well 18 pumping test ranged from 62 m^2/day to 93 m^2/day with a mean transmissivity of 80 m^2/day (Liesch and Associates, 2007). The results from these pumping tests were incorporated into the groundwater flow model as discussed below in the section *Updates to Groundwater Flow Model.* Results of the pumping tests are included in Attachment B.

Porous-Media Flow Evaluation

The porous-media flow capture zone for each of the Lakeville wells was delineated using a slightly modified version of the Metro Model II which uses the modeling code MODFLOW-96 (McDonald and Harbaugh, 1988; Harbaugh and McDonald, 1996). This groundwater flow model is a nine-layer model in which layer 1 generally represents the Quaternary glacial drift aquifer, layer 2 represents the St. Peter Sandstone aquifer, layer 3 represents the Prairie du Chien Group aquifer, layer 4 represents the Jordan Sandstone aquifer, layer 5 represents the St Lawrence Formation, layer 6 represents the Lone Rock Formation, layer 7 represents the Wonewoc Sandstone, layer 8 represents the Eau Claire Formation, and layer 9 represents the Mount Simon Sandstone. For all model layers, where the bedrock units are not present, characteristics of the Quaternary glacial drift are used. The effect of buried bedrock valleys on the groundwater flow system are simulated in this manner. Updates to the Metro Model II are discussed in the following section.

Updates to Groundwater Flow Model

The groundwater flow model used as the base for this study is described in detail in Metropolitan Council (2009). Minor changes were incorporated into the groundwater flow model for this study. Pumping rates for the Lakeville wells were adjusted to reflect future pumping projections. Pumping rates for high capacity wells within 10 miles of Lakeville were adjusted and set at the average pumping rate for the period 2006-2010 based on the Minnesota Department of Natural Resources' SWUDS database. The model grid was refined in the vicinity of the Lakeville municipal wells to allow for a more accurate delineation of the porous-media flow capture zones. The grid cell size was set at 10 x 10 meters around the wells and expands in size to 500 x 500 meters away from the wells.

After the model grid was refined, hydraulic conductivity zones were adjusted. Hydraulic conductivity zones for model layers 1 to 6 representing the Quaternary Sediments, St. Peter Sandstone, Prairie du Chien Group, Jordan Sandstone, St. Lawrence Formation, Tunnel City Group and Wonewoc Sandstone are shown on Figures 7 to 13.

The hydraulic conductivity values of the Prairie du Chien Group and Jordan Sandstone were adjusted to correlate to the results of pumping tests conducted at Lakeville Well 19. The total transmissivity of the Prairie du Chien – Jordan aquifer as determined from the pumping test was 640 m^2/day. The Prairie du Chien Group and Jordan Sandstone are simulated as separate units (layers) in the groundwater flow model

(layer 3 and 4 respectively). The total transmissivity of the two units as determined from the pumping test was distributed in the following manner to establish hydraulic conductivity values for the two units. The hydraulic conductivity of the Jordan Sandstone was determined based on the pumping test conducted at Rosemount Wells 7, 8 and 9 which are all open to the Jordan Sandstone. The hydraulic conductivity of the Jordan Sandstone based on this test is estimated to be 8.4 m/day. Using this hydraulic conductivity and the thickness of the Jordan Sandstone at Lakeville Well 19 (27.4 m) results in a transmissivity of the Jordan Sandstone of 230 m^2/day. The remainder of the total transmissivity estimated from the Lakeville Well 19 test is 410 m^2/day (640 m^2/day minus 230 m^2/day). The thickness of the Prairie du Chien Group at Lakeville Well 19 is 64.0 m which results in a hydraulic conductivity of 6.4 m/day. For the Lakeville WHPP model, hydraulic conductivity zones for the Prairie du Chien Group and Jordan Sandstone in the vicinity of Lakeville were set at 6.4 m/day and 8.4 m/day respectively.

The hydraulic conductivity of the Tunnel City Group and Wonewoc Sandstone were adjusted based on the results of the pumping test conducted at Lakeville Well 18. The total transmissivity of the two units determined from the pumping test was 79.5 m^2/day. The Tunnel City Group and Wonewoc Sandstone are simulated as separate units (layers) in the groundwater flow model (layer 6 and 7 respectively). The total transmissivity of the two units was distributed in the following manner to establish hydraulic conductivity values for the two units. Based on Runkel et al. (2003) the average hydraulic conductivity of the Tunnel City Group for deep bedrock conditions is 1.8 m/day and the average hydraulic conductivity for the Wonewoc Sandstone is 3.3 m/day. Using the ratio of these regionally derived hydraulic conductivity estimates and unit thicknesses of 46 m and 17 m for the Tunnel City Group and Wonewoc Sandstone the total transmissivity as determined from the Well 18 pumping test was distributed resulting a hydraulic conductivity of the Tunnel City Group of 1.0 m/day and a hydraulic conductivity of the Wonewoc Sandstone of 1.9 m/day.

As agreed upon at the August 9, 2010 Pre-Delineation Meeting, no additional model calibration was conducted. Simulated hydraulic head values correlate well with measured values. The final optimized model had the following characteristics for hydraulic head calibration targets in the Lakeville area:

- Mean residual = 2.7 m (8.9 ft)
- Residual standard deviation = 31.8 ft (9.7 m)

A plot of simulated hydraulic heads verses measured hydraulic heads are shown on Figure 14.

Particle Tracking

The regional groundwater flow direction for the Prairie du Chien Group and Jordan Sandstone, as determined from the groundwater flow model is shown on Figures 4 and 5 and is consistent with Sanocki et al., 2009. The 1-year and 10-year porous-media flow capture zones for the Lakeville wells were delineated using particle tracking from the groundwater flow model. A minimum of 100 particles were tracked from each well. Particles were released from 5 vertical points along the open section of each aquifer supplying a well. Porosity values for the Quaternary sediments, St. Peter Sandstone, Prairie du Chien Group, and Jordan Sandstone, St Lawrence Formation, Tunnel City Group, and Wonewoc Sandstone were 0.25, 0.283, 0.056, 0.2, 0.2, 0.253, and 0.253 respectively (Norvitch at al., 1974, Schwartz and Zhang, 2003). Particles were tracked backwards in time from each well for both one and ten years. When viewed in plan view, the area encompassed by the particle traces were then outlined as the one- and ten-year porous-media capture zones (Figure 15).

Sensitivity Analysis

A sensitivity analysis was performed using the auto sensitivity option in Ground Water Vistas (Environmental Simulations Inc., 2007). The model was most sensitive to the horizontal hydraulic conductivity for Zone 15 (Quaternary sediments), Zones 256 and 258 (Prairie du Chien Group), Zones 340, 342, and 362 (Jordan Sandstone), and Zone 601 (Wonewoc). Output from the sensitivity analysis is presented in Attachment C; see Figure 7 to Figure 13 for locations of hydraulic conductivity zones.

Fracture Flow

The Prairie du Chien Group is classified as being highly fractured over much of the Twin Cities metropolitan area. Wells 9, 10, 11, 12, 13, 14, 17, and 19 are open to the Prairie du Chien and Jordan Aquifers. To address possible fracture flow to these wells, MDH (2005) guidelines for delineating WHPAs in fractured and solution-weathered bedrock were followed using Delineation Technique Number 3 (wells open to both porous media and fractured aquifers). Wells 2, 3, 4, 5, 6, 8, 15, and 16 are open to the Jordan Aquifer. Delineation Technique 4 was used for these wells (wells open to a porous media aquifer that is hydraulically connected to a fractured bedrock aquifer). Comparisons of the volume of water in the capture zones generated by porous media delineation to the volume of water pumped (as described in Step 3 of Delineation Technique 4) indicate that a leaky condition exists and the Prairie du Chien aquifer likely supplies a significant amount of water to the wells open solely to the Jordan Aquifer. Also, 10 year particle tracking shows particles originating from wells open solely to the Jordan Aquifer extend into the Prairie du Chien Aquifer. As discussed at the August 9, 2010 Pre-Delineation Meeting wells in the central well field (6, 8, 9, 10, 11, 12, 13, 14, 15, 16, and 17) were grouped together and one

fracture flow capture zone was determined for the entire well field. The pumping volumes were summed together and the center of the fracture flow capture zone was set at the approximate center of the well field. Similarly, Wells 2, 4, and 19 were also grouped together for purposed of fracture flow capture zone delineation.

Preliminary fixed-radius fracture-flow capture zones for the Lakeville wells were extended to account for overlap of capture zones of nearby high capacity wells. These included: Apple Valley municipal wells (unique numbers 205820, 207677, 127263, 127277, 127297, 151561, 151563, 191943, 449257, 433284, 205823, 603075, 674495, 731113, 207675), and unique numbers 694923, 694924, and 526581. For these additional high capacity wells the maximum average pumping rates from 2005-2010 were used. Projections of future pumping rates were determined only for the Lakeville municipal wells. The general procedure for accounting for overlapping capture volumes presented in MDH (2005) was followed except the areas of overlap were calculated using geometric functions within ArcGIS™ rather than using the short and long axis of the overlap. Calculation of the overlap with ArcGIS™ allows for a more accurate redistribution of the shared volumes and allows for easier calculation when more than two wells overlap.

Fracture flow capture zones were also calculated for the cities of Farmington and Rosemount wells, along with unique numbers 462149, 235586, 664152, and 561802. However, the capture zones from these wells did not intersect the capture zones for the Lakeville wells and were not considered in the overlap adjustment calculations.

The fixed radius fracture flow capture zone for Well 3 was extended up-gradient based on the direction of groundwater flow as determined from the porous-media groundwater flow model. Fracture flow capture zones were not extended along fracture orientations as no data are currently available indicating fracture orientations in the Lakeville area. A composite fracture-flow capture zone was defined by combining the components of the fracture-flow analysis for each individual well (Figure 15). A summary of the calculations used in the delineation of fracture flow capture zones is presented in Attachment D.

Well Head Protection Area

The capture zones as delineated for both porous media flow and fracture flow were combined to obtain a preliminary WHPA. Data were assessed to determine if a conjunctive delineation is necessary for capture zones with high aquifer vulnerabilities. In coordination with the MDH (MDH, 2011c) it was determined that a conjunctive delineation was not necessary. This assessment was based on the following: depth of

open intervals for the wells, widespread (but not complete) coverage of the St Peter Formation on top of the Prairie du Chien Group, and recent water quality results.

Recent water quality results from Well 19 and Well 2 are presented below. These data suggest that Well 19 falls in groundwater Category C (post-1953, un-impacted groundwater) for groundwater characterization supporting assessment source water monitoring (MDH, 2011b) and Well 2 falls between groundwater Category B4 (post-1953, impacted, non-pathogen grounds) and Category C. These results support the assessment that a conjunctive delineation is not necessary.

Results of Water Quality Sampling conducted in November, 2011.

Well	NH3 (mg/L)	Br (mg/L)	Cl	Br/Cl	NO3 (mg/L)	SO4 (mg/L)
Well 19 (686288)	0.20	0.0113	0.996	88	< 0.05	8.25
Well 2 (207708)	0.12	0.021	8.67	413	<0.05	16

The composite 1-year time of travel zones comprise the emergency response management zones (Figure 16).

DWSMA Delineation

The DWSMA encompasses the entire WHPA and is defined by property parcel boundaries. The DWSMA extends into the cities of Apple Valley and Farmington (Figure 16).

Well Vulnerability Assessment

Well vulnerability scoring sheets from the Minnesota Department of Health are presented in Attachment E. Wells 3, 4, 8, and 15 are classified as being vulnerable to contaminants released at the surface; all other wells are classified as being not vulnerable to surface contaminants.

DWSMA Vulnerability Assessment

Geologic logs listed in the CWI for wells in the vicinity of the DWSMA were reviewed and “L scores” based on the thickness of confining units above the Prairie du Chien Group at each well location were assigned to each well (Attachment F). (See DNR (1991) for a discussion of how to determine L scores).

L-Scores were compared to the surficial geology map from Meyer (2007) and the bedrock geology map from Mossler and Tipping (2000). Over most of the DWSMA, a thick sequence of till is present,

providing a significant amount of geologic protection from potential releases of contamination at the surface. This thick sequence of till results in an aquifer vulnerability rating of low over most of the DWSMA (Figure 17). In areas where clusters of L-scores showed low values, indicating less protection from surface releases, the geologic logs were reviewed further to determine if the low L-Score was from poorly described geology, or if indeed the thickness of low-permeability units is less in those areas. Near Well 3 and northeast of Wells 2, 4, and 19 the till is thin or absent and surficial geology is composed mostly of sand and gravel glacial outwash. In these areas, an aquifer vulnerability of high was assigned (Figure 17). A few geologic logs indicated the potential presence of a confining unit at the base of the St. Peter Sandstone consisting of siltstone or shale. However, the description of this unit was very inconsistent and the extent of this potential confining unit is not clearly known so it was not considered in assessing aquifer vulnerability.

One of the water quality parameters used for well vulnerability assessments (Attachment E) is tritium. Tritium (^3H), a radioactive isotope of hydrogen, whose atmospheric concentrations rose in the 1950s and early 1960s due to atmospheric hydrogen bomb testing, has been used extensively to date groundwater. Tritium activities peaked during atmospheric hydrogen bomb testing of the 1950s and 1960s, and values of ^3H in precipitation reached a maximum of approximately 10,000 T.U. (tritium units) in 1963 (Mazor, 2004). Natural production of ^3H in the upper atmosphere introduces approximately 5 T.U. to precipitation each year (Mazor, 2004). Because ^3H has a relatively short half-life of 12.43 years, radioactive decay since the bomb peak has reduced tritium activities to near background levels and ^3H is used mostly for relative age dating today. Groundwater that has little or no detectible ^3H is stated to be “vintage” or pre-bomb. Groundwater with detectable values of ^3H is stated to be “young” or post-bomb. The presence of tritium at concentrations above 1 tritium unit indicates the presence of a significant fraction of post-1954 (i.e., recently infiltrated) water in the groundwater sample. Tritium results from Well 7 indicate the presence of “old” water that was infiltrated prior to 1954. Tritium results from Wells 3, 4, 8, and 15 show detectable levels of tritium in the wells and indicate young water.

Model files and shapefiles pertaining to this amendment are included in Attachment G. Please contact me at (952) 832-2691 if you have any questions concerning this WHPA/DWSMA delineation amendment.

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

_____ Date: __February 10, 2012_

John C. Greer, P.G. (license no 30347)

Enclosures:
- Tables
- Figures
- Attachment A – Well Records
- Attachment B – Pumping Test Data
- Attachment C – Model Parameter Sensitivity Analysis
- Attachment D – Fracture-Flow Calculations
- Attachment E – MDH Well Vulnerability
- Attachment F – L-Scores
- Attachment G – Model files and GIS Shapefiles

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Table 1
Precipitation (inches) 2006-2010
City of Lakeville, MN

	2006	2007	2008	2009	2010	Average
January	0.30	0.00	0.00	0.00	0.55	0.17
February	0.00	0.00	0.40	0.00	1.16	0.31
March	2.01	2.30	1.97	1.43	0.96	1.73
April	1.91	1.11	3.75	1.95	1.36	2.02
May	1.96	2.97	2.98	1.29	4.17	2.67
June	2.81	2.61	2.90	3.35	7.13	3.76
July	2.49	0.83	2.39	1.82	6.51	2.81
August	8.00	8.55	2.18	7.85	5.89	6.49
September	2.36	3.32	1.74	2.05	5.52	3.00
October	0.51	3.50	2.05	3.90	1.61	2.31
November	0.86	0.00	1.38	0.16	2.07	0.89
December	2.13	1.48	1.15	1.83	1.60	1.64
Total	**25.34**	**26.67**	**22.89**	**25.63**	**38.53**	**27.812**

Data from: High Density Precipitation Network, Minnesota Climatology Working Group

Table 2
Annual and Projected Pumping Rates for Lakeville Wells

		Total Annual Withdrawal (gal/yr)				
Unique Number	Well Name	2006	2007	2008	2009	2010
207725	1	0	0	0	0	0
207708	2	534,760,000	443,890,000	499,530,000	289,860,000	190,990,000
207727	3	0	6,060,000	90,000	0	0
212650	4	308,550,000	568,670,000	296,660,000	291,330,000	247,470,000
241440	5	0	0	0	0	0
161409	6	22,650,000	17,100,000	10,560,000	4,230,000	0
161439	7*	20,000	30,000	0	0	0
433296	8	323,710,000	317,570,000	311,900,000	201,070,000	7,090,000
554192	9	172,570,000	231,700,000	185,610,000	64,600,000	0
554193	10	327,990,000	231,470,000	430,640,000	442,520,000	300,220,000
554215	11	91,340,000	71,970,000	28,860,000	100,300,000	0
562991	12	62,050,000	108,580,000	93,950,000	199,150,000	218,360,000
596650	13	90,290,000	148,480,000	84,620,000	73,400,000	148,490,000
603073	14	77,040,000	114,700,000	58,180,000	104,360,000	98,210,000
651737	15	63,180,000	76,930,000	52,390,000	45,560,000	66,460,000
655907	16	64,550,000	67,960,000	89,250,000	42,850,000	0
694913	17	215,000,000	130,920,000	100,000,000	106,330,000	34,640,000
745558	18	0	17,490,000	201,970,000	192,330,000	177,970,000
686288	19	0	0	0	230,040,000	603,050,000
	Totals	2,353,700,000	2,553,520,000	2,444,210,000	2,387,930,000	2,092,950,000

Source: Lakeville's MDNR Annual Appropriation Reports

		Percentage of Annual Withdrawal					
Unique Number	Well Name	2006	2007	2008	2009	2010	Average Annual % of Withdrawal
207725	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
207708	2	22.7%	17.4%	20.4%	12.1%	9.1%	16.4%
207727	3	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%
212650	4	13.1%	22.3%	12.1%	12.2%	11.8%	14.3%
241440	5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
161409	6	1.0%	0.7%	0.4%	0.2%	0.0%	0.4%
161439	7*	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
433296	8	13.8%	12.4%	12.8%	8.4%	0.3%	9.5%
554192	9	7.3%	9.1%	7.6%	2.7%	0.0%	5.3%
554193	10	13.9%	9.1%	17.6%	18.5%	14.3%	14.7%
554215	11	3.9%	2.8%	1.2%	4.2%	0.0%	2.4%
562991	12	2.6%	4.3%	3.8%	8.3%	10.4%	5.9%
596650	13	3.8%	5.8%	3.5%	3.1%	7.1%	4.7%
603073	14	3.3%	4.5%	2.4%	4.4%	4.7%	3.8%
651737	15	2.7%	3.0%	2.1%	1.9%	3.2%	2.6%
655907	16	2.7%	2.7%	3.7%	1.8%	0.0%	2.2%
694913	17	9.1%	5.1%	4.1%	4.5%	1.7%	4.9%
745558	18	0.0%	0.7%	8.3%	8.1%	8.5%	5.1%
686288	19	0.0%	0.0%	0.0%	9.6%	28.8%	7.7%

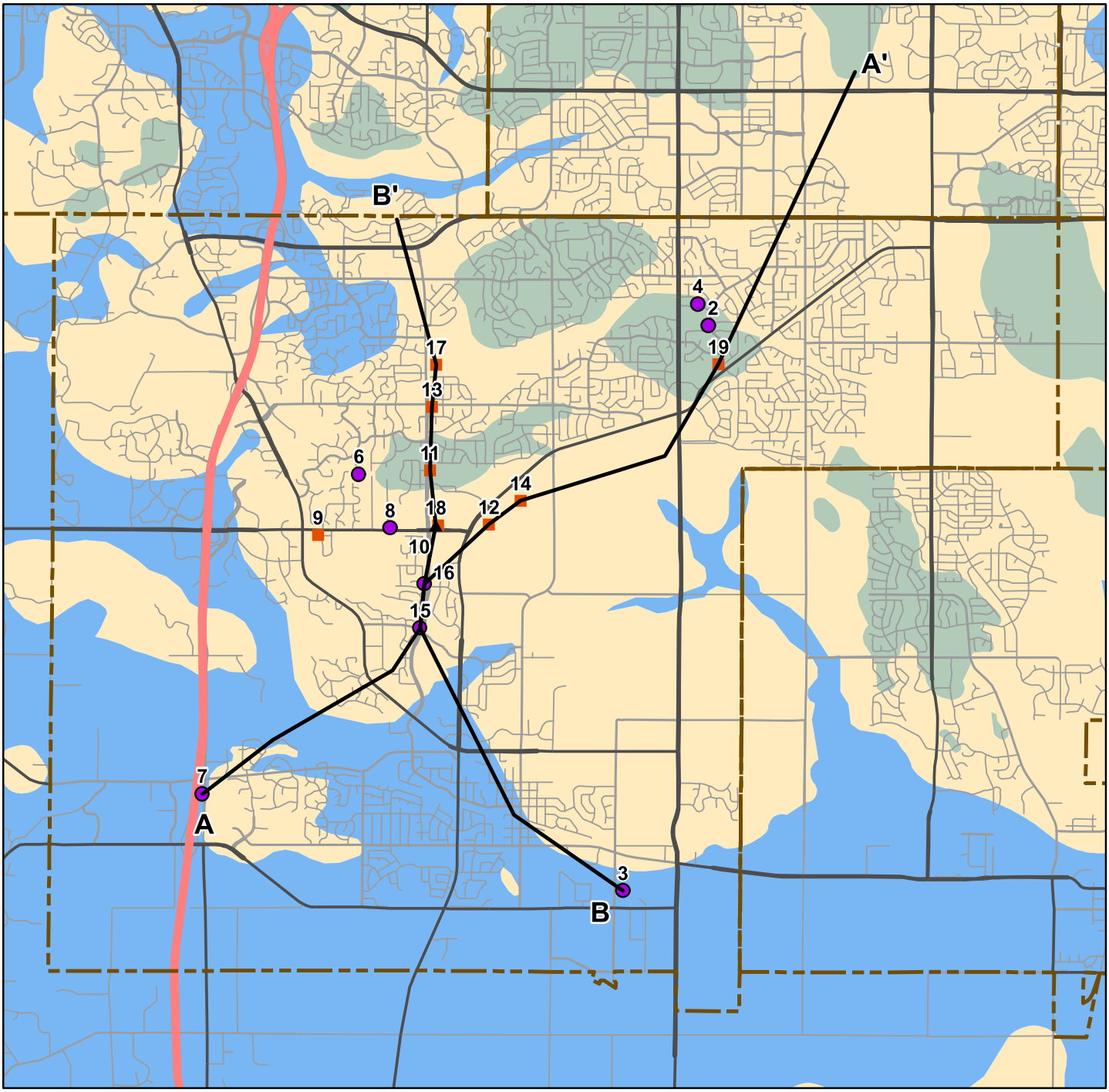
		Projected Water Use (2016)			Maximum Total Pumping for Model Input[4]		
Unique Number	Well Name	Total[1] (gal/yr)	% of Total Projected Water Use Well[2]	Projected Well Pumpage Based on %[3] (gal/yr)	gal/yr	gal/day	m^3/day
207725	1		0.0%	0	0	0	0
207708	2		11.0%	336,050,000	534,760,000	1,465,096	5,545
207727	3		0.0%	0	6,060,000	16,603	63
212650	4		12.0%	366,600,000	568,670,000	1,558,000	5,897
241440	5		0.0%	0	0	0	0
161409	6		1.0%	30,550,000	30,550,000	83,699	317
161439	7*		0.0%	0	0	0	0
433296	8		10.0%	305,500,000	323,710,000	886,877	3,357
554192	9		6.0%	183,300,000	231,700,000	634,795	2,403
554193	10		15.0%	458,250,000	458,250,000	1,255,479	4,752
554215	11		2.5%	76,375,000	100,300,000	274,795	1,040
562991	12		6.5%	198,575,000	218,360,000	598,247	2,264
596650	13		5.0%	152,750,000	152,750,000	418,493	1,584
603073	14		8.0%	244,400,000	244,400,000	669,589	2,534
651737	15		2.5%	76,375,000	76,930,000	210,767	798
655907	16		2.5%	76,375,000	89,250,000	244,521	926
694913	17		5.0%	152,750,000	215,000,000	589,041	2,230
745558	18		5.0%	152,750,000	201,970,000	553,342	2,094
686288	19		8.0%	244,400,000	603,050,000	1,652,192	6,254
	Totals	3,055,000,000		3,055,000,000	4,055,710,000	11,111,534	42,057

[1] Projected 2016 water use projection from Lakeville's 2008 DNR Water Emergency & Conservation Plan

[2] Percentages for Wells are based the average annual % of withdrawal for the period 2006 thorugh 2010 and adjusted slightly based on City plans.

[3] Estimated per well pumpage based on 2016 projected water use and average % of annual withdrawal

[4] For each well, the greater of the estimated pumpage based on projected 2016 water use and actual annual pumpage for 2006 through 2010.



Modified from Mossler and Tipping (2000)

Geologic Cross Section

Municipality

Muncipial Wells

- Tunnel City Group - Wonewoc Sandstone
- Jordan Sandstone
- Prairie du Chien Group - Jordan Sandstone

Bedrock Geology

- PLATTEVILLE-GLENWOOD FRMS.
- ST. PETER SANDSTONE
- PRAIRIE DU CHIEN GROUP

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Figure 1

Bedrock Geology
WHPP Amendment
City of Lakeville
Dakota County, MN

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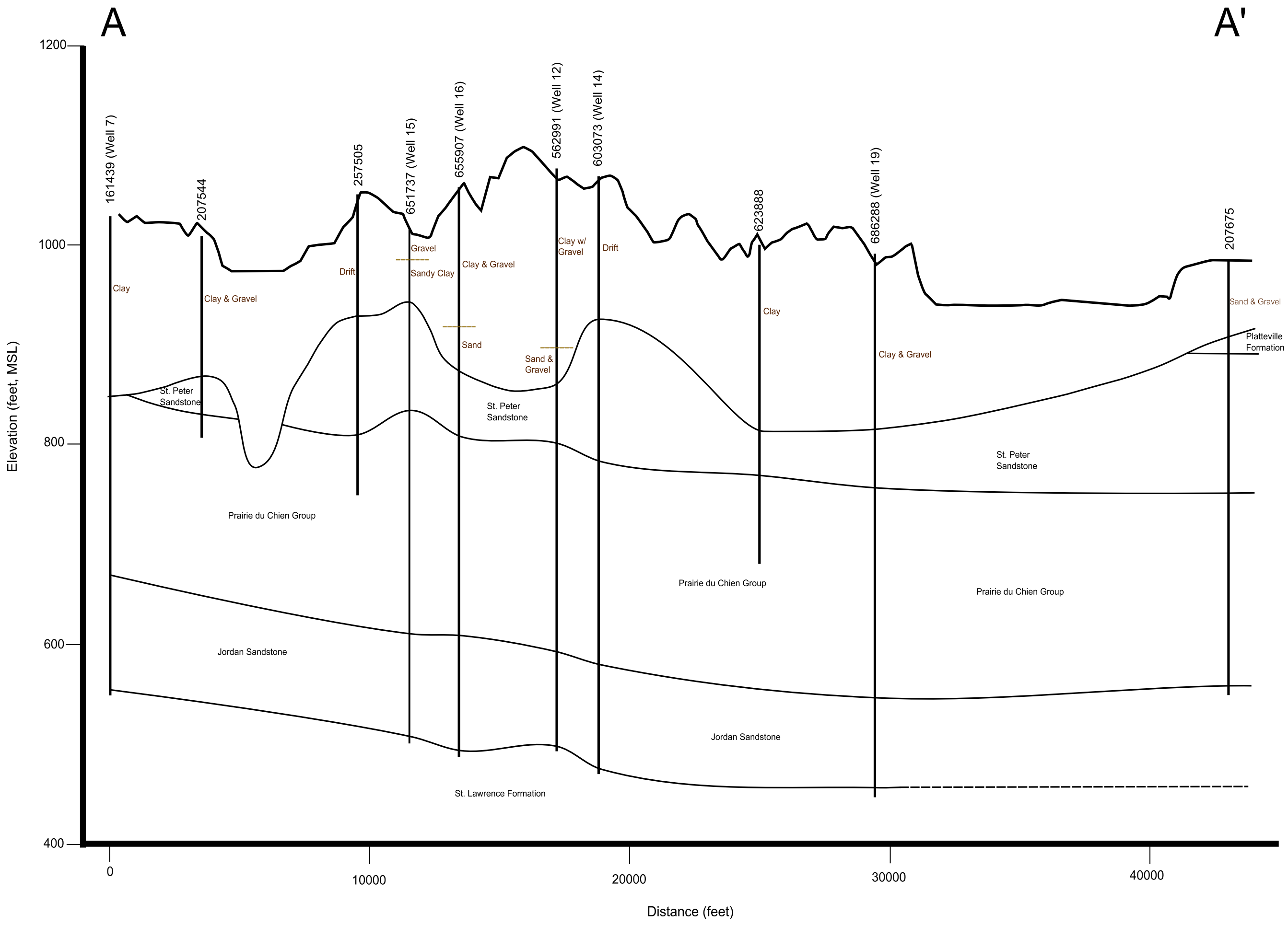
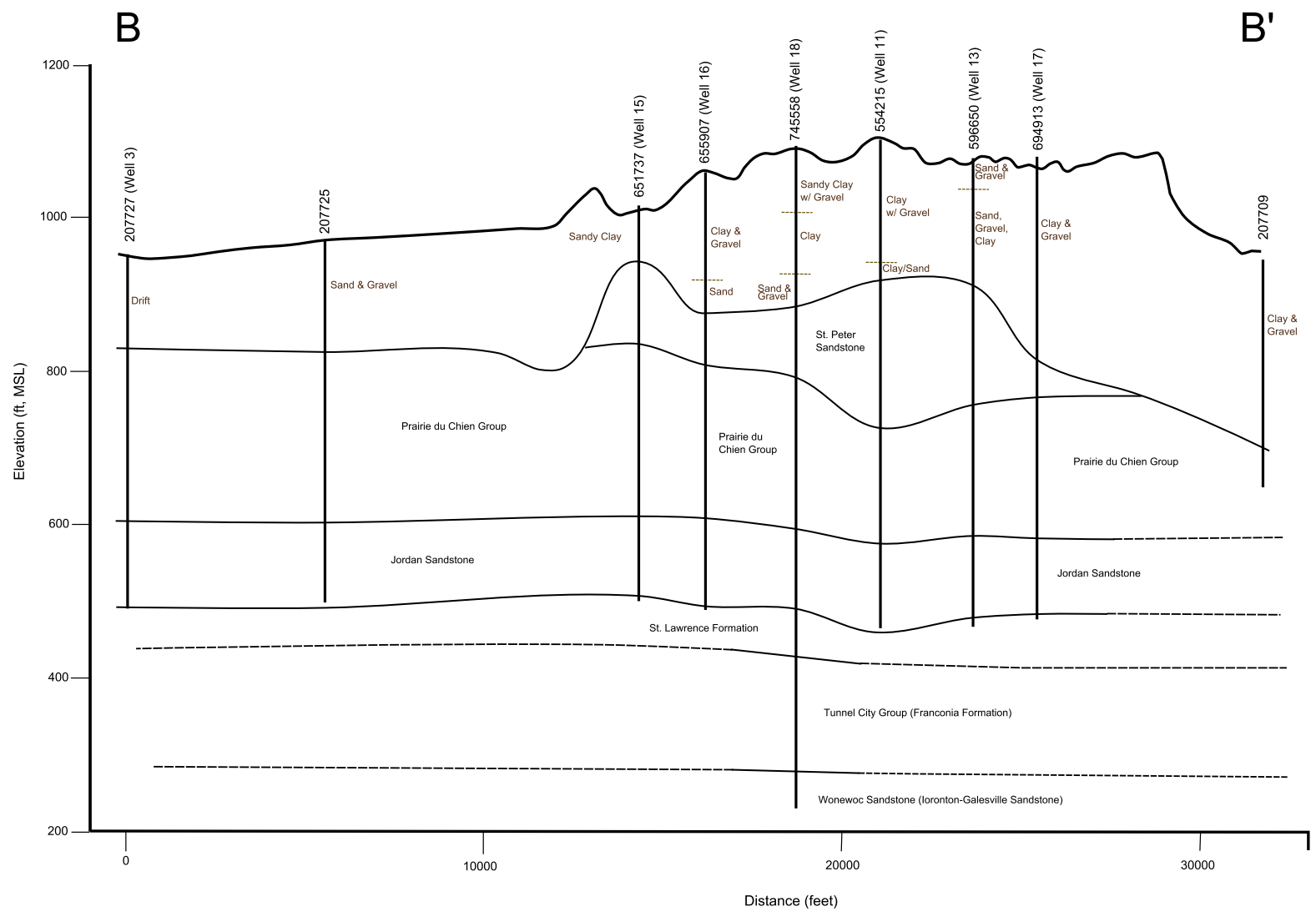


Figure 2

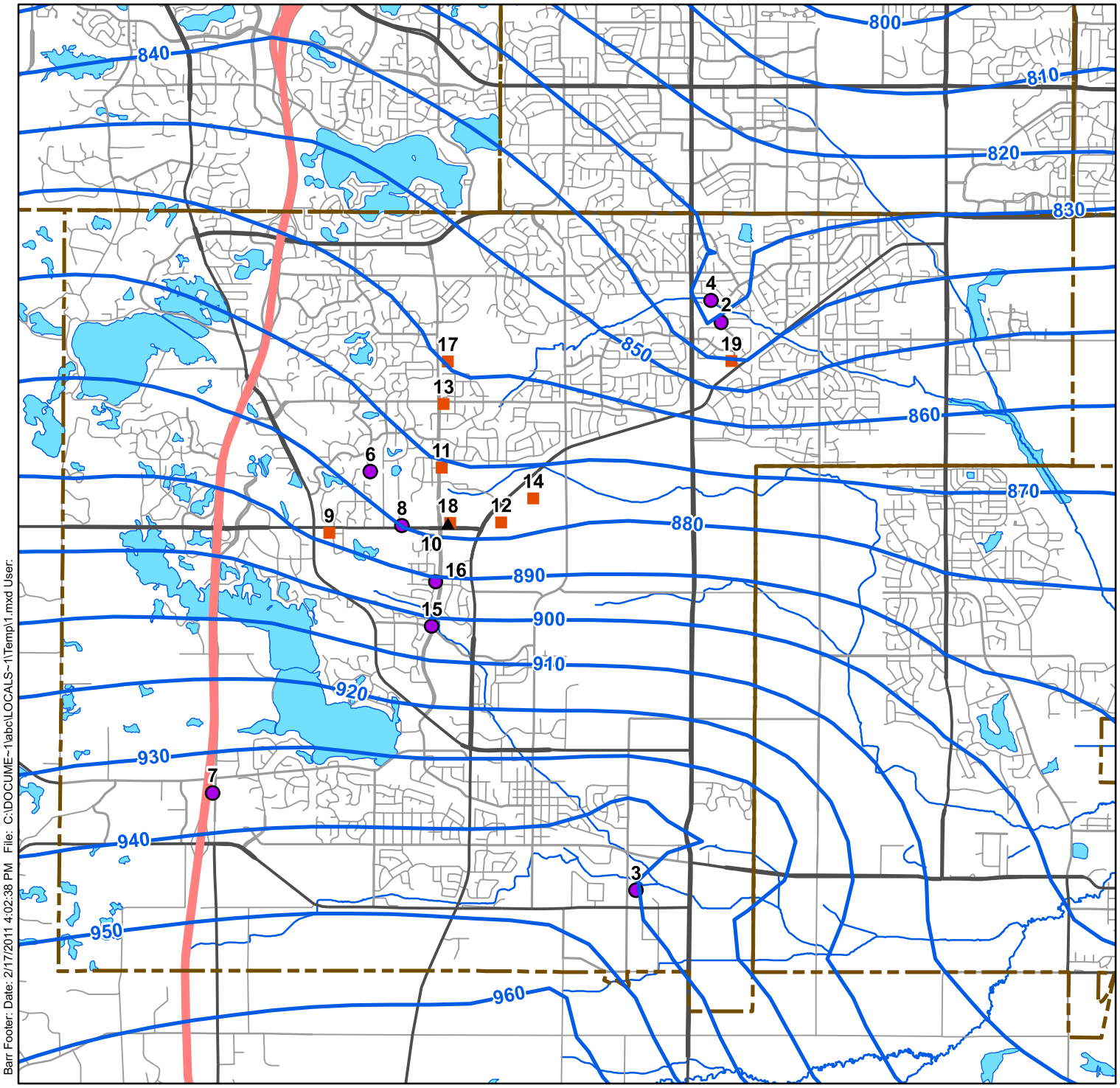
Geologic Cross Section A-A'
WHPP Amendment
City of Lakeville
Dakota County, MN



BARR

Figure 3

Geologic Cross Section B-B'
WHPP Amendment
City of Lakeville
Dakota County, MN



Muncipial Wells

- ▲ Tunnel City Group - Wonewoc Sandstone
- ● Jordan Sandstone
- ■ Prairie du Chien Group - Jordan Sandstone
- Groundwater Contour (feet, MSL)
- Municipality

N

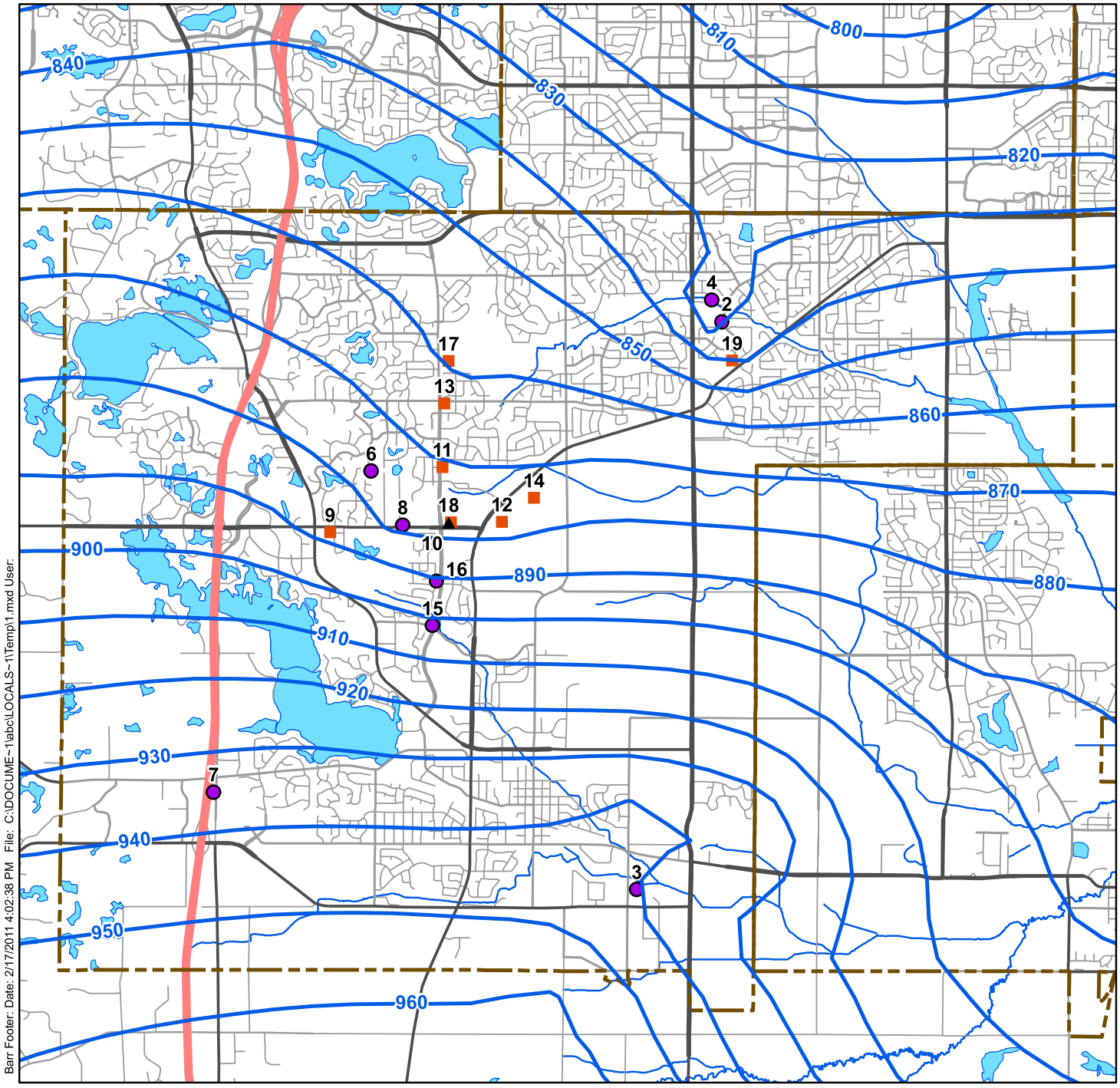
Miles

0 1 2

BARR

Figure 4

Groundwater Contours
Prairie du Chein Group
WHPP Amendment
City of Lakeville
Dakota County, MN



Barr Footer: Date: 2/17/2011 4:02:38 PM File: C:\DOCUME~1\abc\LOCALS~1\Temp\1.mxd User:

Muncipial Wells

- ▲ Tunnel City Group - Wonewoc Sandstone
- ● Jordan Sandstone
- ■ Prairie du Chien Group - Jordan Sandstone
- Groundwater Contour (ft, MSL)
- Municipality

N

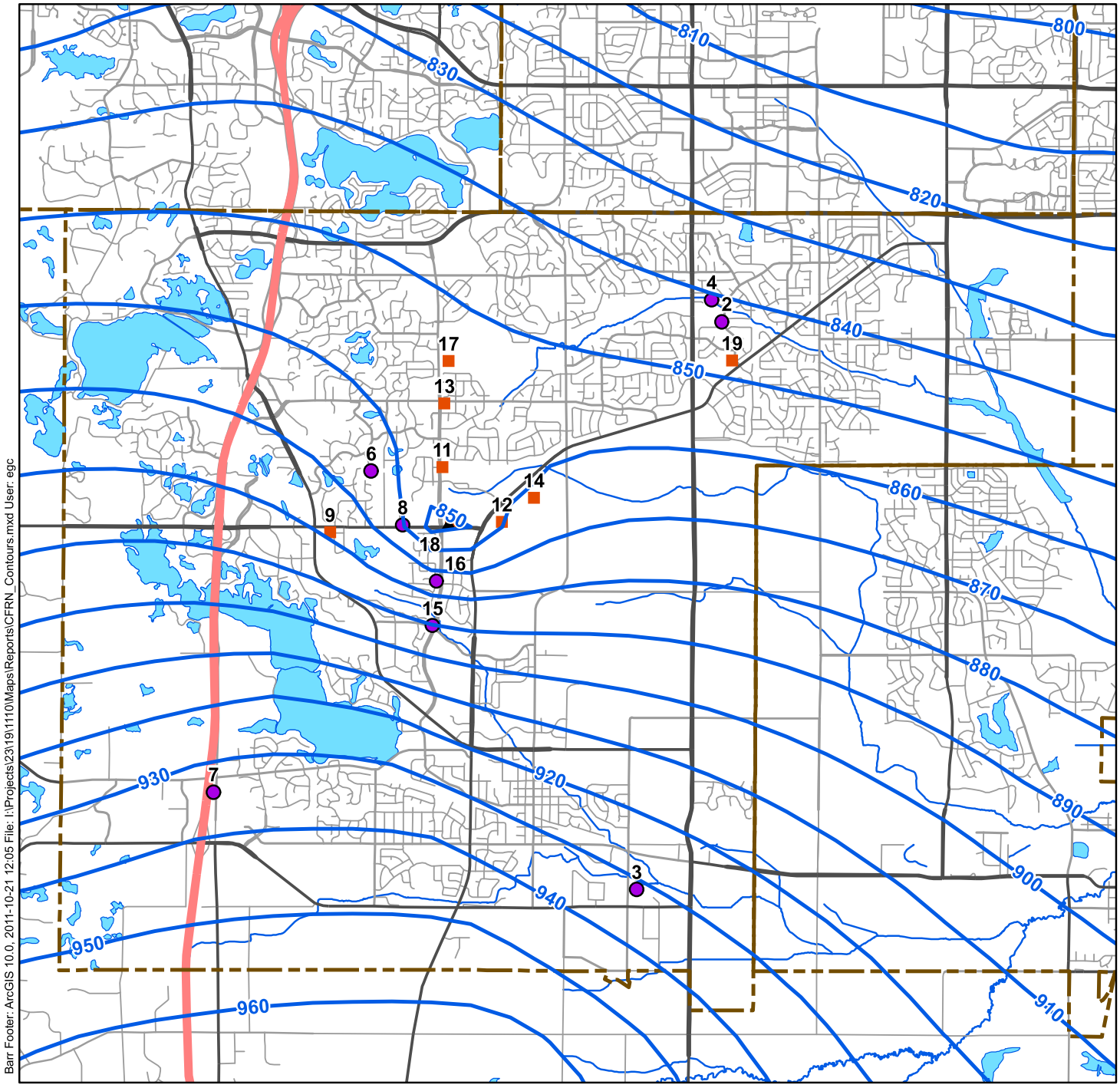
Miles

0 1 2

BARR

Figure 5

Groundwater Contours
Jordan Sandstone
WHPP Amendment
City of Lakeville
Dakota County, MN



Barr Footer: ArcGIS 10.0, 2011-10-21 12:05 File: I:\Projects\23\19\1110\Maps\Reports\CFRN_Contours.mxd User: egc

Muncipial Wells

- ▲ Tunnel City Group - Wonewoc Sandstone
- ● Jordan Sandstone
- ■ Prairie du Chien Group - Jordan Sandstone
- Groundwater Contours (ft, MSL)
- Municipality

N

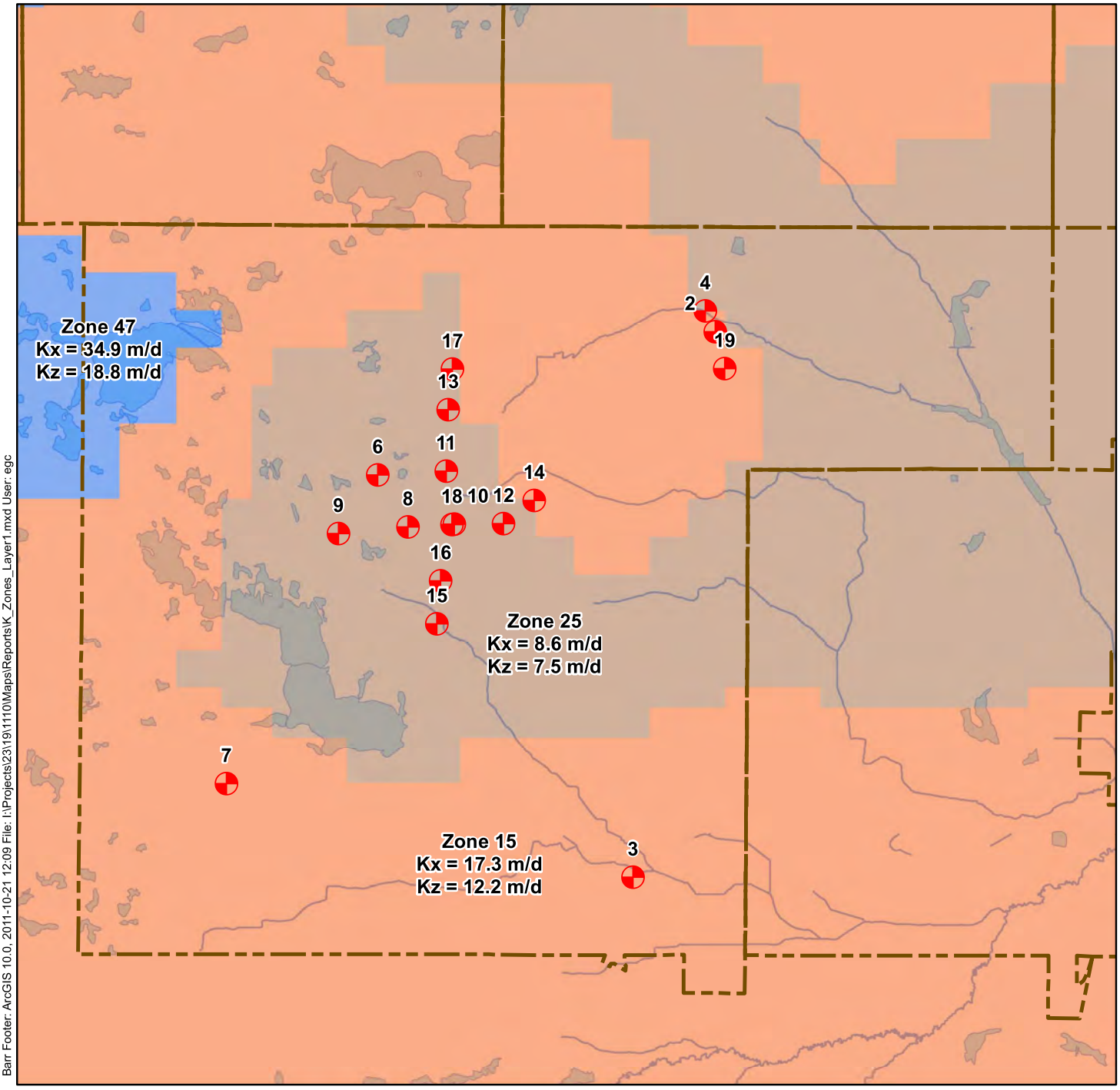
Miles

0 1 2

BARR

Figure 6

Groundwater Contours
Tunnel City Group
WHPP Amendment
City of Lakeville
Dakota County, MN



Barr Footer: ArcGIS 10.0, 2011-10-21 12:09 File: I:\Projects\23\19\1110\Maps\Reports\K_Zones_Layer1.mxd User: egc

Municipality

Municipal Wells

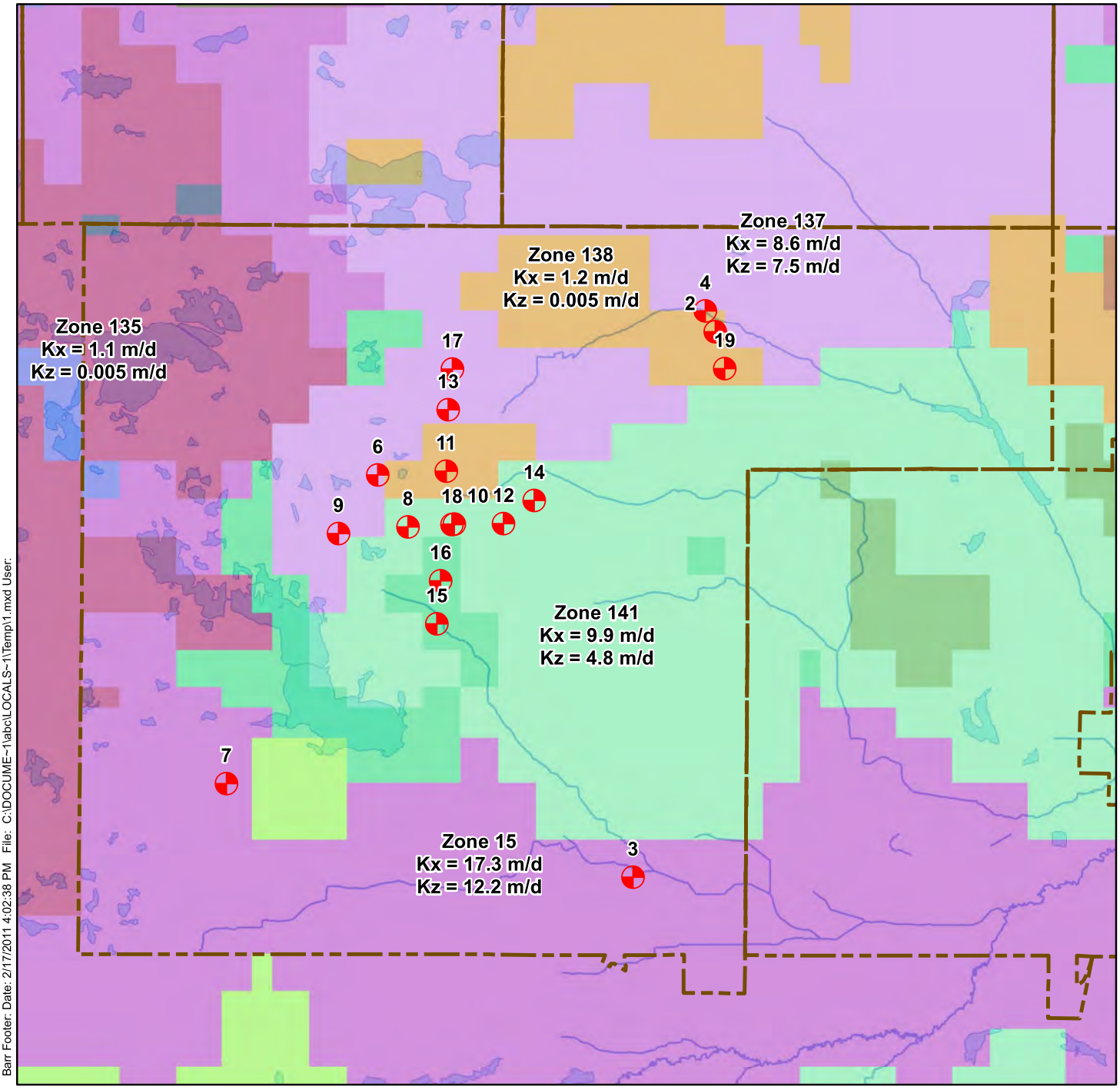
Miles

0 1 2

BARR

Figure 7

Hydraulic Conductivity Zones
Model Layer 1
WHPP Amendment
City of Lakeville
Dakota County, MN



Barr Footer: Date: 2/17/2011 4:02:38 PM File: C:\DOCUME~1\abc\LOCALS~1\Temp\1.mxd User:

Municipality

Municipal Wells

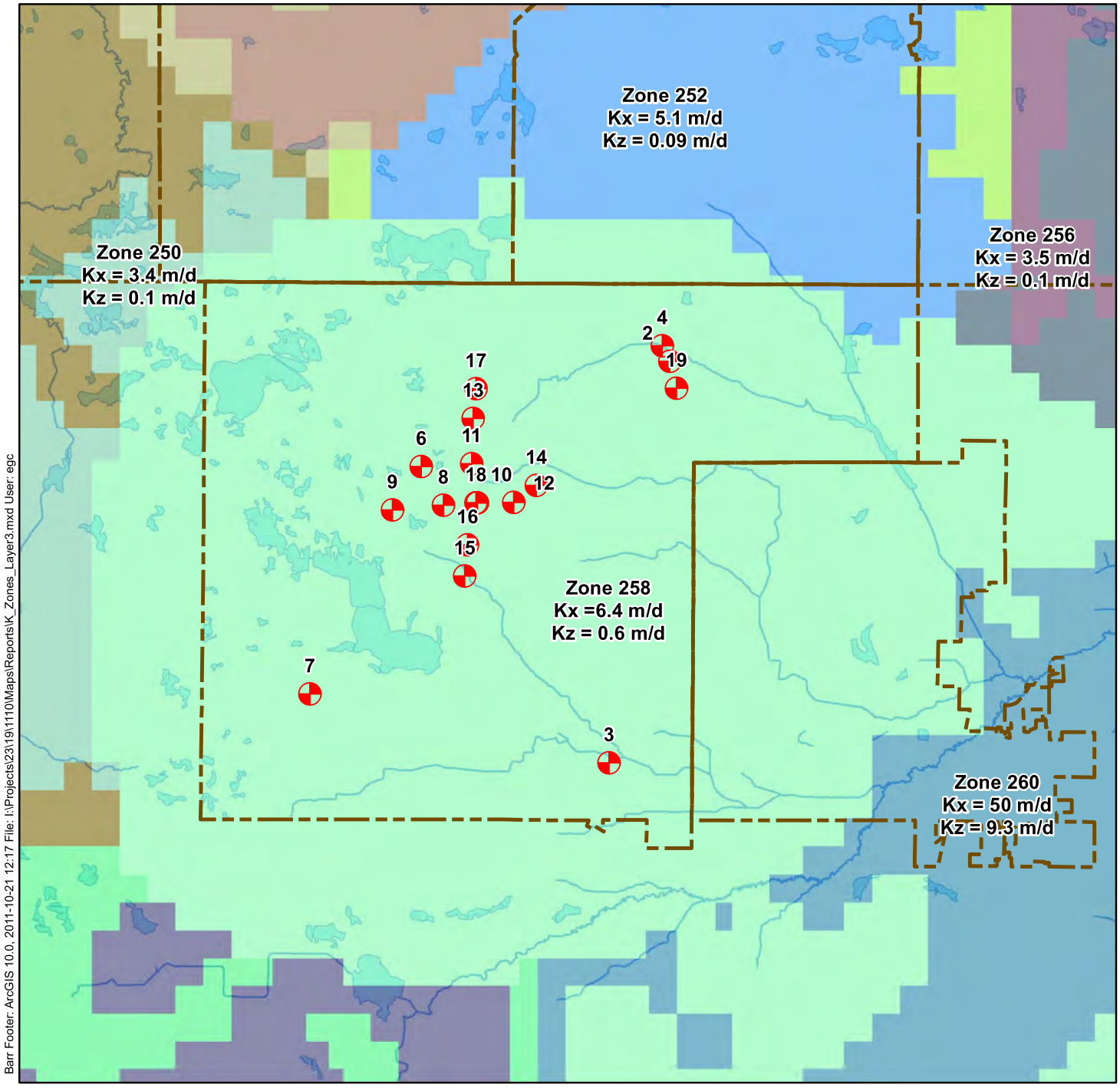
Miles

0 1 2

BARR

Figure 8

Hydraulic Conductivity Zones
Model Layer 2
WHPP Amendment
City of Lakeville
Dakota County, MN



Barr Footer: ArcGIS 10.0, 2011-10-21 12:17 File: I:\Projects\23\19\1110\Maps\Reports\K_Zones_Layer3.mxd User: egc

Municipality

Municipal Wells

N

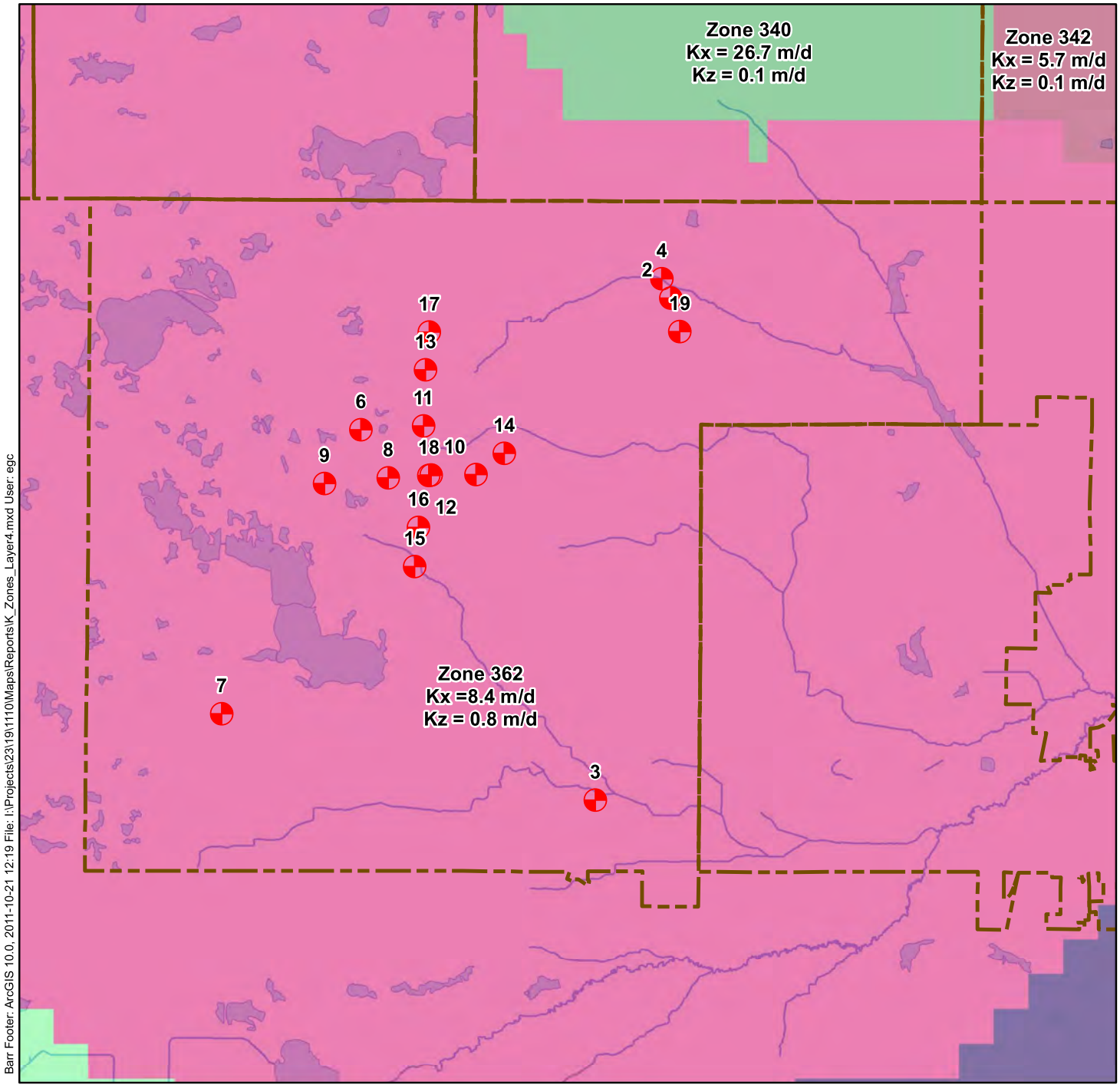
Miles

0 1 2

BARR

Figure 9

Hydraulic Conductivity Zones
Model Layer 3
WHPP Amendment
City of Lakeville
Dakota County, MN



Barr Footer: ArcGIS 10.0, 2011-10-21 12:19 File: I:\Projects\23\19\1110\Maps\Reports\K_Zones_Layer4.mxd User: egc

Municipality

Municipal Wells

N

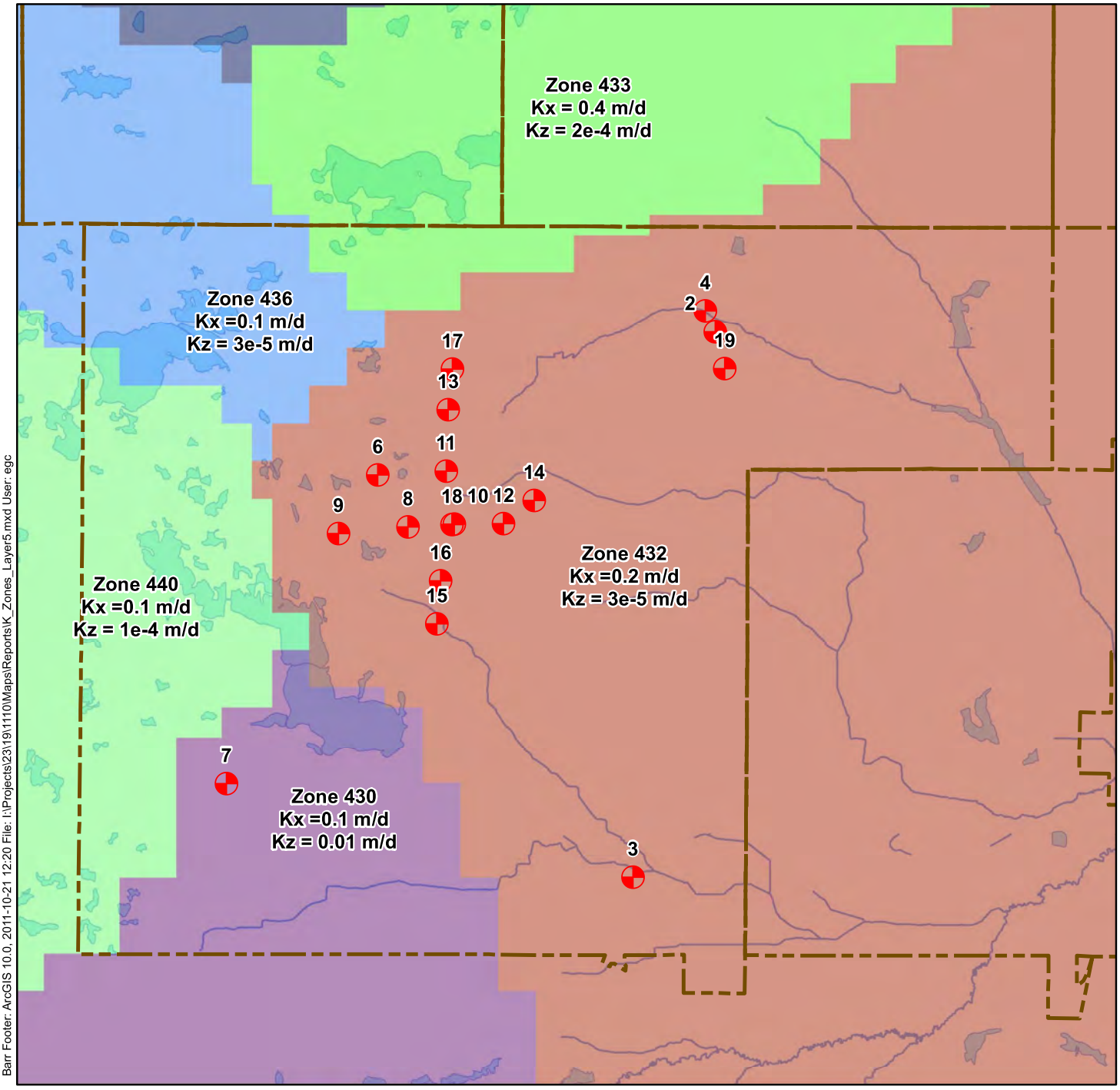
Miles

0 1 2

BARR

Figure 10

Hydraulic Conductivity Zones
Model Layer 4
WHPP Amendment
City of Lakeville
Dakota County, MN



Barr Footer: ArcGIS 10.0, 2011-10-21 12:20 File: I:\Projects\23\19\1110\Maps\Reports\K_Zones_Layer5.mxd User: egc

Municipality

Municipal Wells

N

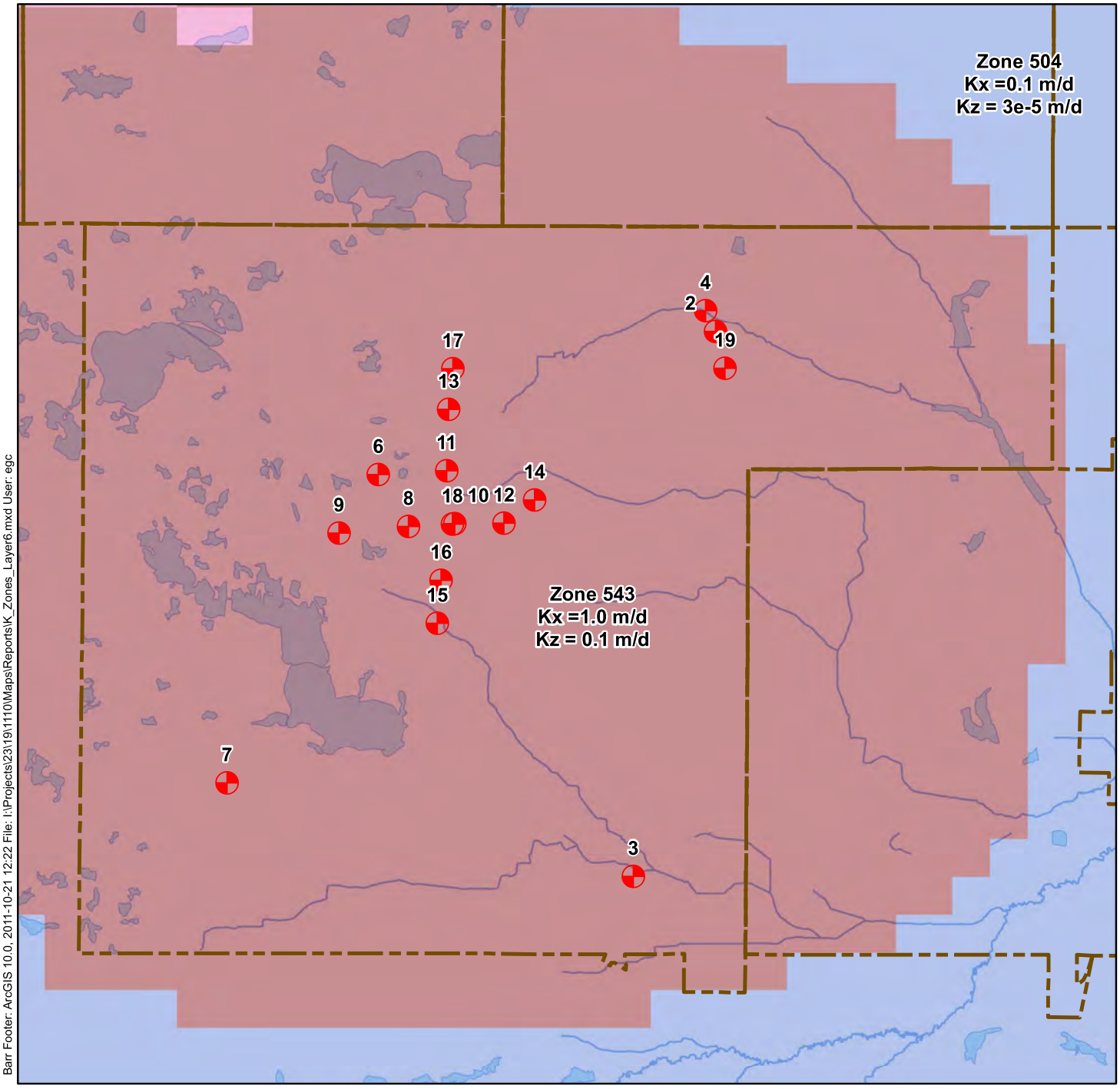
Miles

0 1 2

BARR

Figure 11

Hydraulic Conductivity Zones
Model Layer 5
WHPP Amendment
City of Lakeville
Dakota County, MN



Barr Footer: ArcGIS 10.0, 2011-10-21 12:22 File: I:\Projects\23\19\1110\Maps\Reports\K_Zones_Layer6.mxd User: egc

Municipality

Municipal Wells

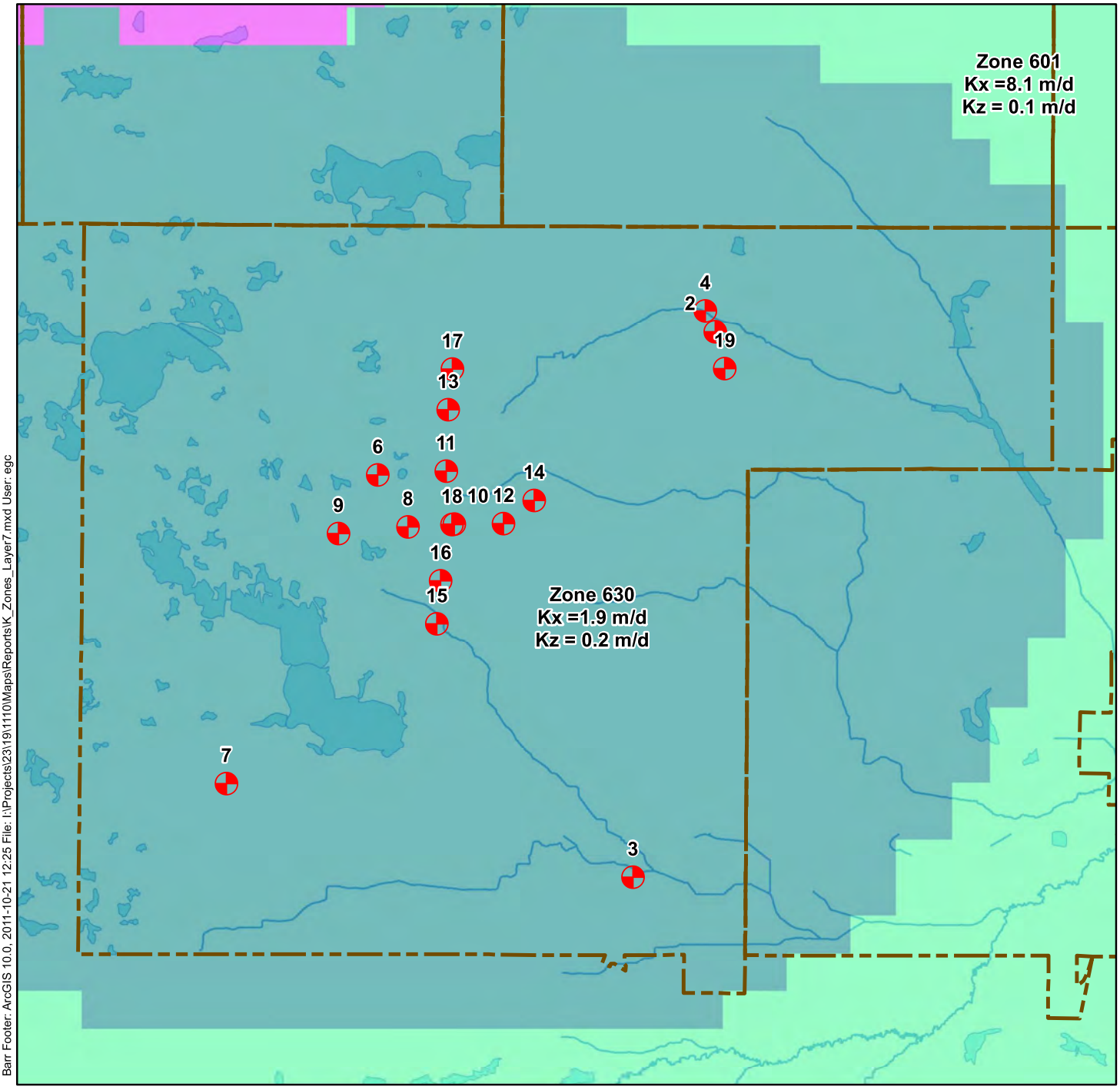
Miles

0 1 2

BARR

Figure 12

Hydraulic Conductivity Zones
Model Layer 6
WHPP Amendment
City of Lakeville
Dakota County, MN



Barr Footer: ArcGIS 10.0, 2011-10-21 12:25 File: I:\Projects\23\19\1110\Maps\Reports\K_Zones_Layer7.mxd User: egc

Municipality

Municipal Wells

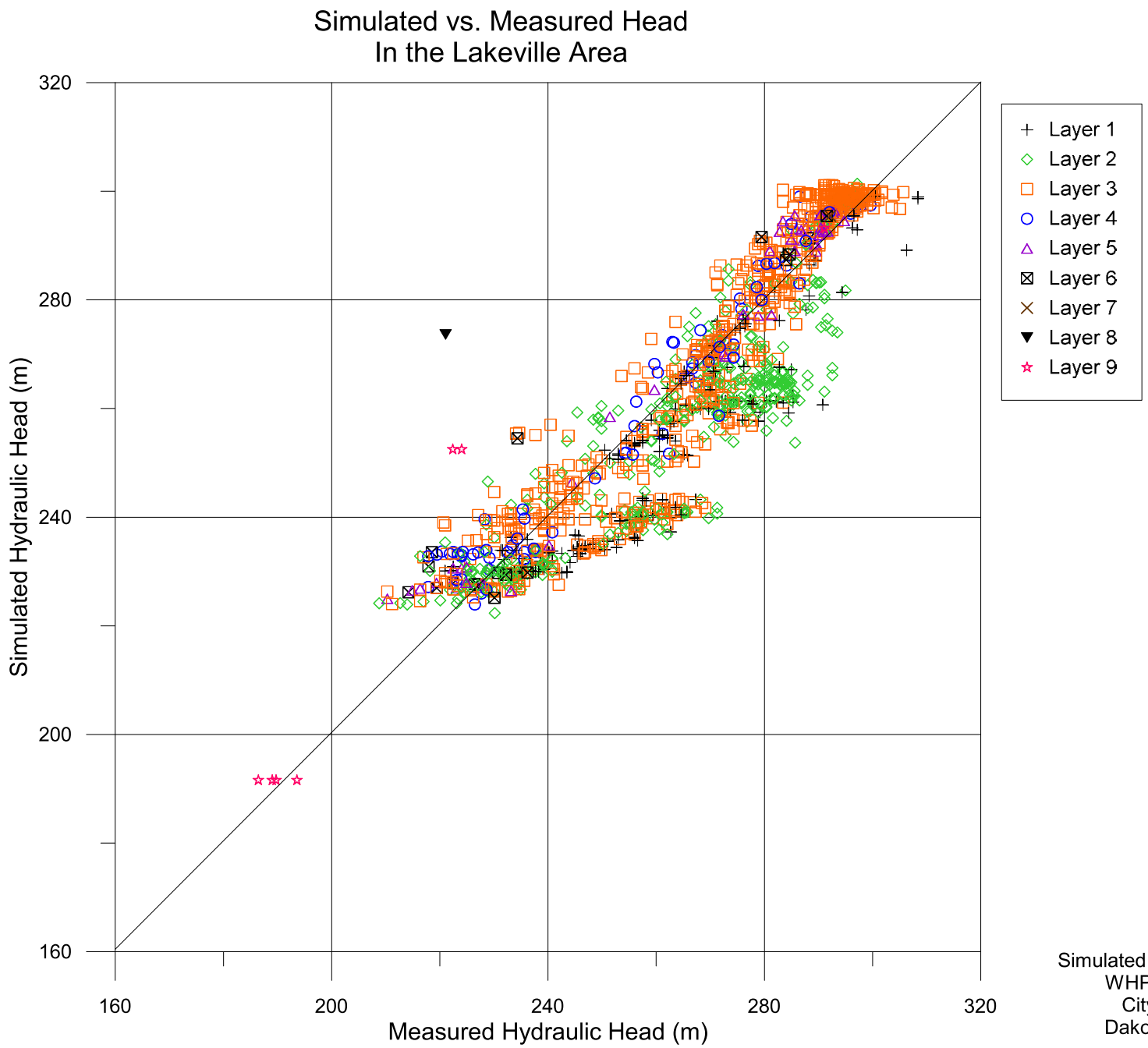
Miles

0 1 2

BARR

Figure 13

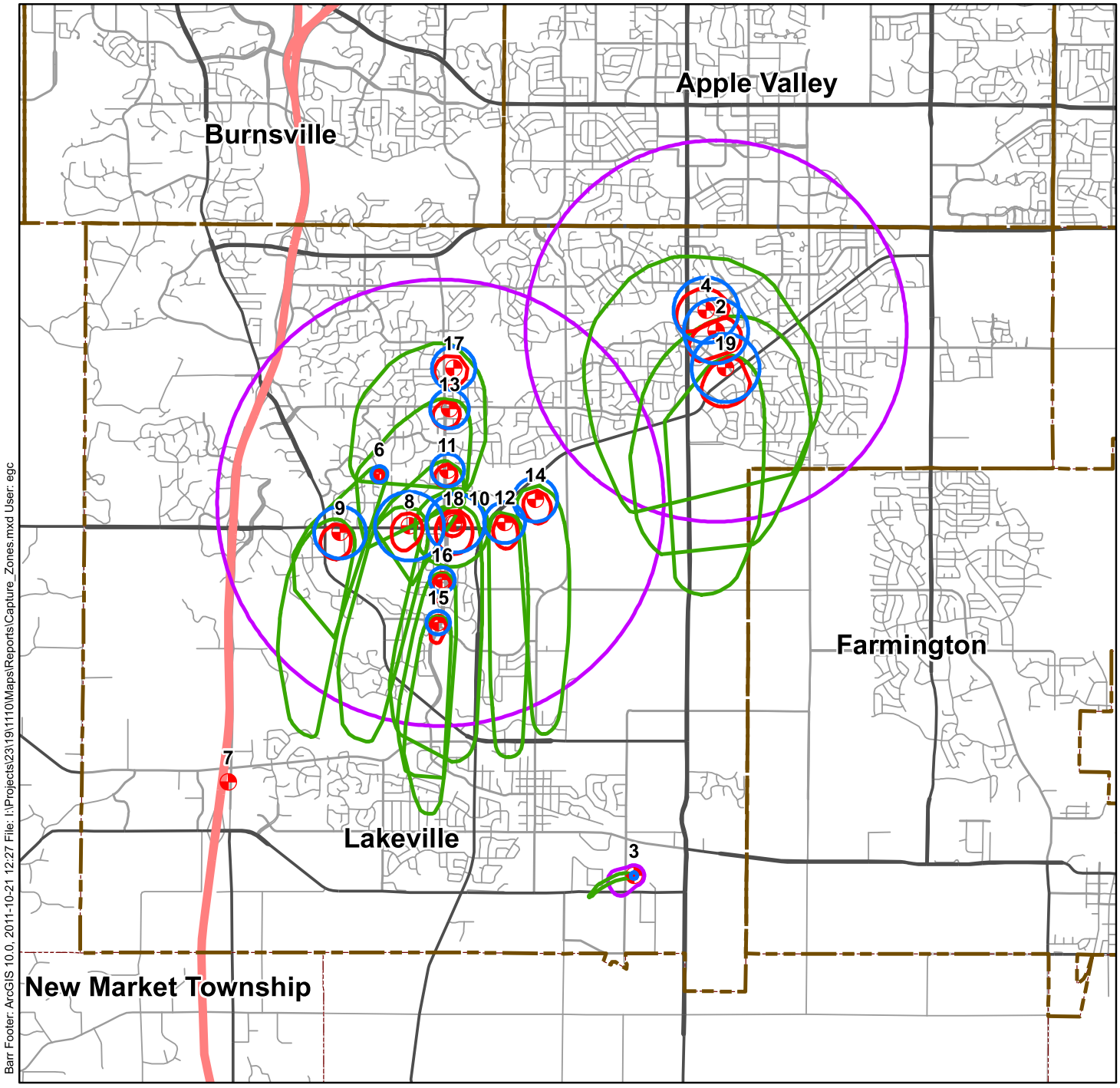
Hydraulic Conductivity Zones
Model Layer 7
WHPP Amendment
City of Lakeville
Dakota County, MN



BARR

Figure 14

Simulated vs. Measured Head
WHPP Amendment
City of Lakeville
Dakota County, MN



1 Year Porous Media Capture Zones

1 year Fracture Flow Capture Zones

10 year Porous Media Capture Zones

10 Year Fracture Flow Capture Zones 10yr

Municipal Wells

Municipality

N

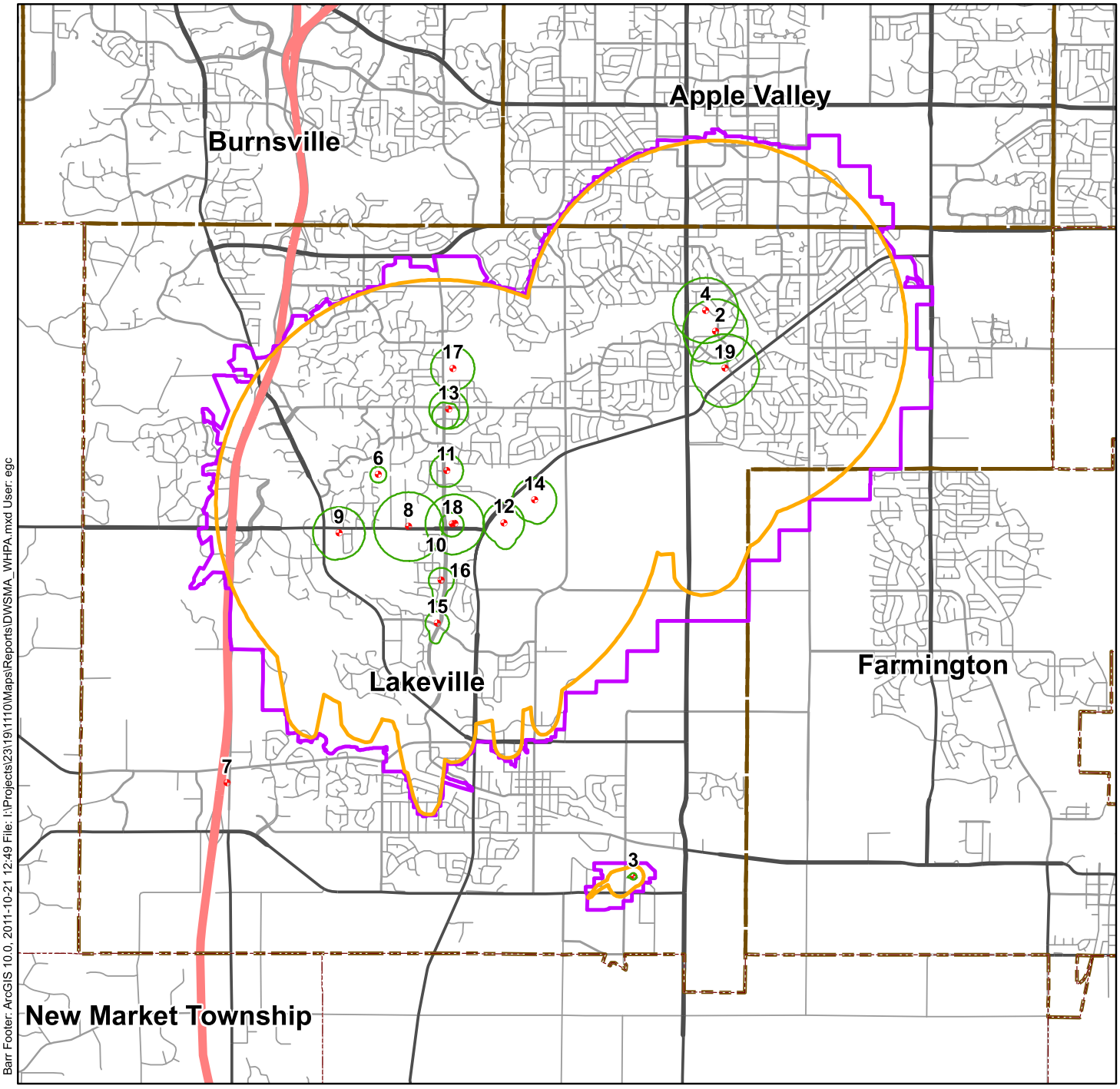
Miles

0 1 2

BARR

Figure 15

Capture Zones
WHPP Amendment
City of Lakeville
Dakota County, MN



WHPA

DWSMA

Emergency Response Zone

Municipal Wells

Municipality

N

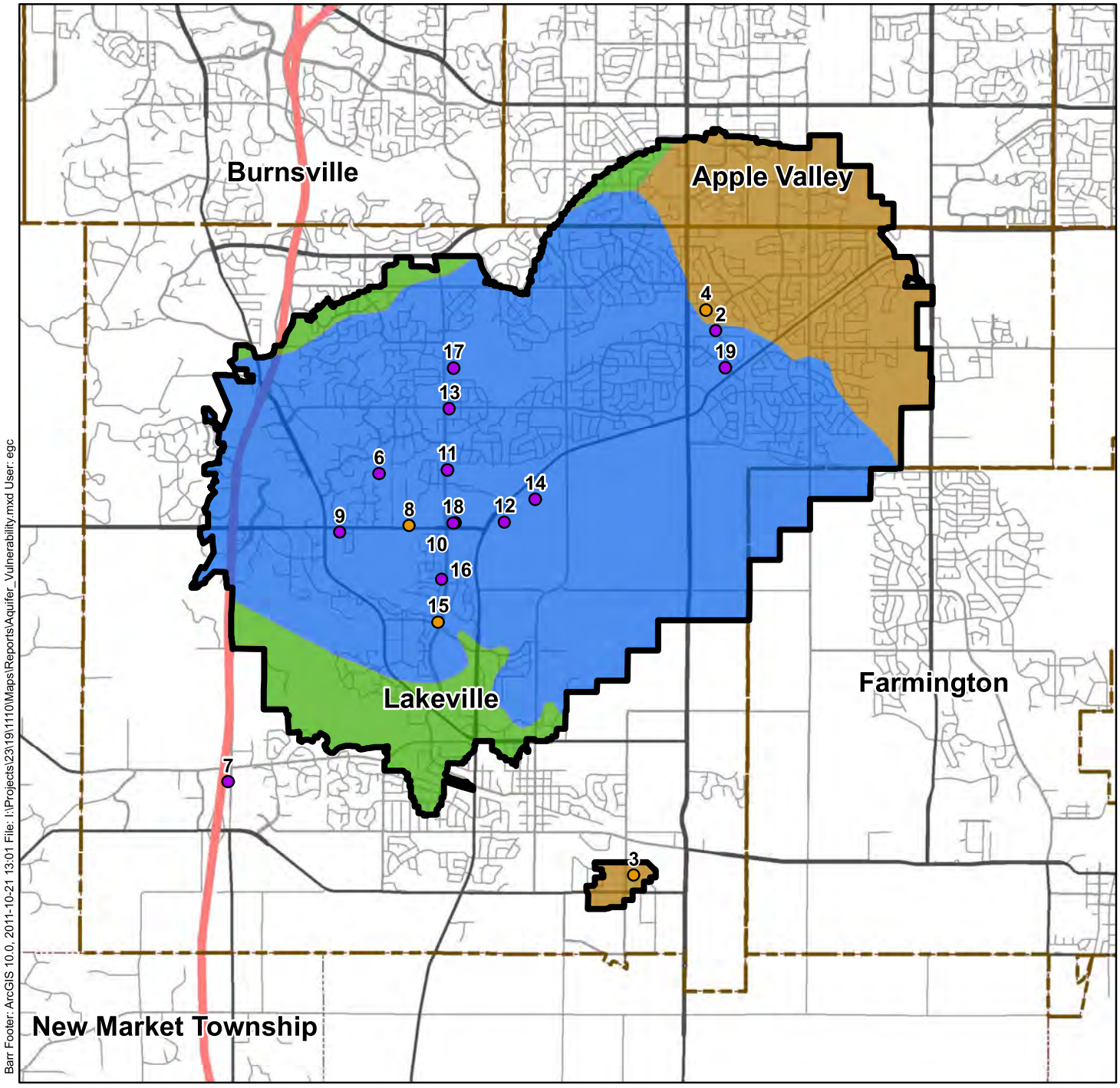
Miles

0 1 2

BARR

Figure 16

DWSMA and WHPA
WHPP Amendment
City of Lakeville
Dakota County, MN



Barr Footer: ArcGIS 10.0, 2011-10-21 13:01 File: I:\Projects\23\19\1110\Maps\Reports\Aquifer_Vulnerability.mxd User: egc

MDH Well Vulnerability

- Not Vulnerable
- Vulnerable
- DWSMA

Aquifer Vulnerability

- High
- Moderate
- Low

N

Miles

0 1 2

BARR

Figure 17

Aquifer Vulnerability
WHPP Amendment
City of Lakeville
Dakota County, MN

Attachment A

Well Records

Minnesota Unique Well No.

207725

County Dakota
Quad Farmington
Quad ID 88B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 10/19/1990
Update Date 06/29/2001
Received Date

Well Name LAKEVILLE 1

Township Range Dir Section Subsections Elevation 970 **ft.**

114 20 W 29 DCAABA **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
472 **ft.**	472 **ft.**	05/19/1965

Drilling Method Cable Tool

Well Address
208TH ST
LAKEVILLE MN

Drilling Fluid --

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

Use Municipal

Geological Material	Color	Hardness	From	To
CLAY & SAND			0	14
SAND & GRAVEL			14	144
SHAKOPEE			144	270
ROOT VALLEY			270	301
ONEOTA			301	351
SHALE			351	367
SANDSTONE			367	472

Casing Type Steel (black or low carbon) **Joint** No Information **Drive Shoe?** ☐ Yes ☐ No **Above/Below** 0 **ft.**

Casing Diameter	Weight	Hole Diameter
10 in. to 145 ft.	lbs./ft.	
8 in. to 361 ft.	lbs./ft.	

Open Hole from 361 ft. to 472 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
42 ft. from Land surface Date Measured 05/19/1965

PUMPING LEVEL (below land surface)
61 ft. after hrs. pumping 302 g.p.m.

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

NO REMARKS

Located by: Minnesota Geological Survey **Method:** Digitized - scale 1:24,000 or larger (Digitizing Table)

Unique Number Verification: Information from owner **Input Date:** 01/01/1990

System: *UTM - Nad83, Zone15, Meters* **X:** 480659 **Y:** 4943953

Grouting Information Well Grouted? ☐ Yes ☐ No

Grout Material: Neat Cement from 0 to 361 ft. 0

Nearest Known Source of Contamination
__feet __direction __type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☑ Not Installed Date Installed
Manufacturer's name FAIRBANKS MORSE Model number __ HP 30 Volts 220
Length of drop Pipe __ft. Capacity 350 g.p.m Type Turbine Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

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

First Bedrock Prairie Du Chien Group **Aquifer** Jordan
Last Strat Jordan **Depth to Bedrock** 144 **ft.**

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Keys Well Co.	62012	

County Well Index Online Report **207725** Printed 6/22/2011 HE-01205-07

Minnesota Unique Well No.

207708

County Dakota
Quad Farmington
Quad ID 88B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 10/19/1990
Update Date 12/30/2004
Received Date

Well Name LAKEVILLE 2

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	3	CCADDB	**Elevation Method**	964 ft. Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
517 ft.	517 ft.	07/17/1964

Drilling Method --

Well Address
GERDING PA
LAKEVILLE MN 55044

Drilling Fluid --

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

Use Community Supply **PWS ID** 1190015 **Source** S01

Geological Material	Color	Hardness	From	To
GLACIAL DRIFT			0	37
PLATTEVILLE LIMESTONE			37	65
ST. PETER SANDSTONE			65	210
SHAKOPEE-ONEOTA DOLOMITE			210	417
JORDAN SANDSTONE			417	517

Casing Type Steel (black or low carbon) **Joint** No Information **Drive Shoe?** ☐ Yes ☐ No **Above/Below** 0 ft.

Casing Diameter	Weight	Hole Diameter
24 in. to 33 ft.	lbs./ft.	
16 in. to 434 ft.	lbs./ft.	

Open Hole from 434 ft. to 517 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
56 ft. from Land surface Date Measured 04/17/1964

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

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

REMARKS
SOIL DEVELOPED BY DYNAMITING AND BAILING 176 YDS OF SAND.

Grouting Information Well Grouted? ☐ Yes ☐ No

Grout Material: Neat Cement from 0 to 434 ft. 50.5 yrds.

Located by: Minnesota Geological Survey
Method: GPS Differentially Corrected
Unique Number Verification: Information from owner
Input Date: 04/10/2000
System: *UTM - Nad83, Zone15, Meters*
X: 483142 **Y:** 4950194

Nearest Known Source of Contamination
__feet __direction __type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP 0 Volts
Length of drop Pipe __ft. Capacity __g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

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

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Tri-state Well Co.	27118	BENEKE, R.

First Bedrock Platteville
Last Strat Jordan
Aquifer Jordan
Depth to Bedrock 37 ft.

County Well Index Online Report **207708** Printed 6/22/2011 HE-01205-07

Minnesota Unique Well No.

207727

County Dakota
Quad Farmington
Quad ID 88B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 10/19/1990
Update Date 12/30/2004
Received Date

Well Name LAKEVILLE 3

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	33	ACBDA	951 ft.	Elevation Method: Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
460 ft.	460 ft.	09/30/1968

Drilling Method --

Well Address
HAMBURG AV
LAKEVILLE MN 55044

Geological Material	Color	Hardness	From	To
GLACIAL DRIFT			0	120
SHAKOPEE-ONEOTA DOLOMITE			120	347
JORDAN SANDSTONE			347	459
ST. LAWRENCE SHALE			459	460

Drilling Fluid --

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

Use Community Supply **PWS ID** 1190015 **Source** S02

Casing Type Steel (black or low carbon) **Joint** No Information **Drive Shoe?** ☐ Yes ☐ No **Above/Below** 0 ft.

Casing Diameter				Weight	Hole Diameter
24	in. to	125	ft.	lbs./ft.	
16	in. to	363	ft.	lbs./ft.	

Open Hole from 363 ft. to 460 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
21 ft. from Land surface Date Measured 09/30/1968

PUMPING LEVEL (below land surface)
53 ft. after hrs. pumping 1400 g.p.m.

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

NO REMARKS

Located by: Minnesota Geological Survey
Method: GPS Differentially Corrected
Unique Number Verification: Information from owner
Input Date: 04/10/2000
System: *UTM - Nad83, Zone15, Meters*
X: 482055 **Y:** 4942986

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 363 ft. 0

Nearest Known Source of Contamination
_feet _direction _type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

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

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Tri-state Well Co.	27118	RAUSCHER, R.

First Bedrock Prairie Du Chien Group
Last Strat St.Lawrence
Aquifer Jordan
Depth to Bedrock 120 ft.

County Well Index Online Report **207727** Printed 6/22/2011 HE-01205-07

Minnesota Unique Well No.

212650

County Dakota
Quad Farmington
Quad ID 88B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 10/19/1990
Update Date 12/30/2004
Received Date

Well Name LAKEVILLE 4

Township Range Dir Section Subsections Elevation 954 **ft.**

114	20	W	3	CBDBCD	**Elevation Method**	Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
505 **ft.**	505 **ft.**	05/30/1969

Drilling Method --

Well Address
167 ST
LAKEVILLE MN 55044

Drilling Fluid --

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

Use Community Supply **PWS ID** 1190015 **Source** S03

Geological Material	Color	Hardness	From	To
SAND GRAVEL	BROWN		0	18
FINE SAND	YELLOW		18	22
LIMEROCK	YELLOW		22	34
LIMEROCK + SHALE	BLUE		34	45
LIMEROCK + SHALE	BLUE		45	50
ST. PETER SANDSTONE	YELLOW		50	100
ST. PETER SANDSTONE	BROWN		100	150
ST. PETER SANDSTONE	GRAY		150	195
SHAKOPEE	WHITE		195	200
SHAKOPEE	GRAY		200	300
SHAKOPEE	TAN		300	410
JORDAN SHALE	LIGHT		410	412
JORDAN	GRAY		412	422
JORDAN	WHITE	HARD	422	485
JORDAN SHALE	GRAY		485	505

Casing Type Steel (black or low carbon) **Joint** No Information **Drive Shoe?** ☐ Yes ☐ No **Above/Below** 0 **ft.**

Casing Diameter	Weight	Hole Diameter
24 in. to 37 ft.	lbs./ft.	
16 in. to 434 ft.	lbs./ft.	

Open Hole from 434 ft. to 505 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
40 ft. from Land surface Date Measured 05/30/1969

PUMPING LEVEL (below land surface)
125 ft. after hrs. pumping 1920 g.p.m.

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

REMARKS
M.G.S. NO.533.

Located by: Minnesota Geological Survey

Method: GPS Differentially Corrected

Unique Number Verification: Information from owner

Input Date: 04/10/2000

System: *UTM - Nad83, Zone15, Meters*

X: 483011 **Y:** 4950471

Grouting Information Well Grouted? ☐ Yes ☐ No

Nearest Known Source of Contamination
_feet _direction _type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP 0 Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

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

Cuttings Yes
First Bedrock Platteville
Last Strat Jordan
Aquifer Jordan
Depth to Bedrock 22 **ft.**

Well Contractor Certification

Renner E.H. Well	71015	
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report **212650** Printed 6/22/2011
HE-01205-07

Minnesota Unique Well No.

241440

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 07/10/1989
Update Date 07/17/2000
Received Date

Well Name LAKEVILLE 5

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	7	BCDBAA	**Elevation Method**	1105 **ft.** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
605 **ft.**	605 **ft.**	

Drilling Method Cable Tool

Well Address
JAVA CT N
LAKEVILLE MN 55044

Drilling Fluid --

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

Use Municipal

Geological Material	Color	Hardness	From	To
CLAY	YELLOW		0	45
CLAY	BLUE		45	195
DIRTY SAND			195	205
CLAY	BLUE		205	342
HARDSTONE AND CLAY			342	375
DOLOMITE			375	505
SANDSTONE			505	605

Casing Type Steel (black or low carbon) **Joint** No Information **Drive Shoe?** ☐ Yes ☐ No **Above/Below** **ft.**

Casing Diameter	Weight	Hole Diameter
10 in. to 321 ft.	lbs./ft.	10 in. to 605 ft.
6 in. to 515 ft.	lbs./ft.	

Open Hole from 515 ft. to 605 ft.

Screen NO **Make** **Type**

Diameter **Slot/Gauze** **Length** **Set Between**

Static Water Level
200 ft. from Land surface Date Measured

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

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

REMARKS
FOREST HILLS ADDITION LOT 19. FOREST HILLS ADDITON WELL.

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 515 ft. 0

Located by: Minnesota Geological Survey **Method:** Digitization (Screen) - Map (1:24,000)

Unique Number Verification: Information from owner **Input Date:** 03/06/2002

System: *UTM - Nad83, Zone15, Meters* **X:** 478232 **Y:** 4949355

Nearest Known Source of Contamination
__feet __direction __type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

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

First Bedrock Prairie Du Chien Group **Aquifer** Jordan
Last Strat Jordan **Depth to Bedrock** 375 **ft.**

Well Contractor Certification

Minnesota Department of Health	MDH	
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report **241440** Printed 6/22/2011 HE-01205-07

Minnesota Unique Well No.

161409

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 12/27/1989
Update Date 12/30/2004
Received Date

Well Name LAKEVILLE 6

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	18	BA		1161 ft.
					Elevation Method	Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
682 ft.	682 ft.	08/13/1980

Drilling Method Cable Tool

Well Address
185 ST N
LAKEVILLE MN 55044

Drilling Fluid
--

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

Use Community Supply **PWS ID** 1190015 **Source** S04

Geological Material	Color	Hardness	From	To
CLAY + ROCKS			0	234
SANDROCK		HARD	234	383
SHAKOPEE			383	574
SANDROCK			574	667
ST. LAWRENCE			667	682

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** 3 **ft.**

Casing Diameter			Weight	Hole Diameter		
24	in. to	234 ft.	94.62 lbs./ft.	23	in. to	591 ft.
16	in. to	591 ft.	62.58 lbs./ft.	16	in. to	682 ft.

Open Hole from 591 ft. to 682 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
265 ft. from Land surface Date Measured 08/13/1980

PUMPING LEVEL (below land surface)
280 ft. after 24 hrs. pumping 1400 g.p.m.

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

REMARKS
M.G.S. NO.2081.

Located by: Minnesota Department of Health **Method:** GPS Differentially Corrected
Unique Number Verification: N/A **Input Date:** 04/10/2000
System: *UTM - Nad83, Zone15, Meters* **X:** 478685 **Y:** 4948299

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 591 ft.

Nearest Known Source of Contamination
__feet __direction __type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

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

Cuttings Yes
First Bedrock St.Peter
Last Strat St.Lawrence
Aquifer Jordan
Depth to Bedrock 234 **ft.**

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Bergerson-Caswell	27058	HENRICH, E.

County Well Index Online Report **161409** Printed 6/22/2011
HE-01205-07

Minnesota Unique Well No.

161439

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 07/10/1989
Update Date 12/30/2004
Received Date

Well Name LAKEVILLE 7

Township Range Dir Section Subsections Elevation 1030 **ft.**

114 21 W 25 CBAACD **Elevation Method** Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
479 **ft.**	479 **ft.**	08/30/1984

Drilling Method Cable Tool

Well Address

LAKEVILLE MN 55044

Drilling Fluid --

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

Use Community Supply **PWS ID** 1190015 **Source** S05

Geological Material	Color	Hardness	From	To
CLAY	GRAY	SOFT	0	120
CLAY	BROWN	HARD	120	180
SHAKOPEE-ONEOTA	GRAY	HARD	180	360
JORDAN	GRAY	SOFT	360	475
ST. LAWRENCE	GRAY	SOFT	475	479

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** 4 **ft.**

Casing Diameter		Weight	Hole Diameter		
24 in. to	171 ft.	94.62 lbs./ft.	23 in. to	375 ft.	
18 in. to	375 ft.	70.59 lbs./ft.	17 in. to	479 ft.	

Open Hole from 375 ft. to 479 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
110 ft. from Land surface Date Measured 08/24/1984

PUMPING LEVEL (below land surface)
136 ft. after 20 hrs. pumping 1500 g.p.m.

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

REMARKS
M.G.S. NO.2013. GAMMA LOGGED 5-28-84.
200 YDS S. OF KENRICH & CR 64

Located by: Minnesota Geological Survey **Method:** GPS Differentially Corrected

Unique Number Verification: Information from owner **Input Date:** 04/10/2000

System: *UTM - Nad83, Zone15, Meters* **X:** 476686 **Y:** 4944222

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 375 ft. 30 yrds.

Nearest Known Source of Contamination
120 feet E direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

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

Cuttings Yes **Borehole Geophysics** Yes
First Bedrock Prairie Du Chien Group **Aquifer** Jordan
Last Strat Jordan **Depth to Bedrock** 180 **ft.**

Well Contractor Certification

Bergerson-Caswell	27058	HENDRYCKS, R.
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report **161439** Printed 6/22/2011 HE-01205-07

Minnesota Unique Well No.

433296

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 06/26/1992
Update Date 12/29/2004
Received Date

Well Name LAKEVILLE 8

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	18	ACDDCB	**Elevation Method**	1095 **ft.** Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
615 **ft.**	615 **ft.**	07/21/1989

Drilling Method Cable Tool

Well Address

LAKEVILLE MN 55044

Drilling Fluid --

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

Use Community Supply **PWS ID** 1190015 **Source** S06

Geological Material	Color	Hardness	From	To
CLAY	BROWN	SOFT	0	17
CLAY AND GRAVEL		SOFT	17	117
SHALE		MEDIUM	117	163
SAND, GRAVEL, AND CLAY		SOFT	163	245
SAND		SOFT	245	250
SANDROCK		SOFT	250	395
LIMEROCK		HARD	395	505
SAND (JORDAN)		MEDIUM	505	615

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☐ Yes ☐ No **Above/Below** 2 **ft.**

Casing Diameter	Weight	Hole Diameter
24 in. to 252 ft.	94.6 lbs./ft.	23 in. to 522 ft.
18 in. to 522 ft.	70.6 lbs./ft.	17 in. to 615 ft.

Open Hole from 522 ft. to 615 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
201 ft. from Land surface Date Measured 07/17/1989

PUMPING LEVEL (below land surface)
220 ft. after 3 hrs. pumping 1200 g.p.m.

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

REMARKS
M.G.S. NO.3369.
WELL AT ITALY AVE. AND 185TH ST. W.

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 522 ft. 30 yrds.

Located by: Minnesota Geological Survey
Method: GPS Differentially Corrected
Unique Number Verification: Information from owner
Input Date: 04/10/2000
System: *UTM - Nad83, Zone15, Meters*
X: 479084 **Y:** 4947612

Nearest Known Source of Contamination
800 feet North East direction Other type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

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

Cuttings Yes
First Bedrock St.Peter
Last Strat Jordan
Aquifer Jordan
Depth to Bedrock 250 **ft.**

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Keys Well Co.	62012	KEYS, G.

County Well Index Online Report **433296** Printed 6/22/2011 HE-01205-07

Minnesota Unique Well No.

554192

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 02/20/1995
Update Date 11/18/2003
Received Date

Well Name LAKEVILLE 9

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	18	CBBADA	**Elevation Method**	1098 **ft.** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
608 **ft.**	608 **ft.**	199412

Drilling Method Cable Tool

Well Address
185TH ST
LAKEVILLE MN 55044

Drilling Fluid --

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

Use Community Supply **PWS ID** 1190015 **Source** S07

Geological Material	Color	Hardness	From	To
SANDY CLAY	BROWN	SOFT	0	22
CLAY W/SAND & GRAVEL	BROWN	SOFT	22	237
SAND	BROWN	SOFT	237	246
SANDSTONE	BROWN	SOFT	246	256
SAND	BROWN	SOFT	256	280
SANDSTONE (GRAY)	GRAY	MEDIUM	280	355
LIMESTONE	GRAY	HARD	355	494
SANDSTONE	TAN	MEDIUM	494	603
SHALE & SANDSTONE	GRAY	MEDIUM	603	608

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** 0 **ft.**

Casing Diameter	Weight	Hole Diameter
24 in. to 283 ft.	lbs./ft.	
18 in. to 406 ft.	lbs./ft.	

Open Hole from 406 ft. to 608 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
187 ft. from Land surface Date Measured 199412

PUMPING LEVEL (below land surface)
223 ft. after 8 hrs. pumping 1390 g.p.m.

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

REMARKS
M.G.S. NO. 3638.

Located by: Minnesota Department of Health
Method: Digitization (Screen) - Map (1:24,000)
Unique Number Verification: Information from owner
Input Date: 11/18/2003
System: *UTM - Nad83, Zone15, Meters*
X: 478164 **Y:** 4947527

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 406 ft. 546 bags

Nearest Known Source of Contamination
100 feet N direction Septic tank/drain field type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

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

Cuttings Yes
First Bedrock St.Peter
Last Strat Jordan
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 280 **ft.**

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Keys Well Co.	62012	UNERTL, F.

County Well Index Online Report **554192** Printed 6/22/2011 HE-01205-07

Minnesota Unique Well No.

554193

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 02/20/1995
Update Date 12/30/2004
Received Date

Well Name LAKEVILLE 10

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	17	BCCDBD	Elevation Method	1085 ft. Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
616 ft.	616 ft.	199412

Drilling Method Cable Tool

Well Address
185TH ST
LAKEVILLE MN 55044

Drilling Fluid --

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

Use Community Supply **PWS ID** 1190015 **Source** S08

Geological Material	Color	Hardness	From	To
SAND & GRAVEL	BROWN	SOFT	0	18
HARDPAN	GRAY	MEDIUM	18	28
CLAY	GRAY	SOFT	28	118
CLAY & GRAVEL	GRAY	SOFT	118	199
GRAVEL	GRAY	SOFT	199	210
SAND	TAN	SOFT	210	216
SANDROCK	TAN	SOFT	216	249
SANDROCK & DOLOMITE	GRAY	MEDIUM	249	290
SANDROCK & DOLOMITE	GRAY	MEDIUM	290	376
LIMESTONE	GRAY	HARD	376	506
SANDROCK	GRAY	MEDIUM	506	616

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☐ Yes ☐ No **Above/Below** 0 **ft.**

Casing Diameter	Weight	Hole Diameter
24 in. to 250 ft.	94 lbs./ft.	
18 in. to 425 ft.	71 lbs./ft.	

Open Hole from 425 ft. to 616 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
180 ft. from Land surface Date Measured 199412

PUMPING LEVEL (below land surface)
212 ft. after 12 hrs. pumping 1500 g.p.m.

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

REMARKS
M.G.S. NO. 3578.

Located by: Minnesota Department of Health
Method: Digitization (Screen) - Map (1:24,000)
Unique Number Verification: Information from owner
Input Date: 11/18/2003
System: *UTM - Nad83, Zone15, Meters*
X: 479694 **Y:** 4947651

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 425 ft. 528 bags

Nearest Known Source of Contamination
225 feet S direction Septic tank/drain field type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

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

Cuttings Yes
First Bedrock St.Peter
Last Strat Jordan
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 216 **ft.**

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Keys Well Co.	62012	SAMPSON, J.

County Well Index Online Report **554193** Printed 6/22/2011 HE-01205-07

Minnesota Unique Well No.

554215

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 10/25/1996
Update Date 12/30/2004
Received Date

Well Name LAKEVILLE 11

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	17	BBBBBD	Elevation Method	1102 ft. Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
637 ft.	637 ft.	07/26/1996

Drilling Method Cable Tool

Well Address
IPAVA AV
LAKEVILLE MN 55044

Drilling Fluid Water

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

Use Community Supply **PWS ID** 1190015 **Source** S09

Geological Material	Color	Hardness	From	To
CLAY/GRAVEL	GRAY	SOFT	0	160
CLAY/SAND	GRAY	SOFT	160	178
SHALE	GREEN	SOFT	178	183
SANDSTONE	YEL/WHT		183	345
DOLOMITE/SHALE/SAND	VARIED	MEDIUM	345	375
LIMESTONE	TAN	HARD	375	526
SANDSTONE	WHITE	MEDIUM	526	637

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** 0 **ft.**

Casing Diameter	Weight	Hole Diameter
24 in. to 186 ft.	94.62 lbs./ft.	23 in. to 420 ft.
18 in. to 415 ft.	70.59 lbs./ft.	17 in. to 637 ft.

Open Hole from 415 ft. to 637 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
201 ft. from Land surface Date Measured 02/22/1996

PUMPING LEVEL (below land surface)
224 ft. after 10 hrs. pumping 1500 g.p.m.

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

REMARKS
M.G.S. NO. 3733.

Located by: Minnesota Department of Health
Method: Digitization (Screen) - Map (1:24,000)
Unique Number Verification: Information from owner
Input Date: 11/18/2003
System: *UTM - Nad83, Zone15, Meters*
X: 479589 **Y:** 4948353

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 415 ft. 756 bags

Nearest Known Source of Contamination
50 feet W direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☑ Not Installed Date Installed 07/18/1996
Manufacturer's name GOULDS Model number 12CHC HP 125 Volts 460
Length of drop Pipe 290 ft. Capacity 1300 g.p.m Type Submersible Material Steel (black or low carbon)

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

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

Cuttings Yes
First Bedrock Glenwood
Last Strat Jordan
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 178 **ft.**

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Keys Well Co.	62012	UNERTL, S.

County Well Index Online Report **554215** Printed 6/22/2011 HE-01205-07

Minnesota Unique Well No.

562991

County Dakota
Quad Farmington
Quad ID 88B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 05/09/1997
Update Date 08/01/2006
Received Date

Well Name LAKEVILLE 12

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	17	BDDDAA	**Elevation Method**	1078 **ft.** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
585 **ft.**	585 **ft.**	05/01/1997

Drilling Method Cable Tool

Well Address
18500 DODD RD
LAKEVILLE MN 55044

Drilling Fluid Bentonite

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

Use Community Supply **PWS ID** 1190015 **Source** S10

Geological Material	Color	Hardness	From	To
CLAY	YELLOW	V.SOFT	0	20
SAND & GRAVEL	YELLOW	HARD	20	25
CLAY & STONES	GRAY	HARD	25	145
CLAY/ROCKS	YELLOW	HARD	145	165
CLAY	GRAY	MEDIUM	165	180
SAND/GRAVEL	VARIED	MEDIUM	180	216
ST. PETER SANDSTONE	VARIED	HARD	216	275
SHAKOPEE/ONEOTA	GRAY	HARD	275	485
JORDAN	TAN/WHT	SFT-MED	485	581
ST. LAWRENCE	GREEN	MEDIUM	581	585

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** 0 **ft.**

Casing Diameter	Weight	Hole Diameter
24 in. to 241 ft.	94.62 lbs./ft.	24 in. to 380 ft.
18 in. to 380 ft.	70.59 lbs./ft.	18 in. to 585 ft.

Open Hole from 380 ft. to 585 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
178 ft. from Land surface Date Measured 05/01/1997

PUMPING LEVEL (below land surface)
215 ft. after 8 hrs. pumping 1980 g.p.m.

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

REMARKS
M.G.S. NO. 3749.

Located by: Minnesota Department of Health **Method:** Digitization (Screen) - Map (1:24,000)

Unique Number Verification: Information from owner **Input Date:** 11/18/2003

System: *UTM - Nad83, Zone15, Meters* **X:** 480343 **Y:** 4947659

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Bentonite from 0 to 380 ft. 18 yrds.

Nearest Known Source of Contamination
__feet __direction __type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☑ Not Installed Date Installed 11/00/1997
Manufacturer's name LAYNE-HATACHI Model number 15DRC-3 HP 125 Volts 460
Length of drop Pipe 260 ft. Capacity __g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

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

Cuttings Yes
First Bedrock St.Peter
Last Strat St.Lawrence
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 216 **ft.**

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Renner E.H. Well	71015	SIGAFOOS, R.

County Well Index Online Report **562991** Printed 6/22/2011 HE-01205-07

Minnesota Unique Well No.

596650

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 12/28/1999
Update Date 08/01/2006
Received Date

Well Name LAKEVILLE 13

Township	Range	Dir	Section	Subsections	Elevation	Elevation Method
114	20	W	8	CBBBAB	1078 ft.	7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
611 ft.	611 ft.	07/02/1999

Drilling Method Cable Tool

Well Address
175TH ST
LAKEVILLE MN 55044

Geological Material	Color	Hardness	From	To
SAND & GRAVEL	BROWN	SOFT	0	30
CLAY	GRAY	SOFT	30	40
SAND, GRAVEL & CLAY	BRN/GRY	SOFT	40	167
SANDSTONE	WHT/GRY	MEDIUM	167	322
LIMEROCK	BRN/TAN	HARD	322	497
SANDSTONE	YEL/WHT	MEDIUM	497	600
SHALE	GRN/GRY	MEDIUM	600	611

Drilling Fluid Water

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

Use Community Supply **PWS ID** 1190015 **Source** S11

Casing Type Steel (black or low carbon) **Joint** Threaded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** ft.

Casing Diameter	Weight	Hole Diameter
24 in. to 184 ft.	94.62 lbs./ft.	24 in. to 416 ft.
18 in. to 416 ft.	70.59 lbs./ft.	18 in. to 611 ft.

Open Hole from 416 ft. to 611 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
17 ft. from Land surface Date Measured 03/17/1999

PUMPING LEVEL (below land surface)
195 ft. after 8 hrs. pumping 1500 g.p.m.

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

REMARKS
M.G.S. NO. 3993.

Located by: Minnesota Department of Health **Method:** GPS SA On (averaged)
Unique Number Verification: Information from owner **Input Date:** 08/16/1999
System: *UTM - Nad83, Zone15, Meters* **X:** 479614 **Y:** 4949163

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 416 ft. 1176 bags

Nearest Known Source of Contamination
100 feet W direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 07/01/1999
Manufacturer's name GOULD Model number 14RJLC HP 125 Volts 460
Length of drop Pipe 260 ft. Capacity 1200 g.p.m Type Submersible Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

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

Cuttings Yes
First Bedrock St.Peter
Last Strat St.Lawrence
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 167 ft.

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Keys Well Co.	62012	UNERTL, S.

County Well Index Online Report **596650** Printed 6/22/2011
HE-01205-07

Minnesota Unique Well No.

603073

County Dakota
Quad Farmington
Quad ID 88B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 01/24/2002
Update Date 08/01/2006
Received Date

Well Name LAKEVILLE 14

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	17	ACAAAA	**Elevation Method**	1070 **ft.** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
600 **ft.**	600 **ft.**	07/11/2001

Drilling Method Cable Tool

Well Address
KING PARK
LAKEVILLE MN 55044

Drilling Fluid Water

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

Use Community Supply **PWS ID** 1190015 **Source** S12

Geological Material	Color	Hardness	From	To
DRIFT	GRAY		0	143
SANDSTONE	YELLOW		143	262
SHALEY SANDSTONE	GRAY		262	275
SHALE	GRAY		275	287
LIMESTONE	GRY/TAN		287	490
SHALEY S.S.	GRAY		490	502
SANDSTONE	WHITE		502	595
SHALE	BLU/GRN		595	600

Casing Type Steel (black or low carbon) **Joint** No Information **Drive Shoe?** ☑ Yes ☐ No **Above/Below** **ft.**

Casing Diameter	Weight	Hole Diameter
24 in. to 144 ft.	94.62 lbs./ft.	24 in. to 365 ft.
18 in. to 365 ft.	70.59 lbs./ft.	17 in. to 600 ft.

Open Hole from 365 ft. to 600 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
180 ft. from Land surface Date Measured 03/16/2001

PUMPING LEVEL (below land surface)
205 ft. after 24 hrs. pumping 2000 g.p.m.

Well Head Completion
Pitless adapter manufacturer MONITOR Model 10PS1820
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

REMARKS
M.G.S. NO. 4075.

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 365 ft. 1176 bags

Located by: Minnesota Department of Health

Method: Digitization (Screen) - Map (1:24,000)

Unique Number Verification: Information from owner

Input Date: 11/18/2003

System: *UTM - Nad83, Zone15, Meters*

X: 480749 **Y:** 4947962

Nearest Known Source of Contamination
500 feet W direction Other type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 07/06/2001
Manufacturer's name GOULD Model number 14RJLC HP 125 Volts 460
Length of drop Pipe 300 ft. Capacity 1550 g.p.m Type Submersible Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

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

Cuttings Yes
First Bedrock St.Peter
Last Strat St.Lawrence
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 143 **ft.**

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Keys Well Co.	62012	SAMPSON, J.

County Well Index Online Report **603073** Printed 6/22/2011
HE-01205-07

Minnesota Unique Well No.

651737

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 01/22/2002
Update Date 03/11/2005
Received Date

Well Name LAKEVILLE 15

Township Range Dir Section Subsections Elevation 1017 **ft.**

114 20 W 19 ADAABC **Elevation Method** Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
517 **ft.**	515 **ft.**	02/28/2001

Drilling Method Other

Well Address
192ND ST
LAKEVILLE MN 55044

Drilling Fluid Water

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

Use Community Supply **PWS ID** 1190015 **Source** S13

Geological Material	Color	Hardness	From	To
SANDY CLAY	BROWN	SOFT	0	12
GRAVEL ROCKS	BROWN	SOFT	12	27
GRAVEL	GRAY	SOFT	27	30
SANDY CLAY	GRAY	SOFT	30	58
SANDY CLAY	BROWN	SOFT	58	70
ROCKS	BLK/BRN	MEDIUM	70	73
SANDSTONE	GRAY	MEDIUM	73	151
SANDSTONE & SHALE	GRAY	MEDIUM	151	153
SANDSTONE	GRAY	SOFT	153	177
SANDSTONE & SHALE	GRAY	MEDIUM	177	182
LIMESTONE	GRAY	MED-HRD	182	406
SANDSTONE	GRAY	MEDIUM	406	420
SANDSTONE	GRAY	SOFT	420	460
SANDSTONE	GRAY	SFT-MED	460	480
SANDSTONE SHALE	GRY/GRN	MEDIUM	480	510
SHALE	GREEN	MEDIUM	510	515

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** **ft.**

Casing Diameter	Weight	Hole Diameter
24 in. to 192 ft.	lbs./ft.	24 in. to 192 ft.
18 in. to 412 ft.	lbs./ft.	18 in. to 515 ft.

Open Hole from 412 ft. to 515 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
106 ft. from Land surface Date Measured 02/28/2001

PUMPING LEVEL (below land surface)
133.33 ft. after 1 hrs. pumping 1400 g.p.m.

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

NO REMARKS

Located by: Minnesota Department of Health **Method:** Digitization (Screen) - Map (1:24,000)

Unique Number Verification: Information from owner **Input Date:** 11/18/2003

System: *UTM - Nad83, Zone15, Meters* **X:** 479463 **Y:** 4946335

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 413 ft.

Nearest Known Source of Contamination
__feet __direction __type

Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

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

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Traut M.J. Well Co.	71536	TONY/ED

First Bedrock St.Peter
Last Strat St.Lawrence
Aquifer Jordan
Depth to Bedrock 73 **ft.**

County Well Index Online Report **651737** Printed 6/22/2011 HE-01205-07

Minnesota Unique Well No.

655907

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 03/03/2003
Update Date 01/16/2007
Received Date

Well Name LAKEVILLE 16

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	18	DDDADC		1059 ft.
					Elevation Method	Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
570 ft.	570 ft.	02/00/2003

Drilling Method Cable Tool

Well Address
18988 IRON RIVER TR
LAKEVILLE MN 55044

Drilling Fluid Water

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

Use Community Supply **PWS ID** 1190015 **Source** S14

Geological Material	Color	Hardness	From	To
CLAY & GRAVEL	GRAY	SOFT	0	140
SHALE & SAND	YELLOW	SOFT	140	184
SANDSTONE & SHALE	YEL/WHT	MEDIUM	184	208
SANDSTONE	WHITE	MEDIUM	208	250
LIMESTONE	GRAY	HARD	250	450
SANDSTONE	WHITE	MEDIUM	450	565
SHALE	GREEN	MEDIUM	565	570

Casing Type Steel (black or low carbon) **Joint** No Information **Drive Shoe?** ☑ Yes ☐ No **Above/Below** ft.

Casing Diameter	Weight	Hole Diameter
24 in. to 184 ft.	lbs./ft.	24 in. to 466 ft.
18 in. to 466 ft.	lbs./ft.	18 in. to 570 ft.

Open Hole from 466 ft. to 573 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
139 ft. from Land surface Date Measured 10/14/2002

PUMPING LEVEL (below land surface)
176 ft. after 12 hrs. pumping 1400 g.p.m.

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

REMARKS
M.G.S. NO. 4236.

Located by: Minnesota Department of Health
Method: Digitization (Screen) - Map (1:24,000)
Unique Number Verification: Information from owner
Input Date: 11/18/2003
System: *UTM - Nad83, Zone15, Meters*
X: 479516 **Y:** 4946901

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 466 ft. 588 bags

Nearest Known Source of Contamination
50 feet South West direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 02/00/2003
Manufacturer's name GOULD Model number 13CMC HP 125 Volts 460
Length of drop Pipe 300 ft. Capacity 1400 g.p.m Type Submersible Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

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

Cuttings Yes
First Bedrock St.Peter
Last Strat St.Lawrence
Aquifer Jordan
Depth to Bedrock 184 ft.

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Keys Well Co.	62012	GALVIN, M.

County Well Index Online Report **655907** Printed 6/22/2011
HE-01205-07

Minnesota Unique Well No.

694913

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 0
Update Date 07/19/2007
Received Date 07/26/2004

Well Name LAKEVILLE 17

Township	Range	Dir	Section	Subsections	Elevation	
114	20	W	8	BBCACC	1082 ft.	Elevation Method: Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
607 ft.	607 ft.	06/01/2004

Drilling Method Cable Tool

Well Address
17100 IPAVA AV
LAKEVILLE MN 55044

Drilling Fluid Bentonite

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

Use Community Supply **PWS ID** 1190015 **Source** S15

Geological Material	Color	Hardness	From	To
HARD DRY CLAY	BROWN	MEDIUM	0	15
ROCKS/GRAVEL	BROWN	MEDIUM	15	23
CLAY & GRAVEL	BROWN	HARD	23	248
RUBBLE/ST. PETER	GRAY	MEDIUM	248	266
ST. PETER S.S.	LT. GRY	MEDIUM	266	316
SHAKOPEE DOLOMITE	GRAY	HARD	316	499
JORDAN SANDSTONE	GRY/WHT	MEDIUM	499	599
SANDY SHALE	BLU/GRN	MED-HRD	599	607

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** ft.

Casing Diameter	Weight	Hole Diameter
24 in. to 272 ft.	94.63 lbs./ft.	24 in. to 415 ft.
18 in. to 415 ft.	70.59 lbs./ft.	19 in. to 607 ft.

Open Hole from 415 ft. to 607 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
176.1 ft. from Land surface Date Measured 03/30/2004

PUMPING LEVEL (below land surface)
206.31 ft. after 24 hrs. pumping 2000 g.p.m.

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

REMARKS
M.G.S. NO. 4310.

Located by: Minnesota Department of Health **Method:** GPS SA Off (averaged)
Unique Number Verification: Information from owner **Input Date:** 08/23/2004
System: *UTM - Nad83, Zone15, Meters* **X:** 479668 **Y:** 4949702

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from to 415 ft. 22 yrds.

Nearest Known Source of Contamination
200 feet N direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 06/00/2004
Manufacturer's name GOULDS Model number 13CHC-4 HP 125 Volts 480
Length of drop Pipe 290 ft. Capacity 1400 g.p.m Type Submersible Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

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

First Bedrock St.Peter
Last Strat St.Lawrence
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 266 ft.

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Renner E.H. Well	71015	COLBURN, S.

County Well Index Online Report **694913** Printed 6/22/2011
HE-01205-07

Minnesota Unique Well No.

745558

County Dakota
Quad Orchard Lake
Quad ID 89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 01/05/2007
Update Date 10/09/2007
Received Date 04/04/2007

Well Name LAKEVILLE 18

Township	Range	Dir	Section	Subsections	Elevation Method	Elevation
114	20	W	17	BCCDBC	7.5 minute topographic map (+/- 5 feet)	1093 ft.

Well Depth	Depth Completed	Date Well Completed
864 ft.	864 ft.	02/00/2007

Drilling Method Dual Rotary

Well Address
18400 IPAVA AV
LAKEVILLE MN 55044

Drilling Fluid Water

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

Geological Material	Color	Hardness	From	To
CLAY	BROWN	SOFT	0	5
SAND & GRAVEL	BROWN	SOFT	5	28
CLAY	GRAY	SOFT	28	47
SAND & GRAVEL	BROWN	SOFT	47	61
SANDY CLAY	GRAY	MEDIUM	61	76
CLAY	GRAY	SOFT	76	86
SAND & GRAVEL	VARIED	SOFT	86	96
CLAY	GRAY	MEDIUM	96	166
CLAY & GRAVEL	BROWN	SOFT	166	174
GRANITE BOULDER WHT RED BLACK	VARIED	HARD	174	176
CLAY	GRAY	MEDIUM	176	198
SAND & GRAVEL	VARIED	SOFT	198	209
SAND & GRAVEL	VARIED	SOFT	209	211
FINE SAND	GRAY	SOFT	211	221
FINE SANDSTONE	GRAY	SOFT	221	243
SANDSTONE & SHALE LAYERS	VARIED	SOFT	243	247
SANDSTONE & SHALE	TAN/GRY	MEDIUM	247	248
SANDSTONE & SHALE	GRAY	MEDIUM	248	250
SANDSTONE	GRAY	MEDIUM	250	254
SANDSTONE & SHALE	TAN/GRY	MEDIUM	254	274
SANDSTONE	TAN	MEDIUM	274	279
SANDSTONE	TAN/GRY	MEDIUM	279	284
SANDSTONE & SHALE	TAN/GRY	MEDIUM	284	289
SANDSTONE & PYRITE	GRAY	HARD	289	294
SANDSTONE	GRAY	HARD	294	301
LMS W/TAN SANDST. LAYER 304-304.5	GRAY	HARD	301	306
LMS	GRAY	HARD	306	311
LMS W/TAN SANDSTONE LAYERS	GRAY	HARD	311	316
LMS	GRAY	HARD	316	324
SANDSTONE	TAN	HARD	324	326
LMS W/TAN SANDSTONE LAYERS	TAN	HARD	326	331
LMS	GRAY	HARD	331	341
LMS & SANDSTONE LAYERS	GRAY	HARD	341	346
LMS W/BRN LAYER (348-348.5)	GRAY	HARD	346	351
LMS	GRAY	HARD	351	361
LMS	TAN	HARD	361	366
LMS	TAN/GRY	HARD	366	386
LMS W/TAN SANDST. LAYER 389-389.5	TAN/GRY	HARD	386	391
LMS W/FEW TAN SANDSTONE LAYERS	TAN/GRY	HARD	391	396
LMS W/PYRITE	TAN/GRY	HARD	396	401
LMS W/PYR. ONE TAN SS LAYER 402-04	TAN/GRY	HARD	401	406
LMS W/PYRITE	BRN/GRY	HARD	406	411
LMS W/PYRITE, BRN/TAN/GREY		HARD	411	416
LMS W/PYRITE	TAN/GRY	HARD	416	421
LMS W/TAN SANDSTONE LAYERS	TAN/GRY	HARD	421	426
LMS W/TAN SANDSTONE LAYERS	GRAY	HARD	426	431
LMS W/TAN SANDSTONE LAYERS	TAN/GRY	HARD	431	436
LMS	GRY/TAN	HARD	436	451
LMS	TAN	HARD	451	491
LMS	GRAY	HARD	491	497
LMS	GRAY	HARD	497	498
SANDSTONE	GRAY	HARD	498	503
SANDSTONE W/LMS LAYER 503-503.5	GRAY	HARD	503	508
SANDSTONE & GREEN SHALE	GRAY	HARD	508	523
SANDSTONE	GRAY	HARD	523	538
SANDSTONE & GREEN SHALE	GRAY	HARD	538	548
SANDSTONE	GRAY	HARD	548	573
SANDSTONE & GREEN SHALE	GRAY	HARD	573	593
SANDSTONE	GRAY	HARD	593	603
SANDSTONE W/GREEN SHALE LAYERS	GRAY	HARD	603	618
SANDSTONE W/GREEN SHALE LENSES	GRAY	HARD	618	628
SILTSTONE	GRAY	HARD	628	633

Use Community Supply **PWS ID** **Source**

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** **ft.**

Casing Diameter	Weight	Hole Diameter
18 in. to 254 ft.	70.59 lbs./ft.	18 in. to 254 ft.
12 in. to 667 ft.	49.56 lbs./ft.	17 in. to 864 ft.

Open Hole from 667 ft. to 864 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
214 ft. from Land surface Date Measured 02/14/2007

PUMPING LEVEL (below land surface)
378 ft. after 12 hrs. pumping 600 g.p.m.

LMS	GRAY	HARD	633	648
LMS	GRY/TAN	HARD	648	657
SILTSTONE	GRY/TAN	HARD	657	663
SANDSTONE & GREEN SHALE	GRAY	HARD	663	668
SANDSTONE & GRN. SHALE W/SILTSTONE	GRAY	HARD	668	673
SANDSTONE & GREEN SHALE	GRAY	HARD	673	688
SANDSTONE & GRN SHALE, GRY/BRN LAY	GRY/BRN	HARD	688	693
LMS	VARIED	HARD	693	695
SANDSTONE & GREEN SHALE	GRAY	HARD	695	720
SANDST & GRN. SHALE, GRY/TAN LAYER	GRY/TAN	HARD	720	775
SANDSTONE	TAN/GRY	HARD	775	780
SANDSTONE & GREEN SHALE	GRY/TAN	HARD	780	785
SANDSTONE	GRY/TAN	HARD	785	790
SANDSTONE & GREEN SHALE	GRY/TAN	HARD	790	795
SANDSTONE & GREEN SHALE	GRAY	HARD	795	808
SANDSTONE & GREEN SHALE	GRAY	HARD	808	809
SANDSTONE	GRAY	HARD	809	844
SANDSTONE & GREEN SHALE	GRAY	HARD	844	864

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

REMARKS
GAMMA LOGGED 1-4-2007. M.G.S. NO. 4653. LOGGED BY JIM TRAEN.

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from to 667 ft. 28 yrds.

Located by: Minnesota Geological Survey **Method:** Digitization (Screen) - Map (1:24,000)

Unique Number Verification: Info/GPS from data source **Input Date:** 01/05/2007

System: *UTM - Nad83, Zone15, Meters* **X:** 479663 **Y:** 4947647

Nearest Known Source of Contamination
20 feet N direction Sewer type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

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

Cuttings Yes **Borehole Geophysics** Yes

First Bedrock St.Peter **Aquifer** Franconia-Ironton-Galesvill

Last Strat Ironton-Galesville **Depth to Bedrock** 209 **ft.**

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Mark J Traut Wells, Inc.	1404	MATTHEW/TONY

County Well Index Online Report **745558** Printed 6/22/2011
HE-01205-07

Minnesota Unique Well No.

686288

County Dakota
Quad Farmington
Quad ID 88B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 09/25/2008
Update Date 05/13/2009
Received Date

Well Name LAKEVILLE 19

Township Range Dir Section Subsections Elevation 992 **ft.**

Township	Range	Dir	Section	Subsections	Elevation Method
114	20	W	10	BACACB	7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
545 **ft.**	545 **ft.**	05/00/2009

Drilling Method Cable Tool

Well Address
17191 GERDINE PA
LAKEVILLE MN 55068

Drilling Fluid Bentonite

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

Use Community Supply **PWS ID** **Source**

Geological Material	Color	Hardness	From	To
TOP SOIL	BLACK	SOFT	0	5
SAND & CLAY	YELLOW	SOFT	5	10
CLAY	YELLOW	SOFT	10	15
CLAY	GRAY	SOFT	15	59
CLAY & GRAVEL/ROCKS	GREEN	SOFT	59	165
CLAY & SANDROCK	GREEN	SOFT	165	170
CLAY	GRAY	MEDIUM	170	175
SANDROCK	YELLOW	MEDIUM	175	235
LIMEROCK	GRAY	HARD	235	445
SANDSTONE	GRAY	MEDIUM	445	535
SHALE & SANDROCK	BLU/GRY	MEDIUM	535	545

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** **ft.**

Casing Diameter	Weight	Hole Diameter
24 in. to 195 ft.	94.71 lbs./ft.	24 in. to 341 ft.
18 in. to 341 ft.	70.65 lbs./ft.	17 in. to 545 ft.

Open Hole from 341 ft. to 545 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
95 ft. from Land surface Date Measured 12/18/2008

PUMPING LEVEL (below land surface)
132 ft. after 24 hrs. pumping 1200 g.p.m.

Well Head Completion
Pitless adapter manufacturer BAKER Model 11PS1820
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

REMARKS
M.G.S. NO. 4919.

Located by: Minnesota Department of Health **Method:** GPS SA Off (averaged)
Unique Number Verification: N/A **Input Date:** 07/21/2008
System: *UTM - Nad83, Zone15, Meters* **X:** 483267 **Y:** 4949707

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from to 341 ft. 14 yrds.

Nearest Known Source of Contamination
250 feet S direction Body of water type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 05/12/2009
Manufacturer's name GOULDS Model number 13CMC HP 125 Volts 460
Length of drop Pipe 262 ft. Capacity 1250 g.p.m Type Submersible Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☑ No

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

Cuttings Yes
First Bedrock St.Peter
Last Strat Jordan-St.Lawrence
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 175 **ft.**

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Keys Well Drilling Co.	1347	ALLAN, J.

County Well Index Online Report **686288** Printed 6/22/2011
HE-01205-07

Attachment B

Pumping Test Data

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

Aquifer Test Plan

Public Water Supply ID:	1190015	**PWS Name:**	City of Lakeville

Contact

Aquifer Test Contact:	**John Greer**
Contractor Name and Address:	**Barr Engineering**
	4700 West 77th Street
City, State, Zip:	**Minneapolis, MN 55435-4803**
Phone and Fax Number:	**952-832-2691 (phone) 952-832-2601 (fax)**

Proposed Aquifer Test Method

[X] 1) An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on a public well in your water supply system.

[ ] 2) An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on another well in a hydrogeologic setting determined by the department to be equivalent.

[ ] 3) A pumping test conducted on a new or existing public well in your water supply system and that meets the requirements for larger sized water systems (wellhead protection rule part 4720.5520).

[ ] 4) A pumping test conducted on a new or existing public well in your water supply system and that meets the requirements for smaller sized water systems (wellhead protection rule part 4720.5530).

[ ] 5) An existing pumping test that does not meet the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on: 1) a public water supply well or 2) another well in a hydrogeologic setting determined by the department to be equivalent.

[ ] 6) An existing specific capacity test or specific capacity test for the public water supply well.

[ ] 7) An existing published transmissivity value.

- Include all pumping test data and the estimated transmissivity value when the aquifer test method proposed is one of those specified in Nos. 1, 2, 5, 6, or 7 listed above.

To request this document in another format, please call the Section Receptionist at (651) 201-4700 or Division TTY at (651) 201-5797.

HE-01555-01 (10/06)
IC #140-0606

Test Description			
Pumped Well Unique No:	686288 (Lakeville 19)	**Test Duration (Hours):**	24 hrs
Location (Township, Range, Section, Quarters):	T114 R20W Sec10 BACACB	**Pump Type:**	Submersible
		Discharge Rate:	1200 gpm
Number of Observation Wells:	2	**Flow Rate Measuring Device Type:**	

[X] Confined [ ] Unconfined

- You must include a map showing the location of the pumping well and observation well(s).

Rational for Proposed Test Method

Briefly describe the rationale for method selected:

Pumping Test using Lakeville Well 19 (pumping) and Wells 2 and 4 (monitoring)

Well 19 Pumping Test:
Range of transmissivity = 640 m^2/day to 890 m^2/day

List all unique numbers of wells that this Aquifer Test Plan applies to:					
686288 (19)	161439 (7)	596650 (13)			
207708 (2)	433296 (8)	603073 (14)			
207727 (3)	554192 (9)	651737 (15)			
212650 (4)	554193 (10)	655907 (16)			
241440 (5)	554215 (11)	694913 (17)			
161409 (6)	562991 (12)				

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

Aquifer Test Plan

Public Water Supply ID:	1190015	**PWS Name:**	City of Lakeville

Contact

Aquifer Test Contact:	**John Greer**
Contractor Name and Address:	**Barr Engineering**
	4700 West 77th Street
City, State, Zip:	**Minneapolis, MN 55435-4803**
Phone and Fax Number:	**952-832-2691 (phone) 952-832-2601 (fax)**

Proposed Aquifer Test Method

[X] 1) An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on a public well in your water supply system.

[ ] 2) An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on another well in a hydrogeologic setting determined by the department to be equivalent.

[ ] 3) A pumping test conducted on a new or existing public well in your water supply system and that meets the requirements for larger sized water systems (wellhead protection rule part 4720.5520).

[ ] 4) A pumping test conducted on a new or existing public well in your water supply system and that meets the requirements for smaller sized water systems (wellhead protection rule part 4720.5530).

[ ] 5) An existing pumping test that does not meet the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on: 1) a public water supply well or 2) another well in a hydrogeologic setting determined by the department to be equivalent.

[ ] 6) An existing specific capacity test or specific capacity test for the public water supply well.

[ ] 7) An existing published transmissivity value.

- Include all pumping test data and the estimated transmissivity value when the aquifer test method proposed is one of those specified in Nos. 1, 2, 5, 6, or 7 listed above.

To request this document in another format, please call the Section Receptionist at (651) 201-4700 or Division TTY at (651) 201-5797.

HE-01555-01 (10/06)
IC #140-0606

Test Description			
Pumped Well Unique No:	745558 (Lakeville 18)	**Test Duration (Hours):**	
Location (Township, Range, Section, Quarters):	T114 R20W Sec17 BCCDBC	**Pump Type:**	Submersible
		Discharge Rate:	600 gpm
Number of Observation Wells:	1	**Flow Rate Measuring Device Type:**	Flow Meter

[X] Confined [ ] Unconfined

- You must include a map showing the location of the pumping well and observation well(s).

Rational for Proposed Test Method

Briefly describe the rationale for method selected:

Pumping Test using Lakeville Well 18 (pumping) and Legends Golf Couse Well (monitoring)

Results documented in:

Liesch Companies. 2007. Installation and Testing of Lakeville Well 18; Prepared for City of Lakeville, Minnesota.

Well 18 Pumping Test:
Mean transmissivity = 79.55 m^2/day
Range of transmissivity = 61.48 to 93.68 m^2/day

List all unique numbers of wells that this Aquifer Test Plan applies to:					
745558 (18)					

LIESCH

You Are Receiving a Transmittal From

Liesch Associates, Inc. ▪ 13400 15th Avenue North ▪ Minneapolis, MN 55441
Phone: (763) 489-3100 ▪ Toll Free: (800) 338-7914 ▪ Fax: (763) 489-3101

To: Jay Frischman
Minnesota Department of Natural Resources
500 Lafayette Road
Box 32
St. Paul, MN 55155-4032

JUN 2007
Received
DNR Waters

Date: June 26, 2007

Re: Lakeville FIG Well Report

Transmitted:

As you requested: ☒
For your information: ☐
Other: ☐

Comments: Jay; Here is a copy of the Lakeville FIG well report for your files. Feel free to call if you have questions. Thanks.

Sincerely,

LIESCH ASSOCIATES, INC.

David J. Lowell, PG

W:\ws\11079\2007-06-26 FIG well TNS.doc

Installation and Testing of Lakeville Well 18

Prepared For:

City of Lakeville, Minnesota

May 2007

Prepared By:

Liesch Companies

Minneapolis, MN • Madison, WI • Scottsdale, AZ

Installation and Testing of Well 18

Prepared for:

City of Lakewood, Minnesota

Prepared by:

LIESCH ASSOCIATES, INC.
13400 15TH AVENUE NORTH
PLYMOUTH, MN 55441

May 2007

PROJECT NUMBER: 11079.00

This report was prepared by me or under my direct supervision.

James de Lambert, PG

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5.0 CONCLUSIONS AND RECOMMENDATIONS 5

APPENDICES

Appendix A — Figure 1 – Well 18 Site Plan
Figure 2 – Well 18 Construction Diagram

Appendix B — Table 1 – Pumping Test Statistics and Observations
Table 2 – Aquifer Parameters Calculated from Well 18 Pumping Tests
Table 3 – Summary of Water Quality Results

Appendix C — Well 18 MDH and Geophysical Logs, Well Alignment and Mill Numbers

Appendix D — Legend Well Log, Pumping Test Data, Plots and Calculations

Appendix E — Water Quality Sampling Laboratory Report

1.0 INTRODUCTION

Liesch Associates, Inc. (Liesch) assisted the City of Lakeville (Lakeville) with well construction and testing of Well 18. At the request of the Minnesota Department of Natural Resources (DNR), this well was constructed to assess the water quality and supply potential of the Franconia-Ironton-Galesville Aquifer in the Lakeville area. The following report is a summary of the construction and testing procedures conducted at Well 18. The locations of Well 18 and nearby Prairie du Chien-Jordan Aquifer Well 10 are illustrated on **Figure 1**, Well 18 Site Plan (**Appendix A**). The location for Well 18 was selected based upon the location of the treatment plant and consideration of City property ownership, locations of existing water lines and surface features.

Prior to the construction and testing phase of the project, plans and specifications were prepared and competitive bids for the work were obtained. Mark J. Traut Wells (Traut) of Waite Park, Minnesota was awarded the contract to construct and test Well 18. The well was started on November 28, 2006 and the pumping test was officially completed on March 19, 2007 when the pump was restarted and water samples were collected.

2.0 DRILLING SUMMARY

Traut was the successful bidder and provided the well contractor services and materials for this project. The well was drilled using dual tube reverse rotary techniques. Well 18 was constructed as a permanent double cased production well with 18-inch low carbon steel well casing set to 254 feet below grade and 12-inch low carbon steel well casing set to 667 feet below grade. The well was completed open hole to a total depth of 864 feet. A well construction diagram for Well 18 is provided as **Figure 2** in **Appendix A**.

Borehole electric logging procedures were conducted by Downhole Well Services, Inc. of Mounds View, Minnesota. A suite of geophysical logs were plotted to characterize the geologic materials and to identify formation contacts. Temperature, natural gamma, single point resistance, spontaneous potential, fluid resistivity and 8, 16, 32 and 64-foot normal resistivity logs were measured. A copy of the MDH Well Record for well 18 is provided along with one full page and seven enlarged views of the geophysical well log in **Appendix C**.

2.1 Well 18 Construction

Construction of Well 18 started on November 28, 2006. At that time, a dual rotary drilling rig was

set up on site and prepared for drilling. 18-inch low carbon steel casing was drilled and driven to a depth of 254 feet and grouted into place on December 12, 2006. The 18-inch casing was set at the top of a shaley portion of the St. Peter Formation. The borehole was then drilled to a 17-inch diameter and advanced to a depth of 864 feet. The suite of geophysical logs were run on January 4, 2007 by Downhole Well Services, Inc. 12-inch LCS casing equipped with a grout shoe was set to a final depth of 667 feet on January 8, 2007 and was grouted into place on January 16, 2007.

Alignment testing was conducted on January 15, 2007. The alignment test indicates that Well 18 is at a maximum, approximately 17.5 inches out of plumb and 2.8 inches out of alignment. These deviations are within the allowable range established in the specifications package. A copy of the measured deviations and vertical alignment plots for Well 18 are included in the back of Appendix **D**.

After the 12-inch casing was grouted into place and the pea rock fill was removed from the well, development was initiated. The well was developed using air lifting, pressurization and pumping. Blasting procedures were also conducted to enlarge the open portion of the borehole to increase the effective radius of the well and further decrease the entrance velocity. Development continued until sand production reached very low levels.

3.0 PUMPING TEST SUMMARY AND AQUIFER ANALYSIS

3.1 Well 18 Pumping Test

A constant rate pumping test was conducted at Well 18. The pumping period started at 9:15 am on March 6, 2007 and terminated at approximately 1:00 am on March 12, 2007 due to generator failure. Recovery measurements were collected by hand measurements because a pressure transducer was installed in the pumping well. This pumping test was performed using a submersible pump, flow regulating valve, and a flow totalizer. The pumping well and the Legend Golf Course well were monitored for water level changes before, during and after the pumping test. The data provided in **Table 1** represents the basic information regarding water level fluctuations under the specific pumping conditions encountered during the test.

For this test, water level information was obtained using hand measurements for static, drawdown and recovery water levels at Well 18, and the Legend well. The Legend Golf Course well is located approximately 22,800 feet west-southwest of Well 18. The Legend well was selected as an observation well because Well 18 is finished in the Franconia-Ironton-Galesville Aquifer and the

Legend well is the nearest known well also completed in this deep aquifer. A pressure transducer was installed in Well 18, however the transducer was not set deep enough to record water level changes during pumping.

The pumping rate was set just after pump start-up and periodically adjusted as the pumping head increased. Well 18 was pumped at 600 gallons per minute (gpm) throughout the duration of the pumping portion of the test. Recovery was measured at Well 18 and the other monitoring points for over approximately a six and one-half day period after pumping ceased. A copy of the Legend Well and Boring Log along with a tabulation of the water level measurements and computed drawdown observed during the pumping test are included in **Appendix D**.

Graphical methods were used to determine aquifer coefficients as well as to identify any major boundary conditions encountered during the test. Both Theis curve matching and the Jacobs method semi-logarithmic plots of drawdown during pumping and the residual drawdown measured during recovery are provided in **Appendix D** along with the computed parameter values. These graphical methods are commonly used because they provide a visual representation of possible boundaries and require shorter times to plot and analyze. Hand collected water level measurements are used to create the charts from the test at Well 18. The water levels measured at the Legend well were corrected for barometric pressure changes as measured at Well 18.

3.2 Well 18 Pumping Test Data Analysis

The two most commonly sought aquifer characteristics are coefficients that represent the transmissivity and storativity of the aquifer. Transmissivity is a measure of an aquifers ability to transmit water and is defined as the rate of flow through a vertical section of aquifer of unit width (extending the full saturated height of the aquifer), under a hydraulic gradient of one. The higher the transmissivity, the more easily water can move through the aquifer. Storativity is a measure of the amount of water stored in an aquifer and is defined as the volume of water released or taken into storage per unit surface area, per unit change in head. These two coefficients are physical properties of the aquifer material. The values computed from the pumping test data are presented on **Table 2**.

The charts included as **Appendix D** represent the effective conditions for pumping from the aquifer for at least the period of the test and are commonly used to calculate storage and transmissivity values. Computations were conducted using both the drawdown and recovery data. The drawdown and residual drawdown data from Well 18 was plotted against logarithmic time to produce Jacobs's method straight line plots. In addition, a fully logarithmic Theis curve match graphing time/distance

squared vs. drawdown was performed using both of the monitored wells and a Theis curve match of the time vs. drawdown data for the Legend well was also conducted. After approximately 1,000 minutes of pumping, the slope of the Jacobs semi-log plot of Time vs. Drawdown at Well 18 flattens and appears to be trending towards equilibrium between well discharge and formation recharge at the time the generator failed. Copies of the fore mentioned plots are included in **Appendix D**.

The transmissivities computed from the drawdown and recovery information ranged from 4,950 to 7,543 g/d/ft^2 and the storativity values ranged from 5.36 x 10^{-5} to 5.62 x 10^{-5}. These transmissivity values are generally somewhat higher than those measured at the Madewakanton Sioux Community, located south of Shakopee, Minnesota. The Madewakanton Sioux Community test was conducted in 2005 by the USGS and is discussed in detail in USGS Scientific Investigations Report 2005-5245. The maximum transmissivity reported from the 2005 test is 4,862 g/d/ft^2. The storativity values are comparable between the two pumping tests.

All of the drawdown was attributed to the pumping of Well 18. No compensation was made for any portion of the drawdown that might have been contributed by other wells that may have been pumping from the Franconia-Ironton-Galesville Aquifer. A specific capacity of 3.76 gpm/ft was observed at Well 18 after one day of pumping. This value is in close agreement with the theoretical drawdown in a 100 % efficient well under confined conditions with a transmissivity of 7,500 g/d/ft^2 and suggests that Well 18 is sufficiently developed and reasonably efficient.

4.0 WATER QUALITY RESULTS

Because the pumping test ended early due to generator failure, water quality samples were collected from the well after a 7-day recovery period. To accomplish this task, the pump used for the test remained in the well for the recovery period and was restarted to collect the sample. The water sample was collected from the test pump discharge pipe.

A summary of the analytical results is presented on **Table 3** and copies of the laboratory reports for Well 18 are included in **Appendix E**. Included on **Table 3** are the US EPA Maximum Contaminant Levels (MCLs) and Secondary Maximum Contaminant Levels (SMCLs), where applicable. A review of **Table 3** indicates that none of the analytes were detected at concentrations in excess of their respective MCL. However, the sample does exceed the SMCL for iron. This parameter is commonly exceeded in Minnesota and SMCLs, which are not enforceable standards, are based primarily on aesthetic criteria rather than potential human health

effects. Volatile organic compounds were not detected using the MDH 465F analysis and pesticides and herbicides not detected using the MN list 1 and list 2 analyses.

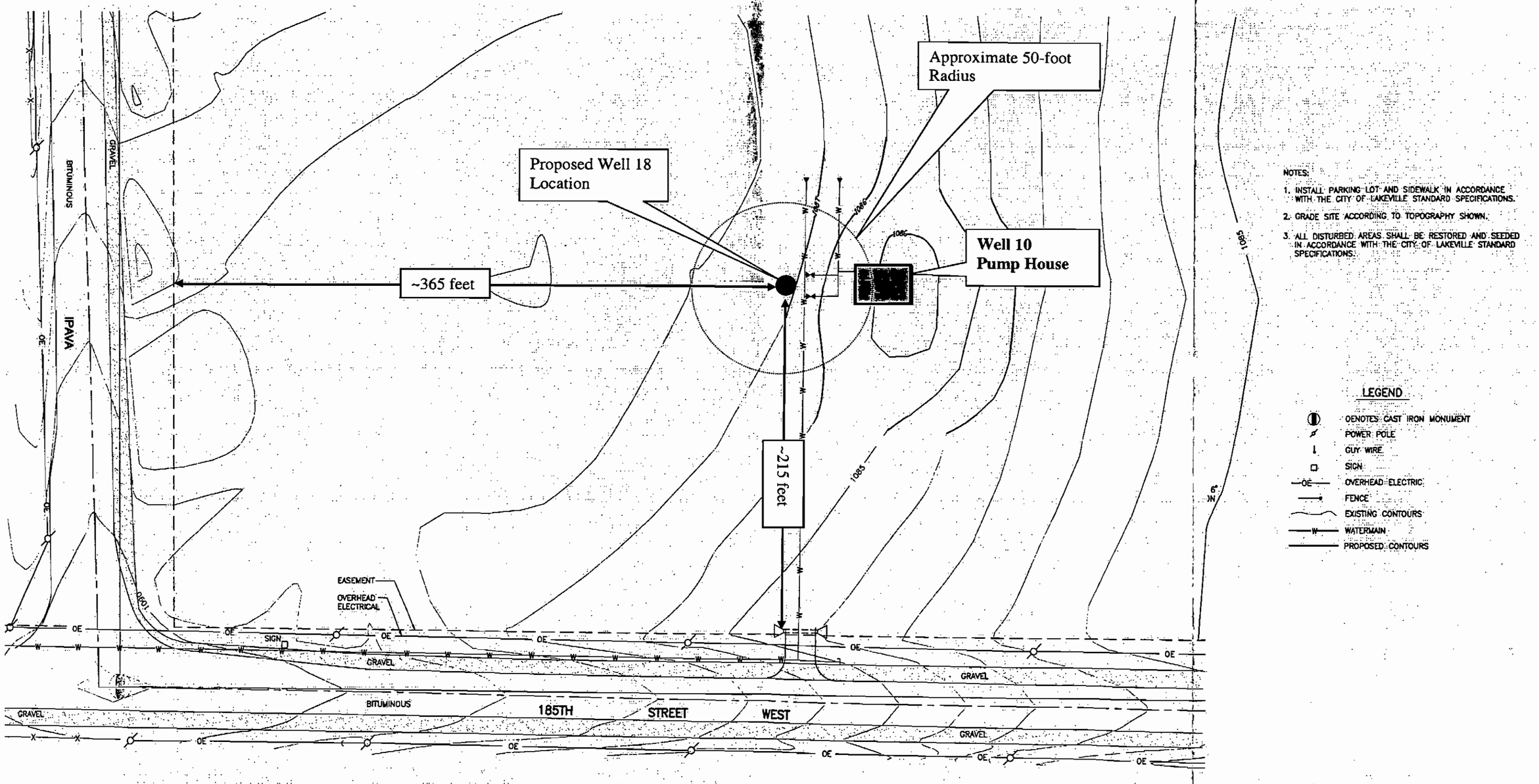
5.0 CONCLUSIONS AND RECOMMENDATIONS

- The pumping test conducted at Well 18 suggest that this well is adequately developed and is capable of supplying water at rates of at least 600 gpm for extended periods of time. In addition, the pumping test results from the Well 18 test indicate interference drawdown between Well 18 and the Legend well is less than 0.5 feet after five and one-half days of continuous pumping at over 600 gpm.

- Water samples collected after the pumping phase of the test did not identify exceedance of any enforceable water quality standards for the parameters analyzed.

- The specific capacity at the end of the pumping portion of the test was measured at approximately 3.42 gpm/ft using an overall pumping rate of 611 gpm. This suggests that a pump capable of supplying 600 gpm under the required head conditions should be set at a depth of at least 450 feet to provide some additional available drawdown to compensate for declines in water level and well efficiency decline over time. The pump could be set as deep as 650 feet should longer periods between well rehabilitation be necessary.

W:\ws\11079\Well 18 Report\Report Well 18.doc



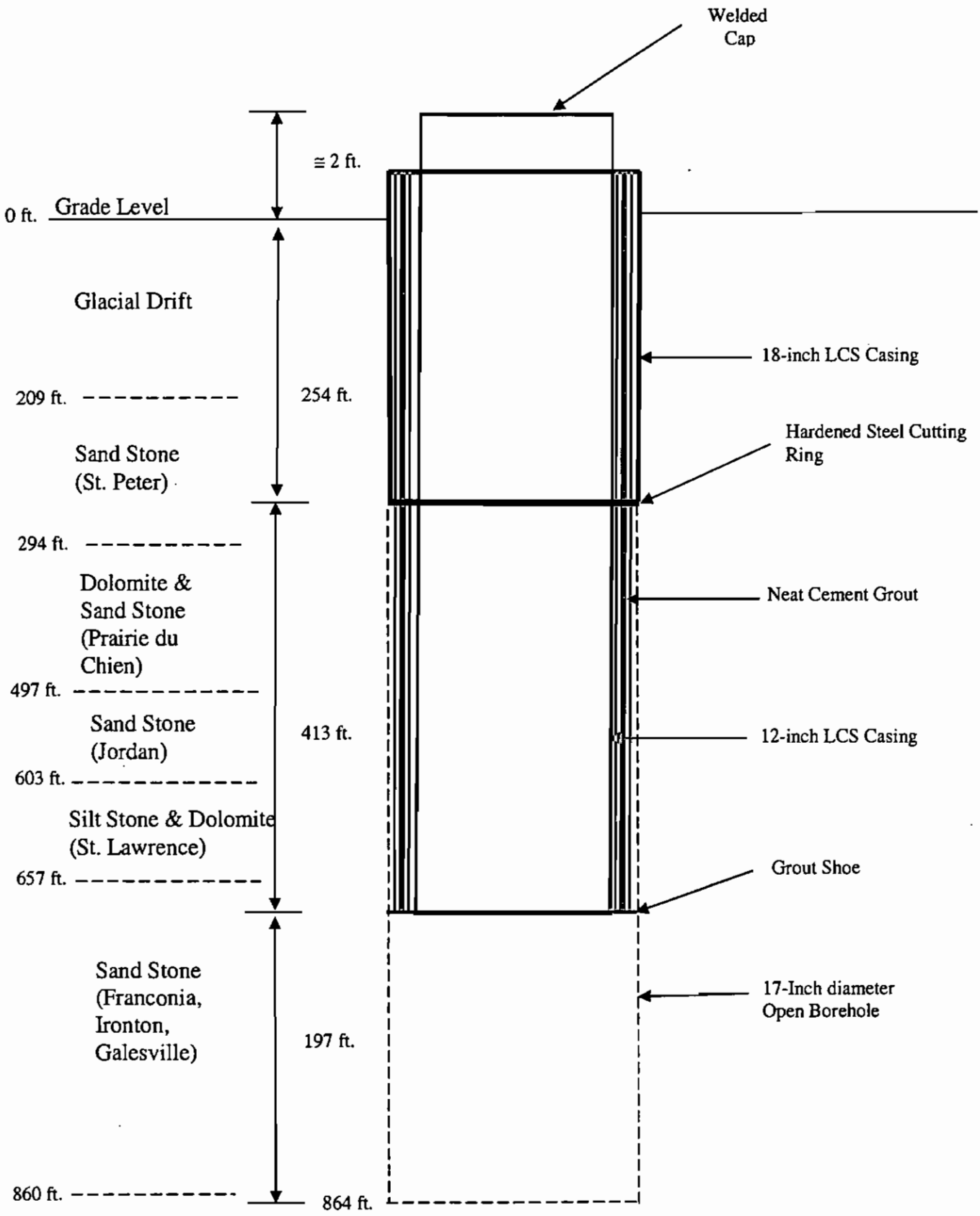
Note: Proposed Well 18 is Located on City Lakeville Water Treatment Plant Property. Dakota County TAXPIN 220170001826

Source: City of Lakeville

LIESCH Hydrogeologists • Engineers • Environmental Scientists

6000 Gisholt Dr. Suite 203, Madison, WI 53713, (608) 223-1532
13400 15th Avenue N, Minneapolis, MN 55441, (763) 489-3100
4300 N Miller Rd, Suite 200, Scottsdale, AZ 85251, (480) 421-0853

CITY OF LAKEVILLE	MAY 07
WELL 18 SITE PLAN	FIG. 1



LIESCH Hydrogeologists • Engineers • Environmental Scientists
6000 Gisholt Dr, Suite 203 Madison, WI 53713 (608) 223-1532
13400 15th Avenue N Minneapolis, MN 55441 (612) 559-1423
2700 N Central Ave, Suite 890 Phoenix, AZ 85004 (602) 650-2815

CITY OF LAKEVILLE

MAY 07

WELL 18 CONSTRUCTION DIAGRAM

FIG. 2

TABLE 1: PUMPING TEST STATISTICS AND OBSERVATIONS

	Well 18		Legend Well	
Distance from Pumping Well (ft)	**0**		**22,800**	
Approximate Time Since Pumping Started (min)	**Water Depth (ft)**	**Drawdown (ft)**	**Water Depth (ft)**	**Corrected Drawdown (ft)**
0	213.15	0.00	108.39	0.00
100	346.10	132.95	108.39	0.00
1,440	384.62	171.47	108.35	0.08
2,800	389.26	176.11	108.10	0.10
5,600	394.08	180.93	108.28	0.24
7,600	394.15	181.00	108.43	0.44
8,145	Pump Off		Pump Off	
After 10,650 Minutes of Recovery	220.45	7.30	109.53	0.50

TABLE 2: AQUIFER PARAMETERS CALCULATED FROM WELL 18 PUMPING TEST

WELL	DATA SOURCE	s/LOG CYCLE (ft)	CALCULATED TRANSMISSIVITY (g/d/ft)	CALCULATED STORATIVITY (Dimentionless)
Well 18	Jacob - Time vs Drawdown	32	4,950	--
Well 18	Jacob - Recovery - t/t' vs Residual Drawdown	21	7,543	--
Legend Well	Theis t/r^2 vs Drawdown	--	6,251	5.36E-05
Well 18 & Legend Well	Theis Time vs Drawdown	--	6,875	5.26E-05
	Average =		**6,405**	**5.31E-05**

TABLE 3: SUMMARY OF WATER QUALITY RESULTS

Analyte	Units	Well 18 (3/19/07)	MCL
Gross Alpha	pCI/L	8.0 +/- 2.4	15
Gross Beta	pCI/L	8.2 +/- 2.6	50
Radium 226	pCI/L	1.7+/- 0.6	5 pCi/L total of both
Radium 228	pCI/L	2.0 +/- 0.6	226 and 228
Radon 222	pCI/L	296 +/- 18	--
Alkalinity, Total	mg/L	296	--
Arsenic	mg/L	<0.0005	0.01
Barium	mg/L	0.113	2
Cadmium	mg/L	0.00013	0.005
Calcium	mg/L	88	--
Chloride	mg/L	<3	250 (smcl)
Chromium	mg/L	<0.01	0.1
Fluoride	mg/L	0.27	4
Hardness, Total	mg/L	328	--
Iron	mg/L	0.671	0.3 (smcl)
pH, Lab	units	7.2	6.5 - 8.5 (smcl)
Lead	mg/L	0.00064	0.015
Magnesium	mg/L	26.3	--
Manganese	mg/L	0.029	0.05 (smcl)
Mercury	mg/L	<0.00002	0.002
Nitrogen, Nitrate +Nitrite	mg/L	<0.2	10
Selenium	mg/L	0.00132	0.05
Silver	mg/L	<0.005	0.1 (smcl)
Sulfate	mg/L	20.7	250 (smcl)
Thallium	mg/L	<0.0001	0.002
Dissolved Solids, Total	mg/L	304	500 (smcl)
Volatile Organic Compounds	ug/L	All BDL	--
MDA List 1 Pesticides	ug/L	All BDL	--
MDA List 2 Pesticides	ug/L	All BDL	--

MCL = Maximum contaminant level (enforceable standard).
smcl = Secondary maximum contaminant level (non-enforceable standard).
BDL = Below laboratory detection limits

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes, Chapter 103I

MINNESOTA UNIQUE WELL AND BORING NO. 745558

WELL/BORING LOCATION

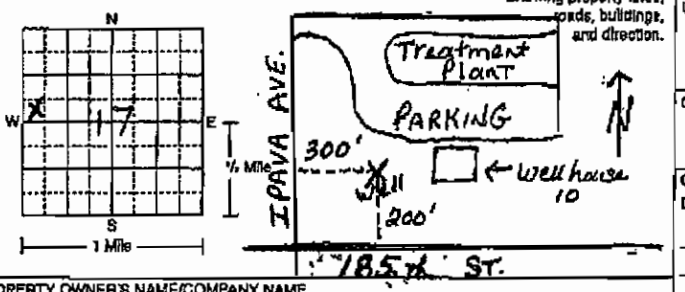
County Name: Dakota

Township Name	Township No.	Range No.	Section No.	Fraction
Lakeville	114N	20W	17	SW SW NW

GPS LOCATION: Latitude degrees 40 minutes 40 seconds 55; Longitude degrees 93 minutes 15 seconds 23

House Number, Street Name, City, and Zip Code of Well Location: 18400 Ipava Ave., Lakeville, MN 55044 or Fire Number

Show exact location of well/boring in section grid with "X."



Sketch map of well location. Showing property lines, roads, buildings, and direction.

PROPERTY OWNER'S NAME/COMPANY NAME: City of Lakeville

Property owner's mailing address if different than well location address indicated above.
20195 Holyoke Ave.
Lakeville, MN 55044

WELL/BORING OWNER'S NAME/COMPANY NAME: City of Lakeville

Boring owner's mailing address if different than property owner's address indicated above.

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
See Attached.....				

Use a second sheet, if needed.

REMARKS, ELEVATION, SOURCE OF DATA, etc.

MINN. DEPT OF HEALTH COPY 745558

WELL/BORING DEPTH (completed): 864 ft. DATE WORK COMPLETED: 2/2007

DRILLING METHOD: ☐ Cable Tool ☐ Driven ☐ Dug ☐ Auger ☐ Rotary ☐ Jetted ☒ Dual Rotary

DRILLING FLUID: H_2O WELL HYDROFRACTURED? ☐ Yes ☒ No From ____ ft. To ____ ft.

USE: ☐ Domestic ☐ Monitoring ☐ Heating/Cooling ☐ Noncommunity PWS ☐ Environ. Bore Hole ☐ Industry/Commercial ☒ Community PWS ☐ Irrigation ☐ Remedial ☐ Elevator ☐ Dewatering ☐ ____

CASING MATERIAL: ☒ Steel ☐ Plastic; Drive Shoe? ☒ Yes ☐ No; ☐ Threaded ☒ Welded ☐ ____

HOLE DIAM.

CASING

Diameter			Weight	Specifications	HOLE DIAM.
18 in. to	254 ft.		70.59 lbs./ft.	Steel	18 in. to 254 ft.
12 in. to	667 ft.		49.56 lbs./ft.	Steel	17 in. to 864 ft.
in. to	ft.		lbs./ft.		in. to ft.

SCREEN: Make ____ Type ____ Slot/Gauze ____ Set between ____ ft. and ____ ft.; Diam. ____ Length ____ FITTINGS ____

OPEN HOLE From 667 ft. To 864 ft.

STATIC WATER LEVEL: 214 ft. ☒ Below ☐ Above land surface; Date measured 2-14-07

PUMPING LEVEL (below land surface): 378 ft. after 12 hrs. pumping 6000 g.p.m.

WELL HEAD COMPLETION: ☐ Pitless Adapter Manufacturer ____ Model ____; ☐ Casing Protection ____ ☒ 12 in. above grade; ☐ At-grade (Environmental Well and Boring ONLY)

GROUTING INFORMATION: Well grouted? ☒ Yes ☐ No; Grout materials: ☒ Neat cement ☐ Bentonite ☐ Concrete ☐ Other ____
From 667 To 0 ft. 28 ☒ Yds. ☐ Bags
From ____ To ____ ft. ____ ☐ Yds. ☐ Bags
From ____ To ____ ft. ____ ☐ Yds. ☐ Bags

NEAREST KNOWN SOURCE OF CONTAMINATION: 20 feet North direction Storm Sewer type

Well disinfected upon completion? ☐ Yes ☐ No

PUMP: ☒ Not Installed Date Installed ____
Manufacturer's name ____
Model Number ____ HP ____ Volts ____
Length of drop pipe ____ ft. Capacity ____ g.p.m.
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ ____

ABANDONED WELLS: Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

VARIANCE: Was a variance granted from the MDH for this well? ☐ Yes ☒ No TN# ____

WELL CONTRACTOR CERTIFICATION
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

Licensee Business Name: Mark J. Traut Wells, Inc. Lic. or Reg. No. 1404

Authorized Representative Signature: David Traut Date: 2-21-07

Name of Driller: Matthew Erickson & Tony Burroughs

HE-01205-09 (Rev. 9/05)

IC 140-0020

.....Geological Materials Continued

Unique # 745558

Geological Materials	Color	Hardness of Materials	From	To
Clay	Brown	Soft	0	5
Sand & Gravel	Brown	Soft	5	28
Clay	Grey	Soft	28	47
Sand & Gravel	Brown	Soft	47	61
Sandy Clay	Grey	Med.	61	76
Clay	Grey	Soft	76	86
Sand & Gravel	Mixed	Soft	86	96
Clay	Grey	Med.	96	166
Clay & Gravel	Brown	Soft	166	174
Granite Boulder	White/Red/Black	Hard	174	176
Clay	Grey	Med.	176	198
Sand & Gravel	Mixed	Soft	198	211
Fine Sand	Grey	Soft	211	221
Fine Sandstone	Grey	Soft	221	243
Sandstone & Shale Layers	Mixed	Soft	243	247
Sandstone & Shale	Tan & Grey	Med.	247	248
Sandstone & Shale	Grey	Med.	248	250
Sandstone	Grey	Med.	250	254
Sandstone & Shale	Tan & Grey	Med.	254	274
Sandstone	Tan	Med.	274	279
Sandstone	Tan & Grey Layers	Med.	279	284
Sandstone & Shale	Tan & Grey	Med.	284	289
Sandstone & Pyrite	Grey	Hard	289	294
Sandstone	Grey	Hard	294	301
LMS w/tan Sandstone Layer (304-304.5)	Grey	Hard	301	306
LMS	Grey	Hard	306	311
LMS w/tan Sandstone Layers	Grey	Hard	311	316
LMS	Grey	Hard	316	324
Sandstone	Tan	Hard	324	326
LMS w/tan Sandstone Layers	Tan	Hard	326	331
LMS	Grey	Hard	331	341
LMS & Sandstone Layers	Grey	Hard	341	346
LMS w/brn Layer (348-348.5)	Grey	Hard	346	351
LMS	Grey	Hard	351	361
LMS	Tan	Hard	361	366
LMS	Tan & Grey	Hard	366	386
LMS w/tan Sandstone Layer (389-389.5)	Tan & Grey	Hard	386	391
LMS w/few tan Sandstone Layers	Tan & Grey	Hard	391	396
LMS w/ Pyrite	Tan & Grey	Hard	396	401
LMS w/ Pyrite (one tan SS Layer (402-404)	Tan & Grey	Hard	401	406
LMS w/ Pyrite	Brown & Grey	Hard	406	411

.....Geological Materials Continued

LMS w/ Pyrite	Brown, Tan, Grey	Hard	411	416
LMS w/Pyrite	Tan & Grey	Hard	416	421
LMS w/tan Sandstone Layers	Tan & Grey	Hard	421	426
LMS w/tan Sandstone Layers	Grey	Hard	426	431
LMS w/tan Sandstone Layers	Tan & Grey	Hard	431	436
LMS	Grey & Tan	Hard	436	451
LMS	Tan	Hard	451	491
LMS	Grey	Hard	491	498
Sandstone	Grey	Hard	498	503
Sandstone w/LMS Layer (503-503.5)	Grey	Hard	503	508
Sandstone & Green Shale	Grey	Hard	508	523
Sandstone	Grey	Hard	523	538
Sandstone & Green Shale	Grey	Hard	538	548
Sandstone	Grey	Hard	548	573
Sandstone & Green Shale	Grey	Hard	573	593
Sandstone	Grey	Hard	593	603
Sandstone w/green Shale Lenses	Grey	Hard	603	618
Sandstone w/green Shale Lenses	Grey	Hard	618	628
Siltstone	Grey	Hard	628	633
LMS	Grey	Hard	633	648
LMS	Grey & Tan	Hard	648	657
Siltstone	Grey & Tan	Hard	657	663
Sandstone & Green Shale	Grey	Hard	663	668
Sandstone & Green Shale w/Siltstone	Grey	Hard	668	673
Sandstone & Green Shale	Grey	Hard	673	688
Sandstone & Green Shale	Grey & Brown Layered	Hard	688	693
LMS	Mixed	Hard	693	695
Sandstone & Green Shale	Grey	Hard	695	720
Sandstone & Green Shale	Grey & Tan Layers	Hard	720	775
Sandstone	Tan & Grey	Hard	775	780
Sandstone & Green Shale	Grey & Tan	Hard	780	785
Sandstone	Grey & Tan	Hard	785	790
Sandstone & Green Shale	Grey & Tan	Hard	790	795
Sandstone & Green Shale	Grey	Hard	795	809
Sandstone	Grey	Hard	809	844
Sandstone & Green Shale	Grey	Hard	844	864

DOWNHOLE WELL SERVICES, LLC.
8145 Long Lake Road
Mounds View, Minnesota 55112-6033
Phone (651) 238-1190
Fax (763) 784-2244
Res. (763) 784-1876
E-mail: marsahill@aol.com
Web Site: www.downholewellservices.com
Wireline Services Manager: James Traen

PROJECT NAME: City of Lakeville – Municipal Well No. 18 – January 4, 2006

STREET ADDRESS: 19400 Ipava Avenue
City: Lakeville **County:** Dakota **State:** Minnesota
G.P.S.: N 44 deg. 40.914 min. W093 deg. 18.397 min **Quad:** 86-B (Orchard Lake)
Township Name: **Township:** 114N **Range:** 20W **Section:** 17 **Qtr. Section:** BCCDBC
MN Unique Well No.: 745558 **Project No.:** 0792-189 **Cutting Set No.:** M054653 **File:** lakeville18.LAS

Well Owner: City of Lakeville **Operations & Maintenance Director:** Mr. Don Volk
Consulting Co.: Liesch Associates, Inc **Geologist:** Mr. Scott H. Pearson, P.G.
Lithology: Minnesota Geological Survey **Geologist:** Mr. John Mossler
Client / Drilling Co.: Mark J. Traun Wells, Inc **Drillers:** Matthew Erickson & Tony Burroughs
Logging Unit/Truck: 201 **Other Services:** none

Depth Drilled: 864 feet **Reported Depth:** 864 feet **Depth Logged:** 864 feet
Depth Reference: Grade **Elevation:** 1083 +/- 5 feet **Stickup:** 18 inches

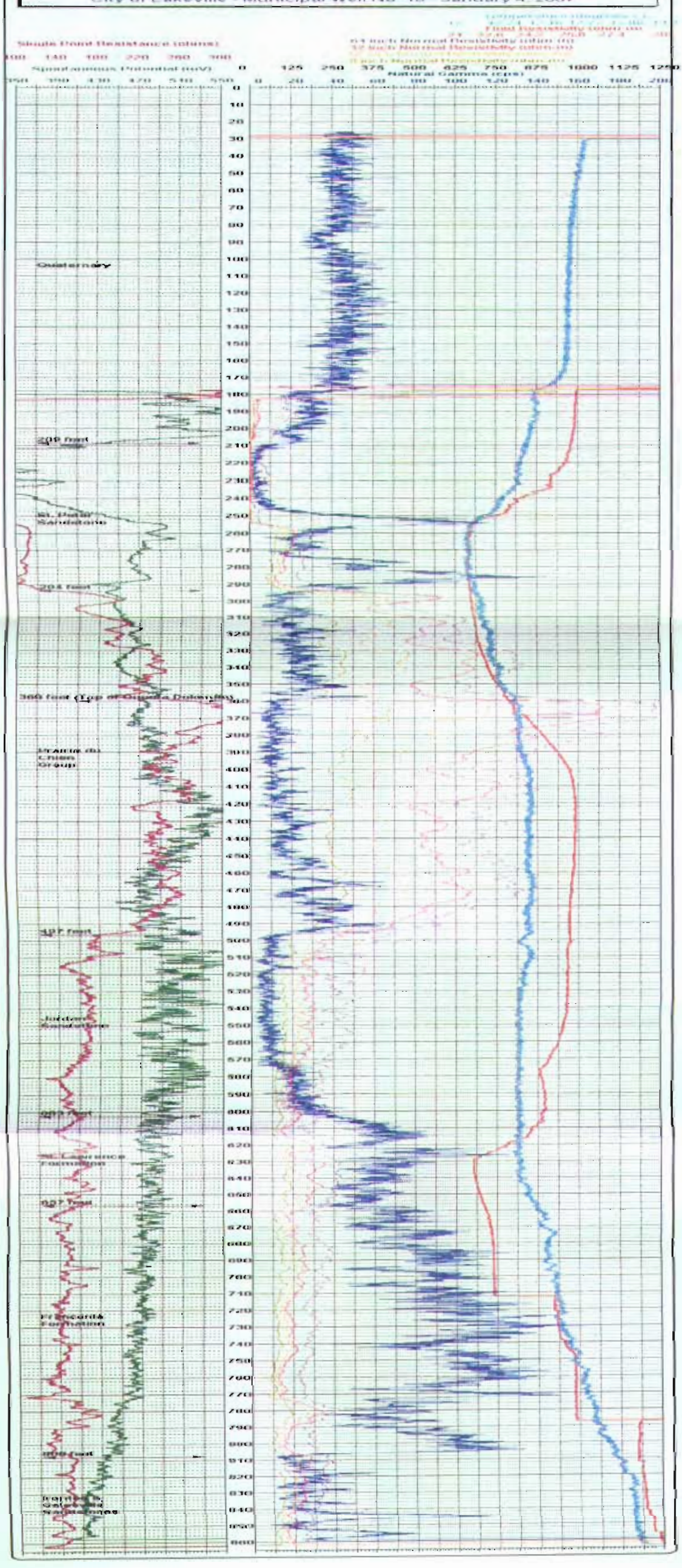
Bit Size	From	To	Casing Size	From	To	Comments
16 inch	0 feet	264 feet	16 inch	0 feet	264 feet	
17 inch	264 feet	864 feet				Open Hole

Drilling Method: Dual Rotary **Date Drilled:** January 3, 2006 **Fluid Level:** 170 feet
Mud Type: none **Hole Medium:** Water **Date Logged:** 01/04/07
Time Since Circulation: 6 hours

Log Name	Run No.	Probe S/N	Logger S/N	Dig. Int.	Speed	Equipment Type	Logging Detector Type	Source Size	Logged Interv. From	To
Polyradic	two	2919	1039	0.166	100 fpm	standard			864 feet	26 feet

Remarks: Conclusions and recommendations associated with formation contacts are based, in part, on information Downhole Well Services, LLC obtained with current sources. Downhole Well Services depictions of these contacts are based partially on Downhole Well Services' observations along with review and comments provided by the appropriate state or federal agencies. Verification of the authenticity or accuracy of the information is not warranted or guaranteed by Downhole Well Services, LLC.

City of Lakeville - Municipal Well No. 18 - January 4, 2007



DOWNHOLE WELL SERVICES, LLC.

8145 Long Lake Road
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Phone:(651) 238-1198
Fax:(763) 784-2244
Res: (763) 785-1876
E-mail: marsabitt@aol.com
Web Site: www.downholewellservices.com

Wireline Services Manager: James Traen

PROJECT NAME: City of Lakeville - Municipal Well No. 18 - January 4, 2006

LOCATION

STREET ADDRESS: 18400 Ipava Avenue
City: Lakeville **County:** Dakota **State:** Minnesota
G.P.S.: N 44 deg. 40.914 min. W093 deg. 15.397min. **Quad:** 88-B (Orchard Lake)
Township Name: **Township:** 114N **Range:** 20W **Section:** 17 **Qtr. Section:** BCCDBC
MN Unique Well No.: 745558 **Project No.:** 0792-169 **Cutting Set No.:** MGS4653 **File:** lakeville18.LAS

GENERAL DATA

Well Owner: City of Lakeville **Operations & Maintenance Director:** Mr. Don Volk
Consulting Co.: Liesch Associates, Inc. **Geologist:** Mr. Scott R. Pearson, P.G.
Lithology: Minnesota Geological Survey **Geologist:** Mr. John Mossler
Client / Drilling Co.: Mark J. Traut Wells, Inc. **Drillers:** Matthew Erickson & Tony Burroughs
Logging Unit/Truck: 201 **Other Services:** none

BOREHOLE DATA

Depth Drilled: 864 feet **Reported Depth:** 864 feet **Depth Logged:** 864 feet
Depth Reference: Grade **Elevation:** 1093 +/- 5 feet **Stickup:** 18 inches

	Bit Size	From	To	Casing Size	From	To	Comments
1.	18 inch	0 feet	254 feet	18 inch	-1.5 feet	254 feet	
2.	17 inch	254 feet	864 feet				Open Hole
3.							
4.							

Drilling Method: Dual Rotary **Date Drilled:** January 3, 2006 **Fluid Level:** 178 feet
Mud Type: none **Hole Medium:** Water **Date Logged:** 01/04/07
Time Since Circulation: 5 hours

LOGGING DATA

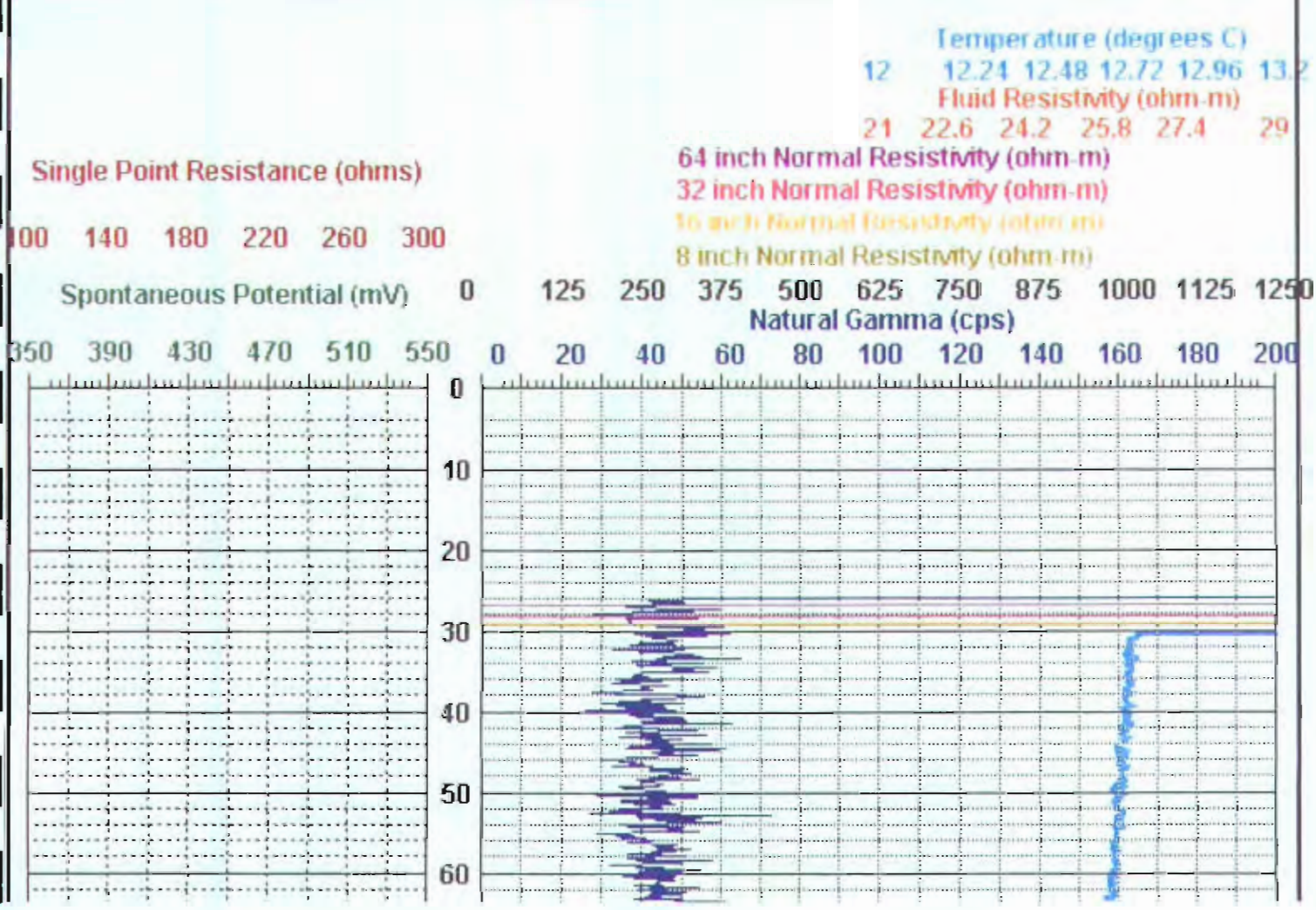
		Equipment		Logging		Detector	Source	Logged Inter.	
Log Name	Run No.	Probe S/N	Logger S/N	Dig. Int.	Speed	Type	Type	Size	From	To

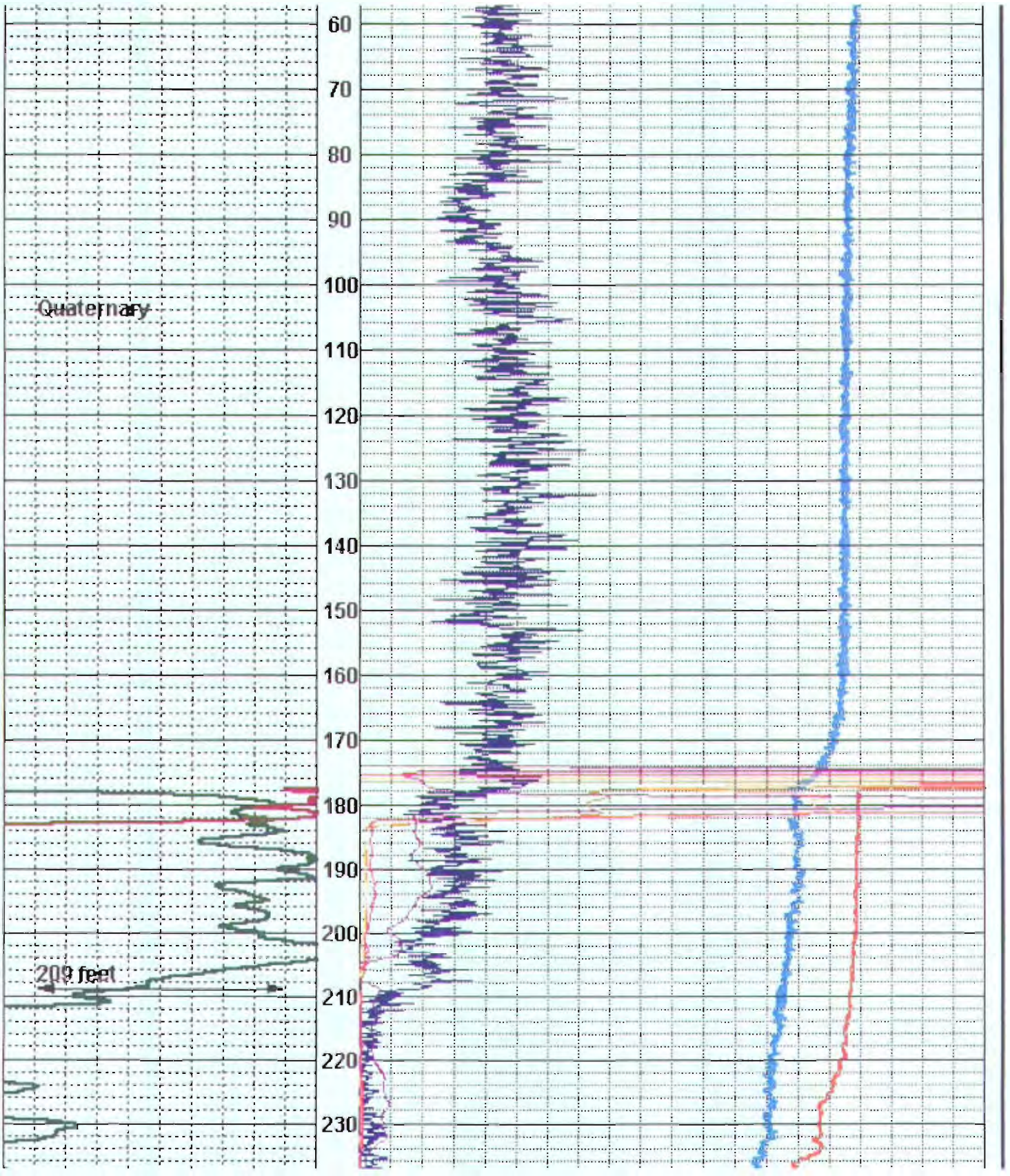
LOGGING DATA

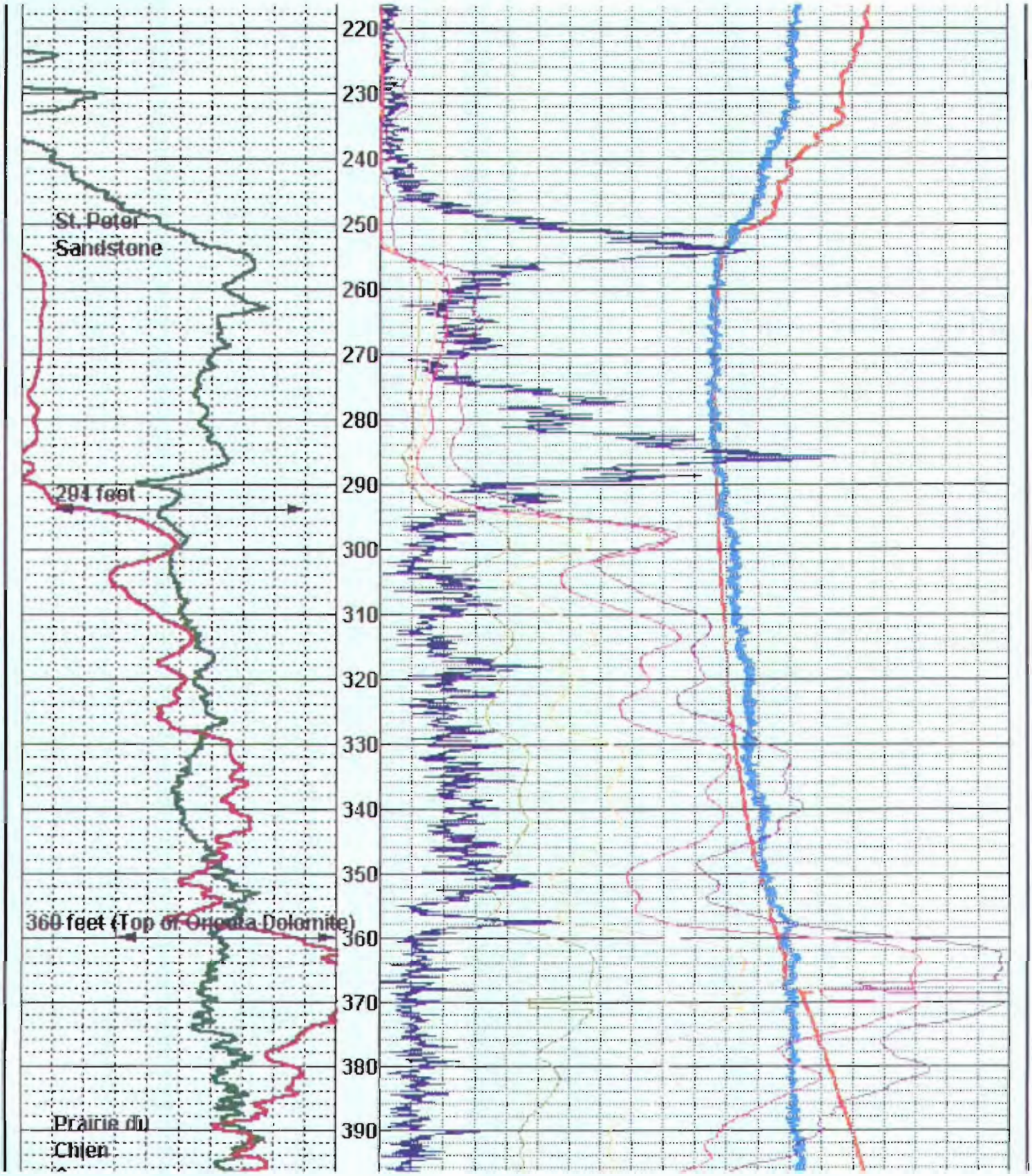
Log Name	Run No.	Equipment Probe S/N	Equipment Logger S/N	Logging Dig. Int.	Logging Speed	Detector Type	Source Type	Source Size	Logged Inter. From	Logged Inter. To
1. Polyelectric	two	2919	1038	0.16ft.	15ft./min.	electrodes			864 feet	26 feet
2.										
3.										
4.										

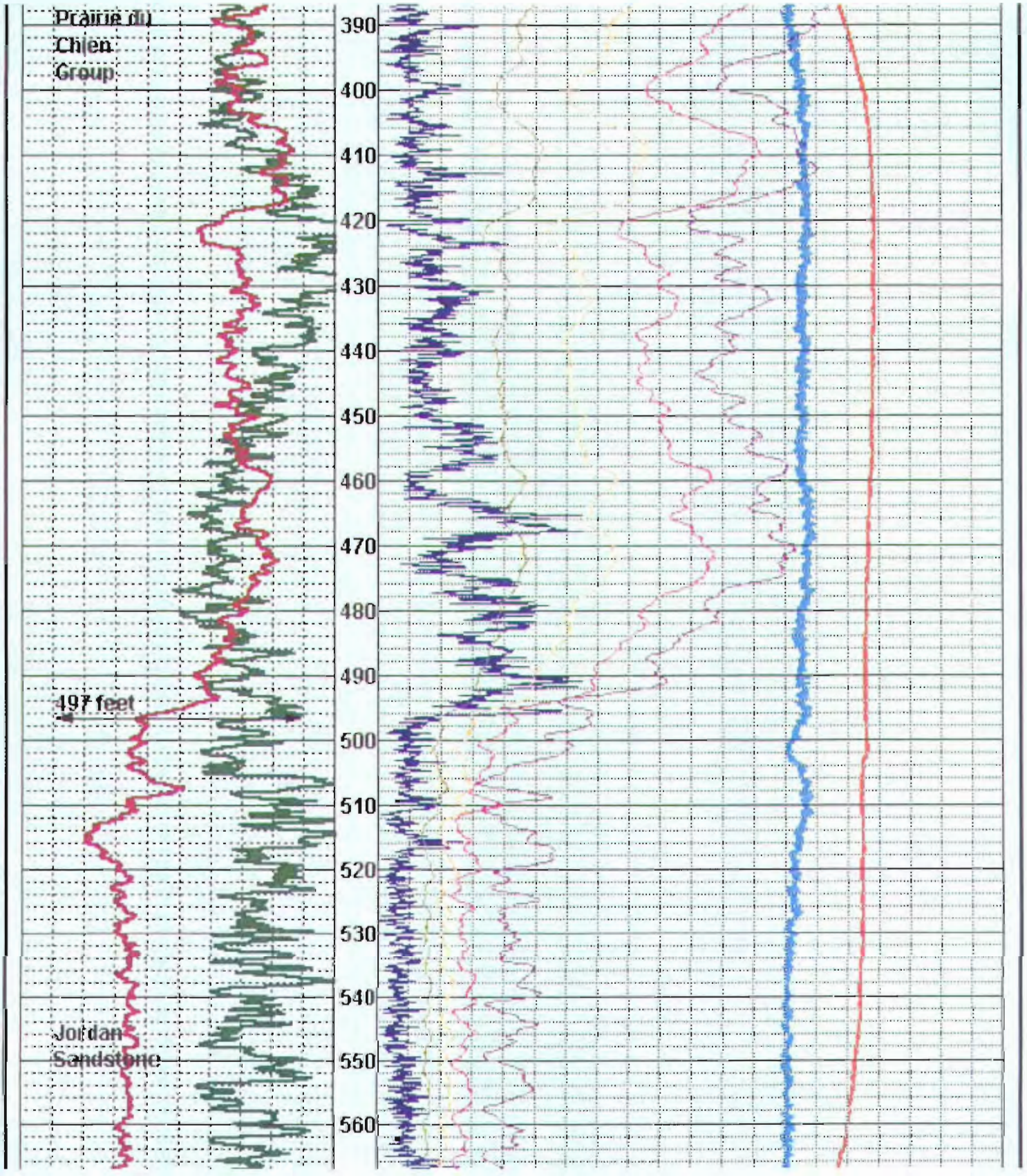
Remarks: Conclusions and recommendations associated with formation contacts are based, in part, on information Downhole Well Services, LLC obtained with current sources. Downhole Well Services' depictions of these contacts are based partially on Downhole Well Services' observations along with review and comments provided by the appropriate state or federal agencies. Verification of the authenticity or accuracy of this information is not warranted or guaranteed by Downhole Well Services, LLC.

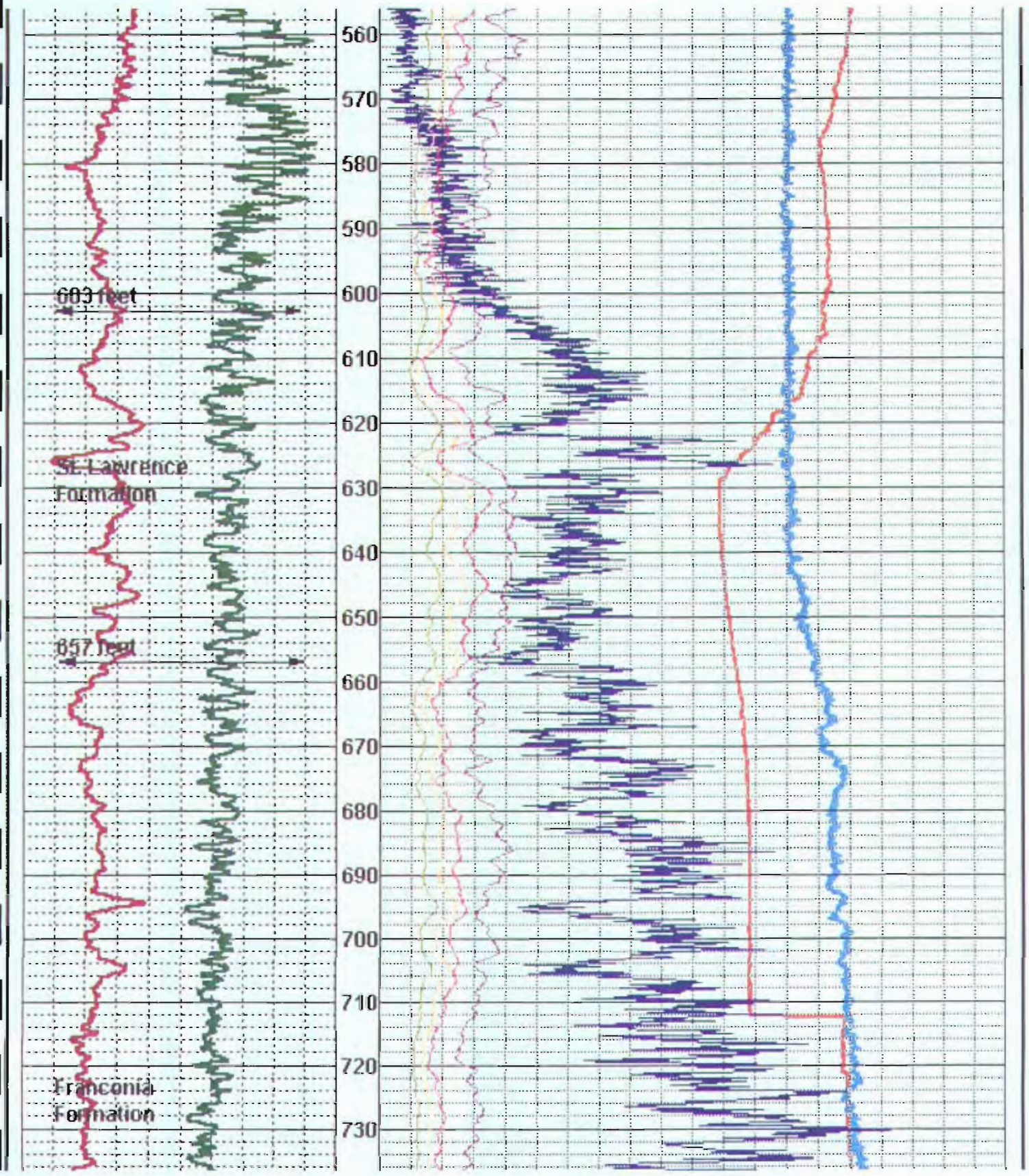
City of Lakeville - Municipal Well No. 18 - January 4, 2007

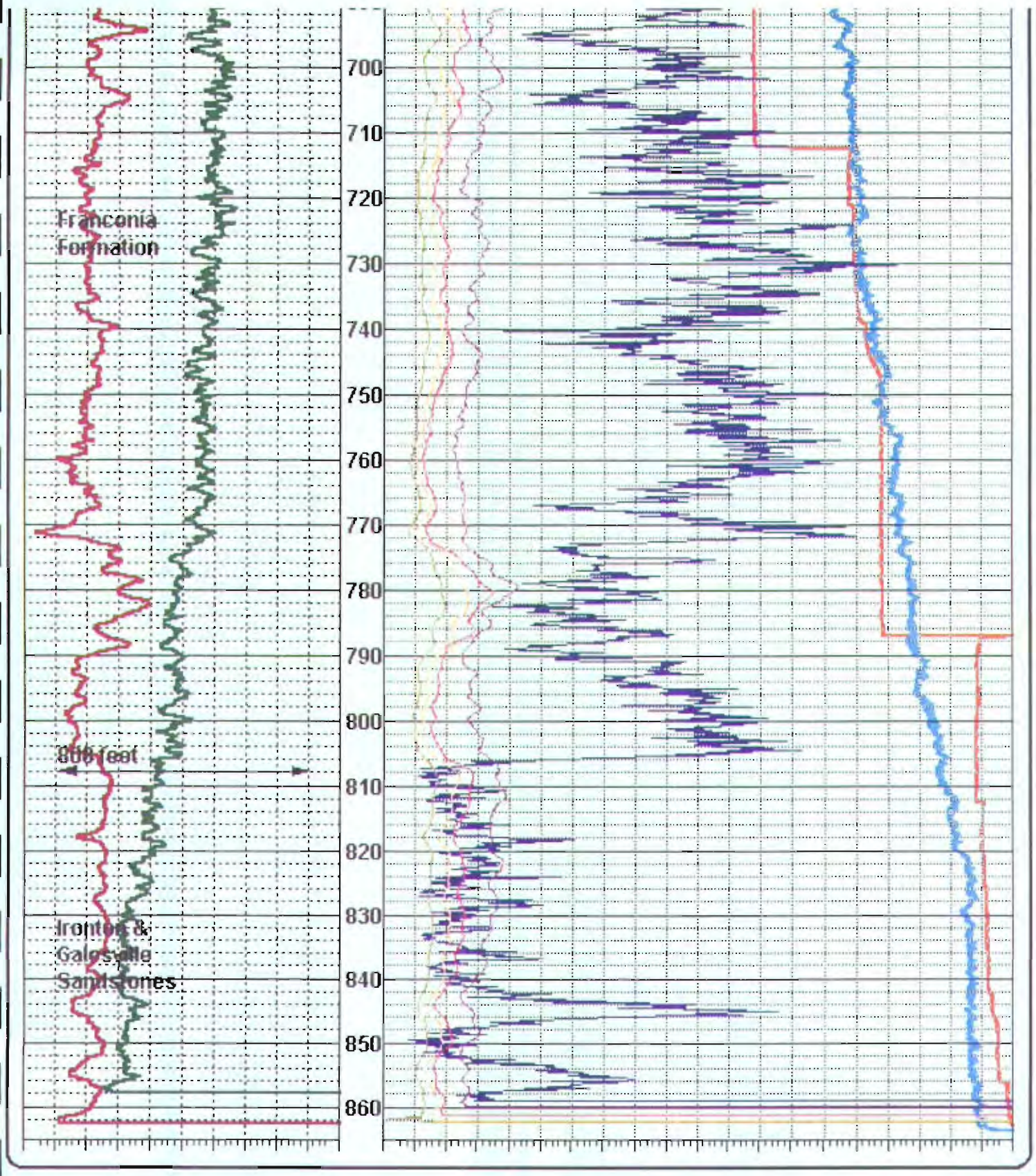


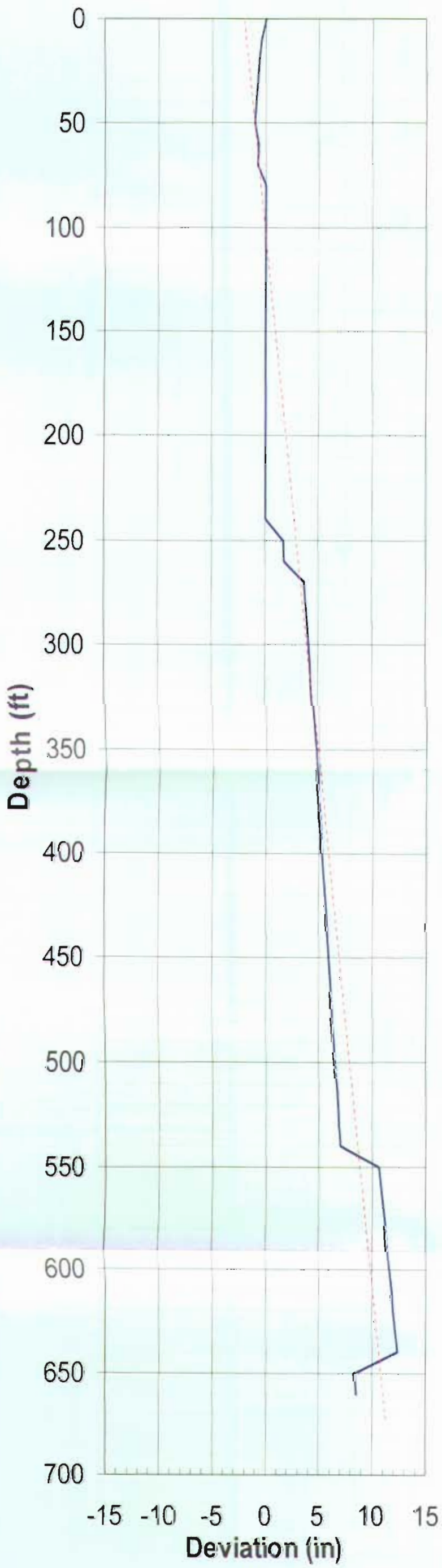

Quaternary
209 feet
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230

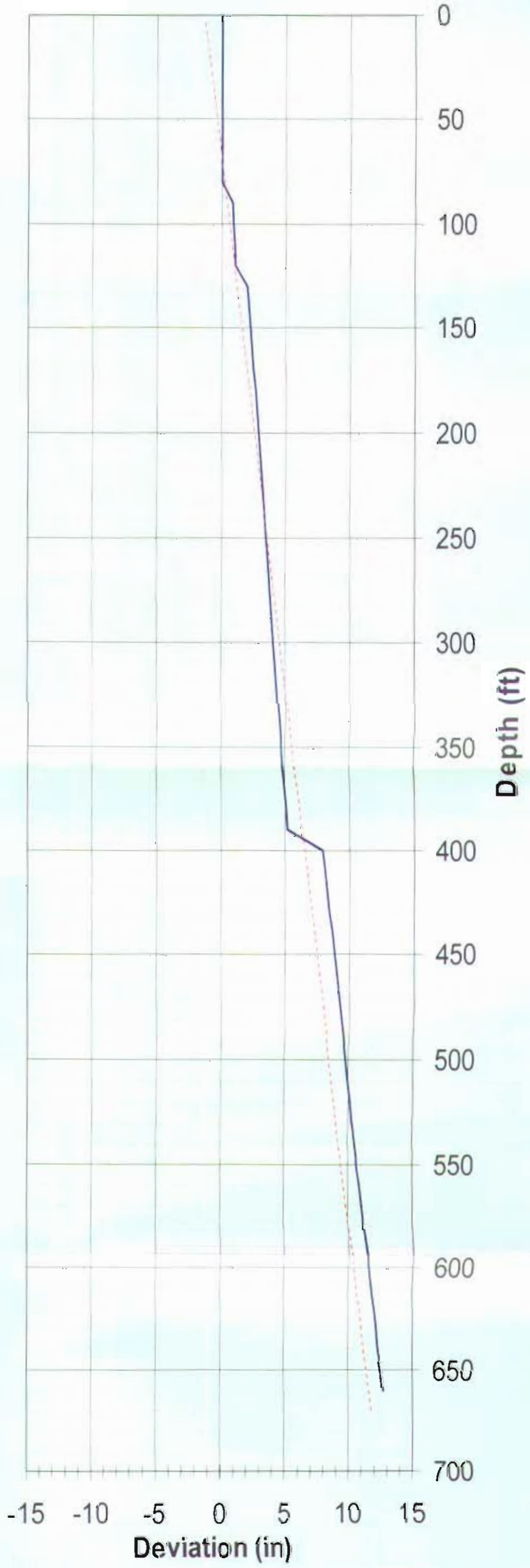

220
230
240
250
260
270
280
290
300
310
320
330
340
350
360
370
380
390
St. Peter
Sandstone
294 feet
360 feet (Top of Oneota Dolomite)
Prairie du
Chien


Prairie du
Chien
Group
390
400
410
420
430
440
450
460
470
480
490
497 feet
500
510
520
530
540
Jordan
Sandstone
550
560


560
570
580
590
600
610
620
630
640
650
660
670
680
690
700
710
720
730
603 feet
657 feet
St. Lawrence
Formation
Franconia
Formation


Franconia
Formation
800 feet
Ironton &
Galesville
Sandstones
700
710
720
730
740
750
760
770
780
790
800
810
820
830
840
850
860





LIESCH Hydrogeologists • Engineers • Environmental Scientists
6000 Gisholt Dr, Suite 203 Madison, WI 53713 (608) 223-1532
13400 15th Avenue N Minneapolis, MN 55441 (763) 489-3100
4300 N Miller Rd, Suite 211 Scottsdale, AZ 85251 (480) 421-0853

CITY OF LAKEVILLE

MAR 07

WELL 18 ALIGNMENT

Project: CITY OF LAKEVILLE WELL 18
Project No: 307776 DATE: 1-16-07

Diameter of Inner Casing 12 Inches Plumb Bob O. 11 1/2
Height of Apex Above Top of Well 10 feet
Allowed Drift Fraction Per 100 feet 0.6666

Depth of Plummet Below Top of Well (feet)	Horizontal Deflection of Plumb Line (inches)				Calculated Drift of Well (inches)				Actual Drift (Inches)	Allowed Drift (Inches)
	North	South	East	West	North	South	East	West		
10	0	0	0	0	0	0	0	0	0.000	0.800
20	0	0	0	0.062	0	0	0	0.186	0.186	1.600
30	0	0	0	0.125	0	0	0	0.5	0.500	2.400
40	0	0	0	0.125	0	0	0	0.625	0.625	3.200
50	0	0	0	0.125	0	0	0	0.75	0.750	4.000
60	0	0	0	0.062	0	0	0	0.434	0.434	4.800
70	0	0	0	0.062	0	0	0	0.496	0.496	5.599
80	0.062	0	0	0	0.558	0	0	0	0.558	6.399
90	0.062	0	0	0	0.62	0	0	0	0.620	7.199
100	0.062	0	0	0	0.682	0	0	0	0.682	7.999
110	0.062	0	0	0	0.744	0	0	0	0.744	8.799
120	0.062	0	0	0	0.806	0	0	0	0.806	9.599
130	0.125	0	0	0	1.75	0	0	0	1.750	10.399
140	0.125	0	0	0	1.875	0	0	0	1.875	11.199
150	0.125	0	0	0	2	0	0	0	2.000	11.999
160	0.125	0	0	0	2.125	0	0	0	2.125	12.799
170	0.125	0	0	0	2.25	0	0	0	2.250	13.599
180	0.125	0	0	0	2.375	0	0	0	2.375	14.399
190	0.125	0	0	0	2.5	0	0	0	2.500	15.198
200	0.125	0	0	0	2.625	0	0	0	2.625	15.998
210	0.125	0	0	0	2.75	0	0	0	2.750	16.798
220	0.125	0	0	0	2.875	0	0	0	2.875	17.598
230	0.125	0	0	0	3	0	0	0	3.000	18.398
240	0.125	0	0.062	0	3.125	0	1.55	0	3.488	19.198
250	0.125	0	0.062	0	3.25	0	1.612	0	3.628	19.998
260	0.125	0	0.125	0	3.375	0	3.375	0	4.773	20.798
270	0.125	0	0.125	0	3.5	0	3.5	0	4.950	21.598
280	0.125	0	0.125	0	3.625	0	3.625	0	5.127	22.398
290	0.125	0	0.125	0	3.75	0	3.75	0	5.303	23.198
300	0.125	0	0.125	0	3.875	0	3.875	0	5.480	23.998
310	0.125	0	0.125	0	4	0	4	0	5.657	24.798
320	0.125	0	0.125	0	4.125	0	4.125	0	5.834	25.597
330	0.125	0	0.125	0	4.25	0	4.25	0	6.010	26.397
340	0.125	0	0.125	0	4.375	0	4.375	0	6.187	27.197
350	0.125	0	0.125	0	4.5	0	4.5	0	6.364	27.997
360	0.125	0	0.125	0	4.625	0	4.625	0	6.641	28.797
370	0.125	0	0.125	0	4.75	0	4.75	0	6.718	29.597
380	0.125	0	0.125	0	4.875	0	4.875	0	6.894	30.397
390	0.125	0	0.125	0	5	0	5	0	7.071	31.197
400	0.187	0	0.125	0	7.867	0	5.125	0	9.222	31.997
410	0.187	0	0.125	0	7.854	0	5.25	0	9.447	32.797
420	0.187	0	0.125	0	8.041	0	5.375	0	9.672	33.597
430	0.187	0	0.125	0	8.228	0	5.5	0	9.897	34.397
440	0.187	0	0.125	0	8.415	0	5.625	0	10.122	35.196
450	0.187	0	0.125	0	8.602	0	5.75	0	10.347	35.996
460	0.187	0	0.125	0	8.789	0	5.875	0	10.572	36.796
470	0.187	0	0.125	0	8.976	0	6	0	10.797	37.596
480	0.187	0	0.125	0	9.163	0	6.125	0	11.022	38.396
490	0.187	0	0.125	0	9.35	0	6.25	0	11.247	39.196
500	0.187	0	0.125	0	9.537	0	6.375	0	11.471	39.996
510	0.187	0	0.125	0	9.724	0	6.5	0	11.696	40.796
520	0.187	0	0.125	0	9.911	0	6.625	0	11.921	41.596
530	0.187	0	0.125	0	10.098	0	6.75	0	12.146	42.396
540	0.187	0	0.125	0	10.285	0	8.875	0	12.371	43.196
550	0.187	0	0.187	0	10.472	0	10.472	0	14.810	43.996
560	0.187	0	0.187	0	10.659	0	10.659	0	15.074	44.796
570	0.187	0	0.187	0	10.846	0	10.846	0	15.339	45.595
580	0.187	0	0.187	0	11.033	0	11.033	0	15.603	46.395
590	0.187	0	0.187	0	11.22	0	11.22	0	15.867	47.195
600	0.187	0	0.187	0	11.407	0	11.407	0	16.132	47.995
610	0.187	0	0.187	0	11.594	0	11.594	0	16.398	48.795
620	0.187	0	0.187	0	11.781	0	11.781	0	16.661	49.595
630	0.187	0	0.187	0	11.968	0	11.968	0	16.925	50.395
640	0.187	0	0.187	0	12.155	0	12.155	0	17.190	51.195
650	0.187	0	0.125	0	12.342	0	8.25	0	14.645	51.995
660	0.187	0	0.125	0	12.529	0	8.375	0	15.070	52.795
670	0	0	0	0	0	0	0	0	0.000	53.595
680	0	0	0	0	0	0	0	0	0.000	54.395
690	0	0	0	0	0	0	0	0	0.000	55.194
700	0	0	0	0	0	0	0	0	0.000	55.994
710	0	0	0	0	0	0	0	0	0.000	56.794

INSPECTION CERTIFICATE

HUSTEEL CO., LTD.

HEAD OFFICE : Shinan B/D 15F, 943-19, Daechi-dong Kangnam-ku, SEOUL 135-845, KOREA
DANGJIN PLANT: 569-1, BULEOK-RI, SOREGAN-MYEON, DANGJIN-GUN, CHUNGCHEONGNAM-DO, KOREA
DAEBUL PLANT: 11 BLOCK, DAEBUL NATIONAL INDUSTRIAL COMPLEX, MAEBUL-RI, SAM-HO-MYEON, YOUNGAM-KUN, CHULLANAM-DO, KOREA

계약서번호 L/C No. : SHS80317JK / 18561RJ
발급일자 ISSUED DATE : 2006. 06. 08
품명 COMMODITY : E.R.W. STEEL PIPE
제품규격 SPECIFICATION : API 5L X42 PSL1/API 5LB /ASTM A53B/ASME SA 53B

증명서번호 CERTIFICATE No. : 060608 - 102
제조번호 MANUFACTURED No. : 06-06-202
주문자 SUPPLIER : HUSTEEL CO., LTD.
수요가 CUSTOMER :

ITEM NO.	HEAT NO. (LOT)	품종 TYPE ①	수량 QUANTITY (PIECES)	호칭경 O.D. SIZE (in)	주문치수 ORDER SIZE 바깥지름 O.D. (mm) ②	두께 W.T. (in) ③	길이 LENGTH (ft)	중량 WEIGHT (lb/ft)	인장시험 TENSILE TEST 인장강도 TENSILE STRENGTH (psi)	항복강도 YIELD STRENGTH (psi)	연신율 ELONGATION (%)	화학성분 CHEMICAL COMPOSITION(%) C	Si	Mn	P	S	Cu	Cr	Ni	Mo	V
												2	3	2	3		2 ④		3		
1	C620439	BPEB	61	12 3/4	323.9	0.250	20'	33.41	73966	58448	36	13	12	86	10	8	2	2	3	TR	TR
2	C621964	BPEB	2	12 3/4	323.9	0.250	20'	33.41	70485	48005	40	17	14	78	16	6	3	2	2	TR	TR
3	C621965	BPEB	10	12 3/4	323.9	0.250	20'	33.41	71501	53662	34	13	7	72	13	7	3	2	2	1	TR
4	C621966	BPEB	3	12 3/4	323.9	0.250	20'	33.41	71501	53662	34	13	7	72	13	7	3	2	2	1	TR
5	C622102	BPEB	25	12 3/4	323.9	0.250	20'	33.41	71791	53662	35	16	11	79	13	9	3	2	2	TR	TR
6	C630371	BPEB	39	12 3/4	323.9	0.250	20'	33.41	70630	51196	34	16	13	76	11	8	2	2	3	TR	1
7	C622077	BPEB	59	18	457.0	0.250	20'	47.44	67730	50036	37	14	18	74	13	8	2	3	2	1	TR
8	C622078	BPEB	63	18	457.0	0.250	20'	47.44	66714	43509	43	15	10	76	14	12	3	2	2	1	TR
9	C428521	BPEB	1	18	457.0	0.375	20'	70.65	68310	42639	42	18	14	79	15	10	2	3	2	1	1
10	C622077	BPEB	2	18	457.0	0.375	20'	70.65	68310	42639	42	18	14	79	15	10	2	3	2	1	1

ITEM NO.	수압시험 HYDROSTATIC TEST TP (PSI) ⑤	RE-SULT	열처리온도 HEAT TREATMENT (℃)	비파괴시험 NDT (U.T) ⑥	경도시험 HARDNESS TEST (Hrb)	외주장 CIRCUMFERENCE(mm) END	BODY	용접부인장강도 TENSILE STRENGTH OF WELDS (psi)	아연도금시험 ZINC COATING TEST WZC (g/m²) ⑦	CST (TIMES)	VISUAL & DIMEN-SION	FLATT-EKING (BEND) TEST	RGT	FRT	CRT	RFT	S.T (%)	충격시험 IMPACT TEST ENE-RGY (J) (0)℃	SHEAR AREA (%)	잔류자기 Res. Mag. Gauss	비고 REMARKS
1	1400	GOOD	930	ACCEPT				78027			ACCEPT	GOOD	GOOD				0.1			23	
2	1400	GOOD	930	ACCEPT				74546			ACCEPT	GOOD	GOOD				0.1			21	
3	1400	GOOD	930	ACCEPT				75561			ACCEPT	GOOD	GOOD				0.1			23	
4	1400	GOOD	930	ACCEPT				75561			ACCEPT	GOOD	GOOD				0.1			20	
5	1400	GOOD	930	ACCEPT				75851			ACCEPT	GOOD	GOOD				0.1			23	
6	1400	GOOD	930	ACCEPT				74691			ACCEPT	GOOD	GOOD				0.1			21	
7	990	GOOD	930	ACCEPT				71791			ACCEPT	GOOD	GOOD				0.1			20	
8	990	GOOD	930	ACCEPT				70775			ACCEPT	GOOD	GOOD				0.1			21	
9	1490	GOOD	950	ACCEPT				72371			ACCEPT	GOOD	GOOD				0.1			23	
10	1490	GOOD	950	ACCEPT				72371			ACCEPT	GOOD	GOOD				0.1			22	

NOTE : ①TYPE BPE BLACK PLAIN ENDS BPEB BPE BEVELLED BTE BLACK THREADED ENDS BTC BLACK THREADED & COUPLED GPE GALVANIZED PLAIN ENDS GTE GALVANIZED THREADED ENDS GTC GALVANIZED THREAD & COUPLED.
②O.D. OUTSIDE DIAMETER ③W.T. WALL THICKNESS ④CHEMICAL COMPOSITION CHECK ANALYSIS 2:×100 3:×1000 TR TRACE ⑤TP TESTING PRESSURE ⑥NDT NONDESTRUCTIVE TEST
E.T EDDY CURRENT TEST U.T ULTRASONIC TEST ⑦WZC WEIGHT OF ZINC COATING CST COPPER SULPHATE TEST ⑧NDT WELD DUCTILITY TEST RGT RING GAGE TEST FRT FRANGE TEST ⑨ RES.MAG. : RESIDUAL MAGNETISM
CRT CRUSH TEST RFT REVERSE FLATTENING TEST S.T STRAIGHTNESS

SIGNATURE

SURVEYOR TO:

본 제품은 관련 규격이 정한 시험 및 검사에 합격하였음을 증명합니다.
WE HEREBY CERTIFY THAT THE PRODUCTS HEREIN HAVE BEEN MADE AND TESTED IN ACCORDANCE WITH THE ABOVE SPECIFICATION AND ALSO WITH THE REQUIREMENTS CALLED FOR THE ORDER.

SIGNATURE

MANAGER OF QUALITY ASSURANCE TEAM

HMS C-30-05-(21)

Unique Well Number	County	Quad	Quad Id
643505	Scott	Orchard Lake	89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

MINNESOTA STATUTES CHAPTER 1031

Entry Date 2000/11/03
Update Date 2005/03/11
Received Date

Wellname THE LEGENDS CLUB

Township	Range	Dir	Section	Subsection	Field Located Elevation	MGS
114	21	W	21	AACABC	992.00 ft.	

Well Depth	Depth Completed	Date Well Completed
710.00 ft	710.00 ft	2000/09/06

Well Owner THE LEGENDS CLUB
19400 NATCHEZ AV
PRIOR LAKE MN

Contact ENEBAK, JAKE
6800 FRANCE AV S
EDINA MN 55435 Changed

Drilling Method Non-specified Rotary

Drilling Fluid Bentonite

Well Hydrofractured? ☐ YES ☑ NO
From ft. to

Use Public Supply/non-comm.-transient

Casing Type Steel (black or low Drive Shoe? ☑ YES ☐ NO
Diameter 8 Depth 519
14.00 in. from 0.00 to 154.00 ft. lbs/ft
8.00 in. from 0.00 to 519.00 ft. lbs/ft

Hole Diameter (in.)
20.0(To
12.3(To

Description	Color	Hardness	From	To (ft.)
TOP SOIL	BLACK		0	2
SANDY CLAY	TAN		2	7
BOULDER			7	8
GRAVEL			8	11
SANDY CLAY	TAN		11	16
SANDY CLAY	BLUE		16	58
GRAVEL			58	61
CLAY	BLUE		61	71
BOULDER/GRAVEL			71	97
CLAY	BLUE		97	125
CLAY	BLUE		125	130
SAND W/CLAY	BROWN		130	140
SANDSTONE			140	148
SANDSTONE		HARD	148	155
CRUMBLY SANDSTONE			155	170
SANDSTONE		HARD	170	201
SANDSTONE, BROKEN			201	205
VOID			205	209
SANDSTONE	RED/BROW		209	210
SANDSTONE, BROKEN			210	218
LIMESTONE	GRAY		218	225
SANDSTONE, BROKEN			225	274
LIMESTONE	BROWN	MEDIUM	274	325
LIMESTONE	BROWN	MEDIUM	325	328
SANDSTONE	GRAY	MEDIUM	328	392
LIMESTONE		MEDIUM	392	400
SANDSTONE	GRAY	MEDIUM	400	438
GRANITE & SANDSTONE	GREEN	MEDIUM	438	448
GRANITE & SANDSTONE	GREEN	MEDIUM	448	460
LIMESTONE	GRAY	HARD	460	485
SANDSTONE		HARD	485	492

Screen No
Make
Diamter Slot Length Set
Type

Open Hole(ft.) From 519.(to 710.0

Static Water Level
108.00 ft. Land surface Date measured 2000/07/28

Pumping Level (below land surface)
278.60 ft. after 8.00 hrs. pumping 400.00 g.p.m.

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

Grouting Information Well grouted? ☑ YES ☐ NO
Material Neat Cement From 0.0 To 154.0 ft. 6.00 Cubic yards
Material Neat Cement From 0.0 To 519.0 ft. 83.00 Cubic yards

Nearest Known Source of Contamination
50 feet Direction SDF Type
Well disinfected upon completion? ☑ YES ☐ NO

Pump
☐ Not Installed Date Installed 2000/09/22
Manufacture's name CROWN
Model number 7M-340-5 HP 50.00 Volts 460
Length of drop pipe 336.(Material Capacity 400 g.p.m
Type Submersible

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☑ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☑ NO

Well Contractor Cerfication
Thein Well Co. 34625
License Business Name Lic. or Reg No.
GRABOWSKI, D.
Name of Driller Date

Remarks
GAMMA LOGGED 7-12-2000. M.G.S. NO. 4025. IRRIGATION WELL- NO WATER SAMPLE REQUIRED WELL NO.2.

First Badrock Prairie Du Chien Group **Aquifer** Franconia-Ironton-Galesvill
Last Strat Ironton-Galesville **Depth to Bedrock** 125.00 ft.

Unique Well Number	County	Quad	Quad Id
643505	Scott	Orchard Lake	89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

MINNESOTA STATUTES CHAPTER 1031

Entry Date	Update Date	Received Date
2000/11/03	2005/03/11	

Wellname	Township	Range	Dir	Section	Subsection	Depth Drilled	Depth Completed	Date Completed	Lic/Reg. No.	Driller Name
THE LEGENDS CLUB	114	21	W	21	AACABC	710 ft	710 ft	2000/09/06	34625	GRABOWSKI, D.

Elevation 992.00 ft. **Method** 7.5 minute topographic **Aquifer** Franconia-Ironton-Gales **Depth to Bedrock** 125 ft. **Open Hole** 519-710 **SWL** 108

Field Located Minnesota Geological Survey
Program
Uni No.Verified Information from owner
Geologic Interpretation Bruce Bloomgren

Location Method Digitization (Screen) - Map (1:2 Universal Transverse Mercator(UTM) - NAD83 - Zone 15 - Meters
Input Source
Input Date 2002/03/06
Agency Minnesota Geological Survey

UTM Easting (X) 472874
UTM Northing (Y) 4946562
Interpretation Method Geologic study 1:24k to 1:100k

Geological Material	Color	Hardness	DEPTH From	DEPTH To	Thick	ELEVATION From	ELEVATION To	Stratigraphy	LITHOLOGY Primary	LITHOLOGY Secondary	LITHOLOGY Minor
TOP SOIL	BLACK		0	2	2	992	990	Recent Deposit-black	Soil	Organic Deposits	
SANDY CLAY	TAN		2	7	5	990	985	Clay & sand-brown	Clay	Sand	
BOULDER			7	8	1	985	984	Boulder or boulders	Boulder		
GRAVEL			8	11	3	984	981	Gravel (+larger)	Gravel		
SANDY CLAY	TAN		11	16	5	981	976	Clay & sand-brown	Clay	Sand	
SANDY CLAY	BLUE		16	58	42	976	934	Clay & sand-gray	Clay	Sand	
GRAVEL			58	61	3	934	931	Gravel (+larger)	Gravel		
CLAY	BLUE		61	71	10	931	921	Clay-gray	Clay		
BOULDER/GRAVEL			71	97	26	921	895	Sand & larger	Boulder	Gravel	
CLAY	BLUE		97	125	28	895	867	Clay-gray	Clay		
CLAY	BLUE		125	130	5	867	862	Prairie Du Chien Group	Clay		
SAND W/CLAY	BROWN		130	140	10	862	852	Prairie Du Chien Group	Dolomite	Sandstone	
SANDSTONE			140	148	8	852	844	Prairie Du Chien Group	Dolomite	Sandstone	
SANDSTONE		HARD	148	155	7	844	837	Prairie Du Chien Group	Dolomite		
CRUMBLY SANDSTONE			155	170	15	837	822	Prairie Du Chien Group	Dolomite		
SANDSTONE		HARD	170	201	31	822	791	Prairie Du Chien Group	Dolomite		
SANDSTONE, BROKEN			201	205	4	791	787	Prairie Du Chien Group	Dolomite		
VOID			205	209	4	787	783	Prairie Du Chien Group	Crevice		
SANDSTONE	RED/BRN		209	210	1	783	782	Prairie Du Chien Group	Dolomite		
SANDSTONE, BROKEN			210	218	8	782	774	Prairie Du Chien Group	Dolomite		
LIMESTONE	GRAY		218	225	7	774	767	Prairie Du Chien Group	Dolomite		
SANDSTONE, BROKEN			225	274	49	767	718	Prairie Du Chien Group	Dolomite		
LIMESTONE	BROWN	MEDIUM	274	325	51	718	667	Prairie Du Chien Group	Dolomite		
LIMESTONE	BROWN	MEDIUM	325	328	3	667	664	Jordan	Sandstone		

Unique Well Number	County	Quad	Quad Id
643505	Scott	Orchard Lake	89A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

MINNESOTA STATUTES CHAPTER 1031

Entry Date	Update Date	Received Date
2000/11/03	2005/03/11	

Wellname	Township	Range	Dir	Section	Subsection	Depth Drilled	Depth Completed	Date Completed	Lic/Reg. No.	Driller Name
THE LEGENDS CLUB	114	21	W	21	AACABC	710 ft	710 ft	2000/09/06	34625	GRABOWSKI, D.

Elevation 992.00 ft. **Method** 7.5 minute topographic **Aquifer** Franconia-Ironton-Gales **Depth to Bedrock** 125 ft. **Open Hole** 519-710 **SWL** 108

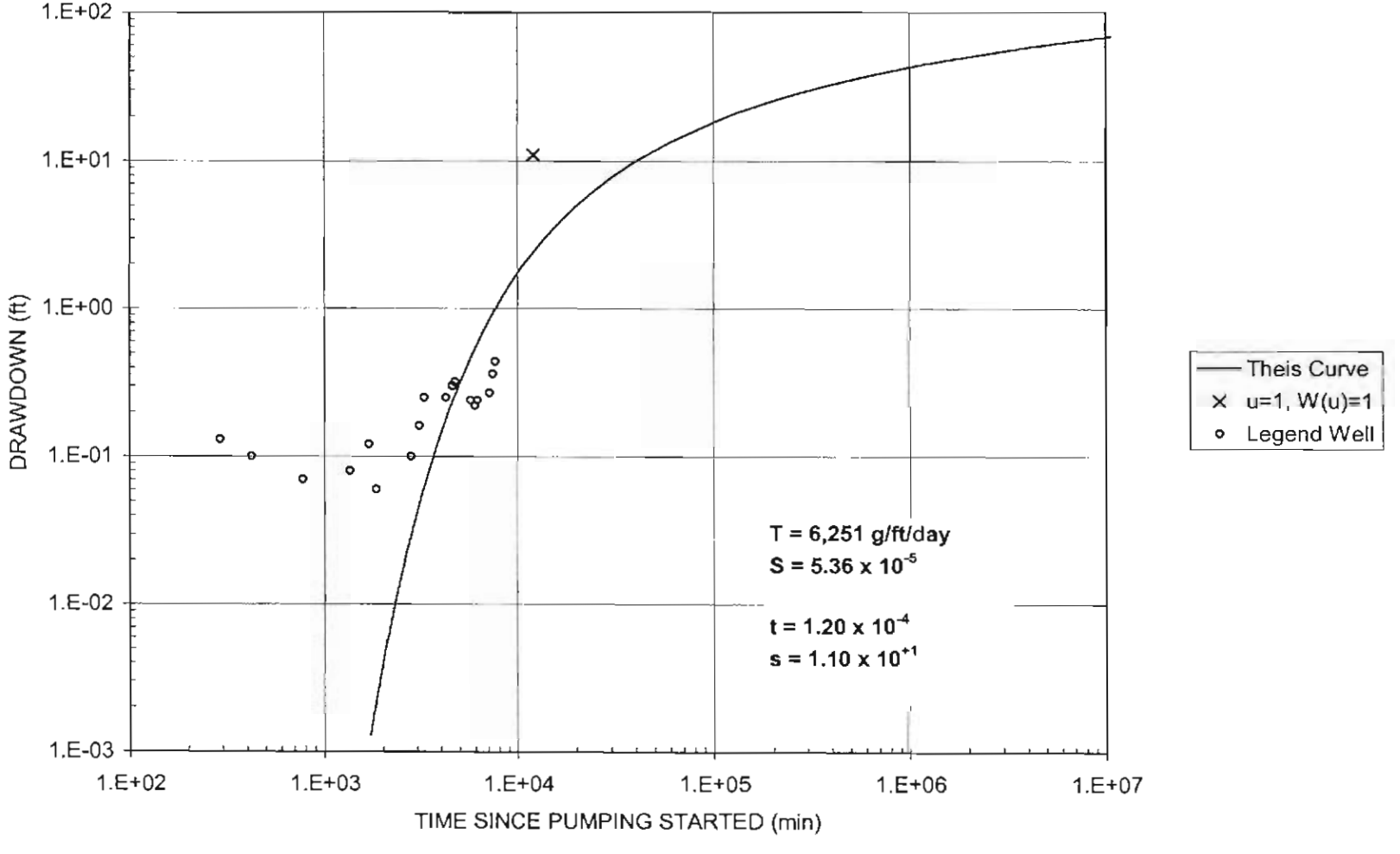
Field Located Minnesota Geological Survey
Program
Uni No.Verified Information from owner
Geologic Interpretation Bruce Bloomgren

Location Method Digitization (Screen) - Map (1:: Universal Transverse Mercator(UTM) - NAD83 - Zone 15 - Meters
Input Source
Input Date 2002/03/06
Agency Minnesota Geological Survey

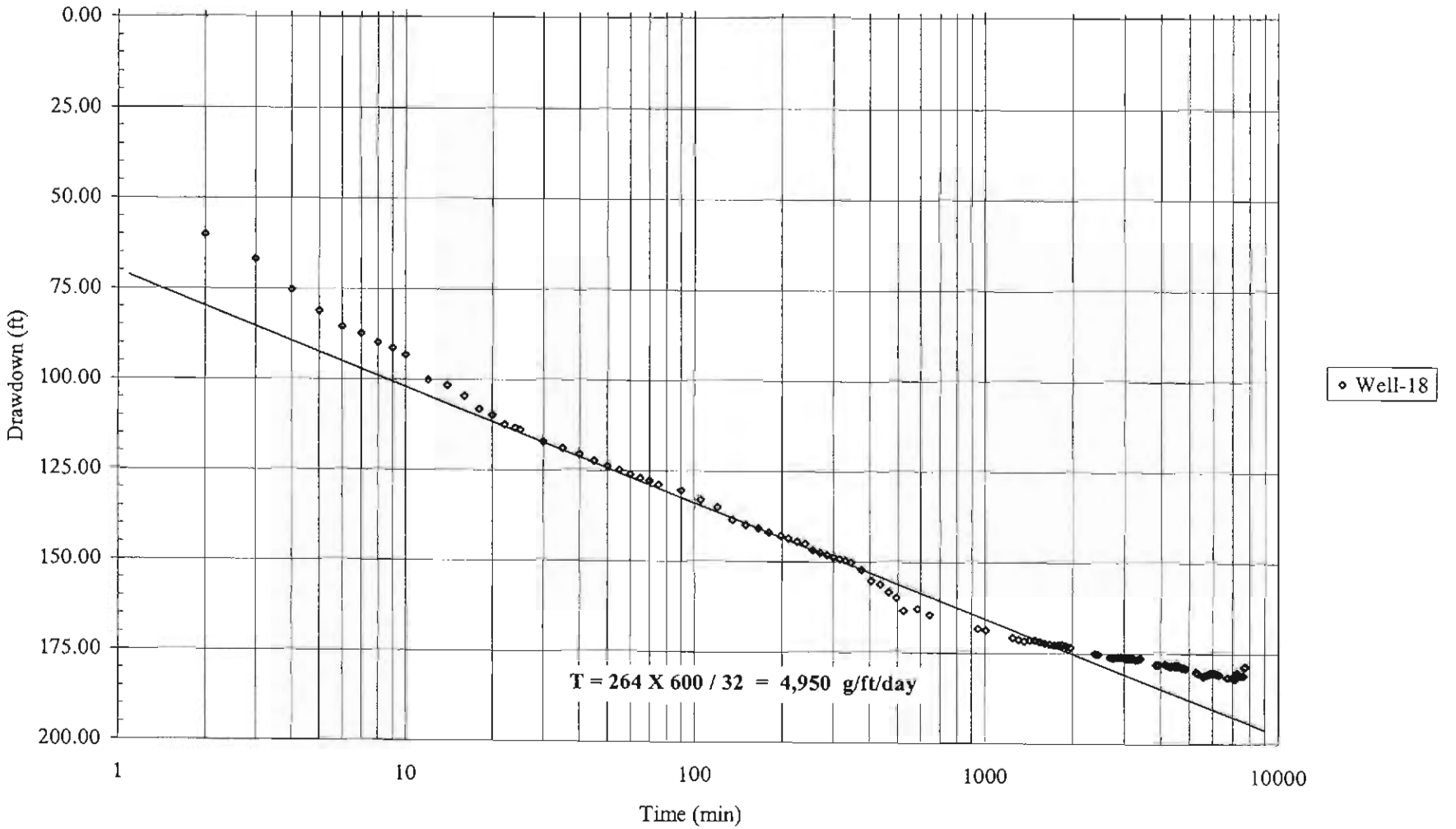
UTM Easting (X) 472874
UTM Northing (Y) 4946562
Interpretation Method Geologic study 1:24k to 1:100k

Geological Material	Color	Hardness	DEPTH From	DEPTH To	Thick	ELEVATION From	ELEVATION To	Stratigraphy	LITHOLOGY Primary	LITHOLOGY Secondary	LITHOLOGY Minor
SANDSTONE	GRAY	MEDIUM	328	392	64	664	600	Jordan	Sandstone		
LIMESTONE		MEDIUM	392	400	8	600	592	Jordan	Sandstone		
SANDSTONE	GRAY	MEDIUM	400	438	38	592	554	Jordan	Sandstone		
GRANITE & SANDSTONE	GREEN	MEDIUM	438	448	10	554	544	Jordan	Sandstone	Siltstone	
GRANITE & SANDSTONE	GREEN	MEDIUM	448	460	12	544	532	St.Lawrence	Siltstone	Dolomite	
LIMESTONE	GRAY	HARD	460	485	25	532	507	St.Lawrence	Dolomite	Siltstone	
SANDSTONE		HARD	485	492	7	507	500	St.Lawrence	Siltstone	Dolomite	
SANDSTONE		SOFT	492	513	21	500	479	St.Lawrence	Siltstone	Dolomite	
SANDSTONE		SOFT	513	637	124	479	355	Franconia	Sandstone	Shale	Dolomite
SANDSTONE		SOFT	637	670	33	355	322	Ironton-Galesville	Sandstone		
SANDSTONE		MED-HRD	670	703	33	322	289	Ironton-Galesville	Sandstone		
SANDSTONE	DK. GRY	HARD	703	710	7	289	282	Ironton-Galesville	Sandstone		

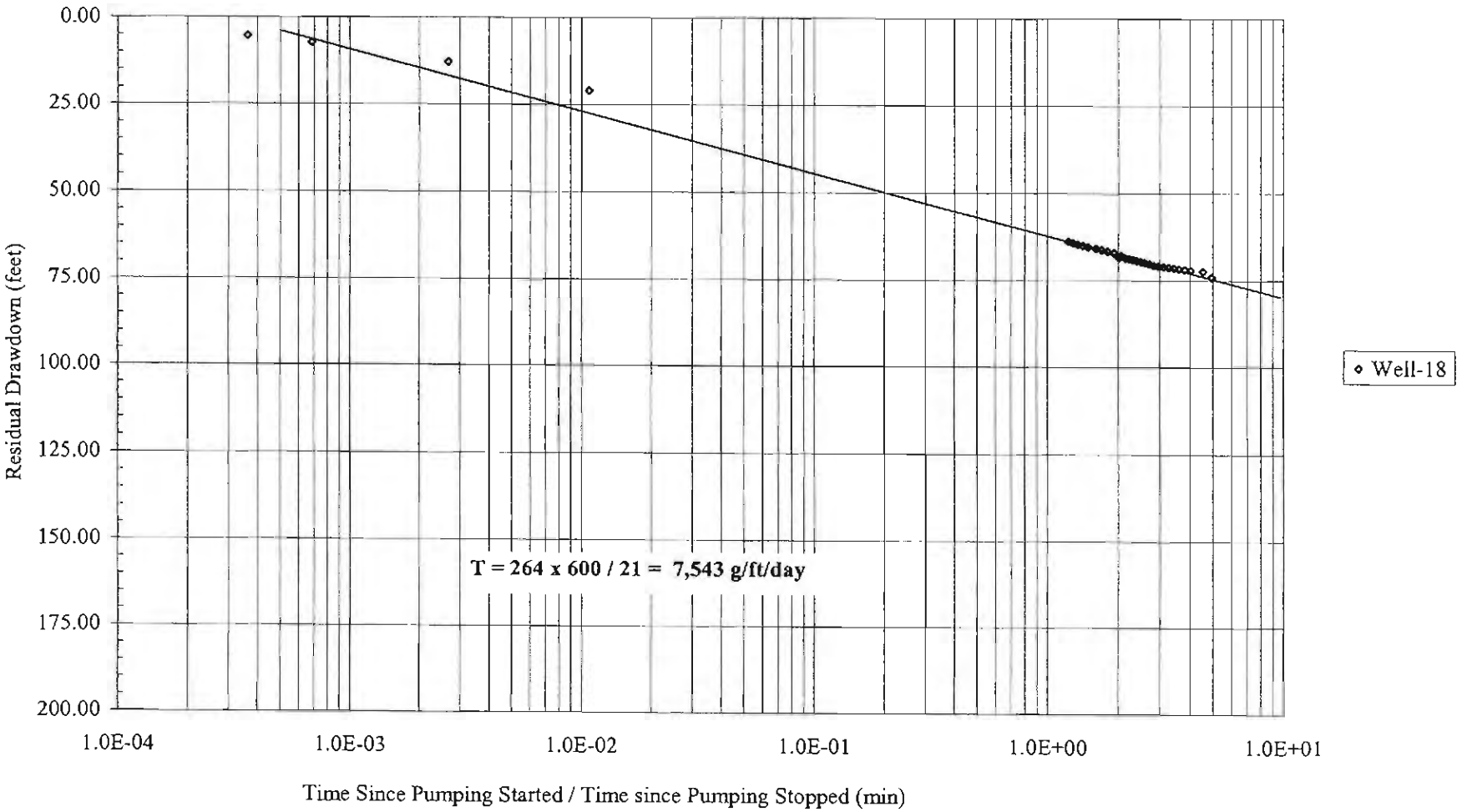
THEIS TIME vs DRAWDOWN MATCH - LEGEND WELL



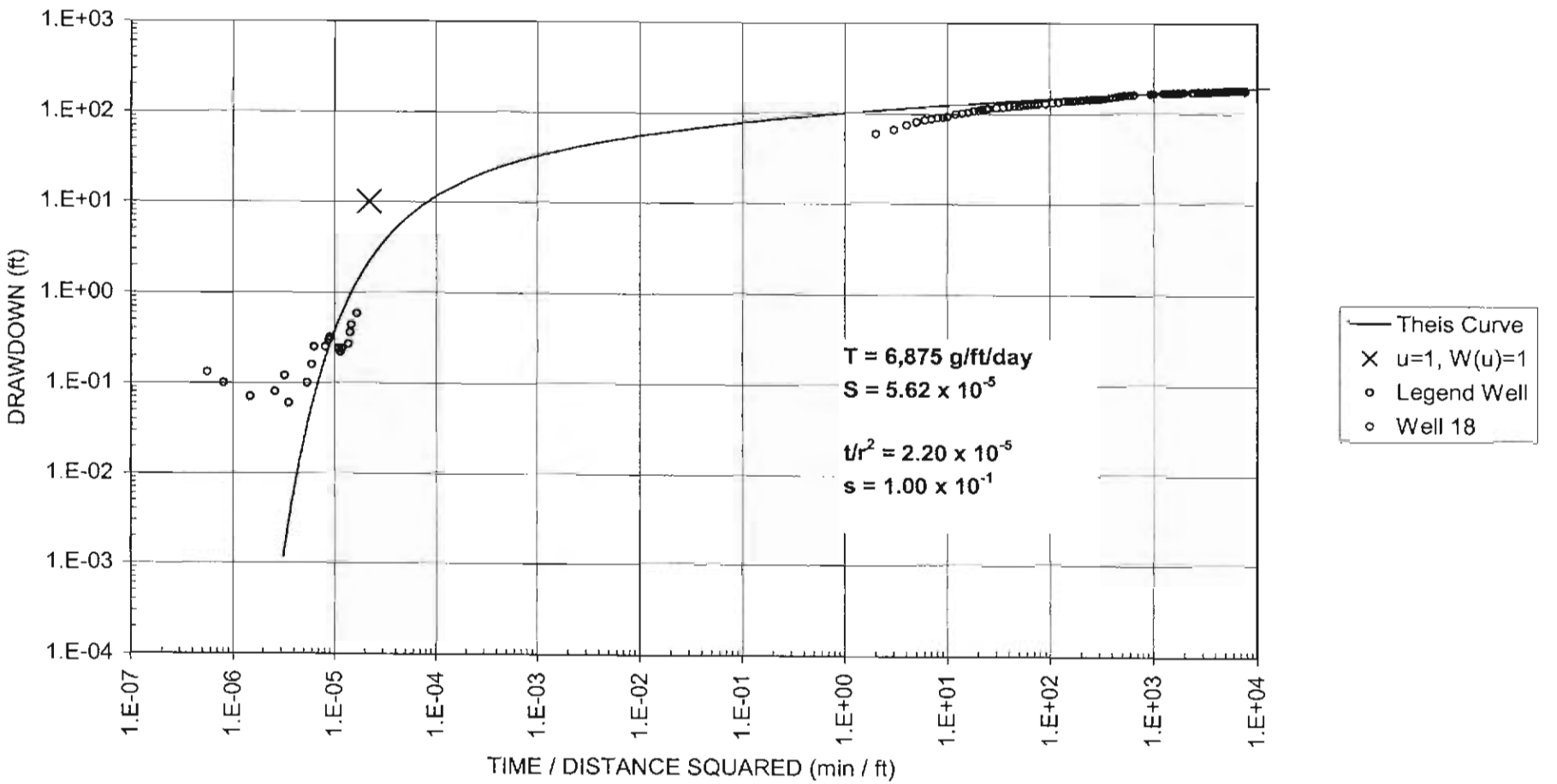
JACOBS DRAWDOWN PLOT



JACOBS RECOVERY PLOT



THEIS TIME/DISTANCE SQUARED vs DRAWDOWN MATCH - BOTH WELLS



Lakeville Well 18 Water Level Data - Pumping

Date/Time	Depth to Water (ft)	Time Since Pumping Started (min)	Drawdown (ft)	Meter Gallons	Cumulative Rate Gallons	Incremental Gallons	t/r^2
3/6/07 9:15 AM	213.15	0	0.00	77492200			
3/6/07 9:17 AM	273.30	2	60.15				2
3/6/07 9:18 AM	280.10	3	66.95				3
3/6/07 9:19 AM	288.40	4	75.25				4
3/6/07 9:20 AM	294.30	5	81.15	77494700	500	500	5
3/6/07 9:21 AM	298.65	6	85.50				6
3/6/07 9:22 AM	300.52	7	87.37				7
3/6/07 9:23 AM	303.04	8	89.89				8
3/6/07 9:24 AM	304.51	9	91.36				9
3/6/07 9:25 AM	306.40	10	93.25	77497800	560	620	10
3/6/07 9:27 AM	313.31	12	100.16				12
3/6/07 9:29 AM	314.85	14	101.70	77501000	587	640	14
3/6/07 9:31 AM	317.78	16	104.63				16
3/6/07 9:33 AM	321.30	18	108.15				18
3/6/07 9:35 AM	322.95	20	109.80	77504300	605	660	20
3/6/07 9:37 AM	325.56	22	112.41				22
3/6/07 9:39 AM	326.51	24	113.36				24
3/6/07 9:40 AM	327.05	25	113.90	77507500	612	640	25
3/6/07 9:45 AM	330.23	30	117.08	77511500	643	800	30
3/6/07 9:50 AM	332.00	35	118.85	77514400	634	580	35
3/6/07 9:55 AM	333.56	40	120.41	77517800	640	680	40
3/6/07 10:00 AM	335.41	45	122.26				45
3/6/07 10:05 AM	336.86	50	123.71				50
3/6/07 10:10 AM	337.98	55	124.83				55
3/6/07 10:15 AM	339.16	60	126.01				60
3/6/07 10:20 AM	340.15	65	127.00				65
3/6/07 10:25 AM	340.92	70	127.77				70
3/6/07 10:30 AM	342.01	75	128.86				75
3/6/07 10:45 AM	343.50	90	130.35				90
3/6/07 11:00 AM	346.10	105	132.95				105
3/6/07 11:15 AM	348.15	120	135.00	77571700	663	674	120
3/6/07 11:30 AM	351.72	135	138.57				135
3/6/07 11:45 AM	353.05	150	139.90				150
3/6/07 12:01 PM	354.04	166	140.89	77596700	630	543	166
3/6/07 12:15 PM	355.10	180	141.95				180
3/6/07 12:33 PM	356.05	198	142.90				198
3/6/07 12:45 PM	356.75	210	143.60				210
3/6/07 1:00 PM	357.60	225	144.45	77643500	672	793	225
3/6/07 1:15 PM	358.22	240	145.07				240
3/6/07 1:30 PM	359.97	255	146.82				255
3/6/07 1:45 PM	360.68	270	147.53				270
3/6/07 2:00 PM	361.26	285	148.11	77672500	633	483	285
3/6/07 2:15 PM	361.81	300	148.66				300
3/6/07 2:30 PM	362.41	315	149.26				315
3/6/07 2:45 PM	362.80	330	149.65				330
3/6/07 3:00 PM	363.32	345	150.17	77710000	631	625	345

Lakeville Well 18 Water Level Data - Pumping

Date/Time	Depth to Water (ft)	Time Since Pumping Started (min)	Drawdown (ft)	Meter Gallons	Cumulative Rate Gallons	Incremental Gallons	t/r^2
3/6/07 3:30 PM	365.42	375	152.27				375
3/6/07 4:00 PM	368.42	405	155.27	77748300	632	638	405
3/6/07 4:30 PM	369.39	435	156.24				435
3/6/07 5:00 PM	371.45	465	158.30	77790700	642	707	465
3/6/07 5:30 PM	373.02	495	159.87				495
3/6/07 6:00 PM	376.60	525	163.45	77830700	645	667	525
3/6/07 7:00 PM	376.17	585	163.02	77870200	646	658	585
3/6/07 8:00 PM	377.75	645	164.60	77905400	641	587	645
3/7/07 1:00 AM	381.45	945	168.30	78100500	644	650	945
3/7/07 2:00 AM	381.92	1005	168.77	78139200	644	645	1005
3/7/07 6:00 AM	383.90	1245	170.75	78293300	643	642	1245
3/7/07 7:00 AM	384.36	1305	171.21	78331800	643	642	1305
3/7/07 8:00 AM	384.81	1365	171.66	78370200	643	640	1365
3/7/07 9:00 AM	384.62	1425	171.47	78408500	643	638	1425
3/7/07 10:00 AM	384.52	1485	171.37	78446600	643	635	1485
3/7/07 11:00 AM	385.07	1545	171.92	78484600	642	633	1545
3/7/07 12:01 PM	385.41	1606	172.26	78522600	642	623	1606
3/7/07 1:00 PM	385.67	1665	172.52	78560500	642	642	1665
3/7/07 2:00 PM	385.91	1725	172.76	78598400	641	632	1725
3/7/07 3:00 PM	385.94	1785	172.79	78636200	641	630	1785
3/7/07 4:00 PM	385.76	1845	172.61	78673800	640	627	1845
3/7/07 5:00 PM	386.12	1905	172.97	78711300	640	625	1905
3/7/07 6:00 PM	386.48	1965	173.33	78748900	640	627	1965
3/8/07 1:00 AM	388.29	2385	175.14	79011600	637	625	2385
3/8/07 2:00 AM	388.51	2445	175.36	79049000	637	623	2445
3/8/07 6:00 AM	389.29	2685	176.14	79198600	636	623	2685
3/8/07 7:00 AM	389.48	2745	176.33	79235900	635	622	2745
3/8/07 8:00 AM	389.26	2805	176.11	79273200	635	622	2805
3/8/07 9:00 AM	389.21	2865	176.06	79310300	635	618	2865
3/8/07 10:00 AM	389.16	2925	176.01	79347400	634	618	2925
3/8/07 11:00 AM	389.30	2985	176.15	79384400	634	617	2985
3/8/07 12:00 PM	389.54	3045	176.39	79421400	634	617	3045
3/8/07 1:00 PM	389.64	3105	176.49	79458400	633	617	3105
3/8/07 2:00 PM	389.59	3165	176.44	79495400	633	617	3165
3/8/07 3:00 PM	389.75	3225	176.60	79532300	633	615	3225
3/8/07 4:00 PM	389.92	3285	176.77	79569200	632	615	3285
3/8/07 5:00 PM	389.85	3345	176.70	79605900	632	612	3345
3/8/07 6:00 PM	389.60	3405	176.45				3405
3/9/07 1:30 AM	391.27	3855	178.12	79919200	630	614	3855
3/9/07 2:30 AM	391.28	3915	178.13	79956000	629	613	3915
3/9/07 6:00 AM	391.12	4125	177.97	80083100	628	605	4125
3/9/07 7:00 AM	391.35	4185	178.20	80119800	628	612	4185
3/9/07 8:00 AM	391.52	4245	178.37	80156900	628	618	4245
3/9/07 9:00 AM	391.67	4305	178.52	80193500	627	610	4305
3/9/07 10:00 AM	391.44	4365	178.29	80230000	627	608	4365
3/9/07 11:00 AM	391.48	4425	178.33	80266300	627	605	4425
3/9/07 12:01 PM	391.80	4486	178.65	80302900	627	600	4486

Lakeville Well 18 Water Level Data - Pumping

Date/Time	Depth to Water (ft)	Time Since Pumping Started (min)	Drawdown (ft)	Meter Gallons	Cumulative Rate Gallons	Incremental Gallons	t/r^2
3/9/07 1:00 PM	391.24	4545	178.09	80339200	626	615	4545
3/9/07 2:00 PM	391.51	4605	178.36	80375500	626	605	4605
3/9/07 3:00 PM	391.86	4665	178.71	80411900	626	607	4665
3/9/07 4:00 PM	392.11	4725	178.96	80448200	626	605	4725
3/9/07 5:00 PM	392.13	4785	178.98	80484600	625	607	4785
3/9/07 6:00 PM	392.25	4845	179.10	80521000	625	607	4845
3/10/07 1:00 AM	393.22	5265	180.07	80775300	624	605	5265
3/10/07 2:00 AM	393.49	5325	180.34	80811500	623	603	5325
3/10/07 6:00 AM	394.50	5565	181.35	80957200	623	607	5565
3/10/07 7:00 AM	394.08	5625	180.93	80993400	622	603	5625
3/10/07 8:00 AM	394.11	5685	180.96	81029600	622	603	5685
3/10/07 9:00 AM	393.88	5745	180.73	81066200	622	610	5745
3/10/07 10:00 AM	393.70	5805	180.55	81101900	622	595	5805
3/10/07 11:00 AM	393.61	5865	180.46	81138000	622	602	5865
3/10/07 12:00 PM	393.60	5925	180.45	81174100	621	602	5925
3/10/07 1:00 PM	393.50	5985	180.35	81210800	621	612	5985
3/10/07 2:00 PM	393.55	6045	180.40	81246600	621	597	6045
3/10/07 3:00 PM	393.60	6105	180.45	81281000	621	573	6105
3/10/07 4:00 PM	393.70	6165	180.55	81315400	620	573	6165
3/10/07 5:00 PM	393.80	6225	180.65	81352800	620	623	6225
3/10/07 6:00 PM	393.92	6285	180.77	81387700	620	582	6285
3/11/07 1:00 AM	394.78	6705	181.63	81638600	618	597	6705
3/11/07 2:00 AM	394.79	6765	181.64	81673000	618	573	6765
3/11/07 6:00 AM	394.81	7005	181.66	81785100	613	467	7005
3/11/07 7:00 AM	395.00	7065	181.85	81820200	613	585	7065
3/11/07 8:00 AM	395.10	7125	181.95	81858600	613	640	7125
3/11/07 9:00 AM	393.70	7185	180.55	81895000	613	607	7185
3/11/07 10:00 AM	393.40	7245	180.25	81926000	612	517	7245
3/11/07 11:00 AM	393.60	7305	180.45	81962700	612	612	7305
3/11/07 12:00 PM	394.00	7365	180.85	81998000	612	588	7365
3/11/07 1:00 PM	394.10	7425	180.95	82033600	612	593	7425
3/11/07 2:00 PM	394.15	7485	181.00	82069400	612	597	7485
3/11/07 3:00 PM	394.15	7545	181.00	82104500	611	585	7545
3/11/07 4:00 PM	394.15	7605	181.00	82140300	611	597	7605
3/11/07 5:00 PM	391.80	7665	178.65	82178000	611	628	7665
3/11/07 6:00 PM	391.70	7725	178.55	82209000	611	517	7725
3/12/07 1:00 AM		8145		82442500	608	556	8145

Generator Failure - Pump Off @ 1:00 AM 3/12/07

Lakeville Well 18 Water Level Data - Recovery

Date/Time	Depth to Water (ft)	Time Since Pumping Started (min)	Residual Drawdown (ft)	Time Since Pumping Stopped (min)	t/t'
		Generator Failure - Pump Off @ 1:00 AM 3/12/07			
3/12/07 1:15 AM	287.20	8160	74.05	15	4.9395
3/12/07 1:16 AM	285.50	8161	72.35	16	4.5243
3/12/07 1:18 AM	285.20	8163	72.05	18	4.0047
3/12/07 1:19 AM	285.00	8164	71.85	19	3.7833
3/12/07 1:20 AM	284.80	8165	71.65	20	3.5841
3/12/07 1:21 AM	284.60	8166	71.45	21	3.4038
3/12/07 1:22 AM	284.40	8167	71.25	22	3.2399
3/12/07 1:23 AM	284.20	8168	71.05	23	3.0903
3/12/07 1:24 AM	284.00	8169	70.85	24	2.9531
3/12/07 1:25 AM	283.80	8170	70.65	25	2.8270
3/12/07 1:26 AM	283.40	8171	70.25	26	2.7028
3/12/07 1:27 AM	283.00	8172	69.85	27	2.5878
3/12/07 1:28 AM	282.70	8173	69.55	28	2.4847
3/12/07 1:29 AM	282.40	8174	69.25	29	2.3886
3/12/07 1:30 AM	282.10	8175	68.95	30	2.2989
3/12/07 1:31 AM	281.90	8176	68.75	31	2.2183
3/12/07 1:32 AM	281.70	8177	68.55	32	2.1427
3/12/07 1:33 AM	281.00	8178	67.85	33	2.0566
3/12/07 1:34 AM	281.55	8179	68.40	34	2.0122
3/12/07 1:35 AM	280.20	8180	67.05	35	1.9162
3/12/07 1:37 AM	279.80	8182	66.65	37	1.8018
3/12/07 1:39 AM	279.40	8184	66.25	39	1.6991
3/12/07 1:41 AM	279.00	8186	65.85	41	1.6064
3/12/07 1:44 AM	278.60	8189	65.45	44	1.4878
3/12/07 1:46 AM	278.20	8191	65.05	46	1.4144
3/12/07 1:48 AM	277.80	8193	64.65	48	1.3471
3/12/07 1:50 AM	277.40	8195	64.25	50	1.2852
3/12/07 1:52 AM	277.00	8197	63.85	52	1.2281
3/13/07 9:30 AM	234.17	10095	21.02	1950	0.0108
3/15/07 9:25 AM	226.02	12970	12.87	4825	0.0027
3/19/07 10:31 AM	220.45	18796	7.30	10651	0.0007
3/22/07 9:30 AM	218.58	23055	5.43	14910	0.0004

Legend Well Water Level Data - All

r ≅ 22,800ft

Date/Time	Depth to Water (ft)	Time Since Pumping Started (min)	Drawdown (ft)	Barometric Correction (ft H2O)	Corrected Drawdown (ft)	t/r2
3/6/07 8:04 AM	108.39					
3/6/07 9:15 AM		**Pump on**				
3/6/07 10:50 AM	108.39	95	0.00	0.00	0.00	1.83E-07
3/6/07 2:04 PM	108.31	289	-0.08	-0.21	0.13	5.56E-07
3/6/07 4:15 PM	108.25	420	-0.14	-0.24	0.10	8.08E-07
3/6/07 10:07 PM	108.25	772	-0.14	-0.21	0.07	1.49E-06
3/7/07 7:50 AM	108.35	1355	-0.04	-0.12	0.08	2.61E-06
3/7/07 1:23 PM	108.40	1688	0.01	-0.11	0.12	3.25E-06
3/7/07 4:00 PM	108.31	1845	-0.08	-0.14	0.06	3.55E-06
3/8/07 7:50 AM	108.10	2795	-0.29	-0.39	0.10	5.38E-06
3/8/07 1:00 PM	108.02	3105	-0.37	-0.53	0.16	5.97E-06
3/8/07 4:00 PM	108.04	3285	-0.35	-0.60	0.25	6.32E-06
3/9/07 7:57 AM	107.97	4242	-0.42	-0.67	0.25	8.16E-06
3/9/07 1:35 PM	108.05	4580	-0.34	-0.64	0.30	8.81E-06
3/9/07 4:00 PM	108.09	4725	-0.30	-0.62	0.32	9.09E-06
3/10/07 8:05 AM	108.28	5690	-0.11	-0.35	0.24	1.09E-05
3/10/07 1:00 PM	108.36	5985	-0.03	-0.25	0.22	1.15E-05
3/10/07 4:00 PM	108.42	6165	0.03	-0.21	0.24	1.19E-05
3/11/07 7:58 AM	108.53	7123	0.14	-0.13	0.27	1.37E-05
3/11/07 12:55 PM	108.54	7420	0.15	-0.21	0.36	1.43E-05
3/11/07 4:10 PM	108.53	7615	0.14	-0.30	0.44	1.46E-05
	Pump off @ 1:00 am 3/12/07					
3/12/07 7:57 AM	108.47	8562	0.08	-0.51	0.59	1.65E-05
3/13/07 10:00 AM	108.55	10125	0.16	-0.51	0.67	1.95E-05
3/15/07 9:48 AM	109.36	12993	0.97	-0.13	1.10	2.50E-05
3/19/07 10:17 AM	109.53	18782	1.14	0.64	0.50	3.61E-05

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NEW ULM, MN 56073-0249
PHONE (507) 354-8517 WATS (800) 782-3557 FAX (507) 359-2890

QUALITY CONTROL REPORT

Work Order #: 200712-3224
Laboratory #: 07-A9208
Date Reported: 6 April 2007

Analyte	Spike (ppb)	Recovered (ppb)	% Recovery	QC Blank Analyte Concentrations
Dicamba	1.00	1.00	100	ND
MCPA	1.00	0.97	97	ND
2,4-D	1.00	0.92	0.92	ND
Triclopyr	1.00	0.92	92	ND
2,4,5-TP	1.00	0.98	98	ND
2,4,5-T	1.00	0.94	94	ND
2,4-DB	1.00	0.99	99	ND
Bentazon	1.00	0.40	40*	ND
Picloram	1.00	0.82	82	ND

ND = None Detected
* = Below acceptable limits

MVTL METHOD I.D.	Description	REFERENCE METHOD
T00523	2.0	EPA SW-846 Method 8151(Modified); Method 3510

Quality control data reviewed and approved by Michael Wierima, Organics Special Chemistry Section Leader
By and for Minnesota Valley Testing Laboratories, Inc.

M. Wierima 06 APR 07

LABORATORIES, Inc.
P.O. BOX 249 1126 N. FRONT STREET
NEW ULM, MN 56073-0249
PHONE (507) 354-8517 WATS (800) 782-3557 FAX (507) 359-2890

QUALITY CONTROL REPORT

Work Order #: 200712-3224
Laboratory #: 07-A9208
Date Reported: 6 April 2007

Analyte	Spike (ppb)	Recovered (ppb)	% Recovery	QC Blank Analyte Concentrations
EPTC	1.00	0.84	84	ND
Trifluralin	1.00	0.85	85	ND
Pramitol	1.00	1.00	100	ND
Atrazine	1.00	0.95	95	ND
Dimethanamid	1.00	1.00	100	ND
Alachlor	1.00	1.00	100	ND
Metolachlor	1.00	0.98	98	ND
Cyanazine	1.00	1.07	107	ND

ND = None Detected

MVTL METHOD I.D.	REVISION	REFERENCE METHOD
B15323	1.8	US EPA SW 846-8141A-3510

Quality control data reviewed and approved by Michael Wierima, Organics Section Leader
By and for Minnesota Valley Testing Laboratories, Inc.

M. Wierima 06 April 07

Underwriters Laboratories Inc.®

Water Quality Report
South Bend Office
110 South Hill Street
South Bend, IN 46617-2702 USA
www.ul.com/water
tel: 1 574 233 4777
fax: 1 574 233 8207
Customer Service: 1 800 332 4345

Laboratory Report

Client: Minnesota Valley Testing Labs

Attn: Nina Lovell
1126 North Front Street
New Ulm, MN 56073

Report: 179020
Priority: Standard Written
Status: Final
PWS ID: Not Supplied

Copies to: None

Sampling Points

1 - Well 18

Sample Information

UL ID #	Client ID	Method	Collected Date / Time	Collected By:	Received Date / Time
1599669	Well 18	7500-Rn B	03/19/07 12:00	Client	03/20/07 08:30
1599670	Well 18	7110 B	03/19/07 12:00	Client	03/20/07 08:30
1599671	Well 18	7500-Ra B	03/19/07 12:00	Client	03/20/07 08:30
1599671	Well 18	7500-Ra D	03/19/07 12:00	Client	03/20/07 08:30
1599672	Well 18	200.8	03/19/07 12:00	Client	03/20/07 08:30

Report Summary

Detailed quantitative results are presented on the following pages.

We appreciate the opportunity to provide you with this analysis. If you have any questions concerning this report, please do not hesitate to call Traci Chlebowski at (574) 233-4777.

Note: This report may not be reproduced, except in full, without written approval from Underwriters Laboratories (UL).

Traci Chlebowski — Authorized Signature
Proj Mgr. — Title
4-11-07 — Date

Client Name: Minnesota Valley Testing Labs
Report #: 179020

ent Name: Minnesota Valley Testing Labs

Report #: 179020

ampling Point: Well 18

PWS ID: Not Supplied

Radionuclides

Analyte ID #	Analyte	Method	Reg Limit	DL**	Result	Units	Preparation Date	Analyzed	UL ID #
7440-61-1	Uranium	200.8	30 *	1.0	< 1.0	ug/L	---	03/21/07 15:17	1599672
---	Gross Alpha	7110 B	15 *	2.3	**8.0 ± 2.4**	pCi/L	03/21/07 12:30	03/23/07 18:07	1599670
---	Gross Beta	7110 B	50 *	2.6	**8.2 ± 2.6**	pCi/L	03/21/07 12:30	03/23/07 18:07	1599670
13982-63-3	Radium-226	7500-Ra B	---	0.4	**1.7 ± 0.6**	pCi/L	03/22/07 10:15	04/04/07 14:01	1599671
5262-20-1	Radium-228	7500-Ra D	---	0.8	**2.0 ± 0.6**	pCi/L	03/22/07 10:15	04/03/07 12:14	1599671
---	Combined Radium	calc.	5 *	N/A	**3.7 ± 0.9**	pCi/L	03/22/07 10:15	04/04/07 14:01	1599671
10043-92-2	Radon-222	7500-Rn B	---	14	**296 ± 18**	pCi/L	03/20/07 13:36	03/20/07 21:13	1599669

Detection Limit (DL) shall be that concentration which can be counted with a precision of plus or minus 100% at the 95 % confidence level.

UL has demonstrated it can achieve these report limits in reagent water, but can not document them in all sample matrices.

Reg Limit Type:	MCL	SMCL	AL
Symbol:	*	^	!

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1126 North Front Street
New Ulm, MN 56073
Phone: (507) 354-8517
Toll Free: (800) 782-3557 Fax: (507) 359-2890

Chain of Custody Record

Page_____of_____.

Work Order # 12-3224

Company Name and Address:
DAVID LOWELL
c/o LIESCH ASSOCIATES, INC
13400 15TH AVE N.
MINNEAPOLIS, MN 55105

Billing Address (indicate if different from above):

Account #:

Contact:

Name of Sampler:

Quote Number

Project Name/Number:

Phone #:

Fax #: For faxed report check box ☐

E-mail: For e-mail report check box ☐

Date Submitted:

Purchase Order #:

Sample Information					Bottle Type												Analysis
Lab Number	Sample ID	Sample Type (Food, Soil, Water, Etc.)	Date Sampled	Time Sampled	VOC Vials	500 ml unpres.	1000 ml unpres.	500 ml HNO3	1000 ml HNO3	500 ml H2SO4	1000 ml H2SO4	Sterile plastic	Amber H2SO4	500 ml NaOH	Filtered? Y or N	Other:	Analysis Required
A9208	WELL 18	WATER	3/19	12:00													SEE ATTACHED LIST

Comments:

KEMSKE PAPER CO. / OSWALD PUBLISHING CO., NEW ULM, MN (800 782-3532) N749

Transferred by:	Date:	Time:	Sample Condition:	Received by:	Date:	Time:	Temp:
1. David Lowell	3/20/07				3-20-07	1003	4
2.	3-20-07	1525					

Please submit the top two copies with your samples. We will return the completed original with your results.

MINNESOTA VALLEY TESTING LABORATORIES, INC.

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MEMBER ACIL

AMENDED REPORT 18 APR 07

DAVID LOWELL
LIESCH ASSOCIATES INC
13400 15TH AVE N
PLYMOUTH MN 55441-4532

Report Date: 18 Apr 07
Lab Number: 07-A9208
Work Order #:12-3224
Account #: 013269
Sample Matrix: GROUNDWATER
Date Sampled: 19 Mar 07 12:00
Date Received: 20 Mar 07 15:25
PO #: DAVE LOWELL

Sample Description: WELL 18

Temp at Receipt: 4.0C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Date Ext / MDA List I					29 Mar 07	SP
Date Ext / MDA List II					26 Mar 07	SP
Water Digestions					26 Mar 07	JMS
pH	7.2	units	1.0	SM 4500 H-B	21 Mar 07 11:05	AKF
Alkalinity, Total	296	mg/L CaCO3	20	SM 2320B 18th Ed	21 Mar 07 10:48	RBK
Gross Alpha	SEE ATTACHED					
Gross Beta	SEE ATTACHED					
Radium 226	SEE ATTACHED					
Radium 228	SEE ATTACHED			EPA M9320		
Radon-222	SEE ATTACHED					
Hardness, Total as CaCO3	328	mg/L	NA	2340.B	26 Mar 07 11:11	Calculated
Nitrate	< 0.2	mg/L as N	NA	353.2	23 Mar 07 13:43	Calculated
Fluoride	0.27	mg/L	0.10	SM 18th ED 4500-F C	23 Mar 07 3:24	JD
Sulfate	20.7	mg/L	4.0	375.4	22 Mar 07 12:41	DAP
Chloride	< 3	mg/L	3	325.2	30 Mar 07 11:20	DAP
Nitrate+Nitrite	< 0.2	mg/L as N	0.2	353.2	23 Mar 07 13:43	DAP
Nitrite	< 0.05	mg/L as N	0.05	USGS I-4540-85	21 Mar 07 9:20	DAP
Mercury	< 0.02	ug/L	0.02	245.7 Draft	22 Mar 07 10:53	CJR
Solids, Total Dissolved	304	mg/L	1	SM 2540C	25 Mar 07 11:17	AKF
Calcium	88.00	mg/L	0.500	6010	26 Mar 07 11:11	CJR
Magnesium	26.30	mg/L	0.500	6010	26 Mar 07 11:11	CJR
Sodium	4.790	mg/L	0.500	6010	26 Mar 07 11:11	CJR
Barium	0.113	mg/L	0.005	6010	26 Mar 07 11:11	CJR
Chromium	< 0.01	mg/L	0.01	6010	26 Mar 07 11:11	CJR
Iron	0.671	mg/L	0.015	6010	26 Mar 07 11:11	CJR
Manganese	0.029	mg/L	0.005	6010	26 Mar 07 11:11	CJR
Silver	< 0.005	mg/L	0.005	6010	26 Mar 07 11:11	CJR
Arsenic	< 0.5	ug/L	0.5	200.8	27 Mar 07 11:43	TB
Cadmium	0.13	ug/L	0.10	200.8	27 Mar 07 11:43	TB
Lead	0.64	ug/L	0.50	200.8	27 Mar 07 11:43	TB
Selenium	1.32	ug/L	0.50	200.8	27 Mar 07 11:43	TB
Thallium	< 0.1	ug/L	0.1	200.8	27 Mar 07 11:43	TB
2,4-D	< 0.9	ug/L	0.3	MDA-EA-WA200	4 Apr 07	RB
2,4-DB	< 0.9	ug/L	0.3	MDA-EA-WA200	4 Apr 07	RB
Dicamba	< 0.9	ug/L	0.3	MDA-EA-WA200	4 Apr 07	RB
MCPA	< 0.9	ug/L	0.3	MDA-EA-WA200	4 Apr 07	RB
Picloram	< 0.9	ug/L	0.3	MDA-EA-WA200	4 Apr 07	RB
2,4,5-T	< 0.3	ug/L	0.1	MDA-EA-WA200	4 Apr 07	RB
2,4,5-TP	< 0.9	ug/L	0.3	MDA-EA-WA200	4 Apr 07	RB
Triclopyr	< 0.9	ug/L	0.3	MDA-EA-WA200	4 Apr 07	RB

RL = Reporting Limit

Elevated "Less Than Result" (<): @ = Due to sample matrix
! = Due to sample quantity
= Due to sample concentration
+ = Due to extract volume

CERTIFICATION: MN LAB # 027-015-125 WI LAB # 999447680 ND MICRO # 1013-M ND WW/DW # R-040 IA LAB #: 132 IA LAB #: 022

MVTL guarantees the accuracy of the analysis done on the sample submitted for testing. It is not possible for MVTL to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by MVTL. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

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MEMBER ACIL

AMENDED REPORT 18 APR 07

DAVID LOWELL
LIESCH ASSOCIATES INC
13400 15TH AVE N
PLYMOUTH MN 55441-4532

Report Date: 18 Apr 07
Lab Number: 07-A9208
Work Order #:12-3224
Account #: 013269
Sample Matrix: GROUNDWATER
Date Sampled: 19 Mar 07 12:00
Date Received: 20 Mar 07 15:25
PO #: DAVE LOWELL

Sample Description: WELL 18

Temp at Receipt: 4.0C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Bentazon	< 0.9	ug/L	0.3	MDA-EA-WA200	4 Apr 07	RB
Acetochlor	< 1.5	ug/L	0.5	3510/GCMS	3 Apr 07	RB
Alachlor (Lasso)	< 1.5	ug/L	0.5	3510/GCMS	3 Apr 07	RB
Atrazine (Aatrex)	< 1.5	ug/L	0.5	3510/GCMS	3 Apr 07	RB
Chlorpyrifos (Lorsban)	< 1.5	ug/L	0.5	3510/GCMS	3 Apr 07	RB
Cyanazine (Bladex)	< 0.6	ug/L	0.2	3510/GCMS	3 Apr 07	RB
Deethylatrazine	< 1.5	ug/L	0.5	3510/GCMS	3 Apr 07	RB
Deisopropylatrazine	< 1.5	ug/L	0.5	3510/GCMS	3 Apr 07	RB
Dimethenamid (Frontier)	< 1.5	ug/L	0.5	3510/GCMS	3 Apr 07	RB
EPTC (Eradicane)	< 1.5	ug/L	0.5	3510/GCMS	3 Apr 07	RB
Ethalfluralin (Sonalan)	< 1.5	ug/L	0.5	3510/8080M	3 Apr 07	RB
Fonofos (Dyphonate)	< 1.5	ug/L	0.5	3510/GCMS	3 Apr 07	RB
Metolachlor (Dual)	< 1.5	ug/L	0.5	3510/GCMS	3 Apr 07	RB
Metribuzin (Sencor, Lexone)	< 1.5	ug/L	0.5	3510/GCMS	3 Apr 07	RB
Pendimethalin (Prowl)	< 1.5	ug/L	0.5	3510/GCMS	3 Apr 07	RB
Phorate (Thimet)	< 0.9	ug/L	0.3	3510/GCMS	3 Apr 07	RB
Prometon (Pramitol)	< 1.5	ug/L	0.5	3510/GCMS	3 Apr 07	RB
Propachlor (Ramrod)	< 1.5	ug/L	0.5	3510/GCMS	3 Apr 07	RB
Propazine (Milogard)	< 1.5	ug/L	0.5	3510/GCMS	3 Apr 07	RB
Simazine (Princep)	< 1.5	ug/L	0.5	3510/GCMS	3 Apr 07	RB
Terbufos (Counter)	< 0.6	ug/L	0.2	3510/GCMS	3 Apr 07	RB
Tri-Allate (Far-Go)	< 1.5	ug/L	0.5	3510/GCMS	3 Apr 07	RB
Trifluralin (Treflan)	< 1.5	ug/L	0.5	3510/GCMS	3 Apr 07	RB

ATRAZINE-D5 SURROGATE RECOVERY: 91 %

TRIPHENYLPHOSPHATE SURROGATE RECOVERY: 99 %

DCAA SURROGATE RECOVERY: 109 %

Approved by: Jason G. Smith, Inorganic Laboratory Manager New Ulm, MN

Dan O'Connell, Organic Laboratory Manager New Ulm, MN

RL = Reporting Limit

Elevated "Less Than Results" (<): @ = Due to sample matrix
! = Due to sample quantity
= Due to sample concentration
* = Due to extract volume

CERTIFICATION: MN LAB # 027-015-125 WI LAB # 999447680 ND MICRO # 1C13-M ND WW/DW # R-040 IA LAB #: 132 IA LAB #: 022

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35 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
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MEMBER ACIL

AMENDED REPORT 18 APR 07

DAVID LOWELL
LIESCH ASSOCIATES INC
13400 15TH AVE N
PLYMOUTH MN 55441-4532

Report Date: 18 Apr 07
Lab Number: 07-A9208
Work Order: 12-3224
Account #: 013269
Sample Matrix: GROUNDWATER
Date Sampled: 19 Mar 07 12:00
Sampled By:
Date Received: 20 Mar 07 15:25
PO #: DAVE LOWELL

Sample Description: WELL 18

Temp at Receipt: 4.0C

	CAS #	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Acetone	67-64-1	< 10	ug/L	10	SW8260B	29 Mar 07	DWR
Allyl Chloride	107-05-1	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Benzene	71-43-2	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Bromobenzene	108-86-1	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Bromochloromethane	74-97-5	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Bromodichloromethane	75-27-4	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Bromoform	75-25-2	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Bromomethane	74-83-9	< 2	ug/L	2	SW8260B	29 Mar 07	DWR
n-Butylbenzene	104-51-8	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
sec-Butylbenzene	135-98-8	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
t-Butylbenzene	98-06-6	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Carbon Tetrachloride	56-23-5	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Chlorobenzene	108-90-7	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Chlorodibromomethane	124-48-1	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Chloroethane	75-00-3	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Chloroform	67-66-3	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Chloromethane	74-87-3	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
2-Chlorotoluene	95-49-8	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
4-Chlorotoluene	106-43-4	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Cumene	98-82-8	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,2-Dibromo-3-chloropropane	96-12-8	< 2	ug/L	2	SW8260B	29 Mar 07	DWR
1,2-Dibromoethane	106-93-4	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Dibromomethane	74-95-3	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,2-Dichlorobenzene	95-50-1	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,3-Dichlorobenzene	541-73-1	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,4-Dichlorobenzene	106-46-7	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Dichlorodifluoromethane	75-71-8	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,1-Dichloroethane	75-34-3	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,2-Dichloroethane	107-06-2	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,1-Dichloroethene	75-35-4	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
cis-1,2-Dichloroethene	156-59-2	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
trans-1,2-Dichloroethene	156-60-5	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Dichlorofluoromethane	75-43-4	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,2-Dichloropropane	78-87-5	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,3-Dichloropropane	142-28-9	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
2,2-Dichloropropane	594-20-7	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,1-Dichloropropene	563-58-6	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
cis-1,3-Dichloropropene	10061-01-5	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
trans-1,3-Dichloropropene	10061-02-6	< 1	ug/L	1	SW8260B	29 Mar 07	DWR

RL = Reporting Limit

Elevated "Less Than Result" (<): @ = Due to sample matrix
' = Due to sample quantity
= Due to sample concentration
* = Due to extract volume

CERTIFICATION: MN LAB # 027-035-125 WI LAB # 999497680 ND MUNI # 1013-M ND WW/DW # R-040 IA LAB #: 132 IA LAB #: 022

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MEMBER ACIL

AMENDED REPORT 18 APR 07

DAVID LOWELL
LIESCH ASSOCIATES INC
13400 15TH AVE N
PLYMOUTH MN 55441-4532

Report Date: 18 Apr 07
Lab Number: 07-A9208
Work Order: 12-3224
Account #: 013269
Sample Matrix: GROUNDWATER
Date Sampled: 19 Mar 07 12:00
Sampled By:
Date Received: 20 Mar 07 15:25
PO #: DAVE LOWELL

Sample Description: WELL 18

Temp at Receipt: 4.0C

	CAS #	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Ethyl Benzene	100-41-4	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Ethyl Ether	60-29-7	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Hexachlorobutadiene	87-68-3	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
p-Isopropyltoluene	99-87-6	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Methyl Ethyl Ketone	78-93-3	< 5	ug/L	5	SW8260B	29 Mar 07	DWR
Methyl Isobutyl Ketone	108-10-1	< 2	ug/L	2	SW8260B	29 Mar 07	DWR
Methyl tert-butyl Ether	1634-04-4	< 2	ug/L	2	SW8260B	29 Mar 07	DWR
Methylene Chloride	75-09-2	< 2	ug/L	2	SW8260B	29 Mar 07	DWR
Naphthalene	91-20-3	< 2	ug/L	2	SW8260B	29 Mar 07	DWR
n-Propylbenzene	103-65-1	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Styrene	100-42-5	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,1,1,2-Tetrachloroethane	630-20-6	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,1,2,2-Tetrachloroethane	79-34-5	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Tetrachloroethene	127-18-4	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Tetrahydrofuran	109-99-9	< 5	ug/L	5	SW8260B	29 Mar 07	DWR
Toluene	108-88-3	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,2,3-Trichlorobenzene	87-61-6	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,2,4-Trichlorobenzene	120-82-1	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,1,1-Trichloroethane	71-55-6	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,1,2-Trichloroethane	79-00-5	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Trichloroethene	79-01-6	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Trichlorofluoromethane	75-69-4	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,2,3-Trichloropropane	96-18-4	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Trichlorotrifluoroethane	76-13-1	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,2,4-Trimethylbenzene	95-63-6	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,3,5-Trimethylbenzene	108-67-8	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Vinyl Chloride	75-01-4	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
m-Xylene and p-Xylene	136777-61-2	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
o-Xylene	95-47-6	< 1	ug/L	1	SW8260B	29 Mar 07	DWR

DIBROMOFLUOROMETHANE (SURROGATE) RECOVERY: 95 %
TOLUENE-d8 (SURROGATE) RECOVERY: 97 %
4-BROMOFLUOROBENZENE (SURROGATE) RECOVERY: 98 %

Approved by: R. Dan O'Connell
Dan O'Connell, Organic
Laboratory Manager New Ulm, MN

RL = Reporting Limit

Elevated "Less Than Result" (<): @ = Due to sample matrix
! = Due to sample quantity
= Due to sample concentration
* = Due to extract volume

CERTIFICATION: MN LAB # 027-015-125 WI LAB # 999447680 ND MICRO # 1013-M ND WW/DW # R-040 IA LAB #: 132 IA LAB #: 022

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MEMBER ACIL

DAVID LOWELL
LIESCH ASSOCIATES INC
13400 15TH AVE N
PLYMOUTH MN 55441-4532

Report Date: 15 Apr 07
Lab Number: 07-A9209
Work Order: 12-3224
Account #: 013269
Sample Matrix: GROUNDWATER
Date Sampled: 19 Mar 07
Sampled By:
Date Received: 20 Mar 07 15:25
PO #: DAVE LOWELL

Sample Description: TRIP BLANK

Temp at Receipt: 4.0C

	CAS #	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Acetone	67-64-1	< 10	ug/L	10	SW8260B	29 Mar 07	DWR
Allyl Chloride	107-05-1	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Benzene	71-43-2	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Bromobenzene	108-86-1	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Bromochloromethane	74-97-5	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Bromodichloromethane	75-27-4	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Bromoform	75-25-2	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Bromomethane	74-83-9	< 2	ug/L	2	SW8260B	29 Mar 07	DWR
n-Butylbenzene	104-51-8	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
sec-Butylbenzene	135-98-8	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
t-Butylbenzene	98-06-6	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Carbon Tetrachloride	56-23-5	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Chlorobenzene	108-90-7	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Chlorodibromomethane	124-48-1	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Chloroethane	75-00-3	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Chloroform	67-66-3	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Chloromethane	74-87-3	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
2-Chlorotoluene	95-49-8	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
4-Chlorotoluene	106-43-4	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Cumene	98-82-8	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,2-Dibromo-3-chloropropane	96-12-8	< 2	ug/L	2	SW8260B	29 Mar 07	DWR
1,2-Dibromoethane	106-93-4	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Dibromomethane	74-95-3	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,2-Dichlorobenzene	95-50-1	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,3-Dichlorobenzene	541-73-1	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,4-Dichlorobenzene	106-46-7	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Dichlorodifluoromethane	75-71-8	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,1-Dichloroethane	75-34-3	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,2-Dichloroethane	107-06-2	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,1-Dichloroethene	75-35-4	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
cis-1,2-Dichloroethene	156-59-2	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
trans-1,2-Dichloroethene	156-60-5	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Dichlorofluoromethane	75-43-4	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,2-Dichloropropane	78-87-5	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,3-Dichloropropane	142-28-9	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
2,2-Dichloropropane	594-20-7	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,1-Dichloropropene	563-58-6	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
cis-1,3-Dichloropropene	10061-01-5	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
trans-1,3-Dichloropropene	10061-02-6	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Ethyl Benzene	100-41-4	< 1	ug/L	1	SW8260B	29 Mar 07	DWR

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= Due to sample concentration
+ = Due to extract volume

CERTIFICATION: MN LAB # 027-015-125 WI LAB # 999447680 ND MICRO # 1013-M ND WW/DW # R-040 IA LAB #: 132 IA LAB #: 022

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MEMBER ACIL

Report Date: 15 Apr 07
Lab Number: 07-A9209
Work Order: 12-3224
Account #: 013269
Sample Matrix: GROUNDWATER
Date Sampled: 19 Mar 07
Sampled By:
Date Received: 20 Mar 07 15:25
PO #: DAVE LOWELL

DAVID LOWELL
LIESCH ASSOCIATES INC
13400 15TH AVE N
PLYMOUTH MN 55441-4532

Sample Description: TRIP BLANK

Temp at Receipt: 4.0C

	CAS #	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Ethyl Ether	60-29-7	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Hexachlorobutadiene	87-68-3	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
p-Isopropyltoluene	99-87-6	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Methyl Ethyl Ketone	78-93-3	< 5	ug/L	5	SW8260B	29 Mar 07	DWR
Methyl Isobutyl Ketone	108-10-1	< 2	ug/L	2	SW8260B	29 Mar 07	DWR
Methyl tert-butyl Ether	1634-04-4	< 2	ug/L	2	SW8260B	29 Mar 07	DWR
Methylene Chloride	75-09-2	< 2	ug/L	2	SW8260B	29 Mar 07	DWR
Naphthalene	91-20-3	< 2	ug/L	2	SW8260B	29 Mar 07	DWR
n-Propylbenzene	103-65-1	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Styrene	100-42-5	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,1,1,2-Tetrachloroethane	630-20-6	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,1,2,2-Tetrachloroethane	79-34-5	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Tetrachloroethene	127-18-4	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Tetrahydrofuran	109-99-9	< 5	ug/L	5	SW8260B	29 Mar 07	DWR
Toluene	108-88-3	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,2,3-Trichlorobenzene	87-61-6	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,2,4-Trichlorobenzene	120-82-1	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,1,1-Trichloroethane	71-55-6	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,1,2-Trichloroethane	79-00-5	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Trichloroethene	79-01-6	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Trichlorofluoromethane	75-69-4	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,2,3-Trichloropropane	96-18-4	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Trichlorotrifluoroethane	76-13-1	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,2,4-Trimethylbenzene	95-63-6	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
1,3,5-Trimethylbenzene	108-67-8	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
Vinyl Chloride	75-01-4	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
m-Xylene and p-Xylene	136777-61-2	< 1	ug/L	1	SW8260B	29 Mar 07	DWR
o-Xylene	95-47-6	< 1	ug/L	1	SW8260B	29 Mar 07	DWR

DIBROMOFLUOROMETHANE (SURROGATE) RECOVERY: 95 %
TOLUENE-d8 (SURROGATE) RECOVERY: 97 %
4-BROMOFLUOROBENZENE (SURROGATE) RECOVERY: 99 %

Approved by: R. Dan O'Connell
Dan O'Connell, Organic
Laboratory Manager New Ulm, MN

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CERTIFICATION: MN LAB # 027-015-125 WI LAB # 999447680 ND MICRO # 1013-M ND WW/DW # R-040 IA LAB #: 132 IA LAB #: 022

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MEMBER ACIL

Name: Dave Lowell
Company Name: Liesch Associates
Address: 13400 15th Ave N
Plymouth, MN 55441
Phone: 800-338-7914
Requested Turnaround Time: Standard
Date: March 19,2007

Quote Number: 3-19-07NJL
Project Manager: Dave Lowell
Project Name: Well Testing
Account Number: 013269
Fax: 763-559-2202
Terms: Net 15 Days
Expiration Date: December 31, 2007

Quantity	Sample Matrix	Analyte	Unit Cost	Total Cost
1	Water	Radium 226 & 228	$222.00	$222.00
1	Water	Gross Alpha & Beta	$78.00	$78.00
1	Water	Radon 222	$90.00	$90.00
1	Water	Alkalinity	$14.00	$14.00
1	Water	Arsenic	$23.00	$23.00
1	Water	Barium	$16.00	$16.00
1	Water	Cadmium	$23.00	$23.00
1	Water	Calcium	$16.00	$16.00
1	Water	Chloride	$14.00	$14.00
1	Water	Chromium	$16.00	$16.00
1	Water	Fluoride	$16.50	$16.50
1	Water	Total Hardness	Calculation	$0.00
1	Water	Iron	$16.00	$16.00
1	Water	Lead	$23.00	$23.00
1	Water	Magnesium	$16.00	$16.00
1	Water	Manganese	$16.00	$16.00
1	Water	Mercury	$39.00	$39.00
1	Water	Nitrate-Nitrogen	$28.00	$28.00
1	Water	Selenium	$16.00	$16.00
1	Water	Silver	$23.00	$23.00
1	Water	TDS	$16.50	$16.50
1	Water	Sulfate	$14.00	$14.00
1	Water	Thallium	$16.00	$16.00
1	Water	pH	$6.50	$6.50
1	Water	VOCs-method 465F	$120.00	$120.00

Continued on next page

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MEMBER ACIL

Name: Dave Lowell
Company Name: Liesch Associates
Address: 13400 15th Ave N
Plymouth, MN 55441
Phone: 800-338-7914
Requested Turnaround Time: Standard
Date: March 19,2007

Quote Number: 3-19-07NJL
Project Manager: Dave Lowell
Project Name: Well Testing
Account Number: 013269
Fax: 763-559-2202
Terms: Net 15 Days
Expiration Date: December 31, 2007

Quantity	Sample Matrix	Analyte	Unit Cost	Total Cost
1	Water	MN List 1	$175.00	
1	Water	MN List 2	$200.00	$200.00
1	Water	Sodium	$16.00	$16.00
			Total:	$1,094.50

Comments:

Quoted by: Nina Lovell

Accepted by: _____

Date: _____

Signature: Nina Lovell

Signature: _____

Title: Customer Service

Title: _____

MVTL guarantees the accuracy of the analysis done on the sample submitted for testing. It is not possible for MVTL to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by MVTL. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

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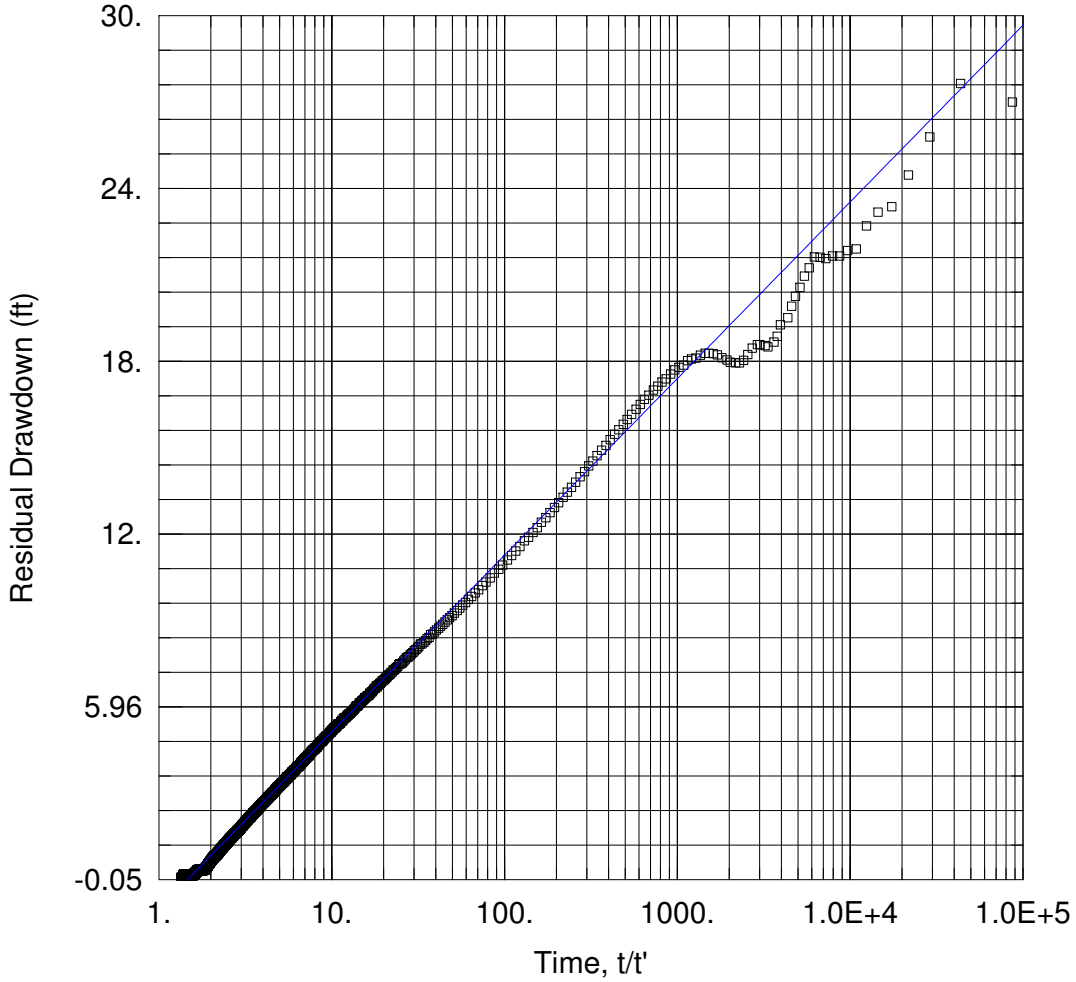


LAKEVILLE WELL 19 RECOVERY TEST

Data Set: P:\Mpls\23 MN\19\2319A84 Lakeville Well 19\WorkFiles\Pumping Test\Well 19 Recovery.aqt
Date: 08/04/11 Time: 15:48:08

PROJECT INFORMATION

Company: Barr Engineering Company
Client: City of Lakeville
Project: 23/19-0A84.00
Location: Lakeville, MN
Test Well: Well 19
Test Date: 12/18-22/2008

AQUIFER DATA

Saturated Thickness: 305. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
Well 19	0	1.44

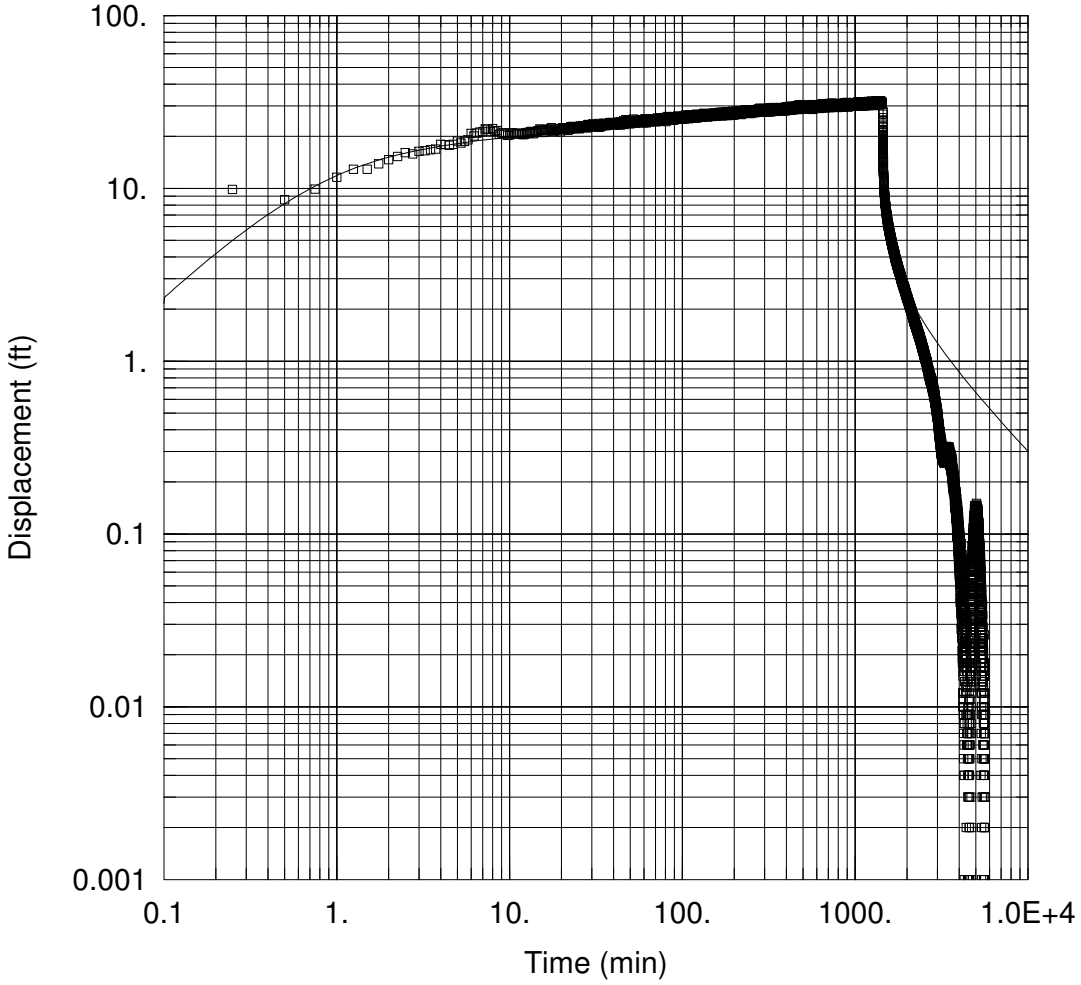
Observation Wells

Well Name	X (ft)	Y (ft)
▫ Well 19	0	1.44

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 6889.2 ft^2/day S/S' = 1.493



LAKEVILLE WELL 19 PUMPING TEST - WELL 19 RESPONSE

Data Set: P:\...\Well 19 Test_Well 19 Only.aqt
Date: 08/04/11 Time: 15:49:21

PROJECT INFORMATION

Company: Barr Engineering Company
Client: City of Lakeville
Project: 23/19-0A84.00
Location: Lakeville, MN
Test Well: Well 19
Test Date: 12/18-22/2008

AQUIFER DATA

Saturated Thickness: 305. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
Well 19	527437.787	183368.03

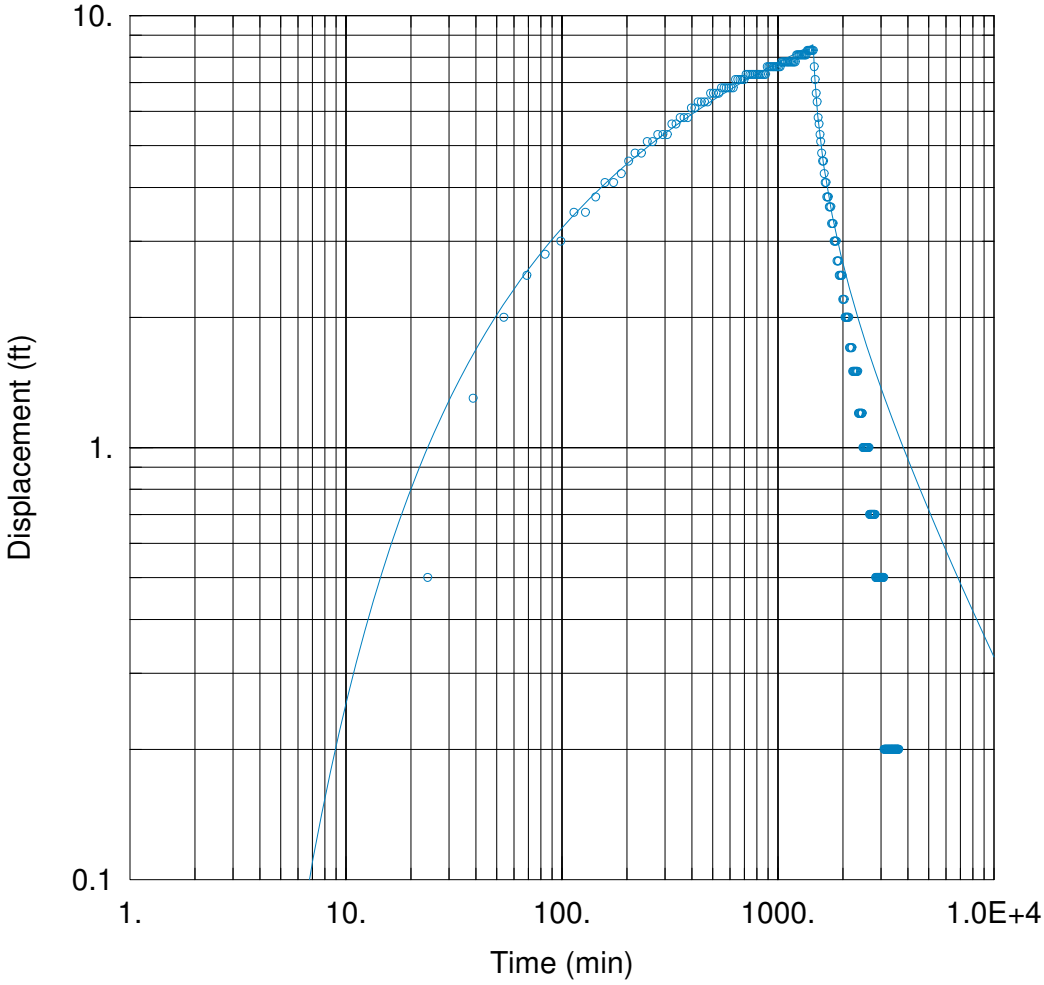
Observation Wells

Well Name	X (ft)	Y (ft)
▫ Well 19	527437.787	183368.03

SOLUTION

Aquifer Model: Confined Solution Method: Papadopulos-Cooper

T = 9584.1 ft^2/day S = 0.002
r(w) = 1.44 ft r(c) = 1.44 ft



LAKEVILLE WELL 19 PUMPING TEST - WELL 2 RESPONSE

Data Set: P:\...\Well 19 Test_Well 2 Only.aqt
Date: 08/04/11 Time: 15:48:45

PROJECT INFORMATION

Company: Barr Engineering Company
Client: City of Lakeville
Project: 23/19-0A84.00
Location: Lakeville, MN
Test Well: Well 19
Test Date: 12/18-22/2008

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
Well 19	527437.787	183368.03

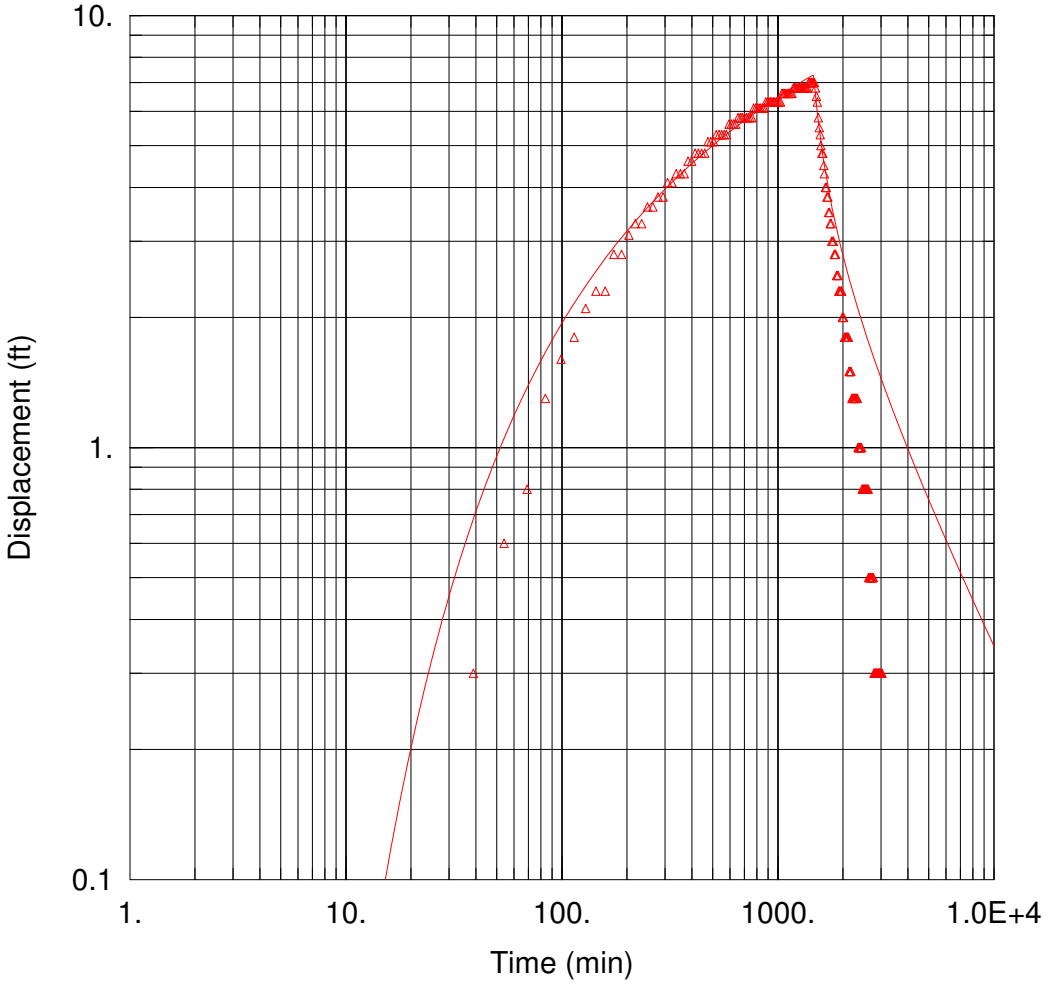
Observation Wells

Well Name	X (ft)	Y (ft)
○ Well 2	527019.865	184955.294

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 8793.1 ft^2/day
S = 0.0001253
Kz/Kr = 0.1
b = 305. ft



LAKEVILLE WELL 19 PUMPING TEST - WELL 4 RESPONSE

Data Set: P:\...\Well 19 Test_Well 4 Only.aqt
Date: 08/04/11 Time: 15:49:04

PROJECT INFORMATION

Company: Barr Engineering Company
Client: City of Lakeville
Project: 23/19-0A84.00
Location: Lakeville, MN
Test Well: Well 19
Test Date: 12/18-22/2008

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
Well 19	527437.787	183368.03

Observation Wells

Well Name	X (ft)	Y (ft)
△ Well 4	526567.257	185888.67

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 8281.1 ft^2/day
S = 0.0001015
Kz/Kr = 1.
b = 305. ft

Attachment C

Model parameter Sensitivity Analysis

Table C1
Sensitivity Analysis Results

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 25 Kx25

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.515006	101601.1582	0.185298	0	0	2.90087E+13	-1.45043E+13
2	0.3	1.45E+13	6053.440086	101604.036	0.277057	0	0	2.07217E+13	-1.45052E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.798658	101591.9736	-0.091904	0	0	4.83391E+13	-1.45017E+13
5	1.5	1.45E+13	6053.856426	101590.0224	-0.148466	0	0	2.90024E+13	-1.45012E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 25 Kz 25

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.713119	101595.1493	0.000015	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.709509	101595.1527	0.000039	0	0	2.07181E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.716787	101595.1416	-0.000034	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.717272	101595.1422	-0.000035	0	0	2.90053E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 15 Kx 15

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6031.411835	101688.5287	-0.201201	0	0	2.90592E+13	-1.45296E+13
2	0.3	1.45E+13	6023.255381	101748.1326	-0.335837	0	0	2.07811E+13	-1.45468E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6068.258298	101555.8393	0.07914	0	0	4.83042E+13	-1.44913E+13
5	1.5	1.45E+13	6077.566623	101533.4767	0.122646	0	0	2.89695E+13	-1.44848E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 15 Kz 15

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.683071	101595.6286	-0.000169	0	0	2.90055E+13	-1.45028E+13
2	0.3	1.45E+13	6053.638989	101596.2928	-0.000343	0	0	2.07185E+13	-1.4503E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.712338	101595.0162	-0.000073	0	0	4.8342E+13	-1.45026E+13
5	1.5	1.45E+13	6053.711283	101594.9495	-0.000096	0	0	2.90052E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 138 Kx 138

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.717493	101596.0191	-0.009949	0	0	2.90058E+13	-1.45029E+13
2	0.3	1.45E+13	6053.726646	101596.4394	-0.014705	0	0	2.07186E+13	-1.4503E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.685049	101594.622	0.004358	0	0	4.83416E+13	-1.45025E+13
5	1.5	1.45E+13	6053.678804	101594.3187	0.007622	0	0	2.90048E+13	-1.45024E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 138 Kz 138

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.724993	101595.4484	-0.004374	0	0	2.90054E+13	-1.45027E+13
2	0.3	1.45E+13	6053.734849	101595.6501	-0.007738	0	0	2.07183E+13	-1.45028E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.693589	101594.9899	0.001157	0	0	4.8342E+13	-1.45026E+13
5	1.5	1.45E+13	6053.68689	101594.9152	0.001955	0	0	2.90051E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 137 Kx 137

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.685023	101599.9865	-0.028798	0	0	2.9008E+13	-1.4504E+13
2	0.3	1.45E+13	6053.671478	101602.3829	-0.042283	0	0	2.0721E+13	-1.45047E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.690377	101592.6259	0.014666	0	0	4.83397E+13	-1.45019E+13
5	1.5	1.45E+13	6053.688595	101591.1105	0.024855	0	0	2.9003E+13	-1.45015E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 137 Kz 137

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.71873	101595.8063	0.00446	0	0	2.90056E+13	-1.45028E+13
2	0.3	1.45E+13	6053.722322	101596.2339	0.00826	0	0	2.07185E+13	-1.45029E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.694222	101594.8531	-0.001603	0	0	4.83418E+13	-1.45026E+13
5	1.5	1.45E+13	6053.68884	101594.7131	-0.002291	0	0	2.9005E+13	-1.45025E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 141 Kx 141

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.703939	101597.8985	0.110318	0	0	2.90068E+13	-1.45034E+13
2	0.3	1.45E+13	6053.713063	101599.2006	0.160942	0	0	2.07197E+13	-1.45038E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.699767	101593.6452	-0.059398	0	0	4.83407E+13	-1.45022E+13
5	1.5	1.45E+13	6053.690623	101592.7112	-0.098144	0	0	2.90039E+13	-1.45019E+13

Table C1
Sensitivity Analysis Results

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 141 Kz 141

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.705892	101595.1495	0.000173	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.695055	101595.1617	0.000908	0	0	2.07181E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.71855	101595.1436	-0.000018	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.719747	101595.1435	-0.000014	0	0	2.90053E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 135 Kx 135

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.71267	101595.1597	-0.000087	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.713858	101595.17	-0.000088	0	0	2.07181E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.707583	101595.1129	-0.000045	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.707586	101595.1062	-0.000031	0	0	2.90052E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 135 Kz 135

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.72127	101595.1709	0.001418	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.734303	101595.2062	0.00306	0	0	2.07181E+13	-1.45027E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.710097	101595.1284	-0.000367	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.708889	101595.1251	-0.0005	0	0	2.90053E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 258 Kx 258

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6054.483383	101611.1453	0.538402	0	0	2.90144E+13	-1.45072E+13
2	0.3	1.45E+13	6054.839889	101618.9252	0.799368	0	0	2.07277E+13	-1.45094E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.245954	101587.1533	-0.2637	0	0	4.83345E+13	-1.45004E+13
5	1.5	1.45E+13	6053.496362	101582.3749	-0.422469	0	0	2.8998E+13	-1.4499E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 258 Kz 258

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.482773	101595.5641	0.039166	0	0	2.90055E+13	-1.45028E+13
2	0.3	1.45E+13	6053.28356	101595.9735	0.07857	0	0	2.07184E+13	-1.45029E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.770171	101594.9853	-0.01042	0	0	4.8342E+13	-1.45026E+13
5	1.5	1.45E+13	6053.799493	101594.9116	-0.015944	0	0	2.90051E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 250 Kx 250

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.647939	101595.1073	-0.013048	0	0	2.90052E+13	-1.45026E+13
2	0.3	1.45E+13	6053.608479	101595.0754	-0.02099	0	0	2.0718E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.721486	101595.1099	0.005598	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.735243	101595.1082	0.009303	0	0	2.90052E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 250 Kz 250

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.708569	101595.132	-0.000056	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.707707	101595.131	-0.000067	0	0	2.0718E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.715643	101595.143	-0.000033	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.715419	101595.1434	-0.000036	0	0	2.90053E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 249 Kx 249

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6052.288318	101594.2218	-0.035727	0	0	2.90048E+13	-1.45024E+13
2	0.3	1.45E+13	6051.672498	101593.8303	-0.052216	0	0	2.07175E+13	-1.45023E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6054.476934	101595.6017	0.018798	0	0	4.83425E+13	-1.45028E+13
5	1.5	1.45E+13	6054.97998	101595.9365	0.032287	0	0	2.90057E+13	-1.45029E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 249 Kz 249

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6052.920865	101594.6	-0.009834	0	0	2.9005E+13	-1.45025E+13
2	0.3	1.45E+13	6052.289317	101594.1797	-0.018597	0	0	2.07177E+13	-1.45024E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.95262	101595.278	0.002444	0	0	4.83422E+13	-1.45027E+13
5	1.5	1.45E+13	6054.077297	101595.3589	0.004041	0	0	2.90054E+13	-1.45027E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 252 Kx 252

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.716792	101601.5131	-0.059491	0	0	2.90089E+13	-1.45044E+13
2	0.3	1.45E+13	6053.714845	101604.5523	-0.089089	0	0	2.07219E+13	-1.45053E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.676557	101591.8158	0.028879	0	0	4.8339E+13	-1.45017E+13
5	1.5	1.45E+13	6053.669305	101589.8049	0.047479	0	0	2.90022E+13	-1.45011E+13

Table C1
Sensitivity Analysis Results

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 252 Kz 252

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.706599	101595.3204	0.000654	0	0	2.90054E+13	-1.45027E+13
2	0.3	1.45E+13	6053.696495	101595.5171	0.000986	0	0	2.07182E+13	-1.45027E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.706837	101595.0808	-0.000325	0	0	4.8342E+13	-1.45026E+13
5	1.5	1.45E+13	6053.705353	101595.0505	-0.000417	0	0	2.90052E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 256 Kx 256

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6054.298408	101619.2505	-0.012321	0	0	2.9019E+13	-1.45095E+13
2	0.3	1.45E+13	6055.035452	101630.7099	-0.018215	0	0	2.07325E+13	-1.45128E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.721361	101582.7816	0.005742	0	0	4.83304E+13	-1.44991E+13
5	1.5	1.45E+13	6053.735046	101575.2323	0.009986	0	0	2.89939E+13	-1.4497E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 256 Kz 256

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.721441	101596.1647	-0.000955	0	0	2.90058E+13	-1.45029E+13
2	0.3	1.45E+13	6053.719854	101597.164	-0.002311	0	0	2.07189E+13	-1.45032E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.711489	101594.8704	0.000172	0	0	4.83419E+13	-1.45026E+13
5	1.5	1.45E+13	6053.701013	101594.6873	0.000352	0	0	2.9005E+13	-1.45025E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 260 Kx 260

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6057.556145	101594.7789	-0.044091	0	0	2.90051E+13	-1.45026E+13
2	0.3	1.45E+13	6059.519121	101595.1597	-0.065465	0	0	2.07181E+13	-1.45027E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6054.933033	101595.6828	0.022713	0	0	4.83426E+13	-1.45028E+13
5	1.5	1.45E+13	6056.409152	101596.1577	0.037332	0	0	2.90058E+13	-1.45029E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 260 Kz 260

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.719451	101595.1111	-0.000336	0	0	2.90052E+13	-1.45026E+13
2	0.3	1.45E+13	6053.744702	101595.1013	-0.000487	0	0	2.0718E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.701781	101595.1287	-0.000029	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.700317	101595.1322	0.000004	0	0	2.90053E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 254 Kx 254

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.746678	101595.1508	0.00082	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.769828	101595.1661	0.001429	0	0	2.07181E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.685727	101595.1112	-0.000525	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.673906	101595.1009	-0.000927	0	0	2.90052E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 254 Kz 254

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.716306	101595.1391	-0.000027	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.716731	101595.1384	-0.000222	0	0	2.0718E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.705074	101595.1258	-0.000065	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.703946	101595.125	-0.000062	0	0	2.90053E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 253 Kx 253

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.486736	101594.935	0.004414	0	0	2.90052E+13	-1.45026E+13
2	0.3	1.45E+13	6053.391749	101594.8652	0.005367	0	0	2.0718E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.799981	101595.2074	-0.00306	0	0	4.83422E+13	-1.45026E+13
5	1.5	1.45E+13	6053.856197	101595.2619	-0.005586	0	0	2.90053E+13	-1.45027E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 253 Kz 253

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.701419	101595.1271	0.000414	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.692835	101595.1215	0.000949	0	0	2.0718E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.712283	101595.1345	-0.000191	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.711237	101595.1309	-0.000251	0	0	2.90053E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 362 Kx 362

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6054.024775	101610.3278	0.289358	0	0	2.90139E+13	-1.4507E+13
2	0.3	1.45E+13	6054.186048	101617.5016	0.414787	0	0	2.07271E+13	-1.4509E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.602456	101587.3033	-0.154652	0	0	4.83347E+13	-1.45004E+13
5	1.5	1.45E+13	6054.02001	101582.5028	-0.253139	0	0	2.89981E+13	-1.4499E+13

Table C1
Sensitivity Analysis Results

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 362 Kz 362

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.702135	101595.1718	0.001162	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.683369	101595.2107	0.004747	0	0	2.07181E+13	-1.45027E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.722889	101595.1414	-0.00016	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.709523	101595.1136	-0.000662	0	0	2.90052E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 339 Kx 339

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.681191	101596.0992	-0.033215	0	0	2.90058E+13	-1.45029E+13
2	0.3	1.45E+13	6053.669774	101596.5223	-0.048139	0	0	2.07186E+13	-1.4503E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.702678	101594.5476	0.017619	0	0	4.83415E+13	-1.45025E+13
5	1.5	1.45E+13	6053.707253	101594.2032	0.029659	0	0	2.90047E+13	-1.45024E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 339 Kz 339

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.704087	101595.1201	-0.000115	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.707694	101595.1295	-0.000052	0	0	2.0718E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.708721	101595.1258	-0.000085	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.704402	101595.1242	-0.000127	0	0	2.90053E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 357 Kx 357

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6052.23554	101594.2967	-0.036439	0	0	2.90048E+13	-1.45024E+13
2	0.3	1.45E+13	6051.48656	101593.8691	-0.054457	0	0	2.07175E+13	-1.45023E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6054.380738	101595.4941	0.018092	0	0	4.83424E+13	-1.45027E+13
5	1.5	1.45E+13	6054.787302	101595.7361	0.030287	0	0	2.90056E+13	-1.45028E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 357 Kz 357

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.559492	101595.0376	-0.001025	0	0	2.90052E+13	-1.45026E+13
2	0.3	1.45E+13	6053.378408	101594.916	-0.002796	0	0	2.0718E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.75142	101595.1595	0.000029	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.762224	101595.1628	0.000179	0	0	2.90053E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 341 Kx 341

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6052.967094	101594.8427	-0.014411	0	0	2.90051E+13	-1.45026E+13
2	0.3	1.45E+13	6052.600363	101594.6965	-0.021318	0	0	2.07179E+13	-1.45025E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6054.087614	101595.2332	0.007967	0	0	4.83422E+13	-1.45027E+13
5	1.5	1.45E+13	6054.358539	101595.3064	0.013502	0	0	2.90053E+13	-1.45027E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 341 Kz 341

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.716166	101595.1446	-0.000016	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.716147	101595.1447	-0.00001	0	0	2.0718E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.715848	101595.1405	-0.000026	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.715975	101595.1423	-0.000024	0	0	2.90053E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 344 Kx 344

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6052.901469	101594.6121	0.012142	0	0	2.9005E+13	-1.45025E+13
2	0.3	1.45E+13	6052.53159	101594.3886	0.017061	0	0	2.07178E+13	-1.45024E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6054.104289	101595.3741	-0.007509	0	0	4.83423E+13	-1.45027E+13
5	1.5	1.45E+13	6054.34455	101595.5227	-0.013403	0	0	2.90055E+13	-1.45027E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 344 Kz 344

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.717097	101595.143	-0.000014	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.717443	101595.1445	0.000001	0	0	2.0718E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.715207	101595.1392	-0.000002	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.715222	101595.1397	-0.000002	0	0	2.90053E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 358 Kx 358

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6054.907689	101595.6584	-0.021156	0	0	2.90056E+13	-1.45028E+13
2	0.3	1.45E+13	6055.446008	101595.9601	-0.030603	0	0	2.07184E+13	-1.45029E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.750593	101594.8754	0.011091	0	0	4.83418E+13	-1.45025E+13
5	1.5	1.45E+13	6054.446657	101594.7562	0.018869	0	0	2.9005E+13	-1.45025E+13

Table C1
Sensitivity Analysis Results

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 358 Kz 358

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.708218	101595.1225	-0.000159	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.714999	101595.1254	-0.000192	0	0	2.0718E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.707152	101595.1298	-0.000067	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.706464	101595.1262	-0.000068	0	0	2.90053E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 342 Kx 342

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6055.322891	101624.7656	-0.015477	0	0	2.90221E+13	-1.45111E+13
2	0.3	1.45E+13	6056.482122	101638.2124	-0.022963	0	0	2.07356E+13	-1.45149E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.736002	101579.3103	0.007188	0	0	4.83271E+13	-1.44981E+13
5	1.5	1.45E+13	6053.761899	101569.4385	0.012342	0	0	2.89906E+13	-1.44953E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 342 Kz 342

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.708484	101595.3667	-0.000031	0	0	2.90054E+13	-1.45027E+13
2	0.3	1.45E+13	6053.707061	101595.6566	-0.000086	0	0	2.07183E+13	-1.45028E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.714936	101595.0807	-0.000021	0	0	4.8342E+13	-1.45026E+13
5	1.5	1.45E+13	6053.714122	101595.0523	-0.000022	0	0	2.90052E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 340 Kx 340

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.754434	101604.5492	-0.121334	0	0	2.90106E+13	-1.45053E+13
2	0.3	1.45E+13	6053.76526	101609.2988	-0.185276	0	0	2.07238E+13	-1.45067E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.666065	101590.5283	0.057696	0	0	4.83377E+13	-1.45013E+13
5	1.5	1.45E+13	6053.653596	101587.8153	0.093498	0	0	2.90011E+13	-1.45005E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 340 Kz 340

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.705814	101595.1707	0.000172	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.705514	101595.213	0.000583	0	0	2.07181E+13	-1.45027E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.707096	101595.1134	-0.000162	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.702157	101595.0998	-0.000196	0	0	2.90052E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 432 Kx 432

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.706131	101595.532	0.003885	0	0	2.90055E+13	-1.45027E+13
2	0.3	1.45E+13	6053.708009	101595.6997	0.005661	0	0	2.07183E+13	-1.45028E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.698359	101594.8737	-0.002369	0	0	4.83419E+13	-1.45026E+13
5	1.5	1.45E+13	6053.696674	101594.712	-0.003771	0	0	2.9005E+13	-1.45025E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 432 Kz 432

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.581233	101596.6134	0.069971	0	0	2.90061E+13	-1.45031E+13
2	0.3	1.45E+13	6053.521044	101597.3494	0.10486	0	0	2.07189E+13	-1.45033E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.752291	101594.3727	-0.03263	0	0	4.83414E+13	-1.45024E+13
5	1.5	1.45E+13	6053.780131	101593.9249	-0.051808	0	0	2.90046E+13	-1.45023E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 437 Kx 437

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.699191	101595.1146	0.000672	0	0	2.90052E+13	-1.45026E+13
2	0.3	1.45E+13	6053.698207	101595.1151	0.001126	0	0	2.0718E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.700809	101595.1113	-0.00063	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.702633	101595.1136	-0.000901	0	0	2.90052E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 437 Kz 437

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.669439	101595.1062	0.017146	0	0	2.90052E+13	-1.45026E+13
2	0.3	1.45E+13	6053.632831	101595.0949	0.036023	0	0	2.0718E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.718598	101595.1355	-0.004622	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.723958	101595.1394	-0.006739	0	0	2.90053E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 432 Kx 432

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.706131	101595.532	0.003885	0	0	2.90055E+13	-1.45027E+13
2	0.3	1.45E+13	6053.708009	101595.6997	0.005661	0	0	2.07183E+13	-1.45028E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.698359	101594.8737	-0.002369	0	0	4.83419E+13	-1.45026E+13
5	1.5	1.45E+13	6053.696674	101594.712	-0.003771	0	0	2.9005E+13	-1.45025E+13

Table C1
Sensitivity Analysis Results

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 432 Kz 432

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.581233	101596.6134	0.069971	0	0	2.90061E+13	-1.45031E+13
2	0.3	1.45E+13	6053.521044	101597.3494	0.10486	0	0	2.07189E+13	-1.45033E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.752291	101594.3727	-0.03263	0	0	4.83414E+13	-1.45024E+13
5	1.5	1.45E+13	6053.780131	101593.9249	-0.051808	0	0	2.90046E+13	-1.45023E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 433 Kx 433

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.703139	101595.1448	-0.001371	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.702193	101595.1543	-0.001965	0	0	2.07181E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.70298	101595.1033	0.000494	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.702643	101595.0925	0.000891	0	0	2.90052E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 433 Kz 433

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.69816	101595.1393	0.022631	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.694583	101595.1539	0.037519	0	0	2.07181E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.705779	101595.1139	-0.008512	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.705471	101595.1066	-0.013203	0	0	2.90052E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 436 Kx 436

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.696357	101595.1185	-0.001209	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.693161	101595.1175	-0.001689	0	0	2.0718E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.704659	101595.1146	0.000467	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.70665	101595.1151	0.000834	0	0	2.90052E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 436 Kz 436

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.714479	101595.1613	0.00616	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.716823	101595.1765	0.009301	0	0	2.07181E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.694385	101595.0908	-0.00368	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.687508	101595.0709	-0.006202	0	0	2.90052E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 543 Kx 543

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.728553	101596.3459	0.125841	0	0	2.9006E+13	-1.4503E+13
2	0.3	1.45E+13	6053.743736	101596.8724	0.191439	0	0	2.07188E+13	-1.45031E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.693189	101594.4262	-0.057882	0	0	4.83414E+13	-1.45024E+13
5	1.5	1.45E+13	6053.679363	101593.962	-0.093681	0	0	2.90046E+13	-1.45023E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 543 Kz 543

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.701709	101595.1276	0.003225	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.693484	101595.1269	0.007801	0	0	2.0718E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.709203	101595.1271	-0.000884	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.710295	101595.1281	-0.001166	0	0	2.90053E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 504 Kx 504

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.042629	101603.0209	-0.023148	0	0	2.90098E+13	-1.45049E+13
2	0.3	1.45E+13	6052.764376	101606.3453	-0.034748	0	0	2.07226E+13	-1.45058E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6054.078088	101590.5622	0.011322	0	0	4.83377E+13	-1.45013E+13
5	1.5	1.45E+13	6054.326462	101587.5868	0.01878	0	0	2.90009E+13	-1.45005E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 504 Kz 504

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.681422	101595.2	0.00031	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.64159	101595.2593	0.000713	0	0	2.07181E+13	-1.45027E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.714049	101595.1074	-0.000177	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.714394	101595.0884	-0.000245	0	0	2.90052E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 538 Kx 538

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.682572	101595.2506	-0.010646	0	0	2.90053E+13	-1.45027E+13
2	0.3	1.45E+13	6053.677395	101595.3054	-0.013671	0	0	2.07181E+13	-1.45027E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.705073	101595.0218	0.006632	0	0	4.8342E+13	-1.45026E+13
5	1.5	1.45E+13	6053.709546	101594.9667	0.011444	0	0	2.90052E+13	-1.45026E+13

Table C1
Sensitivity Analysis Results

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 538 Kz 538

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.715147	101595.152	0.00054	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.709737	101595.1527	0.002009	0	0	2.07181E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.705773	101595.1241	-0.000329	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.716337	101595.1402	-0.000241	0	0	2.90053E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 620 Kx 620

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.699693	101595.2954	-0.012608	0	0	2.90054E+13	-1.45027E+13
2	0.3	1.45E+13	6053.693984	101595.361	-0.017813	0	0	2.07181E+13	-1.45027E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.695021	101594.9967	0.006429	0	0	4.8342E+13	-1.45026E+13
5	1.5	1.45E+13	6053.695869	101594.9328	0.011896	0	0	2.90051E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 620 Kz 620

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.703795	101595.122	0.000535	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.702397	101595.1217	0.001379	0	0	2.0718E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.708501	101595.1254	-0.0002	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.708522	101595.1299	-0.000238	0	0	2.90053E+13	-1.45026E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 601 Kx 601

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6055.03075	101696.2962	-0.080415	0	0	2.9063E+13	-1.45315E+13
2	0.3	1.45E+13	6056.146286	101745.8816	-0.120271	0	0	2.07795E+13	-1.45457E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6054.062401	101541.8962	0.040662	0	0	4.82915E+13	-1.44875E+13
5	1.5	1.45E+13	6054.294718	101508.2261	0.066197	0	0	2.89557E+13	-1.44779E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 601 Kz 601

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.899182	101603.2127	0.000671	0	0	2.90099E+13	-1.45049E+13
2	0.3	1.45E+13	6054.076476	101611.2528	0.001425	0	0	2.07246E+13	-1.45072E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.650946	101592.8551	-0.000326	0	0	4.83399E+13	-1.4502E+13
5	1.5	1.45E+13	6053.623778	101591.7545	-0.000411	0	0	2.90033E+13	-1.45017E+13

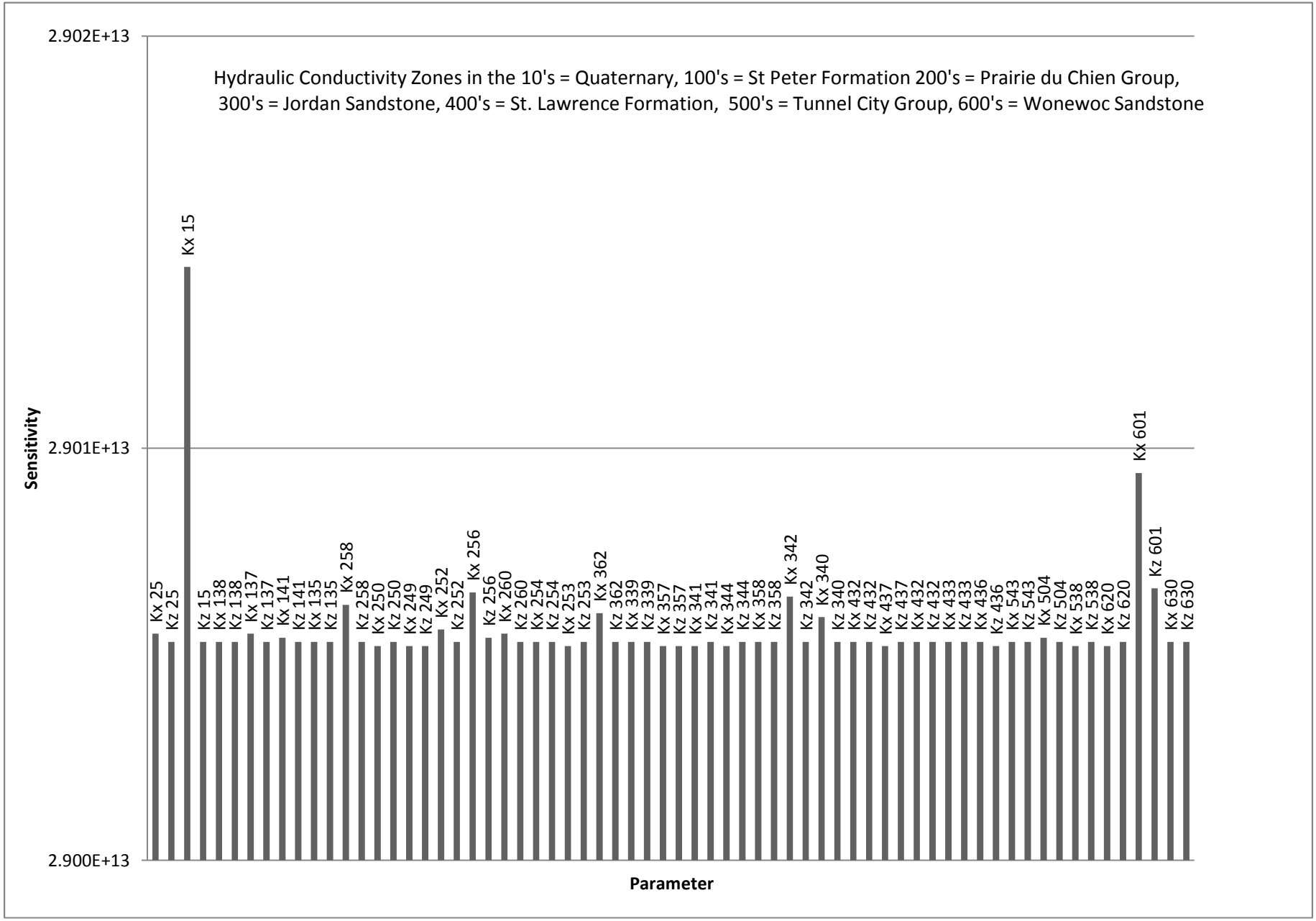
Groundwater Vistas Sensitivity Analysis
Parameter: Kx Zone: 630 Kx 630

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.734069	101596.4125	0.127334	0	0	2.9006E+13	-1.4503E+13
2	0.3	1.45E+13	6053.753726	101596.9662	0.193958	0	0	2.07188E+13	-1.45032E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.682488	101594.3694	-0.059901	0	0	4.83414E+13	-1.45024E+13
5	1.5	1.45E+13	6053.662779	101593.8694	-0.09687	0	0	2.90045E+13	-1.45023E+13

Groundwater Vistas Sensitivity Analysis
Parameter: Kz Zone: 630 Kz 630

Run	Multiplier	Sum of Squares	Residual Mean	Residual Std.	Average Drawdown	CH	River	Sensitivity	DeltaRss
1	0.5	1.45E+13	6053.715997	101595.1423	0.000025	0	0	2.90053E+13	-1.45026E+13
2	0.3	1.45E+13	6053.71553	101595.1421	0.000089	0	0	2.0718E+13	-1.45026E+13
3	1	1.45E+13	6053.715204	101595.1392	0	0	0	0	-1.45026E+13
4	1.3	1.45E+13	6053.715214	101595.1391	-0.000001	0	0	4.83421E+13	-1.45026E+13
5	1.5	1.45E+13	6053.715234	101595.1397	-0.000001	0	0	2.90053E+13	-1.45026E+13

Figure C1
Parameter Sensitivities



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Attachment D

Fracture-Flow Calculations

Main Well Field (6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17)

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	4,073
Aquifer Thickness, H (ft)	182
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
11,161.11

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	22204
Pumping Period (years)	10
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	55.5

Calculated Fixed Radius (m)	Volume (m^3)
2881.0222	1,447,225,000

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 2, Well 4, Well 19

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	3246
Aquifer Thickness, H (ft)	211
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
7672.386

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	17696
Pumping Period (years)	10
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	64.3

Calculated Fixed Radius (m)	Volume (m^3)
2389.514	1,153,400,000

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 3

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	12
Aquifer Thickness, H (ft)	227
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
26.36451

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	63
Pumping Period (years)	10
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	69.2

Calculated Fixed Radius (m)	Volume (m^3)
137.4342	4,106,250

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Apple Valley

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	7063
Aquifer Thickness, H (ft)	190
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)

18539.58

Wells:
205820
207677
127263
127277
127297
151561
151563
191943
449257
433284
205823
603075
674495
731113
207675

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	38500
Pumping Period (years)	10
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	58

Calculated Fixed Radius (m)	Volume (m^3)
3711.025	2,509,375,000

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Rosemount

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	1154.1
Aquifer Thickness, H (ft)	219
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
2628.232

Wells:
603051
626785
655902
731123

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	6290.9
Pumping Period (years)	10
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	66.75

Calculated Fixed Radius (m)	Volume (m^3)
1398.325	410,031,875

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Farmington

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	1770.1
Aquifer Thickness, H (ft)	183
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
4824.042

Wells:
112212
509060
554248
706804

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	9648.8
Pumping Period (years)	10
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	55.8

Calculated Fixed Radius (m)	Volume (m^3)
1894.074	628,895,000

$$R = \sqrt{\frac{Q}{\pi L n}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 694923 & 694924

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	81.8
Aquifer Thickness, H (ft)	120.5
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
338.5561

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	445.9
Pumping Period (years)	10
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	36.7

Calculated Fixed Radius (m)	Volume (m^3)
502.0687	29,063,125

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 462149

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	77.9
Aquifer Thickness, H (ft)	140
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
277.5069

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	424.6
Pumping Period (years)	10
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	42.7

Calculated Fixed Radius (m)	Volume (m^3)
454.2067	27,674,821

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 235586

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	205.3
Aquifer Thickness, H (ft)	242
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
423.0951

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	1119.1
Pumping Period (years)	10
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	73.8

Calculated Fixed Radius (m)	Volume (m^3)
560.8978	72,941,339

$$\sqrt{\frac{Q}{\pi L n}} = R$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 526581

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	22.8
Aquifer Thickness, H (ft)	99
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
114.8587

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	124.3
Pumping Period (years)	10
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	30.2

Calculated Fixed Radius (m)	Volume (m^3)
292.2198	8,101,696

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 664152

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	34.2
Aquifer Thickness, H (ft)	175
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
97.46584

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	186.4
Pumping Period (years)	10
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	53.34

Calculated Fixed Radius (m)	Volume (m^3)
269.2613	12,149,286

$$R = \sqrt{\frac{Q}{\pi L n}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 561802

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	7.6
Aquifer Thickness, H (ft)	20
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
189.5169

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	41.4
Pumping Period (years)	10
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	6.1

Calculated Fixed Radius (m)	Volume (m^3)
375.2431	2,698,393

$$R = \sqrt{\frac{Q}{\pi L n}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 2

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	1017
Aquifer Thickness, H (ft)	207
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
2450.276

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	5545
Pumping Period (years)	1
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	63.1

Calculated Fixed Radius (m)	Volume (m^3)
426.9859	36,141,518

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 3

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	12
Aquifer Thickness, H (ft)	227
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
26.36451

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	63
Pumping Period (years)	1
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	69.2

Calculated Fixed Radius (m)	Volume (m^3)
43.4605	410,625

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 4

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	1081
Aquifer Thickness, H (ft)	215
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
2507.562

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	5897
Pumping Period (years)	1
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	65.5

Calculated Fixed Radius (m)	Volume (m^3)
432.1877	38,435,804

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 6

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	58.2
Aquifer Thickness, H (ft)	191
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
151.9686

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	317
Pumping Period (years)	1
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	58.2

Calculated Fixed Radius (m)	Volume (m^3)
106.303	2,066,161

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 8

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	615.9
Aquifer Thickness, H (ft)	110
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
2792.427

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	3357
Pumping Period (years)	1
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	33.5

Calculated Fixed Radius (m)	Volume (m^3)
455.9642	21,880,446

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 9

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	440.8
Aquifer Thickness, H (ft)	139
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
1581.58

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	2403
Pumping Period (years)	1
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	42.4

Calculated Fixed Radius (m)	Volume (m^3)
342.9031	15,662,411

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 10

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	871.8
Aquifer Thickness, H (ft)	216
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
2012.924

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	4752
Pumping Period (years)	1
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	65.8

Calculated Fixed Radius (m)	Volume (m^3)
387.0818	30,972,857

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 11

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	190.8
Aquifer Thickness, H (ft)	151
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
630.1817

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	1040
Pumping Period (years)	1
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	46

Calculated Fixed Radius (m)	Volume (m^3)
216.5784	6,778,571

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 12

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	415.3
Aquifer Thickness, H (ft)	210
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
986.2954

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	2264
Pumping Period (years)	1
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	64

Calculated Fixed Radius (m)	Volume (m^3)
270.9104	14,756,429

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 13

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	290.6
Aquifer Thickness, H (ft)	165
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
878.367

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	1584
Pumping Period (years)	1
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	50.3

Calculated Fixed Radius (m)	Volume (m^3)
255.606	10,324,286

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 14

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	464.9
Aquifer Thickness, H (ft)	203
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
1142.162

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	2534
Pumping Period (years)	1
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	61.9

Calculated Fixed Radius (m)	Volume (m^3)
291.4308	16,516,250

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 15

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	146.4
Aquifer Thickness, H (ft)	224
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
325.9548

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	798
Pumping Period (years)	1
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	68.3

Calculated Fixed Radius (m)	Volume (m^3)
155.6928	5,201,250

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 16

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	169.9
Aquifer Thickness, H (ft)	200
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
423.67

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	926
Pumping Period (years)	1
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	70

Calculated Fixed Radius (m)	Volume (m^3)
165.6662	6,035,536

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 17

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	409.1
Aquifer Thickness, H (ft)	183
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
1114.918

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	2230
Pumping Period (years)	1
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	55.8

Calculated Fixed Radius (m)	Volume (m^3)
287.9472	14,534,821

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 19

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

If Q/Qs is less than 3000 m then delineation Technique 2 should be used: Calculated Fixed Radius with An Upgradient Extension

Input variables	
Well Discharge, Q (gpm)	1147.3
Aquifer Thickness, H (ft)	210
Aquifer Hydraulic Conductivity K (m/day)	6.4
Hydraulic Gradient, i	0.0056

Calculated Q/Qs (m)
2724.721

Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1ft^3}{7.48gal}\right)\left(\frac{1440\min}{1day}\right)\left(\frac{0.0283m^3}{1ft^3}\right)}{(H)\left(\frac{0.3048m}{1ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extention

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weatherd Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	6254
Pumping Period (years)	1
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	64

Calculated Fixed Radius (m)	Volume (m^3)
450.2632	40,762,679

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:
Q = Well Discharge (L3/T)=(Well pumping rate)(pumping time period)
n = effective porosity
L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Revised Fixed Radius for Main Well Field

Main

Original Fixed Radius Area for Subject Well	26076126.13
Original Capture Zone Volume for Subject Well	1447225000

Well	Search Combo	Volume of fixed radius capture zone (m^3) (No overlap)	Common interval with subject well (m)	Area of overlap with subject well (m^2)	Volume of overlap with subject well	Revised Volume Component (m^3)	Revised Volume for Subject Well (m3)	Revised Radius of Subject Well (m)
Main	Main-Main	1,447,225,000	55.5	0	0	0	1522481065	2954.9798
2-4-19	2-4-19-Main	1,153,400,000	55.5	2004295.99	111238427	61903208.97		
3	3-Main	4,106,250	55.5	0	0	0		
AV	AV-Main	2,509,375,000	55.5	0	0	0		
RM	RM-Main	410,031,875	55.5	0	0	0		
F	F-Main	628,895,000	55.5	0	0	0		
694923	694923-Main	29,063,125	36.7	0	0	0		
462149	462149-Main	27,674,821	42.7	0	0	0		
235586	235586-Main	72,941,339	55.5	0	0	0		
526581	526581-Main	8,101,696	30.2	268147.549	8098056	8052974.699		
664152	664152-Main	12,149,286	53.34	100194.474	5344373.3	5299881.37		
561802	561802-Main	2,698,393	6.1	0	0	0		

Revised Fixed Radius for Wells 2, 4, 19

2-4-19

Original Fixed Radius Area for Subject Well	17937791.6
Original Capture Zone Volume for Subject Well	1153400000

Well	Search Combo	Volume of fixed radius capture zone (m^3) (No overlap)	Common interval with subject well (m)	Area of overlap with subject well (m^2)	Volume of overlap with subject well	Revised Volume Component (m^3)	Revised Volume for Subject Well (m3)	Revised Radius of Subject Well (m)
Main	Main-2-4-19	1,447,225,000	55.5	2004295.99	1.11E+08	49335218.25	1286149963	2523.28
2-4-19	2-4-19-2-4-19	1,153,400,000	64.3	0	0	0		
3	3-2-4-19	4,106,250	64.3	0	0	0		
AV	AV-2-4-19	2,509,375,000	58	4567148.4	2.65E+08	83414744.3		
RM	RM-2-4-19	410,031,875	64.3	0	0	0		
F	F-2-4-19	628,895,000	55.8	0	0	0		
694923	694923-2-4-19	29,063,125	36.7	0	0	0		
462149	462149-2-4-19	27,674,821	42.7	0	0	0		
235586	235586-2-4-19	72,941,339	64.3	0	0	0		
526581	526581-2-4-19	8,101,696	30.2	0	0	0		
664152	664152-2-4-19	12,149,286	53.34	0	0	0		
561802	561802-2-4-19	2,698,393	6.1	0	0	0		

Upgradient Extension Well 3

	3
Well Location	
X	482055
Y	4942986
Length of extension (1.57 * radius of fixed radius capture zone)	215.77164
Flow Direction	243.5
Flow Direction + 10 degrees	253.5
Flow Direction - 10 degrees	233.5

Center of extension	
X	481861.9
Y	4942889.7
Center of extension +10 degrees	
X	481848.11
Y	4942924.7
Center of extension - 10 degrees	
X	481881.55
Y	4942857.7

Attachment E

MDH Well Vulnerability

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

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

PWSID: 1190015
SYSTEM NAME: Lakeville
WELL NAME: Well #10

TIER: 2
WHP RANK:
UNIQUE WELL #: 00554193

COUNTY: Dakota | TOWNSHIP NUMBER: 114 | RANGE: 20 W | SECTION: 17 | QUARTERS: BCC

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Prairie Du Chien-Jordan	
DNR Geologic Sensitivity Rating	:	Very low	0
L Score	:	18	
Geologic Data From	:	Well Record	
Year Constructed	:	1994	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	425	0
Well Depth	:	616	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1500	20
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	<.05 05/06/1996	0
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		20
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE

Vulnerability Overridden :

COMMENTS

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

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

PWSID: 1190015
SYSTEM NAME: Lakeville
WELL NAME: Well #11

TIER: 2
WHP RANK:
UNIQUE WELL #: 00554215

COUNTY: Dakota | TOWNSHIP NUMBER: 114 | RANGE: 20 W | SECTION: 17 | QUARTERS:

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Prairie Du Chien-Jordan	
DNR Geologic Sensitivity Rating	:	Very low	10
L Score	:	9	
Geologic Data From	:	Well Record	
Year Constructed	:	1996	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	415	0
Well Depth	:	637	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1300	20
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	Unknown	0
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		30
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE

Vulnerability Overridden :

COMMENTS

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

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

PWSID: 1190015
SYSTEM NAME: Lakeville
WELL NAME: Well #12

TIER: 2
WHP RANK:
UNIQUE WELL #: 00562991

COUNTY: Dakota | TOWNSHIP NUMBER: 114 | RANGE: 20 W | SECTION: 17 | QUARTERS:

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Prairie Du Chien-Jordan	
DNR Geologic Sensitivity Rating	:	Very low	0
L Score	:	13	
Geologic Data From	:	Well Record	
Year Constructed	:	1997	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	380	5
Well Depth	:	585	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1100	20
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	Unknown	0
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		25
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE

Vulnerability Overridden :

COMMENTS

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

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

PWSID: 1190015
SYSTEM NAME: Lakeville
WELL NAME: Well #13

TIER: 2
WHP RANK:
UNIQUE WELL #: 00596650

COUNTY: Dakota | TOWNSHIP NUMBER: 114 | RANGE: 20 W | SECTION: 8 | QUARTERS: BCC

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Prairie Du Chien-Jordan	
DNR Geologic Sensitivity Rating	:	Low	20
L Score	:	1	
Geologic Data From	:	Well Record	
Year Constructed	:	1999	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	416	0
Well Depth	:	611	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1200	20
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	Unknown	0
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		40
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE
Vulnerability Overridden	:		

COMMENTS

Geologic sensitivity rating of L-1 reflects 10 foot thickness of clay. Till is not credited because of description that suggests it is sandy. No credit is given to basal St. Peter Fm. as no shale is indicated in log.

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

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

PWSID: 1190015
SYSTEM NAME: Lakeville
WELL NAME: Well #14

TIER: 2
WHP RANK:
UNIQUE WELL #: 00603073

COUNTY: Dakota | TOWNSHIP NUMBER: 114 | RANGE: 20 W | SECTION: 17 | QUARTERS: ACA

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Prairie Du Chien-Jordan	
DNR Geologic Sensitivity Rating	:	Low	20
L Score	:	1	
Geologic Data From	:	Well Record	
Year Constructed	:	2001	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	365	5
Well Depth	:	600	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Unknown	5
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1200	20
Pathogen Detected?			NOT VULNERABLE
Surface Water Characteristics?			NOT VULNERABLE
Maximum nitrate detected	:	Unknown	0
Maximum tritium detected	:	<.8 06/23/2011	NOT VULNERABLE
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		50
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE

Vulnerability Overridden :

COMMENTS

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

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

PWSID: 1190015
SYSTEM NAME: Lakeville
WELL NAME: Well #15

TIER: 2
WHP RANK:
UNIQUE WELL #: 00651737

COUNTY: Dakota | TOWNSHIP NUMBER: 114 | RANGE: 20 W | SECTION: 19 | QUARTERS:

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Jordan	
DNR Geologic Sensitivity Rating	:	Very low	15
L Score	:	5	
Geologic Data From	:	Well Record	
Year Constructed	:	2001	
Construction Method	:	Rotary/Drilled	0
Casing Depth	:	412	0
Well Depth	:	515	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1200	20
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	Unknown	0
Maximum tritium detected	:	4 06/23/2011	VULNERABLE
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		35
Wellhead Protection Vulnerability Rating	:		VULNERABLE

Vulnerability Overridden :

COMMENTS

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

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

PWSID: 1190015
SYSTEM NAME: Lakeville
WELL NAME: Well #16

TIER: 2
WHP RANK:
UNIQUE WELL #: 00655907

COUNTY: Dakota | TOWNSHIP NUMBER: 114 | RANGE: 20 W | SECTION: 18 | QUARTERS:

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Jordan	
DNR Geologic Sensitivity Rating	:	Very low	0
L Score	:	13	
Geologic Data From	:	Well Record	
Year Constructed	:	2003	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	466	0
Well Depth	:	570	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1200	20
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	Unknown	0
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		20
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE

Vulnerability Overridden :

COMMENTS

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

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

PWSID: 1190015
SYSTEM NAME: Lakeville
WELL NAME: Well #17

TIER: 2
WHP RANK:
UNIQUE WELL #: 00694913

COUNTY: Dakota | TOWNSHIP NUMBER: | RANGE: | SECTION: | QUARTERS:

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Prairie Du Chien-Jordan	
DNR Geologic Sensitivity Rating	:	Very low	-10
L Score	:	22	
Geologic Data From	:	Well Record	
Year Constructed	:	2004	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	415	0
Well Depth	:	607	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1200	20
Pathogen Detected?			NOT VULNERABLE
Surface Water Characteristics?			NOT VULNERABLE
Maximum nitrate detected	:	Unknown	0
Maximum tritium detected	:	<.8 06/23/2011	NOT VULNERABLE
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		10
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE

Vulnerability Overridden :

COMMENTS

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

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

PWSID: 1190015
SYSTEM NAME: Lakeville
WELL NAME: Well #18

TIER: 2
WHP RANK:
UNIQUE WELL #: 00745558

COUNTY: Dakota | TOWNSHIP NUMBER: | RANGE: | SECTION: | QUARTERS:

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Franconia-Ironton-Galesville	
DNR Geologic Sensitivity Rating	:	Very low	0
L Score	:	15	
Geologic Data From	:	Well Record	
Year Constructed	:	2007	
Construction Method	:	Rotary/Drilled	0
Casing Depth	:	667	0
Well Depth	:	864	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	370	5
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	Unknown	0
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		5
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE

Vulnerability Overridden :

COMMENTS

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

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

PWSID: 1190015
SYSTEM NAME: Lakeville
WELL NAME: Well #19

TIER: 2
WHP RANK:
UNIQUE WELL #: 00686288

COUNTY: Dakota | TOWNSHIP NUMBER: | RANGE: | SECTION: | QUARTERS:

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Prairie Du Chien-Jordan	
DNR Geologic Sensitivity Rating	:	Very low	10
L Score	:	9	
Geologic Data From	:	Well Record	
Year Constructed	:	2009	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	341	5
Well Depth	:	545	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1200	20
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	Unknown	0
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		35
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE

Vulnerability Overridden :

COMMENTS

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

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

PWSID: 1190015
SYSTEM NAME: Lakeville
WELL NAME: Well #2

TIER: 2
WHP RANK:
UNIQUE WELL #: 00207708

COUNTY: Dakota | TOWNSHIP NUMBER: 114 | RANGE: 20 W | SECTION: 3 | QUARTERS: CCAD

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Jordan	
DNR Geologic Sensitivity Rating	:	Low	20
L Score	:	1	
Geologic Data From	:	Well Record	
Year Constructed	:	1964	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	434	0
Well Depth	:	517	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	890	10
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	<.4 07/02/1990	0
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		30
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE

Vulnerability Overridden :

COMMENTS

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

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

PWSID: 1190015
SYSTEM NAME: Lakeville
WELL NAME: Well #3

TIER: 2
WHP RANK:
UNIQUE WELL #: 00207727

COUNTY: Dakota | TOWNSHIP NUMBER: 114 | RANGE: 20 W | SECTION: 33 | QUARTERS: ACBD

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Jordan	
DNR Geologic Sensitivity Rating	:	High	0
L Score	:	0	
Geologic Data From	:	Well Record	
Year Constructed	:	1968	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	363	5
Well Depth	:	460	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1125	20
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	<1 01/01/1970	0
Maximum tritium detected	:	1.6 09/05/2008	VULNERABLE
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		25
Wellhead Protection Vulnerability Rating	:		VULNERABLE
Vulnerability Overridden	:		

COMMENTS

High rating is based on the vulnerability mapping by the Minnesota Geological Survey. The driller's log for this well is too general to describe the vulnerability rating for the unconsolidated deposits. Previous tritium result of <0.8TU on 02/26/2001.

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

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

PWSID: 1190015
SYSTEM NAME: Lakeville
WELL NAME: Well #4

TIER: 2
WHP RANK:
UNIQUE WELL #: 00212650

COUNTY: Dakota | TOWNSHIP NUMBER: 114 | RANGE: 20 W | SECTION: 3 | QUARTERS: CBDB

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Jordan	
DNR Geologic Sensitivity Rating	:	Low	20
L Score	:	1	
Geologic Data From	:	Well Record	
Year Constructed	:	1969	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	434	0
Well Depth	:	505	
Casing grouted into borehole?		Unknown	0
Cement grout between casings?		Unknown	5
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1200	20
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	<.4 07/02/1990	0
Maximum tritium detected	:	3.4	VULNERABLE
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		45
Wellhead Protection Vulnerability Rating	:		VULNERABLE

Vulnerability Overridden :

COMMENTS

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

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

PWSID: 1190015
SYSTEM NAME: Lakeville
WELL NAME: Well #6

TIER: 2
WHP RANK:
UNIQUE WELL #: 00161409

COUNTY: Dakota | TOWNSHIP NUMBER: 114 | RANGE: 20 W | SECTION: 18 | QUARTERS: BA

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Jordan	
DNR Geologic Sensitivity Rating	:	Very low	-10
L Score	:	22	
Geologic Data From	:	Well Record	
Year Constructed	:	1980	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	591	0
Well Depth	:	682	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1200	20
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	<.4 10/01/1981	0
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		10
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE

Vulnerability Overridden :

COMMENTS

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

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

PWSID: 1190015
SYSTEM NAME: Lakeville
WELL NAME: Well #7

TIER: 2
WHP RANK:
UNIQUE WELL #: 00161439

COUNTY: Dakota | TOWNSHIP NUMBER: 114 | RANGE: 21 W | SECTION: 25 | QUARTERS: CBAA

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Jordan	
DNR Geologic Sensitivity Rating	:	Very low	0
L Score	:	17	
Geologic Data From	:	Well Record	
Year Constructed	:	1984	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	375	5
Well Depth	:	479	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1200	20
Pathogen Detected?			NOT VULNERABLE
Surface Water Characteristics?			NOT VULNERABLE
Maximum nitrate detected	:	<.4 07/02/1990	NOT VULNERABLE
Maximum tritium detected	:	<.8	NOT VULNERABLE
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		25
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE

Vulnerability Overridden :

COMMENTS

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

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

PWSID: 1190015
SYSTEM NAME: Lakeville
WELL NAME: Well #8

TIER: 2
WHP RANK:
UNIQUE WELL #: 00433296

COUNTY: Dakota | TOWNSHIP NUMBER: | RANGE: | SECTION: | QUARTERS:

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Jordan	
DNR Geologic Sensitivity Rating	:	Very low	0
L Score	:	15	
Geologic Data From	:	Well Record	
Year Constructed	:	1989	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	522	0
Well Depth	:	615	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1200	20
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	<.4 07/02/1990	0
Maximum tritium detected	:	1.1 06/23/2011	VULNERABLE
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		20
Wellhead Protection Vulnerability Rating	:		VULNERABLE
Vulnerability Overridden	:		

COMMENTS

Previous tritium result 1.1 TU on 05/13/2008.

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

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

PWSID: 1190015
SYSTEM NAME: Lakeville
WELL NAME: Well #9

TIER: 2
WHP RANK:
UNIQUE WELL #: 00554192

COUNTY: Dakota | TOWNSHIP NUMBER: 114 | RANGE: 20 W | SECTION: 18 | QUARTERS: CBA

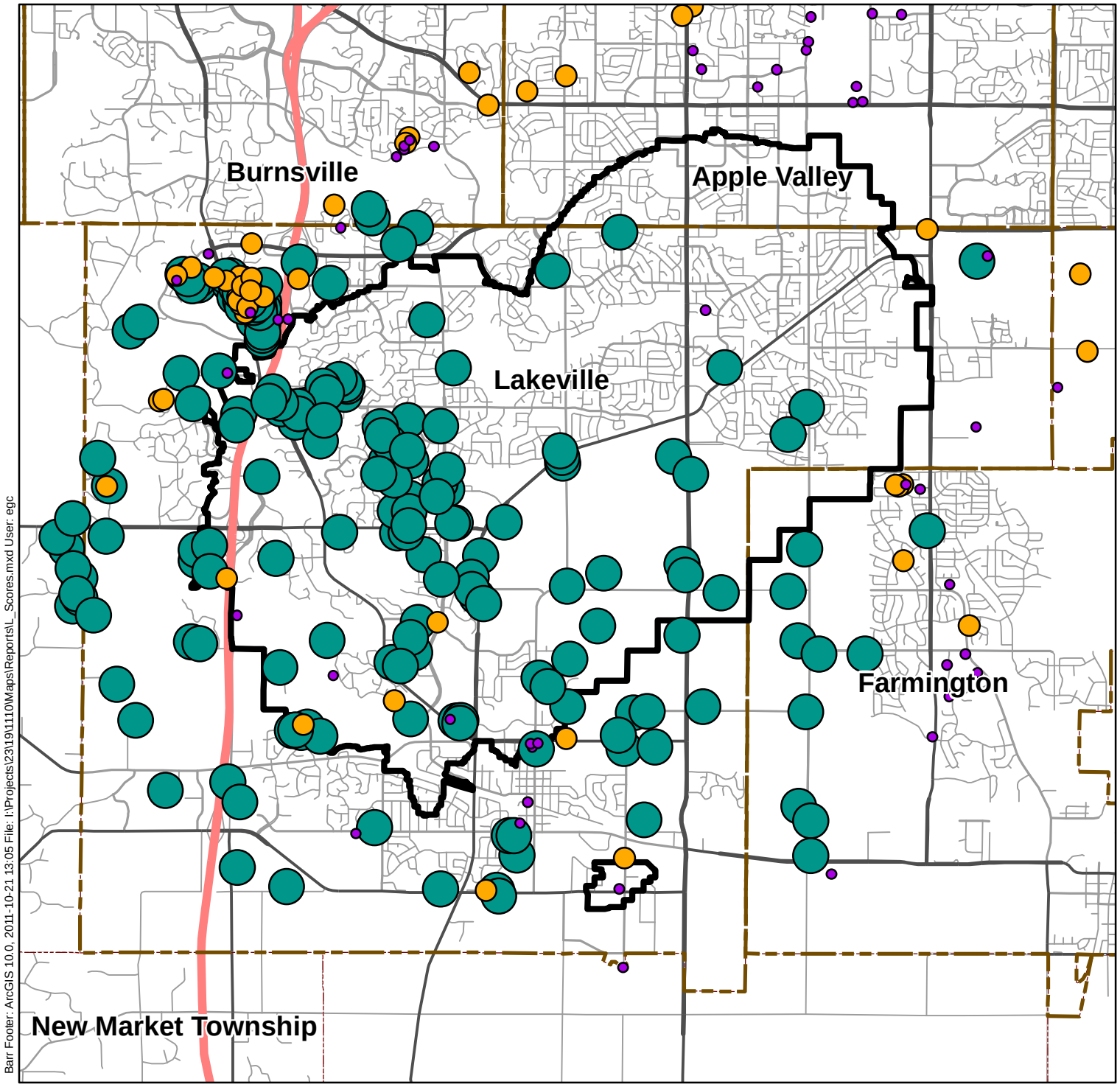
CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Prairie Du Chien-Jordan	
DNR Geologic Sensitivity Rating	:	Very low	0
L Score	:	15	
Geologic Data From	:	Well Record	
Year Constructed	:	1994	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	406	0
Well Depth	:	608	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1100	20
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	<.05 05/06/1996	0
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		20
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE

Vulnerability Overridden :

COMMENTS

Attachment F

L-Scores



Barr Footer: ArcGIS 10.0, 2011-10-21 13:05 File: I:\Projects\23\19\1110\Maps\Reports\L_Scores.mxd User: egc

L Scores

- 0
- 1-4
- >4
- DWSMA

N

Miles

0 1 2

BARR

Figure F-1

L Scores
WHPP Amendment
City of Lakeville
Dakota County, MN

Appendix C

Data Elements Assessment

Appendix C
Data Elements Assessment

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C1.0 Data Elements and Assessment

The data elements and their assessments required to be included in the Wellhead and Source Water Protection Plan (WHPP) for the City of Lakeville (Public Water Supply 1190015) are discussed in this appendix. Data elements related to the physical environment, land use, water quantity, and water quality required for this WHPP for the City of Lakeville were specified in the June 20, 2012 Scoping Decision Notice No. 2 from the Minnesota Department of Health (MDH, 2012a). Two Drinking Water Supply Management Areas (DWSMAs) have been delineated for Lakeville (Barr, 2012). The larger, or main, DWSMA extends into portions of the Cities of Apple Valley and Farmington. Locations of the Lakeville DWSMAs are shown on Figure C-1.

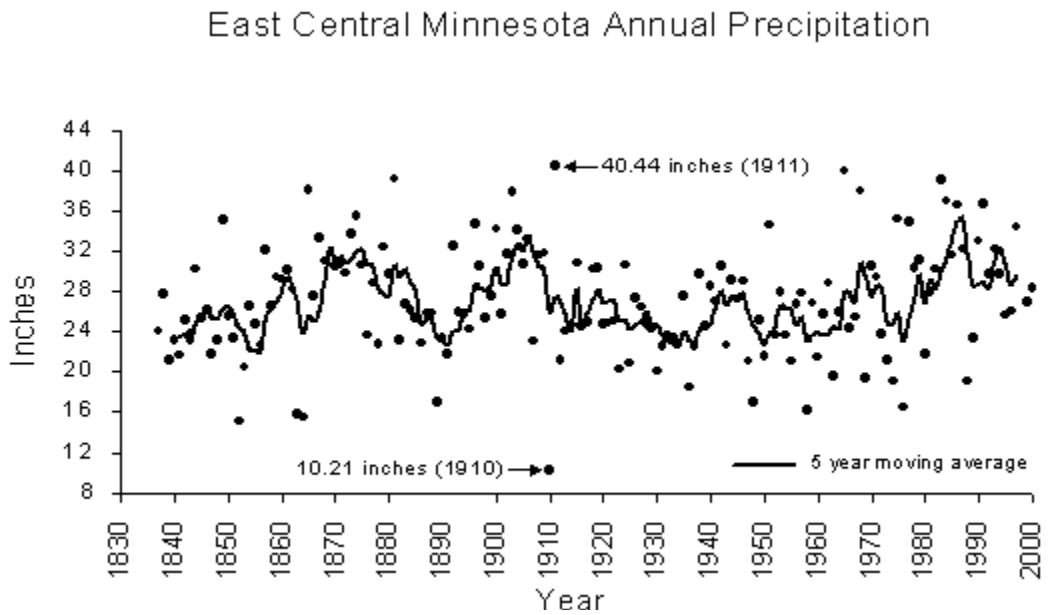
C1.1 Physical Environment Data Elements

Data elements discussed in this section include precipitation, geology and hydrogeology, soils, and water resources.

C1.1.1 Precipitation

Management of the Drinking Water Supply Management Areas (DWSMAs) in the City of Lakeville must consider and reflect available precipitation information. As shown in Attachment C-1, there are a number of precipitation gaging stations around Dakota County, including in the vicinity of Lakeville, that report measurements to the State Climatology Office. Locations of these precipitation gaging stations are identified by township, range, and section in the Minnesota Climatology Working Group tables in Attachment C-1. These tables also show the monthly and annual precipitation measured at these stations in Dakota County for the period 2008 through 2012. In addition, the City of Lakeville currently has four rain gaging stations distributed around the city. A location map for these gaging stations is presented in Attachment C-1. Monthly averages of precipitation measured at each of the City's gaging stations for the period 2008 through 2012 are also presented in Attachment C-1.

Annual precipitation in east-central Minnesota from the late 1830s to 2000 is shown in the following graph:



Source: Minnesota Dept. of Natural Resources website: http://www.dnr.state.mn.us/climate/water_availability.html

The amount of precipitation affects recharge to the groundwater system and the potential for contaminant loading to the groundwater system. This is particularly important in areas of high aquifer vulnerability where the aquifer is not protected from infiltration of precipitation by significant confining units between the ground surface and the top of the source water aquifer. Recharge to the groundwater system affects the size of the WHPA. Recharge was included in the groundwater flow model used to identify the porous media flow portion of the WHPAs (e.g., Barr, 2012; MCES, 2009). In addition, the amount of precipitation also affects the amount of surface runoff. As noted in Barr (2012), the Lakeville DWSMAs include areas where aquifer vulnerability is classified as High but it was determined that it was not necessary to include surface water contribution areas in the delineations. (Surface water contribution areas are areas of higher topography from which surface runoff drains onto areas within the WHPA where aquifer vulnerability is classified as High.)

C1.1.2 Geology and Hydrogeology

Existing information on the geology and hydrogeology in the vicinity of Lakeville was used to define the extent of the source water aquifers used by the City, delineate the WHPAs, and to assess the vulnerability of the public water supply wells and the aquifers in the DWSMAs.

The regional conceptual hydrogeologic model is described in detail by MCES (2009) and hydrogeologic conditions in the vicinity of Lakeville are discussed by Liesch (2002) and Barr (2012). Information pertinent to the Lakeville area is summarized below.

The regional and local geology and hydrogeology of the area are discussed by MCES (2009) and the geology and hydrogeology in the vicinity of the DWSMAs is summarized below.

The stratigraphy of the unconsolidated glacial drift in the vicinity of Lakeville is complex and consists of several thick sequences of glacial till interbedded with outwash sand and gravel. As shown on Figure C-2, the main Lakeville DWSMA overlies a buried bedrock plateau in which the Platteville and Glenwood Formations and the St. Peter Sandstone are generally the uppermost bedrock units. There are several small valleys in which the Prairie du Chien Group is the uppermost bedrock unit cut into the margins of this plateau (see also Bloomgren et al, 1990; Mossler, 1990). The small southern Lakeville DWSMA around Well 3 lies above an area where the Prairie du Chien Group is the uppermost bedrock unit.

The regional groundwater flow system includes the following aquifers (some of which are suitable only for domestic production due to their low yields): the Quaternary glacial drift deposits, St. Peter Sandstone, Prairie du Chien Group, Jordan Sandstone, St. Lawrence Formation, Tunnel City Group (formerly known as the Franconia Formation), Wonewoc Sandstone (formerly known as the Ironton and Galesville Sandstones), and Mt. Simon Sandstone. Hydraulic interaction between the upper and lower regional aquifers is considered negligible.

As shown in Table C-1, the Lakeville wells are completed in four of the bedrock aquifers: the Prairie du Chien Group, the Jordan Sandstone, the Tunnel City Group, and the Wonewoc Sandstone. These aquifers are also referred to in this Plan as the source water aquifers.

The important bedrock hydrostratigraphic units relative to the Lakeville DWSMAs are described in more detail in Barr (2012).

Information regarding the geology and hydrogeology of the area was used to assess the vulnerability to contamination of the source water aquifer within the DWSMAs. The information is consistent with the classification of the uppermost source water aquifers within the DWSMAs as being susceptible to contamination to varying degrees depending upon location.

C1.1.3 Soils

Management of the vulnerable parts of the DWSMAs in the City of Lakeville must consider and reflect available soil information.

Review of available information from the U.S. Department of Agriculture – Natural Resources Conservation Service SSURGO database (USDA-NRCS, 2011) indicates that there are a variety of surficial soil types within the DWSMAs and that these soils have a range of infiltration characteristics. Surficial soil types within the DWSMAs are shown on Figure C-3 and surficial soil permeability is shown on Figure C-4. While available data from the Minnesota Board of Water and Soil Resources indicates there are areas of high soil erosion risk within the main DWSMA, the City is not aware of any eroding lands causing sedimentation problems within the DWSMAs.

Based on the aquifer vulnerability assessment results, issues related to surficial soil characteristics or the surficial soil types may potentially have an effect on the management strategies developed for the DWSMAs. Surficial geologic materials in the City of Eagan include sand, gravel and porous soils. The City is well aware that land development and land use activity may have an impact on the source water aquifer, particularly in areas of high aquifer vulnerability within the DWSMAs, due to surface water infiltration through the permeable soil types.

C1.1.4 Water Resources

Surface water resources must be evaluated to determine if they could potentially apply to this Plan.

Major watersheds that overlap the Lakeville DWSMAs include the Mississippi River watershed and the Minnesota River watershed. The City of Lakeville lies within the boundaries of the areas administered by the Vermillion River Watershed Joint Powers Organization (VRWJPO) and the Black Dog Watershed Management Organization (BDWMO). Flow directions in and boundaries of the watersheds in the area do not indicate any reasons for concern.

Surface water bodies with the DWSMAs include lakes, ponds, streams, storm water basins, and wetlands. Lake Marion, wetlands in the main DWSMA, and streams that cross the DWSMAs meet the definition of public waters in Minnesota Statutes Section 103G.005, subdivision 15. In addition, several of the lakes have shoreland classifications pursuant to Minnesota Statutes Sections 103F.201 to 103F.221 and consistent with Minnesota Rules part 6120.3300. Title 11, Chapter 102 of the Lakeville City Code authorizes the shoreland overlay district, identifies water bodies to which it applies, and specifies land use and management of the shoreland district. Some of streams cross portions of the DWSMAs that have been identified as highly vulnerable to contamination. The majority of the areas in the DWSMAs that are within a FEMA-designated Flood Zone are in Zone AE with the remainder of the areas in Zone A. Lakeville does not have an appropriation permit to withdraw water from any surface water feature within the DWSMAs. Water quality management for

the surface water bodies in Lakeville is addressed in the City's Water Resources Management Plan (Barr, 2008).

There are wetlands within the DWSMAs. Some of these wetlands are associated with other surface water features such as lakes or streams. The majority of these wetlands within the DWSMAs are small in size (i.e., <2 ½ acres.) and are not definable by the Minnesota Statute for Public Waters Wetlands (i.e., Section 103G.221 to 103G.2373). Wetlands in Lakeville are identified in the City's Water Resources Management Plan (Barr, 2008). Title 11 Chapter 16 of the City Code addresses wetlands protection and management.

Per the June 20, 2012 Second Scoping Decision Notice from the MDH, submission of data elements related to water resources are not required for this WHPP.

Based on the aquifer vulnerability assessment results, it appears that issues related to surface water resources should be considered in the development of the management strategies for the DWSMAs, particularly in areas where aquifer vulnerability is classified as High. Geologic conditions in and around the City's DWSMAs result in the aquifer vulnerability being classified as High in approximately 17% of the area within the main DWSMA and 100% of the area within the small DWSMA around Well 3. The quality of the source water is dependent on the quality of its recharge. Recharge sources/mechanisms are noted above. Existing surface water management programs in the DWSMAs address water quality and, therefore, reduce the potential negative effects that surface infiltrating waters may have on the source water aquifer. The City believes that existing surface water management programs are adequate to address surface water quality in the DWSMAs and to ensure that aquifer recharge and water availability do not become an issue for the City.

C1.2 Land Use Data Elements

Land use within the DWSMAs is discussed in this section. In the Part 1 of this Plan, parcel information for Lakeville was used in the delineation of the DWSMA (Barr, 2012).

C1.2.1 Current Land Use

Figure C-5 shows the current (year 2010) land-use map within the DWSMAs. Numerous land uses are found within the DWSMAs. Land uses in the DWSMAs that cover 1% or more of the area in the DWSMAs include residential uses, parks/recreational/preserve uses, institutional uses, industrial and utility uses, commercial uses, undeveloped land, and agricultural uses. As shown on Figure C-5, residential land use is the most common land use occupying approximately 45% of the DWSMAs.

Figure C-6 shows the current Lakeville zoning within the DWSMAs. Zoning maps for Apple Valley and Farmington are presented in Attachment C-2.

C1.2.1.1 Potential Contaminant Source Inventory

A potential contaminant source inventory (PCSI) was conducted within the DWSMAs. As shown on Figure C-1, the aquifer vulnerability in the DWSMAs includes the following classifications: Low, Moderate, and High with the aquifer vulnerability within the majority of the main Lakeville DWSMA classified as Low with smaller areas in which the aquifer vulnerability is classified as Moderate or High while the aquifer vulnerability within the entire small DWSMA around Lakeville Well 3 is classified as High. In the areas where aquifer vulnerability is classified as High the types of potential contaminant sources inventoried include chemical storage sites, potential Class V well locations (per the U.S. EPA, Class V wells include cesspools, large-scale septic systems serving more than 20 people, or potential automotive maintenance waste disposal wells/pits), dump and spill sites, hazardous waste generators, individual sewage treatment systems (ISTS; a.k.a., septic systems), storage tank sites (registered storage tanks and leaking underground storage tank sites), and wells (active and sealed). In areas where the aquifer vulnerability is classified as Moderate the types of potential contaminant point sources inventoried include potential Class V well locations, storage tank sites (registered storage tanks and leaking underground storage tank sites), and wells (active and sealed). In areas where the aquifer vulnerability is classified as Low the types of potential contaminant point sources inventoried include potential Class V well locations and wells (active and sealed).

Information on potential contaminant source locations was obtained from the following sources: Dakota County, Minnesota Department of Natural Resources (MDNR), Minnesota Department of Public Safety (DPS), Minnesota Geological Survey (MGS), Minnesota Pollution Control Agency (MPCA), and U.S. Environmental Protection Agency (EPA) databases. These data sources are summarized in Table C-2. Information from the various sources was compared to identify overlaps/duplications. Inaccurate locations identified during the PCSI were corrected to the extent possible based on available data. For future updates of this Plan, the City will access available data sources and maintain as accurate and up to date a potential contaminant source database as possible in its wellhead protection file.

In July 2012 the MDH completed a potential contaminant source inventory for in the Inner Wellhead Management Zone (IWMZ) around each of the municipal supply wells. Copies of the IWMZ inventory reports are presented in Attachment C-3.

Properties identified as potential sources of contamination during the PCSI are listed in Tables C-3 through C-10 as follows:

- Wells – Table C-3
- Potential Class V wells – Table C-4
- Storage tanks – Table C-5
- Dump sites – Table C-6
- Spill locations – Table C-7
- Hazardous waste generators – Table C-8
- Chemical Storage Sites – Table C-9
- ISTS – Table C-10

Results of this inventory indicate the presence of several potential contaminant source properties within the DWSMAs and include properties with wells, potential Class V well locations, storage tanks, hazardous waste generators, dump and spill sites, chemical storage, and ISTS. These potential source properties include various commercial, medical, dental, disposal, government, industrial, and storage tank sites as well as residences. The spill/release sites have been or are being addressed under oversight by the MPCA. Locations of potential contaminant sources are shown on Figures C-7 through C-13 as follows:

- Well locations – Figure C-7
- Potential Class V Well locations – Figure C-8
- Storage tank locations – Figure C-9
- Dump and spill site locations – Figure C-10
- Hazardous waste generator locations – Figure C-11
- Chemical storage site locations – Figure C-12
- ISTS – Figure C-13

These potential contaminant sources have been considered in the development of the management strategies for the DWSMAs.

As shown in Tables C-3 to C-10, locations of potential contaminant sources were verified, to the extent possible, during preparation of this Plan. Verification procedures used included matching mapped locations with addresses on MDH Well Records or State/County-issued permits, published business addresses, property parcel addresses, local knowledge of City staff, or information from City files (note that not all verification procedures were used for each type of potential contaminant source). The data tables indicate the status of verification for each potential contaminant source location. New information developed on contaminant sources in the future will be verified as they are discovered as part of the WHPP implementation.

C.1.2.1.1.1 Wells

Private wells located within the DWSMAs, in particular wells completed in the lower half of the Prairie du Chien Group, in the Jordan Sandstone, or in the Tunnel City Group and/or Wonewoc Sandstone have the potential for being a pathway for contamination to reach the source water aquifers (i.e., the aquifers from which the City's wells pump water) and the Lakeville municipal wells. Wells that were not properly installed or have not been adequately maintained may provide a conduit for contaminants to reach the source water aquifers. Data obtained from the MGS County Well Index (CWI), Dakota County, the MDH Sealed Wells database, and the MDNR State Water Use Data System (SWUDS) during the PCSI indicate that there are 742 wells (this number includes open and sealed wells) within the Lakeville DWSMAs (Figures C-7a, b, and c). Table C-3 lists the wells that were identified in the DWSMA and indicates the aquifer in which each well is completed (if known), the date the well was completed (if known), and the status of the well (if known).

As indicated in Table C-3, 123 of the wells in the DWSMAs are identified as active domestic water supply wells. Twenty-eight of the private wells for which information was available on the aquifer in which the well is completed are open to the Prairie du Chien Group aquifer. Private wells located within the DWSMAs, particularly those wells completed in or below a source water aquifer, have the potential for being a pathway for contamination to reach the source water aquifer(s) and the Lakeville municipal water supply wells.

Available information indicates that there are a number of non-domestic use wells (not including the Lakeville water supply wells) within the DWSMAs (Table C-3). Wells that were not properly installed or have not been adequately maintained may provide a conduit for contaminants to reach the source water aquifers.

Available information from the SWUDS database indicates that there are 47 high capacity wells within a zone that includes the DWSMA and extends one mile beyond the DWSMA boundary. High capacity wells are defined as wells that pump more than 1,000,000 gallons per year or more than 10,000 gallons per day. High capacity wells outside of the DWSMA were identified because changes in operation of these wells could, potentially, affect the DWSMA boundary. Seventeen of the high capacity wells in or within one mile of the DWSMA are the Lakeville municipal wells. Of the remaining 30 wells, seven are used for some type of irrigation, six are used for some type of industrial processing, 15 of the wells are municipal water supply wells, and two of the wells are private waterworks (Table C-11). As shown in Table C-11, 17 of the non-Lakeville municipal wells are identified as open to the Prairie du Chien Group and/or Jordan Sandstone.

C.1.2.1.1.2 Potential Class V Well Locations

An inventory of locations where Class V wells may be present within the DWSMAs was done as part of the PCSI. Typical land uses associated with the presence of Class V wells include automobile service stations and repair shops. As defined by the U.S. Environmental Protection Agency, large-scale septic systems that serve more than 20 people also are included in the Class V well classification. During the PCSI, it was determined that there are 17 properties where Class V wells may be present based on the type of business that is or had operated there or the use of the property (see Table C-4 and Figure C-8). Fifteen of these potential Class V well locations are properties that appear to be associated with automobile repair. It appears that two of the locations have large-scale septic systems that likely serve 20 or more people. MDH did not require that the City determine if Class V wells are actually present on any of these properties. Results of the verification are summarized in Table C-4. These locations are shown on Figure C-8.

C.1.2.1.1.3 Storage Tanks

The PCSI identified 31 properties with storage tanks within the portions of the DWSMAs in which aquifer vulnerability is classified as Moderate or High (Table C-5 and Figure C-9). Products stored in the storage tanks vary from site to site and include various fuels, used or waste oil, and unspecified chemicals. Of the 31 properties identified, leaking underground storage tank (LUST) sites account for 6 of the properties. Available information indicates that the MPCA has closed the LUST sites.

C.1.2.1.1.4 Dumps

The PCSI identified two properties within the portions of the DWSMAs where aquifer vulnerability is classified as High on which old dump sites are located (Table C-6 and Figure C-10).

C.1.2.1.1.5 Spills

The PCSI identified two properties within the portions of the DWSMAs where aquifer vulnerability is classified as High on which contaminant spills (LUST sites are addressed in Section C.1.2.1.1.3 above) had occurred (Table C-7 and Figure C-10).

C.1.2.1.1.6 Hazardous Waste Generators

The PCSI identified 39 properties within the portions of the DWSMAs where aquifer vulnerability is classified as High on which hazardous waste generators are or have been present (Table C-8 and

Figure C-11). These properties include large quantity, moderate quantity, and very small quantity hazardous waste generators.

C.1.2.1.1.7 Chemical Storage Sites

The PCSI identified four properties within the portions of the DWSMAs where aquifer vulnerability is classified as High on which chemical storage occurs (Table C-9 and Figure C-12). As shown on Figure C-12, three of these properties are in the small DWSMA around Well 3 and the other property is in the northeastern portion of the main Lakeville DWSMA. Chemicals stored on these properties are shown in Table C-9.

C.1.2.1.1.8 Individual Sewage Treatment Systems (ISTS)

As indicated in Table C-10, the PCSI identified two properties within the portions of the DWSMAs where aquifer vulnerability is classified as High on which ISTS are present (note: the large capacity septic systems identified in Table C-4 are not included here). Both of these locations are private residences. These two locations are shown on Figure C-13.

Title 7, Chapter 5, Section 16 of the Lakeville City Code addresses regulation of ISTS. The City Code adopts Dakota County ordinance 113 as amended in section 7-5-16 of the City Code.

C1.2.2 Historical Land Use

At one time Lakeville was a rural community that serviced surrounding agricultural activities. In recent years, Lakeville's convenient location relative to the metropolitan area has stimulated both residential and commercial growth. Located between urban and rural service areas, Lakeville maintains a historic downtown neighborhood and other mature residential areas.

In 1853 when Captain William B. Dodd, who came from the east to serve the military forts in the Minnesota Territory, designed and directed the construction of a road that would serve as a practical land route connecting the military forts in St. Paul to the southern forts. The road, which was named for Captain Dodd after he was killed in the Sioux uprising in 1862, bisects present-day Lakeville.

J.J. Brackett, who owned a St. Paul lumber mill and transported mail, supplies, and travelers along this route, soon chose Lakeville as an ideal site for a town because it was roughly halfway between St. Paul and St. Peter. In 1855 he platted 250 acres and named it Lakeville because it bordered the nearby Prairie Lake (now known as Lake Marion). By 1858 Lakeville contained a general store, two hotels, a boarding house, a blacksmith shop, a saloon, and a shoemaker shop.

Lakeville Township, which encompassed the rural area around the tiny town of Lakeville, was officially formed as a governing unit in 1858. A variety of ethnic groups settled in the Lakeville area in the early years, including immigrants from Ireland, Scotland, England and the Scandinavian countries.

When the Hastings and Dakota Railroad was built near the tiny village of Lakeville in 1869, railroad officials unsuccessfully tried to buy land for a depot. The railroad then bought 20 acres one-half mile to the east; put up a platform and named this area Fairfield. Existing businesses moved from the original town site to Fairfield, and new businesses were established at the new town site. For nine years, business owners and residents tried to get Fairfield's name changed to Lakeville. In 1878, they decided they wanted a government separate from the township and sought incorporation as the Village of Lakeville.

In 1910, Colonel Marion Savage and several partners built an amusement park on the east shore of the then Prairie Lake, renaming it Lake Marion after Colonel Savage, along with a railroad line that connected the park with the Twin Cities. Antlers Amusement Park became one of the most famous amusement parks in the upper Midwest. The amusement park declined in popularity in the 1920s and 1930s due to a combination of factors - the advent of the automobile, the Great Depression, and several dry years that saw Lake Marion drop to its lowest level ever (LAHS, 2004).

Airlake Industrial Park opened in 1967 and there are now more than 100 businesses and 4,000 people employed at the industrial park.

Historical land use shown on Figure C-14 is based on pre-1984 land use data from the Metropolitan Council. As indicated on Figure C-14, a large percentage of the historical land use in the areas that falls within the limits of the DWSMAs was agricultural. Metadata associated with ESRI shapefiles of pre-1984 land use maps available from the Metropolitan Council indicate that the maps are not considered reliable for determining land use of individual properties. Based on available information, historical land uses that might significantly affect the management strategies for the DWSMAs that are not currently present within the DWSMAs were not identified.

While it is possible that buried features such as wells that were not properly sealed or unused underground storage tanks not listed in any available database could be present within the DWSMAs, available information does not suggest the presence of such features. Thus, there is no basis for a concerted search for such buried features within the DWSMAs. If any such, currently unknown,

features are to be located in the future it would most likely occur only if they are encountered during development or redevelopment of a property.

C1.3 Public Utilities

Management of the DWSMAs in the City of Lakeville must consider and reflect available public utility services information.

The Lakeville municipal wells have open-borehole completions, mainly in the Prairie Du Chien Group and Jordan Sandstone aquifers. One well (Well 18) is open to the Tunnel City Group and Wonewoc Sandstone aquifers. Well construction information for the Lakeville municipal wells is summarized in Table C-1. Copies of the MDH Well Records for these wells are presented in Appendix A.

C1.3.1 Pipelines

As shown on Figure C-15, there are petroleum and natural gas pipelines that are in the vicinity of the DWSMAs. In addition there are petroleum pipelines and a natural gas pipeline that cross the main Lakeville DWSMA. The City will rely on State/Federal oversight and the management programs of the pipeline owners for proper operation and maintenance of the pipelines and response to releases from the pipelines. Therefore, additional measures in this Plan to address releases are not necessary. To the extent possible, the City will support any response activities by these other entities in the event of a release from any of the pipelines within the DWSMAs.

C.1.3.2 Sewers

C.1.3.2.1 Sanitary Sewers

The existing and proposed trunk sanitary sewer system in Lakeville is shown on Figure C-16. Since the main Lakeville DWSMA extends into portions of Apple Valley and Farmington, available sanitary sewer maps for these cities are presented in Attachment C-2. Aquifer vulnerability in a portion of the area within the main DWSMA and the entire area within the Well 3 DWSMA is classified as High.

An improperly designed or maintained sanitary sewer system may increase the chance for the release of untreated sewage into environmentally sensitive areas, such as protected wetlands, lakes, and rivers or allow infiltration of untreated sewage in portions of the DWSMAs in which aquifer vulnerability is classified as High that could potentially reach the source water aquifer. The City of Lakeville and other cities whose jurisdictions overlap the main Lakeville DWSMA have ongoing

maintenance programs to insure the integrity and proper operation of their sanitary sewer systems. Additional measures in this Plan to address the sanitary sewers are considered to be unnecessary.

C.1.3.2.2 Storm Sewers

A municipal storm sewer and surface water drainage system plays a significant role in the management of storm water and can be an important part of management strategies developed for a wellhead protection plan. An improperly designed or maintained storm sewer and surface water drainage system may increase the chance for the spread of a contaminant into environmentally sensitive areas such as protected wetlands, lakes, and rivers or allow infiltration of contaminants within areas of the DWSMAs with aquifer vulnerability classified as High that could potentially reach the source water aquifer.

Storm water management in Lakeville is described in the City's Water Resources Management Plan (Barr, 2008). Maps showing the existing elements of the Lakeville storm water management system are shown on Figures 4.2.2, 4.3.2, 4.4.2, 4.5.2, 4.6.2, and 4.7.2 of the City's Water Resources Management Plan. The Lakeville's storm sewer lines are shown on Figure C-17. Title 7 Chapter 7 of the City Code adopts the Water Resources Management Plan. Stormwater management is further addressed in Title 7 Chapter 16 of the City Code.

Since the main Lakeville DWSMA extends into portions of Apple Valley and Farmington, available storm sewer maps for these cities are presented in Attachment C-2.

Issues related to storm water management may potentially have an effect on the management strategies developed for areas in the DWSMAs in which the aquifer vulnerability classification is High. Lakeville, Apple Valley and Farmington have programs in place to address surface water. The City will rely on these existing surface water management programs to address issues related to surface water. Therefore additional measures to address surface water in this Plan are considered to be unnecessary.

C1.4 Water Quantity Data Elements

Surface water and groundwater quantity are discussed in this section. Per the June 20, 2012 Second Scoping Decision Notice from the MDH, submission of data elements related to water quantity is not required for this WHPP.

C1.4.1 Surface Water Quantity

As discussed above, surface water features within the DWSMAs include lakes, ponds, storm water basins, and wetlands. These surface water features in Lakeville are identified and discussed in the City's Water Resources Management Plan (Barr, 2008). Lakeville does not have an appropriations permit to withdraw water from any surface water feature within the DWSMAs. The only permitted surface water withdrawal within the DWSMA is Crystal Lake Golf Course, which has an appropriation permit to withdraw water from ponds on the course. However, the SWUDS database indicates that no withdrawals from the ponds have been reported by the golf course through 2011. Additional measures in this Plan to address surface water quantity issues are considered to be unnecessary.

C1.4.2 Groundwater Quantity

The Lakeville municipal water supply system currently includes 17 wells. As shown in Table C-1, however, Well 3 is Out Long Term and Well 7 is and Emergency Backup Well. Under MDNR Appropriation Permit No. 1980-6107, the City of Lakeville currently has a permitted annual groundwater appropriation of 2.812 billion gallons per year (BGY). The permitted instantaneous total pumping rate for the Lakeville system is 19,300 gallons per minute (gpm) or approximately 27.8 million gallons per day (MGD).

The projected water use (i.e., pumpage) used to delineate the Lakeville WHPAs and DWSMAs was 4,055,710,000 gallons per year (Barr, 2012).

In 1967 most of Lakeville Township merged with the Village of Lakeville to become the 38-square-mile City of Lakeville. Just prior to the 1967 merger, Lakeville Township included 2,100 residents, while the village was home to just under 1,000. By 1970, Lakeville's population had grown to over 7,000. The population approximately doubled from 1970 to 1980 to 14,790. During the period 1980 to 1990 the population of Lakeville increased approximately 70% to 24,854. In 2000 the population of Lakeville was 43,128. In the 2010 census Lakeville had a population of 55,954. As of 2011, Metropolitan Council reported the Lakeville population was 56,534. Lakeville's population is projected to reach 78,400 in 2020 and 88,800 in 2030 according to the City's 2030 Comprehensive Land Use Plan (NAC, 2008.

Water demand for the period 1998 through 2007 is presented in the City's Water Supply Plan (Lakeville, 2008) and total annual volume pumped by the Lakeville municipal wells during the period 2006 through 2010 is presented in Part 1 of this Plan (Barr, 2012). Between 1998 and 2005

Lakeville's water demand increased approximately 38%. From 2005 to 2010 the water demand met by the City increased approximately 12%. During the period 1998 through 2010, the total per capita/day water demand met by the City's water supply system ranged from approximately 103 gallons per capita/day to approximately 135 gallons per capita/day while the residential per capita/day water demand was significantly lower (e.g., Lakeville, 2008).

The Lakeville Comprehensive Water Plan (SEH, 2008) projects the maximum day water demand in 2030 will be approximately 32.6 MGD or approximately 22,700 gpm. Current daily demand on the Lakeville water system averages approximately 6.5 MGD. Maximum day demand (the largest daily water use in a given year) is currently about 19.5 MGD.

The projected water use (i.e., pumpage) used to delineate the Lakeville WHPAs and DWSMAs is 4,055,710,000 gallons per year (Barr, 2012).

As discussed above, in addition to the City of Lakeville municipal wells the PCSI identified 30 high capacity water wells within one mile of the DWSMAs that are listed in the MDNR's SWUDS database as having annual appropriations of more than 1 million gallons. Information on these wells is presented in Table C-11. While the City has dealt with well interference complaints in the past, there are currently no known adverse groundwater conflicts or interferences with the existing Lakeville municipal wells.

Construction of other high capacity wells in or near the DWSMAs may influence groundwater flow in the source water aquifers and the groundwater quantity available to the municipal system. Such wells could potentially affect the boundaries of the DWSMAs, which would require the City to update the Wellhead Protection Plan. In addition, such wells could potentially reduce the static levels in the source water aquifers. Issues regarding changes in appropriations resulting from additions or deletions to the current list of water appropriations in the DWSMAs will be addressed in the management portion of this Plan.

Persistent drought conditions may also prove to be a threat to the quantity of groundwater available to the municipal system. To address potential shortages, Lakeville has in place a water conservation program. Under Title 7 Chapter 5 of the Lakeville City Code emergency water use restrictions can be established when a water supply shortage threatens the City. In addition, the City has put in place restrictions on sprinkling from May 1 to September 30 of each year. The program restricts watering of lawns, sod, or seeded areas to either odd or even days of the month, depending on the property address. During the period in which restrictions are in place sprinkling is banned between 11:00 a.m.

and 5:00 p.m. daily. There is a 30-day exception from the sprinkling restrictions for watering of new landscaping, sod, or seed. In addition, the restrictions do not apply to limited hand watering of plants using a hose or if a private water source is used.

The City of Lakeville's current water supply meets the demand of its consumers. The City is confident that the municipal water supply system will continue to have the capability of meeting future demand.

C1.5 Water Quality Data Elements

Surface water and groundwater quality are discussed in this section. Per the June 20, 2012 Second Scoping Decision Notice from the MDH, submission of data elements related to water quality are not required for this WHPP.

C1.5.1 Surface Water Quality

The City's Water Resources Management Plan (Barr, 2008) identifies and addresses surface water issues. The Plan establishes the framework of a comprehensive program that is aimed at protecting and improving the quality of existing surface water resources within the City and provides guidelines for current and future urban development.

C1.5.2 Groundwater Quality

The MDH has an ongoing program to monitor the quality of municipal water supplies. City of Lakeville municipal wells are sampled at least once every year for selected metals, other inorganic compounds, organic compounds, and bacteria as part of this program. To date, reported concentrations of all monitoring parameters meet the regulatory levels specified by the U.S. EPA as part of the Safe Drinking Water Act or by the State of Minnesota. These results are presented in the Lakeville Drinking Water Annual Report. A copy of the 2011 Lakeville Consumer Confidence Report is presented in Appendix D.

In addition to the MDH sampling program, the City collects 60 random samples in the distribution system every month and has the samples analyzed for bacteria. The results of the sampling are submitted to the MDH. The City also tests chlorine residuals at each location where these samples are collected. The City does not have any additional water quality data for the source water aquifer within the DWSMAs beyond that obtained by the MDH and City sampling programs.

The City treats water pumped from its water supply wells in a 20 MGD capacity iron/manganese removal (gravity filtration following chlorination and sodium permanganate addition). After filtering, the water is treated again with chlorine as well as fluoride and potassium orthophosphate. Iron and manganese slurry is discharged to the sanitary sewer via a timed valve.

The MDH has prepared a study for Dakota County which evaluates the relative susceptibility of the water table aquifer to contamination from nitrate (as well as other contaminants) (MDH, 2012b). Some of the areas of high susceptibility identified by the MDH are within the Lakeville DWSMAs. In areas of the DWSMAs where the vulnerability of the uppermost source water aquifer is classified as High, the travel time from the water table aquifer to the uppermost source water aquifer would be short. In areas of the main DWSMA where the vulnerability of the uppermost source water aquifer is classified as Moderate or Low the travel time from the water table aquifer to the uppermost source water aquifer would be significantly longer than in an area of High vulnerability.

It's important to consider groundwater quality when determining management strategies for the land uses within the DWSMAs. Since the City currently enjoys good water quality, the City has developed management strategies in this WHPP aimed at maintaining the groundwater quality in the source water aquifers.

C1.6 Assessment of Data Elements

C1.6.1 Use of the Municipal Wells

Lakeville currently has 17 active wells in the municipal water supply and distribution system for Public Water Supply 1190015. One of these wells is out long term and one of the wells is used as an emergency backup well. Locations of the wells are shown on Figure C-1 and construction details for the Lakeville municipal wells are summarized in Table C-1. Copies of the MDH well records for these wells are presented in Appendix A.

In the 2010 census Lakeville had a population of 55,954. Per Lakeville's 2030 Comprehensive Land Use Plan (NAC, 2008), the population in the City is projected to reach 78,400 in 2020 and 88,800 in 2030.

As discussed above, the City's projected water demand in 2030 will be approximately 32.6 MGD while current daily demands on the Lakeville water system average about 6.5 MGD. Lakeville's permitted appropriation volume is 2.812 BGY. The permitted instantaneous total pumping rate for the Lakeville system is 19,300 gpm.

Lakeville currently has six water storage facilities consisting of four elevated storage reservoirs, one ground storage reservoir, and one underground reservoir. These reservoirs have a combined useable storage capacity of 7.85 million gallons.

Based on the City's Comprehensive Water Plan (SEH, 2008), it is projected that the City will construct up to ten additional water supply wells before 2030. Actual construction dates for additional wells will depend on demand growth. It is expected the new wells would be completed in the Prairie du Chien/Jordan Aquifer.

C1.6.2 Wellhead Protection Area Criteria

Delineation of the WHPAs for the Lakeville wells involved the evaluation of both porous-media and fracture flow. Information/criteria used to perform the groundwater flow modeling for the Lakeville WHPA/DWSMA delineations are discussed in the WHPA delineation report (Amendment to Part 1 of this WHPP prepared by Barr, 2012) and summarized below.

C1.6.2.1Time of Travel

A 10-year time of travel was used for the WHPA delineation for each of the Lakeville municipal wells. A map in the Part 1 report shows the 10-year time of travel WHPAs for the Lakeville wells.

C1.6.2.2Aquifer Transmissivity

Pumping tests conducted at Wells 18 and 19 were used to determine the transmissivity of the Tunnel City-Wonewoc aquifers and Prairie du Chien-Jordan aquifers, respectively. A summary of those pumping test results is included in Appendix B of the Part 1 WHPP Amendment report. Results from the pumping tests were incorporated into the groundwater flow model as discussed in the WHPP Part 1 Amendment report (Barr, 2012).

C1.6.2.3Daily Volume of Water Pumped

Daily volume of water pumped from each of Lakeville's municipal wells used in the groundwater flow model was determined by using the highest recorded or projected pumping volume for each well. Determination of the daily volume of water pumped for each well used in the groundwater flow models is discussed in detail in Barr (2012).

C1.6.2.4Flow Boundaries

The major groundwater flow boundary in the Lakeville area is the Minnesota River to the north. The Vermillion River to the south likely acts as a flow boundary for groundwater flow at the water table and upper bedrock but likely has little influence on the deeper bedrock conditions (Metropolitan

Council, 2009). Details on the groundwater flow boundaries used for groundwater flow modeling are presented in Metropolitan Council (2009). Major rivers and lakes within the model domain are simulated using the River Package within MODFLOW.

C1.6.2.5Groundwater Flow Field

The groundwater flow field used for delineation of the WHPAs was determined by the groundwater flow model and is consistent with that shown in Sanocki et al. (2009).

C1.6.3 Quantity and Quality of Water Supplying the Public Water Supply Wells

As discussed above, 16 of the 17 Lakeville municipal wells are open to only the Jordan Sandstone or both the Prairie du Chien Group and Jordan Sandstone. Well 18 is open to the Tunnel City Group and Wonewoc Sandstone. Construction details for the Lakeville municipal wells are summarized in Table C-1. Construction of Well 18 was completed in 2007. During the period 2008 through 2011, the volume of water the City pumped from the Tunnel City Group and Wonewoc Sandstone was never more than approximately 8.5% of the annual total pumped from the municipal wells. Thus, the Prairie du Chien Group and Jordan Sandstone are the major source water aquifers for the City of Lakeville.

Based on the available information, there are no known groundwater quantity issues that will have any significant impact on the management of the DWSMAs associated with the Lakeville wells. While it is possible that high capacity wells completed in the Prairie Du Chien Group or Jordan Sandstone in the vicinity of Lakeville or within the DWSMAs could affect the quantity of groundwater available, there are currently no known significant conflicts or interferences related to the municipal wells in the DWSMAs. It is anticipated that the DWSMAs will expand in the future as Lakeville installs additional wells in the source water aquifers. New wells constructed within the 10-year life time of this Plan will be incorporated, as directed by the MDH, into the groundwater model and, if projected pumping from the new wells affects the boundaries of the DWSMAs, Plan amendments will be prepared with the help of the Wellhead Protection Consultant.

C1.6.4 Land and Groundwater Uses in the DWSMA

Aquifer vulnerability within the DWSMAs ranges from Low to High. In the main Lakeville DWSMA, the aquifer vulnerability is classified as High in approximately 17% of the area in the DWSMA. The aquifer vulnerability is classified as Moderate in approximately 11% of the area and as Low in approximately 72% of the area. In the Well 3 DWSMA, the aquifer vulnerability is classified as High throughout the entire DWSMA. When the DWSMAs are taken together, the

aquifer vulnerability is classified as High in approximately 18% of the total area within the Lakeville DWSMAs; approximately 11% of the area is classified as Moderate vulnerability and approximately 71% of the area is classified as Low vulnerability. Land uses within the DWSMAs could affect source water protection efforts or the management of the DWSMAs. In particular, unmaintained, damaged, poorly-constructed, unused, or incorrectly abandoned wells could provide a direct route for contaminants to enter the source water aquifer(s).

As discussed by Barr (2012), the DWSMAs were delineated to encompass the zone in which groundwater travel time to the Lakeville municipal wells is ten years or less. The DWSMAs encompass the WHPAs as described above and are defined by geographically identifiable features. The main Lakeville DWSMA extends into portions of the cities of Apple Valley and Farmington.

Potential contaminant sources within the DWSMAs identified through the PCSI include wells, storage tank sites, potential Class V well locations, hazardous waste generators, chemical storage locations, dump and spill sites, and ISTS. These potential contaminant sources will be considered when developing the management strategies for the Lakeville DWSMAs.

C2.0 References

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Tables

Table C-1

Lakeville Municipal Well Construction Summary
City of Lakeville

Well Name	Unique Number	Status/ Use[1]	Year Constructed/ Reconstructed	Total Depth (ft bgs)	Casing Diameter (in.)	Depth to Top of Open Interval (ft bgs)	Well Vulnerability Status[2]	Aquifer
Well 2	207708	A, P	1964	517	24x16	434	Not Vulnerable	Jordan SS
Well 3	207727	A, OLT	1968	460	24x16	363	Vulnerable	Jordan SS
Well 4	212650	A, P	1969	505	24x16	434	Vulnerable	Jordan SS
Well 6	161409	A, P	1980	682	24x16	591	Not Vulnerable	Jordan SS
Well 7	161439	A, E	1984	479	24x18	375	Not Vulnerable	Jordan SS
Well 8	433296	A, P	1989	615	24x18	522	Vulnerable	Jordan SS
Well 9	554192	A, P	1994	608	24x18	406	Not Vulnerable	Prairie du Chien Gp/Jordan SS
Well 10	554193	A, P	1994	616	24x18	425	Not Vulnerable	Prairie du Chien Gp/Jordan SS
Well 11	554215	A, P	1996	637	24x18	415	Not Vulnerable	Prairie du Chien Gp/Jordan SS
Well 12	562991	A, P	1997	585	24x18	380	Not Vulnerable	Prairie du Chien Gp/Jordan SS
Well 13	596650	A, P	1999	611	24x18	416	Not Vulnerable	Prairie du Chien Gp/Jordan SS
Wels 14	603073	A, P	2001	600	24x18	365	Not Vulnerable	Prairie du Chien Gp/Jordan SS
Well 15	651737	A, P	2001	515	24x18	412	Vulnerable	Jordan SS
Well 16	655907	A, P	2003	570	24x18	466	Not Vulnerable	Jordan SS
Well 17	694913	A, P	2004	607	24x18	415	Not Vulnerable	Prairie du Chien Gp/Jordan SS
Well 18	745558	A, P	2007	864	18x12	667	Not Vulnerable	Tunnel City Gp/Wonewoc SS
Well 19	686288	A, P	2009	545	24x18	341	Not Vulnerable	Prairie du Chien Gp/Jordan SS

[1] A = Active
P = Primary water supply well
E = Emergency well
OLT = Out Long Term

[2] See Barr, 2012
bgs = below ground surface

Table C-2

Potential Contaminant Source Inventory Data Sources
City of Lakeville

Potential Contaminant Source Type	Data Source(s)
Chemical Storage Sites	MPCA WIMN database
Dump and Spill Sites	MPCA WIMN database
Hazardous Waste Generator Locations	MPCA WIMN database
Individual Sewage Treatment System Locations	
Potential Class V Well Locations	MPCA WIMN data; Google Address Inventory
Storage Tanks	MPCA, Dakota County Tank Data (provided by Dakota County - Department of Environmental Services); MPCA TALES database (LUST locations)
Wells	MGS CWI Database; City of Lakeville; MDNR SWUDS database
Other Data Type	**Data Source(s)**
Aquifer Vulnerability	dwsvul.shp - MDH Environmental Health Division - Source Water
Current Land Use	Met Council 2010 Generalized Land Use
Historical Land Use	
Planned Land Use	Met Council 2030 Generalized Interpreted Land Use
Bedrock Geology	bgpg2000.shp - MGS
Pipelines	mnpipe.shp - MGIO & MnOPS 1996
Soils (Cover)	soilmu_a_mn019.shp (Carver County) and soilmu_a_mn053.shp (Hennepin County) - USDA SSURGO
Soils (Hydrologic)	soilmu_a_mn019.shp (Carver County) and soilmu_a_mn053.shp (Hennepin County) - USDA SSURGO

Acronyms

CWI - County Well Index
LUST - Leaking Underground Storage Tank
Met Council - Metropolitan Council
MDA - Minnesota Department of Agriculture
MDH - Minnesota Department of Health
MDNR - Minnesota Department of Natural Resources
MGIO - Minnesota Geospatial Information Office
MGS - Minnesota Geological Survey
MnOPS - Minnesota Office of Pipeline Safety
MPCA - Minnesota Pollution Control Agency
SWUDS - State Water Use Data System
WIMN - What's In My Neighborhood

Table C-3

PCSI Results - Wells Within the DWSMAs
City of Lakeville

Map ID	Unique No.	Status	Use	Well Location	City or Twp	PID No.	Well Owner	PCS Code	Facility Code	Facility Designation	Total/Sealed Depth (feet)	Date Completed/Sealed	Aquifer	Location Verified
2	207708	Active	Community Supply (Municipal)	Gerding Pa	Lakeville	037-222110000060	Lakeville 2	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	517	07/17/1964	CJDN	Yes
3	207727	Active	Community Supply (Municipal)	Hamburg Av	Lakeville	037-220330005011	Lakeville 3	WEL	6200	Public Administration Establishments	460	09/30/1968	CJDN	Yes
4	212650	Active	Community Supply (Municipal)	167 Street	Lakeville	037-222110000040	Lakeville 4	WEL	6200	Public Administration Establishments	505	05/30/1969	CJDN	Yes
6	161409	Active	Community Supply (Municipal)	185 Street N	Lakeville	037-220180025022	Lakeville 6	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	682	08/13/1980	CJDN	Yes
8	433296	Active	Community Supply (Municipal)	185th Street W	Lakeville	037-227300000010	Lakeville 8	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	615	07/21/1989	CJDN	Yes
9	554192	Active	Community Supply (Municipal)	185th Street	Lakeville	037-220180054012	Lakeville 9	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	608	12/00/1994	OPCJ	Yes
10	554193	Active	Community Supply (Municipal)	185th Street	Lakeville	037-224178001010	Lakeville 10	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	616	12/00/1994	OPCJ	Yes
11	554215	Active	Community Supply (Municipal)	Ipava Av	Lakeville	037-224437500010	Lakeville 11	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	637	07/26/1996	OPCJ	Yes
12	562991	Active	Community Supply (Municipal)	18500 Dodd Rd	Lakeville	037-220170025012	Lakeville 12	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	585	05/01/1997	OPCJ	Yes
13	596650	Active	Community Supply (Municipal)	20195 Holyoke Av W	Lakeville	037-227950001010	Lakeville 13	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	611	07/02/1999	OPCJ	Yes
14	603073	Active	Community Supply (Municipal)	Not Available	Lakeville	037-220170025012	Lakeville 14	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	600	07/11/2001	OPCJ	Yes
15	651737	Active	Community Supply (Municipal)	192nd Street	Lakeville	037-227582500100	Lakeville 15	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	515	02/28/2001	CJDN	Yes
16	655907	Active	Community Supply (Municipal)	18988 Iron River Tr	Lakeville	037-227582500050	Lakeville 16	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	570	02/00/2003	CJDN	Yes
17	694913	Active	Community Supply (Municipal)	17100 Ipava Av	Lakeville	037-220080025013	Lakeville 17	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	607	06/01/2004	OPCJ	Yes
18	745558	Pending (Edited)	Community Supply (Municipal)	18400 Ipava Av	Lakeville	037-224178001010	Lakeville 18	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	864	02/00/2007	CFIG	Yes
19	686288	Active	Community Supply (Municipal)	17191 Gerdine Pa	Lakeville	037-220100025021	Lakeville 19	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	545	05/00/2009	OPCJ	Yes
20	126526	Active	Irrigation	Not Available	Lakeville	037-221150005181	Cross Nurseries	WEL	2100	Retail Sales or Service	305	03/11/1977	MTPL	No
21	443364	Sealed	Abandoned	21400 Hamburg Av	Lakeville	037-221110001084	Aptus Environmental Svcs	WEL	4342	Hazardous Waste Treatment and Disposal	25	09/29/1988	Unconsolidated Sediments (Edited)	Yes
22	443363	Sealed	Abandoned	21400 Hamburg Av	Lakeville	037-221110001084	Aptus Environmental Svcs	WEL	4342	Hazardous Waste Treatment and Disposal	25	09/29/1988	Unconsolidated Sediments (Edited)	Yes
23	441885	Active	Domestic	6885 160th Street W	Apple Valley	037-010340076020	Pahl, Wayne	WEL	1100-01	Residence	220	04/30/1988	Not Available	No
24	186314	Active	Domestic	Flagstaff Av	Lakeville	037-222670000040	Elias, Steve	WEL	1100-01	Residence	215	03/01/1982	Not Available	No
25	174671	Active	Domestic	18660 Highview Av W	Lakeville	037-220160054012	Habor, William	WEL	1000	All Establishments Offering Residence	300	03/19/1980	Not Available	Yes
26	441288	Active	Domestic	18412 Italy Av	Lakeville	037-227300000041	Wenzel, Jim	WEL	1000	All Establishments Offering Residence	325	06/07/1989	St Peter (Edited)	Yes
27	431630	Sealed	Abandoned	Mn 50 & 35w Lm	Lakeville	037-222890000010	Mw	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	18	08/14/1987	Unconsolidated Sediments (Edited)	No
28	446966	Sealed	Abandoned	Not Available	Lakeville	037-220030052010	Mw-2	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	22	11/02/1988	Unconsolidated Sediments (Edited)	No
29	446965	Sealed	Abandoned	Not Available	Lakeville	037-220030052010	Mw-1	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	22	11/02/1988	Unconsolidated Sediments (Edited)	No
30	466211	Active (Edited)	Domestic	19480 Iteri Av	Lakeville	037-220190019010	Hanson, John	WEL	1000	All Establishments Offering Residence	175	09/13/1990	St Peter (Edited)	Yes
31	150184	Active	Domestic	11020 181st Street W	Lakeville	037-226330003070	Lundeen, Mark	WEL	1000	All Establishments Offering Residence	300	06/02/1984	St Peter (Edited)	Yes
32	150182	Active (Edited)	Domestic	11062 181st Street W	Lakeville	037-226330003060	Not Available	WEL	1000	All Establishments Offering Residence	300	09/17/1984	Prairie du-Chien Dolomite (Edited)	Yes
33	190466	Sealed	Abandoned	10200 165 Street W	Lakeville	037-223335201010	Jones, Brad	WEL	1100-01	Residence	261	11/09/1977	St Peter (Edited)	No
34	196586	Active	Other	Not Available	Lakeville	037-222670000040	Encon Util.	WEL	4000	Transporation, Communication, Information, and Utilities	31	09/29/1983	Not Available	No
35	216324	Active	Unknown	Not Available	Lakeville	037-220160080011	Larson, Darrell	WEL	1000	All Establishments Offering Residence	165	09/18/1967	Not Available	No
36	216245	Active	Domestic	17670 Jaguar Ct	Lakeville	037-225350003130	Muellner, Ed	WEL	1000	All Establishments Offering Residence	320	05/23/1974	Not Available	Yes
37	255694	Active	Domestic	11080 181st Street W	Lakeville	037-226330003050	Erickson, Dan	WEL	1000	All Establishments Offering Residence	300	09/19/1984	Not Available	Yes
38	216360	Active	Unknown	Not Available	Lakeville	037-220160080011	Mcdonald, Mike	WEL	1000	All Establishments Offering Residence	400	03/27/1972	Not Available	No
39	427495	Active	Domestic	19521 Iteri Av	Lakeville	037-220190078010	Thorman, Jerry	WEL	1000	All Establishments Offering Residence	201	05/11/1988	Not Available	Approximate
40	239828	Active	Unknown	Not Available	Lakeville	Not Available	Donnay Apts	WEL	1100-02	Apartment or condominium	96	06/26/1972	Not Available	No
41	240158	Active	Unknown	Not Available	Lakeville	037-220160076011	Harris Plumbing	WEL	2000	General Sales and Service	195	06/07/1973	Not Available	No
42	451527	Active	Domestic	8315 190th Street W	Lakeville	037-220160059010	Hoffman, Tom	WEL	1000	All Establishments Offering Residence	295	08/02/1988	Not Available	Yes
43	403269	Active	Dewatering Well	Not Available	Lakeville	037-220110003012	Dw	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	35	07/14/1984	Not Available	No
44	403263	Active	Other	Not Available	Apple Valley	037-017589301010	Lake Area Utilities Con.	WEL	4000	Transporation, Communication, Information, and Utilities	43	11/05/1984	Not Available	No
45	508112	Unknown	Domestic	18751 Kenyon Av	Lakeville	037-225665001060	Golden Home Bldrs	WEL	1000	All Establishments Offering Residence	135	10/27/1989	Unconsolidated Sediments (Edited)	Yes
46	471524	Sealed (Edited)	Monitor Well	17380 Kenrick Av	Lakeville	037-221185000173	Mw-2	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	14	11/01/1990	Unconsolidated Sediments (Edited)	Approximate
47	471523	Sealed	Abandoned	71380 Kenrick Av	Lakeville	037-221185000173	Mw-3	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	16	11/01/1990	Unconsolidated Sediments (Edited)	Approximate
48	471522	Sealed	Abandoned	17380 Kenrick Av	Lakeville	037-221185000173	Mw-4	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	14	11/01/1990	Unconsolidated Sediments (Edited)	Approximate
49	471521	Sealed	Abandoned	17380 Kenrick Av	Lakeville	037-221185000173	Mw-1	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	31	10/31/1990	Unconsolidated Sediments (Edited)	Approximate
50	405788	Sealed (Edited)	Monitor Well	7468 167th Street W	Lakeville	037-222110000030	Mw-10	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	21	07/31/1986	Unconsolidated Sediments (Edited)	Yes
51	405787	Sealed	Abandoned	7468 167th Street W	Lakeville	037-222110000030	Rc-1	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	27	07/23/1986	Unconsolidated Sediments (Edited)	Yes
52	405786	Sealed	Abandoned	7468 167th Street W	Lakeville	037-222110000030	Mw-9	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	22	07/22/1986	Unconsolidated Sediments (Edited)	Yes
53	405785	Sealed	Abandoned	7468 167th Street W	Lakeville	037-222110000030	Mw-8	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	22	05/08/1986	Unconsolidated Sediments (Edited)	Yes
54	405784	Sealed	Abandoned	7468 167th Street W	Lakeville	037-222110000030	Mw -7	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	21	05/07/1986	Unconsolidated Sediments (Edited)	Yes
55	405783	Sealed	Abandoned	7468 167th Street W	Lakeville	037-222110000030	Mw-6	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	22	05/07/1986	Unconsolidated Sediments (Edited)	Yes
56	405782	Sealed	Abandoned	7468 167th Street W	Lakeville	037-222110000030	Mw-5	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	22	05/07/1986	Unconsolidated Sediments (Edited)	Yes
57	405781	Sealed	Abandoned	7468 167th Street W	Lakeville	037-222110000030	Mw-4	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	22	05/07/1986	Unconsolidated Sediments (Edited)	Yes
58	405780	Sealed	Abandoned	7468 167th Street W	Lakeville	037-222110000030	Mw-3	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	22	05/08/1986	Unconsolidated Sediments (Edited)	Yes
59	405779	Sealed	Abandoned	7468 167th Street W	Lakeville	037-222110000030	Mw-2	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	22	05/09/1986	Unconsolidated Sediments (Edited)	Yes
60	405778	Sealed	Abandoned	7468 167th Street W	Lakeville	037-222110000030	Mw-1	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	21	05/07/1986	Unconsolidated Sediments (Edited)	Yes
61	503216	Active	Domestic	18621 Kenyon Av	Lakeville	037-225665001060	Henning, John	WEL	1000	All Establishments Offering Residence	230	09/30/1989	Prairie du-Chien Dolomite (Edited)	Approximate
62	590540	Active	Domestic	19282 Dodd Bl	Lakeville	037-220200027010	Weibe, Bruce	WEL	1100-01	Residence	201	09/03/1997	Unknown	Yes
63	552477	Sealed (Edited)	Monitor Well	7468 167th Street W	Lakeville	037-222110004090	Mw-2	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	17	09/07/1994	Unconsolidated Sediments (Edited)	Yes
64	547291	Active	Domestic	8280 190th Street	Lakeville	037-220210028013	Kozulla, Dean	WEL	1000	All Establishments Offering Residence	300	07/13/1994	Prairie du-Chien Dolomite (Edited)	Yes
65	547401	Sealed	Abandoned	10812 175th Street W	Lakeville	037-221187501013	Mw	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	15	06/23/1994	Unconsolidated Sediments (Edited)	Approximate
66	547400	Sealed	Abandoned	10812 175th Street W	Lakeville	037-221187501013	Mw	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	34	06/23/1994	Unconsolidated Sediments (Edited)	Approximate
67	584257	Active	Elevator Shaft	19795 Holyoke Av	Lakeville	037-221130101010	All Saints Catholic Chur	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	17	06/14/1996	Not Available	Yes
68	624800	Active	Elevator Shaft	15500 Galaxie Av S	Apple Valley	037-017589301010	Haight Construction	WEL	7000	Construction-Related Business	45	05/05/1999	Not Available	Approximate
69	544034	Active	Elevator Shaft	Rr 3 Box 152	Apple Valley	037-014910001090	Haight, Steve	WEL	1100-01	Residence	23	04/12/1994	Not Available	No
70	544033	Active	Elevator Shaft	Rr 3 Box 152	Apple Valley	037-014910001090	Haight, Steve	WEL	1100-01	Residence	23	04/27/1994	Not Available	No
71	604370	Active	Domestic	17894 Flagstaff Av	Lakeville	037-220110052010	Mc Kinley, Paul	WEL	1100-01	Residence	200	11/06/1997	St Peter (St. Peter)	Yes
72	544036	Active	Elevator Shaft	Rr 3 Box 152	Apple Valley	037-014910001090	Haight, Steve	WEL	1100-01	Residence	23	05/27/1994	Not Available	No
73	544035	Active	Elevator Shaft	Rr 3 Box 152	Apple Valley	037-014910001090	Haight, Steve	WEL	1100-01	Residence	23	04/13/1994	Not Available	No
74	527244	Sealed	Abandoned	7773 214th Street	Lakeville	037-221105000040	Mw-2	WEL	6200	Public Administration Establishments	12	10/12/1993	Not Available	Approximate
75	527243	Sealed	Abandoned	7773 214th Street	Lakeville	037-221105000040	Mw-3	WEL	6200	Public Administration Establishments	12	10/12/1993	Not Available	Approximate
76	527242	Sealed	Abandoned	7773 214th Street	Lakeville	037-221105000040	Mw-1	WEL	6200	Public Administration Establishments	12	10/12/1993	Unconsolidated Sediments (Edited)	Approximate
77	489709	Active	Domestic	11083 181st Street W	Lakeville	037-226330002020	Thorman, Jerry	WEL	1000	All Establishments Offering Residence	336	07/30/1991	Prairie du-Chien Dolomite (Edited)	Yes

Table C-3

PCSI Results - Wells Within the DWSMAs
City of Lakeville

Map ID	Unique No.	Status	Use	Well Location	City or Twp	PID No.	Well Owner	PCS Code	Facility Code	Facility Designation	Total/Sealed Depth (feet)	Date Completed/Sealed	Aquifer	Location Verified
78	615146	Active	Elevator Shaft	9300 185th Street W	Lakeville	037-224442501010	Isd #194	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	16	08/14/1998	Not Available	Yes
79	540194	Active	Domestic	18345 Ipava Av	Lakeville	037-220180009012	Halverson,john & Mary Jo	WEL	1000	All Establishments Offering Residence	280	04/19/1994	Not Available	Yes
80	649008	Sealed (Edited)	Abandoned	17805 Dodd Bl	Lakeville	037-220090052010	Joe Miller Farms	WEL	9000	Agriculture, Forestry, Fishing, and Hunting	180	07/13/2000	St Peter (Edited)	Approximate
81	W0000539	Active	Domestic	Not Available	Lakeville	Not Available	Artes, K.m.	WEL	1000	All Establishments Offering Residence	0	Not Available	Not Available	No
82	610417	Active	Domestic	8790 195 Street W	Lakeville	037-226650001120	Kari, David	WEL	1000	All Establishments Offering Residence	190	03/05/1999	St Peter (Edited)	Yes
83	502777	Active	Domestic	Kenrick Av	Lakeville	037-220240027011	Midwest Asphalt	WEL	3000	Manufacturing and Wholesale Trade	220	08/10/1989	Not Available	No
84	504637	Active	Monitor Well	17471 Kenwood Tr	Lakeville	037-221140001010	Mw-5	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	18	05/11/1987	Not Available	Yes
85	504636	Active	Monitor Well	17471 Kenwood Tr	Lakeville	037-221140001010	Mw-4	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	18	05/11/1987	Unconsolidated Sediments (Edited)	Yes
86	504635	Active	Monitor Well	17471 Kenwood Tr	Lakeville	037-221140001010	Mw-3	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	18	05/11/1987	Not Available	Yes
87	504634	Active	Monitor Well	17471 Kenwood Tr	Lakeville	037-221140001010	Mw-2	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	18	05/11/1987	Unconsolidated Sediments (Edited)	Yes
88	504633	Active	Monitor Well	17471 Kenwood Tr	Lakeville	037-221140001010	Mw-1	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	18	05/11/1987	Unconsolidated Sediments (Edited)	Yes
89	512870	Active	Domestic	11170 181st Street W	Lakeville	037-226330003010	Southward, Donald & Cath	WEL	1000	All Establishments Offering Residence	260	07/21/1992	Unconsolidated Sediments (Edited)	Yes
90	518801	Active	Domestic	17819 Cedar Av	Lakeville	037-220090081010	Lyndale Garden Center	WEL	1000	All Establishments Offering Residence	280	11/03/1992	St Peter (Edited)	Approximate
91	545125	Active	Domestic	11094 181st Street W	Lakeville	037-226330003040	Loesch, Charles	WEL	1000	All Establishments Offering Residence	290	08/01/1994	Prairie du-Chien Dolomite (Edited)	Yes
92	504641	Sealed	Abandoned	17471 Kenwood Tr	Lakeville	037-221140001010	Mw-9	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	18	05/12/1987	Unconsolidated Sediments (Edited)	Yes
93	504640	Sealed	Abandoned	17471 Kenwood Tr	Lakeville	037-221140001010	Mw-8	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	18	05/12/1987	Unconsolidated Sediments (Edited)	Yes
94	504639	Active	Monitor Well	17471 Kenwood Tr	Lakeville	037-221140001010	Mw-7	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	18	05/12/1987	Unconsolidated Sediments (Edited)	Yes
95	504638	Active	Monitor Well	17471 Kenwood Tr	Lakeville	037-221140001010	Mw-6	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	18	05/12/1987	Not Available	Yes
96	526581	Active	Irrigation	19600 Ipava Av	Lakeville	037-224436001010	Ind. Sch. Dist. #194	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	275	06/08/1993	Prairie du-Chien Dolomite (Edited)	Yes
97	524121	Active	Domestic	8356 190th Street	Lakeville	037-220210028015	Ratzlaff, Colleen	WEL	1000	All Establishments Offering Residence	280	02/02/1993	Unconsolidated Sediments (Edited)	Yes
98	469669	Sealed	Abandoned	7468 167th Street W	Lakeville	037-222110004090	Mw-2	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	20	Not Available	Unconsolidated Sediments (Edited)	Yes
99	469668	Sealed	Abandoned	7468 167th Street W	Lakeville	037-222110004090	Mw-1	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	20	Not Available	Unconsolidated Sediments (Edited)	Yes
100	475659	Active	Other	17380 Kenrick Av	Lakeville	037-221185000173	Sb-4	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	16	10/31/1990	Not Available	Approximate
101	475658	Active	Other	17380 Kenrick Av	Lakeville	037-221185000173	Sb-3	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	16	10/31/1990	Not Available	Approximate
102	475656	Active	Other	17380 Kenrick Av	Lakeville	037-221185000173	Sb-1	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	21	10/31/1990	Not Available	Approximate
103	585193	Active	Domestic	8739 172nd Street	Lakeville	037-220080007010	Claymore, Bob	WEL	1000	All Establishments Offering Residence	240	01/29/1997	St Peter (Edited)	Yes
104	584894	Sealed (Edited)	Irrigation	17085 Firtree Pl	Lakeville	037-224810001060	Martin, Bill	WEL	9000	Agriculture, Forestry, Fishing, and Hunting	15	08/03/1996	Unconsolidated Sediments (Edited)	Yes
105	573808	Active	Domestic	18685 Highview Ave	Lakeville	037-220170075030	Friedges, John	WEL	1000	All Establishments Offering Residence	300	03/06/1996	St Peter (Edited)	Yes
106	595076	Active	Domestic	17745 Flagstaff Av	Lakeville	037-223094508010	Jenson, Tom	WEL	1000	All Establishments Offering Residence	220	09/29/1997	St Peter (Edited)	Yes
107	584289	Active	Elevator Shaft	5580 170th Street W	Lakeville	037-222650001010	Isd#192	WEL	6100	Schools	7	08/19/1996	Not Available	Yes
108	W0000441	Active	Domestic	7205 167th Ct W	Lakeville	037-222110104360	Meyerhoff, S.	WEL	1100-01	Residence	0	Not Available	Not Available	Yes
109	571179	Active	Irrigation	17065 Firtree Pl	Lakeville	037-224810001080	Malburg, Anthony	WEL	9000	Agriculture, Forestry, Fishing, and Hunting	15	06/16/1996	Not Available	Yes
110	530065	Active	Irrigation	16725 Inns Brook Drive	Lakeville	037-221858500032	Crystal Lake Golf Club	WEL	5000	Arts, Entertainment, and Recreation	500	06/30/1993	Prairie du-Chien Dolomite (Edited)	Yes
111	W0000420	Active	Domestic	8159 190th Street E	Lakeville	037-220160062012	Vogen, A.	WEL	1000	All Establishments Offering Residence	0	00/00/1969	Not Available	Yes
112	518170	Active	Domestic	11130 181st Street W	Lakeville	037-226330003020	Minor, William	WEL	1000	All Establishments Offering Residence	265	09/29/1992	Prairie du-Chien Dolomite (Edited)	Yes
113	517375	Active	Domestic	9925 Iteri Ct W	Lakeville	037-220190077010	Casey, John & Lynne	WEL	1000	All Establishments Offering Residence	201	07/08/1993	St Peter (Edited)	Yes
114	664132	Active	Domestic	8730 195th Street W	Lakeville	037-226650001100	Rosenbush, Merlin	WEL	1000	All Establishments Offering Residence	300	08/06/2001	Prairie du-Chien Dolomite (Edited)	Yes
115	W0000358	Active	Domestic	18065 Ixonia Ave	Lakeville	037-224740002051	Hammond, R.	WEL	1000	All Establishments Offering Residence	0	Not Available	Not Available	Yes
116	660834	Active	Domestic	8481 198th Street W	Lakeville	037-220210051013	Rolfing, David	WEL	1000	All Establishments Offering Residence	280	06/27/2001	St Peter (Edited)	Yes
117	664118	Active	Domestic	19266 Cedar Av	Lakeville	037-220220025014	Thomas, Paul	WEL	1000	All Establishments Offering Residence	270	07/26/2001	Prairie du-Chien Dolomite (Edited)	Yes
118	645044	Sealed (Edited)	Abandoned	153rd & Foilage Av Lm	Apple Valley	Not Available	Dw	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	40	05/30/2003	Unconsolidated Sediments (Edited)	No
119	686713	Active	Monitor Well	20195 Holyoke Av	Lakeville	037-223205001010	Mw	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	335	12/09/2002	Prairie du-Chien Dolomite (Edited)	Yes
120	700685	Active	Domestic	8450 190th Street W	Lakeville	037-220210028014	Leipnipz, Andy	WEL	1000	All Establishments Offering Residence	360	06/17/2004	Not Available	Yes
121	696094	Active	Domestic	19390 Iteri Av	Lakeville	037-220190014010	Eggum, Blaine	WEL	1000	All Establishments Offering Residence	180	08/22/2003	St Peter (Edited)	Yes
122	698174	Active	Irrigation	6885 160th Street W	Apple Valley	037-010340076020	Pahl's Market	WEL	9000	Agriculture, Forestry, Fishing, and Hunting	220	12/01/2003	Not Available	No
123	605942	Active	Domestic	18835 Kenyon Av	Lakeville	037-225665001040	Wintheiser, Dave	WEL	1000	All Establishments Offering Residence	240	07/02/1998	Prairie du-Chien Dolomite (Edited)	Yes
124	630251	Active	Elevator Shaft	15500 Galaxie Av S	Apple Valley	037-017589301010	Haight Construction	WEL	7000	Construction-Related Business	45	05/03/1999	Not Available	Approximate
125	657946	Active	Domestic	8610 195th Street W	Lakeville	037-226650001060	Heintz, Marv	WEL	1000	All Establishments Offering Residence	340	07/16/2001	Prairie du-Chien Dolomite (Edited)	Yes
126	733221	Sealed (Edited)	Monitor Well	17380 Kennrick Av	Lakeville	037-221185000173	Mw-1	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	14	12/15/2005	Unconsolidated Sediments (Edited)	Approximate
127	733220	Sealed (Edited)	Monitor Well	17380 Kennrick Av	Lakeville	037-221185000173	Mw-2	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	30	12/15/2005	Unconsolidated Sediments (Edited)	Approximate
128	733219	Sealed (Edited)	Monitor Well	17380 Kennrick Av	Lakeville	037-221185000173	Mw-3	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	14	12/16/2005	Unconsolidated Sediments (Edited)	Approximate
129	733218	Sealed (Edited)	Monitor Well	17380 Kenrick Av	Lakeville	037-221185000173	Mw-4	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	14	12/16/2005	Unconsolidated Sediments (Edited)	Approximate
130	645038	Sealed (Edited)	Dewatering Well	20195 Holyoke Av	Lakeville	037-220100051011	Lakeville	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	45	12/18/2002	Not Available	Yes
131	701823	Active	Elevator Shaft	18476 Kenrick Av	Lakeville	037-227670101010	Citizens Bank	WEL	2000	General Sales and Service	29	12/01/2003	Not Available	Yes
132	553836	Sealed (Edited)	Dewatering Well	Not Available	Apple Valley	037-016340122030	Dw	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	44	09/04/1998	Unconsolidated Sediments (Edited)	No
133	023116	Active	Environmental Boring	Not Available	Lakeville	037-221110001084	Not Available	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	40	03/12/2007	Not Available	No
134	749745	Active	Domestic	10252 185th Street W	Lakeville	037-220180052014	Bakhe, Steven And Randee	WEL	1000	All Establishments Offering Residence	300	08/29/2007	St Peter (Edited)	Yes
135	747892	Active	Piezometer	604 28th Av S	Lakeville	037-014830001010	Pz 115	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	20	10/30/2006	Not Available	Approximate
136	751646	Active	Irrigation	19688 Juno Tr	Lakeville	037-220240076010	City Of Lakeville	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	300	03/13/2008	Not Available	Approximate
137	745242	Active	Domestic	18875 Cedar Av S	Lakeville	037-220160080012	Not Available	WEL	1000	All Establishments Offering Residence	280	09/13/2006	Prairie du Chien (Edited)	Yes
138	660841	Active	Domestic	19848 Highview Av	Lakeville	037-220210053010	Berres, Richard	WEL	1000	All Establishments Offering Residence	255	10/19/2001	Prairie du-Chien Dolomite (Edited)	Yes
139	525269	Sealed (Edited)	Monitor Well	10812 175th Street W	Lakeville	037-221187501013	Mw	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	16	12/07/1995	Unconsolidated Sediments (Edited)	Approximate
140	427373	Active	Domestic	11091 181st Street W	Lakeville	037-226330002010	Heinz	WEL	1000	All Establishments Offering Residence	280	12/11/1986	Prairie du-Chien Dolomite (Edited)	Yes
141	525270	Sealed (Edited)	Monitor Well	17450 Kenwood Tr	Lakeville	037-221185000161	Mw	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	16	12/08/1995	Unconsolidated Sediments (Edited)	Approximate
142	599538	Sealed (Edited)	Monitor Well	10812 175th Street W	Lakeville	037-221187501013	Mw-5	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	16	07/18/1997	Unconsolidated Sediments (Edited)	Approximate
143	555057	Sealed (Edited)	Monitor Well	16780 Kenerick Av	Lakeville	037-220011076031	Mw-1	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	28	11/08/1994	Unconsolidated Sediments (Edited)	Yes
144	555056	Sealed (Edited)	Monitor Well	16780 Kenrick Av	Lakeville	037-220011076031	Mw-2	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	30	11/01/1994	Unconsolidated Sediments (Edited)	Yes
145	555055	Sealed (Edited)	Monitor Well	16780 Kenrick Av	Lakeville	037-220011076031	Mw-3	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	32	11/02/1994	Unconsolidated Sediments (Edited)	Yes
146	553818	Sealed (Edited)	Dewatering Well	Not Available	Lakeville	037-220210050010	Dw	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	49	11/14/1995	Unconsolidated Sediments (Edited)	No
147	552476	Sealed (Edited)	Monitor Well	7468 167th Street W	Lakeville	037-222110000030	Mw-1	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	17	09/07/1994	Unconsolidated Sediments (Edited)	Yes
148	598592	Sealed (Edited)	Monitor Well	Hamburg Av	Lakeville	037-223600001010	Mw-4	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	14	07/17/1997	Unconsolidated Sediments (Edited)	No
149	598591	Sealed (Edited)	Monitor Well	Not Available	Lakeville	037-221105000040	Mw-3	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	14	07/17/1997	Unconsolidated Sediments (Edited)	No
150	760137	Active	Elevator Shaft	15450 Cedar Av	Apple Valley	037-014830001010	Apple Valley Transit	WEL	4130	Road, ground, passenger, and transit	56	05/26/2009	Not Available	Yes
151	207300	Sealed (Edited)	Domestic	18101 Ipava Av W	Lakeville	037-225960101040	C Fossum	WEL	1000	All Establishments Offering Residence	280	11/22/1972	MTPL	Approximate

Table C-3

PCSI Results - Wells Within the DWSMAs
City of Lakeville

Map ID	Unique No.	Status	Use	Well Location	City or Twp	PID No.	Well Owner	PCS Code	Facility Code	Facility Designation	Total/Sealed Depth (feet)	Date Completed/Sealed	Aquifer	Location Verified
152	207726	Active	Domestic	20066 Italy Av	Lakeville	037-221150008280	Tom Blackford	WEL	1100-01	Residence	285	08/12/1968	OSTP	Yes
153	207771	Active	Industrial	35 Ih W	Lakeville	037-220240027011	N W Bithuminous	WEL	3000	Manufacturing and Wholesale Trade	311	Not Available	OPDC	No
154	664152	Active	Community Supply (Municipal)	17701 Kenyon Av W	Lakeville	037-220121052010	Queen Anne Court 3	WEL	1000	All Establishments Offering Residence	435	10/06/2001	OPDC	Approximate
155	100023	Active	Domestic	17740 Jaquar Pa	Lakeville	037-225350003180	James Forsyth	WEL	1000	All Establishments Offering Residence	335	01/23/1975	OSTP	Yes
156	410903	Active	Domestic	9780 192 Street W	Lakeville	037-220190005010	Thomas Bricko	WEL	1000	All Establishments Offering Residence	199	11/28/1984	OSTP	Yes
157	207769	Active	Domestic	176 Street	Lakeville	037-221185000225	Not Available	WEL	1000	All Establishments Offering Residence	290	06/22/1972	MTPL	No
158	207547	Active	Domestic	18931 35 Ih	Lakeville	Not Available	Charles Lehman	WEL	1000	All Establishments Offering Residence	200	03/14/1968	OPDC	No
159	207548	Active	Domestic	17625 Italy Ct	Lakeville	037-221940201080	Dan Sabin	WEL	1000	All Establishments Offering Residence	315	06/21/1974	OSTP	Yes
160	207553	Sealed (Edited)	Abandoned	17336 Jersey Wa	Lakeville	037-222750002030	Elfering Construction	WEL	7000	Construction-Related Business	315	02/26/1974	OPDC	Yes
161	207555	Active	Domestic	17296 Jersey Wa	Lakeville	037-222750002010	Forest Hills Construction	WEL	7000	Construction-Related Business	318	08/17/1973	OSTP	Yes
162	441851	Active	Domestic	Not Available	Lakeville	037-220180081011	Randal Slagel	WEL	1000	All Establishments Offering Residence	280	12/29/1987	OSTP	No
163	239812	Active	Domestic	10333 175 Street W	Lakeville	037-220070031010	Carl Hummel	WEL	1000	All Establishments Offering Residence	370	01/20/1961	MTPL	Yes
164	207772	Active	Domestic	10669 202 Street	Lakeville	037-224750001040	J.v. Anderson	WEL	1100-01	Residence	180	10/04/1968	QUUU	Yes
165	207718	Active	Domestic	190 Street	Lakeville	037-220160060010	Loren Tempelton	WEL	1000	All Establishments Offering Residence	273	11/16/1971	OPDC	No
166	216487	Active	Domestic	10735 202 Street W	Lakeville	037-227330002100	Otto Geier	WEL	1100-01	Residence	180	10/28/1974	OSTP	Yes
167	207719	Sealed (Edited)	Abandoned	190 Street	Lakeville	Not Available	Ronald Ferguson	WEL	1000	All Establishments Offering Residence	285	11/11/1970	OSTP	No
168	207557	Sealed (Edited)	Abandoned	35 Ih W	Lakeville	037-221185000184	Tom Thumb	WEL	2000	General Sales and Service	272	08/23/1971	OSTP	No
169	124319	Active	Domestic	Not Available	Lakeville	037-220080077010	Robert Pugh	WEL	1000	All Establishments Offering Residence	255	10/20/1976	OSTP	No
170	547276	Active	Domestic	17837 Flagstaff Av	Lakeville	037-220100075016	Sturgeon, Dan	WEL	1000	All Establishments Offering Residence	240	06/17/1994	OPDC	Yes
171	207526	Active	Domestic	8445 190 Street W	Lakeville	037-220160058010	Julian Sauser	WEL	1000	All Establishments Offering Residence	303	10/24/1973	OPDC	Yes
172	216227	Active	Domestic	17299 Janquil Av	Lakeville	037-221185000133	Gerald Sover	WEL	1000	All Establishments Offering Residence	305	11/13/1972	OPDC	Yes
173	W0000801	Active	Domestic	19455 Iteri Av	Lakeville	037-220190016010	Nagel, Vernon	WEL	1000	All Establishments Offering Residence	250	Not Available	Not Available	Yes
174	207770	Sealed (Edited)	Commercial	10784 176 Street W	Lakeville	037-227120001012	Avgonne Beauty Shop	WEL	2000	General Sales and Service	300	02/19/1969	MTPL	Approximate
175	401111	Sealed (Edited)	Domestic	18243 Ipava Av	Lakeville	037-220180009012	Daryl Mcnab	WEL	1000	All Establishments Offering Residence	320	12/13/1983	OSTP	Approximate
176	207305	Active	Domestic	Ixonia Av	Lakeville	037-221940103050	A. Montaine	WEL	1000	All Establishments Offering Residence	290	06/05/1973	OSTP	No
177	216248	Active	Unknown	17805 Junelle Pa W	Lakeville	037-221185000360	Morel J. Helkenon	WEL	1000	All Establishments Offering Residence	286	08/14/1968	MTPL	Yes
178	443599	Active	Domestic	Not Available	Lakeville	037-220190014010	Thomas Piper	WEL	1000	All Establishments Offering Residence	220	05/06/1988	OSTP	No
179	207765	Active	Domestic	35 Ih W	Lakeville	037-224130000010	Skelly Oil Co.	WEL	3000	Manufacturing and Wholesale Trade	325	06/24/1966	OSTP	No
180	239810	Active	Unknown	9646 185 Street	Lakeville	037-220180007010	George Handel	WEL	1000	All Establishments Offering Residence	338	10/19/1973	OPDC	Approximate
181	190464	Active	Domestic	18267 Italy Av	Lakeville	037-227300000220	Jerry Thorman	WEL	1000	All Establishments Offering Residence	336	11/01/1977	OPDC	Yes
182	251988	Sealed (Edited)	Domestic	Not Available	Lakeville	037-228850703070	H130271	WEL	1000	All Establishments Offering Residence	300	Not Available	OSTP	No
183	435206	Sealed	Abandoned	19065 Dodd Rd	Lakeville	Not Available	Plasch, Perry	WEL	1000	All Establishments Offering Residence	300	07/08/1987	OSTP	Approximate
184	207544	Active	Domestic	10715 202 Street	Lakeville	037-227330002051	Wally Potter	WEL	1100-01	Residence	202	05/21/1974	MTPL	Yes
185	190454	Active	Domestic	Not Available	Lakeville	037-220210032010	Langlois, Ed	WEL	1000	All Establishments Offering Residence	271	08/20/1980	OSTP	No
186	427397	Active	Domestic	Not Available	Lakeville	037-220170057013	Brad Turbes	WEL	1000	All Establishments Offering Residence	310	04/30/1987	MTPL	No
187	451138	Active	Domestic	18835 Knollwood Circle	Lakeville	037-225665001040	David Wintheizer	WEL	1000	All Establishments Offering Residence	220	09/12/1988	OPDC	Yes
188	259467	Active	Public Supply/Non-community-transient	8315 190th Street West	Lakeville	037-220160059010	Golden Ridge Stables 1	WEL	2000	General Sales and Service	0	Not Available	Not Available	Yes
189	212389	Sealed	Abandoned	Not Available	Lakeville	037-221185000225	Ambrose Hauer	WEL	1000	All Establishments Offering Residence	300	09/16/1974	MTPL	No
190	457183	Sealed (Edited)	Domestic	18150 Ipava	Lakeville	037-224762501010	Roxberg, Steve	WEL	1000	All Establishments Offering Residence	300	06/19/1989	OSTP	Yes
191	180425	Active	Domestic	Not Available	Lakeville	037-220160078010	Berton Holst	WEL	1000	All Establishments Offering Residence	280	10/28/1981	OPDC	No
192	129291	Active	Domestic	19544 Iteri Av	Lakeville	037-221895001020	David Haukos	WEL	1000	All Establishments Offering Residence	244	07/29/1976	OSTP	Yes
193	141801	Active	Domestic	Not Available	Lakeville	037-220210051012	Jacobsen, Gene	WEL	1000	All Establishments Offering Residence	300	05/02/1978	OPDC	No
194	W0000054	Active	Domestic	17585 Junelle Pa W	Lakeville	037-221188501010	Nesbett, George	WEL	1000	All Establishments Offering Residence	260	Not Available	Not Available	Approximate
195	241440	Sealed	Municipal	Java Ct N	Lakeville	037-222750002200	Lakeville 5	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	605	Not Available	CJDN	No
196	207712	Sealed (Edited)	Abandoned	17410 Johnquil Av	Lakeville	037-222750001120	Robert Elfaring	WEL	1000	All Establishments Offering Residence	310	08/05/1972	MTPL	Yes
197	207528	Active	Domestic	7190 190 Street	Lakeville	Not Available	Tim Kelly	WEL	1000	All Establishments Offering Residence	222	05/04/1972	MTPL	Approximate
198	207546	Active	Domestic	Juno Tr	Lakeville	Not Available	Wade Lowry	WEL	1100-01	Residence	180	08/26/1974	OSTP	No
199	239811	Sealed	Abandoned	10900 Orchard Tr	Lakeville	037-228430001020	David Frankson	WEL	1000	All Establishments Offering Residence	185	07/20/1973	QBAA	Yes
200	207552	Active	Domestic	17345 Jersey Wa	Lakeville	037-222750001040	Forest Hills Constructio	WEL	7000	Construction-Related Business	305	03/12/1973	MTPL	Yes
201	124316	Active	Domestic	Not Available	Lakeville	037-220080076010	David Erstad	WEL	1000	All Establishments Offering Residence	255	09/18/1976	OSTP	No
202	435205	Active	Domestic	Not Available	Lakeville	037-220200025014	Norm Plasch	WEL	1000	All Establishments Offering Residence	300	07/10/1987	OSTP	No
203	207714	Active	Domestic	17876 Ixonia Av	Lakeville	037-221940103040	Jim Kiesner	WEL	1000	All Establishments Offering Residence	290	06/20/1973	OSTP	Yes
204	190465	Active	Domestic	18328 Itlay Av	Lakeville	037-227300000070	Hipp Schmidt	WEL	1000	All Establishments Offering Residence	308	07/22/1977	OPDC	Yes
205	119641	Active	Domestic	17760 Jaquar Ct	Lakeville	037-225350003190	Gary West	WEL	1000	All Establishments Offering Residence	390	01/24/1976	MTPL	Approximate
206	198323	Active	Domestic	16615 Ipava Av	Lakeville	037-220050027010	Ryan	WEL	1000	All Establishments Offering Residence	360	08/02/1984	OSTP	Approximate
207	256165	Inactive	Domestic	17685 Junelle Pa	Lakeville	037-221188501040	Not Available	WEL	1000	All Establishments Offering Residence	320	Not Available	OPDC	Approximate
208	161900	Active	Public Supply/Non-community	16096 160th Street	Lakeville	037-223290701010	Church Of God	WEL	5000	Arts, Entertainment, and Recreation	240	04/29/1980	OSTP	Yes
209	441518	Active	Domestic	Not Available	Lakeville	037-226330002040	Not Available	WEL	1000	All Establishments Offering Residence	300	06/01/1988	MTPL	No
210	119712	Sealed	Abandoned	50 Hy	Lakeville	037-224754203020	Milan, Robert	WEL	1000	All Establishments Offering Residence	77	06/18/1979	QWTA	No
211	207527	Active	Commercial	190 Street	Lakeville	037-220160080012	Yahama Sports	WEL	2000	General Sales and Service	252	06/21/1973	OSTP	No
212	207530	Active	Domestic	20187 Dodd Bl	Lakeville	037-220290032031	Lavern Wahl	WEL	1100-01	Residence	62	11/17/1966	QUUU	Yes
213	207549	Active	Domestic	17850 Iten Ct	Lakeville	037-221940301100	Jerry Leiphar	WEL	1000	All Establishments Offering Residence	360	07/26/1973	MTPL	Yes
214	216488	Active	Domestic	19730 Holyoke Av	Lakeville	037-220200076010	Dayton Kempson	WEL	1000	All Establishments Offering Residence	262	05/21/1973	OPDC	Yes
215	405798	Sealed	Abandoned	7468 167th Street W	Lakeville	037-222110000030	Rc-2	WEL	2000	General Sales and Service	25	02/12/1987	QBAA	Yes
216	207525	Sealed	Abandoned	Flagstaff Av	Lakeville	037-220100077010	Robert Jensen	WEL	1000	All Establishments Offering Residence	527	07/07/1965	MTPL	No
217	216486	Active	Domestic	17700 Junelle Pa	Lakeville	037-221185000250	Colin Fowler	WEL	1000	All Establishments Offering Residence	290	06/22/1972	MTPL	Yes
218	435214	Sealed (Edited)	Domestic	Not Available	Lakeville	037-220190077010	Keith Poets	WEL	1000	All Establishments Offering Residence	180	07/10/1987	OSTP	No
219	119595	Active	Domestic	9808 185 Street W	Lakeville	037-220180080020	John Lafavor	WEL	1000	All Establishments Offering Residence	320	05/10/1977	MTPL	Yes
220	207550	Active	Domestic	17930 Italy Pa	Lakeville	037-221940501020	Paul Byers	WEL	1000	All Establishments Offering Residence	330	07/24/1974	OSTP	Yes
221	180413	Active	Domestic	19355 Jersey Av	Lakeville	037-220190031010	Zane Henrichs	WEL	1000	All Establishments Offering Residence	105	09/04/1981	QBAA	Yes
222	418657	Active	Domestic	Not Available	Lakeville	037-221185000225	Gary Lynn Peterson	WEL	1000	All Establishments Offering Residence	259	08/23/1985	QBAA	No
223	207558	Active	Domestic	35 Ih W	Lakeville	037-220121006012	Country Kitchen	WEL	2000	General Sales and Service	238	07/25/1973	OSTP	No
224	250775	Unknown	Domestic	17134 Dodd Bl	Lakeville	037-221860003060	17134 Dodd Blvd.	WEL	1000	All Establishments Offering Residence	274	Not Available	MTPL	Approximate
225	249236	Active (Edited)	Community Supply (Municipal)	Not Available	Lakeville	037-220121052010	Queen Anne Court 1	WEL	1000	All Establishments Offering Residence	0	Not Available	Not Available	No

Table C-3

PCSI Results - Wells Within the DWSMAs
City of Lakeville

Map ID	Unique No.	Status	Use	Well Location	City or Twp	PID No.	Well Owner	PCS Code	Facility Code	Facility Designation	Total/Sealed Depth (feet)	Date Completed/Sealed	Aquifer	Location Verified
226	235584	Active	Industrial	Not Available	Lakeville	037-221110004090	Juno Tool And Plastic Co	WEL	3320-01	Plastics/Synthetics Manufacturing	123	11/03/1966	QBUA	No
227	207721	Active	Domestic	Not Available	Lakeville	037-220180010010	Fossum	WEL	1000	All Establishments Offering Residence	292	04/13/1973	OSTP	No
228	256166	Inactive	Domestic	17714 Junelle Pa	Lakeville	037-221188501040	Not Available	WEL	1000	All Establishments Offering Residence	282	Not Available	OSTP	Approximate
229	623888	Sealed (Edited)	Irrigation	17819 Cedar Av	Lakeville	037-222122501010	Lyndale Garden Center	WEL	2000	General Sales and Service	320	04/01/1999	OSPC	Approximate
230	259445	Active (County)	Public Supply/Non-community-transient	06075 Highview Ave	Lakeville	037-228175008080	Minnesota Valley Free Lu	WEL	3000	Manufacturing and Wholesale Trade	0	Not Available	Not Available	Yes
231	207556	Active	Commercial	35 Ih W	Lakeville	037-221185000173	Texaco Station	WEL	2000	General Sales and Service	185	10/18/1966	QUUU	No
232	216492	Active	Domestic	Not Available	Lakeville	037-220200081010	Bob Schweich	WEL	1000	All Establishments Offering Residence	214	12/21/1973	OSTP	No
233	257504	Sealed (Edited)	Unknown	9830 Iteri La	Lakeville	037-221895002020	Iteri Lane Old 4 In. Well	WEL	1000	All Establishments Offering Residence	235	Not Available	OSPC	Approximate
234	101085	Active	Domestic	20088 Kenwood Tr W	Lakeville	037-220290034030	Allen Soli	WEL	1100-01	Residence	154	09/10/1976	OSTP	Yes
235	207551	Active	Domestic	17971 Ixonia Av	Lakeville	037-221940102110	Loren Johnsen	WEL	1000	All Establishments Offering Residence	315	07/18/1974	OSTP	Yes
236	498440	Active	Domestic	19688 Juno Tr	Lakeville	037-220240076010	Casperson Park	WEL	5000	Arts, Entertainment, and Recreation	180	01/13/1992	OSTP	Yes
237	207768	Sealed	Abandoned	18800 Lyndale Av S	Lakeville	037-220121052010	Queen Anne Courts	WEL	1000	All Establishments Offering Residence	517	06/18/1960	CJDN	Yes
238	257505	Sealed (Edited)	Unknown	9835 Iteri La	Lakeville	037-221895001060	Not Available	WEL	1000	All Establishments Offering Residence	302	Not Available	OSPC	Yes
239	207545	Active	Domestic	202 Street	Lakeville	037-224750001073	Clarence Rudigen	WEL	1100-01	Residence	175	06/23/1972	OSTP	No
240	137360	Active	Domestic	18268 Italy Av	Lakeville	037-227300000090	Edward Blue	WEL	1000	All Establishments Offering Residence	325	11/25/1977	MTPL	Yes
241	404654	Active	Domestic	20042 Kenwood Tr	Lakeville	037-221150001020	Campion, James	WEL	1100-01	Residence	85	05/18/1984	QWTA	Yes
242	207713	Sealed (Edited)	Domestic	17659 Ipawa Av	Lakeville	037-221940601010	Not Available	WEL	1000	All Establishments Offering Residence	275	08/06/1970	OSTP	Approximate
243	207722	Sealed (Edited)	Abandoned	19707 Jersey Av	Lakeville	037-224490023180	Not Available	WEL	1100-01	Residence	167	12/28/1972	OSTP	Yes
244	427499	Active	Domestic	Not Available	Lakeville	Not Available	Winston Christainson	WEL	1000	All Establishments Offering Residence	280	06/10/1988	OSTP	No
245	207767	Active	Commercial	Queen Anne Te	Lakeville	037-220121052010	Queen Anne Court 2	WEL	1000	All Establishments Offering Residence	248	08/01/1962	OSTP	Yes
246	256196	Inactive	Domestic	Not Available	Lakeville	037-221860000012	H-222602	WEL	1000	All Establishments Offering Residence	250	Not Available	OSTP	No
247	212388	Active	Domestic	19091 Dodd Bl	Lakeville	037-220170057013	Plasch, Dr. Robert	WEL	1000	All Establishments Offering Residence	305	03/23/1972	OPDC	Approximate
248	207720	Active	Domestic	50 Hy	Lakeville	037-224740002030	Fossum	WEL	1000	All Establishments Offering Residence	310	10/18/1972	OSTP	No
249	474609	Sealed (Edited)	Domestic	18040 Cedar Av	Lakeville	037-220150026023	Miller, Joseph	WEL	1000	All Establishments Offering Residence	280	02/28/1991	OPDC	Yes
250	207554	Active	Domestic	17316 Jersey Wa	Lakeville	037-222750002020	Forest Hills Construction	WEL	2000	General Sales and Service	318	08/21/1973	MTPL	Yes
251	124309	Active	Domestic	160 Street	Lakeville	037-228175004080	Henry Vanthoff	WEL	1000	All Establishments Offering Residence	160	12/10/1975	OPVL	No
252	102292	Active	Domestic	18398 Italy Av	Lakeville	037-227300000050	Paul Wagner	WEL	1000	All Establishments Offering Residence	320	04/27/1979	OPDC	Yes
253	426582	Active	Domestic	Not Available	Lakeville	037-220190085010	Kath	WEL	1000	All Establishments Offering Residence	200	06/04/1987	OSTP	No
254	023120	Sealed	Abandoned	Not Available	Lakeville	037-220090081010	Sb-1	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	41	08/14/2008	Not Available	No
255	478691	Sealed	Unknown, from Sealed Wells Database	Hwy 50 (& Cedar Av)	Lakeville	Not Available	Jeff Belzers Chevrolet	WEL	2000	General Sales and Service	14 (Sealed Depth)	12/21/1994	Not Available (from Sealed Wells Database)	No
256	506933	Sealed	Unknown, from Sealed Wells Database	Not Available	Lakeville	037-222117200040	Farmington, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	40 (Sealed Depth)	9/1/1989	Not Available (from Sealed Wells Database)	No
257	506934	Sealed	Unknown, from Sealed Wells Database	Not Available	Lakeville	037-222117200040	Farmington, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	40 (Sealed Depth)	9/1/1989	Not Available (from Sealed Wells Database)	No
258	501692	Sealed	Unknown, from Sealed Wells Database	17471 Kenwood Tr	Lakeville	037-221140001010	Amoco Oil Company	WEL	2000	General Sales and Service	14 (Sealed Depth)	6/2/1992	Not Available (from Sealed Wells Database)	Yes
259	660241	Sealed	Unknown, from Sealed Wells Database	184th St W & Kenyon Av	Lakeville	Not Available	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	39 (Sealed Depth)	4/29/2003	Not Available (from Sealed Wells Database)	No
260	H000003312	Sealed	Unknown, from Sealed Wells Database	6618 Upper 163rd Ct	Lakeville	037-222117206230	Coldwell Banker	WEL	2200	Financial and insurance establishments	26 (Sealed Depth)	8/17/1990	Not Available (from Sealed Wells Database)	Yes
261	H000003315	Sealed	Unknown, from Sealed Wells Database	10267 199th St W	Lakeville	037-221150021070	Meyer, Tim	WEL	1100-01	Residence	48 (Sealed Depth)	9/26/1990	Not Available (from Sealed Wells Database)	Yes
262	630006	Sealed	Unknown, from Sealed Wells Database	Not Available	Lakeville	037-223150202090	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	39 (Sealed Depth)	10/21/1999	Not Available (from Sealed Wells Database)	No
263	H000017311	Sealed	Unknown, from Sealed Wells Database	19749 Juno Tr	Lakeville	037-220240076020	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	33 (Sealed Depth)	1/10/1992	Not Available (from Sealed Wells Database)	Yes
264	H000011926	Sealed	Unknown, from Sealed Wells Database	19400 Dodd Rd	Lakeville	037-220190030020	Isd 194	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	140 (Sealed Depth)	7/16/1991	Not Available (from Sealed Wells Database)	Yes
265	H000011744	Sealed	Unknown, from Sealed Wells Database	10812 175th St W	Lakeville	037-221185000190	Superamerica Gas	WEL	2000	General Sales and Service	230 (Sealed Depth)	6/4/1991	Not Available (from Sealed Wells Database)	Approximate
266	H000007679	Sealed	Unknown, from Sealed Wells Database	16645 Ixonia Av	Lakeville	037-221940001030	Miewind, Mike	WEL	1000	All Establishments Offering Residence	318 (Sealed Depth)	12/27/1990	Not Available (from Sealed Wells Database)	No
267	H000010057	Sealed	Unknown, from Sealed Wells Database	10262 199th St W	Lakeville	037-224490020050	Christensen, Richard	WEL	1100-01	Residence	60 (Sealed Depth)	4/24/1991	Not Available (from Sealed Wells Database)	Yes
268	H000009575	Sealed	Unknown, from Sealed Wells Database	19833 Jersey Av	Lakeville	037-221150023051	Erickson, Jerry	WEL	1100-01	Residence	57 (Sealed Depth)	4/9/1991	Not Available (from Sealed Wells Database)	Yes
269	H000015650	Sealed	Unknown, from Sealed Wells Database	18228 Kenwood Tr W	Lakeville	037-223332601020	Eliason Ent. Inc.	WEL	1000	All Establishments Offering Residence	185 (Sealed Depth)	10/24/1991	Not Available (from Sealed Wells Database)	No
270	H000010859	Sealed	Unknown, from Sealed Wells Database	19980 Kenwood Tr	Lakeville	037-224490002020	Hansen, Gloria	WEL	1100-01	Residence	52 (Sealed Depth)	4/22/1991	Not Available (from Sealed Wells Database)	Yes
271	H000040363	Sealed	Unknown, from Sealed Wells Database	17450 Kenwood Tr W	Lakeville	037-221185000184	James Refrigeration	WEL	2000	General Sales and Service	30 (Sealed Depth)	6/24/1994	Not Available (from Sealed Wells Database)	Yes
272	H000040536	Sealed	Unknown, from Sealed Wells Database	17540 Junelle Pa	Lakeville	037-221188500010	Peterson, Jynn	WEL	1000	All Establishments Offering Residence	89 (Sealed Depth)	1/7/1994	Not Available (from Sealed Wells Database)	No
273	H000035365	Sealed	Unknown, from Sealed Wells Database	17450 Kenwood Tr W	Lakeville	037-221185000184	James Refrigeration	WEL	2000	General Sales and Service	27 (Sealed Depth)	7/15/1993	Not Available (from Sealed Wells Database)	Approximate
274	H000035342	Sealed	Unknown, from Sealed Wells Database	10812 175th St W	Lakeville	037-221185000190	Kelly, Vern	WEL	1000	All Establishments Offering Residence	30 (Sealed Depth)	7/8/1993	Not Available (from Sealed Wells Database)	Approximate
275	H000048753	Sealed	Unknown, from Sealed Wells Database	160th St	Apple Valley	037-011165401021	Steve Haight Construction	WEL	7000	Construction-Related Business	50 (Sealed Depth)	4/7/1994	Not Available (from Sealed Wells Database)	No
276	H000046908	Sealed	Unknown, from Sealed Wells Database	18100 Kenwood Tr	Lakeville	037-221185000380	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	30 (Sealed Depth)	5/25/1995	Not Available (from Sealed Wells Database)	Approximate
277	H000055419	Sealed	Unknown, from Sealed Wells Database	19069 Orchard Tr	Lakeville	037-221330002040	Sather, Roger/kathle	WEL	1000	All Establishments Offering Residence	170 (Sealed Depth)	10/14/1994	Not Available (from Sealed Wells Database)	Yes
278	H000046910	Sealed	Unknown, from Sealed Wells Database	18086 Kenwood Tr	Lakeville	037-220130001010	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	233 (Sealed Depth)	5/25/1995	Not Available (from Sealed Wells Database)	Approximate
279	H000046919	Sealed	Unknown, from Sealed Wells Database	20014 Kenwood Tr	Lakeville	037-224490002040	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	38 (Sealed Depth)	7/19/1995	Not Available (from Sealed Wells Database)	Yes
280	H000046986	Sealed	Unknown, from Sealed Wells Database	18386 Ipava Av	Lakeville	037-224178001010	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	23 (Sealed Depth)	11/17/1994	Not Available (from Sealed Wells Database)	Yes
281	H000053013	Sealed	Unknown, from Sealed Wells Database	10812 175th St W	Lakeville	037-221185000190	Foels, Kelley	WEL	1000	All Establishments Offering Residence	20 (Sealed Depth)	6/24/1994	Not Available (from Sealed Wells Database)	Approximate
282	H000048172	Sealed	Unknown, from Sealed Wells Database	Not Available	Lakeville	037-225950000010	Isd 192	WEL	6100	Schools	15 (Sealed Depth)	6/14/1994	Not Available (from Sealed Wells Database)	No
283	H000038088	Sealed	Unknown, from Sealed Wells Database	9290 202nd St W	Lakeville	037-220290036021	Cenex	WEL	3000	Manufacturing and Wholesale Trade	12 (Sealed Depth)	8/6/1993	Not Available (from Sealed Wells Database)	Yes
284	H000036944	Sealed	Unknown, from Sealed Wells Database	Not Available	Lakeville	037-220121034011	Coldwell Banker	WEL	2000	General Sales and Service	174 (Sealed Depth)	10/13/1993	Not Available (from Sealed Wells Database)	No
285	H000037964	Sealed	Unknown, from Sealed Wells Database	9228 202nd St	Lakeville	037-220290036021	Scheffler, Al	WEL	1100-01	Residence	32 (Sealed Depth)	8/20/1993	Not Available (from Sealed Wells Database)	Approximate
286	H000060675	Sealed	Unknown, from Sealed Wells Database	9900 165th St	Lakeville	037-223335200010	Tollefson Developing	WEL	3000	Manufacturing and Wholesale Trade	90 (Sealed Depth)	11/22/1994	Not Available (from Sealed Wells Database)	Approximate
287	H000065583	Sealed	Unknown, from Sealed Wells Database	19750 Holyoke Av	Lakeville	037-221853500010	All Saints Catholic Church	WEL	5000	Arts, Entertainment, and Recreation	40 (Sealed Depth)	7/12/1995	Not Available (from Sealed Wells Database)	Approximate
288	H000067039	Sealed	Unknown, from Sealed Wells Database	20079 Italy Av	Lakeville	037-224490000071	Anderson, Mary	WEL	1100-01	Residence	18 (Sealed Depth)	7/4/1995	Not Available (from Sealed Wells Database)	Yes
289	H000065776	Sealed	Unknown, from Sealed Wells Database	20187 Dodd Bl	Lakeville	037-220290032031	Kwik Trip, Inc.	WEL	2000	General Sales and Service	53 (Sealed Depth)	8/7/1995	Not Available (from Sealed Wells Database)	Yes
290	H000073092	Sealed	Unknown, from Sealed Wells Database	17450 Kenwood Tr	Lakeville	037-221185000184	Kelly Fuels	WEL	2000	General Sales and Service	15 (Sealed Depth)	12/7/1995	Not Available (from Sealed Wells Database)	Approximate
291	H000054488	Sealed	Unknown, from Sealed Wells Database	71380 Kenrick Rd	Lakeville	037-221185000173	Sinclair Marketing	WEL	2000	General Sales and Service	14 (Sealed Depth)	9/2/1994	Not Available (from Sealed Wells Database)	Approximate
292	H000051707	Sealed	Unknown, from Sealed Wells Database	18076 Kenwood Tr	Lakeville	037-220130001010	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	83 (Sealed Depth)	9/19/1994	Not Available (from Sealed Wells Database)	Approximate
293	H000058955	Sealed	Unknown, from Sealed Wells Database	20180 Dodd Bl	Lakeville	Not Available	Budget Oil Company	WEL	3000	Manufacturing and Wholesale Trade	21 (Sealed Depth)	5/9/1997	Not Available (from Sealed Wells Database)	No
294	H000090663	Sealed	Unknown, from Sealed Wells Database	19774 Kenwood Tr	Lakeville	037-221150005181	Cross Nurseries, Inc.	WEL	2100	Retail Sales or Service	200 (Sealed Depth)	7/25/1987	Not Available (from Sealed Wells Database)	Yes
295	H000090580	Sealed	Unknown, from Sealed Wells Database	15999 Cedar Av	Apple Valley	037-221950001010	Mn Lumber & Wrecking	WEL	3210	Wood Products Establishment	70 (Sealed Depth)	5/24/1984	Not Available (from Sealed Wells Database)	Approximate
296	H000090615	Sealed	Unknown, from Sealed Wells Database	17500 Java Ct N	Lakeville	Not Available	Lakeville #2	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	583 (Sealed Depth)	9/13/1984	Not Available (from Sealed Wells Database)	Yes
297	H000090648	Sealed	Unknown, from Sealed Wells Database	10695 175th St W	Lakeville	037-221185000151	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	61 (Sealed Depth)	10/7/1988	Not Available (from Sealed Wells Database)	Yes
298	H000090524	Sealed	Unknown, from Sealed Wells Database	Not Available	Lakeville	037-221140001020	Amoco Oil	WEL	2000	General Sales and Service	84 (Sealed Depth)	11/4/1987	Not Available (from Sealed Wells Database)	No
299	H000090525	Sealed	Unknown, from Sealed Wells Database	10755 175th St	Lakeville	037-221185000161	Fullerton Lumber Co	WEL	3000	Manufacturing and Wholesale Trade	205 (Sealed Depth)	7/7/1987	Not Available (from Sealed Wells Database)	No

Table C-3

PCSI Results - Wells Within the DWSMAs
City of Lakeville

Map ID	Unique No.	Status	Use	Well Location	City or Twp	PID No.	Well Owner	PCS Code	Facility Code	Facility Designation	Total/Sealed Depth (feet)	Date Completed/Sealed	Aquifer	Location Verified
300	H000090526	Sealed	Unknown, from Sealed Wells Database	10880 175th St W	Lakeville	037-221185000190	Grohoski, Steve	WEL	2000	General Sales and Service	212 (Sealed Depth)	7/9/1987	Not Available (from Sealed Wells Database)	Yes
301	H000094918	Sealed	Unknown, from Sealed Wells Database	170th St W	Lakeville	Not Available	Arcon Construction	WEL	7000	Construction-Related Business	298 (Sealed Depth)	4/25/1989	Not Available (from Sealed Wells Database)	No
302	H000094919	Sealed	Unknown, from Sealed Wells Database	10185 170th St W	Lakeville	037-224697804050	Arcon Construction	WEL	7000	Construction-Related Business	275 (Sealed Depth)	4/25/1989	Not Available (from Sealed Wells Database)	Approximate
303	H000094923	Sealed	Unknown, from Sealed Wells Database	19950 Dodd Rd	Lakeville	Not Available	Isd Lakeville	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	34 (Sealed Depth)	6/8/1989	Not Available (from Sealed Wells Database)	Approximate
304	H000094924	Sealed	Unknown, from Sealed Wells Database	167th St W	Lakeville	Not Available	Fina Gas	WEL	2000	General Sales and Service	18 (Sealed Depth)	5/23/1989	Not Available (from Sealed Wells Database)	No
305	H000108240	Sealed	Unknown, from Sealed Wells Database	17380 Kenrick Av	Lakeville	037-221185000173	Sinclair Marketing	WEL	2000	General Sales and Service	19 (Sealed Depth)	7/31/1996	Not Available (from Sealed Wells Database)	Approximate
306	H000079041	Sealed	Unknown, from Sealed Wells Database	29750 Kenwood Tr	Lakeville	Not Available	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	57 (Sealed Depth)	2/27/1992	Not Available (from Sealed Wells Database)	No
307	H000110756	Sealed	Unknown, from Sealed Wells Database	19713 Jersey Av	Lakeville	037-221150023170	Emond, James	WEL	1100-01	Residence	52 (Sealed Depth)	5/13/1997	Not Available (from Sealed Wells Database)	Yes
308	H000115999	Sealed	Unknown, from Sealed Wells Database	17380 Kenrick Av	Lakeville	037-221185000173	Sinclair Oil Corporation	WEL	2000	General Sales and Service	45 (Sealed Depth)	4/16/1997	Not Available (from Sealed Wells Database)	Approximate
309	H000122478	Sealed	Unknown, from Sealed Wells Database	17171 Ipava Av	Lakeville	037-220070003013	Suburban Builders	WEL	3000	Manufacturing and Wholesale Trade	67 (Sealed Depth)	5/15/1996	Not Available (from Sealed Wells Database)	Yes
310	H000110470	Sealed	Unknown, from Sealed Wells Database	8739 172nd St W	Lakeville	037-220080007010	Claymore, Bob	WEL	1000	All Establishments Offering Residence	133 (Sealed Depth)	2/7/1997	Not Available (from Sealed Wells Database)	Yes
311	H000114394	Sealed	Unknown, from Sealed Wells Database	16000 Cedar Av S	Lakeville	037-221950001010	Fleming Companies	WEL	2000	General Sales and Service	31 (Sealed Depth)	11/19/1996	Not Available (from Sealed Wells Database)	Yes
312	H000105327	Sealed	Unknown, from Sealed Wells Database	9030 202nd St W	Lakeville	037-220290026026	Provincial Corporation	WEL	2100	Retail Sales or Service	45 (Sealed Depth)	2/17/1997	Not Available (from Sealed Wells Database)	Yes
313	H000099837	Sealed	Unknown, from Sealed Wells Database	Not Available	Lakeville	Not Available	Wenzel, Jim	WEL	1000	All Establishments Offering Residence	80 (Sealed Depth)	6/8/1989	Not Available (from Sealed Wells Database)	No
314	H000130271	Sealed	Unknown, from Sealed Wells Database	17955 Dodd Bl	Lakeville	037-220080077010	Ryan Contracting	WEL	7000	Construction-Related Business	300 (Sealed Depth)	2/10/1999	Not Available (from Sealed Wells Database)	Approximate
315	H000130295	Sealed	Unknown, from Sealed Wells Database	19289 Dodd Bl	Lakeville	037-222060000010	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	169 (Sealed Depth)	1/18/2000	Not Available (from Sealed Wells Database)	Approximate
316	H000130296	Sealed	Unknown, from Sealed Wells Database	19355 Dodd Bl	Lakeville	037-220200029010	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	51 (Sealed Depth)	1/19/2000	Not Available (from Sealed Wells Database)	Approximate
317	H000128419	Sealed	Unknown, from Sealed Wells Database	18219 Flagstaff Av	Farmington	037-140150001010	Brand, Gene	WEL	1000	All Establishments Offering Residence	191 (Sealed Depth)	9/30/1991	Not Available (from Sealed Wells Database)	Yes
318	H000130551	Sealed	Unknown, from Sealed Wells Database	9202 202nd St W	Lakeville	037-220290036021	Vanzandt, Mark	WEL	1000	All Establishments Offering Residence	49 (Sealed Depth)	10/30/1998	Not Available (from Sealed Wells Database)	Approximate
319	H000122499	Sealed	Unknown, from Sealed Wells Database	11171 173rd St W	Lakeville	037-221185000062	Gateway Development	WEL	7000	Construction-Related Business	182 (Sealed Depth)	8/22/1996	Not Available (from Sealed Wells Database)	No
320	H000122500	Sealed	Unknown, from Sealed Wells Database	17134 Dodd Bl	Lakeville	037-220100025020	Mcmenomy & Associates	WEL	2000	General Sales and Service	277 (Sealed Depth)	10/10/1996	Not Available (from Sealed Wells Database)	Approximate
321	H000128799	Sealed	Unknown, from Sealed Wells Database	19863 Juno Tr W	Lakeville	037-220240078010	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	12 (Sealed Depth)	11/3/2003	Not Available (from Sealed Wells Database)	Yes
322	H000117993	Sealed	Unknown, from Sealed Wells Database	7468 W 167th St	Lakeville	037-222110000030	Texaco Inc.	WEL	2116	Gasoline Services	25 (Sealed Depth)	5/30/1997	Not Available (from Sealed Wells Database)	Yes
323	H000146090	Sealed	Unknown, from Sealed Wells Database	10017 185th St W	Lakeville	037-220180050011	Enebak Construction	WEL	7000	Construction-Related Business	230 (Sealed Depth)	12/7/1998	Not Available (from Sealed Wells Database)	Approximate
324	H000134010	Sealed	Unknown, from Sealed Wells Database	Lot 26e	Lakeville	037-221700003040	Carpenter, Cliff	WEL	1000	All Establishments Offering Residence	24 (Sealed Depth)	5/19/1998	Not Available (from Sealed Wells Database)	No
325	H000129793	Sealed	Unknown, from Sealed Wells Database	19863 Juno Tr	Lakeville	037-220240078010	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	15 (Sealed Depth)	12/10/1997	Not Available (from Sealed Wells Database)	Yes
326	H000125031	Sealed	Unknown, from Sealed Wells Database	17894 Flagstaff Av	Lakeville	037-220110052010	Mckinley, Paul	WEL	1000	All Establishments Offering Residence	99 (Sealed Depth)	11/6/1997	Not Available (from Sealed Wells Database)	Yes
327	H000125040	Sealed	Unknown, from Sealed Wells Database	18956 Kenrick Av	Lakeville	Not Available	Stavros, John	WEL	1000	All Establishments Offering Residence	22 (Sealed Depth)	10/14/1997	Not Available (from Sealed Wells Database)	No
328	H000151360	Sealed	Unknown, from Sealed Wells Database	16540 Dodd Bl	Lakeville	037-222117705020	North Suburban Dev.	WEL	1100-01	Residence	37 (Sealed Depth)	4/5/1999	Not Available (from Sealed Wells Database)	Yes
329	H000151405	Sealed	Unknown, from Sealed Wells Database	19250 Kenrick Av	Lakeville	Not Available	Bury, Richard	WEL	1100-01	Residence	152 (Sealed Depth)	1/11/2000	Not Available (from Sealed Wells Database)	Approximate
330	H000151407	Sealed	Unknown, from Sealed Wells Database	19250 Kenrick Av	Lakeville	Not Available	Bury, Richard	WEL	1100-01	Residence	96 (Sealed Depth)	1/11/2000	Not Available (from Sealed Wells Database)	Approximate
331	H000144444	Sealed	Unknown, from Sealed Wells Database	Not Available	Lakeville	037-221188501040	Hennepin Parks	WEL	4000	Transporation, Communication, Information, and Utilities	104 (Sealed Depth)	6/23/1991	Not Available (from Sealed Wells Database)	No
332	H000157734	Sealed	Unknown, from Sealed Wells Database	18271 Kenwood Tr	Lakeville	037-220130002020	Mcdonald, Jerry	WEL	1000	All Establishments Offering Residence	234 (Sealed Depth)	6/16/2000	Not Available (from Sealed Wells Database)	Yes
333	H000163323	Sealed	Unknown, from Sealed Wells Database	6533 160th St	Apple Valley	037-010350050011	Pulte Homes	WEL	7000	Construction-Related Business	22 (Sealed Depth)	5/19/2000	Not Available (from Sealed Wells Database)	Yes
334	H000172922	Sealed	Unknown, from Sealed Wells Database	18931 Kenyon Av	Lakeville	Not Available	Nolan, Michael	WEL	1000	All Establishments Offering Residence	25 (Sealed Depth)	7/18/2001	Not Available (from Sealed Wells Database)	No
335	H000163630	Sealed	Unknown, from Sealed Wells Database	18927 Kenyon Av S	Lakeville	Not Available	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	15 (Sealed Depth)	11/27/2000	Not Available (from Sealed Wells Database)	No
336	H000160553	Sealed	Unknown, from Sealed Wells Database	10332 199th St W	Lakeville	037-221155000091	Willson, Stan	WEL	1100-01	Residence	17 (Sealed Depth)	9/29/1999	Not Available (from Sealed Wells Database)	Yes
337	H000160554	Sealed	Unknown, from Sealed Wells Database	10332 199th St W	Lakeville	037-221155000091	Willson, Stan	WEL	1100-01	Residence	35 (Sealed Depth)	9/29/1999	Not Available (from Sealed Wells Database)	Yes
338	H000165208	Sealed	Unknown, from Sealed Wells Database	17805 Dodd Bl	Lakeville	037-220090052010	Joe Miller Farms	WEL	9000	Agriculture, Forestry, Fishing, and Hunting	81 (Sealed Depth)	7/13/2000	Not Available (from Sealed Wells Database)	Approximate
339	H000165227	Sealed	Unknown, from Sealed Wells Database	17775 Cedar Av	Lakeville	037-220090079013	Joe Miller Farms	WEL	9000	Agriculture, Forestry, Fishing, and Hunting	236 (Sealed Depth)	10/20/2000	Not Available (from Sealed Wells Database)	Approximate
340	H000165244	Sealed	Unknown, from Sealed Wells Database	18851 Dodd Bl	Lakeville	037-220170057013	Wensmann Homes	WEL	2000	General Sales and Service	319 (Sealed Depth)	4/20/2001	Not Available (from Sealed Wells Database)	Approximate
341	H000165245	Sealed	Unknown, from Sealed Wells Database	18915 Dodd Bl	Lakeville	037-220170057013	Wensmann Homes	WEL	2000	General Sales and Service	209 (Sealed Depth)	5/22/2001	Not Available (from Sealed Wells Database)	Approximate
342	H000158848	Sealed	Unknown, from Sealed Wells Database	17659 Ipava Av	Lakeville	Not Available	Shamrock Development	WEL	7000	Construction-Related Business	270 (Sealed Depth)	9/29/1999	Not Available (from Sealed Wells Database)	No
343	H000169212	Sealed	Unknown, from Sealed Wells Database	17385 Junelle Pa	Lakeville	037-221185000174	Jackson, Bill	WEL	1000	All Establishments Offering Residence	71 (Sealed Depth)	8/11/2000	Not Available (from Sealed Wells Database)	Approximate
344	H000169213	Sealed	Unknown, from Sealed Wells Database	Not Available	Lakeville	037-221187503040	Jackson, Bill	WEL	1000	All Establishments Offering Residence	82 (Sealed Depth)	8/11/2000	Not Available (from Sealed Wells Database)	No
345	H000180427	Sealed	Unknown, from Sealed Wells Database	16526 Foliage Av	Lakeville	037-222117303170	Coldwell Banker	WEL	2200	Financial and insurance establishments	23 (Sealed Depth)	9/26/2001	Not Available (from Sealed Wells Database)	Yes
346	H000175256	Sealed	Unknown, from Sealed Wells Database	18999 Orchard Tr	Lakeville	037-221330100010	Select Builders	WEL	7000	Construction-Related Business	180 (Sealed Depth)	10/16/2000	Not Available (from Sealed Wells Database)	Approximate
347	H000176070	Sealed	Unknown, from Sealed Wells Database	19376 Dodd Bl	Lakeville	037-220200026010	Schweich, Bernard/eliz	WEL	1000	All Establishments Offering Residence	31 (Sealed Depth)	1/31/2001	Not Available (from Sealed Wells Database)	Yes
348	H000183547	Sealed	Unknown, from Sealed Wells Database	18961 Kenyon Av	Lakeville	Not Available	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	25 (Sealed Depth)	5/28/2002	Not Available (from Sealed Wells Database)	No
349	H000183548	Sealed	Unknown, from Sealed Wells Database	18961 Kenyon Av	Lakeville	Not Available	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	25 (Sealed Depth)	5/28/2002	Not Available (from Sealed Wells Database)	No
350	H000185193	Sealed	Unknown, from Sealed Wells Database	10522 188th St W	Lakeville	037-222780003010	Dean Johnson Builders	WEL	7000	Construction-Related Business	105 (Sealed Depth)	11/10/2001	Not Available (from Sealed Wells Database)	Approximate
351	H000181449	Sealed	Unknown, from Sealed Wells Database	9604 202nd St W	Lakeville	037-224747900010	Shamrock Development	WEL	7000	Construction-Related Business	50 (Sealed Depth)	6/15/2001	Not Available (from Sealed Wells Database)	Yes
352	H000178755	Sealed	Unknown, from Sealed Wells Database	19091 Dodd Bl	Lakeville	037-220200025014	D.r. Horton Inc-minnesota	WEL	2000	General Sales and Service	24 (Sealed Depth)	9/25/2001	Not Available (from Sealed Wells Database)	Approximate
353	H000178758	Sealed	Unknown, from Sealed Wells Database	19091 Dodd Bl	Lakeville	037-220200025014	D.r. Horton Inc-minnesota	WEL	2000	General Sales and Service	306 (Sealed Depth)	9/25/2001	Not Available (from Sealed Wells Database)	Approximate
354	H000181465	Sealed	Unknown, from Sealed Wells Database	9604 202nd St W	Lakeville	037-224747900010	Shamrock Development	WEL	7000	Construction-Related Business	30 (Sealed Depth)	6/15/2001	Not Available (from Sealed Wells Database)	Yes
355	H000200741	Sealed	Unknown, from Sealed Wells Database	16723 Ipava Av	Lakeville	037-220080025013	Action Construction	WEL	7000	Construction-Related Business	358 (Sealed Depth)	11/11/2002	Not Available (from Sealed Wells Database)	Approximate
356	H000200742	Sealed	Unknown, from Sealed Wells Database	16723 Ipava Av	Lakeville	037-220080025013	Action Construction	WEL	7000	Construction-Related Business	172 (Sealed Depth)	11/11/2002	Not Available (from Sealed Wells Database)	Approximate
357	H000207618	Sealed	Unknown, from Sealed Wells Database	7287 161st St	Lakeville	037-221950101021	Holiday Companies	WEL	2116	Gasoline Services	33 (Sealed Depth)	7/24/2003	Not Available (from Sealed Wells Database)	Yes
358	H000190013	Sealed	Unknown, from Sealed Wells Database	9532 W 185th St	Lakeville	Not Available	Miller, Joe	WEL	1000	All Establishments Offering Residence	270 (Sealed Depth)	7/15/2002	Not Available (from Sealed Wells Database)	Yes
359	H000190028	Sealed	Unknown, from Sealed Wells Database	16570 Dodd Bl	Lakeville	037-222117705050	Wright Homes, Inc.	WEL	7000	Construction-Related Business	215 (Sealed Depth)	10/7/2002	Not Available (from Sealed Wells Database)	Yes
360	H000199601	Sealed	Unknown, from Sealed Wells Database	17955 Flagstaff Av W	Lakeville	Not Available	Ryan Contracting	WEL	7000	Construction-Related Business	256 (Sealed Depth)	11/20/2002	Not Available (from Sealed Wells Database)	No
361	H000222502	Sealed	Unknown, from Sealed Wells Database	17585 Junelle Pa	Lakeville	037-221188500010	United Properties	WEL	2000	General Sales and Service	220 (Sealed Depth)	5/7/2004	Not Available (from Sealed Wells Database)	Approximate
362	H000222503	Sealed	Unknown, from Sealed Wells Database	17590 Junelle Pa	Lakeville	037-221188500010	United Properties	WEL	2000	General Sales and Service	292 (Sealed Depth)	5/7/2004	Not Available (from Sealed Wells Database)	Approximate
363	H000222504	Sealed	Unknown, from Sealed Wells Database	17685 Junelle Pa	Lakeville	037-221188501040	United Properties	WEL	2000	General Sales and Service	315 (Sealed Depth)	5/26/2004	Not Available (from Sealed Wells Database)	Approximate
364	H000222505	Sealed	Unknown, from Sealed Wells Database	17714 Junelle Pa	Lakeville	037-221188500010	United Properties	WEL	2000	General Sales and Service	279 (Sealed Depth)	5/7/2004	Not Available (from Sealed Wells Database)	Approximate
365	H000222510	Sealed	Unknown, from Sealed Wells Database	175th St W	Lakeville	Not Available	United Properties	WEL	2000	General Sales and Service	120 (Sealed Depth)	5/7/2004	Not Available (from Sealed Wells Database)	No
366	H000213774	Sealed	Unknown, from Sealed Wells Database	19019 Orchard Tr	Lakeville	037-228310001010	Wagner, Jennifer	WEL	1000	All Establishments Offering Residence	180 (Sealed Depth)	8/21/2003	Not Available (from Sealed Wells Database)	Yes
367	H000218450	Sealed	Unknown, from Sealed Wells Database	17830 Kenwood Tr	Lakeville	037-223332601020	United Properties	WEL	2000	General Sales and Service	33 (Sealed Depth)	4/28/2004	Not Available (from Sealed Wells Database)	Yes
368	H000214638	Sealed	Unknown, from Sealed Wells Database	17720 Kenwood Tr	Lakeville	037-221188601020	Fridges Excavating	WEL	8000	Mining and Extractive Uses	308 (Sealed Depth)	10/24/2003	Not Available (from Sealed Wells Database)	Approximate
369	H000214640	Sealed	Unknown, from Sealed Wells Database	17713 Junelle Pa	Lakeville	037-221188500010	Friedges Excavating	WEL	8000	Mining and Extractive Uses	287 (Sealed Depth)	10/24/2003	Not Available (from Sealed Wells Database)	Approximate
370	H000210473	Sealed	Unknown, from Sealed Wells Database	18961 Kenyon Av	Lakeville	Not Available	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	17 (Sealed Depth)	5/10/2005	Not Available (from Sealed Wells Database)	No
371	H000209234	Sealed	Unknown, from Sealed Wells Database	18931 Kenyon Av	Lakeville	Not Available	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	181 (Sealed Depth)	11/14/2003	Not Available (from Sealed Wells Database)	No
372	H000209245	Sealed	Unknown, from Sealed Wells Database	10811 176th St	Lakeville	037-224130001011	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	289 (Sealed Depth)	4/12/2004	Not Available (from Sealed Wells Database)	No
373	H000207697	Sealed	Unknown, from Sealed Wells Database	17819 Cedar Av	Lakeville	037-221860001010	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	323 (Sealed Depth)	8/6/2004	Not Available (from Sealed Wells Database)	Approximate

Table C-3

PCSI Results - Wells Within the DWSMAs
City of Lakeville

Map ID	Unique No.	Status	Use	Well Location	City or Twp	PID No.	Well Owner	PCS Code	Facility Code	Facility Designation	Total/Sealed Depth (feet)	Date Completed/Sealed	Aquifer	Location Verified
374	H000224624	Sealed	Unknown, from Sealed Wells Database	17685 Junelle Pa	Lakeville	037-221188501040	United Properties	WEL	2000	General Sales and Service	275 (Sealed Depth)	7/15/2004	Not Available (from Sealed Wells Database)	Approximate
375	H000224627	Sealed	Unknown, from Sealed Wells Database	17886 Kenwood Tr	Lakeville	037-223332601020	United Properties	WEL	2000	General Sales and Service	200 (Sealed Depth)	7/23/2004	Not Available (from Sealed Wells Database)	Approximate
376	H000232937	Sealed	Unknown, from Sealed Wells Database	10741 173rd St W	Lakeville	037-221185000084	Ryan Contracting Company	WEL	7000	Construction-Related Business	262 (Sealed Depth)	4/11/2005	Not Available (from Sealed Wells Database)	No
377	H000232938	Sealed	Unknown, from Sealed Wells Database	10604 173rd St W	Lakeville	037-221185000084	Ryan Contracting Company	WEL	7000	Construction-Related Business	83 (Sealed Depth)	4/11/2005	Not Available (from Sealed Wells Database)	No
378	H000232939	Sealed	Unknown, from Sealed Wells Database	10694 173rd St W	Lakeville	037-221185000084	Ryan Contracting Company	WEL	7000	Construction-Related Business	317 (Sealed Depth)	4/11/2005	Not Available (from Sealed Wells Database)	No
379	H000232944	Sealed	Unknown, from Sealed Wells Database	10604 173rd St W	Lakeville	037-221185000084	Ryan Contracting Company	WEL	7000	Construction-Related Business	265 (Sealed Depth)	4/11/2005	Not Available (from Sealed Wells Database)	No
380	H000220127	Sealed	Unknown, from Sealed Wells Database	10784 176th St W	Lakeville	037-225340002030	United Properties-bruce Carlson	WEL	2000	General Sales and Service	30 (Sealed Depth)	3/17/2004	Not Available (from Sealed Wells Database)	No
381	H000219606	Sealed	Unknown, from Sealed Wells Database	18661 Irving Wa	Lakeville	037-226740004010	Jerome Craig Homes	WEL	2000	General Sales and Service	348 (Sealed Depth)	8/2/2004	Not Available (from Sealed Wells Database)	Yes
382	H000222501	Sealed	Unknown, from Sealed Wells Database	17580 Junelle Pa	Lakeville	037-221188500010	United Properties	WEL	2000	General Sales and Service	286 (Sealed Depth)	5/7/2004	Not Available (from Sealed Wells Database)	Approximate
383	H000222602	Sealed	Unknown, from Sealed Wells Database	Cedar (& Dodd Bl) Av	Lakeville	Not Available	Ryan Contracting Company	WEL	7000	Construction-Related Business	254 (Sealed Depth)	6/21/2004	Not Available (from Sealed Wells Database)	No
384	H000237980	Sealed	Unknown, from Sealed Wells Database	17977 Ipava Av W	Lakeville	037-221145001050	Dr Horton Inc.	WEL	2000	General Sales and Service	266 (Sealed Depth)	9/2/2005	Not Available (from Sealed Wells Database)	Approximate
385	H000237982	Sealed	Unknown, from Sealed Wells Database	Ipava Av	Lakeville	037-220180009012	Dr Horton Inc.	WEL	2000	General Sales and Service	21 (Sealed Depth)	9/1/2005	Not Available (from Sealed Wells Database)	No
386	H000232198	Sealed	Unknown, from Sealed Wells Database	9290 202nd St W	Lakeville	037-220290036021	River Country Coop	WEL	9000	Agriculture, Forestry, Fishing, and Hunting	65 (Sealed Depth)	6/23/2006	Not Available (from Sealed Wells Database)	Yes
387	H000228786	Sealed	Unknown, from Sealed Wells Database	18365 Dodd Bl	Lakeville	037-220170025012	Veit And Co.	WEL	2000	General Sales and Service	264 (Sealed Depth)	12/27/2004	Not Available (from Sealed Wells Database)	Approximate
388	H000232168	Sealed	Unknown, from Sealed Wells Database	9280 202nd St W	Lakeville	037-220290036021	Farmers Union Coop	WEL	9000	Agriculture, Forestry, Fishing, and Hunting	55 (Sealed Depth)	10/13/2005	Not Available (from Sealed Wells Database)	Yes
389	H000237781	Sealed	Unknown, from Sealed Wells Database	10768 173rd St	Lakeville	037-221185000084	Ryan Construction, Inc.	WEL	7000	Construction-Related Business	72 (Sealed Depth)	9/20/2005	Not Available (from Sealed Wells Database)	No
390	H000237782	Sealed	Unknown, from Sealed Wells Database	10851 W 173rd St	Lakeville	037-221185000084	Ryan Construction Inc.	WEL	7000	Construction-Related Business	257 (Sealed Depth)	9/20/2005	Not Available (from Sealed Wells Database)	No
391	H000228837	Sealed	Unknown, from Sealed Wells Database	17751 Dodd Bl	Lakeville	037-220090053010	Friedges Excavating	WEL	8000	Mining and Extractive Uses	265 (Sealed Depth)	5/16/2005	Not Available (from Sealed Wells Database)	Approximate
392	H000228841	Sealed	Unknown, from Sealed Wells Database	17751 Dodd Bl	Lakeville	037-220090053010	Friedges Excavating	WEL	8000	Mining and Extractive Uses	110 (Sealed Depth)	7/17/2005	Not Available (from Sealed Wells Database)	Approximate
393	H000228842	Sealed	Unknown, from Sealed Wells Database	17099 Dodd Bl	Lakeville	037-222085002070	Mw Johnson Construction	WEL	7000	Construction-Related Business	213 (Sealed Depth)	8/24/2005	Not Available (from Sealed Wells Database)	Approximate
394	H000227013	Sealed	Unknown, from Sealed Wells Database	17380 Kenrick Av	Lakeville	037-221185000173	Sinclair Oil Corporation	WEL	2000	General Sales and Service	15 (Sealed Depth)	11/22/2004	Not Available (from Sealed Wells Database)	Approximate
395	H000230698	Sealed	Unknown, from Sealed Wells Database	17265 Joy Ct	Lakeville	037-221182501050	Dr Horton Builders	WEL	7000	Construction-Related Business	300 (Sealed Depth)	2/15/2006	Not Available (from Sealed Wells Database)	Yes
396	H000230700	Sealed	Unknown, from Sealed Wells Database	17265 Joy Ct	Lakeville	037-221182501050	Dr Horton Builders	WEL	7000	Construction-Related Business	122 (Sealed Depth)	2/21/2006	Not Available (from Sealed Wells Database)	Yes
397	H000257428	Sealed	Unknown, from Sealed Wells Database	9830 Iteri La	Lakeville	Not Available	Curren, Conrad	WEL	1000	All Establishments Offering Residence	238 (Sealed Depth)	7/6/2007	Not Available (from Sealed Wells Database)	No
398	H000257429	Sealed	Unknown, from Sealed Wells Database	9835 Iteri La	Lakeville	037-221895001060	Curren, Conrad	WEL	1000	All Establishments Offering Residence	30 (Sealed Depth)	7/6/2007	Not Available (from Sealed Wells Database)	Yes
399	H000200574	Sealed	Unknown, from Sealed Wells Database	9290 202nd St W	Lakeville	037-220290036021	Farmers Union Coop Oil	WEL	9000	Agriculture, Forestry, Fishing, and Hunting	35 (Sealed Depth)	6/30/2004	Not Available (from Sealed Wells Database)	Yes
400	H000245679	Sealed	Unknown, from Sealed Wells Database	19950 Dodd Bl	Lakeville	Not Available	Preferred Titile Of Mn	WEL	2100	Retail Sales or Service	44 (Sealed Depth)	10/26/2006	Not Available (from Sealed Wells Database)	Approximate
401	H000258627	Sealed	Unknown, from Sealed Wells Database	17380 Kenrick Ci	Lakeville	037-221185000173	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	175 (Sealed Depth)	7/26/2007	Not Available (from Sealed Wells Database)	Approximate
402	H000247056	Sealed	Unknown, from Sealed Wells Database	9945 Iteri Ct W	Lakeville	037-220190076010	Poets, Keith	WEL	1000	All Establishments Offering Residence	175 (Sealed Depth)	6/7/2006	Not Available (from Sealed Wells Database)	Yes
403	H000232196	Sealed	Unknown, from Sealed Wells Database	Not Available	Lakeville	037-220290037018	River County Coop	WEL	9000	Agriculture, Forestry, Fishing, and Hunting	65 (Sealed Depth)	7/25/2006	Not Available (from Sealed Wells Database)	No
404	H000232191	Sealed	Unknown, from Sealed Wells Database	9290 202nd St W	Lakeville	037-220290036021	River Country Coop	WEL	9000	Agriculture, Forestry, Fishing, and Hunting	58 (Sealed Depth)	4/6/2006	Not Available (from Sealed Wells Database)	Yes
405	H000267798	Sealed	Unknown, from Sealed Wells Database	7773 214th St W	Lakeville	037-221105000040	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and Other Institutions	20 (Sealed Depth)	4/15/2008	Not Available (from Sealed Wells Database)	Approximate
406	H000255669	Sealed	Unknown, from Sealed Wells Database	18065 Ixonia Av	Lakeville	037-224740002051	Omdal, Christopher	WEL	1000	All Establishments Offering Residence	248 (Sealed Depth)	5/21/2008	Not Available (from Sealed Wells Database)	Yes
407	H000276972	Sealed	Unknown, from Sealed Wells Database	18030 Kenwood Tr	Lakeville	037-220130001010	Cross, Nancy	WEL	1000	All Establishments Offering Residence	239 (Sealed Depth)	6/25/2009	Not Available (from Sealed Wells Database)	Yes
408	761572	Sealed	Unknown, from Sealed Wells Database	Dodd Rd	Lakeville	037-220020001030	Metropolitan Council	WEL	6200	Public Administration Establishments	25 (Sealed Depth)	7/15/2010	Not Available (from Sealed Wells Database)	No
409	H000270656	Sealed	Unknown, from Sealed Wells Database	17180 Highview Av	Lakeville	037-220080003010	Miller, Joe	WEL	1000	All Establishments Offering Residence	228 (Sealed Depth)	6/12/2008	Not Available (from Sealed Wells Database)	Yes
410	H000294741	Sealed	Unknown, from Sealed Wells Database	16161 Cedar Av	Lakeville	037-221630001014	Northern Tier Retail	WEL	2116	Gasoline Services	16 (Sealed Depth)	5/3/2011	Not Available (from Sealed Wells Database)	Yes
411	H000294907	Sealed	Unknown, from Sealed Wells Database	9965 176th Ci	Lakeville	037-221940001050	Carboneau, Scott	WEL	1000	All Establishments Offering Residence	328 (Sealed Depth)	6/2/2011	Not Available (from Sealed Wells Database)	Yes
412	H000300031	Sealed	Unknown, from Sealed Wells Database	16161 Cedar Av	Lakeville	037-221630001014	Not Available	WEL	2116	Gasoline Services	41 (Sealed Depth)	11/14/2011	Not Available (from Sealed Wells Database)	Yes
413	H000290170	Sealed	Unknown, from Sealed Wells Database	17398 Glacier Wa	Lakeville	037-226750702020	Not Available	WEL	2000	General Sales and Service	21 (Sealed Depth)	12/2/2010	Not Available (from Sealed Wells Database)	Yes
414	101006	Active	Domestic	No Street Address On File	Lakeville	037-226460703170	Barth Construction	WEL	1100-01	Residence	90	8/19/1975	Unknown	No
415	119708	Active	Domestic	19774 Kenwood Trl	Lakeville	037-221150005181	Cross Nurseries Inc	WEL	2100	Retail Sales or Service	196	5/14/1979	Prairie du-Chien Dolomite	Yes
416	235542	Active	Unknown	No Street Address On File	Lakeville	Not Available	Lakeville-for Hill	WEL	1000	All Establishments Offering Residence	605	5/11/1961	Unknown	No
417	416222	Active	Domestic	16070 Highview Ave	Lakeville	037-220050001012	Mn Valley Lutheran Church	WEL	1000	All Establishments Offering Residence	255	7/26/1985	Unknown	Yes

Table C-4

PCSI Results - Potential Class V Well Locations in the DWSMAs
City of Lakeville

Map ID	MPCA ID / County ID	PID No.	Status	Location Name	Street Address	City or Twp	PCS Code	Facility Code	Facility Designation	Location Verified
1	MN-037-NOT5-0026	037-220110003012	Not Available	Frontier Mobile Home Sales Inc.	5622 173rd Street W	Lakeville	CVWWD	1100-03	Mobile home park	Approximate
2	MND985765569	037-012000101060	Active	Jiffy Lube	15405 Cedar Ave S	Apple Valley	CVWWD	2110-01	Automobile/vehicle repair	Yes
3	MNR000071084	037-221950001020	Active	Northland Collision Inc	7430 160th St W	Lakeville	CVWWD	2110-01	Automobile/vehicle repair	Yes
4	MN0000930016	037-012000101040	Active	Transmission Dr Inc	15425 Cedar Ave	Apple Valley	CVWWD	2110-01	Automobile/vehicle repair	Yes
5	MNR000054106	037-221950101010	Active	Grandview Tire & Auto	7358 W 160th St	Lakeville	CVWWD	2110-01	Automobile/vehicle repair	Yes
6	MND985767920	037-012000101030	Active	Midas Muffler - Apple Valley	15455 Cedar Ave	Apple Valley	CVWWD	2110-01	Automobile/vehicle repair	Yes
7	MNR000111039	037-221110002010	Active	Airlake Truck Body & Paint Inc	21540 Hamburg Avenue S, Suite C	Lakeville	CVWWD	2110-01	Automobile/vehicle repair	Yes
8	562	037-220290025016	Not Available	Lake Marion Collision	20120 Dodd Blvd	Lakeville	CVWWD	2110-01	Automobile/vehicle repair	Yes
9	MN0000937185	037-222950001012	Active	Hometown Auto Service	20315 Iberia Ave	Lakeville	CVWWD	2110-01	Automobile/vehicle repair	Yes
10	1928	037-221860001030	Not Available	Lakeville Goodyear	17567 Cedar Ave S	Lakeville	CVWWD	2110-01	Automobile/vehicle repair	Yes
11	2080	037-223332502010	Not Available	Tires Plus	17900 Kenwood Trail	Lakeville	CVWWD	2110-01	Automobile/vehicle repair	Yes
12	MND985686153	037-220290037017	Inactive	Korbas Don Auto Body	9300 202nd St W	Lakeville	CVWWD	2110-01	Automobile/vehicle repair	Yes
13	MNS000130872	037-221185000225	Active	Lynn's Auto Body	10714 175th St W	Lakeville	CVWWD	2110-01	Automobile/vehicle repair	Yes
14	MND985719913	037-220190086010	Inactive	Rogers Auto Service	9880 Iteri Ct W	Lakeville	CVWWD	2110-01	Automobile/vehicle repair	Yes
15	MNR000051821	037-228150001010	Active	Valvoline Rapid Oil Change	17505 Kenwood Trl	Lakeville	CVWWD	2110-01	Automobile/vehicle repair	Yes
16	MND985757129	037-221185000061	Active	Heartland Tire and Service	17311 Kenrick Ave	Lakeville	CVWWD	2110-01	Automobile/vehicle repair	Yes
17	116	037-224178001030	Active	Lifetime Fitness	18425 Dodd Blvd	Lakeville	CVWWD	5000	Arts, Entertainment and Recreation	Yes

Approximate - Parcel not found but location is approximately where that address would exist.

Table C-5

PCSI Results - Storage Tanks in the DWSMAs
City of Lakeville

Map ID	PID Number	Site	Site Address	City	MPCA Site ID	Tank Status	Tank Number	Tank Product	Product Released	Tank Capacity	Install Date	Registration Date	Date Removed	Release Discovered Date	Release Report Date	Complete Site Closure Date	PCS Code-Material Code	Facility Code	Facility Designation	Location Verified
1	037-223107601020	ConAgra Store Brands	21325 Hamburg Ave	Lakeville	1075	Active	1	Unregulated	Tank Site Only	15,000	11/14/1995	05/07/2008	Not Available	Not Available	Not Available	Not Available	AST	3110-01	Food processing plant	Yes
1	037-223107601020	ConAgra Store Brands	21325 Hamburg Ave	Lakeville	1075	Active	2	Unregulated	Tank Site Only	5,000	10/13/1998	05/07/2008	Not Available	Not Available	Not Available	Not Available	AST	3110-01	Food processing plant	Yes
1	037-223107601020	ConAgra Store Brands	21325 Hamburg Ave	Lakeville	1075	Active	3	Unregulated	Tank Site Only	9,000	10/13/1998	05/07/2008	Not Available	Not Available	Not Available	Not Available	AST	3110-01	Food processing plant	Yes
1	037-223107601020	ConAgra Store Brands	21325 Hamburg Ave	Lakeville	1075	Active	4	Unregulated	Tank Site Only	9,000	10/13/1998	05/07/2008	Not Available	Not Available	Not Available	Not Available	AST	3110-01	Food processing plant	Yes
1	037-223107601020	ConAgra Store Brands	21325 Hamburg Ave	Lakeville	1075	Active	5	Unregulated	Tank Site Only	7,000	10/13/1998	05/07/2008	Not Available	Not Available	Not Available	Not Available	AST	3110-01	Food processing plant	Yes
1	037-223107601020	ConAgra Store Brands	21325 Hamburg Ave	Lakeville	1075	Active	6	Unregulated	Tank Site Only	7,000	10/13/1998	05/07/2008	Not Available	Not Available	Not Available	Not Available	AST	3110-01	Food processing plant	Yes
1	037-223107601020	ConAgra Store Brands	21325 Hamburg Ave	Lakeville	1075	Closed In-Practice	7	Unregulated	Tank Site Only	6,000	07/01/2007	05/07/2008	Not Available	Not Available	Not Available	Not Available	AST	3110-01	Food processing plant	Yes
1	037-223107601020	ConAgra Store Brands	21325 Hamburg Ave	Lakeville	1075	Active	8	Food	Tank Site Only	9,000	09/01/2011	09/9/2011	Not Available	Not Available	Not Available	Not Available	AST-W00	3110-01	Food processing plant	Yes
2	037-011177501010	Cub Foods	15350 Cedar Ave	Apple Valley	11246	Active	001	Diesel	Tank Site Only	1,500	11/1/1992	08/03/1992	Not Available	Not Available	Not Available	Not Available	AST-F000	2100	Retail sales or service	Yes
3	037-220050027010	Crystal Lake Elementary School	165TH & IPAVA	Lakeville	11370	Active	001	Fuel Oil	Tank Site Only	10,000	10/09/1987	10/12/1987	Not Available	Not Available	Not Available	Not Available	AST-F000	6000	Education, Public Administration, Health Care, and Other Institutions	No
4	037-220011076031	Lakeville Truck Station	16780 KENRICK AVE	Lakeville	1175	Removed	001	Gasoline	Tank Site Only	6,000	01/01/1972	04/21/1986	05/14/1996	Not Available	Not Available	Not Available	AST-F000	4000	Transportation, Communication, Information, and Utilities	No
4	037-220011076031	Lakeville Truck Station	16780 KENRICK AVE	Lakeville	1175	Removed	002	Diesel	Tank Site Only	10,000	01/01/1972	04/21/1986	05/14/1996	Not Available	Not Available	Not Available	AST-F000	4000	Transportation, Communication, Information, and Utilities	No
4	037-220011076031	Lakeville Truck Station	16780 KENRICK AVE	Lakeville	1175	Removed	003	Fuel Oil	Tank Site Only	8,000	01/01/1971	04/21/1986	06/01/1988	Not Available	Not Available	Not Available	UST-F00	4000	Transportation, Communication, Information, and Utilities	No
4	037-220011076031	Lakeville Truck Station	16780 KENRICK AVE	Lakeville	1175	Removed	004	Used Or Waste Oil	Tank Site Only	1,000	01/01/1970	04/21/1986	09/16/1994	Not Available	Not Available	Not Available	UST-F00	4000	Transportation, Communication, Information, and Utilities	No
4	037-220011076031	Lakeville Truck Station	16780 KENRICK AVE	Lakeville	1175	Removed	005	Diesel	Tank Site Only	6,000	01/01/1972	04/21/1986	05/14/1996	Not Available	Not Available	Not Available	UST-F00	4000	Transportation, Communication, Information, and Utilities	No
4	037-220011076031	Lakeville Truck Station	16780 KENRICK AVE	Lakeville	1175	Active	415	Diesel	Tank Site Only	12,000	01/05/1996	01/17/1996	Not Available	Not Available	Not Available	Not Available	UST-F00	4000	Transportation, Communication, Information, and Utilities	No
4	037-220011076031	Lakeville Truck Station	16780 KENRICK AVE	Lakeville	1175	Active	416	Alcohol Blend	Tank Site Only	8,000	01/05/1996	01/17/1996	Not Available	Not Available	Not Available	Not Available	UST-C00	4000	Transportation, Communication, Information, and Utilities	No
5	037-221110004060	Perma Gove	21365 HAMBURG	Lakeville	119671	Active	1001	Other Substance	Tank Site Only	5,500	01/01/2003	06/12/2003	Not Available	Not Available	Not Available	Not Available	AST	3000	Manufacturing and Wholesale Trade	Yes
5	037-221110004060	Perma Gove	21365 HAMBURG	Lakeville	119671	Active	1	Other Substance	Tank Site Only	1,000	10/01/2008	06/02/2009	Not Available	Not Available	Not Available	Not Available	AST	3000	Manufacturing and Wholesale Trade	Yes
5	037-221110004060	Perma Gove	21365 HAMBURG	Lakeville	119671	Active	2	Other Substance	Tank Site Only	2,000	03/09/2009	06/02/2009	Not Available	Not Available	Not Available	Not Available	AST	3000	Manufacturing and Wholesale Trade	Yes
5	037-221110004060	Perma Gove	21365 HAMBURG	Lakeville	119671	Active	3	Other Substance	Tank Site Only	5,000	12/01/2006	06/02/2009	Not Available	Not Available	Not Available	Not Available	AST	3000	Manufacturing and Wholesale Trade	Yes
5	037-221110004060	Perma Gove	21365 HAMBURG	Lakeville	119671	Active	4	Other Substance	Tank Site Only	1,500	12/01/2006	06/02/2009	Not Available	Not Available	Not Available	Not Available	AST	3000	Manufacturing and Wholesale Trade	Yes
5	037-221110004060	Perma Gove	21365 HAMBURG	Lakeville	119671	Active	5	Chemical Other Or Unspecified	Tank Site Only	750	12/01/2006	06/02/2009	Not Available	Not Available	Not Available	Not Available	AST-C00	3000	Manufacturing and Wholesale Trade	Yes
5	037-221110004060	Perma Gove	21365 HAMBURG	Lakeville	119671	Active	6	Chemical Other Or Unspecified	Tank Site Only	750	12/01/2006	06/02/2009	Not Available	Not Available	Not Available	Not Available	AST-C00	3000	Manufacturing and Wholesale Trade	Yes
5	037-221110004060	Perma Gove	21365 HAMBURG	Lakeville	119671	Active	7	Chemical Other Or Unspecified	Tank Site Only	1,000	10/01/2008	06/02/2009	Not Available	Not Available	Not Available	Not Available	AST-C00	3000	Manufacturing and Wholesale Trade	Yes
5	037-221110004060	Perma Gove	21365 HAMBURG	Lakeville	119671	Active	8	Other Substance	Tank Site Only	1,000	10/01/2008	06/02/2009	Not Available	Not Available	Not Available	Not Available	AST	3000	Manufacturing and Wholesale Trade	Yes
6	037-224437102001	Lakeville Superette	20180 DODD BLVD	Lakeville	12155	Not Available	Not Available	Not Available	Tank Site Only	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	2100	Retail sales and service	No
7	037-222117200040	Parkview Elementary School	6795 GERDINE PATH	Lakeville	1228	Removed	001	Fuel Oil	Tank Site Only	10,000	01/01/1970	03/12/1986	07/09/1990	Not Available	Not Available	Not Available	UST-F00	6100	Schools	Yes
7	037-222117200040	Parkview Elementary School	6795 GERDINE PATH	Lakeville	1228	Active	002	Fuel Oil	Tank Site Only	10,000	07/09/1990	07/09/1990	Not Available	Not Available	Not Available	Not Available	UST-F00	6100	Schools	Yes
8	037-224437101020	Lake Marion Elementary School	19900 DODD BLVD	Lakeville	13290	Active	001	Fuel Oil	Tank Site Only	10,000	12/01/1989	01/17/1990	Not Available	Not Available	Not Available	Not Available	UST-F00	6000	Education, Public Administration, Health Care, and Other Institutions	No
9	037-220290036021	Farmers Union Coop Assn	9290 202ND ST W	Lakeville	1359	Removed	001	Gasoline	Tank Site Only	12,000	06/15/1983	None Indicated	05/21/2003	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	No
9	037-220290036021	Farmers Union Coop Assn	9290 202ND ST W	Lakeville	1359	Removed	002	Gasoline	Tank Site Only	12,000	06/15/1983	None Indicated	05/21/2003	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	No
9	037-220290036021	Farmers Union Coop Assn	9290 202ND ST W	Lakeville	1359	Removed	003	Diesel	Tank Site Only	12,000	06/15/1983	04/29/1986	05/21/2003	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	No
9	037-220290036021	Farmers Union Coop Assn	9290 202ND ST W	Lakeville	1359	Active	004	Diesel	Tank Site Only	12,000	08/03/1989	01/29/1990	Not Available	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	No
9	037-220290036021	Farmers Union Coop Assn	9290 202ND ST W	Lakeville	1359	Removed	005	Gasoline	Tank Site Only	1,000	01/01/2001	04/29/1986	07/24/1989	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	No
9	037-220290036021	Farmers Union Coop Assn	9290 202ND ST W	Lakeville	1359	Removed	006	Gasoline	Tank Site Only	1,000	01/01/2001	04/29/1986	07/24/1989	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	No
9	037-220290036021	Farmers Union Coop Assn	9290 202ND ST W	Lakeville	1359	Active	007	Alcohol Blend	Tank Site Only	12,000	05/23/2003	07/28/2003	Not Available	Not Available	Not Available	Not Available	UST-C00	2116	Gasoline services	No
9	037-220290036021	Farmers Union Coop Assn	9290 202ND ST W	Lakeville	1359	Active	008	Diesel	Tank Site Only	10,000	05/23/2003	07/28/2003	Not Available	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	No
9	037-220290036021	Farmers Union Coop Assn	9290 202ND ST W	Lakeville	1359	Active	009	Gasoline	Tank Site Only	12,000	05/23/2003	07/28/2003	Not Available	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	No
9	037-220290036021	Farmers Union Coop Assn	9290 202ND ST W	Lakeville	1359	Active	1001	Used Or Waste Oil	Tank Site Only	285	10/01/1996	12/09/1996	Not Available	Not Available	Not Available	Not Available	AST-F00	2116	Gasoline services	No
10	037-220330005011	City Of Lakeville-Public Works	7773 214TH ST	Lakeville	16441	Removed	001	Diesel	Tank Site Only	4,000	08/15/1972	12/03/1985	10/28/1992	Not Available	Not Available	Not Available	UST-F00	6200	Public administration establishments	Yes
10	037-220330005011	City Of Lakeville-Public Works	7773 214TH ST	Lakeville	16441	Removed	002	Gasoline	Tank Site Only	8,000	08/15/1973	12/03/1985	10/28/1992	Not Available	Not Available	Not Available	UST-F00	6200	Public administration establishments	Yes
10	037-220330005011	City Of Lakeville-Public Works	7773 214TH ST	Lakeville	16441	Removed	003	Gasoline	Tank Site Only	8,000	07/15/1980	12/03/1985	10/28/1992	Not Available	Not Available	Not Available	UST-F00	6200	Public administration establishments	Yes
11	037-220290032031	Kwik Trip #692	20187 DODD BLVD	Lakeville	19383	Active	272	Diesel	Tank Site Only	12,000	09/22/1995	01/30/1996	Not Available	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	No
11	037-220290032031	Kwik Trip #692	20187 DODD BLVD	Lakeville	19383	Active	273	Gasoline	Tank Site Only	12,000	09/22/1995	01/30/1996	Not Available	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	No
11	037-220290032031	Kwik Trip #692	20187 DODD BLVD	Lakeville	19383	Active	274	Gasoline	Tank Site Only	12,000	09/22/1995	01/30/1996	Not Available	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	No
11	037-220290032031	Kwik Trip #692	20187 DODD BLVD	Lakeville	19383	Active	275	Gasoline	Tank Site Only	15,000	09/22/1995	01/30/1996	Not Available	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	No
12	037-220290001325	Oasis Market	20180 Dodd Blvd	Lakeville	214804	Removed	001	E-10 - 10% ethanol & 90% gas	Tank Site Only	10,000	09/01/1983	02/18/1986	01/20/2005	Not Available	Not Available	Not Available	UST-F00	2000	General Sales and Service	Yes
12	037-220290001325	Oasis Market	20180 Dodd Blvd	Lakeville	214804	Removed	002	E-10 - 10% ethanol & 90% gas	Tank Site Only	10,000	09/01/1983	02/18/1986	01/20/2005	Not Available	Not Available	Not Available	UST-F00	2000	General Sales and Service	Yes
12	037-220290001325	Oasis Market	20180 Dodd Blvd	Lakeville	214804	Removed	003	E-10 - 10% ethanol & 90% gas	Tank Site Only	10,000	09/01/1983	02/18/1986	01/20/2005	Not Available	Not Available	Not Available	UST-F00	2000	General Sales and Service	Yes
13	037-011179501010	Lakeville/apple Valley Lift Station L-15	7465 W 160th St	Lakeville	221538	Active	001	Diesel	Tank Site Only	1,000	07/15/1998	08/30/1988	Not Available	Not Available	Not Available	Not Available	UST-F00	6000	Education, Public Administration, Health Care, and Other Institutions	Yes
14	037-224437101020	Lake Marion Elementary School	19875 Dodd Blvd	Lakeville	223401	Active	001	Fuel Oil	Tank Site Only	10,000	12/01/1989	01/17/1990	Not Available	Not Available	Not Available	Not Available	UST-F00	6000	Education, Public Administration, Health Care, and Other Institutions	Yes
15	037-011625101010	Gas Plus #19	15550 Cedar Ave	Apple Valley	227435	Active	001	Alcohol Blend	Tank Site Only	12,000	10/25/1996	06/18/1997	Not Available	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	Yes
15	037-011625101010	Gas Plus #19	15550 Cedar Ave	Apple Valley	227435	Active	002	Alcohol Blend	Tank Site Only	12,000	10/25/1996	06/18/1997	Not Available	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	Yes
15	037-011625101010	Gas Plus #19	15550 Cedar Ave	Apple Valley	227435	Active	003	Alcohol Blend	Tank Site Only	12,000	10/25/1996	06/18/1997	Not Available	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	Yes
16	037-012000101060	Jiffy Lube	15405 Cedar Ave S	Apple Valley	230150	Active	1001	Used Or Waste Oil	Tank Site Only	1,000	06/01/1993	09/29/1993	Not Available	Not Available	Not Available	Not Available	AST-F00	2110-01	Automotive/vehicle repair	Yes
16	037-012000101060	Jiffy Lube	15405 Cedar Ave S	Apple Valley	230150	Active	1002	Motor Oil	Tank Site Only	2,000	06/01/1993	09/29/1993	Not Available	Not Available	Not Available	Not Available	AST-F00	2110-01	Automotive/vehicle repair	Yes
16	037-012000101060	Jiffy Lube	15405 Cedar Ave S	Apple Valley	230150	Active	1003	Motor Oil	Tank Site Only	1,000	06/01/1993	09/29/1993	Not Available	Not Available	Not Available	Not Available	AST-F00	2110-01	Automotive/vehicle repair	Yes
16	037-012000101060	Jiffy Lube	15405 Cedar Ave S	Apple Valley	230150	Active	1004	Motor Oil	Tank Site Only	280	06/01/1993	09/29/1993	Not Available	Not Available	Not Available	Not Available	AST-F00	2110-01	Automotive/vehicle repair	Yes
16	037-012000101060	Jiffy Lube	15405 Cedar Ave S	Apple Valley	230150	Active	1005	Antifreeze	Tank Site Only	220	06/01/1993	09/29/1993	Not Available	Not Available	Not Available	Not Available	AST-C00	2110-01	Automotive/vehicle repair	Yes
16	037-012000101060	Jiffy Lube	15405 Cedar Ave S	Apple Valley	230150	Active	1006	Antifreeze	Tank Site Only	220	None Indicated	12/26/2002	Not Available	Not Available	Not Available	Not Available	AST-C00	2110-01	Automotive/vehicle repair	Yes
17	037-221950101021	Holiday Station Store #333	7287 160th St	Lakeville	231924	Active	001	Gasoline	Tank Site Only	20,000	10/18/2003	12/10/2003	Not Available	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	Yes
17	037-221950101021	Holiday Station Store #333	7287 160th St	Lakeville	231924	Active	002	Gasoline	Tank Site Only	10,000	10/18/2003	12/10/2000	Not Available	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	Yes
17	037-221950101021	Holiday Station Store #333	7287 160th St	Lakeville	231924	Active	003	Gasoline	Tank Site Only	10,000	10/18/2003	12/10/2003	Not Available	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	Yes
17	037-221950101021	Holiday Station Store #333	7287 160th St	Lakeville	231924	Active	004	E-85 - 85% ethanol & 15% gas	Tank Site Only	10,000	01/20/2003	12/10/2003	Not Available	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	Yes
17	037-221950101021	Holiday Station Store #333	7287 160th St	Lakeville	231924	Active	005	Diesel	Tank Site Only	10,000	10/18/2003	12/10/2003	Not Available	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	Yes
18	037-221677501020	Kowalskis Market	7590 W 160th St	Lakeville	234696	Removed	1001	Diesel	Tank Site Only	1,000	07/01/2005	02/24/2006	09/01/2008	Not Available	Not Available	Not Available	AST-F00	2100	Retail sales or service	Approximate
19	037-010330076012	Cedar Park Elmentary School	7500 Whitney Dr	Apple Valley	33978	Removed	001	Fuel Oil	Tank Site Only	12,000	01/01/1978	03/12/1986	06/17/2002	Not Available	Not Available	Not Available	UST-F00	6000	Education, Public Administration, Health Care, and Other Institutions	Yes
19	037-010330076012	Cedar Park Elmentary School	7500 Whitney Dr	Apple Valley	33978	Removed	002	Fuel Oil	Tank Site Only	12,000	01/01/1978	03/12/1986	06/17/2002	Not Available	Not Available	Not Available	UST-F00	6000	Education, Public Administration, Health Care, and Other Institutions	Yes
19	037-010330076012	Cedar Park Elmentary School	7500 Whitney Dr	Apple Valley	33978	Removed	003	Fuel Oil	Tank Site Only	315	01/01/1978	03/12/1986	06/17/2002	Not Available	Not Available	Not Available	UST-F00	6000	Education, Public Administration, Health Care, and Other Institutions	Yes
19	037-010330076012	Cedar Park Elmentary School	7500 Whitney Dr	Apple Valley	33978	Active	004	Diesel	Tank Site Only	6,000	07/16/2002	07/31/2002	Not Available	Not Available	Not Available	Not Available	UST-F00	6000	Education, Public Administration, Health Care, and Other Institutions	Yes
20	037-221630001014	SuperAmerica #4337	16161 Cedar Ave	Lakeville	36981	Active	001	E-10 - 10% ethanol & 90% gas	Tank Site Only	12,000	08/30/1988	11/4/1988	Not Available	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	Yes
20	037-221630001014	SuperAmerica #4337	16161 Cedar Ave	Lakeville	36981	Active	002	E-10 - 10% ethanol & 90% gas	Tank Site Only	10,000	08/30/1988	11/4/1988	Not Available	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	Yes
20	037-221630001014	SuperAmerica #4337	16161 Cedar Ave	Lakeville	36981	Active	003	Diesel	Tank Site Only	10,000	08/30/1988	11/4/1988	Not Available	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	Yes
20	037-221630001014	SuperAmerica #4337	16161 Cedar Ave	Lakeville	36981	Active	004	E-10 - 10% ethanol & 90% gas	Tank Site Only	10,000	08/30/1988	11/4/1988	Not Available	Not Available	Not Available	Not Available	UST-F00	2116	Gasoline services	Yes
21	037-220240027011	Solv-Oil Service & Supply	19250 KENRICK AVE	Lakeville	50271	Temporarily Closed	1001	Used Or Waste Oil	Tank Site Only	17,000	01/01/1985	05/25/1990	Not Available	Not Available	Not Available	Not Available	AST-F00	3000	Manufacturing and Wholesale Trade	No
21	037-220240027011	Solv-Oil Service & Supply	19250 KENRICK AVE	Lakeville	50271	Temporarily Closed	1002	Used Or Waste Oil	Tank Site Only	17,000	01/01/1985	05/25/1990	Not Available	Not Available	Not Available	Not Available	AST-F00	3000	Manufacturing and Wholesale Trade	No
22	037-014830001010	Menards	15450 Cedar Ave	Apple Valley	54232975	Active	1001	Diesel	Tank Site Only	560	06/01/1986	06/17/1993	Not Available	Not Available	Not Available	Not Available	AST-F00	2122	Hardware stores and home centers	Yes
23	037-220011076031	Mn Department Of Transportation/ Mndot	16780 KENRICK AVE	Lakeville	55665	Active	1001	Used Or Waste Oil	Tank Site Only	650	01/01/1994	07/08/1998	Not Available	Not Available	Not Available	Not Available	AST-F00	4000	Transportation, Communication, Information, and Utilities	No
23	037-220011076031	Mn Department Of Transportation/ Mndot	16780 KENRICK AVE	Lakeville	55665	Active	1002	Transmission Fluid	Tank Site Only	265	01/01/1984	07/08/1998	Not Available	Not Available	Not Available	Not Available	AST-F00	4000	Transportation, Communication, Information, and Utilities	No
23	037-220011076031	Mn Department Of Transportation/ Mndot	16780 KENRICK AVE	Lakeville	55665	Active	1003	Motor Oil	Tank Site Only	265	01/01/1984	07/08/1998	Not Available	Not Available	Not Available	Not Available	AST-F00	4000	Transportation, Communication, Information, and Utilities	No
24	037-220290001016	Lakeville Police Department	20110 Holyoke Ave	Lakeville	56861	Active	1	Diesel	Tank Site Only	1,300	06/11/2008	05/14/2009	Not Available	Not Available	Not Available	Not Available	AST-F00	6000	Education, Public Administration, Health Care, and Other Institutions	Yes
25	037-221110001084	MCI Paint and Drywall	21400 Hamburg Ave	Lakeville	57669	Removed	001	Diesel	Tank Site Only	10,000	10/26/1992	06/21/2002	05/23/2005	Not Available	Not Available	Not Available	UST-F00	7000	Construction Related Business	Yes
25	037-221110001084	MCI Paint and Drywall	21400 Hamburg Ave	Lakeville	57669	Removed	002	Gasoline	Tank Site Only	10,000	10/26/1992	06/21/2002	05/23/2005	Not Available	Not Available	Not Available	UST-F00	7000	Construction Related Business	Yes

Table C-6

PCSI Results - Dump Sites in the DWSMAs
City of Lakeville

MapID	Name	PCS-Material Code	Facility Code	Facility Designation	PID Number	City	Location Verified
1	National Electric Disposal	SCC-F000	4346-04	Recycling site	037-221110001084	Lakeville	Yes
2	DeGreco Disposals	SCC-W000	4346	Waste treatment and disposal	037-221110004090	Lakeville	Yes

Table C-7

PCSI Results - Spills in the DWSMAs
City of Lakeville

MapID	PID Number	Name	Address	City	Product	Spill Report Date	PCS Code	Facility Code	Facility Designation	Location Verified
1	037-221110004090	American Freightways	21455 Hamberg Ave	Lakeville	Light Fuel Oil and Diesel	11/4/1998	SPL	3000	Manufacturing and Wholesale Trade	Yes
2	037-222117204130	Residential Street	16245 Franchise Ave	Rosemount	Hydraulic Fluid	4/5/2001	SPL	1100-01	Residence	Yes

Approximate - Parcel not found but location is approximately where that address would exist.
Uncertain - No address information provided or address is provided but changed substantially making locating difficult.

Table C-8

PCSI Results - Hazardous Waste Generators in the DWSMAs
City of Lakeville

Map ID	PID Number	MPCA/Unique ID	Generator	Address	City	Generator Size	Generator Type	Generator Status	PCS Code	Facility Code	Facility Designation	Location Verified
1	037-223107601020	1700	ConAgra Streetore Brands	21325 Hamburg Avenue	Lakeville	VSQG	Mixed Batteries, Lab Packs, Mercury, Oil Sorbents, Parts Washer Solvent, Used Oil, Oil Filters, Lead Acid Batteries, Paint Material, Fluorescent Lamps, PCB Ballasts, Antifreeze, Part Washer, Electronics	Active	HWG	3110-01	Food Processing Plant	Yes
2	037-223107601020	49	Grist Mill/IHFSB	21325 Hamburg Avenue	Lakeville	VSQG	Parts Washer Solvent, Used Oil, Lead Acid Batteries, Paint Material, Fluorescent Lamps, Oil/Antifreeze, Ballasts, Oil Filters, Antifreeze	Out of Business	HWG	3110-01	Food Processing Plant	Yes
3	037-221110001084	2037	Designed Cabinets	7965 215th Street West	Lakeville	VSQG	Thinner, Paint Booth Filters, Fluorescent Lamps, Solvent Rags	Active	HWG	3230	Furniture Manufacturing	Yes
4	037-221110001084	2079	MCI Paint & Drywall	21400 Hamburg Avenue	Lakeville	VSQG	Rags / Solvent, Latex Paint, Paint Booth Filters, Parts Washer Solvent, Paint Thinner, Used Oil, Fluorescent Lamps	Out of Business	HWG	2130	Durable Consumer Goods, Sales or Service	Approximate
5	037-221110003011	1835	Performance Office Papers	21565 Hamburg Avenue	Lakeville	VSQG	Part Washer - Citrus, Fluorescent Lamps, Used Oil, Used Oil Filters, Press Wash, Rags/Solvent, Ink, Parts Washer, Aerosol Paint	Active	HWG	3220-02	Paper Mill	Yes
6	037-221110004060	1869	HOBO Incorp.	21365 Hamburg Avenue	Lakeville	MQG	Lab Packs, Fluorescent Lamps	Active	HWG	3320	Chemical Manufacturing/Processing Plant	Yes
7	037-221110004060	353	Perma Groove, Inc.	21365 Hamburg Avenue	Lakeville	VSQG	Lacquer Thinner, Fluorescent Lamps	Out of Business	HWG	3210	Wood Products Establishment	Yes
8	037-223600001010	413	Imperial Plastics	21320 Hamburg Avenue West	Lakeville	MQG	Parts Washer Solvent, Used Oil, Fluorescent Lamps, Oil Filters, Parts Washer - System 1	Active	HWG	3320-01	Plastics/Synthetics Manufacturing	Yes
9	037-221105001010	480	J and E Manufacturing Co.	7925 215th Street West	Lakeville	MQG	Parts Washer Solvent, Thinner / Paint, Paint Filters/Rags, Used Oil, Paint Filters, Cutting Fluid, Rags / Solvent, Fluorescent Lamps, Powder Paint, Oily Rags, Electronics	Active	HWG	3340	Primary Metal Manufacturing	Yes
10	037-221110003011	702	OEI Business Products	21565 Hamburg Avenue	Lakeville	MQG	Parts Washer Solvent, Used Oil, Fluorescent Lamps, Oil Filters	Out of Business	HWG	3440	Sign Manufacturing	Yes
11	037-221110001084	MNR000042044	State Special Waste Facility	21400 Hamburg Avenue Suite B	Lakeville	VSQG	Not Available	Active	HWG	4000	Transportation, Communication, Information, and Utilities	Yes
12	037-011625201010	MNR000026518	Park Dental Apple Valley	15650 Cedar Ave S Ste B	Apple Valley	VSQG	Not Available	Inactive	HWG	2400	Professional, scientific and technical services and general business	Yes
13	037-220330005011	MND982208944	Lakeville City Of	7773 214th Street	Lakeville	VSQG	Parts Washer Solvent, Carb Cleaner, Lead Acid Batteries, Paint Thinner, Used Oil, Oil Filters, Antifreeze, Fluorescent Lamps, Parts Washer - System 1	Inactive	HWG	6500	Health and Human Services Facilities	Yes
14	037-221950001020	MNR000071084	Northland Collision Inc	7430 160th St W	Rosemount	VSQG	Not Available	Active	HWG	2110-01	Automotive/vehicle repair	Yes
15	037-221950001010	MND985756683	Asbel Chiropractic	16050 Cedar Ave S	Rosemount	VSQG	Not Available	Active	HWG	2400	Professional, scientific and technical services and general business	Yes
16	037-221110101030	MND118759315	Cabinet Concepts	8135 215th Street West	Lakeville	VSQG	Not Available	Inactive	HWG	3230	Furniture Manufacturing	Yes
17	037-221110004070	MND985757863	Beryl D Shannon Aviation	21405 Hamburg Avenue	Lakeville	VSQG	Not Available	Active	HWG	3370	Transportation, Automobile Manufacturing	Yes
18	037-220110075010	MNP200000372	Us Dea	17620 Exley Ave W	Lakeville	VSQG	Not Available	Active	HWG	1100-03	Mobile home park	Yes
19	037-012000101040	MN0000930016	Transmission Dr Inc	15425 Cedar Ave	Apple Valley	VSQG	Not Available	Active	HWG	2110-01	Automotive/vehicle repair	Yes
20	037-222117301360	PW5103023076	Don Henrichs	6660 167th St W	Rosemount	VSQG	Not Available	Inactive	HWG	1100-01	Residence	Yes
21	037-222117209100	MND980606123	National Waste Exch Hw Service	16581 Frazer Way W	Rosemount	VSQG	Not Available	Inactive	HWG	4341	Hazardous waste collection facility	Yes
22	037-011177501010	MNR000005983	Cub Foods	15350 Cedar Ave	Apple Valley	LQG	Not Available	Active	HWG	2400	Professional, scientific and technical	Yes
23	037-222110000020	MND985752864	Apple Lake Animal Hospital	16570 Cedar Avenue S	Lakeville	VSQG	Not Available	Inactive	HWG	6500	Health and Human Services Facilities	Approximate
24	037-221950001010	MNR000054783	Oasis Stores	16000 Cedar Ave S	Lakeville	VSQG	Not Available	Inactive	HWG	2400	Professional, scientific and technical	Yes
25	037-221950101010	MNR000054106	Grandview Tire & Auto	7358 W 160th St	Lakeville	VSQG	Not Available	Active	HWG	2110-01	Automotive/vehicle repair	Yes
26	037-221110002010	MNS000130831	JDC Sports	21540 Hamburg Avenue S Suite B	Lakeville	MQG	Not Available	Active	HWG	2417-01	Photographic Services	Yes
27	037-222110000020	MND982427353	Osman Cleaners	16560 Cedar Avenue S	Lakeville	VSQG	Not Available	Inactive	HWG	2600-01	Dry Cleaners	Approximate
28	037-223106000020	MNR000028852	Air Lake Machine Welding Inc	21210 Grenada Avenue	Lakeville	VSQG	Not Available	Active	HWG	3350	Machinery Manufacturing	Yes
29	037-012000101050	MNR000055699	Sherwin Williams Co 3179	15415 Cedar Ave	Apple Valley	VSQG	Not Available	Active	HWG	2130-01	Paint stores	Yes
30	037-012000101030	MND985767920	Midas Muffler - Apple Valley	15455 Cedar Ave	Apple Valley	VSQG	Not Available	Active	HWG	2110-01	Automotive/vehicle repair	Yes
31	037-221950001010	MND985722016	Dakota Dental Clinic Pa	16020 Cedar Ave S	Rosemount	VSQG	Not Available	Active	HWG	2400	Professional, scientific and technical services and general business	Yes
32	037-221110101021	MND068168780	Viking Acoustical Corp	21480 Heath Avenue	Lakeville	VSQG	Not Available	Active	HWG	3230	Furniture Manufacturing	Yes
33	037-011625201010	MNR000001180	Fairview Cedar Ridge Clinic	15650 Cedar Ave S Ste A	Apple Valley	VSQG	Not Available	Active	HWG	6511	Clinics	Yes
34	037-221677501010	MNS000158055	Walgreen's Store 5634	7560 160th St W	Lakeville	VSQG	Not Available	Active	HWG	2100	Retail sales or servive	Yes
35	037-221110102081	MNR000071142	Scruples Inc	8231 214th St W	Lakeville	VSQG	Not Available	Inactive	HWG	2400	Professional, scientific and technical services and general business	Yes
36	037-012000101060	MND985765569	Jiffy Lube	15405 Cedar Ave	Apple Valley	VSQG	Not Available	Active	HWG	2110-01	Automotive/vehicle repair	Yes
37	037-221110002010	MNR000111039	Airlake Truck Body & Paint Inc	21540 Hamburg Avenue S Suite C	Lakeville	VSQG	Not Available	Active	HWG	2110-01	Automotive/Vehicle Repair	Yes
38	037-221110004090	MND148504822	Juno Tool & Plastic Corp - Lakeville	21455 Hamburg Avenue	Lakeville	VSQG	Not Available	Inactive	HWG	3320-01	Plastics/Synthetics Manufacturing	Yes
39	037-012000101030	MN0000251058	Batteries Plus - Apple Valley	15445 Cedar Ave	Apple Valley	VSQG	Not Available	Active	HWG	2130	Durable Consumer goods, sales, or service	Approximate

Approximate - Parcel not found but location is approximately where that address would exist.

LQG Large Quantity Generator
MQG Moderate Quantity Generator
VSQG Very Small Quantity Generator

Table C-9
PCSI Results - Chemical Storage Sites in the DWSMAs
City of Lakeville

MapID	PID Number	CAS Numbers	Facility Name	Site Address	Chemicals	PCS-Material Code	Facility Code	Facility Designation	Location Verified
1	037-223107601020	7439921, 7664939	Conagra Foods Inc	21325 Hamburg Ave	Lead, Battery Acid	STOR-C000	3110-01	Food processing plant	Yes
2	037-221110004060	1310732, 7664939, 1643205, 6834920, 1310732, 77929	Hobo Inc.	21365 Hamburg Ave	Sodium Hydroxide Powder, Sulfuric Acid, Lauramine Oxide, Sodium Metasilicate, Pa-170, Express, Clearcoat Berry, Evolution Plus, Evolution (Bulk), The Solution, Pink Satin, Bsc Booster, Hp Booster, Aos 40%, Mayquat C-15, Chembrite Ab, Presoak X	STOR-C000	3320	Chemical manufacturing/processing plant	Yes
3	037-222117200040	68476302	Parkview Elementary School - Isd #196	6795 Gerdine Path	Fuel Oil #2	STOR-C000	6100	Schools	Yes
4	037-220330005011	7782505	City Of Lakeville - Well #3	7783 214th Street W	Chlorine	STOR-C000	6000	Education, public administration, health care, and other institutions	Approximate

Approximate - Parcel not found but location is approximately where that address would exist.

Table C-10

PCSI Results - ISTS in the DWSMAs
City of Lakeville

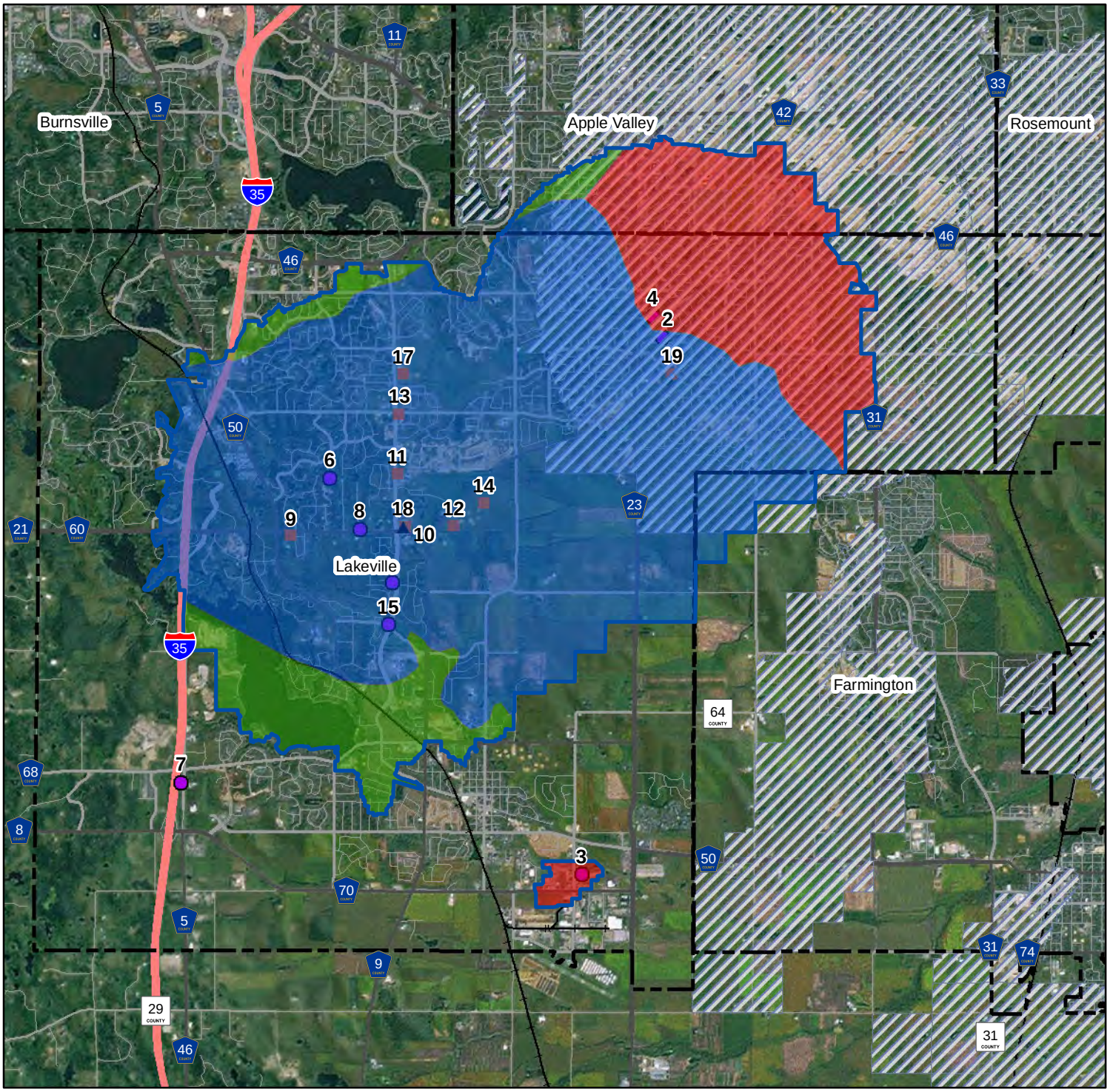
MapID	Septic System Unique No.	PID Number	Address	City or Township	PCS Code	Facility Code	Facility Designation	Location Verified
1	9686	037-222117405020	6540 169th St W	Farmington	ISTS	1100-01	Residence	Yes
2	13450	037-220030076010	16897 Dodd Blvd	Lakeville	ISTS	1100-01	Residence	Yes

Table C-11

High Capacity Wells within One Mile of the DWSMAs
City of Lakeville

MapID	Permit Number	Unique ID	Type	Status	Use	Well Location	City or Twp	Permittee	PCS Code	Facility Code	Facility Designation	Aquifer	Permitted GPM
2	1980-6107	207708	Waterworks	Active	Municipal Waterworks	Gerding Pa	Lakeville	Lakeville 2	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CJDN	19,300
3	1980-6107	207727	Waterworks	Active	Municipal Waterworks	Hamburg Avenue	Lakeville	Lakeville 3	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CJDN	19,300
4	1980-6107	212650	Waterworks	Active	Municipal Waterworks	167 Street	Lakeville	Lakeville 4	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CJDN	19,300
6	1980-6107	161409	Waterworks	Active	Municipal Waterworks	185 Street North	Lakeville	Lakeville 6	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CJDN	19,300
8	1980-6107	433296	Waterworks	Active	Municipal Waterworks	185th Street West	Lakeville	Lakeville 8	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CJDN	19,300
9	1980-6107	554192	Waterworks	Active	Municipal Waterworks	185th Street	Lakeville	Lakeville 9	WEL	6000	Education, Public Administration, Health Care, and other Institutions	OPCJ	19,300
10	1980-6107	554193	Waterworks	Active	Municipal Waterworks	185th Street	Lakeville	Lakeville 10	WEL	6000	Education, Public Administration, Health Care, and other Institutions	OPCJ	19,300
11	1980-6107	554215	Waterworks	Active	Municipal Waterworks	Ipava Avenue	Lakeville	Lakeville 11	WEL	6000	Education, Public Administration, Health Care, and other Institutions	OPCJ	19,300
12	1980-6107	562991	Waterworks	Active	Municipal Waterworks	18500 Dodd Rd	Lakeville	Lakeville 12	WEL	6000	Education, Public Administration, Health Care, and other Institutions	OPCJ	19,300
13	1980-6107	596650	Waterworks	Active	Municipal Waterworks	20195 Holyoke Avenue West	Lakeville	Lakeville 13	WEL	6000	Education, Public Administration, Health Care, and other Institutions	OPCJ	19,300
14	1980-6107	603073	Waterworks	Active	Municipal Waterworks	Not Available	Lakeville	Lakeville 14	WEL	6000	Education, Public Administration, Health Care, and other Institutions	OPCJ	19,300
15	1980-6107	651737	Waterworks	Active	Municipal Waterworks	192nd Street	Lakeville	Lakeville 15	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CJDN	19,300
16	1980-6107	655907	Waterworks	Active	Municipal Waterworks	18988 Iron River trail	Lakeville	Lakeville 16	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CJDN	19,300
17	1980-6107	694913	Waterworks	Active	Municipal Waterworks	17100 Ipava Avenue	Lakeville	Lakeville 17	WEL	6000	Education, Public Administration, Health Care, and other Institutions	OPCJ	19,300
18	1980-6107	745558	Waterworks	Active	Municipal Waterworks	18400 Ipava Avenue	Lakeville	Lakeville 18	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CFIG	19,300
19	1980-6107	686288	Waterworks	Active	Municipal Waterworks	17191 Gerdine Pa	Lakeville	Lakeville 19	WEL	6000	Education, Public Administration, Health Care, and other Institutions	OPCJ	19,300
20	1977-6019	126526	Non-Crop Irrigation	Active	Nursery	Not Available	Lakeville	Cross Nurseries Inc	WEL	2100	Retail sales or service	MTPL	300
96	2009-0370	526581	Non-Crop Irrigation	Active	Landscaping/Athletic Fields	19600 Ipava Avenue	Lakeville	Ind. Sch. Dist. #194	WEL	6100	Schools	Not Available	100
110	2004-3096	530065	Non-Crop Irrigation	Active	Golf Course Irrigation	Not Available	Lakeville	Crystal Lake Golf Club	WEL	5000	Arts, Entertainment and Recreation	Not Available	500
154	1992-6155	664152	Waterworks	Active	Private Waterworks	17701 Kenyon Avenue West	Lakeville	Queen Anne Court 3	WEL	1000	All Establishments Offering Residence	OPDC	300
245	1992-6155	207767	Waterworks	Standby	Private Waterworks	Queen Anne Terrace	Lakeville	Queen Anne Court 2	WEL	1000	All Establishments Offering Residence	OSTP	300
127263	1974-5229	127263	Waterworks	Active	Municipal Waterworks	140th Street West	Apple Valley	Apple Valley 6	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CJDN	22,250
127277	1974-5229	127277	Waterworks	Active	Municipal Waterworks	Not Available	Apple Valley	Apple Valley 7	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CJDN	22,250
127297	1974-5229	127297	Waterworks	Active	Municipal Waterworks	14200 Cedar Avenue	Apple Valley	City Of Apple Valley	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CJDN	22,250
151563	1974-5229	151563	Waterworks	Active	Municipal Waterworks	140th Street West	Apple Valley	Apple Valley 10	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CJDN	22,250
161439	1980-6107	161439	Waterworks	Active	Municipal Waterworks	Kenrich	Lakeville	Lakeville 7	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CJDN	19,300
205820	1974-5229	205820	Waterworks	Active	Municipal Waterworks	Not Available	Apple Valley	Apple Valley 4	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CJDN	22,250
205823	1974-5229	205823	Waterworks	Active	Municipal Waterworks	13800 Galaxie Avenue	Apple Valley	Apple Valley 16	WEL	6000	Education, Public Administration, Health Care, and other Institutions	OPCJ	22,250
205824	1974-5229	205824	Waterworks	Standby	Municipal Waterworks	209 Strese Lane	Apple Valley	Apple Valley 1	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CJDN	22,250
207675	1995-6229	207675	Industrial Processing	Active	Non-Metallic Processing	42 Circle	Apple Valley	North Star Concrete Co.	WEL	3000	Manufacturing and Wholesale Trade	CJDN	400
207677	1974-5229	207677	Waterworks	Active	Municipal Waterworks	14200 Cedar Avenue	Apple Valley	City Of Apple Valley	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CJDN	22,250
235586	1959-0725	235586	Waterworks	Active	Municipal Waterworks	Not Available	Farmington	Farmington 4	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CJDN	9,000
236156	1962-0547	236156	Non-Crop Irrigation	Active	Golf Course Irrigation	17976 Judicial Road	Lakeville	Northern Gopher Golf Inc	WEL	5000	Arts, Entertainment and Recreation	MTPL	600
433284	1974-5229	433284	Waterworks	Active	Municipal Waterworks	14200 Cedar Avenue	Apple Valley	City Of Apple Valley	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CJDN	22,250
449257	1974-5229	449257	Waterworks	Active	Municipal Waterworks	14200 Cedar Avenue	Apple Valley	City Of Apple Valley	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CJDN	22,250
497931	1995-6151	497931	Industrial Processing	Active	Sand and Gravel Washing	6801 150th Street West	Apple Valley	Fischer Sand & Aggregate	WEL	8000	Mining and Extractive Uses	Not Available	4,500
497932	1995-6151	497932	Industrial Processing	Active	Sand and Gravel Washing	6801 150th Street West	Apple Valley	Fischer Sand And Agg	WEL	8000	Mining and Extractive Uses	Not Available	4,500
497933	1995-6151	497933	Industrial Processing	Active	Sand and Gravel Washing	6801 150th Street West	Apple Valley	Fisher Sand And Agg	WEL	8000	Mining and Extractive Uses	Not Available	4,500
509056	1974-5229	509056	Waterworks	Standby	Municipal Waterworks	140th Street West	Apple Valley	Apple Valley 14	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CMTS	22,250
519955	1974-5229	519955	Waterworks	Standby	Municipal Waterworks	6442 140th Street	Apple Valley	Apple Valley 15	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CMTS	22,250
561802	1998-6057	561802	Industrial Processing	Active	Non-Metallic Processing	5001 160th Street	Rosemount	Model Stone, Inc.	WEL	3000	Manufacturing and Wholesale Trade	OPDC	140
561802	1998-6057	561802	Industrial Processing	Active	Other Industrial Processing	5001 160th Street	Rosemount	Model Stone, Inc.	WEL	3000	Manufacturing and Wholesale Trade	OPDC	140
603075	1974-5229	603075	Waterworks	Active	Municipal Waterworks	14200 Cedar Avenue	Apple Valley	City Of Apple Valley	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CJDN	22,250
694923	2007-0140	694923	Non-Crop Irrigation	Active	Landscaping/Athletic Fields	21135 Jacquard Avenue	Lakeville	Isd #194 Lakeville	WEL	6000	Education, Public Administration, Health Care, and other Institutions	Not Available	545
694924	2007-0140	694924	Non-Crop Irrigation	Active	Landscaping/Athletic Fields	21135 Jacquard Avenue	Lakeville	Isd #194 Lakeville	WEL	6000	Education, Public Administration, Health Care, and other Institutions	Not Available	545
731113	1974-5229	731113	Waterworks	Active	Municipal Waterworks	5540 140th Street West	Apple Valley	Apple Valley 19	WEL	6000	Education, Public Administration, Health Care, and other Institutions	CJDN	22,250
751646	2008-0375	751646	Non-Crop Irrigation	Active	Landscaping/Athletic Fields	19688 Juno Trail	Lakeville	Lakeville, City Of	WEL	6000	Education, Public Administration, Health Care, and other Institutions	Not Available	150

Figures



Barr Footer: ArcGIS 10.2.1, 2014-04-08 16:09 File: I:\Projects\23\19\1110\Maps\Reports\WHPP\IFigC-1 DWSMA Locations.mxd User: JJL2

Muncipial Wells

- Tunnel City Group - Wonewoc Sandstone
- Jordan Sandstone
- Prairie du Chien Group - Jordan Sandstone
- Railroad
- Lakeville DWSMA
- Municipality
- DWSMAs Near Lakeville

Aquifer Vulnerability

- High
- Moderate
- Low

N

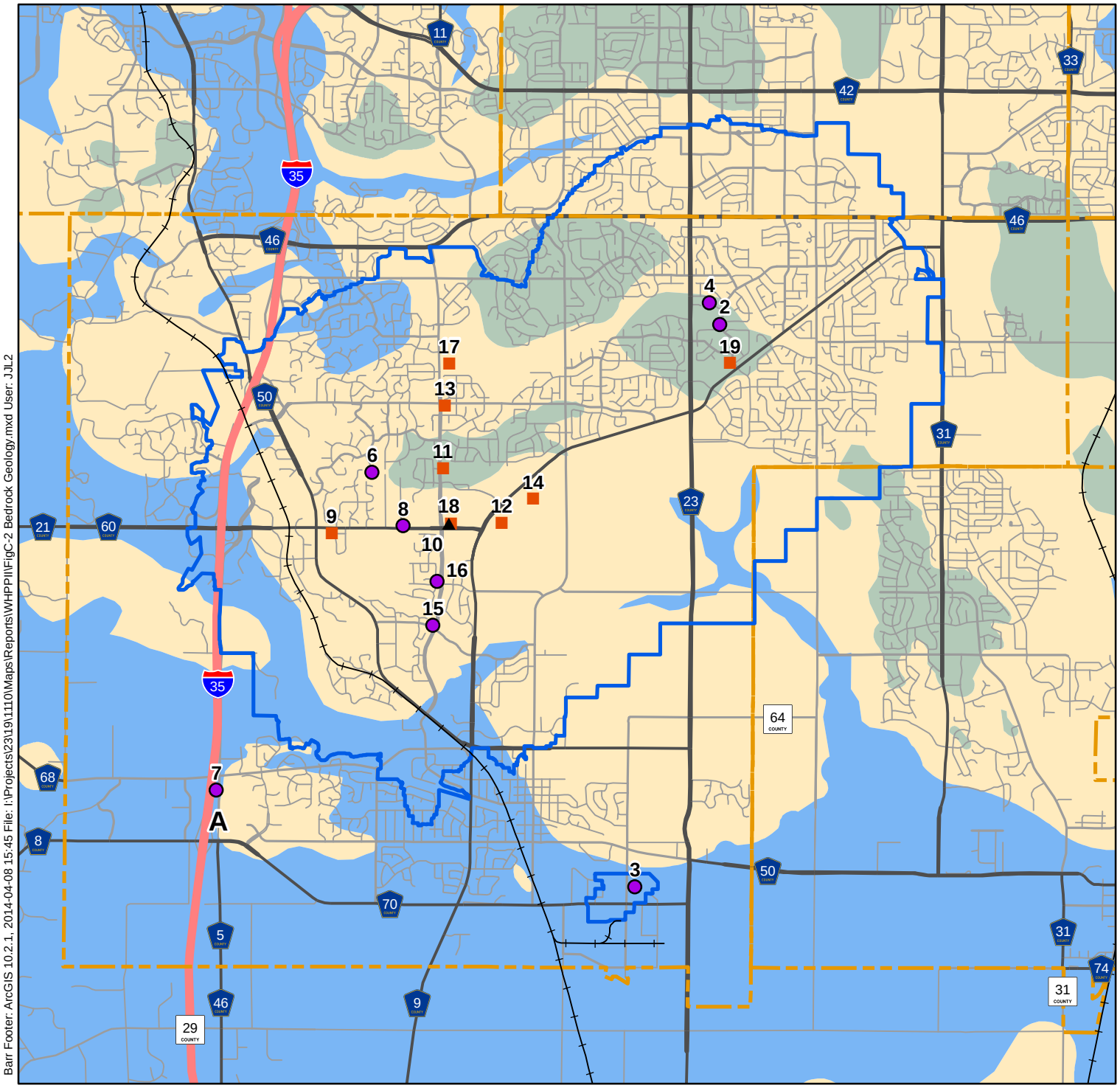
Feet

0 5,000 10,000

BARR

Figure C-1

MUNICIPAL WELLS, DWSMAs, AND AQUIFER VULNERABILITY
City of Lakeville
Dakota County, MN



Barr Footer: ArcGIS 10.2.1, 2014-04-08 15:45 File: I:\Projects\23\19\1110\Maps\Reports\WHPP\IFigC-2 Bedrock Geology.mxd User: JJL2

Modified from Mossler and Tipping (2000)

Lakeville Muncipial Wells

- ▲ Tunnel City Group - Wonewoc Sandstone
- ● Jordan Sandstone
- ■ Prairie du Chien Group - Jordan Sandstone
- Railroad
- Lakeville DWSMA
- Municipal Boundary

Bedrock Subcrop

- PLATTEVILLE-GLENWOOD FRMS.
- ST. PETER SANDSTONE
- PRAIRIE DU CHIEN GROUP

N

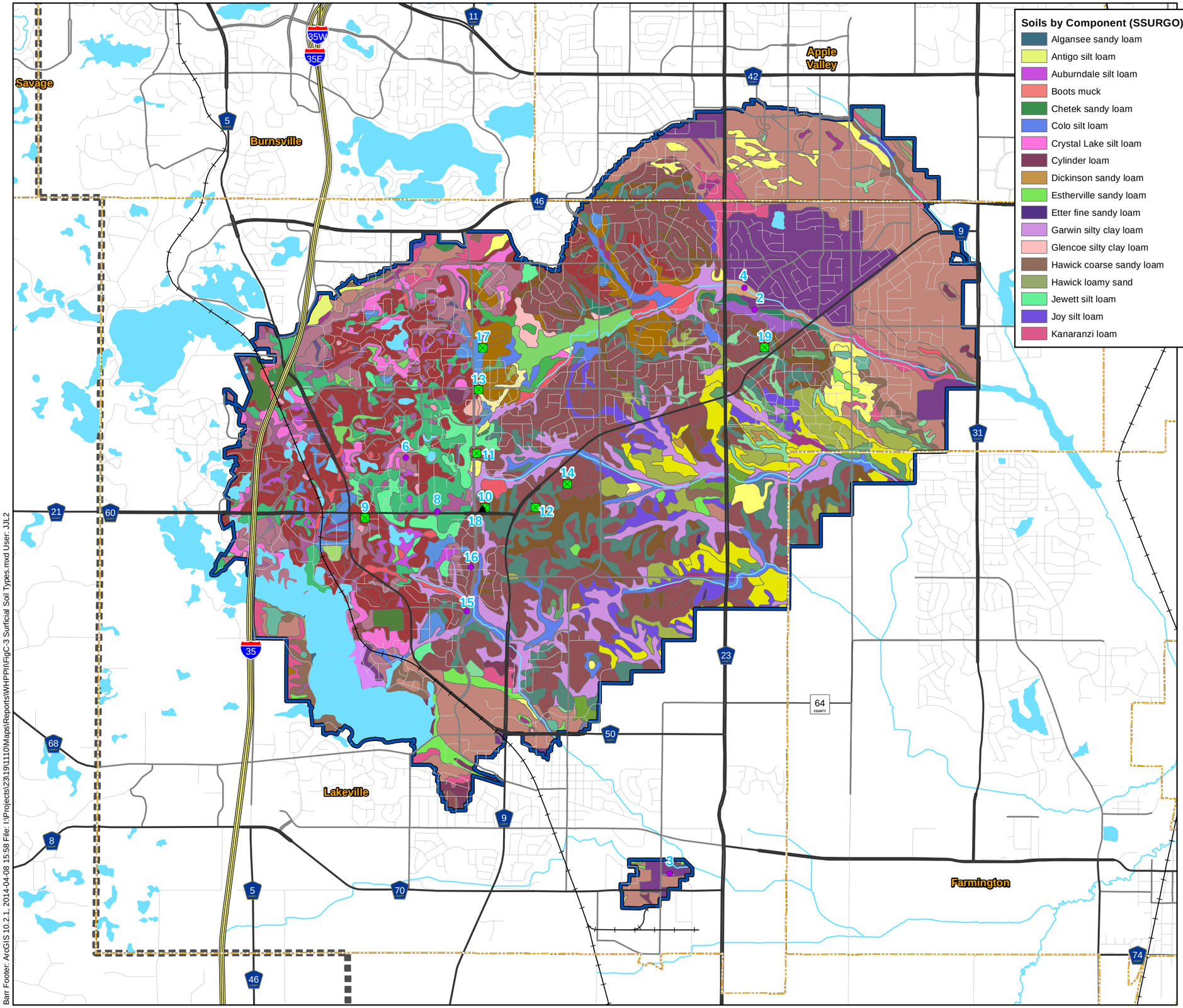
Miles

0 1 2

BARR

Figure C-2

BEDROCK SUBCROP
Wellhead Protection Plan
City of Lakeville
Dakota County, MN



Soils by Component (SSURGO)*

- Algansee sandy loam
- Antigo silt loam
- Auburndale silt loam
- Boots muck
- Chetek sandy loam
- Colo silt loam
- Crystal Lake silt loam
- Cylinder loam
- Dickinson sandy loam
- Estherville sandy loam
- Etter fine sandy loam
- Garwin silty clay loam
- Glencoe silty clay loam
- Hawick coarse sandy loam
- Hawick loamy sand
- Jewett silt loam
- Joy silt loam
- Kanaranzi loam
- Kato silty clay loam
- Kennebec silt loam
- Kennebec variant silt loam
- Kingsley sandy loam
- Kingsley-Lester complex
- Kingsley-Mahtomedi complex
- Kingsley-Mahtomedi-Spencer complex
- Klinger silt loam
- Le Sueur loam
- Lester loam
- Lindstrom silt loam
- Mahtomedi loamy sand
- Marshan silty clay loam
- Maxfield silty clay loam
- Mayer loam, swales
- Ostrander loam
- Otterholt silt loam
- Palms muck
- Pits, gravel
- Port Byron silt loam
- Quam silt loam
- Salida gravelly coarse sandy loam
- Seelyeville muck
- Spencer silt loam
- Spillville loam
- Tallula silt loam
- Terril loam
- Timula-Bold silt loams
- Udorthents, wet
- Urban land
- Urban land-Chetek complex
- Urban land-Kingsley complex
- Urban land-Waukegan complex
- Wadena loam
- Water
- Waukegan silt loam
- Webster clay loam
- Zumbro loamy fine sand

Municipal Wells

- Tunnel City Group - Wonewoc Sandstone
- Jordan Sandstone
- Prairie du Chien Group - Jordan Sandstone
- Railroad
- Lakeville DWSMA
- Municipal Boundary
- County Boundary

3 - Municipal Well Location Map ID
(Map ID refers to Table C-2)

* SSURGO Data (U.S. Dept. of Agriculture, Natural Resources Conservation Service)

N

Feet

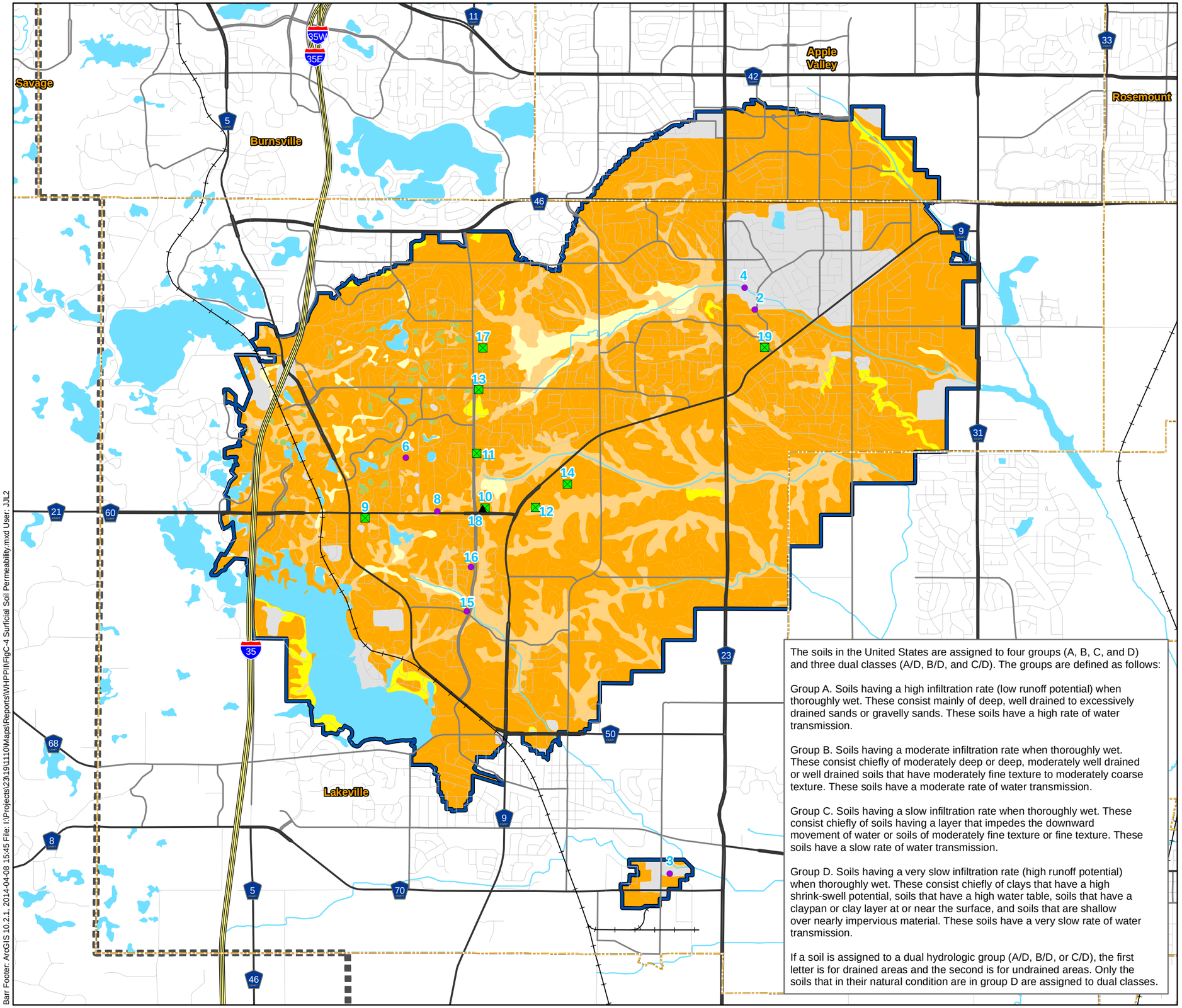
4,000 0 4,000

BARR

Figure C-3

SURFICIAL SOIL TYPES
City of Lakeville
Dakota County, MN

Barr Footer: ArcGIS 10.2.1, 2014-04-08 15:58 File: I:\Projects\23\19\1110\Maps\Reports\WHPP\FigC-3 Surficial Soil Types.mxd User: JJL2



Soil Permeability Classification*

- Not rated or not available
- A
- A/D
- B
- B/D
- C
- C/D
- D

Municipal Wells

- Tunnel City Group - Wonewoc Sandstone
- Jordan Sandstone
- Prairie du Chien Group - Jordan Sandstone
- Railroad
- Lakeville DWSMA
- Municipal Boundary
- County Boundary

3 - Municipal Well Location Map ID
(Map ID refers to Table C-2)

* SSURGO Data (U.S. Dept. of Agriculture, Natural Resources Conservation Service)

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

N

Feet

4,000 0 4,000

BARR

Figure C-4

SURFICIAL SOIL PERMEABILITY
City of Lakeville
Dakota County, MN

Barr Footer: ArcGIS 10.2.1, 2014-04-08 15:45 File: I:\Projects\23\19\11\0\Maps\Reports\WHPPlt\FigC-4 Surficial Soil Permeability.mxd User: JJL2

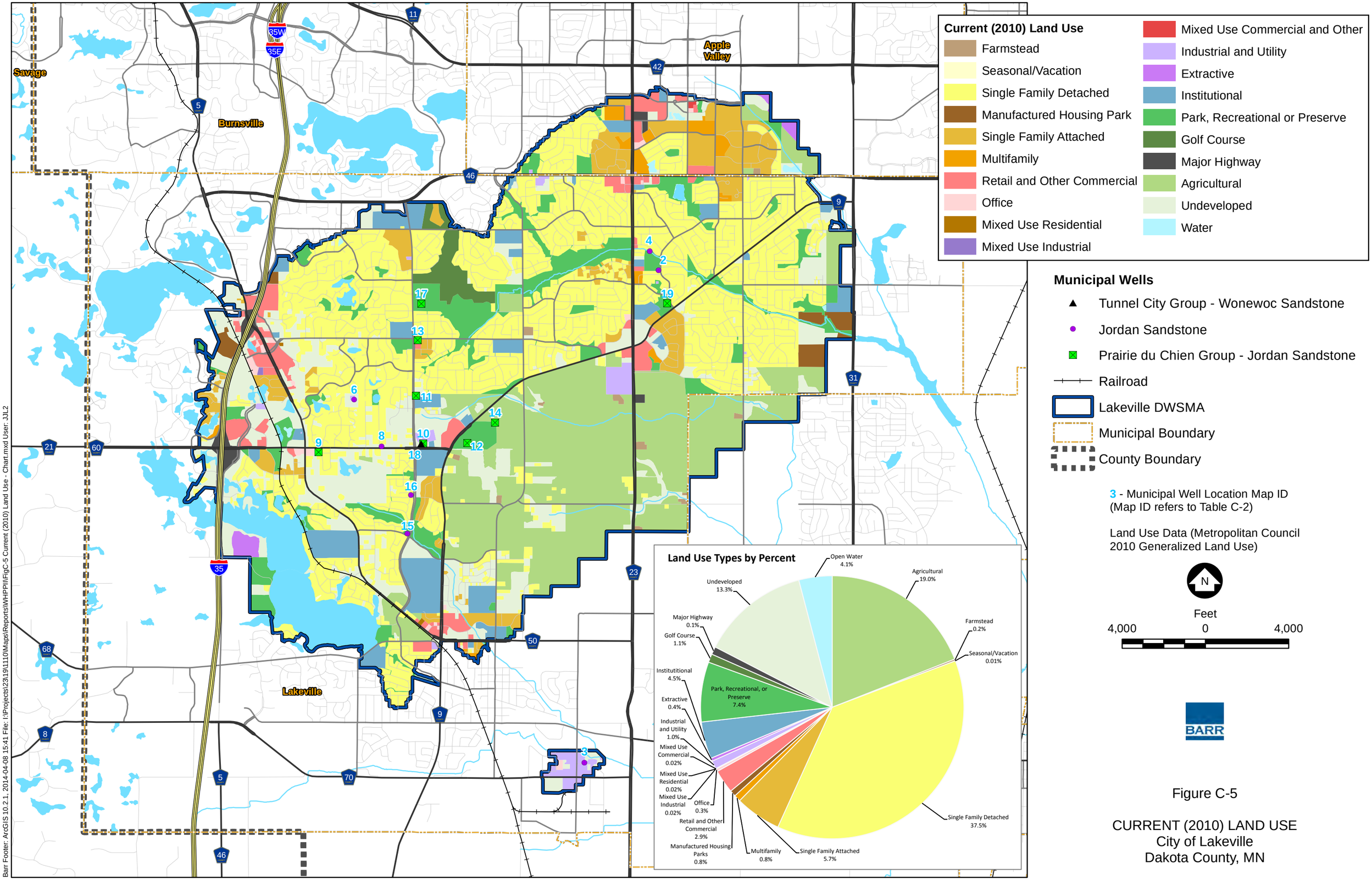
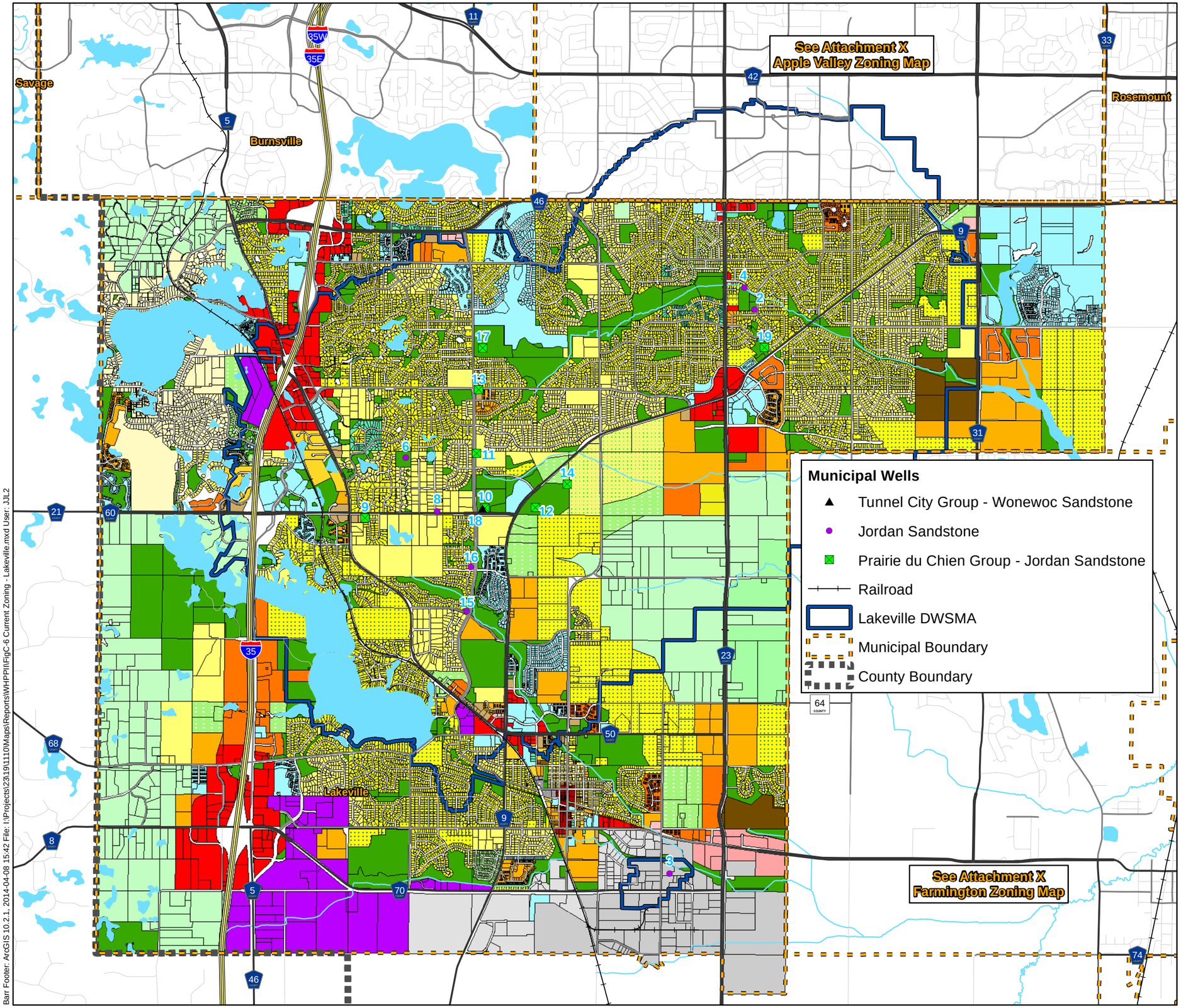


Figure C-5

CURRENT (2010) LAND USE
City of Lakeville
Dakota County, MN

Barr Footer: ArcGIS 10.2.1, 2014-04-08 15:41 File: I:\Projects\23\19\1110\Maps\Reports\WHPP\FigC-5 Current (2010) Land Use - Chart.mxd User: JJL2



City of Lakeville Zoning

Agricultural Preserve
- A-P, AGRICULTURAL PRESERVE DISTRICT
- RA, RURAL/AGRICULTURAL DISTRICT

Residential Districts
- RS-1, SINGLE FAMILY RESIDENTIAL DISTRICT
- RS-2, SINGLE FAMILY RESIDENTIAL DISTRICT
- RS-3, SINGLE FAMILY RESIDENTIAL DISTRICT
- RS-4, SINGLE FAMILY RESIDENTIAL DISTRICT
- RS-CBD, RESIDENTIAL SINGLE FAMILY CENTRAL BUSINESS DISTRICT
- RSMH, SINGLE FAMILY MANUFACTURED HOME PARK DISTRICT
- RST-1, SINGLE AND TWO FAMILY RESIDENTIAL DISTRICT
- RST-2, SINGLE AND TWO FAMILY RESIDENTIAL DISTRICT
- RM-1, MEDIUM DENSITY RESIDENTIAL DISTRICT
- RM-2, MEDIUM DENSITY RESIDENTIAL DISTRICT
- RH-1, MULTIPLE FAMILY RESIDENTIAL DISTRICT
- RH-2, MULTIPLE FAMILY RESIDENTIAL DISTRICT

Commercial Districts
- O-R, OFFICE/RESIDENTIAL TRANSITION DISTRICT
- C-1, NEIGHBORHOOD COMMERCIAL DISTRICT
- C-2, HIGHWAY COMMERCIAL DISTRICT
- C-3, GENERAL COMMERCIAL DISTRICT
- C-CBD, COMMERCIAL CENTRAL BUSINESS DISTRICT
- OP, OFFICE PARK DISTRICT

Industrial Districts
- I-1, LIGHT INDUSTRIAL DISTRICT
- I-2, GENERAL INDUSTRIAL DISTRICT
- I-CBD, INDUSTRIAL CENTRAL BUSINESS DISTRICT

Special Districts
- PUD, PLANNED UNIT DEVELOPMENT DISTRICT
- P/OS, PUBLIC AND OPEN SPACE DISTRICT

3 - Municipal Well Location Map ID
(Map ID refers to Table C-2)

N

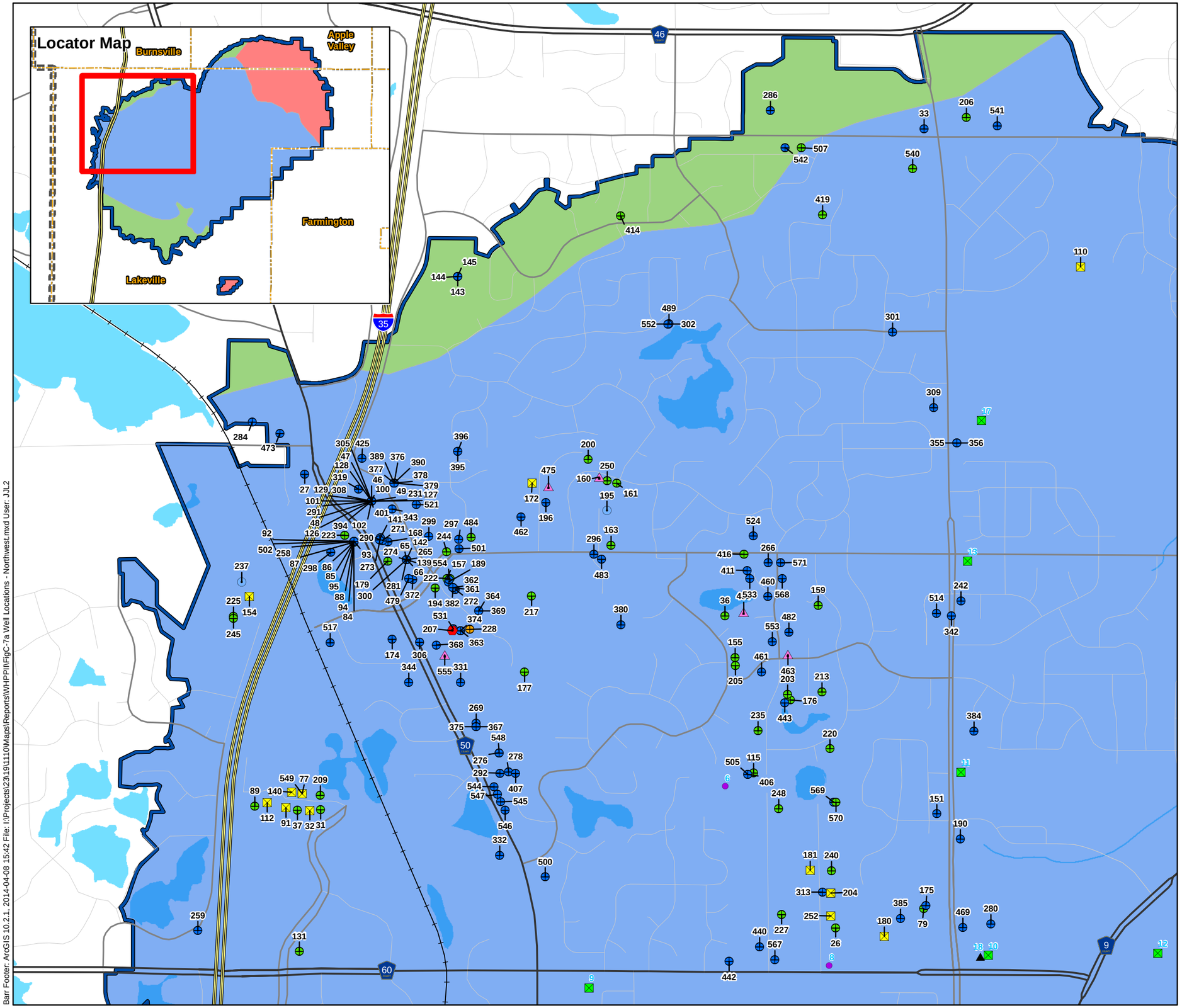
Feet
4,000 0 4,000

BARR

Figure C-6

CURRENT ZONING
LAKEVILLE
City of Lakeville
Dakota County, MN

Barr Footer: ArcGIS 10.2.1, 2014-04-08 15:42 File: I:\Projects\23\19\1110\Maps\Reports\WHPP\IFigC-6 Current Zoning - Lakeville.mxd User: JJL2



Source Aquifer Wells by Status and Aquifer

- Active - Prairie du Chien
- Inactive - Prairie du Chien
- Sealed - Prairie du Chien
- Sealed - Jordan Sandstone

Other Wells by Status

- Active
- Inactive
- Sealed

Municipal Wells

- Tunnel City Group - Wonewoc Sandstone
- Jordan Sandstone
- Prairie du Chien Group - Jordan Sandstone
- Railroad
- Lakeville DWSMA
- Municipal Boundary
- County Boundary

Aquifer Vulnerability

- High
- Moderate
- Low

384 - Well Location Map ID
(Map ID refers to Table C-2)

12 - Municipal Well Location Map ID
(Map ID refers to Table C-2)

N

Feet

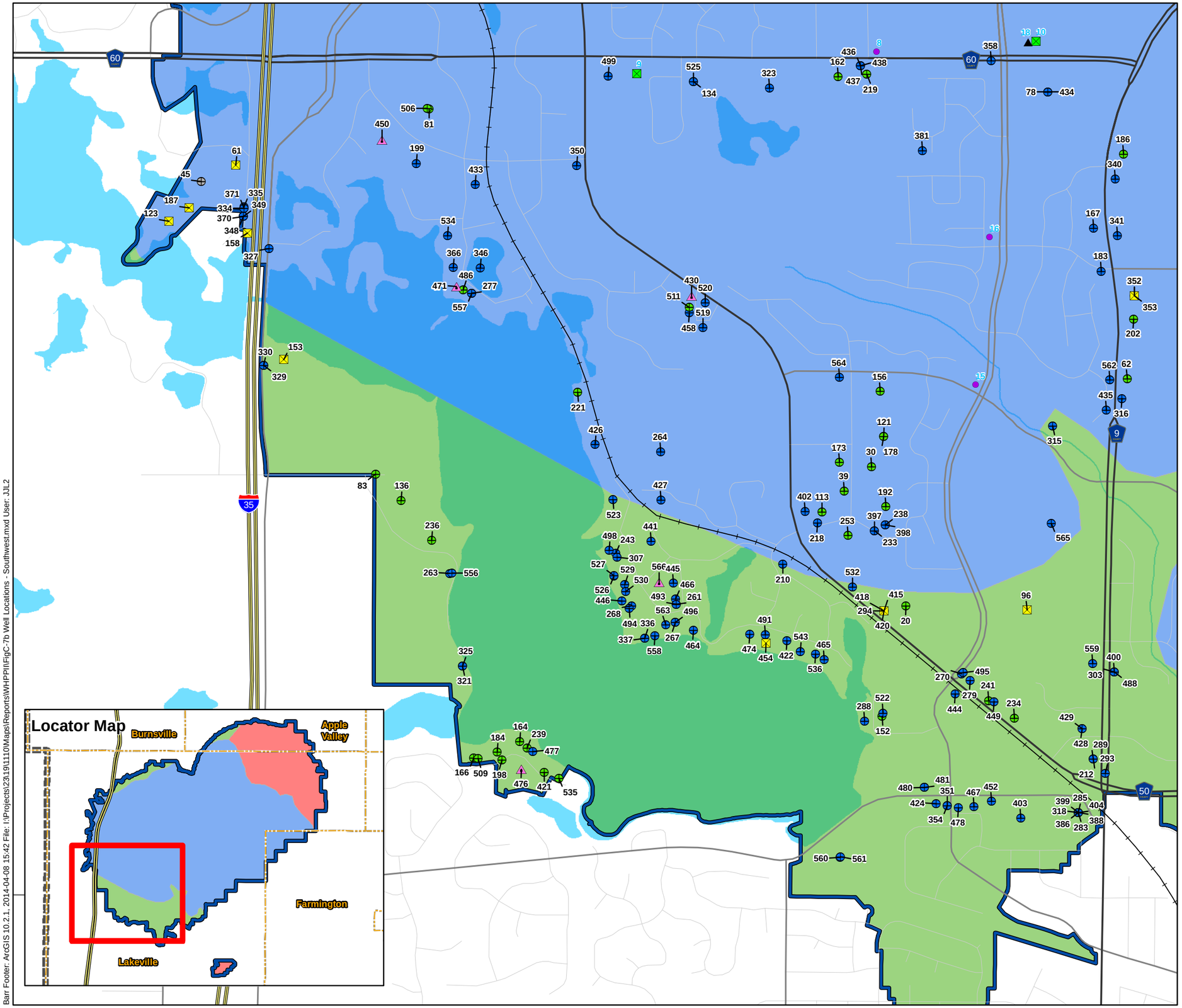
1,200 0 1,200

BARR

Figure C-7a

WELL LOCATIONS - NORTHWEST
City of Lakeville
Dakota County, MN

Barr Footer: ArcGIS 10.2.1, 2014-04-08 15:42 File: I:\Projects\23\19\1110\Maps\Reports\WHPP\FigC-7a Well Locations - Northwest.mxd User: JJL2



Source Aquifer Wells by Status and Aquifer

- Active - Prairie du Chien
- Sealed - Prairie du Chien

Other Wells by Status

- Active
- Sealed
- Unknown

Municipal Wells

- Tunnel City Group - Wonewoc Sandstone
- Jordan Sandstone
- Prairie du Chien Group - Jordan Sandstone
- Railroad
- Lakeville DWSMA
- Municipal Boundary
- County Boundary

Aquifer Vulnerability

- High
- Moderate
- Low

96 - Well Location Map ID
(Map ID refers to Table C-2)

15 - Municipal Well Location Map ID
(Map ID refers to Table C-2)

N

Feet

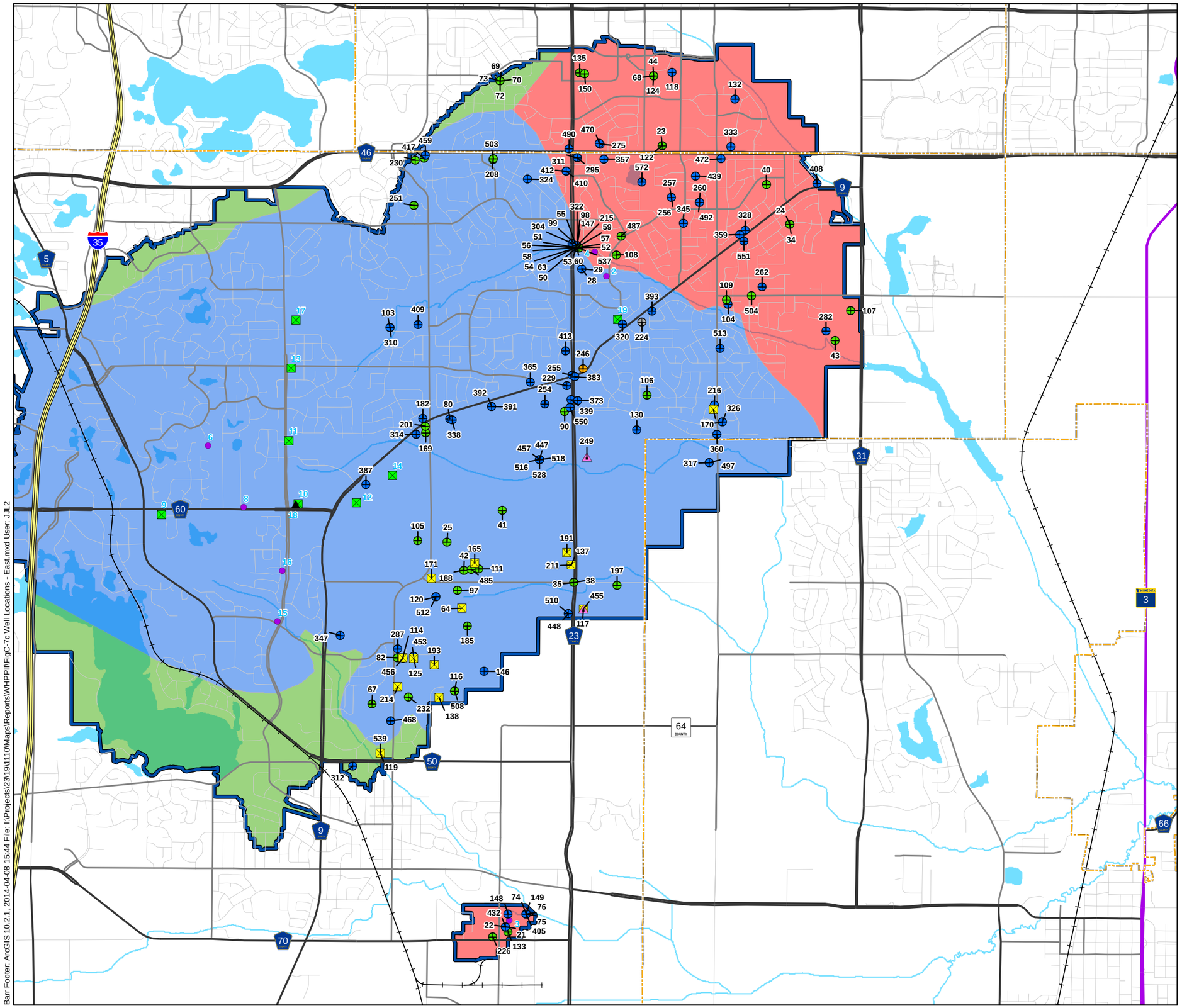
1,200 0 1,200

BARR

Figure C-7b

WELL LOCATIONS - SOUTHWEST
City of Lakeville
Dakota County, MN

Barr Footer: ArcGIS 10.2.1, 2014-04-08 15:42 File: I:\Projects\23\19\1110\Maps\Reports\WHPP\IfFigC-7b Well Locations - SouthwestLmxd User: JJL2



Source Aquifer Wells by Status and Aquifer

- Active - Prairie du Chien
- Sealed - Prairie du Chien

Other Wells by Status

- Active
- Inactive
- Sealed
- Unknown

Municipal Wells

- Tunnel City Group - Wonewoc Sandstone
- Jordan Sandstone
- Prairie du Chien Group - Jordan Sandstone
- Railroad
- Lakeville DWSMA
- Municipal Boundary
- County Boundary

Aquifer Vulnerability

- High
- Moderate
- Low

320 - Well Location Map ID
(Map ID refers to Table C-2)

19 - Municipal Well Location Map ID
(Map ID refers to Table C-2)

N

Feet

3,500 0 3,500

BARR

Figure C-7c

WELL LOCATIONS - EAST
City of Lakeville
Dakota County, MN

Barr Footer: ArcGIS 10.2.1, 2014-04-08 15:44 File: I:\Projects\23\19\1110\Maps\Reports\WHPP\\FigC-7c Well Locations - East.mxd User: JJL2

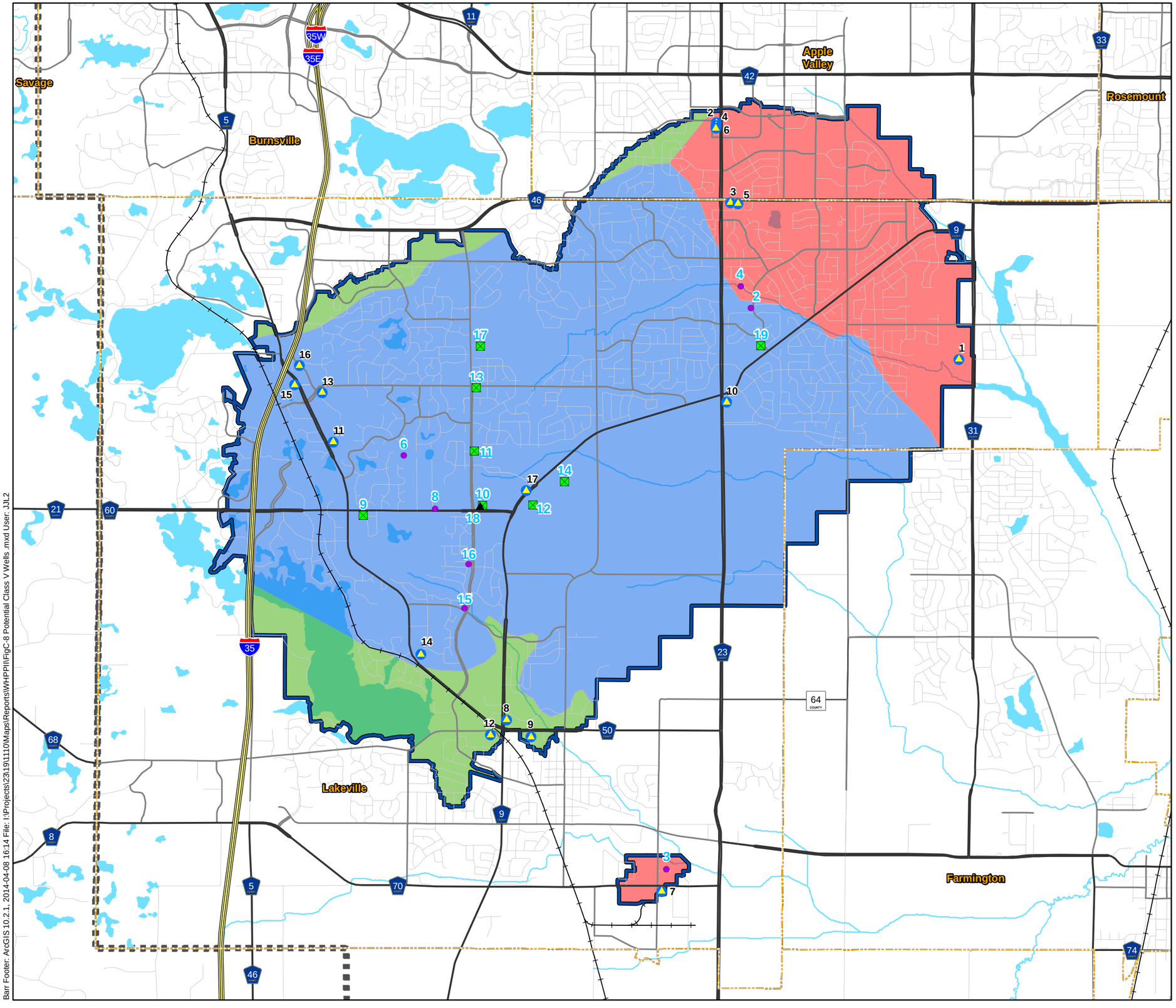


Figure C-8

POTENTIAL CLASS V
WELL LOCATIONS
City of Lakeville
Dakota County, MN

Barr Footer: ArcGIS 10.2.1, 2014-04-08 16:14 File: I:\Projects\23\19\1110\Maps\Reports\WHPP\FigC-8 Potential Class V Wells .mxd User: JJL2

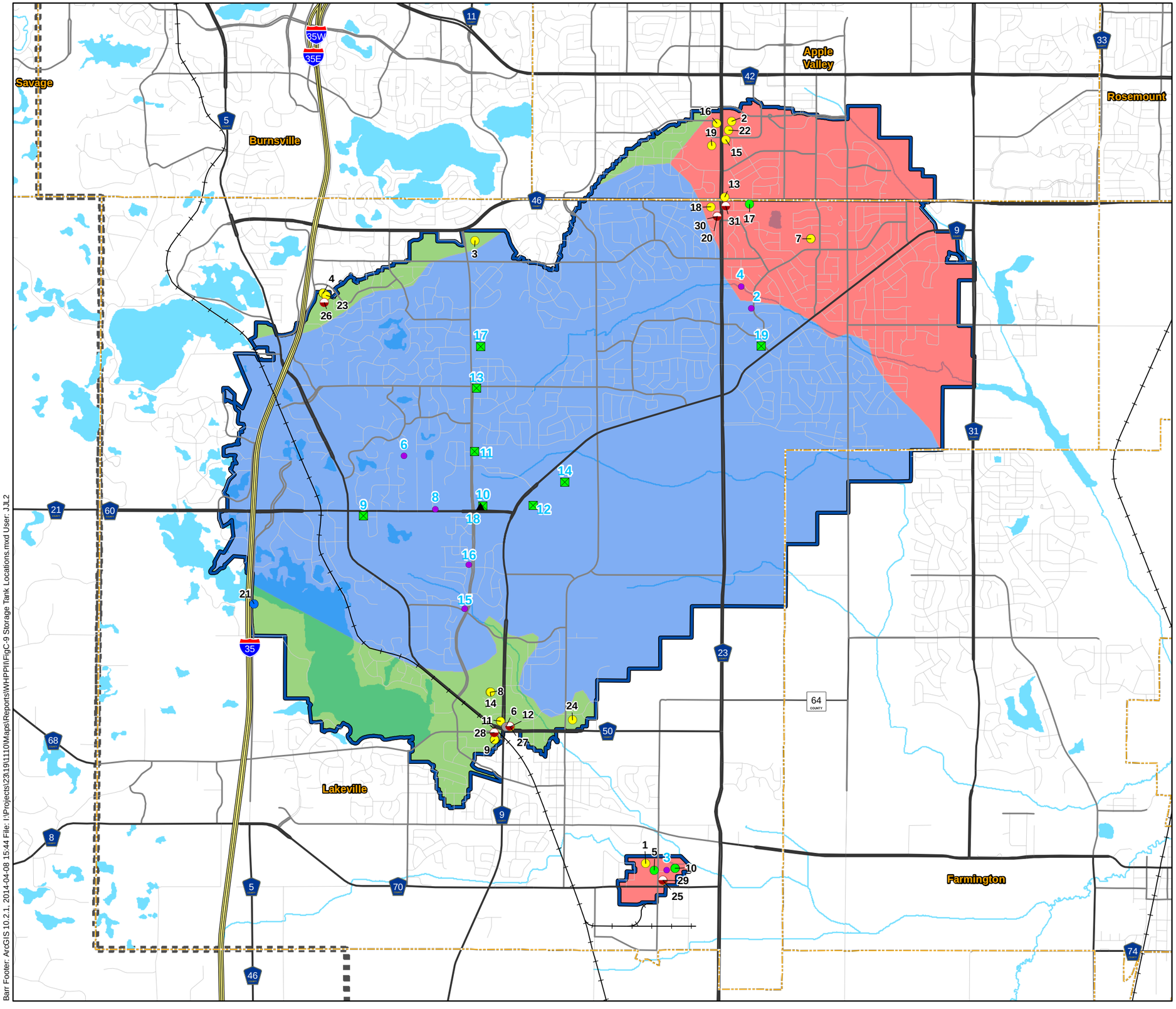
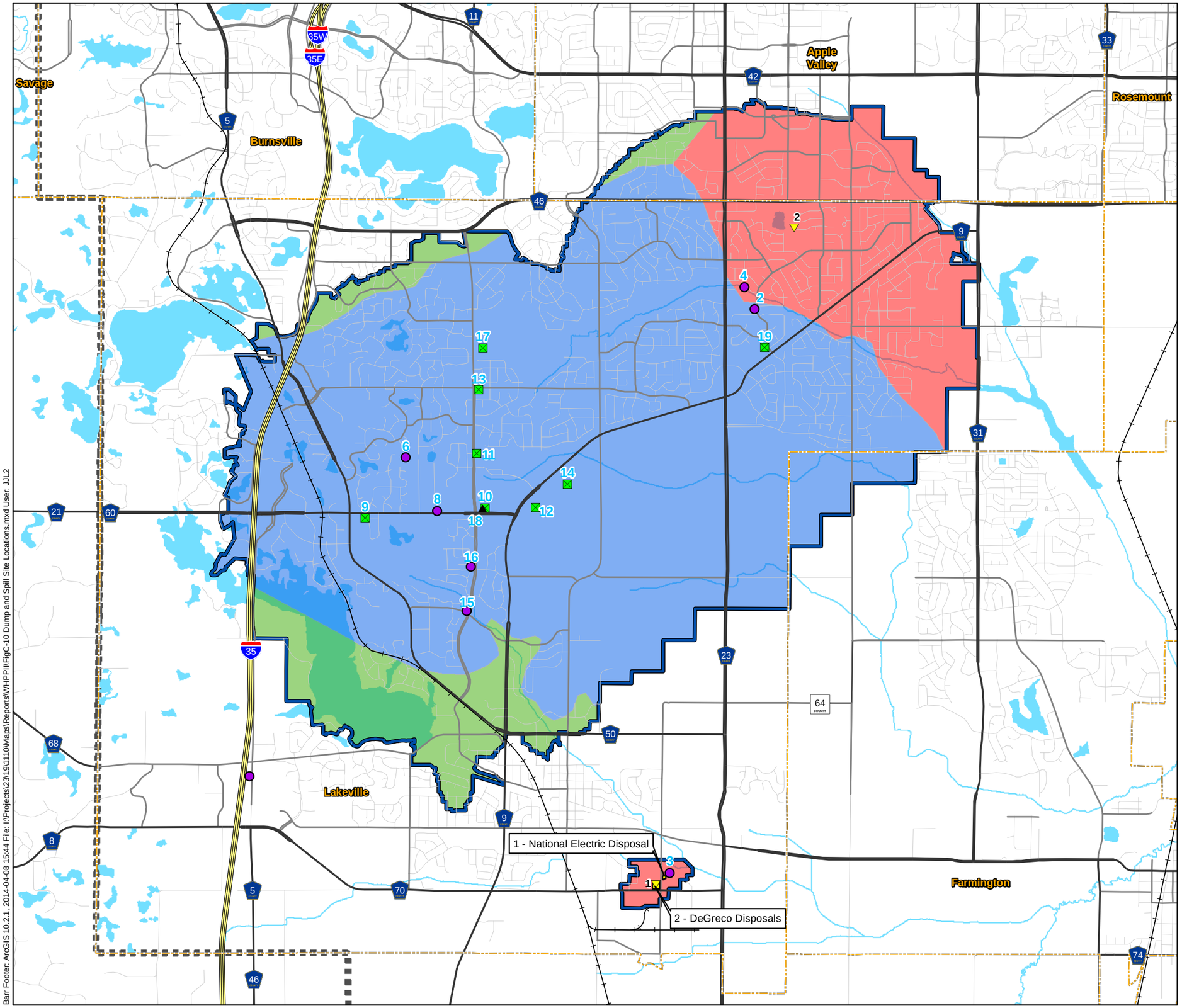


Figure C-9

STORAGE TANK LOCATIONS
City of Lakeville
Dakota County, MN

Barr Footer: ArcGIS 10.2.1, 2014-04-08 15:44 File: I:\Projects\23\19\1110\Maps\Reports\WHPP\FigC-9 Storage Tank Locations.mxd User: JJL2



Spill Location

Muncipal Wells

Tunnel City Group - Wonewoc Sandstone

Jordan Sandstone

Prairie du Chien Group - Jordan Sandstone

Railroad

Dump Site Location

Lakeville DWSMA

Municipal Boundary

County Boundary

Aquifer Vulnerability

High

Moderate

Low

1 - Spill Location Map ID
(Map ID refers to Table C-X)

3 - Municipal Well Location Map ID
(Map ID refers to Table C-2)

N

Feet

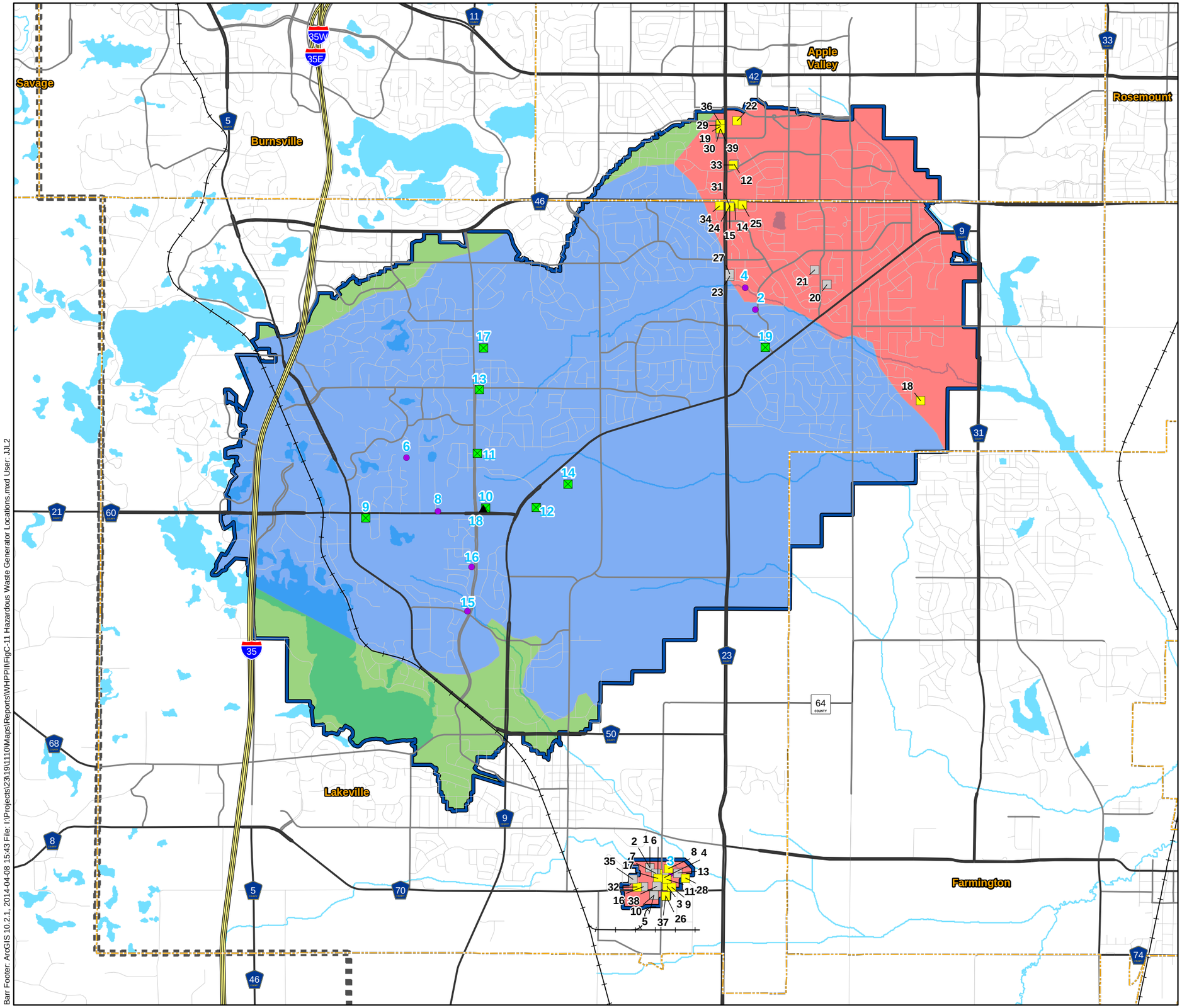
4,000 0 4,000

BARR

Figure C-10

DUMP AND SPILL
SITE LOCATIONS
City of Lakeville
Dakota County, MN

Barr Footer: ArcGIS 10.2.1, 2014-04-08 15:44 File: I:\Projects\23\19\1110\Maps\Reports\WHPPII\FigC-10 Dump and Spill Site Locations.mxd User: JJL2



Hazardous Waste Generator Locations by Status

- Active
- Inactive

Municipal Wells

- Tunnel City Group - Wonewoc Sandstone
- Jordan Sandstone
- Prairie du Chien Group - Jordan Sandstone
- Railroad
- Lakeville DWSMA
- Municipal Boundary
- County Boundary

Aquifer Vulnerability

- High
- Moderate
- Low

5 - Hazardous Waste Location Map ID (Map ID refers to Table C-X)

3 - Municipal Well Location Map ID (Map ID refers to Table C-2)

N

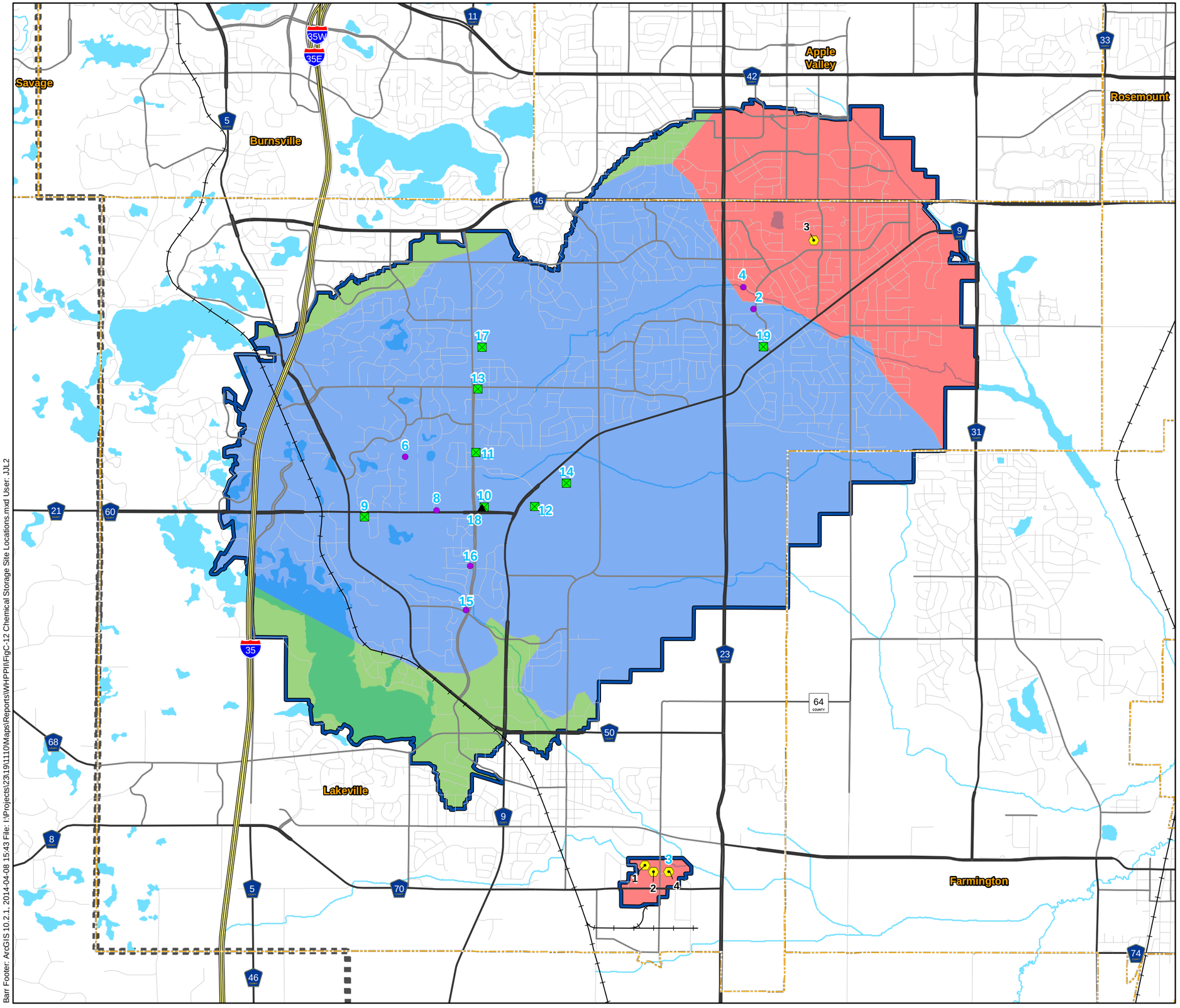
Feet

4,000 0 4,000

BARR

Figure C-11

HAZARDOUS WASTE GENERATOR LOCATIONS
City of Lakeville
Dakota County, MN



Non-agricultural Chemical Storage Location

Municipal Wells

- Tunnel City Group - Wonewoc Sandstone
- Jordan Sandstone
- Prairie du Chien Group - Jordan Sandstone
- Railroad
- Lakeville DWSMA
- Municipal Boundary
- County Boundary

Aquifer Vulnerability

- High
- Moderate
- Low

1 - Chemical Storage Location Map ID (Map ID refers to Table C-X)

3 - Municipal Well Location Map ID (Map ID refers to Table C-2)

N

Feet

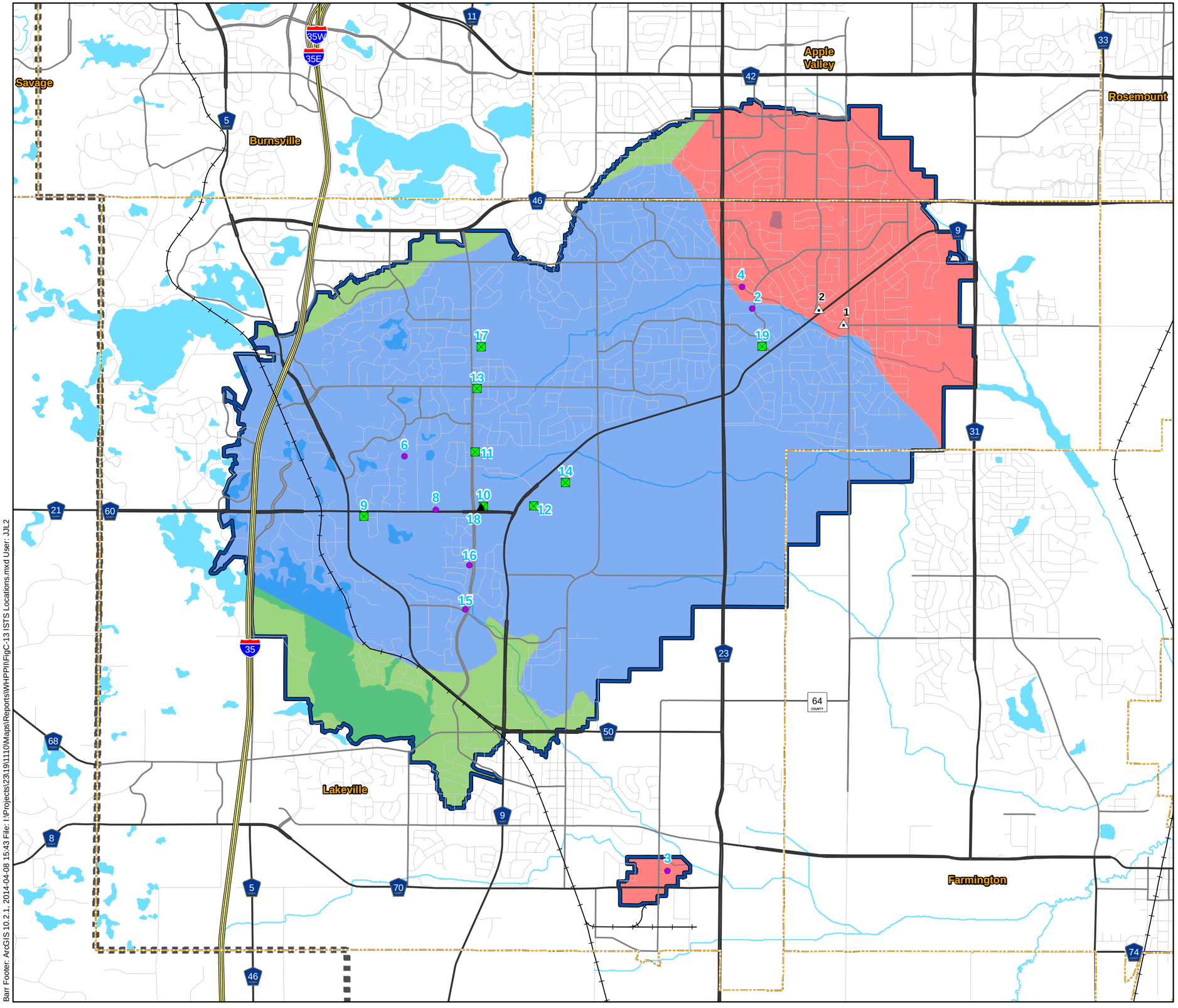
4,000 0 4,000

BARR

Figure C-12

CHEMICAL STORAGE LOCATIONS
City of Lakeville
Dakota County, MN

Barr Footer: ArcGIS 10.2.1, 2014-04-08 15:43 File: I:\Projects\23\19\1110\Maps\Reports\WHPP\FigC-12 Chemical Storage Site Locations.mxd User: JJL2



Individual Sewer Treatment System

Municipal Wells

- Tunnel City Group - Wonewoc Sandstone
- Jordan Sandstone
- Prairie du Chien Group - Jordan Sandstone
- Railroad
- Lakeville DWSMA
- Municipal Boundary
- County Boundary

Aquifer Vulnerability

- High
- Moderate
- Low

1 - Individual Sewer Treatment System Map ID
(Map ID refers to Table C-X)

3 - Municipal Well Location Map ID
(Map ID refers to Table C-2)

N

Feet

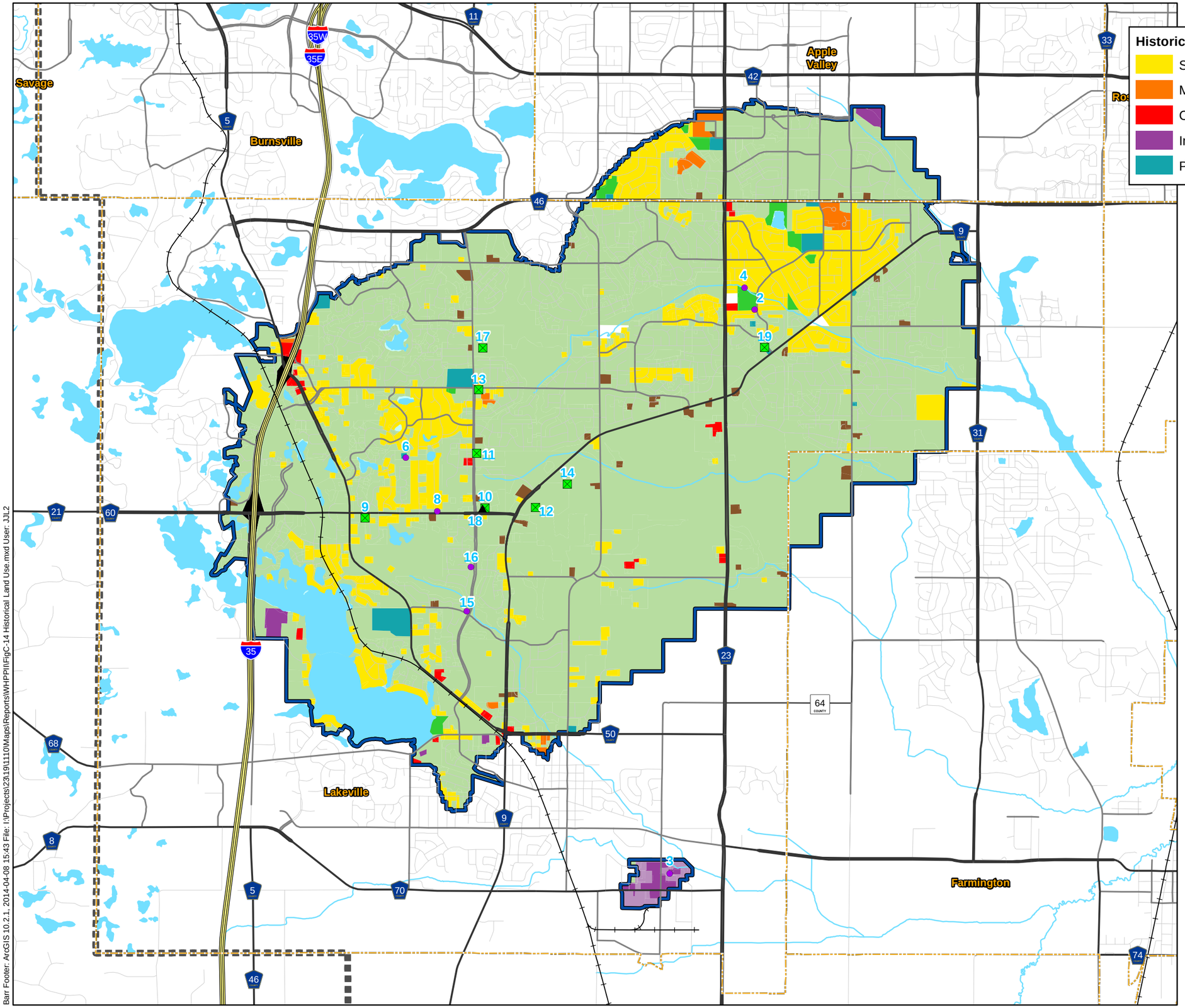
4,000 0 4,000

BARR

Figure C-13

ISTS LOCATIONS
City of Lakeville
Dakota County, MN

Barr Footer: ArcGIS 10.2.1, 2014-04-08 15:43 File: I:\Projects\23\19\1110\Maps\Reports\WHPP\FigC-13 ISTS Locations.mxd User: JJL2



Historical (1984) Land Use

- Single Family Residential
- Multi-Family Residential
- Commercial
- Industrial
- Public/Semi-Public
- Parks & Recreation
- Vacant/Agricultural
- Major Four Lane Highways
- Open Water Bodies
- Farmsteads
- Industrial Parks not Developed

Municipal Wells

- Tunnel City Group - Wonewoc Sandstone
- Jordan Sandstone
- Prairie du Chien Group - Jordan Sandstone
- Railroad
- Lakeville DWSMA
- Municipal Boundary
- County Boundary

3 - Municipal Well Location Map ID
(Map ID refers to Table C-2)

Historical Land Use Data (Metropolitan Council)

N

Feet

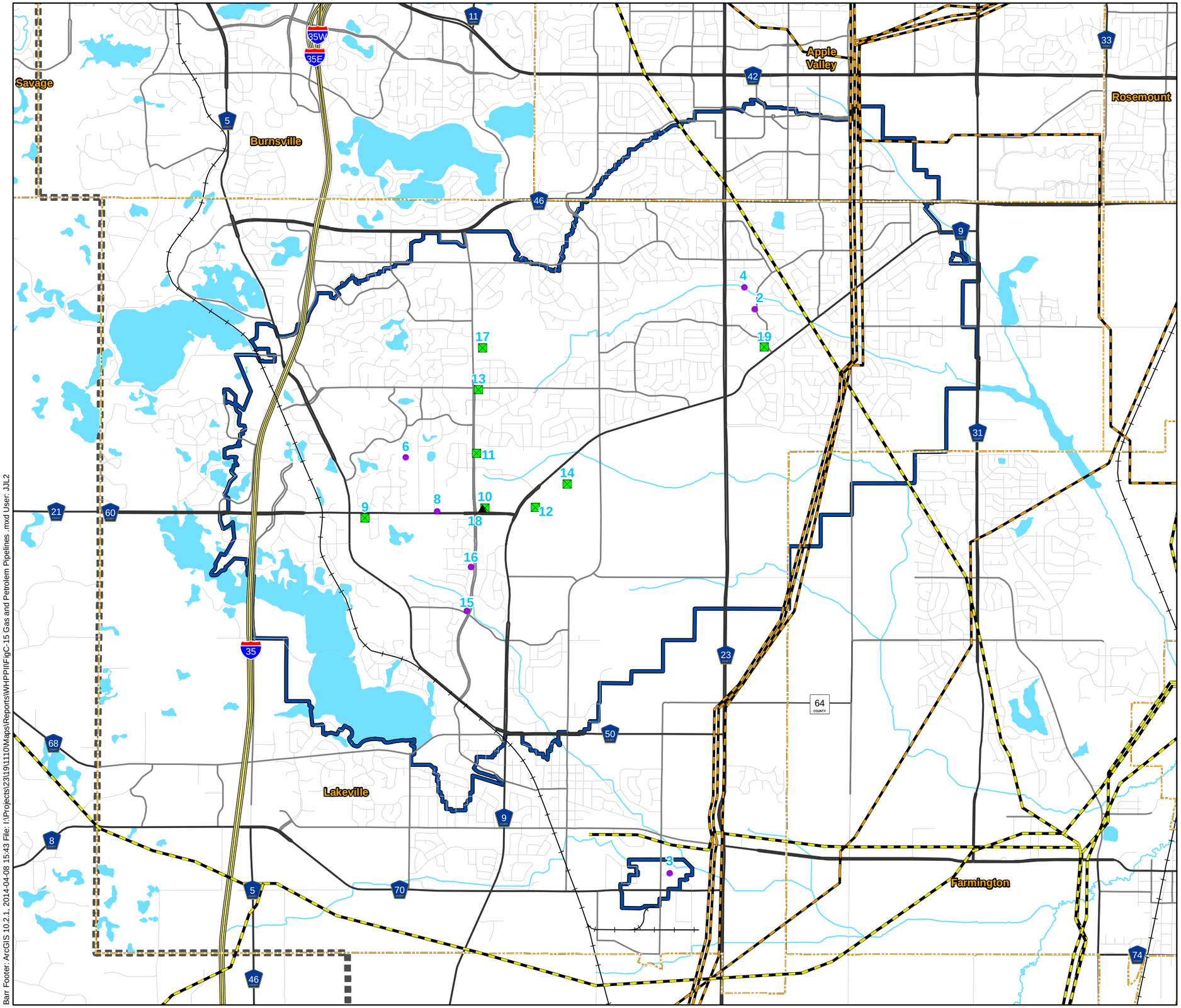
4,000 0 4,000

BARR

Figure C-14

HISTORICAL LAND USE
City of Lakeville
Dakota County, MN

Barr Footer: ArcGIS 10.2.1, 2014-04-08 15:43 File: I:\Projects\23\19\1110\Maps\Reports\WHPP\FigC-14 Historical Land Use.mxd User: JJL2



Municipal Wells

- Tunnel City Group - Wonewoc Sandstone
- Jordan Sandstone
- Prairie du Chien Group - Jordan Sandstone
- Natural Gas Pipeline
- Petroleum Pipeline
- Railroad
- Lakeville DWSMA
- Municipal Boundary
- County Boundary

3 - Municipal Well Location Map ID
(Map ID refers to Table C-2)

N

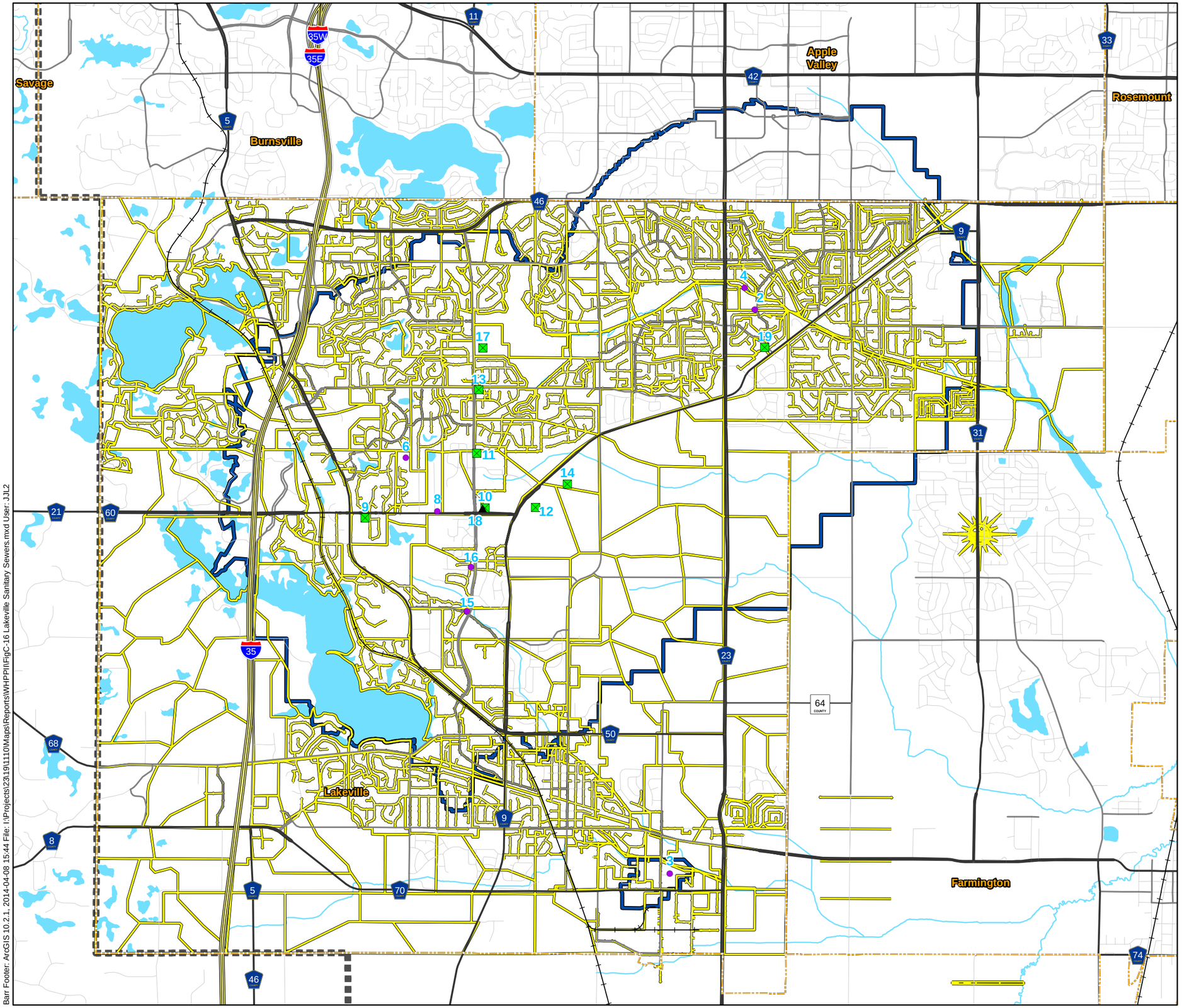
Feet
4,000 0 4,000

BARR

Figure C-15

NATURAL GAS AND
PETROLEUM PIPELINES
City of Lakeville
Dakota County, MN

Barr Footer: ArcGIS 10.2.1, 2014-04-08 15:43 File: I:\Projects\23\19\1110\Maps\Reports\WHPP\IFigC-15 Gas and Petrolem Pipelines .mxd User: JJL2



Municipal Wells

- ▲ Tunnel City Group - Wonewoc Sandstone
- ● Jordan Sandstone
- ■ Prairie du Chien Group - Jordan Sandstone
- Sanitary Sewer Network
- Railroad
- Lakeville DWSMA
- Municipal Boundary
- County Boundary

3 - Municipal Well Location Map ID
(Map ID refers to Table C-2)

N

Feet

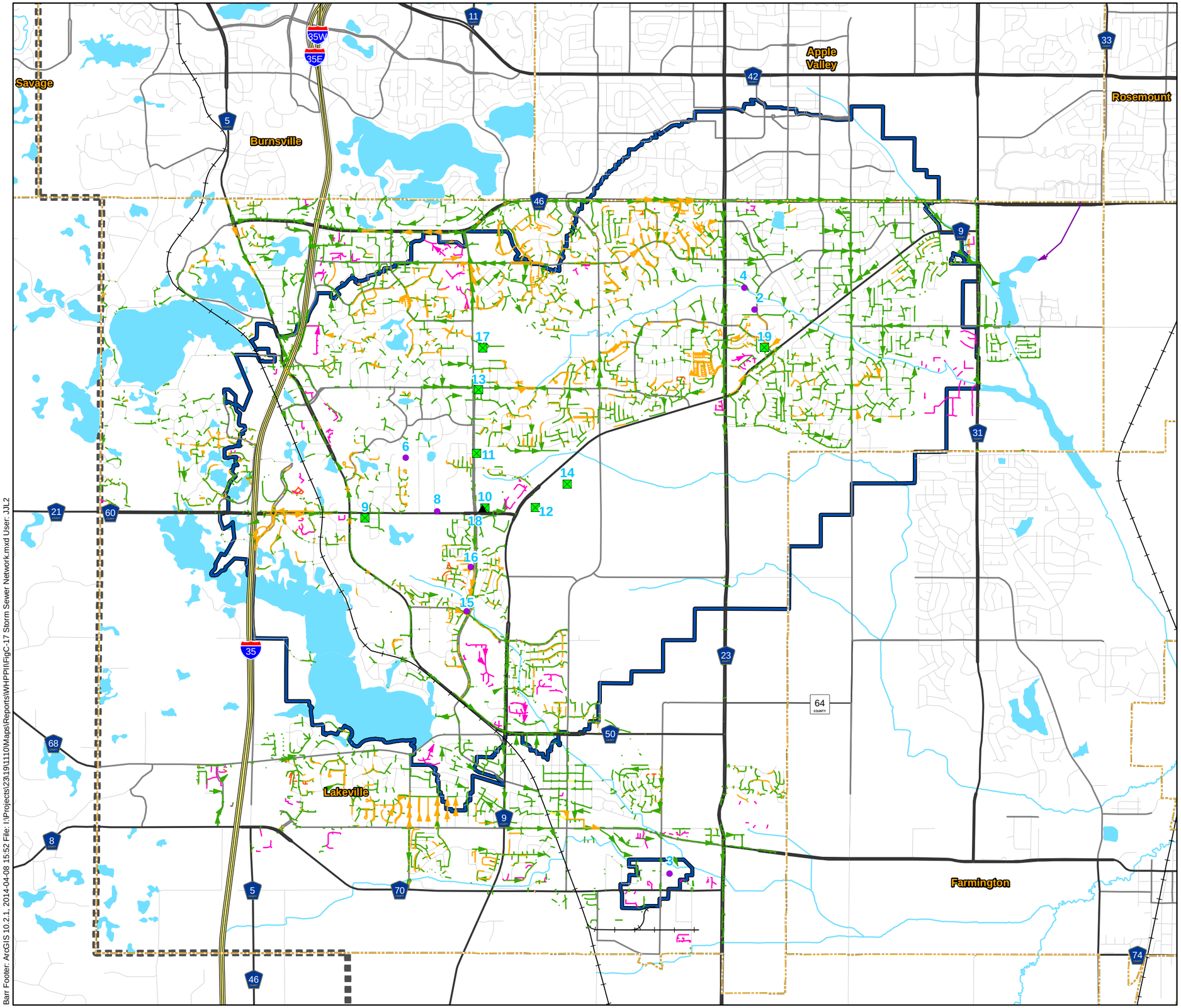
4,000 0 4,000

BARR

Figure C-16

LAKEVILLE SANITARY SEWERS
City of Lakeville
Dakota County, MN

Barr Footer: ArcGIS 10.2.1, 2014-04-08 15:44 File: I:\Projects\23\19\1110\Maps\Reports\WHPII\FigC-16 Lakeville Sanitary Sewers.mxd User: JJL2



Municipal Wells

- Tunnel City Group - Wonewoc Sandstone
- Jordan Sandstone
- Prairie du Chien Group - Jordan Sandstone

Storm Sewer Network

- Storm Main
- Drain Tile
- Private Storm Main
- Private Drain Tile
- Forcemain
- Abandoned
- Railroad
- Lakeville DWSMA
- Municipal Boundary
- County Boundary

3 - Municipal Well Location Map ID
(Map ID refers to Table C-2)

N

Feet

4,000 0 4,000

BARR

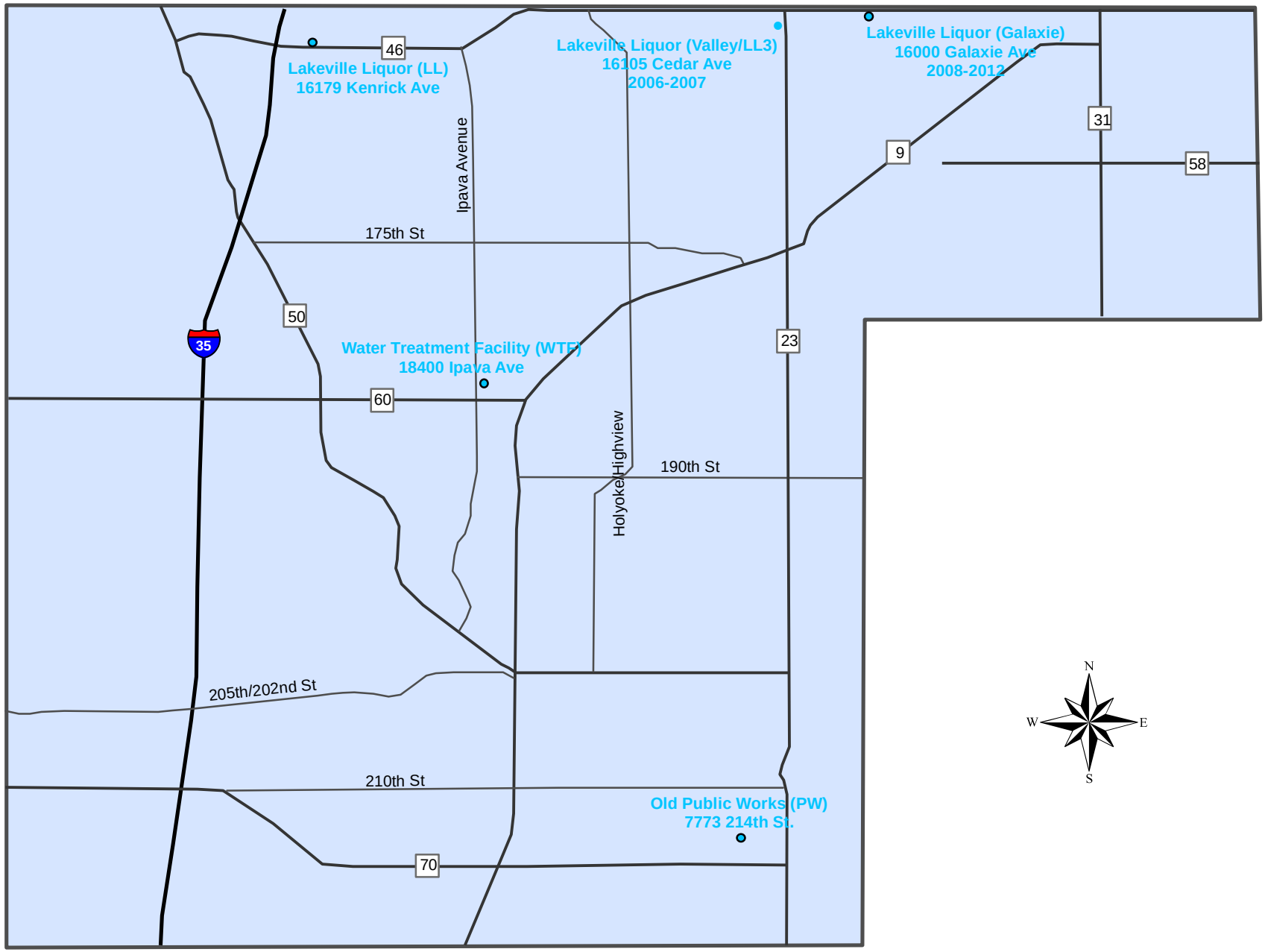
Figure C-17

LAKEVILLE STORM SEWERS
City of Lakeville
Dakota County, MN

Barr Footer: ArcGIS 10.2.1, 2014-04-08 15:52 File: I:\Projects\23\19\1110\Maps\Reports\WHPP\IIFigC-17 Storm Sewer Network.mxd User: JJL2

Attachment C-1

Precipitation Data



Lakeville Rain Gage Locations
2006-2012

Lakeville Rain Gage Data
Monthly Averages
2008-2012

	Monthly Rainfall (inches)					
	LL	PW	Galaxie	WTF	Average	Comments
2008						
April	2.02	1.76	0.54	0.69	1.25	4/15 - 4/30
May	2.90	2.79	2.93	3.17	2.95	
June	4.11	2.33	3.63	3.90	3.88	No data at PW after 6/10
July	2.23	0.00	2.09	2.59	2.30	
August	2.34	0.00	2.37	2.08	2.26	
September	2.52	0.00	1.95	1.93	2.13	
October	2.26	0.00	2.23	2.38	2.29	10/01 - 10/20
2009						
April				1.22	1.22	4/23 - 4/30
May				1.03	1.03	Data at LL 6/01 - 8/10
June	3.93	4.62	3.66	4.35	4.14	Data at PW 6/04 - 7/31
July	2.20	1.91	2.30	2.29	2.18	Data at Galaxie 6/01 - 8/10
August	4.12	0.00	3.70	7.73	3.89	
September				0.80	0.80	
October				6.85	6.85	10/01 - 10/31
2010						
April	0.00	0.92	0.13	0.00	0.92	4/12 - 4/30
May	0.00	3.81	3.93	0.00	3.87	Data at LL 6/25 - 10/22
June	2.87	6.33	8.68	3.34	7.50	Data at PW 4/12 - 8/24
July	5.87	5.50	4.72	5.26	5.34	Data at Galaxie 4/26 - 10/20
August	8.95	5.95	7.49	0.10	7.46	Data at WTF 6/25 - 7/30 & 8/26 - 9/16
September	6.62	0.00	6.71	2.30	6.66	
October	0.02	0.00	0.01	0.00	0.02	10/01 - 10/22
2011						
April						5/10 - 5/31
May	3.46	2.45	3.99	3.29	3.30	Data at LL 5/16 - 9/28
June	4.09	3.87	4.27	4.22	4.11	Data at PW 5/11 - 9/28
July	5.87	6.32	5.52	6.39	6.02	Data at Valley 5/10 - 9/28; PW and Galaxie missing parts of 7/18-7/20 No rainfall at LL or WTF on those days
August	3.00	1.49	2.49	1.87	2.21	Data at WTF 5/16 - 9/28
September	0.58	0.65	0.58	0.57	0.60	9/01 - 9/28
October						
2012						
April						
May		2.14	2.99	3.20	2.78	5/07 - 5/31
June		7.55	0.00	5.88	6.72	Galaxie missing data 6/07-7/11
July	4.29	3.10	4.62	3.68	3.92	LL missing data until 7/12
August	2.02	3.69	3.66	2.50	2.97	
September	0.57	0.43	0.45	0.61	0.52	
October						10/01 - 10/03

LL = Lakeville Liquor Kenrick - 16179 Kenrick Ave.

PW = Old Public Works Building - 7773 214th St.

Galaxie = Lakeville Liquor Galaxie - 16000 Galaxie Ave.

WTF = Water Treatment Facility - 18400 Ipava Ave.

Minnesota Climatology Working Group

State Climatology Office - DNR Division of Ecological and Water Resources University of Minnesota

Annual Reports of Monthly Precipitation Totals

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Choose a county and year, then click on **"Annual report"**.

DAKOTA | 2008 | Annual report

2008 DAKOTA Monthly Precipitation, Totals

cc	ttt	rr	ss	oooooooo	nnnn	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AGR	HYD	ANN	GRO
19	27N	22W	4		SWCD	.17	.54	1.13	5.40	2.86	4.36	1.81	2.78	2.06	2.11	1.21	2.44	29.54	27.58	26.87	13.87
19	27N	22W	15		BYRG	.19	.44	1.23	3.91	4.80	3.98	2.77	2.35	1.89	2.35	1.42	1.54			26.87	15.79
19	27N	22W	29	SMOLIK N	MOSQ				3.65	3.08	4.21	3.02	2.27	2.20	2.33						14.78
19	27N	23W	21	DELEJSI	MOSQ					3.48	4.48	2.88	3.81	2.86	2.70						17.51
19	27N	23W	25		SWCD	.18	.52	1.84	4.50	3.14	4.41	2.83	3.45	2.24	2.41	1.62	1.46	32.19	29.66	28.60	16.07
19	27N	23W	25		BYRG	.20	.54	1.39	4.79	2.94	4.03	3.10	2.96	2.48	2.29	1.59	1.79	31.12	29.68	28.10	15.51
19	27N	23W	35	EAGAN PK	MOSQ				4.47	2.81	4.73	2.82	3.30	2.56	2.33						16.22
19	27N	23W	36		BYRG	.18	.59	1.34	4.85	2.75	4.40	2.44	3.94	2.03	2.30	1.62	1.68	31.47	29.25	28.12	15.56
19	28N	22W	17		SWCD	.18	.62	1.73	5.50	2.52	3.59	1.32	2.59	2.73	2.29	1.56	1.76	31.05	28.53	26.39	12.75
19	28N	22W	18		BYRG				3.84	2.17	2.59	1.87	2.46	2.84	2.27						11.93
19	28N	22W	27	SST PAUL	MOSQ				4.17	2.67	4.54	1.99	2.61	3.02	2.24						14.83
19	28N	22W	31		SWCD	.18	.58	1.26	5.94	3.00	4.16	1.78	3.42	2.35	2.34	1.32	1.90	31.84	29.67	28.23	14.71
19	112N	20W	8		SWCD				3.36	2.78	3.30	2.60	3.71	1.75	1.91						14.14
19	112N	20W	25	NORTHFIE	MOSQ				4.28	3.82	4.55	2.67	2.65	1.67	2.08						15.36
19	113N	18W	17		SWCD	.30	.59	1.07	4.75	3.32	4.82	2.96	4.29	1.78	2.10	1.52	1.30	31.90	30.07	28.80	17.17
19	113N	19W	35		SWCD				3.75	3.94	4.65	2.67	3.36	1.43	1.72						16.05
19	113N	20W	15		SWCD	.22	.50	1.16	3.33	1.91	3.58	2.67	3.09	2.01	2.01	1.72	1.27	26.60	24.16	23.47	13.26
19	114N	16W	19		SWCD				*	3.35	3.63	1.56	4.93	.60							14.07
19	114N	20W	4		SWCD		.64		3.75	2.61	3.06	3.16									
19	114N	20W	8	BEADLE	MOSQ				3.92	2.68	3.71	2.25	2.45	2.09	2.86						13.18
19	114N	20W	24	FARMINGT	NWS	0	.31	1.55	3.75	2.98	2.90	2.39	2.18	1.74	2.05	1.48	3.55	24.88	23.30	24.88	12.19
19	114N	20W	26		BYRG	.22	.43	2.05	3.86	3.27	3.65	2.60	2.53	2.11	2.19	1.97	1.14			26.02	14.16
19	114N	20W	27		SWCD				2.52												
19	114N	20W	36	BEADLE K	MOSQ				3.93	3.03	3.84	1.99	2.75	2.31	2.01						13.92
19	115N	17W	21	BEADLE K	MOSQ				4.40	3.56	4.65	2.65	3.07	2.05	1.90						15.98
19	115N	17W	21	HASTINGS	NWS	.27	.93	.77	4.94	3.50	4.02	1.89	3.11	1.92	1.83	1.33	1.26	29.60	27.80	25.77	14.44
19	115N	19W	32	ROSESHOP	MOSQ				4.83	2.76	4.40	2.74	2.71	1.88	2.19						14.49
19	115N	19W	33	ROSEMOUN	NWS	.30	.60	1.60	4.63	2.69	4.59	2.79	3.02	2.28	2.00	1.50	1.74	30.60	29.80	27.74	15.37
19	115N	20W	25		SWCD	.23	.65	1.18	5.87	3.55	4.22	3.40	2.60	1.95	2.48	1.79	2.24	33.26	32.08	30.16	15.72
county averages						.20	.57	1.38	4.33	3.07	4.04	2.49	3.05	2.10	2.20	1.55	1.79	30.34	28.47	27.14	14.78
# of obs						14	15	14	27	28	28	28	27	27	26	14	14	12	12	14	27

- Data as received and digitized on or before 1/31/2013. **All values are in inches**.
- 'cc ttt rr ss' is county-township-range-section number, 'ooooooo' is community name (where applicable), 'nnnn' is network type.
- 'AGR', 'HYD', and 'ANN' are 12 month precipitation totals starting in Sep 2007, Oct 2007, and Jan 2008, respectively. 'GRO' is growing season (May 2008 thru Sep 2008) precipitation total.
- '*' denotes a partial monthly record, 'e' denotes that value is wholly or partially estimated.
- Prepared by: State Climatology Office - DNR Waters, phone: 651-296-4214, web: http://climate.umn.edu

For some purposes, **daily** precipitation data are required. The precipitation data archive allows a user to interactively retrieve daily precipitation data from the site nearest to a target.

Obtaining Data for Legal Purposes

Last modified: April 10, 2008

Minnesota Climatology Working Group

State Climatology Office - DNR Division of Ecological and Water Resources University of Minnesota

Annual Reports of Monthly Precipitation Totals

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Choose a county and year, then click on **"Annual report"**.

DAKOTA | 2009 | Annual report

2009 DAKOTA Monthly Precipitation, Totals

cc	ttt	rr	ss	oooooooo	nnnn	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AGR	HYD	ANN	GRO
19	27N	22W	4		SWCD	.59	1.39	1.30	2.09	.70	3.23	1.28	7.39	.28	6.54	.30	2.43	25.79	24.01	27.52	12.88
19	27N	22W	29	SMOLIK N	MOSQ				2.38	1.00	3.44	1.65	7.46	.73	6.79						14.28
19	27N	23W	21	DELEJSI	MOSQ					.90	3.29		8.71	.69	6.82						
19	27N	23W	25		SWCD				2.34	.98	3.48	1.94	6.72	.66	7.08	.64	2.62				13.78
19	27N	23W	25		BYRG	.56	1.31	1.42	2.21	.94	3.16	2.08	7.52	.63	6.50	.49	2.77	27.35	25.50	29.59	14.33
19	27N	23W	35	DAKOTA P	MOSQ				2.17	.84	3.99	1.67	6.83	.69	7.46						14.02
19	27N	23W	36		BYRG	.55	1.12	1.39	2.35	.93	3.79	1.78	6.27	.65	6.78	.56	2.58	25.81	24.43	28.75	13.42
19	28N	22W	17		SWCD	.60	1.54	1.59	2.17	.57	2.45	1.34	7.49	.43	6.72	.47	3.30	26.09	23.79	28.67	12.28
19	28N	22W	18		BYRG				1.96	.63	1.80	1.70	8.19	.41	6.26						12.73
19	28N	22W	27	SST PAUL	MOSQ				1.36	.30	3.50	1.71	8.51	.46	6.36						14.48
19	28N	22W	31		SWCD	.53	1.74	1.34	2.44	.81	3.32	2.12	8.23	.13	5.81	.33	3.06	28.44	26.22	29.86	14.61
19	112N	20W	8		SWCD					*	5.09	1.79	7.32	.93	6.14	.85					
19	112N	20W	25	NORTHFIE	MOSQ				1.77	1.25	3.85	3.74	8.71	.85	6.88						18.40
19	113N	18W	17		SWCD	.49	1.08	1.13	1.82	.90	3.89	2.12	7.34	.55	6.30	.53	1.77	25.47	24.24	27.92	14.80
19	113N	19W	35		SWCD				2.17	.95	3.87	1.55	8.08	.46	6.38						14.91
19	113N	20W	15		SWCD	.71	.72	1.27	1.96	1.01	3.54	2.31	7.77	.62	6.11	.80	1.62	26.30	24.91	28.44	15.25
19	114N	17W	3		SWCD				*	1.07	4.39	3.26	7.18	1.93	4.86	.56	2.36				17.83
19	114N	19W	31	FARMINGT	MOSQ				1.60		3.74	1.98	7.25								
19	114N	20W	8	BEADLE	MOSQ				2.33	1.00	3.88		7.94	.68	6.67						
19	114N	20W	24	FARMINGT	NWS	.80	1.20	1.43	2.15	1.29		1.82	7.85	2.05		.16	1.60				
19	114N	20W	26		BYRG	.84	.95	1.59	1.89	1.20	4.30	2.87	8.57	.83	6.63	.75	2.27	29.62	28.34	32.69	17.77
19	114N	20W	36	BEADLE K	MOSQ					.88				.71	6.21						
19	115N	17W	21	BEADLE K	MOSQ				1.56	.99	5.88	2.45	6.75	.76							16.83
19	115N	17W	21	HASTINGS	NWS	.47	1.06	.96	1.84	1.39	5.39	2.36	7.32	.81	4.94	.51	1.61	27.13	26.02	28.66	17.27
19	115N	17W	27		SWCD				1.23	1.11	5.35	2.71	7.96	.63	6.13	.65	2.94				17.76
19	115N	19W	30		SWCD											.55					
19	115N	19W	32	ROSESHOP	MOSQ						3.68	2.03	7.97	.59	6.36						
19	115N	19W	33	ROSEMOUN	NWS	.69	1.15	1.33	2.23	1.34	3.93	1.86	7.81	.60	6.31	.59	2.35	27.86	26.18	30.19	15.54
19	115N	19W	35	ROSEMOUN	MOSQ				1.99	1.19											
19	115N	20W	25		SWCD	1.00	2.50	1.63	2.32	1.22	3.53	1.72	6.65	.24	7.05	.54	3.85	29.03	27.32	32.25	13.36
county averages						.64	1.31	1.37	2.01	.98	3.84	2.07	7.62	.70	6.40	.55	2.48	27.17	25.54	29.50	15.07
# of obs						13	12	12	24	26	26	25	27	27	25	17	15	11	11	11	21

- Data as received and digitized on or before 1/31/2013. **All values are in inches**.
- 'cc ttt rr ss' is county-township-range-section number, 'ooooooo' is community name (where applicable), 'nnnn' is network type.
- 'AGR', 'HYD', and 'ANN' are 12 month precipitation totals starting in Sep 2008, Oct 2008, and Jan 2009, respectively. 'GRO' is growing season (May 2009 thru Sep 2009) precipitation total.
- '*' denotes a partial monthly record, 'e' denotes that value is wholly or partially estimated.
- Prepared by: State Climatology Office - DNR Waters, phone: 651-296-4214, web: http://climate.umn.edu

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Choose a county and year, then click on **"Annual report"**.

DAKOTA 2010 Annual report

2010 DAKOTA Monthly Precipitation, Totals

cc	ttt	rr	ss	oooooooo	nnnn	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AGR	HYD	ANN	GRO
19	27N	22W	4		SWCD	.52	1.43	.67	2.50	3.08	7.39	2.94	5.55	5.55	1.59	1.92	3.87	33.63	38.90	37.01	24.51
19	27N	22W	29	SMOLIK N	MOSQ				2.64	3.39	7.11	5.03	6.22	6.17	1.84						27.92
19	27N	23W	21	DELEJSI	MOSQ				2.98	3.19	7.57	5.41	7.12	6.51	2.05						29.80
19	27N	23W	25		SWCD	.62	1.07	.79	2.70	3.40	6.55	4.90	5.88	6.09	1.99	2.68	2.83	36.91	42.34	39.50	26.82
19	27N	23W	25		BYRG	.79	1.23	.87	2.53	3.39	6.44	4.08	6.99	6.01	2.04	2.33	3.55	36.71	42.09	40.25	26.91
19	27N	23W	35	DAKOTA P	MOSQ				2.73	3.37	7.60	4.21	6.68	6.23							28.09
19	27N	23W	36		BYRG	.83	1.06	.84	2.34	3.39	6.90	4.62	5.71	6.21	1.91	2.25	3.06	36.26	41.82	39.12	26.83
19	28N	22W	17		SWCD	.68	1.41	.65	3.00	3.29	7.92	5.12	4.07	5.33	1.73	2.55	4.23	37.06	41.96	39.98	25.73
19	28N	22W	18		BYRG				2.47	3.42	9.23	4.72	4.17	5.56	1.52	*					27.10
19	28N	22W	27	SST PAUL	MOSQ					2.34	6.41	3.45	4.38	5.40	1.94						21.98
19	28N	22W	31		SWCD	.89	.96	1.05	2.56	3.12	7.16	2.37	4.36	5.32	1.80	2.81	4.25	31.80	36.99	36.65	22.33
19	112N	19W	30	NORTHFIE	NWS									*							
19	112N	20W	8		SWCD				1.34	3.61	6.36	6.47	4.74	10.55	1.26						31.73
19	112N	20W	25	NORTHFIE	MOSQ					4.25	6.27	4.80	4.46	13.77	1.53						33.55
19	113N	18W	17		SWCD	.54	.66	.94	1.37	3.41	9.19	5.46	7.52	8.66	1.05	2.15	2.19	38.24	46.35	43.14	34.24
19	113N	19W	35		SWCD				1.30	3.76	6.09	4.70	4.59	11.04	1.26						30.18
19	113N	20W	11	FARMINGT	NWS										1.86	1.09	1.60				
19	113N	20W	15		SWCD	.65	1.16	.93	1.52	3.52	6.35	8.57	7.65	7.34	1.99	1.42	1.85	39.50	46.22	42.95	33.43
19	114N	17W	3		SWCD	1.46	1.10	.41	1.76	3.79	6.23	5.30	6.79	6.21	1.01	1.51	3.82	36.55	40.83	39.39	28.32
19	114N	19W	26		SWCD			*		4.09	7.14	6.53	5.00	6.58	1.27	*					29.34
19	114N	19W	31	FARMINGT	MOSQ				1.19				8.21								
19	114N	20W	8	BEADLE	MOSQ				1.99	3.57	7.94	5.42	7.18	6.52	1.71						30.63
19	114N	20W	24	FARMINGT	NWS	.55	.70	*	1.36	3.73	7.13	6.51	5.89	*	*						
19	114N	20W	26		BYRG	.68	1.21	.83	1.70	4.63	7.25	6.69	6.72	7.80	2.13	2.15	2.45	40.19	47.16	44.24	33.09
19	114N	20W	36	BEADLE K	MOSQ					3.84	6.51	7.22		6.78							
19	115N	17W	21	BEADLE K	MOSQ				1.79	3.57	5.87	6.10	6.77	6.53							28.84
19	115N	17W	21	HASTINGS	NWS	.45	.71	.50	2.10	4.06	6.38	6.57	5.33	6.55	1.28	2.74	3.38	33.97	39.71	40.05	28.89
19	115N	17W	27		SWCD	.57	1.26		1.84	3.74	6.61	6.15	7.63		1.36						
19	115N	19W	30		SWCD		1.10														
19	115N	19W	32	ROSESHOP	MOSQ				2.02	3.98	6.90	4.94	5.57	6.57	1.67						27.96
19	115N	19W	33	ROSEMOUN	NWS	.69	1.16	.96	1.70	3.19	7.35	6.60	5.93	6.59	1.93	2.46	2.54	37.43	43.42	41.10	29.66
19	115N	20W	25		SWCD	.89	2.06	.97	2.79	3.62	8.24	4.29	6.75	6.36	1.92	3.79	3.52	41.29	47.41	45.20	29.26

county averages	.72	1.14	.80	2.09	3.56	7.07	5.33	6.00	7.01	1.67	2.28	3.08	36.89	42.71	40.66	28.69
# of obs	15	16	13	25	28	28	28	28	26	25	14	14	13	13	13	25

- Data as received and digitized on or before 1/31/2013. **All values are in inches**.
- 'cc ttt rr ss' is county-township-range-section number, 'ooooooo' is community name (where applicable), 'nnnn' is network type.
- 'AGR', 'HYD', and 'ANN' are 12 month precipitation totals starting in Sep 2009, Oct 2009, and Jan 2010, respectively. 'GRO' is growing season (May 2010 thru Sep 2010) precipitation total.
- '*' denotes a partial monthly record, 'e' denotes that value is wholly or partially estimated.
- Prepared by: State Climatology Office - DNR Waters, phone: 651-296-4214, web: http://climate.umn.edu

For some purposes, **daily** precipitation data are required. The precipitation data archive allows a user to interactively retrieve daily precipitation data from the site nearest to a target.

Obtaining Data for Legal Purposes

Last modified: April 10, 2008

Minnesota Climatology Working Group

State Climatology Office - DNR Division of Ecological and Water Resources University of Minnesota

Annual Reports of Monthly Precipitation Totals

This application creates annual summaries of precipitation data gathered by volunteer-based observation networks throughout Minnesota. The data presented are monthly totals and the data are grouped by county. Observer locations are described using township, range, and section numbers.

Choose a county and year, then click on **"Annual report"**.

DAKOTA 2011 Annual report

2011 DAKOTA Monthly Precipitation, Totals

cc	ttt	rr	ss	oooooooo	nnnn	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AGR	HYD	ANN	GRO
19	27N	22W	4		SWCD	1.14	2.04	2.29	3.24	4.03	3.87	6.45	3.08	.44	.51	.37	.86	39.07	33.96	28.32	17.87
19	27N	22W	29	SMOLIK N	MOSQ				3.34	4.33	4.53	5.17									
19	27N	23W	21	DELEJSI	MOSQ				3.23	4.64	5.21	5.10									
19	27N	23W	25		SWCD			2.56	3.67	4.23	4.90	4.97	3.35	.67	.72	.48	1.02				18.12
19	27N	23W	25		BYRG	1.00	1.46	2.50	3.17	4.60	4.86	4.60	3.23	.65	.69	.45	.97	39.35	33.99	28.18	17.94
19	27N	23W	35	EAGAN PK	MOSQ				3.29	3.48	4.71	4.51									
19	27N	23W	36		BYRG	.97	1.52	2.37	3.34	4.40	4.82	4.85	3.76	.63	.74	.40	.97	39.46	33.88	28.77	18.46
19	28N	22W	17		SWCD	1.05	2.05	*	3.45	4.39	4.39	6.94	3.03	.50	.55	.55	.89				19.25
19	28N	22W	18		BYRG				3.35	3.79	4.41	6.47	4.62	.51	.69						19.80
19	28N	22W	27	SST PAUL	MOSQ				3.58	3.85		6.77									
19	28N	22W	31		SWCD	.74	2.43	2.75	2.97	4.24	3.74	6.14	3.09	.46	.63	.54	.90	40.28	35.42	28.63	17.67
19	112N	20W	8		SWCD				3.56	4.15	5.24	8.19	1.96	.98							20.52
19	112N	20W	25	NORTHFIE	MOSQ				3.58	4.47	5.48	5.74									
19	113N	18W	17		SWCD	.66	1.53	2.44	3.26	3.81	5.97	7.33	2.31	.96	.48	.46	1.17	41.36	33.66	30.38	20.38
19	113N	19W	35		SWCD				3.47	3.82	4.92	5.97	1.72	.67	.46						17.10
19	113N	20W	15		SWCD	.86	.80	2.02	3.47	4.44	4.77	7.98	2.72	.84	1.15	.31	1.17	39.66	33.16	30.53	20.75
19	114N	17W	3		SWCD	1.51	1.17	1.94	2.82	3.14	6.11	5.35	3.68	.76	1.10	.58	.75	38.27	32.82	28.91	19.04
19	114N	19W	26		SWCD					3.18	5.07	6.22	2.59	.70	.49						17.76
19	114N	19W	31	FARMINGT	MOSQ				3.20	4.12	4.91	7.02									
19	114N	20W	8	BEADLE	MOSQ				3.26	4.64	4.02	6.33									
19	114N	20W	26		BYRG	1.11	1.13	2.38	3.99	3.97	4.39	6.76	2.21	.69	.99	.39	1.46	40.47	33.36	29.47	18.02
19	115N	17W	21	BEADLE K	MOSQ				3.46	3.57	6.59	5.55									
19	115N	17W	21	HASTINGS	NWS	.52	1.44	2.32	3.88	3.65	5.54	4.80	4.19	.82	.86	.25	*	40.29	34.56		19.00
19	115N	17W	27		SWCD	.92				3.33											
19	115N	19W	33	ROSEMOUN	NWS	1.46	1.73	2.56	3.08	4.65	4.41	4.97	3.16	.62	.71	.44	.94	39.54	33.57	28.73	17.81
19	115N	19W	35	ROSEMOUN	MOSQ				3.19	4.53	3.80	4.78									
19	115N	20W	25		SWCD	1.35	2.13	2.99	5.70	5.50	4.20	5.14	2.13	.57	.73	.47	1.03	44.73	38.94	31.94	17.54
county averages						.99	1.62	2.43	3.46	4.11	4.83	5.93	2.99	.67	.72	.44	1.01	40.23	34.30	29.39	18.65
# of obs						14	12	12	25	27	25	26	17	17	16	13	12	11	11	10	17

- Data as received and digitized on or before 1/31/2013. **All values are in inches.**
- 'cc ttt rr ss' is county-township-range-section number, 'oooooooo' is community name (where applicable), 'nnnn' is network type.

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- Prepared by: State Climatology Office - DNR Waters, phone: 651-296-4214, web: http://climate.umn.edu

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Obtaining Data for Legal Purposes

Last modified: April 10, 2008

Minnesota Climatology Working Group

State Climatology Office - DNR Division of Ecological and Water Resources University of Minnesota

Annual Reports of Monthly Precipitation Totals

This application creates annual summaries of precipitation data gathered by volunteer-based observation networks throughout Minnesota. The data presented are monthly totals and the data are grouped by county. Observer locations are described using township, range, and section numbers.

Choose a county and year, then click on **"Annual report"**.

DAKOTA | 2012 | Annual report

2012 DAKOTA Monthly Precipitation, Totals

cc	ttt	rr	ss	oooooooo	nnnn	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AGR	HYD	ANN	GRO
19	27N	22W	4		SWCD	.61	2.13	2.09	3.15	9.68	4.47	3.67	1.92	.55	1.58	.77		29.90	30.01		20.29
19	27N	22W	29	SMOLIK N	MOSQ				3.94	7.73	5.17	5.26	2.17	.62	1.27						20.95
19	27N	23W	21	DELEJSI	MOSQ				3.27	9.56	6.10	4.35	2.04	.56							22.61
19	27N	23W	25		SWCD	.78	.33	3.27	3.66	7.48	5.19	3.72	2.35	.71	1.45	.79		29.67	29.71		19.45
19	27N	23W	25		BYRG	.73	1.95	1.50	3.30	7.82	5.31	4.05	2.25	.68	1.43	.70	1.95	29.67	29.70	31.67	20.11
19	27N	23W	35	EAGAN PK	MOSQ				3.48	7.39	5.85	4.03	2.79	.82	1.53						20.88
19	27N	23W	36		BYRG	.69	2.07	1.99	3.65	7.37	5.64	4.44	2.27	.70	1.33	.72		30.86	30.93		20.42
19	28N	22W	17		SWCD	.75	2.29	2.16	3.51	7.45	4.23	5.17	1.33	.36	1.26	.87		29.38	29.24		18.54
19	28N	22W	18		BYRG				3.47	8.81	4.31	5.74	1.39	.51	1.09						20.76
19	28N	22W	31		SWCD	.82	1.70	1.44	3.35	9.59	4.58	4.96	1.65	.53	1.46	.83		30.62	30.69		21.31
19	112N	20W	8		SWCD				2.72	8.26	10.28	3.84	4.56	.41	1.40	.67					27.35
19	112N	20W	25	NORTHFIE	MOSQ				3.38	7.35	13.41	4.56	4.77	.63							30.72
19	113N	18W	17		SWCD	.53	2.18	2.52	3.18	7.55	9.85	5.12	4.42	.69	1.40	.80	3.04	38.42	38.15	41.28	27.63
19	113N	19W	35		SWCD				3.02	6.70	10.86	3.51	3.81	.48	1.03						25.36
19	113N	20W	15		SWCD							3.04		.66	1.18	.90					
19	113N	20W	15		SWCD	.62	2.24	1.58	2.99	8.00	8.26	3.30	5.85					36.31			
19	114N	17W	3		SWCD	.47	1.50	2.02	2.79	8.45	6.98	3.27	2.05	.57	1.89	1.46		30.72	30.53		21.32
19	114N	19W	26		SWCD			1.67	2.75	7.72	6.72	3.94	3.24	.29	1.05						21.91
19	114N	19W	31	FARMINGT	MOSQ				3.29	8.76	7.79	4.25	3.95	.52	1.75						25.27
19	114N	20W	8	BEADLE	MOSQ				3.05	8.25	5.89	4.19	2.97	.57	1.33						21.87
19	114N	20W	26		BYRG	.58	1.80	1.73	2.92	7.69	7.95	4.11									
19	115N	17W	21	HASTINGS	NWS	1.32	1.99	2.87	3.63	8.07	5.97	3.02	1.69	.66	.81	.86	1.11			32.00	19.41
19	115N	17W	28	HASTINGS	MOSQ							3.75	2.88								
19	115N	19W	33	ROSEMOUN	NWS	.63	1.90	2.09	3.23	7.49	6.45	4.79	3.56	.72	1.14	.47	1.14	32.85	32.95	33.61	23.01
19	115N	19W	35	ROSEMOUN	MOSQ				3.39	7.77	5.89	5.05	2.93	.76	1.35						22.40
19	115N	20W	25		SWCD	.77	2.41	1.59	3.23	7.04	4.83	4.14	2.77	.41	1.30	.71		29.58	29.42		19.19
county averages						.72	1.88	2.04	3.26	8.00	6.75	4.20	2.90	.58	1.33	.81	1.81	31.63	31.13	34.64	22.31
# of obs						13	13	14	24	24	24	26	24	23	21	13	4	11	10	4	22

- Data as received and digitized on or before 1/31/2013. **All values are in inches**.
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- '*' denotes a partial monthly record, 'e' denotes that value is wholly or partially estimated.
- Prepared by: State Climatology Office - DNR Waters, phone: 651-296-4214, web: http://climate.umn.edu

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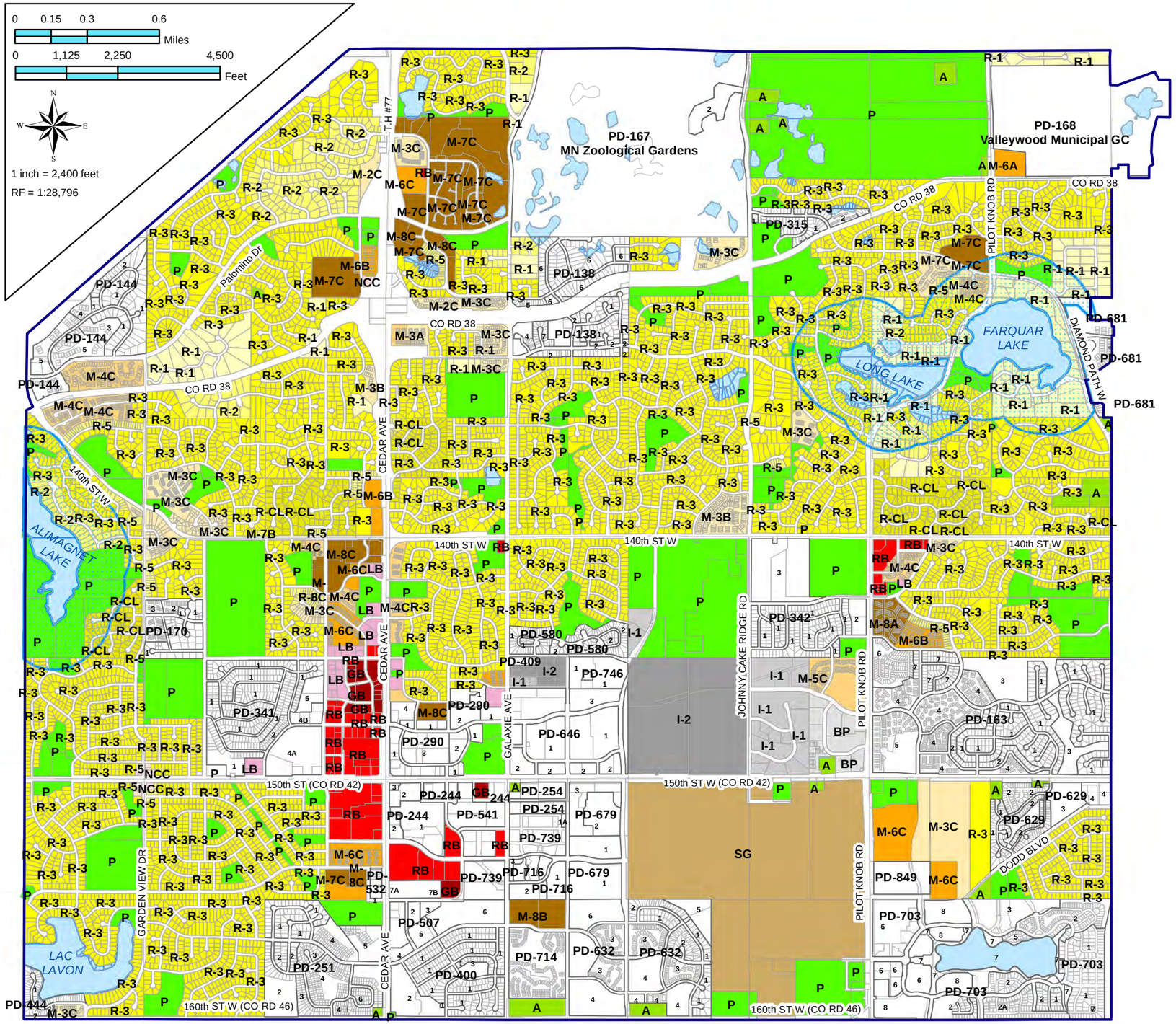
Obtaining Data for Legal Purposes

Last modified: April 10, 2008

Attachment C-2

Maps for Apple Valley and Farmington

Zoning Map



Apple Valley
Community Development Department

Dakota County GIS

City of APPLE VALLEY

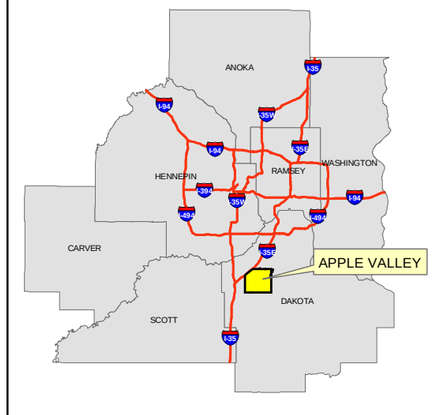
DESIGNATIONS:	ACRES:	PERCENT:
Residential:		
R-1 - Single Family 40,000 Sq. Ft	263.8	2.63%
R-2 - Single Family 18,000 Sq. Ft	142.4	1.27%
R-3 - Single Family 11,000 Sq. Ft	2,745.2	24.51%
R-4 - Single Family (Reserved)	0.00	0.00%
R-CL Residential Cluster	173.9	1.55%
R-5 - Two Family 15,000 Sq. Ft	44.2	0.39%
Multiple Family (A,B,C):		
M-1 - 3-4 Units/Acre	0.00	0.00%
M-2 - 3-5 Units/Acre	25.8	0.23%
M-3 - 3-6 Units/Acre	136.3	1.22%
M-4 - 6-8 Units/Acre	81.7	0.73%
M-5 - 6-10 Units/Acre	29.1	0.26%
M-6 - 6-12 Units/Acre	83.0	0.74%
M-7 - 12-20 Units/Acre	137.9	1.23%
M-8 - 12-24 Units/Acre	82.7	0.74%
Business:		
NCC - Neighborhood Convenience Center	9.7	0.09%
LB & LB-1 - Limited Business	36.3	0.32%
GB & GB-1 - General Business	26.0	0.23%
RB - Retail Business	114.8	1.03%
SC - Regional Shopping Center	0.00	0.00%
VB - Vistor Business	0.00	0.00%
Industrial:		
BP - Business Park	34.2	0.31%
I-1 - Limited Industrial	72.0	0.64%
I-2 - General Industrial	185.2	1.65%
Other:		
PD - Planned Development	2,517.0	22.47%
A - Agricultural	209.0	1.87%
SG - Sand & Gravel	539.3	4.82%
P - Institutional	1,170.6	10.45%
Existing Lakes/Ponds	413.4	3.69%
Right-of-Way	1,926.0	17.20%
TOTALS:	**11,200.0**	**100.00%**
SH - Shoreland District		

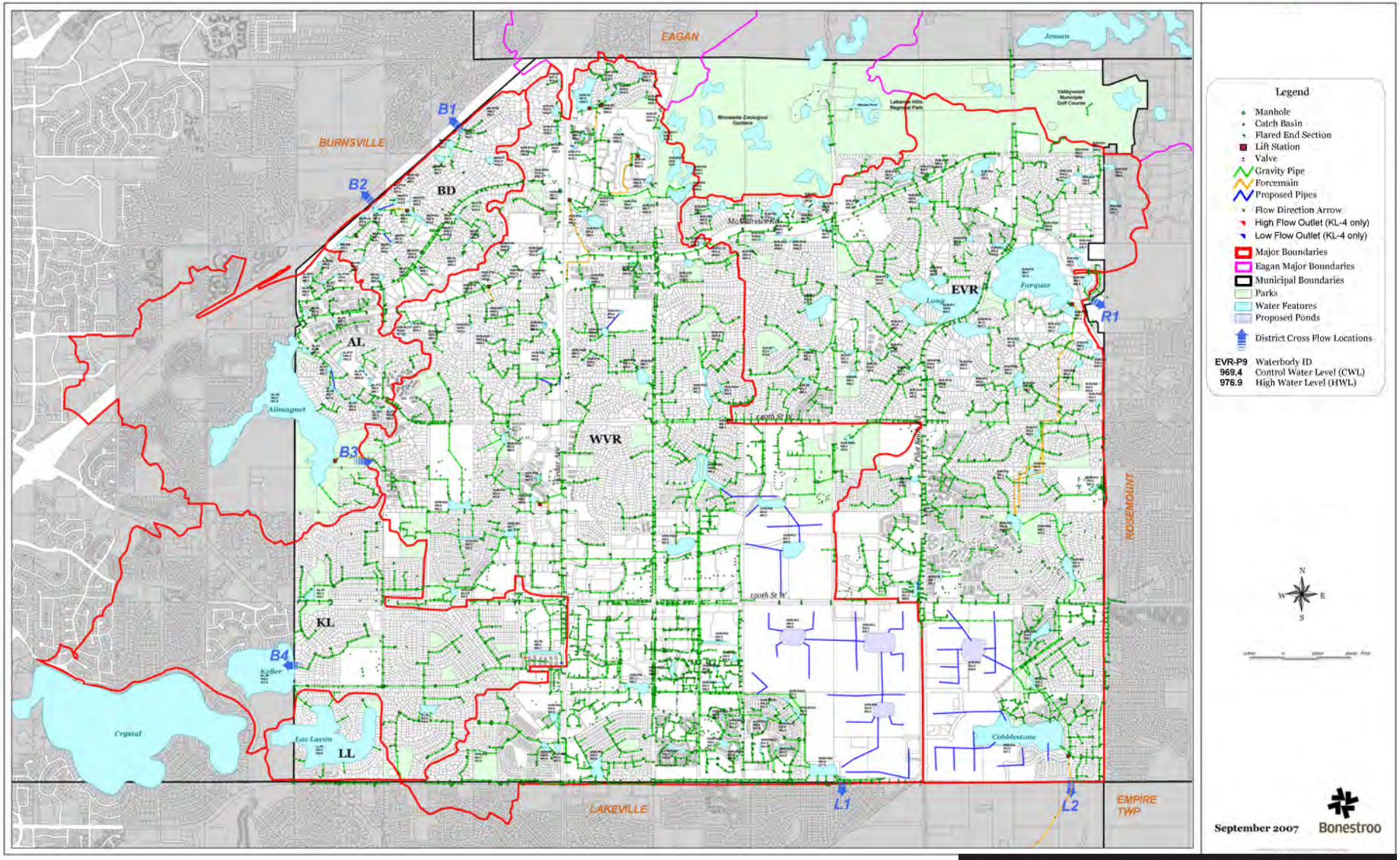
The Zoning Designations on this map are a representation of a combination of maps and ordinances which make up the complete Apple Valley Zoning Regulations. All Zoning Designations are subject to change. Information on each Planned Development available at Apple Valley Municipal Center. Zoning district land areas are estimates based upon map elements.

Latest Revision: Ordinance Number 926 Date: 10/27/11

City of Apple Valley Planning Department

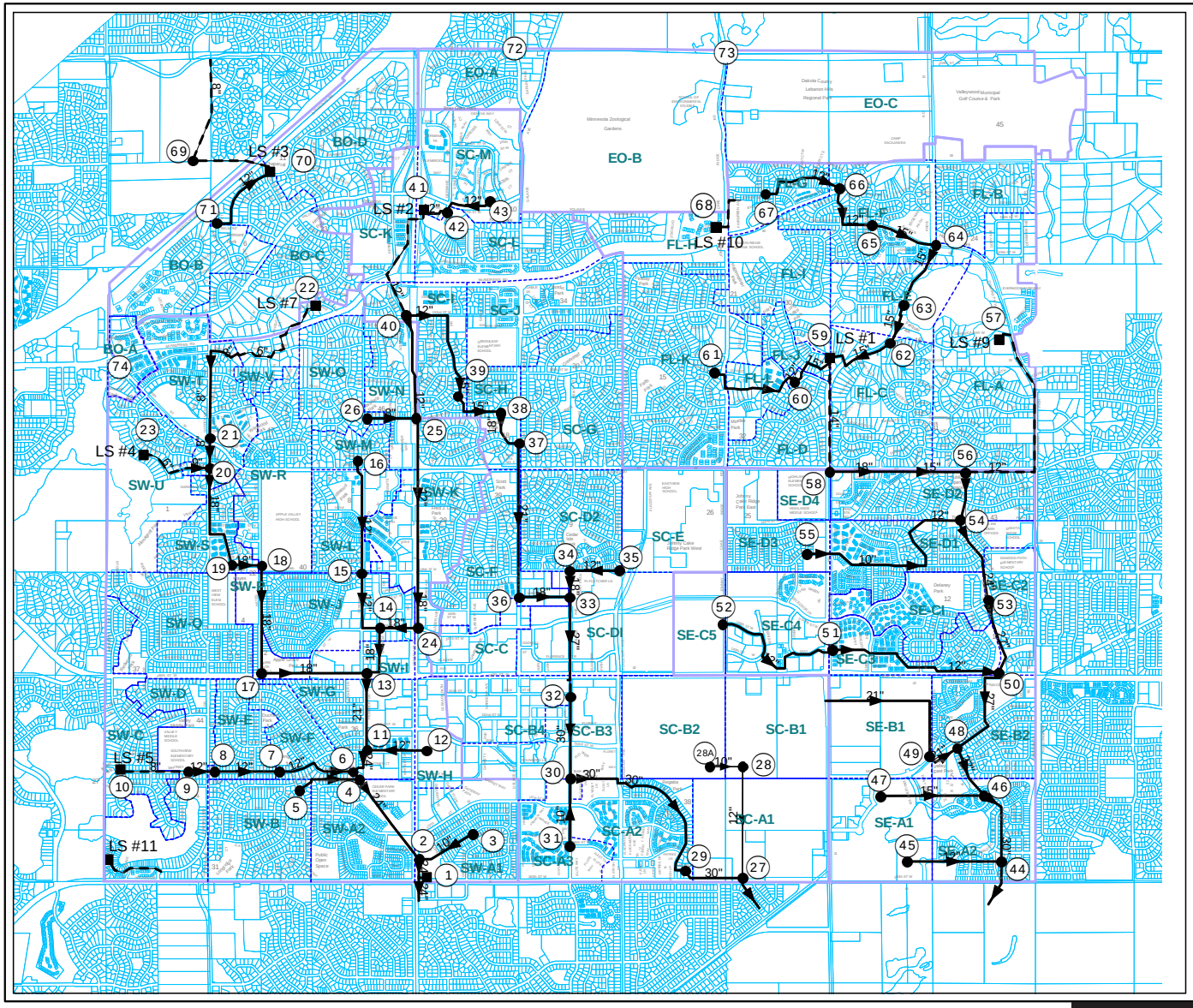
Telephone (952) 953-2575





Storm Drainage System

Figure 9.8



Apple Valley

Trunk Sanitary Sewer System

May 2008

- Node
- Lift Stations

Trunk System
- Existing Force Main
- Existing Trunk Sewer
- Proposed Trunk Sewer

Boundaries
- Major District Boundary
- Subdistrict Boundary

Bonestroo

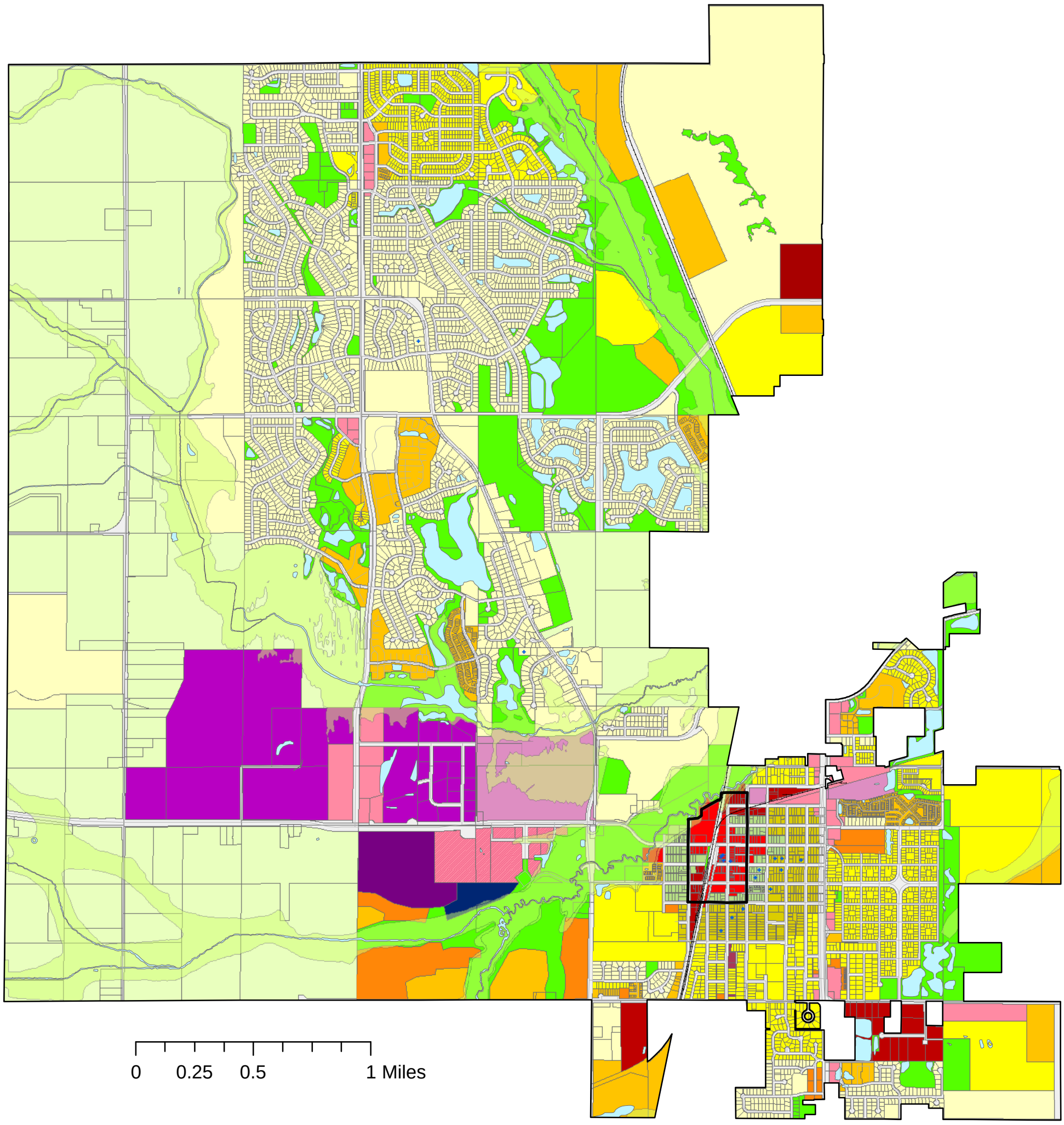
I:\68\6802210\cad\report504.apr layout: Sanitary Plan

Trunk Sanitary Sewer System

Figure 9.1

Map 12.1

Farmington Zoning Map



Legend

Zoning

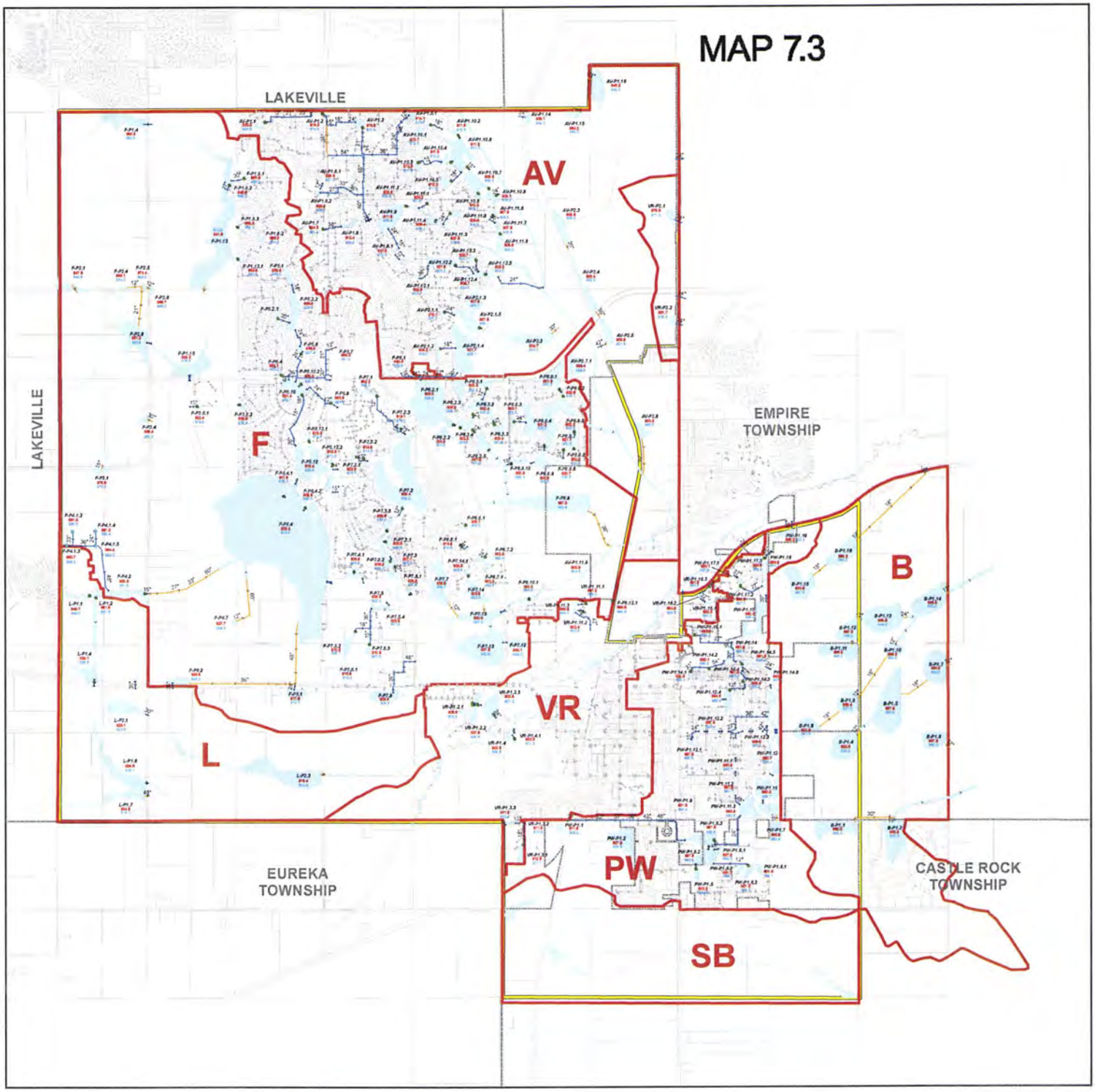
- A-1 (Agriculture)
- B-1 (Highway Business)
- B-2 (Downtown Business)
- B-3 (Heavy Business)
- B-4 (Neighborhood Business)
- Business/Commercial Flex
- I-1 (Industrial)
- IP (Industrial Park)
- Mixed-Use
- Mixed-Use Commercial/Residential
- P/OS (Park/Open Space)
- R-1 (Low Density Residential - 1.0-3.5 du/ac)
- R-2 (Low/Medium Density Residential - 3.5 - 6.0 du/ac)
- R-3 (Medium Density Residential - 6.0-12.0 du/ac)
- R-5 (High Density Residential - 12.0+ du/ac)
- R-D (Downtown Residential)
- R-T (Downtown Transitional Mixed Use)
- ROW (Right-of-Way)
- SSC (Spruce Street Commercial)
- Water

Other

- Vermillion River Floodplain
- Downtown Commercial District
- Historic Properties

N
W E
S

Map dated November 7, 2012.
Prepared for the City of Farmington
Community Development Department
by the Dakota County Office of GIS.



Pond Inlets and Outlets
- Catch Basin Manhole
- Flared End
- Skimmer
- Existing Pond Outlet Pipe
- Proposed Pond Outlet Pipe
- Open Channel

Existing Storm Sewer System
- Catch Basin Manhole
- Flared End
- Manhole
- Skimmer
- Catch Basin
- Existing Storm Pipe

- Major District
- 2030 Boundary
- Jurisdictional Boundary
- Waterbodies
- L-P1.7 Pond ID
- HWL- High Water Level
- OE - Outlet Elevation

City of Farmington

Local Surface Water Management Plan

SURFACE WATER SYSTEM

July 2008

Map 1

N W E S

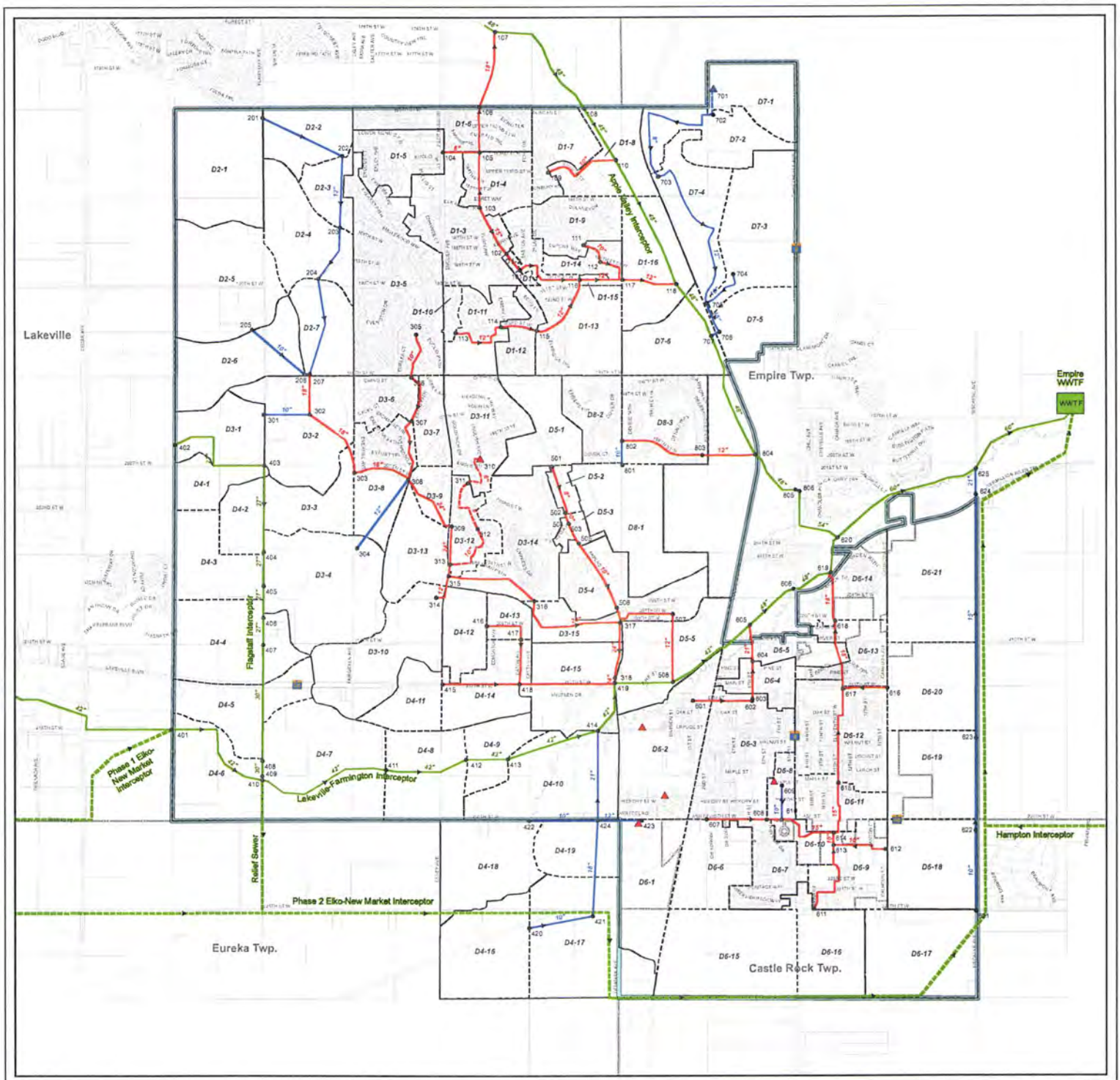
Feet

2000 1000 0 2000

Bonestroo

k:\141\14106285\GIS\projects\swmp-map1.mxd

Map 7.1



MCES INTERCEPTOR
- Existing Gravity Pipe
- Proposed Gravity Pipe

EXISTING TRUNK SANITARY SEWER
- Existing
- Existing Forcemain

PROPOSED SANITARY SEWER
- Trunk Sewer
- Forcemain

- Node
- Existing Lift Station
- Proposed Lift Station
- Flow Arrow
- District Boundary
- Subdistrict Boundary
- 2030 City Boundary
- Existing Jurisdictional Boundaries

City of Farmington

Comprehensive Sewer Plan

TRUNK SANITARY SEWER

October 2008

Map 1

N W E S

Feet

2000 1000 0 2000

Bonestroo

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Attachment C-3

IWMZ Inventories

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 1190015 **COMMUNITY**
NAME Lakeville
ADDRESS Lakeville Water Superintendent, 20195 Holyoke Avenue West, Lakeville, MN 55044

FACILITY (WELL) INFORMATION

NAME Well #2
FACILITY ID S01
UNIQUE WELL NO. 207708
COUNTY Dakota

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?
☐ YES (Please attach a copy)
☐ NO ☐ UNDETERMINED

PWS ID / FACILITY ID	1190015 S01	UNIQUE WELL NO.	207708

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

PWS ID / FACILITY ID	1190015 S01	UNIQUE WELL NO.	207708

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		Y	180	Y
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		Y	195	Y
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		Y	150	Y
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		Y	195	Y
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	195	Y
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	190	Y
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	180	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		Y	10	Y
*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	1190015 S01	UNIQUE WELL NO.	207708

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

	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.

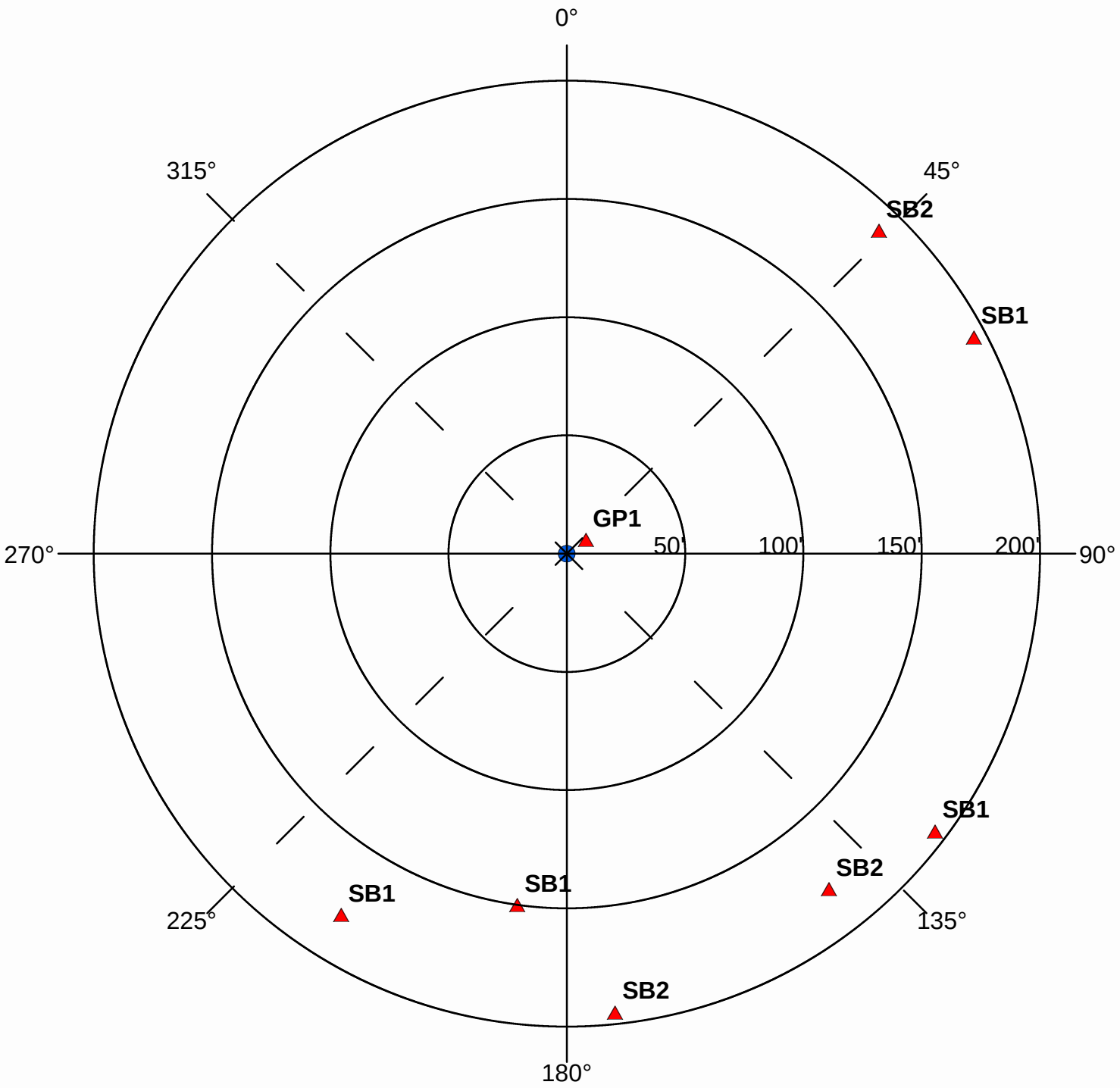
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1190015 S01	UNIQUE WELL NO.	207708

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

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



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

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

INSPECTOR	Hoerr, Robyn	DATE	7 - 30 - 2012

PWS ID / FACILITY ID	1190015 S01	UNIQUE WELL NO.	207708

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.		07/30/2012
Floor drains, such as in pumphouses, that discharge to a gravel pocket or seepage pit should have a "No Dumping" sign posted.		07/30/2012

COMMENTS

For further information, please contact:

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

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

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

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

PUBLIC WATER SYSTEM INFORMATION

PWS ID 1190015 **COMMUNITY**
NAME Lakeville
ADDRESS Lakeville Water Superintendent, 20195 Holyoke Avenue West, Lakeville, MN 55044

FACILITY (WELL) INFORMATION

NAME Well #3
FACILITY ID S02
UNIQUE WELL NO. 207727
COUNTY Dakota

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?
☐ YES (Please attach a copy)
☐ NO ☐ UNDETERMINED

PWS ID / FACILITY ID	1190015 S02	UNIQUE WELL NO.	207727

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

PWS ID / FACILITY ID	1190015 S02	UNIQUE WELL NO.	207727

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		N		
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		N		
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		N		
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		N		
Wells and Borings							
*EB1	Elevator boring, not conforming to rule	50	50		N		
*EB2	Elevator boring, conforming to rule	20	20		N		
MON	Monitoring well	record dist.	record dist.		N		
WEL	Operating well	record dist.	record dist.		N		
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		Y	36	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	1190015 S02	UNIQUE WELL NO.	207727

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
*PP1	Petroleum buried piping	50	50		N		
*PP2	Petroleum or crude oil pipeline to a refinery or distribution center	100	100		N		
PT1	Petroleum tank or container, 1100 gal. or more, without safeguards	150	150		N		
PT2	Petroleum tank or container, 1100 gal. or more, with safeguards	100	100		N		
PT3	Petroleum tank or container, buried, between 56 and 1100 gal.	50	50		N		
PT4	Petroleum tank or container, not buried, between 56 and 1100 gal.	50[5]	20		Y	57	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.

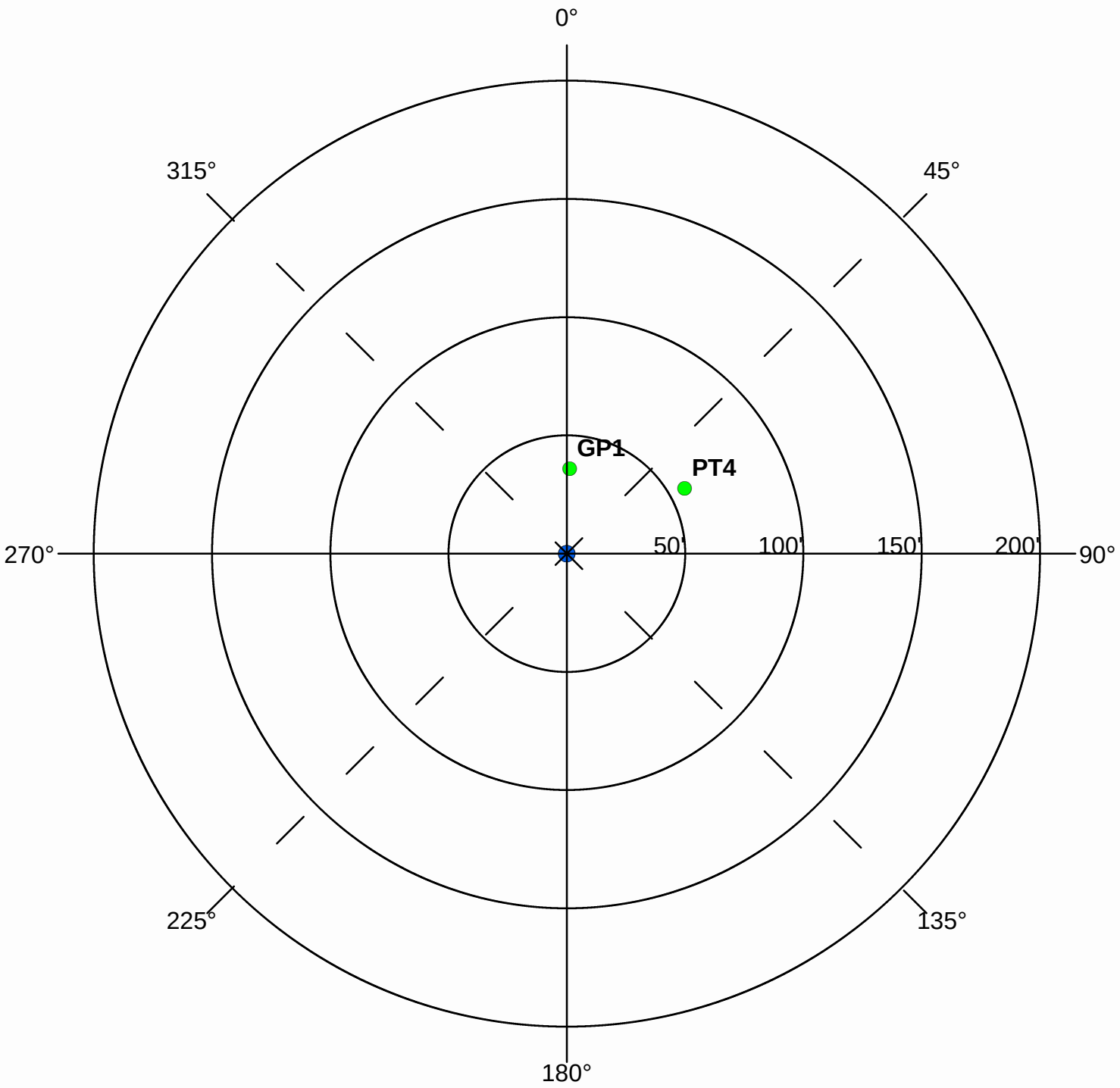
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1190015 S02	UNIQUE WELL NO.	207727

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

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



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

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

INSPECTOR	Hoerr, Robyn	DATE	7 - 30 - 2012

PWS ID / FACILITY ID	1190015 S02	UNIQUE WELL NO.	207727

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED
Secondary containment, such as earthen or concrete barriers, should be provided for above ground storage tanks to contain spills or leaks.		07/30/2012
Floor drains, such as in pumphouses, that discharge to a gravel pocket or seepage pit should have a "No Dumping" sign posted.		07/30/2012

COMMENTS

For further information, please contact:

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

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

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

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

PUBLIC WATER SYSTEM INFORMATION

PWS ID 1190015 **COMMUNITY**
NAME Lakeville
ADDRESS Lakeville Water Superintendent, 20195 Holyoke Avenue West, Lakeville, MN 55044

FACILITY (WELL) INFORMATION

NAME Well #4
FACILITY ID S03
UNIQUE WELL NO. 212650
COUNTY Dakota

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?
☐ YES (Please attach a copy)
☐ NO ☐ UNDETERMINED

PWS ID / FACILITY ID	1190015 S03	UNIQUE WELL NO.	212650

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

PWS ID / FACILITY ID	1190015 S03	UNIQUE WELL NO.	212650

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		Y	110	Y
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		Y	150	Y
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		Y	180	Y
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		Y	125	Y
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		N		
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	100	Y
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		

PWS ID / FACILITY ID	1190015 S03	UNIQUE WELL NO.	212650

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				
*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		Y	30	Y
*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.

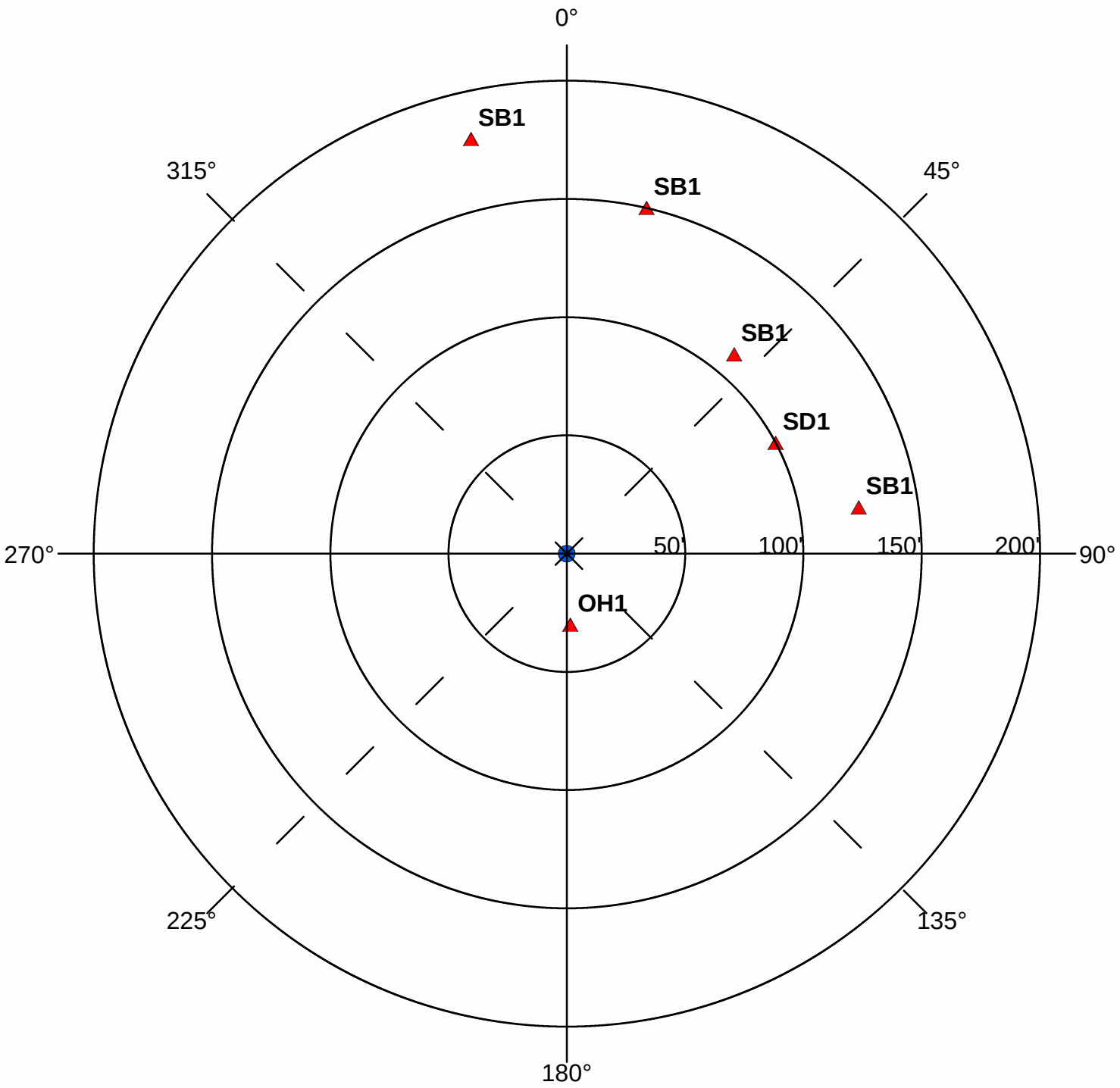
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1190015 S03	UNIQUE WELL NO.	212650

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

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



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

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

INSPECTOR	Hoerr, Robyn	DATE	7 - 30 - 2012

PWS ID / FACILITY ID	1190015 S03	UNIQUE WELL NO.	212650

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.		07/30/2012
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.		07/30/2012
The stormwater pipe should be managed to insure optimal performance. Information on stormwater management can be found on the Minnesota Pollution Control Agency website.		07/30/2012

COMMENTS

There is a floor drain inside the well house for clear water drainage that drains directly into the stormwater ditch to the south of the 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

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	1190015	**COMMUNITY**
NAME	Lakeville	
ADDRESS	Lakeville Water Superintendent, 20195 Holyoke Avenue West, Lakeville, MN 55044	

FACILITY (WELL) INFORMATION

NAME	Well #6	**IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?**
FACILITY ID	S04	☐ **YES** (Please attach a copy)
UNIQUE WELL NO.	161409	☐ **NO** ☐ **UNDETERMINED**
COUNTY	Dakota	

PWS ID / FACILITY ID	1190015 S04	**UNIQUE WELL NO.**	161409

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

PWS ID / FACILITY ID	1190015 S04	UNIQUE WELL NO.	161409

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		N		
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		N		
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		N		
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		N		
Wells and Borings							
*EB1	Elevator boring, not conforming to rule	50	50		N		
*EB2	Elevator boring, conforming to rule	20	20		N		
MON	Monitoring well	record dist.	record dist.		N		
WEL	Operating well	record dist.	record dist.		N		
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		Y	40	Y
*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	1190015 S04	UNIQUE WELL NO.	161409

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

* New potential contaminant source.

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

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

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

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

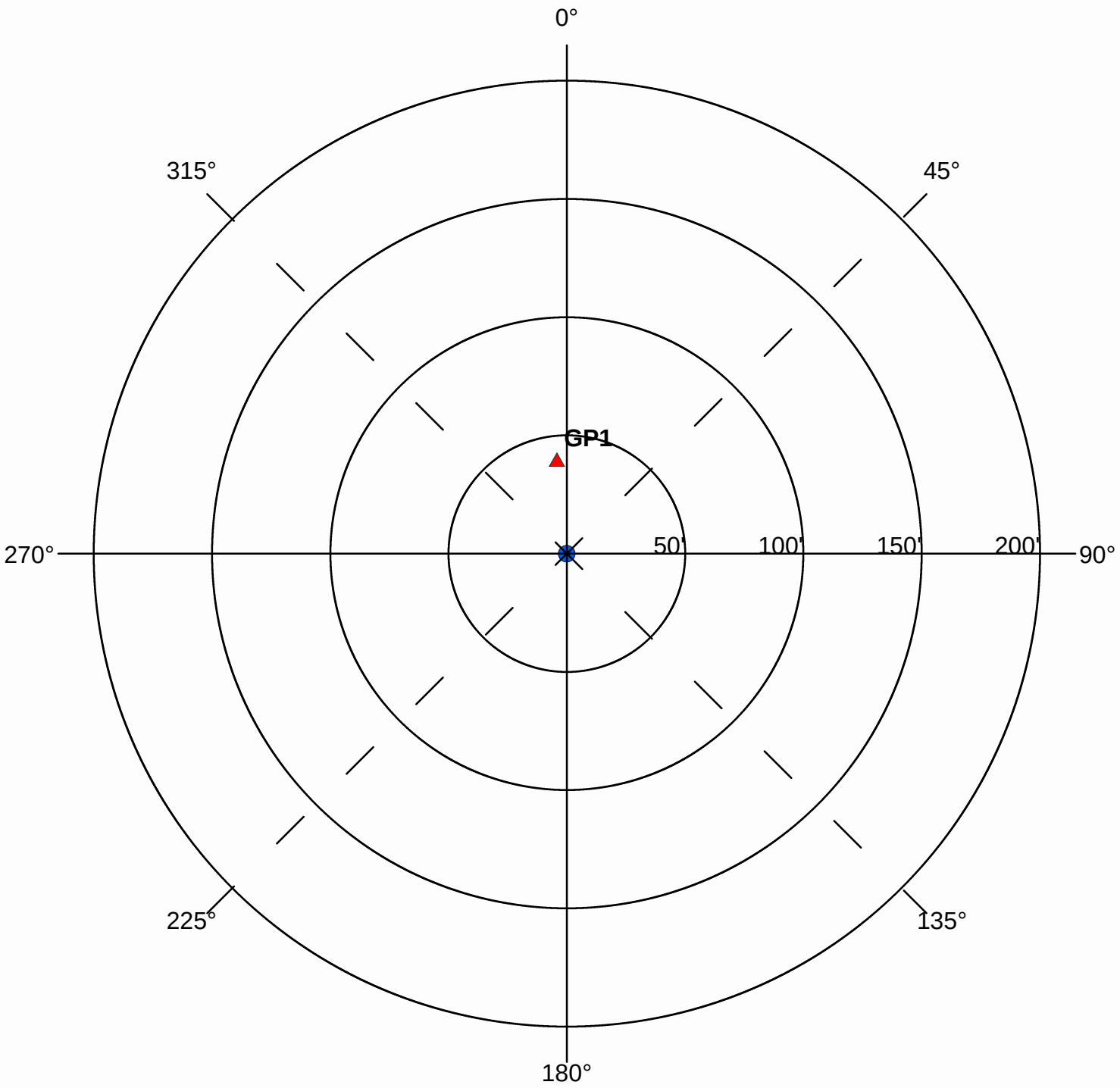
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls;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

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

PWS ID / FACILITY ID	1190015 S04	UNIQUE WELL NO.	161409

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

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



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

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

INSPECTOR	Hoerr, Robyn	DATE	7 - 30 - 2012

PWS ID / FACILITY ID	1190015 S04	UNIQUE WELL NO.	161409

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED
Floor drains, such as in pumphouses, that discharge to a gravel pocket or seepage pit should have a "No Dumping" sign posted.		07/30/2012

COMMENTS

9/7/2003 - Location for PCSI Type GPR (bearing = 0, distance = 0 , inventory date: 7/21/1998) could not be determined.

For further information, please contact:

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

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

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

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

PUBLIC WATER SYSTEM INFORMATION

PWS ID 1190015 **COMMUNITY**
NAME Lakeville
ADDRESS Lakeville Water Superintendent, 20195 Holyoke Avenue West, Lakeville, MN 55044

FACILITY (WELL) INFORMATION

NAME Well #7
FACILITY ID S05
UNIQUE WELL NO. 161439
COUNTY Dakota

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?
☐ YES (Please attach a copy)
☐ NO ☐ UNDETERMINED

PWS ID / FACILITY ID	1190015 S05	UNIQUE WELL NO.	161439

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

PWS ID / FACILITY ID	1190015 S05	UNIQUE WELL NO.	161439

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		N		
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	145	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		Y	60	Y
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	175	Y
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		N		
Wells and Borings							
*EB1	Elevator boring, not conforming to rule	50	50		N		
*EB2	Elevator boring, conforming to rule	20	20		N		
MON	Monitoring well	record dist.	record dist.		N		
WEL	Operating well	record dist.	record dist.		N		
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		Y	38	N
*HS1	Hazardous substance buried piping	50	50		N		
HS2	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight, without safeguards	150	150		N		
HS3	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight with safeguards	100	100		N		
HS4	Hazardous substance multiple storage tanks or containers for residential retail sale or use, no single tank or container exceeding 56 gal. or 100 lbs., but aggregate volume exceeding	50	50		N		
HWF	Highest water or flood level	50	N/A		N		
*HG1	Horizontal ground source closed loop heat exchanger buried piping	50	50		N		
*HG2	Horizontal ground source closed loop heat exchanger buried piping and horizontal piping, approved materials and heat transfer fluid	50	10		N		
IWD	Industrial waste disposal well (Class V well)[2]	illegal[3]	illegal[3]		N		
IWS	Interceptor, including a flammable waste or sediment	50	50		N		

PWS ID / FACILITY ID	1190015 S05	UNIQUE WELL NO.	161439

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
OH1	Ordinary high water level of a stream, river, pond, lake, reservoir, or drainage ditch (holds water six months or more)	50	35		Y	80	Y
*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.

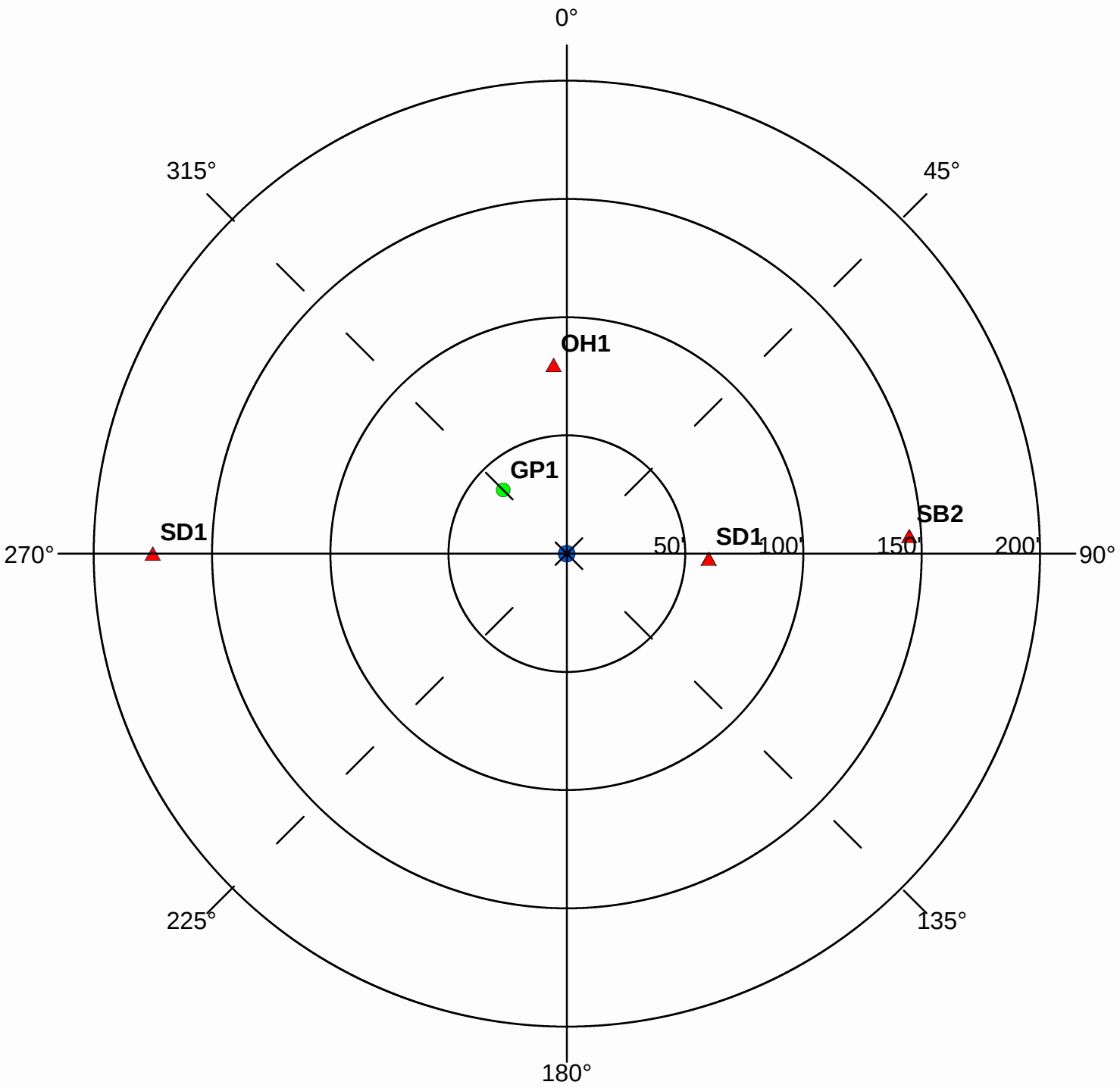
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1190015 S05	UNIQUE WELL NO.	161439

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

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



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

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

INSPECTOR	Hoerr, Robyn	DATE	7 - 30 - 2012

PWS ID / FACILITY ID	1190015 S05	UNIQUE WELL NO.	161439

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.		07/30/2012
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.		07/30/2012
Floor drains, such as in pumphouses, that discharge to a gravel pocket or seepage pit should have a "No Dumping" sign posted.		07/30/2012
The stormwater pipe should be managed to insure optimal performance. Information on stormwater management can be found on the Minnesota Pollution Control Agency website.		07/30/2012

COMMENTS

For further information, please contact:

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

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

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

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

PUBLIC WATER SYSTEM INFORMATION

PWS ID	1190015	**COMMUNITY**
NAME	Lakeville	
ADDRESS	Lakeville Water Superintendent, 20195 Holyoke Avenue West, Lakeville, MN 55044	

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.	433296	☐ **NO** ☐ **UNDETERMINED**
COUNTY	Dakota	

PWS ID / FACILITY ID	1190015 S06	**UNIQUE WELL NO.**	433296

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

PWS ID / FACILITY ID	1190015 S06	UNIQUE WELL NO.	433296

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		N		
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		N		
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	90	Y
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		N		
Wells and Borings							
*EB1	Elevator boring, not conforming to rule	50	50		N		
*EB2	Elevator boring, conforming to rule	20	20		N		
MON	Monitoring well	record dist.	record dist.		N		
WEL	Operating well	record dist.	record dist.		N		
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		Y	60	Y
*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	1190015 S06	UNIQUE WELL NO.	433296

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

* New potential contaminant source.

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

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

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

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

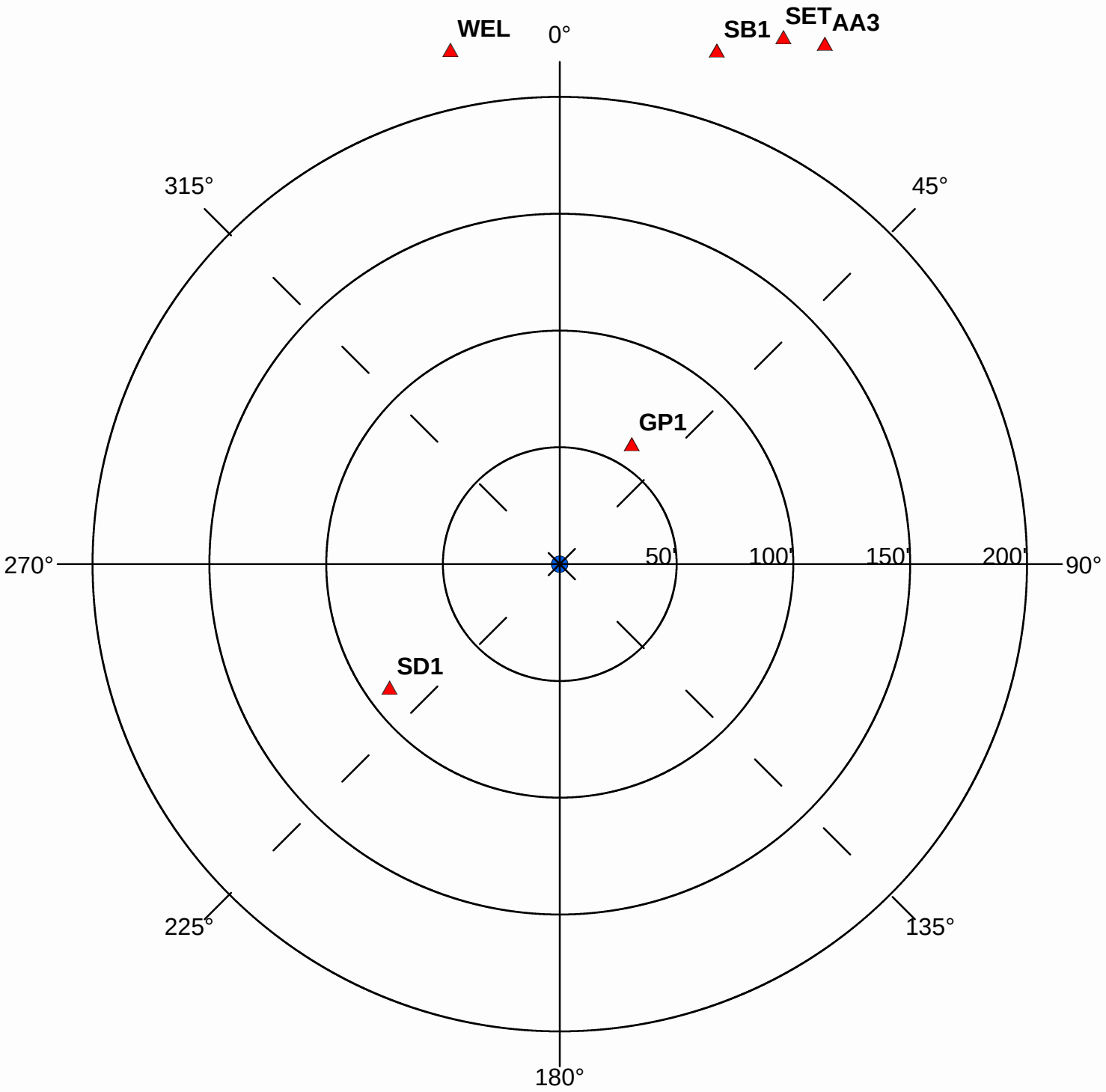
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls;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

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

PWS ID / FACILITY ID	1190015 S06	UNIQUE WELL NO.	433296

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

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



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

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

INSPECTOR	Hoerr, Robyn	DATE	7 - 30 - 2012

PWS ID / FACILITY ID	1190015 S06	UNIQUE WELL NO.	433296

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED
Floor drains, such as in pumphouses, that discharge to a gravel pocket or seepage pit should have a "No Dumping" sign posted.		07/30/2012
The stormwater pipe should be managed to insure optimal performance. Information on stormwater management can be found on the Minnesota Pollution Control Agency website.		07/30/2012

COMMENTS

For further information, please contact:

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

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

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

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

PUBLIC WATER SYSTEM INFORMATION

PWS ID	1190015	**COMMUNITY**
NAME	Lakeville	
ADDRESS	Lakeville Water Superintendent, 20195 Holyoke Avenue West, Lakeville, MN 55044	

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.	554192	☐ **NO** ☐ **UNDETERMINED**
COUNTY	Dakota	

PWS ID / FACILITY ID	1190015 S07	**UNIQUE WELL NO.**	554192

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

PWS ID / FACILITY ID	1190015 S07	UNIQUE WELL NO.	554192

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		Y	165	Y
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	195	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	1190015 S07	UNIQUE WELL NO.	554192

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

* New potential contaminant source.

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

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

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

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

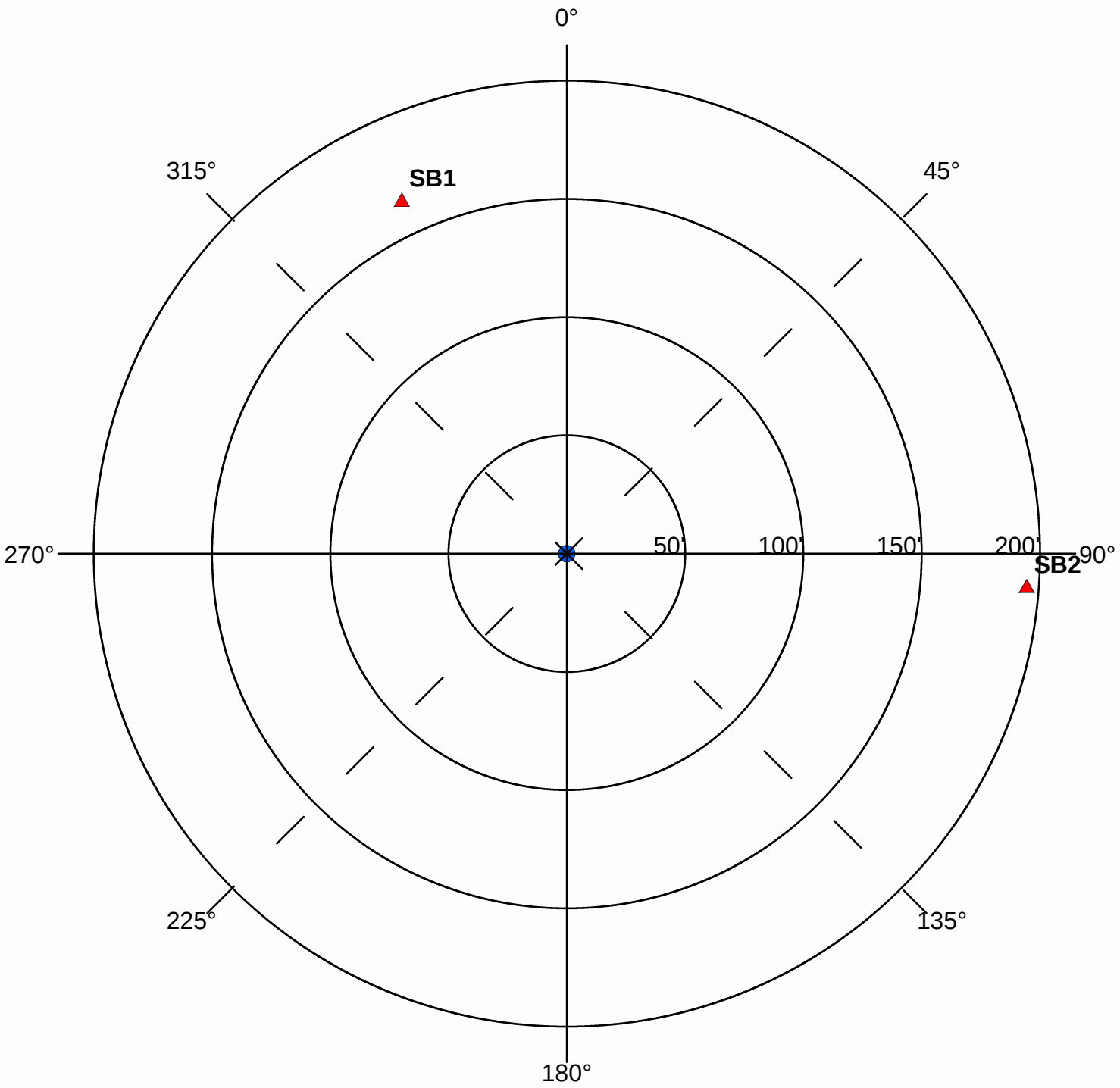
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls;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

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

PWS ID / FACILITY ID	1190015 S07	UNIQUE WELL NO.	554192

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

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



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

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

INSPECTOR	Hoerr, Robyn	DATE	7 - 30 - 2012

PWS ID / FACILITY ID	1190015 S07	UNIQUE WELL NO.	554192

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.		07/30/2012

COMMENTS

For further information, please contact:

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

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

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

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

PUBLIC WATER SYSTEM INFORMATION

PWS ID 1190015 **COMMUNITY**
NAME Lakeville
ADDRESS Lakeville Water Superintendent, 20195 Holyoke Avenue West, Lakeville, MN 55044

FACILITY (WELL) INFORMATION

NAME Well #10
FACILITY ID S08
UNIQUE WELL NO. 554193
COUNTY Dakota

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?
☐ YES (Please attach a copy)
☐ NO ☐ UNDETERMINED

PWS ID / FACILITY ID	1190015 S08	UNIQUE WELL NO.	554193

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

PWS ID / FACILITY ID	1190015 S08	UNIQUE WELL NO.	554193

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		N		
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		N		
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	50	Y
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	75	Y
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	189	Y**
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	101	
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		Y	55	N
*HS1	Hazardous substance buried piping	50	50		N		
HS2	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight, without safeguards	150	150		N		
HS3	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight with safeguards	100	100		N		
HS4	Hazardous substance multiple storage tanks or containers for residential retail sale or use, no single tank or container exceeding 56 gal. or 100 lbs., but aggregate volume exceeding	50	50		N		
HWF	Highest water or flood level	50	N/A		N		
*HG1	Horizontal ground source closed loop heat exchanger buried piping	50	50		N		
*HG2	Horizontal ground source closed loop heat exchanger buried piping and horizontal piping, approved materials and heat transfer fluid	50	10		N		
IWD	Industrial waste disposal well (Class V well)[2]	illegal[3]	illegal[3]		N		
IWS	Interceptor, including a flammable waste or sediment	50	50		N		

PWS ID / FACILITY ID	1190015 S08	UNIQUE WELL NO.	554193

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
OH1	Ordinary high water level of a stream, river, pond, lake, reservoir, or drainage ditch (holds water six months or more)	50	35		N		
*PP1	Petroleum buried piping	50	50		N		
*PP2	Petroleum or crude oil pipeline to a refinery or distribution center	100	100		N		
PT1	Petroleum tank or container, 1100 gal. or more, without safeguards	150	150		N		
PT2	Petroleum tank or container, 1100 gal. or more, with safeguards	100	100		N		
PT3	Petroleum tank or container, buried, between 56 and 1100 gal.	50	50		N		
PT4	Petroleum tank or container, not buried, between 56 and 1100 gal.	50[5]	20		N		
PU1	Pit or unfilled space more than four feet in depth	20	20		N		
PC1	Pollutant or contaminant that may drain into the soil	50	50	100	N		
SP1	Swimming pool, in-ground	20	20		N		
*VH1	Vertical heat exchanger, horizontal piping conforming to rule	50	10		N		
*VH2	Vertical heat exchanger (vertical) piping, conforming to rule	50	35		N		
*WR1	Wastewater rapid infiltration basin, municipal or industrial	300	300	600	N		
*WA1	Wastewater spray irrigation area, municipal or industrial	150	150	300	N		
*WS1	Wastewater stabilization pond, industrial	150	150	300	N		
*WS2	Wastewater stabilization pond, municipal, 500 or more gal./acre/day of leakage	300	300	600	N		
*WS3	Wastewater stabilization pond, municipal, less than 500 gal./acre/day of leakage	150	150	300	N		
*WT1	Wastewater treatment unit tanks, vessels and components (Package plant)	100	100		N		
*WT2	Water treatment backwash disposal area	50	50	100	N		
Additional Sources (If there is more than one source listed above, please indicate here).							
Potential Contamination Sources and Codes Based on Previous Versions of this Form							
	none found within 200' of this well.						

* New potential contaminant source.

** 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.

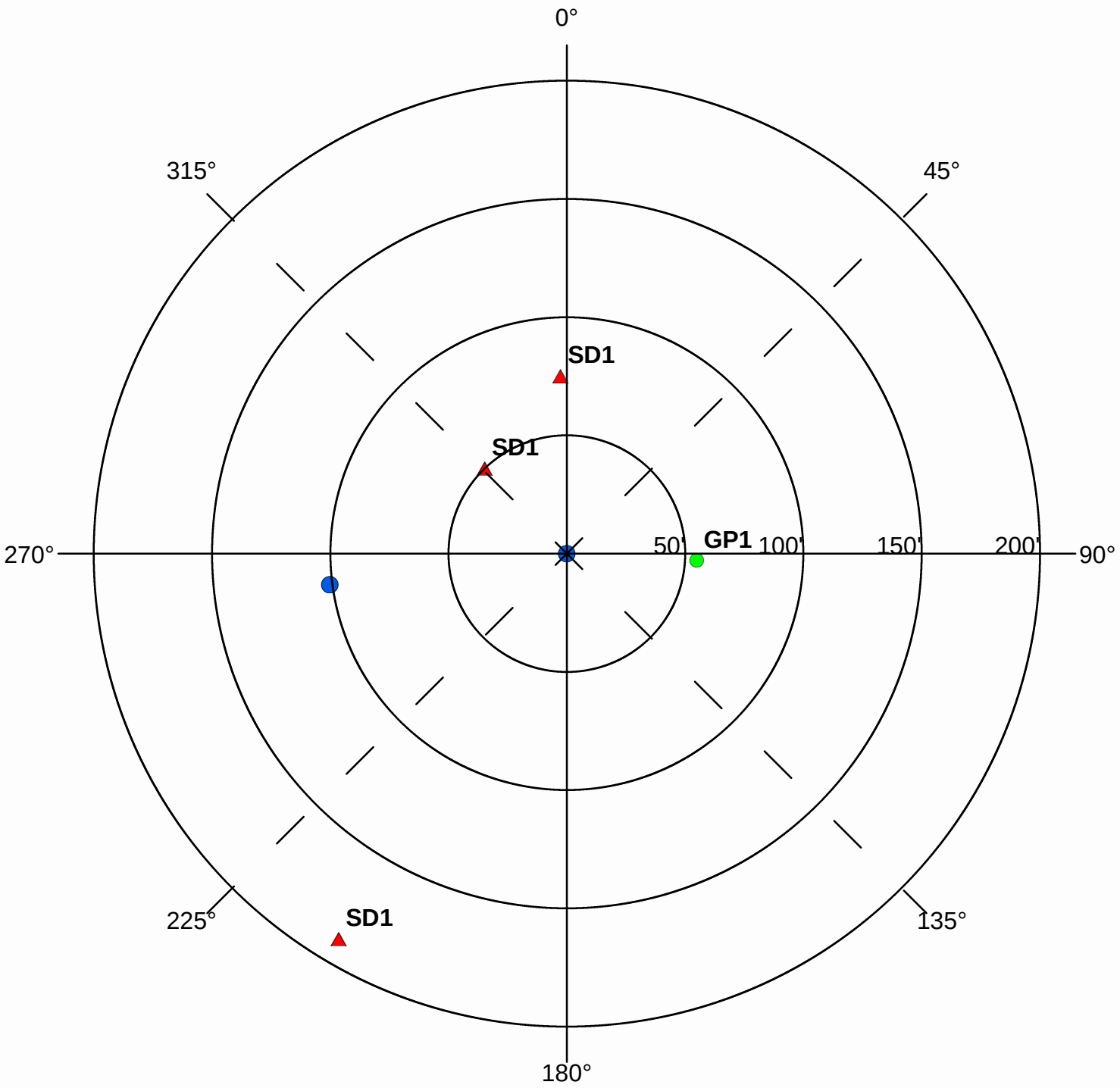
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1190015 S08	UNIQUE WELL NO.	554193

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

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



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

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

INSPECTOR	Hoerr, Robyn	DATE	7 - 30 - 2012

PWS ID / FACILITY ID	1190015 S08	UNIQUE WELL NO.	554193

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED
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.		07/31/2012
Floor drains, such as in pumphouses, that discharge to a gravel pocket or seepage pit should have a "No Dumping" sign posted.		07/30/2012

COMMENTS

For further information, please contact:

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

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

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

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

PUBLIC WATER SYSTEM INFORMATION

PWS ID 1190015 **COMMUNITY**
NAME Lakeville
ADDRESS Lakeville Water Superintendent, 20195 Holyoke Avenue West, Lakeville, MN 55044

FACILITY (WELL) INFORMATION

NAME Well #11
FACILITY ID S09
UNIQUE WELL NO. 554215
COUNTY Dakota

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?
☐ YES (Please attach a copy)
☐ NO ☐ UNDETERMINED

PWS ID / FACILITY ID	1190015 S09	UNIQUE WELL NO.	554215

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

PWS ID / FACILITY ID	1190015 S09	UNIQUE WELL NO.	554215

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		N		
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		N		
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		N		
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		N		
Wells and Borings							
*EB1	Elevator boring, not conforming to rule	50	50		N		
*EB2	Elevator boring, conforming to rule	20	20		N		
MON	Monitoring well	record dist.	record dist.		N		
WEL	Operating well	record dist.	record dist.		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	1190015 S09	UNIQUE WELL NO.	554215

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

* New potential contaminant source.

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

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

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

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

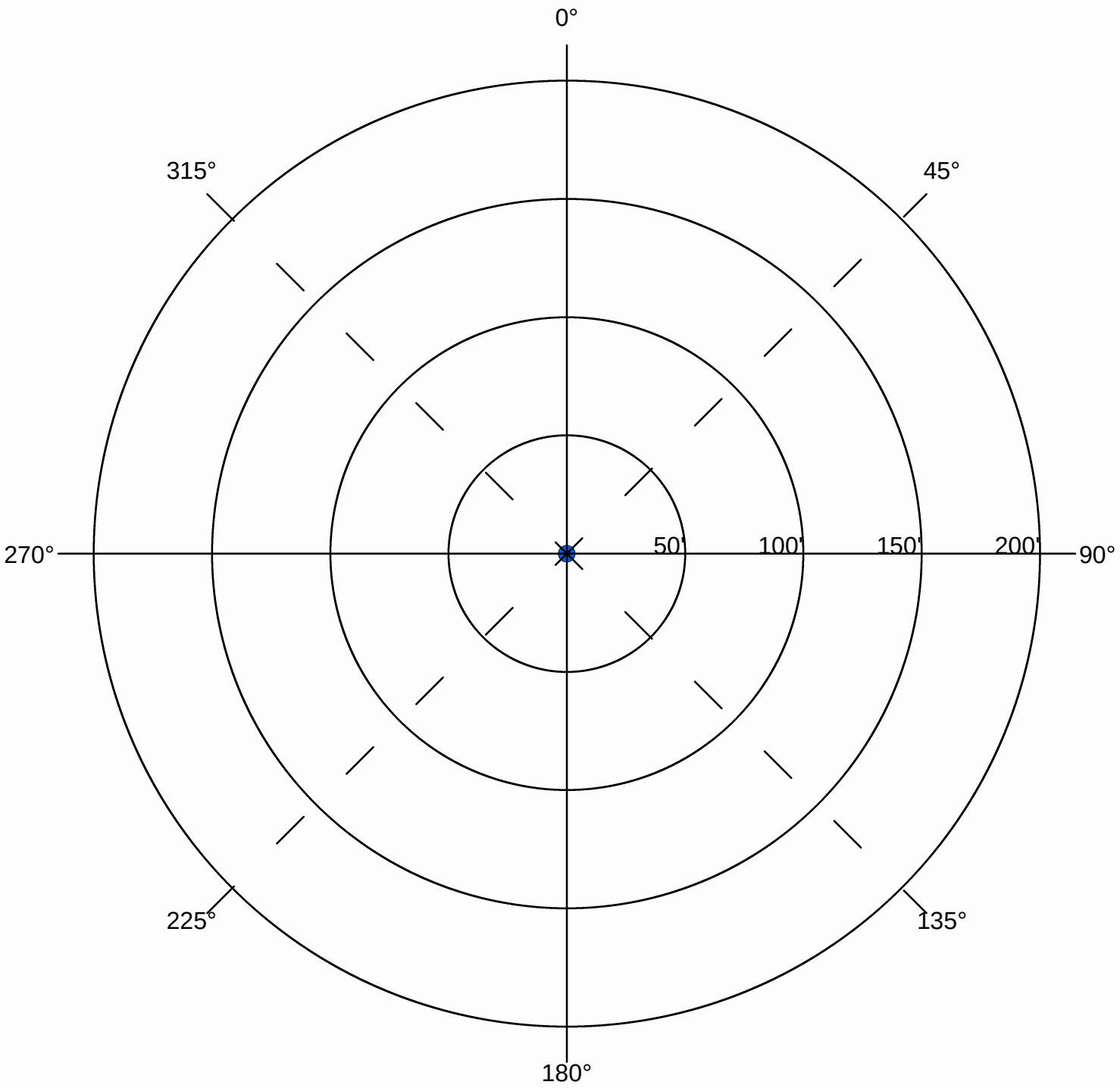
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls;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

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

PWS ID / FACILITY ID	1190015 S09	UNIQUE WELL NO.	554215

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

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



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

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

INSPECTOR	Hoerr, Robyn	DATE	7 - 30 - 2012

PWS ID / FACILITY ID	1190015 S09	UNIQUE WELL NO.	554215

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

COMMENTS

For further information, please contact:

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

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

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

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

PUBLIC WATER SYSTEM INFORMATION

PWS ID	1190015	**COMMUNITY**
NAME	Lakeville	
ADDRESS	Lakeville Water Superintendent, 20195 Holyoke Avenue West, Lakeville, MN 55044	

FACILITY (WELL) INFORMATION

NAME	Well #12	**IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?**
FACILITY ID	S10	☐ **YES** (Please attach a copy)
UNIQUE WELL NO.	562991	☐ **NO** ☐ **UNDETERMINED**
COUNTY	Dakota	

PWS ID / FACILITY ID	1190015 S10	**UNIQUE WELL NO.**	562991

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

PWS ID / FACILITY ID	1190015 S10	UNIQUE WELL NO.	562991

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		N		
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		N		
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		N		
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		N		
Wells and Borings							
*EB1	Elevator boring, not conforming to rule	50	50		N		
*EB2	Elevator boring, conforming to rule	20	20		N		
MON	Monitoring well	record dist.	record dist.		N		
WEL	Operating well	record dist.	record dist.		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	1190015 S10	UNIQUE WELL NO.	562991

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
*PP1	Petroleum buried piping	50	50		N		
*PP2	Petroleum or crude oil pipeline to a refinery or distribution center	100	100		N		
PT1	Petroleum tank or container, 1100 gal. or more, without safeguards	150	150		N		
PT2	Petroleum tank or container, 1100 gal. or more, with safeguards	100	100		N		
PT3	Petroleum tank or container, buried, between 56 and 1100 gal.	50	50		N		
PT4	Petroleum tank or container, not buried, between 56 and 1100 gal.	50[5]	20		N		
PU1	Pit or unfilled space more than four feet in depth	20	20		N		
PC1	Pollutant or contaminant that may drain into the soil	50	50	100	Y	110	Y
PC1	Pollutant or contaminant that may drain into the soil	50	50	100	Y	110	Y
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.

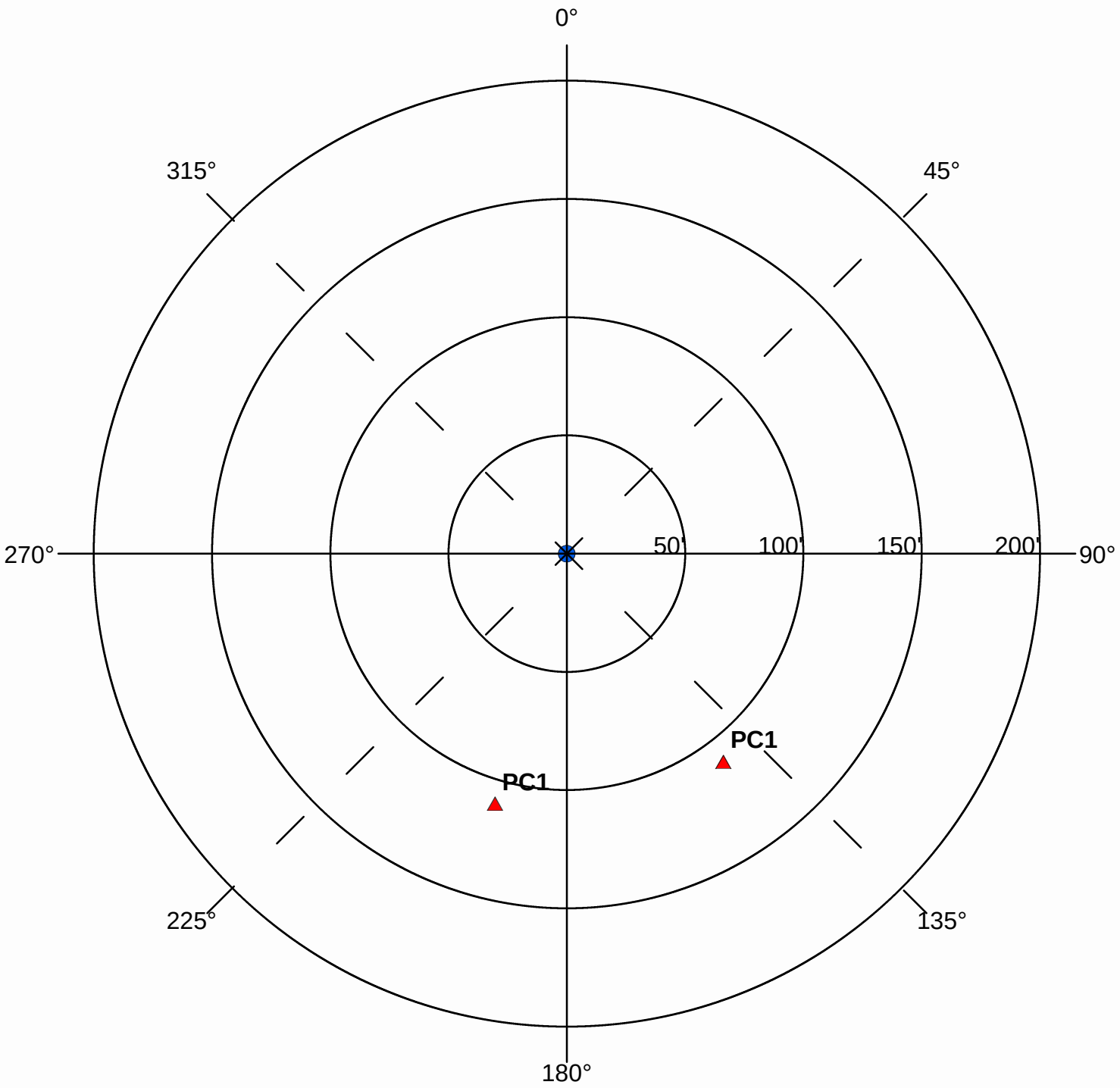
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1190015 S10	UNIQUE WELL NO.	562991

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

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



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

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

INSPECTOR	Hoerr, Robyn	DATE	7 - 30 - 2012

PWS ID / FACILITY ID	1190015 S10	UNIQUE WELL NO.	562991

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED
Others within 200 feet of the well could be encouraged to properly handle, store, and dispose of agricultural chemicals. Information is available from the Minnesota Department of Agriculture (www.mda.state.mn.us/appd/waterprotect.htm or 1-800-967-2474).		07/30/2012

COMMENTS

For further information, please contact:

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

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

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

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

PUBLIC WATER SYSTEM INFORMATION

PWS ID	1190015	**COMMUNITY**
NAME	Lakeville	
ADDRESS	Lakeville Water Superintendent, 20195 Holyoke Avenue West, Lakeville, MN 55044	

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.	596650	☐ **NO** ☐ **UNDETERMINED**
COUNTY	Dakota	

PWS ID / FACILITY ID	1190015 S11	**UNIQUE WELL NO.**	596650

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

PWS ID / FACILITY ID	1190015 S11	UNIQUE WELL NO.	596650

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		N		
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		N		
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	190	Y
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	1190015 S11	UNIQUE WELL NO.	596650

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

* New potential contaminant source.

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

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

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

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

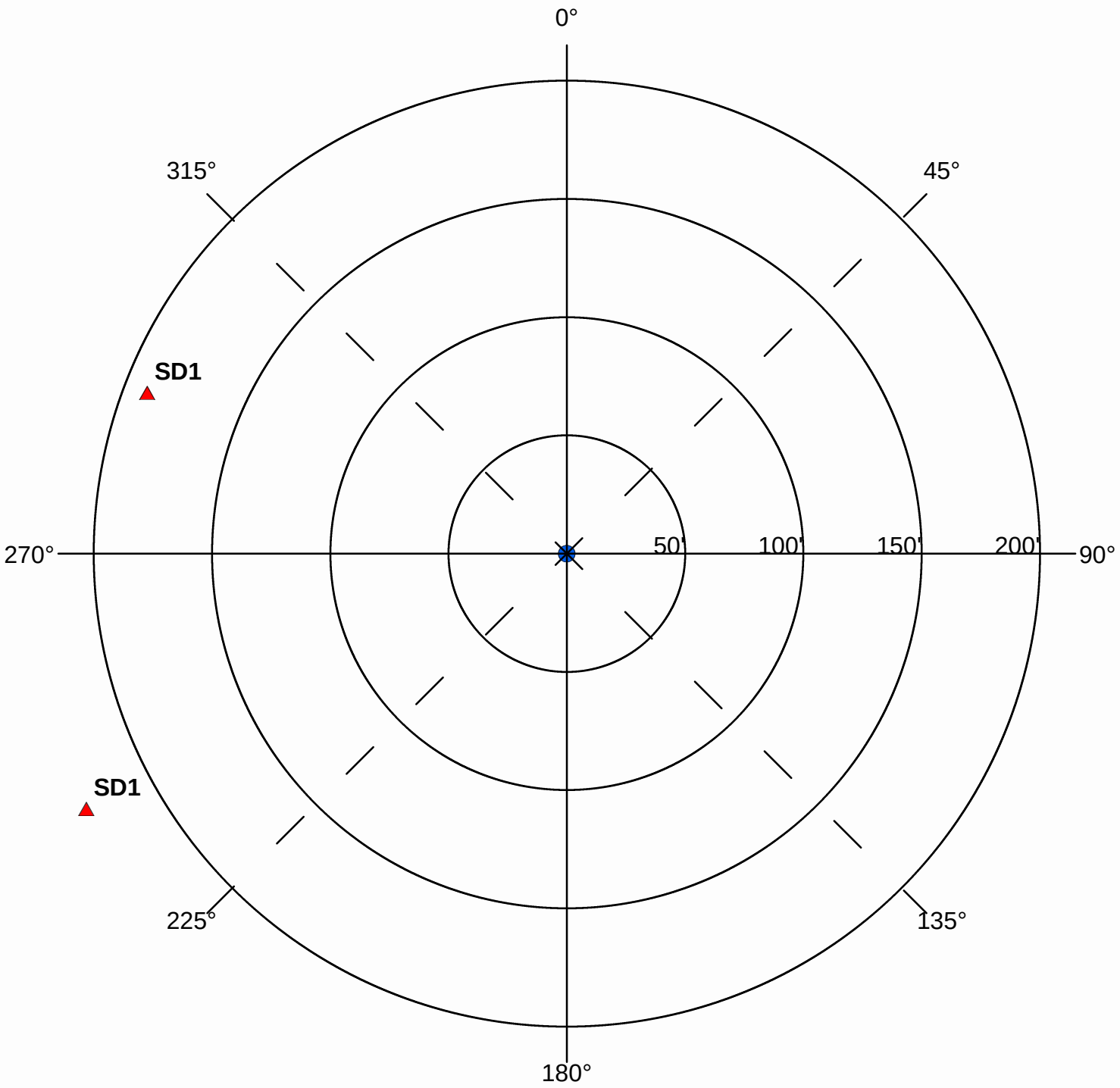
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls;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

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

PWS ID / FACILITY ID	1190015 S11	UNIQUE WELL NO.	596650

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

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



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

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

INSPECTOR	Hoerr, Robyn	DATE	7 - 30 - 2012

PWS ID / FACILITY ID	1190015 S11	UNIQUE WELL NO.	596650

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED
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.		07/30/2012

COMMENTS

For further information, please contact:

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

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

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

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

PUBLIC WATER SYSTEM INFORMATION

PWS ID 1190015 **COMMUNITY**
NAME Lakeville
ADDRESS Lakeville Water Superintendent, 20195 Holyoke Avenue West, Lakeville, MN 55044

FACILITY (WELL) INFORMATION

NAME Well #14
FACILITY ID S12
UNIQUE WELL NO. 603073
COUNTY Dakota

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?
☐ YES (Please attach a copy)
☐ NO ☐ UNDETERMINED

PWS ID / FACILITY ID	1190015 S12	UNIQUE WELL NO.	603073

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

PWS ID / FACILITY ID	1190015 S12	UNIQUE WELL NO.	603073

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		N		
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		N		
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		N		
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		N		
Wells and Borings							
*EB1	Elevator boring, not conforming to rule	50	50		N		
*EB2	Elevator boring, conforming to rule	20	20		N		
MON	Monitoring well	record dist.	record dist.		N		
WEL	Operating well	record dist.	record dist.		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	1190015 S12	UNIQUE WELL NO.	603073

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
*PP1	Petroleum buried piping	50	50		N		
*PP2	Petroleum or crude oil pipeline to a refinery or distribution center	100	100		N		
PT1	Petroleum tank or container, 1100 gal. or more, without safeguards	150	150		N		
PT2	Petroleum tank or container, 1100 gal. or more, with safeguards	100	100		N		
PT3	Petroleum tank or container, buried, between 56 and 1100 gal.	50	50		N		
PT4	Petroleum tank or container, not buried, between 56 and 1100 gal.	50[5]	20		N		
PU1	Pit or unfilled space more than four feet in depth	20	20		N		
PC1	Pollutant or contaminant that may drain into the soil	50	50	100	Y	65	N
PC1	Pollutant or contaminant that may drain into the soil	50	50	100	Y	59	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.

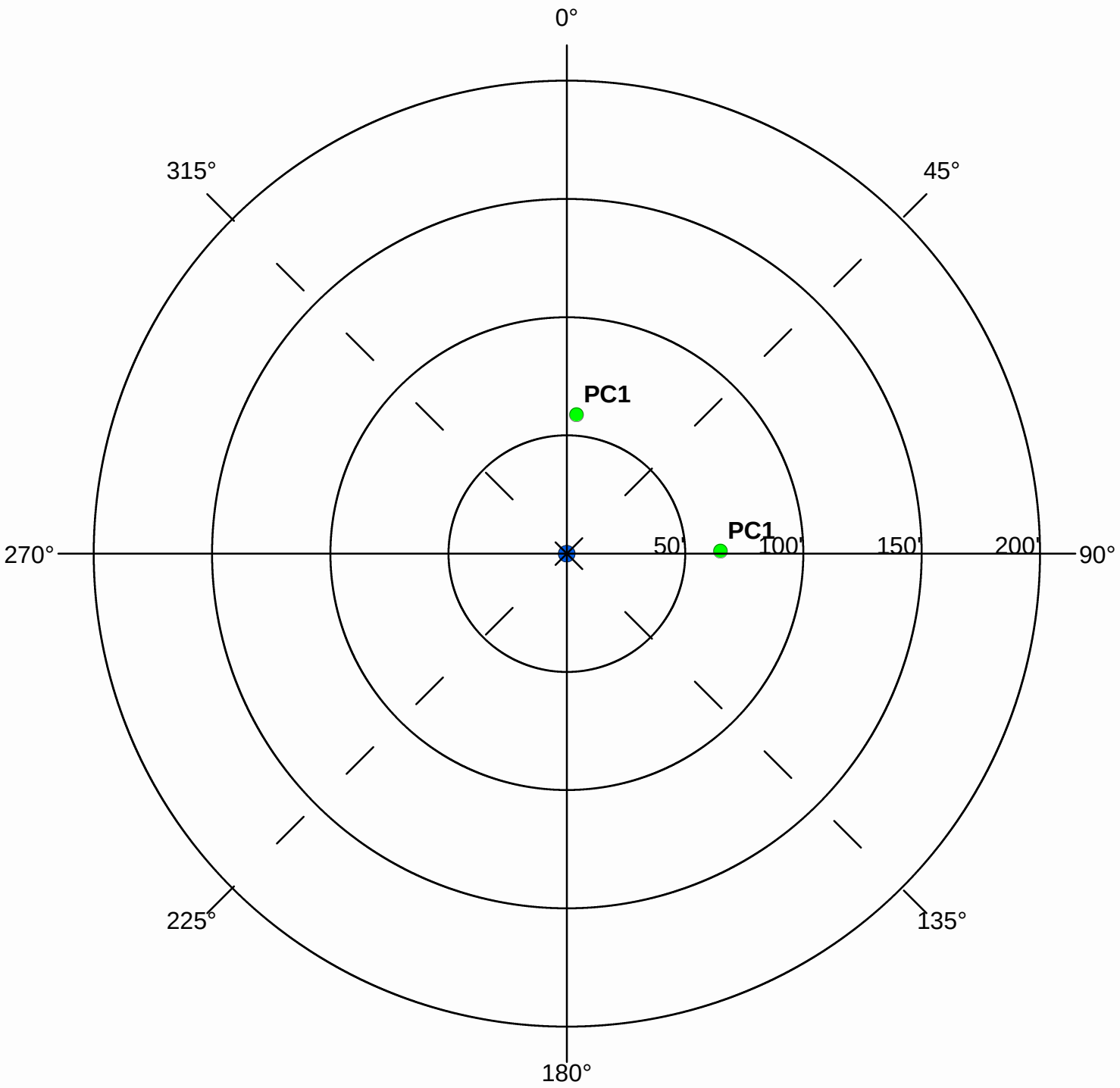
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1190015 S12	UNIQUE WELL NO.	603073

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

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



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

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

INSPECTOR	Hoerr, Robyn	DATE	7 - 30 - 2012

PWS ID / FACILITY ID	1190015 S12	UNIQUE WELL NO.	603073

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED
Others within 200 feet of the well could be encouraged to properly handle, store, and dispose of agricultural chemicals. Information is available from the Minnesota Department of Agriculture (www.mda.state.mn.us/appd/waterprotect.htm or 1-800-967-2474).		07/30/2012

COMMENTS

For further information, please contact:

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

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

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

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

PUBLIC WATER SYSTEM INFORMATION

PWS ID	1190015	**COMMUNITY**
NAME	Lakeville	
ADDRESS	Lakeville Water Superintendent, 20195 Holyoke Avenue West, Lakeville, MN 55044	

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.	651737	☐ **NO** ☐ **UNDETERMINED**
COUNTY	Dakota	

PWS ID / FACILITY ID	1190015 S13	**UNIQUE WELL NO.**	651737

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

PWS ID / FACILITY ID	1190015 S13	UNIQUE WELL NO.	651737

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		N		
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	100	Y
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	120	Y
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	160	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		Y	50	Y
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	135	Y
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	70	Y
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	165	Y
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		Y	90	Y
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		

PWS ID / FACILITY ID	1190015 S13	UNIQUE WELL NO.	651737

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				
*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							
	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.

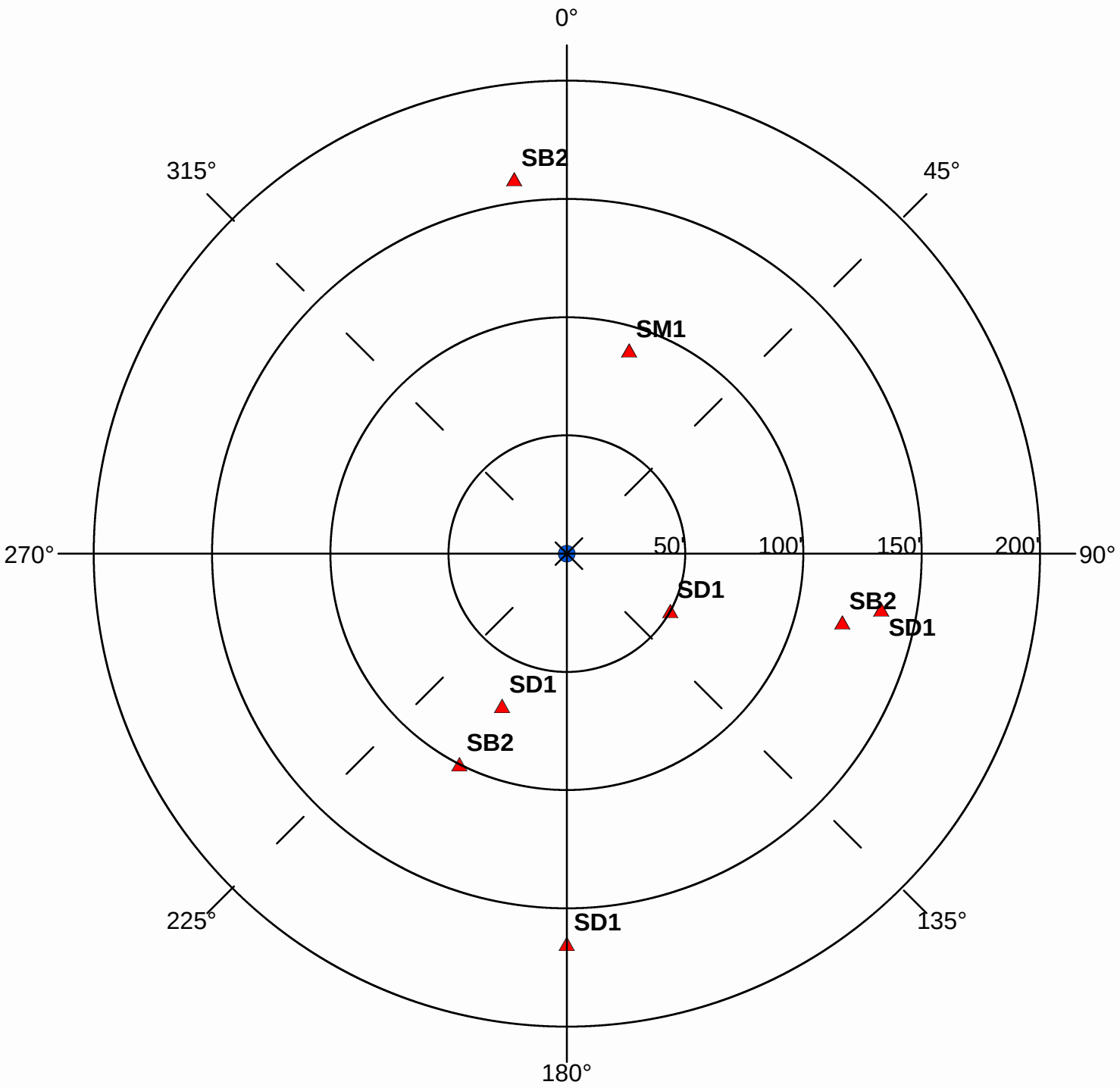
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1190015 S13	UNIQUE WELL NO.	651737

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

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



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

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

INSPECTOR	Hoerr, Robyn	DATE	7 - 30 - 2012

PWS ID / FACILITY ID	1190015 S13	UNIQUE WELL NO.	651737

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.		07/30/2012
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.		07/30/2012
The stormwater pipe should be managed to insure optimal performance. Information on stormwater management can be found on the Minnesota Pollution Control Agency website.		07/30/2012

COMMENTS

For further information, please contact:

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

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

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

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

PUBLIC WATER SYSTEM INFORMATION

PWS ID 1190015 **COMMUNITY**
NAME Lakeville
ADDRESS Lakeville Water Superintendent, 20195 Holyoke Avenue West, Lakeville, MN 55044

FACILITY (WELL) INFORMATION

NAME Well #16
FACILITY ID S14
UNIQUE WELL NO. 655907
COUNTY Dakota

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?
☐ YES (Please attach a copy)
☐ NO ☐ UNDETERMINED

PWS ID / FACILITY ID	1190015 S14	UNIQUE WELL NO.	655907

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

PWS ID / FACILITY ID	1190015 S14	UNIQUE WELL NO.	655907

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		Y	100	Y
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	100	Y
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	160	Y
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	75	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		Y	80	Y
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	80	Y
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	100	Y
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	60	Y
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		

PWS ID / FACILITY ID	1190015 S14	UNIQUE WELL NO.	655907

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				
*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							
	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.

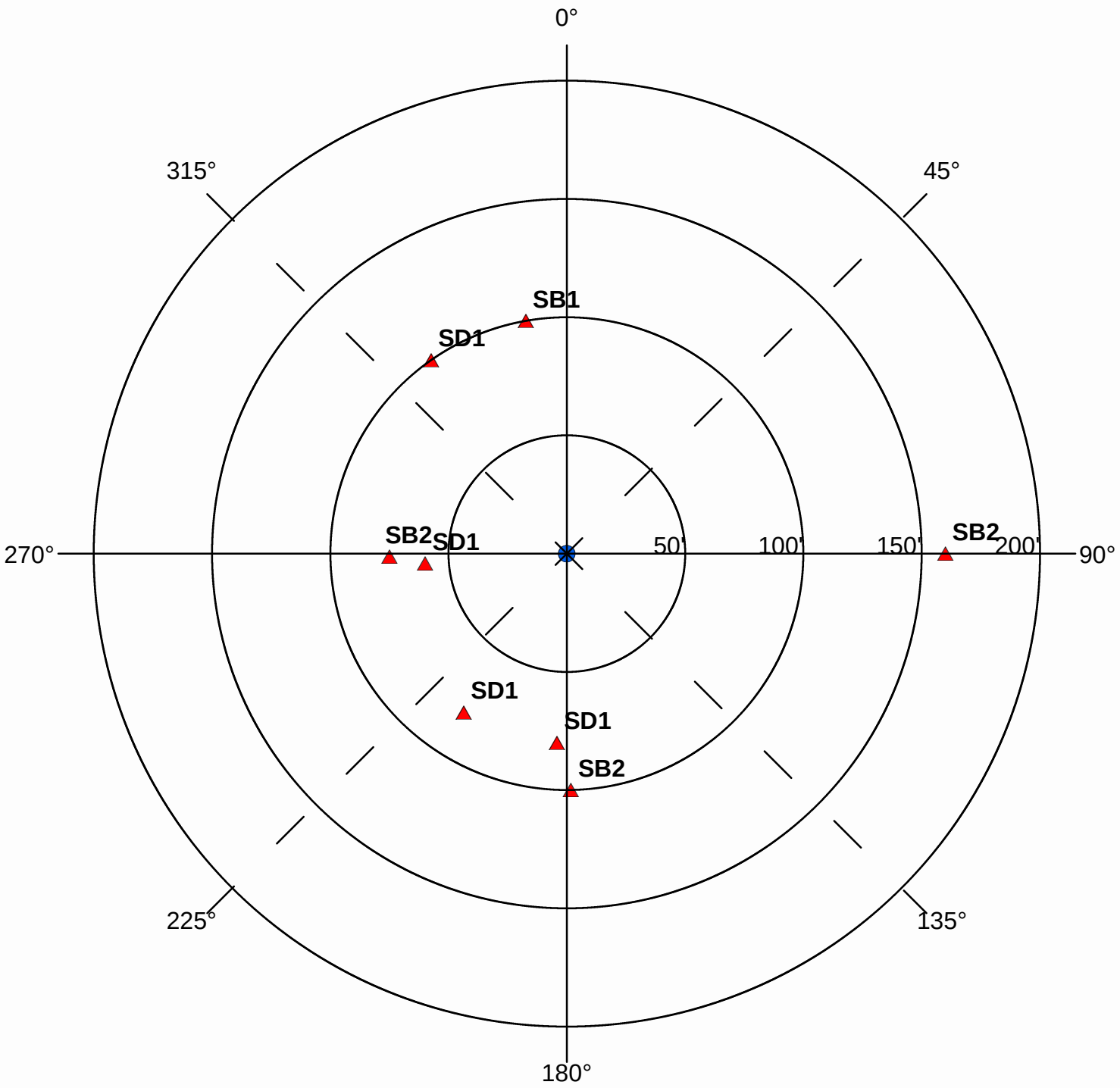
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1190015 S14	UNIQUE WELL NO.	655907

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

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



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

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

INSPECTOR	Hoerr, Robyn	DATE	7 - 30 - 2012

PWS ID / FACILITY ID	1190015 S14	UNIQUE WELL NO.	655907

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.		07/30/2012
The stormwater pipe should be managed to insure optimal performance. Information on stormwater management can be found on the Minnesota Pollution Control Agency website.		07/30/2012

COMMENTS

For further information, please contact:

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

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

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

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

PUBLIC WATER SYSTEM INFORMATION

PWS ID 1190015 **COMMUNITY**
NAME Lakeville
ADDRESS Lakeville Water Superintendent, 20195 Holyoke Avenue West, Lakeville, MN 55044

FACILITY (WELL) INFORMATION

NAME Well #17
FACILITY ID S15
UNIQUE WELL NO. 694913
COUNTY Dakota

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?
☐ YES (Please attach a copy)
☐ NO ☐ UNDETERMINED

PWS ID / FACILITY ID	1190015 S15	UNIQUE WELL NO.	694913

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

PWS ID / FACILITY ID	1190015 S15	UNIQUE WELL NO.	694913

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		N		
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		N		
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	160	Y
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	150	Y
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	190	Y
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		N		
Wells and Borings							
*EB1	Elevator boring, not conforming to rule	50	50		N		
*EB2	Elevator boring, conforming to rule	20	20		N		
MON	Monitoring well	record dist.	record dist.		N		
WEL	Operating well	record dist.	record dist.		N		
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		N		
*HS1	Hazardous substance buried piping	50	50		N		
HS2	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight, without safeguards	150	150		N		
HS3	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight with safeguards	100	100		N		
HS4	Hazardous substance multiple storage tanks or containers for residential retail sale or use, no single tank or container exceeding 56 gal. or 100 lbs., but aggregate volume exceeding	50	50		N		
HWF	Highest water or flood level	50	N/A		N		
*HG1	Horizontal ground source closed loop heat exchanger buried piping	50	50		N		
*HG2	Horizontal ground source closed loop heat exchanger buried piping and horizontal piping, approved materials and heat transfer fluid	50	10		N		
IWD	Industrial waste disposal well (Class V well)[2]	illegal[3]	illegal[3]		N		
IWS	Interceptor, including a flammable waste or sediment	50	50		N		

PWS ID / FACILITY ID	1190015 S15	UNIQUE WELL NO.	694913

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
OH1	Ordinary high water level of a stream, river, pond, lake, reservoir, or drainage ditch (holds water six months or more)	50	35		N		
*PP1	Petroleum buried piping	50	50		N		
*PP2	Petroleum or crude oil pipeline to a refinery or distribution center	100	100		N		
PT1	Petroleum tank or container, 1100 gal. or more, without safeguards	150	150		N		
PT2	Petroleum tank or container, 1100 gal. or more, with safeguards	100	100		N		
PT3	Petroleum tank or container, buried, between 56 and 1100 gal.	50	50		N		
PT4	Petroleum tank or container, not buried, between 56 and 1100 gal.	50[5]	20		N		
PU1	Pit or unfilled space more than four feet in depth	20	20		N		
PC1	Pollutant or contaminant that may drain into the soil	50	50	100	N		
SP1	Swimming pool, in-ground	20	20		N		
*VH1	Vertical heat exchanger, horizontal piping conforming to rule	50	10		N		
*VH2	Vertical heat exchanger (vertical) piping, conforming to rule	50	35		N		
*WR1	Wastewater rapid infiltration basin, municipal or industrial	300	300	600	N		
*WA1	Wastewater spray irrigation area, municipal or industrial	150	150	300	N		
*WS1	Wastewater stabilization pond, industrial	150	150	300	N		
*WS2	Wastewater stabilization pond, municipal, 500 or more gal./acre/day of leakage	300	300	600	N		
*WS3	Wastewater stabilization pond, municipal, less than 500 gal./acre/day of leakage	150	150	300	N		
*WT1	Wastewater treatment unit tanks, vessels and components (Package plant)	100	100		N		
*WT2	Water treatment backwash disposal area	50	50	100	N		
Additional Sources (If there is more than one source listed above, please indicate here).							
Potential Contamination Sources and Codes Based on Previous Versions of this Form							
	none found within 200' of this well.						

* New potential contaminant source.

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

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

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

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

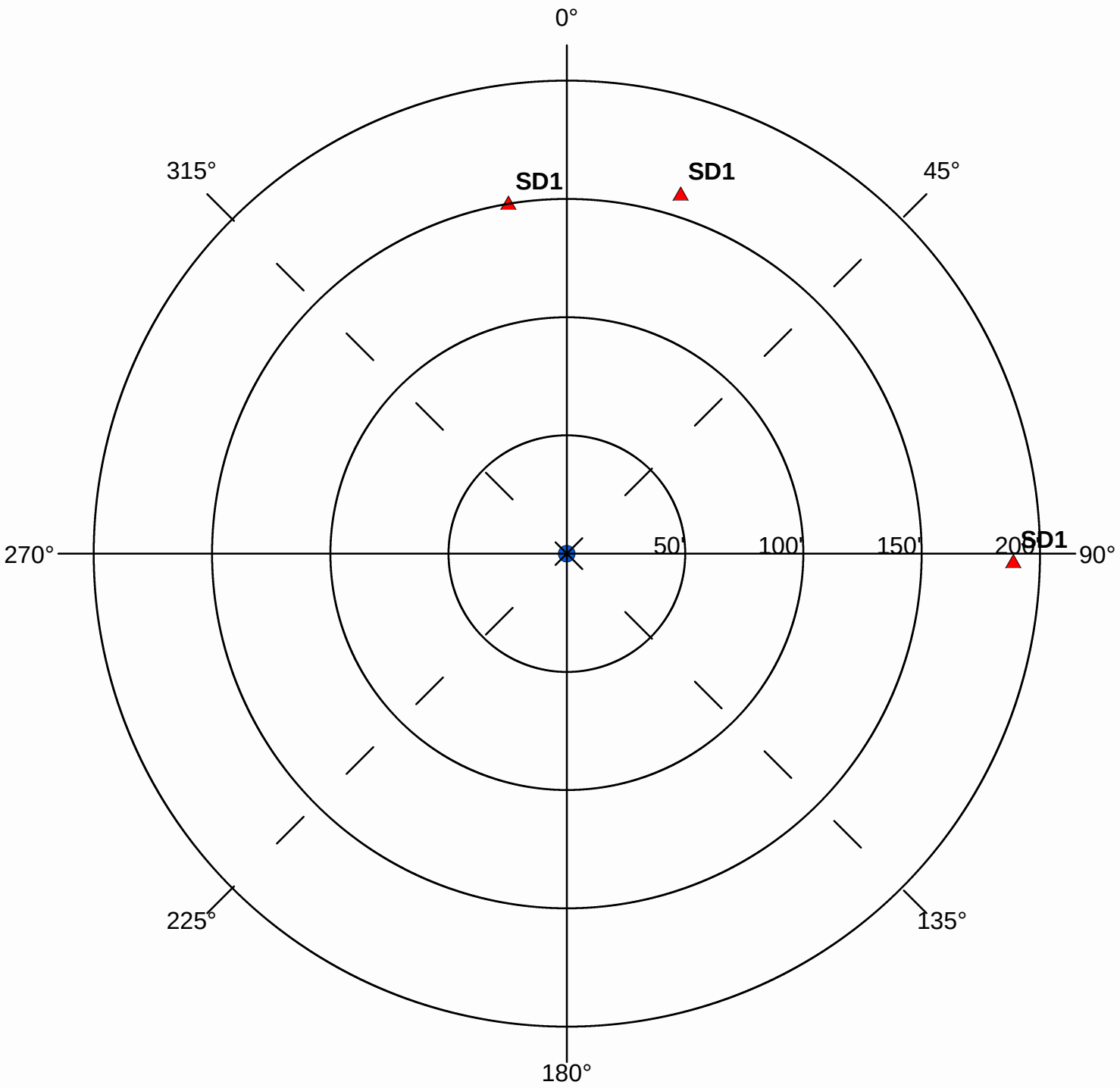
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls;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

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

PWS ID / FACILITY ID	1190015 S15	UNIQUE WELL NO.	694913

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

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



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

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

INSPECTOR	Hoerr, Robyn	DATE	7 - 30 - 2012

PWS ID / FACILITY ID	1190015 S15	UNIQUE WELL NO.	694913

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED
The stormwater pond/pipe (choose) should be managed to insure optimal performance. Information on stormwater management can be found on the Minnesota Pollution Control Agency website.		07/30/2012

COMMENTS

For further information, please contact:

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

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

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

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

PUBLIC WATER SYSTEM INFORMATION

PWS ID	1190015	**COMMUNITY**
NAME	Lakeville	
ADDRESS	Lakeville Water Superintendent, 20195 Holyoke Avenue West, Lakeville, MN 55044	

FACILITY (WELL) INFORMATION

NAME	Well #18	**IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?**
FACILITY ID	S16	☐ **YES** (Please attach a copy)
UNIQUE WELL NO.	745558	☐ **NO** ☐ **UNDETERMINED**
COUNTY	Dakota	

PWS ID / FACILITY ID	1190015 S16	**UNIQUE WELL NO.**	745558

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

PWS ID / FACILITY ID	1190015 S16	UNIQUE WELL NO.	745558

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		N		
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		N		
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	82	Y**
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	131	Y**
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	150	Y
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	101	
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		Y	155	N**
*HS1	Hazardous substance buried piping	50	50		N		
HS2	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight, without safeguards	150	150		N		
HS3	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight with safeguards	100	100		N		
HS4	Hazardous substance multiple storage tanks or containers for residential retail sale or use, no single tank or container exceeding 56 gal. or 100 lbs., but aggregate volume exceeding	50	50		N		
HWF	Highest water or flood level	50	N/A		N		
*HG1	Horizontal ground source closed loop heat exchanger buried piping	50	50		N		
*HG2	Horizontal ground source closed loop heat exchanger buried piping and horizontal piping, approved materials and heat transfer fluid	50	10		N		
IWD	Industrial waste disposal well (Class V well)[2]	illegal[3]	illegal[3]		N		
IWS	Interceptor, including a flammable waste or sediment	50	50		N		

PWS ID / FACILITY ID	1190015 S16	UNIQUE WELL NO.	745558

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
OH1	Ordinary high water level of a stream, river, pond, lake, reservoir, or drainage ditch (holds water six months or more)	50	35		N		
*PP1	Petroleum buried piping	50	50		N		
*PP2	Petroleum or crude oil pipeline to a refinery or distribution center	100	100		N		
PT1	Petroleum tank or container, 1100 gal. or more, without safeguards	150	150		N		
PT2	Petroleum tank or container, 1100 gal. or more, with safeguards	100	100		N		
PT3	Petroleum tank or container, buried, between 56 and 1100 gal.	50	50		N		
PT4	Petroleum tank or container, not buried, between 56 and 1100 gal.	50[5]	20		N		
PU1	Pit or unfilled space more than four feet in depth	20	20		N		
PC1	Pollutant or contaminant that may drain into the soil	50	50	100	N		
SP1	Swimming pool, in-ground	20	20		N		
*VH1	Vertical heat exchanger, horizontal piping conforming to rule	50	10		N		
*VH2	Vertical heat exchanger (vertical) piping, conforming to rule	50	35		N		
*WR1	Wastewater rapid infiltration basin, municipal or industrial	300	300	600	N		
*WA1	Wastewater spray irrigation area, municipal or industrial	150	150	300	N		
*WS1	Wastewater stabilization pond, industrial	150	150	300	N		
*WS2	Wastewater stabilization pond, municipal, 500 or more gal./acre/day of leakage	300	300	600	N		
*WS3	Wastewater stabilization pond, municipal, less than 500 gal./acre/day of leakage	150	150	300	N		
*WT1	Wastewater treatment unit tanks, vessels and components (Package plant)	100	100		N		
*WT2	Water treatment backwash disposal area	50	50	100	N		
Additional Sources (If there is more than one source listed above, please indicate here).							
Potential Contamination Sources and Codes Based on Previous Versions of this Form							
	none found within 200' of this well.						

* New potential contaminant source.

** 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.

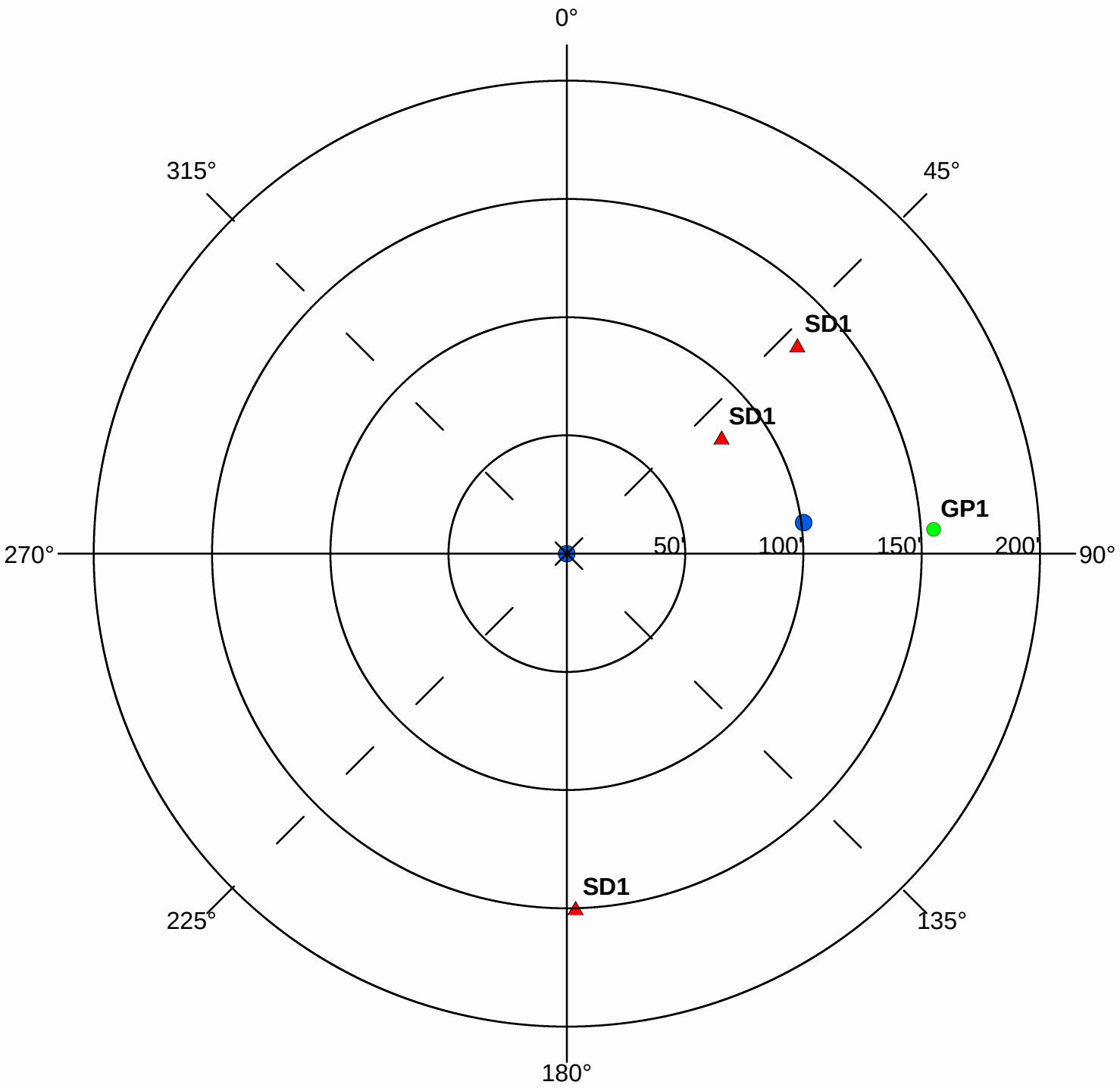
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1190015 S16	UNIQUE WELL NO.	745558

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

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



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

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

INSPECTOR	Hoerr, Robyn	DATE	7 - 30 - 2012

PWS ID / FACILITY ID	1190015 S16	UNIQUE WELL NO.	745558

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED
Floor drains, such as in pumphouses, that discharge to a gravel pocket or seepage pit should have a "No Dumping" sign posted.		07/30/2012
The stormwater pipe should be managed to insure optimal performance. Information on stormwater management can be found on the Minnesota Pollution Control Agency website.		07/30/2012

COMMENTS

For further information, please contact:

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

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

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

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

PUBLIC WATER SYSTEM INFORMATION

PWS ID	1190015	**COMMUNITY**
NAME	Lakeville	
ADDRESS	Lakeville Water Superintendent, 20195 Holyoke Avenue West, Lakeville, MN 55044	

FACILITY (WELL) INFORMATION

NAME	Well #19	**IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?**
FACILITY ID	S17	☐ **YES** (Please attach a copy)
UNIQUE WELL NO.	686288	☐ **NO** ☐ **UNDETERMINED**
COUNTY	Dakota	

PWS ID / FACILITY ID	1190015 S17	**UNIQUE WELL NO.**	686288

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		

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		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		Y	151	Y
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	85	Y
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	150	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		Y	130	Y
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		

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		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
OH1	Ordinary high water level of a stream, river, pond, lake, reservoir, or drainage ditch (holds water six months or more)	50	35		N		
*PP1	Petroleum buried piping	50	50		N		
*PP2	Petroleum or crude oil pipeline to a refinery or distribution center	100	100		N		
PT1	Petroleum tank or container, 1100 gal. or more, without safeguards	150	150		N		
PT2	Petroleum tank or container, 1100 gal. or more, with safeguards	100	100		N		
PT3	Petroleum tank or container, buried, between 56 and 1100 gal.	50	50		N		
PT4	Petroleum tank or container, not buried, between 56 and 1100 gal.	50[5]	20		N		
PU1	Pit or unfilled space more than four feet in depth	20	20		N		
PC1	Pollutant or contaminant that may drain into the soil	50	50	100	N		
SP1	Swimming pool, in-ground	20	20		N		
*VH1	Vertical heat exchanger, horizontal piping conforming to rule	50	10		N		
*VH2	Vertical heat exchanger (vertical) piping, conforming to rule	50	35		N		
*WR1	Wastewater rapid infiltration basin, municipal or industrial	300	300	600	N		
*WA1	Wastewater spray irrigation area, municipal or industrial	150	150	300	N		
*WS1	Wastewater stabilization pond, industrial	150	150	300	N		
*WS2	Wastewater stabilization pond, municipal, 500 or more gal./acre/day of leakage	300	300	600	N		
*WS3	Wastewater stabilization pond, municipal, less than 500 gal./acre/day of leakage	150	150	300	N		
*WT1	Wastewater treatment unit tanks, vessels and components (Package plant)	100	100		N		
*WT2	Water treatment backwash disposal area	50	50	100	N		
Additional Sources (If there is more than one source listed above, please indicate here).							
Potential Contamination Sources and Codes Based on Previous Versions of this Form							
	none found within 200' of this well.						

* New potential contaminant source.

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

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

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

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

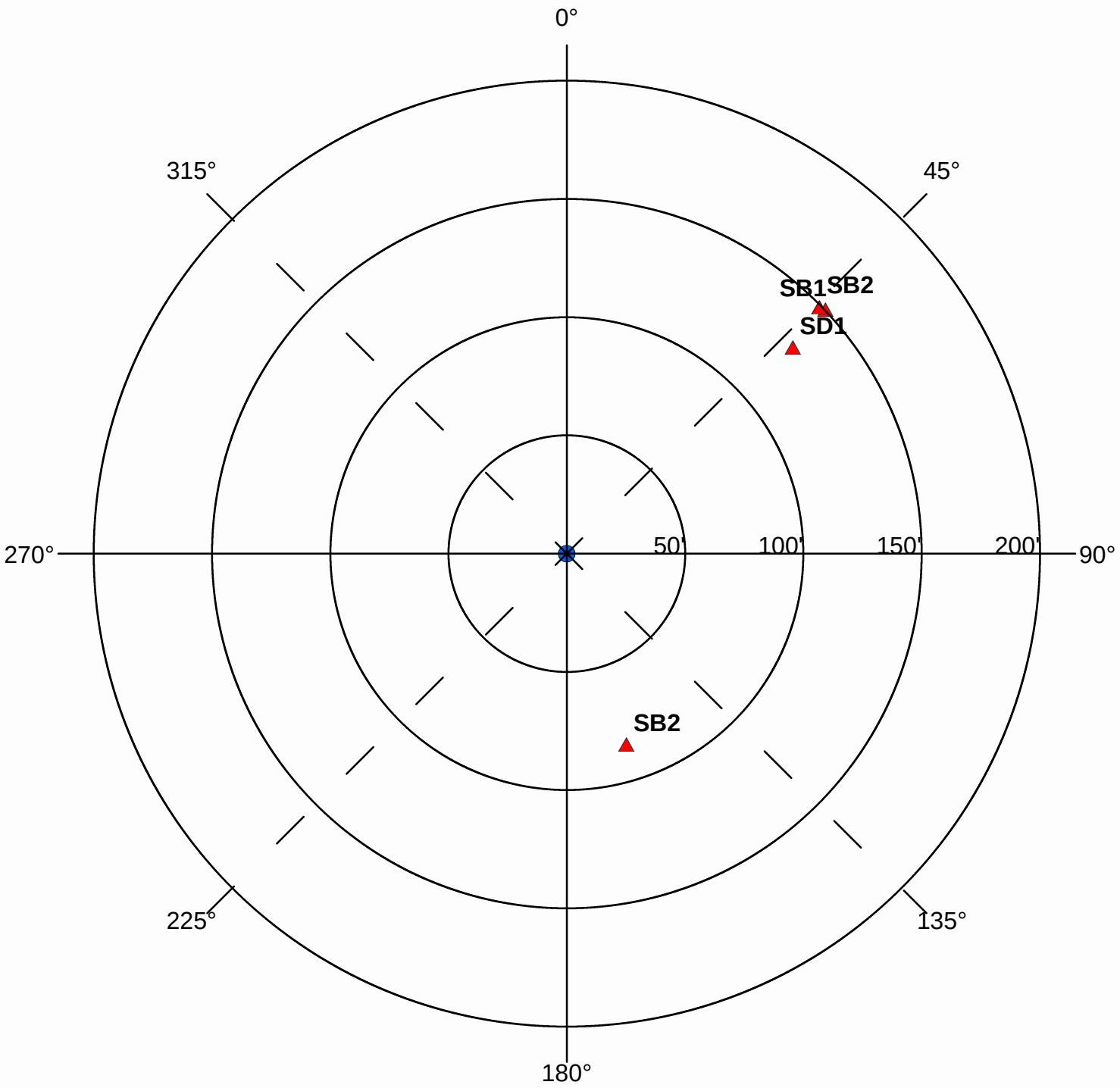
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls;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

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

PWS ID / FACILITY ID	1190015 S17	UNIQUE WELL NO.	686288

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

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



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

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

INSPECTOR	Hoerr, Robyn	DATE	7 - 30 - 2012

PWS ID / FACILITY ID	1190015 S17	UNIQUE WELL NO.	686288

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.		07/30/2012
The stormwater pipe should be managed to insure optimal performance. Information on stormwater management can be found on the Minnesota Pollution Control Agency website.		07/30/2012

COMMENTS

For further information, please contact:

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

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

Appendix D

Water Quality Information

Water Quality Report

Water conservation tips are available on the City website at www.lakevillemn.gov.

Annual report on drinking water quality for Lakeville

The City of Lakeville is issuing the results of monitoring done on its drinking water for the period from January 1 to December 31, 2011. The purpose of the report is to advance consumers' understanding of drinking water and heighten awareness of the need to protect precious water resources.

Sources of your drinking water

Lakeville provides drinking water to its residents from a groundwater source: 16 wells ranging from 460 to 864 feet deep, that draw water from the Prairie Du Chien/Jordan and the Franconia-Ironton-Galesville aquifers. Lakeville drinking water meets all drinking water standards, but the Minnesota Department of Health has also made a determination as to how vulnerable the source of water may be to future contamination. 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 online at *www.health.state.mn.us/divs/eh/water/swp/swa.* Call 952-985-2708 if you have questions about the City of Lakeville drinking water or would like information about opportunities for public participation in decisions that may affect the quality of water.

Results of monitoring

No substances were detected at levels that violated federal drinking water standards. However, some substances were detected in trace amounts that were below legal limits. The adjacent table shows the substances that were detected in trace amounts last year. (Some substances are sampled less frequently than once a year; as a result, not all substances were sampled in 2011. If any of these substances were detected the last time they were sampled for, they are included in the table along with the date the detection occurred.)

Key to abbreviations

MCLG - Maximum Contaminant Level Goal: The level of a substance 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 substance 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 substance 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.
pCi/l - PicoCuries per liter (a measure of radioactivity).
ppb - Parts per billion, which can also be expressed as micrograms per liter (ug/l).
ppm - Parts per million, which can also be expressed as milligrams per liter (mg/l).
N/A - Not applicable (does not apply).

Compliance with national regulations

The sources of drinking water (both tap 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.

Substances that may be present in source water include:
Microbial substances, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
Inorganic substances, 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 substances, 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 substances, 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 substances in water provided to public water systems. Food and Drug Administration regulations establish limits for substances 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 substances. The presence of substances does not necessarily indicate that water poses a health risk. More information about substances and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline at 1-800-426-4791.

Some people may be more vulnerable to substances 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 substances are available from the Safe Drinking Water Hotline at 1-800-426-4791.

Meeting all federal standards

Contaminant (units)	MCLG	MCL	Level Found Range (2011)	Level Found Average/ Result*	Typical Source of Contaminant	Meets standards
Alpha Emitters (pCi/l) (01/08/2009)	0	15.4	N/A	7	Erosion of natural deposits.	✓
Barium (ppm)	2	2	N/A	.17	Discharge of drilling wastes, metal refineries, and erosion of natural deposits.	✓
Combined Radium (pCi/l) (01/08/2009)	0	5.4	N/A	2.3	Erosion of natural deposits.	✓
Fluoride (ppm)	4	4	.93-1.2	1.16	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 & aluminum factories.	✓
Haloacetic Acids (HAA5) (ppb)	0	60	N/A	6.5	By-product of drinking water disinfection.	✓
TTHM (Total trihalomethanes) (ppb)	0	80	N/A	9.7	By-product of drinking water disinfection.	✓

* This is the value used to determine compliance with federal standards. It sometimes is the highest value detected or sometimes is an average of all 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	.01-.78	.32	Water additive used to control microbes.

****Highest and lowest monthly average.
*****Highest quarterly average.

Contaminant (units)	MCLG	AL	90% Level	# of sites over AL	Typical Source of Contaminant
Copper (ppm)	1.3	1.3	0.76	0 out of 30	Corrosion of household plumbing systems; erosion of natural deposits.
Lead (ppb)	0	15	1.1	0 out of 30	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 Lakeville 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 for drinking or cooking. If you are concerned about lead in your drinking 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*.

Some contaminants do not have Maximum Contaminant Levels established for them. These unregulated contaminants are assessed using state standards known as health risk limits to determine if they pose a threat to human health. If unacceptable levels of an unregulated contaminant are found, the response is the same as if an MCL has been exceeded; the water system must inform its customers and take other corrective actions. In the table that follows are the unregulated contaminants that were detected:

Contaminant (units)	Level Found Range (2011)	Level Found Average/ Result	Typical Source of Contaminant
Sodium (ppm)	N/A	4.82	Erosion of natural deposits.
Sulfate (ppm)	N/A	10.2	Erosion of natural deposits.

Monitoring of unregulated substances as required by the U.S. Environmental Protection Agency rules (40 CFR 141.40) was conducted in 2009. Results of the unregulated contaminant monitoring are available upon request from Cindy Swanson, Minnesota Department of Health, 651-201-4656.

Water Quality Report

2012 report on drinking water quality for Lakeville

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Results of monitoring

No substances were detected at levels that violated federal drinking water standards. However, some substances were detected in trace amounts that were below legal limits. The adjacent table shows the substances that were detected in trace amounts last year. (Some substances are sampled less frequently than once a year; as a result, not all substances were sampled in 2012. If any of these substances were detected the last time they were sampled for, they are included in the table along with the date the detection occurred.)

Key to abbreviations

MCLG - Maximum Contaminant Level Goal: The level of a substance 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 substance 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 substance 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.
pCi/l - PicoCuries per liter (a measure of radioactivity).
ppb - Parts per billion, which can also be expressed as micrograms per liter (ug/l).
ppm - Parts per million, which can also be expressed as milligrams per liter (mg/l).
N/A - Not applicable (does not apply).

Compliance with national regulations

The sources of drinking water (both tap 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.

Substances that may be present in source water include:
Microbial substances, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
Inorganic substances, 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 substances, 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 substances, 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 substances in water provided to public water systems. Food and Drug Administration regulations establish limits for substances 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 substances. The presence of substances does not necessarily indicate that water poses a health risk. More information about substances and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline at 1-800-426-4791.

Meeting all federal standards

Contaminant (units)	MCLG	MCL	Level Found Range (2012)	Level Found Average/ Result*	Typical Source of Contaminant	Meets standards
Alpha Emitters (pCi/l)	0	15.4	N/A	6.2	Erosion of natural deposits.	✓
Barium (ppm) (01/12/2011)	2	2	N/A	.17	Discharge of drilling wastes, metal refineries, and erosion of natural deposits.	✓
Combined Radium (pCi/l)	0	5.4	N/A	3	Erosion of natural deposits.	✓
Fluoride (ppm)	4	4	.9-1.1	1.01	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 & aluminum factories.	✓
Haloacetic Acids (HAA5) (ppb)	0	60	3.8-12.1	8.7	By-product of drinking water disinfection.	✓
TTHM (Total trihalomethanes) (ppb)	0	80	6.8-19.7	18.1	By-product of drinking water disinfection.	✓

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

Contaminant (units)	MRDLG	MRDL	****	*****	Typical Source of Contaminant
Chlorine (ppm)	4	4	.2-.6	.34	Water additive used to control microbes.

****Highest and lowest monthly average.
*****Highest quarterly average.

Contaminant (units)	MCLG	AL	90% Level	# of sites over AL	Typical Source of Contaminant
Copper (ppm) (09/12/2010)	1.3	1.3	.76	0 out of 30	Corrosion of household plumbing systems; erosion of natural deposits.
Lead (ppb) (09/12/10)	0	15	1.1	0 out of 30	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 Lakeville 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 for drinking or cooking. If you are concerned about lead in your drinking 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.

Some people may be more vulnerable to substances 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 substances are available from the Safe Drinking Water Hotline at 1-800-426-4791.

Appendix E

Written Comments on the Wellhead Protection Plan

Metropolitan Council

Environmental Services

March 5, 2014

Chris Petree, Wellhead Protection Manager
City of Lakeville
18400 Ipava Avenue
Lakeville, MN 55044

RE: City of Lakeville Wellhead Protection Plan
Metropolitan Council District 16
Referral File No. 21200-1

Dear Mr. Petree:

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

The Council reviews wellhead protection plans to ensure consistency with information reported in the Council's master water supply plan, including: population and water demand information, predicted issues associated with water supply development, and identified opportunities for inter-jurisdictional cooperation. This wellhead protection plan provides a good overview of the supply source and measures to protect it. Council staff review finds the wellhead protection plan to be consistent with the metropolitan area master water supply plan, with the following technical comments:

The city is commended for planning to track the number of MDH Well Owner's Handbooks sent to residents with private wells. Such information tracking is critical for determining the effectiveness of wellhead protection measures. In addition, the city is commended for including the Minnesota Technical Assistance Program (MnTAP) in the tools available for businesses to manage solid and hazardous wastes in high vulnerability portions of the DWSMA. The Metropolitan Council encourages businesses to contact MnTAP regarding water conservation measures that can be undertaken to reduce demand on aquifers and reduce business operating expenses.

The integration of the WHPP with the city's planning process is a critical task in strengthening groundwater protection. The city is encouraged to share lessons learned in this process with surrounding communities.

The Council encourages cooperation among communities to sustainably develop and protect drinking water supplies. The city is commended for participating in the southeast metro groundwater work group in conjunction with surrounding communities.

The city is encouraged to increase conservation efforts in order to achieve an average residential water demand of 75 gallons per capita per day or less by 2018, as well as a ratio of maximum to average daily demand of 2.6 or less. Both goals were identified in the 2007 Metropolitan Council letter of comment for the most recent City of Lakeville Water Supply Plan (2008).

This letter completes the Council's review process. On behalf of the Council, I thank you for your effort in preparing this plan. Please send us a copy of the finalized WHPP, if any revisions are made. Should any questions arise on the Council's review comments or on the process it followed, please feel free to contact

Brian Davis of the Council's Environmental Services Division at (651) 602-1519 or brian.davis@metc.state.mn.us.

Sincerely,

Keith Buttleman
Assistant General Manager, Environmental Quality Assurance

cc: Wendy Wulff, Metropolitan Council District Member, District16
Patrick Boylan, Metropolitan Council Sector Representative
Karen Voz, Minnesota Department of Health

Appendix F

Wellhead Protection Program Evaluation Template

CITY OF LAKEVILLE, MINNESOTA

Wellhead Protection Program Evaluation

Evaluation Completed By
(Wellhead Protection Manager): _____

Date Evaluation Completed: _____

Plan Evaluation Frequency (according to wellhead protection plan):

- ☐ **1 year**
- ☐ **2.5 years**

Copies of Evaluation Presented or Sent to:

☐ Minnesota Department of Health
Environmental Health Division
Source Water Protection Unit
P.O. Box 64975
St. Paul, MN 55164-0975

☐ Lakeville City Council
(Date Presented)

☐ City's Wellhead Protection File

I. Changes to Water System, Delineations, or Contaminant Sources

A. List the unique number and locations of new wells installed since the last plan evaluation:

Unique Well Number	Date Online	Delineation Completed?
.		

B. List any new facilities or changes in current facilities in the drinking water supply management area(s) that may be of concern with regard to groundwater quality (list the facility name and nature of concern):

Facility Name	Change	Distance to Well	Well Number	Date Change Made

C. Was any component of the contingency plan implemented by your system at any time since the last program evaluation?

- ☐ **Yes (What was the reason?_____)**
- ☐ **No**

List changes that are needed in the contingency plan and <u>update the plan accordingly</u>:

1.

2.

3.

II. Wellhead Protection Plan Evaluation Approaches

In letters A-D below, complete the sections that apply to the evaluation approaches that were specified in your wellhead protection plan (Chapter 6).

A. Sampling the quality of groundwater throughout the drinking water supply management area. ***(Summarize efforts or attach report of sampling results and conclusions.)***

B. Documenting inventory control of potential contaminants. ***(Summarize efforts.)***

C. Documentation of the implementation of wellhead protection measures. ***(Summarize efforts.)***

D. Using monitoring data that are required by existing laws and rules in effect at the time of plan adoption. ***(List data used and summarize conclusions made from data.)***

III. New Wellhead Protection Data

List any new data that relates to wellhead protection delineations or source management (i.e., groundwater study results, water quality monitoring data, well construction logs, etc.) that may be used during the next update of the wellhead protection plan:

Nature of Data	Source of Data

IV. Plan Implementation Administrative and Financial Concerns

A. Estimate the annual expense of plan implementation for each plan year including staff time and actual dollar amount spent.

Year	Annual Expense	Year	Annual Expense
1	$	6	$
2	$	7	$
3	$	8	$
4	$	9	$
5	$	10	$

B. Estimate full-time equivalency (FTE) spent on wellhead protection implementation in terms of percentage of FTE.

FTE = _____%

C. Has the wellhead protection budget been adequate to conduct wellhead protection implementation activities during the last evaluation period?

☐ **Yes** ☐ **No**

If no, where could it improve?

D. Itemize difficulties incurred during your plan implementation.

1.

2.

3.

4.

Appendix G

Lakeville Water Supply Plan

20 November 2008

Mr. Dale E. Homuth
Regional Hydrologist
DNR Waters, Central Region
1200 Warner Road
St. Paul, Minnesota 55106-6793

Subject: Certification of Adoption – Lakeville Water Supply Plan

Dear Mr. Homuth:

Enclosed is the Certificate of Adoption for the Lakeville Water Supply Plan signed by the Mayor for the City of Lakeville as requested in your November 6, 2008 letter. If any additional information is needed, I can be reached at (952) 985-2708.

Sincerely,

Christopher J. Petree
Operations & Maintenance Director

Encl:
Certificate of Adoption

RECEIVED
DEC 02 2008
DNR
Waters

City of Lakeville
20195 Holyoke Avenue • Lakeville, MN 55044
Phone (952) 985-4400 • FAX (952) 985-4499 • www.ci.lakeville.mn.us

CERTIFICATION OF ADOPTION
WATER SUPPLY PLAN

City or Water System Name:	City of Lakeville
Name of Person Authorized to Sign Certification on Behalf of the System:	Holly Dahl
Title:	Mayor
Address:	20195 Holyoke Avenue Lakeville, Minnesota 55044
Telephone:	952-985-4403 Fax: 952-985-4409
E-mail:	hdahl@lakevillemn.gov

I certify that the Water Supply Plan approved by the Department of Natural Resources has been adopted by the City Council for the City of Lakeville that has authority over water supply services.

Signed: _____ Date: November 17, 2008
Mayor

_____
City Clerk

Fax (651/772-7977) or mail this certification to:

DNR Waters
1200 Warner Road
St. Paul MN 55106

or email to dale.holmuth@dnr.state.mn.us

RECEIVED
DEC 02 2008
DNR
Waters

Water Supply Plan

City of Lakeville
20 June 2008

20 June 2008

DNR Waters
Water Permit Programs Supervisor
500 Lafayette Road
St. Paul, Minnesota 55155-4032

Subject: City of Lakeville Water Supply Plan

Dear Sir or Madam:

Enclosed please find a copy of the Lakeville Water Supply Plan for your review and approval. This plan takes into account recent trends in population growth and water use, as well as current and planned infrastructure from the City's Comprehensive Water Plan.

If you have any questions, I can be reached at (952) 985-2708.

Sincerely,

Ken Seurer
Interim Operations and Maintenance Director

City of Lakeville
20195 Holyoke Avenue • Lakeville, MN 55044
Phone (952) 985-4400 • FAX (952) 985-4499 • www.lakeville.mn.us

DEPARTMENT OF NATURAL RESOURCES - DIVISION OF WATERS and METROPOLITAN COUNCIL
WATER SUPPLY PLANS

These guidelines are divided into four parts. The first three parts, Water Supply System Description and Evaluation, Emergency Response Procedures and Water Conservation Planning apply statewide. Part IV, relates to comprehensive plan requirements that apply only to communities in the Seven-County Twin Cities Metropolitan Area. If you have questions regarding water supply plans, please call (651) 259-5703 or (651) 259-5647 or e-mail your question to wateruse@dnr.state.mn.us. Metro Communities can also direct questions to the Metropolitan Council at watersupply@metc.state.mn.us or (651) 602-1066.

DNR Water Appropriation Permit Number(s)	806107
Name of Water Supplier	City of Lakeville
Address	20195 Holyoke Avenue
Contact Person	Christopher J. Petree
Title	Operations and Maintenance Director
Phone Number	952-985-2708
E-Mail Address	cpetree@lakevillemn.gov

PART I. WATER SUPPLY SYSTEM DESCRIPTION AND EVALUATION

The first step in any water supply analysis is to assess the current status of demand and supplies. Information in Part I, can be used in the development of Emergency Response Procedures and Conservation Plans.

A. ANALYSIS OF WATER DEMAND.

Fill in Table 1 for the past 10 years water demand. If your customer categories are different than the ones listed in Table 1, please note the changes below.

Water Use Trends. Discuss factors that influence trends in water demand (i.e. growth, weather, industry, conservation). If appropriate, include a discussion of other factors that affect daily water use, such as use by non-resident commuter employees or large water consuming industry.
Major factors that influence water use in Lakeville are growth and weather. Lakeville continues to grow at an average of 4 percent per year with a resulting average increase in winter quarter water use of 1.5 percent per year. Overall, water use has increased on an average of 5 percent per year since 1996. Weather and the effects of wet years and dry years have a significant impact on water use during the summer months of June, July, and August. Peak use rates and peak demand days correlate to the amount of rain received. In years with 15 or fewer rain days (a rain day being .10 inches or more), water use over the summer increased far in excess of the 5 percent historical average. Of the data collected, 2001, 2003, 2005, and 2007 are the best examples of the effect of weather on summer water use. The combination of high temperatures and 15 or fewer days of rain during those summers caused peaks in demand well above what had been primarily a growth derived upward trend in water use. In recent years, use of odd/even and time of day watering restrictions has made resource management more effective and reduced the amount of peak day demand.

TABLE 1 Historic Water Demand

Year	Total Population	Population Served	Total Connections	Residential Water Sold (MG)	C/I/I Water Sold (MG)	Wholesale Deliveries (MG)	Total Water Sold (MG)	Total Water Pumped (MG)	Percent Unmetered/ Unaccounted	Average Demand (MGD)	Maximum Demand (MGD)	Residential gallons/ capita/day	Total gallons/ capita/day
1998	38,506	37,306	10,994	1,165	196	None	1,362	1,417	4%	3.73	N/A	85.56	104.06
1999	40,315	39,115	11,695	1,202	178	None	1,405	1,581	13%	4.32	10.68	84.19	110.74
2000	43,128	41,928	12,407	1,459	209	None	1,668	1,893	13%	5.17	16.26	95.34	123.70
2001	44,751	43,551	12,922	1,634	225	None	1,852	1,998	8%	5.51	20.16	102.79	125.69
2002	46,285	45,085	13,476	1,385	198	None	1,580	1,698	7%	4.61	13.44	84.16	103.18
2003	47,523	46,323	14,215	1,866	230	None	2,094	2,183	5%	5.96	16.90	110.36	129.11
2004	49,097	47,897	15,218	1,645	215	None	1,857	2,069	11%	5.63	15.59	94.09	118.35
2005	51,722	50,522	15,634	1,620	259	None	1,875	2,059	10%	5.46	17.82	87.85	111.66
2006	52,323	51,123	16,566	1,875	306	None	2,176	2,354	8%	6.38	18.57	100.48	126.15
2007	52,835	51,635	16,871	2,096	282	None	2,375	2,553	7%	6.92	19.91	111.16	135.46

MG – Million Gallons **MGD** – Million Gallons per Day **C/I/I**- Commercial, Industrial, Institutional

Residential. Water used for normal household purposes, such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering lawns and gardens.

Institutional. Hospitals, nursing homes, day care centers, and other facilities that use water for essential domestic requirements. This includes public facilities and public metered uses. You may want to maintain separate institutional water use records for emergency planning and allocation purposes.

Commercial. Water used by motels, hotels, restaurants, office buildings, commercial facilities, both civilian and military.

Industrial. Water used for thermoelectric power (electric utility generation) and other industrial uses such as steel, chemical and allied products, food processing, paper and allied products, mining, and petroleum refining.

Wholesale Deliveries. Bulk water sales to other public water suppliers.

Unaccounted. Unaccounted for water is the volume of water withdrawn from all sources minus the volume sold.

Residential Gallons per Capita per Day = total residential sales in gallons/population served/365 days **Total Gallons per Capita per Day** = total water withdrawals/population served/365 days

NOTE: Non-essential water uses defined by Minnesota Statutes 103G.291, include lawn sprinkling, vehicle washing, golf course and park irrigation and other non-essential uses. Some of the above categories also include non-essential uses of water.

TABLE 2 Large Volume Users - List the top 10 largest users.

Customer	Gallons per year	% of total annual use
Country View Mobile Home Park (374 units)	20,547,000	0.8%
Queen Ann Mobile Home Park (156 units)	16,992,000	0.7%
Cloverleaf Cold Storage Co.	13,945,000	0.5%
Arden International Kitchen	13,103,000	0.5%
Ardmor Village Mobile Home Park (340 units)	12,881,000	0.5%
CONAGRA Foods	10,484,000	0.4%
North Creek Mobile Home Park (165 units)	10,418,000	0.4%
Charles Cudd Company	8,728,000	0.3%
Imperial Plastic	7,977,000	0.3%
Springbrook Condominiums (154 units)	6,789,000	0.3%

B. TREATMENT AND STORAGE CAPACITY.

TABLE 3(A) Water Treatment

Water Treatment Plant Capacity	20 Million Gallons per day
Describe the treatment process used (ie, softening, chlorination, fluoridation, Fe/Mn removal, reverse osmosis, coagulation, sedimentation, filtration, others). Also, describe the annual amount and method of disposal of treatment residuals, if any.	
The Lakeville Water Treatment Facility (WTF) is an iron and manganese removal facility. Raw water is pumped from deep wells in the Jordan, Prairie du Chien, and Franconia-Ironton-Galesville aquifers to the WTF. The water is initially treated with chlorine and potassium permanganate ($KMnO_4$). These chemicals are used as oxidants to bring the iron and manganese out of suspension so that they can be filtered out in the filter cells. The water then flows through approximately 36 inches of anthracite, manganese green sand, and a standard sand and gravel filter media where the iron and manganese (no longer in suspension) are trapped on the top of the media. The filtered water is treated again with chlorine as well as fluoride and potassium orthophosphate prior to flowing to the clearwell for storage until needed. From the clearwell, water flows by gravity to the high service pumping station to be pumped to the distribution system and reservoirs. Iron and manganese trapped on the filter media are removed by a process called backwashing, where the filters are air scrubbed and the flow of water is reversed through the filter media. The water from the backwash process is diverted to a holding tank where it is held until it is brought back into the WTF. When the backwash water is brought back into the WTF it is mixed with polymer to coagulate the iron and manganese and then moved through a plate settler where the iron and manganese settle to the bottom. The iron and manganese slurry is released to the sanitary sewer system via a timed valve. The clear water is pumped back to the beginning of the filtration process to be filtered again. The WTF was originally designed to treat 10 million gallons per day. In 2001 the facility was expanded to be able to treat 20 million gallons per day. This capacity can be further augmented by using two emergency backup wells that pump water directly into the distribution system.	

TABLE 3(B) Storage Capacity - List all storage structures and capacities.

Total Storage Capacity		**Average Day Demand** (average of last 5 years)
8.85 Million Gallons		5.674 Million Gallons per Day
Type of Structure	Number of Structures	Million of Gallons
Elevated Storage	4	3.75
Ground Storage	1	2.00
Other: WTF Clearwell	1	3.10

C. WATER SOURCES. List all groundwater, surface water and interconnections that supply water to the system. Add or delete lines to the tables as needed.

TABLE 4(A) Total Water Source Capacity for System (excluding emergency connections)

Total Capacity of Sources	13,970 Gallons per minute
Firm Capacity (largest pump out of service)	12,470 Gallons per minute

TABLE 4(B) Groundwater Sources - Copies of water well records and well maintenance information should be included with the public water supplier's copy of the plan in Attachment . If there are more wells than space provided or multiple well fields, please use the List of Wells template (see Resources) and include as Attachment .

Well # or name	Unique Well Number	Year Installed	Well & Casing Depth (ft)	Well Diameter (in)	Capacity (GPM)	Geologic Unit	Status
2	207708	1964	477/517	16	1200	CJDN	Active
3	207727	1968	363/460	16	1200	CJDN	Peak Use
4	212650	1969	434/505	16	1200	CJDN	Active
6	161409	1981	581/682	16	1200	CJDN	Active
7	161439	1984	375/479	18	1200	CJDN	Peak Use
8	433296	1990	522/615	18	1200	CJDN	Active
9	554192	1995	406/608	18	1200	CJDN	Active
10	554193	1995	425/616	18	1500	CJDN	Active
11	554215	1996	415/637	18	1300	CJDN	Active
12	562991	1997	389/585	18	1200	CJDN	Active
13	596650	1999	416/611	18	1200	CJDN	Active
14	603073	2001	365/600	18	1200	CJDN	Active
15	651737	2001	412/517	18	1200	CJDN	Active
16	655907	2003	466/570	24	1200	CJDN	Active
17	694913	2004	415/607	24	1200	CJDN	Active
18	745558	2007	677/864	12	400	CFIG	Active

Status: Active use, Emergency, Standby, Seasonal, Peak use, etc.
GPM: Gallons per Minute
Geologic Unit: Name of formation(s), which supplies water to the well

TABLE 4(C) Surface Water Sources

- **Not Applicable to Lakeville.**

Intake ID	Resource name	Capacity (GPM/MGD)

GPM – Gallons per Minute MGD – Million Gallons per Day

TABLE 4(D) Wholesale or Retail Interconnections - List interconnections with neighboring suppliers that are used to supply water on a **regular basis** either wholesale or retail.

- **Not applicable to Lakeville**

Water Supply System	Capacity (GPM/MGD)	Wholesale or retail

GPM – Gallons per Minute MGD – Million Gallons per Day

TABLE 4(E) Emergency Interconnections - List interconnections with neighboring suppliers or private sources that can be used to supply water on an emergency or occasional basis. Suppliers that serve less than 3,300 people can leave this section blank, but must provide this information in Section II C.

Water Supply System	Capacity (GPM/MGD)	Note any limitations on use
City of Burnsville	3 MGD	System elevation limits capacity.
City of Apple Valley	1 MGD	System elevation limits capacity and supply area.
City of Farmington	1 MGD	System elevation limits capacity and supply area.

GPM – Gallons per Minute MGD – Million Gallons per Day

D. DEMAND PROJECTIONS.

TABLE 5 Ten Year Demand Projections

Year	Population Served	Average Day Demand (MGD)	Maximum Day Demand (MGD)	Projected Demand (MGY)
2008	53,227	6.61	19.36	2,413
2009	54,819	6.80	19.92	2,482
2010	56,411	7.00	20.51	2,555
2011	58,301	7.24	21.21	2,643
2012	60,191	7.47	21.88	2,727
2013	62,081	7.71	22.59	2,814
2014	63,971	7.94	23.26	2,898
2015	65,531	8.13	23.82	2,967
2016	67,451	8.37	24.52	3,055
2017	69,341	8.61	25.22	3,143

MGD – Million Gallons per Day MGY – Million Gallons per Year

Projection Method. Describe how projections were made, (assumptions for per capita, per household, per acre or other methods used).

Population projections were based on growth data provided by the Metropolitan Council. The average annual growth rate for 2008 – 2010 is estimated at 3 percent and from 2011 – 2017 is estimated at 3.3 percent. Increases in the average day demand are based on the average per capita per day use rates for the last five years (from Table 1), 124.2 GPCD. Maximum day demand is based on the ratio of average day demand to maximum day demand (from Table 1) over the last 5 years resulting in a peaking factor of 2.93. Projected demand is based on the average day demand times the number of days in a year.

E. RESOURCE SUSTAINABILITY

Sustainable water use: use of water to provide for the needs of society, now and in the future, without unacceptable social, economic, or environmental consequences.

Monitoring. Records of water levels should be maintained for all production wells and source water reservoirs/basins. Water level readings should be taken monthly for a production well or observation well that is representative of the wells completed in each water source formation. **If water levels are not currently measured each year, a monitoring plan that includes a schedule for water level readings must be submitted as Attachment .**

TABLE 6 Monitoring Wells - List all wells being measured.

Unique well number	Type of well (production, observation)	Frequency of Measurement (daily, monthly etc.)	Method of Measurement (steel tape, SCADA etc.)
686711	Observation	Hourly	SCADA
686713	Observation	Hourly	SCADA
686712	Observation	Hourly	SCADA

Water Level Data. Summarize water level data including seasonal and long-term trends for each ground and/or surface water source. If water levels are not measured and recorded on a routine basis then provide the static water level (SWL) when the well was constructed and a current water level measurement for each production well. Also include all water level data taken during well and pump maintenance.

Well logs are provided in Attachment 1.

Ground Water Level Monitoring – DNR Waters in conjunction with federal and local units of government maintain and measure approximately 750 observation wells around the state. Ground water level data are available online www.dnr.state.mn.us/waters. Information is also available by contacting the Ground Water Level Monitoring Manager, DNR Waters, 500 Lafayette Road, St. Paul, MN 55155-4032 or call (651) 259-5700.

Natural Resource Impacts. Indicate any natural resource features such as calcareous fens, wetlands, trout streams, rivers or surface water basins that are or could be influenced by water withdrawals from municipal production wells. Also indicate if resource protection thresholds have been established and if mitigation measures or management plans have been developed.

None.

Sustainability. Evaluate the adequacy of the resource to sustain current and projected demands. Describe any modeling conducted to determine impacts of projected demands on the resource.

The City of Lakeville completed a well siting study in 2004 and a comprehensive water plan in 2008. The comprehensive water plan highlighted challenges to the continued growth of the Lakeville's water distribution system. The most serious in the context of sustainability is that 14 additional wells, a combination of high and low pressure wells in the Jordan-Prairie du Chien and Franconia-Ironton-Galesville aquifer, will be required to meet water demands between now and the city's full development in 2030. To support this estimate of needs, the well siting study modeled three different scenarios for the expansion of the city's well field to meet the expected growth. Significant in the findings was the potential for the city to dewater the upper portion of the Prairie du Chien – Jordan Aquifer particularly in the southwest and central portions of the City. The result, for the city and to maintain the ability of the aquifer to meet expected demands, is to expand the well field away from the impacted area. A copy of the well siting study is at Attachment 2. A copy of the comprehensive water plan is at Attachment 3.

Source Water Protection Plans. The emergency procedures in this plan are intended to comply with the contingency plan provisions required in the Minnesota Department of Health's (MDH) Wellhead Protection (WHP) Plan and Surface Water Protection (SWP) Plan.	
Date WHP Plan Adopted:	January 8, 2004
Date for Next WHP Update:	January 2008
SWP Plan:	☐ In Process ☐ Completed ☒ Not Applicable

F. CAPITAL IMPROVEMENT PLAN (CIP)

Adequacy of Water Supply System. Are water supply installations, treatment facilities and distribution systems adequate to sustain current and projected demands? ☐ Yes ☒ No If no, describe any potential capital improvements over the next ten years and state the reasons for the proposed changes.
To meet city growth and the corresponding increase in demand, the City of Lakeville has an ongoing program for the expansion of its water system. In 2006, the City drilled Well 18 into the Franconia-Ironton-Galesville (FIG) formation to determine the efficacy of that aquifer to supplement the City's Jordan-Prairie du Chien wells. While it does not perform to the same capacity, it does provide a continuous supplemental flow that does not appear to degrade that aquifer. The City is planning construction of Well 19 in 2008 and Well 20 in 2010 in the Jordan-Prairie du Chien aquifer. Additional wells are currently projected to be added approximately every two years. (See table below.)

Proposed Water Sources. Does your current CIP include the addition of new wells or intakes? ☒ Yes ☐ No If yes, list the number of new installations and projected water demands from each for the next ten years. Plans for new production wells must include the geologic source formation, well location, and proposed pumping capacity.
Additional information is in the well siting study, Attachment 2 and the comprehensive water plan, Attachment 3.

Well # or name	Planned Installation	Projected Demand (MGD)	Proposed Pumping Capacity (GPM)	Geologic Source Formation	Location
19	2008	1.5	1200	CJDN	Gerdine Path and Dodd Blvd
20	2010	1.5	1200	CJDN	175th Street and Dodd Blvd
21	2012	1.5	1200	CJDN	178th Street and Dodd Blvd
22	2014	.5	600	CFIG	168th Street and Gerdine Path
23	2016	1.5	1200	CJDN	185th Street and Highview Ave
24	2018	1.5	1200	CJDN	Foliage Ave and Dodd Blvd

MGD – Millions of Gallons per Day
GPM – Gallons per Minute
Geologic Unit: Name of formation(s), which supplies water to the well

Water Source Alternatives. If new water sources are being proposed, describe alternative sources that were considered and any possibilities of joint efforts with neighboring communities for development of supplies.

No new water sources are being considered.

Preventative Maintenance. Long-term preventative programs and measures will help reduce the risk of emergency situations. Identify sections of the system that are prone to failure due to age, materials or other problems. This information should be used to prioritize capital improvements, preventative maintenance, and to determine the types of materials (pipes, valves, couplings, etc.) to have in stock to reduce repair time.

The City of Lakeville has an active and ongoing preventive maintenance program for all aspects of its water system.

- Vertical turbine pumps are removed, inspected, and repaired or replaced as part of a scheduled rehabilitation program every eight years.
- Submersible pumps are pulled, inspected, and repaired or replaced as part of a schedule rehabilitation program every 10 years.
- Wells piping is also pulled at the same time the corresponding pump and motor are removed. The piping is inspected for integrity and replaced as necessary.
- Emergency or peaking wells are rehabilitated every 15 years based on their low use rates
- During each rehabilitation, excess sand is baled from the wells to maintain an efficient water flow and minimize potential pump damage.
- Hydrants throughout the City are inspected and exercised annually.
- Gate valves operation is schedule as time permits.
- Reservoirs are periodically inspected with recondition planned every 15 years.
- Valve, meter, and equipment upgrades and replacement are planned and budgeted as necessary.

PART II. EMERGENCY RESPONSE PROCECURES

Water emergencies can occur as a result of vandalism, sabotage, accidental contamination, mechanical problems, power failures, drought, flooding, and other natural disasters. The purpose of emergency planning is to develop emergency response procedures and to identify actions needed to improve emergency preparedness. In the case of a municipality, these procedures should be in support of, and part of, an all-hazard emergency operations plan. If your community already has written procedures dealing with water emergencies we recommend that you use these guidelines to review and update existing procedures and water supply protection measures.

Federal Emergency Response Plan

Section 1433(b) of the Safe Drinking Water Act as amended by the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (Public Law 107-188, Title IV – Drinking Water Security and Safety) requires community water suppliers serving over 3,300 people to prepare an Emergency Response Plan. **Community water suppliers that have completed the Federal Emergency Response Plan and submitted the required certification to the U.S. Environmental Protection Agency have satisfied Part II, Sections A, B, and C of these guidelines and need only provide the information below regarding the emergency response plan and source water protection plan and complete Sections D (Allocation and Demand Reduction Procedures), and E (Enforcement).**

Provide the following information regarding your completed Federal Emergency Response Plan:

Emergency Response Plan	**Contact Person**	**Contact Number**
Emergency Response Lead	Christopher J. Petree	952-985-2708
Alternate Emergency Response Lead	Ken Seurer	952-985-2740
Emergency Response Plan Certification Date	29 December 2004	

Operational Contingency Plan. An operational contingency plan that describes measures to be taken for water supply mainline breaks and other common system failures as well as routine maintenance is recommended for all utilities. Check here ☒ if the utility has an operational contingency plan. At a minimum a contact list for contractors and supplies should be included in a water emergency telephone list.

Communities that have completed Federal Emergency Response Plans should skip to Section D.

EMERGENCY RESPONSE PROCEDURES

A. Emergency Telephone List. A telephone list of emergency contacts must be included as an attachment to this plan (complete template or use your own list). The list should include key utility and community personnel, contacts in adjacent communities, and appropriate local, state and federal emergency contacts. Please be sure to verify and update the contacts on the emergency telephone list on a regular basis (once each year recommended). In the case of a municipality, this information should be contained in a notification and warning standard operating procedure maintained by the warning point for that community. Responsibilities and services for each contact should be defined.

B. Current Water Sources and Service Area. Quick access to concise and detailed information on water sources, water treatment, and the distribution system may be needed in an emergency. System operation, water well and maintenance records should be maintained in a central secured location so that the records are accessible for emergency purposes and preventative maintenance. A detailed map of the system showing the treatment plants, water sources, storage facilities, supply lines, interconnections, and other information that would be useful in an emergency should also be readily available. Do these records and maps exist and can staff access the documents in the event of an emergency.

C. Procedure for Augmenting Water Supplies. List all available sources of water that can be used to augment or replace existing sources in an emergency. In the case of a municipality, this information should be contained in a notification and warning standard operating procedure maintained by the warning point for that community. Copies of cooperative agreements should be maintained with your copy of the plan and included as an attachment. Be sure to include information on any physical or chemical problems that may limit interconnections to other sources of water. Approvals from the MN Department of Health are required for interconnections and reuse of water.

TABLE 7 (A) Public Water Supply Systems – List interconnections with other public water supply systems that can supply water in an emergency.

Water Supply System	Capacity (GPM/MGD)	Note any limitations on use

GPM – Gallons per Minute MGD – Million Gallons per Day

TABLE 7 (B) - Private Water Sources – List other sources of water available in an emergency.

Name	Capacity (GPM/MGD)	Note any limitations on use

GPM – Gallons per Minute MGD – Million Gallons per Day

D. **Allocation and Demand Reduction Procedures.** The plan must include procedures to address gradual decreases in water supply as well as emergencies and the sudden loss of water due to line breaks, power failures, sabotage, etc. During periods of limited water supplies public water suppliers are required to allocate water based on the priorities established in Minnesota Statutes 103G.261.

Water Use Priorities (Minnesota Statutes 103G.261)

First Priority. Domestic water supply, excluding industrial and commercial uses of municipal water supply, and use for power production that meets contingency requirements.

NOTE: Domestic use is defined (MN Rules 6115.0630, Subp. 9), as use for general household purposes for human needs such as cooking, cleaning, drinking, washing, and waste disposal, and uses for on-farm livestock watering excluding commercial livestock operations which use more than 10,000 gallons per day or one million gallons per year.

Second Priority. Water uses involving consumption of less than 10,000 gallons per day.

Third Priority. Agricultural irrigation and processing of agricultural products.

Fourth Priority. Power production in excess of the use provided for in the contingency plan under first priority.

Fifth Priority. Uses, other than agricultural irrigation, processing of agricultural products, and power production.

Sixth Priority. Non-essential uses. These uses are defined by Minnesota Statutes 103G.291 as lawn sprinkling, vehicle washing, golf course and park irrigation, and other non-essential uses.

List the statutory water use priorities along with any local priorities (hospitals, nursing homes, etc.) in Table 8. Water used for human needs at hospitals, nursing homes and similar types of facilities should be designated as a high priority to be maintained in an emergency. Local allocation priorities will need to address water used for human needs at other types of facilities such as hotels, office buildings, and manufacturing plants. The volume of water and other types of water uses at these facilities must be carefully considered. After reviewing the data, common sense should dictate local allocation priorities to protect domestic requirements over certain types of economic needs. In Table 8, list the priority ranking, average day demand and demand reduction potential for each customer category (modify customer categories if necessary).

Table 8 Water Use Priorities

Customer Category	Allocation Priority	Average Day Demand (GPD)	Demand Reduction Potential (GPD)
Residential	1	5,742,000	0
Institutional	1	119,000	0
Commercial	3	418,000	0
Industrial	3	226,000	0
Irrigation	6	100,000	0
Wholesale	N/A	0	0
Non-essential	6	0	0
	TOTALS	6,605,000	0

GPD – Gallons per Day

Demand Reduction Potential. The demand reduction potential for residential use will typically be the base demand

during the winter months when water use for non-essential uses such as lawn watering do not occur. The difference between summer and winter demands typically defines the demand reduction that can be achieved by eliminating non-essential uses. In extreme emergency situations lower priority water uses must be restricted or eliminated to protect first priority domestic water requirements. Short-term demand reduction potential should be based on average day demands for customer categories within each priority class.

Triggers for Allocation and Demand Reduction Actions. Triggering levels must be defined for implementing emergency responses, including supply augmentation, demand reduction, and water allocation. Examples of triggers include: water demand >100% of storage, water level in well(s) below a certain elevation, treatment capacity reduced 10% etc. Each trigger should have a quantifiable indicator and actions can have multiple stages such as mild, moderate and severe responses. Check each trigger below that is used for implementing emergency responses and for each trigger indicate the actions to be taken at various levels or stages of severity in Table 9.

- ☒ Water Demand
- ☐ Treatment Capacity
- ☐ Storage Capacity
- ☒ Groundwater Levels
- ☐ Surface Water Flows or Levels
- ☒ Pump, Booster Station or Well Out of Service
- ☒ Governor's Executive Order – Critical Water Deficiency (required by statute)
- ☐ Water Main Break
- ☒ Loss of Production
- ☒ Security Breach
- ☒ Contamination
- ☐ Other (list in Table 9)

Table 9 Demand Reduction Procedures

Condition	Trigger(s)	Actions
Stage 1 (Mild)	Water Demand.	• Seasonal restrictions are implemented at the beginning of the summer season. • When demand exceeds 12 MGD, enforcement activity is increased.
	Groundwater Levels	• Monitor for impact of increased pumping.
	Pump, Booster Station, or Well Out of Service	• Use additional wells as needed to meet demand
	Loss of Production (Power Outage)	• Limit non-essential water use. • Rent generators to use at Wells 12 and 14.
	Security Breach or Contamination	• Follow emergency response plan. • Determine threat credibility. • Coordinate with law enforcement and MN Dept of Health.

Stage 2 (Moderate)	Water Demand.	• When demand exceeds 17 MGD, increased enforcement of City water restrictions to 7 days per week and up to 24 hours per day.
	Groundwater Levels	• As the in groundwater levels affects pump efficiency, emphasize enforcement of water restrictions. • Notify the City Administrator and brief City Council concerning the impacts.
	Pump, Booster Station, or Well Out of Service	• Change SCADA priorities and use emergency wells as needed to support the system. • Begin limiting non-essential water use.
	Loss of Production (Power Outage)	• Complete actions for Stage 1. • Use interconnects with neighboring cities. • Limit nonessential water use as necessary.
	Security Breach or Contamination	• Complete actions for Stage 1. • Limit water use as the threat dictates.
Stage 3 (Severe)	Water Demand.	• Complete actions for Stages 1 and 2. • Coordinate through the mayor to further restrict non-essential water use. • Declaration of a City water emergency suspending all non-essential water use.
	Groundwater Levels	• Suspend all non-essential water use.
	Pump, Booster Station, or Well Out of Service	• Limit non-essential water use for duration of outage.
	Loss of Production (Power Outage)	• Complete actions for Stages 1 and 2. • Restrict or suspend non-essential water use as necessary.
	Security Breach or Contamination	• Complete actions for Stages 1 and 2

Critical Water Deficiency (M.S. 103G.291)	Executive Order by Governor & as provided in above triggers	• Stage 1: Restrict lawn watering, vehicle washing, golf course and park irrigation and other nonessential uses. • Stage 2: Suspend lawn watering, vehicle washing, golf course and park irrigation and other nonessential uses.

Note: The potential for water availability problems during the onset of a drought are almost impossible to predict. Significant increases in demand should be balanced with preventative measures to conserve supplies in the event of prolonged drought conditions.

Notification Procedures. List methods that will be used to inform customers regarding conservation requests, water use restrictions, and suspensions. Customers should be aware of emergency procedures and responses that they may need to implement.
Notices to customers concerning changes to water restrictions or the declaration of a water emergency, along with any individual suspensions of use would be disseminated through: • City web site. • Local newspapers. • Government access cable channel. • Letters to residents. Emergency notification of conservation measures or water emergencies resulting from contamination, loss of production, or groundwater levels would be done through: • Government access cable channel. • Door to door delivery of notices. • Postings at City facilities. • Postings at commercial properties

E. **Enforcement.** Minnesota Statutes require public water supply authorities to adopt and enforce water conservation restrictions during periods of critical water shortages.

Public Water Supply Appropriation During Deficiency.
Minnesota Statutes 103G.291, Subdivision 1.

Declaration and conservation.
(a) If the governor determines and declares by executive order that there is a critical water deficiency, public water supply authorities appropriating water must adopt and enforce water conservation restrictions within their jurisdiction that are consistent with rules adopted by the commissioner.
(b) The restrictions must limit lawn sprinkling, vehicle washing, golf course and park irrigation, and other nonessential uses, and have appropriate penalties for failure to comply with the restrictions.

An ordinance that has been adopted or a draft ordinance that can be quickly adopted to comply with the critical water deficiency declaration must be included in the plan (include with other ordinances in Attachment 7 for Part III, Item 4). Enforcement responsibilities and penalties for non-compliance should be addressed in the critical water deficiency ordinance.
Sample regulations are available at www.dnr.state.mn.us/waters

Authority to Implement Water Emergency Responses. Emergency responses could be delayed if city council or utility board actions are required. Standing authority for utility or city managers to implement water restrictions can improve response times for dealing with emergencies. Who has authority to implement water use restrictions in an emergency?

☐ Utility Manager ☐ City Manager ☐ City Council or Utility Board
☒ Other (describe): Mayor

Emergency Preparedness. If city or utility managers do not have standing authority to implement water emergency responses, please indicate any intentions to delegate that authority. Also indicate any other measures that are being considered to reduce delays for implementing emergency responses.
Access to or the availability of the Mayor to implement changes to City water restrictions does not hinder the City's response to water emergencies. There are no current plans to delegate this function below the mayoral level.

PART III. WATER CONSERVATION PLAN

Water conservation programs are intended to reduce demand for water, improve the efficiency in use and reduce losses and waste of water. Long-term conservation measures that improve overall water use efficiencies can help reduce the need for short-term conservation measures. Water conservation is an important part of water resource management and can also help utility managers satisfy the ever-increasing demands being placed on water resources.

> Minnesota Statutes 103G.291, requires public water suppliers to implement demand reduction measures before seeking approvals to construct new wells or increases in authorized volumes of water. Minnesota Rules 6115.0770, require water users to employ the best available means and practices to promote the efficient use of water. Conservation programs can be cost effective when compared to the generally higher costs of developing new sources of supply or expanding water and/or wastewater treatment plant capacities.

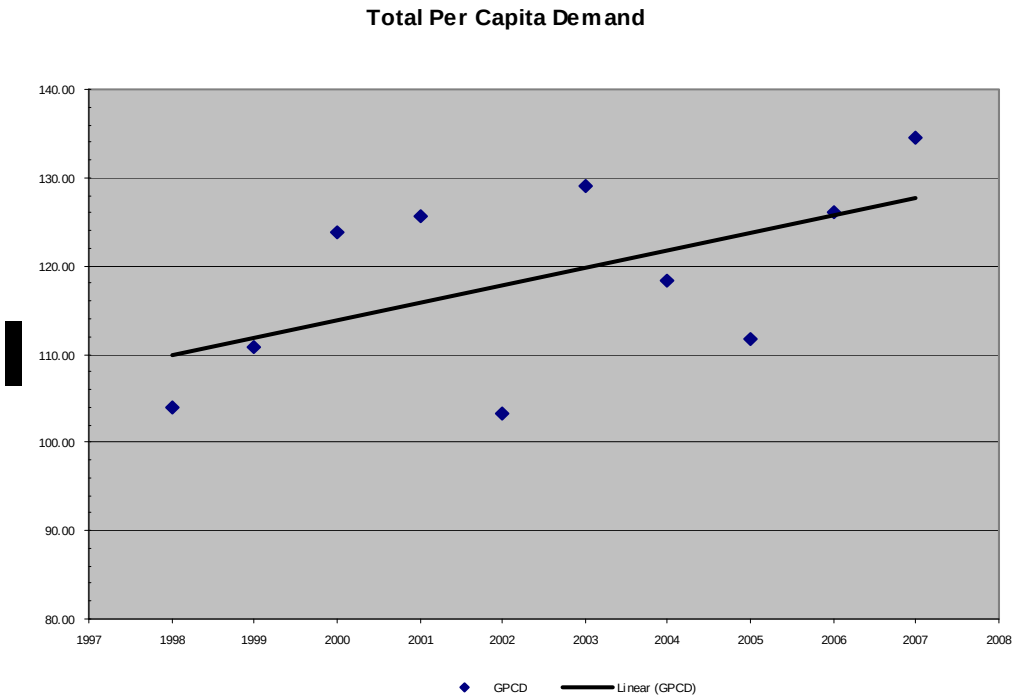
A. Conservation Goals. The following section establishes goals for various measures of water demand. The programs necessary to achieve the goals will be described in the following section.

Unaccounted Water (calculate five year averages with data from Table 1)	
Average annual volume unaccounted water for the last 5 years	185,170,000 gallons
Average percent unaccounted water for the last 5 years	8.3 percent
AWWA recommends that unaccounted water not exceed 10%. Describe goals to reduce unaccounted water if the average of the last 5 years exceeds 10%.	

Residential Gallons Per Capita Demand (GPCD)	
Average residential GPCD use for the last 5 years (use data from Table 1)	100.79 GPCD
In 2002, average residential GPCD use in the Twin Cities Metropolitan Area was 75 GPCD. Describe goals to reduce residential demand if the average for the last 5 years exceeds 75 GPCD.	
The continued enforcement of time of day and odd-even water use restrictions established in 2004 along with aging of current residential areas is expected to slowly bring about a reduction in average residential GPCD. Recent dry summers have caused significant increases in use rates. Water use is monitored throughout the critical summer months and enforcement activities are increased to notify residents of water restrictions. Changes to the water rate structure in 2007 to include a third tier for high rate users and an accumulative surcharge will also help to curb non-essential uses that drive high per capita amounts. The City continues to make education the centerpiece of its efforts to reduce high water use through weekly reminders in the local newspaper and daily water conservation tips and water conservation programming on the government access channel.	

Total Per Capita Demand: From Table 1, is the trend in overall per capita demand over the past 10 years ☒ increasing or ☐ decreasing? If total GPCD is increasing, describe the goals to lower overall per capita demand or explain the reasons for the increase.
The trend in per capita demand shows a steady increase over the past 10 years. The increase can be attributed to a combination of hot, dry summers and the significant growth in the City beginning in 1999. Between 1999 and 2005, the City saw its population grow by 30 percent. Corresponding with this population increase was growth in new landscaped area around residences and an upswing

in the installation of automated in-ground sprinkler systems. Lowering the increasing demand continues to be a goal of the education process in water conservation and the enforcement of water use restrictions. Direct notification to residents of a water use violation does result, generally, in compliance with time of day and odd/even restrictions. However, dry summers see increased use as residents make maximum use of the time available for lawn watering. To counter higher usage, the City has introduced a tiered water rate structure and an accumulating surcharge for those who repeatedly violate the restrictions. Continued monitoring of water use rates will show the impact of these disincentives in reducing overall per capita demand.



Peak Demands (calculate average ratio for last five years using data from Table 1)	
Average maximum day to average day ratio	2.93
If peak demands exceed a ratio of 2.6, describe the goals for lowering peak demands.	

Young and predominantly residential municipalities generally have higher peaking factors due to irrigation demands. Additionally, extensive growth within the City between 1999 and 2005 continues to drive average daily demand and peaking factors through the establishment of new landscaping. With expected growth trends over the next 10 years and the continued emphasis on residential growth, reducing the peaking factor through continued water conservation education and strong enforcement of existing water use restrictions is a priority.

Specific efforts to reduce peak water demands include:

- Installation of automatic meter reading technologies to better monitor and trend water use.
- Installation of pressure reducing valves on residential services.
- A tiered water rate structure.
- An accumulative surcharge for violations.
- Water conservation videos on the government access cable channel.
- Periodic water restriction and water conservation reminders in the local newspaper.
- A City ordinance detailing odd/even and time of day water use restrictions.

B. Water Conservation Programs. Describe all short-term conservation measures that are available for use in an emergency and long-term measures to improve water use efficiencies for each of the six conservation program elements listed below. Short-term demand reduction measures must be included in the emergency response procedures and must be in support of, and part of, a community all-hazard emergency operation plan.

1. **Metering.** The American Water Works Association (AWWA) recommends that every water utility meter all water taken into its system and all water distributed from its system at its customer's point of service. An effective metering program relies upon periodic performance testing, repair, repair and maintenance of all meters. AWWA also recommends that utilities conduct regular water audits to ensure accountability.
   Complete Table 10 (A) regarding the number and maintenance of customer meters.

TABLE 10 (A) Customer Meters

	Number of Accounts	Number of Metered Connections	Meter testing schedule (years)	Average age/meter replacement schedule (years)
Residential	16,394	16,394	As needed	10 years / 20 years
Institutional	71	71	As needed	5 years / 20 years
Commercial	304	304	As needed	5 years / 20 years
Industrial	101	101	As needed	5 years / 20 years
Public Facilities	0	0		/
Other	0	0		/
TOTALS	16,870	16,870		

Unmetered Systems. Provide an estimate of the cost to install meters and the projected water savings from metering water use. Also indicate any plans to install meters.

TABLE 10 (B) Water Source Meters

	Number of Meters	Meter testing schedule (years)	Average age/meter replacement schedule (years)
Water Source (wells/intakes)	16	As needed	5 years / 20 years
Treatment Plant	2	As needed	9 years / 20 years

2. **Unaccounted Water.** Water audits are intended to identify, quantify, and verify water and revenue losses. The volume of unaccounted-for water should be evaluated each billing cycle. The AWWA recommends a goal of ten percent or less for unaccounted-for water. Water audit procedures are available from the AWWA and MN Rural Water Association.

Frequency of water audits: ☐ each billing cycle ☒ yearly ☐ other:

Leak detection and survey: ☐every year ☐ every years ☒ periodic as needed (for

known/suspected leaks)

Year last leak detection survey completed:

Reducing Unaccounted Water. List potential sources and efforts being taken to reduce unaccounted water. If unaccounted water exceeds 10% of total withdrawals, include the timeframe for completing work to reduce unaccounted water to 10% or less.
The City established a metering program for City facilities and irrigation systems in 2007, as well as a single, metered fill point for all commercial bulk water users. The City continues to have an active water meter rental program for bulk users.

3. **Conservation Water Rates.** Plans must include the current rate structure for all customers and provide information on any proposed rate changes.

Billing Frequency: ☐ Monthly ☐ Bimonthly ☒ Quarterly
☐ Other (describe):

Volume included in base rate or service charge: None.

Conservation Rate Structures

☒ Increasing block rate: rate per unit increases as water use increases
☐ Seasonal rate: higher rates in summer to reduce peak demands
☐ Service charge or base fee that does not include a water volume

Conservation Neutral Rate Structure

☐ Uniform rate: rate per unit is the same regardless of volume

Non-conserving Rate Structures

☐ Service charge or base fee that includes a large volume of water
☐ Declining block rate: rate per unit decreases as water use increases
☐ Flat rate: one fee regardless of how much water is used (unmetered)

Other (describe):

Water Rates Evaluated: ☒ every year ☐ every years ☐ no schedule
Date of last rate change: 2007

Declining block (the more water used, the cheaper the rate) and flat (one fee for an unlimited volume of water) rates should be phased out and replaced with conservation rates. Incorporating a seasonal rate structure and the benefits of a monthly billing cycle should also be considered along with the development of an emergency rate structure that could be quickly implemented to encourage conservation in an emergency.

Current Water Rates. Include a copy of the actual rate structure in Attachment 4 or list current water rates including base/service fees and volume charges below.

Non-conserving Rate Structures. Provide justification for the rate structure and its impact on reducing demands or indicate intentions including the timeframe for adopting a conservation rate structure.

4. **Regulation.** Plans should include regulations for short-term reductions in demand and long-term improvements in water efficiencies. Sample regulations are available from DNR Waters. Copies of adopted regulations or proposed restrictions should be included in Attachment 4 of the plan. Indicate any of the items below that are required by local regulations and also indicate if the requirement is applied each year or just in emergencies.

☒ Time of Day: no watering between 11:00 am and 5:00 pm
(reduces evaporation) ☐ year around ☒ seasonal ☐ emergency only
☒ Odd/Even: (helps reduce peak demand) ☐ year around ☒ seasonal ☐ emergency only
☐ Water waste prohibited (no runoff from irrigation systems)
Describe ordinance:
☐ Limitations on turf areas for landscaping (reduces high water use turf areas)
Describe ordinance:
☒ Soil preparation (such as 4”-6” of organic soil on new turf areas with sandy soil)
Describe ordinance: Where the topsoil is removed, sufficient topsoil shall be set aside for respreading over the developed area. Topsoil shall be restored or provided to a minimum depth of four inches (4") and shall be of a quality at least equal to the soil quality prior to development
☒ Tree ratios (plant one tree for every square feet to reduce turf evapotranspiration)
Describe ordinance: A plan and inventory certified by a forester or landscape architect indicating all of the significant trees and their locations in the proposed development or on the lot. The tree preservation plan shall include the size, species, tag numbers, and location of all significant trees proposed to be saved and removed on the area of development, and the measures proposed to protect the significant trees to be saved.
☐ Prohibit irrigation of medians or areas less than 8 feet wide
Describe ordinance:
☒ Permit/meter required to fill swimming pool ☒ every year ☐ emergency only
☐ Other (describe):

State and Federal Regulations (mandated)

☒ Rainfall sensors on landscape irrigation systems. Minnesota Statute 103G.298 requires “All automatically operated landscape irrigation systems shall have furnished and installed technology that inhibits or interrupts operation of the landscape irrigation system during periods of sufficient moisture. The technology must be adjustable either by the end user or the professional practitioner of landscape irrigation services.”

☒ Water Efficient Plumbing Fixtures. The 1992 Federal Energy Policy Act established manufacturing standards for water efficient plumbing fixtures, including toilets, urinals, faucets,

and aerators.

Enforcement. Are ordinances enforced? ☒ Yes ☐ No If yes, indicate how ordinances are enforced along with any penalties for non-compliance.
City staff actively canvases the City throughout the May 1 to September 30 water restriction period and issues warnings to either time of day or odd/even violators. Repeat violators are assessed a water surcharge for each violation after the first warning. In 2007, staff worked throughout the summer, during and after business hours as well as nights and weekends, accumulating approximately 922staff hours to aggressively enforce Lakeville's time of day and odd/even water restrictions. In total, 2,761 warning notices were issued, of that 346 surcharges were applied to utility bills for continuing violations.

5. **Education and Information Programs.** Customers should be provided information on how to improve water use efficiencies a minimum of two times per year. Information should be provided at appropriate times to address peak demands. Emergency notices and educational materials on how to reduce water use should be available for quick distribution during an emergency. If any of the methods listed in the table below are used to provide water conservation tips, indicate the number of times that information is provided each year and attach a list of education efforts used for the last three years.

2007 Current Education Programs	**Times/Year**
Billing inserts or tips printed on the actual bill	
Consumer Confidence Reports	1
Local news papers	
Community news letters (weekly, included in local newspaper)	22
Direct mailings (water audit/retrofit kits, showerheads, brochures)	
Information at utility and public buildings	1
Public Service Announcements (multiple times per day)	155
Cable TV Programs (including council meetings)	110
Demonstration projects (landscaping or plumbing)	
K-12 Education programs (Project Wet, Drinking Water Institute)	
School presentations	
Events (children's water festivals, environmental fairs)	
Community education	
Water Week promotions	
Information provided to groups that tour the water treatment plant	3
Website (include address: www.ci.lakeville.mn.us)	1
Targeted efforts (large volume users, users with large increases)	
Notices of ordinances (include tips with notices)	2,761
Emergency conservation notices (recommended)	
Other: Permanent signs on major city streets highlighting conservation requirements.	340

List education efforts for the last three years in Attachment 5 of the plan. Be sure to indicate whether educational efforts are on-going and which efforts were initiated as an emergency or drought management effort.

Proposed Education Programs. Describe any additional efforts planned to provide conservation information to customers a minimum of twice per year (required if there are no current efforts).

A packet of conservation tips and information can be obtained by contacting DNR Waters or the Minnesota Rural Water Association (MRWA). The American Water Works Association (AWWA) www.awwa.org or www.waterwiser.org also has excellent materials on water conservation that are available in a number of formats. You can contact the MRWA 800/367-6792, the AWWA bookstore 800/926-7337 or DNR Waters 651/259-5703 for information regarding educational materials and formats that are available.

6. **Retrofitting Programs.** Education and incentive programs aimed at replacing inefficient plumbing fixtures and appliances can help reduce per capita water use as well as energy costs. It is recommended that communities develop a long-term plan to retrofit public buildings with water efficient plumbing fixtures and that the benefits of retrofitting be included in public education programs. You may also want to contact local electric or gas suppliers to see if they are interested in developing a showerhead distribution program for customers in your service area.

A study by the AWWA Research Foundation (Residential End Uses of Water, 1999) found that the average indoor water use for a non-conserving home is 69.3 gallons per capita per day (gpcd). The average indoor water use in a conserving home is 45.2 gpcd and most of the decrease in water use is related to water efficient plumbing fixtures and appliances that can reduce water, sewer and energy costs. In Minnesota, certain electric and gas providers are required (Minnesota Statute 216B.241) to fund programs that will conserve energy resources and some utilities have distributed water efficient showerheads to customers to help reduce energy demands required to supply hot water.

Retrofitting Programs. Describe any education or incentive programs to encourage the retrofitting of inefficient plumbing fixtures (toilets, showerheads, faucets, and aerators) or appliances (washing machines).
All current state code requirements for water conserving fixtures are enforced by the Lakeville Inspections Department. A retrofitting program has not been pursued due to small number of older residences.

Plan Approval. Water Supply Plans must be approved by the Department of Natural Resources (DNR) every ten years. Please submit plans for approval to the following address:

DNR Waters
Water Permit Programs Supervisor
500 Lafayette Road
St. Paul, MN 55155-4032

or Submit electronically to wateruse@dnr.state.mn.us.

Adoption of Plan. All DNR plan approvals are contingent on the formal adoption of the plan by the city council or utility board. Please submit a certificate of adoption (example available) or other action adopting the plan.

Metropolitan Area communities are also required to submit these plans to the Metropolitan Council. Please see PART IV. ITEMS FOR METROPOLITAN AREA PUBLIC SUPPLIERS.

METROPOLITAN COUNCIL

PART IV. ITEMS FOR METROPOLITAN AREA PUBLIC SUPPLIERS

Minnesota Statute 473.859 requires water supply plans to be completed for all local units of government in the seven-county Metropolitan Area as part of the local comprehensive planning process. Much of the required information is contained in Parts I-III of these guidelines. However, the following additional information is necessary to make the water supply plans consistent with the Metropolitan Land Use Planning Act upon which local comprehensive plans are based. Communities should use the information collected in the development of their plans to evaluate whether or not their water supplies are being developed consistent with the Council's Water Resources Management Policy Plan.

Policies. Provide a statement(s) on the principles that will dictate operation of the water supply utility: for example, "It is the policy of the city to provide good quality water at an affordable rate, while assuring this use does not have a long-term negative resource impact."
The City of Lakeville will provide safe, clean water to meet the needs of its residents and continue to follow requirements established federal and state agencies such as the Environmental Protection Agency, Minnesota Department of Health, and Minnesota Department of Natural Resources.

Impact on the Local Comprehensive Plan. Identify the impact that the adoption of this water supply plan has on the rest of the local comprehensive plan, including implications for future growth of the community, economic impact on the community and changes to the comprehensive plan that might result.
There is no anticipated impact by this water suppply plan on local comprehensive or development plans.

Demand Projections

Year	Total Community Population	Population Served	Average Day Demand (MGD)	Maximum Day Demand (MGD)	Projected Demand (MGY)
2010	59,500	58,300	8.82	25.57	3,212
2020	78,400	77,400	9.56	27.72	3,489
2030	88,800	88,800	10.37	30.07	3,785
Ultimate	101,000	101,000	11.25	32.62	4,106

Population projections should be consistent with those in the Metropolitan Council's *2030 Regional Development Framework* or the Communities 2008 Comprehensive Plan update**.** If population served differs from total population, explain in detail why the difference (ie, service to other communities, not complete service within community etc.).
Metropolitan Urban Service Area does not cover all of Lakeville and as a result, water and sanitary sewer service does not extend to entire population.

PLAN SUBMITTAL AND REVIEW OF THE PLAN

The plan will be reviewed by the Council according to the sequence outlined in Minnesota Statutes 473.175. **Prior to submittal to the Council, the plan must be submitted to adjacent governmental units for a 60-day review period.** Following submittal, the Council determines if the plan is complete for review within 15 days. If incomplete, the Council will notify the community and request the necessary information. When complete the Council will complete its review within 60 days or a mutually agreed upon extension. The community officially adopts the plan after the Council provides its comments.

Plans can be submitted electronically to the Council; however, the review process will not begin until the Council receives a paper copy of the materials. Electronic submissions can be via a CD, 3 ½" floppy disk or to the email address below. Metropolitan communities should submit their plans to:

Reviews Coordinator Metropolitan Council 230 E 5th Street, St. Paul, MN 55101	electronically to: watersupply@metc.state.mn.us

ATTACHMENT 1

WELL LOGS

ATTACHMENT 2

LAKEVILLE WELL SITING STUDY

COPY PROVIDED UNDER SEPARATE COVER

ATTACHMENT 3

COMPREHENSIVE WATER PLAN

ATTACHMENT 4

ADOPTED REGULATIONS

CITY OF LAKEVILLE

RESOLUTION

RESOLUTION ADOPTING WATER, SANITARY SEWER, STREET LIGHT RATES, SURFACE WATER MANAGEMENT FEE, STATE WATER TESTING FEE, AND DAKOTA COUNTY (PRIVATE) SEPTIC SYSTEM FEE

NOW THEREFORE, BE IT RESOLVED, that the following utility fees are approved and adopted effective with all accounts billed after February 1, 2008 until changed by the City Council.

I. Sewer Rates

A. Residential

1. Charges shall be based on actual water consumption, or the water consumed during the first quarter of the year, whichever is less.

2. When an account is newly established, the sewer maximum charge shall be set at 18,000 gallons of sewer use. Sewer charge for the remainder of the year will be at this figure, or actual usage, whichever is less. The total for 18,000 gallons is therefore $49.20.

3. A basic sewer charge of $3.30/dwelling unit per quarter will be charged for all accounts.

4. Cost per thousand gallons shall be $2.55.

5. A flat rate of $49.20/dwelling unit per quarter shall be charged to those residential customers who do not have metered water.

6. Residential customers shall be billed for a minimum of 5,000 gallons per quarter.

B. Industrial, Institutional and Commercial

1. Charges shall be based on actual gallons of water consumed.

2. A basic sewer charge of $3.30 per quarter will be charged for all accounts.

3. Cost per thousand gallons of usage shall be $2.55..

4. Industrial, Institutional and Commercial customers shall be billed for a minimum of 5,000 gallons per quarter.

C. Manufactured Home Parks and Multiple dwellings served by a single meter shall be charged for the number of units each quarter at the time the meter is read. The sewer charges for each quarter shall be determined by dividing the total gallons of water by number of units.

1. Charges shall be based on actual water consumption, or the water consumed during the first quarter of the year, whichever is less.

2. A basic sewer charge of $3.30 per quarter per dwelling unit will be charged for all accounts.

3. Cost per thousand gallons of consumption shall be $2.55.

4. The charges per dwelling unit shall be based on a minimum of 5,000 gallons per quarter.

D. When a separate water system is installed and is limited to uses that cannot enter the sewer system, no charge shall be made for sewer on the water metered for said system.

II. Water Rates

A. Residential

1. Charges shall be based on actual metered gallons consumed each quarter.

2. A basic water charge of $6.25 per quarter will be charged for each account.

a) Tier one consumption - Shall be $1.00 per thousand gallons for the first 30 thousand gallons.
b) Tier two consumption - Shall be $1.45 per thousand gallons in excess of 30 thousand gallons but less than or equal to 49 thousand gallons.
c) Tier three consumption - Shall be $2.00 per thousand gallons consumption exceeding 49 thousand gallons.

B. Commercial, Industrial and Institutional

1. Charges shall be based on actual metered gallons consumed each quarter.

2. A basic water charge of $6.25 per quarter will be charged for each account.

a) Tier one consumption - Shall be $1.00 per thousand gallons for the first 30 thousand gallons.

b) Tier two consumption - Shall be $1.45 per thousand gallons in excess of 30 thousand gallons provided none of the water is used for irrigation purposes.
c) Tier three consumption - Shall be $2.00 per thousand gallons consumption exceeding 49 thousand gallons. Commercial, Industrial and Institutional customers shall be exempt from Tier three charges if the account is not used for irrigation purposes.

C. Manufactured Home Parks and multi-family dwellings

1. Charges shall be based on actual metered gallons consumed each quarter.

2. A basic water charge of $6.25 per quarter will be charged for each dwelling unit.

a. Tier one consumption - Shall be $1.00 per thousand gallons for the first 30 thousand gallons per account.
b. Tier two consumption - Shall be $1.45 per thousand gallons in excess of 30 thousand gallons but less than or equal to 49 thousand gallons for each account.
c. Tier three consumption - Shall be $2.00 per thousand gallons consumption exceeding 49 thousand gallons for each account.

D. Irrigation sprinkler accounts shall be billed at $2.00 per thousand gallons.

E. Bulk water accounts

1. Shall be billed at $2.60 per thousand gallons
2. Account setup fee of $10.00/account

F. For those accounts whereby an accurate reading cannot be determined due to faulty meter, water consumption shall be established to be 18,000 gallons per quarter per dwelling unit.

III. State water testing fee $1.59/quarter/connection

IV. Streetlights

1. Utility accounts served by water and/or sanitary sewer

A. Residential	$ 6.05/dwelling unit/quarter
B. Multiple Family	$ 6.05/dwelling unit/quarter
C. Institutional	$ .16930/front foot
D. Commercial/Industrial	$ .16930/front foot
E. New subdivisions, as part of development Contract	$ 24.20/residential dwelling unit

2. Utility accounts not served by water and/or sanitary sewer shall be billed annually

A. Residential	$ 24.20/dwelling unit/year
B. Multiple Family	$ 24.20/dwelling unit/year
C. Manufactured Homes and Manufactured Home Parks	No charge

V. Surface Water Management Fee

1. Utility accounts served by water and/or sanitary sewer
   A. The single family (residential equivalent utility factor) Surface Water Management Utility Fee shall be $5.50/dwelling unit per quarter for those utility accounts served by water and/or sanitary sewer.

2. Utility accounts not served by water and/or sanitary sewer shall be billed annually
   A. The residential equivalent utility factor Surface Water Management Utility Fee shall be $22.00/dwelling unit per year for those accounts not served by water and/or sanitary sewer.

3. New subdivisions, as part of development contracts, $22.00/residential dwelling unit.

VI. Head of households over 65 years of age or living on social security or pension income alone:

1. Enrolled on or before December 7, 1998 shall be entitled to a 30% discount on water and sanitary sewer services to homesteaded residential properties as described in Section I and II above. Said accounts are also exempt from street light charges as described in Section III above.

2. Enrolled after December 7, 1998 shall be entitled to a 30% discount on water, sanitary sewer and street light services to homesteaded residential properties as described in Section I, II and III above subject to a maximum discount based on ten thousand gallons of usage.

3. Persons qualifying for the discount must annually certify that they meet the requirements of this section prior to December 31 of each year in order to receive the benefits in the following year.

VII. A monthly penalty of 1.5% of the unpaid balance or $1.00, whichever is greater will be charged on all delinquent accounts that are greater than $10.00. No penalty will be charged on closed accounts.

VIII. Accounts certified to the County Treasurer/Auditor for collection with the subsequent year's taxes will be charged a $25.00 service charge plus 18% interest per year.

IX. Water Shut-offs

a) During normal business hours	$10.00
b) After normal business hours	$25.00

X. Water Reconnections

a) During normal business hours	$10.00
b) After normal business hours	$25.00

XI. Replace frost bottom - $35.00

XII. Testing of Water Meters (only if meter tests correct) in accordance with Ordinance 7-5-4-6.

a) 5/8" to 1"	$40.00
b) 1 1/4" to 2"	$80.00
c) All other sizes	contract cost (Minneapolis) plus 10%

XIII. Surcharge for water service (penalties) for violation of Ordinance 7-5-12 relating to Emergency (water) Regulations.

a) First violation	Warning
b) Second violations in the same calendar year	$ 50
c) Third violation in the same calendar year	$100
d) Fourth violation in the same calendar year	$150
e) Fifth and subsequent violations in the same calendar year	$200

XIV. Residents with private septic systems shall be billed a private septic system fee of $2.97/year

APPROVED AND ADOPTED by the Lakeville City Council this 17th day of December, 2007.

CITY OF LAKEVILLE

By: Holly Dahl, Mayor

ATTEST:

Charlene Friedges, City Clerk

ORDINANCE NO. 831
WATER USE RESTRICTIONS AND EXEMPTIONS

Disclaimer:
This is provided for informational purposes only. The formatting of this ordinance may vary from the official hard copy. In the case of any discrepancy between this ordinance and the official hard copy, the official hard copy will prevail.

CITY OF LAKEVILLE

DAKOTA COUNTY, MINNESOTA

AN ORDINANCE AMENDING TITLE 7 OF THE

LAKEVILLE CITY CODE TO ADOPT

CHANGES TO WATER USE RESTRICTIONS AND EXEMPTIONS

THE CITY COUNCIL OF THE CITY OF LAKEVILLE ORDAINS:

SECTION 1. Title 7 of the Lakeville City Code is hereby amended to add the following:

7-5-12: WATER USE:

12-1: WATER EMERGENCY:

To protect the health and safety of the consumers, as well as the general welfare, the mayor or his/her designee may impose emergency regulations pertaining to city water use.

A. During an emergency, restrictions for the use of city water may include, but are not limited to, the total prohibition of watering, sprinkling, or irrigation of lawn, grass, turf, or plantings.
B. Restrictions imposed during an emergency shall continue in effect until the end of the emergency and/or removed by the mayor or his/her designee.
C. Notification of restrictions to city water use may be given by publication or by posting in the city hall and at such public places as the council may direct. (Ord. 747, sec. 1, 10-20-2003, eff. 1-1-2004)

7-5-12-2: ANNUAL WATER USE RESTRICTIONS:

To conserve water resources and allow the city's water system flexibility in meeting peak demands, certain limitations must be placed on the city's water supply.

A. An odd-even sprinkling restriction based on street addresses is in effect from May 1 to September 30 each year. Residents with odd numbered addresses may water on odd numbered calendar days; residents with even numbered addresses may water on even numbered calendar days.
B. Homeowners' associations and apartment complexes that provide a common irrigation system may water only every other day. Homeowners' associations and apartments north of 185th Street may water on odd numbered days and those south of 185th Street may water on even numbered days.
C. City water cannot be used for the purposes of irrigating or watering lawns, sod, or seeded areas

between eleven o'clock (11:00) A.M. and five o'clock (5:00) P.M. daily. (Ord. 747, sec. 1, 10-20-2003, eff. 1-1-2004)

-12-3: EXCEPTIONS:

The water use restrictions in section 7-5-12-2 of this chapter do not apply in the following situations:

A. Limited hand watering of gardens and plants using a hose.
B. Watering of areas with new sod or seed within thirty (30) days of installation.
C. Watering from a source other than the city's water supply if the water user has registered the alternative source with Dakota County and the alternative source is properly permitted by the state of Minnesota. Under this exemption, the city may inspect the property to ensure compliance. (Ord. 747, sec. 1, 10-20-2003, eff. 1-1-2004)

7-5-12-4: PENALTIES:

A. Failure to comply with restrictions or prohibitions imposed under this section 7-5-12 shall result in a surcharge for water service for each violation in an amount determined by resolution of the city council, which will be added to the water bill for the property on which such violation occurs.
B. Violators will be notified prior to the imposition of a surcharge. An initial notice of violation will be given to the violator. Subsequent violations in the same calendar year will result in the imposition of a surcharge. Notices of surcharge for violations occurring after receipt of the initial notice shall be mailed to the property owner. The city shall presume receipt of the notice of surcharge three (3) days after mailing. (Ord. 747, sec. 1, 10-20-2003, eff. 1-1-2004)

SECTION 2. This ordinance shall be effective immediately upon its passage.

ADOPTED this 17th day of December, 2007, by the City Council of the City of Lakeville, Minnesota.

CITY OF LAKEVILLE

BY:

_____

Holly Dahl, Mayor

ATTEST:

_____

Charlene Friedges, City Clerk

10-4-11: TREE PRESERVATION:

The following process for preserving significant trees shall be required of subdividers and home builders. Subdividers shall preserve, where feasible, all healthy trees of significant value even if the trees are less than six inches (6") in diameter.

A.Definitions: The following words and terms, whenever they occur in this section, are defined as follows:

DIAMETER: The measurement of a tree's trunk measured four and one-half feet (4.5') above the ground.

DRIP LINE: The farthest distance away from the trunk of a tree that rain or dew will fall directly to the ground from the leaves or branches of the tree or one foot (1') per one inch (1") of diameter, whichever is greater.

SIGNIFICANT TREE: A healthy tree measuring six inches (6") in diameter or greater.

TREE CERTIFICATION: A certified inventory of trees on the site after work is complete listing all trees and their final disposition, which is signed by a licensed forester or landscape architect.

TREE PRESERVATION PLAN: A plan and inventory certified by a forester or landscape architect indicating all of the significant trees and their locations in the proposed development or on the lot. The tree preservation plan shall include the size, species, tag numbers, and location of all significant trees proposed to be saved and removed on the area of development, and the measures proposed to protect the significant trees to be saved.

TREE PROTECTION: Snow fencing or polyethylene laminar safety netting placed at the drip line of the significant trees to be preserved. The tree protection measures shall be shown on tree preservation plan drawings and remain in place until all grading and construction activity is terminated.

B.Subdividers:

1. Subdividers shall:

a. Prepare a tree preservation plan superimposed on the grading plan.

b. Ensure the tree preservation plan is followed during the plan development (mass grading).

c. Submit a five hundred dollar ($500.00) security for the preparation of individual lot tree preservation plans for each mass graded lot with at least one significant tree to be saved and for each custom graded lot with at least one significant tree and a one thousand dollar ($1,000.00) security per lot for tree preservation requirements. The security will be included in the development contract.

2. The tree preservation plan must be certified by a forester or landscape architect. The forester or landscape architect shall indicate on the plan the following items:

a. Mass graded areas and proposed grades.

b. Custom graded lots.

c. Size, species, tag numbers, and location of all significant trees.

d. Identification of all significant trees proposed to be saved and significant trees proposed to be

removed.

e. Measures proposed to protect significant trees shall include, but are not limited to:

(1) Installation of snow fencing or polyethylene laminar safety netting at the drip line.

(2) Placing fill against the trunk of the tree, on the root crown, and under the drip line of the tree shall be prohibited.

(3) Installation of erosion control measures.

(4) Prevention of change in soil chemistry due to concrete washout and leakage or spillage of toxic materials such as fuels or paints.

(5) Pruning of oak trees must not take place from April 15 through July 1. If wounding of oak trees occurs, a nontoxic tree wound dressing must be applied immediately. Excavators must have a nontoxic tree wound dressing with them on the development site. (Ord. 673, sec. 1, 7-17-2000)

3. During preliminary plat review, the tree preservation plan will be reviewed according to the best available layout to preserve significant trees and the efforts of the subdivider to mitigate damage to significant trees. If two (2) trees are preserved on each lot (preferably the front yard of the lot), the landscape plan requirements of two (2) 2 1/2-inch caliper trees are waived. (Ord. 731, sec. 24, 3-17-2003)

4. The subdivider shall provide a financial guarantee as part of the development contract to guarantee replacement of all significant trees which were to have been saved but were actually destroyed or damaged. A financial security for each mass graded lot with at least one significant tree to be saved and a financial security for each custom graded lot with at least one significant tree shall be provided as part of the development contract to ensure tree protection. The financial security, generally one thousand dollars ($1,000.00) per lot, will be determined by the community and economic development department based on the number and size of trees to be saved.

5. After mass grading has been completed and streets and utilities installed, the forester or landscape architect shall:

a. Certify in writing to the city the status of all trees indicated as save trees in the approved plan.

b. Certify in writing to the city whether tree protection measures were installed.

c. Certify the status of any remove designated trees that were saved.

6. If a significant tree indicated to be saved on the tree preservation plan is destroyed or damaged, the tree replacement policy will be enforced by the city. (See tree replacement guidelines.)

7. The financial security will be released upon: a) certification in writing by the forester or landscape architect indicating the tree protection measures were installed on mass graded lots and tree replacement is completed, if necessary; and/or b) the builders have posted security for the custom graded lots.

8. Removal of tree preservation measures shall require written approval from the city engineer. Tree preservation measures shall not be removed from the site until the city engineer has approved the grading as built plans for a mass graded site nor prior to the release of financial securities held by the city.

C.Home Builders:

1. The city will require an individual lot tree preservation plan prepared and incorporated on the required site survey for each custom graded lot with at least one significant tree or any lot with trees designated as custom save. The plan shall be consistent with the original tree preservation plan for the plat. The homeowner, builder and the forester or landscape architect shall meet prior to the development of the individual lot tree preservation plan to determine the placement of the home where the fewest significant trees would be destroyed or damaged. The builder will be responsible for ensuring the tree preservation plan is followed during building construction.

On mass graded lots with at least one significant tree to be saved, builders are required to follow the tree preservation plan for the plat.

2. The individual lot tree preservation plan must be certified by a forester or landscape architect and signed by the homeowner. The forester or landscape architect will indicate on the plan the following:

a. Size, species, and location of all significant trees.

b. Identification of all significant trees proposed to be saved and significant trees proposed to be removed.

c. Measures proposed to protect significant trees shall include, but are not limited to:

(1) Installation of snow fencing or polyethylene laminar safety netting placed at the drip line.

(2) Placing fill against the trunk of the tree, on the root crown, and under the drip line of the tree shall be prohibited.

(3) Installation of erosion control methods.

(4) Prevention of change in soil chemistry due to concrete washout and leakage or spillage of toxic materials such as fuels or paints.

(5) Pruning of oak trees must not take place from April 15 through July 1. If wounding of oak trees occurs, a nontoxic tree wound dressing must be applied immediately. Excavators must have a nontoxic tree wound dressing with them on the development site.

3. Home builders will be required to furnish the following items for tree preservation at the time the building permit application is submitted for all lots with at least one significant tree:

a. Security of one thousand dollars ($1,000.00) per lot for tree protection requirements.

b. Certified tree plan.

c. Builders are liable for subcontractors that destroy or damage significant trees that were indicated to be saved on the individual lot tree preservation plan.

4. Building inspectors will monitor the tree protection measures at the time of routine inspections.

5. Prior to the issuance of a certificate of occupancy and release of tree preservation security, the forester or landscape architect shall certify to the city in writing the final disposition of safe trees on the lot and that all the tree protection measures identified on the tree preservation plan were installed from the start of construction to the end of construction and tree replacement is completed, if necessary.

D. Tree Replacement Policy: Subdividers and builders shall be required to replace the significant trees which were indicated on the tree preservation plan to be saved but ultimately were destroyed or damaged. The subdivider and builder shall be required to replace each of the significant trees destroyed or damaged with two (2) replacement trees. Replacement trees must consist of nursery stock and be no less than the following sizes: (Ord. 673, sec. 1, 7-17-2000)

1. Deciduous trees: No less than two and one-half inches (2 1/2") in diameter. (Ord. 731, sec. 25, 3-17-2003)

2. Coniferous trees: No less than six feet (6') high.

Replacement trees shall be species similar to the trees which were destroyed or damaged and can include those species shown on the following table:

Deciduous Trees:	Maples	Oak
	Linden (Basswood)	Ash
	Green ash	Birch
	Honeylocust	Ginkgo (male only)
	Hackberry	Kentucky coffee tree
Coniferous Trees:	Common Name	Scientific Name
	Fir	Abies (all varieties)/
	pseudotsuga	
	Colorado blue	Picea pungens
	and green spruce	
	Black Hills spruce	Picea abies
	Austrian pine	Pinus nigra
	White pine	Pinus strobus

Replacement trees shall not be placed on easements or street rights of way. The city shall determine the locations of tree replacement for subdividers' tree plans. If tree replacement is required on the individual lot because the builder destroyed or damaged a tree which was to be saved, the forester or landscape architect shall determine where the replacement trees shall be installed. (Ord. 673, sec. 1, 7-17-2000)

10-4-5: EROSION AND SEDIMENT CONTROL:

A. The development shall conform to the natural limitations presented by topography and soil so as to create the least potential for soil erosion.

B. Erosion and siltation control measures shall be coordinated with the different stages of construction. Appropriate control measures shall be installed prior to development when necessary to control erosion.

C. Land shall be developed in increments of workable size such that adequate erosion and siltation controls can be provided as construction progresses. The smallest practical area of land shall be exposed at any one period of time.

D. When soil is exposed, the exposure shall be for the shortest feasible period of time, as specified in the development agreement.

E. Where the topsoil is removed, sufficient topsoil shall be set aside for respreading over the developed area. Topsoil shall be restored or provided to a minimum depth of four inches (4") and shall be of a quality at least equal to the soil quality prior to development.

F. Natural vegetation shall be protected wherever practical.

G. Runoff water shall be diverted to a sedimentation basin before being allowed to enter the natural drainage system.

H. The developer shall comply with current City specifications for erosion and sediment control, including any specifications or design standards specifically adopted to provide additional protection to various categories of water bodies as defined in Section 10-4-7 of this Chapter.

I. Development shall comply with and follow all best management practices for erosion and sedimentation control as specified in the MPCA publication "Protecting Water Quality in Urban Areas", as may be amended. (Ord. 673, sec. 1, 7-17-2000)

7-5-4-1: METERS REQUIRED:

Before any water conveyed through the municipal water system shall be used or utilized on the premises of person, there shall be installed a water meter that will accurately measure the water consumed on the premises. The outside reader for the water meter shall be located on the front of a home or within three feet (3') of the front of the home. (Ord. 502, sec. 1, 6-7-1993)

ATTACHMENT 5

EDUCATION AND INFORMATION PROGRAMS

2004 Education Programs	Times/Year
Billing inserts or tips printed on the actual bill	
Consumer Confidence Reports	1
Local news papers	
Community news letters (weekly, included in local newspaper)	5
Direct mailings (water audit/retrofit kits, showerheads, brochures)	
Information at utility and public buildings	
Public Service Announcements (multiple times per day)	
Cable TV Programs (including council meetings)	40
Demonstration projects (landscaping or plumbing)	
K-12 Education programs (Project Wet, Drinking Water Institute)	
School presentations	
Events (children's water festivals, environmental fairs)	
Community education	
Water Week promotions	
Information provided to groups that tour the water treatment plant	7
Website (include address: www.ci.lakeville.mn.us)	
Targeted efforts (large volume users, users with large increases)	
Notices of ordinances (include tips with notices)	362
Emergency conservation notices (recommended)	
Other:	

2005 Education Programs	Times/Year
Billing inserts or tips printed on the actual bill	2
Consumer Confidence Reports	1
Local news papers	
Community news letters (weekly, included in local newspaper)	22
Direct mailings (water audit/retrofit kits, showerheads, brochures)	1
Information at utility and public buildings	
Public Service Announcements (multiple times per day)	155
Cable TV Programs (including council meetings)	70
Demonstration projects (landscaping or plumbing)	
K-12 Education programs (Project Wet, Drinking Water Institute)	
School presentations	
Events (children's water festivals, environmental fairs)	
Community education	
Water Week promotions	
Information provided to groups that tour the water treatment plant	7
Website (include address: www.ci.lakeville.mn.us)	155
Targeted efforts (large volume users, users with large increases)	
Notices of ordinances (include tips with notices)	1,020
Emergency conservation notices (recommended)	
Other:	

2006 Current Education Programs	Times/Year
Billing inserts or tips printed on the actual bill	
Consumer Confidence Reports	1
Local news papers	
Community news letters (weekly, included in local newspaper)	22
Direct mailings (water audit/retrofit kits, showerheads, brochures)	
Information at utility and public buildings	1
Public Service Announcements (multiple times per day)	155
Cable TV Programs (including council meetings)	110
Demonstration projects (landscaping or plumbing)	
K-12 Education programs (Project Wet, Drinking Water Institute)	
School presentations	
Events (children's water festivals, environmental fairs)	
Community education	
Water Week promotions	
Information provided to groups that tour the water treatment plant	7
Website (include address: www.ci.lakeville.mn.us)	1
Targeted efforts (large volume users, users with large increases)	
Notices of ordinances (include tips with notices)	1,910

Messages from the City of Lakeville

This week's meetings

No meetings this week

All meetings held at City Hall, 20195 Holyoke Ave., unless otherwise noted. Agendas for each meeting are posted on the City website, *www.lakevillemn.gov*.

Construction update

Progress on all projects is weather permitting.

County Road 70/I-35

The first phase of the County Road 70/I-35 interchange project has begun. This phase will include reconstruction work on County Road 70 west of I-35, the two south frontage roads that are being relocated, and the temporary connection to Keokuk on the north. Sanitary sewer work will also begin on the west side of I-35, along the north side of County Road 70. Work will be done under traffic, but delays can be expected.

Dodd Boulevard

Dodd Boulevard from County Road 50 to the City limits is scheduled for milling on Monday, June 9 and paving on Tuesday, June 10.

County Road 60 (185th Street)

County Road 60 from Ipava to County Road 50 is scheduled to be milled on Tuesday, June 10, and paved on Wednesday, June 11.

Mark your calendars

June 7 - Sign up for flag exchange

The Lakeville VFW is offering a free flag exchange. Sign up on June 7 at the VFW, 8790 Upper 208th St., (behind Ace Hardware in downtown Lakeville) from 1 to 8 p.m. Then, on Flag Day, June 14, those who signed up can exchange their old or damaged flag for a new replacement. One flag per family for those who sign up on June 7. The VFW will properly retire the old flags.

WATER CONSERVATION IN EFFECT

NO LAWN WATERING 11 AM – 5 PM DAILY

ODD / EVEN WATERING MAY – SEPT

Watering restrictions

Odd/even and time-of-day watering restrictions are in effect through September 30. There is a non-compliance surcharge of $50 or more per violation. Please follow the watering rules.

Conservation tip of the week

Dispose of pet waste properly

Pet waste disposal may not spring to mind when you think of protecting the water resources in Lakeville, but it certainly plays a role in water pollution. Leaving pet waste on your lawn or driveway allows it to wash into the storm sewer and pollutes Lakeville's lakes, ponds, and streams with dangerous bacteria. By disposing of pet waste properly you will be doing your part to protect yourself and the environment.

Responsible pet owners help others enjoy City neighborhoods and parks

The City's parks, trails, and open spaces are amenities that all residents enjoy. Canines enjoy the parks and trails as well. But, pet owners who take their dogs on walks through the community must also take responsibility for obeying Lakeville's animal ordinances.

Most pet owners realize that owning a dog is a responsibility and they carefully obey the laws. However, it's the few who don't that infringe on others' ability to enjoy walks in the City's parks and trails or through neighborhoods.

Leash Law

Dogs are not allowed to be at large within the City. Lakeville established this dog leash law in 2001. The law supports responsible pet ownership that allows others to feel safe from dogs while in public places. No dog can be in a City park or on a City street, trail, or sidewalk unless on a leash. The leash must not exceed 25 feet in length. When a pedestrian is within 100 feet, the dog must immediately be brought under close control (by the owner's side).

The only exceptions are for dogs that have received an American Kennel Club "Canine Good Citizen" certificate or dogs with an electronic training collar. Pet owners who go through the effort of training their dogs to this responsibility level are recognized with this exception. Proof of certification is required. While certified Canine Good Citizen dogs may be walked off-leash, they must still be called into close control when pedestrians are within 100 feet.

This law is in effect everywhere in the community except in your own yard or when permission is granted on someone else's private property. In addition, in Ritter Farm Park, all dogs must be kept under close control at all times.

Cleanup

Pet owners are responsible for cleaning up any waste their dogs leave on any public or private property. This includes City parks and trails. Dog owners must immediately remove any waste left by their animal and dispose of it in a sanitary manner. Dog owners must carry a plastic disposal bag anytime they walk their dog.

Licensing

Any dog over six months of age must be licensed. The license tag must be worn by the dog at all times. A certificate of rabies vaccination must be presented before a license is issued. Licensing protects public safety by providing a way to insure that all dogs are properly vaccinated against rabies. Licensing also helps make sure you can be located quickly if your dog strays, is stolen, or gets injured. Dog licenses are available at City Hall, 20195 Holyoke Avenue.

The Police Department and Park Rangers continue educating dog owners about the City's dog regulations and will issue warning tickets or citations. For more information, call Animal Control at 612-718-3918.

Animal Control Officer Barb Maxwell keeps her dog Twix on a leash whenever they go for a walk and she carries a bag for pet waste disposal as City ordinance requires.

Start planning for National Night Out

Start planning your National Night Out celebration now! This year is the 25th anniversary and the perfect year for a neighborhood party.

Tuesday, Aug. 5, 2008

- The new Lakeville police station will open this August and Chief Vonhof and the police department want to make this the best Lakeville National Night Out yet.

- If you haven't organized or attended a neighborhood party in the past–this is the year to put an event together.

- National Night Out parties strengthen police and community partnerships, help build community as neighbors meet neighbors, and heighten crime prevention awareness throughout the City. Parties are easy to organize and fun for everyone.

Watch for upcoming information and party ideas on the City website at *www.lakevillemn.us*.

For more information, contact Lori Clemmer, Lakeville's National Night Out coordinator, at 952-985-2829.

Let's make it the best NNO yet!

NIGHT OUT 25

Messages from the City of Lakeville

This week's meetings

June 2	City Council , 7 p.m.
June 4	Parks, Rec., & NR, 6 p.m.
June 5	Planning Commission, 6 p.m.

All meetings held at City Hall, 20195 Holyoke Ave., unless otherwise noted. Agendas for each meeting are posted on the City website, *www.lakevillemn.gov.*

Mark your calendars

June 7 - Sign up for flag exchange

The Lakeville VFW is offering a free flag exchange. Sign up on June 7 at the VFW, 8790 Upper 208th St., (behind Ace Hardware in downtown Lakeville) from 1 to 8 p.m. Then, on Flag Day, June 14, those who signed up can exchange their old or damaged flag for a new replacement. One flag per family for those who sign up on June 7. The VFW will properly retire the old flags.

Starting June 18–Farmers' Market New location–Arts Center parking lot

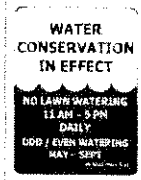
The St. Paul Farmers' Market returns to Lakeville on Wednesdays from noon to 5 p.m. beginning June 18. This year, the market will move to the Arts Center parking lot on Holyoke and 210th.

AirExpo moved

Due to safety considerations, the AirExpo 2008 will move back to Flying Cloud Airport in Eden Prairie. For more information, check the website at *www.wotn.org.*

Pan-O-Prog memorabilia wanted

The Pan-O-Prog Past Presidents group recently presented a check to Lakeville Area Historical Society members Vern Jensen, Sue Blanchard, and Wally Potter (second left to right) to fund a Pan-O-Prog memorabilia display at the Historical Society Building, 8795 210th Street. Also shown is Past President Robert Erickson (left). Residents are encouraged to donate any Pan-O-Prog items for the display. For more information, call the Historical Society at 952-469-0373.



Watering restrictions

Odd/even and time-of-day watering restrictions are in effect through September 30. There is a non-compliance surcharge of $50 or more per violation. Please follow the watering rules.

Construction season begins June 2

Lakeville's biggest construction project this summer, the County Road 70/I-35 interchange, and several overlay and reclamation projects are scheduled to begin in June.

County Road 70/I-35 interchange

This two-year county project will include reconstruction of a one-mile section of County Road 70, reconstruction of the I-35 ramps, bridge replacement over I-35, and the realignment of frontage roads at County Road 70 and I-35. County Road 70 will be widened to a four-lane divided highway.

The project will be constructed in stages. The new ramps, loops, frontage roads, and a portion of County Road 70 will be constructed in 2008. This portion of the project will be done under traffic. Construction will begin on the two south frontage roads that are being relocated and the temporary connection to Keokuk on the north. Sanitary sewer work will also begin on the west side of I-35, along the north side of County Road 70.

The existing bridge over I-35 will be removed in spring 2009 and construction of the new bridge and the remaining portion of County Road 70 is expected to be completed during the construction season. The construction company on the project bid 100 days to complete the new bridge. The daily cost of inconvenience to road users has been calculated to be $10,000. Using a cost plus time bidding method, the construction company will be charged $10,000 per day for each day over the 100 day bid. This type of bid was used to minimize construction time and delays on this high-volume construction project. Once complete, the new bridge and interchange will be able to handle increased traffic flow and will enhance safety.

Overlay and reclamation projects

Dakota County has scheduled two overlay projects in Lakeville during the week of June 2. Work areas include **Dodd Boulevard from County Road 50 south to the City limits, and 185th Street from Ipava Avenue to County Road 50.**

Judicial Road from 185th Street to 205th Street is also scheduled for overlay beginning June 9.

Reclamation will begin in the **Valley Park area** on June 16. The project will include reclamation (grinding the street surface), curb and gutter repair, sidewalk repair, and street resurfacing.

Warning siren reminders

The recent tornado in Hugo should be a reminder to Lakeville residents of how important it is to be prepared and aware of what warning siren activation means. The policy in Dakota County is to activate sirens when a severe thunderstorm warning or a tornado warning has been issued by the National Weather Service.

The warning siren system is designed as an outdoor warning system and its purpose is to give people outdoors adequate warning that a dangerous storm is approaching. "The siren is a notification method to have people seek shelter and then use their radio or televisinn to find out what is happening," said Sgt. John Kornmann, Emergency Management Director for Lakeville.

When a siren sounds, residents who are outdoors should immediately go inside. All residents should turn on a radio or television to find out where the storm is, what towns will be affected, and the primary threat associated with the storm. Do not think that the threat is over when the sirens have stopped. In Dakota County warning sirens have an internal timer that is set for a three-minute activation and no "all clear" will be sounded.

"Weather Alert Radios that are sold at a variety of stores are another good tool to alert you to threatening weather conditions," said Kornmann. These radios, which cost about $30, can be programmed for Dakota County information.

"Residents should also take this opportunity to make sure that they have all their insurance and other important documents stored in a secure place," said Kornmann.

There are a number of websites that can give you and your family important preparedness information. Minnesota's emergency preparedness website is *www.codeready.com.* Links to other preparedness information can be found on the City website at *www.lakevillemn.gov.*

Kornmann said that residents who wish to help victims of the Hugo tornado can make contributions to the Red Cross or Salvation Army. "These agencies are dealing directly with the situation and can direct funds where they can do the most good," said Kornmann.

Conservation tip of the week

There are over 5,500 storm drains in Lakeville. Each one is a direct pathway to neighborhood ponds, wetlands, streams, or lakes. Even if you don't live near a water body, storm drains still carry water to them from your neighborhood. Keep our waters clean by sweeping grass clippings and fertilizer back onto the lawn where it is needed.

Messages from the City of Lakeville

Annual report on drinking water quality for Lakeville

The City of Lakeville is pleased to share the results of testing on tap water provided to residents for the period of Jan. 1 to Dec. 31, 2007. For the past eight years, the City's Utility Department has distributed this annual report to provide accurate information that summarizes the Environmental Protection Agency's testing regulations to ensure water quality. The purpose of the report is to advance consumers' understanding of drinking water and heighten awareness of the need to protect precious water resources.

Sources of your drinking water

Lakeville provides drinking water to its residents from a groundwater source: 16 wells ranging from 460 to 864 feet deep, that draw water from the Prairie Du Chien/Jordan aquifer and the Franconia Ironton Galesville formation. Lakeville drinking water meets all drinking water standards, but sources of water may potentially be susceptible to contamination. 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 online at *www.health.state.mn.us/divs/eh/water/swp/swa*. Call 952-985-2740 if you have questions about City of Lakeville drinking water or would like information about opportunities for public participation in decisions that may affect the quality of drinking water.

Results of monitoring

No substances were detected at levels that violated federal drinking water standards. However, some substances were detected in trace amounts that were below legal limits. The adjacent table shows the substances that were detected in trace amounts last year. (Some substances are sampled less frequently than once a year; as a result, not all substances were sampled in 2007. If any of these substances were detected the last time they were sampled for, they are included in the table along with the date 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.
pCi/l - PicoCuries per liter (a measure of radioactivity).
ppb - Parts per billion, which can also be expressed as micrograms per liter (ug/l).
ppm - Parts per million, which can also be expressed as milligrams per liter (mg/l).
N/A - Not applicable (does not apply).

Compliance with national regulations

The sources of drinking water (both tap 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.

Monitored substances that may be present in source water include:
Microbial substances, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
Inorganic substances, 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 substances, 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 substances, 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 substances in water provided to public water systems. Food and Drug Administration regulations establish limits for substances 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 substances. The presence of substances does not necessarily indicate that water poses a health risk. More information about substances and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline at 1-800-426-4791.

Some people may be more vulnerable to substances 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 are available from the Safe Drinking Water Hotline at 1-800-426-4791.

Meeting all federal standards

Substance (units)	MCLG	MCL	Level Found: Range (2007)	Level Found: Average/ Result*	Typical Source of Substance	Meets standards
Alpha Emitters (pCi/l) (10/18/2004)	0	15.4	N/A	11.2	Erosion of natural deposits.	✓
Combined Radium (pCi/l) (10/18/2004)	0	5.4	N/A	3.1	Erosion of natural deposits.	✓
Fluoride (ppm)	4	4	1-1.2	1.23	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 & aluminum factories.	✓
Haloacetic Acids (HAA5) (ppb)	0	60	N/A	6.3	By-product of drinking water disinfection	✓
TTHM (Total trihalomethanes) (ppb)	0	80	N/A	9.3	By-product of drinking water disinfection.	✓
Total Coliform Bacteria	0	>5%	N/A	0%	Naturally present in the environment.	✓

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

Substance (units)	MRDLG	MRDL	****	*****	Typical Source of Substance
Chlorine (ppm)	4	4	.01 - 1.39	.48	Water additive to control microbes.

**** Highest and lowest monthly average.
***** Highest monthly average

Substance (units)	MCLG	A.L.	90% Level	# of sites over A.L.	Typical Source of Substance
Copper (ppm)	N/A	1.3	0.86	1 of 30	Corrosion of household plumbing systems; erosion of natural deposits.
Lead (ppb)	N/A	15	3	0 of 30	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. The City of Lakeville is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water is 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 the 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 are available on the State Drinking Water website at *www.epa.gov/safewater/lead*

Some substances do not have Maximum Contaminant Levels established for them. These "unregulated contaminants" are assessed using state standards known as health risk limits to determine if they pose a threat to human health. If unacceptable levels of an unregulated substance are found, the response is the same as if an MCL has been exceeded: the water system must inform its customers and take other corrective actions. In the table that follows are the unregulated substances that were detected.

Substance (units)	Level Found: Range (2007)	Level Found: Average/ Result	Typical Source of Substance
Sodium (ppm)	N/A	4.4	Erosion of natural deposits
Sulfate (ppm)	N/A	7.02	Erosion of natural deposits

Messages from the City of Lakeville

This week's meetings

May 19	**City Council, 7 p.m.**
May 21	**Parks, Rec., & NR, 6 p.m.**
May 22	**Planning Commission, 6 p.m.**

All meetings held at City Hall, 20195 Holyoke Ave., unless otherwise noted. Agendas for each meeting are posted on the City website, *www.lakevillemn.gov.*

Mark your calendars

May 17–Citywide Garage Sale
8 a.m. to 4 p.m., 200 garage sales throughout the City. Map available online.

May 18– "For the Birds!"
Ritter Farm Park, 19300 Ritter Tr., 11 a.m. to 1 p.m. Raptors and bird experts and activities including bird banding and build a birdfeeder. FREE!

May 26– Memorial Day observance
Lakeville Veterans Memorial (Aronson Park)
1 to 1:45 p.m. Speaker, Congressman John Kline.

Starting June 18–Farmers' Market New Location–Arts Center Parking lot
The St. Paul Farmers' Market returns to Lakeville on Wednesdays from noon to 5 p.m. beginning June 18. This year, the market will move to the Arts Center parking lot on Holyoke and 210th.

Lakeville Government Television updates *Messages* show

Did you know that you can get the latest updates on City events by watching the *Messages* show on Lakeville Government Channel 16? Updated twice a month, *Messages* is one of the City's most popular cable shows.

Messages is now being expanded to include new and timely segments of interest to residents. The new format will be hosted by City Administrator Steve Mielke, who will be interviewing guests from the community who are involved in events, activities, and development in the City.

In addition to timely interviews, the show also includes a variety of the following segments:

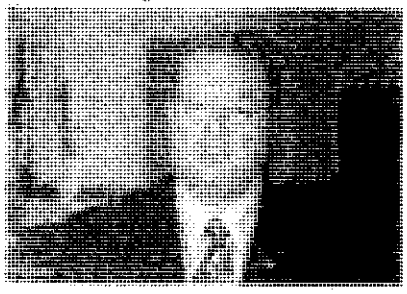
- History Moment
- Focus on Business
- Chief's Report
- Park & Rec update
- Arts Center Presents
- Senior Center update (including recipe of the month)
- Pet tips
- Nature Connections
- Cellar Notes with Lakeville Liquors
- Meet the City employee

The combination of segments will offer residents a glimpse into current City events. Because the show is updated twice a month, the content will always be current.

Check out the new format and find out what's going on around Lakeville. The new schedule for *Messages* on cable channel 16 is:

- Sunday–4 a.m., 8 a.m., noon, 9 p.m.
- Monday–6 a.m., 9 a.m., noon
- Tuesday–6 p.m.
- Wednesday–6 a.m., 9 a.m., noon, 6 p.m.
- Thursday–1 a.m., 9 p.m.
- Friday–2 a.m., 6 a.m., noon, 6 p.m.
- Saturday–6 a.m., 9 a.m.

The show can also be seen online anytime at *www.lakevillemn.gov.*



City Administrator Steve Mielke is the new host of *Messages*.

Bids accepted on trap rock

The City of Lakeville is accepting bids on 1,450 cubic yards of 1/8 inch trap rock. This item will be sold in its entirety; bids for portions will not be accepted. The City makes no warranty or guarantee regarding the condition of the item being sold. The City reserves the right to reject any and all bids and reserves the right to award the bid in the best interest of the City.

Bids must be received before 2 p.m., Thursday, May 29 at City Hall, 20195 Holyoke Ave., Lakeville, MN. Bids are to be placed in a sealed envelope with the following information indicated on the outside of the envelope:
Bid: 1/8" trap rock

Mail bids to: Dennis Feller, Lakeville City Hall, 20195 Holyoke Ave., Lakeville, MN 55044.

More information and a bid form are available on the City website at *www.lakevillemn.gov,* under For Your Information, on the home page. Persons wanting additional information about the item should contact Mark Roschen at 952-985-2731 or mroschen@lakevillemn.gov.

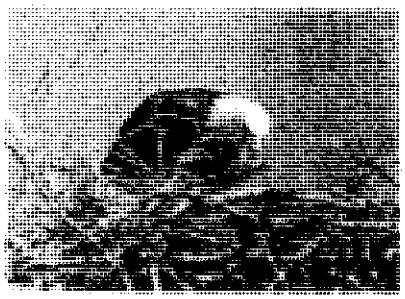
Find/report eagle sightings on website

Lakeville's pair of bald eagles appear to be caring for at least one new eaglet this spring. Last year, their first as a nesting pair, the two successfully hatched two eaglets that grew up, learned to fly, and left the nest.

Now, after being observed in April feathering their nest (literally) the pair are taking turns watching the nest, where one tiny head has been seen popping up.

The nested pair stayed in Lakeville throughout the winter and could be seen flying over Lake Marion and elsewhere in the City. The Parks & Recreation Department keeps track of their nest and receives numerous calls from residents about sightings of the eagles.

If you would like to report a sighting or want to find out where the eagles have been seen, check the new eagle sighting log on the City website at *www.lakevillemn.gov,* under For Your Information. The eagle page also has photographs of Lakeville's eagles that are updated regularly.



Lakeville's female eagle could be seen feathering her nest this spring by plucking feathers from her chest and placing them in the interior of her nest, where a new eaglet has now been spotted.

WATER CONSERVATION IN EFFECT

Watering

Odd/even and time-of-day watering restrictions are in effect through September 30. Non-compliance surcharge of $50 or more per violation.

Free open house for at-risk homeowners

If you are worried about your next house payment or are concerned about your interest rate changing, the Minnesota Home Ownership Center, in conjunction with the Dakota County Community Development Agency (CDA) is offering a free open house to answer your questions. The free and confidential workshop will give you an opportunity to ask questions and get free advice from mortgage lending and foreclosure prevention specialists.

Thursday, June 5
4:30–7:30 p.m.
Eagan Community Center
1501 Central Parkway

Messages from the City of Lakeville

This week's meetings

May 12 **Council Work Session, 5:30 p.m.**

May 13 **Telecommunications, 6 p.m.**

All meetings held at City Hall, 20195 Holyoke Ave., unless otherwise noted. Agendas for each meeting are posted on the City website, *www.lakevillemn.gov.*

Mark your calendars

May 10–Family Fun Fest
6 to 10 p.m., Ames Arena. Food, fun, and activities for the family. Moon Walk, Beat the Goalie, Soccer Shoot Out, and more. Movie at 8:15 p.m.

May 15– Taste of Lakeville
Lakeville Area Arts Center, 5 p.m. Check *www.taste-of-lakeville.org* for details and ticket prices.

May 17– "For the Birds!"
Ritter Farm Park, 19300 Ritter Tr., 11 a.m. to 1 p.m. Raptor and bluebird experts and activities including bird banding.

May 26– Memorial Day observance
Lakeville Veterans Memorial (Aronson Park)
1 to 1:45 p.m. Speaker, Congressman John Kline.

Citywide Garage Sale May 17, 8 a.m. to 4 p.m.

Almost 200 garage sales are now registered for Lakeville's Citywide Garage Sale on Saturday, May 17, 8 a.m. to 4 p.m.

A map showing all the garage sale locatiuns is now available for viewing or printout from the City website at *www.lakevillemn.gov.* Beginning May 13 through 16, printed maps will also be available for $2 at City Hall.

RV dump site now open at new WTF location

Water is now available at the new recreational vehicle wastewater site on Ipava Avenue, just north of the Water Treatment Facility. Directional signs are posted.

Campers and other recreational vehicles can use the site to empty wastewater directly into the sanitary sewer system. The site is open throughout the year, but water for rinsing and cleaning is turned on only during warm weather. There is no charge for using this site.

WATER CONSERVATION IN EFFECT

Watering

Odd/even and time-of-day watering restrictions are in effect through September 30. Non-compliance surcharge of $50 or more per violation.

"For the Birds!" at Ritter Farm Park

Lakeville's nesting eagles are currently guarding new eaglets. In honor of these eagles who have made Lakeville their home, the Parks and Recreation Department is throwing a "nest warming" party.

For the Birds!
Nest warming party and bird celebration
Sunday, May 18
11 a.m. to 1 p.m.
Ritter Farm Park, 19300 Ritter Trail

The celebration will provide a unique opportunity to interact with bird experts while enjoying Ritter Farm Park. Activities for all ages will be available, including building a bird feeder and bird banding.

The Raptor Center will present raptors of Minnesota, including a bald eagle, and the Minnesota Bluebird Recovery Program will answer bluebird questions and offer nest boxes for purchase. So, pack a lunch and enjoy a hike along the picturesque trails where you may see some of Ritter Farm's 20 pairs of nesting bluebirds.

The Parks and Recreation Department would also like your help in naming Lakeville's eagles. Come to celebrate at Ritter Farm Park and submit your name ideas. For more information on "For the Birds!" call 952-985-4616.

Help improve lake water quality

With spring finally here, residents are anxious to get their yards and neighborhoods ready for the growing season. Sometimes, the choices made in an effort to cleanup areas are actually doing harm to the environment. Here are some things you should not do:

Don't mow or spray weed killer on City property
Sometimes City property, especially around lakes and ponds, may not appear to be well maintained. There's a reason for this. By allowing vegetation to grow around water bodies and other sensitive areas, pollutants are filtered out naturally. Vegetation around bodies of water protects the water quality and also provides important wildlife habitat.

Don't dump yard waste near the water
Most water bodies in Lakeville are in City-owned out lots or have easements surrounding them. Yard waste should never be dumped in these out lots or easements. Yard waste releases phosphorus which will have a negative effect on water quality.

Keep grass clippings off paved surfaces—especially the street
Anything that is washed down the street, including grass clippings, ends up in the storm sewer, and then in the water of our lakes, ponds, and streams. Grass clippings that end up in our lakes and streams release phosphorus that creates algae blooms and deteriorates water quality. Even if you don't live near a lake, runoff from your home affects our lake and pond water quality. You can help protect water quality simply by sweeping grass clippings back up onto your lawn where they act as a natural fertilizer.

Yard waste should be disposed of through curbside pick-up or by composting. Please check where you are storing your compost or yard waste to ensure that it is a considerable distance from any body of water.

If you have questions about what you can do to help protect Lakeville's ponds, streams, and lakes, please check the Environmental Resources page of the City website at *www.lakevillemn.gov.*

Hazardous Waste Drop-off Day numbers

More than 1,300 vehicles passed through Lakeville's annual Household Hazardous Waste Drop-off on May 3. All items collected will be reused, recycled, or properly disposed of. Items collected included:

- 1,225 gallons of used oil
- 310 auto batteries
- 139 appliances
- 5.5 semi-trailers full of used electronics
- 8 tons of scrap metal
- 23,980 lbs. of latex paint
- 12,925 lbs. of oil based paint
- 3 drums of antifreeze (165 gallons)
- 275 gallons of flammable liquid
- 1,400 fluorescent lamps
- 400 lbs. of propane cylinders

Responsible disposal of household items is necessary for a healthy environment. If you missed drop-off day, you can still recycle your hazardous household products, used electronics, and appliances. You can find the most up-to-date information on responsible disposal on the County website at *www.co.dakota.mn.us.*

On May 3, workers sorted, wrapped, and hauled away 5.5 semi-trailers full of used electronics as part of Household Hazardous Waste Drop-off Day. All items collected will be recycled or properly disposed of.

Messages from the City of Lakeville

This week's meetings

April 21 City Council, 7 p.m.
April 22 Economic Development Commission, 5 p.m.

Meetings held at City Hall, 20195 Holyoke Ave., unless otherwise noted. Agendas for each meeting are posted on the City website, *www.lakevillemn.gov*.

Mark your calendars

Severe Weather Awareness Week April 21-25

Tornado drills will be held on Thursday, April 24

On April 24, the National Weather Service will simulate a tornado watch beginning at 9 a.m. Lakeville severe weather warning sirens will sound for two tornado drills on that day. For more information check *www.severeweather.state.mn.us*.

The first drill will take place at 1:45 p.m. This first drill allows schools, businesses, and hospitals to practice their emergency plans.

The second drill will take place at 6:55 p.m. This evening drill will allow families and second-shift workers to practice their plans.

Arbor Day and Simple Steps

Join the Arbor Day celebration and a Simple Steps walk on Saturday, May 3 at 10 a.m.

The celebration will showcase Valley Lake Park, 16050 Garrett Path. The City Forester will conduct a ceremonial tree planting, hand out seedlings, and answer tree-related questions. Someone will win a beautiful new tree or shrub.

After the ceremony, you can walk the new trails at the park with the Mayor and City Council Members as part of the Simple Steps walking program. This will be a great opportunity to start a summer walking program to reduce stress, increase energy, and lose weight. For more information on Arbor Day or Simple Steps, call 952-985-4616.

Odd/even watering begins May 1

The City watering program will begin on Thursday, May 1. The restrictions are designed to encourage water conservation. Residents can water every other day—determined by the last digit of their house number. If your house number (not street number) ends in an even number, water on even-numbered calendar days. If your house number ends in an odd number, water on odd-numbered days.

In addition, watering is only allowed before 11 a.m. or after 5 p.m. every day. This is because watering during the heat of the day wastes water.

Watering restrictions are in effect from May 1 to Sept. 30 each year. If you have any questions, please call the Utility Department at 952-985-2708.

WATER CONSERVATION IN EFFECT

NO LAWN WATERING 11 AM – 5 PM DAILY
ODD / EVEN WATERING MAY – SEPT

Household Hazardous Waste Drop-Off Day

Saturday, May 3
9 a.m. to 2 p.m.
Central Maintenance Facility
On the west side of Cedar Ave., just south of Dodd Blvd.

Lakeville residents only – Sponsored by the City of Lakeville

ELECTRONICS DROP OFF

Items accepted at no charge:

- TVs
- Computer Monitors
- CPUs
- Keyboards
- Printers
- VCRs
- Fax machines
- Stereos
- Telephones
- Miscellaneous electronics

NOT ACCEPTED:
Business electronics

SCRAP METAL DROP OFF

- Metal must be free of fabric, plastic, rubber, wood or other non-metal materials.
- Acceptable items include, but are not limited to, bicycle frames, car hoods, car doors, swing sets, etc.
- Metal lawnmowers and snowblowers must be drained of fluids and wheels removed.
- Drums and pails must be rinsed clean, with one end open.

NOT ACCEPTED: Sealed containers (such as air tanks, shock absorbers or torque converters) unless they are split in half or contain at least a fist-sized hole.

APPLIANCES DROP OFF

$25 per appliance.

Accepted appliances:
- Air conditioners
- Dehumidifiers
- Dishwashers
- Freezers
- Garbage disposals
- Heat pumps
- Humidifiers
- Microwave ovens
- Ranges
- Refrigerators
- Residential furnaces
- Stoves
- Trash compactors
- Washers/dryers
- Water heaters
- Water softeners

NOT ACCEPTED:
- Gas air conditioners
- Gas refrigerators

Dakota County residents only – Co-sponsored by the City of Lakeville and Dakota County

Materials accepted at no charge:

- Aerosol cans (with product remaining)
- Antifreeze
- Auto batteries
- Batteries (rechargeable)
- Fluorescent lights, ballasts
- Gasoline, fuels
- Herbicides
- Household cleaners
- Latex/oil paint
- Lawn and garden products
- Lighter fluid
- Nail polish remover
- Oil and oil filters
- Driveway sealer
- Paint strippers and thinners
- Pesticides
- Most products labeled dangerous, flammable, combustible, poisonous or corrosive
- Photographic chemicals
- Poisons
- Pool chemicals
- Propane tanks
- Roofing tar
- Stain leftovers
- Varnish
- Weed killers
- Wood preservatives

IF YOU HAVE ANY QUESTIONS PLEASE CALL 952-985-4400.

NOT ACCEPTED: Tires, business hazardous waste or business electronics.

Funding for this flyer provided by Dakota County Board of Commissioners and the Minnesota Office of Environmental Assistance (OEA)

New water usage and fine structure

In an effort to encourage water conservation, in December 2007 the City Council approved a new water tier structure and surcharge increase for excess water use. The new water tier structure for utility billing will increase water usage costs for those who use between 30,000 and 50,000 gallons and an additional increase for those using over 50,000 gallons during the summer quarter (June, July, August). In Lakeville, the average summer water use is less than 20,000 gallons.

The quarterly rates will go up proportionate to water usage (rates per 1,000 gallons):

Structure	Gallons	2008 rates
Tier 1	Up to 30,000	$1.00
Tier 2	30,000 to 50,000	$1.42
Tier 3	Over 50,000	$2.00

The Council also approved an increase in the surcharges for those who do not follow summer watering restrictions.

Watering restrictions are in effect May 1 through September 30 each year. These restrictions allow watering only every other day. The watering schedule is based on residents' odd or even house number. In addition, watering is only allowed before 11 a.m. or after 5 p.m. every day.

Beginning in May 2008, residents who violate these restrictions will be given a warning for the first violation. The second violation will result in a $50 surcharge. Subsequent violations will increase the surcharge by $50 for each notice, i.e., 3rd notice-$100; 4th notice-$150, 5th and each additional violation notice-$200.

20 November 2008

Mr. Dale E. Homuth
Regional Hydrologist
DNR Waters, Central Region
1200 Warner Road
St. Paul, Minnesota 55106-6793

Subject: Certification of Adoption – Lakeville Water Supply Plan

Dear Mr. Homuth:

Enclosed is the Certificate of Adoption for the Lakeville Water Supply Plan signed by the Mayor for the City of Lakeville as requested in your November 6, 2008 letter. If any additional information is needed, I can be reached at (952) 985-2708.

Sincerely,

Christopher J. Petree
Operations & Maintenance Director

Encl:
Certificate of Adoption

RECEIVED
DEC 02 2008
DNR
Waters

City of Lakeville
20195 Holyoke Avenue • Lakeville, MN 55044
Phone (952) 985-4400 • FAX (952) 985-4499 • www.ci.lakeville.mn.us

CERTIFICATION OF ADOPTION
WATER SUPPLY PLAN

City or Water System Name:	City of Lakeville
Name of Person Authorized to Sign Certification on Behalf of the System:	Holly Dahl
Title:	Mayor
Address:	20195 Holyoke Avenue Lakeville, Minnesota 55044
Telephone:	952-985-4403 Fax: 952-985-4409
E-mail:	hdahl@lakevillemn.gov

I certify that the Water Supply Plan approved by the Department of Natural Resources has been adopted by the City Council for the City of Lakeville that has authority over water supply services.

Signed: _____ Date: November 17, 2008
Mayor

_____
City Clerk

Fax (651/772-7977) or mail this certification to:

DNR Waters
1200 Warner Road
St. Paul MN 55106

or email to dale.holmuth@dnr.state.mn.us

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DNR
Waters