FINAL
Preliminary Assessment Report
Army Aviation Support Facility, St. Cloud, Minnesota

Perfluorooctane-Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA) Impacted Sites
ARNG Installations, Nationwide

April 2019

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Table of Contents

Executive Summary.....1
1. Introduction.....4
1.1 Authority and Purpose.....4
1.2 Preliminary Assessment Methods.....4
1.3 Report Organization.....5
1.4 Facility Location and Description.....5
1.5 Facility Environmental Setting.....5
1.5.1 Geology.....6
1.5.2 Hydrogeology.....6
1.5.3 Hydrology.....6
1.5.4 Climate.....7
1.5.5 Current and Future Land Use.....7
2. Fire Training Areas.....11
3. Non-Fire Training Areas.....12
3.1 Hangar Fire Suppression System Releases.....12
3.2 Fire Extinguishers.....12
4. Emergency Response Areas.....15
5. Adjacent Sources.....16
6. Conceptual Site Model.....18
6.1 AOI 1 St. Cloud AASF.....18
7. Conclusions.....21
7.1 Findings.....21
7.2 Uncertainties.....21
7.3 Potential Future Actions.....22
8. References.....24

Figures

Figure ES-1 Summary of Findings
Figure ES-2 Conceptual Site Model, St. Cloud AASF
Figure 1-1 Facility Location
Figure 1-2 Groundwater Features
Figure 1-3 Surface Water Features
Figure 3-1 Non-Fire Training Areas
Figure 5-1 Adjacent Sources
Figure 6-1 Areas of Interest
Figure 6-2 Conceptual Site Model for AOI 1 St. Cloud AASF
Figure 7-1 Summary of Findings

Appendices

Appendix A Data Resources
Appendix B Preliminary Assessment Documentation
B.1 Interview Records
B.2 Visual Site Inspection Checklists
B.3 Conceptual Site Model Information
Appendix C Photographic Log

Acronyms and Abbreviations

°F	degrees Fahrenheit
AASF	Army Aviation Support Facility
AECOM	AECOM Technical Services, Inc.
AFFF	aqueous film forming foam
AOI	Area of Interest
ARFF	Aircraft Rescue and Fire Fighting Facility
ARNG	Army National Guard
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CSM	conceptual site model
FTA	fire training area
IED	Installations & Environment Division
MNARNG	Minnesota Army National Guard
MNDNR	Minnesota Department of Natural Resources
MnDOT	Minnesota Department of Transportation
NGWA	National Ground Water Association
PA	Preliminary Assessment
PFAS	per- and poly-fluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
SI	Site Inspection
US	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VSI	visual site inspection

Executive Summary

The United States (US) Army Corps of Engineers (USACE) Baltimore District on behalf of the Army National Guard (ARNG)-Installations & Environment Division (IED), Cleanup Branch contracted AECOM Technical Services, Inc. (AECOM) to perform *Preliminary Assessments (PAs) and Site Inspections (SIs) for Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) Impacted Sites at ARNG Facilities Nationwide*. The ARNG is assessing potential effects on human health related to processes at facilities that used per- and poly-fluoroalkyl substances (PFAS), primarily in the form of aqueous film forming foam released as part of firefighting activities, although other PFAS sources are possible.

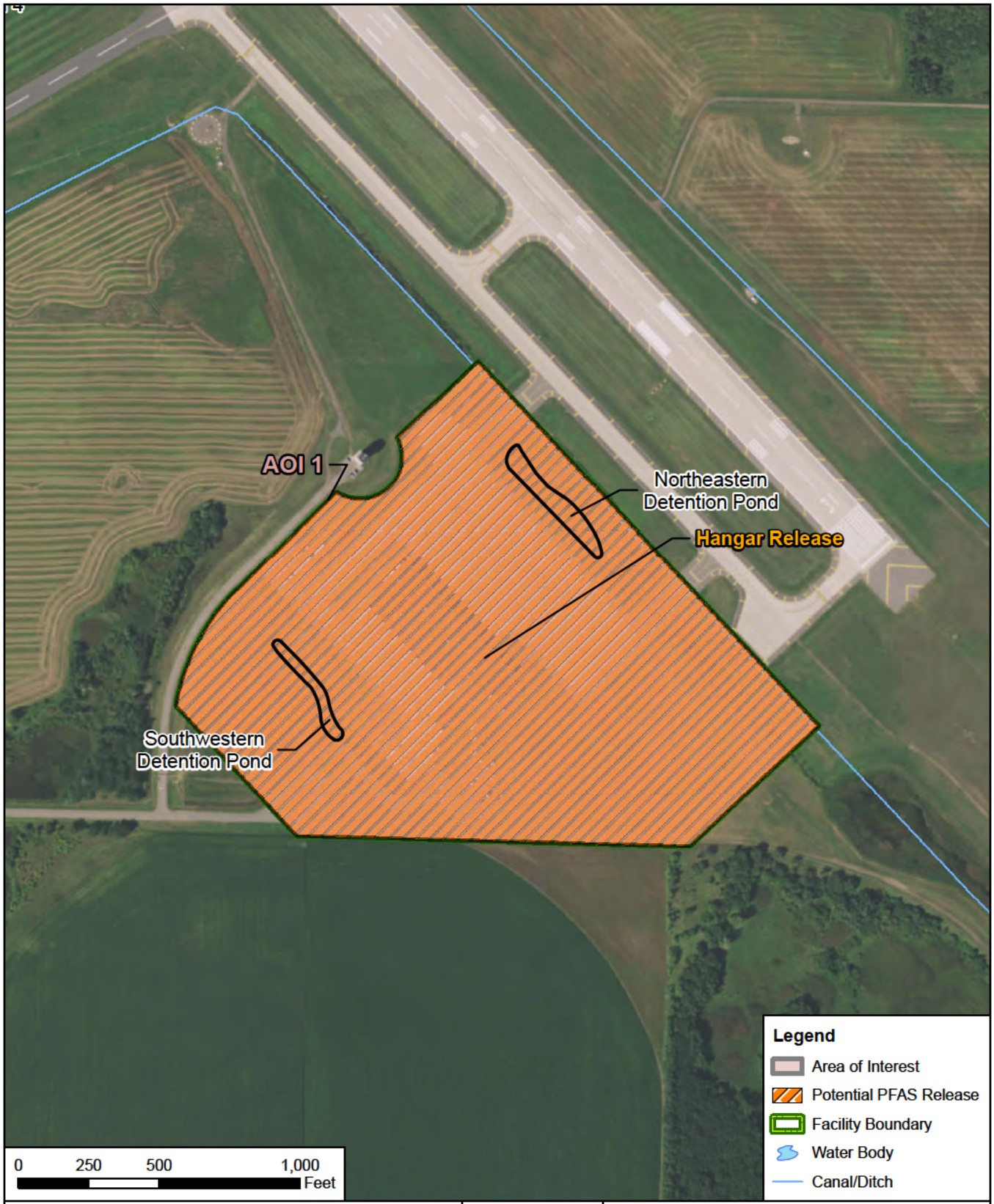
AECOM completed a PA for PFAS at the Army Aviation Support Facility (AASF) in St. Cloud, Minnesota, to assess potential PFAS release areas and exposure pathways to receptors. The AASF is constructed on a parcel of land owned by the City of St. Cloud and leased to the Minnesota Army National Guard (MNARNG). The current lease agreement expires in 2104. The performance of this PA included the following tasks:

- Reviewed data resources to obtain information relevant to suspected PFAS releases
- Conducted a site visit 25 September 2018
- Interviewed current MNARNG personnel, MNARNG environmental managers and operations staff, the St. Cloud Fire Department, and the St. Cloud Regional Airport Manager
- Completed visual site inspections at known or suspected potential PFAS release locations and documented with photographs
- Developed a conceptual site model (CSM) to outline the potential release and pathway of PFAS for the Area of Interest (AOI) and the facility (**Figure ES-1**)

One AOI related to potential PFAS releases was identified at the St. Cloud AASF during the PA. The AOI is shown on **Figure ES-1** and described below:

Area of Interest	Name	Used by	Potential Release Date
AOI 1	St. Cloud AASF	MNARNG	June 2013

Based on potential AFFF releases at this AOI, there is potential for exposure to PFAS contamination in surface soil and intermittent surface water and sediments to site workers, construction workers, and trespassers/recreational users via ingestion and inhalation of dust, subsurface soil to site and construction workers via ingestion and inhalation of dust, and groundwater to off-facility residents via ingestion. Because the St. Cloud AASF was recently built (2007) and has always been operated by the MNARNG, the uncertainty associated with potential PFAS use at the facility is low. However, potential off-facility PFAS release areas exist adjacent to the St. Cloud AASF, and these areas include property upgradient of the facility. Therefore, it is unknown whether or not the off-facility sources affect the St. Cloud AASF. The CSM for the St. Cloud AASF is shown on **Figure ES-2**.



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at St. Cloud AASF, MN			
REVISED	1/14/2019	GIS BY	MS	1/14/2019
SCALE	1:6,000	CHK BY	JZ	1/14/2019
Base Map: Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	1/14/2019

Summary of Findings

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Figure ES-1

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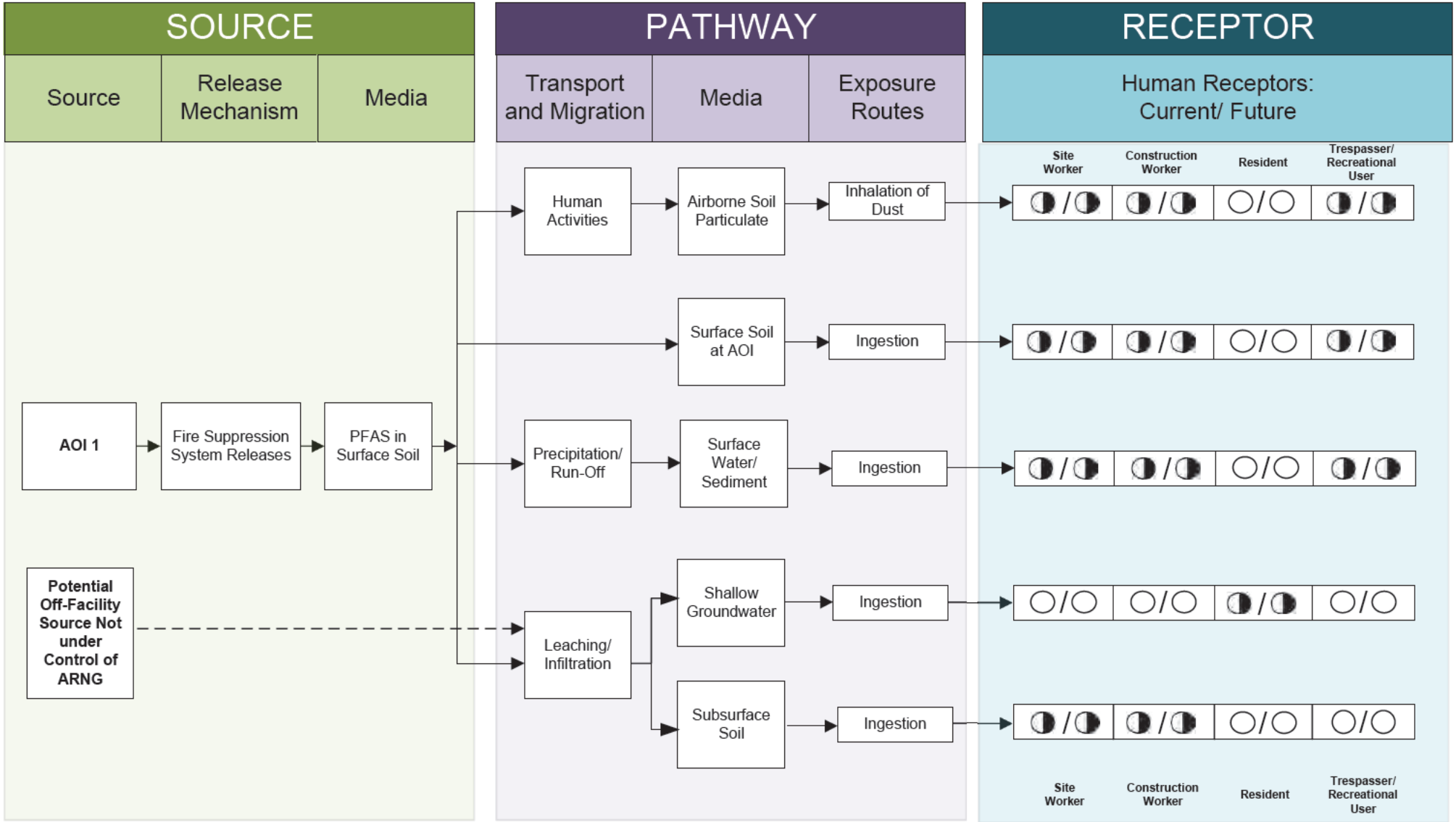


LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Complete Pathway

Figure ES-2
Conceptual Site Model
St. Cloud AASF

1. Introduction

1.1 Authority and Purpose

The United States (US) Army Corps of Engineers (USACE) Baltimore District on behalf of the Army National Guard (ARNG)-Installations & Environment Division (IED), Cleanup Branch contracted AECOM Technical Services, Inc. (AECOM) to perform *Preliminary Assessments (PAs) and Site Inspections (SIs) for Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) Impacted Sites at ARNG Facilities Nationwide* under Contract Number W912DR-12-D-0014, Task Order W912DR17F0192, issued 11 August 2017. The ARNG is assessing potential effects on human health related to processes at facilities that used per- and poly-fluoroalkyl substances (PFAS), primarily in the form of aqueous film forming foam (AFFF) released as part of firefighting activities, although other PFAS sources are possible. In addition, the ARNG is assessing businesses or operations adjacent to the ARNG facility (not under the control of ARNG) that could potentially be responsible for a PFAS release.

PFAS are classified as emerging environmental contaminants that are garnering increasing regulatory interest due to their potential risks to human health and the environment. PFAS formulations contain highly diverse mixtures of compounds. Thus, the fate of PFAS compounds in the environment varies. The regulatory framework at both federal and state levels continues to evolve. The US Environmental Protection Agency (USEPA) issued Drinking Water Health Advisories for PFOA and PFOS in May 2016, but there are currently no promulgated national standards regulating PFAS in drinking water. In the absence of federal maximum contaminant levels, some states have adopted their own drinking water standards for PFAS. The State of Minnesota has adopted screening values of 35 parts per trillion for PFOA and 27 parts per trillion for PFOS (Minnesota Department of Health 2018). These values are more protective than the USEPA value of 70 parts per trillion, individually or combined.

This report presents the findings of a PA for PFAS at the Army Aviation Support Facility (AASF) in St. Cloud, Minnesota, in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations [CFR] Part 300), and USACE requirements and guidance.

This PA documents the known fire training areas (FTAs) as well as other locations where PFAS may have been released into the environment at the AASF. The term PFAS will be used throughout this report to encompass all PFAS chemicals being evaluated, including PFOS and PFOA, which are key components of AFFF.

1.2 Preliminary Assessment Methods

The performance of this PA included the following tasks:

- Reviewed data resources to obtain information relevant to suspected PFAS releases
- Conducted a site visit on 25 September 2018
- Interviewed current MNARNG personnel, MNARNG environmental managers and operations staff, the St. Cloud Fire Department, and the St. Cloud Regional Airport Manager
- Completed visual site inspections (VSIs) at known or suspected potential PFAS release locations and documented with photographs
- Developed a conceptual site model (CSM) to outline the potential release and pathway of PFAS for the Area of Interest (AOI) and the facility

1.3 Report Organization

This report has been prepared in accordance with the USEPA *Guidance for Performing Preliminary Assessments under CERCLA* (USEPA 1991). The report sections and descriptions of each are:

- **Section 1** – **Introduction:** identifies the project purpose and authority and describes the facility location, environmental setting, and methods used to complete the PA
- **Section 2** – **Fire Training Areas:** describes the FTAs at the facility identified during the site visit
- **Section 3** – **Non-Fire Training Areas:** describes other locations of potential PFAS releases at the facility identified during the site visit
- **Section 4** – **Emergency Response Areas:** describes areas of potential PFAS release at the facility, specifically in response to emergency situations
- **Section 5** – **Adjacent Sources:** describes sources of potential PFAS release adjacent to the facility that are not under the control of ARNG
- **Section 6** – **Conceptual Site Model:** describes the pathways of PFAS transport and receptors for the AOIs and the facility
- **Section 7** –**Conclusions:** summarizes the data findings and presents the conclusions of the PA
- **Section 8** – **References:** provides the references used to develop this document
- **Appendix A** – Data Resources
- **Appendix B** – Preliminary Assessment Documentation
- **Appendix C** – Photographic Log

1.4 Facility Location and Description

The St. Cloud AASF is along US Highway 10 in Haven Township, Sherburne County, Minnesota (**Figure 1-1**), approximately 4 miles southeast of St. Cloud, Minnesota, and 60 miles northwest of Minneapolis-St. Paul, the Twin Cities (Minnesota Department of Transportation [MnDot] Office of Aeronautics 2006). The facility is accessible from Highway 10 by 12th Street, from the south by County Road 65 and 45th Avenue, and from Interstate-94.

The AASF was constructed in 2007 on a parcel of land, approximately 55-acres, owned by the City of St. Cloud and leased to the MNARNG. The current lease agreement expires 14 April 2104. See **Appendix A** for real estate documents. The current AASF facilities include an 80,000 square foot hangar for the operation, maintenance, and repair of MNARNG rotary-winged aircraft, administrative offices, and classrooms.

1.5 Facility Environmental Setting

The St. Cloud AASF lies within the Upper Mississippi River Basin which encompasses several land tributaries to the Mississippi River. The area is relatively flat with small variations in elevation. The elevation of the facility is approximately 1,030 feet above mean sea level. The surrounding area is covered by cropland, wooded area, and wetlands.

1.5.1 Geology

The St. Cloud AASF is situated in the Anoka Sand Plain Subsection of the Eastern Broadleaf Forest Province as defined by the Minnesota Department of Natural Resources (MNDNR) Ecological Classification System (Sherburne County Planning & Zoning Department 2011). The Anoka Sand Plain is a sandy lake plain formed from runoff and repeated incursions of the sea (Cummins and Grigal 1981). Bedrock in the area consists of gently dipping layers of sandstone, shale, and carbonate rocks that range in thickness from 50 feet to greater than 200 feet (MNDNR 2017). The bedrock ranges in age from Archean granites to Upper Mesozoic Cretaceous sediments (Cummins and Grigal 1981). The bedrock is underlain by sedimentary rock formed by volcanism from the Precambrian Age to the Ordovician Age, including the Hinckley Sandstone and Fond du Lac Formation (MNDNR 2017). Granite plutons from the East-Central Batholith are abundant in the region and are quarried for buildings and monuments (Cummins and Grigal 1981). At the surface, the area is aggregate and defined by remnants of glaciation including moraine, drumlins, eskers, kames, and outwash plains with deposited deep layers of glacial till. Glacier-formed depressions have formed wetlands and many of the state's modern lakes and rivers.

1.5.2 Hydrogeology

The St. Cloud AASF is within the Central Groundwater Province as defined by the MNDNR (Sherburne County Planning & Zoning Department 2011) and drained on the northeast side by the Town of Parent-Elk Watershed and on the southwest side by the County Ditch Number Three Watershed. Groundwater is drawn from sand and gravel aquifers and from deeper fractured and weathered bedrock or sedimentary rock. Depth to groundwater in the area ranges from 7 to 28 feet below ground surface, although wells that are closer to lakes, streams, rivers, and wetlands are shallower (Sherburne County Planning & Zoning Department 2011). Groundwater flow is generally to the south and laterally toward larger creeks and rivers (**Figure 1-2**). Aquifer recharge is predominantly through infiltration of precipitation, although some recharge occurs from open water sources (MNDNR 2017).

No potable water wells are located within the boundary of the AASF; however, domestic wells exist within four miles of the facility (**Figure 1-2**) and private, residential wells were observed in the area during the VSI. The majority of groundwater use in the area is for irrigation (MNDNR 2017). Drinking water for the AASF is supplied by the City of St. Cloud, which uses the Mississippi River as its drinking water source (City of St. Cloud 2011).

1.5.3 Hydrology

Sherburne County has 125 lakes, most of which are less than 20 feet deep, and 493 miles of rivers and streams (Sherburne County Planning & Zoning Department 2011). The largest lake near the St. Cloud AASF is Donovan Lake, approximately two miles to the north, and the largest river is the Mississippi River, approximately five miles to the west (**Figure 1-3**).

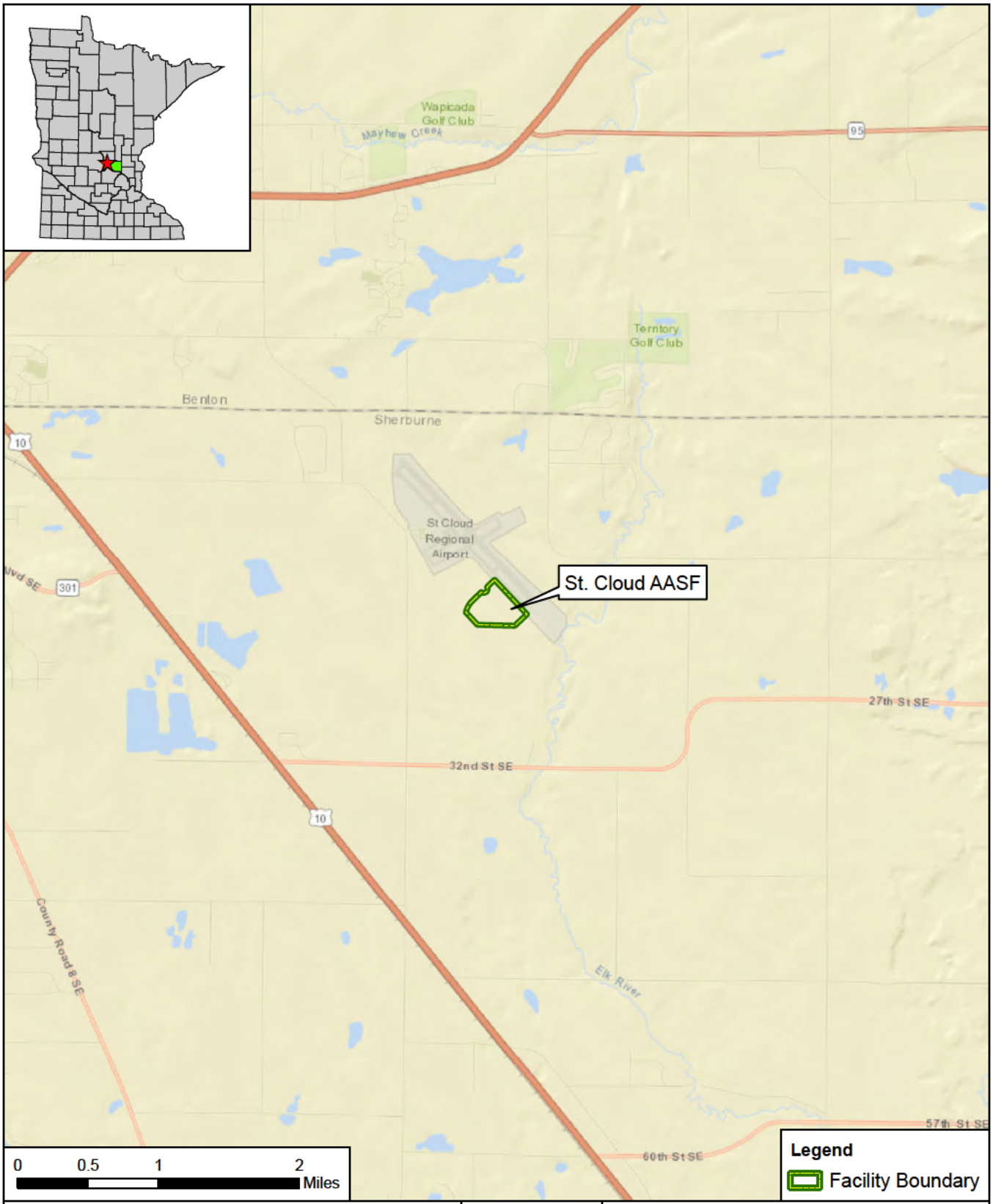
The St. Cloud AASF has detention ponds on both the northeastern and southwestern sides of the ramps, flanked by wetlands, which collect runoff from the AASF. The detention ponds are approximately 3 feet deep and seeded with vegetation. Swales in both detention ponds carry intermittent surface water to storm sewers and the Elk River. The Elk River runs parallel to the Mississippi River before converging at the city of Elk River. Other regional surface water features include small lakes, tributaries, and wetlands.

1.5.4 Climate

The climate of St. Cloud consists of hot, humid summers and cold winters with moderate to heavy snowfall. Seasonally, temperatures vary from summer highs of 82 degrees Fahrenheit (°F) to winter lows of 2 °F (World Climate 2018). The average temperature is 42.85 °F. Average precipitation is 27.72 inches of rain and 47 inches of snow (World Climate 2018). The area is subject to severe storms and occasional tornadoes. The prevailing wind varies from north to south, averaging 8 to 12 miles per hour.

1.5.5 Current and Future Land Use

The St. Cloud AASF is a controlled access facility with public roads and is adjacent to the St. Cloud Regional Airport. The St. Cloud Regional Airport is owned and operated by the City of St. Cloud and provides private, commercial, corporate, cargo, and military air service. Future infrastructure improvements, land acquisitions, and land use controls are anticipated in the area as significant urban development along the Interstate-94/Highway 10 corridor continues due to the migration of businesses and residents from the Twin Cities (MnDot 2006).



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NOTES	Preliminary Assessment for PFAS at St. Cloud AASF, MN			
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SCALE	1:63,360	CHK BY	JZ	10/29/2018
Base Map: Sources: Esri, HERE, DeLorme, USGS, Intermap, Increment P Corp., NRCAN, Esri Japan, METI,		PM	RG	10/29/2018

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Facility Location

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Figure 1-1

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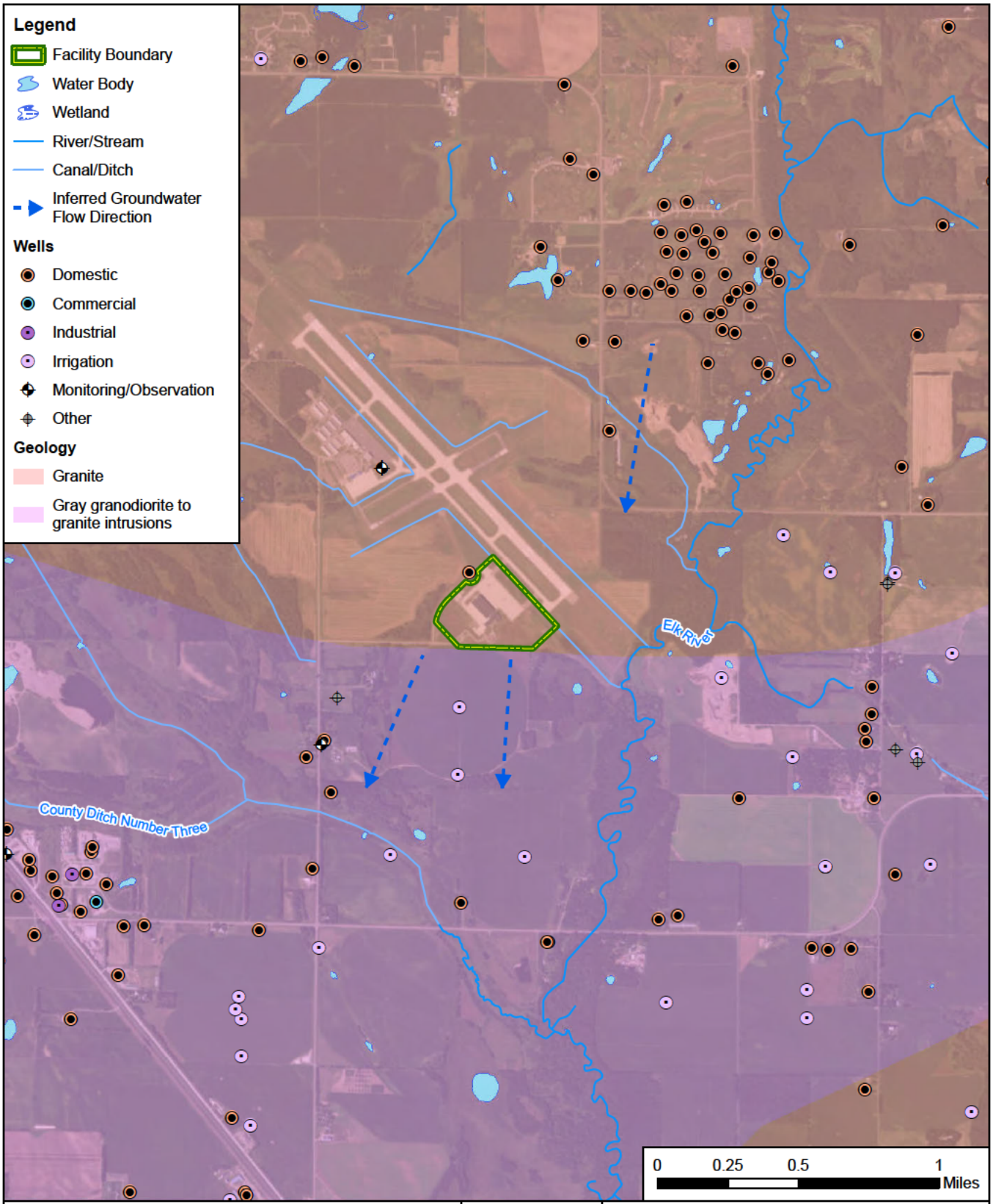

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SCALE	1:31,680	CHK BY	JZ	4/12/2019
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	4/12/2019

Groundwater Features

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Figure 1-2

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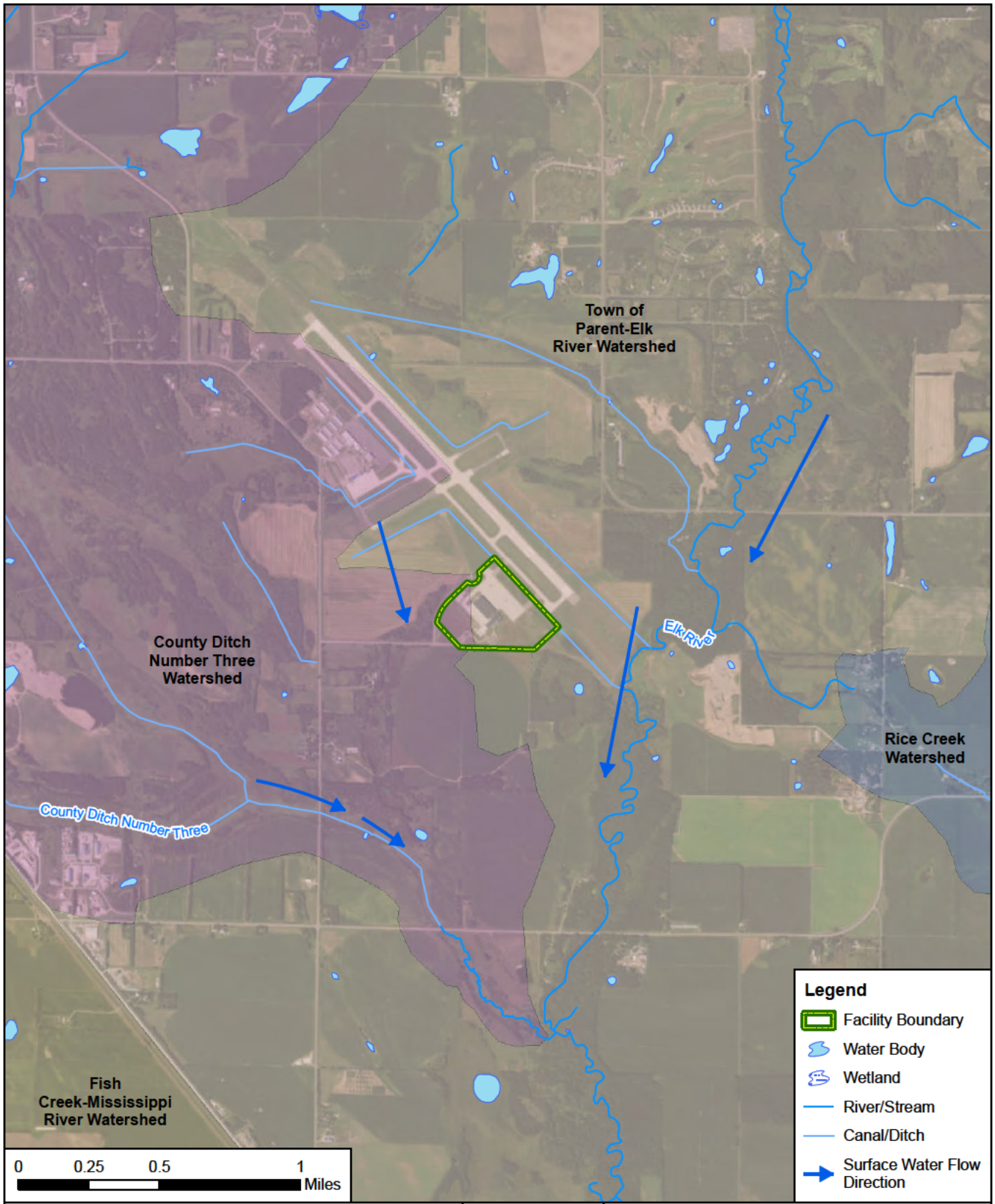

CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at St. Cloud AASF, MN			
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SCALE	1:31,680	CHK BY	JZ	1/14/2019
Base Map: Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	1/14/2019

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Surface Water Features

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Figure 1-3

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2. Fire Training Areas

No FTAs were identified within the AASF facility during the PA through interviews or document review. The City of St. Cloud provides fire emergency services for the St. Cloud AASF.

3. Non-Fire Training Areas

Non-FTAs where AFFF was stored and/or potentially released were identified during the PA. A description of each non-FTA is presented below and shown on **Figure 3-1**.

3.1 Hangar Fire Suppression System Releases

The AASF hangar contains 24 fire suppression system hoods supplied by a 1300-gallon system filled with Jet-X high expansion foam. The geographic coordinates of the hangar are 45°32'21.9"N and 94°03'23.6"W (**Figure 3-1**). The AFFF tank, pumps, and bulk 55-gallon drums of AFFF that supply the fire suppression system are housed in a building adjacent to the hangar. The geographic coordinates are 45°32'23.2"N and 94°03'26.2"W. The pumps are tested monthly and the system is inspected annually using water only by Johnson Controls (formally SimplexGrinnell).

Three releases of AFFF from the fire suppression have occurred. The first release of AFFF occurred during initial testing of the system in March 2009, prior to MNARNG assuming ownership of the building. During the initial test, approximately 200 gallons of 3 percent AFFF concentrate were released into the hangar and then washed down the trench drain. The trench drain is plumbed to a flammable waste interceptor and then to the sanitary sewer. The sanitary sewer flows to the St. Cloud Wastewater Treatment Facility in St. Cloud, Minnesota. The second release occurred on 11 February 2011 when a contractor accidentally triggered the system. During the second release, approximately 200 gallons of 3 percent AFFF concentrate were released. Following the second release, the lines were flushed and the foam was washed down the trench drain in the hangar by MNARNG personnel.

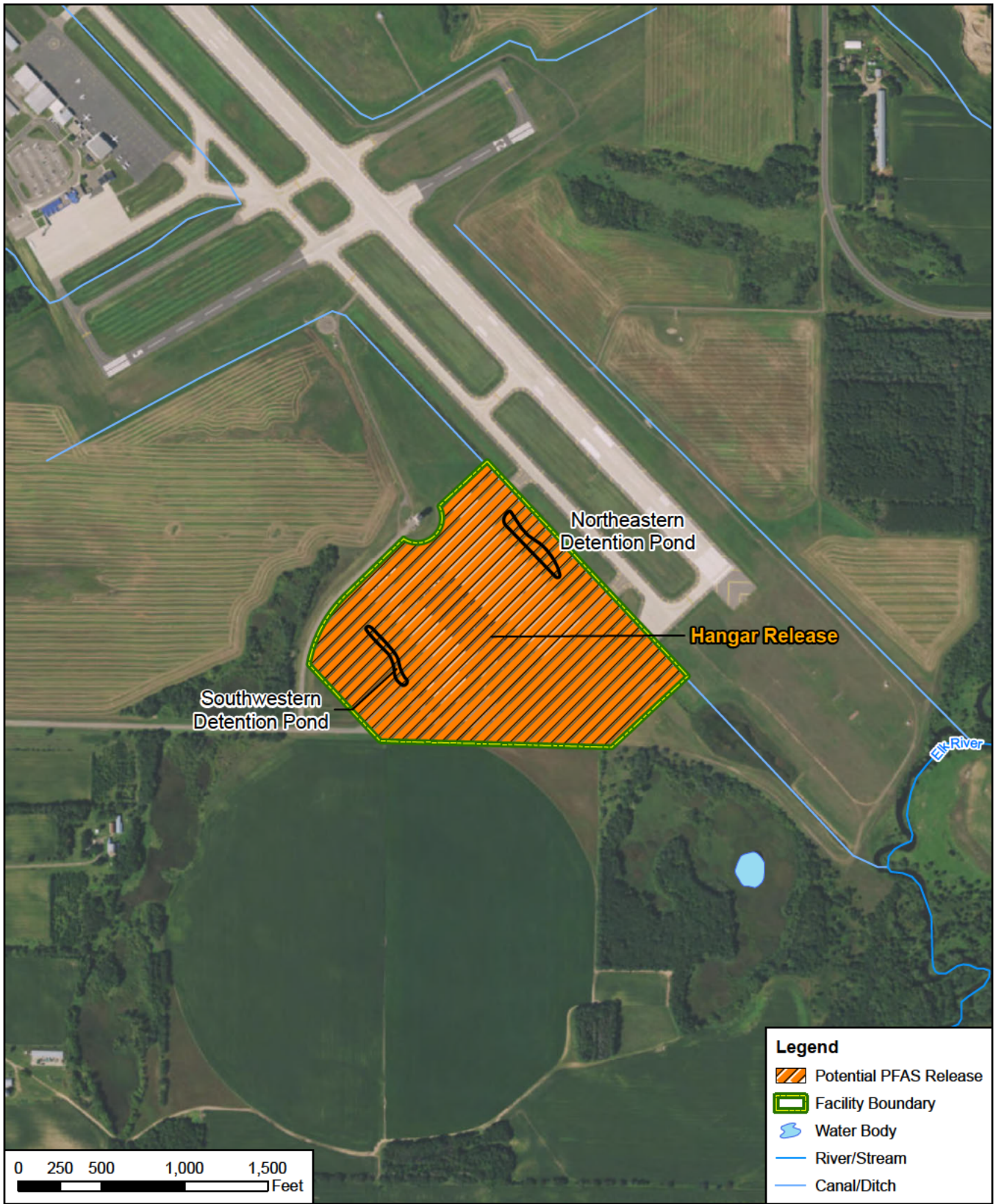
The third release occurred during a storm in June 2013. The AASF was hit by lightning during the storm and stray voltage triggered the fire suppression system. During this release, all 1300 gallons of 3 percent AFFF were released, filling the 80,000 square foot hangar to the ceiling. After the release, the northeast and southwest doors of the hangar were opened, and the foam was pushed and washed out of the hangar onto the ramp. The foam was then washed or plowed using snow plows into detention ponds on the northeast and southwest ends of the ramps (**Figure 3-1**). In addition, rotary-winged aircraft were washed on the northeast side of the hangar following the release. The wash water was allowed to dissipate in the northeast detention pond. The bladder in the AFFF tank that supplies the fire suppression system was damaged during the June 2013 release and replaced.

Due to concerns of possible flooding at the facility, a swale was cut into the detention pond on the southwestern side of the ramp in 2015 or 2016. The final disposition of any soil removed from the detention pond during the reconfiguration is unknown. No remediation activities have occurred at the northeastern detention pond. Swales in both detention ponds carry intermittent surface water off of the facility towards storm sewers and the Mississippi River.

3.2 Fire Extinguishers

Historically, the AASF had seven TriMax-30 fire extinguishers, one for training with dish soap, two for outdoor use supplied with 6 percent AFFF, and four for indoor use supplied with 3 percent AFFF. The TriMax-30 fire extinguishers were never used at the AASF for training or emergency response. Hydrostatic testing was conducted once by an outside contractor. The contractor emptied the fire extinguishers prior to testing at another facility, not under the control of MNARNG. The AASF historically had bulk 3 percent and 6 percent AFFF in 5-gallon containers used to refill the TriMax fire extinguishers after hydrostatic testing. Any spills of AFFF were small, wiped up with rags, and did not go down any drains. In October 2017, the TriMax-30

fire extinguishers were replaced by seven 125-pound Purple K fire extinguishers. The TriMax fire extinguishers and bulk AFFF were returned full to Camp Ripley and are currently sitting in the US Property and Fiscal Office warehouse awaiting demilitarization.



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SCALE	1:10,200	CHK BY	JZ	1/14/2019
Base Map: Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	1/14/2019

Non-Fire Training Area

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Figure 3-1

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4. Emergency Response Areas

No emergency response areas were identified within the AASF facility during the PA through interviews or document review. The City of St. Cloud provides fire emergency services for the St. Cloud AASF.

5. Adjacent Sources

One potential off-facility source of PFAS adjacent to the AASF, not under the control of the MNARNG, was identified during the PA, the St. Cloud Regional Airport. The geographic coordinates of the airport are 45°32'45.7"N and 94°03'59.1"W (**Figure 5-1**). The St. Cloud Regional Airport was constructed in 1969 and is owned and operated by the City of St. Cloud. The St. Cloud AASF is southeast and adjacent to the St. Cloud Regional Airport. In 1999, an Aircraft Rescue and Fire Fighting Facility (ARFF) (Building 23) was constructed at the airport. The City of St. Cloud Fire Department provides fire emergency services for the St. Cloud Regional Airport out of the ARFF building, also known as Station 4. According to the St. Cloud Fire Chief, Station 4 is manned only during incoming charter flights.

Station 4 has two equipment bays with one crash rescue truck and one pick-up truck. The crash rescue truck holds 1,500 gallons of water, 225 gallons of AFFF concentrate, and 450 gallons of dry chemical (St. Cloud Regional Airport 2006) . The pick-up truck holds 450 gallons of dry chemical and 100 gallons of foam mix (St. Cloud Regional Airport 2006). According to the St. Cloud Fire Chief and the Airport Manager, semiannual nozzle testing for the St. Cloud fire trucks is conducted at the airport, north of the ARFF between the building and the ramp. The geographic coordinates of the nozzle testing area are 45°32'48.3"N and 94°03'53.3"W (**Figure 5-1**). During the nozzle testing, approximately 5-gallons of AFFF mixture are released to the ground. No information was available on the type or concentration of foam used or stored at the facility, and no remediation activities are known to have occurred at this location.

The City of St. Cloud Fire Chief indicated AFFF was dispensed once on a small plane fire in one of the hangars at the airport; however, the Airport Manager recalled the fire was put out with an ABC fire extinguisher. Also, MNARNG personnel recalled seeing possible foam training at the northern end of Runway 13/31; however, the Airport Manager indicated only water is used during triannual training for emergency services at the north end of the runway.

Two additional sources of PFAS in the St. Cloud area, not adjacent to the AASF facility were identified in a report by Delta Consultants titled *Perfluorocarbon (PFC)-Containing Firefighting Foams And Their Use In Minnesota*: the St. Cloud Fire Department Station 2 and Keystone Automotive. These two sources are located on the west side of the Mississippi River. The AASF is located east of the Mississippi River; therefore, PFAS use at these locations is unlikely to affect the AASF facility.



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at St. Cloud AASF, MN			
REVISED	12/7/2018	GIS BY	MS	12/7/2018
SCALE	1:2,400	CHK BY	JZ	12/7/2018
Base Map: Sources: Esri, HERE, DeLorme, USGS, Intermap, Increment P Corp., NRCAN, Esri Japan, METI,		PM	RG	12/7/2018

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Adjacent Source

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Figure 5-1

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6. Conceptual Site Model

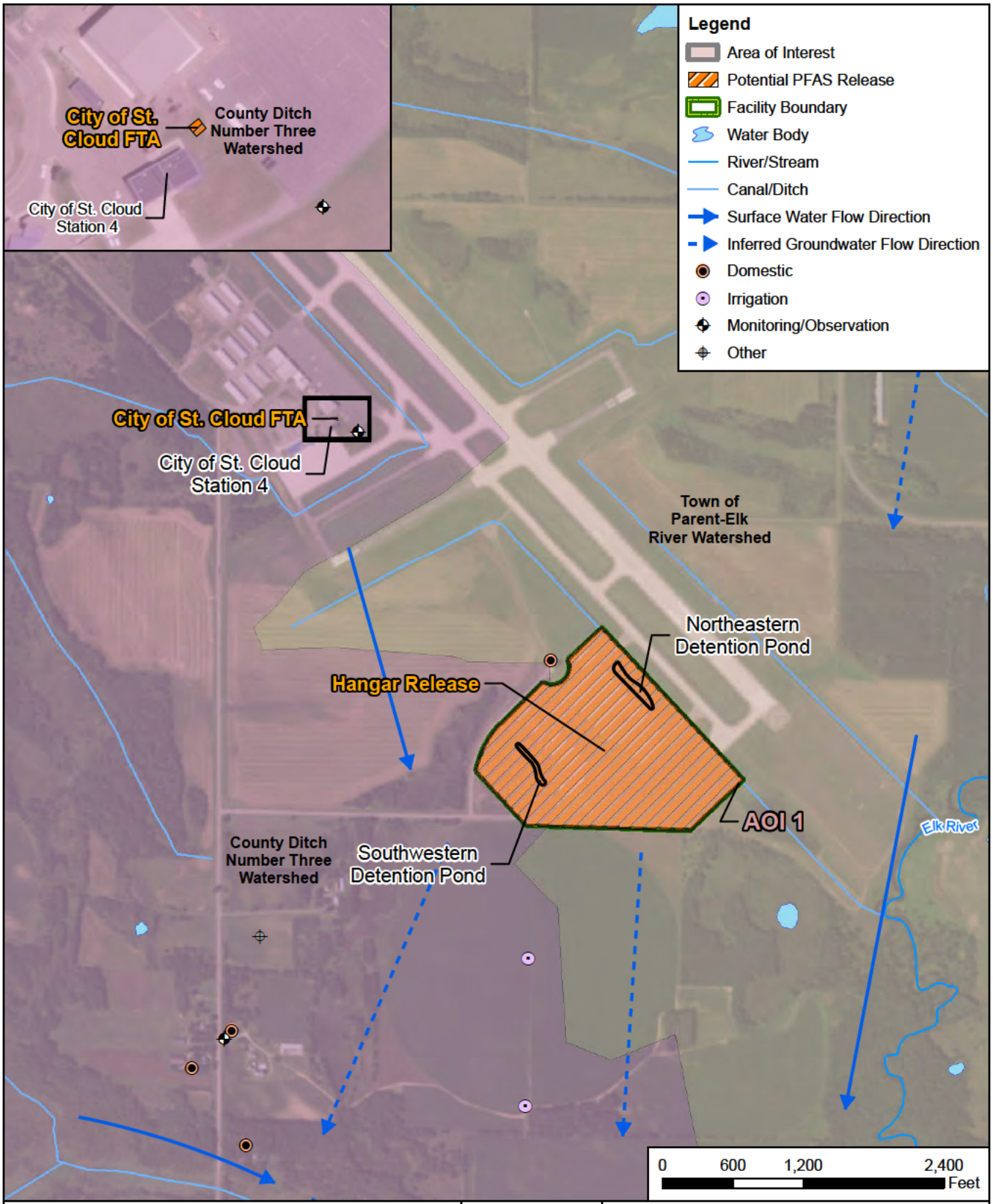
Based on the PA findings, one area of interest (AOI) was identified at the St. Cloud AASF: AOI 1 St. Cloud AASF. The AOI location is shown on **Figure 6-1**. The following sections describe the CSM components and the specific CSMs developed for the AOIs. The CSM identifies the three components necessary for a potentially complete exposure pathway: (1) source, (2) pathway, (3) receptor. If any of these elements are missing, the pathway is considered incomplete.

In general, the potential PFAS exposure pathways are ingestion and inhalation. Dermal contact is not considered to be a potential exposure pathway as studies have shown very limited absorption of PFAS through the skin (National Ground Water Association [NGWA] 2018). Receptors at the current AASF include site workers, construction workers, trespassers/recreational users, and off-facility residents. The CSM for the St. Cloud AASF indicates which specific receptors could potentially be exposed to PFAS.

6.1 AOI 1 St. Cloud AASF

AOI 1 encompasses the entire area within the St. Cloud AASF property boundary. Releases of AFFF occurred from the fire suppression system at the AASF in 2009, 2011, and 2013. After the releases in 2009 and 2011, AFFF was washed to the sanitary sewer, and is, therefore, not suspected to have impacted AOI 1. However, after the release in June 2013, AFFF was washed out of both sides of the hangar and plowed into the northeast and southwest detention ponds by the MNARNG. In addition, rotary-winged aircraft were washed on the northeast side of the hangar following the release, and the wash water was allowed to dissipate in the northeast detention pond. Photographs provided by the MNARNG show AFFF on the ground surface throughout the entire facility boundary and on the AASF building following the June 2013 release.

Ground-disturbing activities to surface soil and intermittent surface water and sediment at AOI 1 and the Elk River could result in site worker, construction worker, and trespasser/recreational user exposure to potential PFAS contamination. Therefore, the exposure pathways for inhalation of soil particles and ingestion of soil, surface water, and sediment are potentially complete for these receptors. Ground-disturbing activities to subsurface soil could result in site and construction worker exposure via inhalation of soil particles and ingestion of subsurface soil. Therefore, the inhalation and ingestion pathways for these receptors are considered potentially complete. Drinking water for the facility is supplied by the City of St. Cloud; however, domestic water supply wells and private, residential wells are present to the southwest and northeast of the facility. Groundwater flow at the St. Cloud AASF is predominantly to the south-southwest; therefore, some of these wells are downgradient of AOI 1, and the exposure pathway for groundwater to residents through domestic drinking water ingestion is potentially complete. The CSM for AOI 1 is shown on **Figure 6-2**.



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at St. Cloud AASF, MN			
REVISED	3/13/2019	GIS BY	MS	3/13/2019
SCALE	1:14,400	CHK BY	JZ	3/13/2019
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	3/13/2019

Area of Interest

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 6-1

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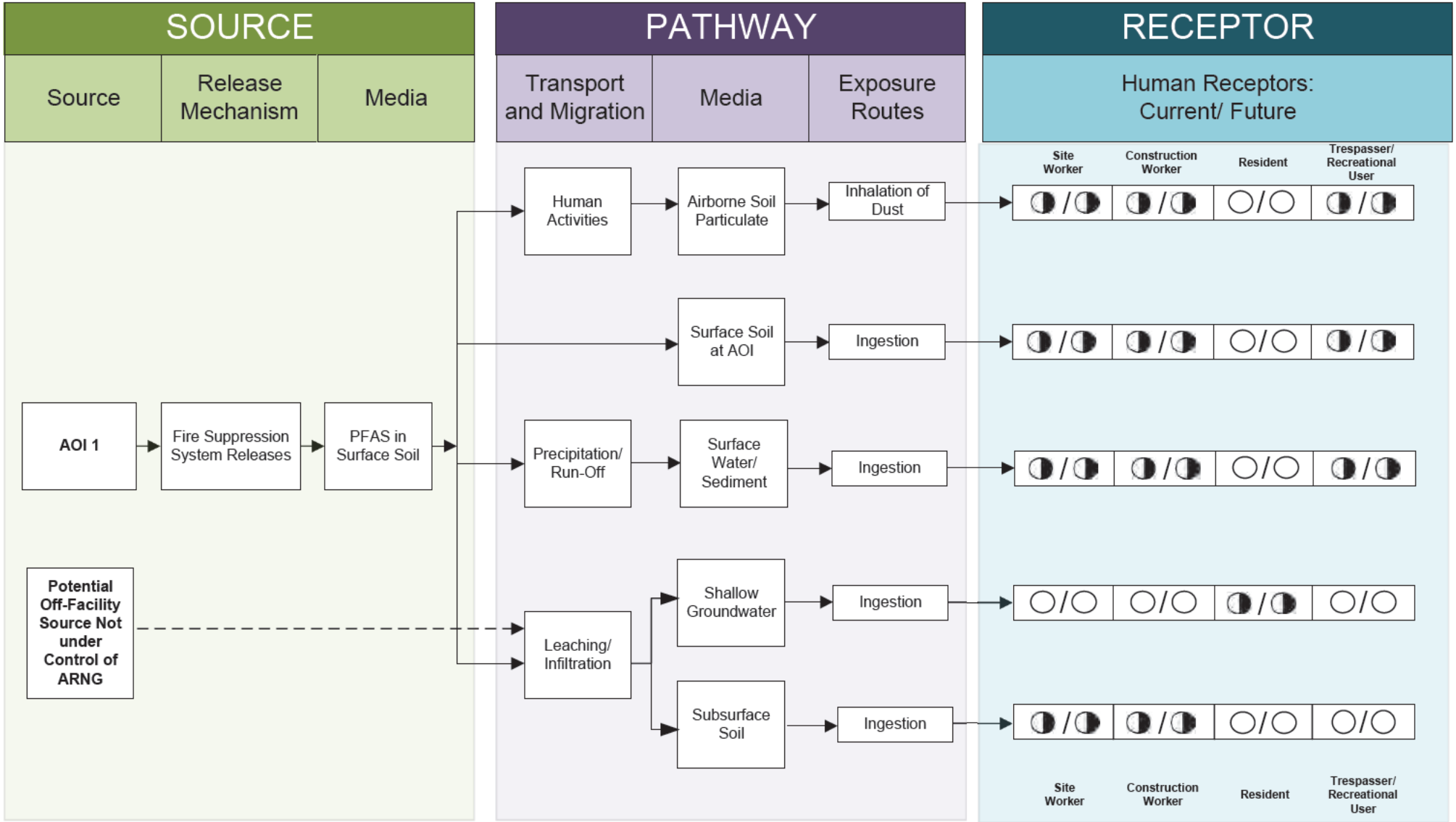


LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Complete Pathway

Figure 6-2
Conceptual Site Model
AOI 1 St. Cloud AASF

7. Conclusions

This report presents a summary of available information gathered during the PA on the use and storage of AFFF and other PFAS-related activities at the St. Cloud AASF. The PA findings are based on the information presented in **Appendix A** and **Appendix B**.

7.1 Findings

One AOI related to potential PFAS release was identified at the St. Cloud AASF during the PA (**Figure 7-1**):

Area of Interest	Name	Used by	Potential Release Dates
AOI 1	St. Cloud AASF	MNARNG	June 2013

Based on potential PFAS releases at this AOI, there is potential for exposure to PFAS contamination in surface soil, intermittent surface water and sediments, and subsurface soil to all receptors via ingestion and inhalation of dust and groundwater to residents via ingestion.

The following areas discussed in **Section 2** through **Section 5** were determined to have no suspected release:

No Suspected Release Area	Used by	Rationale for No Suspected Release Determination
Fire Extinguishers	MNARNG	The TriMax fire extinguishers were never used for training or emergency response at the St. Cloud AASF. The TriMax fire extinguishers were replaced with Purple K in 2017 and returned full to Camp Ripley.

7.2 Uncertainties

A number of information sources were investigated during this PA to determine the potential for PFAS-containing materials to have been present, used, or released at the facility. Historically, documentation of PFAS use was not required because PFAS were considered benign. Therefore, records were not typically kept by the facility or available during the PA on the use of PFAS in training, firefighting, or other non-traditional activities, or on its disposition.

The conclusions of this PA are predominantly based on the information provided during interviews with personnel who had direct knowledge of PFAS use at the facility. Sometimes the provided information was vague or conflicted with other sources. Gathered information has a degree of uncertainty due to the absence of written documentation, the limited number of personnel with direct knowledge due to staffing changes, the time passed since PFAS was first used (1969 to present), and a reliance on personal recollection. Inaccuracies may arise in potential PFAS release locations, dates of release, volume of releases, and the concentration of AFFF used. There is also a possibility the PA has missed a source of PFAS, as the science of how PFAS may enter the environment continually evolves.

In order to minimize the level of uncertainty, readily available data regarding the use and storage of PFAS were reviewed, retired and current personnel were interviewed, multiple persons were interviewed for the same potential source area, and potential source areas were visually inspected.

The following table summarizes the uncertainties associated with the PA:

Area of Interest	Source of Uncertainty
AOI 1	Potential off-facility PFAS release areas exist adjacent to the St. Cloud AASF. Because these areas include property upgradient of the facility, it is unknown whether or not the off-facility sources affect the St. Cloud AASF.
AOI 1	Due to concerns of possible flooding at the facility, a swale was cut into the southwest detention pond in 2015 or 2016. The final disposition of any soil removed from the detention pond during the reconfiguration is unknown.

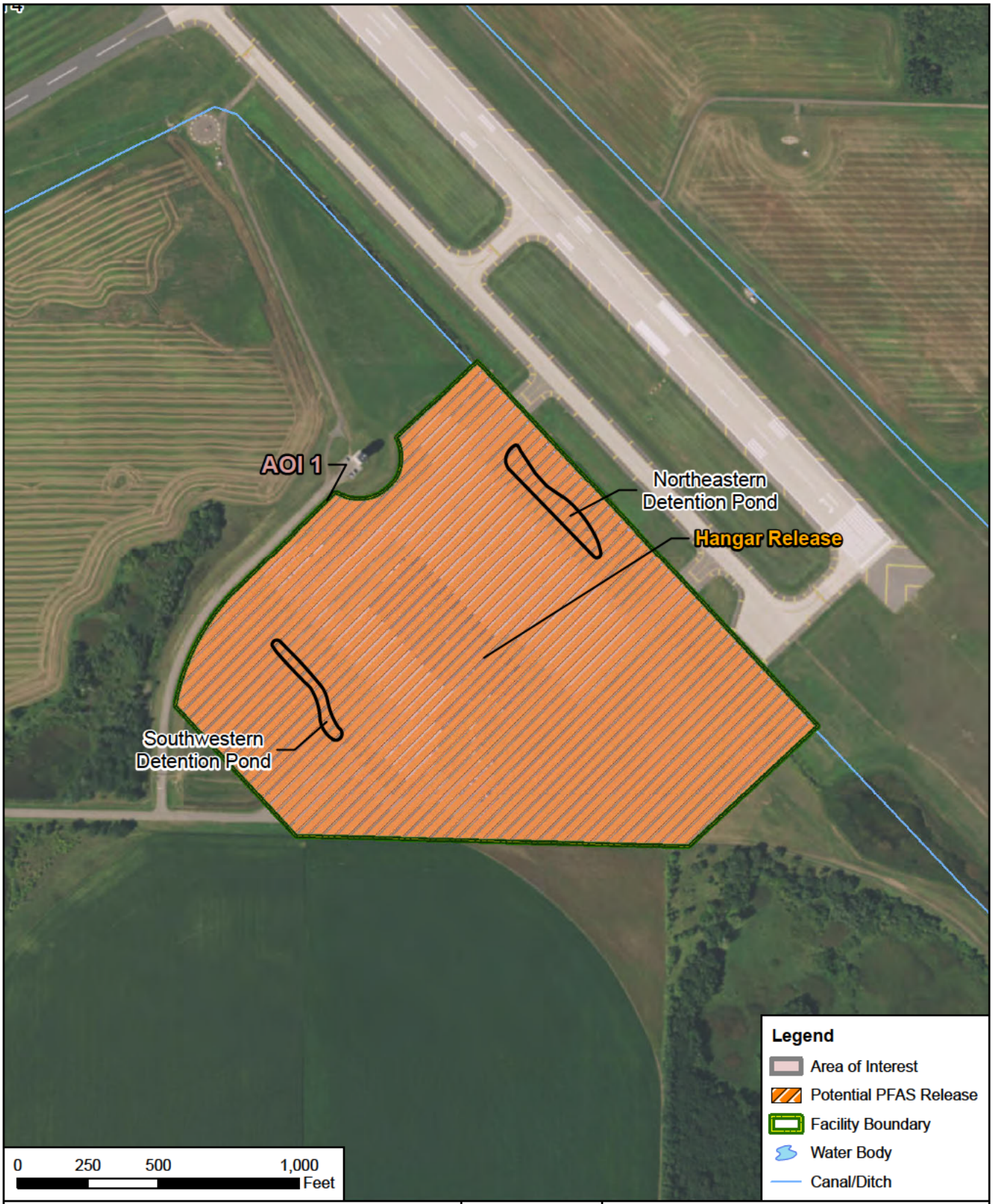
Because the St. Cloud AASF was recently built (2007) and has always been operated by the MNARNG, personnel with knowledge of the facility's operations over the facility's lifetime were available for interview during the PA; therefore, the uncertainty associated with potential PFAS use at the facility is low. However, potential off-facility PFAS release areas exist adjacent to the St. Cloud AASF, and these areas include property upgradient of the facility. Therefore, it is unknown whether or not the off-facility sources affect the St. Cloud AASF.

7.3 Potential Future Actions

Interviews and records (covering 2007 to present) indicate that ARNG activities may have resulted in potential PFAS releases at the AOI identified during the PA. Based on the CSM developed for the AOI, there is potential for receptors to be exposed to PFAS contamination in soil, surface water, sediment, and groundwater at this AOI. The following table summarizes the rationale used to determine if the AOI should be considered for further investigation under the CERCLA process and undergo an SI.

ARNG evaluates the need for an SI at the St. Cloud AASF based on the presence of a PFAS release, possible receptors, and the migration potential of PFAS contamination to receptors.

Area of Interest	AOI Location	Rationale	Potential Future Action
AOI 1 St. Cloud AASF	45°32'21.9"N and 94°03'23.6"W	Approximately 1300 gallons of AFFF concentrate released from the fire suppression system once in June 2013.	Proceed to an SI for soil, surface water, sediment, and groundwater



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at St. Cloud AASF, MN			
REVISED	1/14/2019	GIS BY	MS	1/14/2019
SCALE	1:6,000	CHK BY	JZ	1/14/2019
Base Map: Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	1/14/2019

N

Summary of Findings

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 7-1

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8. References

City of St. Cloud, Minnesota. 2011. *Stormwater Management Plan*. December.

Cummins, J.F. and Grigal, D.F. 1981. *Legend to Map Soil and Land Surface of Minnesota 1980.* Department of Soil Science, University of Minnesota. Soil Series No. 110, Miscellaneous Publication 11.

Minnesota Department of Health. 2018. *Human Health-Based Water Guidance Table.* Available at http://www.health.state.mn.us/divs/eh/risk/guidance/gw/table.html (Accessed 13 January 2019).

Minnesota Department of Natural Resources (MNDNR). 2017. *Geologic Atlas of Sherburne County, Minnesota*. County Atlas Series C-32, Part B, Hydrogeology.

Minnesota Department of Transportation Office of Aeronautics (MnDot). 2006. *St. Cloud Regional Airport Master Plan*.

National Ground Water Association (NGWA). 2018. *Groundwater and PFAS: State of Knowledge and Practice*. January.

Sherburne County Planning & Zoning Department. 2011. *Comprehensive Land Use Plan 2010-2030*. September.

St. Cloud Regional Airport. 2006. *Airport Master Plan*. December.

United States Environmental Protection Agency (USEPA). 1991. *Guidance for Performing Preliminary Assessments under CERCLA.* September.

World Climate. 2018. *Average Weather Data for Saint Cloud, Minnesota.* Available at http://www.worldclimate.com/climate/us/minnesota/saint-cloud (Accessed 12 October 2018)

Appendix A
Data Resources

Data Resources will be provided separately on CD. Data Resources for the St. Cloud Army Aviation Support Facility include:

St. Cloud AASF Leases, Licenses, and Permits

- 2005 Army Aviation Support Facility Lease and Use Agreement
- 2005 Amendment #1 to Army Aviation Support Facility Lease and Use Agreement
- 2005 Amendment #2 to Army Aviation Support Facility Lease and Use Agreement

St. Cloud AASF PFAS Release Information

- 2008 PFCs in Minnesota's Ambient Environment Progress Report
- 2009 PFCs and Class B Firefighting Foam
- 2010 PFCs and Their Use in Minnesota
- 2011 PFC Survey and Sampling Activities
- 2015 Jet-X High-Expansion Foam Material Data Sheet

Previous Investigations Completed at the St. Cloud AASF

- 2006 St. Cloud Regional Airport Maser Plan Update
- 2007 St. Cloud Stormwater Pollution Prevention Plan
- 2011 City of St. Cloud Stormwater Management Plan
- 2011 Sherburne County Comprehensive Land Use Plan 2010-2030
- 2017 Geologic Atlas of Sherburne County, Minnesota

St. Cloud AASF Facility Maps

- 2018 St. Cloud AASF Detention Pond Map

St. Cloud AASF EDR Report

- 2018 St. Cloud AASF Environmental Data Resource Report

ARMY AVIATION SUPPORT FACILITY LEASE AND USE AGREEMENT

This Army Aviation Support Facility (AASF) Lease and Use Agreement ("Lease") is made between the City of Saint Cloud, a body corporate and politic ("Lessor") and the State of Minnesota Department of Military Affairs ("Tenant"). This lease is being executed in duplicate.

WHEREAS, Lessor owns and/or controls the real property at the Saint Cloud Regional Airport ("Airport") in Haven Township, County of Sherburne, State of Minnesota; and

WHEREAS, Tenant desires to lease property at the Airport for the purpose of constructing and operating military training and operation facilities, including, but not necessarily limited to, an AASF adjacent to the existing airport facility; and

WHEREAS, the establishment of an AASF and/or other military training facility will substantially benefit the Lessor and it residents; and

WHEREAS, Lessor is willing to lease certain property to Tenant for the described purposes and upon the terms and conditions set out in this lease.

NOW THEREFORE, in consideration of the foregoing and the mutual covenants contained in this Lease, the parties agree as follows:

1. **TERM:**
   A. The term of this lease will be from 15 April 2005 through 14 April 2104.

   B. Option to Renew. The Tenant has the right to renew this lease for an option term of an additional 50 years at the end of the initial lease term. To exercise this right, the tenant will provide written notice to the Lessor of its intent to do so at least 365 days prior to the end of the initial term. The terms of the Lease during the option period shall be as similar to the terms of this lease as is permitted under then existing law or regulation. The right to renew shall be contingent upon the Tenant being in compliance with the substantial terms of the Lease.

2. **RENT**: Tenant shall pay to Lessor as and for rent of the Premises, the sum of one dollar ($1.00) and other good and valuable consideration, receipt of which is acknowledged by the Lessor.

3. **LEASED PREMISES:** The area being leased by the Lessor to the Tenant in this lease is described at Exhibit "A" ("Premises"). The parties agree that this lease includes a right of reasonable access to the Premises. To protect such access, the Lessor shall provide an access easement to the Tenant over the area shown in Exhibit "B". This easement shall only remain in effect during the term of this lease.

4. **USE OF PREMISES**: The Tenant shall have the right to use the Premises for military purposes, which includes, but is not necessarily limited to, operation of an AASF. Such use may include, but is not necessarily limited to, operation, storage, maintenance and repair of military aircraft and/or vehicles and administration and/or training of military personnel.

5. **CONSTRUCTION AND IMPROVEMENTS:**

A. General: As part of the consideration for this lease, Tenant shall have the right to construct or otherwise make improvements to the Premises, including, but not necessarily limited to, construction of an AASF. Such construction and improvements shall not begin until the Tenant has submitted a written proposal for the construction or improvement to the Lessor and received the Lessor's written consent, which consent shall not be unreasonably withheld.

B. All construction or improvements shall be at no cost to the Lessor.

C. Construction and improvements shall conform to applicable laws, regulations and building codes.

6. **UTILITIES AND GENERAL MAINTENANCE**:

A. Lessor shall, at no expense to the Tenant, provide sanitary sewer and water service up to the edge of the premises. Tenant will be responsible for running sanitary sewer and water service from the edge of the Premises to any facilities constructed on the premises pursuant to the Lease.

B. The water service provided by Lessor shall be at a volume that meets the requirements of the National Fire Protection Association, the local fire marshal and other applicable law or regulation. Tenant shall be responsible, at its own expense to provide fixtures or equipment necessary for fire fighting. This includes, but is not limited to equipment necessary to boost water pressure to levels used for fire fighting purposes.

C. Tenant shall pay for all water, sanitary sewer, gas, electricity, telephone, refuse collection, storm sewer charges or other similar charges used on or attributable to the premises.

D. Tenant shall be responsible for general maintenance and janitorial services on the premises during the term of the lease.

E. Lessor agrees to provide any easements reasonably necessary for installation of utilities, including but not necessarily limited to, gas, electricity and telephone. Such easements will be located so as to minimize any interference with Airport operations.

7. **QUIET ENJOYMENT**: Upon Tenant's fulfillment of its obligations under this Lease, Tenant shall have quiet possession and enjoyment of the Premises during the term of the Lease. Lessor and its designated representatives shall have the right, after reasonable notice to the Tenant, to enter the Premises for the purpose of making repairs or improvements to parcels adjoining the Premises and to install, repair, maintain and construct through the Premises, such pipes, wires and other similar items as necessary for the operation of the Airport, except as restricted by applicable law or military regulation. In doing so, the Lessor shall use reasonable diligence to minimize disruption to Tenant's use and enjoyment of the Premises and shall reasonably repair any damage caused by such entry.

8. **OPERATION OF AIRPORT**: Lessor shall properly maintain, operate and manage the Airport at all times in a safe manner, according to generally accepted good practices in the State of Minnesota for airports of similar size and character and in compliance with applicable state and federal laws and regulations. If for any reason beyond the control of Lessor (including, but not limited to, war, strike, riots, and civil commotion), Lessor fails to properly maintain, operate or manage the Airport, such failure is not a breach of this Lease and Lessor is not liable in damages.

9. **USE OF AIRPORT FACILITIES**:

A. Subject to the terms and conditions of this Lease, Tenant shall have the use, in common with other users of the Airport of all public facilities at the Airport, together with all necessary and convenient rights of ingress and egress to and from the Airport and the Premises. Such facilities include, but are not limited to, the use of landing areas, runways, taxiways, navigational aids, terminal facilities and aircraft parking areas designated by Lessor. Provided, however, that such access and use shall be upon such terms and under such rules and regulations as they now exist or be hereinafter enacted by the Lessor and subject to any charges for such use as may be established from time to time by the Lessor. Such rules and/or regulations may not unreasonably interfere with the Tenant's use of the Premises and the Airport for military aviation purposes.

B. The parties agree that the anticipated level of use of the facilities at the Airport does not constitute a "substantial use" as defined under Title 49, United States Code, Chapter 471 "Airport Development" (49 USC §§47101-47129). Accordingly, the Tenant's use of said facilities meets the criteria for use without charge under Chapter 471, which provides that, in airports developed with financial assistance from the United States, facilities usable for takeoff and landing of aircraft will be available without charge for use by Government aircraft in common with other aircraft, so long as such use is not substantial.

C. In the event that the nature or extent of the Tenant's use changes so as to constitute a substantial use, as set out in said Chapter 471, the parties shall either amend this Lease or enter into a separate agreement concerning said facilities

10. **USE NOT EXCLUSIVE:** Tenant shall have the right to conduct all operations authorized pursuant to the terms of this lease, provided, however, that this Lease shall not be deemed to grant the Tenant the exclusive right to use any portion of the Airport, except the Premises.

11. **MAINTENANCE OF AIRPORT FACILITIES**: Lessor shall maintain all public and common or joint use areas of the airport, including the air operations area, in good repair, and shall make such repairs, replacements or additions thereto as reasonably necessary for the safe and efficient operation of the airport.

12. **AERIAL APPROACHES:** Lessor shall have the authority to take actions reasonably necessary to protect the aerial approaches, so that those approaches are not obstructed and so that they comply with applicable standards for use by aircraft. This includes the right to prevent Tenant from erecting or permitting to be erected, any building or other structure on or adjacent to the airport which would violate applicable standards for aerial approaches or constitute a hazard to aircraft.

13. **COMPLIANCE WITH LAWS**: Tenant shall comply with all applicable local, municipal, county, state and federal laws, regulations, rules and ordinances, now or hereafter in force, to the extent Tenant is permitted under applicable state or federal law or except as otherwise necessary for military operations.

14. **INSPECTION:** Lessor has the right to inspect the Premises and the improvements located on the Premises except as restricted by applicable law or military regulation relating to military aircraft, equipment, or other property. Lessor will give Tenant at least 24 hours notice of such inspections.

15. **LIABILITY:**

A. Except as otherwise provided in this Agreement, Tenant and Lessor agree that neither party shall be liable for claims for damages to property or injuries to individuals arising from acts of the other under the terms of this Agreement or occurring as a consequence of the performance of responsibilities under this Agreement.

B. Tenant and Lessor agree that each shall give reasonable notice of any such claim or action. Each party shall provide to each other all information, records, statements, photographs, video, or other documents reasonably necessary to defend any claims, except as restricted by applicable law or military regulation.

C. The provisions of this Section shall survive expiration or earlier termination of this Lease.

16. **MAINTENANCE:** Tenant shall keep and maintain the Premises, and all improvements, buildings, structures or property located thereon in good order and repair. Tenant or any other individual or entity that acquires title to improvements or fixtures located on the Premises from Tenant, may remove improvements or fixtures from the Premises. If only fixtures are removed, the individual or entity removing the fixtures must repair any damage to the remaining improvements or fixtures and remove and properly dispose of any debris resulting from the removal of the fixtures. If improvements are removed, the individual or entity removing the improvements must: (i) remove and properly dispose of any debris resulting from the removal of the improvements; (ii) return the Premises to a buildable condition; (iii) remediate environmental contamination existing on the Premises arising out of Tenant's past or present operations on the Premises; and (iv) remove, seal or abandon in place, as reasonably required by Lessor, above ground or underground storage tanks, septic systems or wells installed on the Premises by Tenant. The obligations in the proceeding sentence shall survive termination of this Lease.

17. **SURRENDER OF PREMISES**: Upon the expiration or termination of this Lease, Tenant shall either remove all improvements and fixtures, (in which case Tenant must comply with all requirements of Section 17.) or transfer ownership of the improvements to either the Lessor or to a prospective tenant, which must be approved by Lessor. Lessor's approval of such a transfer will not be unreasonably withheld. If Tenant does not accomplish this within ninety (90) days after the termination or expiration of this Lease, or within a reasonable extension of time if more than ninety (90) days is needed, Lessor will become the owner of the improvements.

18. ENVIRONMENTAL RESPONSIBILITIES:

A. Definitions

(1) "Environmentally Regulated Substances" means any element, compound, pollutant, contaminant, or toxic or hazardous substance, material or waste, or any mixture thereof, regulated pursuant to any Environmental Law, including but not limited to products that might otherwise be considered of commercial value, such as asbestos, polychlorinated biphenyls, petroleum products and byproducts, glycol and other materials used in de-icing operations.

(2) "Environmental Law" means any common law or duty, case law or ruling, statute, rule, regulation, law, ordinance or code, whether local, state or federal which is applicable to Tenant's activities under this Lease that regulates, creates standards for or imposes liability or standards of conduct concerning any element, compound, pollutant, contaminant, or toxic or hazardous substance, material or waste, or any mixture thereof, including but not limited to products that might otherwise be considered of commercial value, such as asbestos, polychlorinated biphenyls, petroleum products and byproducts, glycol and other materials used in de-icing operations.

B. Compliance with Environmental Laws.

Tenant shall conduct its operations on the Premises and Airport in compliance with applicable Environmental Laws. Tenant shall obtain all necessary permits or other approvals under the Environmental Laws and shall submit applications, forms, documentation, notifications, certifications, or other governmental submittals relating thereto. Upon the request of lessor, Tenant shall provide copies to lessor of any such applications, forms, documentation, notifications or certifications.

C. Testing and Reports

Tenant shall provide to Lessor, within ten (10) days of receipt, a copy of any notice regarding a violation of the Environmental Laws arising out of Tenant's operations on the Premises and Airport, a copy of any final report regarding compliance with Environmental Laws or with the presence, use, emission or release of any Environmentally Regulated

Substances arising out of Tenant's operations on the Premises and Airport, or a copy of any notice of the emission or release of Environmentally Regulated Substances in violation of the Environmental Laws arising out of Tenant's operations on the Premises and Airport.

D. Notification

Tenant shall immediately notify Lessor in writing of any matter Tenant obtains knowledge of that constitutes any emission, spill or release or any threatened emission, spill or release of any Environmentally Regulated Substance in, on, under or about the Premises and Airport arising out of Tenant's operations which is believed to be in violation of the Environmental Laws. Tenant shall promptly notify Lessor verbally of any fuel spill or any other spill caused or resulting from Tenant's operations on the Premises and Airport.

19. NON-DISCRIMINATION

A. General

Tenant, as part of the consideration herein, hereby covenants and agrees, as a covenant running with the land, that (1) no person, on the grounds of race, color, or national origin shall be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of the Premises; (2) that in the construction of any improvements on, over, or under the Premises, and the furnishing of services thereon, no person on the grounds of race, color, or national origin shall be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination; and (3) Tenant shall use the Premises in compliance with all other applicable requirements imposed by or pursuant to Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Non-Discrimination in Federally Assisted Programs of the Department of Transportation – Effectuation of Title VI of the Civil Rights Act of 1964, as amended from time to time.

B. Improvements

Tenant, as part of the consideration herein, hereby covenants and agrees, as a covenant running with the land, that in the event improvements are constructed, maintained or otherwise operated on the Premises for a purpose for which a program or activity of the Department of Transportation is extended or for another purpose involving the provision of similar services or benefits, Tenant shall operate such improvements and services in compliance with all other applicable requirements imposed

by or pursuant to Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Non-Discrimination in Federally Assisted Programs of the Department of Transportation – Effectuation of Title VI of the Civil Rights Act 1964, as amended from time to time.

20. CIVIL RIGHTS

Tenant agrees that it will comply with applicable laws, statutes, Executive Orders and rules that are promulgated to assure that no person shall, on the grounds of race, creed, color, national origin, sex, age, or handicap be excluded from participating in any activity conducted with or benefiting from federal assistance.

This provision obligates Tenant or its transferee for the period during which federal assistance is extended to the Airport, except where federal assistance is to provide, or is in form of personal property or real property or interest therein or structures or improvements thereon. In these cases, the provision obligates the party or any transferee for the longer of the following periods: (1) the period during which the property is used by the sponsor or any transferee for a purpose for which federal assistance is extended, or for another purpose involving the provision of similar services or benefits; or (2) the period during which the Airport sponsor or any transferee retains ownership or possession of the property.

21. GENERAL PROVISIONS:

a. Waiver. The waiver by the Lessor or Tenant of any breach of any term of this lease shall not be deemed a waiver of any prior or subsequent breach of the same term or any other term of this Lease.
b. Headings. The headings of this Lease are for convenience in reference and are not intended to define or limit the scope of any provision of this Lease.
c. Entire Agreement. This Lease represents the entire agreement between the parties and supersedes any prior agreements regarding the Premises. This Lease may only be modified if done in writing and executed by both parties.
d. Severability. If any part of this Lease is held to be invalid, it shall not affect the validity of the remaining parts of the Lease, provided that such invalidity does not materially prejudice either party under the remaining parts of the Lease.
e. Governing Law. This lease shall be governed by Minnesota Law except as superseded by applicable federal law or regulation.
f. Commitments to Federal or State Agencies. Nothing in this lease shall be construed to prevent Lessor from making such commitments as necessary to qualify for state or federal funding for the Airport.

g. Assignment. This Lease or any part hereof may not be assigned, transferred or sublet by either party without the prior written consent of the other party.

h. Successors. This lease shall extend to bind the legal representatives, successors and assigns of the parties to this Lease.

i. Relationship of Parties. Nothing contained in this Lease shall be deemed to create a partnership, association or joint venture between the Lessor and the Tenant, or to create any other relationship between the parties other than that of landlord and tenant.

j. Notice. Any notice required under this lease shall be in writing and delivered in person, by courier or mailed by certified mail, return receipt requested, postage prepaid, addressed as set out below:

   i. Lessor: Airport Director, 1550 – 45th Avenue SE, St. Cloud, MN, 56304.

   ii. Tenant: Office of the Adjutant General, ATTN: JFMN-AAG-AR, Veterans Service Building, Saint Paul, MN 55155

Either party may change its address for notice by providing written notice to the other party.

IN WITNESS WHEREOF, Lessor and Tenant have executed this Lease as of the dates indicated below:

LESSOR: CITY OF SAINT CLOUD

Signed: John D Ellenbecker
Name: John D. Ellenbecker
Title: Mayor
Date: 4-14-05

Signed: John L. Nelson
Name: ~~Gregg Engdahl~~ John L Nelson
Title: Clerk
Date: 4-14-05

Seal:

TENANT: STATE OF MINNESOTA, DEPARTMENT OF MILITARY AFFAIRS

By: LARRY W SHELLITO
MAJOR GENERAL
MINNESOTA ARMY NATIONAL GUARD
Title: ADJUTANT GENERAL OF MINNESOTA
Date: 16 Apr 05

EXHIBIT A

LEASE DESCRIPTION
ARMY AVIATION SUPPORT FACILITY
ST CLOUD REGIONAL AIRPORT

That part of the North Half of Section 10, Township 124 North, Range 29 West, Sherburne County, Minnesota described as follows:

Commencing at the northeast corner of said Section 10; thence North 89 degrees 18 minutes 18 seconds West, assumed bearing, along the north line of said Section 10 a distance of 2716.42 feet to the centerline of the parallel taxiway of runway 31 of the St. Cloud Regional Airport; thence South 43 degrees 51 minutes 54 seconds East along said centerline 1169.08 feet; thence at a right angle South 46 degrees 08 minutes 06 seconds West 160.00 feet to the point of beginning of the parcel to be described; thence continuing South 46 degrees 08 minutes 06 seconds West 395.68 feet to a point 150.00 feet from the center of the control tower for said airport; thence southeasterly, southerly, and westerly 396.03 feet along a non-tangential circular curve concave to the west having a radius of 150.00 feet, a central angle of 151 degrees 16 minutes 24 seconds, and a chord that bears South 46 degrees 31 minutes 52 seconds West to a point on a line 33.00 feet easterly of, and parallel with, the centerline of the access road to said control tower; thence South 44 degrees 55 minutes 37 seconds West along said parallel line 492.48 feet; thence southwesterly and southerly 475.33 feet along a tangential curve having a radius of 767.00 feet and central angle of 35 degrees 30 minutes 29 seconds; thence South 43 degrees 49 minutes 58 seconds East 631.01 feet to the south line of said North Half of Section 10; thence South 89 degrees 18 minutes 22 seconds East along said south line 1395.03 feet to the southeast corner of said North Half of Section 10; thence North 46 degrees 08 minutes 06 seconds East 627.02 feet to a line 160.00 southwesterly of, and parallel with, said taxiway centerline; thence North 43 degrees 51 minutes 54 seconds West along said parallel line 1771.34 feet to the point of beginning.

Contains 53.57 acres more or less.

EXHIBIT B

EASEMENT DESCRIPTION

Together with an easement for vehicle and utility access purposes over, under and across that part of the South 66.00 feet of the North Half of Section 10, Township 124 North, Range 29 West, Sherburne County, Minnesota lying westerly of, and adjacent with, the southwesterly line of the above described parcel.

AMENDMENT # 1.
TO
ARMY AVIATION SUPPORT FACILITY LEASE AND USE AGREEMENT

This Amendment #1 modifies the Army Aviation Support Facility (AASF) Lease and Use Agreement ("Lease") between the City of Saint Cloud, a body corporate and politic ("Lessor") and the State of Minnesota Department of Military Affairs ("Tenant") for the period from 15 April 2005 through 14 April 2104. This Amendment #1 is being executed in duplicate.

WHEREAS, the parties wish to modify the Lease by correcting the legal description included in Appendixes A and B thereof; and
WHEREAS Under the terms and provision of the lease, specifically at Paragraph 21.c., any changes or modifications to the lease must be in writing and signed by both parties.

NOW THEREFORE, in consideration of the mutual covenants contained in this Amendment #1, the parties agree as follows:

Lessor and Tenant agree to amend and modify the Lease dated April 15, 2005 by amending and modifying Exhibit A and Exhibit B thereof as follows:

EXHIBIT A

PROPOSED LEASE DESCRIPTION
ARMY AVIATION SUPPORT FACILITY
ST CLOUD REGIONAL AIRPORT

That part of the North Half of Section 10, Township 35 North, Range 30 West, Sherburne County, Minnesota described as follows:

Commencing at the northeast corner of said Section 10; thence North 89 degrees 18 minutes 18 seconds West, assumed bearing, along the north line of said Section 10 a distance of 2716.42 feet to the centerline of the parallel taxiway of runway 31 of the St. Cloud Regional Airport; thence South 43 degrees 51 minutes 54 seconds East along said centerline 1169.08 feet; thence at a right angle South 46 degrees 08 minutes 06 seconds West 160.00 feet to the point of beginning of the parcel to be described; thence continuing South 46 degrees 08 minutes 06 seconds West 395.68 feet to a point 150.00 feet from the center of the control tower for said airport; thence southeasterly, southerly, and westerly 396.03 feet along a non-tangential circular curve concave to the west having a radius of 150.00 feet, a central angle of 151 degrees 16 minutes 24 seconds, and a chord

that bears South 46 degrees 31 minutes 52 seconds West to a point on a line 33.00 feet easterly of, and parallel with, the centerline of the access road to said control tower; thence South 44 degrees 55 minutes 37 seconds West along said parallel line 492.48 feet; thence southwesterly and southerly 475.33 feet along a tangential curve having a radius of 767.00 feet and central angle of 35 degrees 30 minutes 29 seconds; thence South 43 degrees 49 minutes 58 seconds East 631.01 feet to the south line of said North Half of Section 10; thence South 89 degrees 18 minutes 22 seconds East along said south line 1395.03 feet to the southeast corner of said North Half of Section 10; thence North 46 degrees 08 minutes 06 seconds East 627.02 feet to a line 160.00 southwesterly of, and parallel with, said taxiway centerline; thence North 43 degrees 51 minutes 54 seconds West along said parallel line 1771.34 feet to the point of beginning.

Contains 53.57 acres more or less.

EXHIBIT B

Together with an easement for vehicle and utility access purposes over, under and across that part of the South 66.00 feet of the North Half of Section 10, Township 35 North, Range 30 West, Sherburne County, Minnesota lying westerly of, and adjacent with, the southwesterly line of the above described parcel.

In all other respects the Lease remains in full force and effect under the substantive terms agreed to by the parties.

IN WITNESS WHEREOF, Lessor and Tenant have executed this Amendment #1 to Lease as of the dates indicated below:

LESSOR: CITY OF SAINT CLOUD

Signed: BY John D Ellenbecker

Name: John D. Ellenbecker

Title: Mayor

Date: 7-28-05

Signed: Gregg Engdahl

Name: Gregg Engdahl

Title: Clerk

Date: 7-28-05

Seal:

TENANT: STATE OF MINNESOTA, DEPARTMENT OF MILITARY AFFAIRS

By: LARRY W. SHELLITO
MAJOR GENERAL
MINNESOTA ARMY NATIONAL GUARD

Title: ADJUTANT GENERAL OF MINNESOTA

Date: 26 Jul 05

ARMY AVIATION SUPPORT FACILITY
AMENDMENT #2 to LEASE AND USE AGREEMENT

This Amendment No. 2 to the Army Aviation Support Facility ("AASF") Lease and Use Agreement ("Lease") is made by and between the City of Saint Cloud, ("Lessor"), and the State of Minnesota, Department of Military Affairs ("Tenant").

WHEREAS, Lessor and Tenant entered into the Lease dated April 14, 2005, involving the lease of certain property located at the Saint Cloud Regional Airport ("Airport")

WHEREAS, Lessor and Tenant deem certain amendments and additional terms and conditions mutually beneficial for the effective continuation of said Lease;

NOW THEREFORE, the parties agree to the addition of the following terms and conditions, which shall become part of the Lease, effective as of the date set forth hereinafter.

1. **LEASED PREMISES - INCREASE**: This Amendment #2 will increase the total square footage originally described as "Leased Premises" in the Lease and Use Agreement. The increase in area being leased by the LESSOR to the Tenant in this lease amendment is described at Exhibit "A". This is an increase in square footage as previously described in the Lease. The parties agree that this lease includes a right of reasonable access to the Premises.

2. **LEASED PREMISES #2 – DRAINAGE LEASE:** LESSOR agrees to grant lessee a drainage Lease for the purpose of water flow across the road to the Leased Premises #2 as described in Exhibit "B" This lease term shall be for five years, automatically renewing for an additional five years unless terminated in writing by either party. The term of the drainage lease shall not exceed the term of the lease.

3. Except as modified by the provisions of this Amendment, said Lease is ratified and confirmed as originally written.

EXHIBITS:

Exhibit A
Exhibit B
Exhibit C

IN WITNESS WHEREOF, Lessor and Tenant have executed this Amendment as of the dates indicated below:

Lessor:
CITY OF SAINT CLOUD

By: Dave Kleis

Name: Dave Kleis

Title: Mayor

Date: October 10, 2017

By: Seth Kauffman

Name: Seth Kauffman

Title: City Clerk

Date: October 10, 2017

Tenant:
STATE OF MINNESOTA
DEPARTMENT OF MILITARY AFFAIRS

By:

Name: DONALD J. KERR
EXECUTIVE DIRECTOR

Title:

Date: 20Sep 2017

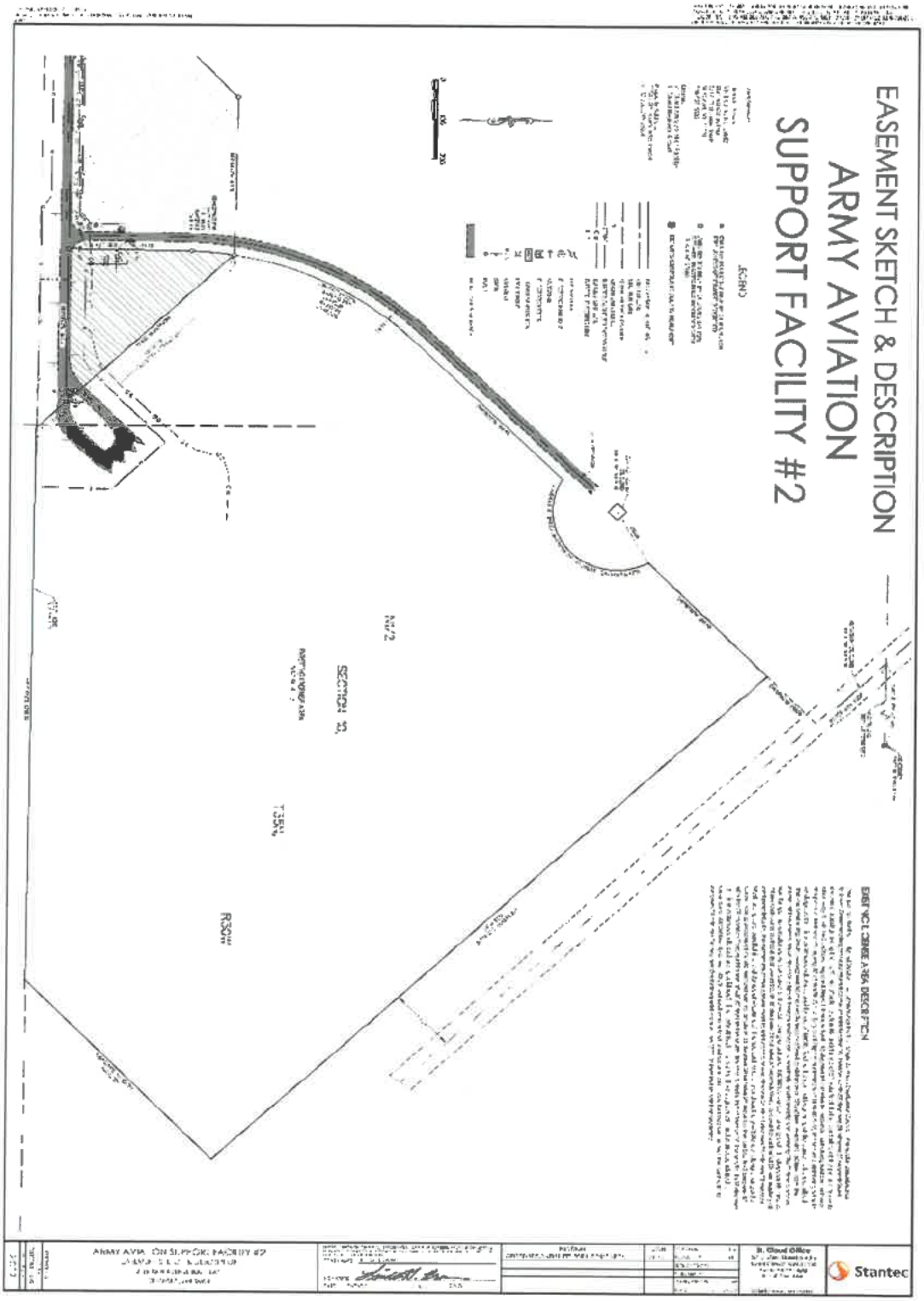
EXHIBIT A
LEASED PREMISIS INCREASE DESCRIPTION
ARMY AVIATION SUPPORT FACILITY
ST. CLOUD REGIONAL AIRPORT

A license area over, under and across that part of the North Half of Section 10, Township 35 North, Range 30 West, Sherburne County, Minnesota, described as follows: Commencing at the northeast corner of said Section 10; thence North 89 degrees 18 minutes 18 seconds West, assumed bearing, along the north line of said Section 10, a distance of 2716.42 feet, to the centerline of the parallel taxiway of runway 31 of the St. Cloud Regional Airport; thence South 43 degrees 51 minutes 54 seconds East along said centerline of the parallel taxiway of runway 31 of the St. Cloud Regional Airport, a distance of 1169.08 feet; thence at a right angle South 46 degrees 08 minutes 06 seconds West, a distance of 160.00 feet; thence continuing South 46 degrees 08 minutes 06 seconds West, a distance of 395.68 feet to a point 150 feet from the center of the control tower for said airport; thence southeasterly, southerly, southwesterly and westerly 396.03 feet along a non-tangential circular curve concave to the west having a radius of 150.00 feet, a central angle of 151 degrees 16 minutes 24 seconds, and a chord that bears South 46 degrees 31 minutes 52 seconds West, to a point on a line 33.00 feet easterly of, and parallel with, the centerline of the access road to said control tower, thence South 44 degrees 55 minutes 37 seconds West, along said parallel line, a distance of 492.48 feet; thence southwesterly and southerly 475.33 feet along a tangential curve having a radius of 767.00 feet and central angle of 35 degrees 30 minutes 29 seconds to the point of beginning of the license area to be described; thence continuing southerly 99.13 feet along said tangential curve having a radius of 767.00 feet and a central angle of 07 degrees 24 minutes 18 seconds; thence South 00 degrees 51 minutes 51 seconds West, a distance of 285.73 feet, to the north line of the South 66 feet of said North Half of Section 10; thence South 89 degrees 18 minutes 22 seconds East, along said north line of the South 66 feet of the North Half of Section 10, a distance 387.63 feet; thence North 43 degrees 49 minutes 58 seconds West, a distance of 539.21 feet to the point of beginning.

EXHIBIT B
LEASED PREMISIS #2 DESCRIPTION
DRAINAGE LEASE

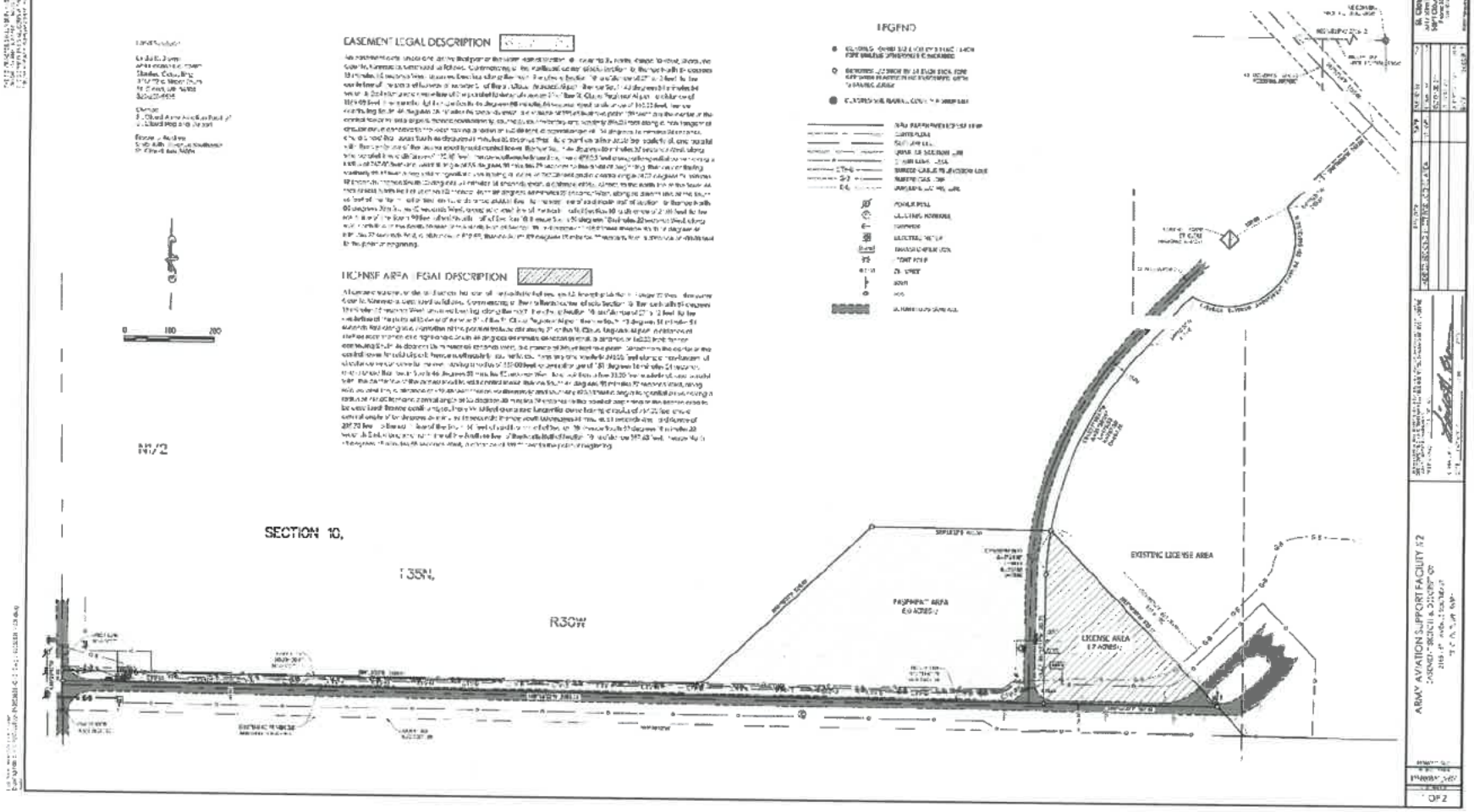
A lease over, under and across that part of the North Half of Section 10, Township 35 North, Range 30 West, Sherburne County, Minnesota, described as follows: Commencing at the northeast corner of said Section 10; thence North 89 degrees 18 minutes 18 seconds West, assumed bearing, along the north line of said Section 10, a distance of 2716.42 feet, to the centerline of the parallel taxiway of runway 31 of the St. Cloud Regional Airport; thence South 43 degrees 51 minutes 54 seconds East along said centerline of the parallel taxiway of runway 31 of the St. Cloud Regional Airport, a distance of 1169.08 feet; thence at a right angle South 46 degrees 08 minutes 06 seconds West, a distance of 160.00 feet; thence continuing South 46 degrees 08 minutes 06 seconds West, a distance of 395.68 feet to a point 150 feet from the center of the control tower for said airport; thence southeasterly, southerly, southwesterly and westerly 396.03 feet along a non-tangential circular curve concave to the west having a radius of 150.00 feet, a central angle of 151 degrees 16 minutes 24 seconds, and a chord that bears South 46 degrees 31 minutes 52 seconds West, to a point on a line 33.00 feet easterly of, and parallel with, the centerline of the access road to said control tower, thence South 44 degrees 55 minutes 37 seconds West, along said parallel line, a distance of 492.48 feet; thence southwesterly and southerly 475.33 feet along a tangential curve having a radius of 767.00 feet and central angle of 35 degrees 30 minutes 29 seconds to the point of beginning; thence continuing southerly 99.13 feet along said tangential curve having a radius of 767.00 feet and a central angle of 07 degrees 24 minutes 18 seconds; thence South 00 degrees 51 minutes 51 seconds West, a distance of 285.73 feet, to the north line of the South 66 feet of said North Half of Section 10; thence North 89 degrees 18 minutes 22 seconds West, along said north line of the South 66 feet of the North Half of Section 10, a distance 2183.11 feet, to the west line of said North Half of Section 10; thence North 00 degrees 38 minutes 40 seconds West, along said west line of the North Half of Section 10, a distance of 24.01 feet, to the north line of the South 90 feet of said North Half of Section 10; thence South 89 degrees 18 minutes 22 seconds West, along said north line of the South 90 feet of the North Half of Section 10, a distance of 1418.93 feet; thence North 46 degrees 46 minutes 27 seconds East, a distance of 519.59; thence South 89 degrees 18 minutes 22 seconds East, a distance of 400.00 feet to the point of beginning.

EXHIBIT C
SURVEY MAP



EASEMENT SKETCH & DESCRIPTION

ARMY AVIATION SUPPORT FACILITY #2



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ARMY AVIATION SUPPORT FACILITY #2

OF 2



PFCs in Minnesota's Ambient Environment:

2008 Progress Report

Minnesota Pollution Control Agency

Table of Contents

PFC Acronym Glossary 1

Executive Summary 2

Introduction 2

Investigation of PFCs in the Ambient Environment 5

- Air and Precipitation Monitoring 5
- Aqueous Film-Forming Foam (AFFF) Use 5
- Fish Tissue and Surface Water Monitoring 5
- Food Web Studies 5
- Ground Water Monitoring 5
- Lake Calhoun PFOS Source Investigation 5
- Land Use Influence of PFOS Concentrations in Fish Tissue 5
- Literature Reviews 6
- Mississippi River Sampling 6
- Soil Microcosm Studies with EPA Labs 6
- Urban Watershed Study 6
- Wastewater Treatment Plant PFC Release Assessment 6
- Water Quality Criteria Development 6
- Wildlife/Ecological Risk Assessment 6

Sources, Fate and Transport of PFCs in the Ambient Environment 7

Distribution of PFCs in Minnesota's Environment 9

- Twin Cities Metro Area Lakes - Fish and Water 9
- Mississippi River Sampling 11
- Ground Water 11
- Air Monitoring 11
- AFFF Fire-Fighting Foam 11
- Wastewater Treatment Plants 12
- Permitted Landfills 12
- Soil Microcosms 12

PFCs in Humans and Wildlife: Exposure and Effects 13

- Human Exposure via Drinking Water 13
- Human Exposure via Fish Consumption 14
- Human Health Risk 14
- Human Health Criteria 15
- Ecotoxicity of PFCs 17
- PFCs as Potential Endocrine Disruptors 17

Summary and Outlook 17

References 19

Appendix A: PFC Monitoring Data Collected by the MPCA
Appendix B: Sources, Fate and Transport of PFCs in the Environment
Appendix C: Summary of Available Toxicity Data

PFC Acronym Glossary

Groups

PFCs – perfluorochemicals or perfluorinated compounds
PASs – perfluoroalkyl surfactants
PFCAs – perfluorocarboxylic acid
PFSAs – polyfluorinated alkyl substances
FTOH – fluorotelomer alcohols
PFAAs – perfluoroalkyl acids

Individual

PFBA – perfluorobutanoic acid
PFBS – perfluorobutane sulfonate
PFPeA – perfluoropentanoic acid
PFHxA – perfluorohexanoic acid
PFHxS – perfluorohexane sulfonate
PFHpA – perfluoroheptanoic acid
PFOA – perfluorooctanoic acid
PFOS – perfluorooctane sulfonate
PFOSA – perfluorooctane sulfonamide
PFNA – perfluorononanoic acid
PFDA – perfluorodecanoic acid
PFUnA – perfluoroundecanoic acid
PFDoA – perfluorododecanoic acid
N-EtFOSE – N-ethyl perfluorooctanesulfonamidoethanol
N-MeFOSE – N-methyl perfluorooctanesulfonamidoethanol

Other Acronyms

AFFF – aqueous fire fighting foam
ECF – electrochemical fluorination
WWTP – wastewater treatment plant

Executive Summary

Perfluorochemicals (PFCs) are a group of fully-fluorinated carbon-based compounds that repel both oil and water and are very resistant to breakdown in the environment. These properties have led to their use in numerous industrial and consumer products. Specific PFCs of interest in Minnesota include PFOS (perfluorooctane sulfonate), PFOA (perfluorooctanoic acid) and PFBA (perfluorobutanoic acid).

Manufacture of PFCs in Minnesota began in the late 1950s by 3M Corporation at its Cottage Grove Facility. 3M ceased production of PFOS and PFOA in 2002 after several studies showed that PFCs were bioaccumulating in humans and wildlife worldwide. In 2004, PFCs were detected in drinking water supplies in several eastern Twin Cities suburbs; sources of the contamination were traced to legal disposal of 3M manufacturing wastes. The Minnesota Pollution Control Agency (MPCA) and the Minnesota Department of Health (MDH) have since identified contaminated wells and provided clean drinking water to affected consumers.

PFCs are released to the environment through manufacturing processes, industrial use, and the use of PFC-containing consumer products. PFCs, like PFOS and PFOA, are also formed from the breakdown of other fluorinated compounds such as fluorotelomer alcohols produced by DuPont. In order to identify potential sources of PFCs to the environment it is critical to understand the fate and transport processes governing these compounds.

It is now known that PFCs are ubiquitous environmental contaminants. This is a concern because some PFCs (such as PFOS and PFOA) are persistent, bioaccumulative and toxic. The worldwide presence of PFCs in humans and animals provides strong evidence that exposure to this group of chemicals is through general environmental exposure and is not limited to known point sources or areas of contamination. Although all routes of exposure have yet to be clearly defined, exposure likely occurs through a variety of pathways including drinking water, food and food packaging, and use of consumer products containing PFCs.

In Minnesota, it has been apparent since 2006 that PFCs may be present at concentrations of potential concern in the ambient environment (i.e., away from 3M disposal sites). The MPCA negotiated a Consent Order with 3M in May 2007. The Consent Order provided funding for additional monitoring of PFCs around Minnesota and intense remediation efforts at the 3M manufacturing and waste disposal sites. Since then, the MPCA has made a number of important discoveries regarding PFCs in Minnesota's ambient environment.

Some of the results to date presented in this report include the following findings. Several lakes in the Twin Cities and portions of the Mississippi River have elevated concentrations of PFOS in fish tissue, which has resulted in fish consumption advisories. Sampling indicates that, although present, PFC concentrations in shallow ambient ground water are well below health advisory concentrations. Most sampled waste water treatment plant influent, effluent, and sludge has detectable concentrations of PFCs. PFCs were detected in permitted landfills leachate, landfill gas, and landfill gas condensate, as well as in ground water upgradient and downgradient of the facility. More detail and additional results are presented in the report, including several extensive data sets in the appendices.

Introduction

Perfluorochemicals (PFCs) are a group of fully-fluorinated carbon-based compounds that repel both oil and water and are very resistant to breakdown in the environment. These properties have led to the use of PFCs in numerous industrial and consumer products. PFOS* (perfluorooctane sulfonate), PFOA (perfluorooctanoic acid), and PFBA (perfluorobutanoic acid) are examples of individual PFCs of concern in Minnesota. Common applications of PFCs include non-stick coatings for cookware, stain repellants, paper coatings, food packaging, fire-fighting foams, lubricants, wetting agents, corrosion inhibitors, cleaning products, cosmetics, and pesticide applications.

At this time, PFOS, PFOA, and PFBA are the PFCs of greatest interest in Minnesota due to their persistence, toxicity, and/or widespread detection in the environment and biota.

Manufacture of PFCs in Minnesota began in the late 1950's by 3M Corporation at its Cottage Grove Facility. After research found that PFOS could be measured in not just wildlife but also humans from around the world, 3M began the process of phasing out of the manufacture of the 8-carbon PFCs (PFOS and PFOA) and PFOS-related products in 2000. The phase out of PFOS production in Minnesota was completed in 2002. Since that time, 3M has worked to develop new technologies based on shorter chain PFCs such as perfluorobutane sulfonate (PFBS).

Although PFCs have been in commercial use for nearly 50 years they have only recently been detected in the global environment. It is now known that PFCs are ubiquitous environmental contaminants; they have been detected globally in lakes, rivers, oceans, sediment, soil, precipitation, air, biota, sewage sludge, and wastewater effluent. This is a concern because some PFCs are persistent, bioaccumulative and toxic. Several studies indicate that most wildlife and humans worldwide have at least some PFCs in their blood. While many sources of PFC exposure remain unknown, it is likely that exposure to PFCs occurs through consumption of contaminated food and water, and the use of numerous PFC-containing commercial products.

In 2004, PFCs detected in drinking water supplies in several eastern Twin Cities suburbs were traced to legal disposal of 3M manufacturing wastes, which occurred in the 1950s and later at four different locations. The Minnesota Pollution Control Agency (MPCA) and the Minnesota Department of Health (MDH) have since identified contaminated wells and provided clean drinking water to affected consumers. Most of the drinking-water problems have been characterized and brought under control. However, PFCs have been detected in all other environmental settings tested to date in Minnesota.

*Please refer to the acronym glossary at the beginning of this document for a complete list of acronyms used.

The May 2007 Consent Order with 3M paid for additional monitoring of PFCs around Minnesota as well as intense remediation efforts at the 3M manufacturing and waste disposal sites. From this work, the MPCA has learned that:

- The use of PFCs in industrial, commercial and consumer product applications continues even though 3M ceased production of PFOA and PFOS in 2002. Manufacturers in other countries continue to produce PFOA and PFOS for use in products that are legally exported and used for beneficial purposes in the U.S. and around the globe.

- Past and present PFC usage provides pathways for release into the environment that cannot be solely attributed to 3M, which developed the original PFC chemistry.

The MPCA is therefore pursuing a broader approach to addressing PFCs effectively, both in the short and long term:

Consent Order with 3M

In 2007, the MPCA negotiated a Consent Order (legally binding agreement) with 3M on the PFC contamination in Minnesota. The issues addressed in the Consent Order are as follows:

- Rigorous, robust cleanup plan
- Recognition of MPCA jurisdiction
- Municipal and private drinking water supplies
- Future actions on PFBA
- Additional studies on health and environmental effects
- Cooperation from 3M on sharing research and information
- Preservation of MPCA's right to take action in the future

- Investigations – ongoing studies to understand the presence, extent, sources, movement and fate of PFCs in the environment
- Remediation– vigorous and effective completion of cleanups at the 3M PFC waste disposal areas in Woodbury, Oakdale, Cottage Grove, and the Washington County Landfill
- Regulation – monitoring at wastewater treatment plants (WWTPs) and operating solid waste facilities; establishment of water quality criteria (site-specific standards) to protect fish for human consumption; permit requirements for facilities discharging into impaired waters
- Partnerships – with MDH, Minnesota Department of Natural Resources (MDNR), United States Environmental Protection Agency (EPA) and others to better characterize the risks of exposure to PFCs in the environment
- Data Management – efficient tracking, storage, retrieval and usage of all data including environmental samples; remedial investigations
- Communications – regular meetings with affected local officials and legislators; extensive web pages detailing agency actions and findings

The MPCA's investigation of PFCs in the ambient environment, along with supporting information gleaned from the scientific literature, is presented in this interim report. Several studies are still in progress, and more studies will likely be proposed in the future.

Investigation of PFCs in the Ambient Environment

A number of PFC projects have been completed or are underway. Brief descriptions of projects underway or completed by the MPCA and its partners are provided below, alphabetically.

Air and Precipitation Monitoring

Ambient air and precipitation samples are being collected to screen for PFC concentrations in urban and rural environments.

Aqueous Film-Forming Foam (AFFF) Use

Two AFFF projects are underway. One is a survey of PFC-containing AFFF users in Minnesota regarding their use of AFFF in fire fighting training. The other is a case study of PFC concentrations in sediment and shallow ground water at a site of known AFFF discharge during fire fighting training.

Fish Tissue and Surface Water Monitoring

Fish tissue and surface water samples are being collected in selected urban and rural lakes for two purposes. The first is to better understand the extent and magnitude of PFC contamination in commonly harvested fish species in lakes and rivers with high fishing pressure. Second, results will be used to evaluate bioaccumulation of PFCs in fish fillet tissue.

Food Web Studies

Two studies are underway at Lake Johanna to help develop better understanding about how PFCs move through the aquatic food web. Water, sediment, and aquatic organisms from Lake Johanna are being analyzed for PFC content as part of an aquatic food web study. Additionally, swallow eggs, chicks, and their food insects are being analyzed to determine differences in PFC concentrations in different locations and environmental media, identify which PFCs contribute to the differences, and to calculate accumulation rates.

Ground Water Monitoring

Samples of ground water were collected from wells in vulnerable, shallow aquifers in urban and agricultural areas. Sample results provided information about PFC impacts to ground water from potentially many different sources: industrial and municipal stormwater infiltration, land use, precipitation infiltration, surface water infiltration, pesticides, land application of biosolids, and/or atmospheric deposition.

Lake Calhoun PFOS Source Investigation

Elevated concentrations of PFOS in fish tissue from Lake Calhoun were a surprise. Storm water and rain water samples from the Lake Calhoun storm watershed will be collected to identify major sources of PFCs to Lake Calhoun, if major sources exist. This study is still in progress.

Land Use Influence of PFOS Concentrations in Fish Tissue

This project will utilize GIS, statistical analysis, and other information to analyze watershed characteristics and other factors that may influence PFOS concentrations in fish tissue.

Literature Reviews

On an ongoing basis, science indices, journals, reports, and regulatory news about PFC research results or policy development are searched. Review of the current literature keeps the MPCA and MDH up-to-date on research being conducted worldwide on PFC fate and transport, toxicology, risk assessment, and standard setting.

Mississippi River Sampling

The EPA is coordinating an effort to evaluate the range of concentrations of PFCs in water of the Mississippi River from the headwaters in Minnesota to the confluence with the Ohio River in Cairo, Illinois. In conjunction with the Water Quality Task Force members of the Upper Mississippi River Basin Association, approximately 200 surface water samples are being collected from key locations in the Mississippi River between Lake Itasca, Minnesota, and Cairo, Illinois.

Soil Microcosm Studies with EPA Labs

In cooperation with EPA, soil microcosms are being used to evaluate the potential for particular PFC compounds to break down in ground water and to measure the adsorption characteristics and mobility of PFCs in the ground water environment. Microcosms have been constructed using aquifer sediment spiked with PFC compounds. Periodic analysis of the microcosms will provide data on PFC fate and transport in ground water.

Urban Watershed Study

Stormwater inputs to PFC-impaired lakes will be sampled to develop better understanding about how PFCs move through an urban watershed to a lake.

Wastewater Treatment Plant PFC Release Assessment

Influent, effluent and sludge from WWTPs were sampled to assess the contribution of these facilities as potential sources of PFCs in Minnesota's environment. Facilities were selected to represent a variety of treatment technologies and influent sources (i.e. residential, commercial, industrial). Sources, environmental fate, and potential exposure pathways of PFCs detected at wastewater treatment facilities will be evaluated.

Water Quality Criteria Development

Water quality criteria were developed for PFOS and PFOA; PFBA is still in process. The process involves literature reviews of toxicity data, including 3M aquatic toxicity tests. Site-specific criteria are in place for PFOS and PFOA in Lake Calhoun and the Mississippi River. In Lake Calhoun, the chronic criteria (protective of both human health and aquatic life) are 12 ng/L for PFOS and 1.62 µg/L for PFOA. In the Mississippi River, the chronic criteria are 6 ng/L for PFOS and 2.7 µg/L for PFOA. Go to http://www.pca.state.mn.us/cleanup/pfc/index.html#pfos for more information.

Wildlife/Ecological Risk Assessment

To assess ecological risks from PFCs, MPCA filled a gap in National Park Service sampling, and expanded the study area for assessing targeted "persistent, bioaccumulative, toxicants" (PBTs), including PFCs, in bald eagles that nest along portions of the Mississippi and St. Croix Rivers. The sampling will allow monitoring of trends in PFC concentration and bald eagle nesting success over

time. The number and development of young in nests are assessed in the study area, and eagle nestling blood samples were collected for analysis of PFCs.

The purpose of these studies is to determine the distribution and extent of PFC contamination in Minnesota's ambient environment. However, these studies can only assess concentrations of PFCs in various media. In order to give context and meaning to the data, it is critical to first understand the fate and transport of PFCs in the environment. The following section provides a brief discussion of direct and indirect sources of PFCs, as well as fate and transport in relevant environmental media.

Sources, Fate and Transport of PFCs in the Ambient Environment*

*Please refer to Appendix B for a more detailed discussion of the fate and transport of PFCs.

The variety and number of fluorinated compounds currently in production comprise an enormous number of chemicals. Drugs, anesthetics, chemotherapeutic agents, pesticides, refrigerants, such as chlorofluorocarbons (CFCs), as well polymers such as Teflon and Goretex, are a few of the thousands of products made from fluorinated carbon compounds [2].

***Perfluorinated compound** – a compound in which all available carbon atoms are bound to fluorine atoms.*

PFOA and PFOS are examples of perfluorinated surfactants. They are often found in surface water samples and are almost always found in wildlife and humans. While it is clear that these are not naturally occurring compounds – they are entirely human-made – how these compounds have become so widely distributed in our environment in often very remote locations is less understood. Studies have shown that PFOA, for example, is likely "ubiquitous in the northern hemisphere" [3].

The direct release of these compounds to the environment through manufacturing processes represents one way chemicals like PFOA or PFOS get into the environment. However, several recent studies show that PFOA and PFOS can be generated as byproducts when other fluorinated compounds break down. This means that the fate of other fluorinated compounds is important to understanding how chemicals like PFOA and PFOS are released to and persist in the environment.

Perfluorinated surfactants are made either through *electrochemical fluorination* (ECF) or through a *telomerization* manufacturing process [2, 4]. ECF is the process that 3M used to produce fluorinated compounds. ECF was used to produce the fluorinated surfactants PFOA and PFOS that are used in fire-fighting foams (AFFF), paints, polishes, films, and lubricants. ECF is the only process used to directly produce PFOA and PFOS, with over 6 million pounds produced in 2000 [4]. The major contributors to environmental loads appear to be through the use of PFOA and perfluorononanoic acid (PFNA) [5]. Other chemicals produced through ECF include the compounds used to make fabric stain repellents, carpet treatments, and paper coating materials [2, 4].

DuPont uses the telomerization process to make fluorinated compounds [2]. Unlike the PFCs made through 3M's ECF process, Dupont's method is often used to make *fluorotelomer alcohols* (FTOHs)[2]. FTOHs are not used directly in products. Instead, FTOHs are used as intermediates in the manufacture of other products, where they are often present in residual amounts of up to 4% by weight [6]. There are many types of fluorinated compounds that are used in a wide variety of products.

Chemicals like PFOA and PFOS are resistant to degradation which makes them persistent in the surface water, soil, and ground water. Moody *et al.* [7] studied a creek into which fire-fighting foam (AFFF) was spilled. PFOA, perfluorohexanoic acid (PFHxA, a chemical similar to PFOA), and PFOS were present in the surface water and in fish tissue for several years after the spill. They were also detected in ground water underneath a site where AFFF fire-fighting foam was used [8]. These studies focused on surface water or ground water contamination where there was a clear source or a spill. The widespread, low-level contamination of soil, ground water, and surface water in remote locations is difficult to explain, however, because it is unlikely that PFOA and similar chemicals that are non-volatile could be transported to areas far from a likely source.

Unlike PFOA, the FTOHs produced by DuPont are volatile and can be found in the air. FTOH will break down into PFOA (Fig. 1) and related chemicals in the atmosphere [3, 9] such as perfluorodecanoic acid (PFDA, a compound similar to PFOA). With over 10 million pounds of FTOH produced per year, enough FTOH is manufactured yearly to maintain the current observed concentrations of PFOA and related compounds in the environment [9]. FTOHs also break down in wastewater treatment plants, where up to 10% of FTOH can be converted to PFOA and similar compounds [10, 11].

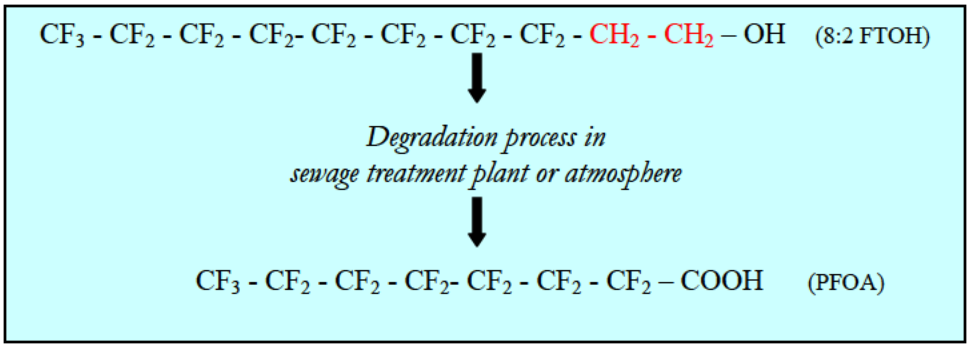

Figure 1. Conversion of 8:2 fluorotelomer alcohol into PFOA.

The degradation of FTOHs to PFOA and related chemicals can explain other observations:

- The appearance of PFDA in fish samples in Minnesota is consistent with the breakdown of FTOH to PFDA, because PFDA has no significant history of intentional industrial production [12].
- According to DeSilva and Mabury (2006), 89% of PFOA in human blood samples from the Midwest is attributable to PFOA that originated from telomerization production methods [12].
- Recent MPCA studies show that various perfluorinated surfactants – including PFOA and PFOS – were present in air samples in 2008 [13]. The presence of these compounds in the air can be partially explained by the breakdown of FTOH molecules in the atmosphere. 3M discontinued manufacture of these PFCs in 2002.
- Minnesota ground water monitoring shows PFOA, perfluoropentanoic acid (PFPeA), perfluorohexanoic acid (PFHxA), perfluoroheptanoic acid (PFHpA), and perfluorononoic acid (PFNA) at trace or low concentrations that are widespread under ambient conditions, with no known or likely sources of these compounds [14]. The degradation of FTOH

compounds in the air or in the soil is a plausible source of these detections in the ambient environment.

Polymers made from fluorinated chemicals are produced in far greater volumes than the fluorinated surfactants discussed above. Very little information, however, has been published regarding their fate in the environment [4].

Polymers typically resist breaking down. The breakdown of polymers made from fluorinated chemicals is expected to add only a very slight amount of PFOA and similar chemicals to the environment [15]. However, the polymers used widely for oil and water-resistant coatings on food-contact paper products have been found to degrade into FTOH and subsequently to PFOA [16]. The degradation of this water-resistant coating chemical was found to occur in the intestinal tract and the blood of laboratory animals, representing a significant source of exposure to PFCs [16].

Indoor air concentrations of fluorinated chemicals used to make fabric and carpet coatings are roughly 10-20 times greater than outdoor concentrations of the same chemicals [17]. These compounds may, in turn, break down into PFOS [18]. This could expose people to PFOS through ingestion and inhalation inside of homes that contain fabric coating products.

In soil, PFOS has been found to adsorb to various minerals, with adsorption increasing with PFOS concentration[19]. However, PFOS apparently adsorbs to soil less than other pollutants [19]. Some research shows that the mobility of PFOS and PFOA in ground water can change depending on the ground water conditions [20]. Adsorption variability might be important in how far and how fast these contaminants spread in aquifers away from spills or disposal sites.

Distribution of PFCs in Minnesota's Environment

In Minnesota, it has been apparent since 2006 that PFCs may be present at concentrations of potential concern beyond the disposal sites and the groundwater contamination associated with them. Since then, the MPCA has made a number of important discoveries regarding PFCs in Minnesota's ambient environment. The following section provides a brief discussion of the results to date of several completed and on-going studies at the MPCA. For more detailed analytical results, please refer to Appendix A.

Twin Cities Metro Area Lakes - Fish and Water

In April 2007, the MPCA found elevated concentrations of PFOS in fish taken from Lake Calhoun in Minneapolis. PFOS is the most bioaccumulative PFC in fish, and this finding was of concern to the city of Minneapolis and people who fish in this popular lake. MDH issued new fish consumption advisories for the lake. Sampling was expanded to other metro-area fishing lakes, and additional findings were announced later in 2007 and early 2008. In addition to Calhoun, Lake Johanna and Lake Elmo received one meal per month fish-consumption advisories. For the most part these lakes have no groundwater connection with the waste sites, and the source(s) of contamination are still not identified [21]. Figure 2 illustrates the 2006-2008 Twin Cities metro area fish sampling results. MPCA has ongoing projects underway, including an aquatic food web study and a stormwater runoff study, to better understand the distribution of PFCs in Minnesota's aquatic environment.

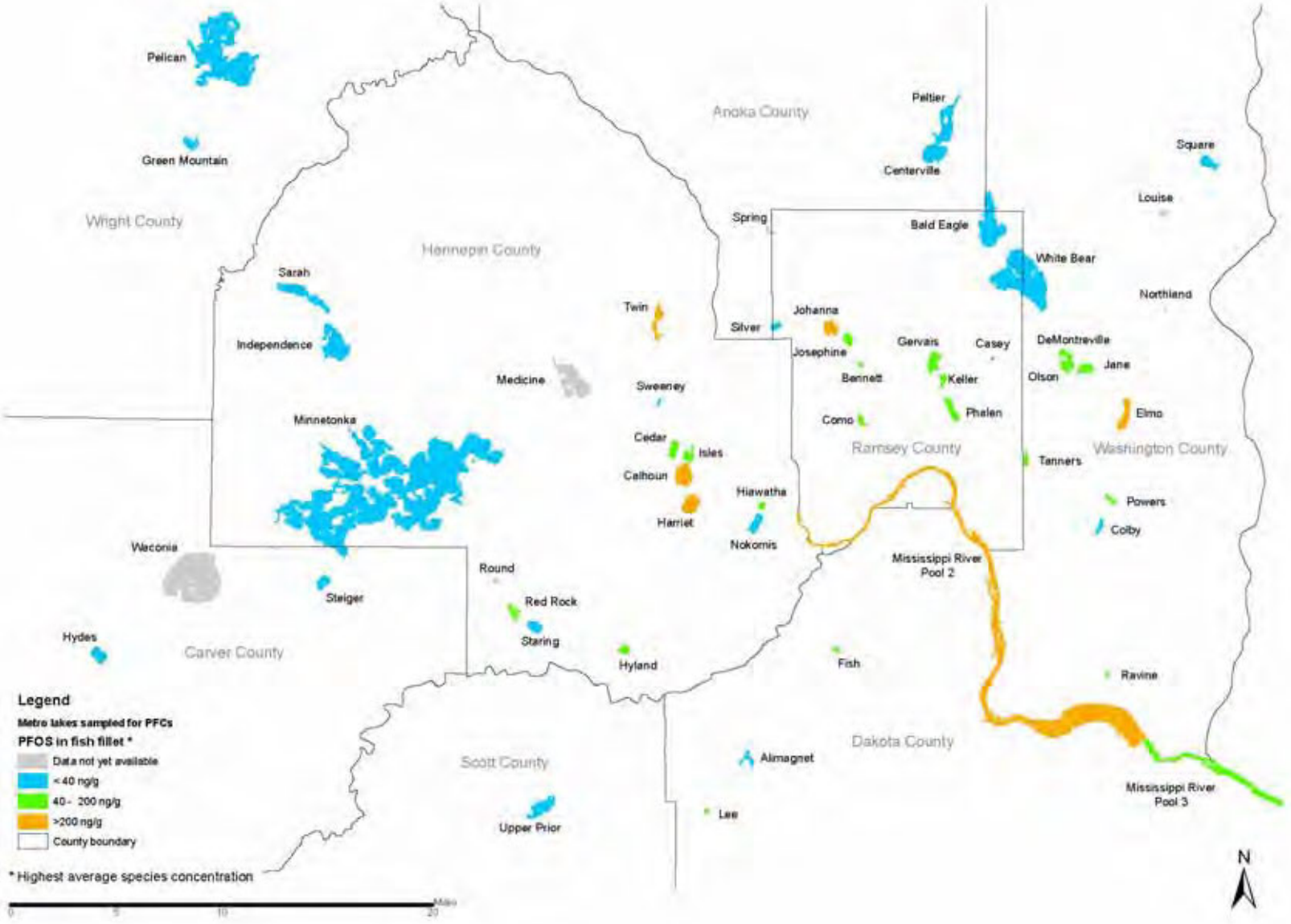

Figure 2. Fish Tissue Sampling Results for Twin Cities' Area Lakes (2006 – 2008).

Mississippi River Sampling

Fish have been collected from various reaches of the Mississippi River and analyzed for PFCs since 2005. Elevated concentrations of PFOS in fish tissue have resulted in MDH fish consumption advisories for at least one species in Pool 2, Pool 3, Pool 4, and Pools 5, 5a, and 6 (Fig. 2). Fish were sampled in the Mississippi River near Brainerd, and the PFOS concentrations in the Brainerd-area fish were low.

Ground Water

Ambient shallow ground water was sampled for PFCs in urban and agricultural areas of Minnesota during 2006 and 2007. Sampling was conducted by MPCA in cooperation with the Minnesota Department of Agriculture (MDA). Wells were selected in vulnerable aquifers. PFCs were detected in ambient shallow ground water at concentrations below MDH health guidelines. PFBA was the most commonly detected PFC, and it was the PFC detected at the highest concentration. Most of the PFC detections above the reporting limit were in the Twin Cities Metro Area. Land uses associated with the wells that had detected PFC concentrations were Industrial, Commercial, Sewered Residential, and Agricultural [22].

Air Monitoring

Air samples have been collected at two Minnesota sites, one urban and one rural. PFOS, PFOA, and PFBA were detected in air at both locations. Total concentrations were approximately 50% higher in the urban location. Additionally, 7 PFCs not detected in the rural location were detected at the urban location. Very few studies have measured and reported air concentrations of PFOS and PFOA. Minnesota's air results are within the range of PFOS and PFOA concentrations in air reported by others [23, 24]. A suburban location is currently being monitored for PFCs in air, but results are not yet available.

AFFF Fire-Fighting Foam

In 2008, MPCA hired a contractor to survey likely users of PFC-containing fire-fighting foam regarding their use of foam in both fire suppression training and in fire fighting. Survey questions were related to frequency of foam use, volume of foam used, location of foam used, and brands/types of foam used. Approximately 67% of municipal fire departments (522 of 785), all 16 fire training school, all three airports with fire departments, and both refineries with fire departments responded to the survey. Identified fire training locations were screened and ranked for relative risk based on type of foam used and proximity to potential human or environmental receptors: drinking water wells, well head protection areas and source water protection areas, surface water, wetlands, and karst geology.

Approximately 20 current or former fire training areas were identified as having a high potential for PFC contamination to drinking water, ground water, soil, and/or surface water. MDH and MPCA are conducting follow-up sampling and investigations of high-risk sites. The first round of sampling will focus on drinking water wells in proximity to fire training activities.

Wastewater Treatment Plants

The MPCA conducted a survey for PFCs in wastewater effluent at 28 municipal and industrial WWTPs across the state in 2007. A number of sample locations showed low concentrations of PFCs. The city of Brainerd's plant had elevated concentrations (see box). The Brainerd finding, traced to a chrome-plating facility, raised questions about the potential for PFCs to enter surface waters through permitted WWTP discharges to surface water. More facilities were sampled in 2008, and results were consistent with 2007 findings [21].

Permitted Landfills

Through monitoring conducted in 2006-7, the MPCA found PFCs in ground water, leachate, landfill gas, and gas condensate at a number of landfills. These findings suggest that PFCs may be released from consumer, commercial and demolition wastes. However, the concentrations were very low in ground water, and in most cases, results suggested that landfills were not acting as sources of PFC impacts to ground water. No drinking-water wells were affected [21].

Soil Microcosms

In collaboration with EPA's National Exposure Research Laboratory, MPCA is investigating the fate of PFCs in ground water. Soil collected from beneath the ground water table at the Washington County Landfill was brought to the laboratory.

Microcosms were prepared using this soil under anaerobic conditions, and PFOS and PFOA were added to the microcosms at known concentrations. Samples of these microcosms on a quarterly basis showed that, while these compounds resist degradation, the adsorption of these compounds to the soil changes with time. This is possibly due to changing oxidation/reduction conditions within the microcosms. These results have important implications to the fate of PFC in the vicinity of landfills where oxidation/reduction status changes spatially.

Brainerd WWTP Case Study

The PFOS concentrations in the Brainerd wastewater treatment plant influent, effluent and sludge were significantly higher than other WWTPs sampled around the state. In response to the noteworthy result, Brainerd Public Utilities (BPU), operator of the WWTP, hired a consultant to collect wastewater samples from locations around the city to try to determine the source of the PFOS. PFOS was detected in samples from five locations. Four concentrations ranged from 0.08 - 1.18 µg/L. The fifth sample concentration, collected at a manhole in an industrial park, had a PFOS concentration of 49.8 µg/L. **[1].**

Keystone Automotive, a chrome plating operation specializing in automobile bumpers, is located in the industrial park adjacent to the manhole with the highest PFOS concentration sample. Keystone used a PFOS-containing surfactant product in its chrome plating bath. The PFOS-containing surfactant product reduces surface tension, which in turn helps reduce emissions of hexavalent chromium from the plating solution – an important worker-safety issue. In September 2007, Keystone switched to a different mist suppressant that does not contain PFCs. Ongoing monitoring is being conducted to monitor the effectiveness of the new mist suppressant. Monitoring will continue to document the effect that the product change has over time on PFOS discharge concentrations [1].

PFCs in Humans and Wildlife: Exposure and Effects

That PFCs are found throughout the world is not surprising due to their presence in a wide variety of industrial, commercial, and consumer products. The world-wide presence of PFCs in humans and animals provides strong evidence that exposure to this group of chemicals is through general environmental exposure and is not limited to known point sources or areas of contamination. The exact sources and routes of all exposures are unknown, although efforts are underway to evaluate the primary sources.

Several studies of human blood samples from around the world have found that nearly all people tested have some PFCs in their blood [25, 26]. A number of studies have also tried to assess potential routes of exposure [27-30]. Although all routes of exposure have yet to be clearly defined, exposure likely occurs through a variety of pathways, including drinking water, food and food packaging, and use of consumer products containing PFCs. Once people are exposed to PFCs, they are very slowly eliminated and stay in the body for many years [31].

PFCs have also been shown to bioaccumulate in wildlife, including top predators such as polar bears, bald eagles, mink, and seals; PFCs also bioaccumulate in fish. However, unlike other persistent organic pollutants, PFCs bind to protein rather than fatty tissues making it difficult to predict tissue concentrations using typical bioaccumulation models.

Human Exposure via Drinking Water

As a result of the manufacturing activities in Minnesota and the accompanying waste disposal, some eastern Twin Cities suburbs were found to have higher concentrations of PFCs in ground water when compared to the general environment. Several studies suggest that PFCs readily move through the soil and enter the ground water. Through investigations conducted by MDH and MPCA, it was discovered that some area residents were being exposed to PFCs through their drinking water (Table 1). Over 1,300 wells in the eastern Twin Cities suburbs have been tested, and MDH, MPCA, and 3M have worked with affected parties to provide safe drinking water by supplying alternative sources of water or assisting with water filtration to remove PFCs.

Testing of ground water in the eastern Twin Cities suburbs over the past several years suggests concentrations of PFCs have remained stable and have not increased. MDH and MPCA staff continues to test wells in the area to monitor any changes in concentrations or movement of the PFC ground water plume.

To date, most of the drinking water supplies located away from the eastern Twin Cities suburbs that have been tested have no detectable PFCs. Although PFBA was detected in several wells, the concentrations found were below levels of health concern established by the MDH. Testing of additional drinking water sources throughout Minnesota will continue to evaluate potential exposure to PFCs through drinking water.

Table 1. PFCs detected in Minnesota Drinking Water

	PFOS[a]	PFOA[a]	PFBA[a]
East Metro Area			
Municipal wells	ND[b] – 0.9	ND – 0.9	ND – 2.2
Private wells	ND - 3.5	ND - 2.2	ND - 12
Other Areas			
Municipal wells	ND	ND	ND – 0.4
Private wells	ND	ND	ND - 0.5
Criteria set by MDH			
Health Risk Limit (HRL)	0.3	0.5[c]	-
Health Based Value (HBV)	-	-	7

[a]Concentrations are in µg/L (ppb, parts per billion)
[b]ND = not detected
[c]In September 2008, MDH proposed lowering the HRL for PFOA to 0.3 µg/L.

Human Exposure via Fish Consumption

There are numerous reports documenting the presence of PFCs in fish and animals throughout the world [32-36]. In cooperation with the DNR and MDH, the MPCA has been testing fish in Twin Cities metro area lakes and rivers as well as selected outstate water bodies for the presence of PFCs to evaluate the potential for human exposure through the consumption of fish.

Fish from 56 different lakes as well as several reaches of the Mississippi and St. Croix Rivers have been tested for PFCs. PFOS, the primary PFC found to accumulate in fish fillet tissue, has been found in various fish species from several different lakes and river reaches at concentrations such that the MDH has issued site specific consumption guidelines for fish for the affected waters. Other PFCs detected in Minnesota fish include PFPeA, PFHxA, PFHxS, PFOSA, PFNA, PFDA, and PFUnA (Appendix A).

Human Health Risk

Although there are only a few studies investigating the effects of PFCs on human health, it is an area of active scientific research. The majority of studies evaluating the human health effects of PFCs have been conducted using animal models. While most studies have focused on PFOS and PFOA, information is growing for other PFCs such as PFBA and PFHxS.

In studies evaluating the health of 3M workers exposed to PFCs during manufacturing processes, no clear associations between adverse health effects and exposure were found [37]. It should be noted that the people evaluated in these studies were healthy workers who may not represent the average population. Three recent studies evaluated the health effects of PFCs on newborn babies associated with concentrations of PFCs in the blood of their mothers [38-40]. Each study found PFC concentrations in the mother's blood correlated to decreases in measures of growth in the newborns. Participants in these studies were exposed to PFCs through typical life activities, not as a result of known point sources of contamination.

As part of an agreement in a class action lawsuit against DuPont, a health study (The C8 Health Project) of 70,000 people in West Virginia and Ohio exposed to PFOA in drinking water is being undertaken to determine if there are any health effects related to PFOA exposure. Participants in this project live in areas of known drinking water contamination due to industrial activities.

Preliminary reports suggest a relationship between PFOA exposure and elevated cholesterol levels. Additional reports are pending [41].

In animal studies, PFCs have been associated with adverse effects including, but not limited to, altered cholesterol and thyroid hormone levels, suppression of the immune system, and developmental effects such as increased neonatal mortality, decreased body weight and weight gain in newborns and delayed eye opening. Animal studies generally form the basis of establishing human health criteria.

Human Health Criteria

Minnesota Department of Health

Following the discovery of PFCs in ground water in the East Metro Area, the MDH developed drinking water criteria for PFOS, PFOA and PFBA. Under emergency rule making authority enacted by the Minnesota Legislature, the MDH promulgated in rule Health Risk Limits (HRLs) of 0.3 µg/L* for PFOS and 0.5 µg/L for PFOA in August 2007. In September 2008, MDH proposed lowering the HRL for PFOA from 0.5 µg/L to 0.3 µg/L. In February 2008, MDH established a health based value (HBV) of 7 µg/L for PFBA. PFBA is thought to be less toxic than PFOS and PFOA because of its shorter half-life in rodents. HRLs and HBVs are concentrations of chemical-specific ground water contaminants that MDH has determined would result in little or no appreciable harm to people drinking the water daily over a lifetime. The process of determining HRLs and HBVs are the same; however, HBVs have not been promulgated in rule.

Due to limited toxicity information available for other PFCs, such as PFBS, PFHxS, and PFHxA, which have been found at very low concentrations in some wells, drinking water criteria cannot be developed for these chemicals at this time. The MDH continues to monitor PFC research activities and will re-evaluate criteria as new information becomes available.

In addition to the health criteria for PFOA, PFOS and PFBA established by the MDH for drinking water, values for the protection of human health have also been developed by other regulatory and health agencies in the U.S as well as in Europe. As described below, drinking water values developed by other agencies range from 0.04 - 9 µg/L for PFOA and 0.1 - 0.9 µg/L for PFOS.

New Jersey

In 2007, the New Jersey Department of Environmental Protection (NJDEP) provided preliminary guidance to the Pennsgrove Water Supply Company to assess public health implications due to PFOA in the system's drinking water [42]. The NJDEP recommended a preliminary health-based guidance in drinking water of 0.04 µg/L PFOA, which is the lower end of the range of several values derived from non-cancer and cancer endpoints in different species.

The drinking water value the NJDEP developed is based on comparisons between target blood levels of humans and actual or predicted blood levels of experimental animals. The difference between the New Jersey and the Minnesota values for PFOA is primarily due to use of a larger uncertainty factor and different water intake rates.

MDH had several concerns regarding the New Jersey approach, including the ability to accurately estimate a serum concentration associated with observed effects, the potential for episodic serum

*µg/L (micrograms per liter) = ppb (parts per billion)

concentrations given the short half-life of PFOA in the female rat, and the uncertainty regarding the serum to water ratio. In developing its HBVs for PFOA and PFOS, MDH has chosen to utilize an animal model that it believes is more relevant to humans and a more traditional risk assessment methodology.

EPA

In 2006, the EPA set a site-specific drinking water action level of 0.5 µg/L for PFOA for the communities surrounding the DuPont Washington Works Facility in West Virginia [43]. Based on the scientific information available regarding the toxicity and the toxicokinetics of PFOA, EPA recommends that steps be taken to eliminate or reduce exposure to PFOA in the vicinity of the Washington Works Facility. Through a Consent Order, the EPA determined, "As required by Section 1431 of the SDWA (Safe Drinking Water Act) and for purposes of this Order, EPA has determined that C-8 [PFOA and its salts] is a contaminant present in or likely to enter a PWA [public water system] or a USDW [under ground source of drinking water] which may present an imminent and substantial endangerment to human health at concentrations at or above 0.50 µg/L in drinking water"[44]. In 2009, the EPA established provisional health advisories for PFOS and PFOA of 0.2 µg/L and 0.4 µg/L, respectively.

North Carolina

In 2007, the North Carolina Division of Water Quality in the Department of Environment and Natural Resources established a Public Health Goal of 0.63 µg/L for PFOA [45, 46] based on the same studies used by MDH. The difference between the North Carolina and the Minnesota values for PFOA is primarily due to use of a different water intake rate.

United Kingdom

The Food Standards Agency issued Tolerable Daily Intakes (TDIs) that are equivalent to drinking water concentrations of 9 µg/L for PFOA and 0.9 µg/L for PFOS. The evaluation conducted by the Food Standards Agency was based on the same experimental studies used by MDH; however, a dose-metric (a measurable physical/chemical property that corresponds to a compound's ability to cause a biological effect, such as toxicity) adjustment to account for species differences in half-life was not included [47-49].

Germany

In 2006, the German Ministry of Health established maximum tolerable concentrations for combined total exposure to PFOA and PFOS in drinking water and recommended that concentrations of PFOA and PFOS be combined in evaluations as they are considered to have comparable toxicity[50]. The Ministry issued a "strictly health-based guide value" for combined total exposure to PFOA and PFOS in drinking water of 0.3 µg/L. As a "health-based precautionary value", the Ministry established a drinking water value of 0.1 µg/L to account for exposure to other perfluorinated chemicals in addition to PFOA and PFOS due to the possibility of toxic risks which have yet to be identified and which may be attributed to additional perfluorinated chemicals with shorter or longer carbon chains than PFOA and PFOS. The Ministry recommends that efforts are to be made to reduce levels of total perfluorinated chemicals to less than the health-based precautionary value.

Ecotoxicity of PFCs

Several laboratory studies have demonstrated the toxicity of PFOS to aquatic organisms such as algae, invertebrates, fish, and ducks; PFOS toxicity in bobwhite quail has also been determined[51]. Mysid shrimp and chironomids, aquatic invertebrates that are important components in fresh water food webs, appear to be the most sensitive aquatic organisms tested to date. PFOS exhibits moderately acute toxicity in fathead minnows (*Pimephales promelas*). See Appendix C for a more detailed description of the available toxicity data.

A recent study of the effects of PFCs on marine mussels indicated that some PFCs (PFOA, PFNA, PFDA, and PFHxS) act as *chemosensitizers* (compounds that increase sensitivity to other chemicals) by interfering with a cell's ability to rid itself of toxic chemicals [52]. This interference could allow toxic substances that would normally be excreted to accumulate in the cell where they may have an adverse effect. Humans and other animals have cellular defense mechanisms similar to marine mussels.

PFCs as Potential Endocrine Disruptors

Several studies have shown that various PFCs have the potential to disrupt the endocrine systems of animals [53-59]. Laboratory studies of rats indicate that exposure to PFDA interfered with cholesterol transport and the production of steroid hormones, which resulted in reduced serum testosterone [56]. Exposure of rodents to PFOA has been associated with adverse effects on the testes [54]. PFOS has been shown to disrupt circulating levels of thyroid hormones in rats [57]. In cell cultures, FTOHs increased the number of estrogen receptors and induced MCF-7 breast cancer cell proliferation [55]. FTOHs were shown to be estrogenic *in vivo* in the male medaka (*Oryzias latipes*) as indicated by the induction of vitellogenin (a protein typically produced only in females) [58]. PFOS, PFOA, and certain FTOHs were also shown to be estrogenic *in vitro* [59].

Summary and Outlook

PFCs have a number of beneficial uses in myriad industrial, commercial, and consumer products due to their unique ability to repel both water and oil, and to resist breakdown. However, these same properties also contribute to their persistence, toxicity, ability to travel long distances to remote areas, and propensity to bioaccumulate in animals and humans. It is now known that PFCs are ubiquitous environmental contaminants that have been detected in a variety of settings, including humans and biota, worldwide.

There are many potential sources of PFC release to the environment, and humans and wildlife are exposed to PFCs through a variety of pathways. Several effects of exposure to PFCs have been documented in laboratory studies, including decreased growth and altered development in newborns, immune suppression, endocrine disruption, and increased sensitivity to other chemicals. Drinking water criteria and fish consumption advisories have been established to protect human health in Minnesota.

MPCA has conducted a number of studies of PFCs in the ambient environment, and several studies are still in progress. The goal of these studies is to determine the extent and distribution of PFC contamination in MN, and to determine likely sources of contamination. To date, PFCs have been detected in variety of environmental settings in Minnesota including surface water, ground water, air, soil, and fish.

The current PFC investigations are providing important clues to the origins, fate and consequences of PFCs in Minnesota's ambient environment, and will guide follow-up studies in the coming year. There is still much to learn, however. What do detections in fish, water, blood and other settings mean to people and the environment? How do PFCs move to remote parts of the planet? What are the ongoing sources of PFC release to the environment?

Despite having few human health studies, enough concerns are raised from existing human- and animal-based PFC toxicity studies to suggest that further environmental monitoring and health risk assessments are appropriate and necessary to answer questions of human and ecological risk. There are few established benchmarks against which to compare concentrations found in sampling work. Fortunately, the MPCA and MDH are not alone researching these challenging questions.

As is fitting for a global problem, scientists in government, academia and industry around the world are regularly adding to the scientific knowledge about environmental fate, movement, degradation, exposure and risks to humans and animals. The EPA is also becoming more active in the analytical and regulatory aspects of PFCs.

Minnesota agencies are in frequent contact with researchers worldwide and are partnering in some projects to represent Minnesota's interests. These complementary efforts at the state, national and international levels are key to solving the complex scientific questions about PFCs, and providing reliable information that citizens, government and industry are counting on to make good decisions.

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Appendix A

PFC Monitoring Data Collected by the MPCA

Table A1. Perfluorinated Compounds in Rural Ambient Shallow Ground Water, October 2007

Location ID	Type	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnA	PFDoA	PFBS	PFHxS	PFOS	PFOSA
FINE	Spring	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 5.01	< 5.01	< 5.01	< 2.51
BURR	Spring	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46	< 4.92	< 4.92	< 4.92	< 2.46
RAINY	Spring	2.43	< 2.43	< 2.43	< 2.43	< 2.43	< 2.43	< 2.43	< 2.43	< 2.43	< 4.86	< 4.86	< 4.86	< 2.43
747009	Monitoring Well	22	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 5.07	< 5.07	< 5.07	< 2.54
492127	Monitoring Well	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 5.09	< 5.09	< 5.09	< 2.55
747010	Monitoring Well	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 4.95	< 4.95	< 4.95	< 2.47
244529	Monitoring Well	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 4.94	< 4.94	< 4.94	< 2.47
431151	Monitoring Well	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46	< 4.91	< 4.91	< 4.91	< 2.46
244492	Monitoring Well	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 5.00	< 5.00	< 5.00	< 2.50
747014	Monitoring Well	**32.2**	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 4.99	< 4.99	< 4.99	< 2.50
747011	Monitoring Well	6.38	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 5.08	< 5.08	< 5.08	< 2.54
747012	Monitoring Well	3.14	< 2.45	< 2.45	< 2.45	< 2.45	< 2.45	< 2.45	< 2.45	< 2.45	< 4.89	< 4.89	< 4.89	< 2.45
747014	Monitoring Well	20.4	< 2.45	< 2.45	< 2.45	< 2.45	< 2.45	< 2.45	< 2.45	< 2.45	< 4.89	< 4.89	< 4.89	< 2.45
747015	Monitoring Well	3.37	< 2.38	< 2.38	< 2.38	< 2.38	< 2.38	< 2.38	< 2.38	< 2.38	< 4.76	< 4.76	< 4.76	< 2.38
747016	Monitoring Well	**63**	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 4.98	< 4.98	< 4.98	< 2.49
747018	Monitoring Well	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 5.01	< 5.01	< 5.01	< 2.51
747019	Monitoring Well	< 2.61	< 2.61	< 2.61	< 2.61	< 2.61	< 2.61	< 2.61	< 2.61	< 2.61	< 5.22	< 5.22	< 5.22	< 2.61
639515 [a]	Monitoring Well	23.3	< 11.6	< 3.88	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 4.98	< 4.98	< 4.98	< 2.49
639515 [b]	Monitoring Well	22	< 9.04	< 4.26	< 2.45	< 2.45	< 2.45	< 2.45	< 2.45	< 2.45	< 4.89	< 4.89	< 4.89	< 2.45
623617 [a]	Monitoring Well	6.65	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 4.98	< 4.98	< 4.98	< 2.49
623617 [a,c]	Monitoring Well	4.21	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 5.01	< 5.01	< 5.01	< 2.50
623617 [b]	Monitoring Well	3.97	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 5.10	< 5.10	< 5.10	< 2.55
equipment blank [c]	N/A	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 4.99	< 4.99	< 4.99	< 2.49

All units are nanograms per liter (parts per trillion)

[a] sample collected early in the purge

[b] sample collected late in the purge

[c] dedicated teflon tubing used for this sample

< indicates less than the detection limit. Number following the symbol represents the detection limit

Grayed detected values indicate that the detected concentration is below the Reporting Level of 25 ng/L

PFBA in Shallow Ground Water in Rural Areas
October 2007

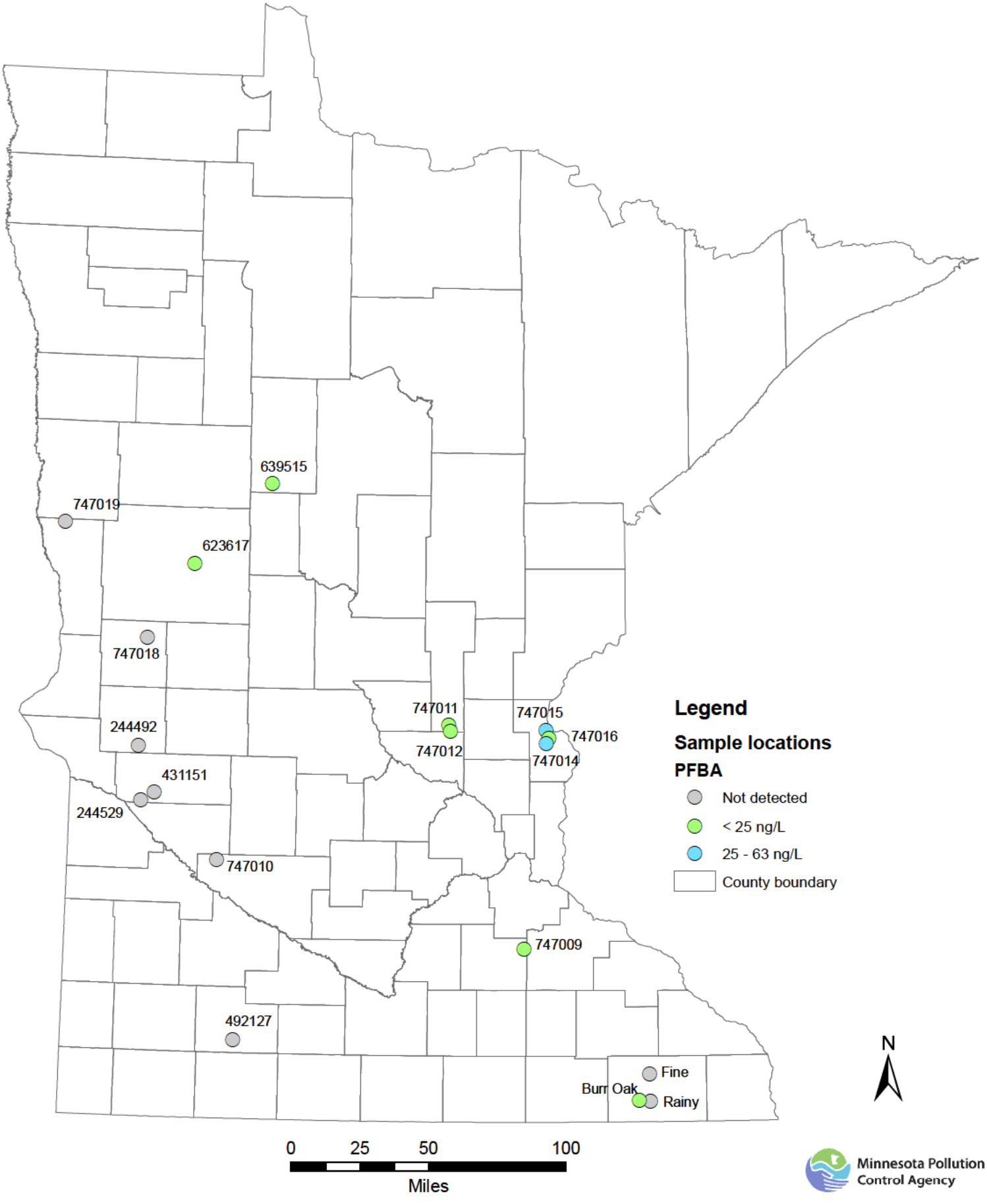


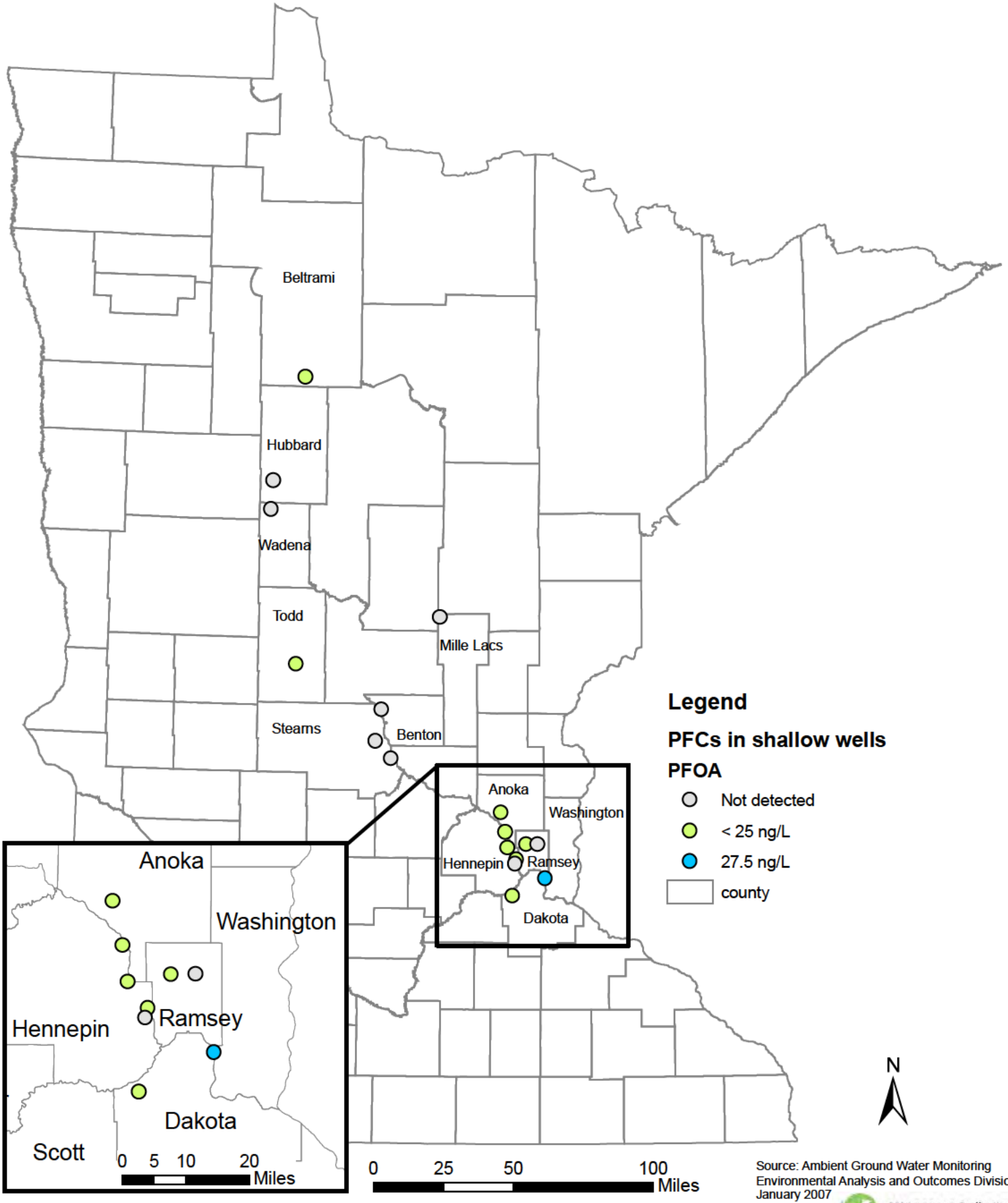
Table A2. Perfluorinated Compounds in Urban Ambient Shallow Ground Water, 2006 - 2007

Ambient ID	Sample Date [a]	Land Use	City	County	PFBA	PFOA	PFOS	PFPeA	PFHxA	PFHpA	PFBS	PFHxS	PFNA
2495	November 2006	Sewered residential	Anoka	Anoka	**43.4**	17.2	< 2.29	8.54	7.72	15.1	< 2.80	9.85	< 0.929
2495	December 2006	Sewered residential	Anoka	Anoka	12.5	12.7	< 2.22	3.05	2.66	6.86	3.1	3.64	< 1.14
2495	November 2007	Sewered residential	Anoka	Anoka	14.8	19.7	< 5.07	4.61	4.15	2.92	< 5.07	< 5.07	< 2.54
1071	November 2006	Industrial	Minneapolis	Hennepin	**61.3**	< 1.11	< 2.31	1.71	1.35	< 2.63	5.37	< 2.57	< 0.934
1071	December 2006	Industrial	Minneapolis	Hennepin	**59.5**	1.33	< 2.24	2.75	1.38	< 1.38	7.05	< 2.24	< 1.14
1071	November 2007	Industrial	Minneapolis	Hennepin	**61.8**	< 2.64	< 5.27	< 3.05	< 3.27	< 4.54	< 5.27	< 5.27	< 2.64
1070	November 2006	Industrial	Arden Hills	Ramsey	**279**	17	3.49	< 53.7	10.5	8.37	< 2.83	4.66	< 1.55
1070	December 2006	Industrial	Arden Hills	Ramsey	**266**	24.8	< 2.25	13.4	14.8	6.94	< 14.3	7.46	1.21
8180	November 2006	Sewered residential	Vadnais Heights	Ramsey	**347**	< 1.11	< 2.41	6.87	< 0.946	1.58	< 2.81	< 2.56	< 0.930
8180	December 2006	Sewered residential	Vadnais Heights	Ramsey	**468**	1.1	< 2.23	6.33	< 1.05	< 1.05	< 2.21	< 2.23	< 1.14
8180	November 2007	Sewered residential	Vadnais Heights	Ramsey	**230**	< 2.55	< 5.10	5.8	< 2.55	< 2.98	< 5.10	< 5.10	< 2.55
1069	November 2006	Industrial	Newport	Washington	**716**	**27.5**	**37**	**38.8**	24.1	7.07	24.4	**77.8**	< 0.929
1069	December 2006	Industrial	Newport	Washington	**922**	23	19.7	**55.8**	**31.1**	5.91	**39.9**	**69.6**	< 1.14
1069	November 2007	Industrial	Newport	Washington	**51.1**	32.4	7.26	10.2	6.82	2.78	< 5.12	< 5.12	< 2.56
1060	November 2006	Commercial	Burnsville	Dakota	22	8.84	2.79	5.01	2.38	3.7	< 2.83	< 2.58	< 0.938
1021	November 2006	Industrial	Minneapolis	Hennepin	**43.6**	8.58	< 2.28	3.1	2.94	2.16	< 2.79	2.92	< 0.923
1021	November 2007	Industrial	Minneapolis	Hennepin	**30.5**	7.17	< 10.3	< 5.13	< 5.13	< 5.13	< 10.3	< 10.3	< 5.13
2505	November 2006	Sewered residential	Minneapolis	Hennepin	**43.9**	1.36	2.39	2.91	< 0.944	< 1.10	< 2.80	< 2.56	< 0.929
2505	November 2007	Sewered residential	Minneapolis	Hennepin	**49.7**	< 2.54	< 5.08	< 2.54	< 2.54	< 2.54	< 5.08	< 5.08	< 2.54
2522	November 2006	Sewered residential	Minneapolis	Hennepin	20.4	6.64	**31**	4.78	3.11	< 2.73	< 5.77	24.4	< 2.98
2522	November 2007	Sewered residential	Minneapolis	Hennepin	11.6	4.06	13.7	< 4.81	< 4.08	< 5.60	< 5.17	6.01	< 2.59
12702	November 2006	Sewered residential	Bemidji	Beltrami	1.34	7.28	18.2	1.44	2.45	1.4	< 2.28	6.7	< 1.18
8192	November 2006	Transitional	Rice	Benton	< 2.87	< 2.39	< 5.53	< 2.51	< 2.59	< 2.59	< 5.47	< 5.53	< 2.83
12731	November 2006	Non-sewered residential	Garrison	Mille Lacs	23.4	< 1.00	< 2.30	< 1.05	< 1.22	< 1.37	< 2.28	< 2.30	< 1.18
1097	November 2006	Undeveloped	St. Cloud	Stearns	< 2.86	< 2.39	< 5.52	< 2.50	< 2.58	< 2.58	< 5.46	< 5.52	< 2.82
1099	November 2006	Commercial	St. Cloud	Stearns	5.02	< 2.52	< 5.82	< 2.64	< 2.72	< 2.72	< 5.76	< 5.82	< 2.97
8177	November 2006	Commercial	Long Praire	Todd	3.76	7.86	2.78	1.06	3.64	1.15	< 2.23	**45.7**	< 1.15
1107	November 2006	Undeveloped	Bemidji	Wadena	< 1.18	< 0.988	< 2.28	< 1.03	< 1.07	< 1.07	< 2.25	< 2.28	< 1.16
8176	November 2006	Sewered residential	Park Rapids	Wadena	< 1.21	< 1.02	< 2.34	< 1.06	< 1.10	< 1.10	< 2.32	< 2.34	< 1.20

All units are nanograms per liter (parts per trillion)
PFDA, PFUnA, PFDoA, and PFOSA were also analyzed, but were not detected in any sample
< indicates less than the detection limit. Number following the symbol represents the detection limit
Grayed detected values indicate that the detected concentration is below the Reporting Level of 25 ng/L
QA/QC of these results are in-process

[a] November 2006 samples were collected using a minimum purge protocol; Other samples were collected using a standard purge protocol

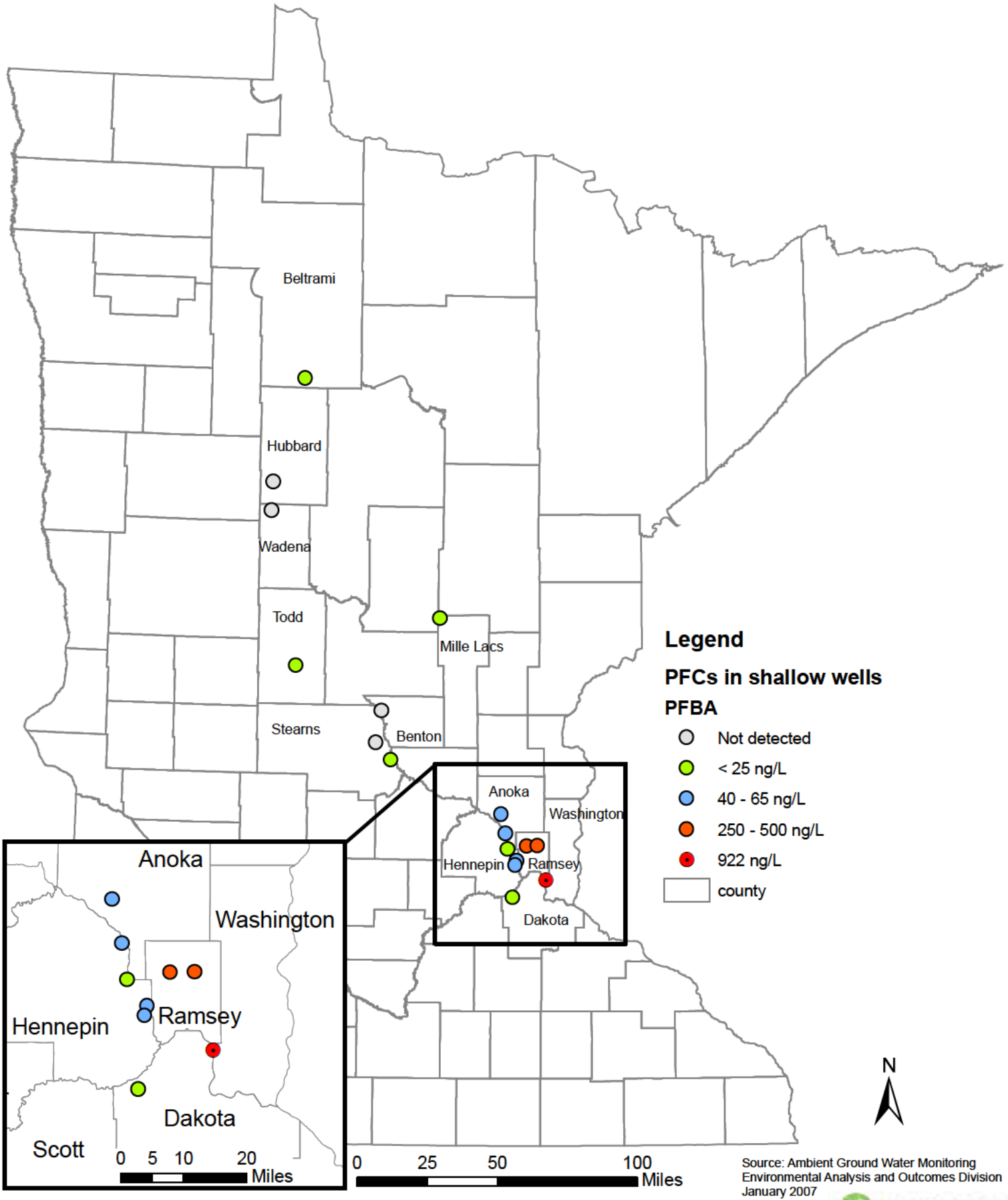
PFOA in Shallow Ground Water
November/December 2006 Sampling



Source: Ambient Ground Water Monitoring
Environmental Analysis and Outcomes Division
January 2007

Minnesota Pollution Control Agency

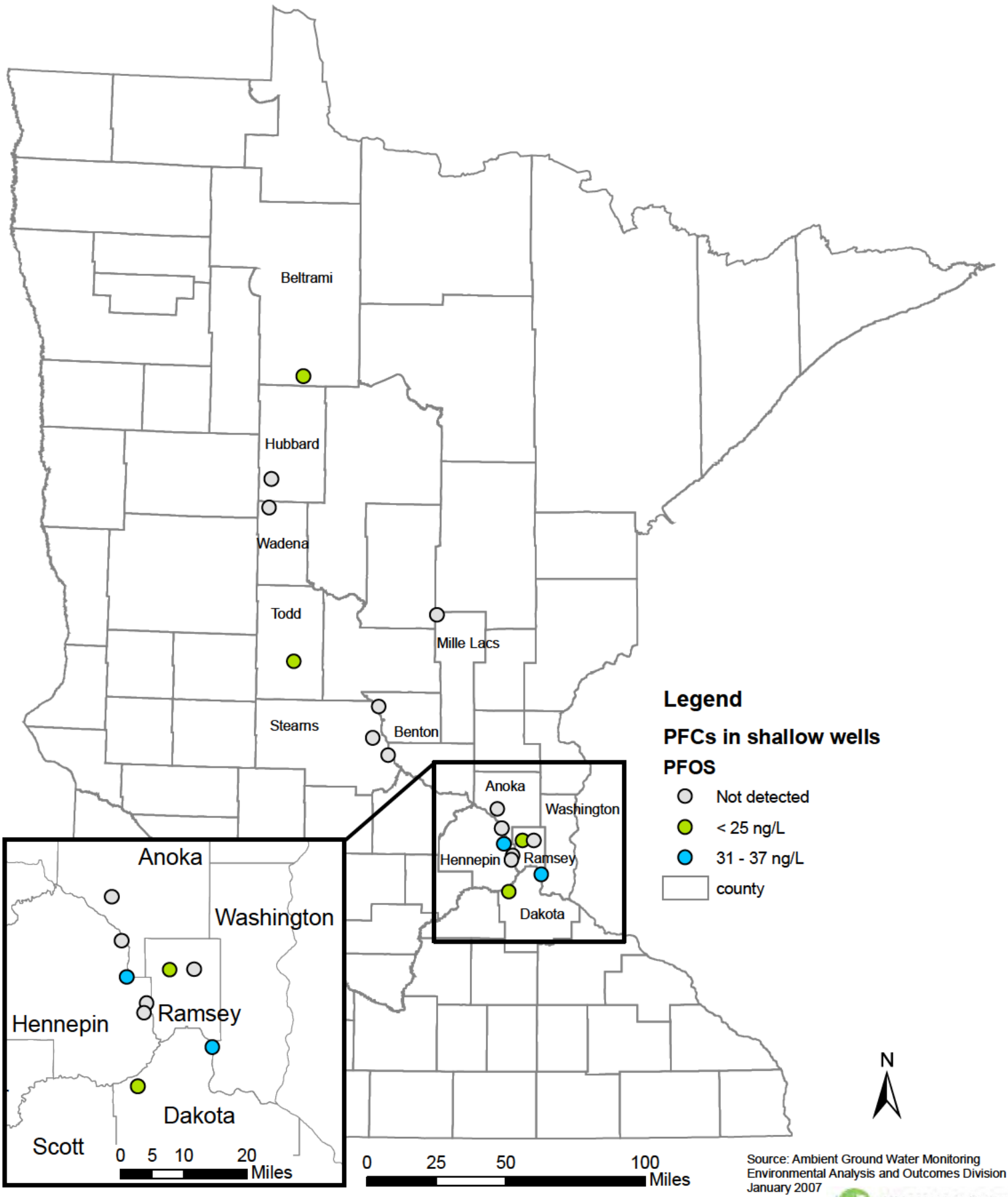
PFBA in Shallow Ground Water
November/December 2006 Sampling



Source: Ambient Ground Water Monitoring
Environmental Analysis and Outcomes Division
January 2007

Minnesota Pollution Control Agency

PFOS in Shallow Ground Water
November/December 2006 Sampling



Source: Ambient Ground Water Monitoring
Environmental Analysis and Outcomes Division
January 2007

Minnesota Pollution Control Agency

Table A3. 2006 Surface Water Samples

				ng/L (ppt)												
	location	**date**	**depth**	**PFBA**	**PFPeA**	**PFHxA**	**PFHpA**	**PFOA**	**PFNA**	**PFDA**	**PFUnA**	**PFDoA**	**PFBS**	**PFHxS**	**PFOS**	**PFOSA**
St. Croix River #1	1mile North of Wildriver State Park access (Nevers Dam) and 4 miles South of Wildriver State Park access	11/8/2006	surface	3.37	< 2.54	< 2.62	< 2.62	< 2.42	< 2.86	< 2.77	< 3.24	< 2.48	< 5.54	< 5.60	< 5.60	< 2.26
St. Croix River #2		11/8/2006	surface	< 4.82	< 4.22	< 4.35	< 4.35	< 4.02	< 4.75	< 4.60	< 5.38	< 4.12	< 9.20	< 9.30	< 9.30	< 3.75
St. Croix River #3		11/8/2006	surface	5.77	< 2.52	< 2.60	< 2.60	< 2.41	< 2.84	< 2.75	< 3.22	< 2.47	< 5.51	< 5.57	< 5.57	< 2.25
Mississippi River Pool 3 #1	dock 5	11/9/2006	surface	547	31.3	16.4	4.14	32.5	< 2.94	< 2.85	< 3.33	< 2.55	47.3	26.5	19	< 2.33
Mississippi River Pool 3 #2	Kings Cove - mid channel	11/9/2006	surface	412	29.5	15.8	4.76	31.4	< 2.94	< 2.84	< 3.33	< 2.55	55.2	27.1	23.1	< 2.32
Mississippi River Pool 3 #3	Kings Cove - lower	11/9/2006	surface	192	24	14.7	3.3	27.3	< 2.95	< 2.86	< 3.35	< 2.56	67.1	17.7	37.8	< 2.33
Calhoun (Hennepin) #1	north	11/15/2006	surface	25.4	5.07	4.35	3.3	18.1	< 2.81	< 2.72	< 3.18	< 2.44	< 5.44	< 5.50	105	< 2.22
Calhoun (Hennepin) #2	middle	11/15/2006	surface	24.2	4.43	4.41	3.72	20.5	< 2.86	< 2.77	< 3.24	< 2.48	< 5.54	< 5.60	115	2.57
Calhoun (Hennepin) #3	south	11/15/2006	surface	26.7	< 4.59	5.25	3.57	20.7	< 2.84	< 2.75	< 3.22	< 2.47	< 5.51	< 5.57	104	< 2.25
	Lake ID															
Tettegouche (Lake) A	38-0231	11/9/2006	surface	< 11.2	< 1.49	< 1.08	< 1.08	1.42	1.32	< 1.14	< 1.34	< 1.02	< 2.28	< 2.31	< 2.31	< 0.932
Tettegouche (Lake) B	38-0231	11/9/2006	12"	< 6.48	< 1.02	< 1.24	< 1.16	1.19	< 1.15	< 1.11	< 1.30	< 0.994	< 2.22	< 2.24	< 2.24	< 0.906
Dyers (Cook)	16-0634	11/9/2006	surface	< 4.88	< 1.36	< 1.02	< 1.76	< 0.947	< 1.12	< 1.08	< 1.26	< 0.967	< 2.16	< 2.18	< 2.18	< 0.881
Long Lake (Kandiyohi)	34-0066	11/8/2006	surface	10.3	< 1.04	< 1.07	< 1.07	< 0.992	< 1.17	< 1.13	< 1.32	< 1.01	< 2.26	< 2.29	< 2.29	< 0.922
Sagatagan (Sterns) A	73-0092	11/8/2006	surface	11.7	< 1.70	< 1.10	1.34	1.85	< 1.20	< 1.17	< 1.36	< 1.04	< 2.33	< 2.36	< 2.36	< 0.952
Sagatagan (Sterns) B	73-0092	11/8/2006	12"	15.2	< 1.04	< 1.07	< 1.07	1.39	< 1.17	< 1.14	< 1.33	< 1.02	< 2.27	< 2.30	< 2.30	< 0.926
Long Lake (Itasca)	31-0570	11/9/2006	surface	11.3	< 1.02	< 1.05	< 1.05	0.988	< 1.15	< 1.11	< 1.30	< 0.998	< 2.23	< 2.25	< 2.25	< 0.909

Table A4. 2007 Brainerd Area Mississippi River Surface Water Samples

Sample ID	**Collection Date**	**Collection Time**	**Site Description**	**Lat**	**Lon**	**PFOS**	**PFOA**	**PFBA**	**PFBS**	**PFPeA**	**PFHxA**	**PFHpA**	**PFNA**	**PFDA**	**PFUnA**	**PFDoA**	**PFHxS**	**PFOSA**
BR101707-01	10/17/2007	14:12	above paper plant	46.38189	94.17927	< 9.87	< 4.94	6.29	< 9.87	< 4.94	< 4.94	< 5.36	< 4.94	< 4.94	< 4.94	< 4.94	< 9.87	< 4.94
BR101707-02	10/17/2007	14.14	above paper plant (dup)	46.38189	94.17927	< 5.04	< 2.52	5.37	< 5.04	< 2.52	< 2.52	< 4.41	< 2.52	< 2.52	< 2.52	< 2.52	< 5.04	< 2.52
BR101707-03	10/17/2007	16:15	monitoring station S002-640	46.34826	94.20765	< 4.97	< 2.49	5.43	< 4.97	< 4.75	< 2.76	< 2.87	< 2.49	< 2.49	< 2.49	< 2.49	< 4.97	< 2.49
BR101707-04	10/17/2007	16:16	monitoring station S002-640 (dup)	46.34826	94.20765	< 4.94	< 2.47	4.45	< 4.94	< 2.47	< 2.68	< 3.07	< 2.47	< 2.47	< 2.47	< 2.47	< 4.94	< 2.47
BR101707-05	10/17/2007	16:00	at WWTP discharge	46.33363	94.23067	93.6	5.67	4.35	20.2	< 4.15	3.56	< 2.61	2.58	< 2.51	< 2.51	< 2.51	< 5.02	< 2.51
BR101707-06	10/17/2007	16:01	at WWTP discharge (dup)	46.33363	94.23067	102	4.99	5.55	26	< 3.53	4.49	< 2.95	3.07	< 2.54	< 2.54	< 2.54	< 5.09	< 2.54
BR101707-07	10/17/2007	15:53	below WWTP discharge	46.33114	94.23488	< 5.06	< 2.53	3.9	< 5.06	< 2.88	< 2.53	< 3.40	< 2.53	< 2.53	< 2.53	< 2.53	< 5.06	< 2.53
BR101707-08	10/17/2007	15:55	below WWTP discharge (dup)	46.33114	94.23488	< 5.10	< 2.55	6.97	< 5.10	< 2.73	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 5.10	< 2.55
BR101707-09			Trip Blank			< 4.97	< 2.49	< 2.49	< 4.97	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 4.97	< 2.49

Table A5. Mississippi River Surface Water Samples, June 2008
all samples collected at approximately 12 inches below surface

	ng/L (ppt)												
	PFBA	**PFPeA**	**PFHxA**	**PFHpA**	**PFOA**	**PFNA**	**PFDA**	**PFUnA**	**PFDoA**	**PFBS**	**PFHxS**	**PFOS**	**PFOSA**
Pool 3	23.1	3.99	3.6	3.56	5.95	< 2.53	< 2.53	< 2.53	< 2.53	< 5.06	< 5.06	5.32	< 2.53
Pool 3	24.1	< 4.06	5.22	< 2.96	6.34	< 2.66	< 2.56	< 2.56	< 2.56	< 5.11	6.6	6.44	< 2.56
Pool 3	26.1	< 3.17	4.22	3.47	11	< 2.45	< 2.45	< 2.45	< 2.45	< 4.89	5.31	5.82	< 2.45
Pool 3	33.5	< 4.03	4.82	3.37	8.62	< 2.92	< 2.51	< 2.51	< 2.51	< 5.01	6.52	6.95	< 2.51
Pool 3	36.1	7.18	5.43	< 4.80	8.96	< 4.80	< 4.80	< 4.80	< 4.80	< 9.61	< 9.61	< 9.61	< 4.80
Pool 3	35.4	5.97	4.26	< 2.81	8.79	< 2.41	< 2.41	< 2.41	< 2.41	< 4.82	< 4.82	5.98	< 2.41
Pool 3	31.6	< 2.51	4.18	< 2.51	10.1	< 2.51	< 2.51	< 2.51	< 2.51	< 5.02	5.55	5.66	< 2.51
Pool 3	15.2	< 3.65	3.79	< 2.60	3	< 2.49	< 2.49	< 2.49	< 2.49	< 4.98	< 4.98	< 4.98	< 2.49
Pool 3	14.7	< 3.77	< 2.62	< 2.68	5.18	< 2.50	< 2.50	< 2.50	< 2.50	< 5.01	< 5.01	6.11	< 2.50
Pool 3	12.4	< 2.47	< 2.47	< 2.58	3.93	< 2.47	< 2.47	< 2.47	< 2.47	< 4.94	5.04	4.95	< 2.47
Pool 3	9.7	< 2.50	3.11	< 2.50	3.19	< 2.50	< 2.50	< 2.50	< 2.50	< 5.00	< 5.00	6.75	< 2.50
Pool 2	8.06	< 2.76	3	< 2.50	4.24	< 3.50	< 2.50	< 2.50	< 2.50	< 4.99	< 4.99	< 4.99	< 2.50
Pool 2	8.44	< 5.84	< 2.47	3.58	3.96	< 3.10	< 2.47	< 2.47	< 2.47	< 4.94	< 4.94	< 4.94	< 2.47
Pool 2	6.38	< 2.47	3.09	< 3.03	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 4.94	< 4.94	< 4.94	< 2.47
Pool 2	14.7	< 2.44	4.72	< 2.44	5.86	< 2.44	< 2.44	< 2.44	< 2.44	< 4.88	< 4.88	< 4.88	< 2.44
Pool 2	11.2	< 4.90	5.62	< 4.90	< 4.90	< 4.90	< 4.90	< 4.90	< 4.90	< 9.79	< 9.79	< 9.79	< 4.90
Pool 2	12.3	< 2.47	4.12	< 2.47	3.2	< 2.47	< 2.47	< 2.47	< 2.47	< 4.95	< 4.95	< 4.95	< 2.47
Pool 2	12.3	< 2.88	4.5	< 2.72	3.73	< 2.52	< 2.52	< 2.52	< 2.52	< 5.05	< 5.05	< 5.05	< 2.52
Pool 2	10	< 2.55	< 2.55	< 2.55	3.44	< 2.55	< 2.55	< 2.55	< 2.55	< 5.10	< 5.10	< 5.10	< 2.55
Pool 2	16.7	< 2.47	2.53	< 2.47	5.11	< 2.47	< 2.47	< 2.47	< 2.47	< 4.94	< 4.94	< 4.94	< 2.47
Pool 2	14.5	< 2.48	2.59	< 2.48	3.68	< 2.48	< 2.48	< 2.48	< 2.48	< 4.96	< 4.96	< 4.96	< 2.48
Pool 2	14.6	< 2.42	5.23	< 2.42	4.18	< 2.42	< 2.42	< 2.42	< 2.42	< 4.83	< 4.83	< 4.83	< 2.42

Table A6. 2008 Surface Water

	Cty Rd 9 Drainage Ditch ng/L (ppt)							**Rice Lake** ng/L (ppt)							**Fish Lake** ng/L (ppt)						
	1	2	3	**avg**	**median**	**min**	**max**	1	2	3	**avg**	**median**	**min**	**max**	1	2	3	**avg**	**median**	**min**	**max**
PFBA	18.6	15.3	14.1	16.0	15.3	14.1	18.6	12.9	12.1	10.9	12.0	12.1	10.9	12.9	3.46	3.81	3.74	3.7	3.7	3.5	3.8
PFPeA	24	25.7	26.9	25.5	25.7	24	26.9	16.5	18.5	18.3	17.8	18.3	16.5	18.5	< 4.20	< 2.53	< 2.55	<dl	<dl	<dl	<dl
PFHxA	81.6	80.5	76.3	79.5	80.5	76.3	81.6	43.2	56.6	54	51.3	54.0	43.2	56.6	5.2	4.82	4.56	4.9	4.8	4.6	5.2
PFHpA	18.7	19.7	19	19.1	19	18.7	19.7	15	17.9	15.2	16.0	15.2	15.0	17.9	< 5.96	< 7.60	< 6.09	<dl	<dl	<dl	<dl
PFOA	59	56.5	48.1	54.5	56.5	48.1	59	38.2	38.8	42	39.7	38.8	38.2	42.0	4.6	3.67	4.23	4.2	4.2	3.7	4.6
PFNA	< 2.54	3.06	< 5.04	3.1	3.06	3.06	3.06	< 2.54	< 2.49	< 2.53	<dl	<dl	<dl	<dl	< 2.53	< 2.53	< 2.55	<dl	<dl	<dl	<dl
PFDA	< 2.54	< 2.49	< 5.04	<dl	<dl	<dl	<dl	< 2.54	< 2.49	< 2.53	<dl	<dl	<dl	<dl	< 2.53	< 2.53	< 2.55	<dl	<dl	<dl	<dl
PFUnA	< 2.54	< 2.49	< 5.04	<dl	<dl	<dl	<dl	< 2.54	< 2.49	< 2.53	<dl	<dl	<dl	<dl	< 2.53	< 2.53	< 2.55	<dl	<dl	<dl	<dl
PFDoA	< 2.54	< 2.49	< 5.04	<dl	<dl	<dl	<dl	< 2.54	< 2.49	< 2.53	<dl	<dl	<dl	<dl	< 2.53	< 2.53	< 2.55	<dl	<dl	<dl	<dl
PFBS	37	42.9	48.4	42.8	42.9	37	48.4	28.6	27.5	27.3	27.8	27.5	27.3	28.6	< 5.06	< 5.06	< 5.10	<dl	<dl	<dl	<dl
PFHxS	353	384	363	367	363	353	384	236	255	253	248	253	236	255	15.1	17.6	17.3	16.7	17.3	15.1	17.6
PFOS	132	140	102	125	132	102	140	110	108	122	113	110	108	122	19.7	9.78	8.84	12.8	9.8	8.8	19.7
PFOSA	< 2.54	< 2.49	< 5.04	<dl	<dl	<dl	<dl	< 2.54	< 2.49	< 2.53	<dl	<dl	<dl	<dl	< 2.53	< 2.53	< 2.55	<dl	<dl	<dl	<dl

Table A7. Mississippi and Minnesota River water samples collected for PFC analysis, April 2008

Note: data from other rivers (Elk and Snake rivers are tributaries of the Mississippi; MN-16 is removed from the watersheds)

Site Description	estimated value		ng/L (ppt)												
Minnesota	**Collection Date**	**Collection Time**	**PFBA**	**PFPeA**	**PFHxA**	**PFHpA**	**PFOA**	**PFNA**	**PFDA**	**PFUnA**	**PFDoA**	**PFBS**	**PFHxS**	**PFOS**	**PFOSA**
Mississippi River: County Road 7 near Bemidji, MN	4/29/2008	7:38	< 2.58	< 3.69	< 2.58	< 2.58	< 2.58	< 2.58	< 2.58	< 2.58	< 2.58	< 5.15	< 5.15	< 5.15	< 2.58
Mississippi River: State Hwy 197 in Bemidji, MN	4/29/2008	8:25	< 3.39	< 4.66	< 2.57	< 2.57	< 2.57	< 2.57	< 2.57	< 2.57	< 2.57	< 5.13	< 5.13	< 5.13	< 2.57
Mississippi River: Grand Rapids, MN	4/29/2008	10:45	6.57	< 3.58	< 2.52	< 2.52	< 2.52	3.18	< 2.52	< 2.52	< 2.52	< 5.03	< 5.03	< 5.03	< 2.52
Mississippi River: Grand Rapids, MN (dup)	4/29/2008	10:46	< 3.80	< 3.73	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 5.10	< 5.10	< 5.10	< 2.55
Mississippi River: County Hwy 1 in Aitkin, MN	4/29/2008	12:58	< 3.77	< 3.32	< 2.47	< 3.52	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 4.94	< 4.94	< 4.94	< 2.47
Mississippi River: above paper plant in Brainerd, MN	4/29/2008	15:05	5.42	< 3.43	< 2.58	< 4.99	< 2.58	< 2.58	< 2.58	< 2.58	< 2.58	< 5.15	< 5.15	< 5.15	< 2.58
Mississippi River: boat landing below paper plant in Brainerd, MN	4/29/2008	16:05	< 3.35	< 3.51	< 2.53	< 2.53	< 2.53	< 2.53	< 2.53	< 2.53	< 2.53	< 5.06	< 5.06	< 5.06	< 2.53
Mississippi River: park dock near monitoring station S002-640 in Brainerd, MN	4/29/2008	16:45	6.7	< 4.63	< 2.54	< 2.73	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 5.09	< 5.09	< 5.09	< 2.54
Mississippi River: near Fort Ripley, MN	4/30/2008	7:37	5.34	< 5.68	< 5.07	< 4.84	< 4.97	< 2.50	< 2.50	< 2.50	< 2.50	< 5.01	< 5.01	< 5.01	< 2.50
Mississippi River: downstream of Platte River near Rice, MN	4/30/2008	8:48	3.95	< 3.04	< 2.56	< 4.85	< 4.97	< 2.56	< 2.56	< 2.56	< 2.56	< 5.12	< 5.12	< 5.12	< 2.56
Mississippi River: at Sauk Rapids, MN	4/30/2008	9:34	6.87	< 5.36	< 6.37	< 5.15	< 7.13	< 7.80	< 2.54	< 2.54	< 2.54	< 5.08	< 5.08	< 5.08	< 2.54
Mississippi River: near Clearwater, MN, downstream of St. Cloud WWTP	4/30/2008	10:20	4.23	< 3.90	< 3.84	< 5.77	< 2.80	< 2.59	< 2.59	< 2.59	< 2.59	< 5.18	< 5.18	< 5.18	< 2.59
Mississippi River: near Clearwater, MN, downstream of St. Cloud WWTP (dup)	4/30/2008	10:21	7.07	< 6.88	< 2.54	< 3.38	< 2.54	< 6.72	< 2.54	< 2.54	< 2.54	< 5.07	< 5.07	< 5.07	< 2.54
Elk River: north of Clear Lake – junction cty #20 & #16	4/30/2008	11:15	6.57	< 5.11	< 7.54	< 5.06	< 4.11	< 7.38	< 2.50	< 2.50	< 2.50	< 4.99	< 4.99	< 4.99	< 2.50
Snake River: near Mora, MN – boat landing on cty #6	4/30/2008	12:50	4.1	< 3.20	< 5.90	< 5.82	< 2.52	< 2.52	< 2.52	< 2.52	< 2.52	< 5.04	< 5.04	< 5.04	< 2.52
Creek to Rice Lake: near Duluth, MN – cty #9 crossing	4/30/2008	16:05	< 5.16	11.9	31.3	16.2	36.4	< 5.51	< 5.16	< 5.16	< 5.16	16.2	168	58.2	< 5.16
Rum River: just above the confluence with Miss. River	5/9/2008	17:30	8.31	< 3.56	< 2.53	< 4.26	< 2.53	< 2.53	< 2.53	< 2.53	< 2.53	< 5.06	< 5.06	< 5.06	< 2.53
Mississippi River: Elk River	5/9/2008	18:00	6.14	< 2.49	< 2.58	< 3.49	< 2.49	< 5.65	< 2.49	< 2.49	< 2.49	< 4.98	< 4.98	< 4.98	< 2.49
Mississippi River: Brooklyn Park	5/9/2008	4:30	< 4.83	< 6.61	< 4.83	< 6.39	< 4.83	< 4.83	< 4.83	< 4.83	< 4.83	< 9.66	< 9.66	< 9.66	< 4.83
Mississippi River: Hidden Falls, above Minn River	5/9/2008	1:30	5.51	< 3.51	< 2.46	< 4.03	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46	< 4.93	< 4.93	< 4.93	< 2.46
Minnesota River: at Fort Snelling before confluence	5/9/2008	12:30	3.41	< 2.51	< 2.51	< 4.33	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 5.03	< 5.03	< 5.03	< 2.51
Minnesota River: at Fort Snelling before confluence (dup)	5/9/2008	12:30	< 2.57	< 2.57	< 2.57	< 2.57	< 2.57	< 2.57	< 2.57	< 2.57	< 2.57	< 5.14	< 5.14	< 5.14	< 2.57
Mississippi River: St. Paul, 494 Bridge below WWTP	5/9/2008	11:30	6.89	< 6.91	< 2.51	< 6.85	< 2.51	< 3.92	< 2.51	< 2.51	< 2.51	< 5.02	< 5.02	< 5.02	< 2.51
Mississippi River: St. Paul, 494 Bridge below WWTP (dup)	5/9/2008	11:30	3.64	< 2.52	< 2.52	< 2.92	< 2.52	< 3.60	< 2.52	< 2.52	< 2.52	< 5.05	< 5.05	< 5.05	< 2.52
Mississippi River: Nininger, above 3M	5/9/2008	10:30	9.64	< 6.98	< 2.49	< 5.16	2.79	< 2.49	< 2.49	< 2.49	< 2.49	< 4.98	< 4.98	< 4.98	< 2.49
Mississippi River: Nininger, above 3M (dup)	5/9/2008	10:30	6.11	< 3.09	< 2.54	< 5.16	< 2.54	< 3.28	< 2.54	< 2.54	< 2.54	< 5.07	< 5.07	< 5.07	< 2.54
Mississippi River: Hastings below 3M	5/9/2008	9:30	13.5	< 2.92	< 2.57	< 4.87	2.8	< 2.57	< 2.57	< 2.57	< 2.57	< 5.13	< 5.13	5.23	< 2.57
Mississippi River: Hastings below 3M (dup)	5/9/2008	9:30	11.3	< 2.49	< 2.49	< 4.83	3.75	< 3.45	< 2.49	< 2.49	< 2.49	< 4.98	< 4.98	< 4.98	< 2.49
Minnesota River: Ortonville	5/7/2008	13:30	5.47	< 2.69	< 2.54	< 2.89	< 2.54	< 3.08	< 2.54	< 2.54	< 2.54	< 5.07	< 5.07	5.16	< 2.54
Minnesota River: Granite Falls	5/7/2008	10:00	4.4	< 2.84	< 2.48	< 3.30	< 2.48	< 5.04	< 2.48	< 2.48	< 2.48	< 4.97	< 4.97	< 4.97	< 2.48
Minnesota River: Mankato, above Blue Earth	5/6/2008	4:30	2.72	< 3.40	< 2.52	< 3.24	< 2.52	< 3.15	< 2.52	< 2.52	< 2.52	< 5.05	< 5.05	< 5.05	< 2.52
Minnesota River: Mankato, downriver of Blue Earth	5/6/2008	3:30	< 2.48	< 2.48	< 2.48	< 3.82	< 2.48	< 2.48	< 2.48	< 2.48	< 2.48	< 4.96	< 4.96	< 4.96	< 2.48
Minnesota River: Mankato, downriver of Blue Earth (dup)	5/6/2008	3:30	3.05	< 6.85	< 2.53	< 3.43	< 2.53	< 2.53	< 2.53	< 2.53	< 2.53	< 5.06	< 5.06	< 5.06	< 2.53
Minnesota River: Downriver of Seven Mile Creek	5/6/2008	2:30	3.39	< 2.49	< 2.49	< 2.92	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 4.98	< 4.98	< 4.98	< 2.49

Table A8. Mississippi and Minnesota River water samples collected for PFC analysis, August 2008

estimated value

Minnesota Site Description	Collection Date	Collection Time	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnA	PFDoA	PFBS	PFHxS	PFOS	PFOSA
Mississippi River: County Road 7 near Bemidji, MN	8/18/2008	17:02	2.62	< 2.48	< 2.48	< 3.29	< 2.48	3.01	< 2.48	< 2.48	< 2.48	< 4.96	< 4.96	< 4.96	< 2.48
Mississippi River: State Hwy 197 in Bemidji, MN	8/18/2008	17:30	3.29	< 2.51	< 2.51	< 2.51	2.62	< 2.51	< 2.51	< 2.51	< 2.51	< 5.03	< 5.03	< 5.03	< 2.51
Mississippi River: Grand Rapids, MN	8/19/2008	8:45	3.94	< 2.53	< 2.53	< 2.53	< 2.53	< 2.53	< 2.53	< 2.53	< 2.53	< 5.06	< 5.06	< 5.06	< 2.53
Mississippi River: Grand Rapids, MN (dup)	8/19/2008	8:46	3.56	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 5.01	< 5.01	< 5.01	< 2.50
Mississippi River: County Hwy 1 in Aitkin, MN	8/19/2008	11:15	4.83	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 4.97	< 4.97	< 4.97	< 2.49
Mississippi River: above paper plant in Brainerd, MN	8/19/2008	12:40	3.52	< 2.56	< 2.56	< 2.56	< 2.56	4.24	< 2.56	< 2.56	< 2.56	< 5.12	< 5.12	< 5.12	< 2.56
Mississippi River: near paper plant in Brainerd, MN	8/19/2008	14:15	4.73	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 4.94	< 4.94	< 4.94	< 2.47
Mississippi River: monitoring station S002-640 in Brainerd, MN	8/19/2008	15:02	4.36	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 4.97	< 4.97	< 4.97	< 2.49
Mississippi River: at WWTP discharge in Brainerd, MN	8/19/2008	15:47	5.28	< 4.92	< 4.92	< 4.92	9.5	7.19	< 4.92	< 4.92	< 4.92	83	< 9.84	151	< 4.92
Mississippi River: at WWTP discharge in Brainerd, MN (dup)	8/19/2008	15:48	6.07	< 2.47	3.35	< 2.47	4.42	5.88	< 2.47	< 2.47	< 2.47	87.8	< 4.94	170	< 2.47
Mississippi River: below WWTP discharge in Brainerd, MN	8/19/2008	15:58	4.96	< 2.50	< 2.50	< 2.50	< 2.50	3.01	< 2.50	< 2.50	< 2.50	< 4.99	< 4.99	< 4.99	< 2.50
Mississippi River: below WWTP discharge in Brainerd, MN (dup)	8/19/2008	15:59	4.4	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 5.01	< 5.01	< 5.01	< 2.50
Mississippi River: near Fort Ripley, MN	8/19/2008	18:00	3.51	< 2.50	< 2.50	< 2.50	< 2.50	4.19	< 2.50	< 2.50	< 2.50	< 5.00	< 5.00	< 5.00	< 2.50
Mississippi River: downstream of Platte River near Rice, MN	8/20/2008	8:06	3.65	< 2.48	< 2.48	< 2.48	< 2.48	2.65	< 2.48	< 2.48	< 2.48	< 4.96	< 4.96	< 4.96	< 2.48
Mississippi River: at Sauk Rapids, MN	8/20/2008	9:15	5.48	< 2.50	< 2.50	< 2.50	< 2.50	3.92	< 2.50	< 2.50	< 2.50	< 4.99	< 4.99	< 4.99	< 2.50
Mississippi River near Clearwater, downstream of St. Cloud WWTP	8/20/2008	10:40	3.9	< 2.48	< 2.48	< 2.48	2.5	< 2.48	< 2.48	< 2.48	< 2.48	< 4.96	< 4.96	< 4.96	< 2.48
Mississippi River near Clearwater, downstream of St. Cloud WWTP (dup)	8/20/2008	10:41	5.1	< 2.48	< 2.48	< 2.48	< 2.48	2.79	< 2.48	< 2.48	< 2.48	< 4.96	< 4.96	< 4.96	< 2.48
Mississippi River: Elk River	8/19/2008		11.1	< 2.50	< 2.50	< 2.50	2.97	< 2.50	< 2.50	< 2.50	< 2.50	< 5.01	< 5.01	< 5.01	< 2.50
Rum River: just above the confluence with Miss. River	8/19/2008	16:43	7.2	< 2.52	< 2.52	< 2.52	< 2.52	< 2.52	< 2.52	< 2.52	< 2.52	< 5.04	< 5.04	< 5.04	< 2.52
Mississippi River: Brooklyn Park	8/19/2008	10:04	8.15	< 2.52	< 2.52	3.98	2.54	< 2.52	< 2.52	< 2.52	< 2.52	< 5.03	< 5.03	< 5.03	< 2.52
Mississippi River: Hidden Falls, above Minn River	8/19/2008	14:36	10.2	< 2.50	2.58	3.87	7.66	< 2.50	< 2.50	< 2.50	< 2.50	< 4.99	< 4.99	< 4.99	< 2.50
Minnesota River: at Fort Snelling before confluence	8/19/2008	13:57	6.64	< 2.54	3.18	< 2.54	4.5	< 2.54	< 2.54	< 2.54	< 2.54	< 5.08	< 5.08	< 5.08	< 2.54
Minnesota River: at Fort Snelling before confluence (dup)	8/19/2008	13:57	5.94	2.84	2.72	< 2.58	4.02	< 2.58	< 2.58	< 2.58	< 2.58	< 5.15	< 5.15	< 5.15	< 2.58
Mississippi River: St. Paul, 494 Bridge below WWTP	8/19/2008	11:56	14.2	< 2.53	4.96	3.81	7.19	< 2.53	< 2.53	< 2.53	< 2.53	< 5.06	< 5.06	6.02	< 2.53
Mississippi River: St. Paul, 494 Bridge below WWTP (dup)	8/19/2008	11:56	15.3	3	6.03	2.72	7.25	< 2.61	< 2.61	< 2.61	< 2.61	< 5.22	< 5.22	6.2	< 2.61
Mississippi River: Nininger, above 3M	8/19/2008	10:48	23.2	3.69	6.29	4.42	8.55	< 2.57	< 2.57	< 2.57	< 2.57	< 5.15	< 5.15	7.95	< 2.57
Mississippi River: Nininger, above 3M (dup)	8/19/2008	10:48	21.1	3.41	4.87	3.18	8	< 2.54	< 2.54	< 2.54	< 2.54	5.61	< 5.07	8.13	< 2.54
Mississippi River: Hastings below 3M	8/19/2008	10:00	69.9	4.68	8.12	4.15	19.3	< 2.55	< 2.55	< 2.55	< 2.55	13.4	9.36	17.7	< 2.55
Mississippi River: Hastings below 3M (dup)	8/19/2008	10:00	63.9	7.1	8.44	3.19	19.6	< 2.58	< 2.58	< 2.58	< 2.58	13.6	9.87	16.7	< 2.58
Minnesota River: Ortonville	8/22/2008	10:50	3.01	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 5.08	< 5.08	< 5.08	< 2.54
Minnesota River: Granite Falls	8/22/2008	9:00	3.37	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 5.10	< 5.10	< 5.10	< 2.55
Minnesota River: Mankato, above Blue Earth	8/21/2008	12:00	2.82	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 4.98	< 4.98	< 4.98	< 2.49
Minnesota River: Mankato, downriver of Blue Earth	8/21/2008	12:05	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 2.55	< 5.10	< 5.10	< 5.10	< 2.55
Minnesota River: Downriver of Blue Earth (dup)	8/21/2008	11:20	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 5.09	< 5.09	< 5.09	< 2.54
Minnesota River: Downriver of Seven Mile Creek	8/21/2008	11:20	< 5.17	< 5.17	< 5.17	< 5.17	< 5.17	< 5.17	< 5.17	< 5.17	< 5.17	< 10.3	< 10.3	< 10.3	< 5.17

2005 MPCA PFC Fish Data

Mississippi River Pool 2 Fish PFC analysis												
MPCA Species & Sample ID #	Sample Date	Analyzed as Fillet or Whole Fish	Wt (g)	Ln (cm)	Age/ sex (yrs/ m-f)	PFOA ng/g (ppb)	PFOS ng/g (ppb)	PFOSA ng/g (ppb)	PFPeA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Walleye												
WE-1	10/3/05	Fillet	3275	70	7/m	<0.581	13.1	1.35	<1.42	<0.644	<0.572	<0.682
WE-2	10/3/05	Fillet	1079	54	3/f	<0.614	75.5	3.61	<1.79	0.789	<0.604	1.21
WE-3	10/3/05	Fillet	1230	49	2/f	<0.591	180	26.4	<1.44	1.67	<0.581	1.03
WE-4	10/3/05	Fillet	3125	70	7/f	<0.538	45.5	3.35	<1.31	1.43	<0.529	<0.631
Carp												
Carp-1	10/3/05	Fillet	1771	53	4/m	1.24	347	21.4	<5.96	3.85	2.19	3.01
Carp-2	10/3/05	Fillet	2532	55	5/f	<0.602	73.5	<0.572	<5.87	1.26	<0.592	<0.706
Carp-3	10/3/05	Fillet	2416	57	5/m	<0.590	175	2.02	5.76	2.16	0.992	<0.693
Carp-4	10/3/05	Fillet	4675	61	6/f	<0.608	420	7.67	<5.93	4.06	1.36	0.957
Carp-5	10/3/05	Fillet	5175	62	6/f	<0.605	66.4	0.908	<5.90	1.68	0.803	<0.710
SM Bass												
SMB-1	10/3/05	Fillet	285	26	5/m	<0.619	269	34.1	<1.51	4.4	3.38	8.35
SMB-2	10/3/05	Fillet	252	26	4/m	<0.596	336	22.7	<1.45	5.05	3.36	6.03
SMB-3	10/3/05	Fillet	165	22	4/f	<0.607	167	6.77	<1.48	4.33	3.5	4
SMB-4	10/3/05	Fillet	303	28	5/m	<0.615	158	20.4	<1.50	3.4	2.47	3.81
SMB-5	10/3/05	Fillet	135	22	4/f	<0.591	122	6.16	<1.44	2.75	2.33	3.71
SMB-6	10/3/05	Fillet	215	26	4/f	<0.578	156	8.43	<1.41	3.79	3.17	5.17
White Bass												
WB-1	10/3/05	Fillet	416	31	2/f	<0.609	510	8.43	<1.48	6.55	3.08	2.31
WB-2	10/3/05	Fillet	780	37	4/f	<0.600	102	2.75	<1.83	2.6	<0.591	<0.705
WB-3	10/3/05	Fillet	441	32	2/f	<0.605	240	3.28	<1.48	3.88	1.71	1.27
WB-4	10/3/05	Fillet	219	24	1/f	1.17	1860	166	<1.53	17.5	9.07	11.1
WB-5	10/3/05	Fillet	665	38	4/f	<0.602	83.6	2.35	<1.47	1.88	0.93	1.02
Other												
SMBuffalo	10/3/05	fillet	2633	49	?/f	<0.605	374	32.7	<5.90	2.79	2.65	4.17
Emerald Shiner	10/3/05	Composite of 16 whole fish	28	3 to 5 cm	na	<0.603	93.5	8.63	<5.87	1.76	0.734	<0.706
Gizzard Shad	10/3/05	Composites of 29 whole fish from L8616-13	149 166 157	8 to 15 cm	na	A<0.618 B<0.605 C<0.598	52.7 71.5 120	10.7 11.1 18.5	19.1 15.3 13.7	<0.684 <0.670 0.841	<0.608 <0.595 <0.588	<0.725 <0.710 0.861

< = less than the detection limit; number following this symbol represents the detection limit

2005 MPCA PFC Fish Data

Mississippi River Lake Pepin Fish PFC analysis												
MPCA Species & Sample ID #	Sample Date	Analyzed as Fillet or Whole Fish	Wt (g)	Ln (cm)	Age/ sex (yrs/ m-f)	PFOA ng/g (ppb)	PFOS ng/g (ppb)	PFOSA ng/g (ppb)	PFPeA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Walleye												
WE-1	10/4/05	Fillet	741	42	1/f?	<0.603	47	1.52	<5.88	<0.668	<0.593	<0.708
WE-2	10/4/05	Fillet	861	47	2/f	<0.574	63.1	2.34	<5.60	1.53	<0.565	<0.674
WE-3	10/5/05	Fillet	2483	55	3/f	<0.605	49.4	1.77	<5.90	<0.670	<0.595	<0.710
WE-4	10/5/05	Fillet	1079	47	2/f	<0.579	83.4	2.14	<5.65	1.2	<0.569	<0.679
WE-5	10/5/05	Fillet	2252	60	5/f	<0.907	39.3	1.38	<1.86	<0.670	<0.595	<0.710
WE-6	10/5/05	Fillet	1180	47	3/m	<0.581	47.4	1.83	<1.50	1.07	<0.572	<0.682
Carp												
Carp-1	9/27/05	Whole Fish	3011	52	4/f	<0.587	65.5	2.9	<5.72	1.2	1.12	<0.688
Carp-2	9/27/05	Whole Fish	2626	53	4/m	<0.585	90.7	1.6	<5.71	2	1.21	<0.687
Carp-3	9/27/05	Whole Fish	3019	54	4/m	<0.594	99.6	1.64	<5.79	3.07	1.6	0.876
Carp-4	9/27/05	Fillet	4975	59	6/f	<0.603	46.3	<0.573	<5.88	<0.668	<0.593	<0.708
Carp-5	9/27/05	Fillet	2730	56	6/m	<0.598	59.9	0.724	<5.83	1.17	0.662	<0.701
Carp-5 (dup)	9/27/05	Fillet(duplicate)	2730	56	6/m	<0.607	51.1	0.581	<5.92	0.926	0.602	<0.712
SM Bass												
SMB-1	9/27/05	Fillet	792	35	3/m	<0.583	103	2.69	<1.42	1.92	1.07	0.82
SMB-1(dup)	9/27/05	Fillet (duplicate)	792	35	3/m	<0.647	116	2.56	<2.05	2.31	1.21	0.928
SMB-2	9/27/05	Fillet	553	35	4/f	<0.592	66.2	1.19	<1.45	1.04	<0.582	<0.694
SMB-3	9/27/05	Fillet	729	36	4/f	<0.673	95.6	1.79	<2.56	1.85	0.692	1.06
SMB-4	9/27/05	Whole Fish	303	27	3/m	<0.584	175	3.98	<2.52	3.57	1.28	0.924
SMB-5	9/27/05	Whole Fish	1205	39	5/f	<0.611	172	3.28	<1.49	3.2	1.25	1.35
White Bass												
WB-1	10/4/05	Fillet	640	33	4/m	<0.603	114	3.37	<2.78	1.06	<0.594	<0.708
WB-2	10/4/05	Fillet	812	36	4/f	<0.605	100	2.08	<1.80	1.45	<0.595	<0.710
WB-3	10/4/05	Whole Fish	692	33	3/m	<0.604	223	5.71	<1.77	4.26	1.89	1.61
WB-4	10/5/05	Whole Fish	446	28	1/f	<0.599	194	4.45	<1.46	3.3	1.1	1.12
WB-4(dupl)	10/5/05	Whole fish(dup)	446	28	1/f	<0.585	165	4.24	<1.43	3.11	1.52	1.14
WB-5	10/5/05	Whole Fish	664	33	4/m	<0.576	248	4.92	<1.40	3.37	1.47	1.26
Other												
Gizzard Shad	9/23/05	Composites of 38 whole fish	1436	~15	na	A<0.672 B<0.581 C<0.588	37.9 33.4 47.1	2.27 1.87 2.45	18.5 17.2 17.8	0.694 0.817 <0.651	<0.594 <0.571 <0.578	<0.709 <0.681 <0.690
Emerald Shiner	9/27/05	Composites of 40 whole fish	117	~8	na	A<0.579 B<0.607 C<0.602	105 107 90.9	2.15 0.706 1.4	2.17 2.44 2.02	2.57 2.6 2.59	0.877 1.17 0.927	<0.679 <0.712 <0.707

< = less than the detection limit; number following this symbol represents the detection limit

	Average PFOS Concentration [ng/g; ppb]							
	Bluegill	**Smallmouth Bass**	**Largemouth Bass**	**White Bass**	**Walleye**	**Northern Pike**	**White Sucker**	**Channel Catfish**
Mississippi River pool 3	170 (5)	ns	ns	132 (5)	ns	ns	ns	ns
Mississippi River pool 4	85 (5)	ns	ns	ns	ns	ns	ns	ns
Mississippi River pool 5	65 (5)	96 (5)	85 (5)	ns	54 (4)	111 (5)	ns	10 (2)
Mississippi River pool 5a	61 (5)	73 (5)	ns	ns	65 (5)	ns	ns	14 (4)
St. Croix River: Taylors Falls to Danbury	<dl (5)	<dl (5)	ns	ns	<dl (5)	<dl (5)	<dl (5)	ns
Lake Calhoun	319 (5)	ns	ns	ns	ns	ns	49 (5)	ns

numbers listed are: average PFOS concentration (# of fish)
<dl – less than the detection limit ≈ 5 ng/g
ns – not sampled

Samples were analyzed for the 13 different perfluorochemicals listed.

			CAS #
PFBA	C-4	perfluorobutanoic acid	375-22-4
PFBS	C-4	perfluorobutane sulfonate	375-73-5
PFPeA	C-5	perfluoropentanoic acid	2706-90-3
PFHxA	C-6	perfluorohexanoic acid	307-24-4
PFHxS	C-6	perfluorohexane sulfonate	355-46-4
PFHpA	C-7	perfluoroheptanoic acid	375-85-9
PFOA	C-8	perfluorooctanoic acid	335-67-1
PFOS	C-8	perfluorooctane sulfonate	1763-23-1
PFOSA	C-8	perfluorooctane sulfonamide	754-91-6
PFNA	C-9	perfluorononanoic acid	375-95-1
PFDA	C-10	perfluorodecanoic acid	335-76-2
PFUnA	C-11	perfluoroundecanoic acid	2058-94-8
PFDoA	C-12	perfluorododecanoic acid	307-55-1

Mississippi River Pool 3 Fish PFC analysis												
MPCA Species & Sample ID	Sample Date	Fillet or Whole Fish	Wt (g)	Ln (cm)	Age/ sex (yrs/ m-f)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BG-1	11/9/06	Fillet	102	17	3/M	440	<1.52	<6.70	1.42	8.05	5.09	4.41
BG-1	11/9/06	Whole Fish	102	17	3/M	815	<1.46	<1.75	6.5	12.3	6.13	4.70
BG-2	11/9/06	Fillet	135	17	3/M	108	<1.46	<8.68	3.62	5.36	5.79	14.6
BG-2	11/9/06	Whole Fish	135	17	3/M	187	<1.48	<1.76	10.2	7.6	6.46	14.2
BG-3	11/9/06	Fillet	152	18	3/M	123	<1.51	<1.81	<1.41	3.17	<2.01	1.55
BG-3	11/9/06	Whole Fish	152	18	3/M	186	<1.28	0.91	1.03	5.59	2.17	2.34
BG-4	5/2006	Fillet	177	18.5	3/F	87.5	<1.48	<1.77	<1.38	2.36	<1.98	<1.51
BG-5	5/2006	Fillet	160	18	3/M	92.1	<1.47	<1.75	<1.37	<1.67	<1.96	<1.50
White Bass												
WB-1	11/9/06	Fillet	33	12.5	1/J	122	<1.48	<8.00	11.5	4.88	<1.98	2.28
WB-1	11/9/06	Whole Fish	33	12.5	1/J	134	<1.79	<1.70	14.5	6.11	1.73	3.09
WB-2	11/9/06	Fillet	34	13	1/J	154	<1.49	<3.14	8.75	5.9	2.83	2.23
WB-2	11/9/06	Whole Fish	34	13	1/J	161	<1.51	<2.86	10.3	9.5	2.53	2.73
WB-3	11/9/06	Fillet	34	13	1/J	150	<2.51	<1.80	10.9	5.28	2.09	2.92
WB-3	11/9/06	Whole Fish	34	13	1/J	148	<1.51	<6.58	15.1	7.3	2.75	4.06
WB-4	11/9/06	Fillet	44	13	1/J	148	<1.48	<2.65	10.6	4.55	<1.90	2.71
WB-4	11/9/06	Whole Fish	44	13	1/J	153	<1.48	<4.99	17	7	2.06	4.13
WB-5	11/9/06	Fillet	41	14.5	1/J	86.7	<1.51	<6.24	6.58	4.14	<2.01	<1.54
WB-5	11/9/06	Whole Fish	41	14.5	1/J	114	<2.10	1.3	7.9	6.33	1.34	1.18
Other												
Emerald Shiner	11/9/06	Composite of 38 whole fish		~4.5		84.2	<1.43	<1.71	5.21	4.33	<1.91	2.17
Gizzard Shad	11/9/06	Composite of 33 whole fish		~9		17.9	<1.25	<1.94	1.53	<1.42	<1.66	<1.27

Mississippi River Pool 4 Fish PFC analysis												
MPCA Species & Sample ID	Sample Date	Fillet or Whole Fish	Wt (g)	Ln (cm)	Age/ sex (yrs/ m-f)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BG-1	5/2006	Fillet	262	20	4/F	98.3	<1.43	<1.70	<1.33	2.51	<1.90	<1.46
BG-2	5/2006	Fillet	152	17.5	3/M	28.1	<1.47	<1.75	<1.37	<1.67	<1.96	<1.50
BG-3	5/2006	Fillet	158	18	3/F	45.5	<1.52	<1.82	<1.42	<1.73	<2.03	<1.55
BG-4	5/2006	Fillet	125	16	3/M	152	<1.48	<1.76	<1.37	3.26	2.76	2.7
BG-5	5/2006	Fillet	146	18	3/M	101	<1.39	<1.66	<1.29	2.04	2.46	2.13

Mississippi River Pool 5 Fish PFC analysis												
MPCA Species & Sample ID	Sample Date	Fillet or Whole Fish	Wt (g)	Ln (cm)	Age/ sex (yrs/ m-f)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BG-1	11/6/06	Fillet	172	19	4/F	40.3	<1.51	<1.81	<1.41	<1.72	<2.01	<1.54
BG-2	11/6/06	Fillet	252	20	4/J	94.7	<1.38	<1.64	<1.28	2.17	<1.83	<1.40
BG-3	11/6/06	Fillet	199	21	4/M	42.7	<1.43	<1.71	<1.33	1.74	<1.91	<1.46
BG-4	11/6/06	Fillet	189	19	4/F	69.6	<1.54	<1.84	<1.44	1.97	<2.06	<1.57
BG-5	11/6/06	Fillet	114	17	3/F	77.2	<1.51	<1.81	<1.41	2.4	<2.01	<1.54
Smallmouth Bass												
SMB-1	5/2006	Fillet	1512	45	8/F	150	<1.48	<1.76	1.63	3.27	<1.97	<1.50
SMB-2	5/2006	Fillet	131	19	2/J	83.5	<1.45	<1.73	<1.35	2.49	<1.93	<1.48
SMB-3	5/2006	Fillet	449	29	4/M	47.7	<1.50	<1.80	1.86	2.13	<2.00	<1.53
SMB-4	5/2006	Fillet	262	26.5	3/F	93.5	<1.48	<1.77	<1.38	2.59	<1.98	<1.51
SMB-5	5/2006	Fillet	565	33	5/M	104	<1.45	<1.74	1.35	2.25	<1.94	<1.48
Largemouth Bass												
LMB-1	5/2006	Fillet	456	30	6/F	82.9	<1.43	<1.70	<1.33	2.59	<1.90	<1.46
LMB-2	5/2006	Fillet	1043	39	7/M	74.3	<1.45	<1.73	<1.35	1.66	<1.93	<1.48
LMB-3	5/2006	Fillet	689	34	6/F	85.8	<1.38	<1.64	<1.28	2.48	<1.83	<1.40
LMB-3 (dup)	5/2006	Fillet	689	34	6/F	96.5	<1.36	<2.56	<1.27	2.74	<1.82	<1.39
LMB-4	5/2006	Fillet	455	29	4/M	107	<1.41	<1.69	<1.32	3.74	<1.88	<1.44
LMB-5	5/2006	Fillet	502	31	5/M	74.6	<1.50	<1.80	<1.40	2.57	<2.00	<1.53
Walleye												
WAE-1	5/2006	Fillet	1000	47	7/M	34.3	<1.54	<1.83	<1.43	<1.75	<2.05	<1.57
WAE-1 (dup)	5/2006		1000	47	7/M	26.5	<1.54	<1.84	<1.44	<1.76	<2.06	<1.57
WAE-2	5/2006	Fillet	339	31	3/J	60.6	<1.48	<1.76	1.94	1.73	<1.97	<1.50
WAE-3	5/2006	Fillet	362	33	3/J	93.2	<1.47	<1.75	1.49	<1.67	<1.96	<1.50
WAE-4	5/2006	Fillet	965	43	5/M	27.1	<1.48	<1.77	1.97	<1.69	<1.98	<1.51
Northern Pike												
NOP-1	5/2006	Fillet	1457	58	8/F	91.2	<1.45	<1.74	3.43	1.79	<1.94	<1.48
NOP-2	5/2006	Fillet	2568	64	8/F	224	<1.47	<1.75	5.54	2.34	<1.96	<1.50
NOP-2 (dup)	5/2006	Fillet	2568	64	8/F	235	<1.37	<1.64	4.98	2.39	<1.82	<1.40
NOP-3	5/2006	Fillet	214	28	2J	130	<1.47	<1.75	2.87	2.63	<1.96	<1.50
NOP-4	5/2006	Fillet	710	45	6/J	12.2	<1.42	<1.70	2.52	<1.62	<1.89	<1.45
NOP-5	5/2006	Fillet	1498	42	6/F	97.5	<1.5	<1.80	2.86	1.93	<2.00	<1.53
Channel Catfish												
CCF-1	5/2006	Fillet	485	31	?/J	9.59	<1.51	<1.81	<1.41	<1.72	<2.01	<1.54
CCF-2	5/2006	Fillet	1956	52	5/M	<3.32	<1.44	<1.72	<1.34	<1.64	<1.92	<1.47
Other												
Gizzard Shad	11/6/06	Composites of 40 whole fish		~13		20.1	<1.48	<1.76	<1.37	<1.68	<1.97	<1.50

Mississippi River Pool 5a Fish PFC analysis												
MPCA Species & Sample ID	Sample Date	Fillet or Whole Fish	Wt (g)	Ln (cm)	Age/ sex (yrs/ m-f)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BG-1	5/2006	Fillet	164	17	3/M	34.6	<1.32	<1.58	<1.23	<1.50	<1.76	<1.35
BG-2	5/2006	Fillet	168	18	3/M	99.2	<1.50	<2.18	<1.39	<1.70	<2.00	<1.53
BG-3	5/2006	Fillet	284	20	4/M	82.9	<1.26	<1.55	<1.17	1.65	<1.68	<1.29
BG-4	5/2006	Fillet	199	20	4/M	34	<1.60	<1.91	<1.49	<1.82	<2.13	<1.63
BG-5	5/2006	Fillet	188	19	4/F	55.5	<1.36	<1.63	<1.27	<1.55	<1.82	<1.39
Smallmouth Bass												
SMB-1	5/2006	Fillet	813	36	7/M	52.3	<1.50	<1.79	<1.39	<1.70	<2.00	<1.53
SMB-2	5/2006	Fillet	819	36	7/M	116	<1.41	<1.68	1.39	2.89	<1.88	<1.44
SMB-3	5/2006	Fillet	746	35	6/F	67.1	<1.50	<1.79	1.43	<1.70	<2.00	<1.53
SMB-4	5/2006	Fillet	377	28	4/M	84.6	<1.48	<1.77	<1.38	2.74	<1.98	<1.51
SMB-5	5/2006	Fillet	672	34	6/M	45	<1.45	<2.38	<1.35	<1.65	<1.93	<1.48
Walleye												
WAE-1	5/2006	Fillet	740	41	5/F	56.4	<1.48	<1.76	1.83	<1.68	<1.97	<1.50
WAE-2	5/2006	Fillet	1454	49	6/F	49.3	<1.49	<1.78	2.15	<1.70	<1.99	<1.52
WAE-3	5/2006	Fillet	1125	47	6/F	41	<1.54	<1.84	1.53	<1.76	<2.06	<1.57
WAE-4	5/2006	Fillet	195	25.5	2/J	75.4	<1.41	<2.14	<1.32	<1.61	<1.88	<1.44
WAE-5	5/2006	Fillet	2158	55	9/F	103	<1.47	<1.75	1.66	2.74	<1.96	<1.50
Channel Catfish												
CCF-1	5/2006	Fillet	2086	57	6/M	<3.26	<1.41	<1.69	<1.32	<1.61	<1.88	<1.44
CCF-2	5/2006	Fillet	1489	46	4/F	18.3	<1.38	<1.64	<1.28	2.34	<1.83	<1.40
CCF-3	5/2006	Fillet	1147	41	3/F	9.55	<1.55	<1.85	<1.44	<1.77	<2.07	<1.58
CCF-4	5/2006	Fillet	738	39	2/F	13.4	<1.46	<1.99	<1.36	<1.66	<1.95	<1.49

St. Croix River Fish PFC analysis												
MPCA Species & Sample ID	Sample Date	Fillet or Whole Fish	Wt (g)	Ln (cm)	Age/ sex (yrs/ m-f)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BG-1	8/11/06	Fillet	94	16.5	3/F	<3.57	<1.93	<3.85	<1.44	<1.77	<2.07	<1.58
BG-1(Dup)	8/11/06	Fillet	94	16.5	3/F	<3.48	<1.51	<1.81	<1.41	<1.72	<2.01	<1.54
BG-1	8/11/06	Whole Fish	94	16.5	3/F	<3.38	<1.47	<1.75	<1.37	<1.67	<1.96	<1.50
BG-2	8/11/06	Fillet	60	13	2/M	<4.21	<1.54	<4.56	<1.44	<1.76	<2.06	<1.57
BG-2	8/11/06	Whole Fish	60	13	2/M	4.22	<1.46	<1.75	<1.36	<1.66	<1.95	<1.49
BG-3	8/11/06	Fillet	78	14.5	2/F	<3.38	<1.47	<1.88	<1.37	<1.67	<1.96	<1.50
BG-3	8/11/06	Whole Fish	78	14.5	2/F	3.40	<1.53	<1.82	<1.42	<1.74	<2.04	<1.56
BG-4	8/11/06	Fillet	76	14	2/M	<3.37	<1.46	<2.49	<1.36	<1.66	<1.95	<1.49
BG-4	8/11/06	Whole Fish	76	14	2/M	4.07	<1.41	<1.69	<1.32	<1.61	<1.88	<1.44
BG-5	8/11/06	Fillet	73	15	2/J	<3.48	<1.51	<4.78	<1.41	<1.72	<2.01	<1.54
BG-5	8/11/06	Whole Fish	73	15	2/J	<3.54	<1.54	<1.83	<1.43	<1.75	<2.05	<1.57
Smallmouth Bass												
SMB-1	8/11/06	Fillet	926	37	6/M	<3.41	<1.51	<8.80	<1.38	<1.69	<1.98	<1.51
SMB-1	8/11/06	Whole Fish	926	37	6/M	1.52	<1.50	<1.80	<1.40	<1.71	<2.00	<1.53
SMB-2	8/11/06	Fillet	435	29	4/M	<3.50	<1.52	<1.82	<1.42	<1.73	<2.03	<1.55
SMB-2	8/11/06	Whole Fish	435	29	4/M	1.16	<1.45	<1.74	<1.35	<1.66	<1.94	<1.48
SMB-3	8/11/06	Fillet	428	30	4/F	<3.41	<1.48	<1.77	<1.38	<1.69	<1.98	<1.51
SMB-3	8/11/06	Whole Fish	428	30	4/F	<3.32	<1.44	<2.80	<1.34	<1.64	<1.92	<1.47
SMB-4	8/7/06	Fillet	419	27	4/F	<3.48	<1.51	<1.81	<1.41	<1.72	<2.01	<1.54
SMB-5	8/7/06	Fillet	440	28	4/M	<3.52	<1.53	<1.82	<1.42	<1.74	<2.04	<1.56
Walleye												
WE-1	8/15/06	Fillet	796	40	5/M	<3.48	<1.51	<1.81	<1.41	<1.72	<2.01	<1.54
WE-2	8/4/06	Fillet	1124	46	6/F	<3.57	<1.55	<1.85	<1.44	<1.77	<2.07	<1.58
WE-3	8/4/06	Fillet	401	33	3/J	<3.37	<1.46	<1.75	<1.36	<1.66	<1.95	<1.49
WE-4	8/4/06	Fillet	287	28	3/J	<3.40	<1.48	<2.38	<1.37	<1.68	<1.97	<1.50
WE-5	8/7/06	Fillet	405	32	3/J	<3.29	<1.43	<1.70	<1.33	<1.62	<1.90	<1.46
Northern Pike												
NOP-1	8/16/06	Fillet	629	43	6/J	<3.33	<1.45	<1.73	<1.35	<1.65	<1.93	<1.48
NOP-2	8/15/06	Fillet	476	42	6/F	<3.17	<1.38	<1.64	<1.28	<1.57	<1.83	<1.40
NOP-3	8/16/06	Fillet	1068	48	7?/ M	<3.30	<1.43	<1.71	<1.33	<1.63	<1.91	<1.46
NOP-3 (dup)	8/16/06	Fillet	1068	48	7?/ M	<3.27	<1.42	<1.70	<1.32	<1.62	<1.89	<1.45
NOP-4	8/7/06	Fillet	1365	58	8/M	<3.27	<1.42	<1.70	<1.32	<1.62	<1.89	<1.45
NOP-5	8/16/06	Fillet	526	43	6/F	<3.48	<1.51	<1.81	<1.41	<1.72	<2.01	<1.54
White Sucker												
WTS-1	8/15/06	Fillet	358	31	3/J	<3.33	<1.45	<1.73	<1.35	<1.65	<1.93	<1.48
WTS-2	8/15/06	Fillet	572	36	3/F	<3.21	<1.39	<1.67	<1.30	<1.59	<1.86	<1.42
WTS-3	8/15/06	Fillet	519	33	3/F	<3.33	<1.45	<1.73	<1.35	<1.65	<1.93	<1.48

Lake Calhoun Fish PFC analysis												
MPCA Species & Sample ID	Sample Date	Fillet or Whole Fish	Wt (g)	Ln (cm)	Age/ sex (yrs/ m-f)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BG-1	11/15/06	Fillet	59	15.5	3/F	373	<1.40	<1.88	1.63	7.13	2.92	4.23
BG-1	11/15/06	Whole Fish	59	15.5	3/F	493	<1.43	1.38	2.60	14.9	4.92	5.53
BG-2	11/15/06	Fillet	62	13	2/F	356	<1.42	<1.70	3.46	7	4.1	6.18
BG-2	11/15/06	Whole Fish	62	13	2/F	438	<1.43	<2.74	4.27	13.34	6.82	9.19
BG-3	11/15/06	Fillet	65	15	3/F	181	<1.50	<1.80	1.95	3.28	2.79	4.49
BG-3	11/15/06	Whole Fish	65	15	3/F	280	<1.39	<2.09	5.51	6.9	4.63	5.92
BG-4	11/15/06	Fillet	60	16	3/F	311	<1.46	<1.75	4.69	5.64	3.34	4.72
BG-4	11/15/06	Whole Fish	60	16	3/F	590	<1.50	<2.79	6.43	12.0	5.67	8.10
BG-5	11/15/06	Fillet	68	16	3/F	373	<1.51	<1.81	3.92	8.02	4.01	5.9
BG-5	11/15/06	Whole Fish	68	16	3/F	528	<1.45	<1.97	3.47	13.9	7.73	9.96
White Sucker												
WTS-1	11/15/06	Fillet	250	29	2/M	<3.52	<1.53	<1.82	<1.42	<1.74	<2.04	<1.56
WTS-1	11/15/06	Whole Fish	250	29	2/M	2.91	<1.50	<1.79	<1.39	0.92	<2.00	<1.53
WTS-1 (dup)	11/15/06	Whole Fish	250	29	2/M	1.96	<1.52	<1.82	<1.42	<1.73	<2.03	<1.55
WTS-2	11/15/06	Fillet	309	31	2/J	<3.40	<1.48	<1.76	<1.37	<1.68	<1.97	<1.50
WTS-2 (dup)	11/15/06	Fillet	309	31	2/J	<3.37	<1.46	<1.75	<1.36	<1.66	<1.95	<1.49
WTS-2	11/15/06	Whole Fish	309	31	2/J	<3.23	<2.29	<1.67	<1.30	<1.59	<1.87	<1.43
WTS-3	11/15/06	Fillet	179	27	2/J	<3.54	<1.54	<1.83	<1.43	<1.75	<2.05	<1.57
WTS-3	11/15/06	Whole Fish	179	27	2/J	<3.24	<1.41	<1.68	<1.60	<1.60	<1.88	<1.44
WTS-4	11/15/06	Fillet	660	35	3/J	49.1	2.39	<1.82	<1.42	4.39	<2.04	1.98
WTS-4	11/15/06	Whole Fish	660	35	3/J	77	2.28	<1.82	3.72	5.44	1.76	2.65
WTS-5	11/15/06	Fillet	335	29	2/J	<3.26	<1.41	<1.69	<1.32	<1.61	<1.88	<1.44
WTS-5	11/15/06	Whole Fish	335	29	2/J	<3.40	<1.48	<6.33	<1.47	<1.68	<1.97	<1.50

< = less than the detection limit; number following this symbol represents the detection limit

Twin Cities Metro Lakes

	Average PFOS Concentration [ng/g; ppb]								
	Bluegill	**Bluegill (comp)**	**Black Crappie**	**Black Crappie (comp)**	**Largemouth Bass**	**Northern Pike**	**Walleye**	**White Sucker**	**Yellow Perch (comp)**
Bald Eagle	<dl (5)	<dl (5)	8 (5)	ns	6 (5)	ns	ns	ns	ns
Cedar (Hennepin)	28 (5)	34 (5)	ns	ns	72 (4)	ns	ns	ns	ns
Cedar (Scott)	<dl (5)	<dl (5)	ns	ns	6 (5)	ns	<dl (1)	ns	ns
Centerville	9 (5)	9 (5)	ns	ns	Ns	9 (7)	ns	ns	ns
Colby	22 (5)	23 (5)	14 (5)	14(5)	Ns	ns	ns	ns	ns
Como	26 (5)	28 (5)	66 (5)	ns	30 (1)	42 (4)	ns	ns	ns
Demontreville	12 (5)	8 (5)	ns	ns	46 (5)	ns	ns	ns	ns
Elmo	242 (5)	302 (5)	495 (5)	ns	544 (5)	ns	ns	ns	ns
Gervais	93 (5)	100 (5)	157 (5)	ns	184 (5)	ns	ns	ns	ns
Green Mountain	<dl (5)	<dl (5)	ns	ns	ns	ns	ns	ns	ns
Harriet	114 (5)	89 (5)	ns	ns	148 (5)	ns	ns	ns	ns
Hiawatha	26 (5)	27 (5)	40 (5)	ns	ns	28 (6)	ns	ns	ns
Hydes	<dl (5)	<dl (5)	<dl (6)	ns	ns	5 (5)	ns	ns	ns
Independence	5 (5)	<dl (5)	<dl (5)	ns	ns	<dl (2)	ns	ns	ns
Jane	22 (5)	8 (5)	25 (8)	ns	47 (5)	ns	ns	ns	ns
Johanna	212 (6)	250 (5)	222 (3)	ns	ns	ns	ns	ns	ns
Josephine	87 (6)	93 (6)	ns	ns	ns	ns	ns	ns	ns
Keller	69 (5)	70 (5)	ns	ns	ns	ns	ns	ns	ns
Minnetonka	<dl (5)	7 (5)	8 (5)	ns	ns	9 (3)	ns	ns	ns
Nokomis	10 (7)	ns	10 (5)	ns	ns	ns	ns	ns	ns
Olson	17 (5)	15 (5)	ns	ns	42 (5)	ns	ns	ns	ns
Peltier	12 (5)	ns	ns	ns	ns	14 (5)	ns	ns	ns
Phalen	69 (5)	50 (5)	104 (3)	ns	142 (5)	ns	ns	ns	ns
Powers	40 (5)	65 (5)	51 (5)	ns	ns	69 (3)	ns	ns	42 (5)
Prior (Upper)	5 (5)	<dl (5)	ns	ns	6 (5)	ns	ns	ns	ns
Ravine	23 (5)	19 (5)	60 (5)	ns	63 (5)	ns	ns	ns	ns
Red Rock	41 (5)	35 (5)	103 (5)	ns	69 (5)	ns	ns	ns	ns
Sarah	7 (5)	<dl (4)	<dl (5)	ns	ns	10 (5)	ns	ns	ns
Silver	24 (5)	34 (5)	33 (5)	35 (5)	ns	ns	17 (4)	ns	ns
Square	<dl (5)	<dl (5)	5 (5)	ns	<dl (5)	ns	ns	ns	ns
Tanners	76 (5)	55 (5)	118 (5)	ns	80 (5)	ns	ns	ns	ns
White Bear	5 (5)	6 (5)	25 (2)	ns	9 (5)	ns	ns	ns	ns

River Reaches

	Average PFOS Concentration [ng/g; ppb]								
	Bluegill	**Bluegill (comp)**	**Smallmouth Bass**	**Largemouth Bass**	**White Bass**	**Walleye**	**Northern Pike**	**White Sucker**	**Channel Catfish**
Mississippi River									
Brainerd area	10 (2)	ns	13 (5)	ns	ns	9 (5)	7 (3)	ns	ns
St. Croix River									
Washington County Bluff Park area	23 (5)	12 (5)	15 (5)	ns	82 (1)	17 (5)	ns	ns	ns

numbers listed are: average PFOS concentration (# of fish)
<dl – less than the detection limit ≈ 5 ng/g
ns – not sampled
comp – composite; tissue from several fish is combined then PFCs are measured

Samples were analyzed for the 13 different perfluorochemicals listed.

			CAS #
PFBA	C-4	perfluorobutanoic acid	375-22-4
PFBS	C-4	perfluorobutane sulfonate	375-73-5
PFPeA	C-5	perfluoropentanoic acid	2706-90-3
PFHxA	C-6	perfluorohexanoic acid	307-24-4
PFHxS	C-6	perfluorohexane sulfonate	355-46-4
PFHpA	C-7	perfluoroheptanoic acid	375-85-9
PFOA	C-8	perfluorooctanoic acid	335-67-1
PFOS	C-8	perfluorooctane sulfonate	1763-23-1
PFOSA	C-8	perfluorooctane sulfonamide	754-91-6
PFNA	C-9	perfluorononanoic acid	375-95-1
PFDA	C-10	perfluorodecanoic acid	335-76-2
PFUnA	C-11	perfluoroundecanoic acid	2058-94-8
PFDoA	C-12	perfluorododecanoic acid	307-55-1

Bald Eagle Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-1	5/2/07	Fillet	22	9.5	2/J	<4.98	<2.49	<2.49*	<2.49	<2.49	<2.49	<2.49
BGS-4	5/2/07	Fillet	11	8	1/J	<4.39	<2.19	<2.19*	<2.19	<2.19	<2.19	<2.19
BGS-5	5/2/07	Fillet	25	11	2/M	<4.93	<2.46	<2.46*	<2.46	<2.46	<2.46	<2.46
BGS-6	5/2/07	Fillet	79	15.5	5/M	<4.76	<2.38	<2.38*	<2.38	<2.38	<2.38	<2.38
BGS-9	5/2/07	Fillet	88	16	5/M	<4.61	<2.30	<2.30*	<2.30	<2.30	<2.30	<2.30
BGS-comp	5/2/07	Fillet	50a	12a		<4.78	<2.39	<2.39	<2.39	<2.39	<2.39	<2.39
Black Crappie												
BKS-1	5/2/07	Fillet	95	17.5	4/F	10.5	<2.50	<2.50*	<2.50	<2.50	<2.50	<2.50
BKS-2	5/2/07	Fillet	98	17	4/F	7.24	<2.39	<2.39*	<2.39	<2.39	<2.39	<2.39
BKS-3	5/2/07	Fillet	236	24	7/F	7.89	<2.35	<2.35	<2.35	<2.35	<2.35	<2.35
BKS-4	5/2/07	Fillet	104	19	5/J	4.69	<2.30	<2.30	<2.30	<2.30	<2.30	<2.30
BKS-5	5/2/07	Fillet	97	18	5/F	7.54	<2.58	<2.58	<2.58	<2.58	<2.58	<2.58
Largemouth Bass												
LMB-1	5/2/07	Fillet	992	38	7/F	<5.00	<2.50	<2.50*	<2.50	<2.50	<2.50	<2.50
LMB-2	5/2/07	Fillet	684	34	6/F	<4.69	<2.35	<2.35*	<2.35	<2.35	<2.35	<2.35
LMB-3	5/2/07	Fillet	764	34	6/F	6.18	<2.35	<2.35*	<2.35	<2.35	<2.35	<2.35
LMB-4	5/2/07	Fillet	452	31	5/F	<4.81	<2.40	<2.40*	<2.40	<2.40	<2.40	<2.40
LMB-5	5/2/07	Fillet	560	31.5	5/M	<5.03	<2.51	<2.51*	<2.51	<2.51	<2.51	<2.51

Cedar Lake Fish PFC analysis (Hennepin County)												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-1	2007	Fillet	24	12	3/F	33.5	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50
BGS-5	2007	Fillet	56	15.5	5/J	31	<2.39	<2.39	<2.39	2.46	<2.39	<2.39
BGS-6	2007	Fillet	25	11.5	2/F	17.9	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50
BGS-8	2007	Fillet	47	14.5	4/F	30.9	<2.37	<2.37	<2.37	3.11	<2.37	<2.37
BGS-10	2007	Fillet	24	12	2/J	27.8	<2.51	<2.51	<2.51	5.25	3.77	<2.51
BGS-comp	2007	Fillet	31a	12a		34	<2.42	<2.42	<2.42	2.99	<2.42	2.56
Largemouth Bass												
LMB-1	2007	Fillet	531	33	5/M	53.8	<2.46	<2.46	<2.46	4.88	3.54	2.58
LMB-2	2007	Fillet	488	31	5/F	70.8	<2.40	<2.40	<2.40	6.7	3.49	3.39#
LMB-3	2007	Fillet	1166	43	10/F	56.3	<2.48	<2.48	<2.48	8.27	4.61	3.25#
LMB-4	2007	Fillet	1592	46	11/F	108	<2.42	<2.42	<2.42	5.22	3.67	5.27#
LMB-4(dup)		Fillet				103	<2.45	<2.45	<2.45	6.37	4.05	5.02#

Cedar Lake Fish PFC analysis (Scott County)												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-1	8/24/07	Fillet	16	9	1/J	<4.81	<2.40	<2.40	<2.40	<2.40	<2.40	<2.40
BGS-4	8/24/07	Fillet	19	10	2/J	<6.76	<2.49	<2.49	<2.49	<2.49	<2.49	<2.49
BGS-5	8/24/07	Fillet	97	17	6/M	<4.81	<2.40	<2.40	<2.40	<2.40	<2.40	<2.40
BGS-6	8/24/07	Fillet	31	NA	4/M	<4.95	<2.48	<6.43	<2.48	<2.48	<2.48	<2.48
BGS-9	8/24/07	Fillet	82	16	5/M	<4.81	<2.40	<2.40	<2.40	<2.40	<2.40	<2.40
BGS-comp	8/24/07	Fillet	59a	12a		<4.85	<2.43	<2.43	<2.43	<2.43	<2.43	<2.43
Largemouth Bass												
LMB-1	8/24/07	Fillet	1292	41	9/M	6.24	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46
LMB-2	8/24/07	Fillet	1528	NA	9/F	<4.90	<2.45	<2.45	<2.45*	<2.45	<2.45	<2.45
LMB-3	8/24/07	Fillet	1264	40	8/F	<4.67	<2.34	<2.34	<2.34*	<2.34	<2.34	<2.34
LMB-4	8/24/07	Fillet	857	40	8/M	<4.88	<2.44	<2.44	<2.44*	<2.44	<2.44	<2.44
LMB-5	8/24/07	Fillet	1110	42	9/M	<4.74	<3.85	<2.37	<2.37*	<2.37	<2.37	<2.37
LMB-5(dup)		Fillet				<5.03	<2.51	<2.51	<2.51*	<2.51	<2.51	<2.51
Walleye												
WE-1	8/24/07	Fillet	714	43	7/M	<4.95	<2.48	<4.04	<2.48*	<2.48	<2.48	<2.48

Centerville Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-1	2007	Fillet	69	15	4/F	12.8	<2.43	<2.43	<2.43	<2.43	<2.43	<2.43
BGS-2	2007	Fillet	62	14.5	4/M	6.24	<2.45	<2.45	<2.45	<2.45	<2.45	<2.45
BGS-4	2007	Fillet	42	12.5	3/J	9.94	<2.45	<2.45	<2.45	<2.45	<2.45	<2.45
BGS-8	2007	Fillet	61	15	4/F	<4.95	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
BGS-9	2007	Fillet	74	15	4/M	6.74	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
BGS-comp	2007	Fillet	72a	15a		8.71	<2.23	<2.23	<2.23	<2.23	<2.23	<2.23
Northern Pike												
NP-1	2007	Fillet	1609	58	4/F	9.01	<2.49	<2.49	<2.49	<2.49	<2.49	<2.49
NP-2	2007	Fillet	878	49	4/J	10.2	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
NP-3	2007	Fillet	793	46	4/J	9.03	<2.43	<2.43	<2.43	<2.43	<2.43	<2.43
NP-4	2007	Fillet	1067	56.5	4/J	6.3	<2.74	<2.50	<2.50	<2.50	<2.50	<2.50
NP-5	2007	Fillet	1183	54	4/M	7.84	<2.51	<2.51	<2.51	<2.51	<2.51	<2.51
NP-6	2007	Fillet	1546	65	5/M	11.4	<2.40	<2.40	<2.40	<2.40	<2.40	<2.40
NP-7	2007	Fillet	896	51	4/M	10.6	<2.44	<2.44	<2.44	<2.44	<2.44	<2.44

Colby Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-4	6/6/07	Fillet	21	9.5	1/M	21.7	<2.44	<2.44*	<2.44	3.01	<2.44	<2.44
BGS-5	6/6/07	Fillet	31	12	2/F	23.9#	<2.46	<4.03*	<2.46	<2.46	<2.46	<2.46
BGS-7	6/6/07	Fillet	34	12.5	2/J	32.8	<2.49	<3.10*	<2.49	<2.49	<2.49	<2.49
BGS-9	6/6/07	Fillet	35	12	2/F	13#	<2.50	<2.50*	<2.50	<2.50	<2.50	<2.50
BGS-10	6/6/07	Fillet	29	11	2/F	18.9#	<2.49	<2.49*	<2.49	<2.49	<2.49	<2.49
BGS-comp	6/6/07	Fillet	23a	NA		23.4	<2.40	<2.40	<2.40	<2.40	<2.40	<2.40
Black Crappie												
BKS-2	6/6/07	Fillet	42	14	3/F	16.6	<2.50	<2.50*	<2.50	2.84	<2.50	<2.50
BKS-4	6/6/07	Fillet	47	14.5	3/M	13.2#	<2.45	<2.45	<2.45	<2.45	<2.45	<2.45
BKS-5	6/6/07	Fillet	47	14.5	3/M	12.6#	<2.35	<2.35	<2.35	<2.35	<2.35	<2.35
BKS-7	6/6/07	Fillet	46	15	3/M	14.6	<2.44	<2.44	<2.44	<2.44	<2.44	<2.44
BKS-8	6/6/07	Fillet	34	13.8	3/F	12	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
BKS-comp	6/6/07	Fillet	37a	13a		14.3	<2.43	<2.43	<2.43	<2.43	<2.43	<2.43

Como Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-3	5/1/07	Fillet	31	11	2/F	39#	<2.34	<2.34*	3.54	3.71	4.66	5.99
BGS-4	5/1/07	Fillet	29	11	2/J	32.6#	<2.50	<2.50*	3.8	3.88	3.84	5.21
BGS-6	5/1/07	Fillet	99	16	5/M	34.2	<2.50	<2.50*	4.2	<2.50	<2.50	4.03
BGS-8	5/1/07	Fillet	61	14.5	4/M	20.6	<2.43	<2.43*	2.84	<2.43	2.75	3.72
BGS-10	5/1/07	Fillet	93	16	5/F	23.1	<2.49	<2.49*	<2.49	<2.49	2.65	3.08
BGS-comp	5/1/07	Fillet	47a	13a		28.1	<2.49	<2.49	2.98	<2.49	<2.49	4.45
Black Crappie												
BKS-1	5/1/07	Fillet	141	17	4/M	59.7	<2.42	<2.42*	3.09	10.6	6.52	7.93
BKS-2	5/1/07	Fillet	69	16	4/M	44.9	<2.53	<2.53*	<2.53	6.69	3.16	6.07
BKS-3	5/1/07	Fillet	408	28	8/F	104	<2.36	<2.36*	3.14	15.2	9.09	10.5
BKS-4	5/1/07	Fillet	158	20.5	5/M	57.6	<2.30	<2.30*	<2.30	10.6	5.96	6.95
BKS-5	5/1/07	Fillet	817	32	10/F	63.4	<2.50	<2.50*	<2.50	10.3	4.97	5.88
Largemouth Bass												
LMB-1	5/1/07	Fillet	867	37	7/F	29.5	<2.40	<2.40*	2.42	4.04	4.35	6.68
Northern Pike												
NP-1	5/1/07	Fillet	2129	66	5/M	54.4	<2.48	<2.48*	20	7.7	3.93	5.08
NP-1(dup)	5/1/07	Fillet				45.2	<2.36	<2.36*	18.6	7.69	5.03	6.22
NP-2	5/1/07	Fillet	838	49	4/M	34.6	<2.45	<2.45*	15.8	5.92	4.83	8.47
NP-3	5/1/07	Fillet	858	48	4/M	44.7	<2.48	<2.48*	15.6	5.5	5.12	6.45
NP-4	5/1/07	Fillet	746	49	4/M	47.3	<2.43	<2.43*	19.1	7.51	5.23	7.42

Demontreville Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-1	4/30/07	Fillet	26	11	2/F	27.1#	<2.49	<2.49*	<2.49	3.04	<2.49	<2.49
BGS-5	4/30/07	Fillet	20	11	2/F	35.3#	<2.42	<2.42*	<2.98	<2.42	<2.42	<2.42
BGS-6	4/30/07	Fillet	75	14	4/M	<5.00	<2.50	<2.50*	<2.50	<2.50	<2.50	<2.50
BGS-8	4/30/07	Fillet	137	17.5	6/M	11.9	<2.42	<2.42*	<2.42	<2.42	<2.42	<2.42
BGS-10	4/30/07	Fillet	134	18.5	7/M	<5.00	<2.50	<2.50*	<2.50	<2.50	<2.50	<2.50
BGS-comp	4/30/07	Fillet	64a	13a		8.46	<2.42	<2.42	<2.42	<2.42	<2.42	<2.42
Largemouth Bass												
LMB-1	4/30/07	Fillet	686	33	5/M	41.8	<2.42	<2.42*	<2.42	<2.42	<2.42	<2.42
LMB-2	4/30/07	Fillet	1012	39	7/F	32.9	<2.50	<2.5*	<2.50	<2.50	<2.50	<2.50
LMB-2(dup)	4/30/07	Fillet				25.8	<2.43	<2.43*	<2.43	<2.43	<2.43	<2.43
LMB-3	4/30/07	Fillet	612	33	5/F	27	<2.40	<2.40*	<2.40	<2.40	<2.40	<2.40
LMB-4	4/30/07	Fillet	1023	39	7/M	44.9	<2.48	<2.48*	<2.48	<2.48	<2.48	<2.48
LMB-5	4/30/07	Fillet	877	37.5	7/M	84.4	<2.30	<2.30*	<2.30	<2.30	2.88	<2.30

Elmo Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-2	5/2/07	Fillet	16	10	2/J	291#	<2.48	<2.48*	<2.48	<2.48	<2.48	<2.48
BGS-4	5/2/07	Fillet	19	10	2/M	217#	<2.49	<2.49*	<2.49	<2.49	<2.49	<2.49
BGS-8	5/2/07	Fillet	42	13	3/J	149	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
BGS-9	5/2/07	Fillet	30	12.5	3/J	233	20.1	<4.24	<4.24	<4.24	<4.24	<4.24
BGS-10	5/2/07	Fillet	35	13	3/F	345	<3.11	<3.11	<3.11	<3.11	<3.11	<3.11
BGS-comp	5/2/07	Fillet	25a	11a		302	<2.43	<2.43	<2.43	<2.43	<2.43	<2.43
Black Crappie												
BKS-1	5/2/07	Fillet	228	24	7/F	374	<2.36	<2.36	<2.36	3.13	<2.36	<2.36
BKS-2	5/2/07	Fillet	369	28	8/F	574	<2.42	<2.42	<2.42	6.38	<2.42	<2.42
BKS-3	5/2/07	Fillet	292	25.5	7/F	550	<2.34	<2.34	<2.34	3.42	<2.34	<2.34
BKS-4	5/2/07	Fillet	209	22	6/F	534	<2.63	<2.36	<2.36	3.82	<2.36	<2.36
BKS-5	5/2/07	Fillet	189	23	6/F	443	<2.56	<2.56	<2.56	3.14	<2.56	<2.56
Largemouth Bass												
LMB-1	5/2/07	Fillet	470	31	5/M	643	<2.54	<2.54	<2.54	4.44	<2.54	<2.54
LMB-2	5/2/07	Fillet	672	35	6/F	431	<2.43	<2.43*	<2.43	<2.43	<2.43	<2.43
LMB-3	5/2/07	Fillet	894	37	7/F	653	<2.50	<2.50*	<2.50	3.94	<2.50	<2.50
LMB-3(dup)	5/2/07	Fillet				660	<2.51	<2.51*	<2.51	4.06	<2.51	<2.51
LMB-4	5/2/07	Fillet	1062	39	7/F	711	<2.40	<2.40*	<2.40	4.32	<2.40	<2.40
LMB-5	5/2/07	Fillet	698	33	5/M	281	<2.55	<2.55	<2.55	<2.55	<2.55	<2.55

Gervais Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-2	5/1/07	Fillet	6	7.5	1/J	175#	<2.69	<2.69*	<2.69	5.73	2.7	<2.69
BGS-5	5/1/07	Fillet	6	7	1/J	107#	<3.50	<3.50*	<3.50	5.43	3.57	<3.50
BGS-7	5/1/07	Fillet	75	16	5/F	148	<2.31	<2.31	<2.31	6.44#	<2.31	<2.31
BGS-9	5/1/07	Fillet	90	17	6/F	90.5	<2.46	<2.46	<2.46	2.57#	<2.46	<2.46
BGS-10	5/1/07	Fillet	68	15	4/F	39.9	<2.30	<2.30	<2.30	<2.30	<2.30	<2.30
BGS-comp	5/1/07	Fillet	34a	10a		100	<2.45	<2.45	<7.35	3.8	<2.45	<2.45
Black Crappie												
BKS-1	5/1/07	Fillet	171	23	6/F	132	<2.36	<2.36	<2.36	4.33	<2.36	<2.36
BKS-2	5/1/07	Fillet	86	16	4/M	166	<2.31	<2.31*	<2.31	9.5	3.37	<2.31
BKS-3	5/1/07	Fillet	122	19	5/M	206	<2.35	<2.35	<2.35	11.4	4.08	2.78
BKS-4	5/1/07	Fillet	180	22	6/M	170	<2.29	<2.29*	<2.29	10.9	5.09	8.41
BKS-5	5/1/07	Fillet	65	16	4/F	112	<2.38	<2.38*	<2.38	4.65	<2.38	<2.38
Largemouth Bass												
LMB-1	5/1/07	Fillet	2268	47	11/F	159	<2.49	<2.49*	<2.49	6.23	2.97	<2.49
LMB-2	5/1/07	Fillet	488	31	5/M	153	<2.31	<2.31	<2.31	6.24	3.95	<2.31
LMB-3	5/1/07	Fillet	385	29	4/M	227	<2.36	<2.36*	<2.36	10.7	5.79	2.38
LMB-4	5/1/07	Fillet	661	33	5/M	221	<2.13	<2.13	<2.13	8.67	6.23	5.87
LMB-5	5/1/07	Fillet	311	28	4/F	158	<2.19	<2.19	<2.19	7.42	3.85	<2.19

Green Mountain Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-1	5/9/07	Fillet	50	13.5	3/J	<4.85	<2.43	<2.43	<2.43	<2.43	<2.43	<2.43
BGS-3	5/9/07	Fillet	118	17.5	6/M	<4.98	<2.49	<2.49	<2.49	<2.49	<2.49	<2.49
BGS-5	5/9/07	Fillet	133	19	7/M	<4.90	<2.45	<2.45	<2.45	<2.45	<2.45	<2.45
BGS-6	5/9/07	Fillet	85	16	5/F	<4.85	<2.43	<2.43	<2.43	<2.43	<2.43	<2.43
BGS-8	5/9/07	Fillet	50	13.5	3/M	<4.85	<2.43	<2.43	<2.43	<2.43	<2.43	<2.43
BGS-comp	5/9/07	Fillet	65a	14a		<4.88	<2.44	<2.46	<2.44	<2.44	<2.44	<2.44

Harriet Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-5	8/17/07	Fillet	17	9	1/J	108	<2.40	<2.40	<2.40	4.91	<2.40	<2.40
BGS-6	8/17/07	Fillet	42	10	2/F	78.1	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
BGS-7	8/17/07	Fillet	12	7	1/J	124	<2.43	<2.43	<2.43	6.98	<2.43	<2.43
BGS-9	8/17/07	Fillet	30	11	2/M	95.9	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46
BGS-10	8/17/07	Fillet	73	NA	4/M	163	<2.40	<2.40	<2.40	4.98	5.27#	4.12
BGS-comp	8/17/07	Fillet	41a	13a		89.3	<2.44	<2.44	<2.44	2.59	<2.44	<2.44
Largemouth Bass												
LMB-1	8/17/07	Fillet	373	30	4/F	146	<5.38	<2.49	<2.49*	8.74	4.59	2.78
LMB-2	8/17/07	Fillet	554	34	6/F	20.5	<3.66	<2.46	<2.46*	5.4	<2.46	<2.46
LMB-3	8/17/07	Fillet	355	29	4/J	150	<2.39	<2.39	<2.39*	9.25	3.71	3.64
LMB-4	8/17/07	Fillet	963	39	8/M	254	<4.20	<2.43	<2.43*	10	5.28	7.1
LMB-5	8/17/07	Fillet	866	40	8/F	170	<2.42	<2.42	<2.42	10.1	4.65	3.66

Hiawatha Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-2	2007	Fillet	73	16	5/M	35	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
BGS-6	2007	Fillet	94	18	6/M	15.7	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
BGS-7	2007	Fillet	36	13	3/F	15.5	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
BGS-9	2007	Fillet	8	8	1/J	31.8	<2.43	<2.43	<2.43	<2.43	<2.43	<2.43
BGS-10	2007	Fillet	5	7.8	1/J	31.9	<3.55	<3.55	<3.55	<3.55	<3.55	<3.55
BGS-comp	2007	Fillet	42a	12a		27.3	<2.42	<2.42	<2.42	<2.42	<2.42	<2.42
Black Crappie												
BKS-1	2007	Fillet	73	19	5/F	36.6	<2.50	<2.50	<2.50	2.7	<2.50	<2.50
BKS-2	2007	Fillet	103	21.5	6/M	71.7	<2.35	<2.35	<2.35	3.94	<2.35	4.75
BKS-3	2007	Fillet	71	18	4/F	35.1	<2.30	<2.30	<2.30	2.32	<2.30	<2.30
BKS-4	2007	Fillet	83	18	4/F	33.5	<2.45	<2.45	<2.45	<2.45	<2.45	<2.45
BKS-5	2007	Fillet	64	17	4/F	21	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50
Northern Pike												
NP-1	6/19/07	Fillet	1140	56	4/M	17.1	< 2.49	< 2.49	3.65	< 2.49	< 2.49	< 2.49
NP-2	6/19/07	Fillet	738	46	4/F	36.7	< 4.60	< 2.49	2.64	< 2.49	2.98	2.58
NP-3	6/19/07	Fillet	927	51	4/M	16.7	< 2.51	< 2.51	2.95	< 2.51	< 2.51	< 2.51
NP-4	6/19/07	Fillet	1192	NA	4/F	59.5	< 2.46	< 2.46	6.2	4.33	3.6	4.99
NP-4(dup)						65.4	< 2.46	< 2.46	5.25	4.86	3.06	5.58
NP-5	6/19/07	Fillet	2530	74	6/F	14.5	< 2.46	< 2.46	4.17	< 2.46	< 2.46	< 2.46
NP-6	6/19/07	Fillet	3700	77	6/F	25.6	< 2.49	< 2.49	3.86	< 2.49	2.72	< 2.49

Hydes Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-1	7/24/07	Fillet	9	7	1/J	<5.05	<2.53	<2.53	<2.53	<2.53	<2.53	<2.53
BGS-5	7/24/07	Fillet	9	9	1/J	<5.08	<2.54	<2.54	<2.54	<2.54	<2.54	<2.54
BGS-6	7/24/07	Fillet	130	17	6/F	<4.85	<2.43	<2.43	<2.43	<2.43	<2.43	<2.43
BGS-7	7/24/07	Fillet	127	17	6/M	<4.83	<2.42	<2.42	<2.42	<2.42	<2.42	<2.42
BGS-10	7/24/07	Fillet	123	17.5	6/F	<4.95	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
BGS-10(dup)		Fillet				<4.90	<2.45	<2.45	<2.45	<2.45	<2.45	<2.45
BGS-comp	7/24/07	Fillet	62a	12a		<4.41	<2.20	<2.20	<2.20	<2.20	<2.20	<2.20
Black Crappie												
BKS-1	7/24/07	Fillet	124	20	5/F	<4.88	<2.44	<2.45	<2.44*	<2.44	<2.44	<2.44
BKS-1(dup)		Fillet				<4.93	<2.46	<2.46	<2.46*	<2.46	<2.46	<2.46
BKS-2	7/24/07	Fillet	178	23	6/F	<4.90	<2.95	<2.45	<2.45*	<2.45	<2.45	<2.45
BKS-3	7/24/07	Fillet	167	22.5	6/F	<4.78	<4.24	<2.39	<2.39*	<2.39	<2.39	<2.39
BKS-4	7/24/07	Fillet	206	24	7/F	<4.88	<2.44	<2.44	<2.44*	<2.44	<2.44	<2.44
BKS-5	7/24/07	Fillet	224	25	7/M	<4.90	<2.45	<2.45	<2.45*	<2.45	<2.45	<2.45
BKS-6	7/24/07	Fillet	220	25	7/F	<4.90	<2.87	<2.45	<2.45*	<2.45	<2.45	<2.45
Northern Pike												
NP-1	7/24/07	Fillet	2170	68	5/M	<4.93	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46
NP-2	7/24/07	Fillet	631	48	4/M	<4.41	<2.20	<2.20	<2.20	<2.20	<2.20	<2.20
NP-3	7/24/07	Fillet	741	46	4/F	<4.52	<2.26	<2.26	<2.26	<2.26	<2.26	<2.26
NP-4	7/24/07	Fillet	2342	68	6/J	<4.69	<2.35	<2.35	<2.35	<2.35	<2.35	<2.35
NP-4(dup)						<4.65	<2.33	<2.33	<2.33	<2.33	<2.33	<2.33
NP-5	7/24/07	Fillet	3445	74	6/F	4.76	<2.37	<2.37	<2.37	<2.37	<2.37	<2.37

Independence Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-4	7/24/07	Fillet	13	10	2/J	5.1	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50
BGS-6	7/24/07	Fillet	14	10	2/J	<4.88	<2.44	<2.44	<2.44	<2.44	<2.44	<2.44
BGS-7	7/24/07	Fillet	14	9.5	1/J	5.41	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50
BGS-8	7/24/07	Fillet	45	14	4/F	<4.83	<2.42	<2.42	<2.42	<2.42	<2.42	<2.42
BGS-9	7/24/07	Fillet	55	15	4/M	<4.85	<2.43	<2.43	<2.43	<2.43	<2.43	<2.43
BGS-comp	7/24/07	Fillet	45a	13a		<4.88	<2.44	<2.44	<2.44	<2.44	<2.44	<2.44
Black Crappie												
BKS-1	7/24/07	Fillet	70	18	4/F	<4.95	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
BKS-2	7/24/07	Fillet	78	19	5/F	<4.65	<2.33	<2.33	<2.33	<2.33	<2.33	<2.33
BKS-3	7/24/07	Fillet	81	18	4/M	<5.00	<2.50	<3.22	<2.50	<2.50	<2.50	<2.50
BKS-4	7/24/07	Fillet	81	19	5/M	<4.93	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46
BKS-5	7/24/07	Fillet	139	22	6/F	<4.93	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46
Northern Pike												
NP-1	7/24/07	Fillet	2000	57	4/F	<5.54	<2.40	<2.40	<2.40	<2.40	<2.40	<2.40
NP-2	7/24/07	Fillet	3700	76	6/M	<4.90	<2.45	<2.45	<2.45	<2.45	<2.45	<2.45
NP-2(dup)						<4.95	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48

Jane Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-4	6/07	Fillet	16	10.5	2/J	20.7	<2.46	<2.46*	<2.46	<2.46	<2.46	<2.46
BGS-6	6/07	Fillet	99	18	6/F	8.62#	<2.50	<2.50*	<2.50	<2.50	<2.50	<2.50
BGS-7	6/07	Fillet	73	17.2	6/M	46.3	<2.44	<2.44*	<2.44	<2.44	<2.44	<2.44
BGS-7(dup)						36.5#	<2.48	<2.48*	<2.48	<2.48	<2.48	<2.48
BGS-8	6/07	Fillet	18	10.6	2/J	12.2#	<2.50	<2.50*	<2.50	<2.50	<2.50	<2.50
BGS-10	6/07	Fillet	95	NA	4/M	<4.95	<2.48	<2.48*	<2.48	<2.48	<2.48	<2.48
BGS-comp	6/07	Fillet	43a	13a		7.76	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46
Black Crappie												
BKS-1	6/07	Fillet	65	15	3/M	13.6#	<2.40	<2.40*	<2.40	<2.40	<2.40	<2.40
BKS-2	6/07	Fillet	109	18.2	5/M	26.2	<2.40	<2.40*	<2.40	<2.40	<2.40	<2.40
BKS-3	6/07	Fillet	78	17.8	4/F	10.2#	<2.48	<2.48*	<2.48	<2.48	<2.48	<2.48
BKS-4	6/07	Fillet	63	16.5	4/M	39.7	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
BKS-5	6/07	Fillet	96	19.5	5/M	34.2	<2.45	<2.45	<2.45	<2.45	<2.45	<2.45
BKS-6	6/07	Fillet	99	21	6/F	19.5	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46
BKS-7	6/07	Fillet	115	20	5/M	34.8#	<2.43	<2.43	<2.43	<2.43	<2.43	<2.43
BKS-7(dup)						21.9#	<2.42	<2.42	<2.42	<2.42	<2.42	<2.42
BKS-8	6/07	Fillet	108	19	5/M	21.7	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46
Largemouth Bass												
LMB-1	6/07	Fillet	507	33	5/M	35.1	<2.49	<2.49	<2.49	<2.49	<2.49	<2.49
LMB-2	6/07	Fillet	535	36	7/M	38.1	<2.49	<2.49	<2.49	<2.49	<2.49	<2.49
LMB-3	6/07	Fillet	599	33	5/M	83.4	<3.65	<5.00	<2.49	3.32	2.82	<2.49
LMB-4	6/07	Fillet	525	36	7/M	25.8	<2.43	<2.43	<2.43	<2.43	<2.43	<2.43
LMB-5	6/07	Fillet	809	NA	6/F	53.6	<2.44	<2.97	<2.44	<2.44	<2.44	<2.44

Johanna Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-1	6/19/07	Fillet	71	16	5/M	183	<2.44	<2.44*	<2.44	<2.44	<2.44	<2.44
BGS-2	6/19/07	Fillet	56	14.5	4/M	184#	<2.43	<2.43*	<2.43	4.02	<2.43	<2.43
BGS-3	6/19/07	Fillet	94	18	6/M	176#	<2.40	<2.40*	<2.40	3.85	3.86	7.34
BGS-6	6/19/07	Fillet	42	13	3/M	207#	<2.46	<2.46*	<2.46	5.69	4.3	3.58
BGS-7	6/19/07	Fillet	55	16	4/M	230	<2.49	<2.52*	<2.49	3.73	<2.49	<2.49
BGS-8	6/19/07	Fillet	57	15.5	4/M	292	<2.44	<2.44*	<2.44	<2.44	<2.44	<2.44
BGS-comp	6/19/07	Fillet	55a	14a		250	<2.45	<2.45	<2.45	3.24	<2.45	2.65
Black Crappie												
BKS-1	6/19/07	Fillet	89	NA	4/M	384	<2.34	<2.34	<2.34	8.92	3.94	3.31
BKS-2	6/19/07	Fillet	83	20	5/F	213	<2.44	<3.06	<2.44	4.51	<2.44	<2.44
BKS-3	6/19/07	Fillet	94	20	5/F	70.3	<2.48	<2.48	<2.48	2.66	<2.48	<2.48

Josephine Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-1	5/24/06	Fillet	37	11	2M	73.4	< 2.43	< 2.43	< 2.43	< 2.43	< 2.43	< 2.43
BGS-2	5/24/06	Fillet	58	14	4/F	52.5	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49
BGS-4	5/24/06	Fillet	68	16	5/M	50.2	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46
BGS-5	5/24/06	Fillet	44	13.1	3/F	102	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51
BGS-10	5/24/06	Fillet	38	13.2	3M	55.6	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46#
BGS-12	5/24/06	Fillet	36	13	3/M	188	< 2.50	< 2.50	< 2.50	3.07	< 2.50	< 2.50
BGS-comp	5/24/06	Fillet	42a	14a		92.6	< 2.48	< 2.48	< 2.49	< 2.48	2.98	< 2.48

Keller Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-1	7/07	Fillet	50	13.5	3/M	26.2	<2.45	<2.45	<2.45	<2.45	<2.45	<2.45
BGS-2	7/07	Fillet	54	14.5	4/J	64.6	<2.35	<2.35	<2.35	2.5	<2.35	<2.35
BGS-5	7/07	Fillet	56	14	4/M	97.1	<2.46	<2.46	<2.46	4.88	4.31	<2.46
BGS-7	7/07	Fillet	58	15	4/F	50.1	<2.46	<2.46	<2.46	4.47	2.99	<2.46
BGS-10	7/07	Fillet	58	15	4/M	106	<2.49	<2.49	<2.49	4.81	3.77	2.73
BGS-comp	7/07	Fillet	53a	15a		70	<2.10	<2.10	<2.10	2.67	<2.10	<2.10

Minnetonka Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-1	6/21/07	Fillet	72	15.5	5/F	< 4.90	< 2.45	< 2.45	< 2.45	< 2.45	< 2.45	< 2.45
BGS-4	6/21/07	Fillet	69	13.2	3/F	< 4.93	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46
BGS-5	6/21/07	Fillet	54	12	2/F	< 4.98	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49
BGS-9	6/21/07	Fillet	16	10	2/J	< 5.03	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51
BGS-10	6/21/07	Fillet	15	10	2/J	< 4.98	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49
BGS-comp		Fillet	49a	13a		7.47	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50
Black Crappie												
BKS-1	6/22/07	Fillet	464	34	11/F	7.16	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51
BKS-1(dup)						8.04	< 2.37	< 2.37	< 2.37	< 2.37	< 2.37	< 2.37
BKS-2	6/22/07	Fillet	300	28	8/F	6.22	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49
BKS-3	6/22/07	Fillet	192	24	7/M	10.9	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46
BKS-4	6/22/07	Fillet	121	21	6/F	< 4.92	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46
BKS-5	6/22/07	Fillet	90	19	5/F	< 5.03	< 2.51	< 4.18	< 2.51	< 2.51	< 2.51	< 2.51
Northern Pike												
NP-1	6/15/07	Fillet	2987	71	5/F	10.3	< 2.48	< 2.48	< 2.48	< 2.48	< 2.48	< 2.48
NP-2	6/15/07	Fillet	3700	80	6/M	7.83	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50
NP-3	6/15/07	Fillet	1830	62	4/F	7.61	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49

Nokomis Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-1	7/17/07	Fillet	25	11	2/M	10.8	<2.44	<2.44	<2.44	<2.44	<2.44	<2.44
BGS-2	7/17/07	Fillet	73	16	5/M	9.21	<2.38	<2.38	<2.38	<2.38	<2.38	<2.38
BGS-3	7/17/07	Fillet	58	15	4/M	13.4	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50
BGS-4	7/17/07	Fillet	31	11	2/M	7.71	<2.49	<3.00	<2.49	<2.49	<2.49	<2.49
BGS-5	7/17/07	Fillet	55	14	4/F	6.45	<2.45	<2.45	<2.45	<2.45	<2.45	<2.45
BGS-6	7/17/07	Fillet	49	14.5	4/F	7.23	<2.43	<2.43	<2.43	<2.43	<2.43	<2.43
BGS-7	7/17/07	Fillet	69	15	4/M	11.4	<2.45	<2.45	<2.45	<2.45	<2.45	<2.45
Black Crappie												
BKS-1	7/17/07	Fillet	84	18.5	5/M	11.7	<2.49	<2.49	<2.49*	<2.49	<2.49	<2.49
BKS-2	7/17/07	Fillet	74	17.8	4/M	10.1	<2.46	<2.46	<2.46*	<2.46	<2.46	<2.46
BKS-3	7/17/07	Fillet	72	17.5	4/F	12.3	<2.45	<2.45	<2.45*	<2.45	<2.45	<2.45
BKS-4	7/17/07	Fillet	67	16.2	4/M	7.66	<2.45	<4.34	<2.45*	<2.45	<2.45	<2.45
BKS-5	7/17/07	Fillet	91	19	5/M	8.18	<2.79	<2.44	<2.44*	<2.44	<2.44	<2.44

Olson Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-1	4/30/07	Fillet	19	10	2/F	7.8#	<2.34	<2.34*	<2.34	<2.34	<2.34	<2.34
BGS-2	4/30/07	Fillet	21	10	2/J	21.1#	<2.50	<2.50*	<2.50	<2.50	<2.50	<2.50
BGS-5	4/30/07	Fillet	33	13	3/J	24.7	<3.97	<3.97	<3.97	<3.97	<3.97	<3.97
BGS-8	4/30/07	Fillet	51	15	4/J	9.28	<2.44	<2.44	<2.44	<2.44	<2.44	<2.44
BGS-9	4/30/07	Fillet	85	15	4/F	<4.85	<2.43	<2.43	<2.43	<2.43	<2.43	<2.43
BGS-comp	4/30/07	Fillet	40a	13a		14.5	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46
Largemouth Bass												
LMB-1	4/30/07	Fillet	1148	41	9/M	45.7	<2.40	<2.40*	<2.40	2.84	2.87	<2.40
LMB-2	4/30/07	Fillet	1170	39	7/M	43.6	<2.44	<2.44*	<2.44	2.51	2.85	<2.44
LMB-3	4/30/07	Fillet	1159	39	7/M	19.7	<2.45	<2.45*	<2.45*	<2.45	3.04	<2.45
LMB-4	4/30/07	Fillet	1379	42	9/M	77.5	<2.40	<2.40*	<2.40*	2.87	<2.40	<2.40
LMB-5	4/30/07	Fillet	1024	37	7/F	24.9	<2.40	<2.40*	<2.40	<2.40	<2.40	<2.40
LMB-5(dup)	4/30/07	Fillet				24.5	<2.49	<2.49*	<2.49	<2.49	<2.49	<2.49

Peltier Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-1	2007	Fillet	58	15	4/M	17.6	<2.44	<2.44	<2.44*	<2.44	<2.44	<2.44
BGS-2	2007	Fillet	87	15.8	5/F	9.52	<2.48	<2.48	<2.48*	<2.48	<2.48	<2.48
BGS-3	2007	Fillet	50	13	3/F	15.1	<4.27	<2.45	<2.45*	<2.45	<2.45	<2.45
BGS-4	2007	Fillet	34	12.3	3/J	10.9	<2.50	<2.50	<2.50*	<2.50	<2.50	<2.50
BGS-5	2007	Fillet	30	11.5	2/F	7.53	<3.43	<2.50	<2.50*	<2.50	<2.50	<2.50
Northern Pike												
NP-1	2007	Fillet	607	45	4/J	20.7	<2.78	<2.65	<2.49	<2.49	<2.49	<2.49
NP-2	2007	Fillet	658	43	4/J	14.5	<2.43	<2.43	<2.43	<2.43	<2.43	<2.43
NP-3	2007	Fillet	764	51	4/J	8.2	<2.40	<2.40	<2.40	<2.40	<2.40	<2.40
NP-4	2007	Fillet	883	50	4/F	13.6	<2.49	<2.49	<2.49	<2.49	<2.49	<2.49
NP-5	2007	Fillet	1161	54	4/J	13.1	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48

Lake Phalen Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-2	5/1/07	Fillet	19	10	2/J	156#	<2.49	<2.49*	<2.49	5.23	2.99	<2.49
BGS-4	5/1/07	Fillet	25	11.5	2/J	82.7#	<2.50	<2.50*	<2.50	3.14	<2.50	<2.50
BGS-6	5/1/07	Fillet	55	11.5	2/F	60.6	<2.36	<2.36	<2.36	<2.36	<2.36	<2.36
BGS-9	5/1/07	Fillet	101	16	5/M	93.4	<2.48	<2.48	<2.48	2.48#	<2.48	<2.48
BGS-10	5/1/07	Fillet	73	15	4/F	53.8	<2.38	<2.38	<2.38	2.61#	<2.38	<2.38
BGS-comp	5/1/07	Fillet	53a	12a		45.3	<2.42	<2.42	<2.42	<2.42	<2.42	<2.42
BGS-comp(dup)	5/1/07	Fillet				55	<2.24	<2.24	<2.24	<2.24	<2.24	<2.24
Black Crappie												
BKS-1	5/1/07	Fillet	26	12	2/J	42.1#	<2.39	<2.39*	<2.39	<2.39	<2.39	<2.39
BKS-2	5/1/07	Fillet	58	14	3/M	104	<2.42	<2.42*	<2.42	5.29	<2.42	<2.42
BKS-3	5/1/07	Fillet	67	17	4/M	67.7#	<2.36	<2.36*	<2.36	3.05	<2.36	<2.36
Largemouth Bass												
LMB-1	5/1/07	Fillet	1212	41	9/F	183	<2.49	<2.49*	<2.49	9.46	3.99	2.66
LMB-2	5/1/07	Fillet	596	33.5	5/M	136	<2.45	<2.45	<2.45	7.64	4.67	<2.45
LMB-2(dup)	5/1/07	Fillet				129	<2.48	<2.48	<2.48	6.14	3.88	<2.48
LMB-3	5/1/07	Fillet	1279	43	10/F	128	<2.34	<2.34*	<2.34	5.38	3.08	<2.34
LMB-4	5/1/07	Fillet	1415	42	9/F	147#	<2.35	<2.35*	<2.35	4.96	<2.35	<2.35
LMB-4(dup)	5/1/07	Fillet				147#	<2.44	<2.44*	<2.44	5.28	3.61	<2.44
LMB-5	5/1/07	Fillet	1872	43	10/F	120	<2.34	<2.34*	<2.34	3.63	<2.34	<2.34

Powers Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-1	7/07	Fillet	31	13	3/F	48.5	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
BGS-2	7/07	Fillet	66	15	4/M	45	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50
BGS-6	7/07	Fillet	59	16.5	6/M	44.8	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
BGS-9	7/07	Fillet	58	17	6/M	26.6	<2.40	<2.40	<2.40	<2.40	<2.40	<2.40
BGS-10	7/07	Fillet	40	NA	5/F	32.7	<2.45	<2.45	<2.45	<2.45	<2.45	<2.45
BGS-comp	7/07	Fillet	43a	13a		65.3	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
Black Crappie												
BKS-1	7/07	Fillet	99	20	5/M	63.9	<2.39	<2.39	<2.39*	<2.39	<2.39	<2.39
BKS-2	7/07	Fillet	100	20	5/F	59.9	<2.35	<2.35	<2.35*	2.49	<2.35	<2.35
BKS-3	7/07	Fillet	109	19	5/F	53.3	<4.84	<2.45	<2.45*	2.47	<2.45	<2.45
BKS-4	7/07	Fillet	108	20	5/F	33.6	<2.49	<4.64	<2.49	<2.49	<2.49	<2.49
BKS-5	7/07	Fillet	105	19	5/F	42.9	<2.34	<2.34	<2.34	<2.34	<2.34	<2.34
Northern Pike												
NP-1	7/07	Fillet	2233	70	6/M	71.1	<2.49	<2.49	<2.49	3.08	2.64	<2.49
NP-2	7/07	Fillet	1680	64	5/M	71.9	<2.50	<2.50	<2.50	3.04	<2.50	<2.50
NP-3	7/07	Fillet	NA	70	6/J	62.8	<2.48	<2.48	<2.48	2.73	2.56	<2.48
Yellow Perch												
YP-comp	7/07	Fillet	34a	15a		41.6	<2.36	<2.36	<2.36	<2.36	<2.36	<2.36

Prior (Upper) Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-2	8/23/07	Fillet	29	12	3/M	5.25	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46
BGS-4	8/23/07	Fillet	27	11	2/F	<4.95	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
BGS-6	8/23/07	Fillet	41	13	3/F	<4.81	<2.40	<2.40	<2.40	<2.40	<2.40	<2.40
BGS-8	8/23/07	Fillet	48	13	3/F	<5.00	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50
BGS-10	8/23/07	Fillet	85	16	5/M	<4.98	<2.49	<2.49	<2.49	<2.49	<2.49	<2.49
BGS-comp	8/23/07	Fillet	38a	12a		<4.98	<2.49	<2.49	<2.49	<2.49	<2.49	<2.49
Largemouth Bass												
LMB-1	8/23/07	Fillet	576	33	5/M	<4.90	2.8	<2.45	<2.45*	<2.45	<2.45	<2.45
LMB-2	8/23/07	Fillet	653	35	6/F	6.14	<2.49	<19.6	<2.49*	2.62	<2.49	<2.49
LMB-3	8/23/07	Fillet	503	32	5/M	<4.93	<2.46	<2.46	<2.46*	<2.46	<2.46	<2.46
LMB-4	8/23/07	Fillet	370	31	5/F	<4.76	<2.38	<2.38	<2.38*	<2.38	<2.38	<2.38
LMB-5	8/23/07	Fillet	744	37	7/F	<4.95	<2.48	<2.48	<2.48*	<2.48	<2.48	<2.48

Ravine Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-1	4/30/07	Fillet	30	10	2/M	10.3	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46
BGS-4	4/30/07	Fillet	35	12	3/J	10.8	<4.67	<4.67	<4.67	<4.67	<4.67	<4.67
BGS-5	4/30/07	Fillet	23	10	2/M	45.1	<2.49	<2.49	<2.49	<2.49	<2.49	<2.49
BGS-9	4/30/07	Fillet	206	19.5	7/M	29.3	<2.29	<2.29	<2.29	<2.29	<2.29	<2.29
BGS-9(dup)	4/30/07	Fillet				30.3	<2.45	<2.45	<2.45	<2.45	<2.45	<2.45
BGS-10	4/30/07	Fillet	97	16	5/M	19.3	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
BGS-comp	4/30/07	Fillet	60a	13a		19.4	<2.43	<2.43	<2.43	<2.43	<2.43	<2.43
Black Crappie												
BKS-1	4/30/07	Fillet	52	15	3/F	55.9	<2.48	<2.48*	<2.48*	<2.48	<2.48	<2.48
BKS-2	4/30/07	Fillet	43	15	3/J	64.5	<2.42	<2.42*	<2.42*	<2.42	<2.42	<2.42
BKS-3	4/30/07	Fillet	42	14	3/J	77.8	2.69	<2.56*	<2.56	<2.56	<2.56	<2.56
BKS-4	4/30/07	Fillet	50	15	3/J	60.4	<2.31	<2.31*	<2.31	<2.31	<2.31	<2.31
BKS-5	4/30/07	Fillet	45	14	3/F	41.3	<2.35	<2.35*	<2.35*	<2.35	<2.35	<2.35
Largemouth Bass												
LMB-1	4/30/07	Fillet	725	32.5	5/M	50.6	<2.40	<2.40*	<2.40*	<2.40	<2.40	<2.40
LMB-2	4/30/07	Fillet	890	35	6/M	36	<2.13	<2.13*	<2.13*	<2.13	<2.13	<2.13
LMB-3	4/30/07	Fillet	911	34.5	6/F	65.2	<2.38	<2.38*	<2.38*	<2.38	<2.38	<2.38
LMB-4	4/30/07	Fillet	1084	36.5	7/M	107	<2.40	<2.40*	<2.40*	<2.40	<2.40	<2.40
LMB-5	4/30/07	Fillet	1011	33	5/M	53.8	<2.31	<2.31*	<2.31*	<2.31	<2.31	<2.31

Red Rock Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-6	8/17/07	Fillet	5	10	2/J	42	<2.40	<2.40	<2.40	<2.40	<2.40	<2.40
BGS-7	8/17/07	Fillet	43	13.9	4/J	32.7	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
BGS-8	8/17/07	Fillet	61	15.2	5/M	42.2	<2.43	<2.43	<2.43	<2.43	<2.43	<2.43
BGS-9	8/17/07	Fillet	130	18.2	7/M	58.3	<2.45	<2.45	<2.45	<2.45	<2.45	<2.45
BGS-10	8/17/07	Fillet	57	14	4/F	29.2	<2.44	<2.44	<2.44	<2.44	<2.44	<2.44
BGS-comp	8/17/07	Fillet	27a	11a		35.2	<2.38	<3.02	<2.38	<2.38	<2.38	<2.38
Black Crappie												
BKS-1	8/17/07	Fillet	81	17	4/F	79.9	<2.48	<2.48	<2.48	2.73	<2.48	<2.48
BKS-2	8/17/07	Fillet	102	20	5/F	97.1	<2.48	<2.48	<2.48	3.07	<2.48	<2.48
BKS-3	8/17/07	Fillet	149	21	6/M	153	<2.49	<2.49	<2.49	3.69	<2.49	<2.49
BKS-4	8/17/07	Fillet	283	27	8/F	115	<2.43	<2.43	<2.43	3.62	<2.43	<2.43
BKS-5	8/17/07	Fillet	122	19	5/F	68.6	<2.49	<2.49	<2.49	2.95	<2.49	<2.49
Largemouth Bass												
LMB-1	8/17/07	Fillet	666	38	7/M	85.7	<2.76	<2.42	<2.42*	2.67	<2.42	<2.42
LMB-2	8/17/07	Fillet	527	33	5/F	60.6	<2.60	<2.44	<2.44*	2.69	<2.44	<2.44
LMB-3	8/17/07	Fillet	566	33	5/J	64.5	<2.46	<2.46	<2.46*	3.22	<2.46	<2.46
LMB-4	8/17/07	Fillet	591	33	5/F	57.4	<2.48	<2.48	<2.48*	<2.48	<2.48	<2.48
LMB-5	8/17/07	Fillet	716	36	7/M	74.4	<3.99	<2.33	<2.33*	3.07	<2.33	<2.33

Sarah Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-3	7/16/07	Fillet	70	17	6/F	6.12	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
BGS-4	7/16/07	Fillet	86	18	7/M	6.21#	<2.49	<2.49	<2.49	<2.49	<2.49	<2.49
BGS-6	7/16/07	Fillet	74	17	6/F	7.97	<2.49	<2.49	<2.49	<2.49	<2.49	<2.49
BGS-7	7/16/07	Fillet	10	7	1/J	8.51	<2.43	<2.43	<2.43	<2.43	<2.43	<2.43
BGS-9	7/16/07	Fillet	15	9.2	1/J	<5.00	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50
BGS-comp	7/16/07	Fillet	52a	13a		<4.90	<2.45	<2.45	<2.45	<2.45	<2.45	<2.45
Black Crappie												
BKS-1	7/16/07	Fillet	NA	21	6/F	<4.95	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
BKS-2	7/16/07	Fillet	NA	20	5/M	<5.00	<2.50	<2.50	<2.50	<2.50	<2.50	<2.50
BKS-3	7/16/07	Fillet	NA	24	7/F	<4.83	<2.42	<2.42	<2.42	<2.42	<2.42	<2.42
BKS-4	7/16/07	Fillet	NA	20	5/M	<4.76	<2.38	<9.45	<2.38	<2.38	<2.38	<2.38
BKS-5	7/16/07	Fillet	NA	21	6/M	<4.93	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46
Northern Pike												
NP-1	7/16/07	Fillet	3440	70.7	6/F	7.88	<2.64	<2.45	<2.45	<2.45	<2.45	<2.45
NP -2	7/16/07	Fillet	4052	85	7/F	10.8	<2.49	<2.49	<2.49	<2.49	<2.49	<2.49
NP -2(dup)		Fillet				14.4	<2.43	<2.43	<2.43	<2.43	<2.43	<2.43
NP -3	7/16/07	Fillet	3821	85	8/F	13.6	<2.45	<2.45	<2.45	<2.45	<2.45	<2.45
NP -4	7/16/07	Fillet	3229	81.5	7/F	7.45	<2.42	<2.42	<2.42	<2.42	<2.42	<2.42
NP -5	7/16/07	Fillet	1757	66	5/M	9.6	<2.39	<2.39	<2.39	<2.39	<2.39	<2.39

Silver Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-3	5/4/07	Fillet	64	16	5/M	24	<2.40	<2.40	<2.40	<2.40	3.38	<2.40
BGS-4	5/4/07	Fillet	38	13	3/F	19.6	<2.43	<2.43	<2.43	<2.43	2.53	<2.43
BGS-5	5/4/07	Fillet	36	13	3/F	24.4#	<2.42	<2.42	<2.42	<2.42	<2.42	<2.42
BGS-7	5/4/07	Fillet	43	14	4/F	31.3	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
BGS-9	5/4/07	Fillet	32	13	3/F	21.4	<2.42	<2.42	<2.42	<2.42	<2.42	<2.42
BGS-comp	5/4/07	Fillet	59a	14a		33.7	<2.44	<2.44	<2.44	<2.44	<2.44	2.89
Black Crappie												
BKS-1	5/4/07	Fillet	69	16	5/F	26.6#	<2.46	<2.46	<2.46	2.92	<2.46	<2.46
BKS-4	5/4/07	Fillet	63	17	4/M	36.6	<2.48	<2.48	<2.48	3.39	<2.48	3.38
BKS-6	5/4/07	Fillet	67	18	5/M	45	<2.49	<2.49	<2.49	4.52	<2.49	2.89
BKS-7	5/4/07	Fillet	67	18	5/M	28.6	<2.50	<2.50	<2.50	3.88	3.11	3.05
BKS-10	5/4/07	Fillet	296	27	8/F	29.3#	<2.43	<2.43	<2.43	3.77	3.08	<2.43
BKS-10(dup)						26.2	<2.44	<2.44	2.65	<2.44	<2.44	<2.44
BKS-comp	5/4/07	Fillet	110	19		34.9	<2.45	<2.45	<2.45	<2.45	<2.45	<2.45
BKS-comp(dup)						33.5	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
Walleye												
WE-1	5/4/07	Fillet	453	50	9/M	10.2	<2.40	<4.84	2.71	<2.40	<2.40	<2.40
WE-1(dup)						10.8	<2.42	<2.42	4.2	<2.42	<2.42	<2.42
WE-2	5/4/07	Fillet	486	52	10/M	18.8	<2.44	<2.44	4.65	2.8	2.85	<2.44
WE-3	5/4/07	Fillet	371	27	4/M	10.5	<2.49	<2.49	5.31	<2.49	<2.49	<2.49
WE-4	5/4/07	Fillet	1200	46	8/M	26.6	<2.33	<2.33	4.82	2.99	2.49	2.96

Square Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-2	5/2/07	Fillet	15	18.5	7/F	<4.57	<2.28	<2.28*	<2.28	<2.28	<2.28	<2.28
BGS-4	5/2/07	Fillet	21	10	2/F	<4.69	<2.35	<2.35*	<2.35	<2.35	<2.35	<2.35
BGS-8	5/2/07	Fillet	44	12.5	3/F	<4.72	<2.36	<2.36*	<2.36	<2.36	<2.36	<2.36
BGS-9	5/2/07	Fillet	84	16	5/M	<4.88	<2.44	<2.44*	<2.44	<2.44	<2.44	<2.44
BGS-10	5/2/07	Fillet	111	17.5	6/M	<4.95	<2.48	<2.48*	<2.48	<2.48	<2.48	<2.48
BGS-comp	5/2/07	Fillet	53a	13a		<4.72	<2.36	<2.36	<2.36	<2.36	<2.36	<2.36
Black Crappie												
BKS-1	5/2/07	Fillet	74	16.5	4/M	<4.93	<2.46	<2.46*	<2.46	<2.46	<2.46	<2.46
BKS-2	5/2/07	Fillet	125	18.5	5/M	5.2	<2.44	<2.44*	<2.44	<2.44	<2.44	<2.44
BKS-3	5/2/07	Fillet	94	18	5/M	<4.76	<2.38	<2.38*	<2.38	<2.38	<2.38	<2.38
BKS-4	5/2/07	Fillet	80	17	4/F	<4.90	<2.45	<2.45	<2.45	<2.45	<2.45	<2.45
BKS-5	5/2/07	Fillet	126	20	5/M	<4.98	<2.49	<2.49	<2.49	<2.49	<2.49	<2.49
Largemouth Bass												
LMB-1	5/2/07	Fillet	309	26.5	3/M	<4.67	<2.34	<2.34*	<2.34	<2.34	<2.34	<2.34
LMB-2	5/2/07	Fillet	301	28	3/M	<4.88	<2.44	<2.44*	<2.44	<2.44	<2.44	<2.44
LMB-3	5/2/07	Fillet	284	27.5	3/F	<4.81	<2.40	<2.40*	<2.40	<2.40	2.88	<2.40
LMB-4	5/2/07	Fillet	383	29.5	4/F	<5.00	<2.50	<2.50*	<2.50	<2.50	<2.50	<2.50
LMB-5	5/2/07	Fillet	316	28	3/M	<5.03	<2.51	<2.51*	<2.51	<2.51	<2.51	<2.51

Tanners Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-1	6/12/07	Fillet	89	17	6/M	61.1#	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46
BGS-2	6/12/07	Fillet	32	12.5	3/F	87#	<2.30	<2.30	<2.30	<2.30	<2.30	<2.30
BGS-5	6/12/07	Fillet	93	18	7/F	56.6	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
BGS-7	6/12/07	Fillet	89	16.5	6/F	70.4	<2.44	<2.44	<2.44	<2.44	<2.44	<2.44
BGS-10	6/12/07	Fillet	12	10	2/J	105	<2.49	<2.49	<2.49	4.36	<2.49	<2.49
BGS-comp	6/12/07	Fillet	50a	13a		55	<2.44	<2.59	<2.44	<2.44	<2.44	<2.44
Black Crappie												
BKS-1	6/12/07	Fillet	69	18	4/M	265	<2.45	<2.45	<2.45*	6.3	<2.45	<2.45
BKS-2	6/12/07	Fillet	63	15	3/M	75.9	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46
BKS-3	6/12/07	Fillet	56	18	4/F	91.2	<2.38	<3.96	<2.38	2.82	<2.38	<2.38
BKS-4	6/12/07	Fillet	80	18.5	4/M	94.6	<2.39	<2.39	<2.39	<2.39	<2.39	<2.39
BKS-5	6/12/07	Fillet	56	17	4/F	64	<2.81	<2.40	<2.40	<2.40	<2.40	<2.40
Largemouth Bass												
LMB-1	6/12/07	Fillet	378	NA	4/F	96.5	<2.43	<3.18	<2.43	6.05	4.62	4.11
LMB-2	6/12/07	Fillet	619	NA	5/F	75.7	<2.44	<2.44	<2.44	4.86	4.42	8.37
LMB-3	6/12/07	Fillet	576	35	6/F	76.6	<2.39	<2.39	<2.39	3.56	4.73	3.4
LMB-4	6/12/07	Fillet	823	37	7/M	74.9	<2.44	<2.44	<2.44	3.44	<2.44	4.2
LMB-5	6/12/07	Fillet	1570	50	12/F	74.1	<2.56	<2.56	<2.56*	3.33	<2.56	<2.56

White Bear Lake Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-2	5/2/07	Fillet	26	10	2/F	<4.88	<2.44	<2.44*	<2.44	<2.44	<2.44	<2.44
BGS-3	5/2/07	Fillet	8	7	1/J	<8.13	<4.07	<4.07*	<4.07	<4.07	<4.07	<4.07
BGS-5	5/2/07	Fillet	32	12	3/J	<4.81	<2.40	<2.40*	<2.40	<2.40	<2.40	<2.40
BGS-7	5/2/07	Fillet	171	19	7/M	4.77	<2.28	<2.28*	<2.28	<2.28	<2.28	<2.28
BGS-8	5/2/07	Fillet	111	25.5	5/F	5.08	<2.34	<2.34*	<2.34	<2.34	<2.34	<2.34
BGS-comp	5/2/07	Fillet	64a	13a		6.06	<2.31	<2.31	<2.31	<2.31	<2.31	<2.31
Black Crappie												
BKS-1	5/2/07	Fillet	172	21	6/F	18.4	<2.44	<2.44*	<2.44	<2.44	<2.44	<2.44
BKS-2	5/2/07	Fillet	525	30	10/F	30.8	<2.54	<2.54*	<2.54	3.51	<2.54	<2.54
Largemouth Bass												
LMB-1	5/2/07	Fillet	811	35	6/M	<4.81	<2.40	<2.40*	<2.40	<2.40	<2.40	<2.40
LMB-2	5/2/07	Fillet	845	36.5	7/F	9.07	<2.49	<2.49*	<2.49	<2.49	<2.49	<2.49
LMB-3	5/2/07	Fillet	638	34	6/M	<4.76	<2.38	<2.38*	<2.38	<2.38	<2.38	<2.38
LMB-4	5/2/07	Fillet	515	31	5/M	<4.85	<2.43	<2.43*	<2.43	<2.43	<2.43	<2.43
LMB-5	5/2/07	Fillet	503	31	5/M	<4.85	<2.43	<2.43*	<2.43	<2.43	<2.43	<2.43

St. Croix River Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-3	7/19/07	Fillet	86	15.5	5/F	<4.83	<2.42	<2.42	<2.42	<2.42	<2.42	<2.42
BGS-5	7/19/07	Fillet	83	14.5	4/F	33.1	<2.45	<2.45	<2.45	<2.45	<2.45	<2.45
BGS-7	7/19/07	Fillet	122	18.5	7/M	<4.95	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48
BGS-8	7/19/07	Fillet	76	15	4/M	22.3	<2.40	<2.40	<2.40	<2.40	<2.40	<2.40
BGS-10	7/19/07	Fillet	80	15	4/M	13.1	<2.44	<2.65	<2.44	<2.44	<2.44	<2.44
BGS-comp	7/19/07	Fillet	82a	15a		12	<2.42	<2.42	<2.42	<2.42	<2.42	<2.42
BGS-comp(dup)						16.4	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46
Walleye												
WE-1	7/19/07	Fillet	670	45	8/M	8.34	<2.45	<3.85	<2.45*	<2.45	<2.45	<2.45
WE-2	7/19/07	Fillet	695	44	7/M	13.8	<2.35	<2.35	<2.35*	<2.35	<2.35	<2.35
WE-3	7/19/07	Fillet	641	42	6/M	12	<2.42	<2.42	<2.42*	<2.42	<2.42	<2.42
WE-4	7/19/07	Fillet	919	48	9/M	40.2	<2.42	<2.42	<2.42*	<2.42	<2.42	<2.42
WE-5	7/19/07	Fillet	890	48	9/M	12.7	<2.49	<2.49	<2.49	<2.49	<2.49	<2.49
White Bass												
WHB-1	7/19/07	Fillet	403	34	5/F	81.8	<2.50	<2.50	<2.50	2.63	<2.50	<2.50
Smallmouth Bass												
SMB-1	7/19/07	Fillet	573	35	3/M	12.3	<2.29	<2.29	<2.29	<2.29	<2.29	<2.29
SMB-2	7/19/07	Fillet	730	38	4/M	29.1	<2.45	<2.45	<2.45	<2.45	<2.45	<2.45
SMB-2(dup)						31.4	<2.22	<2.22	<2.22	<2.22	<2.22	<2.22
SMB-3	7/19/07	Fillet	425	30	1/M	<4.90	<2.45	<2.45	<2.45	<2.45	<2.45	<2.45
SMB-4	7/19/07	Fillet	286	29	1/M	5.44	<2.33	<2.33	<2.33	<2.33	<2.33	<2.33
SMB-5	7/19/07	Fillet	252	27	1/M	11.2	<2.48	<2.48	<2.48	<2.48	<2.48	<2.48

Mississippi River Brainerd area Fish PFC analysis												
Species & Sample ID	Sample Date	Tissue	Wt (g)	Ln (cm)	Age/ sex (yrs)	PFOS ng/g (ppb)	PFOA ng/g (ppb)	PFBA ng/g (ppb)	PFOSA ng/g (ppb)	PFDA ng/g (ppb)	PFUnA ng/g (ppb)	PFDoA ng/g (ppb)
Bluegill												
BGS-1	8/13/07	Fillet	50	14	4/J	7.38	<2.44	<2.47	<2.44*	<2.44	<2.44	<2.44
BGS-2	8/13/07	Fillet	59	13.3	3/F	12.3	<2.45	<2.45	<2.45*	<2.45	<2.45	<2.45
Walleye												
WE-1	8/13/07	Fillet	225	31	5/J	9.42	<2.35	<2.35	<2.35*	<2.35	<2.35	<2.35
WE-2	8/13/07	Fillet	625	43	7/F	8	<2.48	<2.48	<2.48*	<2.48	<2.48	<2.48
WE-3	8/13/07	Fillet	325	32	5/F	7.69	<2.46	<2.46	<2.46*	<2.46	<2.46	<2.46
WE-4	8/13/07	Fillet	1425	49	9/M	10.4	<2.42	<2.42	<2.42*	<2.42	<2.42	<2.42
WE-5	8/13/07	Fillet	1850	54	11/ M	8.75	<2.35	<2.35	<2.35*	<2.35	<2.35	<2.35
WE-5(dup)						8.99	<2.43	<8.25	<2.43*	<2.43	<2.43	<2.43
Northern Pike												
NP-1	8/13/07	Fillet	301	33	3/J	7.15	<2.35	<2.35	<2.35*	<2.35	<2.35	<2.35
NP-2	8/13/07	Fillet	1050	51	4/F	6.29	<2.46	<2.46	<2.46*	<2.46	<2.46	<2.46
NP-3	8/13/07	Fillet	1450	54	4/F	7.62	<2.27	<2.27	<2.27*	<2.27	<2.27	<2.27
Smallmouth Bass												
SMB-1	8/13/07	Fillet	1275	44	6/F	12.5	<2.44	<3.29	<2.44*	<2.44	<2.44	<2.44
SMB-2	8/13/07	Fillet	1300	39	4/M	12.1	<2.27	<2.27	<2.27*	<2.27	<2.27	<2.27
SMB-3	8/13/07	Fillet	900	36	3/M	11.3	<2.33	<2.33	<2.33*	<2.33	<2.33	<2.33
SMB-4	8/13/07	Fillet	1850	41	5/M	8.82	<2.43	<2.43	<2.43*	<2.43	<2.43	<2.43
SMB-5	8/13/07	Fillet	225	23	2/J	18	<2.40	<11.8	<2.92*	<2.40	<2.40	<2.40

< = less than the detection limit; number following this symbol represents the detection limit

* estimated values with a negative bias

estimated values with a positive bias

2008 MPCA Metro Lakes Fish PFC Data

Twin Cities Metro Lakes

	Average PFOS Concentration [ng/g; ppb]							
	Bluegill	**Bluegill (comp)**	**Black Crappie**	**Black Crappie (comp)**	**Largemouth Bass**	**Northern Pike**	**Pumpkinseed**	**Pumpkinseed (comp)**
Alimagnet	24.27 (6)	24.7 (6)	31.38 (6)	31.60 (6)	ns	ns	ns	ns
Bennett	40.12 (6)	36.8 (6)	46.52 (5)	58.50 (4)	ns	51.38 (5)	ns	ns
Calhoun	203.80 (5)	267 (4)	267.17 (6)	ns	425.60 (5)	ns	ns	ns
Casey	ns	ns	12.45 (5)	14.50 (5)	ns	ns	ns	ns
Cedar (Hennepin)	50.09 (8)	ns	68.15 (2)	ns	136.74 (5)	ns	ns	ns
Fish	76.08 (6)	73.70 (6)	101.68 (5)	98.60 (6)	ns	134.60 (5)	17.48 (5)	15.70 (6)
Harriet	137.00 (5)	ns	138.40 (5)	ns	227.40 (5)	ns	ns	ns
Hyland	12.44 (5)	ns	23.92 (5)	ns	43.06 (5)	ns	ns	ns
Isles	68.40 (3)	ns	166.97 (6)	ns	197.00 (5)	ns	ns	ns
Lee	22.47 (6)	20.80 (6)	38.24 (5)	29.30 (4)	ns	ns	ns	ns
Pelican	<dl (5)	ns	<dl (5)	ns	<dl (5)	ns	ns	ns
Starring (5/30/08)	22.27 (3)	ns	ns	ns	26.40 (4)	ns	ns	ns
Starring (6/24/08)	10.07 (2)	ns	15.86 (5)	ns	32.50 (1)	ns	ns	ns
Steiger	5.75 (3)	ns	5.69 (1)	ns	9.55 (5)	ns	ns	ns
Sweeney	26.20 (5)	ns	28.47 (3)	ns	49.52 (5)	ns	ns	ns
Twin	396.80 (6)	ns	419.00 (5)	ns	480.40 (5)	ns	ns	ns

Numbers listed are: average PFOS concentration (# of fish)
<dl – less than detection limit (approx. 2.5 ng/g)
ns – not sampled
comp – composite; tissue from several fish is combined prior to analysis

2008 MPCA Metro Lakes Fish PFC Data

Note: This summary table is only for concentrations of PFDA in fish from lakes listed below.

Twin Cities Metro Lakes

	Average PFDA Concentration [ng/g; ppb]							
	Bluegill	**Bluegill (comp)**	**Black Crappie**	**Black Crappie (comp)**	**Largemouth Bass**	**Northern Pike**	**Pumpkinseed**	**Pumpkinseed (comp)**
Alimagnet	3.69 (1)	<dl (5)	3.93 (5)	5.57 (6)	ns	ns	ns	ns
Bennett	4.74 (4)	3.38 (6)	6.67 (5)	6.66 (4)	ns	5.92 (5)	ns	ns
Calhoun	4.60 (5)	5.12 (4)	7.28 (6)	ns	11.00 (5)	ns	ns	ns
Casey	ns	ns	<dl (5)	<dl (5)	ns	ns	ns	ns
Cedar (Hennepin)	4.15 (6)	ns	5.23 (2)	ns	9.03 (5)	ns	ns	ns
Fish	2.91 (4)	4.16 (6)	5.48 (5)	6.17 (6)	ns	7.24 (5)	<dl (5)	<dl (5)
Harriet	4.03 (5)	ns	4.8 (5)	ns	8.03 (5)	ns	ns	ns
Hyland	2.55 (1)	ns	3.96 (4)	ns	4.83 (5)	ns	ns	ns
Isles	4.14 (3)	ns	8.87 (6)	ns	8.85 (5)	ns	ns	ns
Lee	3.03 (3)	<dl (6)	4.70 (5)	3.82 (4)	ns	ns	ns	ns
Pelican	<dl (5)	ns	<dl (5)	ns	<dl (5)	ns	ns	ns
Starring (5/30/08)	<dl (3)	ns	ns	ns	2.59 (1)	ns	ns	ns
Starring (6/24/08)	<dl (2)	ns	<dl (5)	ns	<dl (1)	ns	ns	ns
Steiger	<dl (4)	ns	<dl (2)	ns	<dl (5)	ns	ns	ns
Sweeney	3.17 (4)	ns	5.00 (3)	ns	5.66 (5)	ns	ns	ns
Twin	3.04 (6)	ns	5.04 (5)	ns	5.02 (5)	ns	ns	ns

Numbers listed are: average PFDA concentration (# of fish)
<dl – less than detection limit (approx. 2.5 ng/g)
ns – not sampled
comp – composite; tissue from several fish is combined prior to analysis

2008 MPCA Metro Lakes Fish PFC Data

Note: This summary table is only for concentrations of PFUnA in fish from lakes listed below.

Twin Cities Metro Lakes

	Average PFUnAConcentration [ng/g; ppb]							
	Bluegill	**Bluegill (comp)**	**Black Crappie**	**Black Crappie (comp)**	**Largemouth Bass**	**Northern Pike**	**Pumpkinseed**	**Pumpkinseed (comp)**
Alimagnet	3.65 (2)	<dl (5)	<dl (5)	2.65 (6)	ns	ns	ns	ns
Bennett	3.06 (6)	3.09 (6)	<dl (5)	3.01 (4)	ns	4.51 (3)	ns	ns
Calhoun	2.71 (2)	2.93 (4)	3.28 (3)	ns	6.21 (5)	ns	ns	ns
Casey	ns	ns	<dl (5)	<dl (5)	ns	ns	ns	ns
Cedar (Hennepin)	2.66 (2)	ns	3.05 (1)	ns	5.75 (5)	ns	ns	ns
Fish	2.74 (3)	<dl (6)	<dl (5)	<dl (6)	ns	5.11 (5)	<dl (5)	<dl (5)
Harriet	2.84 (3)	ns	<dl (5)	ns	3.85 (5)	ns	ns	ns
Hyland	<dl (5)	ns	<dl (5)	ns	3.80 (3)	ns	ns	ns
Isles	2.62 (2)	ns	5.49 (4)	ns	6.67 (5)	ns	ns	ns
Lee	<dl (6)	<dl (6)	3.61 (1)	<dl (4)	ns	ns	ns	ns
Pelican	<dl (5)	ns	<dl (5)	ns	<dl (5)	ns	ns	ns
Starring (5/30/08)	<dl (3)	ns	ns	ns	<dl (4)	ns	ns	ns
Starring (6/24/08)	<dl (2)	ns	<dl (5)	ns	<dl (1)	ns	ns	ns
Steiger	<dl (4)	ns	<dl (2)	ns	<dl (5)	ns	ns	ns
Sweeney	4.44 (3)	ns	4.87 (1)	ns	4.73 (5)	ns	ns	ns
Twin	4.58 (6)	ns	4.58 (4)	ns	6.07 (5)	ns	ns	ns

Numbers listed are: average PFUnA concentration (# of fish)
<dl – less than detection limit (approx. 2.5 ng/g)
ns – not sampled
comp – composite; tissue from several fish is combined prior to analysis

2008 MPCA Metro Lakes Fish PFC Data

Note: This summary table is only for concentrations of PFDoA in fish from lakes listed below.

Twin Cities Metro Lakes

	Average PFDoA Concentration [ng/g; ppb]							
	Bluegill	**Bluegill (comp)**	**Black Crappie**	**Black Crappie (comp)**	**Largemouth Bass**	**Northern Pike**	**Pumpkinseed**	**Pumpkinseed (comp)**
Alimagnet	2.57 (1)	<dl (5)	<dl (5)	<dl (6)	ns	ns	ns	ns
Bennett	3.02 (1)	<dl (6)	<dl (5)	<dl (4)	ns	3.26 (4)	ns	ns
Calhoun	3.68 (2)	4.15 (4)	2.90 (2)	ns	6.32 (5)	ns	ns	ns
Casey	ns	ns	<dl (5)	<dl (5)	ns	ns	ns	ns
Cedar (Hennepin)	2.76 (1)	ns	2.68 (1)	ns	5.51 (5)	ns	ns	ns
Fish	3.21 (1)	<dl (6)	<dl (5)	<dl (6)	ns	3.84 (5)	<dl (5)	<dl (5)
Harriet	2.80 (1)	ns	<dl (5)	ns	3.38 (3)	ns	ns	ns
Hyland	<dl (5)	ns	<dl (5)	ns	<dl (5)	ns	ns	ns
Isles	<dl (3)	ns	6.24 (5)	ns	7.27 (5)	ns	ns	ns
Lee	<dl (6)	<dl (6)	<dl (5)	<dl (4)	ns	ns	ns	ns
Pelican	<dl (5)	ns	<dl (5)	ns	<dl (5)	ns	ns	ns
Starring (5/30/08)	<dl (3)	ns	ns	ns	<dl (4)	ns	ns	ns
Starring (6/24/08)	<dl (2)	ns	<dl (5)	ns	<dl (1)	ns	ns	ns
Steiger	<dl (4)	ns	<dl (2)	ns	<dl (5)	ns	ns	ns
Sweeney	3.66 (5)	ns	4.49 (1)	ns	5.90 (5)	ns	ns	ns
Twin	2.84 (1)	ns	2.88 (3)	ns	3.46 (4)	ns	ns	ns

Numbers listed are: average PFDoA concentration (# of fish)
<dl – less than detection limit (approx. 2.5 ng/g)
ns – not sampled
comp – composite; tissue from several fish is combined prior to analysis

Table A9. 2007 Wastewater Treatment Plant Influent (ng/L)

AREA	PLANT NAME	Sample ID	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnA	PFDoA	PFBS	PFHxS	PFOS	PFOSA
North	ALSSD	ALS	12	< 4.39	8.98	4.59	30.4	< 4.95	< 4.79	< 5.60	< 4.29	15.6	32.2	21.9	< 3.91
South	Austin	AUS-D	22.1	2.63	3.35	< 2.68	6.46	< 2.92	< 2.83	< 3.31	< 2.53	< 5.66	8.03	6.52	< 2.31
South	Austin	AUS-I	19.6	3.51	2.95	< 2.42	4.39	< 2.52	< 2.44	< 3.62	< 2.19	< 4.89	< 4.94	< 9.39	< 1.99
North	BoiseCascade	BOI	362	< 4.28	< 4.41	< 4.41	< 4.08	< 4.82	< 4.67	< 5.46	< 4.18	< 4.67	< 9.43	< 9.43	< 3.81
North	Brainerd	BRA	< 11.6	< 4.39	8.47	4.88	9.93	< 4.94	< 4.78	< 5.60	< 4.28	109	45.9	811	< 3.90
Central	DodgeCenter	DOD	83.3	< 2.76	< 2.85	< 2.85	6.27	< 3.11	< 3.01	< 3.52	< 2.70	< 6.02	7.14	19	< 2.46
Central	Eagle Point	EAG	656	31.3	22.9	5.59	17.1	< 4.13	< 4.13	< 4.13	< 4.13	67.1	19.9	< 8.28	< 4.13
North	Fergus Falls	FER	33	< 4.19	< 4.32	< 4.32	5.08	< 4.72	< 4.57	< 5.34	< 4.09	< 14.5	< 9.24	14.7	< 3.73
Central	Flint Hills	FLI	40.2	< 17.6	17.2	< 16.7	9.08	< 6.19	< 6.19	< 6.19	< 6.19	31.6	27.5	54.6	< 6.19
North	Hibbing	HIB	20.2	< 4.15	< 4.28	< 4.28	61.1	9.44	< 4.52	< 5.29	< 4.05	< 13.3	16.4	< 17.9	< 3.69
Central	Hutchinson	HUT	37	< 3.90	< 4.02	< 4.02	4.95	< 4.39	< 4.25	< 4.97	< 3.81	75.8	11.5	80.8	< 3.47
Central	Marathon-Ashland	MAR	1020	62.6	44.8	15	20	4.21	< 4.07	< 4.07	< 4.07	180	131	256	< 4.07
Central	Maynard	MAY	26	4.13	4.99	< 2.70	8.51	< 2.95	< 2.86	< 3.34	< 2.56	< 5.72	< 5.78	< 5.78	4.43
Central	Melrose	MEL	< 12.0	< 4.38	< 4.52	< 4.52	5.18	< 4.93	< 4.78	< 5.59	< 4.28	< 9.56	< 9.66	< 9.66	< 3.90
Central	Metro Plant	MET-1	58.1	8.58	12.9	6.52	21	< 4.38	< 4.38	< 4.38	< 4.38	38.8	12.4	35.3	< 4.38
Central	Metro Plant	MET-2	86.8	9.09	14.1	6.64	21.8	< 4.14	< 4.14	< 4.14	< 4.14	32.7	14.1	34.9	< 4.14
Central	Montivedeo	MON	32.9	< 3.17	< 3.27	< 3.27	9.47	6.82	7.74	< 4.04	< 3.10	< 6.91	< 8.28	< 6.99	< 2.82
South	Morton	MOR-1	< 4.03	< 4.03	< 4.03	< 4.03	< 4.03	< 4.03	< 4.03	< 4.03	< 4.03	21.2	< 8.06	< 8.06	< 4.03
South	Morton	MOR-2	< 4.05	< 4.05	< 4.05	< 4.05	< 4.05	< 4.05	< 4.05	< 4.05	< 4.05	9.38	< 8.11	< 8.11	< 4.05
South	Owatonna	OWA	35.2	9.29	15.4	< 3.85	19.5	< 4.20	< 4.07	< 4.76	< 3.65	< 8.14	< 8.23	< 8.23	< 3.32
North	Paynesville	PAY	38	< 4.39	< 4.53	< 4.53	< 4.18	< 4.95	< 4.79	< 5.60	< 4.29	< 9.58	< 9.68	< 9.68	< 3.91
South	Pipestone	PIP	18.9	52.4	< 2.57	< 2.57	3.32	3.4	< 2.72	< 3.18	< 2.44	< 5.44	< 5.50	< 5.50	< 2.22
South	Red Wing	RED	97.7	< 3.79	9.59	< 3.91	13.5	6.65	< 4.14	< 4.84	< 3.70	< 13.2	< 8.36	< 8.36	< 3.37
South	Rochester	ROC	36.8	< 4.04	5.06	< 4.17	17.7	< 4.55	< 4.41	< 5.15	< 3.94	< 8.81	10.4	< 10.7	< 3.59
Central	Me.CoSeneca	SEN	110	< 3.38	9.31	< 3.48	28.7	8.53	< 3.68	< 4.31	< 3.30	118	187	171	< 3.01
Central	St. Cloud	STC	< 12.0	< 4.41	6.81	6.81	16.5	< 4.96	< 4.80	< 5.62	< 4.30	< 11.2	21.5	< 9.71	< 3.92
North	Thief River F	THI	< 13.8	< 4.23	< 4.37	< 5.57	43.6	5.36	< 4.62	< 5.40	< 4.13	< 12.9	< 9.33	< 9.33	< 3.77
Central	Willmar	WIL	45.7	< 3.70	< 3.81	< 3.81	7.25	4.87	< 4.03	< 4.72	< 3.61	< 8.07	< 8.15	< 8.15	< 3.29
North	WLSSD	WLS	71.8	< 9.21	5.84	7.3	14	< 4.80	< 4.65	< 5.44	< 4.16	< 14.8	< 9.39	< 9.39	< 3.79
South	Worthington	WOR	61.9	< 3.90	< 4.02	< 4.02	4.28	< 4.39	< 4.25	< 4.97	< 3.80	< 8.50	< 8.59	< 8.59	< 3.47

Estimated values based on QA review

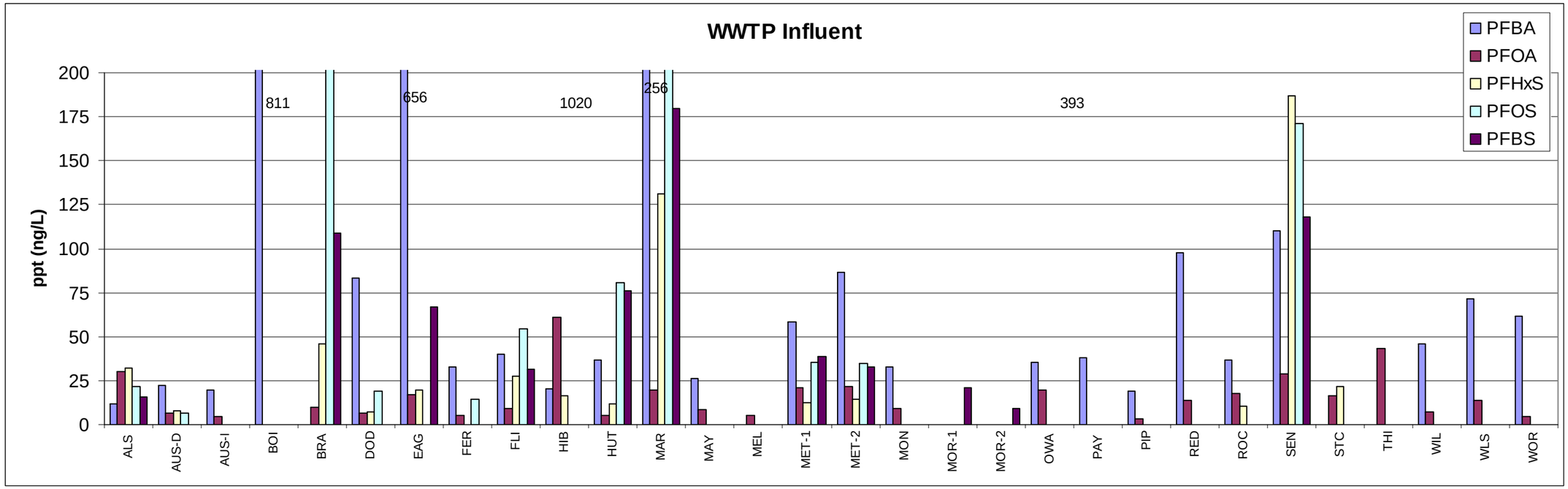


Figure A1. PFCs in WWTP Influent, 2007.

Table A10. 2007 Wastewater Treatment Plant Effluent in (ng/L)

AREA	PLANT NAME	Sample ID	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnA	PFDoA	PFBS	PFHxS	PFOS	PFOSA
North	ALSSD	ALS	32.4	4.9	11.5	2.78	13.2	5.31	< 2.87	< 3.36	< 2.57	17.3	40.8	18.4	< 2.35
South	Austin	AUS	21.5	5.12	5.27	< 2.65	5.99	< 2.90	< 2.81	< 3.28	< 2.51	< 5.61	< 5.67	< 6.54	< 2.29
North	BoiseCascade	BOI	68.3	< 4.26	< 4.39	< 4.39	4.99	< 4.80	< 4.64	< 5.43	< 4.16	< 9.29	< 9.39	< 9.39	< 3.79
North	Brainerd	BRA	50.3	< 2.49	12.3	6.25	19	14.1	< 2.71	< 3.17	< 2.43	107	10.6	1510	< 2.21
Central	DodgeCenter	DOD	23.4	9.88	4.8	< 2.57	7.56	< 2.81	< 2.72	< 3.18	< 2.44	< 5.44	< 5.50	< 5.50	< 2.22
Central	Eagle Point	EAG	565	21.2	27.6	6.57	22.5	4.38	3.53	< 2.57	< 2.57	29.6	21.9	< 5.14	< 2.57
North	Fergus Falls	FER	18.2	2.73	10.5	3.07	9.03	10.3	< 2.81	< 3.29	< 2.52	8.1	< 5.68	< 5.68	< 2.29
Central	Flint Hills	FLI	148	< 9.91	23.6	6.86	10	< 2.59	< 2.59	< 2.59	< 2.59	< 5.17	45	57.5	5.21
North	Hibbing	HIB	22	48.1	30.7	8.24	63.5	31.4	7.33	< 3.29	< 2.52	7.2	8.57	12.8	< 2.29
Central	Hutchinson	HUT	35	40.5	40.2	4.87	31.8	< 2.93	3.7	< 3.32	< 2.54	26.6	12.9	42.6	< 2.32
Central	Marathon-Ashland	MAR	79.3	< 6.26	< 6.26	< 6.26	< 6.26	< 6.26	< 6.26	< 6.26	< 6.26	< 12.5	< 12.5	< 12.5	< 6.26
Central	Maynard	MAY	27	4.55	7.82	3.37	15	< 3.10	< 3.00	< 3.51	< 2.69	< 6.01	< 6.07	< 6.07	2.57
Central	Melrose	MEL	13.6	< 2.60	< 2.68	< 2.68	3.54	4.22	< 2.83	< 3.31	< 2.54	< 5.67	< 5.73	< 5.73	< 2.31
Central	Metro Plant	MET-1	120	16	27.4	15	50.5	15.2	7.56	< 2.64	< 2.64	25.7	26.5	110	< 2.64
Central	Metro Plant	MET-2	75.2	12.5	25.9	15	50.4	12.1	6.68	< 2.56	< 2.56	22	25.7	87.4	< 2.56
Central	MSP Airport	MSP-1	23.5	18.8	53.9	31.3	120	18.1	82.8	6.61	8.02	7.17	28.5	23.8	5.82
Central	MSP Airport	MSP-2	41.1	63.2	108	51.8	148	30.4	115	12.5	13	18	74.9	393	< 2.53
Central	Montivedeo	MON	17.8	36.5	14.7	2.86	26.5	3.78	3.29	< 3.30	< 2.52	< 5.64	9.55	< 5.70	< 2.30
South	Morton	MOR-1	< 2.60	< 2.60	< 2.60	< 2.60	3.38	< 2.60	< 2.60	< 2.60	< 2.60	< 5.20	< 5.20	< 5.20	< 2.60
South	Morton	MOR-2	< 4.45	< 4.45	< 4.45	< 4.45	< 4.45	< 4.45	< 4.45	< 4.45	< 4.45	< 8.91	< 8.91	< 8.91	< 4.45
South	Owatonna	OWA	17.9	39.8	20.9	3.73	32.1	< 2.88	4.33	< 3.27	< 2.50	< 5.58	< 5.64	< 6.79	< 2.28
North	Paynesville	PAY	75.6	14.9	19.6	10.6	33.5	9.3	< 4.53	< 5.30	< 4.06	< 9.06	10.8	< 9.16	< 3.70
South	Pipestone	PIP	50.3	6.05	8.16	4.15	18.7	4.41	< 2.93	< 3.42	< 2.62	< 5.85	< 5.92	10.1	2.95
South	Red Wing	RED	53.6	8.79	30.2	4.97	22.7	< 4.76	< 4.61	< 5.39	< 4.13	13.9	20.2	< 12.1	< 3.76
South	Rochester	ROC	31.3	79.2	28.8	45.6	39.9	8.01	5.44	< 3.30	< 2.52	< 5.64	10.9	15.3	3.03
Central	Me.CoSeneca	SEN	42.4	40.1	39.3	13.3	64.1	7.92	4	< 3.28	< 2.51	39.8	53.1	58.5	< 2.29
Central	St. Cloud	STC	43.7	5.66	23.9	4.32	27.1	10.2	< 2.81	< 3.28	< 2.51	12.4	27.7	6.84	< 2.29
Central	Willmar	WIL	36.8	< 2.57	4.99	2.74	5.86	< 2.90	< 2.81	< 3.28	< 2.51	< 5.61	< 5.67	< 11.4	< 2.29
North	WLSSD	WLS	31.1	3.18	6.53	3.48	14.2	8.48	< 2.76	< 3.23	< 2.47	16.2	< 5.58	16	< 2.25
South	Worthington	WOR	14.9	7.36	3.44	< 2.66	6.04	< 2.90	< 2.81	< 3.29	< 2.52	< 5.63	< 5.69	< 5.69	< 2.30

Estimated values based on QA review

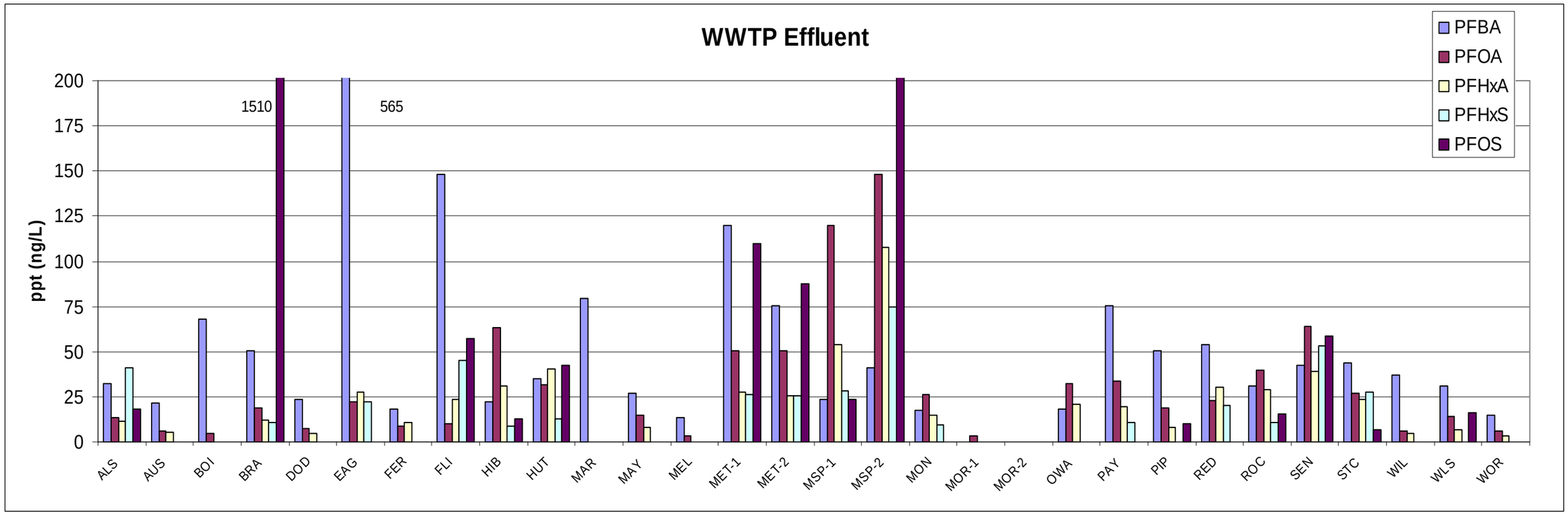


Figure A2. PFCs in WWTP Effluent, 2007.

Table A11. 2007 Wastewater Treatment Plant Sludge (ng/g dry weight)

AREA	PLANT NAME	Sample ID	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnA	PFDoA	PFBS	PFHxS	PFOS	PFOSA	% Moisture
North	ALSSD	ALS	< 4.59	< 4.59	< 4.59	< 4.59	17.3	18.7	13.8	9.76	< 4.59	< 9.18	< 9.18	99	14.2	90.1
South	Austin	AUS	-	< 0.770	< 0.817	< 0.794	1.06	3.89	1.92	< 0.982	< 0.752	< 5.05	< 5.09	< 5.09	< 2.05	96.8
North	BoiseCascade	BOI-A	< 0.194	< 0.194	< 0.194	< 0.194	< 0.194	< 0.194	< 0.194	< 0.194	< 0.194	< 0.389	< 0.389	< 0.389	< 0.194	17.2
North	BoiseCascade	BOI-P	0.254	< 0.191	< 0.191	< 0.191	< 0.191	< 0.191	< 0.191	< 0.191	< 0.191	< 0.382	< 0.382	< 0.382	< 0.191	50.6
North	BoiseCascade	BOI-S	< 0.401	< 1.15	< 0.849	< 0.299	< 0.266	0.45	< 0.201	< 0.201	< 0.201	< 0.818	< 0.703	< 0.713	< 0.201	0.37
North	Brainerd	BRA	< 0.869	< 0.677	3.47	0.877	3.68	20.1	3.99	5.9	2.22	< 11.3	2.77	861	2.98	95
Central	DodgeCenter	DOD	-	1.33	< 0.624	< 0.624	5.6	7.6	18.8	5.16	3.91	< 1.32	2.46	24.6	6.87	95.8
Central	Eagle Point	EAG	2.47	0.617	2.7	< 0.590	6.02	2.21	20.7	4.65	4.65	< 1.25	< 2.58	22.4	4	95.3
North	Fergus Falls	FER	2.74	< 1.33	3.15	< 0.727	4.04	62.7	6.16	11.8	1.43	< 1.45	< 1.45	21.4	3.52	98.1
North	Hibbing	HIB	< 1.80	< 0.799	< 0.778	< 0.752	2.48	2.67	1.72	2.04	2.17	< 2.04	< 1.50	8.18	< 0.752	93.9
Central	Hutchinson	HUT	-	29.4	13	4.73	54.6	10.1	57.2	6.16	11.6	5.6	3.99	304	10.8	97.9
Central	Melrose	MEL	1.56	< 0.595	< 0.676	< 0.532	2.17	6.69	2.82	3.29	0.976	< 1.09	< 1.38	3.94	3.28	94.4
Central	Metro Plant	MET-1	7.27	4.52	6.58	< 2.73	24.5	23.3	36.9	19.2	19.2	< 5.46	< 8.33	267	16.3	98.7
Central	Metro Plant	MET-2	10.6	3.72	9.8	< 3.31	22.9	14.3	29.7	15.3	13.6	< 6.62	< 15.0	261	12.3	98.7
Central	Montivedeo	MON	-	4.17	2.88	1.03	19	22.4	73.5	15.6	13	< 2.39	3.45	39.7	28	96.7
South	Owatonna	OWA		4.48	17	3.05	32.1	4.13	89.1	3.55	11.7	< 4.23	< 3.95	30.8	17.4	96.1
South	Red Wing	RED	-	< 0.941	2.97	< 0.970	3.14	2.86	2.93	< 1.20	< 0.919	< 6.17	< 6.22	< 6.22	< 2.51	97.4
South	Rochester	ROC	1.65	< 0.633	0.952	< 0.633	3.76	3.31	6.29	2.64	2.06	< 3.21	4.83	21.2	3.88	93
Central	Me.CoSeneca	SEN	-	< 0.493	1.12	0.548	6.8	3.59	10.7	3.81	2.19	< 3.23	< 3.26	141	4.53	94.9
Central	St. Cloud	STC	< 0.792	< 1.03	4.55	< 0.792	7.32	4.89	15.7	3.86	1.39	< 5.32	3.59	20.4	2.4	96.6
Central	Willmar	WIL	-	< 0.958	1.85	1.29	3.1	5.87	2.24	1.93	< 0.936	< 6.28	< 6.34	< 6.34	< 2.56	97.5
North	WLSSD	WLS	6.75	< 1.85	< 1.85	< 1.85	4.43	4.12	4.72	4.24	< 1.85	< 4.14	< 3.69	18.7	11.5	98
South	Worthington	WOR	-	4.46	< 2.38	< 2.38	3.24	< 2.60	3.86	< 2.95	< 2.25	< 5.05	< 5.09	8.88	3.72	98.9

Estimated values based on QA review

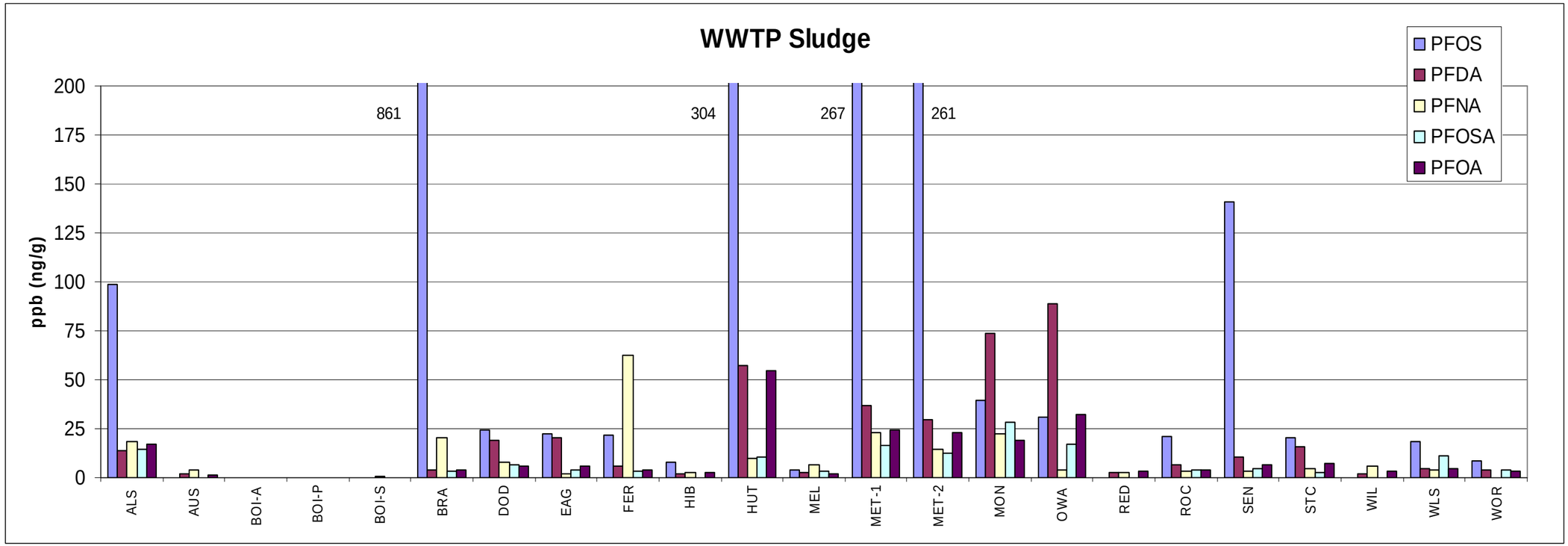


Figure A3. PFCs in WWTP Sludge, 2007.

Table A12. 2008 Wastewater Treatment Plant Influent in (ng/L)

		CLIENT ID	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnA	PFDoA	PFBS	PFHxS	PFOS	PFOSA
ALL	Albert Lea	PF-ALL-IN	< 6.10	< 3.90	14.7	< 3.90	< 3.90	< 3.90	< 3.90	< 3.90	< 3.90	< 7.80	< 7.80	< 7.80	< 3.90
ALX	Alexandria Lakes Area	PF-ALX-IN	< 4.63	< 6.47	22.5	6.65	10.8	4.09	< 3.33	< 3.33	< 3.33	< 6.66	15.9	< 6.66	< 3.33
AUS	Austin	PF-AUS-IN	< 5.07	< 5.07	< 5.07	< 5.07	< 5.07	< 5.07	< 5.07	< 5.07	< 5.07	< 10.1	< 10.1	33.5	< 5.07
BIG	Big Lake	PF-BIG-IN	14.2	< 3.05	10.6	16	422	< 2.59	< 2.59	< 2.59	< 2.59	< 5.18	< 5.18	< 5.18	< 2.59
BRD	Brainerd	PF-BRD-IN	< 6.62	< 11.8	8.75	< 5.73	6.9	< 7.81	< 5.73	< 5.73	< 5.73	< 11.5	< 11.5	29.5	< 5.73
CNF	Cannon Falls	PF-CNF-IN	7.17	< 6.94	< 3.42	< 3.42	38.4	< 3.42	< 3.42	< 3.42	< 3.42	< 6.84	< 6.84	< 6.84	< 3.42
CRK	Crookston	PF-CRK-IN	< 2.52	< 2.79	34.2	10.4	25	25.4	6.51	< 2.52	< 2.52	< 5.04	< 5.04	11.7	3.03
DDC	Dodge Center	PF-DDC-IN	9.17	< 6.81	8.36	< 2.58	3.23	< 2.58	< 2.58	< 2.58	< 2.58	< 5.16	< 5.16	32.2	< 2.58
EVL	Eveleth	PF-EVL-IN	4.93	< 7.92	< 3.57	< 3.57	6.84	< 3.57	< 3.57	< 3.57	< 3.57	< 7.13	< 7.13	< 7.13	< 3.57
FAR	Faribault	PF-FAR-IN	9.92	< 2.56	< 2.56	< 2.56	7.19	< 2.56	< 2.56	< 2.56	< 2.56	< 5.11	< 5.11	< 5.11	< 2.56
FHR	Flint Hills Resources LP	PF-FHR-IN	NQ	487	< 14.7	< 7.91	< 2.80	< 2.80	< 2.80	< 2.80	< 2.80	130	18.1	43.5	< 2.80
GRR	Grand Rapids	PF-GRR-IN	<3.88	<12.1	<6.19	<19.8	<6.19	<6.19	<6.19	<6.19	<6.19	<12.4	<12.4	<12.4	<6.19
HIB	Hibbing	PF-HIB-IN	3.26	< 4.13	6.99	< 4.18	26.7	< 2.61	< 2.61	< 2.61	< 2.61	< 5.23	< 5.23	< 5.23	< 2.61
HUT	Hutchinson	PF-HUT-IN	24.6	< 8.18	11.5	< 5.48	< 5.48	< 5.48	< 5.48	< 5.48	< 5.48	< 11.0	11.2	19.8	< 5.48
ISL	Isle	PF-ISL-IN	7.86	< 3.30	5.11	< 3.30	3.95	< 3.30	< 3.30	< 3.30	< 3.30	< 6.59	< 6.59	< 6.59	< 3.30
LES	Le Sueur/Henderson	PF-LES-IN	< 6.02	< 6.02	< 6.02	< 6.02	98.9	< 6.02	< 6.02	< 6.02	< 6.02	< 12.0	< 12.0	< 12.0	< 6.02
MSP	MAC – Minneapolis/St. Paul Intl Airport														
MAN	Mankato	PF-MAN-IN	< 5.31	< 5.38	12.1	< 5.31	31.6	7.77	< 5.31	< 5.31	< 5.31	< 10.6	< 10.6	< 10.6	< 5.31
MPL	Maple Lake	PF-MPL-IN	8.03	< 2.54	4.93	< 2.54	< 4.05	< 2.54	< 2.54	< 2.54	< 2.54	< 5.08	< 8.59	< 5.08	< 2.54
EAP	Met Council – Eagles Point	PF-EAP-IN	401	18.8	13.8	< 5.36	14	< 5.36	< 5.36	< 5.36	< 5.36	< 10.7	< 10.7	34	< 5.36
MWP	Met Council – Metropolitan	PF-MWP-IN	58.3	< 8.70	10.8	< 6.05	16.1	< 6.05	< 6.05	< 6.05	< 6.05	< 12.1	< 12.1	16.4	< 6.05
RMT	Met Council – Rosemount	PF-RMT-IN	25.2	6.05	7.37	< 5.78	10.2	< 5.78	< 5.78	< 5.78	< 5.78	< 11.6	< 11.6	< 11.6	< 5.78
SEN	Met Council – Seneca	PF-SEN-IN	10.3	< 7.30	13.4	11.3	40.5	< 7.30	< 7.30	< 7.30	< 7.30	< 14.6	23.7	< 14.6	< 7.30
MON	Montevideo	PF-MON-IN	< 4.73	< 5.08	7.62	< 4.73	12	5.57	< 4.73	< 4.73	< 4.73	19.2	< 9.46	< 9.46	< 4.73
MOR	Moorhead	PF-MOR-IN	< 6.02	< 13.4	< 6.02	< 6.02	6.4	< 6.02	< 6.02	< 6.02	< 6.02	< 12.0	< 12.0	< 12.0	< 6.02
NUM	New Ulm	PF-NUM-IN	< 5.10	< 5.10	6.29	< 5.10	< 5.10	< 5.10	< 5.10	< 5.10	< 5.10	< 10.2	< 10.2	< 10.2	< 5.10
OWA	Owatonna	PF-OWA-IN	4.98	< 3.18	7.6	4.97	9.61	< 3.18	< 3.18	< 3.18	< 3.18	< 6.37	< 6.37	< 6.37	< 3.18
PAY	Paynesville	PF-PAY-IN	9.92	< 5.65	< 5.10	7.82	6.8	5.88	< 5.10	< 5.10	< 5.10	< 10.2	< 10.2	< 10.2	< 5.10
PNI	Pine Island	PF-PNI-IN	7.49	< 5.32	2.93	< 2.56	7.38	< 2.56	< 2.56	< 2.56	< 2.56	< 5.12	< 5.12	176	< 2.56
PRN	Princeton	PF-PRN-IN	21.4	< 6.63	3.67	< 2.79	4.17	< 3.36	< 2.79	< 2.79	< 2.79	< 5.58	< 5.58	< 5.58	< 2.79
ROC	Rochester (dups)	PF-ROC-INA	3.48	< 6.25	6.11	3.44	4.59	< 2.56	< 2.56	< 2.56	< 2.56	< 5.13	< 5.13	< 5.13	< 2.56
ROY	Royalton														
SIL	Silver Lake	PF-SIL-IN	< 4.78	< 6.13	< 4.78	< 4.78	5.18	< 5.64	< 4.78	< 4.78	< 4.78	< 9.57	< 9.57	36.4	< 4.78
STC	St. Cloud	PF-STC-IN	7.38	< 4.27	9.63	6.58	6.98	3.06	< 2.61	< 2.61	< 2.61	< 5.22	< 5.22	12.2	< 2.61
STJ	St. James	PF-STJ-IN	< 4.86	< 5.87	< 6.04	< 4.86	< 4.86	< 4.86	< 4.86	< 4.86	< 4.86	21.8	< 9.73	27.4	< 4.86
WAB	Wabasha	PF-WAB-IN	20.3	< 8.92	6.16	< 2.72	8.85	< 2.72	< 2.72	< 2.72	< 2.72	< 5.44	< 5.44	15.9	< 2.72
WAR	Warroad	PF-WAR-IN	< 3.47	< 2.60	21.7	5.2	16.3	5.51	< 2.60	< 2.60	< 2.60	< 5.21	< 5.21	< 5.21	< 2.60
WIN	Winona	PF-WIN-IN	12.7	4.18	10	5.04	13.5	< 2.72	< 2.72	< 2.72	< 2.72	< 5.43	12.2	8.63	< 2.72
WLS	WLSSD	PF-WLS-IN	< 16.8	< 12.0	< 12.0	< 12.0	< 12.0	< 12.0	< 12.0	< 12.0	< 12.0	< 24.0	< 24.0	< 24.0	< 12.0
XCL	Xcel Energy - Prairie Island Nuclear	PF-XCL-IN	20.3	< 3.38	5.47	< 2.50	5.53	< 2.50	< 2.50	< 2.50	< 2.50	< 4.99	< 4.99	< 4.99	< 2.50

not sampled
*Estimated value

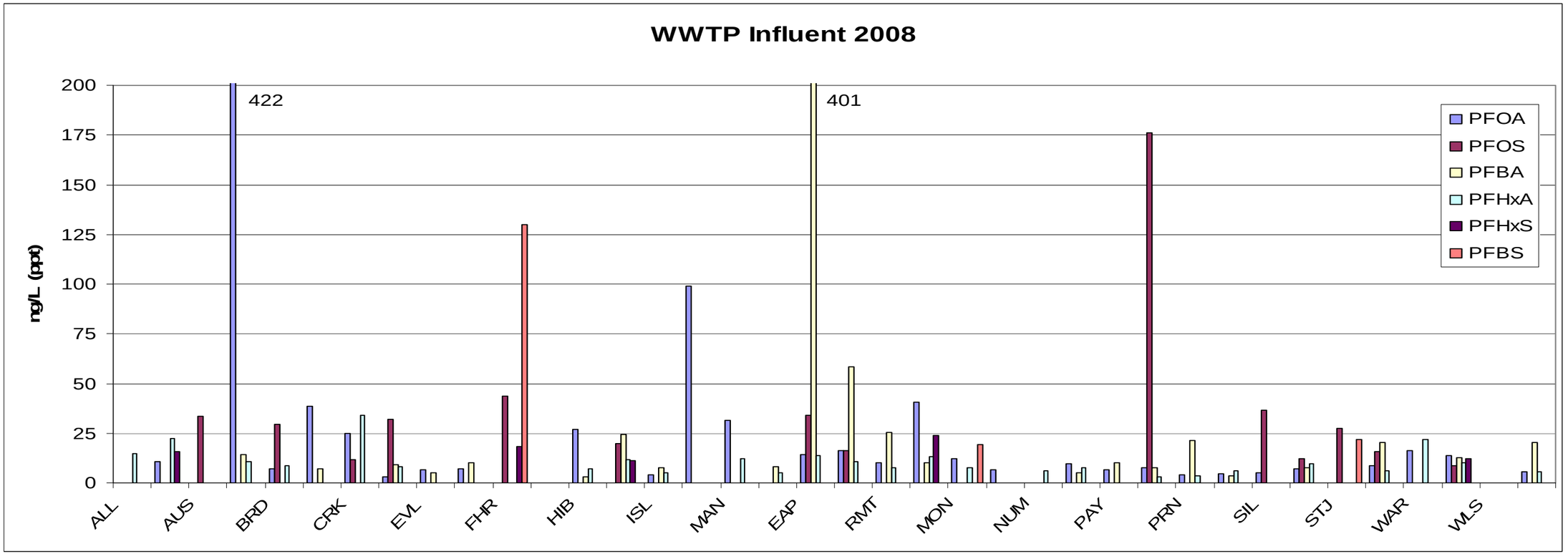


Figure A4. PFCs in WWTP Influent, 2008.

Table A13. 2008 Wastewater Treatment Plant Effluent in (ng/L)

		CLIENT ID	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnA	PFDoA	PFBS	PFHxS	PFOS	PFOSA
ALL	Albert Lea	PF-ALL-EF	4.06	5.79	10.1	3.96	8.48	2.77	< 2.45	< 2.45	< 2.45	< 4.91	< 4.91	< 4.91	< 2.45
ALX	Alexandria Lakes Area	PF-ALX-EF	5.4	12.6	37.7	7.31	30.5	7.36	< 2.57	< 2.57	< 2.57	< 5.15	23.8	9.46	< 2.57
AUS	Austin	PF-AUS-EF	3.51	7.28	6.04	2.92	5.72	< 2.46	< 2.46	< 2.46	< 2.46	< 4.91	< 4.91	< 4.91	< 2.46
BIG	Big Lake	PF-BIG-EF	18.1	45.4	41.1	6.44	49	< 5.02	< 5.02	< 5.02	< 5.02	17.6	< 10.0	< 10.0	5.98
BRD	Brainerd	PF-BRD-EF	< 7.56	< 4.86	7.41	< 5.72	8.82	6.45	< 4.86	< 4.86	< 4.86	< 9.72	< 9.72	45	< 4.86
CNF	Cannon Falls	PF-CNF-EF	4.11	9.16	24.3	17.5	17.1	7.13	< 2.58	< 2.58	< 2.58	< 5.17	< 5.17	< 5.17	< 2.58
CRK	Crookston	PF-CRK-EF	< 10.5	< 10.3	45.8	10.6	33.3	33.3	5.25	< 2.67	< 2.67	< 5.34	21.1	8.02	2.89
DDC	Dodge Center	PF-DDC-EF	7.79	< 2.62	7.07	4.9	12.2	< 2.62	< 2.62	< 2.62	< 2.62	< 5.25	< 5.25	< 5.25	< 2.62
EVL	Eveleth	PF-EVL-EF	3.94	< 4.25	3.05	2.6	9.48	< 2.48	< 2.48	< 2.48	< 2.48	< 4.95	< 4.95	< 4.95	< 2.48
FAR	Faribault	PF-FAR-EF	< 6.14	2.83	5.02	< 2.61	5.66	< 2.61	< 2.61	< 2.61	< 2.61	< 5.22	< 5.22	< 5.22	< 2.61
FHR	Flint Hills Resources LP	PF-FHR-EF	128	< 5.50	12.2	5.87	5.48	< 2.63	< 2.49	< 2.49	< 2.49	18.5	42.9	32.5	3.06
GRR	Grand Rapids	PF-GRR-EF	7.38	<11	<3.48	<16.7	6.52	<2.58	<2.58	<2.58	<2.58	<5.16	<5.16	<5.16	<2.58
HIB	Hibbing	PF-HIB-EF	4.38	< 2.48	11.4	5.91	18.6	5.66	3.72	< 2.48	< 2.48	10.1	< 4.95	< 4.95	< 2.48
HUT	Hutchinson	PF-HUT-EF	7.19	9.52	22.7	4.5	20.4	< 2.55	< 2.55	< 2.55	< 2.55	5.39	11	52.3	< 2.55
ISL	Isle	PF-ISL-EF	15.7	15.7	69.1	19.2	43.8	20.2	9.51	< 4.95	< 4.95	< 9.91	< 9.91	13.8	< 4.95
LES	Le Sueur/Henderson	PF-LES-EF	31.1	< 4.84	6.34	< 5.53	11.9	4.18	< 2.52	< 2.52	< 2.52	< 5.04	< 5.04	< 5.04	< 2.52
MSP	MAC – Minneapolis/St. Paul Intl Airport	PF-MSP-P1	19.2	38.1	79.2	34.1	91.1	20.1	50.4	5.63	3.01	< 5.03	19.2	40.9	< 2.51
MSP	MAC – Minneapolis/St. Paul Intl Airport	PF-MSP-P2	9.78	11.6	25.9	9.89	33	50.3	12.2	20.4	2.84	5.62	27.2	60.3	2.84
MAN	Mankato	PF-MAN-EF	9.17	34	56	11.2	63.3	4.89	2.63	< 2.54	< 2.54	16.6	< 5.08	< 5.08	< 2.54
MPL	Maple Lake	PF-MPL-EF	7.23	< 2.78	6.72	3.42	3.98	< 2.58	< 2.58	< 2.58	< 2.58	20.4	< 5.15	< 5.15	< 2.58
EAP	Met Council – Eagles Point	PF-EAP-EF	541	18	34	13.1	34.5	3.8	< 2.60	< 2.60	< 2.60	53.2	105	489	< 2.60
MWP	Met Council – Metropolitan	PF-MWP-EF	61.1	11.1	28.7	17.8	43.5	60.6	4.8	9.38	< 2.57	19.8	13	80.2	< 2.57
RMT	Met Council – Rosemount	PF-RMT-EF	130	17.8	36.9	19.3	99.5	8.28	< 5.39	< 5.39	< 5.39	21	15.1	18.3	< 5.39
SEN	Met Council – Seneca	PF-SEN-EF	13.1	10.9	32.3	12.5	28.3	9.42	3.18	< 2.54	< 2.54	21.1	20.5	32.9	< 2.54
MON	Montevideo	PF-MON-EF	5.23	14.5	21.6	3.46	21.1	4.38	< 2.57	< 2.57	< 2.57	26.2	< 5.14	< 5.14	< 2.57
MOR	Moorhead	PF-MOR-EF	< 3.84	8.71	26	6.53	26.4	5.7	< 2.48	< 2.48	< 2.48	< 4.95	11.9	15.8	< 2.48
NUM	New Ulm	PF-NUM-EF	27.7	48.2	71.4	25.7	53	< 2.59	< 2.59	< 2.59	< 2.59	< 5.19	< 5.19	< 5.19	< 2.59
OWA	Owatonna	PF-OWA-EF	10.4	34.7	59.5	9.35	84.5	2.58	7	< 2.51	< 2.51	7.24	< 5.03	< 5.03	< 2.51
PAY	Paynesville	PF-PAY-EF	< 11.8	< 5.82	27.7	8.62	33.9	9.45	4	< 2.52	< 2.52	< 5.03	< 5.03	7.84	< 2.52
PNI	Pine Island	PF-PNI-EF	6	5.21	7.18	< 5.05	11.6	< 5.05	< 5.05	< 5.05	< 5.05	267	< 10.1	545	< 5.05
PRN	Princeton	PF-PRN-EF	9.19	26.5	34	6.02	34.1	< 2.57	3.83	< 2.57	< 2.57	5.44	< 5.15	< 5.15	< 2.57
ROC	Rochester	PF-ROC-EFA	12.8	31.7	40.7	30.2	37	7.9	4.1	< 2.49	< 2.49	13.8	< 4.97	< 4.97	< 2.49
ROY	Royalton	PF-ROY-EF	6.77	<4.94	<4.94	<4.94	<4.94	<4.94	<4.94	<4.94	<4.94	<9.87	<9.87	<9.87	<4.94
SIL	Silver Lake	PF-SIL-EF	< 4.65	< 5.30	10.6	4.84	17.8	4.88	< 3.27	< 3.27	< 3.27	< 6.55	8.83	20.5	< 3.27
STC	St. Cloud	PF-STC-EF	16.5	< 4.73	42.5	< 5.01	26.7	6.14	2.75	< 2.53	< 2.53	< 5.06	11	11	< 2.53
STJ	St. James	PF-STJ-EF	7.33	16.2	11.8	4.63	10.3	< 2.53	< 2.53	< 2.53	< 2.53	47.3	< 5.06	91.5	< 2.53
WAB	Wabasha	PF-WAB-EF	18.4	18.3	18.2	5.15	25.4	< 2.54	< 2.54	< 2.54	< 2.54	5.93	< 5.09	5.24	2.76
WAR	Warroad	PF-WAR-EF	4.41	< 4.42	47.6	13	21	8.13	< 2.48	< 2.48	< 2.48	< 4.96	< 4.96	6	4.32
WIN	Winona	PF-WIN-EF	10.8	5.79	22.1	3.64	20.9	2.98	< 2.64	< 2.64	< 2.64	< 5.28	14.5	16.4	< 2.64
WLS	WLSSD	PF-WLS-EF	29.6	< 5.88	11.5	10.5	21.7	6.1	4.37	< 2.48	< 2.48	39.1	< 4.97	15.2	< 2.48
XCL	Xcel Energy - Prairie Island Nuclear	PF-XCL-OUT	20.1	5.21	3.9	< 2.50	4.95	< 3.02	< 2.50	< 2.50	< 2.50	< 4.99	< 4.99	< 4.99	< 2.50

*Estimated value

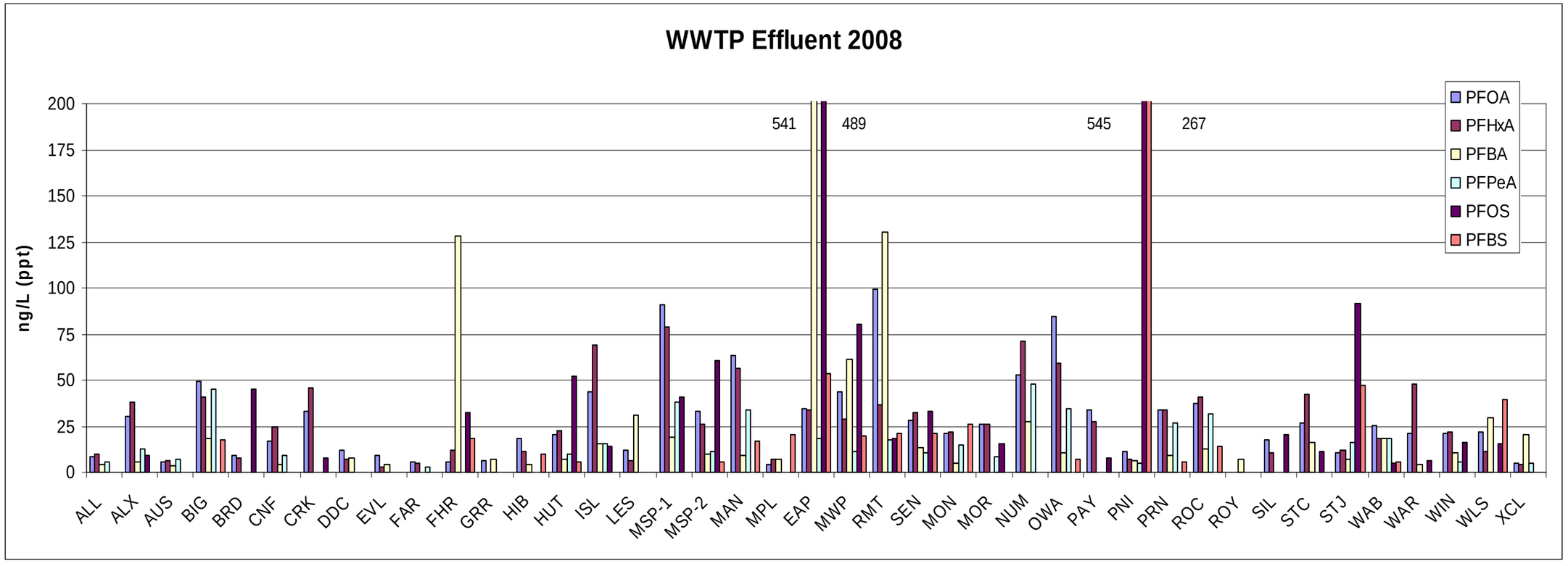


Figure A5. PFCs in WWTP Effluent, 2008.

Table A14. 2008 Wastewater Treatment Plant Sludge in (ng/g)

		CLIENT ID	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnA	PFDoA	PFBS	PFHxS	PFOS	PFOSA	% Moisture
ALL	Albert Lea	PF-ALL-SL	< 3.36	< 3.36	< 3.36	< 3.36	5.9	6.78	14.7	4.95	3.45	< 6.71	< 6.71	18.5	14	99.3
ALX	Alexandria Lakes Area															
AUS	Austin	PF-AUS-SL	< 0.748	< 0.748	< 0.748	< 0.748	< 0.748	1.45	0.955	< 0.932	< 1.96	< 1.50	< 1.51	4.15	< 0.748	96.7
BIG	Big Lake															
BRD	Brainerd	PF-BRD-SL	<5.17	<5.17	10.6	<5.17	<5.17	11.6	5.89	10	5.19	<10.3	<10.3	442	<5.17	98.1
CNF	Cannon Falls															
CRK	Crookston															
DDC	Dodge Center															
EVL	Eveleth															
FAR	Faribault															
FHR	Flint Hills Resources LP															
GRR	Grand Rapids															
HIB	Hibbing															
HUT	Hutchinson	PF-HUT-SL	< 9.37	15.3	21.1	< 9.37	35.4	< 9.37	< 9.37	< 9.37	< 9.37	< 18.7	< 18.7	< 18.7	< 9.37	analyzed as aqueous sample
ISL	Isle															
LES	Le Sueur/Henderson															
MSP	MAC – Minneapolis/St. Paul Intl Airport															
MAN	Mankato	PF-MAN-SL	3.31	< 1.85	15.9	1.95	17.4	4.38	13.1	3.61	9.95	< 2.24	13.1	88.4	24.8	97.8
MPL	Maple Lake															
EAP	Met Council – Eagles Point															
MWP	Met Council – Metropolitan	PF-MWP-SL	9.2	< 2.31	8.27	3.87	14.2	49.7	17.3	297	11.2	< 4.61	4.98	253	19.4	98.9
RMT	Met Council – Rosemount															
SEN	Met Council – Seneca	PF-SEN-SL	< 0.512	< 0.551	5.5	1.26	9.15	9.86	26.3	13.5	10.2	< 1.02	11.4	350	6.04	95.1
MON	Montevideo	PF-MON-SL	< 1.67	< 1.67	3.18	< 1.67	15.9	31.7	51	41.5	16	< 3.35	< 3.35	36.4	23.4	98.5
MOR	Moorhead															
NUM	New Ulm	PF-NUM-SL	4.42	< 4.46	19.2	6.82	27.7	4.09	24.1	6.42	7.3	< 2.63	3.42	18.5	6.96	98.1
OWA	Owatonna															
PAY	Paynesville															
PNI	Pine Island															
PRN	Princeton															
ROC	Rochester	PF-ROC-SLA	0.43	< 0.321	1.82	< 0.321	3.75	4.92	13.6	4.73	6.16	< 0.641	< 5.23	7.42	2.42	92.2
ROY	Royalton															
SIL	Silver Lake															
STC	St. Cloud	PF-STC-SL	< 0.760	< 0.760	11.3	< 1.25	6.91	6.84	11	4.08	5.1	< 1.52	< 5.08	11.6	1.35	96.8
STJ	St. James	PF-STJ-SL	< 0.674	< 0.674	1.45	< 0.674	1.8	0.814	5.88	3.09	5.85	< 1.35	1.7	252	8.53	96.3
WAB	Wabasha															
WAR	Warroad															
WIN	Winona	PF-WIN-SL	< 4.48	< 3.46	12.3	< 1.79	14	26.3	23.4	12.7	15.4	< 3.58	6.6	91.1	6.94	98.6
WLS	WLSSD	PF-WLS-SL	< 0.848	< 0.848	1.94	< 0.848	3.2	3.3	5.14	4.48	2.14	< 1.70	< 1.70	16	1.31	70.7
XCL	Xcel Energy - Prairie Island Nuclear															

not sampled
*Estimated value

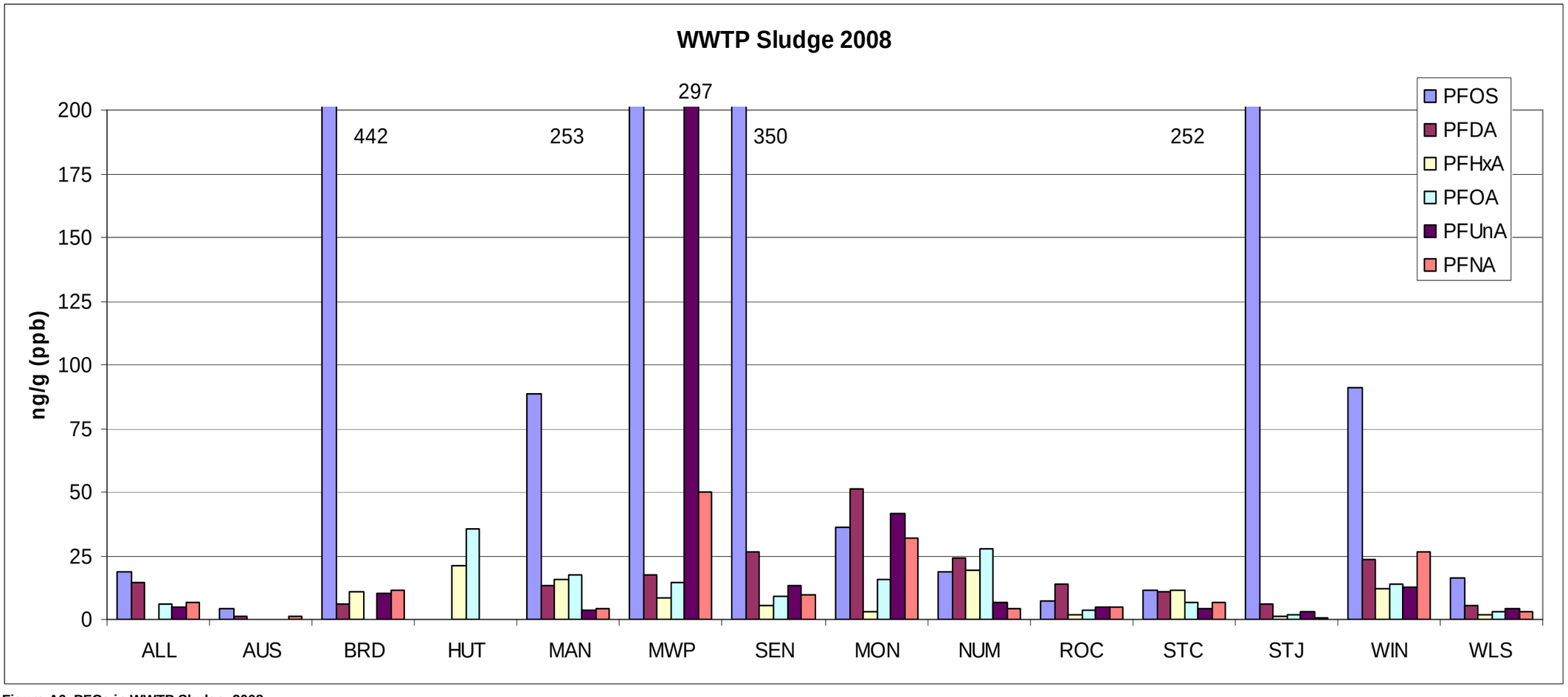


Figure A6. PFCs in WWTP Sludge, 2008.

Table A15. Draft Results from Red Rock Road Air Sampling Site

Sample 4	96hrs Filter *	96hrs Front puf/xad **	96hrs Back puf ***	Particulate	Gaseous	Total Air Concentration
UNITS	ng/sample	ng/sample	ng/sample	pg/m^3	pg/m^3	pg/m^3
PFBA	< 0.500	13.06	1.32	ND	11.4	11.4
PFPeA	< 0.500	0.542	< 0.500	ND	0.4	0.4
PFHxA	< 0.500	1.95	< 0.500	ND	1.6	1.6
PFHpA	< 0.500	0.542	< 0.500	ND	0.4	0.4
PFOA	2.77	20.2	< 0.500	2.2	16.1	18.3
PFNA	< 0.500	0.526	11.4	ND	9.5	9.5
PFDA	< 0.500	< 0.500	< 0.500	ND	ND	ND
PFUnA	< 0.500	< 0.500	< 0.500	ND	ND	ND
PFDoA	< 0.500	< 0.500	< 0.500	ND	ND	ND
PFBS	< 1.00	< 1.00	< 1.00	ND	ND	ND
PFHxS	< 1.00	< 1.00	< 1.00	ND	ND	ND
PFOS	2.63	2.29	< 1.00	2.1	1.8	3.9
PFOSA	< 0.500	1.7	< 0.500	ND	1.4	1.4

Total sample air volume was 1257.9 m^3 air

Sample 5	96hrs Filter *	96hrs Front puf/xad raw	96hrs Front puf/xad **	96hrs Back puf ***	96hrs Total	Total air volume	Particulate	Gaseous	Total Air Concentration
UNITS	ng/sample	ng/sample	ng/sample	ng/sample	ng/sample	m^3 Air	pg/m^3	pg/m^3	pg/m^3
PFBA	< 0.500	19.9	18.56	1.04	19.60	1252.1	ND	15.7	15.7
PFPeA	< 0.500	0.627	0.627	< 0.500	0.63	1252.1	ND	0.5	0.5
PFHxA	< 0.500	1.01	1.01	< 0.500	1.01	1252.1	ND	0.8	0.8
PFHpA	< 0.500	0.554	0.554	< 0.500	0.55	1252.1	ND	0.4	0.4
PFOA	2.84	2.92	2.92	< 0.500	5.76	1252.1	2.3	2.3	4.6
PFNA	< 0.500	5.43	5.43	5.71	11.14	1252.1	ND	8.9	8.9
PFDA	< 0.500	< 0.500	< 0.500	< 0.500	< 0.5	1252.1	ND	ND	ND
PFUnA	< 0.500	< 0.500	< 0.500	< 0.500	< 0.5	1252.1	ND	ND	ND
PFDoA	< 0.500	< 0.500	< 0.500	< 0.500	< 0.5	1252.1	ND	ND	ND
PFBS	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	1252.1	ND	ND	ND
PFHxS	< 1.00	5.49	5.49	< 1.00	5.49	1252.1	ND	4.4	4.4
PFOS	3.22	2.72	2.72	< 1.00	5.94	1252.1	2.6	2.2	4.7
PFOSA	< 0.500	< 0.500	< 0.500	< 0.500	< 0.5	1252.1	ND	ND	ND

Total sample air volume was 1252.1 m^3 air

Sample 6	72hrs Filter *	72hrs Front puf/xad **	72hrs Back puf ***	Particulate	Gaseous	Total Air Concentration
UNITS	ng/sample	ng/sample	ng/sample	pg/m^3	pg/m^3	pg/m^3
PFBA	< 0.500	10.66	1.07	ND	12.4	12.4
PFPeA	< 0.515	0.653	< 0.500	ND	0.7	0.7
PFHxA	< 0.500	1.06	< 0.500	ND	1.1	1.1
PFHpA	< 0.500	0.636	< 0.500	ND	0.7	0.7
PFOA	1.82	6.21	< 0.500	1.9	6.6	8.5
PFNA	< 0.500	6.56	5.49	ND	12.7	12.7
PFDA	< 0.500	< 0.500	< 0.500	ND	ND	ND
PFUnA	< 0.500	< 0.500	< 0.500	ND	ND	ND
PFDoA	< 0.500	< 0.500	< 0.500	ND	ND	ND
PFBS	< 1.00	< 1.00	< 1.00	ND	ND	ND
PFHxS	< 1.11	< 1.00	< 1.00	ND	ND	ND
PFOS	6.46	2.19	< 1.00	6.8	2.3	9.1
PFOSA	< 0.500	0.926	< 0.500	ND	1.0	1.0

Total sample air volume was 945.8 m^3 air

Sample 7	72hrs Filter *	72hrs Front puf/xad raw	72hrs Front puf/xad **	72hrs Back puf ***	72hrs Total	Total air volume	Particulate	Gaseous	Total Air Concentration
UNITS	ng/sample	ng/sample	ng/sample	ng/sample	ng/sample	m^3 Air	pg/m^3	pg/m^3	pg/m^3
PFBA	< 0.500	13.1	11.76	1.96	13.72	937.8	ND	14.6	14.6
PFPeA	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	937.8	ND	ND	ND
PFHxA	< 0.500	2.13	2.13	< 0.500	2.13	937.8	ND	2.3	2.3
PFHpA	< 0.500	< 0.500	< 0.500	0.515	< 0.500	937.8	ND	ND	ND
PFOA	4.78	13.4	13.4	< 0.500	18.18	937.8	5.1	14.3	19.4
PFNA	< 0.500	6.46	6.46	7.12	13.58	937.8	ND	14.5	14.5
PFDA	< 0.500	< 0.500	< 0.500	1.1	< 0.5	937.8	ND	1.2	1.2
PFUnA	< 0.500	< 0.500	< 0.500	< 0.500	< 0.5	937.8	ND	ND	ND
PFDoA	< 0.500	< 0.500	< 0.500	< 0.500	< 0.5	937.8	ND	ND	ND
PFBS	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	937.8	ND	ND	ND
PFHxS	< 1.54	< 1.98	< 1.00	< 1.00	< 1.00	937.8	ND	ND	ND
PFOS	6.31	2.21	2.21	< 1.00	8.52	937.8	6.7	2.4	9.1
PFOSA	< 0.500	0.745	0.745	< 0.500	0.75	937.8	ND	0.8	0.8

Total sample air volume was 937.8 m^3 air

* Filter: Front end fiberglass filter captures most particulates and aerosols

** Front puf/xad: This section of sampling train will capture all PFCs in gaseous form and any ultra fine particles that may escape capture on filter. Blank-corrected.

*** Back puf: Secondary polyurethane packing designed to capture any breakthough of gaseous PFCs from front puf/xad. May also be used as a QC indicator of overall collection efficiency

Table A15. Continued

Sample 8	72hrs Filter *	72hrs Front puf/xad **	72hrs Back puf ***	Particulate	Gaseous	Total Air Concentration
UNITS	ng/sample	ng/sample	ng/sample	pg/m^3	pg/m^3	pg/m^3
PFBA	< 0.500	7.46	1.07	ND	8.6	8.6
PFPeA	< 0.500	< 0.500	< 0.500	ND	ND	ND
PFHxA	< 0.500	0.955	< 0.500	ND	1.0	1.0
PFHpA	< 0.500	0.636	< 0.500	ND	0.6	0.6
PFOA	1.62	1.67	< 0.500	1.6	1.7	3.3
PFNA	< 0.500	8.7	5.49	ND	14.3	14.3
PFDA	< 0.500	1.87	< 0.500	ND	ND	1.9
PFUnA	< 0.500	< 0.500	< 0.500	ND	ND	ND
PFDoA	< 0.500	< 0.500	< 0.500	ND	ND	ND
PFBS	< 1.00	< 1.00	< 1.00	ND	ND	ND
PFHxS	< 1.00	< 1.00	< 1.00	ND	ND	ND
PFOS	7.83	4.96	< 1.00	7.9	5.0	12.9
PFOSA	< 0.500	< 0.500	< 0.500	ND	ND	ND

Total sample air volume was 991.8 m^3 air

* Filter: Front end fiberglass filter captures most particulates and aerosols

** Front puf/xad: This section of sampling train will capture all PFCs in gaseous form and any ultra fine particles that may escape capture on filter. Blank-corrected.

*** Back puf: Secondary polyurethane packing designed to capture any breakthough of gaseous PFCs from front puf/xad. May also be used as a QC indicator of overall collection efficiency

Appendix B

Sources, Fate, and Transport of PFCs in the Environment

Direct Sources of Perfluorinated Chemicals to the Environment

The variety and number of fluorinated compounds currently in production comprise an enormous group of chemicals including drugs, anesthetics, chemotherapeutic agents, many pesticides, and refrigerants, as well polymers such as Teflon® and Goretex® [1]. The environmental fate of most of these compounds is unknown.

This summary is focused primarily on perfluorinated surfactants which include perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) and related compounds that have been the focus of intense environmental study. Perfluorinated surfactants are consistently detected in almost every surface and ground water sample and are almost always found in wildlife and humans. While it is clear that these are not naturally occurring compounds – they are entirely human-made – how these compounds have become so widely distributed in our environment in often very remote locations is less understood. Studies have shown that PFOA, for example, is likely "ubiquitous in the northern hemisphere" without a clear source of that widespread contamination [2]

The direct release of these compounds to the environment through manufacturing processes represents one route of exposure to chemicals like PFOA or PFOS. However, several recent studies show that they can also be generated through the degradation of other fluorinated compounds or products that are not of serious environmental concern.

Fluorinated surfactants are synthesized via two primary methods: through electrochemical fluorination (ECF) or through a telomerization manufacturing process[1, 3]. ECF is the process that 3M uses to produce fluorinated compounds. This process begins with sulfonyl fluorides, fluoroalkyl iodides, or carbonyl fluorides, and results in numerous perfluorinated carbon (PFC) compound isomers and byproducts. It results in isomeric mixtures of PFC that are typically 30% branched isomers and 70% straight carbon chain isomers [1, 3]. ECF was used to produce the fluorinated surfactants PFOA and PFOS, non-volatile perfluorinated surfactants that are used in fire-fighting foams (aqueous film-forming foams, or AFFF), paints, polishes, films, and lubricants. ECF is the only process used to directly produce PFOA and PFOS, with over 6 million pounds produced in 2000 [3].

The major contributors to environmental loads appear to be direct sources from the use of PFOA and the ammonia salts of perfluorononanoic acid (PFNA) in fluoropolymer manufacturing [4]. The chemicals produced through ECF from sulfonyl fluorides include PFOS, *N*-methylperfluorooctanesulfonamidoethanol (*N*-MeFOSE), and *N*-ethylperfluorooctanesulfonamidoethanol (*N*-EtFOSE)[1, 3]. The latter two volatile sulfonamide alcohols are themselves building blocks for a variety of polymers, chemical intermediates, and other perfluoroalkyl substances, and were used to produce carpet treatments and paper coating materials[3]. Due to their volatility, *N*-MeFOSE, and *N*-EtFOSE have been found in atmospheric samples.

A primary use of fluorinated chemicals is in the synthesis of fluorinated polymers. Polyfluoroalkylphosphate surfactants (PAPs), for example, are produced from *N*-EtFOSE and have been used in food contact paper products since 1974. *N*-MeFOSE was the primary ingredient in the production of polymers used for coating fabrics and carpets, such

as 3M's ScotchGard® products [5]. sOf the compounds produced through the ECF process, 3% were used in fire-fighting foams, 10% were used as industrial surfactants and coatings, 37% were used in textile, leather, and carpet coatings, and 41% of fluorinated alkyl substances were used for paper and packaging.

Telomerization, is DuPont's process of manufacturing fluorinated alkyl compounds[1]. In this process, only chemicals that consist of straight-carbon chains are produced (as opposed to straight or branched perfluorinated chains produced by ECF process). This is the now the major fluorotelomer manufacturing process since 3M phased out production of PFOA and PFOS in 2000.

Unlike the ECF process, telomerization is often used to make fluorotelomer alcohols (FTOHs)[1], which are characterized by the presence of a terminal ethanol group. FTOHs vary in the number of fluorinated carbons that are attached to the alcohol group. Due to the feedstock and the chemical manufacturing method, they always contain an even number of carbons. FTOHs are not used directly in commercial applications. Rather, they are used as reactive intermediates in the manufacture of other fluorosurfactants and PFC polymer products, where they are often present in residual amounts of up to 4% by weight [6].

Indirect Sources of Fluorinated Chemicals to the Environment

Fluorotelomer Alcohols

The fate of fluorinated and perfluorinated compounds is dependent on the particular chemical in question and the surrounding environment. Due to the high strength of the fluorine-carbon bond, fluorinated chemicals are typically very stable and highly resistant to biological and abiotic degradation. However, some carbon-fluorine bonds are biodegradable under aerobic conditions [7], and recent studies have demonstrated that some fluorinated chemicals can degrade in ways that partially explain patterns of PFC contamination observed in the environment.

Several studies have demonstrated that perfluorocarboxylic acids (PFCAs, which include PFOA and PFBA, perfluorobutanoic acid) and perfluoroalkanesulfonates (such as PFOS and PFBS, perfluorobutane sulfonate) are extremely persistent in surface water, soil, and ground water, and are unlikely to break down. Moody, et al. [8] reported that the PFCAs PFOA and perfluorohexanoic acid (PFHxA) as well as PFOS, were very persistent in surface water into which fire-fighting foam was spilled, and were detected in fish liver tissue over years of sampling after the spill. PFCAs were also persistent in ground water where AFFF fire-fighting foam was used for training[9]. These studies focused on surface water or ground water contamination that was attributable to an identifiable source or spill. The reasons for widespread, low-level contamination of soil, ground water, and surface water in the ambient environment, however, are not clear, because it is difficult to explain how non-volatile PFCA salts such as PFOA could be transported to areas far from a likely source of these chemicals.

FTOHs are usually precursors to the production of fluoropolymers used in paper and carpet treatments, paints, adhesives, waxes, and polishes. They are considered semi-volatile, but their environmental fate is dictated by their partitioning behavior [10]. They have a vapor pressure of 140 – 990 Pa and partition into the atmosphere, where they have been detected

at concentrations of 17 - 135 picograms m^{-3} [11]. FTOH is known to break down abiotically in the atmosphere with roughly a 20 day half-life, yielding the corresponding PFCAs such as perfluorodecanoic acid (PFDA) [2, 11]. With over 10 million pounds of FTOH produced per year, Ellis et al. [11] concluded that enough FTOH is manufactured yearly to maintain currently observed concentrations of PFCAs in the environment. The process of FTOH degrading to PFCAs may account for the estimated 0.4 tons of PFOA deposited in the arctic annually [2]. FTOHs can also undergo biological breakdown to PFCAs (e.g. PFOA), during aerobic treatment of wastewater treatment plant (WWTP) sludge via beta-oxidation. Between 1 – 10% of FTOH is converted to PFOA in this treatment process [7, 10].

The degradation of FTOHs to PFCAs is consistent with the observations made of the distribution of PFC in other studies:

- The appearance of PFDA in fish samples in Minnesota is consistent with the breakdown of 10:2 FTOH to PFDA. The longer chain PFCAs have no significant history of intentional industrial production [12], and there is no known natural source of long-chain PFCAs [11].

- DeSilva and Mabury [12] report that 98% of human blood samples from the Midwest in 2004-2005 consist of straight-chain, telomere-based PFOA, implying that only 11% of the PFOA exposure was to ECF-derived PFOA. They attributed 89% of the PFOA to fluorotelomer-based production methods.

- Recent MPCA studies show that various perfluorinated surfactants – including PFOA and PFOS – were present in the atmosphere in 2008. The presence of these compounds in the air can be explained by the photodecomposition of FTOH molecules in the atmosphere. 3M discontinued manufacture of these PFCs in 2000.

- Minnesota ground water monitoring shows PFOA, PFPeA (perfluoropentanoic acid), PFHxA, PFHpA (perfluoroheptanoic acid), and PFNA at low concentrations that are widespread under ambient conditions, with no known or likely sources of these compounds. The degradation of FTOH compounds to these corresponding PFCAs is a plausible source of these PFCA detections in the ambient environment.

Fluorinated Polymers

Fluorinated polymers are produced in far greater volumes than the fluorinated surfactants. However, very little has been published regarding the fate and behavior of fluorinated polymers in the environment [3]

Synthetic polymers in general are typically very resistant to biological or non-biological degradation. Studies on fluoroacrylate polymers indicate that these compounds have a 1200 year half-life and the biodegradation of fluoroacrylate polymers is expected to add only a very slight amount of PFCA to the global pool of PFCAs [13]. However, PAPs – polymers used extensively for oil and water-resistant coatings on food contact paper products – degrade into FTOHs and subsequently to a toxic fluorotelomer aldehyde intermediate, which, in turn, degrades to fluorotelomer carboxylic acids such as PFOA [5]. The degradation of PAPs was found to occur in the gastrointestinal tract and bloodstream of

laboratory animals. *With PAPs representing 20% of all PFCs produced for paper coatings, this represents a significant source of exposure to PFCAs like PFOA.*[5].

PAPs are typically generated from monomers of *N*-EtFOSE, which are produced through the ECF process described above. Studies conducted by 3M indicated that *N*-EtFOSE can aerobically degrade to PFOS in wastewater in 35 days. Another study found that biodegradation of *N*-EtFOSE in wastewater did not generate PFOS in wastewater [14], although it did anaerobically degrade to related compounds. This work suggested that the transformation of *N*-EtFOSE to PFOS may not occur within the typical hydraulic residence time of a WWTP, and implied that any PFOS in WWTP effluent is likely due to PFOS present in the in influent. It appears that much of the PFOS in a WWTP is removed. Shultz et al [3] estimated that 98% of PFOS was removed in WWTPs.

N-MeFOSE was typically used to manufacture fluorinated-polymer coatings for fabric and carpet. Shoeib et al [15] found that indoor air concentrations of *N*-MeFOSE and *N*-EtFOSE were roughly 10-20 times greater than outdoor concentrations. It has been suggested that these compounds can break down into PFOS directly in the atmosphere [16] thereby providing a route of human exposure to PFOS ingestion and inhalation inside the home where these products have been used. The breakdown of *N*-MeFOSE and *N*-EtFOSE to PFOS may also explain in part the presence of PFOS in remote environments, since *N*-MeFOSE and *N*-EtFOSE volatilize and can be transported through the atmosphere, eventually breaking down to PFOS [17]. However, it may also be possible for PFOS to condense onto atmospherically mobile aerosol particles that are then transported over long distances and eventually deposited in remote locations [17].

In soil, PFOS has been found to adsorb to various iron minerals, with adsorption increasing with PFOS concentration [18]. However, PFOS apparently adsorbs to soil less than hydrocarbons of similar size [18]. Other studies with PFC surfactants show that the organic carbon concentrations in the soil and PFC size are the most important factors influencing sorption to soil [19]. In addition, low pH and high Ca^{+2} in soil solution increases the adsorption of these compounds, suggesting that electrostatic interactions are important in the sorption of PFOS and other PFC surfactants to soil and sediment [19]. Microcosm studies conducted on ground-water sediment collected from the Washington County landfill [20] indicated that adsorption of PFOS and PFOA may be dependent on the oxidation/reduction status of the ground water, implying that these compounds may become more mobile in highly reduced ground water aquifers.

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Appendix C

Summary of PFC Toxicity Studies

*Please note: This is not an exhaustive list and other studies may exist that the author was not aware of at the time of printing.

Species or Type of Assay	**Compound and Exposure Concentrations** (mg/kg bw/day unless otherwise noted)	**Endpoint**	**Effect Concentration** (mg/kg bw/day unless otherwise noted)	**Reference**
Rat 90 day oral exposure	PFOS potassium salt 0, 30, 100, 300, 1000, 3000	Death Changes in organ and body weight	LC_{50} = 100 LOAEL = 30	Goldenthal et al., 1978
Rat 2 generation reproductive toxicity	PFOS potassium salt 0.1, 0.4, 1.6, 3.2 by gavage	Significant reduction pup weight gain in F1 generation	LOAEL = 0.4 NOAEL = 0.1	Christian et al., 1999
Rat 2-year dietary study	PFOS 0.06 – 0.23 (males) 0.07 – 0.21 (females)	Histopathological changes in liver	LOAEL (both sexes) = 40.08 µg/g in liver And 13.9 mg/L in serum	Covance Laboratories, Inc. 2002
Rhesus monkeys 90 day gavage	PFOS potassium salt 0, 0.5, 1.5, 4.5	100% Death Gastrointestinal toxicity	4.5 LOAEL = 0.5	Goldenthal et al., 1978
Cynomolgus monkeys 26 weeks	PFOS	Thymic atrophy (females) Reduced HDL, cholesterol, triiodo-thyronine, total bilirubin (males)	LOEL = 0.03 Corresponding to mean concentrations in female and male sera and liver of 19.8 µg/mL and 14.5 µg/g, respectively	Covance Laboratories, Inc. 2002
Fathead minnow (*Pimephales promelas*) 96 h and 42 d	PFOS lithium salt	Death	LC_{50} (96h) = 4.7 mg/L NOEC (42d) = 0.3 mg/L	OECD, 2002
Mysid shrimp (*Mysis bahia*)	PFOS lithium salt	Death	LC_{50} (96h) = 3.6 mg/L NOEC = 0.25 mg/L	OECD, 2002
Aquatic midge (*Chironomous tentans*)	PFOS	Growth and survival	NOEC (10d) = 0.0491 mg/L	Macdonald et al., 2004
Green Algae (*Pseudokirchnerilla subcapitata*)	PFOS	Cell density	IC_{50} (96h) = 48.2 mg/L NOEC = 5.3 mg/L	Boudreau et al., 2003
Mallard duck (*Anas platyrhyncos*) 21 weeks in feed	PFOS	Reduced testes size and decreased spermatogenesis	10 mg/kg diet corresponding to serum and liver concentrations of 87.3 µg/mL and 60.9 µg/g, respectively	3M, 2003

Species or Type of Assay	Compound and Exposure Concentrations (mg/kg bw/day unless otherwise noted)	Endpoint	Effect Concentration (mg/kg bw/day unless otherwise noted)	Reference
Bobwhite quail (*Colinus virginianus*) 21 weeks in feed	PFOS	Increase in liver weight (female) Increased incidence of small testes size (male) Reduced chick survivability as a percentage of eggs set	10 mg/kg diet	3M, 2003
Marine Mussel (*Mytilus californianus*)	PFNA PFDA	Inhibition of p-glycoprotein cellular efflux transporter resulting in chemosensitization	IC50 (PFNA) = 4.8 µM IC50 (PFDA) = 7.1 µM	Stevenson et al., 2006
Male Rats 14 day oral	PFDoA 1, 5, 10	Decreased absolute testes weight Increased total serum cholesterol Increased luteinizing hormone Decreased testosterone Reduced mRNA expression of genes involved in cholesterol transport and steroid synthesis	10 10 10 5 and 10 5 and 10	Shi et al., 2007
Medaka (*Oryzias latipes*)				
MCF-7 Breast Cancer Cells *In vitro*	6:2 and 8:2 FTOH	Breast cancer cell proliferation	10 µM	Maras et al., 2006
Tilapia Hepatocytes *In vitro*	PFOS PFOA 6:2 FTOH 8:2 FTOH	Estrogenicity determined by vitellogenin induction	3.1×10^{-7} M 5.1×10^{-7} M 1.1×10^{-6} M 7.5×10^{-7} M	Liu et al., 2007

Other useful toxicity studies:

3M, **2008**. *Ecotoxicity of and Derivation of Preliminary Safe Water Concentrations for Perfluorobutyric Acid (PFBA)*. Presented at North American SETAC, Tampa, Florida, 2008.

Jensen, A and H. Leffers, 2008. *Review Article: Emerging endocrine disrupters: perfluoroalkylated substances*, International Journal of Andrology, **31**, 161-169.

PFCs and Class B Firefighting Foam

Minnesota Pollution Control Agency

What do doughnut bags, outdoor clothing, stain-resistant carpet, non-stick frying pans, aircraft hydraulic oils, and certain firefighting foams have in common? They contain man-made chemicals called perflurochemicals (PFCs). Many kinds of PFCs have been used for several decades to make products stain resistant, water repellant, slippery, and long lasting. Without PFCs, the cooking grease would seep through our fast-food bags, our car seats and carpets would be more stained, and fighting a petroleum fire might be more difficult.

In recent years, scientists have found that PFCs may cause long-lasting environmental contamination, including uptake into humans' bodies. Of particular concern is the possibility that PFCs in Class B firefighting foam may be able to travel from a fire training area to a city's municipal or private wells. Sampling will be done in 2009 to investigate that possibility.

PFC Background

The Minnesota- based 3M Company in Cottage Grove developed PFCs in the late 1940's. PFCs have properties that make them great surfactants. Their chemical structure makes them extremely resistant to change or breakdown. Once released to the environment, they remain there for a very long time. They also travel long distances through soil and into the ground water in a relatively short time. As a result, PFCs have been found in soil, sediments, water, wildlife and humans throughout the world. The way PFCs have become so widespread is not well understood.

Because of the unexpected worldwide spread of PFCs, 3M discontinued manufacture of products containing PFOS and PFOA (two of the PFC chemicals) in 2002. 3M's Class B firefighting foam was included. PFC chemicals continue to be produced by other methods and in different forms by 3M and other companies across the world. Some of these products may travel through air and breakdown to problematic PFCs.

Wastes from 3M's manufacturing processes were placed at several disposal sites in Washington County. PFCs have been found in the ground water in areas of Washington and Dakota Counties, and in surface water and wastewater effluent in other parts of the state. PFCs have also been found in some fish in the greater metropolitan area. Filters containing activated carbon or reverse osmosis units are now filtering PFCs from wells with PFC levels that exceed the Minnesota Department of Health's (MDH) health-based exposure limits. Fish consumption advisories have been issued for some lakes.

Health Concerns

The potential health significance of PFCs in drinking water is under study at both the state and federal levels. Much of this research consists of toxicological studies in laboratory animals. At high concentrations, two types of PFCs, perfluorooctane sulfonic acid (PFOA) and perfluorooctonate sulfonate (PFOS), have been shown to cause harmful changes in the liver and developmental problems (e.g., delays in growth and maturation) in the offspring of rats and mice exposed during pregnancy. A limited number of other PFC chemicals are also being studied.

There are few studies of health effects in people. As part of its worker health and safety program, 3M routinely monitored the health of its workers. No significant or consistent health effects have been identified in these workers. Three studies of newborn babies and PFC levels in the mother's blood found a very small decrease in birth weight or other measures of growth with increasing PFC levels in the mother. A large health study of 70,000 people exposed to the type of PFC called PFOA in drinking water in Ohio and West Virginia is currently underway but it will be some time before results are available. In general, the

studies in people have shown that the levels of PFCs in the environment may be linked to changes in the body, but the studies have not shown specific illness in people.

Firefighting Foam

There are many kinds of firefighting foam. The use of foam has saved many lives and prevented huge property losses. Many manufacturers have made firefighting foams, but the exact content of those foams is often not disclosed.

Class A foam has come into widespread use in recent years for wildfire, structure and other fires. A detergent-like "surfactant" in the Class A foam makes the firefighting water "wetter" and more able to penetrate combustible material. **Class A foams typically do not contain PFC chemicals.**

PFCs and Class B foam training near wells

In the early 1960's, 3M and the U.S. Navy developed Class B "aqueous film forming foam" (AFFF) type foams. Class B foams are used on flammable petroleum fires and spills. Some or most Class B foams have had PFCs as part of their formulation, in particular PFOS.

Some foam manufacturers have changed processes and materials to eliminate or minimize PFC content in foam. However many foam manufacturers may not know or reveal PFC content of current or past formulations.

As part of the overall investigation of PFCs in Minnesota, the Minnesota Pollution Control Agency (MPCA) and MDH have started looking at the pattern of firefighting foam training.

Most Minnesota cities use ground water as a drinking water source. Many municipal wells are near a fire station or fire training locations. There is a possibility that fire training sites where Class B foams were repeatedly used may have allowed PFCs to enter municipal or private drinking water wells.

In 2008 an MPCA contractor, Delta Environmental, surveyed Minnesota's fire service on past foam use – two-thirds of fire departments provided information. Many departments have used and trained with Class B foam. The foam was usually used in small amounts; however, it may only take a small amount of chemical to affect ground water. MDH has taken the survey data and compared it to municipal well locations and characteristics. Most cities that use wells have wellhead protection plans that map the areas where spills and pollution may reach a well. Fire chiefs should become familiar with these plans. Cities with wells that are vulnerable because of their shallow depth or coarse soils or their proximity to foam training locations have been identified. MDH will be sampling wells in many of those cities in spring of 2009. If PFCs are found, MDH will notify the water utility.

MPCA will be sampling soil near 25 or so Class B foam training sites in the spring of 2009 to see if PFCs remain in the soil and ground water. Fire chiefs will be notified before sampling to request site access and permission. Results will be provided back to the cities.

Next Steps

Results from the first round of sampling are expected in summer 2009. In the meantime, the State Chiefs' Association and the State Fire Marshal will be asked to help suggest guidance to Minnesota's fire service on Class B foam. Likely, that guidance will include:

- using Class B foam on flammable liquids like gasoline, but not routinely using on other combustible liquids such as diesel or fuel oil
- using non-PFC training foams or detergents during training
- investigating PFC content of the currently sold Class B foams

Additional information about PFCs is available on the MPCA and MDH web pages at:
www.pca.state.mn.us/cleanup/pfc/index.html or
www.health.state.mn.us/divs/eh/hazardous/topics/pfcs/index.html.

Contact Information

If you need help or have a question, your MPCA contact can be reached at 651-296-6300 or 800-657-3864.

PFC technical information and MPCA's sampling:
Nile Fellows, nile.fellows@pca.state.mn.us
Doug Wetzstein, doug.wetzstein@pca.stat.mn.us

Pollution issues related to firefighting:
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PERFLUOROCARBON (PFC)-CONTAINING FIREFIGHTING FOAMS AND THEIR USE IN MINNESOTA

DELTA PROJECT NO. 19382DEL08

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TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 Purpose 1
1.2 Background 1

2.0 PFCs in FIREFIGHTING FOAM 2
2.1 Chemistry of PFCs 2
2.1.1 ECF Process 3
2.1.2 Telomerization Process 4
2.2 PFCs in Firefighting Foam 4
2.3 The USEPA and PFOA and PFOS 5

3.0 USE OF FIREFIGHTING FOAMS IN MINNESOTA 6
3.1 Interviews with Minnesota Firefighting Organizations 6
3.2 Survey Mailing to Minnesota Firefighting Organizations 6
3.3 Survey Results 7
3.3.1 Survey Results - Municipal Fire Departments 7
3.3.2 Survey Results – Airports 7
3.3.3 Survey Results - Firefighting Training Schools 8
3.3.4 Survey Results - Petroleum Refineries 8
3.3.5 Survey Results - Camp Ripley 8

4.0 RANKING OF FIREFIGHTING FOAM TRAINING SITES 9
4.1 Ranking Criteria 9
4.2 Ranking Results 9
4.3 Additional Foam Discharge Sites 11

5.0 SITE RECONNAISSANCE AND SAMPLE COLLECTION 12
5.1 Sample Collection at the Kandiyohi County Landfill 12
5.2 Sample Collection at WAFTA 13
5.3 Sample Collection at the Kings Cove Marinas 13
5.4 Sample Collection at Duluth International Airport 13
5.5 Sample Collection at Up North Plastics 13

6.0 SAMPLING RESULTS 13
6.1 Laboratory Analytical Results, Soil and Sediment Sampling 14
6.2 Soil Laboratory Results versus State PFC Soil Reference Values 15
6.3 Groundwater and Surface Water Sampling Results 16
6.4 Groundwater PFC Concentrations Versus Minnesota HRLs 16
6.5 State Surface Water Criteria for PFCs 17
6.6 Ambient Groundwater Concentrations in Minnesota 17

7.0 RECEPTOR SURVEYS AND ASSESSMENT OF RISK 18
7.1 MDH Municipal Well Sampling 19
7.2 Well Receptor Survey, Richfield 19
7.3 Well Receptor Survey, WAFTA 19
7.4 Well Information, Duluth International Airport 19

8.0 FINDINGS AND RECOMMENDATIONS 19
8.1 PFCs in Class B Foam 19
8.2 Class B Foam Use in Minnesota 20
8.3 Sampling Findings 20
8.4 State Recommendations on the Use of Class B Firefighting Foam 21
8.5 Recommendations for Further Assessment 22

9.0 REMARKS 23

10.0 REFERENCES 24

List of Tables

Table 1 Class B Foam Use Ranking Summary, Minnesota Municipal Fire Departments
Table 2 Class B Foam Use Ranking Summary, Minnesota Airport and Refinery Fire Departments and Training Schools
Table 3 PFC Sample Collection Summary, Minnesota Firefighting Foam Training and Discharge Sites
Table 4 Soil and Sediment Analytical Results, PFCs
Table 5 Groundwater and Surface Water Analytical Results, PFCs.

List of Graphs

Graph 1 Soil and Sediment PFC Concentrations
Graph 2 Groundwater and Surface Water PFC Concentrations

List of Appendices

Appendix A *Best Practices Today for Class B Firefighting Foam*

PERFLUOROCARBONS IN FIREFIGHTING FOAM

AND THEIR USE IN MINNESOTA

1.0 INTRODUCTION

1.1 Purpose

Delta Consultants (Delta) has worked under contract with the Minnesota Pollution Control Agency (MPCA) investigating perfluorochemicals in Class B firefighting foams and their use in Minnesota. Previous information regarding this investigation was presented in the following reports:

- Perfluorocarbon (PFC)-Containing Firefighting Foams and Their Use In Firefighting Training in Minnesota, dated June 30, 2008 (the June 2008 Report); and,
- Addendum to PFC-Containing Firefighting Foams and Their Use In Firefighting Training in Minnesota, dated October 22, 2008 (the October 2008 Addendum Report);
- Firefighting Training Area Site Reconnaissance, Pine Bend Flint Hills Refinery, Marathon Refinery, Burnsville Fire Training Center, and Site Access for 21 Fire Departments, dated April 3, 2009 (the April 2009 Report);
- Report of Site Reconnaissance and Sampling at Select Firefighting Foam Training Areas in Minnesota, dated June 30, 2009 (the June 2009 Report); and,
- Report of Investigation Activities at Select Firefighting Foam Training Areas and Foam Discharge Sites in Minnesota, dated February 10, 2010 (the February 2010 Report).

This report condenses the previous reports and includes PFC sampling conducted by others at the following fire foam training and fire sites:

- Duluth Air National Guard Base at the Duluth International Airport;
- Western Area Fire Training Academy (WAFTA) in St. Bonifacius;
- Up North Plastics in Cottage Grove; and,
- Kings Cover Marina in Hastings.

1.2 Background

As a part of an overall investigation of PFCs in Minnesota, the MPCA and Minnesota Department of Health (MDH) started looking at firefighting foams as a possible source of PFCs in the environment. In 2008 PFCs were researched as a constituent of firefighting foams. Municipal fire departments, fire departments at major oil refineries and airports, and fire training schools in the State were surveyed regarding their use of Class B firefighting foams. Additionally, various persons in the State with fire fighting knowledge and experience were interviewed. A survey questionnaire mailed out to the fire departments concentrated on the use of firefighting foams in training based on the assumption that training areas where firefighting foams were discharged repeatedly at the same location would be at greater risk for the introduction of PFCs into the environment via the breakdown of the foam. The firefighting training sites were then ranked for their potential

to release PFCs to sensitive environments based on a number of criteria: the types and amounts of foam used in training, the frequency of the training events, the environmental setting of the firefighting training site, and the presence of nearby water supply wells. The results of the research, survey and training site ranking were presented in the June 2008 and October 2008 Addendum Reports. Both reports are available on the MPCA website at www.pca.state.mn.us/cleanup/pfc/index.html. A brief summary of the research and survey findings are presented in Sections 6.0 and 7.0 of this report.

Based on the site ranking, twenty-one firefighting training sites were chosen for further investigation. The additional investigation included site reconnaissance, sampling of the groundwater and/or soil, and/or additional interviews. Information and data collected at these "priority" sites were documented in the April 2009, June 2009 and February 2010 Reports. These reports are also available on the MPCA website.

During the course of the PFC-Firefighting Foam investigation it was decided that the locations of several fires where large quantities of PFC-containing foams were utilized would also be investigated for the possible release of PFCs to the environment. Information and data collected at the River Grove Marina in Inver Grove Heights, and the Kandiyohi County Landfill in New London, were included in the above-referenced reports. Reports of PFC sampling related to firefighting foam conducted by the MPCA and other consultants at the Duluth Air National Guard Base in Duluth, the WAFTA site in St. Bonifacius, the Up North Plastics facility in Cottage Grove, and the Kings Cove Marina in Hastings, are available at the MPCA. The investigation activities and results for all of these sites are discussed in Sections 6.0 and 7.0 of this report.

2.0 PFCs in FIREFIGHTING FOAM

Perflourocarbons or perfluorochemicals (PFCs) are a class of man-made chemicals derived from hydrocarbons, where the hydrogen atoms have been replaced by fluorine atoms. PFCs are characterized by chains of carbon atoms of varying lengths to which fluorine atoms are strongly bonded, making PFCs durable and hard to break down (1). PFCs have been used since the 1950s to produce industrial and consumer products that are heat and stain resistant, water repellant, and film-forming (2). PFCs have been used in a variety of products including stain-resistant fabrics and carpet, coatings for food packaging, non-stick cookware, and firefighting foams (2)(3)(4).

2.1 Chemistry of PFCs

The PFC class of chemicals includes three groups of PFCs pertinent to the discussion of PFCs in firefighting foam: perfluorocarboxylates, perfluorinated sulfonates, and fluorotelomer sulfonates (5).

Perfluorocarboxylates are fully fluorinated carbon molecules with a carboxylate group on the end of the chain. Perfluorinated sulfonates are fully fluorinated carbon molecules with a sulfonate group on the end of the chain. Fluorotelomer sulfonates are partially fluorinated molecules. Examples of the PFC chemicals within each group are described in Table A, below.

TABLE A - PFC CHEMICALS

Chemical Group	Chemical Acronym	Chemical Name	CAS Registry No.	No. of Fluorinated Carbon Chains
Perfluorinated carboxylic acids	PFBA	perfluorobutanoic acid	375-22-4	4
	PFPeA	perfluoro-n-pentanoic acid	2706-90-3	5
	PFHxA	perfluorohexanoic acid	307-24-4	6
	PFHpA	perfluoroheptanoic acid	375-85-9	7
	PFOA	perfluorooctanoic acid	335-67-1	8
	PFNA	perfluorononanoic acid	375-95-1	9
	PFDA	perfluorodecanoic acid	335-76-2	10
	PFUnA	perfluoroundecanoic acid	2058-94-8	11
	PFDoA	perfluorododecanoic acid	307-55-1	12
	PFTA	perfluorotridecanoic acid	not determined	not determined
Perfluorinated sulfonates	PFBS	perfluorobutane sulfonate	29420-49-3	4
	PFHxS	perfluorohexane sulfonate	355-46-4	6
	PFOS	perfluorooctane sulfonate	1763-23-1	8
Fluorotelomer sulfonates	6:2 FtS	1-octanesulfonic acid, 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluoro-, ammonium salt	--	6
	8:2 FtS	--	--	8

PFCs are made using one of two methods: the Simons electro-chemical fluorination (ECF) developed by 3M; or, a telomerization process (6).

2.1.1 ECF Process

The ECF process used by 3M generates fully fluorinated compounds in branched- and straight-chains with both even and odd numbers of perfluorocarbons (6)(7). The chemical of interest in the ECF process is perfluorooctanesulfonyl fluoride (POSF), $C_8F_{17}SO_2F$. The final degradation product of POSF and its derived products include perfluorinated sulfonates and perfluorinated carboxylic acids (8). While perfluorinated carboxyl acids are associated with both the ECF process and the telomerization process (see Section 2.1.2), perfluorinated sulfonates only result from the ECF process (9).

2.1.2 Telomerization Process

The telomerization process creates fluorinated telomers that are different from ECF-made fluorinated molecules in that they only have an even number of fluorinated carbon atoms and the molecule is predominantly straight-chained (6)(7). In addition, the fluorotelomerization process inserts an ethyl group between the fluoroalkyl chain and the functional group on the end, which differentiates the atom from an ECF-process fluorinated molecule. Fluorotelomer sulfonates are made using a telomerization process, and perfluorinated carboxylic acids may be present in the final product as a result of unreacted or partially reacted starting materials or intermediate (10).

2.2 PFCs in Firefighting Foam

There are several classes of fires, depending on the material that is burning. Class B fires involve the burning of flammable liquids such as gasoline, fuel oil, cleaning fluids and solvents. Aqueous film-forming foam (AFFF) was developed in the 1960s for use on Class B fires. AFFF has a fluorochemical-based surfactant that rapidly forms a film across the fire surface, which prevents the release of flammable fuel vapors and excludes oxygen from the fuel surface (11).

3M was the original manufacturer of fluorochemical-based AFFF in the 1960s, using the ECF process. As indicated in Section 2.1.1, PFCs made using the ECF process can contain or degrade to perfluorinated sulfonates and perfluorinated carboxylic acids. As part of 3M's voluntary production phase out of PFOS chemicals, they stopped manufacturing PFOS-based AFFF in 2002.

DuPont, Ansul, Chemguard and other firefighting foam manufacturers use telomer-based fluorochemical surfactants in their AFFF. The telomer-based foams are not made with, and do not break down to, PFOS. According to the Fire Fighting Foam Coalition (www.fffc.org), telomer-based firefighting foams contain predominantly (75 to 80%) six-chain carbon fluorosurfactants (6:2 FtS), with varying percentages of eight-chain or higher homologues (8:2 FtS). While telomer-based surfactants are not made with PFOA, low levels of PFOA may be present as a byproduct (13).

Class B AFFF is typically purchased in five-gallon buckets. These foam concentrates are mixed into the water using an in-line eductor or other proportioning/mixing device. The foam concentrate/water solution can then be fed through one of two types of discharge devices, either a nozzle-aspirated foam system (NAFS) or a compressed air foam system (CAFS). Both systems produce a finished foam that is a combination of water, air and foam concentrate. Class B AFFF concentrates may or may not have expiration dates included on the product container, but foam manufacturers Chemguard and Ansul indicate that Class B foam should have a shelf life of 20 to 25 years if stored properly.

Class A firefighting foams, used to extinguish wood and grass fires, are detergent-based foams with a hydrocarbon-based surfactant, not a fluorochemical-based surfactant (14). Class A foams are not known to contain PFCs and are not considered a source of PFCs.

Training foams are similar to Class A and Class B foams but are made specifically for fire training exercises and do not contain chemical components for firefighting performance. Training foams are available from most manufacturers and are generally less expensive because they do not contain (costly) fluorinated surfactant components. Training foams are not made with PFCs.

2.3 The USEPA and PFOA and PFOS

In 1999 the U.S. Environmental Protection Agency (USEPA) began an investigation into PFOS after receiving data from 3M that PFOS was persistent, bioaccumulative and unexpectedly toxic (15). Ultimately 3M ceased production of PFOS-based chemistry in 2002, including the production of PFOS-based firefighting foams.. 3M also identified PFOA in human blood as part of their PFOS studies (15), and in June 2000 the USEPA expanded their investigation to include other PFCs, including PFOA.

In 2002 and 2007 the USEPA published significant new use rules (SNURs) under the Toxic Substances Control Act (TSCA) to limit the manufacture or import of perfluoroalkyl sulfonate chemicals, including PFOS and PFHxS. According to the initial 2002 SNUR, 3M was the only manufacturer in the U.S. of PFOS-based chemicals included in the SNUR.

In January 2006, USEPA and eight major PFC manufacturing companies (3M/Dyneon, Arkema, Inc., AGC Chemicals/Asahi Glass, Ciba Specialty Chemicals, Clariant Corporation, Daikin, E.I. duPont de Nemours and Company, and Solvay Solex) created the 2010/15 PFOA Stewardship Program. The companies committed to reduce facility emissions and product content of PFOA, PFOA precursor chemical, or PFOA-related homologues by 95 percent by 2010, and to work toward eliminating emissions and product content by 2015. As part of the program the companies submit annual reports on their progress toward reaching the goals. Information regarding the 2010/15 PFOA Stewardship Program is available at www.regulations.gov in docket EPA-HQ-OPPT-2006-0621.

Members of the Fire Fighting Foam Coalition that make telomer-based AFFF agents are in position to meet the goals of the PFOA Stewardship Program before 2015 by using C6-based fluorosurfactants that provide the same fire protection characteristics as C8-based foams. Incorporating these new fluorosurfactants in AFFF will require some reformulation and perhaps re-approval of most Class B foams between 2010 and 2015 (16).

3.0 USE OF FIREFIGHTING FOAMS IN MINNESOTA

In order to gain an understanding of the organizations in Minnesota that utilize firefighting foam, the types and quantities of firefighting foam being used, and the locations where the foams are being used in training exercises, the websites of firefighting organizations were reviewed, individuals commonly known to be involved in or associated with firefighting in Minnesota were interviewed, and the users of firefighting foams in Minnesota were surveyed regarding their foam use.

3.1 Interviews with Minnesota Firefighting Organizations

Several individuals commonly known to be involved in or associated with firefighting in Minnesota were interviewed regarding the use of firefighting foams in Minnesota. The interviews were presented in the June 2008 Report. Key findings of these interviews are as follows: the two oil refineries in Minnesota—the Marathon Oil refinery in St. Paul Park and the Flint Hills Resources Pine Bend refinery in Rosemount—have their own dedicated fire departments; that the Minnesota Department of Natural Resources (MDNR) trains firefighters at the Minnesota Interagency Fire Center in Grand Rapids using training foam; the Minnesota State Colleges and Universities (MNSCU) system has sixteen schools with firefighting training programs, and they switched from the use of AFFF to soap-based foams for training in approximately 2004; and that generally AFFF is not used for training exercises because its too expensive.

3.2 Survey Mailing to Minnesota Firefighting Organizations

Questionnaires regarding the use of firefighting foam were mailed to 785 fire departments in Minnesota in April and May 2008. The questionnaire surveyed the departments on current and historical types and amounts of firefighting foam used in firefighting and fire training, the locations of the fire training areas, and the fate of the spent training foam. In addition to municipal fire departments, questionnaires were mailed to the following potential firefighting foam users in Minnesota:

- All of the airports with dedicated fire departments: Minneapolis-St. Paul International Airport (MSP); Rochester International Airport; and, the Duluth International Airport.
- The following 16 colleges with firefighter training programs: Itasca Community College in Grand Rapids; Alexandria Technical College; St. Cloud Technical College; Minnesota West Community College in Marshall; Ridgewater College in Willmar; South Central College in North Mankato; Riverland Community College in Austin; Pine Technical College in Pine City; Hennepin Technical Colleges in Plymouth and Eden Prairie; Northland Community Colleges in Thief River Falls and East Grand Forks; Central Lakes College in Brainerd; Minnesota State Community College in Moorhead; Mesabi Range Community College in Virginia; and, Lake Superior Technical College in Duluth. Southwest State University in Marshall, Minnesota indicated that they do not offer a firefighting training program and that their program is only a business administration program for fire chiefs and captains.
- 2 petroleum refineries; and,
- Camp Ripley in Little Falls.

Completed questionnaire surveys were presented in the June 2008 Report and October 2008 Addendum Report.

3.3 Survey Results

Results of the completed surveys received from the municipal fire departments, airports, firefighting training schools, refineries, and Camp Ripley are presented in Sections 3.3.1 through 3.3.5.

3.3.1 Survey Results - Municipal Fire Departments

A total of 522 completed questionnaires were received from the 785 municipal fire departments that were surveyed, a response rate of 66%. Copies of the completed questionnaires were included in the June 2008 Report and October 2008 Addendum Report. The following general findings and statistics were ascertained from the questionnaires:

- Fifty-two (or 10%) of the responding municipal fire departments do not use firefighting foam at all.
- Of the responding municipal fire departments that utilize firefighting foam, 243 (or 52%) use only Class A foams.
- Of the remaining 227 responding municipal fire departments that utilize Class B firefighting foams, approximately 50% do not train with Class B foam but only use Class B foam for fire response.
- Of the municipal fire departments that train with Class B foam, 28% of the departments train at multiple or different locations for every training session, or at live burns only. Thus there is not one specific training location.
- The remaining municipal fire departments that train with Class B foam repeatedly at the same location were ranked based on the potential for PFCs to enter sensitive environments. The ranking criteria are discussed in Section 5.0.

3.3.2 Survey Results – Airports

Of the seven airports operated by the Metropolitan Airports Commission, (Crystal, Lake Elmo, Flying Cloud, Anoka County-Blaine, St. Paul, Lakeville and Minneapolis-St. Paul International (MSP), only MSP has its own fire department. Other MAC airports are served by the municipal fire departments in which they are located. Currently the MSP fire department trains with foam at the Lake Superior College Emergency Response Training Center (ERTC) in Duluth. Prior to 2001 training with 3M-brand Class B foam was conducted at two different locations on the northwest portion of the airport.

The Rochester Airport Fire Department also trains with foam at the ERTC facility in Duluth. However, the Federal Aviation Administration (FAA) requires annual testing of fire equipment. The foam equipment tests require a short burst of foam to show that the fire trucks are functioning properly. Less than 5 gallons of Chemguard-brand Class B foam is used annually for equipment testing.

The City of St. Cloud Fire Department is responsible for fire response at the St. Cloud Airport. The St. Cloud Fire Department trains with Chemguard-brand Class B foam at two locations, including the fire station near the airport.

The 148th Fighter Wing of the Minnesota Air National Guard is responsible for fire and emergency services at the Duluth International Airport. The unit no longer trains at the airport with firefighting foam. The MPCA is investigating two former fire training areas at the Duluth Airport for PFCs.

3.3.3 Survey Results - Firefighting Training Schools

Survey questionnaires were returned by all sixteen MNSCU firefighting training schools. Only two of the schools hold training exercises on campus with Class B foam: Lake Superior College in Duluth; and, Northland College in East Grand Forks.

3.3.4 Survey Results - Petroleum Refineries

Both the Marathon Refinery in St. Paul Park and the Flint Hills Resources Pine Bend Refinery in Rosemount have their own in-house fire departments, and both refineries have on-site fire fighting training facilities where spent Class B foam is collected and routed through their in-house wastewater treatment plants. The fire department at the Marathon Refinery uses approximately 50 to 100 gallons of Ansul-brand ThunderStorm Class B foam per semi-annual training event; prior to 2000 they used 3M-brand foam. Other municipal departments train at the Marathon Refinery fire training area, using foam provided by the Marathon Refinery fire department. Fire foam training at the Pine Bend Refinery in Rosemount takes place approximately 20 to 25 times during the training season from April through November, and approximately 5 to 10 gallons of Ansul –brand ThunderStorm Class B foam is used per training event. The Pine Pend Refinery fire department used 3M-brand Class B foam historically, and has a stockpile of approximately 50,000 gallons of 3M-brand foam on hand. Other area municipal departments train at the refinery training grounds with foam provided by the refinery.

The former Conoco-Phillips oil refinery in Wrenshall, Minnesota ceased operation in the early 1980s. The City of Wrenshall Volunteer Fire Department indicated that the refinery had their own fire fighting equipment, but that the Wrenshall Fire Department responded to any fire calls. The department trained at the Wrenshall refinery with Class B foam when it was in operation.

3.3.5 Survey Results - Camp Ripley

The Fire and Emergency Services Coordinator for Camp Ripley indicated that his position at Camp Ripley had been created in approximately 2007, and he was not familiar with historical firefighting practices at Camp Ripley. No firefighting training with foam is currently being conducted at Camp Ripley.

4.0 RANKING OF FIREFIGHTING FOAM TRAINING SITES

The training sites where Class B firefighting foam is or was used on more than one occasion were ranked in order to identify those with the highest potential to release PFCs to sensitive environments. The sites were ranked according to the criteria listed in Section 4.1. A relative numerical score was assigned for each criterion that was meant to reflect the relative importance of each parameter with respect to its potential to release PFCs to the environment, and the sensitivity of the environmental receptors.

4.1 Ranking Criteria

The criteria are listed below in brief; a more detailed description of the ranking criteria were presented in the June 2008 Report. The following criteria were considered in ranking training sites on their potential to release PFCs to sensitive environments:

1) Brand of foam used for training. Due to the known content of PFOS and PFOA in firefighting foams manufactured by 3M, training sites where 3M foams were currently or formerly used in training were ranked higher.
2) Amount of foam used in training.
3) Proximity to nearby surface waters.
4) Proximity to nearby wetlands.
5) Proximity to karst geological areas.
6) Proximity to wellhead protection areas (WPA) and/or source water assessment areas (SWAA).
7) The presence of water supply wells nearby.

Since spent training foam are released to the ground or go to a storm sewer at most training sites, the final destination of the spent foam was not considered as a ranking criteria.

4.2 Ranking Results

A total of 80 municipal fire departments' training sites, 3 airport fire departments, 2 firefighting training schools, and 3 petroleum refineries were ranked. Rankings for the municipal fire departments are presented in **Table 1, *Class B Foam Use Ranking Summary, Minnesota Municipal Fire Departments***, and rankings for the training schools, airports, and refineries are presented in **Table 2, *Class B Foam Use Ranking Summary, Minnesota Airport and Refinery Fire Departments and Training Schools***. Individual profiles for each of the ranked sites were included in the June 2008 Report and October 2008 Addendum Report.

Total scores assigned to the firefighting foam training sites ranged from 7 to 33. The highest scores were assigned to sites generally located in a wellhead protection or source water protection area and/or a karst

area, had water supply wells located within ¼-mile, a wetland and/or surface water body located within ¼-mile of the training site, and 3M foams are or were used for training. A total of 21 sites were considered for follow-up investigations, as listed below:

- *Minneapolis/St. Paul International Airport former training areas*: MSP Airport is located in a WPA and an active karst area, with up to 40 gallons of foam used annually for training. From 1983 through 2001, fire foam training with 3M-brand Class B foam was conducted east of Cargo Road near the present location of the glycol management facility. Foam training prior to 1983 took place at an area located northeast of the current FedEx facility. Both the pre- and post-1983 former fire foam training areas were re-worked and excavated to some extent during construction associated with the addition of a new airport runway in 2001. Storm water from this area of the airport drains to a holding pond near the southwest corner of the MSP Airport.
- *Marathon Refinery, St. Paul Park:* Marathon Refinery is located in an active karst area near the Mississippi River, with approximately 250 gallons of Ansul-brand foam used annually for training. The Marathon Refinery historically used 3M-brand Class B foams through approximately 2000. Fire foam training is conducted at fire training grounds located near the southwest corner of the refinery. Spent foam and water is routed to an on-site waste water treatment plant.
- *Flint Hills Pine Bend Refinery, Rosemount:* Pine Bend refinery is located in a transition karst area, with approximately 300 gallons of Ansul-brand foam used annually for training. Foams manufactured by 3M were historically used in training. Fire foam training is conducted at fire training grounds near the southwest corner of the refinery. Spent foam is collected into a lined holding area from which it is pumped out and disposed through an on-site waste water treatment plant.
- *Kenyon Fire Department foam training area:* Bi-annual training with 3M-brand foam is conducted on Slee Street, between Cross and Pine Streets at the east end of town. The training area is located in a SWAA and an active karst area.
- *Claremont Fire Department training and foam demonstration areas:* Annual to bi-annual training with 3M-brand foam is conducted on a paved surface in front of the fire station on Front Street, where spent foam and water drain to a storm sewer. In the fall of 2008 a fire foam demonstration was held behind the station. The fire station is located in a SWAA and a transition karst area.
- *Harmony Fire Department foam training areas:* Foam training has occurred at two locations: historically in front of the fire station on Main Avenue South, and more recently at the municipal tree/brush dump south of the fire station. Foam training with Ansul-brand foam takes place annually or less. Both areas are located in a SWAA and an active karst area.
- *Bemidji Fire Department foam training site:* Annual training is conducted with five gallons or less 3M-brand foam at the Bemidji Regional Airport. The airport is located in a WPA with surface waters and wetlands adjacent to the airport and shallow municipal wells located nearby.
- *Fridley Fire Department training site:* Historically, training with 3M-brand firefighting foam took place at the North Metro Fire Training Center on 71st Avenue in Fridley. A training structure was built in 1994/1995 over a burn pit that had been used for foam training. The training center is located in a WPA and a transition or covered karst area.
- *Burnsville Fire Department training site:* The Burnsville Fire Department has trained three times with Ansul-brand foam at the ABLE Fire Training Center since it was built in 1989, and the last training exercise was in 2004. The fire training center is located at the southeast corner of the intersection of Cliff Road and River Ridge Boulevard in Burnsville. The training center is located in a WPA and appears to be situated in an active karst area. Municipal wells are located nearby.
- *Goodview Fire Department training area:* Occasional training (approximately six times in the last twenty years) is conducted on a paved area in front of the fire station located at 4140 W. 5th Street. Spent foam and water drain to a storm sewer which discharges into the backwaters of the

Mississippi River. The fire station and the discharge area are located in a WPA and an active karst area.

- *North St. Paul Fire Department training site:* Semi-annual training with 3M-brand foam takes place at the North St. Paul Public Works facility on 1st Street North. The site is located in a WPA and covered karst area.
- *Richfield Fire Department:* The Richfield Fire Department historically trained occasionally with 3M foam behind the Richfield Ice Arena, located at 636 East 66th Street. The ice arena is located in a WPA and covered karst area, with municipal wells nearby. Surface runoff from the training area would drain to nearby Legion Lake.
- *Rochester Fire Department:* Historically, annual training with 3M-brand foam took place in a parking lot near the northwest corner of the Olmsted County Fairgrounds in Rochester. The site is located in a WPA and active karst area.
- *Luverne Fire Department:* A one-time fire foam demonstration took place in approximately 2005 at the Luverne municipal tree/brush dump. A burn pan was used, and the soils around the burn pan were cleaned up with a payloader afterwards. The site is located in a WPA, and a shallow municipal water supply well located nearby.
- *Lake Superior College Emergency Response Training Center (ERTC):* The potential exists for historical use of 3M or other brand foams at the ERTC from approximately 1994 through 1996. Training foam has been used at the facility since 1996. An on-site wetland is located adjacent to the foam training area, and the St. Louis River nearby. This site was selected for sampling after inquiries received by the MPCA regarding this facility.

Although originally identified as priority sites, additional information collected during follow-up activities that clarified foam use precluded the following sites from sampling: Pierz Fire Department; Cottage Grove Fire Department; Alexandria Fire Department; Myrtle Fire Department; Preston Fire Department; two training sites used by the Brooklyn Center Fire Department; and South Central College in Mankato. Since the MPCA conducted a PFC investigation at the former fire training area at the Duluth International Airport, no further investigation was conducted for this project. Additional inquiries regarding the fire training areas utilized by the Maynard and Hutchinson Fire Departments found that the Maynard Fire Department only uses Class A foam, and the Hutchinson Fire Department did not train with Class B foam at the former training location on the Crow River.

4.3 Additional Foam Discharge Sites

During the course of the PFC/Firefighting Foam project, additional incidents of firefighting foam discharge were brought to the attention of the MPCA. Further investigation was made into foam use at the following sites:

- *Kings Cove Marina, Hastings[(a)]:* In October 2002 a fire at the Kings Cove Marina destroyed several boats which were dry-docked at the west end of the marina. Several fire departments responded to the fire with various brands of Class B foam, apparently including approximately 305 gallons of 3M foam. This firefighting event may have released firefighting foam directly to the Mississippi River. Fish tissue sampling by the MPCA has identified PFCs in fish collected from the Mississippi River in the Hastings area.
- *River Grove Marina, Inver Grove Heights:* A fire occurred on a docked boat at the River Grove Marina on September 26, 2009. The Inver Grove Fire Department responded to the fire with, in

part, Ansul-brand Class B foam, which was discharged onto the burning boat and docks on the Mississippi River.

- *Kandiyohi County Landfill, New London:* A fire occurred at the Kandiyohi County Landfill over several days at the end of October 2009. Several fire departments responded to the fire, and approximately 545 gallons of 3M Class B foam was used on the fire.
- *Crystal Airport:* The Brooklyn Center Fire Chief related that several fire departments responded to a large hangar fire at the Crystal Airport in 2006. Interviews with responding departments found that Class B foam was not used at the hangar fire, but had been used at several plane crash sites at the airport.
- *Up North Plastics, Cottage Grove*[(a)]*:* A fire occurred at the business of Up North Plastics in December 2002. Its been estimated that upwards of 4,000 gallons of foam were used to extinguish the fire. Spent foam migrated into ditches and wetlands north of the facility, and to a storm sewer outlet south of the facility across Jamaica Road. Up North Plastics property is located within an area being investigated to identify sources of PFCs found in private wells in the Langdon and River Acres neighborhoods of Cottage Grove.
- *Western Area Fire Training Academy (WAFTA), St. Bonifacius*[(a)]*:* The WAFTA training facility was operated from 1974 through 1990, at the site of a former Nike Missile launch facility. The site was being investigated by the MPCA for other contaminants when, in May 2006, fourteen monitoring wells were sampled for PFCs. PFCs were detected in several of the wells.
- *Duluth International Airport*[(a)]*:* The Duluth Air National Guard Base and the Duluth Air Force Base both historically used two fire training areas located on the northeast side of the Duluth International Airport for Class B foam training.

(a) Further investigation and subsequent sampling at these sites was conducted by consultants other than Delta on behalf of the MPCA. Since firefighting foams were discharged at these sites, they are being included in this report.

5.0 SITE RECONNAISSANCE AND SAMPLE COLLECTION

Generally, the same or similar procedures were followed for site reconnaissance and sampling at the municipal fire department foam training areas. These procedures were presented in previous reports that detail specific site investigations. The sites where sampling was not conducted by Delta, or were not included in previous reports, are discussed in sections 5.1 through 5.5.

5.1 Sample Collection at the Kandiyohi County Landfill

Groundwater samples were collected for PFC analysis from two existing wells at the Kandiyohi County Landfill. Monitoring well DMW-1A is located upgradient of the C&D portion of the landfill where the fire occurred, and DMW-3 is located approximately 300 to 350 feet away in a roughly downgradient direction. The wells at Kandiyohi County Landfill were sampled on two occasions, in January and May 2010. Soil borings were not advanced at the landfill and soil samples were not collected.

5.2 Sample Collection at WAFTA

Groundwater samples were collected for PFC analysis from fourteen existing wells at the WAFTA site. The groundwater sampling was conducted in May 2006 by ENSR Corporation and is summarized in their report, *Phase II Site Investigation at Former Nike Missile Base MSP-70/Western Area Fire Training Academy,* dated October 2006. Monitoring well MW-4 was situated within the former fire training area, and the other wells were located side-gradient and downgradient of the training area. Monitoring well BG-4 was situated furthest downgradient of the training area, near the southeast corner of the WAFTA site. Soil samples were not collected for PFC analysis at WAFTA. The MPCA followed-up in 2008 and 2009 with sampling of nearby residential water wells for PFCs.

5.3 Sample Collection at the Kings Cove Marinas

At site of the fire at Kings Cove Marina in Hastings, two surface water and two sediment samples were collected from the adjacent Mississippi River where spent foam accumulated. One surficial soil sample was collected where foam was discharged on land. Sampling at Kings Cove Marina was conducted by West Central Environmental Consultants (WCEC). A data report detailing the sampling at Kings Cove Marina was submitted to the MPCA by WCEC on March 8, 2010.

5.4 Sample Collection at Duluth International Airport

Six soil borings were advanced within two former fire foam training areas at the Duluth International Airport for the purpose of collecting groundwater samples only. The sampling was conducted in October 2007 by BB&E, LLC, as presented in their *Groundwater Sampling Report, Duluth Air National Guard Base* dated December 19, 2007. Soil samples were not collected for PFC analysis at the fire training areas. The MPCA is following up with sampling of residential water wells in the area for PFCs.

5.5 Sample Collection at Up North Plastics

Five surficial soil samples were collected from the storm water ditch to which spent foam and water from the Up North Plastics fire reportedly drained. Four sediment and two surface water samples were also collected from a pond at the end of the storm water ditch. Groundwater samples were collected from three irrigation wells which are located at distances up to 1.5 miles away from the Up North Plastics facility. Sampling associated with the Up North Plastics fire was conducted by WCEC in July 2009. WCEC submitted a data report dated September 22, 2009, to the MPCA detailing this sampling.

6.0 SAMPLING RESULTS

Soil and sampling results are summarized in **Table 4, *Soil and Sediment Analytical Results, PFCs***. Groundwater and surface water sampling results are summarized in **Table 5, *Groundwater and Surface Water Analytical Results, PFCs***. The amount of foam used in training or at a fire response, and the foam

brands and the last known approximate date of training or date of foam discharge at a fire, are included on the tables.

Samples were submitted to either Axys Analytical Services LTD (Axys) or MPI Research for analysis of PFCs. Duplicate samples were collected at select sites and submitted to both laboratories for comparison purposes. Samples collected at the WAFTA site were analyzed by the MDH and by Exygen Research, which later became Axys. The laboratories used for analysis are noted in Tables 4 and 5.

According to research, one important factor for the transport of anionic perfluorinated surfactants in soil is the organic content of the soil; soil partition coefficients were found to be linearly related to organic carbon content, and sorption of the anionic perfluorinated surfactants to soil particles increased with increasing perfluorinated chain length (17). Therefore, soil samples collected for PFC analysis at select sites were also submitted to Pace Analytical Services for laboratory analysis of total organic carbon (TOC) via EPA Method SW9060.

6.1 Laboratory Analytical Results, Soil and Sediment Sampling

Laboratory analysis detected PFCs in 52 of the 80 soil and sediment samples analyzed for this project (see **Table 4**). The highest PFC concentrations detected in soil or sediment samples were found in the soil samples collected at the Bemidji Airport and the Richfield Ice Arena, and the sediment sample collected from the on-site wetland at the Lake Superior College ERTC. The Bemidji Fire Department trains annually with foam at the Bemidji Airport. Training with Class B foam ceased at the ERTC in 1996, and Class B foam training by the Richfield Fire Department stopped in 1999. 3M-brand Class B foam was used, or was likely used, at all three sites.

Class B foam manufactured by 3M was used, or was likely used (based on the date of foam use and the popularity of the foam) at all of the sites sampled as part of this project, except for the following: the ABLE fire training center in Burnsville; the fire foam training areas in Luverne and Harmony; the River Grove Marina fire; and, the storm sewer associated with the Goodview Fire Station. While PFOS is associated with 3M-brand foam, PFOS was detected in the soil at the sites in Burnsville, Luverne and Goodview. However, the PFOS detected in the storm water sediment sample collected in Goodview may or may not be associated with foam use at the Goodview Fire Station since storm water runoff is collected from numerous points along the storm sewer. Ansul-brand foam was used for training at the Burnsville site, however, the Burnsville Assistant Fire Chief indicated that the use of 3M-brand foam cannot be absolutely ruled out. The Harmony Fire Department indicated they train with Ansul-brand foam. The brand of foam used at the Luverne site for demonstration is unknown.

Analytical data for all of the soil and sediment samples indicates that perfluorinated sulfonates, especially PFOS, are present at higher concentrations than perfluorinated carboxylic acids. PFOS was the PFC

compound detected most often in the soil/sediment samples, with PFOS detected in 45 of the 80 samples analyzed. The next most-detected compounds were PFHxS and PFOA, which were detected in 36 of the soil/sediment samples. These trends are illustrated in **Graph 1**, ***Soil and Sediment PFC Concentrations***.

For the purpose of analyzing PFC concentrations trends with depth and with elapsed time between the last foam use and sampling date, PFOS soil concentration data were compared from the fire foam training sites where 3M-brand foam was used. This included PFOS data from foam training sites in Bemidji, Claremont, Rochester, Richfield, and Fridley. No trends were apparent in analyzing PFOS concentrations at shallow (0 to 4 feet bgs) and deep (4 to 8 feet bgs) depths, and no trends were apparent in comparing PFOS concentrations, and PFOS concentration increases/decreases with depth, to the length of elapsed time between the sampling and the last foam training. This lack of data trend may be due to the varying amounts of foam and water used, and different types of soils, and bare soil or grassy training sites versus paved training areas.

No trends are apparent between PFC compound concentrations and TOC concentrations. As expected, TOC concentrations are higher in the shallower soil samples.

6.2 Soil Laboratory Results versus State PFC Soil Reference Values

The MDH has defined soil reference values (SRVs) for a number of chemical compounds, which are soil contaminant concentrations above which an unacceptable risk to human health is predicted, dependent upon different exposure scenarios. The SRVs may or may not apply to the foam training areas or the fire sites; they are presented in this report for comparison purposes only.

Tier 1 SRVs assume that human exposure to contaminants is chronic and occurs in a residential site setting. Tier 2 SRVs assume contaminant exposures for industrial and recreational property uses. The MPCA has defined soil Tier 1 Residential SRVs, Tier 2 Recreational SRVs, and Tier 2 Industrial SRVs for only the following PFC compounds:

	Tier 1 Residential SRV	*Tier 2 Recreational SRV*	*Tier 2 Industrial SRV*
PFOS	2,100 ng/g	2,600 ng/g	14,000 ng/g
PFOA	2,100 ng/g	2,500 ng/g	13,000 ng/g
PFBA	77,000 ng/g	94,000 ng/g	500,000 ng/g

ng/g: nanograms per gram, which is equivalent to parts-per-billion.

None of the PFC concentrations detected in soil or sediment samples collected for this project met or exceeded any of the MPCA SRVs.

6.3 Groundwater and Surface Water Sampling Results

Laboratory analysis detected PFCs in 68 of the 72 groundwater and surface water samples analyzed for this project (see **Table 5**). Groundwater or surface water samples with the highest PFOS concentrations were found in samples collected at the WAFTA site. Water samples with the highest PFOA concentrations were collected at MSP Airport, WAFTA, and Duluth International Airport. Class B foams made by 3M were used, or were likely used based on the date of foam use, at all of these sites in the past.

The PFC compounds most often detected in groundwater and surface water samples were perfluorinated carboxylic acids. PFOA was detected in 59 of the 72 water samples collected during this project, and PFBA was detected in 58 water samples. PFHxA and PFPeA were detected in 55 and 53 of the water samples, respectively. This trend is illustrated in **Graph 2**, ***Groundwater and Surface Water PFC Concentrations.***

PFCs were detected in surface waters near the following fire foam training areas or fire sites where Class B foam was used: Richfield; MSP Airport; Goodview; River Grove Marina; Lake Superior College ERTC; Kings Cove Marina; and Up North Plastics. With the exception of Lake Superior College ERTC, the sampled bodies of water receive storm water runoff from areas other than the foam training or foam discharge sites. The PFCs detected in the surface waters may be attributed to the firefighting foam, or they may be from an unidentified source. At the ERTC in Duluth, it appears that only runoff from the fire training area enters that wetland.

At sites where 3M-brand foam were not used (the ABLE fire training center in Burnsville; the fire foam training areas in Luverne and Harmony; and, the storm sewer associated with the Goodview Fire Station), PFOS was detected in the groundwater or surface water. As discussed in Section 2.2, PFOS is associated with firefighting foams made by 3M. The source of PFOS at the ABLE fire training center in Burnsville, and at the training areas in Luverne and Harmony, is not known. The storm sewer outlet sampled in Goodview collects storm water from a large area where other sources of PFOS may exist.

6.4 Groundwater PFC Concentrations Versus Minnesota HRLs

The MDH has defined drinking water standards or values for the following PFC compounds: PFOS, PFOA, PFBA, and PFBS. The State drinking water Health Risk Limit (HRL) for both PFOS and PFOA in drinking water is 300 nanograms per liter (ng/L), which is equivalent to parts-per-trillion. The chronic exposure Health Based Value (HBV) for both PFBA and PFBS is 7,000 ng/L. The HBVs are developed by the MDH as interim guidance until a HRL can be established. A Risk Assessment Advice (RAA) for perfluorohexane sulfonate (PFHxS) does not specify numerical health-based limits or values.

The PFOS HRL was exceeded in at least one groundwater sample collected from the following sites:

- WAFTA

- Marathon Refinery
- Bemidji Airport
- ABLE fire training center in Burnsville
- MSP Airport

The PFOA HRL was exceeded in at least one groundwater sample collected from the following sites:

- MSP Airport
- WAFTA
- Duluth Airport
- ABLE fire training center in Burnsville
- Richfield Ice Arena

The surface water sample collected from the on-site wetland at the Lake Superior College ERTC had PFOS and PFOA concentrations that exceeded the drinking water HRLs. The HBVs for PFBA and PFBS were not exceeded in any of the water samples collected during this project.

6.5 State Surface Water Criteria for PFCs

The MPCA has developed site-specific ambient surface water quality criteria for only two PFC compounds, PFOA and PFOS. PFOA and PFOS criteria haven been developed for the surface waters of Lake Calhoun and for a portion of the Mississippi River, in accordance with Minnesota Rules, Chapter 7050.0218, *Methods for Determination of Criteria for Toxic Pollutants, for which Numerical Standards Not Promulgated.* Ambient surface water quality criteria have not been developed for any of the surface water bodies sampled as part of this project.

6.6 Ambient Groundwater Concentrations in Minnesota

In October 2007, ambient groundwater samples were collected by the MPCA from springs and monitoring wells in rural Minnesota for analysis of thirteen PFC compounds, including PFOA and PFOS. Sampling data is presented in the MPCA document *PFCs in Minnesota's Ambient Environment: 2008 Progress Report.* Twenty-two groundwater samples were analyzed for PFCs. The only PFC compound detected was PFBA, which was detected in thirteen samples at concentrations ranging from 2.43 ng/l to 63 ng/l.

In November-December 2006 and November 2007, the MPCA collected twenty-six ambient groundwater samples in urban areas of Minnesota, excluding those in Washington County where PFCs in groundwater are linked releases at historic 3M dumps. The samples were analyzed for nine PFC compounds, including PFOA and PFOS. Every PFC analyte was detected in at least one groundwater sample. Detected PFBA concentrations ranged from 1.34 ng/l to 468 ng/l. PFOA concentrations ranged from 1.1 ng/l to 24.8 ng/l. PFOS concentrations ranged from 2.39 ng/l to 31 ng/l.

In comparing groundwater sampling results from those sites sampled during this project in the rural areas of Minnesota (Harmony, Luverne, Bemidji, and Kandiyohi County) the PFBA concentrations as well as the number of other PFC analytes detected were considered. The PFC concentrations detected in groundwater at the firefighting foam training sites in Harmony, Luverne and Bemidji cannot be attributed to ambient concentrations. At the Kandiyohi County Landfill, where only low levels of PFBA have been detected in the well sample collected downgradient of the site of the fire, the PFBA concentrations may or may not be due to ambient levels.

Ambient concentrations of PFBA, PFOA and PFOS in groundwater found at urban locations were compared to the data collected at the remaining firefighting training sites or fire sites. The PFC concentrations detected in groundwater at the sites in Richfield, Fridley, Burnsville, and at MSP Airport, Duluth Airport, WAFTA, Marathon Refinery, and MW-3 at the Flint Hills Resources Pine Bend Refinery cannot be attributed to ambient concentrations. The PFBA, PFOA and PFOS concentrations detected in groundwater samples collected at the North St. Paul training area and the Crystal Airport, and in the upgradient groundwater samples (B-5, B-6 and B-7) at MSP Airport and the upgradient sample (MW-1) at the Pine Bend Refinery may or may not be due to ambient levels.

7.0 RECEPTOR SURVEYS AND ASSESSMENT OF RISK

The execution of receptor surveys and an evaluation of potential risks associated with PFC impacts identified during this project was not part of the scope of work, with one exception: a water well receptor survey was conducted around the former firefighting foam training area in Richfield due to the known presence of private wells in the area (see Section 7.2). The MPCA is not aware of anyone drinking water that has been impacted with PFCs above drinking water criteria due to the use of firefighting foam. The chemicals associated with firefighting foams of most concern at this time are PFOS and PFOA. According to the Minnesota Department of Health, nearly all people have some amount of PFCs in their blood. Studies by the Center for Disease Control and Prevention (CDC) published in 2007 found that PFOS, PFOA and PFHxS were detected in approximately 98% of the population (18). Research relied upon by the MDH in setting HRLs for drinking water indicates the health concerns associated with exposure to PFOS are effects on the liver and thyroid; health concerns related to PFOA are effects on the liver, slowed development in fetuses, reduced number of red blood cells, and changes to the immune system (19). While less is known about the potential health effects of telomerized compounds, the fact that they are showing up in more locations where firefighting foams are being used may mean that more study is warranted.

7.1 MDH Municipal Well Sampling

One of the risks associated with PFCs in groundwater is to human health should a potable water well be drawing water from impacted groundwater. There are municipal supply wells located near several of the "priority" sites where groundwater impacted by PFCs have been identified, including Bemidji, Luverne, Burnsville, and Richfield. The MPCA and MDH have worked together to identify public supply wells that may be at risk due to their proximity to firefighting foam training areas or large fire sites where Class B foam was discharged. The MDH has sampled supply wells near several fire foam training areas in the "priority" cities and elsewhere, and while low levels of some PFC compounds were detected in municipal well water samples, none of the concentrations have exceeded the HRLs or HBVs.

7.2 Well Receptor Survey, Richfield

As presented in the February 2010 Report, a water well survey was conducted in the area adjacent to or within one-quarter mile to the east, south and southeast of, the former Richfield fire foam training area at the Richfield Ice Arena, in reference to the easterly or potential southeasterly groundwater flow direction. The survey included a search of the MDH County Well Index (CWI), and walking and mailing surveys to identify private water wells. The survey identified several sealed and abandoned water supply wells and groundwater monitoring wells in the survey area. No active wells, other than the municipal wells which were being sampled by MDH, were identified within ¼-mile downgradient of the former fire training area.

7.3 Well Receptor Survey, WAFTA

A groundwater receptor survey conducted by ENSR Corporation identified several water supply wells within one-half mile of the WAFTA site. Sampling of the nearby water wells by the MPCA in 2008 and 2009 did not identify PFCs in any of the wells.

7.4 Well Information, Duluth International Airport

According to the *Groundwater Sampling Report* by BB&E, LLC, there are no drinking water wells in the immediate area of the former firefighting foam training areas, and there are no plans to install water supply wells on airport property. The nearest residential water supply wells identified in a groundwater receptor survey conducted in association with this site are located approximately 1.25 miles away. The residential wells are currently being sampled for PFCs under the oversight of the MPCA.

8.0 FINDINGS AND RECOMMENDATIONS

8.1 PFCs in Class B Foam

Based on the literature review, interviews with knowledgeable persons, and survey of firefighting foam manufactures, the surfactant in Class B firefighting foams contain PFCs. The Class B foams manufactured by 3M prior to 2002 using the ECF manufacturing process contain, or break down to, perfluorinated

sulfonates. Class B foams made by other manufacturers using a telomerization process contain, or break down to, fluorotelomer sulfonates and perfluorinated carboxylic acids.

8.2 Class B Foam Use in Minnesota

Based on the survey of Minnesota firefighting organizations, and assuming that the 66% response rate by municipal fire departments is representative of the entire State, approximately 10% of the municipal fire departments do not use firefighting foam at all, approximately 58% of the municipal fire departments use only Class A foams, approximately 15% of the municipal fire departments use Class B foam for fire response but do not train with Class B foam, and approximately 15% of the municipal fire departments use and train with Class B foam.

The two active oil refineries in the State have their own fire departments and their own on-site fire training areas where Class B foam is used in training and as needed for extinguishing fires.

Of the sixteen MNSCU firefighting training schools, only two of the schools hold training exercises or held training exercises on campus with Class B foam: Lake Superior College ERTC in Duluth; and, Northland College in East Grand Forks.

Firefighting training with Class B foam is no longer conducted at MSP Airport or the Duluth International Airport. Training at these airports with 3M-brand Class B foam was conducted in the past.

Firefighting training with Class B foam at the WAFTA site in St. Bonifacius ceased in 1990. Firefighting foam is not used in training exercises at the SCALE Regional Public Safety Training Facility in Jordan, which opened in 2008. Firefighting foam training is not conducted at Camp Ripley.

Class B foams have been used, and will continue to be used on Class B fires across the State in order to protect public safety, the safety of firefighters, and property. Class B foams are not classified as a hazardous substance, nor has the MPCA or other regulatory entity placed any restrictions on the use of Class B foams.

8.3 Sampling Findings

This project has identified PFCs in soil, sediments, surface water and groundwater at locations where various brands of Class B firefighting foams were used. PFCs were found in soils and groundwater at sites where several years have passed since the last training event or since foam was discharged at a fire. PFC compounds associated with 3M's ECF manufacturing process (i.e. perfluorinated sulfonates) were detected at training sites where 3M-brand foams were not used.

Groundwater is impacted with PFOA and/or PFOS at concentrations exceeding the State drinking water HRLs at the following sites:

- WAFTA site in St. Bonifacius
- Marathon Refinery in St. Paul Park
- Bemidji Regional Airport
- ABLE fire training center in Burnsville
- MSP Airport
- Duluth International Airport
- Richfield Ice Arena

While these locations have PFOA and/or PFOS concentrations in groundwater that exceed the State drinking water Criteria, at this time the MPCA is not aware of anyone drinking water contaminated with PFCs due to the use of firefighting foams that exceed drinking water criteria. Sampling of private water wells in the area of the WAFTA and Duluth International Airport firefighting foam training sites did not detect PFCs in any of the wells. A groundwater receptor survey conducted in the area of the Richfield Ice Arena did not identify any active private water wells.

The PFC concentrations in soils at all sites where samples were collected are all well below the current clean-up criteria.

Firefighting foam training sites with minimal use of Class B foams exhibited low levels of PFCs in groundwater, but concentrations are not exceeding current standards. Therefore, those training sites ranked lower than the 21 "priority" sites do not appear to be a risk to human health or the environment and will not be subject to further action at this time, unless additional information is obtained that would change the ranking of a site.

8.4 State Recommendations on the Use of Class B Firefighting Foam

The MPCA, in conjunction with the Minnesota Department of Public Safety and the Minnesota State Colleges and Universities, has prepared a "Best Practices Today for Class B Firefighting Foam" document, a copy of which is included in **Appendix A**. The Best Practices document recognizes the importance of the use of Class B firefighting foam to fight Class B fires-- it protects the public, it protects the firefighters working to protect us, and it protects property. The Best Practice document presents information and recommendations on the use of foam on fires and spills, foam training, foam types, firefighters' health, and foam disposal, and includes the following recommendations:

- Use Class B foams as necessary on Class B fires, but use Class A foams for Class A fires.
- Use training foam, and not Class B foam, in training exercises if possible. Training foams do not appear to contain PFCs.
- Training with Class B foams in wellhead protection areas or near public or private water supply wells should be avoided whenever possible.

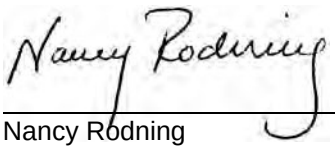
8.5 Recommendations for Further Assessment

While the MPCA is not aware of anyone drinking water contaminated with PFCs above drinking water criteria associated with firefighting foam use, several sites still warrant some additional investigation. Based on the information presented in this report and previous reports, following are recommendations for further assessment with regards to PFCs at firefighting foam training sites or fire sites where Class B foam was used:

1. Conduct groundwater receptor surveys to evaluate risk at the following sites where PFOA and/or PFOS concentrations in groundwater exceeded the State HRLs:
    - Marathon Refinery in St. Paul Park
    - Bemidji Regional Airport
    - ABLE fire training center in Burnsville
    - MSP Airport
2. Conduct a groundwater receptor survey to evaluate risk in the area of the Lake Superior College ERTC due to elevated PFOS and PFOA concentrations in the wetland adjacent to the training area.
3. Continue to monitor groundwater for PFCs at the existing monitoring well located downgradient of the fire site at the Kandiyohi County Landfill. Since the foam discharge occurred less than one year ago, it may take time for potential PFC impacts to migrate through the soil to the water table, and to migrate with groundwater to the location of well DMW-3. Consider installing a monitoring well closer to the site of the fire if site activities and land use nearer the fire site are conducive to the presence of a monitoring well.
4. At the time of sampling at Crystal Airport, there was no water in Shingle Creek. Since PFCs were detected in a sediment sample collected on the down stream side of Crystal Airport, but none were detected upstream, water samples should be collected at or near the locations of the previous sediment samples to test for PFCs in Shingle Creek adjacent to Crystal Airport.
5. Follow up with inquiries, and sampling if warranted, at any large fires that occur or have occurred where Class B foams are used extensively.

9.0 REMARKS

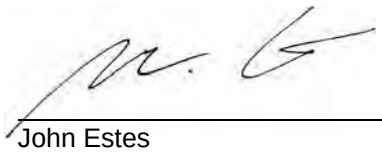
The recommendations contained in this report represent Delta's professional opinions based upon the currently available information and are arrived at in accordance with currently accepted professional standards. This report is based upon a specific scope of work requested by the client. The contract between Delta and its client outlines the scope of work, and only those tasks specifically authorized by that contract or outlined in this report were performed. This report is intended only for the use of Delta's client and anyone else specifically identified in writing by Delta as a user of this report. Delta will not and cannot be liable for unauthorized reliance by any other third party. Other than as contained in this paragraph, Delta makes no express or implied warranty as to the contents of this report.



Date: June 30, 2010

Nancy Rodning
Project Geologist

Reviewed by:



Date: June 30, 2010

John Estes
Project Manager

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TABLES

Table 1 Class B Foam Use Ranking Summary, Minnesota Municipal Fire Departments

Table 2 Class B Foam Use Ranking Summary, Minnesota Airport and Refinery Fire Departments and Training Schools

Table 3 PFC Sample Collection Summary, Minnesota Firefighting Foam Training and Discharge Sites

Table 4 Soil and Sediment Analytical Results, PFCs

Table 5 Groundwater and Surface Water Analytical Results, PFCs.

TABLE 1

CLASS B FOAM USE RANKING SUMMARY
MINNESOTA MUNICIPAL FIRE DEPARTMENTS
Delta Project No. 19382DEL08

		SITE RANKING CRITERIA								
Department	**Training Location**	**Foam Type: 3M current or former use in training =8**	**Annual Class B Foam Usage in Training: 5 gal or less=2; 6 to 10 gal=4; >10 gal=6**	**Surface Water Nearby: within 1/4 mile=3; within 1 mile=1; No=0**	**Wetlands Nearby: within 1/4 mile=3; within 1 mile=1; No=0**	**Karst Area: Active=5; Transition=4; Covered=2; No=0**	**Water Wells Nearby: within 1/4 mile=3; within 1 mile=1; No=0**	**WPA/SWAA: site in WPA and/or SWAA=5; within 1/4 mile=4; within 1 mile=2; No=0**	**OVERALL SITE RANKING**	**Notes**
Richfield	Richfield ice arena, 636 E. 66th St.	8	6	3	3	2	3	5	30	sampled soil, groundwater, surface water, upgradient groundwater
Fridley	300 71st Av., Fridley (North Metro Fire Training Center)	8	2	3	3	4	3	5	28	sampled soil, groundwater, sediment
Luverne	Tree dump 1/2 mile south of city on Hwy 75, east side of road.	8	6	3	3	0	3	5	28	sampled soil, groundwater
North St. Paul	No. St. Paul Public Works, 2303 1st St. N.	8	6	3	1	2	3	5	28	sampled soil, groundwater, surface water
Brooklyn Center	Fire station #1 6250 Brooklyn Blvd.	8[(a)]	6	1	1	4	3	5	28	follow-up site visit indicated no Class B foam training.
	Fire station #2 6500 Dupont Av. N.	8[(a)]	6	1	1	4	3	5	28	follow-up site visit indicated no Class B foam training.
Preston	Fillmore County Fairgrounds Fillmore St. & Cty. Hwy. 12, Preston	8	2	3	3	5	3	4	28	follow-up interview indicated one-time training at specified location only.
Kenyon	Fire station, 714 2nd St.	8	2	3	1	5	3	5	27	sampled soil
Cottage Grove	Fire Station 2, 8641 80th St. S.	8	2	3	3	5	1	5	27	follow-up interview indicated training with Class A foam only.
Bemidji	Bemidji Airport (Class B)	8	4	3	3	0	3	5	26	follow-up interview indicated foam brand unknown; sampled soil, groundwater
Northfield	City street shop, 1710 Riverview Drive.	8	2	3	3	5	3	1	25	haven't trained with foam in 10-15 years, and only trained when new equipment purchased.
Rochester	2021 41st St. NW	8	2	1	1	5	3	5	25	sampled soil
Burnsville	ABLE Fire Training Center Cliff Rd & River Ridge Blvd.	0	4	3	3	5	3	5	23	sampled soil, groundwater
Claremont	Front of fire hall on Front St.	8	2	1	0	4	3	5	23	sampled soil
Clearbrook	Tank farm on south edge of town.	8[(a)]	4	3	3	0	3	2	23	Fire Chief wasn't sure the type of foam used. Spent foam caught on floating lids at tank farm.
Linwood Twp	Behind fire station, 22870 Typo Creek Dr., Stacy	8	4	3	3	0	3	2	23	
Littlefork	Fire hall, McPherson & 3rd Av	8[(a)]	2	3	3	0	3	4	23	follow-up attempts unsuccessful
St. Clair	City of St. Clair	8[(a)]	6	3	1	2	3	0	23	follow-up attempts unsuccessful
Alexandria	Various, including VoTech, Magellan tank farm, live burns.	8[a]	2	3	1	0	3	5	22	historical training with Class B foam at Magellen tank farm only.
Golden Valley	7800 Golden Valley Road	0	6	3	1	4	3	5	22	
Hutchinson	205 3rd Av. SE	8	4	1	1	0	3	5	22	no on-site foam training, historically trained with foam at 3M facility in town.
	1300 Adams St. SE	8	4	3	1	0	3	2	21	

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Department	**Training Location**	**Foam Type: 3M current or former use in training =8**	**Annual Class B Foam Usage in Training: 5 gal or less=2; 6 to 10 gal=4; >10 gal=6**	**Surface Water Nearby: within 1/4 mile=3; within 1 mile=1; No=0**	**Wetlands Nearby: within 1/4 mile=3; within 1 mile=1; No=0**	**Karst Area: Active=5; Transition=4; Covered=2; No=0**	**Water Wells Nearby: within 1/4 mile=3; within 1 mile=1; No=0**	**WPA/SWAA: site in WPA and/or SWAA=5; within 1/4 mile=4; within 1 mile=2; No=0**	**OVERALL SITE RANKING**	**Notes**
Myrtle	Myrtle ballfield	8[(a)]	2	1	0	5	1	5	22	follow-up interview indicated use of Class A foam only.
Perham	Near parking entrance of Prairie Winds Middle School	8[(a)]	4	1	1	0	3	5	22	various brands Class B foam, more training with class A than Class B. Switched to POK stick last year.
Pierz	Intersection of 25 and 27, Pierz	8	2	3	3	0	1	5	22	follow-up interview indicated one-time training at specified location only.
St. Paul	1683 Energy Park Dr., St. Paul	8	4	1	1	5	3	0	22	
Crosslake	Joint City/County maintenance facility, 13870 Whipple.	8[(a)]	2	3	3	0	3	2	21	training location confirmed with City, could not confirm type of foam used.
Fairmont	City shop park lot, 417 E. Margaret St.	8	6	3	3	0	1	0	21	
Goodview	Across street from fire station, 4140 W. 5th St.	0	2	3	3	5	3	5	21	sampled surface water, sediment
Mankato	Fire Sta. #1, 300 Madison Av.	8	4	1	0	5	1	2	21	
Marshall	Marshall Merit Center, Cty Rd 33 (1001 W. Erie Rd.)	8[(a)]	6	3	3	0	1	0	21	
Harmony	Fire hall, Main Av. S. and Brush dump, east of intersection of 139 & Gordon Rd.	0	2	3	3	5	1	5	19	sampled soil and groundwater
Hugo	5223 140th St. N.	0	2	3	3	4	3	4	19	
	4630 Fable Rd. Ct. N.	0	2	3	3	4	3	5	20	
Minneapolis	25 37th Ave. NE	8	2	3	1	4	1	0	19	
Rosemount	14700 Shannon Pkwy	8	2	1	1	2	3	2	19	
Winona	Central Fire Sta., 451 E. 3rd.	0	2	3	1	5	3	5	19	
	Technical College, 1250 Homer Rd.	0	2	3	3	5	3	0	16	
Cannon Falls	Cannon Valley fair grounds, Cannon Falls	0	2	3	3	5	1	4	18	
Lanesboro	Lanesboro ball park parking lot, County Road 8	0	2	3	3	5	1	4	18	
Loretto	259 Medina St. N.	8	2	1	1	0	1	5	18	
Plymouth	Fire Station, 13250 Co. Rd. 6	0	2	1	1	2	1	5	12	
	Fire Station, 3300 Dunkirk Ln.	0	2	3	3	2	3	5	18	
	Fire Station, Old Rockford Rd.	0	2	3	3	2	3	5	18	
Waconia	7550 Airport Rd.	0	4	3	3	0	3	0	13	
	26 Maple St. S.	0	4	3	1	0	3	5	16	
	8075 Paradise Lane	0	4	3	3	0	3	5	18	
Montevideo	Fire station, 103 Canton Av.	8	2	3	3	0	1	0	17	

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Delta Project No. 19382DEL08

		SITE RANKING CRITERIA								
Department	**Training Location**	**Foam Type: 3M current or former use in training =8**	**Annual Class B Foam Usage in Training: 5 gal or less=2; 6 to 10 gal=4; >10 gal=6**	**Surface Water Nearby: within 1/4 mile=3; within 1 mile=1; No=0**	**Wetlands Nearby: within 1/4 mile=3; within 1 mile=1; No=0**	**Karst Area: Active=5; Transition=4; Covered=2; No=0**	**Water Wells Nearby: within 1/4 mile=3; within 1 mile=1; No=0**	**WPA/SWAA: site in WPA and/or SWAA=5; within 1/4 mile=4; within 1 mile=2; No=0**	**OVERALL SITE RANKING**	**Notes**
Apple Valley	Fire Sta. #1, 15000 Hayes Rd.	0	2	1	3	2	3	5	16	
	Apple Valley central maintenance facility, 6442 140th St. W.	0	2	1	3	2	3	4	15	
Elysian	Fire hall, 212 E. Main	0	2	3	3	2	1	5	16	
Norwood	City vacant lot at South & Rush Streets	0	2	1	3	2	3	5	16	
Paynesville	City airport	0	2	3	3	0	3	5	16	
Pelican Rapids	2nd Av. NW & 4th St.	0	2	3	3	0	3	5	16	
St. Cloud	Open field near Sta. 2 700 41st Av N.	0	6	3	1	0	1	5	16	
	Sta. 4, 1550 45th Av SE	0	6	1	3	0	1	4	15	
Waldorf	Main Street	0	6	1	1	2	1	5	16	
Buffalo Lake	315 N. Main St., at Main & Church Sts.	8	2	1	1	0	1	2	15	
Hamburg	181 Broadway	0	2	3	3	2	3	2	15	
Lake Johanna	Varies, mostly at Station 3, 5545 Lexington Ave.	0	4	3	3	2	3	0	15	
Richmond	Industrial lot, 3 lots west of Main & 191st Av, on the north side of Main.	0	2	3	3	0	3	4	15	
Sartell-LeSauk	Fire hall, 220 4th Ave. S.	0	2	3	3	0	3	4	15	
Silver Lake	Public Works storage area, 305 E. Main St.	0	2	3	3	0	3	4	15	
Upsala	110 W. Elm Av., Upsala	0	4	3	3	0	3	2	15	
Welcome	NE corner of Dugan St. S. and Mill St.	0	2	1	3	0	3	5	14	
Albert Lea	Frank Av., near dog pound	0	2	1	1	2	3	4	13	
Cass Lake	Railroad ROW by 8 Railroad St. NW, Cass Lake	0	4	1	1	0	3	4	13	
Glenville	High school football field	0	2	3	1	4	3	0	13	
New York Mills	City utility gravel parking lot, west side of town, between Centennial Dr. W. and Hwy. 10.	0	2	3	3	0	3	2	13	
Pine River	Fair grounds	0	2	1	1	0	1	5	10	
	School grounds on 1st Street	0	2	3	3	0	1	4	13	
Waseca	Waseca Cty Fairground, area of grand stand.	0	4	1	1	2	1	4	13	

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MINNESOTA MUNICIPAL FIRE DEPARTMENTS
Delta Project No. 19382DEL08

		SITE RANKING CRITERIA								
Department	**Training Location**	**Foam Type: 3M current or former use in training =8**	**Annual Class B Foam Usage in Training: 5 gal or less=2; 6 to 10 gal=4; >10 gal=6**	**Surface Water Nearby: within 1/4 mile=3; within 1 mile=1; No=0**	**Wetlands Nearby: within 1/4 mile=3; within 1 mile=1; No=0**	**Karst Area: Active=5; Transition=4; Covered=2; No=0**	**Water Wells Nearby: within 1/4 mile=3; within 1 mile=1; No=0**	**WPA/SWAA: site in WPA and/or SWAA=5; within 1/4 mile=4; within 1 mile=2; No=0**	**OVERALL SITE RANKING**	**Notes**
Cloquet	Gravel pit next to city garage at 410 Armory Road	0	2	1	3	0	1	5	12	
Maynard	Mable St. & Sherman	0	2	1	1	0	3	5	12	follow-up interview indicated use of Class A foam only.
Newfolden	Fire hall	0	2	3	1	0	1	5	12	
Randall	At lot across the street from the fire station.	0	2	0	3	0	3	4	12	
Alborn	Albrook School, 7427 Seville Rd., Saginaw (demonstration)	0	2	1	3	0	1	0	7	
	Alborn Fire Hall, 6390 Hwy. 7, Alborn (training & demo).	0	2	3	3	0	3	0	11	
Appleton	Appleton Public Works bldg. 427 S. Munsterman St.	0	4	1	3	0	3	0	11	
Dilworth	Fire hall, 709 1st Av NW	0	2	3	1	0	3	2	11	
Evansville	East end of town, (new) Council Circle.	0	2	1	3	0	1	4	11	
Hibbing	2320 Brooklyn Dr.	0	2	1	1	0	3	4	11	
Hoyt Lakes	Triple ballfields or near Hoyt Lakes fire hall, 123-1/2 Kennedy Memorial Dr.	0	2	3	3	0	3	0	11	
Mapleton	Street in front of fire hall, 103 3rd Av NE	0	2	1	0	2	1	5	11	
Northrop	Behind fire hall, 211 N. Bridgeman	0	2	0	1	0	3	5	11	
Dunnell-Lake Fremont	Old ball diamond, N. Seeley Av., Dunnell	0	2	1	1	0	1	4	9	
Ellsburg	Fire hall, 1763 Melrude Rd., Melrude, MN	0	2	3	3	0	1	0	9	
Porter	Fire hall, 301 Lone Tree Street	0	4	3	1	0	1	0	9	
Tyler	Corner of Bradley & Applebee	0	6	1	1	0	1	0	9	
Blackhoof	3148 Cty. Rd. 5, Barnum	0	2	1	1	0	3	0	7	
Breckenridge	1312 Minnesot Av.	0	4	1	1	0	1	0	7	
Wolverton	Gravel road in front of fire hall, 301 Hwy 75, Wolverton	0	2	3	1	0	1	0	7	

Notes:
(a) Foam type or training use not specified, 3M foam use for training assumed.
WPA: Wellhead Protection Area
SWAA: Source Water Assessment Area

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TABLE 2

CLASS B FOAM USE RANKING SUMMARY

MINNESOTA AIRPORT AND REFINERY FIRE DEPARTMENTS AND TRAINING SCHOOLS

Delta Project No. 19382DEL08

				Site Ranking Criteria							
Entity	**Location**	**Training Location**	**Notes**	**Foam Type: 3M current or former use in training=8**	**Annual Class B Foam Usage in Training: 5 gal or less=2; 6 to 10 gal=4; >10 gal=6**	**Surface Water Nearby: within 1/4 mile=3; within 1 mile=1; No=0**	**Wetlands Nearby: within 1/4 mile=3; within 1 mile=1; No=0**	**Karst Area: Active=5; Transition=4; Covered=2; No=0**	**Water Wells Nearby: within 1/4 mile=3; within 1 mile=1; No=0**	**WPA/SWAA: site in WPA and/or SWAA=5; within 1/4 mile=4; within 1 mile=2; No=0**	**Site Ranking**
Alexandria Technical College	1601 Jefferson St. Alexandria	Various locations	Foam provided by various fire departments.	Foam training at various locations, foam provided by other fire departments. Site not ranked.							
Central Lakes College	501 W. College Drive, Brainerd	Various fire departments		Multiple training locations, site not ranked.							
Hennepin Technical College	13100 Collegeview Dr. Eden Prairie	Parking lots of school		Use of Class A and training foam only; no Class B foam use. Site not ranked.							
Hennepin Technical College	1820 Xenium Ln. N. Plymouth	Hennepin Technical College, 13100 College View Dr., Eden Prairie		Class A foam use only, site not ranked.							
Itasca Community College	1831 E. Hwy. 169 Grand Rapids	Not applicable		Foam not used in training, site not ranked.							
Lake Superior College	11501 Hwy 23 Duluth	On-site	Training foam type Kidde Trainol. Other departments train with Trainol.	8	2	3	3	0	1	0	17
Mesabi Range College	1001 Chestnut St. Virginia	Various fire departments and on-site.		Class A foam use only, site not ranked.							
Minnesota State Community & Technical College	2900 28th Av. S. Moorhead	Various fire departments; no training with foam on campus.	Foams supplied by local fire departments.	Multiple training locations, site not ranked.							
Minnesota West Comm & Tech College	607 W. Main St., #100 Marshall	Various fire departments: Granite Falls, Luverne, Jackson, Lake Wilson, and Merit Center in Marshall	Training foam type unknown.	Multiple training locations, site not ranked.							
Northland College	1101 Hwy 1 East Thief River Falls	Various fire departments	Foam training done at off-site locations using other departments' foam.	Class A foam use only, multiple training locations; site not ranked.							
Northland College	2022 Central Av. NE East Grand Forks	Two grassy areas and a parking lot on campus.	Stopped using Class B protein foam more than 5 years ago.	0	6	1	1	0	0	0	8
Pine Technical College	900 4th St. SE Pine City	Various house burns, training as requested.	Foam supplied by other fire departments.	Class A foam use only, multiple training locations; site not ranked.							

TABLE 2

CLASS B FOAM USE RANKING SUMMARY

MINNESOTA AIRPORT AND REFINERY FIRE DEPARTMENTS AND TRAINING SCHOOLS

Delta Project No. 19382DEL08

Entity	Location	Training Location	Notes	Site Ranking Criteria							Site Ranking
				Foam Type: 3M current or former use in training=8	Annual Class B Foam Usage in Training: 5 gal or less=2; 6 to 10 gal=4; >10 gal=6	Surface Water Nearby: within 1/4 mile=3; within 1 mile=1; No=0	Wetlands Nearby: within 1/4 mile=3; within 1 mile=1; No=0	Karst Area: Active=5; Transition=4; Covered=2; No=0	Water Wells Nearby: within 1/4 mile=3; within 1 mile=1; No=0	WPA/SWAA: site in WPA and/or SWAA=5; within 1/4 mile=4; within 1 mile=2; No=0	
St. Cloud Technical College	1540 Northway Drive St. Cloud	Various fire departments		Multiple training locations, site not ranked.							
South Central College	1920 Lee Blvd North Mankato	On-site (10%) and at various fire departments (90%).	Training with various foam brands, whatever the trainee dept. has on hand and whatever is least expensive.	es that there is no on-site training with Class B foam.							
Ridgewater College	2101 NW 15th Av Willmar	Off-site at various fire departments: Litchfield, Ortonville, Prinsburg, Morris		Class A foam use only, multiple training locations; site not ranked.							
Riverland Community College	1900 8th Av NW Austin	Have not trained in many years, recall one training event in Preston, MN.	Foam brands not specified.	Class A and training foam use only, multiple training locations; site not ranked.							
Flint Hills Resources, Pine Bend Refinery Fire Dept.	Rosemount	SW corner of refinery site, 1255 Clayton Blvd.	3M Foams (FC 600F, FC 602, ATC 3x3, FC 603) no longer used for training. Ansul Thunderstorm FC600A used for training. Other departments train on site.	8	6	1	1	4	3	0	23
Marathon Petroleum Refinery	St. Paul Park	Refinery fire training grour	Switched from 3M to Ansul Thunderstorm foam in ~2000. Use ~250 gallon foam for training; non-training foam use varies. Site located in Special Well Construction Area.	8	6	3	3	5	3	2	30
Former Wrenshall Refinery	Highway 1, Wrenshall	Per Wrenshall Fire Chief, historic training with foam on-site.		8[(b)]	6[(c)]	3	3	0	3	2	25[(c)]
Camp Ripley	15000 Hwy 115 Little Falls	No on-site training with foam.	Class A foam type Fire-Trol Fire Foam 103B	No on-site training with foam, Class A foam use only; site not ranked.							

TABLE 2

CLASS B FOAM USE RANKING SUMMARY

MINNESOTA AIRPORT AND REFINERY FIRE DEPARTMENTS AND TRAINING SCHOOLS

Delta Project No. 19382DEL08

				Site Ranking Criteria							
Entity	**Location**	**Training Location**	**Notes**	**Foam Type: 3M current or former use in training=8**	**Annual Class B Foam Usage in Training: 5 gal or less=2; 6 to 10 gal=4; >10 gal=6**	**Surface Water Nearby: within 1/4 mile=3; within 1 mile=1; No=0**	**Wetlands Nearby: within 1/4 mile=3; within 1 mile=1; No=0**	**Karst Area: Active=5; Transition=4; Covered=2; No=0**	**Water Wells Nearby: within 1/4 mile=3; within 1 mile=1; No=0**	**WPA/SWAA: site in WPA and/or SWAA=5; within 1/4 mile=4; within 1 mile=2; No=0**	**Site Ranking**
Metropolitan Airports Commission at Minneapolis/St. Paul Airport	MSP	Trained until recently at Humphrey remote ramp or de-icing pad. Plugged drains, collected spent foam for off-site disposal	Ansul 3% used for training. Historic use of military protein foam in 1960s/1970s. Historic use of 3M foam through ~2000. Class A foam type 1% Lorcon.	8	6	3	3	5	3	5	33
Rochester Airport Fire Dept.	Rochester	Various on-site locations as selected by FAA Inspector, usually a runway. "Short bursts" of foam required in training by FAA. Firefighters train at facility in Duluth.		0	2	3	3	5	3	0	16
Minnesota Air National Guard - Duluth International Airport	Duluth	No current on-site training with foam.	Active site investigation for PFCs at former fire training site under direction of MPCA. 3M foam still used in fire response.	8[(b)]	6	3	3	0	3	0	23

Notes:

(a) Foam type or training use not specified, 3M foam use for training assumed.

(b) 3M foam not currently used in training, but currently used in fire response. Site ranked based on use of foam in fire response.

(c) Ranking assumes maximum use of 3M foam in training exercises.

WPA: Wellhead Protection Area

SWAA: Source Water Assessment Area

DELTA

TABLE 3

Sample Collection Summary
Minnesota Firefighting Foam Training and Discharge Sites
Delta Project No. 19382DEL08

Site	# Borings Advanced	Sampled Media							Notes
		Boring Soil Samples	Surface Soil Samples	Groundwater from Borings	Groundwater from Existing Well	Upgradient Groundwater	Sediment	Surface Water	
MSP Airport Minneapolis, MN	7			X	X	X	X	X	Soil samples not collected from borings.
Marathon Refinery St. Paul Park	0				X	X			Sampled existing wells only, no borings advanced.
Flint Hills Resources Pine Bend Refinery Rosemount	0				X	X			Sampled existing wells only, no borings advanced.
Kenyon Fire Department Training Site Slee Street Kenyon	2	X							Groundwater not encountered in borings.
Claremont Fire Department Training Site Claremont Fire Station, Behind	2	X							Groundwater not encountered in borings.
Claremont Fire Department Training Site Claremont Fire Station, Front	1	X							Groundwater not encountered in borings.
Harmony Fire Department Training Sites Harmony Municipal Tree/Brush Dump	2	X		X					
Harmony Fire Department Training Sites Harmony Fire Station	2	X							Groundwater not encountered in borings.
Bemidji Fire Department Training Site Bemidji Regional Airport	2	X		X					
Fridley Fire Department Training Site North Metro Fire Training Center Fridley	2	X		X			X		Sediment sample collected from an on-site wetland.
Burnsville Fire Department Training Site ABLE Fire Training Center Burnsville	3	X		X					Groundwater collected from boring B-3 only.
Goodview Fire Department Training Site Storm Sewer Discharge Point Goodview	0						X	X	Samples collected at storm sewer discharge point only.
No. St. Paul Fire Department Training Site No. St. Paul Public Works Facility	2	X	X	X					
Richfield Fire Department Training Site Richfield Ice Arena	4	X		X		X		X	
Rochester Fire Department Training Site Olmsted County Fairgrounds Rochester	2	X							Groundwater not encountered in borings.
Luverne Fire Department Training Site Municipal Tree/Brush Dump Luverne	3	X		X					
Lake Superior College ERTC Duluth	0		X				X	X	Samples collected at underground pipe discharge point and from on-site wetland.
River Grove Marina Inver Grove Heights	0						X	X	
Kandiyohi County Landfill New London	0				X	X			Sampled existing wells only, no borings advanced.
Crystal Airport Crystal	2	X	X	X			X		
Kings Cove Marina Hastings	0		X				X	X	
Up North Plastics Cottage Grove	0		X				X	X	Samples collected along storm water ditch and associated pond.
WAFTA St. Bonifacius	0				X				Sampled existing wells only.
Duluth International Airport Former Fire Training Areas	6			X					Soil samples not collected from borings.

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TABLE 4

Soil and Sediment Analytical Results, PFCs
Minnesota Fire Foam Training and Discharge Sites
Delta Project No. 19382DEL08

				Perfluorinated carboxylic acids									Perfluorinated sulfonates			
				Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)
#Perfluorinated Carbon Chains:				**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**
Harmony Fire Dept. Training Area, Tree/Brush Dump																
Training Frequency:	Annual or less since ~2006															
Last Training Event[(1)]:	2008															
Foam Usage per Training Event:	5 gallons or less															
Foam Brand:	variety, including Ansulite															
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**													
Harmony B-1 SL 0-4'	0-4 ft.	4/23/2009	Axys	< 0.0955	< 0.0955	< 0.0955	< 0.0955	< 0.0955	< 0.0955	< 0.0955	< 0.0955	< 0.0955	< 0.191	< 0.191	< 0.191	< 0.0955
Harmony B-1 SL 4-8'	4-8 ft.	4/23/2009	Axys	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.201	< 0.201	< 0.201	< 0.101
Harmony B-2 SL 0-4'	0-4 ft.	4/23/2009	Axys	< 0.0947	< 0.0947	< 0.0947	< 0.0947	< 0.0947	< 0.0947	< 0.0947	< 0.0947	< 0.0947	< 0.189	< 0.189	< 0.189	< 0.0947
Harmony B-2 SL 4-8'	4-8 ft.	4/23/2009	Axys	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.192	< 0.192	< 0.192	< 0.0962
Harmony Fire Dept. Training Area, Harmony Fire Station																
Training Frequency:	Annual or less, 1994 thru 1999															
Last Training Event[(1)]:	1999															
Foam Usage per Training Event:	5 gallons or less															
Foam Brand:	variety, including Ansulite															
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**													
Harmony B-3 SL 0-4'	0-4 ft.	4/23/2009	Axys	< 0.0977	**0.2**	< 0.0977	**0.161**	< 0.0977	**0.125**	< 0.0977	< 0.0977	< 0.0977	< 0.195	< 0.195	< 0.195	< 0.0977
Harmony B-3 SL 4-8'	4-8 ft.	4/23/2009	Axys	< 0.0950	< 0.0950	< 0.0950	< 0.0950	< 0.0950	< 0.0950	< 0.0950	< 0.0950	< 0.0950	< 0.190	< 0.190	< 0.190	< 0.0950
Harmony B-4 SL 0-4'	0-4 ft.	4/23/2009	Axys	< 0.0989	**0.253**	**0.133**	**0.15**	< 0.0989	< 0.0989	< 0.0989	< 0.0989	< 0.0989	< 0.198	< 0.198	< 0.198	< 0.0989
Harmony B-4 SL 4-8'	4-8 ft.	4/23/2009	Axys	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.200	< 0.200	< 0.200	< 0.100

TABLE 4

Soil and Sediment Analytical Results, PFCs
Minnesota Fire Foam Training and Discharge Sites
Delta Project No. 19382DEL08

				Perfluorinated carboxylic acids									Perfluorinated sulfonates			
				Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)
#Perfluorinated Carbon Chains:				**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**
Burnsville Fire Dept. Training Area, ABLE Fire Training Center																
Training Frequency:	3 times since 1989															
Last Training Event[(1)]:	2004															
Foam Usage per Training Event:	5-10 gallons															
Foam Brand:	Ansul															
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**													
Burnsville B-1 SL 0-4'	0-4 ft.	4/24/2009	Axys	**1.73**	**5.32**	**3.27**	**6.72**	**11.4**	**10.2**	**4.37**	**0.537**	**0.542**	< 0.192	**2.63**	**102**	< 0.0962
Burnsville B-1 SL 4-8'	4-8 ft.	4/24/2009	Axys	**0.132**	**1.54**	**1.77**	**8.46**	**14.8**	< 0.0956	< 0.0956	< 0.0956	< 0.0956	< 0.191	**11**	**1.62**	< 0.0956
Burnsville B-2 SL 0-4'	0-4 ft.	4/24/2009	Axys	**0.796**	**3.08**	**1.69**	**1.05**	**5.78**	**7.92**	< 0.0992	< 0.0992	< 0.0992	< 0.198	< 0.198	**2.8**	< 0.0992
Burnsville B-2 SL 4-8'	4-8 ft.	4/24/2009	Axys	**1.83**	**4.81**	**3.97**	**4.14**	**0.355**	< 0.0985	< 0.0985	< 0.0985	< 0.0985	< 0.197	**1.2**	< 0.197	< 0.0985
North St. Paul Fire Dept. Training Area, Public Works Facility																
Training Frequency:	semi-annual, 5-10 times total															
Last Training Event[(1)]:	2008															
Foam Usage per Training Event:	5-10 gallons															
Foam Brand:	3M															
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**													
No St Paul B-1 SL 0-4'	0-4 ft.	5/6/2009	Axys	< 0.0926	< 0.0926	< 0.0926	< 0.0926	< 0.0926	< 0.0926	< 0.0926	< 0.0926	< 0.0926	< 0.185	< 0.185	< 0.185	< 0.0926
No St Paul B-1 SL 4-8'	4-8 ft.	5/6/2009	Axys	< 0.0998	< 0.0998	< 0.0998	< 0.0998	< 0.0998	< 0.0998	< 0.0998	< 0.0998	< 0.0998	< 0.200	< 0.200	< 0.200	< 0.0998
No St Paul B-2 SL 0-4'	0-4 ft.	5/6/2009	Axys	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.191	< 0.191	< 0.191	< 0.0954
No St Paul B-2 SL 4-8'	4-8 ft.	5/6/2009	Axys	< 0.0978	< 0.0978	< 0.0978	< 0.0978	< 0.0978	< 0.0978	< 0.0978	< 0.0978	< 0.0978	< 0.196	< 0.196	< 0.196	< 0.0978
No St Paul B-3 SL 0-2'	0-2 ft.	5/6/2009	Axys	< 0.0972	< 0.0972	< 0.0972	< 0.0972	**0.107**	< 0.0972	< 0.0972	< 0.0972	< 0.0972	< 0.194	< 0.194	**0.623**	< 0.0972

TABLE 4

Soil and Sediment Analytical Results, PFCs
Minnesota Fire Foam Training and Discharge Sites
Delta Project No. 19382DEL08

				Perfluorinated carboxylic acids									Perfluorinated sulfonates			
				Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)
#Perfluorinated Carbon Chains:				**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**
Richfield Fire Dept. Training Area, Richfield Ice Arena																
Training Frequency:	occasional															
Last Training Event[(1)]:	1999															
Foam Usage per Training Event:	30-40 gallons															
Foam Brand:	3M															
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**													
Richfield B-1 0-4'	0-4 ft.	5/7/2009	Axys	< 0.0932	**0.226**	**0.191**	**0.433**	**1.36**	**1.44**	**0.095**	< 0.0932	< 0.0932	< 0.186	**1.26**	**104**	**0.21**
Richfield B-1 4-8'	4-8 ft.	5/7/2009	Axys	**0.322**	**1.43**	**0.905**	**0.592**	**1.11**	**1.89**	< 0.0966	< 0.0966	< 0.0966	< 0.193	**1.44**	**102**	< 0.0966
Richfield B-2 0-4'	0-4 ft.	5/7/2009	Axys	**0.464**	**1.33**	**1.07**	**0.85**	**2.32**	**5.03**	**0.306**	< 0.186	< 0.186	< 0.373	**13**	**401**	**0.47**
Richfield B-2 4-8'	4-8 ft.	5/7/2009	Axys	**1.04**	**4.52**	**4.7**	**3.28**	**5.02**	**4.83**	< 0.379	< 0.379	< 0.379	< 0.757	**32.2**	**666**	< 0.379
Richfield B-3 0-4'	0-4 ft.	5/7/2009	Axys	< 0.0942	< 0.0942	**0.314**	**0.309**	**1.49**	< 0.0942	< 0.0942	< 0.0942	< 0.0942	< 0.188	**21.9**	**56.4**	< 0.0942
Richfield B-3 4-8'	4-8 ft.	5/7/2009	Axys	**0.173**	**0.439**	**1.02**	**0.283**	**0.336**	< 0.104	< 0.104	< 0.104	< 0.104	**0.57**	**2.35**	**9.33**	< 0.104
Richfield B-4 0-8'	0-8 ft.	10/8/2009	Axys	< 0.0956	< 0.0956	< 0.0956	< 0.0956	**0.129**	< 0.0956	< 0.0956	< 0.0956	< 0.0956	< 0.191	**0.236**	**4.52**	< 0.0956
Kenyon Fire Dept. Training Area, Slee Street																
Training Frequency:	bi-annual															
Last Training Event[(1)]:	2004															
Foam Usage per Training Event:	< 5 gallons															
Foam Brand:	variety, including 3M															
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**													
Kenyon B-1 SL 0-4'	0-4 ft.	5/15/2009	Axys	< 0.0963	< 0.0963	< 0.0963	**0.111**	< 0.0963	< 0.0963	< 0.0963	< 0.0963	< 0.0963	< 0.193	< 0.193	< 0.193	< 0.0963
Kenyon B-1 SL 0-4'	0-4 ft.	5/15/2009	MPI	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Kenyon B-1 SL 4-8'	4-8 ft.	5/15/2009	Axys	< 0.0944	< 0.0944	< 0.0944	< 0.0944	< 0.0944	< 0.0944	< 0.0944	< 0.0944	< 0.0944	< 0.189	< 0.189	< 0.189	< 0.0944
Kenyon B-1 SL 4-8'	4-8 ft.	5/15/2009	MPI	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Kenyon B-2 SL 0-4'	0-4 ft.	5/15/2009	Axys	< 0.0937	< 0.0937	< 0.0937	< 0.0937	< 0.0937	< 0.0937	< 0.0937	< 0.0937	< 0.0937	< 0.187	< 0.187	< 0.187	< 0.0937
Kenyon B-2 SL 0-4'	0-4 ft.	5/15/2009	MPI	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Kenyon B-2 SL 4-8'	4-8 ft.	5/15/2009	Axys	< 0.0943	< 0.0943	< 0.0943	< 0.0943	< 0.0943	< 0.0943	< 0.0943	< 0.0943	< 0.0943	< 0.189	< 0.189	< 0.189	< 0.0943
Kenyon B-2 SL 4-8'	4-8 ft.	5/15/2009	MPI	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

TABLE 4

Soil and Sediment Analytical Results, PFCs
Minnesota Fire Foam Training and Discharge Sites
Delta Project No. 19382DEL08

				Perfluorinated carboxylic acids									Perfluorinated sulfonates			
				Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)
#Perfluorinated Carbon Chains:				**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**
Claremont Fire Dept. Training Area, Back of Fire Station																
Training Frequency:	1 time															
Last Training Event[(1)]:	Fall 2008															
Foam Usage per Training Event:	5 gallons or less															
Foam Brand:	3M															
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**													
Claremont B-1 SL 0-4'	0-4 ft.	5/15/2009	Axys	< 0.0907	< 0.0907	< 0.0907	< 0.0907	< 0.0907	< 0.0907	< 0.0907	< 0.0907	< 0.0907	< 0.181	< 0.181	**0.308**	< 0.0907
Claremont B-1 SL 0-4'	0-4 ft.	5/15/2009	MPI	**0.413**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**0.773**	<0.2	<0.2
Claremont B-1 SL 4-8'	4-8 ft.	5/15/2009	Axys	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.193	**0.224**	**0.321**	< 0.0966
Claremont B-1 SL 4-8'	4-8 ft.	5/15/2009	MPI	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Claremont B-2 SL 0-4'	0-4 ft.	5/15/2009	Axys	< 0.0936	< 0.0936	**0.385**	< 0.0936	**0.154**	< 0.0936	< 0.0936	< 0.0936	< 0.0936	**0.491**	**1.65**	**24.7**	**0.129**
Claremont B-2 SL 4-8'	4-8 ft.	5/15/2009	Axys	< 0.0958	< 0.0958	< 0.0958	< 0.0958	< 0.0958	< 0.0958	< 0.0958	< 0.0958	< 0.0958	< 0.192	< 0.192	**0.25**	< 0.0958
Claremont Fire Dept. Training Area, Front of Fire Station																
Training Frequency:	annually or less															
Last Training Event[(1)]:	approximately 2007															
Foam Usage per Training Event:	5 gallons or less															
Foam Brand:	3M															
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**													
Claremont B-3 SL 0-4'	0-4 ft.	5/15/2009	Axys	**0.114**	**0.167**	**0.427**	**0.232**	**0.174**	< 0.0912	< 0.0912	< 0.0912	< 0.0912	**2.39**	**5.25**	**3.46**	< 0.0912
Claremont B-3 SL 4-8'	4-8 ft.	5/15/2009	Axys	< 0.0935	< 0.0935	< 0.0935	< 0.0935	< 0.0935	< 0.0935	< 0.0935	< 0.0935	< 0.0935	< 0.187	**0.561**	**0.988**	< 0.0935

TABLE 4

Soil and Sediment Analytical Results, PFCs
Minnesota Fire Foam Training and Discharge Sites
Delta Project No. 19382DEL08

				Perfluorinated carboxylic acids									Perfluorinated sulfonates			
				Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)
#Perfluorinated Carbon Chains:				**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**
Luverne Fire Dept. Training Site, Tree/Brush Dump																
Training Frequency:	1 time															
Last Training Event[(1)]:	2005															
Foam Usage per Training Event:	5 gallons															
Foam Brand:	unknown															
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**													
Luverne B-1 SL 0-4'	0-4 ft.	5/22/2009	Axys	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.192	< 0.192	< 0.481	< 0.241
Luverne B-1 SL 0-4'	0-4 ft.	5/22/2009	MPI	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Luverne B-1 SL 4-8'	4-8 ft.	5/22/2009	Axys	< 0.0981	< 0.0981	< 0.0981	< 0.0981	< 0.0981	< 0.0981	< 0.0981	< 0.0981	< 0.0981	< 0.196	< 0.196	< 0.490	< 0.245
Luverne B-1 SL 4-8'	4-8 ft.	5/22/2009	MPI	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Luverne B-2 SL 0-4'	0-4 ft.	5/22/2009	Axys	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.191	< 0.191	**0.481**	< 0.239
Luverne B-2 SL 0-4'	0-4 ft.	5/22/2009	MPI	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Luverne B-2 SL 4-8'	4-8 ft.	5/22/2009	Axys	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.200	< 0.200	< 0.500	< 0.250
Luverne B-2 SL 4-8'	4-8 ft.	5/22/2009	MPI	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Luverne B-3 SL 0-4'	0-4 ft.	5/22/2009	Axys	< 0.0974	< 0.0974	< 0.0974	< 0.0974	< 0.0974	< 0.0974	< 0.0974	< 0.0974	< 0.0974	< 0.195	< 0.195	< 0.487	< 0.244
Luverne B-3 SL 0-4'	0-4 ft.	5/22/2009	MPI	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Luverne B-3 SL 4-8'	4-8 ft.	5/22/2009	Axys	< 0.0984	< 0.0984	< 0.0984	< 0.0984	< 0.0984	< 0.0984	< 0.0984	< 0.0984	< 0.0984	< 0.197	< 0.197	< 0.492	< 0.246
Luverne B-3 SL 4-8'	4-8 ft.	5/22/2009	MPI	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Fridley Fire Dept. Training Site, North Metro Fire Training Center																
Training Frequency:	occasional															
Last Training Event[(1)]:	1994/1995															
Foam Usage per Training Event:	< 5 gallons															
Foam Brand:	3M															
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**													
Fridley B-1 SL 0-4'	0-4 ft.	5/27/2009	Axys	**0.242**	**0.422**	**0.413**	**0.27**	**0.291**	**0.144**	< 0.100	< 0.100	< 0.100	< 0.201	**1.25**	**43**	< 0.100
Fridley B-1 SL 4-8'	4-8 ft.	5/27/2009	Axys	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.201	< 0.201	**2.45**	< 0.101
Fridley B-2 SL 0-4'	0-4 ft.	5/27/2009	Axys	**1.34**	**1.67**	**2.78**	**0.735**	**0.699**	< 0.102	< 0.102	< 0.102	< 0.102	**3.01**	**23.4**	**3.48**	< 0.102
Fridley B-2 SL 4-8'	4-8 ft.	5/27/2009	Axys	**0.601**	**1.13**	**1.53**	**0.335**	**0.493**	< 0.0950	< 0.0950	< 0.0950	< 0.0950	**1.32**	**14.2**	**1.31**	< 0.0950
Fridley B-3 Sediment 6"	0.5 ft.	5/27/2009	Axys	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.193	< 0.193	**18.3**	< 0.0966

TABLE 4

Soil and Sediment Analytical Results, PFCs
Minnesota Fire Foam Training and Discharge Sites
Delta Project No. 19382DEL08

				Perfluorinated carboxylic acids									Perfluorinated sulfonates			
				Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)
#Perfluorinated Carbon Chains:				**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**
Rochester Fire Dept. Training Area, Olmsted County Fairgrounds																
Training Frequency:	annual															
Last Training Event[(1)]:	2001/2002															
Foam Usage per Training Event:	5 gallons or less															
Foam Brand:	3M															
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**													
Rochester B-1 SL 0-4'	0-4 ft.	5/28/2009	Axys	**0.207**	< 0.0979	< 0.0979	< 0.0979	< 0.0979	< 0.0979	< 0.0979	< 0.0979	< 0.0979	< 0.196	**0.361**	**0.559**	< 0.0979
Rochester B-1 SL 4-8'	4-8 ft.	5/29/2009	Axys	< 0.0957	< 0.0957	< 0.0957	< 0.0957	< 0.0957	< 0.0957	< 0.0957	< 0.0957	< 0.0957	< 0.191	< 0.191	< 0.191	< 0.0957
Rochester B-2 SL 0-4'	0-4 ft.	5/28/2009	Axys	**0.142**	< 0.0999	**0.173**	< 0.0999	< 0.0999	< 0.0999	< 0.0999	< 0.0999	< 0.0999	< 0.200	**1.7**	**1.12**	< 0.0999
Rochester B-2 SL 4-8'	4-8 ft.	5/29/2009	Axys	< 0.0949	< 0.0949	< 0.0949	< 0.0949	< 0.0949	< 0.0949	< 0.0949	< 0.0949	< 0.0949	< 0.190	< 0.190	< 0.190	< 0.0949
Goodview Fire Station, Storm Drain Outflow																
Training Frequency:	6 times in 20 years															
Last Training Event[(1)]:	2004/2005															
Foam Usage per Training Event:	5 gallons															
Foam Brand:	Ansul															
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**													
Goodview Sed-1	0-6 in.	10/19/2009	Axys	< 0.0883	< 0.0883	< 0.0883	< 0.0883	< 0.0883	< 0.0883	< 0.0883	< 0.0883	< 0.0883	< 0.177	< 0.177	**0.332**	< 0.0883
Bemidji Fire Dept. Training Area, Bemidji Airport																
Training Frequency:	annual															
Last Training Event[(1)]:	2008/2009															
Foam Usage per Training Event:	5 gallons															
Foam Brand:	3M															
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**													
Bemidji B-1 SL 0-4'	0-4 ft.	11/5/2009	Axys	< 0.0951	< 0.0951	**0.216**	< 0.0951	**0.118**	< 0.0951	< 0.0951	< 0.0951	< 0.0951	< 0.190	**3.12**	**55.7**	**0.112**
Bemidji B-1 SL 4-8'	4-8 ft.	11/5/2009	Axys	< 0.0913	< 0.0913	< 0.0913	< 0.0913	**0.498**	< 0.0913	< 0.0913	< 0.0913	< 0.0913	**0.267**	**3.98**	**56**	< 0.0913
Bemidji B-2 SL 0-4'	0-4 ft.	11/5/2009	Axys	**0.184**	**0.322**	**1.44**	**0.143**	**1.31**	**0.099**	< 0.0933	< 0.0933	< 0.0933	< 1.87	**13.9[(2)]**	**1200[(2)]**	**18.5**
Bemidji B-2 SL 4-8'	4-8 ft.	11/5/2009	Axys	< 0.276	< 0.276	**0.411[(2)]**	**0.917[(2)]**	**19.6[(2)]**	< 0.276	< 0.276	< 0.276	< 0.276	**0.957[(2)]**	**147[(2)]**	**606[(2)]**	< 0.276

TABLE 4

Soil and Sediment Analytical Results, PFCs
Minnesota Fire Foam Training and Discharge Sites
Delta Project No. 19382DEL08

				Perfluorinated carboxylic acids									Perfluorinated sulfonates			
				Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)
#Perfluorinated Carbon Chains:				**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**
River Grove Marina Fire, Inver Grove Heights																
Date of Foam Discharge:	9/26/2009															
Foam Usage	15 gallons															
Foam Brand:	Ansul															
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**													
River Grove Sed-1	0-6 in.	11/18/2009	MPI	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.667	<0.667	<0.667	<0.333
River Grove Sed-2	0-6 in.	11/18/2009	MPI	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.667	<0.667	<0.667	<0.333
River Grove Sed-3	0-6 in.	11/18/2009	MPI	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.667	<0.667	<0.667	<0.333
Lake Superior College ERTC																
Training Frequency:	unknown, 1994-1996															
Last Training Event[(1)]:	1996															
Foam Usage per Training Event:	unknown															
Foam Brand:	3M or other															
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**													
ERTC SS-1	0-6 in.	11/25/2009	Axys	< 0.0998	**0.205**	**0.794**	**0.139**	**0.495**	< 0.0998	< 0.0998	< 0.0998	< 0.0998	< 0.200	**3.49**	**83.5**	**4.54**
ERTC Sed-1	0-6 in.	11/25/2009	Axys	< 0.0917	< 0.0917	< 0.0917	< 0.0917	**0.225**	< 0.0917	< 0.0917	< 0.0917	< 0.0917	< 0.183	**1.2**	**57.5**	**6.52**
ERTC Sed-2	0-6 in.	11/25/2009	Axys	**0.218**	**0.536**	**1.72**	**0.268**	**1.26**	**0.184**	**0.101**	**0.174**	< 0.0933	**1.47**	**19.6**	**538**	**181**
MSP Airport																
Training Frequency:	unknown															
Last Training Event[(1)]:	2001															
Foam Usage per Training Event:	5-10 gallons															
Foam Brand:	3M															
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**													
MSP Sed-1	0-6 in.	1/19/2010	Axys	< 0.484	< 0.484	< 0.484	< 0.484	**1.8**	**1.89**	**17.3**	**2.5**	**15.6**	< 0.968	< 0.968	**8.84**	**3.55**

TABLE 4

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Delta Project No. 19382DEL08

				Perfluorinated carboxylic acids									Perfluorinated sulfonates			
				Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)
#Perfluorinated Carbon Chains:				**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**
Crystal Airport																
Date of Foam Discharge:	June 2009															
Foam Usage per Training Event:	unknown															
Foam Brand:	Fire Aide 2000															
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**													
Crystal B-1 SL 0-4'	0-4 ft.	1/20/2010	Axys	< 0.486	< 0.486	< 0.486	< 0.486	< 0.486	< 0.486	< 0.486	< 0.486	< 0.486	< 0.972	< 0.972	< 0.972	< 0.486
Crystal B-1 SL 4-8'	4-8 ft.	1/20/2010	Axys	< 0.493	< 0.493	< 0.493	< 0.493	< 0.493	< 0.493	< 0.493	< 0.493	< 0.493	< 0.985	< 0.985	< 0.985	< 0.493
Crystal B-2 SL 0-4'	0-4 ft.	1/20/2010	Axys	< 0.488	< 0.488	< 0.488	< 0.488	< 0.488	< 0.488	< 0.488	< 0.488	< 0.488	< 0.977	< 0.977	< 0.977	< 0.488
Crystal B-2 SL 4-8'	4-8 ft.	1/20/2010	Axys	< 0.490	< 0.490	< 0.490	< 0.490	< 0.490	< 0.490	< 0.490	< 0.490	< 0.490	< 0.979	< 0.979	< 0.979	< 0.490
Crystal SS-1	2 ft.	1/20/2010	Axys	< 0.498	**0.929**	< 0.498	< 0.498	< 0.498	< 0.498	< 0.498	< 0.498	< 0.498	< 0.996	< 0.996	< 0.996	< 0.498
Crystal Sed-1	0-6 in.	1/20/2010	Axys	< 0.513	< 0.513	< 0.513	< 0.513	< 0.513	< 0.513	< 0.513	< 0.513	< 0.513	< 1.03	< 1.03	< 1.03	< 0.513
Crystal Sed-2	0-6 in.	1/20/2010	Axys	**0.467**	**1.16**	< 0.404	**0.491**	**0.654**	**0.412**	**0.863**	**1.17**	**2.47**	< 0.807	**1.03**	**7.1**	**1.45**
Kings Cove Marina, Hastings Fire																
Date of Foam Discharge:	October 2002															
Foam Usage	305 gallons															
Foam Brand:	3M															
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**													
Kings Cove Marina Soil	Surficial	12/3/2009	MPI	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	**1.11**	**2.07**	**10.4**	<0.667	<0.667	<0.667	<0.333
Kings Cove Marina Sed 1	Surficial	12/3/2009	MPI	<0.333	<0.333	<0.333	<0.333	**0.841**	<0.333	<0.333	<0.333	<0.333	<0.667	<0.667	**1.34**	<0.333
Kings Cove Marina Sed 2	Surficial	12/3/2009	MPI	<0.333	<0.333	**0.773**	<0.333	**0.736**	<0.333	<0.333	<0.333	<0.333	<0.667	**4.44**	**6.12**	<0.333

TABLE 4

Soil and Sediment Analytical Results, PFCs
Minnesota Fire Foam Training and Discharge Sites
Delta Project No. 19382DEL08

				Perfluorinated carboxylic acids									Perfluorinated sulfonates			
				Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)
#Perfluorinated Carbon Chains:				**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**
Up North Plastics, Cottage Grove Fire																
Date of Foam Discharge:	12/1/2002															
Foam Usage	4,000 gallons or more															
Foam Brand:	unknown															
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**													
Up North Plastics Soil 1	Surficial	7/16/2009	Axys	**2.45**	**0.419**	**0.682**	**0.189**	**1.18**	**0.342**	**0.642**	**2.46**	**1.27**	**0.296**	**20.6**	**258**	**8.91**
Up North Plastics Soil 2	Surficial	7/16/2009	Axys	**0.985**	< 0.0982	**0.205**	**0.115**	**0.381**	< 0.0982	< 0.0982	**0.341**	**0.343**	< 0.196	**2.07**	**59.1**	**2.99**
Up North Plastics Soil 3	Surficial	7/16/2009	Axys	**0.203**	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.202	< 0.202	< 0.202	< 0.101
Up North Plastics Soil 4	Surficial	7/16/2009	Axys	< 0.0964	< 0.0964	**0.233**	< 0.0964	**0.172**	< 0.0964	**0.097**	**1.88**	< 0.0964	< 0.193	**3.91**	**355**	**16.5**
Up North Plastics Soil 5	Surficial	7/16/2009	Axys	**3.82**	**0.628**	**0.477**	**0.266**	**8.29**	< 0.0964	< 0.0964	**0.122**	**0.128**	**0.199**	**0.712**	**7.48**	**0.428**
Up North Plastics Sed 1	Surficial	7/16/2009	Axys	**0.659**	< 0.0965	< 0.0965	< 0.0965	**0.406**	< 0.0965	< 0.0965	< 0.0965	< 0.0965	< 0.193	< 0.193	**1.15**	< 0.0965
Up North Plastics Sed 2	Surficial	7/16/2009	Axys	**3.37**	**0.195**	**0.19**	< 0.110	**0.957**	**0.113**	< 0.110	**0.165**	**0.713**	**0.284**	**1.65**	**104**	**0.782**
Up North Plastics Sed 3	Surficial	7/16/2009	Axys	**14.2**	**1.94**	**1.32**	**0.608**	**14.6**	< 0.104	< 0.104	< 0.104	**0.188**	< 0.207	**0.764**	**16.3**	< 0.104
Up North Plastics Sed 4	Surficial	7/16/2009	Axys	**2.35**	**0.265**	**0.143**	< 0.119	**1.49**	< 0.119	**0.331**	**0.657**	**1.24**	< 0.238	**0.596**	**13.6**	**0.325**
Up North Plastics Sed Dup	Surficial	7/16/2009	Axys	**1.25**	< 0.102	< 0.102	< 0.102	**0.726**	< 0.102	< 0.102	< 0.102	< 0.102	< 0.204	< 0.204	**1.67**	< 0.102

Notes:

PFC results are in nanograms per gram (ng/g), which is equivalent to parts per billion.
PFC compounds soil results reported on a dry weight basis.
Bolded type indicates detection above the laboratory method detection limit.
Non-detect results presented as less than the laboratory detection limit.
Axys: Axys Analytical Services LTD
MPI: MPI Research
(1) Last training event prior to sampling, dates are approximate
(2) Results based on analysis of a dilution of the sample extract.

DELTA

TABLE 5

Groundwater and Surface Water Analytical Results, PFCs
Minnesota Fire Foam Training and Discharge Sites
Delta Project No. 19382DEL08

			Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)
#Perfluorinated Carbon Chains:			4	5	6	7	8	9	10	11	12	4	6	8	8
Health-Based Limits:			7000[2]	ND	ND	ND	300[3]	ND	ND	ND	ND	7000[2]	RAA[4]	300[3]	ND
Harmony Fire Dept. Training Area, Tree/Brush Dump															
Training Frequency:	Annual or less since ~2006														
Last Training Event[1]:	2008														
Foam Usage per Training Event:	5 gallons or less														
Foam Brand:	variety, including Ansulite														
Sample ID	**Sample Date**	**Laboratory**													
Harmony B-1 GW	4/23/2009	Axys	**7.3**	**3.27**	**2.67**	< 2.49	**7**	< 2.49	< 2.49	< 2.49	< 2.49	< 4.98	< 4.98	**8.33**	< 2.49
Harmony B-2 GW	4/23/2009	Axys	**9.04**	**2.52**	< 2.46	< 2.46	**6.92**	< 2.46	< 2.46	< 2.46	< 2.46	< 4.92	< 4.92	**6.74**	< 2.46
North St. Paul Fire Dept. Training Area, Public Works Facility															
Training Frequency:	semi-annual, 5-10 times total														
Last Training Event[1]:	2008														
Foam Usage per Training Event:	5-10 gallons														
Foam Brand:	3M														
Sample ID	**Sample Date**	**Laboratory**													
No St Paul B-1 GW	5/6/2009	Axys	**137**	**13.3**	**13.2**	**8.83**	**13.8**	< 3.49	< 3.49	< 3.49	< 3.49	< 6.99	**14.1**	< 6.99	< 3.49
No St Paul B-2 GW	5/6/2009	Axys	**145**	**15.5**	**14.1**	**8.22**	**13.2**	< 2.50	< 2.50	< 2.50	< 2.50	< 5.01	**14.8**	< 5.01	< 2.50
Richfield Fire Dept. Training Area, Richfield Ice Arena															
Training Frequency:	occasional														
Last Training Event[1]:	1999														
Foam Usage per Training Event:	30-40 gallons														
Foam Brand:	3M														
Sample ID	**Sample Date**	**Laboratory**													
Richfield B-1 GW	5/7/2009	Axys	**1070**	**3470**	**3500**	**819**	**50.3**	< 18.8	< 18.8	< 18.8	< 18.8	**737**	**76.2**	< 37.7	< 18.8
Richfield B-2 GW	5/7/2009	Axys	**1240**	**4890**	**4170**	**1920**	**1330**	< 91.4	< 91.4	< 91.4	< 91.4	< 183	< 183	< 183	< 91.4
Richfield B-3 GW	5/7/2009	Axys	**201**	**331**	**888**	**217**	**458**	< 66.7	< 66.7	< 66.7	< 66.7	**293**	**689**	< 133	< 66.7
Legion Lake SW-1	8/27/2009	Axys	**4.02**	<7.21	< 2.51	**3.55**	**5.69**	**3.63**	**3.92**	< 2.51	< 2.51	< 5.02	< 5.02	**13.2**	< 2.51
*Richfield B-4 GW 29 ft.	10/8/2009	Axys	**228**	**10.3**	**10.3**	**5.43**	**38.7**	< 2.48	< 2.48	< 2.48	< 2.48	< 4.96	**71.4**	< 4.96	< 2.48

TABLE 5

Groundwater and Surface Water Analytical Results, PFCs
Minnesota Fire Foam Training and Discharge Sites
Delta Project No. 19382DEL08

			Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)
#Perfluorinated Carbon Chains:			**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**
Health-Based Limits:			**7000[2]**	**ND**	**ND**	**ND**	**300[3]**	**ND**	**ND**	**ND**	**ND**	**7000[2]**	**RAA[4]**	**300[3]**	**ND**
Luverne Fire Dept. Training Site, Tree/Brush Dump															
Training Frequency:	1 time														
Last Training Event[1]:	2005														
Foam Usage per Training Event:	5 gallons														
Foam Brand:	unknown														
Sample ID	**Sample Date**	**Laboratory**													
Luverne B-1 GW 8 ft.	5/22/2009	Axys	< 2.53	< 2.53	< 2.53	< 2.53	< 2.53	< 2.53	< 2.53	< 2.53	< 2.53	< 5.05	**18.1**	< 5.05	< 2.53
Luverne B-1 GW 8 ft.	5/22/2009	MPI	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0[5]	<25.0	<25.0
Luverne B-2 GW 12 ft.	5/22/2009	Axys	< 2.55	< 2.55	**3.78**	< 2.55	**2.73**	< 2.55	< 2.55	< 2.55	< 2.55	< 5.10	**22.8**	**18.4**	< 2.55
Luverne B-2 GW 12 ft.	5/22/2009	MPI	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	**25.1**	<25.0[7]	<25.0
Luverne B-3 GW 12 ft.	5/22/2009	Axys	< 2.53	**3.99**	**11.3**	< 2.53	**3.39**	< 2.53	< 2.53	< 2.53	< 2.53	< 5.07	**21.4**	**20.1**	< 2.53
Luverne B-3 GW 12 ft.	5/22/2009	MPI	<25.0	<25.0	<25.0[6]	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	**28.8**	<25.0[8]	<25.0
Fridley Fire Dept. Training Site, North Metro Fire Training Center															
Training Frequency:	occasional														
Last Training Event[1]:	1994/1995														
Foam Usage per Training Event:	< 5 gallons														
Foam Brand:	3M														
Sample ID	**Sample Date**	**Laboratory**													
Fridley B-1 GW	5/27/2009	Axys	**37.6**	**34**	**27.1**	**23.2**	**32.7**	< 4.27	< 4.27	< 4.27	< 4.27	**15.2**	**98.9**	**21.9**	< 4.27
Fridley B-2 GW	5/27/2009	Axys	**88.3**	**97.2**	**166**	**59.5**	**86.8**	< 5.39	< 5.39	< 5.39	< 5.39	**182**	**1330**	**35**	< 5.39
MSP Airport															
Training Frequency:	unknown														
Last Training Event[1]:	2001														
Foam Usage per Training Event:	5-10 gallons														
Foam Brand:	3M														
Sample ID	**Sample Date**	**Laboratory**													
MSP Airport B-1 GW	5/29/2009	Axys	**279**	**909**	**1640**	**317**	**988**	**42**	< 41.2	< 41.2	< 41.2	**332**	**3090**	< 82.5	< 41.2
MSP Airport B-2 GW	5/29/2009	Axys	**190**	**507**	**817**	**198**	**958**	< 48.8	< 48.8	< 48.8	< 48.8	**286**	**2920**	< 97.6	< 48.8
MSP Airport B-3 GW	5/29/2009	Axys	**151**	**148**	**477**	< 135	**12000**	< 135	< 135	< 135	< 135	< 269	**21200**	**281**	< 135
MSP Airport B-4 GW	5/29/2009	Axys	< 1250	< 1250	**3140**	**5830**	**286000**	< 1250	< 1250	< 1250	< 1250	< 2500	**145000**	< 2500	< 1250
*MSP Airport B-5 GW	1/19/2010	Axys	**103**	**81.3**	**168**	**17.5**	**7.29**	< 2.63	< 2.63	< 2.63	< 2.63	160	110	< 5.26	< 2.63
*MSP Airport B-6 GW	1/19/2010	Axys	**58.6**	**60.4**	**187**	**44.6**	**11.2**	< 2.55	< 2.55	< 2.55	< 2.55	**64.1**	**204**	**11**	< 2.55
*MSP Airport B-7 GW	1/19/2010	Axys	**130**	**233**	**114**	< 2.53	**3.77**	< 2.53	< 2.53	< 2.53	< 2.53	**7.77**	< 5.05	< 5.05	< 2.53
CWN-14A GW	1/19/2010	Axys	**40.9**	**32.3**	**42.2**	**17.8**	**19.1**	< 2.54	< 2.54	< 2.54	< 2.54	< 5.07	**19.3**	**15.6**	< 2.54
CWN-15A GW	1/19/2010	Axys	**72**	**15.3**	**20.2**	**7.27**	**56.9**	< 2.75	< 2.75	< 2.75	< 2.75	**9.45**	**202**	< 5.50	< 2.75
Signature MW-2 GW	1/19/2010	Axys	**83.7**	**96.8**	**162**	**69.7**	**79.5**	< 6.57	< 5.40	< 5.40	< 5.40	**151**	**1780**	**953**	< 5.40
MSP SW-1	1/19/2010	Axys	**46.8**	**46**	**82.1**	**24.6**	**50.1**	**13.4**	**13.9**	< 2.46	< 2.46	**46.5**	**184**	**39**	< 2.46

TABLE 5

Groundwater and Surface Water Analytical Results, PFCs
Minnesota Fire Foam Training and Discharge Sites
Delta Project No. 19382DEL08

			Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)
#Perfluorinated Carbon Chains:			**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**
Health-Based Limits:			**7000[2]**	**ND**	**ND**	**ND**	**300[3]**	**ND**	**ND**	**ND**	**ND**	**7000[2]**	**RAA[4]**	**300[3]**	**ND**
Marathon Refinery															
Training Frequency:	semi-annual														
Last Training Event[1]:	2009														
Foam Usage per Training Event:	50-100 gallons														
Foam Brand:	Ansul, historical use of 3M														
Sample ID	**Sample Date**	**Laboratory**													
Marathon MW-101	8/20/2009	MPI	**183**	**403**	**150**	**12.4**	**36.7**	<2.5	<2.5	<2.5	<2.5	**479**	**3710**	**93.2**	<2.5
*Marathon MW-912	8/20/2009	MPI	**462**	**298**	**51.5**	**21.8**	**17.5**	<2.5	<2.5	<2.5	<2.5	**37.0**	**1580**	**731**	<2.5
Marathon SP-11	8/20/2009	MPI	**182**	**458**	**171**	**52.2**	**35.6**	**20.7**	<2.5	<2.5	<2.5	**369**	**4910**	**5770**	<2.5
Marathon MW-172	8/20/2009	MPI	**59.8**	**245**	**154**	**25.1**	**15.5**	**11.4**	<2.5	<2.5	<2.5	**49.0**	**1220**	**1330**	<2.5
Marathon MW-156	8/20/2009	MPI	**220**	**1730**	**527**	**200**	**73.1**	**26.9**	<2.5	**2.58**	<2.5	**462**	**10500**	**14900**	<2.5
Marathon MW-156 Dupl.	8/20/2009	MPI	**221**	**1660**	**534**	**184**	**81.4**	**23.7**	<2.5	**2.93**	<2.5	**502**	**8930**	**11700**	**2.62**
Burnsville Fire Dept. Training Area, ABLE Fire Training Center															
Training Frequency:	3 times since 1989														
Last Training Event[1]:	2004														
Foam Usage per Training Event:	5-10 gallons														
Foam Brand:	Ansul														
Sample ID	**Sample Date**	**Laboratory**													
Burnsville B-3 GW 44.5 ft.	8/27/2009	Axys	**146**	**422**	**281**	**447**	**1260**	**81.7**	**17.8**	< 2.52	< 2.52	**12.8**	**279**	**522**	< 2.52
Goodview Fire Station, Storm Drain Outflow															
Training Frequency:	6 times in 20 years														
Last Training Event[1]:	2004/2005														
Foam Usage per Training Event:	5 gallons														
Foam Brand:	Ansul														
Sample ID	**Sample Date**	**Laboratory**													
Goodview SW-1	10/19/2009	Axys	< 2.53	< 2.53	**4.78**	< 2.53	**4.49**	**2.56**	**2.82**	< 2.53	< 2.53	< 5.06	< 5.06	**8.19**	< 2.53
Bemidji Fire Dept. Training Area, Bemidji Airport															
Training Frequency:	annual														
Last Training Event[1]:	2008/2009														
Foam Usage per Training Event:	5 gallons														
Foam Brand:	3M														
Sample ID	**Sample Date**	**Laboratory**													
Bemidji B-1 GW 15 ft.	11/5/2009	Axys	**4.14**	**3.85**	**14.5**	**3.75**	**49**	< 2.50	< 2.50	< 2.50	< 2.50	**19.1**	**227**	**483**	< 2.50
Bemidji B-2 GW 15 ft.	11/5/2009	Axys	**21.1**	**55.5**	**340**	**33.8**	**200**	< 12.2	< 12.2	< 12.2	< 12.2	**129**	**1490**	**789**	< 12.2

TABLE 5

Groundwater and Surface Water Analytical Results, PFCs
Minnesota Fire Foam Training and Discharge Sites
Delta Project No. 19382DEL08

			Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)
#Perfluorinated Carbon Chains:			**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**
Health-Based Limits:			**7000[2]**	**ND**	**ND**	**ND**	**300[3]**	**ND**	**ND**	**ND**	**ND**	**7000[2]**	**RAA[4]**	**300[3]**	**ND**
River Grove Marina Fire, Inver Grove Heights															
Date of Foam Discharge:	9/26/2009														
Foam Usage	15 gallons														
Foam Brand:	Ansul														
Sample ID	**Sample Date**	**Laboratory**													
River Grove SW-1	11/18/2009	MPI	**3.54**	<2.5	<2.5	<2.5	**2.79**	<2.5	<2.5	<2.5	<2.5	**4.00**	<2.5	<2.5	<2.5
*River Grove SW-2	11/18/2009	MPI	**4.23**	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	**3.43**	<2.5	<2.5	<2.5
Lake Superior College ERTC															
Training Frequency:	unknown, 1994-1996														
Last Training Event[1]:	1996														
Foam Usage per Training Event:	unknown														
Foam Brand:	3M or other														
Sample ID	**Sample Date**	**Laboratory**													
ERTC SW-1	11/25/2009	Axys	**257**	**537**	**1790**	**348**	**991**	**31.8**	**3.45**	< 2.51	< 2.51	**1870**	**9390**	**11300**	**360**
Kandiyohi County Landfill Fire															
Date of Foam Discharge:	10/1/2009														
Foam Usage	545 gallons														
Foam Brand:	3M, Ansul														
Sample ID	**Sample Date**	**Laboratory**													
Kandiyohi DMW-1A	1/12/2010	Axys	< 2.43	< 2.43	< 2.43	< 2.43	< 2.43	< 2.43	< 2.43	< 2.43	< 2.43	< 4.87	< 4.87	< 4.87	< 2.43
Kandiyohi DMW-3	1/12/2010	Axys	**6.1**	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 5.01	< 5.01	< 5.01	< 2.51
Kandiyohi DMW-1A	5/4/2010	Axys	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 4.99	< 4.99	< 4.99	< 2.49
Kandiyohi DMW-3	5/4/2010	Axys	**11**	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 4.98	< 4.98	< 4.98	< 2.49
Crystal Airport															
Date of Foam Discharge:	June 2009														
Foam Usage	unknown														
Foam Brand:	Fire Aide 2000														
Sample ID	**Sample Date**	**Laboratory**													
Crystal B-1 GW 5.5 ft.	1/20/2010	Axys	**16.2**	< 2.56	< 2.56	< 2.56	< 2.56	< 2.56	< 2.56	< 2.56	< 2.56	< 5.12	< 5.12	< 5.12	< 2.56
Crystal B-2 GW 6 ft.	1/20/2010	Axys	**37.3**	< 2.50	< 2.50	< 2.50	**2.65**	< 2.50	< 2.50	< 2.50	< 2.50	< 5.01	< 5.01	**5.27**	< 2.50

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#Perfluorinated Carbon Chains:			**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**
Health-Based Limits:			**7000[2]**	**ND**	**ND**	**ND**	**300[3]**	**ND**	**ND**	**ND**	**ND**	**7000[2]**	**RAA[4]**	**300[3]**	**ND**
Flint Hills Resources Pine Bend Refinery															
Training Frequency:	20-25 times per year														
Last Training Event[1]:	2009														
Foam Usage per Training Event:	20-25														
Foam Brand:	Ansul, historical use of 3M														
Sample ID	**Sample Date**	**Laboratory**													
*FHR Pine Bend MW-1	1/21/2010	Axys	**179**	**12.5**	**10.1**	< 2.45	**4.63**	< 2.45	< 2.45	< 2.45	< 2.45	**8.67**	**25.9**	**28.5**	< 2.45
FHR Pine Bend MW-3	1/21/2010	Axys	**310**	**136**	**251**	**43.7**	**49.1**	< 2.48	< 2.48	< 2.48	< 2.48	**181**	**516**	**245**	< 2.48
FHR Pine Bend MW-111	1/21/2010	Axys	**156**	**7.58**	**3.62**	< 2.42	**3.92**	< 2.42	< 2.42	< 2.42	< 2.42	< 4.84	< 4.84	< 4.84	< 2.42
Kings Cove Marina, Hastings Fire															
Date of Foam Discharge:	October 2002														
Foam Usage	305 gallons														
Foam Brand:	3M														
Sample ID	**Sample Date**	**Laboratory**													
Kings Cove Marina SW-1	12/3/2009	MPI	**180**	**10.2**	**9.87**	**3.41**	**25.8**	< 2.5	< 2.5	< 2.5	< 2.5	**17.5**	**17.8**	**13.7**	< 2.5
Kings Cove Marina Dup (SW-1)	12/3/2009	MPI	**177**	**10.0**	**8.83**	**2.95**	**22.9**	< 2.5	< 2.5	< 2.5	< 2.5	**18.7**	**17.9**	**13.4**	<2.5
Kings Cove Marina SW-2	12/3/2009	MPI	**170**	**9.93**	**10.5**	**3.05**	**25.4**	< 2.5	< 2.5	< 2.5	< 2.5	**16.8**	**19.1**	**16.2**	< 2.5
Duluth International Airport															
Training Frequency:	unknown														
Last Training Event:	pre-2007														
Foam Usage per Training Event:	unknown														
Foam Brand:	3M and/or Chemguard														
Sample ID	**Sample Date**	**Laboratory**													
Duluth Intl. Airport GWS-1	10/2007	Axys	**2310**	**7160**	**13000**	**1340**	**4800**	< 45.7	< 45.7	< 45.7	< 45.7	**2000**	**626**	< 91.3	< 45.7
Duluth Intl. Airport GWS-2	10/2007	Axys	**482**	**1090**	**3590**	**534**	**4640**	**13.1**	< 12.4	< 12.4	< 12.4	**913**	**3440**	< 24.8	< 12.4
Duluth Intl. Airport Dup (GWS-2)	10/2007	Axys	**496**	**1250**	**4370**	**522**	**4250**	< 12.6	< 12.6	< 12.6	< 12.6	**953**	**3320**	< 25.2	< 12.6
Duluth Intl. Airport GWS-3	10/2007	Axys	**1900**	**6940**	**10800**	**1760**	**6790**	**88.5**	< 43.6	< 43.6	< 43.6	**2020**	**1690**	**98.8**	< 43.6
Duluth Intl. Airport GWS-4	10/2007	Axys	**1110**	**4780**	**11500**	**2000**	**8780**	< 31.9	< 31.9	< 31.9	< 31.9	**1630**	**4070**	< 63.8	< 31.9
Duluth Intl. Airport GWS-5	10/2007	Axys	**6.25**	**1.66**	**3.06**	**1.96**	**6.18**	< 0.991	< 0.991	< 0.991	< 0.991	**2.87**	**33.5**	**3.41**	< 0.991
Duluth Intl. Airport GWS-6	10/2007	Axys	**694**	**1750**	**2750**	**497**	**1500**	**14.8**	< 10.3	< 10.3	< 10.3	**776**	**1880**	< 20.6	< 10.3

TABLE 5

Groundwater and Surface Water Analytical Results, PFCs
Minnesota Fire Foam Training and Discharge Sites
Delta Project No. 19382DEL08

			Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)
#Perfluorinated Carbon Chains:			**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**
Health-Based Limits:			**7000[2]**	**ND**	**ND**	**ND**	**300[3]**	**ND**	**ND**	**ND**	**ND**	**7000[2]**	**RAA[4]**	**300[3]**	**ND**
WAFTA, St. Bonifacius															
Training Frequency:	unknown														
Last Training Event:	6/12/1905														
Foam Usage per Training Event:	unknown														
Foam Brand:	unknown														
Sample ID	**Sample Date**	**Laboratory**													
WAFTA BG-2	5/11/2006	MDH	< 1000	< 1000	< 1000	NA	**1000**	NA	NA	NA	NA	< 500	**200[J]**	< 500	NA
WAFTA BG-4	5/11/2006	MDH	**800[J]**	**3200**	**2300**	NA	**2100**	NA	NA	NA	NA	< 500	**2100**	**2200**	NA
WAFTA MW-1	5/11/2006	MDH	< 1000	< 1000	**300[J]**	NA	**7400**	NA	NA	NA	NA	< 500	**200[J]**	< 500	NA
WAFTA MW-2	5/11/2006	MDH	**2400**	**8900**	**7800**	NA	**7900**	NA	NA	NA	NA	**600**	**9900**	**9500**	NA
WAFTA MW-3	5/10/2006	MDH	< 1000	< 1000	**300[J]**	NA	< 1000	NA	NA	NA	NA	**200[J]**	**5100**	**22000**	NA
WAFTA MW-4	5/10/2006	MDH	**9900**	**42000**	**30000**	NA	**43000**	NA	NA	NA	NA	**1500**	**42000**	**118000**	NA
WAFTA MW-4	5/10/2006	Exygen	**14100**	**66300**	**43600**	NA	**41100**	NA	NA	NA	NA	**1820**	**43800**	**114000**	NA
WAFTA MW-5	5/10/2006	MDH	< 1000	**200[J]**	**300[J]**	NA	**700[J]**	NA	NA	NA	NA	< 500	**700**	**2100**	NA
WAFTA MW-5	5/10/2006	Exygen	< 1000	< 1000	< 1000	NA	< 1000	NA	NA	NA	NA	< 1000	< 1000	**1460**	NA
WAFTA MW-7	5/11/2006	MDH	**1200**	**3800**	**3400**	NA	**1000**	NA	NA	NA	NA	**200[J]**	**2300**	**3900**	NA
WAFTA MW-8	5/10/2006	MDH	**90[J]**	**400[J]**	**300[J]**	NA	**100[J]**	NA	NA	NA	NA	< 500	< 500	**1300**	NA
WAFTA MW-8	5/10/2006	Exygen	< 1000	< 1000	< 1000	NA	< 1000	NA	NA	NA	NA	< 1000	< 1000	< 1000	NA
WAFTA MW-9	5/11/2006	MDH	< 1000	< 1000	< 1000	NA	< 1000	NA	NA	NA	NA	< 500	< 500	< 500	NA
WAFTA MW-10	5/10/2006	MDH	**700[J]**	**2000**	**2000**	NA	**2300**	NA	NA	NA	NA	**500**	**12000**	**27000**	NA
WAFTA MW-10	5/10/2006	Exygen	< 1000	**3350**	**3320**	NA	**2270**	NA	NA	NA	NA	< 1000	**11600**	**18400**	NA
WAFTA MW-11	5/10/2006	MDH	< 1000	< 1000	< 1000	NA	< 1000	NA	NA	NA	NA	< 500	< 500	< 500	NA
WAFTA MW-11	5/10/2006	Exygen	< 1000	< 1000	< 1000	NA	< 1000	NA	NA	NA	NA	< 1000	< 1000	< 1000	NA
WAFTA MW-12	5/11/2006	MDH	< 1000	< 1000	< 1000	NA	< 1000	NA	NA	NA	NA	< 500	< 500	< 500	NA
WAFTA MW-13	5/10/2006	MDH	< 1000	< 1000	< 1000	NA	< 1000	NA	NA	NA	NA	< 500	**300[J]**	< 500	NA

TABLE 5
Groundwater and Surface Water Analytical Results, PFCs
Minnesota Fire Foam Training and Discharge Sites
Delta Project No. 19382DEL08

			Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)
#Perfluorinated Carbon Chains:			**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**
Health-Based Limits:			**7000[2]**	**ND**	**ND**	**ND**	**300[3]**	**ND**	**ND**	**ND**	**ND**	**7000[2]**	**RAA[4]**	**300[3]**	**ND**
Up North Plastics Fire															
Date of Foam Discharge:	December 2002														
Foam Usage	4,000 gallons or more														
Foam Brand:	uknown														
Sample ID	**Sample Date**	**Laboratory**													
Up North Plastics SW-1	7/16/2009	Axys	**1230**	**64.3**	**34.5**	**12**	**242**	< 2.52	< 2.52	< 2.52	< 2.52	**20.7**	**32.4**	< 5.04	< 2.52
Up North Plastics SW-2	7/16/2009	Axys	**436**	**36.1**	**26.9**	**9.43**	**78.3**	**3.37**	< 2.53	< 2.53	< 2.53	**9.42**	**7.4**	< 5.06	< 2.53
Up North Plastics SW Dup	7/16/2009	Axys	**572**	**39.4**	**28.1**	**9.92**	**87.5**	< 2.50	< 2.50	< 2.50	< 2.50	**10.3**	**10.8**	**7.64**	< 2.50
Up North Plastics Zywiec Irrigation Well 1	7/29/2009	MDH	**1242.3**	**51.4**	0	NA	0	NA	NA	NA	NA	0	0	0	NA
Up North Plastics Zywiec Irrigation Well 2	7/29/2009	MDH	**447**	0	0	NA	0	NA	NA	NA	NA	0	0	0	NA
Up North Plastics Zywiec Irrigation Well 3	7/29/2009	MDH	**2133.6**	**106.2**	**61**	NA	**55**	NA	NA	NA	NA	0	0	0	NA
Up North Plastics Smallidge	7/29/2009	MDH	**1046.3**	**51.6**	0	NA	**53.3**	NA	NA	NA	NA	0	0	0	NA

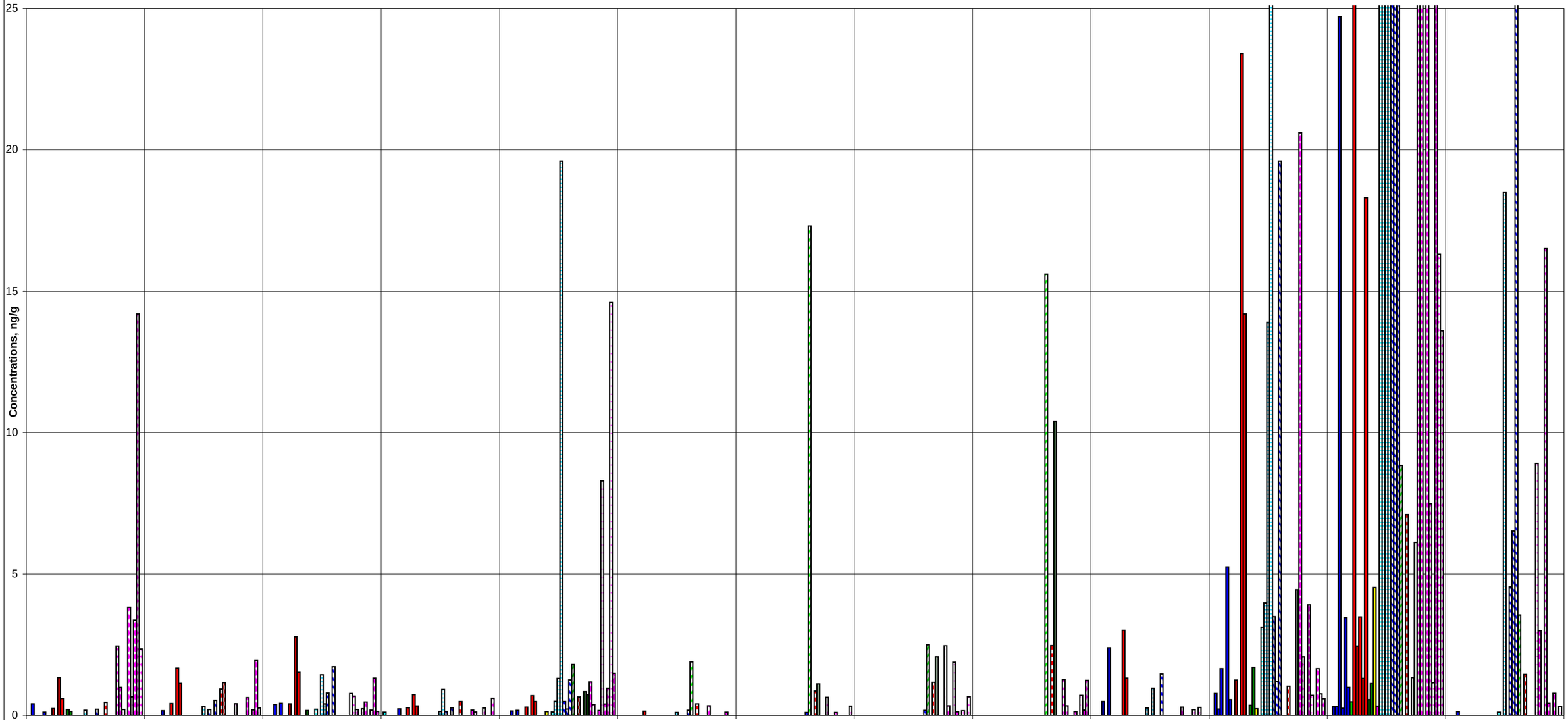
Notes:
All results and standards are in nanograms per liter (ng/L), which is equivalent to parts per trillion.
Axys: Axys Analytical Services LTD
MPI: MPI Research
MDH: Minnesota Department of Health Environmental Laboratory.
Exygen: Exygen Research
Bolded type indicates detection above the laboratory method detection limit.
Highlighted concentrations exceed the HBV or HRL.
(1) Last training event prior to sampling, dates are approximate
(2) Health-Based Value (HBV) for chronic exposure defined by the Minnesota Department of Health.
(3) Health Risk Limit (HRL) for drinking water defined by the Minnesota Department of Health.
(4) Risk Assessment Advise (RAA) set by the Minnesota Department of Health for PFHxS does not specify numeric values.
ND: No health-based limit defined.
(5) Manually Calculated Result is 18.9
(6) Manually Calculated Result is 17.1
(7) Manually Calculated Result is 23.3
(8) Manually Calculated Result is 21.7
(J) Analyte positively identified, result is below reporting limit and is estimated.
*Sample collected upgradient of fire foam training or discharge area, intended to act as "background" sample.
NA: Not analyzed

DELTA

GRAPHS

Graph 1	Soil and Sediment PFC Concentrations
Graph 2	Groundwater and Surface Water PFC Concentrations

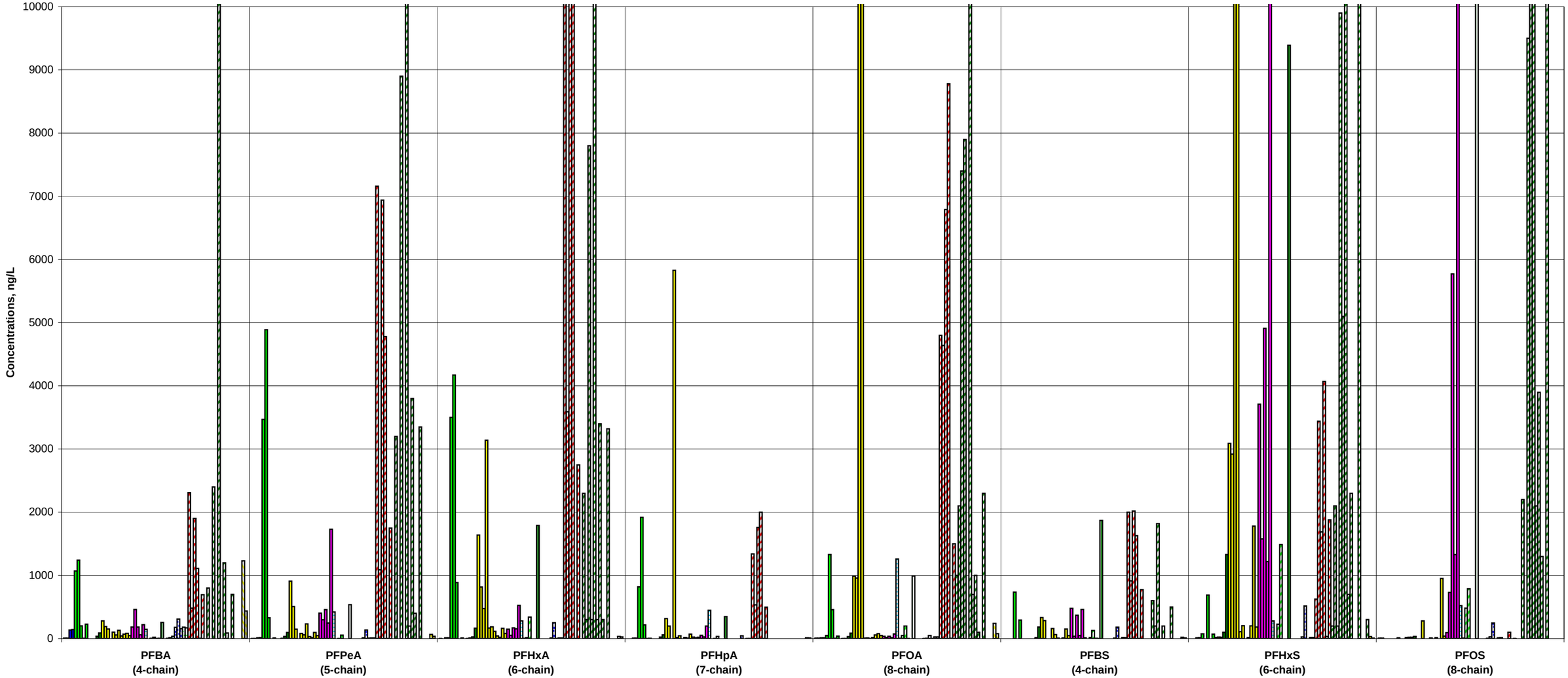
GRAPH 1
Soil and Sediment PFC Concentrations



NOTE: The PFHxS, PFOS, and/or PFOSA concentrations for the following samples are greater than 25 ng/g: Fridley B-10-4'; Bemidji B-1 1-4' and 4-8', and B-2 0-4' and 4-8'; ERTC SS-1, Sed-1, Sed-2; Up North Plastics Soil 1, Soil 2, Soil 4, and Sed 2.

Kenyon B-1 SL 0-4'	Claremont B-1 SL 0-4'	Claremont B-1 SL 4-8'	Claremont B-2 SL 0-4'	Claremont B-2 SL 4-8'	Claremont B-3 SL 0-4'	Claremont B-3 SL 4-8'
Luverne B-2 SL 0-4'	Fridley B-1 SL 0-4'	Fridley B-1 SL 4-8'	Fridley B-2 SL 0-4'	Fridley B-2 SL 4-8'	Fridley B-3 Sediment 6"	Rochester B-1 SL 0-4'
Rochester B-2 SL 0-4'	Richfield B-4 0-8'	Goodview Sed-1	Bemidji B-1 SL 0-4'	Bemidji B-1 SL 4-8'	Bemidji B-2 SL 0-4'	Bemidji B-2 SL 4-8'
ERTC SS-1	ERTC Sed-1	ERTC Sed-2	MSP Sed-1	Crystal SS-1	Crystal Sed-2	Kings Cove Marina Soil
Kings Cove Marina Sed 1	Kings Cove Marina Sed 2	Up North Plastics Soil 1	Up North Plastics Soil 2	Up North Plastics Soil 3	Up North Plastics Soil 4	Up North Plastics Soil 5
Up North Plastics Sed 1	Up North Plastics Sed 2	Up North Plastics Sed 3	Up North Plastics Sed 4			

GRAPH 2
Groundwater and Surface Water PFC Concentrations



Note: The PFBA, PFOA, PFHxS, and/or PFOS concentrations for the following samples are greater than 10,000 ng/L: MSP Airport B-3, MSP Airport B-4, Marathon MW-156, ERTC SW-1, WAFTA MW-3, WAFTA MW-4, and WAFTA MW-10.

Harmony B-1	Harmony B-2	No St Paul B-1	No St Paul B-2
Richfield B-1	Richfield B-2	Richfield B-3	Legion Lake SW-1
Richfield B-4	Luverne B-1	Luverne B-2	Luverne B-3
Fridley B-1	Fridley B-2	MSP Airport B-1	MSP Airport B-2
MSP Airport B-3	MSP Airport B-4	MSP Airport B-5	MSP Airport B-6
MSP Airport B-7	MSP Airport CWN-14A	MSP Airport CWN-15A	MSP Airport Signature MW-2
MSP SW-1	Marathon MW-101	*Marathon MW-912	Marathon SP-11
Marathon MW-172	Marathon MW-156	Burnsville B-3	Goodview SW-1
Bemidji B-1 GW	Bemidji B-2 GW	River Grove SW-1	River Grove SW-2
ERTC SW-1	Kandiyohi DMW-1A	Kandiyohi DMW-3	Crystal B-1
Crystal B-2	FHR Pine Bend MW-1	FHR Pine Bend MW-3	FHR Pine Bend MW-111
Kings Cove Marina SW-1	Kings Cove Marina SW-2	Duluth Intl. Airport GWS-1	Duluth Intl. Airport GWS-2
Duluth Intl. Airport GWS-3	Duluth Intl. Airport GWS-4	Duluth Intl. Airport GWS-5	Duluth Intl. Airport GWS-6
WAFTA BG-2	WAFTA BG-4	WAFTA MW-1	WAFTA MW-2
WAFTA MW-3	WAFTA MW-4	WAFTA MW-5	WAFTA MW-7
WAFTA MW-8	WAFTA MW-9	WAFTA MW-10	WAFTA MW-11
WAFTA MW-12	WAFTA MW-13	Up North Plastics SW-1	Up North Plastics SW-2

APPENDIX A

Best Practices Today for Class B Firefighting Foam

Best Practices Today for Class B Firefighting Foam

- Perfluorochemicals (PFCs) are a group of chemicals developed by 3M Corp for use in products to make them water repellent, stain-resistant, slippery and longer lasting.
- PFCs are not natural and do not seem to break down in the environment. Once in the environment, they may be taken up by living things, and build up (bioaccumulate) within the tissue of plants, animals and people.
- Scientists have been surprised to find PFCs in approximately 98% of all humans, including people in remote areas who have never had contact with the modern world. Studies in Minnesota have shown PFCs to be present in some ground and surface waters, air, soil and fish. Studies are underway to see if PFCs create health or developmental problems in people.
- PFCs are used in Class B firefighting foams to increase their effectiveness and make them long lasting.
- The Minnesota Pollution Control Agency (MPCA) is working on a study to understand the potential of firefighting foam as a source of PFCs in the environment. Soil and groundwater at approximately 20 firefighting training sites will be evaluated for PFCs. Minnesota Department of Health is sampling some municipal wells near foam training sites.
- Results from this work will be able late in 2009. MPCA, MnSCU Fire/EMS/Safety Center, and Fire Marshal's Office have developed guidelines for the training and use of Class B fire fighting foam until more answers on foam are known.

<u>Use of foam on fires and spills</u>

First, Class B firefighting foam has been a lifesaver. It is meant for flammable liquid fires and flammable liquid pools, or for combustible liquid fires. So use it if you have a flammable liquid like gasoline on fire or a big gasoline pool in a place where it could ignite or where it would do damage if it did ignite. Don't automatically use it for a diesel fuel spill, unless the diesel fuel is on fire or the situation is endangering life and property. Don't automatically blanket non-leaking flammable liquid tanks unless the situation really calls for it.

Second, don't use Class B foam on car fires, ordinary structure fires, wildland fires, or other inappropriate situations. Class A foams are meant for those situations, Class A foams are not thought to contain PFCs.

Foam training

Foam training sessions should include discussion of when foam use is necessary, when it can be helpful for safety, and when its use is inappropriate.

If possible, use training foams in training. Training foams are not thought to contain PFCs. Class B foam training should not be done near surface waters or storm sewer inlets which would allow foam to quickly drain to water.

PFCs can quickly pass through soil to groundwater. If your city has municipal wells your city water superintendent will have a map of the "well head protection area" which shows where the city's wells draw their water from. Training in those protection areas or in areas near private wells should be avoided. Train on soil where possible, and pick organic soils as opposed to sandy and gravelly soils if possible. That will increase the likelihood that PFCs in the foam are retained in the soil and don't quickly wash through to groundwater.

Foam types

There are many types of PFCs. Apparently all the AFFF type Class B foams have some PFC content of various types. Ethanol resistant AFFF foams apparently also contain types of PFCs. Class A foams are not thought to contain PFCs.

Firefighters' Health

Use foams to protect the public, your firefighters, and valuable property. There is no current concern that PFCs can enter firefighters' bodies by occasional skin contact or inhalation during firefighting or training.

Disposal

At this time the best disposal of Class B foams is to use it appropriately on Class B flammable liquid spills and fires. Liquids can't be put into the garbage. If Class B foam is sent down the sanitary sewer it will go to the city's wastewater treatment plant and the PFCs in the foam probably will pass straight on through to the river or lake without being broken down. So for now, the best advice is to store it safely where the containers won't get damaged until it gets used or until there are better disposal options available. That likely will be quite some time.

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PERFLUOROCARBON (PFC)-CONTAINING FIREFIGHTING FOAMS AND THEIR USE IN MINNESOTA: SURVEY AND SAMPLING ACTIVITIES, STATE FISCAL YEAR 2011

ANTEA GROUP PROJECT NO. 45618DEL04
June 30, 2011

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c-pfc1-19

TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 Purpose 1
1.2 Background 1

2.0 SCOPES OF WORK CONDUCTED IN STATE FISCAL YEAR 2011 4
2.1 Work Order SFDE1107-2 4
2.1.1 Groundwater Receptor Surveys 5
2.1.2 Follow-Up Sampling at Kandiyohi County Landfill 8
2.1.3 Follow-Up Sampling at Shingle Creek 8
2.2 Work Order SFDE1111 9
2.2.1 Follow-up Sampling at Lake Superior College ERTC 10
2.2.2 Well Sampling near Lake Superior College ERTC 11
2.3 Work Order SFDE1113 12
2.3.1 Sampling at the Hidden Harbor Marina 12
2.3.2 Sampling at Wetland Near the ABLE Training Center 13
2.3.3 Expanded Well Survey and Sampling Near the Bemidji Regional Airport 14

3.0 CONCLUSIONS AND RECOMMENDATIONS 16
3.1 MSP Airport 16
3.2 Kandiyohi County Landfill 16
3.3 Crystal Airport 17
3.4 Lake Superior College ERTC 17
3.5 Marathon Refinery 17
3.6 ABLE Training Center, Burnsville 17
3.7 Bemidji Regional Airport 18
3.8 Large Fire Sites 18

4.0 REMARKS 19

List of Tables

Table 1 Groundwater and Surface Water PFC Analytical Results
Table 2 Soil and Sediment Analytical Results, PFCs and TOC
Table 3 Well Receptor Summary for Select Firefighting Foam Training Sites in Minnesota

List of Appendices

Appendix A Marathon Refinery Groundwater Receptor Survey Documents
Appendix B Bemidji Regional Airport Groundwater Receptor Survey Documents, October 2010 Survey
Appendix C Burnsville ABLE Training Center Groundwater Receptor Survey Documents
Appendix D MSP Airport Groundwater Receptor Survey Documents
Appendix E Lake Superior College ERTC Receptor Survey Documents
Appendix F Kandiyohi County Landfill Sample Location Map
Appendix G Crystal Airport Sample Location Maps
Appendix H Lake Superior College ERTC Sample Location Maps and Analytical Summary Table
Appendix I Hidden Harbor Marina Well Location Map
Appendix J Burnsville ABLE Training Center Sample Location Map
Appendix K Bemidji Regional Airport December 2010 Well Receptor Survey and Well Sampling Documents

PERFLUOROCARBON (PFC)-CONTAINING FIREFIGHTING FOAMS AND THEIR USE IN MINNESOTA: SURVEY AND SAMPLING ACTIVITIES, STATE FISCAL YEAR 2011

1.0 INTRODUCTION

1.1 Purpose

Antea™ Group (formerly Delta Consultants) has worked under contract with the Minnesota Pollution Control Agency (MPCA) investigating perfluorochemicals in Class B firefighting foams and the use of Class B firefighting foams in Minnesota. Previous information regarding this investigation was presented in the following reports:

- Perfluorocarbon (PFC)-Containing Firefighting Foams and Their Use In Firefighting Training in Minnesota, dated June 30, 2008 (the June 2008 Report);
- Addendum to PFC-Containing Firefighting Foams and Their Use In Firefighting Training in Minnesota, dated October 22, 2008 (the October 2008 Addendum Report);
- Firefighting Training Area Site Reconnaissance, Pine Bend Flint Hills Refinery, Marathon Refinery, Burnsville Fire Training Center, and Site Access for 21 Fire Departments, dated April 3, 2009 (the April 2009 Report);
- Report of Site Reconnaissance and Sampling at Select Firefighting Foam Training Areas in Minnesota, dated June 30, 2009 (the June 2009 Report);
- Report of Investigation Activities at Select Firefighting Foam Training Areas and Foam Discharge Sites in Minnesota, dated February 10, 2010 (the February 2010 Report);
- Perfluorocarbon (PFC)-Containing Firefighting Foams and Their Use in Firefighting Training in Minnesota, dated June 30, 2010 (the June 2010 Report);
- Perfluorocarbon (PFC)-Containing Firefighting Foams and Their Use in Minnesota: Well Receptor Surveys and Follow-Up Sampling at Select Sites, dated November 15, 2010 (the November 2010 Report);
- Perfluorocarbon (PFC)-Containing Firefighting Foams and Their Use in Minnesota: Sampling at the Lake Superior College Emergency Response Training Center, Duluth, dated February 25, 2011 (the February 2011 Report); and,
- Perfluorocarbon (PFC)-Containing Firefighting Foams and Their Use in Minnesota: Sampling at the Hidden Harbor Marina, Burnsville Wetland, and Bemidji Private Wells dated May 13, 2011 (the May 2011 Report).

This report summarizes data and information for activities conducted for the "PFC/Firefighting Foam" project during the Minnesota State Fiscal Year of 2011.

1.2 Background

As a part of an overall investigation of PFCs in Minnesota, the MPCA and Minnesota Department of Health (MDH) have been investigating firefighting foams as a possible source of PFCs in the environment. Aqueous film-forming foam, or Class B AFFF, has a fluorochemical-based surfactant that rapidly forms a film across the fire surface, which prevents the release of flammable fuel vapors and excludes oxygen from the fuel surface. PFCs have been identified in soil,

sediment, surface water and groundwater samples collected from locations in Minnesota where various brands of Class B AFFF have been used repeatedly in training exercises or in large quantity to extinguish fires.

Municipal fire departments, fire departments at major oil refineries and airports in Minnesota, fire training schools in the State, and other knowledgeable persons were surveyed and interviewed regarding their use and knowledge of firefighting foams. Firefighting training sites and fire sites where Class B AFFF is or was used were ranked for their potential to release PFCs to the environment based on a number of criteria, including the following: the types and amounts of foam used, the frequency of the training events, the environmental setting of the site, and the presence of nearby receptors such as water supply wells and surface waters. The results of the survey and site ranking were presented in the June 2008 Report and October 2008 Addendum Report. Both reports are available on the MPCA website at www.pca.state.mn.us/cleanup/pfc/index.html.

Based on the site ranking, a number of firefighting training sites and fire sites where Class B AFFF was discharged were selected for further investigation. Additional investigation activities included site reconnaissance, in-depth interviews with knowledgeable persons, and/or sampling of potentially affected media including groundwater, soil, surface water and/or sediments. Information and data collected at these select sites were documented in the April 2009, June 2009, February 2010, June 2010, November 2010, February 2011 and May 2011 Reports. These reports are also available on the MPCA website. The investigation activities found that PFCs are present in the environment (soil, groundwater, surface water and/or sediment) at sites where Class B AFFF was discharged repeatedly in training exercises or where large amounts of Class B foam were utilized on Class B fires. The investigations have also identified PFCs in surface water or groundwater at concentrations above the State Health Risk Limits (HRLs) for drinking water at the following sites:

- a former firefighting training area behind the Richfield Ice Arena in Richfield;
- two former firefighting training areas at Minneapolis-St. Paul International (MSP) Airport;
- a firefighting training area at the Marathon Refinery in St. Paul Park;
- the Apple Valley-Burnsville-Lakeville-Eagan (ABLE) Training Center in Burnsville;
- a firefighting training area at the Bemidji Regional Airport; and,
- a firefighting training area at the Lake Superior College Emergency Response Training Center (ERTC) in Duluth.

PFC concentrations above the HRLs in groundwater were also identified by environmental consultants other than Antea Group at a former firefighting training area at the Duluth International Airport and at the Western Area Fire Training Academy (WAFTA) in St. Bonifacius. Sampling results for these sites are presented briefly in the June 2010 Report.

Laboratory results for all PFC sampling conducted in association with this PFC/Firefighting Foam project are summarized in **Table 1, *Groundwater and Surface Water PFC Analytical Results***, and **Table 2, *Soil and Sediment Analytical Results, PFCs and TOC (Total Organic Carbon)***.

One of the risks associated with PFCs in groundwater is to human health should a potable water well be drawing water from an impacted groundwater aquifer. The MPCA and MDH have worked together to identify public supply wells that may be at risk due to their proximity to firefighting foam training areas or large fire sites where Class B AFFF was discharged. The MDH has sampled water supply wells near several fire foam training areas and while low levels of some PFC compounds were detected in municipal well water samples, none of the water samples had PFC concentrations higher than the HRLs or State Health-Based Values (HBVs). Groundwater sampling conducted by the MDH is discussed briefly in the June 2010 Report.

Based on the presence of PFCs at levels above the HRLs in groundwater at the former firefighting training area in Richfield and the known presence of private water supply wells in the area, a receptor survey was conducted in the vicinity of the former training area in order to identify potential receptors of impacted groundwater. The survey identified several sealed and abandoned water supply wells and groundwater monitoring wells in the survey area, but no active water supply wells other than the municipal wells which were being sampled by MDH. Results of the receptor survey for the former firefighting training area in Richfield are presented in the February 2010 Report. Receptor survey results for the Duluth International Airport and the WAFTA site in St. Bonifacius are also briefly presented in the June 2010 Report.

In 2006 and 2007 a number of groundwater samples collected by the MPCA from multiple rural and urban locations in Minnesota were analyzed for PFCs as part of a State-wide monitoring effort of PFCs in the ambient environment. The results of that sampling and a comparison of groundwater data collected as part of the ambient sampling and the sampling done as part of the PFCs/Firefighting Foam project were presented in the June 2010 Report. Ambient sampling data is presented in the MPCA document *PFCs in Minnesota's Ambient Environment: 2008 Progress Report.*

At the end of the State Fiscal Year 2010, the following recommendations for additional work for the PFC/Firefighting Foam project were made in the June 2010 Report:

1. Conduct groundwater receptor surveys to evaluate risk at the following sites where PFOA and/or PFOS concentrations in groundwater exceeded the State HRLs:
    - Marathon Refinery in St. Paul Park
    - Bemidji Regional Airport
    - ABLE Training Center in Burnsville
    - Minneapolis-St. Paul International Airport (MSP)
2. Conduct a groundwater receptor survey to evaluate risk in the area of the Lake Superior College ERTC due to elevated PFOS and PFOA concentrations in the wetland adjacent to the training area.

3. Continue to monitor groundwater for PFCs at the existing monitoring well located downgradient of the fire site at the Kandiyohi County Landfill. Since the foam discharge occurred less than one year ago, it may take time for potential PFC impacts to migrate through the soil to the water table, and to migrate with groundwater to the location of monitoring well DMW-3. Consider installing a monitoring well closer to the site of the fire if site activities and land use nearer the fire site are conducive to the presence of a monitoring well.
4. At the time of sampling at Crystal Airport in January 2010, there was no water in Shingle Creek. Since PFCs were detected in a sediment sample collected on the downstream side of Crystal Airport, but none were detected in an upstream sediment sample, water samples should be collected at or near the locations of the previous sediment samples to test for PFCs in Shingle Creek adjacent to Crystal Airport.
5. Follow up with inquiries, and sampling if warranted, at any large fires that occur or have occurred where Class B AFFF is used extensively.

2.0 SCOPES OF WORK CONDUCTED IN STATE FISCAL YEAR 2011

As a result of finding PFCs at concentrations above the HRLs in groundwater or surface water at the sites identified in Section 1.2, receptor surveys were conducted in the vicinities of these sites in Fiscal Year 2011, except for the former firefighting training area in Richfield where a receptor survey was conducted in Fiscal Year 2010. The purpose of the receptor surveys was to identify potential receptors of PFC-impacted groundwater or surface water. Based on results of the receptor surveys, private wells near the Marathon Refinery, Bemidji Regional Airport, and Lake Superior College ERTC, and surficial water bodies near Lake Superior College ERTC and the ABLE Training Center, were sampled for PFCs.

Additional follow-up PFC sampling was also conducted in Fiscal Year 2011 at two sites: (1) groundwater samples were collected from two existing monitoring wells at the Kandiyohi County Landfill, where Class B AFFF was used on a fire in October 2009; and, (2) surface water and sediment samples were collected from Shingle Creek, adjacent to Crystal Airport.

2.1 Work Order SFDE1107-2

To address the recommendations included in the June 2010 Report, Antea Group performed the following scope of work under MPCA Work Order SFDE1107-2, dated July 23, 2010:

1. Conducted groundwater receptor surveys in the vicinity of current or former firefighting training sites at the following locations: Marathon Refinery in St. Paul Park; Bemidji Regional Airport; ABLE Training Center in Burnsville; MSP Airport; and, Lake Superior College ERTC in Duluth.
2. Conducted additional groundwater sampling from two existing wells at the Kandiyohi Landfill.
3. Conducted additional sediment and surface water sampling at Shingle Creek adjacent to the Crystal Airport in Crystal.

4. Prepared a report summarizing work performed as part of the scope of work (the November 2010 Report).

2.1.1 Groundwater Receptor Surveys

Groundwater receptor surveys conducted in the vicinity of the current or former firefighting training sites identified in Section 2.1 included the following activities:

- Walking surveys were conducted in order to identify all houses and businesses, surface water bodies, water wells, and any other features that may be a groundwater receptor. The walking surveys included the area within 500 feet upgradient and side-gradient of the sites and 1/2-mile downgradient of the sites. Hydrological resources used in determine groundwater flow directions at each of the sites are presented in the November 2010 Report.
- Information regarding the potable water source and water wells at the properties identified during the walking surveys was obtained from property owners or tenants. Information was obtained through personal interviews or via well survey questionnaires that were either left at a property or sent in the mail.
- Inquiries were made as necessary with the water supply utility regarding municipal water sources, municipal well locations, and the availability of municipal water in the area of the sites.
- The MDH County Well Index (CWI) was searched in order to identify registered water wells located within the survey areas.

Details and results for each of the receptor surveys are presented in the November 2010 Report. The November 2010 Report included references Findings of the surveys are summarized in **Table 3, *Well Receptor Summary for Select Firefighting Foam Training Sites in Minnesota***. The receptor surveys identified the following potential groundwater receptors:

- Marathon Refinery: As presented in the November 2010 Report, the inferred groundwater flow direction is generally to the southwest. An April 2008 groundwater elevation contour map prepared by URS in association with a petroleum release at the Marathon Refinery (unrelated to the firefighting foam area at the refinery) indicated a slightly more southerly groundwater flow direction at the southeast portion of the refinery property. Thus the receptor survey performed for this PFC/Firefighting Foam project included an area within 1/2-mile to the south and southwest of the firefighting training area at the refinery. A figure showing the October 2010 receptor survey area, inferred groundwater flow directions, returned well survey questionnaires, and a MDH CWI map of wells in the survey area and associated well logs are included as **Appendix A**.

  Of the eleven wells shown on the CWI map in the receptor survey area, eight are either monitoring wells, remedial wells, or abandoned wells. The remaining three wells mapped by the CWI, Unique Well nos.

441942, 576171, and 429870, are domestic wells registered to Willie Brown or Willie's Hidden Harbor. The well questionnaire survey identified five active water supply wells at or owned by the Hidden Harbor Marina. In addition to the three wells mentioned above Unique Well nos. 268354 and 559256 are registered to Harbor Village #2 and Willie's Hidden Harbor, respectively; however, these wells were not mapped on the CWI. According to the owner of the Hidden Harbor Marina, the five wells are used for a variety of purposes, including wash water and drinking water. The City of St. Paul Park confirmed that the Hidden Harbor Marina is not connected to the municipal water supply. The Hidden Harbor Marina is located approximately 0.3 miles south of the fire training area at Marathon Refinery. Discussion of sampling of the wells owned by the Hidden Harbor Marina is presented in **Section 2.3.1**.

The Mississippi River is located approximately 600 feet west of the firefighting training area at the Marathon Refinery. Previous sampling of water, sediments and fish tissue from the Mississippi River as part of the PFC/Firefighting Foam project and other unrelated State projects has identified PFCs in all sampled media. Therefore, the MPCA decided that additional sampling of surface water and sediment from the Mississippi River near the Marathon Refinery would not provide useful data for this project due to the previously identified presence of PFCs in the river and other regional PFC groundwater impacts associated with former 3M landfills in Washington County.

- Bemidji Regional Airport: As presented in the November 2010 Report, the regional groundwater flow direction in the area of the Bemidji Regional Airport is generally to the southeast. The initial receptor survey conducted in October 2010 identified one active water supply well within 1/2-mile downgradient of the Airport. The identified well is at the Kraus Anderson construction shop located to the southeast. However, review of the MDH CWI identified multiple residential wells located between 3/4-mile and 1 mile east and southeast of the firefighting training area at the Bemidji Regional Airport. An expansion of the receptor survey was conducted under a later Work Order, as discussed in **Section 2.3**.

  Grass Lake is located approximately 1/2-mile south-southwest of the firefighting foam training area at the Bemidji Regional Airport. According to personnel with the City of Bemidji Street Department, stormwater flow from the airport is ultimately routed to a wetland to the north of the Airport, thus, Grass Lake does not receive stormwater runoff from the Airport. A figure showing the October 2010 receptor survey area, inferred groundwater flow direction, returned well survey questionnaires, and a MDH CWI map of wells in the area and associated well logs are included as **Appendix B**. Discussion of the subsequent, expanded receptor survey is presented in **Section 2.3.3**.
- ABLE Training Center: As presented in the November 2010 Report, the regional groundwater flow direction in the area of the ABLE Training Center is generally to the northwest, toward the Minnesota River. A figure

showing the receptor survey area, completed well survey questionnaires, and a MDH CWI map of wells in the area of the ABLE Training Center and associated well logs are included as **Appendix C**. No active water supply wells were identified by the receptor survey, except for three municipal wells that were previously sampled twice by the MDH for PFCs. A wetland or pond located across Cliff Road from the ABLE Training Center was identified as a potential receptor for groundwater or stormwater runoff from the site.

- MSP Airport: As presented in the November 2010 Report, the regional groundwater flow direction in the area of MSP Airport is generally to the southeast, toward the Minnesota River. A figure showing the receptor survey area, inferred groundwater flow direction, and a MDH CWI map indicating the lack of wells within the survey area are included as **Appendix D**. No water supply wells or surface waters were identified within the receptor survey area. The Minnesota River is located approximately 1.8 miles southeast of the former firefighting training areas at MSP Airport.
- Lake Superior College ERTC: As presented in the November 2010 Report, the inferred groundwater flow direction in the area of the ERTC is generally to the south, toward the St. Louis River. However, localized features such as creeks that flow to the southeast and a historical gravel pit to the west may influence groundwater flow at the ERTC. Therefore the receptor survey included areas within 1/2-mile to the west and southeast. A figure showing the receptor survey area, inferred regional groundwater flow direction, completed well survey questionnaires, and a MDH CWI map of wells in the area of the ERTC are included as **Appendix E**. No well logs for the wells identified in the survey area were available on the CWI. Five active water supply wells were identified during the walking survey at nearby houses on Highway 23 in Duluth. One of the wells is shared by two houses. The City of Duluth Public Works Department confirmed that municipal water is not currently utilized by the identified houses. In addition, two creeks flow near the firefighting practice area at the ERTC, which apparently join up before flowing southward beneath Highway 23 to the backwater of the St. Louis River. One of the creeks appears to flow through a wetland located adjacent to the firefighting practice area. Sediments and surface waters of the wetland and creek were sampled previously.

Based on the results of the receptor surveys the following recommendations were made in the November 2010 Report:

- pursuit of access to the five wells at the Hidden Harbor Marina for PFC sampling;
- pursuit of access to the Kraus Anderson shop well in Bemidji for PFC sampling;
- completion of an expanded receptor survey to include private wells further east and southeast of the Bemidji Regional Airport;
- pursuit of access to the wetland or pond near the ABLE Training Center in Burnsville for PFC sampling of wetland surface water and sediment; and,

- pursuit of access to the residential wells near the Lake Superior College for PFC sampling, and access to the ERTC for follow-up surface water and sediment sampling for PFCs.

2.1.2 Follow-Up Sampling at Kandiyohi County Landfill

In October 2009 approximately 545 gallons of Class B AFFF were used on a fire at the Kandiyohi County Landfill. Groundwater samples were collected from existing landfill monitoring wells DMW-1A and DMW-3 in January 2010 and May 2010. Well DMW-1A is located upgradient of the fire area, and DMW-3 is located approximately 300 to 350 feet downgradient of the fire area. A figure illustrating the approximate area of the fire and the referenced monitoring wells is included in **Appendix F**. No PFCs were identified in either sample collected from DMW-1A, and only low levels of perflourobutanoic acid (PFBA) were found in the samples collected from DMW-3 (see **Table 1)**. Additional sampling was recommended in the June 2010 Report to assess groundwater conditions over time downgradient of the fire area.

Follow-up groundwater samples were collected from DMW-1A and DMW-3 on August 12, 2010, for PFC analysis. The samples were submitted to Axys Analytical Services for analysis of PFCs.

Laboratory analysis did not detect any PFCs in the (upgradient) DMW-1A sample and only a low concentration of PFBA in the (downgradient) DMW-3 sample, which is consistent with previous sampling results (see **Table 1**). Details of and results for the follow-up sampling at Kandiyohi County Landfill are presented in the November 2010 Report.

Continued groundwater sampling from DMW-1A and DMW-3 was recommended in the November 2010 Report. However, the MPCA decided that additional sampling was not warranted at that time since the nearest potential groundwater receptor is located approximately one-half mile southwest of the fire area at the landfill, and significant concentrations of PFCs have been not detected in DMW-3. With the passage of more time to allow for PFCs, if present, to reach the monitoring wells, re-sampling of DMW-1A and DMW-3 should be reconsidered.

2.1.3 Follow-Up Sampling at Shingle Creek

Interviews with responding municipal fire departments around the Crystal Airport in Crystal indicated that Class B AFFF may have been used in the past to respond to plane crash-related fires at the Crystal Airport. Generally, storm water runoff flows through various pathways and drainage ditches across the airport grounds to Shingle Creek. Shingle Creek flows along the east side of Crystal Airport to the southeast, emptying into Twin Lake. In a project unrelated to the PFC/Firefighting Foam project, PFCs were identified in fish samples collected from Twin Lake, including high levels of PFOS. The source of the PFOS in the fish collected from Twin Lake has not been identified to date.

Soil, groundwater, and sediment sampling for PFCs was conducted at Crystal Airport in January 2010 from several locations, including upstream and downstream locations in Shingle Creek adjacent to Crystal Airport. A figure showing the January 2010 sample locations is included in **Appendix G**. Due to the winter season and lack of water

in the creek, only sediment samples were collected from the Shingle Creek in January 2010. Sampling results identified several PFC compounds in the downstream sediment sample; PFCs were not detected above laboratory detection limits in the sediment sample collected from the upstream location in Shingle Creek (see **Table 2**). The January 2010 sampling event at Crystal Airport is presented in the February 2010 and June 1010 Reports. The June 2010 Report recommended surface water sampling and follow-up sediment sampling from Shingle Creek for PFCs.

Follow-up sediment samples and surface water samples were collected from Shingle Creek on October 1, 2010, from the same locations upstream and downstream of the Crystal Airport as the January 2010 samples. A figure showing the October 2010 sample locations is included in **Appendix G**. The samples were submitted to Axys Analytical Services for analysis of PFCs.

Laboratory results for surface water samples Crystal SW-1 (upstream sample) and Crystal SW-2 (downstream sample) detected concentrations of several PFC compounds; all of the concentrations were below the State HRLs (see **Table 1**). Although the HRLs are not necessarily applicable to the surface water in Shingle Creek, they are presented here and in Table 1 for comparison purposes only. The PFC concentrations detected in the upstream sample were slightly higher than those detected in the downstream sample. Details of the sampling and laboratory results for the surface water samples only are presented in the November 2010 Report; the laboratory results for the sediment sample were not available at the time of the November 2010 Report.

Laboratory results for the upstream and downstream sediment samples (Crystal Sed-3 and Crystal Sed-4, respectively) collected on October 1, 2010, were received after the November 2010 Report was finalized. Laboratory results are included in **Table 2**. Laboratory analysis did not detect any PFCs in the upstream Crystal Sed-3 sample. Low concentrations (less than 5 nanograms-per-gram (ng/g), which is roughly equivalent to parts-per-billion) of several PFC compounds were detected in the downstream Crystal Sed-4 sample. The PFC concentrations in Crystal Sed-4 were slightly lower than concentrations detected in downstream sample Crystal Sed-2 collected in January 2010. PFC concentrations in all sediment samples collected from Shingle Creek were below MPCA Tier 1 Soil Reference Values (SRVs). Although the Tier 1 SRVs are not necessarily applicable to sediments in Shingle Creek, they are presented here and in Table 2 for comparison purposes only.

Based on the relatively low concentrations of PFCs detected in sediment and surface water samples collected from Shingle Creek adjacent to Crystal Airport, no further sampling is recommended at this time.

2.2 Work Order SFDE1111

Antea Group performed the following scope of work under MPCA Work Order SFDE1111, dated October 20, 2010, based on results of the groundwater receptor survey and previous creek and wetland sampling at the Lake Superior College ERTC in Duluth:

1. An access agreement was implemented between the MPCA and Lake Superior College for additional PFC sampling of surface waters and sediments at the ERTC.

2. Access agreements were implemented between nearby well owners and the MPCA for PFC sampling of their water wells.
3. Surface water and sediment samples were collected at the ERTC from the wetland and the creek located adjacent to the ERTC fire training area for PFC analysis.
4. Water samples were collected from two of the (five) private water wells located within one-half mile of the ERTC for analysis of PFCs.
5. Sediment, surface water and well water samples were analyzed by a State-contracted laboratory for analysis of PFCs.
6. A report was prepared summarizing the work performed as part of the scope of work (the February 2010 Report).

2.2.1 Follow-up Sampling at Lake Superior College ERTC

Previous sampling in November 2009 of surface water and sediments from a wetland at the ERTC, as well as sampling of soil and creek sediment below the outfall for a 6-inch perforated pipe that runs beneath the fire training area identified PFC concentrations present in all of the media sampled (see **Tables 1 and 2**). A laboratory data table specific to samples collected at and in the vicinity of the ERTC is included in **Appendix H**. A Site Map showing sample locations at the ERTC is included in **Appendix H**. The concentrations of PFOA and PFOS detected in the surface water sample (ERTC SW-1) collected from the wetland were higher than the HRLs. Although the HRLs are not necessarily applicable to surface waters of the State, there was a concern that elevated concentrations of PFOA and PFOS could reach groundwater or a drinking water aquifer that is utilized by nearby water supply wells.

An access agreement between the MPCA and Lake Superior College was executed on November 8, 2010, allowing access for PFC sampling of a wetland and a creek at the ERTC. A copy of the access agreement is included in the February 2011 Report.

Sediment and surface water samples were collected by Antea Group on November 18, 2010, at or near the locations of previous sediment and surface water samples. Sample locations are shown on the Site Map included in Appendix H. In addition, a surface water sample was collected from the creek. Sediment and surface water samples collected from the wetland were labeled “ERTC Sed-3” and “ERTC SW-2”. The sediment and surface water samples collected from the creek were labeled “ERTC Sed-4” and “ERTC SW-3.” The samples were submitted to Axys Analytical Services for analysis of PFCs.

Laboratory analysis detected approximately similar PFC concentrations in ERTC Sed-4 as previous creek sediment sample ERTC Sed-1, and in ERTC Sed-3 as previous wetland sediment sample ERTC Sed-2 (see **Table 2**). PFC concentrations in all sediment samples, and soil sample ERTC SS-1 collected previously, were below MPCA Tier 1 SRVs. Although the Tier 1 SRVs are not necessarily applicable to soils and sediments at the ERTC, they are presented here and in Table 2 for comparison purposes only.

The PFC concentrations detected in wetland surface water sample SW-2 were lower than concentrations in the November 2009 wetland sample SW-1 (see **Table 1**). PFOS concentrations detected in both surface water samples SW-1 and SW-2 exceeded the HRL, with concentrations of 11,300 nanograms per liter (ng/L) and 7,640 ng/L, respectively. The PFOA concentration of 991 ng/L detected in the November 2009 SW-1 sample exceeded the HRL of 300 ng/L, but the PFOA concentration of 290 ng/L detected in SW-2 in November 2010 was below the HRL. The PFOS concentration of 7,630 ng/L detected in the creek surface water sample (ERTC-SW-3) also exceeded the HRL. Although the HRLs are not necessarily applicable to surface waters at the ERTC, they are presented here for comparison purposes only.

Details of and results for the follow-up sampling at Lake Superior College ERTC are presented in the February 2011 Report.

2.2.2 Well Sampling near Lake Superior College ERTC

The groundwater receptor survey conducted in September and October 2010 identified six residences within one-half mile of the ERTC that utilized drinking water from five private wells; two of the houses shared one well (see **Table 3**). The locations of the residences are shown on a map of the ERTC surrounding area included in **Appendix H**. The City of Duluth Public Works Department confirmed that the houses within the receptor survey area are not connected to the municipal water supply, but that a water main is available to one of the properties, at 11825 Highway 23.

Access agreements were sent to the owners of the identified residences with private wells, requesting access to their residences to collect water samples from private wells for analysis of PFCs. Three of the well owners provided access to the MPCA and Antea Group as their contractor to sample their wells. However, a sampling appointment for the residence at 11825 Highway 23 s was cancelled and was not rescheduled. Copies of the access agreements are included in the February 2011 Report.

On November 19, 2010, water samples were collected from private wells at two residences located within one-half mile of the Lake Superior College ERTC, at 10801 and 11601 Highway 23 in Duluth. The sample collected from the residence at 10801 Highway 23 was labeled “ERTC-10801,” and the sample collected at 11601 Highway 23 was labeled “ERTC-11601.” The samples were submitted to Axys Analytical Services for analysis of PFCs.

The only PFC compounds detected in the water well samples collected from the private water wells at 10801 and 11601 Highway 23 were PFOS and perfluorohexane sulfonate (PFHxS). The PFOS concentrations of 6.49 ng/L and 7.26 ng/L were below the HRL of 300 ng/L. The concentrations of PFHxS detected in the well water samples were 11.2 ng/L and 9.63 ng/L; the RAA for PFHxS does not include a numerical standard. All of the other PFC compounds were not detected above laboratory detection limits in either well water sample. Sample results are included on **Table 1**. Sample results were provided to the home owners.

Details of and results for the private well sampling associated with the Lake Superior College ERTC are presented in the February 2011 Report.

2.3 Work Order SFDE1113

Antea Group performed work under MPCA Work Order SFDE1113, dated November 30, 2010, based on results of the groundwater receptor surveys conducted in the vicinities of the firefighting training areas at the following locations: Marathon Refinery, Bemidji Regional Airport, and the ABLE Training Center. The scope of work performed under Work Order SFDE1113 included the following activities:

1. An access agreement was executed between the MPCA and the owner of the Hidden Harbor Marina to allow sampling of five water supply wells at the Marina for PFC analysis. Water samples were collected from these wells and submitted for laboratory analysis of PFCs.
2. An access agreement was executed between the MPCA and the City of Burnsville to allow surface water and sediment sampling for PFCs at the wetland or pond located on City property north of the ABLE Training Center. A surface water sample and a sediment sample were collected and submitted for laboratory analysis of PFCs.
3. A well receptor survey was conducted for the neighborhood located approximately 3/4-mile east of the Bemidji Regional Airport.
4. Access agreements were executed between the MPCA and select well owners in Bemidji for sampling of their water wells for PFCs. Water samples were collected from the select wells and submitted for laboratory analysis of PFCs.
5. A report was prepared summarizing the work performed as part of the scope of work (the May 2010 Report).

2.3.1 Sampling at the Hidden Harbor Marina

Sampling of select existing groundwater monitoring wells near and upgradient of the firefighting training area at the Marathon Refinery was conducted in August 2009. Laboratory analysis of five water samples plus one duplicate sample identified PFCs in all of the samples, including PFOS concentrations above the HRL. The laboratory analytical results are included in **Table 1**. Sampling at the Marathon Refinery is discussed in the February 2010 Report.

As discussed in **Section 2.1.1**, the groundwater receptor survey conducted in the vicinity of Marathon Refinery in October 2010 identified five water supply wells owned by the owner of the Hidden Harbor Marina, as follows:

- Unique Well No. 268354 at the marina workshop that is used for non-potable uses such as toilets and cleaning boats (labeled “Well A- Hidden Harbor” for sampling purposes).
- Unique Well No. 559256 at the marina that supplies water to the on-site restaurant and to marina boat customers (“Well B-Hidden Harbor”).
- A residential well located at the house associated with the marina. This house is currently being used as the shower house for marina customers. The unique well number for this well is unknown (“Well C-Hidden Harbor”).

- A residential well located at the house at 1001 Oak Street, just south of the marina. The unique well number for this well is unknown ("Well D-Hidden Harbor").
- Unique Well No. 429870 at the house at 115 10th Avenue West, just south of the marina ("Well E-Hidden Harbor").

Unique Well nos. 441942 and 576171 are likely associated with Well C and Well D, however, insufficient information was readily available to match up the physical wells with the unique well numbers. A figure showing the locations of the sampled wells at the Hidden Harbor Marina is included as **Appendix I**.

An access agreement between the MPCA and the owner of the Hidden Harbor Marina allowed for sampling of the above-identified wells. Water samples were collected from all five wells on March 3, 2011. The well samples were labeled as indicated above and submitted to Axys Analytical Services for analysis of PFCs.

Laboratory results for the well samples collected at the Hidden Harbor Marina are summarized on **Table 1**. Laboratory analysis detected low levels of perfluorinated carboxylic acids in three of the Hidden Harbor Marina well samples: the water well at the restaurant (Unique No. 559256/Well B), and the houses at 1001 Oak Street (Well D) and 115 10th Avenue West (Unique No. 429870/Well E). All detected PFC concentrations were below the HRL or other drinking water health-based values defined by the MDH (see **Table 1**). Sampling results were provided to the owner of the Hidden Harbor Marina.

The PFC compound that was detected above the HRL at the Marathon Refinery was PFOS, which is a perfluorinated sulfonate. No perfluorinated sulfonates were detected in any of the Hidden Harbor Marina well samples, only perfluorinated carboxylic acids were detected in the Hidden Harbor Marina well samples. Based on the different types of PFC compounds detected in the wells at the Marathon Refinery and the Hidden Harbor wells, the PFC impacts in groundwater at the Hidden Harbor Marina do not appear to be from the firefighting training area at the Marathon Refinery.

The City of St. Paul Park is included in an area of Washington County known to have low levels of PFC groundwater impacts associated with landfills where 3M wastes were historically dumped. Assessment and monitoring data associated with the 3M wastes in Washington County are available at the MPCA and MDH websites.

Details of and results of the Hidden Harbor Marina well sampling are presented in the May 2011 Report.

2.3.2 Sampling at Wetland Near the ABLE Training Center

Groundwater sampling was conducted at the ABLE Training Center in August 2009. A groundwater sample was collected from soil boring B-3. (Attempts to collect groundwater samples from borings B-1 and B-2 were unsuccessful.) Laboratory analysis of the groundwater sample (Burnsville B-3 GW 44.5 ft.) detected several PFCs in the sample, including PFOA and PFOS at concentrations above the HRL (see **Table 1**).

As discussed in **Section 2.1.1**, the groundwater receptor survey conducted in the vicinity of the ABLE Training Center did not identify any water supply wells except for the municipal wells already sampled by the MDH. A wetland or pond located across Cliff Road from the ABLE Training Center was identified as a potential receptor for storm water runoff. The wetland is on property owned by the City of Burnsville.

An access agreement executed between the MPCA and the City of Burnsville allowed for sampling of the surface water and sediment from the wetland for PFCs. A surface water sample (Burnsville Pond SW-1) and a sediment sample (Burnsville Pond Sed-1) were collected from the wetland on April 20, 2011. The sample locations are shown on a figure included as **Appendix J**. The well samples were submitted to Axys Analytical Services for analysis of PFCs.

The laboratory results for the surface water sample collected at the Burnsville wetland are included on **Table 1**. Low levels of perfluorinated carboxylic acids were detected in the surface water sample, at concentrations below the HRL or other drinking water health-based values defined by the MDH. The State drinking water criteria are not necessarily applicable to surface waters, but are discussed here for comparison purposes only. There are no surface water criteria for PFCs applicable to the sampled wetland in Burnsville. Details of the sampling from the Burnsville wetland, and laboratory results for the surface water sample only, are presented in the May 2011 Report; the laboratory results for the sediment sample were not available at the time of the May 2011 Report.

Laboratory results for the sediment sample collected from the Burnsville wetland were received after the May 2011 Report was finalized. Laboratory results are included in **Table 2**. Laboratory analysis detected relatively low concentrations of PFCs in the Burnsville Pond Sed-1 sample, at concentrations below the MPCA Tier 1 SRVs. Although the Tier 1 SRVs are not necessarily applicable to sediments at the wetland in Burnsville, they are presented here and in Table 2 for comparison purposes only.

The types of PFC compounds detected in soil and groundwater samples collected from soil borings at the ABLE Training Center are similar to those detected in the Burnsville Pond samples. The PFCs detected in the Burnsville pond/wetland may or may not be from the ABLE Training Center, as stormwater runoff entering the pond/wetland may be picking up PFCs from other potential sources in the area. An assessment of other potential PFC sources in the area was not completed as part of this project. Since the PFC concentrations in the Burnsville Pond samples were relatively low an assessment of other potential PFC sources in the area does not appear to be warranted at this time.

2.3.3 Expanded Well Survey and Sampling Near the Bemidji Regional Airport

Soil and groundwater sampling was conducted in November 2009 at the area in front of the fire station at the Bemidji Regional Airport, where the Bemidji Fire Department trains periodically with Class B AFFF. Soil and groundwater samples were collected from two soil borings, B-1 and B-2. Laboratory analysis of the groundwater samples identified several PFCs, including PFOS at concentrations above the HRL (see **Table 1**).

As discussed in Section 2.1.1, Antea Group conducted a groundwater receptor survey in October 2010 of the area located within one-half mile south and southeast of the training area at the Bemidji Airport. This initial receptor survey identified one active water supply well, the Kraus Anderson shop well. Information regarding the October 2010 receptor survey is presented in the November 2010 Report.

Other domestic water wells were known to exist outside the October 2010 receptor survey area. The MDH expressed some concern that shallow domestic wells located in a neighborhood between 3/4-mile and 1 mile east of the fire foam training area at the airport could potentially be impacted by the PFC groundwater impacts. Thus, a recommendation was made in the November 2010 Report to conduct a receptor survey in this area and sample a select number of wells identified in the survey.

Well survey letters were mailed to the owners of 33 properties in the neighborhood immediately east of the Bemidji Regional Airport in December 2010. Completed well surveys were returned by 17 well owners; the completed surveys identified 13 active wells in the neighborhood. A table summarizing all properties surveyed and survey responses received is included in **Appendix K**. A map showing the survey area is also included in **Appendix K**.

Of the thirteen active wells identified during the survey, six of the wells were selected for PFC sampling. The wells were selected so as to sample from varying depths and locations within the survey neighborhood. A seventh well, the well at the Kraus Anderson shop, was also selected for PFC sampling.

Access agreements between the MPCA and the selected seven well owners allowed for the sampling of their wells for PFCs. The wells were sampled on March 24, 2011, with the following exception: the well owner at 2120 Anne Street NW was not available on the day of sampling. The locations of the wells sampled are included on the map of the survey area included in **Appendix K**. A laboratory-supplied sample jar, nitrile sampling gloves, and cooler were left at 2120 Anne Street NW by Antea Group personnel on March 24, 2011. The property owner collected a sample from the well on March 29, 2011 and shipped the sample in the cooler provided to Antea Group. The well samples were labeled as follows:

- Bemidji 2021 Anne
- Bemidji 2326 Bardwell
- Bemidji 3481 Laurel
- Bemidji 2316 Bardwell
- Bemidji 2103 Anne
- Bemidji Kraus Anderson
- Bemidji 2120 Anne

Water samples were submitted to Axys Analytical Services for laboratory analysis of PFCs. Details of the sampling from the wells in Bemidji are presented in the May 2011 Report; the laboratory results for the water samples were not available at the time of the May 2011 Report.

Laboratory analysis of the well samples did not detect any PFCs in the following samples: Bemidji 2021 Anne, Bemidji 2326 Bardwell, Bemidji 3481 Laurel, and, Bemidji 2120 Anne. Low levels of PFBA were detected in the Bemidji 2316 Bardwell and Bemidji Kraus Anderson samples, at concentrations higher than PFBA levels detected in soil boring samples B-1 and B-2 collected at the airport. Low levels of PFHxS and PFOS were detected in the Bemidji 2103 Anne sample. All PFC concentrations detected were below the HRLs or HBVs. Laboratory results are included on **Table 1**.

The well at 2103 Anne Street NW is reportedly 55 feet deep; a search of the MDH CWI did not locate the well log. This is the only well sampled where PFOS was detected; PFOS is the PFC compound detected in groundwater above the HRL at the Bemidji Regional Airport borings. The wells at 2021 and 2120 Anne Street NW are located on adjoining properties to 2103 Anne Street NW and are both reportedly 30 feet deep; no PFCs were detected in either of these wells. The well at 2326 Bardwell Drive NW is reportedly 52 feet and is situated roughly between the firefighting training area at the Bemidji Regional Airport and the house at 2103 Anne Street NW and is of similar depth to the well at 2103 Anne Street NW; however, no PFCs were detected in the well sample collected at 2326 Bardwell Drive NW.

The data collected during this investigation is inconclusive in determining whether or not the PFCs detected in the wells at 2103 Anne Street NW, 2316 Bardwell Drive NW, and the Kraus Anderson shop are due to the discharge of Class B AFFF at the Bemidji Regional Airport.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 MSP Airport

No potential groundwater receptors were identified in the receptor survey area at MSP Airport. Antea Group recommends no further actions at this time with regards to PFCs in the soil and groundwater at the former fire training areas at MSP Airport.

3.2 Kandiyohi County Landfill

Three rounds of groundwater sampling have been collected from existing monitoring wells since the October 2009 fire at the Kandiyohi County Landfill. Laboratory analyses of the groundwater samples have detected similar concentrations of PFBA in DMW-3, which is presumably located downgradient of the site of the landfill fire. No other PFC compounds were detected in groundwater samples from DMW-3, and no PFCs have been detected in upgradient groundwater samples collected from DMW-1A.

At all of the firefighting foam training sites where groundwater was sampled as part of the PFC/Firefighting Foam investigation, foam training occurred either historically or over the course of several years time. There are no other sites besides the Kandiyohi County Landfill where groundwater was sampled so soon after the release of Class B AFFF, thus, there are no comparable sites to evaluate “breakthrough” data for PFC migration through soil and

groundwater to a monitoring point. The lack of significant concentrations of PFCs detected in groundwater at DMW-3 may be due to travel time associated with both the migration of PFC-containing Class B AFFF from the surface of the landfill where foam was discharged to the water table, and the transport of PFCs in groundwater to the location of DMW-3.

Antea Group recommends additional sampling of groundwater at DMW-1A and DMW-3 to continue monitoring for PFCs in groundwater associated with the October 2009 discharge of firefighting foam. If significant concentrations of PFCs are detected at DMW-3 in the future, sampling for PFCs at the private well located approximately 1/2-mile downgradient should be considered.

3.3 Crystal Airport

Based on the relatively low concentrations of PFCs detected in soil and groundwater samples collected at Crystal Airport and in sediment and surface water samples collected from Shingle Creek adjacent to Crystal Airport, no further sampling at Crystal Airport or Shingle Creek is recommended at this time.

3.4 Lake Superior College ERTC

Based on the sediment and water samples collecting during this assessment, the elevated levels of PFCs detected in the creek and wetland sediment and surface water samples at the ERTC do not appear to be impacting the nearby drinking water supply wells at or above drinking water standards. According to the former and current program supervisors at the ERTC, Class B AFFF is no long used in training. The former program supervisor interviewed as part of this PFC/Firefighting Foam investigation indicated Class B AFFF hadn't been used at the ERTC since approximately 1996. No further assessment of PFCs at the Lake Superior College ERTC is recommended at this time.

3.5 Marathon Refinery

Sampling results for the water well samples collected from the five wells at the Hidden Harbor Marina indicate concentrations of PFCs are below the State HRL or other drinking water health-based values defined by the MDH. Based on the type of PFC compounds detected in the wells at the Marathon Refinery and the Hidden Harbor wells, the PFC impacts in groundwater at the Hidden Harbor Marina do not appear to be from the firefighting training area at the Marathon Refinery. The Marathon Refinery's fire department switched from 3M Class B alcohol resistant (AR)-AFFF to Ansul-brand AR-AFFF in approximately 2000. Spent foam and water used at the fire training area at the refinery is routed via storm sewers to an on-site wastewater treatment plant. No further well sampling at Marathon Refinery or the Hidden Harbor Marina in association with the PFC/Firefighting Foam project is recommended at this time.

3.6 ABLE Training Center, Burnsville

Relatively low levels of PFCs were detected in the surface water and sediment samples collected from the pond or wetland located downgradient of the ABLE Training Center. According to fire department personnel from Apple Valley, Burnsville, Lakeville and Eagan interviewed during this PFC/Firefighting Foam investigation, Class B AFFF has

not been used at the ABLE Training Center since approximately 2004. No further sampling in association with PFCs identified at the ABLE Training Center in Burnsville is recommended at this time.

3.7 Bemidji Regional Airport

PFC concentrations detected in groundwater samples collected from nearby private wells were below the State HRL or other drinking water health-based values defined by the MDH. PFC concentrations detected in nearby municipal wells sampled by the MDH were also below the HRL or other drinking water health-based values. According to the training officer for the Bemidji Fire Department, they no longer train with Class B AFFF but use dish soap instead for training purposes. No further PFC sampling at the Bemidji Regional Airport or nearby wells appears warranted at this time.

3.8 Large Fire Sites

Sampling conducted as part of the MPCA's PFCs/Firefighting Foam investigation has identified PFCs in soil, groundwater, surface water and sediments at sites where significant quantities of Class B AFFF were discharged either repeatedly over time at a training site, or during a fire response. While the use of Class B AFFF is necessary and should be used to protect lives and property at a Class B fire, the release or migration of PFC-containing Class B AFFF to non-paved surfaces or surface water bodies will likely result in the release of PFCs to the environment. The release of PFC-containing Class B AFFF in or near environmentally sensitive areas such as Wellhead Protection Areas, areas with shallowly underlying karst bedrock, or lakes or streams may inadvertently provide an exposure pathway that may potentially impact human health via drinking water, direct exposure, or fish consumption. At large fire sites were significant quantities of Class B AFFF are discharged, the MPCA may want to assess the environmental setting, the presence of nearby surface waters, the presence of water supply wells in the area, and the potential risk posed to identified receptors. Water sample collection from private wells or surface water bodies for PFCs may be warranted dependent upon results of the assessment.

4.0 REMARKS

The recommendations contained in this report represent Antea Group's professional opinions based upon the currently available information and are arrived at in accordance with currently accepted professional standards. This report is based upon a specific scope of work requested by the client. The contract between Antea Group and its client outlines the scope of work, and only those tasks specifically authorized by that contract or outlined in this report were performed. This report is intended only for the use of Antea Group's client. Antea Group will not and cannot be liable for unauthorized reliance by any other third party. Other than as contained in this paragraph, Antea Group makes no express or implied warranty as to the contents of this report.

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Date: July 1, 2011

Reviewed by:

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Date: July 1, 2011

TABLES

Table 1 Groundwater and Surface Water PFC Analytical Results
Table 2 Soil and Sediment Analytical Results, PFCs and TOC
Table 3 Well Receptor Summary for Select Firefighting Foam Training Sites in Minnesota

TABLE 1
Groundwater and Surface Water PFC Analytical Results
Minnesota Fire Foam Training and Discharge Sites

			Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perfluorooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)
#Perfluorinated Carbon Chains:			**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**
Health-Based Limits:			**7000**[1]	**ND**	**ND**	**ND**	**300**[2]	**ND**	**ND**	**ND**	**ND**	**7000**[1]	**RAA**[3]	**300**[2]	**ND**
Sample ID	**Date**	**Laboratory**													
Harmony B-1 GW	4/23/2009	Axys	**7.3**	**3.27**	**2.67**	< 2.49	**7**	< 2.49	< 2.49	< 2.49	< 2.49	< 4.98	< 4.98	**8.33**	< 2.49
Harmony B-2 GW	4/23/2009	Axys	**9.04**	**2.52**	< 2.46	< 2.46	**6.92**	< 2.46	< 2.46	< 2.46	< 2.46	< 4.92	< 4.92	**6.74**	< 2.46
No St Paul B-1 GW	5/6/2009	Axys	**137**	**13.3**	**13.2**	**8.83**	**13.8**	< 3.49	< 3.49	< 3.49	< 3.49	< 6.99	**14.1**	< 6.99	< 3.49
No St Paul B-2 GW	5/6/2009	Axys	**145**	**15.5**	**14.1**	**8.22**	**13.2**	< 2.50	< 2.50	< 2.50	< 2.50	< 5.01	**14.8**	< 5.01	< 2.50
Richfield B-1 GW	5/7/2009	Axys	**1070**	**3470**	**3500**	**819**	**50.3**	< 18.8	< 18.8	< 18.8	< 18.8	**737**	**76.2**	< 37.7	< 18.8
Richfield B-2 GW	5/7/2009	Axys	**1240**	**4890**	**4170**	**1920**	**1330**	< 91.4	< 91.4	< 91.4	< 91.4	< 183	< 183	< 183	< 91.4
Richfield B-3 GW	5/7/2009	Axys	**201**	**331**	**888**	**217**	**458**	< 66.7	< 66.7	< 66.7	< 66.7	**293**	**689**	< 133	< 66.7
Legion Lake SW-1	8/27/2009	Axys	**4.02**	<7.21	< 2.51	**3.55**	**5.69**	**3.63**	**3.92**	< 2.51	< 2.51	< 5.02	< 5.02	**13.2**	< 2.51
*Richfield B-4 GW 29 ft.	10/8/2009	Axys	**228**	**10.3**	**10.3**	**5.43**	**38.7**	< 2.48	< 2.48	< 2.48	< 2.48	< 4.96	**71.4**	< 4.96	< 2.48
Luverne B-1 GW 8 ft.	5/22/2009	Axys	< 2.53	< 2.53	< 2.53	< 2.53	< 2.53	< 2.53	< 2.53	< 2.53	< 2.53	< 5.05	**18.1**	< 5.05	< 2.53
Luverne B-1 GW 8 ft.	5/22/2009	MPI	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0[4]	<25.0	<25.0
Luverne B-2 GW 12 ft.	5/22/2009	Axys	< 2.55	< 2.55	**3.78**	< 2.55	**2.73**	< 2.55	< 2.55	< 2.55	< 2.55	< 5.10	**22.8**	**18.4**	< 2.55
Luverne B-2 GW 12 ft.	5/22/2009	MPI	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	**25.1**	<25.0[6]	<25.0
Luverne B-3 GW 12 ft.	5/22/2009	Axys	< 2.53	**3.99**	**11.3**	< 2.53	**3.39**	< 2.53	< 2.53	< 2.53	< 2.53	< 5.07	**21.4**	**20.1**	< 2.53
Luverne B-3 GW 12 ft.	5/22/2009	MPI	<25.0	<25.0	<25.0[5]	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	<25.0	**28.8**	<25.0[7]	<25.0
Fridley B-1 GW	5/27/2009	Axys	**37.6**	**34**	**27.1**	**23.2**	**32.7**	< 4.27	< 4.27	< 4.27	< 4.27	**15.2**	**98.9**	**21.9**	< 4.27
Fridley B-2 GW	5/27/2009	Axys	**88.3**	**97.2**	**166**	**59.5**	**86.8**	< 5.39	< 5.39	< 5.39	< 5.39	**182**	**1330**	**35**	< 5.39
MSP Airport B-1 GW	5/29/2009	Axys	**279**	**909**	**1640**	**317**	**988**	**42**	< 41.2	< 41.2	< 41.2	**332**	**3090**	< 82.5	< 41.2
MSP Airport B-2 GW	5/29/2009	Axys	**190**	**507**	**817**	**198**	**958**	< 48.8	< 48.8	< 48.8	< 48.8	**286**	**2920**	< 97.6	< 48.8
MSP Airport B-3 GW	5/29/2009	Axys	**151**	**148**	**477**	< 135	**12000**	< 135	< 135	< 135	< 135	< 269	**21200**	**281**	< 135
MSP Airport B-4 GW	5/29/2009	Axys	< 1250	< 1250	**3140**	**5830**	**286000**	< 1250	< 1250	< 1250	< 1250	< 2500	**145000**	< 2500	< 1250
*MSP Airport B-5 GW	1/19/2010	Axys	**103**	**81.3**	**168**	**17.5**	**7.29**	< 2.63	< 2.63	< 2.63	< 2.63	160	110	< 5.26	< 2.63
*MSP Airport B-6 GW	1/19/2010	Axys	**58.6**	**60.4**	**187**	**44.6**	**11.2**	< 2.55	< 2.55	< 2.55	< 2.55	**64.1**	**204**	**11**	< 2.55
*MSP Airport B-7 GW	1/19/2010	Axys	**130**	**233**	**114**	< 2.53	**3.77**	< 2.53	< 2.53	< 2.53	< 2.53	**7.77**	< 5.05	< 5.05	< 2.53
CWN-14A GW	1/19/2010	Axys	**40.9**	**32.3**	**42.2**	**17.8**	**19.1**	< 2.54	< 2.54	< 2.54	< 2.54	< 5.07	**19.3**	**15.6**	< 2.54
CWN-15A GW	1/19/2010	Axys	**72**	**15.3**	**20.2**	**7.27**	**56.9**	< 2.75	< 2.75	< 2.75	< 2.75	**9.45**	**202**	< 5.50	< 2.75
Signature MW-2 GW	1/19/2010	Axys	**83.7**	**96.8**	**162**	**69.7**	**79.5**	< 6.57	< 5.40	< 5.40	< 5.40	**151**	**1780**	**953**	< 5.40

TABLE 1
Groundwater and Surface Water PFC Analytical Results
Minnesota Fire Foam Training and Discharge Sites

			Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perfluorooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)
#Perfluorinated Carbon Chains:			**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**
Health-Based Limits:			**7000(1)**	**ND**	**ND**	**ND**	**300(2)**	**ND**	**ND**	**ND**	**ND**	**7000(1)**	**RAA(3)**	**300(2)**	**ND**
Sample ID	**Date**	**Laboratory**													
MSP SW-1	1/19/2010	Axys	**46.8**	**46**	**82.1**	**24.6**	**50.1**	**13.4**	**13.9**	< 2.46	< 2.46	**46.5**	**184**	**39**	< 2.46
Marathon MW-101	8/20/2009	MPI	**183**	**403**	**150**	**12.4**	**36.7**	<2.5	<2.5	<2.5	<2.5	**479**	**3710**	**93.2**	<2.5
*Marathon MW-912	8/20/2009	MPI	**462**	**298**	**51.5**	**21.8**	**17.5**	<2.5	<2.5	<2.5	<2.5	**37.0**	**1580**	**731**	<2.5
Marathon SP-11	8/20/2009	MPI	**182**	**458**	**171**	**52.2**	**35.6**	**20.7**	<2.5	<2.5	<2.5	**369**	**4910**	**5770**	<2.5
Marathon MW-172	8/20/2009	MPI	**59.8**	**245**	**154**	**25.1**	**15.5**	**11.4**	<2.5	<2.5	<2.5	**49.0**	**1220**	**1330**	<2.5
Marathon MW-156	8/20/2009	MPI	**220**	**1730**	**527**	**200**	**73.1**	**26.9**	<2.5	**2.58**	<2.5	**462**	**10500**	**14900**	<2.5
Marathon MW-156 Dupl.	8/20/2009	MPI	**221**	**1660**	**534**	**184**	**81.4**	**23.7**	<2.5	**2.93**	<2.5	**502**	**8930**	**11700**	**2.62**
Well A - Hidden Harbor	3/3/2011	Axys	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 5.02	< 5.02	< 5.02	< 2.51
Well B - Hidden Harbor	3/3/2011	Axys	**94.3**	**3.11**	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 4.98	< 4.98	< 4.98	< 2.49
Well C - Hidden Harbor	3/3/2011	Axys	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 5.03	< 5.03	< 5.03	< 2.51
Well D - Hidden Harbor	3/3/2011	Axys	**965**	**67.5**	**34.4**	< 11.8	**61.5**	< 11.8	< 11.8	< 11.8	< 11.8	< 23.5	< 23.5	< 23.5	< 11.8
Well E - Hidden Harbor	3/3/2011	Axys	**542**	< 16.5	< 16.5	< 16.5	< 16.5	< 16.5	< 16.5	< 16.5	< 16.5	< 33.1	< 33.1	< 33.1	< 16.5
Burnsville B-3 GW 44.5 ft.	8/27/2009	Axys	**146**	**422**	**281**	**447**	**1260**	**81.7**	**17.8**	< 2.52	< 2.52	**12.8**	**279**	**522**	< 2.52
Burnsville Pond SW-1	4/20/2011	Axys	**10.8**	< 2.55	< 2.55	**2.82**	**4.16**	< 2.55	< 2.55	< 2.55	< 2.55	< 5.10	< 5.10	< 5.10	< 2.55
Goodview SW-1	10/19/2009	Axys	< 2.53	< 2.53	**4.78**	< 2.53	**4.49**	**2.56**	**2.82**	< 2.53	< 2.53	< 5.06	< 5.06	**8.19**	< 2.53
Bemidji B-1 GW 15 ft.	11/5/2009	Axys	**4.14**	**3.85**	**14.5**	**3.75**	**49**	< 2.50	< 2.50	< 2.50	< 2.50	**19.1**	**227**	**483**	< 2.50
Bemidji B-2 GW 15 ft.	11/5/2009	Axys	**21.1**	**55.5**	**340**	**33.8**	**200**	< 12.2	< 12.2	< 12.2	< 12.2	**129**	**1490**	**789**	< 12.2
Bemidji 2021 Anne	3/24/2011	Axys	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 4.99	< 4.99	< 4.99	< 2.50
Bemidji 2326 Bardwell	3/24/2011	Axys	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46	< 2.46	< 4.91	< 4.91	< 4.91	< 2.46
Bemidji 3481 Laurel	3/24/2011	Axys	< 2.52	< 2.52	< 2.52	< 2.52	< 2.52	< 2.52	< 2.52	< 2.52	< 2.52	< 5.05	< 5.05	< 5.05	< 2.52
Bemidji 2316 Bardwell	3/24/2011	Axys	**5.04**	< 2.56	< 2.56	< 2.56	< 2.56	< 2.56	< 2.56	< 2.56	< 2.56	< 5.12	< 5.12	< 5.12	< 2.56
Bemidji 2103 Anne	3/24/2011	Axys	< 2.48	< 2.48	< 2.48	< 2.48	< 2.48	< 2.48	< 2.48	< 2.48	< 2.48	< 4.96	**6.52**	**5.76**	< 2.48
Bemidji Kraus Anderson	3/24/2011	Axys	**6.68**	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 5.02	< 5.02	< 5.02	< 2.51
Bemidji 2120 Anne	3/29/2011	Axys	< 2.48	< 2.48	< 2.48	< 2.48	< 2.48	< 2.48	< 2.48	< 2.48	< 2.48	< 4.97	< 4.97	< 4.97	< 2.48
River Grove SW-1	11/18/2009	MPI	**3.54**	<2.5	<2.5	<2.5	**2.79**	<2.5	<2.5	<2.5	<2.5	**4.00**	<2.5	<2.5	<2.5
*River Grove SW-2	11/18/2009	MPI	**4.23**	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	**3.43**	<2.5	<2.5	<2.5

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			Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perfluorooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)
#Perfluorinated Carbon Chains:			**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**
Health-Based Limits:			**7000(1)**	**ND**	**ND**	**ND**	**300(2)**	**ND**	**ND**	**ND**	**ND**	**7000(1)**	**RAA(3)**	**300(2)**	**ND**
Sample ID	**Date**	**Laboratory**													
ERTC SW-1	11/25/2009	Axys	**257**	**537**	**1790**	**348**	**991**	**31.8**	**3.45**	< 2.51	< 2.51	**1870**	**9390**	**11300**	**360**
ERTC SW-2	11/18/2010	Axys	**76.8**	**144**	**476**	**66.2**	**290**	**22.4**	< 2.49	< 2.49	< 2.49	**315**	**2630**	**7640(1)**	**134(1)**
ERTC SW-3	11/18/2010	Axys	**35**	**62.8**	**366**	**39.5**	**234**	**5.62**	< 2.49	< 2.49	< 2.49	**135**	**1510**	**7630**	**385**
ERTC-10801	11/29/2010	Axys	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 5.00	**11.2**	**6.49**	< 2.50
ERTC-11601	11/29/2010	Axys	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 4.95	**9.63**	**7.26**	< 2.47
Kandiyohi DMW-1A	1/12/2010	Axys	< 2.43	< 2.43	< 2.43	< 2.43	< 2.43	< 2.43	< 2.43	< 2.43	< 2.43	< 4.87	< 4.87	< 4.87	< 2.43
Kandiyohi DMW-3	1/12/2010	Axys	**6.1**	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 2.51	< 5.01	< 5.01	< 5.01	< 2.51
Kandiyohi DMW-1A	5/4/2010	Axys	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 4.99	< 4.99	< 4.99	< 2.49
Kandiyohi DMW-3	5/4/2010	Axys	**11**	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 2.49	< 4.98	< 4.98	< 4.98	< 2.49
Kandiyohi DMW-1A	8/12/2010	Axys	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 2.54	< 5.09	< 5.09	< 5.09	< 2.54
Kandiyohi DMW-3	8/12/2010	Axys	**7.61**	< 2.48	< 2.48	< 2.48	< 2.48	< 2.48	< 2.48	< 2.48	< 2.48	< 4.95	< 4.95	< 4.95	< 2.48
Crystal B-1 GW 5.5 ft.	1/20/2010	Axys	**16.2**	< 2.56	< 2.56	< 2.56	< 2.56	< 2.56	< 2.56	< 2.56	< 2.56	< 5.12	< 5.12	< 5.12	< 2.56
Crystal B-2 GW 6 ft.	1/20/2010	Axys	**37.3**	< 2.50	< 2.50	< 2.50	**2.65**	< 2.50	< 2.50	< 2.50	< 2.50	< 5.01	< 5.01	**5.27**	< 2.50
Crystal SW-1	10/1/2010	Axys	**35.7**	**5.54**	**5.62**	**3.31**	**6.28**	< 2.48	< 2.48	< 2.48	< 2.48	< 4.97	< 4.97	**8.18**	< 2.48
Crystal SW-2	10/1/2010	Axys	**25.4**	**4.58**	**4.91**	< 2.58	**5.95**	< 2.58	< 2.58	< 2.58	< 2.58	< 5.16	< 5.16	< 5.16	< 2.58
*FHR Pine Bend MW-1	1/21/2010	Axys	**179**	**12.5**	**10.1**	< 2.45	**4.63**	< 2.45	< 2.45	< 2.45	< 2.45	**8.67**	**25.9**	**28.5**	< 2.45
FHR Pine Bend MW-3	1/21/2010	Axys	**310**	**136**	**251**	**43.7**	**49.1**	< 2.48	< 2.48	< 2.48	< 2.48	**181**	**516**	**245**	< 2.48
FHR Pine Bend MW-111	1/21/2010	Axys	**156**	**7.58**	**3.62**	< 2.42	**3.92**	< 2.42	< 2.42	< 2.42	< 2.42	< 4.84	< 4.84	< 4.84	< 2.42
Kings Cove Marina SW-1	12/3/2009	MPI	**180**	**10.2**	**9.87**	**3.41**	**25.8**	< 2.5	< 2.5	< 2.5	< 2.5	**17.5**	**17.8**	**13.7**	< 2.5
Kings Cove Marina Dup (SW-1)	12/3/2009	MPI	**177**	**10.0**	**8.83**	**2.95**	**22.9**	< 2.5	< 2.5	< 2.5	< 2.5	**18.7**	**17.9**	**13.4**	<2.5
Kings Cove Marina SW-2	12/3/2009	MPI	**170**	**9.93**	**10.5**	**3.05**	**25.4**	< 2.5	< 2.5	< 2.5	< 2.5	**16.8**	**19.1**	**16.2**	< 2.5
Duluth Intl. Airport GWS-1	10/2007	Axys	**2310**	**7160**	**13000**	**1340**	**4800**	< 45.7	< 45.7	< 45.7	< 45.7	**2000**	**626**	< 91.3	< 45.7
Duluth Intl. Airport GWS-2	10/2007	Axys	**482**	**1090**	**3590**	**534**	**4640**	**13.1**	< 12.4	< 12.4	< 12.4	**913**	**3440**	< 24.8	< 12.4
Duluth Intl. Airport Dup (GWS-2)	10/2007	Axys	**496**	**1250**	**4370**	**522**	**4250**	< 12.6	< 12.6	< 12.6	< 12.6	**953**	**3320**	< 25.2	< 12.6
Duluth Intl. Airport GWS-3	10/2007	Axys	**1900**	**6940**	**10800**	**1760**	**6790**	**88.5**	< 43.6	< 43.6	< 43.6	**2020**	**1690**	**98.8**	< 43.6
Duluth Intl. Airport GWS-4	10/2007	Axys	**1110**	**4780**	**11500**	**2000**	**8780**	< 31.9	< 31.9	< 31.9	< 31.9	**1630**	**4070**	< 63.8	< 31.9
Duluth Intl. Airport GWS-5	10/2007	Axys	**6.25**	**1.66**	**3.06**	**1.96**	**6.18**	< 0.991	< 0.991	< 0.991	< 0.991	**2.87**	**33.5**	**3.41**	< 0.991

TABLE 1
Groundwater and Surface Water PFC Analytical Results
Minnesota Fire Foam Training and Discharge Sites

			Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)
#Perfluorinated Carbon Chains:			**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**
Health-Based Limits:			**7000(1)**	**ND**	**ND**	**ND**	**300(2)**	**ND**	**ND**	**ND**	**ND**	**7000(1)**	**RAA(3)**	**300(2)**	**ND**
Sample ID	**Date**	**Laboratory**													
Duluth Intl. Airport GWS-6	10/2007	Axys	**694**	**1750**	**2750**	**497**	**1500**	**14.8**	< 10.3	< 10.3	< 10.3	**776**	**1880**	< 20.6	< 10.3
WAFTA BG-2	5/11/2006	MDH	< 1000	< 1000	< 1000	NA	**1000**	NA	NA	NA	NA	< 500	**200(J)**	< 500	NA
WAFTA BG-4	5/11/2006	MDH	**800(J)**	**3200**	**2300**	NA	**2100**	NA	NA	NA	NA	< 500	**2100**	**2200**	NA
WAFTA MW-1	5/11/2006	MDH	< 1000	< 1000	**300(J)**	NA	**7400**	NA	NA	NA	NA	< 500	**200(J)**	< 500	NA
WAFTA MW-2	5/11/2006	MDH	**2400**	**8900**	**7800**	NA	**7900**	NA	NA	NA	NA	**600**	**9900**	**9500**	NA
WAFTA MW-3	5/10/2006	MDH	< 1000	< 1000	**300(J)**	NA	< 1000	NA	NA	NA	NA	**200(J)**	**5100**	**22000**	NA
WAFTA MW-4	5/10/2006	MDH	**9900**	**42000**	**30000**	NA	**43000**	NA	NA	NA	NA	**1500**	**42000**	**118000**	NA
WAFTA MW-4	5/10/2006	Exygen	**14100**	**66300**	**43600**	NA	**41100**	NA	NA	NA	NA	**1820**	**43800**	**114000**	NA
WAFTA MW-5	5/10/2006	MDH	< 1000	**200(J)**	**300(J)**	NA	**700(J)**	NA	NA	NA	NA	< 500	**700**	**2100**	NA
WAFTA MW-5	5/10/2006	Exygen	< 1000	< 1000	< 1000	NA	< 1000	NA	NA	NA	NA	< 1000	< 1000	**1460**	NA
WAFTA MW-7	5/11/2006	MDH	**1200**	**3800**	**3400**	NA	**1000**	NA	NA	NA	NA	**200(J)**	**2300**	**3900**	NA
WAFTA MW-8	5/10/2006	MDH	**90(J)**	**400(J)**	**300(J)**	NA	**100(J)**	NA	NA	NA	NA	< 500	< 500	**1300**	NA
WAFTA MW-8	5/10/2006	Exygen	< 1000	< 1000	< 1000	NA	< 1000	NA	NA	NA	NA	< 1000	< 1000	< 1000	NA
WAFTA MW-9	5/11/2006	MDH	< 1000	< 1000	< 1000	NA	< 1000	NA	NA	NA	NA	< 500	< 500	< 500	NA
WAFTA MW-10	5/10/2006	MDH	**700(J)**	**2000**	**2000**	NA	**2300**	NA	NA	NA	NA	**500**	**12000**	**27000**	NA
WAFTA MW-10	5/10/2006	Exygen	< 1000	**3350**	**3320**	NA	**2270**	NA	NA	NA	NA	< 1000	**11600**	**18400**	NA
WAFTA MW-11	5/10/2006	MDH	< 1000	< 1000	< 1000	NA	< 1000	NA	NA	NA	NA	< 500	< 500	< 500	NA
WAFTA MW-11	5/10/2006	Exygen	< 1000	< 1000	< 1000	NA	< 1000	NA	NA	NA	NA	< 1000	< 1000	< 1000	NA
WAFTA MW-12	5/11/2006	MDH	< 1000	< 1000	< 1000	NA	< 1000	NA	NA	NA	NA	< 500	< 500	< 500	NA
WAFTA MW-13	5/10/2006	MDH	< 1000	< 1000	< 1000	NA	< 1000	NA	NA	NA	NA	< 500	**300(J)**	< 500	NA
Up North Plastics SW-1	7/16/2009	Axys	**1230**	**64.3**	**34.5**	**12**	**242**	< 2.52	< 2.52	< 2.52	< 2.52	**20.7**	**32.4**	< 5.04	< 2.52
Up North Plastics SW-2	7/16/2009	Axys	**436**	**36.1**	**26.9**	**9.43**	**78.3**	**3.37**	< 2.53	< 2.53	< 2.53	**9.42**	**7.4**	< 5.06	< 2.53
Up North Plastics SW Dup	7/16/2009	Axys	**572**	**39.4**	**28.1**	**9.92**	**87.5**	< 2.50	< 2.50	< 2.50	< 2.50	**10.3**	**10.8**	**7.64**	< 2.50
Up North Plastics Zywiec Irrigation Well 1	7/29/2009	MDH	**1242.3**	**51.4**	0	NA	0	NA	NA	NA	NA	0	0	0	NA
Up North Plastics Zywiec Irrigation Well 2	7/29/2009	MDH	**447**	0	0	NA	0	NA	NA	NA	NA	0	0	0	NA
Up North Plastics Zywiec Irrigation Well 3	7/29/2009	MDH	**2133.6**	**106.2**	**61**	NA	**55**	NA	NA	NA	NA	0	0	0	NA

TABLE 1
Groundwater and Surface Water PFC Analytical Results
Minnesota Fire Foam Training and Discharge Sites

			Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)
#Perfluorinated Carbon Chains:			4	5	6	7	8	9	10	11	12	4	6	8	8
Health-Based Limits:			7000[1]	ND	ND	ND	300[2]	ND	ND	ND	ND	7000[1]	RAA[3]	300[2]	ND
Sample ID	**Date**	**Laboratory**													
Up North Plastics Smallidge	7/29/2009	MDH	**1046.3**	**51.6**	0	NA	**53.3**	NA	NA	NA	NA	0	0	0	NA

Notes:
All results and standards are in nanograms per liter (ng/L), which is equivalent to parts per trillion.
Axys: Axys Analytical Services LTD
MPI: MPI Research
MDH: Minnesota Department of Health Environmental Laboratory.
Exygen: Exygen Research
Bolded type indicates detection above the laboratory method detection limit.
Highlighted concentrations exceed the Health-Based Limit.
(1) Health-Based Value (HBV) for chronic exposure defined by the Minnesota Department of Health.
(2) Health Risk Limit (HRL) for drinking water defined by the Minnesota Department of Health.
(3) Risk Assessment Advice (RAA) set by the Minnesota Department of Health for PFHxS does not specify numeric values.
ND: No health-based limit defined.
(4) Manually Calculated Result is 18.9
(5) Manually Calculated Result is 17.1
(6) Manually Calculated Result is 23.3
(7) Manually Calculated Result is 21.7
(J) Analyte positively identified, result is below reporting limit and is estimated.
*Sample collected upgradient of fire foam training or discharge area, intended to act as "background" sample.
NA: Not analyzed

TABLE 2
Soil and Sediment Analytical Results, PFCs and TOC
Minnesota Fire Foam Training and Discharge Sites

				Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)	Mean Total Organic Carbon (TOC)
#Perfluorinated Carbon Chains:				**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**	**-**
Tier 1 Residential SRV:				**77000**	**ND**	**ND**	**ND**	**2100**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**2100**	**ND**	**ND**
Tier 2 Recreational SRV:				**94000**	**ND**	**ND**	**ND**	**2500**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**2600**	**ND**	**ND**
Tier 2 Industrial SRV:				**500000**	**ND**	**ND**	**ND**	**13000**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**14000**	**ND**	**ND**
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**														
Harmony B-1 SL 0-4'	0-4 ft.	4/23/2009	Axys	< 0.0955	< 0.0955	< 0.0955	< 0.0955	< 0.0955	< 0.0955	< 0.0955	< 0.0955	< 0.0955	< 0.191	< 0.191	< 0.191	< 0.0955	3230
Harmony B-1 SL 4-8'	4-8 ft.	4/23/2009	Axys	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.201	< 0.201	< 0.201	< 0.101	1720
Harmony B-2 SL 0-4'	0-4 ft.	4/23/2009	Axys	< 0.0947	< 0.0947	< 0.0947	< 0.0947	< 0.0947	< 0.0947	< 0.0947	< 0.0947	< 0.0947	< 0.189	< 0.189	< 0.189	< 0.0947	6150
Harmony B-2 SL 4-8'	4-8 ft.	4/23/2009	Axys	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.192	< 0.192	< 0.192	< 0.0962	1260
Harmony B-3 SL 0-4'	0-4 ft.	4/23/2009	Axys	< 0.0977	**0.2**	< 0.0977	**0.161**	< 0.0977	**0.125**	< 0.0977	< 0.0977	< 0.0977	< 0.195	< 0.195	< 0.195	< 0.0977	2380
Harmony B-3 SL 4-8'	4-8 ft.	4/23/2009	Axys	< 0.0950	< 0.0950	< 0.0950	< 0.0950	< 0.0950	< 0.0950	< 0.0950	< 0.0950	< 0.0950	< 0.190	< 0.190	< 0.190	< 0.0950	1770
Harmony B-4 SL 0-4'	0-4 ft.	4/23/2009	Axys	< 0.0989	**0.253**	**0.133**	**0.15**	< 0.0989	< 0.0989	< 0.0989	< 0.0989	< 0.0989	< 0.198	< 0.198	< 0.198	< 0.0989	2380
Harmony B-4 SL 4-8'	4-8 ft.	4/23/2009	Axys	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.200	< 0.200	< 0.200	< 0.100	1500
Burnsville B-1 SL 0-4'	0-4 ft.	4/24/2009	Axys	**1.73**	**5.32**	**3.27**	**6.72**	**11.4**	**10.2**	**4.37**	**0.537**	**0.542**	< 0.192	**2.63**	**102**	< 0.0962	21700
Burnsville B-1 SL 4-8'	4-8 ft.	4/24/2009	Axys	**0.132**	**1.54**	**1.77**	**8.46**	**14.8**	< 0.0956	< 0.0956	< 0.0956	< 0.0956	< 0.191	**11**	**1.62**	< 0.0956	2240
Burnsville B-2 SL 0-4'	0-4 ft.	4/24/2009	Axys	**0.796**	**3.08**	**1.69**	**1.05**	**5.78**	**7.92**	< 0.0992	< 0.0992	< 0.0992	< 0.198	< 0.198	**2.8**	< 0.0992	22300
Burnsville B-2 SL 4-8'	4-8 ft.	4/24/2009	Axys	**1.83**	**4.81**	**3.97**	**4.14**	**0.355**	< 0.0985	< 0.0985	< 0.0985	< 0.0985	< 0.197	**1.2**	< 0.197	< 0.0985	12400
Burnsville Pond Sed-1	0-6 in.	4/20/2011	Axys	< 0.0986	< 0.0986	< 0.0986	< 0.0986	< 0.0986	< 0.0986	**0.168**	**0.371**	**0.787**	< 0.197	< 0.197	**0.87**	**0.122**	NA
No St Paul B-1 SL 0-4'	0-4 ft.	5/6/2009	Axys	< 0.0926	< 0.0926	< 0.0926	< 0.0926	< 0.0926	< 0.0926	< 0.0926	< 0.0926	< 0.0926	< 0.185	< 0.185	< 0.185	< 0.0926	19600
No St Paul B-1 SL 4-8'	4-8 ft.	5/6/2009	Axys	< 0.0998	< 0.0998	< 0.0998	< 0.0998	< 0.0998	< 0.0998	< 0.0998	< 0.0998	< 0.0998	< 0.200	< 0.200	< 0.200	< 0.0998	624
No St Paul B-2 SL 0-4'	0-4 ft.	5/6/2009	Axys	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.191	< 0.191	< 0.191	< 0.0954	27400
No St Paul B-2 SL 4-8'	4-8 ft.	5/6/2009	Axys	< 0.0978	< 0.0978	< 0.0978	< 0.0978	< 0.0978	< 0.0978	< 0.0978	< 0.0978	< 0.0978	< 0.196	< 0.196	< 0.196	< 0.0978	796
No St Paul B-3 SL 0-2'	0-2 ft.	5/6/2009	Axys	< 0.0972	< 0.0972	< 0.0972	< 0.0972	**0.107**	< 0.0972	< 0.0972	< 0.0972	< 0.0972	< 0.194	< 0.194	**0.623**	< 0.0972	12700
Richfield B-1 0-4'	0-4 ft.	5/7/2009	Axys	< 0.0932	**0.226**	**0.191**	**0.433**	**1.36**	**1.44**	**0.095**	< 0.0932	< 0.0932	< 0.186	**1.26**	**104**	**0.21**	2170
Richfield B-1 4-8'	4-8 ft.	5/7/2009	Axys	**0.322**	**1.43**	**0.905**	**0.592**	**1.11**	**1.89**	< 0.0966	< 0.0966	< 0.0966	< 0.193	**1.44**	**102**	< 0.0966	355
Richfield B-2 0-4'	0-4 ft.	5/7/2009	Axys	**0.464**	**1.33**	**1.07**	**0.85**	**2.32**	**5.03**	**0.306**	< 0.186	< 0.186	< 0.373	**13**	**401**	**0.47**	8370
Richfield B-2 4-8'	4-8 ft.	5/7/2009	Axys	**1.04**	**4.52**	**4.7**	**3.28**	**5.02**	**4.83**	< 0.379	< 0.379	< 0.379	< 0.757	**32.2**	**666**	< 0.379	6100
Richfield B-3 0-4'	0-4 ft.	5/7/2009	Axys	< 0.0942	< 0.0942	**0.314**	**0.309**	**1.49**	< 0.0942	< 0.0942	< 0.0942	< 0.0942	< 0.188	**21.9**	**56.4**	< 0.0942	13100
Richfield B-3 4-8'	4-8 ft.	5/7/2009	Axys	**0.173**	**0.439**	**1.02**	**0.283**	**0.336**	< 0.104	< 0.104	< 0.104	< 0.104	**0.57**	**2.35**	**9.33**	< 0.104	36900
Richfield B-4 0-8'	0-8 ft.	10/8/2009	Axys	< 0.0956	< 0.0956	< 0.0956	< 0.0956	**0.129**	< 0.0956	< 0.0956	< 0.0956	< 0.0956	< 0.191	**0.236**	**4.52**	< 0.0956	NA
Kenyon B-1 SL 0-4'	0-4 ft.	5/15/2009	Axys	< 0.0963	< 0.0963	< 0.0963	**0.111**	< 0.0963	< 0.0963	< 0.0963	< 0.0963	< 0.0963	< 0.193	< 0.193	< 0.193	< 0.0963	26300
Kenyon B-1 SL 0-4'	0-4 ft.	5/15/2009	MPI	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	NA
Kenyon B-1 SL 4-8'	4-8 ft.	5/15/2009	Axys	< 0.0944	< 0.0944	< 0.0944	< 0.0944	< 0.0944	< 0.0944	< 0.0944	< 0.0944	< 0.0944	< 0.189	< 0.189	< 0.189	< 0.0944	23600
Kenyon B-1 SL 4-8'	4-8 ft.	5/15/2009	MPI	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	NA
Kenyon B-2 SL 0-4'	0-4 ft.	5/15/2009	Axys	< 0.0937	< 0.0937	< 0.0937	< 0.0937	< 0.0937	< 0.0937	< 0.0937	< 0.0937	< 0.0937	< 0.187	< 0.187	< 0.187	< 0.0937	13300
Kenyon B-2 SL 0-4'	0-4 ft.	5/15/2009	MPI	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	NA

TABLE 2
Soil and Sediment Analytical Results, PFCs and TOC
Minnesota Fire Foam Training and Discharge Sites

				Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)	Mean Total Organic Carbon (TOC)
#Perfluorinated Carbon Chains:				**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**	**-**
Tier 1 Residential SRV:				**77000**	**ND**	**ND**	**ND**	**2100**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**2100**	**ND**	**ND**
Tier 2 Recreational SRV:				**94000**	**ND**	**ND**	**ND**	**2500**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**2600**	**ND**	**ND**
Tier 2 Industrial SRV:				**500000**	**ND**	**ND**	**ND**	**13000**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**14000**	**ND**	**ND**
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**														
Kenyon B-2 SL 4-8'	4-8 ft.	5/15/2009	Axys	< 0.0943	< 0.0943	< 0.0943	< 0.0943	< 0.0943	< 0.0943	< 0.0943	< 0.0943	< 0.0943	< 0.189	< 0.189	< 0.189	< 0.0943	25600
Kenyon B-2 SL 4-8'	4-8 ft.	5/15/2009	MPI	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	NA
Claremont B-1 SL 0-4'	0-4 ft.	5/15/2009	Axys	< 0.0907	< 0.0907	< 0.0907	< 0.0907	< 0.0907	< 0.0907	< 0.0907	< 0.0907	< 0.0907	< 0.181	< 0.181	**0.308**	< 0.0907	217000
Claremont B-1 SL 0-4'	0-4 ft.	5/15/2009	MPI	**0.413**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**0.773**	<0.2	<0.2	NA
Claremont B-1 SL 4-8'	4-8 ft.	5/15/2009	Axys	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.193	**0.224**	**0.321**	< 0.0966	14800
Claremont B-1 SL 4-8'	4-8 ft.	5/15/2009	MPI	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	NA
Claremont B-2 SL 0-4'	0-4 ft.	5/15/2009	Axys	< 0.0936	< 0.0936	**0.385**	< 0.0936	**0.154**	< 0.0936	< 0.0936	< 0.0936	< 0.0936	**0.491**	**1.65**	**24.7**	**0.129**	184000
Claremont B-2 SL 4-8'	4-8 ft.	5/15/2009	Axys	< 0.0958	< 0.0958	< 0.0958	< 0.0958	< 0.0958	< 0.0958	< 0.0958	< 0.0958	< 0.0958	< 0.192	< 0.192	**0.25**	< 0.0958	7500
Claremont B-3 SL 0-4'	0-4 ft.	5/15/2009	Axys	**0.114**	**0.167**	**0.427**	**0.232**	**0.174**	< 0.0912	< 0.0912	< 0.0912	< 0.0912	**2.39**	**5.25**	**3.46**	< 0.0912	35200
Claremont B-3 SL 4-8'	4-8 ft.	5/15/2009	Axys	< 0.0935	< 0.0935	< 0.0935	< 0.0935	< 0.0935	< 0.0935	< 0.0935	< 0.0935	< 0.0935	< 0.187	**0.561**	**0.988**	< 0.0935	453
Luverne B-1 SL 0-4'	0-4 ft.	5/22/2009	Axys	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.0962	< 0.192	< 0.192	< 0.481	< 0.241	12500
Luverne B-1 SL 0-4'	0-4 ft.	5/22/2009	MPI	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	NA
Luverne B-1 SL 4-8'	4-8 ft.	5/22/2009	Axys	< 0.0981	< 0.0981	< 0.0981	< 0.0981	< 0.0981	< 0.0981	< 0.0981	< 0.0981	< 0.0981	< 0.196	< 0.196	< 0.490	< 0.245	13300
Luverne B-1 SL 4-8'	4-8 ft.	5/22/2009	MPI	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	NA
Luverne B-2 SL 0-4'	0-4 ft.	5/22/2009	Axys	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.0954	< 0.191	< 0.191	**0.481**	< 0.239	10300
Luverne B-2 SL 0-4'	0-4 ft.	5/22/2009	MPI	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	NA
Luverne B-2 SL 4-8'	4-8 ft.	5/22/2009	Axys	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.200	< 0.200	< 0.500	< 0.250	14400
Luverne B-2 SL 4-8'	4-8 ft.	5/22/2009	MPI	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	NA
Luverne B-3 SL 0-4'	0-4 ft.	5/22/2009	Axys	< 0.0974	< 0.0974	< 0.0974	< 0.0974	< 0.0974	< 0.0974	< 0.0974	< 0.0974	< 0.0974	< 0.195	< 0.195	< 0.487	< 0.244	7860
Luverne B-3 SL 0-4'	0-4 ft.	5/22/2009	MPI	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	NA
Luverne B-3 SL 4-8'	4-8 ft.	5/22/2009	Axys	< 0.0984	< 0.0984	< 0.0984	< 0.0984	< 0.0984	< 0.0984	< 0.0984	< 0.0984	< 0.0984	< 0.197	< 0.197	< 0.492	< 0.246	39500
Luverne B-3 SL 4-8'	4-8 ft.	5/22/2009	MPI	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	NA
Fridley B-1 SL 0-4'	0-4 ft.	5/27/2009	Axys	**0.242**	**0.422**	**0.413**	**0.27**	**0.291**	**0.144**	< 0.100	< 0.100	< 0.100	< 0.201	**1.25**	**43**	< 0.100	55700
Fridley B-1 SL 4-8'	4-8 ft.	5/27/2009	Axys	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.201	< 0.201	**2.45**	< 0.101	1670
Fridley B-2 SL 0-4'	0-4 ft.	5/27/2009	Axys	**1.34**	**1.67**	**2.78**	**0.735**	**0.699**	< 0.102	< 0.102	< 0.102	< 0.102	**3.01**	**23.4**	**3.48**	< 0.102	11400
Fridley B-2 SL 4-8'	4-8 ft.	5/27/2009	Axys	**0.601**	**1.13**	**1.53**	**0.335**	**0.493**	< 0.0950	< 0.0950	< 0.0950	< 0.0950	**1.32**	**14.2**	**1.31**	< 0.0950	19800
Fridley B-3 Sediment 6"	0.5 ft.	5/27/2009	Axys	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.0966	< 0.193	< 0.193	**18.3**	< 0.0966	14800
Rochester B-1 SL 0-4'	0-4 ft.	5/28/2009	Axys	**0.207**	< 0.0979	< 0.0979	< 0.0979	< 0.0979	< 0.0979	< 0.0979	< 0.0979	< 0.0979	< 0.196	**0.361**	**0.559**	< 0.0979	4100
Rochester B-1 SL 4-8'	4-8 ft.	5/29/2009	Axys	< 0.0957	< 0.0957	< 0.0957	< 0.0957	< 0.0957	< 0.0957	< 0.0957	< 0.0957	< 0.0957	< 0.191	< 0.191	< 0.191	< 0.0957	1440
Rochester B-2 SL 0-4'	0-4 ft.	5/28/2009	Axys	**0.142**	< 0.0999	**0.173**	< 0.0999	< 0.0999	< 0.0999	< 0.0999	< 0.0999	< 0.0999	< 0.200	**1.7**	**1.12**	< 0.0999	4780
Rochester B-2 SL 4-8'	4-8 ft.	5/29/2009	Axys	< 0.0949	< 0.0949	< 0.0949	< 0.0949	< 0.0949	< 0.0949	< 0.0949	< 0.0949	< 0.0949	< 0.190	< 0.190	< 0.190	< 0.0949	431

TABLE 2
Soil and Sediment Analytical Results, PFCs and TOC
Minnesota Fire Foam Training and Discharge Sites

				Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)	Mean Total Organic Carbon (TOC)
#Perfluorinated Carbon Chains:				**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**	**-**
Tier 1 Residential SRV:				**77000**	**ND**	**ND**	**ND**	**2100**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**2100**	**ND**	**ND**
Tier 2 Recreational SRV:				**94000**	**ND**	**ND**	**ND**	**2500**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**2600**	**ND**	**ND**
Tier 2 Industrial SRV:				**500000**	**ND**	**ND**	**ND**	**13000**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**14000**	**ND**	**ND**
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**														
Goodview Sed-1	0-6 in.	10/19/2009	Axys	< 0.0883	< 0.0883	< 0.0883	< 0.0883	< 0.0883	< 0.0883	< 0.0883	< 0.0883	< 0.0883	< 0.177	< 0.177	**0.332**	< 0.0883	NA

TABLE 2
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Minnesota Fire Foam Training and Discharge Sites

				Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)	Mean Total Organic Carbon (TOC)
#Perfluorinated Carbon Chains:				**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**	**-**
Tier 1 Residential SRV:				**77000**	**ND**	**ND**	**ND**	**2100**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**2100**	**ND**	**ND**
Tier 2 Recreational SRV:				**94000**	**ND**	**ND**	**ND**	**2500**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**2600**	**ND**	**ND**
Tier 2 Industrial SRV:				**500000**	**ND**	**ND**	**ND**	**13000**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**14000**	**ND**	**ND**
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**														
Bemidji B-1 SL 0-4'	0-4 ft.	11/5/2009	Axys	< 0.0951	< 0.0951	**0.216**	< 0.0951	**0.118**	< 0.0951	< 0.0951	< 0.0951	< 0.0951	< 0.190	**3.12**	**55.7**	**0.112**	6230
Bemidji B-1 SL 4-8'	4-8 ft.	11/5/2009	Axys	< 0.0913	< 0.0913	< 0.0913	< 0.0913	**0.498**	< 0.0913	< 0.0913	< 0.0913	< 0.0913	**0.267**	**3.98**	**56**	< 0.0913	535
Bemidji B-2 SL 0-4'	0-4 ft.	11/5/2009	Axys	**0.184**	**0.322**	**1.44**	**0.143**	**1.31**	**0.099**	< 0.0933	< 0.0933	< 0.0933	< 1.87	**13.9**(1)	**1200**(1)	**18.5**	3540
Bemidji B-2 SL 4-8'	4-8 ft.	11/5/2009	Axys	< 0.276	< 0.276	**0.411**(1)	**0.917**(1)	**19.6**(1)	< 0.276	< 0.276	< 0.276	< 0.276	**0.957**(1)	**147**(1)	**606**(1)	< 0.276	487
River Grove Sed-1	0-6 in.	11/18/2009	MPI	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.667	<0.667	<0.667	<0.333	NA
River Grove Sed-2	0-6 in.	11/18/2009	MPI	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.667	<0.667	<0.667	<0.333	NA
River Grove Sed-3	0-6 in.	11/18/2009	MPI	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	<0.667	<0.667	<0.667	<0.333	NA
ERTC SS-1	0-6 in.	11/25/2009	Axys	< 0.0998	**0.205**	**0.794**	**0.139**	**0.495**	< 0.0998	< 0.0998	< 0.0998	< 0.0998	< 0.200	**3.49**	**83.5**	**4.54**	NA
ERTC Sed-1	0-6 in.	11/25/2009	Axys	< 0.0917	< 0.0917	< 0.0917	< 0.0917	**0.225**	< 0.0917	< 0.0917	< 0.0917	< 0.0917	< 0.183	**1.2**	**57.5**	**6.52**	NA
ERTC Sed-2	0-6 in.	11/25/2009	Axys	**0.218**	**0.536**	**1.72**	**0.268**	**1.26**	**0.184**	**0.101**	**0.174**	< 0.0933	**1.47**	**19.6**	**538**	**181**	NA
ERTC Sed-3	0-6 in.	11/18/2010	Axys	**0.118**	**0.202**	**1.01**	**0.171**	**0.75**	**0.149**	< 0.0955	**0.174**	**0.156**	**0.318**	**7.1**	**476**(1)	**207**(1)	NA
ERTC Sed-4	0-6 in.	11/28/2010	Axys	< 0.0933	**0.135**	**0.628**	**0.119**	**0.581**	< 0.0933	< 0.0933	< 0.0933	< 0.0933	< 0.187	**3.52**	**51.3**	**1.95**	NA
MSP Sed-1	0-6 in.	1/19/2010	Axys	< 0.484	< 0.484	< 0.484	< 0.484	**1.8**	**1.89**	**17.3**	**2.5**	**15.6**	< 0.968	< 0.968	**8.84**	**3.55**	NA
Crystal B-1 SL 0-4'	0-4 ft.	1/20/2010	Axys	< 0.486	< 0.486	< 0.486	< 0.486	< 0.486	< 0.486	< 0.486	< 0.486	< 0.486	< 0.972	< 0.972	< 0.972	< 0.486	458
Crystal B-1 SL 4-8'	4-8 ft.	1/20/2010	Axys	< 0.493	< 0.493	< 0.493	< 0.493	< 0.493	< 0.493	< 0.493	< 0.493	< 0.493	< 0.985	< 0.985	< 0.985	< 0.493	5610
Crystal B-2 SL 0-4'	0-4 ft.	1/20/2010	Axys	< 0.488	< 0.488	< 0.488	< 0.488	< 0.488	< 0.488	< 0.488	< 0.488	< 0.488	< 0.977	< 0.977	< 0.977	< 0.488	3840
Crystal B-2 SL 4-8'	4-8 ft.	1/20/2010	Axys	< 0.490	< 0.490	< 0.490	< 0.490	< 0.490	< 0.490	< 0.490	< 0.490	< 0.490	< 0.979	< 0.979	< 0.979	< 0.490	569
Crystal SS-1	2 ft.	1/20/2010	Axys	< 0.498	**0.929**	< 0.498	< 0.498	< 0.498	< 0.498	< 0.498	< 0.498	< 0.498	< 0.996	< 0.996	< 0.996	< 0.498	NA
Crystal Sed-1	0-6 in.	1/20/2010	Axys	< 0.513	< 0.513	< 0.513	< 0.513	< 0.513	< 0.513	< 0.513	< 0.513	< 0.513	< 1.03	< 1.03	< 1.03	< 0.513	NA
Crystal Sed-2	0-6 in.	1/20/2010	Axys	**0.467**	**1.16**	< 0.404	**0.491**	**0.654**	**0.412**	**0.863**	**1.17**	**2.47**	< 0.807	**1.03**	**7.1**	**1.45**	NA
Crystal Sed-3	0-6 in.	10/1/2010	Axys	< 0.376	< 0.376	< 0.376	< 0.376	< 0.376	< 0.376	< 0.376	< 0.376	< 0.376	< 0.752	< 0.752	< 0.752	< 0.376	NA
Crystal Sed-4	0-6 in.	10/1/2010	Axys	< 0.474	< 0.474	< 0.474	< 0.474	< 0.474	< 0.474	< 0.474	**0.661**	**1.65**	< 0.949	< 0.949	**4.64**	**1.13**	NA
Kings Cove Marina Soil	0-4 in.	12/3/2009	MPI	<0.333	<0.333	<0.333	<0.333	<0.333	<0.333	**1.11**	**2.07**	**10.4**	<0.667	<0.667	<0.667	<0.333	NA
Kings Cove Marina Sed 1	0-4 in.	12/3/2009	MPI	<0.333	<0.333	<0.333	<0.333	**0.841**	<0.333	<0.333	<0.333	<0.333	<0.667	<0.667	**1.34**	<0.333	NA
Kings Cove Marina Sed 2	0-4 in.	12/3/2009	MPI	<0.333	<0.333	**0.773**	<0.333	**0.736**	<0.333	<0.333	<0.333	<0.333	<0.667	**4.44**	**6.12**	<0.333	NA

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				Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)	Mean Total Organic Carbon (TOC)
#Perfluorinated Carbon Chains:				**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**4**	**6**	**8**	**8**	**-**
Tier 1 Residential SRV:				**77000**	**ND**	**ND**	**ND**	**2100**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**2100**	**ND**	**ND**
Tier 2 Recreational SRV:				**94000**	**ND**	**ND**	**ND**	**2500**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**2600**	**ND**	**ND**
Tier 2 Industrial SRV:				**500000**	**ND**	**ND**	**ND**	**13000**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**14000**	**ND**	**ND**
Sample ID	**Sample Depth**	**Sample Date**	**Laboratory**														
Up North Plastics Soil 1			Axys	**2.45**	**0.419**	**0.682**	**0.189**	**1.18**	**0.342**	**0.642**	**2.46**	**1.27**	**0.296**	**20.6**	**258**	**8.91**	NA
Up North Plastics Soil 2			Axys	**0.985**	< 0.0982	**0.205**	**0.115**	**0.381**	< 0.0982	< 0.0982	**0.341**	**0.343**	< 0.196	**2.07**	**59.1**	**2.99**	NA
Up North Plastics Soil 3			Axys	**0.203**	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.101	< 0.202	< 0.202	< 0.202	< 0.101	NA
Up North Plastics Soil 4			Axys	< 0.0964	< 0.0964	**0.233**	< 0.0964	**0.172**	< 0.0964	**0.097**	**1.88**	< 0.0964	< 0.193	**3.91**	**355**	**16.5**	NA
Up North Plastics Soil 5			Axys	**3.82**	**0.628**	**0.477**	**0.266**	**8.29**	< 0.0964	< 0.0964	**0.122**	**0.128**	**0.199**	**0.712**	**7.48**	**0.428**	NA
Up North Plastics Sed 1			Axys	**0.659**	< 0.0965	< 0.0965	< 0.0965	**0.406**	< 0.0965	< 0.0965	< 0.0965	< 0.0965	< 0.193	< 0.193	**1.15**	< 0.0965	NA
Up North Plastics Sed 2			Axys	**3.37**	**0.195**	**0.19**	< 0.110	**0.957**	**0.113**	< 0.110	**0.165**	**0.713**	**0.284**	**1.65**	**104**	**0.782**	NA
Up North Plastics Sed 3			Axys	**14.2**	**1.94**	**1.32**	**0.608**	**14.6**	< 0.104	< 0.104	< 0.104	**0.188**	< 0.207	**0.764**	**16.3**	< 0.104	NA
Up North Plastics Sed 4			Axys	**2.35**	**0.265**	**0.143**	< 0.119	**1.49**	< 0.119	**0.331**	**0.657**	**1.24**	< 0.238	**0.596**	**13.6**	**0.325**	NA
Up North Plastics Sed Dup			Axys	**1.25**	< 0.102	< 0.102	< 0.102	**0.726**	< 0.102	< 0.102	< 0.102	< 0.102	< 0.204	< 0.204	**1.67**	< 0.102	NA

Notes:
PFC results and standards are in nanograms per gram (ng/g), which is equivalent to parts per billion.
TOC results are in milligrams per kilogram (mg/kg), which is equivalent to parts per million.
Tier 1 Residential SRV: Minnesota soil reference value for chronic human exposure in a residential setting.
Tier 2 Recreational SRV: Minnesota soil reference value for exposure in a recreational setting.
Tier 2 Industrial SRV: Minnesota soil reference value for exposure in an industrial setting.
PFC compounds soil results reported on a dry weight basis.
ND: No SRV defined.
Axys: Axys Analytical Services LTD
MPI: MPI Research
TOC analyses performed by Pace Analytical Services.
Bolded type indicates detection above the laboratory method detection limit.
NA: not analyzed
(1) Results based on analysis of a dilution of the sample extract.

TABLE 3
WELL RECEPTOR SURVEY SUMMARY FOR SELECT FIRFIGHTING FOAM TRAINING SITES IN MINNESOTA
OCTOBER - NOVEMBER 2010

Site # From Receptor Survey Map	Property Address	Property Occupant	Water Supply Well (Yes or No)	Well Use	Use of Public Water Supply?	How Determined	Public Water Supply Connection Confirmed?	Comments
BEMIDJI REGIONAL AIRPORT								
1	3824 Moberg Dr. NW	Bemidji Regional Airport	No	NA	Yes	Interview, Airport Manager	No	
2	3507 Gillet Dr. NW	Rausch Cold Weather Testing Facility	No	NA	Yes	Interview, site personnel	No	
3	3700 Norris Ct. NW	Bureau of Criminal Apprehension, MN Dept. of Public Safety	No	NA	Yes	Interview, site personnel	No	
4	3622 Moberg Dr. NW	Great River Dentistry	No	NA	Yes	Questionnaire returned	No	
5	3600 Moberg Dr. NW	Indoor Auto Mall	No	NA	Yes	Interviews, current and previous site owners	No	Well no. 169190 was a water supply well at this site; well has been sealed.
6	3500 Moberg Dr. NW	Quality Inn	No	NA	Yes	Interview, site manager	No	
7	3300 Gillett Dr. NW	Paul Bunyan Elementary & ISD #31 Offices	No	NA	Yes	Interview, school district business manager	No	
8	Gillett Dr. NW	City of Bemidji Water Treatment Facility	No	NA	Yes	Interview, City of Bemidji Public Works	No	
9	3168 Adams Av. NW	Kraus Anderson Construction Co.	Yes	Non-potable		Interview, site personnel	No	
10	3920 Hwy. 2 W.	MNDOT Northwest District	No	NA	Yes	Interview, site personnel	No	
ABLE TRAINING CENTER, BURNSVILLE								
Site	River Ridge Blvd.	ABLE Fire Training Center	No	NA	Yes	Interview, Burnsville Fire Chief	No	
1	12205 River Ridge Blvd.	Northern Tool & Equipment	No	NA	Yes	Interview, site personnel	No	
2	12101 Interstate 35W S.	Dodge of Burnsville	No	NA	Yes	Questionnaire returned	No	
3	600 121st St. W.	Walser Suburu	No	NA	Yes	Interview, site personnel	No	
4	12001 Interstate 35W S.	All State Self Storage	No	NA	Yes	Interview, site personnel	No	
5	11937 Interstate 35W S.	Chalet Driving Range	No	NA	Yes	Interview, property owner	No	Several groundwater monitoring wells related to a historical dump are located on the property.
6	Pleasant Av.	Archery range, tree/brush dump	No	NA	No	Interview, Burnsville Public Works	No	
7	201 121st St. W.	Bury & Carlson, concrete/asphalt recycling	No	NA	Yes	Interview, site personnel	No	
8	25 Cliff Rd. W.	Rivers Edge Business Center	No	NA	Yes	Questionnaire returned	No	
9	15 Cliff Rd. W.	American Electric Motion	No[1]	NA	Yes	Questionnaire not returned	No	
10	12259 Nicollet Av.	Nicollet Business Campus II	Unknown	NA	Yes	Questionnaire returned	No	Managed by Wellington Management
11	12270 Nicollet Av.	Nicollet Business Campus	No	NA	Yes	Questionnaire returned	No	Managed by Wellington Management
12	50 River Ridge Ct.	Burnsville Public Works	Yes	Municipal	Yes	Interviews with Public Works personnel	NA	City well nos. 1, 2, 4, 5, 7, 8 nearby, locations indicated by Public Works personnel. No other water supply in survey area known to Public Works personnel.
13	12200 River Ridge Blvd.	Vacant/undeveloped	Yes	Industrial	NA	Site visit; correspondence with State, County.	No	Unique well no. 229108, industrial well, registered active. Buildings recently demolished and site razed. Site currently vacant. State and County cannot confirm current well status. No wells were observed on the property.
LAKE SUPERIOR COLLEGE ERTC, DULUTH								
Site	11501 Hwy. 23	Lake Superior College ERTC	No	NA	Yes	Interview, Program Supervisor	Yes	
1	10401 Hwy. 23	Residence	No	NA	No	Interview, homeowner	City Public Works confirmed no connection	Residence connected to private well at 10423 Hwy. 23.
2	10423 Hwy. 23	Residence	Yes	Drinking	No	Based on other interviews	City Public Works confirmed no connection	Questionnaire not returned.
3	11801 Hwy. 23	Residence	Yes	Drinking	No	Interview, homeowner	City Public Works confirmed no connection	
4	11601 Hwy. 23	Residence	Yes	Drinking	No	Interview, homeowner	City Public Works confirmed no connection	Well depth 411 feet.
5	11605 Hwy. 23	Residence	Yes	Drinking	No	Interview, homeowner	City Public Works confirmed no connection	New well pump recently installed, depth to water ~75 feet.
6	11825 Hwy. 23	Residence	Yes	Drinking	No	Interview, homeowner	City Public Works confirmed no connection	

TABLE 3
WELL RECEPTOR SURVEY SUMMARY FOR SELECT FIRFIGHTING FOAM TRAINING SITES IN MINNESOTA
OCTOBER - NOVEMBER 2010

Site # From Receptor Survey Map	Property Address	Property Occupant	Water Supply Well (Yes or No)	Well Use	Use of Public Water Supply?	How Determined	Public Water Supply Connection Confirmed?	Comments
MSP AIRPORT								
1	7150 Humphrey Drive	Humphrey Terminal	No	NA	Yes	Interview, Mark Wacek, MAC	No	
2	Humphrey Drive	Humphrey Terminal Parking Ramp	No	NA	Yes	Interview, Mark Wacek, MAC	No	
3	34th Ave. S.	MSP Fire Station No. 1	No	NA	Yes	Interview, Mark Wacek, MAC	No	
4	34th Ave. S.	Hangars 4-8	No	NA	Yes	Interview, Mark Wacek, MAC	No	
5	2825 Cargo Rd.	FedEx	No	NA	Yes	Interview, Mark Wacek, MAC	No	
6	Cargo Rd.	UPS	No	NA	Yes	Interview, Mark Wacek, MAC	No	
7	MSP Airport	South airfield lighting electrical center	No	NA	Yes	Interview, Mark Wacek, MAC	No	
8	MSP Airport	Glycol Management Facility	No	NA	Yes	Interview, Mark Wacek, MAC	No	
MARATHON REFINERY, ST. PAUL PARK								
1	729 Factory St.	Residence, vacant	No	NA	Yes	Questionnaire not delivered	Yes	Questionnaire returned by Post Office, marked "vacant". Municipal water connection confirmed by City Public Works Dept; assume no water supply well on property.
2	812 Front St.	Residence	No	No	Yes	Questionnaire not returned	Yes	Two houses located on property, owned by Hidden Harbor Marina. Marina owner not aware of water wells on property.
3	388 9th Ave.	Hidden Harbor Marina	Yes	Potable uses	No	Interview, property owner	Confirmed no connection	Five water supply wells located on property.
4	Lions Levee Park	7th Ave. W.	NA	NA	NA	Site reconnaissance	NA	No buildings with water service.

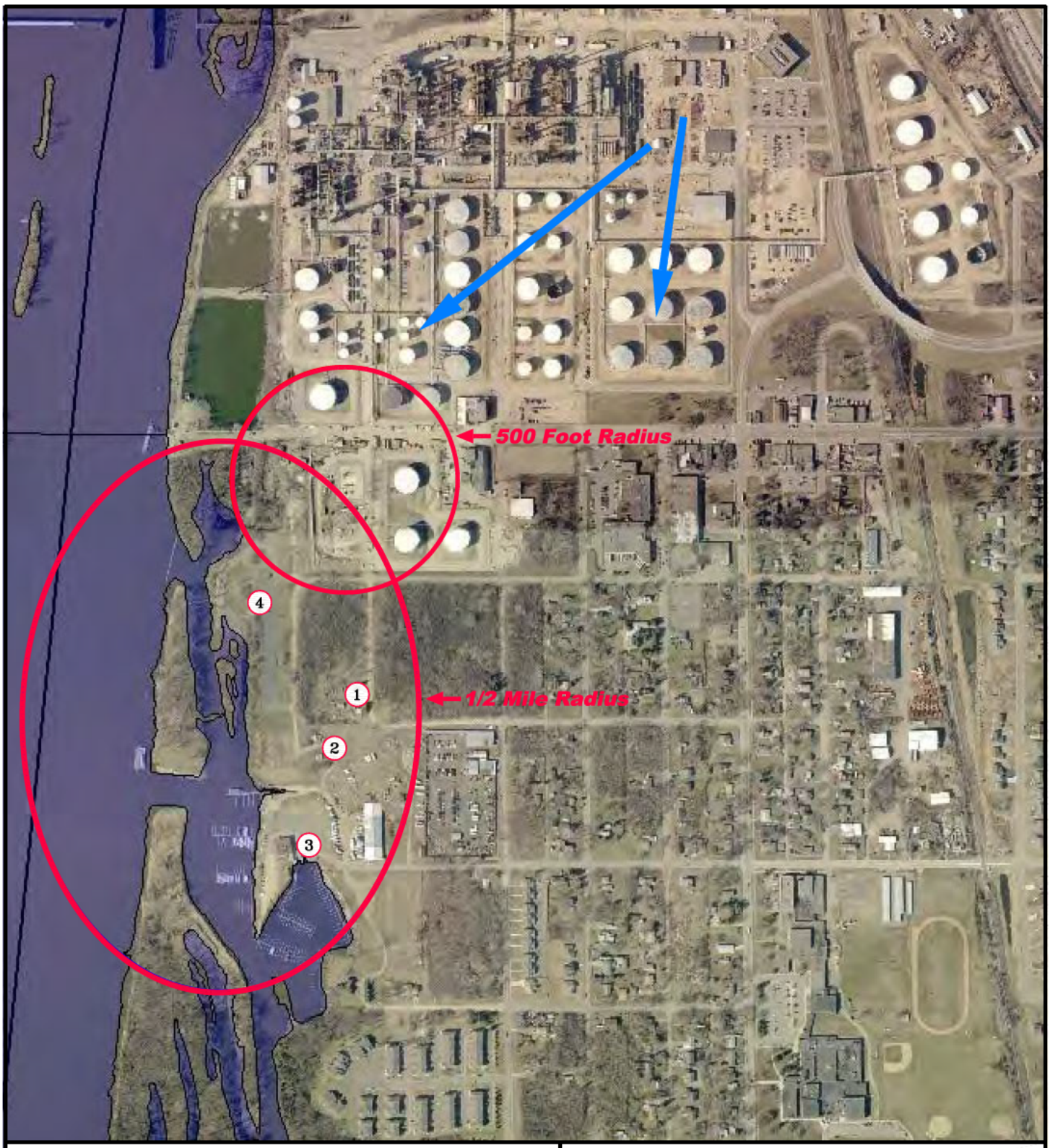
Notes:

Sites included on this Table are depicted on applicable Well Receptor Survey figures included in report.

[1] Receptor Survey Questionnaire indicated that if questionnaire was not returned it would be assumed that the property has no water wells, basements or sumps.
NA - Not Applicable

Appendix A

Marathon Refinery Groundwater Receptor Survey Documents



LEGEND:

Property Occupant

1. Residence – 729 Factory St.
2. Residence – 812 Front St.
3. Hidden Harbor Marina – 388 9th Ave.
4. Lions Levee Park – 7th Ave. S.

Inferred Groundwater Flow Direction

North

FIGURE
RECEPTOR SURVEY
MARATHON OIL FIRE TRAINING AREA
ST. PAUL PARK, MINNESOTA

PROJECT NO.	PREPARED BY	DRAWN BY
45618DEL04	NR	DD
DATE	REVIEWED BY	FILE NAME
06/30/11		Marathon-1

anteagroup

via telephone 10-26-10

Receptor Survey Questionnaire

PROPERTY ADDRESS: 388 9th Av. W - Hidden Harbor Marina

1. Is there, or has there ever been, a water well on the property? **Yes** **No** **Unknown**

If you answered **No or Unknown**, proceed to Question 2. 5 wells on property

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

X ACTIVE _____ABANDONED _____SEALED

1b. How deep is (was) the well? _____FEET (if depth is unknown check here _____)

1c. In what year was the well installed (if known)? _____ Bought property ~1 year ago

1d. If the well was abandoned, what year was the well sealed?_____

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.)_____

1f. Where on the property is (was) the well located? 1 - Maintenance 1 - Restaurant 1 - Boats 1 - Hosing 1 - Drink water

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

Yes **No** 810 & 812 Front St - owned by Marina

Name_____

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

2. Is a public water supply currently utilized by the property? **Yes** **No**

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

Name Tim Kennedy

Telephone Number 651-400-0846 DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please feel free to contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or Nile Fellows, MPCA, at 651-757-2352.

Nancy Rodning
5910 RICE CREEK PARKWAY • SUITE 100
ST. PAUL, MINNESOTA 55126 USA

UNITED STATES POSTAGE
PITNEY BOWES
$ 000.44⁰

DELTA

VAC

PROPERTY OWNER OR TENANT
729 FACTORY STREET
ST. PAUL PARK, MN 55071

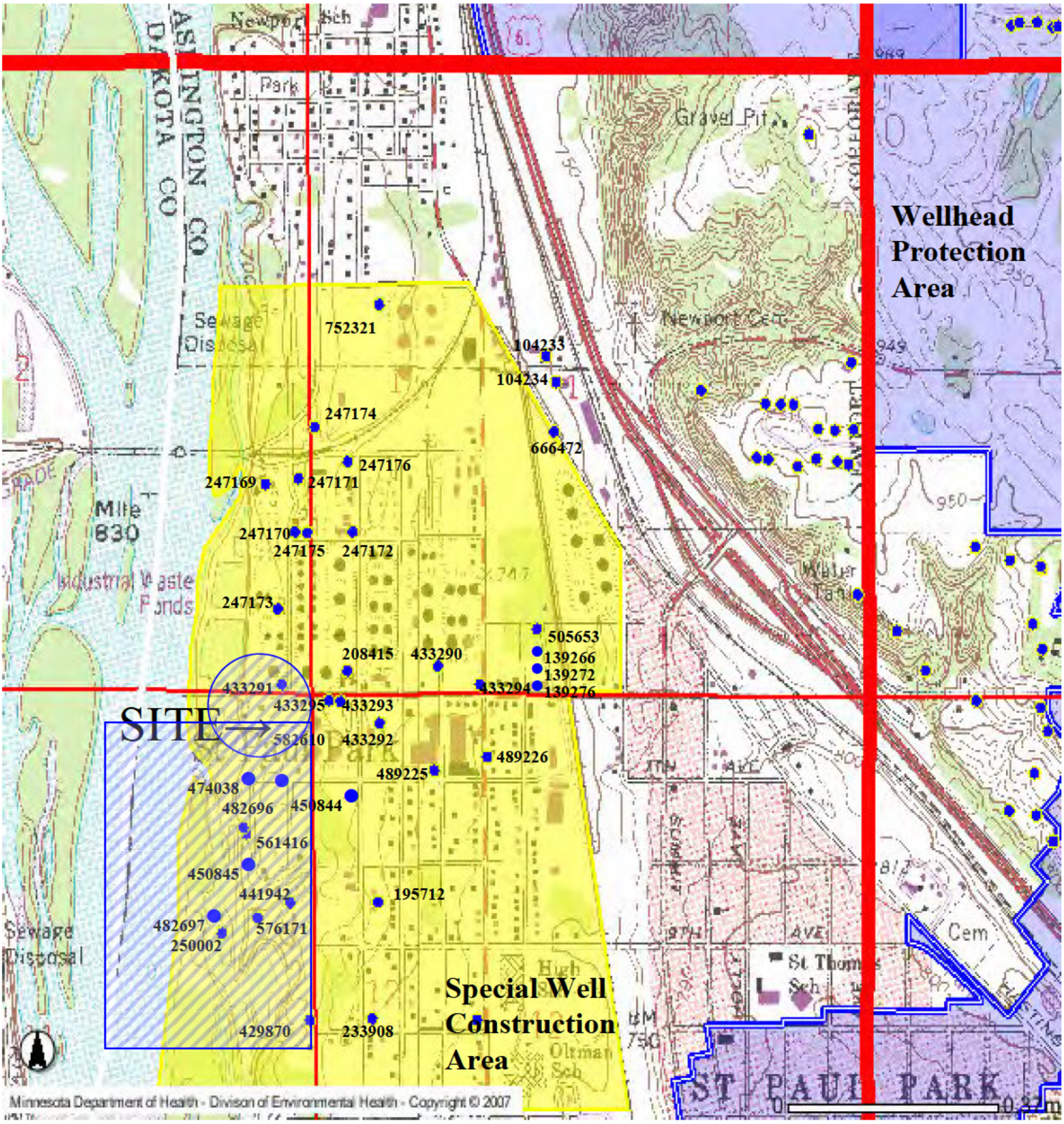
NIXIE 550 4E 1 VAC
RETURN TO SENDER
VACANT
UNABLE TO

NOT A SOLICITATION

BC: 55126502

55071 55126 5023

MARATHON PETROLEUM REFINERY CWI Well Map



Approximate Area of Receptor Survey

Minnesota Unique Well No.
250002

County Washington
Quad Inver Grove Heights
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 07/25/1995
Update Date 05/11/2005
Received Date

Well Name WILLIE'S HIDDEN HARBOR
Township Range Dir Section Subsections Elevation
27 22 W 11 ADBDCD Elevation Method 690 ft. 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
235 ft.	235 ft.	

Drilling Method --

Drilling Fluid --

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

Use Abandoned Status Sealed

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

Casing Diameter	Weight	Hole Diameter
4 in. to 220 ft.	lbs./ft.	

Open Hole from 220 ft. to 235 ft.

Screen NO Make Type

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
14 ft. from Land surface Date Measured 06/06/1995

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)

Geological Material	Color	Hardness	From	To
PRAIRIE DU CHIEN GROUP			0	146
JORDAN SANDSTONE			146	230
ST. LAWRENCE FORMATION			230	235

REMARKS
GAMMA LOGGED 6-6-1995.
WELL SEALED 07-15-1996 BY 62119

Grouting Information Well Grouted? ☐ Yes ☐ No

Located by: Minnesota Geological Survey
Method: Digitized - scale 1:24,000 or larger (Digitizing Table)
Unique Number Verification: Information from owner
Input Date: 07/18/1996
System: UTM - Nad83, Zone15, Meters
X: 499426 Y: 4965451

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

Borehole Geophysics Yes
First Bedrock Prairie Du Chien Group
Last Strat St.Lawrence
Aquifer Multiple
Depth to Bedrock 0 ft.

Well Contractor Certification
Minnesota Geological Survey — License Business Name
MGS — Lic. Or Reg. No.
Name of Driller

County Well Index Online Report

250002

Printed 11/3/2010
HE-01205-07

Minnesota Unique Well No.
268354

County Washington
Quad Inver Grove Heights
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 02/07/2007
Update Date 03/01/2011
Received Date

Well Name HARBOR VILLAGE #2
Township Range Dir Section Subsections Elevation: 718 ft.
27 22 W 11 ADADCA Elevation Method: Calc from NED (National Elevation Dataset)

Well Depth	Depth Completed	Date Well Completed
0 ft.	0 ft.	0

Drilling Method

Drilling Fluid

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

Use Public Supply/non-comm.-transient PWS ID Source

Casing Type Joint Drive Shoe? ☐ Yes ☐ No Above/Below ft.

Geological Material	Color	Hardness	From	To

Casing Diameter	Weight	Hole Diameter

Open Hole from ft. to ft.

Screen

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
ft. from 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)

NO REMARKS

Grouting Information Well Grouted? ☐ Yes ☐ No

Located by: Washington Cty.
Unique Number Verification: Info/GPS from data source
System: UTM - Nad83, Zone15, Meters
Method: GPS SA Off (averaged)
Input Date: 06/10/2009
X: 499620 Y: 4965494

Nearest Known Source of Contamination
0 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

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

License Business Name | Lic. Or Reg. No. | Name of Driller

County Well Index Online Report 268354 Printed 6/29/2011
HE-01205-07

Minnesota Unique Well No.
429870

County Washington
Quad Inver Grove Heights
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 08/15/1991
Update Date 09/29/2005
Received Date

Well Name BROWN, WILLIE
Township Range Dir Section Subsections Elevation 733 ft.
27 22 W 11 DAAAAA Elevation Method CALC FROM 2-FOOT COUNTY DEM

Well Depth	Depth Completed	Date Well Completed
220 ft.	220 ft.	02/23/1987

Drilling Method Non-specified Rotary

Well Address
215 10TH AV W
ST PAUL PARK MN 55071

Geological Material	Color	Hardness	From	To
GRAVEL	BROWN	SOFT	0	8
LIME	YELLOW	HARD	8	165
SANDROCK	YELLOW	SOFT	165	220

Drilling Fluid Bentonite
Well Hydrofractured? ☐ Yes ☐ No
From Ft. to Ft.

Use Domestic

Casing Type Steel (black or low carbon) Joint Welded Drive Shoe? ☑ Yes ☐ No
Above/Below 1 ft.

Casing Diameter	Weight	Hole Diameter
8 in. to 8 ft.	18 lbs./ft.	12 in. to 8 ft.
4 in. to 189 ft.	11 lbs./ft.	8 in. to 18 ft.

Open Hole from 189 ft. to 220 ft.

Screen NO Make Type

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
40 ft. from Land surface Date Measured 02/23/1987

PUMPING LEVEL (below land surface)
80 ft. after 2 hrs. pumping 20 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

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 189 ft. 5 yrds.

Located by: Minnesota Geological Survey Method: Digitization (Screen) - Map (1:24,000)
Unique Number Verification: Information from owner Input Date: 09/07/2005
System: UTM - Nad83, Zone15, Meters X: 499675 Y: 4965234

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

Pump ☐ Not Installed Date Installed 04/03/1987
Manufacturer's name GRUNDFOS Model number SP-2-12 HP 0.5 Volts 230
Length of drop Pipe 84 ft. Capacity 12 g.p.m Type Submersible Material Galvanized

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
Kimmes-Bauer	19521	ANDERSON, L.

First Bedrock Prairie Du Chien Group
Last Strat Jordan
Aquifer Jordan
Depth to Bedrock 8 ft.

County Well Index Online Report

429870

Printed 11/3/2010
HE-01205-07

Minnesota Unique Well No.
433291

County Washington
Quad Inver Grove Heights
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 06/07/1993
Update Date 03/06/2002
Received Date

Well Name ASHLAND PETROLEUM MW-102
Township Range Dir Section Subsections Elevation 725 ft.
27 22 W 2 DDDDCC Elevation Method 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
47 ft.	47 ft.	04/26/1989

Drilling Method Non-specified Rotary

Drilling Fluid --

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

Use Monitor well

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

Casing Diameter	Weight	Hole Diameter
8 in. to 13 ft.	lbs./ft.	
4 in. to 22 ft.	lbs./ft.	

Open Hole from 22 ft. to 47 ft.

Screen NO Make Type

Diameter	Slot/Gauze	Length	Set Between

Well Address

ST PAUL PARK MN 55071

Geological Material	Color	Hardness	From	To
DRIFT, SAND & CLAY	BLACK		0	6
LIMEROCK	YEL/TAN		6	47

Static Water Level
ft. from 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
M.G.S. NO. 2788.
27-22-2 DDDDCC
ELEV 725-+5
103-D

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 22 ft. 8.5 bags

Located Minnesota Geological Survey
Method Digitization (Screen) - Map (1:24,000)
Unique Number Verification Information from owner
Date 02/13/2004
System UTM - Nad83, Zone15, Meters
X: 499596 Y: 4966070

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 Prairie Du Chien Group
Last Strat Prairie Du Chien Group
Aquifer Prairie Du Chien Group
Depth to Bedrock 6 ft.

Well Contractor Certification

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

County Well Index Online Report

433291

Printed 6/29/2008
HE-01205-07

Minnesota Unique Well No.
441942

County Washington
Quad Inver Grove Heights
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 08/14/1991
Update Date 09/29/2005
Received Date

Well Name WILLIE'S HIDDEN HARBOR
Township Range Dir Section Subsections Elevation
27 22 W 11 ADADBA Elevation Method
727 ft.
CALC FROM 2-FOOT COUNTY DEM

Well Depth	Depth Completed	Date Well Completed
240 ft.	240 ft.	10/29/1984

Drilling Method Non-specified Rotary

Well Address
388 9TH AV W
ST PAUL PARK MN 55071

Geological Material	Color	Hardness	From	To
SAND	BROWN	SOFT	0	25
LIME	YELLOW	HARD	25	170
SAND ROCK	BROWN	SOFT	170	200
SAND ROCK	BLUE	HARD	200	240

Drilling Fluid
Bentonite

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

Use Domestic

Casing Type Steel (black or low carbon) Joint Welded Drive Shoe? ☑ Yes ☐ No Above/Below 1 ft.

Casing Diameter	Weight	Hole Diameter
8 in. to 25 ft.	18 lbs./ft.	12 in. to 25 ft.
4 in. to 203 ft.	11 lbs./ft.	8 in. to 200 ft.

Open Hole from 203 ft. to 240 ft.

Screen NO Make Type

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
25 ft. from Land surface Date Measured 10/29/1987

PUMPING LEVEL (below land surface)
30 ft. after 2 hrs. pumping 50 g.p.m.

Well Head Completion
Pitless adapter manufacturer WHITEWATER Model SU4X5
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

NO REMARKS

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 203 ft. 4 yrds.

Located by: Minnesota Geological Survey
Method: Digitization (Screen) - Map (1:24,000)
Unique Number Verification: Information from owner
Input Date: 09/07/2005
System: UTM - Nad83, Zone15, Meters
X: 499620 Y: 4965527

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

Pump ☐ Not Installed Date Installed 12/03/1987
Manufacturer's name GRUNDFOS Model number SP-2-12 HP 1.5 Volts 230
Length of drop Pipe 42 ft. Capacity 10 g.p.m Type Submersible Material Galvanized

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
Kimmes-Bauer	19521	ANDERSON, L.

First Bedrock Prairie Du Chien Group
Last Strat Jordan
Aquifer Jordan
Depth to Bedrock 25 ft.

County Well Index Online Report

441942

Printed 11/3/2010
HE-01205-07

Minnesota Unique Well No.
450845

County Washington
Quad Inver Grove Heights
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 12/21/1992
Update Date 02/14/2008
Received Date

Well Name PIRNIE, MALCOLM

Township	Range	Dir	Section	Subsections	Elevation	ft.
27	22	W	11	AAD	Elevation Method	

Well Depth	Depth Completed	Date Well Completed
54 ft.	54 ft.	10/17/1988

Drilling Method --

Drilling Fluid --

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

Use Monitor well

Casing Type Joint No Information Drive Shoe? ☐ Yes ☐ No Above/Below ft.

Geological Material	Color	Hardness	From	To

Casing Diameter	Weight	Hole Diameter

Open Hole from ft. to ft.

Screen Make Type

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
35 ft. from Land surface Date Measured 12/21/1988

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
END OF FRONT ST.
MW 5

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 _ 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

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

Thein Well Co.	34050	
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report 450845 Printed 11/3/2010
HE-01205-07

Minnesota Unique Well No.
474038

County Washington
Quad Inver Grove Heights
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 12/21/1992
Update Date 09/01/2009
Received Date

Well Name CITY OF ST.PAUL PARK
Township 27 Range 22 Dir W Section 11 Subsections AA
Elevation ft.
Elevation Method

Well Depth: 19 ft.
Depth Completed: 18 ft.
Date Well Completed: 11/11/1991
Drilling Method --

Drilling Fluid --
Well Hydrofractured? ☐ Yes ☐ No
From Ft. to Ft.

Use Monitor well

Casing Type Joint No Information Drive Shoe? ☐ Yes ☐ No Above/Below ft.

Casing Diameter	Weight	Hole Diameter

Open Hole from ft. to ft.

Screen Make Type

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
11 ft. from Land surface Date Measured 11/11/1991

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)

Geological Material	Color	Hardness	From	To
FILL W/ SILTY SAND & LEAN CLAY	BLK/BRN		0	10
LEAN CLAY	DK. BRN	V.SOFT	10	17
SAND FINE GRAINED (VERY LOOSE)	BROWN		17	19

REMARKS
MW 107
NEAR 7TH AVE & FRONT ST., ST.PAUL PARK

Grouting Information Well Grouted? ☑ Yes ☐ No
Grout Material: Neat Cement from to 4.5 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

Twin City Testing	M0112	NELSON T.
License Business Name	Lic. Or Reg. No.	Name of Driller

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report 474038 Printed 11/3/2010
HE-01205-07

Minnesota Unique Well No.
482696

County Washington
Quad Inver Grove Heights
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 04/22/2003
Update Date 04/25/2007
Received Date

Well Name W-200
Township Range Dir Section Subsections Elevation 702 ft.
27 22 W 11 AADCBC Elevation Method 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
195 ft.	195 ft.	09/18/1992

Drilling Method Non-specified Rotary

Well Address
100 3RD W
ST PAUL PARK MN 55071

Drilling Fluid --

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

Use Abandoned Status Sealed

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

Geological Material	Color	Hardness	From	To
DRIFT			0	3
LIMESTONE			3	155
SANDSTONE			155	195

Casing Diameter	Weight	Hole Diameter
14 in. to 3 ft.	55.57 lbs./ft.	17.5 in. to 3 ft.
8 in. to 155 ft.	28.55 lbs./ft.	13 in. to 155 ft.

Open Hole from 170 ft. to 195 ft.

Screen NO Make Type

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
46 ft. from Land surface Date Measured 09/18/1992

PUMPING LEVEL (below land surface)
ft. after hrs. pumping 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
WELL SEALED 08-16-2000 BY 62012
ORIGINAL USE : MONITOR WELL

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement	from	to 3 ft.	2 bags
Grout Material: Neat Cement	from	to 170 ft.	4 yrds.
Grout Material: Neat Cement	from	to 155 ft.	5 yrds.

Located by: Minnesota Department of Health
Method: GPS SA Off (averaged)
Unique Number Verification: N/A
Input Date: 08/15/2000
System: UTM - Nad83, Zone15, Meters
X: 499487 Y: 4965714

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

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

First Bedrock Prairie Du Chien Group
Last Strat Jordan
Aquifer Jordan
Depth to Bedrock 3 ft.

County Well Index Online Report

482696

Printed 11/3/2010
HE-01205-07

Minnesota Unique Well No.
482697

County Washington
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 09/01/2009
Update Date 09/01/2009
Received Date

Well Name ASHLAND PETROLEUM COMPANY

Township	Range	Dir	Section	Subsections	Elevation	ft.
27	22	W	11	ACD	Elevation Method	

Well Depth	Depth Completed	Date Well Completed
47 ft.	47 ft.	09/09/1992

Drilling Method Non-specified Rotary

Well Address
100 3RD AV W 55071
ST PAUL PARK MN 55071

Geological Material	Color	Hardness	From	To
DRIFT	BLACK	SOFT	0	3
LIMESTONE	BROWN	HARD	3	47

Drilling Fluid
Other

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

Use Monitor well

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

Casing Diameter	Weight	Hole Diameter
12 in. to 2.5 ft.	lbs./ft.	12 in. to 22 ft.
6 in. to 22 ft.	lbs./ft.	6 in. to 47 ft.

Open Hole from 22 ft. to 47 ft.

Screen NO Make Type

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
32.25 ft. from Land surface Date Measured 09/09/1992

PUMPING LEVEL (below land surface)
34 ft. after 1.25 hrs. pumping 11 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
WELL LABELED: W-108

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from to 22 ft. 10 bags

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

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

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report

482697

Printed 11/3/2010
HE-01205-07

Minnesota Unique Well No.
559256

County Washington
Quad Inver Grove Heights
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 08/22/1996
Update Date 03/01/2011
Received Date

Well Name WILLIES HIDDEN HARBOR
Township Range Dir Section Subsections Elevation
27 22 W 11 ADBDDA Elevation Method
692 ft.
Calc from NED (National Elevation Dataset)

Well Depth	Depth Completed	Date Well Completed
234 ft.	234 ft.	05/17/1996

Drilling Method Non-specified Rotary

Well Address
388 9TH AV
ST PAUL PARK MN 55071

Drilling Fluid --

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

Use Public Supply/non-comm.-transient PWS ID 5820301 Source S01

Casing Type Steel (black or low carbon) Joint Welded Drive Shoe? ☑ Yes ☐ No Above/Below 1 ft.

Geological Material	Color	Hardness	From	To
SAND	BROWN	SOFT	0	25
LIME	YELLOW	SOFT	25	34
LIME	YELLOW	HARD	34	45
SHALE	BLUE	HARD	45	55
LIME	YELLOW	HARD	55	137
SANDROCK	YELLOW	SOFT	137	141
SANDROCK	YELLOW	SOFT	141	190
SANDROCK	GRAY	MEDIUM	190	227
SANDROCK	GRAY	MEDIUM	227	234

Casing Diameter	Weight	Hole Diameter
8 in. to 24 ft.	28.55 lbs./ft.	12 in. to 34 ft.
4 in. to 225 ft.	10.79 lbs./ft.	8 in. to 225 ft.

Open Hole from 225 ft. to 234 ft.

Screen NO Make Type

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
0 ft. from Land surface Date Measured 05/17/1996

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

Well Head Completion
Pitless adapter manufacturer WHITEWATER Model SU4X5.5
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

REMARKS
GAMMA LOGGED 5-17-1996.
27-22-11 ADBDDB
ELEV 688-+5
103-D
WELL #1

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 225 ft. 6.5 yrds.

Located by: Washington Cty.
Unique Number Verification: Info/GPS from data source
System: UTM - Nad83, Zone15, Meters

Method: GPS SA Off (averaged)
Input Date: 06/10/2009
X: 499471 Y: 4965491

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

Pump ☑ Not Installed Date Installed 06/13/1996
Manufacturer's name GRUNDFOS Model number 25S10-7 HP 1 Volts 230
Length of drop Pipe 42 ft. Capacity 20 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

Borehole Geophysics Yes
First Bedrock Prairie Du Chien Group
Last Strat St.Lawrence
Aquifer Multiple
Depth to Bedrock 25 ft.

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Kimmes-Bauer	19521	PEINE, J.

County Well Index Online Report

559256

Printed 6/29/2011
HE-01205-07

Minnesota Unique Well No.
561416

County Washington
Quad Inver Grove Heights
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 04/22/2003
Update Date 04/25/2007
Received Date

Well Name RW-5
Township Range Dir Section Subsections Elevation 705 ft.
27 22 W 11 AADCCB Elevation Method 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
75 ft.	75 ft.	07/06/1995

Drilling Method Non-specified Rotary

Well Address
ST PAUL PARK MN 55071

Geological Material	Color	Hardness	From	To
LIMESTONE	TAN	HARD	0	40
LIMESTONE	TAN	SOFT	40	45
LIMESTONE	TAN	HARD	45	70
LIMESTONE	TAN	SOFT	70	75

Drilling Fluid Bentonite
Well Hydrofractured? ☐ Yes ☐ No
From Ft. to Ft.

Use Other (specify in remarks)

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

Casing Diameter	Weight	Hole Diameter
8 in. to 25 ft.	lbs./ft.	12 in. to 25 ft.
		8 in. to 75 ft.

Open Hole from 25 ft. to 75 ft.

Screen NO Make Type

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
30 ft. from Land surface Date Measured 07/06/1995

PUMPING LEVEL (below land surface)
75 ft. after 2 hrs. pumping 30 g.p.m.

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

REMARKS
WELL LOCATION: 700 BLOCK OF FRONT ST. ST. PAUL PARK, MN 55071
WATER STARTED COMING AT 32'
USE-REMEDIAL

Grouting Information Well Grouted? ☑ Yes ☐ No
Grout Material: Neat Cement from to 24 ft. 8 bags

Located by: Minnesota Department of Health
Unique Number Verification: N/A
System: UTM - Nad83, Zone15, Meters
Method: GPS SA Off (averaged)
Input Date: 08/15/2000
X: 499494 Y: 4965698

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	ROBBIE&JEFF

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

County Well Index Online Report

561416

Printed 4/10/2009
HE-01205-07

Minnesota Unique Well No.
576171

County Washington
Quad Inver Grove Heights
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 09/25/1996
Update Date 12/30/2004
Received Date

Well Name WILLIES HIDDEN HARBOR
Township Range Dir Section Subsections Elevation
27 22 W 11 ADACCA Elevation Method
702 ft.
Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
200 ft.	200 ft.	07/17/1996

Drilling Method Non-specified Rotary

Well Address
388 9TH AV
ST PAUL PARK MN

Geological Material	Color	Hardness	From	To
SAND	BROWN	SOFT	0	30
ROCK	TAN	HARD	30	132
SANDROCK	YELLOW	SOFT	132	189
SANDROCK	YELLOW	HARD	189	200

Drilling Fluid
--

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

Use Domestic

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

Casing Diameter	Weight	Hole Diameter
4 in. to 189 ft.	lbs./ft.	12 in. to 30 ft.
		8 in. to 189 ft.

Open Hole from 189 ft. to 200 ft.

Screen NO Make Type

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
12 ft. from Land surface Date Measured 07/17/1996

PUMPING LEVEL (below land surface)
20 ft. after 1 hrs. pumping 30 g.p.m.

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

REMARKS
27-22-11
ELEV 103-D

Located by: Minnesota Department of Health
Unique Number Verification: N/A
System: UTM - Nad83, Zone15, Meters
Method: Digitization (Screen) - Map (1:24,000)
Input Date: 10/24/2003
X: 499527 Y: 4965490

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 2 to 160 ft. 54 bags

Nearest Known Source of Contamination
100 feet W direction Body of water type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☑ Not Installed Date Installed 07/18/1996
Manufacturer's name OWNER'S Model number HP 0 Volts
Length of drop Pipe ft. Capacity 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

Well Contractor Certification

Schroepfer Well Co.	62119	SCHROEPFER T
License Business Name	Lic. Or Reg. No.	Name of Driller

First Bedrock Prairie Du Chien Group
Last Strat Jordan
Aquifer Jordan
Depth to Bedrock 30 ft.

County Well Index Online Report

576171

Printed 11/3/2010
HE-01205-07

Minnesota Unique Well No.
582610

County Washington
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date
Update Date 09/01/2009
Received Date

Well Name ASHLAND PETROLEUM COMPANY

Township	Range	Dir	Section	Subsections	Elevation	ft.
27	22	W	11	AAA	Elevation Method	

Well Depth	Depth Completed	Date Well Completed
193 ft.	193 ft.	07/28/1997

Drilling Method Non-specified Rotary

Well Address
BROADWAY & MAIN ST
ST PAUL PARK MN 55071

Geological Material	Color	Hardness	From	To
FILL	BLACK	SOFT	0	2
LIMESTONE	TAN	HARD	2	158
SANDSTONE	TAN	MEDIUM	158	193

Drilling Fluid
--

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

Use Remedial

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

Casing Diameter	Weight	Hole Diameter
6 in. to 173 ft.	lbs./ft.	12 in. to 173 ft.
		6 in. to 193 ft.

Open Hole from 173 ft. to 193 ft.

Screen NO Make Type

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
20 ft. from Land surface Date Measured 07/28/1997

PUMPING LEVEL (below land surface)
ft. after hrs. pumping 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
ENGINEER - BAYWEST
WELL NUMBERED W-205

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from to 173 ft. 110 bags

Nearest Known Source of Contamination
25 feet W 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

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

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report

582610

Printed 11/3/2010
HE-01205-07

Appendix B

Bemidji Regional Airport Groundwater Receptor Survey Documents, October 2010 Survey



LEGEND:

Inferred Groundwater Flow Direction

Property Occupant

1. Bemidji Regional Airport
2. Rausch Cold Weather Testing Facility
3. Bureau of Criminal Apprehension, MN Dept. of Public Safety
4. Great River Dentistry
5. Indoor Auto Mall
6. Quality Inn
7. Paul Bunyan Elementry & ISD #31 Offices
8. City of Bemidji Water Treatment Facility
9. Kraus Anderson Construction Co.
10. MNDOT Northwest District

North

FIGURE
RECEPTOR SURVEY
BEMIDJI FIRE DEPARTMENT FIRE TRAINING AREA
BEMIDJI AIRPORT
BEMIDJI, MINNESOTA

PROJECT NO.	PREPARED BY	DRAWN BY
45618DEL04	NR	DD
DATE	REVIEWED BY	FILE NAME
06/30/11		Bemidji-1

anteagroup

Receptor Survey Questionnaire – over Telephone 10-11-10 12:50pm

PROPERTY ADDRESS: Quality Inn 3500 Mokers Dr.

1. Is there, or has there ever been, a water well on the property? **Yes** (No) **Unknown**

If you answered **No or Unknown**, proceed to Question 2.

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

_____ACTIVE _____ABANDONED _____SEALED

1b. How deep is (was) the well? _____FEET (if depth is unknown check here _____)

1c. In what year was the well installed (if known)? _____

1d. If the well was abandoned, what year was the well sealed?_____

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.)_____

_____

1f. Where on the property is (was) the well located?_____

_____

_____

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

Yes **No**

Name_____

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

2. Is a public water supply currently utilized by the property? (Yes) **No**

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

Name Kevin Rakow - GM

Telephone Number 218-444-7708 DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please feel free to contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or Nile Fellows, MPCA, at 651-757-2352.

Not the Holiday Inn.

via telephone 10-11-10

Receptor Survey Questionnaire

PROPERTY ADDRESS: 3600 Moberg DR NW - Indoor Auto Mall

1. Is there, or has there ever been, a water well on the property? **Yes** **No** **Unknown**

If you answered **No or Unknown**, proceed to Question 2.

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

_____ACTIVE _____ABANDONED _____SEALED

1b. How deep is (was) the well? _____FEET (if depth is unknown check here _____)

1c. In what year was the well installed (if known)? _____

1d. If the well was abandoned, what year was the well sealed?_____

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.)_____

_____

1f. Where on the property is (was) the well located?_____

_____

_____

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

Yes **No**

Name_____

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

2. Is a public water supply currently utilized by the property? **Yes** **No**

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

Name Todd Lowth

Telephone Number 218-751-3140 DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please feel free to contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or Nile Fellows, MPCA, at 651-757-2352.

11/3/10

Former Holiday Inn. Well Registered. Knowing no well, on city water. Former owner is Gary Gangle hoff Properties

DELTA

PHONE COMMUNICATION RECORD

Date 11-3-10 Time 12:00

Person Contacted — Incoming ☐ Outgoing ☒ Gary Congdon, Bemidji

Phone 218-444-6900 Project No.

Project Name/Location

Contacted by Nancy R

Participants

Subject well 169190 - Holiday Inn (Indoor Auto Mall)

Notes

there was a well there in the 1970's, there was no city water then.

(City water came to area). well was capped. the ~~was~~ convention center addition was built over the location of that well.

Receptor Survey Questionnaire

PROPERTY ADDRESS: Great River Dentistry, 3622 Mobers Drive NW, Bemidji

1. Is there, or has there ever been, a water well on the property? **Yes** (No) **Unknown**

If you answered **No or Unknown**, proceed to Question 2.

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

_____ACTIVE _____ABANDONED _____SEALED

1b. How deep is (was) the well? _____FEET (if depth is unknown check here _____)

1c. In what year was the well installed (if known)? _____

1d. If the well was abandoned, what year was the well sealed?_____

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.)_____

_____

1f. Where on the property is (was) the well located?_____

_____

_____

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

Yes **No**

Name_____

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

2. Is a public water supply currently utilized by the property? (Yes) **No**

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

Name Douglas R. Williams, DDS

Telephone Number 218-751-4216 DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please feel free to contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or Nile Fellows, MPCA, at 651-757-2352.

Receptor Survey Questionnaire

via telephone 10-11-10

PROPERTY ADDRESS: 3700 Norris Ct NW

1. Is there, or has there ever been, a water well on the property? **Yes** (No) **Unknown**

If you answered **No or Unknown**, proceed to Question 2.

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

_____ACTIVE _____ABANDONED _____SEALED

1b. How deep is (was) the well? _____FEET (if depth is unknown check here _____)

1c. In what year was the well installed (if known)? _____

1d. If the well was abandoned, what year was the well sealed?_____

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.)_____

_____

1f. Where on the property is (was) the well located?_____

_____

_____

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

Yes **No**

Name_____

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

2. Is a public water supply currently utilized by the property? (Yes) **No**

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

Name Jim Dougherty, MN Bureau of Criminal Apprehension

Telephone Number 218-755-6050 DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please feel free to contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or Nile Fellows, MPCA, at 651-757-2352.

Receptor Survey Questionnaire

PROPERTY ADDRESS: 3300 Gilett Dr NW - Paul Bunyan ISD #31

1. Is there, or has there ever been, a water well on the property? **Yes** (No) **Unknown**

If you answered **No or Unknown**, proceed to Question 2.

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

_____ACTIVE _____ABANDONED _____SEALED

1b. How deep is (was) the well? _____FEET (if depth is unknown check here _____)

1c. In what year was the well installed (if known)? _____

1d. If the well was abandoned, what year was the well sealed?_____

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.)_____

_____

1f. Where on the property is (was) the well located?_____

_____

_____

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

Yes **No**

Name_____

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

2. Is a public water supply currently utilized by the property? (Yes) **No**

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

Name Chris - Business Manager

Telephone Number 218-333-3100 DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please feel free to contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or Nile Fellows, MPCA, at 651-757-2352.

Via Telephone 10-21-10

Receptor Survey Questionnaire

PROPERTY ADDRESS: 3507 Gilbert Drive - Rausch Cold Weather Testing

1. Is there, or has there ever been, a water well on the property? **Yes** **No** **Unknown**

If you answered **No or Unknown**, proceed to Question 2.

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

_____ACTIVE _____ABANDONED _____SEALED

1b. How deep is (was) the well? _____FEET (if depth is unknown check here _____)

1c. In what year was the well installed (if known)? _____

1d. If the well was abandoned, what year was the well sealed?_____

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.)_____

_____

1f. Where on the property is (was) the well located?_____

_____

_____

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

Yes **No**

Name_____

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

2. Is a public water supply currently utilized by the property? **Yes** **No**

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

Name Jason

Telephone Number 218-751-0016 DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please feel free to contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or Nile Fellows, MPCA, at 651-757-2352.

Receptor Survey Questionnaire — via telephone 10-14-10

PROPERTY ADDRESS: 3920 Hwy 2 west - MNDOT

1. Is there, or has there ever been, a water well on the property? **Yes** (**No**) **Unknown**

If you answered **No or Unknown**, proceed to Question 2.

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

_____ACTIVE _____ABANDONED _____SEALED

1b. How deep is (was) the well? _____FEET (if depth is unknown check here _____)

1c. In what year was the well installed (if known)? _____

1d. If the well was abandoned, what year was the well sealed?_____

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.)_____

_____

1f. Where on the property is (was) the well located?_____

_____

_____

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

Yes **No**

Name_____

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

2. Is a public water supply currently utilized by the property? (**Yes**) **No**

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

Name Dan Tricke

Telephone Number 218-755-6507 DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please feel free to contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or Nile Fellows, MPCA, at 651-757-2352.

Receptor Survey Questionnaire

PROPERTY ADDRESS: Kraus Anderson Const. Shop 3168

1. Is there, or has there ever been, a water well on the property? **Yes** **No** **Unknown**

If you answered **No or Unknown**, proceed to Question 2.

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

____ACTIVE _____ABANDONED _____SEALED

1b. How deep is (was) the well? ~20 FEET (if depth is unknown check here _____)

1c. In what year was the well installed (if known)? _____

1d. If the well was abandoned, what year was the well sealed?_____

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.)_____

1f. Where on the property is (was) the well located?_____

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

Yes **No**

Name_____

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

2. Is a public water supply currently utilized by the property? **Yes** **No**

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

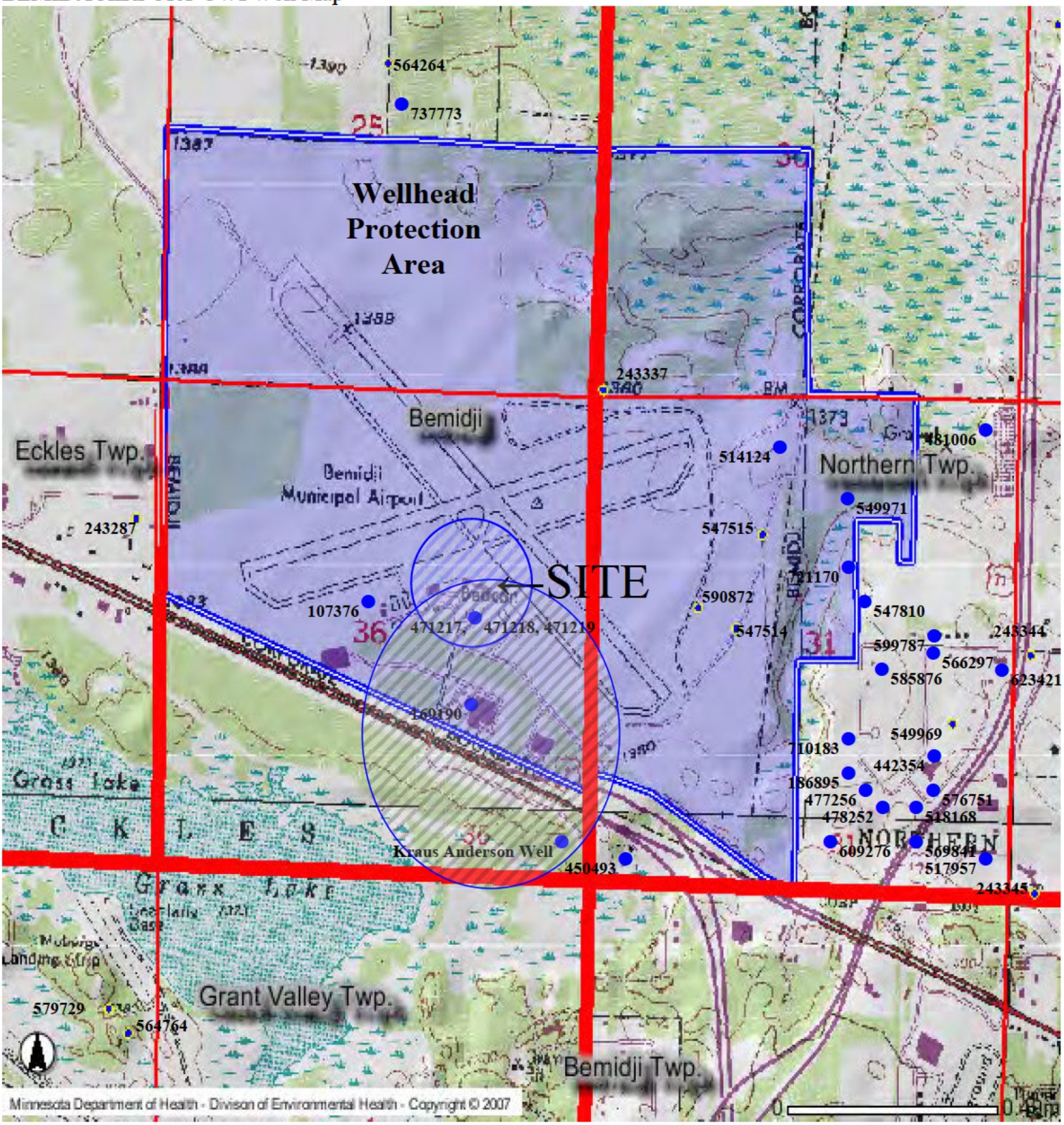
Name_____

Telephone Number 218-751-4207 DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please feel free to contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or Nile Fellows, MPCA, at 651-757-2352.

BEMIDJI AIRPORT CWI Well Map



Approximate Area of Receptor Survey (October 2010)

Minnesota Unique Well No.
169190

County Beltrami
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 02/28/1989
Update Date 03/11/2005
Received Date

Well Name HOLIDAY INN

Township	Range	Dir	Section	Subsections	Elevation	ft.
147	34	W	36		Elevation Method	

Well Depth	Depth Completed	Date Well Completed
86 ft.	86 ft.	03/14/1980

Drilling Method Non-specified Rotary

Geological Material	Color	Hardness	From	To
FINE SAND	BROWN	SOFT	0	43
CLAY	GRAY	HARD	43	55
BOULDERS		HARD	55	74
SAND	GRAY	SOFT	74	86

Drilling Fluid
--

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

Use Commercial

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

Casing Diameter	Weight	Hole Diameter

Open Hole from ft. to ft.

Screen YES Make JOHNSON Type stainless steel

Diameter	Slot/Gauze	Length	Set Between
	15		76 ft. and 86 ft.

Static Water Level
10 ft. from Land surface Date Measured 03/14/1980

PUMPING LEVEL (below land surface)
70 ft. after 60 hrs. pumping 100 g.p.m.

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

REMARKS
FRONT SECTION 36

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 _ 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
Diamond Water Wells	18446	WADDELL L

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report | 169190 | Printed 4/3/2009
HE-01205-07

Minnesota Unique Well No.
186895

County Beltrami
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 02/28/1989
Update Date 03/11/2005
Received Date

Well Name RUEBEN ROBERTSON

Township	Range	Dir	Section	Subsections	Elevation	ft.
147	33	W	31	DC	Elevation Method	

Well Depth	Depth Completed	Date Well Completed
66 ft.	66 ft.	08/16/1984

Drilling Method Cable Tool

Drilling Fluid --

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

Use Domestic

Casing Type Galvanized Joint Threaded Drive Shoe? ☑ Yes ☐ No Above/Below 1 ft.

Geological Material	Color	Hardness	From	To
SAND & CLAY	YELLOW	HARD	0	18
SAND	YELLOW	HARD	18	42
SAND & CLAY	YELLOW	HARD	42	61
SAND	YELLOW	HARD	61	66

Casing Diameter	Weight	Hole Diameter
2 in. to 62 ft.	3.75 lbs./ft.	

Open Hole from ft. to ft.

Screen YES Make JOHNSON Type stainless steel

Diameter	Slot/Gauze	Length	Set Between
1.3	8	4	62 ft. and 66 ft.

Static Water Level
18 ft. from Land surface Date Measured 08/16/1984

PUMPING LEVEL (below land surface)
18 ft. after 120 hrs. pumping 10 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

Grouting Information Well Grouted? ☐ Yes ☑ No

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

Pump ☐ Not Installed Date Installed 08/16/1984
Manufacturer's name TAIT Model number 5CAT HP 0.5 Volts 110
Length of drop Pipe 21 ft. Capacity 6 g.p.m Type Jet Material Galvanized

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
Nelson Well Drilling	04121	NELSON, L.

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report 186895 Printed 4/3/2009
HE-01205-07

Minnesota Unique Well No.
442354

County Beltrami
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 11/08/1990
Update Date 02/04/2004
Received Date

Well Name KERNMER, KAY

Township	Range	Dir	Section	Subsections	Elevation	ft.
147	33	W	31		Elevation Method	

Well Depth	Depth Completed	Date Well Completed
52 ft.	52 ft.	10/06/1989

Drilling Method Non-specified Rotary

Well Address
2316 BARDWELL DR NW
BEMIDJI MN 5660

Drilling Fluid
--

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

Use Domestic

Casing Type Plastic Joint No Information Drive Shoe? ☐ Yes ☐ No Above/Below 1 ft.

Casing Diameter	Weight	Hole Diameter
		6.25 in. to 52 ft.

Open Hole from ft. to ft.

Screen YES Make SMITH Type stainless steel

Diameter	Slot/Gauze	Length	Set Between
	12	4	ft. and ft.

Geological Material	Color	Hardness	From	To
SAND	YELLOW	SOFT	0	15
SAND	BLUE	SOFT	15	35
CLAY	BLUE	SOFT	35	43
SAND	YELLOW	MEDIUM	43	52

Static Water Level
15 ft. from Land surface Date Measured 10/06/1989

PUMPING LEVEL (below land surface)
ft. after hrs. pumping 40 g.p.m.

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

REMARKS
NORTH OF THE EAST END OF THE AIRPORT

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from to 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

Aqua Well Drilling	04463	YERBICH, A.
License Business Name	Lic. Or Reg. No.	Name of Driller

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report

442354

Printed 4/3/2009
HE-01205-07

Minnesota Unique Well No.
450493

County Beltrami
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 03/03/1991
Update Date 07/24/2000
Received Date

Well Name OLSON, RON

Township	Range	Dir	Section	Subsections	Elevation	ft.
147	33	W	31	CCC	Elevation Method	

Well Depth	Depth Completed	Date Well Completed
47 ft.	47 ft.	09/23/1987

Drilling Method Jetted

Well Address
BEMIDJI MN 56601

Geological Material	Color	Hardness	From	To
SAND			0	39
CLAY	BLUE		39	43
SAND	BLUE		43	47

Drilling Fluid
--

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

Use Domestic

Casing Type Galvanized Joint Threaded Drive Shoe? ☑ Yes ☐ No Above/Below 1 ft.

Casing Diameter	Weight	Hole Diameter
2 in. to 42 ft.	3 lbs./ft.	

Open Hole from ft. to ft.

Screen YES Make JOHNSON Type

Diameter	Slot/Gauze	Length	Set Between
1.3	12	48	43 ft. and 47 ft.

Static Water Level
14 ft. from Land surface Date Measured 09/23/1987

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)

NO REMARKS

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 _ 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

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

License Business Name | Lic. Or Reg. No. | SIZER, G. Name of Driller

County Well Index Online Report 450493 Printed 4/3/2009
HE-01205-07

Minnesota Unique Well No.
471217

County Beltrami
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 09/25/1992
Update Date 08/28/2007
Received Date 06/24/1991

Well Name BEMIDJI AVIATION MW-1

Township	Range	Dir	Section	Subsections	Elevation	ft.
147	34	W	36	ACD	Elevation Method	

Well Depth	Depth Completed	Date Well Completed
20 ft.	20 ft.	06/06/1991

Drilling Method Other

Drilling Fluid --

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

Use Abandoned Status Sealed

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

Casing Diameter	Weight	Hole Diameter
2 in. to 10 ft.	lbs./ft.	8 in. to 20 ft.

Open Hole from ft. to ft.

Screen YES Make JOHNSON Type stainless steel

Diameter	Slot/Gauze	Length	Set Between
2	20	10	10 ft. and 20 ft.

Geological Material	Color	Hardness	From	To
CONCRETE	WHITE		0	1
SAND - MODERATE	YEL/BRN		1	6
SAND - DARK, YELL/BRN			6	14
SAND - PALE, YELL/BRN			14	20

Static Water Level
15 ft. from Land surface Date Measured 06/06/1991

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
MONITORING WELL IS USED TO CK THE SPREAD OF GAS IN THE GROUND WATER.
WELL SEALED 10-05-1993 BY 75330
ORIGINAL USE MW - MONITOR WELL - #1
DRILLING METHOD - HOLLOW ROD

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Bentonite from 9 to 10 ft.
Grout Material: Neat Cement from to 9 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

Valnes Well Co.	75330	VALNES, T.
License Business Name	Lic. Or Reg. No.	Name of Driller

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report 471217 Printed 4/3/2009
HE-01205-07

Minnesota Unique Well No.
471218

County Beltrami
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 09/25/1992
Update Date 10/16/2008
Received Date 06/24/1991

Well Name BEMIDJI AVIATION MW-2

Township	Range	Dir	Section	Subsections	Elevation	ft.
147	34	W	36	ACD	Elevation Method	

Well Depth	Depth Completed	Date Well Completed
20 ft.	20 ft.	06/06/1991

Drilling Method Other

Well Address
2 HY W
MN

Geological Material	Color	Hardness	From	To
CONCRETE	WHITE		0	1
SAND - MODERATE YELL/BRN			1	6
SAND - DARK YELL/BRN			6	14
SAND - PALE YELL/BRN			14	20

Drilling Fluid
--

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

Use Abandoned Status Sealed

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

Casing Diameter	Weight	Hole Diameter
2 in. to 10 ft.	lbs./ft.	8 in. to 20 ft.

Open Hole from ft. to ft.

Screen YES Make JOHNSON Type stainless steel

Diameter	Slot/Gauze	Length	Set Between
2	10	10	10 ft. and 20 ft.

Static Water Level
16 ft. from Land surface Date Measured 06/06/1991

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
MW WELL IS USED TO CHECK THE SPREAD OF GASOLINE IN THE GROUND WATER.
WELL SEALED 10-05-1993 BY 75330
ORIGINAL USE MW - MONITOR WELL - #2
DRILLING METHOD - HOLLOW ROD

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Bentonite from 9 to 10 ft.
Grout Material: Neat Cement from to 9 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

Valnes Well Co.	75330	VALNES, T.
License Business Name	Lic. Or Reg. No.	Name of Driller

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report 471218 Printed 4/3/2009
HE-01205-07

Minnesota Unique Well No.
471219

County Beltrami
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 09/25/1992
Update Date 10/16/2008
Received Date 06/24/1991

Well Name BEMIDJI AVIATION MW-3

Township	Range	Dir	Section	Subsections	Elevation	ft.
147	34	W	36	ACD	Elevation Method	

Well Depth	Depth Completed	Date Well Completed
20 ft.	20 ft.	06/06/1991

Drilling Method --

Well Address
2 HY W
MN

Drilling Fluid
--

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

Use Abandoned Status Sealed

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

Casing Diameter	Weight	Hole Diameter
2 in. to 10 ft.	lbs./ft.	8 in. to 20 ft.

Open Hole from ft. to ft.

Screen YES Make JOHNSON Type stainless steel

Diameter	Slot/Gauze	Length	Set Between
2	10	10	10 ft. and 20 ft.

Static Water Level
15.5 ft. from Land surface Date Measured 06/06/1991

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)

Geological Material	Color	Hardness	From	To

REMARKS
MW WELL IS TO CHECK TO SPREAD OF GASOLINE IN THE GROUND WATER.
WELL SEALED 10-05-1993 BY 75330
ORIGINAL USE MW - MONITOR WELL

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Bentonite from 9 to 10 ft.
Grout Material: Neat Cement from to 9 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

Valnes Well Co.	75330	VALNES, T.
License Business Name	Lic. Or Reg. No.	Name of Driller

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report | 471219 | Printed 4/3/2009
HE-01205-07

Minnesota Unique Well No.
477256

County Beltrami
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 04/04/1992
Update Date 07/24/2000
Received Date

Well Name PETSCHE, WILLIAM

Township	Range	Dir	Section	Subsections	Elevation	ft.
147	33	W	31	DDB	Elevation Method	

Well Depth	Depth Completed	Date Well Completed
54 ft.	54 ft.	07/03/1991

Drilling Method Cable Tool

Well Address
2323 ALGEE CT NW
MN

Geological Material	Color	Hardness	From	To
SAND	YELLOW		0	27
CLAY			27	48
SAND			48	54
CLAY & ROCK	BLACK		54	

Drilling Fluid
--

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

Use Domestic

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

Casing Diameter	Weight	Hole Diameter
4 in. to 50 ft.	lbs./ft.	

Open Hole from ft. to ft.

Screen YES Make COOK Type stainless steel

Diameter	Slot/Gauze	Length	Set Between
2	12	4	50 ft. and 54 ft.

Static Water Level
26 ft. from Land surface Date Measured 07/03/1991

PUMPING LEVEL (below land surface)
38 ft. after 30 hrs. pumping 15 g.p.m.

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

NO REMARKS

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 AERMOTOR Model number __ HP 0.5 Volts 220
Length of drop Pipe 30 ft. Capacity __g.p.m Type Submersible Material Plastic

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
Lahman Well Drilling	04051	LAHMAN, C.

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report | 477256 | Printed 4/3/2009
HE-01205-07

Minnesota Unique Well No.
478252

County Beltrami
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 09/19/1991
Update Date 07/24/2000
Received Date

Well Name SHIPPER, SHARON

Township	Range	Dir	Section	Subsections	Elevation	ft.
147	33	W	31	ACC	Elevation Method	

Well Depth	Depth Completed	Date Well Completed
50 ft.	50 ft.	07/01/1991

Drilling Method Non-specified Rotary

Well Address
2405 ALYCE CT
BEMIDJI MN 56601

Drilling Fluid
Bentonite

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

Use Domestic

Casing Type Plastic Joint No Information Drive Shoe? ☐ Yes ☑ No Above/Below 1 ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 45 ft.	lbs./ft.	8.8 in. to 50 ft.

Open Hole from ft. to ft.

Screen YES Make JOHNSON Type plastic

Diameter	Slot/Gauze	Length	Set Between
4	23	5	45 ft. and 50 ft.

Geological Material	Color	Hardness	From	To
SAND	BROWN		0	19
SAND	GRAY		19	26
SILTY CLAY	GRAY		26	30
SAND	GRAY		30	50

Static Water Level
12 ft. from Land surface Date Measured 07/01/1991

PUMPING LEVEL (below land surface)
38 ft. after 60 hrs. pumping 30 g.p.m.

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

NO REMARKS

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 40 to 10 ft.

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

Pump ☐ Not Installed Date Installed 07/02/1991
Manufacturer's name AERMOTOR Model number SD12-50 HP 0.5 Volts 230
Length of drop Pipe 35 ft. Capacity 9 g.p.m Type Submersible Material Plastic

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
North Star Drilling	49588	FELL, B.

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report 478252 Printed 4/3/2009
HE-01205-07

Minnesota Unique Well No.
514124

County Beltrami
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 03/09/1993
Update Date 03/11/2005
Received Date

Well Name FRONTIER HOMES INC

Township	Range	Dir	Section	Subsections	Elevation	ft.
147	33	W	31	BAA	Elevation Method	

Well Depth	Depth Completed	Date Well Completed
56 ft.	56 ft.	09/28/1992

Drilling Method Cable Tool

Drilling Fluid
--

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

Use Domestic

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

Casing Diameter	Weight	Hole Diameter
4 in. to 52 ft.	11 lbs./ft.	

Open Hole from ft. to ft.

Screen YES Make COOK Type stainless steel

Diameter	Slot/Gauze	Length	Set Between
4	10	4	52 ft. and 52 ft.

Geological Material	Color	Hardness	From	To
SAND	YELLOW		0	56

Static Water Level
18 ft. from Land surface Date Measured 09/28/1992

PUMPING LEVEL (below land surface)
33 ft. after 30 hrs. pumping 15 g.p.m.

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

NO REMARKS

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 _ 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
Lahman Well Drilling	04051	LAHMAN, C.

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report 514124 Printed 4/3/2009
HE-01205-07

Minnesota Unique Well No.
518168

County Beltrami
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 03/09/1993
Update Date 02/04/2004
Received Date

Well Name KOLP, RICHARD

Township	Range	Dir	Section	Subsections	Elevation	ft.
147	33	W	31	DAC	Elevation Method	

Well Depth	Depth Completed	Date Well Completed
54 ft.	54 ft.	10/20/1992

Drilling Method Non-specified Rotary

Well Address
3611 LAUREL DR NW
MN

Geological Material	Color	Hardness	From	To
SAND	YELLOW	SOFT	0	27
CLAY	BLUE	SOFT	27	31
SAND	BLUE	HARD	31	54

Drilling Fluid
Revert

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

Use Domestic

Casing Type Plastic Joint No Information Drive Shoe? ☐ Yes ☐ No Above/Below ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 50 ft.	lbs./ft.	8.5 in. to 30 ft.
		6.25 in. to 54 ft.

Open Hole from ft. to ft.

Screen YES Make JOHNSON Type

Diameter	Slot/Gauze	Length	Set Between
2	12	4	50 ft. and 54 ft.

Static Water Level
16 ft. from Land surface Date Measured 10/20/1992

PUMPING LEVEL (below land surface)
16 ft. after 120 hrs. pumping 35 g.p.m.

Well Head Completion
Pitless adapter manufacturer MAASS Model 4J1
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

REMARKS
DICK'S MARINE

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 7 to 30 ft.
Grout Material: Cuttings from 30 to 39 ft.

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

Pump ☐ Not Installed Date Installed 10/22/1992
Manufacturer's name STA-RITE Model number 10SP4C02T HP 0.5 Volts 220
Length of drop Pipe 40 ft. Capacity 10 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

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Nelson Well Drilling	04121	REED, G.

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report 518168 Printed 4/3/2009
HE-01205-07

Minnesota Unique Well No.
547810

County Beltrami
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 10/26/1994
Update Date 02/04/2004
Received Date

Well Name OLSON, REID & KATHY

Township	Range	Dir	Section	Subsections	Elevation	ft.
147	33	W	31	ACC	Elevation Method	

Well Depth	Depth Completed	Date Well Completed
55 ft.	55 ft.	06/23/1994

Drilling Method Non-specified Rotary

Well Address
2321 ANNE ST NW
BEMIDJI MN 56601

Geological Material	Color	Hardness	From	To
SAND	YELLOW	SOFT	0	30
CLAY	YELLOW	SOFT	30	45
SAND	YELLOW	HARD	45	55

Drilling Fluid
Bentonite

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

Use Domestic

Casing Type Plastic Joint No Information Drive Shoe? ☐ Yes ☐ No Above/Below ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 50 ft.	lbs./ft.	8 in. to 30 ft.
		6.25 in. to 55 ft.

Open Hole from ft. to ft.

Screen YES Make Type stainless steel

Diameter	Slot/Gauze	Length	Set Between
2	10	5	50 ft. and 55 ft.

Static Water Level
18 ft. from Land surface Date Measured 06/23/1994

PUMPING LEVEL (below land surface)
18 ft. after 120 hrs. pumping 20 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

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Bentonite from 8 to 30 ft. 3 bags

Nearest Known Source of Contamination
75 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

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Nelson Well Drilling	04121	REED, G.

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report 547810 Printed 4/3/2009
HE-01205-07

Minnesota Unique Well No.
549969

County Beltrami
Quad Peterson Lake
Quad ID 329C

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 01/01/1980
Update Date 01/03/2005
Received Date

Well Name LOREN, ROBERT
Township Range Dir Section Subsections Elevation
147 33 W 31 ABD
Elevation Method 1380 ft. Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
108 ft.	108 ft.	03/24/1995

Drilling Method Non-specified Rotary

Drilling Fluid Bentonite

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

Use Domestic

Casing Type Plastic Joint Glued Drive Shoe? ☑ Yes ☐ No Above/Below ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 96 ft.	1.87 lbs./ft.	8.3 in. to 30 ft.
		6.25 in. to 108 ft.

Open Hole from ft. to ft.

Screen YES Make COOK Type stainless steel

Diameter	Slot/Gauze	Length	Set Between
2	12	12	96 ft. and 108 ft.

Geological Material	Color	Hardness	From	To
SAND	BROWN	SOFT	0	49
CLAY	GRAY	MEDIUM	49	67
SAND	GRAY	SOFT	67	72
CLAY AND SAND	GRAY	MEDIUM	72	93
SAND	YELLOW	MEDIUM	93	108

Static Water Level
12 ft. from Land surface Date Measured 03/24/1995

PUMPING LEVEL (below land surface)
108 ft. after 120 hrs. pumping 75 g.p.m.

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

NO REMARKS

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 7 to 30 ft. 4 bags

Located Beltrami Cty. Soil & Water Cons. Dist.
Method GPS SA On (averaged)
Unique Number Verification Information from owner
Date N/A
System UTM - Nad83, Zone15, Meters
X: 356185 Y: 5262812

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

Pump ☐ Not Installed Date Installed 03/24/1995
Manufacturer's name GOULD Model number 48LE30 HP 3 Volts 230
Length of drop Pipe 80 ft. Capacity 70 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
Last Strat
Aquifer
Depth to Bedrock ft.

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Bradseth Well Co.	04527	BRADSETH, C.

County Well Index Online Report 549969 Printed 6/25/2008
HE-01205-07

Minnesota Unique Well No.
566297

County Beltrami
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 12/20/1995
Update Date 02/04/2004
Received Date

Well Name BEWELY, DAVID

Township	Range	Dir	Section	Subsections	Elevation	ft.
147	33	W	31	ACD	Elevation Method	

Well Depth	Depth Completed	Date Well Completed
55 ft.	55 ft.	11/14/1995

Drilling Method Non-specified Rotary

Well Address
2120 ANNE ST
BEMIDJI MN 56601

Geological Material	Color	Hardness	From	To
SAND	BROWN	SOFT	0	12
CLAY	GRAY	MEDIUM	12	19
SAND, GRAVEL	GRAY	MEDIUM	19	28
CLAY	GRAY	MEDIUM	28	41
SAND	BROWN	SOFT	41	55

Drilling Fluid
Bentonite

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

Use Domestic

Casing Type Plastic Joint No Information Drive Shoe? ☐ Yes ☑ No Above/Below ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 51 ft.	lbs./ft.	6.75 in. to 55 ft.

Open Hole from ft. to ft.

Screen YES Make HALBURTON Type stainless steel

Diameter	Slot/Gauze	Length	Set Between
2	12	4	51 ft. and 55 ft.

Static Water Level
13 ft. from Land surface Date Measured 11/14/1995

PUMPING LEVEL (below land surface)
22 ft. after 60 hrs. pumping 25 g.p.m.

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

NO REMARKS

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Bentonite from 8 to 30 ft. 2 bags

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

Pump ☐ Not Installed Date Installed 11/15/1995
Manufacturer's name MYERS Model number __ HP 0.5 Volts 230
Length of drop Pipe _ ft. Capacity 10 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

Well Contractor Certification

Aqua Well Drilling	04463	SCANDIN, R.
License Business Name	Lic. Or Reg. No.	Name of Driller

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report 566297 Printed 4/3/2009
HE-01205-07

Minnesota Unique Well No.
569841

County Beltrami
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 12/20/1995
Update Date 07/24/2000
Received Date

Well Name HURLEY, LLOYD

Township	Range	Dir	Section	Subsections	Elevation	ft.
147	33	W	31	DDC	Elevation Method	

Well Depth	Depth Completed	Date Well Completed
57 ft.	57 ft.	11/20/1995

Drilling Method Non-specified Rotary

Well Address
BANDWELL PARK
MN

Geological Material	Color	Hardness	From	To
SAND	BROWN	SOFT	0	22
CLAY	BROWN	SOFT	22	24
SAND	BROWN	SOFT	24	30
SAND	GRAY	SOFT	30	57

Drilling Fluid
Other

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

Use Domestic

Casing Type Plastic Joint No Information Drive Shoe? ☐ Yes ☐ No Above/Below ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 52 ft.	lbs./ft.	8 in. to 57 ft.

Open Hole from ft. to ft.

Screen YES Make HOWARD SMITH Type stainless steel

Diameter	Slot/Gauze	Length	Set Between
2	12	5	52 ft. and 57 ft.

Static Water Level
17 ft. from Land surface Date Measured 11/20/1995

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
BANDWELL PARK

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 8 to 40 ft. 1 yrds.

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

Pump ☐ Not Installed Date Installed
Manufacturer's name STA-RITE Model number __ HP 0.5 Volts 230
Length of drop Pipe _ft. Capacity 10 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

Well Contractor Certification

Sizer Water Well	04620	PINK, C.
License Business Name	Lic. Or Reg. No.	Name of Driller

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report 569841 Printed 4/3/2009
HE-01205-07

Minnesota Unique Well No.
576751

County Beltrami
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 03/06/1997
Update Date 02/04/2004
Received Date

Well Name WIEBOLT, DARWIN

Township	Range	Dir	Section	Subsections	Elevation	ft.
147	33	W	31	DAD	Elevation Method	

Well Depth	Depth Completed	Date Well Completed
55 ft.	55 ft.	06/07/1996

Drilling Method Non-specified Rotary

Well Address
LUELE DR
BEMIDJI MN 56601

Geological Material	Color	Hardness	From	To
SAND	BROWN	SOFT	0	10
SAND	GRAY	SOFT	10	45
CLAY	BROWN	MEDIUM	45	49
SAND	GRAY	SOFT	49	55

Drilling Fluid
Bentonite

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

Use Domestic

Casing Type Plastic Joint No Information Drive Shoe? ☐ Yes ☑ No Above/Below ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 51 ft.	lbs./ft.	6.75 in. to 55 ft.

Open Hole from ft. to ft.

Screen YES Make JOHNSON Type stainless steel

Diameter	Slot/Gauze	Length	Set Between
2	12	4	51 ft. and 55 ft.

Static Water Level
20 ft. from Land surface Date Measured 06/07/1996

PUMPING LEVEL (below land surface)
30 ft. after 60 hrs. pumping 20 g.p.m.

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

NO REMARKS

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Bentonite from 8 to 30 ft. 2 bags

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

Pump ☐ Not Installed Date Installed 06/14/1996
Manufacturer's name STA-RITE Model number __ HP 0.75 Volts 230
Length of drop Pipe 40 ft. Capacity 12 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

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Aqua Well Drilling	04463	SCANDIN, R.

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report 576751 Printed 4/3/2009
HE-01205-07

Minnesota Unique Well No.
585876

County Beltrami
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 09/26/1997
Update Date 10/08/2008
Received Date

Well Name OTTERTAIL REALTY

Township	Range	Dir	Section	Subsections	Elevation	ft.
147	33	W	31	ADC	Elevation Method	

Well Depth	Depth Completed	Date Well Completed
57 ft.	57 ft.	06/14/1997

Drilling Method Non-specified Rotary

Well Address
1925 ANN ST NW
BEMIDJI MN

Geological Material	Color	Hardness	From	To
NO RECORD			0	57

Drilling Fluid
Bentonite

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

Use Domestic

Casing Type Plastic Joint No Information Drive Shoe? ☐ Yes ☐ No Above/Below ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 53 ft.	lbs./ft.	8.5 in. to 30 ft.
		6.25 in. to 57 ft.

Open Hole from ft. to ft.

Screen YES Make JOHNSON Type stainless steel

Diameter	Slot/Gauze	Length	Set Between
2	12	4	53 ft. and 57 ft.

Static Water Level
18 ft. from Land surface Date Measured 06/14/1997

PUMPING LEVEL (below land surface)
20 ft. after 2 hrs. pumping 30 g.p.m.

Well Head Completion
Pitless adapter manufacturer SNAPPY Model 8PL41U
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

NO REMARKS

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 30 ft. 3 bags

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

Pump ☐ Not Installed Date Installed 06/17/1997
Manufacturer's name MEYERS Model number 2N52-12 HP 0.5 Volts 220
Length of drop Pipe 40 ft. Capacity 12 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

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Nelson Well Drilling	04121	REED, G.

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report 585876 Printed 4/3/2009
HE-01205-07

Minnesota Unique Well No.
599787

County Beltrami
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 05/10/1999
Update Date 03/11/2005
Received Date

Well Name HWMENIK, JAMES

Township	Range	Dir	Section	Subsections	Elevation	ft.
147	33	W	31		Elevation Method	

Well Depth	Depth Completed	Date Well Completed
55 ft.	55 ft.	04/17/1998

Drilling Method Non-specified Rotary

Well Address
1898 ANN ST

Drilling Fluid
Bentonite

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

Use Domestic

Casing Type Plastic Joint No Information Drive Shoe? ☐ Yes ☐ No Above/Below ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 55 ft.	lbs./ft.	

Open Hole from ft. to ft.

Screen YES Make JOHNSON Type stainless steel

Diameter	Slot/Gauze	Length	Set Between
2	12	5	50 ft. and 55 ft.

Geological Material	Color	Hardness	From	To
SAND	BROWN	SOFT	0	15
SAND	GRAY	SOFT	15	28
CLAY	GRAY	SOFT	28	47
SAND	BROWN	SOFT	47	55

Static Water Level
15 ft. from Land surface Date Measured 04/17/1998

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

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

NO REMARKS

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: from 8 to 30 ft. 2 bags

Nearest Known Source of Contamination
55 feet North West direction Tanks type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name STA RITE Model number __ HP 0.5 Volts 230
Length of drop Pipe _ ft. Capacity 10 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

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Sizer Water Well	04620	PINK, C.

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report 599787 Printed 4/3/2009
HE-01205-07

Minnesota Unique Well No.
609276

County Beltrami
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 07/01/1998
Update Date 07/24/2000
Received Date

Well Name DAHL, JOHN

Township	Range	Dir	Section	Subsections	Elevation	ft.
147	33	W	31	DCB	Elevation Method	

Well Depth	Depth Completed	Date Well Completed
60 ft.	60 ft.	04/14/1998

Drilling Method Non-specified Rotary

Well Address
BARDWELL PARK
BEMIDJI MN 56601

Geological Material	Color	Hardness	From	To
SAND	BROWN		0	25
CLAY	BRN/GRY		25	35
SAND	BROWN		35	50
SAND	GRAY		50	60

Drilling Fluid
Bentonite

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

Use Domestic

Casing Type Plastic Joint No Information Drive Shoe? ☐ Yes ☑ No Above/Below ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 55 ft.	lbs./ft.	8.8 in. to 60 ft.

Open Hole from ft. to ft.

Screen YES Make CERTAINTEED Type plastic

Diameter	Slot/Gauze	Length	Set Between
4	23	5	55 ft. and 60 ft.

Static Water Level
12 ft. from Land surface Date Measured 04/14/1998

PUMPING LEVEL (below land surface)
40 ft. after 60 hrs. pumping 30 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

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Bentonite from 0 to 30 ft.

Nearest Known Source of Contamination
50 feet 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

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
North Star Drilling	49588	FELL, B.

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report 609276 Printed 4/3/2009
HE-01205-07

Minnesota Unique Well No.
623421

County Beltrami
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 03/07/2000
Update Date 03/11/2005
Received Date

Well Name HASKELL, JAMES

Township	Range	Dir	Section	Subsections	Elevation	ft.
147	33	W	31	ADC	Elevation Method	

Well Depth	Depth Completed	Date Well Completed
64 ft.	64 ft.	04/12/1999

Drilling Method Non-specified Rotary

Well Address
1931 ANNE ST NW
BEMIDJI MN 56601

Geological Material	Color	Hardness	From	To
SNAD	BROWN	MEDIUM	0	15
SAND/GRAVEL	BROWN	MEDIUM	15	30
CLAY	GRAY	MEDIUM	30	35
CLAYFINE SAND	BROWN	MEDIUM	35	45
CLAY/SANDY	GRAY	MEDIUM	45	55
SAND	GRAY	MEDIUM	55	64

Drilling Fluid
Bentonite

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

Use Domestic

Casing Type Plastic Joint No Information Drive Shoe? ☐ Yes ☑ No Above/Below ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 60 ft.	lbs./ft.	6.75 in. to 64 ft.

Open Hole from ft. to ft.

Screen YES Make WESCO Type stainless steel

Diameter	Slot/Gauze	Length	Set Between
4	12	4	60 ft. and 64 ft.

Static Water Level
14 ft. from Land surface Date Measured 04/12/1999

PUMPING LEVEL (below land surface)
20 ft. after 1 hrs. pumping 30 g.p.m.

Well Head Completion
Pitless adapter manufacturer MERRILL Model MCK4100
☐ Casing Protection ☑ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

NO REMARKS

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Bentonite from 8 to 30 ft. 2 bags

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

Pump ☐ Not Installed Date Installed 04/29/1999
Manufacturer's name GOULD Model number 10SB05 HP 0.5 Volts 230
Length of drop Pipe 30 ft. Capacity 10 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

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Aqua Well Drilling	04463	EVANS, T.

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report 623421 Printed 4/3/2009
HE-01205-07

Minnesota Unique Well No.
710183

County Beltrami
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date
Update Date 05/03/2006
Received Date 12/22/2004

Well Name
Township 147 | Range 33 | Dir W | Section 31 | Subsections DAD | Elevation | ft. | Elevation Method

Well Depth: 84 ft. | Depth Completed: 84 ft. | Date Well Completed: 06/17/2004

Drilling Method Non-specified Rotary

Well Address
BARDWELL CT
BEMIDJI MN 56601

Drilling Fluid: Bentonite

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

Use Domestic

Casing Type Plastic Joint No Information Drive Shoe? ☐ Yes ☑ No Above/Below ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 80 ft.	lbs./ft.	6.75 in. to 84 ft.

Open Hole from ft. to ft.

Screen YES Make JOHNSON Type stainless steel

Diameter	Slot/Gauze	Length	Set Between
2	10	4	80 ft. and 84 ft.

Geological Material	Color	Hardness	From	To
SAND	BROWN	SOFT	0	22
FINE SAND	GRAY	SOFT	22	45
SAND	BROWN	SOFT	45	84

Static Water Level
15 ft. from Land surface Date Measured 06/17/2004

PUMPING LEVEL (below land surface)
30 ft. after 1 hrs. pumping 35 g.p.m.

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

REMARKS
WELL LOCATION: LOT 17 BLOCK 1 BARDWELL CT. BEMIDJI

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: High solids bentonite from to 30 ft. 2 bags

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

Pump ☐ Not Installed Date Installed 06/23/2004
Manufacturer's name RED JACKET Model number 50F211 HP 0.5 Volts 230
Length of drop Pipe 40 ft. Capacity 12 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
Last Strat
Aquifer
Depth to Bedrock ft.

Well Contractor Certification

Aqua Well Drilling	04463	CESOLINI, C.
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report | 710183 | Printed 4/3/2009
HE-01205-07

Minnesota Unique Well No.
721170

County Beltrami
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date
Update Date 08/02/2006
Received Date 01/12/2006

Well Name COOP. DEVELOPMENT

Township	Range	Dir	Section	Subsections	Elevation	ft.
147	33	W	31	ACB	Elevation Method	

Well Depth	Depth Completed	Date Well Completed
72 ft.	72 ft.	04/18/2005

Drilling Method Non-specified Rotary

Well Address
2419 BORING CT NW
BEMIDJI MN 56601

Geological Material	Color	Hardness	From	To
SAND	BROWN	MEDIUM	0	28
CLAY	BLUE	MEDIUM	28	56
SAND	BROWN	HARD	56	72

Drilling Fluid
Bentonite

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

Use Domestic

Casing Type Plastic Joint No Information Drive Shoe? ☐ Yes ☑ No Above/Below ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 60 ft.	lbs./ft.	8.5 in. to 30 ft.
		6.25 in. to 72 ft.

Open Hole from ft. to ft.

Screen YES Make JOHNSON Type stainless steel

Diameter	Slot/Gauze	Length	Set Between
4	10	12	60 ft. and 72 ft.

Static Water Level
15 ft. from Land surface Date Measured 04/18/2005

PUMPING LEVEL (below land surface)
20 ft. after 2 hrs. pumping 100 g.p.m.

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

NO REMARKS

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Bentonite from to 30 ft. 3 bags

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

Pump ☐ Not Installed Date Installed 04/21/2005
Manufacturer's name GOULD Model number 556530 HP 3 Volts 230
Length of drop Pipe 40 ft. Capacity 70 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

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Nelson Well Drilling	04121	REED, J.

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report 721170 Printed 4/3/2009
HE-01205-07

Appendix C

Burnsville ABLE Training Center Groundwater Receptor Survey Documents



LEGEND:

Inferred Groundwater Flow Direction

North

FIGURE
RECEPTOR SURVEY
ABLE FIRE TRAINING CENTER
BURNSVILLE, MINNESOTA

PROJECT NO.	PREPARED BY	DRAWN BY
45618DEL04	NR	DD
DATE	REVIEWED BY	FILE NAME
06/30/11		Burnsville-1

anteagroup

In Person Interview 8-17-10

Receptor Survey Questionnaire

PROPERTY ADDRESS: 12205 River Ridge Blvd - Northern Tool & Equip

1. Is there, or has there ever been, a water well on the property? **Yes** (**No**) **Unknown**

If you answered **No or Unknown**, proceed to Question 2. No evidence of any

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

_____ACTIVE _____ABANDONED _____SEALED

1b. How deep is (was) the well? _____FEET (if depth is unknown check here _____)

1c. In what year was the well installed (if known)? _____

1d. If the well was abandoned, what year was the well sealed?_____

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.)_____

_____

1f. Where on the property is (was) the well located?_____

_____

_____

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

Yes **No**

Name_____

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

2. Is a public water supply currently utilized by the property? (**Yes**) **No**

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

Name Store Manager

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please feel free to contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or Nile Fellows, MPCA, at 651-757-2352.

Receptor Survey Questionnaire

PROPERTY ADDRESS: John Adamich => Lodge of Bemidji
12101 Hwy 35 SW

1. Is there, or has there ever been, a water well on the property? **Yes** (**No**) **Unknown**

If you answered **No or Unknown**, proceed to Question 2.

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

_____ACTIVE _____ABANDONED _____SEALED

1b. How deep is (was) the well? _____FEET (if depth is unknown check here _____)

1c. In what year was the well installed (if known)? _____

1d. If the well was abandoned, what year was the well sealed?_____

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.)_____

_____

1f. Where on the property is (was) the well located?_____

_____

_____

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

Yes **No**

Name_____

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

2. Is a public water supply currently utilized by the property? (**Yes**) **No**

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

Name John Adamich => Lodge of Bemidji

Telephone Number 612/237-8021 (cell) DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please feel free to contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or Nile Fellows, MPCA, at 651-757-2352.

Receptor Survey Questionnaire

PROPERTY ADDRESS: 12101 Hwy 35 W SOUTH BURNSVILLE

1. Is there, or has there ever been, a water well on the property? **Yes** (No) **Unknown**

If you answered **No or Unknown**, proceed to Question 2.

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

_____ACTIVE _____ABANDONED _____SEALED

1b. How deep is (was) the well? _____FEET (if depth is unknown check here _____)

1c. In what year was the well installed (if known)? _____

1d. If the well was abandoned, what year was the well sealed?_____

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.)_____

_____

1f. Where on the property is (was) the well located?_____

_____

_____

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

Yes **No**

Name JOHN HAMICH

Telephone Number CELL 612-237-8001 DAY or EVENING (please circle one and state best time to reach you)

2. Is a public water supply currently utilized by the property? (Yes) **No**

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

Name JOHN HAMICH

Telephone Number CELL 612-237-8001 DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please feel free to contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or Nile Fellows, MPCA, at 651-757-2352.

– In Person Interview 8-17-10

Receptor Survey Questionnaire

PROPERTY ADDRESS: 600 12th St. W. – Walser Suburu

1. Is there, or has there ever been, a water well on the property? **Yes** **No** **Unknown**

Not aware of

If you answered **No or Unknown**, proceed to Question 2.

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

_____ACTIVE _____ABANDONED _____SEALED

1b. How deep is (was) the well? _____FEET (if depth is unknown check here _____)

1c. In what year was the well installed (if known)? _____

1d. If the well was abandoned, what year was the well sealed?_____

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.)_____

_____

1f. Where on the property is (was) the well located?_____

_____

_____

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

Yes **No**

Name_____

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

2. Is a public water supply currently utilized by the property? **Yes** **No**

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

Name_____

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please feel free to contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or Nile Fellows, MPCA, at 651-757-2352.

In Person Interview 8-17-10

Receptor Survey Questionnaire

PROPERTY ADDRESS: 12001 Hwy 35 - All State Self Storage

1. Is there, or has there ever been, a water well on the property? **Yes** (**No**) **Unknown**

If you answered **No or Unknown**, proceed to Question 2.

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

_____ACTIVE _____ABANDONED _____SEALED

1b. How deep is (was) the well? _____FEET (if depth is unknown check here _____)

1c. In what year was the well installed (if known)? _____

1d. If the well was abandoned, what year was the well sealed?_____

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.)_____

_____

1f. Where on the property is (was) the well located?_____

_____

_____

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

Yes **No**

Name_____

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

2. Is a public water supply currently utilized by the property? (**Yes**) **No**

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

Name Owner/Manager

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please feel free to contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or Nile Fellows, MPCA, at 651-757-2352.

Receptor Survey Questionnaire

PROPERTY ADDRESS: 11737 HWY 35W CHAKO GOLF

1. Is there, or has there ever been, a water well on the property? **Yes** **No** **Unknown**

If you answered **No or Unknown**, proceed to Question 2.

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

_____ACTIVE _____ABANDONED _____SEALED

1b. How deep is (was) the well? _____FEET (if depth is unknown check here _____)

1c. In what year was the well installed (if known)? _____

1d. If the well was abandoned, what year was the well sealed?_____

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.)_____

_____

1f. Where on the property is (was) the well located?_____

_____

_____

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

Yes **No**

Name MICHAEL McGOWAN

Telephone Number (952) 890-1081 DAY or EVENING (please circle one and state best time to reach you)

2. Is a public water supply currently utilized by the property? **Yes** **No**

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

Name ABOVE

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please feel free to contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or Nile Fellows, MPCA, at 651-757-2352.

11-3-10 No water supply wells, just monitoring wells.

PLEASE CONTACT CAMPBELL FIRST CO MPCA

In Person Interview - 8-17-10

Receptor Survey Questionnaire

PROPERTY ADDRESS: Bury & Carlson - 201 12 1st St. NW

1. Is there, or has there ever been, a water well on the property? **Yes** (**No**) **Unknown**

If you answered **No or Unknown**, proceed to Question 2.

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

_____ACTIVE _____ABANDONED _____SEALED

1b. How deep is (was) the well? _____FEET (if depth is unknown check here _____)

1c. In what year was the well installed (if known)? _____

1d. If the well was abandoned, what year was the well sealed?_____

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.)_____

_____

1f. Where on the property is (was) the well located?_____

_____

_____

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

Yes **No**

Name_____

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

2. Is a public water supply currently utilized by the property? (**Yes**) **No**

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

Name_____

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please feel free to contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or Nile Fellows, MPCA, at 651-757-2352.

Receptor Survey Questionnaire

PROPERTY ADDRESS: Rivers Edge Business Center, 25 W. Cliff Road, Burnsville

1. Is there, or has there ever been, a water well on the property? **Yes** (No) **Unknown**

If you answered **No or Unknown**, proceed to Question 2.

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

_____ACTIVE _____ABANDONED _____SEALED

1b. How deep is (was) the well? _____FEET (if depth is unknown check here _____)

1c. In what year was the well installed (if known)? _____

1d. If the well was abandoned, what year was the well sealed?_____

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.)_____

_____

1f. Where on the property is (was) the well located?_____

_____

_____

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

Yes **No**

Name_____

Telephone Number_____ DAY or EVENING (please circle one and state best time to reach you)

2. Is a public water supply currently utilized by the property? (Yes) **No**

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

Name MICHAEL VALENTINE, MANAGING PARTNER

Telephone Number 612-850-4374 DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please feel free to contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or Nile Fellows, MPCA, at 651-757-2352.

Receptor Survey Questionnaire

PROPERTY ADDRESS: 12259 (12250-12268) Nicollet Avenue, Burnsville

1. Is there, or has there ever been, a water well on the property? **Yes** **No** **Unknown**

If you answered **No or Unknown**, proceed to Question 2.

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

_____ACTIVE _____ABANDONED _____SEALED

1b. How deep is (was) the well? _____FEET (if depth is unknown check here _____)

1c. In what year was the well installed (if known)? _____

1d. If the well was abandoned, what year was the well sealed?_____

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.)_____

_____

1f. Where on the property is (was) the well located?_____

_____

_____

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

Yes **No**

Name_____

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

2. Is a public water supply currently utilized by the property? **Yes** **No**

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

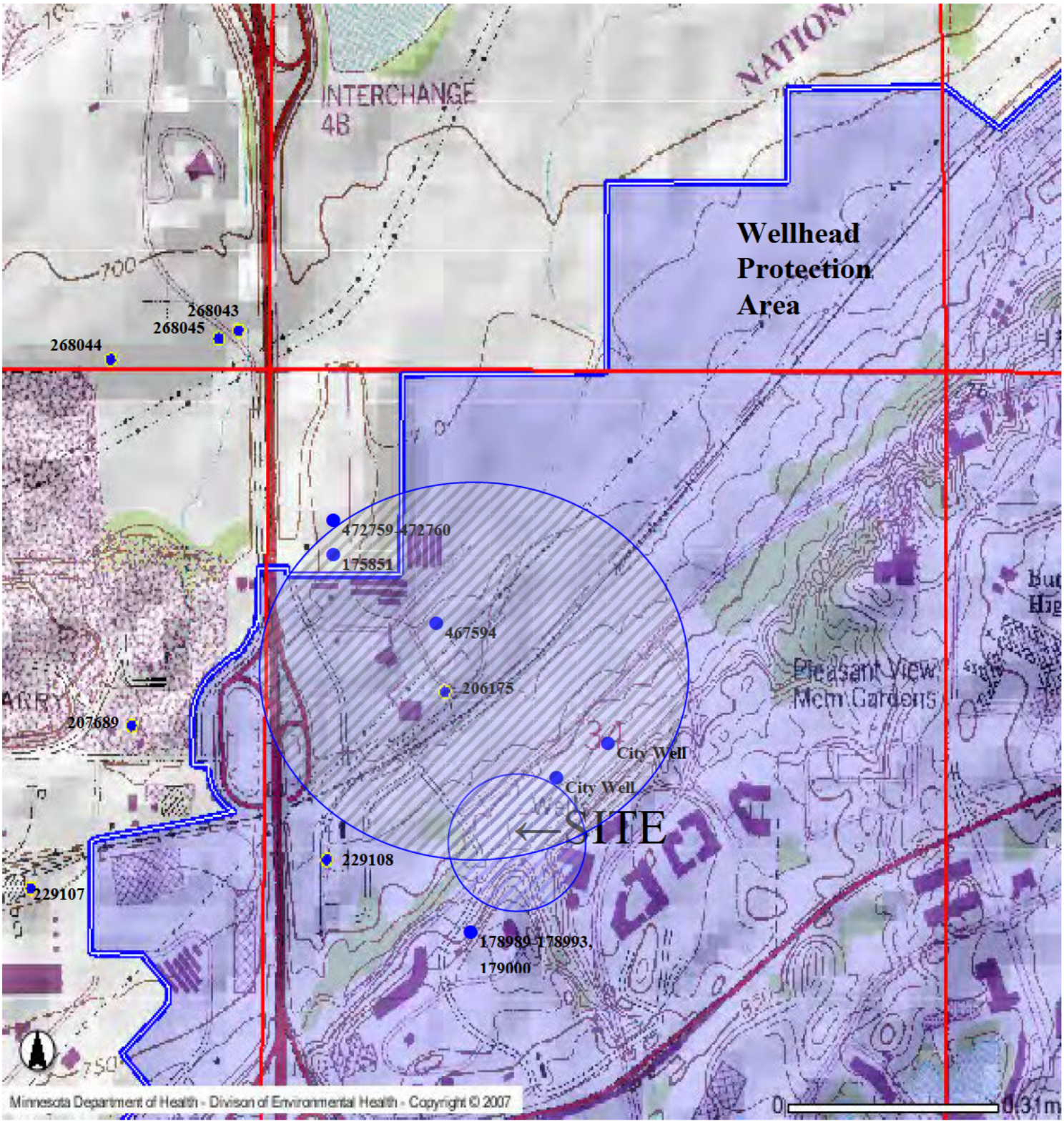
Name Nick Kau - Wellington Mgmt.

Telephone Number 651-999-5537 DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please feel free to contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or Nile Fellows, MPCA, at 651-757-2352.

BURNSVILLE CWI Well Map



Approximate Area of Receptor Survey

Minnesota Unique Well No.
175851

County Dakota
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 06/22/2001
Update Date
Received Date

Well Name BURNSVILLE TW

Township	Range	Dir	Section	Subsections	Elevation	ft.
27	24	W	34	BCD	Elevation Method	

Well Depth	Depth Completed	Date Well Completed
100 ft.	100 ft.	04/16/1980

Drilling Method Non-specified Rotary

Drilling Fluid --

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

Use Test well

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

Casing Diameter	Weight	Hole Diameter
6 in. to 60 ft.	20 lbs./ft.	

Open Hole from 60 ft. to 160 ft.

Screen NO Make Type

Diameter	Slot/Gauze	Length	Set Between

Geological Material	Color	Hardness	From	To
DRIFT			0	17
SHAKOPEE	YELLOW	HARD	17	100

Static Water Level
5 ft. from Land surface Date Measured 04/16/1980

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)

NO REMARKS

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 60 ft. 2.5 yrds.

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

Pump ☐ Not Installed Date Installed 05/16/1980
Manufacturer's name DEMPSTER Model number 15C2-59-S1 HP 0.5 Volts 115
Length of drop Pipe 54 ft. Capacity 20 g.p.m Type Submersible Material Galvanized

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

Stevens Well Co.	27194	KADERLIK, C.
License Business Name	Lic. Or Reg. No.	Name of Driller

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report 175851 Printed 4/2/2009
HE-01205-07

Minnesota Unique Well No.
178989

County Dakota
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 06/22/2001
Update Date
Received Date

Well Name BURNSVILLE MW

Township	Range	Dir	Section	Subsections	Elevation	ft.
27	24	W	34		Elevation Method	

Well Depth	Depth Completed	Date Well Completed
110 ft.	110 ft.	06/00/1981

Drilling Method Non-specified Rotary

Well Address
12111 RIVER RIDGE
BURNSVILLE MN

Geological Material	Color	Hardness	From	To
DRIFT	BLACK	SOFT	0	11
LIMEROCK	YELLOW	HARD	11	65
SANDSTONE	YELLOW	SOFT	65	68
LIMEROCK	YEL/GRY	HARD	68	110

Drilling Fluid
--

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

Use Monitor well

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

Casing Diameter	Weight	Hole Diameter
12 in. to 11 ft.	49 lbs./ft.	18.5 in. to 11 ft.
6 in. to 70 ft.	19 lbs./ft.	12 in. to 70 ft.

Open Hole from 70 ft. to 110 ft.

Screen NO Make Type

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
ft. from Date Measured

PUMPING LEVEL (below land surface)
ft. after hrs. pumping 200 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

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 70 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

Stevens Well Co.	27194	KADERLIK, C.
License Business Name	Lic. Or Reg. No.	Name of Driller

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report 178989 Printed 4/2/2009
HE-01205-07

Minnesota Unique Well No.
178990

County Dakota
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 06/22/2001
Update Date 06/22/2001
Received Date

Well Name BURNSVILLE MW

Township	Range	Dir	Section	Subsections	Elevation	ft.
27	24	W	34		Elevation Method	

Well Depth	Depth Completed	Date Well Completed
110 ft.	110 ft.	06/00/1981

Drilling Method Non-specified Rotary

Well Address
12111 RIVERRIDGE BL
BURNSVILLE MN

Geological Material	Color	Hardness	From	To
DRIFT	BLACK	SOFT	0	11
LIMEROCK	YELLOW	HARD	11	65
SANDSTONE	YELLOW	SOFT	65	68
LIMEROCK	YEL/GRY	HARD	68	94
SANDSTONE	YELLOW	SOFT	94	100
LIMEROCK	YELLOW	M.HARD	100	110

Drilling Fluid
--

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

Use Test well

Casing Type Steel (black or low carbon) Joint No Information Drive Shoe? ☐ Yes ☑ No Above/Below 110 ft.

Casing Diameter	Weight	Hole Diameter
12 in. to 11 ft.	49 lbs./ft.	18.5 in. to 11 ft.
6 in. to 70 ft.	19 lbs./ft.	12 in. to 70 ft.

Open Hole from 70 ft. to 110 ft.

Screen NO Make Type

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
ft. from Date Measured

PUMPING LEVEL (below land surface)
ft. after hrs. pumping 200 g.p.m.

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

REMARKS
MONITORING WELL SHAKOPEE.

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 70 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

Stevens Well Co.	27194	KADERLIK, C.
License Business Name	Lic. Or Reg. No.	Name of Driller

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report

178990

Printed 4/2/2009
HE-01205-07

Minnesota Unique Well No.
178991

County Dakota
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 06/22/2001
Update Date
Received Date

Well Name BURNSVILLE MW

Township	Range	Dir	Section	Subsections	Elevation	ft.
27	24	W	34		Elevation Method	

Well Depth	Depth Completed	Date Well Completed
110 ft.	110 ft.	06/00/1981

Drilling Method Non-specified Rotary

Well Address
12111 RIVER RIDGE BL

Drilling Fluid
--

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

Use Monitor well

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

Geological Material	Color	Hardness	From	To
DRIFT	BLACK	SOFT	0	12
LIMEROCK	YELLOW	HARD	12	94
SANDSTONE	YELLOW	SOFT	94	99
LIMEROCK	YELLOW	M.HARD	99	110

Casing Diameter	Weight	Hole Diameter
12 in. to 12 ft.	49 lbs./ft.	18.5 in. to 12 ft.
6 in. to 70 ft.	19 lbs./ft.	12 in. to 70 ft.

Open Hole from 70 ft. to 110 ft.

Screen NO Make Type

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
ft. from Date Measured

PUMPING LEVEL (below land surface)
ft. after hrs. pumping 200 g.p.m.

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

REMARKS
IN THE PUMP SECTION LOCK BOXES & RECORDERS WERE USED.

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 _ 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

Stevens Well Co.	27194	KADERLIK, C.
License Business Name	Lic. Or Reg. No.	Name of Driller

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report 178991 Printed 4/2/2009
HE-01205-07

Minnesota Unique Well No.
178992

County Dakota
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 06/22/2001
Update Date 06/22/2001
Received Date

Well Name BURNSVILLE MW

Township	Range	Dir	Section	Subsections	Elevation	ft.
27	24	W	34		Elevation Method	

Well Depth	Depth Completed	Date Well Completed
220 ft.	220 ft.	06/00/1981

Drilling Method Non-specified Rotary

Well Address
12111 RIVER RIDGE BL
MN

Geological Material	Color	Hardness	From	To
CLAY	BLACK	SOFT	0	21
COARSE GRAVEL	GRAY	SOFT	21	35
LIMESTONE	YELLOW	M.HARD	35	38
LIMEROCK CAVERN	YELLOW	SOFT	38	39
LIMEROCK	YELLOW	M.HARD	39	45
LIMEROCK CAVERN	YELLOW	SOFT	45	48
LIMEROCK	YELLOW	HARD	48	65
SANDSTONE	YELLOW	SOFT	65	68
LIMEROCK	YELLOW	SOFT	68	96
SANDSTONE W/LIMEROCK LENS	YELLOW	SOFT	96	104
LIMEROCK	YELLOW	M.HARD	104	125
LIMEROCK	GRAY	HARD	125	155
SANDROCK ONEOTA	DK. GRY	HARD	160	160
SANDSTONE/ JORDAN	DK. GRY	M.HARD	160	220

Drilling Fluid
--

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

Use Monitor well

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

Casing Diameter	Weight	Hole Diameter
12 in. to 35 ft.	lbs./ft.	18.5 in. to 35 ft.
6 in. to 185 ft.	lbs./ft.	12 in. to 183 ft.

Open Hole from ft. to ft.

Screen NO Make Type

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
ft. from 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
JORDAN EVERY 8-10 FEET HAD HARD LENSES.

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 _ 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

Stevens Well Co.	27194	KADERLIK, C.
License Business Name	Lic. Or Reg. No.	Name of Driller

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report

178992

Printed 4/2/2009
HE-01205-07

Minnesota Unique Well No.
178993

County Dakota
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 06/22/2001
Update Date
Received Date

Well Name BURNSVILLE MW

Township	Range	Dir	Section	Subsections	Elevation	ft.
27	24	W	34		Elevation Method	

Well Depth	Depth Completed	Date Well Completed
220 ft.	220 ft.	06/00/1981

Drilling Method Non-specified Rotary

Well Address
12111 RIVER RIDGE BL

Drilling Fluid
--

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

Use Monitor well

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

Casing Diameter	Weight	Hole Diameter
12 in. to 11 ft.	49 lbs./ft.	18.5 in. to 11 ft.
6 in. to 183 ft.	19 lbs./ft.	12 in. to 183 ft.

Open Hole from 183 ft. to 220 ft.

Screen NO Make Type

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
ft. from Date Measured

PUMPING LEVEL (below land surface)
ft. after hrs. pumping 200 g.p.m.

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

Geological Material	Color	Hardness	From	To
DRIFT	BLACK	SOFT	0	11
LIMEROCK	YELLOW	HARD	11	94
SANDSTONE	YELLOW	SOFT	94	100
LIMEROCK	YELLOW	HARD	100	163
SANDSTONE	WHT/GRY	M.HARD	163	220

REMARKS
LOCK BOXES & RECORDERS

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 _ 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

Stevens Well Co.	27194	KADERLIK, C.
License Business Name	Lic. Or Reg. No.	Name of Driller

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report

178993

Printed 4/2/2009
HE-01205-07

Minnesota Unique Well No.
179000

County Dakota
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 06/22/2001
Update Date
Received Date

Well Name BURNSVILLE MW

Township	Range	Dir	Section	Subsections	Elevation	ft.
27	24	W	34		Elevation Method	

Well Depth	Depth Completed	Date Well Completed
220 ft.	220 ft.	06/00/1981

Drilling Method Non-specified Rotary

Well Address
121111 RIVER RIDGE BL
BURNSVILLE MN

Geological Material	Color	Hardness	From	To
DRIFT	BLACK	SOFT	0	11
LIMEROCK	YELLOW	HARD	11	66
SANDSTONE	YELLOW	SOFT	66	69
LIMEROCK	YELLOW	HARD	69	159
SANDROCK	DK. GRY	HARD	159	165
SANDSTONE	WHT/GRY	SOFT	165	220

Drilling Fluid
--

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

Use Monitor well

Casing Type Steel (black or low carbon) Joint Welded Drive Shoe? ☐ Yes ☑ No Above/Below 2.5 ft.

Casing Diameter	Weight	Hole Diameter
12 in. to 11 ft.	49 lbs./ft.	18.5 in. to 11 ft.
6 in. to 183 ft.	19 lbs./ft.	12 in. to 183 ft.

Open Hole from 183 ft. to 220 ft.

Screen NO Make Type

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
ft. from Date Measured

PUMPING LEVEL (below land surface)
ft. after hrs. pumping 200 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

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 0 to 183 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

Stevens Well Co.	27194	KADERLIK, C.
License Business Name	Lic. Or Reg. No.	Name of Driller

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report

179000

Printed 4/2/2009
HE-01205-07

Minnesota Unique Well No.
206175

County Dakota
Quad Bloomington
Quad ID 104D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 10/19/1990
Update Date 06/22/2001
Received Date

Well Name BURNSVILLE
Township Range Dir Section Subsections Elevation 725 ft.
27 24 W 34 BDC Elevation Method 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
220 ft.	220 ft.	12/20/1963

Drilling Method --

Drilling Fluid --

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

Use Abandoned Status Inactive

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

Casing Diameter	Weight	Hole Diameter
6 in. to 180 ft.	lbs./ft.	
6 in. to 180 ft.	lbs./ft.	

Open Hole from ft. to ft.

Screen NO Make Type

Diameter	Slot/Gauze	Length	Set Between

Well Address
12111 RIVER RIDGE BL
BURNSVILLE MN

Geological Material	Color	Hardness	From	To
FILL			0	12
SHAKOPEE-ONEOTA DOLOMITE			12	168
JORDAN SANDSTONE			168	220

Static Water Level
ft. from Date Measured

PUMPING LEVEL (below land surface)
0 ft. after hrs. pumping 200 g.p.m.

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

REMARKS
ABANDONED OPEN HOLE ARTESIAN FLOW OPEN HOLE
CASING: 010 TO 0012;006 TO 0180.

Grouting Information Well Grouted? ☐ Yes ☐ No

Located United States Geological Survey
Method Digitized - scale 1:24,000 or larger (Digitizing Table)
Unique Number Verification N/A
Date N/A
System UTM - Nad83, Zone15, Meters
X: 477578 Y: 4959030

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

First Bedrock Prairie Du Chien Group
Last Strat Jordan
Aquifer Jordan
Depth to Bedrock 12 ft.

County Well Index Online Report

206175

Printed 6/26/2008
HE-01205-07

Minnesota Unique Well No.
229108

County Dakota
Quad Bloomington
Quad ID 104D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 05/20/1991
Update Date 03/08/2007
Received Date

Well Name NORTHWESTERN STATES CEMENT CO.
Township Range Dir Section Subsections Elevation 743 ft.
27 24 W 34 CBCABA Elevation Method 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
270 ft.	270 ft.	10/04/1963

Drilling Method --

Drilling Fluid --

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

Use Industrial

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

Casing Diameter	Weight	Hole Diameter
20 in. to 29 ft.	lbs./ft.	
12 in. to 194 ft.	lbs./ft.	

Open Hole from 194 ft. to 270 ft.

Screen NO Make Type

Diameter	Slot/Gauze	Length	Set Between

Well Address

BURNSVILLE MN

Geological Material	Color	Hardness	From	To
GLACIAL DRIFT			0	27
SHAKOPEE-ONEOTA DOLOMITE			27	179
JORDAN SANDSTONE			179	270

Static Water Level
-1 ft. from Land surface Date Measured 10/04/1963

PUMPING LEVEL (below land surface)
14 ft. after hrs. pumping 360 g.p.m.

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

REMARKS
WELL FLOWS DON'T KNOW HOW HIGH ABOVE GROUND LEVEL.
LINER PIPE GROUTED WITH PURE CEMENT.

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from to ft.

Located Minnesota Geological Survey Method Digitization (Screen) - Map (1:24,000)
Unique Number Verification Information from owner Date 08/30/2004
System UTM - Nad83, Zone15, Meters X: 477296 Y: 4958679

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

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

First Bedrock Prairie Du Chien Group
Last Strat Jordan
Aquifer Jordan
Depth to Bedrock 27 ft.

County Well Index Online Report

229108

Printed 6/26/2008
HE-01205-07

Minnesota Unique Well No.
467594

County Dakota
Quad Bloomington
Quad ID 104D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 12/04/1992
Update Date 10/01/2008
Received Date

Well Name MW-1
Township 27 | Range 24 | Dir W | Section 34 | Subsections BBA | Elevation | ft.
Elevation Method

Well Depth: 22 ft. | Depth Completed: 22 ft. | Date Well Completed: 10/09/1990
Drilling Method Power Auger

Well Address
121ST ST & PLEASANT LM
BURNSVILLE MN

Geological Material	Color	Hardness	From	To
SAND FILL	BROWN	MEDIUM	0	3
SWAMP DEPOSIT	BLACK	SOFT	3	13
SANDY SILTY CLAY	BROWN	SOFT	13	18
COARSE SAND	BROWN	MEDIUM	18	22

Drilling Fluid: --
Well Hydrofractured? ☐ Yes ☐ No
From Ft. to Ft.

Use Monitor well

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

Casing Diameter	Weight	Hole Diameter
2 in. to 16.5 ft.	lbs./ft.	8.25 in. to 21.5 ft.

Open Hole from ft. to ft.

Screen YES Make JOHNSON Type stainless steel

Diameter	Slot/Gauze	Length	Set Between
2	10	5	16.3 ft. and 21.3 ft.

Static Water Level
19 ft. from Land surface Date Measured 10/09/1990

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
121ST ST. & PLEASANT AVE., BURNSVILLE
BURNSVILLE IND. PARK 3RD ADDITION, BLOCK 3, LOT 1
DAKOTA COUNTY PERMIT #90-6095; MW 1

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from 2 to 14 ft. 0.05 yrds.
Grout Material: CONCRETE from to 2 ft.

Nearest Known Source of Contamination
1500 feet North West direction Landfill 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

American Eng Testing	M0024	ROMAN B.
License Business Name	Lic. Or Reg. No.	Name of Driller

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report | 467594 | Printed 4/2/2009
HE-01205-07

Minnesota Unique Well No.
472759

County Dakota
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 103I

Entry Date 09/29/2008
Update Date 09/29/2008
Received Date

Well Name MW-1

Township	Range	Dir	Section	Subsections	Elevation	ft.
27	24	W	34	BB	Elevation Method	

Well Depth	Depth Completed	Date Well Completed
22 ft.	21 ft.	09/18/1990

Drilling Method Power Auger

Well Address

BURNSVILLE MN

Geological Material	Color	Hardness	From	To
FILL, MIX OF SILT OR FLY ASH & PEA			0	1
PEAT	BLACK		1	3
ORG CLAY W/ FEW SHELLS, ROOTS PEAT	GRAY	SOFT	3	8
SANDY LEAN CLAY SOME GRAVEL	BROWN	SOFT	8	9
LEAN CLAY W/ SAND	BROWN	SOFT	9	17
SANDY LEAN CLAY W/ SOME GRAVEL STI	GRY/BRN		17	22

Drilling Fluid
--

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

Use Monitor well

Casing Type Steel (black or low carbon) Joint Threaded Drive Shoe? ☐ Yes ☑ No Above/Below 2.7 ft.

Casing Diameter	Weight	Hole Diameter
2 in. to 10.5 ft.	lbs./ft.	8 in. to 20.5 ft.

Open Hole from ft. to ft.

Screen YES Make WESCO Type stainless steel

Diameter	Slot/Gauze	Length	Set Between
2	10		10.5 ft. and 20.5 ft.

Static Water Level
14.1 ft. from Land surface Date Measured 09/18/1990

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
LOCATION: MAP ATTACHED TO WELL LOG

Grouting Information Well Grouted? ☑ Yes ☐ No

Grout Material: Neat Cement from to 5.5 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

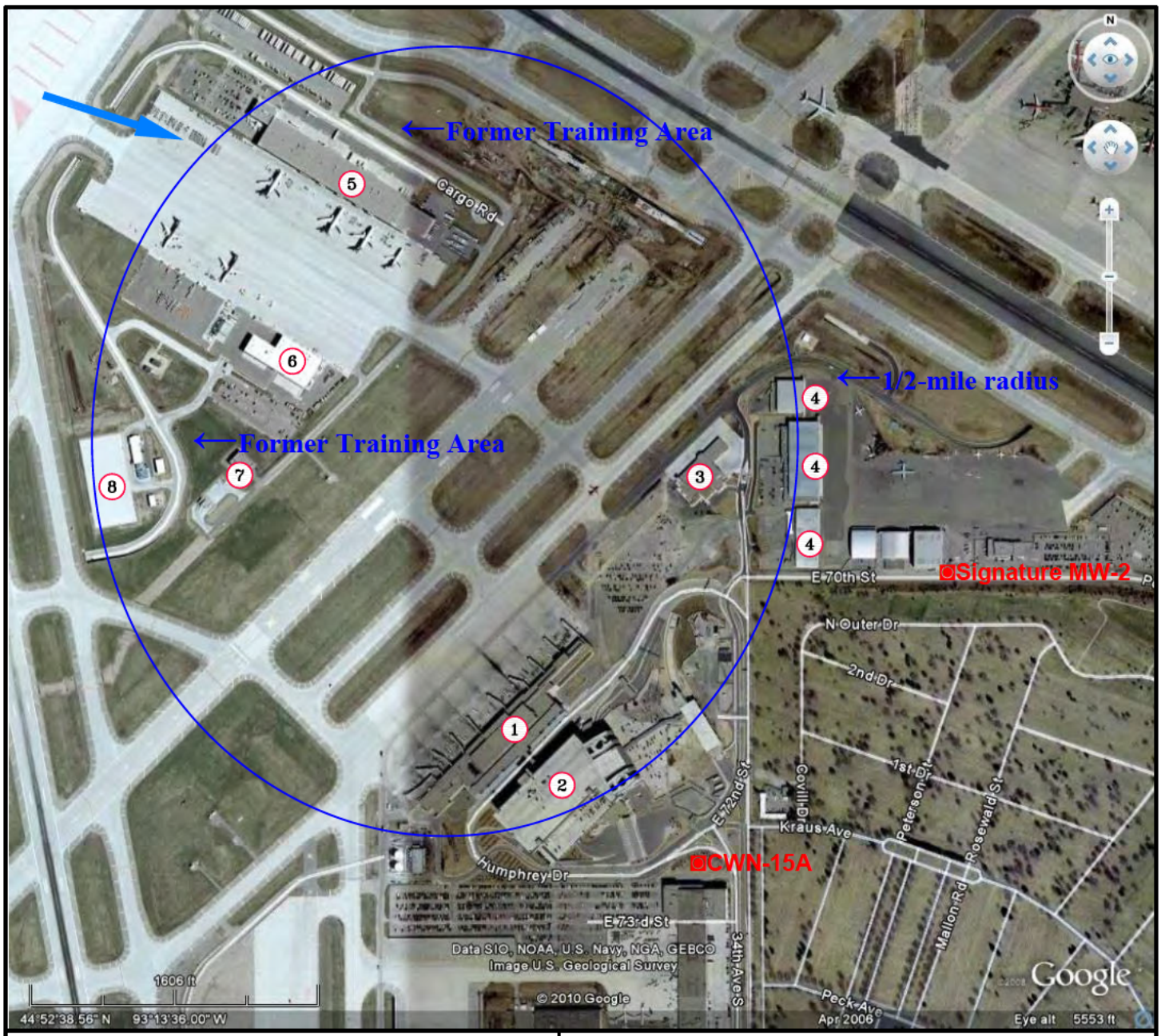
Gislason, John	M0070	BRABENDER, K.
License Business Name	Lic. Or Reg. No.	Name of Driller

First Bedrock
Last Strat
Aquifer
Depth to Bedrock ft.

County Well Index Online Report 472759 Printed 4/2/2009
HE-01205-07

Appendix D

MSP Airport Groundwater Receptor Survey Documents



LEGEND:

- Monitoring Well
- Inferred Groundwater Flow Direction

Property Occupant

1. Humphrey Terminal
2. Humphrey Terminal Parking Ramp
3. MSP Fire Station No. 1
4. Hangers 4–8
5. FedEx
6. UPS
7. South airfield lighting electrical center
8. Glycol Management Facility

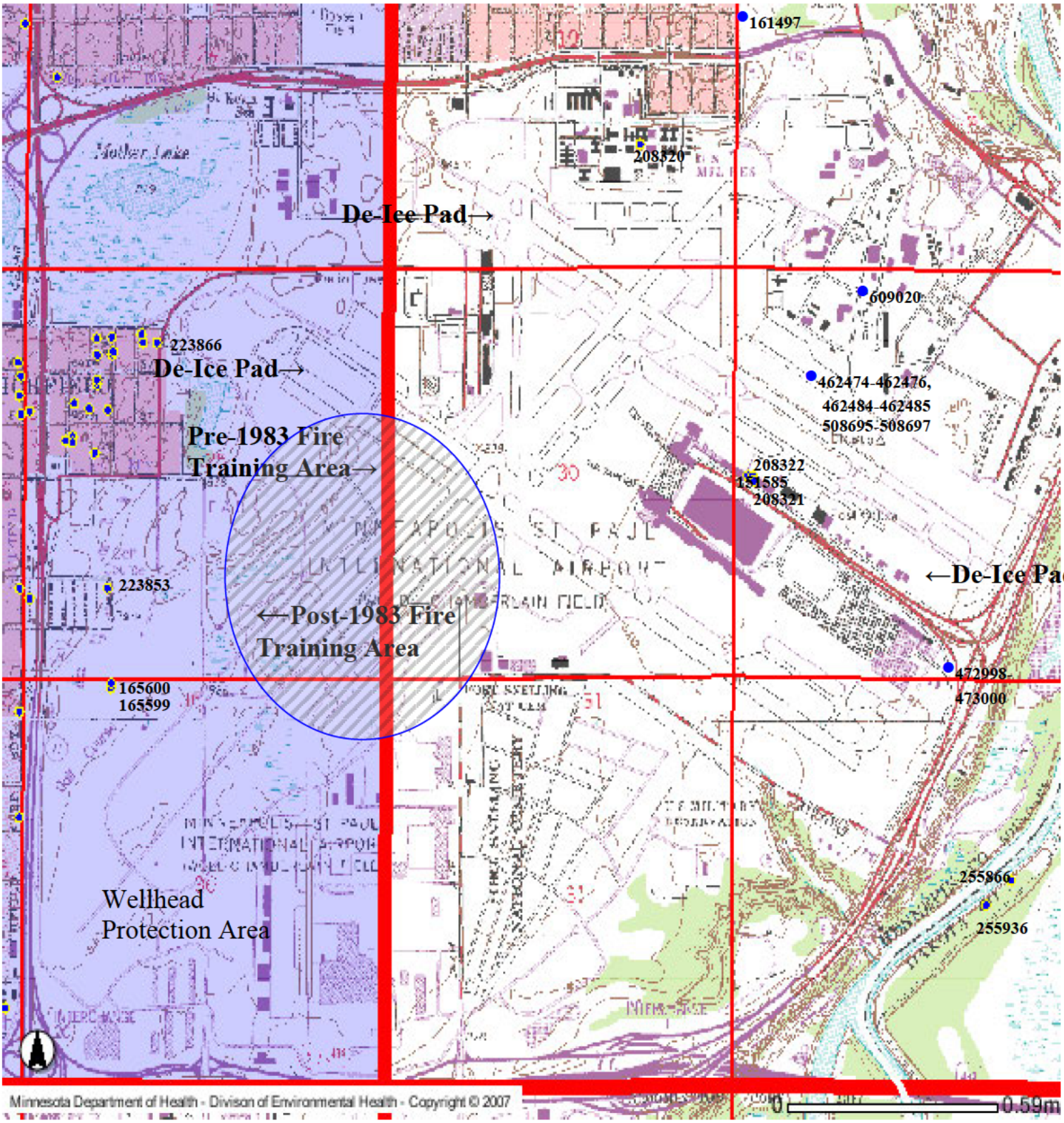
North

FIGURE
RECEPTOR SURVEY
FORMER FIRE TRAINING AREAS
MSP AIRPORT
MINNEAPOLIS, MINNESOTA

PROJECT NO.	PREPARED BY	DRAWN BY
45618DEL04	NR	DD
DATE	REVIEWED BY	FILE NAME
06/30/11		MSP Airport–1

anteagroup

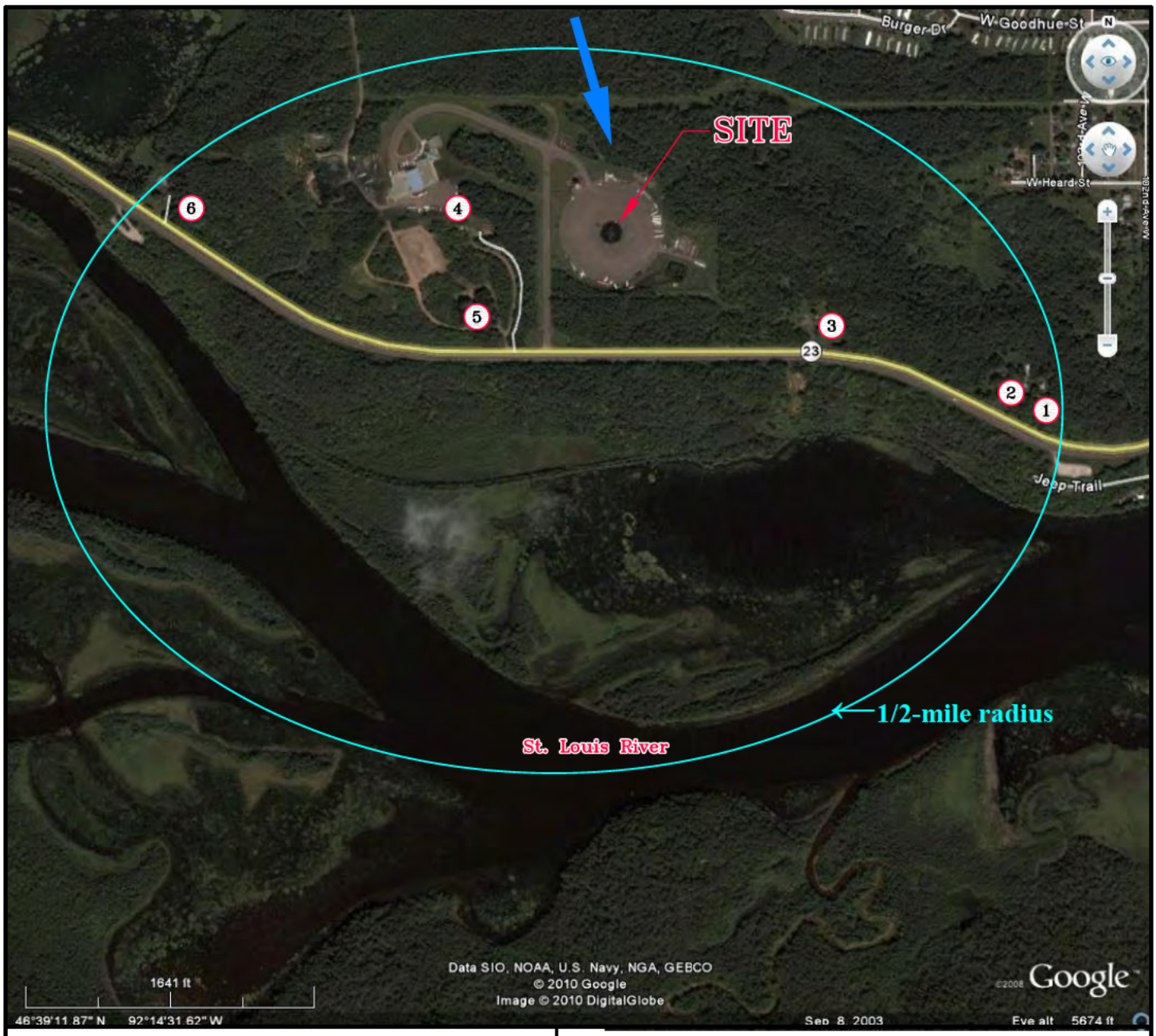
MINNEAPOLIS-ST. PAUL INTERNATIONAL AIRPORT CWI Well Map



Approximate Area of Receptor Survey

Appendix E

Lake Superior College ERTC Receptor Survey Documents



LEGEND:

Inferred Groundwater Flow Direction

Property Occupant

1. Residence – 10401 Hwy 23
2. Residence – 10423 Hwy 23
3. Residence – 11801 Hwy 23
4. Residence – 11601 Hwy 23
5. Residence – 11605 Hwy 23
6. Residence – 11825 Hwy 23

North

FIGURE
RECEPTOR SURVEY
LAKE SUPERIOR COLLEGE ERTC
11501 HIGHWAY 23
DULUTH, MINNESOTA

PROJECT NO.	PREPARED BY	DRAWN BY	
45618DEL04	NR	DD	anteagroup
DATE	REVIEWED BY	FILE NAME	
06/30/11		Superior–1	

Receptor Survey Questionnaire

via telephone 11-2-10

PROPERTY ADDRESS: 11825 Hwy 23

1. Is there, or has there ever been, a water well on the property? **(Yes)** **No** **Unknown**

If you answered **No or Unknown**, proceed to Question 2.

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

_____ACTIVE _____ABANDONED _____SEALED

1b. How deep is (was) the well? _____FEET (if depth is unknown check here _____)

1c. In what year was the well installed (if known)? _____

1d. If the well was abandoned, what year was the well sealed?_____

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.)_____ All domestic

1f. Where on the property is (was) the well located?_____

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

(Yes) **No**

Name Bob Fspenson

Telephone Number 218-626-2746 DAY or EVENING (please circle one and state best time to reach you)
218-393-4966

2. Is a public water supply currently utilized by the property? **Yes** **(No)**

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

Name_____

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or MPCA Project Manager Nile Fellows at 651-757-2352.

Receptor Survey Questionnaire - via telephone 10-26-10

PROPERTY ADDRESS: 10401 Hwy 23

1. Is there, or has there ever been, a water well on the property? (Yes) No Unknown

If you answered **No or Unknown**, proceed to Question 2.

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

_____ACTIVE ___X___ABANDONED _____SEALED

1b. How deep is (was) the well? _____FEET (if depth is unknown check here _____)

1c. In what year was the well installed (if known)? _____

1d. If the well was abandoned, what year was the well sealed?_____

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.)_____

1f. Where on the property is (was) the well located? Well didn't have good water. Use well from next door - nephew's well water

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

Yes **No**

Name Ruth McIntyre

Telephone Number 218-620-1128 DAY or EVENING (please circle one and state best time to reach you)

2. Is a public water supply currently utilized by the property? **Yes** (No)

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

Name_____

Telephone Number_____ DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please feel free to contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or Nile Fellows, MPCA, at 651-757-2352.

Receptor Survey Questionnaire - In Person Interview

PROPERTY ADDRESS: 11605 W Hwy 2-3

1. Is there, or has there ever been, a water well on the property? **Yes** **No** **Unknown**

If you answered **No or Unknown**, proceed to Question 2.

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

X ACTIVE _____ABANDONED _____SEALED

1b. How deep is (was) the well? _____FEET (if depth is unknown check here _____)

1c. In what year was the well installed (if known)? ?

1d. If the well was abandoned, what year was the well sealed?_____

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.) all - drinking, etc

Pump - 150'
Water - 75'

1f. Where on the property is (was) the well located?

in house

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

Yes **No**

Name Jerry Ferrari

Telephone Number 626 3525 DAY or EVENING (please circle one and state best time to reach you)

2. Is a public water supply currently utilized by the property? **Yes** **No**

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

Name_____

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please feel free to contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or Nile Fellows, MPCA, at 651-757-2352.

In Person Interview

Receptor Survey Questionnaire

PROPERTY ADDRESS: 10801 Hwy 23 Duluth 55808

1. Is there, or has there ever been, a water well on the property? (Yes) **No** **Unknown**

If you answered **No or Unknown**, proceed to Question 2.

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

X ACTIVE _____ABANDONED _____SEALED

1b. How deep is (was) the well? _____FEET (if depth is unknown check here ?)

1c. In what year was the well installed (if known)? 1950s

1d. If the well was abandoned, what year was the well sealed?_____

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.) drinking, etc.

1f. Where on the property is (was) the well located? house corner - SE corner

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

Yes **No**

Name John McIntosh

Telephone Number 218-213-7850 cell DAY or EVENING (please circle one and state best time to reach you)

2. Is a public water supply currently utilized by the property? **Yes** (No)

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

Name_____

Telephone Number_____DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please feel free to contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or Nile Fellows, MPCA, at 651-757-2352.

Receptor Survey Questionnaire

PROPERTY ADDRESS: 11601 HIGHWAY 23, DULUTH, MN 55808

1. Is there, or has there ever been, a water well on the property? (Yes) No Unknown

If you answered **No or Unknown**, proceed to Question 2.

1a. If you answered **Yes**, is the well *active* (in use), *abandoned* (not in use), or *sealed* (decommissioned following Minnesota Department of Health [MDH] Well Code guidelines).

X ACTIVE _____ ABANDONED _____ SEALED

1b. How deep is (was) the well? 411 FEET (if depth is unknown check here _____)

1c. In what year was the well installed (if known)? 1991

1d. If the well was abandoned, what year was the well sealed? - NA -

3e. If the well is active, for what purpose is it used? Example: (drinking water, lawn sprinkler, cooling, etc.) DRINKING WATER, SHOWERS, LAUNDRY USE

1f. Where on the property is (was) the well located? APPROXIMATELY 40' NORTHWEST OF THE HOUSE IN THE REAR YARD AREA

1g. If there is currently a water supply well on the property, would you grant access to the property in order to obtain a water sample from either an indoor or outside faucet (at no cost to property owner)?

(Yes) No

Name DIXON R. BASTIE

Telephone Number (218) 348-2287 (DAY) or EVENING (please circle one and state best time to reach you)

2. Is a public water supply currently utilized by the property? Yes (No)

3. May we contact you for further information if necessary? If so, please provide your name and telephone number.

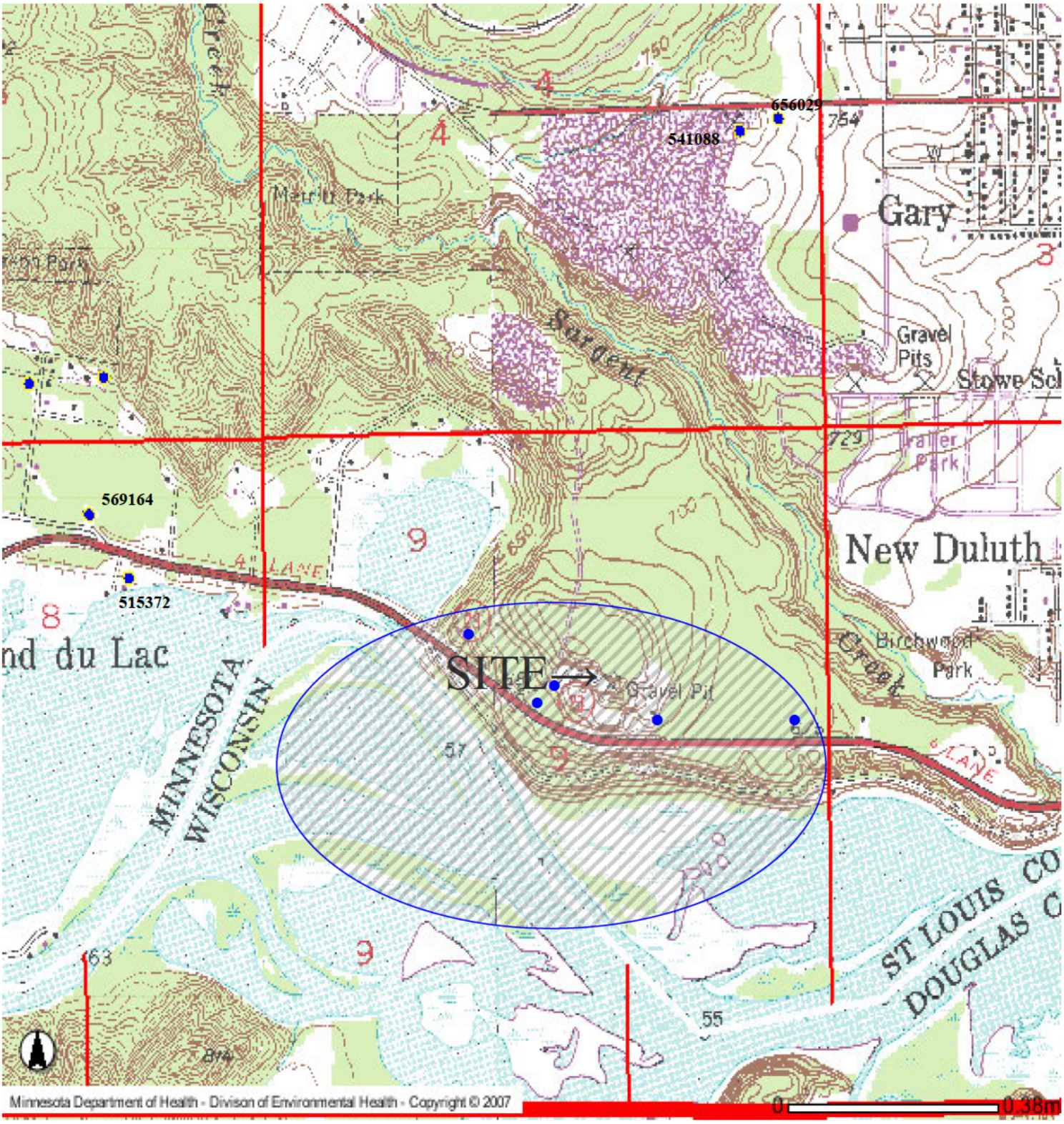
Name -- SEE ABOVE --

Telephone Number _____ DAY or EVENING (please circle one and state best time to reach you)

Please complete this form and mail it back to Delta in the enclosed self-addressed stamped envelope. Delta thanks you in advance for taking the time to complete this form.

If you have any questions, or need help completing this form, please feel free to contact Nancy Rodning, Delta Consultants, at (651)697-5152 or 1-800-477-7411, or Nile Fellows, MPCA, at 651-757-2352.

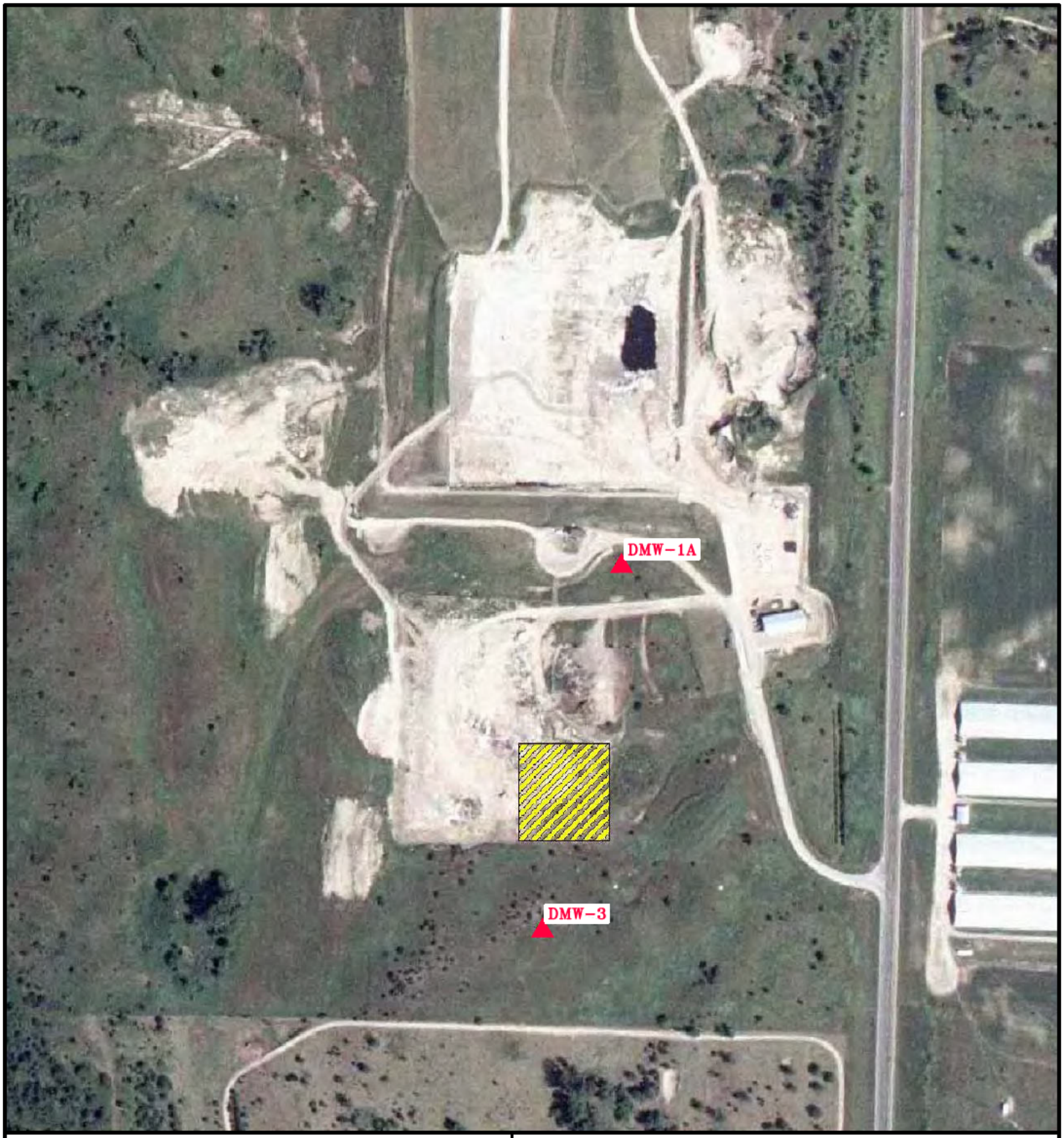
LAKE SUPERIOR COLLEGE - DULUTH CWI Well Map



Approximate Area of Receptor Survey

Appendix F

Kandiyohi County Landfill Sample Location Map



LEGEND:

Sample Location

Foam Use Area

North

0 350

SCALE IN FEET

FIGURE
SAMPLE LOCATIONS
KANDIYOHI LANDFILL
NEW LONDON, MINNESOTA

PROJECT NO.	PREPARED BY	DRAWN BY
45618DEL04	NR	DD
DATE	REVIEWED BY	FILE NAME
06/20/11		Kandiyohi-1

anteagroup

Appendix G

Crystal Airport Sample Location Maps



LEGEND:

- Sample Location
- Boring Location

North

0 750

SCALE IN FEET

FIGURE
JANUARY 2010 PFC SAMPLING LOCATIONS
CRYSTAL AIRPORT
CRYSTAL, MINNESOTA

PROJECT NO.	PREPARED BY	DRAWN BY
45618DEL04	NR	DD
DATE	REVIEWED BY	FILE NAME
06/20/11		Crystal-3

anteagroup



LEGEND:

▲ Sample Location

North

0 750

SCALE IN FEET

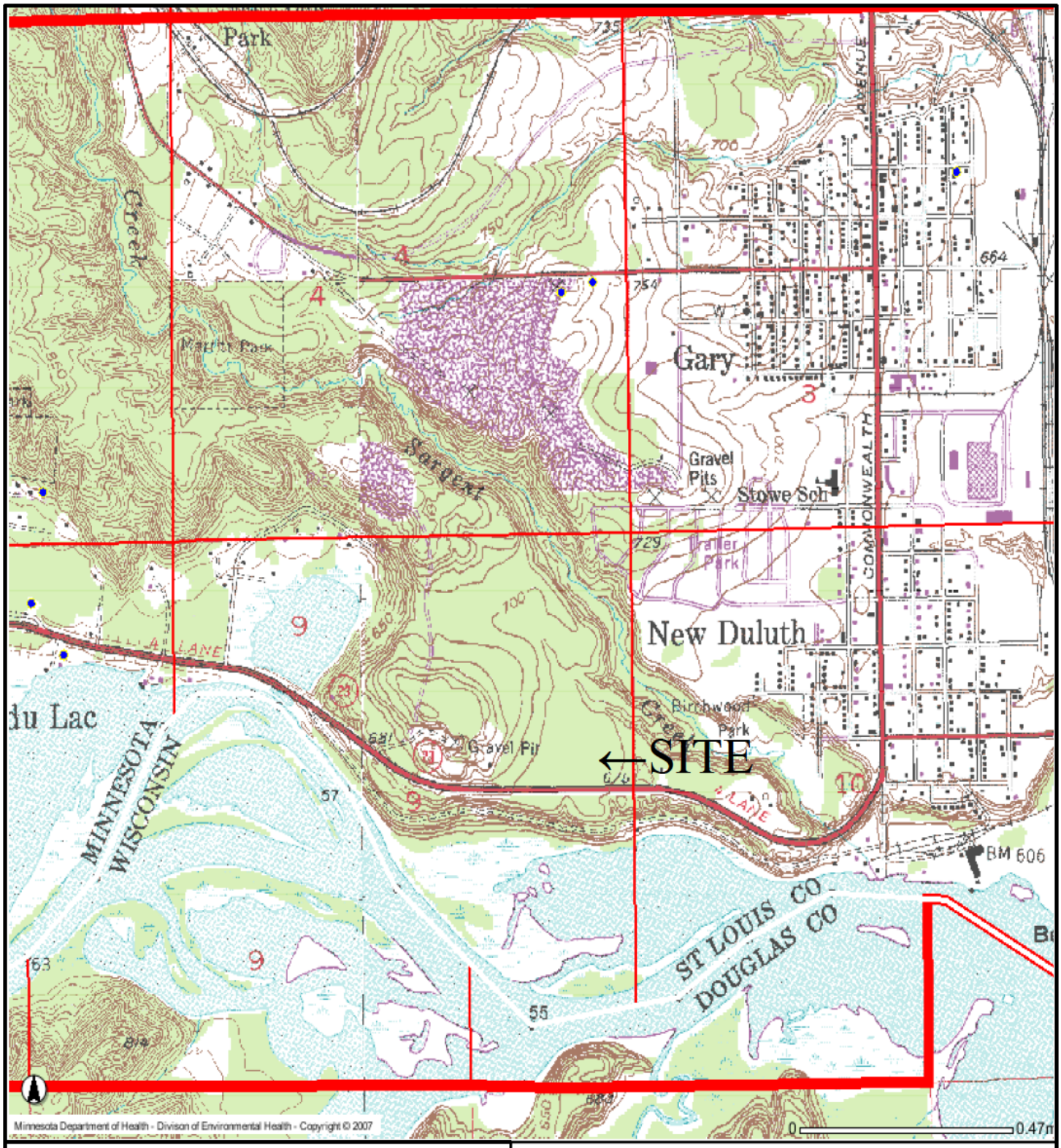
FIGURE
OCTOBER 2010 SAMPLE LOCATIONS
CRYSTAL AIRPORT
CRYSTAL, MINNESOTA

PROJECT NO.	PREPARED BY	DRAWN BY
45618DEL04	NR	DD
DATE	REVIEWED BY	FILE NAME
06/20/11		Crystal-1

anteagroup

Appendix H

Lake Superior College ERTC Sample Location Maps and Analytical Summary Table



LEGEND:

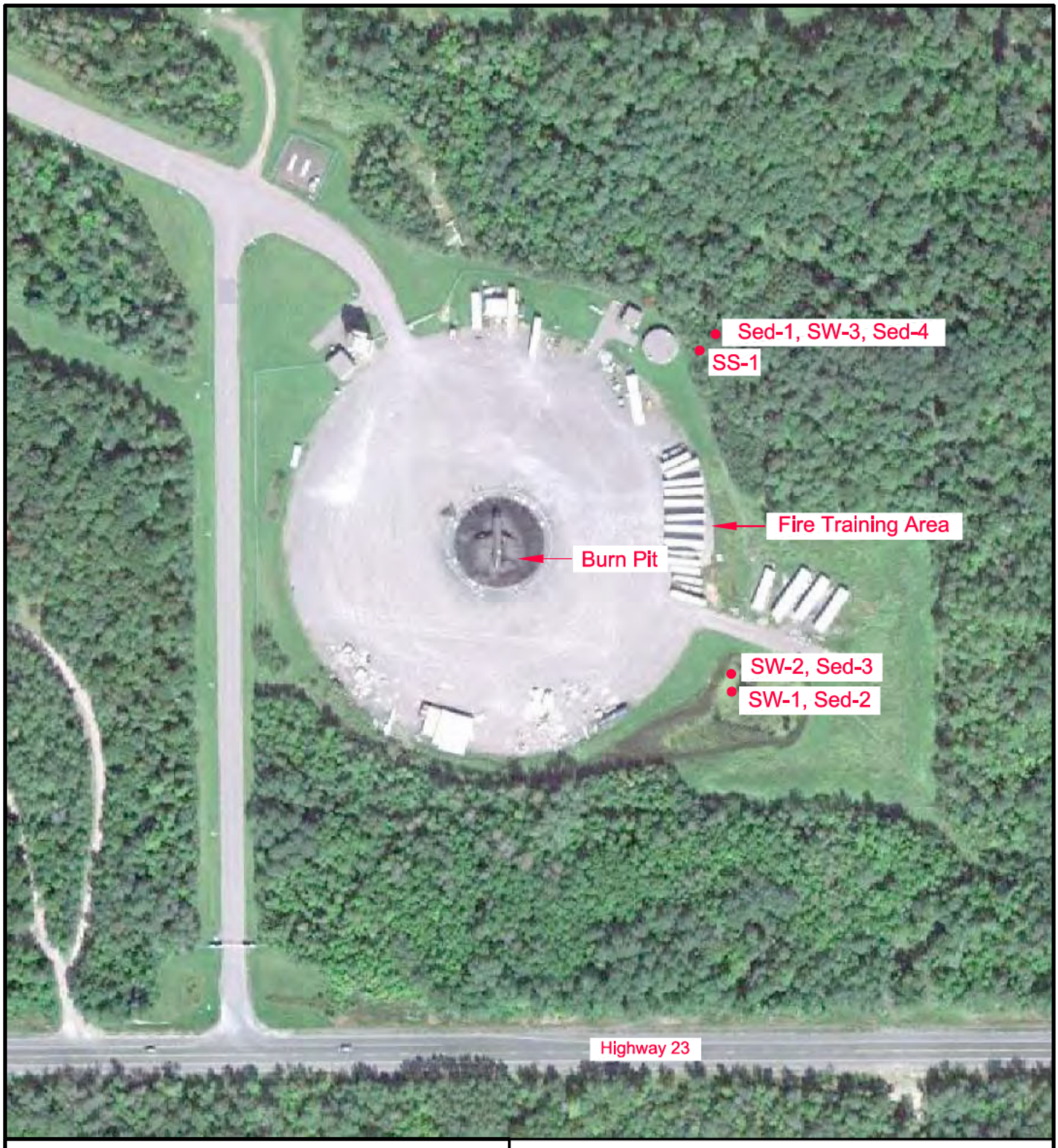
- Well Locations

North

FIGURE 1
SITE LOCATION MAP
LAKE SUPERIOR COLLEGE ERTC
11501 HWY 23
DULUTH, MINNESOTA

PROJECT NO.	PREPARED BY	DRAWN BY
45618DEL02	NR	DD
DATE	REVIEWED BY	FILE NAME
02/18/11		Duluth-1

anteagroup



LEGEND:

- Sample Locations

North

0 200

SCALE IN FEET

FIGURE 2
SITE MAP
LAKE SUPERIOR COLLEGE ERTC
11501 HWY 23
DULUTH, MINNESOTA

PROJECT NO.	PREPARED BY	DRAWN BY	
45618DEL02	NR	DD	
DATE	REVIEWED BY	FILE NAME	
02/18/11		Duluth-2	

anteagroup



FIGURE 3
SURROUNDING AREA MAP
LAKE SUPERIOR COLLEGE ERTC
11501 HWY 23
DULUTH, MINNESOTA

PROJECT NO.	PREPARED BY	DRAWN BY
45618DEL02	NR	DD
DATE	REVIEWED BY	FILE NAME
02/21/11		Duluth-3

anteagroup

PFC Analytical Results for Lake Superior College ERTC Samples
Antea Group Project No. 45618DEL0

		Perfluorobutanoic acid (PFBA)	Perfluoro-n-pentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorobutanoic sulfonate (PFBS)	Perfluorohexane sulfonate (PFHxS)	Perflourooctane sulfonate (PFOS)	Perfluorooctane sulfonylamide (PFOSA)
#Perfluorinated Carbon Chains:		4	5	6	7	8	9	10	11	12	4	6	8	8
Tier 1 Residential SRV, ng/g:		77000	ND	ND	ND	2100	ND	ND	ND	ND	ND	ND	2100	ND
Tier 2 Recreational SRV, ng/g:		94000	ND	ND	ND	2500	ND	ND	ND	ND	ND	ND	2600	ND
Tier 2 Industrial SRV, ng/g:		500000	ND	ND	ND	13000	ND	ND	ND	ND	ND	ND	14000	ND
Drinking Water Health-Based Limits, ng/L:		7000(1)	ND	ND	ND	300(2)	ND	ND	ND	ND	7000(1)	RAA(3)	300(2)	ND
Sample ID	**Sample Date**													
Wetland Samples														
ERTC Sed-2	11/25/2009	0.218	0.536	1.72	0.268	1.26	0.184	0.101	0.174	< 0.0933	1.47	19.6	538	181
ERTC Sed-3	11/18/2010	0.118	0.202	1.01	0.171	0.75	0.149	< 0.0955	0.174	0.156	0.318	7.1	476(D)	207(D)
ERTC SW-1	11/25/2009	257	537	1790	348	991	31.8	3.45	< 2.51	< 2.51	1870	9390	11300	360
ERTC SW-2	11/18/2010	76.8	144	476	66.2	290	22.4	< 2.49	< 2.49	< 2.49	315	2630	7640(D)	134(D)
Creek Samples														
ERTC Sed-1	11/25/2009	< 0.0917	< 0.0917	< 0.0917	< 0.0917	0.225	< 0.0917	< 0.0917	< 0.0917	< 0.0917	< 0.183	1.2	57.5	6.52
ERTC Sed-4	11/18/2010	< 0.0933	0.135	0.628	0.119	0.581	< 0.0933	< 0.0933	< 0.0933	< 0.0933	< 0.187	3.52	51.3	1.95
ERTC SW-3	11/18/2010	35	62.8	366	39.5	234	5.62	< 2.49	< 2.49	< 2.49	135	1510	7630	385
Private Well Water Samples														
ERTC-10801	11/19/2010	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 5.00	11.2	6.49	< 2.50
ERTC-11601	11/19/2010	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 2.47	< 4.95	9.63	7.26	< 2.47

Notes:
All samples were analyzed by Axys Analytical Services LTD of British Columbia, Canada.
Sediment results and standards are in nanograms per gram (ng/g), which is approximately equivalent to parts-per-billion.
Surface water and well water results and water standards are in nanograms per liter (ng/L), which is approximately equivalent to parts-per-trillion.
Non-detect results are expressed as "less than" the laboratory detection limit.
Bolded type indicates detection above the laboratory method detection limit.
Tier 1 Residential SRV: Minnesota soil reference value for chronic human exposure in a residential setting.
Tier 2 Recreational SRV: Minnesota soil reference value for exposure in a recreational setting.
Tier 2 Industrial SRV: Minnesota soil reference value for exposure in an industrial setting.
PFC compounds soil results reported on a dry weight basis.
(1) Health-Based Value (HBV) for chronic exposure defined by the Minnesota Department of Health.
(2) Health Risk Limit (HRL) for drinking water defined by the Minnesota Department of Health.
(3) Risk Assessment Advise (RAA) set by the Minnesota Department of Health for PFHxS does not specify numeric values.
ND: No State or Federal values or limits defined.
(D) Dilution performed on sample by laboratory.

Appendix I

Hidden Harbor Marina Well Location Map



Hidden Harbor Marina Water Supply Wells

Well A	Located in the marina workshop, used for non-potable uses. Unique Well #268354.
Well B	Located in the parking lot north of the restaurant/bar. Restaurant/bar and marina docks connected to this well. Unique Well #559256
Well C	Located in backyard of marina house. This house is currently being used as the shower house for use by marina customers. Unique Well # unknown.
Well D	Located in the crawl space of the house at 1001 Oak Street. Unique Well # unknown.
Well E	Located in the house basement at 115 10th Avenue West. Unique Well #429870

North

FIGURE
SAMPLING LOCATIONS
HIDDEN HARBOR MARINA
ST. PAUL PARK, MINNESOTA

PROJECT NO.	PREPARED BY	DRAWN BY	
45618DEL04	NR	DD	
DATE	REVIEWED BY	FILE NAME	
06/21/11		H Harbor-1	anteagroup

Appendix J

Burnsville ABLE Training Center Sample Location Map



North

FIGURE
SAMPLING LOCATIONS
ABLE TRAINING CENTER
BURNSVILLE, MINNESOTA

PROJECT NO.	PREPARED BY	DRAWN BY	
45618DEL04	NR	DD	
DATE	REVIEWED BY	FILE NAME	
06/21/11		ABLE-1	

antea group

Appendix K

Bemidji Regional Airport December 2010 Well Receptor Survey and Well Sampling Documents



LEGEND

Inferred Groundwater Flow Direction

North

FIGURE
DECEMBER 2010 RECEPTOR SURVEY AND WELL SAMPLE LOCATIONS
BEMIDJI REGIONAL AIRPORT
BEMIDJI, MINNESOTA

PROJECT NO.	PREPARED BY	DRAWN BY
45618DEL04	NR	DD
DATE	REVIEWED BY	FILE NAME
06/30/11		Bemidji-2

anteagroup

WELL RECEPTOR SURVEY RESULTS
BEMIDJI FIRE DEPARTMENT TRAINING AREA - BEMIDJI REGIONAL AIRPORT
March 2011

ADDRESS	WELL? Yes/No	UNIQUE WELL NO.	ACTIVE? Yes/No	WELL USE	WELL DEPTH	COMMENTS
2405 Alyce Court NW		478252				No questionnaire returned.
1826 Anne Street NW						No questionnaire returned.
1925 Anne Street NW		585876				No questionnaire returned.
2001 Anne Street NW						No questionnaire returned.
2014 Anne Street NW						No questionnaire returned.
2015 Anne Street NW						No questionnaire returned.
2021 Anne Street NW	yes		yes	drinking, lawn	30 feet	Well installed 1972, basement. Municipal water also being utlilized.
2027 Anne Street NW						No questionnaire returned.
2103 Anne Street NW	yes		yes	all household uses	55 feet	Well installed 1987, front yard. No municipal water being utilized.
2120 Anne Street NW	yes	566297	yes	drinking, lawn	unknown	Well installed ~1995, located between shop and trailer house. No municipal water being utilized.
2220 Anne Street NW						No questionnaire returned.
2127 Bardwell Drive NW	yes	549971	no	NA	unknown	Well installed 1997, abandoned/sealed 2010. Located just north of building. Municipal water being utilized.
2201 Bardwell Drive NW	yes		yes	lawn irrigation	65 feet	Well installed 1995, east side of office portion of building. Municipal water being utilized.
2212 Bardwell Drive NW	no		NA	NA	NA	Reported no well, no municipal water.
2231 Bardwell Drive NW	yes		yes	lawn irrigation	44 feet	Well installed 1995. Accessible via outside faucet. Municipal water also being utilized.
2310 Bardwell Drive NW						No questionnaire returned.
2316 Bardwell Drive NW	yes	442354	yes	all household uses	100+ feet	Well installed 1989. Municipal water not being utilized.
2322 Bardwell Drive NW	yes		yes	bathroom utilities	unknown	Well installed 1997, northeast corner of the property. No municipal water being utilized.
2324 Bardwell Drive NW						No questionnaire returned.
2326 Bardwell Drive NW	yes		yes	all household uses	52 feet	Well installed 1992, front of house. Municipal water also being utilized.
2532 Bardwell Drive NW						No questionnaire returned.
3354 Laurel Drive NW	yes		yes	lawn irrigation	unknown	Located between building and fence.
3455 Laurel Drive NW	yes		no	NA	NA	Well sealed 2010, northwest corner of property.
3481 Laurel Drive NW	yes	576751 710183	yes	drinking	60 feet	No municipal water being utilized.

WELL RECEPTOR SURVEY RESULTS
BEMIDJI FIRE DEPARTMENT TRAINING AREA - BEMIDJI REGIONAL AIRPORT
March 2011

ADDRESS	WELL? Yes/No	UNIQUE WELL NO.	ACTIVE? Yes/No	WELL USE	WELL DEPTH	COMMENTS
2134 Bardwell Drive NW	yes		yes	drinking	60 feet	No municipal water being utilized.
3501 Laurel Drive NW	yes		yes	irrigation	100 feet?	Well installed 1987, 10 ft. north of office building. Not used for drinking water. Municipal water also being utilized.
3611 Laurel Drive NW	yes	518168	yes	toilets, washing boats	unknown	Bemidji Marine. Bottled water for drinking. No municipal water being utilized.
3709 Laurel Drive NW	yes		yes	irrigation, pressure wash	unknown	One active and two sealed wells (2010). Well located between the two site buildings. Municipal water also being utilized.
2221 Tod Court NW	no		NA	NA	NA	Reported no well, no municipal water.
2225 Tod Court NW						[1]Survey returned NSN; remailed to property owner tax address.
2402 Tracy Court NW						No questionnaire returned.
2408 Tracy Court NW						[1]Survey returned NSN; remailed to property owner tax address.
3810 Whispering Meadows Court NW						No questionnaire returned.
3813 Whispering Meadows Court NW						No questionnaire returned.
3168 Adams Drive NW	yes		yes	pressure wash, bathrooms	~20 feet	Telephone interview, October 2010, Kraus Anderson Construction Shop

Notes:

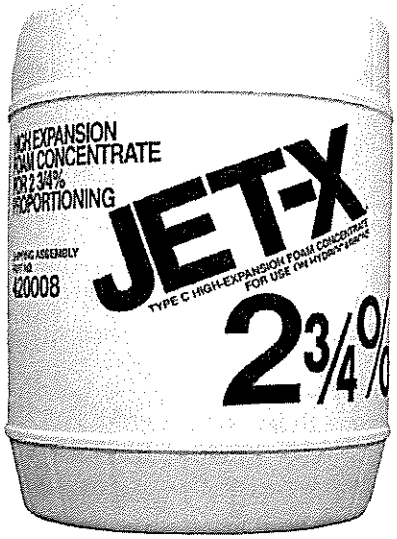
(1) mail returned by Post Office, "no such number."

Water sample collected for PFC analysis.

Antea Group

ANSUL

JET-X 2 3/4% High-Expansion Foam Concentrate



008445

Description

JET-X 2 3/4% High-Expansion Foam Concentrate is a synthetic-based formulation comprised of hydrocarbon surfactants, solvents, and stabilizers for use with medium- and high-expansion foam generators. It is transported and stored as a concentrate to provide ease of use and considerable savings in weight and volume.

JET-X 2 3/4% High-Expansion Foam Concentrate can be used to produce foam with expansion ratios ranging from 50:1 to 1000:1 depending upon the type of generator and its operating pressure. It can be proportioned with fresh, salt or hard water. When used with high-expansion generators, recommended proportioning is at 2.75% (2.75 gallons JET-X concentrate with 97.25 gallons water). When used with medium-expansion foam nozzles, it is typically proportioned at a 2% concentration.

TYPICAL PHYSIOCHEMICAL PROPERTIES AT 77 °F (25 °C)

Appearance	Green Liquid
Density	1.020 g/ml ± 0.020
pH	6.0 – 7.0
Refractive Index	1.365 ± 0.010
Viscosity	8 ± 2 centistokes

Application

JET-X 2 3/4% High-Expansion Foam Concentrate is a tremendously flexible firefighting agent, used in fighting Class A, Class B, and LNG fires both indoors and outdoors. It is used only with air-aspirating foam discharge devices except when used as a wetting agent on Class A fuels.

JET-X 2 3/4% High-Expansion Foam Concentrate, when used with high-expansion generators, is capable of totally flooding large rooms and enclosures allowing it to effectively extinguish horizontal and vertical (three-dimensional) fires. High-expansion foam is also effective in reducing vapor concentrations downwind from unignited LNG and other hazardous low boiling point gaseous products such as ammonia spills.

When used with medium-expansion foam equipment, JET-X 2 3/4% High-Expansion Foam Concentrate forms a foam blanket which prevents the release of fuel vapor and also provides additional cooling due to the higher water content. Medium-expansion foam has benefits in outdoor applications because the foam is less affected by wind conditions.

Foaming Properties

The performance of JET-X 2 3/4% High-Expansion Foam Concentrate will vary depending upon the performance characteristics of the equipment. Expansion ratios through high-expansion generators are typically between 200:1 and 1000:1. For this reason, it is important for the proper design of a high-expansion system that the JET-X 2 3/4% High-Expansion Foam Concentrate be specifically listed with the foam generators. Refer to the performance table listing expansion ratios of JET-X high-expansion generators used in conjunction with JET-X 2 3/4% foam concentrate (See JET-X Generator Data Sheet, Form F-93137, latest edition). Medium-expansion foam generators typically deliver expansion ratios between 50:1 and 200:1.

Proportioning

JET-X 2 3/4% High-Expansion Foam Concentrate can be proportioned easily at the correct dilution using most conventional proportioning equipment such as:

1. Balanced pressure and in-line balanced pressure pump proportioning equipment
2. Balanced pressure bladder tank proportioners
3. Around-the-pump type proportioners
4. Fixed or portable in-line venturi (eductor) type proportioners

The usable temperature range for JET-X 2 3/4% High-Expansion Foam Concentrate with this equipment is 35 °F to 120 °F (2 °C to 49 °C).

June 2013
11 Feb, 2011

One Stanton Street / Marinette, WI 54143-2542, USA / +1-715-735-7411 / www.ansul.com
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Storage

Store JET-X 2 3/4% High-Expansion Foam Concentrate in the packaging supplied (polyethylene totes, drums or pails) or in equipment recommended by the manufacturer as part of the foam system and within the temperature limits specified.

Avoid freezing of the product. If the product is frozen during storage or transport, it must be thawed and inspected for signs of separation. If separation has occured, the product must be mixed until homogenous.

Storage of JET-X 2 3/4% High-Expansion Foam Concentrate as a pre-mix is not recommended.

Compatibility

Refer to ANSUL Technical Bulletin No. 64 for a detailed discussion of compatibility.

Different types of foam concentrates (e.g., AFFF, protein base) should not be mixed under any circumstances. JET-X 2 3/4% concentrate should not be mixed for use with JET-X 2% concentrate.

Materials of Construction Compatibility

Tests have been performed with JET-X 2 3/4% High-Expansion Foam Concentrate verifying its compatibility with standard carbon steel "black" pipe and pipe manufactured from various stainless steel or brass compounds. Alternative pipe, fittings, and valves may be used in some cases if acceptable to the customer and/or the authority having jurisdiction. Refer to ANSUL Technical Bulletin No. 59 addressing acceptable materials of construction for use with ANSUL foam concentrates.

Galvanized pipe and fittings must not be used in areas where undiluted concentrate will contact them since corrosion will result.

Please **first** consult Tyco Fire Protection Products for specific guidelines concerning materials of construction.

Inspection

As with any fire suppressing agent, JET-X 2 3/4% High-Expansion Foam Concentrate should be inspected periodically per requirements of NFPA 11 "Standard for Low-, Medium-, and High-Expansion Foam." Annually submit samples to the manufacturer or a qualified laboratory for quality condition testing. Refer to the Field Inspection Manual (Part No. 31274) for detailed inspection procedures. An annual inspection is recommended unless unusual conditions of exposure occur. In such cases, contact Tyco Fire Protection Products for more information.

Expansion ratios observed in lab tests may vary depending on the equipment and methods used by the testing laboratory. For this reason, lab scale expansion ratios outside of the range typical of full scale equipment (200:1 to 1000:1) do not necessarily mean that a foam concentrate is not fit for purpose. If there are any questions about the viability of an ANSUL High-Expansion Foam Concentrate sample, contact Tyco Fire Protection Products.

Approvals and Listings

JET-X 2 3/4% High-Expansion Foam Concentrate is Underwriters Laboratories (UL) Listed and Factory Mutual (FM) Approved with various foam hardware devices.

Ordering Information

JET-X 2 3/4% High-Expansion Foam Concentrate is available in pails, drums, totes, or bulk shipment.

Part No.	Description	Shipping Weight	Cube
420008	Pail 5 gal (19 L)	51 lb (23.1 kg)	1.08 ft^3 (0.0305 m^3)
420009	Drum 55 gal (208 L)	577 lb (261.7 kg)	11.33 ft^3 (0.3208 m^3)
431175	Tote 265 gal (1000 L)	2465 lb (1118 kg)	50.05 ft^3 (1.42 m^3)
420208	Bulk Order	Contact Technical Services	

Note: The converted metric values in this document are provided for dimensional reference only and do not reflect an actual measurement.

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Executive Summary

The Minnesota Department of Transportation Office of Aeronautics (MnDOT) commissioned an air service study (Tier 2 Study) in 2001 to assess the potential for growth and development of the smaller commercial service airports in the Minnesota and Wisconsin System of Airports. The Tier 2 Study, completed in June 2003, identified long-term opportunities for St. Cloud Regional Airport (the Airport), such as serving as a spoke in the mainline carrier networks, a reliever airport for Minneapolis-St. Paul International Airport, and a Minnesota National Guard headquarters and military training and deployment center, among other roles.

To prepare for these opportunities, it was recommended in the Tier 2 Study that the operators of the Tier 2 airports work to improve air service at their individual and collective airports; plan for the long-term development of facilities and land acquisition to support those facilities; and implement detailed business planning and property management systems. Representatives of the Metropolitan Airports Commission (MAC), the Metropolitan (Metro) Council, MnDOT, and the Tier 2 Steering Committee recognized that St. Cloud Regional Airport would be the logical site for an additional commercial service airport to serve the Minneapolis-St. Paul region. It was, therefore, recognized that the City of St. Cloud would need to act quickly to halt encroachment of residential and other incompatible land uses around the Airport in areas that may be needed for future Airport expansion. This Master Plan was initiated to identify areas required for potential long-term aviation development, prepare a plan for incremental expansion, and assist the City of St. Cloud in business and financial planning to support Airport development.

1. Goals and Objectives of the Master Plan

In preparing the Master Plan, a two-pronged approach was used to assess future Airport needs by (a) developing an implementable 20-year plan while (b) also anticipating needs to meet longer-term growth over the next 40- to 50-years so that aviation resources can be protected from encroachment by residential and other incompatible land uses. The following goals for the Master Plan were developed:

Goal 1: Protect for future Airport development

Goal 2: Prepare a plan for logical, incremental Airport development to serve near-term demand

Goal 3: Ensure that the planning process is accessible to the public and involves the various jurisdictions and stakeholders that have interest in the Airport

Goal 4: Support the City of St. Cloud in attaining capital funding

Goal 5: Identify opportunities and tools for revenue development

2. Aviation Activity Forecasts

Forecasts of enplaned passengers, air cargo, commercial and general aviation operations, based aircraft, aircraft fleet mix, and other aviation activity at the Airport were developed for 2004 through 2024. The forecasts form the basis for determining development needs at the Airport and the additional land that may be needed to accommodate future Airport development in an orderly fashion.

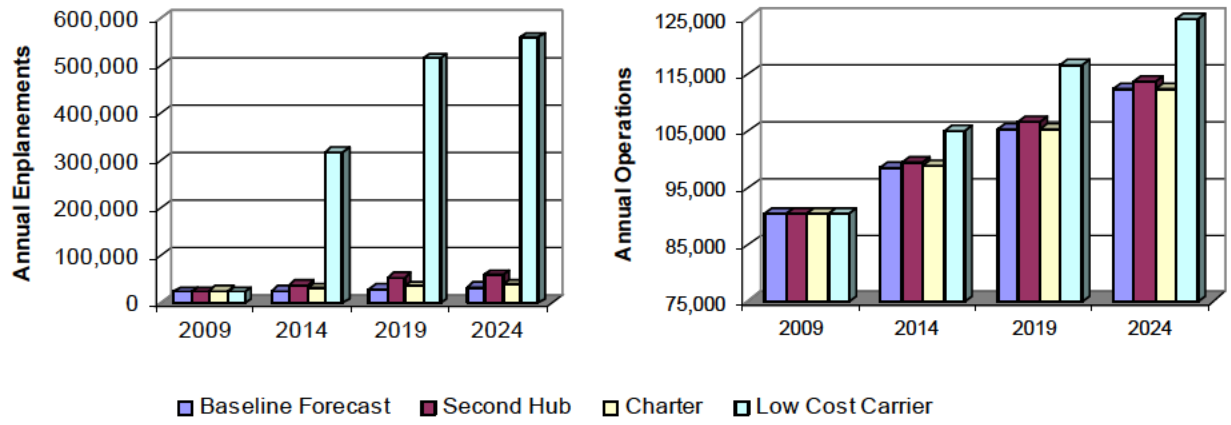
The development of aviation activity forecasts requires both careful analysis and subjective judgment, especially in the case of St. Cloud Regional Airport, where a high rate of population and economic growth is tempered by the Airport's proximity to the Minneapolis-St. Paul metropolitan area and Minneapolis-St. Paul International Airport. Historical aviation activity and trends, as well as industry, regional, and local factors that affect aviation activity at the Airport were analyzed and assumptions were made about these factors to forecast future activity.

A **Baseline Forecast** was developed based on growth conditions comparable to national conditions, with underlying assumptions that, through the forecast period, the Airport will remain a single carrier, single destination airport and no significant new local factors will affect the airport's growth. Three alternative demand scenarios were also developed to test the effect that a higher level of activity would have on facilities at the Airport. These alternative demand scenarios are described below.

- The **Second Hub Scenario** consists of the addition of regional jet service to another hub airport, such as Detroit Metropolitan Wayne County Airport—Northwest's second major northern U.S. hub—following the establishment of high-frequency service to Northwest's Minneapolis-St. Paul International Airport (MSP) hub. The synergy between these two airports could provide many domestic and international connecting opportunities at St. Cloud Regional Airport. In terms of aircraft fleet, Northwest would initially increase its Saab fleet and then convert to an all regional jet fleet by 2017.
- The **Charter Scenario** consists of the potential addition of charter jet flights (using aircraft such as the B-737 or MD-80 that seat approximately 150 passengers) to leisure markets. The seasonal charter service would begin with one flight per month during the 2005-2006 winter season. Seasonal flights to destinations such as Orlando and Laughlin, Nevada, would be added in subsequent years along with added frequency to each of these destinations.
- The **Low Cost Carrier Scenario** consists of the entry of a low cost carrier offering 10 to 15 daily jet flights providing point-to-point service to four new domestic markets based on a Southwest Airlines-type model. Operations were assumed to be conducted using medium-sized narrowbody aircraft, such as the B-737-700 (with approximately 145 seats). This low-cost carrier service was assumed to be initiated in 2012 with four flights per day to Chicago Midway Airport and four flights per day to Denver International Airports. Northwest is presumed to respond by adding service. By 2015, flights would be added to Phoenix, followed by the addition of flights to the Baltimore-Washington DC metropolitan area in 2018. By 2024, approximately 15 daily flights would be provided to these four new domestic markets.

Exhibit 1 illustrates the enplaned passenger and total operations forecasts under the various demand scenarios. In general, single-carrier service to one or two hubs, as anticipated under the Baseline Forecast and the Second Hub Scenario, represents steady, but slow, increases in numbers of passengers and operations at the Airport. The initiation of service by a low cost carrier at the Airport would be anticipated to invite a more aggressive response from Northwest, both with respect to the accelerated start-up of service to a second hub and the replacement of Saab aircraft with regional jets. The result of the competition would be an immediate and significant build-up of service at the Airport.

Exhibit 1



Sources: KRAMER aerotek, inc., and Ricondo & Associates, Inc. (forecasts)
Prepared by: Ricondo & Associates, Inc.

The assumptions underlying the various alternative scenarios included general growth, as identified in the Baseline Forecast, in general aviation activity based on national trends and consideration of flight school and military activity, including the addition of activity resulting from relocation of the Minnesota National Guard's helicopter operations to the Airport. The levels of general aviation and military operations do not fluctuate by forecast scenario.

Planning Activity Levels (PALs) and a Sensitivity Level (SL) were defined for the enplaned passenger and aircraft operations forecasts. The purpose of the PALs and SL is to guide Airport management in determining when, according to actual activity and not calendar years, Airport facilities would need to be expanded. By linking Airport expansion decisions to activity levels and not specific dates, the City can be flexible and responsive with regard to facility development. The PALs and SL represent benchmarks for expansion and correlate to the demand scenarios as follows:

- PAL 1 – Baseline Forecast 2009
- PAL 2 – Charter Scenario 2014
- PAL 3 – Second Hub Scenario 2014 with 2024 general aviation and military activity
- SL 4 – Low Cost Carrier Scenario 2019 with 2024 general aviation and military activity

Although tied to specific years for forecasting purposes, the PALs and SL are intended to characterize a level and type of activity for use in planning and programming facility requirements that may occur during that year, earlier, or later, depending on actual growth at the Airport. While PAL 1 through PAL 3 represent steady growth of regional carrier commercial activity, and initiation of service by larger commercial jets (at PAL 2), SL 4 represents an entirely different picture of activity with a low cost carrier initiating service at the Airport. The number of enplaned passengers and medium narrowbody jet operations under SL 4 would be significantly higher than under the PALs and would create a very different set of terminal and passenger facility requirements than the PALs. Therefore, this level of activity is used as a sensitivity analysis to identify the additional improvements that would be necessary to accommodate the Low Cost Carrier Scenario. To ensure adequate planning for general aviation facilities and 2024 operations, both PAL 3 and SL 4 include full 2024 general aviation and military activity.

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1. Goals and Objectives of the Master Plan

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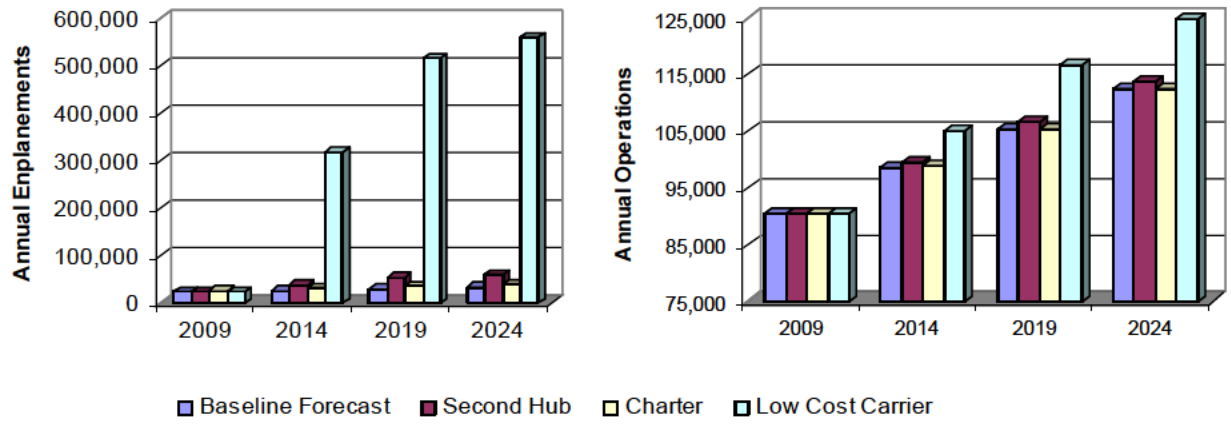

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Prepared by: Ricondo & Associates, Inc.

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3. Development Alternatives

As defined by Airport stakeholders, the Master Plan goals that are relevant to identifying a preferred Airport development plan include: protect for future Airport development beyond the 20-year planning period to an ultimate Airport development plan and prepare a plan for logical, incremental Airport development to serve near-term growth (typical 20-year Master Plan planning period).

Although demand for specific facilities was not established to define requirements for an ultimate plan, the Airport stakeholders agreed on the eventual need for a parallel runway to increase airfield capacity and property acquisition to support that development and provide a buffer zone between the ultimate Airport site and the surrounding area. Stakeholders desired an ultimate site and layout that could serve as a second commercial service airport for the region, accommodating numerous daily commercial passenger flights, general aviation growth, and collateral development to generate additional revenue. Thus, long-term development (i.e., the ultimate plan) alternatives were first identified and evaluated to ensure that near-term development would support and form the basis for ultimate development. Initially, 21 runway configuration alternatives were identified, evaluated, and refined to three primary alternatives and a no-action alternative. The alternatives included extensions to existing runways and a new parallel runway northwest or southeast of Runway 5-23 or northeast or southwest of Runway 13-31 at various critical separations. Ultimately, through several screening analyses, a preferred ultimate Airport Development Plan (ADP) was identified.

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The recommended Airport Development Plan, shown on **Exhibit 2,** represents, in conceptual form, all development that should be implemented if growth were to occur as forecast. The ADP can be considered a completed conceptual picture of the Airport at the end of the 20-year planning period. It should be noted that the ADP represents one vision of how facilities could be developed. Actual development may not mirror that shown on the ADP due to factors such as tenant preferences for facility configuration. However, the ADP serves as a guideline for the future Airport layout. The ADP was derived based on the ability to incrementally achieve the preferred ultimate plan development concept.

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- Two areas for general aviation development are identified, providing for continued expansion in the north airfield as well as new development in the south airfield.
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Executive Summary

The Minnesota Department of Transportation Office of Aeronautics (MnDOT) commissioned an air service study (Tier 2 Study) in 2001 to assess the potential for growth and development of the smaller commercial service airports in the Minnesota and Wisconsin System of Airports. The Tier 2 Study, completed in June 2003, identified long-term opportunities for St. Cloud Regional Airport (the Airport), such as serving as a spoke in the mainline carrier networks, a reliever airport for Minneapolis-St. Paul International Airport, and a Minnesota National Guard headquarters and military training and deployment center, among other roles.

To prepare for these opportunities, it was recommended in the Tier 2 Study that the operators of the Tier 2 airports work to improve air service at their individual and collective airports; plan for the long-term development of facilities and land acquisition to support those facilities; and implement detailed business planning and property management systems. Representatives of the Metropolitan Airports Commission (MAC), the Metropolitan (Metro) Council, MnDOT, and the Tier 2 Steering Committee recognized that St. Cloud Regional Airport would be the logical site for an additional commercial service airport to serve the Minneapolis-St. Paul region. It was, therefore, recognized that the City of St. Cloud would need to act quickly to halt encroachment of residential and other incompatible land uses around the Airport in areas that may be needed for future Airport expansion. This Master Plan was initiated to identify areas required for potential long-term aviation development, prepare a plan for incremental expansion, and assist the City of St. Cloud in business and financial planning to support Airport development.

1. Goals and Objectives of the Master Plan

In preparing the Master Plan, a two-pronged approach was used to assess future Airport needs by (a) developing an implementable 20-year plan while (b) also anticipating needs to meet longer-term growth over the next 40- to 50-years so that aviation resources can be protected from encroachment by residential and other incompatible land uses. The following goals for the Master Plan were developed:

Goal 1: Protect for future Airport development

Goal 2: Prepare a plan for logical, incremental Airport development to serve near-term demand

Goal 3: Ensure that the planning process is accessible to the public and involves the various jurisdictions and stakeholders that have interest in the Airport

Goal 4: Support the City of St. Cloud in attaining capital funding

Goal 5: Identify opportunities and tools for revenue development

2. Aviation Activity Forecasts

Forecasts of enplaned passengers, air cargo, commercial and general aviation operations, based aircraft, aircraft fleet mix, and other aviation activity at the Airport were developed for 2004 through 2024. The forecasts form the basis for determining development needs at the Airport and the additional land that may be needed to accommodate future Airport development in an orderly fashion.

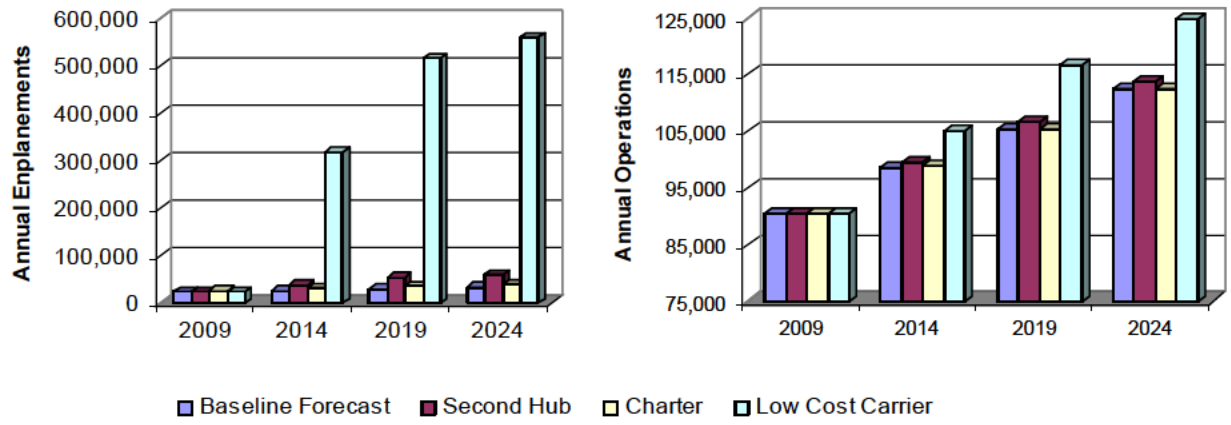
The development of aviation activity forecasts requires both careful analysis and subjective judgment, especially in the case of St. Cloud Regional Airport, where a high rate of population and economic growth is tempered by the Airport's proximity to the Minneapolis-St. Paul metropolitan area and Minneapolis-St. Paul International Airport. Historical aviation activity and trends, as well as industry, regional, and local factors that affect aviation activity at the Airport were analyzed and assumptions were made about these factors to forecast future activity.

A **Baseline Forecast** was developed based on growth conditions comparable to national conditions, with underlying assumptions that, through the forecast period, the Airport will remain a single carrier, single destination airport and no significant new local factors will affect the airport's growth. Three alternative demand scenarios were also developed to test the effect that a higher level of activity would have on facilities at the Airport. These alternative demand scenarios are described below.

- The **Second Hub Scenario** consists of the addition of regional jet service to another hub airport, such as Detroit Metropolitan Wayne County Airport—Northwest's second major northern U.S. hub—following the establishment of high-frequency service to Northwest's Minneapolis-St. Paul International Airport (MSP) hub. The synergy between these two airports could provide many domestic and international connecting opportunities at St. Cloud Regional Airport. In terms of aircraft fleet, Northwest would initially increase its Saab fleet and then convert to an all regional jet fleet by 2017.
- The **Charter Scenario** consists of the potential addition of charter jet flights (using aircraft such as the B-737 or MD-80 that seat approximately 150 passengers) to leisure markets. The seasonal charter service would begin with one flight per month during the 2005-2006 winter season. Seasonal flights to destinations such as Orlando and Laughlin, Nevada, would be added in subsequent years along with added frequency to each of these destinations.
- The **Low Cost Carrier Scenario** consists of the entry of a low cost carrier offering 10 to 15 daily jet flights providing point-to-point service to four new domestic markets based on a Southwest Airlines-type model. Operations were assumed to be conducted using medium-sized narrowbody aircraft, such as the B-737-700 (with approximately 145 seats). This low-cost carrier service was assumed to be initiated in 2012 with four flights per day to Chicago Midway Airport and four flights per day to Denver International Airports. Northwest is presumed to respond by adding service. By 2015, flights would be added to Phoenix, followed by the addition of flights to the Baltimore-Washington DC metropolitan area in 2018. By 2024, approximately 15 daily flights would be provided to these four new domestic markets.

Exhibit 1 illustrates the enplaned passenger and total operations forecasts under the various demand scenarios. In general, single-carrier service to one or two hubs, as anticipated under the Baseline Forecast and the Second Hub Scenario, represents steady, but slow, increases in numbers of passengers and operations at the Airport. The initiation of service by a low cost carrier at the Airport would be anticipated to invite a more aggressive response from Northwest, both with respect to the accelerated start-up of service to a second hub and the replacement of Saab aircraft with regional jets. The result of the competition would be an immediate and significant build-up of service at the Airport.

Exhibit 1



Sources: KRAMER aerotek, inc., and Ricondo & Associates, Inc. (forecasts)
Prepared by: Ricondo & Associates, Inc.

The assumptions underlying the various alternative scenarios included general growth, as identified in the Baseline Forecast, in general aviation activity based on national trends and consideration of flight school and military activity, including the addition of activity resulting from relocation of the Minnesota National Guard's helicopter operations to the Airport. The levels of general aviation and military operations do not fluctuate by forecast scenario.

Planning Activity Levels (PALs) and a Sensitivity Level (SL) were defined for the enplaned passenger and aircraft operations forecasts. The purpose of the PALs and SL is to guide Airport management in determining when, according to actual activity and not calendar years, Airport facilities would need to be expanded. By linking Airport expansion decisions to activity levels and not specific dates, the City can be flexible and responsive with regard to facility development. The PALs and SL represent benchmarks for expansion and correlate to the demand scenarios as follows:

- PAL 1 – Baseline Forecast 2009
- PAL 2 – Charter Scenario 2014
- PAL 3 – Second Hub Scenario 2014 with 2024 general aviation and military activity
- SL 4 – Low Cost Carrier Scenario 2019 with 2024 general aviation and military activity

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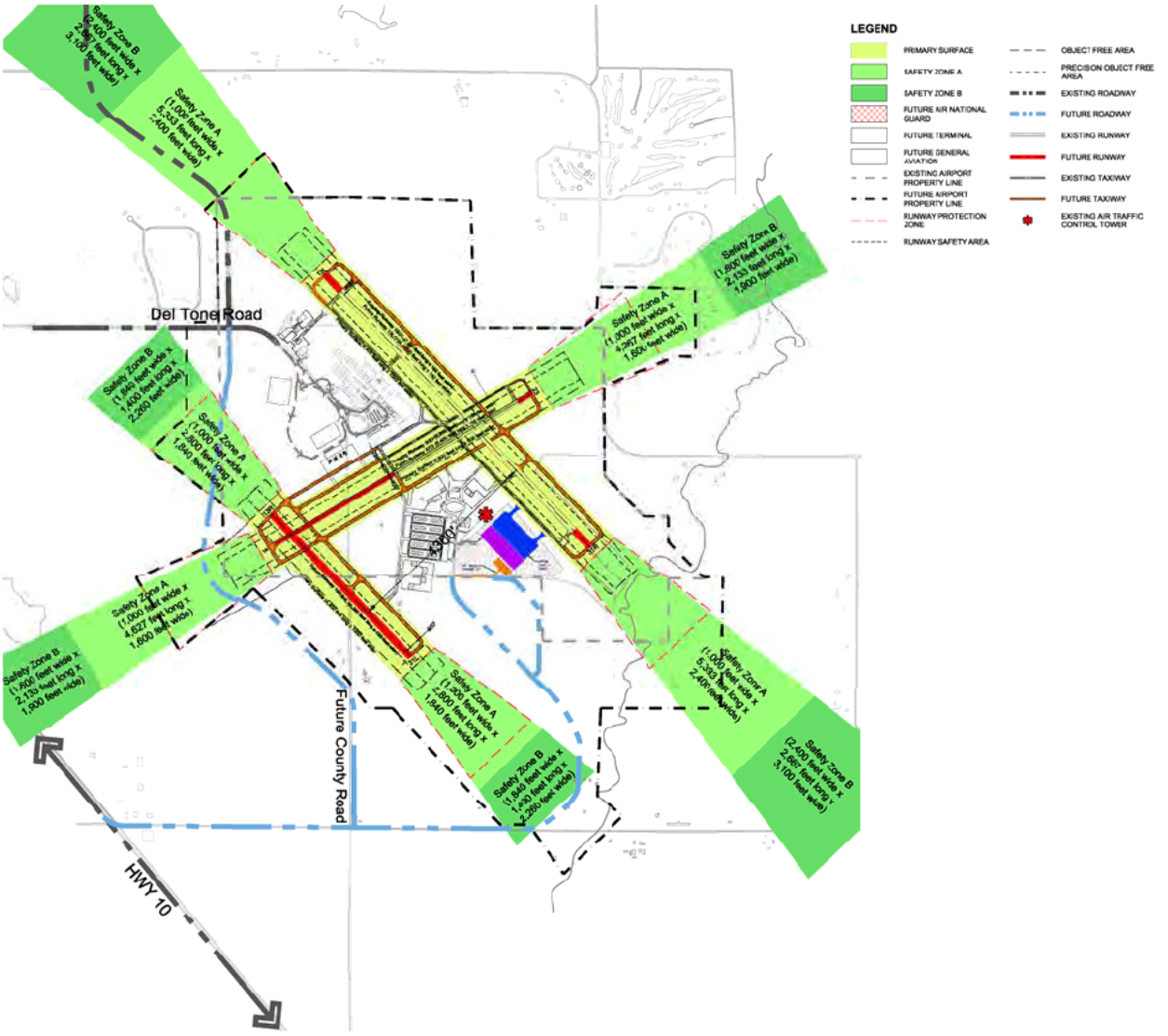
Exhibit 2

Airport Development Plan



Source: Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

The Ultimate Airport Development Plan will serve as the guide for land acquisition in order to protect the surrounding area for future Airport expansion. In addition, extension of the proposed general aviation training runway to 7,000 feet is included in the Ultimate ADP.

5. Development Timing

Implementation of the ADP should be based on demand and the need to provide additional capacity or replace facilities that are at the end of their useful lives. Ideally, the project elements should be implemented in sufficient time to accommodate growing demand, but not so early that facilities are underutilized and revenues do not materialize sufficiently to pay for the improvements. The ability to time implementation correctly requires an understanding of the factors that trigger the need for various project elements, ongoing monitoring of activity data, and an understanding of the length of

time it takes to complete projects under the Airport's and City's organization structure. Specific qualitative factors that should trigger implementation of various development elements of the ADP are illustrated in a simple decision tree on **Exhibit 3.**

In general, projects to support the Baseline Forecast would be implemented in the near-term (i.e., 2006 to 2013). These projects include land acquisition to support the ultimate ADP. Mid-term development could include projects to support the Second Hub or Charter Scenario operations, if either type of activity develops at the Airport, which would likely occur between 2011 and 2020. Finally, long-term development could support the Low Cost Carrier Scenario activity, including the development of terminal and associated landside facilities as well as extension of the crosswind runway and development of the 4,200-foot general aviation training runway.

6. Environmental Considerations

Environmental issues that could result from implementation of the ADP were quantitatively or qualitatively assessed to provide an indication of the type of environmental processing that may be required. Potential areas of impact associated with such development projects typically include consideration of areas exposed to significant levels of aircraft noise, as defined by exposure to 65 dBA day-night average sound level (DNL) and above; areas of potential land acquisition; and areas where the ground would be disturbed due to the development projects themselves. Exhibit 2 depicts the land acquisition and project footprint areas.

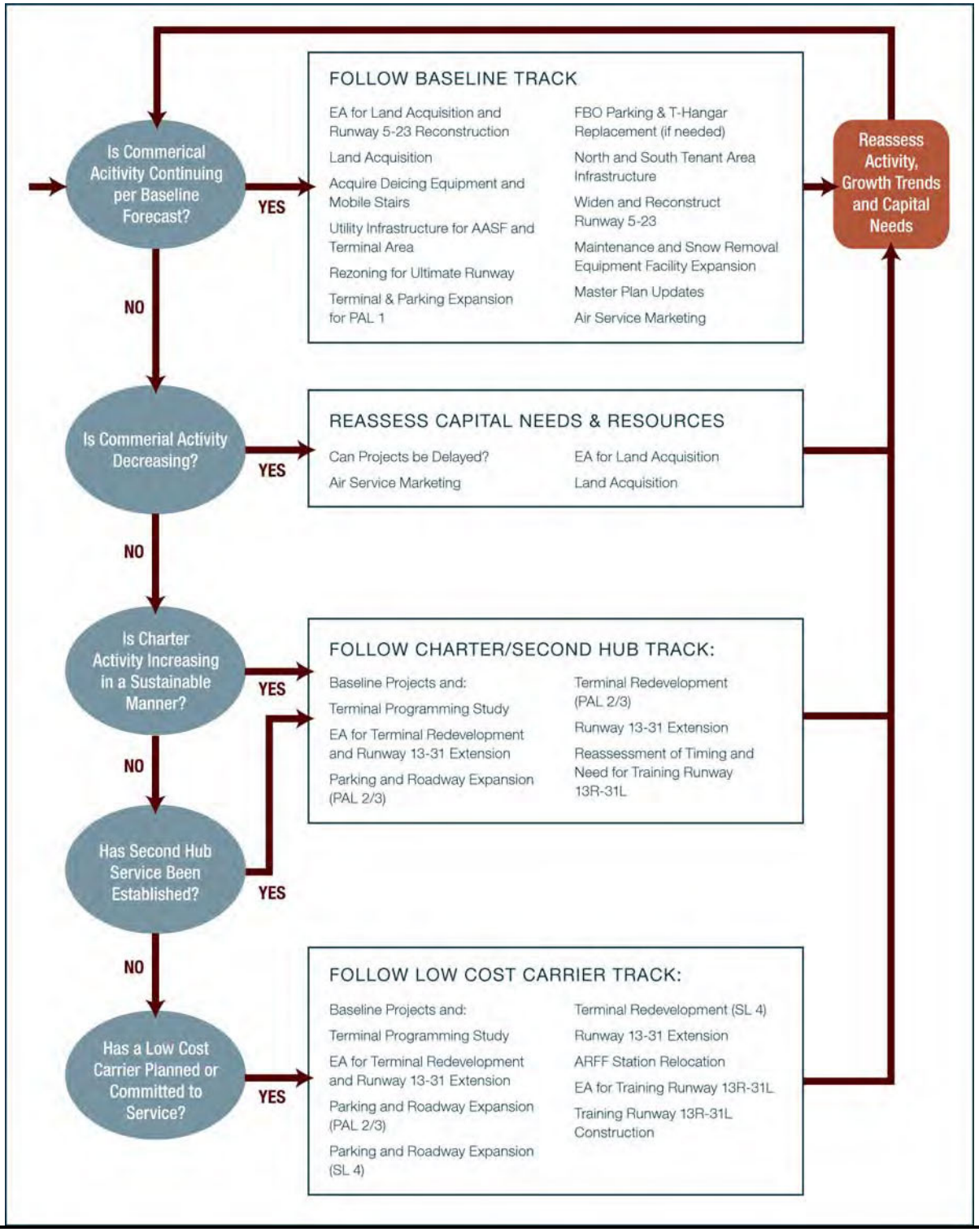
Exhibit 4 illustrates the existing (2004) and projected (SL 4) noise exposure contours, based on specific operational and physical conditions at the Airport. As shown, the DNL 65 noise exposure contours for both existing and future conditions are entirely within the Airport boundary and no homes, schools, or other noise-sensitive facilities would be affected.

Based on the development associated with ADP projects, the following potential environmental impacts have been preliminarily identified. More specific environmental analyses will be required when individual projects near the development stage and are submitted for environmental review.

- Social and induced socioeconomic impacts could result from acquisition and relocation of several residences around the Airport, as could changes to the surrounding roadway network, and these impacts would require consideration.
- Air quality analyses would likely be necessary to evaluate potential operational and construction impacts of projects, especially considering that St. Cloud is a maintenance area for carbon monoxide.
- Construction of individual ADP projects could affect storm water drainage, water wells, and wetlands at the Airport, and may require a National Pollutant Discharge Elimination System (NPDES) permit, Construction Stormwater Permits, review of Storm Water Pollution Prevention Plans (SWPPPs), a Section 404 (of the Clean Water Act) permit from the U.S. Army Corps of Engineers, and a permit from the Sherburne Soil and Water Conservation District.
- Department of Transportation Act, Section 4(f) lands evaluations would consider potential direct and indirect impacts to the Sand Prairie Wildlife Management Area.

Exhibit 3

Decision Tree

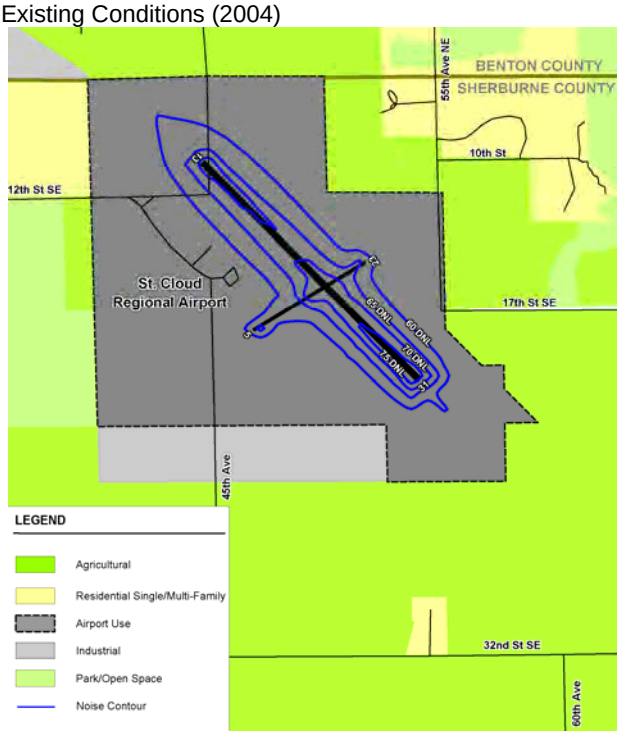


Source: Ricondo & Associates, Inc., December 2005
Prepared by: Ricondo & Associates, Inc.

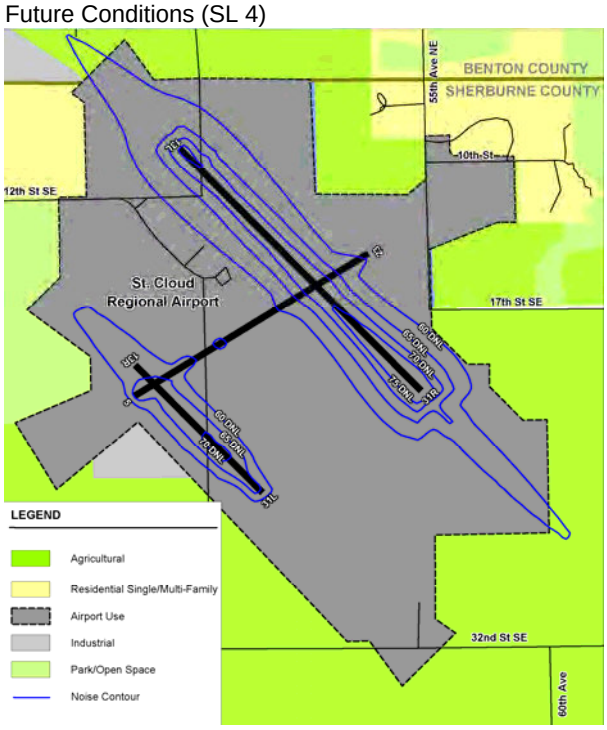
Exhibit 4

Noise Exposure Maps

Existing Conditions (2004)



Future Conditions (SL 4)



Source: Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

- The State Historic Preservation Office should be contacted regarding potential impacts to archaeological resources related to development in the vicinity of the Elk River, as well as the potential historical significance of any properties proposed to be acquired as part of the ADP.
- Potential fish, wildlife, and plant impacts may require various permits, such as a biological opinion if the project were to affect a federally protected species; an incidental take permit with a jeopardy/adverse modification biological opinion, and coordination with the Minnesota Department of Natural Resources given potential impacts to flora, fauna, and threatened and endangered species.
- Potential impacts to the Elk River floodplains from the grading of land and the approach lighting system associated with the extension of Runway 13L-31R should be considered.
- Farmland impacts are anticipated, as ADP projects would remove approximately 423 acres of farmland from production.

7. Financial Viability

The development projects recommended in the Master Plan would be funded from several sources. The City of St. Cloud will maximize the use of federal and State funds to leverage local investment. Potential funding sources include:

- Federal Grants-in-Aid under the Airport Improvement Program (AIP)
- Passenger facility charges
- Minnesota Department of Transportation, Airport Development Section grant programs
- State bond funds earmarked for property acquisition
- Third-Party Funds
- Local Funds

Additionally, a business plan was developed to provide a set of standards, financial tools, and action items to enable the City to better manage and develop the Airport, consistent with standard practices at similar airports.

8. Conclusion and Next Steps

Given regional conditions, St. Cloud Regional Airport has the potential to play a more significant role in the provision of air service in central Minnesota. However, it is essential that Airport management begin planning for this potential to position the Airport to accommodate growth when the time is right. To realize the Airport's potential, it is recommended that the City accomplish the following tasks in the near-term future (over the next five years):

- Complete the environment prerequisites for land acquisition.
- Secure federal, State, and other funding as soon as possible; acquire land necessary to implement the Master Plan recommendations; and establish the long-term configuration of the Airport.
- Establish appropriate land use and zoning restrictions necessary to protect the land from urban encroachment and development not compatible with commercial airport operations.
- Arrange for the services and equipment to be available on the Airport to attract charter airline service (ground handling and services equipment).
- Revise and update the Airport's air service development program to recognize the evolution of the airline industry in recent years. Implement the program to attract additional scheduled and charter air service while retaining the existing Northwest Airlink (Mesaba Airlines) service. Make at least eight sales calls per year to airline schedule and air route development departments.
- Position the Airport to take advantage of opportunities resulting from the Metropolitan Airports Commission's divestitures of less lucrative activities or activities that cannot be accommodated at MAC-run airports due to various constraints (e.g., land availability, capacity, congestion, etc.).
- Ensure that lease agreements with new tenants benefit the Airport enterprise in terms of revenues and needed support services.
- Support Statewide initiatives that would make State grants to the Airport more reliable.

1. Introduction

The Airport is located east of the City of St. Cloud, Minnesota, in the northern portion of Sherburne County. The Airport is owned and operated by the City of St. Cloud. An Airport Board appointed by the Mayor provides oversight, but not policy decision. The City of St. Cloud city council and city staff make policy decisions regarding the Airport. Daily operation is under the control of the Airport Director. Within the St. Cloud area there are several jurisdictions including: Benton, Sherburne and Stearns Counties, Haven and Minden Townships, and the cities of St. Cloud, Sauk Rapids, Sartell, and Waite Park. **Exhibit 1-1** depicts the St. Cloud area and the location of the Airport.

The Airport supports a variety of aviation activity, including commercial passenger service, corporate aviation, general aviation and flight training. Northwest Airlink provides commercial passenger service to and from Minneapolis-St. Paul International Airport. The Airport's new Airport Traffic Control Tower (ATCT) opened on November 8, 2004 under the operations of Midwest Air Traffic Control.

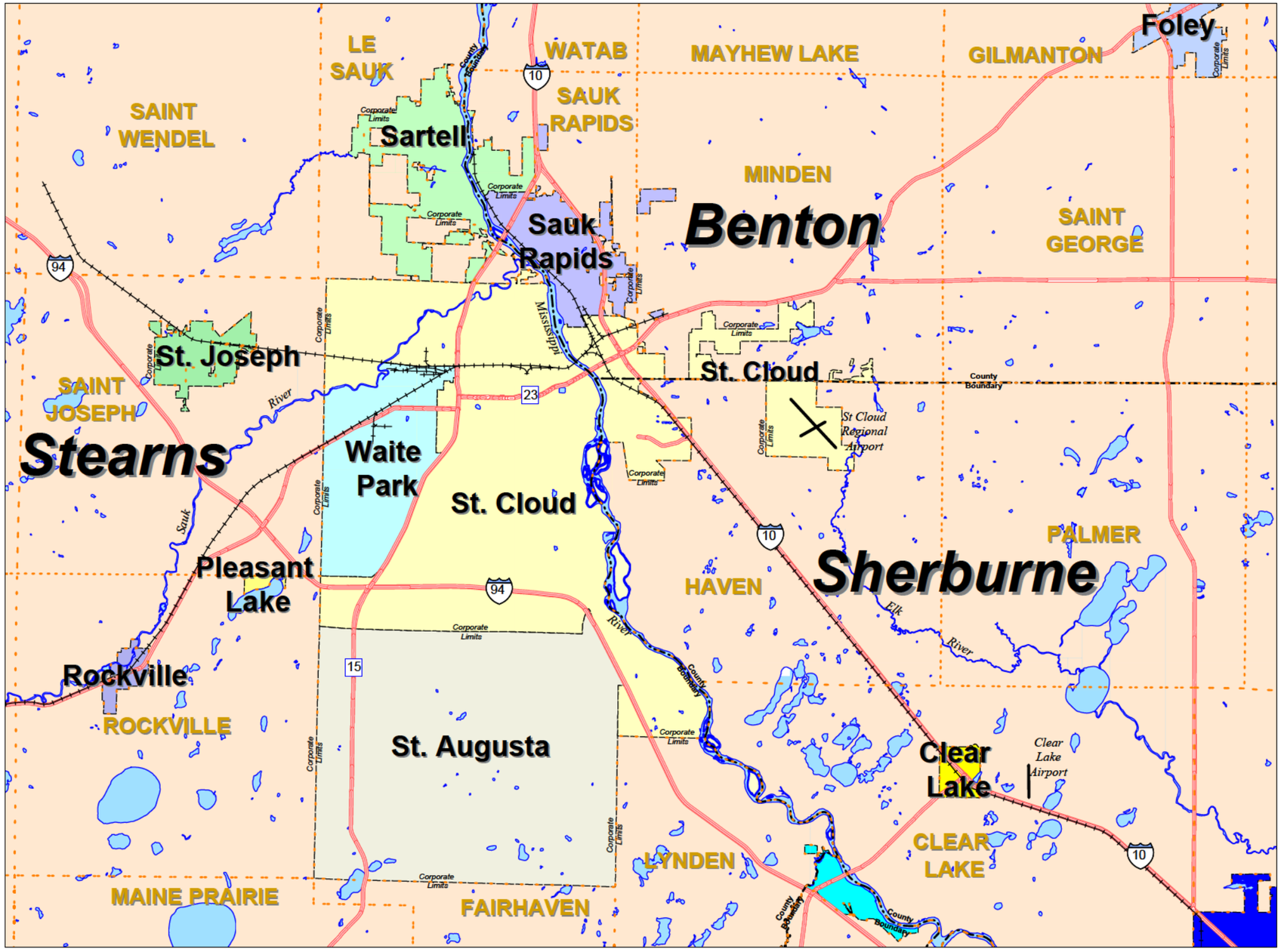
1.1 Purpose of this Master Plan Update

Minnesota Department of Transportation Office of Aeronautics (MnDOT) commissioned a *Tier 2 Air Service Study* (Tier 2 Study)[1] in 2001 to assess the potential for growth and development of smaller commercial service airports in the Minnesota and Wisconsin System of Airports. The Tier 2 Study, completed in June 2003, identified long-term opportunities for the St. Cloud Regional Airport, including serving as a:

- Spoke in mainline carrier networks
- Reliever airport for Minneapolis-St. Paul International Airport
- Business center for aviation related and commercial enterprise
- Regional triage center
- Center for aircraft maintenance
- Center for cargo and cargo distribution facilities
- Recipient of MSP airport divestiture
- Multi-modal transportation hub
- National guard headquarters and military training and deployment center

To prepare for these opportunities, the Tier 2 Study recommended that the Tier 2 airports work to improve air service at their individual and collective airports; plan for long term development of facilities and land acquisition to support those facilities; and implement detailed business planning and property management systems. In 2002, the cities of Brainerd and St. Cloud received $1 million from the US Department of Transportation, one of the largest first year Small Community Air Service Development Pilot Program grants. MnDOT, the Initiative Foundation and the cities of Brainerd and St. Cloud contributed additional funds. The business community also pledged support through the creation of two travel banks. Through the Air 21 Project, St. Cloud has been engaged in air service marketing with some successes despite current market conditions. In addition, the City of St. Cloud has extended the Airport's primary runway and commissioned the new Air Traffic Control Tower.

[1] *Tier 2 Air Service Study, Minnesota in Partnership with Wisconsin*, Office of Aeronautics, Minnesota Department of Transportation, June 2003.



Source: Minnesota Department of Transportation Office of Transporation Data & Analysis
Prepared by: Ricondo & Associates, Inc., Nov. 2004

Exhibit 1-1

north
0 12,000 Feet

N:\cad-symbols\maps\St Cloud\GIS\MNDOT\StCloud\St Cloud - Area.WOR

Vicinity of St. Cloud

Additionally, representatives of the Metropolitan Airports Commission (MAC), Metropolitan (Metro) Council, MnDOT and the Tier 2 Steering Committee recognized that the St. Cloud Regional Airport would be the logical site for an additional commercial service airport to serve the Minneapolis/St. Paul region. As such, it was recognized that the City of St. Cloud would need to move quickly to halt encroachment of residential and other incompatible land uses around the Airport in areas that may be needed for future Airport expansion. This Master Plan Study was initiated to identify areas required for potential long-term aviation development, prepare a plan for incremental expansion, and assist the City of St. Cloud in business and financial planning to support development.

1.2 The Region's Vision for the Airport

Interviews were held with airport stakeholders on October 20 - 22, 2004 in St. Cloud, and on October 26, 2004 by telephone. The Master Plan Study Team conducted these meetings to better understand the Airport sponsor's and public officials' vision for the Airport and ensure that the Study Team would be working from a common understanding of the issues with the Airport sponsor. The following people were interviewed:

- Mayor
- City Council Representatives
- City Administrator
- Finance Director
- Airport Director
- Public Services Director
- Director of Planning
- Airport Board
- St. Cloud Chamber of Commerce President
- St. Cloud Economic Development Partnership Director
- MnDOT Aeronautics Division Director and staff

From those interviewed, a common vision and set of issues emerged. Although the Master Plan Study will not include an air service initiative, issues regarding air service were discussed in the interviews and so are included in this initial discussion. The following points summarize the findings of the interview process.

- **Urban growth along the I-94/Highway 10 corridor between St. Cloud and Minneapolis/St. Paul, is expected to continue**, making the St. Cloud area a virtual suburb of the Twin Cities over a 10 to 20 year period. Not only are commuters expected to live in St. Cloud and work in the Twin Cities, but also commutes may occur the other way. Improvements to the ground transportation network will provide better north-south connections between St. Cloud and the Twin Cities, and east-west across the Mississippi River tying the west side of St. Cloud to the east and the Airport. Traffic congestion in the Twin Cities and along the corridor has made drive time longer and unreliable in terms of schedule. The planned North Star Rail Corridor is expected to improve connectivity between St. Cloud and the Twin Cities.
- **St. Cloud Regional Airport is the most likely second air carrier airport to serve the Twin Cities region** compared to any of the other Tier 2 airports (Duluth, Eau Claire, and Rochester). Proximity to the Twin Cities, Airport infrastructure, population growth trends, and the ability for the Airport to develop further are factors that contribute to this view.

- **Urban encroachment on the Airport is viewed as a serious issue that must be addressed quickly.** National developers have begun housing developments in various parts of the area. City growth is limited to the north and west due to environmental considerations and geology. Legislative action placed a moratorium on development within the state-specified air safety zones around all Minnesota airports that were in the process of conducting master plan updates. This moratorium, which expires in mid-May 2005, halted a residential development to the northwest of the St. Cloud Regional Airport. As development pressures increase, landowners will be more interested in selling, land values will increase, and political jurisdictions will be interested in reaping tax benefits of new development.
- **Some type of multi-jurisdictional development planning or oversight may be valuable for the Airport.** The City of St. Cloud prepares a long-range land use plan for the area in collaboration with the various townships, cities and counties. However, a coordinated, ongoing effort to review development plans could provide orderly development that would be mutually beneficial to the Airport and the various jurisdictions. The City of St. Cloud has orderly annexation agreements with both Minden and Haven townships (to the north and south of the Airport, respectively) that are expected to encourage collaborative development. All of these jurisdictions should participate in the Master Plan Study process.
- **St. Cloud area businesses and the general population are supportive of Airport initiatives and recognize the Airport as a significant economic generator.** A tax referendum to fund the runway extension several years ago passed in all six of the area cities. In a poll recently conducted of area businesses by the St. Cloud Area Chamber of Commerce, the Airport ranked number two in funding importance after the library.
- **Acquisition of property around the Airport will require a substantial investment, necessitating that the City obtains state and federal funding as well as support from other local jurisdictions.** Funding assistance will be needed from the State of Minnesota/MnDOT and the FAA, as well as other local jurisdictions such as Benton, Stearns and Sherburne counties. The City has been successful in obtaining funds for past projects and expects to continue in that success. The November 2004 regional tax referendum to extend the sales tax to fund various projects included a measure for funding land acquisition around the Airport. This measure passed by a wide majority.
- **If the Airport is to be a de facto part of the Minneapolis-St. Paul regional airport system, then coordinated marketing and planning with the MAC, as the sponsor of that airport system, would be useful in optimizing use of all airports within the region.** Informal coordination has been underway with MAC. One of St. Cloud's City Council representatives sits on the MAC board, and MAC representatives have been to visit the Airport to provide advice and insights.
- **The market will drive development, however the Airport needs to be poised to respond to opportunities.** The types of urban development that occur in St. Cloud and along the I-94/Highway 10 corridor will help determine the demand for air service. In addition, the Airport should be prepared to capitalize on opportunities due to migration of businesses or activity from the Twin Cities. Preparation of a long-term plan will define development areas on-Airport, verify the need for infrastructure improvements, allow identification of land acquisition and land use controls, and focus needs for funding. The development plan can be used to guide orderly incremental development of the Airport to increase revenues and ensure that development is compatible with long-term growth.

- **To be successful, the Airport needs to be easy to use, accessible, and comfortable.** Any plans for development should retain the ease of use since this is an important factor in travelers selecting to travel from the Airport. The Airport's user-friendly nature should be publicized to residents in the region.
- **The majority of residents in the area do not have a clear understanding of what goes on at the Airport and its importance to the community.** Unless residents travel from the Airport or have attended one of the open houses during Summerfest, there is very little opportunity to go to the Airport. Therefore, the general public has little understanding of the type or level of aviation activity that takes place at the Airport. The campaign to recruit the Air National Guard Blackhawk Helicopter Unit from St. Paul to St. Cloud broadened the public awareness of the Airport to some extent in terms of economic benefits and jobs, however, more could be done to draw the public to the Airport.
- **The Airport terminal will need to be expanded if a new carrier serves St. Cloud or multiple departures and or arrivals occur at the same time.** The passenger waiting area is cramped with more than one regional flight at a time. Security screening has exacerbated the condition. Parking may need to be expanded, and a restaurant facing the airfield (rather than the parking lot) might produce more interest and revenues.
- **The mix of aircraft traffic (commercial turboprops, corporate jets, student pilot training, and other general aviation) is the biggest concern in terms of airfield use and capacity.** The ATCT will improve safety, but is also expected to increase flight training traffic since it will provide valuable instrument approach training that can't be obtained at other nearby airports.

Although this Master Plan Study will not address air service, several comments regarding air service were received and should be considered when addressing the physical planning of the Airport. It was noted that charter flights from the Airport have been very popular, although the terminal isn't spacious enough to comfortably process the number of passengers using the larger charters. Frequency and reliability of service into and out of the Airport could be expected to boost usage of the Airport, as would air service to another hub destination. Flight delays and cancellations into and out of St. Cloud Regional Airport create hardships for travelers. Businesses want reliable, frequent, and economical air service with a choice of destinations when considering relocation to or expansion in the St. Cloud area. Service to another hub such as Chicago, Cleveland, Detroit, or Denver would open up new markets to travelers. It was also generally thought that the public would view jet aircraft, rather than turboprops, as a customer service improvement.

1.3 Master Plan Goals and Objectives

Based on the shared vision for the Airport, the Master Plan Study will take a two-pronged approach, presenting an implementable 20-year plan while also assessing anticipated needs to meet longer term growth over the 40 to 50-year period so that aviation resources can be protected from encroachment by residential and other incompatible land uses.

Goal 1: Protect for future airport development

Objectives:

- Identify and prioritize land acquisition needs for long-term airport development to allow the City to initiate environmental reviews and to raise the funds required to purchase the property.
- Prepare a "2050 Plan" for long-term (40 to 50-year) development. The 2050 Plan concept would generally define the "ultimate" airport boundaries, potential airfield configuration and capacity, on-Airport land use, access and utility infrastructure.
- Identify off-Airport land use controls that the City could implement, with the cooperation of other jurisdictions, to maintain compatibility.

Goal 2: Prepare a plan for logical, incremental Airport development to serve near-term demand

Objectives:

- Assess on-Airport physical improvements needed over the 20-year master planning period and use this as the basis for a long-term CIP for the Airport.
- Identify off-Airport physical improvements needed and/or programmed over the next 20 years and use this to focus efforts for funding by non-FAA sources.
- Identify appropriate sites for near term hangar development to meet existing demand.
- Within a business and financing plan, identify potential funding sources for land acquisition and development over the 20-year period.

Goal 3: Ensure that the planning process is accessible to the public and involves the various jurisdictions and stakeholders that have interest in the Airport

Objectives:

- Hold a series of committee meetings throughout the project to receive study information and provide feedback to the Study Team.
- Provide briefing materials to the Airport Director for posting on the City's Airport website.
- Provide a public workshop near the end of the planning process to present the study findings to the community and region.
- Support the City in providing additional briefings to regional employers, business leaders, and others not involved in the Study committees.

Goal 4: Support the City of St. Cloud in capital funding recruitment

Objectives:

- Prepare a financial plan and supporting documentation to help achieve reasonable participation or support from surrounding jurisdictions.

- Maximize federal grants in aid through program coordination with FAA and by providing materials to assist the City of St. Cloud in gaining the support of the Minnesota Congressional Delegation.
- Coordinate funding requirements with MnDOT and provide materials to assist the City of St. Cloud in gaining support from the region's legislative representation.

Goal 5: Identify opportunities and tools for revenue development

Objectives:

- Assess concession and commercial development possibilities for St. Cloud Regional Airport.
- Prepare an airport development plan that will accommodate various types of development including large and small operators.
- Develop business management tools and documentation that would facilitate leasing and major tenant recruitment by the City of St. Cloud.

An important by-product of this Master Plan Study should be increased public awareness of the Airport's needs and its benefits to the region. Through participation in the planning process, regional jurisdictions and stakeholders will better understand the challenges of and need for protection for future growth. The City will be have the tools to respond to opportunities for growth and development – whether it be additional air service or development of tenant facilities – in a logical, focused manner that supports long-term objectives.

2. Airport Inventory

2.1 Airport History

The Airport has been owned and operated by the City of St. Cloud since 1929. Some of the major milestones in the history of STC are documented below.

March 1929: 143 acres of land near Cable, Minnesota were donated by Ms. Alice Wheelock Whitney to construct a municipal airport for the City of St. Cloud.

May 1929: Whitney-Cable Airport was dedicated.

Dec. 1933: Construction started on Whitney Memorial II Airport (currently, the Whitney Drive area). Ms. Whitney traded the property of the original Whitney-Cable Airport for a larger tract of land north of town.

June 1935: Whitney Memorial II Airport opened.

Mid 1960s: Construction of homes, schools, and hospital expansion projects near the airport, along with no safety zones for the approaches and an unlit runway, caused unsafe conditions at Whitney Memorial II Airport.

1967: Due to the unsafe conditions, the City of St. Cloud selected, purchased, and developed a new 1,400-acre airport site four miles east of downtown St. Cloud on Del Tone Road.

1969: St. Cloud Municipal Airport was constructed. The new Airport resolved many of the unsafe conditions that occurred at the Whitney Memorial II Airport site. The new Airport had approach zones and a lighted, longer runway.

1970s: The City completed a number of Airport expansion projects, including a runway extension, taxiway extensions, a new airline terminal building, an ARFF station, a fuel farm, corporate hangars, T-hangars, maintenance hangars, and other aviation facilities.

1983: An Airport Advisory Board was formed to advise the City with regard to Airport operations and construction projects.

1988: Wright Aero purchased St. Cloud Aviation, a fixed base operator (FBO) at the Airport, which had been in existence since the Airport opened in 1969.

July 1993: Mesaba Airlines established service between STC and Minneapolis-St. Paul International Airport with the 19-seat Swearingen Metroliner.

Dec. 1995: Due to increased passenger traffic and the need for an updated terminal facility, a new terminal was designed and constructed; the terminal opened on this date.

Oct. 1997: A full-time Airport Manager was hired.

1999: An Aircraft Rescue and Fire Fighting (ARFF) Facility was constructed.

2000: The most recent Airport Master Plan was completed.

Nov. 2004: The Airport Traffic Control Tower (ATCT) opened on November 8.

Dec. 2004: The Minnesota Air Guard announced that it will relocate half of its Blackhawk helicopter maintenance operation stations from St. Paul Downtown Airport to STC.

2005: The Snow Removal Equipment (SRE) building addition was constructed.

A view of the airfield is shown on **Exhibit 2-1**.

Exhibit 2-1

Airfield Viewed from the South



Source: SEH, Inc.
Prepared by: SEH, Inc.

2.2 Airport Location/Access

2.2.1 Location and Current Access

St. Cloud Regional Airport is located along U.S. Highway 10 in Sherburne County, approximately 60 statute miles northwest of Minneapolis-St. Paul and approximately 4 miles southeast of downtown St. Cloud (via Highway 23). The Airport is situated on approximately 1,413 acres of land and occupies land in all or portions of Sections 3, 4, 9, 10, and 11 in Township 35 North – Range 30 West. The City of St. Cloud controls an additional 421 acres through easements. The September 2003 Comprehensive Plan established land use patterns around the Airport based on compatibility with Airport operations. According to the 2005 *Airport Facility Directory*, the Airport has an Airport Reference Point (ARP) of N 45° 32.79' W94^{o} 03.59' and an elevation of 1,031 feet above mean sea level (MSL).

The Airport is accessible from Highway 10 via Del Tone Road (12th Street), from the south via County Road 65 and 45th Avenue, and from Interstate 94 (I-94). The landside access system at STC consists of a two-lane on-Airport roadway system, which serves as the link between the area highway system, the terminal area, and other primary Airport destinations. The access system also includes a terminal area curbside system and public and employee parking lots. The curbside drop-off area is 135 feet long and is designated for three lanes.

According to the Federal Aviation Administration's (FAA) 2005-2009 *National Plan of Integrated Airport Systems* (NPIAS) report, STC is one of 10 airports in Minnesota with commercial airline service. However, one of those commercial service airports has lost service; therefore, currently nine airports in Minnesota have commercial airline service. **Exhibit 2-2** shows the location of STC in Minnesota in relation to the other commercial service airports. **Exhibit 2-3** is a United States Geological Survey (USGS) map showing the Airport's location with respect to the City of St. Cloud. **Exhibit 2-4** is an aerial photograph of the Airport environs.

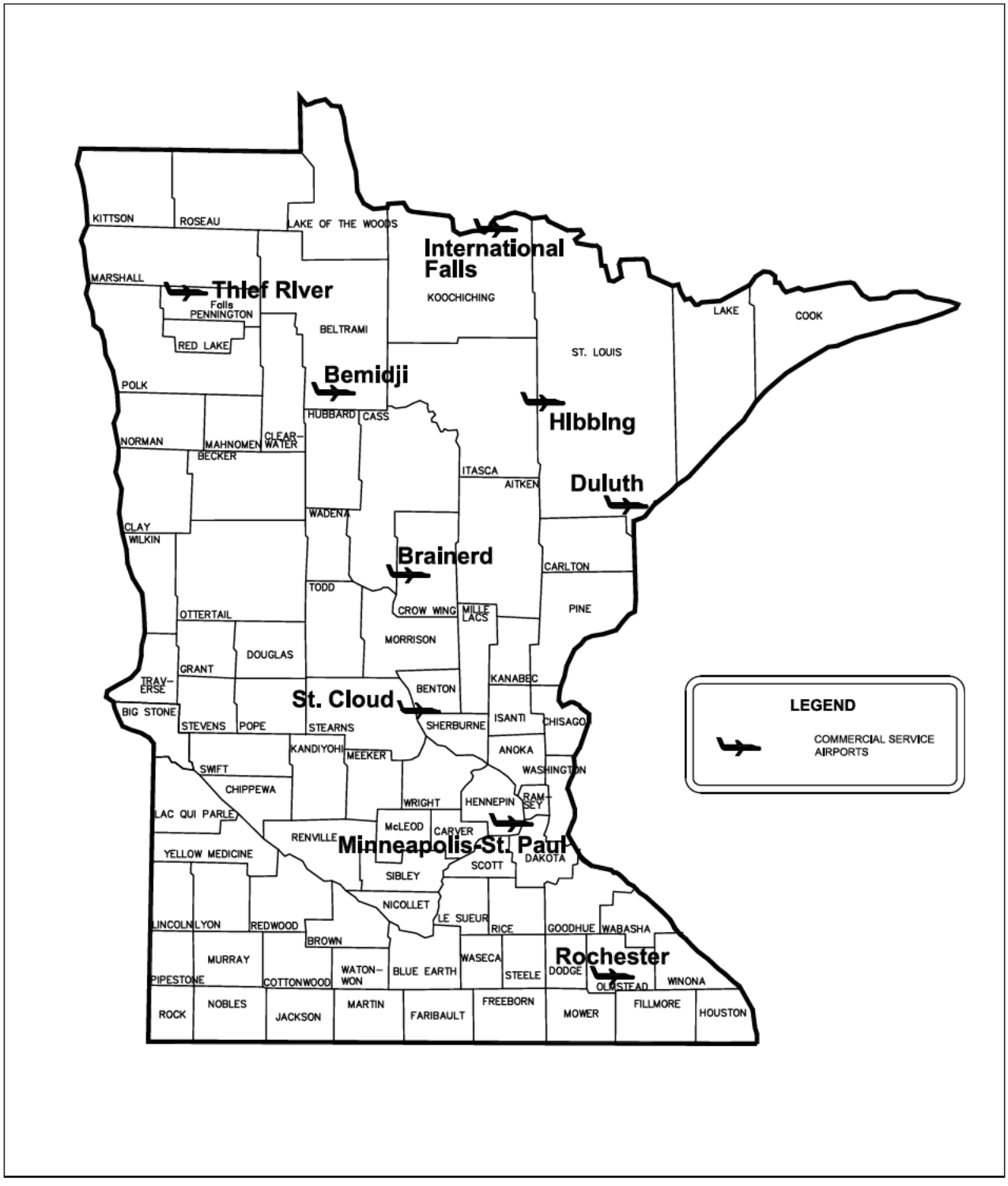
In addition, there are 21 public use general aviation (GA) airports within a 50-mile radius of the Airport, as listed in **Table 2-1**.

Table 2-1

Public Airports within 50 Miles of St. Cloud Regional Airport

Airport Code	City	Airport Name	Approx. Distance and Direction from STC (miles)	Controlled
6D1	Brooten	Brooten Municipal	44.3 W	No
CFE	Buffalo	Buffalo Municipal	25.0 SSE	No
CBG	Cambridge	Cambridge Municipal	33.4 E	No
8Y5	Clarissa	Clarissa Municipal	49.1 NW	No
8Y6	Clear Lake	Leaders Clear Lake	7.2 SSE	No
25D	Forest Lake	Forest Lake	48.3 ESE	No
GYL	Glencoe	Glencoe Municipal	47.4 S	No
HCD	Hutchinson	Hutchinson Municipal-Butler Field	43.4 SSW	No
LJF	Litchfield	Litchfield Municipal	32.9 SW	No
LXL	Little Falls	Little Falls-Morrison County	27.0 NNW	No
14Y	Long Prairie	Long Prairie -Todd Field	40.1 WNW	No
MGG	Maple Lake	Maple Lake Municipal	18.9 S	No
18Y	Milaca	Milaca Municipal	22.5 NE	No
ANE	Minneapolis	Anoka County/Blaine-Janes Field	43.1 SE	Yes
MIC	Minneapolis	Crystal	41.6 SE	Yes
JMR	Mora	Mora Municipal	38.8 ENE	No
2P3	Paynesville	Paynesville Municipal	30.7 WSW	No
PNM	Princeton	Princeton Municipal	19.0 E	No
ROS	Rush City	Rush City Regional	47.3 E	No
D39	Sauk Centre	Sauk Centre Municipal	37.9 WNW	No
10D	Winsted	Winsted Municipal	35.8 S	No

Source: AirNav, LLC.
Prepared by: Ricondo & Associates, Inc. and SEH, Inc.



Source: SEH Inc., November 2004.
Prepared by: SEH Inc., November 2004.

Exhibit 2-2

Not to Scale

north

Airport Location Map

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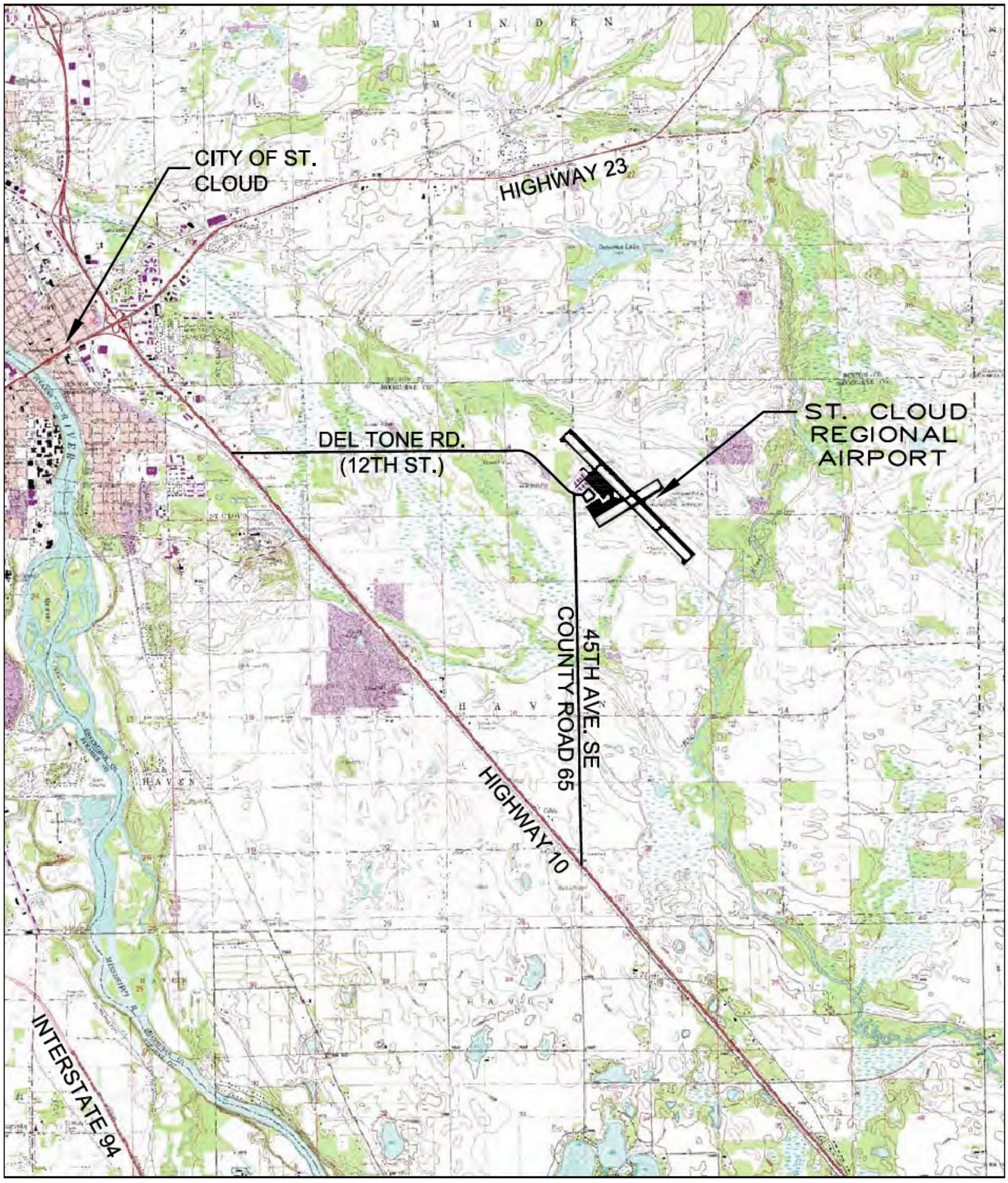

Source: USGS 7.5-Minute Quadrangle Series Map, 1993
Prepared by: SEH Inc., April 2005

Exhibit 2-3

0 6,000 ft.

north

Airport Vicinity Map

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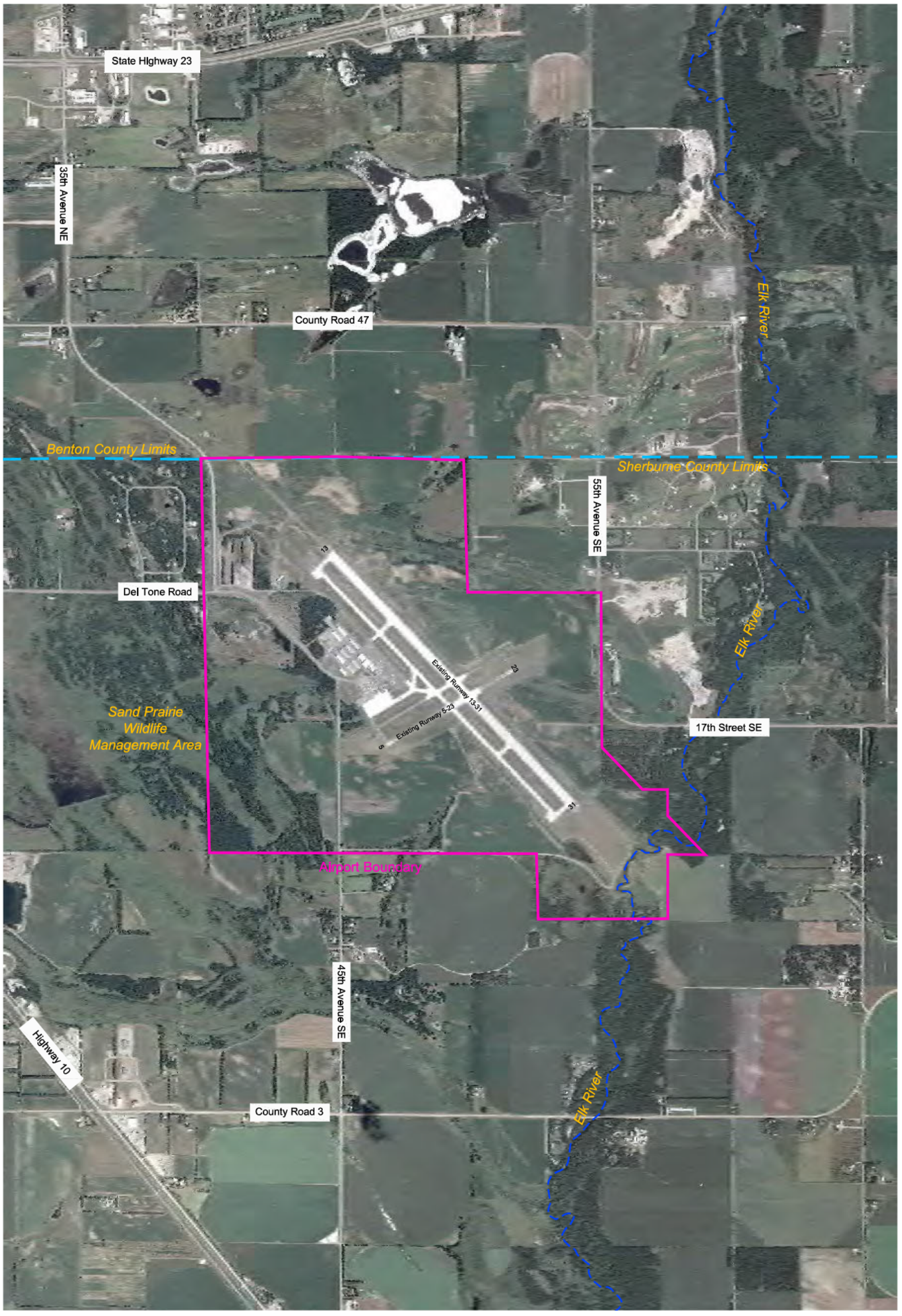

Source: Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Exhibit 2-4

0 2000 ft.

north

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Airport Environs

Master Plan Update
Airport Inventory

December 2006

2.2.2 Future Access Plans

Future plans are to develop a new connection between I-94 and Highway 10 that provides a more direct routing to the Airport. The Minnesota Department of Transportation (MnDOT) District 3 St. Cloud office is currently planning and responsible for this project. The connection is planned to begin approximately two miles south of the existing Clearwater exit on I-94 and head north, crossing State Highway 24 and connecting with Highway 10 a mile and a half north of Clearwater. The connection will allow for a faster northbound and southbound connection between the two highways and bypass the stoplights on State Highway 24. Construction of the connection is tentatively scheduled to begin in 2015, with a completion date in 2019.

Another future improvement to the transportation system between the Twin Cities and St. Cloud is the Northstar Corridor Railway. The railway is planned to provide a mass transit light rail system for commuters to the downtown metropolitan area of Minneapolis-St. Paul. The initial plans were for the transit system to stop in St. Cloud; however, the final destination is currently planned for Big Lake, Minnesota, approximately 27 miles south of St. Cloud.

Sherburne County has plans to continue the extension of 35th Avenue NE to link with County Road 3 south of the Airport. The section of 35th Avenue NE between Del Tone Road and Highway 23 north of the Airport was recently completed. The southern extension is generally planned to flow along the western Airport boundary, and then curve eastward to tie into 45th Avenue SE. Benton County's 28/9 Study is identifying a corridor extending north from the Airport, crossing Highway 23, and connecting to Highway 10 in Sauk Rapids. This roadway will serve as an eastern loop around the St. Cloud area.

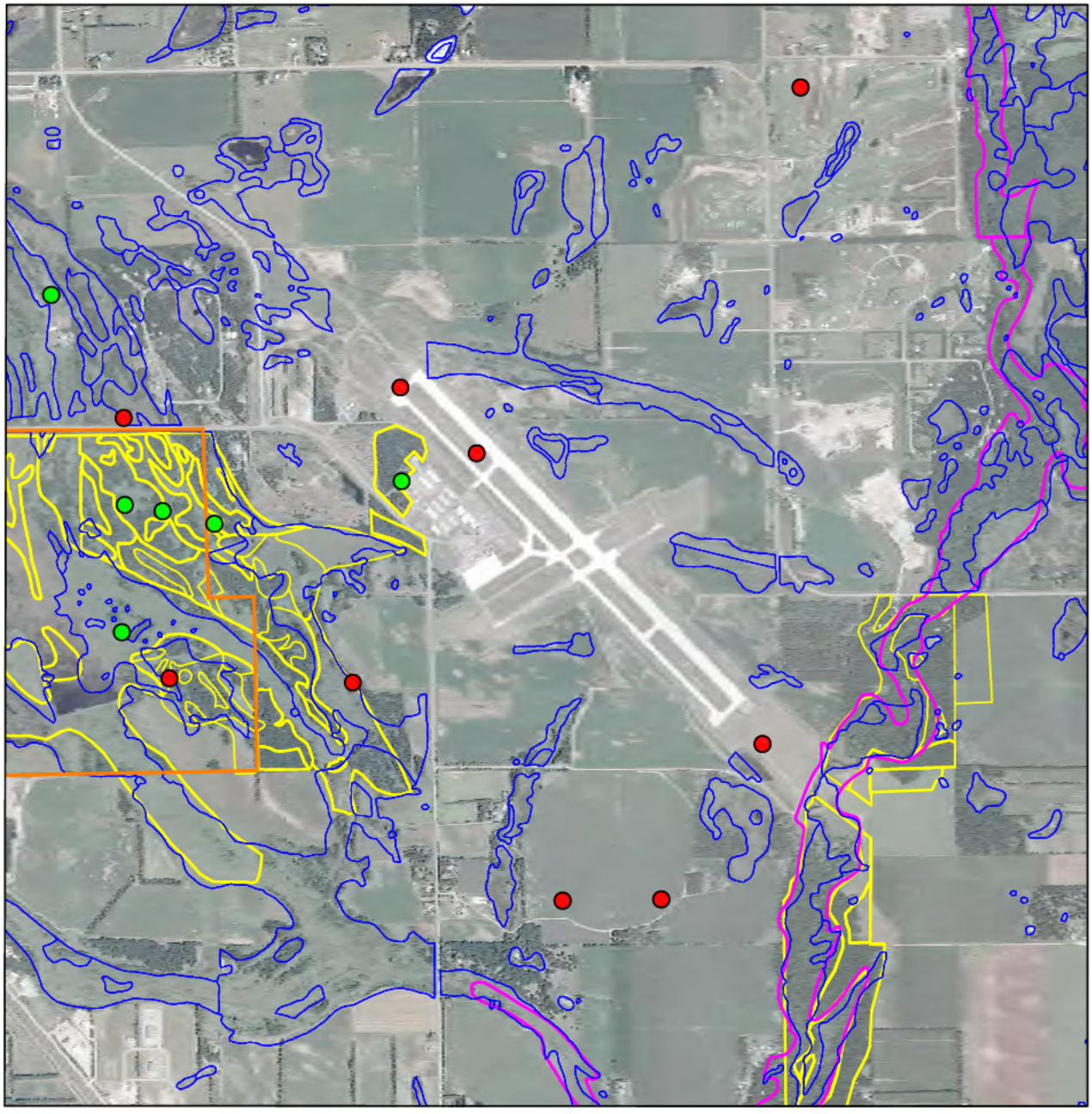
2.3 Topography/Soils/Environmentally Sensitive Areas

STC is located in a relatively flat area. The Elk River is located southeast of the Airport, and wetlands and wooded areas are located to the west and northwest.

According to a geotechnical evaluation prepared in May 1999, the soils on the Airport are mainly reddish, yellow, and brown and are classified as poorly graded sands. The majority of the sands are fine to medium-grained, with some silt present. The soils are classified as moist and wet to water-bearing, with loose to medium range of density. Topsoil in undisturbed areas is generally about six inches thick.

Exhibit 2-5 shows environmentally sensitive areas in the area surrounding STC. The Sand Prairie Wildlife Management Area borders the Airport to the west, the Elk River borders it to the east and south, and residential development borders the Airport to the north.

According to the *Comprehensive Plan* for the City of St. Cloud, the "land within and adjacent to the Airport represent the highest biodiversity in the St. Cloud area. Nine occurrences of rare animal species, including Blandings Turtle, the sandhill crane, and the western hognose snake, have been reported in the Airport area. In addition, a rare oak savannah community is located within the Sand Prairie Wildlife Management Area, which is adjacent to the Airport." Additional oak savannah and wetlands areas are located on Airport property.



LEGEND:

- Wetlands
- Native Plant Communities
- Floodplain
- Sand Prairie Wildlife Management Area
- Rare Plant/Habitat
- Rare Wildlife Species

Sources: Wetlands - National Wetlands Inventory USFWS, June, 1980; Rare Species - Natural Heritage Program MNDNR, 2004
Native Plant Communities - Minnesota County Biological Survey MNDNR, 2004; Floodplain - FEMA Floodplain, 2004
Sand Prairie Wildlife Management Area - Wildlife Management Areas MNDNR, 2004

Prepared by: SEH Inc., April 2005.

Exhibit 2-5

0 2,500 ft.

north

Environmentally Sensitive Areas in the Airport Vicinity

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An "Environmentally Sensitive Area Ordinance" has been adopted by the City of St. Cloud "to provide and encourage measures of protection to those properties identified as Environmentally Sensitive Areas (ESAs.)" ESAs are areas that contain native vegetation and natural features and/or natural resources. The ESA Ordinance is intended to work in concert with the Comprehensive Plan to help guide orderly growth.

2.4 Airport Classification

The FAA classifies airports by the type of traffic they accommodate or are designed to accommodate. Each airport, and sometimes each runway at each airport, is assigned an Airport Reference Code (ARC), which is used to relate design criteria to the operational and physical characteristics of the aircraft intended to operate at that airport. The ARC is based on two aircraft components: Aircraft Approach Category (aircraft approach speed) and Airplane Design Group (ADG) (aircraft wingspan).

The FAA has designated five Aircraft Approach Categories, as shown in **Table 2-2,** and six Airplane Design Groups, as shown in **Table 2-3**.

Table 2-2

FAA Aircraft Approach Category

Category	Aircraft Approach Speed
A	Less than 91 knots
B	91 knots or more, but less than 121 knots
C	121 knots or more, but less than 141 knots
D	141 knots or more, but less than 166 knots
E	166 knots or more

Source: FAA Advisory Circular 150/5300-13 CHG 7, *Airport Design*, October 1, 2002.
Prepared by: SEH, Inc.

Table 2-3

FAA Airplane Design Group

Airplane Design Group	Wingspan
I	Up to, but not including, 49 feet
II	49 feet up to, but not including, 79 feet
III	79 feet up to, but not including, 118 feet
IV	118 feet up to, but not including, 171 feet
V	171 feet up to, but not including, 214 feet
VI	214 feet up to, but not including, 262 feet

Source: FAA Advisory Circular 150/5300-13 CHG 7, *Airport Design*, October 1, 2002.
Prepared by: SEH, Inc.

The current Airport Layout Plan (ALP) for STC, dated February 6, 2001, indicates that Runway 13-31 is designed for ARC B-II standards and proposed for ARC C-III, with an ultimate ARC C-IV designation. Runway 5-23 is currently ARC B-II with a proposed and ultimate designation of ARC C-III.

According to the latest (1999) version of the Minnesota State Aviation System Plan (SASP) published by the MnDOT, STC is classified as a Key System Airport. As defined in the 1999 Minnesota SASP, Key System Airports "have paved and lighted primary runways of at least 5,000

feet in length. They are capable of accommodating all single engine aircraft along with larger multi-engine aircraft and most corporate jets. There are 27 key airports in the state."

2.5 Critical Aircraft

The critical aircraft for any given airport is defined as the aircraft (or group of aircraft) whose dimensional and/or performance characteristics are the basis for selection of facility design criteria. According to FAA Advisory Circular (AC) 150/5325-4A, *Runway Length Requirements for Airport Design*, the critical aircraft must be demonstrated to account for a minimum of 250 annual or forecast annual operations.

The current critical aircraft operating at STC is the 34-seat Saab 340 (ARC B-II) operated by Northwest Airlink/Mesaba Airlines. This aircraft accounted for 8,026 annual operations at the Airport in 2003. Mesaba currently offers six daily round trip flights to Minneapolis/St. Paul International Airport.

At the time of the primary runway/taxiway reconstruction in 2001, the ultimate goal was to provide a facility to more safely and efficiently accommodate the existing critical aircraft and also to provide a runway length to attract low-cost airline service. Therefore, justification for the runway extension to 7,000 feet was based on the existing critical aircraft (Saab 340), but the pavement strength was based on a planned ultimate critical aircraft in the ARC C-III category (MD-82).

2.6 Airfield

The components of the current airfield are summarized in this section, including the runway and taxiway system, aprons, navigational aids, and airfield lighting.

2.6.1 Runways and Taxiway System

2.6.1.1 Runway 13-31

Runway 13-31 is the primary runway at STC and is used for commercial airline operations. It was constructed in 1969, rehabilitated in 1985, and reconstructed and extended in 2001 to the present dimensions of 7,000 feet long by 150 feet wide. The runway is constructed of 12 inches of Portland cement concrete (PCC) over 12 inches of aggregate base course over 24 inches of granular borrow. The runway also has 25-foot paved shoulders on either side, consisting of three inches of asphaltic pavement over six inches of aggregate base and granular borrow. Blast pads on both runway ends are 200 feet by 200 feet and marked with chevrons.

The runway is equipped with high intensity runway lights (HIRL), a medium intensity approach lighting system with runway alignment indicator lights (MALSR), precision approach path indicators (PAPIs), and runway end identifier lights (REILs). The pavement is marked for a precision instrument approach.

Runway 13-31 is served by a full length parallel taxiway (Taxiway A) with medium intensity taxiway lights (MITL) and is of the same construction as the runway. The taxiway is offset from the runway (centerline to centerline) by 400 feet, and is 60 feet wide with 20-foot paved shoulders on either side, of the same construction as the runway shoulders.

Four connector taxiways link Runway 13-31 to Taxiway A, the air carrier apron, the general aviation apron, and the general aviation terminal area. The connector taxiways are of the same width, length, and construction as Taxiway A and are labeled A-1 through A-4, beginning at the south end of the airfield and progressing north. At each runway end, there are "holding bays" for aircraft waiting to take-off.

See **Exhibit 2-6** and **Table 2-4** for additional runway information.

2.6.1.2 Runway 5-23

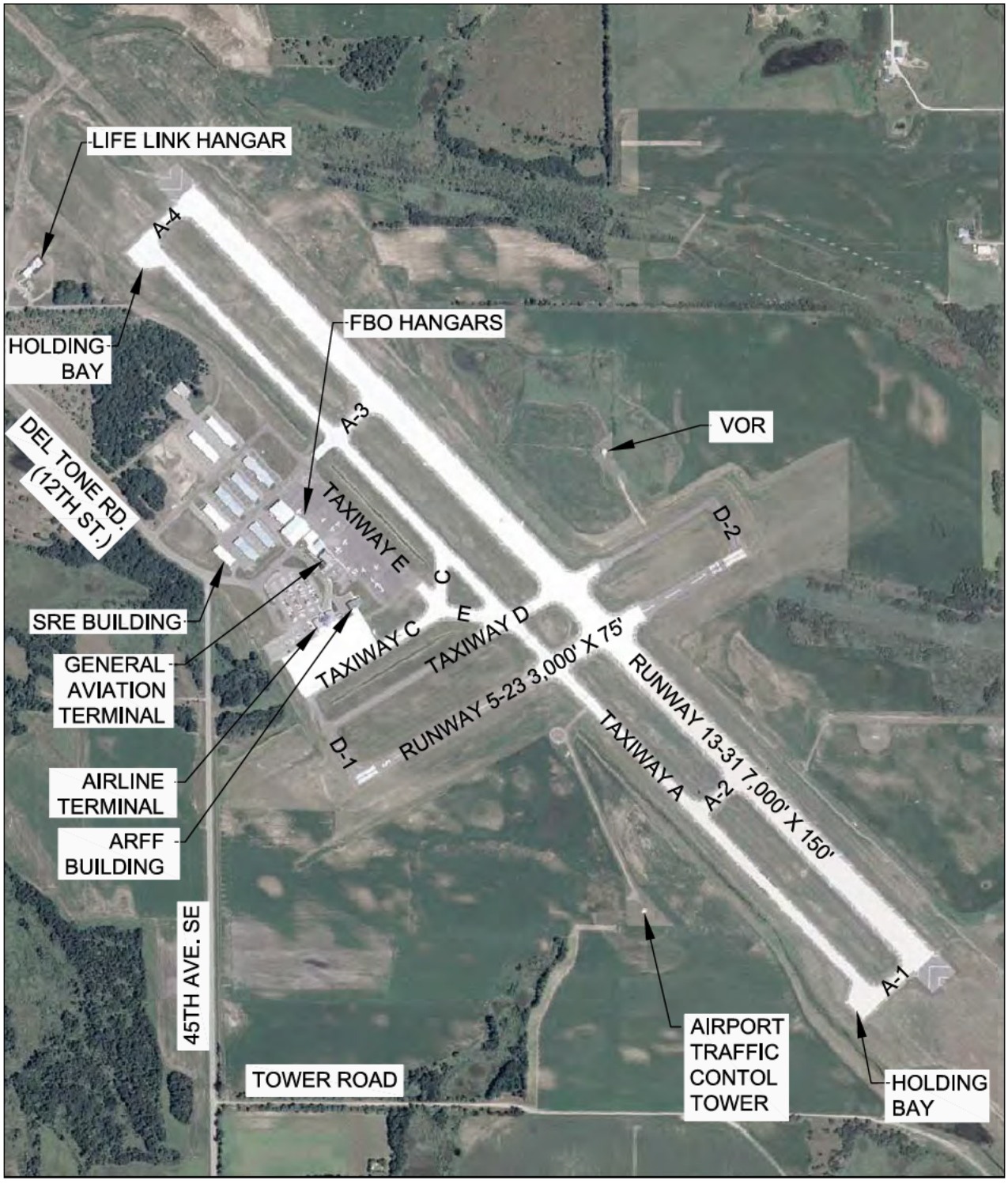
Runway 5-23 is the secondary or crosswind runway at STC and is used exclusively by smaller general aviation aircraft. The length of the runway is not adequate for commercial airline operations. It was constructed in 1969, rehabilitated in 1985, and partially reconstructed in 2001. The runway is 3,000 feet long and 75 feet wide. The runway is constructed of both PCC and asphaltic concrete and has been maintained with the addition of a porous friction course (PFC). The intersections of Runways 13-31 and 5-23 were reconstructed in 2001 in preparation for the eventual reconstruction of the entire Runway 5-23. This portion of the runway is of the same construction as Runway 13-31. The rehabilitation in 1985 (the remaining portion of Runway 5-23) was constructed with a typical section of 1-inch PFC, 3 inches of bituminous base course placed in two 1.5-inch lifts, and 6 to 7 inches of aggregate base.

The runway is equipped with medium intensity runway lights (MIRL) and is marked for a non-precision instrument approach.

Runway 5-23 is served by a full-length parallel taxiway (Taxiway D) with MITL. The taxiway is offset from the runway (centerline to centerline) by 400 feet. The portion of Taxiway D that crosses Runway 13-31 and Taxiway A was reconstructed as part of the construction of Runway 13-31 and Taxiway A. This section of Taxiway D is 60 feet wide with shoulders 20 feet wide on both sides. Beyond this reconstructed section to the east and to the west, the taxiway is 40 feet wide and is assumed to be of similar construction to the typical section of Runway 5-23, completed in 1985.

Two connector taxiways link Runway 5-23 to Taxiway D, the air carrier apron, the general aviation apron, and the commercial passenger terminal area. The connector taxiways are assumed to be of the same construction as the remaining portion of Runway 5-23. The connector taxiways are labeled D-1 on the Runway 5 end and D-2 on the Runway 23 end. Taxiway D-1 is 50 feet wide and extends to Taxiway C and the air carrier apron (discussed in the next section). Taxiway D-2 is 60 feet wide.

Taxiway C runs parallel to Taxiway D, is 60 feet wide with 20-foot paved shoulders on either side, and is of PCC construction. Taxiway C runs along the air carrier apron extending to the northeast and then turning 45 degrees in a north direction and terminating at Taxiway A. Taxiway E runs parallel to Taxiway A, is 40 feet wide, and is of asphaltic construction. Taxiway E runs along the general aviation apron, beginning approximately 350 feet north of Taxiway A-3, extending southeast to the Taxiway C/E intersection, and then turning approximately 45 degrees in an easterly direction and terminating at Taxiway A.



Sources: SEH Inc.; USDA FSA Digitial Orthorectified Quarter Quadrangle, 2003.
Prepared by: SEH Inc., April 2005

Exhibit 2-6

0 1,000 ft.

north

Existing Airport Layout

P:\STC\Phase 02 Inventory\SEH Exhibits\fig Existing Airport.dwg

Table 2-4

Runway Characteristics

Runway Characteristic	Runway 13-31	Runway 5-23
Length (ft)	7,000	3,000
Width (ft)	150	75
Runway Pavement	Concrete	Concrete- Asphalt PFC
Effective Runway Gradient (%)	0.19	0.09
Design Pavement Strength (lbs)		
▪ Single gear	75,000	50,000
▪ Dual gear	175,000	75,000
▪ Dual tandem gear	280,000	Not Applicable.

Source: *2005 Airport Facility Directory North Central U.S.*, U.S. Department of Transportation, March 2005
Prepared by: SEH, Inc.

2.6.2 Aprons

STC has two aircraft parking aprons. One is used mainly for air carrier aircraft operations and the other for general aviation (GA) operations.

The air carrier apron is adjacent to the Airline Terminal Building and is approximately 250 feet by 600 feet, excluding Taxiway C. This apron was designed to accommodate the forecast critical aircraft in the C-III category, the MD-82. The apron was designed to accommodate two ARC C-III aircraft at one time. Therefore, the construction of this apron is the same as that of primary Runway 13-31 and its parallel taxiway, including 12 inches of PCC, 12 inches of aggregate base, and 24 inches of granular borrow.

The apron was also designed with a glycol recover pump station to recover the glycol used to de-ice air carrier aircraft. A catch basin was installed on the apron with a plugging mechanism to be used when glycol is applied. The glycol can then be pumped from the catch basin and disposed of in an environmentally friendly manner. When glycol is not being applied, the catch basin is left unplugged so that storm water can drain through the existing storm water drainage system.

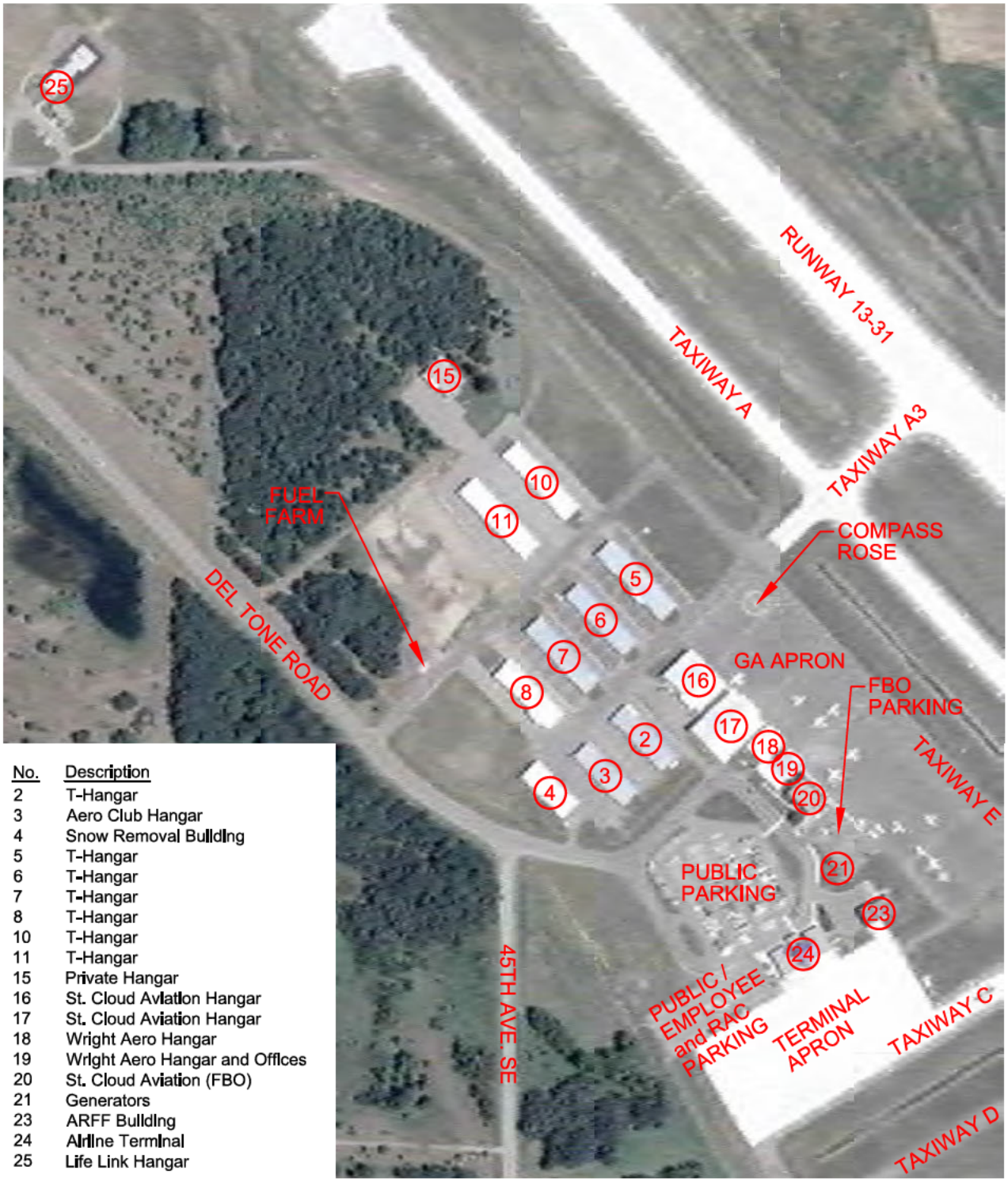
The GA apron is 240 feet by 1,018 feet, excluding Taxiway E, and is adjacent to the General Aviation Building. The apron is used to park general aviation aircraft and is designed to accommodate 35 aircraft for short-term parking or longer-term tiedowns.

The aprons and other terminal buildings and spaces are shown on **Exhibit 2-7**.

2.6.3 Airfield Pavement Condition

The Minnesota Department of Transportation, through inspection and contracted pavement evaluations, provides regularly updated pavement condition reports for Minnesota airports.

During the 1970s, the US Army Corps of Engineers developed a standardized pavement condition index, or PCI. The PCI is a numerical representation of the condition of a pavement section at the time of its inspection. An index of 100 indicates new pavement, and an index of 0 indicates pavement that has failed. Indices that fall between these numbers indicate proportionate pavement conditions. The PCI rating is primarily based on the accurate identification of certain visual indications of pavement distress and deterioration. The procedures for conducting these investigations are outlined in FAA Advisory Circular 150/5380-6A, *Guidelines and Procedures for Maintenance of Airport Pavements*.



No.	Description
2	T-Hangar
3	Aero Club Hangar
4	Snow Removal Building
5	T-Hangar
6	T-Hangar
7	T-Hangar
8	T-Hangar
10	T-Hangar
11	T-Hangar
15	Private Hangar
16	St. Cloud Aviation Hangar
17	St. Cloud Aviation Hangar
18	Wright Aero Hangar
19	Wright Aero Hangar and Offices
20	St. Cloud Aviation (FBO)
21	Generators
23	ARFF Building
24	Airline Terminal
25	Life Link Hangar

Source: USDA FSA Digital Orthorectified Quarter Quadrangle, 2003.
Prepared by: SEH Inc., April 2005

Exhibit 2-7

0 400 ft.

north

Existing Support / General Aviation Facilities

P:\STC\Phase 02 Inventory\SEH Exhibits\fig Existing Facilities.dwg

Both the FAA and the State of Minnesota endorse the PCI system for evaluating pavements. MnDOT conducted a pavement evaluation at STC in 2004. The results of that evaluation, during which pavement conditions at the time of the inspection and estimated pavement condition indices through 2009 were documented, are summarized in **Table 2-5**. This information is presented graphically on **Exhibit 2-8**.

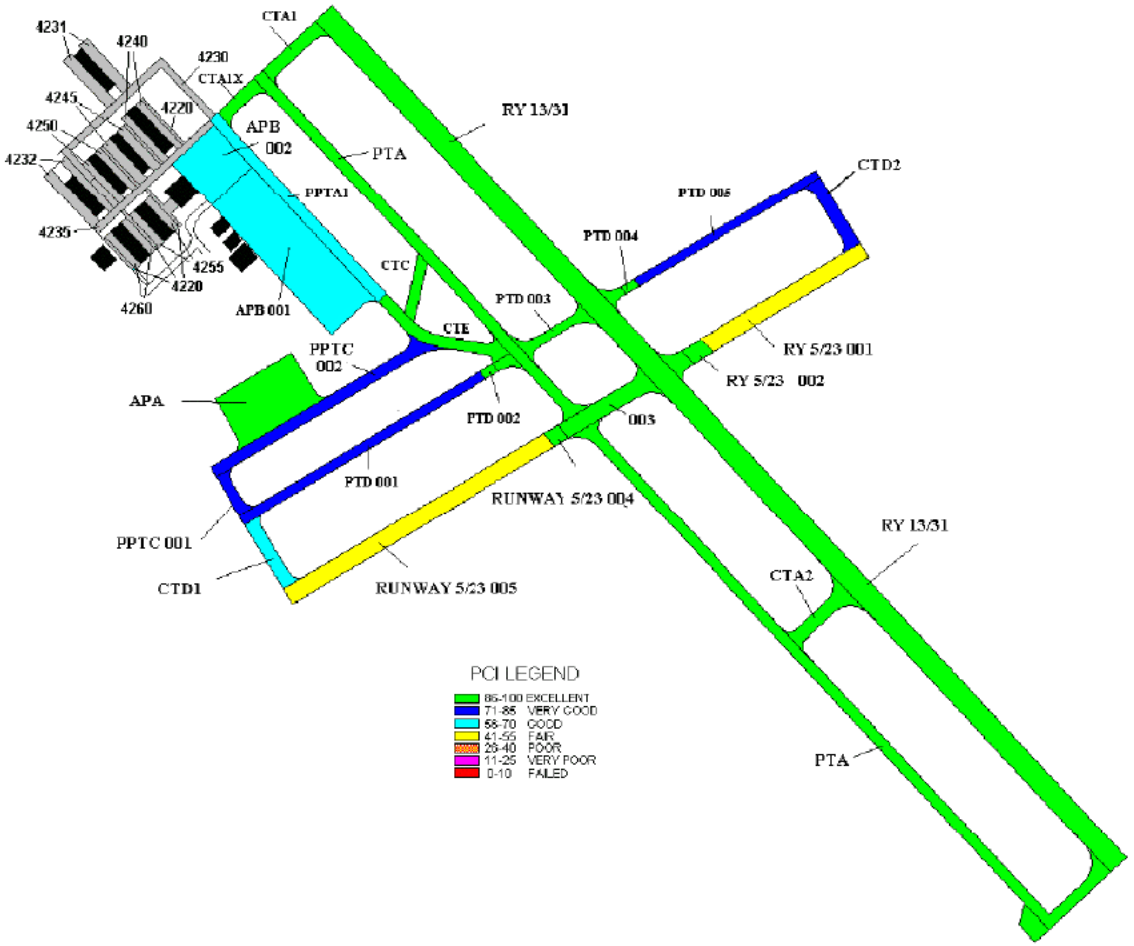
Not all pavement conditions were documented in the 2004 MnDOT report. Excluded were the hangar area and associated taxilanes. The condition of the remaining pavements at STC ranges from excellent to fair. The fair pavement is on the southwest portion of Runway 5-23.

Table 2-5

Pavement Condition Index (PCI) Values

Network ID	Branch ID	Section ID	1/1/05	1/1/06	1/1/07	1/1/08	1/1/09
STC	Apron A (APA)	001	90.00	87.00	84.00	81.00	78.00
STC	Apron B (APB)	001	60.00	58.00	56.00	54.00	52.00
STC	APB	002	65.00	63.00	61.00	59.00	57.00
STC	Connecting Taxiway A-1 (CTA1)	001	90.00	87.00	84.00	81.00	78.00
STC	CTA1X	001	90.00	87.00	84.00	81.00	78.00
STC	CTA2	001	90.00	87.00	84.00	81.00	78.00
STC	CTC	001	90.00	87.00	84.00	81.00	78.00
STC	CTD1	001	67.00	65.00	63.00	62.00	60.00
STC	CTD2	001	72.00	71.00	69.00	68.00	66.00
STC	CTE	001	90.00	87.00	84.00	81.00	78.00
STC	Partial Parallel Taxiway A-1 (PPTA1)	001	67.00	65.00	63.00	62.00	60.00
STC	PPTC	001	56.00	54.00	52.00	50.00	47.00
STC	PPTC	002	90.00	87.00	84.00	81.00	78.00
STC	Parallel Taxiway A (PTA)	001	90.00	87.00	84.00	81.00	78.00
STC	PTD	001	72.00	71.00	69.00	68.00	66.00
STC	PTD	002	42.00	39.00	36.00	33.00	30.00
STC	PTD	003	90.00	87.00	84.00	81.00	78.00
STC	PTD	005	70.00	69.00	67.00	65.00	64.00
STC	Runway (RY)13-31	001	90.00	87.00	84.00	81.00	78.00
STC	RY5-23	001	54.00	52.00	49.00	47.00	45.00
STC	RY5-23	002	90.00	87.00	84.00	81.00	78.00
STC	RY5-23	003	90.00	87.00	84.00	81.00	78.00
STC	RY5-23	004	90.00	87.00	84.00	81.00	78.00
STC	RY5-23	005	43.00	40.00	37.00	35.00	32.00

Source: MnDOT Office of Aeronautics, 2004
Prepared by: SEH, Inc.



Source: MnDOT Office of Aeronautics, 2003.
Prepared by: SEH Inc., November 2004.

Exhibit 2-8

Not to Scale

north

Pavement Condition Index

P:\STC\Phase 02 Inventory\SEH Exhibits\fig Pavement.dwg

2.6.4 Navigational Aids/Lighting

Navigational Aids (NAVAIDs) and airport lighting assist pilots with both visual and instrument guidance to the selected runway during landing. **Table 2-6** lists the runway markings, edge lighting, NAVAIDS and approach minimums for each runway end. Other navigational aids at the Airport include an alternating white/green flashing beacon to indicate a civilian airport, a lighted wind cone to help pilots visually identify wind direction, and a compass rose.

HIRL is standard equipment for runways with precision approach capabilities, which is the case at STC. REILs identify the ends of a runway. REIL consists of a pair of strobes on either side of the runway threshold. The MALSR provides the approaching pilot with a more easily distinguishable runway environment and assists the pilot with visual alignment to the runway. A PAPI is a visual vertical approach alignment tool used by pilots.

The navigational aids available to pilots include a very high frequency omnidirectional range (VOR) station, global positioning system (GPS), instrument landing system (ILS), and a non-directional radio beacon (NDB).

Table 2-6

Runway Marking, Lighting, and Navigational Aids

Runway	Marking	Lighting	Minimums [1/]	NAVAIDs
13	Precision Instrument	HIRL, REIL, MALSR, PAPI	1,420 (400) -0.5	VOR/DME, GPS
31	Precision Instrument	HIRL, REIL, MALSR, PAPI	1,219 (200) -0.5	ILS, VOR, NDB, GPS
5	Nonprecision Instrument	MIRL	1,400 (500) –1.0	GPS
23	Nonprecision Instrument	MIRL	1,440 (500) –1.0	GPS

Note:
DME = Distance measuring equipment.
1/ Minimums indicate ceiling elevation in feet above mean sea level (MSL), feet above ground level (AGL), and visibility in statute miles. The Airport elevation is 1,031 feet above MSL.

Sources: *U.S. Terminal Procedures – North Central* - U.S. Department of Transportation, August. 2004, *Airport Facility Directory – North Central* - U.S. Department of Transportation., September 30, 2004.
Prepared by: SEH, Inc.

2.7 Airspace

2.7.1 En Route Air Traffic Control

The en route airspace surrounding the Airport is controlled by the Minneapolis Air Route Traffic Control Center (ARTCC) on frequency 121.05. The ARTCC is located in Farmington, Minnesota, and is responsible for controlling approximately 300,000 square miles of airspace, including all of Minnesota and portions of North and South Dakota, Nebraska, Iowa, Wisconsin, and Michigan, and a portion of Canada. Pilots operating under instrument flight rules (IFR) must maintain radio communications with the ARTCC. This airspace is divided into sectors, which are managed by different "controllers". When pilots transition from one sector to another, the controller requests the pilots to change to the next controller's frequency for further air route guidance.

When a pilot is attempting to land at STC, the ARTCC turns over "control" of the aircraft to the ATCT located at the Airport.

Staff at the Automated Flight Service Station (AFSS) located in Princeton, Minnesota, also can assist pilots with weather reports, directional finding, emergency procedures, briefings, etc. Some of this information is automated and some is received via radio communication in real time. The AFSS can be contacted on frequency 122.5.

2.7.2 En Route Navigational Aids

En route navigational aids are established to maintain accurate en route air navigation, using ground-based transmission facilities and onboard receiving instruments.

STC is served by one VOR station. The VOR is a ground-based navigational aid that transmits radio signals 360 degrees in azimuth from the station. These radio signals enable pilots to turn at a given point above the ground or fly along a radial to or from the station. VORs are often combined with distance measuring equipment (DME), as is the case at STC. The VOR at STC provides nonprecision instrument approaches to both Runway 13 and Runway 31. It was relocated to its present position north of the intersection of the runways in 2003.

VORs are also used to define low altitude (Victor) and high altitude (jet route) airways through the area. Low altitude airways are designated from 1,200 feet above ground level (AGL) up to 18,000 feet above MSL and are generally used to accommodate lower-speed, non-jet aircraft. They are also used to vector jet traffic into and out of airports. The jet routes, defined as those airways above 18,000 feet above MSL, are used by high-speed, pressurized jet aircraft.

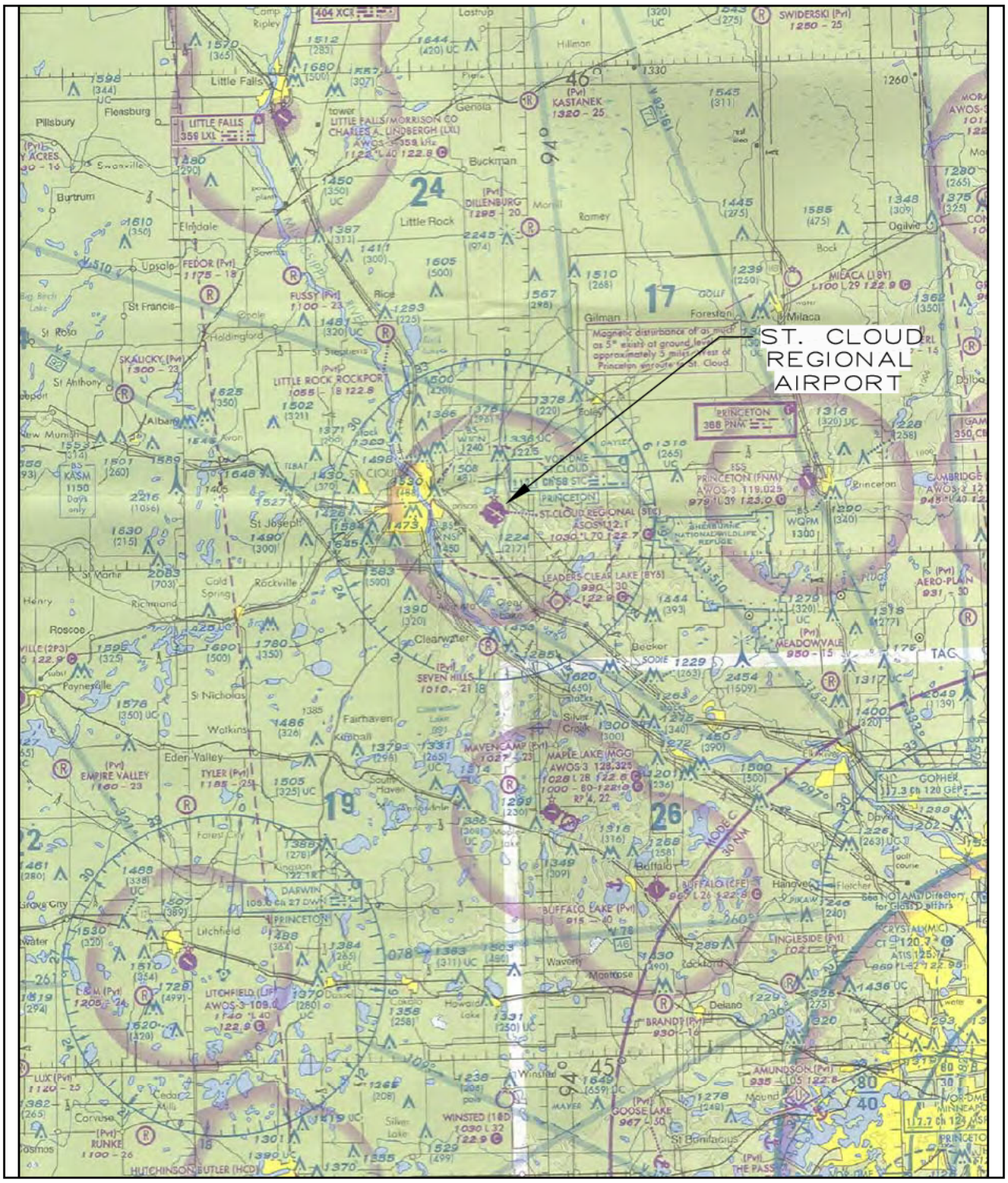
The VOR facilities and low altitude airways are shown on **Exhibit 2-9**. The St. Cloud VOR does not form any airways. Its primary purpose is to guide aircraft to or from STC as they transition from or to the en route airspace.

2.7.3 Local Airspace Control

The airspace in the vicinity of STC is considered to be Class D. This airspace is controlled by an ATCT within a five-statue mile radius of the Airport, from the surface up to 3,600 feet above MSL. In order to fly into Class D airspace, a pilot must establish two-way radio contact with the ATCT prior to takeoff from or entering the five-statute mile radius. Pilots are allowed to operate in Class D airspace under all meteorological conditions. However, during inclement weather conditions pilots without an instrument rating are not allowed to operate in Class D airspace. When weather conditions are more favorable and the pilots can operate under visual flight rules (VFR), they are allowed to operate in Class D airspace provided they make the necessary radio contact with the ATCT. The air traffic controller in Class D airspace provides pilot clearance and instructions, but during VFR conditions, pilots are required to see-and-avoid other aircraft. Aircraft separation is provided by the ATCT during marginal VFR (MVFR) and IFR conditions.

Additional navigational information is offered to pilots navigating to and from STC on the Automated Terminal Information Service (ATIS) on frequency 119.375. STC ground control transmits and receives on frequency 121.6 and the ATCT transmits and receives on frequency 118.25. When the ATCT is closed (11 p.m. to 7 a.m.), the airspace reverts to Class E airspace and pilots using STC are advised to broadcast their flight intentions and monitor the Common Traffic Advisory Frequency (CTAF) on frequency 118.25.

Airspace classifications are depicted on **Exhibit 2-10.**



Source: Federal Aviation Administration - National Aeronautical Charting Office, July 2004.
Prepared by: SEH Inc., November 2004.

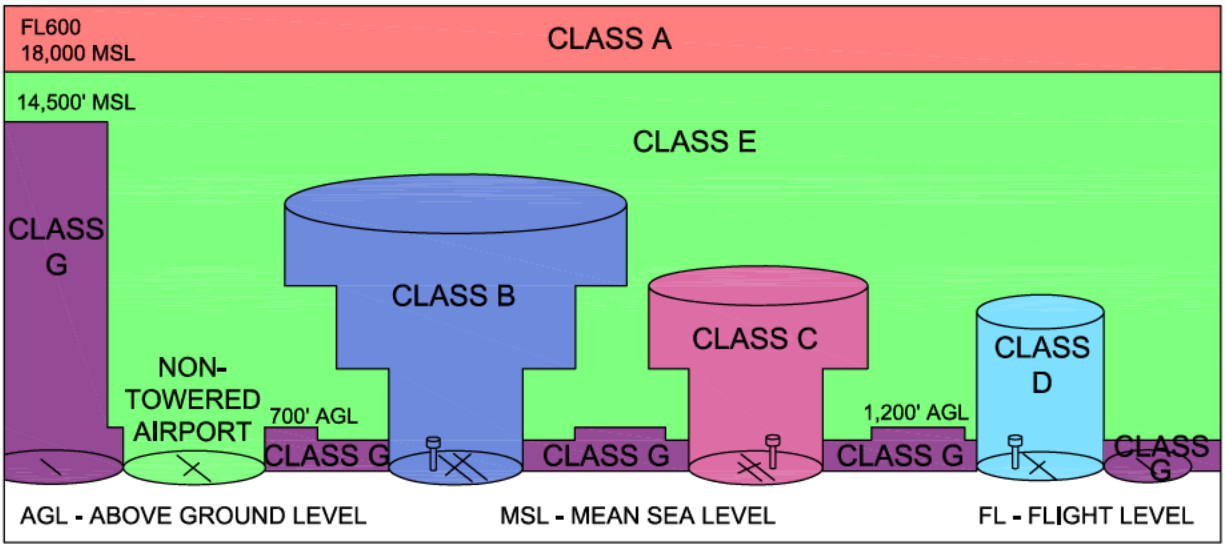
Exhibit 2-9

0 4 miles

north

St. Cloud Airspace Structure

P:\STC\Phase 02 Inventory\SEH Exhibits\fig Airspace Structure.dwg



An Easy-To-Read Chart for VFR Flight

Airspace Features	Class A	Class B	Class C	Class D	Class E	Class G
Entry Requirements	ATC clearance	ATC clearance	Prior two-way communi-cations	Prior two-way communi-cations	None	None
Minimum Pilot Qualifications	Instrument rating	Private or student certificate location dependent	Student certificate	Student certificate	Student certificate	Student certificate
Two-way Radio Communication	Yes	Yes	Yes	Yes	Not required	Not required
Special VFR Allowed*	No	Yes	Yes	Yes	Yes	N/A
VFR Visibility Minimum	N/A	3 Statute miles**	3 Statute miles**	3 Statute miles**	3 Statute miles**	1 Statute miles**
VFR Minimum Distance from Clouds	N/A	Clear of clouds	500' below, 1,000 feet above, 2000 feet horizontally**	500' below, 1,000 feet above, 2000 feet horizontally**	500' below, 1,000 feet above, 2000 feet horizontally**	Clear of clouds**
VFR Aircraft Separation	N/A	All	IFR	Runway operations	None	None
Traffic Advisories	Yes	Yes	Yes	Workload permitting	Workload permitting	Workload permitting
Former Airspace Equivalent	Positive Control Area (PCA)	Terminal Control Area (TCA)	Airport Radar Service Area (RSA)	Airport traffic area and control zone	General controlled airspace	Uncontrolled airspace

* Authorized by an ATC clearance and conducted within the lateral boundaries of the surface area.

**Flight visibility and cloud clearance requirements differ for operations below 1,200 feet AGL, above 1,200 feet AGL but below 10,000 feet MSL, above 10,000 feet MSL, day, night, or student pilot. See FARs 61.89 and 91.155 for specifics.

Source: Federal Aviation Administration, September 1993.
Prepared by: SEH Inc., April 2005.

Exhibit 2-10

Airspace Classification

P:\STC\Phase 02 Inventory\SEH Exhibits\fig Airspace Class.dwg

2.7.4 Visual and Instrument Approach Procedures

2.7.4.1 VFR Procedures

While the ATCT is operational (daily 7:00 a.m. to 11:00 p.m.), pilots assume left-hand traffic pattern flow to or from the runway unless otherwise instructed by the ATCT. During non-ATCT operations, pilots arriving at and departing from STC observe the same standard left hand traffic pattern flow. The traffic pattern altitude (TPA) is 1,831 feet above MSL (800 feet AGL).

2.7.4.2 IFR Procedures

Currently, there are eight published instrument approach procedures for STC. These include:

- Runway 31 Category I ILS or Localizer (**Exhibit 2-11**)
- Runway 31 VOR (**Exhibit 2-12)**
- Runway 31 NDB (**Exhibit 2-13**)
- Runway 31 RNAV/GPS (**Exhibit 2-14**)
- Runway 13 VOR/DME (**Exhibit 2-15**)
- Runway 13 RNAV/GPS (**Exhibit 2-16**)
- Runway 5 RNAV/GPS (**Exhibit 2-17**)
- Runway 23 RNAV/GPS (**Exhibit 2-18**)

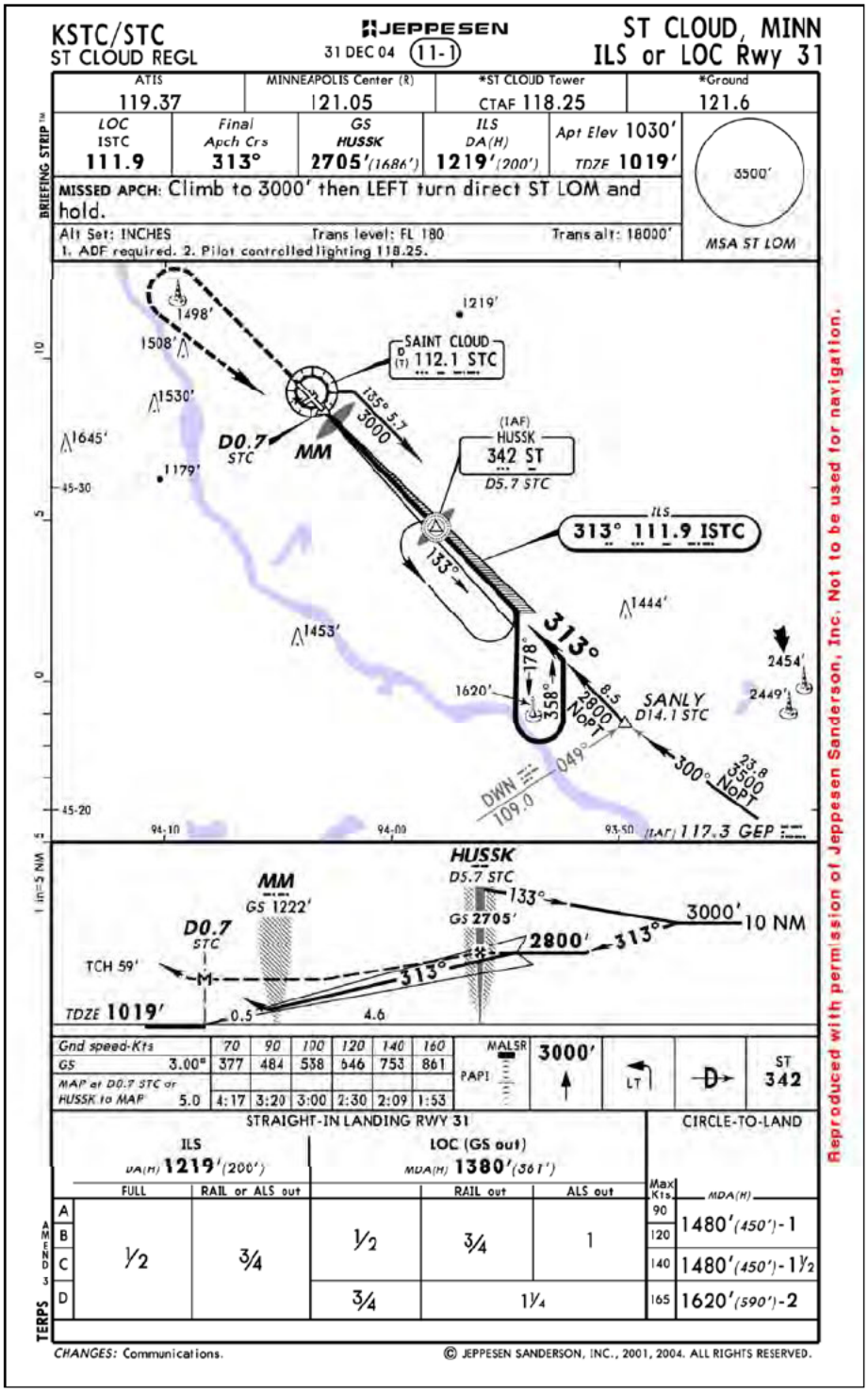
2.8 Meteorology

Prevailing wind is a major factor influencing runway orientation. Wind conditions affect all aircraft to some degree. In general terms, the smaller the aircraft, the more it is affected by wind. Crosswinds are often a contributing factor in light aircraft accidents. Therefore, the orientation of the runway, so that it is aligned with the prevailing wind for the greatest percentage of time, adds substantially to the safety and usefulness of the airport.

The crosswind component of wind direction and velocity is defined as the resultant vector, which acts at right angles to the runway centerline. Wind coverage is defined as the percentage of time that crosswind components are below an acceptable velocity. The desired wind coverage is 95 percent or greater.

Table 2-7 shows the wind coverage for each runway at STC and for the runways combined. The wind coverage for each runway was calculated using 10.5 knots, 13 knots, and 16 knots of crosswind. The data collected at St. Cloud Regional Airport for 1991 through 2000 were used in this analysis.

As shown in Table 2-7, Runway 13-31, with a 10.5-knot crosswind component, does not meet the desirable 95 percent wind coverage. Also, Runway 5-23 does not meet the desired coverage with a 10.5-knot or 13-knot crosswind component. When Runway 13-31 and Runway 5-23 are considered together, each crosswind component is greater than the 95 percent desired coverage. **Exhibit 2-19** shows the wind rose information for each runway separately and also for the runways combined.

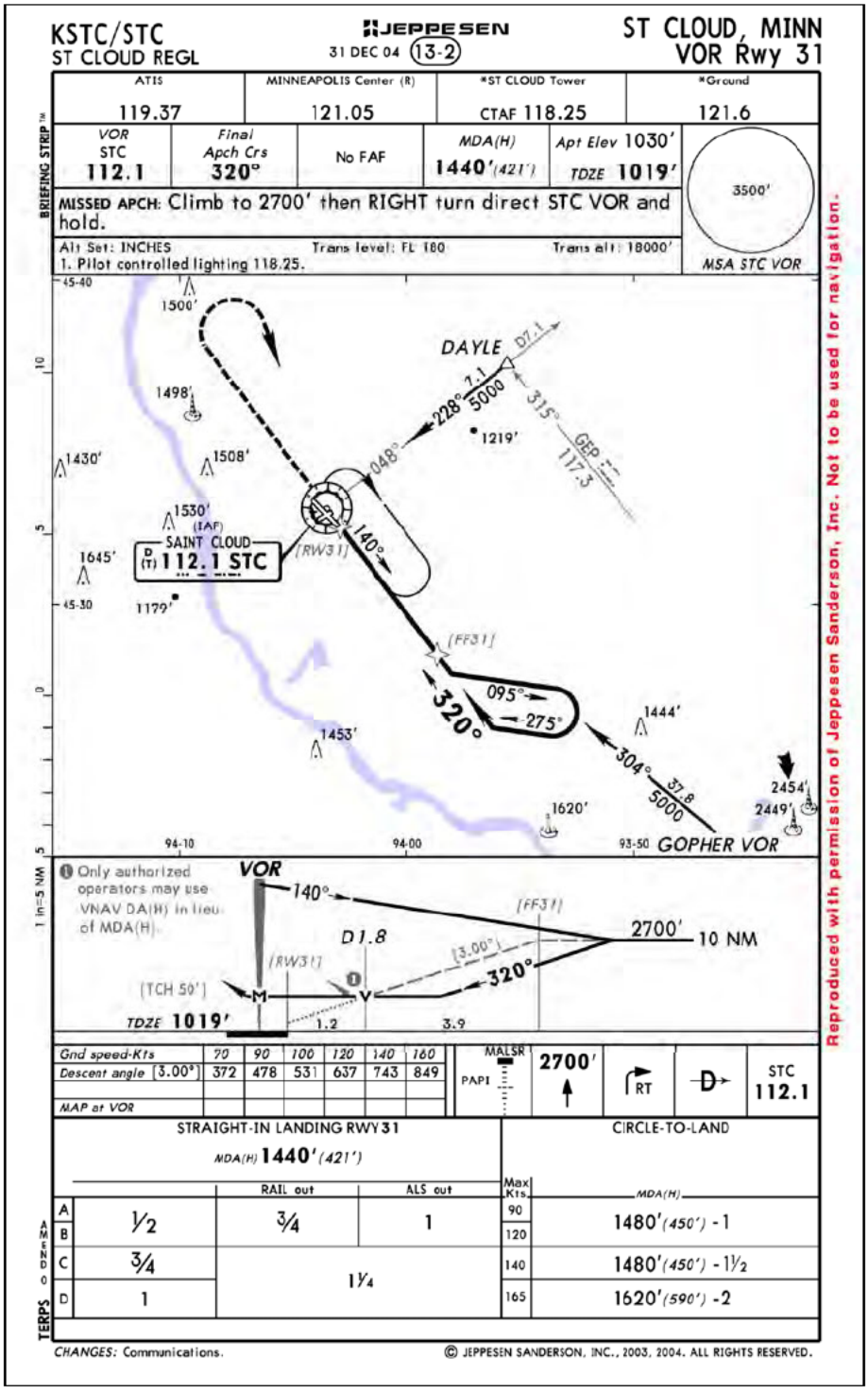


Source: ©Jeppesen Sanderson, Inc., 2001, 2004. All Rights Reserved.
Prepared by: SEH Inc., April 2005

Exhibit 2-11

ILS Runway 31

P:\STC\Phase 02 Inventory\SEH Exhibits\fig ILS 31.dwg

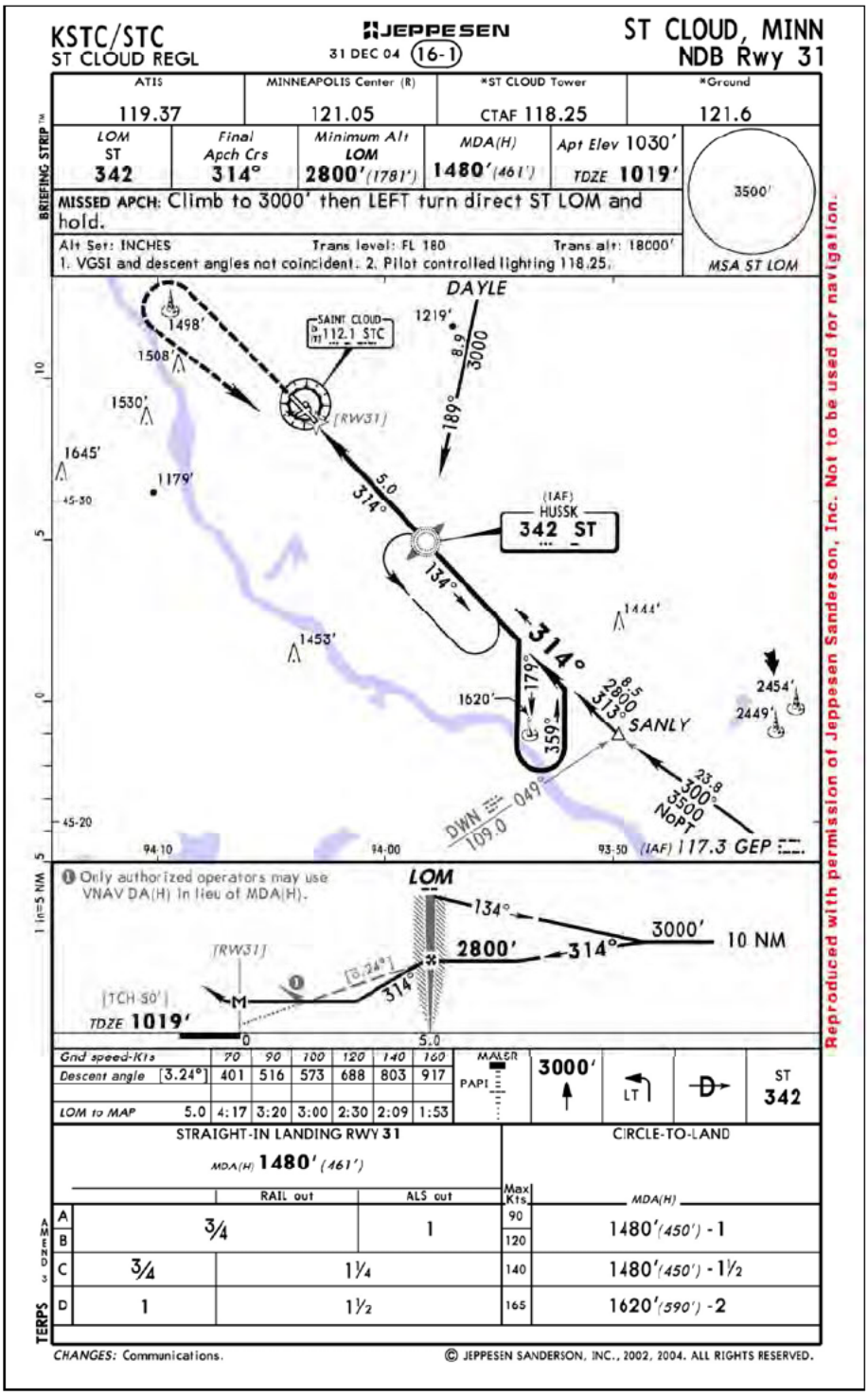


Source: ©Jeppesen Sanderson, Inc., 2003, 2004. All Rights Reserved.
Prepared by: SEH Inc., April 2005

Exhibit 2-12

VOR Runway 31

P:\STC\Phase 02 Inventory\SEH Exhibits\fig VOR 31.dwg

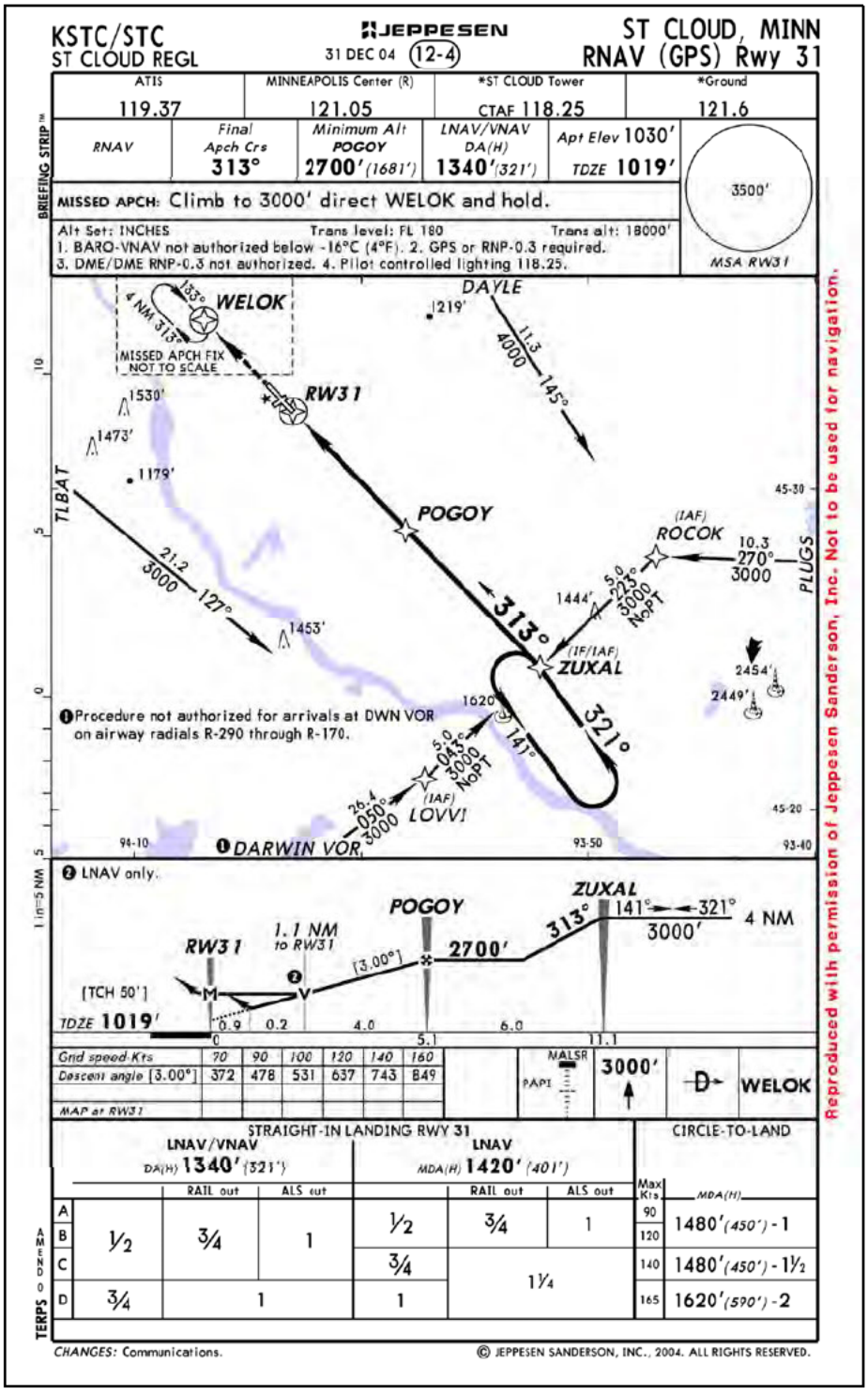


Source: ©Jeppesen Sanderson, Inc., 2002, 2004. All Rights Reserved.
Prepared by: SEH Inc., April 2005

Exhibit 2-13

NDB Runway 31

P:\STC\Phase 02 Inventory\SEH Exhibits\fig NDB 31.dwg

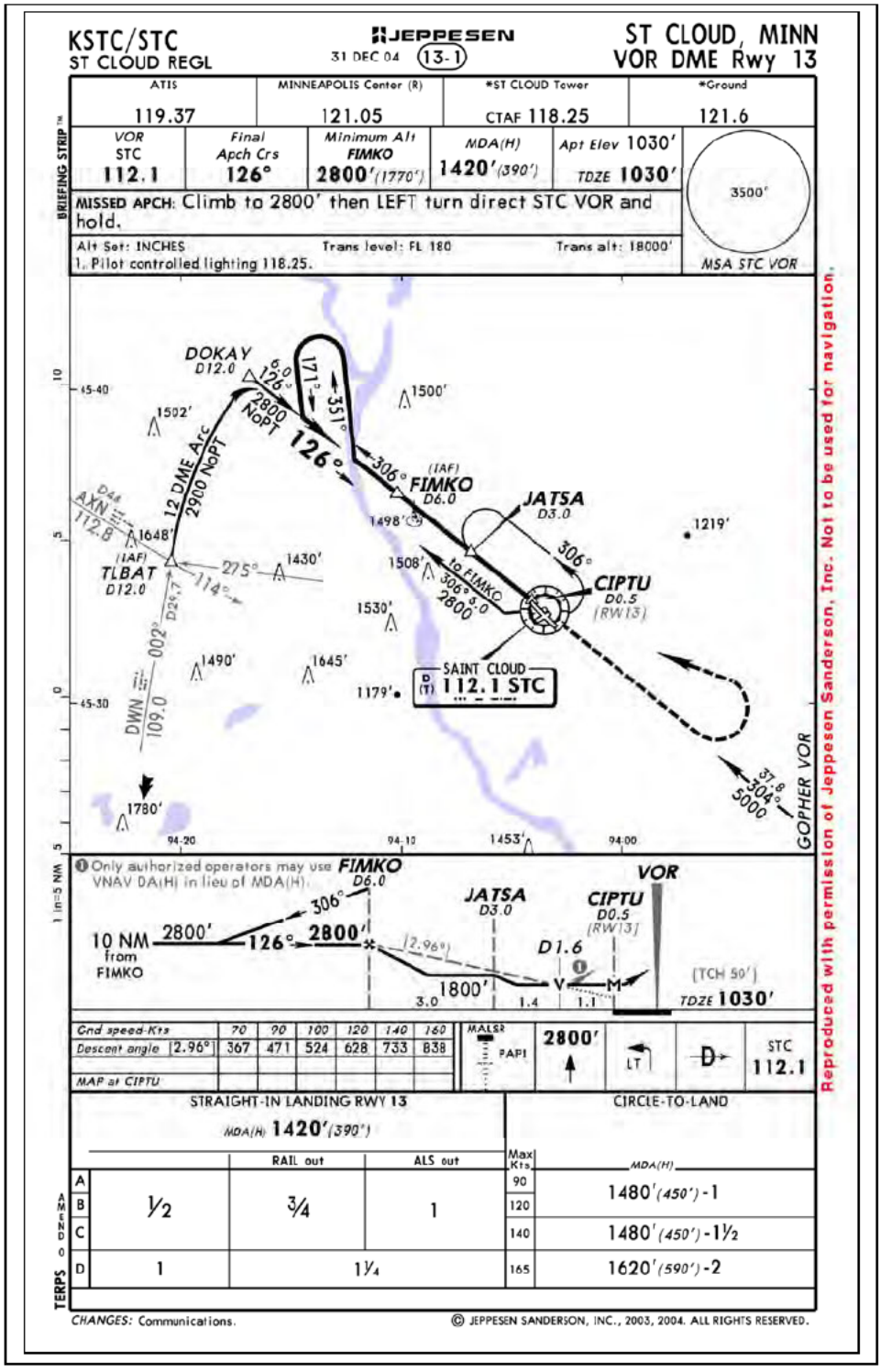


Source: ©Jeppesen Sanderson, Inc., 2004. All Rights Reserved.
Prepared by: SEH Inc., April 2005

Exhibit 2-14

RNAV/GPS Runway 31

P:\STC\Phase 02 Inventory\SEH Exhibits\fig RNAV 31.dwg

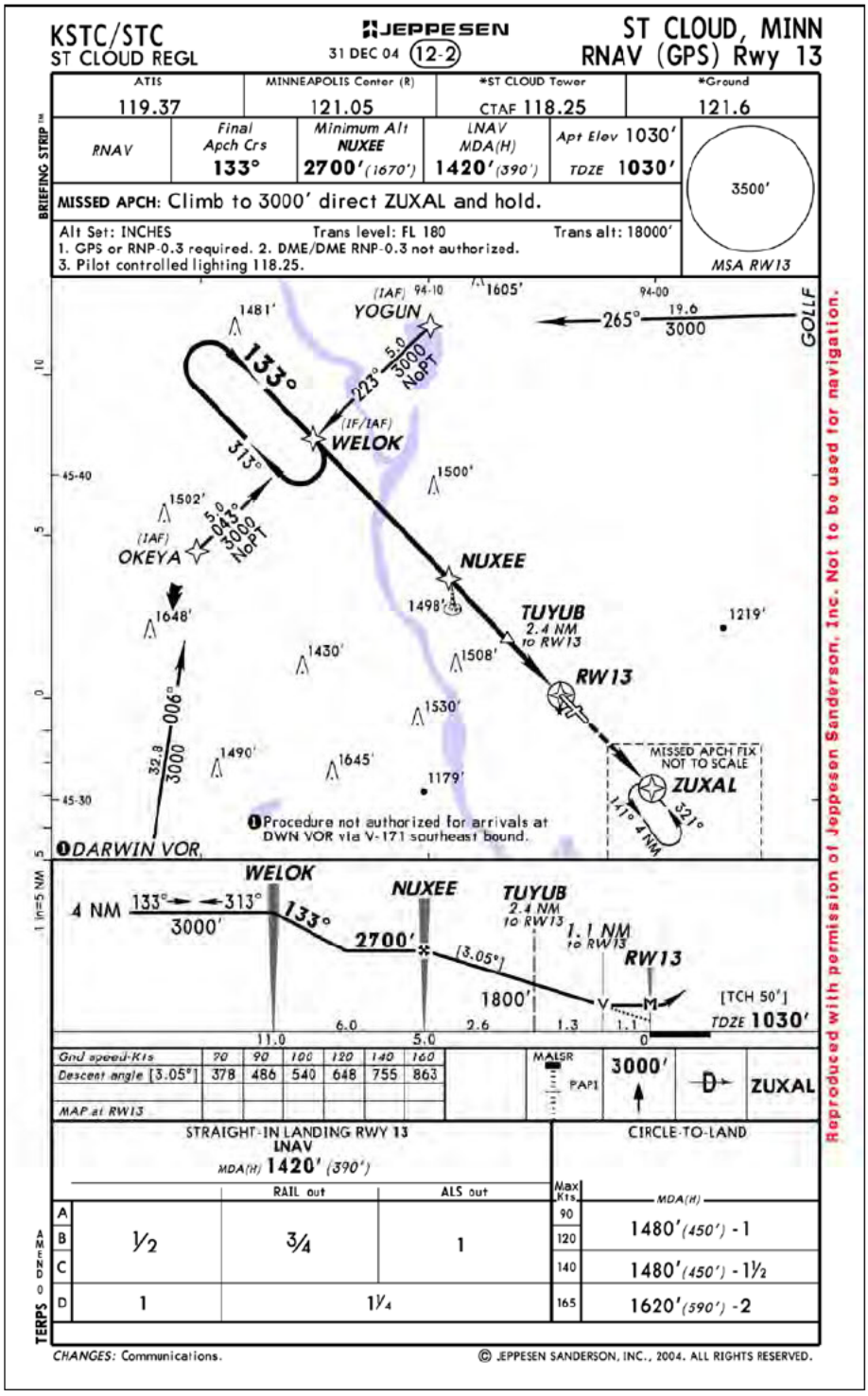


Source: ©Jeppesen Sanderson, Inc., 2003, 2004. All Rights Reserved.
Prepared by: SEH Inc., April 2005

Exhibit 2-15

VOR/DME Runway 13

P:\STC\Phase 02 Inventory\SEH Exhibits\fig VOR13.dwg

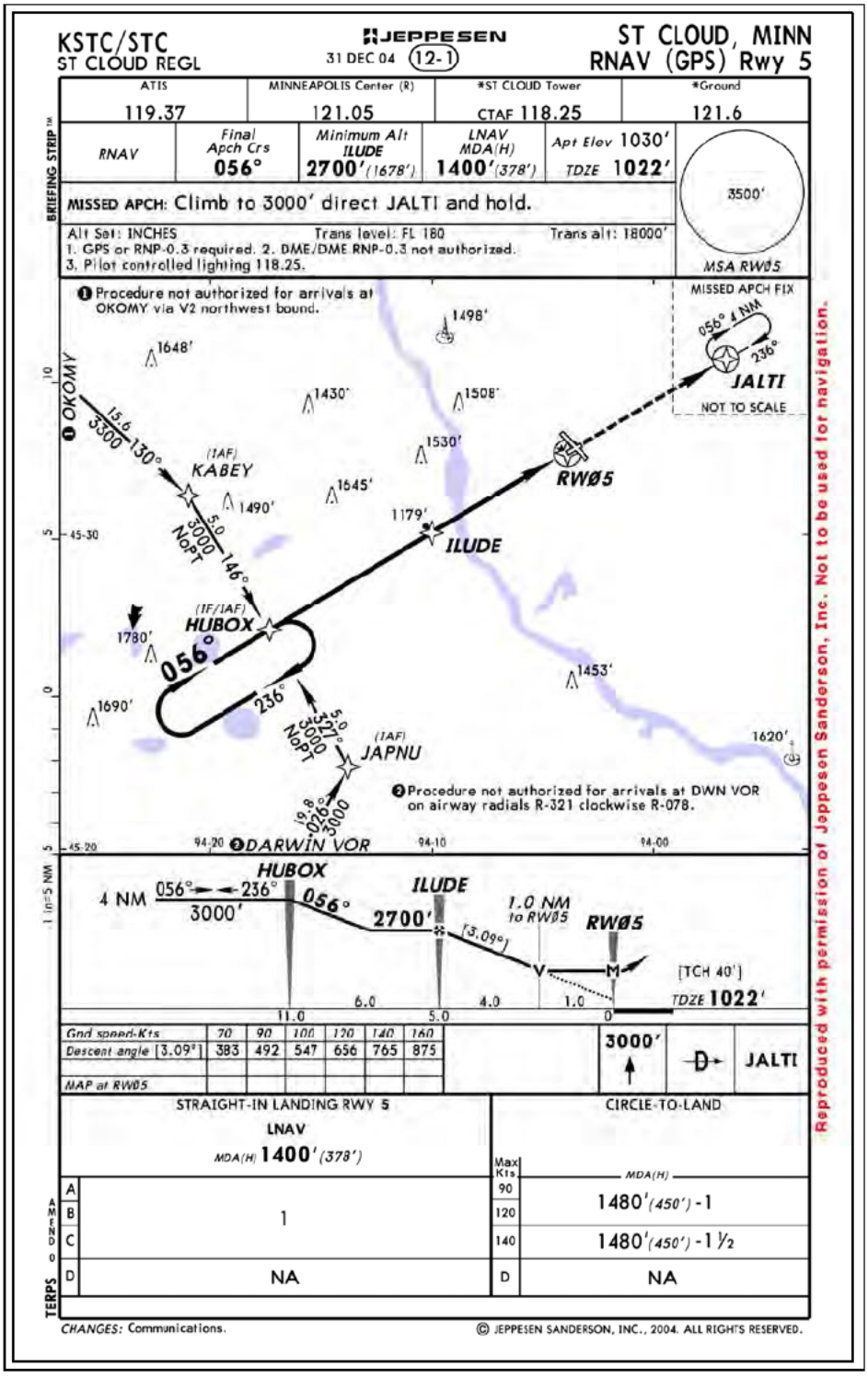


Source: ©Jeppesen Sanderson, Inc., 2004. All Rights Reserved.
Prepared by: SEH Inc., April 2005

Exhibit 2-16

RNAV/GPS Runway 13

P:\STC\Phase 02 Inventory\SEH Exhibits\fig RNAV 13.dwg

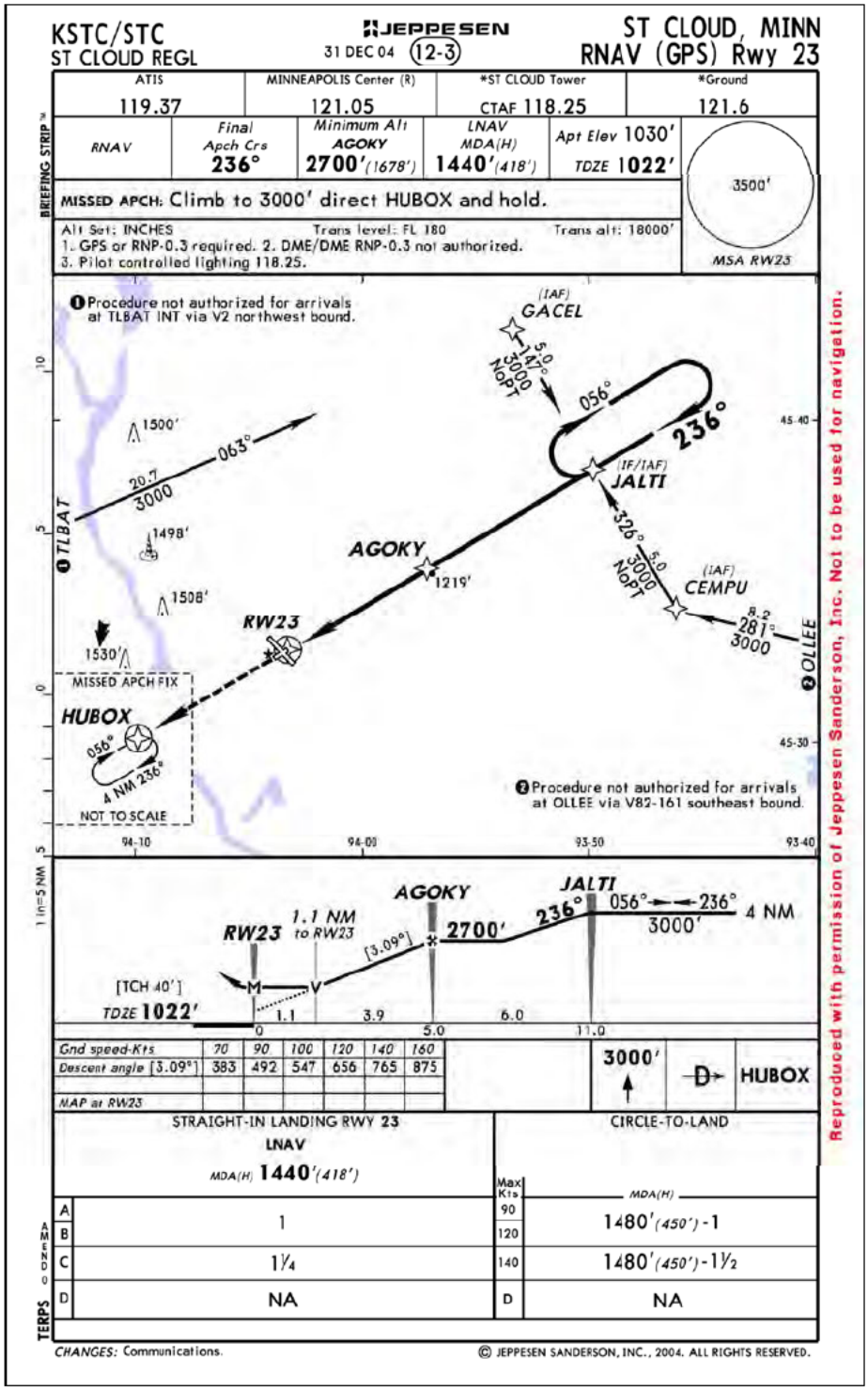


Source: ©Jeppesen Sanderson, Inc., 2004. All Rights Reserved.
Prepared by: SEH Inc., April 2005

Exhibit 2-17

RNAV/GPS Runway 5

P:\STC\Phase 02 Inventory\SEH Exhibits\fig RNAV 5.dwg



Source: ©Jeppesen Sanderson, Inc., 2004. All Rights Reserved.
Prepared by: SEH Inc., April 2005

Exhibit 2-18

RNAV/GPS Runway 23

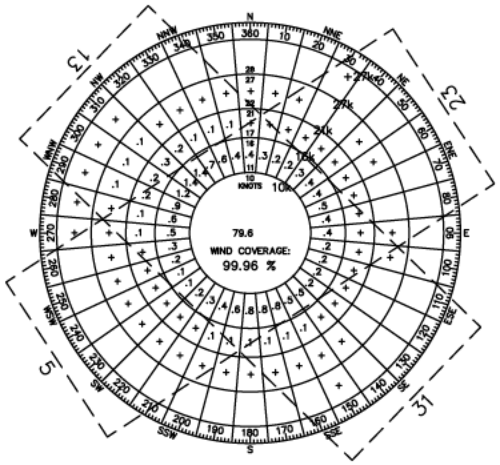
P:\STC\Phase 02 Inventory\SEH Exhibits\fig RNAV 23.dwg

Table 2-7

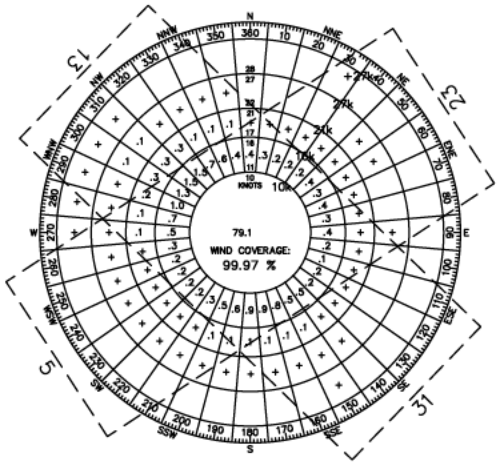
Wind Coverage

	Conditions	10.5 Knots Crosswind (%)	13 Knots Crosswind (%)	16 Knots Crosswind (%)
Runway 13-31	ALL	94.12	97.23	99.44
	IFR	94.25	97.32	99.45
	VFR	92.08	96.04	99.22
Runway 5-23	ALL	87.48	92.89	98.02
	IFR	86.90	92.59	97.98
	VFR	91.27	94.86	98.20
Combined Runways 13-31 and 5-23	ALL	98.56	99.70	99.96
	IFR	98.52	99.72	99.97
	VFR	98.60	99.51	99.84

Source: National Climatic Data Center, Asheville, N.C.
Prepared by: SEH, Inc.



ALL WEATHER WIND ROSE
(RWY 13/31 = 16 kts)
(RWY 5/23 = 16 kts)



INSTRUMENT FLIGHT WIND ROSE
(RWY 13/31 = 16 kts)
(RWY 5/23 = 16 kts)

WIND COVERAGE			
	10.5 KNOTS	13 KNOTS	16 KNOTS
RUNWAY 13/31	94.12% ALL	97.23% ALL	99.44% ALL
	94.25% IFR	97.32% IFR	99.45% IFR
	92.08% VFR	96.04% VFR	99.22% VFR
RUNWAY 5/23	87.48% ALL	92.89% ALL	98.02% ALL
	86.9% IFR	92.59% IFR	97.98% IFR
	91.27% VFR	94.86% VFR	98.20% VFR
COMBINED RWYS 13/31 & 5/23	98.56% ALL	99.70% ALL	99.96% ALL
	98.52% IFR	99.72% IFR	99.97% IFR
	98.60% VFR	99.51% VFR	99.84% VFR
SOURCE: NATIONAL CLIMATIC DATA CENTER, ASHEVILLE, NC PERIOD: ST. CLOUD REGIONAL AIRPORT 1991–2000			

Source: FAA Advisory Circular 5300-13, *Airport Design,* November 2004, Version 4.1.
Prepared by: SEH Inc., April 2005

Exhibit 2-19

Wind Roses

P:\STC\Phase 02 Inventory\SEH Exhibits\fig Wind Rose.dwg

2.9 Terminal Area

2.9.1 Airline Terminal Building

In December 1995, a new airline terminal building, as shown on **Exhibit 2-20**, was built to help serve the commercial flights at STC without affecting general aviation activities. The airline terminal building was constructed along the access loop, southeast of the main parking lot. The building is 9,505 square feet and includes airline, public, concession, administrative, utility, and government or Transportation Security Administration (TSA), space. The terminal plan is depicted on **Exhibit 2-21**. The square footage for each type of space is presented in **Table 2-8**.

Exhibit 2-20

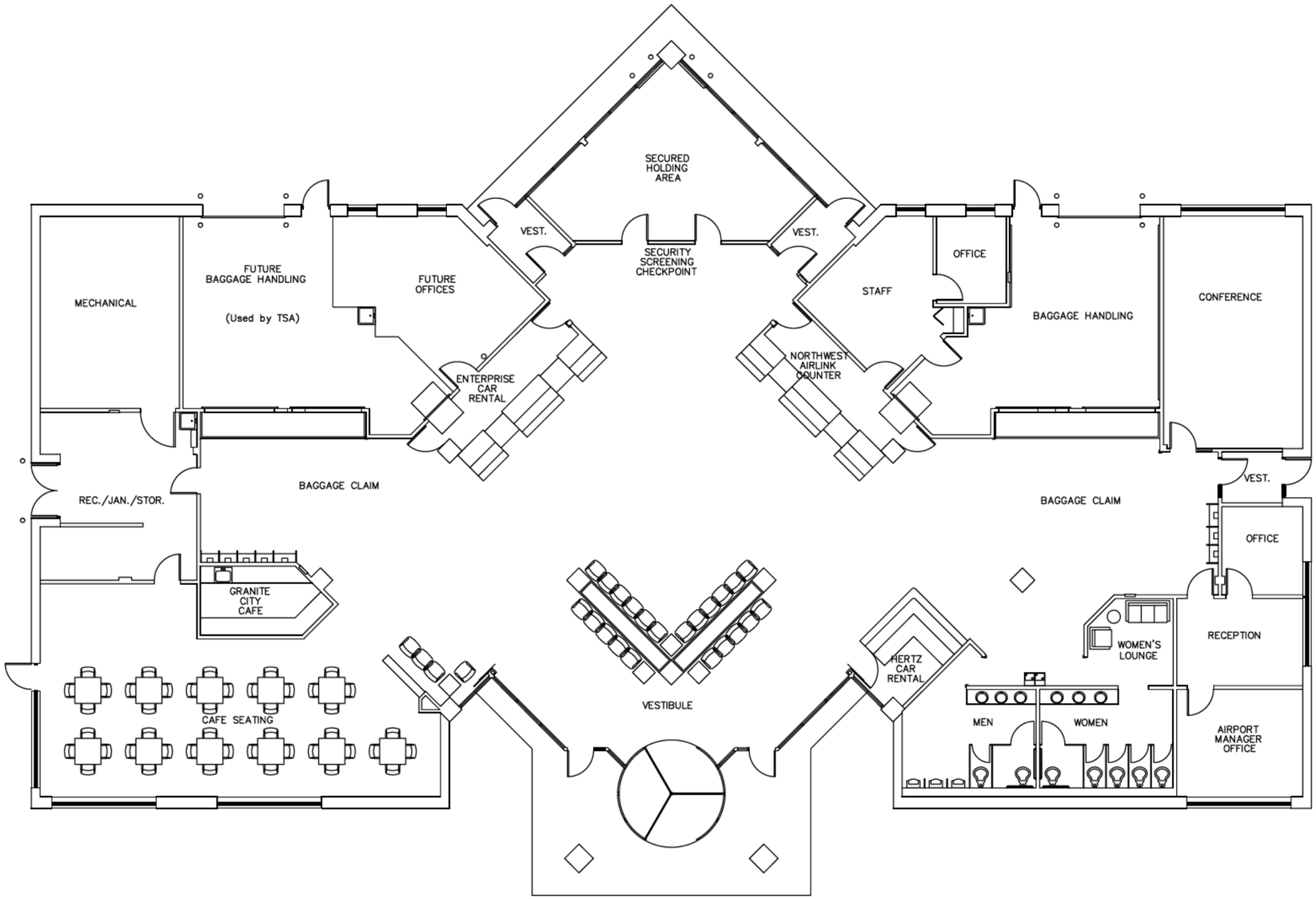
Passenger Terminal Building



Source: SEH, Inc.
Prepared by: SEH, Inc.

There are currently two ticket counters, two baggage handling areas, and two baggage claim areas within the airline space of the terminal building. Currently, the Gate B ticket counter is used to accommodate the commercial service flights by Northwest Airlink/Mesaba Airlines. The Gate A ticket counter is used by Enterprise Rent-A-Car.

Before passengers board a flight, they pass through the TSA-run security checkpoint before entering the holdroom area. The holdroom is capable of accommodating approximately 30 people comfortably. In the event that another airline initiates service at STC, the hold bay area would have to be increased and the security equipment would have to be repositioned or relocated to allow use of the loading door for Gate A. Currently, TSA screening equipment is blocking the use of this door.



Source: SEH Inc., October 1993.
Prepared by: SEH Inc., April 2005.

Exhibit 2-21

Not to Scale

north

Terminal Plan

P:\STC\Phase 02 Inventory\SEH exhibits\fig Terminal.dwg

Table 2-8

Terminal Space Utilization

	Square Footage	Designed Use	Current Use
Airline Space:			
Ticketing	525	Airline Ticketing	Airline Ticketing
Baggage Handling	510	Baggage Handling	Baggage Handling
Operations	345	Office and Airline Operations Area	Office and Airline Operations Area
Baggage Claim	590	Baggage Claim	Baggage Claim
Total	**1,970**		
Public Space:			
Circulation	1,965	1,565 sq ft Circulation / 400 sq ft Baggage Claim Circulation	General Public Space
Restrooms	550	Restrooms	Restrooms
Conference Room	430	Conference Room	Conference Room
Total	**2,945**		
Concessions:			
Food Service	125	Food Service	Food Service
Common Dining	930	Common Dining	Common Dining
Car Rental 1	190	Car Rental/Concession	Hertz Rent-A-Car
Car Rental 2	525	Airline Ticketing	Enterprise Rent-A-Car
Car Rental Offices	865	Airline Offices and Baggage Handling	Office Space: Rental Car Companies/TSA
Total	**2,635**		
Administrative:			
Manager Office	180	Manager Office	Manager Office
Reception Office	150	Reception Office	Reception Office
Other Office	100	Assistant Manager Office	Computer Office
Total	**430**		
Utility:			
Mechanical Room	355	Mechanical Room	Mechanical Room
Janitor/Storage	350	Janitor/Storage	Janitor/Storage
Total	**705**		
Government/TSA:			
Security Screening Area	375	Passenger Circulation	Screening Area
Holding/Boarding Area	445	Passenger Circulation	Secure Holding/Boarding Area
Total	**820**		
Total Square Footage	**9,505**		

Source: Terminal Floor Plans, SEH
Prepared by: SEH, Inc.

Because the terminal building was designed and constructed prior to September 11, 2001, TSA screening equipment requirements were not developed or taken into consideration in the design. The subsequent installation of this equipment that encroaches on former circulation and operational areas has interrupted the public circulation area adjacent to the common hold room. Additionally, queuing for security screening often exceeds capacity to the degree that queued passengers block the public circulation area.

The public space within the terminal building includes two circulation areas for enplaning and deplaning passengers, along with restrooms and a conference room. One passenger circulation area is designed to allow 60 to 70 people to wait for their departing flights. Next to the circulation area is a concessions area where people can sit and eat at the Granite City Ground Crew restaurant. This area also includes public telephones. The second circulation area open to the public is the baggage claim area. The Hertz Rent-A-Car counter also faces this area. All baggage at STC is ground loaded and unloaded by Northwest Airlink/Mesaba Airlines staff.

The administrative space, which is not open to the public, includes the Airport Director's office, a reception office, a smaller conference room, and another open office for future use.

2.9.2 Parking

2.9.2.1 Public Parking

Both the public and employees enjoy free parking at STC. Public parking is accommodated in two locations on the Airport: the main parking lot north of the terminal and the west lot, located west of the terminal. The main parking lot contains 250 spaces, of which 208 standard-size spaces and 5 handicapped parking spaces, including two van-accessible spaces, are available for public use. The west lot contains 98 standard spaces, of which 60 are available for public parking, and four handicapped spaces.

On recent occasions, the Airport parking facilities have been occupied to near capacity. The most recent occurrence was in October 2004, when available parking spaces at the Airport numbered only four. Although detailed records are not kept, based on Airport staff experience, the parking lot for the terminal building is typically more than half full.

2.9.2.2 Employee Parking

Three additional parking facilities serve as employee parking lots, but are not formally designated as such. Parking for employees in the airline terminal, Airport administration, and other users of the Airport is provided in the west parking lot immediately adjacent to the airline terminal building. Three spaces are reserved for Airport administration, three for Mesaba Airlines employees, and three for miscellaneous employees.

A separate parking lot, located south of the General Aviation terminal, is available for FBO employees and customers. This lot is marked for 45 standard spaces and two handicapped spaces. The FBOs also lease 37 parking spaces in the main parking lot, although these are not marked as reserved for FBO use. Employee parking at the ARFF station consists of four spaces, one of which is marked for handicapped drivers.

2.9.2.3 Rental Car Parking/Staging

Twenty-five spaces are marked for rental car staging in the parking lot, located immediately adjacent to the airline terminal building on the facility's southwest side, for the rental car companies based at the Airport.

2.10 Tenant Facilities

2.10.1 General Aviation Terminal

The General Aviation (GA) Terminal (Building 20) was constructed in 1969. When commercial service began at STC in 1993, the existing GA Terminal was used to process commercial flights and passengers. When the new airline terminal was completed in 1995, the GA Terminal was renovated to better accommodate general aviation activity. It includes approximately 4,350 square feet of space to serve corporate and GA activities at STC. The GA Terminal is shown on **Exhibit 2-22**.

Exhibit 2-22

General Aviation Terminal



Source: SEH, Inc.
Prepared by: SEH, Inc.

St. Cloud Aviation operates the General Aviation Terminal. It has seating for 11 people in the passenger lounge area; however, the area has sufficient space to accommodate at least 11 more people with additional furniture. The GA Terminal also has a pilot's lounge, flight planning room (with a Meteorlogix weather computer), restrooms, an FBO Manager's office, break room, reception area, personnel offices, vending machines, and a mechanical room.

2.10.2 T-Hangars and Other Tenant Facilities

St. Cloud Aviation and Wright Aero are the two FBOs located at STC, although Wright Aero owns and operates both companies. The FBOs coordinate and help service the GA area at STC. Wright Aero has an office located inside Building 19 (see Exhibit 2-7 for all building locations). Airport

users are able to access the FBO facilities directly from the airside and the landside. The Wright Aero flight school facility has a reception area with a pilot supply shop, waiting area, flight instruction room with cubicles, and an instructor's office with cubicles. The FBOs occupy Hangars 16, 17, 18, and 19.

The GA area at STC was developed in the 1970s. Along with the FBO buildings, this area includes 74 T-hangars. There are three 8-unit T-hangar buildings (Buildings 2, 3, and 8) and five 10-unit T-hangar buildings (Buildings 5, 6, 7, 10, and 11). The City of St. Cloud owns all of the hangars, with the exception of the Aero Club Hangar (Building 3). Some of the businesses that rent T-hangar space from the City include Aerographics, 20-20 Design, Doering Company, Lake Area Flyers, Oleen Ag Air, JAD Corporation, DJT Aviation, Peters Body Shop, and DOMK Inc.

St. Cloud Aviation has three aircraft stored in T-hangars. One aircraft is located in Building 5, one in Building 7, and one in Building 8. St. Cloud State University (SCSU) Aero Club owns Building 3 and leases the land that it occupies from the City. The Aero Club recently added a maintenance hangar bay on the southeast end of its eight-unit T-hangar to increase capacity. The addition allows Aero Club to work on two aircraft simultaneously and a third, if needed, in the eight-unit hangar space. According to a survey of tenants conducted as part of this inventory process, nine aircraft operated by the SCSU Aero Club are used for pilot training.

St. Cloud Aviation provides the following services to both corporate and private aircraft owners:

- Fuel sales
- Aircraft maintenance
- Avionics repair
- Pilots lounge
- Hotel reservations
- Baggage handling
- Aircraft cleaning
- Catering
- Rental cars
- Hangar storage, etc.

Wright Aero provides ground and flight training school with an average of 100 students and 250 ratings issued annually. St. Cloud State University also uses the Airport for its Aero Club aviation studies program.

Life Link III is an emergency response operator that leases a facility and land just northwest of the Runway 13 hold pad, outside of the GA area. Life Link has a 15-year lease, which became effective October 1, 2001.

2.11 Support Facilities

2.11.1 Aircraft Rescue and Fire Fighting Facilities

The ARFF Building (Building 23), as shown on **Exhibit 2-23**, was constructed in 1999 at a location northeast of the airline terminal. It consists of two equipment bays 44-feet long and 14-feet wide, with an additional 4 feet between the bays and 8 feet on each side. Garage doors on each end of the bays allow the ARFF vehicles to drive through the bays for quick-access and egress. The building has a main and lower level, with the lower level used primarily for utilities. The main level is connected to the garages and has a day room, dining/kitchen, dispatch, two dorm rooms, and a bathroom. The building totals 4,580 square feet. Currently, only one firefighter is stationed at the Airport 24 hours per day, seven days per week. Nine firefighters rotate 24-hour shifts with the downtown St. Cloud fire stations.

Exhibit 2-23

Aircraft Rescue and Fire Fighting Building



Source: SEH, Inc.
Prepared by: SEH, Inc.

St. Cloud has an ARFF Index of A. The ARFF Index is determined by the length of the air carrier aircraft serving the Airport with five or more operations per day. Index A is for aircraft serving the Airport that are less than 90 feet in length (Saab 340). FAA-defined ARFF Indices are shown in **Table 2-9**.

Table 2-9

ARFF Indices

ARFF Index	Aircraft Length (feet)
A	Less than 90
B	At least 90, but less than 126
C	At least 126, but less than 159
D	At least 159, but less than 200
E	At least 200

Source: Federal Aviation Administration, Federal Aviation Regulations Part 139.315, *Aircraft Rescue and Firefighting: Index Determination*
Prepared by: SEH, Inc.

Airports with an ARFF Index of A are required to have one vehicle that carries at least 500 pounds of sodium-based dry chemical or Halon 1211; or 450 pounds of potassium-based dry chemical and water with a commensurate quantity of aqueous film-forming foam (AFFF) to total 100 gallons, for simultaneous dry chemical and AFFF application.

St. Cloud is currently equipped with two trucks, one ARFF rig and a pick-up. The Titan Airport Rescue Rig holds 1,500 gallons of water, 225 gallons of foam, and 450 gallons of dry chemical. The pick-up holds 450 gallons of dry chemical and 100 gallons of foam mix.

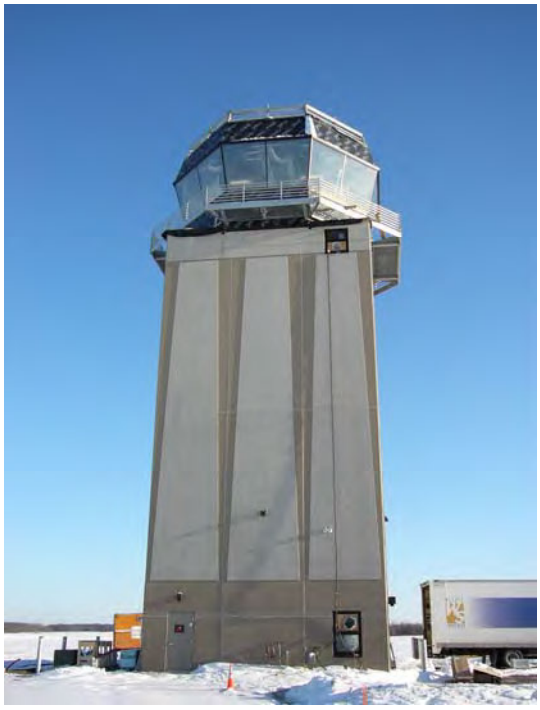
The only water that is available on-site is provided from two 1,000-gallon tanks located in the basement of the ARFF Building. The tanks provide both potable and fire-fighting water to the facility. There is no public sewer or water service to the building and the closest fire hydrant is approximately one mile away.

2.11.2 Airport Traffic Control Tower

The St. Cloud Airport traffic control tower, as shown on **Exhibit 2-24**, opened November 8, 2004, and is a contract tower operated by Midwest Air Traffic Control under contract with the FAA. The ATCT is south of the intersection of Runways 13-31 and 5-23, as shown on Exhibit 2-6. Roadway access to the ATCT is provided from 45th Avenue SE, approximately 3,500 feet south of the building area, via a service road to the ATCT.

Exhibit 2-24

Airport Traffic Control Tower



Source: SEH, Inc.
Prepared by: SEH, Inc.

The ATCT is 82 feet, 10 inches above ground level and has a controller eye elevation of 70 feet AGL. The ATCT has seven levels. Each level can be accessed by a stairway or by an elevator. The elevator runs up the middle of the ATCT.

The first level of the ATCT contains the ATCT Manager's office and a locker room, along with an electrical room, elevator room, and telecommunications room. The second level is open space with a mechanical room. The third, fourth, and fifth levels are open space. The sixth level contains restrooms, a break room, a janitor's area, and an equipment room. The seventh level is the top level where the air traffic controllers are stationed, and there are three controller positions.

The ATCT is open daily from 7:00 a.m. until 11:00 p.m. The ATCT is on frequency 118.25.

2.11.3 Snow Removal Equipment Building

The Airport's snow removal equipment (SRE) building (Building 4), as shown in Exhibit **2-25**, is located in the general aviation T-hangar area (see Exhibit 2-6). A 60-foot by 75-foot expansion to the south was recently completed. The SRE building serves as the main facility for field maintenance operations, with all vehicles stored within the building's six vehicle bays. The building contains an office, equipment, parts, and sand storage areas. Upon completion of the expansion, the maintenance building will encompass 13,500 square feet.

Exhibit 2-25

Snow Removal Equipment Building



Source: SEH, Inc.
Prepared by: SEH, Inc.

Currently, three full-time field maintenance personnel are located at STC. Local individuals assist during the winter season, plowing snow on landside parking lots and sidewalks. Due to security measures, the three full-time personnel are the only maintenance personnel granted airside access, and they are responsible for all airside maintenance.

The photograph above was taken prior to the current expansion project on the northwest end of this building.

2.11.4 Airport Security and Safety

In 2001, portions of the perimeter of STC were enclosed by an eight-foot high chain link fence with two additional feet of barbed wire to protect from wildlife intrusion. A second fencing project currently under way will completely enclose the perimeter of the Airport. Due to changes in MnDOT/FAA requirements, the current fencing project will consist of 10 feet of chain link with no barbed wire. The fence follows the Airport property line, with the exception of the southeast corner of the property, where it will follow Tower Road and extend to the Elk River before turning north and intersecting with the Airport property line. Access is gained though sliding gates with keypad codes. Codes are issued by the Airport Director, or access may be granted via a call box connected to St. Cloud Aviation.

2.11.5 Fuel Storage/Distribution

The vehicular fueling needs of the FBO, airport operations, and Airport maintenance equipment are served by three above-ground steel tanks, the first with a total capacity of 500 gallons of unleaded fuel for maintenance vehicles, one 750-gallon tank for off-road diesel equipment, and one 500 gallon tank for on-road diesel equipment. St. Cloud Aviation provides all aircraft fueling services at the Airport. At the present time, Jet-A and Avgas 100LL are available for aircraft, each of which is contained in a 12,000-gallon capacity underground tank. Each tank was installed in 1996. Existing underground tanks must meet current State and federal statutory requirements governing corrosion protection and spill and overfill prevention, as well as providing an approved method of leak detection.

2.12 Utility Infrastructure

2.12.1 Sanitary Collection System

There is currently no public sanitary sewer collection system on the Airport. Facilities are served by individual septic systems.

Septic systems on the Airport include a mound septic system on the sides of the two parking lots and the terminal loop; the maintenance building; St. Cloud Aviation repair shop; Life Link III; and the ATCT.

2.12.2 Water System

The City of St. Cloud water system includes a central water treatment plant (WTP), five storage facilities, a booster station, and water main ranging in size from 4 to 30 inches in diameter. The system is split into two pressure zones with the majority of the system served by the normal pressure zone (HGL = 1183.4). The southwest portion of the City is served by a boosted pressure zone (HGL = 1250). Based on a ground elevation of 1,020 feet, the Airport area will receive water at an approximate pressure of 65 to 70 pounds per square inch (psi) based on tower water levels and demand conditions.

The WTP has a capacity of 16 million gallons per day (MGD) with the ability to produce 24 MGD with the installation of additional equipment. The source of water is the Mississippi River. Daily

demand has approximated 7.25 MGD over the past five years. In 2003, the City experienced a maximum daily demand of 14.20 MGD.

The closest trunk water main locations near the Airport include the following:

- 12-inch at the intersection of 35th Avenue SE and County Road 47
- 10-inch at the Minnesota Correctional Facility (Minnesota Blvd.)
- 12-inch at 10th and 7th Street SE

The City is currently in the process of updating its Water Distribution Analysis, which will identify proposed water main to serve future expansion, including the Airport. This analysis is expected to be completed in late 2005. See **Exhibit 2-26** for existing and proposed trunk water main.

Water wells have been drilled to serve on-Airport facilities. Water wells are located in the pavement between the terminal and the ARFF building; one south of the FBO building in the parking lot; one east of the maintenance building; one for Life Link III; and one for the ATCT.

2.12.3 Storm Drainage System

Drainage from improved areas flows south in the direction of the Elk River. The majority of the Airport site drains to a series of ditches and culverts along the south side of Taxiway A. This ditch system drains to a wetland area prior to discharging into the Elk River.

2.12.4 Electrical Power

Electrical power is provided by Connexus Energy. All facilities at STC have electrical service.

2.12.5 Communication Lines

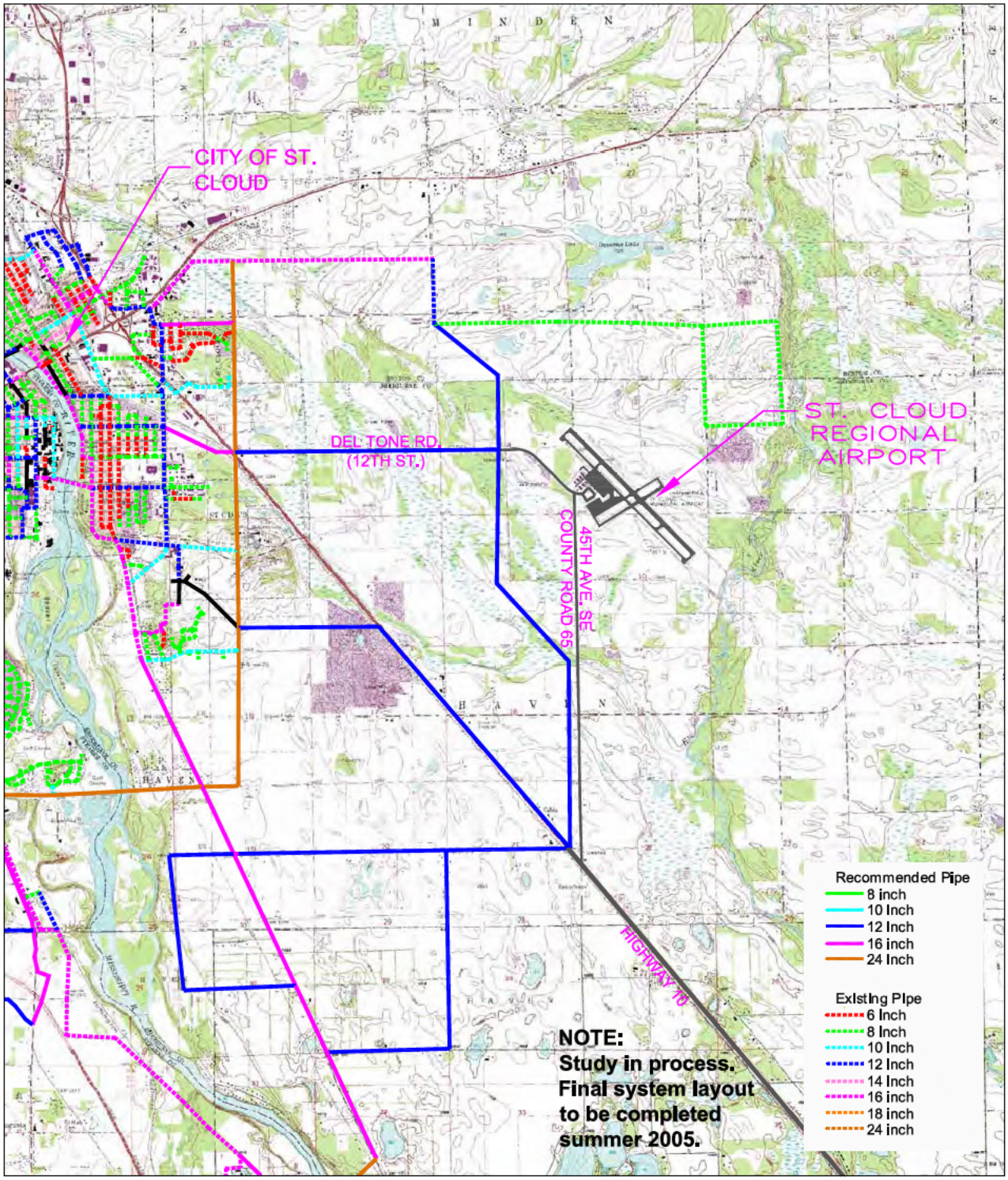
Qwest, Integra, and Nextel provide communication lines for the Airport. Long distance service is provided by the Minnesota Department of Administration, Intertechnologies.

2.12.6 Gas Lines

Natural gas lines are provided by Xcel Energy. The terminal building, St. Cloud Aviation hangars, FBO hangars, the ARFF Building, and Life Link III hangar all have natural gas to heat their hangars. Only one T-hangar unit has a natural gas hookup, the rest of the T-hangars at STC have electrical service.

2.13 Existing Zoning

The City of St. Cloud, along with Benton, Sherburne, and Stearns Counties, control the land uses around the Airport. Although the Airport is located east of the majority of the city limits, it is already annexed into the city. According to a map prepared by the City of St. Cloud Planning Department, the Airport is currently zoned for Planned Unit Development (PUD). The Airport approach areas are also zoned according to MnDOT requirements (explained below). There is some residential development northeast of the Airport and a Planned Industrial District (PID) to the northwest. The majority of surrounding land uses are agriculture along with the Sand Prairie Wildlife Management Area located adjacent and west of the Airport property. Residences are scattered throughout the Airport environs. **Exhibit 2-27** depicts zoning in the Airport environs.



Sources: St. Cloud Public Utilities; USGS 7.5-Minute Quadrangle Series Map, 1993
Prepared by: SEH Inc., April 2005

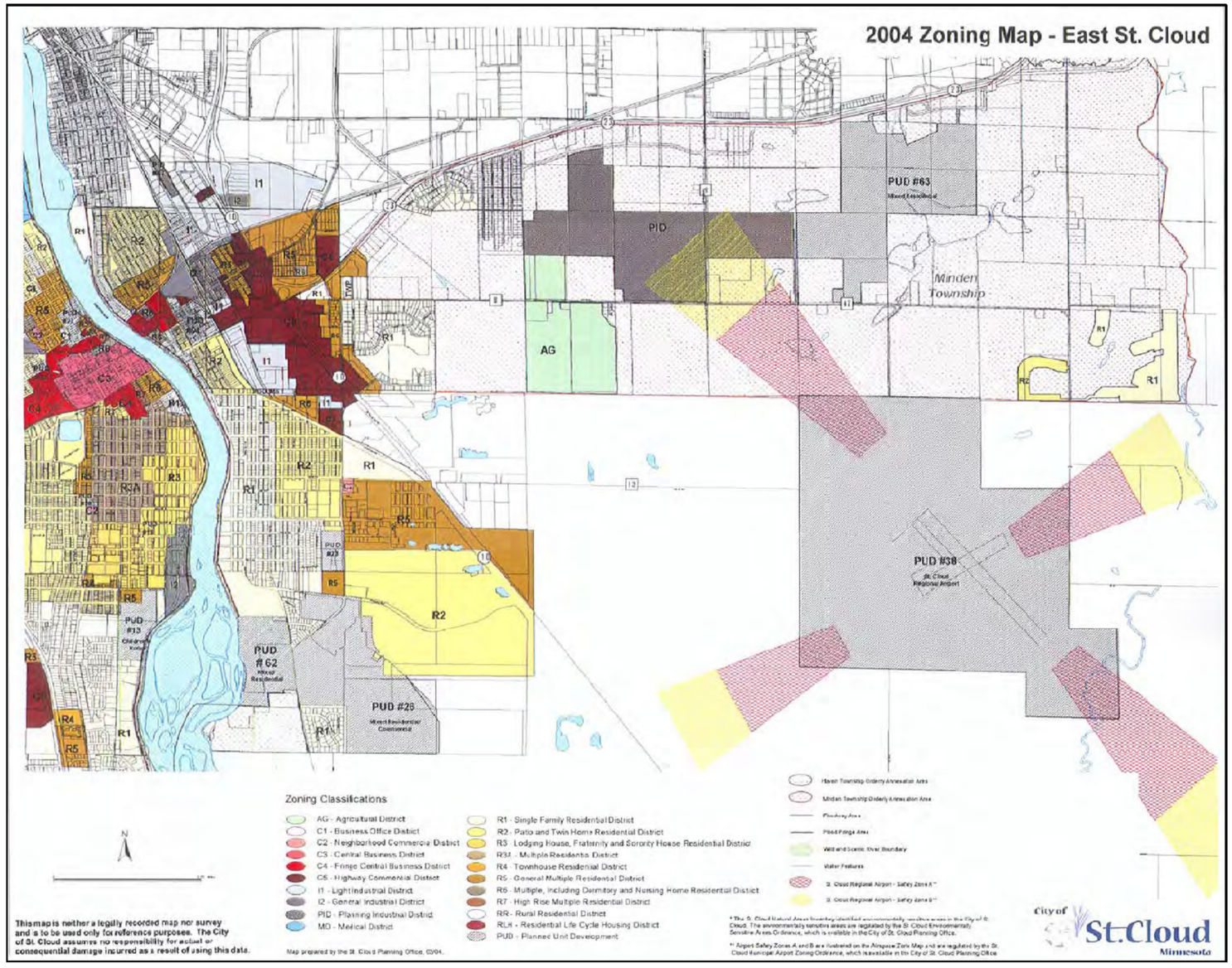
Exhibit 2-26

0 6,000 ft.

north

Trunk Water Main

P:\STC\Phase 02 Inventory\SEH Exhibits\fig Trunk Water.dwg



Source: City of St. Cloud, *East St. Cloud Zoning Map*, February 2004.
Prepared by: SEH Inc., April 2005.

Exhibit 2-27

Not to Scale

East St. Cloud Zoning Map

P:\STC\Phase 02 Inventory\SEH Exhibits\fig Zoning.dwg

The City of St. Cloud and its surrounding townships have effectively utilized orderly annexation agreements to address future growth demand. Those portions of Benton County located south of Highway 23 are regulated by a joint planning board comprised of elected officials from the City of St. Cloud, Benton County, and Minden Township. This body serves as the planning, zoning and subdivision authority for the Minden Township and the City of St. Cloud's orderly annexation area. The City of St. Cloud is currently negotiating a new orderly annexation agreement with Haven Township to establish terms for urban growth, non-farm rural development, and potential planning cooperation.

Specific MnDOT land use zoning requirements apply to all public use airports in Minnesota. These requirements are contained in the Minnesota Department of Transportation, Aeronautics Rules, Chapter 8800, extracted from Minnesota Rules 1997 including amendments adopted and published in the State Register through July 22, 1999. The City of St. Cloud administers the St. Cloud Municipal Airport Zoning Ordinance. The Ordinance rules are governed and implemented by the City of St. Cloud and Benton, Sherburne, and Stearns County Joint Airport Zoning Board.

The State identifies specific "zones" and restricts general development in the vicinity of the Airport. Each airport sponsor must either have adopted or be in the process of adopting the MnDOT airport zoning to be eligible for State airport funding. These zones are identified on Exhibit 2-27 as the trapezoidal shape off the ends of each runway. The City of St. Cloud, and the Benton, Sherburne, and Stearns Counties Joint Airport Zoning Board adopted the MnDOT land use zoning ordinance on December 16, 1976.

Table 2-10 lists the current dimensions for these zones for the Airport's runways. Runway 13-31 is zoned for 7,000 feet and Runway 5-23 for 5,500 feet. In other words, if runway length is added to the primary runway or if another runway is added in another orientation, the zoning for the Airport would need to be updated. For the current Airport configuration, the Airport zoning is adequate.

Table 2-10

Current Runway Safety Zone Dimensions

	Runway End			
	13	31	5	23
Safety Zone A	500' x 3,466.67' x 1,540'	1,000' x 2,500' x 2,040'	500' x 2,000' x 1,100'	500' x 2,000' x 1,100'
Safety Zone B	1,540' x 1,733.33' x 2,560'	2,040' x 1,733.33' x 2,560'	1,100' x 1,000' x 1,400'	1,100' x 1,000' x 1,400'
Runway Protection Zone	500' x 2,000' x 1,100'	500' x 2,000' x 1,100'	500' x 2,000' x 1,100'	1,000' x 2,500' x 1,750'

Source: *Airport Layout Plan*, HNTB, February 2001.
Prepared by: Ricondo & Associates, Inc.



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typed or printed name: Randy J Sabart

registration no.: 25508

date: April 16, 2007

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minnesota army national guard

st. cloud, minnesota

GRADING PLAN

C200

SEE SHEET C202A FOR ADDITIONAL GRADING INFORMATION

NOTES:
1. ALL ELEVATIONS AND CONTOURS GIVEN ARE SHOWN TO FINISHED GRADE, UNLESS OTHERWISE NOTED.
2. REFER TO THE SITE PLAN FOR HORIZONTAL SITE DIMENSIONS AND LAYOUT.
3. EXCESS SELECT GRANULAR MATERIAL SHALL BE STOCKPILED ON-SITE AND AT A LOCATION AND MANNER SUITABLE TO THE OWNER. DISPOSE OF EXCESS MATERIALS OFF-SITE WHEN WORK IS COMPLETE.
4. THE LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE AND MAY NOT BE COMPLETE. THE CONTRACTOR SHALL HAVE ALL UTILITIES LOCATED IN THE FIELD BEFORE DIGGING. EXISTING UTILITIES MAY NOT BE RELOCATED PRIOR TO THE START OF CONSTRUCTION AS DETAILED IN THE DRAWINGS.
5. CONTRACTOR TO CONTACT UTILITY COMPANIES AND COORDINATE RELOCATION OF UTILITIES AS REQUIRED.
6. CONTRACTOR SHALL PROVIDE AND MAINTAIN ALL EROSION CONTROL MEASURES AS SHOWN ON THESE PLANS AND SPECIFICATIONS AND IMPLEMENT ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY IN ORDER TO PROTECT THE SITE AND ADJACENT PROPERTY.
7. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DISPOSE OFF-SITE ALL TREES, STUMPS, BRUSH, OR OTHER DEBRIS THAT EXISTS WITHIN THE CONSTRUCTION AREAS.
8. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY LEVEL D. THIS QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA". THE CONTRACTOR SHALL HAVE ALL UTILITIES LOCATED BEFORE DIGGING. THE CONTRACTOR SHALL CONTACT UTILITY COMPANIES TO RELOCATE UTILITIES AS REQUIRED.
9. SWALES, PROPERTY LINES, AND BOULEVARDS TO BE GRADED TO FINAL ELEVATIONS. ALL AREAS MUST DRAIN.
10. TEMPORARY DRAINAGE SWALES OR DITCHING WHERE REQUIRED BY THE ENGINEER TO MAINTAIN DRAINAGE WILL BE CONSIDERED INCIDENTAL TO THE PROJECT BID.
11. GRADING WORK AND CONSTRUCTION EQUIPMENT SHALL NOT TRESPASS ON ADJACENT PRIVATE PROPERTY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY CLAIMS RESULTING FROM SUCH ACTIONS.
12. ALL SOILS TRACKED ONTO TAXI-WAY SHALL BE REMOVED IMMEDIATELY. ALL OTHER PAVEMENT OR OFF-SITE AREAS SHALL BE REMOVED DAILY.
13. IN ORDER TO PREVENT EXCESSIVE COMPACTION IN POND INFILTRATION AREAS, NO HAUL ROUTES, ASSEMBLY, OR MATERIAL STORAGE SHALL OCCUR OVER ANY PORTION OF THE POND DURING THE CONSTRUCTION PROCESS. EQUIPMENT USE WITHIN THE INFILTRATION AREAS SHALL BE MINIMIZED TO THE MAXIMUM EXTENT POSSIBLE AND RESTRICTED TO ONLY THE AMOUNT OF WORK NECESSARY TO CREATE PROPOSED GRADES.
14. EXCAVATE INFILTRATION AREAS TO 1.5 FEET BELOW THE BOTTOM POND CONTOUR AND PLACE SELECT TOPSOIL (SPECIAL). SELECT TOPSOIL (SPECIAL) SHALL CONSIST OF A MIXTURE OF 30% COMPOST, GRADE 2 (MN/DOT 3890.2B), 40% FINE FILTER AGGREGATE (MN/DOT 3149.2J), AND 30% SALVAGED TOPSOIL. QUANTITIES OF EACH MATERIAL SHALL BE BASED ON THE TOTAL VOLUME OF SELECT TOPSOIL (SPECIAL) PLACED. MATERIALS SHALL BE TILLED BY THE CONTRACTOR FOR A MINIMUM OF THREE PASSES, OR UNTIL A UNIFORM COLOR IS REACHED. NO HEAVY EQUIPMENT SHALL BE USED.

CONC
BIT
18" CLASS 3 RANDOM RIPRAP W/GEOTEXTILE FILTER FABRIC MN/DOT TYPE 4
EXTEND RIPRAP 1' ABOVE DITCH BOTTOM
EXCAVATE EXISTING DITCH TO PLACE RIPRAP FLUSH WITH THE FLOW LINE
FUTURE TAXIWAY
INFILTRATION AREA 4H:1V SIDE SLOPE
POND BOTTOM ELEV 1008.0
NWL 1008.0
HWL 1010.38
EOF 1010.6
FUTURE FUELING PAD
FFE 1016.00
Building FFE: Actual: 1016.33' Assumed: 100'-0"
INFILTRATION AREA 8H:1V SIDE SLOPE
POND BOTTOM ELEV 1006.0
NWL 1006.0
HWL 1009.21
EXCAVATE EXISTING DITCH TO PLACE RIPRAP FLUSH WITH THE FLOW LINE
EXTEND RIPRAP 1' ABOVE DITCH BOTTOM
PROTECT EX GRAVEL ROAD MAINTAIN CONTINUOUS ACCESS FOR AIRPORT PERSONNEL AND EQUIPMENT

MATCH LINE
SEE SHEET C202

scale 25 50 0 50 100 feet

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I hereby certify that this plan, specification or report was prepared by me or under my direct supervision & that I am a duly licensed engineer under the laws of the state of minnesota.
signature: Randy Sabart
typed or printed name: Randy J Sabart
registration no.: 25508
date: April 16, 2007

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minnesota army national guard

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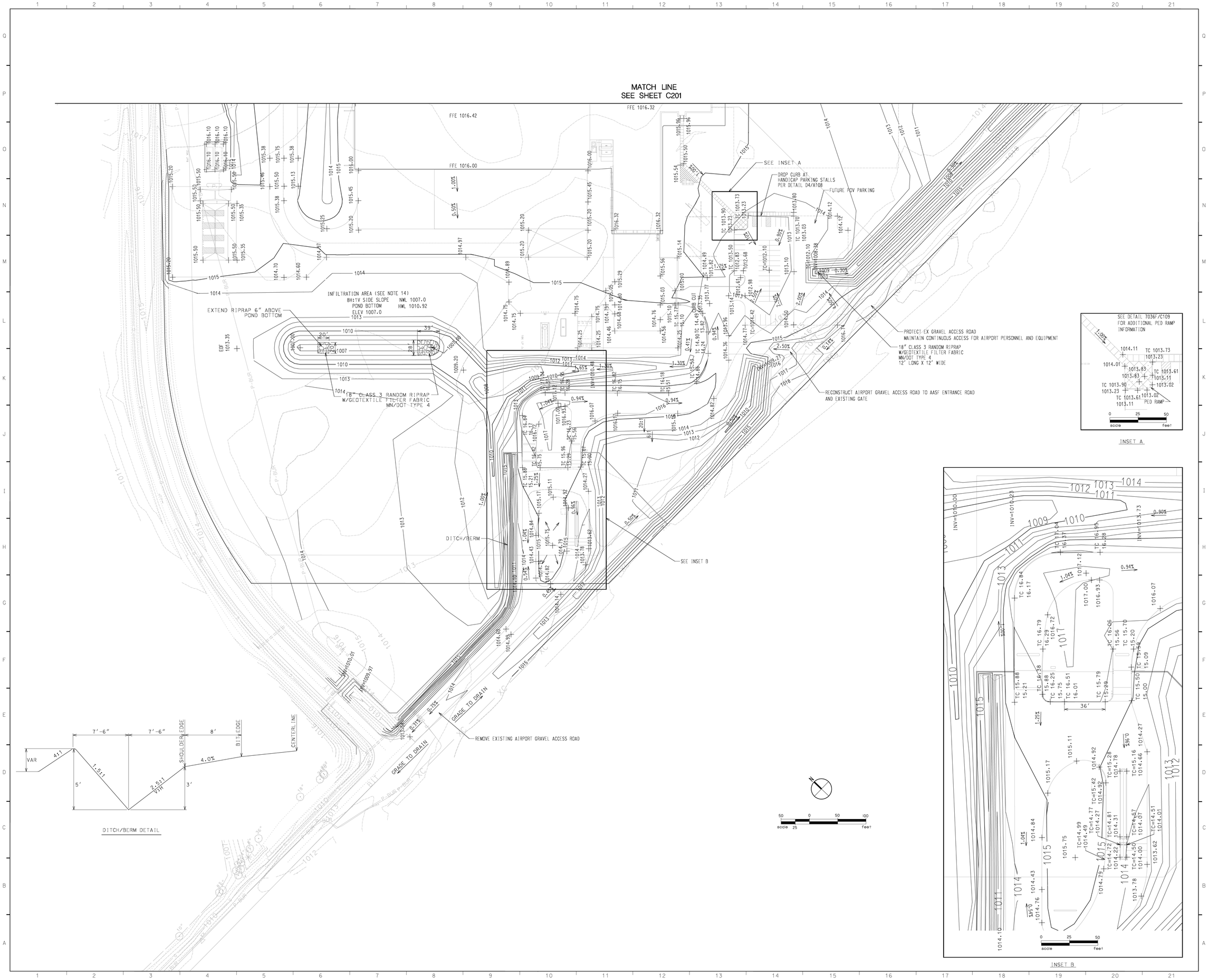
GRADING PLAN

C201



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I hereby certify that this plan, specification or report was prepared by me or under my direct supervision & that I am a duly licensed engineer under the laws of the state of minnesota

signature: Randy Sabart

typed or printed name: Randy J Sabart

registration no.: 25508

date: April 16, 2007

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project no: 0501
drawn by: GQK,JLS
checked by: RJS
date: April 16, 2007
revisions:

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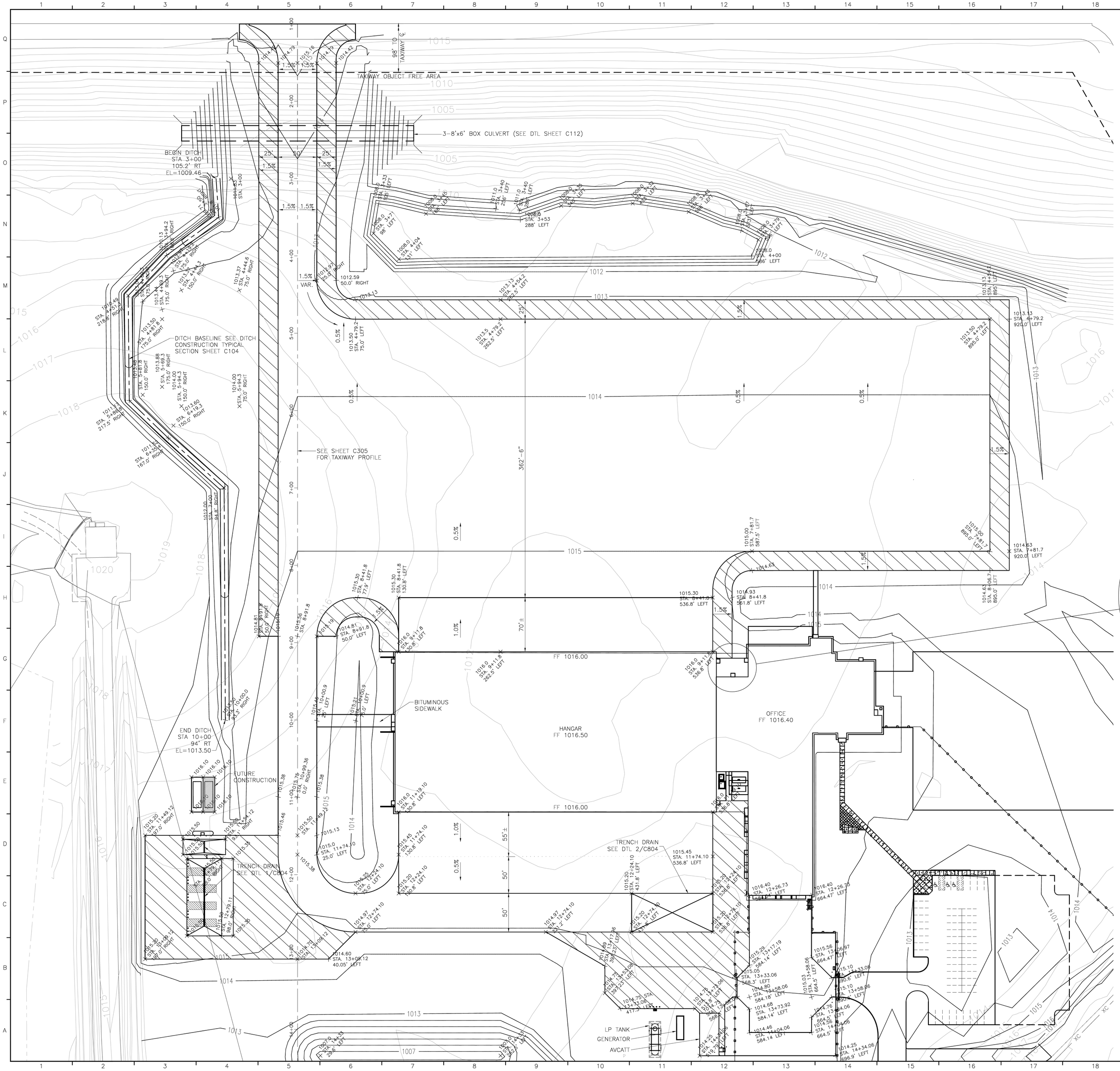
e-mail: hmack@hmarch.com
website: www.hmarch.com

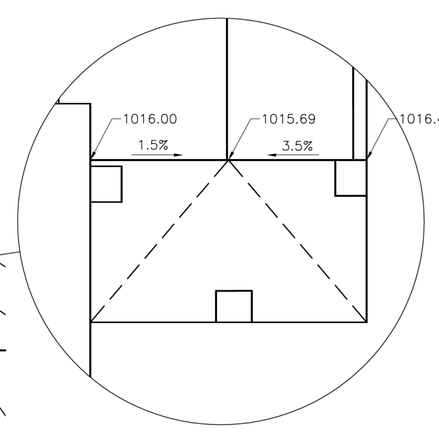
army aviation support facility
minnesota army national guard

st. cloud, minnesota

GRADING PLAN

C202





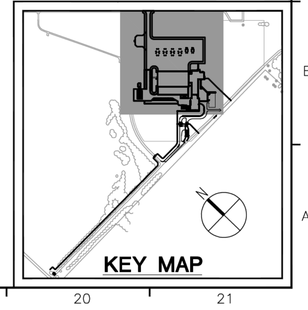
PATIO/STOOP DETAIL
NOT TO SCALE

LEGEND

- PAVEMENT SHOULDER
- EXISTING CONTOURS
- PROPOSED CONTOURS

NOTE:

GRADING PLAN AS SHOWN IS BASED ON ACCEPTANCE AND CONSTRUCTION OF BASE BID, PLUS ALL AVAILABLE ALTERNATES. SEE SHEETS C204 & C205 FOR PAVING MATERIAL TYPE, GRADING, CONSTRUCTION LIMITS AND APPLICABLE SPOT ELEVATIONS FOR CONSTRUCTION OF INDIVIDUAL ALTERNATES.



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signature:
typed or printed name: Benita L. Crow
registration no.: 42316
date: April 16, 2007

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project no: 0520
drawn by: sjl
checked by: blc, ajs
date: april 16, 2007
revisions:

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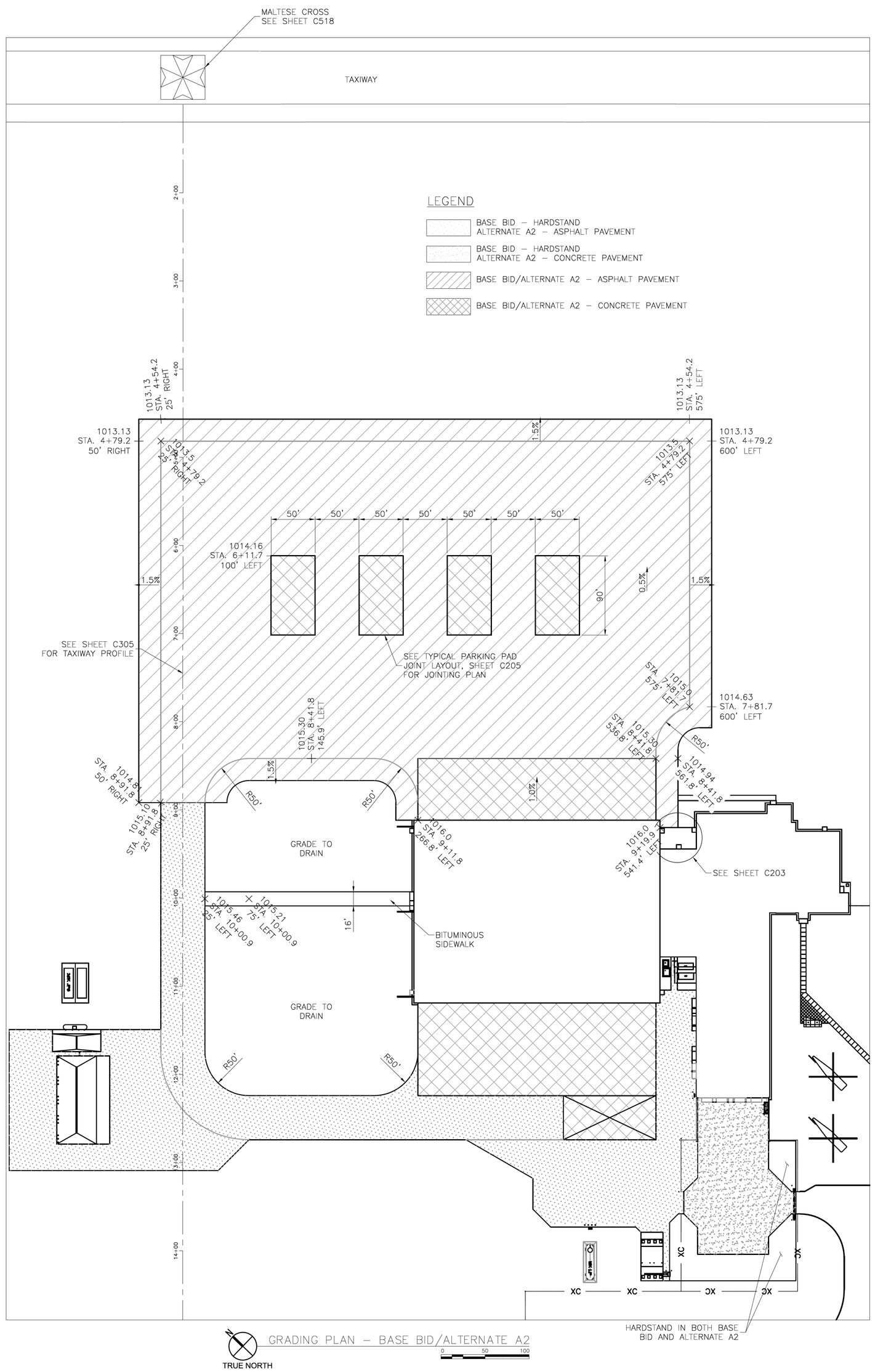
website: www.hmarch.com

army aviation support facility
minnesota army national guard
st. cloud, minnesota

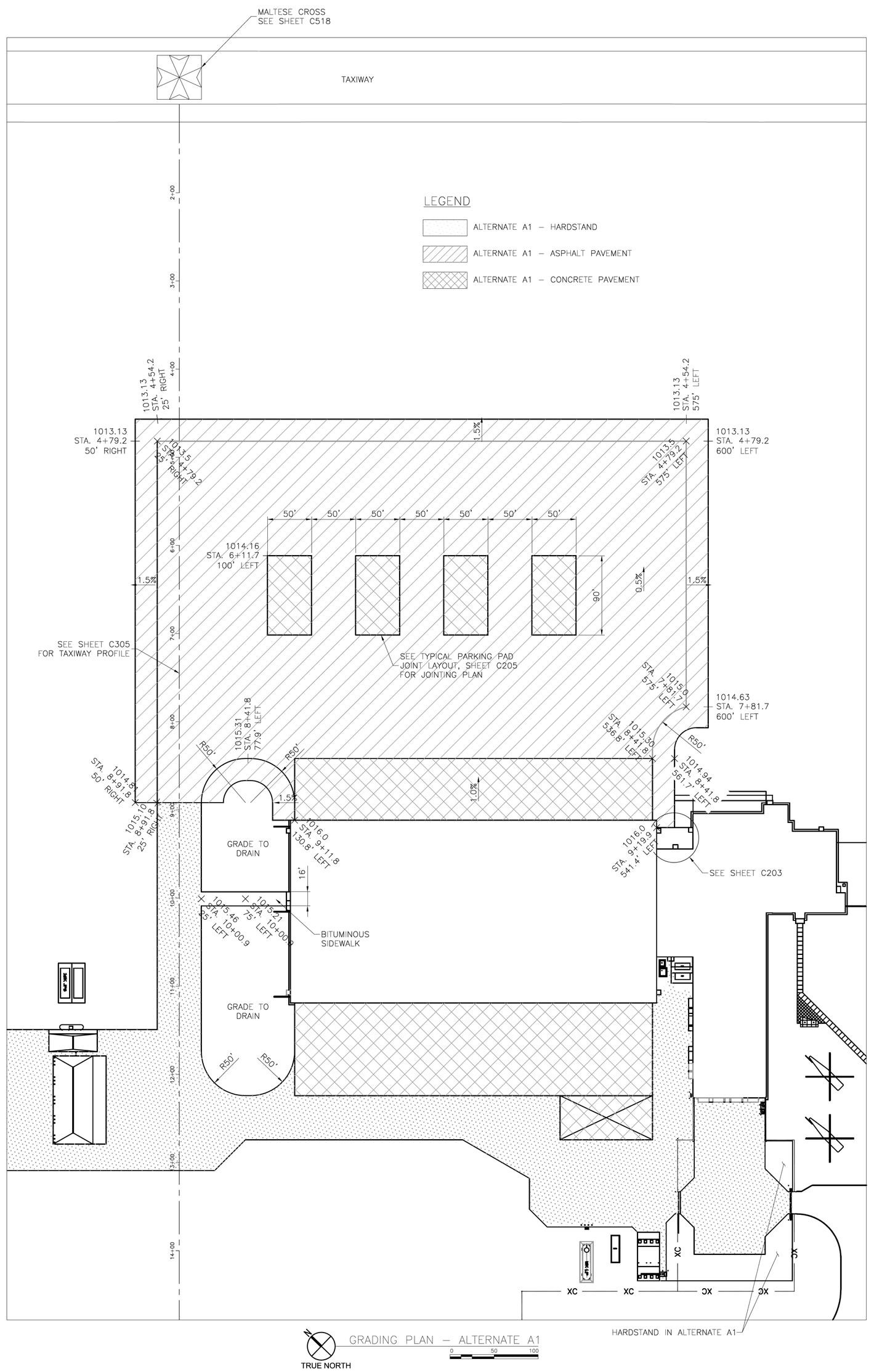
ULTIMATE GRADING PLAN

C203

preliminary not for construction



GRADING PLAN – BASE BID/ALTERNATE A2



GRADING PLAN – ALTERNATE A1

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checked by: blc, ajs
date: april 16, 2007
revisions:

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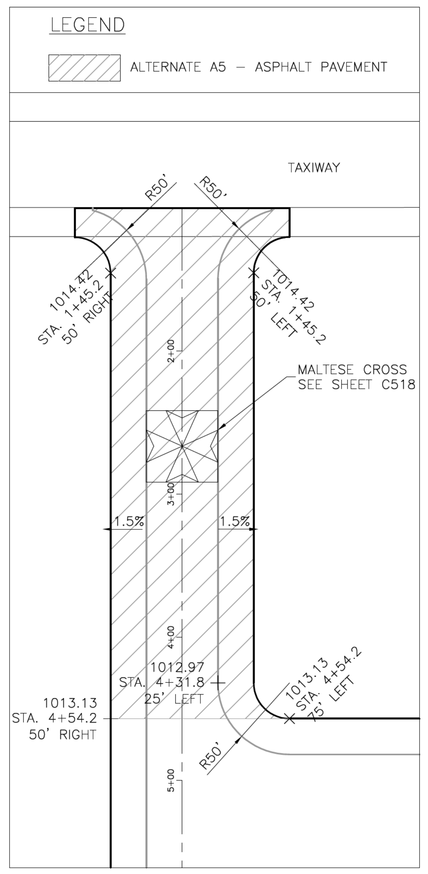
st. cloud, minnesota

CONSTRUCTION GRADING PLAN ALTERNATES

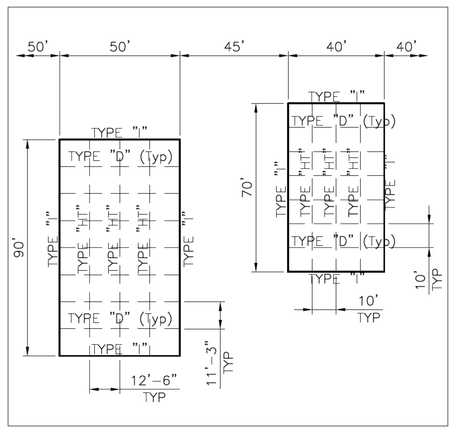
C204

preliminary not for construction



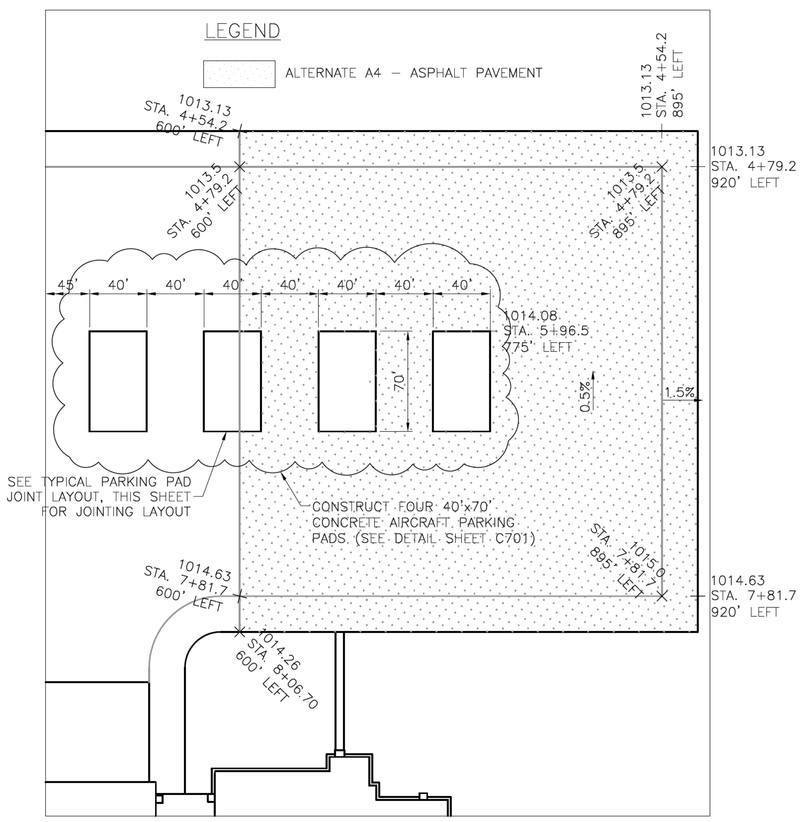
GRADING PLAN – ALTERNATE A5

TRUE NORTH



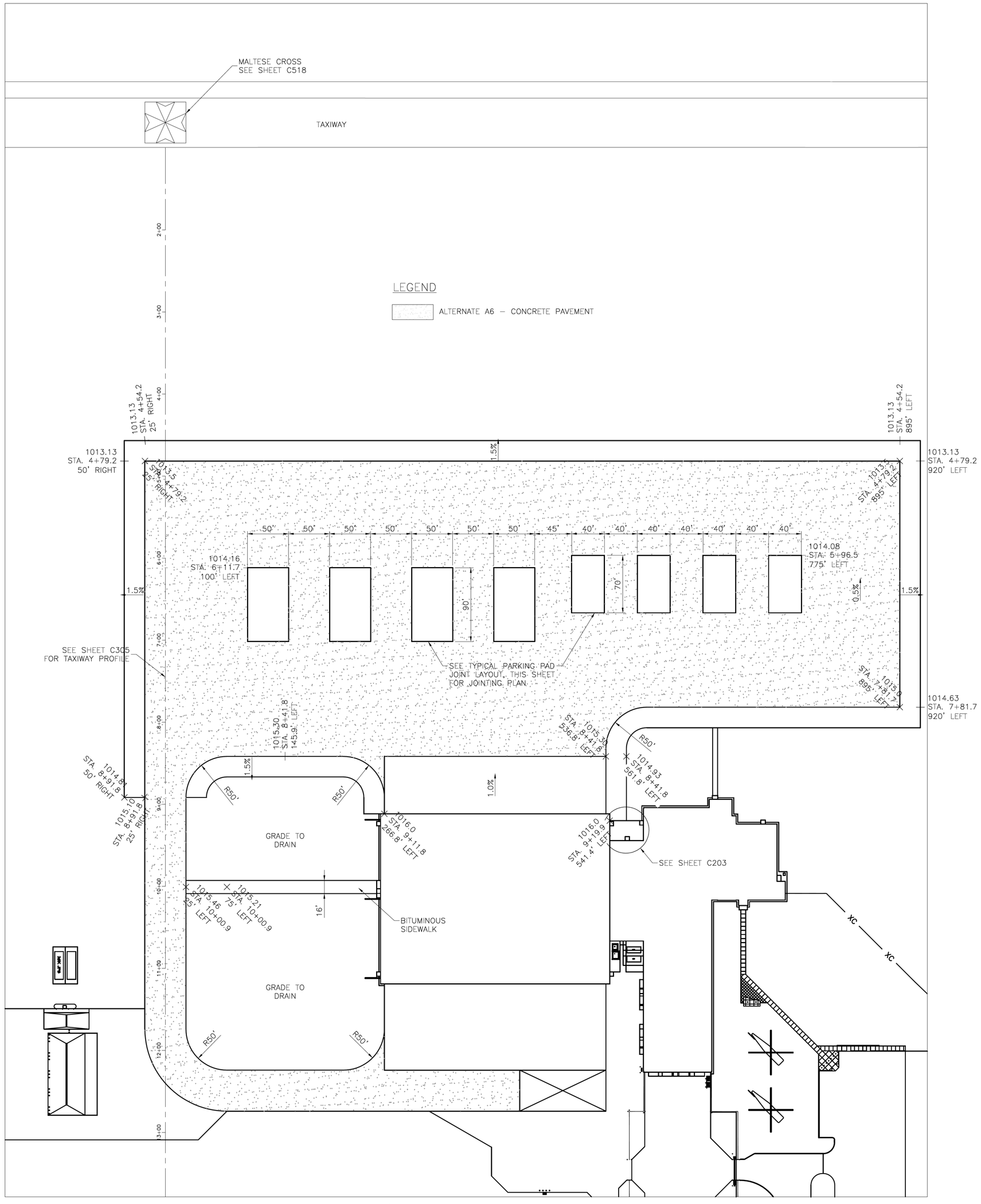
TYPICAL PARKING PAD JOINT LAYOUT

TRUE NORTH



GRADING PLAN – ALTERNATE A4

TRUE NORTH



GRADING PLAN – ALTERNATE A6

TRUE NORTH

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signature:

typed or printed name: Benita L. Crow

registration no.: 42316

date: April 16, 2007

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project no: 0520
drawn by: sjl
checked by: blc, als
date: april 16, 2007
revisions:

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army aviation support facility

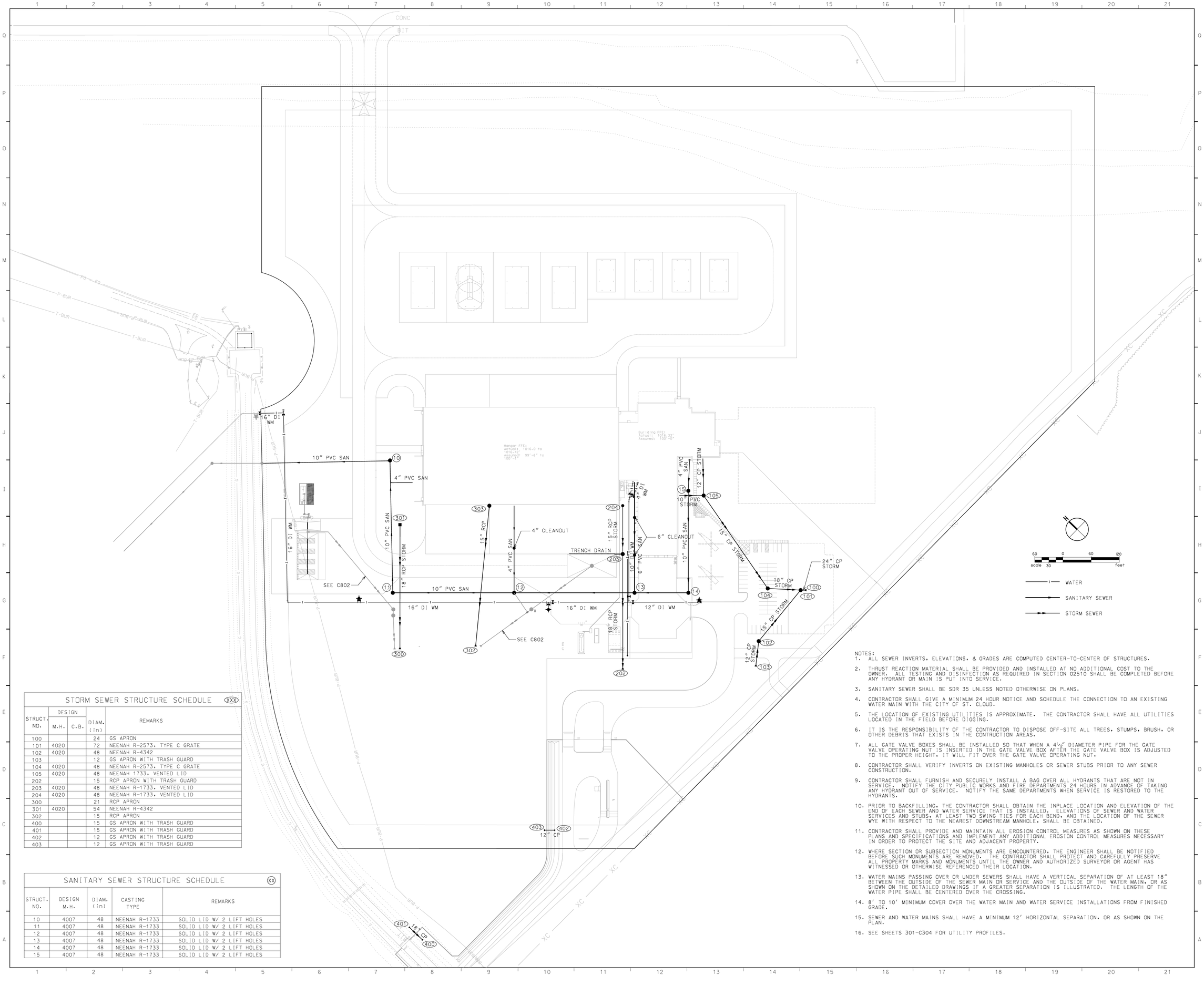
minnesota army national guard

st. cloud, minnesota

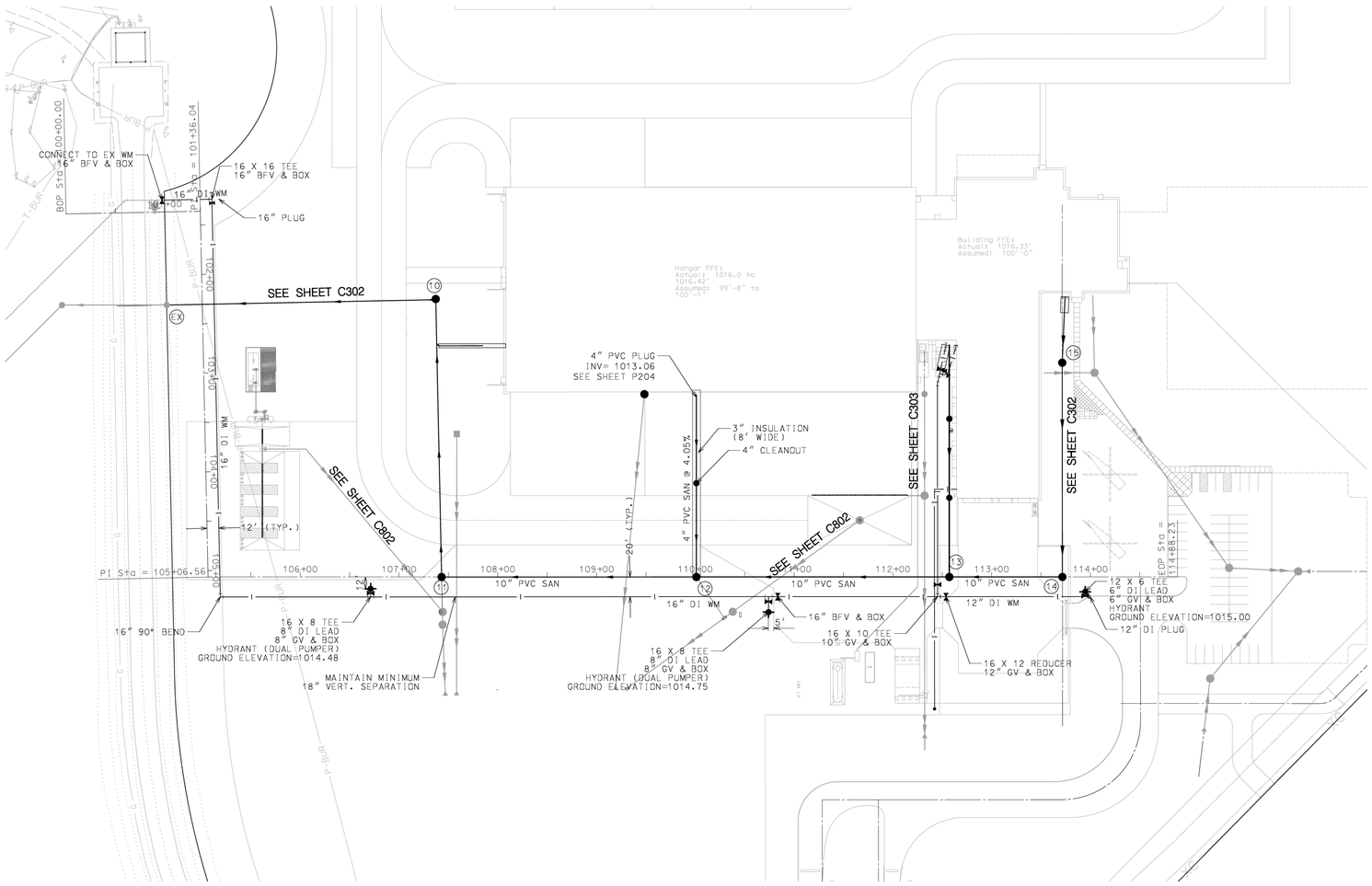
CONSTRUCTION GRADING PLAN ALTERNATES

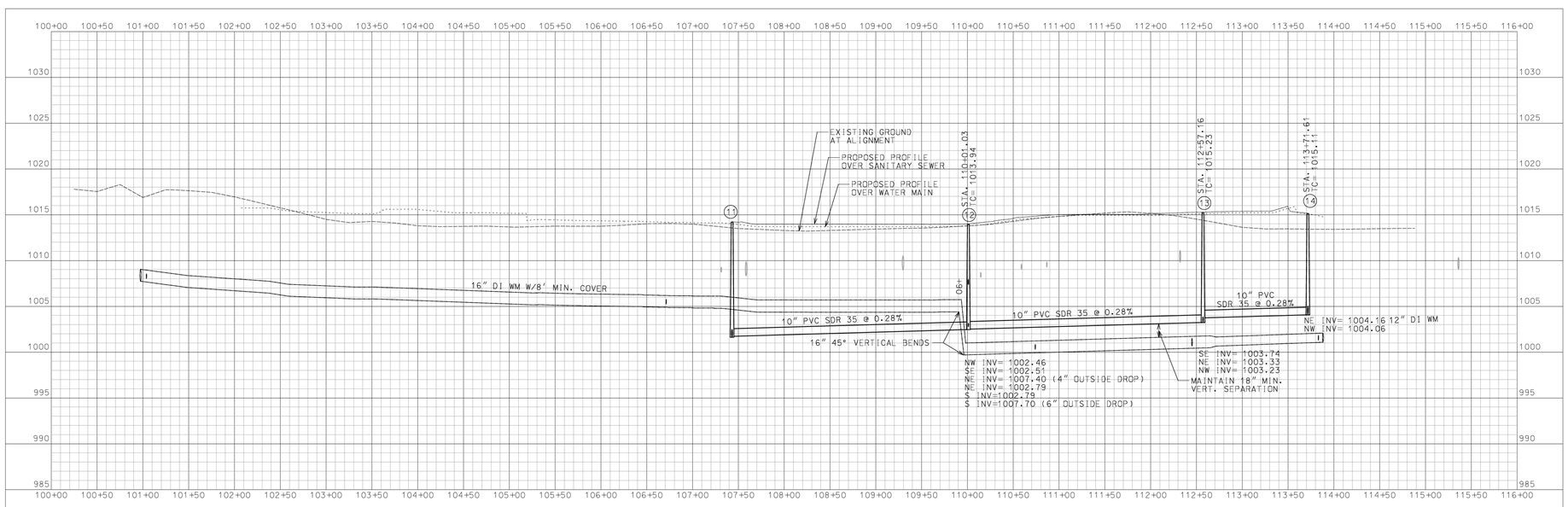
C205

preliminary not for construction


CONC
BIT
FO
FO
P-BUR
T-BUR
and P-BUR
T-BUR
FB
T-BUR
16" DI
WM
10" PVC SAN
10
4" PVC SAN
16" DI WM
10" PVC SAN
301
18" RCP STORM
SEE C802
11
10" PVC SAN
16" DI WM
300
303
15" RCP
4" PVC SAN
4" CLEANOUT
12
16" DI WM
302
SEE C802
TRENCH DRAIN
203
204
15" RCP STORM
10" WM
6" PVC SAN
6" CLEANOUT
13
16" DI WM
12" DI WM
18" RCP STORM
202
Hangar FFEs
Actual: 1016.0 to 1016.42'
Assumed: 99'-8" to 100'-1"
Building FFEs
Actual: 1016.33'
Assumed: 100'-0"
4" PVC SAN
12" CP STORM
15
105
10" PVC STORM
15" CP STORM
24" CP STORM
18" CP STORM
104
100
101
15" CP STORM
102
12" CP STORM
103
403
402
12" CP
401
18" CP
400
XC
XC
XC

NOTE:
1. THE CITY OF ST. CLOUD WILL BE CONSTRUCTING THE MUNICIPAL UTILITIES TO THE CONNECTION POINT AT THE NORTH END OF THE SITE. THE CITY OF ST. CLOUD ANTICIPATES SANITARY SEWER AND WATER MAIN WILL BE OPERATIONAL TO THE AASF BY JULY 1, 2008.





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signature:
typed or printed name: Randy J Sabart
registration no.: 23506
date: April 16, 2007

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project no: 0501
drawn by: DDK,JLS
checked by: RJS
date: April 16, 2007
revisions:

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army aviation support facility
minnesota army national guard

st. cloud, minnesota

UTILITY PLAN & PROFILE

C301

BOP Sta = 280+00.00

CONNECT TO EX SAN SEWER MANHOLE
CORE DRILL HOLE FOR 10" SEWER
CONSTRUCT MANHOLE INVERT

EDP Sta = 286+53.38

10 X 4 PVC WYE & BEND
4" PVC RISER AS REQUIRED

10" PVC SAN

PI Sta = 283+22.51

4" PVC SAN @ 1.25%

3" INSULATION
4" PVC PLUG
INV= 1007.19
SEE SHEET P204

SEE SHEET C301

SEE SHEET C303

BOP Sta = 150+00.00

PI Sta = 113+71.65

EDP Sta = 157+27.61

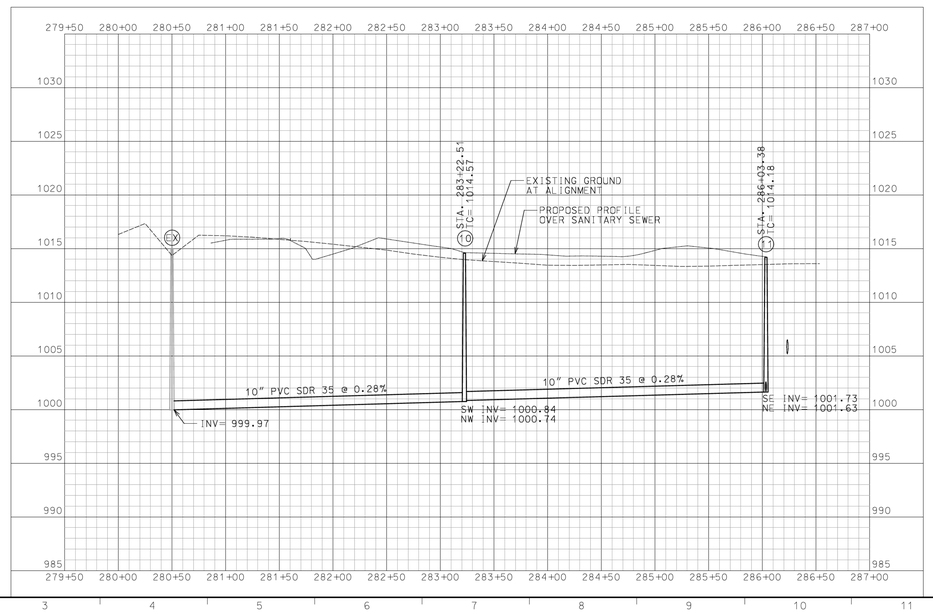
3" INSULATION
(8'WX16'L)

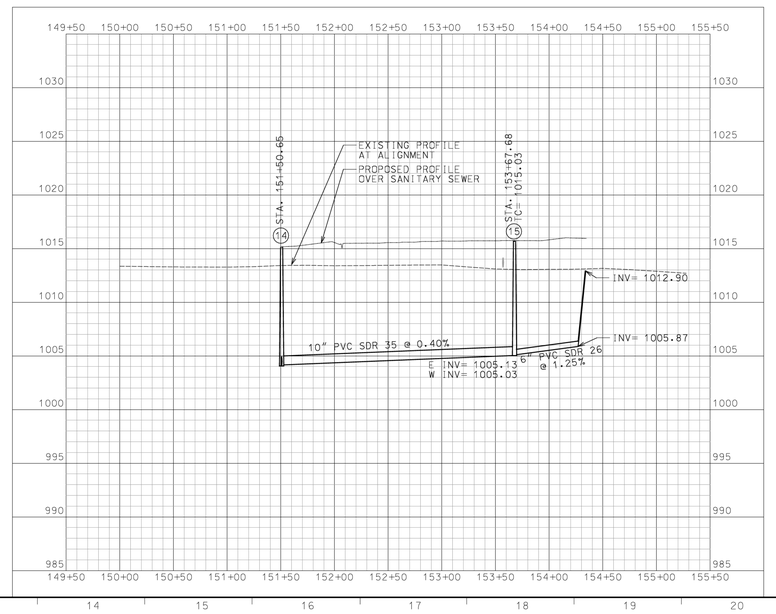
6" PVC PLUG

6" PVC SAN

PROVIDE BEND
AS REQUIRED
SEE SHEET M201
INV=1012.90

SEE SHEET C304





scale 50 0 50 100 feet

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typed or printed name: Randy J Sabart
registration no.: 25908
date: April 16, 2007

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project no: 0501
drawn by: DGK,JLS
checked by: RJS
date: April 16, 2007
revisions:

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website: www.hmarch.com

army aviation support facility
minnesota army national guard
st. cloud, minnesota

UTILITY PLAN & PROFILE

C302

SEE SHEET C301

SEE SHEET C802

AVCATT HOSE CONNECTION

BOP Sta = 159+75.00

160+00 (202)

161+00

162+00

163+00 (203) (204)

15" RCP STORM

10" DI WM

13.1' (TYP.)

CONNECT TO BUILDING STUB
SEE SHEET M203
(FIELD VERIFY INV. ELEV)

EOP Sta = 163+78.00

10" 11° BEND
10X4 TEE
4" 45° BEND (2)
4" GV & BOX
10" GV & BOX
3" INSULATION (8' WIDE)
10" 11° BEND
10" DI PLUG
PROVIDE BEND
AS REQUIRED
INV=1011.57

SEE PLUMBING PLAN SHEET M203
CONNECT TO BUILDING STUB
(FIELD VERIFY INV. ELEV.)

3/4" TYPE K COPPER SERVICE PIPE
MINIMUM 8' COVER
SEE MECHANICAL PLANS FOR MORE INFORMATION

10" GV & BOX

(13)

6" PVC SAN

6" CLEANOUT (TYP)

12' (TYP.)

3" INSULATION (8' WIDE)

8X4 PVC WYE & BEND
4" PVC @ 1.50%
CONNECT TO BUILDING STUB.
INV=1012.98
SEE SHEET M202

4" 11° BEND
4" DI PLUG
PROVIDE BEND
AS REQUIRED
INV=1008.40

CONNECT TO BUILDING STUB
SEE SHEET M202
(FIELD VERIFY INV. ELEV)

6" PVC SDR 35 @ 1.25%

12" CP STORM

CONNECT TO BUILDING STUB
SEE SHEET M201
(FIELD VERIFY INV. ELEV)

(105)

PI Sta = 243+10.13

EOP Sta = 243+88.21

242+00

15" CP STORM

241+00

PI Sta = 240+70.07

(104)

(103) 123+00

12" CP STORM

(102)

15" CP STORM

124+00

PI Sta = 123+00.06

BOP Sta = 121+00.00

8" CP STORM

(101)

BOP Sta = 240+00.00

(100)

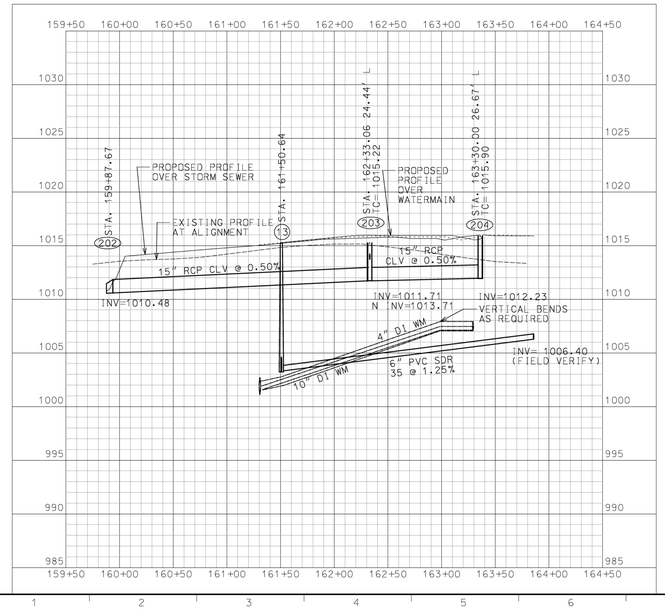
12" CP STORM

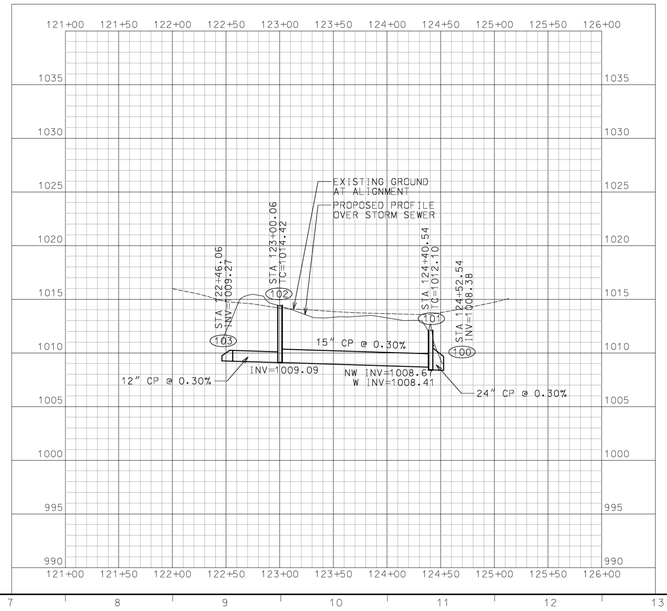
125+00

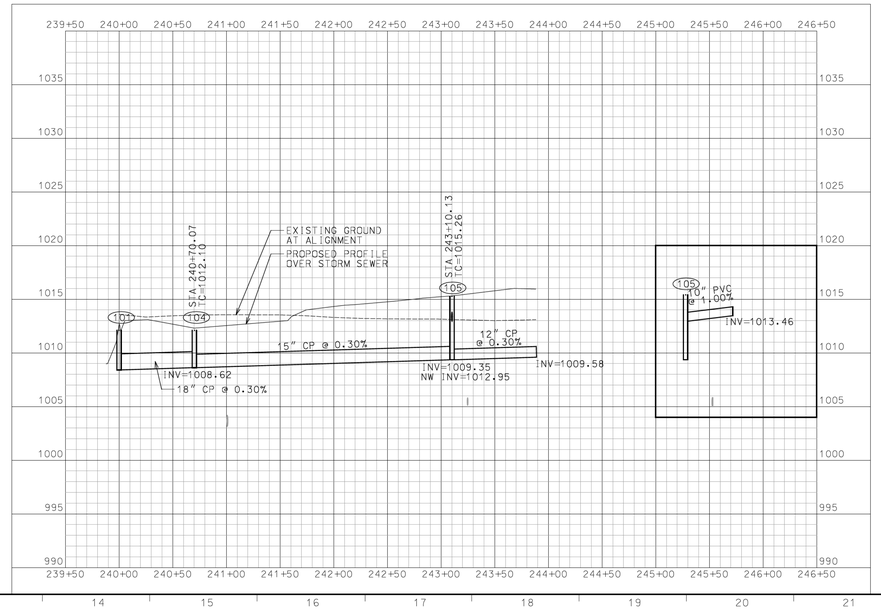
EOP Sta = 125+13.90

N

50 0 50 100
scale 25 feet







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date: April 16, 2007

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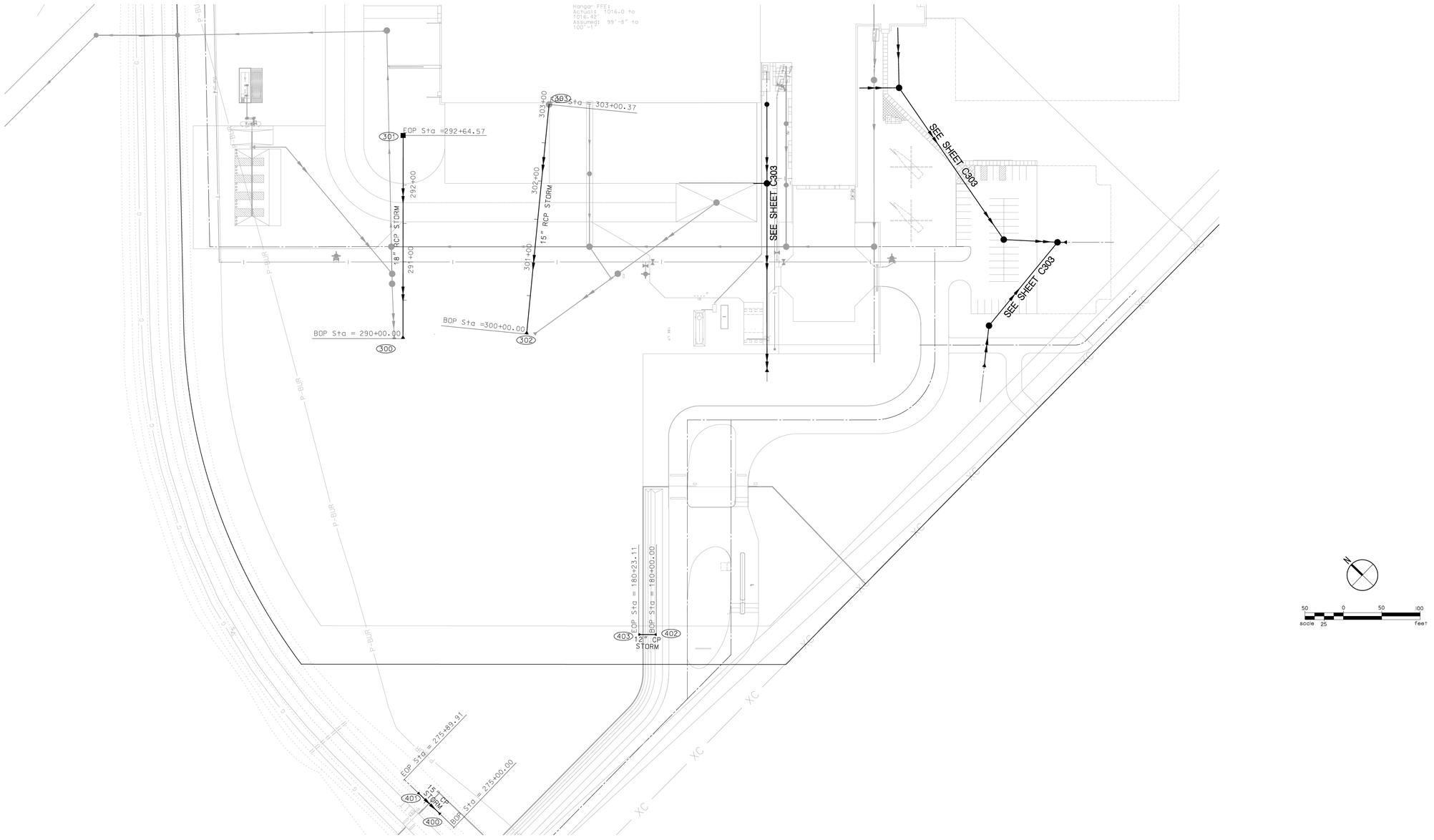
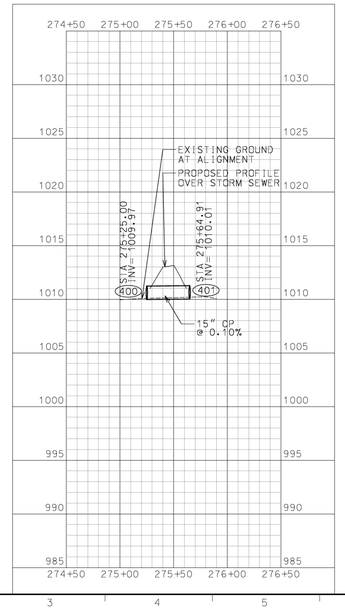
army aviation support facility
minnesota army national guard

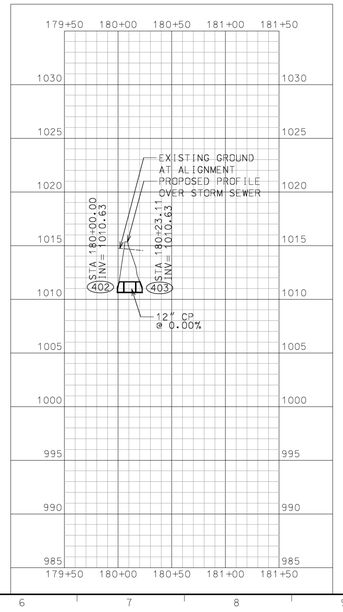
st. cloud, minnesota

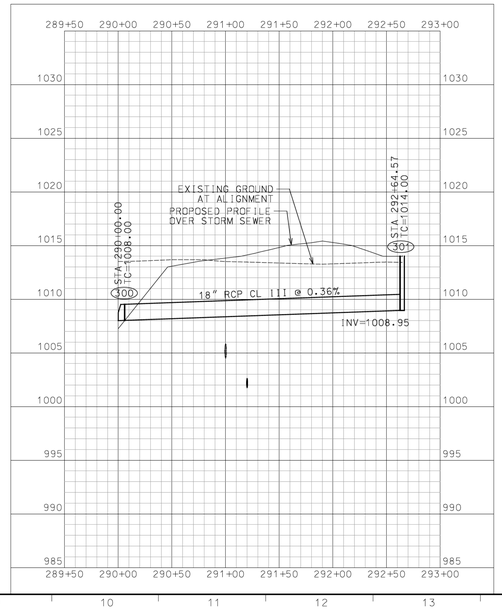
UTILITY PLAN & PROFILE

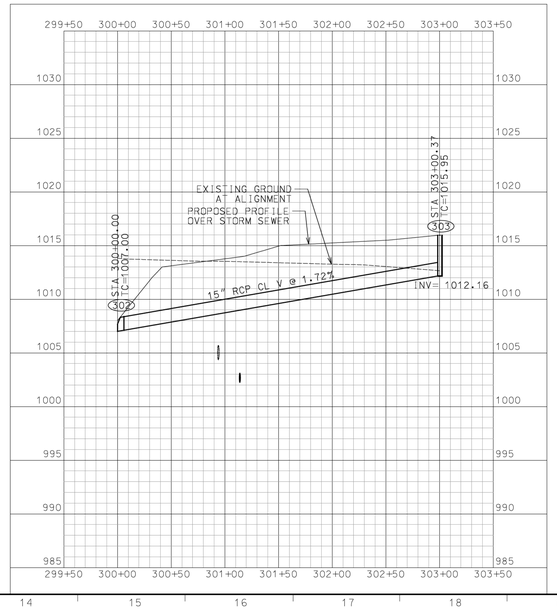
C303











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date: April 16, 2007

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army aviation support facility

minnesota army national guard

st. cloud, minnesota

UTILITY PLAN & PROFILE

C304

SITE PLAN

November 21, 2005

0 50 100 250 500

Hot refueling pad (150' x 150')

fueling controls

CH47 100' x 150'

CH47 100' x 150'

CH47 100' x 150'

Transient 100' x 150'

UH60 80' x 100'

UH60 80' x 100'

UH60 80' x 100'

UH60 80' x 100'

Future UH60 parking pads 80' x 100'

Stormwater Retention Area Phase I

70ft apron (to match UH60's bay)

105 ft apron (to match CH47's bay)

Concrete Sidewalk Phase I

atfp barrier

flagpole Phase I

18 ft high fence

Existing SCRA access road to remain

Existing 10ft high SCRA perimeter fence to remain

New electric gate for SCRA access road; provide with key pad / proximity reader - verify width with SCRA;

POV parking - 82 stalls Phase I - hardstand Phase II - asphalt

Phase III

Service Yard Phase I - hardstand Phase II - concrete

AVCATT

6 ft high perimeter fence

engine wash pad

fueling yard and containment

buried propane tank

above ground JP8 fuel tanks

oil/water separator

12ft high SCRA perimiter fence

10 ft SCRA perimeter fence

Relocate SCRA electric service

6ft high perimiter fence

16' sliding gate and traffic control arm with ground detection loops; speed bumps

hardstand drive

inspection lane

traffic control arm key pass / proximity reader; fuchsia guard hostile; speed bumps

Site for future FMS

Connect to SCRA access road here

26ft wide access drive: Phase 1 - hardstand Phase 2 - asphalt

Existing SCRA access road to remain

SCRA Existing 10ft high fence to be relocated. Replace with 6ft high fence

NOTE:
Verify relocation requirements of existing farmer electric access gate

Existing SCRA access road to be abandoned

FUTURE LAND ACQUISITION (GUARD AREA)

S43°49'58"E 631.01

S46°08'06"W 627.02

N46°08'06"E 627.02

S39°18'22"E 1398.03

Proposed SCRA 10 ft high fence and access gates with ground loops and key pad / proximity reader

SCRA Existing 10ft high perimter fence to be relocated

Existing SCRA access road to be abandoned

26ft wide road

SCRA Existing 4 strand barbed wire fence to remain

Existing SCRA 10 ft high fence to be relocated to north side of road

Existing SCRA 10 ft high fence relocated to this side of road

New 10 ft high SCRA fence

SCRA Existing 4 strand barbed wire fence to remain

Existing SCRA 10 ft high fence to remain

45th Avenue SE

preliminary design 35% submittal

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typed or printed name: kyle m. modular

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army aviation support facility

phases i and ii

st. cloud, minnesota

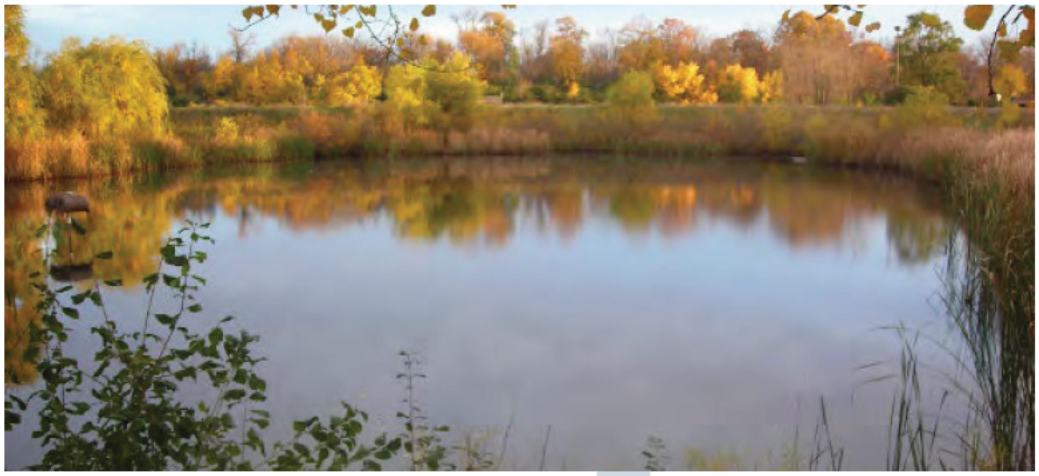
sp-oa1

preliminary not for construction

City of St. Cloud Minnesota

Stormwater Management Plan

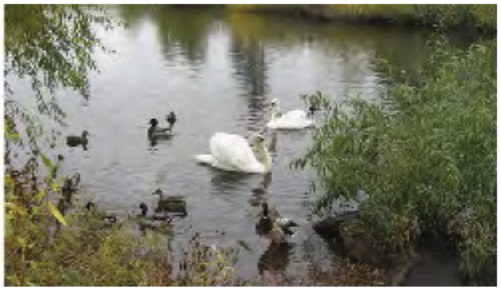
prepared for
City of St. Cloud











December 2011

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Contents

CHAPTER 1 – EXECUTIVE SUMMARY 5

CHAPTER 2 - INTRODUCTION 8

CHAPTER 3 – PHYSICAL SETTING 9

3.1 LOCATION AND HISTORY 9
3.2 TOPOGRAPHY 12
3.3 SOILS 17
3.4 GROUNDWATER AND DRINKING WATER 19
3.5 CLIMATE 22
3.6 KEY WATER RESOURCES 26
3.61 Public Waters 26
3.7 RIVERS 27
3.71 Mississippi River 27
3.8 SAUK RIVER 31
3.81 Elk River 32
3.9 LAKES 32
3.10 CREEKS AND COUNTY DITCH SYSTEMS 33
3.11 WETLANDS 34
3.12 NATURAL RESOURCES 36

CHAPTER 4 – REGULATORY SETTINGS 37

4.1 FEDERAL AGENCIES 37
4.11 United States Environmental Protection Agency 37
4.12 United States Army Corps of Engineers 40
4.13 Federal Emergency Management Agency 40
4.2 STATE AGENCIES 43
4.21 Minnesota Pollution Control Agency 43
4.22 Minnesota Department of Natural Resources (MnDNR) 52
4.23 Minnesota Department of Health 53
4.24 Minnesota Board of Water and Soil Resources 55
4.25 Minnesota Environmental Quality Board (EQB) 55
4.3 LOCAL JURISDICTIONS 56
4.31 City of St. Cloud 56
4.32 Sauk River Watershed District 59
4.33 Stearns, Benton and Sherburne Counties 60
4.4 RELATED PLANS, STUDIES AND REPORTS 61
4.41 Stearns County 2030 Comprehensive Plan 61
4.42 Sauk River Watershed District 2003-2012 Overall Plan 61
4.43 St. Cloud 2003 Comprehensive Plan 61
4.44 St. Cloud 1995 Natural Areas Inventory and Planning Framework 61
4.45 Sherburne County Local Water Management Plan (LWMP) 2007 through February 2017 61
4.46 Benton County Comprehensive Local Water Management Plan 2008 – 2018 62
4.47 Stearns County Local Water Management Plan 2008-2017 63

4.48 2010 Sustainability Framework Plan 63
4.49 St. Cloud Urban Area Mississippi River Corridor Plan 63
4.410 St. Cloud Area Joint Planning District Plan 63
4.411 St. Cloud Source Water Protection Plan 64
4.412 St. Cloud Park and Public Facilities Planning 64
4.413 Plum Creek Regional Park Master Plan (2005) and Land Cover Classification and Planning Guidance (2004) 64
4.414 Barden Park Master Plan (2002) 64
4.415 St. Cloud 2007 Neenah Creek Regional Park Master Plan and 2001 Neenah Creek Regional Park, Plant Community Inventory and Land Cover Classification 64
4.416 Riverside Regional Park Plan (2002) 65
4.417 Lake George Master Plan (2000) 65

CHAPTER 5 - ASSESSMENT 66

5.1 WATER QUANTITY ASSESSMENTS 66
5.2 WATER QUALITY ASSESSMENTS 66
5.21 Antidegradation Assessment 66
5.22 Total Maximum Daily Load (TMDL) Assessments 71
5.23 City of St. Cloud NE Industrial Area Assessment 74
5.24 Sauk River Watershed District Assessments 74
5.25 Elk River Watershed Association (ERWSA) Assessments 75
5.26 Mississippi River Assessments 76
5.27 Neenah Creek Assessments 76

CHAPTER 6 – GOALS AND POLICIES 77

CHAPTER 7 - IMPLEMENTATION PROGRAM 95

7.1 OFFICIAL CONTROLS AND STUDIES 96
7.11 Implementation Item OCS-1: Volume Management Requirements 96
7.12 Implementation Item OCS-2: Design Standards 97
7.13 Implementation Item OCS-3: NE St. Cloud Industrial Area Implementation Plan 97
7.14 Implementation Item OCS-4: Neenah Creek Stream Protection Plan 97
7.15 Implementation Item OCS-6: MS4 Pond Inventory – Assess Treatment Effectiveness 98
7.16 Implementation Item OCS-7: Subwatershed Studies 98
7.17 Implementation Item OCS-8: BMP Retrofit Master Plan 99
7.2 OPERATION AND MAINTENANCE 100
7.21 Implementation Item OM-1: Stormwater Management System Inspections 100
7.22 Implementation Item OM-2: Street Sweeping 100
7.23 Implementation Item OM-3: Storm Sewer and Pond Repairs and Maintenance 100
7.24 Implementation Item OM-4: BMP Repairs and Maintenance 101
7.3 CAPITAL IMPROVEMENTS 102
7.31 Implementation Item CIP-1: Parks CIP Implementation 102
7.32 Implementation Item CIP-2: Public Buildings CIP Implementation 102
7.33 Implementation Item CIP-3: Public Works and Utilities CIP Implementation 102
7.34 Implementation Item CIP-4: BMP Retrofits 103
7.4 NPDES MS4 OBLIGATIONS 105
7.41 Implementation Item MS4/MCM-1: Public Education and Outreach 105

7.42 Implementation Item MS4/MCM-2: Public Participation and Involvement 106
7.43 Implementation Item MS4/MCM-3: Illicit Discharge Detection and Elimination 106
7.44 Implementation Item MS4/MCM-5: Post-Construction Stormwater Management 107
7.45 Implementation Item MS4/MCM-6: Good Housekeeping/Pollution Prevention 107
7.5 FUNDING SOURCES 108
7.51 Implementation Program Summary 109
7.6 VOLUME REDUCTION PLAN 112

CHAPTER 8 – PLAN ADMINISTRATION 113

8.1 REVIEW AND ADOPTION PROCESS 113
8.2 COLLABORATION WITH OTHER ENTITIES 113
8.3 PLAN AMENDMENTS AND FUTURE UPDATES 113
8.4 ANNUAL REPORTING 114

Figures

FIGURE 3.1 – LOCATION MAP 10
FIGURE 3.2 – MINNESOTA BASINS AND MAJOR WATERSHEDS 13
FIGURE 3.3 – CITY OF ST. CLOUD MAJOR WATERSHEDS 15
FIGURE 3.4 – TOPOGRAPHY 16
FIGURE 3.5 – SOILS 18
FIGURE 3.6 – DRINKING WATER SOURCE MANAGEMENT AREA 21
FIGURE 3.7 – ST. CLOUD DAM 28
FIGURE 3.8 – MISSISSIPPI RIVER USGS GAUGE 29
FIGURE 3.9 – ST. CLOUD IMPAIRED WATERS 30
FIGURE 3.10 – SAUK RIVER USGS STREAM GAUGE 31
FIGURE 3.11 – NATIONAL WETLAND INVENTORY 35
FIGURE 4.1 –MNDNR FLOODPLAIN NOMENCLATURE 41
FIGURE 4.2 – FLOOD ZONE AND PUBLIC WATERS MAP 42
FIGURE 4.3 – IMPAIRED WATERS ONE MILE OFFSET 48
FIGURE 4.4 - DWSMA 54
FIGURE 4.5 – CITY ZONING 58
FIGURE 5.6 – SRWD MONITORING LOCATIONS ON THE SAUK RIVER (MAP FROM SAUK RIVER WATERSHED DISTRICT) 75

Tables

TABLE 3-1 – CITY OF ST. CLOUD POPULATION GROWTH 12
TABLE 3-2 – AVERAGE MONTHLY PRECIPITATION, ST. CLOUD AIRPORT, 1970 – 2010 22
TABLE 3-3 – RAINFALL FREQUENCIES ST. CLOUD AREA 23
TABLE 5-1 – ANTIDEGRADATION ANALYSIS MODELING RESULTS – IMPERVIOUS AREAS 68
TABLE 5-2 – ANTIDEGRADATION ANALYSIS MODELING RESULTS – RUNOFF VOLUME 68
TABLE 5-3 – ANTIDEGRADATION ANALYSIS MODELING RESULTS – TOTAL SUSPENDED SOLIDS 68
TABLE 5-4 – ANTIDEGRADATION ANALYSIS MODELING RESULTS – TOTAL PHOSPHORUS 69
TABLE 5-5 – RUNOFF VOLUME MITIGATION 70
TABLE 5-6 – DRAFT 2010 LIST OF IMPAIRED WATERS IN ST. CLOUD (303(D) LIST) 72
TABLE 5-7 – MPCA IMPAIRMENT DESIGNATION THRESHOLDS FOR DETERMINING USE SUPPORT FOR LAKES 73
TABLE 5-8 – WATER QUALITY MEASUREMENTS FOR ST. CLOUD LAKES 73

TABLE 7-1 – STORMWATER UTILITY BUDGETS.....109
TABLE 7-2 – IMPLEMENTATION PROGRAM.....110
TABLE 7-3 – ST. CLOUD VOLUME REDUCTION PLAN.....112

Appendices

Appendix A – Minnesota Department of Health Evaluation Procedure for Infiltration

Appendix B – Public Comment Record

Appendix C – Map 1

Chapter 1 – Executive Summary

St. Cloud's Stormwater Management Plan (SWMP) serves as a comprehensive guide to managing the City's stormwater discharges as growth continues within the St. Cloud area. The SWMP complements St. Cloud's 2003 Comprehensive Plan. As a planning document, the SWMP focuses as much on goals as it does on requirements. In contrast, the City's Stormwater Pollution Prevention Program (SWPPP), mandated as part of the State stormwater permit, delineates requirements and specific, measurable program features and outcomes.
The foundational goals for the SWMP are:

- conservation, protection and restoration of St. Cloud's and the region's surface water resources; and
- compliance with the regulatory requirements that originate with the Clean Water Act and delegated to St. Cloud through State administered stormwater permits; and
- management of City expenditures to achieve the most benefit for the least cost.

The SWMP is guided by Minnesota Rules and Statutes, requirements of the Sauk River Watershed District and the three counties whose jurisdictions overlap St. Cloud. Guidance also comes from Minnesota Department of Natural Resources (MnDNR) requirements, Minnesota's wetland conservation act, and the NPDES stormwater program administered by the Minnesota Pollution Control Agency (MPCA). To achieve the foundational goals, the SWMP is organized according to guidance in Minnesota Statute and Rules.

Physical Setting describes the unique physical characteristics of the St. Cloud area and how these affect stormwater management. For instance, portions of St. Cloud sit atop the Anoka Sandplain which infiltrates more freely than virtually any other soil complex within Minnesota. Consequently, infiltration can be used as a stormwater practice more readily. **Physical Setting** also describes hydrologic features of the area including major and minor watersheds and prominent water features such as the Mississippi River, Sauk River, Elk River, Neenah Creek and Lake George. Well drained by rivers and creeks, the City has different stormwater management considerations than Cities that drain via lakes and wetlands.

To a large extent, the unique regulatory context in Minnesota and the St. Cloud area determines how the city manages stormwater. Though much of Minnesota's regulation originates from Federal mandate through the Clean Water Act, the Federal legislation gets filtered through the State. Consequently, Clean Water Act regulation can look significantly different from State to State. **Regulatory Context** identifies the Federal, State and Local regulations and governmental agencies that determine how St. Cloud will manage its stormwater. The section describes connections among the different regulations

and entities, and draws a direct connection between St. Cloud's infiltration requirement and regulation originating with the Clean Water Act. **Regulatory Context** also describes related plans, studies and reports prepared by local entities, such as the Sauk River Watershed District and the Counties recognized in the SWMP.

The **Assessment** describes both protection and restoration challenges given the unique state of each water body within the St. Cloud area. St. Cloud's primary assessment effort has been the *Loading Assessment and Nondegradation Report* completed in 2009. The analysis calculated the increased pollutant loads that urban growth has created since 1988 and predicts the increased pollutant loads to year 2020 if then current practices are followed. This analysis and comparison of pollutant loads led to the adoption of the current infiltration requirement, which covers both new development and redevelopment projects. Each water body experiences similar pollutants but because of assimilative capacity, water bodies react to pollutants in different ways. Total Maximum Daily Loads (TMDLs) are studies of specific water bodies, identified as impaired for a specific pollutant. TMDLs set pollutant loads which Cities must comply with. The **Assessment** shows four impaired waters in the St. Cloud area but no TMDLs are completed. In the future, St. Cloud may have to modify the stormwater requirements to meet future TMDLs.

The **Goals and Policies** section guides implementation of the Stormwater Management Plan. The goals and policies should be considered a bridge between the **Assessment**, which identifies many stormwater issues and the **Implementation Plan** or program. Not every assessed problem can be addressed by the City. The goals and policies provide nonbinding aspirations for solving problems without consideration of the feasibility or financial impact of the commitment. The **Implementation Plan** and consideration of City finances will ultimately prioritize what the City will do. To some extent, the **Implementation Plan** reflects a binding commitment. The goals and policies however, remain more aspirational than regulatory. The **Goals and Policies** section includes goal statements and policies in eighteen different areas including water quality, water quantity, volume management, stream management, education and public participation, and financial management.

The **Assessment** section identifies specific issues regarding waters within the St. Cloud area. The **Goals and Policies** broadly state St. Cloud's aspirations regarding the waters and, more broadly, the City's stormwater management program. The **Implementation Plan** focuses directly on the things the City wants to accomplish within the next several years. As with any planning effort, this program will be altered, however, basic themes remain the same.

The Implementation Plan identifies four activity areas:

1. Official Control and Studies
2. Operation and Maintenance
3. Capital Improvements
4. NPDES MS4 Obligations

Official controls consist of ordinance, policy, permits and design standards that either mandate or encourage water quality implementation. Studies include analysis and documentation of water quality or quantity issues and often lead to ordinance and policy modifications. Operation and maintenance includes periodic storm sewer replacements and repairs, and small improvements to address nuisance drainage or flooding issues as well as periodic maintenance of ponds, storm sewer and culverts. Capital improvements include water quantity and quality Best Management Practices associated with the large projects for parks, public buildings, public utilities and public works. The NPDES MS4 Permit obligations refer to activities necessary to meet obligations under the general permit coverage. Activities include annual meetings, SWPPP updates and SWPPP implementation.

The costs in the **Implementation Plan** are outlined for each item to the year 2021. The City will periodically update the priorities and costs. A variety of sources fund stormwater management activities; the stormwater utility is the predominant funding source. Grants are seen as a means to leverage City funds to speed implementation.

The **Plan Administration** section discusses review and adoption, collaboration with other entities, plan amendments and updates, and annual reporting. The SWMP requires periodic amendments to remain consistent with regulatory requirements, particularly St. Cloud's MS4 Permit, and to adapt to changing practices in stormwater management. The City of St. Cloud will annually update the stormwater **Implementation Plan** to remain current with the Capital Improvement Plans, specifically Parks, Public Buildings and Public Works. Major amendments consist of changes to the policy and regulatory components of the SWMP or the City's stormwater program. Major amendments will go through the same review and approval process as the Plan, and will be adopted formally by the St. Cloud City Council.

As part of the MS4 Permit and SWPPP activities, the City of St. Cloud annually reports activities related to stormwater management through public outreach and an annual meeting.

Chapter 2 - Introduction

St. Cloud's Stormwater Management Plan (SWMP) serves as a comprehensive guide to managing the stormwater discharges as growth continues within the St. Cloud area. The SWMP is distinct from the MS4 Permit and the Storm Water Pollution Prevention Program (SWPPP). The SWMP is a planning document whereas the SWPPP is a compliance document. More exactly, the SWPPP outlines activities that maintain St. Cloud's compliance with the MS4 Permit. While the SWMP also outlines activities that help maintain compliance with the MS4 Permit, this occurs as part of a larger program to improve the quality of St. Cloud's stormwater discharge while managing expenditures for the improvements. The SWMP complements St. Cloud's 2003 Comprehensive Plan though the SWMP focuses more narrowly on the stormwater impacts of growth. Like other comprehensive planning documents, the SWMP focuses on goals as well as requirements.

The foundational goals for the SWMP are:

- conservation, protection and restoration of St. Cloud's and the region's surface water resources; and
- compliance with the regulatory requirements the originate with the Clean Water Act and delegate St. Cloud through State administered stormwater permits; and
- management of City expenditures to achieve the most benefit for the least cost.

The Minnesota Pollution Control Agency (MPCA) is currently seeking public comment on a revised MS4 Permit. It is expected that the permit will be signed in late 2011 or 2012.

Chapter 3 – Physical Setting

The City of St. Cloud possesses unique conditions that separate it from many other communities. For instance, portions of the City lie above the Anoka Sandplain, and infiltrate more freely than areas outside the Sandplain. This improves the prospects for infiltration practices to address the City's water quality needs. Understanding the unique physical setting provides City staff with foundational knowledge on how to address flood control and water quality issues.

3.1 Location and History

The City of St. Cloud was incorporated in 1856, and was named after a Paris suburb. Located approximately 60 miles northwest of Minneapolis and St. Paul, the municipal limits lie primarily in Stearns County, but also extend into Sherburne and Benton Counties. The Mississippi River flows through the City and forms the border between the counties. The City encompasses approximately 40 square miles and borders six townships; Minden, Haven, St Joseph, Clear Lake, Le Sauk, Lynden; and five cities; Waite Park, Sartell, St Augusta, Rockville and Sauk Rapids (Figure 3.1). The St. Cloud metro area has realized the importance of joint planning efforts through the adoption and subsequent implementation of the St. Cloud Area Joint Planning District Plan. Similarly, the Stormwater Management Plan (SWMP) intends to facilitate coordination among local governments, and State and Federal authority.

Sartell
Sauk Rapids
Mayhew Creek
Donovan Lake
Benton
Sherburne
Saint Joseph
Benton
Stearns
Sauk River
Lake George
Sauk River
Waite Park
124-28
35-31
35-30
County Ditch 3
County Ditch 17
Meenah Creek
Rockville
Saint Augusta
Johnson Creek
Sherburne
Stearns
Mississippi River
County Ditch 15
E/k River
23
15
10
52
301
95
94

St. Cloud Water Resources
- County Boundaries
- Township Boundaries
- Rail Lines
- City Limits

St. Cloud Minnesota

A unique aspect of the City is its age. Since incorporation in 1856, St. Cloud has seen over 30 square miles of development. Urban and residential development of this early era consists of closely spaced homes, buildings and roads which make the retrofit of flood control, water quality and infiltration practices difficult. Additionally, many of these areas have limited or undersized storm sewer systems which leads to frequent street flooding.

Since 1990, St. Cloud has ranked as one of the fastest growing communities in the state. This population growth caught the attention of Minnesota's Pollution Control Agency (MPCA) which designated St. Cloud as one of 30 cities required to complete a Loading Assessment and Nondegradation Report. Nondegradation or antidegradation, is defined and explained in the Regulatory Context section.

With over 67,000 residents in the City of St. Cloud, and over 167,000 residents in the greater St. Cloud Metropolitan Area (2000 census), St. Cloud is a regional population center and a commercial hub for Central Minnesota. St. Cloud's growth is fostered by transportation accessibility and close proximity to the Twin Cities Metropolitan Area. Historically seen as separated by 60 miles of agricultural land from the Twin Cities, St. Cloud is more connected to the Twin Cities as suburban development reaches North on the Interstate 94 corridor. Other highway corridors such as U.S. Highway 10, and State Highways 23 and 15 facilitate travel to and from St. Cloud. Without appropriate mitigation, the growth will continue to stress the area's receiving waters as impervious surfaces replace undeveloped lands. It is a primary purpose of this SWMP to describe appropriate mitigation practices and policies.

Growth brings increased industrial and commercial land uses, some of which constitute a potential source of contamination to St. Cloud's water supply. Clearly, the installation of BMPs to capture stormwater runoff will have the added benefit of protecting the City's drinking water.

> *"Regarding land use, it is not necessarily the particular land use, but the specific activities associated with the land use that can result in significant impacts on source water."*
>
> *St. Cloud Source Water Protection Plan*

Development within City limits is diverse, ranging from highly impervious urban areas in downtown St. Cloud to agricultural lands and hobby farms on the City's fringe. Within this human-dominated environment some substantial natural areas still exist including many wetlands, the Sauk River and the Mississippi River. However, the predominant theme as St. Cloud continues to develop will be the

conversion of agricultural land to residential, commercial and industrial land. The mitigation strategy must be tailored to this conversion since an agricultural to urban conversion is fundamentally different than a natural area to urban conversion.

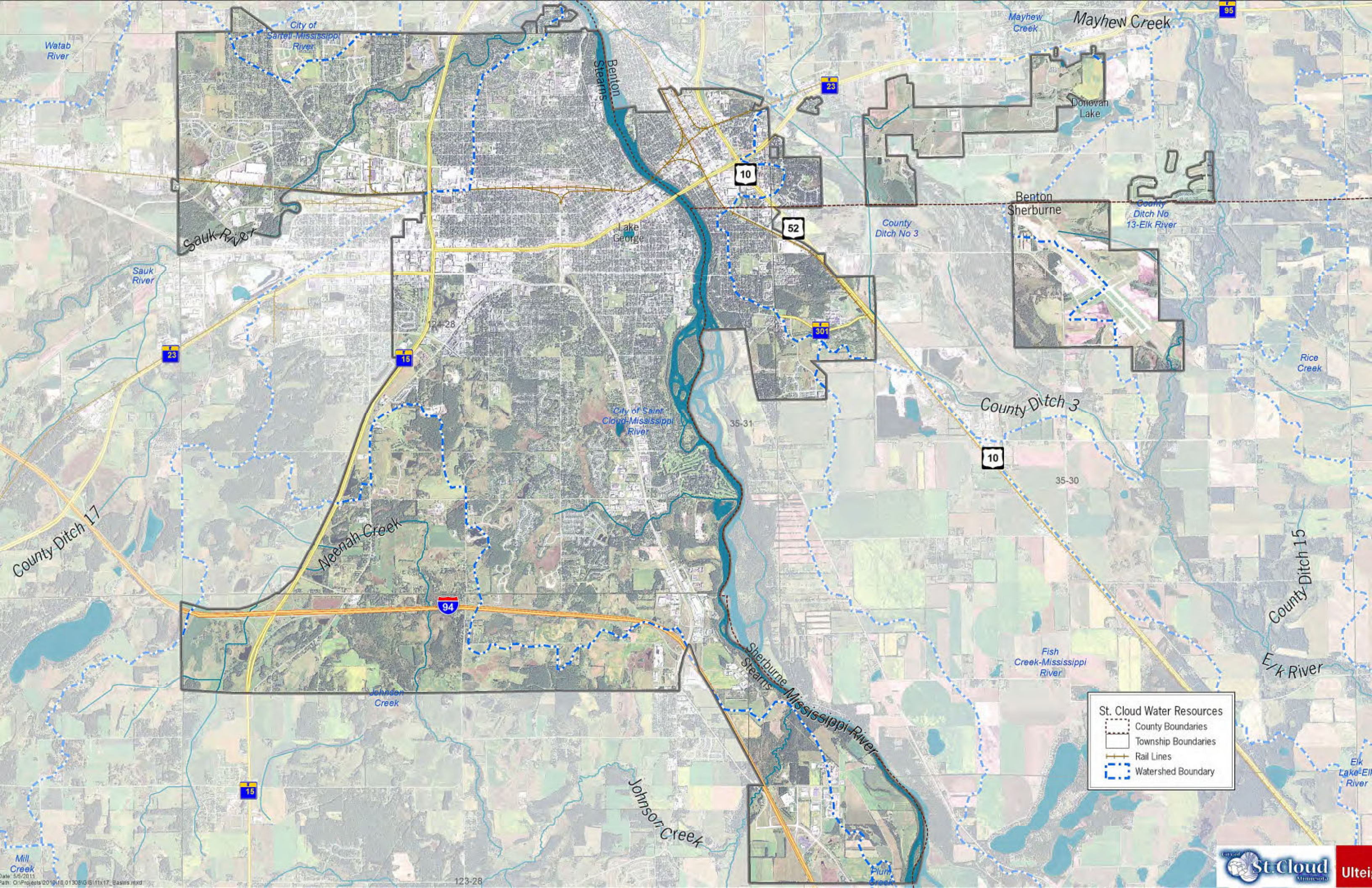
The City last updated the Comprehensive Plan in 2003. Table 3-1, modified from the 2003 Comprehensive Plan, shows population growth from 1980 to 2020.

Table 3-1 – City of St. Cloud Population Growth

Area	1980	1990	2000	2010	2020
St. Cloud	42,566	48,812	58,978	69,651	82,076
Benton County Portion	4,645	5,950	6,363	67,145	
Sherburne County Portion	4,421	5,246	5,905		
Stearns County Portion	33,500	37,616	46,710		
Sources: US Census projections, City of St. Cloud					

3.2 Topography

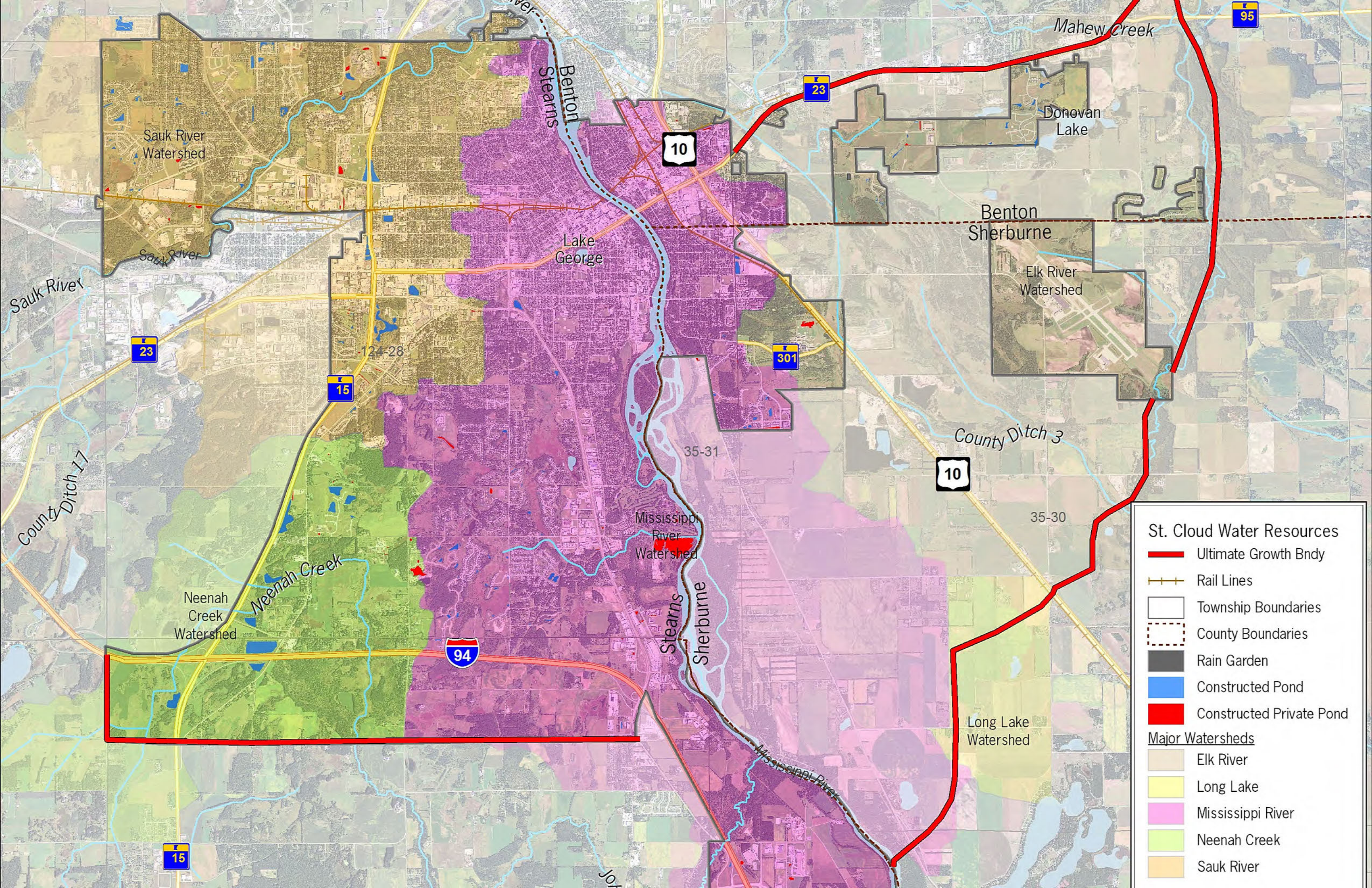
For stormwater management, describing topography involves the delineation of drainage into both minor and major drainage areas. At a large scale, St. Cloud lies within the Upper Mississippi River Basin, which encompasses land tributary to the Mississippi River above its confluence with the St. Croix River in Hastings. Within this larger basin, St. Cloud lies predominantly in the Mississippi River – St. Cloud major watershed which encompasses a total of 721,410 acres. The northwest portion of the City lies within a second major watershed, the Sauk River. Figure 3.2 shows the Basins and Major Watersheds within St. Cloud. The concept of Basin and Major Watershed has the potential to become more important in stormwater regulations as the MPCA considers whether a Basin/Major Watershed regulatory approach might improve outcomes over the current water body based approach.

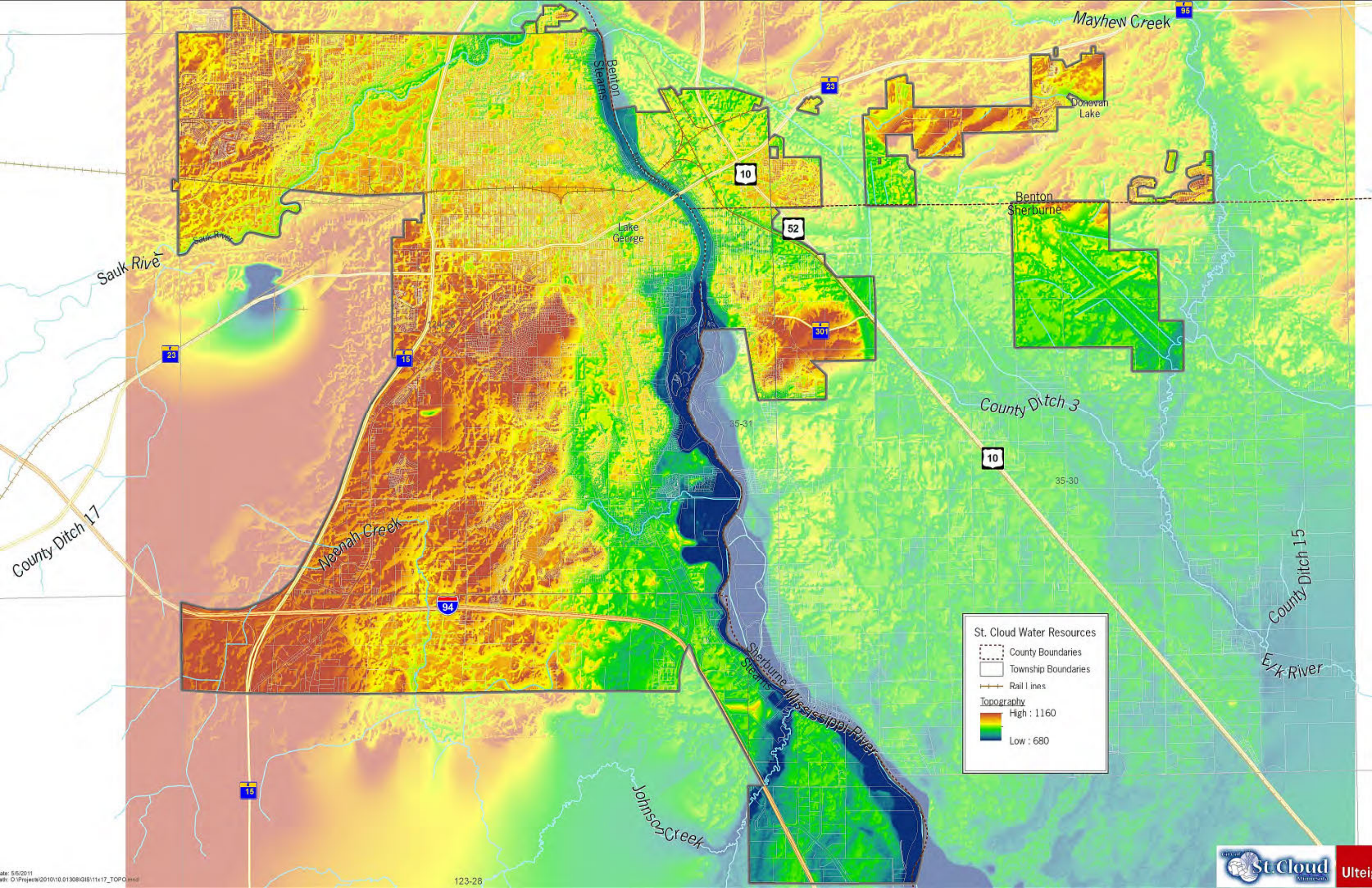

Watab River
City of Sartell-Mississippi River
Benton
Stearns
Mayhew Creek
Mayhew Creek
Donovan Lake
Benton
Sherburne
County Ditch No 13-Elk River
County Ditch No 3
Sauk River
Sauk River
Lake George
123-28
City of Saint Cloud-Mississippi River
35-31
Rice Creek
County Ditch 3
35-30
County Ditch 17
Neenah Creek
Johnson Creek
Sherburne
Stearns
Mississippi River
Fish Creek-Mississippi River
County Ditch 15
Elk River
Mill Creek
Johnson Creek
Plum Creek
123-28
St. Cloud Water Resources
County Boundaries
Township Boundaries
Rail Lines
Watershed Boundary

Within the two major watersheds, the City has further delineated minor watershed and subwatershed boundaries through the *Loading Assessment and Nondegradation Report*, 2007. St. Cloud delineated the 168 subwatersheds from a variety of sources including digital elevation information obtained from the United States Geological Survey (USGS), City storm sewer information, and Minnesota Department of Transportation (MnDOT) drainage information.

To facilitate understanding of larger drainage patterns, St. Cloud organizes the subwatersheds into five distinct watersheds depending on the receiving water for the drainage. These watersheds are Sauk River, Mississippi River, Elk River, Neenah Creek and Long Lake. Figure 3.3 shows the delineation of these watersheds as they relate to the municipal boundaries.

Drainage areas or watersheds describe how runoff is captured and routed to downstream water bodies. Land elevation, land cover and land slope determine how fast the water moves. In general, gradual land slopes dominate St. Cloud's growth area. Higher elevations of up to 1160 occur in the City's western areas adjacent to Trunk Highway 15. From here, elevations fall 480 feet as the land falls off to the Mississippi River. Figure 3.4 presents a visual of these varying elevations. The Mississippi River flows through a gorge in the north part of the City. South of Benton and Sherburne County line the gorge gives way to more extensive floodplain areas, as indicated by the greens and blues in Figure 3.4.


Sauk River Watershed
Sauk River
Sauk River
Benton
Stearns
Lake George
Mahew Creek
Donovan Lake
Benton
Sherburne
Elk River Watershed
124-28
35-31
35-30
County Ditch 3
County Ditch 17
Neenah Creek Watershed
Neenah Creek
Mississippi River Watershed
Stearns
Sherburne
Mississippi River
Long Lake Watershed
10
23
15
94
301
95
St. Cloud Water Resources
Ultimate Growth Bndy
Rail Lines
Township Boundaries
County Boundaries
Rain Garden
Constructed Pond
Constructed Private Pond
Major Watersheds
Elk River
Long Lake
Mississippi River
Neenah Creek
Sauk River



Mayhew Creek
Benton
Stearns
Donovan
Lake
Benton
Sherburne
Lake
George
Sauk River
Sauk River
County Ditch 3
County Ditch 17
Neenah Creek
County Ditch 15
Elk River
Sherburne
Stearns
Mississippi River
Johnson Creek
St. Cloud Water Resources
County Boundaries
Township Boundaries
Rail Lines
Topography
High : 1160
Low : 680
35-31
35-30
123-28
St. Cloud
Ulteig

The lack of bluffs, ravines and other steep slopes promotes relatively moderate runoff rates from the landscape. In contrast, the agricultural ditches and streams in the area tend to accelerate runoff delivery. As St. Cloud expands the growth area it must implement strategies that not only decrease discharge rates but also manage stream base flow so that increases in sediment load from stream beds and banks are minimized. Managing stream base flow often occurs through the use of infiltration and extended detention practices. (Lisa noted this was confusing)

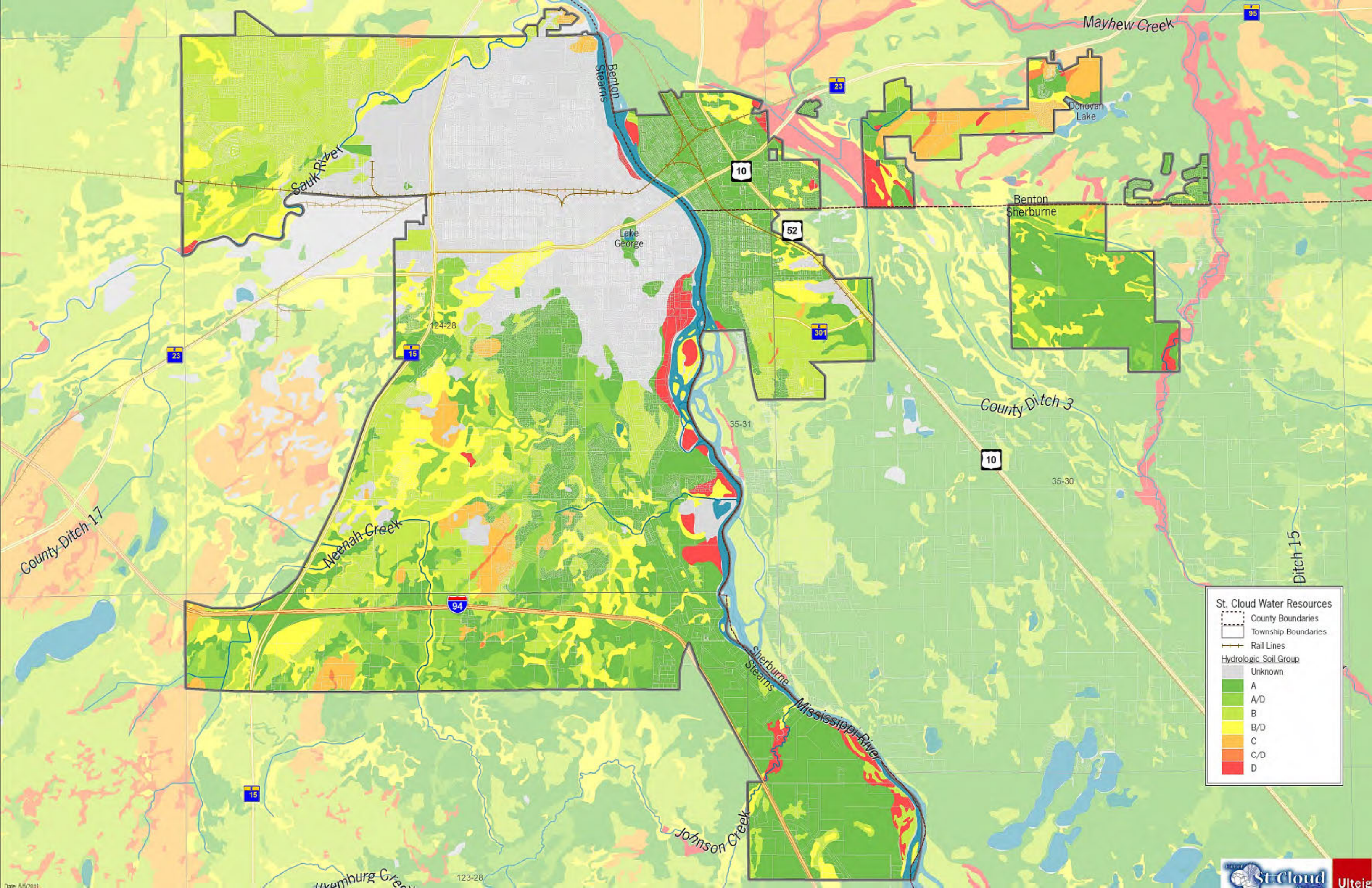
3.3 Soils

The Natural Resources Conservation Service (NRCS) publishes soil survey data for Stearns, Benton and Sherburne Counties. The data includes mapping and physical properties for soil types found in the St. Cloud area.
The soil survey assigns each soil type to a hydrologic soil group, based on the soils ability to infiltrate water during long-duration storms. The four hydrologic soil groups (HSG) are:

- Group A – High Infiltration
- Group B – Moderate Infiltration
- Group C – Slow Infiltration
- Group D – Very Slow Infiltration

Dual hydrologic soil groups are also found in St. Cloud. These classifications are given to soils whose infiltration properties vary according to how well drained is the soil. For example, an HSG B/D soil exhibits B infiltrative properties when drained and D when undrained. This type of soil complex is typical of hydric soils. Only soils that are rated D in their natural condition are assigned to dual classes. The majority of the soil types in St. Cloud are classified as Hydrologic Soil Group A and B, signifying a high to moderate infiltration capacity and potential for use in stormwater volume management. Figure 3.5 presents the Hydrologic Soil Groups for the St. Cloud area.

Parts of St. Cloud were disturbed prior to the soil survey. Figure 3.5 shows these areas in gray. If infiltration is used in these areas, soil borings will determine infiltration capacity. Outside the urban core, highly infiltrative soils occur closer to the Mississippi River while tighter soils occur in the higher elevations above the river where wetlands predominate. In general, infiltration is a viable practice anywhere A and B soils are found which includes the majority of the study area.


Mayhew Creek
Benton
Stearns
Donovan
Lake
Sauk River
Benton
Sherburne
Lake
George
124-28
35-31
County Ditch 3
35-30
County Ditch 17
Neenah Creek
Ditch 15
Sherburne
Stearns
Mississippi River
Johnson Creek
123-28
St. Cloud Water Resources
County Boundaries
Township Boundaries
Rail Lines
Hydrologic Soil Group
Unknown
A
A/D
B
B/D
C
C/D
D

3.4 Groundwater and Drinking water

The periodic advancement and retreat of the glaciers created the level plains and slightly rolling topography seen in the St. Cloud area today, and the deposition of coarse materials from melting glaciers formed the Anoka Sandplain, which underlies the City of St. Cloud. Anoka Sandplain areas infiltrate freely and allow many options for stormwater best management practices (BMPs).

A critical consideration for managing groundwater/surface water interaction is the location and depth of bedrock. The Stearns County 2008 Comprehensive Plan Update included mapping of bedrock depths. Bedrock depths varied between 0 and 50 feet in the western portion of St. Cloud, where several rock outcroppings are seen. Closer to the Mississippi River, bedrock depth ranges between 50 and 100 feet.

Bedrock depth is an important parameter in designing stormwater practices. Typically, proper design maintains some separation between the stormwater practice and bedrock. The Minnesota Department of Health and the Minnesota Pollution Control Agency provide guidance for proper separation, which varies from three to ten feet. Less separation is feasible when infiltration is not proposed with the stormwater practice – particularly if a relatively impermeable soil layer is placed between the practice and the bedrock. Separation from bedrock is recommended to protect groundwater supplies from contaminants in stormwater.

The City of St. Cloud obtains its drinking water from the Mississippi River. This highlights the importance of managing the tributaries to the Mississippi River upstream of the raw water intake.

The St. Cloud raw water intake and water treatment facility are located in Hester Park approximately 1.6 miles downstream of the Sauk River confluence and one mile upstream of the Highway 23 Bridge. Raw water goes through a treatment and filtration process prior to being pumped to customers in St. Cloud and St. Augusta. The system can deliver 16 million gallons per day (mgd), though average daily flow is about 7.5 million gallons per day. The 7.5 mgd average flow represents 0.2% of the Mississippi River average flow of 3.4 billion gallons per day.

Source water protection for St. Cloud involves a 13,320 square mile watershed upstream of the raw water intake and is ultimately coordinated with the Minnesota Department of Health (MDH) and the Cities of Minneapolis and St. Paul, which also draw from the Mississippi River. The City has completed a State endorsed Source Water Protection Plan and delineated an inner emergency response area. This area overlaps the City of St. Cloud corporate limits within those subwatersheds tributary to the Sauk River and those immediately adjacent to the Mississippi upstream of the intake. Within these

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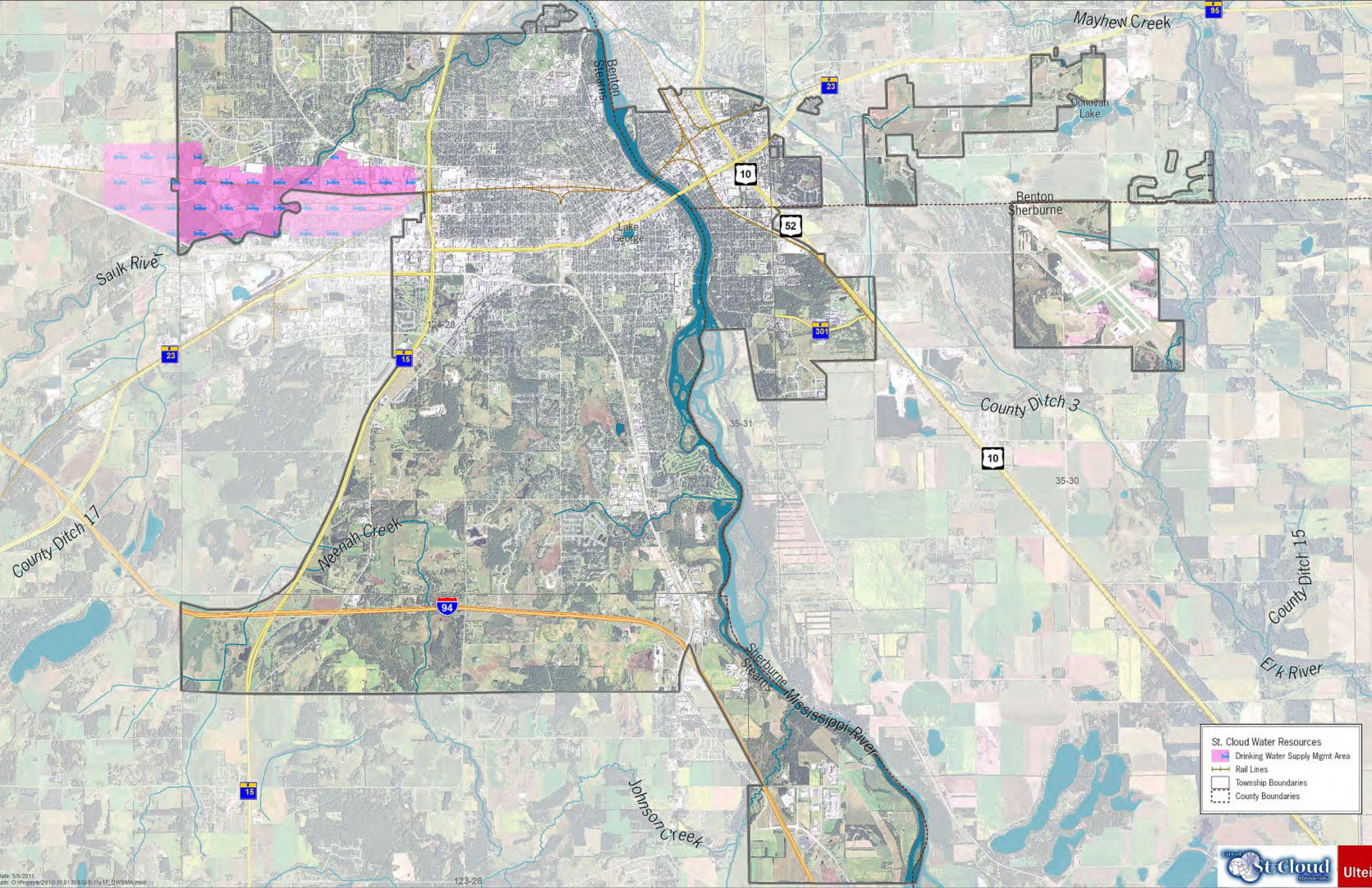
subwatersheds stormwater management practices and source water protection overlap with more urgency than elsewhere.

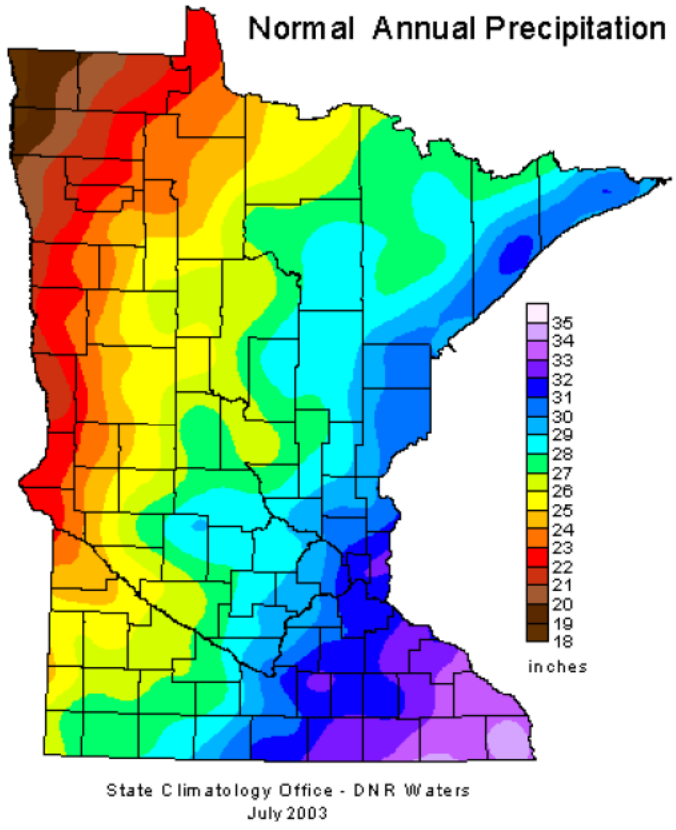
The potential contaminants of concern listed by the Federal Safe Drinking Water Act include organic chemicals, inorganic chemicals, radionuclides, microorganisms, disinfection products and other emerging concerns such as pharmaceuticals and endocrine disruptors. Future investments should be concentrated within these subwatersheds – particularly those tributary to the Sauk River which is known to be a source of pollutants to the Mississippi River. This strategy dovetails with efforts by the Sauk River Watershed District and the Minnesota Pollution Control Agency (MPCA) to develop and implement a Total Maximum Daily Load for the Sauk River.

The City has also designated a High Vulnerability Drinking Water Supply Management Area (DWSMA) along the western border near the Sauk River. This area is drawn around four Waite Park municipal wells even though most the area lies within the City of St. Cloud (Figure 3.6). The MDH has developed an evaluation procedure (Appendix A) for determining whether infiltration practices would be advisable within such areas. This process should be followed when proposing infiltration practices within the DWSMA (Figure 3.6). In general, smaller scale, near surface practices are preferred over large underground infiltration areas when inside a DWSMA.


Mayhew Creek
Benton
Stearns
Donovan
Lake
Benton
Sherburne
Lake
George
Sauk River
12-28
35-31
County Ditch 3
35-30
County Ditch 17
Meenah Creek
Sherburne
Stearns
Mississippi River
Johnson Creek
County Ditch 15
Elk River
123-28
St. Cloud Water Resources
Drinking Water Supply Mgmt Area
Rail Lines
Township Boundaries
County Boundaries

3.5 Climate

City of St. Cloud climate data is published by the National Weather Service (NWS) for five stations within city limits. The NWS is a branch of the National Oceanic and Atmospheric Administration (NOAA). The data utilized in this report is from station 217294, located at the St. Cloud Airport.



The mean annual precipitation used in St. Cloud's *Loading Assessment and Nondegradation Report* is 27.81 inches based on 56 years of data. The 40-year (1970 – 2010) average annual precipitation from the Airport station is 30.47 inches. The reason for the differences in the two annual precipitation amounts is the different time spans used (40 years versus 56 years) and that the *Loading Assessment and* Non*degradation Report* used precipitation readings from several stations in the St. Cloud area versus just the Airport station.

Table 3-2 presents the average monthly and annual precipitation based on the Airport station.

Table 3-2 – Average Monthly Precipitation, St. Cloud Airport, 1970 – 2010

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Inches	1.07	0.64	1.55	2.63	3.26	4.67	3.47	4.04	3.48	3.45	1.45	0.77	30.47

Rainfall frequency estimates are used as design tools in water resources projects. Rainfall frequencies from one to 24-hour duration are summarized in Technical Paper 40, Rainfall Frequency Atlas of the United States, published by the U.S. Weather Bureau (1961). The U.S. Weather Bureau was combined

with other agencies in 1970 to form NOAA and is now known as the National Weather Service. Historically, St. Cloud has defined a 100-year design event as a 24-hour rainfall according to Technical Paper 40, which provides a 24-hour depth of 5.8 inches in St. Cloud.

Table 3-3 presents rainfall recurrence intervals and depths applicable to the St. Cloud area.

Table 3-3 – Rainfall Frequencies St. Cloud Area

Recurrence Interval (yrs.)	24-hour Rainfall Depth (in)
2	2.6
5	3.4
10	4.0
25	4.6
50	5.2
100	5.8

A design rainfall's recurrence reflects the probability that an event will occur in any given year. For instance, a two-year rainfall has a 50% probability of being exceeded in a single year while the 100-year event has a 1% chance of being exceeded. In fact, many hydrologists, public engineering and designers now prefer using the "percent" nomenclature rather than the recurrence year nomenclature.

"Design storm" or "design rainfall" is commonly used to evaluate and design stormwater facilities, flood control works, water quality practices and stream protection practices. A design storm is a purely hypothetical rainfall or rainfall distribution that is intended to simulate the "typical" rainfall events experienced in the area. In effect, the design storm provides a statistical basis for designing stormwater facilities and promotes consistent design among private industry and multiple public entities.

Intense rainfalls or 100-year storms happen every year. The 100-year rainfall depth has a 1% chance of occurring in a very limited area in a given year. If 5.8 inches fall in St. Joseph one year and Sartell the next it is not necessarily a case of a single location receiving two 100-year storms. In fact, the spatial extent of a single 100-year event is generally less than 50 square miles. For areas larger than 50 square miles, 95% of the design 24-hour 100-year rainfall should be used. This ratio falls to 90% as the area grows to 400 square miles.

More intense rainfalls have occurred in the past two decades when compared to the preceding 40-year period. In response, the National Weather Service is updating rainfall frequency relationships for the entire United States. However, they have not completed this work for the Midwest. When complete, it

is likely that the 100-year, 24-hour precipitation will increase and St. Cloud will need to consider whether it changes its design standards in response.

The design event typically used by the City of St. Cloud for modeling purposes is defined as follows:

- 100-year or 1% rainfall depth of 5.8 inches
- SCS Type II Distribution
- 24-hour duration
- Antecedent Moisture Condition 2

St. Cloud uses other design events for other purposes. These events and their purpose are described below:

Average Annual Precipitation

- Water quality analysis often uses an annual time frame to express pollutant loadings. For instance, the City of St. Cloud's *Loading Assessment and Nondegradation Report* uses loadings of lb/yr for phosphorus and total suspended solids and ac-ft/yr for water volume. To achieve consistency with the City's analysis and modeling methods accepted by the MPCA, pollutant loading rates expressed in the SWMP occur in similar units per year. The 27.81 inches of average annual precipitation used in St. Cloud's *Loading Assessment and Nondegradation Report* has been used for consistency.

0.5-inch of runoff off impervious surfaces

- This event is used in the NPDES Construction Stormwater Permit and local ordinance as a minimum infiltration water quality design standard. A rainfall event of 0.7 inches generates 0.5 inches of runoff off of impervious surfaces.

1.0-inch of runoff off impervious surfaces

- The actual event that causes 1.0-inch of runoff off impervious surfaces is a 1.2-inch rainfall. This event is used in the NPDES Construction Stormwater Permit for sites tributary to an impaired water. The requirement is, specifically, that 1.0 inch of water quality volume be provided, of which 0.5 inch must be infiltrated.

2-year, 2.6-inch, 24-hour event

- Many local and the state stormwater permits require the discharge rate to be maintained for this event; doing so helps to preserve downstream channels.

10-year, 4.0-inch, 24-hour event

- Similar to the 2-year event, the 10-year event is often found in permits and local requirements. Generally considered an event for which channel or storm sewer capacity should be provided.

100-year, 5.8-inch, 24-hour event

- The generally accepted flood protection event. This event fills ponds and low areas in streets, parking lots and backyards but should be kept from flooding nearby structures through properly enforced zoning regulations. This is the storm event that sets the floodway elevation.

3.6 Key Water Resources

3.61 Public Waters

According to the Minnesota Department of Natural Resources (MnDNR) "public waters are all waterbasins and water courses that meet the criteria set forth in Minnesota Statutes. Section 103G.005 subd. 15 that are identified on the Public Waters Inventory maps." Though not a complete list, pubic waters include the following:

F Subd. 15. ***Public waters.***

(a) "Public waters" means:

(1) water basins assigned a shoreland management classification by the commissioner under sections 103F.201 to 103F.221;

(2) waters of the state that have been finally determined to be public waters or navigable waters by a court of competent jurisdiction;

(3) meandered lakes, excluding lakes that have been legally drained;

(4) water basins previously designated by the commissioner for management for a specific purpose such as trout lakes and game lakes pursuant to applicable laws;

(5) water basins designated as scientific and natural areas under section 84.033;

(6) water basins located within and totally surrounded by publicly owned lands;

(7) water basins where the state of Minnesota or the federal government holds title to any of the beds or shores, unless the owner declares that the water is not necessary for the purposes of the public ownership;

(8) water basins where there is a publicly owned and controlled access that is intended to provide for public access to the water basin;

(9) natural and altered watercourses with a total drainage area greater than two square miles;
(10) natural and altered watercourses designated by the commissioner as trout streams; and

(11) public waters wetlands, unless the statute expressly states otherwise.
(b) Public waters are not determined exclusively by the proprietorship of the underlying, overlying, or surrounding land or by whether it is a body or stream of water that was navigable in fact or susceptible of being used as a highway for commerce at the time this state was admitted to the union.

*Subd. 15a.**Public waters wetlands.***
"Public waters wetlands" means all types 3, 4, and 5 wetlands, as defined in United States Fish and Wildlife Service Circular No. 39 (1971 edition), not included within the definition of public waters, that are ten or more acres in size in unincorporated areas or 2-1/2 or more acres in incorporated areas.

3.7 Rivers

Three rivers flow through portions of the City; Sauk River, Mississippi River and Elk River.

3.71 Mississippi River

South of the 10th Street Bridge, the Mississippi River is classified by the Minnesota Legislature as a Scenic and Recreational River (Minnesota Statues 103f.301 to 103f.345). This designation refers to rivers that are free-flowing and adjacent to relatively undeveloped lands. As a Scenic and Recreational River, the Mississippi has special protections from storm water discharges. In effect, Minnesota Statute prohibits new and expanded discharge to this portion of the Mississippi. The Mississippi River's special regulatory status is discussed in the Regulatory Context.

The Mississippi River has two dams in the St. Cloud area. The Sartell Dam is upstream of County Highway 29 in the City of Sartell. The Dam rises about 20 feet and generates hydroelectric power for the Sartell Paper Mill. Downstream of the Sartell Dam, the St. Cloud Dam rises approximately 23 feet above the Mississippi just downstream of University Drive. This Dam also generates hydroelectric power and is owned by the City of St. Cloud.

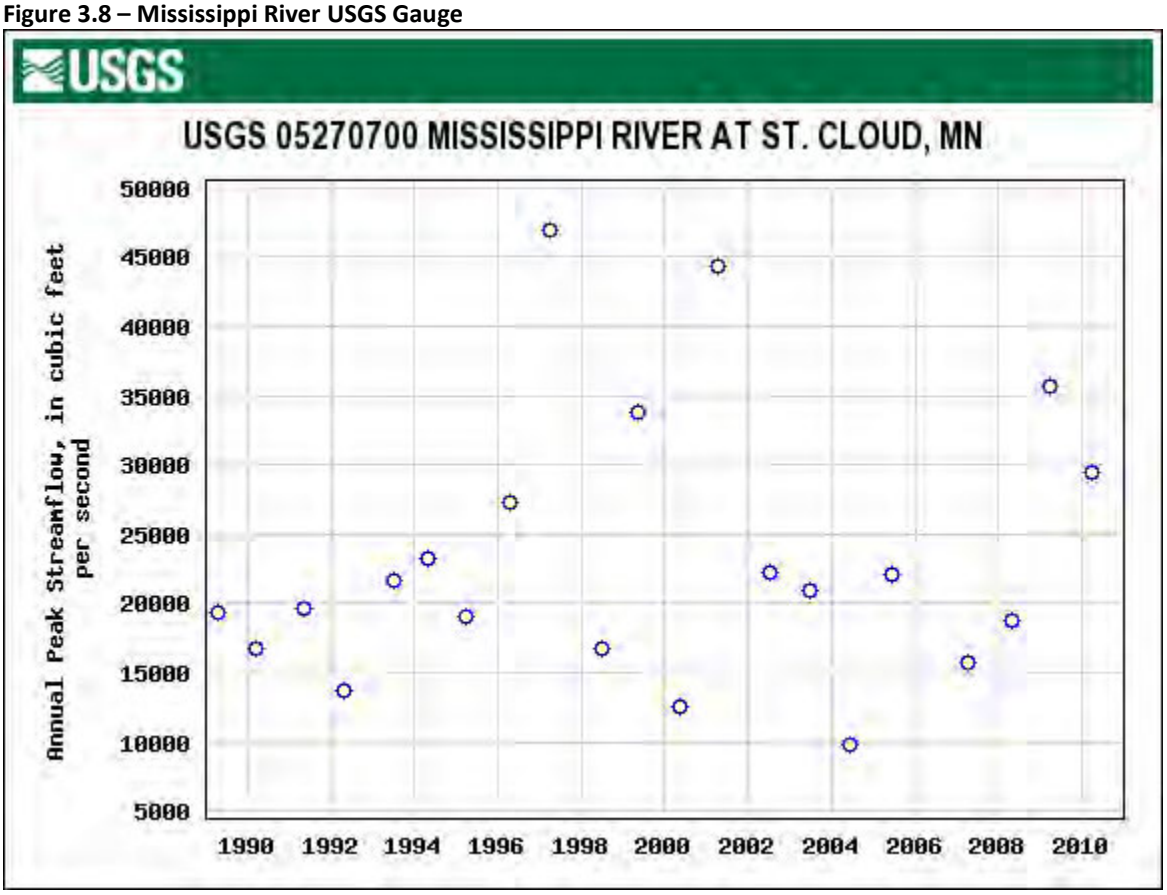
Figure 3.7 – St. Cloud Dam



Hydrologists divide the Mississippi River in Minnesota into an upper basin and lower basin. The upper basin encompasses 20,100 square miles beginning Lake Itasca and extending to Lock and Dam Number 2 in Hastings. St. Cloud is within the upper basin and approximately 13,320 square miles are tributary to the river by the time it passes through St. Cloud.

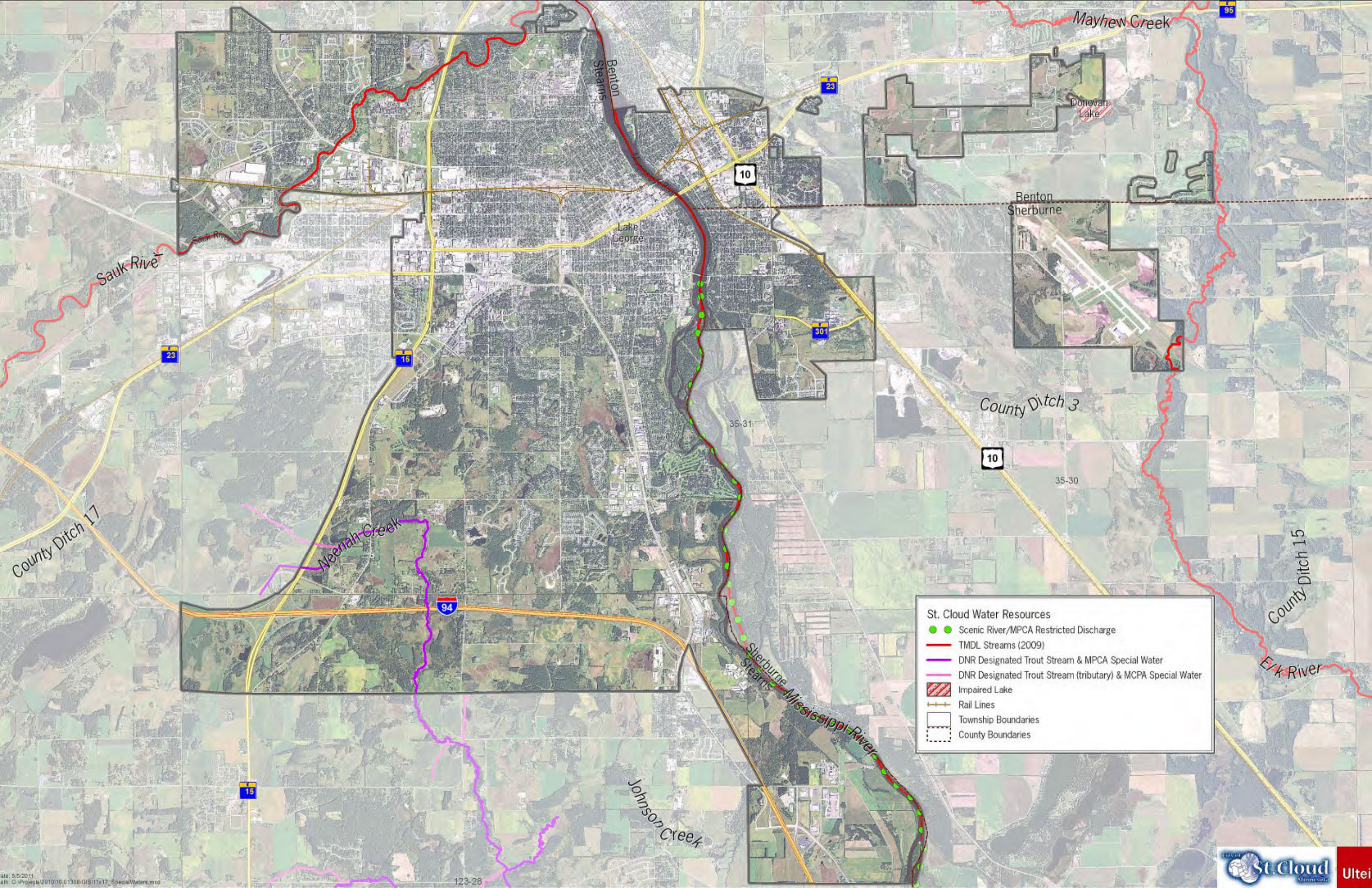
Figure 3.8 shows annual peak streamflow for the Mississippi River, St. Cloud. In 1997, peak streamflow exceeded 45,000 cubic feet per second (cfs); average discharge was 9,167 cfs. In 2007, average discharge fell to 3,675 cfs, a 20-year low.

Figure 3.8 – Mississippi River USGS Gauge



The Minnesota Pollution Control Agency (MPCA) has started a TMDL study for Lake Pepin. A TMDL sets the amount of pollutant a water body can receive and still meet its designated uses, with two of the more common designated uses being fishing and swimming. The Lake Pepin TMDL will lead to waste load allocations which, in turn, could lead to specific load reductions for cities such as St. Cloud.

Pursuant to Clean Water Act requirements forced upon the States by the Federal Environmental Protection Agency, the MPCA has listed the Mississippi River as impaired for mercury and E. coli. The mercury impairment results from atmospheric deposition and a regional mitigation plan (TMDL) has been developed for this impairment. The E. coli impairment occurs in a short stretch of the river above the water intake structure. Each of the rivers are listed on the 2010 MPCA's 303(d) List as impaired (Figure 3.9). Additional information on the impaired waters within St. Cloud is provided in the Regulatory Context and System Assessment Chapters.

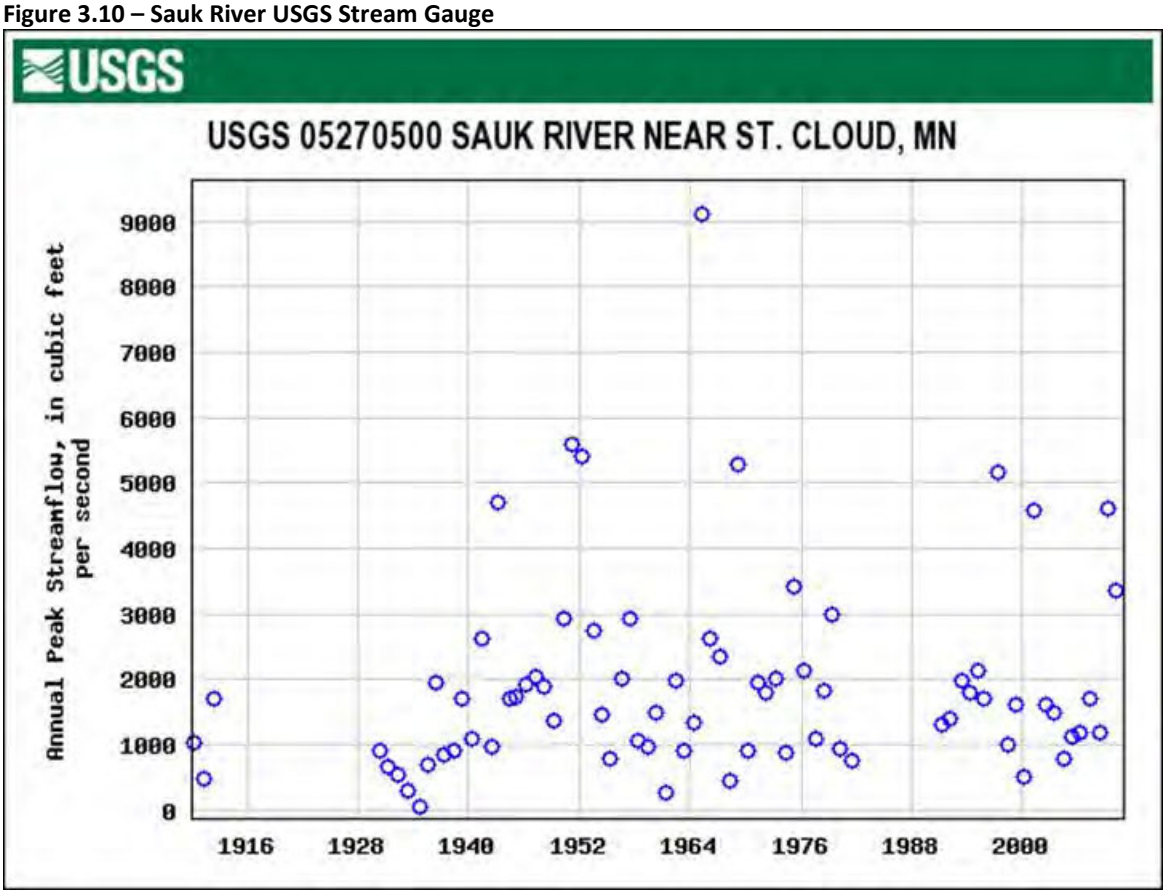

Mayhew Creek
Benton
Stearns
Donovan Lake
Benton
Sherburne
Lake George
Sauk River
County Ditch 3
35-31
35-30
County Ditch 17
Weenah Creek
Johnson Creek
Sherburne
Stearns
Mississippi River
County Ditch 15
Elk River
123-28
St. Cloud Water Resources
Scenic River/MPCA Restricted Discharge
TMDL Streams (2009)
DNR Designated Trout Stream & MPCA Special Water
DNR Designated Trout Stream (tributary) & MCPA Special Water
Impaired Lake
Rail Lines
Township Boundaries
County Boundaries

3.8 Sauk River

The Sauk River flows through the northwest portion of St. Cloud and meets the Mississippi, along the northwestern border of the City limits.

Figure 3.10 shows the annual peak stream flow for the Sauk River in St. Cloud. The tributary area to the Sauk River at this gauge is 1,030 acres. The peak stream flow occurred in 1965 with over 9,000 cfs. More recently, the 2010 annual mean flow was 542.5 cfs.

Figure 3.10 – Sauk River USGS Stream Gauge



Emerging issues for the Sauk River include listing by the MPCA as impaired for fecal coliform, polychlorinated biphenyl (PCB), turbidity and mercury. The Sauk River Watershed District (SRWD) along with several other collaborating agencies including the City of St. Cloud initiated a diagnostic study and monitoring in 2005 to better understand the baseline condition. As noted above, the mercury impairment has been addressed by a regional mitigation plan. Early findings from the monitoring

season indicate that the main portion of the Sauk River does not have a fecal coliform impairment. However, Mill Creek, which is included in the lower Sauk River region, had high fecal coliform readings which may be leading to the listing of the Sauk River. Additional sampling and studies will be necessary to address the impairment and determine the reason for the high readings. The monitoring also includes readings for total phosphorus and ammonia. The SRWD is partnering with the MPCA to begin the TMDL for the other impairments.

The SRWD has also implemented numerous programs including monitoring, setting antidegradation and nondegradation targets and implementing construction of best management practices to reduce total phosphorus and total suspended solids, and education programs.

3.81 Elk River

The Elk River is located on the northeastern border of the City. Nearly all of the area within St. Cloud east of Trunk Highway 10 is tributary to the Elk River. The segment located within city limits is between Mayhew Creek and Rice Creek and is currently listed as impaired for mercury. Although the impairments for the Elk River are downstream of St. Cloud, the Elk River is in the City of St. Cloud Source Water Protection Area. Land use activities and stormwater practices within the watershed can directly affect the water quality of the river and water intakes. Also, the Elk River forms 60% of the Mississippi River St. Cloud Major Basin as shown on Figure 3.2. Therefore, the Elk River Watershed Association initiated monitoring, project planning and the stakeholder process in 2009 as a part of the larger Mississippi River St. Cloud Watershed Monitoring project.

3.9 Lakes

There are two lakes within the City: Lake George and Donovan Lake. Each of these lakes are MnDNR public waters.

Lake George (MnDNR #451W) is located south of CSAH 23 and west of the Mississippi River, between 9th and 12th Avenue South, in Stearns County. The lake is fairly small at 9 acres with a maximum depth of 32 feet. According to the MnDNR "W" designation, Lake George is considered a wetland and not a lake. There is one public access point on the east side of the lake. The footprint and depth of the lake has changed significantly as development has surrounded the lake. In 1927 the north bank was filled and the main body dredged. Prior to that time the lake overflowed via a natural channel to the Mississippi River.

Donovan Lake (MnDNR #4P) is located in the eastern area of St. Cloud, south of CSAH 23 and west of 55th Avenue NE, in Benton County within the Elk River Watershed Association. The lake is 54 acres and

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has a maximum depth of five feet. Shallow lakes like Donovan Lake are periodically mixed, bringing phosphorus rich water near the bottom to the surface of the lake. This causes nutrient enriched water to be available throughout the lake's water column, allowing the growth of large algal populations. The main bay of Donovan Lake is listed by the Minnesota Pollution Control Agency as impaired for aquatic recreation due to excess nutrients causing lake eutrophication.

3.10 Creeks and County Ditch Systems

There are four creeks and/or county ditches within or in close proximity city limits. These include County Ditch 3, Neenah Creek (also known as Robinson and Johnson Creek), Mayhew Creek (County Ditch 10), and County Ditch 17. Each of these systems are designated public waters and thus MnDNR regulated.

County Ditch 3 (unnamed creek) is located on the east side of the Mississippi River in Benton County and tributary to the Elk River. It starts at the Sand Prairie Wildlife Management Area and generally follows Trunk Highway 10 past the Airport to the Elk River. The drainage area to County Ditch 3 is shown on Figure 3.3.

The MPCA has listed Mayhew Creek as impaired for aquatic life due to Mayhew Creek is located on the northern border of the City limits and flows into the Elk River near CSAH 95. Benton County Soil and Water Conservation District has listed Mayhew Creek as a top priority. In response, water quality monitoring and analysis have been initiated by the Elk River Watershed Association (ERWSA).

County Ditch 17 is primarily in the City of Waite Park, on the west border of St. Cloud. It travels from Mud Lake and connects to the Sauk River near County Road 75. The Sauk River Watershed District is the drainage authority for the watershed and is in the process of developing a systematic maintenance and repair program for all county ditches. Future TMDL implementation plans for the Sauk River may affect the County Ditch 17 tributary area.

Neenah Creek (also known as Johnson and Robinson Hill Creek) loops through the southwestern portion of St. Cloud, crossing CSAH 15 and Interstate 94. Neenah Creek is a MnDNR designated Trout Stream and MPCA Special Water. These designations affect the land use planning, and water and natural resource management in the area tributary to the creek. These considerations are outlined in the Regulatory Context Section.

3.11 Wetlands

St. Cloud possesses a diversity of wetland types. Based on the National Wetland Inventory (NWI), wetlands are most prominent in the largely agricultural area in the southwest portion of St. Cloud as shown on Figure 3.11. Wetlands are also prominent along the Mississippi River corridor and east of Highway 10 to the Elk River.

Mayhew Creek
Benton
Stearns
Donovan
Lake
Benton
Sherburne
Lake
George
Sauk River
County Ditch 3
35-31
35-30
County Ditch 17
Meenah Creek
Sherburne
Stearns
Mississippi River
County Ditch 15
E/k River
Johnson Creek
123-28
St. Cloud Water Resources
County Boundaries
Township Boundaries
Rail Lines
NWI - Wetlands

St. Cloud's most recent wetland inventory was completed in 1995 with the Natural Areas Inventory and Planning Framework. This study outlined planning tools to protect and restore wetland areas based on their priority. The highest priority wetlands and natural areas are located in the southwest portion of the City and along County Ditch 3 in the Sand Prairie Wildlife Management Area, west of the Airport. Development adjacent to these areas is restricted to protect the rare upland and wetland communities.

3.12 Natural Resources

Previous natural resource inventories have identified communities and rare species of concern. The Natural Areas Inventory and Planning Framework completed in 1995 located numerous of these features including water resources, rare species, shoreland areas, floodplain areas and exposed bedrock outcrops. The natural areas are located in southern St. Cloud, along the Mississippi River corridor and east of Trunk Highway 10.

The natural areas were ranked from high to low priority. From this inventory the City adopted an Environmentally Sensitive Areas Ordinance and Natural Areas Map, Appendix A of the City's Land Development Code. The ordinance regulates development and promotes protection of the natural areas.

The Natural Areas Inventory and Planning Framework also noted 11 locations with rare animal species and one rare plant community. Blanding's turtles were found in several areas of southern St. Cloud. The area surrounding the Airport also has the highest biodiversity with nine species of rare animals. Additionally, the Sand Prairie Wildlife Management Area, located adjacent to the Airport, has rare oak savanna communities.

Chapter 4 – Regulatory Settings

Local stormwater regulation is often supported by residents and policy makers as a means of protecting locally valued water resources. However, most local stormwater regulations originate from Federal mandates enforced by the State. Local implementations of stormwater practices often result from State permit requirements which originate from the Environmental Protection Agency (EPA) and the Federal Clean Water Act. Similarly, Federal Emergency Management Agency (FEMA) flood protection requirements get implemented by the Minnesota Department of Natural Resources (MnDNR) through local floodplain ordinances. (Other Federal authority originating from the Clean Water Act includes Section 404 requirements that allow the United States Army Corps of Engineers (ACOE) to regulate activities within wetlands.) (FEMA authority to map and regulate floodplains and flood risk constitutes another Federal authority with widespread implications for Mississippi River communities including St. Cloud.)

The primary State regulatory agencies consist of the MPCA, MnDNR and Board of Water and Soil Resources (BWSR). The Minnesota Department of Health, Minnesota Department of Transportation and Environmental Quality Board also participate in stormwater activities. At the local level three jurisdictions typically overlap to regulate stormwater: counties, watershed district and municipalities. Counties typically provide groundwater planning and agricultural drainage authority. Watershed districts cover many parts of Minnesota including a portion of the St. Cloud area. In rural areas, watershed districts take on an agricultural drainage role while in urban areas watershed districts tend to serve a water quality protection and conservation role. The most extensive local authority occurs where land use authority and stormwater regulation coincide as occurs with a city. The combination can make the City most effective for implementing stormwater regulations and improvements.

The following details these Federal and State regulatory agencies and the local jurisdictions with water resource responsibility in the St. Cloud area.

4.1 FEDERAL AGENCIES

4.11 United States Environmental Protection Agency

The United States Environmental Protection Agency (EPA) administers the Clean Water Act and other environmental laws. The Clean Water Act originated from Congressional amendments to the Federal Water Pollution Control Act (FWPCA) in 1972. The FWPCA is approaching 40 years old and the EPA has significantly increased its activity in the Clean Water Act programs in the last decade. Some Permits that originate from Clean Water Act requirements are those under National Pollution Discharge Elimination

System (NPDES), Municipal Separate Storm Sewer (MS4) Permit, Construction Stormwater Permit and an Industrial Activity Stormwater Permit.

In Minnesota, the Minnesota Pollution Control Agency (MPCA) administers the Clean Water Act. Consequently, most Minnesota municipalities do not interact directly with the EPA. The Clean Water Act enabled the EPA to develop regulations to control point source pollution, including wastewater treatment plants and industrial operations. The EPA completed National Urban Runoff Program studies in the early 1980's identifying that stormwater, then classified as a non-point pollution source, has a significant role in degrading surface water quality. As a result, EPA increased regulation of non-point sources, including urban stormwater runoff. The Federal Clean Water Act and the assessment methodology that evolved from the Act considers a water's beneficial use as a benchmark upon which to determine impairment. If a water's beneficial use is swimming and the current water quality does not allow body contact, then the water is impaired. Most Minnesota waters have designated uses of fishing or water recreation (requiring body contact), hence the terminology "fishable and swimmable."

Many programs and measures originate from the Clean Water Act, including:

Total Maximum Daily Loads (TMDL):

- a program to reduce pollutant loads to impaired waters

Antidegradation

- a concept, and emerging permit requirement, that prohibits increases in pollutant loadings to all waters including those not yet impaired

NPDES MS4 Permit

- a permit that requires Cities and other storm sewer system owners to develop and implement Best Management Practices

NPDES Construction Storm Water Permit

- a permit that regulates construction sites and requires practices for erosion and sediment control

NPDES Industrial Activity Storm Water Permit

- a permit that authorizes the discharge of stormwater from certain industrial activities

Outstanding Resource Value Waters

- waters specifically designated by Minnesota's legislature that restricts new and expanded discharge

4.12 United States Army Corps of Engineers

Under Section 404 of the Clean Water Act, the United States Army Corp of Engineers (USACE or Corps) regulates the placement of fill in navigable waters of the United States. The Corps does not transfer regulatory authority to State governments. In Minnesota, both the State Wetland Conservation Act and the requirements of Section 404 must be addressed during impacts to wetlands.

The Corps' regulatory program evolved from historic mandate to maintain the navigability of the nation's waterways. The requirements date back to Federal laws as early as 1824, and to the Rivers and Harbors Act of 1899. With passage of the Clean Water Act, the mandate expanded into the regulation of dredge and fill of navigable waters as well as "waters of the United States." In general, waters of the United States do not include isolated wetlands, though they do include wetlands connected to streams or wetlands connected to other water bodies that are themselves connected to streams. There is precedent for the Corps to claim jurisdiction over isolated wetlands that have aspects of interstate commerce, such as those visited by migratory waterfowl. Given the vagueness of the term "waters of the United States," it is best to consult the local Corps staff in the earliest stages of a project to discuss potential wetland impacts. In most cases, if the Corps determines they have no jurisdiction, they issue a letter to confirm this interpretation.

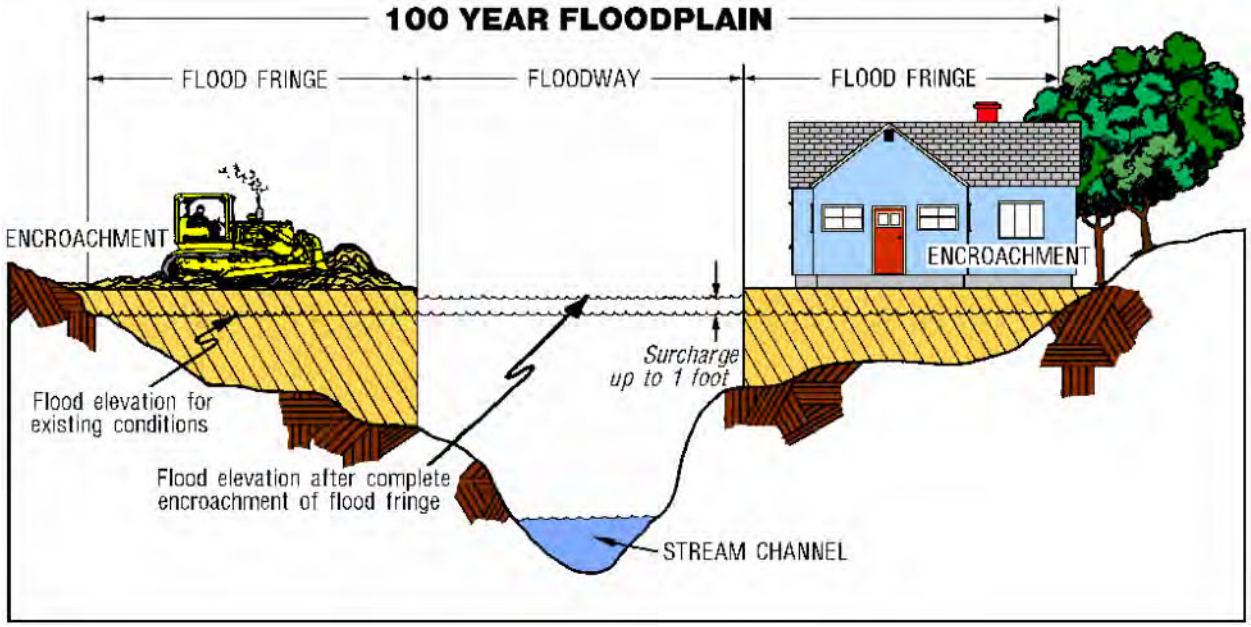
4.13 Federal Emergency Management Agency

The Federal Emergency Management Agency (FEMA) is the federal agency responsible for federal disaster mitigation, including tornados, floods, earthquakes and fires. Specific to stormwater, a component of FEMA is the Federal Insurance and Mitigation Administration which manages the National Flood Insurance Program (NFIP). The NFIP was created in response to increases in costly and disastrous flooding. The NFIP creates floodplain maps, manages floodplains and provides flood insurance. Communities, including St. Cloud, participate in the NFIP to adopt and enforce floodplain management ordinances in exchange for federally backed insurance available from FEMA.

The MnDNR administers and oversees the NFIP in Minnesota. The primary components of the NFIP are the Flood Insurance Rate Maps developed by FEMA through hydrologic and hydraulic studies of streams and other water bodies. The maps show differing levels of flood risk for communities adjacent to the water bodies. Local ordinances reference the maps and the designated hazard areas and controls development within these areas to prevent locating certain structures and incompatible land uses within the 100-year floodplain.

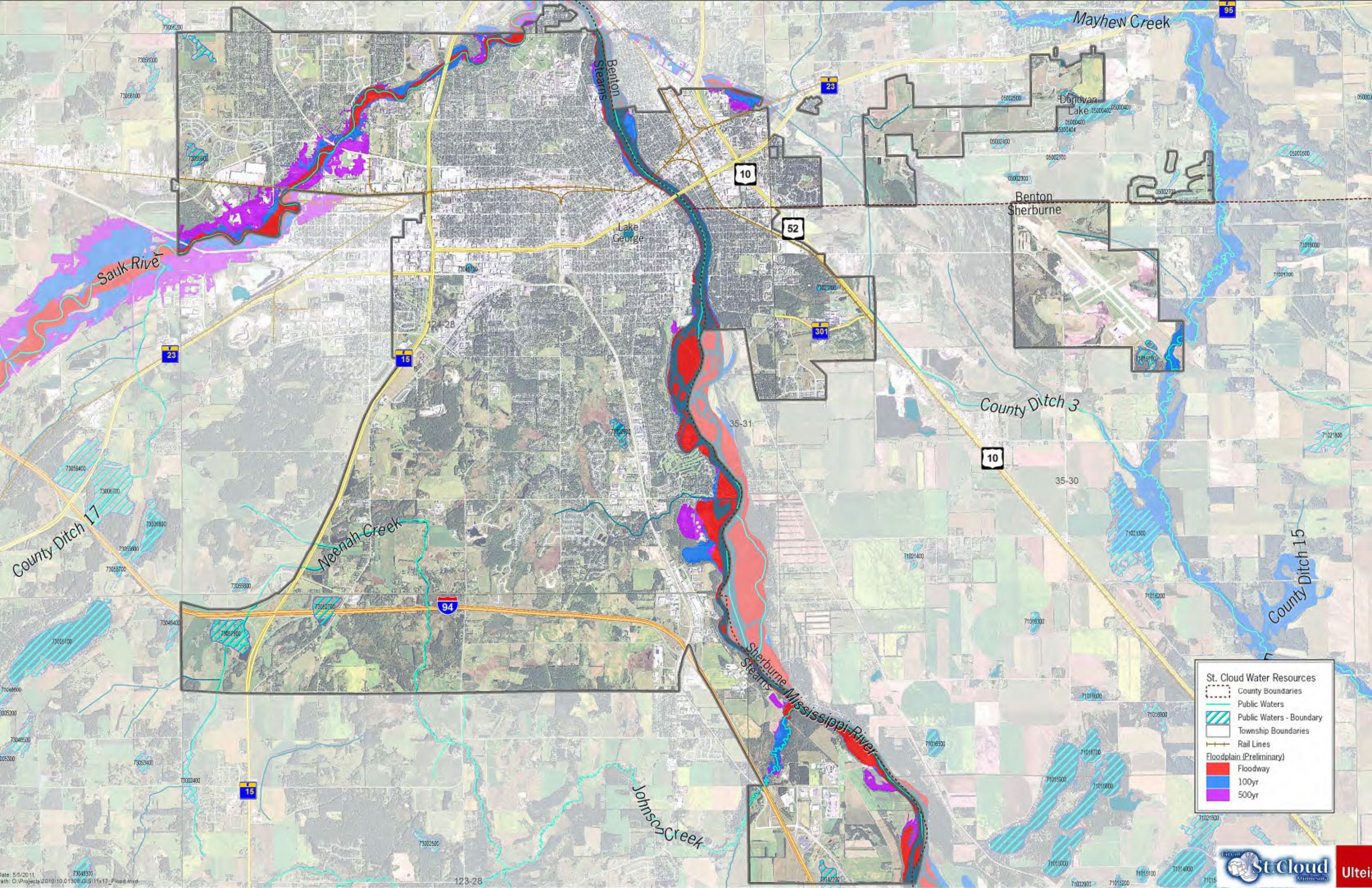
Figure 4.1 from the Army Corp of Engineers conceptually shows the floodplain, flood fringe and floodway in respect to a river channel. A detailed Flood Insurance Study is complete for the section of the Sauk River and Mississippi River adjacent to St. Cloud. Based on the Flood Insurance Rate Map (FIRM) panel 270456 0015C, portions of St. Cloud fall in Zone AE and Zone X.

Figure 4.1 –MnDNR Floodplain Nomenclature



Zone AE is the area where the base flood (1% chance or 100-year event) elevation is known based on a detailed hydrologic and hydraulic study. Zone AE is more commonly known as the 100-year floodplain. In communities that participate in the NFIP, including St. Cloud, properties within Zone AE are required to maintain flood insurance. Zone X is defined as the area outside the 100-year flood yet within the 500-year flood. Properties within Zone X are considered to have moderate risk and are not required to obtain flood insurance.

Figure 4.2 shows three of the designated zones within the City of St. Cloud. The floodway consists of the channel and the over bank areas that are needed to convey the 100-year flood. The 100-year floodplain expands upon the floodway by including areas inundated by a 100-year event but that are not otherwise necessary for conveying the 100-year flood. The flood fringe is backwater area where shallow flooding occurs. Many urban areas are found within the flood fringe – Fargo and Moorhead are a prominent nearby example. Beyond the flood fringe, the 500-year floodplain is the additional area that would be inundated by the 500-year event.


Mayhew Creek
Benton
Stearns
Donovan
Lake
Benton
Sherburne
Lake
George
Sauk River
County Ditch 3
35-31
35-30
County Ditch 17
Weenah Creek
Sherburne
Stearns
Mississippi River
Johnson Creek
County Ditch 15
123-28
12-28
St. Cloud Water Resources
County Boundaries
Public Waters
Public Waters - Boundary
Township Boundaries
Rail Lines
Floodplain (Preliminary)
Floodway
100yr
500yr

The Sauk River, Mississippi River, Elk River, Mayhew Creek and the unnamed creek located in Benton County north of Highway 23 are subject to a detailed Flood Insurance Study (FIS), which sets specific floodplain elevations for the 100-year and 500-year events based on hydraulic modeling. The City of St. Cloud Article 12 of the Land Development Code is the ordinance to minimize flood losses. The Land Development Code references FIS and provides regulations for building within the floodplain.

FEMA is currently in the process of revising the Flood Insurance Studies and the Flood Insurance Rate Maps for Sherburne, Benton and Stearns County; estimated completion is late 2011.

4.2 State Agencies

4.21 Minnesota Pollution Control Agency

The EPA has delegated stormwater regulatory authority to the MPCA. The MPCA has flexibility in developing programs related to the Clean Water Act, and considerably more responsibilities than just managing Minnesota's surface water quality. The MPCA's environmental authority extends into waste management and cleanup programs, general air quality, air quality permits, feedlots, wastewater treatment plants and industrial sites.

The MPCA determines the specific requirements of stormwater permittees. However, the primary regulations affecting stormwater derive from the Clean Water Act. The MPCA's educational, support, regulatory and permit programs that originate from the Clean Water Act include Total Maximum Daily Loads, Antidegradation, National Pollution Discharge Elimination System Municipal Separate Storm Sewer System Permit, Construction General Stormwater Permit, Industrial Permit, Outstanding Resource Value Waters and Minimum Impact Design Standards.

Total Maximum Daily Load (TMDL)

Section 303(d) of the Clean Water Act (CWA) requires state agencies to protect and restore water quality in all surface waters for the designated uses. The CWA requires States to establish water quality standards and list waters that do not meet the standards (impaired waters). The standards establish the quantity/volume limit allowed while still supporting designated uses such as fishing or swimming. The CWA requires the MPCA to publish a list of impaired waters and to develop a priority ranking and schedule for addressing the waters on the list.

Upon listing a water body, the EPA approves and a total maximum daily load (TMDL) study is prepared. A TMDL is "a calculation of the maximum amount of a pollutant that a water body can receive and still safely meet water quality standards." TMDLs generally require pollutant load reductions from the permittees within the water body's tributary area. Permittees include wastewater treatment facilities, industrial sites, construction sites and all MS4s. Because cities constitute the majority of MS4s and control (through land use authority) the majority of land subject to the TMDL, meeting pollutant loading reduction tends to affect cities more than other permitted entities. The St. Cloud SWMP provides guidance to reduce pollutant loads to meet water quality standards even though the City is not currently subject to a TMDL.

The Sauk River, Mississippi River, Elk River, Donovan Lake and Mayhew Creek are listed as impaired for multiple designated uses. The stressors or pollutants include fecal coliform, turbidity, mercury, aquatic macroinvertabrate and fish bioassessments, E coli, nutrient/eutrophication biological indicators and polychlorinated biphenyl (PCB). Impaired water bodies are shown on Figure 3.9 within the, Physical Setting section. The Assessment Section provides detail on each water body, their respective impairments and the status of assessing these impairments.

Approximately two-thirds of Minnesota's water body impairments are caused by mercury deposition. The State of Minnesota has a Mercury TMDL study that establishes an implementation plan with an annual air emission target and water emission target. The air emission affects powerplants, mining and other industrial facilities that incinerate. The water emission target is actually a cap of 24.2 lbs. per year, which allows an 8 lbs. per year increase over current conditions. The unallocated capacity will be given to point source permittees, on a first come, first serve basis. The caveat is that any facility proposing a new or expanded discharge must develop a Mercury Minimization Plan, conduct effluent monitoring and ensure discharges meet interim and final water-quality-based standards, if applicable.

The Sauk River Watershed District is completing the TMDL study for the Sauk River impairments. The MPCA and Minnesota Department of Health are initiating the TMDL study and implementation plan for the Mississippi River E coli bacteria impairment. The TMDL studies are not underway for Donovan Lake and Mayhew Creek.

Antidegradation

As noted earlier, a TMDL identifies measures to bring an impaired water body back to a certain water quality standard. A TMDL is a restoration strategy. In contrast, Antidegradation prohibits increases of certain pollutants from NPDES permitees, regardless of whether the water is impaired or not. Antidegradation is a protection strategy.

Minnesota State Rule 7050.0185 explains the fundamental concept of Antidegradation as:

> *"…the policy of the state to protect all waters from significant degradation from point and nonpoint sources and wetland alterations and to maintain existing water uses and aquatic and wetland habitats. Existing beneficial uses and the water quality necessary to protect the existing uses must be maintained and protected from point and nonpoint sources of pollution. It is the policy of the agency that water quality conditions that are better than applicable water quality standards and are better than levels necessary to support existing beneficial uses must be maintained and protected unless the commissioner finds that, after full satisfaction of this part; a lowering of water quality is acceptable."*

Minnesota's rules were adopted to comply with "antidegradation" requirements of the federal Clean Water Act passed in 1972. The federal government uses the term antidegradation; the State uses nondegradation. However, the State recently moved to "antidegradation" as the preferred terminology.

Most municipalities with population between 10,000 and 100,000 are required to obtain coverage under the general NPDES MS4 permit described below. In 2006, the MPCA required 30 municipalities, including St. Cloud, to complete an antidegradation review with the intent of showing if antidegradation rules are met. The cities were selected based on an assessment of communities most likely to have expanded stormwater discharges to surface waters as reflected by population changes since 1990, current population and projected population growth to 2020.

The antidegradation reviews included conducting a pollutant loading assessment, writing an antidegradation plan and proposing modifications to the Stormwater Pollution Prevent Plan (SWPPP) to

implement the assessment. The City of St. Cloud completed the Loading Assessment and Nondegradation Report in August 2007.

St. Cloud's antidegradation report shows that the City has increased pollutant loadings. The proposed SWPPP modifications included in the City's antidegradation report were implemented using ordinance modifications. More information on St. Cloud's mitigation steps is included in the Assessment Section and Implementation Section.

National Pollution Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit

Since 2003, St. Cloud has been authorized under the General MS4 Permit to discharge stormwater to the waters of the State. Under this permit coverage, St. Cloud must develop and implement a SWPPP.

The MPCA is the permitting authority in Minnesota to address stormwater runoff pollution. The program includes three permits; MS4 Permit, Construction Stormwater Permit and Industrial Permit. The City of St. Cloud is a mandatory small MS4 (population of 50,000 or greater within a central core and an average density of 1,000 people per square mile in the central core and adjacent area) under Phase II of the NPDES MS4 program. Phase I permittees in Minnesota include Minneapolis, St. Paul and Duluth.

The City of St. Cloud is required to obtain coverage by developing a Stormwater Pollution Prevention Program (SWPPP) that addresses six minimum control measures:

1. Public education and outreach
2. Public participation/involvement
3. Illicit discharge detection and elimination
4. Construction site stormwater runoff control
5. Post-construction stormwater management
6. Pollution prevention/good housekeeping for municipal operations

The City of St. Cloud must identify BMPs and measurable goals associated with each minimum control measure. An annual report on SWPPP implementation is submitted to the MPCA. Many of the goals

and policies discussed in this SWMP are directly related to the requirements of the NPDES MS4 permit program.

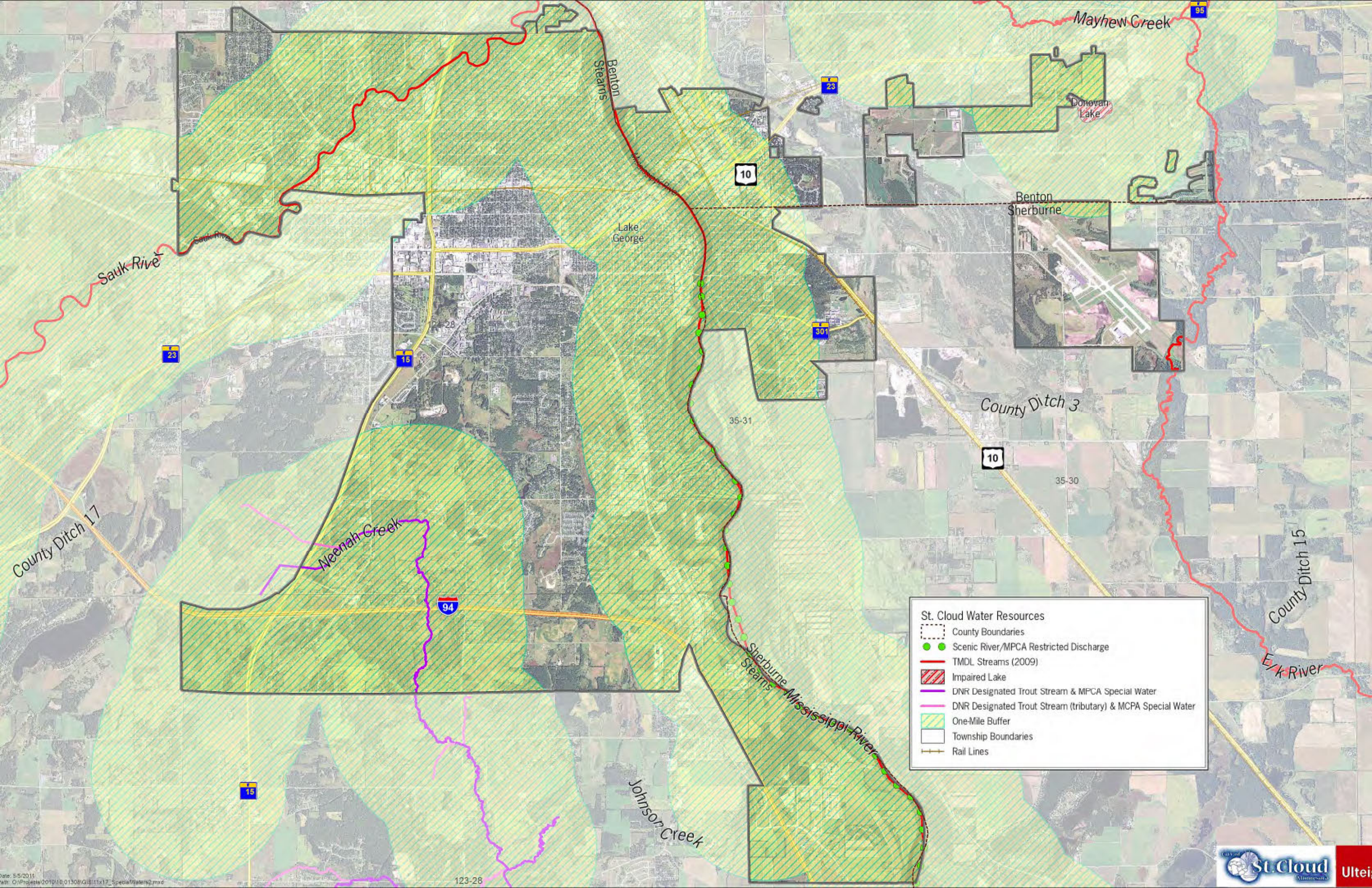
Because of the broadening obligations, it is necessary to add BMPs in four additional categories:

1. Antidegradation Requirements
2. Recordkeeping Requirements
3. Source Water Protection Area Requirements
4. Impaired Water(s) Requirements

National Pollution Discharge Elimination System (NPDES) Construction Stormwater Permit

The MPCA issues general NPDES Permits to authorize the discharge of stormwater from construction activity. The Construction Permit requires water quality treatment at sites in proximity to an impaired water and provisions for volume control. The provision specifically affects areas within one mile of the Sauk River, Mississippi River, Mayhew Creek and Donovan Lake (see figure 4.3). The provision applies to new impervious surfaces. For construction with a discharge point that is within one mile of and flows to an impaired water, the permit requires additional water quality treatment, and that a portion of the treatment occur through infiltration. The construction permit does not include language that eliminates the infiltration requirement for industrial sites and drinking water source protection areas through the Minnesota Stormwater Manual (produced by the MPCA) supports exemptions in these two cases.

Figure 4.3 shows the approximate one mile setback from St. Cloud's impaired waters. The offset is conservative; the permit is not explicit on how to determine the offset (i.e. centerline of the river, 100-year floodplain, or ordinary high water level). The offset shown on Figure 4.3 is based on the 100-year floodplain of the Sauk River and Mississippi River. The offset is also conservative because it doesn't account for the natural meandering of the runoff tributary to the impaired waters. A project that is directly one mile from an impaired water, may be two miles when the entire flow path to the impaired water is considered.



Mayhew Creek
Benton
Stearns
Donovan Lake
Benton
Sherburne
Lake George
Sauk River
Sauk River
County Ditch 3
35-31
35-30
County Ditch 17
Neenah Creek
County Ditch 15
Elk River
Sherburne
Stearns
Mississippi River
Johnson Creek
123-28
St. Cloud Water Resources
County Boundaries
Scenic River/MPCA Restricted Discharge
TMDL Streams (2009)
Impaired Lake
DNR Designated Trout Stream & MPCA Special Water
DNR Designated Trout Stream (tributary) & MCPA Special Water
One-Mile Buffer
Township Boundaries
Rail Lines
St. Cloud

St.Cloud's ordinance expands upon the requirements of the Construction Stormwater Permit. Article 19.11 of the City's Land Development Code outlines water quality, volume and rate control requirements for development and redevelopment sites. For new development, the volume equal to ½ inch of runoff depth from impervious and pervious surfaces shall be abstracted or otherwise infiltrated. For redevelopment sites, the volume equivalent to ¼ inch of runoff depth from redeveloped impervious surfaces and ½ inch from all redeveloped pervious surfaces shall be abstracted or otherwise infiltrated. New impervious with redevelopment must meet the ½ inch standard. The Land Development Code also specifically references the requirements of the Construction Stormwater Permit.

National Pollution Discharge Elimination System (NPDES) Industrial Activity Stormwater Permit

The Minnesota Pollution Control Agency (MPCA) issues a general NPDES Permit that authorizes discharge of stormwater for specific industrial activities. The permit covers a multitude of industrial facilities where the exposure of chemicals and other pollutants creates the potential for contaminated runoff to surface and groundwater resources. Similar to the MS4 Permit and the Construction Stormwater Permit, industrial stormwater permit holders must develop a Stormwater Pollution Prevention Plan, or SWPPP, that describes control measures to prevent pollutant discharges. Industrial facilities can certify a "No Exposure" condition, where all significant industrial materials and activities are protected from rain, snow, snow-melt and runoff through a storm resistant shelter.

The MPCA recently revised permit requirements for industrial permittees. The only municipally owned permittee in the program is the St. Cloud Municipal Airport. The industrial St. Cloud Wastewater Treatment Facility is certified for "no exposure" and the City's Central Maintenance Facility is exempt. However, there are many private industrial permit holders in the St. Cloud area.

Outstanding Resource Value Waters

The NPDES MS4 Permit authorizes the City of St. Cloud to discharge stormwater to waters of the State. One significant restriction is that the permit does not authorize new and expanded discharge to outstanding resource value waters (ORVW). The State identifies an Outstanding Resource Value Water as water with prohibited discharges, restricted discharges or special waters.

St. Cloud does not currently discharge, nor is it likely to discharge, to a prohibited discharge water. These waters include lakes in the BWCA and Voyageur's National Park, portions of Lake Superior, and MnDNR scientific and natural areas.

Restricted discharge waters include the Mississippi River downstream of the dam near University Drive. From this point to the northwestern limits of the City of Anoka, the Mississippi River flows freely, unaffected by the pooling created by dams. This free flowing section of the river was designated "scenic and recreational" by the Wild and Scenic Rivers Act in 1968.

The NPDES Permit does not allow new and expanded discharges to restricted discharge waters unless:

No "prudent and feasible" alternatives exist to eliminate the new and expanded discharge

The NPDES MS4 Permit identifies specific special lakes within St. Cloud:

- Robinson Hill Creek (Neenah Creek) – MnDNR Trout Water
- Mississippi River – Source Water Protection Area
- Waite Park Source Water Protection Area
- All wetlands

The Permit does not authorize new and expanded discharges to trout streams unless there is no "feasible and prudent" alternative. The MPCA specifically identifies temperature as an additional pollutant for consideration for trout waters.

The Permit does not authorize physical alteration of wetlands. Direct discharge to wetlands is avoided in favor of routing runoff through water quality and infiltration practices. However, new and expanded discharges are allowed if treatment is accomplished.

The NPDES MS4 Permit does not preclude new and expanded discharges to Source Water Protection Areas. The permit does require permittees to include within their SWPPP specific measures to protect vulnerable wells and underground source waters. The City of St. Cloud met this requirement through SWPPP BMP 9a-1.

Minimum Impact Design Standards (MIDS)

The Minnesota Legislature allocated funds to "develop performance standards, design standards or other tools to enable and promote the implementation of low impact development and other stormwater management techniques." (Minnesota Statutes 2009, section 115.03, subdivision 5c). The key challenges addressed with MIDS are statewide water quality standards for development and redevelopment, new modeling methods, and determination of a credit system to reward certain land practices that augment water quality: tree planting or restoring native vegetation. The project is scheduled for completion in 2012. Several examples of low impact development best management practices the City of St. Cloud has implemented are shown below, including the green roof and rain gardens at the Library and Fire Station swale.



Antidegradation, is a general preservation strategy that does not match pollutants and water quality standards to specific water bodies, i.e. Minnesota's antidegradation program is based on increases in flow and pollutants and not on the relative impacts these have on water bodies. Though it would be ideal to study every Minnesota water body and cater an antidegradation strategy to the water body's specific condition, this is not feasible. As an alternative, if a community adopts MIDS, there may be a presumption that antidegradation is met. This may release cities from antidegradation submittals.





4.22 Minnesota Department of Natural Resources (MnDNR)

The Minnesota Department of Natural Resources (MnDNR) has eight divisions tasked with protecting the natural resources of Minnesota. The Division of Waters is responsible for the broad task of public waters protection. This includes floodplain, dam and lake management, permitting new outfalls and development activity within and adjacent to public waters, and groundwater management. Figure 4.2 shows the designated Public Waters within St. Cloud that are under MnDNR jurisdiction. The City is required to obtain a Public Waters work permit through the MnDNR for outfalls to these waterbodies or work within the river channel. The MnDNR also restricts development densities within the shoreland management zone and sets minimum shoreland ordinance requirements.

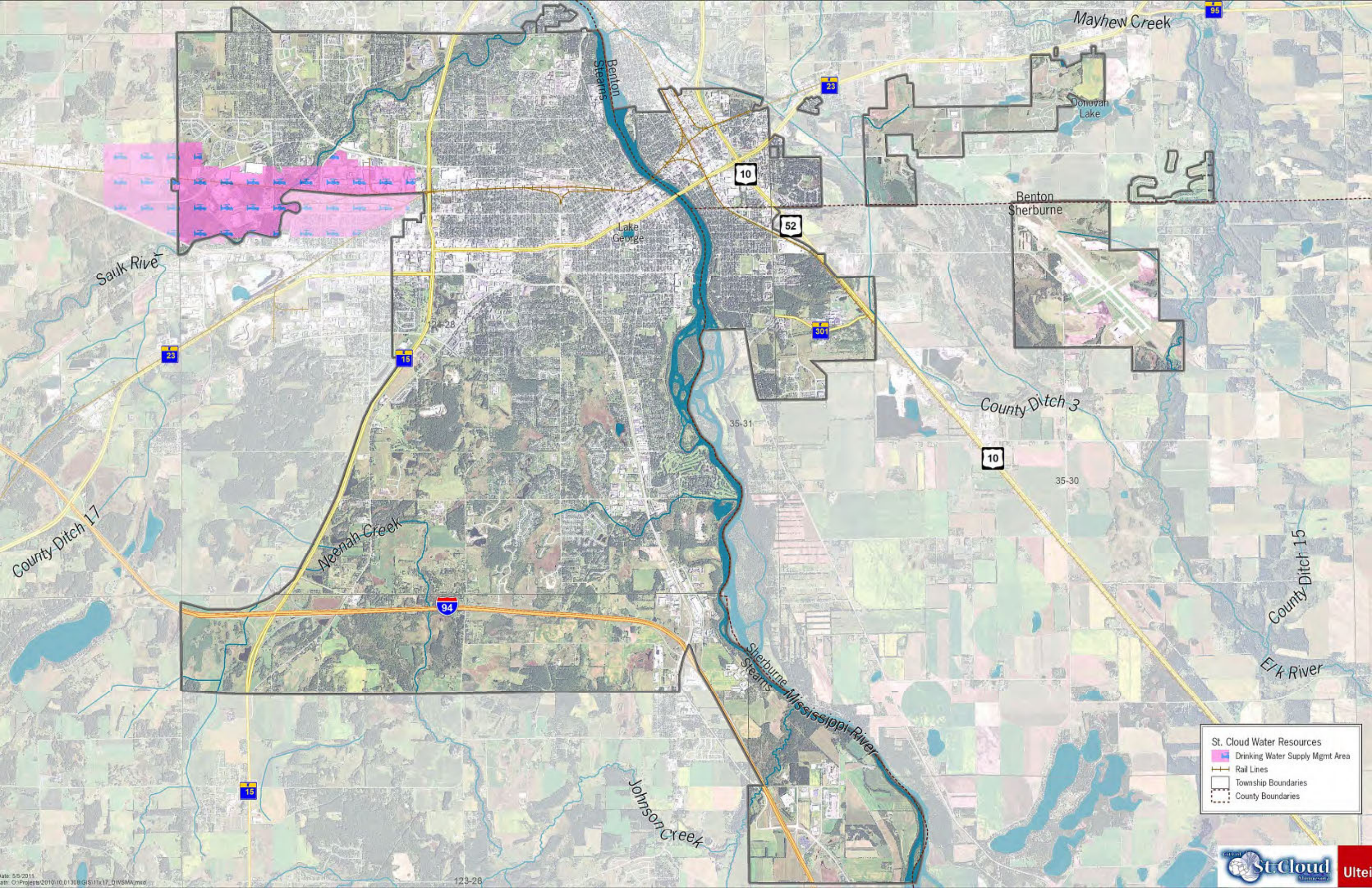
St. Cloud has one MnDNR designated trout stream; Robinson Hill Creek/Neenah Creek. The MnDNR designates trout streams to protect these waters through augmented land use planning, watershed management and natural resource management activities. Trout streams are legally designated by Minnesota Rule Chapter 6264.

In addition to stormwater management roles, the MnDNR also regulates higher volume groundwater appropriations from irrigation and drinking water wells or from dewatering of subsurface excavation. Contractors who propose construction dewatering must often obtain a permit from the MnDNR. Though it regulates floodplains in Minnesota, the MnDNR typically delegates floodplain management authority to municipal or county government. This is the case in the City of St. Cloud.

4.23 Minnesota Department of Health

The Minnesota Department of Health (MDH) manages programs to protect public health, including implementation of the federal Safe Drinking Water Act. The MDH monitors water wells and is responsible for implementation of wellhead protection programs. The MDH has some authority to regulate the use of stormwater infiltration BMPs when they have the potential of contaminating wells or aquifers. The MDH provides several suggested considerations when a development project is within a vulnerable wellhead protection area or drinking water supply management area. The following factors should be evaluated: presence of fractured rock, type of land use proposed, and proximity to 1-year time of travel (emergency) zone, establishment of emergency spill response procedures and evaluation of BMPs for compliance with federal drinking water standards.

A drinking water supply management area (DWSMA) is delineated representing the surface and subsurface area surrounding a public water supply well. The City of Waite Park delineated a very high vulnerability DWSMA within St. Cloud's city limits, as shown on Figure 4.4. There are also several moderate to high vulnerability DWSMAs in the adjacent communities.


Mayhew Creek
Benton
Stearns
Donovan
Lake
Benton
Sherburne
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George
Sauk River
12-28
35-31
County Ditch 3
35-30
County Ditch 17
Meenah Creek
Sherburne
Stearns
Mississippi River
Johnson Creek
County Ditch 15
Elk River
123-28
St. Cloud Water Resources
Drinking Water Supply Mgmt Area
Rail Lines
Township Boundaries
County Boundaries

4.24 Minnesota Board of Water and Soil Resources

Minnesota's Board of Water and Soil Resources (BWSR) works with local government agencies to implement Minnesota's water and soil conservation policies. BWSR is the administrative agency for soil and water conservation districts, watershed districts, watershed management organizations and county water managers. The BWSR is responsible for implementation of Minnesota's Wetland Conservation Act (WCA).

The Wetland Conservation Act, passed in 1991, protects all wetlands unless they fall under an exemption category. The Act follows a "no net loss" policy, and wetlands covered under it must not be drained or filled, wholly or partially, unless replaced by restoring or creating wetland of at least equal public value under an approved replacement plan. Replacement ratio is a minimum of 2:1 (2 acres created for every 1 acre filled) for wetland impacts.

Operating under the BWSR umbrella, Sherburne, Benton and Stearns County Soil and Water Conservation Districts (SWCD) provide technical assistance to landowners, county residents, local government units, watershed organizations and other agencies for natural resource conservation. They function largely as cooperative agencies and do not have a regulatory role unless they have been designated as the local governmental unit for administering the WCA. The SWCDs also provide grant programs for installation of rain gardens, shoreland management, installation of native plants and other stormwater related BMPs.

The Sherburne SWCD was organized in 1944 by local farmers. Benton County SWCD has been active since 1948 and Stearns County SWCD has been active since 1949. Funding for these agencies is provided by County allocation, grants, and contracts with local government units, watershed organizations, and state and federal cost share.

4.25 Minnesota Environmental Quality Board (EQB)

The Environmental Quality Board (EQB) develops policy, creates long range plans and reviews proposed projects that may significantly affect Minnesota's environment. The EQB is comprised of five citizen members and the heads of ten state agencies that play an important role in Minnesota's environment and economic development.

Although the actual reviews are conducted by the appropriate responsible government unit (RGU), the EQB writes the rules for conducting environmental reviews based on Minnesota Statute 116D.04. The nature, location and size of a project determine if an environmental review is required and who will be the RGU. The following documents result from Minnesota's environmental review process.

Enviromental Assessment Worksheet (EAW):

- a first level of screening tool to determine if a full enviromental impact statement is required

Enviromental Assessment Statement (EIS):

- an in-depth analysis for major projects that are identified as having enviromental impacts. Covers economic, social and enviromental infulences and looks at alternate ways to proceed with the project.

Alternate Urban Areawide Review (AUAR):

- The focus of an AUAR is the cumulative impacts of several projects or a cumulative development expected to occur within a larger area, different from an EAW or EIS in the size , area and scope of review

Minnesota's environmental review process uses documentation similar to the Federal National Environmental Policy Act. However, one process cannot substitute for the other. In some cases involving Federal projects or federally funded projects both the State and Federal process must be followed to conclusion.

4.3 LOCAL JURISDICTIONS

4.31 City of St. Cloud

There are three primary City departments involved with the land development process. The Planning and Zoning Department reviews all plats, rezoning requests, and building plans for multiple family residential, commercial and industrial projects. Planning and Zoning staff is responsible for implementation of most of the Land Development Code's regulations including zoning requirements, shoreland regulations, wild and scenic river requirements, and floodplain regulations (see Figure 4.5 for the City's 2009 Zoning Map).

The Engineering Department works with the planning staff to review and develop a stormwater drainage plan. Engineering staff also reviews multiple family residential, commercial and industrial building permits for consistency with the requirements of Article 19 of the Land Development Code.

The Building Safety Department is responsible for issuing the City's building permits. Building safety staff often consults with planning and zoning department staff regarding any potential restrictions such as floodplain, shoreland or wild and scenic rivers regulations.

Mayhew Creek
Benton
Stearns
Donovan Lake
Benton
Sherburne
Lake George
Sauk River
124-28
35-31
County Ditch 3
County Ditch 17
Neenah Creek
Sherburne
Stearns
Mississippi River
Johnson Creek
123-28
Elk River
95
23
10
52
301
15
94

St. Cloud Water Resources

- County Boundaries
- Township Boundaries
- Rail Lines

Zoning

- AG - Agricultural
- C1 - Business Office
- C2 - Neighborhood Commercial
- C3 - Central Business
- C4 - Fringe Central Business
- C5 - Highway Commercial
- I1 - Light Industrial
- I2 - General Industrial
- I3 - Planned Industrial
- MD - Medical
- PUD - Planned Unit Dev'p
- R1 - Single Family Res.
- R2 - Single Family/Two Family
- R3 - Lodging House
- R3A - General Res.
- R4 - Townhouse Res.
- R5 - General Multi-Family
- R6 - Multi-Family Res.
- R7 - High Rise Multi-Family
- RR - Rural Residential

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St. Cloud Minnesota

St. Cloud's Stormwater Pollution Prevention Program (SWPPP) describes 50 Best Management Practices that constitute St. Cloud's stormwater management program. The SWPPP is a legally enforceable document and part of St. Cloud's permit authorization. It is not a tool to enforce controls and minimum standards on activities conducted by St. Cloud's residents, businesses and developers. Consequently, the City of St. Cloud has specific stormwater system use requirements listed in City Ordinance Section 365 and in Article 19 of the Land Development Code. All projects that disturb area greater than or equal to 5,000 square feet are required to obtain a Land Disturbance Permit. However, projects less than 5,000 square feet are still required to follow the requirements outlined in the Land Development Code, Ordinance Section 365. New development projects are required to abstract or infiltrate the runoff depth of ½ inch from impervious and pervious surfaces. Redevelopment projects are required to abstract or infiltrate the volume equivalent to ¼ inch off redeveloped impervious, ½ inch off redeveloped pervious (pervious disturbed and restored back to pervious), and ½ inch off new impervious. Also, the minimum control measures provided in the City's SWPPP must always be followed.

To some extent, water resource management also determines local zoning requirements. The City of St. Cloud has a Floodplain Overlay District and Shoreland District described in Article 12 of the Land Development Code. The City sets land use, fill and low floor elevation restrictions within these districts. Generally, land uses such as farming, green space (golf courses, parks, driving ranges, etc.), residential lawns and commercial loading areas are allowable land uses within the floodway. Permitted land uses in the flood fringe are governed by the underlying zoning district, as long as the lowest floor is one foot or more above the base flood elevation.

4.32 Sauk River Watershed District

The northwest portion of the City of St. Cloud is in the Sauk River Watershed District (SRWD). The SRWD is one of the 47 watershed districts established in Minnesota based on hydrologic boundaries and designed to protect the water resources within their jurisdiction. The SRWD was established in 1986 and covers approximately 1,041 square miles. The Sauk River Watershed District updated their rules on February 16, 2010.

The Sauk River Watershed District requirements are triggered by new development or redevelopment that generates an acre or greater of impervious surfaces. The two primary requirements are:

1. Proposed conditions discharge rates must be less than or equal to existing conditions for the 2, 10 and 100-year 24-hour rainfall events and 7.2-inch, 100-year, 10-day runoff event.

2. The Sauk River is listed as impaired by the MPCA, therefore the property must treat the first one-inch of runoff from new or redeveloped impervious surfaces, and at least ½ inch must be treated through infiltration practices.

The City of St. Cloud has an exemption agreement with the Sauk River Watershed District that allows the City to implement its own rules with the City limits since these rules are equivalent or more robust than watershed rules.

4.33 Stearns, Benton and Sherburne Counties

The majority of St. Cloud lies within Stearns County. Benton and Sherburne Counties are located on the east side of the Mississippi River and each encompasses much less of the City's current land mass. Each County is responsible for administering:

- the Wetland Conservation Act
- MnDNR's shoreland management program
- regulate subsurface sewage treatment systems (septic systems) regulations
- floodplain management through the NFIP

The three counties are also active in providing grants for installation of best management practices (BMPs) and monitoring programs. Each County has a local water plan with which this SWMP will be consistent.

Stearns County's Local Water Management Plan was developed in 1991 due to rapid growth, and was updated 2008. Several aspects of the plan directly affect St. Cloud including source water protection and promotion of low impact development to minimize the effects of development. Stearns County was also required to complete a SWPPP as a part of its MS4 permit compliance.

The Benton County Local Water Management Plan was completed in 2008 with recent minor additions. The priorities listed in the plan include groundwater quantity and quality, and addressing issues with development pressure.

Sherburne County's Local Water Management Plan was first adopted in 1992 and updated in 2007. The plan focuses on groundwater and surface water quality and quantity.

The following section provides additional detail on each County's Plan.

4.4 RELATED PLANS, STUDIES AND REPORTS

The regulatory context for managing stormwater in St. Cloud is driven by comprehensive planning, resource planning and economic development planning conducted by St. Cloud's local jurisdictions. The following describes the pertinent plans, studies and reports that were utilized as background information. The list is not intended to be all inclusive and the actual plan, study or report should be referenced for more information.

4.41 Stearns County 2030 Comprehensive Plan

The purpose of this plan was to create a policy framework to guide land use decisions, infrastructure improvements, intergovernmental cooperation and investments. Data regarding existing natural and water resources, hydric soils and bedrock depth was referenced.

4.42 Sauk River Watershed District 2003-2012 Overall Plan

The SRWD Overall Plan was developed to comply with BWSR requirements. It is a three part plan covering an overview, inventory and assessment of the watershed; policy, goals and objectives framework for groundwater, surface water and land resources; and district implementation strategy.

4.43 St. Cloud 2003 Comprehensive Plan

This plan updates the 1993 Plan. It is intended to guide growth and to protect transportation and natural resources corridors. The primary topics covered include; transportation, natural resources, land use, parks and open space, and implementation. The SWMP utilized existing and future land use plans and demographic forecasts from this document. The 2003 plan also included an Intrinsic Suitability Analysis that mapped natural features (wetlands, soils, bedrock outcroppings, natural areas, floodplain, surface waters, and rare plant and animal species). The analysis was utilized to guide the master planning process and target specific area planning. A large portion of the natural features mapping was taken from the Natural Areas Inventory and Planning Framework completed in 1995.

4.44 St. Cloud 1995 Natural Areas Inventory and Planning Framework

Natural Areas Inventory and Planning Framework completed in 1995 and amended in 2001, ranked the City's natural areas for preservation based on quality, rarity and association with other adjacent natural resources. The rankings were completed for wetlands, natural areas, and rare plant and animal species. The document provided regulatory and non-regulatory methods for preserving high quality natural areas. The rankings are incorporated into the Environmentally Sensitive Areas Ordinance which regulates development of natural areas and priorities these areas for protection.

4.45 Sherburne County Local Water Management Plan (LWMP) 2007 through February 2017

The County first adopted a LWMP in 1992 and has updated the plan four times. The latest update was completed in 2007 for a five-year time frame. The Sherburne SWCD administers and implements the

LWMP. The LWMP focuses on groundwater and surface water quality and quantity. The purpose of the plan is three parts:

- identify existing opportunities to protect land and water resources
- identify priorities to address in the five-year time frame of the plan
- implement projects and programs to address the priority concerns

The priorities generated in the LWMP include the impaired and degraded lakes and streams in the Elk River watershed, aquatic and shoreland vegetation management, concerns with impervious surfaces generated with development, and the water quality and quantity effects. The actions related to the goal of reducing the pollutant loads for the impaired and degraded lakes and streams in the Elk River watershed primarily focus on reducing nutrient loads from agricultural runoff. The actions related to the concerns regarding increased development pressure include working with Cities to retrofit BMPs in developed areas, working with Cities to update ordinances to reduce post-development runoff volumes, and promote low impact development. Aquatic and shoreland vegetation management actions are to promote wetland, stream and lake buffers.

4.46 Benton County Comprehensive Local Water Management Plan 2008 – 2018

Similar to the Sherburne County LWMP, the Benton County LWMP is implemented by the Benton SWCD.

The LWMP consists of three parts:

- identify existing opportunities to protect land and water resources
- identify priorities to address in the five - year time frame of the plan
- identify implementation projects and programs to address the priority concerns

The priorities generated in the LWMP are feedlot and nutrient management, groundwater quantity and quality and development pressure. The primary development pressure noted in the LWMP is in the St. Cloud area. The goals and objectives outlined in the plan relating to groundwater quality and quantity are to develop and implement Wellhead Protection Plans and to continue to regulate subsurface sewage treatment systems. As they relate to St. Cloud, the objectives translate to working with the City to identify and protect regional water supplies and recharge areas and working to address zoning issues related to Wellhead Protection Plans. The LWMP development objectives are to develop a natural

resources inventory, to encourage ordinance development for local government agencies and to provide educational materials on the effects of development.

4.47 Stearns County Local Water Management Plan 2008-2017

There have been three previous LWMPs for Stearns County. Similar to Benton and Sherburne County, the SWCD implements the plan. Three priorities were identified in the plan; source water protection, development impacts and impaired waters. Stearns County assists in protecting the source water protection area for the City of St. Cloud, which derives its municipal water source from the Mississippi River. The action items relating to minimizing development impacts are primarily focused on promoting low impact development and coordination with MS4s. The SWCD provides ongoing monitoring which it intends to expand to assist in providing data for waters in the County.

4.48 2010 Sustainability Framework Plan

The development of the Framework Plan was led by the St. Cloud Joint Planning District Sustainability Committee. Public input meetings generated 17 best practices areas that are addressed in the Framework Plan. Each of these best practices has some applicability to this SWMP, in particular the best practices for Surface and Groundwater Resources. The key topics discussed in the Surface and Groundwater Resources section include education programs, updates to the stormwater design standards to promote low impact development and natural drainage systems, installation of BMPs on agricultural land, recommendations for low impact development practices and reduced impervious with street reconstruction projects.

4.49 St. Cloud Urban Area Mississippi River Corridor Plan

This project was initiated in 2010 with the stated outcome:

> *"to establish a community vision and implement strategies to maintain and enhance the Mississippi River as a regional asset through appropriate stewardship and utilization of the urbanized area's riverfront."*

The project extends from Sauk Rapids to the southern limits of St. Cloud and is being completed with the assistance of several partners, including each of the cities and counties along the Mississippi River.

4.410 St. Cloud Area Joint Planning District Plan

This plan was a corporative effort among Stearns, Benton and Sherburne Counties and five cities: St. Cloud, Sauk Rapids, Sartell, St. Joseph and Waite Park. The Plan emphasize community involvement and 11 goals including; cooperation, economic development, citizen participation, conservation, housing, livable community design, transportation, land use planning, sustainability, public investments and

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public education. The plan was completed in May 2000. The District holds quarterly board meetings to discuss special issues.

4.411 St. Cloud Source Water Protection Plan

The Source Water Protection Plan delineates an area where the potential sources of contamination to public water supplies are managed. The Plan identified three areas, priority area A and its associated drinking water supply management area (DWSMA), priority area B and its associated DWSMA and the source water protection watershed upstream of the St. Cloud Mississippi River intake. Source water protection areas are important in terms of stormwater because they affect the ability to utilize infiltration practices and the level of pretreatment required.

4.412 St. Cloud Park and Public Facilities Planning

The City of St. Cloud Planning Document Library includes several documents that were referenced in this document and are briefly described below.

4.413 Plum Creek Regional Park Master Plan (2005) and Land Cover Classification and Planning Guidance (2004)

Plum Creek Regional Park is located in the southern portion of St. Cloud along the wild and scenic river portion of the Mississippi River and is a key access point to the riverfront. The existing ecology of the area includes high quality woodlands, bluff areas, wetlands and the river frontage. The park plan focuses on restoring and protecting the natural areas while balancing the needs of the park users.

4.414 Barden Park Master Plan (2002)

Barden Park is located on the west side of the Mississippi River between 4th and 5th Avenues and 7th and 8th Street and is bordered by St. Cloud State University. It is one of the oldest parks in St. Cloud and was originally platted in 1855. The master plan presented opportunities to improve, preserve and beautify the park, improve access and strengthen the relationship with the University.

4.415 St. Cloud 2007 Neenah Creek Regional Park Master Plan and 2001 Neenah Creek Regional Park, Plant Community Inventory and Land Cover Classification

The 243-acre Neenah Creek Regional Park is located on the southwest side of the City. It is one of three regional parks in the City. Areas of high quality natural features, species diversity and vegetative cover are found throughout the park. The primary feature of the park is Neenah Creek which is a MnDNR designated trout stream.

4.416 Riverside Regional Park Plan (2002)

Riverside Park is located on the east side of the Mississippi River, accessed by Michigan Avenue and includes Clemens Gardens and Munsinger Gardens. The park plan focuses on access to the park while preserving existing trees.

4.417 Lake George Master Plan (2000)

Lake George is located in the downtown area of St. Cloud in Eastman Park. The lake originally extended east and outletted overland through a ravine to the Mississippi River. The Master Plan outlines several goals and objectives including improving access to the park from downtown, improving the park aesthetics, and integrating park and Technical High School improvements.

Each of the park plans identifies a desire to preserve, protect, or restore natural areas and water resources. The SWMP builds upon these efforts by specifically identifying some methods and means for achieving these things as it relates to wetland resources and stormwater management.

Chapter 5 - Assessment

The assessment describes impairments for specific waters and other challenges identified by the City and others regarding water quantity, water quality and wetlands. Minnesota Statute and Rules generally describe the content for Watershed and Municipal Storm Water Plans; local plans identify "issues and corrective actions" or "problems and corrective actions." This section serves a similar purpose by identifying issues and potential solutions related to flooding, water quality and wetlands. The potential solutions do not necessarily represent commitments by the City of St. Cloud. However, aspects of these solutions will be brought into the City's Implementation Plan.

Preparing a SWMP requires attention to macro drainage patterns. The City has defined these through a subwatershed and drainage area map (Appendix C). The map distinguishes five major subwatersheds within St. Cloud; Mississippi River, Robinson Creek, Sauk River, Elk River and Long Lake. Within each subwatershed, smaller drainage areas are also defined. The areas reflect drainage patterns determined by storm sewer networks and overland paths in both the urban and rural areas of St. Cloud. St. Cloud delineated the 168 drainage areas from a variety of sources including digital elevation information from the United States Geological Survey (USGS), City storm drain information and Minnesota Department of Transportation (MnDOT) drainage information. City staff regularly updates the drainage area delineations and larger subwatershed delineations as new development changes drainage patterns or as new topographic information becomes available.

5.1 Water Quantity Assessments

The City of St. Cloud does not have any specific, large-scale water quantity or flooding issues that might require a large scale project or capital expenditure. Rather, the City has numerous, smaller issues that it must address on a regular basis as part of its inspection, maintenance, and repair program. Smaller issues encompass minor street flooding, fluctuating or high ground water in wetlands, surface drainage problems, plugged outlets and inlets, and storm sewer repairs to name a few. Funding for these maintenance and repair items usually occurs through the stormwater utility, through other funding sources occasionally used.

5.2 Water Quality Assessments

5.21 Antidegradation Assessment

The Clean Water Act (CWA) includes Antidegradation provisions which stipulate that current water quality shall be maintained and that the permits developed by the States to implement the CWA must incorporate this concept of protection. In Minnesota this stipulation occurs in the MS4 Permit through Part X. Appendix D: Antidegradation for Selected MS4s.

Total Maximum Daily Loads (TMDLs) address restoration of water quality to impaired waters. In contrast, antidegradation addresses preservation of water quality for waters that have not reached impairment by prohibiting "new and expanded" discharges unless no "prudent and feasible" alternatives can be found. St. Cloud's antidegradation strategy proposes mitigation for past increases in pollutant loadings and manages future loadings to avoid new and expanded discharges wherever feasible.

In August 2007, the City of St. Cloud completed a water quality report titled Loading Assessment and Nondegradation Report. The report and supporting analysis established St. Cloud's response to the antidegradation provisions of the MS4 Permit.

As required by the MS4 Permit, St. Cloud's loading assessment calculated, through water quality modeling, annual pollutant loads for three time periods; baseline conditions i.e. 1988 to 1990, present conditions and 2020 conditions (based on the City's growth plan). Based on the availability of data, the City chose the years 1988 and 2005 for baseline and present conditions, respectively.

The Loading Assessment and Nondegradation Report modeled three pollutants; total suspended solids (TSS), total phosphorus (TP) and runoff volume. Though the permit did not specify the pollutants of concern, many Cities chose these three pollutants because they represent the predominant impact of urban runoff and because other pollutant loads can be calculated in proportion to loads from these three. Though not technically a pollutant, runoff volume carries other pollutants from impervious and other surfaces. Additionally, increased runoff volume can alter the hydrology to wetlands and streams and cause undesired changes to wetland vegetation and stream banks.

To assess pollutant loadings for the three time periods, St. Cloud used PondNET water quality modeling software; an effective and easy to use software. The loading assessment showed an increase in TSS, TP, and runoff volume from 1988 to 2005, and predicted an increase in all three from 2005 to 2020 if no additional measures were taken. New impervious surface drove the increased loadings. Stormwater ponds help reduce loadings, but they were insufficient to prevent increases across the analysis periods.

As a result of the antidegradation assessment, St. Cloud concluded that urbanization without additional mitigation can cause the City to violate applicable water quality standards, which could lead to the waters being listed as "impaired." Tables 5-1 through 5-4 presents loading comparisons for the three time periods based on PondNET water quality model. Loadings are organized by subwatershed.

Table 5-1 – Antidegradation Analysis Modeling Results – Impervious Areas

Subwatershed	Impervious Areas (ac)			
	Area (sq. mi.)	1988	2005	2020
Elk River	22.3	357.8	1,192.6	2,476.6
Long Lake	0.6	0.2	25.1	66.7
Mississippi River	27.2	2,699.1	4,077.5	5,405.5
Robinson Creek	5.9	34.8	421.4	911.9
Sauk River	17.1	1,917.8	2,666.1	2,856.9
Growth Boundary (total)	73.1	5,009.7	8,382.7	11,717.6

As shown in Table 5-2, there is a significant increase in impervious surfaces from 1988 to 2020.

Table 5-2 – Antidegradation Analysis Modeling Results – Runoff Volume

Subwatershed	Runoff Volume (ac-ft./year)		
	1988	2005	2020
Elk River	2,270	3,247	4,839
Long Lake	49	78	127
Mississippi River	5,513	7,155	8,767
Robinson Creek	587	1,059	1,642
Sauk River	3,153	4,099	4,273
Growth Boundary (total)	11,571	15,637	19,649

The results compared in Table 5-2 do not reflect the impact of the City's infiltration ordinance.

Table 5-3 – Antidegradation Analysis Modeling Results – Total Suspended Solids

Subwatershed	TSS (lbs./year)		
	1988	2005	2020
Elk River	848,428	972,788	1,306,606
Long Lake	25,674	29,162	35,902
Mississippi River	1,542,349	1,777,706	2,063,737
Robinson Creek	197,679	270,060	386,115
Sauk River	765,465	971,723	986,433
Growth Boundary (total)	3,379,595	4,021,438	4,778,793

New impervious surfaces and more efficient conveyance allows for easier transport of TSS generated from the urban landscape. This negates the reduction in landscape yield and leads to the increase shown in Table 5-3.

Table 5-4 – Antidegradation Analysis Modeling Results – Total Phosphorus

Subwatershed	TP (lbs./year)		
	1988	2005	2020
Elk River	3,365	4,286	6,226
Long Lake	94	122	171
Mississippi River	7,253	8,801	10,623
Robinson Creek	766	1,248	1,946
Sauk River	3,911	4,998	5,165
Growth Boundary (total)	15,389	19,454	24,131

Per acre yields of total phosphorus increase in the urban environment when compared to agricultural. This is associated with organic material from pervious and impervious surfaces and from the overall increase in runoff volume due to the new impervious surfaces. Overall, without mitigation, TP loading increases in the urban environment when compared to agricultural.

In response to the modeled load increases, the City adopted new ordinance requirements for infiltration. The ordinance requires that new development provide a volume of infiltration equivalent to ½-inch multiplied over the entire site area and that redevelopment provide ¼-inch from all redeveloped impervious surfaces, ½-inch from all redeveloped pervious surfaces, and ½-inch from all new impervious surfaces.

The mitigation strategy is focused on runoff volume, not TSS and TP. However, the target infiltration depths are sufficient to capture 50 to 75 percent of annual runoff volume; leading to a minimum 50 to 75 percent reduction in TP and TSS. Since the percentage load reduction needed for TSS and TP is less than that needed for volume, using volume as the leading indicator is appropriate.

The regular application of the infiltration standard reduces runoff volume, TSS, TP and many other pollutants found in urban stormwater. Table 5-5 compares baseline to 2005 runoff volume. The "increase" becomes the runoff volume targeted by "redevelopment" provisions within the ordinance.

Table 5-5 – Runoff Volume Mitigation

Subwatershed	Runoff Volume (ac-ft.)		
	1988	Current (2005)	Increase
Elk River	2,270	3,247	977
Long Lake	49	78	29
Mississippi River	5,513	7,155	1,642
Robinson Creek	587	1,059	472
Sauk River	3,153	4,099	946
Growth Area	**11,570**	**15,637**	**4,067**

It is helpful to look at runoff volumes in terms of impervious surface area. For the Sauk River watershed, there is an increase in runoff volume of 946 ac-ft. from 1988 to 2005. Using a ¼-inch design standard for redeveloped impervious surface, this equates to 1,351 acres of existing impervious surface needing retrofit infiltration BMPs. The Loading Assessment and Nondegradation Report conclude that mitigation for past increases in runoff volume will be a long-term process, measured in decades and not years.

To successfully implement runoff volume reduction targets, the City will also consider other implementation strategies:

- The City will look outside public and private project boundaries to evaluate additional existing impervious surfaces for mitigation with simple, cost-effective modifications.
- Cost effective mitigation can include education efforts, examples include:
- Turning downspouts onto pervious areas.
- Constructing driveways to drain onto pervious surfaces.
- Discharging sump pumps onto pervious surfaces.
- Capturing rainwater for reuse.
- Building private shallow basins varying from rainwater gardens to depressed turf areas.
- Inventory large impervious areas and evaluate for BMPs; the most cost-effective BMPs are those that capture sheet flow.
- Overland flow paths may be utilized. Conveyed overland, stormwater has more opportunity to infiltrate than in piped systems.

5.22 Total Maximum Daily Load (TMDL) Assessments

The Clean Water Act requires States to publish an updated list of streams and lakes that are not meeting designated uses based on excess pollutants. The 303(d) list or the impaired waters list is based on violations of water quality standards and is organized by river basin.

For each pollutant that causes a water body to not meet state water quality standards, the federal Clean Water Act requires the MPCA to conduct a Total Maximum Daily Load (TMDL) study. A TMDL study identifies both point and nonpoint sources of each pollutant that causes the water to not meet water quality standards. Water quality sampling and computer modeling determine the amount of pollutant reduction needed to meet the applicable water quality standard.

Four water bodies in the City of St. Cloud are on the impaired waters list. Ultimately, a strategy will be developed to attain the applicable water quality standard for each of these four. The process of developing this strategy is commonly known as the TMDL process and involves the following phases:

1. Assessment and listing
2. TMDL study
3. Implementation plan development
4. Implementation
5. Monitoring of the effectiveness of implementation efforts

Table 5-6 lists the impaired waters in the City.

Table 5-6 – draft 2010 List of Impaired Waters in St. Cloud (303(d) List)

Water Body Lake	Year First Listed	Lake/River #	Affected Use	Pollutant Stressor	TMDL Start/Complete
Sauk River (Mill Creek to Mississippi River) 07010202-501	1994	07010202-501	Aquatic Recreation	Fecal Coliform	2004/2009
	1998		Aquatic Consumption	PCB	1998/2011
	2008		Aquatic Life	Turbidity	2004/2009
Mayhew Creek (Mayhew Lake to Elk River)	2006	07010203-509	Aquatic Life	Aquatic Macroinvertrabrate Bioassessments	2015/2019
	2002			Fish Bioassessments	
Mississippi River (Sauk River to CSAH 7)	2010	07010203-574	Aquatic Recreation	E. Coli	2008/2015
Donovan Lake (Main Bay)	2010	05-0004-02	Aquatic Recreation	Nutrient/Eutrophication Biological Indicators	2010/2015

A statewide TMDL is complete and approved by the EPA for mercury. It requires a 93% reduction for air emissions and a cap on water point sources at 1% above the current level. The Sauk River, Mississippi River from CSAH 7 to the northwest limits of Anoka, and the Elk River are listed as impaired for mercury and are thus beneficiaries of the mercury TMDL.

Three of the four listed waters in the St. Cloud area are rivers or creeks. The MPCA has acknowledged that shallow lakes should not be assessed with the same criteria as deep lakes. Shallow lakes are different than deep lakes due to differences in ecological characteristics and internal nutrient cycling. The MPCA has defined shallow lakes as having a maximum depth less than 15 feet, or having greater than 80% of surface area as littoral (less than 15 feet deep). Table 5-7 outlines the MPCA water quality criteria for shallow and deep lakes. In the case of Donovan Lake, the applicable water quality standard pertains more to deep lakes and not shallow lakes like Donovan.

Table 5-7 – MPCA Impairment Designation Thresholds for Determining Use Support for Lakes

Parameters	ECOREGIONS			
	North Central Hardwood Forest		Western Corn Belt Plains	
	Shallow	Deep	Shallow	Deep
TP (ug/L)	60	40	90	65
Chlorophyll – a (ug/L)	20	14	30	22
Secchi Disk (m)	1.0	1.4	0.7	0.9

The Minnesota Department of Natural Resources (MnDNR) publishes data for Donovan Lake and Lake George. Table 5-8 provides information derived from the MnDNR.

Table 5-8 – Water Quality Measurements for St. Cloud Lakes

Lake Data	Donovan Lake	Lake George
MnDNR ID	05-0004-02, 05-0004-00	73-0611-00
Surface Area (ac)	54	9
Max. Depth (ft.)	5	32
TP (ug/L)	137	Not Available
Chlorophyll – a (ug/L)	52.5	Not Available
Secchi Disk (m)	1.0	Not Available

To be listed as impaired, monitoring data must show that TP and either Chlorophyll-a or secchi depth exceed the standard. If data shows a lake is not meeting the support criteria for any variable, it may be placed on a review list. The MPCA uses a weight of evidence approach to determine if a lake will be listed as impaired.

Donovan Lake is listed as impaired for nutrients. Based on the MnDNR Lake Finder, it is in the North Central Hardwood Forest (NCHF) ecoregion and is considered a shallow lake. When comparing water quality parameters to shallow lakes in the ecoregion, the secchi disk reading is the only parameter that meets the ecoregion standard.

Listing Donovan Lake as impaired is supported by the available evidence. Continued monitoring may be needed to further establish the impairment. Ultimately, a TMDL for Donovan Lake should be based on shallow lake standards and not those for deep lakes.

In 2011, there are 16 TMDLs underway in the Upper Mississippi River Basin one of which is the Sauk River fecal coliform TMDL. The Sauk River Watershed District (SRWD) initiated monitoring in 2005 and a Diagnostic Study is underway. The monitoring and samples taken in 2005 indicate that the Sauk River is not impaired for fecal coliform. Additional sampling and studies are proposed by the SRWD and its partners, including the MPCA.

The TMDL for the Mississippi River will likely be completed by the MPCA though it has not been initiated by the agency. The Mayhew Creek TMDL plan will likely be completed by Elk River Watershed Association (ERWSA). The ERWSA is in the process of completing a TMDL for the Elk River downstream of St. Cloud concerning Big Lake and Mayhew Lake impairments. However, Mayhew Creek impairments are not addressed in the current TMDL process. As individual TMDLs are approved by the MPCA it then falls to individual permit holders to modify SWPPPs and Stormwater Plans to achieve the required MS4 waste load allocations.

5.23 City of St. Cloud NE Industrial Area Assessment

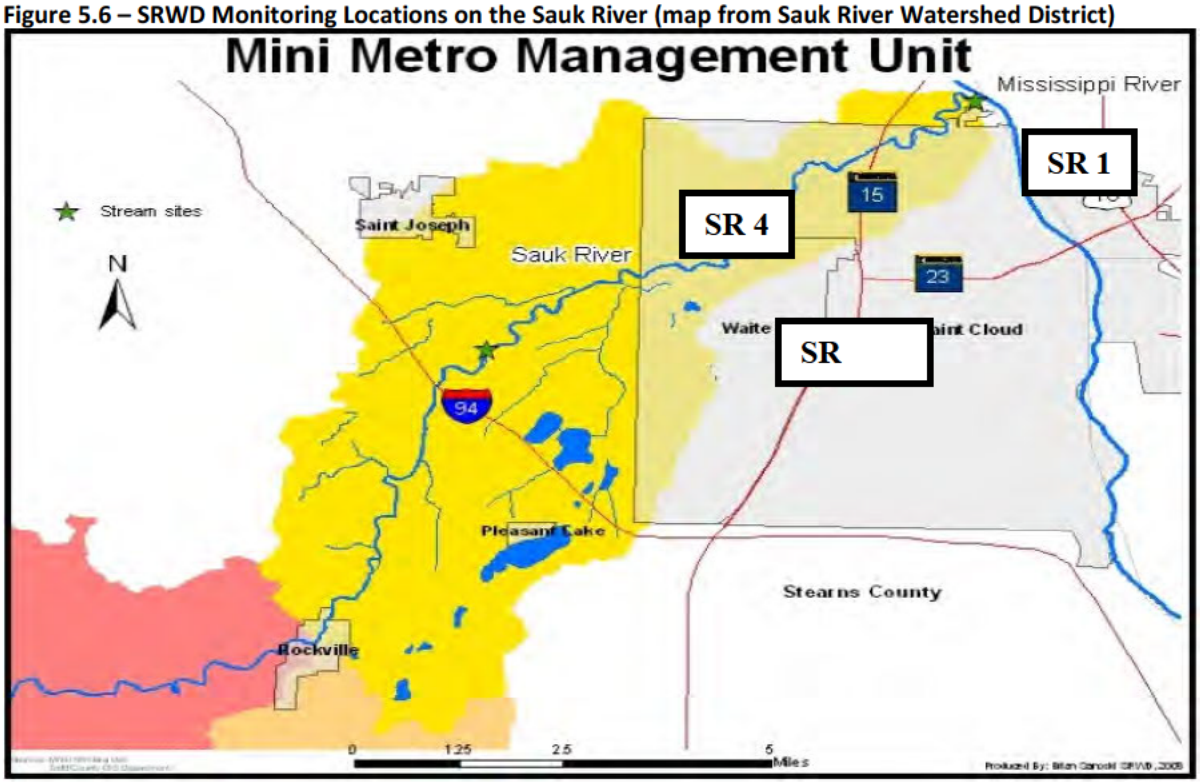
St. Cloud's NE Industrial Area generates significant TSS loads to the Mississippi River. To date these loads have not been quantified. Generally, the loads originate from the widespread gravel parking lots, loading areas, roadways and from the lack of stormwater ponds and treatment areas. The City of St. Cloud does not expect to spend time monitoring this situation and would rather proceed to preliminary concepts for the improvements. The preliminary plan is included as one of the City's implementation items.

5.24 Sauk River Watershed District Assessments

Sauk River Watershed District has three monitoring locations along the Sauk River as shown on Figure 5.6.

- SR 1, near the confluence of the Sauk River with the Mississippi River
- SR 4, on the western border of the St. Cloud Veterans Administration property
- SR USGS, located south of the railroad tracks at the USGS monitoring station

Figure 5.6 – SRWD Monitoring Locations on the Sauk River (map from Sauk River Watershed District)



Monitoring was initiated by the SRWD in 2005. The SRWD gives each monitoring location a report card based on the water quality sampling data. The report card provides a general qualitative evaluation of the water quality in comparison to other monitoring locations. The four parameters, 1) dissolved oxygen, 2) fecal coliform, 3) total phosphorus and 4) total suspended solids (TSS) are given letter grades A through F. A "C" was given to each location along the Sauk River for total phosphorus, TSS and fecal coliform. There is no data to provide a grade for dissolved oxygen.

The SRWD has also completed two Water Sampling Reports in 2003-2004 and 2005-2006. The reports compare water quality sampling data upstream of the confluence of the Mississippi River to MPCA thresholds and recommend future actions. Elevated levels of E. coli are the primary concern discussed.

5.25 Elk River Watershed Association (ERWSA) Assessments

In 2008, the ERWSA began sampling six sites for fecal coliform, two of which are located near city limits – Mayhew Creek at CSAH 8 and Elk River at Trunk Highway 95. The water quality samples were provided to the MPCA to determine if they exceed threshold levels and to determine if the reaches meet the requirements for placement on the impaired waters list. The levels remained below the standard of fecal coliform standard 200 cfs/100 ml for both sites.

5.26 Mississippi River Assessments

Intensive Watershed Monitoring (IWM) Phase 1 began in 2009 for the Mississippi River watershed in St. Cloud. The MPCA initiated the IWM to assess the health of major watersheds through biological, water chemistry and fish sampling. The data is used to determine watershed impairments and used in the TMDL process. Additional monitoring and a watershed assessment were completed in 2010. Ultimately the IWM results in an implementation plan for restoration and protection of the river.

The Lake Pepin TMDL (not complete) might affect St. Cloud through a Waste Load Allocation for phosphorus and TSS. The IWM may have broader implications if it leads to a TMDL since it may incorporate pollutant types or sources that cause St. Cloud to modify the existing mitigation approach.

5.27 Neenah Creek Assessments

Neenah Creek loops through the southwestern portion of St. Cloud, crossing CSAH 15 and Interstate 94. Neenah Creek is a MnDNR designated Trout Stream and MPCA Special Water. In recognition of its value, the City purchased 243-acre Neenah Creek Regional Park in 1999. A Plant Community Inventory and Land Cover Classification were completed in 2001. Neenah Creek is listed as a high priority in the City's Environmentally Sensitive Areas Ordinance.

Additional BMPs might be identified to mitigate temperature impacts to Neenah Creek. If uniformly implemented, the City's infiltration strategy and other runoff reduction strategies that complement it such as reuse and tree canopy, will provide temperature reduction.

Chapter 6 – Goals and Policies

Goals and policies will guide implementation of the Stormwater Management Plan. The goals and policies should be considered a bridge between the assessment, which identifies the many stormwater issues and the implementation plan. Not every assessed problem can be addressed. The goals and policies provide nonbinding aspirations for solving these problems without consideration of the feasibility or financial impact of the commitment. The implementation program and consideration of City finances will ultimately prioritize projects. To some extent the implementation program reflects a binding commitment. The goals and policies however, remain more aspirational than regulatory.

GOAL 1: WATER QUALITY

Water quality is the aesthetic, physical, chemical and biological condition of a water body. Poor water quality in lakes and wetlands often manifests itself through reduced water clarity and nuisance algal blooms. Poor water quality in streams often leads to a reduction in aquatic organisms.

St. Cloud Ordinance and Code

Land Development Code:

- For all new development projects, the volume equivalent to ½ inch of runoff depth over all impervious and pervious surfaces shall be abstracted or otherwise infiltrated.
- For all redevelopment projects, the volume equivalent to ¼ inch of runoff depth from all redevelopment impervious surfaces and ½ inch from all redeveloped pervious shall be abstracted or otherwise infiltrated. New impervious surfaces must meet new development standard.
- Meet MPCA construction stormwater permit requirements.
- Filtration systems meet 80% TSS removal.

Goal Statement Water Quality

Preserve and protect water quality to the maximum extent practicable.

St. Cloud Water Quality Policies

1. Volume management (infiltration) is the primary strategy for improving water quality. Secondary strategies include water quality ponds (sedimentation and nutrient removal) and sustainable site design practices.
2. Sustainable site design practices such as reduction of impervious surfaces, alternative landscaping practices and disconnection of impervious surfaces are encouraged.
3. The City of St. Cloud will manage urbanizing subwatersheds by consistently applying the infiltration ordinance and other complementary requirements so that downstream water bodies are preserved and protected.
4. The City shall implement a program that addresses the minimum control measures outlined in the Phase II NPDES rules for municipal storm sewer systems.
5. Water quality monitoring shall be completed in accordance and in cooperation with watersheds, State and Federal agencies.

GOAL 2: WATER QUANTITY

Water quantity refers to the components of the stormwater management system that convey, store and slowly release stormwater runoff. Typical components include storm sewer, ponds and pond outlet structures. The primary focus of water quantity control is to mitigate the potential increase in flow from new impervious surfaces so that areas downstream are not adversely affected. Effective water quantity control complements water quality control by slowing stormwater runoff thus allowing the deposition of sediment and sediment borne pollutants, the biological uptake of pollutants by vegetation and soils, and the volatilization of pollutants through exposure to air and sunlight.

St. Cloud Ordinances and Code

Land Development Code:

- In cases where the downstream conveyance system is a clearly defined system of limited capacity, the allowable discharge will be limited to the prorated share of the property. Typically this type of system will require the 100-year post development rate of discharge less than the 5-year pre-development rate of discharge.
- In cases where the downstream system is a natural system, 100-year post-development discharge rate equal to or less than the 10-year pre-development rate.
- For receiving systems of limited concern, 2-year, 10-year and 100-year post-development discharge rate equal to or less than existing

Goal Statement – Water Quantity

Control flooding and protect property while seeking the most benefit public expenditures.

St. Cloud Water Quantity Policies

Rate Control

1. Stormwater management decisions will be made to avoid adverse downstream impacts. The potential for an adverse downstream impact may preclude a development site from discharging according to the existing conditions standard.
2. Development, redevelopment and other infrastructure projects shall be designed in a manner that does not overburden the existing downstream stormwater system.
3. The cumulative impacts of increased wetland inundation (stage and duration) will be evaluated as development proposals warrant. In specific cases, rate control policies may be modified to protect wetlands from impacts due to increased inundation.
4. Full development land use shall be assumed for on-site and off-site areas when designing stormwater management facilities.

5. New stormwater facilities shall meet the standards of this plan and the City's design standards. As opportunities allow through redevelopment and infrastructure replacement, existing storm water facilities should be upgraded to improve stormwater management and water quality.
6. It is preferred that rate control and flood mitigation be provided in larger regional facilities rather than numerous, smaller on-site facilities.
7. In areas tributary to Neenah Creek, Mayhew Creek, Plum Creek and County Ditch 3 stream protection volumes must be calculated and implemented according to the methods outlined in St. Cloud's design standards.
8. Easements over floodplains, detention areas, wetlands, ditches and all other parts of the storm water system should be obtained as areas develop or redevelop.

Freeboard

Minimum principal structure elevations shall be at least two feet above the calculated 100-year flood elevation. Higher elevations may be required for structures adjacent to ponding areas with larger tributary watersheds and/or adjacent to landlocked basins. The applicable elevation for determining freeboard is the low ground adjacent to structure elevation.

Landlocked Basins

1. Landlocked basins shall provide sufficient flood storage for back to back 100-year events while providing the minimum freeboard required by the City.
2. Under no circumstances shall landlocked basins be allowed an outlet when this outlet could unreasonably affect a downstream municipality or landowner.

GOAL 3: VOLUME MANAGEMENT

New impervious surfaces associated with development increase runoff volume discharged to lakes, wetlands and streams. Since runoff volume carries pollutants, pollutant loading to these waters is also increased. St. Cloud's volume management requirements originated from its antidegradation analysis and culminated in the current ordinance requirements within the Land Development Code. Through the ordinance, St. Cloud achieves compliance with the antidegradation requirements of its MS4 Stormwater Permit and, more importantly, substantive reduction in runoff volume from its existing and future urban areas. Though the ordinance specifically references infiltration, it should be understood that infiltration

is not the only technique for abstracting runoff volume from urban areas and that the site design principles generally labeled as “low impact development” or “sustainable site design” have large role in achieving the volume management requirements.

St. Cloud Ordinance and Code

Land Development Code: see Water Quality

Goal Statement – Volume Management

Infiltrate stormwater runoff to the maximum extent practicable to reduce loadings of total phosphorus (TP), total suspended solids (TSS) and water volume to lakes, wetlands, rivers and streams.

St. Cloud Volume Management Policies

1. On projects where constructed infiltration is constrained by adverse site conditions, other volume management techniques should be explored before a variance on the infiltration requirement can be granted. Generally, these other techniques reduce or disconnect impervious surface. The Minnesota Stormwater Manual prepared by the MPCA provides guidance on potential adverse site conditions, while the St. Cloud Stormwater Design Guide provides acceptable alternatives to constructed infiltration basins.
2. In addition to adverse site conditions identified by the Minnesota Stormwater Manual, other constraints to the use of constructed infiltration practices occur. Consequently, infiltration practices shall be promoted within the limitations imposed by construction practices, soil conditions, groundwater supply and recharge, safety, snow removal and maintenance.
3. New development and redevelopment projects shall install BMPs and construct stormwater management facilities to reduce runoff volume in the post development condition.
4. For sites where meeting the infiltration ordinance is not achievable, sustainable design practices may be used in lieu of infiltration. Credits achievable for sustainable site design practices are outlined in the St. Cloud Stormwater Design Guide.

GOAL 4: ANTIDEGRADATION

St. Cloud Ordinance and Code

St. Cloud Stormwater Pollution Prevention Plan (SWPPP). The draft MS4 Permit redefines SWPPP as a Stormwater Management Program.

Goal Statement – Antidegradation

Improve the quality of the City's and region's surface water resources by, whenever feasible, decreasing TP, TSS and runoff volume from existing areas and by mitigating volume increases from new development.

St. Cloud Antidegradation Policy

Development and redevelopment projects will be reviewed in the context of antidegradation and best management practices will be implemented as necessary to maintain or reduce current TP, TSS and water volume loads.

GOAL 5: EROSION AND SEDIMENT CONTROL

There are three major components of a successful erosion and sediment control strategy:

1. Ordinance and other regulatory mechanisms
2. Plan review and the requirement for erosion and sediment control plans
3. Procedures for receiving complaints, conducting site inspections and enforcement

St. Cloud's program encompasses all three. The City Land Development Code contains regulatory requirements related to erosion and sediment control. Those proposing projects are required to submit an erosion and sediment control plan to demonstrate compliance with the ordinance. These plans delineate how the site will be managed to minimize erosion and sediment transport. City staff reviews the plans and approve them when the plans comply with St. Cloud's requirements. Once projects begin, City staff performs site visits and maintain a log documenting visits. When sites do not comply with the approved erosion and sediment control plans, City staff initiates corrective actions. St. Cloud has also established a process whereby possible violations can be reported by the public.

St. Cloud Ordinance and Code

St. Cloud SWPPP Land Development Code:

- An erosion and sediment control plan shall be developed for each subdivision consistent with the MPCA Construction General Permit.
- Erosion and sediment control measures shall be coordinated with the different stages of construction.

Goal Statement – Erosion and Sediment Control

Prevent sediment from entering the City's surface water resources.

St. Cloud Erosion and Sediment Control Policies

1. Sediment and erosion control plans are reviewed by the City of St. Cloud. Approval of these is necessary before site grading can commence.
2. The City of St. Cloud periodically inspects active construction sites for compliance with erosion and sediment control plans. For noncompliant sites, an escalating series of enforcement actions occur until compliance is achieved.
3. Existing erosion problems not related to construction site erosion and sediment control will be reviewed for inclusion into the stormwater utility budget.
4. The City will periodically review Construction Site Stormwater Runoff Control Ordinance to maintain conformance with the NPDES construction permit, the City's MS4 permit and other guidance.

GOAL 6: WETLAND MANAGEMENT

St. Cloud Ordinance and Code

St. Cloud Environmentally Sensitive Areas Ordinance (wetlands constitute the majority of features on the environmentally sensitive areas map):

> *All development occurring in areas identified as "environmentally sensitive" must be guided by a concern to protect, conserve and enhance those resources. To accomplish this goal, these regulations create a process to aid, support and promote development that achieves these environmental goals.*

Goal Statement - Wetlands

Preserve and improve wetlands acreage, functions and values and achieve no net loss of wetlands in conformance with the Minnesota Wetland Conservation Act and associated rules.

St. Cloud Wetland Policies

1. Wetland disturbance is discouraged, and in most cases prohibited by City ordinance, State and Federal law. Wetlands must not be drained or filled, wholly or partially, unless replaced by restoring, enhancing, or creating wetland areas of an equal public value. The City expects that potential wetland impacts be evaluated in the following sequence:

    - First priority is to avoid the impact
    - Where the impact cannot be avoided, then the impact must be minimized
    - Where the impact cannot be avoided, then the impact must be mitigated

2. The City requires a wetland delineation for wetlands within development and redevelopment sites and those near the area of disturbance for linear projects. A field delineation report detailing the findings must also be prepared.
3. The City requires that development and redevelopment projects dedicate natural buffer zones around wetlands and streams. Buffer zones should not be mowed or fertilized, except that harvesting of vegetation may be performed to reduce nutrient inputs.

4. Wetland function and values will be protected from development impacts. The development review and approval process will include consideration of wetland functions and values and the impact of development.
5. The City will apply the applicable wetland policies and performance standards of local government units responsible for administering Minnesota's Wetland Conservation Act within St. Cloud's boundaries.
6. The City requires that runoff water quality and infiltration standards be met prior to discharge to wetlands. Wetlands may not be considered as treatment areas for the purposes of meeting the City's stormwater management standards.

GOAL 7: LAKE MANAGEMENT

St. Cloud Ordinance and Code

St. Cloud Environmentally Sensitive Areas Ordinance:

Donovan Lake is included as "high" priority on the City's Environmentally Sensitive Areas map. As high priority a more rigorous process is required to develop adjacent to the lake.

All future development occurring in areas identified as "environmentally sensitive" must be guided by a concern to protect, conserve and enhance those resources. To accomplish this goal, these regulations create a process to aid, support and promote development that achieves these environmental goals. This process will:

a. Identify and prioritize ESA.

b. Aid developers in the creation of their development plans.

c. Aid City staff, the Planning Commission and City Council in their assessment of development plans in ESA.

d. Provide flexibility in the planning process when needed to balance environmental and economic goals.

Goal Statement – Lake Management

Manage time of inundation, bounce and water quality in lakes to preserve their function.

St. Cloud Lake Management Policy

The City will partner with watershed districts and/or state agencies to prepare TMDL studies and implementation plans.

GOAL 8: STREAM MANAGEMENT

St. Cloud Ordinance and Code

St. Cloud Environmentally Sensitive Areas Ordinance:
Neenah Creek is designated as high priority, portions of County Ditch 3 and adjacent wetlands are also high priority.

All development occurring in areas identified as "environmentally sensitive" must be guided by a concern to protect, conserve and enhance those resources. To accomplish this goal, these regulations create a process to aid, support and promote development that achieves these environmental goals. This process will:

a. Identify and prioritize ESA.

b. Aid developers in the creation of their development plans.

c. Aid City staff, the Planning Commission and City Council in their assessment of development plans in ESA.

d. Provide flexibility in the planning process when needed to balance environmental and economic goals.

Goal Statement – Stream Management

Improve water quality, promote wildlife habitat and protect the resource value of streams.

St. Cloud Stream Management Policies

1. The City will protect Neenah Creek from temperature impacts associated with development. Prior to significant new development occurring in the Neenah Creek subwatershed, the City will develop a subwatershed plan specifically directed toward protecting the creek from the effects of urban development.
2. St. Cloud will not expend City resources to stabilize stream banks unless:
    a. The City has reasonable assurance that hydrologic flow from upstream will not increase in the future.
    b. The failing bank poses an imminent threat to infrastructure, inhabited structures or businesses.

GOAL 9: GROUNDWATER

Goal Statement - Groundwater

Manage stormwater in ways that promote groundwater recharge and protect drinking water and wells.

St. Cloud Groundwater Policies

1. The City will cooperate with Stearns, Benton and Sherburne Counties and the Minnesota Department of Health to identify important groundwater resources to protect.
2. Planning, land use regulations and appropriate controls will be utilized to protect groundwater quality and sustainability, and to protect Mississippi River water for the use of St. Cloud, St. Paul, Minneapolis, and communities further downstream.
3. Groundwater recharge areas shall be protected from by restricting infiltration in industrial developments where the potential for contamination is high.

4. The City shall promote well abandonment in conformance with State and County requirements.

GOAL 10: SHORELAND MANAGEMENT

St. Cloud Ordinance and Code

Defined in Article 12 of Land Development Code

Goal Statement – Shoreland Management

Manage shoreland to preserve and enhance the quality of surface waters and conserve the economic, natural, historical and environmental values of shoreland areas.

St. Cloud Shoreland Management Policies

1. Natural areas shall be preserved to the greatest extent possible, especially adjacent to wetland areas, for the benefit of wildlife.
2. Buffer zones of natural vegetation shall be provided around publicly-owned and maintained ponds and wetlands to provide habitat where adequate land is available. Private property owners will be encouraged to create and maintain buffer zones (in excess of the minimum requirement) along wetlands and shorelines.
3. Wetland mitigation or stormwater facility projects shall include provisions to enhance or create upland and wetland habitat.
4. The City shall cooperate with the state and the county to enhance water-based recreation by promoting the maintenance and improvement of public boat access to the Sauk River and Mississippi River. The City recognizes the need to balance water recreational activities with water quality and habitat issues.
5. The City shall generally support efforts of lead agencies (e.g., MnDNR, Stearns County, Sauk River Watershed District etc.) to control exotic and invasive species in City lakes, streams and the Mississippi and Sauk River.

6. Streambank and lakeshore vegetation should be maintained during and after construction projects.
7. Disturbed shoreline areas should be identified, ranked and considered for improvements based on the severity of the disturbance and the potential impact on the water body.
8. Non-disturbed shoreland areas should be protected.
9. Alternative landscape designs that increase beneficial habitat and recreation uses and promote infiltration are encouraged.
10. The City will manage shoreland through implementation of local zoning codes and agency regulations.
11. The Shoreland Overlay Zone will be enforced to promote shoreland protection.
12. The restoration of native riparian vegetation on projects adjacent to public waters and public watercourses will be promoted on both public and private property.
13. The City will update the Shoreland Management Ordinance, Section 12 of the Land Development Code as required by the MnDNR, or as needed, to ensure adequate shoreland protection.

GOAL 11: FLOODPLAIN MANAGEMENT

St. Cloud Ordinance and Code

Defined in Article 12 of Land Development Code

Goal Statements – Floodplain Management

Control development in flood prone areas to protect the public safety and minimize property damage.

St. Cloud Floodplain Management Policies

1. The City will regulate land development within the Floodplain District so that floodplain storage is preserved, base flood elevations do not increase, and new and existing structures are protected from damage.

2. The City will update the Floodplain Management Ordinance, Article 12 of the Land Development Code as required by FEMA and the MnDNR, or as needed, to provide adequate protection for structures and maintain eligibility for flood insurance programs.

GOAL 12: EDUCATION AND PUBLIC PARTICIPATION

St. Cloud Ordinance and Code

St. Cloud Stormwater Pollution Prevention Plan (SWPPP)

Goal Statement – Education and Public Participation

Inform and educate the public on stormwater management and impacts of urban stormwater on St. Cloud's water resources and encourage residents to participate in the protection of water resources.

St. Cloud Education and Public Participation Policies

1. The City shall actively implement and periodically adapt the stormwater education program. The program uses a variety of media to inform and educate the public.
2. The City has developed and will maintain and periodically adapt the landowner education program to promote reduction of nutrient and sediment loading to water bodies. The program encourages environmentally friendly lawn care and the use of native plantings or natural landscapes, where practical.
3. The City will promote citizen and volunteer efforts to protect, restore and enhance local water and natural resources.
4. The public education and outreach program will satisfy the minimum control measures identified in the City's NPDES MS4 permit and SWPPP and will be adapted as needed.
5. In order to leverage City funds and staff time, the public education program coordinates with outside entities.
6. Public involvement opportunities will be provided including annual meetings and volunteer projects.

GOAL 13: MAINTENANCE AND INSPECTION

St. Cloud Ordinance and Code

St. Cloud Stormwater Pollution Prevention Program (SWPPP)

Goal Statement – Maintenance and Inspection

Preserve function and performance of public infrastructure through continued implementation of a maintenance and inspection program.

Example Policies – Maintenance and Inspection

1. The City implements a maintenance and inspection program for stormwater management facilities (e.g., ponds, storm sewer systems, outfalls to waters, etc.). The City's maintenance and inspection program shall meet the requirements of the NPDES Phase II MS4 Storm Water Program.
2. The City will require agreements for private ponds that stipulate maintenance requirements.
3. The City shall require adequate maintenance access for both public and private stormwater facilities.
4. Within an overall maintenance agreement, the City will require that an operation and maintenance plan be prepared for proposed stormwater management BMPs within development and redevelopment projects.
5. St. Cloud will follow the inspection and maintenance schedules established under the NPDES MS4 permit for stormwater management facilities.
6. The City has and will maintain a spill response, containment and clean-up plan.

GOAL 14: FINANCIAL MANAGEMENT

Goal Statement – Financial Management

Maintain adequate funding to support implementation of the stormwater management plan and obligations under the City's MS4 Stormwater Permit.

St. Cloud Financial Management Policies

1. The City will cost effectively manage stormwater implementation to balance capital investments and maintenance needs with available resources.
2. The City will seek grant funds or other resources to assist with special projects and to augment the City's capital expenditures.
3. Alternative funding sources will be explored to accomplish the capital improvements identified.

GOAL 15: REGULATION

Goal Statement - Regulation

St. Cloud will utilize regulatory tools such as ordinance, design standards and developer's guide to achieve stormwater management goals.

Example Policies - Regulation

1. When revising its ordinances and policies, the City will maintain consistency with the watershed district, State, and Federal regulations.
2. Existing ordinances and policies will be amended to conform with goals and policies. If needed, future ordinances and policies will be written to also conform.
3. The St. Cloud Stormwater Design Guide will be used as the primary source for guidance and performance criteria in the design and implementation of stormwater management facilities.
4. Ultimately, the programs and standards of this plan shall be implemented according to the direction and under the authority of the City Administration and City Council. This plan will be amended as necessary to remain current.

GOAL 16: MONITORING

Goal Statement - Monitoring

Utilize a comprehensive program to monitor long term trends for surface water resources.

St. Cloud Monitoring Policies

1. The existing monitoring program will be continued or enhanced to collect baseline and long term water quality data.
2. The City will work with other agencies to conduct monitoring and share data.

GOAL 17: RECREATION, FISH AND WILDLIFE

Goal Statement – Recreation, Fish, and Wildlife

Enhance recreational opportunities by protecting fish and wildlife habitat through effective stormwater management.

St. Cloud Recreation, Fish, and Wildlife Policy

The recreational activity needs of residents will be balanced with water quality and habitat protection considerations.

GOAL 18: RIVERS MANAGEMENT

St. Cloud Ordinance and Code

St. Cloud Article 12 of the Land Development Code and Environmentally Sensitive Areas Ordinance
St. Cloud Stormwater Pollution Prevention Program

City Comprehensive Plan:

- Explore all federal, state and other funding opportunities for local and regional park, open space and trail acquisition, development and maintenance.
- Continue to require the dedication, acquisition and maintenance of parkland in the planned growth areas to meet future park needs of the community.

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- Continue to implement the City's Park Plan and the Central MN Regional Parks and Trails Plan.

Goal Statement – Rivers Management

Protect, preserve and expand stream corridors throughout the City.

St. Cloud Rivers Management Policies

1. Continue to designate the land use districts within river and bluff development.
2. Update Article 12 of the Land Development Code as needed to meet Minnesota Statutes as they pertain to the management of the Mississippi River where it is classified as a wild and scenic river.
3. Conserve and protect the natural scenic values and resources of the Mississippi River, and to maintain a high standard of environmental quality.

Chapter 7 - Implementation Program

The implementation program addresses issues identified within the Assessment. Specifically, this section of St. Cloud's Stormwater Management Plan (SWMP) describes how the City will implement the stormwater goals and policies through official controls such as ordinance and permits, design standards, operation and maintenance, future studies, capital improvements, and MS4 program responsibilities. The path from assessment to implementation is guided by the goals and policies developed in the previous section. The implementation program considers St. Cloud's ability to fund the stormwater program through general levy, stormwater utility, grants and fees.

The implementation program consists of the following components:

1. Official Controls and Studies (OCS)
2. Operation and Maintenance (OM)
3. Capital Improvements (CIP)
4. NPDES MS4 Obligations (MS4)

Official controls consist of ordinance, policy, permits and design standards that either mandate or encourage water quality implementation. Implementation can be mandatory as would occur in development or redevelopment projects or voluntary as may occur on redevelopment projects where impervious surface is not replaced or increased. Studies include analysis and documentation of water quality or quantity issues and often lead to ordinance and policy modifications.

Operation and maintenance includes regular activities needed for proper function of the stormwater system that do not constitute permit obligations. These include periodic storm sewer replacements and repairs, and small improvements to address nuisance drainage or flooding issues as well as periodic maintenance of ponds, storm sewer and culverts.
Capital improvements include large projects. The City's CIP includes projects for parks, public buildings, public utilities and public works. Within some of the larger projects water quality, volume management, or rate control improvements will be required. Within some of the projects, opportunities also exist to go beyond the requirements.

The NPDES MS4 Permit obligations refer to activities necessary to meet obligations under the general permit coverage. Activities include annual meetings, SWPPP updates and SWPPP implementation.

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7.1 Official Controls and Studies

7.11 Implementation Item OCS-1: Volume Management Requirements

St. Cloud's Land Development Code requires:

New Development Projects	•volume equivalent to ½ inch of runoff depth over all impervious and pervious surfaces shall be abstracted or otherwise infiltrated.
Redevelopment Projects	•volume equivalent to ¼ inch of runoff depth from all redevelopment impervious surfaces and ½ inch from all redeveloped pervious shall be abstracted or otherwise infiltrated. New impervious surfaces must meet new development standard.
All Projects	•Meet MPCA Construction Stormwater Permit requirements •Filtration systems meet 80% TSS removal

The volume management requirements outlined above are derived from the Nondegradation Loading Assessment as a means of achieving antidegradation. Antidegradation as a regulatory concept was discussed in the Regulatory Context section.

The City of St. Cloud staff reviews development and redevelopment proposals, and public projects at early stages to determine the feasibility of implementing volume management. The reviews not only look for volume management to meet the ordinance requirements but also look to the feasibility of retrofitting volume management to other areas not affected by the project. This allows St. Cloud to generate a credit that can be used either for future projects or as a means of speeding progress toward the antidegradation goals. This additional level of review and staff effort has associated costs.

7.12 Implementation Item OCS-2: Design Standards

The goals and policies reference volume management and infiltration, and defer to sustainable site practices where infiltration is not obtainable. The City of St. Cloud also requires a certain level of water quality treatment when the volume management standard is not obtainable due to site constraints. Additionally, rate control to manage downstream flooding has been part of the City's stormwater program for many years. Broad guidance on stormwater management can be obtained through various sources, the most prominent of which is the Minnesota Pollution Control Agency's Minnesota Stormwater Manual, which is considered a secondary resource to St. Cloud's design standards. Within the spectrum of many practices and variants for achieving the same result, the City wants projects to focus on simple and reliable techniques. To accomplish this, the City will augment current design guidance to include additional guidance on water quality, volume management and rate control. Long term, City staff will periodically review and update design standards to remain current with established practice and regulatory requirements.

7.13 Implementation Item OCS-3: NE St. Cloud Industrial Area Implementation Plan

St. Cloud has identified the NE St. Cloud Industrial Area as a significant source of sediment discharge to the Mississippi River. The Implementation Study will identify cost effective improvements to reduce the sediment load and will assist the City in budgeting for improvements and pursuing grant funding or loans from several available programs. The focus of the study is implementation, not diagnosis. Though sediment sources will be identified and estimates provided of total annual loading, the study's purpose is not to develop a water quality model and detailed analysis. Rather, the study's purpose is to provide detailed project ideas and budgets so the City can begin implementing real improvements for the area. The study area is generally described as follows:

South of S. Benton Dr., north of Trunk Highway 23, east of the river and the residential areas bound by Searle and 1st Streets, and west of U.S. Highway 10 and also including an approximately ½-mile by ½-mile area immediately northeast of the U.S. Highway 10 and Trunk Highway 23 interchange.

7.14 Implementation Item OCS-4: Neenah Creek Stream Protection Plan

The goals and policies reference volume management and infiltration, and defer to sustainable site practices where infiltration is not obtainable. In general, developments that implement these concepts will provide a significant amount of protection to wetlands, lakes and streams. The trout stream, Neenah Creek, may need augmented or slightly different protections since it is a cold water stream and fishery.

The State of Minnesota designates Neenah Creek as a trout stream which gives it augmented protection within the Construction Activity Stormwater Permit. This augmented protection stipulates that one-inch

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of runoff from new impervious surfaces must be treated prior to discharge to the trout stream and that one-half inch of runoff from new impervious surfaces must be infiltrated. The City of St. Cloud requires one-half inch of infiltration so future development tributary to Neenah Creek must provide an additional one-half inch of capacity in the form of water quality ponding, infiltration or filtration.

Neenah Creek may require additional protections that go beyond the augmented water quality standard. The added protections could include temperature mitigation and stream bank protection by adding a channel protection volume (through extended detention) to the existing rate control standard for areas tributary to the creek. The Protection Plan would use measurements of stream cross sections and a watershed hydrologic and hydraulic model to determine the channel protection volume and would consider land use, topography and park planning to develop the full protection strategy for Neenah Creek.

Implementation Item OCS-5: MS4 Pond Inventory – Baseline Information

The draft reissued MS4 Permit requires MS4s to complete and inventory all constructed ponds and constructed wetlands the MS4's jurisdiction within 30 days of the effective date of the permit. It is expected that the effective date of the permit will occur in late 2011 or 2012. It is also expected that the information required can be obtained through documents and will not require field surveys.

7.15 Implementation Item OCS-6: MS4 Pond Inventory – Assess Treatment Effectiveness

For all constructed ponds and constructed wetlands identified in OCS-5, the draft reissued MS4 Permit requires MS4s to verify BMP volumes to determine treatment effectiveness. Since actual BMP volumes for older ponds will differ from as-builts or as-builts will not be available, it is likely that bathymetric surveys will be conducted on numerous stormwater ponds. Information on these ponds and wetlands must be collected according to a schedule outlined in OCS-5.

7.16 Implementation Item OCS-7: Subwatershed Studies

In lieu of preparing a City-wide hydrologic and hydraulic model, St. Cloud chose an incremental approach whereby subwatershed studies focus on specific areas as development occurs, so that regional storage and trunk conveyance planning reflects a current understanding of development patterns and infrastructure needs. The City-wide approach was used for the water quality model as part of the City's Loading Assessment and Nondegradation Report. The incremental approach allows costs to be spread over a longer time frame and, as importantly, allows some of the costs to be recovered from developers within the subwatershed.

The 2003 Comprehensive Plan Update identifies four distinct growth areas that determine these subwatersheds for study. The first growth area remains from the 1993 Comprehensive Plan and consists

of undeveloped land within the current City limits. A good portion of the 1993 Growth Area lies within the Neenah Creek (aka Robinson Creek) subwatershed. Special considerations for Neenah Creek, a designated trout stream, led to implementation item OCS-4: Neenah Creek Stream Protection Plan, which would serve as the subwatershed study for a significant portion (approximately three square miles) of the 1993 Growth Area. Other subwatershed studies would occur as development warranted in other designated growth areas:

Primary Growth Area	Secondary Growth Area	Ultimate Service Area
•Identified in the 2003 Comprehensive Plan and the 2000 St. Cloud Area District Plan as a near term growth area contiguous to existing urban areas and services. This growth area covers the south portion of the Neenah Creek subwatershed, some of the Mississippi River subwatershed, and a large portion of the Elk River subwatershed.	•Moving south and east from the Primary Growth Area, the Secondary Growth Area primarily covers areas east of the Mississippi River in the Mississippi River and Elk River subwatersheds.	•Remaining growth area fills out the Ultimate Growth Boundary for the City of St. Cloud and lies primarily on the east side of the Mississippi River in the Mississippi River subwatershed.

7.17 Implementation Item OCS-8: BMP Retrofit Master Plan

The City of St. Cloud maintains records of capital expenditures for BMP construction and, in the case of volume management BMPs, the infiltration or runoff volume capacity of each BMP. Using this data, the cost per cubic foot of runoff volume reduction can be calculated. St. Cloud's antidegradation analysis showed that St. Cloud's runoff volume had increased by 4,066 ac-ft. from the baseline period to 2005. Past projects show that $4,350 to $9,150 is spent per acre-foot of infiltration capacity. When considering the 4,066 ac-ft. target, total expenditures would range from $17.7M to $37.2M. Considering the difference between low and high cost implementation, it is desirable for the City to take all opportunities to achieve more cost-effective implementation. Cost effective implementation

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typically occurs for large contiguous impervious surfaces that are interspersed and surrounded by turf and landscaping – i.e. parking lots.

The BMP Retrofit Master Plan would consist of an inventory of large impervious surface and the potential to retrofit BMPs to these surfaces. It would develop conceptually the public/private partnerships necessary for achieving implementation and the types of maintenance agreements that would be necessary. The ultimate goal would be to identify significant opportunities to implement BMPs for $4,350 per acre-foot of capacity rather than $9,150.

7.2 OPERATION AND MAINTENANCE

7.21 Implementation Item OM-1: Stormwater Management System Inspections

St. Cloud staff conducts frequent and routine inspections of the stormwater system. These inspections include an annual inspection of all pollution control devices and inspection of 20% of sewer outfalls, sediment basins and ponds. These inspections yield information on the condition of each component and are used to prioritize expenditures for repair and replacement.

7.22 Implementation Item OM-2: Street Sweeping

St. Cloud sweeps municipal streets and parking lots at least twice annually. The City times spring sweeping to capture sediment from the winter prior to spring rain. The fall sweeping is timed to capture as much leaf and lawn litter as possible. Sweeping of certain areas may occur more frequently than twice per year depending on need. The street sweeping program involves a significant amount of staff time, and costs for maintenance and equipment repair.

7.23 Implementation Item OM-3: Storm Sewer and Pond Repairs and Maintenance

The City's inspections program provides staff with information needed to prioritize repairs and maintenance. These repairs and maintenance fall into common categories:

- increasing pipe capacity or providing storm sewer for areas prone to flooding
- correction of drainage issues caused by high water in wetlands or high groundwater
- correction of drainage issues caused by surface flow

Similar to other older communities, there are locations where the storm sewer connects to the sanitary sewer. When staff encounters these cross connections, the situation is corrected by rerouting the storm sewer.

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7.24 Implementation Item OM-4: BMP Repairs and Maintenance



The City's inspections program also provides staff with information needed to prioritize repairs and maintenance to water quality and infiltration Best Management Practices. Typically, these BMPs include underground infiltration chambers, permeable pavements, tree infiltration boxes and rain gardens. Similar to storm sewer, this infrastructure requires periodic rehabilitation. However, the maintenance and repair cycle for BMP infrastructure varies according to the practice. Rain gardens require twice annual weeding and periodic cleaning. Though data on life cycle is just becoming available, it is generally thought that rain gardens will require major rehabilitation within 10 years. Underground infiltration chambers also require periodic maintenance, primarily to remove accumulated sediment from forebays. Similar to rain gardens, comprehensive data is not available on infiltration chamber expected life cycle. Absent specific data, it is prudent to plan for a 20-year cycle for complete rehabilitation for infiltration chambers.

St. Cloud has constructed significant infiltration capacity the past few years. The City's commitment to continued implementation will add to this and will incrementally add to St. Cloud's maintenance, repair and rehabilitation responsibilities. As part of the BMP repair and maintenance program City staff began collecting information on costs per unit of capacity so that a full unit cycle cost model can be developed for the diverse BMPs that constitute the system.



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7.3 Capital Improvements

7.31 Implementation Item CIP-1: Parks CIP Implementation

St. Cloud's 2012 to 2017 Parks Capital Improvement Plan (CIP) outlines parks and trails expenditures of approximately $48M. Two projects that have significant stormwater management costs are Neenah Creek Regional Park, where parking lots and buildings will require stormwater BMPs, and the Regional Aquatic Community Center, where a new 108,000 square foot building with parking on a five to fifteen-acre site will also need substantial new stormwater BMPs.

7.32 Implementation Item CIP-2: Public Buildings CIP Implementation

Public Buildings, Land and Emergency Management CIP identifies approximately $20M of new and expanded public buildings. As these projects relate to stormwater, small building expansions do not create a substantial future cost for stormwater management. Additionally, stormwater management for a Parks Maintenance Facility in Neenah Creek Regional Park is covered in the CIP item above. However, the Central Maintenance Facility expansion will require new stormwater management infrastructure and offers the opportunity to retrofit BMPs to existing impervious surface. In contrast, the Whitney Senior Center Expansion involves a second story addition, so no new stormwater management infrastructure is required. However, the project does offer the opportunity to retrofit BMPs to a fairly large expanse of public impervious surface evident in the facility's parking lot.

7.33 Implementation Item CIP-3: Public Works and Utilities CIP Implementation

Generally, these projects include the rehabilitation and construction of sanitary and potable water infrastructure with very little surface impact; consequently, few stormwater BMPs are anticipated. In contrast, the Public Works CIP has substantial projects with a significant surface impact. Generally, projects that have a stormwater management component can be broken down into the following project types:

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Neighborhood Revitalization Projects

- Street reconstruction that would require BMPs to meet the City's redeveloped impervious infiltration standard. These projects also offer the opportunity to retrofit BMPs to existing impervious surface.

Interchange Projects

- Generally new impervious surfaces that will require BMPs to meet the City's new impervious surface infiltration standard and to accomplish rate control and water quality treatment, as applicable. These projects generally offer limited opportunity to retrofit BMPs.

Major Roadway Expansion and Reconstruction

- Widening and reconstruction of major transportation facilities throughout the City. These projects trigger the redeveloped impervious standard and present an opportunity to retrofit BMPs .

New Roadway Construction

- New roadways and roadway extensions. Generally, these projects are found in areas where limited existing development exists. These projects will meet the City's new impervious surface infiltration requirement plus achieve rate control and water quality treatment. No retrofit opportunities are generally present with these projects.

7.34 Implementation Item CIP-4: BMP Retrofits

When reconstructed impervious surfaces are a ¼-inch infiltration capacity over the entirety of the reconstructed (or redeveloped) impervious surface is required. However, Antidegradation goals to reducing runoff volume, phosphorus and sediment from existing areas require substantially more capacity than can be achieved through the redeveloped impervious standard. Consequently, St. Cloud will periodically retrofit capacity to the system. This will occur in two ways:

- providing ½-inch of infiltration capacity off redeveloped impervious where obtainable
- identifying existing, untouched, impervious surfaces where BMPs can be cost effectively retrofit

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Additional, retrofit, treatment achieved in this manner can be used as a mitigation credit for projects where infiltration cannot be obtained or can be simply banked as progress toward the antidegradation goal.

It should be noted that "infiltration capacity" as a term refers to any BMP that reduces runoff volume. Consequently, BMPs such as tree canopy, permeable pavement, runoff recycling and reducing impervious surface can be used to achieve the infiltration volume required of a specific project. Some examples are shown in the photos of the Library green roof, pervious pavement alley, rain garden and parking lot retrofit bioretention swale below.









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7.4 NPDES MS4 OBLIGATIONS

St. Cloud's MS4 responsibilities primarily consist of a Stormwater Pollution Prevention Program (SWPPP) that meets the requirements of the MS4 general permit. The SWPPP consists of six minimum control measures (MCM):

- MCM-1: Public Education and Outreach
- MCM-2: Public Participation and Involvement
- MCM-3: Illicit Discharge Detection and Elimination
- MCM-4: Construction Site Stormwater Runoff Control
- MCM-5: Post Construction Stormwater Management
- MCM-6: Pollution Prevention/Good Housekeeping

The following implementation items follow from each of the six MCM's and describe current and future activities in each the six areas.

7.41 Implementation Item MS4/MCM-1: Public Education and Outreach

According to the permit:

> *"A permittee under the general permit authorizing discharge of stormwater from a small municipal separate storm sewer system (MS4 Permit) must implement a public education and outreach program to distribute materials to MS4 residents and educate them about the permit and each of the minimum control measures."*

This implementation item entails distributing materials through direct mail, local cable access and the City website. Other activities include an annual public meeting, storm drain stenciling, public opinion surveys and occasional volunteer opportunities for residents. Another audience includes contractors, consulting engineers, private utility companies and developers; the City disseminates information on the development standards – particularly the infiltration standard – and the inspection and enforcement program.

With the reissuance of the MS4 Permit in late 2011 or early 2012, the City's public education and outreach program will have a slightly different emphasis; mechanisms for evaluating behavior change

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and identification of specific actions for residents are two examples. It is not expected that these changes will create additional costs.

7.42 Implementation Item MS4/MCM-2: Public Participation and Involvement

The MS4 Permit requires St. Cloud to solicit public input and opinion on the SWPPP and implementation. This is typically done through the annual public meeting and the acceptance of written and verbal comments.

Changes in the MS4 Permit will likely require standard operating procedures for the receipt and consideration of public input or at least an outline of procedures already in place.

7.43 Implementation Item MS4/MCM-3: Illicit Discharge Detection and Elimination

The City of St. Cloud is required to develop, implement and enforce a program to detect and eliminate non-stormwater discharges to the stormwater system. As part of this MCM, St. Cloud has developed and continues to update a stormwater system map that identifies the storm sewer system and outfalls to streams, wetlands and lakes. This MCM also involves an education component whereby City employees are educated about what constitutes illicit discharges and how to prevent them. A periodic inspection program is also part of this implementation item.

Minor changes will occur with the draft reissue of the MS4 Permit. Specifically, the City will be required to develop and publish standard operating procedures for illicit discharge detection and elimination including documentation procedures. Additionally, outfall prioritization may become necessary whereby outfalls that drain industrial areas, for instance, would be inspected on a more frequent basis. There will likely be some one-time and ongoing costs associated with these new requirements.

Implementation Item MS4/MCM-4: Construction Site Stormwater Runoff Control

As required by the MS4 Permit, St. Cloud implemented an erosion and sediment control ordinance and well as an inspection and enforcement procedure. To augment the ordinance, a site plan review process was developed, and checklists developed for the review process.

The reissued MS4 Permit draft may require some modification to the ordinance to capture specific permit language regarding “appropriate erosion and sediment control BMPs.” As with other MCM’s the new permit also makes reference to standard operating procedures which requires St. Cloud staff to develop a more formal, written documentation of the current process.

7.44 Implementation Item MS4/MCM-5: Post-Construction Stormwater Management

As required by the MS4 Permit, St. Cloud has a program that prevents or reduces water quality impacts; accomplished primarily through the infiltration and rate control requirements. Implementation consists of site plan review, review of applicability of different BMPs for each project site and periodic ordinance modification.

The reissued permit will likely be more specific as to the pollutants of concern when evaluating potential water quality impacts. Because St. Cloud was required to prepare an Antidegradation analysis and develop a mitigation strategy, the City's requirement is in alignment with the water quality components of the draft Permit.

Assuming that most of the language in the reissued MS4 Permit draft survives public comment, and then St. Cloud will probably have to develop local policy around off-site mitigation and maintenance agreements for privately owned BMPs.

7.45 Implementation Item MS4/MCM-6: Good Housekeeping/Pollution Prevention

Under the MS4 Permit, Cities must develop an operation and maintenance program with the ultimate goal of reducing pollutant runoff from MS4 operations which primarily consist of public works facilities. The MCM requires an employee education program. Additional requirements include inspection of pollutant control devices, outfalls and exposed stockpiles. These inspections and any corrections resulting from them are documented in the annual report.

St. Cloud's program is consistent with the current permit requirements including the following:

- Training City staff on materials handling and fleet maintenance
- Street sweeping
- Inspections of pollution control devices, outfalls and stockpiles
- Record keeping and periodic evaluation of inspection frequency

The draft MS4 Permit expands upon this MCM by requiring the implementation of BMPs to treat stormwater from municipal facilities where any such operation contributes pollutants. This implies that St. Cloud might have to retrofit BMPs to municipal facilities. As with other MCMs the new permit may require that St. Cloud write and adopt standard operating procedures. Changes to the form and content of the inspection and maintenance program are also evident. Most prominent is the requirement to prepare an assessment of constructed ponds and constructed wetlands. Since this constitutes a study, this particular item has been included in the official controls portion of the implementation program.

7.5 FUNDING SOURCES

The City of St. Cloud uses multiple funding sources for stormwater implementation. The various sources and use are described below.

Stormwater Utility

- This is the primary funding source for St. Cloud's MS4 responsibilities, implementation of BMPs for public projects involving redeveloped impervious, and retrofit of BMPs to existing areas. More detail on the stormwater utility is provided below.

State Aid Funds

- St. Cloud participates in the municipal state aid program whereby gas tax money is distributed to Cities for primary, designated transportation routes. Typically, state aid funds pay for storm sewer and drainage facilities for new and rehabilitated routes.

Sales Tax Revenue

- Special projects within St. Cloud can be funded by sales tax revenue. Typically these projects consist of major transportation projects such as interchanges and public facilities. Stormwater management associated with these projects can be funded with the sales tax revenue.

General Revenue

- Whether through bonding or general levy collections, the City can use these funds on projects and associated stormwater management. General revenue is typically used on Neighborhood Revitalization Projects (residential street reconstruction), major interchange projects and public building projects.

Special Assessments

- Special assessments are often used to recover projects costs from properties that benefit from street and utility reconstruction projects. Typically, special assessments cannot be used for stormwater infrastructure unless a special taxing district is established.

Utility Revenue

- The stormwater utility constitutes one source of utility revenue. The City also collects utility revenue from customers of the sanitary sewer and water utility. Typically, these funds are used exclusively for utility improvements and not stormwater, which is funded by its own utility.

Grants and Cost Share

- Federal and state grants, and cost share constitute another important source of revenue for City projects. Typically large public buildings and major transportation projects have some Federal or State contribution. These funds can be used for stormwater management when applicable.

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Section 365:20 of St. Cloud's Code of Ordinances establishes a stormwater utility. Generally, a stormwater utility is a fee to properties within the City based on runoff generated. Since impervious surface is a reasonable surrogate for actual runoff, impervious surface is used to determine a property's fee. Table 7-1 provides a summary stormwater utility budget over the past years.

Table 7-1 – Stormwater Utility Budgets

Category	2007	2008	2009	2010	2011
Personal Services	279,414	336,643	351,717	466,700	444,400
Supplies	45,652	55,631	77,279	62,000	104,000
Services and Charges	113,559	90,404	113,388	258,200	231,200
Capital Outlay	149,208	9,738	150,000	0	8,500
Total	**587,833**	**492,416**	**692,384**	**786,900**	**788,100**

7.51 Implementation Program Summary

The preceding discussion describes individual implementation items and potential funding sources. As illustrated, the full implementation program consists of official controls, operation and maintenance, capital improvements, and MS4 Permit obligations. The Implementation Program looks different than a typical Capital Improvement Plan.

Table 7-2 presents a tabular summary of the Implementation Program. The Implementation Program is the logical culmination of the preceding sections. In Physical Environment the unique hydrologic and geomorphic characteristics of St. Cloud were related to specific water quality and water quantity issues. The Assessment links these issues with specific water bodies and with the overall regulatory context in which St. Cloud manages the stormwater program. The Physical and Regulatory Context creates the need for action and the Goals and Policies section outline some of the actions St. Cloud desires to take. In contrast, the Implementation Program outlines the actions the City needs to take and the costs associated with these actions.

The Implementation Program summary shows planned year, funding source and budgeted cost for every item. For the period 2012 to 2016, costs and funding are presented year to year. For the period 2017 to 2021, costs and funding are presented for the period only. The differing level of detail reflects the uncertainty of planning expenditures and funding beyond five years. The City of St. Cloud will update the Implementation Program in conjunction with the annual NPDES MS4 public meeting by adding detail one more year out. For example, at the 2013 public meeting, the City will present an updated Implementation Program with line items for 2017 and lumped implementation for 2018 to 2022.

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Table 7-2 – Implementation Program							
Item	Expenditures by Year ($)						Funding Sources
	2012	2013	2014	2015	2016	2017-2021	
Implementation Item OCS-1: Volume Management Requirements	30,000	30,000	30,000	30,000	30,000	150,000	General Fund
Implementation Item OCS-2: Design Standards		1,000		1,000		2,000	General Fund
Implementation Item OCS-3: NE Industrial Area Implementation Plan		12,000					SWU
Implementation Item OCS-4: Neenah Creek Stream Protection Plan			25,000				SWU
Implementation Item OCS-5: MS4 Pond Inventory – Baseline Information	7,000						SWU
Implementation Item OCS-6: MS4 Pond Inventory – Assess Treatment Effectiveness		45,000					SWU
Implementation Item OCS-7: Subwatershed Studies		10,000		10,000		30,000	SWU
Implementation Item OCS-8: BMP Retrofit Master Plan	15,000						SWU
Implementation Item OM-1: Stormwater Management System Inspections	10,000	10,000	10,000	10,000	10,000	50,000	SWU
Implementation Item OM-2: Street Sweeping	50,000	50,000	50,000	50,000	50,000	250,000	SWU
Implementation Item OM-3: Storm Sewer and Pond Repairs and Maintenance	30,000	30,000	30,000	30,000	30,000	150,000	SWU
Implementation Item OM-4: BMP Repairs and Maintenance	20,000	20,000	20,000	20,000	20,000	100,000	SWU

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Table 7-2 – Implementation Program							
Item	Expenditures by Year ($)						Funding Sources
	2012	2013	2014	2015	2016	2017-2021	
Implementation Item CIP-1: Parks CIP Implementation	0	0	0	0	0	400,000	See Note
Implementation Item CIP-2: Public Buildings CIP Implementation	5,000	0	0	0	0	10,000	See Note
Implementation Item CIP-3: Public Works CIP Implementation	225,000	226,000	140,000	100,000	200,000	470,000	See Note
Implementation Item CIP-4: BMP Retrofits	42,000	81,000	145,925	276,925	452,925	2,264,625	SWU, Grants
Implementation Item MS4/MCM-1: Public Education and Outreach	108,000	101,000	102,000	104,000	103,000	521,000	SWU
Implementation Item MS4/MCM-2: Public Participation and Involvement	104,000	96,000	98,000	100,000	98,000	501,000	SWU
Implementation Item MS4/MCM-3: Illicit Discharge Detection and Elimination	76,000	74,000	84,000	77,000	86,000	406,000	SWU
Implementation Item MS4/MCM-4: Construction Site Stormwater Runoff Control	106,000	94,000	95,000	98,000	96,000	486,000	SWU
Implementation Item MS4/MCM-5: Post-Construction Stormwater Management	101,000	93,000	95,000	97,000	95,000	486,000	SWU
Implementation Item MS4/MCM-6: Good Housekeeping/Pollution Prevention	101,000	93,000	94,000	97,000	95,000	485,000	SWU
Total	1,030,000	1,066,000	1,018,925	1,100,925	1,365,925	6,761,625	

Note: Implementation items CIP-1 and CIP-2 generally consist of new BMPs for future building or site development projects (such as Neenah Park). CIP-3 consists of BMP implementation for transportation and Neighborhood Revitalization Projects. Funding sources include general revenue, special assessments, state aid funds, bonding, stormwater utility funds, sales tax revenue, grants, and private contribution

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7.6 Volume Reduction Plan

The Implementation Program shows expenditures increasing annually. The result follows from the initial capital and ongoing maintenance costs of St. Clouds BMP implementation program. The primary driver of the program is compliance with antidegration as part of St. Cloud's MS4 Permit.

Antidegradation compliance is part of St. Cloud's MS4 Permit responsibility and was the subject of a detailed study by the City titled Loading Assessment and Nondegradation Report for St. Cloud, Minnesota. The report concludes, through complex water quality modeling, that St. Cloud's annual discharge of runoff had increased from 11,571 ac-ft. per year in the baseline year to 15,637 ac-ft. in 2005. Accordingly, antidegradation is St. Cloud's legal responsibility to reduce runoff volume back to the baseline condition. The 4,066 ac-ft. of runoff volume reduction will be achieved by retrofitting infiltration BMPs throughout the City. The funding for these retrofits is identified under CIP-4. At the current funding level, BMP retrofits will extend the timeframe for achieving baseline loads to a minimum of 200 years. Increasing funding and dedicating this funding to CIP-4 could reduce the period. Leveraged with grants and other sources of funding, it is conceivable that the compliance period might be reduced, assuming that 50% of project costs are funded through alternate sources.

Table 7-3 presents the annual load reduction based upon the funding model presented in Table 7-2. The relationship between expenditure and volume reduction is based on St. Cloud's experience and records.

Table 7-3 – St. Cloud Volume Reduction Plan

Year	Retrofit Expenditures ($)	Low Cost for Volume Reduction ($/ac-ft.)	High Cost for Volume Reduction ($/ac-ft.)	Volume Reduction during Period (ac-ft.)	
				Low Cost	High Cost
2012	42,000	4,400	9,300	9.5	4.5
2013	81,000			18.4	8.7
2014	145,925			33.2	15.7
2015	276,925			62.9	29.8
1016	452,925			102.9	48.7
2017-2021	2,264,625			514.7	243.5
Total	**3,263,400**	--	--	**741.7**	**350.9**

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Chapter 8 – Plan Administration

8.1 Review and Adoption Process

In accordance with Minnesota Statute 103B.235, Subd. 5., the City of St. Cloud must submit the Stormwater Management Plan (SWMP) to the respective County Boards for review and recommendations. St. Cloud submitted the Plan to the Sauk River Watershed District as well. Though not required by statute, St. Cloud also solicited public comments. Doing so maintains consistency with the City's MS4 Permit and Stormwater Pollution Prevention Program (SWPPP), which includes a public participation and involvement component. The St. Cloud Planning Commission reviewed the SWMP concurrently with the public review period. A record of public comments on the SWMP and resultant revisions are contained within Appendix B.

After County and Watershed review and incorporation of pertinent comments, the revised SWMP was brought back to the St. Cloud City Council. The City Council approved the SWMP on month/day/2011. A copy of the City Council resolution is included.

8.2 Collaboration with other Entities

The City of St. Cloud will continue to collaborate with other local governments in implementing BMPs. Collaborating local governments include the three counties and the Sauk River Watershed District.

8.3 Plan Amendments and Future Updates

The Storm Water Management Plan requires periodic amendments to remain consistent with regulatory requirements, particularly the MS4 Permit, and to adapt to changing practices in stormwater management. More specifically, the City will annually update the stormwater implementation plan to remain current with the Capital Improvement Program. Annual updates to the Implementation Plan and other similar textual or tabular updates will be considered minor amendments and do not require resubmittal for review and recommendation. In most cases, staff will process minor amendments. In some cases, City Council approval may be required.

Major amendments consist of significant changes to the policy and regulatory components. Major amendments will go through the same review and approval process as the Plan, and will be adopted formally by the City Council.

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The Plan is intended to guide the City for the next ten years with periodic amendment. If in that time significant growth alters the plan or regulation significantly changes, then a plan update may be necessary. A plan update is essentially a new Stormwater Management Plan and requires a review and recommendation process with the Counties and Watershed District.

8.4 Annual Reporting

The City of St. Cloud annually reports on stormwater management activities through public outreach and the annual meeting. Reporting on progress toward implementation will be included at the annual meeting. The annual reporting will consist of:

- projects implemented and pollutant reductions
- annual updates to the stormwater implementation plan based on updated Capital Improvement Plans
- plan amendments
- regulatory changes
- potential projects for implementation

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APPENDIX A

Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas

Minnesota Department of Health

Introduction

Infiltration is widely promoted because it is a practice with demonstrated long-term value in managing stormwater. As a management technique, properly designed and executed infiltration practices convey several benefits, including the following (as identified in the Minnesota Stormwater Manual): 1) reducing the volume of stormwater runoff; 2) controlling and improving water quality; 3) recharging groundwater; 4) mitigating thermal affects on cold-water fisheries; and 5) attenuating peak flows. Infiltration is clearly a versatile and effective technique for addressing a wide range of stormwater issues. Accordingly, Minnesota Department of Health (MDH) encourages its use in most settings statewide.

Infiltration practices redirect stormwater into the subsurface, where it becomes groundwater. As most people in Minnesota use groundwater as a source of drinking water, the MDH would like to see care exercised in planning projects involving stormwater infiltration, especially in vulnerable wellhead protection areas.

Stormwater runoff often carries with it contaminants that can lead to adverse health effects. The types of contaminants vary widely depending on land use; common contaminants include nitrates, pathogens, metals, chloride, and hydrocarbons. When present at high concentrations, these contaminants can pollute groundwater supplies if infiltrated into the ground. The effects of such contamination can be devastating. An example involving not urban stormwater but runoff from agricultural fields in Ontario illustrates the danger posed by pathogens. Infiltration of the runoff led directly to bacteriological contamination of a well and the associated public water supply system. The resulting disease outbreak took several lives and sickened hundreds of others. This example not only demonstrates the potential for rapid connection between surface water and groundwater, but it clearly indicates that groundwater quality can be jeopardized by infiltration of stormwater from the ground surface.

Most of the public water supply systems that distribute drinking water in Minnesota rely on groundwater as their source. Drinking water protection activities are the responsibility in Minnesota of the MDH. As part of these efforts, MDH regulates wellhead protection planning activities carried out by public water suppliers in the state. One of the goals of wellhead protection planning is to determine the recharge area (i.e., the wellhead protection area) for a well and to manage that area in a manner consistent with safeguarding the drinking water supply.

Stormwater management occurs in urban or suburban areas and in developing communities where impervious surfaces begin to replace natural ground cover. This

document describes suggested considerations for evaluating projects that use infiltration to manage stormwater, with emphasis on how such projects may affect groundwater used for drinking water purposes in wellhead protection areas. A flowchart (Appendix A) is attached to help understand the process.

General Requirements

Federal, regional and state authorities regulate various aspects of the manner in which stormwater is handled, managed, and controlled in Minnesota. For example, the Minnesota Pollution Control Agency (MPCA) administers the Stormwater program, which regulates much of the management of stormwater through the use of permits. The MPCA, regional and local authorities are typically the governmental entities implementing and enforcing stormwater requirements. This guidance applies regardless of whether the stormwater management at the site is regulated or not.

The Minnesota Department of Health has no regulatory authority over most routine handling of stormwater, but does administer the Wellhead Protection Program and other drinking water protection programs. Wellhead protection planning is largely a local activity in Minnesota. Individual public water supply systems decide how to manage land use within wellhead protection areas. Certain land use activities may adversely affect groundwater supplies. Therefore wellhead protection strategies are balanced with aquifer vulnerability. As wellhead protection planning and stormwater management both involve a substantial amount of local government involvement and leadership, good opportunities exist for adopting a consistent approach in the application of each.

Assembling Existing Information

This document is intended for use as guidance for local authorities in evaluating stormwater infiltration projects. Prior to doing so, existing information must be gathered, as described in this section.

- *Is your proposed project in an approved wellhead protection area?* Information in a wellhead plan may help to evaluate proposed infiltration projects. Copies of the report are usually kept with the wellhead protection manager for the public water supplier. While municipalities are typically the largest groundwater users for public consumption, other entities that may have wellhead plans are schools, mobile home parks, and large businesses or employers. Step 1, below, describes how to identify wellhead activities in your area of interest.
- *What aquifer is used by drinking water supply wells in the area of the proposed infiltration?* It is important to know the aquifer used by area wells because in some parts of the state, many potential aquifers are available and depending on local geology, each aquifer may have a different sensitivity to activities at the ground surface.
- *Where is the aquifer(s)vulnerable to contamination from activities at the land surface?* Vulnerability means the degree to which the aquifer is likely to be affected by activities at the ground surface. A wellhead protection plan

distinguishes between zones within the wellhead protection area that are vulnerable from those that are not. Understanding this characteristic helps in evaluating the risk posed by activities like stormwater management.

- *What land uses exist or are proposed for the area generating stormwater?* Local authorities are the best source of information on local land use. Land uses vary in their potential to generate contaminants in stormwater runoff. For example, potential contaminants from industrial or commercial areas are far different from those that may be generated from park or residential areas. The Minnesota Stormwater Manual (links in Appendix B) describes certain land uses that it terms "potential stormwater hotspots (PSH)" that may be incompatible with infiltration in wellhead protection areas. Land use is very hard to characterize broadly. Accordingly, site-specific considerations should be made wherever possible. Consult the Minnesota Stormwater Manual for information on land uses and associated stormwater problems.
- *What are the contaminants of concern in the stormwater and can contaminants be managed?* Do the stormwater management protocols identify any type of pre-treatment that may help to mitigate contaminants in the runoff and are they appropriate for the types of contaminants that are likely to be present in the stormwater?

Each of these items is considered as part of the evaluation process that MDH proposes for considering stormwater infiltration projects in vulnerable wellhead protection areas. The process is described below and is summarized in the flowchart attached as Appendix A.

Process for Evaluating Stormwater Infiltration Projects

Step 1: **Determine if any part of the proposed infiltration site is within a vulnerable wellhead protection area (WHPA) or drinking water supply management area (DWSMA) as defined by Minnesota Rules (4720.5100-5590).** This information is available from the Wellhead Protection Manager at the public water supplier or from MDH staff (651-201-4700). Also, the wellhead protection plan likely contains a section describing the vulnerability assessment, which describes how the vulnerability is determined and how it may vary throughout the DWSMA.

The term 'infiltration site" refers to any structure or device designed to transfer surface waters to the subsurface. In practice, these facilities range in size from rain gardens designed to handle runoff from residential rooftops to basins collecting runoff from large commercial areas. The scale of the infiltration project, in terms of the volume of stormwater handled, clearly must be considered, along with land use, as part of this review process. MDH generally encourages multiple small-scale infiltration projects distributed over a large site in lieu of one large structure to handle stormwater from a site.

> **If yes, proceed to Step 2**. Yes means that the infiltration site is in close proximity to wells used to supply a public water supply system. The wellhead report may indicate the travel time in years between the proposed site and the wells. A vulnerable determination (very high, high, or moderate vulnerability) means the

aquifer will likely be affected by activities at the ground surface. Hence, the proposed infiltration needs to be considered in more detail.

If no, it is unlikely that the proposed stormwater management project will affect drinking water supplies for a public water supply system (with a defined wellhead area), but the project still must comply with MPCA and local requirements for stormwater handling.

Step 2: **Does the aquifer receiving the water from the infiltration basin exhibit fracture or solution-enhanced groundwater flow conditions (secondary porosity features)?** This means groundwater flow through rocks or other geologic materials exhibiting porosity is dominated by fractures or dissolution features (examples include the Prairie du Chien Dolomite and the Galena Limestone). Aquifers characterized by secondary porosity can display extremely rapid groundwater travel times that can put a well at risk in a matter of hours and can have complicated and tortuous flowpaths that are difficult to predict without special testing. Infiltration of stormwater within WHPAs is not recommended in such settings, especially if karst features exist. Infiltration might be acceptable if the karst aquifer is covered by 100 feet or more of other materials. The Minnesota Stormwater Manual identifies karst settings as especially problematic in managing stormwater. Appendix B contains web links to the complete stormwater manual, which should be consulted for more background on managing stormwater in karst areas, as well as maps showing the location of Minnesota's karst areas. However, the manual does not specifically cover the issue of stormwater infiltration in wellhead protection areas of a fractured or solution-enhanced aquifer.

If no, proceed to Step 3.

If yes, infiltration may not be appropriate for this setting. Consider other stormwater handling procedures such as stormwater retention and conveyance outside of the WHPA or moving the infiltration area to a non-vulnerable part of the DWSMA. Additional handling alternatives are presented in the Minnesota Stormwater Manual (see reference in Appendix B).

Step 3: **Is the proposed infiltration site within the 1-year time-of-travel (emergency response zone) as designated by MDH?** A 1-year travel time is significant for several reasons. Most pathogens are not viable in the groundwater after 365 days. So a 1-year travel time represents a margin of safety that will allow some contaminants to attenuate or, additionally, sufficient time for local authorities to react.

If no, proceed to Step 4.

If yes, infiltration is not appropriate in this setting as insufficient time is available after infiltration to cause pathogens to die off or for local authorities to react to a spill. Extenuating circumstances here might be the presence of a sufficiently thick unsaturated zone between the water table and the base of the infiltration site that pathogen attenuation would take place.

Step 4: **What current or proposed land uses drain into the infiltration site?**

Classify the predominant land use upgradient of the infiltration site into one of the following categories:

1. Commercial and industrial;
2. Transportation corridors;
3. Forest, parkland, open space;
4. Low density residential;
5. High density residential; and
6. Golf course, active agricultural (i.e., cropland, feedlots).

Stormwater infiltration in commercial and industrial areas, as well as in transportation corridors is only appropriate if the collection and infiltration system is designed to allow spill containment. MPCA permitting requirements currently prohibit infiltration from industrial areas containing exposed potential contaminant sources or from vehicle fueling or maintenance areas. Categories 3 through 6 represent land uses from which infiltrated runoff is not as likely to contain contaminants that may adversely affect human health if introduced into a drinking water supply, although this may depend on 1) the degree to which land management BMPs have been adopted, and 2) stormwater pretreatment measures. The use of stormwater infiltration devices may be acceptable in areas where they would otherwise be inappropriate if flows from, say, rooftop drainage could be collected for infiltration separate from runoff from industrial areas.

The land use categories presented here are quite broad and there will be differences in the kinds of contaminants that could be generated in runoff from each. The Minnesota Stormwater Manual contains a lengthy discussion (chapter 13) about potential stormwater hotspots (PSHs), which are land uses that have the potential to affect the water quality of stormwater. The Minnesota Stormwater Manual describes conditions under which infiltration of runoff from land uses containing PSHs as a practice is not appropriate. Users of this guidance should be familiar with the PSHs identified in the Minnesota Stormwater Manual as a means of providing context for evaluating general land uses. While the manual identifies many PSHs, the list is not exhaustive, and each land use should be considered on its own merits.

Step 5: (This step does not apply to some land uses – see flow chart): **Are emergency procedures for containment of spills established and acceptable?** The primary concern here relates to transportation corridors. Fuels, chemicals, and other potentially hazardous materials all are moved on roadways and railways. Accidents that happen in unpredictable locations have the potential to affect groundwater. While it may not be practical to design protections against the eventuality of all possible such accidents, local and regional authorities should have a means of responding should a spill occur.

> **If no**, infiltration is not appropriate in this setting.
>
> **If yes**, infiltration may be acceptable but only if contingency responses for spill containment are included in the site planning process.

***Step 6*: Are site planning, BMPs, pre-treatment, or secondary containment measures, or natural attenuation characteristics in the vadose zone acceptable to meet federal drinking water standards?** Every infiltration device or basin should be designed to do as much as is practical at every opportunity to limit the pollutant load to the subsurface. This extends to maintaining the infiltration device so its performance does not deteriorate with age. Regardless of the approach used, the goal is that the water exiting the infiltration device and recharging the groundwater system should meet federal drinking water quality standards. This goal is more stringent than is required by MPCA for routine consideration of stormwater management, but is warranted if a large proportion of the water pumped for drinking water purposes is comprised of infiltrated stormwater. However, it should be noted that drinking water standards are not enforceable except in the water delivered in the public water supply system. Dilution and other attenuation processes may significantly impact concentrations between where stormwater infiltration takes place and where the well pumps water for drinking water purposes.

> **If no**, infiltration is not appropriate in this setting.
>
> **If yes**, planned infiltration appropriate unless site conditions differ in a manner likely to affect stormwater quality adversely thereby not meeting drinking water standards.

Special Situations

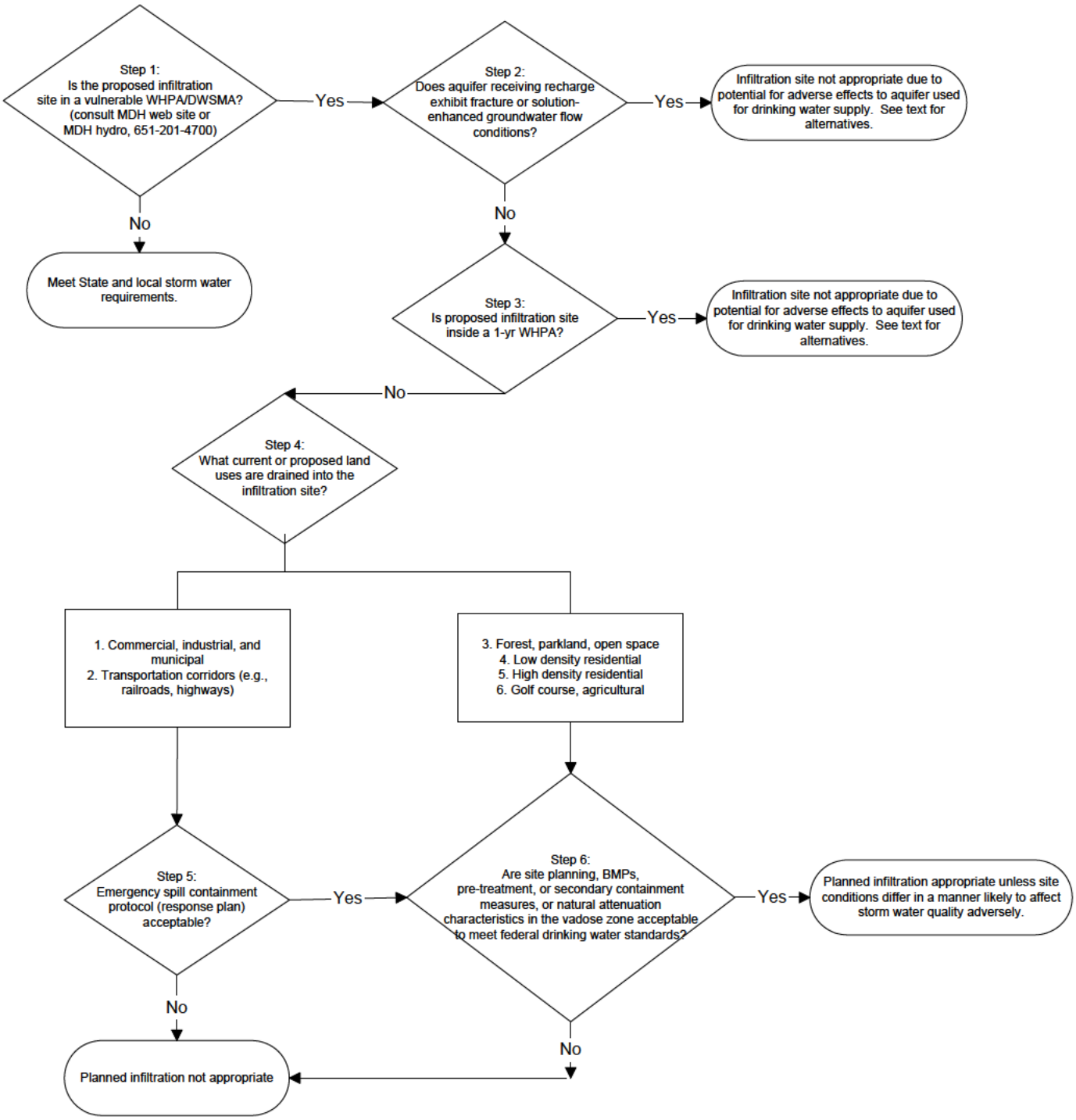
Certain circumstances may dictate a response to the proposed infiltration different from the recommendations of this guidance. For instance, a project involving the infiltration of volumes of water that are large relative to the amount pumped by a nearby well may leave little room for natural processes to dilute the stormwater. Or perhaps specialized predictive tools, such as a groundwater flow model, are available that can help to forecast the effects of the infiltration. Such tools may make it easier to interpret likely effects of the proposed infiltration. While it is impossible to predict all such extenuating circumstances, it will be the role of the user to decide how to incorporate such conditions in the analysis of site-specific infiltration proposals.

Contacting Minnesota Department of Health Staff

Appendix B lists various resources available to help work through this guidance, including MDH staff contacts. MDH hydrologists are generally assigned to specific regions of the state (see Appendix B) but additional assistance is available by calling the Source Water Protection Unit at 651-201-4700.

Appendix A

Appendix A.
A Flow Chart for Evaluating Proposed Stormwater Infiltration Projects in Areas with Vulnerable Groundwater



Note: This flow chart intended for use in conjunction with MDH guidance on evaluating storm water infiltration projects in vulnerable wellhead protection areas.

Appendix B

Appendix B

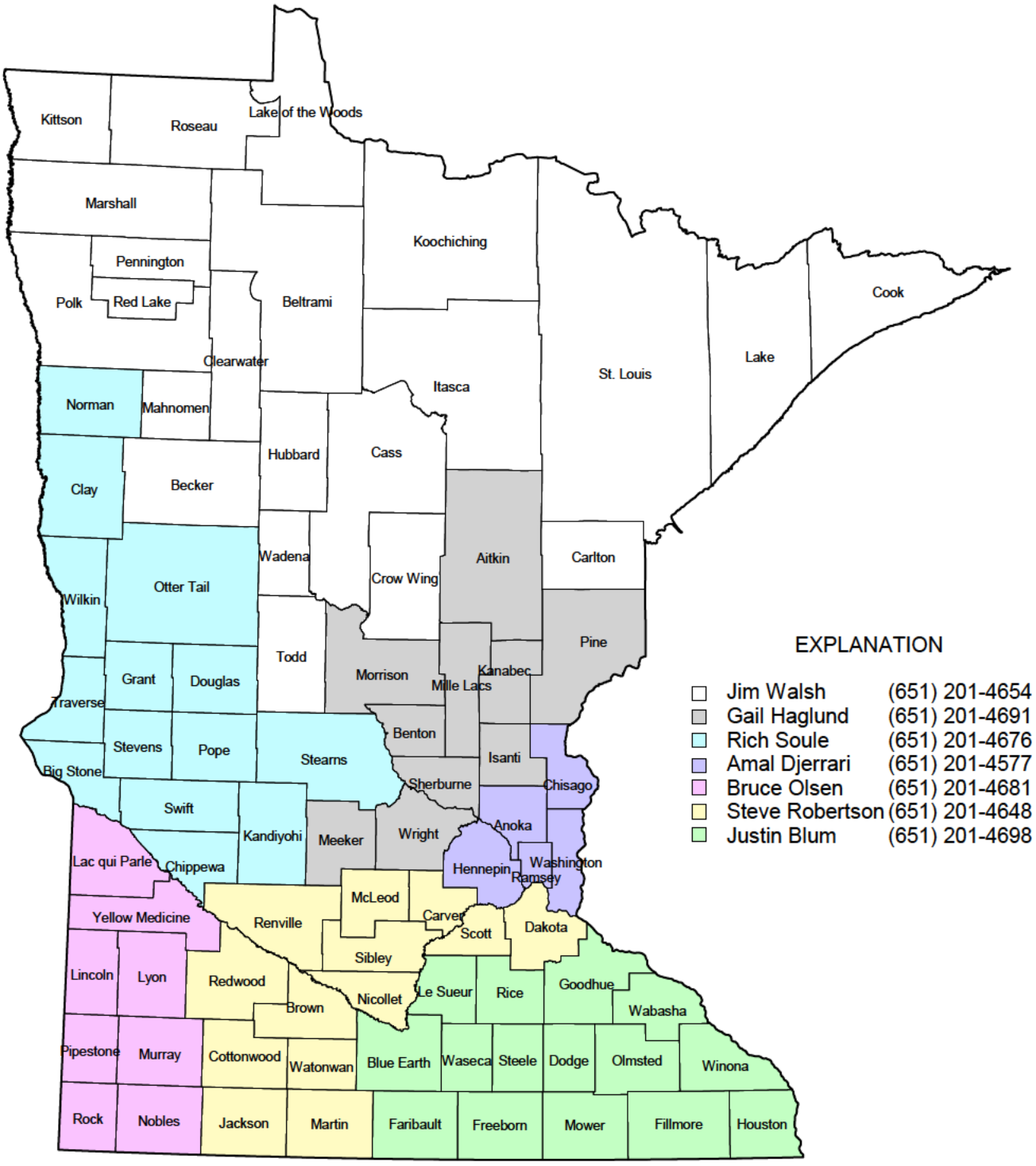
Minnesota Stormwater Manual

www.pca.state.mn.us/water/stormwater/stormwater-manual.html

MDH Hydrologists by Region

See map on next page.

Hydrologist Areas, Wellhead Protection



o:\dwpswp\grow\apr\state\hydroareas.apr

APPENDIX B

APPENDIX C

Sauk River Watershed

Elk River Watershed

Mississippi River Watershed

Neenah Creek Watershed

Long Lake Watershed

Storm Water System

- Outfalls
- RipRap Overflow Structure
- Overflow Structrue
- Ultimate Growth Bndy

Storm Drains

Diameter (inches)

- 0 - 12
- 13 - 24
- 25 - 48
- 49 - 96
- 97 - 127
- Storm Tile
- Infiltration Bioretention
- Private Infiltration Bioretention
- Ponds
- Ponds Private

Ulteig



Sherburne County
Comprehensive Land Use Plan
2010-2030

Prepared by the Sherburne County Planning & Zoning Department
Adopted by the Sherburne County Board of Commissioners on September 6, 2011

Sherburne County Mission:

To provide the necessary services in a cost effective manner
to support quality of life for Sherburne County citizens.

Cover: Briggs Lake, Palmer Township. (photo courtesy of Robin Tomaszewski)

SHERBURNE COUNTY
COMPREHENSIVE LAND USE PLAN
ORD - 187

The County Board of Commissioners of Sherburne County hereby rescinds the 2004 Comprehensive Plan, and adopts the 2010-2030 Comprehensive Land Use Plan by ordinance, as the official controls adopted under the provisions of MN Statutes 394.21 to 394.37. The purpose of the Comprehensive Plan is to guide future land use through the year 2030 in areas within the County's zoning authority. The Comprehensive Plan is the legal basis for establishing Zoning and Subdivision ordinances which regulate current land use. Additionally, the intent of this Comprehensive Plan is to integrate when applicable, township planning efforts in the County's plan that have occurred since it was last updated in 2004. This is a summary of the Ordinance. A full copy is available in the Office of the County Auditor/Treasurer.

This provision was passed by the Sherburne County Board of Commissioners on the 6th day of September, 2011 with the following conditions and duly filed with the Sherburne County Auditor.

1. That all references to the "Unnamed" Regional Park (i.e. Gohman property) be replaced by the Park's name, once a name has been assigned by the County Board;
2. That meeting minutes from the County Board be added (Appendix B).

Ewald Peterson

Ewald Peterson, County Board Chairperson

This foregoing instrument was acknowledged before me this 13 day of September, 2011.

Signature of person taking acknowledgement

Drafted by the Sherburne County Planning & Zoning Department Sherburne County Government Center

LYNN M. GEORGE
NOTARY PUBLIC - MINNESOTA
My Commission Expires Jan. 31, 2015

Sherburne County Board of Commissioners (2011)



Larry Farber, Vice-Chair
District 1

Home: Elk River
Occupation: Police Officer (ret)
Elected: 2009
Term: 1st



Ewald Peterson, Chair
District 2

Home: Big Lake Township
Occupation: Farmer (retired)
Elected: 2007
Term: 2nd



John Riebel
District 3

Home: Becker Township
Occupation: Business Owner (hardware store)
Elected: 2005
Term: 2nd



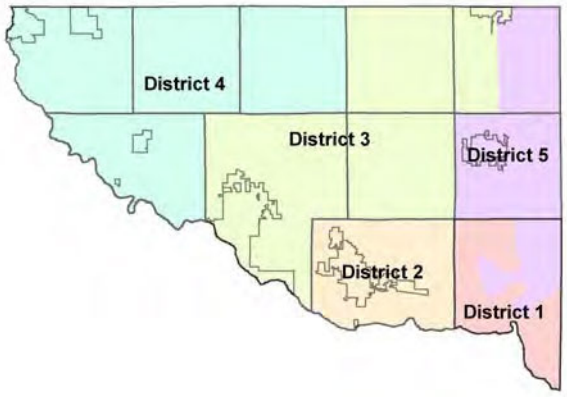
Felix Schmiesing
District 4

Home: Palmer Township
Occupation: Business Owner (motor carrier), Farmer
Elected: 2003
Term: 3rd



Rachel Leonard
District 5

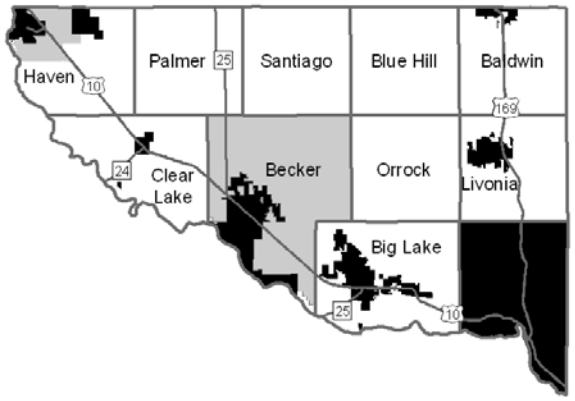
Home: Livonia Township
Occupation: Attorney, Teacher/ Administrator (retired),
Elected: 2001
Term: 3rd



County Commissioner's Districts.

Sherburne County Planning Advisory Board

Bryan Lawrence*	Baldwin Township
Mike Hayes	Big Lake Township
Roger Nelson	Blue Hill Township
Roger Neils**	Clear Lake Township
Eric Meyer	Haven Township
Lila Spencer	Livonia Township
Julie Berg	Orrock Township
Cecil Peterson	Palmer Township
David Jehoich	Santiago Township
John Riebel	County Board Liaison



Sherburne County's jurisdiction for planning & zoning administration (areas in white).

Elected Town Board Members (in townships which the County administers Planning & Zoning for)

Baldwin Township
Jay Swanson*
Tom Rush**
Randy Atwood
Kimberly Good
Larry Handshoe

Big Lake Township
Bob Hofer*
Larry Alfords
Mike Hayes
Jim Stahlmann
Norm Leslie

Blue Hill Township
William Andreson*
Michael Thompson
Roger Nelson

Clear Lake Township
Jack Gallagher*
Gary Gray
Joseph Goenner

Haven Township
Jeffrey Schlingmann*
Mark Knowles**
Mike Pesch
Kathi Sims-Kosloski
Randy Linn

Livonia Township
Donald Sherper*
Dave Hewitt**
Gary Doebler
Butch Hass
Douglas Manthei

Orrock Township
Jeff Jones*
Charles Gotzian
Jerry Petersen
Mike Christianson
Wayne Chermack

Palmer Township
Michael Ganz*
Richard Larson
Cecil Peterson

Santiago Township
Stuart Nelson*
Jeffrey Pappenfus
David Jehoich

* Chair (2011)
** Vice-Chair (2011)

Acknowledgements

The 2010-2030 Comprehensive Land Use Plan was completed by the Sherburne County Planning & Zoning Department. The Department includes four divisions; Zoning, Building, Solid Waste, and Parks & Trails. The primary authors of the Comprehensive Plan are:

Nancy Riddle	Planning & Zoning Admin.	Sherburne Co. Planning & Zoning Dept
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Joe St. Dennis	Building Official	Sherburne Co. Planning & Zoning Dept
Jon Sevald, AICP	County Planner	Sherburne Co. Planning & Zoning Dept
Marc Schneider	Zoning Specialist	Sherburne Co. Planning & Zoning Dept
Brett Forbes	GIS Coordinator	Sherburne Co. Public Works Dept
Jay Forstner	GIS Specialist II	Sherburne Co. Public Works Dept

The County Board of Commissioners wishes to thank those who contributed information and/or provided comments for this Plan;

Chuck Nagel	resident	Baldwin Township
Roger Nelson		Blue Hill Town Board
Bob Hofer		Big Lake Town Board
Larry Alfords		Big Lake Town Board
Jim Stahlmann		Big Lake Town Board
Norm Leslie		Big Lake Town Board
Don Sherper		Livonia Town Board
Jerry Petersen		Orrock Town Board
Wayne Chermack		Orrock Town Board
Katie Larsen, AICP	Senior Planner	City of Big Lake
John Exner	Environmental Specialist	Sherburne Co. Planning & Zoning Dept
David Katzner	Environmental Specialist	Sherburne Co. Planning & Zoning Dept
Dave Lucas	Solid Waste Officer	Sherburne Co. Planning & Zoning Dept
Jen Oknich	Environmental Specialist	Sherburne Co. Planning & Zoning Dept
Judy Weber	Office Manager	Sherburne Co. Planning & Zoning Dept
Brian Bensen	Co Administrator	Sherburne Co. Administration Dept
Luci Botzek	Deputy Co Administrator	Sherburne Co. Administration Dept
Diane Arnold	Co Auditor/Treasurer	Sherburne Co. Auditor/Treasurer Dept
John Cullen, SAMA	Chief Dep Co Assessor	Sherburne Co. Assessor's Dept
J. Henderson, CMAS	Agricultural Specialist	Sherburne Co. Assessor's Dept
Beth Kautz, CMAS	Residential Appraiser	Sherburne Co. Assessor's Dept
Jerry Kritzeck, SAMA	Co Assessor	Sherburne Co. Assessor's Dept
Dick Corbin	Co Traffic Engr. (retired)	Sherburne Co. Public Works Dept
Mike Juricich	Traffic Engineer Tech III	Sherburne Co. Public Works Dept
Rhonda Lewis, PE	County Engineer	Sherburne Co. Public Works Dept
DeAnna Doran	District Manager	Sherburne Co. Soil & Water Conserv Dist
Kurt Kragness	Exec. Director (retired)	Sherburne Co. Historical Society
Scott Mareck, AICP	Exec. Director	St. Cloud Area Planning Organization
Claudia Dumont	Engineering Spec.	MN Dept of Transportation, District 3
Barbara Ronningen	Sr. Research Analyst Spec.	MN Dept of Admin, Demographic Cent.
Becky Balk	Sr. Planner	MN Dept of Agriculture
Howard Rengo	Sr. Warehouse Examiner	MN Dept of Agriculture
Jean Johnson	Administrative Technician	USDA Farm Services Agency
Anne Sittauer	Refuge Manager	US Fish & Wildlife Serv., Sherburne NWR
Michael Grover	Community Affairs Mngr.	Federal Reserve Bank of Minneapolis
Ed Usset	Grain Marketing Spec.	Univ. of MN Dept of Applied Economics
Mary Edwards	Professor	St. Cloud State Univ. Dept of Economics
Tom Daniels	Professor	Univ. of Pennsylvania School of Design

Source of aerial photos used for the chapter headings of pages 14, 18, and 94: Pictometry International Corp.

Table of Contents

	Executive Summary	8
Chapter 1	Introduction	14
Chapter 2	Population	18
Chapter 3	Natural Resources	32
Chapter 4	Land Use	44
Chapter 5	Transportation	68
Chapter 6	Economic Development	76
Chapter 7	Parks & Recreation	84
Chapter 8	Future Land Use	92
	Sherburne County Comprehensive Plan map	95
Chapter 9	Township Land Use Plans	96
Chapter 10	Goals & Policies	140
Appendix A	Town Board Survey Results	150
Appendix B	Public Hearing Minutes	155
Appendix C	Public Comments	160

Executive Summary

Purpose

The purpose of the Comprehensive Plan (Comp Plan) is to guide future land use through the year 2030 in areas within the County's zoning authority. The Comp Plan is the legal basis for establishing Zoning and Subdivision ordinances which regulate current land use. Additionally, the intent of this update of the Comp Plan is to integrate when applicable, township planning efforts into the County's plan that have occurred since it was last updated in 2004.

After the Comprehensive Plan is approved, the County intends to re-write the Zoning and Subdivision ordinances to implement this plan, address current land use issues, and remove inconsistent terminology. These ordinances were adopted in 1994, and have received numerous amendments since then.

Location

Sherburne County is located about an hour northwest of Minneapolis. The eastern half of the County is economically oriented toward the Twin Cities, while the western half is oriented toward St. Cloud, which is partially located within the County.

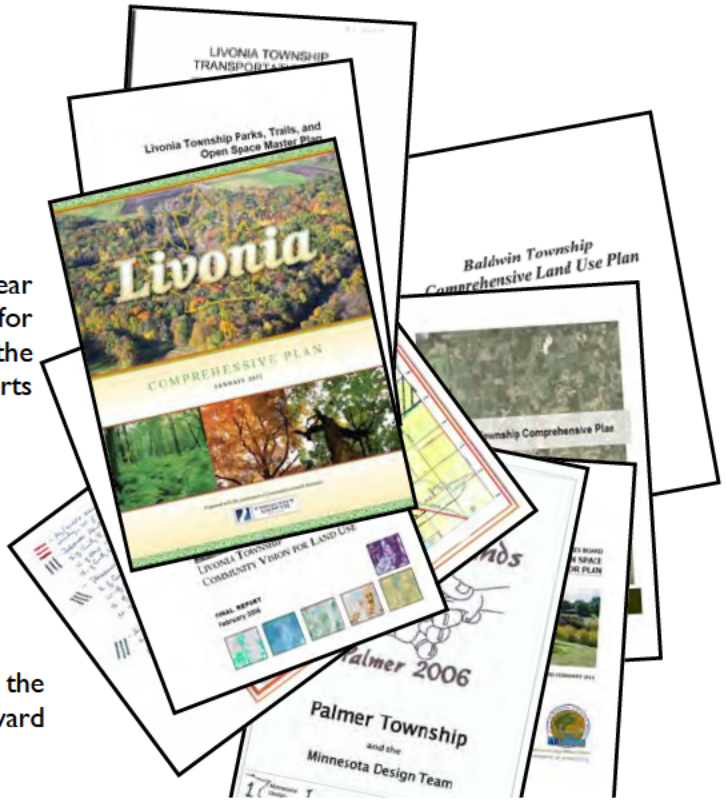
Population

Between 2000 and 2010, the County's population increased 37% from 64,417 to 88,499. Total township population increased from 30,128 to 38,319 (27%). The 2nd, 3rd, and 4th most populous townships in Minnesota are; Big Lake (7,386), Baldwin (6,739), and Livonia (5,951) townships.

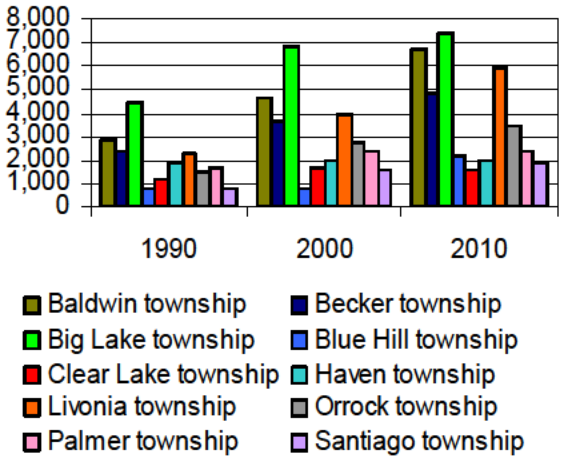
Planning Authority

Sherburne County administers planning & zoning authority in townships, excluding Becker Township, and the Haven Township Orderly Annexation area, except the County does regulate Shoreland, Floodplain, and Wild & Scenic River zoning districts within both townships.

The County has Joint-Powers agreements with Baldwin, Big Lake, and Livonia townships to administer parallel zoning authority. Under this agreement, the County and each township maintain separate, but identical Zoning and Subdivision ordinances. The County administers the application and enforcement procedures assuming County Board and Town Board approval/denial of land use applications (i.e. subdivisions, conditional use permits, etc.) are identical. In the instance that County Board and Town Board action is not identical, the County will enforce the County Board's actions, and the Township will enforce the Town Board's actions.



Various planning documents from townships and joint-ventures, completed between 2004-2011.



1990-2010 Population of townships.

Comprehensive Plan Policies

Chapter 10 includes Goals, Policies, and Implementation Strategies. The Policies listed below are intended to summarize (not replace) Chapter 10.



Natural Resources

Policy 1: Sherburne County's natural resources (soil, water, and ecology) provide unique opportunities and constraints. It is the County's policy to consider these opportunities and constraints when making land use decisions.

Policy 2: Sherburne County includes 125 lakes, 493 miles of rivers & streams, and about 52,898 acres of wetlands (excluding lakes). Surface waters provide a significant scenic and recreational amenity to County residents in addition to filtering pollutants prior to reaching aquifers. Surface waters also provide habitat for birds, fish, and animals. It is the County's policy to protect surface waters as required by Federal and Minnesota regulations, and to promote restoration efforts.

Policy 3: Sherburne County is located in the Anoka Sand Plain, which is a unique ecological environment in Minnesota. It is the County's policy to promote native plant species, control noxious weeds as required by Minnesota laws, and to encourage the preservation of contiguous areas for the migration of native birds and animals.

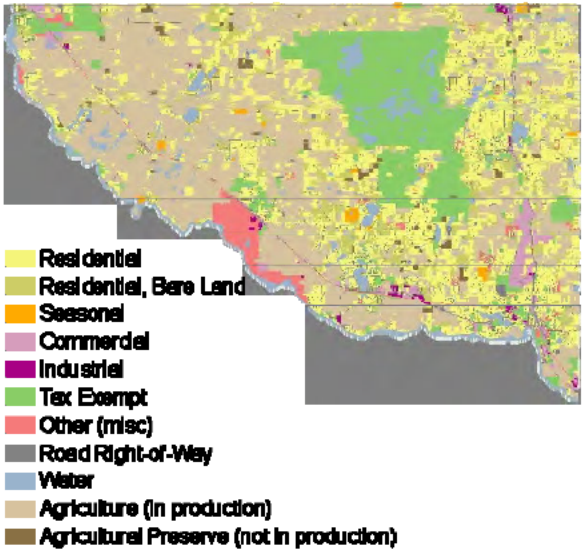
Policy 4: Sherburne County's waterways and aquifers are susceptible to pollution because of the County's sandy permeable soils. It is the County's policy to educate the public about the environment, and promote best management practices.



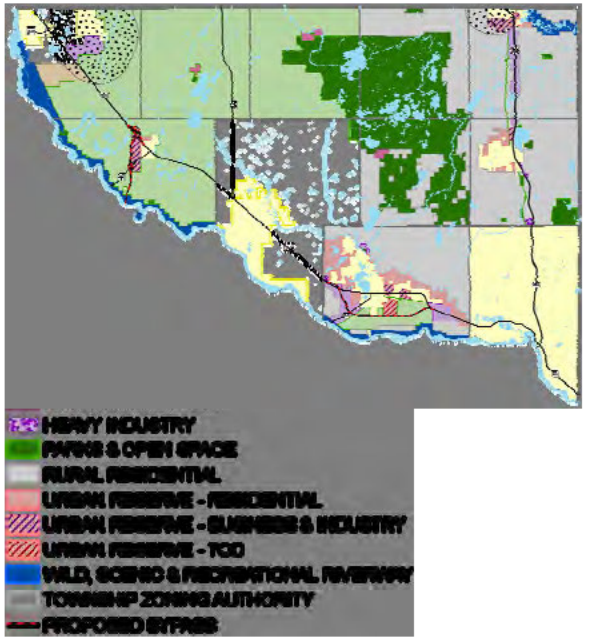
Land Use

Policy 5: Sherburne County (in addition to Wright County along the I-94 corridor) connects the metropolitan areas of the Twin Cities and St. Cloud, and serves as one of the primary growth corridors of Minnesota. When comparing Sherburne County's location, transportation access, and natural soil and water features (i.e. lack of physical constraints) to other counties within the larger region, Sherburne County is an attractive area for urban and rural growth. It is the County's policy to continue to properly manage growth, and maintain the County's autonomy from state agencies in regulating local land use decisions.

Policy 6: Sherburne County includes ten townships and seven cities. As of 2010, the cities of Becker, Big Lake, St. Cloud, and Zimmerman maintain Orderly Annexation (OA) agreements with neighboring townships.



Existing (2010) land use.



2010-2030 Comprehensive Land Use map (future land use). See page 95 for a larger version.

Presumably, each OA is designed to preserve land within a township. It is the County's policy to remain neutral regarding city/township OA agreements, and to respect such agreements. In the case where no OA exists, it is the County's policy to work with applicable cities and townships to zone land within a township.

Policy 7: Sherburne County is the planning & zoning authority in the townships of Blue Hill, Clear Lake, Haven (portions thereof), Orrock, Palmer, and Santiago. The County maintains a "Joint Powers Agreement Regarding Zoning" with the townships of Baldwin, Big Lake, and Livonia, in which the County administers and enforces the township's Zoning and Subdivision ordinances. In portions of Becker and Haven townships, the County administers zoning and subdivision regulations within the Scenic River, Recreational River, Shoreland, and Floodplain zoning districts. It is the County's policy to continue to work with townships to effectively regulate land use in a cost efficient manner.

Policy 8: Sherburne County farmers have made significant investments in irrigation systems for the cultivation of row crops. Agricultural corridors fragmented by development contribute to the rising cost of farming through increased land values, increased traffic, and non-compatible adjacent land uses. It is the County's policy to preserve agricultural areas.

Policy 9: Sherburne County has experienced significant residential growth. The population of townships have increased from 19,874 in 1990 to 38,319 in 2010 (93%). During those 20 years, 747 subdivisions were approved, consisting of 25,905 acres within the ten townships. It is the County's policy to manage residential growth while representing the best interests of property owners.



Economic Development

Policy 10: Sherburne County as a planning & zoning authority in townships maintains a limited role in the promotion of economic development within those townships. The commercial market in rural areas may be limited to those businesses which require high visibility from the traveling public, or provide convenience goods to local residents. It is the County's policy to support local job creation and business expansion by allowing small businesses in appropriate areas, including home businesses. The County recognizes cities' needs to reserve rural areas for future urban economic development, for the benefit of both cities and townships which may be home to those employees.



Transportation

Policy 11: The Sherburne County Long-Range Transportation Plan (2007) identifies County roadway needs through the year 2030. It is the County's policy to implement the Sherburne County Long-Range Transportation Plan.



Parks & Recreation

Policy 12: Sherburne County is in the early stages of park development. The first park (Oak Savanna Land Preserve) was established in 1997. The County manages four parks totaling 345 acres, holds three parcels for non-designated parkland totaling 110 acres, and is currently (2010) in the process of acquiring land to complete the Great Northern Trail connecting Elk River, Zimmerman, and Princeton. Within Sherburne County are the Sherburne National Wildlife Refuge (30,700 acres), Sand Dunes State Forest (6,000 acres of public land), Scientific & Natural Areas (1,162 acres), and Wildlife Management Areas (1,007 acres). These facilities are owned and managed by the U.S. Fish & Wildlife Service or the Minnesota Department of Natural Resources, and offer limited recreational uses. It is the County's policy to provide passive recreational opportunities while minimizing duplication of facilities and activities provided by other agencies.

Approval and Recommendation for Approval of the Comprehensive Plan

Below reflects a vote taken by Town Boards and the County Planning Commission as a recommendation to the County Board for approval of the Comprehensive Plan. A non-vote signifies that no recommendation was provided to the County. Townships were requested to provide a recommendation to the County by May 19, 2011.

County Board
September 6, 2011

Larry Farber	☑ Approval	☐ Denial
Ewald Peterson	☑ Approval	☐ Denial
John Riebel	☑ Approval	☐ Denial
Felix Schmiesing	☑ Approval	☐ Denial
Rachel Leonard	☑ Approval	☐ Denial

Baldwin Town Board
August 1, 2011

Jay Swanson	☑ Approval	☐ Denial
Tom Rush	☑ Approval	☐ Denial
Kimberly Good	☑ Approval	☐ Denial
Randy Atwood	☑ Approval	☐ Denial
Larry Handshoe	☑ Approval	☐ Denial

Big Lake Town Board
May 11, 2011

Bob Hofer	☑ Approval	☐ Denial
Larry Alfords	☐ Approval	☑ Denial
Mike Hayes	☐ Approval	☐ Denial
Jim Stahlmann	☑ Approval	☐ Denial
Norm Leslie	☑ Approval	☐ Denial

Blue Hill Town Board
May 9, 2011

Bill Andresen	☐ Approval	☑ Denial
Mike Thompson	☐ Approval	☑ Denial
Roger Nelson	☐ Approval	☑ Denial

Clear Lake Town Board
May 17, 2011

Jack Gallagher	☑ Approval	☐ Denial
Gary Gray	☑ Approval	☐ Denial
Joe Goenner	☑ Approval	☐ Denial

Haven Town Board

Jeff Schlingmann	☐ Approval	☐ Denial
Michael Pesch	☐ Approval	☐ Denial
Kathi Sims-Kosloski	☐ Approval	☐ Denial
Randy Linn	☐ Approval	☐ Denial
Mark Knowles	☐ Approval	☐ Denial

Planning Commission
July 21, 2011

Bryan Lawrence	☑ Approval	☐ Denial
Mike Hayes	☐ Approval	☐ Denial
Roger Nelson	☑ Approval	☐ Denial
Roger Neils	☐ Approval	☐ Denial
Jeff Schlingmann*	☑ Approval	☐ Denial
Lila Spencer	☑ Approval	☐ Denial
Julie Berg	☑ Approval	☐ Denial
Cecil Peterson	☑ Approval	☐ Denial
David Jehoich	☐ Approval	☐ Denial
John Riebel	☑ Approval	☐ Denial

*Alternate

Livonia Town Board
June 1, 2011

Don Sherper	☑ Approval	☐ Denial
Dave Hewitt	☑ Approval	☐ Denial
Doug Manthei	☑ Approval	☐ Denial
Gary Doebler	☑ Approval	☐ Denial
Butch Hass	☐ Approval	☐ Denial

Orrock Town Board
July 27, 2011

Charles Gotzian	☐ Approval	☑ Denial
Jerry Petersen	☑ Approval	☐ Denial
Jeff Jones	☑ Approval	☐ Denial
Mike Christianson	☑ Approval	☐ Denial
Wayne Chermack	☐ Approval	☑ Denial

Palmer Town Board

Mike Ganz	☐ Approval	☐ Denial
Richard Larson	☐ Approval	☐ Denial
Cecil Peterson	☐ Approval	☐ Denial

Santiago Town Board

Stuart Nelson	☐ Approval	☐ Denial
Jeff Pappenfus	☐ Approval	☐ Denial
David Jehoich	☐ Approval	☐ Denial

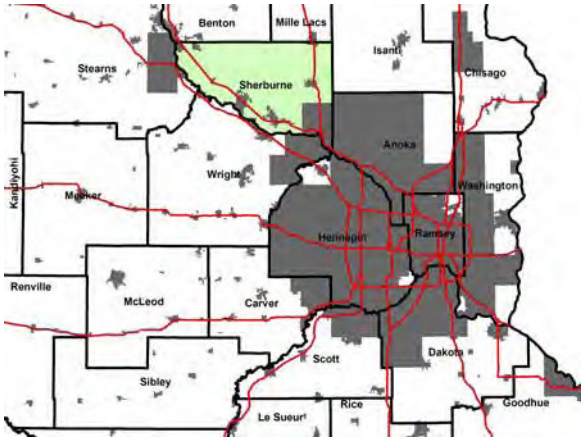
Facts about Sherburne County



photo courtesy of Robin Tomaszewski — **Briggs Lake, Palmer Township**

KEY ECONOMIC INDICATORS[i]

2010 Population[ii]	88,499	Up 37% from 2000 Census of 64,417
2010 Taxable Market Value	$7,786,112,052	Up 114% from 2000
2010 New Construction	$ 32,911,700	Compared to $132,095,816 in 2000
2010 Tax Parcels	41,048	Up 31% from 2000
2010 Business-Type Parcels	1,413	Up 35% from 2000



Sherburne County is located between the metropolitan areas of Minneapolis/St. Paul, and St. Cloud.

1st IN TOWNSHIP RESIDENTIAL GROWTH

Between 2000 and 2010, the County's township population grew from 30,128 to 38,319 (8,191 persons, or 27%) while our population of cities grew from 34,289 to 50,180 (15,891 persons, or 46%). Sherburne's townships which experienced the most growth include Baldwin (+2,067), Livonia (+2,034), Blue Hill (+1,414), and Becker (+1,237) townships. The nearest county in terms of township growth was Beltrami County, which grew from 26,203 in 2000 to 29,606 in 2010 (3,403 persons, or 13%).

22ND IN JOB GROWTH IN U.S.

Money Magazine (July 10, 2008 edition) ranked Sherburne County as the 22nd best county in the nation based on job growth between 2000-2007 (35.73%), citing *"Capturing the runoff from nearby Minneapolis, Sherburne County is undergoing residential expansion and growth in the retail, food, hospitality and healthcare industries. Large companies are attracted to the area - Target and UnitedHealthcare have invested more than $250 million in data centers in the town of Elk River - while the county offers a cushy place for new companies to grow, with business development assistance and reasonably-priced commercial and industrial land."*

51 MINUTES FROM BIG LAKE TO MINNEAPOLIS

Northstar Commuter Rail service began in November, 2009 with six park & ride stations along 40-miles between Big Lake and downtown Minneapolis. Weekday service includes six commute and one reverse commute trips during each morning and evening peak travel periods. Northstar is estimated to have had 1,900-2,000 riders per weekday in 2010. Northstar is owned and operated by the Metropolitan Council through Metro Transit and operates on easements purchased from BNSF Railway. The funding partners for operation of the commuter rail line include; Sherburne County, Anoka, Hennepin, and Stearns counties along with the State of Minnesota (and the Federal Transit Administration for construction),

OVER 60,000 ACRES OF WETLANDS

There are 60,432 acres of wetlands in Sherburne County, classified as a Type 1 through Type 8 wetland. Wetlands are identified by their hydric soils, are wet above ground or within 12" of the ground's surface during all or part of the growing season, and have vegetation adapted to wet soil conditions. Between 1902 and the 1920's, a 212 mile public ditch system was excavated to channel surface water. This included dredging rivers and creeks, as well as draining wetlands to convert into farmland. Additionally, there is an unknown length of privately owned and maintained drainage ditches.

OVER 36,000 ACRES OF RESTORED NATURAL HABITAT

The Sherburne National Wildlife Refuge consists of 30,700 acres. Sherburne is one of 13 National Wildlife Refuges in Minnesota. Established in 1965 to protect and restore the habitats associated with the St. Francis River Valley for migratory birds and other wildlife purposes, the focus of the Refuge today is on the restoration of oak savanna, wetland and big woods habitats. The Sand Dunes State Forest consists of 8,934 acres. Of that, 5,767 acres are state owned. Sand Dunes is one of 58 State Forests in Minnesota. Prior to being a state forest, the area was largely farmed until the 1920's and 1930's. Local farms were affected by The Great Depression and a drought in 1933-1934 leading to the loss of top soil in some areas and the accumulation of sand dunes in others. In 1941, experimental tree planting took place to stabilize soils. The State Forest was established in 1943.

MANUFACTURERS AND PRODUCTS MADE IN SHERBURNE COUNTY

Manufactures defined as North American Industry Classification System (NAICS) code 31,XXX - 33,XXX, and having ten or more employees as reported in the Minnesota Department of Employment & Economic Development's MNPRO as of July, 2010 (number of employees in parentheses).

Liberty Paper, Inc (98)	Pulp, Paper & Paperboard	Becker
Darter Plastics (25)	Resin, Synthetic Rubber	Becker
Remmele Engineering (225)	Machine Shops	Big Lake
Whirl-Air-Flow (38)	Machine Shops	Big Lake
Wacker Stucco (31)	All Other Misc. Nonmetal.	Big Lake
Industrial Molded Rubber (30)	All Other Rubber Prod	Big Lake
Ultra Image Powder Coating (15)	Electroplating, Plating	Big Lake
The Stone Company (14)	Cut Stone & Stone Prod.	Big Lake
White Bear Clothing (12)	Outerware Knitting mills	Big Lake
Thompson Woodworking (11)	Wood Kitchen Cabinet	Big Lake
Cretex Companies (100)	Cement & Concrete	Elk River
Metal Craft Machine & Engr (90)	Machine Shops	Elk River
E & O Tool and Plastics (89)	Resin, Synth. Rubber	Elk River
Elk River Machine Company (80)	Machine Shops	Elk River
Sportech Inc. (77)	Other Trans. Equip	Elk River
J & J Machine (45)	Other Elec. Equip.	Elk River
Dynetic Systems (35)	Elec. Equip Mfg.	Elk River
MN Fabrication & Machine (30)	Electical Equip Mfg.	Elk River
Crystal Cabinet Works (510)	House & Inst. Furniture	Princeton
United States Distilled Prod (116)	Beverage Manufacturing	Princeton
Kinsley Coach (38)	Motor Home Mfg.	Princeton
Glen Metalcraft (37)	Other Metalworking	Princeton
MyCull Fixtures (32)	Other Wood Products	Princeton

Chapter 1
Introduction



Long, Pickerel, and Fish lakes, Clear Lake Township

Sherburne County is located northwest of the Twin Cities and southeast of St. Cloud along one of the fastest growing corridors in the country. The County's 2010 estimated population[1] was 88,499 (cities: 50,180 & townships: 38,319), and is projected[2] to grow 83% to 161,990 by the year 2030. The County is transforming from an agrarian based economy to more suburban and exurban in nature. The eastern half of the County is oriented toward the Twin Cities metro area, while the western half remains agriculturally based, and oriented toward St. Cloud. The County includes two U.S. highways: Highway 10 (east-west), and Highway 169 (north-south). The highways intersect in Elk River, the county seat. The County is ecologically diverse, bordered by the Mississippi River to the south (Objibwe for "great river"), and includes the Sherburne National Wildlife Refuge and Sand Dunes State Forest, together consisting of over 36,000 acres of federal and state owned land.

The County includes ten unincorporated townships, and seven cities, two of which are partially located outside the County (St. Cloud and Princeton). The County Board of Commissioners retains zoning authority over the townships (excludes portions of Becker and Haven townships), and shares parallel zoning authority with three townships (Baldwin, Big Lake, and Livonia). These relationships are further explained on page 97.

What is a Comprehensive Plan?

The purpose of the Comprehensive Land Use Plan is to establish goals and policies to guide land use within the unincorporated areas (i.e. nine townships) of Sherburne County between the years 2010 - 2030. These goals and policies are intended to be implemented through the Zoning and Subdivision ordinances. The Comprehensive Plan is the basis for these ordinances.

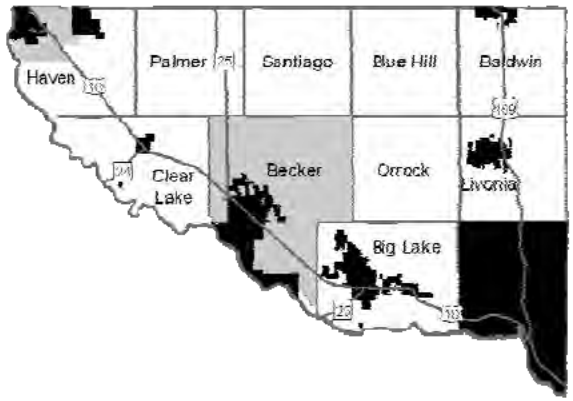


Figure 1.1: County's jurisdiction for Planning & Zoning administration (white areas). Source: Sherburne County Planning & Zoning Dept.

Additionally, the Comprehensive Plan is intended to be used as a reference for information about local land use topics. The Comprehensive Plan is not intended to be all inclusive, thus the reader should not rely on the Comprehensive Plan alone, but should additionally refer to other land use reports, policies, and studies that may be applicable to the subject matter.

A simpler way of thinking about what a comprehensive plan is, is what do we want the community to look like 20-years from now, and how can we get there? To do this, we must first take an inventory of what we have, then make some assumptions of what might occur over those 20-years, and then answer how we should guide land use regulations given these assumptions, in order to accomplish our goals by the year 2030.

What a Comprehensive Plan is not

The Comprehensive Plan is a guide, and is not a law (i.e. ordinance). It assumes that certain changes will happen (i.e. population growth), and guides how land should be used to accommodate these changes while accomplishing the Plan's goals at the same time. The Plan does not guarantee that any changes will occur, and thus the Comprehensive Plan is a guide and not a law.

There are several reasons why the Comprehensive Plan was updated, including; timing, growth pressures, economic conditions, evolving relationships between the County, townships, and cities, the adoption of the *Parks, Trails, and Open Space Policy Plan* (2005), *Transportation Plan* (2007), and a number of related city land use plans and regional studies, all of which require reconsideration of how we look at guiding land use into the future.

The Comprehensive Plan was last updated in 2004, and has received several minor amendments since that time stemming from amendments to the Zoning Map (i.e. rezonings). When land is rezoned from one use to another, this often requires an amendment to the Comprehensive Land Use Map as well so that the two maps are compatible.

The Zoning and Subdivision ordinances received major revisions in 1994 and have had several minor and major amendments since that time. Because of the number of amendments to these ordinances, there is a need for a major update of the Zoning and Subdivision ordinances. This process will be guided by the goals and policies of the Comprehensive Land Use Plan.

The updating of the Comprehensive Land Use Plan may be thought of as a two-part process; (1) updating the plan itself, which will then be implemented through; (2) updating the Zoning and Subdivision ordinances.

Legislative Authority

MN Statute 394.23

The [County] [B]*oard has the power and authority to prepare and adopt by ordinance, a comprehensive plan. A comprehensive plan or plans when adopted by ordinance must be the basis for official controls adopted under the provisions of sections 394.21 to 394.37. The commissioner of natural resources must provide the natural heritage data from the county biological survey, if available, to each county for use in the comprehensive plan. When adopting or updating the comprehensive plan, the board must, if the data is available to the county, consider natural heritage data resulting from the county biological survey. In a county that is not a greater than 80 percent area, as defined in section 103G.005, subdivision 10b,*[3] *the board must consider adopting goals and objectives that will protect open space and the environment.*

MN Statute 394.231

A county adopting or updating a comprehensive plan in a county outside the metropolitan area as defined by section 473.121, subd 2,[4] and that is not greater than 80% [in] *area, as defined in section 103G.005, subd 10b, shall consider adopting goals and objectives for the preservation of agricultural, forest, wildlife, and open space land, and minimizing development in sensitive shoreland areas. Within three years of updating the comprehensive plan, the county shall consider adopting ordinances as part of the county's official controls that encourage the implementation of the goals and objectives. The county shall consider the following goals and objectives:* [see pages 148-149]

1. *Minimizing the fragmentation and development of agricultural, forest, wildlife, and open space lands, including consideration of appropriate minimum lot sizes;*
2. *Minimizing further development in sensitive shoreland areas;*
3. *Minimizing development near wildlife management areas, scientific and natural areas, and nature centers;*
4. *Identification of areas of preference for higher density, including consideration of existing and necessary water and wastewater services, infrastructure, other services, and to the extent feasible, encouraging full development of areas previously zoned for non-agricultural uses;*
5. *Encouraging development close to places of employment, shopping centers, schools, mass transit, and other public and private service centers;*
6. *Identification of areas where other developments are appropriate; and other goals and objectives a county may identify.*
7. *Other goals and objectives a county may identify.*

MN Statute 396.24, Subd 1

Official controls [i.e. Zoning & Subdivision ordinances] *which shall further the purpose and objectives of the comprehensive plan and parts thereof shall be adopted by ordinances. The comprehensive plan must provide guidelines for the timing and sequence of the adoption of official controls to ensure planned, orderly, and staged development and redevelopment consistent with the comprehensive plan.*

October
P+Z Staff Review Committee outlines Comp Plan

January - April
P+Z Staff meet with each Town Board to discuss survey re: preferences for zoning ordinance changes (see Appendix A)

September 2
County Board Workshop, review Township preference survey, Goals & Objectives (see pages 148-149)

October 21
Staff update at Association of Townships Quarterly Meeting

November - January
Draft Comp Plan maps issued to each Town Board for comments

2008 2009 2010

Footnotes:

[i] Source of 2010 estimated population: US Census. Source of other *Key Economic Indicators*: Sherburne County Auditor/ Treasurer Department. 2010 Comprehensive Annual Financial Report p2. Elk River, 2011.

[ii] 2010 Census

[1] 2010 Census

[2] Office of the State Demographer. Extrapolated Population for Minnesota Cities and Townships Outside The Twin Cities Region, 2006 to 2035. Minnesota Department of Administration, Geographic and Demographic Analysis Division. 2007.

NOTE: In 2007, the Minnesota Demographic Center projected the County's 2010 population to be 101,560. In 2010, the Minnesota Demographic Center estimated the County's 2009 population to be 88,122 (15% difference). Assuming that the most recent data is more accurate, the accuracy of the 2006-2035 population projections published in 2007 is doubtful. However, as of 2010, the 2007 report remains to be the most recent population projections from a credible source. The Minnesota Demographic Center intends to update population projections in 2011/2012.

[3] MN Statute 103G.005, subd 10b: *Greater than* **[80%]** *area means a county or watershed where* **[80%]** *or more of the pre-settlement wetland acreage is intact and:*
(1) 10% or more of the current total land area is wetland; or
(2) *50% or more of the current total land area is state or federal land.*

In Sherburne County, 50% - 70% of the pre-settlement wetland acreage is intact, thus MN Statute 394.23 applies to Sherburne County (see Chapter 10: Goals & Policies).

[4] MN Statute 473.121, subd 2: *"Metropolitan area" or "area" means the area over which the Metropolitan Council has jurisdiction, including only the counties of Anoka; Carver; Dakota excluding the city of Northfield; Hennepin excluding the cities of Hanover and Rockford; Ramsey; Scott excluding the city of New Prague; and Washington.*

Sherburne County is not within the "Metropolitan area."

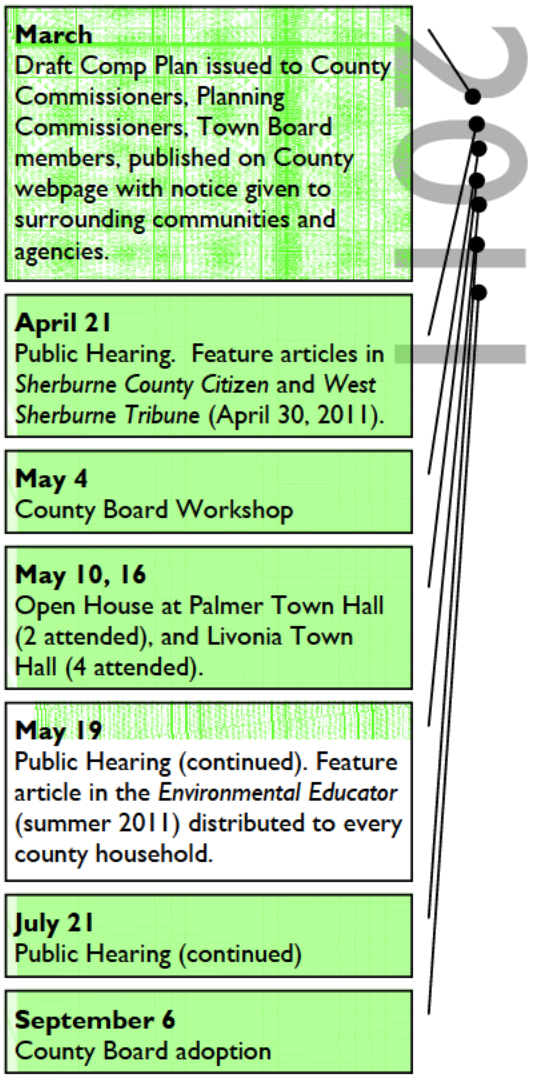


Figure 1.2: Timeline of the Comprehensive Plan update process.

Chapter 2
Population



Winding Trails subdivision, Baldwin Township

Summary

Sherburne County's settlement history can be seen as a series of transitions as industries, transportation, and technologies have changed, influencing how land is used. The Mississippi River corridor through Sherburne County was inhabited by the Ojibwe. During the 1600's and 1700's, French and British trading posts were established along the river, but did not prosper. After the Louisiana Purchase in 1803, much of the area was mapped. Treaties with the Ojibwe in 1837 and 1851 opened the area for logging and European settlement. By 1855, the Red River Ox-Cart Trail was replaced by a territorial/government road constructed between St. Paul and Fort Ripley, which today is U.S. Highway 10. Steamboats pushed logs downstream to local mills established in St. Cloud, Clearwater, Elk River, Anoka, and Champlin. The Homestead Act of 1862 attracted more European settlers increasing the County's population from 725 in 1860 to 3,013 by 1870. A Railroad was established in 1865 along the territorial road. By 1879 the U.S. Army Corps of Engineers stopped maintaining a channel through the Mississippi River, and river towns re-orientated themselves becoming railroad towns, and agriculture replaced logging as the primary industry.

Between 1902 and about 1920, a series of ditches were built to drain much of the County's wetlands to convert into productive farmland. In the early 1970's, mechanical irrigation pivots began to be widely used by farmers to irrigate crops on sandy soils. Between the 1920's and 1950's, weekend cottages and resorts were established along many of the lakeshores. By the 1960's, the County's township population surpassed city populations, only to reverse again during the 1980's. As the metropolitan area expanded into the County, land values increased, resorts closed and cottages were replaced with year-around homes. Between the 1940's and 1980's, power plants were constructed in Becker and Elk River (2). Xcel Energy's SHERCO plant in Becker is the largest coal plant in Minnesota, producing 15.8 million megawatt hours annually. Great River Energy's Elk River Station was converted from coal to nuclear, reconverted to coal, and reconverted again to Refuse Derived Fuel. The County adopted a zoning ordinance in 1971 regulating land use within the townships. A housing boom occurred between 1985 - 2005.

History

The following is a brief timeline of events affecting land use in Sherburne County:

1853:	Treaty of Traverse des Sioux ceding 24 million acres within the Minnesota Territory to the U.S. Government. Chippewa and Mdwakanton Sioux tribes relocated.
1856:	Sherburne County established, with five townships.
1857:	First plat (map) approved (Town of Orono, now part of the City of Elk River).
1862:	Federal Homestead Act approved, deeding 160-acres of federal land to citizens after they have farmed, built and lived in a house on the land for a minimum of five years.
1865 - 1884:	Railroad extended, connecting St. Cloud and Elk River, and Elk River and Princeton.
1920 - 1937:	Highway 10 re-constructed from gravel road to a two-lane concrete trunk-highway.
1931 - 1932:	Highway 169 re-constructed from gravel road to a two-lane concrete trunk-highway.
1938 - 1953:	Highway 10 reconstructed from a two-lane to a four-lane divided trunk-highway.
1959:	Minnesota Legislature adopts the County Planning Act, granting counties the authority to appoint a planning commission and board of adjustment, and adopt a comprehensive plan and zoning ordinance to promote the *"health, safety, moral and general welfare of the community."*
1964:	County Planning & Zoning Commission appointed.
1965:	County Interim Zoning Ordinance adopted
1965:	Sherburne National Wildlife Refuge established.
1966:	St. Cloud Area Planning Organization (APO) established, facilitating transportation planning.
1968:	County Economic Development Plan adopted.
1968 - 1974:	Highway 169 reconstructed from a two-lane to a four-lane divided trunk-highway.
1970:	County Transportation Plan adopted.
1970:	County Comprehensive Plan adopted, guiding land use in townships.
1971:	County Zoning Ordinance adopted regulating land use in townships.
1972:	County adopted Uniform Building Code.
1973:	County Solid Waste Ordinance adopted.
1976:	County Economic Development Plan major revision.
1976:	Mississippi Scenic Riverway Management Plan adopted by the Minnesota Department of Natural Resources (DNR), regulating land use along the Mississippi River between St. Cloud and Anoka.
1976:	Rail line between Elk River and Princeton discontinues regular service.
1976:	St. Cloud Municipal Airport Zoning Ordinance adopted by Benton, Sherburne, and Stearns counties, and St. Cloud.
1978:	Elk River city and township consolidation
1978:	County adopts Princeton Municipal Airport Zoning Ordinance.



Figure 2.1: Sherburne County Courthouse (1877 - 1980), 1981. Source: Minnesota Historical Society (used with permission).

1979:	County adopted Wild & Scenic River ordinance.
1980:	County adopts Minnesota Building Code.
1981:	County Floodplain Ordinance adopted.
1982:	DNR adopts the Cambridge Area Forest Resource Management Plan, which includes the Sand Dunes State Forest.
1986:	County Solid Waste Management Plan adopted
1989:	County Solid Waste Ordinance major revision.
1989:	County Economic Development Plan major revision.
1991:	Wetland Conservation Act adopted.
1991-1993:	County Interim Zoning Ordinance in effect.
1992:	County Comprehensive Plan revised.
1992:	County Comprehensive Water Plan adopted.
1992-1994:	County Shoreland Ordinance major revision.
1993:	County Solid Waste Ordinance major revision.
1994:	County Zoning and Subdivision ordinances major revision.
1997:	County Transportation Plan major revision
1997:	Community Based Planning Act established, creating the St. Cloud Area Joint Planning District.
1999, 2001:	Community Based Planning Act repealed by MN Legislature.
2001:	County Comprehensive Water Plan major revision.
2004:	County Comprehensive Plan major revision.
2004:	County Solid Waste Management Plan major revision.
2005:	Joint County/Township parallel zoning and subdivision ordinances adopted by Baldwin and Big Lake townships.
2007:	Joint County/Township parallel zoning and subdivision ordinances adopted by Livonia Township.
2007:	County Comprehensive Water Plan major revision.
2007:	County Transportation Plan major revision.
2009:	County Road Right-of-Way ordinance adopted.
2009:	Becker Township adopts Zoning and Subdivision ordinances. County continues to administer Floodplain, Wild & Scenic, Shoreland, and Solid Waste ordinances.
2010:	Haven Township adopts Zoning Ordinance within Orderly Annexation area. County continues to administer Floodplain, Wild & Scenic, Shoreland, and Solid Waste ordinances.
2010:	County Solid Waste Management Plan major revision.
2010:	County Solid Waste Ordinance major revision.
2011:	County Comprehensive Plan major revision.

Population

Sherburne County has consistently been one of the fastest growing counties within the Twin Cities area. This has been primarily due to;

- The County's proximity to employment centers in the Twin Cities;
- Easy access to State Highways 10, 101, 169, and Interstate 94; and
- Local land use policy has allowed rural residential development in the eastern half of the County.

According to the U.S. Census, between 2000 - 2010, Sherburne County's population grew from 64,417 to 88,499 (37%). Six other counties in Minnesota experienced more overall growth. But when it comes to township population growth, Sherburne County's ten townships added 8,191 persons, more than twice as many as Beltrami (+3,408), Mille Lacs (+2,489), Scott (+2,309), and St. Louis (+2,083) counties. Chapter 9 includes population information specific to each township.

Household Ethnicity

According to the 2005-2009 American Community Survey; ethnically, almost half of the County's residents are of German ancestry (45.1%), followed by Norwegian (16.7%), Irish (11.7%), Swedish (10.7%), and Polish (7.6%). The largest concentrations of residents claiming German heritage are in Clear Lake (62.4%), Clear Lake Township (60.6%), and Haven Township (57.4%). State-wide, 38.3% of residents are German, and 16.8% in the U.S.

According to the 2010 Census, 94% of County residents are Caucasian (White), followed by Hispanics/Latinos (2.2%), and African American (Black) (1.9%).

According to the 2005-2009 American Community Survey, 1,990 (2.3%) County residents were born in a foreign country. Those residents were most commonly from Europe, Asia, or Latin America. Of those foreign born, 364 residents entered the U.S. between 2000-2009.

Social Characteristics

According to the 2005-2009 American Community Survey, 64.9% of County households consist of a married couple, 52.1% in Minnesota, and 49.7% in the U.S. Communities with the highest percentage of married couples include; Becker (83.6%), Blue Hill (82.4%) and Livonia (77.4%) townships. Of residents 15 years of age and older, the divorce rate (i.e. current marital status is divorced) was 7.4% (male), and 9.2% (female) in the County, compared to 8.4% (male), and 10.2% (female) in Minnesota, and 9.2% (male), and 11.6% (female) in the U.S. Communities with the highest divorce rate (male % / female %) include; Clear Lake Township (15.3% / 4.8%), Clear Lake (14.7% / 7.5%), Zimmerman (13.8% / 18.4%), and Princeton (11.8% / 16.8%).

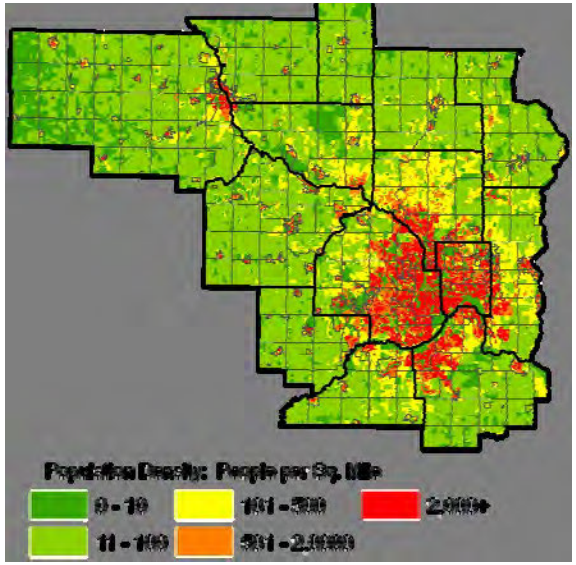


Figure 2.2: Population density by 2000 Census blocks. Source: U.S. Census Bureau.

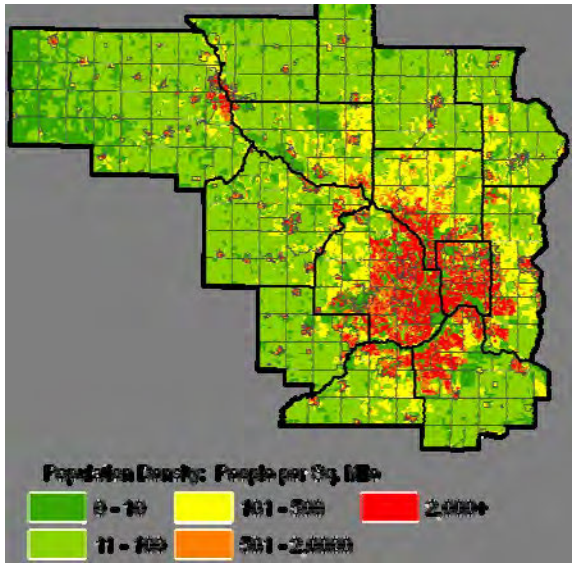


Figure 2.3: Population density by 2010 Census blocks. Source: U.S. Census Bureau.

According to the 2005-2009 American Community Survey, 44.5% of County households have children under 18 years old, compared to 32.6% in Minnesota, and 34.2% in the U.S. Communities with the highest percentage of family households with children include; Clear Lake (64.7%), and Santiago (60%), Becker (55.8%), and Blue Hill (54.8%) townships. Communities with the lowest include; Princeton (22.3%), St. Cloud (24.1), and Clear Lake Township (28.2%). Communities with the highest percentage of households consisting of a single-parent with own children (_% male / _% female head of household) include; Clear Lake (12.7% / 0%), Zimmerman (4% / 14.3%), Princeton (0.5% / 6.9%), St. Cloud (1.8% / 6.2%), and Becker (6.1% / 4.6%).

According to the 2005-2009 American Community Survey, 12.8% of County households include a person(s) 65-years old and older, compared to 21.2% in Minnesota, and 23.6% in the U.S. 4.1% of County households consist of a person 65 years old or older living alone, compared to 9.2% in Minnesota, and 9.3% in the U.S. Communities with the highest percentage include; Princeton (12.2%), Clear Lake (7.3%), and St. Cloud (6.8%).

According to the 2005-2009 American Community Survey, there were an estimated 5,697 civilian veterans living in Sherburne County, or 9.4% of the population 18 years and older. This is compared to 10.2% in Minnesota, and 10.1% in the U.S. Communities with the highest *percentage* of veterans include Clear Lake Township (16% or 215), Baldwin Township (14% or 566), and Clear Lake (12.8% or 35). Other communities with a high *number* of veterans include St. Cloud (9.7% or 5,330), and Elk River (9.2% or 1,459).

	Twp	City
Total Households (of all townships, cities)	12,347	14,200
Households with children under age 18	45.7%	52.9%
Family Households with children under age 18	43.9%	51.4%
Married couple-Family	75.3%	61.5%
Householder living alone	14.1%	17.8%
Householder living alone, age 65 or older	2.7%	4.6%
Households with individuals, age 65 or older	14.0%	11.8%
Average Household size	3.03	2.92
Average Family size	3.32	3.34

Figure 2.4: Social characteristics of households (average of townships and cities, excluding Princeton, St. Cloud). Source: 2005-2009 American Community Survey.

Health

Behavioral Risks

According to the Minnesota Department of Health, behavioral health risks of adult county residents are comparable (i.e. within 3%) to Minnesota county averages, except the percentage of adults with hypertension (high blood pressure) is 6.3% lower in Sherburne County (18.3%) compared to the state average (24.9%) between 2004 - 2007. According to the most recent estimates (2008), 24.5% of adults in Sherburne County are obese and 37.1% are overweight. 17.3% of adults do not exercise, and 20.2% of adults reported having limited activities due to physical, mental, or emotional problems.[1]

Births & Deaths

According to the Minnesota Department of Health[1], between 2003 - 2009 there was an average of 1,301 births per year by Sherburne County residents, while the County experienced an average of 416 deaths per year during this same time period. The leading causes of death of County residents was Cancer (22%) and Heart Disease (20%).

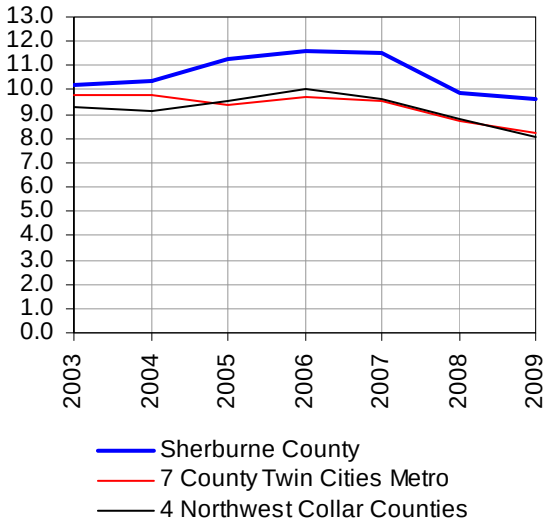


Figure 2.5: Natural Rate of Population Increase (the percentage change in the population due to the difference in the birth rate and death rate). Source: Minnesota Department of Health.[1]

Between 2003 - 2009, Sherburne County's average natural rate of population increase was 11.0, with a high of 11.6 in 2006 and a low of 9.6 in 2009, still well above the state average of 6.6. The natural rate of increase is the percentage change in population due to the difference in the birth rate and death rate. Sherburne's decrease suggests the County's population growth rate has steadily decreased from it's peak in 2006, as have other fast growing counties.

Net Migration Rate is the rate at which people migrate (move) from one area into another. According to US Census estimates, in 2002 Sherburne County had a net migration rate of 39.5 meaning that 2,771 more people moved into the county than moved out of it. But in 2009, the County had a net migration rate of –4.6 meaning 407 more people moved out of Sherburne County than moved into it.[2]

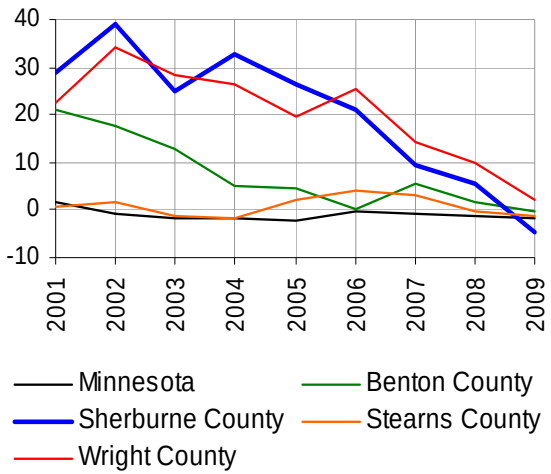


Figure 2.7: Internal Migration Rate of Region 7W counties, 2001-2009. In 2009, 407 more people moved out of Sherburne County than moved into it. Source: US Census.[2]

Healthcare Facilities

Healthcare facilities within the County or in close proximity include;

Hospitals:

- St. Cloud Hospital (St. Cloud), Level 2 Trauma Center, 489 licensed beds
- Fairview Northland Medical Center (Princeton), Level 4 Trauma Center, 54 licensed beds
- New River Medical Center (Monticello), Level 4 trauma Center, 39 licensed beds

Healthcare Clinics:

Within Sherburne County, healthcare clinics are located in most cities and are concentrated in Elk River (9 clinics). Clinics are operated by Allina, CentraCare, Fairview, HealthPartners, North Memorial, and independent providers.

	Obese or Overweight		Current Smokers		Acute Drinking		Chronic Drinking		Perceiving health status as fair or poor		Reporting limitation in any activities because of any impairment or health problem		No exercise		Hypertension	
	MN	Sherburne	MN	Sherburne	MN	Sherburne	MN	Sherburne	MN	Sherburne	MN	Sherburne	MN	Sherburne	MN	Sherburne
2003	60.4%	59.4%	21.2%	22.7%	20.0%	22.7%	5.6%	5.8%	11.1%	9.4%	23.6%	21.6%	N/A	N/A	N/A	N/A
2004	59.6%	57.9%	20.8%	22.1%	19.9%	22.3%	5.6%	5.9%	10.0%	8.6%	21.8%	19.6%	15.9%	15.1%	24.5%	20.3%
2005	59.9%	58.7%	20.0%	21.5%	18.8%	21.4%	5.0%	5.1%	11.3%	9.9%	26.0%	20.6%	17.8%	15.2%	28.6%	17.7%
2006	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2007	61.7%	60.7%	16.5%	17.4%	14.3%	16.0%	3.8%	3.8%	11.0%	9.7%	18.8%	16.5%	16.7%	15.7%	21.5%	17.8%
2008	62.7%	61.6%	17.5%	18.5%	19.7%	21.8%	4.7%	4.8%	11.4%	10.2%	22.5%	20.2%	19.5%	17.3%	N/A	N/A

Figure 2.6: Behavioral risk factors of adult Sherburne County and Minnesota residents. Source: Minnesota Department of Health; Behavioral Risk Factor Surveillance System.[1]

Assisted Living:
Minnesota licensed assisted living facilities within the County include St. Benedict's Senior Community (St. Cloud - 222 beds), Guardian Angels by The Lake (Elk River - 120 beds), Talahi Care Center (St. Cloud - 77 beds) and Lange Board & Rooming Home (Santiago Township).

Additionally, there are a number of local providers for home healthcare and home hospice care.

Uninsured
The U.S. Census estimates that as of 2007, 7,362 Sherburne County residents (9.1%) under age 65 do not have health insurance.

Education
Sherburne County is served by seven public school districts. According to the 2005-2009 American Community Survey, in Sherburne County 93% of adult residents are high school graduates (above state and U.S. averages), 24% have obtained a Bachelor's degree, and 6% have obtained a Master's or professional degree.

Figure 2.12 shows the change in total school enrollment by district (pre-Kindergarten - 12th Grade). The graph shows that the Elk River district has grown substantially in numbers while St. Cloud has declined, and others have remained steady or have had gradual increases. The biggest *percentage* increases between the 1989/1990 - 2009/2010 school years were experienced by Big Lake (66%), Becker (65%), and Elk River (52%). Enrollment decreases were experienced by St. Cloud (-15%) and Foley (-0.5%).

Globe University/Minnesota School of Business includes a campus in Elk River (opened in 2009 as 1 of 19 campuses), and offers certificate, associate, and bachelor degree programs primarily in the business and healthcare industries. The nearest traditional 4-year university is St. Cloud State University (about 17,000 students enrolled), located along the Mississippi River in Stearns County. SCSU offers more than 200 programs. Other nearby 4-year colleges include the College of St. Benedict in St. Joseph, and St. John's University in Collegeville. Two-year colleges nearby include St. Cloud Technical College in St. Cloud, Anoka-Hennepin Technical College in Ramsey, and Anoka-Ramsey Community College in Cambridge and Coon Rapids.

Employment
The Census compiles employment data according to Industry and Occupation. According to the 2005-2009 American Community Survey, industries which employed a significantly higher percentage of local workers compared to state and U.S. averages included the manufacturing, and construction industries.

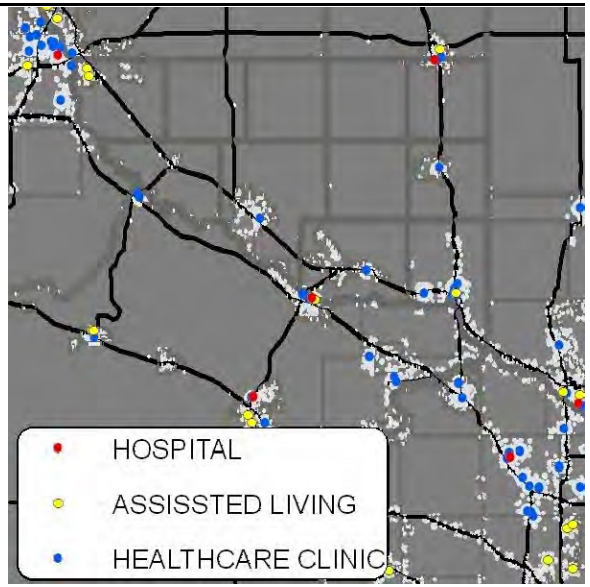


Figure 2.8: Area healthcare facilities. Source: Sherburne County Health & Human Services Department.

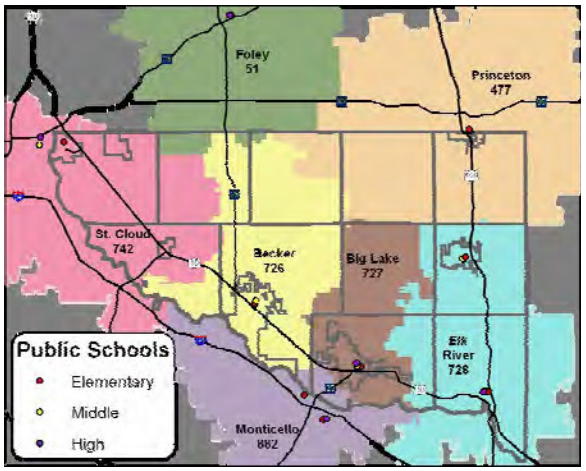


Figure 2.9: Public K-12 school districts and school locations serving primarily County residents (excludes charter schools and public specialty schools). Source: Sherburne County Public Works Dept.

District	High Schools	Grades Served	Student Pop	School property tax paid on a $200,000 house in a **township** (2009)	Total Expenditure per Student (2008)	Limited English Proficiency	Special Ed.	Free & Reduced Priced Lunch	(2008) Minnesota Comprehensive Assessment Series II Scores				AYP Graduation Rate
									Reading (grade 10)		Math (grade 11)		
									Exceed or Meet Standard	Does Not Meet Standard	Exceed or Meet Standard	Does Not Meet Standard	
Becker	Becker	9-12	717	$394.68	$9,140	1%	14%	12%	74%	4%	38%	40%	99.4%
Big Lake	Big Lake	9-12	959	$732.48	$7,971	0%	13%	21%	66%	11%	36%	44%	97.4%
Elk River	Elk River	9-12	1,694	$724.30	$8,490	3%	14%	10%	74%	7%	37%	40%	98.0%
	Zimmerman	9-12	560		$8,873	1%	16%	16%	69%	9%	32%	46%	90.4%
Foley	Foley	9-12	517	$871.46	$8,440	0%	14%	29%	69%	9%	22%	55%	100.0%
Princeton	Princeton	9-12	1,084	$387.48	$8,534	0%	12%	20%	65%	15%	34%	46%	98.6%
St. Cloud	Technical	9-12	1,543	$269.84	$8,330	7%	13%	26%	68%	13%	42%	36%	97.3%
Monticello	Monticello	9-12	1,170	$521.66	$9,605	1%	15%	17%	75%	8%	36%	38%	95.6%

District	Middle Schools	Grades Served	Student Pop		Total Expenditure per Student (2008)	Limited English Proficiency	Special Ed.	Free & Reduced Priced Lunch	(2008) Minnesota Comprehensive Assessment Series II Scores				AYP Attendance Rate
									Reading (grade 7)		Math (grade 7)		
									Exceed or Meet Standard	Does Not Meet Standard	Exceed or Meet Standard	Does Not Meet Standard	
Becker	Becker	6-8	608		$7,075	0%	13%	17%	67%	11%	65%	11%	96.3%
Big Lake	Big Lake	6-8	829		$6,583	2%	12%	21%	59%	18%	55%	19%	95.2%
Elk River	Zimmerman	6-8	460		$7,351	2%	14%	20%	50%	20%	51%	21%	95.6%
	Vandenberg	6-8	546		$9,666	5%	17%	15%	67%	13%	65%	12%	96.5%
	Salk	6-8	651		$8,236	2%	13%	13%	61%	9%	69%	11%	96.2%
Foley	Foley Intermed.	4-8	610		$7,244	0%	16%	29%	63%	14%	57%	16%	96.8%
Princeton	Princeton	6-8	794		$7,687	1%	13%	27%	60%	21%	52%	24%	94.5%
St. Cloud	South Junior	7-8	702		$8,212	8%	15%	34%	60%	21%	59%	15%	94.9%
Monticello	Monticello	6-8	906		$9,889	1%	16%	22%	65%	13%	49%	22%	96.0%

District	Elementary Schools	Grades Served	Student Pop		Total Expenditure per Student (2008)	Limited English Proficiency	Special Ed.	Free & Reduced Priced Lunch	(2008) Minnesota Comprehensive Assessment Series II Scores				AYP Attendance Rate
									Reading (grade 3)		Math (grade 3)		
									Exceed or Meet Standard	Does Not Meet Standard	Exceed or Meet Standard	Does Not Meet Standard	
Becker	Becker Primary	K-2	621		$7,185	2%	11%	15%	N/A	N/A	N/A	N/A	96.3%
	Becker Intermed,	3-5	696		$6,983	2%	11%	17%	84%	5%	85%	4%	96.5%
Big Lake	Independence	K-5	978		$6,411	2%	9%	22%	82%	11%	82%	4%	95.9%
	Liberty	K-5	784		$7,567	3%	13%	21%	84%	8%	77%	4%	96.2%
Elk River	Zimmerman	K-2	599		$8,085	2%	16%	21%	N/A	N/A	N/A	N/A	95.8%
	Westwood	3-5	556		$7,509	3%	13%	23%	85%	6%	80%	4%	95.6%
	Twin Lakes	K-5	698		N/A	4%	10%	13%	86%	5%	88%	1%	N/A
	Parker	K-5	428		$8,168	2%	15%	21%	89%	7%	84%	3%	96.5%
	Meadowvale	K-5	654		$7,618	1%	13%	9%	81%	10%	75%	2%	96.8%
	Lincoln	K-5	522		$8,149	2%	14%	27%	86%	6%	89%	5%	96.5%
Foley	Foley	K-3	524		$7,511	0%	13%	31%	83%	9%	81%	2%	96.7%
Princeton	North	3-5	801		$7,038	1%	12%	26%	76%	13%	72%	7%	95.8%
	South	K-2	787		$7,282	1%	9%	23%	N/A	N/A	N/A	N/A	95.5%
St. Cloud	Clearview	K-6	389		$9,390	0%	20%	25%	66%	20%	75%	6%	96.2%
	Lincoln	K-6	302		$10,710	0%	20%	64%	54%	14%	78%	10%	94.7%
	Talahi	K-6	673		$9,743	25%	19%	70%	50%	22%	70%	5%	95.6%
Monticello	Pinewood	K-5	1014		$9,320	2%	15%	23%	87%	8%	83%	3%	95.8%

Figure 2.10: School District performance. Source: MN Department of Education, Sherburne County Auditor/Treasurer's Dept. (tax rates).

Predominate industries Sherburne County residents are employed in include; Education, Health & Social Services (19.9%, up from 17.8% in 2000 Census), Manufacturing (16.8%, down from 21.3% in 2000), Retail Trade (12.7%, down from 13.3% in 2000), and Construction (9.8%, up from 9.5% in 2000).

Of township residents 16 years and older, 17.5% were employed in Manufacturing compared to 15.3% in cities (excluding Princeton and St. Cloud), 14.2% in Minnesota, and 11.2% in the U.S. Communities with the highest percentage of workers in this industry include Blue Hill Township (21.7%), Livonia Township (21.4%), and Orrock Township (20.7%). Page 13 includes a list of major manufacturing companies and products made locally.

Of township residents 16 years and older, 11.8% were employed in Construction compared to 12.3% in cities (excluding Princeton and St. Cloud), 6.4% in Minnesota, and 7.4% in the U.S. Communities with the highest percentage of workers in this industry include Clear Lake (21.9%), Blue Hill Township (17.5%), and Baldwin Township (15.8%).

According to the MN Department of Employment and Economic Development, as of December 2010, the unemployment rate in Sherburne County was 8.1% compared to 6.5% in the 15-county Twin Cities Metropolitan Statistical Area (MSA), which Sherburne is included in. The U.S. unemployment rate was 9.1%.

Sherburne County's increased unemployment rate may be attributed to the loss of manufacturing jobs and seasonal fluctuation of construction jobs, as illustrated in Figure 2.11. According to the

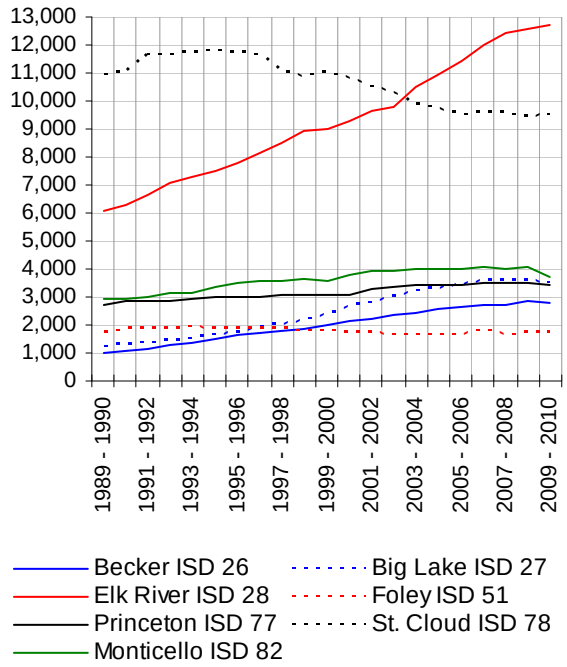


Figure 2.12: Pre-K - 12 Public School Enrollment, 1989 - 2010, Source: MN Department of Education.

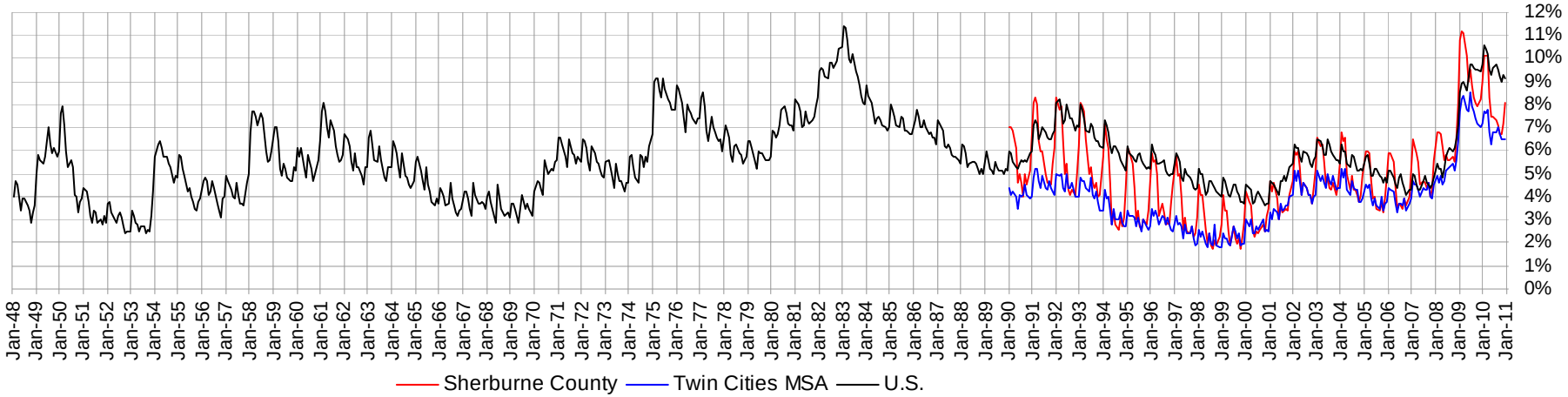


Figure 2.11: Monthly unemployment rate (not adjusted for seasonal employment), 1948 - 2010. Source: MN Department of Employment and Economic Development.

National Bureau of Economic Research[3], the most recent U.S. recession began in December 2007 and ended June 2009 (18 months). The bureau defines a recession as *"a period of falling economic activity spread across the economy, lasting more than a few months, normally visible in real* [Gross Domestic Product]*, real income, employment, industrial production, and wholesale-retail sales."*

Although the national recession has ended, Sherburne County's unemployment rate was over 10% during the winters of 2009 and 2010. In recent years the County's highest unemployment rate was 11.2% in February 2009 compared to 8.2% in the Twin Cities MSA during the same month. The County's lowest unemployment rate was 5.5% in October 2008 compared to 5.1% in the Twin Cities MSA during the same month.

Commuting

According to the 2000 Census, 68% of Sherburne County residents 16 years of age or older work outside of the County. Three of the top ten communities with populations over 2,500 in Minnesota with the longest work commute are located in Sherburne County (see Figure 2.13). According to the 2005-2009 American Community Survey, of workers 16 years and older residing in the County's townships had a mean commute time of 32.7 minutes, compared to 30.7 minutes in cities (excluding Princeton and St. Cloud), 22.2 minutes in Minnesota, and 25.2 minutes in the U.S. Local communities with the longest mean commuting times included Livonia Township (38.3 minutes), Blue Hill Township (36.1), and Orrock Township (35.8). Communities with the shortest commute included Clear Lake Township (24.8 minutes), Haven Township (25.1), and Clear Lake (27.4).

Of workers residing in townships, an average of 82% commuted by driving alone, compared to 84% in cities (excluding Princeton and St. Cloud), 77.9% in Minnesota, and 75.9% in the U.S.

According to the 2005-2009 American Community Survey, of workers residing in townships an average of 0.8% (208 persons) commuted using public transportation compared to 0.5% (231 persons) in cities (excluding Princeton and St. Cloud), 3.3% in Minnesota, and 5% in the U.S.

River Rider was established in 1979 as a joint powers between Sherburne and Wright counties. The dial-a-ride bus service travels between Big Lake, Elk River, Annandale, Buffalo, Cokato, and Monticello. Northstar Commuter Rail service began in November, 2009 between Big Lake and downtown Minneapolis. It has an estimated weekday ridership of between 1,900 - 2,000 in 2010 and is projected to increase to 5,900 by 2030. Northstar Link commuter bus service began in November, 2009 between St. Cloud State University and the Big Lake Commuter Rail Station. It has a projected 2010 weekday ridership of 173.

Of workers residing in townships, an average of 5.1% (1,045 people, total) worked at home,

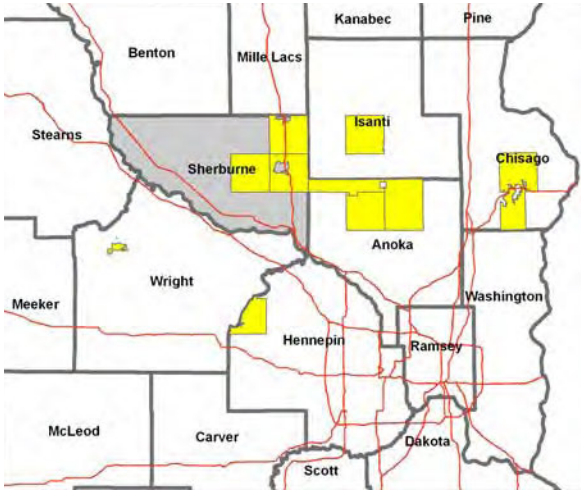


Figure 2.13: Top 10 communities in MN (populations over 2,500) with the longest average commute to work. Source: 2000 Census.

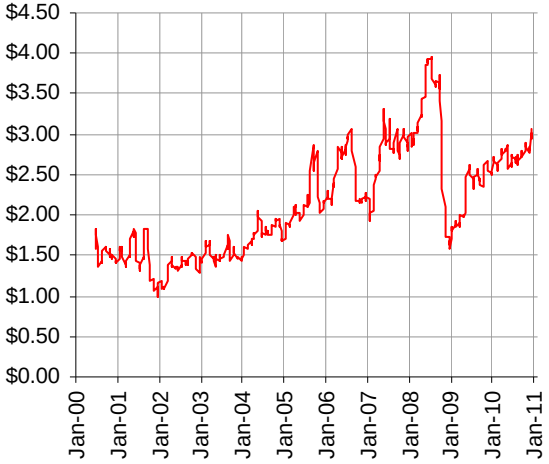


Figure 2.14: Average weekly price of Regular Unleaded gasoline in Minnesota. Source: U.S. Energy Information Administration.

compared to 3.2% in cities (excluding Princeton and St. Cloud), 4.9% in Minnesota, and 4% in the U.S. Communities with the highest percentage of residents who worked from home include Becker (8% or 162 persons), Haven Township (7% or 102 persons), and Livonia Township (6.9% or 161 persons).

Poverty

The Minnesota Office of the Legislative Auditor defines Affordable Housing as: (1) Housing consumes no more than 30% of gross family income, and (2) Housing is affordable to those earning 50% of the local median income for rental housing, and 80% of the local median income for owner-occupied housing.

According to the 2005-2009 American Community Survey, 6.5% of the County's population has an income below the poverty level. 8.0% of the population over 65 years old live in poverty. 6.4% of families with children under 18 years old live in poverty. Communities with the highest percentage of family households living below the poverty level include; St. Cloud (10.2%), Big Lake (8.2%), and Zimmerman (5.9%).

According to the 2005-2009 American Community Survey, the County's median earnings for all workers was $35,611. The median household income was $71,228.

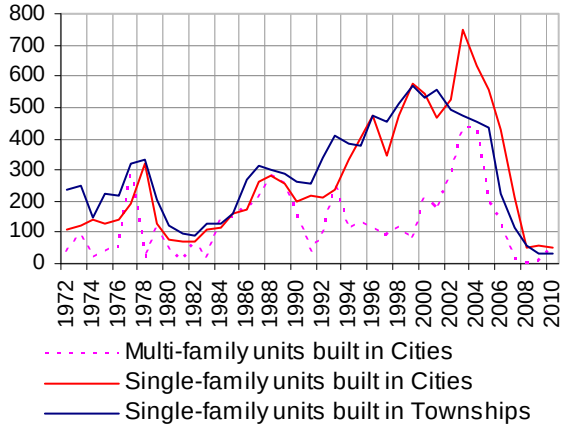


Figure 2.15: Total housing units constructed in Cities and Townships, 1972 - 2010. Multi-family units include apartments, condominiums, nursing home units, townhomes, twin-homes, duplexes, and quadplexes. Source: Sherburne County Planning & Zoning Dept.

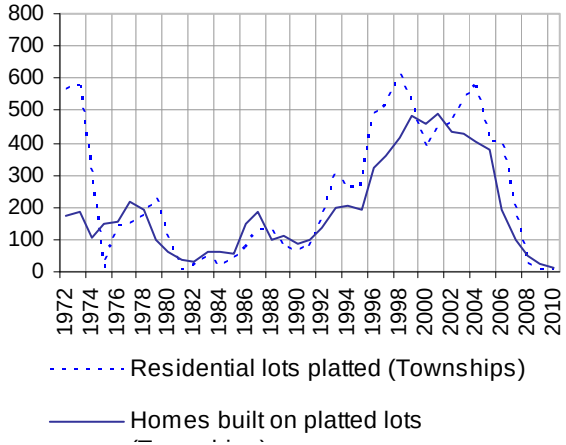


Figure 2.16: Comparison between the number of residential lots platted and the number of homes built on platted lots. Source: Sherburne County Planning & Zoning Dept.

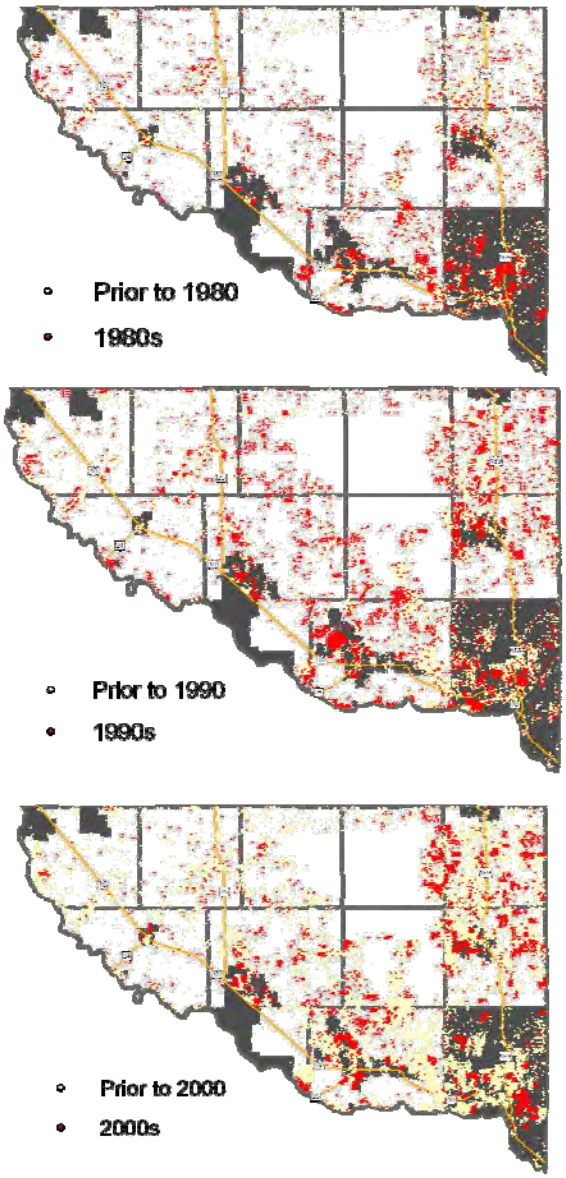


Figure: 2.17: Location of homes built by decade. City boundaries are as of 2009. Source: Sherburne County Assessor's Dept.

Housing

Figure 2.15 shows the number of housing units built per year in townships and cities. Township and city growth rates were comparable during the 1990's. Then a housing boom occurred in the cities during the early 2000's (high of 1,185 units in 2003), followed by a sharp decline beginning in 2005 (low of 52 units in 2008), presumably because the market was overbuilt.

Figure 2.16 shows the correlation between the number of residential lots platted compared to the number of homes built on platted lots in townships. For larger subdivisions, it usually takes at least one year from the time a subdivision is approved by the County Board until a building permit for a new house is issued by the County Planning & Zoning Department. During that time, the subdivision plat is recorded, soil grading is completed, utilities are installed, roads are built, and lots are marketed and sold. Thus, changes in the number of homes built usually follows at least one year behind any change in the number of residential lots approved.

Figure 2.16 also shows when the market may have been over developed with new lots compared to the demand to build new homes, such as in the early 1970's and in the mid-2000's. As of 2011, there were about 3,900 vacant residential platted lots county-wide.

Home Ownership

County-wide, according to the 2005-2009 American Community Survey, 86.4% of homes are owner occupied, while 13.6% are renter occupied. An average of 95.6% of households in townships are owner occupied, compared to an average of 83.8% in cities. The highest percentage of renter occupied households include; St. Cloud (45.6%), Princeton (28.8%), and Clear Lake (17.3%).

According to the 2005-2009 American Community Survey, 58.7% of County residents moved into their current home between 2000-2009. 25.7% of residents moved in between 1990-1999.

Average Home Sale Price

According to the Sherburne County Assessor's Department, the average sale price of a single-family home in the County in January 2000 was $149,935. Between 2000 - 2010, the average sale price peaked in November 2007 at $271,952 (81% increase since January 2000) before falling to $166,484 in November, 2010 (11% increase since January 2000). These figures represent "good sales" which exclude short sales, foreclosures, estate sales, etc. Data also excludes all home sales within the City of St. Cloud.

The Standard & Poor/Case-Shiller Home Price Index (Figure 2.19) measures the percentage rate of change of the average sale price of homes in the 20 largest Metropolitan Statistical Areas (MSA). Sherburne County is included within the Minneapolis/St. Paul MSA. The Index is often referred to as

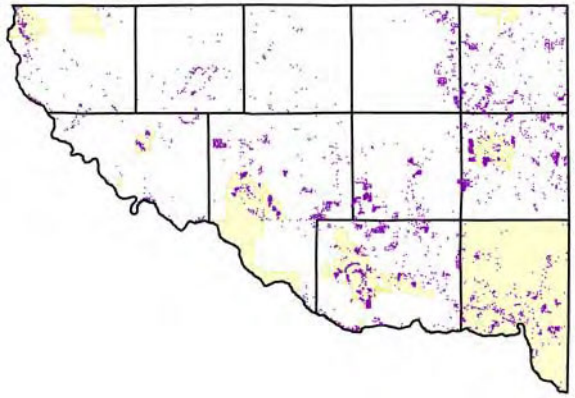


Figure 2.18: Vacant residential platted lots (2011), Source: Sherburne County Assessor's Dept.[7]

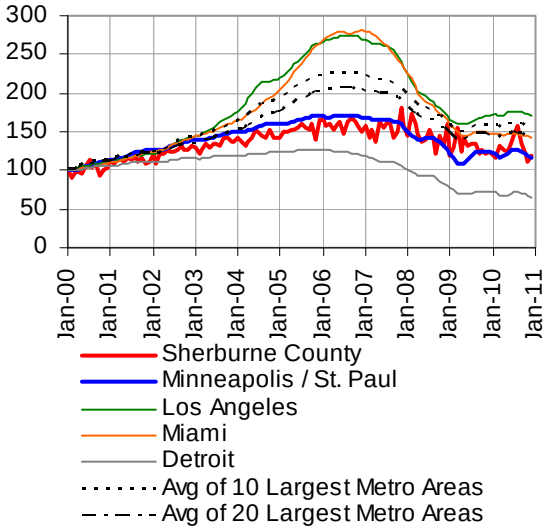


Figure: 2.19: "The Housing Bubble." Percentage change in the average monthly sale price of single-family homes. 100 = 100% of the home value as of January 2000. Sherburne County's data excludes non-traditional sales, and sales within the City of St. Cloud. The line representing the County zigzag's because the fewer the monthly home sales, the more the average is affected by extreme high and low sale prices. Source: S&P/Case-Shiller Home Price Indices[8], Sherburne County Assessor's Dept.

one measure of a local economy's health. Providing an "apples-to-apples" comparison of a home valued at $200,000 as of January, 2000 (values rounded to the nearest $1,000):

- In Sherburne County, the home's value would have peaked at $363,000 in November 2007, and bottomed out at $222,000 in November 2010.
- In the Twin Cities, the home's value would have peaked at $342,000 in June 2006, and bottomed out at $217,000 in April 2009.
- In Los Angeles, CA the home's value would have peaked at $548,000 in September 2006, and bottomed out at $319,000 in April 2009.
- In Miami, FL, the home's value would have peaked at $562,000 in December 2006, and bottomed out at 286,000 in December 2010.
- In Detroit, MI, the home's value would have peaked at $253,000 in November 2005, and bottomed at $132,000 in December 2010.

The fluctuation in home values initially contributed to the rise in home foreclosures.

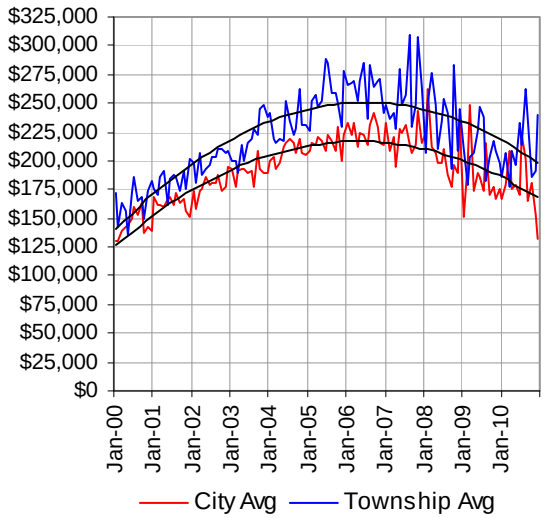


Figure 2.21: Average monthly sale price of single-family detached homes in Sherburne County, 2000 - 2010. Excludes Princeton, St. Cloud, non-traditional sales. Source: Sherburne County Assessor's Dept.

Home Foreclosures

Sherburne County experienced a significant increase in the number of home foreclosures, beginning in 2005. The highest concentrations were in the cities of Elk River and Big Lake. About two-third's of home foreclosures in the County were in cities compared to townships.

In 2005 and 2010, Sherburne County had the highest residential foreclosure rate in Minnesota, and the second highest between 2006 through 2009. Figure 2.20 shows the regional residential foreclosure rate[4] during this period.

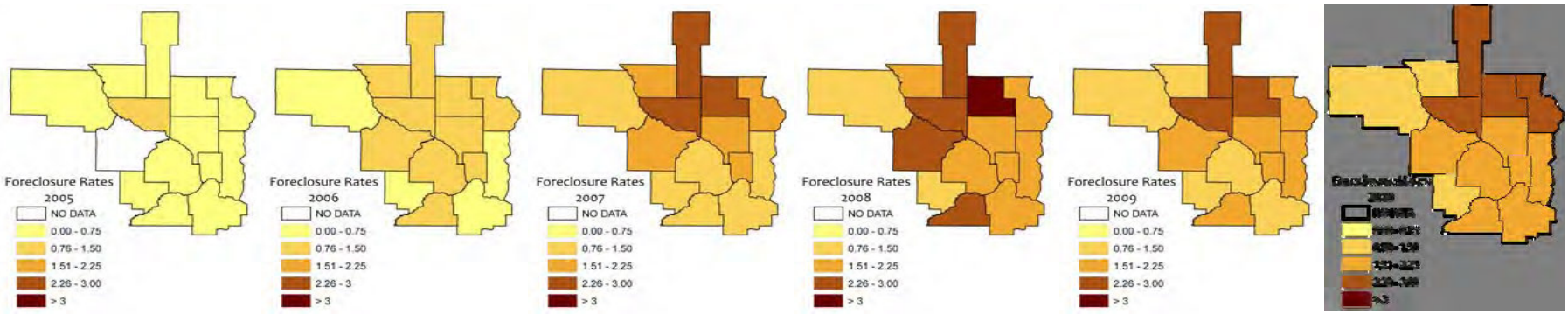


Figure 2.20: Residential Foreclosure Rate, 2005-2010. Foreclosure Rate = the number of foreclosed mortgages as a percent of total residential parcels. Source: HousingLink[5]

State-wide in 2010, the highest foreclosure rates in counties were experienced in; Sherburne (2.93%), Isanti (2.56%), Mille Lacs (2.47), Kanabec (2.45%), and Chisago (2.32%) counties. Four of these counties are known as the "collar counties" located north-northwest of the Twin Cities suburbs. Kanabec County is adjacent to Isanti and Mille Lacs counties. In Sherburne County, the average annual home value appreciation increased 8% - 10% between 2001 - 2005. But in 2006 it was 6%. In 2007 it was -1%. In 2008 it was -5%, and in 2009 it was -15%.

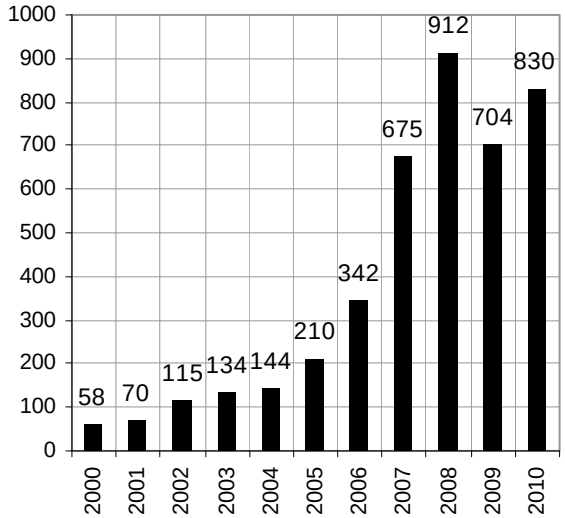


Figure 2.22 Number of foreclosures, 2000-20010.
Source: Sherburne County Sheriff's Dept.

Footnotes:

[1] Minnesota Department of Health. Morbidity and Utilization, Minnesota Behavioral Risk Factors of Adults - County Synthetic Estimates and State Estimates, 2003, 2004, 2005, 2007, 2009.

[2] St. Cloud Area Economic Development Partnership. Comprehensive Economic Development Strategy. St. Cloud, MN, 2010 (Chapter 2, Figure 2). Source of data: http://www.census.gov/popest/estimates.html

[3] The National Bureau of Economic Research *is a private, nonprofit, nonpartisan research organization dedicated to promoting a greater understanding of how the economy works.* Among other projects, the organization identifies contraction (recession) and expansion of business cycles, from 1854 to present. The Federal Reserve Bank does not officially determine the beginning and end of economic recessions, leaving this opinion to others.

[4] Minnesota Home Ownership Center. Foreclosures in Minnesota: A Report Based on Sheriff's Sales. February 15, 2010.

[5] Greater Minnesota Housing Fund. Foreclosures in Minnesota: A Report Based on County Sheriff's Sale Data April 2008. p12, 22. NOTE: Projected 2008 sheriff's sales is an estimate based on the number of sheriff's sales reported for Q1 2008. Data Source: HousingLink (Sheriff's Sales by County), MN Demographic Center (2005 household projection), map created by Elissa Schloesser.

[6] Federal Reserve Bank of St. Louis. A Word on the Economy for High School Students; The Financial Crisis: What Happened? September, 2009 www.stlouisfed.org/education_resources/AWordontheEconomy/player.html June 18, 2010.

[7] Residential vacant lots (2011), defined as; (1) property platted between January 1, 1971 and June 15, 2011; (2) lot is less than 10-acres in size; (3) lot has a Residential tax classification (2011); and (4) has a building value of less than $10,000.

[8] S&P / Case-Shiller Home Price Indices. U.S. Home Price Values, March 2010 (not seasonally adjusted) http://www.standardandpoors.com/home/en/us June 23, 2010.

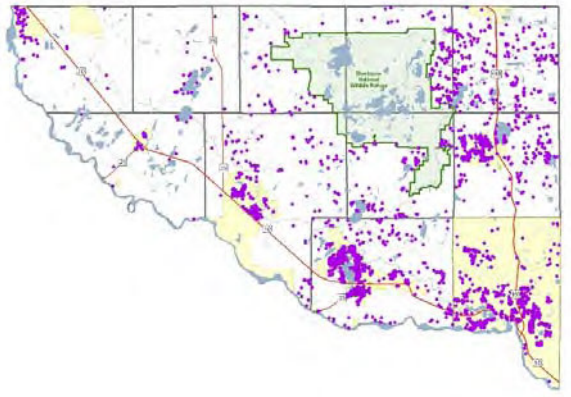


Figure 2.23: Location of home foreclosures, 2006-2009.
Source: Sherburne County Sheriff's Dept.

Chapter 3
Natural Resources



Mississippi River, Big Lake Township

Summary

Minnesota is divided into four ecological providences; Laurentian Mixed Forest, Eastern Broadleaf Forest, Tallgrass & Aspen Parklands, and Prairie Parklands. Sherburne County is located within the Anoka Sand Plain subsection of the Eastern Broadleaf Forest. Within the Anoka Sand Plain, much of the peatlands have been drained for sod and vegetable crops, and much of the prairie and savanna have been urbanized. Of Minnesota counties, Sherburne is ranked 5th in vegetable production, and 2nd in population growth.

Chapter 3 summarizes the County's natural environment and its sensitivities to land use and human habitation. Much of the lake shorelands were developed prior to 1971, when the County adopted a Shoreland Ordinance. This ordinance is based on the Minnesota Department of Natural Resources (DNR) model county shoreland ordinance. Within the Shoreland District, the ordinance regulates land use, subdivision design, structure and septic system setbacks from shoreland. The ordinance also limits the addition and removal of soil, and the removal of vegetation.

Bedrock Geology

Igneous and metamorphic crystalline rocks underlie the western part of Sherburne County, including all of Clear Lake, Haven, and Palmer townships and most of Becker, Blue Hill, and Santiago townships. These rocks generally have very little, if any, porosity and may be difficult to produce water at amounts necessary for domestic or public water supply. The depth to bedrock in this region is generally zero to 100 feet. A few granite outcrops occur in Haven Township near St. Cloud.

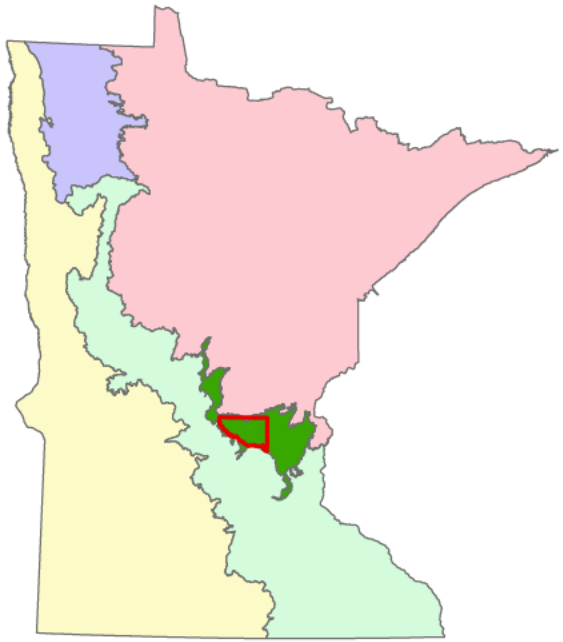


Figure 3.1: The Anoka Sand Plain subsection (dark green area) of the Eastern Broadleaf Forest (green areas), Source: MN DNR.

Sedimentary rocks underlie the eastern part of Sherburne County including all of the cities of Elk River and Big Lake, all of the townships of Livonia and Orrock; most of Baldwin Township; and parts of Becker, Blue Hill, and Santiago townships. These rocks generally produce water at amounts necessary for domestic and public water supply. The depth to bedrock in this region is generally 50' to 300'.

Surficial Geology

Sherburne County lies almost completely within a geologic landform known as the Anoka Sand Plain. The Anoka Sand Plain is a broad sandy lake plain, which contains small dunes, kettle lakes, and tunnel valleys. The other important landform is a series of sandy terraces associated with historic levels of the Mississippi River and its major tributaries (see Figure 3.2).

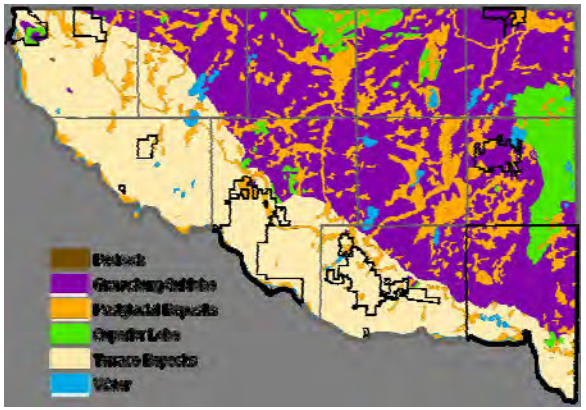


Figure 3.2: Surficial Geology. Source: MN DNR.

Surficial geology and pollution-sensitive areas are important to identifying the occurrence and movement of groundwater and the relation of groundwater to aquifers in the County. Surficial geology and pollution-sensitive areas are important factors when making land use decisions relating to agriculture, irrigation, and designing onsite sewage treatment systems.

The surface geology in the County is dominated by two underlying features: Grantsburg Sublobe outwash and lake sand deposits, and Mississippi River terrace deposits. Less dominate is a small area of Superior Lobe outwash deposits at the east end of the County. The Grantsburg Sublobe outwash consists of sand and gravel, and the lake sand deposits consist of very fine to medium sand. The terrace deposits of the Mississippi River and Superior Lobe outwash consists of sand and gravel.

Soils

Soils in the County range from excessively well drained to very poorly drained, however, most of the County is dominated by excessively drained soils. This parallels the area where the pollution sensitivity of the aquifer contamination is the highest. Evaluation of soil suitability as it relates to onsite sewage treatment systems is also dependent upon the level of the water table in the area; a higher water table will accentuate the circumstances, whereas a lower water table could reduce the impact of less suitable soils on potential groundwater contamination.

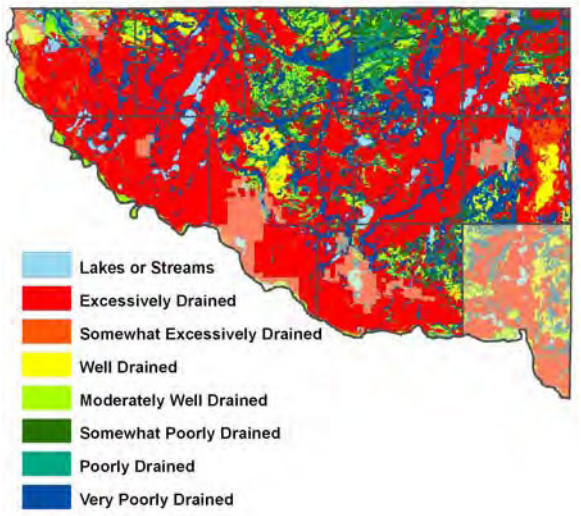


Figure 3.3: Soil Survey, Drainage. Source: Natural Resource Conservation Survey.

Organic soil associations are found in the County. These are very poorly drained soils, with primary uses being specialty crops, sod, pasture and wildlife land. These soils are also considered to have severe soil limitations for on-site sewage treatment systems because they typically have poor percolation rates and are susceptible to "ponding."

Pollution Sensitivity

Pollution sensitivity is the potential due to surficial geology characteristics for surface contamination

to reach groundwater resources. Travel times are controlled by the permeability and thickness of geologic materials through which contaminants would move. Longer travel times are associated with both a greater degree of geologic protection and reduced sensitivity to groundwater pollution. Shorter travel times represent increased sensitivity and inability to protect groundwater from vertical contaminant movement. Figure 3.5 shows that Sherburne County is dominated by very high pollution sensitivity due to the presence of sand and gravel over much of the surface of the County.

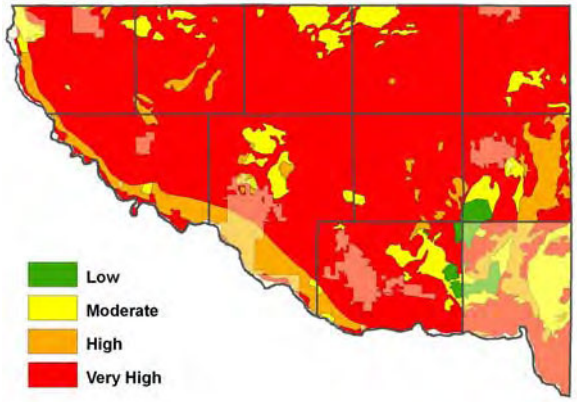


Figure 3.5: Pollution Sensitivity. Source: MN DNR.

Water Use & Source

The Minnesota Department of Natural Resources permits high volume wells drawing 10,000+ gallons per day or 1 million gallons per year (MN Dept of Health permits high volume wells for domestic use). As of 2010, there were 562 active high volume groundwater wells and 50 active high volume surface water wells in Sherburne County. Between 2000 and 2009, an average of 43 billion gallons of water was pumped annually, mostly from rivers & streams (21.7 billion gallons) and from groundwater (11.1 billion gallons). The primary use of water is for power generation plants and crop irrigation.[1]

During this same period, Power Generation Plants consumed an annual average of 20.6 billion gallons of water from rivers & streams, and 377 million gallons from groundwater. Major users include Xcel Energy (Sherco plant) and Great River Energy, both drawing primarily from the Mississippi River for steam power cooling.[1]

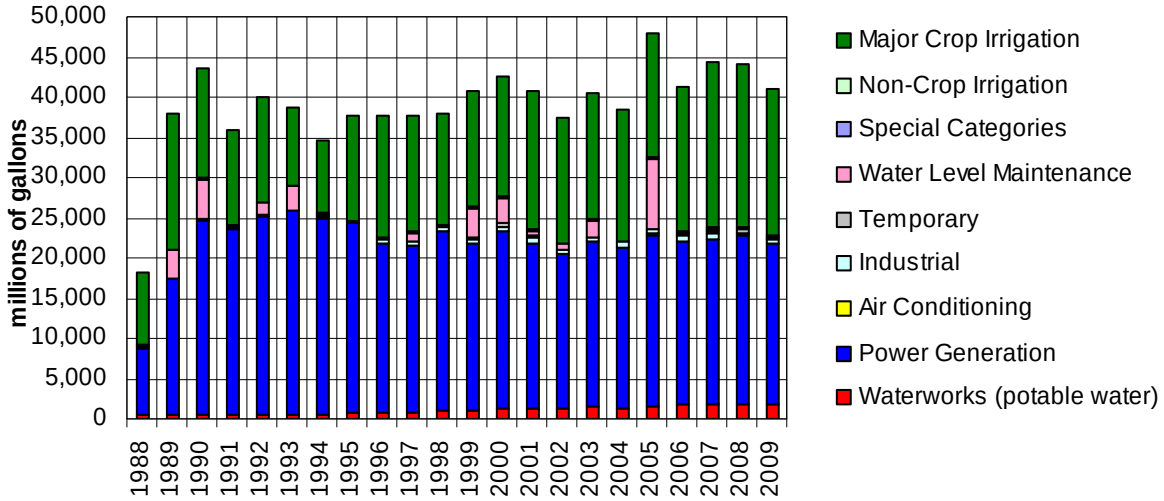


Figure 3.4: What water is used for in Sherburne County. MN DNR Water Appropriation permits are required for withdrawals greater than 10,000 gallons per day or 1 million gallons per year. This graph does not include withdrawals less than this amount (i.e. residential wells). Source: MN DNR,[1]

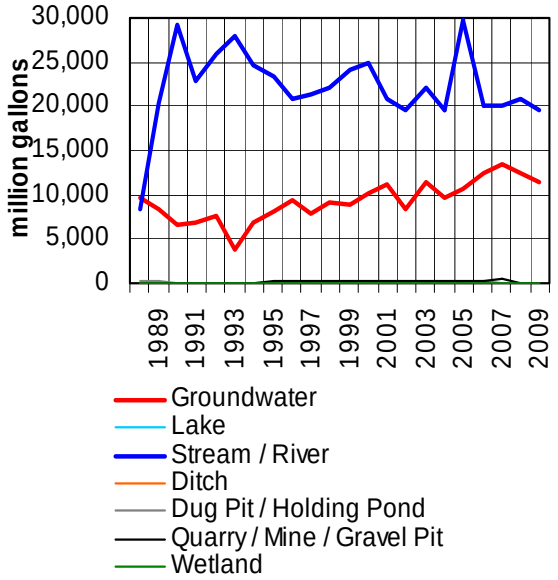


Figure 3.6: Where water comes from in Sherburne County, via water appropriation permits. The spikes in Streams/Rivers can be attributed to increased use by Xcel Energy and Great River Energy, both drawing from the Mississippi River. Source: MN DNR.[1]

During this same period, Crop irrigation consumed an annual average of 37 million gallons of water from rivers & streams, and 8.5 billion gallons from groundwater. Rivers & streams commonly used include the St. Francis, Mississippi, and Elk rivers.[1]

In 2007, Sherburne County farmers produced about $64 million in agricultural products. Crop production in the County is dependent upon access to water for irrigation. If groundwater were no longer accessible, it is likely that most farmland in the County would be converted into other land uses. In 2009, 62,668-acres of cropland was irrigated by groundwater. Irrigated fields range in size between 12-acres (see Figure 4.1) and 395-acres, and averaged 110-acres in size. The depth of groundwater wells for crop irrigation ranged between 25' and 585' in depth (108' average depth), and were permitted (2009) to withdraw an average of 36.2 million gallons per year (700 million gallons per minute) although the average well withdrew only 16 million gallons of groundwater in 2009.[1]

There are a number of known and unknown factors related to groundwater supply. Known data include; geology (Figure 3.2), precipitation amounts by location (Figure 3.21), depth to water table by location (Figure 3.7), and water usage (Figure 3.4). Unknown factors include infiltration rates (the time it takes water on the ground surface to reach aquifers). Thus it is unknown if groundwater is being pumped at a faster rate than its aquifers can be recharged, and the effects pumping has on surface waters such as lakes and wetlands, and ecology. The Minnesota Water Sustainability Framework (2011) suggests that state funding be increased to complete county geological atlases sooner. Sherburne County's geological atlas is scheduled to be completed by 2013/2014. A geological atlas is a systematic study of the areas' geologic and groundwater resources. The Framework also suggests that maximum volumes permitted be based on how the groundwater withdrawn affects the local ecology, whereas currently, permits are granted and then revoked or suspended if the amount withdrawn negatively affects other users. [2]

The DNR and SWCD monitor a number of observation wells throughout the County, most installed in the 1970's and 1980's, and monitored monthly (see Figure 3.7). In 2010, eight observation wells were drilled, providing hourly data, but not enough time has elapsed to make historical comparisons of changes in water table depth.

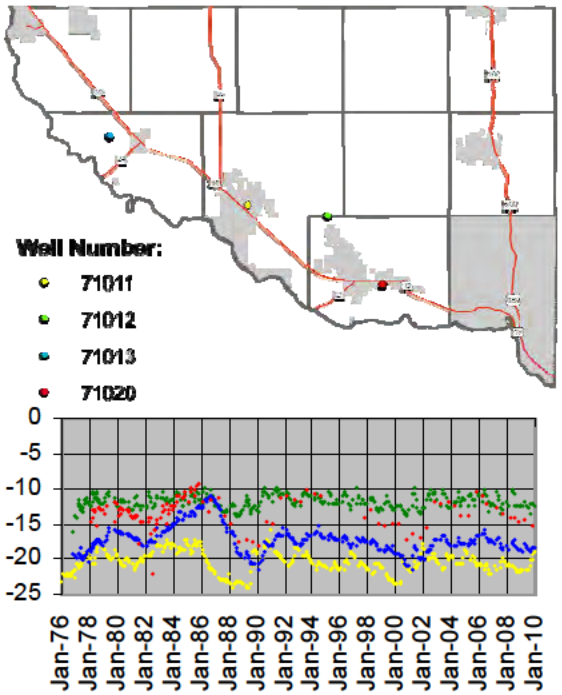


Figure 3.7: Depth to water table (feet). The DNR and SWCD monitor observation wells throughout the County. Shown above are four wells monitored since the 1970's. Source: MN DNR, Minnesota Climatology Working Group.

Nitrates

Nitrate is a common contaminant found in many wells in Minnesota. Nitrate contamination of a well is often regarded as a first sign of deteriorating groundwater quality. Natural levels of nitrate in Minnesota groundwater are usually quite low (less than 1 milligram per liter [mg/L] of nitrate-nitrogen). Elevated nitrate levels in groundwater are often caused by run-off from barnyards or feedlots, excessive use of fertilizers, or septic systems. Wells most vulnerable to nitrate

contamination include shallow wells, dug wells with casings which are not watertight, and wells with damaged, leaking casings or fittings.

Too much nitrate in drinking water poses a risk to infants under six months of age. If an infant is fed water or formula made with water that is high in nitrate, a condition called "blue baby syndrome" (or "methemoglobinemia") can develop. Bacteria which are present in an infant's stomach can convert nitrate to nitrite (NO^2), a chemical which can interfere with the ability of the infant's blood to carry oxygen. As the condition worsens, the baby's skin turns a bluish color, particularly around the eyes and mouth. If nitrate levels in the water are high enough and prompt medical attention is not received, death can result.

The state Health Risk Limit for nitrate is 10 mg/L of nitrate-nitrogen, which provides newborns with reasonable protection against blue baby syndrome. This level is mandatory for all public water systems, and recommended for private wells.

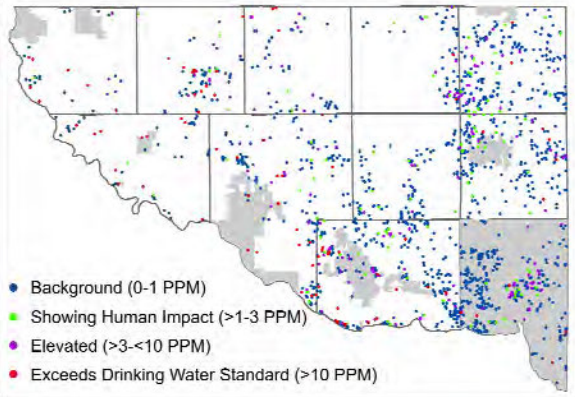


Figure 3.8: Nitrate levels tested from domestic wells, measured in parts per million (PPM). Source: Minnesota Department of Health.

Wellhead Protection Areas

MN Rule 4720 requires wellhead protection plans to protect public water supply wells. Such a well is defined as providing drinking water for human use; to 15 or more service connections, or 25 or more people for at least 60 days a year.

In townships, existing (2010) land use within wellhead protection areas include; non-irrigated and irrigated agriculture (row crops), pasture (horses), rural residential use (10-acre parcels or greater in size), rural residential subdivisions ($^3/_4$-acre lots or greater in size), retail and light industrial businesses, including an auto salvage yard. Such areas are currently (2010) zoned Agriculture, Urban Expansion, and Industrial. Because of the County's high soil pollution sensitivity and shallow aquifer, any proposed change in land use within wellhead protection areas should be reviewed by the County and the city or agency operating the public well.

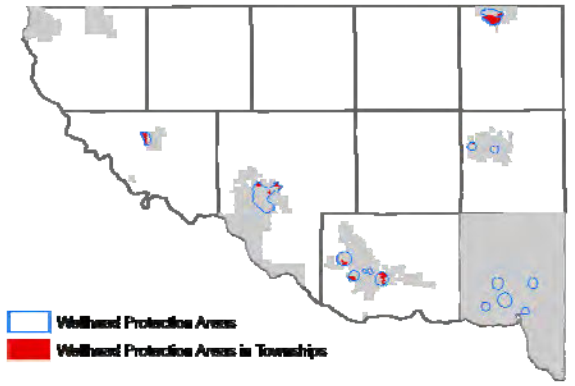


Figure 3.9: Wellhead protection areas. Source: MN Dept of Health.

Watersheds

Sherburne County is drained by two major watersheds. The Mississippi - St. Cloud watershed drains 89% of the County while the Rum River watershed drains 11%. Within each major watershed are a number of minor watersheds. Forty-six minor watersheds exist entirely or partially within the County. The size of watersheds and dominant land-use therein greatly impacts water quality in our streams, lakes and wetlands.

Sherburne County Local Water Management Plan, 2007-2017

The Local Water Management Plan[3] is administered by the Sherburne County Soil & Water Conservation District (SWCD). The plan identifies goals and objectives for three priority concerns:

Priority Concern 1:	Impaired and degraded lakes and streams in the Elk River [minor] Watershed.
Goal:	Reduce pollutant levels for impaired lakes and streams and maintain water quality where resources meet state standards.
Objective A:	Implement land use practices that reduce nutrient loading to surface water resources.
Objective B:	Work with the MPCA to establish total maximum daily load's (TMDL's) for impaired waters.
Priority Concern 2:	Increasing urban and residential land use replacing agriculture, forest and open space creates a concern about water quantity and quality due to increased impervious areas.
Goal:	Mitigate the quantitative and qualitative storm water impacts to surface water from urban and residential development.
Objective A:	Retrofit stormwater treatment for developed areas with no or inadequate treatment.
Objective B:	Use local controls and ordinances to reduce impacts from stormwater runoff.
Objective C:	Identify innovative practices to reduce stormwater runoff.
Priority Concern 3:	Quality and quantity of riparian and aquatic vegetation.
Goal:	Protect, improve and establish native riparian and aquatic vegetation.
Objective A:	Establish riparian buffers on agricultural land.
Objective B:	Preserve and establish buffers of native vegetation on lakes and streams in urban and rural - residential areas.

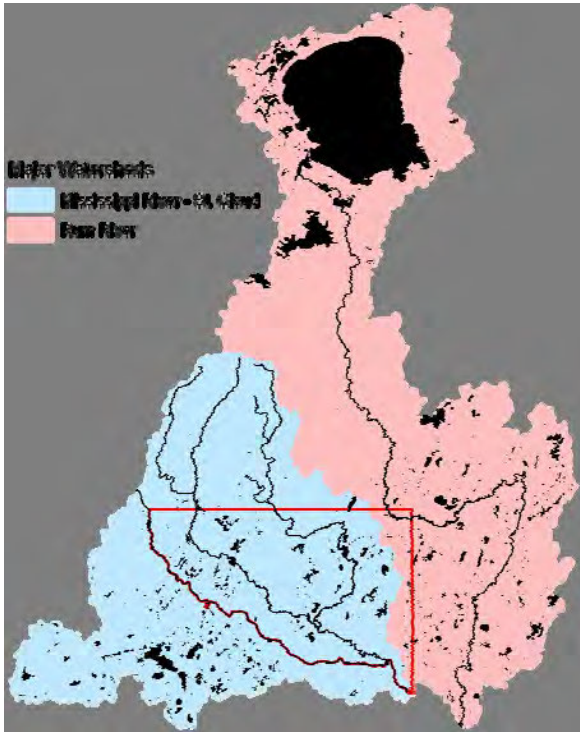


Figure 3.10: Major Watersheds. Source: MN DNR.

Lakes

Sherburne County has 125 lakes and countless wetlands. In the early 1970's the DNR classified lakes into three categories based on how susceptible they are to degradation of water quality and habitat.

- General Development Lakes (8 lakes) exceed 15' in depth, are large enough to show the highest resilience to water quality degradation, and have more than 25 homes per mile of shoreline.
- Recreational Development Lakes (11 lakes) exceed 15' in depth, and exhibit moderate resilience to degradation.
- Natural Environment Lakes (84 lakes) are small and shallow, with few lakeshore homes.

Of all our 125 lakes, only 11 are deeper than 20'. Shallow lakes are much more easily polluted by run-off, re-suspension of sediment (stirring by motors or waves) compared to deeper lakes. Rules for shoreland lots are designed with water quality and natural habitat in mind. Incidentally, a well regulated lake boasts higher property values.

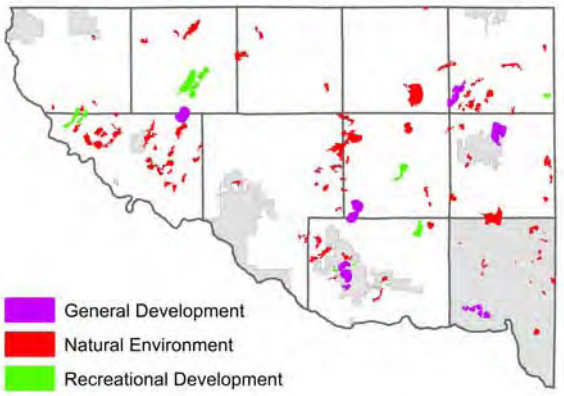


Figure 3.11: Lake types. (Public Waters Index - PWI). Source: MN DNR

Streams (and Rivers)

Sherburne County includes 493 miles of streams. Stream is a term for any flowing waterway including rivers, sloughs, creeks and brooks. The County's streams are broken into five categories of protection.

- Wild & Scenic Rivers: The Mississippi and Rum rivers are state designated Rivers of Outstanding Scenic and Recreational Significance. Land use is regulated by the Mississippi and Rum Scenic & Recreational River Ordinance, adopted in 1979.
- Forested Rivers: Briggs Creek and the Snake River must be well forested to preserve their characteristically cool waters providing habitat for fish. Both waterways are state designated trout streams.
- Agriculture Rivers: The Elk River flows through intensively cultivated areas.
- Transition Rivers: The St. Francis and its tributaries flow through a mix of cultivated and natural lands.
- Tributary Rivers: Battle Brook, Lilly Creek, Rice Creek, Stony Brook, and nine other unnamed waterways are tributaries of the Elk and St. Francis rivers.

Mississippi River

The Mississippi River is about 2,350 miles in length from Lake Itasca, MN to the Gulf of Mexico. It's watershed drains most of the U.S. between the Appalachian and Rocky mountains. The upper Mississippi basin was formed by glaciers of the Laurentide Ice Sheet. The most recent glacier (the Grantsburg Sublobe) receded about 11,000 years ago through what is now Sherburne County.[4]

The river downstream of the St. Cloud dam is characterized by the Beaver Islands (owned by the DNR), which consist of over 30 islands within a two mile stretch. Downstream of the islands, the river meanders to a width between about 350' and 1,400' with channel islands and backwaters. Between St. Cloud and Monticello, the adjacent land is largely wooded or agricultural. Between Monticello and Elk River, the adjacent land is largely residential. Power plants are located near the river in Becker, Monticello, and Elk River, and discharge warmingwater into the river. The DNR reports that one of the best areas in Minnesota to fish for smallmouth bass is on the Mississippi River between Monticello and the Elk River. Local areas along the river experience considerably less fishing pressure compared to area lakes.

In 2007, the DNR charted depth maps between the St. Cloud dam and Coon Rapids dam (Anoka/Hennepin counties). Through Sherburne County, channel depth varies between about 2' - 14'. The Mississippi River is a DNR designated water trail. Boat access is available in St. Cloud (Wilson Park), Clear Lake Township (MN Hwy 24 bridge), Becker (Snuffy's Landing), and Elk River (Babcock Park). A canoe landing is planned at a regional County park in Clear Lake Township.

Mississippi and Rum Wild & Scenic Riverways

In 1973, the Minnesota Legislature adopted the Wild and Scenic Rivers Act (MN Statute 103F), requiring the DNR to conduct studies and adopt riverway management plans. In 1976, a 53 mile segment of the Mississippi River between St. Cloud and Anoka was designated for this program. In 1978, the Rum River was designated between Lake Mille Lacs and the Anoka dam (the portion within Sherburne County is about 7 miles in length). To be designated, a river must meet the following four categories:[5]

- Historic Values: The corridor contains many sites that are important to the state's exploration, settlement, and development history.
- Scenic Values: The wooded islands, bluffs, and shoreline contain many areas of outstanding scenic value.

- Recreational Values: The corridor provides excellent fishing, canoeing, and boating opportunities.
- Natural/Scenic Values: The corridor contains areas of native vegetation, rare plant species, and abundant wildlife.

Land area within the Wild & Scenic Riverway program may consist of a total of 320 acres per river mile, including both sides of the river.

The DNR's Rum River Management Plan was adopted in 1978. The area of the river within the County's zoning authority is zoned "Scenic River."

The DNR's Mississippi Scenic Riverway Management Plan was adopted in 1976. The area of the river within the County's zoning authority is zoned "Scenic River" north of the MN Highway 24 bridge in Clear Lake Township, and "Recreational River" south of the bridge. There is one exception in the area of the MN Highway 25 bridge across from downtown Monticello, which is zoned "Special Use." The intent of the Special Use zoning district is similar to the adjacent Recreational River district, except permitted/conditional uses include certain commercial-type land uses pre-existing to 1979.

The primary difference between Scenic River and Recreational River zoning designations is that the minimum platted lot size is 4-acres in the Scenic River, and 2-acres in the Recreational River and Special Use zoning districts.

In 2010, the DNR proposed to merge the Mississippi Riverway regulations into the proposed Shoreland regulations amendments. In August 2010, Governor Pawlenty expressed concerns that the proposed amendments did not allow local governments enough flexibility, and did not balance the needs of private landowners vs. public use of waterways. The DNR was directed to revisit the proposed amendments in 2011.

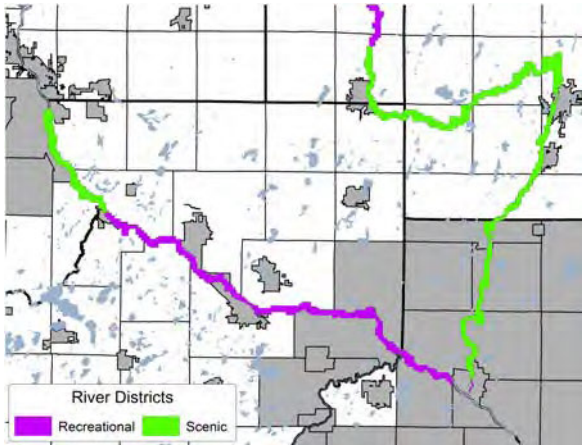


Figure 3.12: Mississippi and Rum Wild & Scenic Riverways. Source: MN DNR.

Impaired Waterways

Impaired waterways are lakes, rivers, and streams which do not meet water quality standards for one or more pollutants, impairing that water body's designated use, such as for drinking water, fishing, swimming, irrigation, or hydroelectricity. A water body's designated use is determined by the Minnesota DNR and the Minnesota Pollution Control Agency (MPCA). The federal Clean Water Act of 1972 requires all states to assess all water bodies every two years for water quality.

In Sherburne County, surface water quality is monitored by the Planning & Zoning Department, local government agencies, and volunteers. The County has received a number of grants through the MPCA and Minnesota Department of Health for funding, although limited funding does not allow for the testing of all water bodies in the County. Water samples are analyzed by the MPCA for

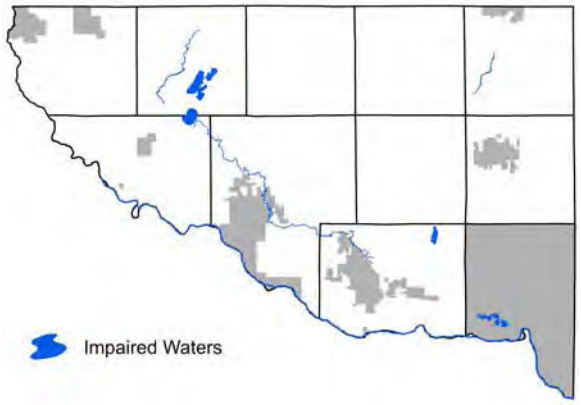


Figure 3.13: Impaired Waterways (2008-draft). Source: MPCA.

pollutants. The MPCA determines if a water body is impaired, not impaired, or if more data is necessary. The MPCA's determination is then approved by the U.S. Environmental Protection Agency (EPA).

If a water body is impaired, the MPCA determines its Total Maximum Daily Load (TMDL), or the maximum amount of pollutants that water body can manage naturally without impairing its designated use. The MPCA also establishes goals to reduce pollutants and restore water quality. Impaired waters in Sherburne County include: Big Elk Lake, Birch Lake, Briggs Lake, Lake Julia, Lake Orono, Elk River, Mississippi River, Battle Creek, and Rice Creek (see Figure 3.13).

All five lakes are impaired for Aquatic Recreation, such as fishing, swimming, and water sports. The specific reason is high fecal coliform. Fecal Coliform is a bacteria found in human and animal intestinal tracts. Common sources of fecal coliform in surface waters include failing septic systems and runoff from feedlots.

The Elk River is impaired for Aquatic Recreation and Aquatic Life. Specifically, high fecal coliform, turbidity (poor water clarity commonly caused by storm water runoff), and aquatic macroinvertebrate bioassessments (insects and spineless water animals).

The Mississippi River through most of Sherburne County is impaired for Aquatic Recreation, Aquatic Life, and Aquatic Consumption. Specifically, high fecal coliform, fish bioassessments, and polychlorinated biphenyls (PCB) in fish tissue. PCB's are industrial chemicals commonly used prior to 1977, which can affect neurodevelopment and reproduction.

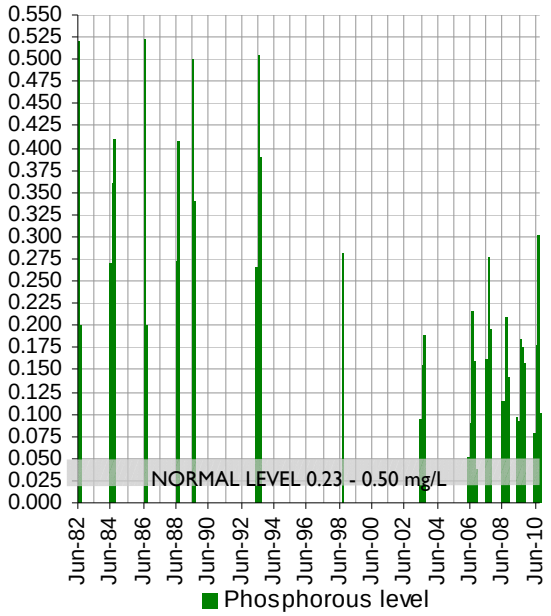


Figure 3.14: Phosphorus levels (mg/L) measured at a depth of 0-2 meters on Big Elk Lake in Clear Lake and Palmer townships. Excess phosphorus causes algae blooms, reducing water clarity and quality. Sources of excess phosphorus include storm water runoff from failing septic systems, fertilizers, agricultural fields and feedlots. Source: MPCA.[6]

Wetlands

Wetlands are defined as having: (1) hydric soils; (2) standing water or saturated soil for at least part of the growing season; and (3) must support vegetation found in wet soils.[7] Between 30% - 50% of the wetlands in Sherburne County have been filled or drained since European settlement. Currently there are 60,432 acres of wetlands, consisting of 20% of the County's land area. In 1991, the Minnesota Legislature adopted the Wetland Conservation Act (WCA), enforced locally by Sherburne County. WCA regulates the draining, filling and excavation of wetlands.

There are many benefits to preserving the wetlands in Sherburne County. Wetlands provide vegetation that prevent erosion around lakes and on streams by reducing the force of wave action; they provide protection and habitat for fish spawning; act as a natural filter that cleanse water before leaving the wetland and provide time for sediment to settle before the water is released; and they act as natural storage basins in times of flooding, reducing the impact during flood events.

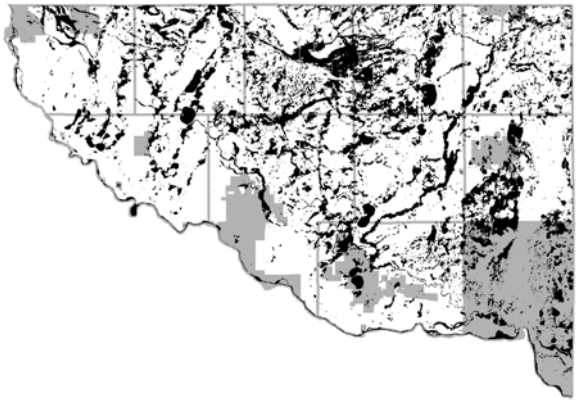


Figure 3.15: Wetlands Source: MN DNR.

Floodplain

Sherburne County has 2,300 acres of floodplain. The Sherburne County Floodplain Ordinance regulates not only how land in designated floodplain areas may be used or altered, but the location and types of structures that are permitted in those areas. The goal of the floodplain ordinance is to minimize the threat to life and property that may result from flooding.

In 2006, Sherburne County entered into a cooperative agreement with the Federal Emergency Management Agency (FEMA) to update the County's floodplain maps through a comprehensive analysis of the major water bodies in the County. This project is planned to be completed in 2011. As a result, the County will have new floodplain maps with more accurate data for planning and regulation. Along with the adoption of new maps, an updated floodplain ordinance will also be adopted.

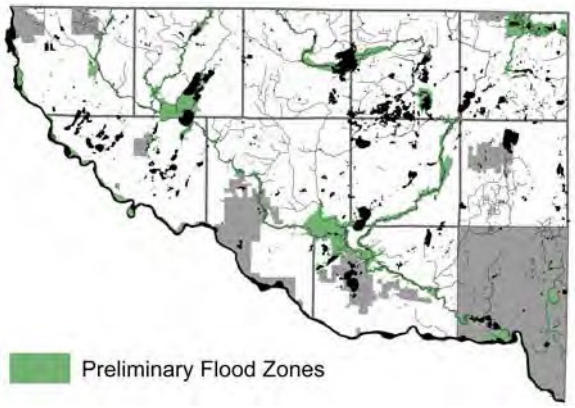


Figure 3.16: Flood Zones (Preliminary 2010) representing areas in which there is a 1% and/or 0.5% chance of flooding in any given year (formally referred to as the 100-year and 500-year flood zones) Source: FEMA.

Ecosystems and Wildlife

Sherburne County is within the Anoka Sandplain subsection of the Eastern Broadleaf Forest. The Eastern Broadleaf Forest traverses twelve states in the upper Mississippi and Ohio river valleys. The Anoka Sandplain subsection lies east of the Mississippi River, primarily in Anoka, Isanti, and Sherburne counties.

> *"This subsection is well-known for sandhill cranes, trumpeter swans, bald eagles, bobolinks, and lark sparrows. Other important species are badgers, Blanding's turtles, and gopher snakes. Important habitats include dry prairie associated with scattered wetlands, rivers, and streams which provide excellent habitat for Blanding's turtles, both species of hognose snakes, and bullsnakes. Some of the best examples of dry oak savanna in the state occur in this subsection. Carlos Avery WMA* [Anoka County] *and Sherburne NWR are important stopover sites for migratory birds."*[9]

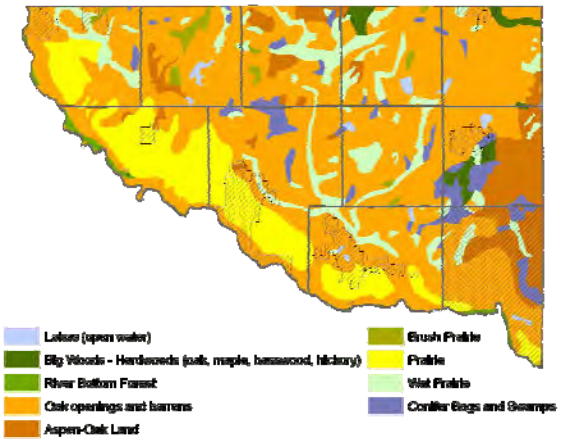


Figure 3.17: Original vegetation (pre-settlement). Source: MN DNR.

The Minnesota DNR has identified 97 Species in Greatest Conservation Need (SGCN) known or predicted to inhabit the Anoka Sandplain, most commonly found in proximity of the Sherburne National Wildlife Refuge, Sand Dunes State Forest, and Carlos Avery Wildlife Management Area (Anoka County). Of these 97 species, 34 species within Sherburne County have been designated as; endangered (4), threatened (7), or of special concern (23). Endangered species include the insect; *Uncas Skipper*, and vascular plants; *Tubercled Rein-Orchid*, *Cross-leaved Milkwort*, and *Tall Nut-rush.* Endangered and threatened species have certain protections under state laws.[10]

Natural Resources Inventory

A Natural Resource Inventory (NRI) identifies specific types of land cover (i.e. agriculture, forest, woodland, shrub, etc.). A more detailed NRI, known as the Minnesota Land Cover Classification

System (MLCCS) further identifies the quality of "natural" land cover types on an A-D scale (A = excellent, D = poor).

In 2011, Sherburne County completed an NRI/MLCCS of 22,417 acres in portions of the western County. The project was completed by Critical Connections Ecological Services, and funded through a grant from the Legislative-Citizens Commission on Minnesota Resources (LCCMR). The study areas were chosen because they contain contiguous corridors of undeveloped natural resources, and because the town boards of Palmer and Santiago requested the County's assistance in developing zoning regulations to improve their town centers (hamlets) located within the project area. The intent of the NRI/MLCCS was to identify areas which should be preserved from development (if and when it occurs), based on the quality of natural features.

Within the project area, the MLCCS identified 398 individual natural communities consisting of 6,173 acres. The MLCCS did not identify any plant communities in "excellent" (A) condition, although a number were identified being in "good" (B) condition.

The NRI/MLCCS report recommends that the data, along with zoning ordinances, demographic and economic information be used to develop a *rational for protection* and *recommended criteria* to identify contiguous greenway corridors to be preserved from development, and by what means is most appropriate. As one example, in order to preserve and promote propagation of plant communities with a quality ranking of "excellent" (A) and "good" (B), an ordinance may be adopted requiring that if land containing such plant communities is developed, that the plant community be included within a conservation easement. A second example is for the County to pursue grants to purchase land or perpetual easements creating contiguous corridors of natural plant communities. Such a corridor would preserve higher quality communities (A-B) and promote restoration of lesser quality plant communities (C-D).

Climatology

There are four National Weather Service stations in Minnesota which provide official weather data, the nearest of which is at the St. Cloud Regional Airport. The DNR's Minnesota Climatology Working Group collects unofficial data from 139 observation stations across the state, reported by volunteers. There are four stations in Sherburne County, located in St. Cloud, Becker Township, Santiago Township, and Elk River. The Santiago station has reported daily (with a few exceptions) temperature, precipitation, snowfall, and snow density readings since 1961.

According to the Santiago station, since 1961 the warmest day (high-low temperature) was July 7, 1988 (105°- 80°). The coldest day was January 9, 1977 (-10° - -43°). The largest snowfall event occurred January 17-23, 1982 (33"). The largest rainfall event occurred September 16-23, 1968

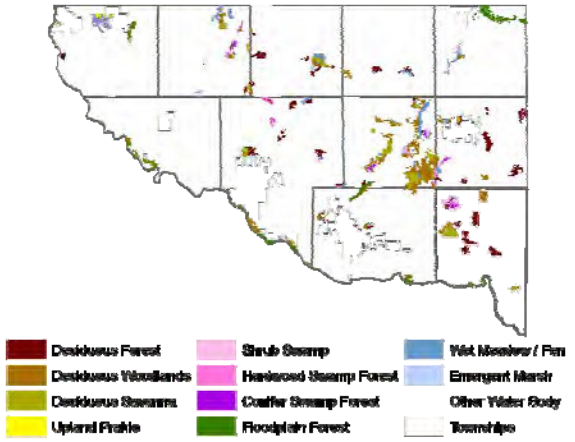


Figure 3.18: Biological Survey of Natural Communities. Source: DNR, MN Statute 394.23; "*When adopting or updating the comprehensive plan, the board must, if the data is available to the county, consider natural heritage data resulting from the county biological survey. In a county that is not a greater than 80 percent area, as defined in section 103G.005, subdivision 10b,[12] the board must consider adopting goals and objectives that will protect open space and the environment..*"

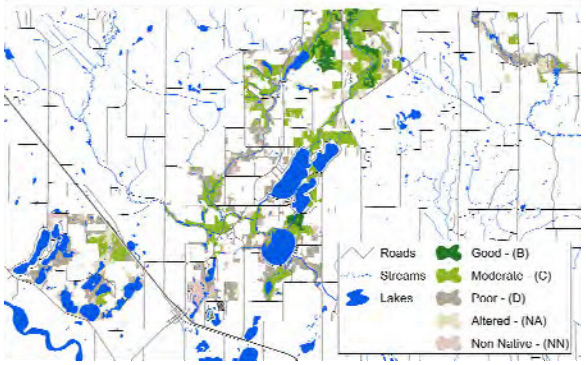


Figure 3.19: The NRI/MLCCS report recommends that the County preserve corridors connecting high to moderate quality (A ,B, C) natural plant communities. Source: Sherburne County Natural Resource Inventory / CCES.

(7.28") ("event" meaning multiple days of snowfall/rain reported with no more than one day of 0" reported within those days.).

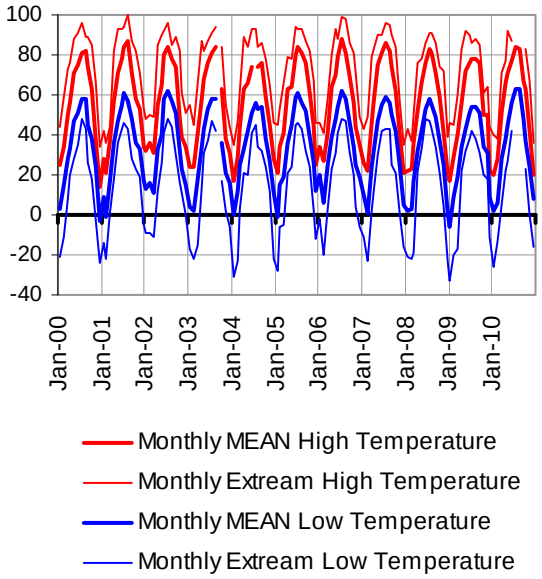


Figure 3.20: Monthly high and low temperature (degrees Fahrenheit) in Santiago Township (weather station), 2000-2010. Source: Minnesota Climatology Working Group.

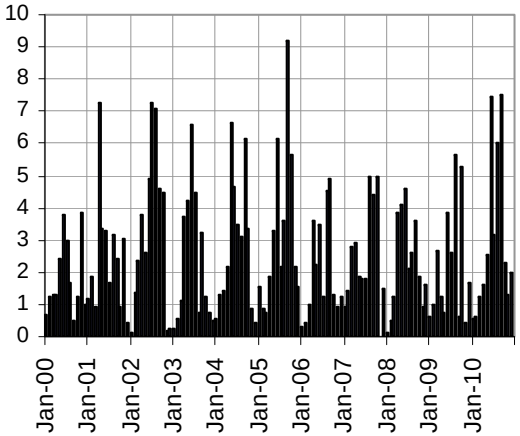


Figure 3.21: Average monthly precipitation (inches) reported in various locations in Sherburne County,2000-2010. Source: Minnesota Climatology Working Group.

Footnotes

[1] Minnesota Department of Natural Resources. Water Use Data 1988-2009. http://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/wateruse.html

[2] University of Minnesota, College of Food, Agriculture, and Natural Resource Sciences, Water Resource Center. Minnesota Water Sustainability Framework,. 2011. (p. 27-33)

[3] Sherburne County Soil & Water Conservation District, Sherburne County Local Water Management Plan, 2007-2017 2007, (p 2-1, 2-7).

[4] University of Minnesota, Minnesota Geological Survey. Minnesota at a Glance. 1997.

[5] Minnesota Department of Natural Resources Division of Waters Mississippi Scenic Riverway Management Plan, July 2004. (p 10-11)

[6] Minnesota Pollution Control Agency. EQuIS Data Base for 71-0141. 2010.

[7] MN Statute 103G.005, Subd 19.

[8] U.S. Fish and Wildlife Service Wetlands of the United States Circular 39 1956.

[9] Minnesota Department of Natural Resources. Tomorrow's Habitat for the Wild and Rare: Action Plan for Minnesota Wildlife.

[10] MN Rule 6134.0150. 2006. p70.

[11] Minnesota Department of Natural Resources. Rare Species Guide. Uncas Skipper. http://www.dnr.state.mn.us/rsg/profile.html June 29, 2010.

[12] MN Statute 103G.005, subd 10b: *Greater than* [80%] *area means a county or watershed where* [80%] *or more of the pre-settlement wetland acreage is intact and:*
(1) *10% or more of the current total land area is wetland; or*
(2) *50% or more of the current total land area is state or federal land.*

Chapter 4
Land Use



Truman Sanford & Sons, Inc, Big Lake Township

Summary

Chapter 4 provides a brief discussion of current land use topics. The purpose of this non-exclusive list is to invite discussion of how certain land use regulations may be improved.

Green Acres

In 2008 and 2009, state tax laws changed affecting *about* 1,400 properties in the County which no longer qualified for the agricultural property tax deferment program, otherwise known as "Green Acres." Properties with Green Acres (class 2a/2b) qualified for a 0.5% tax rate, whereas the residential non-agricultural homestead rate is 1%.

According to the Minnesota Department of Revenue;[1] *"The Green Acres Program provides property tax relief for owners of productive agricultural property in areas where the market value of land is being affected by development pressure, sales of recreational land, or other non-agricultural factors... ...In 2008, the Legislature amended the law to clarify that, going forward, only class 2a productive agricultural land can qualify for Green Acres."*

Prior to 2009, to qualify for Green Acres, the property must have had a minimum of 10 tillable acres in production (i.e. crops, Christmas trees, hay, livestock-excluding horses), providing a minimum annual income of $300 + $10 per tillable acre.

To qualify for Rural Preserve on class 2b land, farmers must meet at least one of the following:[1]



Figure 4.1: Example of woodland that was cleared for cropland in order to qualify for the Green Acres tax deferment program. Source: Sherburne County Planning & Zoning Dept.

- *Have an agricultural homestead and have adjacent class 2a agricultural land enrolled in* [the] *Green Acres program; or*
- *Have class 2b rural vacant land that was properly enrolled in Green Acres for taxes payable in 2008 and have adjacent class 2a agricultural land enrolled in the Green Acres program.*

Prime Farmland

Prime Farmland is land with a dependable water supply, favorable temperature and growing season, acceptable levels of certain nutrients in the soil, and few or no rocks[2] (see Figure 4.3).

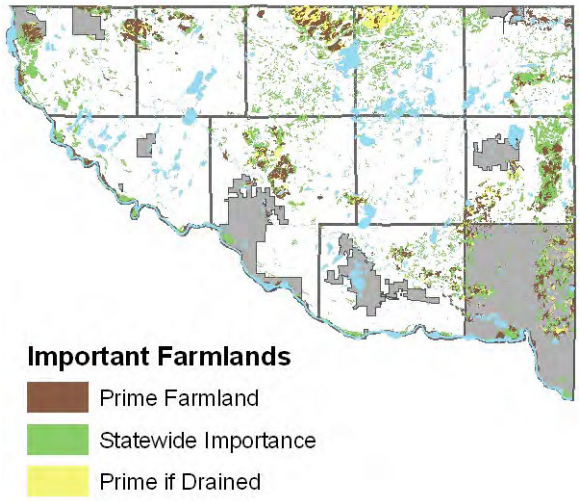


Figure 4.3: Farmland Classification. Source NRCS.[2]

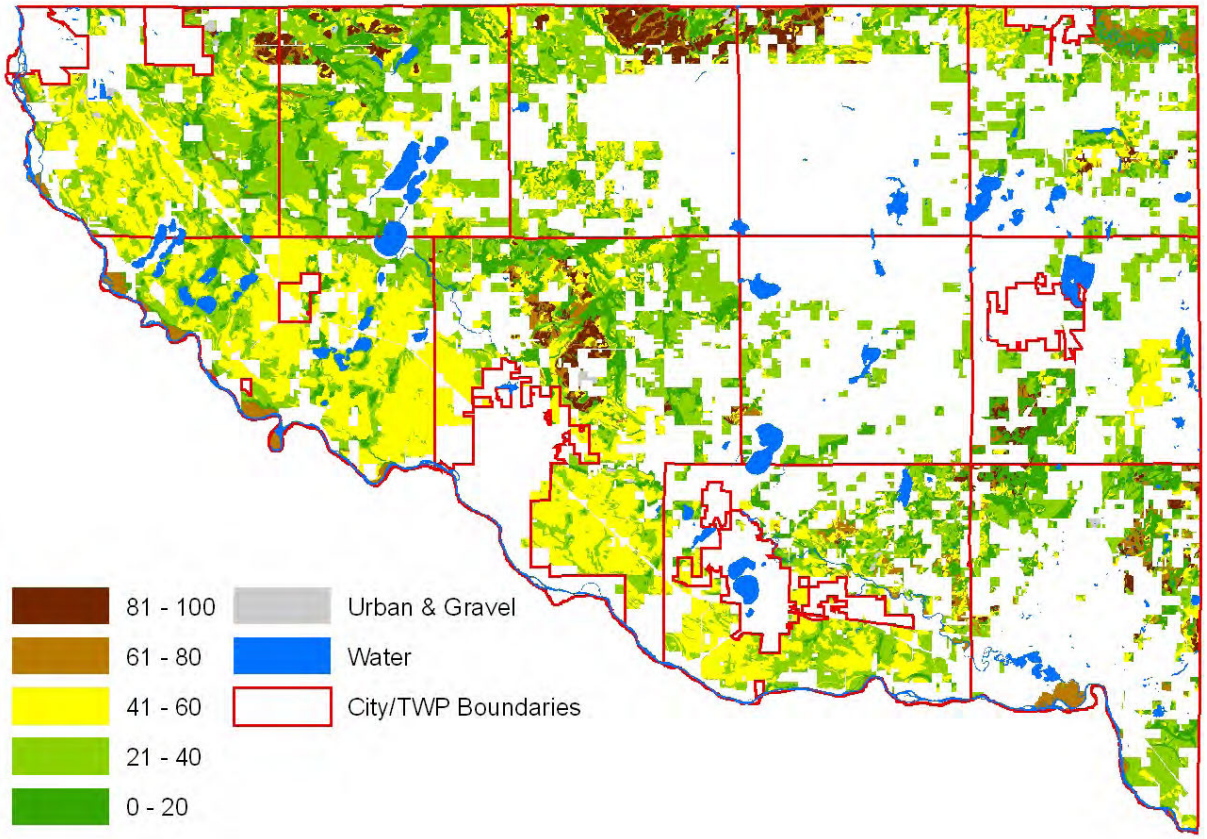


Figure 4.2: Crop Productivity Index (CPI) of land in agricultural production (2008). CPI ranks soils on a 0-100 scale (100 = best) for corn production. CPI does not account for the use of irrigation. Source: NRCS, Sherburne County Assessor's Dept.

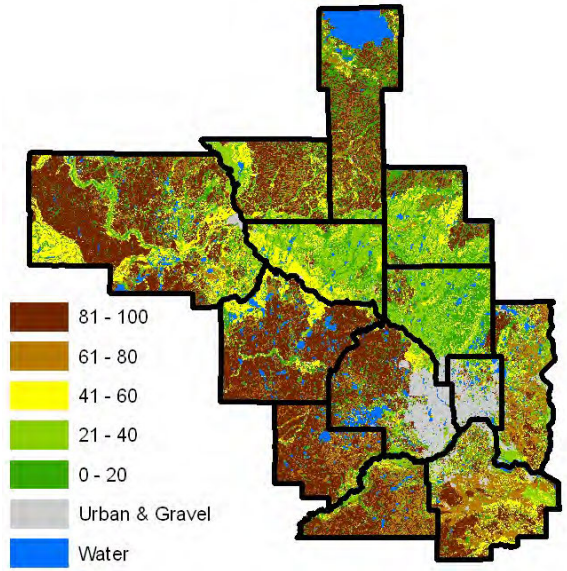


Figure 4.4: Crop Productivity Index (CPI) in the Twin Cities and St. Cloud areas. Source: NRCS.

The Natural Resource Conservation Service (NRCS) developed the Crop Productivity Index (CPI) to create a classification system and database to compare soils and corn crop yields to be used in a number of Farm Service Agency programs. Additionally, a number of counties (not Sherburne) use CPI to determine agricultural land values. CPI ranks soil classifications on a 0-100 scale, 100 being the best soil for the production of corn. The CPI does not account for the use of irrigation, which is widely used in Sherburne County because of our sandy soils.

Figure 4.4 compares CPI rankings in Sherburne County and surrounding areas. Generally, areas within the Anoka Sand Plain including most of Sherburne County are ranked as having marginal soil quality for non-irrigated crop production. Areas with a rank of 81-100 are concentrated along the Co Rd 3 corridor in Santiago and Blue Hill townships.

There is a need to balance the preservation of prime farmland and residential development. While a goal of agricultural townships has been to preserve farmland by restricting development, a number of property owners have expressed frustration about not being able to develop on substandard land that is zoned agricultural. If Prime Farmland can be identified in Sherburne County, possibly by using CPI rankings while accounting for the use of irrigation, the highest and best land use of individual land parcels may be identified.

Agricultural Production

Agriculture remains the dominate land use in Sherburne County. Figure 4.7 illustrates how the estimated total number of acres harvested has decreased year to year, from 93,317 acres in 1921 to 59,000 acres in 2008.[3]

Although the number of acres harvested has decreased, the bushels yield per acre (productivity) has significantly increased[3] (see Figure 4.8). For instance, corn (for grain) has increased from 36 bushels per acre in 1921 to 169 bushels per acre in 2008. The primary contributors to increased productivity has been the common use of irrigation beginning in the early 1970's, improvements in machinery, and greater efficiencies in seed, fertilizer, pesticides applications, and soil management.

According to the 2007 Census of Agriculture[4], the top five crops by acres were;

- Corn for grain 29,025 acres
- Soybeans 16,509 acres
- Vegetables 10,450 acres
- Forage 7,880 acres
- Potatoes 6,609 acres



Figure 4.5: Clear Lake Farmers Elevator Company, Source: Sherburne County Planning & Zoning Dept.

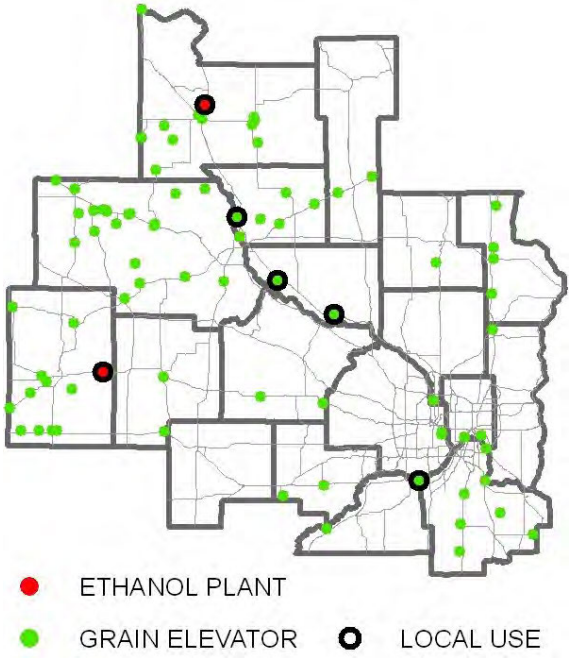


Figure 4.6: Location of grain elevators, ethanol plants, and those elevators most likely used by local farmers. Between 2002-2007, grain storage capacity increased from a per-farm average of 31,268 to 35,270 bushels (12.8%) allowing farmers to sell more when prices are higher. Elevators in Savage and Shakopee accommodate barge traffic. Source: USDA, MN Dept of Agriculture.[5]

In Minnesota, Sherburne County is ranked 2nd in the production of potatoes, 5th in Vegetables, and 1st in pheasants (ranked 3rd in the U.S.).[4]

The family operated Oakwood Game Farm in Baldwin Township has raised game birds since the mid-1960's. Oakwood hatches and ships up to 50,000 chicks each week, from April through July.

The total market value of agricultural products sold in the County in 2007 was $63.9 million, ranking Sherburne County 61st out of Minnesota's 87 counties.[4] The average farm income was $27,967. The average farm production expenses was $96,498.[4]

According to the 2007 Census of Agriculture,[5] the top five crops by value of sales by commodity were;

- Vegetables, melons, potatoes, and sweet potatoes $27,621,000
- Grains, oilseeds, dry beans, and dry peas $14,897,000
- Cattle and calves $ 7,946,000
- Nursery, greenhouse, floriculture, and sod $ 5,582,000
- Poultry and eggs $ 3,420,000

According to the 2007 Census of Agriculture,[4] the estimated market value of farmland and buildings was an average of $2,816 per acre in 2002, and $3,848 in 2007 (36.6% increase). In Minnesota, the average was $1,513 in 2002 and $2,569 in 2007 (69.8% increase).

Residential Development in Agricultural Areas

When Sherburne County adopted its first zoning ordinance in 1971 the Mississippi River corridor was zoned A-1, requiring a Conditional Use Permit (CUP) to construct a non-farm house. Residential subdivisions were not permitted. The majority of the rest of the County (apart from cities and immediately surrounding areas, and commercial areas) was zoned A-2. The A-2 district permitted residential developments with a minimum lot size of 2.5-acres.

In 1979, the County adopted a Wild & Scenic Riverway ordinance. In 1994, the County adopted a new zoning ordinance and zoning districts. Residential subdivisions in the Agricultural District were permitted only as a Cluster subdivision. In 1996, a number of town boards petitioned that land be rezoned from General Rural to Agricultural in applicable townships. These townships included Clear Lake, Haven, Palmer, and Santiago. Blue Hill[7] (1997) and Becker[8] (1999) townships petitioned the same, but were denied.

The Agricultural District permits both farm and non-farm homes, and allows limited residential

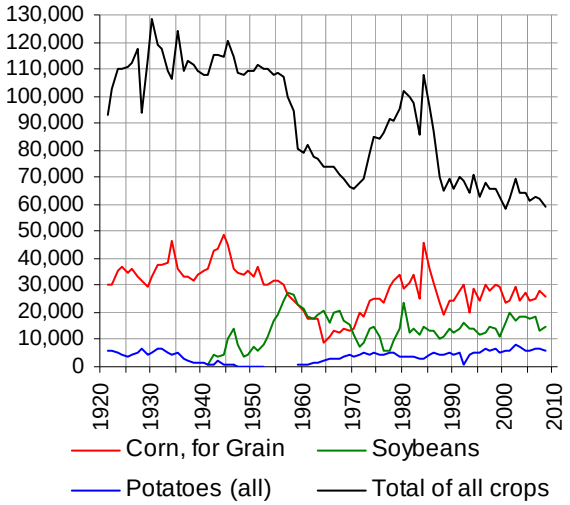


Figure 4.7: Acres harvested in Sherburne County, 1921-2008 (data on potatoes not available for years 1953-1958). Source: USDA.[3]

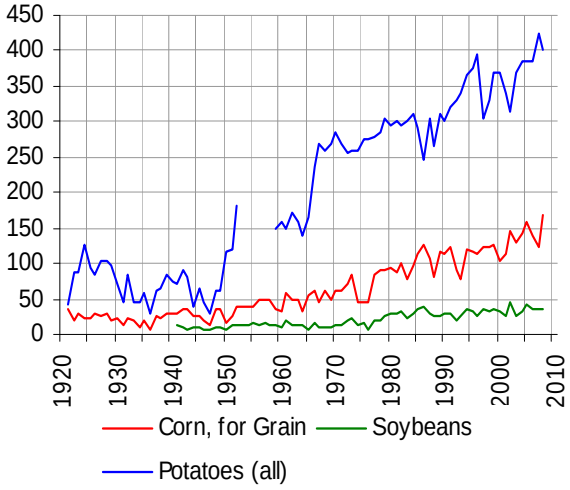


Figure 4.8: Yield per acre for major commodities in Sherburne County, 1921 - 2008 (Corn & soybeans measured in bushels. Potatoes measured in hundredweight. Data on potatoes not available for years 1953-1958.). Source: USDA.[3]



Figure 4.9: In order to subdivide land in the Agricultural District, each lot must be wooded, defined as "a tract of land that has a tree canopy over at least 75% of it" (2010 Zoning Ordinance). These lots were determined by a surveyor and confirmed by the Clear Lake Town Board to be (top to bottom): 99%, 100%, 90%, and 90% wooded. Source: Sherburne County Planning & Zoning Dept., Sanborn.

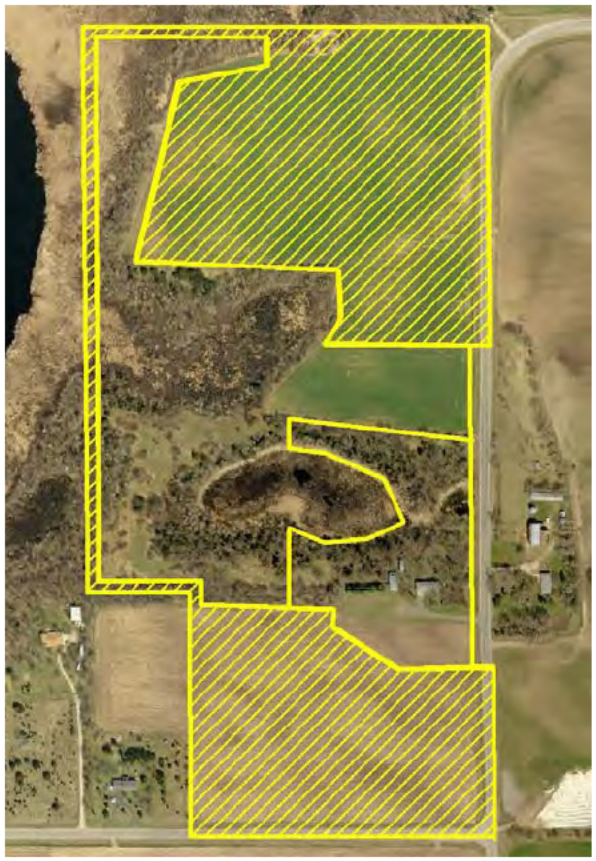


Figure 4.10: The preliminary plat of Mortenson Meadows in Clear Lake Township demonstrates the complexities of complying with the 75% wooded rule. This 78-acre parcel was proposed to be subdivided into two residential lots and one 40-acre metes & bounds parcel (hatched area = 1 contiguous parcel). Source: Sherburne County Planning & Zoning Dept, Sanborn.

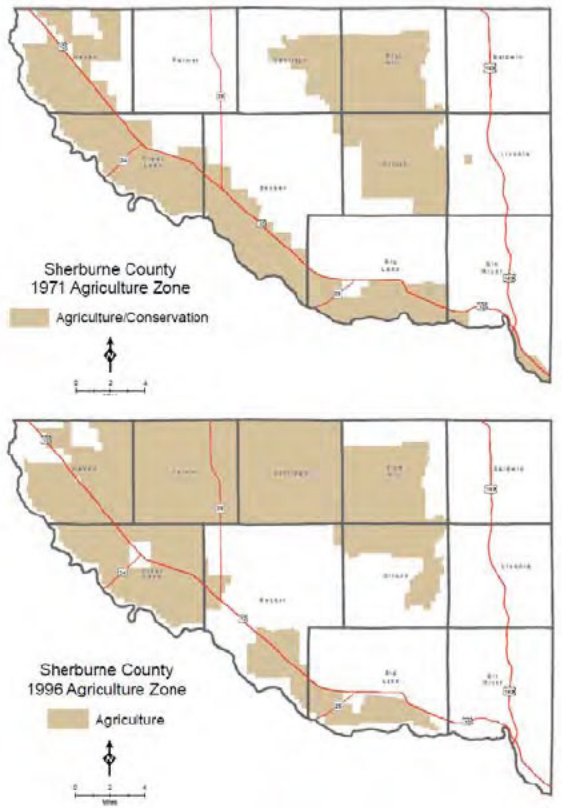


Figure 4.11: Agricultural zoning districts in 1971 and 1996. Source: Sherburne County, Planning & Zoning Dept.

subdivisions with 5-acre lots, where each lot is required to be at least 75% wooded in order to preserve farmland.

The percentage of area wooded (tree canopy) is determined by the developer's surveyor (see Figures 4.9 and 4.10), and agreed upon by the respective town board. Town boards have interpreted "wooded canopy" differently, resulting in inconsistencies.

In preparation of the 2010-2030 Comprehensive Plan, a number of townships requested that ordinances be amended clarifying how land may be developed in agricultural areas (see Appendix A). At a minimum, clarifying the wooded requirement, but also exploring the use of a Land Evaluation Site Assessment (LESA) model and Transfer of Development Rights (TDR) as a replacement of the 75% wooded requirement. There are concerns that residential development in agricultural corridors increase the market value of adjacent farmland, and costs of maintaining existing roads and infrastructure leading to increased property taxes.

Land Evaluation Site Assessment

LESA was created by the U.S. Department of Agriculture (USDA) Natural Soil Conservation Service (NSCS) in 1981 as a tool to conserve farmland. Similar programs have existed since the 1930's. LESA uses a two part analytical scoring system to evaluate the highest and best use of an individual land parcel. Land Evaluation (LE) is based on quantitative soil characteristics in support of crop production, while Site Assessment (SA) is based on qualitative community values such as the parcel's proximity to services and non-compatible land uses. The characteristics of the property are scored for their LE and SA values. This score is then used to advise elected officials if the land parcel should be conserved as-is, or allowed to develop. In Minnesota, LESA is only used in Stearns County.

Transfer of Development Rights

Transfer of Development Rights (TDR) is another tool used to conserve agricultural and wildlife corridors, as explained by author Rick Pruetz in "*Saved by Development*";[12]

> *"With TDR, a community identifies an area it wants to preserve as a 'sending area.' The owners of sending area properties typically have a choice: they can develop their land, or they can deed-restrict their properties against future development and sell only the development rights. (the concepts of 'deed restrictions' and 'development rights' are addressed below.) These development rights can be purchased by the owners or developers of receiving sites. Receiving sites are areas where a community would like to concentrate future growth; these typically are areas within or adjacent to existing development which would be easy to serve with transportation and other public services. By purchasing development rights, these receiving site owners are allowed to build at a higher density than the zoning ordinance would allow for a project that does not include TDR."*

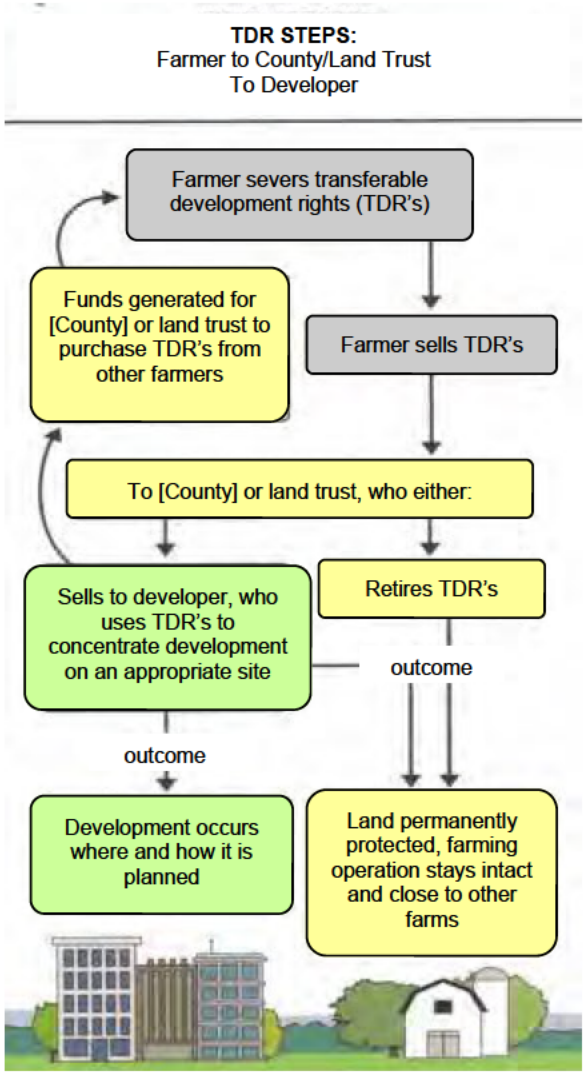


Figure 4.12: How Transfer of Development Rights (TDR) can work. Source: Brandywine Conservancy.[12]

"The goal of TDR is to create a 'win-win-win' outcome. The sending site owner is able to continue farming (or continue using a historic landmark) and also is able to benefit from the sale of development rights. The receiving site owner is able to achieve a greater density, and consequently greater profit, from the purchase of development rights. And the community wins by preserving farmland, environmental areas, or landmarks without having to spend any money to actually acquire these properties."

Since 1996, TDR has been used in Blue Earth, Chisago, and Rice counties to preserve over 9,500 acres. In order for TDR to work well in Sherburne County, the Sending Area must consist of a valuable resource such as farmland, woodland, aggregate, or is adjacent to a city growth area, and the Receiving Area must be zoned such that development is very restrictive without the use of TDR (i.e. 1 home per 40-acres).

Residential Conservation Developments

Conservation Developments are often referred to as Open Space Developments, Low Impact Developments, and in Sherburne County as Cluster Developments and more recently as Residential Planned Unit Developments (R-PUD). Conservation developments typically allow smaller lots at the same or increased density compared to standard developments, but require that a portion of the development be left as open space and preserved under a conservation easement. The open space may be prohibited from being developed, or development may be allowed when access to municipal sewer is available. Conservation developments often require common septic systems, as opposed to individual septic systems used in standard developments.

Between 1995 and 2006, the County approved 27 cluster developments (preliminary plats and/or final plats), totaling 908 lots. The cluster ordinance was amended a number of times in response to approved developments which when constructed, did not achieve the ordinance's intent of preserving natural features and amenities. One of the challenges was that in order to preserve quality features such as existing woods and scenic farmland, those features needed to have already existed, and cannot be recreated. A number of cluster developments consisted of flat land with few features.

In 2002, the County Board adopted a moratorium on cluster developments to allow time to address several concerns. Two public workshops were held in November and December, 2003. Concerns expressed at those workshops, and by County staff are summarized below;

- *Preserving open space in cluster developments (clusters) does not amount to preserving agricultural land.*



Figure 4.13: Savannah Meadows. Orrock Township. Approved in 2001, this 126-acre cluster development includes 61 single-family lots ranging in size from 1/2 acre to 1-acre, and includes 68-acres of open space (54% of the development). The common septic system is owned by Natural Systems Utilities and operated by EcoCheck. Source: Sherburne County Planning & Zoning Dept., Sanborn.



Figure 4.14: Savannah Meadows, Orrock Township. Source: Sherburne County Planning & Zoning Dept.

- *Residential development should not be allowed in agricultural areas.*
- *Townships should be able to review a sketch plan prior to a Preliminary Plat being submitted.*
- *Townships should not be forced to do clusters.*
- *There is a need for smaller more affordable lots, such as those found in clusters. Clusters should be allowed in hamlet areas and designed to be retrofitted to a municipal sewer system (when one becomes available).*
- *The open space is not usable, and is undevelopable.*
- *The County and townships have no interest in maintaining the open space.*
- *The practice of allowing the developer to determine how the open space is to be preserved is not acceptable.*
- *Requiring that 50% of the development be open space is too much.*
- *Undevelopable land should not count towards the minimum requirement for open space.*
- *Unmaintained open space is an eyesore.*

The workshops resulted in several suggestions of how to modify the cluster ordinance and improve the development review process to be more inclusive of the town boards, but it did not result in a consensus among the townships.

In 2004 the County Board removed the provision for Cluster Developments from the ordinance. In 2006, the County adopted a provision for Residential Planned Unit Developments (R-PUD), replacing the cluster ordinance, in part. The new ordinance incorporated many of the suggestions made during the 2003 public workshops.

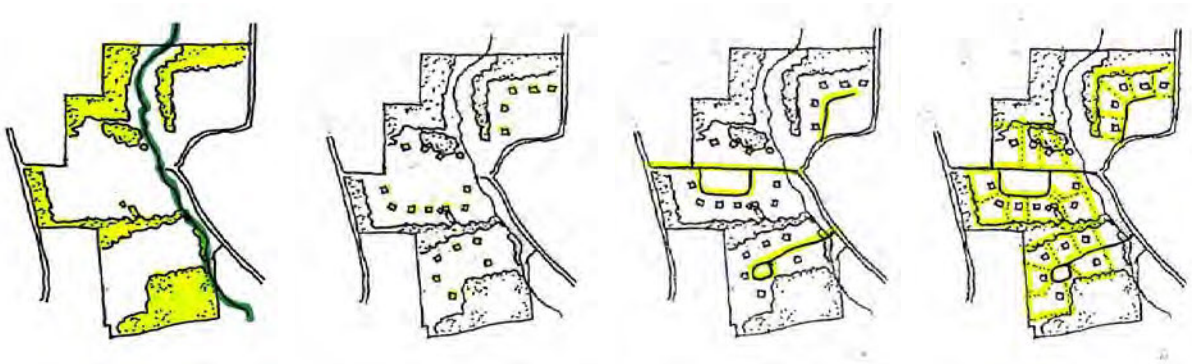


Figure 4.15: Example of four step process of designing a Conservation Development: (Step 1) Identify areas to be preserved (i.e. stream & woods); (Step 2) Select home locations to maximize views; (Step 3) Design roadways; and (Step 4) draw property lines. Conventional developments are often designed in the order of steps 3, 4, 2 without regard to preserving natural features. Source: Randall Arndt[14]



Figure 4.16: The Shores of Eagle Lake in Orrock Township. Approved in 2004 as a Shoreland Planned Unit Development (PUD). The 173-acre development includes 99 single-family lots ranging in size from 0.5 to 0.8 acres, and includes 95 acres of open space (55% of the development). As of 2010, the property has changed ownership a number of times, and has not been built upon. Source: Pictometry International Corp.



Figure 4.17: The Shores of Eagle Lake includes three roundabouts, each with a landscape feature. Source: Sherburne County Planning & Zoning Dept.

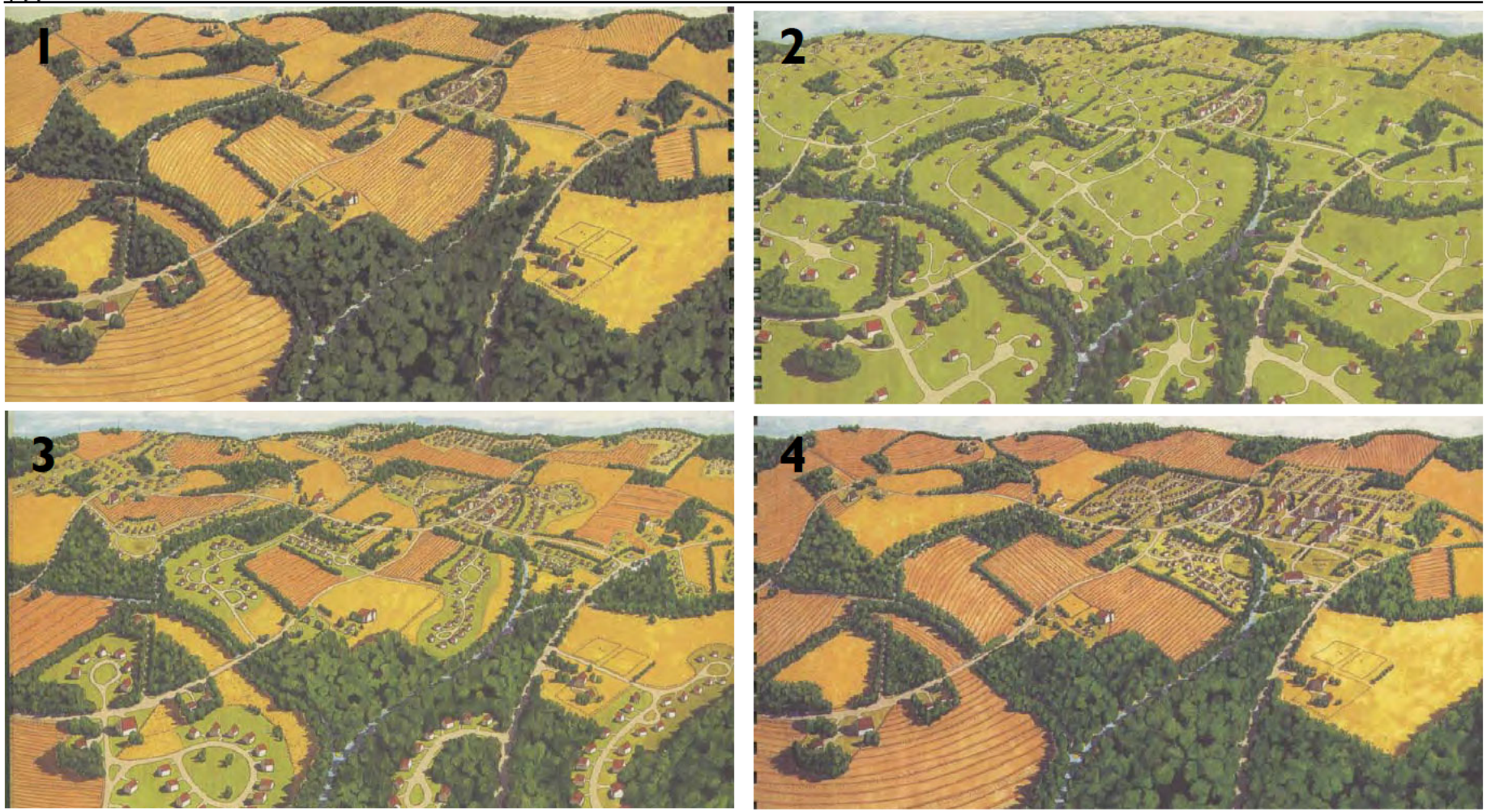


Figure 4.18: Differing housing densities; (1) agricultural, (2) rural development, (3) conservation development, and (4) hamlet development. Most rural residential development in Sherburne County is similar to the pattern in image #2. Source: Brandywine Conservancy.[13]

R-PUD's are a conditional use (CUP) in the Agricultural, General Rural, and Urban Expansion zoning districts as an overlay zoning district. There are two types of R-PUD's; (A) requires a minimum lot size of 1.5-acres with each lot using an individual septic system, and requires no open space; and (B) requires a minimum lot size of $^{1}/_{2}$-acre with each lot using a common septic system, and requires that at least half the development be conserved as open space. In both cases, additional lots (a.k.a. density bonus) may be permitted if certain amenities are required beyond those required in a Standard Plat.

R-PUD's must be a minimum of 30-acres in size, and require a rezoning to an R-PUD Overlay District A or B, a Conditional Use Permit (CUP) is

required for the R-PUD, and they must be approved by the Town Board and County Board.

The intent when the R-PUD ordinance was written was for town boards to identify conservation corridors (R-PUD Overlay District B) where R-PUD's with open space would be encouraged resulting in contiguous open space corridors. In reality, those town boards interested in R-PUD's preferred to review proposed R-PUD's and their locations on a case by case basis. In order for the R-PUD ordinance to be acceptable, town boards were given the option of not allowing them in their township.

Between 2006 - 2010, County Staff reviewed six R-PUD sketch plans with projects located in Baldwin, Big Lake (3), Clear Lake, and Santiago townships. None were submitted for Preliminary Plat approval. Of the four townships involved, two town boards did not feel that the proposed R-PUD's were appropriate for the proposed locations.

Non-conforming Shoreland Lots

There are a number of lakes in Sherburne County which became populated with seasonal cabins prior to any zoning or building regulations. In 1971, the County adopted the Minnesota Department of Natural Resources (DNR) model Shoreland Ordinance, regulating land use and building setbacks within 1,000' of lakes, and within 300' of rivers and streams. This resulted in many lake homes becoming legal non-conforming structures because they were built too close to a water body, road, or property line, and often built on lots smaller than the minimum lot size for that zoning district. If the homeowner wishes to build a home improvement or replace a septic system (for example), a variance to the ordinance is often required so that the addition may encroach into the required setback distance.

Variances require a public hearing, and are acted on by the County's Board of Adjustment. To receive a variance from a building setback, the applicant must prove "practical difficulties" as defined under MN Statute 394.27. Another difficulty for older lakeshore homes is when their septic systems fail, and there is inadequate space on the lot in which to construct a replacement system. This may require the sole use of a holding tank which must be pumped on a regular basis.

Minimum Residential Lot Sizes

The Minnesota Pollution Control Agency (MPCA) has suggested[15] a minimum lot size of two acres or larger if utilizing an individual sewage treatment system (ISTS).

As of 2010, generally the eastern half of the county's townships are zoned General Rural (GR), and the western townships are zoned Agricultural (Ag). The minimum standards for platted residential lots are as follows:



Figure 4:19: Example of non-conforming shoreland lots (outlined). Birch Lake Beach, 2nd Addition in Big Lake Township was platted in 1928. The individual lots are not large enough to accommodate a house, well and septic system, thus multiple lots have been combined to create one buildable lot. Source: Pictometry International Corp.

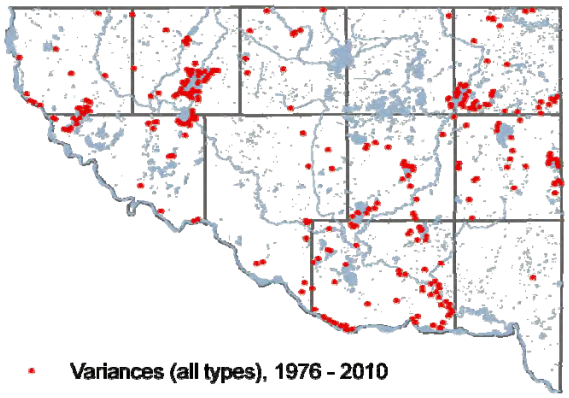


Figure 4.20: Location of variances approved by Sherburne County, 1976-2010. Source: Sherburne County Planning & Zoning Dept.

	GR. Dist	Ag. Dist
Min lot size:	2.5-acres	5-acres
Min lot width:	200'	300'
Min lot depth:	300'	300'

Generally, a township's road & bridge fund may consist of 50% - 70% of their total budget. One solution to reducing this cost is to reduce the amount of roads built by allowing smaller lot sizes and lot widths. For instance, reducing the lot width from 200' to 150' could amount to a road 25% shorter assuming the same number of homes are built, or may allow additional lots thereby decreasing the per-lot assessment for road maintenance/replacement.

In preparation of the 2010-2030 Comprehensive Plan, Clear Lake Township suggested that 5-acre lots in agricultural areas took too much land out of crop production.

Cul-de-Sac Length

The 1971 ordinance required that cul-de-sacs (dead-end roads) not exceed 600' in business/industrial areas, 500' in platted residential areas, and 1,320' in non-platted residential areas (unless justified by topography). In 1994, temporary cul-de-sacs were amended to a maximum of 700' in length. In 1995, temporary cul-de-sacs were amended to a maximum of 1,400' in length in all areas. In 1997 temporary cul-de-sacs were amended to allow exceeding 1,400' in length with approval of the County Board and the local road authority ("temporary cul-de-sac", meaning it will be extended as a thru-road in the future).

The National Fire Protection Association[16] recommends that a cul-de-sac length not exceed the capabilities of the fire department's equipment, and if exceeding 1,200' that a turnaround be located at 1,200' intervals.

Townships have expressed concerns about the increased expense of snow removal in cul-de-sacs, as well as resident's portable basketball hoops and other objects placed in cul-de-sacs.

Accessory Dwelling Units

The County has received several inquiries regarding if a second dwelling unit is permitted on a residential property. The typical request is from homeowners who would like to build a small house or garage apartment for their parents to live in during the summer months, or for an adult child who may not be able to afford to move out on their own. The County permits one residential housing unit per land parcel, with exceptions for temporary homes (mobile homes) occupied by; (1) disabled family members or caregivers, or; (2) farm laborers. In these instances an Interim Use Permit (IUP) is required.



Figure 4.21: The use of "coving" streets (bottom) can reduce the amount of right-of-way (ROW) in a development as demonstrated in these two sketch plans of the same property (22% reduction in linear feet of road). Source: Rick Harrison Site Design Studio.

	Top	**Bottom**
Lots:	138	155
Avg: Lot Size	.55-acres	.50-acres
ROW:	8,964 linear ft.	7,306 linear ft.

In other communities where accessory dwelling units are permitted, opposition is generally due to concerns about inadequate parking, the use of the secondary home as a rental unit rather than lived in by family members, and the overuse of septic systems designed for one home, not two. Allowing a second dwelling on a residential lot essentially increases the density. The dilemma comes in where to draw the line between single family homes, duplexes, and allowing an entire second dwelling on one parcel. Several cities have addressed these concerns, allowing these as a Conditional Use, requiring adequate parking, a minimum and maximum home size, and that the homeowner live on the property.

This topic was discussed by the Planning Commission on July 17, 2008 during a non-related public hearing. At that time, the Commission expressed an interest in allowing Accessory Dwelling Units. However, at the May 21, 2011 Public Hearing regarding the Comprehensive Plan's Goals & Policies, the Commission voted 3-3 (4 non-votes) to retain Implementation Strategy 9-3 to consider multi-generational housing, such as Accessory Dwelling Units. Commission members expressed concerns about the potential appearance of such homes in platted subdivisions and enforcement, assuming it were permitted as a Conditional Use. Other Commissioners wanted the option of approving such a use.

Hamlets

The term "Hamlet" is referred by planners and demographers as an unincorporated place with a population less than 250 residents. In this comprehensive plan, a hamlet is referred to as the commercial center(s) of Orrock, Palmer, and Santiago townships. The challenge to these hamlets have been to provide a population large enough for local businesses to be economically self-sustaining.

Santiago's hamlet is located on the north end of the Sherburne National Wildlife Refuge. It's "Main Street" (20th Street) resembles Small Town America. But every storefront is vacant except for an auto repair shop. The more viable businesses are located at the intersection with County Road 11, anchored by Cetra Sota Co-op, a gas station, and a restaurant/bar. There are about 55 homes within one mile of the hamlet, including 11 homes on 20th Street in the hamlet's core. The estimated population within the hamlet area is 173 persons (2009).

Palmer is fortunate to have a number of lakes attracting a population large enough to support existing businesses, including two restaurants. A 13-lot industrial park was developed in 2007, but remains largely vacant. The industrial park is serviced by County Road 6 which has a weight restriction of 6-tons during spring road restrictions, limiting some potential businesses according to its developer. There are about 200 homes within one mile of the hamlet for an estimated population of 459 persons (2009).



Figure 4.22: Public auction held in Santiago Township, 1920. The auction included general goods brought by area residents. Many of the historic buildings remain, but their current use is unknown. Source of photo: courtesy of Sherburne County History Center.

Orrock's hamlet is limited because of it's location on a sliver of land ($^1/_4$ mile by 2 miles) in-between the Sherburne National Wildlife Refuge and Sand Dunes State Forest. There are about 60 homes within one mile of the hamlet for an estimated population of 174 persons (2009).

The three hamlet's core functions are to provide convenience goods to local residents and a sense of identity to the larger township. In each hamlet there is an opportunity to provide expansion space for local businesses such as Home Businesses, which may have grown beyond their permitted size. During the previous comprehensive plan update, a public hearing was held in April, 2004 for the adoption of the plan. The Comprehensive Plan Taskforce had recommended identifying a Hamlet District in Palmer and Santiago townships with the intention of adopting a hamlet mixed-use zoning district for these areas where they had been zoned Commercial.

During the public hearing there were four residents who spoke; two in favor of hamlets and two against. All were residents of Santiago Township. A petition was signed by 126 Santiago residents in opposition, reading;

> *"We the undersigned of this petition are contesting the Township approving any Cluster Development in Santiago Township. The reason is because of safety issues, along with the added costs burden to the Township residents. Safety issues being added Police protection, Fire protection, and Emergency Medical Vehicle response. Added costs would be tax base increase which would result in higher property taxes for everyone in Santiago."*

The Planning Commission unanimously recommended approval of the comprehensive plan with the condition that "*Hamlet Mixed Use be given special consideration by the County Board."* On May 4, 2004 the County Board approved the Comprehensive Plan update and Land Use Map eliminating the Hamlet Mixed Use designation from the map, but keeping the language in the plan itself for future consideration. The Board expressed that more discussion is needed with town boards and residents regarding hamlets.

In 2002 and 2009 the Santiago Town Board requested that the County develop an alternative zoning district allowing a mix of commercial and residential uses (see page 138-139). Between 2005 and 2008, the Palmer Town Board appointed a taskforce to consider among other topics, mixed-use zoning, and a long-term growth plan. The Town Board concurred with the taskforce's recommendation that if there is to be residential growth, that it radiate out from the township's core commercial area. The taskforce and Town Board recommended in the short term that large scale residential development not be allowed in order to preserve the township's current rural character.

Conditional vs. Interim Uses

The Zoning Ordinance includes a list of permitted, conditional, and interim land uses for each zoning district. Permitted uses are those land uses allowed without specific County Board approval. Conditional and Interim uses are allowed pending a Public Hearing and may include restrictions specific to the intended use, and to avoid disturbing surrounding neighbors.

Conditional Use Permits (CUP) are permanent unless revoked by the County Board. Interim Use Permits (IUP) are temporary. An IUP may expire on a specific date or event, or when the property is sold. The expiration is defined when the IUP is approved.

Interim uses are intended for temporary land uses which do not require a significant investment in permanent structures whose long-term use may be limited because of the short-term interim use. IUP's are most commonly issued for Home Businesses in an Accessory Building.

Orrock Hamlet





Figure 4.23: County Road 5 in the Hamlet of Orrock Township. Source top: Pictometry International Corp., bottom: Sherburne County Planning & Zoning Dept.

Local Businesses:
Gas Station
Restaurant / Bar
Liquor Store
Contractors Yard

Palmer Hamlet





Figure 4.24: County Road 6 in the Hamlet of Palmer Township. Source: top: Pictometry International Corp., bottom: courtesy of Jean Johnson.

Local Businesses:
Gas Station
Restaurant (2) / Bar
Liquor Store
Contractors Yard
Town Hall
Township Park
General Store
Salvage Yard
Mini-Storage
Nursery / Kennel
Manufacturing

Santiago Hamlet



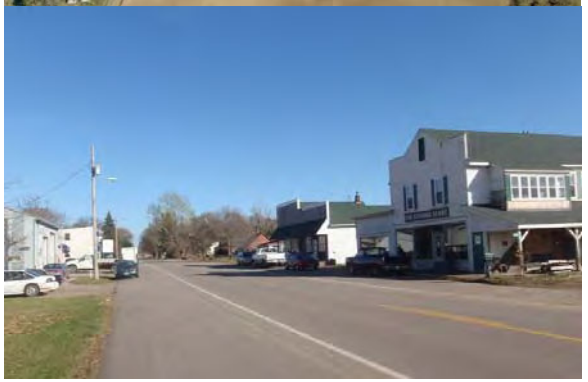


Figure 4.25: 20th Street in the Hamlet of Santiago Township. Source top: Pictometry International Corp., bottom: Sherburne County Planning & Zoning Dept.

Local Businesses:
Gas Station
Restaurant / Bar
Agricultural Cooperative
Auto Repair
Town Hall
Township Park

IUP's became a solution to the situation where a town board, Planning Commission, and/or the County Board felt comfortable issuing a CUP for a specific use to a specific landowner, but felt uncomfortable with the idea that over time, the character of the neighborhood may change such that the land use permitted through the CUP was no longer appropriate for the neighborhood.

In 2008, the Planning & Zoning Department worked with local legislators to amend state statutes to allow counties to issue IUP's whereas previously, IUP's were only allowed in cities.

Home Businesses

Currently (2010), Home Businesses may fit into one of three categories;

A Home Occupation is a business conducted in the house, consumes no more than 25% of the home's square footage, and has no more than two employees (fulltime equivalent) other than the homeowner.

A Home Business in an Accessory Building is a business conducted in a detached garage or outbuilding, which utilizes no more than 1,800 sq ft of one building, and has no more than two employees other than the homeowner.

A Temporary Start-Up Business is a business conducted in a detached garage or outbuilding, which utilizes no more than 1,800 sq ft in one building. The business must be on a parcel that is at least 5-acres. The maximum number of employees is determined by the County Board. The business must be removed within three years (i.e. temporary).

In each case, there are more details provided in the Zoning Ordinance. How each home business is permitted varies on which zoning district the property is located in. Within the Agricultural and General Rural districts, Home Occupations are a permitted use. Home Businesses in an Accessory Building, and Temporary Start-Up Businesses are an Interim Use, requiring an IUP.

IUP's for a Home Businesses in an Accessory Building is the most common request requiring a Public Hearing. The nature of the specific business and the surrounding area heavily impact the County Board's decision of whether the proposed business is appropriate at that location.

Prior to 2008, there was no provision for Interim Uses, or Temporary Start-Up Businesses. Home Businesses in an Accessory Building required a CUP in the Agricultural and General Rural districts. In 2008, this changed with the adoption of an Interim Use ordinance.

Also in 2008, the County contacted 333 landowners who had received a CUP since 1971 to inquire

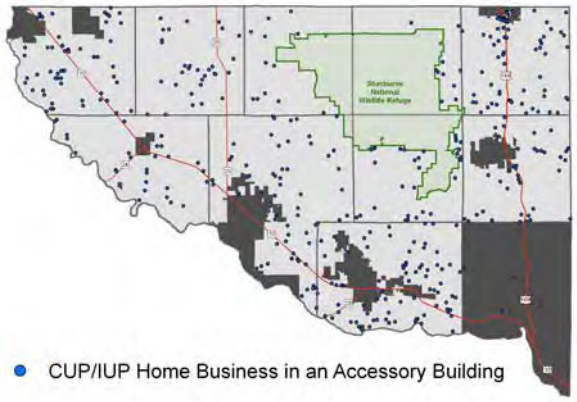


Figure 4.26: Location of "Home Businesses in Accessory Buildings" permitted as a CUP or IUP, 1971 - 2009, Source: Sherburne County Planning & Zoning Dept.



Figure 4.27: CUP for a Home Business in an Accessory Building (auto repair business) located in Big Lake Township. Source: Pictometry International Corp.

if the business was still active, and if the business was operating within the conditions of the CUP requirements when issued. 38% responded that the business was no longer active and consented to the County Board revoking their CUP. The Planning & Zoning Department intends to continue this program on a rotating yearly basis.

Contractor Yards

Applications for contractor yards are also a common zoning request. A Contractor's Yard is a building or property used for storage of vehicles and equipment in the construction industry or similar industries.

There are different sizes of contractor yards that have been permitted, from a pick-up truck and skid loader, to businesses with hundreds of pieces of equipment. Although defined the same, they may be permitted differently depending on size and location. Contractor Yards have been permitted as a Home Business in an Accessory Building, a Contractor's Yard, and as a Highway Planned Unit Development (Hwy PUD).

Aggregate Mining

Sherburne County includes some of the largest aggregate deposits within undeveloped areas of the Twin Cities metropolitan area. The County requires Interim Use Permits (IUP) to excavate or fill 1,000 cubic yards or more (equivalent of about 100 dump trucks), within the County's zoning jurisdiction. Sand and gravel operations are concentrated along two veins in Elk River / Livonia Township, and in Haven Township. Haven includes some areas of granite as well. One of the first commercial mining operations in Minnesota dating back to 1889 occurred on what became the Minnesota State Reformatory for Men (Minnesota Correctional Facility - St. Cloud).

Mining operators pay a local gravel tax based on the amount of material removed from the site. The current (2009) tax is 21.5¢ per cubic yard, or 15¢ per ton. The tax is distributed as follows:

40.375%	host city / township
40.375%	Sherburne County Road & Bridge Fund
14.250%	Sherburne County Gravel Tax Reserve Fund
5.000%	Sherburne County, administrative costs

In 2009, $297,940 was collected in gravel taxes.

A significant cost of aggregate is the cost to transport it from a mine to a construction site. For that reason, it is more economical to use local materials. Larger mining operations are distributed around the Twin Cities along the Minnesota River in Dakota and Scott counties, Maple Grove

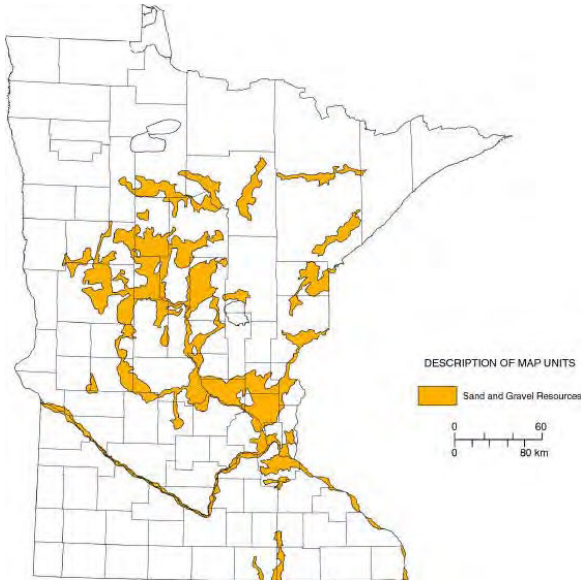


Figure 4.28: Sand and gravel resources. Source: Minnesota Geological Survey.[17]

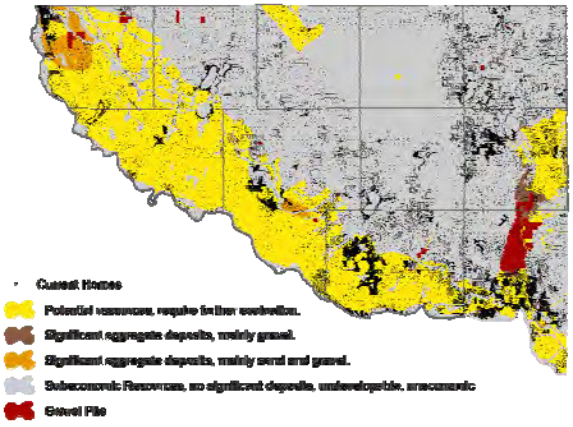


Figure 4.29: Comparison of where aggregate resources and homes are located. Source: MN DNR.

(Hennepin County), and in Elk River / Livonia Township. The operations in Sherburne County are farther away from developing urban areas compared to others, thus local mining is expected to continue for 30+ years before being depleted.

In Haven Township, the aggregate area is located in a predominately agricultural area, and is within St. Cloud's designated growth area. What is not currently mined is in farm production. Once the aggregate is removed, the land is likely to be reclaimed for urban development and parkland. This is likely to take place over the next 20 - 40 years.

In Livonia Township, the aggregate area is located near residential developments. The Zoning Ordinance does require a 40' buffer between aggregate operations and property lines, but there is concern that a residential backyard adjacent to a 50' deep hole in the ground is not a compatible land use.



Figure 4.30: Gravel pit adjacent to a residential development in Haven Township. Source: Pictometry International Corp.

Stormwater Management

The term "Stormwater Management" means to control and filter water runoff caused by rain and snow melt before the runoff reaches water bodies and aquifers. Poorly managed stormwater runoff can flush toxic metals and chemicals into lakes, rivers and wetlands. The Federal Clean Water Act established the National Pollutant Discharge Elimination System (NPDES) program to manage non-agricultural sources of stormwater runoff. The NPDES program is administered through the Minnesota Pollution Control Agency, and includes three types of permits for Municipal Separate Storm Sewer Systems (MS4s), Construction Stormwater, and Industrial Stormwater. The primary requirement of NPDES permits is the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) which will be a permit holder's guiding document for controlling stormwater runoff. Sherburne County is actively involved in Construction Stormwater permits, and Municipal Separate Storm Sewer Systems (MS4s) permits.

Construction projects that disturb more than one-acre of land are required to obtain a Construction NPDES permit. Sherburne County is not the regulating authority over construction stormwater permits, but is involved in permitting and monitoring these sites for compliance with the requirements of the permit's SWPPP.

In Sherburne County there are seven communities classified as MS4's; Sherburne County, Big Lake, Big Lake Township, Elk River, Haven Township, St. Cloud, and the Minnesota Correctional Facility (St. Cloud State Prison). All MS4's are required to develop and implement a SWPPP to reduce the discharge of pollutants from their storm sewer system to the maximum extent practicable. The Sherburne County Planning & Zoning and Public Works departments are responsible for the development and implementation of the County's SWPPP. The SWPPP must address:



Figure 4.31 Example of silt fencing used to control stormwater runoff from a construction site. Source: Sherburne County Planning & Zoning Dept.

- Public education and outreach;
- Public participation/involvement;
- Illicit discharge, detection and elimination;
- Construction site runoff control;
- Post-construction site runoff control; and
- Pollution prevention/good housekeeping.

Solid Waste Facilities

Due to the close proximity to the Twin Cities metropolitan area, Sherburne County is the host community to numerous solid waste facilities. Solid Waste facilities located in the County are currently permitted for the disposal and/or processing of; mixed municipal solid waste (MSW), municipal solid waste combustor ash, construction debris, demolition waste, industrial solid waste, yard waste, recyclables, problem materials, and/or source separated organics. The amount of solid waste generated within the County is a small fraction of the collective amount of solid waste generated outside of the County that is processed and/or disposed of within the County.

Locally, the County is divided into east and west solid waste service districts. The western half is included in the Tri-County Solid Waste Commission's service area. Beginning in 2011, 5,000 tons annually of County Municipal Solid Waste (MSW) originating mostly from the western half of the County will be delivered to the Pope-Douglas Waste Energy Facility located in Alexandria, MN. This facility is a mass burn incinerator with a front end recycling sort line. During the incineration process, 30 million lbs of steam at 170 lbs of pressure is generated. The steam is used by the facility for heating and electricity, and sold to the Douglas County Hospital, and a 3M manufacturing facility for heating purposes.

In the eastern half of the County, several haulers have contracted directly with Great River Energy (GRE) to deliver MSW to the Elk River Resource Processing Facility. The County directly subsidizes the processing cost of the facility, and provides rebates to haulers who deliver waste to this more environmentally preferred disposal location. The waste delivered to this facility is first screened for metals, aluminum, and other items that cannot be burned. The waste is then processed into Refuse Derived Fuel (RDF) and delivered to GRE's Elk River Energy Recovery Station where it is burned to generate high pressure steam needed to power the plant's generators. Elk River Energy Recovery Station is able to supply enough energy to provide for up to 30,000 homes. Following the combustion process, approximately 20% of the RDF remains in the form of ash which is hauled to the Becker Ash Landfill in Becker. Creating RDF instead of disposing the waste in a landfill reduces methane that is generated when waste is burned.

MSW that is not processed is disposed of at landfills. Landfills used by haulers within the County

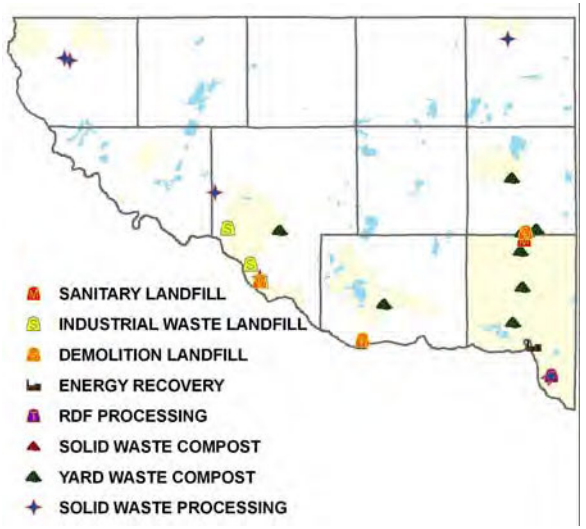


Figure 4.32: Solid Waste Facilities in Sherburne County.
Source: Sherburne County Planning & Zoning Dept.



Figure 4.33: Elk River Sanitary Landfill,, Elk River.
Source: Sherburne County Planning & Zoning Dept.

include; Elk River Landfill; Pine Bend Landfill in Dakota County; and Lakes Area Landfill in Sarona, WI.

The Elk River Landfill estimates that it will reach its MSW capacity by 2015 and its Demolition Debris capacity by 2080. The Vonco II Landfill in Becker Township estimates it will reach capacity by 2045. The Becker Ash Landfill in Becker estimates it will reach capacity by 2015. The SHERCO 3 Ash Disposal Facility in Becker Township estimates it will reach capacity by 2045.

Recycling Facilities in Sherburne County are privately owned and operated. Four full service recyclers are located within the County; B & E Recycling Center in Elk River; BNG Services in Baldwin Township; Central Appliance Recyclers in Haven Township, and; the Elk River Landfill in Elk River. Product Recovery Inc. located in Haven Township recycles used pallets. There are also four private yard waste compost sites located within the County. Additionally, the cities of Becker, Big Lake, Elk River, and Zimmerman operate public compost facilities.

Specific programs, objectives, goals, and County policies regarding solid waste management are referenced within the County's Solid Waste Management Plan (2010). Enforcement is governed by the County's Solid Waste Management Ordinance.

Methane-to-Energy

The Elk River Landfill is divided into open (operational) and closed cells. The closed cells include more than 30 wells used to relieve gas pressure including methane, carbon dioxide, and other byproducts of decay. These gases are collected, compressed to remove moisture, filtered, and separated before being piped to a small power plant at the landfill. The gases fuel generators producing electricity. The electricity is distributed through Elk River Municipal Utilities (ERMU) to about 1,600 homes. The power plant has the capacity to produce 26.7 million kilowatt hours of electricity per year (ERMU provides a total of about 180 million kilowatt hours per year). The facility includes an Environmental Learning Center used to educate students and adults about the methane-to-energy and landfill facilities.

Airport Zoning

Within the County, there are three permitted airports for public use. They are located in St. Cloud (St. Cloud Regional), Princeton (Princeton Municipal), and in Clear Lake Township (Leaders Clear Lake Airport). There are four permitted airports for private use. They are located in Becker (2), Clear Lake, and Haven townships. Additionally, there is one permitted seaplane base located on Rush Lake in Palmer Township.

Land use adjacent to the St. Cloud and Princeton airports are regulated through airport zoning in addition to county and city zoning. Specifically, airport zoning limits population density and structure

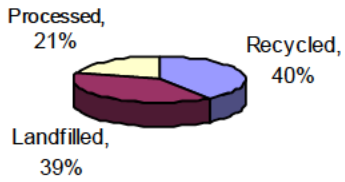


Figure 4.34: How Municipal Solid Waste generated in Sherburne County is processed. Source: Great River Energy.

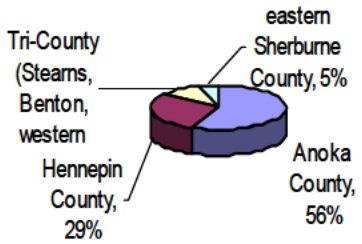


Figure 4.35: In 2009, Great River Energy's Resource Processing Facility in Elk River processed 276,006 tons from the following counties (above). Source: Great River Energy.



Figure 4.36: St. Cloud Regional Airport Terminal. Source: Shingobee Builders.

heights within a conical elevation and distance from existing and planned runways. MnDOT's Airport Compatibility Manual[18] suggests the following benefits of airport hazard area safety zoning:

- Supplements federal airspace protections with state and local ground-based off airport land use protections, as intended;
- Provides a transitional approach to land use development to stabilize land values by incorporation within municipal comprehensive plans;
- Provides a clear visual approach to the runway within densely developed urban areas;
- Protects the future utility of the airport;
- Creates a fixed or readily ascertainable standard that may exempt public entities from tort liability.

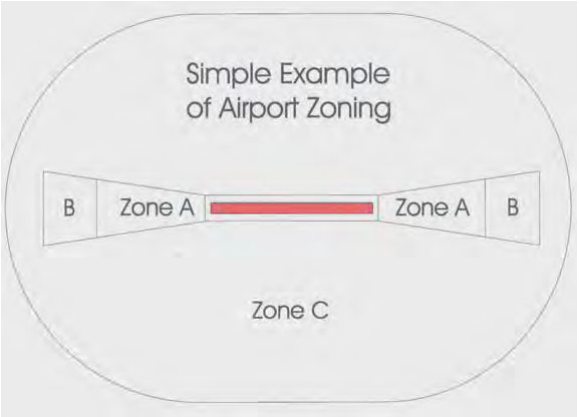


Figure 4.37: Example of Airport Zones A, B, C.
Source: MnDOT Airport Compatibility Manual (p. 24).[18]

The Princeton Municipal Airport is governed by an airport advisory board, serving as a joint zoning board and is administered by the City of Princeton. Its zoning ordinance was adopted in 1978, and has never been updated. The ordinance includes provisions for two runways, although only one has been constructed (3,900' in length). The advisory board is considering constructing a second runway, approximately in the same location identified in the 1978 plan.

The St. Cloud Regional Airport is governed by an airport advisory board, serving as a joint zoning board and is administered by the City of St. Cloud. Its zoning ordinance was adopted in 1976. A Master Plan was adopted in 2007, and proposes that the 3,000' cross-wind runway be extended to 5,000' in length, thereby extending its conical zoning regulations. It's main runway is 7,000' in length and is capable of serving commercial jetliners. Delta Airlines (Mesaba Airlines/Northwest Airlink) discontinued regularly scheduled service in 2010. Sun Country Airlines offers chartered service. The airport continues to market itself to regional carriers, and is exploring options for a St. Cloud - Chicago community backed air service.

In 2009, the Minnesota National Guard constructed a $37 million helicopter training and maintenance facility at the St. Cloud Airport, which provides 60-fulltime jobs, and trains over 300 guardsmen annually. The facility includes six Blackhawk and four Chinook helicopters.

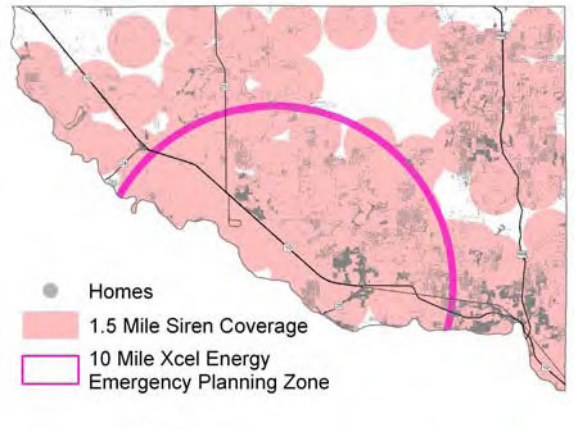


Figure 4.38: 1.5 mile radius from siren locations.
Source: Sherburne County Public Works Dept.

Emergency Management

Emergency Management at the County level is coordinated through the Emergency Service Division within the Sheriff's Department. Primary threats related to land use include; wildfires, flooding, and tornados/windstorms. To mitigate threats within the county's planning & zoning jurisdiction, the County requires the following;

Wildfires: The County requires a 30' clear zone around homes located in areas of coniferous forests

(pine trees). Additionally, the U.S. Fish & Wildlife Service and DNR maintain firebreaks where the Wildlife Refuge and State Forest abut residential areas.

Flooding: The County prohibits new construction within the Regulatory Flood Protection Elevation. No structures are permitted within the Floodway. In the Flood Fringe district only structures that are a minimum of 1' above the regulatory flood protection elevation are permitted.

The County is in the process of updating its Flood Insurance Rate Maps (FIRM), and is anticipated to be completed in 2011.

Tornadoes/Windstorms: The County enforces the Minnesota Building Code, which requires structures to be designed and constructed for wind loads. According to the Minnesota Department of Public Safety, there have been nine tornadoes in Sherburne County between 1950-2008. The most severe tornado was an F2. During this same period neighboring Stearns County experienced 40 tornados and Wright County experienced 19 tornadoes.

On June 17, 2010 Minnesota experienced a record 45 tornadoes (previous record was 20 tornadoes on June 16, 1992), including two F0 tornadoes in Palmer Township.[19]

In recent years, the County has installed 18 additional outdoor emergency sirens, which may be activated by the Sheriff's Department when a tornado warning is issued for the County or other emergencies such as a nuclear accident. The sirens cover the majority of the County including areas within a ten-mile radius (Emergency Planning Zone) of the Monticello Nuclear Generating Plant operated by Xcel Energy, located across the Mississippi River in Wright County. Xcel annually distributes a calendar to residents within its Emergency Planning Zone. The calendar includes an Emergency Preparedness Plan including directions of what to do in the event that a General Emergency is declared.

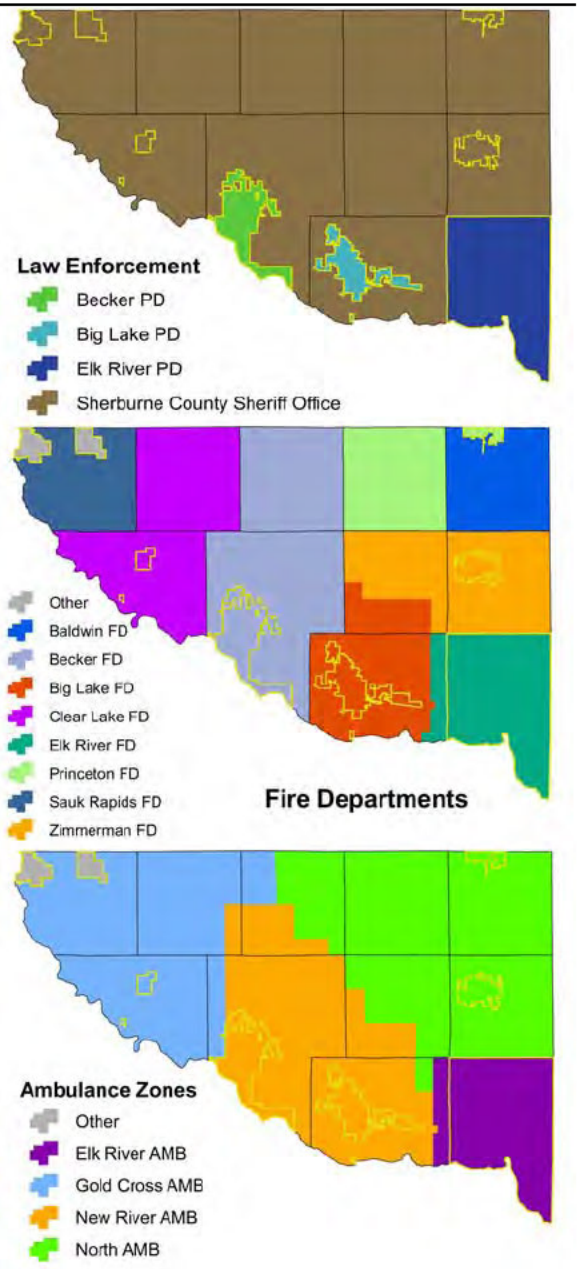


Figure 4.39: Emergency Service Districts (Police, Fire, Ambulance). Source: Sherburne County Sheriff's Dept.

Footnotes:

[1] News Release April 21, 2011: Legislative changes streamline Rural Preserve Program enrollment. Minnesota Department of Revenue. http://taxes.state.mn.us/publications/pages legislative_changes_streamline_rural_preserve_program_enrollment.aspx accessed May 23, 2011.

[2] USDA Natural Resource Conservation Service. NSSH Part 622 Ecological Interpretive Groups. Prime Farmland Soils (622.04). http://soils.usda.gov/technical/handbook/contents/part622.html

[3] USDA National Agricultural Statistics Service - Quick Stats, Sherburne County, MN 1921 - 2008. www.nass.usda.gov/QuickStats

[4] 2007 Census of Agriculture. County Profile: Sherburne County, Minnesota. U.S. Department of Agriculture.

NOTE: Specific to Sherburne County, the 2007 Census of Agriculture had a response rate of 85.8% of farmers, covering 89.3% of farmland, and 95.5% of sales data. Data for non-responders were estimated by the USDA based on like-operations.

[5] MN Department of Agriculture. License Type; Buy & Store Grain, Grain Bank. www2.mda.state.mn.us/webapp/lis/LisResults.jsp . Figure 4.9 compares Grain Storage Capacity between the 2002 and 2007 Census of Agriculture.

[6] U.S. Department of Labor, Bureau of Labor Statistics. CPI Inflation Calculator. http://www.bls.gov/data/inflation_calculator.htm

[7] [Blue Hill Township Meeting Minutes of December 6, 1996];

> *Rod Cook made a motion, seconded by Harold Nelson, that we get the petition out to the residents of Blue Hill Township for signatures either for or against changing the zoning.*

December 19, 1996 a petition was submitted stating;

> *We, the citizens of Blue Hill Township, request that the Sherburne County Board of Commissioners change the zoning of Blue Hill from General Rural to Agricultural which would: (1) Decrease the density of the land until there are adequate services to provide for housing. (2) to control the growth until there is a balance between the commercial and residential growth. (3) To preserve the agricultural tracts and minimize the conflict between residential and agricultural uses.*

The petition was signed by 137 persons.

Date unknown, a petition was submitted stating;

> *We, the citizens of Blue Hill Township, request that the Sherburne County Board of Commissioners not change the current zoning (General Rural) of Blue Hill.*

The petition was signed by 51 persons.

Sherburne County Planning Advisory Board Meeting [Minutes of] January 23, 1997. (p 10-12);

> *Gallagher moved and Lichy seconded to recommend approval of an Amendment for a Zone Change for the following reasons: (a) The Zone Change would be in keeping with the goals of the Comprehensive Land Use Plan. The motion carried with a 6 to 3 vote and is recommended to the County Board for approval.*

During the public hearing, 5 spoke in favor of the rezoning, and 9 spoke against.

Sherburne County Board of Commissioners Regular Meeting Minutes of February 4, 1997. (p 3); *Johnson/Friedl unanimous to deny the petition for an Amendment to the Sherburne County Zoning Map to zone change all "General Rural Districts" in Township 35 North, Range 27 West in Blue Hill Township to "Agricultural Districts."*

[8] Becker Township Public Hearing Meeting [Minutes of] October 18, 1999;

Discussion held on growth and it's effect on the tax structure for township residents. Concerns focused on the school excess levy referendum and school bond issues on the November 2nd ballot, and the amount taxes will be increased. G.Hammer moved to adopt an Interim Ordinance for one year, of a moratorium on platted residential developments in General Rural areas, excluding simple plats, to study the impact of growth in the township, contingent on the legality of the moratorium. J.Riebel seconded and motioned carried with all voting for. G.Hammer moved second L.Olson to change entire zoning of General Rural to Agricultural if moratorium is not legal. Motion carried all voting for G.Hammer moved to hold public hearing November 1, 1999 at 7:00 pm to consider adoption of Interim Ordinance as stated above. L.Olson seconded and motion carried all voting for.

Becker Township Public Hearing Meeting [Minutes of] November 1, 1999;

G.Hammer moved seconded J.Riebel to leave motion stand that was made at the board meeting of October 18, 1999, to change all General Rural Zoning in Becker Township to Agricultural Zoning if a moratorium is not legal. Motion carried with all members voting for.

At the November 18, 1999 Sherburne County Planning Advisory Board meeting, a petition was presented stating;

The citizens of Becker Township, request that the Sherburne County Board of Commissioners change the zoning of Becker Township [from] *General Rural to Agricultural A-1 which would: (1) Decrease the density of the land until there are adequate services to provide for housing. (2) To control the growth until there is a balance between the commercial and residential growth. (3) To preserve the Agricultural tracts and minimize the conflict between residential and agricultural uses. (4) Allow one house per 40 acres of farm field, or one house per 5 acres per wooded lot.*

The petition was signed by 137 persons. During the public hearing, 4 residents spoke in favor of the rezoning, and 5 spoke against (in addition to 2 developers not residing in Becker Township).

Sherburne County Planning Advisory Board Meeting Minutes [of] November 18, 1999, (p5-8);

Lichy moved and Wallin seconded to deny request to rezone based upon the testimony given at the public hearing this evening. The motion to deny carried with Peterson and Riebel in opposition. The motion carried and is recommended to the County Board for denial.

Sherburne County Board of Commissioners Regular Meeting Minutes of December 9, 1999, (p 5);

Wergin/Friedl to deny an amendment to the Comprehensive Land Use Plan and the Sherburne County Zoning Map to rezone the General Rural District of Becker Township to an Agricultural District, as recommended by the Planning Commission, based upon the testimony at the Planning Commission meeting and the fact that the General Rural lands are not predominated by intensive agricultural use as compared to the West side of the Township. [Motion carried.]

[9] St. Cloud Area Economic Development Partnership. Comprehensive Economic Development Strategy. 2010. Chapter 6, Table 10.

[10] Pease, James R., Robert E. Coughlin Land Evaluation and Site Assessment: A Guide Book for Rating Agricultural Lands, Second Addition. Soil and Water Conservation Society, , (p 14-15)

[11] Pruetz, Rick, Saved by Development. Burbank, CA. Arge Press, 1997. pg 3.

[12] The Lancaster County TDR Practitioner's Handbook, 2008, prepared by the Brandywine Conservancy for the Lancaster County Planning Commission, Lancaster, PA.

[13] Brandywine Conservancy. 2003. Transfer of Development Rights: A Flexible Option for Redirecting Growth in Pennsylvania. Chadds Ford, PA: Brandywine Conservancy.

[14] Arndt, Randall, Conservation Design in the Chesapeake Bay Watershed. Natural Lands Trust(p 5-7). NOTE: Figure 4.18 is a sketch of the original image from the referenced source.

[15] Ground Water Quality Beneath Twin Cities Metropolitan Communities Served by Individual Sewage Treatment Systems. Minnesota Pollution Control Agency and Metropolitan Council. February 2002. pg 4.

[16] Standard for Fire Protection Infrastructure for Land Development in Suburban and Rural Areas. National Fire Protection Association, 2008 Edition. pg 1141-14, section 5.1.3 - 5.1.4.

[17] Ad hoc Aggregate Committee. Minnesota's Aggregate Resources: Road to the 21st Century. November, 1998. p. 4.

[18] Airport Land Use Compatibility Manual. Minnesota Department of Transportation, 2006. pg 28.

[19] National Weather Service Weather Forecast Office Minneapolis/Chanhassen. June 17, 2010: Historic Tornado Outbreak Across Minnesota. http://www.crh.noaa.gov/images/mpx/StormReports/17June2010.pdf

Chapter 5
Transportation



County Road 9, Blue Hill Township

Summary

Chapter 5 summarizes the Sherburne County Long-Range Transportation Plan (Plan), adopted in 2007. The Plan does not specifically address township roads. Local road authorities (i.e. townships) are encouraged to develop their own long-range transportation plans. Of the ten townships, only Livonia has adopted such a plan (2005).

The purpose of the County Transportation Plan is to help the County and other affected jurisdictions assess anticipated growth between the years 2007-2030, and to recommend a transportation system that addresses current and future needs. In relation to future land use, the 2007 Transportation Plan based its assumptions using the 2004 Comprehensive Plan. The Transportation Plan is used as a tool to guide major transportation investments and transportation policy decisions.

The Transportation Plan addresses the following topics: existing conditions, analysis of future transportation needs, roadway system plan, modal plan, implementation plan, and financial plan. Please refer to the Transportation Plan for specific details.

Transportation Planning Goals

- Develop a long-range (2030) transportation plan to guide future transportation improvement decisions for the County.
- Obtain a better understanding of local needs, growth trends, and modal opportunities.
- Establish better coordination and cooperation among key stakeholders (cities, townships, adjoining counties, state and regional agencies).
- Identify transportation system improvements and future corridor preservation actions that will accommodate growth.
- Develop a cooperative investment plan to implement projects in a timely manner.

Transportation Planning Objectives

- Identify a comprehensive long-term roadway classification system.
- Develop policies that facilitate the long-term goals of the County.
- Relate the transportation system to both existing and future land use, and area-wide regional transportation plans.
- Identify improvements to existing transportation infrastructure and identify future needs including new and/or improved east-west and north-south corridors through the County.
- Evaluate right-of-way needs for each functional classification roadway, and update access and signal-spacing guidelines.
- Identify the long-term construction and maintenance investments using a life-cycle cost approach.
- Identify improvements that other agencies are contemplating that could be incorporated with Sherburne County projects.
- Develop strategic plans of 5-year to 7-year increments that take into consideration pavement condition, traffic, safety concerns, future growth, etc.
- Identify potential jurisdictional transfers, including the rationale for theses potential transfers, as well as issues and policies associated with these transfers.
- Identify opportunities and needs for trails and transit in the overall Transportation Plan.
- Train appropriate County Staff on the tools provided by the Plan to promote understanding, use, and implementation.

Existing Conditions

Transportation related issues were identified by Focus Groups representing; cities, townships, emergency responders, transit providers, environmental agencies, aggregate mining, businesses, and agriculture.

Issues identified were safety, efficient movement, multimodal, land use/ development, jurisdictional coordination, economic development, and investment & use of funding.

Regarding land use & development, focus groups identified the following issues;

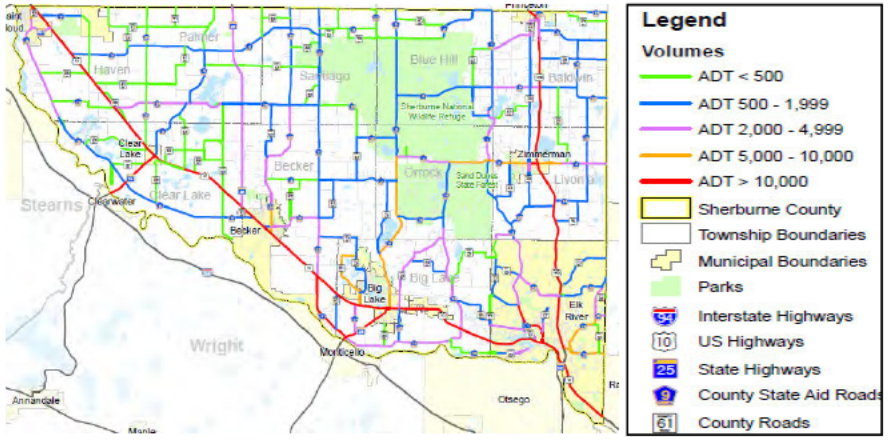


Figure 5.1: Existing Traffic Volumes. Source Sherburne County Transportation Plan (Figure 2) / SRF Consulting.

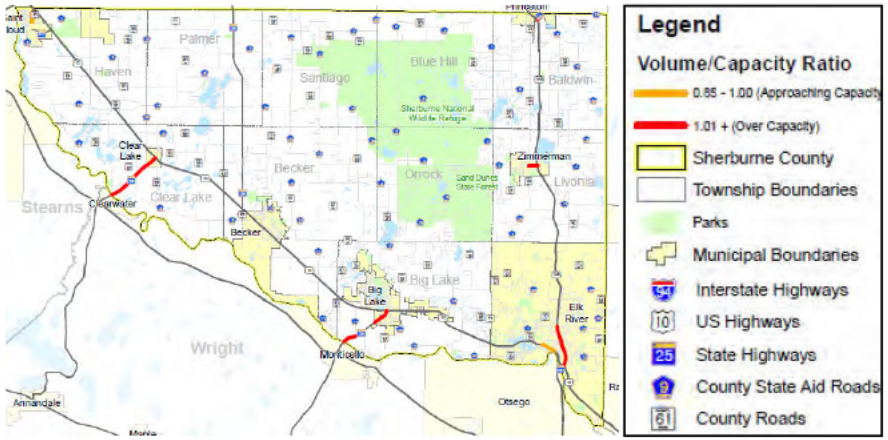


Figure 5.2: Existing Congestion. Source Sherburne County Transportation Plan (Figure 3) / SRF Consulting.

- Ensure that there is a way to preserve right-of-way for future roadways that are needed to serve planned development.
- Relate the County transportation system to both existing and future city land use, area-wide and regional plans.
- Identify growth areas within the County and evaluate the impacts of proposed land use on the transportation system.

Analysis of Future Transportation Needs

The Transportation Plan includes three scenarios modeling future traffic congestion. A Technical Advisory Committee (TAC) felt Scenario One best reflected future needs of the County (see Figure 5.4). Scenario One assumes a number of improvements are completed prior to 2030, including:

- Trunk Highway (TH) 10 Big Lake Bypass
- TH 10/I-94 Clear Lake/Clearwater river crossing
- TH 10 upgrades in Big Lake, Clear Lake - St. Cloud
- TH 10 Interchanges at bypass, County State-Aid Highway's (CSAH) 3, 6, 16
- TH 169 interchange at CSAH 4 (Zimmerman)
- TH 10 overpass at CoRd 65 (Haven Twp)
- TH 169 overpass at 277th Ave (Livonia & Baldwin townships)
- Connection between CSAH 33 (Elk River) & CSAH 22 (Anoka Co)
- Connection between CoRd 12 & TH 10/169 (Elk River)

Roadway System Plan

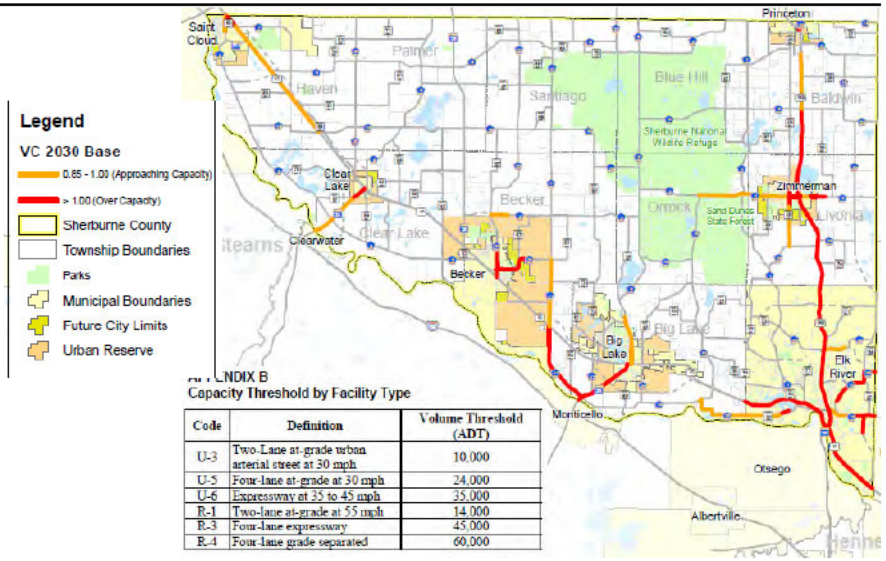
Public roadways are classified into one of the following categories:

Principal Arterials;

- Connect major activity centers
- Have significant continuity at a state level
- Serve long, through-type trips
- Provide high-speed with limited access
- Serve very large travelsheds (regions)

Minor Arterials

- Connect key activity centers
- Have significant continuity on county/multi-county area
- Serve longer to medium-length trips



APPENDIX B
Capacity Threshold by Facility Type

Code	Definition	Volume Threshold (ADT)
U-3	Two-Lane at-grade urban arterial street at 30 mph	10,000
U-5	Four-lane at-grade at 30 mph	24,000
U-6	Expressway at 35 to 45 mph	35,000
R-1	Two-lane at-grade at 55 mph	14,000
R-3	Four-lane expressway	45,000
R-4	Four-lane grade separated	60,000

Figure 5.3: Future Congestion. Assumes improvements are constructed, such as; new TH 24 river crossing between Clear Lake and Clearwater; TH 10 Big Lake bypass; connection between CSAH 33 and CSAH 22 (Anoka Co.) in Elk River, additional interchanges, overpasses, and various upgrades from highway to freeway.
Source: Sherburne County Transportation Plan (Figure 7) / SRF Consulting.

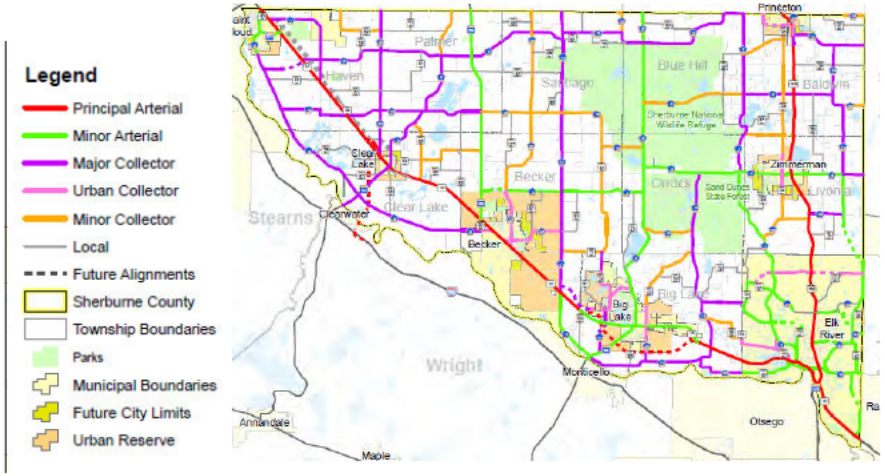


Figure 5.4 Future Functional Class. Source Sherburne County Transportation Plan (Figure 12) / SRF Consulting.

- Provide high-speed with limited access
- Serve large areas

Collectors

- Connect local activity centers and/or connect to higher-order routes
- Have continuity on a local level
- Serve medium-length to short-length trips
- Serve a variety of uses, and can therefore have a variety of speeds
- Place equal emphasis on access and mobility
- Allows service to smaller or localized areas

Local Routes

- Connect local neighborhoods, farms, small developments and higher-order streets/routes
- Have a low degree of continuity
- Have closely spaced access
- Provide direct access (no access control) to property
- Serve limited travelsheds (very few through trips)

The Transportation Plan recommends that several roadways be reclassified to be consistent with Federal Highway Administration (FHWA) guidelines used by MnDOT. For rural areas, the Plan suggests that an amount of Collector roads be reclassified as Local Routes. Based on changes to a road's functional classification, the Transportation Plan suggests that several roadways be transferred from the County to cities/townships, or vice versa (Figure 5.5).

The Transportation Plan includes a table of proposed transfers (Table 11 in Transportation Plan). Each transfer is classified as *definitely meets* transfer guidelines, *substantially meets*, or *marginally meets guidelines dependent on future growth*. Proposed jurisdictional transfers would take place over time; short-range (2007-2014), medium-range (2015-2023), and long-range (2015-2023). If all roads identified as *definitely meets* the guidelines were transferred from MnDOT to the County (4.6 miles), and from the County to townships (20.3 miles), there would an estimated annual savings of $76,191 in costs for road maintenance paid by local tax payers (2004 dollars). The method of transferring road authority is described in the Transportation Plan (Section 6 in Transportation Plan).

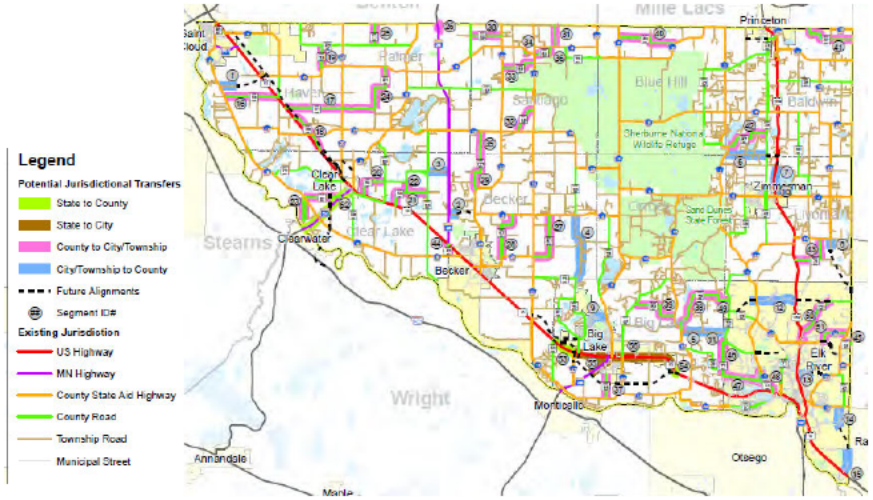


Figure 5.5: Jurisdictional Transfers. Source: Sherburne County Transportation Plan (Figure 13) / SRF Consulting.

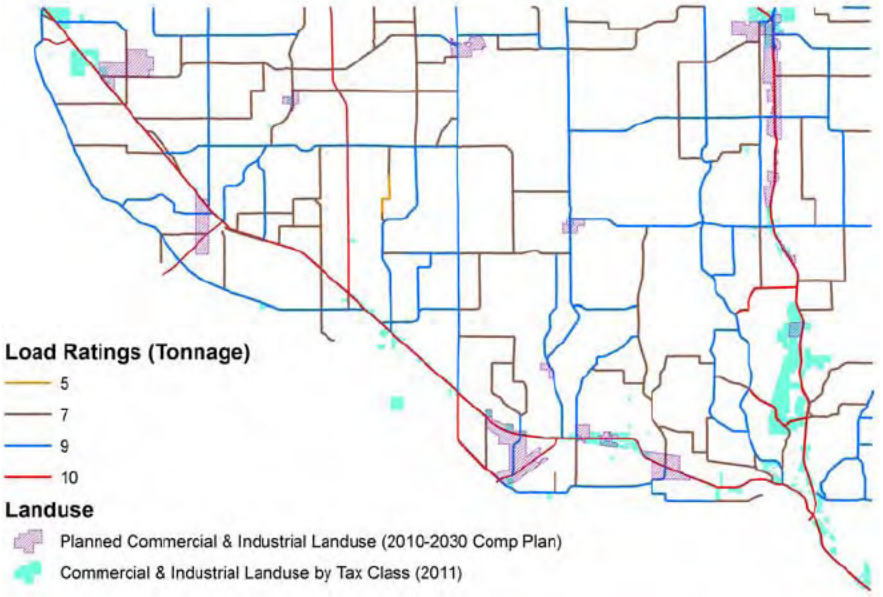


Figure: 5.6: Comparison of road spring weight restrictions, and where businesses are located or planned to be located. Weight restrictions are placed on roads during spring freeze/thaw cycles (about two months). This map shows that existing and planned commercial/industrial areas are affected by these restrictions, which may limit the development of these areas. Source: Sherburne County Public Works Dept,

Modal Plan

Multimodal transportation users and services are summarized as follows;

Trucking

TH 10 and TH 169 are major thoroughfares for freight between the Twin Cities, and St. Cloud (TH 10), and the Brainerd lakes region (TH 169). Locally, major truck use is generated by the transfer of agricultural goods, commercial/industrial products, aggregate, landfill refuse, and fuel (i.e. propane). Several businesses contributing to heavy truck traffic are located along trunk highways. However, most of these areas do not include a frontage road system, which increases the danger associated with left turning trucks on/off the highway.

Rail

The Burlington Northern Santa Fe rail line (BNSF) parallels TH 10, and averages 38 freight trains per day with speeds up to 79 mph. All crossings except at TH 10 and TH 169 are at-grade crossings.

Airports

Within the County, there are four private landing strips located in Becker Township (2) Clear Lake Township, and Haven Township. Three public airports are located in Princeton, St. Cloud, and Clear Lake Township. The Princeton Airport is primarily used by private airplanes. The St. Cloud Regional Airport has capacity for daily passenger air service. In 2009, Delta/Northwest Airlink discontinued regular service. Charter passenger service is available through regional carriers, and the airport continues to market to other carriers.

There is an opportunity for multimodal freight facilities (air-rail-ground) within the vicinity of the St. Cloud airport - TH 10 area.

Transit

Transit is available through local bus, commuter bus, and commuter rail.

Options provides private van and bus service for special needs adults and seniors between their place of residence and adult day service centers, day training & habilitation centers, and employment programs contracted through Options. Destinations primarily include Options' employment center in Big Lake, and area businesses and service centers in Sherburne and northern Wright counties.

RiverRider provides a dial-a-ride local bus service to Sherburne and Wright county residents. Service is limited to weekdays between 7:00 am - 5:00 pm, and travels between Elk River, Big Lake (Sherburne County), and Monticello, Annandale, Buffalo, and Cokato (Wright County). RiverRider is governed by a six member Joint Powers Board consisting of four Sherburne and Wright county



Figure 5.7: Northstar Commuter Rail. Source: NCDA/ Metro Transit.

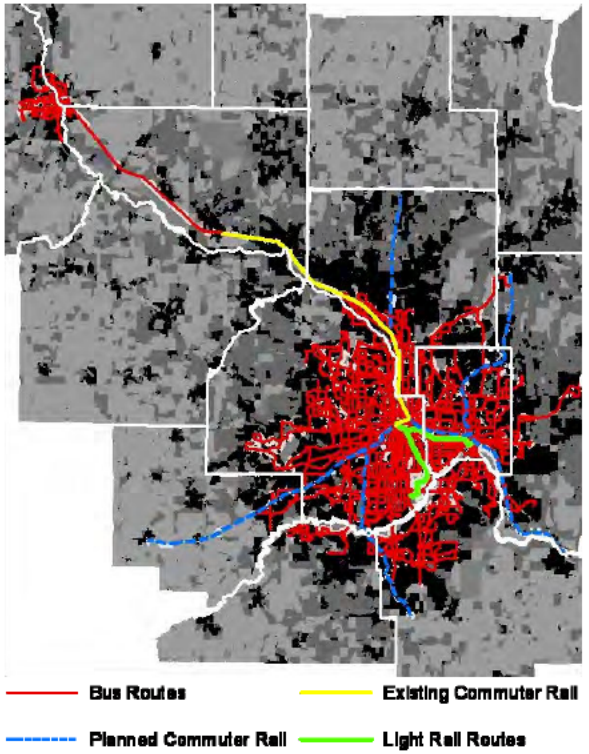


Figure 5.8: 2010 Population densities, with fixed commuter & mass transit routes, and planned commuter routes. Source: MnDOT, Metropolitan Council, St. Cloud Metro Bus, Sherburne County Public Works Dept, US Census Bureau.

commissioners, and two city council representatives. Service began in the mid-1980's.

Northstar Link (The Link) provides scheduled commuter bus service between the east St. Cloud park & ride lot, and the Big Lake commuter rail station. The Link is intended to be used as an intermediary until funding is provided to expand commuter rail from Big Lake to St. Cloud. Scheduled service is provided on weekdays with 5 commute trips during peak travel times (4:00 am - 7:00 am, and 5:00 pm - 8:00 pm). The Link is operated by the St. Cloud Metro Bus, and governed by the Northstar Corridor Development Agency (see below). Service began in November, 2009.

Northstar Commuter Rail (Northstar) provides scheduled commuter rail service between Big Lake and downtown Minneapolis (40-miles), with additional stations located in Elk River, Anoka, Coon Rapids, and Fridley. The Minneapolis station includes a connection to light rail, which travels between downtown Minneapolis and the Minneapolis/St. Paul airport and the Mall of America. Scheduled service is provided on weekdays with 5 commute and 1 reverse commute trips during peak travel times (5:00 am - 8:00 am, and 4:00 pm - 7:00 pm). Three trips are scheduled each day on weekends. The travel time from Big Lake to Minneapolis is 51 minutes. Northstar is operated by Metro Transit. Northstar is governed by a Joint Powers Board called the Northstar Corridor Development Authority (NCDA), representing 30 county, city, township, and regional rail authorities. The 58-member NCDA includes representatives from Sherburne County (2), Sherburne County Regional Rail Authority (2), the cities of Becker (2), Big Lake (2), Clear Lake (2), Elk River (2), St. Cloud (2), and the townships of Becker (1), Big Lake (3), Clear Lake (1), and Haven (3). Service began in November, 2009. Weekday ridership in 2010 averaged about 2,000 and is expected to increased to 5,900 by the year 2030.

Northstar Commuter Rail stations include lighted surface parking accommodating 446 vehicles (Big Lake) and 754 vehicles (Elk River), covered shelters with in-demand heat, and bicycle lockers. The Big Lake station is located in a mixed agricultural and urban single-family residential area. The Elk River station is located in a mixed urban multi-family residential, and industrial area.

Around both stations there is an opportunity for mixed use development and re-development to capitalize on the number of commuters traveling in and out of the areas. Both the cities of Big Lake (2008) and Elk River (2010) have developed Transit Oriented Development (TOD) design guidelines, and/or similar planning documents.

Non-Motorized Trails

There are no hard-surfaced pedestrian trails maintained by the County, as of 2010. The County does maintain unimproved (i.e. grass or dirt) non-motorized trails within the County park system. The County's role is to partner with townships and cities to promote new recreational trails and their connectivity.

One of the County Board's adopted goals has been to complete acquisition of a former railroad bed connecting Elk River and Princeton for use as a regional trail. The County and cities have acquired about $^{2}/_{3}$ of the land necessary, in non-contiguous segments. Please refer to Chapter 7 (pages 90-91) for more details.

Implementation Plan

The Implementation section of the Transportation Plan addresses the criteria for turning back road authority from the County to a city/township; provides for Access Management guidelines (i.e. how far driveways and intersections are spaced); right-of-way guidelines and preservation; and, wetland protection associated with road construction.

Jurisdictional Realignment Process (Turn-backs)

Please refer to the Sherburne County Transportation Plan (Section 6 in Transportation Plan) regarding the criteria and process used.

Access Management Guidelines

In 2009, the County adopted a Right-of-way ordinance. The ordinance requires compliance with the Access Management spacing guidelines identified in the Transportation Plan, unless granted an administrative variance by the Sherburne County Public Works Director.

Access Management is the management of where driveways and roads intersect with other roads, with the goal of minimizing the chance of an accident. Reducing the number of access points on a road can reduce the frequency of accidents occurring involving vehicles turning into or out of that access.

The Minnesota Local Road Research Board[1] recommends the following practices in rural areas:

- Establish an access policy - develop a formal policy that ensures that the agency has processes in place to determine the need for and evaluate the use, location, spacing and design characteristics of the request access points.
- Encourage coordination during the zoning and platting process.
- Give access permits for specific use.
- Encourage adequate spacing of access points.
- Protect the functional area of intersections.
- Ensure adequate sight distance at entrances.
- Avoid offset or dogleg intersections and entrances.
- Consider consolidating access or relocating existing access.
- Encourage good driveway and intersection design characteristics such as:
  - Proper driveway width and turning radii.
  - Proper corner clearance.
  - Adequate approach grade.
  - Proper grading of entrance in-slopes and culvert openings.
  - Keeping sight triangles and clear zones free of obstructions.
  - Alignment of intersections at right angles to maximize sight lines, minimize the time a vehicle is in the conflict area and facilitate turning movements.

Right-of-Way Guidelines and Preservation

The Transportation Plan recommends the following minimum right-of-way (ROW) widths in rural areas;

100’	2-lane Collector
100’	2-land Minor Arterial
100’	4-lane undivided Minor Arterial
120’	4-lane divided Principal Arterial
150’	4-lane divided Minor Arterial
150’	5-6 lane divided Principal Arterial

Figure 5.4 shows where these road classifications are intended to be located. The Transportation Plan identifies three methods for preserving future right-of-way;

- Restrictive zoning regulations in very low density areas (i.e. agricultural) to limit or prohibit uses which may increase traffic.
- Require that when land is platted (subdivided), that necessary land be dedicated from the landowner to the road authority as right-of-way, including any road realignments necessary.
- Identify a future road location on the Official Zoning Map. *"However, if a directly affected property owner requests to develop his/her property, agencies have six months to initiate acquisition and purchase of the property to prevent its development. If the property is not purchased, the owner is allowed to develop it in conformance with current zoning and subdivision regulations. As a result, the official mapping process should only be used for preserving key corridors in areas with significant growth pressures."*[1]

These three methods may be applied to future projects identified as *"future alignments"* in Figure 5.4, such as service roads along TH 10 and TH 169, TH 10 Big Lake bypass, and future river crossings in Clear Lake and Big Lake townships

The Comprehensive Plan Map identifies these future road corridors to be consistent with the Transportation Plan. However it is the intent for the Zoning Map (Official Map) to exclude future road corridors unless immediate funding is available to purchase right-of-way.

Financial Plan

The Transportation Plan includes a list of improvement projects needed within the 2007-2024+ timeframe (see Table 21 in Transportation Plan). These projects have a total estimated cost of $522 million (includes 4% annual inflation).[1]

Only $137 million has been identified through local property taxes ($4.6 million per year), State Aid ($1.8 million per year), and State/Federal assistance ($500,000 per year on average). This leaves a total funding gap of $385 million for County road and bridge projects. The Transportation Plan suggest that an additional $19 million is needed per year to plug the gap, and provides suggestions on various methods for additional funding (see Section 7.3 in Transportation Plan).

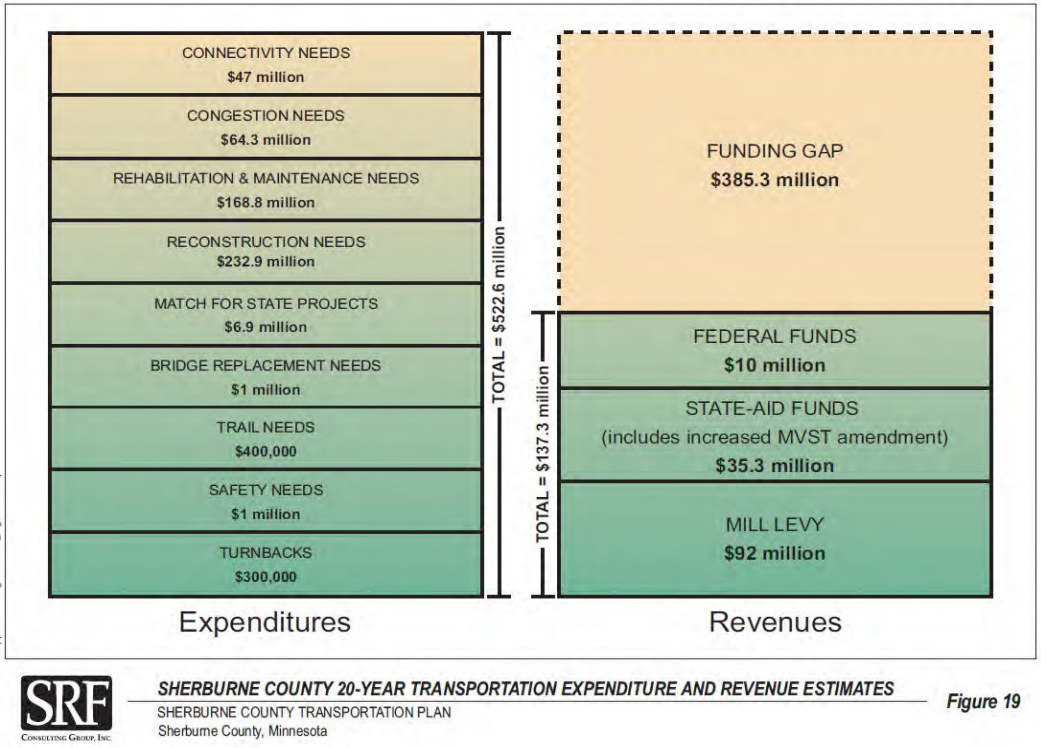


Figure 5.9: 2007-2030 Transportation expenditure and revenue estimates. Source: Sherburne County Transportation Plan (Figure 19) / SRF Consulting.

Footnotes:

[1] Sherburne County Transportation Plan. Sherburne County, 2007. pg 66, 79, 81-82, Figure 19.

Chapter 6
Economic Development



Minnesota Limited, Big Lake Township

Summary

Chapter 6 summarizes recent economic studies and data for Sherburne County and the region. Although the County Board of Commissioners serving as the Economic Development Authority (EDA) establishes economic policies county-wide, its relation to zoning regulations are limited to those township areas for which the County administers planning and zoning. Zoning regulations are only one of many factors influencing industry growth and decline. To understand the potential for economic development in the townships, we must understand their place within the larger economic region.

Sherburne County is within the 13-county Minneapolis-St. Paul-Bloomington Metropolitan Statistical Area (MSA). For simplicity, the Comp Plan refers to this as the "Twin Cities MSA." MSA's are established by the White House Office of Management and Budget based on Census data. The St. Cloud MSA consists of Benton and Stearns counties. One county cannot be located within multiple MSA's. The purpose of MSA's is for tabulating statistical data, and should not be confused with the 7-county Metropolitan Council, which Sherburne County is not part of.

Sherburne County has developed primarily as a bedroom community with 68% of its workforce commuting to jobs outside of the County (Figure 6.1). The County's primary competitors for commercial and industrial development are those communities along interstates and freeways with closer proximity to larger job corridors.

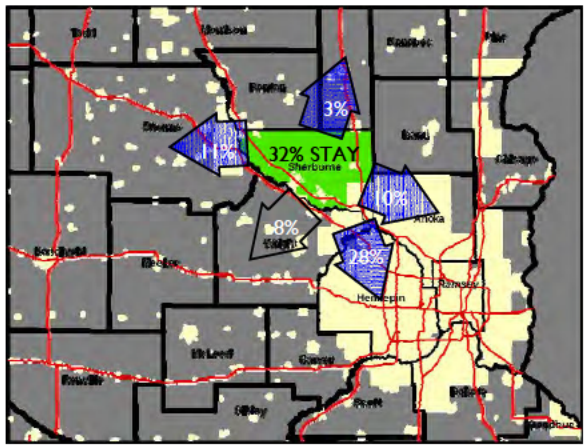


Figure 6.1: Percentage of County workforce (population 16 years old or older) who commute to work outside of the County. Source: 2000 Census.

To summarize the County's Economic Work Plan, the primary economic goals for areas within the townships are to: (1) identify key rural areas, and preserve those areas for future urban commercial-industrial development (30-40 year inventory needed); and (2) identify areas for future permanent rural commercial-industrial development, and amend ordinances to streamline the approval process to encourage rural development and redevelopment

2005-2007 Economic Development Work Plan

In May, 2005 the County Board adopted a three year work plan. The general goals include:

1. Preserve land for future industrial and commercial growth in key locations through planning, zoning, and acquisition in cooperation with affected communities to ensure a strong and balanced tax base, a healthy employment base, and convenient access for residents to goods and services.
2. Advocate for transportation and other infrastructure critical to the County's economic competitiveness.
3. Integrate consideration of economic development into other County planning and decision-making.
4. Support local government efforts to plan and implement economic development initiatives throughout Sherburne County.
5. Market the County for economic development.
6. Create the organizational capacity to effectively implement the 2005-2007 workplan.

Comprehensive Economic Development Strategy (CEDS)

The Minnesota Department of Economic Development divides the state into six economic regions. Each region is further broken down into sub-regions. Sherburne County is within the 13-county Central Planning Region, and the sub-region of 7W along with Benton, Stearns, and Wright counties.

The St. Cloud Area Economic Development Partnership (the Partnership) consists of:

Benton County
Sherburne County
Stearns County
City of St. Cloud
City of St. Joseph
City of Sartell
City of Sauk Rapids
College of St. Benedict
St. Cloud State University
St. Cloud Tech. & Community Coll.
Initiative Foundation
Bremer Bank
St. Cloud Area Assoc of Realtors
HealthPartners Central MN Clinics
St. Cloud Area Chamber of Commerce
St. Cloud Hospital CentraCare Clinic
St. Cloud Opportunities
Stearns Electric Association
Xcel Energy

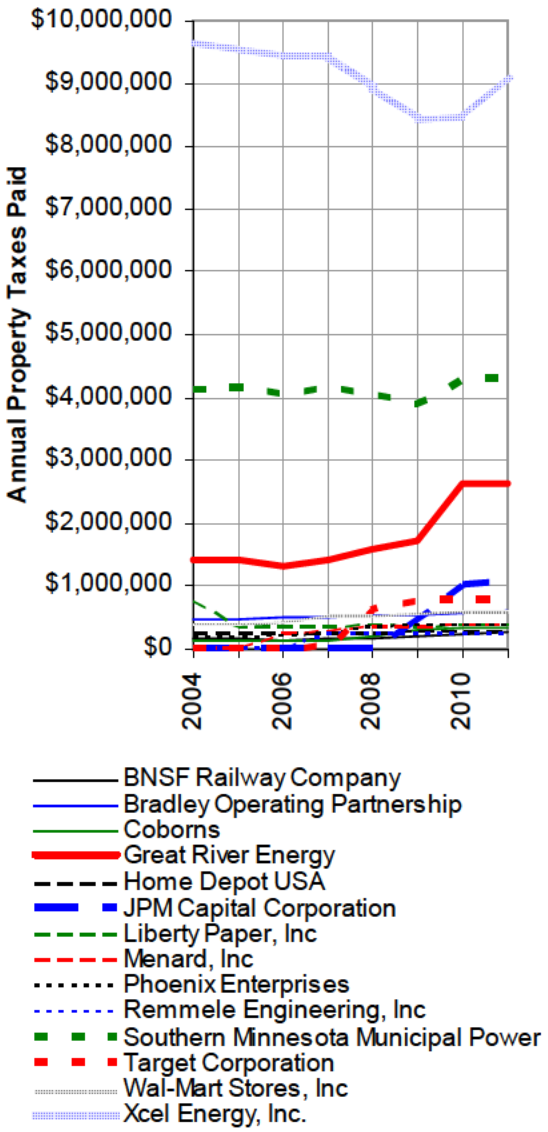


Figure 6.2: Highest property taxpayers in the County (Net taxes paid, less Special Assessments). Property owners listed include those paying $200,000+ in 2011, listed alphabetically. Source: Sherburne County Auditor/ Treasure's Dept.

In 2009 the Partnership received a grant from the U.S. Department of Commerce, Economic Development Administration to complete a Comprehensive Economic Development Strategy (CEDS). The purpose of a CEDS is to create a regional economic development plan. A CEDS is also required to qualify for certain federal funding for community development, infrastructure and disaster recovery projects. The following is a summary of the 2010 CEDS report as it relates to Sherburne County (Note: the CEDS report discusses a wide range of topics which directly and indirectly influence local economic development conditions. Many of these topics are discussed in other chapters of this comprehensive plan);[1]

Employment

According to the 2005-2009 American Community Survey, industries which employed a significant percentage of Sherburne County residents include; education, health & social services (19.9%), manufacturing (16.8%), retail trade (12.7%), and construction (9.8%). Figure 6.3 shows how the number of jobs in these industries have changed between 2000 - 2009.

According to the Minnesota Department of Employment & Economic Development (DEED), between 2000 - 2009, Minnesota gained 30,007 net-jobs, of which 4,541 were in Sherburne County. The seven-county Twin Cities lost about 30,000 net-jobs during this same period.

Between 2000 - 2009 in Sherburne County, the Education & Health Services industry added 3,451 net-jobs while the Manufacturing industry lost 22 net-jobs, but added 28 manufacturing businesses. The industry increased by 998 jobs during 2004, however it is not known where these jobs were created, thus the data may be in error.

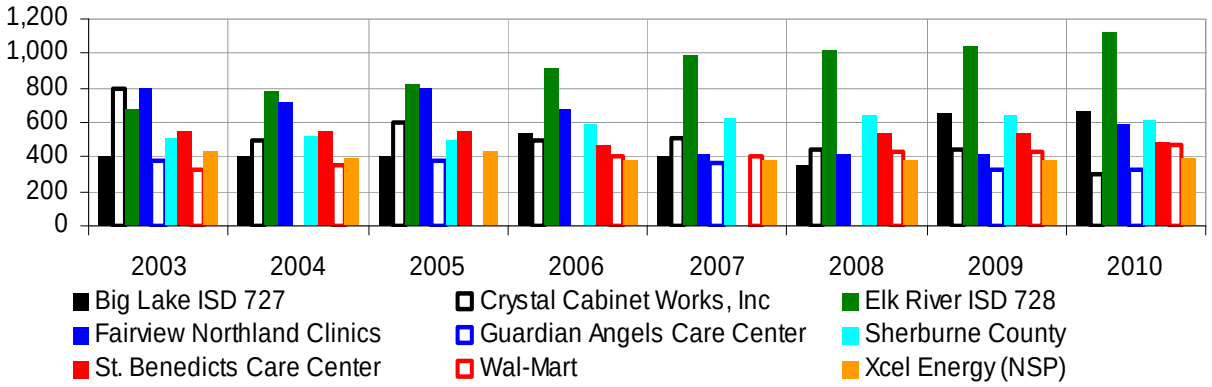


Figure 6.3: Largest Employers in Sherburne County, 2003-2010 (total employees). Source: Elk River ISD 728, Sherburne County Comprehensive Annual Financial Report, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010.

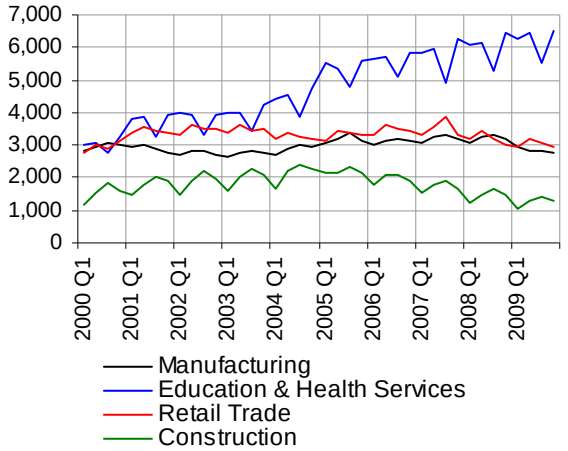


Figure 6.4: Total number of jobs by industry in Sherburne County, 2000 - 2009 (by quarter). Source: MN Department of Employment and Economic Development.

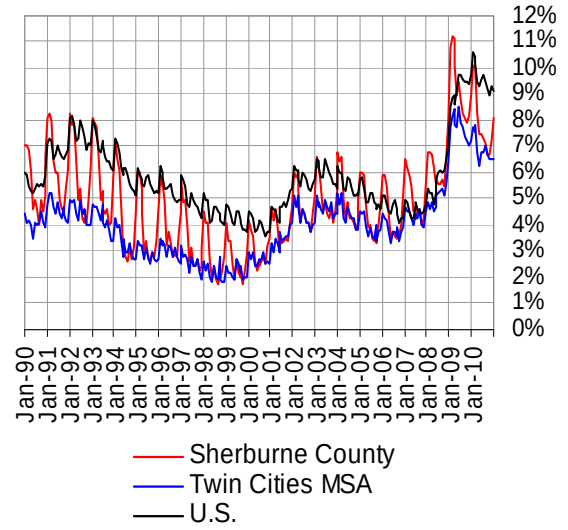


Figure 6.5: Monthly Unemployment Rate (not seasonally adjusted), January 1990 - December 2010. Source: MN Department of Employment and Economic Development.

Between 2007 - 2009 (economic recession), Minnesota lost 57,081 net-jobs, of which 445 were in Sherburne County. The seven-county Twin Cities lost about 59,000 net-jobs during this same period. Of the four main industries in Sherburne County, Manufacturing lost 267 jobs, Education & Health Services gained 659 jobs, Retail Trade lost 420 jobs, and Construction lost 238 jobs.

Figure 6.5 shows unemployment rates between January 1990 - December 2010. Through most of this period the County's non-seasonally adjusted unemployment rate zigzags between those of U.S. and Twin Cities figures (13-county Metropolitan Statistical Area), indicating the County has a large number of residents who are seasonally employed.

Despite the appearance of Figure 6.5, Sherburne County's yearly average unemployment rate is lower than U.S. figures. The County's yearly average rate over this 20-year period was 4.9% with a high of 9.3% in 2009 and a low of 2.6% in 1999. Nationally, the yearly average was 5.8% with a high of 9.3% in 2009 and a low of 4.0% in 2000. The Twin Cities yearly average was 4% with a high of 7.7% in 2009 and a low of 2.2% in 1998 and 1999.

Occupation	*Median Annual Wage*	*Est. Openings in 4-county Region 7W (2010)*	*Education or training needed*
Retail Salespersons	$19,691	4,740	Short-term on-the-job training
Cashiers	$17,740	3,740	Short-term on-the-job training
Personal and Home Care Aides	$25,352	3,492	Short-term on-the-job training
Waiters and Waitresses	$19,931	3,425	Short-term on-the-job training
Combined Food Preparation and Serving Workers	$17,721	3,142	Short-term on-the-job training
Home Health Aides	$22,524	2,828	Short-term on-the-job training
Office Clerks, General	$27,018	2,824	Short-term on-the-job training
Registered Nurses	$73,122	2,676	Associates degree
Truck Drivers, Heavy and Tractor-Trailer Drivers	$34,697	1,684	Short-term on-the-job training
Janitors and Cleaners, Except Maids and Housekeepers	$25,199	1,665	Short-term on-the-job training

Figure 6.6: Top ten occupations in current (2010) demand in Benton, Sherburne, Strearns, and Wright counties (Region 7W). Source: Minnesota Department of Employment & Economic Development.[4]

Industry	*% Growth 2006-2016*	*Projected Openings in 12-county Central MN*
Social Assistance	79.8%	4,635
Community Care Facility for the Elderly	73.5%	1,091
Ambulatory Health Care Services	49.9%	4,655
Residential Mental Health Facilities	49.5%	2,153
Health Care and Social Assistance	44.8%	17,024
Amusement, Gambling & Recreation	44.7%	1,333
Arts, Entertainment, & Recreation	44.4%	1,421
Other Amusement & Recreation Industry	41.3%	1,213
Offices of Physicians	39.7%	1,676
Hospitals	35.7%	4,116

Figure 6.7: Top ten industries with the highest long-term (2006-2016) projected growth rate in the 12-county Central Minnesota area (excludes industries whose employment projections are less than 1,000 new jobs). Source: MN Department of Employment & Economic Development.[4]

Unemployment rates in Sherburne County have been consistently higher than in the Twin Cities except during the extended summers of 1998-2000, and 2003 (extended summer meaning spring-summer or summer-fall).

Long-term employment projections are not available on a per-county basis. The fastest growing industries in Central Minnesota regardless of projected jobs are; Specialized Design Services (81.5% increase, 66 new jobs), Social Assistance (see Figure 6.7), Performing Arts & Sports Promoters (76.5% increase, 26 new jobs), Community Care Facility for the Elderly (see Figure 6.7), Insurance & Employee Benefit Funds (71.4% increase, 5 new jobs).

Of the four major industries employing Sherburne County residents reported by the U.S. Census Bureau, DEED projects that between 2006 - 2016 Manufacturing will decline by 2.4% (loss of 1,018 jobs), Education & Health Services will grow by 32.8% (20,000 new jobs), Retail Trade will grow by 8.9% (3,149 new jobs), and Construction will grow by 10.3% (1,725 new jobs). Projected percentage growth and job creation is for the 12-county Central Minnesota area.

The data suggests that although Manufacturing has traditionally been Sherburne County's biggest industry, the future is in Healthcare. Chapter 2 includes information on local healthcare statistics and facilities.

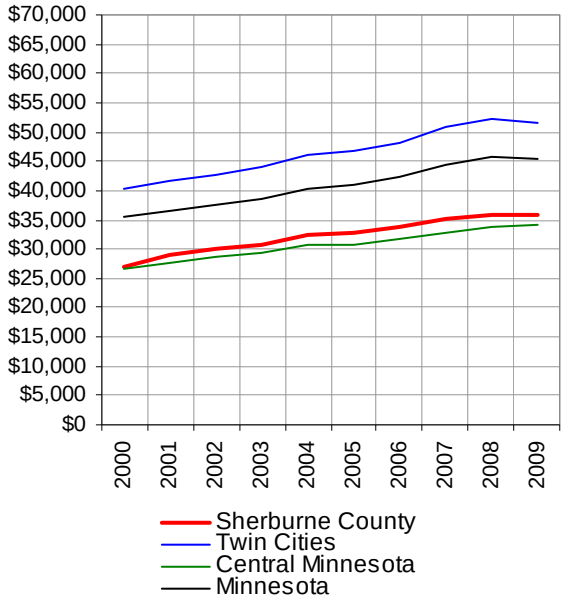


Figure 6.8: Average annual wages in all industries, 2000 - 2009. Source: MN Department of Employment and Economic Development.

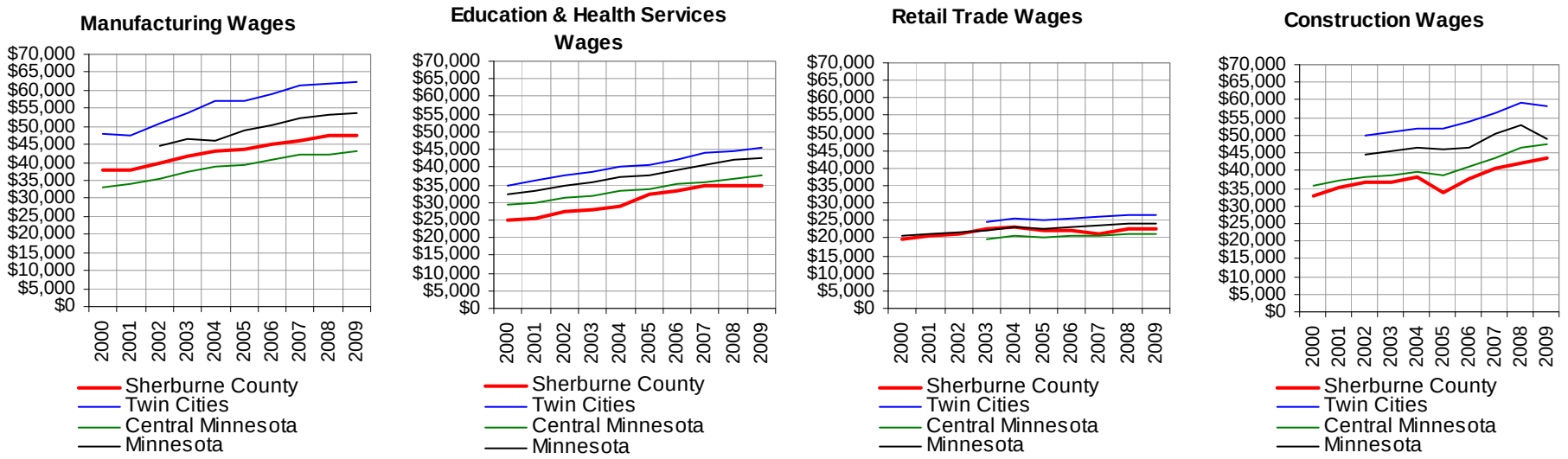


Figure: 6.9: Annual average wages per worker by industry, 2000 - 2009. Source: MN Department of Employment and Economic Development.

Wages

Among the four major industries noted (Manufacturing, Education & Health Services, Retail Trade, and Construction), jobs in Sherburne County pay significantly less on average compared to similar jobs in the Twin Cities and Minnesota, and in some cases less than jobs in Central Minnesota (see Figure 6.8. This suggests that given the choice, a County resident will choose a higher paying job in the Twin Cities over a lower paying job closer to home, supporting the notion that Sherburne County is a bedroom community.

According to DEED, between 2000 - 2009, Manufacturing average wages increased 25% in Sherburne County (2009: $47,269) and 30% in the Twin Cities (2009: $62,285). Education & Health Services average wages increased 39% in Sherburne County (2009: $34,863) and 31% in the Twin Cities (2009: $45,605). Retail Trade average wages increased 15% in Sherburne County (2009: $22,653) and 16% in the Twin Cities (2009: $26,441). And Construction average wages increased 33% in Sherburne County (2009: $43,636) and 23% in the Twin Cities (2009: $58,479).

Concentration of Industry

The 2010 CEDS report[2] (Ch. 4 Table 9 of CEDS report) suggests that industries concentrated in Sherburne County include fabricated metal product manufacturing, forest & wood products, chemicals & chemical based products, machinery manufacturing, and biomedical/biotechnical (life sciences). This data is based on employment figures between 2002 - 2008.

Concentration of Retail Sales

The 2010 CEDS report[2] (Chapter 4, Table 19 of CEDS report) provides Pull Factors based on MN Department of Revenue 2003-2007 tax data. A Pull Factor is a measurement of how much "pull" industry sales have to or from a community. A Pull Factor of around 1.0 signifies that sales of a specific industry is limited to local buyers, while a Pull Factor greater than 1.2 signifies that buyers are coming in from other communities. Pull Factors are one means to identify the growth potential of a specific industry in a specific community The CEDS report provides data for industries in Elk River, Big Lake (limited data available), and other larger cities in the St. Cloud area (Region 7W).

Elk River has strong pull factors for the following industries; Building (3.65), Food & Beverage Stores (2.74), Gas (3.68), and Vehicles & Parts (3.05), while local residents travel outside of the community for personal retail health (0.78), clothing (0.75), leisure goods (0.34), electronics (0.24), and furniture (0.18). Available industry data for Big Lake is limited to gas (0.65), electronics (0.05), and leisure goods (0.02).

The CEDS report suggests that within the St. Cloud region, retail centers are concentrated in St.



Figure 6.10: Metal Craft, Elk River. Manufacturer of medical implants and devices. In 2009, Metal Craft opened a 78,000 sq ft corporate office and manufacturing facility. Source: Metal Craft, Sherburne County Planning & Zoning Dept.

Cloud-Waite Park which has a higher pull factor in every industry except Gas (1.80) compared to other area cities. Excluding St. Cloud, Building Goods are strongest in Elk River (3.65), and St. Michael (2.33). Food & Beverage Stores are strongest in Elk River (2.74), Sartell (2.19), and Monticello (2.02). Gas is strongest in Elk River (1.82) and Sauk Rapids (1.46). General [goods] are strongest in Elk River (3.68), and Buffalo (4.45). Vehicles and parts are strongest in Monticello (5.11), Elk River (3.05), and Buffalo (2.28).

The data suggest that Elk River is a major regional retail center for goods related to construction, gas, and food. The fact that both U.S. Highways 10 and 169 traverse town is an advantage whereas of the other regional cities, only St. Cloud-Waite Park have more than one major highway.

Energy

In 2007, Sherburne County consumed 945,991 megawatt hours of electricity.[5]

Local Electricity Producers:

Xcel Energy operates a three-unit coal/oil steam power plant on 4,500 acres in Becker constructed in 1976-1977 and 1987-1988 with an annual (2007) net-production of 15,869,463 megawatt hours of electricty.[5] Unit 3 is partially owned by Southern Minnesota Municipal Power Agency. The Sherburne County Generating Plant (SHERCO) is the largest coal-fired plant in Minnesota.

Great River Energy (GRE) operates a three-unit refuse derived fuel (RDF)/gas/oil steam power plant in Elk River. The coal plant was constructed in 1951 and 1959, converted to nuclear powered steam in 1963, converted back into coal in 1968, and reconverted to RDF in 1989. The plant has an annual (2007) net-production of 160,968 megawatt hours of electricity, and consumed 273,814 tons of RDF (i.e. garbage) in 2007.[5]

Elk River Municipal Utilities operates a four-unit diesel/gas internal combustion plant in Elk River constructed in 1948, 1962, and 1972 with an annual (2007) net-production of 114 megawatt hours.[5]

Broadband Internet Access

Broadband refers to high speed internet access. According to *Connect Minnesota*, all of Sherburne County has access to mobile broadband. Areas with access to cable, fixed wireless, and DSL as of 2010 are shown in Figure 6.13. Reported areas without access to broadband (other than mobile) are concentrated in agricultural areas and within the Sherburne National Wildlife Refuge.

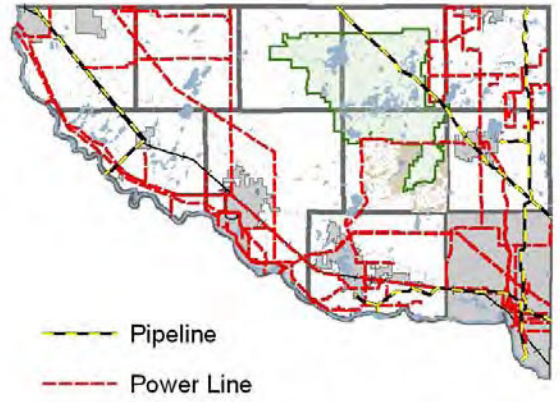


Figure 6.11: Major underground natural gas and crude oil pipelines, and overhead electrical lines. Source: National Pipeline Mapping System, Minnesota Land Management Information Center.



Figure 6.12: SHERCO Plant in Becker, operated by Xcel Energy and Southern Minnesota Municipal Power. SHERCO is the largest coal-fired plant in Minnesota, and produced 18.8 million megawatt hours in 2007. Source: Minnesota Department of Commerce[7], Sherburne County Planning & Zoning Dept.

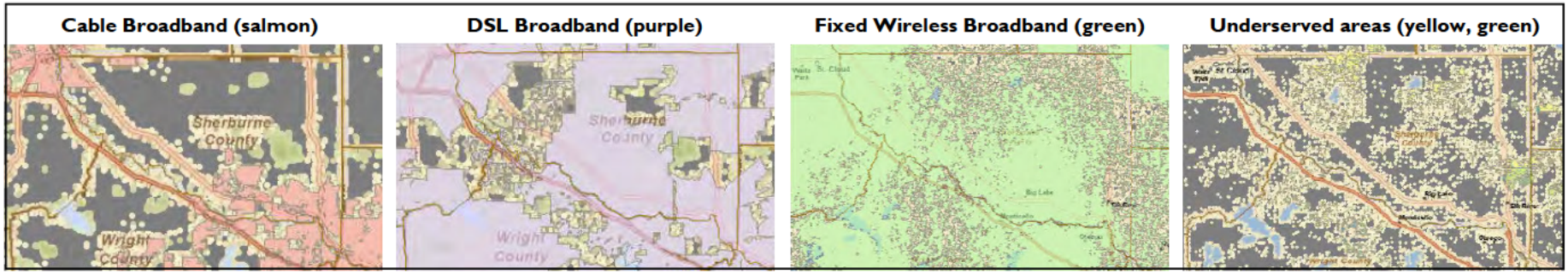


Figure 6.13: Broadband Internet Coverage (2010). Source: Connect Minnesota, ESRI.



Figure 6.14: In 2001 Xcel Energy constructed this wind turbine near the Elk River Landfill as a demonstration project. The turbine is 213' tall with blades 154' in diameter, and may produce 1,200 megawatt hours per year. The average annual wind speed is 12.5 mph. Source: Excel Energy, Sherburne County Planning & Zoning Dept.

Footnotes:

[1] NOTE: The 2010 CEDS report is a comprehensive analysis of topics that directly and indirectly affect economic conditions in Region 7W. The majority of these topics are discussed in the 2010-2030 Comprehensive Land Use Plan in chapters 2 (Population), and 4 (Land Use) using the same sources used by the CEDS report, although not necessarily directly from the CEDS report itself. The CEDS report remains a valuable source for regional data.

[2] St. Cloud Area Economic Development Partnership. Comprehensive Economic Development Strategy. St. Cloud, MN, 2010.

[3] U.S. Census Bureau. 2006-2008 American Community Survey 3-Year Estimates, Sherburne County, MN. http://factfinder.census.gov/home/saff/main.html?_lang=en Accessed: August 23, 2010.

[4] Current Demand Rank; *Displays all occupations ordered from those with more favorable current demand to those with less favorable current demand conditions. A rank order of 1 corresponds to the most favorable demand conditions.* Source: MN Department of Employment and Economic Development. http://www.positivelyminnesota.com/apps/lmi/oid/results.aspx?s=CDRank September 3, 2010.

[5] Minnesota Department of Commerce. The Minnesota Utility Data Book; A reference Guide to Minnesota electric and natural-gas utilities 1965-2007. p.50, 57-58, 60, 74, 94, 96, 113, 121

Chapter 7
Parks & Recreation



Grams Regional Park, Livonia Township

Summary

Chapter 7 summarizes the Sherburne County Parks, Trails, and Open Space Policy Plan (Parks Plan), adopted in 2005. This chapter includes additional information, as well as updates of projects or policy changes since 2005.

Chapter 7 does not specifically address individual township parks or township park plans.

> *The role of Sherburne County is to concentrate its efforts on "passive recreational" facilities such as the preservation of public natural habitat areas, and to partner with townships and cities to promote new recreational trails and their connectivity.*
>
> *It is the role of the townships and cities to provide "active recreational" facilities such as playgrounds and athletic fields. It is the belief of Sherburne County that local governments are more aware of the needs for active recreational facilities in their local communities, and therefore should administer their creation, use, and maintenance with funding in part thru County Park Dedication Fees.*[1]

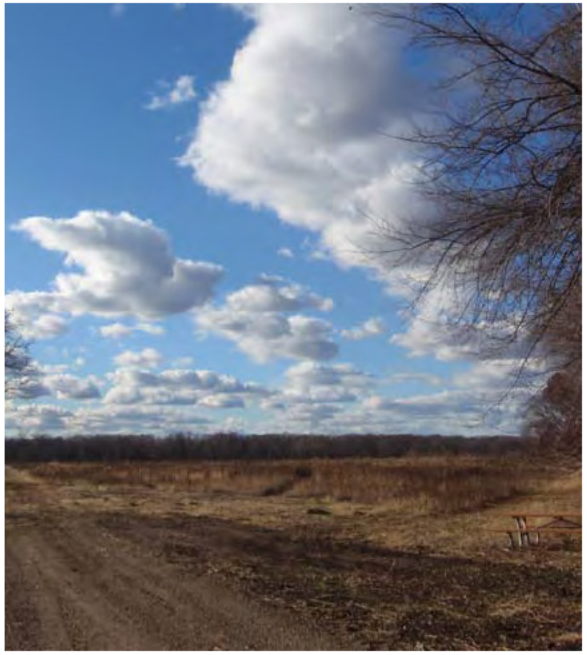


Figure 7.1: Island View Regional Park, Clear Lake Township.

History

The following is a brief history of the County's parks & trails system;

1996: County Parks Committee established.
1996: Parks, Trails, & Open Space needs study completed.
Park, Trail, and Open Space Plan adopted.
1997: 230-acre property in Becker Township donated to the County (Oak Savannah Park).
1998: County Parks Commission appointed.
1998: 29-acre property along the Mississippi River in Big Lake Township acquired by the County through a DNR grant, and donation from a developer (Bridgeview Park Reserve).
1998-2007: Oak Savanna Committee organized to guide development of the Oak Savanna Regional Park
1999: 34-acre property purchased by the County along an abandoned rail line between Elk River and Princeton.
2001: 113-acre property in Livonia Township acquired by the County through DNR grants (Grams Regional Park).
2007: 63-acre property in Clear Lake Township acquired by the County through a DNR grant (Island View Regional Park).

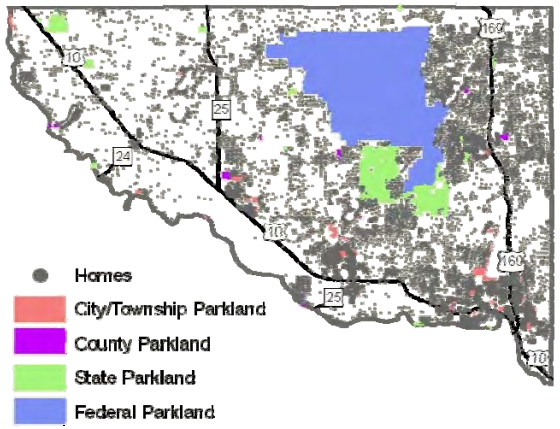


Figure 7.2: Public parkland. Source: MN DNR, Sherburne County Public Works Dept.

Recreational Opportunities

Sherburne County includes a number of active and passive recreational opportunities. A description of passive Federal, State, and County parks is listed below:

Federal Parks

Sherburne National Wildlife Refuge (30,700 acres)

The Sherburne National Wildlife Refuge (Baldwin, Becker, Blue Hill, Orrock, and Santiago townships) is part of a federal system managed by the U.S. Fish & Wildlife Service for the purpose of preservation and public education of natural environments. The primary objective of the Refuge is to provide wildlife-dependent recreational uses that, when compatible with this purpose can involve hunting, fishing, wildlife observation & photography, and environmental education & interpretation. The Refuge features minimal maintenance trails for hiking and interpretive signage for public education.



Figure 7.3: St. Francis River, Sherburne National Wildlife Refuge. Source: U.S. Fish & Wildlife Service.

State Parks

Sand Dunes State Forest (6,000 acres)

The Sand Dunes State Forest (Orrock Township) is managed by the Minnesota Department of Natural Resources (DNR). It functions in part, for the purposes of preservation and public education

of natural environments including plant and animal habitats. State Forests are managed with multiple-use in mind. The Sand Dunes State Forest attempts to place equal management emphasis on wildlife habitat, timber sales, and public recreational use including camping, swimming, boating, and a variety of designated trail use types such as horseback riding, groomed cross-country skiing, and snowmobiling. The state forest features minimal maintenance trails and well maintained trails, depending on use and season.

Scientific and Natural Areas (SNA)

Scientific and Natural Areas were established *"to preserve natural features and rare resources of exceptional scientific and educational value. SNA's are open to the public for nature observation and education, but are not meant for intensive recreational activities."*[2] There are 5 SNA's in Sherburne County, including;

- Clear Lake SNA 62 acres, Clear Lake Township
- Harry W. Cater SNA 133 acres, Haven Township
- Mississippi River Islands SNA 142 acres, Big Lake Township, Elk River
- Rice Lake Savannah SNA 80 acres, Palmer Township
- Uncas Dunes SNA 745 acres, Orrock Township

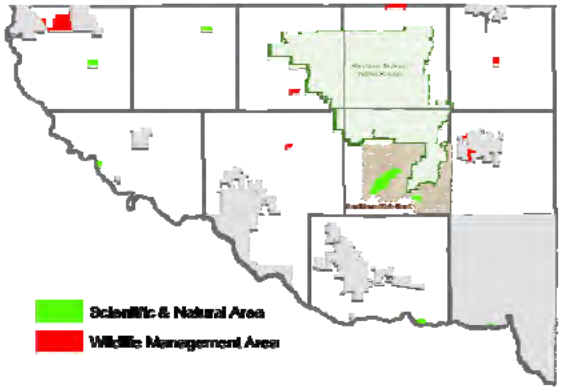


Figure 7.4: Scientific & Natural Areas (SNA), and Wildlife Management Areas (WMA) managed by the MN DNR. Source: MN DNR

Wildlife Management Areas (WMA)

Wildlife Management Areas were established to protect areas that have a high potential for wildlife production, public hunting, trapping, fishing, and recreational uses. WMA's are owned and managed by the DNR. There are five WMA's in Sherburne County, including;

- Fremont WMA 165 acres Livonia Township
- Kunkel WMA 43 acres (2,635 total) Blue Hill Township
- Sand Prairie WMA 650 acres Haven Township
- Santiago WMA 83 acres Santiago Township
- Vietnam Veterans WMA 66 acres Baldwin Township

Oliver H. Kelley Farm

The Minnesota Historical Society has operated the 175-acre Kelley Farm in Elk River since 1961. This living history farm features interpreters and educators dressed in period clothing, providing interactive demonstrations of daily farm and household chores from the mid-1800's. About 28,000 people visit the farm each year. The Kelley Farm is one of 23 National Historic Landmarks in Minnesota.



Figure 7.5: Oliver H. Kelley Farm, (1982). Source: MN Historical Society (used with permission).

County Parks

Oak Savanna Land Preserve (140 acres)

The Oak Savanna Land Preserve (Becker Township) was acquired in 1997 as a gift from Willard and Margaret Cox. The site offers a variety of rare, natural plant communities, original sand dune blowouts from the 1940's, and quality wildlife habitat. Currently there are several miles of trail maintained for multiple users including trails designated for hiking, cross country skiing, and horseback riding. The park is considered Sherburne County's first regional-type park, and combined with Becker City Park, is expected to serve as a regional destination facility offering environmental education, recreation, and open space views.[1] Within the regional park is the Sherburne History Center, which includes a museum, library/archives, community meeting rooms, and a gift shop.

Grams Regional Park (113 acres)

Grams Regional Park (Livonia Township) was acquired in 2001 through a combination of two state grants. Located on Fremont Lake with approximately 1,000 feet of lakeshore, the park features a



Figure 7.6: Grams Regional Park master plan, Livonia Township. Source: Sherburne County Planning & Zoning Dept. / Loucks Assoc.



Figure 7.7: Oak Savanna Land Preserve, Becker Township. Source: Sanborn.



Figure 7.8: Grams Regional Park, Livonia Township. Source: Sanborn.

wide range of landscape features. From the various wetlands that feature tamarack bogs and cattails to the open rolling hills that provide scenic vistas in different directions, the landscape of the park allows opportunity for future regional facilities as the area grows and demands increase.[1]

Island View Regional Park (63 acres)

Island View Regional Park (Clear Lake Township) was acquired in 2007 through a state grant. Located on 1,300' of shoreline along the Mississippi River, the park consists of former farmland, wetlands and wooded areas. It is planned for the farmland to be restored with native vegetation, and for trails to be constructed for hiking, biking, nature study, and picnicking, along with a canoe landing. A master plan for the park and its use was completed in 2011.

Bridgeview Park Reserve (29 acres)

Bridgeview Park Reserve (Becker & Big Lake townships) is located along the Mississippi River and features scenic river vistas, natural plant communities, and a mowed trail system. The land was acquired in 1998 through a Natural and Scenic Area State Grant. The primary goal of the park is to protect the ecological features of the site while providing educational and recreational opportunities for its' users.[1]



Figure 7.10: Island View Regional Park, Clear Lake Township. Source: Sanborn.

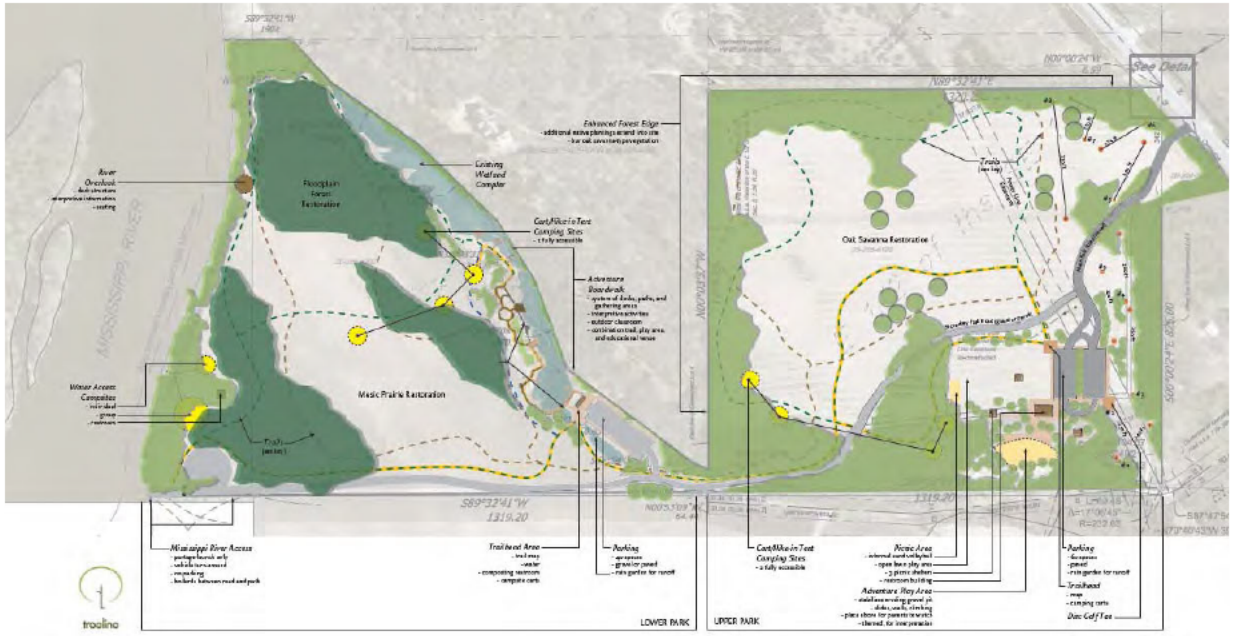


Figure 7.9: Island View Regional Park master plan, Clear Lake Township. Source: Sherburne County/Treeline.



Figure 7.11: Bridgeview Park Reserve, Becker, and Big Lake township. Source: Sanborn.

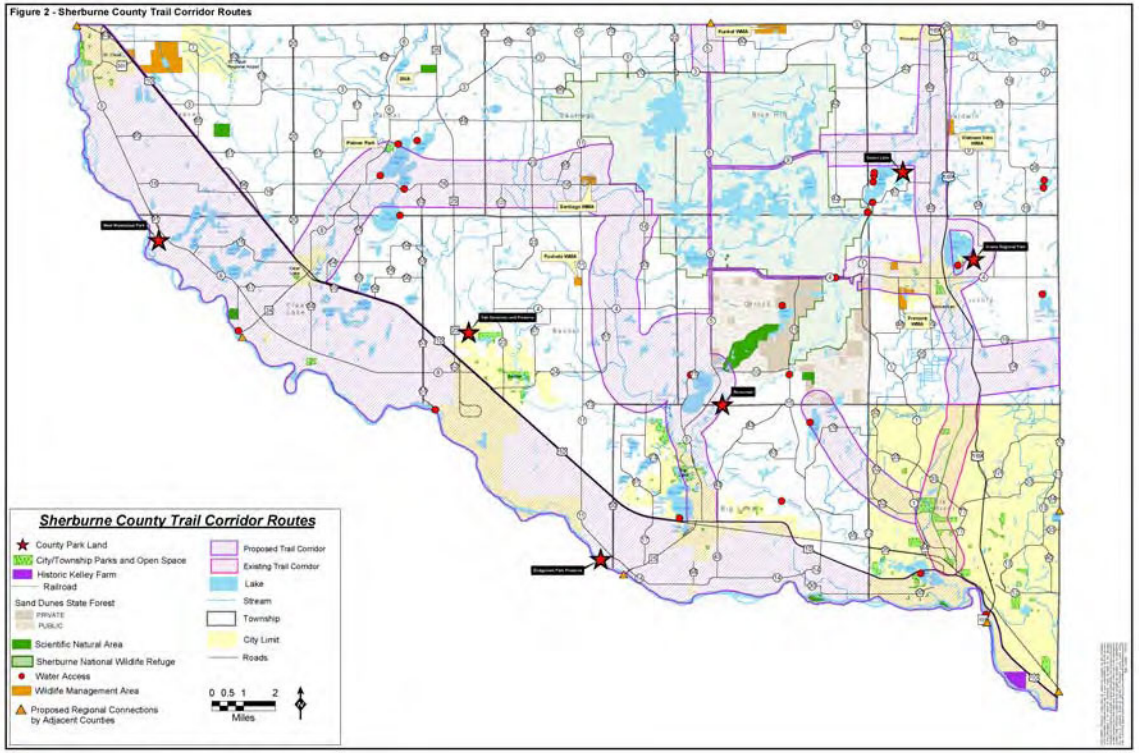


Figure 7.12: Sherburne County Trail Corridor Routes (planned). Source: Sherburne County Parks, Trails, and Open Space Policy Plan (Figure 2).



Figure 7.13: Mowed Trail in Grams Regional Park, Livonia Township. Source: Sherburne County Planning & Zoning.

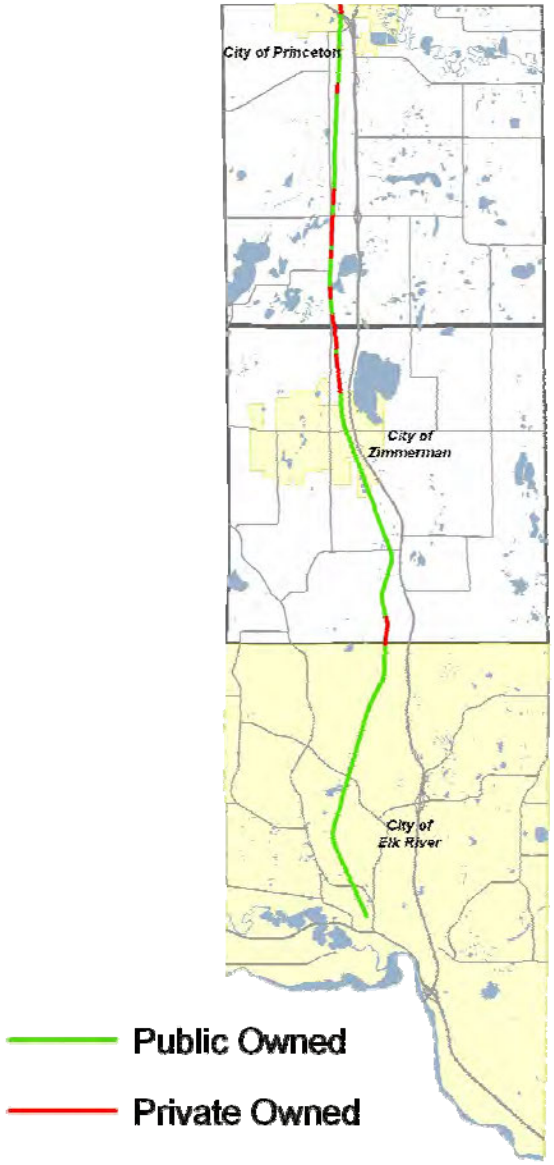


Figure 7.14: Planned route of The Great Northern Trail. Source: Sherburne County Assessor's Dept.

Non-Designated County Parkland

Sherburne County owns three additional parcels of land acquired for the purpose of public recreation, education, or open space preservation. Rivercrest Landing consists of approximately 10 acres and is located along the St. Francis River in Big Lake Township. It was acquired for open space preservation and is intended to function as a future canoe access and/or resting area along the river. A 37-acre parcel along Goose Lake in Baldwin Township was acquired for open space preservation with limited park/trail use. In addition, a 63-acre parcel near County Road 4 in Becker Township was acquired for open space preservation with potential opportunities for environmental education and limited trail use.[1]

Regional Trail System

As of 2010, there are no hard surfaced regional trials maintained by the County. The County is pursuing land and easement acquisition from private landowners for a regional trail between Elk River and Princeton, known as *The Great Northern Trail*, named after The Great Northern Railroad. About 3/4 of the land needed has been acquired by the County, cities, and townships. The trail route follows an abandoned railroad bed, with some segments planned along county roads, and on an existing township trail. The County has been actively seeking state grants for land acquisition. Once the County has acquired the necessary land, a paved trail will be designed and constructed.

Figure 7.12 shows additional planned trail corridors. As land is developed within these corridors, the County will consider requiring park dedication of land for trail purposes.

Goals

The following goals were adopted as part of the Parks Plan (refer to the Parks Plan for objectives of each goal):[1]

- Goal 1: Promote awareness, encourage use, and relate the distinctions of the existing facilities and open spaces available for public use in Sherburne County.
- Goal 2: Identify, protect, and preserve Sherburne County's parks, trails, natural areas, and open spaces.
- Goal 3: Develop corridors and connections that will increase accessibility to existing and proposed facilities and open spaces.
- Goal 4: Identify and develop a strategy for acquisition of critical areas.
- Goal 5: Develop diverse recreational facilities that offer multiple uses and opportunities which meet the local and regional needs.
- Goal 6: Develop site specific plans for parks, trails, and open spaces that show interim and projected uses, phases of planning and development, facilities, activities, natural resource management plans, acreages and boundaries, and access points.



Figure 7.15: Great Northern Trail. This former rail corridor is planned to be constructed as a pedestrian trail. Source: Sherburne County Planning & Zoning Dept.

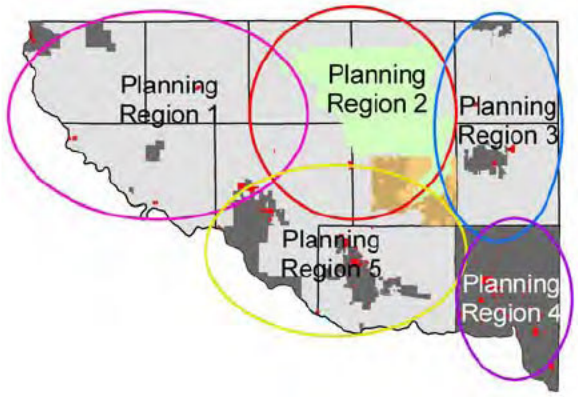


Figure 7.16: Park Planning Regions. Source: Sherburne County Parks, Trails, and Open Space Policy Plan.

Goal 7: Develop a funding strategy for the acquisition, development, operation, and maintenance of Sherburne County parks, trails, and open space.

Goal 8: Identify a variety of mechanisms to assist in the implementation of this [Park] Plan.

Planning & Acquisition

The Sherburne County Park Commission's mission statement is; *"To plan for the acquisition, preservation, restoration, and, when appropriate, the enhancement of the natural resources of Sherburne County."* The County is divided into five park planning regions (see Figure 7.16).

The Parks Plan establishes criteria for acquiring County parkland. Regional County Parks should be a minimum of 100 acres in size and preferably 200 acres or more, are sustainable, provide high quality wildlife habitat, and feature opportunities for natural resources based recreation. Exceptions may be made for: (a) water access; (b) historic, cultural, or geologic significance to the site; (c) a special use that would not be otherwise available within a reasonable distance; (d) significant, sensitive, or unique natural resources; or (e) good potential for future expansion of parks or open space via adjacent property.[1]

Funding

Primary funding for the County's acquisition of park land and facilities is through a Park Dedication Fee ordinance. MN Statute 394.25, subd 7 provides specific details. For each new lot created as part of a subdivision, the County may require that the applicant dedicated up to 10% of the property, or pay a Park Dedication Fee, unless a township has adopted its own park dedication fee ordinance. This dedication must be used for new facilities as opposed to operation and maintenance of existing facilities. If a Park Dedication Fee is used, a minimum of 75% of those funds must be spent within the township of the development generating those fees, unless the township agrees otherwise. As of 2010, the County's Park Dedication Fee was $800 per new residential lot. Other funding is provided through the property tax levy which generates about $70,000 per year (2010).

In 2003, the County conducted a county-wide opinion survey in preparation of the 2004 Comprehensive Plan, and 2005 Parks, Trails, and Open Space Policy Plan. Question 47 was; *"How much would you be willing to see your property taxes increase to fund acquisition, development and maintenance of County trails and parks in Sherburne County?"* The average of responses was $13.50 per household (see Figure 7.18).

Footnotes:

[1] Sherburne County. Sherburne County Parks, Trails, and Open Space Policy Plan. 2005. p 8-9, 11-21, 24

[2] Minnesota Department of Natural Resources. Visiting a Scientific and Natural Area (SNA) http://www.dnr.state.mn.us/snas/rules.html June 30, 2010.

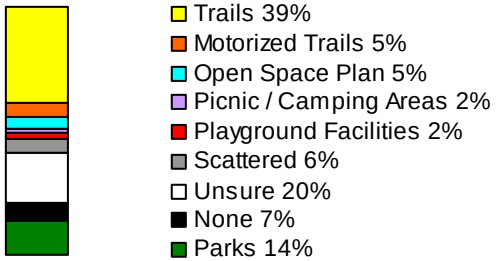


Figure 7.17: Highest priority recreational needs according to residential survey. Source: Sherburne County Comprehensive Plan (2004) / Decision Resources.



Figure 7.18: According to a 2003 survey of County residents, respondents were comfortable in paying an additional $13.50 in property taxes per year to fund County park facilities,

When asked what the preferred means of paying for *parkland acquisition*, respondents "*supported*:"

Rely on Gifts/Wills	64%
Issue County-Backed Bonds	60%
Assess All Residents	40%
County Property Tax	37%
Township Property Tax	29%
Assess Only New Residents	22%

Source: Sherburne County Comprehensive Land Use Plan (2004) / Decision Resources.

Chapter 8
Future Land Use



20th Street, Santiago Township

Summary

Chapter 8 describes future land use designations used in the Comprehensive Plan Map (i.e. future land use map). The purpose of this map is to guide land use between the years 2010 - 2030. The Comprehensive Plan and Map may serve as justification for changes to the Zoning and Subdivision ordinances, and the Zoning Map (Official Map). Chapter 9 subdivides the County Comprehensive Plan map by individual townships.

Future Land Use Categories & Descriptions

The following future land use descriptions correspond to the Comprehensive Land Use Map:

Agricultural

Areas that primarily consist of contiguous corridors of land used for the production of crops, animals, nursery stock, and limited non-farm related housing.

Conservation Corridor Overlay

Areas primarily consisting of corridors of natural habitat or areas intended to be restored to natural habitat and/or private recreational use. Proposed subdivisions within these areas are intended to consist of conservation developments which preserve contiguous corridors of natural habitat and features through a conservation easement.

Rural Residential

Areas currently developed as low density residential, or intended to become developed for low density residential use.

Urban Reserve - Residential
Areas reserved for urban sewered residential development, and included within an Orderly Annexation Agreement, or identified by the town board as likely to become annexed within the years 2010-2030.

Urban Reserve - Transit Oriented Development (TOD)
Areas reserved for urban sewered mixed residential and commercial use. Development within these areas are intended to comply with (or not impede) the City of Big Lake TOD Master Plan and Design Guidelines.

Urban Reserve - Business & Industry
Areas reserved for urban sewered commercial and industrial development, and included within an Orderly Annexation Agreement, or identified by the town board as likely to become annexed within the years 2010-2030, or identified by the County Board as a strategic economic development area compiling a 40-year supply (2010-2050) of land reserved for urban commercial and/or industrial development. Appropriate rural non-sewered commercial and industrial development may be permitted as an interim use.

Hamlet Mixed Use
Areas consisting of existing and future residential, commercial, and light industrial development in Palmer, Orrock, and Santiago townships.

Business & Industry
Areas consisting of current or planned commercial and/or light industrial land use. It is intended for such use to remain rural, non-sewered through the year 2030.

Heavy Industry
Areas which consist of approved or planned intensive uses which are not compatible with uses such as residential, public parks, schools, religious institutions, or other uses determined by the County Board. Example of uses that may be appropriate for this area include, but are not limited to; adult uses, salvage yards, processing or manufacturing of hazardous materials, and landfills.

Highway Preserve
The intent of these designated areas are to preserve rural scenic U.S. and MN highway corridors as undeveloped land uses.

Wild, Scenic, & Recreational Riverway
Areas identified by MN Statute 103F, as amended (Wild & Scenic Rivers Act), or identified by a town board and the County Board as containing similar natural qualities.

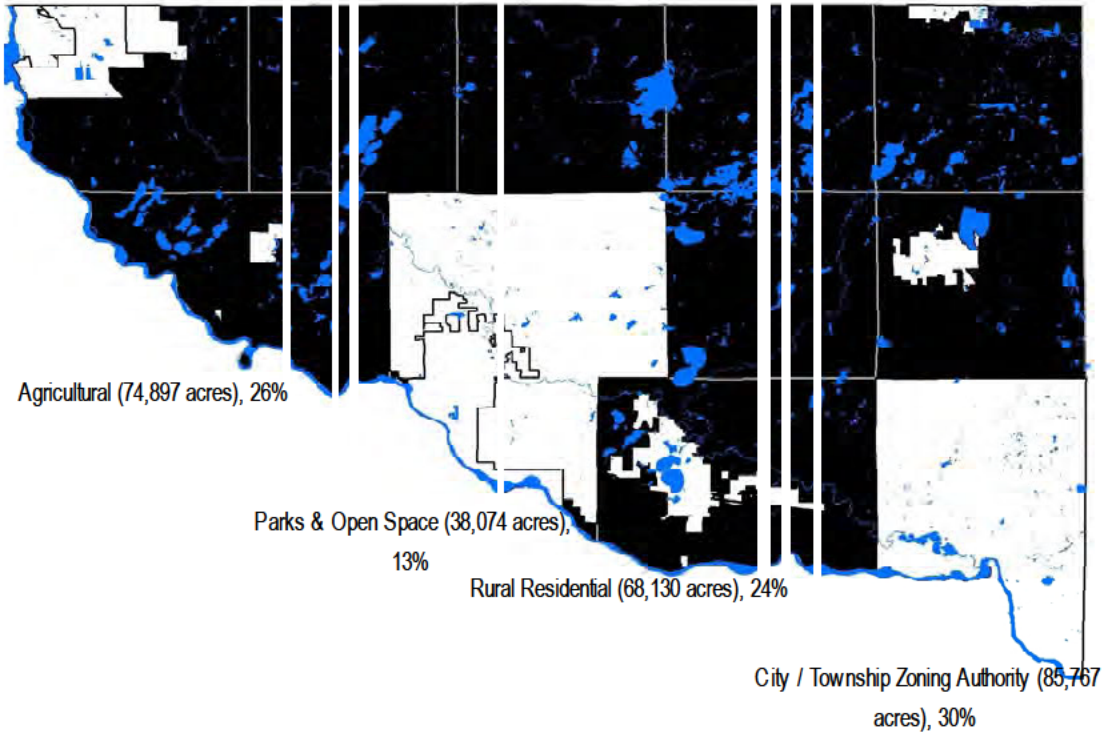
Parks & Open Space
Areas consisting of public or private active and passive recreational use, or intended to be reserved for public natural habitat. Such use may include, but are not limited to; Sherburne National Wildlife Refuge, Sand Dunes State Forest, wildlife management areas, scientific natural areas, County and township designated parks.

Aggregate Reserve

Areas identified by the County Board based on the Minnesota Department of Natural Resources (Classification of Aggregate Resource, Sherburne County, Minnesota, 1987) as containing significant aggregate deposits and areas within proximity of such areas intended to be used as buffers from existing or planned residential subdivisions.

Airport Impact Area

Areas identified as Zone A, B, or C within the Princeton Municipal Airport zoning ordinance and St. Cloud Regional Airport Master Plan, and/or approved by the Sherburne County Board. Uses within these areas are intended to comply with Federal Aviation Administration regulations and the MnDOT Airport Land Use Compatibility Manual.



Aggregate Reserve (1,732 acres)
Agricultural (74,897 acres)
Airport Impact Overlay (13,054 acres)
Business & Industry (4,451 acres)
Hamlet Mixed-Use (705 acres)
Heavy Industry (212 acres)
Parks & Open Space (38,074 acres)
Rural Residential (68,130 acres)
Urban Reserve - Business & Industry (1,726 acres)
Urban Reserve - Residential (4,793 acres)
Urban Reserve - TOD (428 acres)
Wild & Scenic (7,774 acres)
City / Township Zoning Authority (85,767 acres)

Figure 8.1: Future Land Use designations by acreage, and as a percentage of total acres county-wide. Source: Sherburne County Public Works Dept.

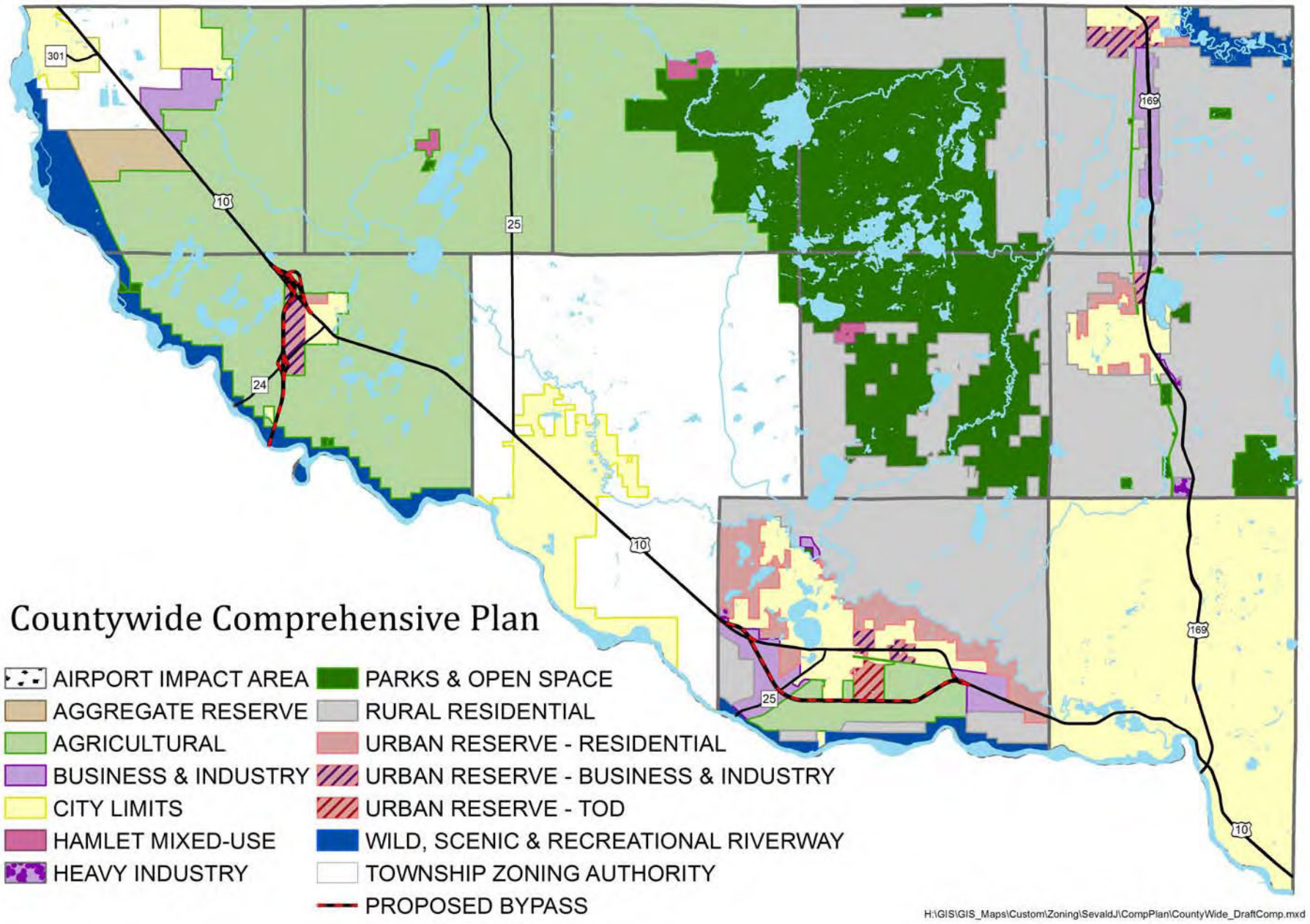


Figure 8.2: Sherburne County Comprehensive Land Use Plan Map (future land use map). Source: Sherburne County Planning & Zoning Dept.

Chapter 9
Township Land Use Plans



Orrock Town Hall

Summary

Whereas the end of Chapter 8 describes future land use categories and includes the Comprehensive Plan Map on a county-wide scale, Chapter 9 compiles these categories into township future land use plans. These maps are to be used as a "guide" for how land is to be developed between the years 2010-2030. It is important to understand the difference between the Comprehensive Plan Map (future land use map) and the Zoning Map (official map). Whereas the Comprehensive Map "guides" land use, the Zoning Map is adopted by ordinance and is law.

Where applicable, Chapter 9 briefly describes plans and studies completed by townships, cities, and regional planning organizations since 2004 (previous comprehensive plan update) or prior, when applicable. By referencing these plans, the County is not adopting them, but acknowledges their existence giving the reader a comprehensive understanding of how different agencies may view the same land area. This chapter includes a "Sherburne County Future Land Use Map" specific to each township. These maps are the "official" Comprehensive Plan maps of Sherburne County.

It is common for city and township plans to contradict each other. These contradictions may be unintended in the case where one plan may be more current compared to the other. Contradictions may also be intentional. For example, if a township disagrees with a city's future land use plan for an area within the township, but outside of an Orderly Annexation Agreement.

Sherburne County recognizes township efforts to influence land use policy through township land use plans. However, the County cannot enforce plans or laws beyond those adopted by the County Board. In any case, this comprehensive plan reflects the recommendations made by the town boards whenever possible.

The process of including town board recommendations in preparation of these maps is described in Chapter 1. Written comments regarding the draft future land use plans were solicited from each town board in November 2009 - January 2010. Of the nine townships, Clear Lake submitted a written

response. Big Lake and Livonia submitted a verbal response during township workshops. Haven provided verbal clarification of an earlier written response from March 2009. In the case of the other five townships, future land use maps and policies are based on one or more of the following;

- Current land use;
- 2004 Comprehensive Plan;
- Previous township plans;
- Previous discussions between the Planning & Zoning Department Staff and town boards.

County-Township Joint Powers

Sherburne County adopted joint powers agreements with the townships of Baldwin (2005), Big Lake (2005), and Livonia (2007). These townships may have had different reasons for entering into a joint powers agreement. One reason may have been to prevent neighboring cities from extending municipal zoning authority beyond municipal boundaries.[1] The Joint Powers agreement[2] states;

> *The purpose of this Agreement shall be to create a unified and simplified method of zoning enforcement within [the] Township whereby the County shall undertake to perform on behalf of the Township all functions regarding administration and enforcement of the Township's Zoning Ordinance and Subdivision Ordinance (the "Ordinances") controls, including inspection, issuance of permits, enforcement and any and all other exercise of authority which may be legally delegated to the County by the Township.*

Under these agreements, the three townships have adopted their own Zoning and Subdivision ordinances. The township ordinances are identical to the County's ordinances. The townships have appointed the County Planning Commission and County Board of Adjustment as the township's. The townships have appointed the County Zoning Administrator and County Attorney to administer and enforce the township's Zoning and Subdivision ordinances. The difference between how a land use request is processed in these three townships compared to the other townships is primarily administrative. **In the event a Town Board's action differs from the County Board's action (i.e. where one board approves a request while the other board denies it), Sherburne County shall enforce the County Board's action, and the township shall enforce the Town Board's action.**

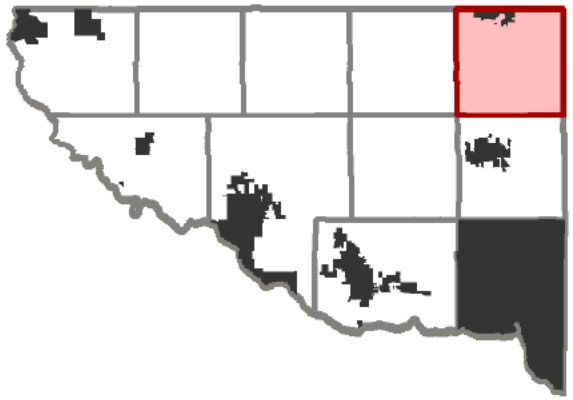
These Joint Powers Agreements do not apply to this Comprehensive Plan, meaning townships may adopt a Comprehensive Plan independent of the County.

Townships with Joint-Powers Zoning
Application submitted to the County
Application submitted to the Township
County Staff review
Township Staff review
Town Board recommendation
County Planning Commission recommendation (public hearing)
County Board action
Town Board action (affirmation of County Board action)

Other Townships
Application submitted to the County
County Staff review
Town Board recommendation
County Planning Commission Recommendation (public hearing)
County Board action

Figure 9.1: Summary of how the administrative procedure of processing a land use request requiring a public hearing differs between those townships with joint-powers zoning and those without. Source: Sherburne County Planning & Zoning Dept.

Baldwin Township



Baldwin Township is located in the northeast corner of Sherburne County, bordering (clockwise) the City of Princeton, Princeton Township (Mille Lacs County), Spencer Brook Township (Isanti County), Livonia Township, and Blue Hill Township.

Baldwin Township was organized in 1858, named after F.E. Baldwin, a County Commissioner. In 1858 the township's area included present-day Blue Hill and Santiago townships. In 1877, the two townships were divided from Baldwin.[5] The County/Township share zoning authority as explained on page 97.

Baldwin Township's natural features include Little Elk Lake, Lake Diann, Cantlin Lake, Sandy Lake, Rum River, and Battle Brook. The township includes several wetland complexes, wooded areas, and farm fields. The township is divided east-west by U.S. Highway 169. About half of the township is built-out.

Population

Baldwin is the County's second most populous township, and third most in Minnesota, behind White Bear (Ramsey County) and Big Lake townships. The 2010 Census estimates its population to be 6,739. Baldwin's population grew 44.2% between 2000 - 2010. By comparison, the City of Princeton grew 19.5% during this same period to an estimated 2010 population of 4,698.

According to the 2005-2009 American Community Survey, township residents' median age was 36.3. 26.4% of residents were under 18 years of age, and 5.4% under 5 years of age. 5.4% of residents were age 65 or over.

Households

According to the 2005-2009 American Community Survey, Baldwin Township's average household size was 2.72 persons. There were 2,025 total housing units, and 2,000 single-family homes. 98.6% of all housing units were owner occupied.

Employment

According to the 2005-2009 American Community Survey, of Baldwin Township residents 16 years and over, 75.4% were employed. The mean travel time to work was 35.5 minutes. Per capita income was $30,180. Median household income was $73,899. 3.3% of individuals (1.5% of families) lived below the poverty level.

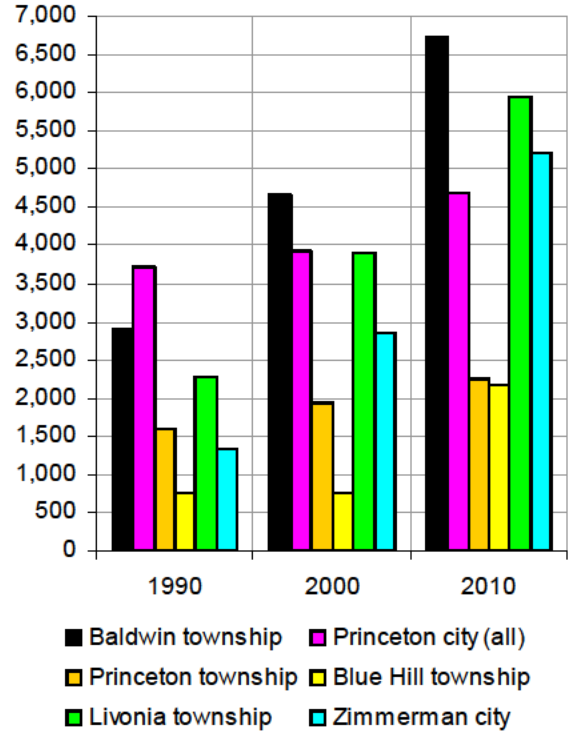


Figure 9.2: Total Population. Source: US Census.

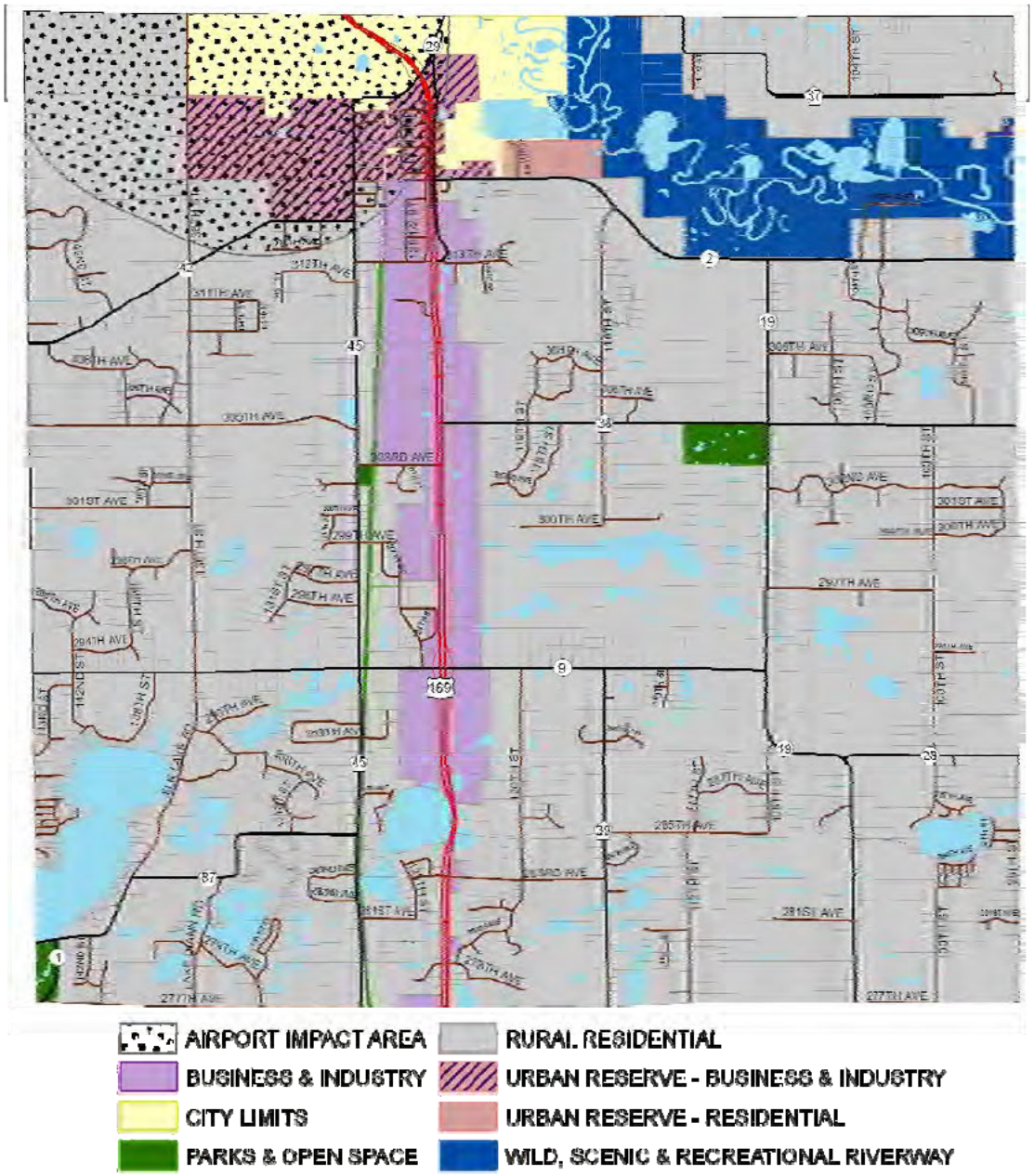


Figure 9.3: Sherburne County Future Land Use Map (Baldwin Township). Source: Sherburne County Planning & Zoning Dept.

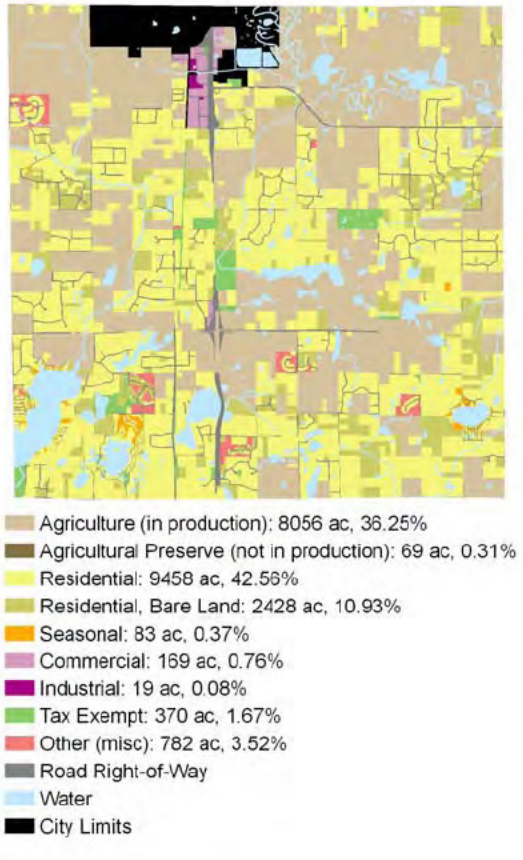


Figure 9.4: Baldwin Township existing land use by acres (2008). Source: Sherburne County Assessor's Dept.

Education

According to the 2005-2009 American Community Survey, of Baldwin Township residents 25 years old or older, 94.4% were high school graduates (or higher), and 19.9% had received a bachelor's degree or higher. Baldwin Township is within the Princeton ISD 477 school district.

Existing Land Use (2008)

Figure 9.4 shows existing (2008) land use. 9,458 acres are used residentially, while 8,056 acres remain in agricultural production. Residential developments are spread throughout the township, and primarily consist of 2.5 acre or larger single-family lots. Agricultural use is concentrated in the northern third of the township south of the City of Princeton, and along County Road 9.

Future Land Use (2010-2030)

Figure 9.3 shows future (2010-2030) land use. The majority of the township is guided for residential use. Non-developed portions of the U.S. Highway 169 corridor (2008 average daily traffic: 19,400) is guided for Business & Industrial land use. It is anticipated that not all of this corridor will become developed by the year 2030, resulting in non-developed land parcels to continue their existing use primarily as non-developed residential and agricultural uses, thereby preserving a scenic rural corridor along Highway 169. Areas south of Princeton are guided for Urban residential and commercial-industrial use.

Previous Township Studies

Highway 169 Taskforce

In 1997-1998, a taskforce was formed with the following objectives: (1) *to evaluate the options available to work with Princeton to provide services and possible tax revenue sharing*, and; (2) *to evaluate the current land uses, zoning and permitted uses within $^1/_4$ mile adjacent to* [Highway] *169 in Baldwin Township in order to make well planned long term land use recommendations for the local community.* The taskforce made the following recommendations to the Baldwin Town Board:

1. *To begin planning with Princeton on joint service agreements that would benefit both communities; issues for discussion should include the following:*

    - *The proposed industrial by-pass connecting west from County Road 45 to Baldwin 136th Street, and to Highway 95 as referenced in the* [1997] *Sherburne County Transportation Plan.*
    - *Strategies to maintain, and or increase Baldwin's commercial/industrial tax base.*
    - *Prepare a feasibility study on cost sharing and tax revenue sharing for the possible extension of utilities.*



Figure 9.5: 125th Street (frontage road), Baldwin Township. Source: Sherburne County Planning & Zoning Dept.

- *The planning, working, service arrangements, joint power agreements, and cost/revenue sharing are intended to prevent annexation between Baldwin and Princeton.*

2. *The land south of 313th along both sides of Highway 169 in Baldwin Township should remain zoned General Rural. The existing setbacks in the General Rural District for principal or accessory structure from Highway 169 should be increased from 100 feet for newly plated parcels to a minimum of 175 feet from the right of way of Highway 169.*

   Secondly, as part of the Subdivision Ordinance, Section 11 General Regulations, Subdivision 1: Design Standards add: "All newly created lots along Highway 169 should be screened from the freeway with natural means such as earth berms, and or trees and natural vegetation wherever possible without filling wetlands. All lots must also meet the minimum decibel standards for noise for residential homes recommended by the Minnesota Pollution Control Agency.

Findings of Fact:

1. *The Task Force found that existing land uses vary and are scattered along the corridor.*
2. *The soils and wetlands will not allow efficient and feasible connections for contiguous building sites and future sewer and water services needed for commercial highway uses.*
3. *Current permitted uses and Conditional Uses in the General Rural Zone allow landowners reasonable use of the land.*
4. *Spot zoning individual properties in this area would be inconsistent with the* [1992] *Sherburne County Land Use Plan and would require additional zoning regulations to ensure only the type of uses and structures that are desirable to the community are allowed.*
5. *The limited allowable accesses for businesses along 169 would require extensive service roads and utility extensions that would be costly to build in wet areas.*
6. *The Task Force wants to protect the integrity of the freeway visibility by preserving the natural appearance in the General Rural District.*
7. *The Task Force wants to protect future residents from noise and the public from bearing the cost of noise barriers after development of land.*
8. *The 175' setback is based on preserving the aesthetic natural view of 169 and is a means at helping achieve MPCA noise standards.*



Figure 9.6: Commercial development along US Highway 169 in Baldwin Township. Source: Pictometry International Corp.

Residential Survey

In 2005, Baldwin Township adopted a township comprehensive plan, which was identical to the County's comprehensive plan.

Also in 2005, the town board distributed a non-scientific survey to 3,340 residential and business addresses. 96 residents responded (3% response rate). Questions and answers are as follows (number of responses in prentices);

Q: Should Baldwin Township have a Comprehensive Plan?
A: Yes (68), No (9)

Q: What do you like best about Baldwin Township?
A: Keep it Rural (86), Personality (25), Government (21), Location (9)

Q: What do you like least about Baldwin Township?
A: Planning/Goals (66), Public Services (44), Pride of Ownership (4)

Q: If you could realistically change one thing about Baldwin Township what would it be?
A: Needs: more business/industry; gas station on Co Rd 9 & Hwy 169; encourage diverse land use, cluster, multiple housing; movie theater; restaurants; pave 133rd loop on east side of Lake Dianne; widen roads; provide water and sewer services for everyone; more citizen involvement, input; DSL; more better snowmobile trails.

Corrections: better/more walking/biking/workout trails, recreation; keep green spaces; no apartments, low-rent housing, trailer parks; monitor home-businesses for pollution, taxing; lower speed limits; clean up after developments; better sight toward the east when exiting onto Co Rd 9 from the north.

Strategies: better, safer traffic control on Co Rd 9 & Co Rd 45, Co Rd 9 & Co Rd 1; more signage, "dead ends, no outlet, cul-de-sacs"; quotas for development; less outdoor lighting; have a limit of 2 dogs per household; lower taxes; township do their own zoning; no city sewer/water systems; support of new, better schools in District 477; start a community task force with vision that the board respects and can work with; additional taxation on new development to benefit our schools, parks, crime fighting; re-elect new board members.



Figure 9.7: Northeast Sherburne Fire Department (foreground), and Baldwin Town Hall & Public Works garage (background). Source: Sherburne County Planning & Zoning Dept.

Q: Baldwin Township has recently received a donation of 80 acres to be used as a township park. What would you like to have for recreation in this community park?
A: Athletics, exercise [activities] (134):

Walking paths, trails, hiking (46)
Bicycling paths (12)
Skating rink, warming house, winter activity (8)
Soccer (adult, youth) (5)
Horseback riding trails (4)
Skateboard park (4)
Skiing (4)
Golf driving range (affordable) (1)
Athletic fields (13)
Waterslide, water park, pool (9)
Basketball (6)
Volleyball (5)
Horseshoes (4)
Rollerblading (4)
Frisbee golf (3)
Tennis Courts (1)
Animal archer hunt limited to township residents only (1)

Family [activities] (32):
Picnic area, pavilion, shelters, grills (29);
Amphitheater, gazebo for entertainment (2)



Figure 9.8: Baldwin Township park, Co Rd 38 & 108th Street. Source: Pictometry International Corp.

Children/youth (29):
playground; skateboard park; Jungle gym with rubber floor;
summer programs.

Q: Infrastructure (23):
A: Park is too costly, let the state manage it (11) Keep it natural, open for hunting (5)
Keep park safe (4) Improve ponds, don't cut trees (3)
Community center/child activity center (3) Benches (1)
Create prairie, wildflowers (1) Electricity/running water (1)
Keep it mowed (1) Restrooms (1)
Work toward no duplication or competition of Princeton park resources (1)

Q: Should Baldwin Township invest in a transportation plan?
A: Yes (24); No (52)

Q: Would you like to see an elementary school in Baldwin Township?
A: Yes (20); No (69)

In 2008, the Town Board appointed a Strategic Planning Committee. In 2009, the township received a Healthy Communities Partnership (HCP) grant through the Initiative Foundation, providing the committee with extensive training and sponsoring a community visioning session in which 300 residents attended. The process received extensive media coverage by Minnesota Public Radio. The committee formed three task forces; (1) Parks, Environment and Social Capital; (2) Economic Development; and (3) Government Innovations. The task forces are exploring projects such as; comprehensive planning, park planning, long-range budgeting, and an annual business appreciation luncheon.

City of Princeton

Princeton's current comprehensive plan (the plan) was adopted in 2008. As it pertains to Baldwin Township, the plan includes Goal 10 - Growth Management; *"Support the expansion of the municipal boundary to growth areas in adjacent townships when development can adequately and efficiently be served by urban infrastructure. Oppose land use patterns that promote rural sprawl and prevent the logical extension of urban services."* Princeton's comprehensive plan identifies a growth boundary, which includes portions of Baldwin Township. As of 2010, the city and township do not have an Orderly Annexation agreement (OA). Within the township, the city's plan includes three "potential development districts" (see Figure 9.10), identified as #4 Airport Business Park, #5 South Gateway Area, and #6 Southeast Residential Area.



Figure 9.9: Princeton's Comprehensive Plan identifies this area of the township for "Neighborhood Commercial." To the left of Hwy 169 is 303rd Ave, with Co Rd 38 to the right. Source: Pictometry International Corp.

In comparison to the County's comprehensive plan, the Airport Business Park area is planned for future Urban Reserve - Business & Industry. The South Gateway area is planned for future Business

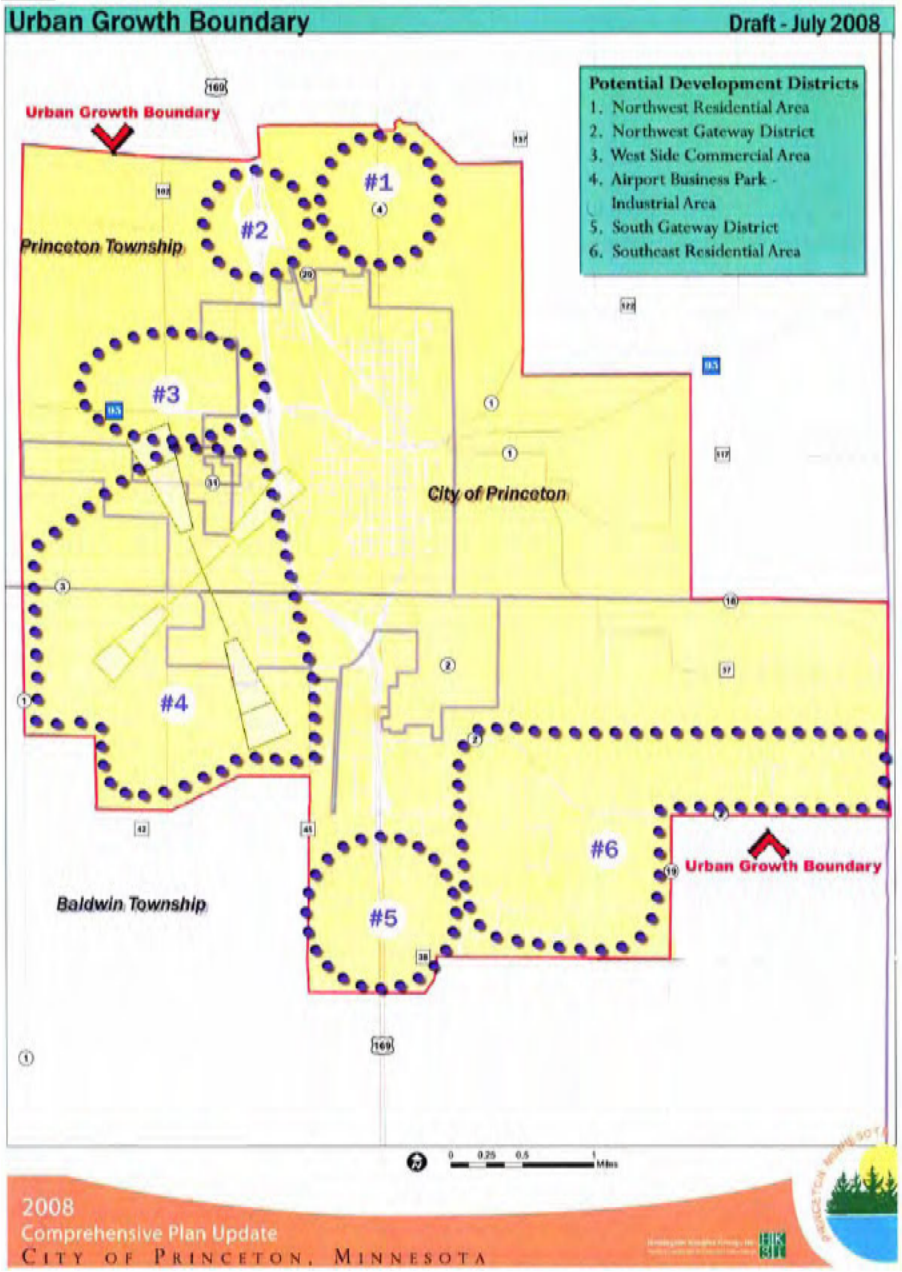


Figure 9.10: City of Princeton Urban Growth Boundary (2008). Source: City of Princeton/HKGI (Figure 2.2 in Princeton Comprehensive Plan).

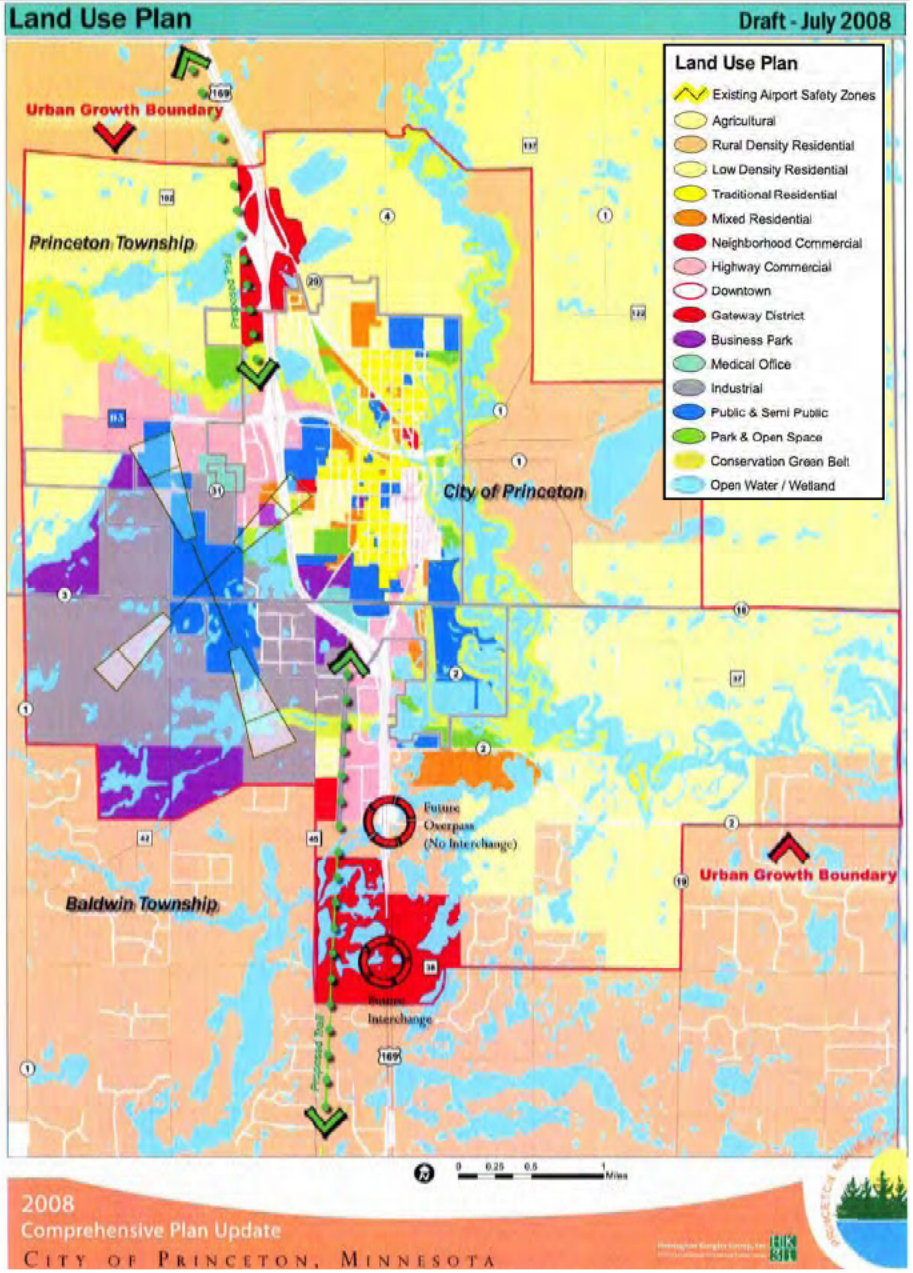


Figure 9.11: City of Princeton Future Land Use Plan (2008) Source: City of Princeton/ HKGI (Figure 2.3 in Princeton Comprehensive Plan).

& Industry, and the Southeast Residential Area is planned for future Rural Residential.

The County and city comprehensive plans conflict in that the city's South Gateway and Southeast Residential areas are not included within the County's Urban Reserve areas because there is no existing (2010) Orderly Annexation agreement or other agreement between Baldwin Township and the City of Princeton that define rural areas to become urban serviced in the future. There is general agreement on the type of land use, but not urban vs. rural serviced. Thus without an OA, it is likely that within the 2010-2030 time period, the city's planned South Gateway and Southeast Residential areas will develop rural, with well and septic systems.

Princeton Municipal Airport Joint Zoning Board

In 1978, an airport joint zoning board was created, consisting of representatives of the City of Princeton, Mille Lacs and Sherburne counties. Also in 1978, the Princeton Municipal Zoning Ordinance was adopted regulating land use within the Joint Zoning Board's jurisdiction. The ordinance was approved by MnDOT, in compliance with MN Statute 360 of the Airport Zoning Act.

The Joint Zoning Board's jurisdiction includes land use within the Airport Hazard Area as defined in the ordinance, and within 2 miles of the airport boundary, and height restrictions within 1.5 miles of the airport boundary. The ordinance regulates land use and airspace in proximity of two planned runways. Runway 15-33 was planned for a length of 2,600', and runway 04-22 was planned for a length of 2,133'. As of 2010, runway 15-33 is constructed at 3,900' in length. Runway 04-22 was never constructed.

The 1978 airport ordinance has not been updated to existing 2010 conditions. However the 1978 zoning regulations still apply but are not enforced by the Joint Planning Board, and are not consistent with other local zoning regulations. Instead, zoning is enforced by the applicable local government unit (i.e. City of Princeton, Sherburne County/Baldwin Township, and Princeton Township). The Joint Airport Planning Board (Princeton Airport Advisory Board) is active, with membership consisting of representatives from the City of Princeton, Princeton Township, and Baldwin Township. The Board reviews all land use applications within Airport Zones A, B, and C. The Board has submitted an Airport Layout Plan (ALP), to the FAA for approval (pending as of 2010), which includes a planned second runway. The ALP does not include an updated zoning ordinance. It is the intension for land use zoning to be left to applicable land use authorities (i.e. city, county/township).

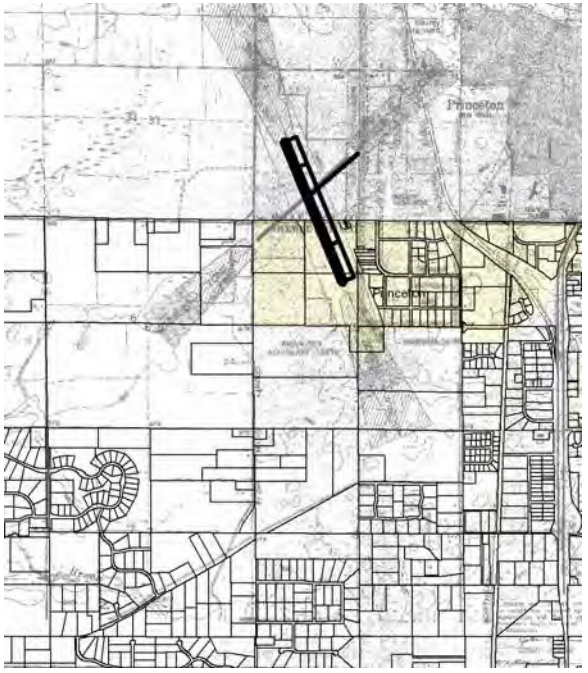
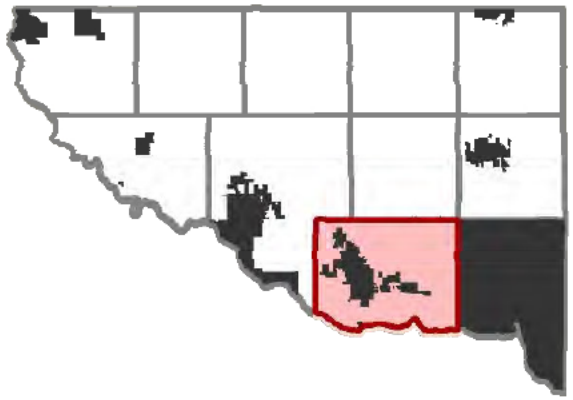


Figure 9.12: Comparison between the Princeton Municipal Airport Land Use Zoning map (1978) and the current (2010) location of the runway. Source: City of Princeton/Kirkham, Michael & Associates (Exhibit A in Princeton Municipal Zoning Ordinance, 1978), Sherburne County Public Works Dept.

Big Lake Township



Big Lake Township is located along U.S. Highway 10, and surrounds the City of Big Lake. The township borders (clockwise) Orrock Township, City of Elk River, City of Otsego (Wright County), Monticello Township (Wright County), City of Monticello (Wright County), and Becker Township.

The township is characterized by Highway 10, which divides the township north-south, and by farm fields between the Mississippi and Elk rivers. Natural features include the Mississippi River (southern border), the confluence of the Elk and St. Francis rivers, Tibbits Brook, and 13 lakes. The township's namesake and most of its lakes are located within the City of Big Lake.

It's first settlements[3] were established in Big Lake (1848) and Bailey's Station (1851), which included a hotel and stagecoach station. In 1857, the town of Liberty was platted in the southwest area of the township but was never developed. Big Lake Township was organized in 1858.

The township maintains joint zoning authority with Sherburne County, where the two maintain parallel zoning and subdivision ordinances (see page 97). The city and township operate a joint Economic Development Authority which has resulted in a successful 90+ acre urban industrial park. The city and township also operate a joint fire district.

Much of the growth in Sherburne County has been driven by access to US Highway 10 and Interstate 94, which run parallel north and south of the Mississippi River into the Twin Cities. The cities of Big Lake (Highway 10) and Monticello (I-94) are connected by a 3-mile segment of MN Highway 25 crossing through Big Lake Township. This segment of highway is primarily agricultural with a an average daily traffic (ADT) count of 12,400 - 16,500 vehicles (2008). The Highway 10 corridor in Big Lake (18,300 - 20,300 ADT) primarily consists of light industrial and commercial services, while the Interstate 94 (55,00 ADT) and MN Highway 25 (22,300 - 27,500 ADT) corridors in Monticello primarily consist of retail and commercial services.

In 2009, Northstar Commuter Rail service began between Big Lake and downtown Minneapolis. The Big Lake station and maintenance facility are located near the intersection of U.S. Highway 10 and County Road 43 on land that previously was in the township.

During the years 2010-2030, rural residential growth is expected to continue primarily north of the Elk River, while the City of Big Lake is expected to expand with a potential for transit oriented development around the Northstar Commuter Rail station. MnDOT has proposed a Highway 10 bypass (unfunded) south of the city. Urban growth pressure is expected to occur along US Highway 10, and MN Highway 25.

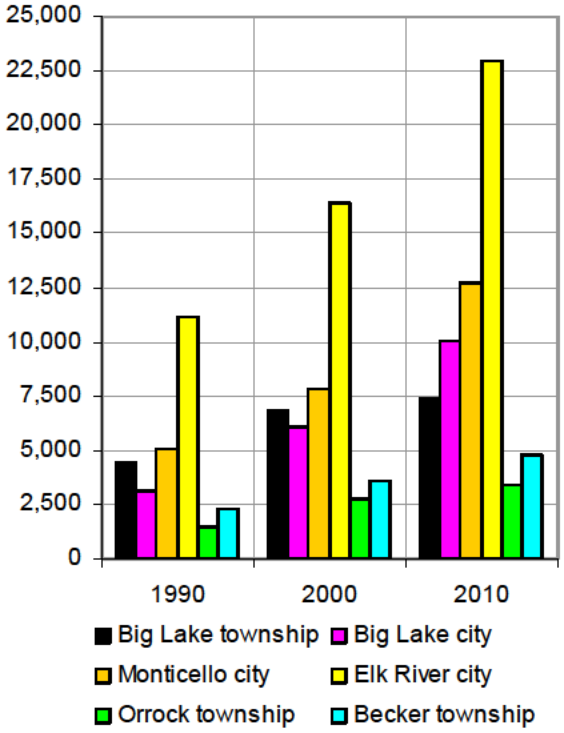


Figure 9.13: Total Population. Source: US Census.

Population

Big Lake Township is the County's most populous township and has the second highest township population in Minnesota, after White Bear Township in Ramsey County (2010 est. pop. 10,949). The US Census estimates Big Lake Township's 2010 population to be 7,386. The township's population has grown 34% between 2000-2010. By comparison, the City of Big Lake grew 66% to an estimated 10,060 (2010) and the City of Monticello grew 40% to an estimated 12,759 (2010) during this same period.

According to the 2005-2009 American Community Survey, Big Lake Township residents' median age was 37. 26.6% of residents were under 18 years of age, and 5.5% under 5 years of age. 2% of residents were age 65 and over.

Households

According to the 2005-2009 American Community Survey, Big Lake Township's average household size was 3.1 persons. There were 2,545 total housing units, and 2,375 single-family owner-occupied homes. 93.3% of all housing units were owner occupied.

Employment

According to the 2005-2009 American Community Survey, of Big Lake Township residents 16 years and over, 82.5% were employed. The mean travel time to work was 35.4 minutes. Per capita income was $33,012. Median household income was $85,324. 3.1% of individuals (1.6% of families) lived below the poverty level.

Education

According to the 2005-2009 American Community Survey, of Big Lake Township residents 25 years old or older, 91.6% were high school graduates, and 20.5% had received a bachelor's degree or higher. Big Lake Township is served by the Big Lake ISD 727, Elk River ISD 728, and Monticello ISD 882 school districts.

Existing Land Use (2008)

Figure 9.16 shows existing (2008) land use. 9,430 acres are used residentially, while 9,525 acres remain in agricultural production. Residential developments are concentrated north of the Elk River, and primarily consist of 2.5 acre or larger single-family lots. Agricultural use is concentrated south of US Highway 10.

Future Land Use (2010-2030)

Figure 9.15 shows future (2010-2030) land use. Areas north of the Elk River are guided for rural



Figure 9.14: Lions Park, Big Lake Township. Source: Sherburne County Planning & Zoning Dept.

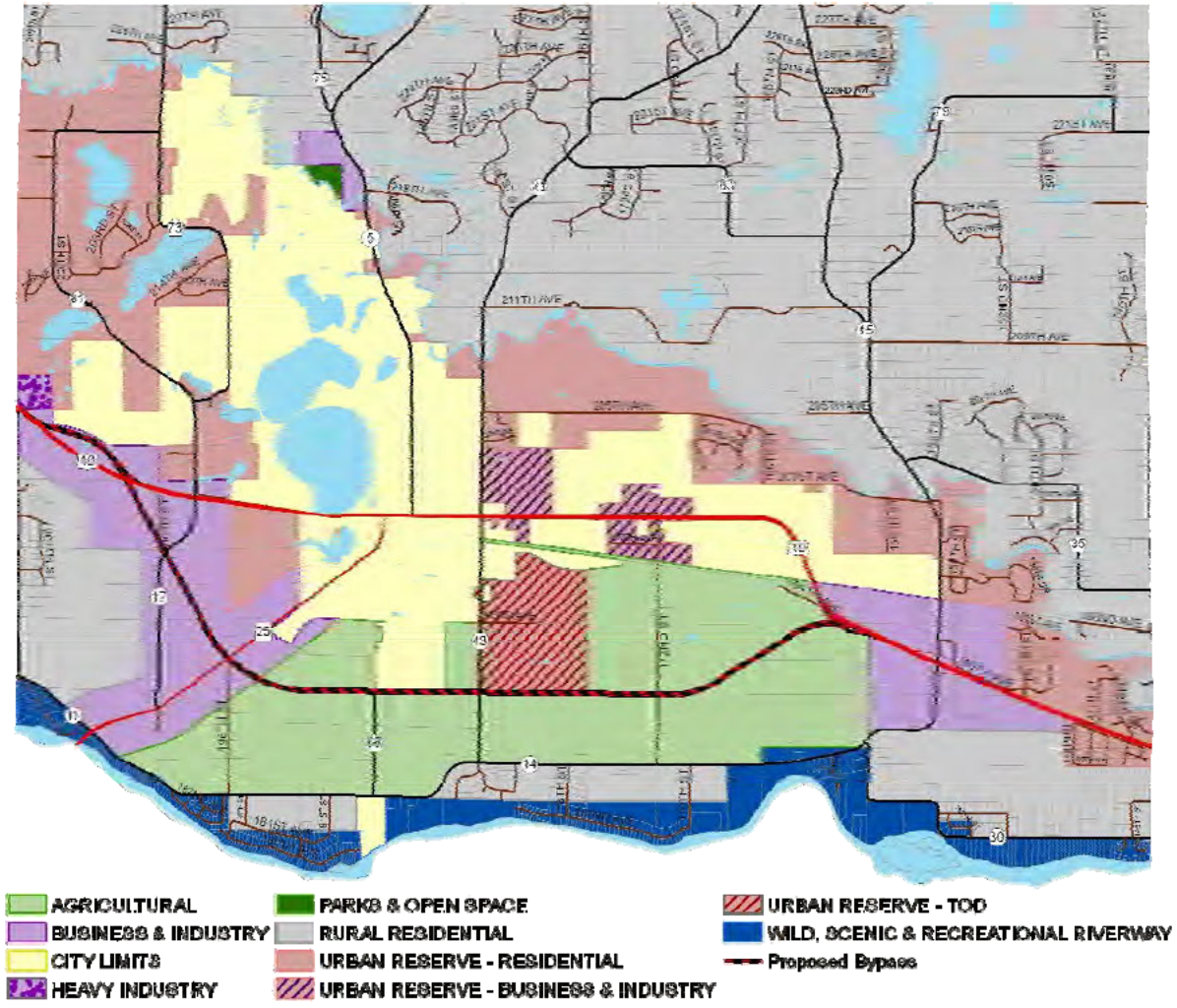


Figure 9.15: Sherburne County Future Land Use Map (Big Lake Township). Source: Sherburne County Planning & Zoning Dept.

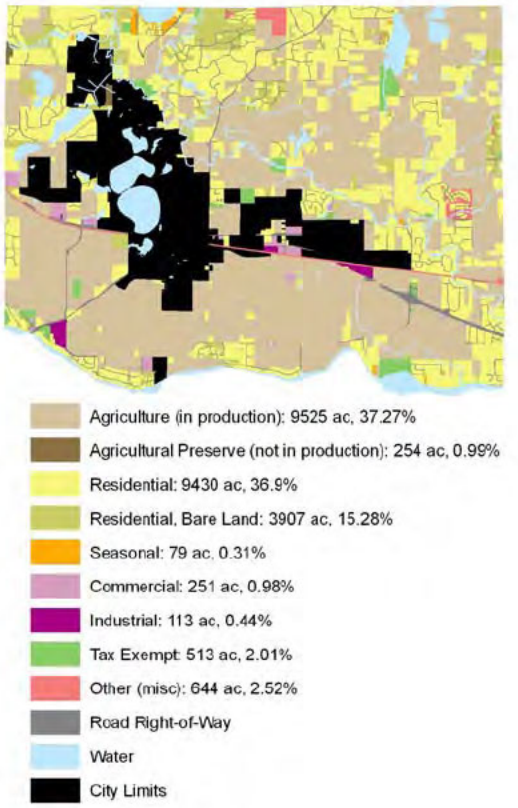


Figure 9.16: Big Lake Township existing land use by acres (2008). Source: Sherburne County Assessor's Dept.

residential as are areas along the Mississippi River. Areas south of the Elk River and north of US Highway 10 are guided for Urban Reserve-Residential, and Urban Reserve-Business & Industry.

Other areas guided for Business & Industry include the interchange of US Highway 10 & CSAH 14/15, the planned interchange of US Highway 10 & US Highway 10 bypass west of the City of Big Lake, 1/4 mile on either side of MN Highway 25 between Monticello and Big Lake, and along County Road 17 which serves as a bypass of downtown Big Lake connecting Monticello to western neighborhoods of Big Lake.

Areas south of the BNSF Railroad and north of CSAH 14 is guided for Agriculture with the exception of the area around the Northstar Commuter Rail station. Although guided for agriculture, it is likely that large tracts may be annexed into the city and developed prior to 2030.

Previous Township Studies

Big Lake Highway Corridor Taskforce

In 1996 a 3-member taskforce was formed representing the Sherburne County Board of Commissioners, Big Lake Town Board, and Big Lake City Council. Its purpose was to make recommendations to the County regarding land use planning along highway corridors in the Big Lake community. During this period, the County Board adopted a one-year moratorium on residential development within the US Highway 10 and MN Highway 25 corridors.

In 1996 following the taskforce's recommendations, the County Board amended the Comprehensive Plan map in Big Lake Township (Figure 9.17);

1. Urban Expansion: areas immediately adjacent to the City of Big Lake along US Highway 10;
2. Industrial: areas west of the Urban Expansion area and east of Becker Township, and areas east of the Urban Expansion area and west of the US Highway 10 interchange with Co Rd 14/15;
3. Commercial: the area of the US Highway 10 & Co Rd 14/15 interchange, and east.
4. Commercial: the MN Highway 25 corridor between Big Lake and Monticello

City of Big Lake

The City of Big Lake's Comprehensive Plan (the plan) was adopted in 2000 and last amended in 2005. The plan's Extra Territorial Land Use Plan (Figure 9.18) identifies all areas south of the Elk River to eventually become urban with the exception of existing rural residential

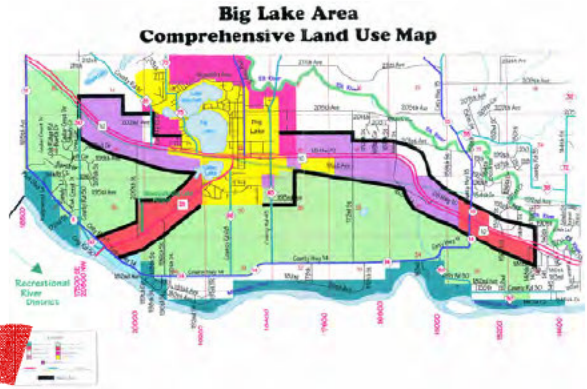


Figure 9.17: In 1996 the Big Lake Highway Corridor Taskforce recommended amendments to the county's comprehensive plan map. Source: Sherburne County Planning & Zoning Dept.

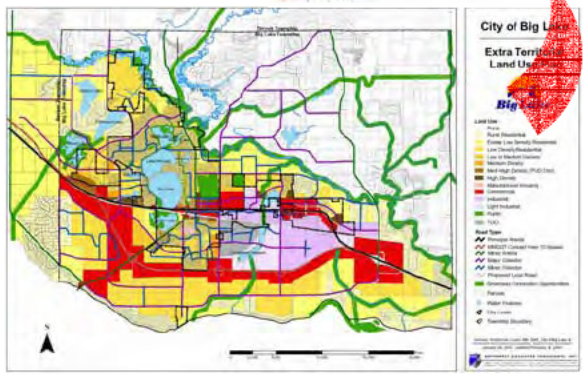


Figure 9.18: City of Big Lake Comprehensive Land Use Plan (2009). Source: City of Big Lake/NAC.

developments along the Mississippi and Elk rivers. The plan includes the planned US Highway 10 bypass and guides land use along this corridor for Commercial, with Industrial and Light Industrial between the bypass and existing US Highway 10, east of County Road 43. Commercial land use is also planned along the MN Highway 25 corridor between Monticello and Big Lake.

The plan includes a number of greenway corridors along rivers, streams, and wetland complexes. These corridors extend north of the Elk River into areas agreed to remain permanently within the township.

In 2008, the city adopted a Transit Oriented Development (TOD) Master Plan, design guidelines, and ordinance for areas near the Northstar Commuter Rail station. Although much of this area is currently (2010) within the township, it is anticipated that prior to development, it will be annexed into the city.

The County's Comprehensive Plan and City's Comprehensive Plan conflict in regards to future land use primarily in two areas; (1) along the US Highway 10 bypass corridor, and south of US Highway 10, east of County Road 43. The City guides this area for Commercial, Industrial, Light Industrial, and TOD, while the County guides this area for agriculture and TOD. Although the future land use designation conflicts, the preservation of land for agricultural use should not impeded the eventual urban development of this area. (2) Non-developed areas along the Mississippi and Elk rivers, the City guides as Low Density Residential, Rural Residential, and Estate Low Density Residential, while the County guides for Rural Residential (large lot single-family).

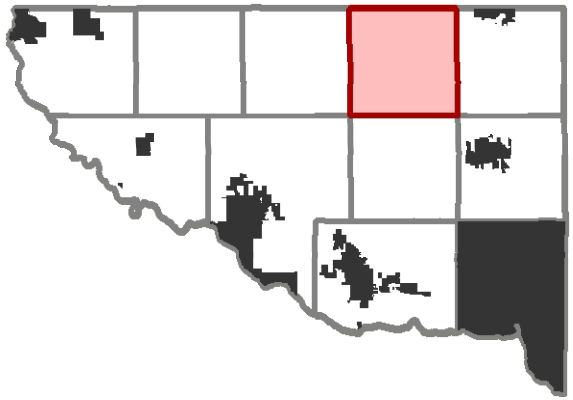


Figure 9.19: City of Big Lake TOD Master Plan. Source: City of Big Lake / LSA.



Figure 9.20: Northstar Commuter Rail, Big Lake Station. Source: MnDOT.

Blue Hill Township



Blue Hill Township is located in northeastern Sherburne County bordering (clockwise) Greenbush Township (Mille Lacs County), Baldwin Township, Orrock Township, and Santiago Township. It's nearest cities are Princeton (1-mile) and Zimmerman (2-miles).

In 1857, the town of Groton was platted along the St. Francis River, but was never developed.[3] Blue Hill Township was organized in 1877, when it seceded from Baldwin Township. The township's namesake is "Blue Hill," (elevation: 1,090') thought to be the highest point in Sherburne County (the highest natural elevation is 1,110' near the St. Cloud state prison).

About 3/4 of the township is within the Sherburne National Wildlife Refuge. Residential developments are common along the eastern border, while the northern border remains agricultural. Some of the best farmland in the County is located along the Co Rd 3 corridor.

Between the years 2010-2030, residential development is expected to continue along the eastern township boundary, extending west. However, development in the northwestern area of the township may be constrained due to a high water table.

Population

The US Census estimates the township's 2010 population to be 2,176. Blue Hill's population has grown 185% since it's 2000 population of 762. By comparison, the City of Princeton grew 19% during this same period to an estimated 2010 population of 3,719.

According to the 2005-2009 American Community Survey, Blue Hill residents' median age was 30.9. 31.3% of residents are under 18 years of age, and 10.7% are under 5 years of age. 3.5% of residents are 65 years old or over.

Households

According to the 2005-2009 American Community Survey, Blue Hill Township's average household size was 2.93 persons. There were 685 total housing units, and 655 single-family owner-occupied homes. 95.6% of all housing units were owner occupied.

Employment

According to the 2005-2009 American Community Survey, of Blue Hill Township residents 16 years and over, 84.8% were employed. The mean travel time to work was 36.1 minutes. Per capita income was $26,232 Median household income was $66,168. 2.1% of individuals (1.8% of families)

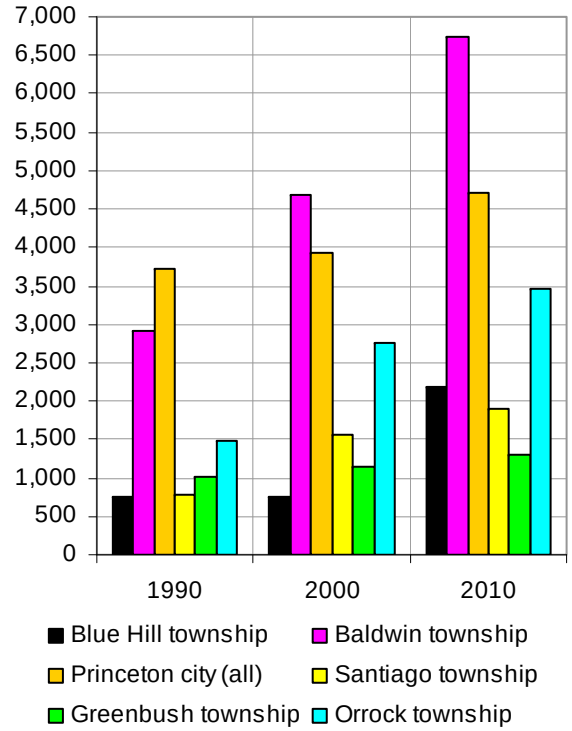


Figure 9.21: Total Population. Source: US Census

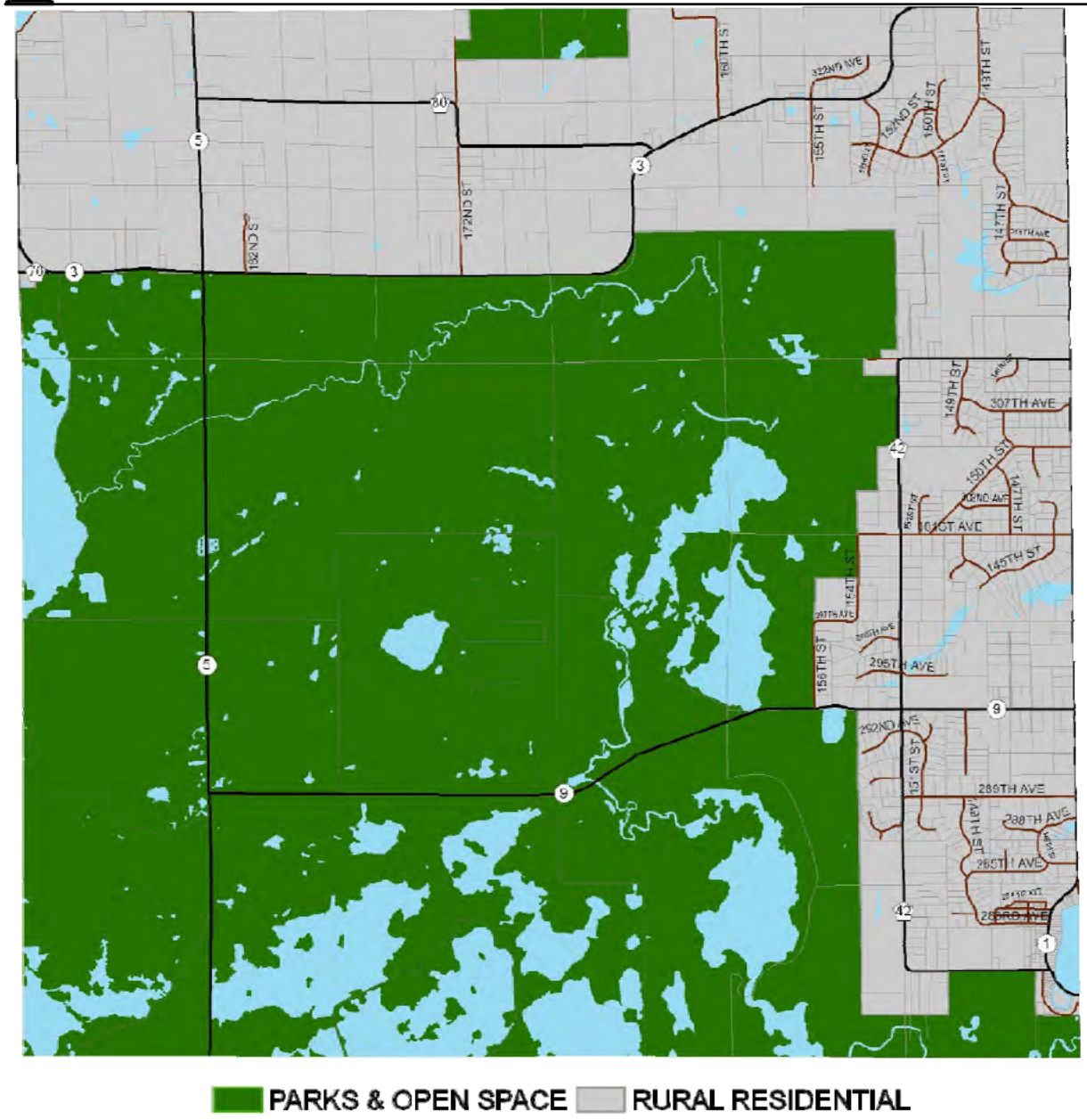


Figure 9.22: Sherburne County Future Land Use Map (Blue Hill Township). Source: Sherburne County Planning & Zoning Dept.

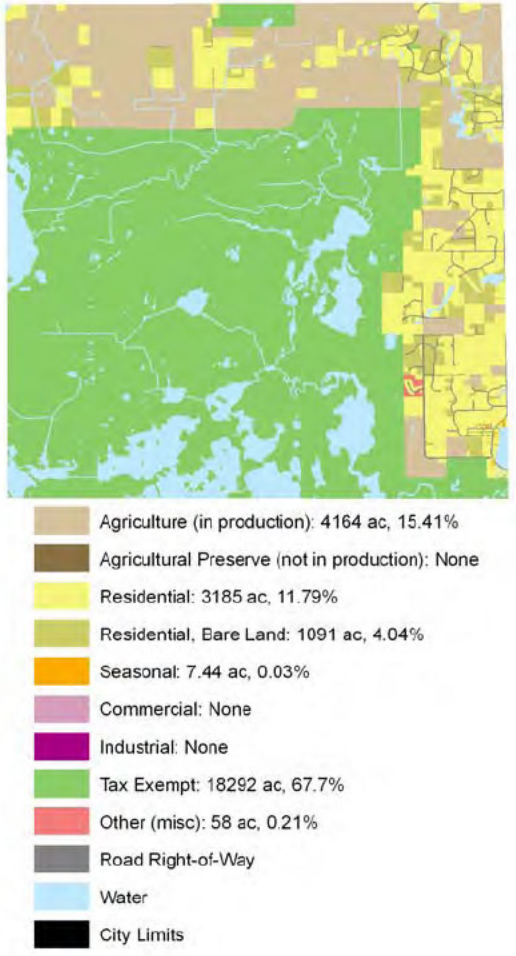


Figure 9.23: Blue Hill Township existing land use by acres (2008). Source: Sherburne County Assessor's Dept.

lived below the poverty level.

Education

According to the 2005-2009 American Community Survey, of Blue Hill township residents 25 years old or older, 91.5% were high school graduates, and 14.3% had received a bachelor's degree or higher. The township is served by the Princeton school district, ISD 477.

Existing Land Use (2008)

Figure 9.23 shows existing (2008) land use. 3,185 acres are used residentially, while 4,164 acres remain in agricultural production. 18,292 acres are classified as tax-exempt, primarily consisting of the Sherburne National Wildlife Refuge. Residential development primarily consisting of 2.5-acre single-family lots is concentrated along county roads 1 and 42 near the Baldwin Township line.

Future Land Use (2010-2030)

Figure 9.24 shows future land use. Residential development on non-public land is expected to continue, similarly to what was experienced during the 2000's. Areas with restrictive soils (primarily along County Road 3) may be limited to agricultural use and non-platted residential uses.

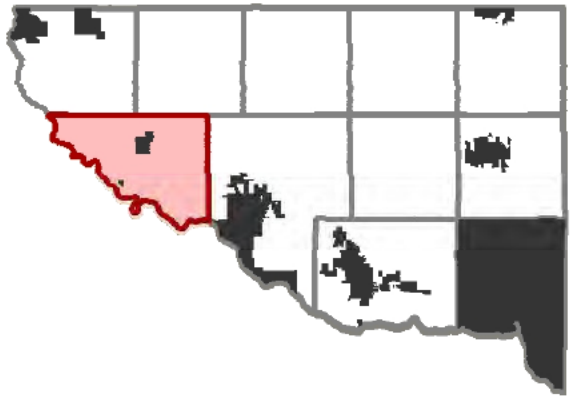


Figure 9.25: Blue Hill Town Hall. Source: Sherburne County Planning & Zoning Dept.



Figure 9.24: "Blue Hill", Sherburne National Wildlife Refuge. Source: Sherburne County Planning & Zoning Dept.

Clear Lake Township



Clear Lake Township is located in western Sherburne County, and encompasses the City of Clear Lake. The township borders (clockwise) Haven Township, Palmer Township, Becker Township, Silver Creek Township (Wright County), Clearwater Township (Wright County), the City of Clearwater (Wright County), Lynden Township (Stearns County), and the City of St. Cloud (Stearns County).

The town of Clear Lake was platted in 1856 and located on Clear Lake, but never developed. Clear Lake Village was then organized in 1858.[3]

The township includes the most farmland in Sherburne County (18,646-acres in production as of 2008). In addition to farmland, the township may be characterized by US Highway 10 and County Road 8, both parallel to the Mississippi River. There are 25 lakes within the township, many of which have undeveloped shoreline. Only Long, Pickerel, and Big Elk lakes are classified by the DNR as "developed."

MN Highway 24 connects the cities of Clearwater (I-94) and Clear Lake (US Hwy 10). The cities are about two miles apart. Highway 24 had a 2008 average daily traffic (ADT) volume of 11,900 - 16,500 and is heavily used by passenger vehicles bypassing Big Lake and St. Cloud between the Twin Cities and the Brainerd lakes area. MnDOT project's its ADT to grow to 34,500 by 2040. The ADT does not include weekend lake traffic whose numbers may double weekday ADT volumes. MnDOT plans to replace Highway 24 through the township tentatively in 2023 (unfunded), in which the existing highway would be turned-back to Sherburne County to become a county road.



Figure 9.26: Clear Lake Town Hall. Source: Sherburne County Planning & Zoning Dept.

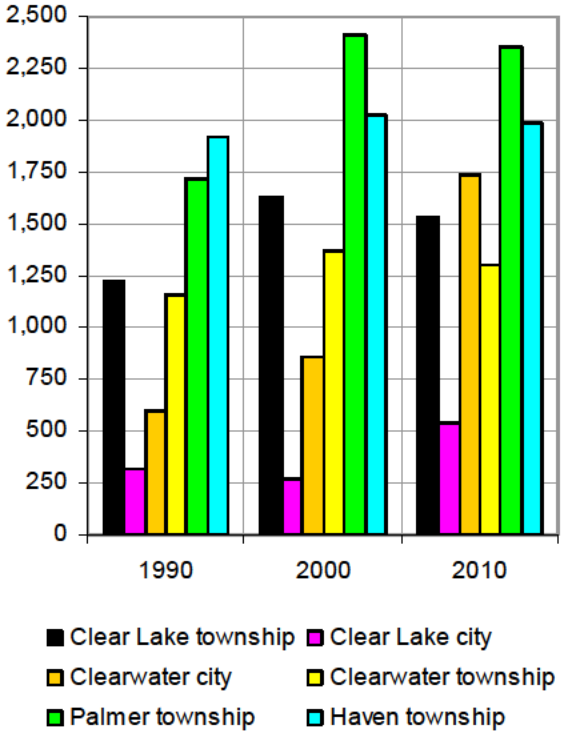


Figure 9.27: Total Population. Source: US Census

Between 2010 - 2030, Clear Lake Township is expected to remain largely agricultural. There may be additional pressure to allow lakeshore development on its many undeveloped lakes. There may be additional growth pressure along the MN Highway 24 corridor as the cities of Clear Lake and Clearwater grow.

Population

The US Census estimates Clear Lake Township's 2010 population to be 1,539. The township's population has decreased 5.6% since its 2000 population of 1,630. By comparison, during the same time period, the City of Clear Lake grew 105% to an estimated 2010 population of 545, and Clearwater grew 102% to an estimated population of 1,735.

According to the 2005-2009 American Community Survey, Clear Lake Township residents' median age was 47. 20.4% of residents are under 18 years of age, and 1.8% are under 5 years of age. 17.7% of residents are 65 years old or over.



Figure 9.28: Clear Lake. Source: Pictometry International Corp.

Households

According to the 2005-2009 American Community Survey, Clear Lake Township's average household size was 2.42 persons. There were 696 total housing units, and 667 single-family owner-occupied homes. 95.8% of all housing units were owner occupied.

Employment

According to the 2005-2009 American Community Survey, of Clear Lake Township residents 16 years and older, 66.4% were employed. The mean travel time to work was 24.8 minutes. Per capita income was $41,897. Median household income was $79,722. 1.8% of individuals (1% families) lived below the poverty level.

Education

According to the 2005-2009 American Community Survey, of Clear Lake Township residents 25 years old or older, 96.2% were high school graduates, and 31% had received a bachelor's degree or higher. The Township is served by the Becker ISD 728 and St. Cloud ISD 742 school districts.

Existing Land Use (2008)

Figure 9.31 shows existing (2008) land use. 2,024 acres are used residentially, while 18,646 acres remain in agricultural production. Existing residential developments primarily consist of lakeshore developments platted in the 1950's - 1970's, and riverfront developments platted mostly in the 1970's, 1990's, and 2000's.



Figure 9.29: Clear Lake Township Park. Source: Pictometry International Corp.

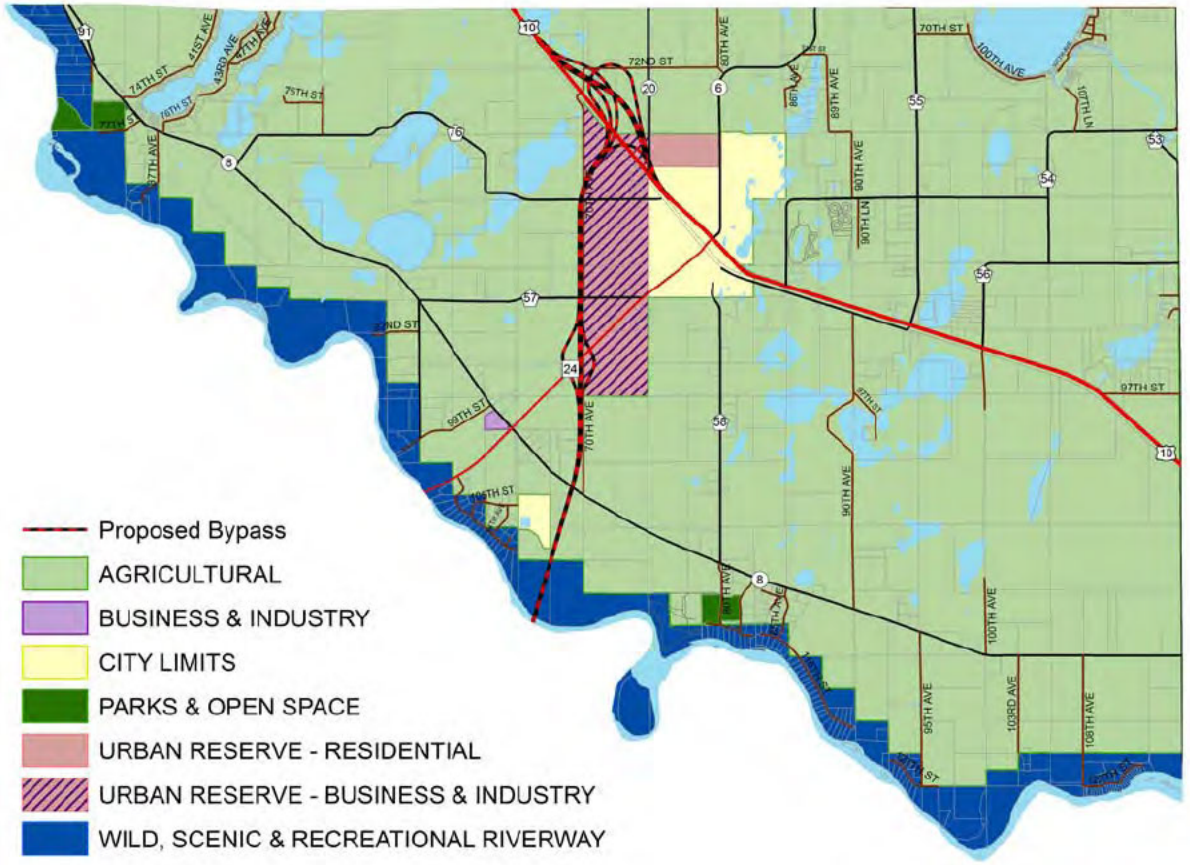


Figure 9.30: Sherburne County Future Land Use Map (Clear Lake Township). Source: Sherburne County Planning & Zoning Dept.

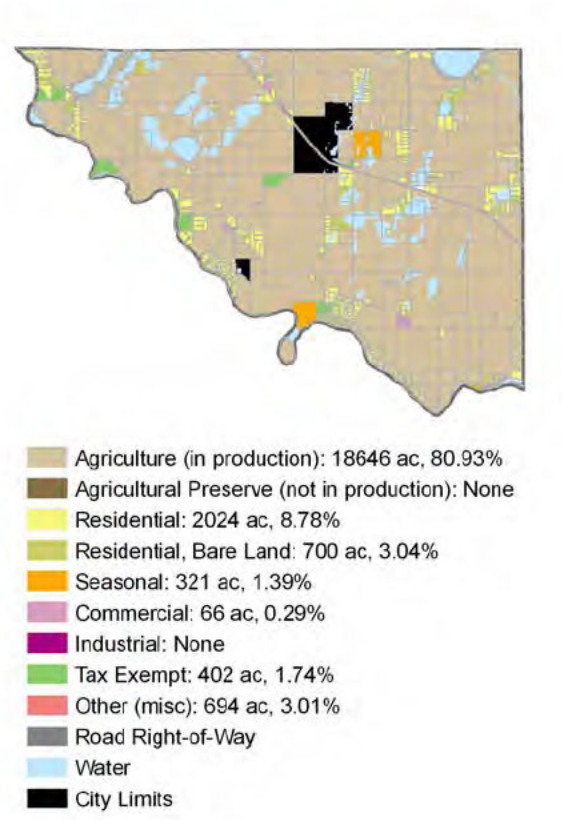


Figure 9.31: Clear Lake Township existing land use by acres (2008). Source: Sherburne County Assessor's Dept.

Future Land Use (2010-2030)

Figure 9.30 shows future land use. The township is expected to remain largely agricultural. It is expected that there will be growth pressure to allow residential development along lakeshores, raising the possibility for Planned Unit Developments (PUD) and conservation developments, in which certain land characteristics may be preserved.

Previous Township Studies

Clear Lake Land Use Taskforce

In 2001, the County Board appointed a four-member taskforce representing the Clear Lake Town Board, Clear Lake City Council, and the County Board of Commissioners. The purpose of the taskforce was to recommend to the County any amendments necessary to the County's comprehensive plan and zoning map related to Urban Expansion areas along the Highway 10 and 24 corridors. The taskforce considered extending the Urban Expansion zoning district east and west of the city, on the south side of US Highway 10, and south of the city along MN Highway 24. The taskforce chose not to make any recommendations pending the outcome of a MnDOT Inter-regional Corridor study (IRC completed in 2002).

City of Clear Lake

As of 2010, the City and Township do not maintain an Orderly Annexation agreement. The City of Clear Lake's Comprehensive Plan (the plan) was last updated in 2006 (Figure 9.32). At the time the plan was written, the city's most current (2004) population estimate was 369, or 0.47% of the County's total population. The plan assumes that percentage to continue, resulting in a city population projection of 523 (2010), 787 (2015), 1,247 (2020), and 2,053 (2025).

To accommodate projected growth between the years 2005 - 2025, the plan projects a need for;

Single-Family Residential:	664 units (235 net-acres, or 306 gross-acres)
Multi-Family Residential:	51 units (12 net-acres, or 12 gross-acres)
Commercial / Industrial:	(27-net acres, or 35 gross-acres)
TOTAL:	715 units (274-net acres, or 356 gross-acres)

These projections culminate in the city's 2005-2025 future land use plan map (see Figure 9.32), which estimates a need for about 2,140 gross-acres to be added to the city.

The County's and city's future land use maps are in conflict regarding projected population growth and the location of future urban land use. The Minnesota Demographic Center projects the city will grow by 109 persons between 2010 - 2025, whereas the city projects a growth of 1,530 persons. Between 2000 - 2009, the city averaged 7.6 residential units built per year. Between 2010 - 2025, the city projects an average growth of 28.6 residential units per year (Table 4-5 in city comprehensive plan). The County's comprehensive plan guides 81 gross-acres for Urban Reserve-Residential, and 660 gross-acres for Urban Reserve-Business & Industry, although not in the same locations as the city's comprehensive plan proposes.

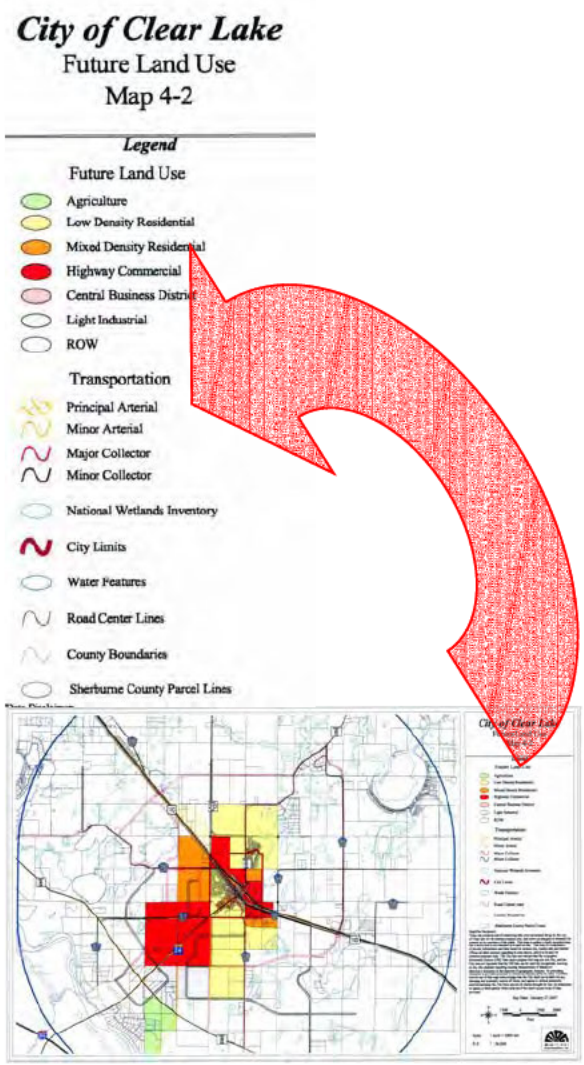
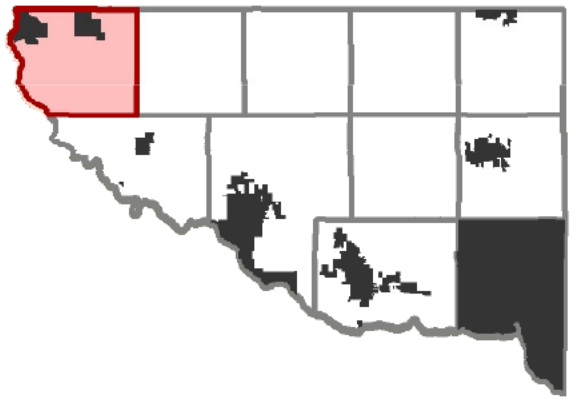


Figure 9.32: City of Clear Lake Comprehensive Plan Map. Source: City of Clear Lake / Municipal Development Group (Map 4-2 in city comprehensive plan).

Haven Township



Haven Township is located in western Sherburne County. The township is bordered by (clockwise); the City of St. Cloud, Minden Township (Benton County), Palmer Township, and Clear Lake Township.

The township is named after John Haven, one of the first settlers in Big Lake. The first settlement was located in the northeast corner of the township and included a tavern (1846). In 1858, the town of Wheeler was platted, located five miles south of St. Cloud. Wheeler included a ferry, sawmills, and flour mills, but did not prosper. The township was organized in 1872.[3]

Haven Township may be characterized by farmland as seen from US Highway 10, along with sand and gravel operations, and deposits largely unexcavated. Whereas the eastern half of Sherburne County has developed as an extension of the Twin Cities, Haven Township located immediately adjacent to the regional City of St. Cloud, has purposefully remained agricultural and undeveloped with the exception of a handful of residential neighborhoods.

In 2010, the township and city adopted a 2010-2025 Orderly Annexation agreement (OA). The Township additionally adopted Zoning and Subdivision ordinances administering land use within the OA area with the intention of enforcing land use restrictions defined in the OA.

During 2010-2030, the township is expected to remain agricultural with little population growth. As development increases regionally, it is expected that aggregate deposits will be excavated and processed. These deposits are primarily located in west-central Haven, and include 2,000 - 3,000 acres. Industrial development is expected to occur in proximity to US Highway 10 and the St. Cloud Regional Airport.

Population

The US Census estimates its 2010 population to be 1,986 persons. Haven's population has decreased 1.9% since its 2000 population of 2,024. By comparison, the City of St. Cloud grew 11.4% during this same period to an estimated 2010 population of 65,842.

According to the 2005-2009 American Community Survey, township residents' median age was 41. 21.8% of residents were under 18 years of age, and 5.6% under 5 years of age. 10.3% of residents were age 65 or over.

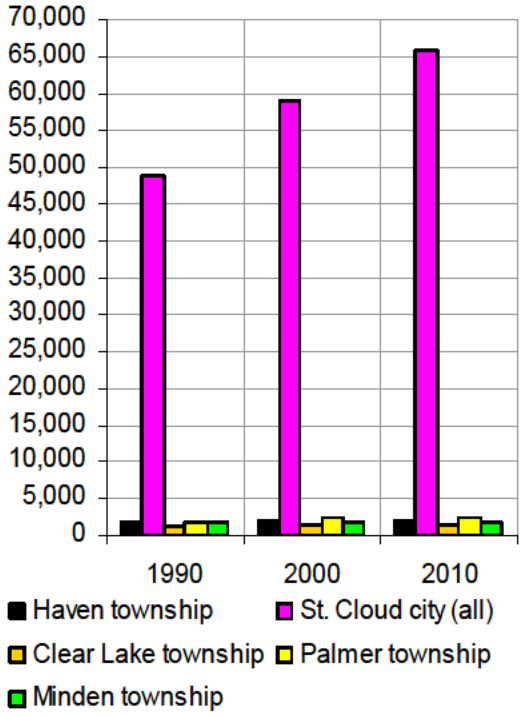


Figure 9.33: Total Population. Source: US Census

Households

According to the 2005-2009 American Community Survey, Haven Township's average household size was 3.01 persons. There were 949 total housing units, and 750 single-family owner-occupied homes. 86% of all housing units were owner occupied.

Employment

According to the 2005-2009 American Community Survey, of Haven residents 16 years and older, 73.5% were employed. The mean travel time to work was 25.1 minutes. Per capita income was $35,536. Median household income was $74,432. 5.9% of individuals (4.2% of families) lived below the poverty level.

Education

According to the 2005-2009 American Community Survey, of Haven residents 25 years old or older, 93.9% were high school graduates, and 28.6% had received a bachelor's degree or higher. Haven Township is within the St. Cloud ISD 742 school district.

Existing Land Use (2008)

Figure 9.37 shows existing (2008) land use. 3,130 acres are used residentially, while 14,894 acres are in agricultural production. Residential developments are scattered, and primarily consist of 2.5 acre lots or greater in size, except for lakeshore lots which average about one acre in size.

Future Land Use (2010-2030)

Figure 9.36 shows future (2010-2030) land use. The majority of the township is expected to continue in agricultural use. Existing industrial corridors along US Highway 10 are guided for Business & Industry along with areas south of the St. Cloud Regional Airport. The Town Board's intension is to limit development as much as possible in areas between the Mississippi River and Co Rd 8. Zoning and subdivision regulations along the river are regulated by the Wild & Scenic Rivers Act (MN Statute 103F). This Act does not pertain to comprehensive planning, however the comprehensive plan guides zoning and subdivision ordinances.

Previous Township Studies

Haven Township Citizen's Committee

In 2004 the town board appointed the Haven Township Citizen's Committee to review Orderly Annexation Agreements, and land use and zoning regulations along the Mississippi River and within proximity of the airport. In March, 2009 the committee submitted recommendations to amend the zoning map and ordinances (see Figure 9.38). Recommendations included;



Figure 9.34: Haven Town Hall. Source: Sherburne County Planning & Zoning.

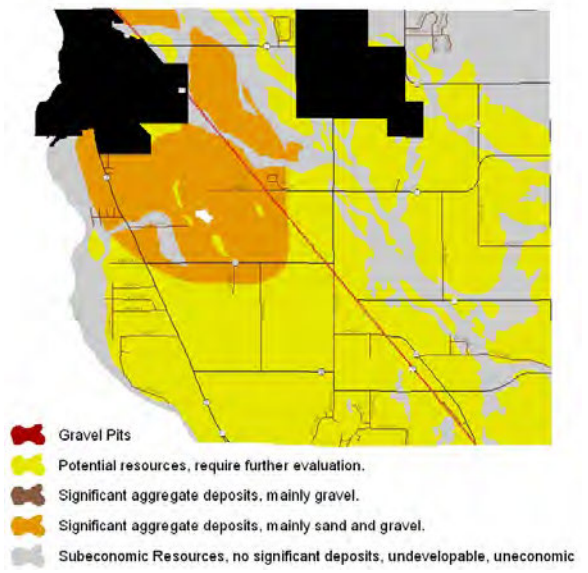


Figure 9.35: Areas identified by the DNR as having significant aggregate deposits. Source: MN DNR.

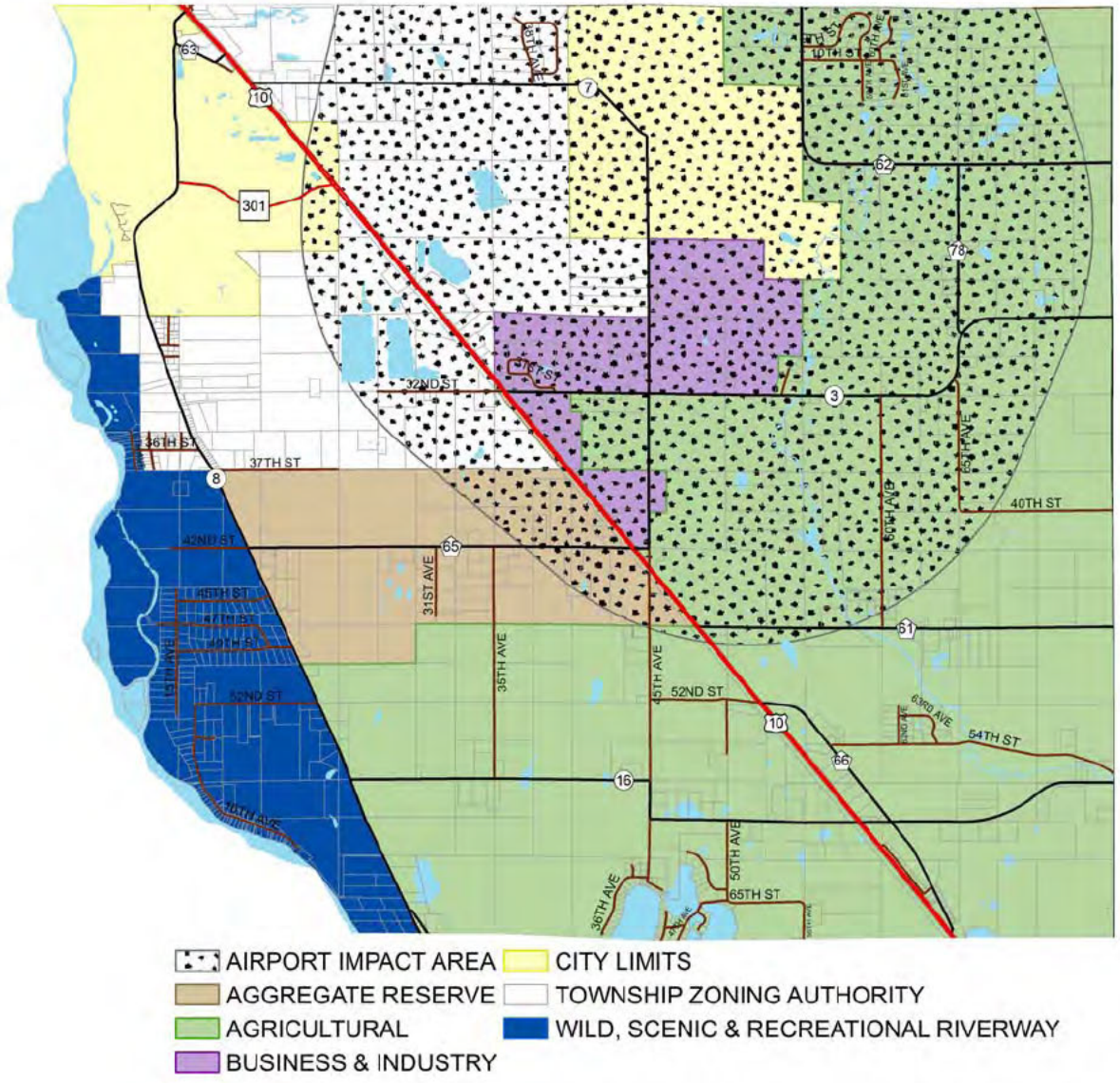


Figure 9.36: Sherburne County Future Land Use Map (Haven Township). The map excludes Tract 1 and 2 of the 2010-2020 Orderly Annexation Agreement. Source: Sherburne County Planning & Zoning Dept.

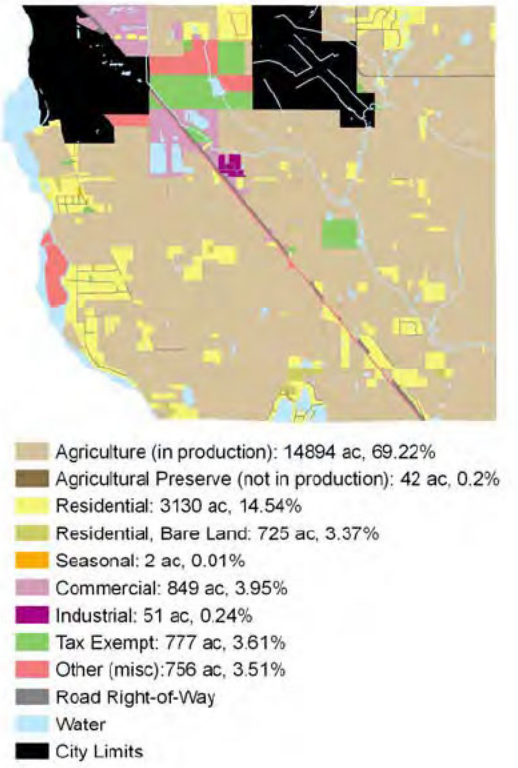


Figure 9.37: Haven Township existing land use by acres (2008). Source: Sherburne County Assessor's Dept.

- Promote gravel and granite extraction within the Aggregate Reserve area.
- Preserve rural isolation and restrict residential development in the Aggregate Reserve area.
- Prohibit landfills and limit retail and manufacturing in the Aggregate Reserve area.
- Provide notification to residents within the Airport Impact area of airport operations and associated nuisances.

Orderly Annexation Agreement

The 2010-2025 Orderly Annexation agreement (OA) is a continuation of the 2005-2010 OA (affected areas are unchanged), with the addition of township zoning. The intention is to preserve the OA areas for future urban development by establishing Township Zoning and Subdivision ordinances to be administered and enforced by the Town Board. The County will continue to administer shoreland, floodplain, and Wild & Scenic Riverway zoning regulations within the OA areas, and all land use regulations outside of the OA areas within the township.

City of St. Cloud

The City of St. Cloud is located within Benton, Sherburne, and Stearns counties. The majority of the city is in Stearns County. Portions of the city within Sherburne County include the St. Cloud Regional Airport, Minnesota Correctional Facility-St. Cloud (established in 1889), Riverside Gardens (park), a number of residential neighborhoods, and highway oriented commercial and light industrial uses along US Highway 10. The portion of the city within Sherburne County has a 2009 population estimate of 6,701.

St. Cloud's current comprehensive plan was adopted in 2003. The plan includes two growth areas within the township; the Haven Township Growth Area Master Plan, and the Airport Area Master Plan (see Figure 9.39).

The Haven Township Growth Area Master Plan includes two concept plans. The primary difference between the two is the alignment of the planned 33rd Street river crossing and land use adjacent to a planned interchange. The Sherburne County Transportation Plan (2007) does not identify a new river crossing (i.e. proposed 33rd Street bridge). The Transportation Plan does proposes to upgrade 37th Street from a local road to a major collector road connecting County Road 8 and US Highway 10. This new connection will be within the area of the proposed 33rd Street river crossing. A service road would also be established along US Highway 10.

The Airport Area Master Plan includes about a 1-2 mile radius around the airport. The plan guides undeveloped land for agriculture, industrial, and parks & open space, and includes a realignment of CSAH 7.

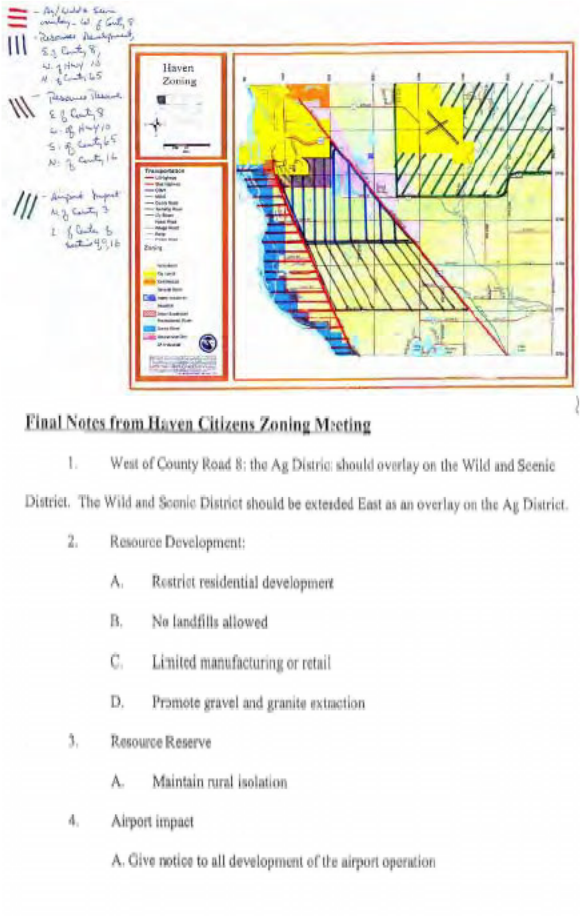


Figure 9.38: Future land use map and descriptions created by the Haven Township Citizen's Committee (2009). Source: Haven Township.

Although the city and county comprehensive plan maps conflict, the overall intent is similar. The County's plan does not recognize planned urban growth within the township beyond areas within the 2010-2025 Orderly Annexation agreement. Although the two future land use maps conflict, the city's guiding principles for land use are similar to the County's comprehensive plan. The County identifies more industrial development south of the airport than the city does but this land use should not conflict with current airport operations.

St. Cloud Municipal Airport Zoning Board

In 1976, the St. Cloud Municipal Airport Zoning Ordinance was adopted by the City of St. Cloud, Benton, Sherburne, and Stearns counties. The ordinance established an Airport Zoning Board, and regulates land use and structure height within the conical airport zones. The ordinance has not been updated or consistently enforced since its adoption. Currently (2010), land use outside of the airport is regulated and enforced by Sherburne County and Haven Township. The County complies with federal and state regulations in regards to population density of land use and height restrictions. Since the 1976 ordinance residential developments have been established east of the airport (12 lots platted in 1988, and 21 lots platted in 1994-1995), and west of the airport (15 lots platted in 1990-1993). Otherwise, land use near the airport has largely remained agricultural. Current (2010) zoning regulations do not allow for the size of residential developments previously approved in the immediate areas around the airport.

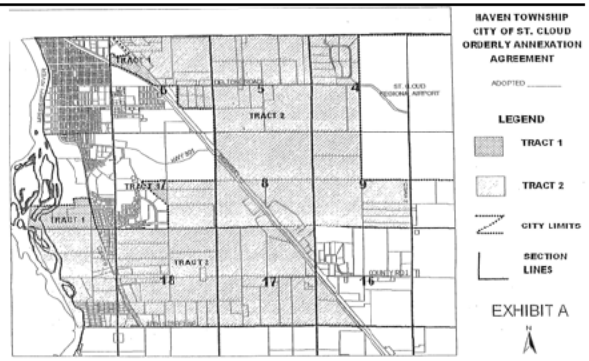


Figure 9.40: 2010-2025 Haven Township - City of St. Cloud Orderly Annexation agreement (OA) area. Source: Haven Township.

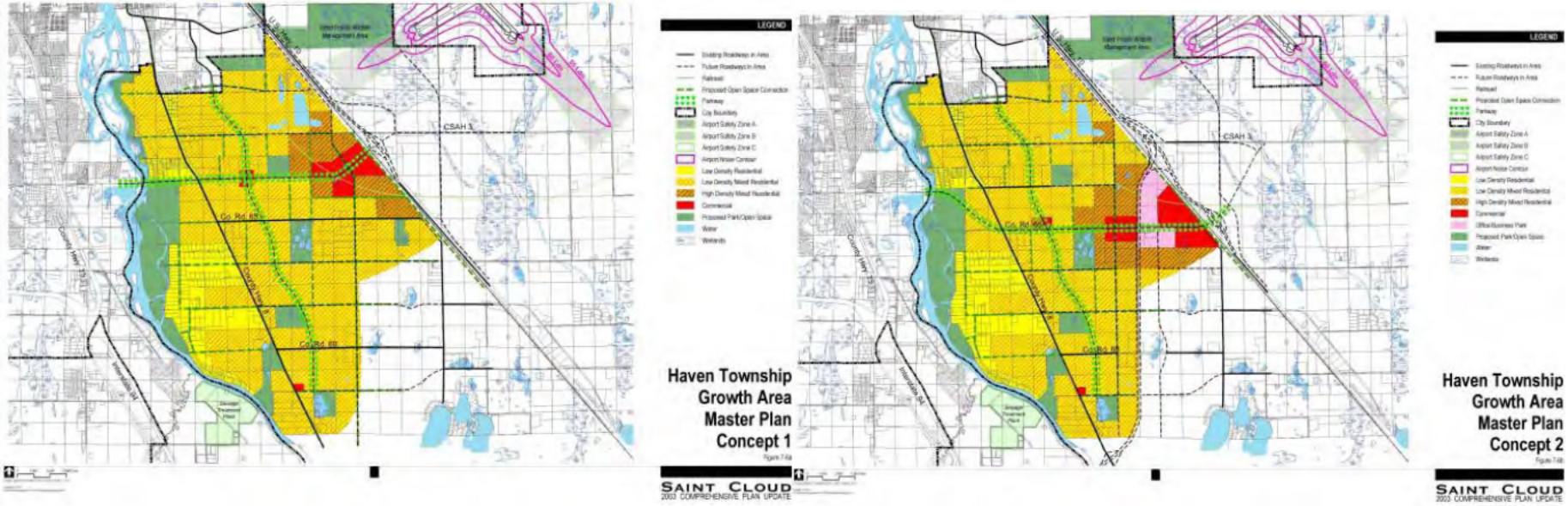


Figure 9.39: City of St. Cloud Haven Township Growth Area Master Plan, concept 1 & 2. Source: City of St. Cloud Comprehensive Plan, p. 7-45, 7-46).

The St. Cloud Regional Airport Master Plan was updated in 2007. The plan includes the proposed extension of both runways and addition of a third runway, which also extends conical Zones A, B, and C. The County's comprehensive plan map designation of Airport Impact Area is in compliance with the 2007 master plan.

St. Cloud Area Joint Planning District Plan

In 1997, the St. Cloud Area Joint Planning Board (the Board) was established, consisting of representatives from Benton, Sherburne, and Stearns counties, and the cities of Sartell, St. Cloud, St. Joseph, Sauk Rapids, and Waite Park. Individual townships were not represented. In 2000, the Board adopted the St. Cloud Area Joint District Plan (the plan), funded by the Minnesota Legislature. The plan identified primary and secondary urban growth areas within an Ultimate Serve Area. Areas within the District Plan included about 2/3's of Haven Township, and a small portion of Clear Lake Township. In 2005, the Legislature funded a study to analyze how effectively the District Plan has been implemented by local governments. The study concluded that the St. Cloud region experienced more rapid growth than the plan anticipated, but that most growth areas were in compliance with the District Plan.

The County's Comprehensive Plan conflicts with the St. Cloud Area Joint District Plan in that the County's plan does not identify the proposed Ultimate Service Area, nor does it identify the two proposed river crossings.

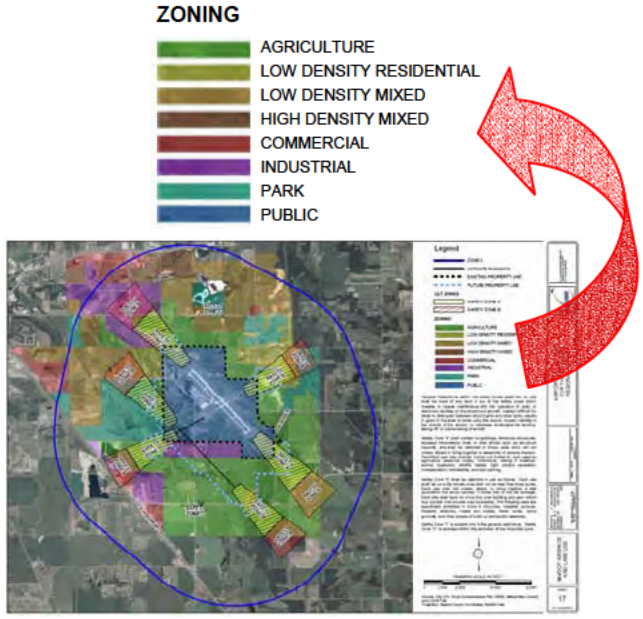


Figure 9.41: Land Use and Airspace zoning plan. Source: City of St. Cloud/SEH (Sheet 17 of Airport Layout Plan).

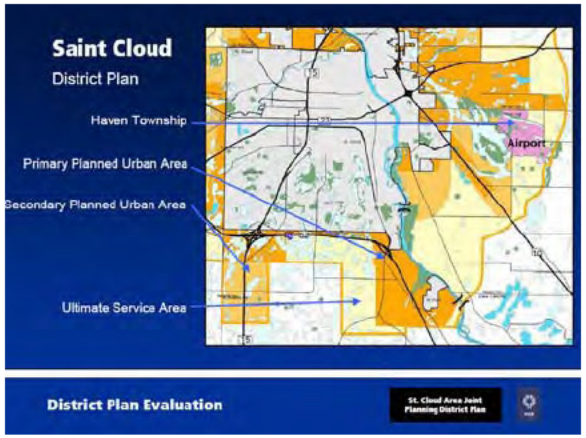
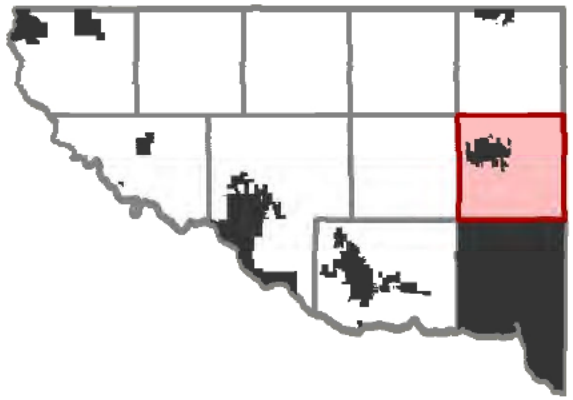


Figure 9.42: St. Cloud Area Joint Planning District Plan. Source: St. Cloud Area Joint Planning Board/DSU.

Livonia Township



Livonia Township is located in eastern Sherburne County, bordering (clockwise) Baldwin Township, Stanford Township (Isanti County), City of St. Francis (Anoka & Isanti counties), City of Elk River, and Orrock Township.

Livonia Township was organized in 1866, and formally had been part of Elk River Township. The origin of the township name is unknown.[3] The township may be characterized by US Highway 169, and residential developments primarily consisting of 2.5-acre lots or larger. Residential developments are primarily located east and west of Zimmerman. Other features include; Fremont Lake, East and West Hunter lakes, a large wetland complex in the southwest quadrant of the township, significant aggregate deposits and gravel mining operations in the southern portion of the township, and a portion of the Elk River Landfill. The Minneapolis Girl Scout Council operates a facility in the southeastern corner of the township, 1,130-acres in size. In 2011, Livonia adopted a Township Comprehensive Plan including 15 goals and a 2010-2015 implementation plan.

During the years 2010-2030, rural residential growth is expected to continue primarily east of US Highway 169. Zimmerman is expected to grow within its Orderly Annexation area, primarily north of the city. Excavation and processing of sand and gravel is expected to continue beyond 2030, to serve development in the northwest Twin Cities metro area.

In 2008-2009, MnDOT conducted a study of the US Highway 169 corridor between the Highway 10-101-169 interchange in Elk River and the Livonia/Baldwin township line. The study identified a preferred layout for an interchange at County Road 4 in Zimmerman, as well as a service road along the highway with a number of interchanges and overpasses. The proposed County Road 4 interchange is estimated to cost $40 million (as of 2008) and remains unfunded. Construction of related overpasses and interchanges is likely to occur after 2030. New development along the corridor should accommodate MnDOT's preferred layout plan for a future service road, overpasses, and interchanges. Service roads should be constructed concurrent with new development along the highway corridor, unless prior funding is provided by MnDOT.

Population

Livonia Township is the County's third most populous township after Big Lake and Baldwin. The US Census estimates Livonia Township's 2010 population to be 5,951. The township's population grew 52% since its 2000 population of 3,917. By comparison, the City of Elk River grew 40% to an estimated 22,974, and the City of Zimmerman grew 83% to 5,228 during this same period.

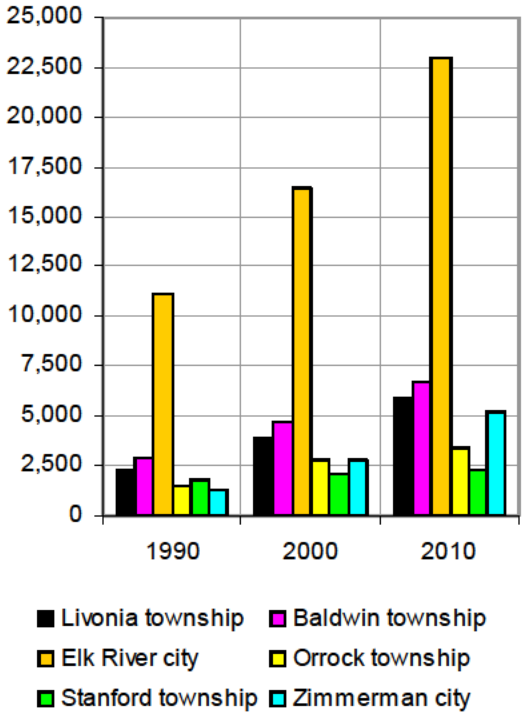


Figure 9.43: Total Population. Source: US Census.

According to the 2005-2009 American Community Survey, Livonia Township residents' median age was 29.9. 35.1% of residents were under 18 years of age, and 13.3% under 5 years of age. 5.8% of residents were age 65 and over.

Households

According to the 2005-2009 American Community Survey, Livonia Township's average household size was 3.3 persons. There were 1,515 total housing units, and 1,409 single-family owner-occupied homes. 93% of all housing units were owner occupied.

Employment

According to the 2005-2009 American Community Survey, of Livonia township residents 16 years old or older, 77.9% were employed. The mean travel time to work was 38.3 minutes. Per capita income was $26,515. Median household income was $77,092. 3.9% of individuals (1.8% of families) lived below the poverty level.

Education

According to the 2005-2009 American Community Survey, of Livonia Township residents 25 years old or older, 92.5% were high school graduates, and 23.3% had received a bachelor's degree or higher. Livonia Township is served by the Elk River ISD #728 school district.

Existing Land Use (2008)

Figure 9.46 shows existing (2008) land use. 8,797-acres are used residentially, while 5,604-acres remain in agricultural production. Residential development primarily consists of 2.5-acre lots or larger, and is primarily located in the north half of the township and along the US Highway 169 corridor. Agriculture is primarily located in the southwest quadrant (sod farms), the south-central (aggregate area), and southeastern quadrant.

Future Land Use (2010-2030)

Figure 9.45 shows future (2010-2030) land use. Residential development is expected to continue, although development may be constrained in the southwest quadrant due to wetlands.

Previous Township Studies

Livonia Township Parks, Trails, & Open Space Master Plan

A township Park Board was created in 2000. A 30-year park plan was adopted in 2005 completed by Hosington Koegler Group. Existing township parks include:



Figure 9.44: Proposed Highway 169 conversion from highway to a freeway. Source: Environmental Assessment / Environmental Assessment Worksheet Trunk Highway 169 Elk River to Zimmerman, Figures 3B, 3C, MnDOT/SRF Consulting.

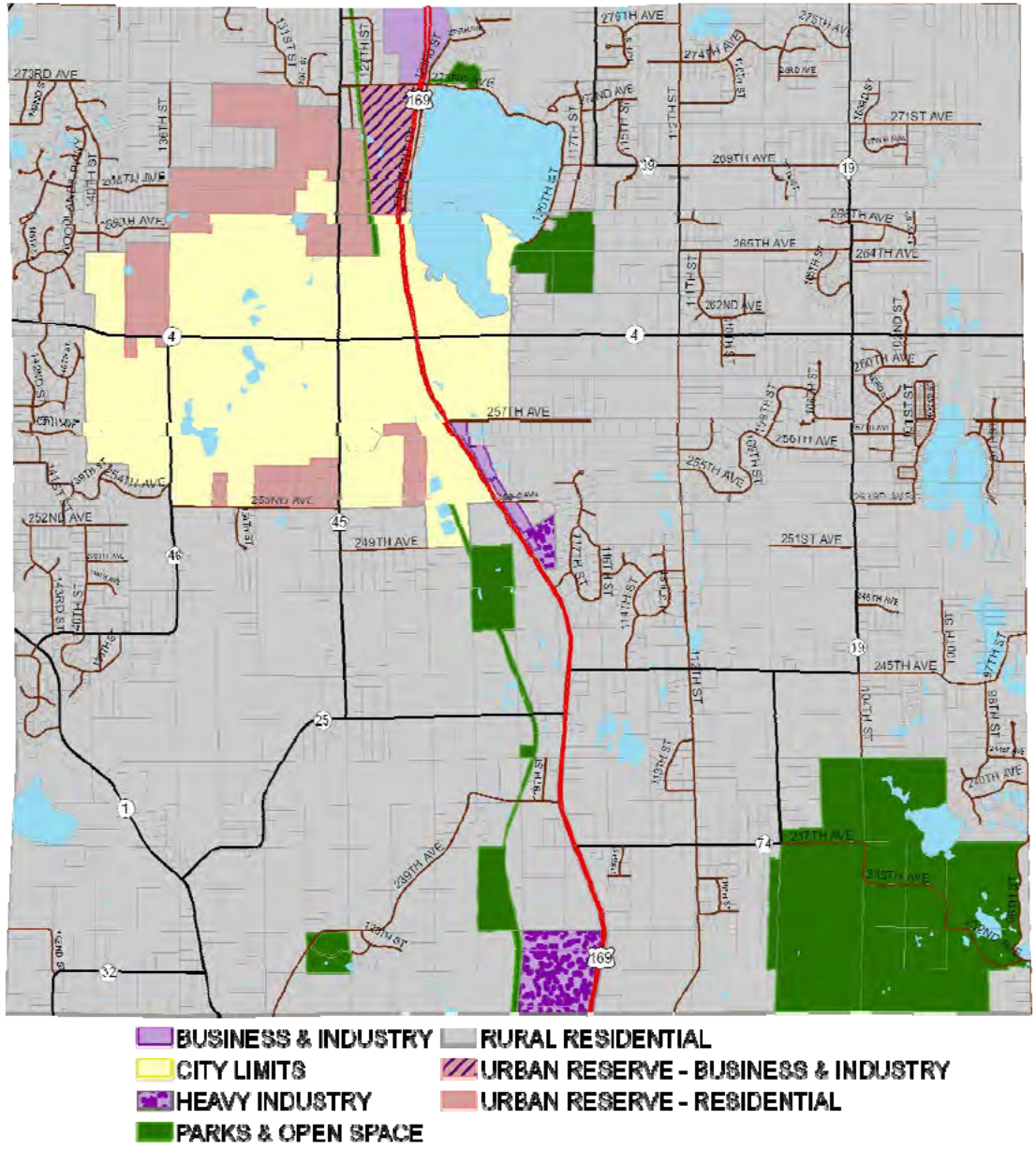


Figure 9.45: Sherburne County Future Land Use Map (Livonia Township). Source: Sherburne County Planning & Zoning Dept.

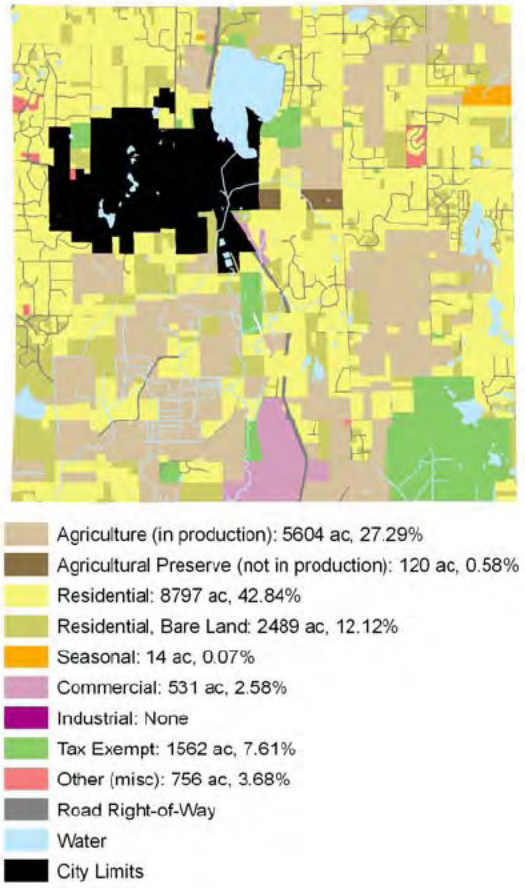


Figure 9.46: Livonia Township existing land use by acres (2008). Source: Sherburne County Assessor's Dept.

- 37-acre Sugarbush Preserve (natural area) with a trail, located in the SW quadrant.
- 15-acre parkland (undeveloped) located along the north shore of Fremont Lake.

Livonia Township Transportation Plan

A township transportation plan was adopted in 2006, completed by Hawkinson Anderson Engineering. The plan identifies future connections of local collector roads, including a service road along U.S. Highway 169.

Livonia Township Community Vision for Land Use

In 2005-2006, a plan was completed by the University of Minnesota, Center for Rural Design. Guided by a 17 member citizen's steering committee, the plan priorities the community's values as they relate to guiding future development (where, and at what densities). This plan was replaced by the Township's Comprehensive Plan (2011)

Livonia Township Comprehensive Plan

In 2011, the Township adopted a comprehensive plan, written by the Community Growth Institute (CGI). The process was guided by a citizen's steering committee, and included a series of public workshops, and a public opinion survey. The goals of this plan are number below:

1 Maintain the rural atmosphere and lifestyle enjoyed by the residents of Livonia Township.
2. New development should complement and enhance the beauty and character of the natural landscape.
3. Protect the water resources within the township from pollution and degradation.
4. Support efforts to acquire significant natural areas, and provide recreational opportunities in Livonia and the surrounding areas for the use and enjoyment of township residents.
5. Maintain a modest level of Taxation in the Township.
6. Plan and budget for future road maintenance expenses to ensure quality infrastructure and stable property taxes.
7. Seek ways to work cooperatively with the City of Zimmerman, to the advantage of both city and township.
8. Discourage unilateral annexations while working with adjacent municipalities to make intelligent annexation decisions.
9. Work to establish a strong sense of community amongst the residents of Livonia Township and Zimmerman.
10. Empower the citizens of Livonia Township to have influence over land use decisions.
11. Increase the level of influence that Livonia Township has on land-use related decisions made by Sherburne County.
12. Strengthen the working relationship with Sherburne County in matters of land use and zoning.
13. Create an economic environment that encourages job retention and creation as well as



Figure 9.47: Sugarbush Preserve Township Park. Source: Livonia Township.

opportunity for business growth.

14. As a township, cooperatively seek to grow jobs in the local area for the benefit of everyone, but do not compete with neighboring cities for commercial and industrial tax base.
15. Provide for aggregate mining that accesses the revenue potential of the resource while protecting the character, environment and future land uses within the township.

Livonia's Comprehensive Plan does not include a future land use map to guide development.

On January 10, 2011, County Staff met with the Livonia Town Board and their planning consultant (CGI) to discuss how the Township's goals may be incorporated into the County's Comprehensive Plan. After extensive discussion, it was the opinion of the Town Board that the County's Comprehensive Plan Map represent current (2010) zoning designations (conflicts with Township Comprehensive Plan). The Town Board understood that continuing to allow residential development in proximity of Highway 169, and aggregate areas will not resolve current land use conflicts, and that these conflicts will need to be addressed at a later date, possibly as the Zoning and Subdivision ordinances are re-written.

City of Zimmerman

The City of Zimmerman is geographically surrounded by Livonia Township. The City's comprehensive plan was last updated in 2001. Urban expansion is limited east, south, and west of the city because of Fremont Lake, wetland constraints, and existing rural residential developments. North of the city are a number of 5-acre and 10-acre residential properties, and a few larger parcels including 80-acres owned by the Elk River School District for consideration as a future school site. The city and township have an Orderly Annexation agreement (OA), valid through 2020. The OA identifies areas for voluntary annexation. Commercial land use is planned north of downtown, along U.S. Highway 169.

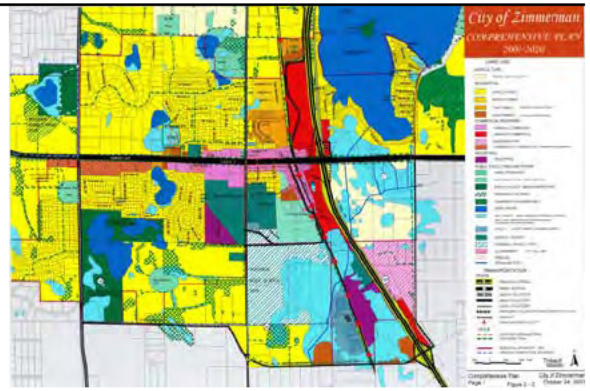


Figure 9.48: Zimmerman Future Land Use Plan (2001). Source: City of Zimmerman/EarthTech.

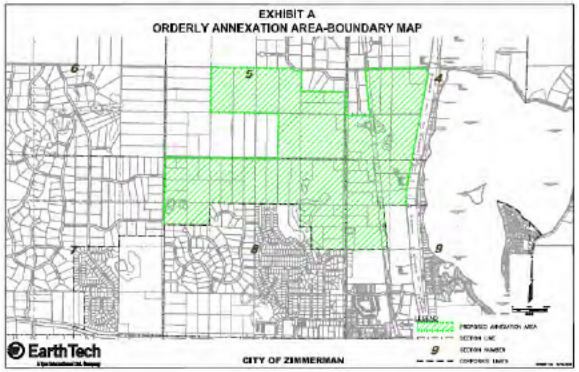
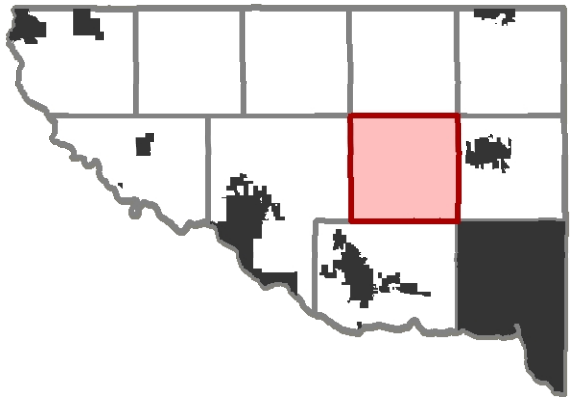


Figure 9.49: City of Zimmerman / Livonia Township Orderly Annexation Agreement map. Source: City of Zimmerman/EarthTech.

Orrock Township



Orrock Township is located in central Sherburne County, bordering (clockwise) Blue Hill Township, Livonia Township, Big Lake Township, and Becker Township. The nearest cities are Zimmerman ($^1/_2$ mile), and Big Lake (1 mile).

Orrock was organized in 1875[3] and may be characterized by the inclusion of over 14,000 acres of public land (63% of township) including the Sherburne National Wildlife Refuge and Sand Dunes State Forest. Within the township lays Eagle Lake, Lake Ann and the St. Francis River. Residential development is concentrated in three areas of the township, along the southern and western borders, east of Zimmerman, and near Lake Ann within the State Forest. At the intersection of county roads 4 & 5 is a small commercial area (Hamlet) consisting of a gas station, bar/restaurant, liquor store, contractor's yard, and a small number of homes.

Between 2010-2030, Orrock Township is expected to continue to develop residentially on the remaining privately held land. It's Hamlet is located about halfway between the cities of Becker, Big Lake, Elk River, and Zimmerman. Although the Hamlet primarily consists of retail services, its central location presents an opportunity for home businesses to transition into a rural commercial center.

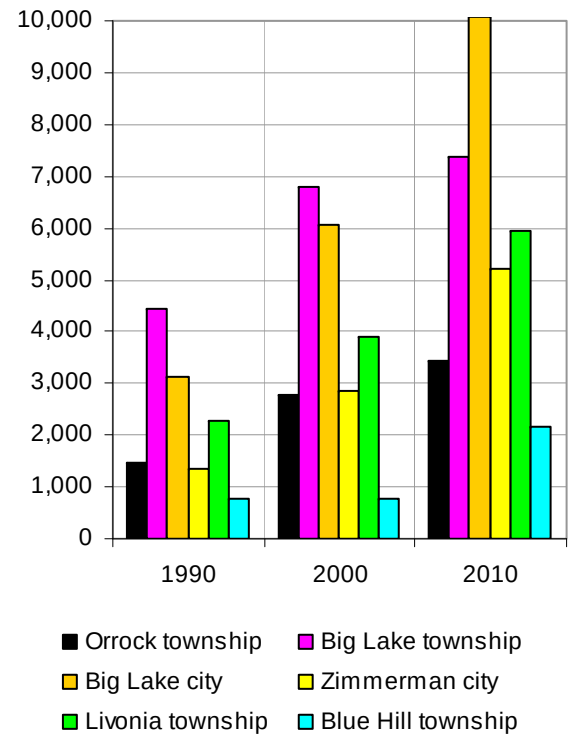


Figure 9.50: Total Population. Source: US Census.

Population

The US Census estimates Orrock Township's 2010 population to be 3,451. The township's population has grown 25% since its 2000 population of 2,764. By comparison, the City of Big Lake (city nearest to Orrock's population center) grew 66% to an estimated 10,060 during this same period.

According to the 2005-2009 American Community Survey, Orrock Township residents' median age was 33.2. 32.6% of residents were under 18 years of age, and 9.1% under 5 years of age. 6.4% of residents were 65 years old or older.

Households

According to the 2005-2009 American Community Survey, Orrock Township's average household size was 3.1 persons. There were 1,616 total housing units, and 1,091 single-family owner-occupied homes. 97.8% of all housing units were owner occupied.

Employment

According to the 2005-2009 American Community Survey, of Orrock Township residents 16 years

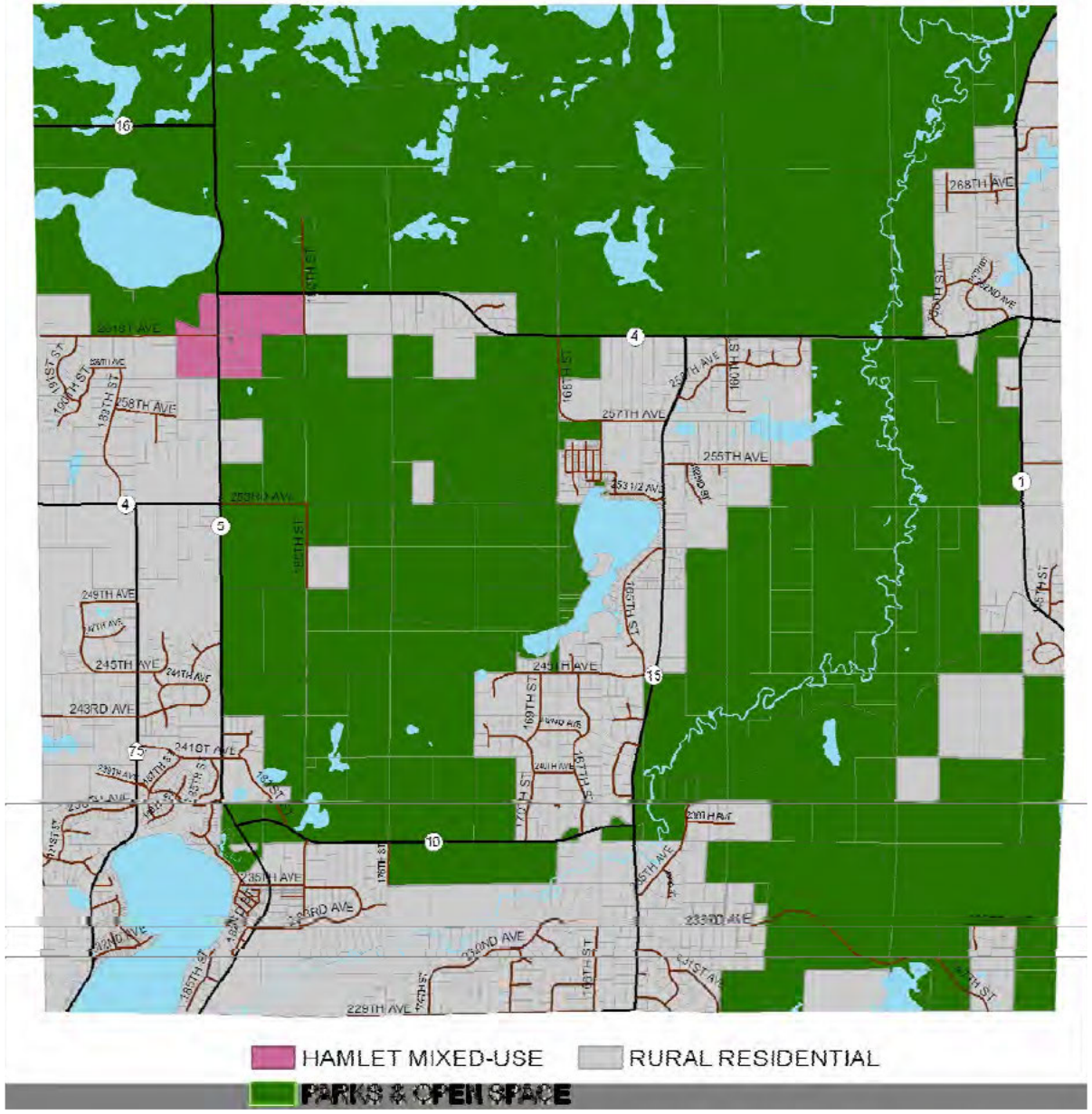


Figure 9.51: Sherburne County Future Land Use Map (Orrock Township). Source: Sherburne County Planning & Zoning Dept.

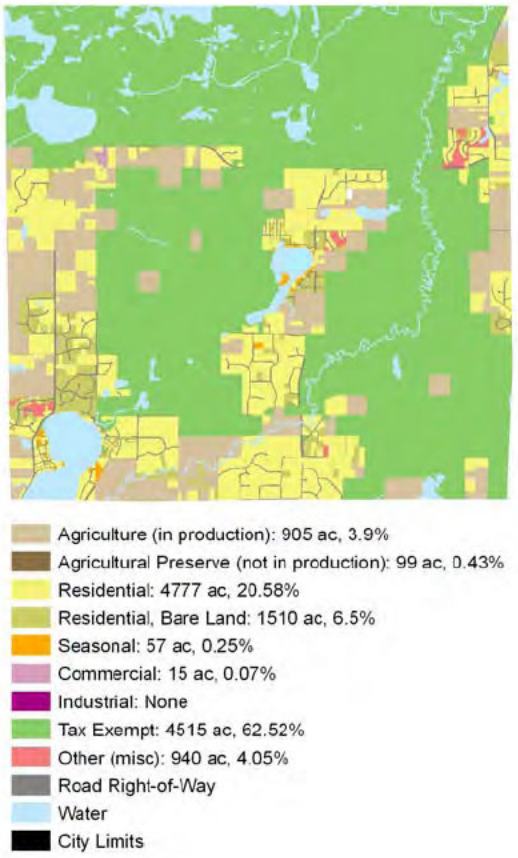


Figure 9.52: Orrock Township existing land use by acres (2008). Source: Sherburne County Assessor's Dept.

and over, 78.6% were employed. The mean travel time to work was 35.8 minutes. Per capita income was $28,614. Median household income was $80,000. 2% of individuals (0.8% of families) lived below the poverty level.

Education

According to the 2005-2009 American Community Survey, of Orrock Township residents 25 years old or older, 95.4% were high school graduates, and 19.1% received a bachelor's degree or higher. Orrock Township is served by the Big Lake ISD 727 and Elk River ISD 728 school districts.

Existing Land Use (2008)

Figure 9.52 shows existing (2008) land use. 14,515-acres (63%) of land in the township is tax-exempt, primarily consisting of the Sherburne National Wildlife Refuge and Sand Dunes State Forest. 4,777-acres (21%) are residential. 905-acres remain in agricultural production. Residential developments primarily consist of 2.5-acre lot size or greater, although there are a number of lakeshore lots as small as 1/3 acre. The earliest lakeshore development dates back to 1923, almost 50 years prior to any zoning regulations.

Future Land Use (2010-2030)

Figure 9.51 shows future (2010-2030) land use. Residential development is expected to continue. The Comprehensive Plan identifies a mixed-use Hamlet in the area which currently consists of a mixture of commercial, industrial, and residential uses.



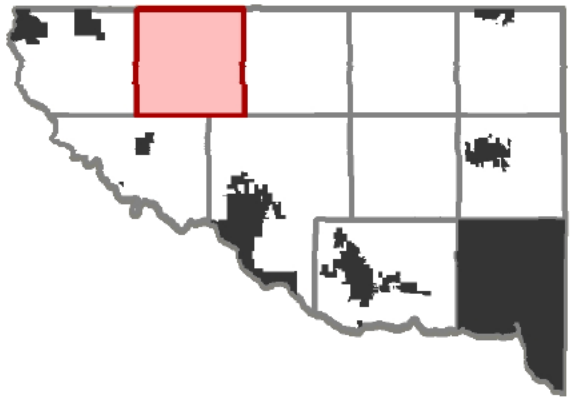
Figure 9.53: Commercial district (Hamlet) in Orrock Township. Source: Sherburne County Planning & Zoning Dept.





Figure 9.54: The Shores of Eagle Lake was platted in 2006 as a Shoreland PUD and Cluster plat. The development consists of 99 lots and 24 outlots. The development was planned to be an upscale neighborhood featuring a private clubhouse overlooking the lake. As of 2010, no homes have been built. Source: Sherburne County Planning & Zoning Dept, Sanborn.

Palmer Township



Palmer Township is located in western Sherburne County. The township is bordered by St. George Township (Benton County), Santiago Township, Becker Township, Clear Lake Township, and Haven Township. The nearest cities are Clear Lake (1 mile) and St. Cloud (2 miles to airport).

Palmer Township was established in 1858, and originally named Briggs Township.[3] The township may be characterized by the Briggs Lake chain, which includes Briggs Lake, Lake Julia, Rush Lake, and Big Elk Lake. Briggs, Julia, and Rush lakes are connected via navigable channels, while Big Elk Lake is connected to Rush Lake via Lilly Creek. The lakeshores were developed residentially primarily between the 1920's and 1950's, with the exception of the north half of Big Elk Lake, which remains undeveloped. In the center of the township is a viable commercial district (hamlet). Palmer includes a significant amount of agricultural land.

In 1951, the Briggs Lake Chain Association was established to address water quality concerns. Activities have included educational seminars, water monitoring, fundraising to control lake weeds and invasive species, publication of a lake resident's directory, and organization of a July 4th boat parade. In 2000, the association received an Outstanding Conservationist award from the Minnesota Association of Soil and Water Conservation Districts.

During 2010-2030, the township is expected to remain primarily agricultural with limited growth in residential and the hamlet areas. Any significant development is expected to occur in the hamlet area.

Population

The US Census estimates its 2010 population to be 2,354 persons. Palmer's population has declined 2.5% since its 2000 population of 2,414. By comparison, the City of Clear Lake grew 105% during this same period to an estimated 2010 population of 545.

According to the 2005-2009 American Community Survey, township residents' median age was 38.8. 24.3% of residents were under 18 years of age, and 6.4% under 5 years of age. 10.6% of residents were age 65 or older.

Households

According to the 2005-2009 American Community Survey, Palmer Township's average household size was 2.72 persons. There were 1,405 total housing units, and 1,099 single-family owner-occupied homes. 78.2% of all housing units were owner occupied.

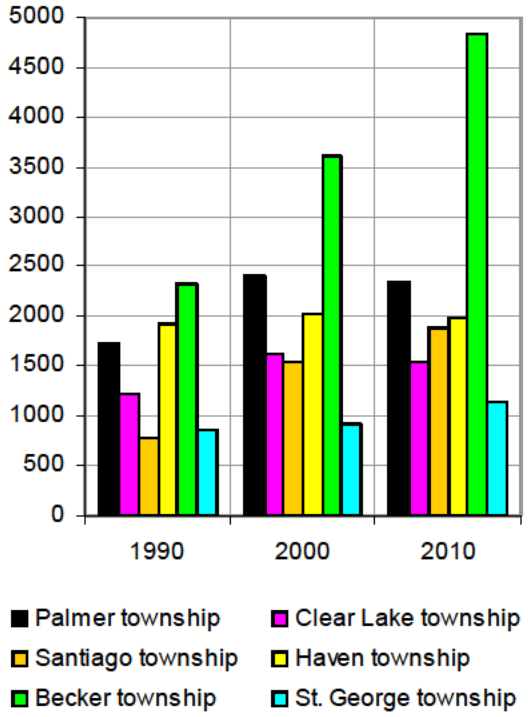


Figure 9.55: Total Population. Source: US Census.

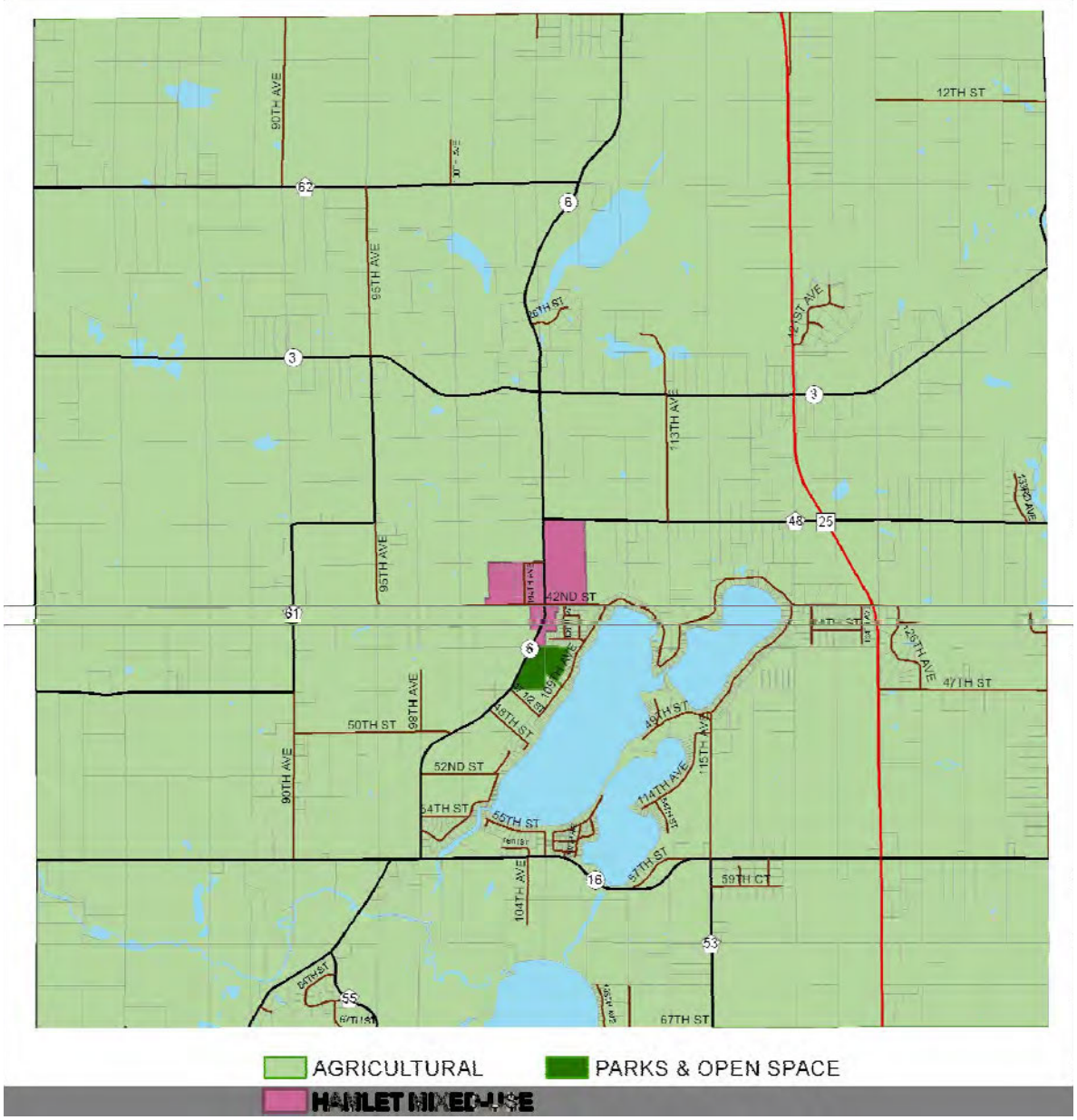


Figure 9.56: Sherburne County Future Land Use Map (Palmer Township). Source: Sherburne County Planning & Zoning Dept.

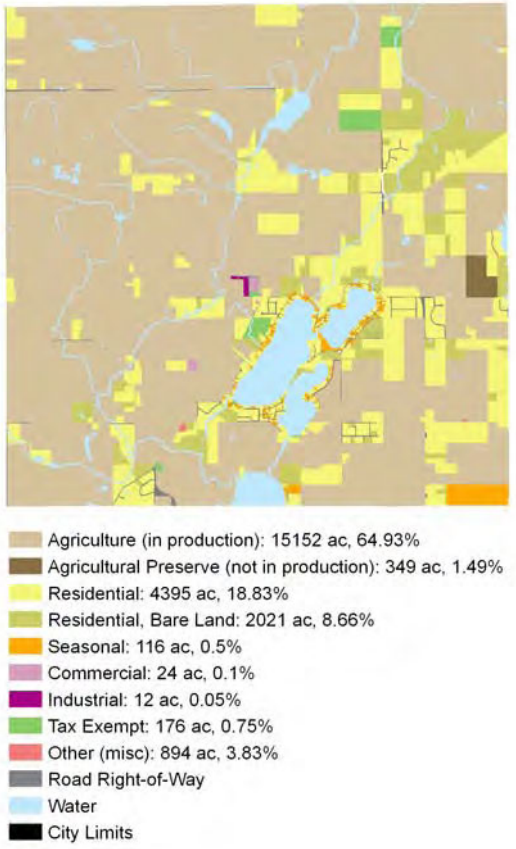


Figure 9.57: Palmer Township existing land use by acres (2008). Source: Sherburne County Assessor's Dept.

Employment

According to the 2005-2009 American Community Survey, of Palmer residents 16 years and older, 78.5% were employed. The mean travel time to work was 30.6 minutes. Per capita income was $30,036. Median household income was $76,106. 2.3% of individuals (1.7% of families) lived below the poverty level.

Education

According to the 2005-2009 American Community Survey, of Palmer residents 25 years old and older, 95.1% were high school graduates, and 20.6% had received a bachelor's degree or higher. Palmer is within the Foley ISD 61, St. Cloud ISD 742, and Becker ISD 726 school districts.

Existing Land Use (2008)

Figure 9.57 shows existing (2008) land use. 4,394 acres are used residentially, while 15,152 acres are in agricultural production (65% of township). Within the County, Palmer ranks 3rd in acres in production, behind Becker (20,021 acres, 58%) and Clear Lake (18,646 acres, 81%) townships. Residential developments are concentrated around the Briggs lake chain and include lakeshore lots between 1/2-acre and 1-acre. Non-lakeshore lots varies between one and five acres in size.

Future Land Use (2010-2030)

Figure 9.56 shows future (2010-2030) land use. The majority of the township is expected to continue in agricultural use. The Hamlet area includes the existing commercial-industrial area. The map identifies future expansion of the hamlet area to included undeveloped land parcels west and north of existing commercial developments.

Previous Township Studies

Palmer Long-term Advisory Team (PLAT)

In 2005, the Town Board appointed a 12-member land use advisory committee representing the interests of farmers, rural residents, lakeshore residents, realtors, small business owners, and Town Board representatives. In 2006, PLAT conducted a three-day visioning workshop facilitated by the Minnesota Design Team. In preparation for the workshop, a survey was delivered to Palmer residents, resulting in a 5% response rate (81 respondents). The results may be see in Figure 9.60.
In 2007, PLAT expanded into four sub-committees:

- Planning & Zoning, and Future Land Use
- Parks & Recreation, and Community Awareness
- Water Quality

Question # 1: What Three Things Do You Like About Palmer?
- •Lakes – 27
- •Rural Atmosphere – 23
- •Low Taxes – 15

Question # 2: Describe the
A: long-term future of Palmer Township?
- •Slow Growth – 32
- •Quiet, Peaceful, Cooperative Community – 11
- •Farming - No Houses – 11

B: long-term future of the Palmer town center?
- •Updated but Retain Rural Feel – 20
- •More Small Businesses – 8
- •Clean Up Area – 8

Question #3: What more should be done to enhance the environmental quality of Palmer Township?
- •Improve Septic Systems – 25
- •Cleaner Lakes and Septic Systems – 19
- •Less 4-Wheelers/ATVs – 9

Question #4:
A: What do you believe the level of commitment should be for planning for the future?
- •High – 44

B: Who should make that commitment?
- •All Residents – 27
- •Mixed - All Interested Parties – 13
- •Group of Township Supervisors, Lake Association, and Community – 7

Question #5: What types of recreation improvements would you like to see in Palmer?
- •Trails Walk/Bike – 33
- •Community Center – 14
- •Lake Improvements – 13

Figure 9.58: In 2006, the township conducted a visioning workshop. As part of the workshop, participating residents were asked to individually answer five questions, and were then asked to identify the most important answer given to each question. Source: Palmer Township, Minnesota Design Team.

- Palmer Chamber of Commerce.

The Planning & Zoning, and Future Land Use sub-committee continued to meet until 2009, culminating in a recommendation to the County regarding the 2010-2030 Comprehensive Plan. Generally, the recommendation was for Palmer to remain the same, but if development is to occur, it should radiate out from the Hamlet area to discourage leapfrog development and preserve the township's agricultural character.

The Parks & Recreation, and Community Awareness sub-committee led to the re-establishment of the Palmer Township Park Board.

The Water Quality sub-committee continued to meet until 2008, facilitating a Water Quality Summit in February, 2008.

The Palmer Chamber of Commerce was never organized due to a lack of interest among local business owners.

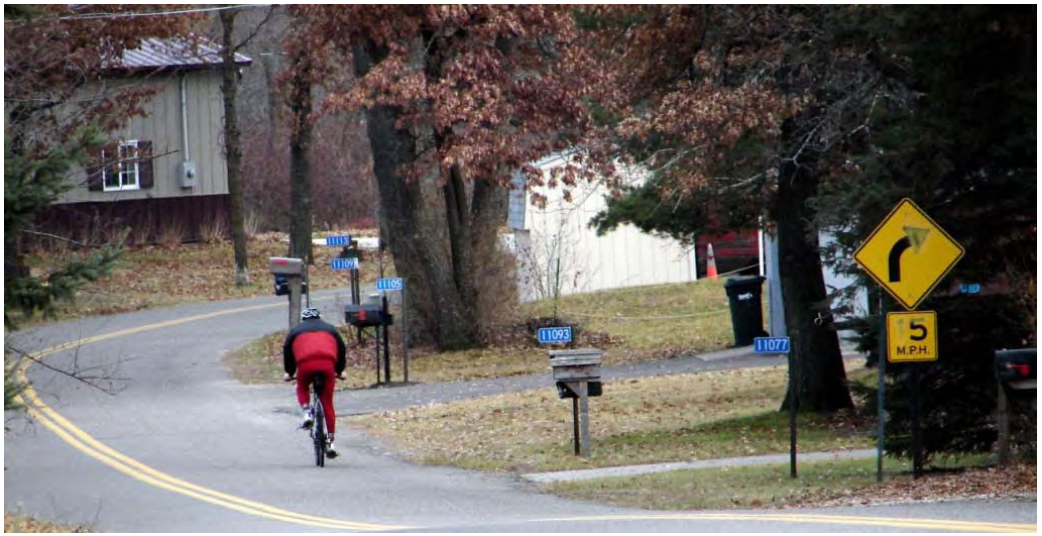


Figure 9.59: 42nd Street, Palmer Township. Photo courtesy of Robin Tomaszewski.

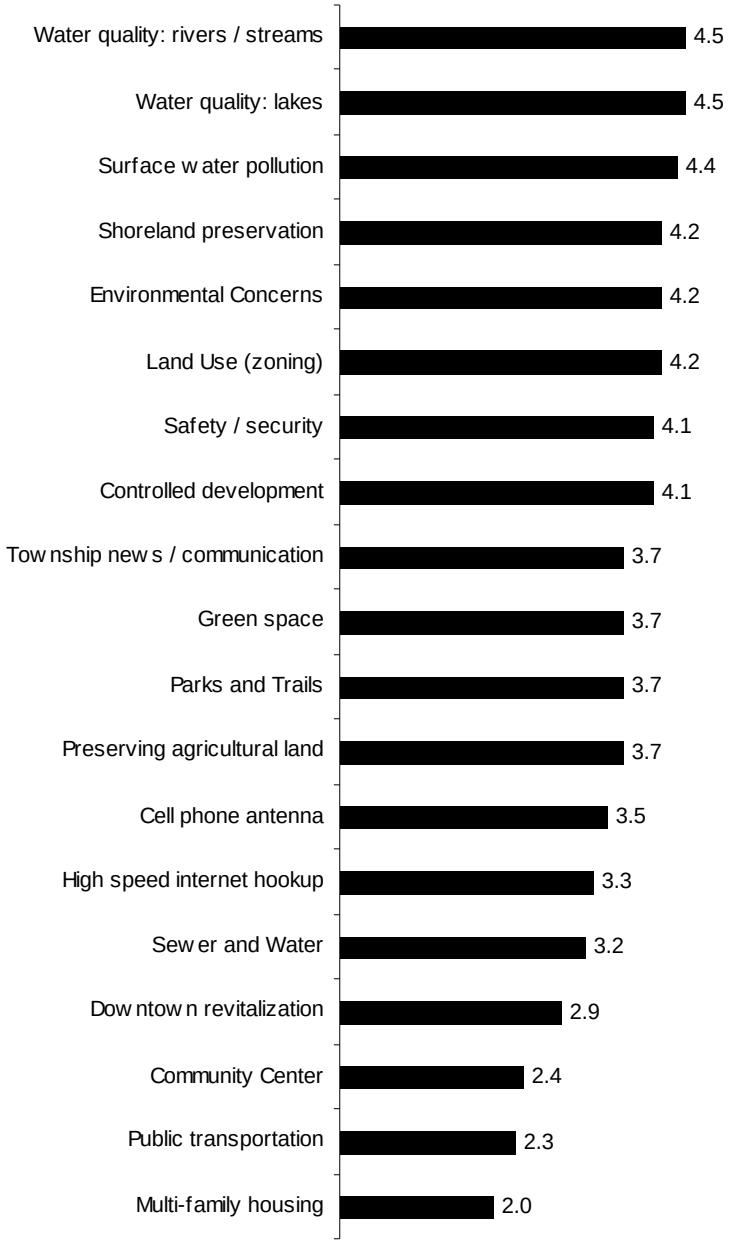
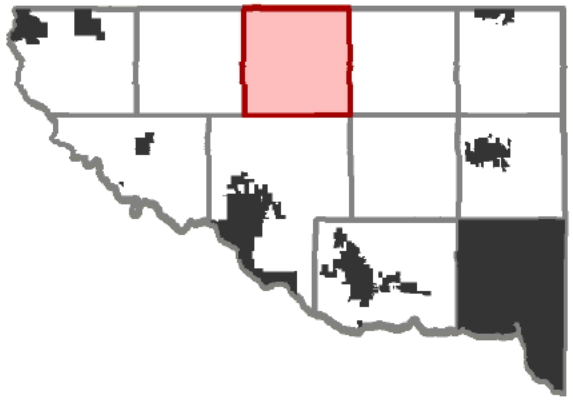


Figure 9.60: "What's important in Palmer Township?" (1 = low, 5 = high). 2006 township resident survey. Source: Palmer Township.

Santiago Township



Santiago Township is located in northern Sherburne County, bordered by Glendorado Township (Benton County), Blue Hill Township, Becker Township, and Palmer Township. The nearest cities include Becker (3 miles), and Princeton (7 miles).

Santiago Township was established in 1868. In the 1870's, a saw mill was located along the St. Francis River manufacturing barrel staves and wagon fellies (wheels). In 1890, the Santiago Store opened. In 1891, the store and creamery suffered fire damage.[3]

The township may be characterized by its historic commercial district (hamlet), the Sherburne National Wildlife Refuge which consist of about 1/3 of the township, rich farmland north of the St. Francis River, and scattered wetlands and wooded areas in the southern half of the township.

Between 2010 - 2030, Santiago is expected to experience limited residential growth, while the hamlet area presents an opportunity to attract small local businesses.

Population

The US Census estimates the township's 2010 population to be 1,895 persons. Santiago's population has grown 22% since its 2000 population of 1,555. By comparison, the cities of Becker grew 77% to a population of 4,538 and Princeton grew 19.5% to a population of 4,698 during this same period.

According to the 2005-2009 American Community Survey, township residents' median age was 31.3. 40.1% of residents were under 18 years of age, and 12.7% under 5 years of age. 3.4% of residents were aged 65 or over.

Households

According to the 2005-2009 American Community Survey, Santiago Township's average household size was 3.44 persons. There were 612 total housing units, and 600 single-family owner-occupied homes. 98% of all housing units were owner occupied.

Employment

According to the 2005-2009 American Community Survey, of Santiago residents 16 years and over, 79.1% were employed. The mean travel time to work was 34.7 minutes. Per capita income was $21,189. Median household income was $70,938. 8.2% of individuals (3.8% of families) lived below the poverty level.

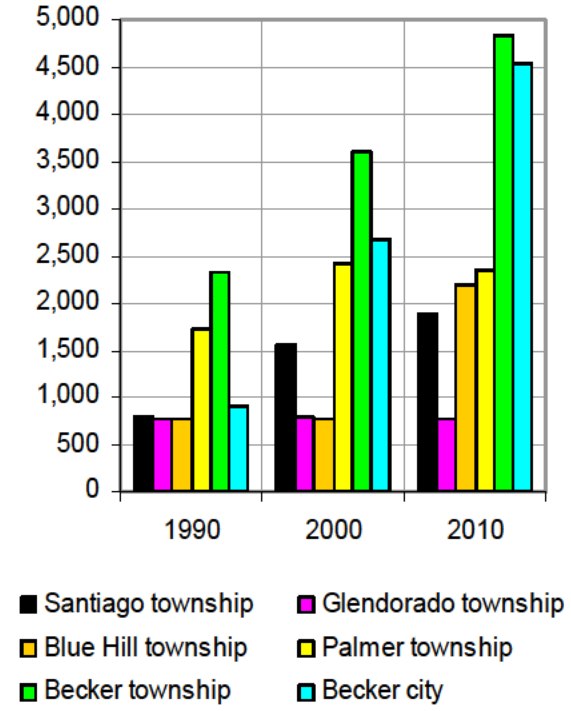


Figure 9.61: Total Population. Source: US Census.

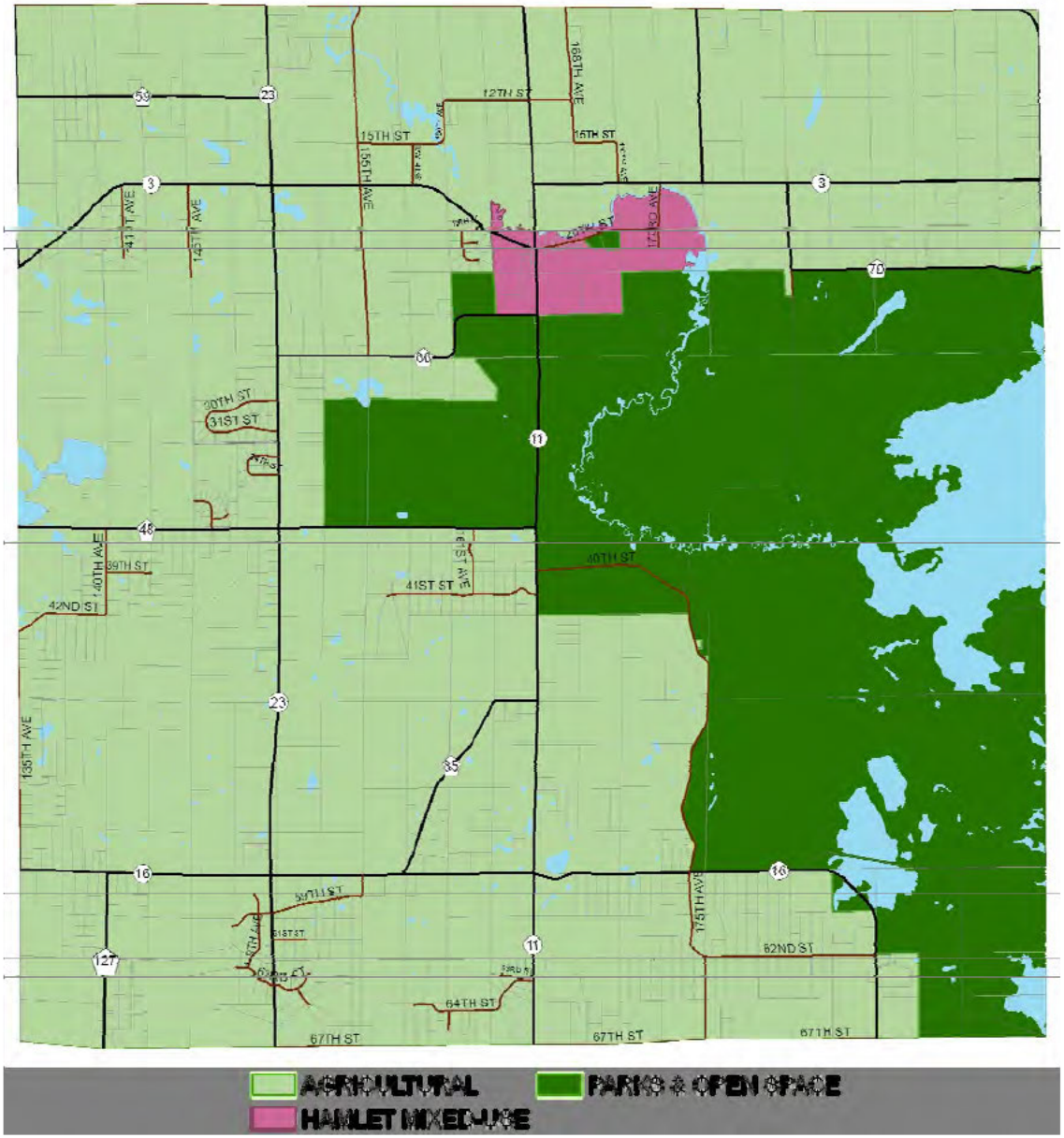


Figure 9.62: Sherburne County Future Land Use Map (Santiago Township). Source: Sherburne County Planning & Zoning Dept.

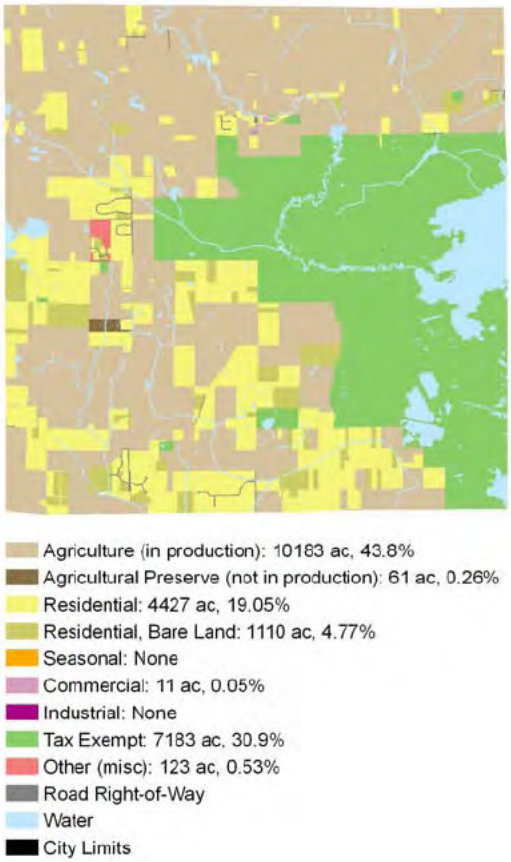


Figure 9.63: Santiago Township existing land use by acres (2008). Source: Sherburne County Assessor's Dept.

Education

According to the 2005-2009 American Community Survey, of Santiago residents 25 years old or older, 96.1% were high school graduates, and 15.9% had received a bachelor's degree or higher. Santiago is within the Foley ISD 51, Princeton ISD 477 and Becker ISD 726 school districts.

Existing Land Use (2008)

Figure 9.63 shows existing (2008) land use. 4,427 acres are used residentially, while 10,183 acres are in agricultural production. Residential developments are scattered and primarily consist of 2.5 acre lots or larger, mostly developed in the late 1990's. There are a number of non-platted 5-acre and 10-acre residential properties concentrated in the southeastern and western portions of the township.

Future Land Use (2010-2030)

Figure 9.62 shows future (2010-2030) land use. The majority of the township is expected to continue in agricultural use and public open space (i.e. Wildlife Refuge). There is a significant amount of wetlands within the refuge and scattered throughout the southern half of the township. Potential development within the southern area may be difficult if roads are required to weave around wetland pockets. Likewise, large scale crop production is challenging, thus the southern half of the township is likely to remain in non-developed residential use.

The Comprehensive Plan identifies a Hamlet in areas currently occupied by a mixture of commercial, industrial, residential, agricultural, and township park land uses. The Hamlet is bordered by the St. Francis River, the refuge, and an existing residential development to the west.

> *..."When I was a kid in the 50's I remember no less than 15 businesses in Santiago and I know there were more earlier. These included two road contractors, photography studio, a car dealership, and no less than 3 gas stations. In more than half those cases the owner or manager lived next to or in the same building. Other houses were interspersed among these business places. We seemed to get along fine. Most of us long time residents feel Santiago should have been the County Seat as we're more centrally located than Elk River (but that's another issue).*
>
> *Today, Santiago has four businesses. Several of the old buildings are still standing, but our little town is not what it was. Ironically, we are increasing in other ways such as population and socio-economic status. How can we address these issues? Tom Barthel, our former Chair, introduced us to the concept of a hamlet. Joe St. Dennis mentioned special use zones. Joe also encouraged our board to be pro-active and give* [the County] *our input.*

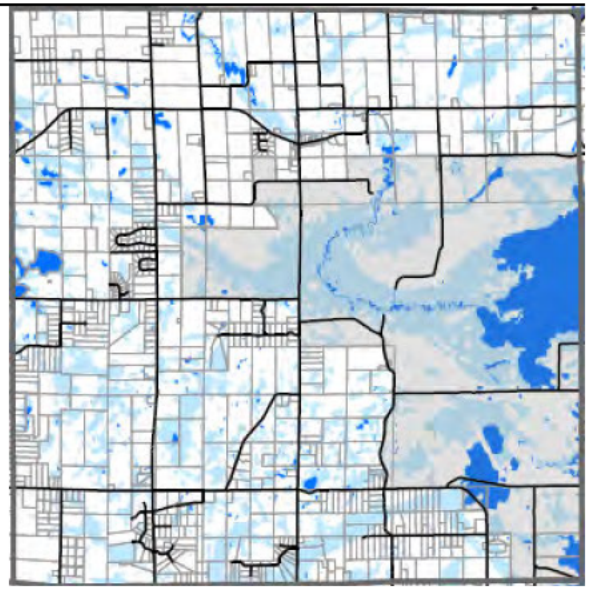


Figure 9.64: Lakes and wetlands in Santiago Township. Source: Sherburne County Planning & Zoning Dept.



Figure 9.65: Santiago Hamlet. Source: Sherburne County Planning & Zoning Dept.

We would like to explore both of these ideas (hamlet and special use zones) but need to know more. The bottom line is that we need to be able to make better use of our existing buildings, allow for growth without imposing on our residents.

Years ago there were apartments above the store. Why not now? We used to have a bank in operation with an apartment above. We still could. We had a creamery that produced butter. Could that building produce something again? Our county is full of horses. Could someone sell saddles and tack? Is there a place for an insurance agent, a tax preparer, an artist, a plumbing shop? The answer to all these questions is yes. Santiago has the space available. However, we need to fit them in among the residents as we did before.

Our town has made big steps in the last few years due in no small part to you folks at the county level. I don't know for sure what our next step is, but we don't want it to be backwards. Help us explore what we can make happen. We don't want the town to grow uncontrolled like some wild west cow town, but we need to be more than a speed trap. In return, I promise not to pursue moving the County Seat, for now!"

Stuart Nelson, Chair
Santiago Town Board
July 14, 2009



Figure 9.66: Main Street (now 20th Street), 1910. Source: Courtesy of Sherburne History Center.



Figure 9.67: Santiago Hardware, and The General Store, date unknown. Source: Courtesy of Sherburne History Center.



Figure 9.68: 20th Street, 2010. Source: Sherburne County Planning & Zoning Dept.

Footnotes:

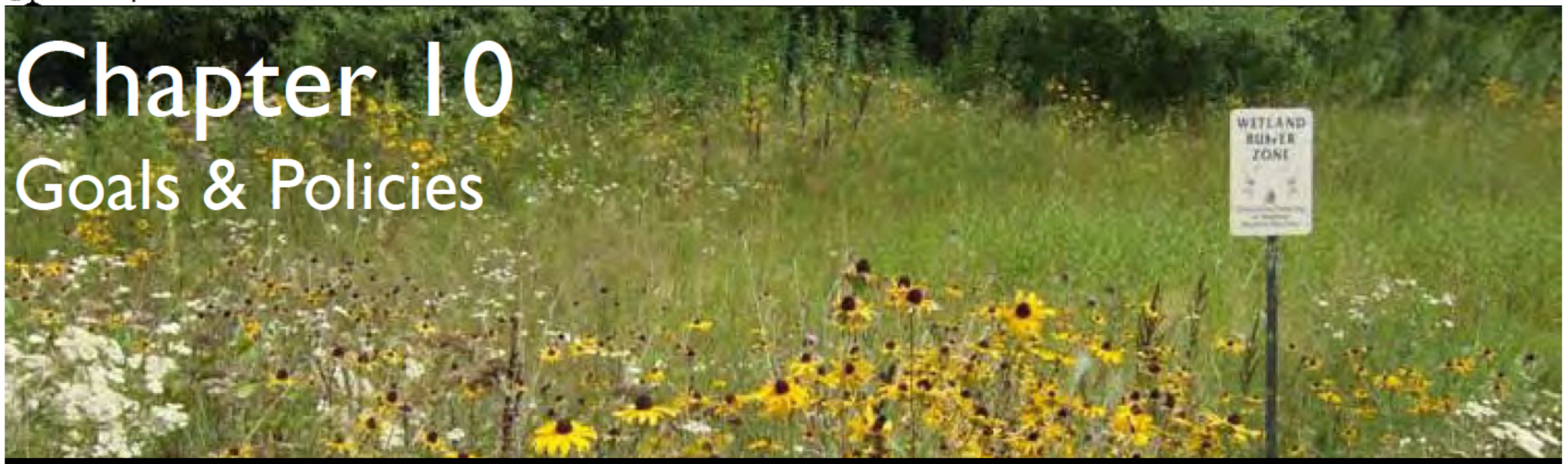
[1] The County-Township Joint Powers Agreement addresses applicable items in MN Statute 471.59.

[2] MN Statute 462.357, Subd. 1 states;

… *"A city may by ordinance extend the application of its zoning regulations to unincorporated territory located within two miles of its limits in any direction, but not in a county or town which has adopted zoning regulations'… …'Any city may thereafter enforce such regulations in the area to the same extent as if such property were situated within its corporate limits, until the county or town board adopts a comprehensive zoning regulation which includes the area"*

[3] The Minnesota Historical Records Survey Project, Division of Professional and Service Projects, Work Projects Administration. Inventory of the County Archives of Minnesota, No. 71 Sherburne County *(Elk River).* Saint Paul, MN. 1940

Chapter 10
Goals & Policies



Liberty Glen subdivision, St. Cloud

Summary

Chapter 10 establishes goals, policies, and their implementation strategies. A **goal** is a general statement relating to the County's values. A **policy** statement provides the reasoning behind each goal. An **Implementation** strategy describes how the County intends to accomplish each goal. Goal statements are generally divided according to topics within the Comprehensive Plan. However, several policy and implementation statements may be applied to multiple goals.

MN Statute 394.231 requires non-metro counties to consider adoption of seven goals and objectives *"for the preservation of agricultural, forest, wildlife, and open space land, and minimizing development in sensitive shoreland areas."*. The County Board of Commissioners held a workshop on September 2, 2009 to consider the objectives recommended in MN Statute 394.231. Those objectives which the County Board agreed with[1] have been incorporated into the following;

Goal 1 Natural Resources

Protect and preserve the County's natural resources for the benefit of County residents and the natural ecology.

Soil & Ground Water

Policy 1: Sherburne County's natural resources (soil, water, and ecology) provide unique opportunities and constraints.

It is the County's policy to consider these opportunities and constraints when making land use decisions.

Implementation 1-1: Complete the Sherburne County Geological Atlas to provide a better understanding of local aquifers and their relationship to surface waters. The geological atlas will map bedrock and surficial geology, stratigraphy (layers), bedrock topography, depth-to-bedrock, subsurface geology, and mineral resources. The geological atlas will assist in identifying areas not appropriate for water intensive land uses, and those uses which may contaminate soil and groundwater.

Implementation 1-2: When a change of land use is proposed requiring a public hearing for a property within a Wellhead Protection Area within the County's zoning authority, the County will notify the applicable agency.[2]

Implementation 1-3: Heavy Industrial facilities shall be designed and constructed to prevent contamination of soils, surface water and ground water.

Implementation 1-4: The County will continue to require that a property's Subsurface Sewage Treatment System (SSTS) meet minimum standards when the property is sold or transferred by mortgage, contract for deed, or other transfer of ownership, and when a building permit is obtained from the County.

Implementation 1-5: The County will continue to provide well water testing kits to County residents.

Surface Waters

Policy 2: Sherburne County includes 125 lakes, 493 miles of rivers & streams, and about 52,898 acres of wetlands (excluding lakes). Surface waters provide a significant scenic and recreational amenity to County residents in addition to filtering pollutants prior to reaching aquifers. Surface waters also provide habitat for birds, fish, and animals.

It is the County's policy to protect surface waters as required by Federal and Minnesota regulations, and to promote restoration efforts.

Implementation 2-1: Within the County's zoning jurisdiction, continue to enforce applicable sections of the Federal Clean Water Act and State regulations, including but not limited to administration and enforcement of Shoreland regulations, the Wetland Conservation Act, and the National Pollutant Discharge Elimination System (NPDES).

Implementation 2-2: Collaborate with the Federal Emergency Management Agency (FEMA) through the National Flood Insurance Program (NFIP) as a Cooperating Technical Partner (CTP), and amend and enforce the Floodplain Ordinance, as required by FEMA.

Implementation 2-3: Consider amending the Scenic and Recreational River ordinance in cooperation with the DNR, so that it is consistent with the Zoning and Subdivision ordinances. Continue to enforce ordinances to protect the environment.

Ecology

Policy 3: Sherburne County is located in the Anoka Sand Plain, which is a unique ecological environment in Minnesota.

It is the County's Policy to promote native plant species, control noxious weeds as required by Minnesota laws, and to encourage the preservation of contiguous areas for the migration of native birds and animals.

Implementation 3-1: Consider requiring that new developments containing rare biological species and natural plant communities preserve these features through a conservation easement, land dedication, or by other approved means. These features have been identified by the MN DNR on the "Natural Communities and Rare Species of Sherburne County, Minnesota" map, completed in 1993. Field verification would be necessary as part of the County's development review process.

Implementation 3-2: Consider Natural Resource Inventory (NRI) data when reviewing land use applications (when available). An NRI is an inventory of plant ecology (i.e. forest, woodland, shrubland, etc.). An NRI may include a more detailed inventory called a Minnesota Land Cover Classification System (MLCCS). An MLCCS grades the quality of ecological areas on an A-D scale. An NRI and MLCCS can identify key ecological areas for preservation. The County will continue to pursue grants to fund additional studies and conservation efforts.

Implementation 3-3: Continue to control and prevent the proliferation of noxious weeds as required under MN Statute 18.81. The County Agricultural Inspector will continue to work with the public, township and city weed inspectors, and the Minnesota Department of Agriculture to implement this task.

Implementation 3-4: Support efforts to manage the spread of Oak Wilt, and other tree diseases and infestations.

Education & Promotion

Policy 4: Sherburne County's waterways and aquifers are susceptible to pollution because of the County's sandy permeable soils.

It is the County's policy to educate the public about the environment, and promote best management practices.

Implementation 4-1: Continue to provide public information on the County's website, such as information about floodplains, shorelands, domestic water and wells, and wetlands.

Implementation 4-2: Continue to publish articles in the Environmental Educator (distributed county-wide).

Implementation 4-3: Continue to facilitate educational workshops to inform residents of conservation efforts, including; the value of waterways and wetlands; promote careful application of surface chemicals such as lawn fertilizers; and the status of impaired waterways.

Implementation 4-4: Promote the Priorities, Goals and Objectives of the Sherburne County Local Water Management Plan.

Goal 2 Land Use

Encourage development in appropriate areas, while preserving agricultural and urban interests.

Regional Planning

Policy 5: Sherburne County (in addition to Wright County along the I-94 corridor) connects the metropolitan areas of the Twin Cities and St. Cloud, and serves as one of the primary growth corridors of Minnesota. When comparing Sherburne County's location, transportation access, and natural soil and water features (i.e. lack of physical constraints) to other counties within the larger region, Sherburne County is an attractive area for urban and rural growth.

It is the County's policy to continue to properly manage growth, and maintain the County's autonomy from state agencies in regulating local land use decisions.

Implementation 5-1: Continue to participate in regional planning workshops and conferences.

Implementation 5-2: Continue to monitor legislative activities, and represent the County as directed by the County Board.

Implementation 5-3: Continue regular communication with local government units (LGU's) within the County concerning Planning & Zoning Department projects, including distribution of the Department's Annual Report.

Urban Expansion

Policy 6: Sherburne County includes ten townships and seven cities. As of 2010, the cities of Becker, Big Lake, St. Cloud, and Zimmerman maintain Orderly Annexation (OA) agreements with neighboring townships. Presumably, each OA is designed to preserve land within a township.

It is the County's policy to remain neutral regarding city/township OA agreements, and to respect such agreements. In the case where no OA exists, it is the County's policy to work with applicable cities and townships to zone land within a township.

Implementation 6-1: The County shall consider amending Zoning and Subdivision ordinances to accommodate Orderly Annexation agreements. Proposed land uses within such areas should not impede future urban development or redevelopment of the area.

Implementation 6-2: In the instance that no Orderly Annexation agreement exist between a city and a township, and the city's Comprehensive Plan identifies future urban expansion within a township, the County will consider facilitating an

agreement (not an OA) between the applicable city and township to reserve land (through zoning regulations) within the township for future urban expansion needs.

Coordination with Townships

Policy 7: Sherburne County is the planning & zoning authority in the townships of Blue Hill, Clear Lake, Haven (portions thereof), Orrock, Palmer, and Santiago. The County maintains a "Joint Powers Agreement Regarding Zoning" with the townships of Baldwin, Big Lake, and Livonia, in which the County administers and enforces the township's Zoning and Subdivision ordinances. In portions of Becker and Haven townships, the County administers zoning and subdivision regulations within the Scenic River, Recreational River, Shoreland, and Floodplain zoning districts.

It is the County's policy to continue to work with townships to effectively regulate land use in a cost efficient manner.

Implementation 7-1: Discuss with Town Boards how the County can address concerns regarding land use regulations, the land use application review process, and administration and communication of records.

Implementation 7-2: Consider amending land use application procedures to reduce the amount of time from when an application is submitted to the County to the time the application is approved (including administrative and public hearing processes).

Implementation 7-3: Amend the Zoning and Subdivision ordinances to remove inconsistent format and language, and address the specific needs of each township.

Implementation 7-4: Coordinate with townships to consider amending the Zoning Ordinance to reserve areas containing significant aggregate deposits for existing and future extraction and processing, and facilitate reclamation land use planning.

Implementation 7-5: Coordinate with townships to consider amending Zoning and Subdivision ordinances to create a Hamlet zoning district, promoting the economic stability and pedestrian orientation of the town centers of Orrock, Palmer, and Santiago townships.

Implementation 7-6: Consider working with townships to identify land use maps.

Agricultural Zoning & Subdivision Regulations

Policy 8: Sherburne County farmers have made significant investments in irrigation systems for the cultivation of row crops. Agricultural corridors fragmented by development contribute to the rising cost of farming through increased land values, increased traffic, and non-compatible adjacent land uses.

It is the County's policy to preserve agricultural areas.

Implementation 8-1: Consider amending Zoning and Subdivision ordinances to limit the fragmentation of agricultural areas.

Residential Zoning & Subdivision Regulations

Policy 9: Sherburne County has experienced significant residential growth. The population of townships have increased from 19,874 in 1990 to 38,319 in 2010 (93%). During those 20 years, 747 subdivisions were approved, consisting of 25,905 acres within the ten townships.

It is the County's policy to manage residential growth while representing the best interests of property owners.

Implementation 9-1: Consider amending Zoning and Subdivision ordinances to discourage development in areas which are not adequately served by public services, such as public roads and emergency services. "Adequate" public services shall be defined. Road access shall comply with access management guidelines (see Tables 15-19 of the Sherburne County Long-Range Transportation Plan, 2007).

Implementation 9-2: Consider amending the Subdivision Ordinance to address concerns related to the regulation of common property (i.e. outlots and easements), such as community septic systems, community open space, and ingress/egress easements.

Implementation 9-3: Consider amending Zoning and Subdivision ordinances to address the need for multi-generational housing, such as allowing accessory dwelling units.

Implementation 9-4: Encourage proposed developments to incorporate healthy active lifestyles, and amenities such as pedestrian trails (public or private).

Goal 3 Economic Development

Support Sherburne County's efforts to retain, expand, and attract new businesses to the County.

Business Development

Policy 10: Sherburne County as a planning & zoning authority in townships maintains a limited role in the promotion of economic development within those townships. The commercial market in rural areas may be limited to those businesses which require high visibility from the traveling public and provide convenience goods to local residents.

It is the County's policy to support local job creation and business expansion by allowing small businesses in appropriate areas, including home businesses. The County recognizes cities' needs to reserve rural areas for future urban economic development for the benefit of both cities and townships, which may be home to those employees.

Implementation 10-1: Continue to support the efforts of the Sherburne County Economic Development Alliance, Housing & Redevelopment Authority, and Regional Rail Authority.

Implementation 10-2: Consider reserving undeveloped U.S. and state trunk highway corridors for future commercial and industrial development. Allow appropriate commercial and industrial development within these corridors in areas accessible by local roads (i.e. no direct access onto U.S. and state trunk highways). Reserving these corridors for future development effectively preserves the area's rural character in the near-term.

Implementation 10-3: Integrate consideration of economic development into County planning and decision-making, including facilitating a chain of communication with the County Administration Department to follow through with economic development leads.

Implementation 10-4: Encourage cities and townships to partner in the development of municipal industrial parks, sharing costs and revenue.

Goal 4 Transportation

The Sherburne County Planning & Zoning Department and Public Works Department shall collaborate efforts to implement the County's Long-Range Transportation Plan.

Sherburne County Long-Range Transportation Plan

Policy 11: The Sherburne County Long-Range Transportation Plan (2007) identifies County roadway needs through the year 2030.

It is the County's policy to implement the Sherburne County Long-Range Transportation Plan.

Implementation 11-1: County Staff will continue to recommend that the County require proposed developments, and proposed changes of land use (i.e. rezonings, CUP/IUP) to comply with access management guidelines (see Tables 15-19 in Transportation Plan).

Implementation 11-2: Continue to support the expansion of commuter rail from Big Lake to St. Cloud.

Implementation 11-3: Continue to support transportation planning of local U.S. and Minnesota highway corridors.

Goal 5 Parks & Recreation

Provide passive recreational opportunities to Sherburne County residents through County parks & trail systems.

Sherburne County Parks System

Policy 12: Sherburne County is in the early stages of park development. The first park (Oak Savanna Land Preserve) was established in 1997. The County manages four parks totaling 345 acres, holds three parcels for non-designated parkland totaling 110 acres, and is currently (2010) in the process of acquiring land to complete the Great Northern Trail connecting Elk River, Zimmerman, and Princeton.

Within Sherburne County are the Sherburne National Wildlife Refuge (30,700 acres), Sand Dunes State Forest (6,000 acres of public land), Scientific & Natural Areas (1,162 acres), and Wildlife Management Areas (1,007 acres). These facilities are owned and managed by the U.S. Fish & Wildlife Service or the Minnesota Department of Natural Resources, and offer limited recreational uses.

It is the County's policy to provide passive recreational opportunities while minimizing duplication of facilities and activities provided by other agencies.

Implementation 12-1: Implement the goals of the Sherburne County Parks, Trails, and Open Space Policy Plan (hereinafter; the Park Plan), adopted in 2005.

Implementation 12-2: Complete land acquisition for the Great Northern Trail, and construct the trail connecting Elk River, Zimmerman, and Princeton.

Implementation 12-3: Develop master park plans for Island View Regional Park, Bridgeview Park Preserve, and pursue funding to implement master plans for all County parks and trails.

Implementation 12-4: When a proposed development is located within a trail corridor identified in the Park Plan, consider requiring land dedication for trail connections.

Implementation 12-5: Continue to pursue opportunities to expand the County parks & trail system, including pursuing grants, state funding, and donations.

Implementation 12-6: Continue to promote the County parks & trail system through the Environmental Educator, County Fair booth, and other promotional activities.

Footnotes:

[1] The land use goals recommended in MN Statute 394.231 word-for-word are not applicable to Sherburne County's townships in all cases. The statute's recommendations are listed below in ***bold italics*** with the County's response following. The County's response is based on comments made by the County Board during a September 2, 2009 workshop.

I. ***Minimizing the fragmentation and development of agricultural, forest, wildlife, and open space lands, including consideration of appropriate minimum lot sizes;***

The County Board agrees, noting that Sherburne County has regulated minimum lot sizes since 1971.

II. ***Minimizing further development in sensitive shoreland areas;***

The County Board agrees. However, the County does not intend to regulate shoreland areas more restrictive than current state regulations except in agricultural zoning and overlay zoning districts where applicable.

III. ***Minimizing development near wildlife management areas, scientific and natural areas, and nature centers;***

The County Board disagrees. Development near WMA's and SNA's will not receive special consideration because of their proximity. However, development adjacent to the Sherburne National Wildlife Refuge, and Sand Dunes State Forest must comply with a 100' building setback from public lands (i.e. boundaries) within the Refuge and State Forest.

IV. ***Identification of areas of preference for higher density, including consideration of existing and necessary water and wastewater services, infrastructure, other services, and to the extent feasible, encouraging full development of areas previously zoned for non-agricultural uses;***

The County Board agrees, in part. Sherburne County will respect Orderly Annexation agreements (OA) between cities and townships, and amend the Comprehensive Plan and Zoning Map when applicable. However, in the event a city and township disagree regarding future urbanization of township land where an OA does not apply, the County will remain neutral unless otherwise guided by this document.

To the County's knowledge, an engineered build-out scenario of each city does not exist which identifies a city's water & wastewater capacity between the years 2010 - 2030. Furthermore, it is the County's opinion that 2006-2035 population projections published by the Minnesota Demographic Center in 2007 (pre-recession) far exceed realistic population growth. Planning for long-term urban expansion in current township areas is difficult given the limited data available. As such, this Plan is dependent upon city/township OA's to identify future urban areas.

Agricultural corridors are concentrated along the Mississippi & Elk rivers in the southern and western portions of the County, and along County Road 3 in the northern portion of the County. These areas are predominately zoned to preserve agriculture, with the exception of areas in Blue Hill Township, which is guided and zoned for residential development. Blue Hill Township is within proximity of US Highway 169 and MN Highway 95 connecting residents to job centers.

V. ***Encouraging development close to places of employment, shopping centers, schools, mass transit, and other public and private service centers;***

The County Board agrees, in part. The County's interpretation of this recommendation is that the Statute's intension is to encourage growth that is economically self-sustaining (i.e. new growth is not subsidized by existing tax payers). The County does not require the consideration of an economic impact analysis for new development. The County believes that such an analysis would be speculative at best given that assumptions must be made where facts are unknown. The allowance for new development in rural areas will continue to be

based on the County Board's and town board's belief of what is best for the county and townships.

Sherburne County is largely a bedroom community in which 68% of its workforce commute to jobs in other counties (2000 Census). The dominate local industries are manufacturing; education, health & social services; retail trade; and construction (2000 Census). The location of these industries are concentrated in the cities of Elk River, Big Lake, and Princeton (see pages 6, 7). Residential growth is projected to continue within these job corridors, which include the townships of Baldwin, Big Lake, and Livonia (MN Demographic Center population projections).

Cities within Sherburne County face competition for retail centers with cities along the I-94 corridor in Hennepin County (Maple Grove, Rogers), Stearns County (St. Cloud), and Wright County (Albertville, Monticello). Within Sherburne County, regional retail centers are concentrated in Elk River along US Highway 169. The County's access to roads, rail, and utilities present a continued opportunity to concentrate on attracting industry vs. retail.

The operation of the Northstar commuter rail service and The Link commuter bus service has provided the option of mass-transit for County residents. Transit stations present a new market for convenience goods & services, and housing. However, transit stations are located within city limits and are not within the County's zoning authority.

The Comprehensive Plan identifies a need to develop or stabilize the hamlets in Orrock, Palmer, and Santiago townships so that they are economically self-sustaining, and function as a small village.

VI. ***Identification of areas where other developments are appropriate; and other goals and objectives a county may identify.***

The County Board agrees, Chapters 8, 9, and 10 of the Comprehensive Plan address appropriate development, goals and objectives.

VII. ***Other goals and objectives a county may identify.***

Chapter 10 of the Comprehensive Plan addresses goals and objectives regarding land use.

[2] MN Statute 394.26, Subd 2(c) requires that when a public hearing is required concerning a change of land use on property within two miles of a city's zoning jurisdiction, that the County notify the applicable City. It has been the County's experience that when such notice has been given, the County often does not receive a response from the city. It is the intension that by explicitly drawing attention to the wellhead protection area, the applicable city is more likely to comment on a proposed land use change in a township.

Appendix A
Town Board Survey

Between January and April, 2009, Planning & Zoning Department Staff met with each town board to discuss the comprehensive plan update process, and to ask a series of questions regarding updating the Zoning and Subdivision ordinances.

The questions presented a series of "options" of how land use in agricultural, residential, and commercial & industrial areas should be regulated. The intention was for Staff to present several zoning options, and for town boards to narrow those options down. Zoning Staff would then develop those options into zoning ordinances.

In the event that individual town board members gave differing opinions, the majority opinion was recorded. The results of the survey found distinct differences between townships, reiterating that "one-size-fits-all" zoning is no longer appropriate. One-size-fits-all zoning assumes that all residential areas, all commercial areas, etc. are equal resulting in a minimal number of zoning districts. Sherburne County has used this method since its first zoning ordinance in 1971. The survey finds that town boards want options, suggesting a need for multiple zoning districts of similar uses where the minimum standards are different (i.e. different lot sizes, architectural standards, etc.).

Results of Town Board Survey re: acceptable options to be used to guide the Comprehensive Plan update and Zoning & Subdivision Ordinance revisions. The survey answers do not commit the townships into agreeing to anything, but provide Staff with direction needed to draft the Plan and ordinances.

AGRICULTURAL AREAS		**Baldwin** Township (2-18-09)	**Big Lake** Township (2-11-09)	**Blue Hill** Township (2-9-09)	**Clear Lake** Township (2-17-09)	**Haven** Township (3-16-09)	**Livonia** Township (1-26-09)	**Orrock** Township (1-28-09)	**Palmer** Township (3-24-09)	**Santiago** Township (4-1-09)
Option 1	One home per 40-acres. No subdivisions and no exceptions.									
Option 2 (current)	One home per 40-acres. Land may be subdivided into a maximum of 3-lots, if all lots are at least 75% wooded, minimal lot size of 5-acres, and minimal lot width of 300' along an existing public road.				X	X			X	
Option 3	Same as Option 2, but remove the wooded requirement.		X							X
Option 4	Two agricultural districts; (A-1) 1 home per 40-acres (no subdivisions); and (A-2) minimum lot size of 10-acres (platted with a minimal lot width of 660' on an existing public road (no wooded req).									

AGRICULTURAL AREAS (continued)										
Option 5	Same as Option 4; but a proposed subdivision with 10-acre lots must be adjacent to parcels the same size or smaller. In other words, subdivisions would have to be located adjacent to each other, and not in the middle of farm fields.									
Option 6	Two agricultural districts; (A-1) 1 home per 40-acres (no subdivisions); and (A-2) minimal lot size of 20-acres with minimal lot width of 660' on an existing public road (no wooded requirement).									
Option 7	Same as Option 6; but a proposed subdivision with 20-acre lots must be adjacent to parcels the same size or smaller. In other words, subdivisions would have to be located adjacent to each other, and not in the middle of farm fields.									
Option 8	One home per 40-acres. Land could be subdivided using Transfer of Development Rights (TDR), with a minimum lot size of 2.5-acres.				X		X		X	
Option 9	One home per 40-acres. Land could be subdivided based on a Land Evaluation Site Assessment (LESA) scoring system. Land is scored based on its soils, slope, neighboring land uses, proximity to such things like feed lots, paved roads, county road, fire station, schools, municipal water/sewer, etc. The idea is to establish a numerical value to land to determine its highest and best use. If its highest and best use is agriculture, then it cannot be subdivided. If it's on a paved road, near services, and the surrounding land is not farmed, then maybe it could be subdivided.				X		X		X	
Option 10	With approval of the Town Board, option to develop as a Residential Planned Unit Development (R-PUD). Property would be rezoned with an R-PUD Overlay District A, and/or R-PUD Overlay District B. **R-PUD Overlay District A**: minimum lot size of 1.5-acres with individual septic systems. Development must include specific amenities such as architectural and landscape standards, parks, trails, etc. **R-PUD Overlay District B**: minimum lot size of 1/2-acre with a shared septic system. Development must include specific amenities such as architectural and landscape standards, parks, trails, etc. 50% of the development must be preserved as Open Space. It could be used by residents, or retained for agriculture, etc.		X		X	X			X	X
Option 11	No Opinion.	X		X				X		
RESIDENTIAL AREAS (currently-2009 General Rural Zoning District)										
Option 1 (current)	Minimum lot size of 2.5 acres, with options (requires approval of township); (1) minimum lot size of 1.5-acres if development includes certain architectural standards and amenities; and (2) minimum lot size of 1/2 acre with a shared septic system, if development includes certain architectural standards and amenities including preserving 50% of the development in a Conservation Easement that cannot be developed.	X	X	X			X			
Option 2	Minimum lot size of 5 acres.	X								

		Baldwin Township (2-18-09)	**Big Lake** Township (2-11-09)	**Blue Hill** Township (2-9-09)	**Clear Lake** Township (2-17-09)	**Haven** Township (3-16-09)	**Livonia** Township (1-26-09)	**Orrock** Township (1-28-09)	**Palmer** Township (3-24-09)	**Santiago** Township (4-1-09)
RESIDENTIAL AREAS (currently-2009 General Rural Zoning District) (continued)										
Option 3	Minimum lot size of 2.5 acres.			X			X			
Option 4	Minimum lot size of 1.5 acres.		X	X			X			
Option 5	Minimum lot size of 1 acre.									
Option 6	Minimum lot size of 1/2 acre with a shared septic system, and require development to preserve 50% of land in a Conservation Easement, which cannot be developed.									
Option 7	No opinion.				X	X		X	X	X
COMMERCIAL & INDUSTRIAL AREAS (not home businesses)										
ARCHITECTURAL & SITE LAYOUT REQUIREMENTS										
Option 1 (current)	No Architectural Design Standards in commercial/industrial districts.		X			X			X	X
Option 2	Commercial/Industrial areas near city commercial/industrial developments shall have architectural and landscape design standards similar to those required in the neighboring city.	X								
Option 3	Pole-barns permitted (i.e. stick framed with sheet steel siding).	X	X		X		X			
ARCHITECTURAL & SITE LAYOUT REQUIREMENTS										
Option 4	Combination of masonry on bottom portion of building with non-masonry on upper portions.	X			X		X	X		
Option 5	All masonry construction.	X			X					
Option 6	No pole-barns (i.e. 100% sheet steel siding). Other exterior finishes are optional (i.e. may be masonry, vinyl, wood, stucco, or metal "accents," etc.).	X						X		

ARCHITECTURAL & SITE LAYOUT REQUIREMENTS (continued)										
Option 7	Require buildings to be farther from the road, with parking in front of the building (i.e. less green space between road and building).	X								
Option 8	Require buildings to be closer to the road, with parking on the side or rear of the buildings (i.e. more green space between buildings).	X					X			
Option 9	No Opinion re: where building/parking is placed on lot.		X		X	X		X	X	X
LANDSCAPE REQUIREMENTS										
Option 10 (current)	No Landscape Design Standards in commercial/industrial districts.		X			X				X
Option 11	Require commercial/industrial lots to establish and maintain a grass lawn (need to define "establish" and "grass lawn").	X			X					
Option 12	Require commercial/industrial lots to establish and maintain a grass lawn, or a low-maintenance lawn approved by the County (i.e. prairie grass, desert rock garden, etc.).	?			X		X	X	X	
Option 13	Require a minimum of 4" of topsoil over previous surface areas of the lot to support grass and other vegetation.	X			X		X	X		
Option 14	Require irrigation system in front and side yards.	?								
Option 15	Require irrigation in all non-pervious areas of the yard.	?								
Option 16	Require trees to be planted in front yard (i.e. 1 tree per 50' of frontage, with credit for existing trees).	X					X	X		
PERMITTED, CONDITIONAL, & INTERIM USES										
Question 1	If the townships could determine specifically what types of land uses could occur on which properties, and what that land use should look like, would your township be willing to have more Permitted Uses and fewer CUP's & IUP's? In other words, if the township said "if you're willing to do X, Y & Z, you can build without a CUP/IUP."	Y	?	Y	N	Y	Y	Y	N	N
HIGHWAY PLANNED UNIT DEVELOPMENTS (Hwy PUD)										
Question 2	Do you think Highway Planned Unit Developments should be left as an option for areas adjacent to highways 10, 24, 25, & 169?	Y	Y	Y	Y	Y	Y	Y	Y	N/A
HIGHWAY PLANNED UNIT DEVELOPMENTS (Hwy PUD) (continued)										
Question 3	Do you think Highway Planned Unit Developments should be an option along county roads that meet a certain qualification (i.e. co Rd with the same or greater amount of traffic compared to Hwy 10, 24, 25, & 169)?	Y	Y	Y	Y	N	Y	Y	Y	Y

		Baldwin Township (2-18-09)	**Big Lake** Township (2-11-09)	**Blue Hill** Township (2-9-09)	**Clear Lake** Township (2-17-09)	**Haven** Township (3-16-09)	**Livonia** Township (1-26-09)	**Orrock** Township (1-28-09)	**Palmer** Township (3-24-09)	**Santiago** Township (4-1-09)
SAND & GRAVEL MINING										
Question 4	Should a Mining zoning district or overlay district be established to limit the conflict between mining and non-compatible land uses such as residential, and work with landowners and the mining industry to develop a master plan for areas with significant deposits (Haven & Livonia townships)? A Yes vote would limit mining to certain areas of Haven and Livonia townships, and in turn would limit residential development in those areas. A no vote would continue to permit mining and residential development in many areas of the townships.	N	N	N/A	Y	Y	Y	N/A	N/A	N

Appendix B

7:30 P.M. A public hearing was held for the **ADOPTION OF THE SHERBURNE COUNTY 2010-2030 COMPREHENSIVE LAND USE PLAN** and to rescind the 2004 Comprehensive Land Use Plan.

Jon Sevald, Sherburne County Planner, proceeded to give the following tentative timeline for the review and adoption of the Plan:

		March	Draft Comprehensive Plan distributed for public comment
Wednesday	April 20	7:30 pm	Sherburne Co Assoc of Townships Qtr Mtg (Haven Town Hall)
Thursday	April 21	6:30 pm	Planning Commission **Public Hearing**
Wednesday	May 4	10:00 am	County Board workshop
Tuesday	May 10	4:00 – 7:00 pm	Public Open House, Palmer Town Hall
Monday	May 16	4:00 – 7:00 pm	Public Open House, Livonia Town Hall
Thursday	May 19	6:30 pm	Planning Commission **Public Hearing** (continued)
Thursday	June 16	6:30 pm	Planning Commission **Public Hearing** (continued, if necessary)
	TBD		County Board Action re: approval of Comprehensive Plan

Sevald noted that the Plan has been distributed to the Planning Commissioners, County Board Members and all Township Board Members. Additionally, the proposed Comp Plan can be viewed in the Zoning Office at the Sherburne County Government Center and may also be downloaded at www.co.sherburne.mn.us.

Sevald explained that the Comprehensive Land Use Plan is basically a guide to land use that will take us through the year 2030 in the nine townships which the County has or shares zoning authority. The Comp Plan is also the basis for the County Zoning and Subdivision Ordinances, and the official Zoning Map. Comprehensive Plans are typically updated about every five years. The County's Comp Plan was last updated in 2004. He began by giving a brief overview of the draft Plan and then proceeded to review and discuss the first two chapters of the Plan.

Neils opened the public hearing.

Neils asked if the 2010 Census data has been added.

Sevald answered that quite a bit of the Comp Plan has been updated with the census information. He said the 2010 Census is limited to population, age, and race but the 2005-2009 American Community Survey (ACS) has more detailed estimates on housing, economics, employment etc., and a lot of that data is used in the Plan. Sevald said he hopes to have all of the current data in time for the adoption of the Plan.

Berg commented that it has helped that development has slowed down so that the County is able to have a chance to study a new plan.

The Board agreed that this is a good transition period.

Berg also noted that Chuck Gotzian has now replaced Jerry Petersen as the Orrock Township Chairperson.

Neils asked if the population projections are accurate.

Sevald explained that the 2006-2035 population projections that were published in 2007 are outdated because they are pre-recession. He noted that once the state revises their projections, there could be an amendment to the Comp Plan to change those population projections. Sevald added that he would be surprised if this revision happens in 2011.

Neils said he felt that the biggest danger would be to make assumptions based on what is known to be an incorrect projection.

Lynn suggested the current projections might be left out and replaced with a statement explaining that when the state makes the new projections, they will be incorporated into the Plan at that time.

Sevald said he would put a notation near anything that has to do with projections.

Neils asked that it be noted someplace in the Plan that statutes require zoning ordinances to be consistent with the Comp Plan. He suggested that an explanation could also be included as to why it is necessary to amend the Comp Plan in order to amend the zoning ordinance.

Neils questioned the 1900 vacant lots in the townships. He asked if those vacant lots could ever be mapped out. Neils said he felt the county will have to begin figuring out how to deal with a volume that large and how to be prepared for the day that someone wants to come in to develop their property. He also asked how many lots are out there that only have preliminary plat approval.

Riddle commented that some of the preliminary plats are starting to be left to expire. She said there can be a count done on those preliminary lots, however, she doesn't believe it is a large number.

Sevald said he could have that information for the Board at the May meeting.

The Planning Commission continued the Public Hearing to the May 19th, 2011 Public Hearing.

8:30 PM Schlingman moved Nelson seconded to adjourn the meeting. Motion carried.

Respectfully submitted by: Judy Weber, Secretary

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13. *The applicant shall comply with all federal, state, and local laws and regulations;*
14. *Incidental work related to body shop and welding is permitted;*
15. *Allow for the display of sales in the front of the business for marine, power sports, RV and ATV equipment.*
16. *The findings in Sect 18, Subd 5, Item 3 of the Sherburne Co Zoning Ordinance have been made.*

The motion carried unanimously and is recommended to the County Board for approval.

2. 6:55 PM Continuation of the public hearing from April 21, 2011 on the **ADOPTION OF THE SHERBURNE COUNTY 2010-2030 COMPREHENSIVE LAND USE PLAN** and to rescind the 2004 Comprehensive Land Use Plan. The purpose of the Comprehensive Land Use Plan (Comp Plan) is to guide land use through the year 2030 in the nine townships which the County has or shares zoning authority. The Comp Plan is also the basis for the County Zoning and Subdivision Ordinances, and the official Zoning Map. Comprehensive Plans are typically updated about every five years. The County's Comp Plan was last updated in 2004.
A copy of the proposed Comprehensive Land Use Plan is available for viewing in the Planning and Zoning Department at the Sherburne County Government Center in Elk River, Monday thru Friday 8am until 4:40pm. additionally, the proposed Comp Plan may be downloaded at www.co.sherburne.mn.us . Written comments will be accepted at the above address.

Jon Sevald recapped the progress made so far on the Comp Plan proposal. The Plan was Published the end of March and it was distributed to County Board, Planning Commission and Town Board Members. The Planning Commission continued this public hearing from the May 19th hearing. He reported that town board members were asked to give their comments by tonight's meeting and he has heard back from about half of the townships and those comments were included in the Board Packets. Sevald said at the next meeting, he will include the county's response to the comments received.

Sevald asked the Commissioners how they would like to proceed in reviewing the plan.

Nelson suggested that the Commissioners review each of the Chapters on their own time, but as a group, review Chapter 11 Goals and Policies. It was the consensus of the Board to proceed to the Goals and Policies of the Comp Plan and once that is completed, to review specifics of the plan as requested by the Planning Commissioners.

Neils asked if MNDOT's three or four proposed projects that are on the books, but are not likely to get funding in foreseeable future, should still be a part of this plan.

Sevald replied that the unofficial answer from MNDOT is that those are all valuable projects but due to limited funding, their priority right now is to focus on preserving the infrastructure as it currently exists. Sevald said he felt there is a value to keeping those projects in the Plan so they are in the back of everyone's mind.

Neils questioned if it remains in the Comp Plan, how do we handle an application that falls in that project area.

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Sevald explained that the staff would take it under consideration, but it basically would not change anything unless those future corridors are actually displayed on a zoning map. By statute, he said he thought the county would have six months to either purchase the property or they lose the right to preserve it.

Discussion continued on whether or not the proposed MNDOT's projects should be a part of the plan.

Sevald proceeded to read the Goals and Policies of Chapter 10. The following changes were suggested by the Planning Commission:

Goal 1 Natural Resources
Policy 1 Implementation 1-3: ~~Areas zoned for Heavy Industrial uses should be located in areas where soils are resistant to permeability and infiltration.~~ Heavy Industrial facilities shall be designed and constructed to prevent contamination of soils, surface water and ground water.

Goal 2 Land Use
Urban Expansion
Policy 6 It is the County's policy to remain neutral regarding city/township OA agreements, and to respect such agreements. In the case where no OA exists, it is the County's policy to work with applicable cities and townships to zone land within a township ~~to reserve land for future urban expansion.~~

Coordination with Townships
Policy 7
Implementation 7-3: ~~Consider a~~Amending the Zoning and Subdivision ordinances to remove inconsistent format and language, and address the specific needs of each township.

Implementation 7-6: Consider working with townships to identify land use maps.

Agricultural Zoning & Subdivision Regulations
Policy 8
~~Implementation 8-2: Consider amending Zoning and Subdivision ordinances affecting areas within the current (2010) Agricultural zoning district that are not within agricultural areas, to allow limited residential development.~~

Residential Zoning & Subdivision Regulations
Policy 9
~~Implementation 9-4: Consider amending Zoning and Subdivision ordinances to incorporate the 1977 St. Cloud Municipal Airport Zoning Ordinance and 1978 Princeton Municipal Airport Zoning Ordinance, both adopted by Sherburne County.~~

Goal 3 Economic Development
Business Development
Policy 10

Sherburne County as a planning and zoning authority in townships maintains a limited role in the promotion of economic development within those townships. ~~The lack of access to municipal water for fire suppression limits the size and use of buildings in rural areas.~~ The commercial market in rural areas may be limited to those businesses which require ~~outside storage,~~ high visibility from the traveling public or provide convenience goods to local residents.

Goal 4 Transportation
Sherburne County Long-Range Transportation Plan
Policy 11:
~~Implementation 11-4: Encourage new developments to incorporate "Complete Streets" guidelines in accordance with MN Statute 174.75, accommodating motorized and pedestrian traffic within the public right-of-way.~~

Schlingman moved and Nelson seconded to continue the public hearing to the next public hearing date.

The motion carried.

Berg moved and Schlingman seconded to adjourn. The motion carried.

8:05 Meeting Adjourned.

Respectfully Submitted by:

Judy Weber, Secretary

Lawrence read the recommended conditions if approved. He opened the public hearing.

Mike Hayes, 19281 172nd Street, Big Lake, said he currently uses the driveway onto TH 24. He explained that it is the Clear Lake Township position that they no longer wish to use 70th Avenue with the potential for a new river crossing coming in. Also, they do not see where it would be beneficial to vacate it only to have MNDOT buy it back.

Norgren commented that he was out to the site and felt that some of the pine trees along TH 24 near the driveway approach were hindering the site distance from both ways.

Waytashak cautioned that the applicant may want to check with MNDOT prior to any tree removal in the case they may be located within the ROW and may need MNDOT permission to do so.

Lawrence asked for additional public comment. Seeing none, he closed the public hearing.

Berg moved and Norgren seconded to recommend approval of the Preliminary and Final Industrial Simple Plat "Evergreen Addition" consisting of 1 lot with an existing structure and with the following conditions:

1. *All exterior light fixtures must be shielded so that bulb cannot be seen and light directed away from adjoining properties and public road right-of-way.*
2. *The existing structure does not meet the required 67 ft setback from 70th Avenue. The structure will be considered legal non-conforming. If the structure were to be torn down or destroyed in order for it to be re-built it would need to be relocated to meet all setback requirements.*
3. *County must received MNDoT comment form prior to signing the plat.*
4. *Developer shall enter into a Developer's Agreement with the County Attorney's office.*
5. *Developer has one year to record plat per Sect 4, Subd 3 of the Subdivision Ordinance.*
6. *The two pine trees near the driveway approach shall be removed upon permission from MNDOT.*

The motion carried unanimously and is recommended to the County Board for approval.

4. **7:10 PM** A Public Hearing was held to continue the public hearing from May 19, 2011 on the **ADOPTION OF THE SHERBURNE COUNTY 2010-2030 COMPREHENSIVE LAND USE PLAN** and to Rescind the 2004 Comprehensive Land Use Plan. The purpose of the Comprehensive Land Use Plan (Comp Plan) is to guide land use through the year 2030 in the nine townships which the County has or shares zoning authority. The Comp Plan is also the basis for the County Zoning and Subdivision Ordinances, and the official Zoning Map. Comprehensive Plans are typically updated about every five years. The County's Comp Plan was last updated in 2004.

Jon Sevald explained the hearing this evening is a continuation from the May 19, 2011 public hearing. He noted after Planning Commission packets were distributed, comments were received

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from Wayne Chermak, Orrock Town Board Supervisor, clarifying earlier comments. Those comments were handed out to the commissioners. He also noted a few minor grammatical changes and said that the current Comp Plan draft dated July 14th has also been posted on the County web site. The Planning Commission packets include a listing of all the changes that have been made to the Comp Plan since it was first presented in March 2011.

Sevald said he had requested that all townships give a recommendation by May 19th and to date, five of the nine Townships have responded. An Orrock Township meeting will be held on July 27th . He noted at the Baldwin Township meeting in June, it was indicated the Township would make their official comment on August 1st. Assuming the Planning Commission makes a recommendation to the County Board for their meeting on August 2nd, their comments will be needed first thing that Tuesday morning. Sevald also noted that if a Township would like to make additional comments, those comments would need to be presented to the County Board as a separate request.

Lawrence asked if the Comprehensive Land Use Plan should be referred to as the County's and the Township's Plan.

Sevald explained that even though Baldwin Township has an agreement with the County for zoning
and subdivision authority, this agreement does not apply to the County's Comprehensive Land Use Plan.

Riebel asked if the actual comments show up in this plan.

Sevald replied that all comments can be found under Appendix C. He also noted that page 159 lists all those who were notified that the draft Comp Plan was made available on the County website. A short discussion continued on various Township comments.

Lawrence opened the public hearing.

Chuck Nagle, 29530 131st St, Princeton, MN said he is from Baldwin Township, and would like to make a few of his own personal comments. He remarked that he felt the draft Comp Plan was a wonderful document that contained many facts and a variety of information and he was very impressed with the work Jon and his team have done.

Nagle said he was at a public hearing not long ago when he heard a very vocal discussion about accessory dwellings. He pointed out that the population is aging and at some point there will not be enough nursing homes. Nagle said he was not suggesting this idea would work for the entire County or even an entire Township, but he felt there are areas where this type of use could fit and not harm anyone.

Nagle also suggested that the two acre minimum lot size could be reduced according to what would make sense in a particular area and based upon local consideration.

Nagle said that although much of the zoning today fits the entire County very well, he suggested there is an opportunity for the County to provide zoning services to a Township

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on a limited basis where a township might enact a subset of the ordinance, for instance for lot sizes or accessory dwellings. Another option would be to expand the "opt out" concept, like the one that is used with PUD's where a township can choose to opt out of that provision.

Nagle challenged the people of Baldwin to make a list of requirements in the zoning ordinance that they do not agree with. He said he would bet the list would be small, and in fact, he felt the Planning Commission and the zoning staff are very qualified and could solve these issues without Baldwin having to get into the zoning business. He also felt there was a real sense of wanting to cooperate with the townships, to get more input and to figure out a solution.

Lawrence asked for additional public comment. Seeing none, the public hearing was closed.

Schlingman moved and Berg seconded to recommend the approval of the adoption of the Sherburne County 2010-2030 Comprehensive Land Use Plan and to rescind the 2004 Comprehensive Land Use Plan.

The motion carried with no opposition and is recommended to the County Board for approval.

7:35 PM Meeting Adjourned.

Respectfully Submitted by:

Judy Weber, Secretary

11. Discussion was held regarding the request for a Preliminary and Final Industrial Simple Plat for Evergreen Addition.

Schmiesing/Farber unanimous to approve the Preliminary and Final Industrial Simple Plat for Evergreen Addition consisting of 1 lot with an existing structure. Property address: 7020 State Hwy 24 SE, Clear Lake, MN Legal Description: Th pt of th NW1/4 of th SE1/4 lying NWly of centerline of TH 24 (full legal on file) Sec 13, Twp 34, Rge 30 Clear Lake Township 11.93 acres Industrial District, as requested by Del Hayes and Sons, Inc., as recommended by the Planning Commission with the following conditions:

1. All exterior light fixtures must be shielded so that bulb cannot be seen and light directed away from adjoining properties and public road right-of-way.
2. The existing structure does not meet the required 67 ft setback from 70th Avenue. The structure will be considered legal non-conforming. If the structure were to be torn down or destroyed, in order for it to be re-built it would need to be relocated to meet all setback requirements.
3. County must receive MNDOT comment form prior to signing the plat.
4. Developer shall enter into a Developer's Agreement with the County Attorney's office.
5. Developer has one year to record plat per Sect 4, Subd 3 of the Subdivision Ordinance.
6. The two pine trees near the driveway approach shall be removed upon permission from MNDOT.

12. Jon Sevald, Planner, was present to request approval to adopt the Sherburne County 2010-2030 Comprehensive Land Use Plan and Rescind the 2004 Comprehensive Land Use Plan.

Schmiesing/Leonard unanimous to table consideration of Comprehensive Plan until September 6, 2011.

13. Heather Lemieux, Fiscal Analyst, was present to request authorization to publish the 2010 Financial Statements and Vendor List as required by law.

Leonard/Farber unanimous to approve the publication and alternate publication of the 2010 Financial Statements and Vendor List in the Elk River Star News and the West Sherburne Tribune.

14. Commissioner Correspondence, Committee Reports, Upcoming Meetings, Future Agenda Items (July 12, 2011 – August 1, 2011) continued:

Commissioner Farber – County Board Meeting, Local Mental Health Advisory Board, Branding Committee Meeting, Gang Strike Force, Tri Cap, Central Regional Radio Board, EMS Board
Commissioner Petersen – County Board Meeting, NACO in Portland, Oregon, Options, Benefits Advisory Committee Meeting

8. Open Forum – The following persons were present: Dick and Dawn Gulbrandson and Lary Hoopes who reside in Bridgeview Addition. The parties presented information about their issues on drainage. The County Board directed County staff to investigate the issue and bring back additional information to the Board in two weeks. The County Attorney agreed to work with staff on the issue. Lary Hoopes also addressed the snowmobile easement and the directing of traffic from the local church. Chuck Nagle, expressed his opinion of the need for a positive working relationship between the County Board, Planning and the Town Board. (Additional notes on the open forum are on file in the Administrator's Office.)

9. Dave Lucas, Solid Waste Administrator, was present to review proposed amendments to the Solid Waste Service Charge Ordinance.

At 9:48 a.m., the Chair opened a Public Hearing to consider Amendments to the Solid Waste Service Charge Ordinance. There was no one present to comment and there were no written comments or phone calls received.

At 9:49 a.m., the Chair closed the Public Hearing

Schmiesing/Leonard unanimous to approve ORD-186 amendments to the Solid Waste Service Charge Ordinance (on file in the Zoning Department) as recommended by staff.

10. Brian Benson, Administrator, was present to request approval of an agreement with Kings Express for a bituminous overlay of a portion of CSAH 3 near St. Cloud.

Leonard/Schmiesing unanimous to approve an Agreement for Bituminous Overlay of a portion of County State Aid Highway 3 near St. Cloud, Minnesota with Kings Express, with funds to be taken from 03-314-6347.

11. Jon Sevald, County Planner, was present to request adoption of the 2010-2030 Comprehensive Plan.

Schmiesing/Riebel unanimous to rescind the 2004 Comprehensive Plan, and adopt the 2010-2030 Comprehensive Land Use Plan with the following conditions:

1. That all references to the "Unnamed" Regional Park (i.e. Gohman property) be replaced by the Park's name, once a name has been assigned by the County Board;

2. That meeting minutes from the County Board be added (Appendix B).

12. Mike Brubaker, Executive Director, Sherburne History Center, was present to review the 2012 grant request from the Sherburne History Center. Mr. Brubaker provided a review of the various programs offered by the History Center, staffing, hours and statistics on visits/requests for information, fund raising, etc. No action taken.

At 10:07 a.m., the Chair recessed the Regular Meeting and opened the Regional Rail Authority Meeting.

At 10:17 a.m., the Chair adjourned the Regional Rail Authority Meeting and reconvened and recessed the Regular Meeting.

At 10:27 a.m. the Chair reconvened the Regular Meeting.

Appendix C
Public Comments

In March 2011, public comments were solicited from the following persons and local agencies, in addition to Sherburne County department heads:

J. Shermak	Becker Township
K. Neu	City of Becker
J. Thares	City of Big Lake
K. Mechtel	City of Clear Lake
J. Barnhart	City of Elk River
J. Blake	City of Princeton
M. Glaesman	City of St. Cloud
B. Towle	City of St. Cloud
R. Piasecki	City of Zimmerman
D. Doran	Sherburne County SWCD
T. Determan	Sherburne County SWCD
M. Basiletti	Sherburne County SWCD
M. Monte	USDA NRCS
K. Hidde	USDA Farm Services
A. Sittauer	US Fish & Wild Life Service
R. Quady	MnDNR Sand Dunes State Forest
R. Stradal	MnDNR Waters
S. Pfeifer	MnDNR Regional Planning
R. Patton	Mn Dept of Agriculture
C. DuMont	MnDOT District 3
S. Mareck	St. Cloud Area Planning Organization
T. Moore	St. Cloud Area Partnership
M. Edwards	St. Cloud State University
J. Wothe	City of Clearwater
A. Schumann	City of Monticello
C. LaDoucer	City of Nowthen
H. Nelson	City of Ramsey
M. Robertson	City of Otsego
M. Hlen	City of St. Francis
C. Benson	Benton County
T. Anderson	Isanti County
M. McPherson	Mille Lacs County
D. Adams	Stearns County
T. Salkowski	Wright County
A. Arvidson	Treeline
J. King	Economic Development Serives
J. Husveth	Critical Connections Eco. Serv.

The majority of the Public Comments are based on the DRAFT Comprehensive Plan, dated March, 2011.

April 1, 2011 DeAnna Doran, Sherburne County Soil & Water Conservation District

PUBLIC COMMENT:

On page 43, under Green Acres; the paragraph discussing the covenant is incorrect. The SWCD doesn't require nor administer the eight year covenant. The SWCD is only responsible to provide a Conservation Assessment Plan, which was originally required in order to enter into the Rural Preserve Property Tax Program. After the SWCD completes the Conservation Assessment Plan, the landowner than goes to the Sherburne County Assessor's office and is required to enter into a covenant through the Assessor's office, which is then recorded. The paragraph should be corrected as follows:

> *In 2009, state tax law was changed again, creating the Rural Preserve Property Tax Program. The intent is that properties which no longer qualify for Green Acres (i.e. class 2b rural vacant land) may qualify for Rural Preserve beginning in 2011. Rural Preserve uses a similar tax deferment plan and requires that the property be entered into an eight year covenant with the Sherburne County Assessor's Office. If the covenant is violated, the property may be removed from the Rural Preserve Program by the County Assessor, requiring the payment of the previous three years property tax deferment. As of September, 2010, the Sherburne County Assessor's office has administered 28 covenants totaling 1,360 acres, involving 8 landowners.*

COUNTY'S RESPONSE:

Paragraph removed per 2011 legislation, eliminating rural preserve covenants.

April 5, 2011 Scott Mareck, St. Cloud Area Planning Organization

PUBLIC COMMENT:

From the APO's perspective, two transportation projects that should be discussed further in the transportation element of Sherburne County's Comprehensive Plan are the proposed Sherburne CSAH 7 realignment west of the St. Cloud Regional Airport and also the proposed 33rd Street South Mississippi River Crossing.

The APO, Sherburne County, City of St. Cloud and others have been working with SRF Consulting Group over the last couple of years on a Corridor Study evaluating potential alternatives for realigning Sherburne CSAH 7. The need for realigning Sherburne CSAH 7 is primarily tied to a potential future extension of a St. Cloud Regional Airport runway. This project is also identified in the APO's financially constrained 2035 Transportation Plan. Discussion of this Study is merited by the County in your Comprehensive Plan. Reference can be made to this potential project with a caveat that the County has not formally committed financially to the improvement at this point.

With regard to the proposed 33rd Street South Mississippi River Crossing, Sherburne County and Stearns County signed an EIS Scoping Document prepared by the APO for this proposed project in 2005. The EIS Scoping Document summarizes social, economic, environmental and transportation analysis for a variety of local River Crossing alternatives extending from University Drive on the north end of the study area to I-94 on the south end of the study area. All alternatives are assumed to have connecting points of TH 15 and TH 10, with a future freeway connection to TH 10 in the vicinity of Sherburne CR 65/CSAH 3. An interchange will be under construction next year at 33rd Street South and TH 15 on the west end of the Corridor. Again, given the history of this project, its regional significance and the involvement by the County in this study process, discussion of this project and the completed analysis and planning is merited by the County in your

Comprehensive Plan. Reference can be made to this potential project with a caveat that the County has not formally committed to the improvement at this point. This project is an illustrative project in the APO's 2035 Transportation Plan and is also identified in the Stearns County and City of St. Cloud Comprehensive Plans.

COUNTY'S RESPONSE:
Chapter 5 (Transportation) summarizes the County Transportation Plan (2007), and is not intended to replace this plan. Because the proposed CSAH 7 realignment and proposed 33rd Street River Crossing are APO projects (not County), and are not specifically addressed by the County Transportation Plan, they are not addressed in the County Comprehensive Plan.

The County Planning & Zoning Department has had no involvement in the CSAH 7 realignment study, and two of the six realignment options are not located within the County's zoning authority (Haven Township, and City of St. Cloud authority).

Figure 9.39 (page 122) includes two maps from the St. Cloud Comprehensive Plan (2003) which show alternatives for a river crossing, and the CSAH 7 realignment.

April 11, 2011 Blue Hill Town Board

PUBLIC COMMENT:
Page 52 – There are new rules for the [Board] *of Adjustment. Don't have to prove hardship.*

Page 88 – Regional trail systems are a pipe dream. Land acquisition & grants have been ongoing for over 10 years & nothing gets done. Time to abandon the idea of a trail system.

Page 90 – Park fees are a redundant & regressive tax. Blue Hill has no plans for, nor no use for their park money at this time.

What does implementation 7-2 mean? How much time?

Chapter 11 – Eliminate or reduce 75% tree cover in Ag District.

COUNTY'S RESPONSE:
Variances:
The term "Hardship" is removed on page [53]. State legislation was amended in 2011 (MN Statute 394.27, subd 7), deleting hardship, and adding practical difficulties.

> *"Variances shall only be permitted when they are in harmony with the general purposes and intent of the ordinance and when the variances are consistent with the comprehensive plan. Variances may be granted when the applicant for the variance establishes that there are practical difficulties in complying with the zoning ordinance. "Practical difficulties," as used in connection with the granting of a variance, means that the property owner proposes to use the property in a reasonable manner not permitted by the zoning ordinance"*

Regional Trails:
In 2003, the County conducted a scientific survey of 500 city and township residents. According to this survey:

Q: Highest priority recreational need?
A: Trails (39%); Parks (14%); Unsure (20%); None (7%).

Q: Visit likelihood if more access trails?
A: Much more likely (15%); Somewhat more likely (25%); No difference (58%).

Q: Development of non-motorized trail system?
A: Top priority (4%); High priority (16%); Medium priority (44%); Low priority (22%).

Q: Rail Corridor for non-motorized trail?
A: Strongly support (24%); Support (46%); Oppose (14%); Strongly oppose (9%).

Since 2008, one of the County Board's annual goals has been to complete land acquisition for the Great Northern Trail between Elk River and Princeton.

Park Dedication Fees:
Park Dedication Fees are not a "regressive tax." MN Statute 394.25, subd 7 establishes "official controls" for counties concerning land development. When land is subdivided, a county may require land dedication or a park dedication fee. Park Dedication Fees may only be used *"for the acquisition and development or improvement of parks, recreational facilities, playgrounds, trails, wetlands, or open space" and may not be used for "ongoing operation, maintenance, or redevelopment."*

MN Statute 394.25, subd 7(m); *The county must use at least 75 percent of the funds collected under this subdivision according to the plan required in paragraph (d)* [referring to capital improvement plan and parks plan or parks component within comprehensive plan] *in the township or city where the collection of funds occurs. However, the township board or city council may agree to allow the county to use these funds outside of the township or city in a manner consistent with the county parks, trails, and open space capital improvement plan or the county parks and open space component in its comprehensive plan. The remainder of the funds may be used by the county only for parks and trails connectivity and accessibility purposes. The county must annually report to cities and townships on where funds were collected and where funds were expended in the past year.* [This language was added in 2003 to MN Statute 394.25, subd. 7 (l) by S.F. 484]

Implementation 7-2 (page 144):
Consider amending land use application procedures to reduce the amount of time from when an application is submitted to the County, to the time the application is approved (including administrative and public hearing processes).

The intent of Implementation Strategy 7-2 is to further discuss with townships which land uses the town boards feel comfortable about allowing as Permitted Uses, and what specific requirements should those uses adhere to. Example: if an applicant applied to allow a retail sales business with outside storage on a property zoned for commercial/industrial use, and the specific use is a permitted use according to the Zoning Ordinance, County Staff should be able to review and approve the application within 5-business days vs. 2-3 months if a public hearing were required.

A common concern heard from landowners and business owners is that the approval process for subdivisions, conditional/interim use permits, etc. takes too long. It is common for this process to take two to three, or more months. There are two solutions to speed up the process;

1. Allow more permitted land uses and fewer conditional/interim uses (CUP/IUP).

   CUP's and IUP's require public hearings. MN Rule 15.99 requires the County to approve or deny a complete application within 60-days. A complete CUP/IUP application requires the applicant to submit comments from the applicable Township (among other requirements). Most Town Boards, the County Planning Commission, and the County Board meet individually once per month regarding planning & zoning requests, thus when the County receives a complete application and when these boards meet, often affects how long it takes to receive approval.

   In 2009, County Staff met with each Town Board to discuss the Comprehensive Plan and preferred options regarding zoning regulations (see Appendix A). Specifically, townships were asked;

   > *"If the townships could determine specifically what types of land uses could occur on which properties, and what that land use should look like, would your township be willing to have more Permitted Uses and fewer CUP's & IUP's? In other words, if the township said "if you're willing to do X, Y, & Z, you can build without a CUP/IUP."*

   Of the nine Town Boards surveyed, five responded yes, three responded no, and one township was unsure. Blue Hill Township responded yes (Feb 9, 2009).

2. Have more frequent township, Planning Commission, and County Board meetings.

   County Planning Commission meetings have a considerable expense (Staff time, Commissioner's per diem and mileage), and can cost over $1,000 per meeting. Depending on the number of public hearings, application fees often do not cover these expenses. Because of these expenses, it is unlikely that the County would increase the frequency of public hearings unless application fees were increased to cover additional costs.

75% Tree Coverage:
Blue Hill Township is zoned (2010) General Rural, except for areas within the Sherburne National Wildlife Refuge, which is zoned Agricultural. Within the Agricultural zoning district, for property to be subdivided into less than 40-acres, each lot must be a minimum of 75% wooded with a treed canopy. There is general agreement among the Town Boards with Agricultural Zoning that either the wooded requirement needs to be better defined, or that this requirement needs to be replaced (see Appendix A). County Staff will consult with townships regarding any proposal to clarify or replace the 75% wooded rule.

April 12, 2011 Anne Sittauer, Sherburne National Wildlife Refuge

PUBLIC COMMENT:
Thank you for the opportunity to review the Sherburne County Comprehensive Plan. I have reviewed the plan and I have one comment. On page 10 of the draft

plan it stated that "the number of National Wildlife Refutes in Minnesota is "10". This statement is not accurate; rather there are 13 National Wildlife Refutes and 5 Wetland Management Districts in Minnesota.

I am supportive of the 2005 Sherburne County Parks, Trails, and Open Space Policy Plan and the Sherburne County Comprehensive Land Use Plan.

COUNTY'S RESPONSE:
Corrected.

April 15, 2011 Katie Larsen, City of Big Lake

PUBLIC COMMENT:

1. *Page* [70]*, TH 10 Bypass: The City of Big Lake has not taken a formal position in regards to future planning around the proposed TH 10 Bypass since MnDOT put the project on hold indefinitely in 2008. The City's TOD Master Plan, for practical purposes, was designed without the TH Bypass going through.*

2. *Page* [70]*: The City of Big Lake and City of Monticello have had very preliminary discussion regarding the possibility of a second river crossing east of Highway 25.*

3. *The City adopted a Complete Streets Policy in 2010 and would encourage the County to consider such a policy especially along County roads abutting city limits to promote pedestrian and bicycle connectivity.*

4. *The City has realized a greater need for code enforcement, screening and land use zoning along BNSF since the start of the Northstar Commuter Rail.*

5. *Page 73: The City officially adopted its TOD Design Guidelines and Zoning Ordinance in December 2008.*

6. *Economic Development: The City appreciates the County's support in our efforts to develop an industrial rail park that could support 1,000 jobs+ and significant increase in revenue generating tax base. We hope to develop this economic development relationship with the County.*

7. *Northstar Commuter Rail: The City appreciates the County taking the lead on facilitating discussions and meetings with all entities along the Northstar Corridor.*

8. *Page* [89]*: The City suggests including County Road 5 and/or 43 as a Trail Corridor Route to support bike enthusiasts interested in utilizing the Northstar from the Cities to Big Lake. We receive several inquiries from bicyclists regarding the City and County trail systems. The Mississippi River, Wildlife Refuge and Sand Dunes are attractive destinations.*

9. *Page* [110]*: The Big Lake Comprehensive Plan was adopted in 2000 with major revision completed in 2005. Several minor amendments have occurred to date. The City is hoping to start a new comprehensive plan in the near future.*

10. *The City's Comp Plan guides land use along the Mississippi and Elk Rivers as Low Density Residential, Rural Residential and Estate Low Density Residential.*

COUNTY RESPONSE:

RE: comments 1, 2:

This section (page 70) is a summary of the Sherburne County Transportation Plan (2007), and does not specifically address items not included within the Transportation Plan.

RE: comment 3:

Sherburne County has not adopted a Complete Streets policy other than what is included in the Transportation Plan (page 55-61 of Transportation Plan). The Planning Commission considered Complete Streets as an Implementation Strategy (Chapter 10: Goals & Policies), and recommended against it, stating that such a requirement would be "onerous, difficult, and impractical for builders."

RE: comment 4:

In areas within the County's zoning jurisdiction, existing (2010) land use along the Northstar Commuter Rail corridor includes; an auto salvage yard, light manufacturing, a lumber yard, farmland, and single family homes. Prior to Northstar (2009) these areas were not viewable to the public. The County enforces a solid waste (i.e. junk) ordinance on a complaint basis. No complaint has been filed, as of the adoption of this Comprehensive Plan. Screening and land use restrictions (unless in violation of solid waste ordinance) are addressed at the time an applicant requests a land use change (i.e. subdivision, CUP/IUP, etc). The County Planning & Zoning Department suggests three options to take care of the concern that the view from commuter rail cars inappropriately represents Sherburne County:

1. The NCDA can install screening (fence and/or trees) along the rail ROW, or work with adjacent property owners to install screening;
2. A person may file a complaint with the County concerning junk, etc. The County will investigate, and if the complaint is valid, the property owner will be required to clean up the property in compliance with the Solid Waste Ordinance. However, based on previous cases where there was a large amount of refuse (junk) and an uncooperative landowner, resolving complaints can take years and considerable cost to the County.
3. Do nothing. When an adjacent property owner applies for a change in land use and there is a solid waste violation, the violation must be resolved prior to their application being approved. Additional screening may be required as a condition of their approval.

RE: comment 5:

Corrected.

RE: comment 8:

Figure 7.12 (Planned trail corridor routes) is taken from the Sherburne County Parks, Trails, & Open Space Policy Plan (2005). This map is also included within the County Transportation Plan (2007). The City's request to add a planned corridor connecting the Northstar Commuter Rail station and Sand Dunes State Forest (CSAH 43, TH 10, CSAH 5) was brought to the County Park Commission on June 2, 2011, who recommended that the Park Plan be amended to add this planned trail corridor. The County Board will consider this request prior to adoption of this Comprehensive Plan.

RE: comment 9:

Corrected.

RE: comment 10:

Corrected (page 110).

May 5, 2011 Livonia Town Board

PUBLIC COMMENT:

1. *Supervisor Sherper, Hewitt and Manthei read the plan thoroughly; Supervisor Doebler had not completed reading the entire plan as of the Town Board meeting on April 25, 2011 but intends to and may offer comment; Supervisor Hass skimmed the plan.*

2. *The Livonia Town Board discussed the Sherburne County Draft Comprehensive Plan at their April 25, 2011 Regular Board Meeting.*

3. *The Plan does not address the Township's 20-year vision for growth because the growth is no longer there due to economic turndown.*

4. *Suggests a summarization of each chapter up front in the report followed by Chapter 8 Future Land Use, Goals and Policies followed by Township Plans and all the informative County History, demographics, etc. Assuming the 2010 census data will be reflected in the final plan; not based off the 2000 census. On page 128 under Previous Township Studies in the first paragraph, eliminate the reference to a 20 acre athletic complex in the southeast quadrant-we are not sure where that came from. The plan feels like a boiler-*[plate] *document. The Board was expecting the County Plan to be in the front so as to highlight the County Plan then follow up with everything else-is all of the demographic info necessary for each Township? Is it necessary to provide all the detail for each Township-maybe summarize only as was done with the Cities. Eliminate previous studies, include only the current individual Town land use plan maps. This document should standout as being first and foremost a County Plan.*

5. *Because of the way the Plan is formatted and because the census/demographic information do not reflect current values, because of the "bulkiness" and because this document does not say "This is a County Land Use Plan", the Board would not recommend approval.*

COUNTY'S RESPONSE:

An Executive Summary has been added.

County Staff met with the Livonia Town Board in January and May, 2011 to discuss the Township's and County's comprehensive plans. The County's Plan as it relates to Livonia, is based from the direction provided by the Town Board.

2010 Census figures were published in March, 2011 a few days prior to the County's issuance of the Draft Comprehensive Plan. The County's intent was always to distribute the Draft to the townships as soon as possible, so that townships could comment on the plan prior to the Planning Commission making a recommendation for approval (est. June, 2011). In the mean time, Staff would update population figures prior to the Planning Commission's recommendation.

This Comprehensive Plan is not a boiler-plate document. After the Comprehensive Plan was last adopted in 2004, County Staff heard a number of comments from townships that the Plan did not provide enough attention to individual townships. In response to that, Chapter 9 (Township Land Use Plans) addresses the uniqueness of each township.

May 11, 2011 Big Lake Town Board

PUBLIC COMMENT

Lots of info about Hwy 10 & 169, not much about east/west transportation corridor.

Each Twp should have automatically been scheduled to sit with a county representative re: plan for their specific Twp. Lots of statistical info available, not much regarding planning.

Question the population projection & if these are really feasible estimates for growth considering the housing & economic climate.

Would like to see [Figure 9.14] *changed to either a picture of the playground at Big Lake Lions Park, the Town Hall or the Big Lake Big Lake Town Hall & Park Marquee sign. Also noticed no mention of Big Lake Twp Lions Park in park section.*

COUNTY'S RESPONSE:

Much of Chapter 5 (Transportation) is a summary of the Sherburne County 2007-2030 Transportation Plan, and is not intended to duplicate all information from the Transportation Plan. The County's primary east-west corridor is US Hwy 10. Figure 5.4 (Future Functional Class) identifies CSAH 4 as a Minor Arterial (connects Becker and Zimmerman), and CSAH 3 as a Major Collector (connects St. Cloud and Princeton).

County Staff met with each Town Board in 2009 to discuss the Comprehensive Plan update process, and township's preferences for what to change in the Zoning and Subdivision ordinances (Appendix A). Because a number of Town Board's meet on the same dates, it would take 3-4 months for Staff to meet with each Town Board at a regular township meeting, thus Staff is available to meet with townships, if the Town Board requests.

The 2010-2030 population projections have been removed. The State Demographic Center published these projections (2006-2035) in 2007 (pre-recession). The State's projection for 2010 (101,560) is significantly higher than the 2010 Census estimates (88,499). The State plans to revise projections in late 2011/2012. It is the County's intent to amend the Comprehensive Plan once these projections are published.

Figure 9.14 (photo of town sign) has been replaced with a photo of Lions Park. Chapter 7 (Parks & Recreation) does not describe in any detail township or city parks. Detailed descriptions of these parks would be more appropriate in the County's Parks, Trails, & Policy Plan. The Comprehensive Plan map does identify township parkland as "Parks & Open Space."

May 17, 2011 Clear Lake Town Board

PUBLIC COMMENT

Map on page 116, property shown from the city limits following Hwy 24 down to Cty Rd 8 be left as shown but the property from Cty Rd 8 to river to remain as Agriculture..

Requirement 75% wooded, would like to see changed to 50% for platting purposes.

COUNTY'S RESPONSE:
Map corrected to show areas east of the proposed MN Hwy 24 interchange to be Urban Expansion-Business & Industry, and areas west to be Agricultural, except for areas within the Scenic & Recreational River zoning district, and property currently (2011) zoned Industrial on the SW corner of MN Highway 24 & Co Rd 8.

The wooded requirement will be discussed during the Zoning & Subdivision ordinances update.

May 17, 2011 Becky Balk, Minnesota Department of Agriculture

PUBLIC COMMENT:
I looked over the Sherburne County Draft Comprehensive Plan and made a couple of observations. But before I get to those. I want to compliment the County on its thoughtful and careful job examining the different approaches to protecting agricultural land. The draft plan looks like it will provide a good foundation for the subsequent zoning discussions. The only observations I have are in regard to Green Acres and agriculture's contribution to the County's economic development. No doubt you are aware that the Legislature just passed a new bill that revises Green Acres and the Rural Preserves Program. Perhaps you might want to add the latest changes to the program in the Land Use Chapter on [page 44]..

Here is a link to the program descriptions provided by the Minnesota Department of Revenues Property Tax division www.taxes.state.rnn.us/property .

In regard to the chapter on Economic Development, there isn't any mention on how agriculture fits into the county's economic development, nor. is it included in the economic development work plan. Since protecting agricultural land is economic development, the county may want to include that rationale in this chapter. More and more states, communities, organizations and producers are promoting investment in agriculture through loan and grant programs, the development of high-value agricultural products and services, direct marketing of farm products and diversification.

Below is a list of a several strategies the county may want to consider:
- *Planning for agricultural viability*
- *Business planning and capital investment*
- *Loan programs and economic development incentives*
- *Farmers' markets*
- *Direct Marketing*
- *Marketing to restaurants and food retailers*
- *Community supported agriculture*
- *Diversification*
- *New products and marketing strategies*
- *Agritourism*
- *Grower Cooperatives*

COUNTY'S RESPONSE:

RE: Green Acres and Agricultural Preserve:
Corrected.

RE: Agriculture and Economic Development:
Chapter 6 (Economic Development) does not specifically address agriculture. This chapter concentrates more on the four major employment industries in the County. According to the 2005-2009 American Community Survey, less than 1% of the County's workforce is employed in agriculture (agriculture/forestry/fishing/hunting/mining). Agriculture and its economic impacts are discussed in Chapter 4 (Land Use).

The Central Minnesota Region 7W Comprehensive Economic Development Strategy report (CEDS) discusses agriculture's economic impact in greater detail than space will allow within the Comprehensive Plan.

Of the strategies suggested by the MN Dept. of Agriculture, the County does not directly participate in these. However, some of these strategies operate independent of the County, such as;

- Elk River Farmer's Market
- MN Historical Society's Kelley Farm (agri-tourism)
- Community Supported Agriculture (CSA);
- Lacey "J" Ranch (Blue Hill Township) (vegetables, fruits, breads, eggs)
- USDA programs (i.e. conservation reserve program, farm loan programs, etc.)

There are a number of fruit & vegetable stands operating throughout the County, defined as a "Farm Related Business", which is a Conditional Use within the Agricultural and General Rural zoning districts.

May 18, 2011 Orrock Town Board

PUBLIC COMMENT:

1. *This plan contains many of the earmarks of "UN Agenda 21" and is but the local version of it, which every American who cherishes Liberty and freedom should oppose with every fiber of his being. The vague clauses and statements of 'policy' contained in this plan leave the field wide open for future "NGO" regulations, being but a means to by pass constitutional restraints on infringements on private property and associated liberties dependent upon protection of private property rights. When fully implemented, "Agenda 21" will cede American sovereignty entirely to global government, and will do so without the consent of elected officials. It is not only a violation of the constitution of the United States but your vote to approve of it is violative of your oath of office.*

http://www.freedomadvocates.org/articles/illegitimate_government/iclei%3a_local_governments_for_sustainability_and_the_u.n.connection_20100807421/

http://www.activistpost.com/2011/05/property-rights-under-attack-in-nj-re.html

2. *Orrock's Hamlet line should extend east to 180th St.*

COUNTY'S RESPONSE:
RE: Hamlet: The Hamlet Mixed-use designation has been extended east to 180th Street.

RE: Agenda 21: Sherburne County is not aware of the "earmarks" within the United Nations' Agenda 21, nor its relationship to the County's Comprehensive Plan.

The act of "planning and zoning activities" as authorized under MN Statute 394.21 does not constitute eminent domain. When property is zoned or re-zoned, it is often at the request of the property owner. The County as a zoning authority does have the ability to zone or re-zone land without a property owner's consent, in compliance with the Public Hearing process. In most cases, this has been in response to major changes such as the County adopting a Zoning Ordinance in 1971, and significantly changing zoning district classifications in 1994. After the 2010-2030 Comprehensive Plan is adopted, the County's intent is to significantly change (re-write) the zoning and subdivision ordinances. Any changes will be based on recommendations provided by townships and the County Planning Commission through the public hearing process. If there are specific concerns the Town Board has, it is important that those concerns be expressed to the County's Planning & Zoning Department.

The UN [United Nations] Agenda 21 and correlating webpage link refer to a Freedom Advocates blog entitled; "ICLEI: Local Government for Sustainability and the U.N. Connection". Freedom Advocates' mission *"is to advance the principles of freedom to individuals and government through public discourse."* (http://www.freedomadvocates.org/about_us/ accessed May 19, 2011)
ICLEI is an acronym for the "International Council for Local Environmental Indicatives." ICLEI provides technical assistance to local governments in implementing sustainable development. ICLEI consists of over 1,200 local governments world-wide. Within Minnesota, member communities include; Blue Earth County, Duluth, Golden Valley, Hennepin County, Mahtomedi, Mankato, Minneapolis, Oakdale, Rochester, Roseville, St. Paul, and Virginia. Sherburne County is not a member community.

Agenda 21 was published by the United Nations Department of Economic and Social Affairs, Division for Sustainable Development. *"Agenda 21 is a comprehensive plan of action to be taken globally, nationally and locally by organizations of the United Nations System, Governments, and Major Groups in every area in which human impacts on the environment".* (http://www.un.org/esa/dsd/agenda21/index.shtm accessed May 19, 2011)

The second webpage link refers to an Activist Post blog entitled "Property Rights Under Attack In NJ Re-zoning Land Grab." *"Activist Post is an Independent News blog for Activists challenging the abuses of the establishment"* The blog article discusses Kingwood Township's (New Jersey) proposed rezoning for a Scenic Corridor Overlay Zone along a highway, and the Township's proposed amendment to a Solar Ordinance to include a deed restriction on private property. The blog article vaguely links zoning (i.e. government's restriction of land use) to the use of Eminent Domain, and zoning restrictions as the taking of private property without just compensation.

Eminent Domain is the condemnation of property by the government for "public use" (MN Statute 117.025) such as;

1. *the possession, occupation, ownership, and enjoyment of the land by the general public, or by public agencies;*
2. *the creation or functioning of a public service corporation; or*
3. *mitigation of a blighted area, remediation of an environmentally contaminated area, reduction of abandoned property, or removal of a public nuisance.*

"The public benefits of economic development, including an increase in tax base, tax revenues, employment, or general economic health, do not by themselves constitute a public use or public purpose." (emphasis added).

The County's *Land Transaction Policy and Procedures* (2006) states;

The Sherburne County Board of Commissioners has identified that economic development is a critical component of the planning strategy for the county and that the infrastructure of the communities within Sherburne County is essential to the maintenance of the county tax base.

The Board has also identified that public parks and trails are an integral part of the quality standard of living in Sherburne County.

It is therefore the policy of the County of Sherburne that voluntary land transactions shall be undertaken, to the extent practicable, in the best interests of all county residents and with consideration given to economic development and the potential impact on the infrastructure of political subdivisions located within the county. For purposes of this policy statement, voluntary land transactions include the sale of county owned land and purchases by the county of parcels either privately owned or under the control of other political jurisdictions.

June 1, 2011 Livonia Town Board

PUBLIC COMMENT:
Doebler/Hewitt unanimous to approve the County dratf comp Plan with the following amendment: Remove the reference to Livonia Township Community Vision for Land Use Plan on [page 127] *and* [corresponding map]*; the information is outdated. Replace the picture on* [Figure 9.47] *with a picture of the Sugarbush Park. Supervisor Hass was absent from the meeting; all other supervisors indicated they read the Plan thoroughly.*

COUNTY'S RESPONSE:
Corrected. A short description acknowledging the *Livonia Township Community Vision for Land Use* is included, noting that the plan was replaced by the Township's Comprehensive Plan.

July 16, 2011 Wayne Chermack, Orrock Town Board member

PUBLIC COMMENT:
Miss RIddle, May I respectfully suggest you present this link and the information contained on the website there, relating to the comprehensive land use plan that one of your employees will be discussing at the upcoming monthly meeting of the Orrock Town board.

Please disregard the language in the comments section; the important parts of the basic contents of the page, including the videos; those in your administration are well advised to learn the truth about this plan they are promoting, and can draw their own conclusions from the information presented.

http://kritterbox.com/showthread.php?tid=1126

COUNTY'S RESPONSE:
See response to Orrock Township, page 169-171.

July 22, 2011 Chuck Nagel, Baldwin Township resident

PUBLIC COMMENT:
Dear Mr. Sevald;

I wish to provide a couple of specific observations concerning the comprehensive plan draft contents and then offer a couple of my personal ideas to consider. First let me say that I routinely hear comments that the county "one size fits all" zoning does not serve Baldwin Township all that well. While I may not share that opinion, perception is reality. Baldwin Township has recently formed a planning commission which some refer to as a planning and zoning commission. Does Sherburne County need another jurisdiction doing zoning administration? I think not.

Accessory Dwelling Units – America's population is aging and the numbers of our parents reaching the point where they can no longer live alone remotely are increasing. Will there be sufficient availability and will all residents be able to afford assisted living residences? Clearly the accessory dwelling concept should not be applied globally as it is dependent on local considerations. What is the harm with a two acre lot when the house is set well back and sometimes almost hidden from the road?

Minimum Lot Sizes – The MPCA has apparently "recommended" a minimum two acre lot size to support a private septic system. Lafayette Township in Chippewa County, Wisconsin, like Baldwin Township being the second largest township in Wisconsin with many lake properties has a 30,000 square feet minimum lot size. A lot size of only one third the size of Sherburne seems to work well there and again I would suggest that there could be some local conditions that might be an exception. Townships are soon going to struggle with the long-term maintenance of sparsely populated roads built during the rapid development. To make matters worse, there is the plan to turnback responsibility of some county roads to the townships.

Provide Planning & Zoning Services to Townships – One possible solution to these and other perceived local zoning issues is for the county to provide planning and zoning services to townships under contract. The City of Becker provides such services to Becker Township as does Cass County to the City of East Gull Lake. The county staff has the expertise, in depth knowledge of the county ordinances and local knowledge. A very high percentage of the current zoning ordinances work very well in all parts of the county. Is it possible that a township may only need to adopt a very small subset of zoning ordinances to meet local needs?

Provide Additional Zoning Ordinance Opt-Out's – Is townships enacting any zoning ordinances (excluding adoption for purposes of joint powers) in the best interest of the entire community? Possibly an even better solution may be to expand the use of township optional ordinances like the PUD's. Consider my two issues above, accessory dwelling units and minimum lot sizes. Leave zoning administration centralized for the economies of scale. It is just possible that townships might find no need for even a planning commission much less a planning and zoning commission if they had

some zoning ordinance options?

COUNTY'S RESPONSE:

RE: Accessory Dwelling Units: Accessory Dwelling Units will be considered during the Zoning Ordinance update.

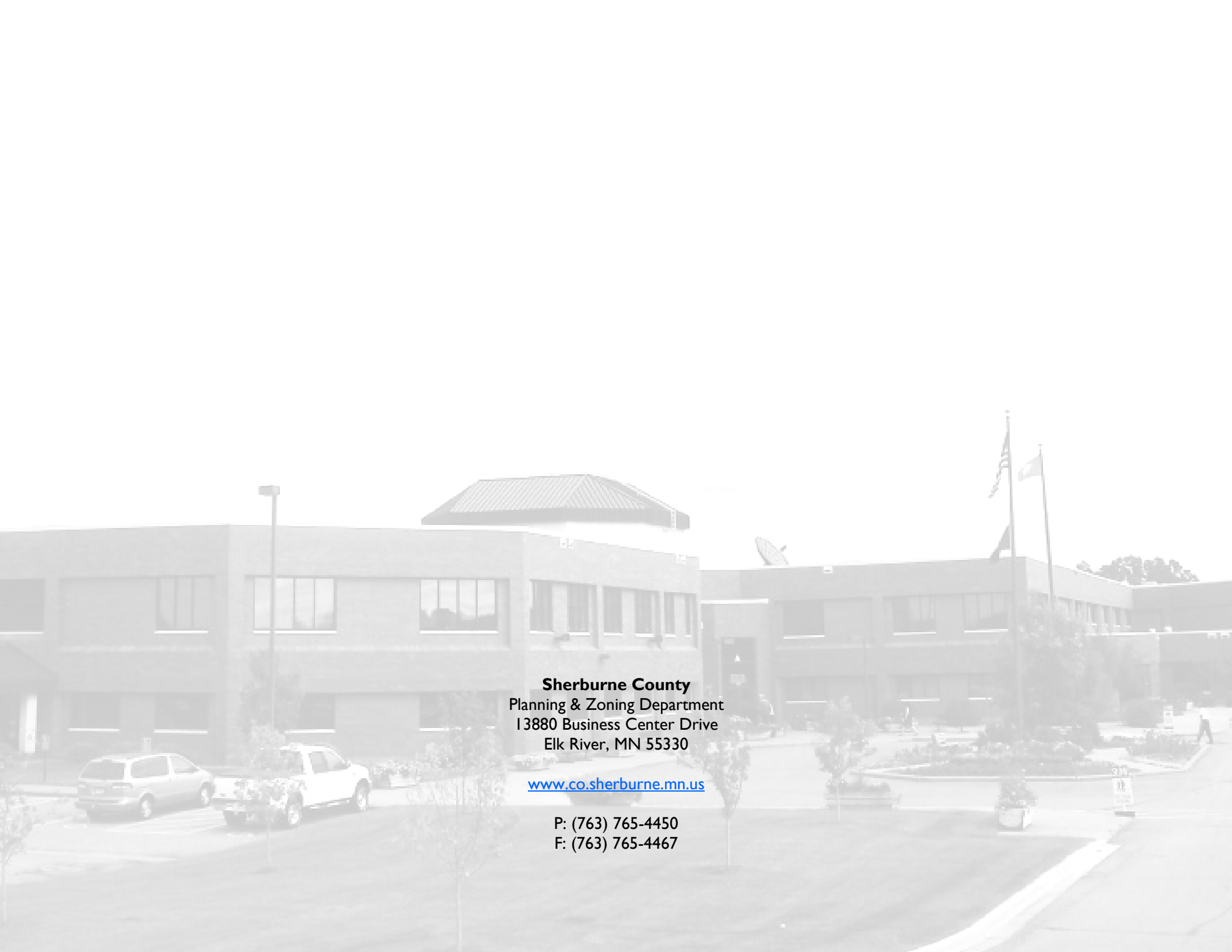
RE: Minimum Lot Sizes: In short, minimum lot sizes were determined based on the even division of a section of land (640 acres). In recent years, scientific studies (see page 67, Footnote 15) have suggested that minimum residential lot sizes utilizing individual septic systems be based on soil conditions and ground water sensitivity to contamination. These studies offer more detailed analysis within the 7-county metro, which excludes Sherburne County. When the County's geological atlas is completed (est. 2014), the atlas may identify areas where smaller or larger residential lots should be located based on scientific analysis, versus historical precedence.

In discussion of lot sizes, there are two questions; how much land is needed, and how much land is wanted. The minimum lot size varies according to the Zoning District. No matter the minimum lot size, the Subdivision Ordinance (2011) requires that a developable residential lot utilizing an individual septic system include a minimum of 40,000 contiguous sq ft (1 acre = 43,560 sq ft), at least 3' above the highest known water table, UNLESS a township with Joint Zoning Authority has adopted "Alternate Standards" (i.e. Big Lake Township), which requires a minimum of 10,000 contiguous sq ft 18" above mottled soils (for primary and alternate septic locations), and 5,000 contiguous sq ft 36" above mottled soils (for house). Soil mottling indicates the presence and depth of seasonally occurring water tables during dry periods. In 2006, the Subdivision Ordinance was amended to allow townships the option of adopting Alternate Standards to determine the developability of a lot based on additional soil testing above and beyond what is normally required. This does not affect the minimum lot size, but it has allowed development to occur on soils thought be marginal, prior to the additional soil testing.

The geological atlas should assist in determining how much land is needed to sustain a residential home in specific areas (and under what conditions), but townships need to determine what lot sizes they are comfortable with. If on-going road maintenance is a concern, a better question is where should development be guided to best utilize existing roads that are underutilized? The answer may be found in the Comprehensive Plan map (page 95). However, this map broadly defines residential areas from non-residential areas, and does not address the density of development, affected by the minimum lot size. Those details will be discussed during the Zoning and Subdivision ordinance update.

RE: Provide Planning & Zoning Services to Townships: As the County's mission statement; *"To provide the necessary services in a cost effective manner to support quality of life for Sherburne County citizens"*, the County's position is that it is more cost-efficient to tax payers for the County to continue providing zoning administration to the townships, versus for the townships to administer their own. Several townships share characteristics such as agricultural land, residential growth, and highway corridors, yet have different ideas about what is in their township's best interest. An example of this is how the Highway 169 corridor is guided for Business & Industry through Baldwin Township, yet guided for Rural Residential through Livonia Township. During the winter months of 2009, Staff met with each Town Board to discuss what changes to the ordinances each Town Board was interested in considering. The results indicated that townships want options. The process of updating the ordinances will include many optional zoning regulations for which townships will be asked which ones are acceptable, and which are not. Those options will then be paired down into a workable ordinance.

RE: Provide Additional Zoning Ordinance Opt-Out's:
See response above.



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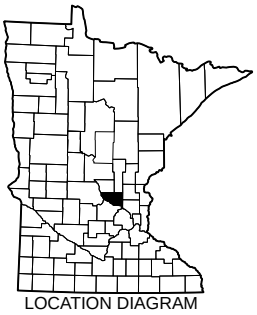
Geologic Atlas of Sherburne County, Minnesota

County Atlas Series C-32

Part B, Hydrogeology


LOCATION DIAGRAM

Report

To accompany these atlas components:

Plate 6, Water Chemistry

Plate 7, Hydrogeologic Cross Sections

DEPARTMENT OF NATURAL RESOURCES

St. Paul
2017

mndnr.gov/groundwatermapping

Recommended Citation

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County Geologic Atlas Program

The Minnesota County Geologic Atlas series has been produced since 1982. Recent atlases are produced in two parts. For Sherburne County:

Part A covers the geology and was produced by the Minnesota Geological Survey (MGS) in 2013. It contains the following: Plate 1, Data-Base Map; Plate 2, Bedrock Geology; Plate 3, Surficial Geology; Plate 4, Quaternary Stratigraphy; Plate 5, Bedrock Topography, Depth to Bedrock, and Sand Distribution Model.

Part B: the Minnesota Department of Natural Resources (DNR) expanded on this information to cover the hydrogeology in this report.

Explanations of the history and purpose of the program, atlas applications, map sales, and descriptions of the atlas components are available online:

Part A, MGS: http://www.mngs.umn.edu/county_atlas/countyatlas.htm

Part B, DNR: mndnr.gov/groundwatermapping

Geologic Atlas User's Guide: http://hdl.handle.net/11299/166713

Technical Reference

Maps were compiled and generated in a geographic information system. Digital data products are available from the DNR County Geologic Atlas Program at mndnr.gov/groundwatermapping.

Maps were prepared from DNR and other publicly available information. Every reasonable effort has been made to ensure the accuracy of the factual data on which the report and map interpretations were based. However, the DNR does not warrant the accuracy, completeness, or any implied uses of these data. Users may wish to verify critical information. Sources include both the references here and information on file in the offices of the MGS and the DNR. Every effort has been made to ensure the interpretations conform to sound geologic and cartographic principles. These maps should not be used to establish legal title, boundaries, or locations of improvements.

The basemaps were modified from the MGS Sherburne County Geologic Atlas, Part A, 2013. Universal Transverse Mercator projection, zone 15N, North American Datum of 1983. North American Vertical Datum of 1988.

Conversion Factors	
12 inches = 1 foot	1 kilometer = 0.621 miles
5280 feet = 1 mile	1 inch per hour = 7.056 x 10^{-6} meters per second
1 foot = 0.3048 meters	1 part per million = 1 milligram per liter
1 meter = 1000 millimeters	1 part per billion = 1 microgram per liter
1000 meters = 1 kilometer	1 milligram per liter = 1000 micrograms per liter

Report Contents

Introduction 1
Geology and physical hydrogeology 3
Surficial geologic units and aquifers 3
Water table 3
Buried sand and gravel aquifers 8
Potentiometric surfaces of buried sand and gravel aquifers 9
Bedrock geologic units and aquifers 16
Potentiometric surface of Mt. Simon–Mss aquifer 16
Water chemistry (Plate 6) 19
Groundwater sampling 19
Groundwater recharge sources 19
Groundwater residence time indicators 21
Tritium 21
Carbon-14 21
Inorganic chemistry of groundwater 21
Naturally occurring elements of health concern 25
Arsenic 25
Manganese 25
Hydrogeologic cross sections (Plate 7) 27
Relative hydraulic conductivity 27
Groundwater flow direction 27
Recharge and discharge: interpreted groundwater residence time 28
Recharge interpretations 28
Discharge interpretations 28
Pollution sensitivity 29
Pollution sensitivity of near-surface materials 29
Methods 29
Results 29
Buried sand and gravel aquifer and bedrock surface sensitivity 32
Methods 32
Results 33
Aquifer characteristics and groundwater use 46
Aquifer specific capacity and transmissivity 46
Groundwater use 48
Conclusions 50
Appendix 52
References 53
Glossary 55

Report Figures

Figure 1. Sherburne County location map 2
Figure 2. Simplified surficial geology 5
Figure 3. Water-table elevation and groundwater flow directions 6
Figure 4. Depth to water table 7
Figure 5. Hydrostratigraphy of Quaternary unconsolidated sediment 8
Figure 6. Potentiometric surface of the csa aquifer 10
Figure 7. Potentiometric surface of the csr aquifer 11
Figure 8. Potentiometric surface of the cse aquifer 12
Figure 9. Potentiometric surface of the scs aquifer 13
Figure 10. Potentiometric surface of the fs1 and mls aquifers 14
Figure 11. Potentiometric surface of the fs2 and suu aquifers 15
Figure 12. Bedrock stratigraphy and hydrostratigraphy 17
Figure 13. Potentiometric surface of Mt. Simon–Mss aquifer 18
Figure 14. Stable isotope values from groundwater samples 20
Figure 15. Stable isotope characteristics of groundwater samples 23
Figure 16. Elevated chloride and nitrate concentrations from groundwater samples 24
Figure 17. Arsenic values from buried sand and bedrock aquifers 26
Figure 18. Geologic sensitivity rating for the near-surface materials 30
Figure 19. Pollution sensitivity of near-surface materials 31
Figure 20. Geologic sensitivity rating for the buried sand and gravel aquifers and the bedrock surface 32
Figure 21. Cross section showing examples of pollution sensitivity ratings 32
Figure 22. Pollution sensitivity of the csa aquifer and groundwater flow directions 36
Figure 23. Pollution sensitivity of the csr aquifer and groundwater flow directions 37
Figure 24. Pollution sensitivity of the cse aquifer and groundwater flow directions 38
Figure 25. Pollution sensitivity of the scs aquifer and groundwater flow directions 39
Figure 26. Pollution sensitivity of the fs1 aquifer and groundwater flow directions 40
Figure 27. Pollution sensitivity of the mls aquifer and groundwater flow directions 41
Figure 28. Pollution sensitivity of the fs2 aquifer and groundwater flow directions 42
Figure 29. Pollution sensitivity of the suu aquifer and groundwater flow directions 43
Figure 30. Pollution sensitivity of the bedrock surface and groundwater flow directions 44
Figure 31. Deeper bedrock samples, tritium and other groundwater chemistry 45
Figure 32. Locations of DNR groundwater appropriation permit holders by general aquifer classification 47
Figure 33. Locations of DNR groundwater appropriation permit holders by water use 49

Report Tables

Table 1. Transmission rates used to assess the pollution sensitivity rating of the near-surface materials 30

Table 2. Specific capacity and transmissivity of selected wells 46

Table 3. Reported 2015 water use from DNR groundwater permit holders 48

Appendix: Groundwater field sample collection and handling details 52

Plates (separate inserts)

Plate 6, Water Chemistry

Plate 7, Hydrogeologic Cross Sections

Acknowledgements

The author would like to thank the following people for their help in reviewing this report and providing helpful suggestions: Mike MacDonald, Minnesota Department of Agriculture; Gail Haglund, Minnesota Department of Health; Bob Tipping and Barbara Lusardi, Minnesota Geological Survey; Michelle Sutherland, Sherburne County; and Dan Cibulka, Sherburne Soil and Water Conservation District. Contributors from the staff at Minnesota DNR include: John Barry, Meagan Harold, Vanessa Baratta, Paul Putzier, Ruth MacDonald, Holly Johnson, Todd Petersen, Nicholas Borchardt, and Valerie Woelfel.

Geologic Atlas of Sherburne County, Minnesota, Part B

By James A. Berg

Introduction

This report and the accompanying plates are Part B of the Sherburne County Geologic Atlas. Part B describes the hydrogeology and is produced by the Minnesota Department of Natural Resources (DNR). It builds on the geology described in Part A, which was previously published by the Minnesota Geological Survey (MGS).

The purpose of this atlas is to illustrate the hydrogeologic setting and inherent pollution sensitivity of the aquifers in the county. This information can be used to make land-use decisions that take into account aquifer sensitivity, water quality, and sustainability.

The **report** describes the hydrogeologic setting, water levels, chemistry, pollution sensitivity, and use of aquifers within the county, as well as the accompanying plates. **Plate 6** illustrates the water chemistry and **Plate 7** shows selected hydrogeologic cross sections to indicate groundwater flow directions and residence time within the buried sand and gravel aquifers and bedrock aquifers. The following information is incorporated to help visualize the distribution of aquifers, aquitards, groundwater recharge, and subsurface flow within the county.

Geology and physical hydrogeology outlines the characteristics of geologic units in the county. Hydrostratigraphic characteristics as aquifers or aquitards are identified with their corresponding geologic units from Part A.

Groundwater elevation maps give a broad look at the direction of groundwater flow in unconfined conditions (water-table elevation) and confined conditions (potentiometric elevation surfaces).

Water chemistry provides information about the water source, flow path, travel time, and residence time of groundwater. The groundwater chemistry supports the results of the pollution sensitivity models and is used to identify areas of interest, such as those with high pollution sensitivity or elevated levels of potentially harmful chemicals.

Hydrogeologic cross sections bring the physical hydrogeology and groundwater chemistry together to illustrate groundwater flow, residence time, and distribution of chemical characteristics. These cross sections help define areas of interest, such as locations of important groundwater recharge, discharge, and pollution sensitivity.

Pollution sensitivity is modeled for two conditions: 1) the near-surface materials and 2) the mapped buried sand and gravel aquifers and the bedrock surface.

The sensitivity of *near-surface materials* is an estimate of the time it takes for water to infiltrate the land surface to a depth of 10 feet. This model is based on hydrologic soil groups and surficial geologic matrix textures.

The sensitivity of *buried sand and gravel aquifers* and the *bedrock surface* is based on the cumulative thickness of fine-grained sediment (aquitard material) overlying an aquifer or the bedrock surface. The pollution sensitivity ratings are compared to tritium and carbon-14 data for residence time, and to inorganic chemistry constituents. These comparisons can be used to evaluate the model results.

Groundwater use and aquifer characteristics summarize specific capacity tests, aquifer tests, and water use records for each aquifer, where available. These data help hydrogeologists plan new wells to meet requirements for a given use.

A **Geologic Atlas User's Guide** is available from the MGS for additional information on the history and purposes of the program, various atlas applications, and descriptions of the Part A components (Setterholm, 2014).

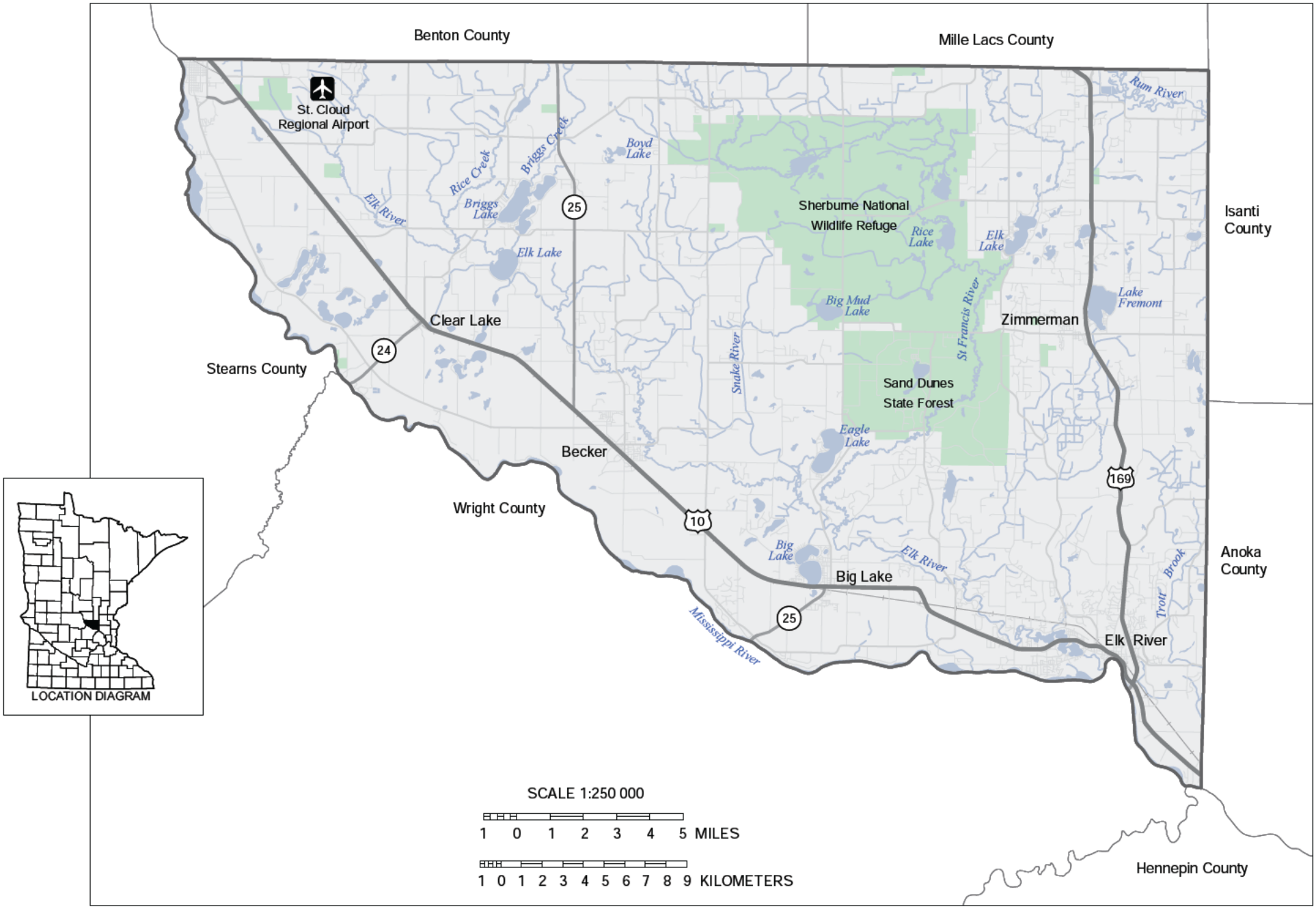


Figure 1. Sherburne County location map

Geology and physical hydrogeology

Sherburne County is located in east-central Minnesota (Figure 1). The southeastern portion of the county includes the northwestern fringe of the Twin Cities metropolitan area (Minneapolis and St. Paul). The county has a population of approximately 92,000 residents, according to a 2015 estimate (United States Census Bureau, 2016). A corridor along the western county boundary that parallels the Mississippi River has urban and suburban land use in the communities of Elk River, Big Lake, Becker, Clear Lake and a small portion of eastern St. Cloud. A large state forest unit (Sand Dunes) and national wildlife refuge (Sherburne) occupy the east central portion of the county. The remainder of the county is mostly low density rural and small communities. The Mississippi River forms the western county border. The county lies within the watersheds of the Mississippi (St. Cloud and Twin Cities) and Rum rivers. The topography is level to rolling in most of the county.

Surficial geologic units and aquifers

The origin of the topography and surficial deposits can be traced back to late-glacial events (Part A, Plate 3) as ice retreated from the county and a proglacial lake formed. The relatively thick and widespread surficial sand and gravel of the Anoka sand plain is one of the most important geologic features controlling groundwater availability and the pollution sensitivity of underlying aquifers (Figure 2).

Two major glacial events set the stage for the abundant sand deposition in this area. The first event was the advance from the northeast and retreat of Superior lobe glaciers (Part A, Plate 3, Figure 4). These glacial episodes created the St. Croix moraine that dominates the topography of the counties that surround Sherburne County to the west, south, and east. This moraine is an area of thick glacial sediment and higher land elevations that were created as the edge of the glacier stagnated in and around the current Twin Cities metropolitan area.

In a second major event, another glacial ice lobe advanced into the region from the northwest (Des Moines lobe). A sublobe of this (Grantsburg sublobe) advanced to the northeast over the St. Croix moraine across the present-day Sherburne County and into Wisconsin. As this sublobe retreated, water from the melting glacial ice was trapped within the surrounding highlands of the St. Croix moraine, creating glacial Lake Anoka. Very fine to medium-grained sand accumulated in this glacial lake creating the sandy portion of the New Brighton Formation. This formation comprises most of the surficial sand in the eastern portion of the county. As the Grantsburg sublobe melted, outwash sand and gravel were deposited in a broad plain to the north and east of the retreating ice front.

Eventually the St. Croix moraine was breached by erosion, forming the present course of the upper Mississippi River. Early flow of glacial meltwater through the Mississippi River was much greater than current flow levels and created broad sand and gravel terraces several miles beyond the present day Mississippi River valley. These deposits account for a major portion of the surficial sand and gravel in the southwestern portion of the county near the Mississippi River.

Water table

The water table is the surface between the unsaturated and saturated zones where the water pressure equals the atmospheric pressure. The water table occurs in both aquifer and aquitard sediment across the entire county.

The surficial sand and gravel aquifer is present below the water table where there is sufficient saturated thickness and yield to install a well and economically pump groundwater.

Water-table elevation (Figure 3) is estimated from several sources of data:

- The elevation of surface-water bodies (e.g., rivers, perennial streams, lakes, and wetlands)
- Static water levels in surficial sand wells obtained from well records in the County Well Index database (converted to elevations*)
- Estimates of wet soil conditions from the Natural Resources Conservation Service (NRCS) county soil survey (converted to elevations*)

**Data were converted to elevations using a digital elevation model derived from LIDAR (Light Detection and Ranging technology).*

Groundwater flow directions in the water-table aquifer are controlled by the dominant groundwater discharge locations, including the Rum, Elk, and Mississippi rivers and associated tributaries.

Depth to water table is derived by subtracting the water-table elevation from the land-surface elevation (Figure 4).

More details on how both maps were constructed can be found in *Methods for estimating water-table elevation and depth to water table* (DNR, 2016a). Shallow water-table

conditions (0–10 feet) are common in the county with the exception of the higher land surface (upland) areas near portions of Briggs Creek; the St. Francis, Snake, Elk, and Mississippi rivers; and uplands in the eastern portion of the county.

The water-table maps provide guidance for many applications, but additional site-specific information should be used to refine information at local scales. Certain conditions affect the fluctuation of the water table and can create locally different results from the maps that were created using this procedure. Some of these include, but are not limited to, seasonal weather conditions, extent and composition of surficial geology units, land-use practices, vegetation composition and distribution, and pumping of large-capacity wells.

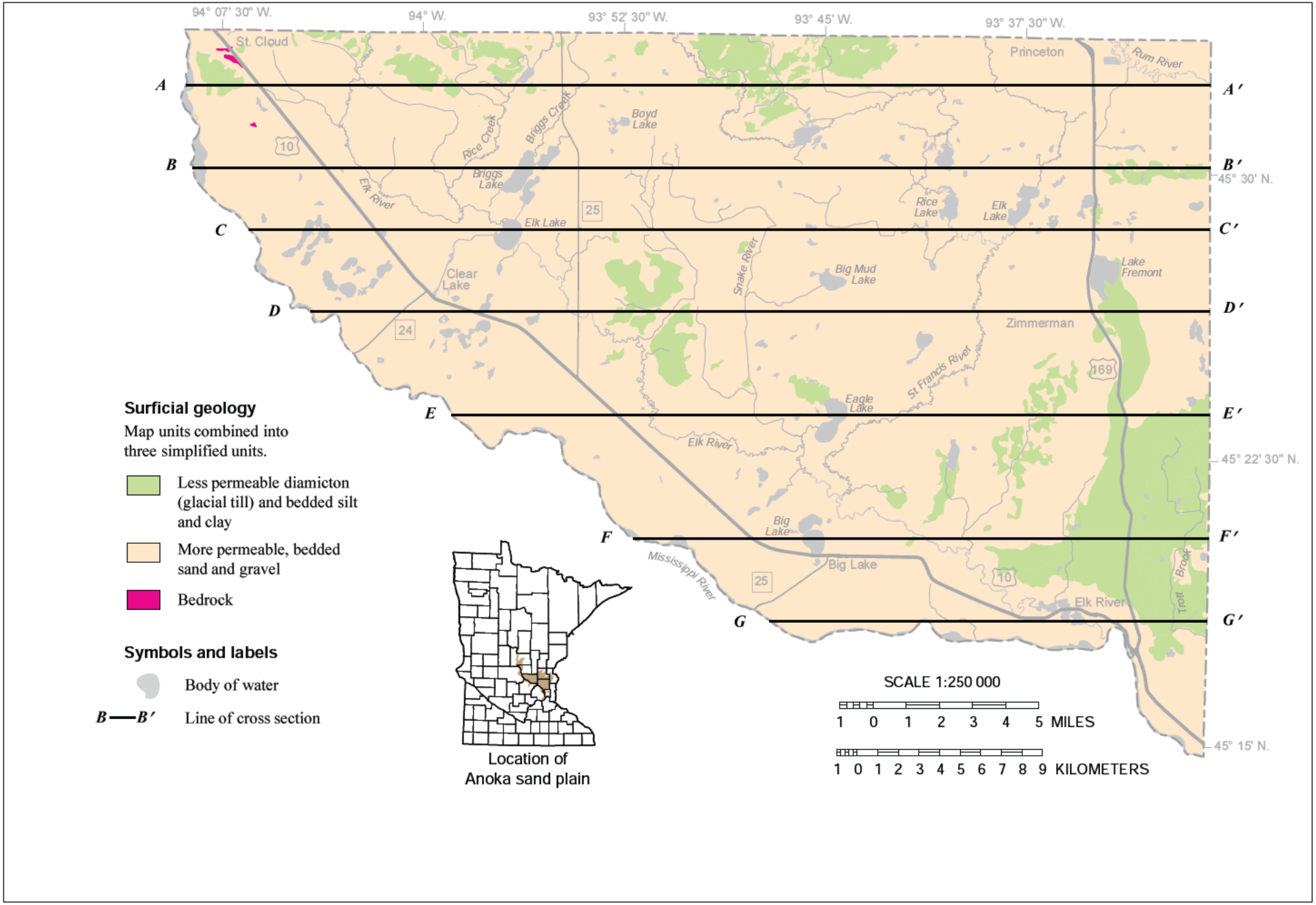


Figure 2. Simplified surficial geology

Sand and gravel is the dominant material at the surface and is a major controlling factor in the pollution sensitivity of the underlying aquifers, not only in Sherburne County, but in the larger area of the Anoka sand plain. Map modified from Part A, Plate 3, Figure 2.

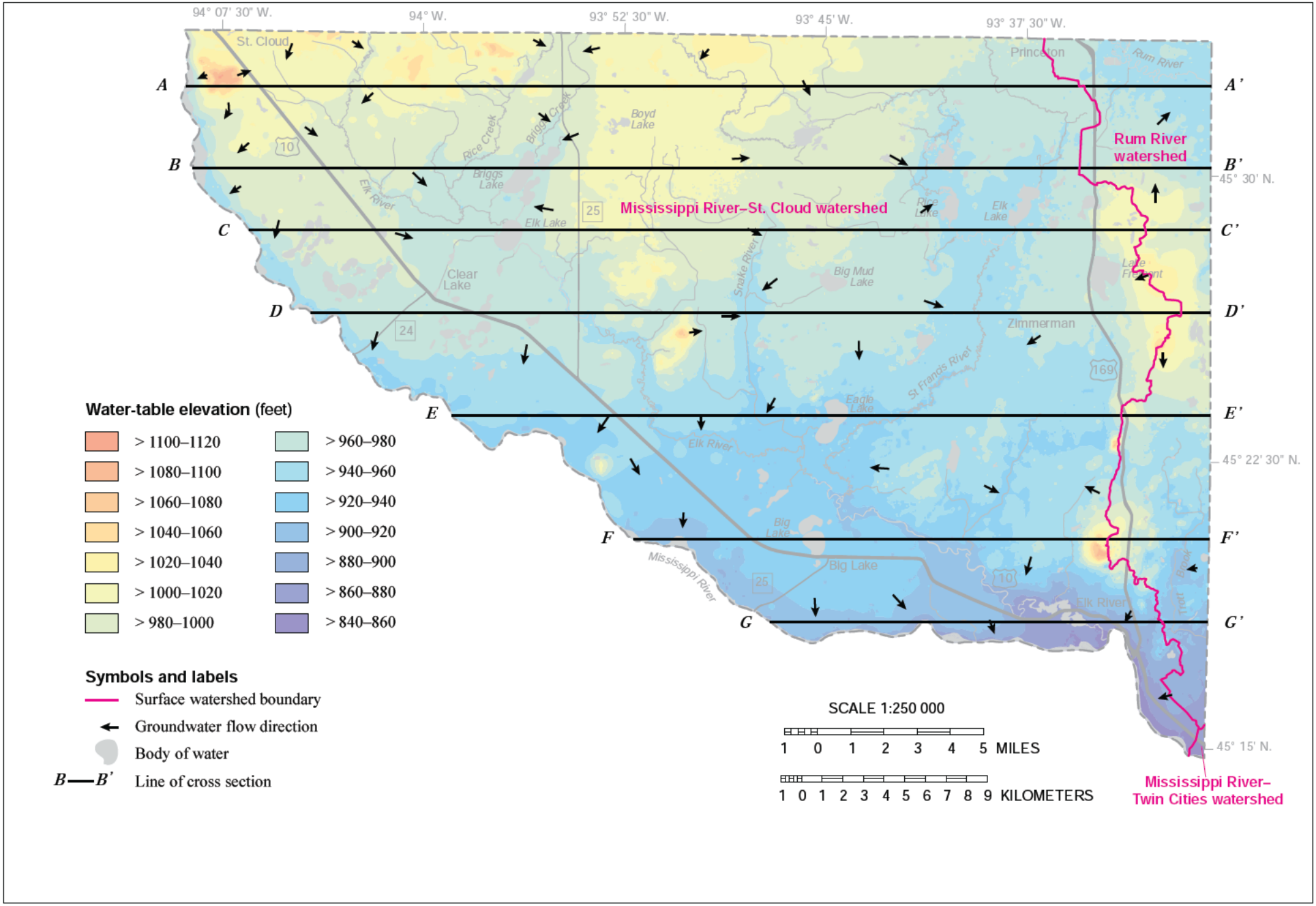


Figure 3. Water-table elevation and groundwater flow directions

Groundwater flows toward the major river valleys within the county. Map modified from Adams, 2016a.

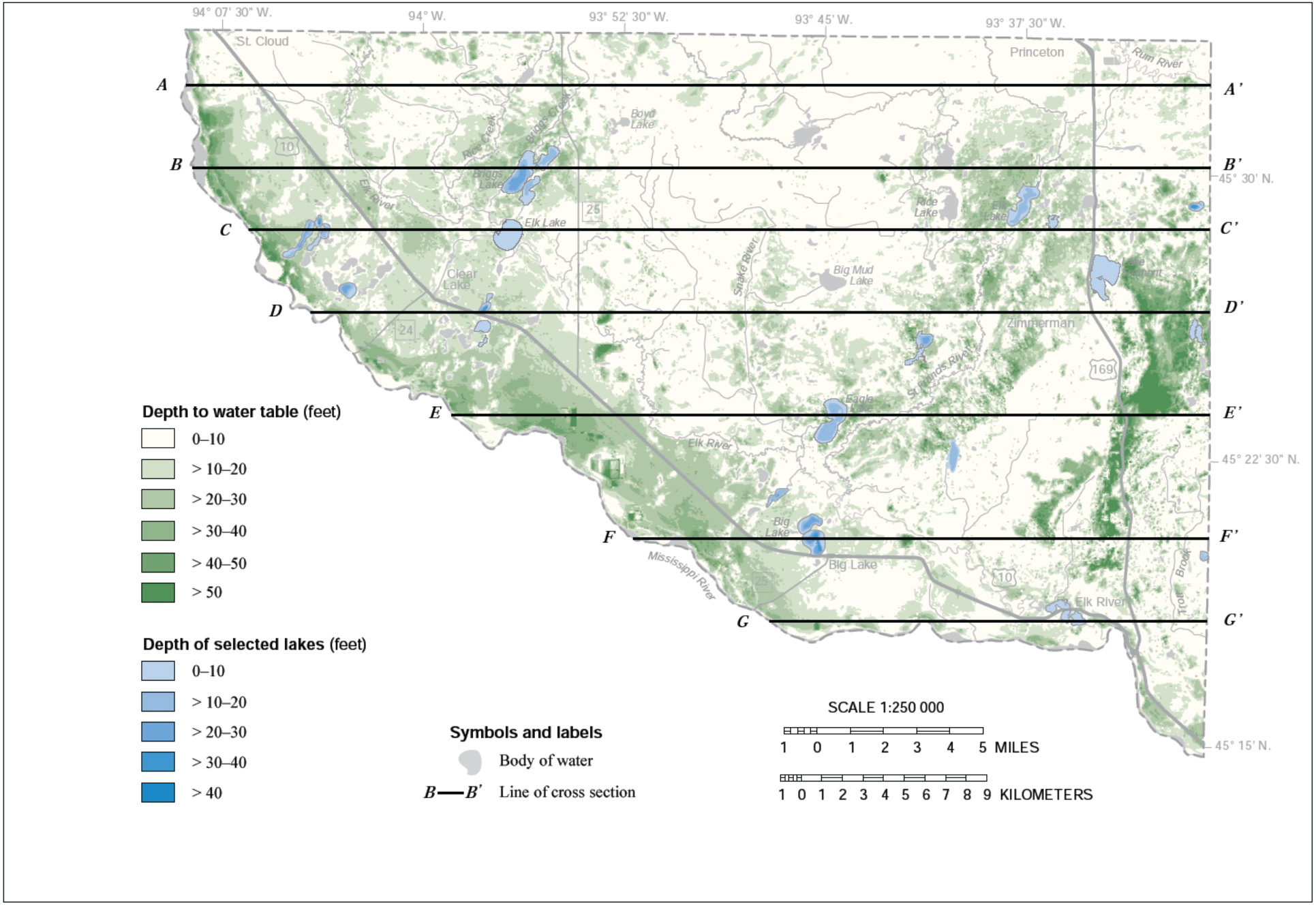


Figure 4. Depth to water table

Shallow water-table conditions are common in the county. Exceptions include the valley edges of major rivers. Most lakes and wetlands can be thought of as an exposed portion of the shallow water table. Map modified from Adams, 2016a.

Buried sand and gravel aquifers

The stratigraphic column in Figure 5 summarizes the geologic units and hydrogeologic properties of the glacial sequence and correlates the corresponding Part A and B unit names and map labels.

The Part B units are represented as follows:

- *Aquifers* are represented with *patterns* throughout this atlas (Figure 5 and Plate 7). Surficial sand units defined in Part A that only exist at the surface (**ss**, **nbs**, and **ns**) are shown with the same pattern. Portions of **csa**, **csr**, **cse**, and **scs** that are surficial or appear to be hydraulically connected to surficial units are shown on Plate 7 with another pattern to emphasize those hydraulic connections. The buried sand and gravel units that are not directly connected to surficial sands are shown with a pattern unique to each unit.
- *Aquitards* are shown as *shades of gray*, representing the relative hydraulic conductivity. Lighter shades represent units with more sand, implying a higher hydraulic conductivity. The shades of gray are based on the average sand content of the aquitard, which is determined from the portion that is less than a 2 millimeter grain size.
- Units of undifferentiated Pleistocene sediment with an unknown texture are shown in *brown*.

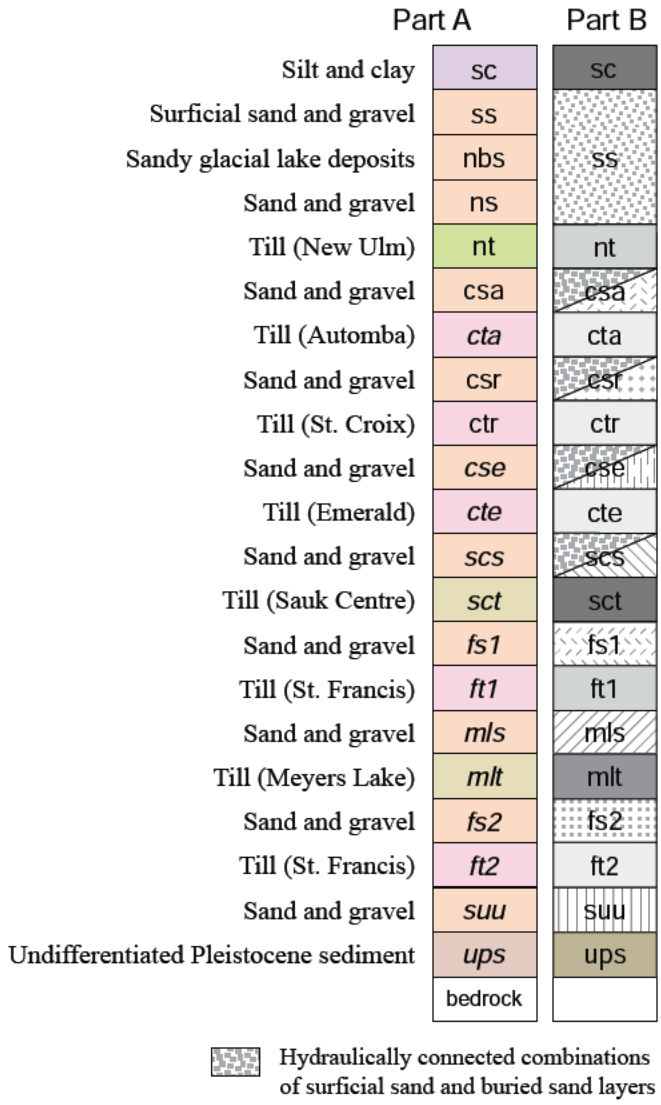


Figure 5. Hydrostratigraphy of Quaternary unconsolidated sediment

Aquifers are shown with patterns and aquitards are shown in shades of gray. Part B aquifer names are based on the name of the till underlying it in Part A. Shades of gray on aquitards correspond to the percent sand content indicating relative hydraulic conductivity, varying from light gray (high hydraulic conductivity) to dark gray (low hydraulic conductivity). The Part A sediment texture description is shown on the left side for reference and unit identification only. Aquifers csa, csr, cse, and scs sometimes directly underlie the surficial aquifer. In that case they are hydraulically connected to the surficial aquifer.

Potentiometric surfaces of buried sand and gravel aquifers

Note: the buried sand and gravel aquifers will subsequently be referred to as the buried sand aquifers.

In confined aquifers, pressure causes water to rise in a well to a level higher than the top of the aquifer. These levels are measured and contoured to create a map of the potentiometric surface for each aquifer. The resulting groundwater-level elevation maps show changes in water levels similar to the way topographic maps show changes in land-surface elevations.

The potentiometric surface of an aquifer represents the potential energy that is available to move groundwater. As groundwater moves from higher to lower potentiometric elevations it flows perpendicular to the potentiometric elevation contours. Flow directions are shown as arrows in Figures 6 through 11.

Groundwater flows from recharge areas through the aquifer to discharge locations within a wide continuum of depth, distance, and time. Flow into, through, and out of shallow aquifers can take weeks to travel distances of up to a mile. Flow in deeper aquifers can take centuries to millennia to travel dozens of miles. When combined with other information, high elevation areas on the potentiometric surface can indicate important recharge areas. River valleys are typical examples of low elevation discharge areas.

Potentiometric surface maps were created from static water-level data from the County Well Index (CWI), measurements made by DNR staff, and river elevation points along the major rivers and streams. The CWI records represent various climatic and seasonal conditions from 1960 through 2014. This data variability creates some uncertainty in potentiometric surface elevations.

River elevation points are included because these features are typically groundwater discharge locations for the relatively shallow buried sand aquifers and the relatively shallow bedrock aquifers. Data from Sherburne and Anoka counties were used together to increase the data coverage and ensure that the potentiometric surfaces were consistent across the county boundary.

All the potentiometric surface maps (Figures 6–11 and 13) show a general pattern of groundwater flow toward the Mississippi River valley. Local flow toward the larger rivers and creeks in the county is evident on the buried sand potentiometric surface maps, such as the Elk and St. Francis rivers, and Briggs Creek. These maps indicate at least some groundwater discharge to the Mississippi and portions of its tributaries are from all the buried sand aquifers.

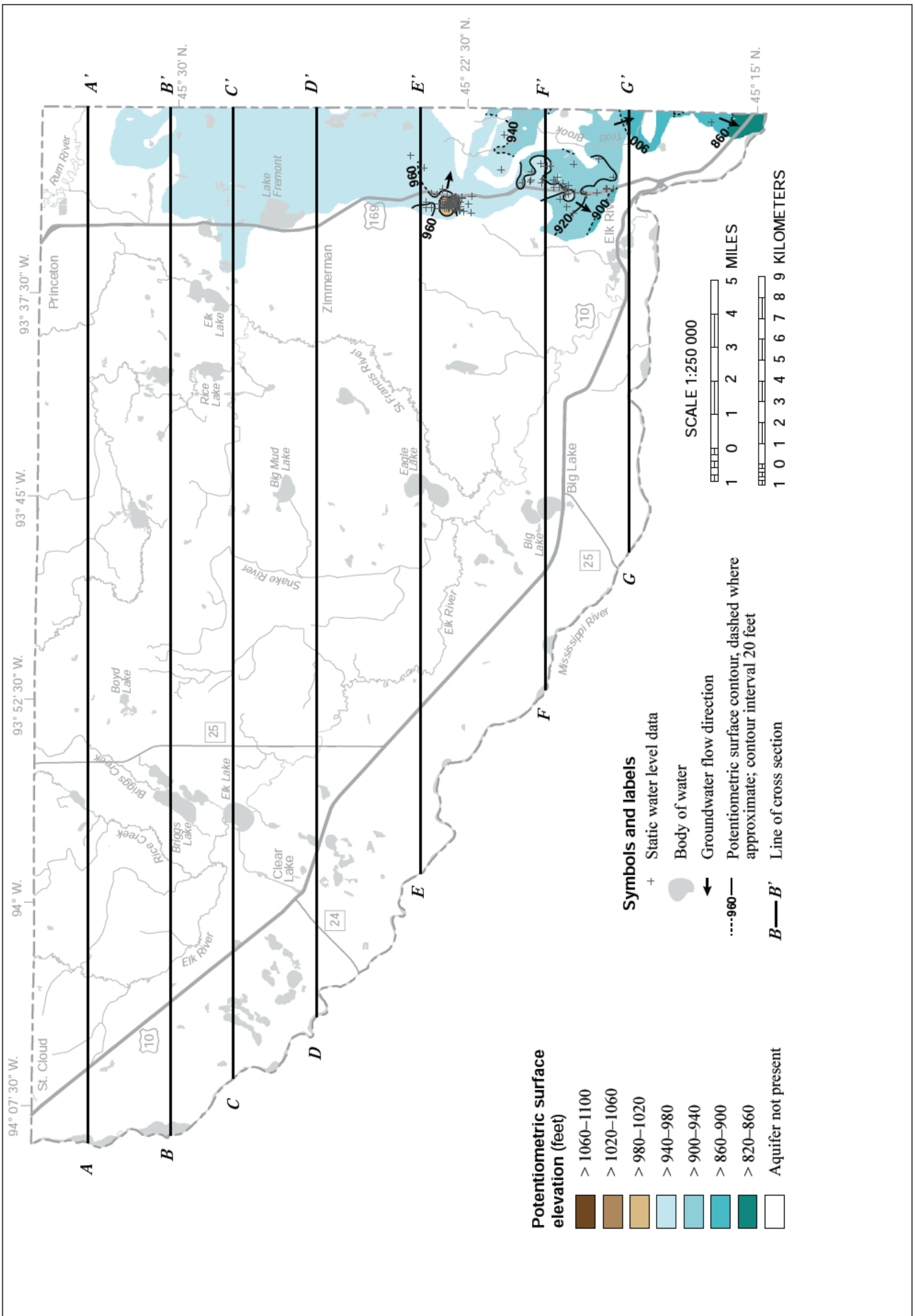


Figure 6. Potentiometric surface of the csa aquifer

Groundwater flow is toward the Mississippi River in the very southern extent and easterly in the northern part of the Elk River.

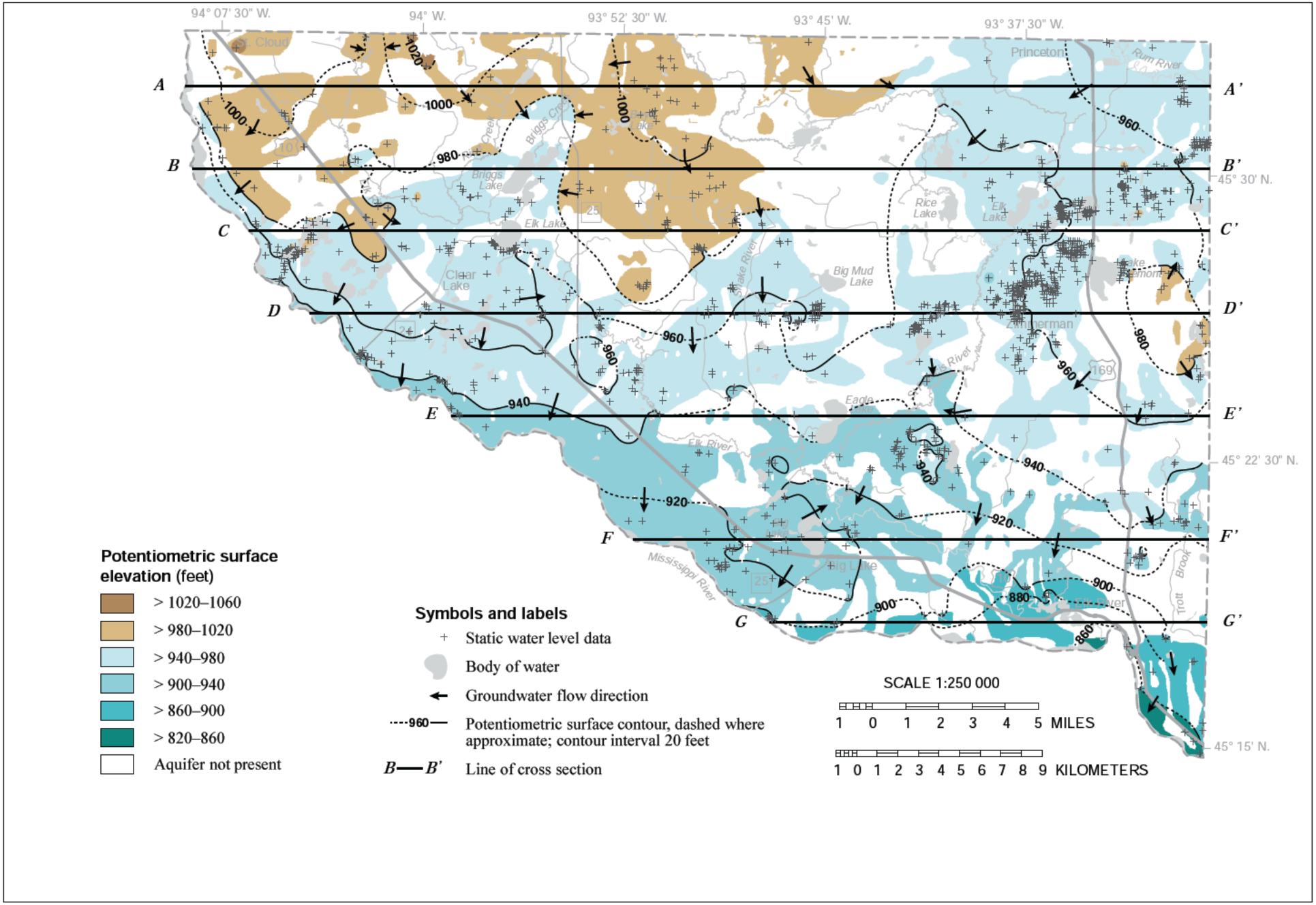


Figure 7. Potentiometric surface of the csr aquifer

Groundwater flow is toward the Mississippi River and locally toward the Elk and St. Francis rivers, and Briggs Creek.

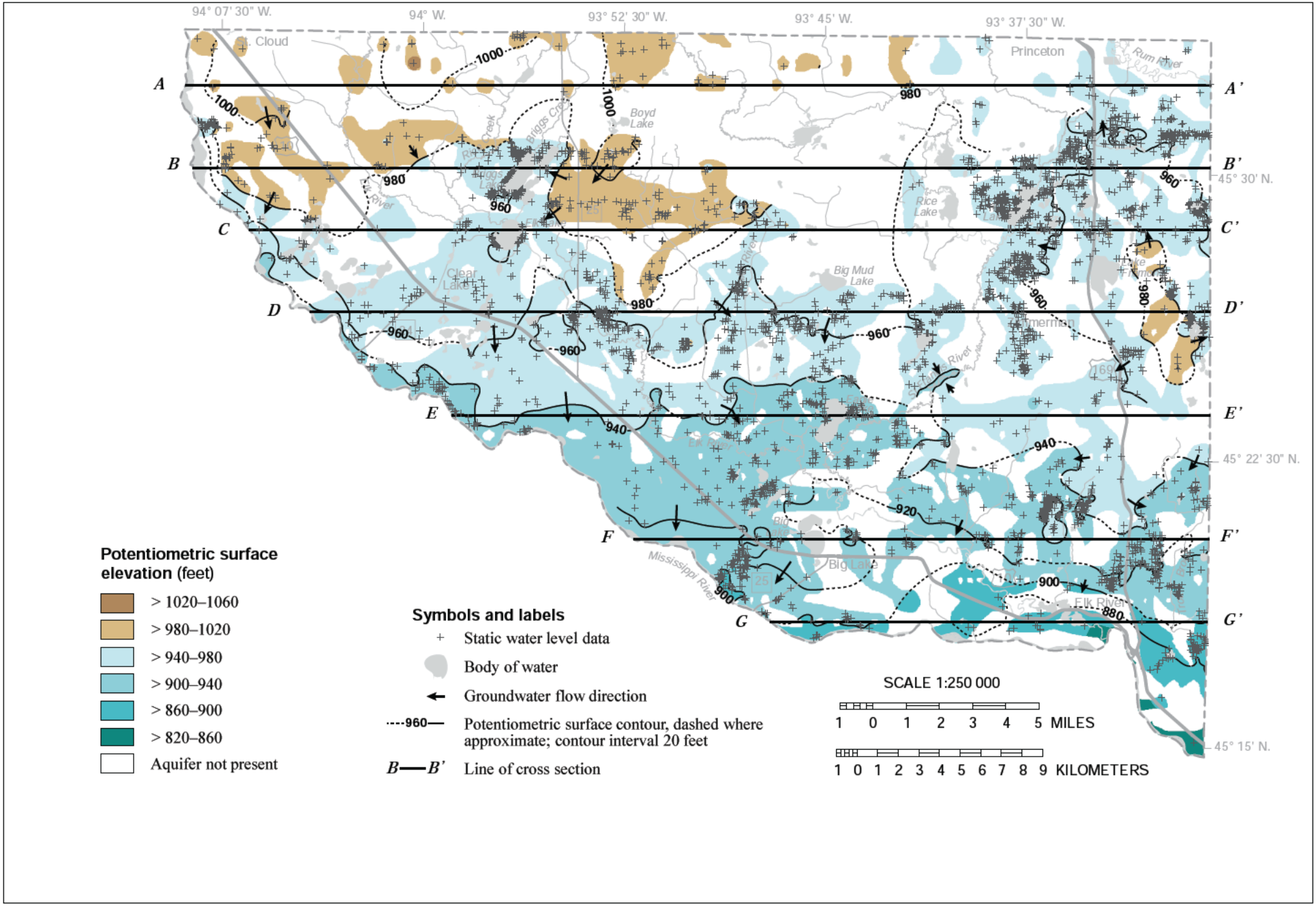


Figure 8. Potentiometric surface of the cse **aquifer**

Groundwater flow is toward the Mississippi River and locally toward the Elk and St. Francis rivers, and Briggs Creek.

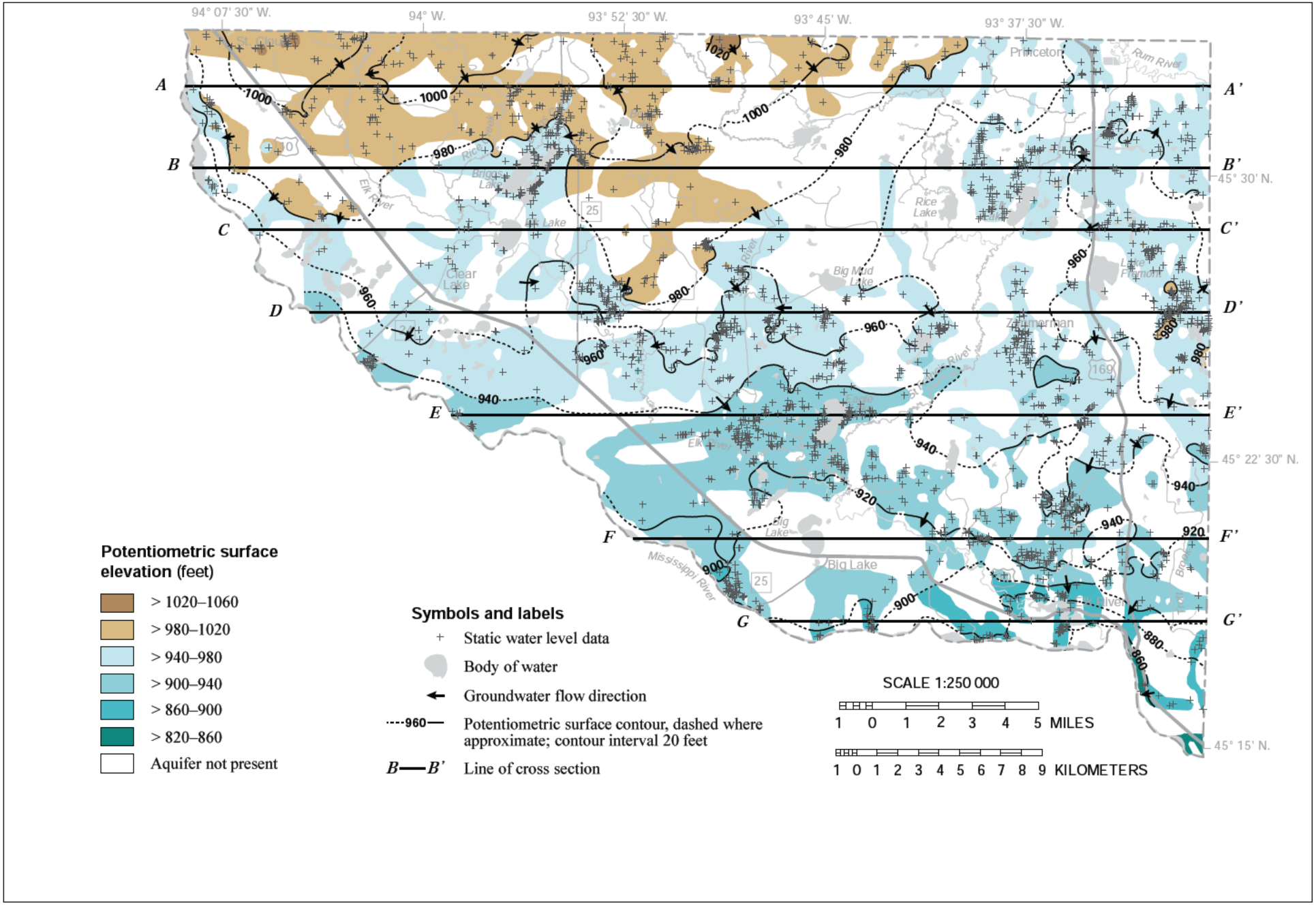


Figure 9. Potentiometric surface of the SCS aquifer

Groundwater flow is toward the Mississippi River and locally toward the Elk and St. Francis rivers, and Briggs Creek.

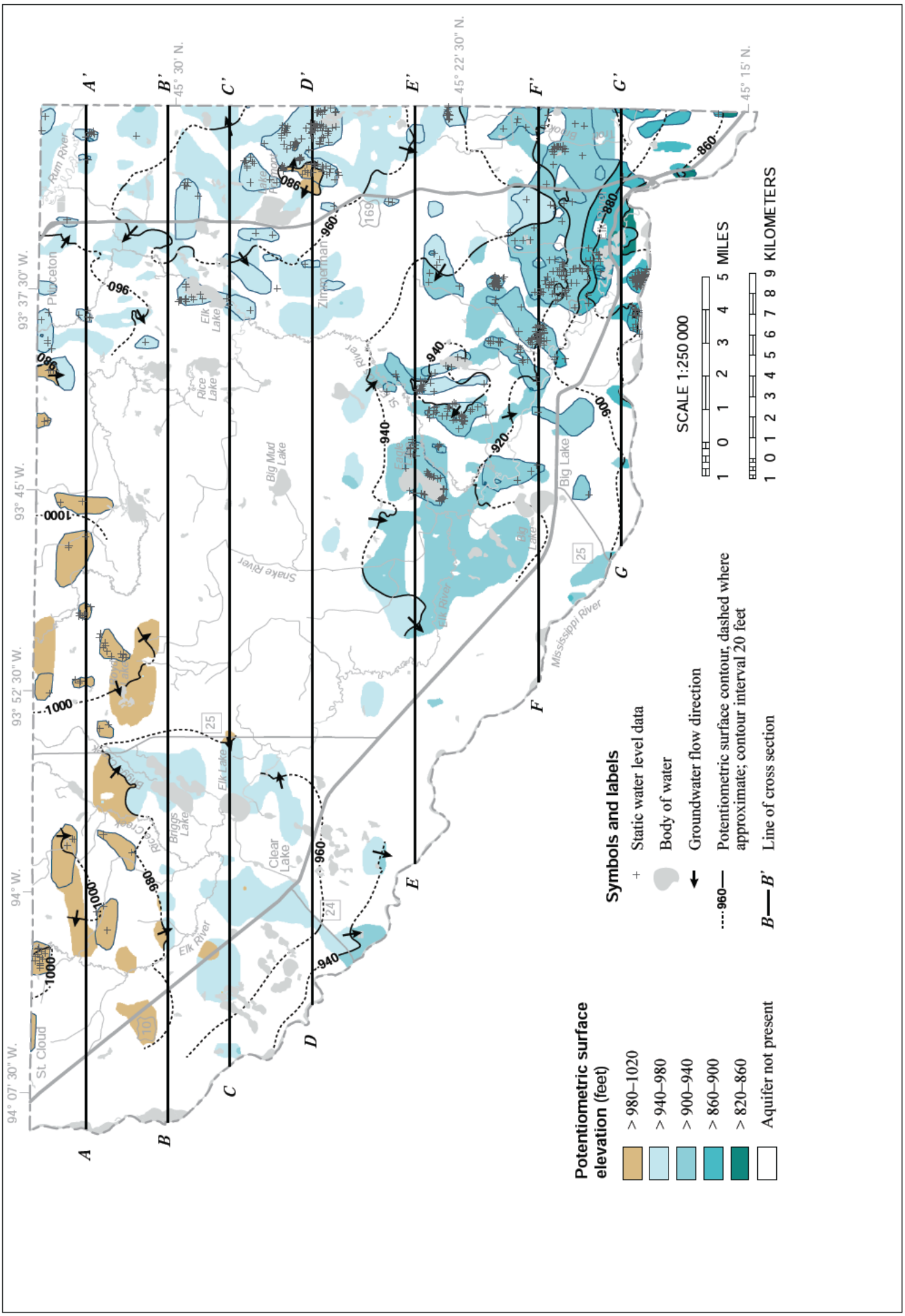


Figure 10. Potentiometric surface of the fs1 and mls aquifers

Groundwater flow is toward the Mississippi River and locally toward the Elk and St. Francis rivers, and Briggs Creek. The fs1 aquifer (shown with outlines) is stratigraphically above the mls aquifer.

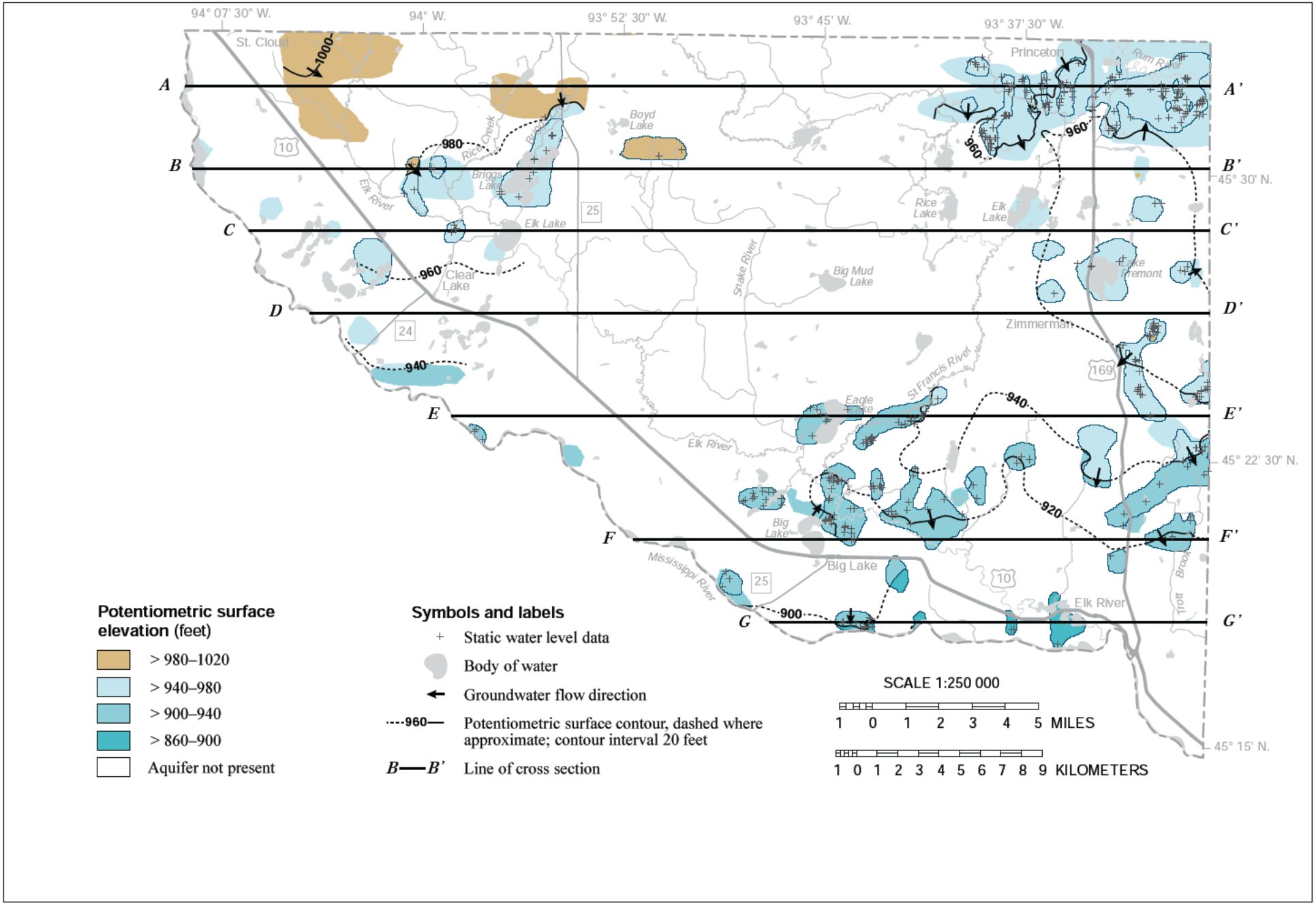


Figure 11. Potentiometric surface of the fs2 **and** suu **aquifers**

Groundwater flow is toward the Mississippi River and locally toward the St. Francis River. The fs2 aquifer (shown with outlines) is stratigraphically above the suu aquifer.

Bedrock geologic units and aquifers

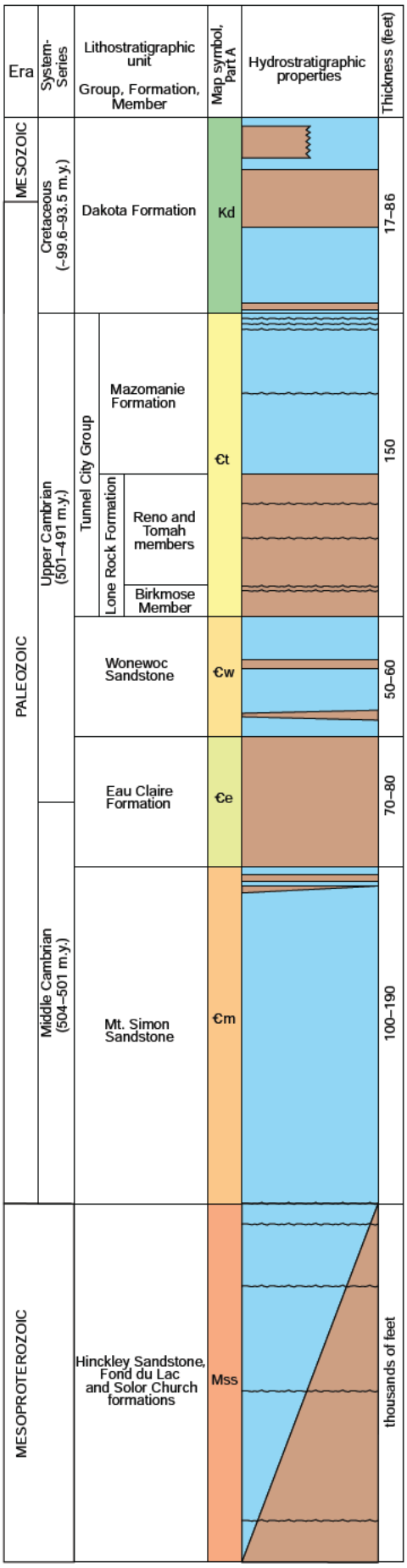
The bedrock formations of Sherburne County are at the northwestern edge of regionally extensive, gently dipping layers of sandstone, shale, and carbonate rock that range in thickness from 50 feet to greater than 200 feet (Figure 12 and Part A, Plate 2, Figure 3). These sedimentary rocks were originally deposited in mostly shallow marine settings during the Paleozoic era (Part A, Plate 2). Portions of these rocks endured periods of weathering while at or near the surface that affected the hydraulic properties. These Paleozoic formations are underlain by a much thicker and older group of Precambrian (Mesoproterozoic) sedimentary rock formations that are also used as aquifers, including the Hinckley Sandstone and Fond du Lac Formation. Since this group of bedrock units is often similar in appearance and difficult to differentiate in the subsurface, the terms "red clastics" or "Mesoproterozoic sedimentary rocks" (Mss) are used.

The formations include in ascending order (oldest to youngest): 1) the Mesoproterozoic: Fond du Lac Formation, Solor Church Formation, and Hinckley Sandstone; 2) the Cambrian: Mt. Simon Sandstone, Eau Claire Formation, Wonewoc Sandstone, and Tunnel City Group (Lone Rock and Mazomanie formations); and 3) the Cretaceous: Dakota Formation. The Dakota Formation has limited extent and is not a significant source of groundwater in the county. The combined Mt. Simon and Mss sandstones are commonly used and considered together as one aquifer. The bedrock aquifers are commonly used for water by municipalities and commercial operations because of their thickness, extent, predictability, and other features that affect water yield. In sandstone aquifers such as the Wonewoc and Mt. Simon–Mss, water moves through intergranular pore spaces and larger macropores such as fractures (Runkel and others, 2003).

An enhanced-permeability zone is generally found in approximately the uppermost 50 feet of sedimentary bedrock units (Runkel and others, 2006). It developed when the bedrock surface was at the land surface. The fractures in this shallow bedrock zone generally increase the yield from aquifers but may compromise the protective character of aquitards. Locally, weathered igneous and metamorphic Precambrian formations provide some groundwater to wells, especially in the northwestern portion of the county. However, these weathered Precambrian units are not a significant source of groundwater in the county.

Potentiometric surface of Mt. Simon–Mss aquifer

The extent of the Upper Tunnel City and Wonewoc aquifers is limited to the very southeastern portion of the county. With this limited extent and only limited water level data available, potentiometric maps have not been included in this county scale report. Similar to the buried sand potentiometric surface maps, the Mt. Simon–Mss aquifer map shows the same general pattern of groundwater flow toward the Mississippi River valley except in the very northeastern corner of the county where flow is northeasterly toward the Rum River (Figure 13). Local flow toward the Elk River is evident in the southern part of the county north of the city of Big Lake. This map indicates at least some groundwater discharge to the Mississippi River and portions of the Elk River are from the Mt. Simon–Mss aquifer.



Hydrostratigraphic properties

- Relatively high permeability (aquifer)
- Relatively low permeability except for fractures in the aquitard
- High permeability bedding fracture

Figure 12. Bedrock stratigraphy and hydrostratigraphy

Geologic stratigraphic units (formations or groups) do not always correspond to hydrogeologic units (aquifers and aquitards). In Sherburne County the Upper Tunnel City aquifer is equivalent to the Mazomanie Formation. Modified from Part A, Plate 2, Figure 3. Figure not to scale.

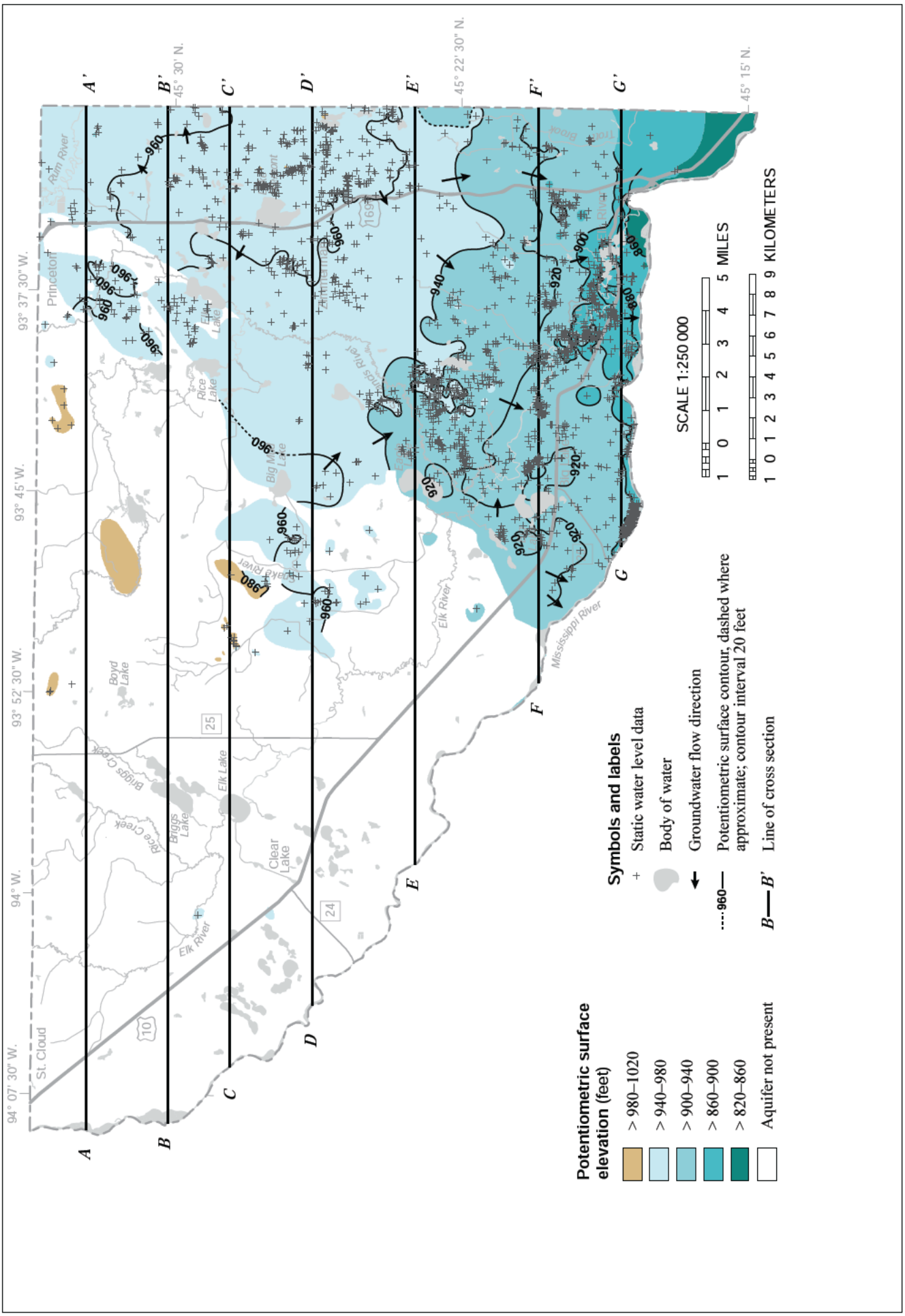


Figure 13. Potentiometric surface of Mt. Simon–Mss aquifer

The general pattern of groundwater flow is toward the Mississippi River valley except in the very northeastern corner of the county where flow is northeasterly toward the Rum River. Local flow toward the Elk River is evident in the southern part of the county.

Water chemistry (Plate 6)

The types of dissolved elements and compounds in groundwater provide information about the recharge areas, the geologic layers that the water has flowed through, and approximately how long the water has been underground (residence time). All groundwater originated as precipitation or surface water that seeped into the ground, through the soil layer, and into the pores and crevices of aquifers and aquitards. Water moves in complicated but definable patterns: into the aquifers as recharge, through the aquifers, and out of the aquifers as discharge. Water chemistry is used to provide information such as the following:

- Groundwater recharged from surface water can be identified from the effect of evaporation on the isotopes of hydrogen and oxygen.
- Groundwater residence time is estimated from tritium and carbon-14 isotopes. Tritium is used to identify water that has moved into the subsurface since the 1950s. Carbon-14 is used to determine groundwater residence times of centuries to millennia.
- The distribution of select elements can indicate areas where groundwater consumption is a potential concern to human health.

Groundwater sampling

To better understand groundwater movement and pollution sensitivity in the county, 92 samples were collected for this project from wells in a range of aquifers (protocols listed in the Appendix). The data were combined with water sample data from other agencies for analysis and interpretations in the following sections. Sources of samples include the Minnesota Department of Health (60 groundwater, 5 surface water), the Minnesota Pollution Control Agency (13 groundwater), an older DNR project (4 groundwater), and the Minnesota Geological Survey (1 groundwater, Lively and others, 1992).

Chemical data from well-water samples were used along with primary physical data (static water level and aquifer tests) to understand water movement. Wells were selected based on their hydrogeologic setting and aquifers were selected for their significance for domestic water supply. An ideal well-sampling network is evenly distributed across the county, includes the more populated areas, and targets surface water and groundwater interaction in the vicinity of lakes and larger rivers. The network distribution depends on citizen willingness to participate. Approximately 1000 well owners were contacted through letters that included a description of the project and a reply card to return if they were willing to participate. Approximately 30 percent of those contacted gave permission for sampling.

Groundwater recharge sources

As water moves from precipitation to groundwater, chemical changes occur that can help determine whether groundwater was recharged directly from precipitation, lake water, or a mixture of the two. Stable isotopes of oxygen and hydrogen are useful for determining groundwater and surface-water interactions (Kendall and Doctor, 2003). Oxygen and hydrogen each have two main stable isotopes: ^{18}O and ^{16}O, and ^{2}H and ^{1}H. The different mass of the isotopes causes evaporation at different rates, which results in *fractionation*, leaving behind different ratios of heavy to light isotopes. This results in isotopic signatures that are unique to groundwater with different sources.

- Groundwater infiltrated directly from *precipitation* exhibits a *meteoric* isotopic signature. It infiltrates directly into the ground, leaving the isotopic ratio unchanged.
- Groundwater recharged from *open water* such as lakes or wetlands exhibits an *evaporative* isotopic signature. It has been subjected to fractionation where light isotopes evaporate into the atmosphere, leaving a ratio favoring heavier isotopes.

To identify the source (precipitation or surface water) of a groundwater sample, oxygen and hydrogen isotopic data are plotted against each other (Figure 14). The x-axis represents the oxygen isotope value ($\delta^{18}O$) and the y-axis represents the hydrogen isotope value ($\delta^{2}H$). The measured ratio in the sample is divided by the ratio in a standard (Vienna Standard Mean Ocean Water [VSMOW]).

Definition of delta (δ)
The stable isotope composition of oxygen and hydrogen are reported as δ values. δ (0/00) = (Rx/Rs-1)*1000 where R represents the ratio of the heavy to light isotope, $^{18}O/^{16}O$ or $^{2}H/^{1}H$ and Rx represents the ratio of the sample and Rs represents the ratio in VSMOW. Delta values are reported in units of parts per thousand (0/00 or permil) relative to VSMOW.

County results are compared to the global meteoric water line, which was developed from precipitation data from around the world. The isotopic values display a linear correlation over the entire range for waters which have not undergone excessive evaporation (Craig, 1961).

The majority of Sherburne samples plot along the meteoric water line, in the center and left portions of the stable isotope graph (Figure 14). This suggests sources from precipitation (rain and snow melt) infiltrated directly into the subsurface and did not reside for long periods in lakes or other surface-water bodies for these samples.

One evaporative signature was found in a groundwater sample downgradient of Big Mud Lake in the central part of the county (Figure 15). There are also some unnamed wetlands upgradient from this location which could be another possible source of surface water. This evaporative signature sample was collected from the relatively shallow (95 feet) **cse** buried sand aquifer. The absence of evaporative signatures from wells near other lakes or lake areas does not necessarily indicate that evaporative signature water is rare in Sherburne's groundwater, but may be more of an artifact of the sampling strategy. Samples from wells at ideal locations and depths for detecting lake evaporative processes on groundwater characteristics are not always available because of accessibility limitations. Samples were limited to wells volunteered by homeowners.

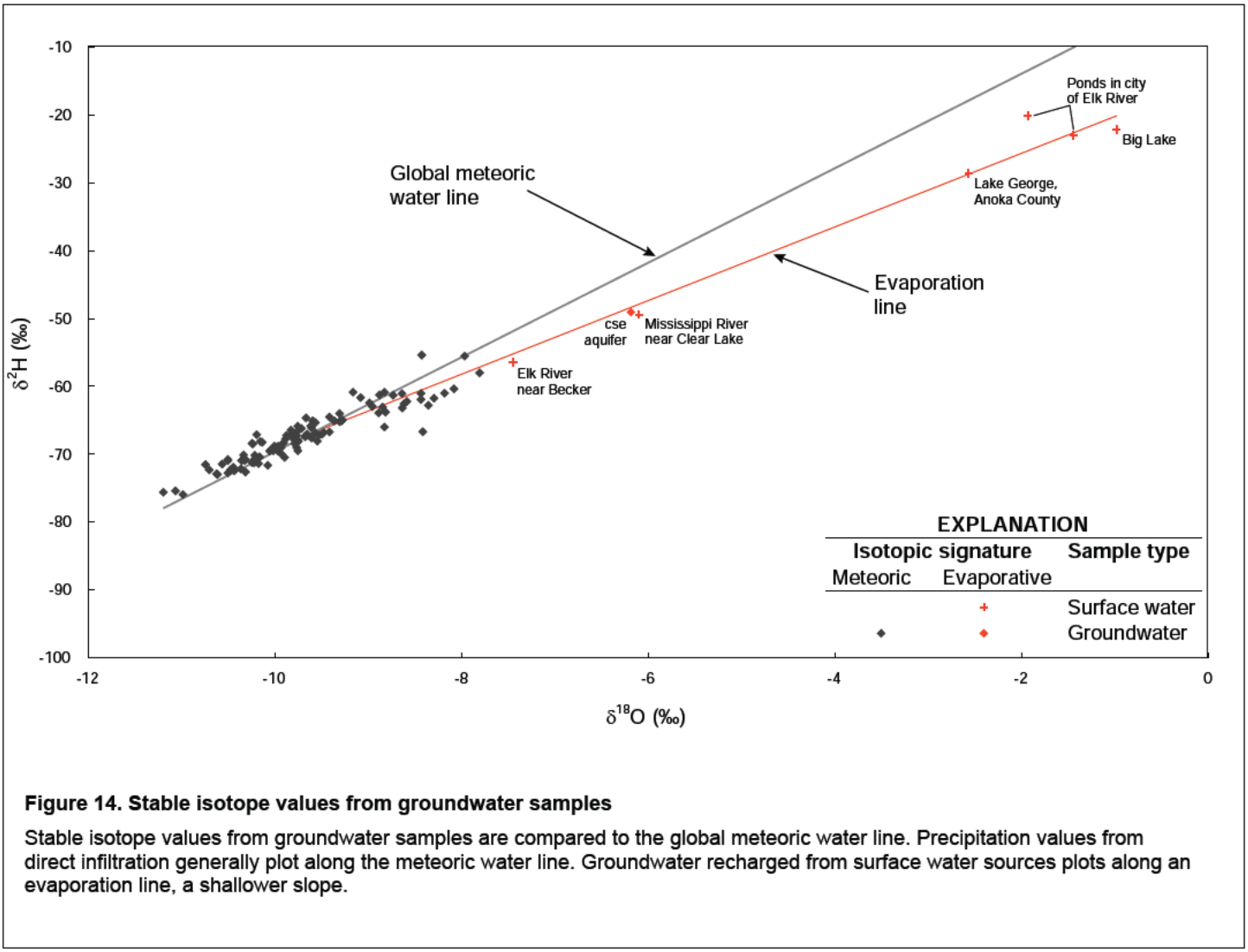


Figure 14. Stable isotope values from groundwater samples

Stable isotope values from groundwater samples are compared to the global meteoric water line. Precipitation values from direct infiltration generally plot along the meteoric water line. Groundwater recharged from surface water sources plots along an evaporation line, a shallower slope.

Groundwater residence time indicators

Groundwater residence time is the approximate time that has elapsed since water infiltrated the land surface to the time it was pumped from a well or discharged to a lake, river, wetland, or spring. Generally short residence time suggests high recharge rates or short travel paths; long residence time suggests low recharge rates or long travel paths. The residence time of groundwater is estimated using isotopic analysis of the radioactive elements tritium and carbon-14.

Tritium

Groundwater residence time can be interpreted from the concentration of tritium. Although tritium is a naturally occurring isotope of hydrogen, atmospheric concentrations were greatly increased between 1953 and 1963 by atmospheric testing of nuclear weapons (e.g., Alexander and Alexander, 1989). This isotope decays at a known rate with a half-life of 12.32 years (Lucas and Unterweger, 2000).

Tritium concentrations and other groundwater chemistry (such as nitrate and chloride values) are compared with the estimated pollution sensitivity. The interpretations are used in maps for pollution sensitivity and the hydrogeologic cross sections. The concentrations are presented in tritium units (TU) and are referred to as *tritium age* in the following categories.

- **Cold War era**: water entered the ground from the peak period of atmospheric tritium concentration from nuclear bomb testing, 1958–1959 and 1961–1972 (greater than 15 TU).
- **Recent**: water entered the ground since about 1953 (8 to 15 TU).
- **Mixed**: water is a mixture of recent and vintage (greater than 1 TU to less than 8 TU).
- **Vintage**: water entered the ground before 1953 (less than or equal to 1 TU).

Carbon-14

The carbon-14 (^{14}C) isotope is used to estimate the residence time for selected vintage and mixed tritium-age samples. This naturally occurring isotope has a half-life of 5,730 years, and is used to estimate groundwater residence time ranging from 100 to 35,000 years (Alexander and Alexander, 1989).

Inorganic chemistry of groundwater

As soon as precipitation infiltrates the soil layer and becomes groundwater, the water begins dissolving minerals in the soil, sediment, and bedrock. Inorganic chemical analysis of groundwater samples is useful for characterizing the changes in water chemistry as it moves deeper into the earth and for identifying the presence of anthropogenic (human caused) pollution sources. This report includes analyses of water samples for inorganic chemistry, including primarily the major cations and major anions that are typically found in concentrations of parts per million (ppm), and select elements that typically are found in trace amounts of parts per billion (ppb).

Organic chemicals were not studied (including pesticides and their breakdown products, solvents, degreasers, etc.). Studies of these organic chemicals in groundwater can be found at other state agencies.

Calcium, magnesium, and sodium cations and bicarbonate anions are dissolved out of the glacial sediment by the groundwater. The constituents are derived from limestone and dolomite bedrock sources (Freeze and Cherry, 1979) and are common in groundwater in the glacial sediment aquifers.

Sodium is often present in deeper aquifers or at mineral interfaces. As groundwater moves through the aquifer systems, calcium and magnesium cations are exchanged for sodium ions (Hounslow, 1995).

Sulfate is largely naturally occurring, and is an important constituent of groundwater in parts of the county. High concentrations in groundwater can negatively affect the taste and may act as a laxative. Sulfate has a nonenforceable federal secondary maximum contaminant limit (SMCL) for public water systems of 250 ppm (EPA, [1996]).

Chloride and nitrate-nitrogen (nitrate) can be used to indicate anthropogenic contamination and evaluate pollution sensitivity.

Elevated chloride can come from sources such as road salts, water softener salts, and fertilizers (Davis and others, 1998; Panno and others, 2006). Groundwater with a chloride concentration above 5 ppm with a chloride/bromide ratio above 250 may indicate anthropogenic sources and high pollution sensitivity. This anion is a significant contaminant in Sherburne County with 57 of 66 groundwater samples (86 percent) exceeding these limits. These elevated occurrences of chloride exhibit a relatively widespread distribution across the county in the ss aquifer, and most of the buried sand aquifers (csr, cse, scs, mls, fs2, and suu). Elevated chloride was also found in bedrock aquifers and an aquifer category including: Wonewoc, Mt. Simon, Fond du Lac,

and red clastics (Figure 16). Eight samples that contained elevated chloride were collected by the Minnesota Pollution Control Agency (MPCA) but were not analyzed for bromide. Since most of these samples were collected from depths of less than 100 feet they are likely from anthropogenic sources in this sand-rich geologic setting.

Elevated nitrate comes from sources such as fertilizer and animal or human waste. Groundwater nitrate concentration that equals or exceeds 1 ppm indicates anthropogenic sources and high aquifer sensitivity (MPCA, 1998; Wilson, 2012). The maximum contaminant level (MCL) for nitrate is 10 ppm (EPA, [1996]). Concentrations that equaled or exceeded the 1 ppm level were found in 35 of 115 groundwater samples (30 percent). All but two of these elevated occurrences were from samples that also contained elevated concentrations of anthropogenic chloride (Figure 16). Elevated nitrate concentrations were most common in the western portion of the county where agriculture is common, and were found in the ss, csr, cse, scs, fs1, and suu buried sand aquifers; the Mt. Simon and Fond du Lac aquifers, and the red clastic category.

EPA standards

Maximum Contaminant Level (MCL): legally enforceable federal standards that apply to public water systems, to limit the levels of contaminants in drinking water.

Secondary Maximum Contaminant Level (SMCL): nonenforceable guidelines for contaminants that may cause cosmetic effects or aesthetic effects in drinking water.

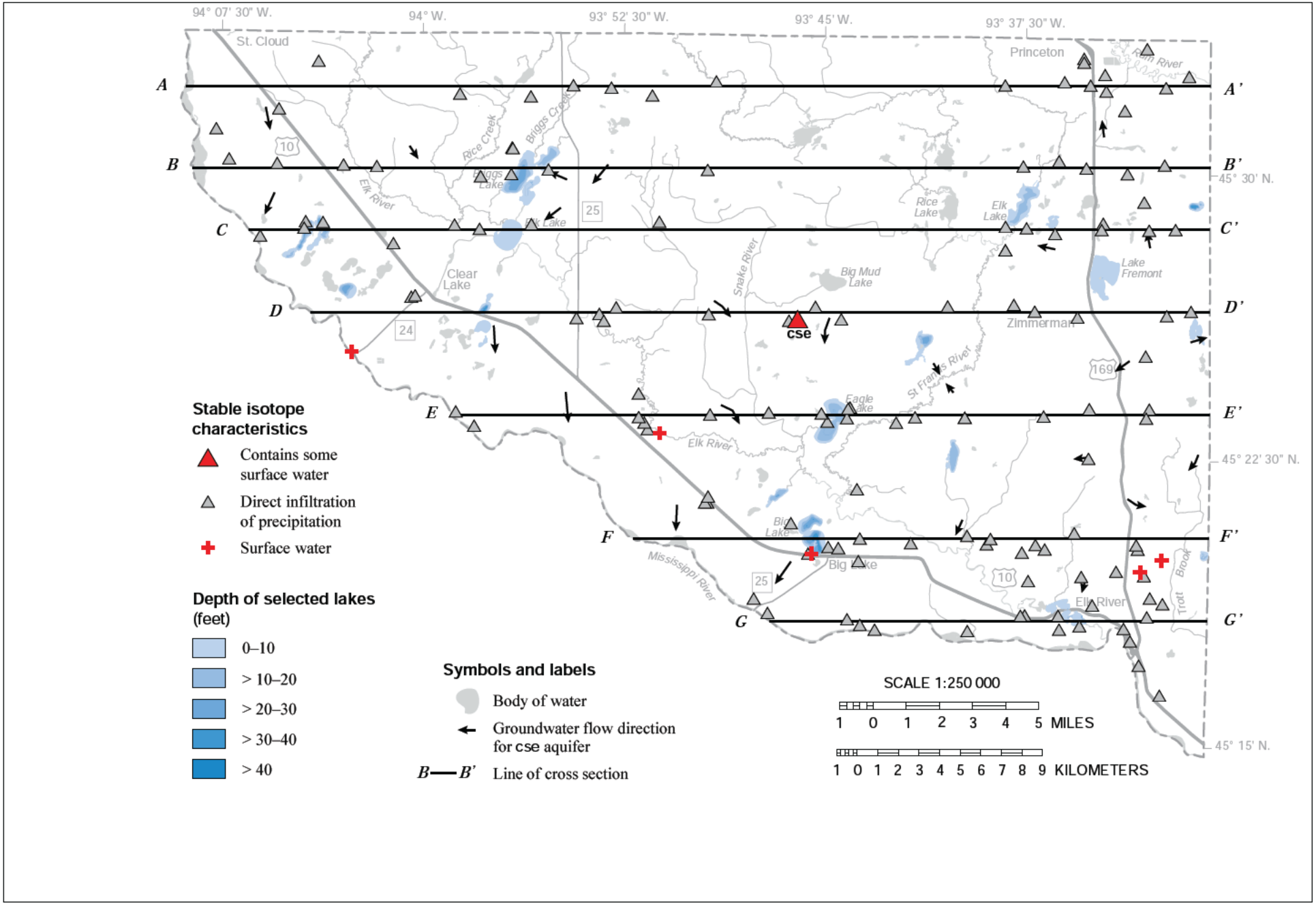


Figure 15. Stable isotope characteristics of groundwater samples

Most groundwater samples collected within the county appear to have originated from direct infiltration of precipitation. One groundwater sample located in the central part of the county contains some water with an evaporative signature.

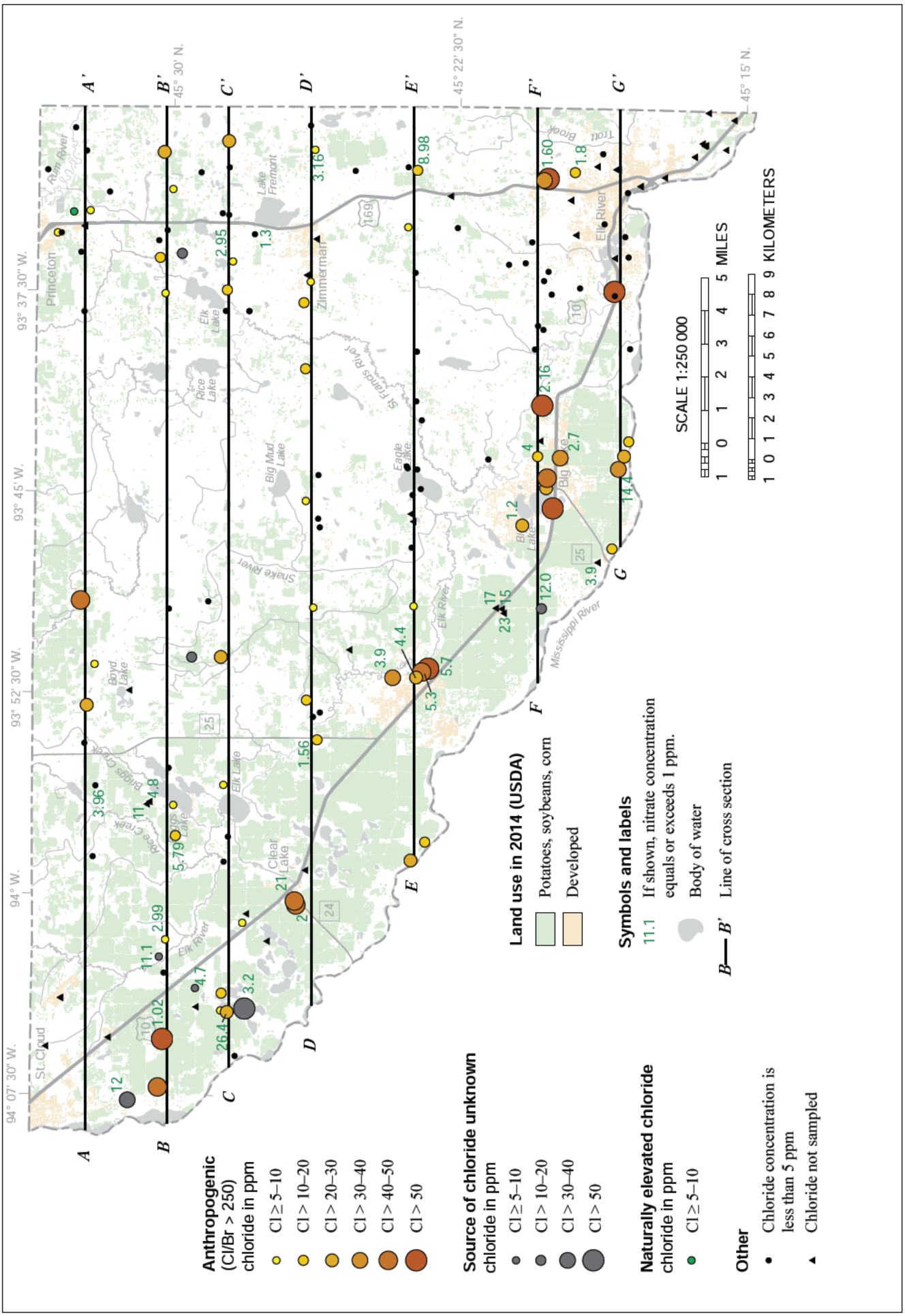


Figure 16. Elevated chloride and nitrate concentrations from groundwater samples

Elevated and anthropogenic (human caused) chloride concentrations (≥5 ppm and Cl/Br >250) from groundwater samples are common and widespread in Sherburne County. Groundwater samples with elevated nitrate values (≥1 ppm) tend to be associated with agricultural areas that run parallel with the Mississippi River.

Naturally occurring elements of health concern

Some chemicals present in water may be naturally occurring but can potentially pose a human health risk in elevated concentrations. Exposure to arsenic has been linked to both cancer and noncancerous health effects (EPA, 2001). Low levels of manganese are a benefit to humans, but high exposures can harm the nervous system (MDH, 2012).

Arsenic

Arsenic is a naturally occurring element in Minnesota groundwater. Current science cannot predict which wells will have high arsenic concentrations, therefore newly constructed wells are tested for arsenic if they are used as a potable water supply, according to Minnesota Rule 4725.5650 (2008). The Environmental Protection Agency (EPA) requires that community water supplies not exceed 10 ppb arsenic (EPA, 2001), but there is no requirement for domestic wells. Well-water samples that exceed 5 ppb arsenic should be resampled to determine if the arsenic level of the first sample is a representative value.

The factors affecting elevated arsenic concentrations in groundwater are not completely understood. There is a strong correlation with wells completed in aquifers associated with glacial sediment bearing materials derived from rocks that lie northwest of Minnesota. Research also indicates that arsenic concentrations are increased in wells that have short screened sections near the boundary of an aquitard and the aquifer (Erickson and Barnes, 2005a; McMahon, 2000).

The original arsenic reservoir is thought to be arsenic-bearing minerals from small shale particles in these glacial materials. Some of this arsenic was previously released and then adsorbed to surfaces of the mineral crystals and other small particles during earlier oxidizing conditions. This surface-adsorbed arsenic, the most chemically available form, is released to groundwater under reducing conditions (Erickson and Barnes 2005b; Nicholas and others, 2011; Thomas, 2007).

While generally not common in Sherburne County, elevated arsenic values (10 ppb or greater) were detected from wells in the csr, cse, scs, and fs2 aquifers (Figure 17). Elevated arsenic detections occurred in five groundwater samples (6 percent). Statewide, from 2008 to 2015, approximately 11 percent of newly constructed potable wells have arsenic concentrations exceeding 10 ppb (MDH, 2016a).

Manganese

Manganese is a naturally occurring element in Minnesota groundwater. The Minnesota Department of Health (MDH) Health Risk Limit (HRL) is 100 ppb (MDH, 2016b). This is the concentration of a groundwater contaminant, or a mixture of contaminants, that can be consumed with little or no risk to health and has been promulgated under rule. For more details, see the Minnesota Ground Water Association white paper on manganese and groundwater (MGWA, 2015).

A large proportion of groundwater samples (88 of 129 samples, 68 percent) contained manganese concentrations that exceeded the lower MDH HRL established for infants (100 ppb) indicating a natural water quality issue for the majority of well owners in the county.

Manganese distribution in Minnesota groundwater is highly variable. Water-table and buried sand aquifers have the greatest median manganese concentrations, 155 and 160 ppb, respectively. In water-table aquifers, 57 percent of drinking water wells sampled have manganese concentrations that equal or exceed 100 ppb. In buried sand aquifers, 63 percent of drinking water wells sampled have manganese concentrations that equal or exceed 100 ppb (MDH, 2014).

Minnesota Department of Health standards

Health risk limit (HRL): the concentration of a groundwater contaminant, or a mixture of contaminants, that can be consumed with little or no risk to health and has been promulgated under rule.

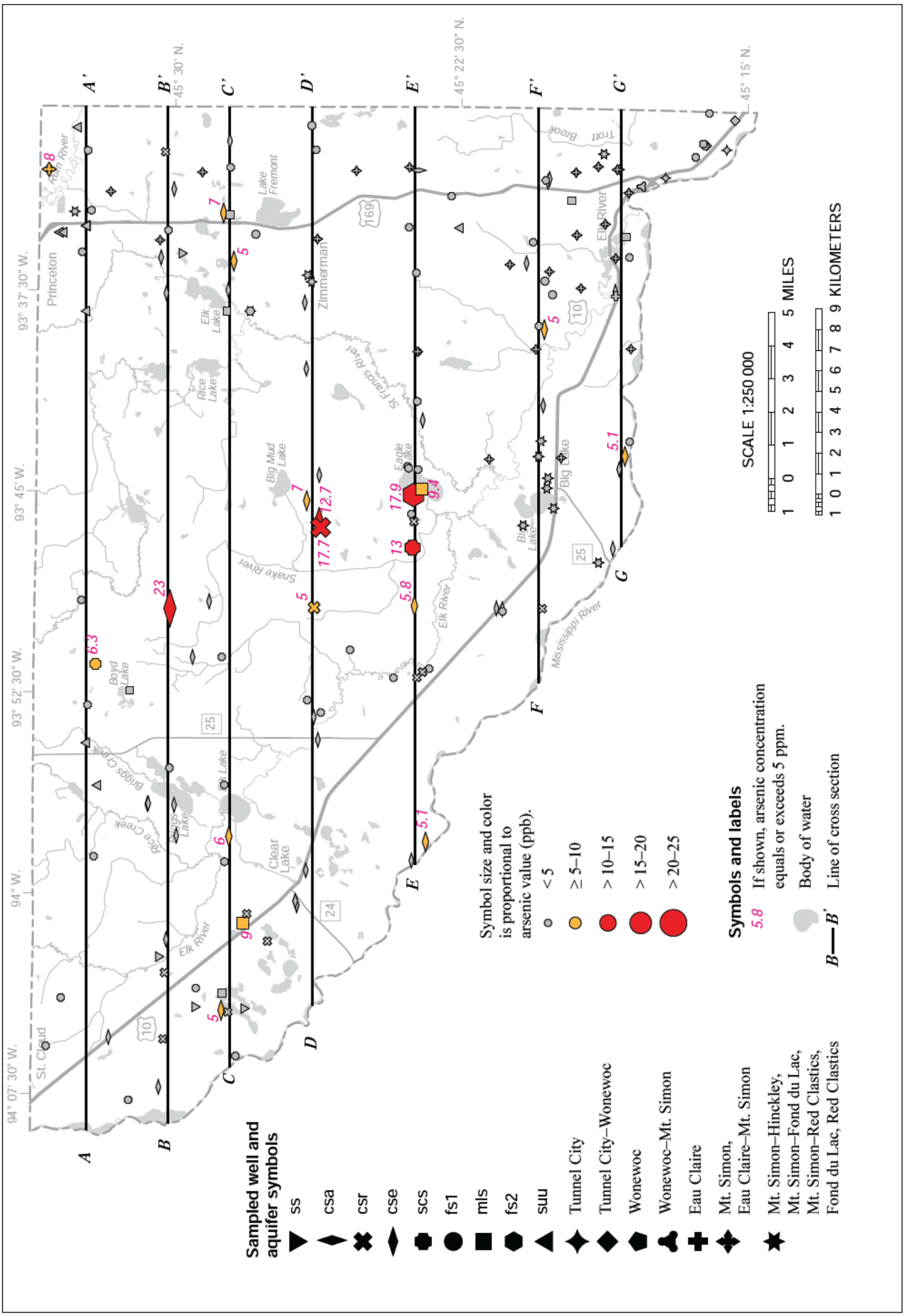


Figure 17. Arsenic values from buried sand and bedrock aquifers

Arsenic concentrations that equaled or exceeded federal drinking water standards (10 ppb) were found in five groundwater samples collected from buried sand aquifers. All arsenic values 5 ppb or greater are labeled for reference.

Hydrogeologic cross sections (Plate 7)

The hydrogeologic cross sections shown on Plate 7 illustrate the horizontal and vertical extent of aquifers and aquitards, groundwater residence time, and general directions of groundwater flow. It also includes a comparison of glacial geologic units that were defined in Part A and the corresponding hydrogeologic units (Figure 5).

The seven cross sections were selected from a set of 37 regularly spaced, west-to-east cross sections created by the MGS, to display the higher density sections of chemistry data and a variety of recharge examples. These cross sections were constructed using a combination of well data from the CWI and the following sections of this atlas: the bedrock geology map (Part A, Plate 2), surficial geology map (Part A, Plate 3), and Quaternary stratigraphy plate (Part A, Plate 4). Well information was projected onto the trace of the cross section from distances no greater than one-half kilometer.

Relative hydraulic conductivity

Hydraulic conductivity is a function of the porosity (volume of pores) and permeability (connectedness of pores) of a sediment or rock layer. Percent sand content in the glacial sediment matrix was used as a proxy for permeability because coarse grains typically add permeability to sediment. Glacial aquitards with a higher sand content are assumed to have a higher hydraulic conductivity than aquitards with lower sand content. This assumption does not account for the occurrence of larger clasts (pebbles, cobble, and boulders), the potential for fine sediment to fill pore spaces, or fractures in the shallow till units.

Glacial sediment layers that act as aquitards (till units) are shown in shades of gray on Plate 7. Lighter shades indicate aquitards with expected higher relative hydraulic conductivity. Darker shades represent aquitards with lower relative hydraulic conductivity. The percent sand in each of the aquitards is based on the average matrix texture of each glacial aquitard (or till).

The tills with the highest sand content are the units of the Cromwell Formation (units ctr, cte, and cta), with 64–65 percent; and the St. Francis formations (fs1 and fs2), 57 and 74 percent, respectively. The lowest sand content is found in the members of the Lake Henry Formation: sct at 22 percent and mlt at 31 percent.

Groundwater flow direction

Groundwater moves from areas with higher potential energy to areas with lower potential energy. The direction of groundwater movement is interpreted from the equipotential contours constructed from measured water levels in wells. These contours can be used to identify the groundwater flow direction, recharge zones, and discharge zones. The equipotential contours and flow arrows show that the groundwater flow in Sherburne County is initially downward, then laterally toward the larger creeks and rivers.

Groundwater recharge zones exist across broad areas of the county due to the relatively thick and widespread surficial sand and generally level topography. Smaller discrete groundwater recharge areas are identified in the following section based on occurrences of connected aquifers and geochemical data such as tritium, chloride, and nitrate.

Recharge and discharge: interpreted groundwater residence time

Recharge interpretations

Cold War era, recent, or mixed tritium-age water may occur in the following situations. Each is indicated using the symbols below on the pollution sensitivity maps and Plates 6 and 7.

① Water from the surface moves through a thin layer of overlying fine-grained material to an underlying aquifer.

Due to the widespread sandy conditions in the county this condition is only present at one location at the far eastern side of B–B′ where only a thin layer of nt till separates the underlying csa and csr buried sand aquifers from the surface.

② Groundwater moves from an overlying surficial aquifer to a buried aquifer.

This is the most common condition in the county due to the extensive surficial sand and common hydraulic connections to underlying aquifers. This condition is shown mostly on the central and western portions of cross sections B–B′ through E–E′ in the shallower buried aquifers csr, cse and to a lesser extent scs. Smaller clusters of locations with this condition are shown in the cse aquifer on the eastern portion of B–B′ and C–C′ and the western portion of G–G′.

③ Groundwater moves from an overlying buried aquifer to an underlying buried aquifer.

Similar to the ② condition, this condition is almost as common due to extensive surficial sand and common hydraulic connections to underlying aquifers and to stratigraphically lower aquifers. This condition is common mostly on the central and eastern portions on cross sections A–A′, D–D′, and E–E′ (buried sand aquifers cse, scs, mls, and fs2), and the western portion of F–F′ (bedrock aquifers).

Ⓛ Groundwater flows laterally.

This classification is necessary due to the limiting assumption of only vertical recharge used in the pollution sensitivity model. It is used where tritium detections occur in very low to low sensitivity areas. The likely source of water containing tritium is not from a direct vertical pathway, but from an upgradient (lateral) location. This condition is shown for most of the locations on A–A′ (scs and suu aquifers), the eastern portion of C–C′ (cse and mls aquifers), locations along F–F′ (scs and bedrock aquifers), and other scattered locations.

Ⓤ Groundwater flowpath is unknown.

The tritium detected in groundwater samples from these locations may be from unknown well conditions or unknown aquifer connections. This unknown designation is used when a recent or mixed classification can't be explained by any of the previously described recharge conditions. These anomalous conditions are sometimes due to old corroded well casing conditions that allow shallow recent water to leak directly into the well casing. In addition, sometimes older wells were not constructed to modern standards and lack a grout seal around the casing, allowing recent tritium-age water leakage directly to the screened or open-hole portion of the well. Five of these unknown locations are shown on the eastern portion of A–A′ (fs2 and suu aquifers), the western portion of C–C′ (fs2 aquifer), the eastern portion of D–D′ (Mt. Simon aquifer), and the eastern side of F–F′ (Eau Claire and Eau Claire–Mt. Simon).

Discharge interpretations

Ⓓ Groundwater discharges to a surface-water body.

Groundwater discharge to rivers, lakes, springs, and wetlands is a common occurrence in Minnesota. It supplies water vital to aquatic ecosystems. Discharge or baseflow is most likely to occur where an underlying aquifer is connected to surface water.

The groundwater discharge (gaining) or recharge from surface water (losing) of surface-water bodies can vary depending on seasonal or climatic cycles. Evaluating this variability was beyond the scope of this study. The following designations of discharge are meant to recognize that groundwater discharge to surface-water bodies is likely to occur for at least part of each year.

A–A′: west side, the Mississippi and Elk rivers; and Rice and Briggs creeks

B–B′: west side, the Mississippi and Elk rivers, and Briggs Lake; east side, the St. Francis River and Battle Brook

C–C′: west side, the Mississippi River and Elk Lake; east side, the St. Francis River

D–D′: west side, the Mississippi and Elk rivers; east side, the Snake and St. Francis rivers

E–E′: west side, the Mississippi and Elk rivers; east side, Eagle Lake

F–F′ and G–G′: the Mississippi and Elk rivers

Pollution sensitivity

Pollution sensitivity maps generated on a county scale are intended to assist citizens and local government in protecting and managing groundwater resources. Pollution sensitivity is defined as the potential for groundwater to be contaminated because of the hydrogeologic properties of the material hosting or overlying it. Migration of contaminants dissolved in water that flowed through unsaturated and saturated sediment is a complex process that is affected by biological degradation, oxidizing or reducing conditions, and other factors. The methods to interpret pollution sensitivity use the following generalizing assumptions:

- Flow paths are vertical and downward from the land surface through the soil and underlying sediment to an aquifer.
- River valleys are typically important groundwater discharge areas (see "Hydrogeologic cross sections"). Local upward groundwater movement is characteristic of these areas and the actual pollution sensitivity in these areas will be less than the rating.
- A contaminant is assumed to travel at the same rate as water.
- A contaminant that is dissolved and moving within water from the surface is not chemically or physically altered over time.

Two models are used to estimate the pollution sensitivity, based on the different properties of the materials. The following assumptions apply to these models.

Near-surface sensitivity (to a depth of 10 feet): sediment texture is the primary property used to create a sensitivity map. The permeability of the sediment matrix texture is estimated based on hydrologic theory and empirical data to establish a downward flow rate. The rate multiplied by the vertical travel distance equals the estimate of the vertical travel time.

Buried aquifer sensitivity: sediment above and between buried sand and gravel aquifers is fine grained with low hydraulic conductivity. The method only considers the cumulative thickness of fine-grained sediment (aquitards) overlying aquifers. It does not consider differences in sediment texture or permeability of aquitard materials.

Pollution sensitivity of near-surface materials

Methods

The sensitivity to pollution of near-surface materials is an estimate of the time it takes for water to infiltrate the land surface, travel through the unsaturated zone, and reach the water table, which is assumed to be 10 feet below land surface. The first 3 feet is assumed to be soil and the next 7 feet (3–10 feet) is assumed to be surficial geological material. If there is no soil data, the transmission rate is based on 10 feet of the surficial geologic unit.

The transmission rate of a soil or surficial geologic unit will vary depending on the texture. In general, coarse-grained materials have faster transmission rates than fine-grained materials. The two primary inputs used to estimate transmission rate are the hydrologic soil group and the surficial geologic matrix texture. Attributes of both are used to estimate the time of travel (Table 1) (USDA-NRCS, 2011; Part A, Plate 4). Further details are available in *Methods to estimate near-surface pollution sensitivity* (DNR, 2016b).

The time of travel through the near-surface sediment varies from hours to approximately a year.

- Areas with a relatively short travel time (hours to a week) are rated high sensitivity (Figure 18).
- Areas with a longer travel time (weeks to a year) are rated low or very low.

Results

High sensitivity conditions dominate the county (Figure 19) since the most common surficial material in the county is sand and gravel. Moderate sensitivity is the next most common category where sandy loam till exists at the surface. A large area of mostly moderate sensitivity exists in the area south of Zimmerman through most of the Elk River city limits. Smaller areas of mostly moderate sensitivity exist north of Becker and along the northern border of the county. One area of mostly low sensitivity exists at the center of the northern county border west of Princeton.

Table 1. Transmission rates used to assess the pollution sensitivity rating of the near-surface materials

[Note that peat is used as an overlay on the map due to variable and typically unknown thicknesses]

Hydrologic Soil Group (0–3 feet)		Surficial Geologic Texture (3–10 feet)		
Group*	**Transmission rate (in/hr)**	**Classification**	**Transmission rate (in/hr)**	**Surficial geology map unit**
A, A/D	1	gravel, sandy gravel, silty gravel	1	Qa, Qbg, Qcc, Qci, Qco, Qno, Qtl, Qtu, Quc
		sand, silty sand	0.71	Qbs, Qe
B, B/D	0.50	silt, loamy sand, units with eolian sand designation	0.50	Qnl
		sandy loam	0.28	Qcd, Qct, Qnc, Qnt
C, C/D	0.075	silt loam, loam	0.075	Ql, Qng
D	0.015	sandy clay loam	0.035	Not mapped in the county
		clay, clay loam, silty clay loam, sandy clay, silty clay	0.015	Not mapped in the county

*The Natural Resources Conservation Service (NRCS) defines hydrologic soil groups primarily based on texture and the occurrence of low permeability layers (USDA-NRCS, 2009):

Group A: water is freely transmitted. Soils are more than 90 percent sand and gravel.

Group B: soils are less permeable but water transmission is still unimpeded.

Group C: water transmission is somewhat restricted.

Group D: water movement is restricted or very restricted.

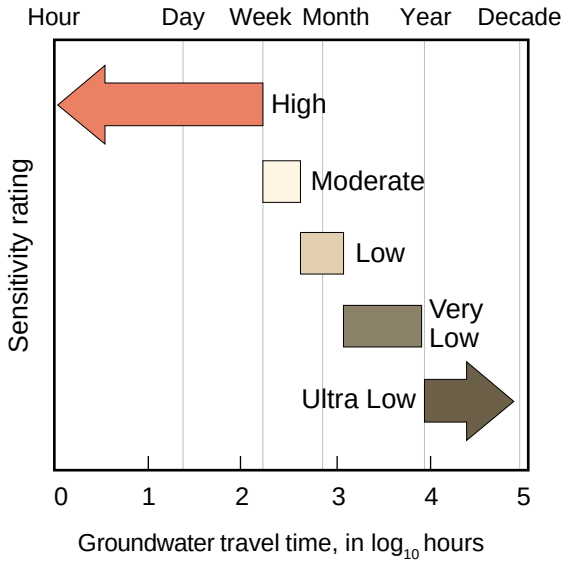


Figure 18. Geologic sensitivity rating for the near-surface materials

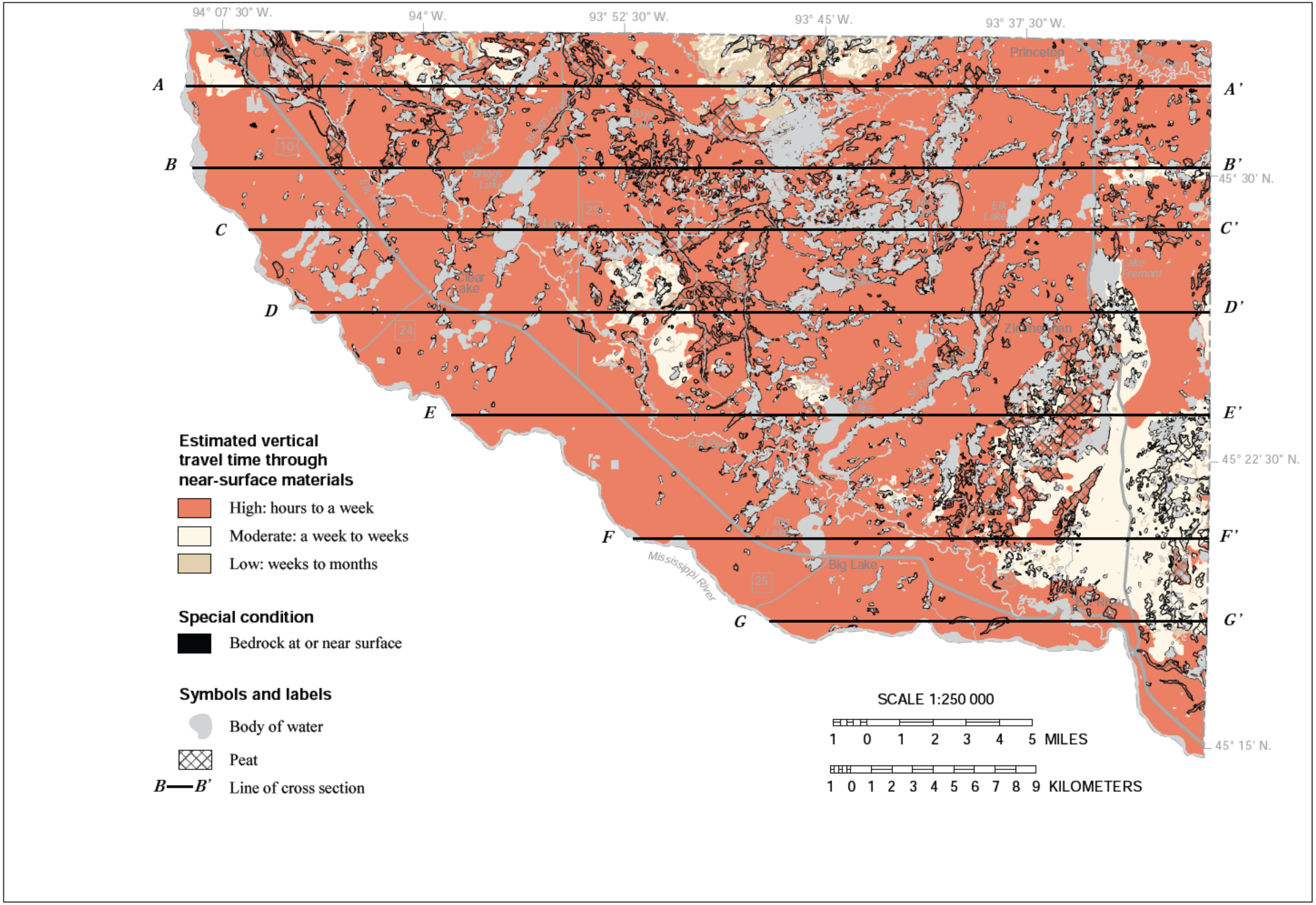


Figure 19. Pollution sensitivity of near-surface materials

This pollution sensitivity model assumes a 10-foot-deep water table and vertical travel of possible pollutants through unsaturated, near-surface materials. Map modified from Adams, 2016b.

Buried sand and gravel aquifer and bedrock surface sensitivity

Methods

The sensitivity rating for the buried sand aquifers and the bedrock surface are based on estimated vertical travel times defined by the Geologic Sensitivity Workgroup (1991). The travel time varies from hours to thousands of years (Figure 20).

- Areas with relatively short travel times of less than a few years are rated high or very high.
- Areas with estimated travel times of decades or longer are rated low or very low.

The DNR developed a method using geographic information systems (GIS) for mapping pollution sensitivity of buried sand aquifers and the bedrock surface based on a simplified two-dimensional model. The model is a representation of how water from precipitation infiltrates the land surface and recharges portions of deeper aquifers.

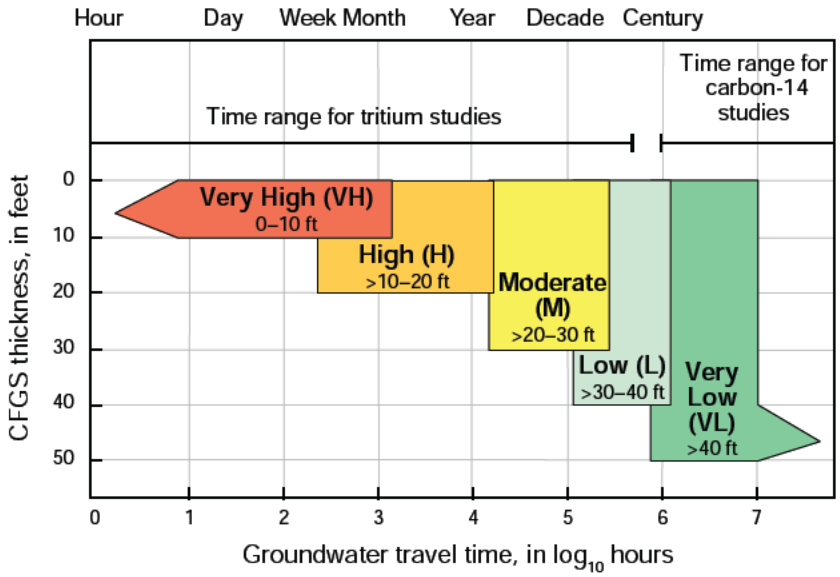


Figure 20. Geologic sensitivity rating for the buried sand aquifers and the bedrock surface

Sensitivity is defined by vertical travel time. The numbers following each rating represent the cumulative fine-grained sediment (CFGS) thickness overlying an aquifer.

The central concept of this process is focused (relatively rapid) recharge: portions of the aquifers overlap and are connected by complex pathways that can allow surface water to penetrate into even the deepest aquifers.

The model assumes the thickness of fine-grained sediment overlying an aquifer is inversely proportional to the sensitivity of an aquifer (Figure 21). The thicker the fine-grained sediment overlying an aquifer, the longer it will take for water to move through it. GIS software is used to calculate a cumulative thickness of these sediment layers. Thicknesses of 10 feet or less are rated very high sensitivity, thicknesses greater than 40 feet are rated very low, and intermediate thicknesses have intermediate sensitivity ratings. A more detailed explanation of this method is available in *Buried aquifer and bedrock surface pollution sensitivity based on cumulative fine-grained sediment (CFGS) thickness* (DNR, 2016c).

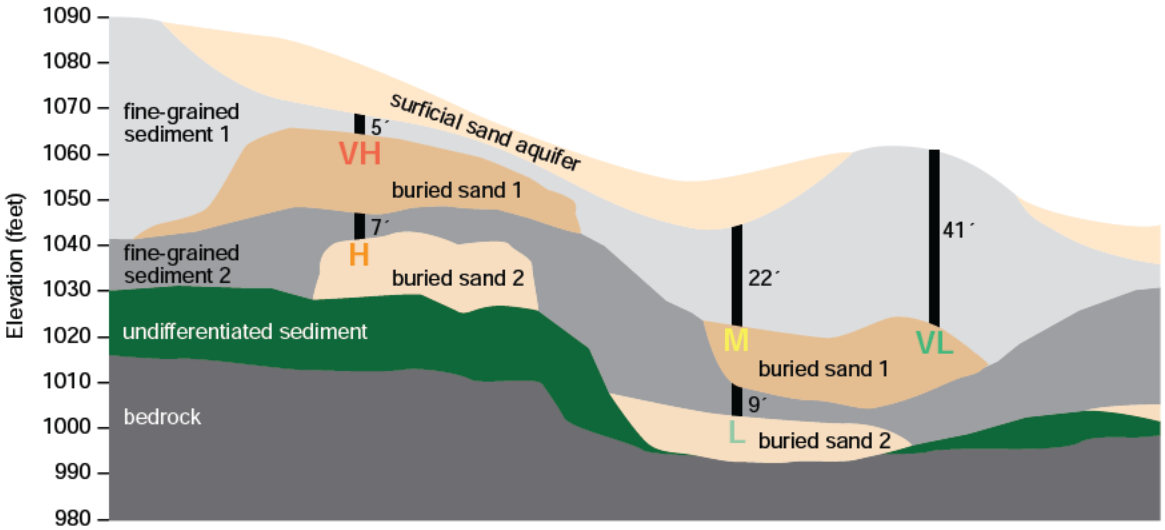


Figure 21. Cross section showing examples of pollution sensitivity ratings

Based on the cumulative thickness of overlying fine-grained sediment. Each vertical black line is labeled with the thickness of fine-grained sediment. The letter at the base of the line indicates the sensitivity rating determined from the cumulative thickness.

Results

The following discussion of the aquifers is in stratigraphic order from the shallowest to the deepest. The model results described in the following section include groundwater flow direction derived from potentiometric surfaces to help the user understand the distribution of particular chemical constituents.

The tritium dataset is a conglomeration of sampling efforts by the DNR and the Minnesota Department of Health (MDH) for several projects since 1989. None of these sampling plans were randomized in a way that would allow a statistical comparison to the results of the pollution sensitivity modeling. Therefore, the descriptions of groundwater chemistry and pollution sensitivity are mostly qualitative. Figure 20 suggests that tritium detections in groundwater samples should be a very rare occurrence from aquifers in areas mapped as very low sensitivity assuming that flow of recent water to the aquifer is vertical. In general, for the upper four aquifers, overlying interconnected sand layers are so extensive that almost all of the samples are mixed or recent tritium age despite directly overlying very low pollution sensitivity conditions. For the deeper aquifers there is a generally good match between tritium age and pollution sensitivity. In the following sections the pollution sensitivity values and spatial distributions are compared to tritium-age of groundwater (Cold War era, recent, mixed, and vintage) for each aquifer.

csa aquifer (Figure 22)

Sensitivity: The csa is a surficial or shallow buried sand aquifer and is unprotected in the northern portion of its extent. The New Ulm Formation (nt), with a loam to sandy loam texture, is the main protective layer (aquitard) for this aquifer in the southern portion of its extent. However, this till layer tends to have a thin and patchy distribution.

These geological circumstances create a pattern of mostly very high pollution sensitivity, especially in the northern portion, with local variations of very low to moderate sensitivity conditions in the southern portion. One groundwater sample had mixed tritium and elevated chloride and nitrate, and was collected from this aquifer near St. Francis shown on the east side of cross section E–E′.

csr aquifer (Figure 23)

Sensitivity: The csr aquifer, like the previously described csa aquifer, exhibits the entire range of pollution sensitivity conditions. This aquifer is overlain in many areas by the New Ulm Formation (nt) or the Cromwell Formation till (cta), or both. With these protective layers the csr aquifer exhibits more areas of very low to moderate pollution sensitivity, especially in the eastern portion of the county, but overall is relatively sensitive to pollution.

Chemistry: All 10 of the groundwater samples analyzed for tritium were mixed, recent, or Cold War tritium age, which is consistent with the relatively sensitive nature of this aquifer. Of the 9 samples tested for chloride, 7 had elevated values ranging from 7.2 to 105 ppm. Of the 6 samples tested for nitrate, 5 had elevated values.

cse aquifer (Figure 24)

Sensitivity: The cse aquifer is relatively widespread and widely used in the county. It has large areas of moderate to very high pollution sensitivity because attributed to thin and patchy overlying aquitard protection. Only the eastern portion of the aquifer is mostly well protected. Similar to the overlying csr aquifer, very high pollution sensitivity conditions are common in the southwestern portion of the county where the overlying New Ulm Formation (nt) and Cromwell Formation till (cta) are absent, thin, or discontinuous.

Chemistry: Of the 35 samples that were tested for tritium, 33 had mixed or recent tritium age (94 percent). The two vintage samples are located at low to moderate sensitivity areas, respectively: west of Elk Lake shown on the west side of C–C′ and east of the Elk River east of center F–F′. The vintage tritium-age sample east of the Elk River on F–F′ had a carbon-14 age of 5,000 years which matches the very low to low pollution sensitivity of that area. The vintage tritium-age sample west of Elk Lake on C–C′ had a carbon-14 age of 4,000 years, which doesn't match the moderate sensitivity of that area but suggests upwelling of older water in the vicinity of the Elk River valley.

Most of the mixed tritium-age samples matched with the low, moderate, and high sensitivities in the central, western, and southern parts of the county. A few of the mixed tritium-age samples matched with very low sensitivity areas in the eastern part of the county and are assumed to have been caused by lateral flow of mixed tritium-age water from upgradient, higher sensitivity locations. The recent tritium-age sample locations, associated with low to very high sensitivity areas, are scattered across all parts of the county with the exception of the eastern area.

Of the 39 samples that were tested for chloride, 26 (67 percent) had elevated concentrations of anthropogenic chloride (≥5 ppm), reflecting the more sensitive nature of this aquifer. Elevated chloride values ranged from 5.3 to 94.3 ppm and were found in all parts of the county. Of the 43 samples tested for nitrate, 13 (30 percent) had elevated concentrations (≧1 ppm) ranging from 1.5 to 21 ppm. These elevated values were widely scattered across most of the county.

scs aquifer (Figure 25)

Sensitivity: The scs aquifer is also relatively widespread and widely used in the county. It has many scattered areas of moderate to very high pollution sensitivity due to thin and patchy overlying aquitard protection. Similar to the overlying cse aquifer, very high pollution sensitivity conditions are common in the southwestern portion of the county where the overlying New Ulm Formation (nt) and Cromwell Formation till units (cta and cte) are absent, thin, or discontinuous.

Chemistry: Of the 33 samples tested for tritium, 29 were mixed or recent tritium age (88 percent). The four vintage samples in the eastern part of the county are located at very low to moderate sensitivity areas.

The 12 recent-age samples matched with the very low to moderate sensitivities throughout the county. Seven samples matched with very low sensitivity areas but were all close to upgradient areas of higher sensitivity suggesting lateral flow of mixed and recent tritium-age water from those upgradient locations. A similar situation was found for the mixed samples where 9 of the 17 were located in very low sensitivity areas but were all downgradient of an area of higher sensitivity, indicating lateral flow of recharge water from those areas. This relatively frequent association of detected tritium (mixed and recent tritium-age water) with local areas of very low and low sensitivity reflects the complexity of overlying hydraulic connections.

Of the 28 samples tested for chloride, 11 (39 percent) had elevated concentrations (≥5 ppm) of anthropogenic chloride, reflecting the more sensitive nature of this aquifer. Elevated chloride values ranged from 5.16 to 61.7 ppm and were found in all parts of the county. Of the 31 samples tested for nitrate, 6 (19 percent) had elevated concentrations (≥1 ppm) of 3.1 and 23 ppm.

fs1 aquifer (Figure 26)

Sensitivity: The fs1 aquifer has a limited known extent. Mapped areas are mostly found in the eastern, southern, and northern parts of the county. This aquifer has a few scattered areas of moderate to very high pollution sensitivity due to local areas of hydraulically connected overlying sand bodies that have created areas of focused recharge.

Chemistry: Of the 4 samples that were tested for tritium, 2 were mixed and 2 were vintage. All of these samples were collected at locations in very low to low sensitivity areas. One sample located south of Elk Lake that was analyzed for carbon-14 residence time had an age of 7,000 years, which was consistent with the very low sensitivity of that area.

None of the five samples that were tested for chloride concentrations equalled or exceeded 5 ppm. One sample located north of Zimmerman had a nitrate concentration of 1.3 ppm.

mls aquifer (Figure 27)

Sensitivity: Parts of the mls aquifer exist at locations across the county. Similar to the overlying fs1 aquifer, the mls aquifer has a few scattered areas of moderate to very high pollution sensitivity due to local areas of hydraulically connected overlying sand bodies that have created areas of focused recharge. Most of these higher sensitivity areas are relatively small with the exception of a larger area northwest of Big Lake.

Chemistry: Of the eight samples tested for tritium, seven were vintage or mixed tritium age. One sample collected from the north-central part of the county near Boyd Lake had a recent tritium age and was associated with a moderate pollution sensitivity area. The four vintage samples are all located in very low sensitivity areas. The two vintage samples that were also analyzed for carbon-14 residence time had values of 4,000 and 5,000 years, respectively: west and east portions of cross section C–C′. One of the three mixed-age samples were located in very low sensitivity areas and can probably be attributed to lateral flow from upgradient areas of higher sensitivity. One of the mixed age samples was located in a high sensitivity area created by multiple overlying interconnected sand layers.

Of the six samples tested for chloride and nitrate, two had elevated concentrations (≥5 ppm) of anthropogenic chloride. Both were located northwest of Clear Lake and are shown on the west side of cross section C–C′ between Elk Lake and Long Lake. Elevated chloride values were 5.89 and 10.0 ppm. None of the samples had elevated nitrate concentrations (≥1 ppm).

fs2 aquifer (Figure 28)

Sensitivity: Parts of the fs2 aquifer exist at locations across the county. Similar to the overlying fs1 and mls aquifers, the fs2 aquifer has a few scattered areas of moderate to very high pollution sensitivity due to local areas of hydraulically connected overlying sand bodies that have created areas of focused recharge.

Chemistry: All of the six samples from this aquifer were mixed tritium age. One sample matched an area with very low sensitivity and probably represents lateral flow from higher sensitivity areas. Three of the mixed tritium-age samples were associated with low sensitivity areas and indicate focused recharge through multiple hydraulically connected overlying sand layers. Two of the mixed samples located in very low sensitivity areas had no apparent source of water that would contain detectable tritium and were classified with a recharge condition of unknown.

All of these samples were tested for chloride and nitrate. One sample located south of Princeton had an elevated (5.92 ppm) concentration of anthropogenic chloride. None of the samples had elevated nitrate concentrations.

suu aquifer (Figure 29)

Sensitivity: Parts of the suu aquifer exist mostly in the northern part of the county with scattered small locations in the south. Similar to the overlying fs1, mls, and fs2 aquifers, the suu has a few scattered areas of moderate to very high pollution sensitivity due to local areas of hydraulically connected overlying sand bodies that have created areas of focused recharge.

Chemistry: Of the eight samples tested for tritium, two were vintage tritium age and two were recent. Both pairs of samples were located south of Princeton less than a mile apart. The vintage samples were associated with very low sensitivity. The recent samples, one with an elevated chloride value, were in an area of moderate to high sensitivity. These two pairs of contrasting samples and associated contrasting sensitivity conditions are good examples of the high variability of hydrogeologic conditions of glacial sediments at a local scale.

The four mixed samples matched areas with very low sensitivity and probably represent lateral flow from higher sensitivity areas. All of the mixed-age samples were tested for chloride and nitrate. One of the samples contained elevated chloride. One sample that had an elevated concentration of nitrate (3.96 ppm) is located east of St. Cloud, shown on A–A′ east of Rice Creek.

Bedrock surface (Figure 30)

Sensitivity: Most of the bedrock aquifer usage and all of the groundwater samples are from the eastern part of the county, where the Paleozoic sandstones of the Mt. Simon and Wonewoc exist along with the underlying Mesoproterozoic clastic units such as the Hinckley and Fond du Lac. Within this eastern Paleozoic and Mesoproterozoic clastic bedrock area, pollution sensitivity is mostly very low with many small scattered areas of moderate to very high. Beyond this area to the west there are some much larger areas of higher sensitivity; especially in an area including Becker and adjoining areas along the Mississippi River where the overlying till units are absent, thin, or discontinuous.

Chemistry: Tritium data shown are only from wells with shallower open-hole constructions relative to the bedrock suface, with relatively short open-hole sections (bedrock surface to top of open hole ≤40 feet and length of open hole ≤80 feet). The purpose of this selection was to pick tritium data that were representative of the bedrock surface conditions and the corresponding pollution sensitivity of the top bedrock surface.

Of the 12 tritium samples from wells that matched these criteria, six samples located in the eastern part of the county were mixed or recent tritium age, and six were vintage. These mixed and recent samples were associated with very low pollution sensitivity ratings and therefore are assumed to have originated by lateral groundwater movement from higher sensitivity areas or unknown circumstances. The five mixed and vintage samples that were also analyzed for carbon-14 residence time showed ages that ranges from 5,000 to 8,000 years, which is consistent with the very low pollution sensitivities of those areas.

Of the 12 samples that were tested for chloride, only one sample in the Elk River area contained an elevated concentration (34.9 ppm) of anthropogenic chloride. One sample located southwest of the city of Big Lake had an elevated nitrate concentration.

Deeper bedrock aquifers (Figure 31)

The selection of tritium data from wells constructed with open-hole portions in the deeper portions of the bedrock aquifers shows some groundwater samples with mixed tritium age (7 of 25). Most of these wells are located in areas of moderate to very high sensitivity for the bedrock surface (Figure 30) in the Big Lake area. This association suggests that in some areas the higher sensitivity conditions could extend to some of the deeper portions of the bedrock aquifers.

"Unknown" recharge conditions are shown for a recent tritium-age sample from the Mt. Simon aquifer in the southeastern portion of the county, and a mixed tritium-age Mt. Simon sample from Zimmerman. The age and condition of these wells may be a factor if older well construction methods or corrosion due to age have allowed leakage of shallow recent water into the well casings (shown with the "U" condition). Of the 16 samples that were tested for chloride, eight had elevated concentrations of anthropogenic chloride, including the areas of Big Lake, Princeton, and Zimmerman. Of the 23 samples tested for nitrate, five contained elevated concentrations, mainly in the Big Lake area.

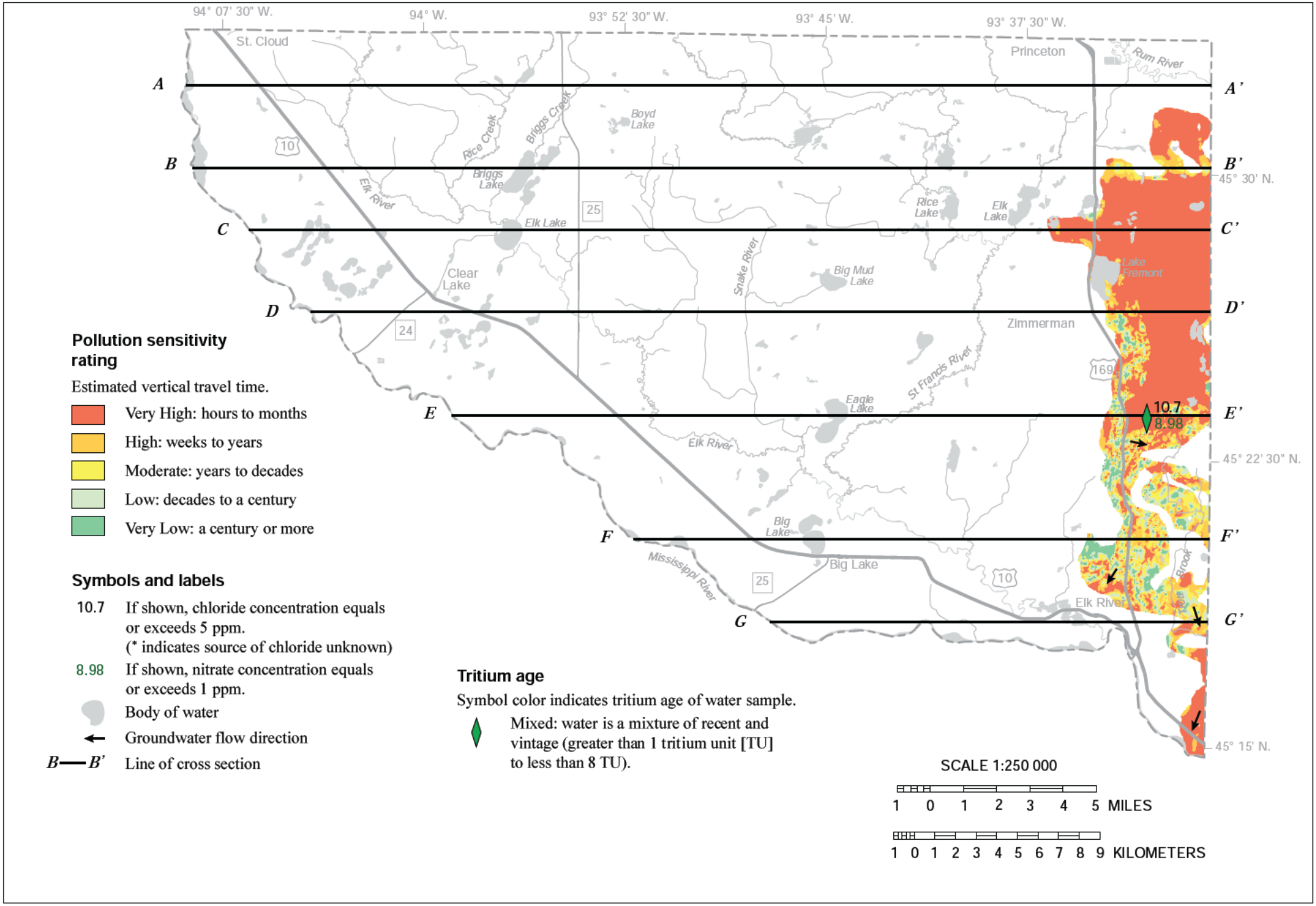


Figure 22. Pollution sensitivity of the csa aquifer and groundwater flow directions

Moderate to very high pollution sensitivity conditions are common.

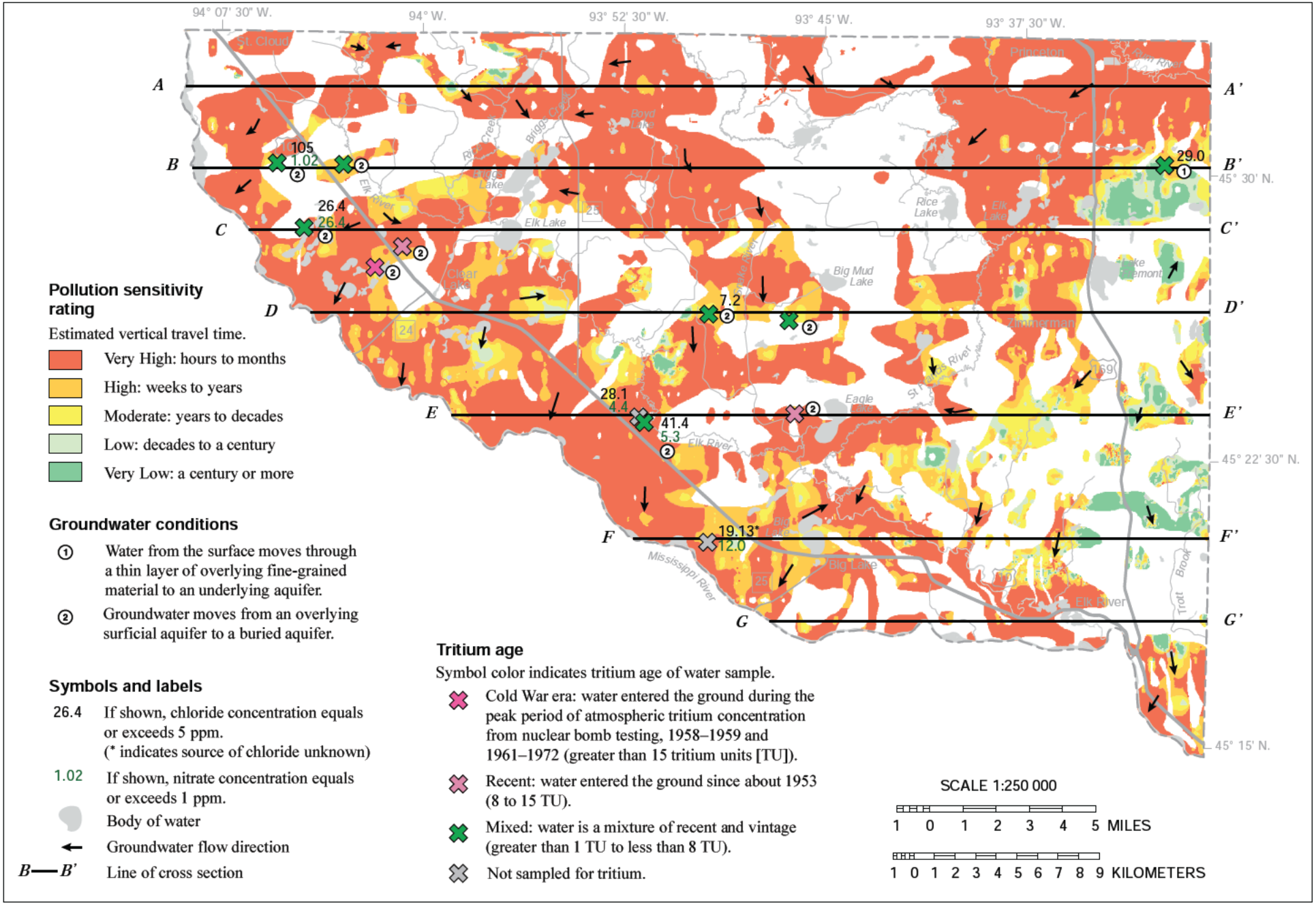


Figure 23. Pollution sensitivity of the csr aquifer and groundwater flow directions

Moderate to very high pollution sensitivity conditions are common, with the exception of some areas in the eastern part of the county.

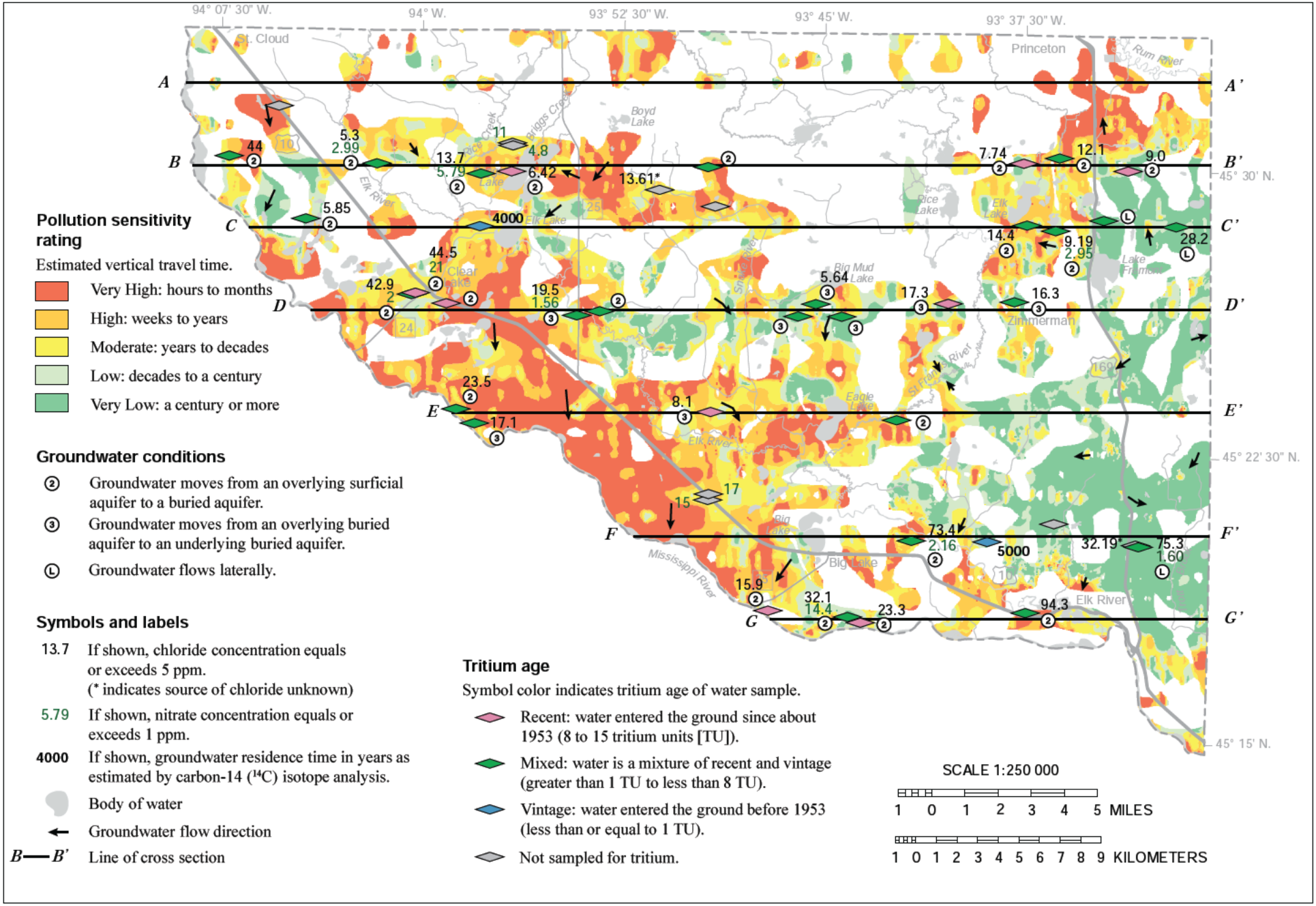


Figure 24. Pollution sensitivity of the cse aquifer and groundwater flow directions

This aquifer has large areas of moderate to very high pollution sensitivity due to thin and patchy overlying aquitard protection. Only the eastern portion of the aquifer is mostly well protected.

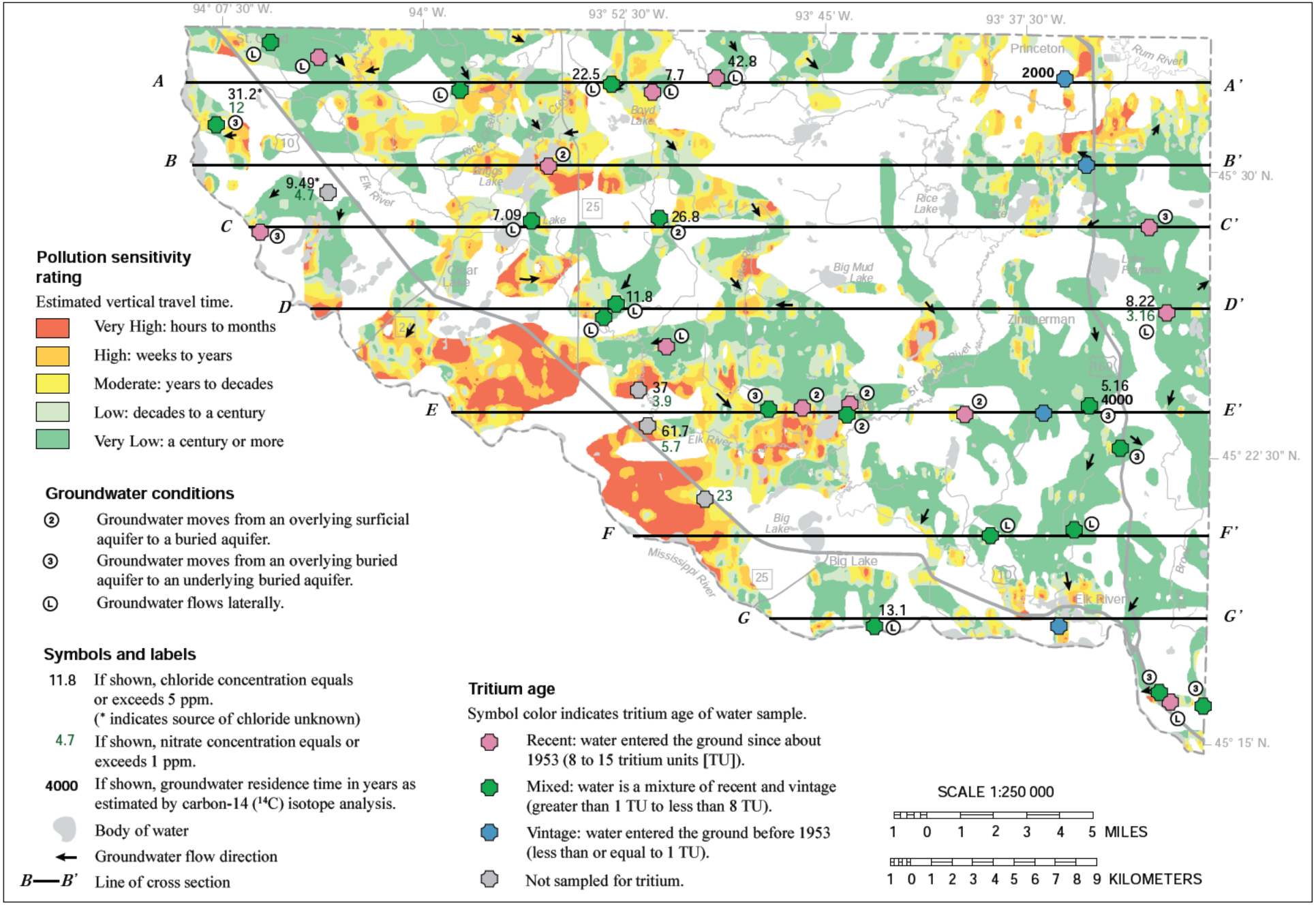


Figure 25. Pollution sensitivity of the SCS aquifer and groundwater flow directions

This aquifer is transitional between the more sensitive overlying aquifers to the less sensitive underlying aquifers.

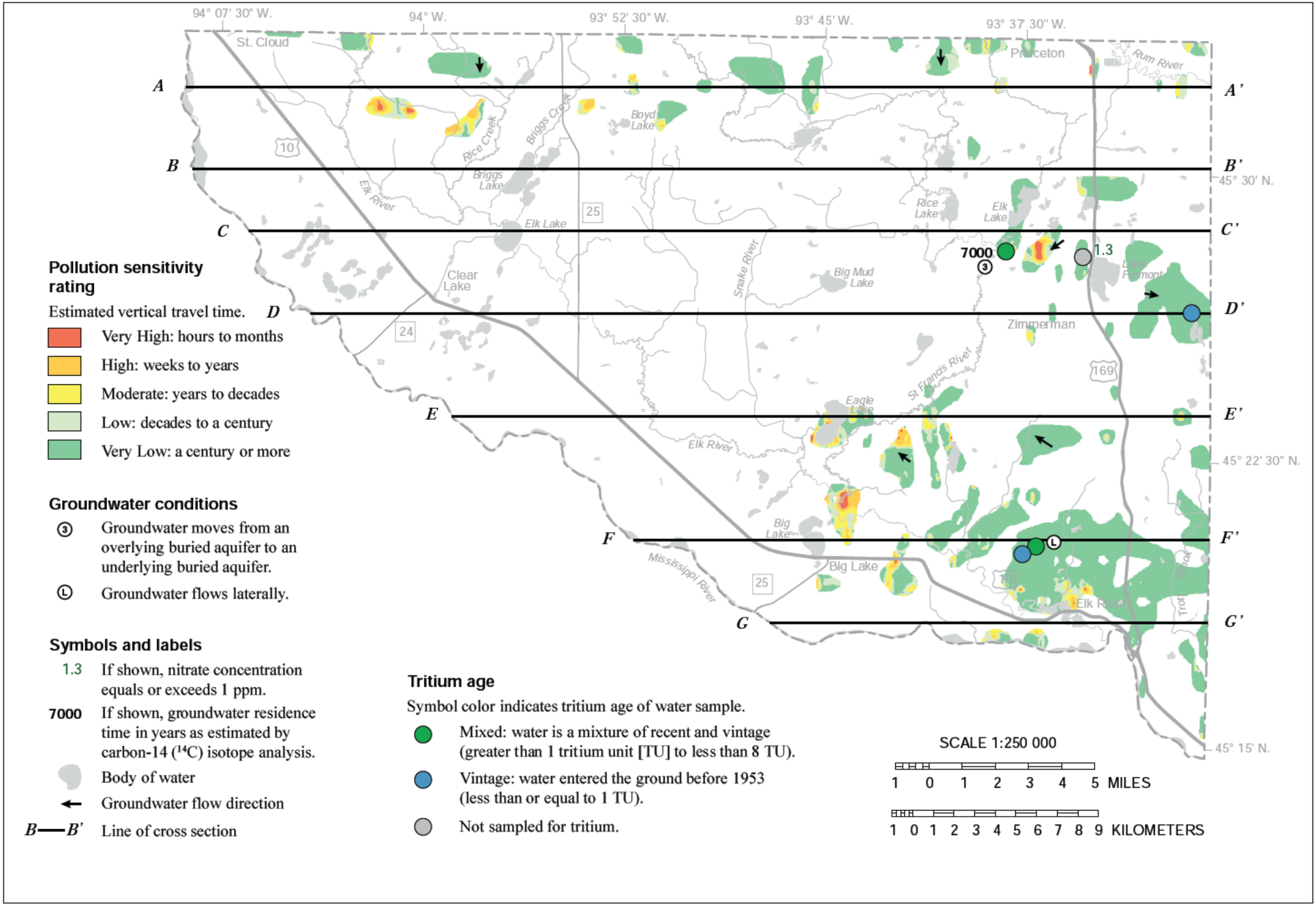


Figure 26. Pollution sensitivity of the fs1 aquifer and groundwater flow directions

The fs1 aquifer is mostly a very low sensitivity aquifer, except for scattered, relatively small areas of moderate to very high sensitivity.

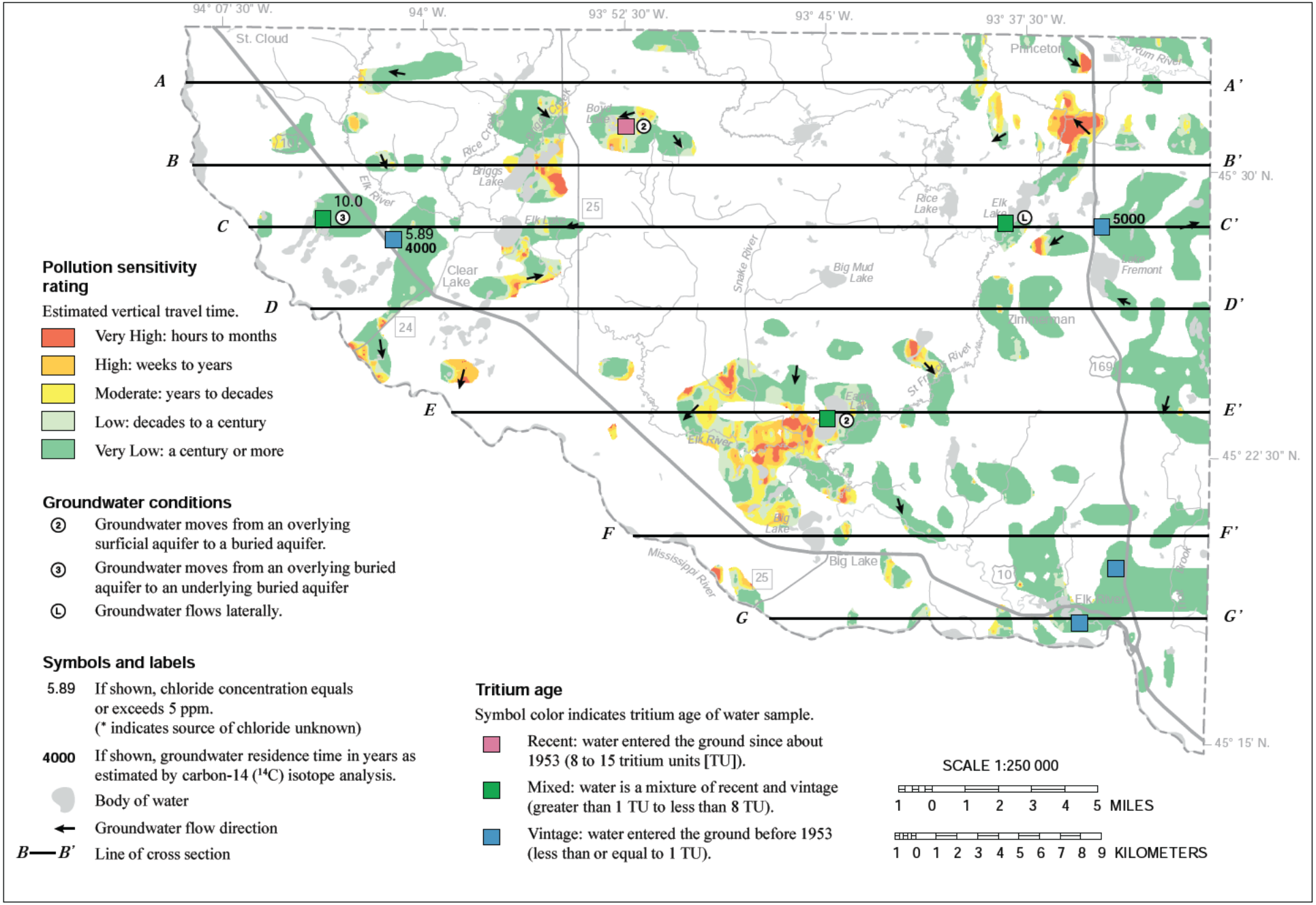


Figure 27. Pollution sensitivity of the mls aquifer and groundwater flow directions

This aquifer has a few scattered areas of moderate to very high pollution sensitivity due to local areas of hydraulically connected overlying sand bodies. Most of these higher sensitivity areas are relatively small with the exception of a larger area northwest of Big Lake.

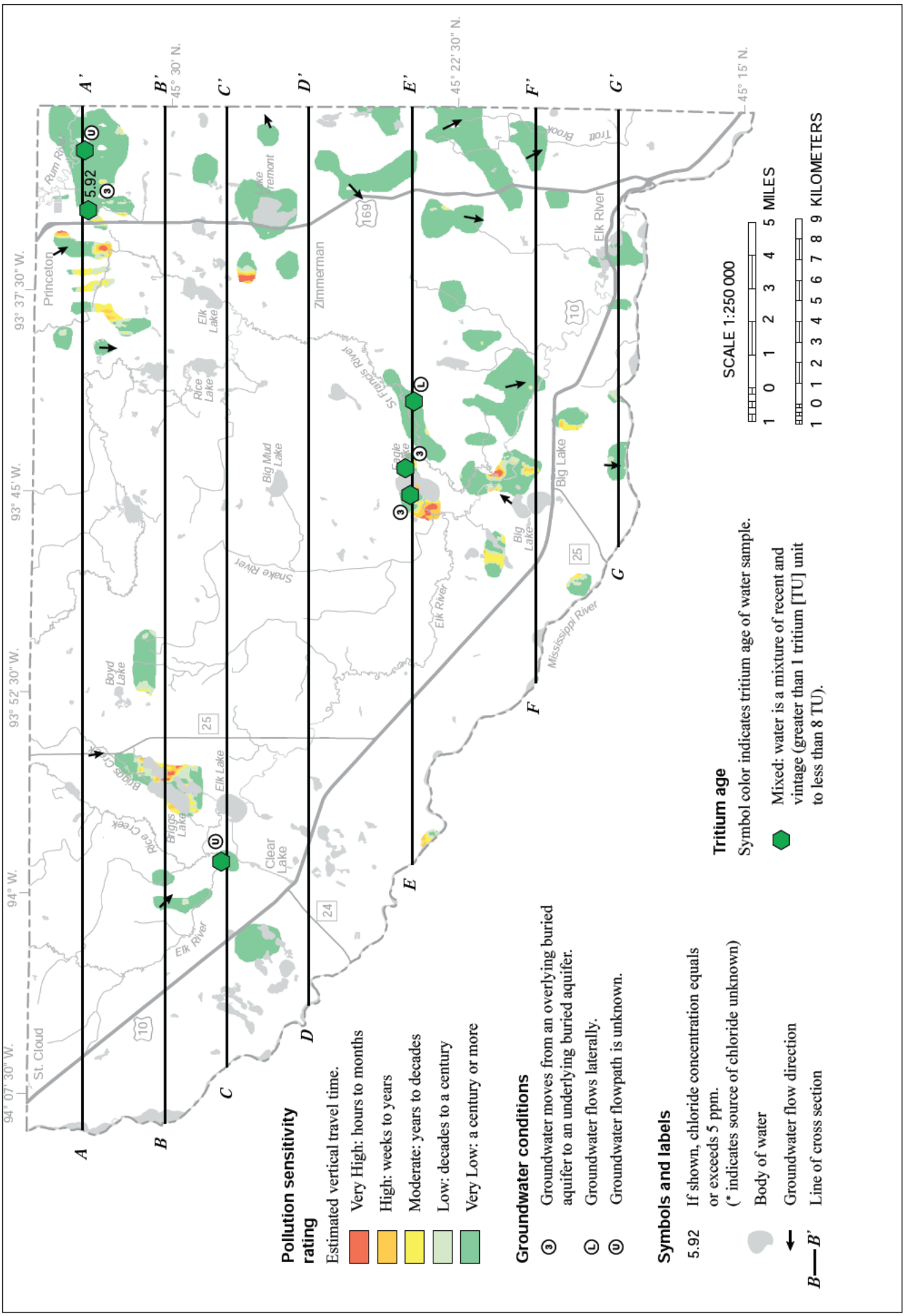


Figure 28. Pollution sensitivity of the fs2 aquifer and groundwater flow directions

This aquifer is mostly a very low sensitivity aquifer, except for scattered, relatively small areas of moderate to very high sensitivity.

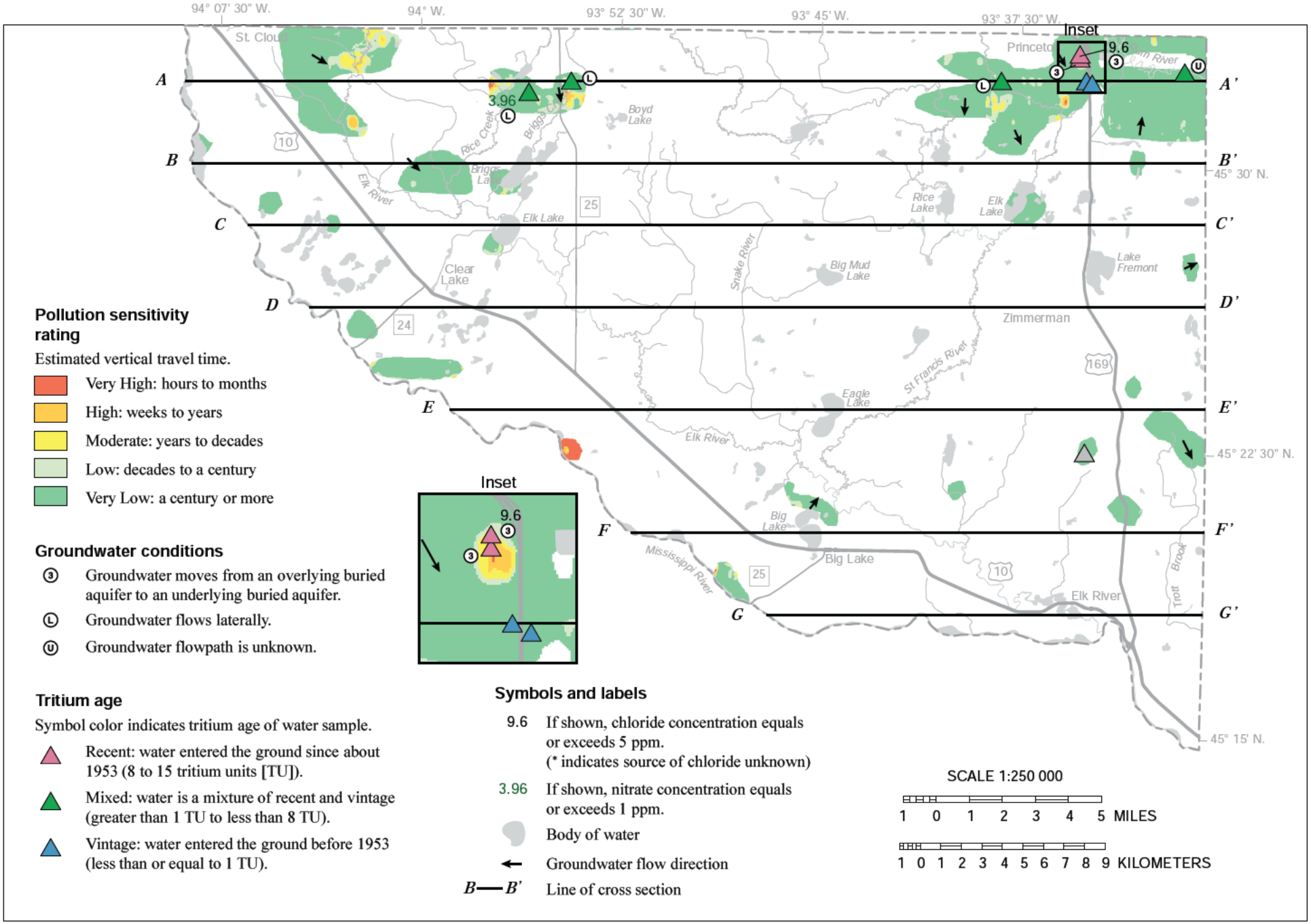


Figure 29. Pollution sensitivity of the suu aquifer and groundwater flow directions

This aquifer is mostly a very low sensitivity aquifer, except for scattered, relatively small areas of moderate to very high sensitivity.

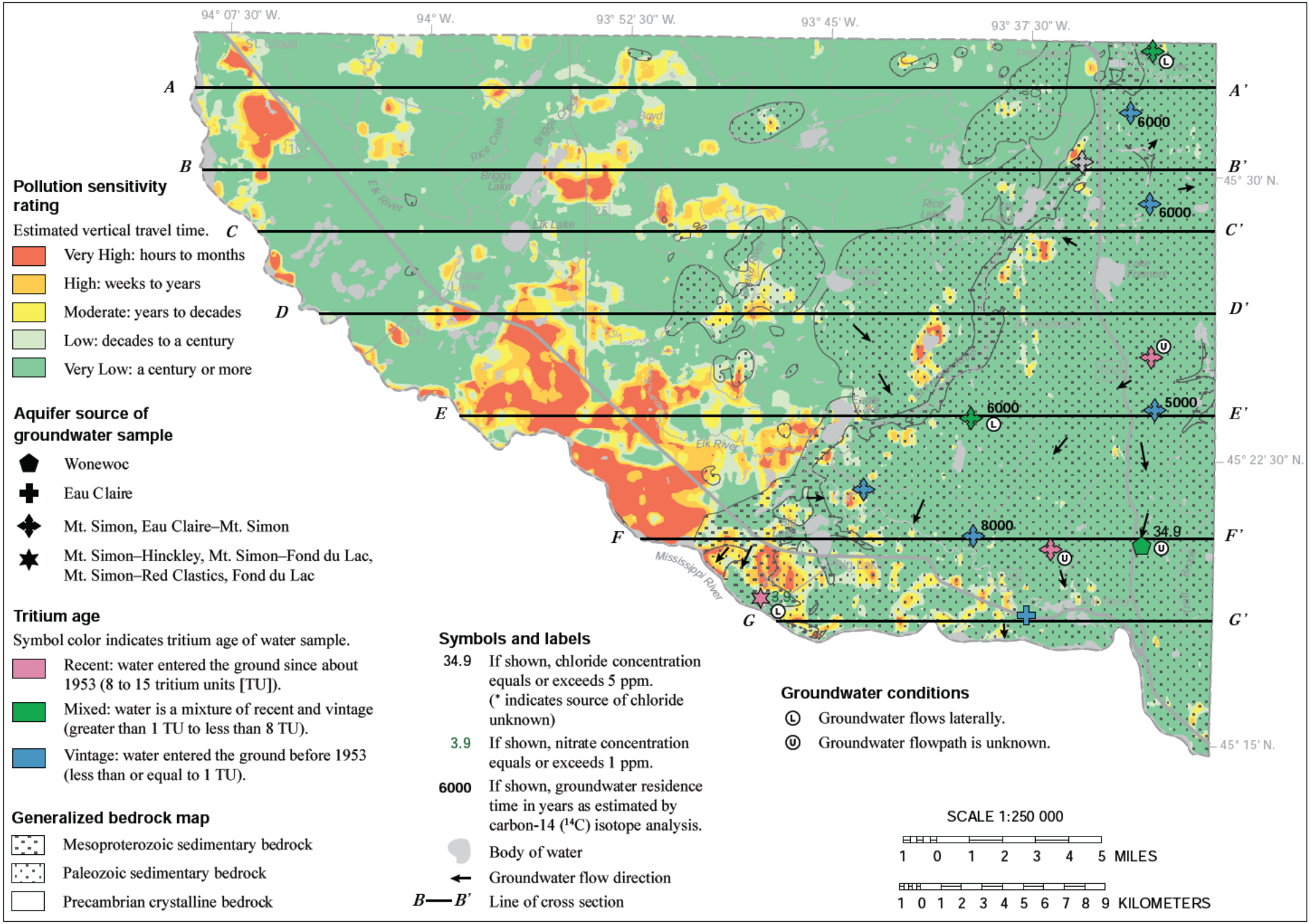


Figure 30. Pollution sensitivity of the bedrock surface and groundwater flow directions

Very low pollution sensitivity is the dominant rating. Limited areas of moderate through very high pollution sensitivity areas are scattered throughout the eastern parts of the county where the main bedrock aquifers are located.

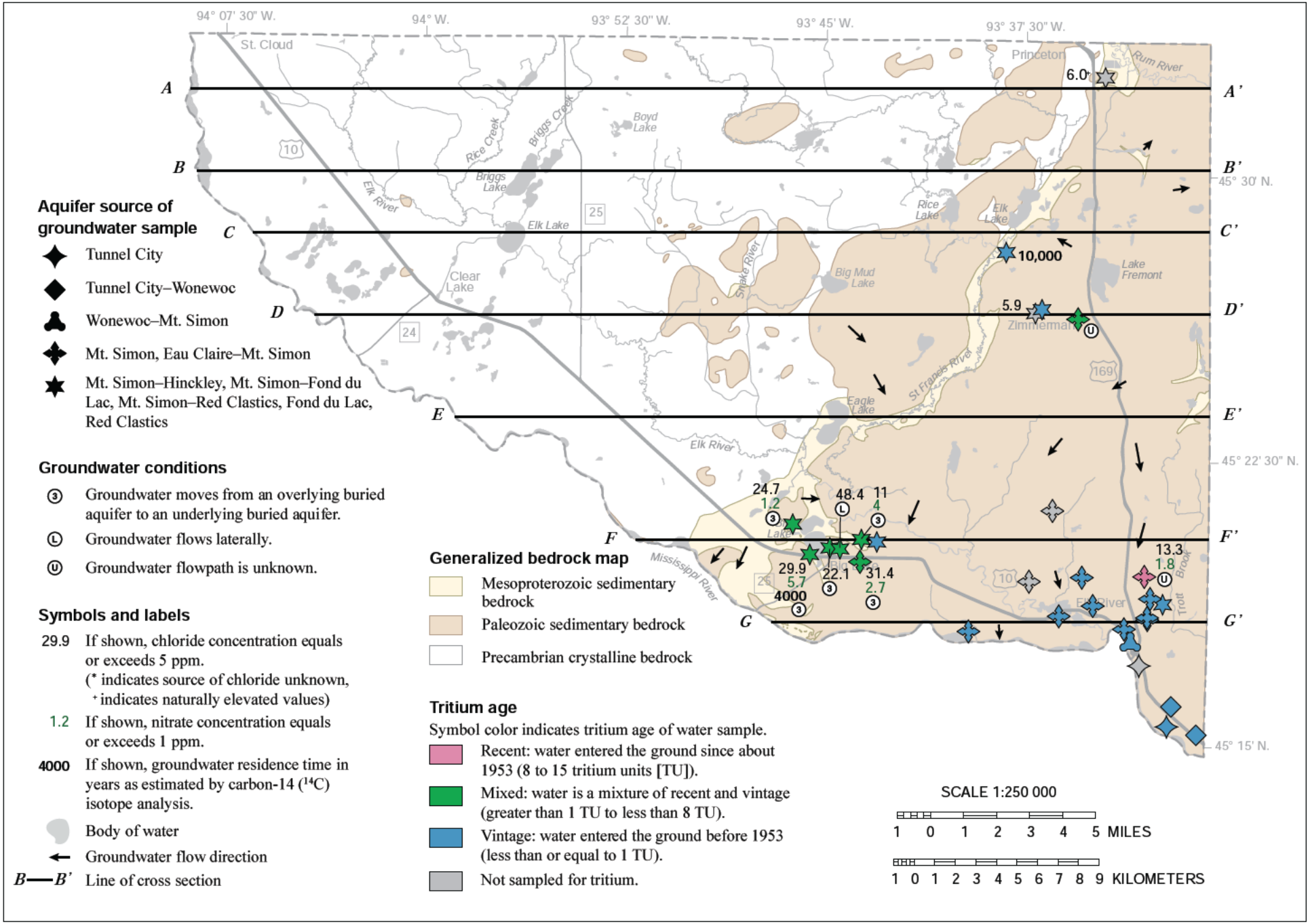


Figure 31. Deeper bedrock samples, tritium and other groundwater chemistry

Some of these deeper groundwater samples had a mixed tritium age which is associated with the moderate to very high sensitivity for the bedrock surface (Figure 30) in the Big Lake area. This association suggests that in some areas the higher sensitivity conditions could extend to some of the deeper portions of the bedrock aquifers.

Aquifer characteristics and groundwater use

Aquifer specific capacity and transmissivity

Aquifer characteristics such as specific capacity and transmissivity are used to describe how water is transmitted by an aquifer. Larger values of each of these parameters indicate more productive aquifers.

capacity is the discharge rate of water produced from a well per unit depth of drawdown. It is typically expressed in gallons per minute per foot (gpm/ft) and is determined from short-term pumping or well-development tests performed after a well was drilled. To ensure that the specific capacity values reflect actual pumping (not air-lifting), the pumping-test data were obtained from the County Well Index for wells with the following conditions:

- The casing diameter was at least 12 inches.
- The well was pumped for at least 4 hours.
- The pumping water level was inside the well casing, at least 2 feet above the well screen or open hole.

Transmissivity is an aquifer's capacity to transmit water. It is calculated from longer-term and larger-scale aquifer tests that provide a more accurate representation of the aquifer properties than specific capacity. It is determined by multiplying the thickness of the aquifer by the hydraulic conductivity of the aquifer material (the rate at which groundwater flows through a unit cross section of an aquifer).

Data from aquifer pumping tests are within a narrow range of values from approximately 4,600 ft^2/day (surficial sand and gravel) to approximately 9,500 ft^2/day (Mt. Simon). Two tests from wells that were constructed in the Mt. Simon and an underlying Mesoproterozoic clastic unit (Hinckley or Fond du Lac) had slightly lower transmissivities possibly due the less porous and permeable nature of these bedrock units.

Table 2. Specific capacity and transmissivity of selected wells

[Specific capacity data adapted from the County Well Index; gpm/ft, gallons per minute per foot. Transmissivity data are from MDH and U.S. Geological Survey (USGS) tests compiled by the DNR; ft^2/day, feet squared per day, -- means no data, * means no tests available.]

Aquifer (CWI Code)	Specific capacity (gpm/ft)					Transmissivity (ft^2/day)		
	Casing diameter (inches)	Mean	Min	Max	Number of tests	Casing diameter (inches)	Mean	Number of tests
Unconsolidated aquifers								
Surficial sand and gravel (QWTA)	12–16	29.9	14.6	50.0	8	12	4,583	5
Buried sand and gravel (QBAA)	12–20	31.7	2.1	161.4	48	4–12	7,456	16
Bedrock aquifers								
Eau Claire–Mt. Simon (CEMS)	12–16	14.9	7.7	18.4	4	*	--	--
Mt. Simon (CMTS)	12–18	21.6	10.3	32.5	13	12–18	9,533	3
Mt. Simon–Hinckley (CMSH)	12–18	29.2	7.4	51.3	5	12–18	8,320	1
Mt. Simon–Fond du Lac (CMFL)	12–18	17.6	5.6	35.3	7	18	6,423	1
Mt. Simon–red clastics (CMRC)	12	27.1	5.3	47.4	4	*	--	--
Mid. Proterozoic Sed. (PMSU)	12	4.3	1.5	7.1	2	*	--	--
Multiple (MTPL)	12–16	24.4	10.4	36.8	4	*	--	--
Total bedrock	12–18	21.1	1.5	51.3	39	18	8,668	5

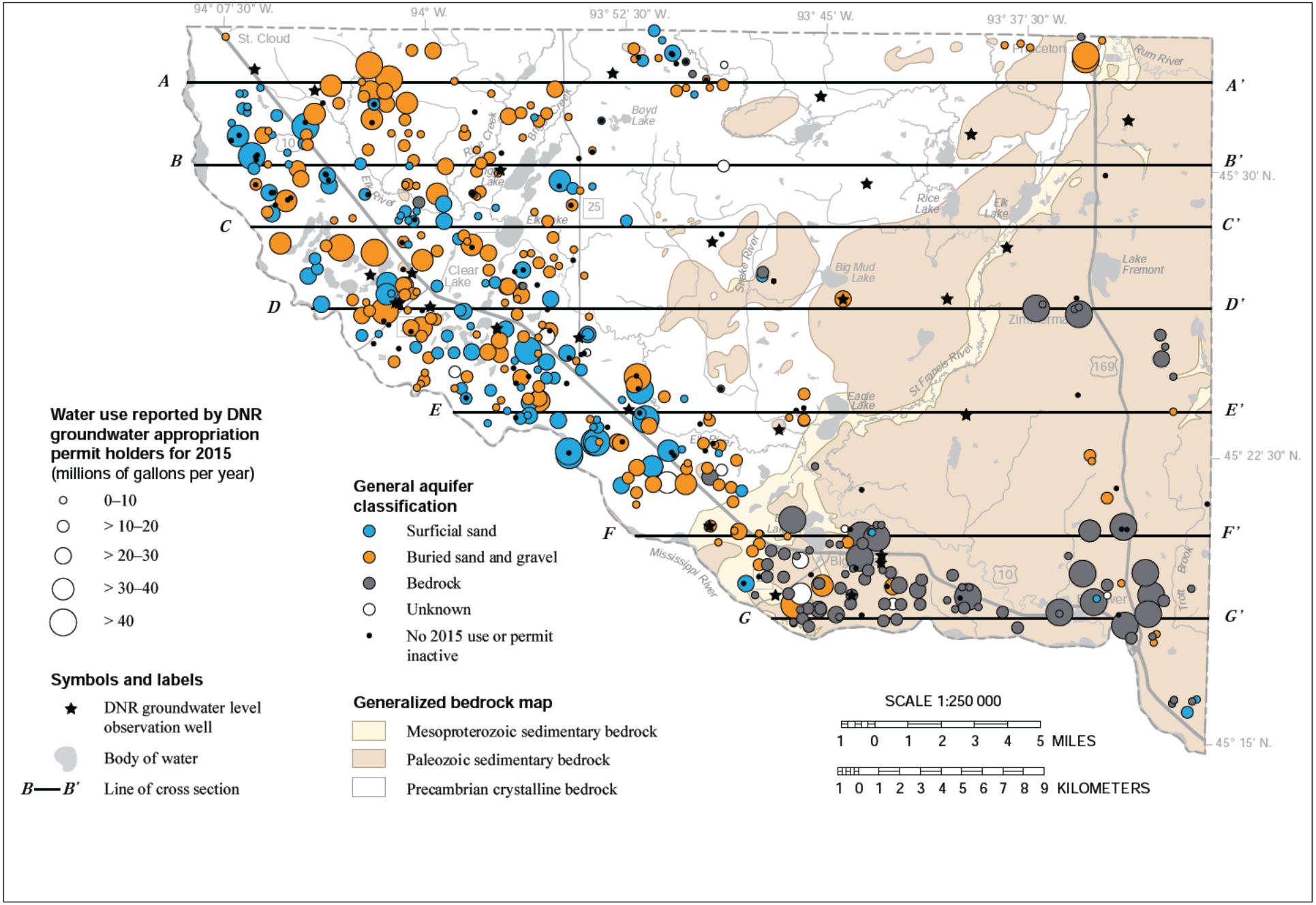


Figure 32. Locations of DNR groundwater appropriation permit holders by general aquifer classification

The majority of the water used in the central and western portions of the county are from the surficial sand (QWTA) and buried sand and gravel aquifers (QBAA). Bedrock aquifers are most commonly used in the eastern part of the county.

Groundwater use

A water-use appropriation permit from the DNR is required for groundwater users withdrawing more than 10,000 gallons of water per day or 1 million gallons per year (with some exceptions). This provides the DNR with the ability to assess and regulate which aquifers are being used and for what purpose.

DNR water appropriation permits require that the water usage be reported annually. Information pertaining to these permits is recorded using Minnesota Department of Natural Resources Permitting and Reporting System (MPARS). This helps the DNR track the volume, source aquifer, and type of water use.

The reported water use for 2015 is categorized in Table 3 for all large capacity users in the county by the type of aquifer (Figure 32) and type of use (Figure 33).

The majority (70 percent) of the permitted water use is for irrigation and is drawn from the surficial sand (QWTA) and buried sand and gravel aquifers (QBAA). Water supply is the second most common use category (20 percent) with bedrock and buried sand and gravel aquifers as the most important sources. Industrial processing (4 percent) uses water mostly from buried sand and bedrock sources. Noncrop irrigation (3 percent) and power generation (4 percent) use water mostly from buried sand and surficial sand sources.

There are no reporting requirements in Minnesota for well owners that use quantities of groundwater less than 10,000 gallons per day or 1 million gallons per year. However, the aquifer being used can be determined in many cases by comparing the well constructions with all of the closely spaced cross sections produced by the MGS. Of the approximately 14,600 active wells in the county with identified aquifers, most wells are completed in the buried sand aquifers (64 percent), followed by the sedimentary bedrock aquifers (21 percent). Only 15 percent are completed in the surficial sand aquifer. The large majority of wells in the county are domestic wells (88 percent), followed by irrigation (4 percent), and public supply (2 percent).

Table 3. Reported 2015 water use from DNR groundwater permit holders

[Data from Minnesota Permitting and Reporting System (MPARS). MGY, million gallons per year; Dash marks (--) indicate no use in those categories. Percentages may not total 100 due to rounding.]

Use category	Surficial sand (QWTA)	Buried sand and gravel (QBAA)	Bedrock	Unknown	Total (MGY)	Total (percent)
Crop irrigation	2572	2604	715	532	6423	70
Water supply	190	231	1384	--	1805	20
Industrial processing	21	248	117	2	387	4
Thermoelectric power generation	127	201	13	--	342	4
Noncrop irrigation	60	118	55	15	248	3
Dust control, livestock watering	--	1	2	--	3	0.04
Total (MGY)	2970	3404	2286	549	9210	
Total (percent)	32	37	25	6	100	

QWTA, Quaternary water table aquifer (surficial sand aquifer)

QBAA, Quaternary buried artesian aquifer

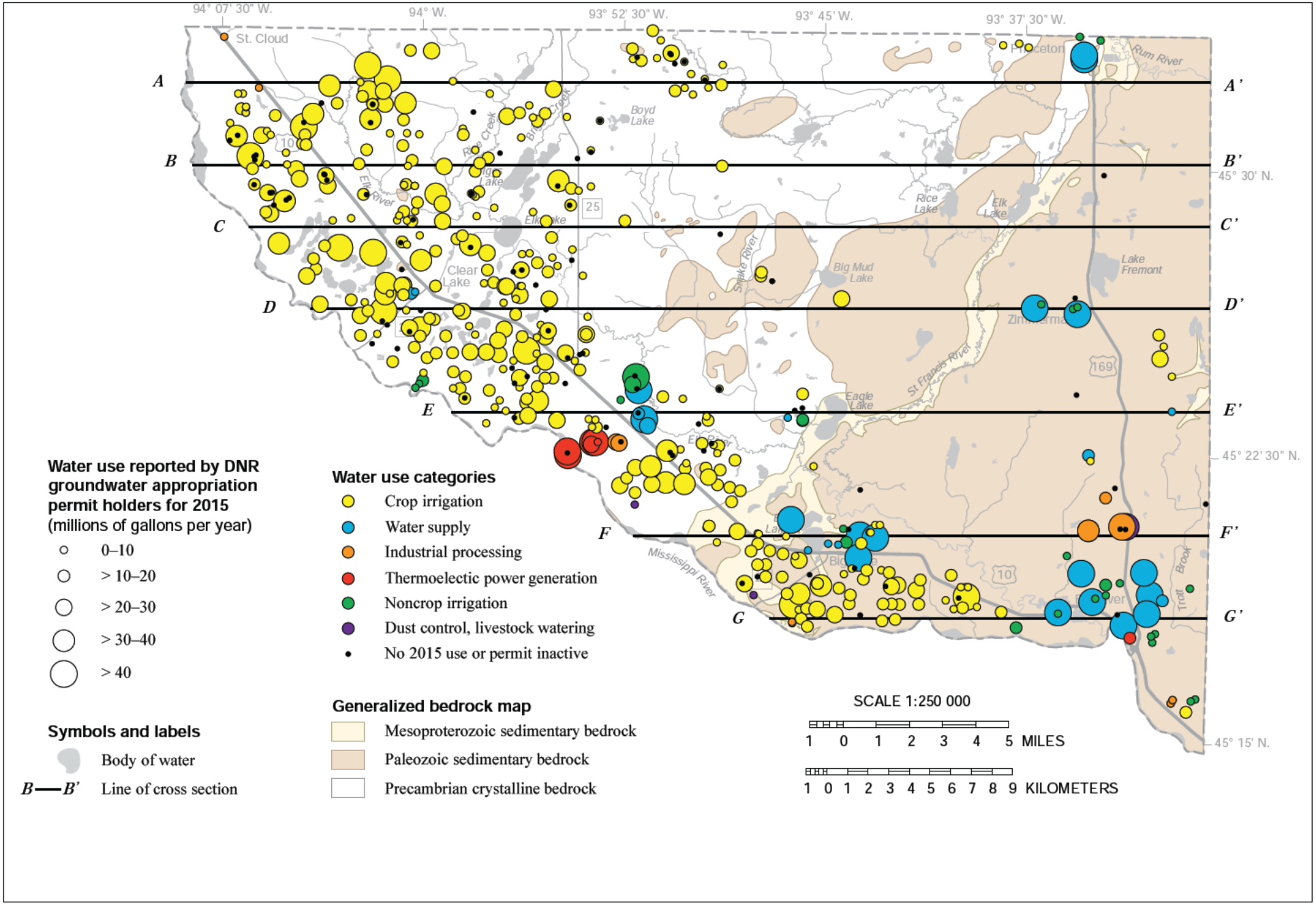


Figure 33. Locations of DNR groundwater appropriation permit holders by water use

The majority of the water used is for irrigation. Water supply is the second most common use category.

Conclusions

Groundwater directions in the water-table aquifer are controlled by the dominant groundwater discharge locations, including the Rum, Elk, and Mississippi rivers and associated tributaries. Shallow water-table conditions (0–10 feet) are common in the county with the exception of the higher land-surface areas near portions of Briggs Creek; the St. Francis, Snake, Elk, and Mississippi rivers; and uplands in the eastern portion of the county.

Potentiometric surface maps show a general pattern of groundwater flow toward the Mississippi River valley. Local flow toward the larger rivers and creeks in the county is evident on all the buried sand potentiometric surface maps, such as the Elk and St. Francis rivers, and Briggs Creek. These maps indicate at least some groundwater discharge to the Mississippi River and portions of its tributaries from all the buried sand aquifers.

Chemical characteristics of groundwater revealed important information regarding groundwater source, human health risk, residence time, and pollution sensitivity implications. One groundwater sample with an evaporative signature was collected downgradient of Big Mud Lake. These data are evidence of surface water to groundwater connections in this area.

- **Chloride** is a significant contaminant in Sherburne County groundwater samples. Of the 66 ground-water samples, 57 (86 percent) exceeded background concentrations for chloride, had elevated chloride to bromide ratios, and were therefore considered anthropogenic. These elevated occurrences of chloride were a relatively widespread across the county in the ss aquifer, most of the buried sand aquifers (crs, ces, scs, mls, and fs2), and also two detections in bedrock aquifers: Wonewoc and red clastics.
- **Nitrate** was found in 35 of 115 groundwater samples (30 percent) with concentrations that exceeded an approximate background concentration of 1 ppm. Nitrate has an EPA MCL of 10 ppm . Elevated nitrate concentrations were most common in the western portion of the county and were found in the ss, csr, cse, scs, fs1, and suu buried sand aquifers and the Mt. Simon, Fond du Lac, and red clastic bedrock aquifers.
- **Arsenic** was found in elevated concentrations (≥10 ppb) in 5 groundwater samples, in the csr, cse, scs, and fs2 aquifers.
- **Manganese** concentrations that equalled or exceeded the lower MDH HRL established for infants (100 ppb) was found in a large proportion of groundwater samples (88 samples, 68 percent) indicating a natural water quality issue for the majority of well owners in the county.
- **Carbon-14** residence time data from 14 wells within the county showed that ages in buried sand and upper bedrock aquifers ranged from approximately 2,000 to 8,000 years. A deeper bedrock aquifer residence time of 10,000 years was reported from the Fond du Lac.

Buried sand aquifer pollution sensitivity: The csa, csr, and cse buried sand aquifers are relatively sensitive to pollution with the exception of portions in the eastern part of the county where sensitivity is commonly very low to moderate. Most of the samples from these aquifers contained Cold War era, recent, or mixed tritium age. Most of the samples from these aquifers contained elevated chloride concentrations.

- The scs buried sand aquifer, similar to the overlying aquifers, is relatively sensitive to pollution and the majority of the groundwater samples from this aquifer contained mixed or recent tritium. However, the eastern portion appears to be better protected with fewer and smaller areas of moderate to very high sensitivity and four locations with vintage tritium age. Fewer than half of the samples contained elevated concentrations of chloride.
- The fs1, mls, fs2, and suu buried sand aquifers have large areas that appear to be well protected and exhibit very low pollution sensitivity ratings with the exception of a larger moderate to very high pollution sensitivity area in between Becker and Big Lake. Only three recent-age samples were detected in the group of 28 samples collected from these aquifers, and approximately a third of the groundwater samples that were analyzed for tritium had a vintage age. Elevated chloride was detected in only 4 of 24 samples (17 percent). Elevated nitrate was detected in 2 of 26 samples (8 percent).

Bedrock surface pollution sensitivity shows well-protected conditions with large areas of very low pollution sensitivity ratings in the eastern part of the county. However, dense clusters of moderate to very high pollution sensitivity areas exist along the southern portion of the county where agriculture and urbanization are common. Elevated anthropogenic chloride values with mixed-age tritium are especially common in the Big Lake area for the deeper bedrock wells. For groundwater samples collected from wells with shallower open-hole constructions, only a few groundwater samples contained mixed or recent tritium. Of the 12 samples that were tested for chloride, only one sample in the Elk River area had an elevated concentration

(34.9 ppm) of anthropogenic chloride. One sample southwest of the city of Big Lake had an elevated nitrate concentration (3.9 ppm).

Water use: the majority of the reported water use (70 percent) is for crop irrigation and mainly draws from the surficial sand (QWTA) and buried sand aquifers (QBAA). Water supply is the second most common use category (20 percent) with bedrock and buried sand aquifers as the most important sources.

Appendix

Groundwater samples were collected from an outside faucet or hydrant. The wells were purged prior to sampling to remove stagnant water from the well bore and plumbing system. Samples were collected after field parameters such as temperature, conductivity, dissolved oxygen, and pH had stabilized. Each was filtered and preserved according to protocols listed below and submitted to laboratories for analysis.

Samples were analyzed by DNR staff, the University of Minnesota Department of Earth Sciences Laboratory (U of M), or the University of Waterloo Environmental Isotope Laboratory in Canada. The well owners received a copy of the results including some background reference information regarding their meaning.

For additional information, contact the County Geologic Atlas program: http://www.dnr.state.mn.us/waters/groundwater_section/mapping/chemdataaccess.html.

Groundwater field sample collection and handling details

Parameter	Enriched Tritium	^{18}O ^{2}H	Cations	Anions	Trace constituents	Alkalinity	^{14}C
Lab	Waterloo	Waterloo	U of M	U of M	U of M	DNR Staff	U of M
Sample container	500 ml HDPE	60 ml HDPE	15 ml, Fisherbrand BLUE cap	50 ml Argos BLACK bottle***	15 ml Sarstedt RED cap	500 ml plastic	30 gallon barrel
Head space	yes	yes	yes	yes	yes	NO	yes
Rinse	no	no	yes*	yes*	yes*	yes**	no
Filter	no	no	yes	yes	yes	no	yes
Preservative	no	no	1 drop 6N HCl	no	5 drops 15N HNO_3	no	NH4OH added to adjust pH
Refrigeration	no	no	yes	yes	yes	Yes, if not analyzed onsite	no
Shelf life	long	long	2–3 weeks	2–3 weeks	2–3 weeks	24–48 hours	years
Field duplicate	1 for every 20 samples	1 for every 20 samples	1 for every 20 samples	1 for every 20 samples	1 for every 20 samples	none	none
Field blank	none	none	1 for every 20****	1 for every 20****	1 for every 20****	none	none
Storage duplicate	yes	yes	no	no	no	no	no

*Rinse the bottle three times with sample water prior to collecting the sample (filtered if sample is filtered). Rinsing means fill the bottle with sample water and then pour the contents out over the cap.

**Rinse the bottle three times with sample water prior to collecting the sample. Fill bottle submerged with cap in hand. Seal bottle submerged ensuring no remnant bubbles.

***Fill 50 ml anion bottle unless filtering is very difficult. Bottle must be at least 1/3 full.

****Use deionized (DI) water from small bottle for field blanks. Pour DI water into the back of the syringe when the plunger is removed. Fill bottles through filter.

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Glossary

anion—a negatively charged ion in which the total number of electrons is greater than the total number of protons, resulting in a net negative electrical charge.

anisotropic—a condition in which a property (e.g., hydraulic conductivity) varies with the direction.

anthropogenic—relating to or resulting from the influence of humans on nature.

aquifer—an underground layer of water-bearing permeable rock or unconsolidated materials (sand and gravel) from which groundwater can be extracted using a water well.

aquitard (or layers)—layers made up of materials with low permeability, such as clay and shale, which prevent any rapid or significant movement of water.

Arsenic (As)—a chemical element that is sometimes dissolved in groundwater and is toxic to humans. Natural arsenic contamination of groundwater is a problem that affects millions of people across the world, including over 100,000 people served by domestic wells in Minnesota.

bedrock—the consolidated rock underlying unconsolidated surface materials such as soil or glacial sediment.

buried aquifer—a body of porous and permeable sediment or bedrock which is buried beneath the ground surface by a low permeability layer.

carbon-14 (^{14}C)—a radioactive isotope of carbon that has a half-life of 5,730 years. It is used to identify groundwater that entered the ground from 100–35,000 years before present.

cation—a positively charged ion in which the total number of electrons is less than the total number of protons, resulting in a net positive electrical charge.

County Well Index (CWI)—a database developed and maintained by the Minnesota Geological Survey and the Minnesota Department of Health containing basic information for wells drilled in Minnesota. Information includes location, depth, static water level, construction, and geological information. The database and other features are available through the Minnesota Well Index online mapping application.

deuterium (^{2}H)—one of two stable isotopes of hydrogen. The nucleus of deuterium contains one proton and one neutron.

dolostone, or dolomite rock—a sedimentary carbonate rock that contains a high percentage of the mineral dolomite. Most dolostone formed as a magnesium replacement of limestone or lime mud prior to lithification. It is resistant to erosion and can either contain bedded layers or be unbedded. It is less soluble than limestone, but it can still develop solution features over time.

equipotential line—a line along which the pressure head of groundwater is the same. Groundwater flow (shown on cross sections) is perpendicular to these lines in the direction of decreasing pressure.

formation—a fundamental unit of lithostratigraphy. A formation consists of a certain number of rock strata that have a comparable lithology, facies, or other similar properties.

fractionation—a separation process in which a certain quantity of a mixture (solid, liquid, solute, suspension, or isotope) is divided up in a number of smaller quantities (fractions) in which the composition varies according to a gradient. Fractions are collected based on differences in a specific property of the individual components. Stable isotopes are fractionated by mass.

glacial—relating to or derived from a glacier.

groundwater—water that collects or flows beneath the earth surface, filling the porous spaces below the water table in soil, sediment, and rocks.

half-life—the time required for one half of a given mass of a radioactive element to decay.

hydrogeology—the study of subsurface water, including its physical and chemical properties, geologic environment, role in geologic processes, natural movement, recovery, contamination, and use.

hydraulic—relating to water movement.

hydraulic conductivity—the rate at which groundwater flows through a unit cross section of an aquifer.

the movement of water from the land surface into the subsurface under unsaturated conditions.

isotope—variants of a particular chemical element. All isotopes of an element share the same number of protons, but each isotope has a different number of neutrons.

meteoric—of, relating to, or derived from the earth's atmosphere.

neutron—a subatomic particle contained in the atomic nucleus. It has no net electrical charge and a mass of approximately 1 (slightly greater than a proton).

nitrate (nitrate-N, NO_3^-)—humans are subject to nitrate toxicity, with infants being especially vulnerable to methemoglobinemia, also known as blue baby syndrome.

Elevated nitrate (≥1 ppm) is primarily from fertilizer sources.

observation well—a well that is used to monitor the water level of groundwater. It is not used as a water source.

Paleozoic—an era of geologic time from about 542–251 million years ago.

potentiometric surface—a surface representing the total head of groundwater in an aquifer and defined by the levels to which water will rise in tightly cased wells.

provenance—the place of origin of a glacier.

Quaternary—geologic time period that began 2.588 million years ago and continues to today. The Quaternary Period comprises the Pleistocene and Holocene epochs.

radioactive—a property of an element that spontaneously decays or changes to a different element through the emission of radioactive particles.

recharge—the process by which water enters the groundwater system.

residence-time indicators—a chemical and/or isotope used to interpret groundwater residence time.

capacity—the discharge of a well divided by the drawdown in the well.

stable isotope—chemical isotopes that are not radioactive.

static water level—the level of water in a well that is not affected by pumping.

stratigraphy—a branch of geology that studies rock layers and layering (stratification). It is primarily used in the study of sedimentary and layered volcanic rocks. Also used to refer to the sequence of rock layers in a region.

till—unsorted glacial sediment deposited directly by ice. It is derived from the erosion and entrainment of rock and sediment over which the glacier has passed.

transmissivity—an aquifer's capacity to transmit water, determined by multiplying the hydraulic conductivity of the aquifer material by the thickness of the aquifer.

tritium (^{3}H)— a radioactive isotope of hydrogen that has a half-life of 12.32 years. The nucleus of tritium contains one proton and two neutrons. It is used to identify groundwater that entered the ground since the 1950s.

tritium unit (TU)—one tritium unit represents the presence of one tritium atom for every 10^{18} hydrogen atoms.

an aquifer that has direct contact with the atmosphere through an unsaturated layer.

vadose zone (unsaturated zone)—The layer between the land surface and the top of the water table.

water table—the surface between the unsaturated and saturated zone where the water pressure equals the atmospheric pressure.

watershed—the area of land drained by a single stream or river.

well nest—two or more wells in close proximity completed in different aquifers.

DEPARTMENT OF NATURAL RESOURCES

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St. Paul, MN 55155-4025
888-646-6367 or 651-296-6157
www.mndnr.gov/waters

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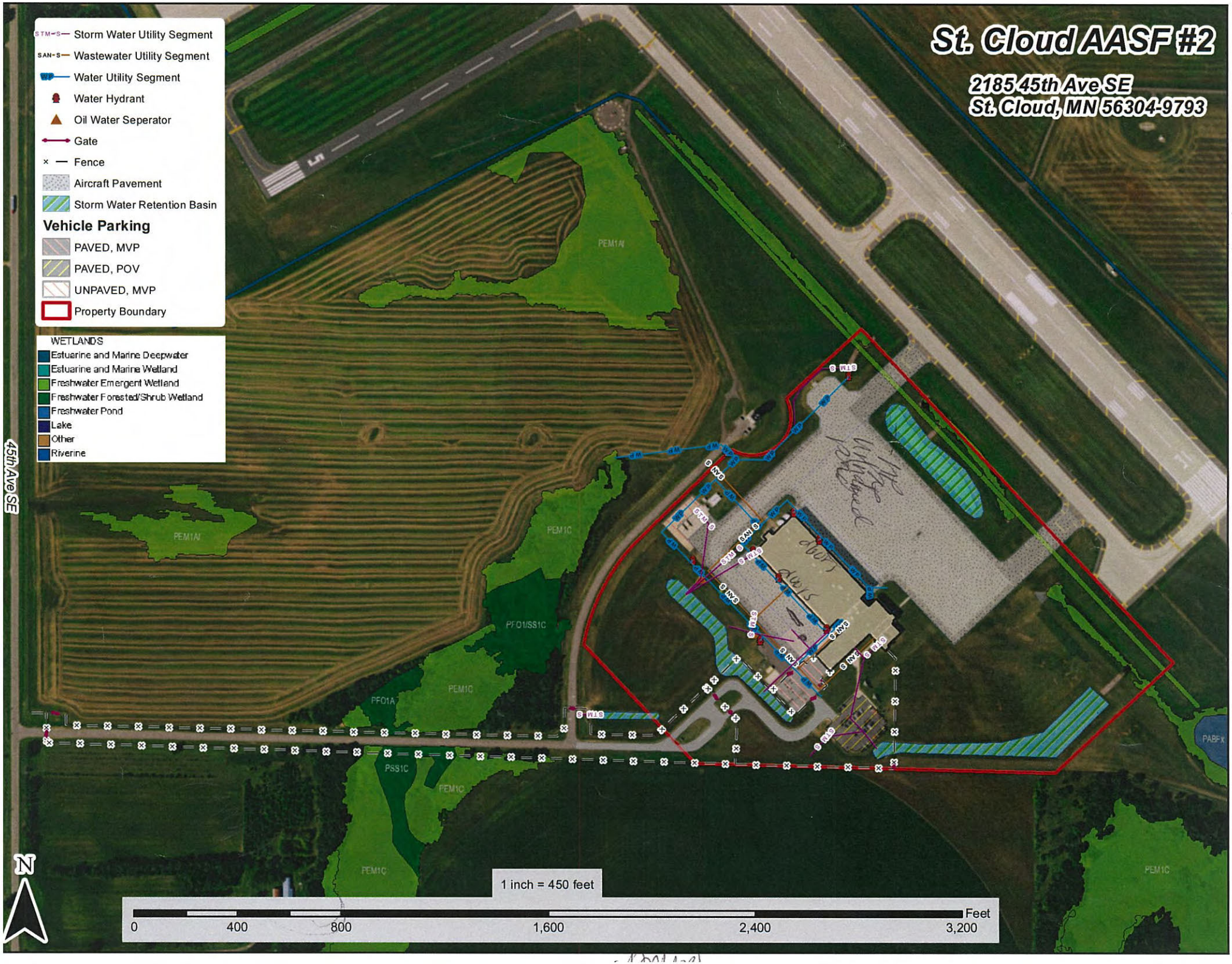
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2185 45th Ave SE
St. Cloud, MN 56304-9793
STM-S Storm Water Utility Segment
SAN-S Wastewater Utility Segment
WP Water Utility Segment
Water Hydrant
Oil Water Seperator
Gate
Fence
Aircraft Pavement
Storm Water Retention Basin
Vehicle Parking
PAVED, MVP
PAVED, POV
UNPAVED, MVP
Property Boundary
WETLANDS
Estuarine and Marine Deepwater
Estuarine and Marine Wetland
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Lake
Other
Riverine
45th Ave SE
PEM1Ad
PEM1C
PFO1/SS1C
PFO1A
PSS1C
PABFx
N
1 inch = 450 feet
0
400
800
1,600
2,400
3,200
Feet

Fax To: AECOM
Contact: Brittany Kirchmann
Fax : 000-000-0000
Date: 10/03/2018

Fax From: Sean McLaughlin
EDR
Phone: 1-800-352-0050

EDR PUR-IQ® Report

"the intelligent way to conduct historical research"

for
St. Cloud AASF
2185 Southeast 45th Avenue
SAINT CLOUD, MN 56304
Lat./Long. 45.540344 / 94.057506
EDR Inquiry # 5441940.2s

The EDR PUR-IQ report facilitates historical research planning required to complete the Phase I ESA process. The report identifies the *likelihood* of prior use coverage by searching proprietary EDR-Prior Use Reports® comprising nationwide information on: city directories, fire insurance maps, aerial photographs, historical topographic maps, flood maps and National Wetland Inventory maps.

Potential for EDR Historical (Prior Use) Coverage - Coverage in the following historical information sources may be used as a guide to develop your historical research strategy:

1. Building Permits: Building Permits are available for 'SAINT CLOUD', MN (1996 - 2017).

2. City Directory: Coverage may exist for portions of Sherburne County, MN.

3. Fire Insurance Map: When you order online any EDR Package or the EDR Radius Map with EDR Sanborn Map Search/Print, you receive site specific Sanborn Map coverage information at no charge.

4. Aerial Photograph: Coverage exists for portions of Sherburne County for the following decades: 1970s, 1990s, 1930s, 1950s, 1960s Shipping time 3-5 business days.

5. Topographic Map: The USGS 7.5 min. quad topo sheet(s) associated with this site:

Historical: Coverage exists for SHERBURNE County

Current: Target Property: TP | 2013 | 5961617 Cable, MN

6. Flood Prone Maps : Coverage is available for Sherburne County

7. NWI Wetland Maps: Coverage exists for Sherburne County

EDR's network of professional researchers, located throughout the United States, accesses the most extensive national collections of city directory, fire insurance maps, aerial photographs, wetland map resources and historical topographic map resources available for SAINT CLOUD, MN. These collections may be located in multiple libraries throughout the country. To ensure maximum coverage, EDR will often assign researchers at these multiple locations on your behalf. Please call or fax your EDR representative to authorize a search.

EDR - HISTORICAL SOURCE(S) ORDER FORM

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Account # 1861179

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SHERBURNE County
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Certified Sanborn® Map Report

10/02/18

Site Name:

St. Cloud AASF
2185 Southeast 45th Avenue
SAINT CLOUD, MN 56304
EDR Inquiry # 5441940.3

Client Name:

AECOM
12120 Shamrock Plaza
Omaha, NE 68154
Contact: Brittany Kirchmann

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Certification # 63C4-4E8E-BA11

PO # NA

Project St. Cloud AASF

UNMAPPED PROPERTY

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2185 Southeast 45th Avenue

SAINT CLOUD, MN 56304

Inquiry Number: 5441940.5

October 03, 2018

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EDR Inquiry # 5441940.5

Client Name:

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Omaha, NE 68154
Contact: Brittany Kirchmann

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Search Results:

Year	Scale	Details	Source
2017	1"=500'	Flight Year: 2017	USDA/NAIP
2013	1"=500'	Flight Year: 2013	USDA/NAIP
2010	1"=500'	Flight Year: 2010	USDA/NAIP
2006	1"=500'	Flight Year: 2006	USDA/NAIP
1997	1"=500'	Flight Date: October 15, 1997	USDA
1991	1"=500'	Acquisition Date: April 21, 1991	USGS/DOQQ
1984	1"=500'	Flight Date: May 09, 1984	NHAP
1977	1"=500'	Flight Date: April 26, 1977	Hurd
1953	1"=500'	Flight Date: August 30, 1953	USGS
1939	1"=500'	Flight Date: May 16, 1939	USDA

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INQUIRY #: 5441940.5
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INQUIRY #: 5441940.5
YEAR: 2013
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INQUIRY #: 5441940.5
YEAR: 2010
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YEAR: 2006
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EDR



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YEAR: 1997

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YEAR: 1991

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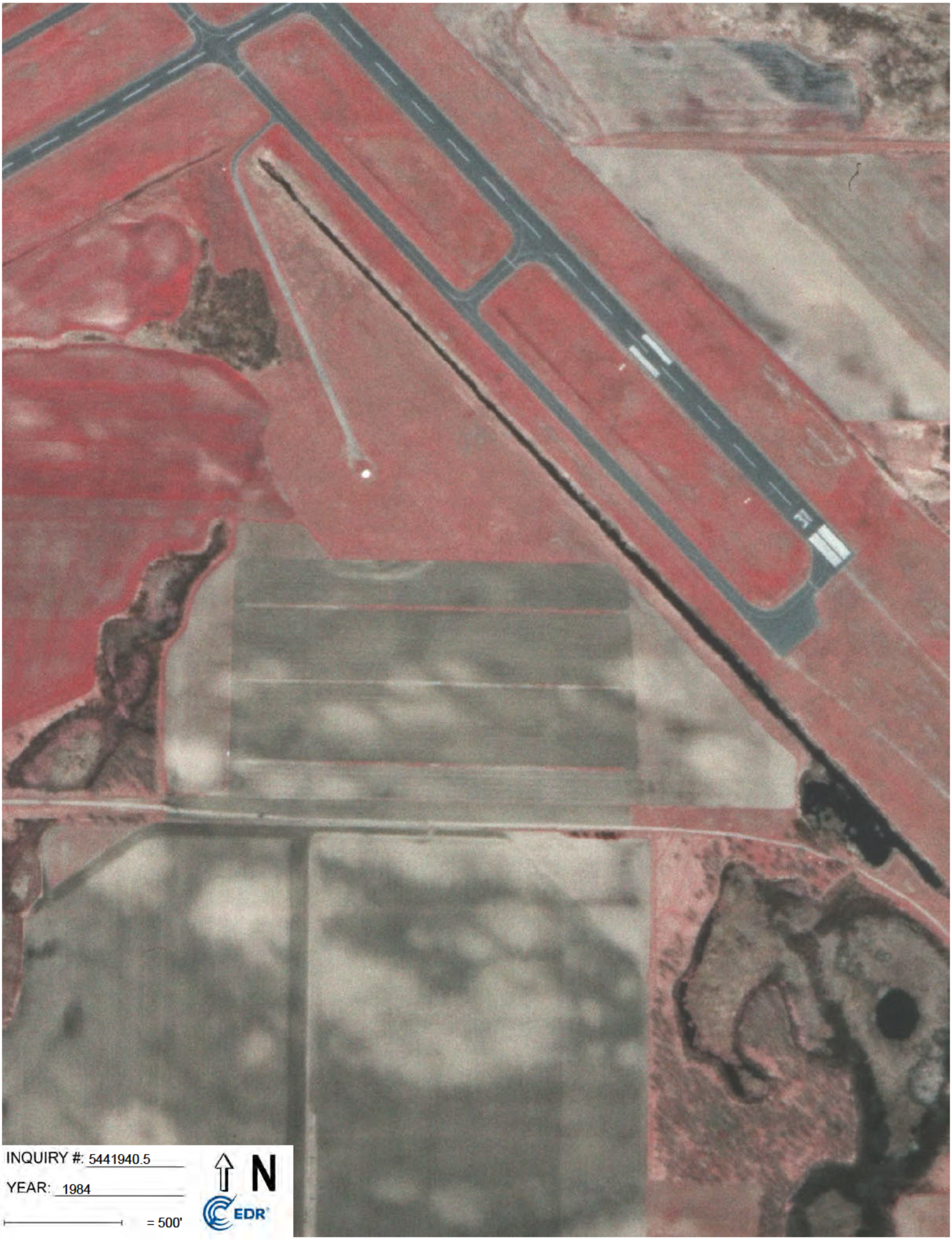

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YEAR: 1984

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INQUIRY #: 5441940.5

YEAR: 1977

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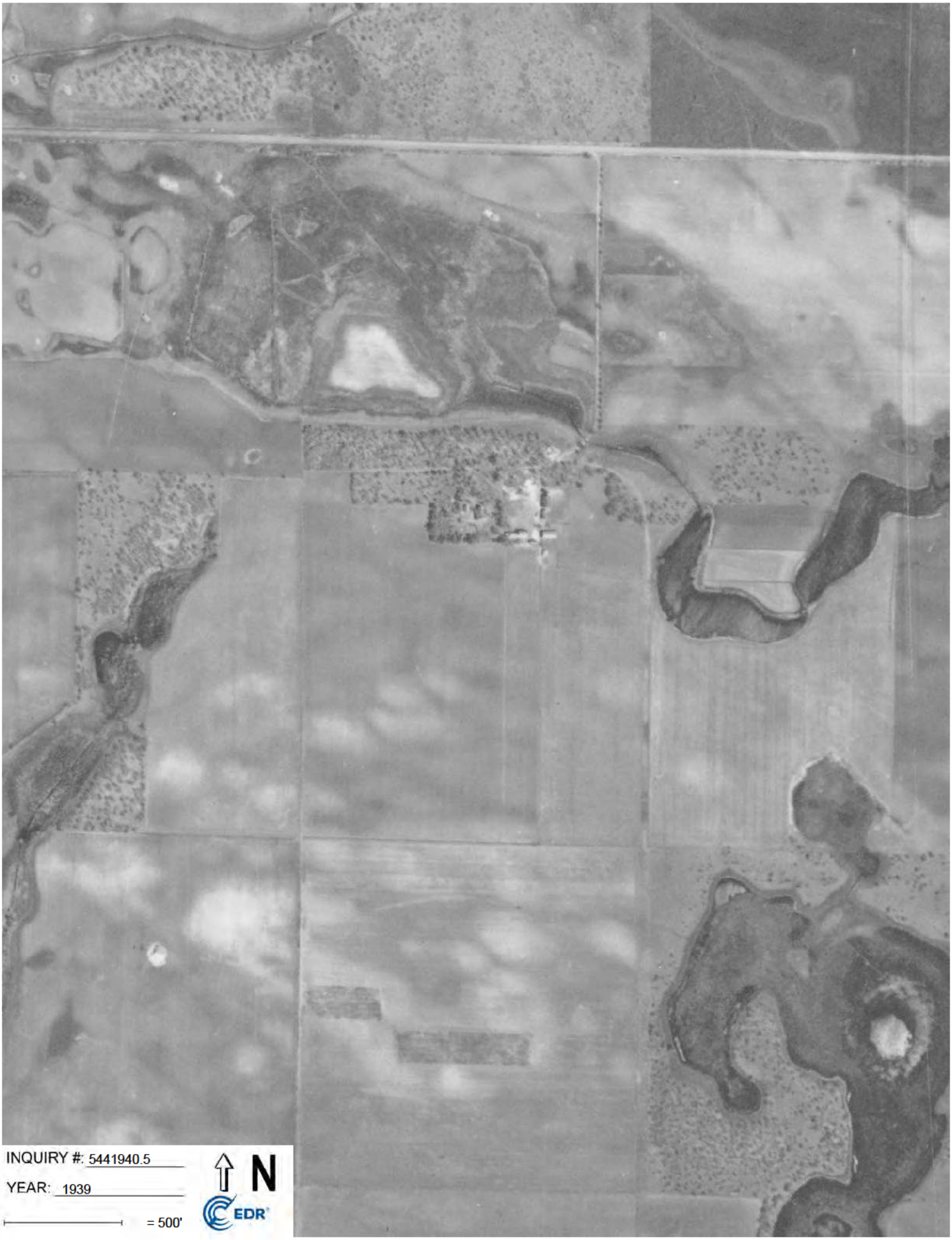

INQUIRY #: 5441940.5

YEAR: 1939

= 500'

N

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October 03, 2018

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TABLE OF CONTENTS

SECTION	PAGE
Executive Summary	ES1
Overview Map	2
Detail Map	3
Map Findings Summary	4
Map Findings	8
Orphan Summary	176
Government Records Searched/Data Currency Tracking	GR-1

GEOCHECK ADDENDUM

Physical Setting Source Addendum	A-1
Physical Setting Source Summary	A-2
Physical Setting SSURGO Soil Map	A-5
Physical Setting Source Map	A-16
Physical Setting Source Map Findings	A-18
Physical Setting Source Records Searched	PSGR-1

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E 2247-16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E 1528-14) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

2185 SOUTHEAST 45TH AVENUE
SAINT CLOUD, MN 56304

COORDINATES

Latitude (North):	45.5403440 - 45° 32' 25.23''
Longitude (West):	94.0575060 - 94° 3' 27.02''
Universal Tranverse Mercator:	Zone 15
UTM X (Meters):	417437.1
UTM Y (Meters):	5043305.0
Elevation:	1020 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	5961617 CABLE, MN
Version Date:	2013

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20150825
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
2185 SOUTHEAST 45TH AVENUE
SAINT CLOUD, MN 56304

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
A1	SAINT CLOUD ARMY AVI	2185 45TH AVE SE	SPILLS, AIRS, Financial Assurance, TIER 2, WIMN,...		TP
A2	SAINT CLOUD ARMY AVI	2185 45TH AVE SE	AST		TP
A3	ST CLOUD ARMY AVIATI	2185 45TH AVE SE	FINDS, ECHO		TP
A4	ARMY AVIATION SUPPOR	2185 45TH AVENUE SE	TIER 2		TP
A5	SAINT CLOUD AASF	2185 45TH AVE	RCRA-CESQG		TP

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was identified in the following records. For more information on this property see page 8 of the attached EDR Radius Map report:

Site	Database(s)	EPA ID
SAINT CLOUD ARMY AVI 2185 45TH AVE SE SAINT CLOUD, MN 56304	SPILLS AIRS Facility Id: 14100064 Financial Assurance Database: Financial Assurance 1, Date of Government Version: 08/01/2016 PROGRAM ID: 64654571 PROGRAM ID: 56231140 PROGRAM ID: 57188064 TIER 2 Facility Status: ACTIVE ERC Number: 15095 WIMN Status: Y NPDES	N/A
SAINT CLOUD ARMY AVI 2185 45TH AVE SE SAINT CLOUD, MN 56304	AST Tank Status: Active Tank Status: Closed	N/A
ST CLOUD ARMY AVIATI 2185 45TH AVE SE ST. CLOUD, MN 56304	FINDS Registry ID:: 110058377536 ECHO Registry ID: 110058377536	N/A
ARMY AVIATION SUPPOR 2185 45TH AVENUE SE ST. CLOUD, MN 56304	TIER 2 Facility Status: ACTIVE ERC Number: 15095	N/A
SAINT CLOUD AASF 2185 45TH AVE SAINT CLOUD, MN 56304	RCRA-CESQG EPA ID:: MNS000141630	MNS000141630

EXECUTIVE SUMMARY

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL ---------- National Priority List
Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ---------- National Priority List Deletions

Federal CERCLIS list

FEDERAL FACILITY ---------- Federal Facility Site Information listing
SEMS ---------- Superfund Enterprise Management System

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE ---------- Superfund Enterprise Management System Archive

Federal RCRA CORRACTS facilities list

CORRACTS ---------- Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG ---------- RCRA - Large Quantity Generators
RCRA-SQG ---------- RCRA - Small Quantity Generators

Federal institutional controls / engineering controls registries

LUCIS ---------- Land Use Control Information System
US ENG CONTROLS ---------- Engineering Controls Sites List
US INST CONTROL ---------- Sites with Institutional Controls

Federal ERNS list

ERNS ---------- Emergency Response Notification System

State- and tribal - equivalent NPL

MN PLP ---------- Permanent List of Priorities

State- and tribal - equivalent CERCLIS

SHWS ---- Superfund Site Information Listing

State and tribal landfill and/or solid waste disposal site lists

UNPERM LF ---- Unpermitted Facilities
SWF/LF ---- Permitted Solid Waste Disposal Facilities
LCP ---- Closed Landfills Priority List

State and tribal leaking storage tank lists

LUST ---- Leak Sites
LAST ---- Leaking Aboveground Storage Tanks
INDIAN LUST ---- Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

FEMA UST ---- Underground Storage Tank Listing
UST ---- Underground Storage Tank Database
INDIAN UST ---- Underground Storage Tanks on Indian Land

State and tribal institutional control / engineering control registries

INST CONTROL ---- Site Remediation Section Database

State and tribal voluntary cleanup sites

VIC ---- Voluntary Investigation and Cleanup Program
INDIAN VCP ---- Voluntary Cleanup Priority Listing

State and tribal Brownfields sites

BROWNFIELDS ---- Petroleum Brownfields Program Sites

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ---- A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

SWRCY ---- Recycling Facilities
INDIAN ODI ---- Report on the Status of Open Dumps on Indian Lands
DEBRIS REGION 9 ---- Torres Martinez Reservation Illegal Dump Site Locations
ODI ---- Open Dump Inventory
IHS OPEN DUMPS ---- Open Dumps on Indian Land

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL ---- Delisted National Clandestine Laboratory Register
SRS ---- Site Remediation Section Database

CDL	Clandestine Drug Labs
MN DEL PLP	Delisted Permanent List of Priorities
US CDL	National Clandestine Laboratory Register

Local Land Records

LIENS	Environmental Liens
LIENS 2	CERCLA Lien Information

Records of Emergency Release Reports

HMIRS	Hazardous Materials Information Reporting System
AGSPILLS	Department of Agriculture Spills
SPILLS 90	SPILLS 90 data from FirstSearch
SPILLS 80	SPILLS 80 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR	RCRA - Non Generators / No Longer Regulated
FUDS	Formerly Used Defense Sites
DOD	Department of Defense Sites
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR	Financial Assurance Information
EPA WATCH LIST	EPA WATCH LIST
2020 COR ACTION	2020 Corrective Action Program List
TSCA	Toxic Substances Control Act
TRIS	Toxic Chemical Release Inventory System
SSTS	Section 7 Tracking Systems
ROD	Records Of Decision
RMP	Risk Management Plans
RAATS	RCRA Administrative Action Tracking System
PRP	Potentially Responsible Parties
PADS	PCB Activity Database System
ICIS	Integrated Compliance Information System
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS	Material Licensing Tracking System
COAL ASH DOE	Steam-Electric Plant Operation Data
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER	PCB Transformer Registration Database
RADINFO	Radiation Information Database
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS	Incident and Accident Data
CONSENT	Superfund (CERCLA) Consent Decrees
INDIAN RESERV	Indian Reservations
FUSRAP	Formerly Utilized Sites Remedial Action Program
UMTRA	Uranium Mill Tailings Sites
LEAD SMELTERS	Lead Smelter Sites
US AIRS	Aerometric Information Retrieval System Facility Subsystem
US MINES	Mines Master Index File
ABANDONED MINES	Abandoned Mines
UXO	Unexploded Ordnance Sites
DOCKET HWC	Hazardous Waste Compliance Docket Listing
FUELS PROGRAM	EPA Fuels Program Registered Listing
AGVIC	Agricultural Voluntary Investigation & Cleanup Listing

EXECUTIVE SUMMARY

ASBESTOS Asbestos Notification Listing
BULK Bulk Facilities Database
COAL ASH Coal Ash Disposal Site Listing
DRYCLEANERS Registered Drycleaning Facilities
ENF Generators Associated with Enforcement Logs
MN HWS Permit Active TSD Facilities
LEAD LEAD
MANIFEST Hazardous Waste Manifest Data
MDA LIS Licensing Information System Database Listing
MN LS List of Sites
VAPOR Vapor Intrusion

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP EDR Proprietary Manufactured Gas Plants
EDR Hist Auto EDR Exclusive Historical Auto Stations
EDR Hist Cleaner EDR Exclusive Historical Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS Recovered Government Archive State Hazardous Waste Facilities List
RGA LF Recovered Government Archive Solid Waste Facilities List
RGA LUST Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

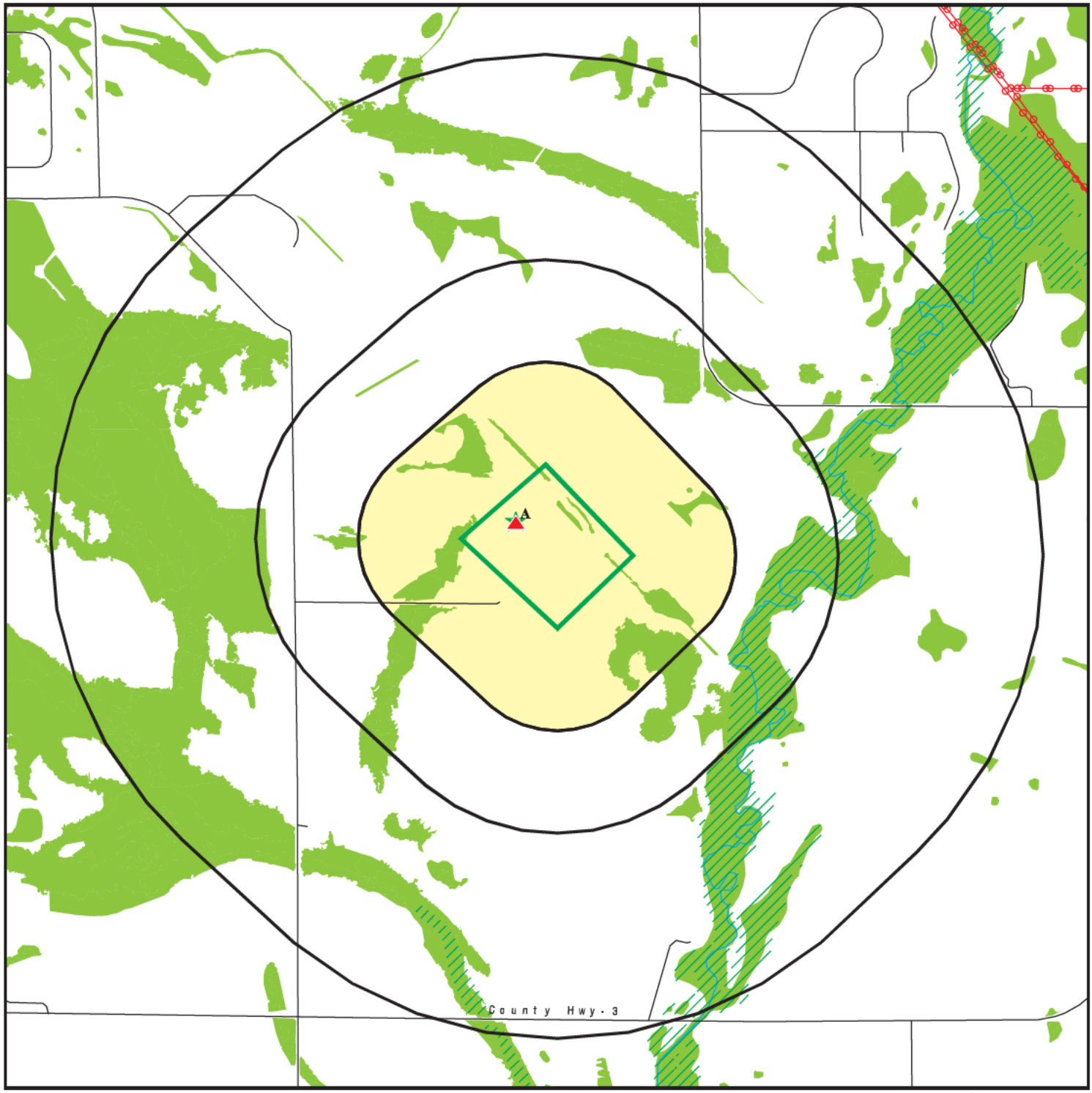
Surrounding sites were not identified.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

There were no unmapped sites in this report.

OVERVIEW MAP - 5441940.2S



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Upgradient Area

0 1/4 1/2 1 Miles

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: St. Cloud AASF	CLIENT: AECOM
ADDRESS: 2185 Southeast 45th Avenue SAINT CLOUD MN 56304	CONTACT: Brittany Kirchmann
LAT/LONG: 45.540344 / 94.057506	INQUIRY #: 5441940.2s DATE: October 03, 2018 8:28 am

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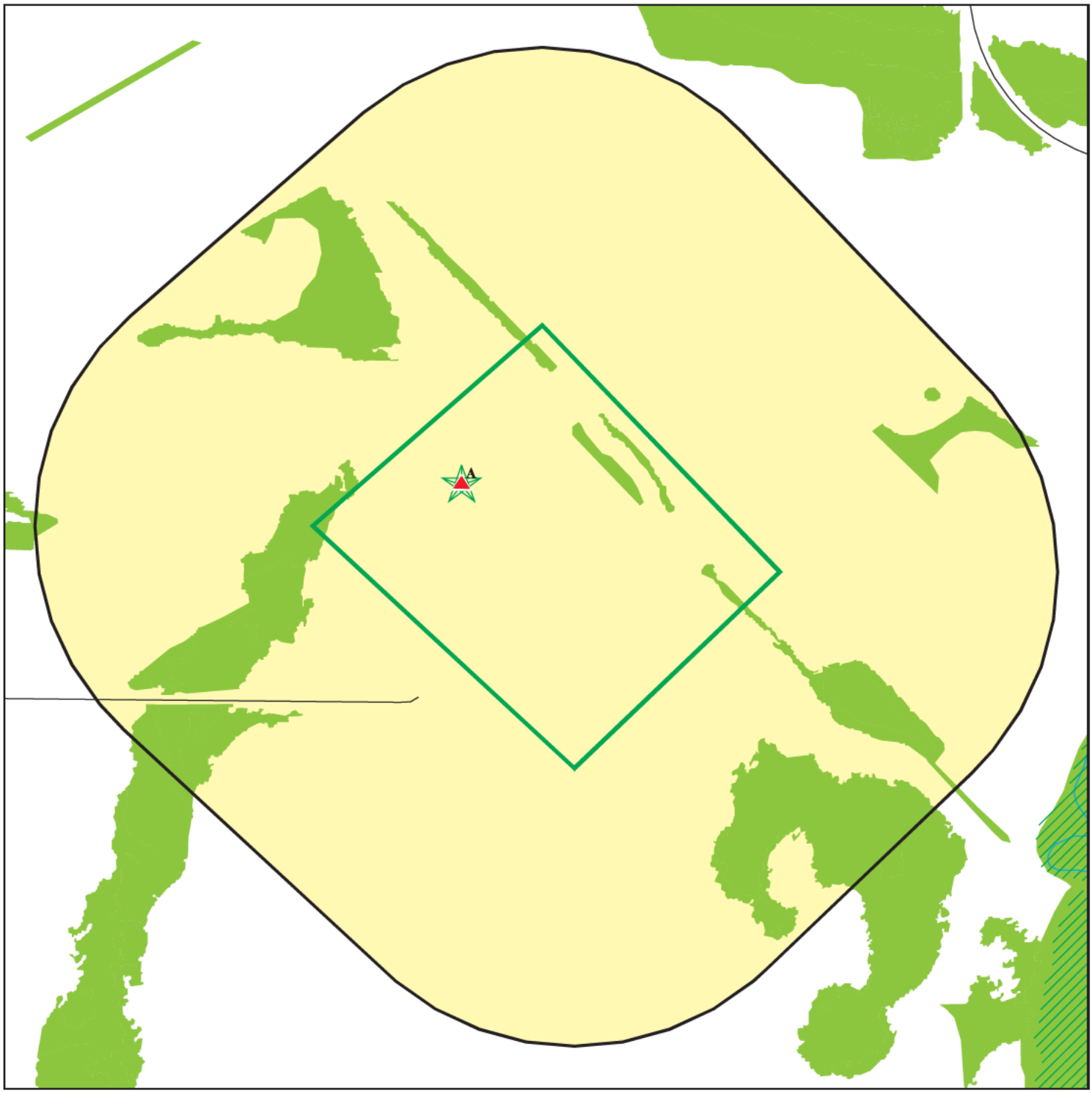
DETAIL MAP - 5441940.2S



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands

0 1/8 1/4 1/2 Miles

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	St. Cloud AASF	CLIENT:	AECOM
ADDRESS:	2185 Southeast 45th Avenue SAINT CLOUD MN 56304	CONTACT:	Brittany Kirchmann
LAT/LONG:	45.540344 / 94.057506	INQUIRY #:	5441940.2s
		DATE:	October 03, 2018 8:29 am

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MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	TP		NR	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site list								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-CESQG	0.250	1	0	0	NR	NR	NR	1
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	TP		NR	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
MN PLP	1.000		0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
SHWS	1.000		0	0	0	0	NR	0
State and tribal landfill and/or solid waste disposal site lists								
UNPERM LF	0.500		0	0	0	NR	NR	0
SWF/LF	0.500		0	0	0	NR	NR	0
LCP	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST	0.500		0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
LAST	0.500		0	0	0	NR	NR	0
INDIAN LUST	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
FEMA UST	0.250		0	0	NR	NR	NR	0
UST	0.250		0	0	NR	NR	NR	0
AST	0.250	1	0	0	NR	NR	NR	1
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal institutional control / engineering control registries								
INST CONTROL	0.500		0	0	0	NR	NR	0
State and tribal voluntary cleanup sites								
VIC	0.500		0	0	0	NR	NR	0
INDIAN VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
SWRCY	0.500		0	0	0	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	TP		NR	NR	NR	NR	NR	0
SRS	0.500		0	0	0	NR	NR	0
CDL	TP		NR	NR	NR	NR	NR	0
MN DEL PLP	1.000		0	0	0	0	NR	0
US CDL	TP		NR	NR	NR	NR	NR	0
Local Land Records								
LIENS	TP		NR	NR	NR	NR	NR	0
LIENS 2	TP		NR	NR	NR	NR	NR	0
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
SPILLS	TP	1	NR	NR	NR	NR	NR	1
AGSPILLS	TP		NR	NR	NR	NR	NR	0
SPILLS 90	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
SPILLS 80	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
DOT OPS	TP		NR	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	TP		NR	NR	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.250		0	0	NR	NR	NR	0
FINDS	TP	1	NR	NR	NR	NR	NR	1
UXO	1.000		0	0	0	0	NR	0
DOCKET HWC	TP		NR	NR	NR	NR	NR	0
ECHO	TP	1	NR	NR	NR	NR	NR	1
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
AGVIC	0.500		0	0	0	NR	NR	0
AIRS	TP	1	NR	NR	NR	NR	NR	1
ASBESTOS	TP		NR	NR	NR	NR	NR	0
BULK	0.250		0	0	NR	NR	NR	0
COAL ASH	0.500		0	0	0	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
ENF	TP		NR	NR	NR	NR	NR	0
Financial Assurance	TP	1	NR	NR	NR	NR	NR	1
MN HWS Permit	1.000		0	0	0	0	NR	0
LEAD	TP		NR	NR	NR	NR	NR	0
MANIFEST	0.250		0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
MDA LIS	0.250		0	0	NR	NR	NR	0
MN LS	0.500		0	0	0	NR	NR	0
TIER 2	TP	2	NR	NR	NR	NR	NR	2
VAPOR	0.500		0	0	0	NR	NR	0
WIMN	0.500	1	0	0	0	NR	NR	1
NPDES	TP	1	NR	NR	NR	NR	NR	1
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA HWS	TP		NR	NR	NR	NR	NR	0
RGA LF	TP		NR	NR	NR	NR	NR	0
RGA LUST	TP		NR	NR	NR	NR	NR	0
- Totals --		11	0	0	0	0	0	11

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

A1
Target
Property

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY
2185 45TH AVE SE
SAINT CLOUD, MN 56304

Site 1 of 5 in cluster A

Actual:
1020 ft.

SPILLS S108496615
AIRS N/A
Financial Assurance
TIER 2
WIMN
NPDES

SPILLS:

Program ID:	64654571
Preferred ID:	86174
Incident ID:	86174
edr_fcity:	ST. CLOUD
Incident Date:	1/17/2013
Program:	Emergency Management
Incident Types:	Transportation Accident - Saddle Tank
Duty Officer Number:	131497
Lead Investigator:	Walter Haas
Incident Status:	Closed or Completed
Closure Type:	Response/Action Completed
AI ID source:	Not reported
Source name:	National Guard - Military Affairs
Source Address:	Camp Ripley, 15000 Hwy 115
Source City:	Little Falls
Source State:	MN
Source ZIP:	56345
Substance:	Diesel Fuel
Quantity:	40
Units:	gallons
Latitude:	Not reported
Longitude:	Not reported
Source CM:	Not reported

SPILLS:

Program ID:	57188064
Facility Address 2:	Not reported
Spill Date:	11/02/2009

Program ID:	64654571
Facility Address 2:	Not reported
Spill Date:	01/17/2013

SPILLS:

Program ID:	64654571
Spill Inc Affected ID:	227473
Spill Inc Affected Code:	14
Tmsp Added:	01/24/2013 08:25:25
Tmsp Last Updated:	01/24/2013 08:25:25
Staff ID Last Update:	WHAAS

SPILLS:

Program ID:	64654571
Spill Incident Accuracy ID:	227473
Spill Product Code:	30
Spill Qty Units:	5
Spill Incident Accuracy:	1
Spill Released Qty:	40
Tmsp Added:	01/24/2013 08:25:25
Tmsp Last Update:	01/24/2013 08:25:25
Staff ID Last Update:	WHAAS

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Program ID:	57188064
Preferred ID:	76710
Incident ID:	76710
edr_fcity:	ST. CLOUD
Incident Date:	11/2/2009
Program:	Emergency Management
Incident Types:	Spill or Release
Duty Officer Number:	107217
Lead Investigator:	Walter Haas
Incident Status:	Closed or Completed
Closure Type:	Response/Action Completed
AI ID source:	Not reported
Source name:	National Guard
Source Address:	Not reported
Source City:	Not reported
Source State:	Not reported
Source ZIP:	Not reported
Substance:	Aviation Gas
Quantity:	30
Units:	gallons
Latitude:	Not reported
Longitude:	Not reported
Source CM:	Not reported

SPILLS:

Program ID:	57188064
Facility Address 2:	Not reported
Spill Date:	11/02/2009

Program ID:	64654571
Facility Address 2:	Not reported
Spill Date:	01/17/2013

SPILLS:

Program ID:	57188064
Spill Inc Affected ID:	206902
Spill Inc Affected Code:	14
Tmsp Added:	11/10/2009 14:26:57
Tmsp Last Updated:	11/10/2009 14:26:57
Staff ID Last Update:	WHAAS

SPILLS:

Program ID:	57188064
Spill Incident Accuracy ID:	206902
Spill Product Code:	24
Spill Qty Units:	5
Spill Incident Accuracy:	1
Spill Released Qty:	30
Tmsp Added:	11/10/2009 14:26:57
Tmsp Last Update:	11/10/2009 14:26:57
Staff ID Last Update:	WHAAS

MN AIRS:

Facility ID:	14100064
File Number:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Fedral/State:	Not reported
Mail Address:	Not reported
Mail City,St,Zip:	Not reported
Contact Name:	Not reported
Contact Phone:	Not reported
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	928110
Permip Program Type:	Not reported
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2016
Industry Type:	Other
Pollutant:	Volatile Organic Compounds
Emissions (lb):	1247.66
Emissions (tons):	0.62383

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2013
Industry Type:	Other
Pollutant:	Carbon Monoxide
Emissions (lb):	1849.2
Emissions (tons):	0.9246

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2013
Industry Type:	Other
Pollutant:	Nitrogen Oxides
Emissions (lb):	3102.6
Emissions (tons):	1.5513
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2013
Industry Type:	Other
Pollutant:	PM Primary
Emissions (lb):	127.214
Emissions (tons):	0.063607
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2013
Industry Type:	Other

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Pollutant:	PM10 Primary
Emissions (lb):	127.214
Emissions (tons):	0.063607
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2013
Industry Type:	Other
Pollutant:	PM2.5 Primary
Emissions (lb):	120.4154
Emissions (tons):	0.0602077
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2013
Industry Type:	Other
Pollutant:	Sulfur Dioxide
Emissions (lb):	90.986
Emissions (tons):	0.045493
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2013
Industry Type:	Other
Pollutant:	Volatile Organic Compounds
Emissions (lb):	1262.9
Emissions (tons):	0.63145

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2013
Industry Type:	Other
Pollutant:	Ammonia
Emissions (lb):	66.338
Emissions (tons):	0.033169

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2013
Industry Type:	Other
Pollutant:	Lead
Emissions (lb):	0.009456
Emissions (tons):	4.728e-06
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2013
Industry Type:	Other
Pollutant:	CO2-equivalent
Emissions (lb):	2369347.1934
Emissions (tons):	1184.6735967
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2012
Industry Type:	Other
Pollutant:	Carbon Monoxide
Emissions (lb):	1288.68
Emissions (tons):	0.64434

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2012
Industry Type:	Other
Pollutant:	Nitrogen Oxides
Emissions (lb):	2126.6
Emissions (tons):	1.0633

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2012
Industry Type:	Other
Pollutant:	PM Primary
Emissions (lb):	124.356
Emissions (tons):	0.062178

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2012
Industry Type:	Other
Pollutant:	PM10 Primary
Emissions (lb):	124.356
Emissions (tons):	0.062178
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2012
Industry Type:	Other
Pollutant:	PM2.5 Primary
Emissions (lb):	112.9428
Emissions (tons):	0.0564714
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Emissions Year:	2012
Industry Type:	Other
Pollutant:	Sulfur Dioxide
Emissions (lb):	60.34
Emissions (tons):	0.03017
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2012
Industry Type:	Other
Pollutant:	Volatile Organic Compounds
Emissions (lb):	1268.18
Emissions (tons):	0.63409
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2012
Industry Type:	Other
Pollutant:	Ammonia
Emissions (lb):	46.386
Emissions (tons):	0.023193
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2012
Industry Type:	Other
Pollutant:	Lead
Emissions (lb):	0.00665
Emissions (tons):	3.325e-06

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2012
Industry Type:	Other
Pollutant:	CO2-equivalent
Emissions (lb):	1663644.4188
Emissions (tons):	831.8222094

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Nitrogen Oxides
Emissions (lb):	2274.8
Emissions (tons):	1.1374
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Carbon Monoxide
Emissions (lb):	1548.6
Emissions (tons):	0.7743
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Volatile Organic Compounds

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Emissions (lb):	1240.54
Emissions (tons):	0.62027
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	PM Primary
Emissions (lb):	150.634
Emissions (tons):	0.075317
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	PM10 Primary
Emissions (lb):	144.634
Emissions (tons):	0.072317
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	PM2.5 Primary
Emissions (lb):	127.1178
Emissions (tons):	0.0635589

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Ammonia
Emissions (lb):	57.024
Emissions (tons):	0.028512

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Sulfur Dioxide
Emissions (lb):	48.29
Emissions (tons):	0.024145
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Lead
Emissions (lb):	0.008476
Emissions (tons):	4.238e-06
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Zinc
Emissions (lb):	0.492126
Emissions (tons):	0.000246063

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Manganese
Emissions (lb):	0.110342
Emissions (tons):	5.5171e-05

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Vanadium
Emissions (lb):	0.03898
Emissions (tons):	1.949e-05

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Nickel
Emissions (lb):	0.0359946
Emissions (tons):	1.79973e-05
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Cadmium
Emissions (lb):	0.0192772
Emissions (tons):	9.6386e-06
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Emissions Year:	2011
Industry Type:	Other
Pollutant:	Copper
Emissions (lb):	0.0151972
Emissions (tons):	7.5986e-06
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Arsenic
Emissions (lb):	0.003916
Emissions (tons):	1.958e-06
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Selenium
Emissions (lb):	0.0023796
Emissions (tons):	1.1898e-06
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Chromium (VI)
Emissions (lb):	0.0021356
Emissions (tons):	1.0678e-06

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Cobalt
Emissions (lb):	0.0014238
Emissions (tons):	7.119e-07

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Beryllium
Emissions (lb):	0.000598
Emissions (tons):	2.99e-07
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Mercury
Emissions (lb):	0.000172058
Emissions (tons):	8.6029e-08
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Toluene

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Emissions (lb):	100.11144
Emissions (tons):	0.05005572
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Methyl Isobutyl Ketone
Emissions (lb):	100
Emissions (tons):	0.05
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Xylenes (Mixed Isomers)
Emissions (lb):	40.03748
Emissions (tons):	0.02001874
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Glycol Ethers
Emissions (lb):	40
Emissions (tons):	0.02

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	N-Hexane
Emissions (lb):	30.52
Emissions (tons):	0.01526

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Formaldehyde
Emissions (lb):	1.4264
Emissions (tons):	0.0007132
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Propylene
Emissions (lb):	0.3394
Emissions (tons):	0.0001697
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Benzene
Emissions (lb):	0.1583
Emissions (tons):	7.915e-05

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Acetaldehyde
Emissions (lb):	0.10088
Emissions (tons):	5.044e-05

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Chromium (III)
Emissions (lb):	0.0230404
Emissions (tons):	1.15202e-05

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Dichlorobenzenes
Emissions (lb):	0.02034
Emissions (tons):	1.017e-05
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Acrolein
Emissions (lb):	0.012166
Emissions (tons):	6.083e-06
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Emissions Year: 2011
Industry Type: Other
Pollutant: 1,3-Butadiene
Emissions (lb): 0.002104
Emissions (tons): 1.052e-06

Facility ID: 14100064
File Number: 4348
Fedral/State: Not reported
Mail Address: 15000 Highway 115
Mail City,St,Zip: Little Falls, MN 563454173
Contact Name: Mr. Scott Albers
Contact Phone: (320) 616-2616
Contact Fax: (320) 632-7473
Latitude: 45.540708199999997
Longitude: -94.0563456
SIC Code: 9711
SIC Code 2: Not reported
NAICS: 92811
Permip Program Type: Registration
Action ID: 2
Effective Start: 09/25/2007
Expiration Date: Not reported
REG PMT Option: D
Emissions Year: 2011
Industry Type: Other
Pollutant: 2-Methylnaphthalene
Emissions (lb): 0.0004068
Emissions (tons): 2.034e-07

Facility ID: 14100064
File Number: 4348
Fedral/State: Not reported
Mail Address: 15000 Highway 115
Mail City,St,Zip: Little Falls, MN 563454173
Contact Name: Mr. Scott Albers
Contact Phone: (320) 616-2616
Contact Fax: (320) 632-7473
Latitude: 45.540708199999997
Longitude: -94.0563456
SIC Code: 9711
SIC Code 2: Not reported
NAICS: 92811
Permip Program Type: Registration
Action ID: 2
Effective Start: 09/25/2007
Expiration Date: Not reported
REG PMT Option: D
Emissions Year: 2011
Industry Type: Other
Pollutant: Dimethylbenz(A)Anthracene
Emissions (lb): 0.0002712
Emissions (tons): 1.356e-07

Facility ID: 14100064
File Number: 4348
Fedral/State: Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	3-Methylcholanthrene
Emissions (lb):	3.052e-05
Emissions (tons):	1.526e-08

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Naphthalene
Emissions (lb):	0.021492
Emissions (tons):	1.0746e-05

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Phenanthrene
Emissions (lb):	0.0041542
Emissions (tons):	2.0771e-06
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Fluorene
Emissions (lb):	0.00388746
Emissions (tons):	1.94373e-06
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Fluoranthene

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Emissions (lb):	0.00105166
Emissions (tons):	5.2583e-07
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Pyrene
Emissions (lb):	0.00071336
Emissions (tons):	3.5668e-07
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Acenaphthylene
Emissions (lb):	0.00069592
Emissions (tons):	3.4796e-07
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Anthracene
Emissions (lb):	0.00028668
Emissions (tons):	1.4334e-07

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Benz(A)Anthracene
Emissions (lb):	0.00025152
Emissions (tons):	1.2576e-07

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
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Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Acenaphthene
Emissions (lb):	0.00021728
Emissions (tons):	1.0864e-07
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
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Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Dibenzo(A,H)Anthracene
Emissions (lb):	9.702e-05
Emissions (tons):	4.851e-08
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Benzo(G,H,I)Perylene
Emissions (lb):	8.466e-05
Emissions (tons):	4.233e-08

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Indeno(1,2,3-C,D)Pyrene
Emissions (lb):	7.984e-05
Emissions (tons):	3.992e-08

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Chrysene
Emissions (lb):	7.694e-05
Emissions (tons):	3.847e-08

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Benzo(K)Fluoranthene
Emissions (lb):	5.09e-05
Emissions (tons):	2.545e-08
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2011
Industry Type:	Other
Pollutant:	Benzo(A)Pyrene
Emissions (lb):	4.506e-05
Emissions (tons):	2.253e-08
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Emissions Year:	2011
Industry Type:	Other
Pollutant:	Benzo(B)Fluoranthene
Emissions (lb):	4.3554e-05
Emissions (tons):	2.1777e-08
Facility ID:	14100064
File Number:	Not reported
Fedral/State:	Not reported
Mail Address:	Not reported
Mail City,St,Zip:	Not reported
Contact Name:	Not reported
Contact Phone:	Not reported
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Not reported
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2010
Industry Type:	Other
Pollutant:	Carbon Monoxide
Emissions (lb):	1700
Emissions (tons):	0.85
Facility ID:	14100064
File Number:	Not reported
Fedral/State:	Not reported
Mail Address:	Not reported
Mail City,St,Zip:	Not reported
Contact Name:	Not reported
Contact Phone:	Not reported
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Not reported
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2010
Industry Type:	Other
Pollutant:	Nitrogen Oxides
Emissions (lb):	2580
Emissions (tons):	1.29
Facility ID:	14100064
File Number:	Not reported
Fedral/State:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Mail Address:	Not reported
Mail City,St,Zip:	Not reported
Contact Name:	Not reported
Contact Phone:	Not reported
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Not reported
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2010
Industry Type:	Other
Pollutant:	PM Primary
Emissions (lb):	180
Emissions (tons):	0.09

Facility ID:	14100064
File Number:	Not reported
Fedral/State:	Not reported
Mail Address:	Not reported
Mail City,St,Zip:	Not reported
Contact Name:	Not reported
Contact Phone:	Not reported
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Not reported
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2010
Industry Type:	Other
Pollutant:	PM10 Primary
Emissions (lb):	180
Emissions (tons):	0.09

Facility ID:	14100064
File Number:	Not reported
Fedral/State:	Not reported
Mail Address:	Not reported
Mail City,St,Zip:	Not reported
Contact Name:	Not reported
Contact Phone:	Not reported
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

NAICS:	92811
Permip Program Type:	Not reported
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2010
Industry Type:	Other
Pollutant:	Volatile Organic Compounds
Emissions (lb):	1000
Emissions (tons):	0.5
Facility ID:	14100064
File Number:	Not reported
Fedral/State:	Not reported
Mail Address:	Not reported
Mail City,St,Zip:	Not reported
Contact Name:	Not reported
Contact Phone:	Not reported
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Not reported
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2010
Industry Type:	Other
Pollutant:	Sulfur Dioxide
Emissions (lb):	60
Emissions (tons):	0.03
Facility ID:	14100064
File Number:	Not reported
Fedral/State:	Not reported
Mail Address:	Not reported
Mail City,St,Zip:	Not reported
Contact Name:	Not reported
Contact Phone:	Not reported
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Not reported
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2010
Industry Type:	Other
Pollutant:	Lead

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Emissions (lb):	0
Emissions (tons):	0
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2009
Industry Type:	Other
Pollutant:	Carbon Monoxide
Emissions (lb):	240
Emissions (tons):	0.12
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2009
Industry Type:	Other
Pollutant:	Nitrogen Oxides
Emissions (lb):	840
Emissions (tons):	0.42
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2009
Industry Type:	Other
Pollutant:	PM Primary
Emissions (lb):	60
Emissions (tons):	0.03

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2009
Industry Type:	Other
Pollutant:	PM10 Primary
Emissions (lb):	60
Emissions (tons):	0.03

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2009
Industry Type:	Other
Pollutant:	Volatile Organic Compounds
Emissions (lb):	480
Emissions (tons):	0.24
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2009
Industry Type:	Other
Pollutant:	Sulfur Dioxide
Emissions (lb):	60
Emissions (tons):	0.03
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2009
Industry Type:	Other
Pollutant:	Lead
Emissions (lb):	0
Emissions (tons):	0

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Facility ID:	14100064
File Number:	Not reported
Fedral/State:	Not reported
Mail Address:	Not reported
Mail City,St,Zip:	Not reported
Contact Name:	Not reported
Contact Phone:	Not reported
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	928110
Permip Program Type:	Not reported
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2016
Industry Type:	Other
Pollutant:	CO2-equivalent
Emissions (lb):	1692101.5792
Emissions (tons):	846.0507896

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Ammonia
Emissions (lb):	66.958
Emissions (tons):	0.033479

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	PM10 Primary
Emissions (lb):	136.218
Emissions (tons):	0.068109
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	CO2-equivalent
Emissions (lb):	2376004.1196
Emissions (tons):	1188.0020598
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Emissions Year:	2014
Industry Type:	Other
Pollutant:	PM2.5 Primary
Emissions (lb):	129.424
Emissions (tons):	0.064712
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 56345
Contact Name:	Gary J. Nierengarten
Contact Phone:	(320) 616-2624
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	D
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2015
Industry Type:	Other
Pollutant:	Carbon Monoxide
Emissions (lb):	1685.4
Emissions (tons):	0.8427
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 56345
Contact Name:	Gary J. Nierengarten
Contact Phone:	(320) 616-2624
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	D
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2015
Industry Type:	Other
Pollutant:	CO2-equivalent
Emissions (lb):	1711522.6604
Emissions (tons):	855.7613302
Facility ID:	14100064
File Number:	Not reported
Fedral/State:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Mail Address:	Not reported
Mail City,St,Zip:	Not reported
Contact Name:	Not reported
Contact Phone:	Not reported
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	928110
Permip Program Type:	Not reported
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2016
Industry Type:	Other
Pollutant:	Nitrogen Oxides
Emissions (lb):	2249
Emissions (tons):	1.1245

Facility ID:	14100064
File Number:	Not reported
Fedral/State:	Not reported
Mail Address:	Not reported
Mail City,St,Zip:	Not reported
Contact Name:	Not reported
Contact Phone:	Not reported
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	928110
Permip Program Type:	Not reported
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2016
Industry Type:	Other
Pollutant:	PM10 Primary
Emissions (lb):	73.914
Emissions (tons):	0.036957

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Sulfur Dioxide
Emissions (lb):	99.212
Emissions (tons):	0.049606
Facility ID:	14100064
File Number:	Not reported
Fedral/State:	Not reported
Mail Address:	Not reported
Mail City,St,Zip:	Not reported
Contact Name:	Not reported
Contact Phone:	Not reported
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	928110
Permip Program Type:	Not reported
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2016
Industry Type:	Other
Pollutant:	PM2.5 Primary
Emissions (lb):	72.3514
Emissions (tons):	0.0361757
Facility ID:	14100064
File Number:	Not reported
Fedral/State:	Not reported
Mail Address:	Not reported
Mail City,St,Zip:	Not reported
Contact Name:	Not reported
Contact Phone:	Not reported
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	928110
Permip Program Type:	Not reported
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2016
Industry Type:	Other
Pollutant:	PM Primary

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Emissions (lb):	73.914
Emissions (tons):	0.036957
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 56345
Contact Name:	Gary J. Nierengarten
Contact Phone:	(320) 616-2624
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	D
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2015
Industry Type:	Other
Pollutant:	Volatile Organic Compounds
Emissions (lb):	1113.86
Emissions (tons):	0.55693
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 56345
Contact Name:	Gary J. Nierengarten
Contact Phone:	(320) 616-2624
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	D
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2015
Industry Type:	Other
Pollutant:	PM Primary
Emissions (lb):	230.812
Emissions (tons):	0.115406
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 56345
Contact Name:	Gary J. Nierengarten

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Contact Phone:	(320) 616-2624
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	D
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2015
Industry Type:	Other
Pollutant:	Ammonia
Emissions (lb):	54.97
Emissions (tons):	0.027485

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Carbon Monoxide
Emissions (lb):	1876.8
Emissions (tons):	0.9384

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 56345
Contact Name:	Gary J. Nierengarten
Contact Phone:	(320) 616-2624
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	D
Action ID:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2015
Industry Type:	Other
Pollutant:	Lead
Emissions (lb):	0.00655
Emissions (tons):	3.275e-06
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Lead
Emissions (lb):	0.00946
Emissions (tons):	4.73e-06
Facility ID:	14100064
File Number:	Not reported
Fedral/State:	Not reported
Mail Address:	Not reported
Mail City,St,Zip:	Not reported
Contact Name:	Not reported
Contact Phone:	Not reported
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	928110
Permip Program Type:	Not reported
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2016
Industry Type:	Other
Pollutant:	Carbon Monoxide
Emissions (lb):	1326.9
Emissions (tons):	0.66345

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Volatile Organic Compounds
Emissions (lb):	1507.16
Emissions (tons):	0.75358

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 56345
Contact Name:	Gary J. Nierengarten
Contact Phone:	(320) 616-2624
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	D
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2015
Industry Type:	Other
Pollutant:	PM10 Primary
Emissions (lb):	230.812
Emissions (tons):	0.115406

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 56345
Contact Name:	Gary J. Nierengarten
Contact Phone:	(320) 616-2624
Contact Fax:	Not reported
Latitude:	45.540708199999997

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	D
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2015
Industry Type:	Other
Pollutant:	PM2.5 Primary
Emissions (lb):	224.881
Emissions (tons):	0.1124405
Facility ID:	14100064
File Number:	Not reported
Fedral/State:	Not reported
Mail Address:	Not reported
Mail City,St,Zip:	Not reported
Contact Name:	Not reported
Contact Phone:	Not reported
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	928110
Permip Program Type:	Not reported
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2016
Industry Type:	Other
Pollutant:	Lead
Emissions (lb):	0.006746
Emissions (tons):	3.373e-06
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 56345
Contact Name:	Gary J. Nierengarten
Contact Phone:	(320) 616-2624
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	D
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Emissions Year:	2015
Industry Type:	Other
Pollutant:	Sulfur Dioxide
Emissions (lb):	186.52
Emissions (tons):	0.09326
Facility ID:	14100064
File Number:	Not reported
Fedral/State:	Not reported
Mail Address:	Not reported
Mail City,St,Zip:	Not reported
Contact Name:	Not reported
Contact Phone:	Not reported
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	928110
Permip Program Type:	Not reported
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2016
Industry Type:	Other
Pollutant:	Sulfur Dioxide
Emissions (lb):	67.254
Emissions (tons):	0.033627
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Acenaphthene
Emissions (lb):	0.00046466
Emissions (tons):	2.3233e-07
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Acenaphthylene
Emissions (lb):	0.00156806
Emissions (tons):	7.8403e-07

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Acetaldehyde
Emissions (lb):	0.2326
Emissions (tons):	0.0001163

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Acrolein
Emissions (lb):	0.02804
Emissions (tons):	1.402e-05
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Aldehyde
Emissions (lb):	21.22
Emissions (tons):	0.01061
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Anthracene

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Emissions (lb):	0.0006124
Emissions (tons):	3.062e-07
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Arsenic
Emissions (lb):	0.0049968
Emissions (tons):	2.4984e-06
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Benz(A)Anthracene
Emissions (lb):	0.00054346
Emissions (tons):	2.7173e-07
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Benzo(G,H,I)Perylene
Emissions (lb):	0.00017096
Emissions (tons):	8.548e-08

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Benzene
Emissions (lb):	0.32254
Emissions (tons):	0.00016127

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Benzo(A)Pyrene
Emissions (lb):	7.97e-05
Emissions (tons):	3.985e-08
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Benzo(B)Fluoranthene
Emissions (lb):	6.41e-05
Emissions (tons):	3.205e-08
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Benzo(K)Fluoranthene
Emissions (lb):	8.11e-05
Emissions (tons):	4.055e-08

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Beryllium
Emissions (lb):	0.0011366
Emissions (tons):	5.683e-07

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	1,3-Butadiene
Emissions (lb):	0.00485
Emissions (tons):	2.425e-06

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Cadmium
Emissions (lb):	0.0222752
Emissions (tons):	1.11376e-05
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Chromium (III)
Emissions (lb):	0.028154
Emissions (tons):	1.4077e-05
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Emissions Year:	2014
Industry Type:	Other
Pollutant:	Chromium (VI)
Emissions (lb):	0.0016598
Emissions (tons):	8.299e-07
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Chrysene
Emissions (lb):	0.00014108
Emissions (tons):	7.054e-08
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Cobalt
Emissions (lb):	0.0015892
Emissions (tons):	7.946e-07
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Copper
Emissions (lb):	0.017901
Emissions (tons):	8.9505e-06

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Dibenzo(A,H)Anthracene
Emissions (lb):	0.00019946
Emissions (tons):	9.973e-08

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Dichlorobenzenes
Emissions (lb):	0.0227
Emissions (tons):	1.135e-05
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Dimethylbenz(A)Anthracene
Emissions (lb):	0.0003028
Emissions (tons):	1.514e-07
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Fluoranthene

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Emissions (lb):	0.00236476
Emissions (tons):	1.18238e-06
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Fluorene
Emissions (lb):	0.00890498
Emissions (tons):	4.45249e-06
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Formaldehyde
Emissions (lb):	1.7768
Emissions (tons):	0.0008884
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Glycol Ethers
Emissions (lb):	40
Emissions (tons):	0.02

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	N-Hexane
Emissions (lb):	34.06
Emissions (tons):	0.01703

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Indeno(1,2,3-C,D)Pyrene
Emissions (lb):	0.00014776
Emissions (tons):	7.388e-08
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Lead
Emissions (lb):	0.00946
Emissions (tons):	4.73e-06
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Manganese
Emissions (lb):	0.24679
Emissions (tons):	0.000123395

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Mercury
Emissions (lb):	0.000379692
Emissions (tons):	1.89846e-07

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Methyl Isobutyl Ketone
Emissions (lb):	100
Emissions (tons):	0.05

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	3-Methylcholanthrene
Emissions (lb):	3.41e-05
Emissions (tons):	1.705e-08
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	2-Methylnaphthalene
Emissions (lb):	0.000454
Emissions (tons):	2.27e-07
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Emissions Year:	2014
Industry Type:	Other
Pollutant:	Naphthalene
Emissions (lb):	20.037242
Emissions (tons):	0.010018621
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Nickel
Emissions (lb):	0.0406496
Emissions (tons):	2.03248e-05
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Phenanthrene
Emissions (lb):	0.0092356
Emissions (tons):	4.6178e-06
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Propylene
Emissions (lb):	0.7822
Emissions (tons):	0.0003911

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Pyrene
Emissions (lb):	0.0015438
Emissions (tons):	7.719e-07

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Selenium
Emissions (lb):	0.005002
Emissions (tons):	2.501e-06
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Toluene
Emissions (lb):	100.18832
Emissions (tons):	0.05009416
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Vanadium

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Emissions (lb):	0.04352
Emissions (tons):	2.176e-05
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Xylenes (Mixed Isomers)
Emissions (lb):	60.0864
Emissions (tons):	0.0300432
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Zinc
Emissions (lb):	0.5498128
Emissions (tons):	0.0002749064
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	Nitrogen Oxides
Emissions (lb):	3228.6
Emissions (tons):	1.6143

Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 56345
Contact Name:	Gary J. Nierengarten
Contact Phone:	(320) 616-2624
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	D
Action ID:	Not reported
Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2015
Industry Type:	Other
Pollutant:	Nitrogen Oxides
Emissions (lb):	4028
Emissions (tons):	2.014

Facility ID:	14100064
File Number:	Not reported
Fedral/State:	Not reported
Mail Address:	Not reported
Mail City,St,Zip:	Not reported
Contact Name:	Not reported
Contact Phone:	Not reported
Contact Fax:	Not reported
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	Not reported
SIC Code 2:	Not reported
NAICS:	928110
Permip Program Type:	Not reported
Action ID:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Effective Start:	Not reported
Expiration Date:	Not reported
REG PMT Option:	Not reported
Emissions Year:	2016
Industry Type:	Other
Pollutant:	Ammonia
Emissions (lb):	47.482
Emissions (tons):	0.023741
Facility ID:	14100064
File Number:	4348
Fedral/State:	Not reported
Mail Address:	15000 Highway 115
Mail City,St,Zip:	Little Falls, MN 563454173
Contact Name:	Mr. Scott Albers
Contact Phone:	(320) 616-2616
Contact Fax:	(320) 632-7473
Latitude:	45.540708199999997
Longitude:	-94.0563456
SIC Code:	9711
SIC Code 2:	Not reported
NAICS:	92811
Permip Program Type:	Registration
Action ID:	2
Effective Start:	09/25/2007
Expiration Date:	Not reported
REG PMT Option:	D
Emissions Year:	2014
Industry Type:	Other
Pollutant:	PM Primary
Emissions (lb):	136.218
Emissions (tons):	0.068109

MN Financial Assurance 1:

PROGRAM ID:	56231140
Township Name:	Not reported
Region:	1
Interest Type:	Tank site
ADDR ID:	555568
Interest Telephone:	NO CORE PI PH.
Preferred ID:	125103
Interest Start Date:	06/24/2009
Interest End Date:	Not reported
Activity Flag:	Y
TMSP Added:	06/24/2009
TMSP Last Update:	10/21/2009 14:41:56
Staff ID Last Update:	JHENRY
Source:	CORE
Source ID:	256312
Country Code:	USA
FOR State:	Not reported
FOR Zone:	Not reported
FIPS County Code:	141
Comments:	Not reported
PROGRAM ID:	57188064
Township Name:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Region:	1
Interest Type:	Spill site
ADDR ID:	57188065
Interest Telephone:	Not reported
Preferred ID:	76710
Interest Start Date:	11/10/2009
Interest End Date:	Not reported
Activity Flag:	Not reported
TMSP Added:	11/10/2009
TMSP Last Update:	11/10/2009 14:26:57
Staff ID Last Update:	WHAAS
Source:	TALES
Source ID:	0
Country Code:	USA
FOR State:	Not reported
FOR Zone:	Not reported
FIPS County Code:	141
Comments:	Caller reporting spill caused by equipment failure. It blew out the vent before the tank was full - 5 gallons went off the concrete and onto the gravel next to it. They are in the process of digging up the soil and will take up to camp Ripley to spread.

PROGRAM ID:	64654571
Township Name:	Not reported
Region:	1
Interest Type:	Spill site
ADDR ID:	64654572
Interest Telephone:	Not reported
Preferred ID:	86174
Interest Start Date:	01/24/2013
Interest End Date:	Not reported
Activity Flag:	Not reported
TMSP Added:	01/24/2013
TMSP Last Update:	01/24/2013 08:25:25
Staff ID Last Update:	WHAAS
Source:	TALES
Source ID:	0
Country Code:	USA
FOR State:	Not reported
FOR Zone:	Not reported
FIPS County Code:	145
Comments:	Caller reporting component failed while refueling equipment causing spill from an overfill situation. Spill to concrete. Absorbents used to recover and placed in containers for disposal. Spill was just brought to caller's attention, reason for late report.

Latitude Longitude:

Program Id:	56231140
Lat/Long ID:	0
Latitude Degrees:	Not reported
Latitude Minutes:	Not reported
Latitude Seconds:	Not reported
Longitude Degrees:	Not reported
Longitude Minutes:	Not reported
Longitude Seconds:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Collection Date:	Not reported
Lat/Long Description:	Not reported
TMSP Added:	05/18/2010 09:37:37
TMSP Last Update:	05/18/2010 09:37:37
Staff ID Last Update:	JHENRY
Coord Source Type:	Not reported
Org Name Source:	Not reported
Coord Coll Meth:	Not reported
Map Scale Code:	Not reported
Source:	TALES
Site ID:	256312
Spatial ID:	56231141

Program Id:	56231140
Lat/Long ID:	146107
Latitude Degrees:	45
Latitude Minutes:	32
Latitude Seconds:	26.54
Longitude Degrees:	-94
Longitude Minutes:	3
Longitude Seconds:	22.84
Collection Date:	06/17/2009 00:00:00
Lat/Long Description:	Not reported
TMSP Added:	06/17/2009 10:33:45
TMSP Last Update:	03/30/2010 18:36:06
Staff ID Last Update:	MAPT_NC
Coord Source Type:	Not reported
Org Name Source:	Not reported
Coord Coll Meth:	G8
Map Scale Code:	T
Source:	CORE
Site ID:	256312
Spatial ID:	56231141

Tab Site:

Program Id:	56231140
Facility Code:	14
Above or Under Code:	1
Indian Reservation:	Not reported
Ust Registration Date:	Not reported
Ast Registration Date:	06/04/2009 00:00:00
TMSP Added:	06/29/2009 15:34:44
TMSP Last Update:	06/29/2009 15:34:44
Staff ID Last Update:	JHENRY
Max Monthy Gallons:	Not reported
Vapor Recovery Installed:	Not reported
Vapor Notif Required:	Not reported

TIER 2:

Year:	2011
Facility Status:	ACTIVE
Facility Phone:	Not reported
Facility Email:	Not reported
Facility Web:	Not reported
Facility MNCP:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

SIC:	9711
NAICS:	928110
Dunn Brad Num:	Not reported
Contact Type:	Not reported
Time Created:	Not reported
Signed By:	Not reported
Title:	Not reported
Signed Date:	Not reported
Attach Site Plan:	Not reported
Attach Coord Abbr:	Not reported
Attach Safeguard Info:	Not reported
Attach ERP:	Not reported
Hardcopy Attachments:	Not reported
Extension Site Plan:	Not reported
Extension Coord Abbr:	Not reported
Extension Safeguard Info:	Not reported
Extension ERP:	Not reported
Last Updated ERP:	Not reported
Last Tested ERP:	Not reported
Last Reviewed ERP:	Not reported
VZone Primary:	Not reported
VZone Secondary:	Not reported
Modified Date:	Not reported
FIPS County:	Not reported
Latitude/Longitude:	/
User Name:	Not reported
TRIFID:	Not reported
CMFCL Record ID:	Not reported
SEPC Approved Date ERP:	Not reported
Client System ID:	710750011
Own Country:	Not reported
Site Plan:	Not reported
Confidential Location:	Not reported
Status 302:	UNKNOWN
Status 312:	UNKNOWN
Emergency Contact Name1:	Brian Waldoch
Emergency Contact Name2:	Andrew Winzenburg
Emergency Contact Name3:	Not reported
Emergency Contact Name4:	Not reported
Emergency Contact 24hr Phone1:	7634438092
Emergency Contact 24hr Phone2:	6129641826
Emergency Contact 24hr Phone3:	Not reported
Emergency Contact 24hr Phone4:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	42474
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	5
Storage Container Type:	A
Storage Pressure Class:	1

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Storage Temperature Class:	4
Storage Location:	SW OF FACILITY GENERATOR EMERGENCY
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	42474
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	5
Storage Container Type:	A
Storage Pressure Class:	1
Storage Temperature Class:	4
Storage Location:	SW CORNER OF FACILITY-FUEL TO BE RECYCLED
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	42474
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	5
Storage Container Type:	A
Storage Pressure Class:	1
Storage Temperature Class:	4
Storage Location:	NW OF FACILITY FUELING TANKS
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	41429
Chemical Name:	OIL,USED
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	3
Avg Daily Amt Code:	3
Storage Container Type:	A
Storage Pressure Class:	1
Storage Temperature Class:	4
Storage Location:	SW CORNER OF FACILITY
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	74986
Chemical Id:	41415
Chemical Name:	PROPANE
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	4
Avg Daily Amt Code:	4
Storage Container Type:	A
Storage Pressure Class:	2
Storage Temperature Class:	4
Storage Location:	WEST OF HANGER FACILITY
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

CAS Number:	N/A
Chemical Id:	44742
Chemical Name:	UNLEADED GASOLINE (MOGAS)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	3
Avg Daily Amt Code:	3
Storage Container Type:	A
Storage Pressure Class:	1
Storage Temperature Class:	4
Storage Location:	WESTERNMOST CORNER OF FACILITY
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	OIL,USED
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	DIESEL FUEL
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	4
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Facility Id:	15095
CAS Number:	74986
Chemical Id:	Not reported
Chemical Name:	PROPANE
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	8
Avg Daily Amt Code:	7
Storage Container Type:	Above ground tank
Storage Pressure Class:	Greater than ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	UNLEADED GASOLINE (MOGAS)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Max Daily Amt Code:	4
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Click this hyperlink while viewing on your computer to access
3 additional MN_TIER2: record(s) in the EDR Site Report.

WIMN:

Status:	Y
Latitude:	45.540708199999997
Longitude:	-94.0563456
Item ID:	121728-AISI0000121728
AI ID:	121728
Document ID:	0
Subject Item Type Code:	CON
Subject Item Category Code:	AISI
Subject Item ID:	121728
Subject Item Category Description:	Agency Interest
Subject Item Type Description:	Conventional Site
Description:	Not reported
Subject Item Designation:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

MPCA Program:	Multiple Programs
Program List:	AQ; HW; ST; TL
City, Township or Unorganized code:	239648
City, Township or Unorganized Name:	Saint Cloud
Congressional District Code:	6
House District:	14B
Senate District:	14
USGS 8-digits:	07010203
USGS 8-digits Name:	Mississippi River - St. Cloud
USGS 10-digits:	701020303
USGS 12-digits:	70102030304
USGS 12-digits Name:	County Ditch No 13-Elk River
MDH Drinking Water Management Code:	Not reported
MDH Drinking Water Management Name:	Not reported
Location Description:	Not reported
Township, Range, Direction, Section QQ:	Not reported
PLS Township:	Not reported
Range:	Not reported
Range Direction:	Not reported
Section:	Not reported
Quarters:	Not reported
Collection Method Code:	G8
Method Description:	GPS - Other
Ref Code:	GEN
Ref Description:	General Location
Location Verified Flag:	N
Collection Date:	04/18/2017
Timestamp of Creation:	03/08/2007
User Name of Creator:	DELTA_M_R1
Timestamp of Last Update:	04/18/2017
User Name of Last Update:	geo_nc
Status Date:	Not reported
The Delta Spatial ID:	Not reported
Activity:	Multiple Activities
Activity List:	Aboveground Tanks; Air Quality; Hazardous Waste, Very small quantity generator; Industrial Stormwater
MPCA ID:	Multiple IDs
MPCA List:	14100064; MNR0534NL; MNR053CBZ; MNS000141630; TS0125103
Program List:	Air Quality; Hazardous Waste; Stormwater; Tanks
Classification:	National Security
Site URL:	http://cf.pca.state.mn.us/wimn/siteInfo.cfm?siteid=121728

NPDES:

Envid:	S108496615
Facility Name:	SAINT CLOUD ARMY AVIATION SUPPORT FACILITY
Address:	Not reported
Active:	Inactive
Interest Type Description:	Not reported
Activity ID:	MNR0534NL
Preferred ID:	Not reported
Activity Sys ID:	121728
Activity Type:	Not reported
Activity Type Code:	Not reported
Effective Start Date:	07/12/2010
End Date:	Not reported
Alternative Method:	Not reported
Coverage Date:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Latitude Degree:	45.5407082
Longitude Degree:	-94.0563456
Location Description:	Not reported
New Imp Area:	Not reported
Old Imp Area:	Not reported
Online Submittal:	Not reported
Other Project Type Description:	Not reported
Owner Name:	Minnesota Army National Guard
Owner Organization Type:	Not reported
Permit Sys ID:	94393
Project Name:	Not reported
Project Size:	Not reported
Termination Date:	Not reported
Acres:	18
Activity Description:	Non-scheduled air transportation including refueling (Waterbody <1 Mile? N.)
No Exposure:	No
One Mile:	Not reported
Permit Type:	Industrial Stormwater Permit
Sector List:	S
Foreign State:	Not reported
Foreign Zone:	Not reported
Township:	Not reported
Range:	Not reported
Range Direction:	Not reported
Section:	Not reported
Quarter:	Not reported
Major Watershed:	Not reported
Major Watershed Code:	Not reported
HUC:	Not reported
Minor Watershed:	Not reported
Minor Watershed Code:	Not reported
Permit Action:	Not reported
Issuance Date:	Not reported
Expiration Date:	Not reported
Action Date:	Not reported
Effective Permit:	Not reported
FDF MGD:	Not reported
NPDES Flag:	Not reported
General Individual:	Not reported
Major Minor:	Not reported
Fac Class:	Not reported
Collection Class:	Not reported
Land Application Type:	Not reported
Principal Component:	Not reported
SIC 1:	Not reported
SIC 2:	Not reported
SIC 3:	Not reported
SIC 4:	Not reported
SIC 5:	Not reported
Data Manager:	Not reported
Permit Writer:	Not reported
Compliance Staff:	Not reported
Engineer:	Not reported
Hydro:	Not reported
X Coord:	Not reported
Y Coord:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Coordinate Method:	Not reported
Prog Int ID:	Not reported
Doc Int ID:	Not reported
Envid:	S108496615
Facility Name:	SAINT CLOUD ARMY AVIATION SUPPORT FACILITY
Address:	Not reported
Active:	Active
Interest Type Description:	Not reported
Activity ID:	MNR053CBZ
Preferred ID:	Not reported
Activity Sys ID:	121728
Activity Type:	Not reported
Activity Type Code:	Not reported
Effective Start Date:	04/05/2015
End Date:	Not reported
Alternative Method:	Not reported
Coverage Date:	Not reported
Latitude Degree:	Not reported
Longitude Degree:	Not reported
Location Description:	Not reported
New Imp Area:	Not reported
Old Imp Area:	Not reported
Online Submittal:	Not reported
Other Project Type Description:	Not reported
Owner Name:	Minnesota Army National Guard
Owner Organization Type:	Not reported
Permit Sys ID:	2859637
Project Name:	Not reported
Project Size:	Not reported
Termination Date:	Not reported
Acres:	5
Activity Description:	Aircraft refueling
No Exposure:	No
One Mile:	Yes
Permit Type:	Industrial Stormwater Permit
Sector List:	S
Foreign State:	Not reported
Foreign Zone:	Not reported
Township:	Not reported
Range:	Not reported
Range Direction:	Not reported
Section:	Not reported
Quarter:	Not reported
Major Watershed:	Not reported
Major Watershed Code:	Not reported
HUC:	Not reported
Minor Watershed:	Not reported
Minor Watershed Code:	Not reported
Permit Action:	Not reported
Issuance Date:	Not reported
Expiration Date:	Not reported
Action Date:	Not reported
Effective Permit:	Not reported
FDF MGD:	Not reported
NPDES Flag:	Not reported
General Individual:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **S108496615**

Major Minor:	Not reported
Fac Class:	Not reported
Collection Class:	Not reported
Land Application Type:	Not reported
Principal Component:	Not reported
SIC 1:	Not reported
SIC 2:	Not reported
SIC 3:	Not reported
SIC 4:	Not reported
SIC 5:	Not reported
Data Manager:	Not reported
Permit Writer:	Not reported
Compliance Staff:	Not reported
Engineer:	Not reported
Hydro:	Not reported
X Coord:	Not reported
Y Coord:	Not reported
Coordinate Method:	Not reported
Prog Int ID:	Not reported
Doc Int ID:	Not reported

A2 **SAINT CLOUD ARMY AVIATION SUPPORT FACILITY** **AST** **A100344194**
Target **2185 45TH AVE SE** **N/A**
Property **SAINT CLOUD, MN 56304**

Site 2 of 5 in cluster A

Actual: **1020 ft.**

AST:

AI ID:	121728
Tank Site ID:	TS0125103
Item ID:	121728-EQUI0000000001
SI Type:	Aboveground Storage Tank
Si Design:	1001
SI Description:	Not reported
Substance:	Petroleum Other
Compartment Number:	1
Wall Type:	Double
Overfill Prevention System:	AST Level 3 (Level 1, and auto shutoff)
Install Date:	2008-06-02 00:00:00
Status Change Date:	2008-06-02 00:00:00
Material:	Carbon steel
Tank Status:	Active
Tanks Contractor:	Not reported
Capacity Gallon:	20000
Longitude:	-94.06873071
Latitude:	45.53921695
Coord Collection Method:	Address Matching House Number
Owner Name:	Minnesota Army National Guard
Owner Address:	Camp Ripley NGMN-FME BLDG 2-1 15000 Highway 115
Owner City:	Little Falls
Owner State:	MN
Owner Zip:	563454173
Tanks URL:	https://cf.pca.state.mn.us/programs/tank_leak/siteDetail.cfm?id=121728-TS0125103&programInterest=TS

AI ID:	121728
Tank Site ID:	TS0125103
Item ID:	121728-EQUI0000000002

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **A100344194**

SI Type:	Aboveground Storage Tank
Si Design:	1002
SI Description:	Not reported
Substance:	Petroleum Other
Compartment Number:	1
Wall Type:	Double
Overfill Prevention System:	AST Level 3 (Level 1, and auto shutoff)
Install Date:	2008-06-02 00:00:00
Status Change Date:	2008-06-02 00:00:00
Material:	Carbon steel
Tank Status:	Active
Tanks Contractor:	Not reported
Capacity Gallon:	20000
Longitude:	-94.06873071
Latitude:	45.53921695
Coord Collection Method:	Address Matching House Number
Owner Name:	Minnesota Army National Guard
Owner Address:	Camp Ripley NGMN-FME BLDG 2-1 15000 Highway 115
Owner City:	Little Falls
Owner State:	MN
Owner Zip:	563454173
Tanks URL:	https://cf.pca.state.mn.us/programs/tank_leak/siteDetail.cfm?id=121728-TS0125103&programInterest=TS

AI ID:	121728
Tank Site ID:	TS0125103
Item ID:	121728-EQUI0000000003
SI Type:	Aboveground Storage Tank
Si Design:	1003
SI Description:	Not reported
Substance:	Petroleum Other
Compartment Number:	1
Wall Type:	Double
Overfill Prevention System:	AST None
Install Date:	2009-04-01 00:00:00
Status Change Date:	2009-04-01 00:00:00
Material:	Carbon steel
Tank Status:	Active
Tanks Contractor:	Not reported
Capacity Gallon:	1800
Longitude:	-94.06873071
Latitude:	45.53921695
Coord Collection Method:	Address Matching House Number
Owner Name:	Minnesota Army National Guard
Owner Address:	Camp Ripley NGMN-FME BLDG 2-1 15000 Highway 115
Owner City:	Little Falls
Owner State:	MN
Owner Zip:	563454173
Tanks URL:	https://cf.pca.state.mn.us/programs/tank_leak/siteDetail.cfm?id=121728-TS0125103&programInterest=TS

AI ID:	121728
Tank Site ID:	TS0125103
Item ID:	121728-EQUI0000000004
SI Type:	Aboveground Storage Tank
Si Design:	1004
SI Description:	Not reported

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **A100344194**

Substance:	Used Oil
Compartment Number:	1
Wall Type:	Double
Overfill Prevention System:	AST Level 1 (High level alarm only)
Install Date:	2009-04-01 00:00:00
Status Change Date:	2009-04-01 00:00:00
Material:	Carbon steel
Tank Status:	Active
Tanks Contractor:	Not reported
Capacity Gallon:	500
Longitude:	-94.06873071
Latitude:	45.53921695
Coord Collection Method:	Address Matching House Number
Owner Name:	Minnesota Army National Guard
Owner Address:	Camp Ripley NGMN-FME BLDG 2-1 15000 Highway 115
Owner City:	Little Falls
Owner State:	MN
Owner Zip:	563454173
Tanks URL:	https://cf.pca.state.mn.us/programs/tank_leak/siteDetail.cfm?id=121728-TS0125103&programInterest=TS

AI ID:	121728
Tank Site ID:	TS0125103
Item ID:	121728-EQUI0000000005
SI Type:	Aboveground Storage Tank
Si Design:	1005
SI Description:	Not reported
Substance:	Petroleum Other
Compartment Number:	1
Wall Type:	Double
Overfill Prevention System:	AST Level 1 (High level alarm only)
Install Date:	2009-04-01 00:00:00
Status Change Date:	2009-04-01 00:00:00
Material:	Carbon steel
Tank Status:	Closed
Tanks Contractor:	Not reported
Capacity Gallon:	500
Longitude:	-94.06873071
Latitude:	45.53921695
Coord Collection Method:	Address Matching House Number
Owner Name:	Minnesota Army National Guard
Owner Address:	Camp Ripley NGMN-FME BLDG 2-1 15000 Highway 115
Owner City:	Little Falls
Owner State:	MN
Owner Zip:	563454173
Tanks URL:	https://cf.pca.state.mn.us/programs/tank_leak/siteDetail.cfm?id=121728-TS0125103&programInterest=TS

AI ID:	121728
Tank Site ID:	TS0125103
Item ID:	121728-EQUI0000000006
SI Type:	Aboveground Storage Tank
Si Design:	1006
SI Description:	Not reported
Substance:	Gasoline Blends (E1-E49)
Compartment Number:	1
Wall Type:	Double

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY (Continued) **A100344194**

Overfill Prevention System:	AST Sight glass/gauge
Install Date:	2010-04-01 00:00:00
Status Change Date:	2010-04-01 00:00:00
Material:	Carbon steel
Tank Status:	Active
Tanks Contractor:	Not reported
Capacity Gallon:	500
Longitude:	-94.06873071
Latitude:	45.53921695
Coord Collection Method:	Address Matching House Number
Owner Name:	Minnesota Army National Guard
Owner Address:	Camp Ripley NGMN-FME BLDG 2-1 15000 Highway 115
Owner City:	Little Falls
Owner State:	MN
Owner Zip:	563454173
Tanks URL:	https://cf.pca.state.mn.us/programs/tank_leak/siteDetail.cfm?id=121728-TS0125103&programInterest=TS

A3 **ST CLOUD ARMY AVIATION SUPPORT FACILITY** **FINDS** **1010707259**
Target **2185 45TH AVE SE** **ECHO** **N/A**
Property **ST. CLOUD, MN 56304**

Site 3 of 5 in cluster A

Actual: 1020 ft.

FINDS:

Registry ID: 110058377536

Environmental Interest/Information System
AIR EMISSIONS CLASSIFICATION UNKNOWN

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

STATE MASTER

Click this hyperlink while viewing on your computer to access additional FINDS: detail in the EDR Site Report.

ECHO:

Envid:	1010707259
Registry ID:	110058377536
DFR URL:	http://echo.epa.gov/detailed-facility-report?fid=110058377536

A4
Target
Property

ARMY AVIATION SUPPORT FACILITY #2
2185 45TH AVENUE SE
ST. CLOUD, MN 56304

TIER 2 **S110144794**
N/A

Site 4 of 5 in cluster A

Actual:
1020 ft.

TIER 2:

Year:	2009
Facility Status:	ACTIVE
Facility Phone:	Not reported
Facility Email:	Not reported
Facility Web:	Not reported
Facility MNCP:	Not reported
SIC:	9711
NAICS:	928110
Dunn Brad Num:	Not reported
Contact Type:	Not reported
Time Created:	Not reported
Signed By:	Not reported
Title:	Not reported
Signed Date:	Not reported
Attach Site Plan:	Not reported
Attach Coord Abbr:	Not reported
Attach Safeguard Info:	Not reported
Attach ERP:	Not reported
Hardcopy Attachments:	Not reported
Extension Site Plan:	Not reported
Extension Coord Abbr:	Not reported
Extension Safeguard Info:	Not reported
Extension ERP:	Not reported
Last Updated ERP:	Not reported
Last Tested ERP:	Not reported
Last Reviewed ERP:	Not reported
VZone Primary:	Not reported
VZone Secondary:	Not reported
Modified Date:	Not reported
FIPS County:	Not reported
Latitude/Longitude:	/
User Name:	Not reported
TRIFID:	Not reported
CMFCL Record ID:	Not reported
SEPC Approved Date ERP:	Not reported
Client System ID:	Not reported
Own Country:	Not reported
Site Plan:	Not reported
Confidential Location:	Not reported
Status 302:	UNKNOWN
Status 312:	UNKNOWN
Emergency Contact Name1:	CPT Wagner
Emergency Contact Name2:	1LT Gradient
Emergency Contact Name3:	Not reported
Emergency Contact Name4:	Not reported
Emergency Contact 24hr Phone1:	7634438092
Emergency Contact 24hr Phone2:	6129641826
Emergency Contact 24hr Phone3:	Not reported
Emergency Contact 24hr Phone4:	Not reported
Facility Id:	15095
CAS Number:	N/A

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Chemical Id:	41429
Chemical Name:	OIL,USED
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	3
Avg Daily Amt Code:	3
Storage Container Type:	A
Storage Pressure Class:	1
Storage Temperature Class:	4
Storage Location:	SW CORNER OF FACILITY
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	41432
Chemical Name:	JP8
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	3
Avg Daily Amt Code:	3

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Storage Container Type:	A
Storage Pressure Class:	1
Storage Temperature Class:	4
Storage Location:	SW CORNER OF FACILITY USED FUEL FOR RECYCLING
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	41427
Chemical Name:	JP8
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	5
Storage Container Type:	A
Storage Pressure Class:	1
Storage Temperature Class:	4
Storage Location:	NW OF FACILITY FUELING TANKS
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	74986
Chemical Id:	41415
Chemical Name:	PROPANE
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	4
Avg Daily Amt Code:	4
Storage Container Type:	A
Storage Pressure Class:	2
Storage Temperature Class:	4
Storage Location:	WEST OF HANGER FACILITY
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	41431
Chemical Name:	JP8
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	4
Avg Daily Amt Code:	4
Storage Container Type:	A
Storage Pressure Class:	1
Storage Temperature Class:	4
Storage Location:	SW OF FACILITY GENERATOR EMERGENCY
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	42474
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	5
Storage Container Type:	A
Storage Pressure Class:	1
Storage Temperature Class:	4
Storage Location:	NW OF FACILITY FUELING TANKS
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	42474
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	5
Storage Container Type:	A
Storage Pressure Class:	1
Storage Temperature Class:	4
Storage Location:	SW OF FACILITY GENERATOR EMERGENCY
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	42474
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Max Daily Amt Code:	5
Avg Daily Amt Code:	5
Storage Container Type:	A
Storage Pressure Class:	1
Storage Temperature Class:	4
Storage Location:	SW CORNER OF FACILITY-FUEL TO BE RECYCLED
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	74986
Chemical Id:	41415
Chemical Name:	PROPANE
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	4
Avg Daily Amt Code:	4
Storage Container Type:	A
Storage Pressure Class:	2
Storage Temperature Class:	4
Storage Location:	WEST OF HANGER FACILITY
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	41429
Chemical Name:	OIL,USED
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	3
Avg Daily Amt Code:	3
Storage Container Type:	A
Storage Pressure Class:	1
Storage Temperature Class:	4
Storage Location:	SW CORNER OF FACILITY
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	74986
Chemical Id:	41415
Chemical Name:	PROPANE
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	4
Avg Daily Amt Code:	4
Storage Container Type:	A
Storage Pressure Class:	2
Storage Temperature Class:	4
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	41429
Chemical Name:	OIL,USED
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	3
Avg Daily Amt Code:	3
Storage Container Type:	A
Storage Pressure Class:	1
Storage Temperature Class:	4
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	42474
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	5
Storage Container Type:	A
Storage Pressure Class:	1
Storage Temperature Class:	4
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	47397
Chemical Name:	DIESEL FUEL
EHS Name:	Not reported
Is EHS:	No

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	3
Avg Daily Amt Code:	3
Storage Container Type:	A
Storage Pressure Class:	1
Storage Temperature Class:	4
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	42474
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	5
Storage Container Type:	A
Storage Pressure Class:	1
Storage Temperature Class:	4
Storage Location:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	44742
Chemical Name:	UNLEADED GASOLINE (MOGAS)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	3
Avg Daily Amt Code:	3
Storage Container Type:	A
Storage Pressure Class:	1
Storage Temperature Class:	4
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	42474
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	5
Storage Container Type:	A
Storage Pressure Class:	1
Storage Temperature Class:	4
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	74986
Chemical Id:	Not reported
Chemical Name:	PROPANE
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	8
Avg Daily Amt Code:	7
Storage Container Type:	Above ground tank
Storage Pressure Class:	Greater than ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	DIESEL FUEL
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	4
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	UNLEADED GASOLINE (MOGAS)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	4
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	OIL,USED
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	DIESEL FUEL
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	4
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	UNLEADED GASOLINE (MOGAS)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	4
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	DIESEL FUEL
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Max Daily Amt Code:	4
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	OIL,USED
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	OIL,USED
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Chemical Name:	OIL,USED
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	74986
Chemical Id:	Not reported
Chemical Name:	PROPANE
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	8
Avg Daily Amt Code:	7
Storage Container Type:	Above ground tank

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Storage Pressure Class:	Greater than ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	74986
Chemical Id:	Not reported
Chemical Name:	PROPANE
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	8
Avg Daily Amt Code:	7
Storage Container Type:	Above ground tank
Storage Pressure Class:	Greater than ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	74986
Chemical Id:	Not reported
Chemical Name:	PROPANE
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	8
Avg Daily Amt Code:	7
Storage Container Type:	Above ground tank
Storage Pressure Class:	Greater than ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	UNLEADED GASOLINE (MOGAS)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	4
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	UNLEADED GASOLINE (MOGAS)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	4
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	DIESEL FUEL
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	4
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	DIESEL FUEL
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Max Daily Amt Code:	5
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	UNLEADED GASOLINE (MOGAS)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	4
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	DIESEL FUEL
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	OIL,USED
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	74986
Chemical Id:	Not reported
Chemical Name:	PROPANE
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	8
Avg Daily Amt Code:	7
Storage Container Type:	Below ground tank
Storage Pressure Class:	Greater than ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	UNLEADED GASOLINE (MOGAS)
EHS Name:	Not reported
Is EHS:	No

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	4
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	DIESEL FUEL
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	OIL,USED
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	74986
Chemical Id:	Not reported
Chemical Name:	PROPANE
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	8
Avg Daily Amt Code:	7
Storage Container Type:	Below ground tank
Storage Pressure Class:	Greater than ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	UNLEADED GASOLINE (MOGAS)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	4
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	74986
Chemical Id:	Not reported
Chemical Name:	PROPANE
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	8
Avg Daily Amt Code:	7
Storage Container Type:	Below ground tank
Storage Pressure Class:	Greater than ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	OIL,USED
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Max Daily Amt Code:	5
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported
Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (JP8)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Fire Department:	Not reported
Phone:	Not reported
Nature of Business:	Not reported
Manned-Unmanned:	Not reported
Is Combustible dust:	Not reported
Is Corrosive to metal:	Not reported
Is Explosive :	Not reported
Is Flammable (gases aerosols liquids or solids):	Not reported
Is Gas under pressure:	Not reported
Is Physical Hazard Not Otherwise Classified:	Not reported
Is In contact with water emits flammable gas:	Not reported
Is Organic peroxide:	Not reported
Is Oxidizer (liquid solid or gas):	Not reported
Is Pyrophoric (liquid or solid):	Not reported
Is Pyrophoric gas:	Not reported
Is Self-heating:	Not reported
Is Self-reactive:	Not reported
Is Acute toxicity (any route of exposure):	Not reported
Is Aspiration hazard:	Not reported
Is Carcinogenicity:	Not reported
Is Germ cell mutagenicity:	Not reported
Is Health Hazard Not Otherwise Classified:	Not reported
Is Reproductive toxicity:	Not reported
Is Respiratory or skin sensitization:	Not reported
Is Serious eye damage or eye irritation:	Not reported
Is Simple asphyxiant :	Not reported
Is Skin corrosion or irritation:	Not reported
Is Specific target organ toxicity:	Not reported

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	DIESEL FUEL
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	300
Fire Department:	ST. CLOUD
Phone:	Not reported
Nature of Business:	Army Aviation Support Facility
Manned-Unmanned:	Yes
Is Combustible dust:	No
Is Corrosive to metal:	No
Is Explosive :	No
Is Flammable (gases aerosols liquids or solids):	Yes
Is Gas under pressure:	No

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Physical Hazard Not Otherwise Classified:	No
Is In contact with water emits flammable gas:	No
Is Organic peroxide:	No
Is Oxidizer (liquid solid or gas):	No
Is Pyrophoric (liquid or solid):	No
Is Pyrophoric gas:	No
Is Self-heating:	No
Is Self-reactive:	No
Is Acute toxicity (any route of exposure):	Yes
Is Aspiration hazard:	Yes
Is Carcinogenicity:	Yes
Is Germ cell mutagenicity:	No
Is Health Hazard Not Otherwise Classified:	No
Is Reproductive toxicity:	No
Is Respiratory or skin sensitization:	No
Is Serious eye damage or eye irritation:	No
Is Simple asphyxiant :	No
Is Skin corrosion or irritation:	Yes
Is Specific target organ toxicity:	Yes

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	UNLEADED GASOLINE (MOGAS)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	4
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	300
Fire Department:	ST. CLOUD
Phone:	Not reported
Nature of Business:	Army Aviation Support Facility
Manned-Unmanned:	Yes
Is Combustible dust:	No
Is Corrosive to metal:	No
Is Explosive :	No
Is Flammable (gases aerosols liquids or solids)	Yes
Is Gas under pressure:	No
Is Physical Hazard Not Otherwise Classified:	No
Is In contact with water emits flammable gas:	No
Is Organic peroxide:	No
Is Oxidizer (liquid solid or gas):	No
Is Pyrophoric (liquid or solid):	No
Is Pyrophoric gas:	No
Is Self-heating:	No
Is Self-reactive:	No
Is Acute toxicity (any route of exposure):	No

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Aspiration hazard:	No
Is Carcinogenicity:	Yes
Is Germ cell mutagenicity:	No
Is Health Hazard Not Otherwise Classified:	No
Is Reproductive toxicity:	Yes
Is Respiratory or skin sensitization:	Yes
Is Serious eye damage or eye irritation:	No
Is Simple asphyxiant :	No
Is Skin corrosion or irritation:	Yes
Is Specific target organ toxicity:	Yes

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	DIESEL FUEL
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	300
Fire Department:	ST. CLOUD
Phone:	Not reported
Nature of Business:	Army Aviation Support Facility
Manned-Unmanned:	Yes
Is Combustible dust:	No
Is Corrosive to metal:	No
Is Explosive :	No
Is Flammable (gases aerosols liquids or solids):	Yes
Is Gas under pressure:	No
Is Physical Hazard Not Otherwise Classified:	No
Is In contact with water emits flammable gas:	No
Is Organic peroxide:	No
Is Oxidizer (liquid solid or gas):	No
Is Pyrophoric (liquid or solid):	No
Is Pyrophoric gas:	No
Is Self-heating:	No
Is Self-reactive:	No
Is Acute toxicity (any route of exposure):	Yes
Is Aspiration hazard:	Yes
Is Carcinogenicity:	Yes
Is Germ cell mutagenicity:	No
Is Health Hazard Not Otherwise Classified:	No
Is Reproductive toxicity:	No
Is Respiratory or skin sensitization:	No
Is Serious eye damage or eye irritation:	No
Is Simple asphyxiant :	No
Is Skin corrosion or irritation:	Yes

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Specific target organ toxicity:	Yes

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (F24)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	300
Fire Department:	ST. CLOUD
Phone:	Not reported
Nature of Business:	Army Aviation Support Facility
Manned-Unmanned:	Yes
Is Combustible dust:	No
Is Corrosive to metal:	No
Is Explosive :	No
Is Flammable (gases aerosols liquids or solids):	Yes
Is Gas under pressure:	No
Is Physical Hazard Not Otherwise Classified:	No
Is In contact with water emits flammable gas:	No
Is Organic peroxide:	No
Is Oxidizer (liquid solid or gas):	No
Is Pyrophoric (liquid or solid):	No
Is Pyrophoric gas:	No
Is Self-heating:	No
Is Self-reactive:	No
Is Acute toxicity (any route of exposure):	Yes
Is Aspiration hazard:	Yes
Is Carcinogenicity:	Yes
Is Germ cell mutagenicity:	No
Is Health Hazard Not Otherwise Classified:	Yes
Is Reproductive toxicity:	No
Is Respiratory or skin sensitization:	No
Is Serious eye damage or eye irritation:	No
Is Simple asphyxiant :	No
Is Skin corrosion or irritation:	Yes
Is Specific target organ toxicity:	Yes

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (F24)
EHS Name:	Not reported
Is EHS:	No

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	300
Fire Department:	ST. CLOUD
Phone:	Not reported
Nature of Business:	Army Aviation Support Facility
Manned-Unmanned:	Yes
Is Combustible dust:	No
Is Corrosive to metal:	No
Is Explosive :	No
Is Flammable (gases aerosols liquids or solids):	Yes
Is Gas under pressure:	No
Is Physical Hazard Not Otherwise Classified:	No
Is In contact with water emits flammable gas:	No
Is Organic peroxide:	No
Is Oxidizer (liquid solid or gas):	No
Is Pyrophoric (liquid or solid):	No
Is Pyrophoric gas:	No
Is Self-heating:	No
Is Self-reactive:	No
Is Acute toxicity (any route of exposure):	Yes
Is Aspiration hazard:	Yes
Is Carcinogenicity:	Yes
Is Germ cell mutagenicity:	No
Is Health Hazard Not Otherwise Classified:	Yes
Is Reproductive toxicity:	No
Is Respiratory or skin sensitization:	No
Is Serious eye damage or eye irritation:	No
Is Simple asphyxiant :	No
Is Skin corrosion or irritation:	Yes
Is Specific target organ toxicity:	Yes

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (F24)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	300
Fire Department:	ST. CLOUD
Phone:	Not reported
Nature of Business:	Army Aviation Support Facility
Manned-Unmanned:	Yes
Is Combustible dust:	No
Is Corrosive to metal:	No
Is Explosive :	No
Is Flammable (gases aerosols liquids or solids):	Yes
Is Gas under pressure:	No
Is Physical Hazard Not Otherwise Classified:	No
Is In contact with water emits flammable gas:	No
Is Organic peroxide:	No
Is Oxidizer (liquid solid or gas):	No
Is Pyrophoric (liquid or solid):	No
Is Pyrophoric gas:	No
Is Self-heating:	No
Is Self-reactive:	No
Is Acute toxicity (any route of exposure):	Yes
Is Aspiration hazard:	Yes
Is Carcinogenicity:	Yes
Is Germ cell mutagenicity:	No
Is Health Hazard Not Otherwise Classified:	Yes
Is Reproductive toxicity:	No
Is Respiratory or skin sensitization:	No
Is Serious eye damage or eye irritation:	No
Is Simple asphyxiant :	No
Is Skin corrosion or irritation:	Yes
Is Specific target organ toxicity:	Yes

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (F24)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	300
Fire Department:	ST. CLOUD
Phone:	Not reported
Nature of Business:	Army Aviation Support Facility
Manned-Unmanned:	Yes
Is Combustible dust:	No
Is Corrosive to metal:	No

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Explosive :	No
Is Flammable (gases aerosols liquids or solids)	Yes
Is Gas under pressure:	No
Is Physical Hazard Not Otherwise Classified:	No
Is In contact with water emits flammable gas:	No
Is Organic peroxide:	No
Is Oxidizer (liquid solid or gas):	No
Is Pyrophoric (liquid or solid):	No
Is Pyrophoric gas:	No
Is Self-heating:	No
Is Self-reactive:	No
Is Acute toxicity (any route of exposure):	Yes
Is Aspiration hazard:	Yes
Is Carcinogenicity:	Yes
Is Germ cell mutagenicity:	No
Is Health Hazard Not Otherwise Classified:	Yes
Is Reproductive toxicity:	No
Is Respiratory or skin sensitization:	No
Is Serious eye damage or eye irritation:	No
Is Simple asphyxiant :	No
Is Skin corrosion or irritation:	Yes
Is Specific target organ toxicity:	Yes

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (F24)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	300
Fire Department:	ST. CLOUD
Phone:	Not reported
Nature of Business:	Army Aviation Support Facility
Manned-Unmanned:	Yes
Is Combustible dust:	No
Is Corrosive to metal:	No
Is Explosive :	No
Is Flammable (gases aerosols liquids or solids)	Yes
Is Gas under pressure:	No
Is Physical Hazard Not Otherwise Classified:	No
Is In contact with water emits flammable gas:	No
Is Organic peroxide:	No
Is Oxidizer (liquid solid or gas):	No
Is Pyrophoric (liquid or solid):	No
Is Pyrophoric gas:	No

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Self-heating:	No
Is Self-reactive:	No
Is Acute toxicity (any route of exposure):	Yes
Is Aspiration hazard:	Yes
Is Carcinogenicity:	Yes
Is Germ cell mutagenicity:	No
Is Health Hazard Not Otherwise Classified:	Yes
Is Reproductive toxicity:	No
Is Respiratory or skin sensitization:	No
Is Serious eye damage or eye irritation:	No
Is Simple asphyxiant :	No
Is Skin corrosion or irritation:	Yes
Is Specific target organ toxicity:	Yes

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (F24)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	300
Fire Department:	ST. CLOUD
Phone:	Not reported
Nature of Business:	Army Aviation Support Facility
Manned-Unmanned:	Yes
Is Combustible dust:	No
Is Corrosive to metal:	No
Is Explosive :	No
Is Flammable (gases aerosols liquids or solids):	Yes
Is Gas under pressure:	No
Is Physical Hazard Not Otherwise Classified:	No
Is In contact with water emits flammable gas:	No
Is Organic peroxide:	No
Is Oxidizer (liquid solid or gas):	No
Is Pyrophoric (liquid or solid):	No
Is Pyrophoric gas:	No
Is Self-heating:	No
Is Self-reactive:	No
Is Acute toxicity (any route of exposure):	Yes
Is Aspiration hazard:	Yes
Is Carcinogenicity:	Yes
Is Germ cell mutagenicity:	No
Is Health Hazard Not Otherwise Classified:	Yes
Is Reproductive toxicity:	No
Is Respiratory or skin sensitization:	No

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Serious eye damage or eye irritation:	No
Is Simple asphyxiant :	No
Is Skin corrosion or irritation:	Yes
Is Specific target organ toxicity:	Yes

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (F24)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	300
Fire Department:	ST. CLOUD
Phone:	Not reported
Nature of Business:	Army Aviation Support Facility
Manned-Unmanned:	Yes
Is Combustible dust:	No
Is Corrosive to metal:	No
Is Explosive :	No
Is Flammable (gases aerosols liquids or solids):	Yes
Is Gas under pressure:	No
Is Physical Hazard Not Otherwise Classified:	No
Is In contact with water emits flammable gas:	No
Is Organic peroxide:	No
Is Oxidizer (liquid solid or gas):	No
Is Pyrophoric (liquid or solid):	No
Is Pyrophoric gas:	No
Is Self-heating:	No
Is Self-reactive:	No
Is Acute toxicity (any route of exposure):	Yes
Is Aspiration hazard:	Yes
Is Carcinogenicity:	Yes
Is Germ cell mutagenicity:	No
Is Health Hazard Not Otherwise Classified:	Yes
Is Reproductive toxicity:	No
Is Respiratory or skin sensitization:	No
Is Serious eye damage or eye irritation:	No
Is Simple asphyxiant :	No
Is Skin corrosion or irritation:	Yes
Is Specific target organ toxicity:	Yes

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Chemical Name:	JET FUEL (F24)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	300
Fire Department:	ST. CLOUD
Phone:	Not reported
Nature of Business:	Army Aviation Support Facility
Manned-Unmanned:	Yes
Is Combustible dust:	No
Is Corrosive to metal:	No
Is Explosive :	No
Is Flammable (gases aerosols liquids or solids)	Yes
Is Gas under pressure:	No
Is Physical Hazard Not Otherwise Classified:	No
Is In contact with water emits flammable gas:	No
Is Organic peroxide:	No
Is Oxidizer (liquid solid or gas):	No
Is Pyrophoric (liquid or solid):	No
Is Pyrophoric gas:	No
Is Self-heating:	No
Is Self-reactive:	No
Is Acute toxicity (any route of exposure):	Yes
Is Aspiration hazard:	Yes
Is Carcinogenicity:	Yes
Is Germ cell mutagenicity:	No
Is Health Hazard Not Otherwise Classified:	Yes
Is Reproductive toxicity:	No
Is Respiratory or skin sensitization:	No
Is Serious eye damage or eye irritation:	No
Is Simple asphyxiant :	No
Is Skin corrosion or irritation:	Yes
Is Specific target organ toxicity:	Yes

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	JET FUEL (F24)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	10
Avg Daily Amt Code:	10
Storage Container Type:	Above ground tank

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	300
Fire Department:	ST. CLOUD
Phone:	Not reported
Nature of Business:	Army Aviation Support Facility
Manned-Unmanned:	Yes
Is Combustible dust:	No
Is Corrosive to metal:	No
Is Explosive :	No
Is Flammable (gases aerosols liquids or solids)	Yes
Is Gas under pressure:	No
Is Physical Hazard Not Otherwise Classified:	No
Is In contact with water emits flammable gas:	No
Is Organic peroxide:	No
Is Oxidizer (liquid solid or gas):	No
Is Pyrophoric (liquid or solid):	No
Is Pyrophoric gas:	No
Is Self-heating:	No
Is Self-reactive:	No
Is Acute toxicity (any route of exposure):	Yes
Is Aspiration hazard:	Yes
Is Carcinogenicity:	Yes
Is Germ cell mutagenicity:	No
Is Health Hazard Not Otherwise Classified:	Yes
Is Reproductive toxicity:	No
Is Respiratory or skin sensitization:	No
Is Serious eye damage or eye irritation:	No
Is Simple asphyxiant :	No
Is Skin corrosion or irritation:	Yes
Is Specific target organ toxicity:	Yes

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	OIL,USED
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	300
Fire Department:	ST. CLOUD
Phone:	Not reported
Nature of Business:	Army Aviation Support Facility

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Manned-Unmanned:	Yes
Is Combustible dust:	No
Is Corrosive to metal:	No
Is Explosive :	No
Is Flammable (gases aerosols liquids or solids):	No
Is Gas under pressure:	No
Is Physical Hazard Not Otherwise Classified:	No
Is In contact with water emits flammable gas:	No
Is Organic peroxide:	No
Is Oxidizer (liquid solid or gas):	No
Is Pyrophoric (liquid or solid):	No
Is Pyrophoric gas:	No
Is Self-heating:	No
Is Self-reactive:	No
Is Acute toxicity (any route of exposure):	No
Is Aspiration hazard:	Yes
Is Carcinogenicity:	Yes
Is Germ cell mutagenicity:	No
Is Health Hazard Not Otherwise Classified:	No
Is Reproductive toxicity:	Yes
Is Respiratory or skin sensitization:	No
Is Serious eye damage or eye irritation:	Yes
Is Simple asphyxiant :	No
Is Skin corrosion or irritation:	Yes
Is Specific target organ toxicity:	Yes

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	OIL,USED
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	300
Fire Department:	ST. CLOUD
Phone:	Not reported
Nature of Business:	Army Aviation Support Facility
Manned-Unmanned:	Yes
Is Combustible dust:	No
Is Corrosive to metal:	No
Is Explosive :	No
Is Flammable (gases aerosols liquids or solids):	No
Is Gas under pressure:	No
Is Physical Hazard Not Otherwise Classified:	No
Is In contact with water emits flammable gas:	No
Is Organic peroxide:	No

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Oxidizer (liquid solid or gas):	No
Is Pyrophoric (liquid or solid):	No
Is Pyrophoric gas:	No
Is Self-heating:	No
Is Self-reactive:	No
Is Acute toxicity (any route of exposure):	No
Is Aspiration hazard:	Yes
Is Carcinogenicity:	Yes
Is Germ cell mutagenicity:	No
Is Health Hazard Not Otherwise Classified:	No
Is Reproductive toxicity:	Yes
Is Respiratory or skin sensitization:	No
Is Serious eye damage or eye irritation:	Yes
Is Simple asphyxiant :	No
Is Skin corrosion or irritation:	Yes
Is Specific target organ toxicity:	Yes

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	OIL,USED
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	300
Fire Department:	ST. CLOUD
Phone:	Not reported
Nature of Business:	Army Aviation Support Facility
Manned-Unmanned:	Yes
Is Combustible dust:	No
Is Corrosive to metal:	No
Is Explosive :	No
Is Flammable (gases aerosols liquids or solids):	No
Is Gas under pressure:	No
Is Physical Hazard Not Otherwise Classified:	No
Is In contact with water emits flammable gas:	No
Is Organic peroxide:	No
Is Oxidizer (liquid solid or gas):	No
Is Pyrophoric (liquid or solid):	No
Is Pyrophoric gas:	No
Is Self-heating:	No
Is Self-reactive:	No
Is Acute toxicity (any route of exposure):	No
Is Aspiration hazard:	Yes
Is Carcinogenicity:	Yes
Is Germ cell mutagenicity:	No

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Health Hazard Not Otherwise Classified:	No
Is Reproductive toxicity:	Yes
Is Respiratory or skin sensitization:	No
Is Serious eye damage or eye irritation:	Yes
Is Simple asphyxiant :	No
Is Skin corrosion or irritation:	Yes
Is Specific target organ toxicity:	Yes

Facility Id:	15095
CAS Number:	74986
Chemical Id:	Not reported
Chemical Name:	PROPANE
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	8
Avg Daily Amt Code:	7
Storage Container Type:	Below ground tank
Storage Pressure Class:	Greater than ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	300
Fire Department:	ST. CLOUD
Phone:	Not reported
Nature of Business:	Army Aviation Support Facility
Manned-Unmanned:	Yes
Is Combustible dust:	No
Is Corrosive to metal:	No
Is Explosive :	Yes
Is Flammable (gases aerosols liquids or solids):	Yes
Is Gas under pressure:	Yes
Is Physical Hazard Not Otherwise Classified:	No
Is In contact with water emits flammable gas:	No
Is Organic peroxide:	No
Is Oxidizer (liquid solid or gas):	No
Is Pyrophoric (liquid or solid):	No
Is Pyrophoric gas:	No
Is Self-heating:	No
Is Self-reactive:	No
Is Acute toxicity (any route of exposure):	No
Is Aspiration hazard:	No
Is Carcinogenicity:	No
Is Germ cell mutagenicity:	No
Is Health Hazard Not Otherwise Classified:	No
Is Reproductive toxicity:	No
Is Respiratory or skin sensitization:	No
Is Serious eye damage or eye irritation:	No
Is Simple asphyxiant :	Yes
Is Skin corrosion or irritation:	Yes
Is Specific target organ toxicity:	No

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Facility Id:	15095
CAS Number:	74986
Chemical Id:	Not reported
Chemical Name:	PROPANE
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	8
Avg Daily Amt Code:	7
Storage Container Type:	Below ground tank
Storage Pressure Class:	Greater than ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	300
Fire Department:	ST. CLOUD
Phone:	Not reported
Nature of Business:	Army Aviation Support Facility
Manned-Unmanned:	Yes
Is Combustible dust:	No
Is Corrosive to metal:	No
Is Explosive :	Yes
Is Flammable (gases aerosols liquids or solids)	Yes
Is Gas under pressure:	Yes
Is Physical Hazard Not Otherwise Classified:	No
Is In contact with water emits flammable gas:	No
Is Organic peroxide:	No
Is Oxidizer (liquid solid or gas):	No
Is Pyrophoric (liquid or solid):	No
Is Pyrophoric gas:	No
Is Self-heating:	No
Is Self-reactive:	No
Is Acute toxicity (any route of exposure):	No
Is Aspiration hazard:	No
Is Carcinogenicity:	No
Is Germ cell mutagenicity:	No
Is Health Hazard Not Otherwise Classified:	No
Is Reproductive toxicity:	No
Is Respiratory or skin sensitization:	No
Is Serious eye damage or eye irritation:	No
Is Simple asphyxiant :	Yes
Is Skin corrosion or irritation:	Yes
Is Specific target organ toxicity:	No

Facility Id:	15095
CAS Number:	74986
Chemical Id:	Not reported
Chemical Name:	PROPANE
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Max Daily Amt Code:	8
Avg Daily Amt Code:	7
Storage Container Type:	Below ground tank
Storage Pressure Class:	Greater than ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	300
Fire Department:	ST. CLOUD
Phone:	Not reported
Nature of Business:	Army Aviation Support Facility
Manned-Unmanned:	Yes
Is Combustible dust:	No
Is Corrosive to metal:	No
Is Explosive :	Yes
Is Flammable (gases aerosols liquids or solids):	Yes
Is Gas under pressure:	Yes
Is Physical Hazard Not Otherwise Classified:	No
Is In contact with water emits flammable gas:	No
Is Organic peroxide:	No
Is Oxidizer (liquid solid or gas):	No
Is Pyrophoric (liquid or solid):	No
Is Pyrophoric gas:	No
Is Self-heating:	No
Is Self-reactive:	No
Is Acute toxicity (any route of exposure):	No
Is Aspiration hazard:	No
Is Carcinogenicity:	No
Is Germ cell mutagenicity:	No
Is Health Hazard Not Otherwise Classified:	No
Is Reproductive toxicity:	No
Is Respiratory or skin sensitization:	No
Is Serious eye damage or eye irritation:	No
Is Simple asphyxiant :	Yes
Is Skin corrosion or irritation:	Yes
Is Specific target organ toxicity:	No

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	UNLEADED GASOLINE (MOGAS)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	4
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	300

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Fire Department:	ST. CLOUD
Phone:	Not reported
Nature of Business:	Army Aviation Support Facility
Manned-Unmanned:	Yes
Is Combustible dust:	No
Is Corrosive to metal:	No
Is Explosive :	No
Is Flammable (gases aerosols liquids or solids):	Yes
Is Gas under pressure:	No
Is Physical Hazard Not Otherwise Classified:	No
Is In contact with water emits flammable gas:	No
Is Organic peroxide:	No
Is Oxidizer (liquid solid or gas):	No
Is Pyrophoric (liquid or solid):	No
Is Pyrophoric gas:	No
Is Self-heating:	No
Is Self-reactive:	No
Is Acute toxicity (any route of exposure):	No
Is Aspiration hazard:	No
Is Carcinogenicity:	Yes
Is Germ cell mutagenicity:	No
Is Health Hazard Not Otherwise Classified:	No
Is Reproductive toxicity:	Yes
Is Respiratory or skin sensitization:	Yes
Is Serious eye damage or eye irritation:	No
Is Simple asphyxiant :	No
Is Skin corrosion or irritation:	Yes
Is Specific target organ toxicity:	Yes

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	UNLEADED GASOLINE (MOGAS)
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	4
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	300
Fire Department:	ST. CLOUD
Phone:	Not reported
Nature of Business:	Army Aviation Support Facility
Manned-Unmanned:	Yes
Is Combustible dust:	No
Is Corrosive to metal:	No
Is Explosive :	No
Is Flammable (gases aerosols liquids or solids):	Yes
Is Gas under pressure:	No

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Physical Hazard Not Otherwise Classified:	No
Is In contact with water emits flammable gas:	No
Is Organic peroxide:	No
Is Oxidizer (liquid solid or gas):	No
Is Pyrophoric (liquid or solid):	No
Is Pyrophoric gas:	No
Is Self-heating:	No
Is Self-reactive:	No
Is Acute toxicity (any route of exposure):	No
Is Aspiration hazard:	No
Is Carcinogenicity:	Yes
Is Germ cell mutagenicity:	No
Is Health Hazard Not Otherwise Classified:	No
Is Reproductive toxicity:	Yes
Is Respiratory or skin sensitization:	Yes
Is Serious eye damage or eye irritation:	No
Is Simple asphyxiant :	No
Is Skin corrosion or irritation:	Yes
Is Specific target organ toxicity:	Yes

Facility Id:	15095
CAS Number:	N/A
Chemical Id:	Not reported
Chemical Name:	DIESEL FUEL
EHS Name:	Not reported
Is EHS:	No
Is EHS More than TPQ:	No
Is Containing EHS:	No
How Chemical Is Stored:	Not reported
Max Daily Amt Code:	5
Avg Daily Amt Code:	4
Storage Container Type:	Above ground tank
Storage Pressure Class:	Ambient pressure
Storage Temperature Class:	Ambient temperature
Storage Location:	Not reported
Is Storage Confidential Location:	No
Remark:	Not reported
Maximum Number of Occupants at One Time:	300
Fire Department:	ST. CLOUD
Phone:	Not reported
Nature of Business:	Army Aviation Support Facility
Manned-Unmanned:	Yes
Is Combustible dust:	No
Is Corrosive to metal:	No
Is Explosive :	No
Is Flammable (gases aerosols liquids or solids)	Yes
Is Gas under pressure:	No
Is Physical Hazard Not Otherwise Classified:	No
Is In contact with water emits flammable gas:	No
Is Organic peroxide:	No
Is Oxidizer (liquid solid or gas):	No
Is Pyrophoric (liquid or solid):	No
Is Pyrophoric gas:	No
Is Self-heating:	No
Is Self-reactive:	No
Is Acute toxicity (any route of exposure):	Yes

ARMY AVIATION SUPPORT FACILITY #2 (Continued) **S110144794**

Is Aspiration hazard:	Yes
Is Carcinogenicity:	Yes
Is Germ cell mutagenicity:	No
Is Health Hazard Not Otherwise Classified:	No
Is Reproductive toxicity:	No
Is Respiratory or skin sensitization:	No
Is Serious eye damage or eye irritation:	No
Is Simple asphyxiant :	No
Is Skin corrosion or irritation:	Yes
Is Specific target organ toxicity:	Yes

Click this hyperlink while viewing on your computer to access
77 additional MN_TIER2: record(s) in the EDR Site Report.

A5 **SAINT CLOUD AASF** **RCRA-CESQG** **1012181595**
Target **2185 45TH AVE** **MNS000141630**
Property **SAINT CLOUD, MN 56304**

Site 5 of 5 in cluster A

Actual:
1020 ft.

RCRA-CESQG:

Date form received by agency:	07/21/2016
Facility name:	SAINT CLOUD AASF
Facility address:	2185 45TH AVE SAINT CLOUD, MN 56304-9793
EPA ID:	MNS000141630
Mailing address:	15000 HIGHWAY 115 LITTLE FALLS, MN 56345-4173
Contact:	SCOTT P ALBERS
Contact address:	CAMP RIPLEY ATTN: MN-FME BLDG. 2-115000 HIGHWAY 115 LITTLE FALLS, MN 56345-4173
Contact country:	Not reported
Contact telephone:	320-616-2616
Contact email:	SCOTT.P.ALBERS.NFG@MAIL.MIL
EPA Region:	05
Classification:	Conditionally Exempt Small Quantity Generator
Description:	Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No

SAINT CLOUD AASF (Continued) **1012181595**

Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

. Waste code: D001
. Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Historical Generators:
Date form received by agency: 12/05/2008
Site name: ST CLOUD AASF
Classification: Conditionally Exempt Small Quantity Generator

Violation Status: No violations found

Count: 0 records.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
		NO SITES FOUND			

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 07/17/2018
Date Data Arrived at EDR: 08/09/2018
Date Made Active in Reports: 09/07/2018
Number of Days to Update: 29

Source: EPA
Telephone: N/A
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 07/17/2018
Date Data Arrived at EDR: 08/09/2018
Date Made Active in Reports: 09/07/2018
Number of Days to Update: 29

Source: EPA
Telephone: N/A
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

Federal Delisted NPL site list

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 07/17/2018
Date Data Arrived at EDR: 08/09/2018
Date Made Active in Reports: 09/07/2018
Number of Days to Update: 29

Source: EPA
Telephone: N/A
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Quarterly

Federal CERCLIS list

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 11/07/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 92

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 07/06/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 07/17/2018
Date Data Arrived at EDR: 08/09/2018
Date Made Active in Reports: 09/07/2018
Number of Days to Update: 29

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Quarterly

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 07/17/2018
Date Data Arrived at EDR: 08/09/2018
Date Made Active in Reports: 09/07/2018
Number of Days to Update: 29

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 09/19/2018
Next Scheduled EDR Contact: 01/07/2019
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: 312-886-6186
Last EDR Contact: 09/19/2018
Next Scheduled EDR Contact: 01/07/2019
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: 312-886-6186
Last EDR Contact: 09/19/2018
Next Scheduled EDR Contact: 01/07/2019
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: 312-886-6186
Last EDR Contact: 09/19/2018
Next Scheduled EDR Contact: 01/07/2019
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: 312-886-6186
Last EDR Contact: 09/19/2018
Next Scheduled EDR Contact: 01/07/2019
Data Release Frequency: Quarterly

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 05/14/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 07/16/2018
Next Scheduled EDR Contact: 11/26/2018
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 07/31/2018
Date Data Arrived at EDR: 08/28/2018
Date Made Active in Reports: 09/14/2018
Number of Days to Update: 17

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 08/28/2018
Next Scheduled EDR Contact: 12/10/2018
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 07/31/2018
Date Data Arrived at EDR: 08/28/2018
Date Made Active in Reports: 09/14/2018
Number of Days to Update: 17

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 08/28/2018
Next Scheduled EDR Contact: 12/10/2018
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 06/18/2018
Date Data Arrived at EDR: 06/27/2018
Date Made Active in Reports: 09/14/2018
Number of Days to Update: 79

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 09/25/2018
Next Scheduled EDR Contact: 01/07/2019
Data Release Frequency: Quarterly

State- and tribal - equivalent NPL

MN PLP: Permanent List of Priorities

The list identifies hazardous waste sites where investigation and cleanup are needed, cleanup is underway, or cleanup has been completed and long-term monitoring or maintenance continues.

Date of Government Version: 06/01/2018
Date Data Arrived at EDR: 06/07/2018
Date Made Active in Reports: 07/24/2018
Number of Days to Update: 47

Source: Pollution Control Agency
Telephone: 651-296-6139
Last EDR Contact: 09/06/2018
Next Scheduled EDR Contact: 12/17/2018
Data Release Frequency: Semi-Annually

State- and tribal - equivalent CERCLIS

SHWS: Superfund Site Information Listing

The SRS database includes all sites that the State Superfund Program is dealing with or has dealt with. The Superfund Program identifies, investigates and determines appropriate cleanup plans for abandoned or uncontrolled hazardous waste sites where a release or potential release of a hazardous substance poses a risk to human health or the environment.

Date of Government Version: 06/01/2018
Date Data Arrived at EDR: 06/07/2018
Date Made Active in Reports: 07/24/2018
Number of Days to Update: 47

Source: Minnesota Pollution Control Agency
Telephone: 651-296-6300
Last EDR Contact: 06/07/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Semi-Annually

State and tribal landfill and/or solid waste disposal site lists

SWF/LF: Permitted Solid Waste Disposal Facilities

Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 08/02/2018
Date Data Arrived at EDR: 08/07/2018
Date Made Active in Reports: 08/29/2018
Number of Days to Update: 22

Source: Minnesota Pollution Control Agency
Telephone: 651-296-7276
Last EDR Contact: 08/07/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Quarterly

UNPERM LF: Unpermitted Facilities

These are facilities that have solid waste disposal yet are not permitted.

Date of Government Version: 08/02/2018
Date Data Arrived at EDR: 08/07/2018
Date Made Active in Reports: 08/29/2018
Number of Days to Update: 22

Source: Pollution Control Agency
Telephone: 651-757-2665
Last EDR Contact: 08/07/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Semi-Annually

LCP: Closed Landfills Priority List

The Minnesota Legislature enacted a law to manage and clean up the state's closed Mixed Municipal Solid Waste Landfills. Under that law, the MPCA is required to create and periodically revise a priority list of qualified landfills, based on the relative health and environmental risks they present. The MPCA established the first such priority list in December, 1994.

Date of Government Version: 04/01/2018
Date Data Arrived at EDR: 04/20/2018
Date Made Active in Reports: 06/04/2018
Number of Days to Update: 45

Source: Minnesota Pollution Control Agency
Telephone: 651-296-9543
Source: Pollution Control Agency, GIS Section
Telephone: 651-296-7266
Last EDR Contact: 08/17/2018
Next Scheduled EDR Contact: 12/03/2018
Data Release Frequency: Annually

State and tribal leaking storage tank lists

LAST: Leaking Aboveground Storage Tanks

A listing of leaking aboveground storage tanks.

Date of Government Version: 07/26/2018
Date Data Arrived at EDR: 08/07/2018
Date Made Active in Reports: 08/29/2018
Number of Days to Update: 22

Source: Pollution Control Agency
Telephone: 651-296-6300
Last EDR Contact: 08/07/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Semi-Annually

LUST: Leak Sites

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 07/26/2018
Date Data Arrived at EDR: 08/07/2018
Date Made Active in Reports: 08/29/2018
Number of Days to Update: 22

Source: Minnesota Pollution Control Agency
Telephone: 651-296-6300
Last EDR Contact: 08/07/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Semi-Annually

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 04/12/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land

A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 04/13/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land

Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 04/12/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 04/10/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 05/08/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 04/24/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 04/25/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 04/01/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

State and tribal registered storage tank lists

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 05/15/2017
Date Data Arrived at EDR: 05/30/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 136

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Varies

UST: Underground Storage Tank Database
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 07/26/2018
Date Data Arrived at EDR: 08/07/2018
Date Made Active in Reports: 08/29/2018
Number of Days to Update: 22

Source: Minnesota Pollution Control Agency
Telephone: 651-649-5451
Last EDR Contact: 08/07/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Semi-Annually

AST: Aboveground Storage Tanks
Registered Aboveground Storage Tanks.

Date of Government Version: 07/26/2018
Date Data Arrived at EDR: 08/07/2018
Date Made Active in Reports: 08/29/2018
Number of Days to Update: 22

Source: Minnesota Pollution Control Agency
Telephone: 651-296-0930
Last EDR Contact: 08/07/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Semi-Annually

INDIAN UST R7: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 04/24/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 04/01/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 05/08/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R5: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 04/12/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R1: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 04/13/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 04/12/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 04/10/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 04/25/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

State and tribal institutional control / engineering control registries

INST CONTROL: Site Remediation Section Database

Sites that have an Institutional Control event.

Date of Government Version: 06/05/2018
Date Data Arrived at EDR: 06/07/2018
Date Made Active in Reports: 07/24/2018
Number of Days to Update: 47

Source: Pollution Control Agency
Telephone: 512-296-6300
Last EDR Contact: 09/06/2018
Next Scheduled EDR Contact: 12/17/2018
Data Release Frequency: Semi-Annually

State and tribal voluntary cleanup sites

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 09/24/2018
Next Scheduled EDR Contact: 01/07/2019
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

VIC: Voluntary Investigation and Cleanup Program
Voluntary Investigation and Cleanup (VIC) Program List.

Date of Government Version: 06/01/2018
Date Data Arrived at EDR: 06/07/2018
Date Made Active in Reports: 07/24/2018
Number of Days to Update: 47

Source: Minnesota Pollution Control Agency
Telephone: 651-296-7291
Last EDR Contact: 09/06/2018
Next Scheduled EDR Contact: 12/17/2018
Data Release Frequency: Semi-Annually

State and tribal Brownfields sites

BROWNFIELDS: Petroleum Brownfields Program Sites
Purchasing, selling, or developing property can present a special set of obstacles if the property is contaminated with chemicals. The Petroleum Brownfields Program is one of several programs within the Minnesota Pollution Control Agency (MPCA) designed to help people address these obstacles. The purpose of the Petroleum Brownfields Program is to provide the technical assistance and liability assurance needed to expedite and facilitate the development, transfer, investigation and/or cleanup of property that is contaminated with petroleum.

Date of Government Version: 06/01/2018
Date Data Arrived at EDR: 06/07/2018
Date Made Active in Reports: 07/24/2018
Number of Days to Update: 47

Source: Pollution Control Agency
Telephone: 651-296-7999
Last EDR Contact: 09/06/2018
Next Scheduled EDR Contact: 12/17/2018
Data Release Frequency: Semi-Annually

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 06/18/2018
Date Data Arrived at EDR: 06/20/2018
Date Made Active in Reports: 09/14/2018
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 09/18/2018
Next Scheduled EDR Contact: 12/31/2018
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

SWRCY: Recycling Facilities
A listing of companies that accept commercial quantities of recyclable materials.

Date of Government Version: 06/11/2018
Date Data Arrived at EDR: 06/12/2018
Date Made Active in Reports: 07/24/2018
Number of Days to Update: 42

Source: Pollution Control Agency
Telephone: 651-296-6300
Last EDR Contact: 08/02/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52
Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 07/30/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Varies

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137
Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 07/17/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: No Update Planned

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39
Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land
A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 08/06/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 176
Source: Department of Health & Human Serivces, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 08/03/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register
A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 05/18/2018
Date Data Arrived at EDR: 06/20/2018
Date Made Active in Reports: 09/14/2018
Number of Days to Update: 86
Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 08/28/2018
Next Scheduled EDR Contact: 12/10/2018
Data Release Frequency: No Update Planned

SRS: Site Remediation Section Database
The database contains site information for sites monitored by the Site Remediation Section.

Date of Government Version: 06/01/2018
Date Data Arrived at EDR: 06/07/2018
Date Made Active in Reports: 07/24/2018
Number of Days to Update: 47
Source: Pollution Control Agency
Telephone: 651-282-5988
Last EDR Contact: 09/06/2018
Next Scheduled EDR Contact: 12/17/2018
Data Release Frequency: Semi-Annually

CDL: Clandestine Drug Labs

This data was passively gathered. That is, the DOH asks law enforcement and other agencies to notify them of Clandestine Drug Labs (CDLs). They do not require reporting of events. Therefore the data represents only a subset of all CDLs. This data has not been verified. The DOH has made no attempt to verify that reported CDLs actually occurred. They have no knowledge if the CDL was involved in cooking or just consisted of chemicals associated with Meth production. The reports they receive are that a suspected CDL was seized.

Date of Government Version: 06/28/2018
Date Data Arrived at EDR: 07/03/2018
Date Made Active in Reports: 07/24/2018
Number of Days to Update: 21

Source: Department of Health
Telephone: 651-215-5800
Last EDR Contact: 10/01/2018
Next Scheduled EDR Contact: 01/14/2019
Data Release Frequency: Quarterly

MN DEL PLP: Delisted Permanent List of Priorities

This generally means that either no more cleanup at a site is needed or that no state superfund funding is needed for long term monitoring activities.

Date of Government Version: 06/01/2018
Date Data Arrived at EDR: 06/07/2018
Date Made Active in Reports: 07/24/2018
Number of Days to Update: 47

Source: Pollution Control Agency
Telephone: 651-296-6139
Last EDR Contact: 09/06/2018
Next Scheduled EDR Contact: 12/17/2018
Data Release Frequency: Semi-Annually

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 05/18/2018
Date Data Arrived at EDR: 06/20/2018
Date Made Active in Reports: 09/14/2018
Number of Days to Update: 86

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 08/28/2018
Next Scheduled EDR Contact: 12/10/2018
Data Release Frequency: Quarterly

Local Land Records

LIENS: Environmental Liens

Sites included in the Site Remediation System Database that have Environmental Liens.

Date of Government Version: 02/16/2016
Date Data Arrived at EDR: 03/09/2016
Date Made Active in Reports: 04/06/2016
Number of Days to Update: 28

Source: Pollution Control Agency
Telephone: 602-282-5988
Last EDR Contact: 08/29/2018
Next Scheduled EDR Contact: 12/17/2018
Data Release Frequency: Quarterly

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 05/13/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 30

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 03/26/2018
Date Data Arrived at EDR: 03/27/2018
Date Made Active in Reports: 06/08/2018
Number of Days to Update: 73

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 09/25/2018
Next Scheduled EDR Contact: 01/07/2019
Data Release Frequency: Quarterly

SPILLS: Spills Database

Spills reported to the Pollution Control Agency.

Date of Government Version: 07/26/2018
Date Data Arrived at EDR: 08/07/2018
Date Made Active in Reports: 08/30/2018
Number of Days to Update: 23

Source: Minnesota Pollution Control Agency
Telephone: 651-649-5451
Last EDR Contact: 08/07/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Semi-Annually

AG SPILLS: Department of Agriculture Spills

This data is a list of pesticide/fertilizer incidents reported to have occurred in Minnesota.

Date of Government Version: 08/02/2018
Date Data Arrived at EDR: 08/07/2018
Date Made Active in Reports: 08/28/2018
Number of Days to Update: 21

Source: Department of Agriculture
Telephone: 651-297-3997
Last EDR Contact: 08/07/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Quarterly

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 11/01/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/11/2013
Number of Days to Update: 39

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SPILLS 80: SPILLS80 data from FirstSearch

Spills 80 includes those spill and release records available from FirstSearch databases prior to 1990. Typically, they may include chemical, oil and/or hazardous substance spills recorded before 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 80.

Date of Government Version: 11/20/2001
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 03/06/2013
Number of Days to Update: 62

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: 312-886-6186
Last EDR Contact: 09/19/2018
Next Scheduled EDR Contact: 01/07/2019
Data Release Frequency: Quarterly

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 01/31/2015
Date Data Arrived at EDR: 07/08/2015
Date Made Active in Reports: 10/13/2015
Number of Days to Update: 97

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 08/24/2018
Next Scheduled EDR Contact: 12/03/2018
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Semi-Annually

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 07/13/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 01/01/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 08/17/2018
Next Scheduled EDR Contact: 11/26/2018
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/27/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 87

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 09/25/2018
Next Scheduled EDR Contact: 01/07/2019
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 08/03/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 09/30/2017
Date Data Arrived at EDR: 05/08/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 73

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 08/10/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 06/21/2017
Date Made Active in Reports: 01/05/2018
Number of Days to Update: 198

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 09/21/2018
Next Scheduled EDR Contact: 12/31/2018
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 01/10/2018
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 2

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 08/24/2018
Next Scheduled EDR Contact: 12/03/2018
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 05/13/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 30

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 09/07/2018
Next Scheduled EDR Contact: 12/17/2018
Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 05/01/2018
Date Data Arrived at EDR: 05/17/2018
Date Made Active in Reports: 09/07/2018
Number of Days to Update: 113

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 07/20/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 10/17/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 3

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 06/01/2017
Date Data Arrived at EDR: 06/09/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 126

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 07/13/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 79

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 07/09/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25
Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25
Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: Quarterly

MLTS: Material Licensing Tracking System
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 08/30/2016
Date Data Arrived at EDR: 09/08/2016
Date Made Active in Reports: 10/21/2016
Number of Days to Update: 43
Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 09/28/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76
Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 09/07/2018
Next Scheduled EDR Contact: 12/17/2018
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 09/04/2018
Next Scheduled EDR Contact: 12/17/2018
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 05/24/2017
Date Data Arrived at EDR: 11/30/2017
Date Made Active in Reports: 12/15/2017
Number of Days to Update: 15
Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 04/03/2018
Date Data Arrived at EDR: 04/05/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 85

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 07/05/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 03/31/2018
Date Data Arrived at EDR: 04/16/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 74

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 10/01/2018
Next Scheduled EDR Contact: 12/31/2018
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 09/28/2017
Number of Days to Update: 218

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 08/24/2018
Next Scheduled EDR Contact: 12/03/2018
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 546

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 08/08/2017
Date Data Arrived at EDR: 09/11/2018
Date Made Active in Reports: 09/14/2018
Number of Days to Update: 3

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 09/11/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 06/23/2017
Date Data Arrived at EDR: 10/11/2017
Date Made Active in Reports: 11/03/2017
Number of Days to Update: 23

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 08/20/2018
Next Scheduled EDR Contact: 12/03/2018
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 05/13/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 30

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 05/03/2018
Date Data Arrived at EDR: 05/31/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 29

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 08/29/2018
Next Scheduled EDR Contact: 12/10/2018
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing

This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 12/05/2005
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 08/31/2018
Next Scheduled EDR Contact: 12/10/2018
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing

Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 08/31/2018
Next Scheduled EDR Contact: 12/10/2018
Data Release Frequency: Varies

ABANDONED MINES: Abandoned Mines

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 09/10/2018
Date Data Arrived at EDR: 09/11/2018
Date Made Active in Reports: 09/14/2018
Number of Days to Update: 3

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 09/10/2018
Next Scheduled EDR Contact: 12/24/2018
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 02/21/2018
Date Data Arrived at EDR: 02/23/2018
Date Made Active in Reports: 03/23/2018
Number of Days to Update: 28

Source: EPA
Telephone: (312) 353-2000
Last EDR Contact: 09/18/2018
Next Scheduled EDR Contact: 12/17/2018
Data Release Frequency: Quarterly

UXO: Unexploded Ordnance Sites

A listing of unexploded ordnance site locations

Date of Government Version: 09/30/2017
Date Data Arrived at EDR: 06/19/2018
Date Made Active in Reports: 09/14/2018
Number of Days to Update: 87

Source: Department of Defense
Telephone: 703-704-1564
Last EDR Contact: 07/13/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Varies

ECHO: Enforcement & Compliance History Information

ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 09/02/2018
Date Data Arrived at EDR: 09/05/2018
Date Made Active in Reports: 09/14/2018
Number of Days to Update: 9

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 09/05/2018
Next Scheduled EDR Contact: 12/17/2018
Data Release Frequency: Quarterly

DOCKET HWC: Hazardous Waste Compliance Docket Listing

A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 01/04/2018
Date Data Arrived at EDR: 01/19/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 84

Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 08/31/2018
Next Scheduled EDR Contact: 12/10/2018
Data Release Frequency: Varies

FUELS PROGRAM: EPA Fuels Program Registered Listing

This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 05/21/2018
Date Data Arrived at EDR: 05/23/2018
Date Made Active in Reports: 09/07/2018
Number of Days to Update: 107

Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 08/22/2018
Next Scheduled EDR Contact: 12/03/2018
Data Release Frequency: Quarterly

AGVIC: Agricultural Voluntary Investigation & Cleanup Listing

A listing of agricultural voluntary investigation & cleanup site locations.

Date of Government Version: 08/02/2018
Date Data Arrived at EDR: 08/07/2018
Date Made Active in Reports: 08/28/2018
Number of Days to Update: 21

Source: Department of Agriculture
Telephone: 651-201-6400
Last EDR Contact: 08/07/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

AIRS: Permit Contact List
A listing of permitted AIRS facilities.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 05/23/2018
Date Made Active in Reports: 07/24/2018
Number of Days to Update: 62

Source: Pollution Control Agency
Telephone: 651-296-7351
Last EDR Contact: 05/23/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

ASBESTOS: Asbestos Notification Listing
Asbestos sites

Date of Government Version: 07/30/2018
Date Data Arrived at EDR: 08/02/2018
Date Made Active in Reports: 08/28/2018
Number of Days to Update: 26

Source: Department of Health
Telephone: 651-201-4620
Last EDR Contact: 07/25/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Varies

BULK: Bulk Facilities Database
Facilities that use bulk pesticides and fertilizers

Date of Government Version: 08/06/2018
Date Data Arrived at EDR: 08/07/2018
Date Made Active in Reports: 08/29/2018
Number of Days to Update: 22

Source: Department of Agriculture
Telephone: 651-297-3997
Last EDR Contact: 08/07/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Quarterly

COAL ASH: Coal Ash Disposal Site Listing
A listing of coal ash disposal site locations.

Date of Government Version: 02/09/2017
Date Data Arrived at EDR: 02/10/2017
Date Made Active in Reports: 03/07/2017
Number of Days to Update: 25

Source: Pollution Control Agency
Telephone: 651-757-2740
Last EDR Contact: 08/02/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Varies

DRYCLEANERS: Registered Drycleaning Facilities
A listing of coin-operated laundries and drycleaning; drycleaning plants, except rug cleaning; and industrial launderers.

Date of Government Version: 06/14/2018
Date Data Arrived at EDR: 06/14/2018
Date Made Active in Reports: 07/24/2018
Number of Days to Update: 40

Source: Pollution Control Agency
Telephone: 651-296-6300
Last EDR Contact: 09/25/2018
Next Scheduled EDR Contact: 12/24/2018
Data Release Frequency: Semi-Annually

ENFORCEMENT: Generators Associated with Enforcement Logs
Regulatory Compliance, Hazardous Waste Enforcement Log and Hazardous Waste Permit Unit Project Identification List.

Date of Government Version: 06/26/2018
Date Data Arrived at EDR: 06/29/2018
Date Made Active in Reports: 07/24/2018
Number of Days to Update: 25

Source: Minnesota Pollution Control Agency
Telephone: 651-297-8332
Last EDR Contact: 09/24/2018
Next Scheduled EDR Contact: 01/07/2019
Data Release Frequency: Varies

Financial Assurance 1: Financial Assurance Information Listing
Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 08/01/2016
Date Data Arrived at EDR: 08/10/2016
Date Made Active in Reports: 11/02/2016
Number of Days to Update: 84

Source: Pollutiona Control Agency
Telephone: 651-297-8220
Last EDR Contact: 08/02/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Quarterly

Financial Assurance 2: Financial Assurance Information listing
A listing of financial assurance information for solid waste facilities.

Date of Government Version: 09/13/2017
Date Data Arrived at EDR: 09/15/2017
Date Made Active in Reports: 10/25/2017
Number of Days to Update: 40

Source: Pollution Control Agency
Telephone: 651-296-6066
Last EDR Contact: 09/05/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Annually

Financial Assurance 3: Financial Assurance Information Listing
A listing of financial assurance information for hazardous waste facilities.

Date of Government Version: 09/13/2017
Date Data Arrived at EDR: 09/15/2017
Date Made Active in Reports: 10/24/2017
Number of Days to Update: 39

Source: Pollution Control Agency
Telephone: 651-296-7258
Last EDR Contact: 09/07/2018
Next Scheduled EDR Contact: 01/07/2019
Data Release Frequency: Varies

MN HWS PERMIT: Active TSD Facilities
Active TSD Facilities.

Date of Government Version: 06/08/2018
Date Data Arrived at EDR: 06/13/2018
Date Made Active in Reports: 07/24/2018
Number of Days to Update: 41

Source: Minnesota Pollution Control Agency
Telephone: 651-297-8470
Last EDR Contact: 09/12/2018
Next Scheduled EDR Contact: 12/24/2018
Data Release Frequency: Annually

LEAD: Lead Inspection Listing
Lead inspections

Date of Government Version: 09/04/2018
Date Data Arrived at EDR: 09/05/2018
Date Made Active in Reports: 09/18/2018
Number of Days to Update: 13

Source: Department of Health
Telephone: 651-201-4137
Last EDR Contact: 07/25/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Varies

MANIFEST: Hazardous Waste Manifest Data
Hazardous waste manifest data.

Date of Government Version: 06/30/2016
Date Data Arrived at EDR: 02/07/2017
Date Made Active in Reports: 04/05/2017
Number of Days to Update: 57

Source: Pollution Control Agency
Telephone: 651-296-7258
Last EDR Contact: 09/14/2018
Next Scheduled EDR Contact: 12/24/2018
Data Release Frequency: Annually

MDA LIS: Licensing Information System Database Listing
Information provided lists all individuals or companies who hold licenses, certificates and/or permits required by state law and regulated by the Department. Additionally, the LIS lists all companies who must register products with the Department before being used or sold in commercial channels within our state.

Date of Government Version: 08/02/2018
Date Data Arrived at EDR: 08/07/2018
Date Made Active in Reports: 08/30/2018
Number of Days to Update: 23

Source: Department of Agriculture
Telephone: 651-201-6000
Last EDR Contact: 08/07/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Quarterly

LS: List of Sites

The List of Sites includes: Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), No Further Remedial Action Planned (NFRAP), National Priorities List (NPL), Permanent List of Priorities (PLP), sites delisted from the Permanent List of Priorities (DPLP), Hazardous Waste Permit Unit Project Facilities (HW PERM), List of Permitted Solid Waste Facilities (SW PERM), 1980 Metropolitan Area Waste Disposal Site Inventory (METRO), 1980 Statewide Outstate Dump Inventory (ODI), Voluntary and Investigation Program (VIC), and Closed Landfill Sites Undergoing Cleanup (LCP).

Date of Government Version: 04/22/2009
Date Data Arrived at EDR: 07/14/2009
Date Made Active in Reports: 07/24/2009
Number of Days to Update: 10

Source: Minnesota Pollution Control Agency
Telephone: 651-297-2731
Source: Pollution Control Agency, GIS Section
Telephone: 651-297-2731
Last EDR Contact: 12/21/2011
Next Scheduled EDR Contact: 04/09/2012
Data Release Frequency: Semi-Annually

TIER 2: Tier 2 Facility Listing

A listing of facilities which store or manufacture hazardous materials that submit a chemical inventory report.

Date of Government Version: 12/31/2017
Date Data Arrived at EDR: 05/07/2018
Date Made Active in Reports: 06/06/2018
Number of Days to Update: 30

Source: Department of Public Safety
Telephone: 651-296-2233
Last EDR Contact: 08/02/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Annually

VAPOR: Vapor Intrusion

A listing of sites with potential or identified vapor risk. Vapor intrusion occurs when chemical vapors migrate from a source of contamination through the soil into the basements or foundations of buildings. These chemical vapors can sometimes pose risks to human health.

Date of Government Version: 06/06/2018
Date Data Arrived at EDR: 06/08/2018
Date Made Active in Reports: 07/24/2018
Number of Days to Update: 46

Source: Pollution Control Agency
Telephone: 651-757-2040
Last EDR Contact: 08/20/2018
Next Scheduled EDR Contact: 12/03/2018
Data Release Frequency: Varies

WIMN: What's In My Neighborhood

Since 2003, the PCA's "What's in My Neighborhood?" database provides information about air quality, hazardous waste, remediation, solid waste, tanks and leaks, and water quality around Minnesota.

Date of Government Version: 07/07/2018
Date Data Arrived at EDR: 07/11/2018
Date Made Active in Reports: 08/30/2018
Number of Days to Update: 50

Source: Pollution Control Agency
Telephone: 651-757-2593
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Semi-Annually

NPDES: Wastewater Permits Listing

A listing of facilities that have a wastewater permit.

Date of Government Version: 06/08/2018
Date Data Arrived at EDR: 06/13/2018
Date Made Active in Reports: 07/24/2018
Number of Days to Update: 41

Source: Minnesota Pollution Control Agency
Telephone: 651-296-6300
Last EDR Contact: 09/12/2018
Next Scheduled EDR Contact: 12/24/2018
Data Release Frequency: Varies

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historical Auto Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historical Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS: Recovered Government Archive State Hazardous Waste Facilities List

The EDR Recovered Government Archive State Hazardous Waste database provides a list of SHWS incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Minnesota Pollution Control Agency in Minnesota.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/03/2014
Number of Days to Update: 186

Source: Minnesota Pollution Control Agency
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Minnesota Pollution Control Agency in Minnesota.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/13/2014
Number of Days to Update: 196

Source: Minnesota Pollution Control Agency
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Minnesota Pollution Control Agency in Minnesota.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/24/2013
Number of Days to Update: 176

Source: Minnesota Pollution Control Agency
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data

Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 08/10/2018
Date Data Arrived at EDR: 08/10/2018
Date Made Active in Reports: 09/10/2018
Number of Days to Update: 31

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 11/26/2018
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2017
Date Data Arrived at EDR: 07/13/2018
Date Made Active in Reports: 08/01/2018
Number of Days to Update: 19

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 07/13/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data

Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 07/01/2018
Date Data Arrived at EDR: 08/01/2018
Date Made Active in Reports: 08/31/2018
Number of Days to Update: 30

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 08/01/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Quarterly

PA MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 07/25/2017
Date Made Active in Reports: 09/25/2017
Number of Days to Update: 62

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 07/12/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Annually

RI MANIFEST: Manifest information

Hazardous waste manifest information

Date of Government Version: 12/31/2017
Date Data Arrived at EDR: 02/23/2018
Date Made Active in Reports: 04/09/2018
Number of Days to Update: 45

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 08/21/2018
Next Scheduled EDR Contact: 12/03/2018
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2017
Date Data Arrived at EDR: 06/15/2018
Date Made Active in Reports: 07/09/2018
Number of Days to Update: 24

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 09/06/2018
Next Scheduled EDR Contact: 12/24/2018
Data Release Frequency: Annually

Oil/Gas Pipelines
Source: PennWell Corporation
Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Electric Power Transmission Line Data
Source: PennWell Corporation
This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Child Care Centers
Source: Department of Human Services
Telephone: 651-296-3971

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.

Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory

Source: Land Management Information Center
Telephone: 617-297-3281

Current USGS 7.5 Minute Topographic Map

Source: U.S. Geological Survey

STREET AND ADDRESS INFORMATION

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GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

ST. CLOUD AASF
2185 SOUTHEAST 45TH AVENUE
SAINT CLOUD, MN 56304

TARGET PROPERTY COORDINATES

Latitude (North):	45.540344 - 45° 32' 25.24''
Longitude (West):	94.057506 - 94° 3' 27.02''
Universal Tranverse Mercator:	Zone 15
UTM X (Meters):	417437.1
UTM Y (Meters):	5043305.0
Elevation:	1020 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	5961617 CABLE, MN
Version Date:	2013

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

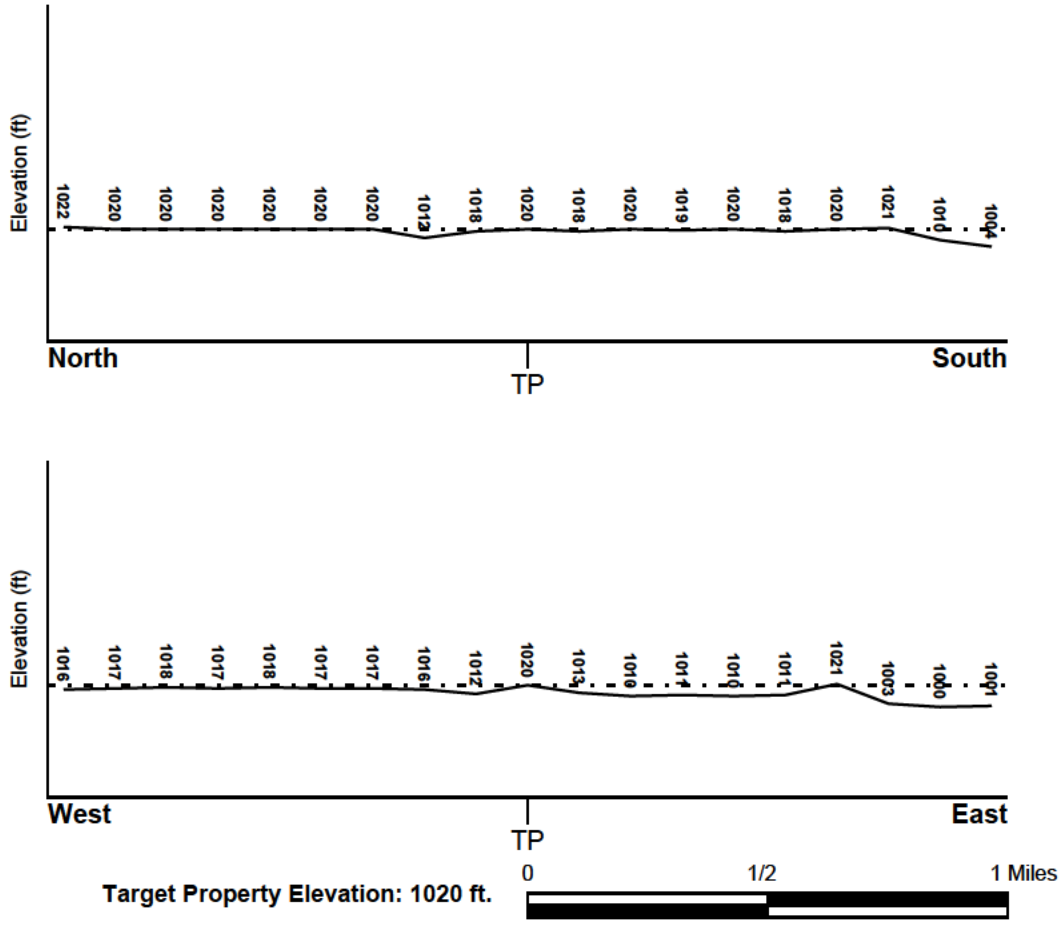
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General NE

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
27141C0045F	FEMA FIRM Flood data

Additional Panels in search area:	FEMA Source Type
27141C0040F	FEMA FIRM Flood data

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
CABLE	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius:	1.25 miles
Status:	Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

* ©1996 Site−specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

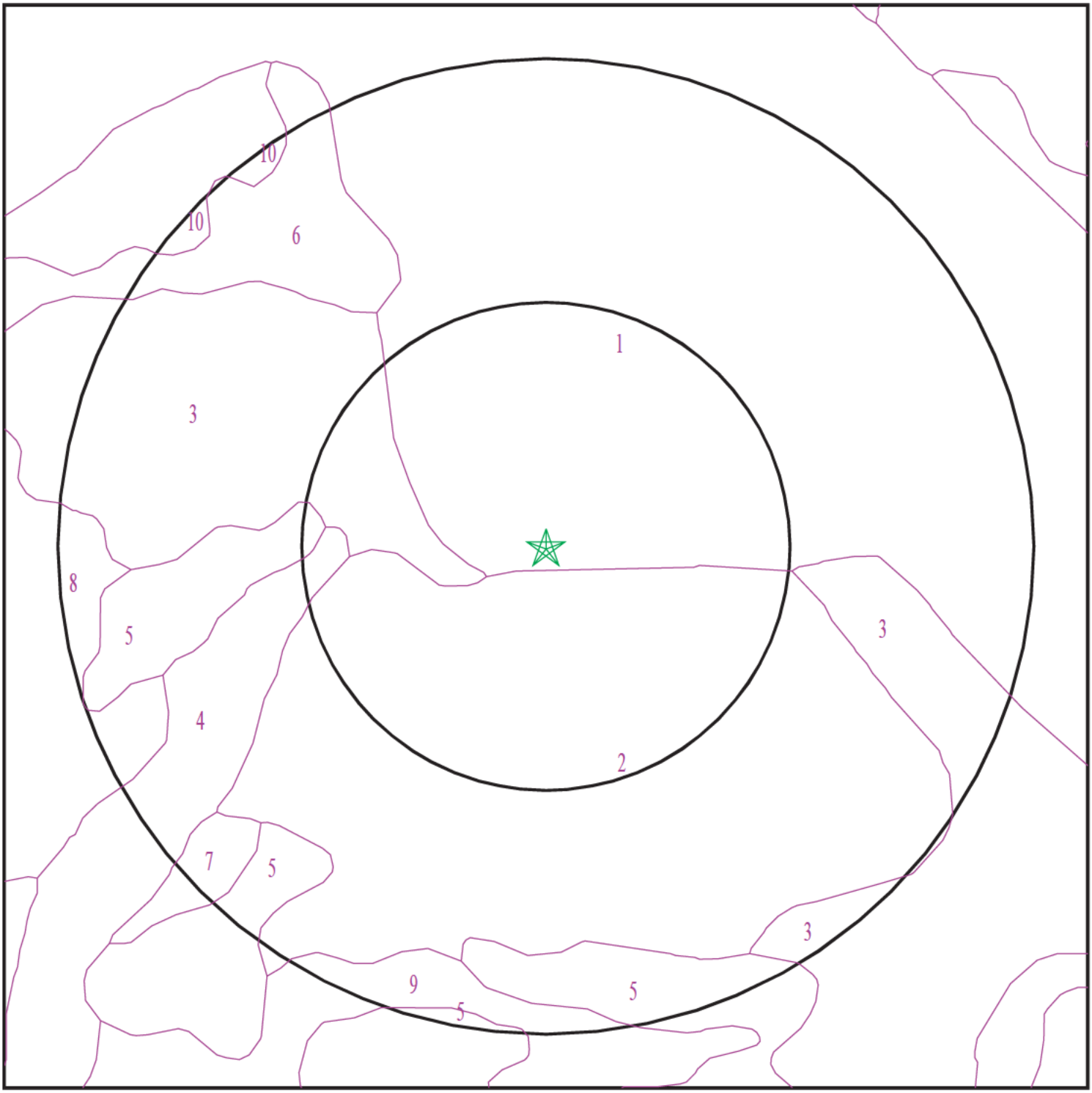
Era:	Precambrian
System:	Precambrian
Series:	X granitic rocks
Code:	Xg *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Plutonic and Intrusive Rocks

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 5441940.2s



★ Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME:	St. Cloud AASF	CLIENT:	AECOM
ADDRESS:	2185 Southeast 45th Avenue SAINT CLOUD MN 56304	CONTACT:	Brittany Kirchmann
LAT/LONG:	45.540344 / 94.057506	INQUIRY #:	5441940.2s
		DATE:	October 03, 2018 8:30 am

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GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name:	Udipsamments (cut and fill land)
Soil Surface Texture:	
Hydrologic Group:	Not reported
Soil Drainage Class:	
Hydric Status: Unknown	
Corrosion Potential - Uncoated Steel:	Not Reported
Depth to Bedrock Min:	> 0 inches
Depth to Watertable Min:	> 0 inches

No Layer Information available.

Soil Map ID: 2

Soil Component Name:	Sandberg
Soil Surface Texture:	loamy coarse sand
Hydrologic Group:	Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.
Soil Drainage Class:	Excessively drained
Hydric Status: Not hydric	
Corrosion Potential - Uncoated Steel:	Moderate
Depth to Bedrock Min:	> 0 inches
Depth to Watertable Min:	> 0 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	loamy coarse sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 282.29 Min: 141.14	Max: 8.4 Min: 7.4
2	11 inches	35 inches	gravelly coarse sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 282.29 Min: 141.14	Max: 8.4 Min: 7.4
3	35 inches	79 inches	gravelly coarse sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 282.29 Min: 141.14	Max: 8.4 Min: 7.4

Soil Map ID: 3

Soil Component Name: Hubbard

Soil Surface Texture: loamy sand

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	12 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6
2	12 inches	18 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6
3	18 inches	79 inches	sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6

Soil Map ID: 4

Soil Component Name: Seelyeville

Soil Surface Texture: muck

Hydrologic Group: Class A/D - Drained/undrained hydrology class of soils that can be drained and are classified.

Soil Drainage Class: Very poorly drained

Hydric Status: All hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	14 inches	muck	A-8	Highly organic soils, Peat.	Max: 42.34 Min: 1.41	Max: Min:
2	14 inches	79 inches	muck	A-8	Highly organic soils, Peat.	Max: 42.34 Min: 1.41	Max: Min:

Soil Map ID: 5

Soil Component Name: Hubbard

Soil Surface Texture: loamy sand

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	18 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6
2	18 inches	22 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
3	22 inches	79 inches	sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6

Soil Map ID: 6

Soil Component Name: Isan

Soil Surface Texture: sandy loam

Hydrologic Group: Class B/D - Drained/undrained hydrology class of soils that can be drained and are classified.

Soil Drainage Class: Poorly drained

Hydric Status: All hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 15 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	18 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand.	Max: 141.14 Min: 42.34	Max: 7.3 Min: 5.6
2	18 inches	29 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand.	Max: 141.14 Min: 42.34	Max: 7.3 Min: 5.6

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
3	29 inches	79 inches	coarse sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand.	Max: 141.14 Min: 42.34	Max: 7.3 Min: 5.6

Soil Map ID: 7

Soil Component Name: Hubbard

Soil Surface Texture: loamy sand

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6
2	11 inches	33 inches	coarse sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
3	33 inches	79 inches	coarse sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6

Soil Map ID: 8

Soil Component Name: Hubbard

Soil Surface Texture: loamy sand

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	20 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6
2	20 inches	31 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
3	31 inches	79 inches	sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6

Soil Map ID: 9

Soil Component Name: Arvilla

Soil Surface Texture: sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Somewhat excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	14 inches	sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 8.4 Min: 7.4

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
2	14 inches	20 inches	sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 8.4 Min: 7.4
3	20 inches	79 inches	gravelly coarse sand	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 8.4 Min: 7.4

Soil Map ID: 10

Soil Component Name: Duelm

Soil Surface Texture: loamy sand

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Moderately well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 76 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	16 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6
2	16 inches	29 inches	coarse sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6
3	29 inches	79 inches	coarse sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
2	USGS40000549343	1/8 - 1/4 Mile East
A4	USGS40000549144	1/4 - 1/2 Mile South

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
C9	USGS40000549041	1/2 - 1 Mile South
D12	USGS40000549104	1/2 - 1 Mile SW
D15	USGS40000591578	1/2 - 1 Mile SW
E16	USGS40000549081	1/2 - 1 Mile SW
F19	USGS40000548993	1/2 - 1 Mile SSW
F20	USGS40000548973	1/2 - 1 Mile SSW
G21	USGS40000549197	1/2 - 1 Mile ESE
H24	USGS40000548850	1/2 - 1 Mile SSE
I27	USGS40000549844	1/2 - 1 Mile NNE
I28	USGS40000549845	1/2 - 1 Mile NNE

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

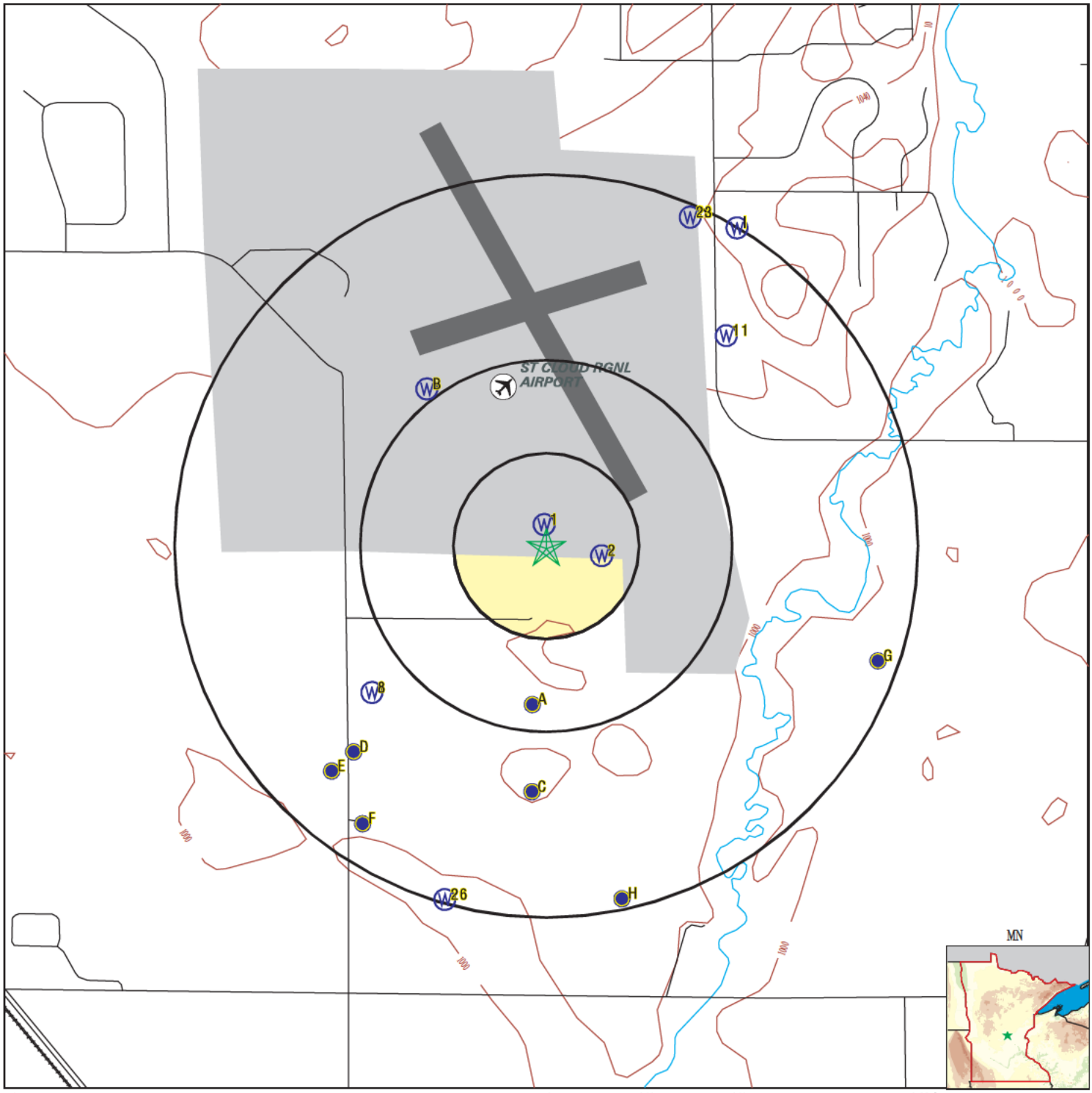
MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	MN6000000227876	0 - 1/8 Mile North
A3	MN6000000174266	1/4 - 1/2 Mile South
B5	MN6000000258384	1/2 - 1 Mile NW
B6	MN6000000258385	1/2 - 1 Mile NW
B7	MN6000000258386	1/2 - 1 Mile NW
8	MN6000000266547	1/2 - 1 Mile SW
C10	MN6000000156825	1/2 - 1 Mile South
11	MN6000000235273	1/2 - 1 Mile NE
D13	MN6000000068124	1/2 - 1 Mile SW
D14	MN6000000254772	1/2 - 1 Mile SW
E17	MN6000000111417	1/2 - 1 Mile SW
F18	MN6000000093537	1/2 - 1 Mile SSW
G22	MN6000000190158	1/2 - 1 Mile ESE
23	MN6000000186552	1/2 - 1 Mile NNE
H25	MN6000000133769	1/2 - 1 Mile SSE
26	MN6000000217622	1/2 - 1 Mile SSW

PHYSICAL SETTING SOURCE MAP - 5441940.2s



County Boundary
Major Roads
Contour Lines
Airports
Earthquake epicenter, Richter 5 or greater
Water Wells
Public Water Supply Wells
Cluster of Multiple Icons

Groundwater Flow Direction
GI Indeterminate Groundwater Flow at Location
GV Groundwater Flow Varies at Location
HD Closest Hydrogeological Data

SITE NAME:	St. Cloud AASF	CLIENT:	AECOM
ADDRESS:	2185 Southeast 45th Avenue SAINT CLOUD MN 56304	CONTACT:	Brittany Kirchmann
LAT/LONG:	45.540344 / 94.057506	INQUIRY #:	5441940.2s
		DATE:	October 03, 2018 8:30 am

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GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

Database | EDR ID Number

1
North
0 - 1/8 Mile
Higher

MN WELLS **MN6000000227876**

Well ID:	0000696926	Original Owner:	SHINGOBEE
Well Elevation:	1022	Well Status:	Active
Well Use:	Domestic	Drill Depth:	92
Completion Depth:	92	Date Completed:	20030911
Casing Diameter:	4	Casing Depth:	84
Grouted:	Y	Dist from Potential Contamination:	0
Direction to Potential Contamination:	Not Reported	Type of Contamination:	Not Reported
Depth to Bedrock:	0	First Stratigraphic Unit:	Not Reported
Last Stratigraphic Unit:	clay-gray	Bottom Open Strat Unit:	sand-gray
Aquifer:	Quat. Buried Artes. Aquifer		
Well Cuttings:	Y	Core Sample Taken:	Not Reported
Geophys Log Exists:	Not Reported	Geochem Info Exists:	Not Reported
Water Chemistry Info Exists:	Not Reported	Observation Well:	Not Reported
Avg Static Water Level Depth:	18		

2
East
1/8 - 1/4 Mile
Lower

FED USGS **USGS40000549343**

Organization ID:	USGS-MN	Organization Name:	USGS Minnesota Water Science Center
Monitor Location:	35N30W10ACA 01	Type:	Well
Description:	Not Reported	HUC:	07010203
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Not Reported
Aquifer Type:	Not Reported	Construction Date:	19751014
Well Depth:	50	Well Depth Units:	ft
Well Hole Depth:	50	Well Hole Depth Units:	ft

A3
South
1/4 - 1/2 Mile
Lower

MN WELLS **MN6000000174266**

Well ID:	0000226056	Original Owner:	HIBBARD, KEITH 1
Well Elevation:	1015	Well Status:	Active
Well Use:	Irrigation	Drill Depth:	85
Completion Depth:	85	Date Completed:	19791115
Casing Diameter:	12	Casing Depth:	60
Grouted:	Not Reported	Dist from Potential Contamination:	0
Direction to Potential Contamination:	Not Reported	Type of Contamination:	Not Reported
Depth to Bedrock:	0	First Stratigraphic Unit:	Not Reported
Last Stratigraphic Unit:	sand-gray	Bottom Open Strat Unit:	sand-gray
Aquifer:	Quat. Buried Artes. Aquifer		
Well Cuttings:	Not Reported	Core Sample Taken:	Not Reported
Geophys Log Exists:	Not Reported	Geochem Info Exists:	Not Reported
Water Chemistry Info Exists:	Not Reported	Observation Well:	Not Reported
Avg Static Water Level Depth:	25		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

A4
South
1/4 - 1/2 Mile
Lower

FED USGS **USGS40000549144**

Organization ID:	USGS-MN	Organization Name:	USGS Minnesota Water Science Center
Monitor Location:	35N30W10DBCCCB01	Type:	Well
Description:	Not Reported	HUC:	07010203
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Glacial Buried Sand and/or Gravel
Aquifer Type:	Confined single aquifer	Construction Date:	19791115
Well Depth:	85	Well Depth Units:	ft
Well Hole Depth:	85	Well Hole Depth Units:	ft

B5
NW
1/2 - 1 Mile
Higher

MN WELLS **MN6000000258384**

Well ID:	0000591232	Original Owner:	ST CLOUD AVIATION
Well Elevation:	1022	Well Status:	Active
Well Use:	Monitor Well	Drill Depth:	22
Completion Depth:	22	Date Completed:	19970115
Casing Diameter:	2	Casing Depth:	12
Grouted:	Y	Dist from Potential Contamination:	0
Direction to Potential Contamination:	Not Reported	Type of Contamination:	Not Reported
Depth to Bedrock:	0	First Stratigraphic Unit:	Not Reported
Last Stratigraphic Unit:	sand-yellow	Bottom Open Strat Unit:	sand-yellow
Aquifer:	Quat. Water Table Aquifer		
Well Cuttings:	Not Reported	Core Sample Taken:	Not Reported
Geophys Log Exists:	Not Reported	Geochem Info Exists:	Not Reported
Water Chemistry Info Exists:	Not Reported	Observation Well:	Not Reported
Avg Static Water Level Depth:	0		

B6
NW
1/2 - 1 Mile
Higher

MN WELLS **MN6000000258385**

Well ID:	0000591230	Original Owner:	ST CLOUD AVIATION MW
Well Elevation:	1022	Well Status:	Active
Well Use:	Monitor Well	Drill Depth:	19
Completion Depth:	19	Date Completed:	19970115
Casing Diameter:	2	Casing Depth:	9
Grouted:	Y	Dist from Potential Contamination:	0
Direction to Potential Contamination:	Not Reported	Type of Contamination:	Not Reported
Depth to Bedrock:	0	First Stratigraphic Unit:	Not Reported
Last Stratigraphic Unit:	sand-yellow	Bottom Open Strat Unit:	sand-yellow
Aquifer:	Quat. Water Table Aquifer		
Well Cuttings:	Not Reported	Core Sample Taken:	Not Reported
Geophys Log Exists:	Not Reported	Geochem Info Exists:	Not Reported
Water Chemistry Info Exists:	Not Reported	Observation Well:	Not Reported
Avg Static Water Level Depth:	0		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

B7
NW
1/2 - 1 Mile
Higher

MN WELLS **MN6000000258386**

Well ID:	0000591229	Original Owner:	ST CLOUD AVIATION MW
Well Elevation:	1022	Well Status:	Active
Well Use:	Monitor Well	Drill Depth:	20
Completion Depth:	20	Date Completed:	19970115
Casing Diameter:	2	Casing Depth:	10
Grouted:	Y	Dist from Potential Contamination:	0
Direction to Potential Contamination:	Not Reported	Type of Contamination:	Not Reported
Depth to Bedrock:	0	First Stratigraphic Unit:	Not Reported
Last Stratigraphic Unit:	sand-yellow	Bottom Open Strat Unit:	sand-yellow
Aquifer:	Quat. Water Table Aquifer		
Well Cuttings:	Not Reported	Core Sample Taken:	Not Reported
Geophys Log Exists:	Not Reported	Geochem Info Exists:	Not Reported
Water Chemistry Info Exists:	Not Reported	Observation Well:	Not Reported
Avg Static Water Level Depth:	0		

8
SW
1/2 - 1 Mile
Lower

MN WELLS **MN6000000266547**

Well ID:	0000272078	Original Owner:	SH-07-12
Well Elevation:	1013	Well Status:	Sealed
Well Use:	Scientific Investigation		
Drill Depth:	155	Completion Depth:	155
Date Completed:	20120215	Casing Diameter:	0
Casing Depth:	0	Grouted:	Y
Dist from Potential Contamination:	0	Direction to Potential Contamination:	Not Reported
Type of Contamination:	Not Reported	Depth to Bedrock:	148
First Stratigraphic Unit:	Cretaceous regolith		
Last Stratigraphic Unit:	Cretaceous regolith		
Bottom Open Strat Unit:	Not Reported	Aquifer:	Not Reported
Well Cuttings:	Not Reported	Core Sample Taken:	Y
Geophys Log Exists:	Y	Geochem Info Exists:	Not Reported
Water Chemistry Info Exists:	Not Reported	Observation Well:	Not Reported
Avg Static Water Level Depth:	0		

C9
South
1/2 - 1 Mile
Higher

FED USGS **USGS40000549041**

Organization ID:	USGS-MN	Organization Name:	USGS Minnesota Water Science Center
Monitor Location:	35N30W10DCCCBC01	Type:	Well
Description:	Not Reported	HUC:	07010203
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Glacial Buried Sand and/or Gravel
Aquifer Type:	Confined single aquifer	Construction Date:	19791115
Well Depth:	122	Well Depth Units:	ft
Well Hole Depth:	122	Well Hole Depth Units:	ft

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

C10
South
1/2 - 1 Mile
Higher

MN WELLS **MN6000000156825**

Well ID:	0000456960	Original Owner:	HIBBARD, KEITH 2
Well Elevation:	1022	Well Status:	Active
Well Use:	Irrigation	Drill Depth:	122
Completion Depth:	122	Date Completed:	19791115
Casing Diameter:	12	Casing Depth:	104
Grouted:	N	Dist from Potential Contamination:	0
Direction to Potential Contamination:	Not Reported	Type of Contamination:	Not Reported
Depth to Bedrock:	0	First Stratigraphic Unit:	Not Reported
Last Stratigraphic Unit:	sand-gray	Bottom Open Strat Unit:	sand-gray
Aquifer:	Quat. Buried Artes. Aquifer		
Well Cuttings:	Not Reported	Core Sample Taken:	Not Reported
Geophys Log Exists:	Not Reported	Geochem Info Exists:	Not Reported
Water Chemistry Info Exists:	Not Reported	Observation Well:	Not Reported
Avg Static Water Level Depth:	25		

11
NE
1/2 - 1 Mile
Higher

MN WELLS **MN6000000235273**

Well ID:	0000651268	Original Owner:	STARK, LEWIS
Well Elevation:	1022	Well Status:	Active
Well Use:	Domestic	Drill Depth:	66
Completion Depth:	66	Date Completed:	20000829
Casing Diameter:	4	Casing Depth:	62
Grouted:	Y	Dist from Potential Contamination:	0
Direction to Potential Contamination:	Not Reported	Type of Contamination:	Not Reported
Depth to Bedrock:	0	First Stratigraphic Unit:	Not Reported
Last Stratigraphic Unit:	sand	Bottom Open Strat Unit:	sand
Aquifer:	Quat. Buried Artes. Aquifer		
Well Cuttings:	Not Reported	Core Sample Taken:	Not Reported
Geophys Log Exists:	Not Reported	Geochem Info Exists:	Not Reported
Water Chemistry Info Exists:	Not Reported	Observation Well:	Not Reported
Avg Static Water Level Depth:	20		

D12
SW
1/2 - 1 Mile
Lower

FED USGS **USGS40000549104**

Organization ID:	USGS-MN	Organization Name:	USGS Minnesota Water Science Center
Monitor Location:	35N30W10CCBCCA01	Type:	Well
Description:	Not Reported	HUC:	07010203
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Glacial Buried Sand and/or Gravel
Aquifer Type:	Confined single aquifer	Construction Date:	19761022
Well Depth:	118	Well Depth Units:	ft
Well Hole Depth:	118	Well Hole Depth Units:	ft

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

D13
SW
1/2 - 1 Mile
Lower

MN WELLS **MN6000000068124**

Well ID:	0000131342	Original Owner:	HIBBARD, J.E.
Well Elevation:	1012	Well Status:	Active
Well Use:	Domestic	Drill Depth:	118
Completion Depth:	118	Date Completed:	19761022
Casing Diameter:	4	Casing Depth:	101
Grouted:	N	Dist from Potential Contamination:	50
Direction to Potential Contamination:	S	Type of Contamination:	Septic Tank/Drain Field
Depth to Bedrock:	0	First Stratigraphic Unit:	Not Reported
Last Stratigraphic Unit:	sand-gray	Bottom Open Strat Unit:	sand-brown
Aquifer:	Quat. Buried Artes. Aquifer		
Well Cuttings:	Not Reported	Core Sample Taken:	Not Reported
Geophys Log Exists:	Not Reported	Geochem Info Exists:	Not Reported
Water Chemistry Info Exists:	Not Reported	Observation Well:	Not Reported
Avg Static Water Level Depth:	16		

D14
SW
1/2 - 1 Mile
Lower

MN WELLS **MN6000000254772**

Well ID:	0000244454		
Original Owner:	U.S.G.S. 71016-JESS HIBBARD		
Well Elevation:	1016	Well Status:	Sealed
Well Use:	Abandoned	Drill Depth:	32
Completion Depth:	32	Date Completed:	19761019
Casing Diameter:	1.3	Casing Depth:	30
Grouted:	Not Reported	Dist from Potential Contamination:	0
Direction to Potential Contamination:	Not Reported	Type of Contamination:	Not Reported
Depth to Bedrock:	0	First Stratigraphic Unit:	Not Reported
Last Stratigraphic Unit:	till	Bottom Open Strat Unit:	till
Aquifer:	Quat. Buried Artes. Aquifer		
Well Cuttings:	Not Reported	Core Sample Taken:	Not Reported
Geophys Log Exists:	Not Reported	Geochem Info Exists:	Not Reported
Water Chemistry Info Exists:	Not Reported	Observation Well:	Y
Avg Static Water Level Depth:	15		

D15
SW
1/2 - 1 Mile
Lower

FED USGS **USGS40000591578**

Organization ID:	USGS-MN	Organization Name:	USGS Minnesota Water Science Center
Monitor Location:	035N30W10CCB01	Type:	Well
Description:	Not Reported	HUC:	07010203
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Not Reported
Aquifer Type:	Not Reported	Construction Date:	19761019
Well Depth:	31.8	Well Depth Units:	ft
Well Hole Depth:	32	Well Hole Depth Units:	ft

Ground water levels,Number of Measurements:	99	Level reading date:	1984-09-13
Feet below surface:	12.67	Feet to sea level:	Not Reported
Note:	Not Reported		
Level reading date:	1984-08-02	Feet below surface:	11.54
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1984-07-02	Feet below surface:	10.09
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1984-06-07	Feet below surface:	10.62
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1984-05-17	Feet below surface:	9.12
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1984-04-10	Feet below surface:	9.40
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1984-03-01	Feet below surface:	9.82
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1984-02-03	Feet below surface:	10.85
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1983-12-20	Feet below surface:	10.82
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1983-11-03	Feet below surface:	9.79
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1983-10-11	Feet below surface:	9.98
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1983-09-22	Feet below surface:	10.45
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1983-08-11	Feet below surface:	11.79
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1983-07-19	Feet below surface:	10.39
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1983-06-08	Feet below surface:	11.06
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1983-05-16	Feet below surface:	9.89
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1983-04-12	Feet below surface:	9.43
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1983-03-03	Feet below surface:	9.65
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1982-12-01	Feet below surface:	9.75
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1982-11-02	Feet below surface:	10.40
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1982-10-05	Feet below surface:	12.25

Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1982-09-09	Feet below surface:	12.09
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1982-08-04	Feet below surface:	12.38
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1982-07-06	Feet below surface:	11.80
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1982-06-02	Feet below surface:	10.36
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1982-05-13	Feet below surface:	10.22
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1982-04-05	Feet below surface:	12.21
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1982-03-10	Feet below surface:	13.51
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1982-02-16	Feet below surface:	13.26
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1981-12-09	Feet below surface:	12.77
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1981-10-15	Feet below surface:	12.84
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1981-09-09	Feet below surface:	13.05
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1981-08-11	Feet below surface:	12.30
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1981-07-01	Feet below surface:	10.09
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1981-06-02	Feet below surface:	11.79
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1981-05-06	Feet below surface:	10.61
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1981-04-07	Feet below surface:	13.09
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1981-03-09	Feet below surface:	13.45
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1981-02-12	Feet below surface:	13.34
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1981-01-13	Feet below surface:	12.82
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1980-12-03	Feet below surface:	12.08
Feet to sea level:	Not Reported	Note:	Not Reported

Level reading date:	1980-11-04	Feet below surface:	11.69
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1980-10-07	Feet below surface:	10.50
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1980-07-08	Feet below surface:	11.79
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1980-06-06	Feet below surface:	12.09
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1980-05-06	Feet below surface:	11.72
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1980-04-08	Feet below surface:	11.79
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1980-03-12	Feet below surface:	13.08
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1980-02-12	Feet below surface:	12.75
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1980-01-02	Feet below surface:	12.16
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1979-12-04	Feet below surface:	11.72
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1979-11-06	Feet below surface:	10.92
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1979-06-30	Feet below surface:	9.42
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1979-05-30	Feet below surface:	9.58
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1979-04-28	Feet below surface:	9.90
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1979-03-28	Feet below surface:	12.16
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1979-02-27	Feet below surface:	13.59
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-12-15	Feet below surface:	12.66
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-11-14	Feet below surface:	12.57
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-10-31	Feet below surface:	12.15
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-10-14	Feet below surface:	11.64
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-09-29	Feet below surface:	11.48
Feet to sea level:	Not Reported	Note:	Not Reported

Level reading date:	1978-09-10	Feet below surface:	12.45
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-08-25	Feet below surface:	11.93
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-08-12	Feet below surface:	11.36
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-07-30	Feet below surface:	10.69
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-07-14	Feet below surface:	9.59
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-06-26	Feet below surface:	10.63
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-06-10	Feet below surface:	10.95
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-05-27	Feet below surface:	10.78
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-05-14	Feet below surface:	10.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-04-28	Feet below surface:	9.67
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-04-10	Feet below surface:	10.13
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-03-26	Feet below surface:	12.05
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-03-10	Feet below surface:	12.03
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-02-20	Feet below surface:	12.45
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1978-01-02	Feet below surface:	11.28
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-12-17	Feet below surface:	11.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-11-13	Feet below surface:	10.74
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-10-30	Feet below surface:	12.02
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-10-10	Feet below surface:	11.74
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-09-24	Feet below surface:	12.92
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-09-05	Feet below surface:	12.83
Feet to sea level:	Not Reported	Note:	Not Reported

Level reading date:	1977-08-20	Feet below surface:	14.32
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-07-30	Feet below surface:	13.78
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-07-16	Feet below surface:	13.29
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-07-03	Feet below surface:	13.63
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-06-21	Feet below surface:	13.52
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-06-04	Feet below surface:	13.14
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-05-21	Feet below surface:	13.06
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-05-05	Feet below surface:	12.81
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-04-20	Feet below surface:	13.47
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-04-04	Feet below surface:	14.01
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-03-24	Feet below surface:	14.22
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-02-09	Feet below surface:	21.04
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1977-02-08	Feet below surface:	15.59
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1976-12-13	Feet below surface:	15.19
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1976-10-22	Feet below surface:	15.04
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1976-10-19	Feet below surface:	15.20
Feet to sea level:	Not Reported	Note:	Not Reported

E16
SW
1/2 - 1 Mile
Lower

FED USGS USGS40000549081

Organization ID:	USGS-MN	Organization Name:	USGS Minnesota Water Science Center
Monitor Location:	35N30W09DDDACA01	Type:	Well
Description:	Not Reported	HUC:	07010203
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Glacial Buried Sand and/or Gravel
Aquifer Type:	Confined single aquifer	Construction Date:	19880401
Well Depth:	59	Well Depth Units:	ft

Well Hole Depth:	59	Well Hole Depth Units:	ft

E17
SW
1/2 - 1 Mile
Lower

MN WELLS **MN6000000111417**

Well ID:	0000447636	Original Owner:	LINDOWSKI, JOHN
Well Elevation:	1010	Well Status:	Active
Well Use:	Domestic	Drill Depth:	59
Completion Depth:	59	Date Completed:	19880401
Casing Diameter:	4	Casing Depth:	50
Grouted:	Y	Dist from Potential Contamination:	105
Direction to Potential Contamination:	SE	Type of Contamination:	Septic Tank/Drain Field
Depth to Bedrock:	0	First Stratigraphic Unit:	Not Reported
Last Stratigraphic Unit:	clay+sand-gray	Bottom Open Strat Unit:	sand +larger-gray
Aquifer:	Quat. Buried Artes. Aquifer		
Well Cuttings:	Not Reported	Core Sample Taken:	Not Reported
Geophys Log Exists:	Not Reported	Geochem Info Exists:	Not Reported
Water Chemistry Info Exists:	Not Reported	Observation Well:	Not Reported
Avg Static Water Level Depth:	18		

F18
SSW
1/2 - 1 Mile
Lower

MN WELLS **MN6000000093537**

Well ID:	0000413294	Original Owner:	HIGGINS, VERNON
Well Elevation:	1007	Well Status:	Active
Well Use:	Domestic	Drill Depth:	62
Completion Depth:	62	Date Completed:	19850326
Casing Diameter:	4	Casing Depth:	58
Grouted:	Y	Dist from Potential Contamination:	0
Direction to Potential Contamination:	Not Reported	Type of Contamination:	Not Reported
Depth to Bedrock:	0	First Stratigraphic Unit:	Not Reported
Last Stratigraphic Unit:	sand-brown	Bottom Open Strat Unit:	sand-brown
Aquifer:	Quat. Buried Artes. Aquifer		
Well Cuttings:	Not Reported	Core Sample Taken:	Not Reported
Geophys Log Exists:	Not Reported	Geochem Info Exists:	Not Reported
Water Chemistry Info Exists:	Not Reported	Observation Well:	Not Reported
Avg Static Water Level Depth:	7		

F19
SSW
1/2 - 1 Mile
Lower

FED USGS **USGS40000548993**

Organization ID:	USGS-MN	Organization Name:	USGS Minnesota Water Science Center
Monitor Location:	35N30W15BBBBAC01	Type:	Well
Description:	Not Reported	HUC:	07010203
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Glacial Buried Sand and/or Gravel
Aquifer Type:	Confined single aquifer	Construction Date:	19850326
Well Depth:	62	Well Depth Units:	ft
Well Hole Depth:	62	Well Hole Depth Units:	ft

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

F20
SSW
1/2 - 1 Mile
Lower

FED USGS **USGS40000548973**

Organization ID:	USGS-MN	Organization Name:	USGS Minnesota Water Science Center
Monitor Location:	35N30W15BBBCBA01	Type:	Well
Description:	Not Reported	HUC:	07010203
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Glacial Buried Sand and/or Gravel
Aquifer Type:	Confined single aquifer	Construction Date:	19900213
Well Depth:	147	Well Depth Units:	ft
Well Hole Depth:	147	Well Hole Depth Units:	ft

G21
ESE
1/2 - 1 Mile
Lower

FED USGS **USGS40000549197**

Organization ID:	USGS-MN	Organization Name:	USGS Minnesota Water Science Center
Monitor Location:	35N30W11CAADBC01	Type:	Well
Description:	Not Reported	HUC:	07010203
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Glacial Buried Sand and/or Gravel
Aquifer Type:	Confined single aquifer	Construction Date:	19770621
Well Depth:	111	Well Depth Units:	ft
Well Hole Depth:	111	Well Hole Depth Units:	ft

G22
ESE
1/2 - 1 Mile
Lower

MN WELLS **MN6000000190158**

Well ID:	0000126518	Original Owner:	PROM, LORN (PROM DAIRY)
Well Elevation:	1013	Well Status:	Active
Well Use:	Irrigation	Drill Depth:	111
Completion Depth:	111	Date Completed:	19770621
Casing Diameter:	12	Casing Depth:	82
Grouted:	N	Dist from Potential Contamination:	0
Direction to Potential Contamination:	Not Reported	Type of Contamination:	Not Reported
Depth to Bedrock:	0	First Stratigraphic Unit:	Not Reported
Last Stratigraphic Unit:	sand	Bottom Open Strat Unit:	sand
Aquifer:	Quat. Buried Artes. Aquifer		
Well Cuttings:	Not Reported	Core Sample Taken:	Not Reported
Geophys Log Exists:	Not Reported	Geochem Info Exists:	Not Reported
Water Chemistry Info Exists:	Not Reported	Observation Well:	Not Reported
Avg Static Water Level Depth:	16		

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

23
NNE **MN WELLS** **MN6000000186552**
1/2 - 1 Mile
Higher

Well ID:	0000460600	Original Owner:	MCCULLOCH, ROBERT
Well Elevation:	1040	Well Status:	Active
Well Use:	Domestic	Drill Depth:	110
Completion Depth:	110	Date Completed:	19911113
Casing Diameter:	4	Casing Depth:	106
Grouted:	Y	Dist from Potential Contamination:	80
Direction to Potential Contamination:	SW	Type of Contamination:	Septic Tank/Drain Field
Depth to Bedrock:	0	First Stratigraphic Unit:	Not Reported
Last Stratigraphic Unit:	sand-brown	Bottom Open Strat Unit:	sand-brown
Aquifer:	Quat. Buried Artes. Aquifer		
Well Cuttings:	Not Reported	Core Sample Taken:	Not Reported
Geophys Log Exists:	Not Reported	Geochem Info Exists:	Not Reported
Water Chemistry Info Exists:	Not Reported	Observation Well:	Not Reported
Avg Static Water Level Depth:	35		

H24
SSE **FED USGS** **USGS40000548850**
1/2 - 1 Mile
Lower

Organization ID:	USGS-MN	Organization Name:	USGS Minnesota Water Science Center
Monitor Location:	35N30W15 01	Type:	Well
Description:	Not Reported	HUC:	07010203
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Glacial Buried Sand and/or Gravel
Aquifer Type:	Confined single aquifer	Construction Date:	19830427
Well Depth:	147	Well Depth Units:	ft
Well Hole Depth:	147	Well Hole Depth Units:	ft

H25
SSE **MN WELLS** **MN6000000133769**
1/2 - 1 Mile
Lower

Well ID:	0000191192	Original Owner:	PROM DAIRY AND HOG
Well Elevation:	1005	Well Status:	Active
Well Use:	Irrigation	Drill Depth:	147
Completion Depth:	147	Date Completed:	19830427
Casing Diameter:	12	Casing Depth:	127
Grouted:	N	Dist from Potential Contamination:	0
Direction to Potential Contamination:	Not Reported	Type of Contamination:	Not Reported
Depth to Bedrock:	0	First Stratigraphic Unit:	Not Reported
Last Stratigraphic Unit:	gravel (+larger)-gray		
Bottom Open Strat Unit:	gravel (+larger)-gray		
Aquifer:	Quat. Buried Artes. Aquifer		
Well Cuttings:	Not Reported	Core Sample Taken:	Not Reported
Geophys Log Exists:	Not Reported	Geochem Info Exists:	Not Reported
Water Chemistry Info Exists:	Not Reported	Observation Well:	Not Reported
Avg Static Water Level Depth:	20		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

26
SSW
1/2 - 1 Mile
Lower

MN WELLS **MN6000000217622**

Well ID:	0000574167	Original Owner:	HIBBARD, KEITH
Well Elevation:	992	Well Status:	Active
Well Use:	Irrigation	Drill Depth:	134
Completion Depth:	120	Date Completed:	19951127
Casing Diameter:	8	Casing Depth:	105
Grouted:	Y	Dist from Potential Contamination:	0
Direction to Potential Contamination:	Not Reported	Type of Contamination:	Not Reported
Depth to Bedrock:	0	First Stratigraphic Unit:	Not Reported
Last Stratigraphic Unit:	clay-gray	Bottom Open Strat Unit:	sand +larger-gray
Aquifer:	Quat. Buried Artes. Aquifer		
Well Cuttings:	Not Reported	Core Sample Taken:	Not Reported
Geophys Log Exists:	Not Reported	Geochem Info Exists:	Not Reported
Water Chemistry Info Exists:	Not Reported	Observation Well:	Not Reported
Avg Static Water Level Depth:	-1		

I27
NNE
1/2 - 1 Mile
Higher

FED USGS **USGS40000549844**

Organization ID:	USGS-MN	Organization Name:	USGS Minnesota Water Science Center
Monitor Location:	35N30W 2BCC 01	Type:	Well
Description:	Not Reported	HUC:	07010203
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Not Reported
Aquifer Type:	Not Reported	Construction Date:	19920423
Well Depth:	52	Well Depth Units:	ft
Well Hole Depth:	52	Well Hole Depth Units:	ft

I28
NNE
1/2 - 1 Mile
Higher

FED USGS **USGS40000549845**

Organization ID:	USGS-MN	Organization Name:	USGS Minnesota Water Science Center
Monitor Location:	35N30W 2BCC 02	Type:	Well
Description:	Not Reported	HUC:	07010203
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Not Reported	Formation Type:	Not Reported
Aquifer Type:	Not Reported	Construction Date:	19930422
Well Depth:	46	Well Depth Units:	ft
Well Hole Depth:	46	Well Hole Depth Units:	ft

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RADON

AREA RADON INFORMATION

State Database: MN Radon

Radon Test Results

Zipcode	Num Tests	Minimum	Maximum	Average	# > 4 pCi/L	# < 4 pCi/L
56304	584	0.0	25.6	4.9	315	269

Federal EPA Radon Zone for SHERBURNE County: 1

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 56304

Number of sites tested: 2

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	Not Reported	Not Reported	Not Reported	Not Reported
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	3.150 pCi/L	50%	50%	0%

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory
Source: Land Management Information Center
Telephone: 617-297-3281

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Minnesota Groundwater Database
Source: Minnesota Geological Survey County Water Well Index (CWI)
Telephone: 612-627-4780

OTHER STATE DATABASE INFORMATION

RADON

State Database: MN Radon
Source: Department of Health
Telephone: 651-215-0909
Radon Test Results

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STREET AND ADDRESS INFORMATION

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St. Cloud AASF
2185 Southeast 45th Avenue
SAINT CLOUD, MN 56304

Inquiry Number: 5441940.2s
October 03, 2018

EDR Summary Radius Map Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION	PAGE
Executive Summary	ES1
Overview Map	2
Detail Map	3
Map Findings Summary	4
Map Findings	8
Orphan Summary	176
Government Records Searched/Data Currency Tracking	GR-1

GEOCHECK ADDENDUM

Physical Setting Source Addendum	A-1
Physical Setting Source Summary	A-2
Physical Setting SSURGO Soil Map	A-5
Physical Setting Source Map	A-16
Physical Setting Source Map Findings	A-18
Physical Setting Source Records Searched	PSGR-1

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E 2247-16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E 1528-14) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

2185 SOUTHEAST 45TH AVENUE
SAINT CLOUD, MN 56304

COORDINATES

Latitude (North):	45.5403440 - 45° 32' 25.23''
Longitude (West):	94.0575060 - 94° 3' 27.02''
Universal Tranverse Mercator:	Zone 15
UTM X (Meters):	417437.1
UTM Y (Meters):	5043305.0
Elevation:	1020 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property:	TP
Source:	U.S. Geological Survey

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20150825
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
2185 SOUTHEAST 45TH AVENUE
SAINT CLOUD, MN 56304

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
A1	SAINT CLOUD ARMY AVI	2185 45TH AVE SE	SPILLS, AIRS, Financial Assurance, TIER 2, WIMN,...		TP
A2	SAINT CLOUD ARMY AVI	2185 45TH AVE SE	AST		TP
A3	ST CLOUD ARMY AVIATI	2185 45TH AVE SE	FINDS, ECHO		TP
A4	ARMY AVIATION SUPPOR	2185 45TH AVENUE SE	TIER 2		TP
A5	SAINT CLOUD AASF	2185 45TH AVE	RCRA-CESQG		TP

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was identified in the following records. For more information on this property see page 8 of the attached EDR Radius Map report:

Site	Database(s)	EPA ID
SAINT CLOUD ARMY AVI 2185 45TH AVE SE SAINT CLOUD, MN 56304	SPILLS AIRS Facility Id: 14100064 Financial Assurance Database: Financial Assurance 1, Date of Government Version: 08/01/2016 PROGRAM ID: 64654571 PROGRAM ID: 56231140 PROGRAM ID: 57188064 TIER 2 Facility Status: ACTIVE ERC Number: 15095 WIMN Status: Y NPDES	N/A
SAINT CLOUD ARMY AVI 2185 45TH AVE SE SAINT CLOUD, MN 56304	AST Tank Status: Active Tank Status: Closed	N/A
ST CLOUD ARMY AVIATI 2185 45TH AVE SE ST. CLOUD, MN 56304	FINDS Registry ID:: 110058377536 ECHO Registry ID: 110058377536	N/A
ARMY AVIATION SUPPOR 2185 45TH AVENUE SE ST. CLOUD, MN 56304	TIER 2 Facility Status: ACTIVE ERC Number: 15095	N/A
SAINT CLOUD AASF 2185 45TH AVE SAINT CLOUD, MN 56304	RCRA-CESQG EPA ID:: MNS000141630	MNS000141630

SURROUNDING SITES: SEARCH RESULTS

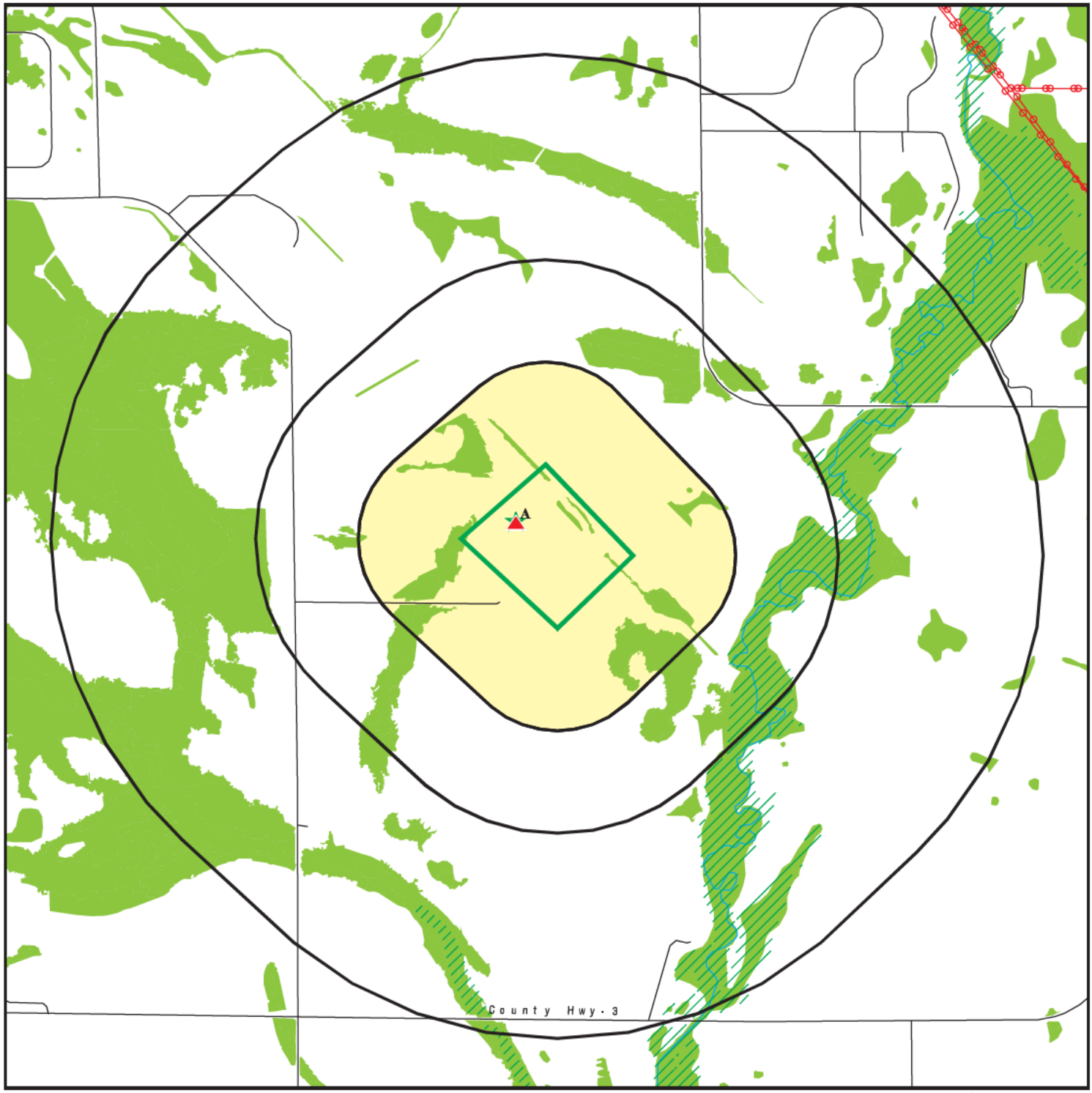
Surrounding sites were not identified.

Unmappable (orphan) sites are not considered in the foregoing analysis.

Count: 0 records. ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
		NO SITES FOUND			

OVERVIEW MAP - 5441940.2S



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Upgradient Area

0 1/4 1/2 1 Miles

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: St. Cloud AASF	CLIENT: AECOM
ADDRESS: 2185 Southeast 45th Avenue SAINT CLOUD MN 56304	CONTACT: Brittany Kirchmann
LAT/LONG: 45.540344 / 94.057506	INQUIRY #: 5441940.2s DATE: October 03, 2018 8:28 am

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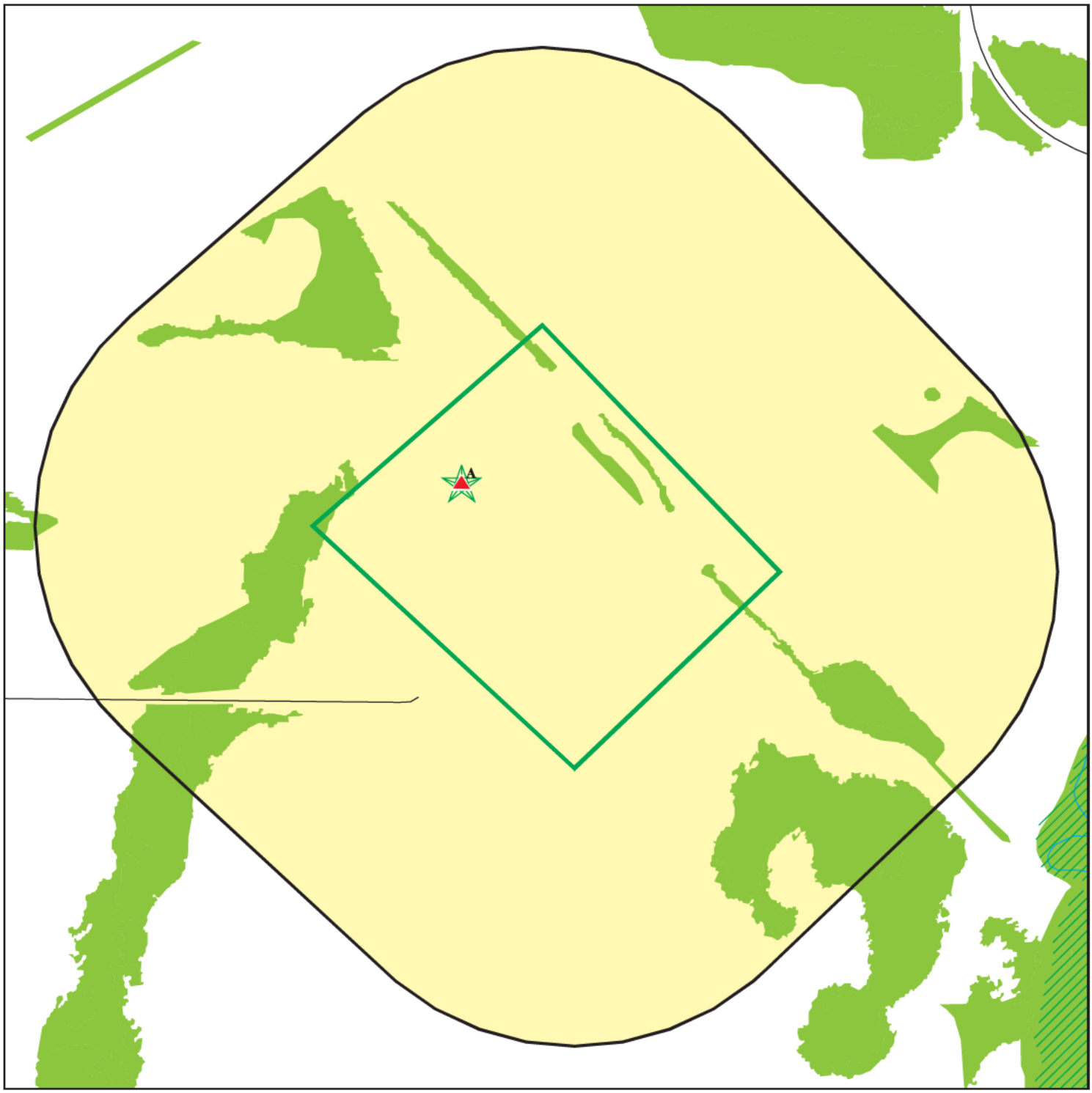
DETAIL MAP - 5441940.2S



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands

0 1/8 1/4 1/2 Miles

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	St. Cloud AASF	CLIENT:	AECOM
ADDRESS:	2185 Southeast 45th Avenue SAINT CLOUD MN 56304	CONTACT:	Brittany Kirchmann
LAT/LONG:	45.540344 / 94.057506	INQUIRY #:	5441940.2s
		DATE:	October 03, 2018 8:29 am

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MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	TP		NR	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site list								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-CESQG	0.250	1	0	0	NR	NR	NR	1
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	TP		NR	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
MN PLP	1.000		0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
SHWS	1.000		0	0	0	0	NR	0
State and tribal landfill and/or solid waste disposal site lists								
UNPERM LF	0.500		0	0	0	NR	NR	0
SWF/LF	0.500		0	0	0	NR	NR	0
LCP	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST	0.500		0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
LAST	0.500		0	0	0	NR	NR	0
INDIAN LUST	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
FEMA UST	0.250		0	0	NR	NR	NR	0
UST	0.250		0	0	NR	NR	NR	0
AST	0.250	1	0	0	NR	NR	NR	1
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal institutional control / engineering control registries								
INST CONTROL	0.500		0	0	0	NR	NR	0
State and tribal voluntary cleanup sites								
VIC	0.500		0	0	0	NR	NR	0
INDIAN VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
SWRCY	0.500		0	0	0	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	TP		NR	NR	NR	NR	NR	0
SRS	0.500		0	0	0	NR	NR	0
CDL	TP		NR	NR	NR	NR	NR	0
MN DEL PLP	1.000		0	0	0	0	NR	0
US CDL	TP		NR	NR	NR	NR	NR	0
Local Land Records								
LIENS	TP		NR	NR	NR	NR	NR	0
LIENS 2	TP		NR	NR	NR	NR	NR	0
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
SPILLS	TP	1	NR	NR	NR	NR	NR	1
AGSPILLS	TP		NR	NR	NR	NR	NR	0
SPILLS 90	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
SPILLS 80	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
DOT OPS	TP		NR	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	TP		NR	NR	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.250		0	0	NR	NR	NR	0
FINDS	TP	1	NR	NR	NR	NR	NR	1
UXO	1.000		0	0	0	0	NR	0
DOCKET HWC	TP		NR	NR	NR	NR	NR	0
ECHO	TP	1	NR	NR	NR	NR	NR	1
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
AGVIC	0.500		0	0	0	NR	NR	0
AIRS	TP	1	NR	NR	NR	NR	NR	1
ASBESTOS	TP		NR	NR	NR	NR	NR	0
BULK	0.250		0	0	NR	NR	NR	0
COAL ASH	0.500		0	0	0	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
ENF	TP		NR	NR	NR	NR	NR	0
Financial Assurance	TP	1	NR	NR	NR	NR	NR	1
MN HWS Permit	1.000		0	0	0	0	NR	0
LEAD	TP		NR	NR	NR	NR	NR	0
MANIFEST	0.250		0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
MDA LIS	0.250		0	0	NR	NR	NR	0
MN LS	0.500		0	0	0	NR	NR	0
TIER 2	TP	2	NR	NR	NR	NR	NR	2
VAPOR	0.500		0	0	0	NR	NR	0
WIMN	0.500	1	0	0	0	NR	NR	1
NPDES	TP	1	NR	NR	NR	NR	NR	1
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA HWS	TP		NR	NR	NR	NR	NR	0
RGA LF	TP		NR	NR	NR	NR	NR	0
RGA LUST	TP		NR	NR	NR	NR	NR	0
- Totals --		11	0	0	0	0	0	11

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

A1
Target Property
Actual: 1020 ft.

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY
2185 45TH AVE SE
SAINT CLOUD, MN 56304

SPILLS **S108496615**
AIRS **N/A**
Financial Assurance
TIER 2
WIMN
NPDES

Click here for full text details

AIRS
Facility Id: 14100064

Financial Assurance
PROGRAM ID: 64654571
PROGRAM ID: 56231140
PROGRAM ID: 57188064

TIER 2
ERC Number: 15095
Facility Status: ACTIVE

WIMN
Status: Y

A2
Target Property
Actual: 1020 ft.

SAINT CLOUD ARMY AVIATION SUPPORT FACILITY
2185 45TH AVE SE
SAINT CLOUD, MN 56304

AST **A100344194**
N/A

Click here for full text details

AST
Tank Status: Active
Tank Status: Closed

A3
Target Property
Actual: 1020 ft.

ST CLOUD ARMY AVIATION SUPPORT FACILITY
2185 45TH AVE SE
ST. CLOUD, MN 56304

FINDS **1010707259**
ECHO **N/A**

Click here for full text details

FINDS
Registry ID:: 110058377536

ECHO
Registry ID: 110058377536

A4
Target
Property

ARMY AVIATION SUPPORT FACILITY #2
2185 45TH AVENUE SE
ST. CLOUD, MN 56304

TIER 2

S110144794
N/A

Actual:
1020 ft.

Click here for full text details

TIER 2
ERC Number: 15095
Facility Status: ACTIVE

A5
Target
Property

SAINT CLOUD AASF
2185 45TH AVE
SAINT CLOUD, MN 56304

RCRA-CESQG

1012181595
MNS000141630

Actual:
1020 ft.

Click here for full text details

RCRA-CESQG
EPA Id: MNS000141630

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

St	Acronym	Full Name	Government Agency	Gov Date	Arvl. Date	Active Date
MN	AG SPILLS	Department of Agriculture Spills	Department of Agriculture	08/02/2018	08/07/2018	08/28/2018
MN	AGVIC	Agricultural Voluntary Investigation & Cleanup Listing	Department of Agriculture	08/02/2018	08/07/2018	08/28/2018
MN	AIRS	Permit Contact List	Pollution Control Agency	12/31/2016	05/23/2018	07/24/2018
MN	ASBESTOS	Asbestos Notification Listing	Department of Health	07/30/2018	08/02/2018	08/28/2018
MN	AST	Aboveground Storage Tanks	Minnesota Pollution Control Agency	07/26/2018	08/07/2018	08/29/2018
MN	BROWNFIELDS	Petroleum Brownfields Program Sites	Pollution Control Agency	06/01/2018	06/07/2018	07/24/2018
MN	BULK	Bulk Facilities Database	Department of Agriculture	08/06/2018	08/07/2018	08/29/2018
MN	CDL	Clandestine Drug Labs	Department of Health	06/28/2018	07/03/2018	07/24/2018
MN	COAL ASH	Coal Ash Disposal Site Listing	Pollution Control Agency	02/09/2017	02/10/2017	03/07/2017
MN	DRYCLEANERS	Registered Drycleaning Facilities	Pollution Control Agency	06/14/2018	06/14/2018	07/24/2018
MN	ENFORCEMENT	Generators Associated with Enforcement Logs	Minnesota Pollution Control Agency	06/26/2018	06/29/2018	07/24/2018
MN	Financial Assurance 1	Financial Assurance Information Listing	Pollutiona Control Agency	08/01/2016	08/10/2016	11/02/2016
MN	Financial Assurance 2	Financial Assurance Information listing	Pollution Control Agency	09/13/2017	09/15/2017	10/25/2017
MN	Financial Assurance 3	Financial Assurance Information Listing	Pollution Control Agency	09/13/2017	09/15/2017	10/24/2017
MN	INST CONTROL	Site Remediation Section Database	Pollution Control Agency	06/05/2018	06/07/2018	07/24/2018
MN	LAST	Leaking Aboveground Storage Tanks	Pollution Control Agency	07/26/2018	08/07/2018	08/29/2018
MN	LCP	Closed Landfills Priority List	Minnesota Pollution Control Agency	04/01/2018	04/20/2018	06/04/2018
MN	LEAD	Lead Inspection Listing	Department of Health	09/04/2018	09/05/2018	09/18/2018
MN	LIENS	Environmental Liens	Pollution Control Agency	02/16/2016	03/09/2016	04/06/2016
MN	LS	List of Sites	Minnesota Pollution Control Agency	04/22/2009	07/14/2009	07/24/2009
MN	LUST	Leak Sites	Minnesota Pollution Control Agency	07/26/2018	08/07/2018	08/29/2018
MN	MANIFEST	Hazardous Waste Manifest Data	Pollution Control Agency	06/30/2016	02/07/2017	04/05/2017
MN	MDA LIS	Licensing Information System Database Listing	Department of Agriculture	08/02/2018	08/07/2018	08/30/2018
MN	MN DEL PLP	Delisted Permanent List of Priorities	Pollution Control Agency	06/01/2018	06/07/2018	07/24/2018
MN	MN HWS PERMIT	Active TSD Facilities	Minnesota Pollution Control Agency	06/08/2018	06/13/2018	07/24/2018
MN	MN PLP	Permanent List of Priorities	Pollution Control Agency	06/01/2018	06/07/2018	07/24/2018
MN	NPDES	Wastewater Permits Listing	Minnesota Pollution Control Agency	06/08/2018	06/13/2018	07/24/2018
MN	RGA HWS	Recovered Government Archive State Hazardous Waste Facilitie	Minnesota Pollution Control Agency		07/01/2013	01/03/2014
MN	RGA LF	Recovered Government Archive Solid Waste Facilities List	Minnesota Pollution Control Agency		07/01/2013	01/13/2014
MN	RGA LUST	Recovered Government Archive Leaking Underground Storage Tan	Minnesota Pollution Control Agency		07/01/2013	12/24/2013
MN	SHWS	Superfund Site Information Listing	Minnesota Pollution Control Agency	06/01/2018	06/07/2018	07/24/2018
MN	SPILLS	Spills Database	Minnesota Pollution Control Agency	07/26/2018	08/07/2018	08/30/2018
MN	SPILLS 80	SPILLS80 data from FirstSearch	FirstSearch	11/20/2001	01/03/2013	03/06/2013
MN	SPILLS 90	SPILLS90 data from FirstSearch	FirstSearch	11/01/2012	01/03/2013	02/11/2013
MN	SRS	Site Remediation Section Database	Pollution Control Agency	06/01/2018	06/07/2018	07/24/2018
MN	SWF/LF	Permitted Solid Waste Disposal Facilities	Minnesota Pollution Control Agency	08/02/2018	08/07/2018	08/29/2018
MN	SWRCY	Recycling Facilities	Pollution Control Agency	06/11/2018	06/12/2018	07/24/2018
MN	TIER 2	Tier 2 Facility Listing	Department of Public Safety	12/31/2017	05/07/2018	06/06/2018
MN	UNPERM LF	Unpermitted Facilities	Pollution Control Agency	08/02/2018	08/07/2018	08/29/2018
MN	UST	Underground Storage Tank Database	Minnesota Pollution Control Agency	07/26/2018	08/07/2018	08/29/2018
MN	VAPOR	Vapor Intrusion	Pollution Control Agency	06/06/2018	06/08/2018	07/24/2018
MN	VIC	Voluntary Investigation and Cleanup Program	Minnesota Pollution Control Agency	06/01/2018	06/07/2018	07/24/2018
MN	WIMN	What's In My Neighborhood	Pollution Control Agency	07/07/2018	07/11/2018	08/30/2018
US	2020 COR ACTION	2020 Corrective Action Program List	Environmental Protection Agency	09/30/2017	05/08/2018	07/20/2018
US	ABANDONED MINES	Abandoned Mines	Department of Interior	09/10/2018	09/11/2018	09/14/2018
US	BRS	Biennial Reporting System	EPA/NTIS	12/31/2015	02/22/2017	09/28/2017
US	COAL ASH DOE	Steam-Electric Plant Operation Data	Department of Energy	12/31/2005	08/07/2009	10/22/2009

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

St	Acronym	Full Name	Government Agency	Gov Date	Arvl. Date	Active Date
US	COAL ASH EPA	Coal Combustion Residues Surface Impoundments List	Environmental Protection Agency	07/01/2014	09/10/2014	10/20/2014
US	CONSENT	Superfund (CERCLA) Consent Decrees	Department of Justice, Consent Decree Library	03/31/2018	04/16/2018	06/29/2018
US	CORRACTS	Corrective Action Report	EPA	03/01/2018	03/28/2018	06/22/2018
US	DEBRIS REGION 9	Torres Martinez Reservation Illegal Dump Site Locations	EPA, Region 9	01/12/2009	05/07/2009	09/21/2009
US	DOCKET HWC	Hazardous Waste Compliance Docket Listing	Environmental Protection Agency	01/04/2018	01/19/2018	04/13/2018
US	DOD	Department of Defense Sites	USGS	12/31/2005	11/10/2006	01/11/2007
US	DOT OPS	Incident and Accident Data	Department of Transporation, Office of Pipeli	07/31/2012	08/07/2012	09/18/2012
US	Delisted NPL	National Priority List Deletions	EPA	07/17/2018	08/09/2018	09/07/2018
US	ECHO	Enforcement & Compliance History Information	Environmental Protection Agency	09/02/2018	09/05/2018	09/14/2018
US	EDR Hist Auto	EDR Exclusive Historical Auto Stations	EDR, Inc.			
US	EDR Hist Cleaner	EDR Exclusive Historical Cleaners	EDR, Inc.			
US	EDR MGP	EDR Proprietary Manufactured Gas Plants	EDR, Inc.			
US	EPA WATCH LIST	EPA WATCH LIST	Environmental Protection Agency	08/30/2013	03/21/2014	06/17/2014
US	ERNS	Emergency Response Notification System	National Response Center, United States Coast	06/18/2018	06/27/2018	09/14/2018
US	FEDERAL FACILITY	Federal Facility Site Information listing	Environmental Protection Agency	11/07/2016	01/05/2017	04/07/2017
US	FEDLAND	Federal and Indian Lands	U.S. Geological Survey	12/31/2005	02/06/2006	01/11/2007
US	FEMA UST	Underground Storage Tank Listing	FEMA	05/15/2017	05/30/2017	10/13/2017
US	FINDS	Facility Index System/Facility Registry System	EPA	02/21/2018	02/23/2018	03/23/2018
US	FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fu	EPA/Office of Prevention, Pesticides and Toxi	04/09/2009	04/16/2009	05/11/2009
US	FTTS INSP	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fu	EPA	04/09/2009	04/16/2009	05/11/2009
US	FUDS	Formerly Used Defense Sites	U.S. Army Corps of Engineers	01/31/2015	07/08/2015	10/13/2015
US	FUELS PROGRAM	EPA Fuels Program Registered Listing	EPA	05/21/2018	05/23/2018	09/07/2018
US	FUSRAP	Formerly Utilized Sites Remedial Action Program	Department of Energy	08/08/2017	09/11/2018	09/14/2018
US	HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing	Environmental Protection Agency	10/19/2006	03/01/2007	04/10/2007
US	HIST FTTS INSP	FIFRA/TSCA Tracking System Inspection & Enforcement Case Lis	Environmental Protection Agency	10/19/2006	03/01/2007	04/10/2007
US	HMIRS	Hazardous Materials Information Reporting System	U.S. Department of Transportation	03/26/2018	03/27/2018	06/08/2018
US	ICIS	Integrated Compliance Information System	Environmental Protection Agency	11/18/2016	11/23/2016	02/10/2017
US	IHS OPEN DUMPS	Open Dumps on Indian Land	Department of Health & Human Serivces, Indian	04/01/2014	08/06/2014	01/29/2015
US	INDIAN LUST R1	Leaking Underground Storage Tanks on Indian Land	EPA Region 1	04/13/2018	05/18/2018	07/20/2018
US	INDIAN LUST R10	Leaking Underground Storage Tanks on Indian Land	EPA Region 10	04/12/2018	05/18/2018	07/20/2018
US	INDIAN LUST R4	Leaking Underground Storage Tanks on Indian Land	EPA Region 4	05/08/2018	05/18/2018	07/20/2018
US	INDIAN LUST R5	Leaking Underground Storage Tanks on Indian Land	EPA, Region 5	04/12/2018	05/18/2018	07/20/2018
US	INDIAN LUST R6	Leaking Underground Storage Tanks on Indian Land	EPA Region 6	04/01/2018	05/18/2018	07/20/2018
US	INDIAN LUST R7	Leaking Underground Storage Tanks on Indian Land	EPA Region 7	04/24/2018	05/18/2018	07/20/2018
US	INDIAN LUST R8	Leaking Underground Storage Tanks on Indian Land	EPA Region 8	04/25/2018	05/18/2018	07/20/2018
US	INDIAN LUST R9	Leaking Underground Storage Tanks on Indian Land	Environmental Protection Agency	04/10/2018	05/18/2018	07/20/2018
US	INDIAN ODI	Report on the Status of Open Dumps on Indian Lands	Environmental Protection Agency	12/31/1998	12/03/2007	01/24/2008
US	INDIAN RESERV	Indian Reservations	USGS	12/31/2014	07/14/2015	01/10/2017
US	INDIAN UST R1	Underground Storage Tanks on Indian Land	EPA, Region 1	04/13/2018	05/18/2018	07/20/2018
US	INDIAN UST R10	Underground Storage Tanks on Indian Land	EPA Region 10	04/12/2018	05/18/2018	07/20/2018
US	INDIAN UST R4	Underground Storage Tanks on Indian Land	EPA Region 4	05/08/2018	05/18/2018	07/20/2018
US	INDIAN UST R5	Underground Storage Tanks on Indian Land	EPA Region 5	04/12/2018	05/18/2018	07/20/2018
US	INDIAN UST R6	Underground Storage Tanks on Indian Land	EPA Region 6	04/01/2018	05/18/2018	07/20/2018
US	INDIAN UST R7	Underground Storage Tanks on Indian Land	EPA Region 7	04/24/2018	05/18/2018	07/20/2018
US	INDIAN UST R8	Underground Storage Tanks on Indian Land	EPA Region 8	04/25/2018	05/18/2018	07/20/2018
US	INDIAN UST R9	Underground Storage Tanks on Indian Land	EPA Region 9	04/10/2018	05/18/2018	07/20/2018
US	INDIAN VCP R1	Voluntary Cleanup Priority Listing	EPA, Region 1	07/27/2015	09/29/2015	02/18/2016

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

St	Acronym	Full Name	Government Agency	Gov Date	Arvl. Date	Active Date
US	INDIAN VCP R7	Voluntary Cleanup Priority Lisitng	EPA, Region 7	03/20/2008	04/22/2008	05/19/2008
US	LEAD SMELTER 1	Lead Smelter Sites	Environmental Protection Agency	05/13/2018	05/30/2018	06/29/2018
US	LEAD SMELTER 2	Lead Smelter Sites	American Journal of Public Health	04/05/2001	10/27/2010	12/02/2010
US	LIENS 2	CERCLA Lien Information	Environmental Protection Agency	05/13/2018	05/30/2018	06/29/2018
US	LUCIS	Land Use Control Information System	Department of the Navy	05/14/2018	05/18/2018	07/20/2018
US	MLTS	Material Licensing Tracking System	Nuclear Regulatory Commission	08/30/2016	09/08/2016	10/21/2016
US	NPL	National Priority List	EPA	07/17/2018	08/09/2018	09/07/2018
US	NPL LIENS	Federal Superfund Liens	EPA	10/15/1991	02/02/1994	03/30/1994
US	ODI	Open Dump Inventory	Environmental Protection Agency	06/30/1985	08/09/2004	09/17/2004
US	PADS	PCB Activity Database System	EPA	06/01/2017	06/09/2017	10/13/2017
US	PCB TRANSFORMER	PCB Transformer Registration Database	Environmental Protection Agency	05/24/2017	11/30/2017	12/15/2017
US	PRP	Potentially Responsible Parties	EPA	10/25/2013	10/17/2014	10/20/2014
US	Proposed NPL	Proposed National Priority List Sites	EPA	07/17/2018	08/09/2018	09/07/2018
US	RAATS	RCRA Administrative Action Tracking System	EPA	04/17/1995	07/03/1995	08/07/1995
US	RADINFO	Radiation Information Database	Environmental Protection Agency	04/03/2018	04/05/2018	06/29/2018
US	RCRA NonGen / NLR	RCRA - Non Generators / No Longer Regulated	Environmental Protection Agency	03/01/2018	03/28/2018	06/22/2018
US	RCRA-CESQG	RCRA - Conditionally Exempt Small Quantity Generators	Environmental Protection Agency	03/01/2018	03/28/2018	06/22/2018
US	RCRA-LQG	RCRA - Large Quantity Generators	Environmental Protection Agency	03/01/2018	03/28/2018	06/22/2018
US	RCRA-SQG	RCRA - Small Quantity Generators	Environmental Protection Agency	03/01/2018	03/28/2018	06/22/2018
US	RCRA-TSDF	RCRA - Treatment, Storage and Disposal	Environmental Protection Agency	03/01/2018	03/28/2018	06/22/2018
US	RMP	Risk Management Plans	Environmental Protection Agency	05/01/2018	05/17/2018	09/07/2018
US	ROD	Records Of Decision	EPA	05/13/2018	05/30/2018	06/29/2018
US	SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing	Environmental Protection Agency	01/01/2017	02/03/2017	04/07/2017
US	SEMS	Superfund Enterprise Management System	EPA	07/17/2018	08/09/2018	09/07/2018
US	SEMS-ARCHIVE	Superfund Enterprise Management System Archive	EPA	07/17/2018	08/09/2018	09/07/2018
US	SSTS	Section 7 Tracking Systems	EPA	12/31/2009	12/10/2010	02/25/2011
US	TRIS	Toxic Chemical Release Inventory System	EPA	12/31/2016	01/10/2018	01/12/2018
US	TSCA	Toxic Substances Control Act	EPA	12/31/2016	06/21/2017	01/05/2018
US	UMTRA	Uranium Mill Tailings Sites	Department of Energy	06/23/2017	10/11/2017	11/03/2017
US	US AIRS (AFS)	Aerometric Information Retrieval System Facility Subsystem (	EPA	10/12/2016	10/26/2016	02/03/2017
US	US AIRS MINOR	Air Facility System Data	EPA	10/12/2016	10/26/2016	02/03/2017
US	US BROWNFIELDS	A Listing of Brownfields Sites	Environmental Protection Agency	06/18/2018	06/20/2018	09/14/2018
US	US CDL	Clandestine Drug Labs	Drug Enforcement Administration	05/18/2018	06/20/2018	09/14/2018
US	US ENG CONTROLS	Engineering Controls Sites List	Environmental Protection Agency	07/31/2018	08/28/2018	09/14/2018
US	US FIN ASSUR	Financial Assurance Information	Environmental Protection Agency	03/01/2018	03/27/2018	06/22/2018
US	US HIST CDL	National Clandestine Laboratory Register	Drug Enforcement Administration	05/18/2018	06/20/2018	09/14/2018
US	US INST CONTROL	Sites with Institutional Controls	Environmental Protection Agency	07/31/2018	08/28/2018	09/14/2018
US	US MINES	Mines Master Index File	Department of Labor, Mine Safety and Health A	05/03/2018	05/31/2018	06/29/2018
US	US MINES 2	Ferrous and Nonferrous Metal Mines Database Listing	USGS	12/05/2005	02/29/2008	04/18/2008
US	US MINES 3	Active Mines & Mineral Plants Database Listing	USGS	04/14/2011	06/08/2011	09/13/2011
US	UXO	Unexploded Ordnance Sites	Department of Defense	09/30/2017	06/19/2018	09/14/2018

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

St	Acronym	Full Name	Government Agency	Gov Date	Arvl. Date	Active Date
CT	CT MANIFEST	Hazardous Waste Manifest Data	Department of Energy & Environmental Protecti	08/10/2018	08/10/2018	09/10/2018
NJ	NJ MANIFEST	Manifest Information	Department of Environmental Protection	12/31/2017	07/13/2018	08/01/2018
NY	NY MANIFEST	Facility and Manifest Data	Department of Environmental Conservation	07/01/2018	08/01/2018	08/31/2018
PA	PA MANIFEST	Manifest Information	Department of Environmental Protection	12/31/2016	07/25/2017	09/25/2017
RI	RI MANIFEST	Manifest information	Department of Environmental Management	12/31/2017	02/23/2018	04/09/2018
WI	WI MANIFEST	Manifest Information	Department of Natural Resources	12/31/2017	06/15/2018	07/09/2018
US	AHA Hospitals	Sensitive Receptor: AHA Hospitals	American Hospital Association, Inc.			
US	Medical Centers	Sensitive Receptor: Medical Centers	Centers for Medicare & Medicaid Services			
US	Nursing Homes	Sensitive Receptor: Nursing Homes	National Institutes of Health			
US	Public Schools	Sensitive Receptor: Public Schools	National Center for Education Statistics			
US	Private Schools	Sensitive Receptor: Private Schools	National Center for Education Statistics			
MN	Daycare Centers	Sensitive Receptor: Child Care Centers	Department of Human Services			
US	Flood Zones	100-year and 500-year flood zones	Emergency Management Agency (FEMA)			
US	NWI	National Wetlands Inventory	U.S. Fish and Wildlife Service			
MN	State Wetlands	Wetlands Inventory	Land Management Information Center			
US	Topographic Map		U.S. Geological Survey			
US	Oil/Gas Pipelines		PennWell Corporation			
US	Electric Power Transmission Line Data		PennWell Corporation			

STREET AND ADDRESS INFORMATION

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GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

ST. CLOUD AASF
2185 SOUTHEAST 45TH AVENUE
SAINT CLOUD, MN 56304

TARGET PROPERTY COORDINATES

Latitude (North):	45.540344 - 45° 32' 25.24''
Longitude (West):	94.057506 - 94° 3' 27.02''
Universal Tranverse Mercator:	Zone 15
UTM X (Meters):	417437.1
UTM Y (Meters):	5043305.0
Elevation:	1020 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	5961617 CABLE, MN
Version Date:	2013

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

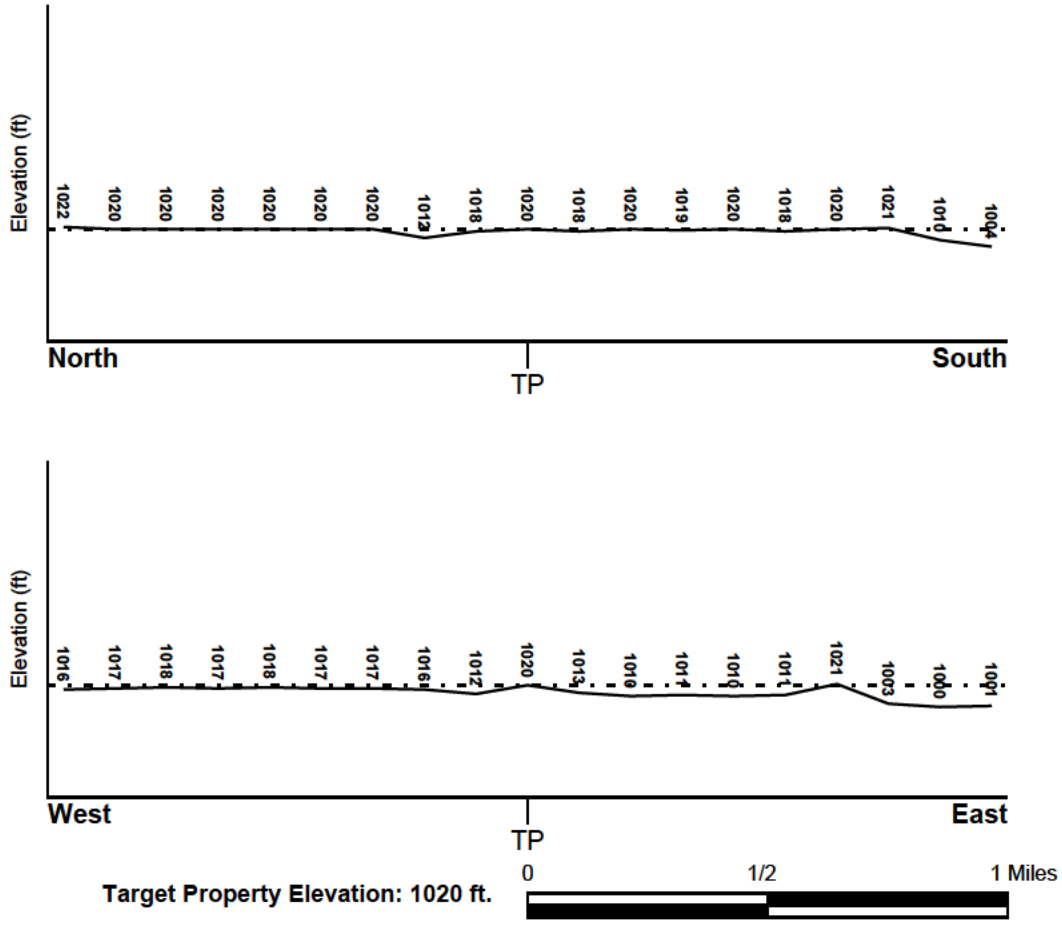
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General NE

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
27141C0045F	FEMA FIRM Flood data

Additional Panels in search area:	FEMA Source Type
27141C0040F	FEMA FIRM Flood data

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
CABLE	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius:	1.25 miles
Status:	Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

* ©1996 Site−specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

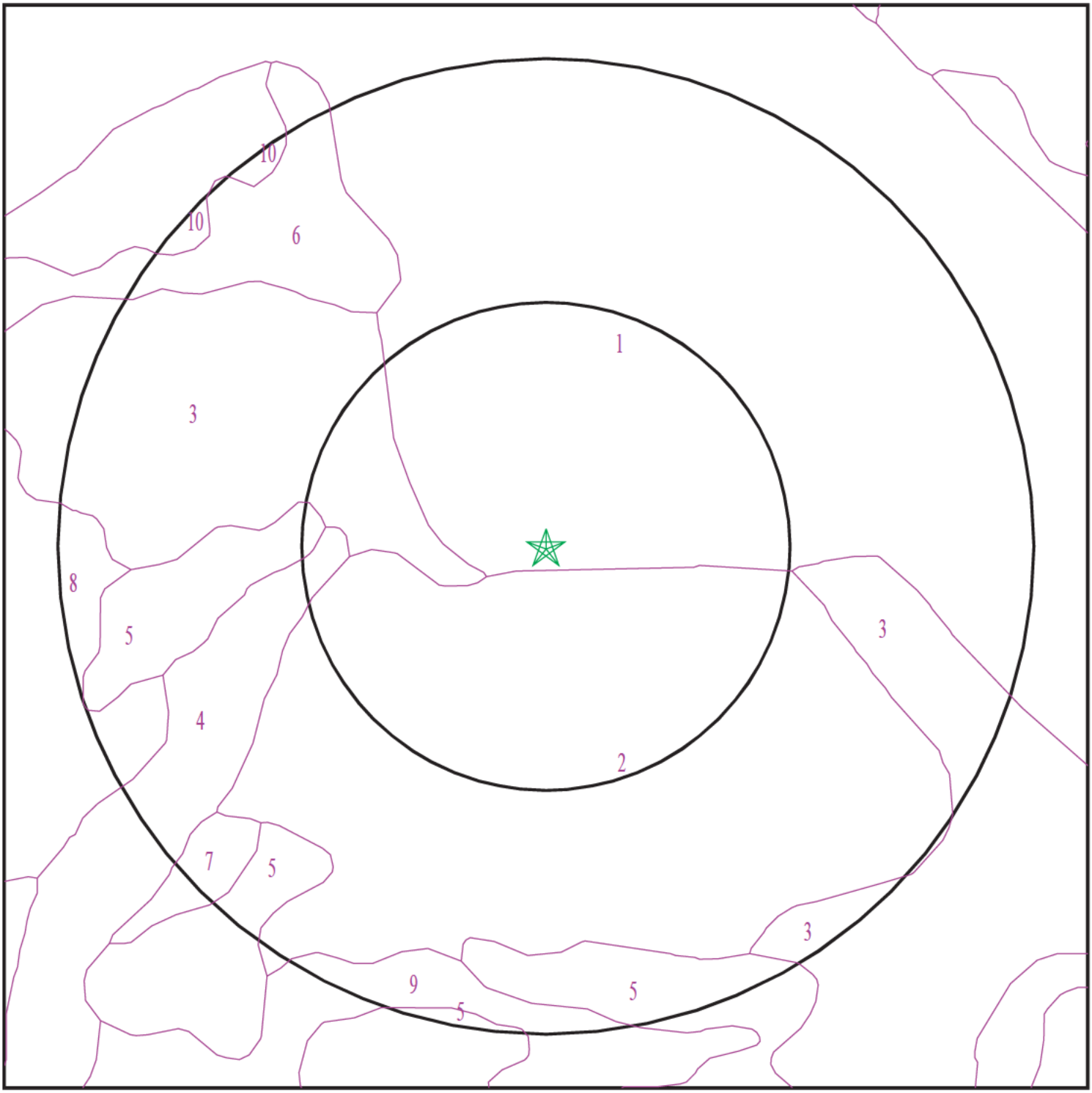
Era:	Precambrian
System:	Precambrian
Series:	X granitic rocks
Code:	Xg *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Plutonic and Intrusive Rocks

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 5441940.2s



★ Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME:	St. Cloud AASF	CLIENT:	AECOM
ADDRESS:	2185 Southeast 45th Avenue SAINT CLOUD MN 56304	CONTACT:	Brittany Kirchmann
LAT/LONG:	45.540344 / 94.057506	INQUIRY #:	5441940.2s
		DATE:	October 03, 2018 8:30 am

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GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name:	Udipsamments (cut and fill land)
Soil Surface Texture:	
Hydrologic Group:	Not reported
Soil Drainage Class:	
Hydric Status: Unknown	
Corrosion Potential - Uncoated Steel:	Not Reported
Depth to Bedrock Min:	> 0 inches
Depth to Watertable Min:	> 0 inches

No Layer Information available.

Soil Map ID: 2

Soil Component Name:	Sandberg
Soil Surface Texture:	loamy coarse sand
Hydrologic Group:	Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.
Soil Drainage Class:	Excessively drained
Hydric Status: Not hydric	
Corrosion Potential - Uncoated Steel:	Moderate
Depth to Bedrock Min:	> 0 inches
Depth to Watertable Min:	> 0 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	loamy coarse sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 282.29 Min: 141.14	Max: 8.4 Min: 7.4
2	11 inches	35 inches	gravelly coarse sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 282.29 Min: 141.14	Max: 8.4 Min: 7.4
3	35 inches	79 inches	gravelly coarse sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 282.29 Min: 141.14	Max: 8.4 Min: 7.4

Soil Map ID: 3

Soil Component Name: Hubbard

Soil Surface Texture: loamy sand

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	12 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6
2	12 inches	18 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6
3	18 inches	79 inches	sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6

Soil Map ID: 4

Soil Component Name: Seelyeville

Soil Surface Texture: muck

Hydrologic Group: Class A/D - Drained/undrained hydrology class of soils that can be drained and are classified.

Soil Drainage Class: Very poorly drained

Hydric Status: All hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	14 inches	muck	A-8	Highly organic soils, Peat.	Max: 42.34 Min: 1.41	Max: Min:
2	14 inches	79 inches	muck	A-8	Highly organic soils, Peat.	Max: 42.34 Min: 1.41	Max: Min:

Soil Map ID: 5

Soil Component Name: Hubbard

Soil Surface Texture: loamy sand

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	18 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6
2	18 inches	22 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
3	22 inches	79 inches	sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6

Soil Map ID: 6

Soil Component Name: Isan

Soil Surface Texture: sandy loam

Hydrologic Group: Class B/D - Drained/undrained hydrology class of soils that can be drained and are classified.

Soil Drainage Class: Poorly drained

Hydric Status: All hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 15 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	18 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand.	Max: 141.14 Min: 42.34	Max: 7.3 Min: 5.6
2	18 inches	29 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand.	Max: 141.14 Min: 42.34	Max: 7.3 Min: 5.6

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
3	29 inches	79 inches	coarse sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand.	Max: 141.14 Min: 42.34	Max: 7.3 Min: 5.6

Soil Map ID: 7

Soil Component Name: Hubbard

Soil Surface Texture: loamy sand

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6
2	11 inches	33 inches	coarse sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
3	33 inches	79 inches	coarse sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6

Soil Map ID: 8

Soil Component Name: Hubbard

Soil Surface Texture: loamy sand

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	20 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6
2	20 inches	31 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
3	31 inches	79 inches	sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Well-graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6

Soil Map ID: 9

Soil Component Name: Arvilla

Soil Surface Texture: sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Somewhat excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	14 inches	sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 8.4 Min: 7.4

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
2	14 inches	20 inches	sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 8.4 Min: 7.4
3	20 inches	79 inches	gravelly coarse sand	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 8.4 Min: 7.4

Soil Map ID: 10

Soil Component Name: Duelm

Soil Surface Texture: loamy sand

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Moderately well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 76 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	16 inches	loamy sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6
2	16 inches	29 inches	coarse sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6
3	29 inches	79 inches	coarse sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Clean Sands, Poorly graded sand.	Max: 141.14 Min: 42.34	Max: 7.8 Min: 5.6

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
2	USGS40000549343	1/8 - 1/4 Mile East
A4	USGS40000549144	1/4 - 1/2 Mile South

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
C9	USGS40000549041	1/2 - 1 Mile South
D12	USGS40000549104	1/2 - 1 Mile SW
D15	USGS40000591578	1/2 - 1 Mile SW
E16	USGS40000549081	1/2 - 1 Mile SW
F19	USGS40000548993	1/2 - 1 Mile SSW
F20	USGS40000548973	1/2 - 1 Mile SSW
G21	USGS40000549197	1/2 - 1 Mile ESE
H24	USGS40000548850	1/2 - 1 Mile SSE
I27	USGS40000549844	1/2 - 1 Mile NNE
I28	USGS40000549845	1/2 - 1 Mile NNE

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

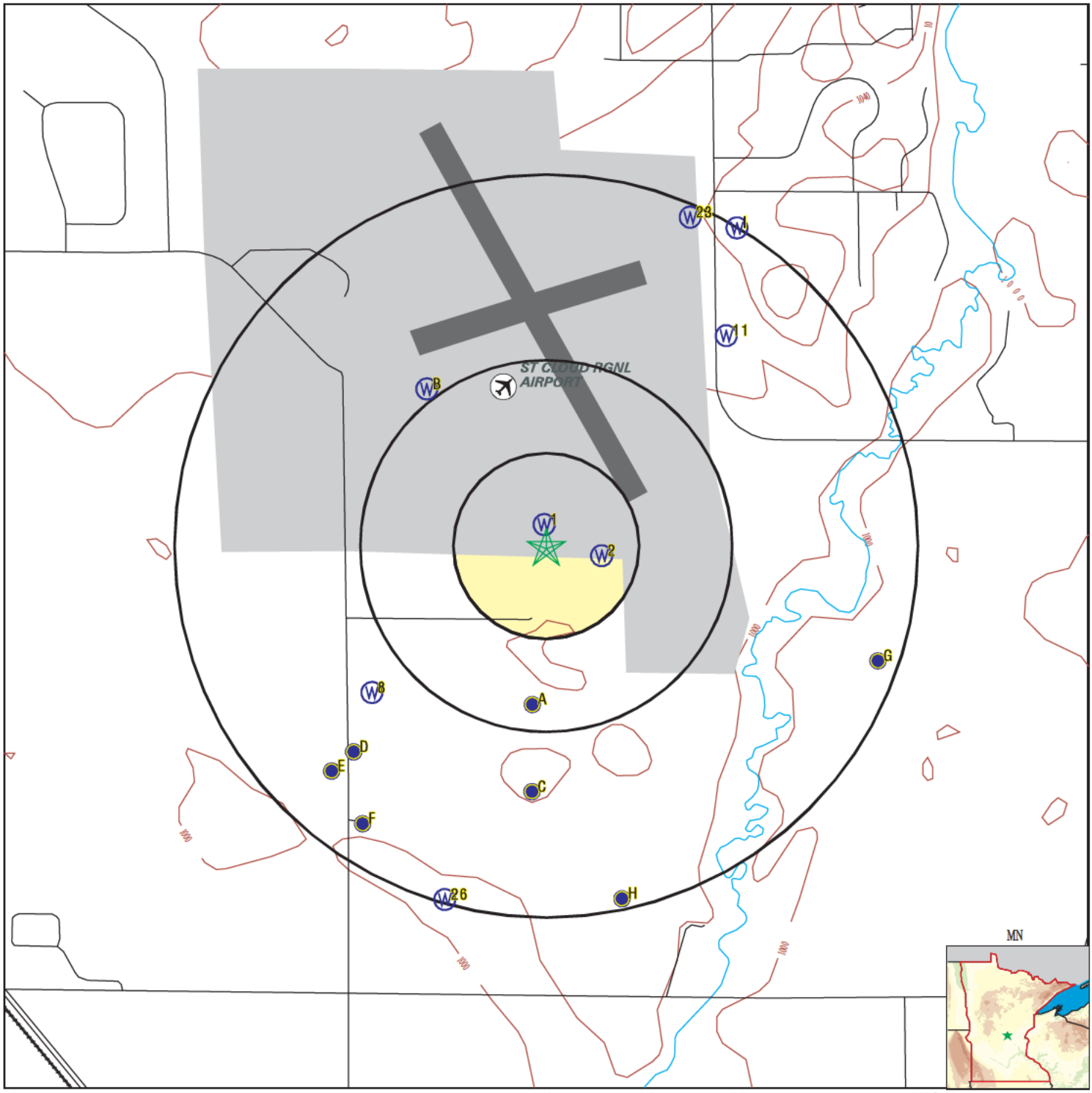
MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	MN6000000227876	0 - 1/8 Mile North
A3	MN6000000174266	1/4 - 1/2 Mile South
B5	MN6000000258384	1/2 - 1 Mile NW
B6	MN6000000258385	1/2 - 1 Mile NW
B7	MN6000000258386	1/2 - 1 Mile NW
8	MN6000000266547	1/2 - 1 Mile SW
C10	MN6000000156825	1/2 - 1 Mile South
11	MN6000000235273	1/2 - 1 Mile NE
D13	MN6000000068124	1/2 - 1 Mile SW
D14	MN6000000254772	1/2 - 1 Mile SW
E17	MN6000000111417	1/2 - 1 Mile SW
F18	MN6000000093537	1/2 - 1 Mile SSW
G22	MN6000000190158	1/2 - 1 Mile ESE
23	MN6000000186552	1/2 - 1 Mile NNE
H25	MN6000000133769	1/2 - 1 Mile SSE
26	MN6000000217622	1/2 - 1 Mile SSW

PHYSICAL SETTING SOURCE MAP - 5441940.2s



County Boundary
Major Roads
Contour Lines
Airports
Earthquake epicenter, Richter 5 or greater
Water Wells
Public Water Supply Wells
Cluster of Multiple Icons

Groundwater Flow Direction
GI Indeterminate Groundwater Flow at Location
GV Groundwater Flow Varies at Location
HD Closest Hydrogeological Data

SITE NAME:	St. Cloud AASF	CLIENT:	AECOM
ADDRESS:	2185 Southeast 45th Avenue SAINT CLOUD MN 56304	CONTACT:	Brittany Kirchmann
LAT/LONG:	45.540344 / 94.057506	INQUIRY #:	5441940.2s
		DATE:	October 03, 2018 8:30 am

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GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID Direction Distance Elevation		Database	EDR ID Number
1 **North** **0 - 1/8 Mile** **Higher**	Click here for full text details	**MN WELLS**	**MN6000000227876**
2 **East** **1/8 - 1/4 Mile** **Lower**	Click here for full text details	**FED USGS**	**USGS40000549343**
A3 **South** **1/4 - 1/2 Mile** **Lower**	Click here for full text details	**MN WELLS**	**MN6000000174266**
A4 **South** **1/4 - 1/2 Mile** **Lower**	Click here for full text details	**FED USGS**	**USGS40000549144**
B5 **NW** **1/2 - 1 Mile** **Higher**	Click here for full text details	**MN WELLS**	**MN6000000258384**
B6 **NW** **1/2 - 1 Mile** **Higher**	Click here for full text details	**MN WELLS**	**MN6000000258385**
B7 **NW** **1/2 - 1 Mile** **Higher**	Click here for full text details	**MN WELLS**	**MN6000000258386**
8 **SW** **1/2 - 1 Mile** **Lower**	Click here for full text details	**MN WELLS**	**MN6000000266547**

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID Direction Distance Elevation		Database	EDR ID Number
C9 **South** **1/2 - 1 Mile** **Higher**	Click here for full text details	**FED USGS**	**USGS40000549041**
C10 **South** **1/2 - 1 Mile** **Higher**	Click here for full text details	**MN WELLS**	**MN6000000156825**
11 **NE** **1/2 - 1 Mile** **Higher**	Click here for full text details	**MN WELLS**	**MN6000000235273**
D12 **SW** **1/2 - 1 Mile** **Lower**	Click here for full text details	**FED USGS**	**USGS40000549104**
D13 **SW** **1/2 - 1 Mile** **Lower**	Click here for full text details	**MN WELLS**	**MN6000000068124**
D14 **SW** **1/2 - 1 Mile** **Lower**	Click here for full text details	**MN WELLS**	**MN6000000254772**
D15 **SW** **1/2 - 1 Mile** **Lower**	Click here for full text details	**FED USGS**	**USGS40000591578**
E16 **SW** **1/2 - 1 Mile** **Lower**	Click here for full text details	**FED USGS**	**USGS40000549081**
E17 **SW** **1/2 - 1 Mile** **Lower**	Click here for full text details	**MN WELLS**	**MN6000000111417**

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID Direction Distance Elevation		Database	EDR ID Number
F18 **SSW** **1/2 - 1 Mile** **Lower**	Click here for full text details	**MN WELLS**	**MN6000000093537**
F19 **SSW** **1/2 - 1 Mile** **Lower**	Click here for full text details	**FED USGS**	**USGS40000548993**
F20 **SSW** **1/2 - 1 Mile** **Lower**	Click here for full text details	**FED USGS**	**USGS40000548973**
G21 **ESE** **1/2 - 1 Mile** **Lower**	Click here for full text details	**FED USGS**	**USGS40000549197**
G22 **ESE** **1/2 - 1 Mile** **Lower**	Click here for full text details	**MN WELLS**	**MN6000000190158**
23 **NNE** **1/2 - 1 Mile** **Higher**	Click here for full text details	**MN WELLS**	**MN6000000186552**
H24 **SSE** **1/2 - 1 Mile** **Lower**	Click here for full text details	**FED USGS**	**USGS40000548850**
H25 **SSE** **1/2 - 1 Mile** **Lower**	Click here for full text details	**MN WELLS**	**MN6000000133769**
26 **SSW** **1/2 - 1 Mile** **Lower**	Click here for full text details	**MN WELLS**	**MN6000000217622**

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID Direction Distance Elevation		Database	EDR ID Number
I27 **NNE** **1/2 - 1 Mile** **Higher**	**Click here for full text details**	**FED USGS**	**USGS40000549844**
I28 **NNE** **1/2 - 1 Mile** **Higher**	**Click here for full text details**	**FED USGS**	**USGS40000549845**

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: MN Radon

Radon Test Results

Zipcode	Num Tests	Minimum	Maximum	Average	# > 4 pCi/L	# < 4 pCi/L
56304	584	0.0	25.6	4.9	315	269

Federal EPA Radon Zone for SHERBURNE County: 1

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 56304

Number of sites tested: 2

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	Not Reported	Not Reported	Not Reported	Not Reported
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	3.150 pCi/L	50%	50%	0%

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory
Source: Land Management Information Center
Telephone: 617-297-3281

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Minnesota Groundwater Database
Source: Minnesota Geological Survey County Water Well Index (CWI)
Telephone: 612-627-4780

OTHER STATE DATABASE INFORMATION

RADON

State Database: MN Radon
Source: Department of Health
Telephone: 651-215-0909
Radon Test Results

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STREET AND ADDRESS INFORMATION

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Appendix B
Preliminary Assessment Documentation

Appendix B.1
Interview Records

PA Interview Questionnaire – Fire Station

Facility: St. Cloud AASF
Interviewer: [redacted]
Date/Time: 9/25/2018; 13:00

Interviewee: [redacted] **(St. Cloud Fire Department)** **Title: Fire Chief** **Phone Number: (320) 255-7213** **Email: N/A**	Can your name/role be used in the PA Report? **Y** or N Can you recommend anyone we can interview? Y or **N**

1. Roles or activities with the Facility/years working at the Facility.

The St. Cloud Fire Department provides emergency response to the St. Cloud AASF.

2. What can you tell us about the history of AFFF at the Facility? Was it used for any of the following activities, circle all that apply and indicate years of active use, if known? Identify these locations on a facility map. None known

   Maintenance (e.g., ramp washing)
   Fire Training Areas - nozzle testing at the airport
   Firefighting (Active Fire)
   Crash
   Fire Suppression Systems (Hangers/Dining Facilities)
   Fire Protection at Fueling Stations
   Non-Technical/Recreational/ Pest Management

3. Are any current buildings constructed with AFFF dispensing systems or fire suppression systems? What are the AFFF/suppression system test requirements? What is the frequency of testing at the AFFF/suppression systems?

   No known suppression systems at the airport hangars.

4. Are fire suppression systems currently charged with AFFF or have they been retrofitted for use of high expansion foam?

   N/A

5. How is AFFF procured? Do you have an inventory/procurement system that tracks use?

   AFFF procured for the St. Cloud Fire Department by the city.

6. What type of AFFF has been/is being used (3%, 6%, Mil Spec Mil-F-24385, High Expansion)? Manufacturer (3M, Dupont, Ansul, National Foam, Angus, Chemguard, Buckeye, Fire Service Plus)?

   Unknown

7. Is AFFF formulated on base? If so, where is the solution mixed, contained, transferred, etc.?

   No

8. Where is the AFFF stored? How is it stored (tanks, 55-gallon drums, 5-gallon buckets)? What size are the storage tanks? Is the AFFF stored as a mixed solution (3% or 6%) or concentrated material?

   The City of St. Cloud stores AFFF at the Station 4 at the airport in 55-gallon drums.

9. How is the AFFF transferred to emergency response vehicles, suppression systems, flightline extinguishers? Is/was there a specified area on the facility where vehicles are filled with AFFF and does this area have secondary containment in case of spills? How and where are vehicles storing AFFF cleaned/decontaminated?

   Unknown

10. Provide a list of vehicles that carried AFFF, now and in the past, and where are/were they located?

    Station 4 has 2 crash rescue fire trucks that are manned only during incoming charter flights. No one was available at Station 4 during the site visit.

11. Any vehicles have a history of leaking AFFF? Do you/did you test the vehicles spray patterns to make sure equipment is working properly? How often are/were these spray tests performed and can you provide the locations of these tests, now and in the past?

    Unknown

12. How many FTAs are/were on this facility and where are they? Locate on a map. How many FTAs are active and inactive? For inactive FTAs, when was the last time that fire training using AFFF was conducted at them?

    Annual nozzle testing is conducted at the airport. The City of St. Cloud Fire Department indicated they have not conducted any other training with AFFF at the airport. A Phase I report by Delta indicated two potential releases by the Ct. Cloud Fire Department: a potential release at the airport and a potential release at Station 2. Training information at the airport conflicts with information provided by MNARNG (try to corroborate with [redacted]).

PA Interview Questionnaire – Fire Station

Facility: St. Cloud AASF
Interviewer: [redacted]
Date/Time: 9/25/2018; 13:00

13. What types of fuels/flammables were used at the FTAs?

    N/A

14. What was the frequency of AFFF use at each location? When a release of AFFF occurs during a fire training exercise, now and in the past, how is/was the AFFF cleaned and disposed of? Were retention ponds built to store discharged AFFF? Was the AFFF trickled to the sanitary sewer or left in the pond to infiltrate?

    N/A

15. Are there mutual aid/use agreements between county, city, local fire department? Please list, even if informal. If formalized, may we have a copy of the agreement? Can you recall specific times when city, county, state personnel came on-post for training? If so, please state which state/county agency, military entity? Do you have any records, including photographs to share with us?

    Yes, the City of St. Cloud provides emergency response for the St. Cloud AASF

16. Did individual units come on-post with their own safety personnel, did they also bring their own AFFF? Was training with AFFF part of these exercises? How were emergencies handled under these circumstances?

    N/A

17. Did military routinely or occasionally fire train off-post? List units that you can recall used/trained at various areas.

    The ARNG has not trained off-post with the St. Cloud Fire Department

18. Are there specific emergency response incident reports (i.e., aircraft or vehicle crash sites and fires)? If so, may we please copy these reports? Who (entity) was the responder?

A small amount of AFFF was dispensed on a small plane fire in one of the hangars at the airport.

19. Do you have records of fuel spill logs? Was it common practice to wash away fuel spills with AFFF? Is/was AFFF used as a precaution in response to fuel releases or emergency runway landings to prevent fires?

    N/A

20. Was AFFF used for forest fires or fire management on-post/off-post? If so, please describe what happened and who was involved?

    N/A

21. Can you provide any other locations where AFFF has been stored, released, or used (i.e. hangars, buildings, fire stations, firefighting equipment testing and maintenance areas, emergency response sites, storm water/surface water, waste water treatment plants, and AFFF ponds)?

    N/A

22. Are you aware of any other creative uses of AFFF? If so, how was AFFF used? What entities were involved?

    No

23. How is off-spec AFFF disposed (used for training, turned in, or given to a local Fire Station)? If applicable, do you know the name of the vendor that removes off-spec AFFF? Do you have copies of the manifest or B/L?

    N/A

PA Interview Questionnaire – Fire Station

Facility: St. Cloud AASF
Interviewer: [redacted]
Date/Time: 9/25/2018; 13:00

24. Do you recommend anyone else we can interview? If so, do you have contact information for them?
No

PA Interview Questionnaire - Other

Facility: St. Cloud AASF
Interviewer: [redacted]
Date/Time: 9/25/2018; 08:00

Interviewees: See below **Roles: Varies, See below** **Phone Number: contact through** [redacted] **Email: contact through** [redacted]	Can your name/role be used in the PA Report? **Y** or N Can you recommend anyone we can interview? **Y** or N [redacted]

Roles or activities with the Facility/Years working at the Facility:

From sign-in sheet:

[redacted]

AASF was built in 2007 and started operations in 2009. The AASF is on property owned by the St. Cloud regional airport and leased (99 year lease) by the MNARNG.

PFAS Use: Identify accidental/intentional release locations, time frame of release, frequency of releases, storage container size (maintenance, fire training, firefighting, buildings with suppression systems (as builts), fueling stations, crash sites, pest management, recreational, dining facilities, metals plating, or waterproofing). How are materials ordered/purchased/disposed/shared with others?

The AASF has a 1300 gallon fire suppression system for the hanger filled with Jet-X high expansion foam (SDS provided by MNARNG). The hangar has 24 hoods for the suppression system. The pumps are run monthly and the system is inspected annually with water only by Johnson Controls (formally SimplexGrinell). There have been 3 releases from the fire suppression system in the hangar: 1.) Initial test in March 2009 prior to MNARNG assuming ownership of the building. About 200 gallons of AFFF concentrate were released (6-8 feet high in the hangar) and then washed down the trench drain in the hangar. The trench drain is plumbed to a flammable waste interceptor and then to the sanitary sewer. 2.) A contractor accidentally set off the system on 11 February 2011. About 200 gallons of AFFF concentrate were released (6-8 feet high in the hangar), lines were flushed, and foam was washed down the trench drain in the hangar. The trench drain is plumbed to a flammable waste interceptor and then to the sanitary sewer. 3.) The building was hit by lightning during a storm in June 2013; stray voltage triggered the fire suppression system and all 1300 gallons were expended. The bladder in the tank was damaged and had to be replaced. The storm hit at approximately 03:00 and took out the power so cameras in the hangar were not working. Foam filled the 80,000 sq ft hangar to the ceiling (pictures provided by MNARNG). After the release both the northeast and southwest end doors on the hangar were opened and foam was pushed out and washed out onto the ramp. Some foam went to the oil-water separator and then to the sanitary sewer, but the majority of foam washed out or was plowed out into detention ponds.

Known Uses
Use
Procurement
Disposition
Storage (Mixed)
Storage (Solution)
Inventory, Off-Spec
Containment
SOP on Filling
Leaking Vehicles
Nozzle and Suppression System Testing
Dining Facilities
Vehicle Washing

PA Interview Questionnaire - Other

Facility: St. Cloud AASF
Interviewer: [redacted]
Date/Time: 9/25/2018; 08:00

The ramps have oil-water separators that are emptied once per year or sooner if issues arise. The ramp has a switch to send water to either sanitary or to storm water. Storm water ends up in the detention ponds on the northeast and southwest ends of the ramp. The detention pond on the northeast end has an additional lower lying area to the north. Due to concerns of possible flooding, a swale was cut into the detention pond on the southwest end of the ramp in 2015-2016; however, the MNARNG has never seen the area flood during heavy rains or rapid snowmelt.

Historically, the AASF had 7 TriMax 30 fire extinguishers (1 training, 2 outdoor with 6% AFFF, 4 indoor with 3% AFFF). The TriMax fire extinguishers were never used at the AASF for training or emergency response. Hydrostatic testing was conducted by a contractor, [redacted] at his facility. The AASF did have bulk AFFF in 5 gallon buckets, both 3% and 6% and refilled the TriMax fire extinguishers after testing in the engine shop. Any spills of AFFF were small and were wiped up with rags. The engine shop does not have floor drains. In October 2017, the TriMax fire extinguishers were replaced by 7 125lb Purple K fire extinguishers. The TriMax fire extinguishers were returned full to Camp Ripley and are currently sitting in the USPFO warehouse awaiting demilitarization.

Fire fighting services for the AASF are provided by the City of St. Cloud which has a station, Station 4, at the St. Cloud Regional Airport. The MNARNG did not recall any emergency response by the City of St. Cloud at the airport; however, the MNARNG does recall seeing the St. Cloud fire department train with foam at the north end of the runway in 2015 or 2016 and possibly at the north end of the Station 4 building.

PA Interview Questionnaire - Other

Facility: St. Cloud AASF
Interviewer: [redacted]
Date/Time: 10/24/2018, 15:30

Interviewee: [redacted] **Title: St. Cloud Regional Airport Manager** **Phone Number:** [redacted]	Can your name/role be used in the PA Report? **Y** or N Can you recommend anyone we can interview? Y or **N**

Roles or activities with the Facility/Years working at the Facility:

[redacted] has served as the manager of the St. Cloud Regional Airport since 2002.

PFAS Use: Identify accidental/intentional release locations, time frame of release, frequency of releases, storage container size (maintenance, fire training, firefighting, buildings with suppression systems (as builts), fueling stations, crash sites, pest management, recreational, dining facilities, metals plating, or waterproofing). How are materials ordered/purchased/disposed/shared with others?

[redacted] indicated the only usage of AFFF at the St. Cloud Regional Airport has been semiannual nozzle testing for Station 4 conducted on the north side of the ARFF building between the building and the ramp. During the semiannual nozzle testing, approximately 5 gallons of AFFF mixture are sprayed and tested with a refractometer. [redacted] is not aware of any other use of AFFF at the airport. The MNARNG indicated possible AFFF training had occurred at the north end of Runway 13/31. However, [redacted] was unaware of AFFF training at the north end of the runway. The airport holds triannual emergency exercise training at the north end of the runway; however, only water is used. None of the hangars at the airport are equipped with an AFFF fire suppression system. [redacted] does not believe AFFF was used on the small plane fire in the hangar. [redacted] recalled the fire being put out with ABC fire extinguishers before the fire department arrived.

Known Uses
Use
Procurement
Disposition
Storage (Mixed)
Storage (Solution)
Inventory, Off-Spec
Containment
SOP on Filling
Leaking Vehicles
Nozzle and Suppression System Testing
Dining Facilities
Vehicle Washing
Ramp Washing
Fuel Spill Washing and Fueling Stations
Chrome Plating or Waterproofing

Appendix B.2
Visual Site Inspection Checklists

Visual Site Inspection Checklist

Names(s) of people performing VSI: [redacted]

Recorded by: [redacted]

ARNG Contact: [redacted]

Date and Time: 25 September 2018, 10:00

Method of visit (walking, driving, adjacent): walking

Source/Release Information

Site Name / Area Name / Unique ID: St. Cloud AASF

Site / Area Acreage: Northeast and Southwest Detention Ponds

Historic Site Use (Brief Description): The current AASF facilities include an 80,000 square foot hangar with an AFFF fire suppression system for the operation, maintenance, and repair of MNARNG rotary-winged aircraft, administrative offices, and classrooms.

Current Site Use (Brief Description): Same as historic use

Physical barriers or access restrictions: Access to the facility is controlled

1. Was PFAS used (or spilled) at the site/area? **Y / N**

1a. If yes, document how PFAS was used and usage time (e.g., fire fighting training 2001 to 2014):
Three releases of AFFF from the fire suppression system have occurred: 2009, 2011, and 2013.

2. Has usage been documented? **Y / N**

2a. If yes, keep a record (place electronic files on a disk):
Information documented by Mr. Mike Allen. Photographs available electronically.

3. What types of businesses are located near the site? **Industrial / Commercial / Plating / Waterproofing / Residential**

3a. Indicate what businesses are located near the site
The St. Cloud Regional Airport is adjacent to the AASF.

4. Is this site located at an airport/flightline? **Y / N**

4a. If yes, provide a description of the airport/flightline tenants:
The St. Cloud Regional Airport is adjacent to the AASF.

Visual Site Inspection Checklist

Other Significant Site Features:

1. Does the facility have a fire suppression system? **Y / N**

1a. If yes, indicate which type of AFFF has been used:

The AASF hangar contains 24 hoods supplied by a 1300-gallon fire suppression system filled with Jet-X high expansion foam.

1b. If yes, describe maintenance schedule/leaks:

The pumps are tested monthly and the system is inspected annually using water only by Johnson Controls (formally SimplexGrinnell). The bladder in the AFFF tank that supplies the fire suppression system was damaged during the June 2013 release and replaced.

1c. If yes, how often is the AFFF replaced:

AFFF has been replaced three times after releases from the system.

1d. If yes, does the facility have floor drains and where do they lead? Can we obtain an as built drawing?

The facility has a trrench drain around the perimeter of the hangar. The trench drain is plumbed to a flammable waste interceptor and then to the sanitary sewer. As-built drawings can be requested from MNARNG as necessary.

Transport / Pathway Information

Migration Potential:

1. Does site/area drainage flow off installation? **Y / N**

1a. If so, note observation and location:

Drainage from the AASF flows to the detention ponds/wetland areas and then towards the river.

2. Is there channelized flow within the site/area? **Y / N**

2a. If so, please note observation and location:

Channelized flow exists from the detention pond to the river.

3. Are monitoring or drinking water wells located near the site? **Y / N**

3a. If so, please note the location:

Residential wells are located downgradient of the facility.

4. Are surface water intakes located near the site? **Y / N**

4a. If so, please note the location:

5. Can wind dispersion information be obtained? **Y / N**

5a. If so, please note and observe the location.

Wind dispersion information can be obtained from the St. Cloud Regional Airport.

6. Does an adjacent non-ARNG PFAS source exist? **Y / N**

6a. If so, please note the source and location.

St. Cloud Regional Airport to the northwest.

Visual Site Inspection Checklist

6b. Will off-site reconnaissance be conducted?	**Y / N**	Follow-up with the St. Cloud Fire Department and the St. Cloud Regional Airport Manager

Significant Topographical Features:

1. Has the infrastructure changed at the site/area? **Y / N**

1a. If so, please describe change (ex. Structures no longer exist):

Due to concerns of possible flooding at the facility, a swale was cut into the detention pond on the southwest end of the ramp in 2015 or 2016.

2. Is the site/area vegetated? **Y / N**

2a. If not vegetated, briefly describe the site/area composition:

3. Does the site or area exhibit evidence of erosion? **Y / N**

3a. If yes, describe the location and extent of the erosion:

4. Does the site/area exhibit any areas of ponding or standing water? **Y / N**

4a. If yes, describe the location and extent of the ponding:

Detention ponds and wetlands are located at or near the site. Flooding has not been observed at the facility, but ponding water has been noted during heavy rainfall and large snowmelts.

Receptor Information

1. Is access to the site restricted? **Y / N**

1a. If so, please note to what extent:

The facility is gated and identification must be shown prior to entering the facility.

2. Who can access the site? **Site Workers / Construction Workers / Trespassers / Residential / Recreational Users / Ecological**

2a. Circle all that apply, note any not covered above:

3. Are residential areas located near the site? **Y / N**

3a. If so, please note the location/distance:

Residential areas are located within one mile of the facility to the northeast and southwest.

4. Are any schools/day care centers located near the site? **Y / N**

4a. If so, please note the location/distance/type:

Visual Site Inspection Checklist

5. Are any wetlands located near the site? **Y / N**

5a. If so, please note the location/distance/type:

The St. Cloud AASF has detention ponds on both the northeast and southwest sides of the ramps, flanked by wetlands, which collect runoff from the AASF.

Additional Notes

Photographic Log

Photo ID/Name	Date & Location	Photograph Description
Photograph No. 1	9/25/2018; St. Cloud AASF	55-gallon drum of Jet-X High-Expansion Foam
Photograph No. 2	9/25/2018; St. Cloud AASF	1300-gallon fire suppression system tank
Photograph No. 3	9/25/2018; St. Cloud AASF	Fire suppression system pumps and piping
Photograph No. 4	9/25/2018; St. Cloud AASF	Fire suppression system piping
Photograph No. 5	9/25/2018; St. Cloud AASF	Fire suppression system hood
Photograph No. 6	9/25/2018; St. Cloud AASF	Jet-X High-Expansion Foam in the St. Cloud AASF hangar after the 11 February 2011 release. Photograph provided by MNARNG.

Appendix B.3
Conceptual Site Model Information

Preliminary Assessment – Conceptual Site Model Information

Site Name: St. Cloud AASF

Why has this location been identified as a site?

There have been three documented releases from the fire suppression system.

Are there any other activities nearby that could also impact this location? Yes

The St. Cloud Regional Airport and Station 4 for the St. Cloud Fire Department are upgradient of the AASF.

Training Events

Have any training events with AFFF occurred at this site? No

If so, how often? N/A

How much material was used? Is it documented? N/A

Identify Potential Pathways: Do we have enough information to fully understand over land surface water flow, groundwater flow, and geological formations on and around the facility? Any direct pathways to larger water bodies?

Surface Water:

Surface water flow direction?South-southwest

Average rainfall? 27.72 inches

Any flooding during rainy season? No

Direct or indirect pathway to ditches? Yes

Direct or indirect pathway to larger bodies of water? No

Does surface water pond any place on site? Yes, detention ponds on the northeastern and southwestern sides of the AASF

Any impoundment areas or retention ponds? Yes

Any NPDES location points near the site? Yes

How does surface water drain on and around the flight line? Yes

Preliminary Assessment – Conceptual Site Model Information

Groundwater:

Groundwater flow direction? South-southwest

Depth to groundwater? 7 to 28 feet bgs

Uses (agricultural, drinking water, irrigation)? Drinking water and irrigation

Any groundwater treatment systems? None known

Any groundwater monitoring well locations near the site? None known

Is groundwater used for drinking water? St. Cloud AASF is on city water but private, residential wells are located in the area

Are there drinking water supply wells on installation? No

Do they serve off-post populations? No

Are there off-post drinking water wells downgradient ? Yes

Waste Water Treatment Plant:

Has the installation ever had a WWTP, past or present? No

If so, do we understand the process and which water is/was treated at the plant? N/A

Do we understand the fate of sludge waste? N/A

Is surface water from potential contaminated sites treated? N/A

Equipment Rinse Water

1. Is firefighting equipment washed? Where does the rinse water go? No

2. Are nozzles tested? How often are nozzles tested? Where are nozzles tested? Are nozzles cleaned after use? Where does the rinse water flow after cleaning nozzles? No

3. Other? No

Preliminary Assessment – Conceptual Site Model Information

Identify Potential Receptors:

Site Worker: Yes

Construction Worker: Yes

Recreational User: Yes

Residential: Yes

Child: Yes

Ecological: Yes

Note what is located near by the site (e.g. daycare, schools, hospitals, churches, agricultural, livestock)?
St. Cloud Regional Airport

Documentation

Ask for Engineering drawings (if applicable). Drawings may be requested from MNARNG.

Has there been a reconstruction or changes to the drainage system? When did that occur? Yes
Due to concerns of possible flooding at the facility, a swale was cut into the detention pond on the southwestern side of the ramp in 2015 or 2016.

Appendix C
Photographic Log

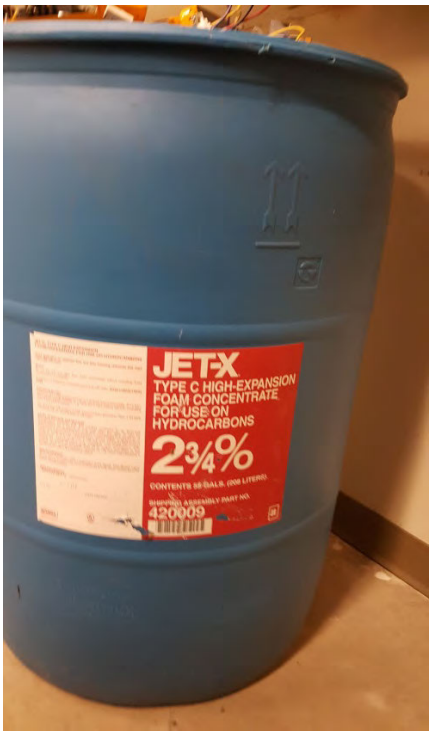
APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Army Aviation Support Facility, St. Cloud, Minnesota	St. Cloud, Minnesota

Photograph No. 1

Description:

55-gallon drum of Jet-X High-Expansion Foam used to refill the St. Cloud AASF fire suppression system tank.



Photograph No. 2

Description:

1300-gallon fire suppression system tank for the St. Cloud AASF.



APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Army Aviation Support Facility, St. Cloud, Minnesota	St. Cloud, Minnesota

Photograph No. 3

Description:

Fire suppression system pumps and piping for the St. Cloud AASF.



Photograph No. 4

Description:

Fire suppression system piping to the St. Cloud AASF.



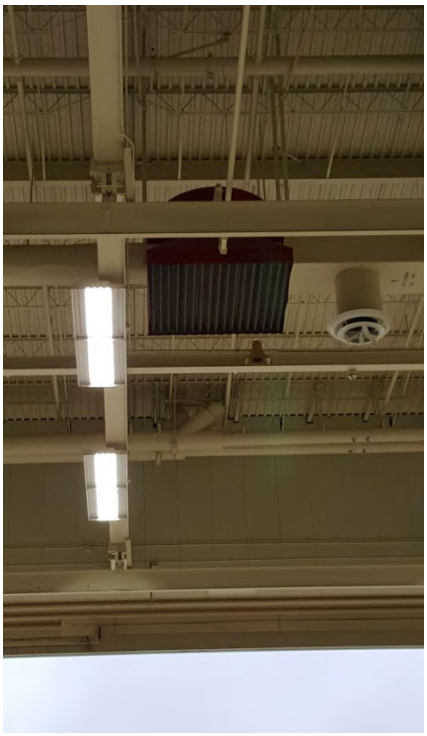
APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Army Aviation Support Facility, St. Cloud, Minnesota	St. Cloud, Minnesota

Photograph No. 5

Description:

One of 24 fire suppression system hoods in the hangar at the St. Cloud AASF.



Photograph No. 6

Description:

Looking north. Jet-X High-Expansion Foam in the St. Cloud AASF hangar after the 11 February 2011 release. Photograph provided by MNARNG.



APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Army Aviation Support Facility, St. Cloud, Minnesota	St. Cloud, Minnesota

Photograph No. 7

Description:

Looking southeast. Jet-X High-Expansion Foam being washed down the trench drain with the hangar doors closed following the 11 February 2011 release. Photograph provided by MNARNG.



Photograph No. 8

Description:

Looking north. Trench drain at the St. Cloud AASF



APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Army Aviation Support Facility, St. Cloud, Minnesota	St. Cloud, Minnesota

Photograph No. 9

Description:

Looking up at the ceiling in the St. Cloud AASF hangar. Jet-X High-Expansion Foam in the hangar after the June 2013 release. Photograph provided by MNARNG.



Photograph No. 10

Description:

Looking north. Jet-X High-Expansion Foam on the northeastern side of the ramp after the June 2013 release. Photograph provided by MNARNG.



APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Army Aviation Support Facility, St. Cloud, Minnesota	St. Cloud, Minnesota

Photograph No. 11

Description:

Looking east. Jet-X High-Expansion Foam on the southwestern side of the ramp after the June 2013 release. Photograph provided by MNARNG.



Photograph No. 12

Description:

Looking east. Jet-X High-Expansion Foam on the southwestern side of the ramp after the June 2013 release. Photograph provided by MNARNG.



APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Army Aviation Support Facility, St. Cloud, Minnesota	St. Cloud, Minnesota

Photograph No. 13

Description:

Looking northeast. Jet-X High-Expansion Foam on the southwestern side of the ramp after the June 2013 release. Photograph provided by MNARNG.



Photograph No. 14

Description:

Looking northeast. Plowing Jet-X High-Expansion Foam on the southwestern side of the ramp after the June 2013 release. Photograph provided by MNARNG.



APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Army Aviation Support Facility, St. Cloud, Minnesota	St. Cloud, Minnesota

Photograph No. 15

Description:

Plowing Jet-X High-Expansion Foam into Southwestern Detention Pond after the June 2013 release. Photograph provided by MNARNG.



Photograph No. 16

Description:

Looking northeast. Jet-X High-Expansion Foam at the entrance of the St. Cloud AASF after the June 2013 release. Photograph provided by MNARNG.



APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Army Aviation Support Facility, St. Cloud, Minnesota	St. Cloud, Minnesota

Photograph No. 17

Description:

Looking east. Storm water outlet in the Southwestern Detention Pond.



Photograph No. 18

Description:

Looking northwest. The Southwestern Detention Pond.



APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Army Aviation Support Facility, St. Cloud, Minnesota	St. Cloud, Minnesota

Photograph No. 19

Description:

Looking east. The Northeastern Detention Pond.



Photograph No. 20

Description:

Looking north. The Northeastern Detention Pond.

