

**WELLHEAD PROTECTION PLAN
FOR THE**

City of Frazee

**This Plan
is in
effect
from
September
2014
through
August
2024**



Forward

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

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

Water Supply Wells Included in This Plan

Unique Number	Well Name or Number	Use/Status ¹
166292	Frazee Well Number 5	P
613129	Frazee Well Number 6	P

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

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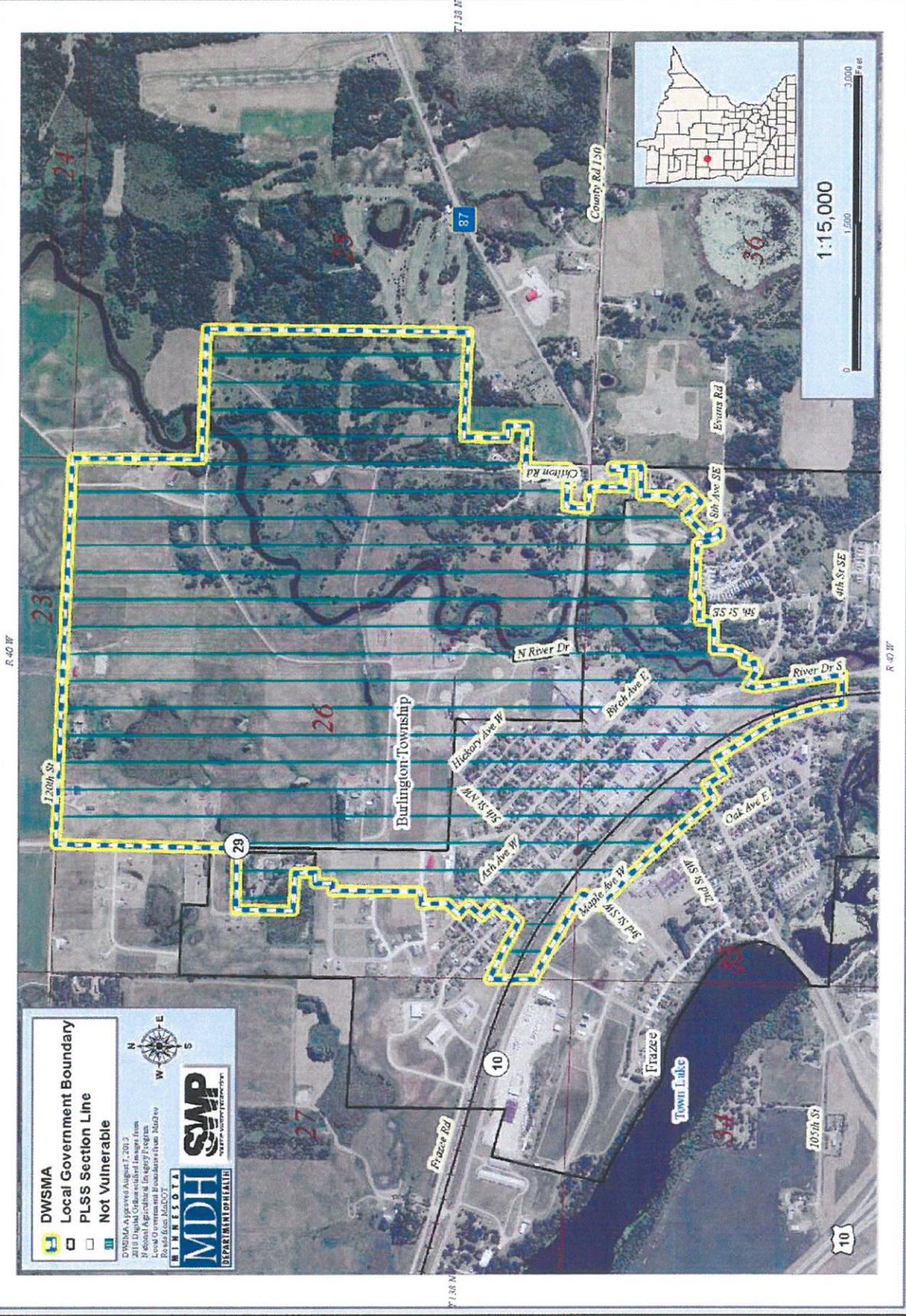
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Frazee Drinking Water Supply Management Area (DWSMA) MN-00685 - Not Vulnerable

Figure 1



DWSMA
Local Government Boundary
PLSS Section Line
Not Vulnerable

DWSMA Approved August 7, 2013
Approved by the Minnesota Department of Health
Local Government and Board of Health
Based on MNDOT

MINNESOTA
MDH
DEPARTMENT OF HEALTH
SAFER • HEALTHIER • TOGETHER

SMP
SOURCE WATER PROTECTION

Chapter 1 - Introduction

1.1 Background

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

1.2 Plan Appendices

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

- Appendix I contains the first part of the plan, consisting of the delineation of the wellhead protection area (WHPA), the drinking water supply management area (DWSMA), and the vulnerability assessments for the public water supply well(s) and the DWSMA. This part of the plan is summarized in Chapter 3.
- Appendix II contains the inventory of potential contamination sources. This inventory is discussed in Chapter 4 in terms of assigning risk to the city's water supply and is also discussed in Chapter 6, relating to issues, problems or opportunities.
- Appendix III contains the DNR Water Supply Plan approved by the DNR in April of 2011 and adopted by the city council in May of 2011. This information is discussed in Chapter 11.
- Appendix IV contains the Inner Wellhead Management Zone (IWMZ) Potential Contaminant Sources. This information is discussed in Chapter 4.
- Appendix V contains the Part One and Part Two WHPP Scoping Documents outlining the requirements for the respective plans.
- Appendix VI contains the 2012 Consumer Confidence Report. This contains the drinking water quality information required annually from the MDH and is summarized and discussed in Chapter 4.
- Appendix VII contains the parcels located within the DWSMA.
- Appendix VIII contains the Glossary of Terms and Acronyms.
- Appendix IX contains the Implementation Schedule.

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

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

The first scoping meeting, held on February 2, 2012, addressed the data elements that were needed to support the delineation of the WHPA, the DWSMA, and the wells and DWSMA vulnerability assessments. The second scoping meeting, held on September 26, 2013, discussed the data elements

required to 1) identify potential risks to the public water supply and 2) develop effective management strategies to protect the public water supply in relation to well and DWSMA vulnerability. The results of each meeting were communicated to the city by MDH through a formal scoping decision notice and are presented in Appendix V. Not all of the data elements listed in the WHP rule had to be addressed in the WHP plan because of the nonvulnerable nature of the city's source of drinking water.

The following table presents the data element assessment results relative to the overall impact that each data element has on the four items listed. Table 1 is the assessment of the present and future implications of the data elements on the four planning activities. The data elements that are marked high (H) are considered to have a direct implication or impact on the activity. Data elements that have an indirect or marginal impact on an activity are shown as moderate (M). A data element that has little if any impact is shown as low (L). The source of the data is shown under "Data Source." The entire land area of the DWSMA is located within Becker County, Burlington Township and the Otter Tail River Watershed. About half of the City of Frazee is located within the DWSMA. Land Use and Zoning are noted in Figures 2 and 3. Land Use is predominantly Urban, Forested and Agriculture as shown in Table 2. The following data elements were reviewed by the WHP team and ranked for prioritization of plan implementation.

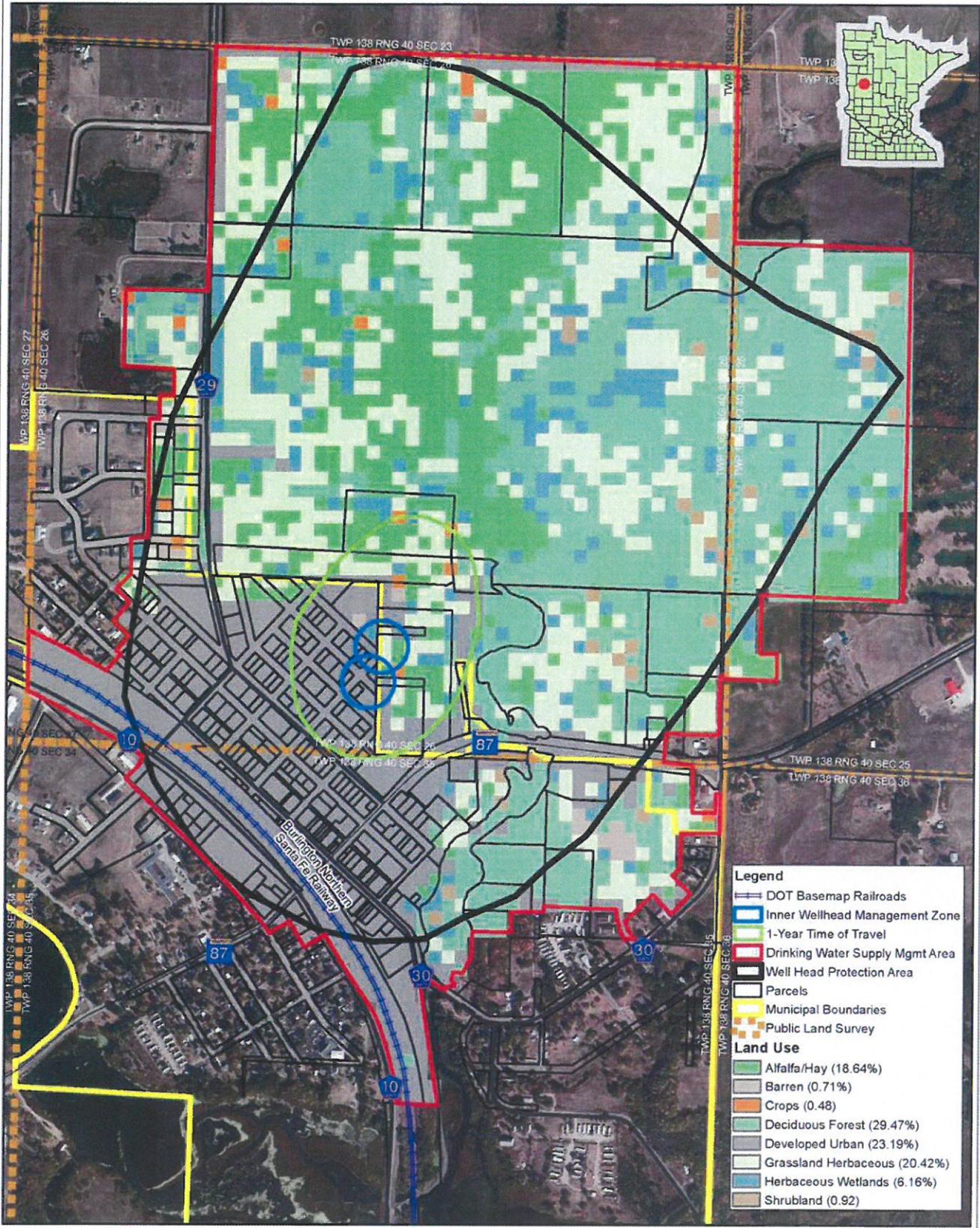
Table 1 - Assessment Results for the Data Elements

Data Element	Present and Future Implications				Data Source
	Use of the Well (s)	Delineation Criteria	Quality and Quantity of Well Water	Land and Groundwater Use in DWSMA	
Geology					
Maps and geologic descriptions	M	H	H	H	MGS, DNR, USGS
Subsurface data	M	H	H	H	MGS, MDH
Borehole geophysics	M	H	H	H	Not Available
Surface geophysics	L	L	L	M	Not Available
Land Use					
Parcel boundaries map	L	H	L	L	Becker County GIS
Political boundaries map	L	H	L	L	Becker County GIS
PLS map	L	H	L	L	USGS
Land use map and inventory	M	H	M	M	USGS, MnGEO
Comprehensive land use map	L	L	L	L	City of Frazee, Becker County
Zoning map	L	L	L	L	City of Frazee, Becker County
Public Utility Services					
Records of well construction, maintenance, and use	H	H	H	H	City of Frazee, MGS, MDH
Groundwater Quantity					
Permitted withdrawals	H	H	H	H	DNR
Groundwater use conflicts	H	H	H	H	DNR
Water levels	H	H	H	H	DNR, MGS, MDH, City of Frazee
Groundwater Quality					
Monitoring data	H	H	H	H	MDH
Isotopic data	H	H	H	H	MDH, DNR
Tracer studies	H	H	H	H	Not Available
Contamination site data	M	M	M	M	Not Available

The above table was taken from Part One of the City of Frazee's Wellhead Protection Plan

CITY OF FRAZEE
Land Use

FIGURE 2



- Legend**
- DOT Basemap Railroads
 - Inner Wellhead Management Zone
 - 1-Year Time of Travel
 - Drinking Water Supply Mgmt Area
 - Well Head Protection Area
 - Parcels
 - Municipal Boundaries
 - Public Land Survey
- Land Use**
- Alfalfa/Hay (18.64%)
 - Barren (0.71%)
 - Crops (0.48)
 - Deciduous Forest (29.47%)
 - Developed Urban (23.19%)
 - Grassland Herbaceous (20.42%)
 - Herbaceous Wetlands (6.16%)
 - Shrubland (0.92)

CITY OF FRAZEE
Zoning

FIGURE 3

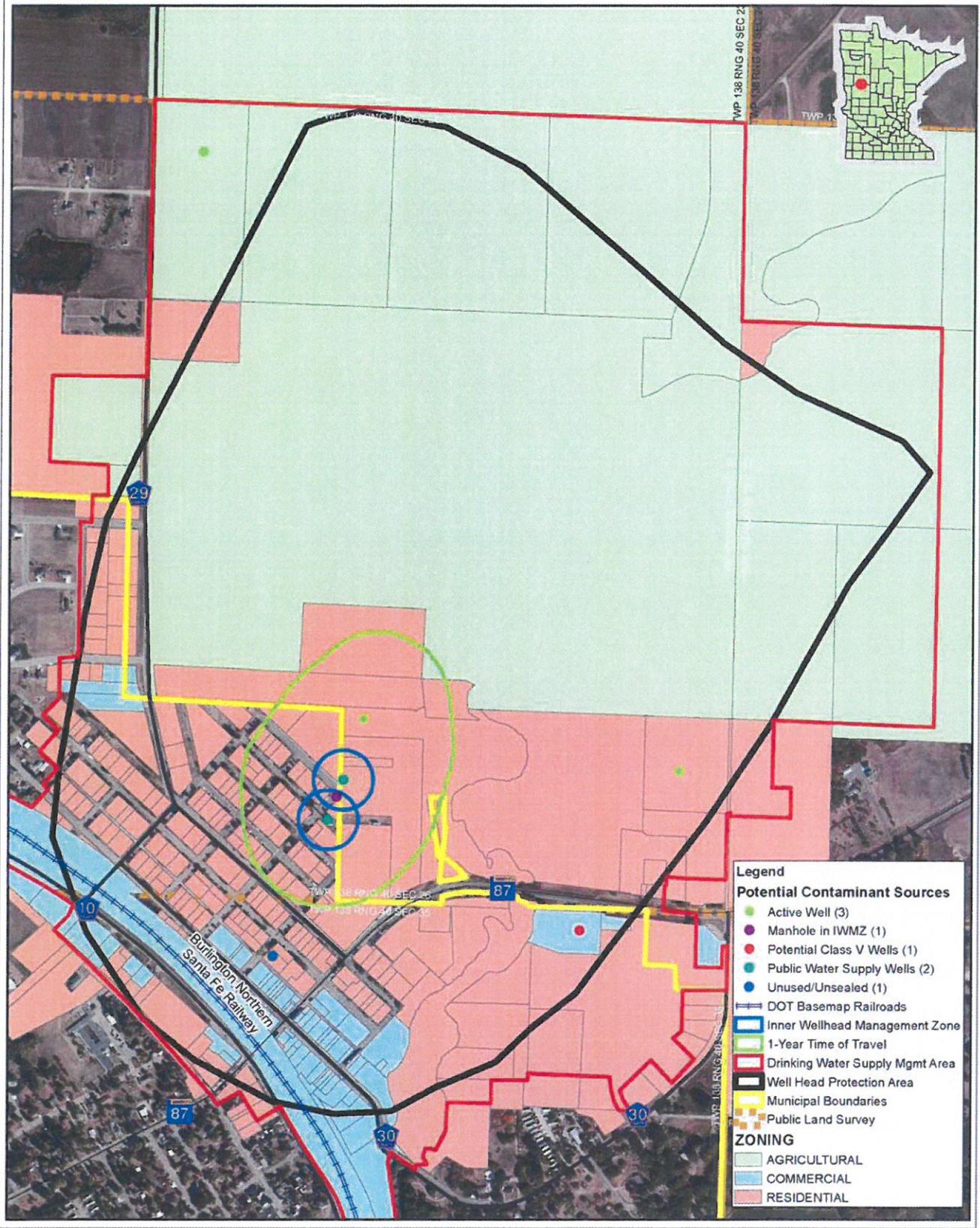
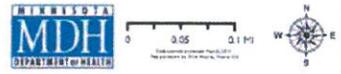


Table 2 – Land Use within the city of Frazee DWSMA

Land Use in the Frazee DWSMA	Acres	Percent
Alfalfa/Hay	139.2	18.64
Barren	5.3	0.71
Crops	3.6	0.48
Deciduous Forest	220.2	29.47
Developed Urban	173.2	23.19
Grassland Herbaceous	152.6	20.42
Herbaceous Wetlands	46.0	6.16
Shrubland	6.9	0.92
Total	747.0	99.99

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

A detailed description of the process used for 1) delineating the WHPA and the DWSMA, and 2) preparing the vulnerability assessments of the city water supply wells and DWSMA is presented in Appendix I. The City of Frazee requested that MDH do this work and it was performed by Richard G. Soule, P.G., Hydrologist, who is licensed as a geoscientist by the State of Minnesota.

3.1 WHPA and DWSMA Delineation

Figure 1 shows the boundaries of the WHPA and the DWSMA. The WHPA was delineated using computer simulations of groundwater movement to generate the underground capture zones for city Wells 5 (Unique No. 166292), and 6 (Unique No. 613129). The WHPA for these water supply wells is shown in Figure 1.

The DWSMA boundaries were designated using the following criteria:

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

3.2 Well Vulnerability Assessment

The construction and water quality obtained from each primary well used by the City of Frazee is included in the assessment of well vulnerability. The vulnerability of the city wells is considered very low because they are constructed so that each well is adequately sealed into the borehole and does not pump water that contains human-caused contaminants.

3.3 DWSMA Vulnerability Assessment

The very low vulnerability assigned to the DWSMA (Figure 1) was determined using geologic, soils, and groundwater chemistry information and indicates that at least 50 continuous feet of clay-rich geological material covers the source water aquifer.

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

The types of potential contamination sources that may exist within the DWSMA were derived from the information collected to satisfy the data element requirements (Chapter 2). The impact assigned to each data element as part of the assessment process (Table 1) was used to assess the types of potential contamination sources that may present a risk to the city's drinking water supply. The very low vulnerability assessment for the DWSMA indicates that, generally, only wells 150 feet deep or greater, other types of boreholes, excavations that may reach the aquifer, and certain types of Environmental Protection Agency Class V Wells are likely to impact the city wells.

4.1 Contaminants of Concern

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

4.2 Inventory Results and Risk Assessment

A description of the locations of potential contamination sources is presented in Appendix II. A summary of the results for the IWMZ is listed in Table 3 and Table 4 presents these results for the remainder of the DWSMA. The priority assigned to each type of potential contamination source addresses 1) the number inventoried, 2) its proximity to a city well, 3) the capability of local geologic conditions to absorb a contaminant, 4) the effectiveness of existing regulatory controls, 5) the time required for the City of Frazee to obtain cooperation from governmental agencies that regulate it, and 6) the administrative, legal, technical, and financial resources needed. A **high (H)** risk potential implies that the potential source type has the greatest likelihood to negatively impact the city's water supply and should receive highest priority for management. A **low (L)** risk potential implies that a lower priority for implementing management measures is assigned. While the city has done due diligence in investigation of wells between 150 and 250 feet deep, they will continue to address any new or unknown wells if they become known.

Table 3 - Potential Contamination Sources and Assigned Risk for the IWMZ

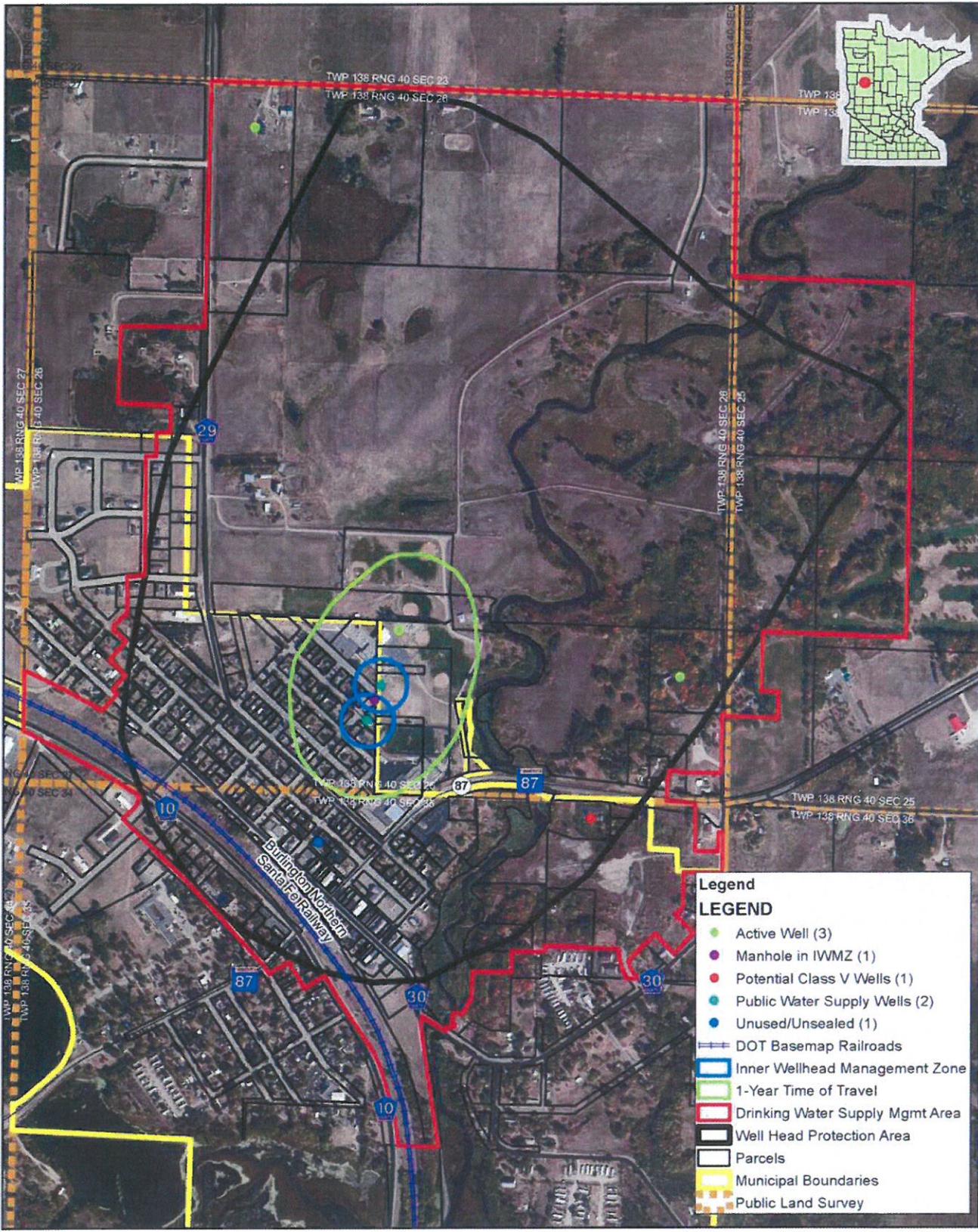
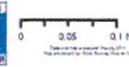
PCSI and Facility Code	Potential Source Type	Total Number	Level of Risk
SD1	Manhole in Street	1	L

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

PCSI and Facility Code	Potential Source Type	Total Number	Level of Risk
WEL - 4331	Public Water Supply Well	2	L
WEL - 1000/6000	Domestic Well >150 & < 250 feet deep	3	M
WEL - 2000	Dug well	1	H
CVWWD - 2000	Potential Class V Wells	1	L

CITY OF FRAZEE
Potential Contaminant Source Inventory

FIGURE 4



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

The city estimates that the following changes to the physical environment, land use, surface water, and groundwater may occur over the 10-year period that the WHP plan is in effect (Table 5). This is needed to determine whether new potential sources of contamination may be introduced in the future and to identify future actions for addressing these anticipated sources. Land and water use changes may introduce new contamination sources or result in changes to groundwater use and quality. The anticipated changes may occur within the jurisdictional authority of the city, although some may not. Table 5 describes the anticipated changes to the physical environment, land use, and surface water or groundwater in relationship to the 1) influence that existing governmental land and water programs and regulations may have on the anticipated change, and 2) administrative, technical, and financial considerations of the City of Frazee and property owners within the DWSMA.

Table 5 - Expected Land and Water Use Changes

Expected Change (Physical Environment, Land Use, Surface Water, Groundwater)	Impact of the Expected Change On the Source Water Aquifer	Influence of Existing Government Programs and Regulations on the Expected Change	Administrative, Technical, and Financial Considerations Due to the Expected Change
Physical Environment: No change is anticipated.	No impact is anticipated	Does not apply	Does not apply
Land Use: The city anticipates only minor land use changes.	Minor impact is anticipated.	Does not apply for wellhead protection purposes.	Does not apply for wellhead protection purposes.
Surface Water: No change is anticipated.	No impact is anticipated	Does not apply	Does not apply
Groundwater: The city does not plan to construct another water supply well within ten years.	No impact is anticipated	Does not apply	Does not apply

Chapter 6 - Issues, Problems, and Opportunities

6.1 Identification of Issues, Problems and Opportunities

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

6.2 Comments Received

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

- Security of the treatment plant
- Unused and unsealed wells
- New growth within the community
- Other high-capacity wells

Table 6 - Issues, Problems, and Opportunities

Issue Identified	Impacted Feature	Problem Associated with the Identified Issue	Opportunity Associated with the Identified Issue	Adequacy of Existing Controls to Address the Issue
There is an unused/unsealed dug pit well in the old fire hall that was a high priority for sealing in the previous plan.	Aquifer Well water quality DWSMA	The city needs to assess which wells present a threat to the aquifer based upon their depth, construction, and state of repair.	The city will work cooperatively with the current property owner and pursue 100% funding to seal this well.	The city does not have authority to require that unused wells be properly sealed. The MDH has authority to require well sealing.
Potential unused and unsealed wells on residential properties – none identified to date.	Aquifer Well water quality DWSMA	The city needs to locate unused, unsealed wells and assess which wells present a threat to the aquifer based upon their depth, construction, and state of repair.	The city can partner with Becker County and utilize MDH implementation grant dollars to help property owners pay for the costs of properly sealing unused wells.	The city does not have authority to require that unused wells be properly sealed. The MDH has authority to require well sealing.
There may be unknown Class V Wells located in the DWSMA.	Aquifer Well water quality DWSMA	The city needs to inform property owners of what a Class V Well is and how to report.	The city can apply for MDH grant funding to inform the property owners within the DWSMA.	The EPA has authority over Class V Wells in Minnesota.
The City treatment plant is not manned 24-hours presenting potential security issues.	Well water quality	Potential for compromise of the security of the wells and treatment plant.	Secure doors and locks for the treatment plant would increase security. MDH implementation grant program may provide funding.	The city does not have employees at the plant 24-hours a day.
There is no back-up power supply for the water plant.	Public Health	The city needs to install a back-up generator to assure a continued water supply during loss of power.	The city can apply for MDH grant funding to purchase and install a back-up generator.	The city does not have access to emergency power at this time.

It is difficult to foresee or plan for the future. The City of Frazee will use its planning and management capabilities within this plan to respond to any new/unknown source water protection issues that may impact the quality or quantity of its drinking water in the future.

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

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

7.1 Existing Controls and Programs of the City of Frazee

Table 7 shows the legal controls and/or programs that the city has identified to support the management of potential contamination sources within the DWSMA.

Table 7 - Controls and Programs of the regulatory authorities within the DWSMA

Type of Control	Program Description
Building Permits issued by the city of Frazee for properties within the city limits and Becker County outside the city limits.	Provides an opportunity to require performance standards to offset potential risk posed by a land use.
Ordinance Requiring Hookup to City Services upon annexation if within 100 feet of a service line.	Reduces the likelihood that the pumping of other wells will impact contaminant movement to the city wells.

7.2 Local Government Controls and Programs

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

Table 8 - Local Agency Controls and Programs

Government Unit	Name of Control/Program	Program Description
Becker County	Household Hazardous Waste Collection	Provides education to landowners and a collection program for disposing of household hazardous waste.
	Environmental Services	Zoning and land use ordinances. Comprehensive land use plan.
City of Frazee	Zoning Administration	Zoning and land use ordinances. Comprehensive land use plan.
	Public Works	ROW permits, maintenance of roads and parks.
Becker County	Soil and Water Conservation District Water Planning	Well sealing cost-share Establishes countywide goals and priorities towards protecting water resources.

7.3 State Agency and Federal Agency Support

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

The following table identifies the specific regulatory programs or technical assistance that state and federal agencies may provide to the City of Frazee to support implementation of the WHP plan. It is likely that other opportunities for assistance may be available over the 10-year period that the plan is in effect due to changes in legal authority or increases in funding granted to state and federal agencies. Therefore, the table references opportunities available when the city’s WHP plan was first approved by MDH.

Table 9 - State and Federal Agency Controls and Programs

Government Unit	Type of Program	Program Description
MDH	State Well Code (Minnesota Rules, Chapter 4725)	MDH has authority over the construction of new wells and the sealing of wells. MDH staff in the Well Management Program offer technical assistance for enforcing well construction codes, maintaining setback distances for certain contamination sources, and well sealing.
MDH	WHP	MDH has staff that will help the city identify technical or financial support that other governmental agencies can provide to assist with managing potential contamination sources.
DNR	Water appropriation permitting (Minnesota Rules, Chapter 6115)	DNR can require that anyone requesting an increase in existing permitted appropriations, or to pump groundwater, must address concerns regarding the impacts to drinking water if these concerns are included in a WHP plan.
EPA	Class V Wells	The EPA has authority over Class V wells. Owners are required to notify the EPA.

7.4 Support Provided by Nonprofit Organizations

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

Chapter 8 - Goals

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

- Maintain a safe and adequate drinking water supply for community residents;
- Prevent contaminants from reaching levels that present a risk to people's health;
- Maintain communication with Becker County on potential land use changes; and
- Provide the citizens with educational materials and other resources to assist landowners with drinking water protection issues such as private well use, maintenance and sealing assistance and Class V wells.

Chapter 9 - Objectives and Plan of Action

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

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

9.1 Objectives

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

1. Create public awareness and general knowledge about the importance of WHP for maintaining an adequate and safe drinking water supply;
2. Increase the knowledge base regarding quantity of water available – maintain adequate drinking water supply.
3. Gather new information on potential contaminants.
4. Manage potential contaminants.
5. Ensure emergency preparedness of local agencies.
6. Create awareness among LGUs about the importance of protection of the drinking water supply aquifer.
7. Maintain communications with the MDH and other agencies able to assist with implementation of this plan.
8. Collect additional data to substantiate information contained within this Plan, and to provide more detail for future Plan amendments.
9. Conduct regular evaluations of Plan implementation and effectiveness.

9.2 WHP Measures and Action Plan

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

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

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

9.3 Establishing Priorities

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

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

The City of Frazee defines a priority for implementing a WHP measure as maintaining the quantity and high quality drinking water they have come to expect. Table 10 lists each measure that will be implemented over the 10-year period that the city's WHP plan is in effect, including the priority assigned to each measure.