

## APPENDIX II

### Wellhead Protection Plan

#### 1.0 INTRODUCTION

Wellhead protection is a means of safeguarding public water supply wells by helping prevent contaminants from entering the area that contributes water to a well or well field over a period of time. This program is now required in Minnesota since the Minnesota Department of Health (MDH) implemented Minnesota Wellhead Protection Rules in November 1997. The MDH initiated its Wellhead Protection Program in response to the 1986 Amendments to the Safe Drinking Water Act and MDH's statutory authority is granted in the Minnesota Groundwater Protection Act of 1989. This report is the culmination of the City of Robbinsdale's efforts to adopt wellhead protection planning for its water supply system.

The City of Robbinsdale currently operates 5 wells for municipal water supply purposes (See page 2). Four wells are completed in the Prairie du Chien –Jordan aquifer system, and one well is completed in the St. Peter Sandstone and the Prairie du Chien-Jordan aquifer system. All the wells are within the city limits.

Detailed descriptions of the geologic and hydrogeologic setting of the water supply system, the delineation of the Wellhead Protection Area and Drinking Water Supply Area, and the well and aquifer vulnerability assessments are presented in *Wellhead Protection Plan, Part 1* (Bonestroo Rosene Anderlik & Assoc., 2005) which was approved by MDH on December 20, 2005. The rest of this report summarizes the information presented in the Part 1 report, presents additional data elements, and presents the contents of the wellhead protection plan.

## **2.0 WELLHEAD PROTECTION AREA AND DRINKING WATER SUPPLY MANAGEMENT AREA**

The wellhead protection area (WHPA) and drinking water supply management area (DWSMA) delineation analyses were conducted in accordance with Minnesota Rules as administered by the Minnesota Department of Health. The Rules specify the following criteria be applied in the delineation analysis: 1) the aquifer's transmissivity, 2) the groundwater flow field, 3) the maximum average daily pumping rate from each of the existing wells, 4) hydrogeologic boundaries, and 5) time of travel.

The final delineations for the Prairie du Chien – Jordan aquifer system wells (Well #s 1-5) were performed according to the *Draft Guidance for Delineating Wellhead Protection Areas in Fractured and Solution-Weathered Bedrock in Minnesota* (MDH, August 29, 2005). The draft guidance does not take into account the aquifer transmissivity, source and sink boundaries such as other wells, or time of travel for fractured aquifer delineations. Nevertheless, MDH considers the guidance to be consistent with Minnesota Rules for wellhead protection. The wellhead protection area delineation for the St. Peter aquifer (Well # 1) was performed using a groundwater flow model.

The results of the WHPA and DWSMA delineations are presented in Figure 1. Additional details on the delineation analysis are presented in *Wellhead Protection Plan Part I*, prepared by Bonestroo Rosene Anderlik & Assoc., Inc. (2005). The delineations were approved by MDH in December 2005.

### **3.0 VULNERABILITY ASSESSMENT**

Two separate assessments were undertaken to determine the vulnerability of the City's water supply. The first assessment consisted of an assessment of the vulnerability to contamination of the aquifer system within the identified DWSMA. This assessment was completed according to MDH guidelines and recommended methodology.

The second assessment was a well vulnerability assessment for each of the 5 City of Robbinsdale wells. The well vulnerability assessment was completed by the MDH. A description of the two assessments is presented in *Wellhead Protection Plan, Part I* prepared by Bonestroo Rosene Anderlik & Assoc. (2005). The DWSMA vulnerability varies from high to low. The results drove the need for a detailed evaluation of potential contaminant sources, which is presented later in this report.

## 4.0 DATA ELEMENTS

The State rules relating to wellhead protection require that wellhead protection plans include specific data elements. The required physical environment, water quantity and water quality data elements were addressed in Part 1 of the Plan (Bonestroo and Associates, February 2006). Part 2 of Chapter 1 of the Plan also includes an assessment of the impact of these data elements on 1) the use of the wells, 2) the drinking water supply management area and 3) the quality and quantity of water supplying the public water supply wells. Each of these elements was discussed specifically in the second scoping meeting with MDH and are presented briefly here.

### 4.1 Precipitation

Average precipitation at the National Weather Service cooperative rain gage at New Hope for the climate normal period 1971 –2000 was 32.17 inches per year. Precipitation recharge was not studied in detail for the wellhead protection area delineation analysis and vulnerability assessment because the aquifers from which the City of Robbinsdale draws its water are recharged from above by leakage from the overlying St. Peter Sandstone Aquifer or overlying glacial drift aquifers rather than by direct precipitation infiltration. The rate of recharge to the upper aquifer was considered in the development of the ground-water model.

There is a potential connection between the aquifer and the surface, particularly in high vulnerability areas, and there exists a potential that precipitation could impact aquifer water quality through direct precipitation recharge and infiltration of storm-water runoff. Therefore, potential non-point source contaminants and the influence of precipitation in combination with the other physical environment data elements must be considered in developing management strategies for highly vulnerable areas.

### 4.2 Geology

A description of geologic conditions in the wellhead protection area is provided in the Part 1 report (Bonestroo Rosene Anderlik & Assoc., 2005). The Prairie du Chien Group (Shakopee Formation Dolostone with sandstone and Oneota Dolomite) overlies the Jordan Sandstone throughout the DWSMA. Together these units form the Prairie du Chien-Jordan aquifer system. The Oneota Dolomite acts as a leaky aquitard between the Shakopee Formation and Jordan Sandstone. Groundwater flow in the Prairie du Chien Group is dominated by secondary porosity, primarily solution enhanced, bedding parallel fractures. Groundwater flow in the Jordan Sandstone is primarily through inter-granular pores.

The contact between the Prairie du Chien Group and the overlying Saint Peter Sandstone is a major erosional surface with several meters of relief. The St. Peter Sandstone has been completely removed by erosion in a north-south trending buried bedrock valley south of Crystal Lake. The lower portion of the Saint Peter Sandstone contains beds of mudstone, siltstone and shale that act as an aquitard, restricting the movement of water between the two aquifers. In several areas of the DWSMA, the St. Peter sandstone is overlain by the Glenwood (shale) and Platteville (massive limestone and dolostone) formations. The Glenwood shale, along with the Platteville Formation, acts as an effective aquitard, greatly restricting vertical groundwater movement. The Jordan Sandstone is underlain by the St. Lawrence Formation (dolomitic shale and siltstone), which, along with beds of shale in the basal Jordan Sandstone, acts as an effective regional confining unit.

The surficial sediments consist of sandy glacial outwash and river terrace deposits, glacial till, or recent alluvial, lake, or wetland sediments throughout most of the DWSMA. Loamy glacial till occurs at the surface in most of the southern and far western portions of the DWSMA. In many areas, the sandy surficial sediments are underlain by loamy glacial till or other fine grained sediments, but the extent and effectiveness of subsurface unconsolidated confining units has not been demonstrated in some areas.

Geology was the most important factor in determining the DWSMA vulnerability. In general, areas where the Platteville and Glenwood Formations are present or thick deposits of loamy or clayey glacial till are present were assigned low vulnerability; areas where the St. Peter Sandstone is the uppermost bedrock and unconsolidated confining units are not present were assigned moderate vulnerability; and areas where the St. Peter Sandstone is mostly or completely eroded were assigned high vulnerability.

It should be noted that, according to MDH guidelines, geologic sensitivity is determined on the basis of the degree of geologic protection in the vertical direction. The vulnerability assessment also takes into account the lateral extent of confining layers, groundwater quality, and groundwater age data. The vulnerability assessment does not fully take into account the three-dimensional groundwater flow system, however.

Therefore, the geological influence on groundwater flow paths is noted here and will be considered in the development of this Plan. In particular, generally eastward flow within the highly sensitive surficial aquifer west of the high vulnerability area to the west of Well #s 1-3 could carry potential contaminants to the high vulnerability area, where vertical movement through the St. Peter Sandstone is less restricted. This was taken into account when determining which types of potential contaminants are a concern. See Chapter 5 for further information on potential contaminant sources of concern.

### *4.3 Soil Conditions*

Because there is not a consistent protective layer of bedrock or glacial drift throughout the DWSMA, local soil conditions and soil infiltration characteristics may impact local groundwater quality. It should be noted, however, that a significant vertical hydraulic gradient is maintained between the surficial aquifer and the Prairie du Chien-Jordan aquifer system. Also, the time-of-travel to the aquifers used and reducing conditions in the aquifers support the presence of assimilative capacity boundaries for nitrate and pathogens.

Based on these factors, a conjunctive wellhead protection area delineation considering surface drainage was not necessary for the City of Robbinsdale system. Nevertheless, the inclusion of a soil map for highly vulnerable areas of the DWSMA is required. Soil conditions along with other physical environment data elements were considered when developing management strategies. However, vulnerability was the primary consideration, and, according to MDH guidelines, soil conditions and precipitation do not influence the vulnerability assessment. Soils in the area are formed in the Pleistocene glacial deposits and recent deposits. Soil map units from the County soil survey are plotted for highly vulnerable portions of the DWSMA in Figure 2. It should be noted that where soils have been disturbed or replaced in urban areas (most of the DWSMA), the soil properties given in the most recent soil survey (1974) may no longer apply.

The soil map shows the soil hydrologic group and symbol for each mapping unit. Soils in hydrologic group A are rapidly permeable and have the highest potential for rapid infiltration. Hydrologic group was assigned based on the dominant soil type before urbanization. Where wetland and other soils have been replaced with fill, no information on hydrologic group or infiltration characteristic is available.

#### *4.4 Water Resources*

The management of the highly vulnerable parts of the Drinking Water Supply Management Area must reflect what is known about this data element (Figure 3).

A significant vertical hydraulic gradient is maintained between the surficial aquifer and the Prairie du Chien-Jordan aquifer system. Also, the time-of-travel to the aquifers used and reducing conditions in the aquifers support the presence of assimilative capacity boundaries for nitrate and pathogens. Based on these factors, a conjunctive wellhead protection area delineation considering surface waters was not necessary for the City of Robbinsdale system. Also, based on the available hydrogeologic data, there is no evidence that withdrawals from the City of Robbinsdale have had a negative impact on surface waters within the DWSMA.

Therefore, no additional management of surface-water resources is necessary to protect the City of Robbinsdale drinking water supplies within the DWSMA.

#### *4.5 Surface Water Quality*

The time-of-travel to the aquifers used and reducing conditions in the aquifers support the presence of assimilative capacity boundaries for nitrate and pathogens. Based on these factors, a conjunctive wellhead protection area delineation considering surface waters was not necessary for the City of Robbinsdale system. Nevertheless, in the highly vulnerable areas of the DWSMA, surface waters may have an indirect hydraulic connection with the Prairie du Chien – Jordan aquifer system, and certain types contaminants, if introduced to surface waters, could potentially affect bedrock aquifer water quality.

There is a Metropolitan Council Environmental Services (MCES) monitoring station at Crystal Lake in Robbinsdale (27-0034). The only routinely monitored parameter at this site is Secchi depth. In general, secchi depth, an indirect measure of suspended solids, is relevant to surface-water quality but is not directly relevant to potential impacts to groundwater quality. Constituents of concern to surface-water quality that are not directly related to potential groundwater contaminants include temperature; secchi depth, transparency tube, turbidity (indirect measures of suspended solids), or suspended solids; phosphorous; and chlorophyll. These parameters have an impact on or reflect biological conditions within the surface water body.

Therefore, the available information on surface water quality does not provide useful information for the management of drinking-water quality. Because the possible connection to surface waters is minimal and indirect, further data collection specifically for wellhead protection is not necessary.

#### *4.6 Groundwater Quality*

Results of routine monitoring of the City of Robbinsdale's wells are on file with the Minnesota Department of Health. The water supply meets all State and Federal drinking water standards, and no human made contaminants have been detected in the water. Tritium was detected in Well #s 1, 2, and 4 indicating that a significant portion of the water supplying those wells was in contact with the atmosphere within the previous 50 years.

The detected tritium confirms that, although human made contaminants have not been detected in the well water, these wells may be vulnerable to surface contaminants. Relatively high iron concentrations in the

raw well water indicate reducing conditions in the aquifer, and reduction of nitrate or denitrification may occur. Thus despite the lack of an extensive confining unit in some areas, there appears to be a significant assimilative capacity boundary for nitrate.

#### *4.7 Groundwater Quantity*

There are a number of wells in Robbinsdale and surrounding cities which are covered by state groundwater appropriation permits. There are no known well interference problems in vicinity of the City of Robbinsdale water supply wells. Data on all water appropriations permits and volumes pumped are maintained by the Minnesota DNR Division of Waters in the SWUDS (State Water Use Data System) database.

Water use in the City of Robbinsdale is not expected to grow significantly. Inter-annual variations in water use are controlled primarily by climatic fluctuations. The City has adopted a water conservation plan, and no new wells will be required to supply future water demand. However, at some point in the future, the City may add a well as a replacement for Well No. 3, which has problems with pumping sand. Well No. 3 would then be retained as an emergency backup well.

## 5.0 CONTAMINANT SOURCE INVENTORY

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

### 5.1 Land Use

Understanding land use is important in determining key areas for concern in managing a wellhead protection area. For example, knowledge about the location of future commercial or industrial development in relation to the DWSMA may reveal a need to closely manage the activity within more sensitive areas. Additionally, any land uses that pose a potential threat to the City's water supply need to be highlighted to increase awareness of any concerns. Identifying historical land uses that may have degraded water quality is also important for protecting the quality of water supplying the wells.

Following a scoping meeting held with Minnesota Department of Health (MDH) staff on March 21, 2006, Bonestroo, Rosene, Anderlik, & Assoc. staff proceeded to locate information about land and water use within the delineated DWSMA for the City of Robbinsdale wells. Any data that was relevant to the public water supply wells, the quality of the water being drawn in to the wells, or land and groundwater uses around the wells was considered important in determining any potential threat to the water supply. The following criteria were established in the MDH Second Scoping Decision Notice:

1. All areas must be evaluated for the presence of wells, automotive disposal systems and cesspools (types of Class V or shallow disposal wells), and large sewer systems serving more than 20 people or 2 or more facilities
2. Moderate vulnerability areas must also be evaluated for the presence of tanks.
3. All land uses and potential contamination sources must be evaluated in high vulnerability areas.

Based on the groundwater flow field within the DWSMA, all land uses and potential sources of contamination would also be evaluated in areas where the surficial aquifer is in the up-gradient direction (in terms of the surficial aquifer) from the bedrock valleys that cut completely or mostly through the St. Peter Sandstone (See Section 4.2).

A map of generalized land use is provided as Figure 4, and a zoning map for the City of Robbinsdale is provided as Figure 5. Existing land use data developed by the Metropolitan Council for the year 2000 are displayed on the land use map (Figure 4). This is the best available map of actual land uses for the entire DWSMA.

MDH provided a composite database from State and Federal sources on potential point sources of contamination such as tanks, leaking underground storage tanks (LUST), dumps, NPDES permitted discharge sites, hazardous waste generators, and other potential sources. The database includes general information and approximate locations for each feature. Each item in the database that is within the DWSMA was located on the correct land parcel based on the location information provided in the database. The database was also filtered based on the vulnerability criteria discussed above.



Figure 6 shows the locations of wells and potential contaminant sources identified on specific parcels. Each type of potential contaminant source is described separately in the following sections. A summary of the potential contaminant sources inventory is given in Section 5.8 below. The accompanying CD includes a tabulation of information about each facility inventoried.

### *5.2 Shallow Disposal Wells*

Disposal wells are potential sources of contamination that must be inventoried for the entire DWSMA. The US EPA regulates disposal wells (Class V injection wells). Automotive disposal wells have been banned in groundwater protection areas, and cesspools have been banned throughout Minnesota. Large septic systems are also regulated as Class V injection wells. The Code of Federal Regulations (Title 40, Chapter I, Part 144.12(a)) states that “no owner or operator [of an injection well] shall construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 CFR part 142 or may otherwise adversely affect the health of persons.”

No Class V injection wells have been identified within the DWSMA.

### *5.3 Wells*

An important component of the potential contaminant source inventory was the locating wells within the DWSMA. Since wells may penetrate confining/low permeability layers that normally protect an aquifer, they are potential pathways for contaminants to rapidly enter the aquifer. A search for active and abandoned wells was undertaken for the DWSMA.

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

1. Minnesota Geological Survey/MDH computerized County Well Index (CWI)
2. Department of Natural Resources SWUDS database
3. Aerial photographs
4. GIS parcel database

Wells identified in the databases were located to the highest accuracy feasible using the information provided in the databases along with the parcel database and air photos. The identified wells are plotted on the map in Figure 6. The wells are located on the correct land parcel if sufficient location data are available. The results of the well search indicated that there are 167 wells known to be in the DWSMA, including the City of Robbinsdale public supply wells.

Three inventoried wells are known to be sealed, and two former remedial wells are believed to have been sealed. Two inactive wells that may not have been sealed were identified. These include an inactive commercial well (unique no. 242119) and a domestic well (unique no. 203570) reported in CWI as having been “destroyed” but not as having been sealed. The status of at least 12 other wells is uncertain at this time. The inventory may not include wells which are unknown at this time, including some wells that were properly sealed.

The majority of the identified wells are/were used for domestic water supply. Commercial, irrigation, monitoring, remedial, and non-community public supply wells were also identified. Within the City of

Robbinsdale, there are no known abandoned municipal well sites. Currently, all municipal wells constructed for the City of Robbinsdale are still in active use.

The impact of other high capacity wells on the groundwater flow field and the quantity of water used was addressed in the Part 1 report (Bonestroo Rosene Anderlik & Assoc., 2005), although the influence of other wells is not taken into account in the wellhead protection area delineation method required by MDH reviewers (*Guidance for Delineating Wellhead Protection Areas in Fractured and Solution-Weathered Bedrock in Minnesota*, MDH, Draft, August 29, 2005).

#### *5.4 Point Sources*

An important component of the potential contaminant source inventory was to look for any potential point sources within the DWSMA that might be a threat to the quality of the public water supply. A point source is any facility that stores, handles, or disposes of materials that, if introduced into the environment, might degrade the quality of the water pumped from the aquifer. An example of a potential point source would be an underground storage tank. Potential point sources of contamination were identified according to the criteria listed above in Section 5.1.

The first step in the point-source search was to investigate available resources listing potential sites of concern. The MDH provided the City with a composite of State and Federal databases listing underground storage tank sites, above ground storage tank sites, leaking underground storage tank (LUST) sites, hazardous waste generators, dumps, agricultural chemical storage sites, and other potential point sources of contamination. The data points were associated with the correct land parcels using the location information provided in the database. Items located within the DWSMA were identified and inventoried according to the required criteria.

In addition to the types of point sources discussed above, individual sewage treatment systems (ISTS, commonly referred to as septic systems) are also a potential concern in high vulnerability areas. Failed or substandard systems may be a threat to aquifer water quality, particularly in high vulnerability areas of the groundwater capture zones. Nitrate is a contaminant of particular concern that may derive from ISTS, although the aquifers appear to have significant assimilative capacity for nitrate. The Minnesota Pollution Control Agency (MPCA) has developed technical standards and criteria for ISTS, which are contained in MN Rules Chapter 7080. State Rules have been adopted by Hennepin County as Ordinance No. 19.

Hennepin County provides an ISTS permitting and inspection program for Robbinsdale, Minneapolis, Golden Valley, Crystal, and Brooklyn Center. The County does not maintain a formal inventory of ISTS systems, however. The entire DWSMA is served by municipal sanitary sewer systems, and no ISTS systems are believed to be active in the DWSMA. Given the historical land uses in the DWSMA, it is possible that undiscovered, abandoned ISTS systems remain. If abandoned systems occur, they could pose a risk of injury or property damage but would be unlikely to significantly threaten the water supplying the public supply wells. Several ISTS sites, believed to be inactive or to have been removed, were identified in the CWI database.

The inventoried potential contaminant sources are mapped in Figure 6. GIS data files in ArcView shape format containing the point source data are available electronically. Also details about the sites and facilities are also provided in tabular form on the accompanying CD.

Proactive management of potential point sources of contamination within the Emergency Response Areas (ERA), and in high vulnerability areas closest to the wells is of most immediate concern. These items pose the greatest potential risk to the quality of water drawn from the public water supply wells. Nevertheless, all of the potential point sources in the inventory have the potential to impact groundwater quality and should be managed appropriately.

Potential point sources located in highly vulnerable portions of the ERAs include a de-listed Superfund site, eight hazardous waste generator permittees, a former ISTS site, one LUST site (former Robbinsdale Farm and Garden, diesel) and three closed LUST sites, six registered storage tank permittees, three active USTs, eight removed or abandoned USTs, three Voluntary Investigative Clean-up sites, and at least one monitoring well. None of these facilities are believed to currently threaten the quality of water reaching the City of Robbinsdale public supply wells.

### *5.5 Non-Point Potential Contaminant Sources*

Non-point sources of contamination are associated with land uses not specific to a particular point or facility. For example, golf courses to which fertilizers and/or pesticides and herbicides have been applied are potential sources of infiltration or runoff containing nitrate and pesticides/herbicides or pesticide/herbicide degradation products. Residential areas and recreational facilities where turf chemicals are applied, and streets and parking lots may also be non-point sources of potential contaminants.

The land use map (Figure 4) provides a guide to areas that may be non-point sources. Contaminants derived from non-point sources may infiltrate directly to groundwater, or they may be transported as surface runoff to areas where infiltration occurs. Non-point sources are, therefore, a concern within high vulnerability areas and areas that drain directly to areas of concentrated infiltration within high vulnerability areas. A map of the storm-water drainage system for the City of Robbinsdale is provided for reference in Appendix III A.

Although portions of the DWSMA are rated as highly vulnerable, the depth of the City of Robbinsdale wells, the apparent assimilative capacity with respect to nitrate, and the fact that surficial contaminants have not been detected in the well water make non-point sources of contamination a low priority concern.

### *5.6 Public Utility Services*

Spills on or leaks from infrastructure systems are also potential sources of contamination that could have an impact on aquifer water quality. Roadways, railways, and petroleum pipelines are examples of transportation routes that may be the site of a leakage or spill that could impact aquifer water quality. Other infrastructure, such storm sewers may divert water to an area with higher surface water infiltration, creating an increased sensitivity to pollution. Sanitary sewer leaks could also degrade groundwater quality.

State Highway 100 is the major trunk highway intersecting the DWSMA. The other main arterial road through the DWSMA is County Highway 81 (West Broadway and Lakeland Ave.). Other arterial and collector roads are also shown in Figure 1. Burlington Northern Santa Fe Railway tracks pass through the DWSMA from the northwest to southeast. The Canadian Pacific Railway forms parts of the northern and western borders of the DWSMA (Figure 1). There are no pipelines within the DWSMA. Copies of the sanitary sewer and storm sewer maps for the City of Robbinsdale are included as Appendix C.

Public water supply wells are also components of the public utility infrastructure. The locations of the wells are shown on Figure 1. In addition to the City of Robbinsdale wells, two other community supply wells are located within the DWSMA (El Presidente Apartments, PWS ID 1270071).

### 5.7 Active Sites of Contamination

Currently, there are no known active sites of contamination within the delineated DWSMA for the City of Robbinsdale. There are three leaking underground storage tank (LUST) sites where contamination still remains and that have not been closed by the MPCA. These sites were included in the inventory but are not currently considered a threat to the drinking water aquifers.

Should any contamination sites be identified within the DWSMA, they will be prioritized in order of the threat they pose to the municipal wells. For sites that may be a high risk or immediate concern, site specific soil conditions, geology, surface runoff, and estimated time of travel to the public supply wells will be investigated to assess the level of threat to the City’s water supply.

### 5.8 Summary

The scope of the potential contaminant source inventory is summarized in the table below:

Type of Potential Contaminant Source	Total Active / Unknown	Total Removed / Closed / Inactive
Registered Storage Tank Permit	44	--
Registered Storage Tank	47	102
LUST Site	3	36
Hazardous Waste Generator Permit	72	1
VIC Site	8	--
Dump	0	2
CERCLIS (“Superfund”)	0	1
State Superfund Site	0	1
Agricultural Chemical Storage / Other	14	Unknown
ISTS (Individual sewage treatment system)	0	4 (unknown status)
Class V wells	0	Unknown
Large septic system	0	0
Abandoned well	1 (unsealed?)	Unknown sealed
Cemetery	1	0

The acreage of non-point source land uses was not determined for this report, but the land use and zoning maps provided as Figures 4 and 5 provide a tool for understanding the scope of land uses in the DWSMA. The inventory was made as complete as practicable at the time of the development of this Plan. Further data collection issues and other problems and opportunities associated with land uses in the DWSMA are addressed in Chapter 7. Plan goals, objectives, and actions are addressed in Chapter 8.

A full table showing the results of the potential contaminant source inventory is provided electronically as part of Appendix F with this report.

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

### *6.1 Changes and Impact of Changes to the Environment and Land Use*

The DWSMA is located entirely within fully developed cities. Within the City of Robbinsdale, 22 to 30 acres of land were designated as potential infill and redevelopment areas between 2000 and 2020 according to the Comprehensive Plan. The population of Robbinsdale is expected to increase by about 13% over the period (Met Council). The planned land use for the DWSMA and surrounding areas, as designated in the city comprehensive plans submitted to the Metropolitan Council is mapped in Figure 7.

Planned land use changes within the City of Robbinsdale include redevelopment of some commercial areas to higher density commercial and mixed land uses, development of low-density and medium density residential uses on Highway 100 turn-back property, and infill of residential uses in under utilized land.

### *6.2 Changes to Surface and Groundwater*

The planned land use changes will have a limited net effect on surface and groundwater because the changes generally involve redevelopment of previously developed areas. Evidence that land use changes since the development of the Robbinsdale water system (mostly in areas outside of the DWSMA) have not had a significant measurable impact on ground-water levels or availability within the City of Robbinsdale was presented in the Part 1 report (Bonestroo Rosene Anderlik & Assoc., 2005).

Since groundwater recharge to the aquifers supplying Robbinsdale's wells is not limited to the area within the City, Robbinsdale is looking towards cooperation with Hennepin County and other local units of government to help implement groundwater protection.

## **7.0 PROBLEMS AND OPPORTUNITIES**

### *7.1 Problems*

1. Portions of the DWSMA for the City of Robbinsdale's Wells are vulnerable to contamination.
2. Portions of the DWSMA include areas of commercial and industrial land uses, some of which represent potential point sources of contaminants.
3. Residential areas of the DWSMA represent potential non-point sources to which the water supply system may be susceptible if lawn care activities are conducted inappropriately or excessively or household hazardous wastes are disposed of improperly.
4. The number and location of improperly abandoned wells in the DWSMA is not known with a high degree of certainty.
5. The number and location of automotive disposal systems (a type of Class V well) in the DWSMA is not known with a high degree of certainty.

### *7.2 Opportunities*

1. Opportunities exist to work with the surrounding communities in planning land uses to protect the aquifers within the DWSMA.
2. Watershed management organizations exist to manage surface water drainage within the DWSMA.

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

#### City of Robbinsdale

Zoning ordinances are the primary means by which the City of Robbinsdale controls water and land use within the city. The land in the DWSMA is currently zoned as shown in Figure 5. Zoning regulations are contained in Sections 505 – 535 of the City of Robbinsdale Codes. The following zoning districts are designated:

#### Residential

- R-1 Single family residential district
- R-2 Single family and two family residential district
- R-3 Medium density residential district
- R-B Residential-business district

#### Commercial

- B-1 Neighborhood business district
- B-2 Limited community business district
- B-3 Highway commercial district
- B-4 Community business district

#### Industrial

- B-W Business-warehouse district

### Downtown

- DD1 Downtown district

### Special District

- FP Flood plain management district
- PF Public Facilities

Other official controls available to Robbinsdale for regulating land use within the DWSMA include conditional use permits and other ordinances. These controls, along with the proposed City of Robbinsdale wellhead protection implementation plan, are anticipated to be adequate in managing the land activities occurring within the City of Robbinsdale portion of the DWSMA. Any deficiencies noted will be addressed and corrected in revisions to the wellhead protection plan.

### Hennepin County

Hennepin County employs ordinances to regulate land use but most would not apply to Robbinsdale's wellhead protection efforts. Most County land use ordinances are only applicable in unincorporated parts of the County, but the DWSMAs are entirely within incorporated cities. Hennepin County does provide an ISTS (individual sewage treatment system) permitting and inspection program for cities that have delegated that authority to the County. Within the City of Robbinsdale DWSMA, this includes Robbinsdale, Minneapolis, Golden Valley, Crystal, and Brooklyn Center. The County also enforces a Hazardous Waste Management Ordinance.

### Shingle Creek Watershed Management Commission

The Shingle Creek Watershed Management Commission (WMC) is governed by a nine-member board of commissioners representing the member cities. As a watershed management organization, the Shingle Creek WMC manages surface waters in the watershed through a Joint Powers Agreement. Policies are stated in the Shingle Creek and West Mississippi River Watershed Management Commissions Second Generation Watershed Management Plan (May 2004). Following review by local municipalities for compliance with municipal ordinances, the Commission reviews improvements and development proposals to determine the effects of the proposals on water resources and compliance with policies stated in the watershed management plan.

The Second Generation Plan was developed between March 2001 and May 2003. The Plan includes information required in Minnesota Administrative Rules Chapter 8410, Local Water Management: an updated land and water resources inventory, goals and policies in eight specific areas; an assessment of problems and identification of corrective actions; an implementation program; and a process for amending the Plan. One of the goals stated in the plan is to "Protect and improve groundwater quality and promote groundwater recharge."

### Bassett Creek Watershed Management Commission

The Bassett Creek Watershed Management Commission (BCWMC) is governed by a nine-member board of commissioners representing the member cities. As a watershed management organization, the BCWMC manages surface waters in the Bassett Creek Watershed through a Joint Powers Agreement. Policies are stated in the Bassett Creek Watershed Management Plan. Following review by local municipalities for compliance with municipal ordinances, the BCWMC reviews improvements and development proposals to determine the effects of the proposals on water resources and compliance with policies stated in the watershed management plan.

### Adjacent Communities

Cities intersected by the DWSMA include Minneapolis, Golden Valley, Crystal, New Hope, and Brooklyn Center. Zoning ordinances are also the primary means of regulating land use activities in surrounding cities. Brooklyn Center also has adopted a wellhead protection plan for its public water supply. The Commissioner of Health has delegated to the City of Minneapolis the authority to issue well permits and establish well construction standards equal to or exceeding the requirements of the State well code.

### State and Federal Regulations

Many of the state and federal regulations for potential sources of pollution are design and operation standards. Examples are regulations concerning on-site sewer systems, underground storage tanks, and landfills. It should be noted that the state's design and operation standards would be adequate for most contaminant sources within the City of Robbinsdale DWSMA.

Land use authority that addresses the location of potential sources of contamination within the City of Robbinsdale DWSMA rests with local units of government according to Minnesota law. Since the City of Robbinsdale DWSMA falls within several local units of government, each local unit of government has jurisdiction over the territory of the DWSMA that falls within its borders.

State and federal governmental units regulate:

- Well construction – MDH and City of Minneapolis;
- Well sealing – MDH;
- State groundwater appropriation permits –DNR;
- Public water supply quality –MDH;
- Setbacks for specific contaminant sources from a well –MDH and local governments through conditional use permitting;
- Tank control program –MPCA, MDA, Fire Marshall;
- Shallow disposal wells - US EPA;
- Agricultural chemical storage/handling - MDA

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

The wellhead protection planning team recommends that no additional regulations be imposed at this time and are confident that local issues may be adequately addressed through existing processes.



## **8.0 WELLHEAD PROTECTION GOALS, OBJECTIVES AND IMPLEMENTATION PLAN**

Robbinsdale established objectives for the water system in the Comprehensive Plan. These objectives were:

1. Maintain the high level of drinking water quality in Robbinsdale
2. Continue to maintain the water system operation and supply.
3. Ensure equitable distribution of costs to all users for system-wide operation and improvements.

Goals and objectives for the Wellhead Protection Plan have been developed based on the results of the vulnerability assessment, the results of the potential contaminant source inventory, and the projected changes to the environment, land use, and surface and ground water within the framework of the objectives listed above. In general, goals and objectives are ranked in order of priority.

### *8.1 Goals*

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

1. Maintain water quality and abundant water quantity in Robbinsdale.
2. Increase public education and awareness of wellhead protection through use of newsletters, Consumer Confidence Reports, and the City's website.

### *8.2 Objectives*

To meet the above goals, Robbinsdale will concentrate management efforts on the following factors to create awareness of groundwater protection and help prevent future contamination of the aquifer:

- A. Inform the public about groundwater availability and water quality issues (Public Education)
- B. Manage wells (Wells)
- C. Manage the Inner Wellhead Management Zone (IWMZ) to prevent contaminants from entering the area within a 200 ft. radius of the public supply wells.
- D. Manage above- and underground storage tanks (Storage Tank Management).
- E. Inform the public about household hazardous waste (Household Hazardous Waste).
- F. Cooperate with Hennepin County on the management of commercial/industrial hazardous waste (Hazardous Waste Management)
- G. Cooperate with Hennepin County to manage septic systems (Septic Systems Management)
- H. Educate the public about proper use of lawn and garden chemicals (Turf Management)
- I. Manage urban stormwater (Urban Stormwater Management)
- J. Address impact of groundwater withdrawals on the wellhead protection area (High Capacity Wells)
- K. Inform the public about shallow disposal wells (Shallow Disposal Wells)

## **A. Public Education**

**Objective A:** Develop public support and understanding for the wellhead protection plan through the use of newsletters, the Consumer Confidence Report, and web pages.

**Action A1:** Include information about wellhead protection and ground water protection in the City newsletter.

**Who:** City of Robbinsdale staff

**Cooperators:** MDH

**When:** Within 6 months of adoption of this Plan

**Cost:** Staff time

**How:** Identify and obtain existing educational materials available from MDH and other sources. Write newsletter articles describing wellhead protection and include contact information and web site addresses for existing educational resources.

**Status:** In progress

**Action A2:** Include summary information about the Wellhead Protection Plan in the annual Consumer Confidence Report mailed to water customers. Provide contacts and web site addresses for educational resources.

**Who:** City of Robbinsdale staff

**When:** Annual CCR report, starting with the first report after plan adoption.

**Cost:** Staff time

**How:** Summarize information gathered in other actions in the CCR.

**Status:** Not currently implemented.

**Action A3:** Include information about the Wellhead Protection Plan and links to other wellhead protection related resources on the City's web pages.

**Who:** City of Robbinsdale staff

**When:** Within 6 months of adoption of this Plan

**Cost:** Staff time

**How:** Provide a summary of wellhead protection goals and implementation in Robbinsdale. Provide links to wellhead protection related web sites at MDH, MDA, and EPA.

**Status:** Not currently implemented.

**B. Wells**

**Objective B1:** Locate unidentified wells and inactive/abandoned wells in the Wellhead Protection Area.

**Action B1:** Request that MDH or the City of Minneapolis inform the City of Robbinsdale when permits are granted for new wells or maintenance of existing wells or abandoned wells are sealed within the WHPA. Request that Hennepin County or the City of Minneapolis inform the City of Robbinsdale when existing wells are disclosed as a result of property transfer within the WHPA.

**Who:** City of Robbinsdale staff

**Cooperators:** MDH, City of Minneapolis, Hennepin County

**When:** Within 3 months following adoption of this Plan

**Cost:** Staff time

**How:** Contact designated Points Of Contact at MDH, City of Minneapolis, and Hennepin County

**Status:** Not currently implemented.

**Objective B2:** Water pipes of the city's public water system may not be connected to a pump, well or tank that is connected to a private waterworks system.

**Action B2:** Water pipes of the city's public water system may not be connected to a pump, well or tank that is connected to a private waterworks system.

**Who:** City of Robbinsdale staff, City Council

**When:** Existing city code

**Cost:** Staff time

**How:** Enforce city code

**Status:** Existing city ordinance (700.29)

**Objective B3:** Educate the public about proper well management.

**Action B3:** Provide links to MDH well management web sites on the City's web pages.

**Who:** City of Robbinsdale staff

**Cooperators:** MDH

**When:** Ongoing

**Cost:** Staff time

**How:** City staff will add hyperlinks to the web site.

**Status:** Not currently implemented.

**C. Inner Wellhead Management Zone**

Objective C1: Manage the 200 ft. radius Inner Wellhead Management Zones to prevent contaminants from entering the area immediately surrounding the wells.

Action C1: Continue to monitor setbacks for all new potential sources of contamination located within the IWMZ.  
Who: City staff  
Cooperators: MDH  
When: Annually, or as needed.  
Cost: Staff time  
How: The wellhead protection manager will ensure that any new regulated activities will meet the required setbacks.  
Status: Continuation of ongoing activities

**D. Storage Tanks Management**

Objective D: Notify owners of tanks located in the DWSMA that the tank is in a source water protection area, and educate owners of properties containing tanks of the importance of spill prevention.

Action D: Contact property owners and make them aware of their placement within the City's wellhead protection plan.  
Who: City Staff  
Cooperators: MPCA  
When: Within 12 months of adoption of this Plan.  
Cost: Staff time  
How: Send mailing out to property owners notifying them about the Drinking Water Supply Management Area delineation and the importance of spill prevention. Provide contact numbers for appropriate government agencies if requested.  
Status: Not currently implemented.

**E. Household Hazardous Waste**

Objective E: Educate the public about household hazardous waste, and provide the public with services relating to household hazardous waste.

Action E: Use existing newsletter or website to encourage residents to use the Hennepin County yearly and local collection events.  
Who: City staff  
Cooperators: Hennepin County Department of Environmental Services  
When: Ongoing  
Cost: Staff time

How: Include information about wellhead protection and the importance of proper disposal of household hazardous wastes in the newsletter or website. Provide facility addresses, operational hours, and Hennepin County contact and web site information. Also include local collection event schedule.

Status: Not currently implemented.

## F. Hazardous Waste Management

Objective F: Cooperate with Hennepin County on the management of commercial/industrial hazardous waste.

Action F1: Use existing website to encourage business owners to take advantage of services provided by the Hennepin county Environmental Protection division.

Who: City staff

Cooperators: Hennepin County Department of Environmental Services

When: Ongoing

Cost: Staff time

How: Provide a hyperlink to the Hazardous Waste page in the Hennepin County web pages. The web page provides contact information, Hazardous Waste information, forms, fact sheets, and links to the *Generator Newsletter*.

Status: Not currently implemented.

Action F2: Provide Hennepin County and any affected neighboring communities with a DWSMA location map.

Who: City staff

Cooperators: Hennepin County Department of Environmental Services, affected neighboring communities.

When: Within 6 months of plan adoption.

Cost: Staff time

How: Notification of the approval of the WHPA and DWSMA delineations and vulnerability assessments. Cooperators may choose to concentrate hazardous waste enforcement efforts within source water protection areas.

Status: Not currently implemented.

## **G. Septic Systems Management**

**Objective G:** Cooperate with Hennepin County to educate property owners about the need for having complying onsite sewage treatment systems.

**Action G:** Assist County's efforts to educate property owners about ISTS systems.

**Who:** City staff

**Cooperators:** Hennepin County Environmental Services

**When:** Ongoing

**Cost:** Staff time

**How:** Provide assistance to Hennepin County, as requested.

**Status:** Not currently implemented.

## **H. Turf Management**

**Objective H:** Encourage residential property owners to use lawn and garden chemicals responsibly.

**Action H:** Cooperate with existing local (NPDES permitting) and County programs to educate property owners about the advantages and disadvantages of the use of chemicals for lawn care and about ways to minimize the potential adverse environmental effect of the chemicals if they choose to use them.

**Who:** City staff

**Cooperators:** Shingle Creek Watershed Management Commission, Bassett Creek Watershed Management Commission, MPCA

**When:** Ongoing

**Cost:** Staff time

**How:** The City adopted its current Storm Water Pollution Prevention Plan (SWPPP) in March 2003, which was amended and adopted in May 2006. This plan includes BMPs related to public outreach and education and public participation and involvement which include methods to encourage property owners to use lawn and garden chemicals responsibly. In addition, the City has also developed an ordinance requiring all fertilizers be phosphorus free.

**Status:** Currently implemented.

## I. Urban Stormwater Management

Objective I: Cooperate with other programs and agencies to manage stormwater quality.

Action I: Continue to implement the City's Storm Water Pollution Prevention Plan (SWPPP) in fulfillment of NPDES permit requirements.

Who: City staff

Cooperators: MPCA, Shingle Creek Watershed Management Commission, Bassett Creek Watershed Management Commission

When: Ongoing. Annual review of SWPPP.

Cost: No additional costs.

How: The City of Robbinsdale has adopted its Stormwater Pollution Prevention Plan (SWPPP) to meet MPCA stormwater permit requirements (2003-2008). The SWPPP includes measures for public education and outreach, public involvement and participation, illicit discharge detection and elimination, construction site runoff control, post construction stormwater management, and pollution prevention and good housekeeping. This includes a BMP to develop a model spill response plan. The SWPPP meets the stormwater management needs of the WHP Plan within the Robbinsdale city limits.

Status: Currently implemented.

## J. High Capacity Wells

Objective J: Identify possible impacts on the wellhead protection area of new high capacity wells or changes in water appropriation.

Action J: Request that the MDH or the City of Minneapolis inform the City of any proposed high capacity wells to be constructed in or near the DWSMA and request the DNR to notify the City of any changes in appropriations to existing wells or appropriations for new wells that may impact the wellhead protection areas.

Who: City staff

Cooperators: MDH, DNR, City of Minneapolis

When: Within 3 months of adoption of this Plan.

Cost: Staff time

How: Send a letter and a figure showing the Wellhead Protection Areas and the DWSMA and the MDH, DNR, and the City of Minneapolis requesting that the City of Robbinsdale be informed of hi-cap well permit applications or changes in appropriations that would affect Robbinsdale wells and/or the Robbinsdale DWSMA.

Status: Not currently implemented.

## **K. Shallow Disposal Wells**

**Objective K:** Attempt to identify shallow disposal wells in the DWSMA and notify owners of federal reporting responsibilities.

**Action K1:** Notify MDH of any shallow disposal well sites within the DWSMA as they are identified by City staff.

**Who:** City staff

**Cooperators:** MDH

**When:** Ongoing

**Cost:** Staff time

**How:** Mail a letter to the regional MDH Environmental Health Division planner identifying the shallow disposal well site.

**Status:** Not currently implemented.

**Action K2:** Notify owners of Class V wells about federal reporting requirements.

**Who:** Wellhead Protection Manager and City staff

**Cooperators:** MDH

**When:** Ongoing

**Cost:** City staff time

**How:** A fact sheet on Class V wells and reporting requirements will be provided to the landowner describing what a Class V well is and the impacts they can have on groundwater quality.

**Status:** Not currently implemented.



## 9.0 GUIDANCE FOR USE BY CITY OF ROBBINSDALE STAFF WELLHEAD PROTECTION PLANNING

To ensure that wellhead protection planning is viable for the City of Robbinsdale, the City staff should understand the nature of the City's program and how their day-to-day actions pertain to the wellhead protection program.

Wellhead Protection Manager: City of Robbinsdale Public Works Director/Engineer (Richard McCoy)

### 9.1 *Activities Affecting Wellhead Protection*

The list presented below reflects the type of information or activities that City staff may encounter or manage as part of their normal functions that should be communicated to the wellhead protection manager. This list should be distributed to affected City departments for their review. Any observed occurrence of the following items listed that may impact surface water or groundwater quality should be reported to the City of Robbinsdale Wellhead Protection Manager (Richard McCoy):

#### Public Safety (Police & Fire Departments)

- Emergency response and spills
- Observed dumping

#### Fire Department

- Emergency response and spills
- Underground storage tank removal, particularly if contamination is observed
- Fire suppression (if techniques may affect water quality)

#### Building Department (Inspections)

- Hazardous materials storage or disposal (household, commercial, or industrial)
- Unsealed or abandoned wells
- Underground storage tank removal, particularly if contamination is observed
- Observed dumping

#### City Planner and Planning Commission

- Zoning changes
- Unusual infiltration and storm-water issues
- Environmental Assessment Worksheets (EAWs)
- Special projects

#### Engineering

- Well sampling and analysis results
- Contamination noted during construction
- Change in pumping of municipal wells
- Sanitary sewer line breaks/ruptures
- Sanitary sewer lift station overflow/failure

### Parks, Recreation, and Forestry Department

- Observed dumping
- Turf Management

In addition, several programmatic activities will need on-going review and consideration. These generally involve fewer departments, and are listed below.

### City Manager

- Review new ordinance development to ensure consistency with Wellhead Protection Plan
- Interaction and liaison with other local units of government

### City Planner and Planning Commission

- Ordinance review and development of official controls, as necessary
- Education activities
- Development of Best Management Practices for use in DWSMA

### Wellhead Protection Manager

- Internal coordination and plan management
- Interaction with external cooperators

## **10.0 PROGRAM EVALUATION**

The City of Robbinsdale will evaluate the progress of the implementation plan every two years. The Wellhead Protection Plan Manager will prepare a progress report to be completed every two years after the Plan is adopted. The progress report will briefly discuss the actions implemented by the City or any cooperators during the previous two years, and actions that will be completed in the next two years. The progress report will outline successful efforts that will have taken place and will identify areas in need of improved management. The progress report will be distributed to the City Council for their review after which it will be submitted to MDH. Results of progress reports will also be considered for plan updates.

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

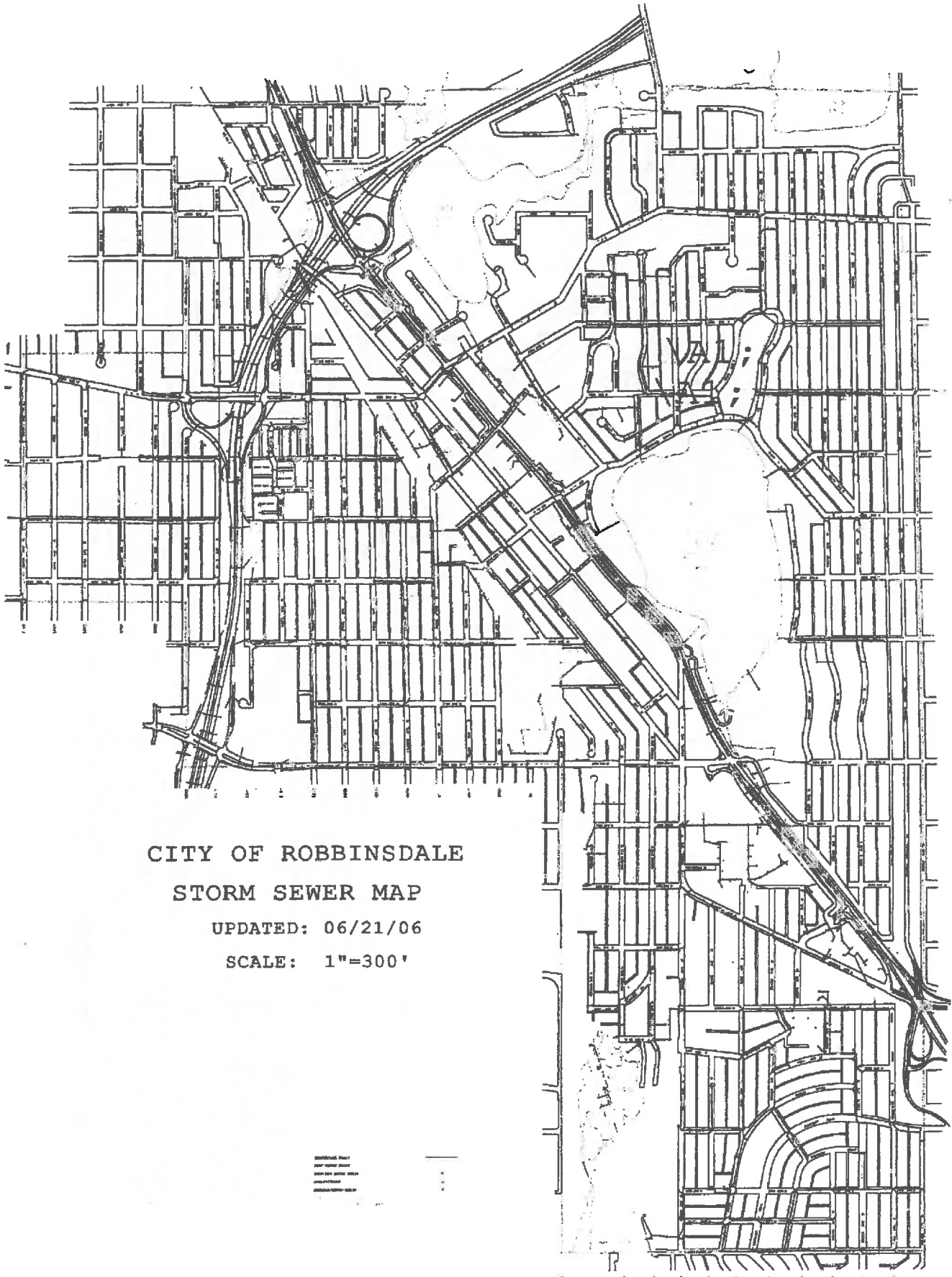
## **11.0 EMERGENCY PREPAREDNESS AND CONTINGENCY PLAN**

The City of Robbinsdale's Water Emergency and Conservation Plan was submitted to both the Department of Natural Resources and the Metropolitan Council for their review, and was approved on August 28, 1997. This plan fulfills the emergency preparedness and contingency planning requirements of the Wellhead Protection Rules.

As required by the US EPA, the City of Robbinsdale has also completed its Vulnerability Assessment and Emergency Response Plan for its water supply system. The Emergency Response Plan will be incorporated into updates to the Water Emergency and Conservation Plan.

## **12.0 LOCAL GOVERNMENT REVIEW AND PUBLIC HEARING**

The draft City of Robbinsdale wellhead protection plan was submitted to local units of government for their review and comments on October 16, 2006. The required 60-day review period ended on December 15, 2006. All comments were considered and, when deemed appropriate, responses were incorporated into the Wellhead Protection Plan.



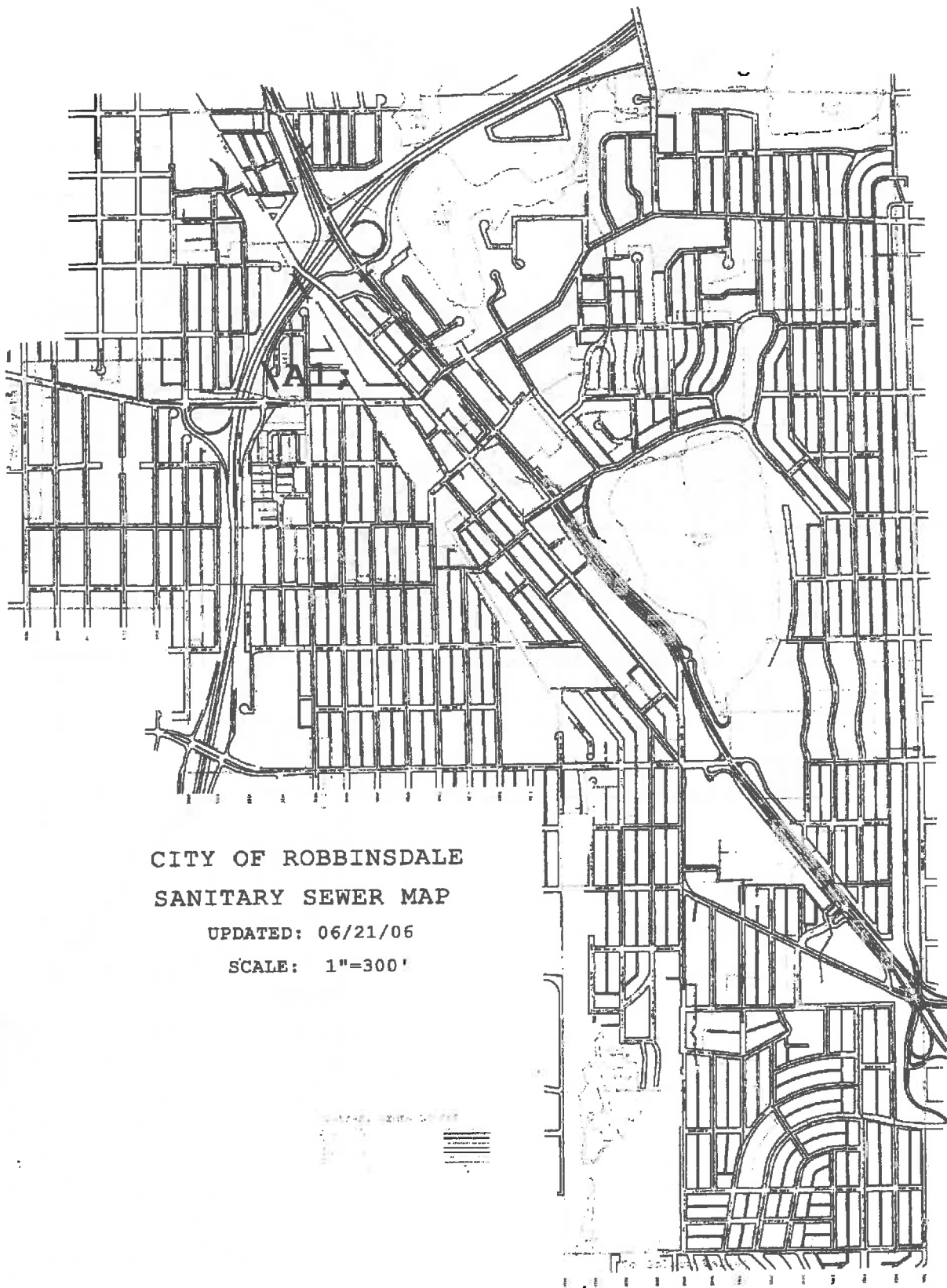
CITY OF ROBBINSDALE

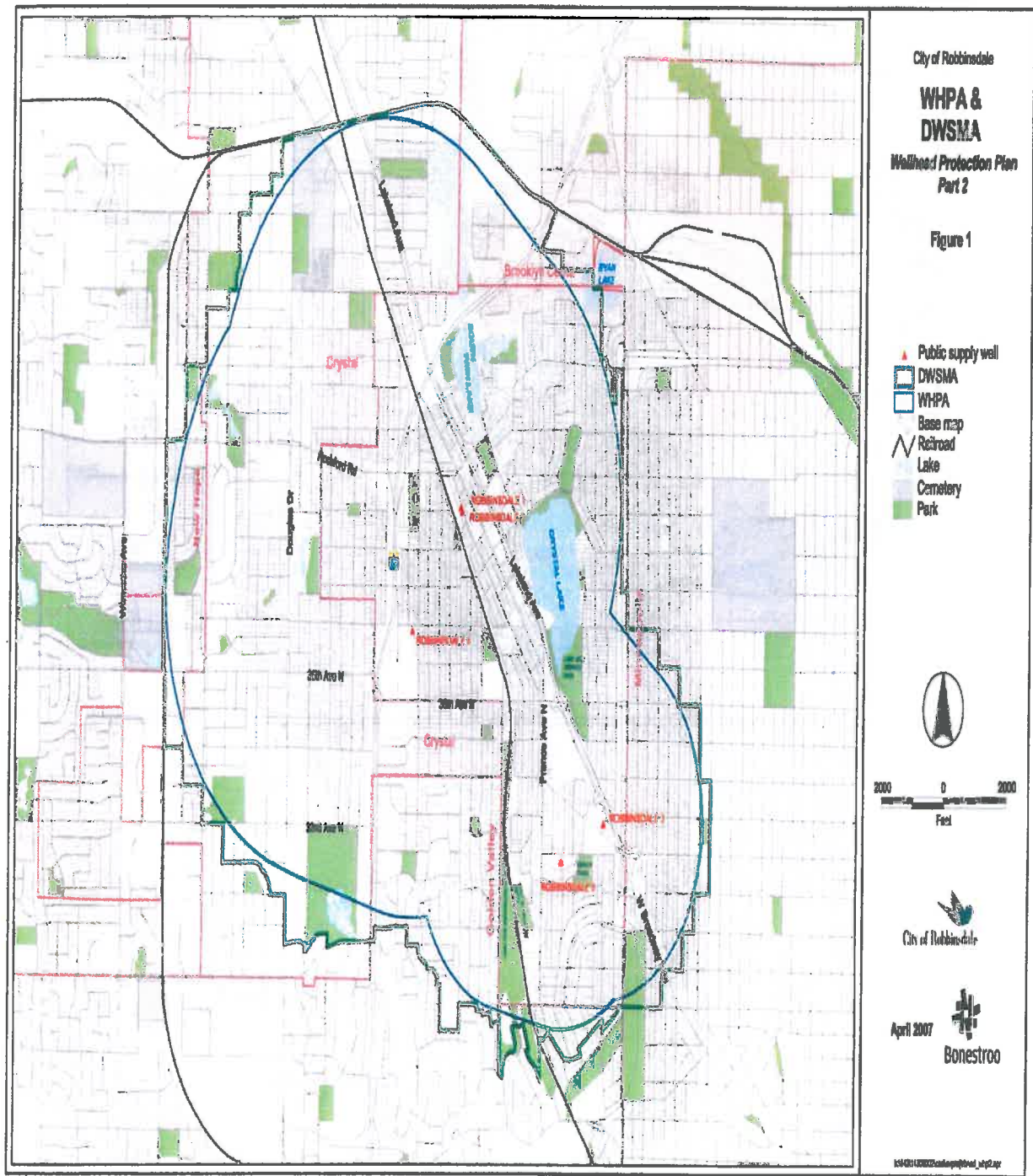
STORM SEWER MAP

UPDATED: 06/21/06

SCALE: 1"=300'

Legend  
--- Sewer Main  
--- Sewer Branch  
--- Sewer Collector  
--- Sewer Lateral





City of Robbinsdale

**WHPA & DWSMA**

Wellhead Protection Plan  
Part 2

Figure 1

- ▲ Public supply well
- ▭ DWSMA
- ▭ WHPA
- Base map
- ▬ Railroad
- ▭ Lake
- ▭ Cemetery
- ▭ Park



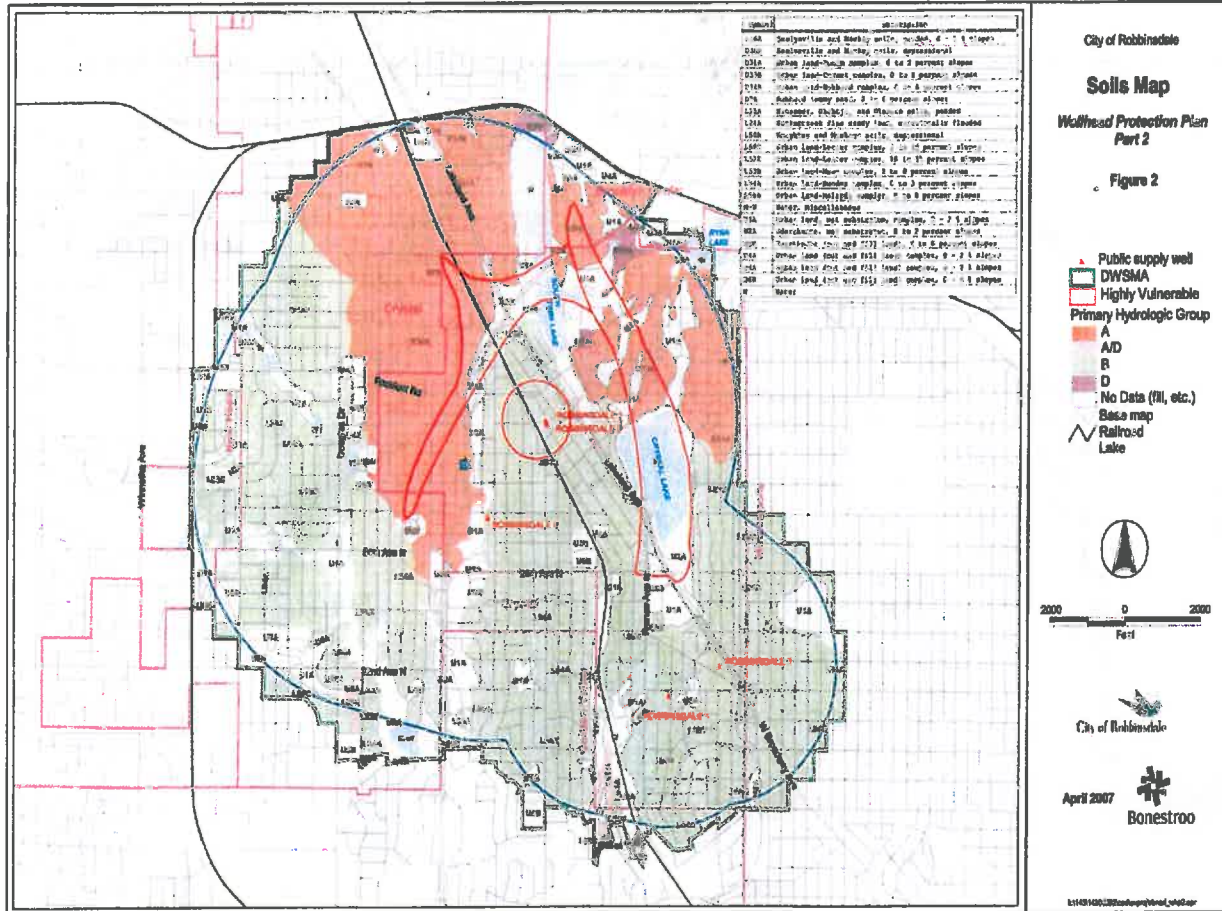
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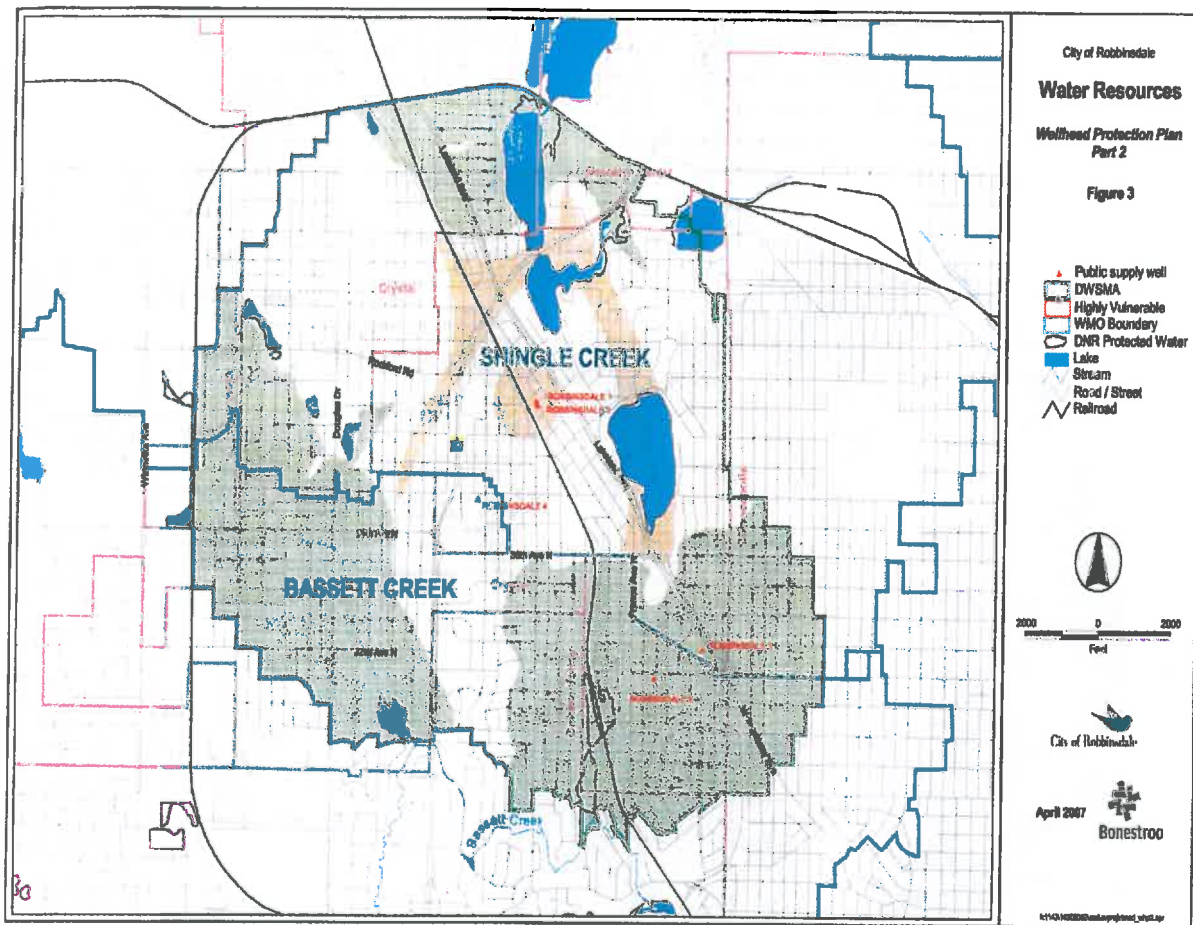


April 2007  
**Bonestroo**

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City of Robbinsdale  
**Water Resources**  
 Wellhead Protection Plan  
 Part 2  
 Figure 3

- Public supply well
- DWWSMA
- Highly Vulnerable
- WMO Boundary
- DNR Protected Water
- Lake
- Stream
- Road / Street
- Railroad



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City of Robbinsdale

April 2007  
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