

Wellhead Protection Plan for the City of Newport, Minnesota

Part I

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1.0 Source Water Assessment

THE SOURCE WATER ASSESSMENT WILL BE PROVIDED BY MDH STAFF

2.0 Introduction

This report summarizes the delineation of the Wellhead Protection Area (WHPA) and Drinking Water Supply Management Area (DWSMA) for the City of Newport, Minnesota. The City of Newport has two municipal water supply wells: Well 1 (Unique #208353) and Well 2 (Unique #225904; see Figure 1). The wells are open to the Jordan Sandstone (Appendix A; MDH, 2001).

3.0 Criteria for Wellhead Protection Area Delineation

The following criteria have been established by the Minnesota Department of Health (MDH) to ensure accurate delineation of the WHPA.

3.1 Time of Travel

A minimum ten-year time of travel criteria must be used to determine a WHPA so there is sufficient reaction time to remediate potential health impacts in the event of contamination of the aquifer. A time of travel of ten years was considered in this study. As required by the Wellhead Protection rules, the one-year time of travel was also determined for each well addressed in this study.

3.2 Aquifer Transmissivity

For this study, transmissivity of the Jordan Sandstone aquifer was estimated from an aquifer test performed in St. Paul Park Well No. 1 (Unique # 208414) in 1990 as part of remedial investigation work done by Barr Engineering Company at the Ashland Refinery (Barr, 1991). Results of this aquifer test were accepted by the MDH to satisfy the requirements of the Newport Wellhead Protection study (MDH, 2002a; 2002b). A summary of the aquifer test is included in Appendix B. The transmissivity for the Jordan Sandstone determined from the aquifer test is $1.8 \text{ ft}^2/\text{min}$ (see Appendix B). The saturated thickness of the Jordan Sandstone in the Newport Well No. 2 is 100 ft. Newport Well No. 1 does not fully penetrate the Jordan Sandstone. Well logs for the Newport municipal wells are included in Appendix A. The hydraulic conductivity value applied to the Jordan Sandstone surrounding Newport in the groundwater flow model used in this study is $1.89 \times 10^{-2} \text{ ft}/\text{min}$ (8.3 m/day).

3.3 Daily Volume of Water Pumped

Daily volume of water pumped in Newport's municipal wells used in the groundwater flow model is based on historical pumping records and projected growth. Pumping rates used in the model are the highest year 2007 rate projected for each well determined as described below.

Actual pumping for each well from the last five years (1997-2001) was taken from the DNR appropriation records (Appendix C). Newport's projected total pumping for the year 2007 was estimated by linear extrapolation to 2007 of the appropriation data trend for each well and then summing the projected pumping for each well.

A second projection of 2007 total pumping was then done based on projected growth of Newport. The City's Comprehensive Plan projects that pumping in Newport will increase 38.6% between 2000 and 2016 (BDMCE, 2002). Projected total pumping in 2007 was calculated by linear interpolation using the Comprehensive Plan information as endpoints.

Finally, the percentage of total pumping attributed to each well was calculated for the time period 1997-2001 and these percentages were applied to the highest projected 2007 total pumping. Total projected 2007 pumping based on growth estimates from the City's Comprehensive Plan described above is greater than the projected 2007 pumping based on extrapolation from the 1997-2001 appropriations reports. Therefore, the projected total pumping for 2007 used in this calculation was the projected growth estimate described above. The average percentage of pumping for each well for the period 1997-2001 was then applied to the total projected pumping in 2007 to determine a projected annual pumping volume for each well.

For each well, the highest of either an observed annual volume pumped from the 1997-2001 pumping records or projected 2007 pumping for each well was used in the model for the WHPA delineation. The rate used for Newport Well No. 1 is the rate determined from the linear extrapolation of the 1997-2001 pumping data and the rate for Newport Well No. 2 is the observed rate from 1997. Total pumping used in the model for this study is 474,896 gallons per day (1,797 meters³ per day). Table 1 summarizes the historical and assumed distribution of the annual withdrawal among the Newport municipal wells.

3.4 Flow Boundaries

To accurately delineate the WHPA, it is necessary to assess how nearby wells, rivers, lakes, and variations in geologic conditions affect flow directions and velocities in the aquifer. The Mississippi and St. Croix Rivers are included in the model. In addition, large lakes in northern Washington County are also represented in the model. Inclusion of these features in the groundwater model is discussed in more detail in Section 3.6 below. Wells were added to the model using data from SWUDs and CWI. Pumping rates for wells in the area of interest (southern Washington County) were updated using the most recent data reported in the SWUDs database (http://files.dnr.state.mn.us/waters/watermgmt_section/appropriations/idxloc.pdf).

3.5 Conceptual Hydrogeologic Model

MDH staff approved for this study (MDH, 2002b) the use of geologic cross sections and discussion of regional geology/hydrogeology text from the Remedial Investigation Report done by Barr in 1991 for the nearby (formerly) Ashland refinery in St. Paul Park (see Barr, 1991). Locations of these cross sections are shown on Figure 2. Cross sections A-A' and B-B' are included as Figures 3 and 4. The following text is based on the discussion of regional geology/hydrogeology in Barr (1991).

The City of Newport is located in southwestern Washington County on a river terrace cut into the bedrock along the east side of the Mississippi River. The terrace and a slightly higher terrace east of Newport were eroded by glacial meltwater from Glacial River Warren as it flowed through what are now the valleys of the Minnesota and Mississippi Rivers (Meyer, et al., 1990). The resulting topography is relatively flat with low hills to the east and northeast.

At its maximum extent, Glacial River Warren occupied a broad valley cut into the bedrock. As the river's flow decreased, Glacial River Warren deposited a thin (less than 10-foot thick) veneer of sand and gravel alluvium on the bedrock terraces and partially filled the deepest portion of the valley with outwash deposits. The Mississippi River that now occupies the valley subsequently deposited floodplain alluvium along the valley sides. The floodplain alluvium consists of sand, silt, and clay along with organic matter.

The bedrock units underlying Newport were deposited in a marine environment during the Cambrian and Ordovician periods of the early Paleozoic. The bedrock units dip gently to the northwest towards the center of the Twin Cities Basin (Mossler and Bloomgren, 1990). Within the Newport corporate boundary, the Platteville Limestone and Glenwood Shale are the uppermost bedrock units in relatively small areas while the Prairie du Chien Group is the uppermost bedrock unit beneath most of Newport. The water table occurs in the Prairie du Chien Group. Therefore, the Prairie du Chien Group and underlying bedrock units are discussed below. Other overlying units have been removed by erosion.

The Ordovician-age upper Prairie du Chien Group is a thin-bedded sandy or oolitic dolomite with thin beds of sandstone and chert in its upper portions. Prior to deposition of the overlying St. Peter Sandstone, significant erosion of the Prairie du Chien Group occurred leaving the contact between the two units somewhat irregular. Solution cavities have been observed near the water table in the Prairie du Chien in cores collected in St. Paul Park (Barr, 1991). The lower Prairie du Chien is thickly to massively bedded dolomite. A thin (12- to 13-foot thick) sandy transitional zone occurs

adjacent to the contact with the Jordan Sandstone. The Prairie du Chien Group is 130 to 200 feet thick in the vicinity of Newport.

The Jordan Sandstone is Cambrian in age and is 60 to 100 feet thick in the vicinity of Newport. The upper Jordan is composed of cross-bedded medium to coarse-grained friable quartzose sandstone. The lower Jordan is primarily massively bedded fine-grained feldspathic sandstone.

A bedrock valley runs down the center of the southern half of Washington County. This valley cuts down into the Jordan Sandstone in its deepest parts (Mossler and Bloomgren, 1990).

Underlying the Jordan Sandstone is the Cambrian-age St. Lawrence Formation. The St. Lawrence Formation is a 30- to 60-foot thick thin-bedded dolomitic shale and siltstone. A 0.5- to 2.0-foot thick dolomitic conglomerate is typically present at the contact between the St. Lawrence Formation and the underlying Franconia Formation.

The Cambrian-age Franconia Formation is composed of very fine-grained glauconitic sandstone, which grades into a fine to coarse-grained non-glauconitic sandstone to the north.

Three additional Cambrian-age bedrock units lie beneath the Franconia Formation. These units are (1) the Ironton and Galesville Sandstones, (2) the Eau Clair Formation, and (3) the Mt. Simon Sandstone. The Ironton and Galesville Sandstones are fine- to coarse-grained quartzose sandstones. The Eau Claire Formation is composed of siltstone, greenish gray shale, and very fine-grained sandstone. The Mt. Simon Sandstone is mainly fine- to coarse-grained quartzose sandstone. The Mt. Simon Sandstone is separated from underlying Proterozoic age rocks by a major erosional surface. The Proterozoic Hinckley Sandstone underlies the Mt. Simon Sandstone.

The following aquifers are present in the Quaternary and Paleozoic sediments beneath Washington County (Kanivetsky and Cleland, 1990):

- (1) Quaternary sediments;
- (2) Prairie du Chien and Jordan Aquifer;
- (3) Franconia/Ironton/Galesville Aquifer; and
- (4) Mt. Simon/Hinckley Aquifer.

The surface of the saturated zone (water table) is found in a variety of geologic materials across the County, including Quaternary sand, gravel, and till, and Paleozoic bedrock units. The water table is in the Prairie du Chien Group near Newport and in the floodplain alluvium (where present) immediately adjacent to the Mississippi River. The Mississippi and St. Croix Rivers are the regional discharge areas for all four aquifer systems.

The Prairie du Chien Group and Jordan Sandstone are generally considered to act as a single hydrogeologic unit in the Twin Cities area (Prairie du Chien- Jordan Aquifer). These units are heavily used for water supply in southern Washington County. In areas of the County east of Newport, these units are under confined conditions. In these areas, the head difference between the Quaternary aquifer and the Prairie du Chien-Jordan aquifer ranges from approximately 10 to 50 feet (Barr, 1991). The Prairie du Chien is unconfined near Newport and the Jordan is considered confined (leaky). This is consistent with the results of the aquifer test discussed in Appendix A. The Prairie du Chien Group and the Jordan Sandstone are included in the groundwater flow model as separate layers.

Groundwater flow in the Prairie du Chien is controlled by fractures, joints, and solution cavities. Flow in the Jordan Sandstone is mainly through intergranular pore spaces. Groundwater in the Prairie du Chien Group and Jordan Sandstone flows from northern Washington County towards the Mississippi and St. Croix Rivers (Kanivetsky and Cleland, 1990).

The St. Lawrence Formation separates the Franconia/Ironton/Galesville Aquifer from the overlying Prairie du Chien/Jordan Aquifer. The St. Lawrence Formation is a regional aquitard, which restricts flow between the two aquifers. Currently, there are no wells in the vicinity of Newport that are known to penetrate the St. Lawrence Formation. The head difference between the Prairie du Chien/Jordan and the Franconia/Ironton/Galesville Aquifers ranges from approximately 25 to 50 feet. The Franconia/Ironton /Galesville Aquifer is not typically used as a source of water in those areas of Washington County where the Prairie du Chien/Jordan Aquifer is present. However, in those areas of the County where they are the uppermost bedrock units, they contribute a major portion of the water for domestic wells. Groundwater in the Franconia/Ironton/Galesville Aquifer flows from northern Washington County towards the Mississippi and St. Croix Rivers.

The Eau Claire Formation aquitard separates the Mt. Simon/Hinckley Aquifer from the overlying Franconia/Ironton/Galesville Aquifer. The head difference between the two aquifers ranges from 0 to approximately 150 feet. The Mt. Simon/Hinckley aquifer is not widely used as a water source in

Washington County. Groundwater flow in the Mt. Simon/Hinckley is generally from the northwestern portion of Washington County east to the St. Croix River.

The primary source of water for the glacial drift/St. Peter Sandstone aquifer is infiltrating precipitation. The primary source of water for the Prairie du Chien Group and Jordan Sandstone is leakage from adjoining aquifer units. Where the Prairie du Chien Group is the uppermost bedrock unit it also receives water via infiltration of precipitation. Discharge is to the major streams; the Mississippi River and the St. Croix River. Pumping wells also remove water from the aquifer units.

3.6 Model Description

The groundwater model MODFLOW (McDonald and Harbaugh, 1988; Harbaugh and McDonald, 1996) was used for this study. MODFLOW is public domain software that is available at no cost from the United States Geological Survey. The preprocessor Groundwater Vistas (Rumbaugh and Rumbaugh, 2001) was used to create the MODFLOW data files.

The model used for the Newport WHP study is a model that was originally developed as the Scott-Dakota Counties model (Barr, 1999) that was then refined for a study in southern Washington County (Appendix D), and then was revised again for local conditions around Newport.

The model used for Newport started as the regional Scott-Dakota Counties Groundwater Flow Model prepared for the MDH by Barr in 1999 (Barr, 1999). The Scott-Dakota Counties model is a four-layer model in which Layer 1 represents the Upper Drift Aquifer (not active in the area surrounding Newport), Layer 2 represents the St. Peter Sandstone/Drift, Layer 3 represents the Prairie du Chien Group, and Layer 4 represents the Jordan Sandstone.

The Scott-Dakota Counties Model was updated to include refinements in Washington County, including the addition of two model layers beneath the Jordan Sandstone. Layers 5 and 6 represent the St. Lawrence Formation aquitard and the combined Franconia Formation-Ironton Sandstone-Galesville Sandstone aquifer. In addition, refinements in layer elevations and hydraulic conductivity were added to the model. The bedrock valley that runs through the southern part of the County was included. This southern Washington County model is described in more detail in Appendix D. Discussion of the calibration of this model is included in Appendix D, including figures with elevations, hydraulic conductivities, and residuals of the calibration.

Finally, the southern Washington County model was modified to represent the conditions near Newport. A zone of hydraulic conductivity was added to represent the transmissivity calculated from the St. Paul Park Well No. 1 aquifer test. Porosities were decided upon at the pre-delineation meeting to be 0.05 for the Prairie du Chien Group and 0.2 for the Jordan Aquifer (MDH, 2002). In addition, the finite difference grid was refined in the area of interest. The grid cell size within the area of Newport is approximately 166 m x 166 m. The cell size increases outside the area of interest to approximately 600 m x 600 m. The MODFLOW modeling files are included electronically on the attached data CD.

The model was modified in the vicinity of Newport to represent the local conditions (Figure 5). Changes to the model included the addition of pumping wells in the Newport area and adjusting hydraulic conductivity locally to correspond to results of the St. Paul Park Well No. 1 aquifer test discussed in Section 3.2 (i.e., hydraulic conductivity changed to 8.3 m/day).

Flow boundaries in the model are represented by stream cells and constant head cells. The Mississippi River is represented by stream cells in Layers 2 and 3, depending on the elevation of the River. Constant head cells were used to represent lakes in northern Washington and Ramsey Counties. These were used for calibration purposes of the model but there were no constant head cells in the area near Newport. More details about this model can be found in “Scott-Dakota Counties Groundwater Flow Model,” Barr (1999), and in the calibration write up found in Appendix D.

Model calibration beyond that described in Appendix D was considered to be unnecessary because the change made to the hydraulic conductivity of the Jordan Sandstone in the vicinity of Newport was very minor and had no observable affect on the model results. In addition, there was a lack of data that could be used for calibration targets in Newport.

3.7 Groundwater Flow Field

The ambient direction of groundwater flow and gradient in the vicinity of Newport was estimated based on piezometric maps from the Washington County Geologic Atlas (Kanivetsky and Cleland, 1990) to be westerly with an approximate gradient of 0.009. This flow direction is consistent with the modeled flow direction determined for this study. The modeled hydraulic gradient in the vicinity of Newport is 0.007.

4.0 Delineation of the Wellhead Protection Area

A detailed discussion of the model calibration is included in Appendix D.

Once the model was calibrated to the available data, the WHPA for each of the Newport wells was delineated using the MODPATH package in Groundwater Vistas. Thirty particles with 3 vertical release points with a minimum Z-offset of 0.1 and a maximum X-offset of 0.9 were distributed in model layer 4 around each well and traced backwards in time for ten years. Particle traces indicated that groundwater flow paths extend out of the Jordan Sandstone into the Prairie du Chien Group.

When viewed in plan view, the area encompassed by the particle traces was then outlined as the ten-year time of travel groundwater capture zone. After the groundwater capture zone was delineated, surface water drainage (i.e., watershed) was taken into account because of the shallow depth to the Prairie du Chien and the lack of confining units above the Prairie du Chien in the vicinity of the Newport municipal wells. In the eastern portion of the watershed, surface water drains away from the groundwater capture zone so the WHPA was not modified in this area. However, in the western portion of the capture zone, the surface water capture zone extends beyond the groundwater capture zone. Therefore, the western portion of the WHPA includes areas where the surface water drainage is toward the groundwater capture zone (Figure 6). The one-year time of travel area is also shown on Figure 6 and is included on the data CD as an ArcView shapefile.

4.1 Other Groundwater Withdrawal

Interference from other wells in the area was assessed by including wells from the SWUDS database. Pumping from wells other than the City of Newport wells was not adjusted to address future use.

4.2 Uncertainty Analysis

As shown in the calibration discussion in Appendix D, care was taken to ensure that the model reasonably represents the conditions in Washington County. It is assumed in this study that the aquifer test from St. Paul Park Well No. 1, use of which for this study is acceptable to the MDH (MDH, 2002), is representative of the conditions in the Jordan Sandstone at the two wells in Newport.

5.0 Delineation of the Drinking Water Supply Management Area

Figure 7 shows the limits of the proposed Drinking Water Supply Management Area (DWSMA) for the City of Newport. ArcView shapefiles of parcels within the Cities of Newport and Woodbury were used to delineate the DWSMA. The DWSMA extends beyond the Newport corporate limits into the City of Woodbury. The Newport DWSMA encompasses the WHPA and has boundaries that correspond to geographically identifiable features (e.g., streets, political boundaries, parcel boundaries). Table 2 lists those City of Newport and Woodbury parcels within the DWSMA.

6.0 Well Vulnerability Assessment

MDH's preliminary assessment is that all of Newport's wells are vulnerable to contamination released at the surface in the vicinity of the wells. Newport agrees with this assessment.

7.0 Drinking Water Supply Management Area Vulnerability Assessment

Geologic conditions vary locally across the area surrounding Newport. In general, the stratigraphy consists of unconsolidated terrace sediments at the surface, underlain by the Prairie du Chien Group, which is underlain by the Jordan Sandstone. Newport municipal wells are completed in the Jordan Sandstone.

Figure 7 is a map showing land parcel and political boundaries in the areas of the well fields and DWSMA. Also included on Figure 7 is the sensitivity to pollution of the Prairie du Chien/Jordan aquifer as published in the Washington County Geologic Atlas (Meyer, 1990). The DWSMA falls within areas ranging from “very low” to “very high” sensitivity to pollution. Therefore, aquifer vulnerability of the City of Newport DWSMA is classified spatially as shown on Figure 7.

8.0 Supporting Data Files

Project-specific data files included on the compact disc are listed in Table 3.

The model can be reviewed using MODFLOW-96 (McDonald and Harbaugh, 1988; Harbaugh and McDonald, 1996).

All coordinates in the modeling files are based on UTM NAD 83 datum. Elevations are in meters above mean sea level (m MSL); time units are days and length units are meters.

GIS files are also listed in Table 3. Descriptions are self-explanatory. DWSMA, parcels, sensitivities, and WHPA shapefiles are in UTM NAD 83 datum.

9.0 References

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Newport

WELLHEAD PROTECTION PLAN

Part 2:

Potential Contaminant Source Management Strategy

(Date)

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PUBLIC WATER SUPPLY PROFILE

PUBLIC WATER SUPPLY

NAME: City of Newport

ADDRESS: 596 7th Ave

Newport, MN 55055

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Part 2 Executive Summary

This portion of the wellhead protection (WHP) plan for the City of Newport, MN includes:

- the results of the Potential Contaminant Source Inventory,
- the Potential Contaminant Source Management Strategy,
- the Emergency/Alternative Water Supply Contingency Plan, and
- the Wellhead Protection Program Evaluation Plan.

Part 1 of the wellhead protection plan presented the 1) delineation of the wellhead protection area (WHPA) and the drinking water supply management area (DWSMA) and 2) the vulnerability assessments for the system's wells and the aquifer within the DWSMA. Part 1 of the WHP plan was submitted to the Minnesota Department of Health (MDH) and approved on October 3, 2003.

The vulnerability assessment for the aquifer within the DWSMA was performed using available information and indicates that the aquifer used by the city is vulnerable to contamination. Consequently, the principle potential sources to contamination to the aquifer are all land uses and wells that reach or penetrate it. This information was presented to the WHP Committee during the Second Scoping meeting held with the MDH on November 20, 2003, when the necessary requirements for the content of Part 2 were outlined and discussed in detail.

The vulnerability assessment for the public water supply system's wells indicates that the wells are vulnerable to contamination based on the information that documents the construction of each well.

The information and data contained in Chapters 1-4 of this part of the WHP Plan support the approaches taken to address potential contamination sources that have been identified as potentially affecting the aquifer used by the public water supply. The reader is encouraged to concentrate attention on Chapters 1-4 in order to better understand why a particular management strategy is included in Chapter 5.

In Chapter 1, the required data elements indicated by the MDH in the Scoping Notice are addressed as well as the data's degree of reliability. Pertinent data elements include information about the geology, water quality and water quantity. The data elements and information supplied in Part 1 of the WHP Plan are based on the assessment that the aquifer providing drinking water for this system is vulnerable to certain land uses and other wells that penetrate the same aquifer.

Chapter 2 addresses the possible impacts that changes in the physical environment, land use, and water resources have on the public water supply. No significant changes are anticipated within the next ten-year period, and the Newport Public Water Supply (PWS) has evaluated the

support necessary to implement its wellhead protection plan.

The problems and opportunities concerning land use issues relating to the aquifer, well water and the DWSMA, and those issues identified at public meetings are addressed in Chapter 3. Historically, the Newport wells have produced good water quality. Unfortunately, the wells are vulnerable to contamination causing three main concerns: 1) identifying land uses in the DWSMA that could possibly contaminate the aquifer and the PWS; 2) other wells located within the DWSMA that could become pathways for contamination to enter the aquifer; and 3) the pumping effects of high-capacity wells that may have alter the boundaries of the delineated WHPA, reduce the hydraulic head in the aquifer, or cause the movement of contamination toward the public water supply wells.

The drinking water protection goals that the public water supplier would like to achieve with this plan are listed in Chapter 4. In essence, the PWS would like to 1) maintain or improve on the current drinking water quality, 2) increase public awareness of groundwater protection issues, 3) protect the aquifer, and 4) collect data to support future efforts in wellhead protection planning.

The objective and action plans for managing the potential sources of contamination are contained in Chapter 5. Actions aimed toward educating the general public about groundwater issues, gathering information about land use and other wells, and collecting data relevant to wellhead protection planning are the general focus.

Chapter 6 contains a guide to evaluate the implementation of the identified management strategies of Chapter 5. The wellhead protection program for the Newport PWS will be evaluated on an annual basis prior to the City's budgeting process.

An emergency/contingency plan is included to address the possibility that the water supply system is interrupted due to either emergency situations or drought. Chapter 7 contains details about the water supply distribution system, emergency contact numbers, equipment listings as well as other information to assist the City in responding quickly and effectively in emergency situations.

The Wellhead Protection Committee consists of the WHP Manager, the Public Works Director, the City Engineer, and an appointed City Council member.

PUBLIC WATER SUPPLY LOCATIONS

Newport Well No. 1: Located at 971 Glen Road (Fire Hall #2). Newport Well No. 1 is located directly behind Fire Hall #2 (directly north of the building).

Newport Well No. 2: Located on the southwest corner of 12th St and 7th Avenue.

CHAPTER ONE

DATA ELEMENTS and ASSESSMENT (4720.5200)

I. REQUIRED DATA ELEMENTS

A. Physical Environment Data Elements

1. Precipitation – There is one observation station in the City of Newport, Bailey Lift Station, near Bailey’s Nurseries. The average precipitation readings can be found in Table 2. As determined in Part 1 of this WHP Plan, the aquifer within a large portion of the DWSMA is highly vulnerable to contamination, and a notable surface water component that supplies a significant amount of recharge to the aquifer supplying the City’s water supply wells. In these portions, surface water reaches groundwater in a short period of time and can mean that contaminants present in the surface water may also reach the aquifer. It is for this reason that precipitation information must be taken into account when determining in this Plan how best to manage land use within Newport’s DWSMA.
2. Geology – The City of Newport is located in southwestern Washington County on a river terrace cut into the bedrock along the east side of the Mississippi River. The terrace and a slightly higher terrace east of Newport were eroded by glacial meltwater from Glacial River Warren as it flowed through what are now the valleys of the Minnesota and Mississippi Rivers. The resulting topography is relatively flat with low hills to the east and northeast.

The bedrock unit underlying Newport was deposited during the Cambrian and Ordovician periods of the early Paleozoic. The water table occurs in the Prairie du Chien Group. The Prairie du Chien Group is a thin-bedded sandy or oolitic dolomite with thin beds of sandstone and chert in its upper portions. Solution cavities have been observed near the water table in the Prairie du Chien in cores collected in St. Paul Park (Barr, 1991). The lower Praire du Chien is thickly to massively bedded dolomite. A thin (12- to 13- foot thick) sandy transitional zone occurs adjacent to the contact with the Jordan Sandstone. The Prairie du Chien Group is 130 to 200 feet thick in the vicinity of Newport. The Jordan Sandstone is Cambrian in age and is 60 to 100 feet thick in the vicinity of Newport. The depth of the Jordan Sandstone ranges from 175-261 feet in Well No. 1 to 189-280 feet below the ground surface at Well No. 2. The Prairie du Chien and Jordan Sandstone are generally considered to act as a single hydrogeologic unit in the Twin Cities area (Prairie du Chien – Jordan Aquifer). These units are heavily used for water supply in southern Washington County. The Prairie du Chien is unconfined near Newport and the Jordan is considered confined (leaky).

As shown in figure 1, vulnerability of the Jordan Sandstone aquifer within the

DWSMA for the City of Newport ranges from “Very Low” to “Very High.” Both Newport Wells are located within the same DWSMA. These classifications are consistent with the sensitivity of the Prairie du Chien/Jordan aquifer to pollution as shown in the Washington County Geologic Atlas.

Groundwater flow in the Prairie du Chien is controlled by fractures, joints, and solution cavities. Flow in the Jordan Sandstone is mainly through intergranular pore spaces. Groundwater in the Prairie du Chien Group and Jordan Sandstone flows from northern Washington County towards the Mississippi and St. Croix Rivers (Kanivetsky and Cleland, 1990). The general direction of groundwater movement is westerly. The primary source of water for the Prairie du Chien Group and Jordan Sandstone is leakage from adjoining aquifer units. Where the Prairie du Chien Group is the uppermost bedrock unit it also receives water via infiltration of precipitation. Discharge is to the major streams, the Mississippi River and the St. Croix River. Pumping wells also remove water from the aquifer units.

Utilization of the geologic information and how they influence the DWSMA should be taken into account when determining management strategies for the plan. All land uses will need to be managed because portions of the Newport DWSMA are vulnerable to contamination.

3. Soils – The Newport area is comprised of two geomorphic regions as shown in figure _____. The Mississippi Valley Outwash is the dominant surface configuration, covering over 90% of the area (watershed). The northern part of the area (watershed) is comprised of a loamy rolling surface configuration called the Twin City Formation. The Newport area is an “island” in the outwash plain. The soil is well drained and consists of 1 to 3 feet of loam or silt over the limestone or sandstone bedrock. As shown in figure ____, east Newport and portions west of Highway 61 have a high infiltration rate causing surface runoff on the soils to be low. It should be noted that the City’s wells are located in this area where there is rapid infiltration rate causing surface runoff as well as very high vulnerability of the aquifer. These conditions will pose a greater challenge to the City as they work to effectively manage this area. Giving additional attention to the wells’ Inner Well Management Zone Area (IWMZ), or 200’ radius around each well is particularly important in this case. West Newport, especially areas along the Mississippi, has a moderate to high surface runoff on the soils. It is important that surface water runoff is documented because of Newport’s high vulnerability to contamination.

The flatter outwash plain in the west portion of Newport has fewer erosion problems and fewer wetland areas. The east portions of Newport have the highest erosion risk; there are some areas with slopes greater than 12 percent.

Utilization of the soil information and how they influence the DWSMA should also be taken into account when determining management strategies in the development of how the land is used within the DWSMA.

4. Water resources – The Newport DWSMA is located in the South Washington County Watershed District. Newport’s watershed is a tributary to the Mississippi River. The southern part of the watershed contains three districts (Grey Cloud Channel, Moore Lake, and Baldwin Lake) that are directly tributary to these Mississippi Backwaters. These areas are considered separately because their principal receiving waters have their own independent ecosystem. The rest of the watershed consists of a series of ponds, trunk storm sewer systems and rural areas that directly or indirectly contribute runoff to the river.

Utilization of the water resources information and how they influence the DWSMA should also be taken into account when determining management strategies for the WHP Plan.

B. Land Use Data Elements

1. Land use – A map showing the boundaries of land parcels within the WHPA/DWSMA, and a listing of property owners and property identification numbers have been submitted to MDH for development of Part 1 of this plan.

The City of Newport has its own land use control ordinance (Chapter 13, City of Newport Code of Ordinances). These control ordinances include the city’s land use zoning (Figure 3). The Newport DWSMA also extends into the jurisdiction of the City of Woodbury. The City of Woodbury also has its own land use control ordinance (). These control ordinances include the city’s land use zoning (Figure 5).

Existing land uses located within the Newport DWSMA consist of residential, commercial, and some agricultural lands. The future land use plan for Newport will focus on the remaining vacant lands in the community where new growth will occur, and on the areas most susceptible to change or redevelopment in the next 20 years. The general land use pattern in the community will not alter drastically from that which exists today except for along the Highway 61 Corridor and portions of eastern Newport. Southwest Woodbury will also continue to transform from woods and fields to mostly residential estates. The City of Newport will encourage compatible development and redevelopment along with the WHP Plan throughout the DWSMA and especially in the highly vulnerable areas. In addition to this, greater attention will be paid to the activities occurring with the wells’ IWMZ areas due to the fact that geology and soils in these areas indicate that the aquifer is highly vulnerable to contamination. A survey of land use activities within the wells’ IWMZs and the following potential contaminant sources were observed.

Well #1: All that is around Well #1 is residential housing.

Well #2: All that is around Well #2 is residential housing, except for Amerect Inc and the railroad tracks.

While these potential sources of contamination are present, the land use within

the DWSMA seems to be compatible with the City's existing land use ordinance.

The review of potential contaminant sources was determined based on the vulnerability of Newport Well No. 1 and No. 2. The vulnerability of these wells as documented in Part 1 of the WHP Plan, requires the inventory of all land uses and potential contaminant sources in much of the DWSMA due to the high vulnerability within the DWSMA. There are also portions of the DWSMA that have been designated to be medium and low vulnerability. In the medium vulnerable areas, Class V wells, wells, and above and below ground storage tanks must be inventoried and managed. In the low vulnerable areas of the DWSMA only Class V wells and wells must be inventoried and managed. Information for the potential contaminant source inventory (PCSI) was gathered from federal, state, and local databases and verified through information provided by City staff and windshield surveys. City staff also identified known historical land uses within the DWSMA that may be considered a potential source of contamination to the City's wells.

A PCSI, Table 1, was completed for both of Newport's DWSMA based on the categories noted above.

The very western portion of the DWSMA is very highly vulnerable to contamination. This area is directly west of the railroad tracks and encompasses a very small area, including Well #2. There is mostly residential housing, and a couple of businesses. These land uses are consistent with the City's zoning regulations. In addition to the very highly vulnerable area of the DWSMA there are three areas that are "highly vulnerable" to contamination. The first area covers parts of central and eastern Newport, as well as a small area in southwest Woodbury. This area is almost entirely residential except for the portion along the Highway 61 corridor, which consists of various types of businesses. Many houses in eastern Newport and almost all of the houses in this portion of Woodbury have private wells and onsite sewage treatment systems. The next area that is highly vulnerable is south of Military Road around Century Avenue (this is also a small area). This area is entirely residential with the exception that one of the residences includes land that is used to park large trucks (garbage trucks). The last area that is highly vulnerable is the northwest corner of Bailey Road and Tower Drive. This area is entirely residential and is provided with city water and sewer services.

Of notable importance to this plan is the railroad line that runs through the very western portion of the Newport DWSMA (very high vulnerability). Companies that transport of this line include Burlington Northern Sante Fe and Canadian Pacific. It is most likely that hazardous materials are regularly transported through Newport on the rail lines, thus exposing the City's wells to contamination events should an accident or spill occur within the wells' DWSMA. In the future, the City of Newport intends to work to improve its

communication with the railroad companies and work to cooperatively develop a pollution prevention strategy and spill response plan for the areas within the City's DWSMA.

2. Public utility services – The main transportation corridors in relation to the Newport DWSMA are shown in figure _____. There are two major highways that are within the city. U.S. Highway 61, which splits the city in half, and Interstate 494, which brushes against the city's north border. As mentioned in the previous section, the City also has rail lines that run along Highway 61 and are located within the DWSMA.

There are only certain portions of the city that are connected to the storm sewer system. More portions of the city will continue to be connected to the system in the future (Newport's Current Storm Sewer System, Figure ____).

C. Water Quantity Data Elements

1. Surface water quantity – The vulnerable Newport DWSMA has to be evaluated for surface water quantity consideration. The Newport area is tributary to the Mississippi River. According to the East Mississippi Watershed Management Organization¹ most of the runoff in the Newport area remains in the watershed. The bluff line that runs along eastern Newport, north to south, the floodplain created from the Mississippi, and the bedrock under the city creates problems for the community such that many areas in Newport are not suitable for basements in homes due to flooding issues.

Newport has experienced floods. In 1965, the city experienced heavy flood damage, which resulted in the construction of a levy in 1969. However, the flood had no direct impact on the city's wells or the PWS.

While surface water has impacted housing construction recommendations and has resulted in flooding in the past, surface water quantity is considered an issue for the City's water supply in this Plan due to its contribution to the recharge of the groundwater supply via sources such as precipitation runoff and lakes/ponds.

2. Groundwater quantity – According to the Washington County Department of Public Health and Environment, the Prairie du Chien/Jordan aquifer has, historically, served the area with abundant water and no conflicts currently exist. The major sources of groundwater recharge in the Newport area are:
 1. Precipitation
 2. Induction from lakes and ponds
 3. Water storage in overlying aquifers (such as glacial drift and St. Peter sandstone).

Those entities that have state appropriation permits within the DSWMA are

¹ This organization has been dissolved and is now called the South Washington County Watershed District

shown in Table ___ with the amount pumped, the use and the aquifer source. No known well interference conflicts exist for the Newport DWSMA.

Washington County is expected to grow 42% by 2020. Multiple communities share the aquifer and it will take a collaborative, coordinated effort to develop sustainable groundwater management. It also should be noted that any addition of high capacity wells in or near the DWSMA may affect ground water contamination plumes, so it is imperative to have knowledge of any new high capacity well in or around the DWSMA in the city's water system. Future correspondence with the Minnesota Department of Natural Resources (MnDNR) regarding high capacity wells, whether granting new permits or changing existing permits, and with MDH may prove useful in this area.

D. Water Quality Data Elements

1. Surface water quality – The Minnesota Pollution Control Agency (MPCA) classifies water resources by their use as outlined in Minnesota Rules Chapter 7050. The South Washington County Watershed is tributary to the Mississippi River. These districts are landlocked (all runoff remains within the district). Most of the watershed consists of a series of ponds, trunk storm sewer systems and rural areas that directly or indirectly contribute runoff to the river. Surface water runoff (quality) and recharging of the wells will be a factor in groundwater quality. In the western portion of the capture zone, the surface water capture zone extends beyond the groundwater capture zone. Therefore, the western portion of the WHPA includes areas where the surface water drainage is toward the groundwater capture zone.
2. Groundwater quality – There have not been any known problems with the Newport area groundwater quality. Historically, the water quality has been listed as generally good. According to the City of Newport Consumer Confidence Report Public Water Supply System, “No contaminants were detected at levels that violated federal drinking water standards. However, some contaminants were detected in trace amounts that were below the legal limit” (Consumer Confidence Report, Appendix ___). The contaminants that were detected are sodium and sulfate, which are from erosion of natural deposits and not because of human land uses.

II. ASSESSMENT OF DATA ELEMENTS

- A. Use of the Well** – The City of Newport Public Works operates a public water supply system serving the city. The City of Newport has two public water supply wells:

<u>Well #</u>	<u>Unique Well #</u>	<u>Depth (ft)</u>	<u>2003 Water Use (gallons)</u>
1	208353	261	70,024,000
2	225907	277	64,778,000

Newport's water comes from wells. The City's water distribution system is divided

into two pressure zones. The City system provides a total storage volume of 750,000 gallons of water in three ground storage reservoirs. The water system serves 933 residential and business customers. Average water pumpage is 115 million gallons per year. The City's wells operate at 950 to 1000 gallons a minute. The total daily capacity of the well system is approximately 2.15 million gallons a day. In 2003, the City of Newport wells pumped out 134.8 million gallons of water. Currently, from the data in section I, there are no serious issues affecting the use of the wells, however it should be noted that during the summer months the use of the wells increases because of recreation and maintenance purposes. The City wells do not experience any difficulty in responding to the increase in pumpage and meeting the additional demands. While a large growth of population is not expected in the City of Newport, it has been projected that the population of Washington County is expected to increase by nearly 42% by the year 2020. Many of the growing communities around Newport are utilizing the same aquifer to supply drinking water. It is this issue that may cause the City of Newport and other communities in the area some concern and will most assuredly require that all work together in coming years to cooperate in water conservation initiatives to ensure adequate water supplies to serve their customers.

B. WHPA Delineation Criteria

Information used to perform the computer modeling and delineation of the WHPA is described in detail in Part 1 of this Plan. The topics addressed include time of travel, flow boundaries, daily volume, ground water flow field, and aquifer transmissivity.

The information used for the delineation was quite reliable. It was necessary in some cases, such as daily volume of water pumped and aquifer transmissivity, to use the information available to make predictions in order to develop the computer model. These assumptions were made with a great amount of confidence in their accurateness due to the fact that the information that the model that was developed coincided with the regional information that had been previously developed by other entities. The City plans, at the earliest convenience, to perform an aquifer pump test to determine local information about aquifer transmissivity.

Water quality from the City's wells is generally good. After the groundwater capture zone was delineated, surface water drainage (i.e., watershed) was taken into account because of the shallow depth to the Prairie du Chien and the lack of confining units above the Prairie du Chien in the vicinity of the Newport municipal wells. In the eastern portion of the watershed, surface water drains away from the groundwater capture zone so the WHPA was not modified in this area. However, in the western portion of the capture zone, the surface water capture zone extends beyond the groundwater capture zone. Therefore, the western portion of the WHPA includes areas where the surface water drainage is toward the groundwater capture zone.

1. Groundwater Time of Travel – The city chose a ten-year groundwater time

of travel in delineating the WHPA. As required by Rule 4720, the one-year time of travel was also determined for each well addressed in this study.

2. Aquifer Transmissivity – For this study, transmissivity of the Jordan Sandstone aquifer was estimated from an aquifer test performed in St. Paul Park Well No. 1 (Unique # 208414) in 1990 as part of remedial investigation work done by Barr Engineering Company at the Ashland Refinery. The transmissivity for the Jordan Sandstone determined from the aquifer test is 1.8 ft²/min. The saturated thickness of the Jordan Sandstone in the Newport Well No. 2 is 100 ft. Newport Well No. 1 does not fully penetrate the Jordan Sandstone. The hydraulic conductivity value applied to the Jordan Sandstone surrounding Newport in the groundwater flow model used in this study is 1.89x10⁻² ft/min (8.3 m/day).
3. Daily Volume of Water Pumped - The daily volume of water pumped from each of the Newport municipal wells used in the groundwater model had to be determined from pumping records for 1997-2001 and a projection of future pumping based on the historical records.
4. Flow Boundaries - The Mississippi and St Croix Rivers are included in the model. In addition, large lakes in northern Washington County are also represented in the model. Wells were added to the model using data from SWUDs and CWI. Pumping rates for wells in the area of interest (southern Washington County) were updated using the most recent data reported in the information from the State Water Use Database System (SWUDS).
5. Groundwater Flow Field - The ambient direction of groundwater flow and gradient in the vicinity of Newport was estimated based on piezometric maps from the Washington County Geologic Atlas to be westerly. This flow direction is consistent with the modeled flow direction determined for this study.

C. Quality and Quantity of Water Supplying the Public Water Supply Well – The Newport area has an abundant supply of groundwater. There has been no known interference's regarding water pumping of the high capacity wells in the Newport area. For this reason it is assumed that groundwater quantity is not an issue. The quality of the water in the municipal wells is generally good. However, the Newport DWSMA is considered to be vulnerable to contamination. There have been some contaminants detected in trace amounts in the PWS, not due to human uses. The City will continue monitoring the PWS for contaminants. After the groundwater capture zone was delineated, surface water drainage (i.e., watershed) was taken into account because of the shallow depth to the Prairie du Chien and the lack of confining units above the Prairie du Chien in the vicinity of the Newport municipal wells. In the western portion of the capture zone, the surface water capture zone extends beyond the groundwater capture zone. Therefore, the western portion of the WHPA includes areas where the surface water drainage is toward the groundwater capture zone. In the future, it is imperative that City of Newport

works to create public awareness of the vulnerability of the DWSMA and the proper management of the potential contamination sites.

The placement of an additional high capacity well in or near the DWSMA, or significant changes in current groundwater appropriations by existing wells, could have an important impact on the aquifer and local water supplies. These issues could also change the identified WHPA and DWSMA for the existing DPP wells, change the static water levels in the DPP wells, or possibly cause the movement of existing contamination plumes towards the DPP WHPA/DWSMA and wells. DPP will work with the MDH Sourcewater Protection Unit to identify proposed high-capacity wells and provide interaction with the proposed well owner to minimize problems.

- D. The Land and Groundwater Uses in the Drinking Water Supply Management Area** – Both wells are used for the same purposes throughout the City of Newport, residential, commercial, industrial and agricultural. Due to the vulnerability assessment of both Newport wells, all types of land use and their associated impacts on groundwater quality are to be considered in the development of the WHP Plan.

CHAPTER TWO

IMPACT OF CHANGES ON PUBLIC WATER SUPPLY WELL (4720.5220)

I. CHANGES IDENTIFIED IN:

- A. Physical Environment** – No significant changes in the physical environment are anticipated within the WHPA or DWSMA or any of the of the PWS wells of the City of Newport. However, if changes to the physical environment should be made within the DWSMA in the future, the City will work to anticipate the impacts of these changes on the City’s wells and groundwater supply.
- B. Land Use** – The future land use plan for Newport will focus on the remaining vacant lands in the community where new growth will occur, and on the areas most susceptible to change or redevelop in the next 20 years. The general land use pattern in the community will not alter drastically from that which exists today except for along the Highway 61 Corridor and portions of eastern Newport. Southwest Woodbury will also continue to transform from woods and fields to mostly residential estates. The Newport DWSMA and the WHP Plan will be implemented and used when redevelopment of Highway 61 and development of eastern Newport and southwest Woodbury occurs.
- C. Surface Water** – In the future, the City of Newport plans to extend stormwater utilities throughout the community.
- D. Groundwater** – Changes in groundwater quality and quantity are not anticipated within the DWSMA itself. It should be noted, however, that the area within the City of Newport’s DWSMA is almost completely developed, except for a small portion located in the City of Woodbury that will likely be developed for residential land use. Therefore, a large increase in the demand for Newport’s wells should not occur. In contrast, Washington County’s population is projected to increase considerably over the next 20 years, which will place pressure on the area’s water resources. Subsequently, a regional water conservation effort focused on insuring the aquifer sustainability is essential, and emphasis on water conservation is a component of this plan.

II. IMPACT OF CHANGES

- A. Expected Changes in Water Use** – A small amount of residential growth and

subsequent increase in water demand can be anticipated in Newport's DWSMA. Residential growth is expected in portions of eastern Newport and in southwest Woodbury, and infill development is expected along the Highway 61 corridor with commercial businesses. The addition of any industrial large capacity water using businesses is not anticipated at this time. The City wells have always been able to meet demand in the past, and no future problems in meeting demand are anticipated due to the small demand increase expected from additional residential users in the future. As mentioned previously, a challenge for the City of Newport and other communities in the Washington County Area will be develop effective water conservation programs to address the large influx of population within the next 20 years.

B. Influence of Existing Water and Land Government Programs and Regulation

The City of Newport has a Comprehensive Land Use Plan to address future development of the City. Future development of the City will be carried out following the updated plans and zoning and land use ordinances of the City of Newport. In addition, changes in land and water management will follow regulations under Minnesota environmental Review Rules (Minnesota Rules, Chapter 4410) if required.

C.

Assessing the impact of future changes in water supply use by appropriators other than the City of Newport is the responsibility of the Minnesota Department of Natural Resources, Division of Waters under the Water Appropriation Permitting Program. The City of Newport will communicate and work with the MnDNR regarding issues that may affect either the aquifer the City utilizes for its drinking water supply, or the City's DWSMA.

The law that regulates the treatment and utilization of water as a source of public drinking water is the federal Safe Drinking Water Act that is carried out under the authority of the US Environmental Protection Agency with state implementation by the Minnesota Department of Health. Changes in federal and state laws and rules could have an influence on the direction that the City of Newport must take in managing and treating the water supply and insuring a safe drinking water supply to the public. The City does not anticipate any changes to the operation of its public water supply system at this time.

Other state agencies with regulatory responsibility within the DWSMA include the MPCA (above and below-ground tanks, contamination sites, etc...) and the MN Department of Agriculture, which regulates agricultural chemical storage sites. The City of Newport will work to establish a line of communication with these agencies to discuss the goals and objectives of this plan.

Another related program is county water management. Through various Washington County governmental programs there may be resources available such

as educational materials for the public, technical support, regulatory programs, or even sources of funding for implementation activities such as well sealing. The South Washington County Watershed District may also be of some assistance to WHP efforts in such areas as storm water management. Other programs available through this agency will also be explored.

Furthermore, since a portion of the Newport DWSMA is located within the City of Woodbury, it is essential that the City of Newport establish a line of communication with officials at the City of Woodbury to discuss WHP issues and concerns, particularly in the areas that are yet to be developed.

All forms of government noted above provide unique opportunities to protect the Newport water supply. This plan provides a local strategy to protect the City's drinking water supply. It is the City's intention to accomplish many of the goals and objectives in this plan by building on existing partnerships, resources, and programs presently offered through these organizations. It is the opinion of the WHP team that further regulation within the DWSMA for the purpose of WHP is not necessary at this time.

C. Administrative, Technical, and Financial Considerations – For this plan to be effective:

1. The City will need to raise public awareness of the issues affecting its drinking water supply through public educational programs.
2. Administrative duties will remain with the Wellhead Protection Manager who will report to the City Council, coordinate implementation of wellhead protection management action plans, and conduct regular meetings.
3. The City of Newport has limited staff time and funds. So, it is important the City works with outside programs through the federal, state, and county governments to achieve its goals and objectives.
4. The costs of implementing Wellhead Protection activities will be evaluated on an annual basis.
5. Major changes are not expected for Newport's DWSMA. However, for the plan to be effective there needs to be public education and participation.

CHAPTER THREE

ISSUES, PROBLEMS, AND OPPORTUNITIES (4720.5230)

I. LAND USE ISSUES, PROBLEMS, AND OPPORTUNITIES RELATED TO:

- A. The Aquifer** – The Newport DWSMA is considered vulnerable because of the shallow depth to the Prairie du Chien and the lack of continuous confining units above the Prairie du Chien in the vicinity of the Newport municipal wells. There has also been a surface water component to the capture zone for the wells. Water from the area around the northwest and southwest DWSMA is draining from bluff areas into the groundwater capture zone. This situation becomes important due to the fact that the areas within this groundwater capture zone, particularly the areas around the City’s wells contain soils that have high infiltration rates. Any non-point contamination sources in the surface water contribution area of the DWSMA have the potential to adversely impact the City’s water supply.

It is known that the population of Washington County is on the incline, and is expected to expand by nearly 40% in the next 20 years. This population growth will place additional stresses on the aquifer that provides drinking water for many of the communities in the area. There have not been prolonged issues with meeting public demand for water in the past, but there is an opportunity at this time to recognize this as an upcoming challenge to public water suppliers to address.

Other WHP issues involving the aquifer include the future placement of an additional high capacity well in or near the DWSMA, or significant changes in current groundwater appropriations by existing wells. Either of these actions could have an important impact on the aquifer and local water supplies. These issues could also change the identified WHPA and DWSMA for the existing City’s wells, change the static water levels in the City’s wells, or possibly cause the movement of existing contamination plumes towards the Newport WHPA/DWSMA and wells. The City will work with the MDH Sourcewater Protection Unit and the MnDNR to identify proposed high-capacity wells and determine the effect that these wells (or changes in appropriation permits) may have on Newport’s DWSMA.

Wells other than high-capacity wells may also pose a threat to the water quality of the aquifer. The City places high priority on verifying the location of all wells within the DWSMA and monitoring these wells to reduce the risk that these wells may become a source of contamination to the aquifer.

- A. B. The Well Water** – The well water quality for Newport’s City wells has been good and complies with all federal safe drinking water standards. All wells have been constructed in accordance with the state well code requirements. Maintaining good communication with the MDH, continuing to monitor the municipal wells on a yearly basis, and developing a water quality database will help the City to quickly identify negative water quality trends that may occur in the future. The City is also aware that the geology and soils in the vicinity of the wells makes it particularly vulnerable to contamination resulting from land uses. The City will develop a program to regularly monitor land uses within the inner wellhead management zone to ensure that land uses that may endanger ground water quality will not exist.

An additional issue with the potential to affect the quality of the City’s drinking water include the presence of major transportation corridors within the DWMSA. The City has both railways and major roads over which potential hazardous substances are transported. The City has the opportunity to work with other departments in its own local governmental system, as well as the major transporters to raise the awareness of the DWSMA location and to integrate WHP issues and concerns into a community spill response plan.

Wellhouse #1 is within 300 feet of the city’s storm sewer water runoff. This poses as an issue because this area does have a high infiltration rate increasing the wells susceptibility to contamination.

Due to the high vulnerability of much of the DWSMA, the City must also determine ways to manage such potential contaminants as Storm water ponds/treatment sites, above and below ground tanks, hazardous waste generators, and residential turf management and household hazardous waste storage and disposal. The City will work with many local and state governmental programs that are already available to help address the risks from these land uses within the DWSMA.

- D. The Drinking Water Supply Management Area** – The principal concern expressed by the City of Newport is to ensure consistent management of the City’s water wells and to promote the management of groundwater resources for future sustainability. While the City of Newport faces the challenge of having limited available staff time and funds to dedicate to the implementation of the WHP plan, the City will work to obtain resources and funds from federal, state, and county governments and existing programs as well as budgeting an adequate amount of City resources for each year’s projected activities.

Restructuring of Highway 61 and Interstate 494 will create several changes for the City of Newport. There is certain to be a number of opportunities for redevelopment. It is important for the preservation of the City’s drinking water quality that the WHP Plan’s goals and objectives be reflected in the redevelopment plans of the transportation corridor.

Newport's DWSMA does encompass a portion of Southwest Woodbury. It is important that the City works with Woodbury in the future to ensure Newport's PWS safety. The DWSMA encompassing a portion of Woodbury also creates an opportunity for Newport to work with one of its neighboring communities. It is also important to work with South Washington County Watershed District. Surface water runoff is an important issue for the PWS, and it is important the City and the District work together to create public awareness.

II. IDENTIFICATION OF:

A. Problems and Opportunities Disclosed at Public Meetings and in Written

Comment- The City of Newport held a Public Information Meeting on November 20, 2003 to give the general public and local units of government an opportunity to comment on the city's WHP delineation and vulnerability assessment. To this date no public comments have been received.

- B. Data Elements** – The state's Wellhead Protection Rule requires that existing information be utilized in developing the initial Wellhead Protection Plan. Much of the data collected and utilized to delineate the City's WHPA and DWSMA, and to determine the vulnerability of the aquifer to possible contamination comes from Part 1 of Newport's WHP Plan and Washington County Geologic Atlas. A piece of information that must be collected at the City's earliest opportunity includes data from a pump test performed on one of the City's wells. Information that was used for the delineation of the WHPA in Part 1 of this plan was obtained from testing data from other wells (other than the City's wells) that were located nearby. By conducting a pump test on its own wells, the future delineations of the WHPA will be more accurate. Also, additional water quality and geologic information collected as a result of ongoing or future efforts would be useful in refining existing data and may be used in future updates of this plan. The State WHP Rule requires that plans be updated every ten years utilizing current data and information. It is also important that a pump test is performed at the most convenient opportunity.

Information and data presented in Chapters 1-3 provide a strong background of information from which to develop management strategies to address both issues of concern and opportunities for the further protection of Newport's DWSMA. The following two chapters present the goals and implementation strategies to achieve them.

C. Status and Adequacy of Official Controls, Plans, and Other Local, State, and Federal Programs on Water Use and Land Use – The Newport community could utilize existing regulatory options such as land use ordinances, sewer ordinances, state well permits and state groundwater appropriation permits as control tools to address issues identified in the WHP Plan.

There are many tools and opportunities available to the city and other regulating agencies that may be used to achieve the wellhead protection planning goals identified by the Wellhead Planning Committee. Federal, state and local governmental units will work in ensuring Newport's quality of water. The following is a list of agencies and the duties they perform:

- MPCA (storage tanks, contamination site investigation and remediation and stormwater)
- Department of Agriculture (agricultural chemical storage sites)
- EPA (Class V wells, or shallow disposal wells)
- MDH (well construction, sighting, groundwater quality, sourcewater protection activities)
- Washington County (on-site sewage systems, water resource programs)
- MnDNR (groundwater appropriations)
- South Washington County Watershed District (stormwater)
- City of Woodbury (land use planning, zoning)

The WHP Committee has recommended that no additional regulations be imposed at this time, but instead monitor existing regulated activity to insure that the existing regulations are protecting the source water of the Newport DWSMA. In addition the WHP Committee will utilize public education, adoption of best management practices and good communication with landowners within the DWSMA as well as continued communications with all the regulating agencies. The WHP Committee also stressed the need for continued cooperation and coordination between the communities and all government units as well as communication with managers in the City of Newport and public officials.

CHAPTER FOUR

WELLHEAD PROTECTION GOALS (4720.5240)

GOALS: The overall goal of the City of Newport is to maintain a safe drinking water supply for all residents of the community, both now and into the future. The City of Newport is also committed to provide this water supply to all future developments in a cost effective and efficient manner following state and federal regulated guidelines.

Other WHP goals for the City of Newport are:

- **Increase general public awareness of groundwater issues such as contamination and future resource sustainability**
- **Increase funding for source water protection**
- **Implement active, community-wide, water conservation program**

CHAPTER FIVE

OBJECTIVES AND PLANS OF ACTION (4720.5250)

I. Establishing Priorities

The WHP Committee and City of Newport considered objectives and strategies addressing the vulnerable wells. Insuring the protection of the vulnerable wells is top priority.

A. WHP Committee considered the following issues for all wells in determining the priority of potential contaminant sources.

1. Vulnerability and risk of contamination
2. Resources and monetary cost
3. Time frame of the plan

B. The WHP Committee listed wellhead protection management issues in the following order of priority for the vulnerable area:

- Sealing of unused wells
- Ongoing monitoring of well water quality and inventory of pollution sources and groundwater contamination
- Promoting proper land use controls in the vulnerable DWSMA
- Educating landowners regarding urban stormwater, turf management and proper storage and disposal of hazardous materials and insuring the integrity of storage tanks
- Inventorying existing wells and their condition
- Understanding the nature of the Prairie du Chein/Jordan Sandstone aquifer
- Promoting pollution prevention as a method of protecting the drinking water supply
- Having emergency management plans for addressing drought, floods and terrorism and other emergencies
- Approach large agencies and recommend their services

II. Management Strategies

The following objectives and management strategies are identified for both of the City of Newport Wells.

A. Well Management

Objective A1: Prevent pollution of City wells through the proper maintenance, abandonment, and sealing of privately owned wells.

- **WHP Measure A1-1:** Survey property owners within the DWSMA for information about wells on their property, the size of these wells and their

condition and use.

Source of Action: Newport Public Works

Cooperator(s): City of Newport, City of Woodbury

Time Frame: 2005

Estimated Cost: Staff time

Goal Achieved: Updated list of wells in the Newport DWSMA

- **WHP Measure A1-2:** Develop and maintain a database of all private wells within the DWSMA including status, well type, use, condition, etc.
Source of Action: Newport Public Works
Cooperator(s): Washington County Department of Public Health and Environment
Time Frame: 2005-2008
Estimated Cost: \$400
Goal Achieved: Accurate information about the management of wells within the DWSMA
- **WHP Measure A1-3:** Develop a program to properly seal unused wells in DWSMA and identify any cost-share programs with Washington County.
Source of Action: Newport Public Works
Cooperator(s): Washington County Department of Public Health and Environment
Time Frame: 2005
Estimated Cost: \$2000
Goal Achieved: Accelerate the sealing of unused wells
- **WHP Measure A1-4:** Maintain a process for well evaluation and inspection when old wells are found.
Source of Action: Newport Public Works
Cooperator(s): Washington County Department of Public Health and Environment
Time Frame: 2005
Estimated Cost: In-kind
Goal Achieved: Insuring wells are properly abandoned as buildings are demolished and areas are redeveloped.

Objective A2: Manage the Inner Wellhead Management Zone (IWMZ, 200' radius) to prevent contaminants from entering the area immediately adjacent to the wells.

- **WHP Measure A2-1:** The Wellhead Protection Committee will review and update the current IWMZ survey for both of the wells in the system.
Source of Action: Wellhead Protection Committee
Cooperator(s): MDH
Time Frame: Immediately, repeat annually
Estimated Cost: Staff time

Goal Achieved: Staff and WHP Committee remain informed and up-to-date on activities within the IWHZ

- **WHP Measure A2-2:** The WHP Committee will continue to monitor setbacks for all new potential sources of contamination located within the IWMZ.
Source of Action: WHP Committee
Cooperator(s): City staff, MDH
Time Frame: Annually, begin immediately
Estimated Cost: Staff time
Goal Achieved: Any new regulated activities will meet required well setbacks.
- **WHP Measure A2-3:** The WHP Committee will monitor any NON-CONFORMING potential contaminant sources currently documented within the IWMZ
Source of Action: City staff
Cooperator(s): MDH
Time Frame: Annually
Estimated Cost: Staff time
Goal Achieved: Ensure that existing non-conforming potential contaminant sources do not endanger the wells.
- **WHP Measure A2-4:** The WHP Committee will work to abate or otherwise minimize the impact of NON-COMPLYING potential contaminant sources currently documented within the IWMZ.
Source of Action: WHP Committee
Cooperator(s): Adjacent land owners, MDH
Time Frame: Continuous
Estimated Cost: Staff time, costs to be determined at later date
Goal Achieved: Ensure that existing non-complying potential contaminant sources are removed, abated or minimized.

B. Monitoring, Inventory, and Hydrogeologic study

Objective B1: Evaluate groundwater chemistry information and potential contaminant sources to anticipate changes in the water quality of source water.

- **WHP Measure B1-1:** Consult with the MPCA to understand clean-up activities and ongoing clean-up efforts.
Source of Action: City of Newport
Cooperator(s): Washington County
Time Frame: Yearly
Estimated Cost: In-kind
Goal Achieved: Education

Objective B2: Work to increase the understanding of the nature of groundwater behavior

- **WHP Measure B2-1:** Conduct a pump test on one of the wells at the earliest convenience, such as when the City needs to do maintenance on one of the wells. At that time they should notify MDH, who MAY assist with the project.

Source of Action: Public Works

Cooperator(s): City of Newport, MDH

Time Frame: As soon as possible

Estimated Cost: Staff time

Goal Achieved: An updated test on Newport's PWS to improve accuracy of WHP Plan revisions

Objective B-3: Identify new high-capacity wells that are proposed for construction in or near DPP's WHPA/DWSMA, and/or major changes to groundwater appropriations for existing high-capacity wells, to determine whether the pumping of said wells will alter the current boundaries of the WHPA/DWSMA delineations or other portions of DPP's WHP Plan.

- **WHP Measure B3-1:** Request from the Regional DNR Office any newly proposed high capacity wells within or near the DWSMA or any changes to existing appropriations permits for high capacity wells. Request assistance from the MDH Sourcewater Protection Unit to evaluate whether proposed pumping will change the boundaries of the delineated WHPA or DWSMA for DPP's wells, or if the vulnerability of the aquifer the wells utilize will be affected.

Source of Action: DPP, MDH, DNR

Cooperators: Adjacent and nearby landowners, well operators

Time Frame: Beginning at time of plan approval, then ongoing

Estimated Cost: Cost of special studies that may be necessary; staff time

Goal Achieved: DPP's WHP program will always be current and be able to incorporate new owners into its education programs.

- **WHP Measure B3-2:** The City of Newport will coordinate efforts with staff in the MDH Sourcewater Protection Unit and the MnDNR Water Appropriations Program to identify proposed high capacity wells in the City of Newport WHP Area, and/or major changes to groundwater appropriation for existing high capacity wells.

Source of Action: City of Newport, MDH, MnDNR

Cooperator(s): Adjacent and nearby landowners, and well operators

Time Frame: Yearly

Estimated Cost: In-kind

Goal Achieved: Prevention of boundary changes to the City of Newport WHPA/DWSMA

C. Hazardous Wastes and Household Hazardous Waste

Objective C1: Promote the use of the Washington County Household Hazardous Waste Collection facility.

- **WHP Measure C1-1:** Insure that businesses and households are familiar with Hazardous Waste Collection Programs. Notify residents through the Newport Newsletter.
Source of Action: City of Newport
Cooperator(s): Washington County Department of Public Health and Environment
Time Frame: Yearly
Estimated Cost: Staff time
Goal Achieved: Utilization of Collection Facility
- **WHP Measure C1-2:** City of Newport will approach hazardous waste generators and recommend MnTap services.
Source of Action: City of Newport
Cooperator(s): MnTap services, businesses within the DWSMA
Time Frame: 2005
Estimated Cost: Copying and postage, staff time
Goal Achieved: Less hazardous waste and make businesses aware of MNTap

D. Storage Tanks

Objective D1: Insure that storage tanks are maintained to prevent leaks and spills.

- **WHP Measure D1-1:** (Work to decrease risk to storage tanks) Insure that all tanks within the DWSMA meet state requirements for spill containment, spill contingency plans and leak detection, by inviting MPCA to give a presentation on storage tank requirements.
Source of Action: City of Newport
Cooperator(s): MPCA, Washington County Environmental Services
Time Frame: 2006
Estimated Cost: In-kind
Goal Achieved: Utilization of Collection Facility
- **WHP Measure D1-2:** Participate in the County hazard mitigation planning effort to insure that leaks and spill prevention from these tanks are addressed in these plans.
Source of Action: City of Newport
Cooperator(s): Washington County Department of Public Health and Environment
Time Frame: Yearly
Estimated Cost: In-Kind
Goal Achieved: Mechanisms for evaluating tanks

E. Turf Management

Objective E1: Promote landscaping and lawn care that minimize fertilizer and pesticide risk to groundwater.

- **WHP Measure E1-1:** WHP Committee will hold meetings with major landowners within the DWSMA including City of Newport Public Works Department and Washington County to convey information regarding wellhead-protecting strategies in caring for turf.
Source of Action: City of Newport
Cooperator(s): Washington County
Time Frame: Yearly
Estimated Cost: Staff time
Goal Achieved: Educating landscapers in proper use of chemical applications
- **WHP Measure E1-2:** Promote strategies for Earth Friendly Landscaping among property owners through educational classes.
Source of Action: City of Newport
Cooperator(s): Washington County Department of Public Health and Environment
Time Frame: 2005, 2007
Estimated Cost: In-kind
Goal Achieved: Informed wellhead residents and businesses

F. Drinking Water Supply and Wellhead Protection Education (community wide)

Objective F1: Insure that public officials and the citizens of Newport understand the importance of WHP.

- **WHP Measure F1-1:** Develop a presentation about groundwater protection and WHP. Audiences could include Planning Commission and City Council, community public meetings, local service organizations, and youth groups.
Source of Action: City of Newport
Cooperator(s): MDH
Time Frame: 2005
Estimated Cost: Staff time, copying and postage
Goal Achieved: Educational tool
- **WHP Measure F1-2:** Insure that citizens are aware of the consumer confidence reports and the efforts of the city to protect and maintain a safe water supply.
Source of Action: Newport Public Works
Cooperator(s): City of Newport
Time Frame: Yearly
Estimated Cost: \$400

Goal Achieved: Educational tool

Objective F2: Incorporate WHP Plan into the Comprehensive Land Use Plan.

- **WHP Measure F2-1:** WHP implementation activities of past year and future planning.
Source of Action: WHP Committee
Cooperator(s): City administrator and WHP Committee
Time Frame: Yearly
Estimated Cost: In-kind
Goal Achieved: Review implementation of current and future WHP activities

Objective F3: Insure that source water protection is considered in development and redevelopment plans.

- **WHP Measure F3-1:** Insure proper zoning controls on activities that are known to potentially cause groundwater contamination and these activities are prohibited or strictly controlled in the DWSMA.
Source of Action: City Administrator
Cooperator(s): City staff
Time Frame: Yearly
Estimated Cost: In-kind
Goal Achieved: Maintain communication links between zoning administration, keeping in mind water issues for WHP within the DWSMA.

G. Water Supply Conservation and Emergency Planning

Objective G1: Insure adequate water supply for the City of Newport

- **WHP Measure G1-1:** Advocate water conservation through public education efforts.
Source of Action: City of Newport
Cooperator(s): Newport Public Works
Time Frame: 2005
Estimated Cost: In-kind
Goal Achieved: Review and update water conservation and emergency plan.
- **WHP Measure G1-2:** Request review of application to MnDNR of high capacity wells within the City of Newport.
Source of Action: City of Newport
Cooperator(s): MnDNR and City of Newport
Time Frame: 2005
Estimated Cost: In-kind
Goal Achieved: Information on new high capacity wells within each DWSMA.

- **WHP Measure G1-3:** Review water use information from large users of City water and track use.
Source of Action: Newport Public Works
Cooperator(s): Large users of city water
Time Frame: Yearly
Estimated Cost: In-kind
Goal Achieved: Track water usage of large water users, and determine any problems or water losses. Refer MNTap services if needed.

H. Storm Water Management Program

Objective H1: Insure that storm water discharged within the DWSMA is a quality that will not be a potential contaminant source for the City's wells.

- **WHP Measure H1-1:** Developing and implementing a storm sewer system in the City of Newport.
Source of Action: City staff
Cooperator(s): City staff
Time Frame: Open
Estimated Cost: Costs to be determined at later date
Goal Achieved: Implement a storm sewer system
- **WHP Measure H1-2:** Insure no illicit discharges to storm drains within the DWSMA by educating the public.
Source of Action: City Engineer's Office
Cooperator(s): Newport Public Works
Time Frame: 2006+
Estimated Cost: In-kind
Goal Achieved: Maintain clean storm sewer systems
- **WHP Measure H1-3:** Where required insure that construction sites within the DWSMA have proper permits and adequate Storm Water Pollution Prevention Plans.
Source of Action: City Engineer's Office
Cooperator(s): MPCA
Time Frame: 2006+
Estimated Cost: In-kind
Goal Achieved: Maintain clean storm sewer systems

I. Spill Prevention and Management

Objective I1: Reduce the risk of contamination to the City wells from spills and leaks.

- **WHP Measure I1-1:** Promote the removal of non-commercial underground storage tanks and the need for containment structures and other anti-spill devices on above ground storage tanks.
Source of Action: Newport Public Works, MDH
Cooperator(s): MPCA, Newport Public Works
Time Frame: Yearly
Estimated Cost: In-kind
Goal Achieved: Spill prevention
- **WHP Measure I1-2:** Promote the development of emergency action plans by all storage tank facilities.
Source of Action: Newport Public Works
Cooperator(s): MPCA and Washington County Department of Public Health and Environment
Time Frame: 2005
Estimated Cost: In-kind
Goal Achieved: Minimize spill impact on water resources
- **WHP Measure I1-3:** Develop a pollution prevention strategy for the DWSMA with the railroad companies.
Source of Action: City of Newport
Cooperator(s): City of Newport and railroad companies
Time Frame: 2005
Estimated Cost: In-kind
Goal Achieved: Develop better relations between City of Newport and the railroad companies.

J. Class V Wells (Shallow Disposal System):

Objective J1: Create awareness among commercial enterprises, local automotive shops or garages about what a Class V well is and Federal EPA registration, permitting and reporting requirements for Class V Wells. In the event that a suspected Class V well is identified, the MDH Planner will be notified to evaluate the status of the Class V well and help determine the next steps needed to be taken by the landowner.

- **WHP Measure J1-1:** Potential locations of Class V Wells (i.e. un-sewered commercial areas, rural automotive repair shops, public facilities such as bus garages, etc.) will be inventoried through direct personal contact with the operator of the business or landowner in the DWSMA. At that time, 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.

In the event a suspected Class V Well is identified, the Regional MDH Planner will be notified to assist in determining the status of the shallow disposal system and what

reporting steps may be needed to register the Class V well with EPA. EPA reporting forms are available at: www.epa.gov/safewater/uic/7520s.html)

Source of Action: WHP Committee and City Staff

Cooperator(s): MDH, WRWA Planners, landowners

Time Frame: Summer 2005

Estimated Cost: Staff time, Postage & copying costs

Goal Achieved: Landowners become informed about federal Class V Well requirements and impacts on groundwater quality.

WHP Measure J1-2: In the event a Class V well is identified, provide information to the landowner on technical services available thru MNTAP to assess management and / or disposal alternatives. Provide them with local contacts for permitting information for the City of Newport and Washington County.

Source of Action: WHP Committee and City Staff

Cooperator(s): MDH, WRWA Planners, landowners, MNTAP

Time Frame: Dependent on outcome of E4-1. As needed.

Estimated Cost: Staff time, Postage & copying costs

Goal Achieved: Alternative management strategies for Class V Wells are identified and the potential for groundwater contamination is reduced.

CHAPTER SIX

EVALUATION PROGRAM (4720.5270)

The success of this Wellhead Protection Plan must be evaluated to determine whether the plan is accomplishing what the City of Newport and the WHP Committee identified as objectives is being achieved.

The following activities will be implemented to:

1. Track the implementation of the objectives identified in the previous sections of this plan.
 2. Determine the effectiveness of specific management strategies regarding the protection of the City of Newport water supply
 3. Identify possible changes to these strategies which may improve their effectiveness
-
1. Look for changes from windshield survey
 2. Meet on as-needed basis
 3. annual reports
 - 4.

CHAPTER SEVEN
ALTERNATIVE WATER SUPPLY; CONTINGENCY STRATEGY.
(4720.5280)

I. PURPOSE

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

The Emergency and Conservation Plan is located at Newport City Hall.