VILLAGE OF CRIVITZ
WELLHEAD PROTECTION PLAN
WELLS #1 #2 & #3

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Prepared for the Village of Crivitz
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BACKGROUND

The Village of Crivitz has prepared this wellhead protection plan for the purpose of minimizing the risk of contamination of the municipal water supply. Wellhead protection is a preventative program designed to protect public water supplies by managing land use in the area surrounding the supply wells. For wells constructed since 1992 such as Crivitz's Well #3, wellhead protection plans are required by the WI DNR. For existing wells constructed prior to 1992, such as Crivitz's Well #1 & #2, wellhead protection plans are voluntarily completed at the utilities discretion. The wellhead protection process identifies protection areas around each municipal water supply well. These areas are designated for special protective measures intended to minimize the risk of the groundwater entering the well from becoming contaminated. The wellhead protection areas are established based a hydrologic study to determine the land area that contributes groundwater to the well. The village originally completed the WHPP in 2008 when the village added Well #3. This plan is prepared in accordance with the Wisconsin Administrative Code, Chapter NR 811.12(6) for wellhead protection planning.

WATER SUPPLY

Crivitz's water system serves a majority of the Village, population 984. Average demand is around 140,000 gallons per day (gpd) which increases slight during the summer months. Water is supplied primarily by the village's Wells #2 & #3 which are alternately pumped. Well #1 is only kept as a backup well due to water quality concerns. Well construction details are as follows.

Table 1

Well #	WI Unique Well ID#	Year Constructed	Total Depth (ft)	Casing Depth (ft)	Open Interval (ft)	Well Diameter (in)	Design Capacity (gpm)
1	BG341	1979	51.5	40	11.5	16	300
2	BF312	1989	172	60	112	12	210
3	BF313	2008	185	72	113	16	230

Before entering the distribution system, raw water pumped from each well is treated at the wellhouse with chlorine for disinfection and orthophosphate for corrosion control. Like much of Wisconsin, the water from the wells is hard, with calcium carbonate concentrations ranging from 180-270 mg/L which is classified by the USGS as hard to very hard (Kammerer, 1981). Storage is provided by one elevated tank with a capacity of 250,000 gallons. Locations of the wells are shown in Figure 1. Lithologic logs and construction details for the wells are included in Appendix B.

Well #1

Well #1 is located on the south side of County Road W 1,800 feet west of the village in the Town of Stephenson. The well is surrounded by agricultural field to the north and several lowland forests to the south. Well #1 was constructed in 1979 and served the village regularly until it was removed from service in 1989 due to nitrate levels above the MCL of 10 mg/L. Since then, Nitrate levels have receded to below the MCL; however the well is maintained only as a backup well due to high levels of Iron and Manganese. Iron and Manganese are not a health concern, but can cause objectionable taste and odor as well as staining issues. With a depth of only 51.5 feet and casing depth of 40 feet, the well is vulnerable to shallow groundwater contamination. Auxiliary power for the well is provided by a natural gas motor.

Well #2

Well #2 is located on the west side of St. Paul Road 13,000 feet east of Well #1 and 1,200 feet east of the village. The wells are surrounded by a mix of forest and low density residential to the north, west and south. There is a single agricultural field directly to the east with a golf course beyond it around 1,500 feet to the east. Well #2 was constructed in 1989. With a depth of 170 feet and casing depth of 60 feet, the well is less vulnerable than Well #1 but still relatively vulnerable to shallow groundwater contamination. Auxiliary power for the well is provided by a diesel generator.

Well #3

Well #3 is located at the corner of St. Paul Road and Cora Lane 1,150 feet north of Well #2. The well is surrounded by a mix of forest and low density residential on all sides with a sand and gravel quarry 1,700 feet northwest of the well. Well #3 was constructed in 2008 to replace Well #1 as one of the village's primary wells. With a depth of 185 feet and casing depth of 72 feet, the well is relatively vulnerable to shallow groundwater contamination. Auxiliary power for the well is provided by a diesel generator.

HYDROGEOLOGIC SETTING

Crivitz is located in south-central Marinette County on the east edge of the Peshtigo River which flows southeast to Green Bay. The area is characterized by an irregular rolling landscape with moderate relief shaped by glaciers. Glaciers advanced into the county then melted away several times throughout history with the most recent known as the late Wisconsin glaciation. This left an uneven cover of glacially deposited unconsolidated silt, sand and gravel referred to as "till" (Mickelson, 1986; Oakes & Hamilton, 1973). Below the glacial deposits is Cambrian age sandstone bedrock formation that is 150-200 feet thick near Crivitz. The sandstone bedrock slopes to the southeast at about 7 feet per mile and forms a productive aquifer for the city. Below the sandstone is igneous & metamorphic bedrock of Precambrian age. This is part of the Precambrian crystalline dome that forms the highlands of northern Wisconsin. It slopes to the southeast at about 30 feet per mile and is effectively impermeable (Kamerer et. al., 1998; Oakes & Hamilton, 1973). Crivitz's Well #1 is west of the Peshtigo River and pumps from the

unconsolidated glacial aquifer. Wells #2 & #3 are east of the Peshtigo River and pump from the Cambrian sandstone aquifer.

The source of all groundwater is precipitation which infiltrates and recharges the aquifer. The rate at which groundwater flows in the aquifer is determined by the hydraulic parameters of the aquifer. Important hydraulic parameters are described below and given in Table 2:

- Aquifer Thickness – Vertical thickness of water bearing porous medium.
- Effective Porosity – The ratio of void volume to the total volume of material (estimate)
- Hydraulic Gradient – The change in water table elevation (hydraulic head), divided by the change in distance in a given direction (calculation shown in Figure 2)
- Storage Coefficient – The volume of water that an aquifer releases from storage, per unit surface area of the aquifer, per unit change in head. Estimated for unconfined aquifers (Schwartz & Zhang, 2003, page 73).
- Transmissivity – The rate at which water is transmitted through a unit width of the aquifer under a unit hydraulic gradient. It is estimated using pump test data, and the "T-Guess" computer solution (Bradbury and Rothschild, 1985).
- Hydraulic Conductivity – The ease with which flow takes place through a porous medium. It is calculated by dividing the transmissivity by the aquifer thickness.

Table 2

Aquifer Hydrologic Parameters	Well #1	Well #2	Well #3
Aquifer	sand & gravel	Sandstone	Sandstone
Aquifer Thickness (ft)	45.4	136	122
Effective Porosity	0.25	0.2	0.2
Hydraulic Gradient	0.005	0.005	0.005
Storage Coefficient	0.1	0.1	0.1
Transmissivity (ft2/sec)	0.058	0.0051	0.0058
Hydraulic Conductivity (ft/day)	110.38	3.24	4.11

The Aquifer hydraulic parameters are estimated using a pump test, which is conducted at the time of well construction, and can be found on the well construction report. A pump test provides an estimate of how much water an aquifer can yield and how good the well performs, also known as the well's specific capacity. This is done by measuring drawdown, which is the difference between the static (pre-pumping) water levels and water levels after pumping the well at a given rate for a given period of time. Pump test results are as follows:

Table 3

Pump Test	Well #1	Well #2	Well #3
Pumping Rate (gpm)	275	264	280
Duration (hours)	24	12	19
Static Water Level (ft)	6.1	36	63
Pumping Water Level (ft)	30.7	140	152
Drawdown (ft)	24.6	104	89
Specific Capacity (gpm/ft)	11.2	2.5	3.1

GROUNDWATER FLOW DIRECTION

In a groundwater flow system, groundwater moves continuously from areas of recharge to areas of discharge. The direction of groundwater flow may be inferred from the regional topography and the slope of the water table. The water table is the upper limit of the aquifer and is measured in "head" or elevation above sea level. The water table is estimated by looking at water levels in wells that have a screened interval within the aquifer, which provide a point of measurement of water table elevation. The best available water table map for the area was developed for by the U.S. Geological Survey (Kammerer, 1995). The water table is shown as contour lines of equal head with a 50 ft contour interval. Groundwater flows approximately at right angles to the contour lines of equal head in the direction of decreasing head. In general groundwater divides coincide with surface water divides. Groundwater in the Peshtigo river basin flows from west to east along relatively short flow paths away from topographically high areas to low areas where it discharges into lakes, streams and wetlands. Groundwater captured by Well #1 originates primarily to the west/southwest of the well and flows east/northeast towards the Peshtigo River. Groundwater captured by Wells #2& #3 originates primarily to the north of the wells and flows south towards the Peshtigo River and it's tributaries. A local portion of the water table map is shown in Figure 2.

ZONE OF INFLUENCE

The Theis Equation is used to calculate the Zone of Influence (ZOI), which is a circle around each well that represents a cone of depression in the water table defined by a drawdown of 1 foot that would develop after 30 days of continuous pumping at full capacity, with no recharge to the groundwater. It assumes that the aquifer is homogeneous (the aquifer is equally permeable in all places and in all directions), the well fully penetrates the aquifer and drawdown is small compared to the saturated thickness. It simulates theoretical worst-case condition. Since the formula uses continuous pumping at full capacity and does not consider recharge to the aquifer, the calculation is artificially large. If recharge was considered, the ZOI would become an elliptical shape extending farther upgradient and less downgradient.

Theis Equation:

$$W(\mu) = \frac{sT}{114.6*Q}$$

$$r^2 = \frac{Tt\mu}{1.87S}$$

Where:

$W(\mu)$ = Well Function
s = Drawdown (1 ft)
Q = Maximum Pumping Capacity
T = Transmissivity (gpd/ft)
S = Storativity
μ = From lookup table based on $W(\mu)$
t = 30 days continuous pumping
R = Radius of the cone of depression

Zone of Influence (ZOI) Calculations:

Well #1 $W(\mu)= \frac{1 \times 37{,}468}{114.6 \times 300}$ W(μ)= 1.0898

μ = 0.23

$r = \sqrt{\left(\frac{37{,}468 \times 30 \times 0.23}{1.87 \times 0.1}\right)}$ ZOI radius= 1,176 feet

Well #2 $W(\mu)= \frac{1 \times 3{,}295}{114.6 \times 210}$ W(μ)= 0.1369

μ = 1.3

$r = \sqrt{\left(\frac{3{,}295 \times 30 \times 1.3}{1.87 \times 0.1}\right)}$ ZOI radius= 829 feet

Well #3 $W(\mu)= \frac{1 \times 3{,}747}{114.6 \times 230}$ W(μ)= 0.1422

μ = 1.3

$r = \sqrt{\left(\frac{3{,}747 \times 30 \times 1.3}{1.87 \times 0.1}\right)}$ ZOI radius= 884 feet

ZONE OF CONTRIBUTION (RECHARGE AREA)

In order to protect the groundwater reaching the village's municipal wells, it is important to determine where that groundwater is coming from. The land area that contributes water to a well is known as the "Zone of Contribution" (ZOC) or recharge area. Several methods can be used to delineate recharge areas ranging from a simple fixed radius to the use of complex computer models. . There are currently no groundwater flow models for the area so WRWA developed a groundwater flow model for this report using the analytical element modeling software GFLOW. The model uses reverse particle tracking to estimate groundwater flow lines from the well backwards to their origination point. The model shows groundwater flow near Well #1 originating to the west/southwest of the well and flowing east/northeast towards the well. The model shows groundwater flow near Wells #2 & #3 originating to the north/northwest of the wells and flowing south/southeast towards the wells. Assumptions used in the model include hydraulic conductivity (K) of 7 ft/day, porosity of 0.2, average aquifer thickness of 150 ft, average annual recharge of 5.2 inches/year (Gebert et. al., 2011) and a pumping rate for each well equal to each well's maximum pumping capacity for a conservative ZOC estimate.

Along with the full ZOC, "capture zones" equal to the 1-year, 5-year and 10-year Time of Travel (TOT) were delineated for each well. Water recharging the aquifer at the margins of the each capture zone should take 1 year, 5 years and 10 years respectively to reach the pumping well. The capture zones are particularly important because most small quantities of contaminants

beyond the 10 year capture zone would likely be diluted or degraded by the geologic formation or contamination could be cleaned up before reaching the pumping well. The capture zones represent the areas where protecting groundwater is most important. The full capture zone should be protected as well; however protection measures can be less intensive in the outlying area. The modeled ZOCs are mapped in Figures 3 & 4.

POTENTIAL CONTAMINANT SOURCES

In order to design the most appropriate management strategy, it is necessary to know what possible sources of groundwater contamination are present around each well. These are locations where human activity or land use has created the potential to release contaminates into the groundwater aquifer. Potential contaminant sources within ½ mile of each well were identified by records review, including the Source Water Assessment prepared by the Wisconsin Department of Natural Resources (WDNR, 2003) and field reconnaissance.

Contaminants infiltrating from the surface are subject to a series of physical, chemical and biological processes that impede, destroy or bind up contaminants moving through the soil and unconsolidated glacial till to the groundwater. Soil grain size, organic matter and layers of silt & clay in the glacial till work to reduce the susceptibility of the aquifer. Soils near Crivitz are primarily sand, sandy loams and loamy sands that have a very limited potential to attenuate pollutants. The shallow depth and short casing of the municipal wells, particularly Well #1, make them susceptible to shallow groundwater contamination. The primary risks to the aquifer are described and discussed below and potential contaminant sources within ½ mile of each well are mapped in Figures 5 & 6. Appendix A contains a comprehensive inventory with distances and direction from the nearest well.

Agriculture

The primary risk from agriculture is Nitrate from fertilizers and manure. Nitrate travels very easily in groundwater with little attenuation. There are several large irrigated agricultural fields just north of Well #1. Well #1 exceeded the drinking water standard of 10 mg/L for nitrate in 1986 due to agro-chemicals mixed in the irrigation well without proper backflow prevention. This investigation is outlined at the DNR EERP site #02-38-000180 available on the DNR's BRRTS website. Nitrate levels have since returned to background levels and Well #1 is used only as a backup well due to other water quality concerns. To maintain the viability of Well #1 as a backup well, fertilizer and chemical applications should be conservative, and best management practices should be implemented for spill prevention and mitigation. There is very little agriculture near Wells #2 & #3 and the risk to these wells from agriculture is minimal.

Domestic Wastewater

Domestic wastewater comes from sanitary sewers and septic systems. All three wells are outside of the village in the un-sewered Town of Stephenson. Wells #2 & #3 have the nearest

and highest density of septic systems. The contaminants of most concern in domestic wastewater include pathogens and nitrate. Pathogens (primarily bacteria and viruses) are filtered somewhat as they move through the ground and are viable for a limited time. The best protection against Pathogens is continuous disinfection which the village currently applies.

Volatile Organic Compounds (VOCs)

VOCs can be released from a variety of sources, including petroleum storage & transport, auto repair shops, dry cleaners and various manufacturing & industrial practices. Some VOCs are heavy and readily move downward through the aquifer. Heavy VOCs consist primarily of chlorinated solvents used in dry cleaning, parts washing (general de-greasing) and brake cleaning operations. The best way to minimize the risk of VOC contamination is preventing spills & illicit discharges of VOCs from residents and industrial operations that handle & store VOCs. There is one leaking petroleum tank cleanup site northeast (up-gradient) of Wells #2 & #3. This site has been investigated and closed under the DNR EERP program. The investigation shows that petroleum contamination at the site has staid fairly localized and should not pose a threat to the municipal wells.

Private Wells

Private wells that are unused or in disrepair can be a direct conduit for contaminants to move quickly from the surface to the groundwater. Damaged or missing well caps provide a direct path for vermin, insect and other organisms to contaminate the aquifer. There are a number of private wells near the municipal wells in the Town of Stephenson which is not serviced by the village water system. Educating these private well owners on proper maintenance and abandonment procedures is an important protective measure. If any previously unknown wells are found or it is discovered that private wells are damaged or don’t meet construction codes, they should be properly abandoned.

Other Threats

In addition to the threats addressed above there are other land use practices that can threaten or degrade groundwater quality. It is important that changes in land use practices near the wells are carefully evaluated for any potential threat to groundwater. Regulatory control and zoning practices can be helpful tools for doing this.

The sandstone bedrock aquifer from which the village obtains its municipal water supply is relatively thin; around 150 feet thick. Below the sandstone is crystalline bedrock that does not yield enough water for a municipal supply. Hi capacity wells or de-watering for mining operations could threaten the viability of the thin sandstone aquifer and should be prohibited anywhere near the municipal wells.

WELLHEAD PROTECTION AREAS

A Wellhead Protection Area (WHPA) is defined by the federal Safe Drinking Water Act as the "surface and subsurface area surrounding a water well or well field, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water or well field". In practical terms, the WHPA is a legally-defined area including all or part of the Zone of Contribution and within which zoning practices or other land-use controls can be implemented to help protect groundwater from contamination (Bradbury et. al., 1999). The WHPA's are established to clearly define the area most critical for protecting the village wells from contamination. They should be the primary focus of efforts to protect the Village water supply.

The WHPA's for Crivitz are established based on the 10-year capture zones. The DNR suggests the boundary of a WHPA be extended to a minimum distance of 1,200 ft around municipal wells. Additionally, the wellhead protection area has been normalized to the nearest PLSS lines and road centerlines for ease of implementation. The wellhead protection area for Well #1 is shown in figure 7 and the wellhead protection area for Wells #2 & #3 is shown in figure 8.

MANAGEMENT STRATEGY

The management strategy outlines the village's plan to implement the wellhead protection plan. "Implementation" means taking specific actions to protect the village water supply wells. This includes addressing specific issues and solutions identified in the wellhead protection plan or by the steering committee. The implementation plan lays out specific actions along with the responsible party and a timeline for completion.

Blue-shaded blocks indicate activities already in place and ongoing

Activity	***Responsible Party***	***Timeframe***	***Comments***
SOURCE MANAGEMENT ACTIVITIES			
Private Wells/Private Well Abandonment Ordinance	Water Superintendent/ Village Clerk	Ongoing	The Village will continue to enforce of the private well abandonment ordinance which works to protect groundwater by requiring private wells within the Village to be properly abandoned or permitted by the Village. Additionally, educational materials will be distributed to private well owners near the municipal wells.

Cross Connection Control	Water Superintendent	Ongoing	The Village has an ongoing Cross Connection Control program in, accordance with NR 810.15 Wis Admin Code, to reduce the risk of contamination to the municipal water supply.
Wellhead Protection Ordinance	Water Superintendent/ Village Clerk/ Village Board	2-3 Year	The Village is working exercising extraterritorial zoning in order to apply a wellhead protection overlay district in the area of the Town of Stephenson surrounding the municipal wells. The extraterritorial zoning process takes 2-3 years.
EDUCATION AND OUTREACH ACTIVITIES			
Consumer Confidence Reports	Water Superintendent/ Village Clerk	Annually	Consumer Confidence Reports are direct mailed to every customer annually to provide information on water quality and protecting the village water supply.
Educational Information Available at Village Office	Village Clerk	Ongoing	The village makes information on groundwater protection available to residents at the utility office. This could include the DNR's educational brochure "Better Homes & Groundwater"
WATER CONSERVATION ACTIVITIES			
Leak Detection	Water Superintendent	Ongoing	Water bills are screened for anomalies that indicate leaks. Leak detection surveys are conducted as needed
Water Meter Exchange	Water Superintendent	Ongoing	Water meters are exchanged every 20 years in accordance with PSC requirements.

STEERING COMMITTEE

A steering committee has been formed to oversee implementation of the elements of this plan. The committee consists of the following individuals:

- Rudi Jensen, Water Superintendent, Village of Crivitz
- Marilyn Padgett, Clerk/Treasurer, Village of Crivitz
- Andrew Aslesen, Source Water Specialist, Wisconsin Rural Water Association

Local governmental entities that have jurisdiction in the planning area are the Village of Crivitz, Town of Stephenson and Marinette County. Cooperation will be sought with these entities in implementing this plan.

CONTINGENCY PLANNING

Contingency planning is done to minimize the disruption of water service in the event of emergencies. In the event that Crivitz' water supply becomes contaminated, the procedures laid out in the Emergency Response Plan, developed by Crivitz Utilities and stored in the Public Works Director's office. The Emergency Response Plan provides a regularly updated comprehensive list of all necessary contacts for water system employees, emergency management agencies, contractors, and state agencies; as well as emergency procedures, including emergency alternate water sources and emergency disinfection procedures.

With one of Crivitz's wells out of service, the remaining wells could meet the average daily demand of around 140,000 gallons per day. The Village has a total storage capacity of 250,000 gallons that could provide approximately two days' worth of water. Additionally, Emergency water use restrictions could be implemented to conserve water. The first to respond to a contaminant spill would be the Crivitz Fire Department. The following is an abbreviated list of emergency contacts.

EMERGENCY CONTACT			PHONE NUMBERS
Local:	Crivitz Village Office		715-854-2030
	Crivitz Water Superintendent-Rudi Jensen		715-927-2359
	Police Department	911	715-732-7600
	Fire Department	911	715-927-2359
	EMS	911	
	DNR Representative – Ken Chambers		920-662-5484
County and Regional:			
	Marinette County Sheriff	911 or	715-732-7600
	Marinette County Emergency Management		715-732-7660
	Marinette County Health Department		715-732-7667
	DNR-Regional Spill Coordinator-Northeast Region		920-424-7077
State:	DNR-State Spill Response		800-943-0003
	State Lab of Hygiene		608-263-3280

Figure 1 – Village of Crivitz Municipal Well Locations

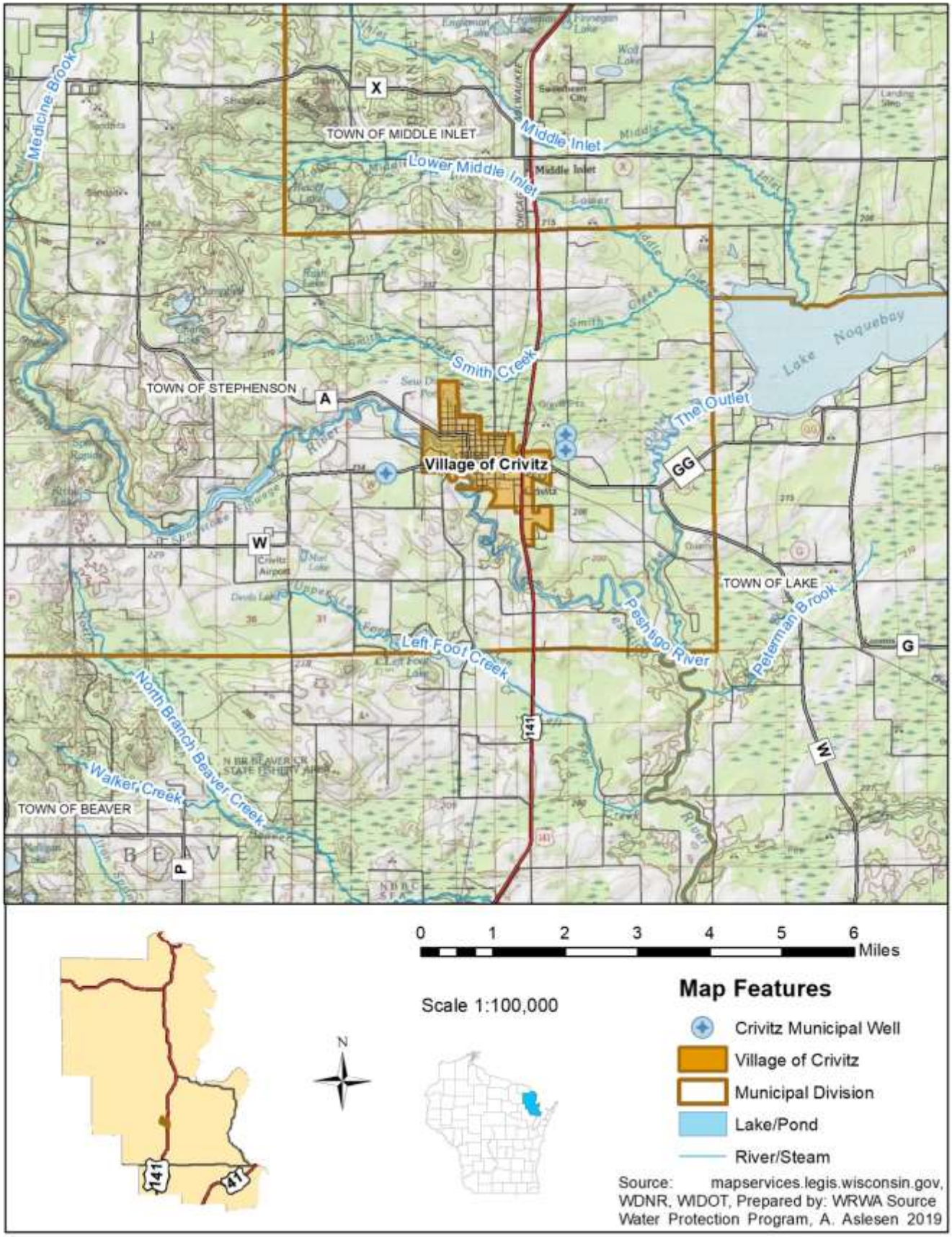


Figure 2 – Groundwater Flow

Figure 3 – Zone of Contribution, Well #1

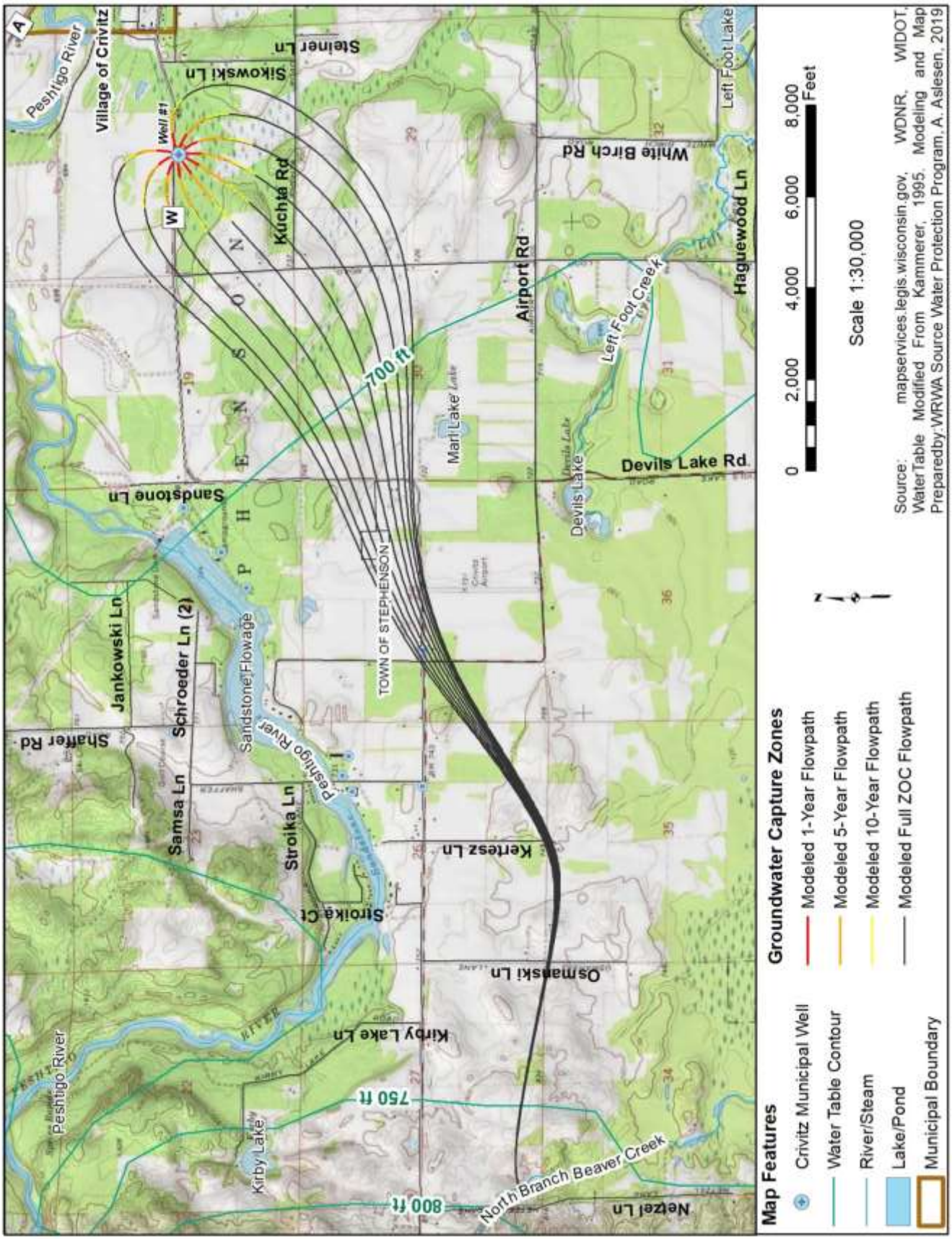


Figure 4 –Zone of Contribution, Wells #2 & #3

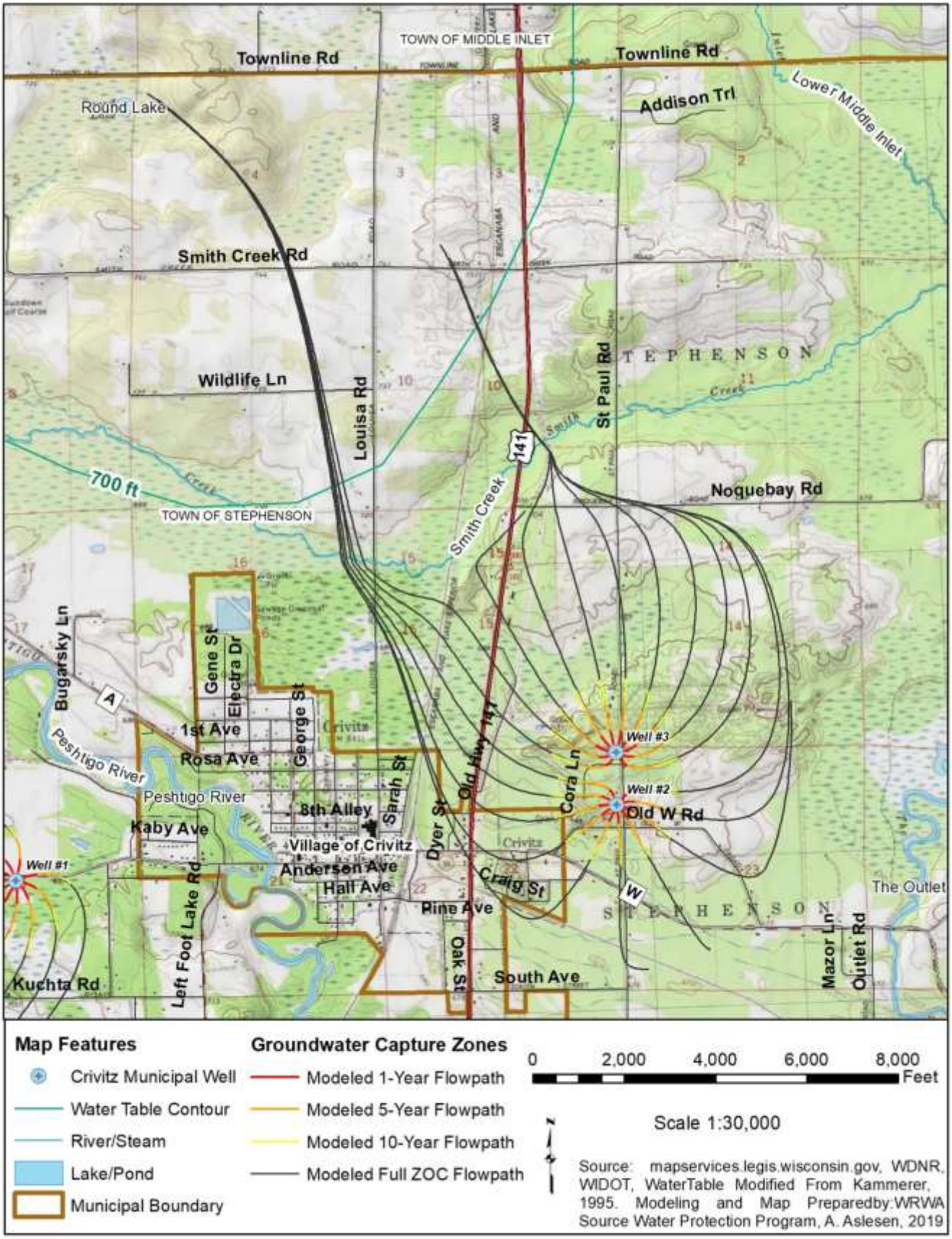


Figure 5 –Potential Contaminant Sources, Well #1

Figure 6 –Potential Contaminant Sources, Wells #2 & #3

Figure 7 – Wellhead Protection Area, Well #1

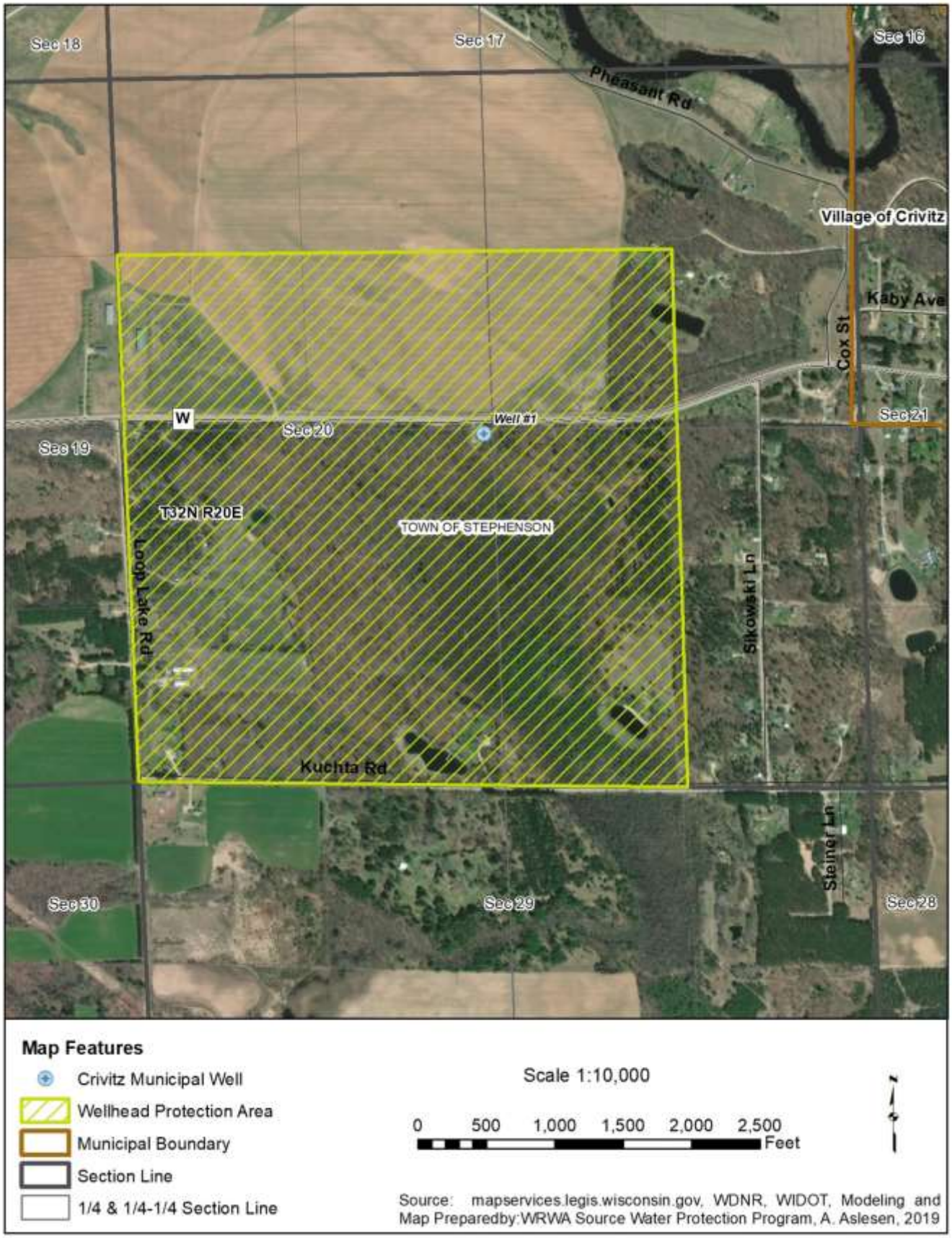
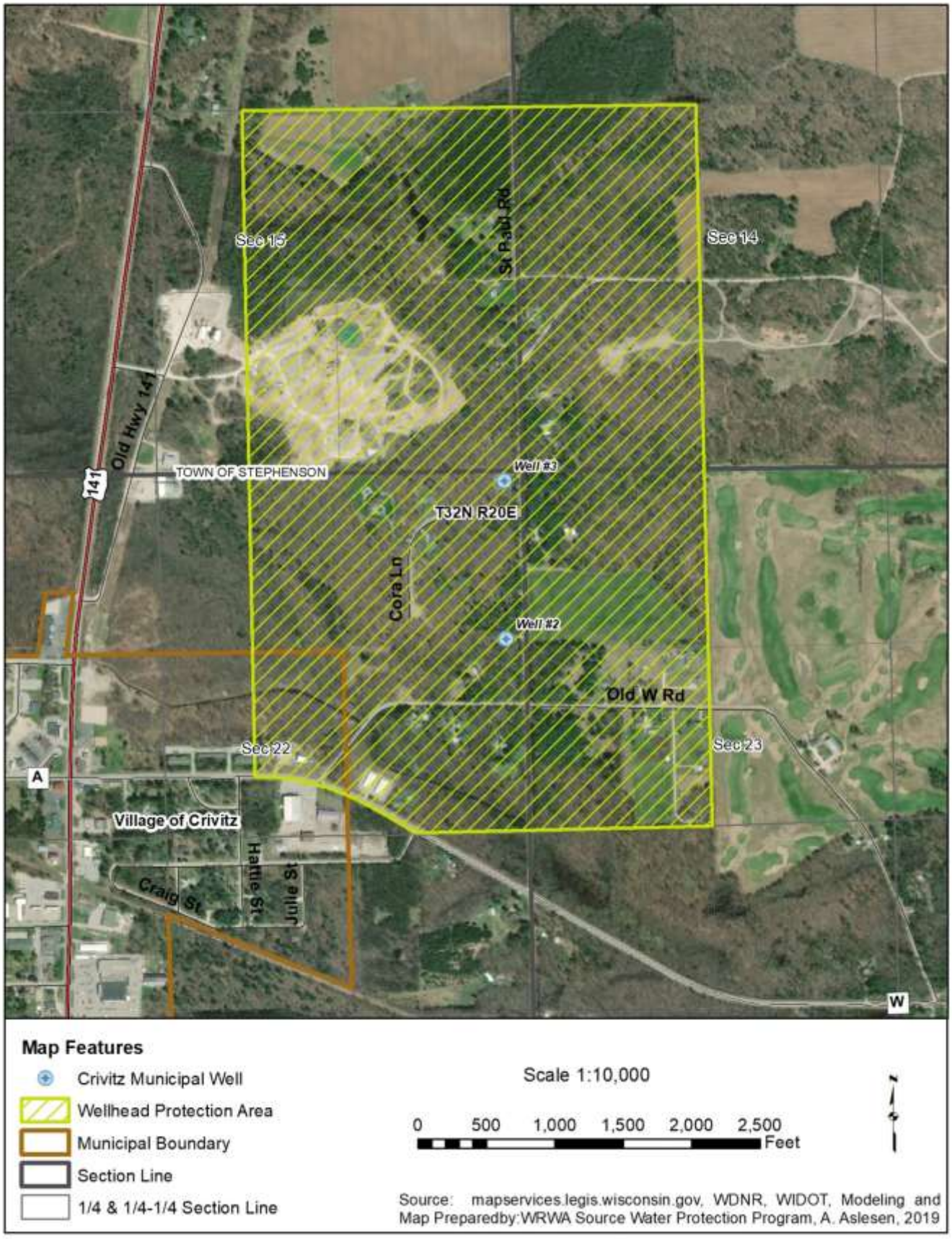


Figure 8 – Wellhead Protection Area, Wells #2 & #3



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Appendix A – Potential Contaminant Source Inventory, Setbacks & List of Abbreviations

Potential Contaminant Sources Within ½ Mile of Well #1

See Figure 5

	Code	Potential Contaminant Sources	Distance (ft)	Direction	Name/Owner	
1	AFP	Agricultural Farming	150	N	Robert Bushman	
2	AIA	Irrigation System	150	N	Robert Bushman	
3	GWA	Water Well-Active	1700+	N,E,S,W	Multiple	
4	GSA	Septic System	1700+	N,E,S,W	Multiple	
	WRP	**ERRP Site**	**Dist (ft)**	**Direction**	**BRRTS ID #**	**Status**
1		Shaffer Hi Cap	1,730	W	02-38-000180	Closed

Potential Contaminant Sources Within ½ Mile of Well #2

See Figure 6

	Code	Potential Contaminant Sources	Distance (ft)	Direction	Name/Owner	
1	AFP	Agricultural Farming	160	E	KTS Family Revocable Trust	
2	GWA	Water Well-Active	300+	N,E,S	Multiple	
3	GSA	Septic System	300+	N,E,S	Multiple	
4	IGS	Gravel and Sand Pits	1,500	NW	Crivitz Redi-Mix Sand & Gravel	
5	MGC	Golf Course	1,500	E	Hunter's Glen Golf Club	
6	GFB	Fuel Storage Tank-Below Ground	1,830	SW	Marinette County Highway Dept.	
7	BSS	Road Salt Storage	2,230	SW	Marinette County Highway Dept.	
8	GFA	Fuel Storage Tank-Above Ground	2,600	SE	Hunter's Glen Golf Club	
	WLS	**Leaking underground storage tank**	**Dist (ft)**	**Direction**	**BRRTS ID #**	**Status**
1		Marinette CNTY HWY COMM-Crivitz	1,875	SW	03-38-001064	Closed
2		Marinette CNTY HWY COMM-Waste Oil	1,200	SW	03-38-001795	Closed

Potential Contaminant Sources Within ½ Mile of Well #3

See Figure 6

	Code	Potential Contaminant Sources	Distance (ft)	Direction	Name/Owner	
2	GWA	Water Well-Active	300+	N,E,S	Multiple	
3	GSA	Septic System	300+	N,E,S	Multiple	
4	IGS	Gravel and Sand Pits	620	NW	Crivitz Redi-Mix Sand & Gravel	
1	AFP	Agricultural Faming	670	SE	KTS Family Revocable Trust	
5	MGC	Golf Course	1,470	E/SE	Hunter's Glen Golf Club	
	WLS	**Leaking underground storage tank**	**Dist (ft)**	**Direction**	**BRRTS ID #**	**Status**
1		Crivitz Redi-Mix Inc	2,080	W/NW	03-38-272835	Closed

CONT CODE	CONTAMINANT SOURCE	DESCRIPTION	SPECIFIC CONTAMINANTS
AAH	Animal housing		Livestock sewage wastes, nitrates, phosphates, chloride, chemical sprays and dips for controlling insect, bacterial, viral , and fungal pests, coliform bacteria, viruses
AFA	Animal Feedlot		Livestock sewage wastes, nitrates, phosphates, chloride, chemical sprays and dips for controlling insect, bacterial, viral , and fungal pests, coliform bacteria, viruses
AFP	Agricultural farming	Active farming operations	Pesticides, fertilizers
AIA	Irrigation system	Agricultural irrigation	Pesticides, fertilizers
AMH	Agriculture milkhouse		Livestock sewage wastes, nitrates, phosphates, chloride, chemical sprays and dips for controlling insect, bacterial, viral , and fungal pests, coliform bacteria, viruses, acids
AMS	Manure storage	Lined and unlined manure storage facilities	Livestock sewage wastes, nitrates, phosphates, chloride, chemical sprays and dips for controlling insect, bacterial, viral , and fungal pests, coliform bacteria, viruses
BCT	Chemical storage	500 gallon or more	Specific to chemical product stored at site
BFS	Fertilizer storage/mixing	Feed mill, agricultural co-op	Nitrates
BFT	Petroleum storage	500 gallon or more	Specific to petroleum product stored at site
BGS	Grain storage site		Fungicides
BPS	Pesticide storage / mixing / load	Feed mill, agricultural co-op	Herbicides, insecticides, rodenticides, fungicides, avicides
BSS	Road salt storage	Bulk storage sites	Sodium chloride, calcium chloride, waste oil
CAI	Airport		Jet fuels, deicers, batteries, diesel fuel, chlorinated solvents, automobile wastes, heating oil, building wastes
CBS	Auto body shop		Paints, solvents
CBY	Boat yard		Diesel fuels, batteries, oils, septage from boat waste disposal areas, wood preservatives, paints, waxes, varnishes, automotive wastes
CCE	Cemetery		Leachate (formaldehyde), lawn and maintenance chemicals
CCW	Car wash	Car washes in unsewered areas	Soaps, detergents, waxes, miscellaneous chemicals
CDC	Dry cleaning		Solvents (tetrachloroethylene, petroleum solvents, freon), spotting chemicals (trichloroethane, ammonia, rust removers)
CLD	Laundromat	Laundromats in unsewered areas	Detergents, bleaches, fabric dyes
CMP	Plating facility	Jewelry and metal plating	Cyanide, heavy metals
CMW	Machine / metal working shop		Solvents, metals, organics, sludges, cutting oils, degreasers
CPH	Photo processing	Only include processing facilities, don't include photo drop off sites	Cyanides, biosludges, silver sludges
CPR	Printing		Solvents, inks, dyes, oils, organics, chemicals
CPS	Paint shop		Paint, paint thinner, solvents
CRT	Railroad track		Spills
CRY	Rail yard		Spills
CSP	Seed production plant		Fumigants
CSS	Gas service station		Gasoline, oils, solvents, miscellaneous wastes
CSY	Scrap/junkyard		Oil, gasoline, antifreeze, PCB contaminated soils, lead acids batteries
CVR	Motor vehicle repair shop		Waste oils, solvents, acids, paints, automotive wastes,
GFA	Fuel storage tank - above ground	Non-service station tanks	Gasoline, diesel fuel, other petroleum products
GFB	Fuel storage tank - underground	Non-service station tanks	Gasoline, diesel fuel, other petroleum products
GSA	Sewage absorption area	Drainfields, mounds, dry wells	"
GSL	Sewer line (municipal)	Municipal sewer lines	Septage, coliform bacteria, viruses, nitrates
GSN	Sewer line (non-municipal)	Non-municipal sewer lines	"
GST	Sewage tank	Holding tanks, septic tanks, sumps	Septage, coliform bacteria, viruses, nitrates, heavy metals, synthetic detergents, cooking and motor oil, bleach, pesticides, paints, paint thinner, photographic chemicals, septic tank cleaner chemicals, chlorides, sulfate, calcium, magnesium, potassium, phosphate
GWA	Water well (active production)		Potential conduit
GWI	Water well (unused or improperly abandoned)		Potential conduit
IAS	Asphalt plant		Petroleum derivatives
ICM	Chemical production	Industrial chemical production facilities	Chemicals
IEE	Electrical and electronic products		Cyanides, metal sludges, caustics, solvents, oils, acids, alkalis,

	manufacturing		paints, methylene chloride, tetrachloroethylene, trichloroethane, acetone, toluene, PCBs
IES	Electroplating / metal finishing facility		Acids, alkaline solutions, cyanide, metallic salts, solvents, cyanide, heavy metal contaminated wastewater
IFM	Furniture or wood manufacturing / refinishing / stripping		Paints, solvents (toluene, methylene chloride), degreasing sludges
IFW	Foundry / smelting plant		Cyanides, sulfides
IGS	Gravel and Sand pits		Spills, miscellaneous chemicals, bacteria
IMQ	Mining / Mine waste		Cyanide, sulfides, metals, acids drainage
IPC	Plastics manufacturer / molder		Solvents, oils, organics and inorganics, paint wastes, cyanides, acids, alkalis, sludges, esters, surfactants, glycols, phenols, formaldehyde, peroxides
IPM	Paper mill		Metals, acids, minerals, sulfides, chemicals, sludges, chlorine, hypochlorite, chlorine dioxide, hydrogen peroxide
IPP	Pipeline (petro./chem.)		Petroleum, chemicals
ISQ	Stone quarries		Spills, miscellaneous chemicals, potential conduit, bacteria
ITP	Textile / polyester manufacturer		Chemicals
IWT	Wood preserving facility		Treated wood residue, preservatives (pentachlorophenol, chromate, copper arsenate,), tanner gas, paint sludges, solvents, creosote, coating wastes
MFT	Fire training facility		Chemicals
MGC	Golf course		Fertilizers, herbicides, pesticides for controlling mosquitoes, ticks, ants, gypsy moths, and other pests., automotive wastes
MGP	Manufactured gas plant / gasification plant		Petroleum VOCs, Benzo(a)pyrene, PAHs, cyanide
MLA	Laboratory (college, medical, school, private, etc.)		Biological wastes, disinfectants, acids, formaldehyde, miscellaneous chemicals
MMI	Military installation		
MMP	Medical Installation (e.g. Hospital)		X-ray developers and fixers, infectious wastes, radiological wastes, biological wastes, disinfectants, asbestos, beryllium, acids, formaldehyde, miscellaneous chemicals
MOT	Other (specify) _____		
WDR	Class V injection well	Any well, drilled or dug hole, used to inject fluids into the subsoil	Chlorides, pathogens, petroleum products, pesticides
WHS	Hazardous waste generator (SARA Title III) / RCRA authority clean-ups	Any facility listed on the SARA Title III list thought to pose a threat to the well / RCRA clean-ups	Hazardous waste
WIN	Incinerator (municipal)		Metals, combustion by-products
WLA	Landfill	Solid and hazardous waste sites listed in the DNR "Registry of Waste Disposal Sites in Wisconsin"	Leachate
WLS	Leaking underground storage tank (LUST)	LUST Sites included in the DNR "Leaking Underground Storage Tank List"	Gasoline, diesel fuel, other petroleum products
WRF	Recycling facility		Petroleum products, chemicals
WRP	ERRP Site	Sites on the DNR "Emergency and Remedial Response" list	Spills
WSI	Wastewater Spray Irrigation		Coliform bacteria, nitrate, chloride, pathogens, viruses
WSS	Sludge spreading	Municipal wastewater sludge, paper mill sludge	Viruses, coliform bacteria, heavy metals, dioxins
WSW	Storm water retention pond		Metals, petroleum products
WTS	Solid waste transfer station		Miscellaneous chemicals
WUC	Superfund site	Sites listed in the DNR "Superfund Sites in Wisconsin"	Miscellaneous contaminants
WWL	Wastewater lagoon	Treatment and/or storage lagoons	Coliform bacteria, viruses
WWO	Wastewater discharge to surface water	Surface water outfall	Coliform bacteria, viruses
WWP	Wastewater treatment plant		
WWS	Wastewater discharge to groundwater	Absorption and seepage cells, spray irrigation, subsurface systems, etc.	Coliform bacteria, viruses

NR 811.12(5) Required Setback Distances From Community Water Supply Wells and Potential Sources of Contamination

Potential Contaminant Source	Minimum Setback Distance (ft)
Emergency Power System Operated by The Same Facility Operating Well And Has a Double Wall Above Ground Storage Tank With Continuous Electronic Intersticial Leak Monitoring	10
Storm Sewer Main or Sanitary Sewer Main Constructed of Water Main Class Material	50
Sanitary Sewer Main Not Constructed of Water Main Class Materials	200
Lift Station	
One or Two Family Residential Fuel Oil UST[1] or AST[2]	
POWTS Treatment Tank or Holding Tank	
Any farm UST[1] system or other UST[1] system with double wall and with electronic interstitial monitoring for the system, any farm AST[2] with double wall, or single wall tank with other secondary containment and under a canopy; other AST[2] system with double wall, or single wall tank with secondary containment and under a canopy and with electronic interstitial monitoring for a double wall tank or electronic leakage monitoring for a single wall tank secondary containment structure*	300[3]
Septic Tank (<12,000 gpd)	400
Cemetery	
Storm Water Retention or Detention Pond	
Farm UST[1] system or other UST[1] system with double wall and with electronic interstitial monitoring for the system, any farm AST[2] with double wall, or single wall tank with other secondary containment and under a canopy or other AST[2] system with double wall, or single wall tank with secondary containment and under a canopy; and with electronic interstitial monitoring for a double wall tank or electronic leakage monitoring for a single wall tank secondary containment structure*	600[6]
Land Application of Municipal, Commercial, or Industrial Waste	1,000
The Boundary of a Land Spreading Facility for Spreading of Petroleum-Sontaminated Sol Regulated Under ch. NR 718 While Facility is in Operation	
Industrial, Commercial, or Municipal Wastewater Treatment Plant Treatment Units, Lagoons, or Storage Structures	
Manure Stacks or Storage Structures	
Septic Tank (>12,000 gpd)	
Solid Waste Storage, Transportation, Transfer, Incineration, Air Curtain Destructor, Processing, Wood Burning, One Time Disposal or Small Demolition Facility	1,200
Sanitary Landfill	
Any Property With Residual Groundwater Contamination That Exceeds CH. NR140 Enforecement	
Coal Storage Area	
Salt or Deicing Material Storage Area	
Single Wall Farm UST or Single Wall Farm AST or Other Single Wall UST or AST That Has or Has Not Received Written Approval From The Department of Commerce or Its Designated Local Program Operator*	
Bulk Fuel Storage Facilities	
Bulk Pesticide or Fertilizer Handling or Storage Facilities	

Footnotes On Page 2

*These requirements apply to tanks containing gasoline, diesel, bio-diesel, ethanol, orther alternative fuel, fuel oil, petroleum product, motor fuel, burner fuel, lubricant, waste oil, or hazardous substance

[1] UST-Underground Storage Tank

[2] AST-Above Ground Storage Tank

[3] These installations shall meet the most restrictive installation requirements of s. Comm 10.260 and receive written approval from the department of commerce or its designated Local Program Operator under s. Comm 10.110

[4] For USTs s. Comm 10.260 states the 600ft setback distance may be reduced by 50% if all of the following features are provided and maintained in addition to the features in the tank–type column: tank system construction of corrosion–resistant material, such as fiber–reinforced plastic, or steel with a fiber–reinforced plastic wrap or jacket; non–discriminating sump sensors; testable secondary containment spill bucket; continuous electronic liquid–filled, pressure, or vacuum interstitial monitoring with automatic system shut–down; audible and visual high–level alarm at 90% full, and automatic shut–off at 95%; all fueling area protected by canopy; and downspouts for drainage of rainwater do not discharge into a fueling area.

[5] For ASTs s. Comm 10.260 states the 600ft setback distance may be reduced by 50% if all of the following features are provided and maintained in addition to the features in the tank–type column: either continuous non–discriminating electronic interstitial monitoring for double wall, or continuous non–discriminating electronic sensor for other secondary containment; audible and visual high–level alarm at 90% full, and either automatic shut–off at 95% or no latch–open device is used with any manual–shutoff nozzle; all dispensing by suction pump fuel transfer; all motor vehicle fueling limited to private or fleet use; all fueling area protected by canopy; and downspouts for drainage of rainwater do not discharge into a fueling area.

[6] These installations shall meet the standard double wall tank or single wall tank secondary containment installation requirements of s. Comm 10.260 and receive written approval from the department of commerce or its designated Local Program Operator under s. Comm 10.110

Appendix B – Lithologic Logs and Well Construction Details

WISCONSIN UNIQUE WELL NUMBER **BG341**
Source: WELL CONSTRUCTION

State of Wi-Private Water Systems-IX/2
Department Of Natural Resources, Box 7921
Madison, WI 53707

Form 3300-77A
(Rev 02/02)bw

Depth 51.5 FT

Property Owner: CRIVITZ, VILLAGE OF
Telephone Number: 715-854-7778
Mailing Address: 800 HENRIETTE AVE
City: CRIVITZ
State: WI
Zip Code: 54114
County of Well Location: 38 MARINETTE
Co Well Permit No: W
Well Completion Date: June 18, 1979

1. Well Location
T=Town C=City V=Village: T of STEPHENSON
Fire#:
Street Address or Road Name and Number: W8707 HWY W WELL #1
Subdivision Name:
Lot#:
Block #:

Well Constructor: MILLER WELL @ PUMP
License #: 208
Facility ID (Public): 438041120
Address:
Public Well Plan Approval#: 780842
City / State / Zip Code:
Date Of Approval: 3/21/1979
Hicap Permanent Well #: 82043
Common Well #: 001
Specific Capacity: 11.2 gpm/ft

Gov't Lot: or NE 1/4 of SW 1/4 of
Section 20 T 32 N R 20 E

2. Well Type 1 (See item 12 below)
1=New 2=Replacement 3=Reconstruction
of previous unique well # _____ constructed in 0
Reason for replaced or reconstructed Well?

3. Well Serves: M (# of homes and or; eg: barn, restaurant, church, school, industry, etc.)
M=Munic O=OTM N=NonCom P=Private Z=Other X=NonPot A=Anode L=Loop H=Drillhole
High Capacity: Well? / Property?

1 1=Drilled 2=Driven Point 3=Jetted 4=Other

4. Is the well located upslope or sideslope and not downslope from any contamination sources, including those on neighboring properties?
Well located in floodplain?
Distance in feet from well to nearest: (including proposed)

1. Landfill
2. Building Overhang
3. 1=Septic 2= Holding Tank
4. Sewage Absorption Unit
5. Nonconforming Pit
6. Buried Home Heating Oil Tank
7. Buried Petroleum Tank
8. 1=Shoreline 2= Swimming Pool
9. Downspout/ Yard Hydrant
10. Privy
11. Foundation Drain to Clearwater
12. Foundation Drain to Sewer
13. Building Drain 1=Cast Iron or Plastic 2=Other
14. Building Sewer 1=Gravity 2=Pressure 1=Cast Iron or Plastic 2=Other
15. Collector Sewer: ___ units ___ in. diam.
16. Clearwater Sump
17. Wastewater Sump
18. Paved Animal Barn Pen
19. Animal Yard or Shelter
20. Silo
21. Barn Gutter
22. Manure Pipe 1=Gravity 2=Pressure 1=Cast iron or Plastic 2=Other
23. Other manure Storage
24. Ditch
25. Other NR 812 Waste Source

5. Drillhole Dimensions and Construction Method

Dia.(in.)	From (ft)	To (ft)
36.0	surface	40
26.0	40	50

Upper Enlarged Drillhole / Lower Open Bedrock
-- 1. Rotary - Mud Circulation
-- 2. Rotary - Air
-- 3. Rotary - Air and Foam
-- 4. Drill-Through Casing Hammer
-- 5. Reverse Rotary
X -- 6. Cable-tool Bit n. dia
-- 7. Temp. Outer Casing in. dia. ____ depth ft. Removed ?
Other

Geology Codes	8. Geology Type, Caving/Noncaving, Color, Hardness, etc	From (ft.)	To (ft.)
GI	GRAVEL @ SOIL	0	5
Y_SG	SAND	5	10
GS	GRAVEL	10	15
T_S_	SAND	15	25
GS	GRAVEL	25	30
T_S_	SAND	30	35
GS	GRAVEL	35	51.25
R_CS	CLAY	35.25	51.5

6. Casing Liner Screen

Dia. (in.)	Material, Weight, Specification Manufacturer & Method of Assembly	From (ft.)	To (ft.)
26.0	NEW STEEL 0 500 WALL API5L WELDED	surface	40
16.0	NEW STEEL 0 375 WALL A53 GR B WELDED	4	40

Dia.(in.)	Screen type, material & slot size	From	To
16.0	S S SCREEN 0 045	40	50

7. Grout or Other Sealing Material

Method / Kind of Sealing Material	From (ft.)	To (ft.)	# Sacks Cement
CEMENT	surface	40.0	

9. Static Water Level
6.1 feet B ground surface (A=Above B=Below)

10. Pump Test
Pumping level 30.7 ft. below surface
Pumping at 275.0 GP M 24.0 Hrs

11. Well Is: 43 in. A Grade (A=Above B=Below)
Developed?
Disinfected? Y
Capped? Y

12. Did you notify the owner of the need to permanently abandon and fill all unused wells on this property?
If no, explain

13. Initials of Well Constructor or Supervisory Driller: DRM — Date Signed
Initials of Drill Rig Operator (Mandatory unless same as above) — Date Signed

Additional Comments? BG
Owner Sent Label? Y
Variance Issued?
More Geology?

Batch 530

WISCONSIN UNIQUE WELL NUMBER **AT097**
Source: WELL CONSTRUCTION

State of Wi-Private Water Systems-DG/2
Department Of Natural Resources, Box 7921
Madison, WI 53707

Form 3300-77A
(Rev 02/02)bw

Depth 172 FT

Property Owner: CRIVITZ, VILLAGE
Telephone Number: - -
Mailing Address: VILLAGE HALL
City: CRIVITZ
State: WI
Zip Code: 54114
County of Well Location: 38 MARINETTE
Co Well Permit No: W
Well Completion Date: June 22, 1989

1. Well Location
T=Town C=City V=Village: T of STEPHENSON(SE PART)
Fire#:
Street Address or Road Name and Number: ST PAUL RD
Subdivision Name:
Lot#:
Block #:

Well Constructor: C T W CORP
License #: 364
Facility ID (Public): 438041120
Address: PO BOX 994
Public Well Plan Approval#: 881517
City: WAUKESHA
State: WI
Zip Code: 53187
Date Of Approval: 2/1/1989
Hicap Permanent Well #: 586
Common Well #: 002
Specific Capacity: 2.5 gpm/ft

Gov't Lot or NE 1/4 of NE 1/4 of
Section 22 T 32 N R 20 E

2. Well Type 1 (See item 12 below)
1=New 2=Replacement 3=Reconstruction
of previous unique well # _____ constructed in 0
Reason for replaced or reconstructed Well?

3. Well Serves M # of homes and or VILLAGE
(eg: barn, restaurant, church, school, industry, etc.)
M=Munic O=OTM N=NonCom P=Private Z=Other X=NonPot A=Anode L=Loop H=Drillhole

High Capacity: Well? Y
Property? Y

1 1=Drilled 2=Driven Point 3=Jetted 4=Other

4. Is the well located upslope or sideslope and not downslope from any contamination sources, including those on neighboring properties?
Well located in floodplain?
Distance in feet from well to nearest: (including proposed)

1. Landfill
2. Building Overhang
3. 1=Septic 2= Holding Tank
4. Sewage Absorption Unit
5. Nonconforming Pit
6. Buried Home Heating Oil Tank
7. Buried Petroleum Tank
8. 1=Shoreline 2= Swimming Pool
9. Downspout/ Yard Hydrant
10. Privy
11. Foundation Drain to Clearwater
12. Foundation Drain to Sewer
13. Building Drain 1=Cast Iron or Plastic 2=Other
14. Building Sewer 1=Gravity 2=Pressure 1=Cast Iron or Plastic 2=Other
15. Collector Sewer: ___ units ___ in . diam.
16. Clearwater Sump
17. Wastewater Sump
18. Paved Animal Barn Pen
19. Animal Yard or Shelter
20. Silo
21. Barn Gutter
22. Manure Pipe 1=Gravity 2=Pressure 1=Cast iron or Plastic 2=Other
23. Other manure Storage
24. Ditch
25. Other NR 812 Waste Source

5. Drillhole Dimensions and Construction Method

Dia.(in.)	From (ft)	To (ft)
18.0	surface	10
17.0	10	60
12.0	60	172

Upper Enlarged Drillhole / Lower Open Bedrock
X -- 1. Rotary - Mud Circulation
X -- 2. Rotary - Air
X -- 3. Rotary - Air and Foam
-- 4. Drill-Through Casing Hammer
-- 5. Reverse Rotary
-- 6. Cable-tool Bit _ n. dia
X -- 7. Temp. Outer Casing _ in. dia. ____ depth ft. Removed ? SPECIFIED
Other

6. Casing Liner Screen Material, Weight, Specification

Dia. (in.)	Manufacturer & Method of Assembly	From (ft.)	To (ft.)
18.0	STEEL	surface	10
12.0	STEEL A-53 0.375 WALL, LTV WELDED CON.	2	60

Dia.(in.)	Screen type, material & slot size	From	To

7. Grout or Other Sealing Material
Method PUMPED

Kind of Sealing Material	From (ft.)	To (ft.)	# Sacks Cement
NEAT CEMENT 6 GAL/BAG	surface	60.0	86

8. Geology

Geology Codes	Type, Caving/Noncaving, Color, Hardness, etc	From (ft.)	To (ft.)
_D_	DRIFT	0	25
_N_	SANDSTONE	25	172

9. Static Water Level
36.0 feet B ground surface
A=Above B=Below

10. Pump Test
Pumping level 140.0 ft. below surface
Pumping at 264.0 GP 12.0 Hrs

11. Well Is: 24 in. A Grade (A=Above B=Below)
Developed? Y
Disinfected? Y
Capped? Y

12. Did you notify the owner of the need to permanently abandon and fill all unused wells on this property? N
If no, explain: TEST WELL LATER

13. Initials of Well Constructor or Supervisory Driller: MAC Date Signed: 7/6/89
Initials of Drill Rig Operator (Mandatory unless same as above): NJ Date Signed: 7/6/89

Additonal Comments? AT
Owner Sent Label? Y
Variance Issued?
More Geology?

Batch 133

WISCONSIN UNIQUE WELL NUMBER **WM410**
Source: ELECTRONICALLY

State of Wi-Private Water Systems-DG/2
Department Of Natural Resources, Box 7921
Madison, WI 53707

Form 3300-77A
(Rev 02/02)bw

Property Owner: Village of Crivitz
Telephone Number: - -
Depth 185 FT

Mailing Address: 800 Henriette Ave

City: Crivitz | State: WI | Zip Code: 54114

1. Well Location
T=Town C=City V=Village: T of CRIVITZ
Fire#:
Street Address or Road Name and Number: ST PAUL

County of Well Location: 38 MARINETTE
Co Well Permit No: W
Well Completion Date: July 7, 2008

Subdivision Name | Lot# | Block #

Well Constructor: VAN DE YACHT LEO WELL DRILLING INC
License #: 6097
Facility ID (Public): 438041120

Address: 1267 LAKEVIEW DR
Public Well Plan Approval#: 2008-0183

City: GREEN BAY | State: WI | Zip Code: 54313
Date Of Approval: 3/31/2008

Hicap Permanent Well #: 70029
Common Well #: 003
Specific Capacity: 3.1 gpm/ft

Gov't Lot or NE 1/4 of NE 1/4 of
Section 22 T 32 N R 20 E

2. Well Type 1 (See item 12 below)
1=New 2=Replacement 3=Reconstruction
of previous unique well # UO224 constructed in
Reason for replaced or reconstructed Well?

3. Well Serves: M
# of homes and or City (eg: barn, restaurant, church, school, industry, etc.)
M=Munic O=OTM N=NonCom P=Private Z=Other X=NonPot A=Anode L=Loop H=Drillhole

High Capacity: Well? Y
Property? Y

1 1=Drilled 2=Driven Point 3=Jetted 4=Other

4. Is the well located upslope or sideslope and not downslope from any contamination sources, including those on neighboring properties? Y
Well located in floodplain? N
Distance in feet from well to nearest: (including proposed)

1. Landfill
2. Building Overhang
3. 1=Septic 2= Holding Tank
4. Sewage Absorption Unit
5. Nonconforming Pit
6. Buried Home Heating Oil Tank
7. Buried Petroleum Tank
8. 1=Shoreline 2= Swimming Pool
9. Downspout/ Yard Hydrant
10. Privy
11. Foundation Drain to Clearwater
12. Foundation Drain to Sewer
13. Building Drain 1=Cast Iron or Plastic 2=Other
14. Building Sewer 1=Gravity 2=Pressure 1=Cast Iron or Plastic 2=Other
15. Collector Sewer: ___ units ___ in . diam.
16. Clearwater Sump
17. Wastewater Sump
18. Paved Animal Barn Pen
19. Animal Yard or Shelter
20. Silo
21. Barn Gutter
22. Manure Pipe 1=Gravity 2=Pressure 1=Cast iron or Plastic 2=Other
23. Other manure Storage
24. Ditch
25. Other NR 812 Waste Source

5. Drillhole Dimensions and Construction Method

Dia.(in.)	From (ft)	To (ft)
20.0	surface	72
16.0	72	185

Upper Enlarged Drillhole
X -- 1. Rotary - Mud Circulation ---------- X
-- 2. Rotary - Air ----------
-- 3. Rotary - Air and Foam ----------
-- 4. Drill-Through Casing Hammer
-- 5. Reverse Rotary
-- 6. Cable-tool Bit _ n. dia ----------
-- 7. Temp. Outer Casing _ in. dia. ____ depth ft. Removed ?
Other
Lower Open Bedrock

Geology Codes	8. Geology Type, Caving/Noncaving, Color, Hardness, etc	From (ft.)	To (ft.)
_Y_	Sand & Gravel	0	8
_N_	Sandstone	8	184
_Q_	Granite	184	185

6. Casing Liner Screen

Dia. (in.)	Material, Weight, Specification Manufacturer & Method of Assembly	From (ft.)	To (ft.)
16.0	plain end welded 375 inch wall	surface	72

Dia.(in.)	Screen type, material & slot size	From	To

9. Static Water Level: 63.0 feet B ground surface (A=Above B=Below)

10. Pump Test: Pumping level 152.0 ft. below surface; Pumping at 280.0 GP M 19.0 Hrs

11. Well Is: 24 in. A Grade (A=Above B=Below)
Developed? Y
Disinfected? Y
Capped? Y

7. Grout or Other Sealing Material

Method	Kind of Sealing Material	From (ft.)	To (ft.)	# Sacks Cement
Tremie Pipe - Pumped	Neat cement grout	surface	72.0	125 S

12. Did you notify the owner of the need to permanently abandon and fill all unused wells on this property? N
If no, explain

13. Initials of Well Constructor or Supervisory Driller: TLV
Date Signed: 7/15/08

Initials of Drill Rig Operator (Mandatory unless same as above): KZ
Date Signed: 7/15/08

Additonal Comments? W
Owner Sent Label? Y
Variance Issued? N
More Geology?

Batch 888888888