



Preferential Pathways Study
City of Sault Ste. Marie
Municipal Well Capture Zones

Prepared for:
Sault Ste. Marie Region Conservation Authority in partnership with PUC
Services Inc. and the Corporation of the City of Sault Ste. Marie

Prepared by

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1.0 Introduction

The Ontario Government has recently passed Bill 43, the *Clean Water Act, 2006* to protect drinking water at the source as part of an overall commitment to human health and the environment. The Sault Ste. Marie Region Conservation Authority (SSMRCA) is working to complete the necessary technical studies in compliance with the *Clean Water Act*. The Act requires the development of a Watershed Based Source Protection Plan and involves the completion of a number of components, including the identification of preferential pathways within well head protection areas for all municipal supply wells.

The MOE Draft Guidance Module 5 (Issues Evaluation and Threats Inventory) provides a list of pathways that can allow contaminants to migrate to a drinking water source. Preferential pathways may include both natural geological conditions (i.e., discontinuous aquitards) as well as man-made or constructed features such as: wells – both active and inactive, pits and quarries, construction activities, septic systems, stormwater ponds and sewer infrastructure. One of the most common preferential pathways and most difficult to locate are abandoned (inactive) wells. Improperly constructed wells can potentially introduce a cumulative impact to drinking water sources especially when appropriate well head protection measures are not maintained. If the well is no longer in use, without proper abandonment a preferential pathway for a contaminant to impact a drinking water source may exist. Similarly, a well no longer in use is unlikely to be maintained on a regular basis and, as a result, water quality impacts may go unnoticed.

It is a requirement of Ontario Regulation 903 that unused wells be properly abandoned by a licensed well contractor and a well abandonment record submitted to the MOE. However, proper well abandonment is not actively enforced or monitored; therefore it is difficult to assess how many improperly abandoned wells may exist.

The SSMRCA in partnership with PUC Services Inc. and the Corporation of Sault Ste. Marie commissioned this report as part of the Ontario Ministry of Environment's 2006 Technical Studies Grant program. R.J. Burnside and Associates Limited (Burnside) and TSH have collaborated to provide the Sault Ste. Marie Region Conservation Authority (SSMRCA) a report that identifies areas within the capture zones of municipal water wells that may have unidentified abandoned wells.

2.0 Background

Most of the area within the urban boundary of the City of Sault Ste. Marie is serviced by municipal water, however there are many houses within the city that were built prior to municipal servicing which may have wells that were not properly abandoned. The location of the study area is identified in Figure 1. Portions of the Batchewana

First Nation are within the two year capture zone of this study but are not within the scope of this project. The SSMRCA will be identifying preferential pathways in this area with the cooperation of the Batchewana First Nation.

There are four municipal well fields used by the City of Sault Ste. Marie, the Steelton Well, the Goulais Well, the Lorna Well and the Shannon Well. The locations of the wells are shown in Figure 2. According to the City and PUC Services the Steelton Well was commissioned in 1914 and was taken over by the PUC via amalgamation in 1918. The Goulais Wells were commissioned in 1952, the Lorna Well in 1977 and the Shannon Well in 1973. Watermains providing water from these wells were generally installed to service the areas closest to the wells first and were then extended to outlying areas.

Capture zones for 50 day, 2 year, 5 year and 10 year travel times were obtained from the 2002 Groundwater Protection Study (Burnside, 2002) and mapped for each well field. These zones, identified in Figure 2 were calculated based on the permitted pumping rate for the well. Areas of high and medium risk for land use identified through the 2002 Groundwater Protection Study were superimposed on the Capture Zone maps. This study will focus on the areas within the two year capture zone for each well with additional emphasis on areas identified as high risk.

3.0 Scope of Work

The following scope of work was proposed in the Burnside/TSH Work Plan and refined at a project initiation meeting on June 15, 2007:

- Identify new and existing sources of historical data;
- Spatial analysis of settlement patterns;
- Locate abandoned wells;
- Public inquires and field investigation including Open Houses; and
- Provide report and final mapping identifying areas of concern.

4.0 Historical Records

The MOE has a database of all registered wells in Ontario. All well records obtained from the MOE Well Records Database were mapped using the UTM coordinates provided (Figure 3A and 3B). These coordinates may or may not be the accurate location of the well. It is also likely that many wells are not included in the database since they may have been drilled prior to the requirement for submission of well records. Similarly, many of the wells consist of 50 mm diameter sandpoints which may have been installed by homeowners or unlicensed contractors.

The initial step involved the sourcing and analysis of historical records to supplement known well records. Initially a database was developed incorporating all of the Municipal streets/roads within the ten year capture zones for each of the four municipal well heads (i.e. Goulais, Steelton, Lorna and Shannon). The database was subsequently populated with Municipal watermain installation dates based on information included in the Public Utilities Commission (PUC) "Watermain Listing Report". There were significant data gaps which necessitated further research using secondary sources of information. Specifically, each of the data gaps was recorded and forward to the PUC for further research using field books, plan/profile drawings and frontage books (i.e. servicing records). Although some of the data gaps were resolved with the secondary source information, a significant number of data gaps remained.

The next step in the process was the sourcing of historical aerial photos from the City of Sault Ste. Marie to identify the locations where properties were likely developed in advance of the installation of municipal potable water servicing. This task was challenging due to the small scale of the aerial photos and in some cases the gaps in dates for successive aerial photos. In each case where a developed property existed prior to the installation of municipal servicing, the location was noted and the aerial photo that was referenced was recorded in the database.

The data collected above was used to create a database and associated mapping which identified properties where a well may have been constructed prior to the installation of municipal potable water servicing. It was also assumed that all developed properties located outside of the urban service line but within the capture zones included individual wells.

5.0 Spatial Analysis

A systematic approach was developed and implemented to identify possible locations where wells may present a threat to the aquifer. This step was used to confirm the data from Section 4.0 and as an attempt to resolve data gaps. To identify areas with potential wells a spatial analysis was conducted with data obtained from the City of Sault Ste. Marie. The spatial analysis involved a series of queries and proximity analysis. The year of construction for the first structure (Residential, Industrial, Commercial) built on each property was ascertained. The date of construction was then compared to the date that city services were installed in the area adjacent to the property. Structure construction dates within 2 years (+/-) of the installation of services dates were considered to coincide. Any property having a first structure construction date later than the services installation date was classified as "Most Probably Not Have a Well on the Property". Properties not meeting these criteria were classified as "Possibility of a Well on the Property". Any property classified as Vacant Land with no record of a structure ever being on the property was classified as

“Most Probably Not Have a Well on the Property”. Any property not within urban service line that was not classified as Vacant Land and had structures used for residential, industrial or commercial purposes was classified as a “Possibility of a Well on the Property”.

6.0 Public Inquires

6.1 Public Open Houses

Based the results from the spatial analysis and historical records review, a mailing list was developed for properties which had the potential of having an abandoned well. Letters were sent out to all households. A copy of the letter is included in Appendix A.

All of the information garnered through the historical records review was plotted on plan drawings and incorporated as displays at two Open Houses. Open Houses were conducted at Parkland School and Korah Collegiate on November 21 and 22 respectively to discuss the results of the historical records review with individual homeowners. The Korah Open House was advertised in the Sault Star on Wednesday, November 22, 2006 and was also advertised on a local radio station. Individual notices were also delivered to each property owner located within the two year capture zones for each of the four well heads.

The Open House at Parkland School was poorly attended. A number of residents attended the Open House at Korah Collegiate and provided useful information. The input received during the sessions and via telephone calls before and after the sessions is summarized in Table 6.1.

Table 6.1: Summary of Information Collected from Public Inquiries

Property Location	Remarks
42 Walter (last house on right)	Had a 50 mm diameter well. He recently removed the piping to a depth of 1.5m below grade, capped the pipe and backfilled. Artesian conditions were present at this location.
43 Walter	May have a well.
Immediately adjacent to 43 Walter	Neighbour reported that this residence was hooked up to municipal water and sewer last year (ie: 2005).
234 Rossmore Rd	Resident not aware of any well on his property. Frank Manzo also indicated that the 17 properties along the north side of Rossmore were severed by Mr. Garson and

Property Location	Remarks
	were subsequently developed with Municipal servicing. Wells were likely present at one time on the south side of Rossmore in this area.
Garson Farm property – north side of Rossmore	It was noted that there is likely one or more wells on the Garson farm property.
43 Chippewa	A 21 m deep well is present on the property. Septic tank was filled with gravel at the time of connection to Municipal services.
Property behind “No Frills” on Korah Rd	A farm was present at this location and there was a well present at one time.
“L” shaped property at the north end of Korah Rd between Goulais and Copper	A well is present and still active. The 50 mm diameter well delivers 27 L/min. The municipal water distribution system was recently extended to this property.
583 Korah Rd	Not aware of any wells within the property.
20 Rushmere Dr. - 3 rd lot east of Newcastle	First home built on the street and was connected to Municipal water at the time of construction. Holy Family school was apparently built before this home and reportedly water was first run along Rushmere to supply the school. It is unlikely that any of the homes along Rushmere had a well. Also based on input from Frank Manzo it is believed that all homes in this subdivision were developed with Municipal water.
Chippewa Street	The properties shown shaded were likely developed with private services.
355 Sussex St.	A resident called SSMRCA and advised that she does not have a well on her property. It appears that this property was first developed in 1959 which may indicate that this subdivision was likely developed with municipal services as many properties were developed in 1959 or later. Frank Manzo also noted that he believes the watermain in the Sussex area were installed in the early 60's.

Property Location	Remarks
177 Glen Ave	The resident has reported that a well is present in the basement.
Korah/Second Line	Remedial works may not have been undertaken at service station on the south west corner.

The above information together with a table top review of potable water infrastructure reports provided to the SSMRCA by the PUC (refer to references) facilitated further refining of the base plans illustrating possible well locations. Figures 3A and 3B show the mapping of potential properties identified through the combination of all information collected from the historical records, spatial analysis and public inquiries.

7.0 Field Investigations

The next stage in the study involved a field investigation in an attempt to confirm which properties have a well. When Burnside/TSH initially prepared the work program, it was thought that a visual “fence line” inspection would be conducted and as a result, it would be important to visit the properties during snow free conditions. However, given the number of properties potentially involved and the potential to “miss” a well, it was decided that a “door to door” survey would be the ideal option for locating wells. As a result, it was not our intention to physically inspect the well, rather just confirm with home owners that there is a well in existence.

On January 16 and 17, 2006 Burnside and TSH staff conducted a door-to-door survey of properties identified as potentially having domestic wells. The Burnside and TSH staff visited homes and briefly explained the study goals. Staff attempted to visit properties identified in Figure 3A and 3B on as many streets as possible. Homes that were older than surrounding homes were targeted. Many residents were not home during the survey or did not know if they had wells. However, some residents who were original owners of their homes were able to confirm an existence of wells and an approximate time of servicing on their street. Information from all residents was recorded. Tables documenting the notes made during the survey are included in Appendix B.

Seven homes had wells that were either visible or confirmed by the home owner. A summary of these wells is included in Table 7.1. Pictures of wells were taken when possible and can be found in Appendix C. A physical inspection of the wells was not within the scope of the project.

Table 7.1 Wells Confirmed by Survey

Address	Capture Zone	Year House Built	Well Type	Easting	Northing	Comments
695 Goulais Avenue	Goulais	1944				Well in use.
37 Chippewa Street	Goulais	1961	Artesian	700589	5157937	Well water running into storm water ditch.
39 Chippewa St	Goulais	1961	Drilled	700566	5157929	
63 Chippewa St.	Goulais	1942	Artesian	700427	5159717	Well water running into storm water ditch.
868 Cooper St.	Goulais	1940	Unknown			Well capped on empty property next to home
49 Walters St.	Goulais	1941				Well decommissioned couple years ago
27 Walters St.	Goulais	1949	Dug			Well casing observed in back yard.
1500 Korah Rd	Goulais	1960	Drilled			Well visible from road.
325 Sussex Rd.	Steelton	1948	Unknown			Well capped and house built over it.
660 Korah Road	Steelton	1941	Artesian	701717	5157683	Apparently filled up with bricks and rocks.
192 Rossmore Rd	Steelton	1890	Artesian	701992	515235	Well closest to house, currently in use.
192 Rossmore Rd	Steelton	1890	Drivepoint	701984	5158192	Pipe in ground, no stick up, no cap on well.

8.0 Final Mapping

Figures 4A and 4B highlight properties that were confirmed to have wells by a resident or by information given by a resident in the area are identified. There are a number of properties considered to potentially have a well where no additional information was available. These are identified in Figures 4A and 4B as “potentially having a well”. A summary of the field survey results is included in Table 8.1.

Table 8.1 Field Survey Summary Table

	Before Field Survey	After Field Survey		
	Potential Properties with Wells	Properties with Confirmed Wells	Properties Unlikely to Have Well	Properties that May Have Wells
Lorna Well	18	0	18	0
Shannon Well	9	4	0	5
Goulais Well	129	33	86	10
Steelton Well	302	17	120	165
Total	458	54	224	180

As can be seen in Table 8.1, the initial desktop review indicated there could be as many as 458 properties with wells. The field survey confirmed 54 properties with wells and 224 properties that are unlikely to have a well. This leaves 180 properties that based on historical documentation and the presence of wells at nearby houses of the same age or older are considered as properties that may have wells.

Lorna Well

Figure 4A displays the final mapping for the Lorna Well. All houses within the two year capture zone were eliminated using information on timing of servicing in area and information from residents.

Shannon Well

Four properties were classified as having wells on their property along Trunk Road, and five properties potentially have wells (Figure 4A). The properties with potential wells were visited during the field survey, however we were either not able to obtain any information from the residents or the residents of the property were not available. One of the potential properties is now a commercial plaza, another property is an abandoned public school.

Goulais Well

Within the Goulais Well two year capture zone, wells were confirmed on Chippewa Street, Walters Street, Cooper Street, Korah Road and Goulais Avenue (Figure 4B). According to a resident, the water mains were built following the amalgamation of Korah Township to the City of Sault Ste. Marie in 1965. Older homes along Goulais Avenue and 2nd Line built before the early 60's potentially have wells. Two properties on Chippewa Street have artesian wells in their front yards that were discharging water into the street's storm water ditches. This is a contravention of O.Reg 903. Pictures of these wells are included in Appendix C.

Steelton Well

Within the Steelton Well two year capture zone, the water mains were installed during the 1950s and 1960s. Some wells were confirmed based on the survey results; however, there are several properties that potentially have wells for which no information is available. This is due to the Steelton area containing streets with houses of varying ages (ranging from 1910 to 1980) and limited information to confirm time of water servicing. Mapping is shown in Figure 4B.

9.0 Discussion

As indicated in Section 4.0, the number of wells in the MOE database that have coordinates within the municipal well capture zones are much less than the number of properties identified as having or potentially having a well. Many of the wells observed during the field survey were 50 mm in diameter and may have been advanced using "jetting" techniques or may have been installed prior to the requirement to submit well records.

The program resulted in a significant reduction in the number of properties suspected to have wells. However, there are still wells within the 2 year Time of Travel (TOT). If these wells are improperly constructed, they will act as conduits for near surface sources of contamination.

The water levels in artesian wells are currently controlled through municipal pumping. Many of these wells still "flow" although the water level is lower than it would be under non pumping conditions. Depending on elevation changes, there may be locations where water levels are below grade (or basement level) due to municipal pumping. These residents may experience problems if municipal pumping was to be reduced or stopped for an extended period of time.

The condition of the wells was not documented as part of this study. The MOE "Draft Issues Evaluations and Threats Inventory Module 5" identifies wells as constructed

preferential pathways which may increase the vulnerability of an area to contamination. The assessment of the degree of risk posed by the presence of these wells is beyond the scope of this study and is considered a task to be undertaken as part of the MOE Tier 2 Water Availability Risk Assessment (MOE Draft Water Quality Risk Assessment Module 6).

There may be some reluctance on the part of residents in identifying wells if they are concerned about incurring the cost associated with properly abandoning a well. Previous modeling identified a 50 day TOT. The Source Water Protection Legislation has replaced this with a 100 m pathogen security/prohibition zone. Wells within either of these two zones are considered to pose a significant risk.

10.0 Conclusion

Based on the information presented above, Burnside offers the following conclusions:

- Within the urban area of Sault Ste. Marie, the MOE well record database does not accurately reflect the number of wells that have been constructed.
- The results of the historical review screening process conducted by TSH corresponded well with the results of the spatial analysis conducted by Burnside with data from the City.
- Generally, watermains were installed at the time houses were constructed.
- The Goulais and Steelton well capture zones have the greatest number of properties that potentially have wells.
- A number of wells in the Goulais well capture zone were “flowing” uncontrolled into ditches.
- Some valuable information was collected at the Korah Open House.
- The Door to Door Survey was able to fill in “data gaps”.
- Some residents were not aware if they had wells.
- Many wells may have been “capped” or buried and therefore are difficult to locate.
- The systematic approach undertaken in this study was successful in reducing the number of properties that may have improperly abandoned wells.
- At the conclusion of the study there were some 234 properties identified as either having or potentially having wells. The distribution of these properties was as follows: Lorna – 0%; Shannon Well – 3.8%; Goulais Well – 18.4%; and Steelton Well – 77.8%.

11.0 Recommendations

Based on the above, Burnside provides the following recommendations:

- A Tier 2 Water Quality Risk Assessment should be completed to identify wells located in close proximity to threats such as known contaminated sites.
- All wells within the 100 m pathogen security/prohibition should be abandoned in accordance to O.Reg. 903.
- Consideration should be given to providing home owners with financial assistance to decommission their wells.

Respectfully Submitted,

R.J. Burnside and Associates Limited



David Hopkins, B.Sc., P.Geo.

Rick Talvitie, P.Eng.

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Figures



Appendix A
Public Information Letter



"Man and Nature"

Sault Ste. Marie Region Conservation Authority

November 6, 2006

Dear Resident,

The Sault Ste. Marie Region Conservation Authority (SSMRCA) in partnership with the Corporation of the City of Sault Ste. Marie and PUC Services Inc. (PUC) are concerned with the long term protection of the groundwater sources which provide drinking water to a significant portion to the City's residences. As a result, the project partners have commissioned a study which is currently being completed by TSH and R.J Burnside & Associates Ltd. (Burnside) to identify potential water quality concerns within an area around the municipal wells. These potential concerns include fuel oil tanks, unused wells and septic systems.

The initial portion of this project involved investigation of historic records to attempt to determine the identification of properties which may have been developed prior to the installation of watermains. These properties have the potential to contain a well or septic system present on the property. As a result of these early investigations, members of the study team will be completing field verification in an attempt to identify the actual presence of wells or septic systems on these properties. Within the next few weeks, members of the study team will be in your neighbourhood looking for the presence of wells and or septic systems.

There is an Open House scheduled at Korah Collegiate & Vocational School on November 22, 2006 from 7:00 pm until 9:00 pm to give residents more information on the project and its outcomes. Attending participants will receive a free gift as a gesture of our appreciation.

The project team would appreciate your assistance in identifying wells prior to their visit. Given that most of these wells would be fairly old, it is likely that they will be a surface structure with a 3 feet diameter concrete pipe or a depressed area in your lawn (see photos below). If you have any structure such as these on your property, we would appreciate it if you could contact the Conservation Authority with your address and phone number. In addition, if you know of any underground fuel tanks that may have existed in your neighbourhood please contact the Conservation Authority.

At this point, the study is to simply identify the location of the wells and septic.

Members of the field verification team will have a letter from the conservation authority identifying them as part of the study team. At no time, will the site team members enter the homes of the properties of interest. Similarly, members of the study team will not access any properties without permission of the homeowner.

By working together all people in Sault Ste. Marie whether they are residents, industries, municipalities or government agencies can contribute to source water protection.

Protecting our water starts at the source, and that source is you.

Should you have any questions, please contact Rhonda Bateman, Source Water Protection Coordinator at the SSMRCA at 705-946-8530 ext. # 202.

Sincerely,

Rhonda Bateman,
Source Water Protection
Coordinator



Appendix B
Field Survey Notes

**SAULT STE. MARIE REGION CONSERVATION AUTHORITY
GROUNDWATER PREFERENTIAL PATHWAY STUDY
FIELD SURVEY NOTES**



SHANNON & LORNA WELLS

Updated: January 16, 2007

DATE	TIME	NAME	ADDRESS	WELL ON PROPERTY									POSSIBLE WATERMAIN INSTALLATION DATE	ADDITIONAL COMMENTS
				YES	NO	NOT SURE	WELL TYPE			WELL LOCATION				
DUG	DRILL	JET	F YRD				B YRD	BSMT						
January 16, 2007	8:30 AM		154 Denwood Drive			√								Not home - unlikely well exists on property.
January 16, 2007	8:35 AM		150 Denwood Drive			√								Not home - unlikely well exists on property.
January 16, 2007	8:37 AM		123 Birchwood Street			√								Home owner did not want to answer questions. Unlikely well exists on property.
January 16, 2007	8:40 AM		127 Birchwood Street		√								Prior to 1973	Home owner confirmed watermain was installed prior to their home being constructed in 1973. This would eliminate all of Birchwood Street.
SUMMARY: DENWOOD DRIVE / BIRCHWOOD STREET Unlikely wells exist on any properties within this subdivision due to watermain construction prior to 1973.														
January 16, 2007	8:55 AM		70 DAUPHIN DRIVE			√								Not home - unlikely well exists on property.
January 16, 2007	9:00 AM		117 Ashgrove Avenue		√								Prior to 1959	Home owner confirmed watermain was installed prior to their home being constructed in 1959. This would eliminate Ashgrove Avenue as well as house on Dauphin Drive.
SUMMARY: ASHGROVE AVENUE / DAUPHIN DRIVE Unlikely wells exist on any properties within this subdivision due to watermain construction prior to 1959.														
January 16, 2007	9:10 AM		310 Dacey Road			√								Abandoned public school.
January 16, 2007	9:12 AM		380 Dacey Road		√									Business - unlikely they know if well existed.
January 16, 2007	9:55 AM		397 Dacey Road			√								Not home.
January 16, 2007	10:00 AM		393 Dacey Road		√									
SUMMARY: DACEY ROAD Unable to determine if wells exist on properties in this area although the potential for wells exists.														
January 16, 2007	9:40 AM		1155 Trunk Road			√								Property abandoned - potential for well as no water meter on house and other wells have been located in the area.
January 16, 2007	9:45 AM		1119 Trunk Road			√								Greenhouse - potential for well as other wells have been located in the area.
January 16, 2007	9:50 AM		967 Trunk Road			√								Car dealership - unlikely they know if well existed.
SUMMARY: TRUNK ROAD Potential for wells on most properties.														



GOULAIS WELL

Updated: January 16, 2007

DATE	TIME	NAME	ADDRESS	WELL ON PROPERTY									POSSIBLE WATERMAIN INSTALLATION DATE	ADDITIONAL COMMENTS
				YES	NO	NOT SURE	WELL TYPE			WELL LOCATION				
							DUG	DRILL	JET	F YRD	B YRD	BSMT		
January 16, 2007	11:25 AM		695 Goulais Avenue	√										Well currently in use - details not available.
January 16, 2007	11:30 AM		705 Goulais Avenue			√								Not home - potential for well as other wells located in the area.
January 16, 2007	11:45 AM		745 Goulais Avenue			√								Not home - potential for well as other wells located in the area.
January 16, 2007	12:50 PM		804 Goulais Avenue			√								Not home - potential for well as other wells located in the area.
SUMMARY: GOULAIS AVENUE NORTH OF WESTCHESTER DRIVE Well confirmed as well as potential for wells on all properties with homes constructed prior to late 1960's.														
January 16, 2007	11:35 AM		35 Chippewa Street			√								Not home - potential for well as other wells located in the area and no water meter located on house.
January 16, 2007	11:36 AM		37 Chippewa Street	√				√		√	√			Not home - wells visible during inspection. Well with hand pump in back yard. Artesian well running in front yard. Photos available.
January 16, 2007	11:38 AM		39 Chippewa Street	√				√		√				Not home - capped well visible in front yard. Photo available. 700566 E 5157929 N
January 16, 2007	11:39 AM		43 Chippewa Street			√								Not home - potential for well as other wells located in the area.
January 16, 2007	11:40 AM		63 Chippewa Street	√				√		√				Artesian well running in front yard. Photos available. 700427 E 5159717 N
SUMMARY: CHIPPEWA STREET Several wells confirmed as well as potential for wells on all properties with homes constructed prior to late 1960's.														
January 16, 2007	11:50 AM		870 Cooper Street		√									Questionable due to date of home and neighbour informed us that empty lot next door has capped well.
January 16, 2007	11:55 AM		864 Cooper Street		√									Home owner said empty lot next door has capped well.
January 16, 2007	11:56 PM	Empty Lot	868 Cooper Street	√										Home owner next door said there is a capped well on property. Well not visible during inspection.
SUMMARY: COOPER STREET Potential for wells on all properties with homes constructed prior to late 1960's.														
January 16, 2007	12:00 PM		1500 Korah Road	√						√				Not home - well visible during inspection. Photo available.

DATE	TIME	NAME	ADDRESS	WELL ON PROPERTY									POSSIBLE WATERMAIN INSTALLATION DATE	ADDITIONAL COMMENTS
				YES	NO	NOT SURE	WELL TYPE			WELL LOCATION				
							DUG	DRILL	JET	F YRD	B YRD	BSMT		
January 16, 2007	12:05 PM		1520 Korah Road			√								Not home - potential for well as other wells located in the area as well as being a 1930 home.
SUMMARY: KORAH ROAD confirmed as well as potential for wells on all properties with homes constructed prior to late 1960's.														
January 16, 2007	1:00 PM		12 Westgate Street		√									Unlikely well exists on property.
January 16, 2007	1:05 PM		17 Westgate Street			√								Not home - unlikely well exists on property.
January 16, 2007	1:15 PM		24 Pretoria Hill			√								Not home - unlikely well exists on property.
January 16, 2007	1:20 PM		10 Pretoria Hill			√								Not home - unlikely well exists on property.
January 16, 2007	1:25 PM		14 Pretoria Hill		√								Prior to 1962	Home owner confirmed watermain was installed prior to their home being constructed in 1962. This would eliminate all of Pretoria Hill and likely surrounding subdivision.
SUMMARY: WESTGATE DRIVE / RUSHMERE DRIVE / PRETORIA HILL / ROYAL ROAD Unlikely wells exist on any properties within this subdivision due to watermain construction prior to 1962.														
January 16, 2007	1:30 PM		546 Goulais Avenue			√								Not home - unsure if wells exist in this area.
January 16, 2007	1:35 PM		530 Goulais Avenue			√								Not home - unsure if wells exist in this area.
January 16, 2007	1:36 PM		520 Goulais Avenue			√								Not home - unsure if wells exist in this area.
SUMMARY: GOULAIS AVENUE SOUTH OF RUSHMERE DRIVE Potential for wells on all properties with homes constructed prior to late 1960's.														
January 16, 2007	2:10 PM		15 Walters Street		√									1939 home - likely well exists on property as watermain installed sometime in 1950's.
January 16, 2007	2:15 PM		19 Walters Street			√								Not home. 1935 home - likely well exists on property as watermain installed sometime in 1950's.
January 16, 2007	2:20 PM		27 Walters Street	√			√				√			1949 home - possible dug well observed in back yard during inspection.
January 16, 2007	2:25 PM		28 Walters Street		√								Prior to 1965	Home owner confirmed watermain was installed prior to their home being constructed in 1965.

DATE	TIME	NAME	ADDRESS	WELL ON PROPERTY									POSSIBLE WATERMAIN INSTALLATION DATE	ADDITIONAL COMMENTS	
				YES	NO	NOT SURE	WELL TYPE			WELL LOCATION					
							DUG	DRILL	JET	F YRD	B YRD	BSMT			
January 16, 2007	2:35 PM		49 Walters Street	√								√		Early to mid 1950's	Home owner confirmed watermain was installed along majority of Walters Street sometime in the 1950's when the area changed from Korah Township to City of SSM. It is likely all homes on Walters Street constructed prior to early 1950's have well on property. Well on this property was decomissioned a few years ago when city extended watermain to end of street.
SUMMARY: WALTERS STREET Wells confirmed as well as potential for wells on all properties with homes constructed prior to 1950's as watermain was likely installed in the early to mid 1950's.															
January 16, 2007	2:55 PM		611 Second Line			√									Not home.
January 16, 2007	3:00 PM		587 Second Line			√									Multi-family residence - information not available.
January 16, 2007	3:02 PM		595 Second Line			√									Multi-family residence - information not available.
SUMMARY: SECOND LINE EAST OF GOULAIS AVENUE Potential for wells on most properties but nothing confirmed due to multi-family residences and rental properties in this area.															
January 16, 2007	3:10 PM		15 Hare Avenue			√									Not home - unlikely well exists on property.
January 16, 2007	3:12 PM		16 Hare Avenue		√										Unlikely well exists on property.
January 16, 2007	3:15 PM		26 Hare Avenue			√									Not home - unlikely well exists on property.
January 16, 2007	3:18 PM		414 Spadina Avenue			√									Not home - unlikely well exists on property.
January 16, 2007	3:20 PM		406 Spadina Avenue		√									Prior to 1952	Home owner confirmed watermain was installed prior to their home being constructed in 1952. This would eliminate all of Spadina as well as Hare.
SUMMARY: HARE AVENUE / SPADINA AVENUE No wells as watermain was constructed prior to building of homes in early 1950's,															
January 16, 2007	3:30 PM		683 Second Line		√										
January 16, 2007	3:35 PM		675 Second Line			√									Not home.
SUMMARY: SECOND LINE Unable to determine if wells exist on properties in this area.															



STEELTON WELL

Updated: January 18, 2007

DATE	TIME	NAME	ADDRESS	WELL ON PROPERTY									POSSIBLE WATERMAIN INSTALLATION DATE	ADDITIONAL COMMENTS
				YES	NO	NOT SURE	WELL TYPE			WELL LOCATION				
							DUG	DRILL	JET	F YRD	B YRD	BSMT		
January 17, 2007	9:15 AM		435 Second Line			√								Rental property - unable to provide information.
January 17, 2007	9:16 AM		428 Second Line			√								Not home - unlikely well exists on property.
January 17, 2007	9:18 AM		436 Second Line			√								Not home - unlikely well exists on property.
January 17, 2007	9:20 AM		448 Second Line			√								Unlikely well exists on property.
January 17, 2007	9:25 AM		420 Second Line			√								Not home - unlikely well exists on property.
January 17, 2007	9:30 AM		408 Second Line		√								Prior to 1945	Originally grandparents house and does not recall property ever having a well.
January 17, 2007	9:35 AM		400 Second Line		√								Prior to 1955	Home owner confirmed watermain was installed prior to their home being constructed in 1955.
January 17, 2007	9:40 AM		372 Second Line			√								Not home - unlikely well exists on property.
January 17, 2007	9:45 AM		376 Second Line			√								Not home - unlikely well exists on property.
January 17, 2007	9:50 AM		391 Second Line			√								1914 Pump House
SUMMARY: SECOND LINE Unlikely wells exist on any properties in this area constructed after 1914 as their is a 1914 Pump House located on Second Line.														
January 17, 2007	10:00 AM		473 First Avenue			√								1912 home - well likely existed on property.
January 17, 2007	10:02 AM		489 First Avenue		√									1910 home - well likely existed on property.
January 17, 2007	10:04 AM		493 First Avenue			√								Not home.
January 17, 2007	10:15 AM		433 Woodcroft Avenue		√									1905 home - well likely existed on property.
January 17, 2007	10:18 AM		430 Woodcroft Avenue		√									Unlikely well exists on property.

[illegible]

DATE	TIME	NAME	ADDRESS	WELL ON PROPERTY									POSSIBLE WATERMAIN INSTALLATION DATE	ADDITIONAL COMMENTS
				YES	NO	NOT SURE	WELL TYPE			WELL LOCATION				
							DUG	DRILL	JET	F YRD	B YRD	BSMT		
February 5/07	12:56 PM		287 Selby Road		√									1948 house - confirmed 299 Selby had a well at one time.
February 5/07	1:00 PM		283 Selby Road			√								1940 house - not home.
February 5/07	1:02 PM		288 Selby Road			√								1949 house - not home.
February 5/07	-		299 Selby Road	√										1949 house - another home owner confirmed that there was a well on this property at one time. Could not confirm with home owner as there had been a fire at the home and the fire department, etc. was still there.
SUMMARY: SELBY ROAD A well confimed at a 1949 house so any house constructed prior to this date is likely to have a well.														
February 5/07	1:10 PM		268 Sussex Road			√								1949 house - not home.
February 5/07	1:15 PM		277 Sussex Road			√								1951 house - not home.
February 5/07	1:17 PM		281 Sussex Road			√								1951 house - not home.
February 5/07	1:20 PM		288 Sussex Road		√									1954 house.
January 17, 2007	10:40 AM		292 Sussex Road			√								Rental property - unable to provide information.
January 17, 2007	10:45 AM		319 Sussex Road		√									
January 17, 2007	10:50 AM		325 Sussex Road	√							√		Around 1959/1960	Home owner confirmed watermain was installed sometime around 1959/1960. There was a well on their property in the back yard but it was capped and the house was built over it.
SUMMARY: SUSSEX ROAD Well confirmed and potential for wells on all properties with homes constructed prior to very early 1960's as watermainns in this area were installed anywhere from 1950-1960.														



Appendix C

Field Survey Photographs

Sault Ste. Marie Preferential Pathway
Study Door to Door Survey



Sault Ste. Marie Preferential Pathway
Study Door to Door Survey

