



Harden Environmental Services Ltd.  
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Groundwater Studies  
Geochemistry  
Phase I / II  
Regional Flow Studies  
Contaminant Investigations  
OMB Hearings  
Water Quality Sampling  
Monitoring  
Groundwater Protection  
Studies  
Groundwater Modelling  
Groundwater Mapping

Our File: 0903

June 2, 2009

The Corporation of the Town of Marathon  
Postal Bag "TM"  
4 Hemlo Drive  
Marathon, Ontario  
P0T 2E0

Attention: Mr. Jim Zimmerman, Works Manager

Dear Mr. Zimmerman:

Re: 2003 Groundwater Study Update

We are pleased to provide an update of our 2003 Groundwater Study. Since 2003 there have been additional studies in and around the Town of Marathon that have improved our understanding of the groundwater flow system and vulnerabilities of the drinking water supplies in the Town. There have also been additional initiatives by the Ministry of the Environment in regards to Source Water Protection planning that we will report on herein.

#### **Status of 2003 Study Recommendations**

Our 2003 Groundwater Protection Study included seventeen recommendations in order to improve the protection of groundwater in the Town of Marathon. The following table summarizes the recommendations and actions taken since 2003.

<b>No.</b>	<b>Recommendation</b>	<b>Description of Action Taken</b>	<b>Proposed Follow-Up</b>
1	Incentives for Residential Fuel Storage Tank Upgrade	The town provided incentives for buried tank removals. Twenty-six tanks were removed as part of this program. It has not been confirmed whether or not there are private buried tanks remaining in the Town. According to the fuel supplier (January 2009), no buried tanks are in use in the Town of Marathon and buried tanks will no longer be filled. See Appendix A for additional information on fuel tank registration.	Review files prepared by Dawn Talarico to see if a survey of buried tanks was undertaken and if it is possible to identify remaining tanks. Petition TSSA for information on buried tanks in Marathon. Above ground oil tanks should be identified and assessed for potential risk to the municipal water wells. Those in critical areas should be evaluated and possibly upgraded (with incentives from the Town of Marathon) if deemed to pose a significant threat to the municipal wells.
2	Adoption of Spills Contingency Plan	Spills Contingency Plan adopted	None
3	Adopt recommended changes to Official Plan	Changes have been made to Official Plan	None
4	Environmental Staff Position	A temporary staff member was hired in 2003/2004. This position is no longer active.	None

<b>No.</b>	<b>Recommendation</b>	<b>Description of Action Taken</b>	<b>Proposed Follow-Up</b>
5	Storm Water Diversion	Storm Water has been diverted away from area near to Well No. 4. There is no longer pooling of water adjacent to railway track.	None
6	Annual Household Hazardous Waste Day	Annual Household Hazardous Waste day has been implemented.	None
7	Alternative Water Supply Investigation	An alternative water supply aquifer has been identified beneath the Marathon Ski Hill. Preliminary testing suggests that the aquifer could supply a significant percentage of the Town's needs.	On-going
8	Mail-out to Commercial Property Owners	Brochure was prepared and delivered to businesses in Marathon.	Reprint brochure and redistribute as a reminder.
9	Road and Trail Signage	Signage has been installed	None
10	Public Awareness Brochure	Brochure was prepared and distributed	Reprint brochure and redistribute as a reminder.
11	Develop Infrastructure Renewal and Investigation Plan for water and wastewater systems.	Leak detection is on-going. In 2007 the eastern side of the railway was completed as well as Aspendale, Spruce, Lloyd Irwin, MacFarland, Birch, Steedman, Manitoba, Ontario, Evergreen, Johnston, McKenzie and Peninsula Rd to booster station.	Additional leak-detection will take place in August and September 2009.

<b>No.</b>	<b>Recommendation</b>	<b>Description of Action Taken</b>	<b>Proposed Follow-Up</b>
12	Annual Review of Water Quality by Professional	Water quality in Pumping Wells No. 2 and No. 6 are monitored and reviewed on a regular basis as part of landfill site monitoring. Annual reports are prepared by OCWA for all wells, however, these reports do not include adequate indicator parameters such as chloride.	Obtain annual samples from Wells 3, 4 and 5. This can be done at same time as landfill monitoring in the fall.
13	Adoption of Pesticide By-Law	No municipal ban on pesticide use has been implemented. A municipal ban was made redundant when Ontario's cosmetic pesticides ban came into effect April 22, 2009. The requirements of the ban are detailed in Ontario Regulation 63/09 and the Pesticides Act, which was amended by the Cosmetic Pesticides Ban Act, 2008.	No additional action required.
14	Hemlo Drain Cover	No action taken.	This is not a priority issue.
15	Implementation of the Infrastructure Renewal and Investigation Plan	We understand that some replacements have been undertaken and others are planned.	Ongoing
16	Reduction of Road Salt Usage	As Figure 6 shows, there is no indication of increasing trend in chloride concentrations. There was a 48% reduction in salt usage between 2007 and 2008.	None Required
17	Indoor Salt Storage Facility	Storage shed was on works budget for 2009 but was deferred. Water quality in monitoring well Mill 2 suggests salt contamination of groundwater.	Consider for future budgets.

## **Water Level Monitoring Program**

The Town of Marathon began a groundwater level-monitoring program in 2007 in response to unexpected high volumes of water usage. The monitoring program involves obtaining water levels from five groundwater monitors and Penn Lake. The five monitoring well locations are shown on Figure 1 and water levels obtained since 2002 are shown on Figures 2 through 5. There is no indication that there is any less availability of water today than there was seven years ago. There is no trend in the data that would suggest diminishing water supplies beneath the Town.

## **Water Quality Monitoring in Pumping Well No. 2 and Pumping Well No. 6**

Pumping Wells No. 2 and No. 6 are sampled regularly as part of the Marathon Landfill Site monitoring program. There is no evidence of degrading water quality in either of these wells since 1999. Figure 6 shows the concentration of chloride over time and there is no upward trend indicated by the data. Chloride is a by-product of road salt and municipal waste. Many other parameters are also measured and there is no indication of degrading water quality over time.

## **Updated Capture Zones for Municipal Wells**

The groundwater model was updated in 2009 as a response to questions raised by the Ministry of the Environment about the landfill site. The updated model did not result in significant change to the predicted source areas of water for the municipal wells. The updated model confirmed that the source areas for the municipal wells originate in the Penn Lake area. The capture zones for the wells are shown on Figure 7.

## **Surface to Well Advection Time Modeling**

In 2005 the MOE contracted the Town of Marathon to undertake an alternative method of estimating the time it would take a contaminant to travel from the ground surface to the municipal wells. The method used in the 2003 Study only accounted for the travel time in the aquifer. In the 2005 method, the time to travel through the unsaturated zone to the aquifer as also included. The consideration of the contaminant migration through the unsaturated zone increased the time of travel to the well compared to the 2003 Study results. This methodology did not result in the identification of different capture zones than already identified in 2003, therefore no adjustment of the groundwater protection areas is warranted.

## **Source Protection Planning**

The Clean Water Act was enacted in 2006 and requires each source water protection area to prepare and submit assessment reports. These assessment reports are very detailed accounts of wellhead protection areas, threats to drinking water quality, identification of

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recharge areas etc.... Unfortunately, the Town of Marathon falls outside of a conservation authority and the source water protection areas are defined as follows:

*4. (1) The area over which a conservation authority has jurisdiction under the Conservation Authorities Act is established as a drinking water source protection area for the purposes of this Act. 2006, c. 22, s. 4 (1).*

We have contacted the MOE and the Lakehead Region Conservation Authority and to date there is no intention on extending the source water protection areas to include the Town of Marathon or other North Shore communities.

### **Alternative Water Supply**

In 2004 Harden Environmental undertook an investigation to find an alternative water source for the Town of Marathon. The investigation looked at areas near Shack Lake, the Airport and the Ski Hill. It was found that the aquifer underlying the Ski Hill could provide a significant percentage of the Town of Marathon's water needs.

### **Sink Hole at Holy Saviour School**

In 2004, a sinkhole developed on the Holy Saviour School property. This occurred as a result of poor monitoring well installation procedures before the school was constructed. The upward movement of water through the space around the well eventually resulted in the washing away of soil from the area. All of this occurred underground, undetected until the ground gave way. The sinkhole occurred under very unique conditions and it is unlikely to occur again.

### **Varsol Contamination Well No. 5**

An occurrence in 2005 provided the Town of Marathon with an example of the vulnerability of their water supply. The sandy soils under the Town provide little in the way of protection from contamination. It is suspected that someone dumped a quantity of Varsol (paint thinner) into a manhole adjacent to Well No. 5. The manhole was not connected to the sewer lines; it was a cover for the dry well beside the well. At the beginning of every pumping cycle, water from the well is pumped into the dry well. The water then infiltrates to the aquifer below. By dumping the Varsol into the dry well, the next time the pumping cycle began, the Varsol was carried almost immediately to the aquifer beside the pumping well. After lengthy testing and pumping to waste the water in Well No. 5 was certified clean again. Since that time, security fencing has been constructed and solid manhole covers have been installed.

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**Recommendations for 2009**

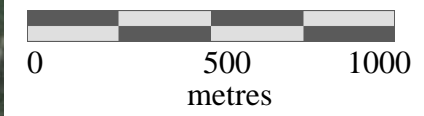
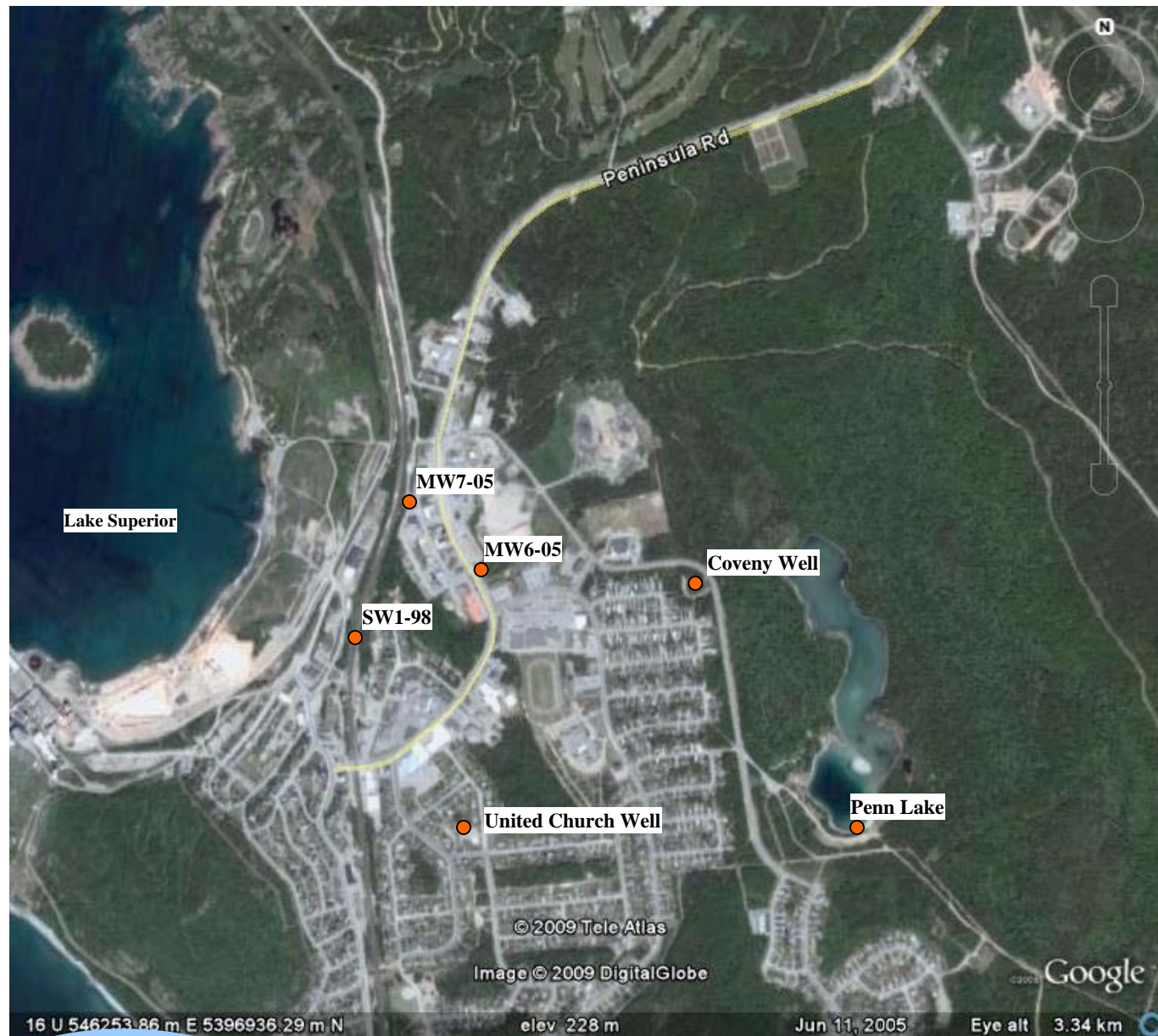
- 1) The greatest threat to the Town of Marathon drinking water remains to be underground storage tanks. As they age any remaining contaminants will eventually leak into the aquifer. Although these tanks are no longer certified and cannot be filled, unless they have been pumped out and/or removed, the threat of contamination lingers. We recommend following up on the 2004 initiative and determine if there are any remaining buried tanks. Also, all buried tanks that are in use will now be registered with the TSSA. A request should be made to the TSSA for records of buried tanks in Marathon. Above ground oil tanks should be identified and assessed for potential risk to the municipal water wells. Those in critical areas should be evaluated and possibly upgraded (with incentives from the Town of Marathon) if deemed to pose a significant threat to the municipal wells.
- 2) Maintain a monthly water level program for SW1-98, Coveny, MW6-05, MW7-05, United Church and Penn Lake.
- 3) Obtain annual water quality samples from Wells No. 3, 4 and 5. The list of parameters should include general chemistry, anions, metals and nutrients.

Sincerely,

Harden Environmental Services Ltd.

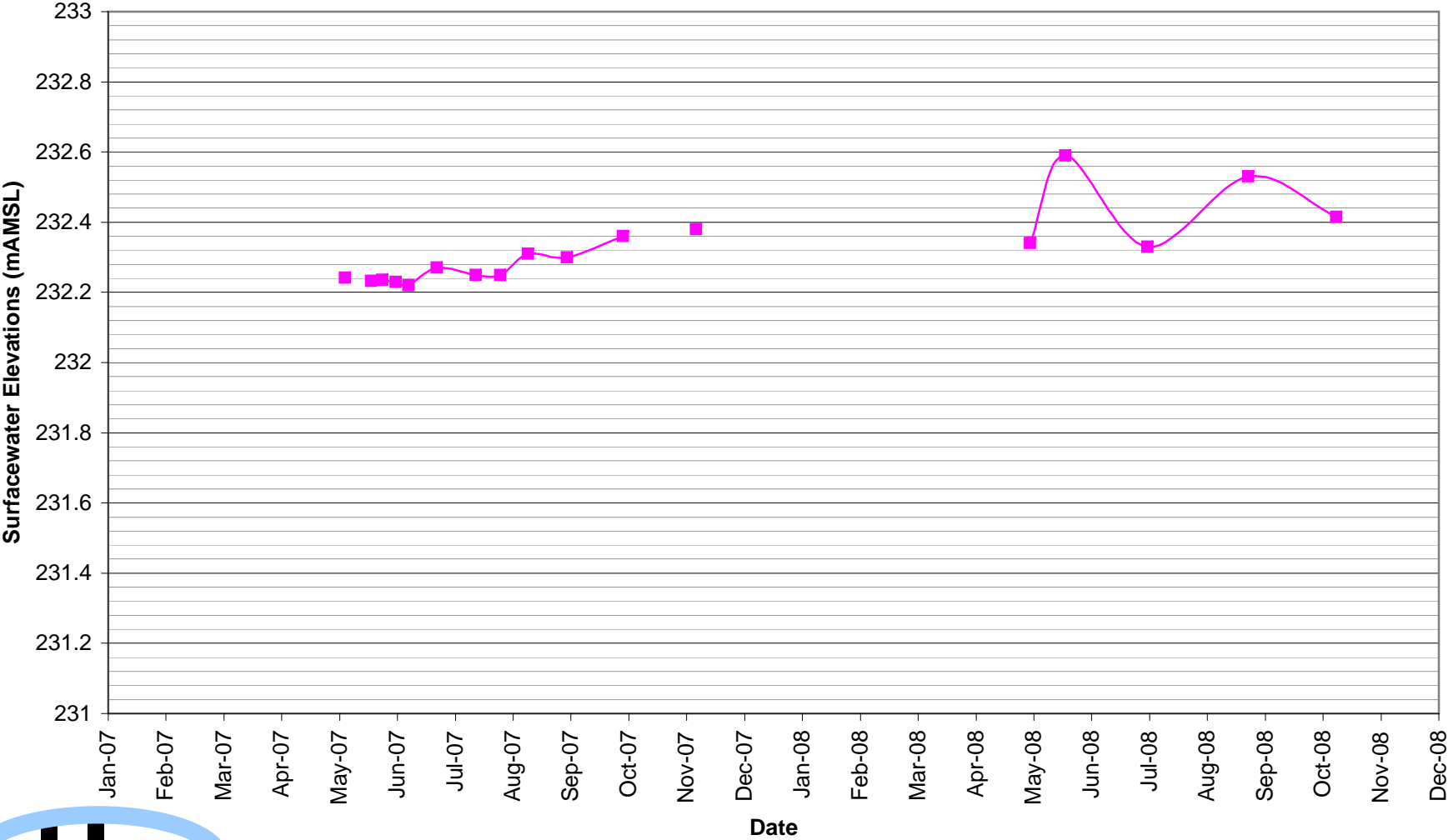


Stan Denhoed, P.Eng., M.Sc.  
Senior Hydrogeologist



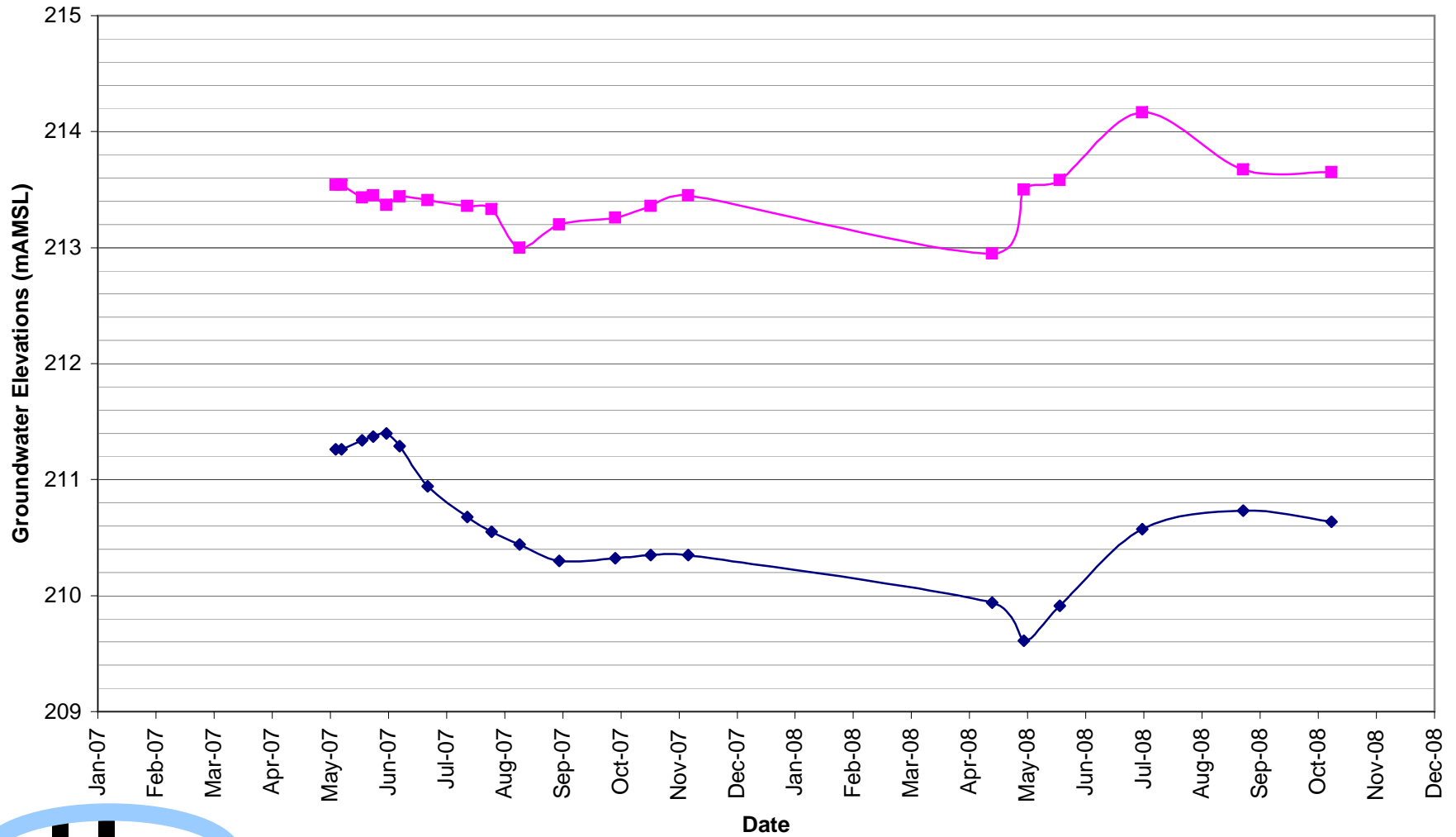
Project No: 0903	FIGURE 1	Monitor Location Map
Date: May 2009	Drawn By: AW	

Figure 2: Penn Lake Surface Water Monitoring Data



■ Penn Lake

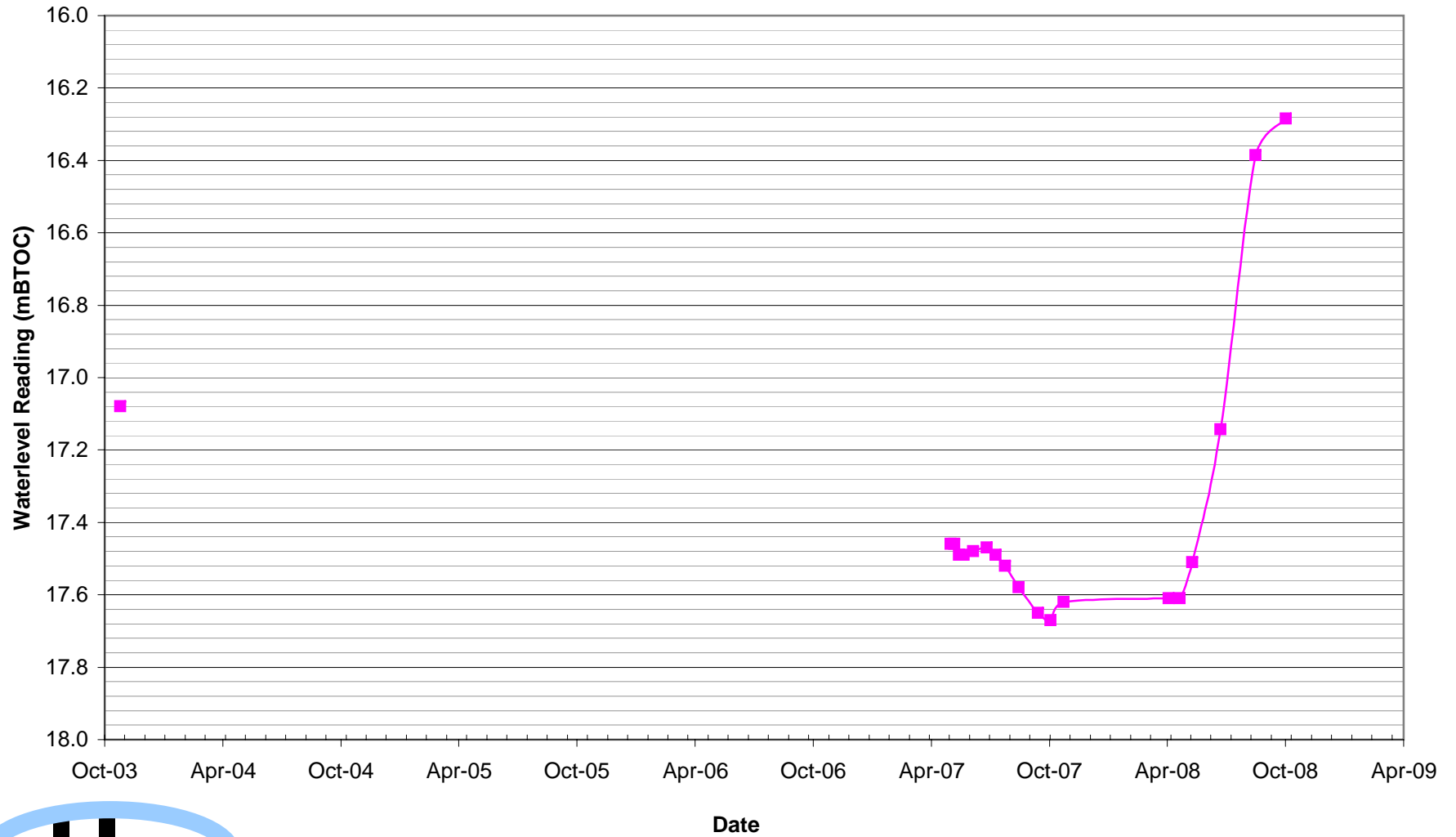
Figure 3: MW6-05 and MW7-05 Groundwater Monitoring Data



◆ MW6-05    ■ MW7-05

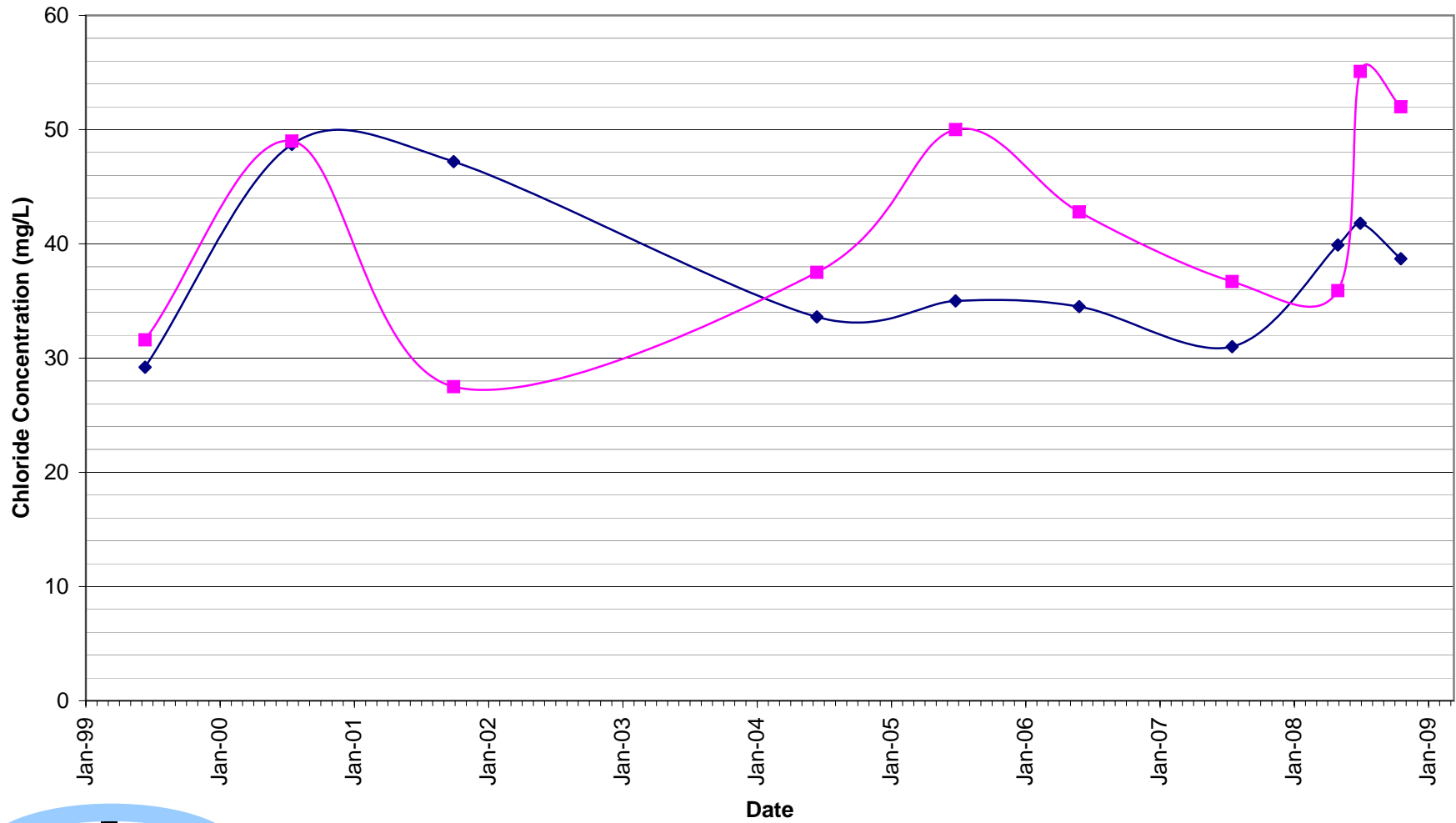


Figure 5: United Church Well Groundwater Monitoring Data

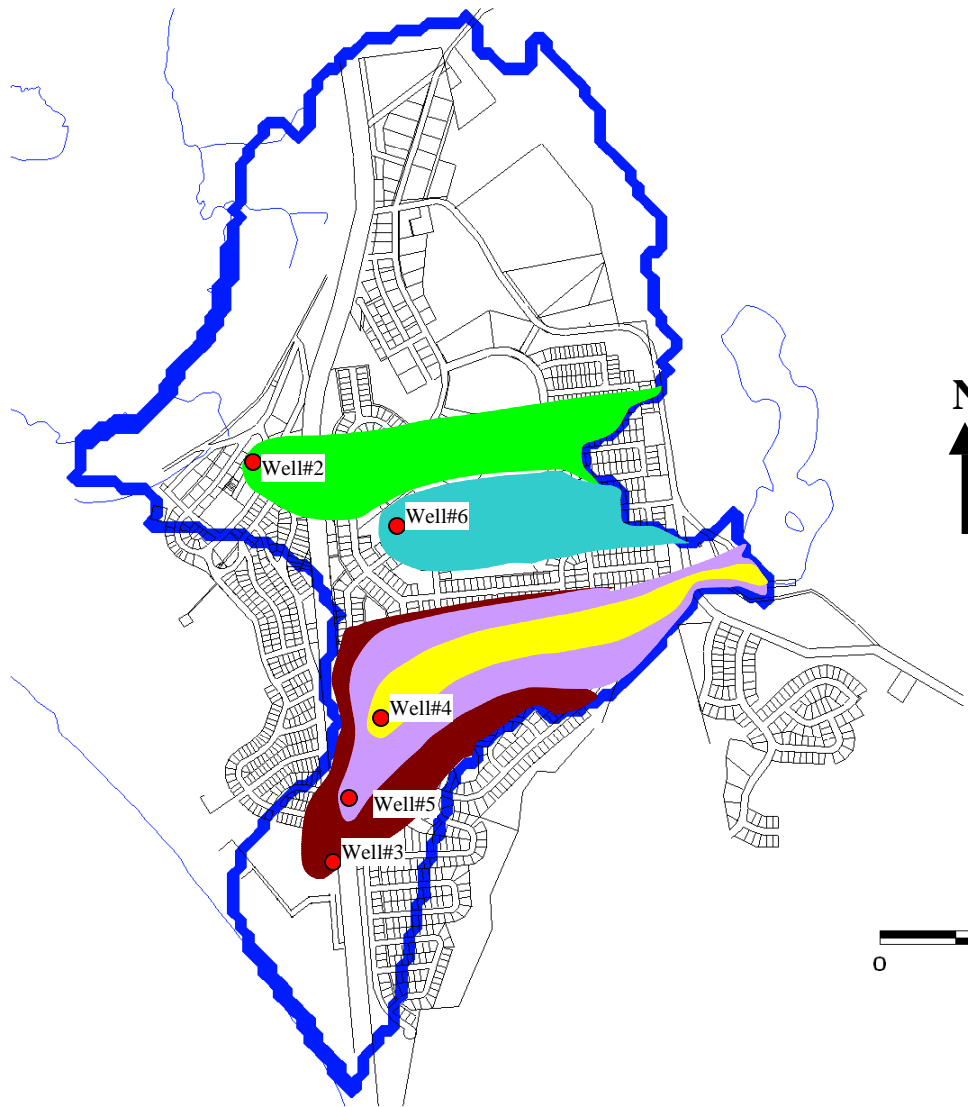


United Church Well

Figure 6: Marathon Town Well Chloride Concentrations



◆ Marathon Well No. 2    ■ Marathon Well No. 6



● Pumping Wells



Project No: 0903

FIGURE 7

Date: May 2009

Drawn By: AW

### Groundwater Capture Zones

# **APPENDIX A**

# CLARIFICATION ON REGISTRATION PROCEDURES FOR UNDERGROUND FUEL OIL STORAGE TANKS

By Raphael Sumabat, Engineer Specialist, Fuels Safety Program

As of May 1, 2002, underground fuel oil storage tanks are required to be registered with TSSA under Ontario Regulation 213/01 (Fuel Oil Regulation).

7. (4) *No person shall supply fuel oil to an underground tank unless the underground tank is registered.*

As a condition of registration, new installations, replacement or modification of existing installations require TSSA engineering design review, inspection of installations prior to backfilling, and inspection after completion.

The submittal of the application to register an underground fuel oil tank shall include drawings of the installation, from the main tank to the appliance and/or day tank, and a list of components (manufacturer, model and specifications) to be installed. While there is no cost for the registration, engineering and inspection fees will be billed accordingly.

To verify compliance, TSSA requires the following information be provided as part of its review:

- name and TSSA registration number of

- contractor responsible for the installation;
- name and TSSA certificate number of petroleum mechanic responsible for the installation (please note that an oil burner technician is required to connect the piping to the appliance and to install the appliance);
- copies of drawings describing the tank and piping installation, and the transition from the underground piping to the indoor piping;
- copies of tank deflection measurements for fibreglass tanks;
- confirmation that a cathodic protection system is installed and operational for any metal components; and
- confirmation that all sumps have been leak tested.

TSSA will also require the following to be completed as part of the inspection process:

- pressure tests of the double wall piping and the interstitial space (as per manufacturer's instructions and the code);
- testing of the entire leak detection system; and
- installation/operation of the overfill protection valve/system.

Please note that an existing underground fuel oil storage tank will not be registered if it does not comply with the following removal or upgrade timeframe/deadline under the Ontario Fuel Oil Code:

Age of Underground Tank System	
(Years from date of original installation as of Oct 1, 2001)	Deadline for Removal or Upgrade
25 or more (or if unknown)	October 1, 2006
20 to 24	October 1, 2007
10 to 19	October 1, 2008
0 to 9	October 1, 2009

Upgrading, when applicable, includes installation of cathodic protection, leak detection, overfill protection and spill containment. The underground tank may additionally be subject to a precision leak test prior to upgrading.

## FUEL SUPPLIER OBLIGATIONS AND AUDITS

The fall edition of TSSA's *Fuels Update* had an article which outlined the fuel supplier audits that TSSA conducts each year to ensure compliance of fuel suppliers who supply fuel to premises with heating equipment. There are regulatory requirements to conduct comprehensive inspections on all heating equipment prior to supplying fuel, initially and every 10 years thereafter. Those regulatory requirements apply to all fuel-types (fuel oil, propane, natural gas, etc.). This article will

discuss audits on fuel suppliers who supply fuel to equipment other than heating equipment.

The regulations require that fuel suppliers cannot supply fuel to propane and petroleum tanks unless they are compliant. The regulations also require that if the site, where the tank is situated, is required by regulation to be licensed, the supplier cannot supply fuel to the site unless it is licensed. Further for propane sites, the supplier cannot supply propane

unless the site operator can provide the annual inspection report indicating the site meets compliance.

As a reminder, if you are supplying fuel to a tank, be sure to understand your obligations under the regulations prior to dispensing.