

# **HYDROGEOLOGY and TEST DRILLING REPORT**

## **Mansfield Ski Club**

Mulmur Township, Ontario

**Prepared For:**

## **Mansfield Ski Club**

**File no.: 510-161**

**June 2016**

*Morrison Environmental Limited  
1087 Meyerside Drive, Unit 1  
Mississauga, Ontario  
L5T 1M5*

*Phone: (905) 564-8944*

*Fax: (905) 564-8952*

*E-mail: [info@morrison-environmental.com](mailto:info@morrison-environmental.com)*



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## **1.0    INTRODUCTION**

Morrison Environmental Limited (MEL) were requested by Finley McEwen on behalf of Mansfield Ski Club (MSC) to conduct a Hydrogeologic Investigation in the vicinity of the Ski Club.

The attached **FIGURE 1** is a topographic location map of the study area. The attached **FIGURE 2** is an airphoto map of the area. **FIGURE 3** is a slightly more zoomed in Airphoto that also shows the area and the location of the two test wells and an observation well.

The purpose of the investigation was to determine the Geology of the overburden and bedrock in the vicinity of the club and the Hydrogeology of the overburden and the bedrock. A test drilling program was conducted to determine aquifer coefficients. All of this was to assess the potential for expanding the existing water supply for the club and also to assess the potential to supply additional water for the expansion to the club, while not interfering with other groundwater users.

In the report we will discuss the local and regional geology and hydrogeology. We will then discuss local domestic water supplies. We will then discuss the details of a two well drilling and testing program we conducted at the site, the well and aquifer testing program and the well and aquifer yield. We will then discuss an iterative groundwater modelling program and our water quality testing program before drawing conclusions and making recommendations.

## **2.0    GEOLOGY**

### **2.1    Regional Geology**

The Mansfield Ski Club is located on the east facing slope of the Niagara Escarpment. The crest of the escarpment is characterized by a limestone/dolostone cap (Anabel Formation) on the escarpment underlain by siltstones and shales predominantly of Silurian aged rocks ( $\pm 350$  million years). These shales extend out easterly under the overburden plain. The bedrock beds dip gently to the southwest at about 20 feet per mile. Below the limestone/dolostone cap the

shale has weathered and there is a talus slope. Subsequent to the Paleozoic bedrock the area has been glaciated by glacial ice advances in the past 60,000 years. The glacial ice advancement out from the centroid of the ice lobe (in the Lake Simcoe area) was in a southerly and southwesterly direction. Glacial till was laid down at the base of glacial ice and smeared on the bedrock through the freeze/melt cycle at the base of the advancing glacier. This glacial till appears to overlie the bedrock throughout the area.

Below the escarpment a thick sand layer outcrops at surface. This appears to be an outwash or lacustrine sand that was deposited in front of the glacier during the waning stages of the last glaciation. On top of the escarpment and to the south along Airport Road ice contact stratified drift has been mapped (kame and outwash). The attached **FIGURE 4** shows the interpreted geology in the vicinity of MSC.

Near the Pine River (which is a tributary of the Nottawasaga River) the more recent alluvium has been mapped and is also shown on **FIGURE 4**.

## **2.2    Local Geology**

On the MSC site, bedrock outcrops or subcrops close to surface near the top of the escarpment. Although a talus slope exists on the escarpment it appears to have been veneered by glacial till. Farther down the escarpment the outwash lacustrine sands outcrop above the glacial till and extensively cover the map area of **FIGURE 4**. The alluvium of the Pine River floodplain is mapped across the area.

## **3.0    HYDROGEOLOGY**

Hydrogeology deals with the movement of groundwater through the overburden and bedrock sediments of the area.

### **3.1     Regional Hydrogeology**

On top of the escarpment the water in the overburden and bedrock flows to the west, away from the escarpment. Below the escarpment, groundwater also flows away from the escarpment but in an easterly direction. Below the escarpment the groundwater flows towards and discharges into the Pine River.

The groundwater in the outwash/lacustrine sands and the alluvium all flows naturally to the Pine River. This surface sand aquifer is a water table aquifer; that is recharged by rainfall, snow melt and runoff, all of which, moves through the pore spaces in the sand. Recharge to the sand aquifer far exceeds any existing or envisioned water takings.

The bedrock is another aquifer used in the area. The groundwater moves under the MSC site in the bedrock in an easterly direction. Groundwater in the bedrock moves westerly from near the crest of the escarpment.

Generally water in the shallow overburden is good quality water with low hardness, low chlorides and low sulphates. Groundwater in the bedrock generally has higher hardness, chlorides and sulphates and often contains hydrogen sulfide gas.

### **3.2     Local Hydrogeology**

Water supplies captured by deep drilled bedrock wells such as the main club well is low yielding and is highly mineralized. The well is located just east of the main parking lot. The wells' yield is about 6 igpm (27.3L/min).

The MSC also have a shallow bored well, which is located on Chalet Run between the main facilities and the base of the escarpment. This well has better quality water but has a low yield 1-2 igpm (4.5-9 L/min).

#### **4.0 LOCAL GROUNDWATER SUPPLIES**

All of the local residents in Mulmur Township rely on groundwater for their domestic supplies. The attached **FIGURE A-1 in APPENDIX A** shows the water well records on file with the Ministry of the Environment and Climate Change (MOECC) within the shaded target area (1000 m radius) shown on the Airphoto. Each well symbol with an associated 7 digit identification code represents a well. The attached **TABLE A-1 in APPENDIX A** shows the Well Identification number, the date the well was completed, the depth of the well, the depth to bedrock (if the well ends in bedrock) and the static water level (level below ground surface) that the water surface sits at.

The attached **FIGURE A-2** is an airphoto base showing a selection of wells from the original database. On this plan wells drilled and bored into the overburden are distinguished from wells drilled into the bedrock. The attached **TABLE A-2** shows the well identification, where the well was completed, the depth, the top of screen (overburden well) or the top of the bedrock. The static water level recorded by the water well contractor is also shown.

The attached **APPENDIX A-1** provides the drilling contractors actual water well records for these selected wells.

In general, wells drilled into the bedrock have relatively low yields and the groundwater is mineralized. In general, the overburden wells are not so highly mineralized and the yields are larger. Drilled wells are generally more productive than bored wells.

#### **5.0 TEST DRILLING PROGRAM**

Following the evaluation of Geology and Hydrogeology in the area we conducted an onsite Test Drilling Program. The evaluation of regional conditions guided us away from bedrock wells in vicinity of the MSC facilities and away from the crest of the escarpment. The shallow outwash aquifer, off the escarpment looked the most promising. We selected the two test wells locations

on the northeast side of the site. The first location was on the east side of the road/parking area in the racing school area.

We retained the services of a Water Well Contractor with the prerequisite experience and equipment to drill and sample for potential higher capacity wells.

The area tested was interpreted to be in an outwash sand aquifer.

### **5.1     Drilling, Design and Construction of PW1**

On May 11, 2016 a 6 inch (150 mm) diameter test well was drilled at the location of PW1 shown on **FIGURE 3**. The well was drilled by the mud rotary method of using clean water. The attached **FIGURE B-1 in APPENDIX B** is a sketch showing the construction of PW1. The sketch shows the Driller's Log of the formations encountered and the construction details of the well.

The attached **FIGURE B-2 in APPENDIX B** is the contractor's Water Well Record for the well PW1. Representative samples of the material encountered were collected, bagged and analyzed for grain size distribution. This arithmetic grain size distribution graph is used specifically for the design of well screens. The specific grain size distribution curves are presented on **FIGURES B-3, TO B-8 in APPENDIX B**.

Based on those analyses a well screen was designed for the well. Eleven feet of 8 slot, 6 inch diameter telescoping stainless steel wire wound well screen was designed and installed in PW1 from 26 to 37 feet (7.9 – 11.3 m). The well was equipped with a 3ft (0.91 m) long sump, below the screen and a 3 ft (0.91 m) long header pipe with a figure K packer above the screen. The static level was 5.45 ft (1.6 m) below ground surface (bgs).

The bottom of the formation was 37 ft (11.3 m) while the bottom of the test hole was 43 ft (13.1 m).

The well was developed by air lift pumping and over pumping until clear, colourless, sand free water was produced.

## **5.2     Drilling, Design and Construction of PW2**

On May 16, 2016 a 6 inch (150 mm) diameter test well was drilled at the location of PW2 as shown on **FIGURE 3**. This well was located 175 ft (53.4 m) south of PW1. Again the well was drilled by the mud rotary method using clean water. The attached **FIGURE C-1 in APPENDIX C** is a sketch showing the construction of the well. The sketch shows the Driller's Log of the formation encountered and the construction details of the well.

The attached **FIGURE C-2 in APPENDIX C** is the contractor's Water Well Record of well PW2. Again representative samples of the material encountered were collected, bagged and analyzed for grain size distribution. The specific grain size distribution curves are presented in **FIGURES C3 to C7 in APPENDIX C**.

Based on these analyses a well screen was designed for the well. Here ten feet of 8 slot, 6 inch diameter telescoping stainless steel wire would well screen was designed and installed in PW2 from 26 to 36 ft (7.9 – 11 m). The well was also equipped with a 3 ft (0.91 m) long sump below the screen and a 3 ft (0.91 m) long header pipe with a figure K packer above the screen. The static water level was 5.26 ft (1.61 m) below ground surface. The bottom of the formation was at 37 feet (11.3 m) while the bottom of the test hole was at 43 ft (13.1 m).

The well was developed by air lift pumping and over pumping until clear, colourless, sand free water was produced.

## **6.0 WELL AND AQUIFER TESTING**

A pumping test run on a well at a constant rate allows us to test the aquifer and determine the important aquifer coefficients of Transmissivity and Storativity. Knowing these parameters allows us to model the aquifer using various pumping rates and scenarios.

A series of tests run on a well at varying controlled pumping rates allows us to evaluate the specific well by determining well losses, formation losses, and well efficiency.

### **6.1 Step Drawdown Testing of PW1**

On May 31, 2016 a three step, Mogg Type, Step Drawdown Test was conducted on PW1. Each step was 15 minutes in duration and at a controlled rate. The well was allowed to recover for about 15 minutes between each step. A semi-logarithmic plot of drawdown vs time for the step test is included in **APPENDIX D** as **FIGURE D-1**. The steps were run at 5.7, 8.8 and 12.3 igpm (25.9, 40.1 and 56.0 L/m).

The attached **FIGURE D-2 in APPENDIX D** shows the drawdown recorded at 15 minutes of each step recorded on an arithmetic plot of drawdown vs pumping rate. The efficiency of the well drops off with each increase in pumping rate.

### **6.2 Step Drawdown Testing of PW2**

On May 31, 2016 a 3 step Mogg type Step Drawdown Teste was conducted on PW2. Each step was 15 minutes in duration at a controlled rate. During the test the well was allowed to recover for around 15 minutes before starting the next sept. The test data was plotted on a semi-logarithmic plot of drawdown vs time. The graph is included as **FIGURE D-3 in APPENDIX D**. The Steps for this test were conducted at rates of 5.7, 8.2 and 12.1 igpm (25.9, 37.4 and 55.0 L/m).

The attached **FIGURE D-4 in APPENDIX D** shows the drawdown measured at 15 minutes of each step and is recorded on an arithmetic plot of drawdown vs pumping rate. The efficiency of PW2 drops off with each increase in the pumping rates. PW2 is considerably more efficient than PW1.

### **6.3     Aquifer Performance Testing on PW2**

On May 25, 2016 we started a 69 hour aquifer performance test on PW2. The pumping rate was 5.7 igpm (6.9 usgpm) or [32.9 L/min] or 47,300 L/day.

The pumping rate was chosen to be below the 50,000 L/day requirement for a Permit To Take Water (PTTW). The rate was controlled using a constant flow Dole valve.

The pumping well PW2 was equipped with a data logger that recorded water levels every minute. Well PW1 was located 175 ft (53.4 m) north of PW2 and was also equipped with a data logger and used as an observation well during the test. Also a private dug well on the neighbour's property to the east was also equipped with a data logger. That well was about 850 ft (260 m) to the east. This well is in service. It is located east of the Pine River.

The attached **FIGURE D-5 in APPENDIX D** is a semi-logarithmic plot of drawdown vs time for the pumped well PW2 data. The drawdown and recovery data is shown on the figure. The water levels rose slightly during day one of the test, stayed steady during day two and part of day three before declining to the end of the test. Subsequent analysis of barometric pressure indicated that there was a corresponding change in the barometric pressure that occurred during this period of the test. See **FIGURE D-9 in APPENDIX D**. The barometric pressure gradually decreased over the first 24 hours of the test and then decreased more rapidly, followed by a gradual increase in barometric pressure during the latter hours of the test. The barometric pressure declined during the recovery period. See also **FIGURE D-10 in APPENDIX D** for an arithmetic plot of barometric pressure.

From the recovery data we have interpreted a Transmissivity for the aquifer of 19,000 igpd/ft (280 m<sup>2</sup>/d). The clean sand aquifer therefore has a high Transmissivity.



The attached **FIGURE D-7 in APPENDIX D** is a semi-logarithmic plot of drawdown vs time of the Observation well (OW1). This is the domestic bored well for Alex Kolodziejski the neighbor located to the east of the pumping wells. The barometric changes are evident of this domestic well.

No interference was experienced during the pumping test at the Kolodziejski well. The changes in water level on the plot were do to domestic usage.

The attached **FIGURE D-8** is a semi-logarithmic plot of drawdown vs distance of the pumping test data. Interpreting this graph, the small drawdown observed of PW1 and the Transmissivity previously determined of 19,000 igpd/ft ( $280\text{m}^2/\text{d}$ ) clearly applies across the site. The Storativity was calculated to be  $1 \times 10^{-2}$  (unitless).

This graph also indicates the radius of influence at the end of the 69 hour aquifer test was about 350 ft (107 m).

It is clear from the test data that the expanding drawdown cone did not reach the Kolodziejski well. The cone of influence did not reach the Pine River either. If the MSC wells are put into service the expanding cone of influence will not extend beyond the Pine River as it is a Recharge boundary.

## **7.0 MODELLING OF GROUDNWATER AVIALABILITY**

Having successfully drilled and tested the two production wells, we have established that the Transmissivity of the aquifer is about 19,000 igpd/ft ( $280\text{ m}^2/\text{day}$ ) and the Storativity of the aquifer is interpreted to be about  $1 \times 10^{-2}$  (unitless). Applying these aquifer coefficients we used a spreadsheet model to estimate the combined yield of the two wells PW1 and PW2.

Through the iterative process there were several runs of the model to determine the maximum capacity of the two wells. The attached **FIGURE E-1 in APPENDIX E** indicates that total

pumping from the two wells of about 40 igpm (182 L/min) is available. The lower efficiency of PW1 may limit its maximum yield.

At this stage it is reasonable to assume that higher groundwater yields can be archived by drilling additional wells in this area along the north east limit of the property. Modeling to determine maximum yields has not yet been performed.

## **8.0 WATER QUALITY TESTING OF PW2**

During the 69 hour aquifer performance test on PW2 we collected water quality samples and submitted them to Agat Laboratories for basic Ionic Balance Analyses. The results of the analyses and the associated Quality Assurance Tests are included in **APPENDIX F**.

The water had a normal pH of 7.91, a hardness of 311mg/L which is slightly hard but normal for this area. The Total Dissolved Solids (TDS) was low 324 mg/L indicating low mineralization. Chlorides are low at 11 mg/L. Nitrates are low at <0.25 mg/L. Sulphates are also low at 40.2 mg/L.

The only parameter that exceeds the guidelines is Manganese at 0.057 mg/L where the guideline is 0.05 mg/L. This is an aesthetic parameter not a health parameter.

It is cautioned that these analyses were selected to “Finger Print” the water quality at his early stage. More complete analyses will be performed before any water is consumed.

## **9.0 SUMMARY AND CONCLUSIONS**

Based on the Geologic and Hydrogeologic conditions interpreted around the MSC site and the drilling and testing program performed on the site it is summarized and concluded that:

1. The shale bedrock and the talus sediments are poorly productive water bearing zones,
2. The outwash sands are the most highly productive water bearing zones at the site,
3. Groundwater in the limestone and shale bedrock flows westward from the top of the escarpment,
4. Groundwater in the shale bedrock beneath the ski slopes and the plain to the east flows to the east generally discharging into the granular sediments and the Pine River,
5. Recharge due to high infiltration assures the Water Balance far exceeds foreseeable withdrawals,
6. Local residents rely on wells ending in the bedrock and the overburden for their water supply,
7. Test drilling into the outwash lacustrine sand aquifer in the northeast sector of the site produced relatively high yields of good quality water,
8. The pumping of the test wells did not and will not create interference problems with the local area well supplies,
9. Significant recharge to the outwash aquifer occurs through the infiltration of precipitation and runoff from the slopes,
10. The existing two test wells can supply about 40 igpm (182 L/m) on a perennial basis established by the interpretation of the aquifer tests and a groundwater model,
11. The water quality indicates that the two test wells yield good quality water, with low chlorides and sulphates and slightly elevated hardness.

## **10.0 RECOMMENDATIONS**

Based on the above summary and conclusions we recommend that:

1. MSC consider using this new source of supply for their existing facilities
2. MSC consider this new tested supply and a possible extension of this supply for their proposed expansion.

Respectfully submitted,

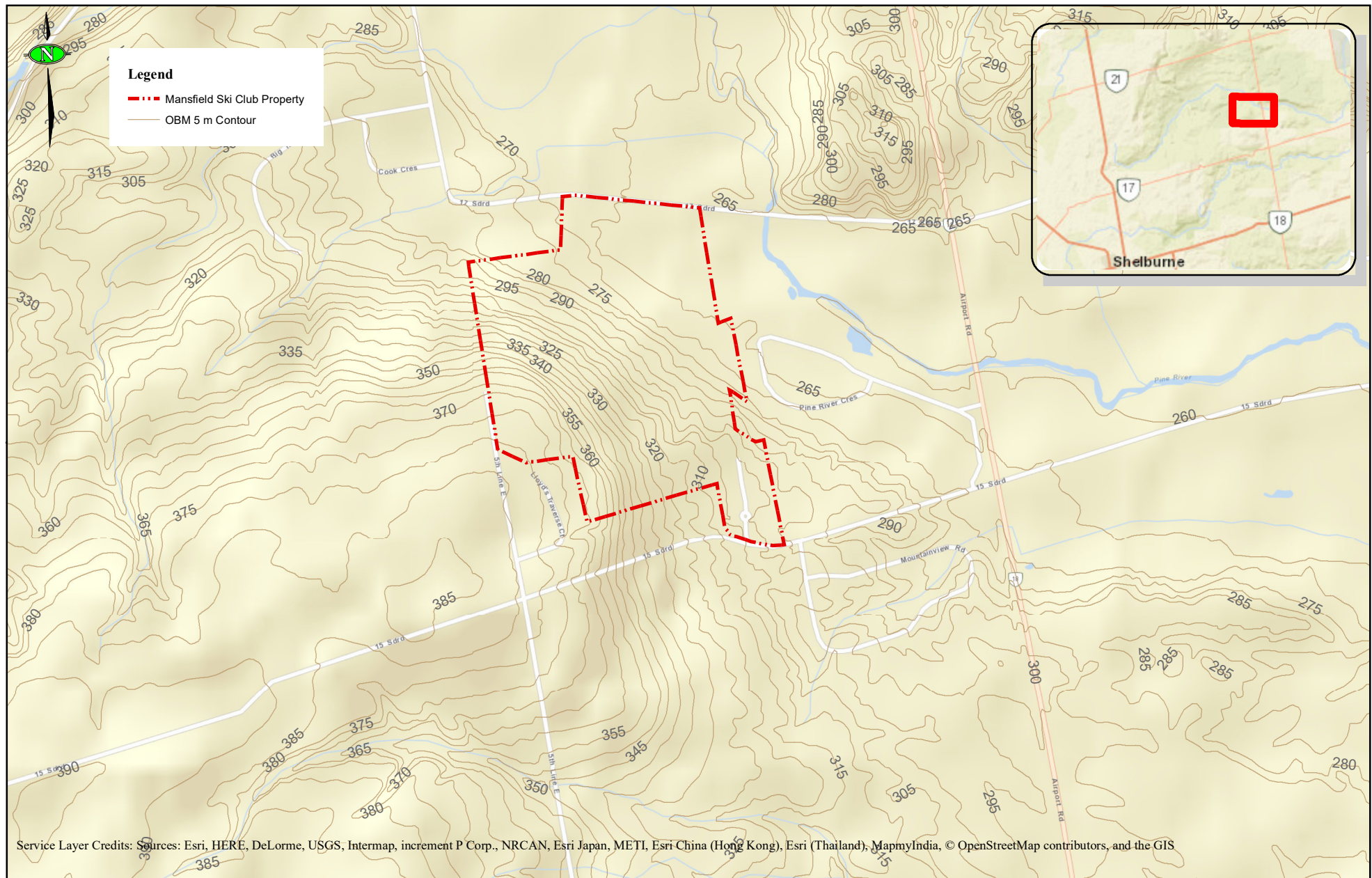
**MORRISON ENVIRONMENTAL LIMITED**



**William D. Morrison, P.Eng.  
President**

## **FIGURES**

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Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS

0 200 400 800  
Meters

FIGURE 1

**1:10,000 TOPOGRAPHICAL LOCATION MAP**  
**Hydrogeology and Test Drilling Report**  
**Mansfield Ski Club**  
**Mulmur Township, Ontario**

PROJECT: 510-161  
DATE: June 1, 2016



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FIGURE 2

**AERIAL SITE PHOTOGRAPH**  
**Hydrogeology and Test Drilling Report**  
**Mansfield Ski Club**  
*Mulmur Township, Ontario*

PROJECT: 510-161

DATE: June 1, 2016



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FIGURE 3

**AERIAL SITE PHOTOGRAPH**  
**Hydrogeology and Test Drilling Report**  
**Mansfield Ski Club**  
*Mulmur Township, Ontario*

**PROJECT: 510-161**

**DATE: June 1, 2016**

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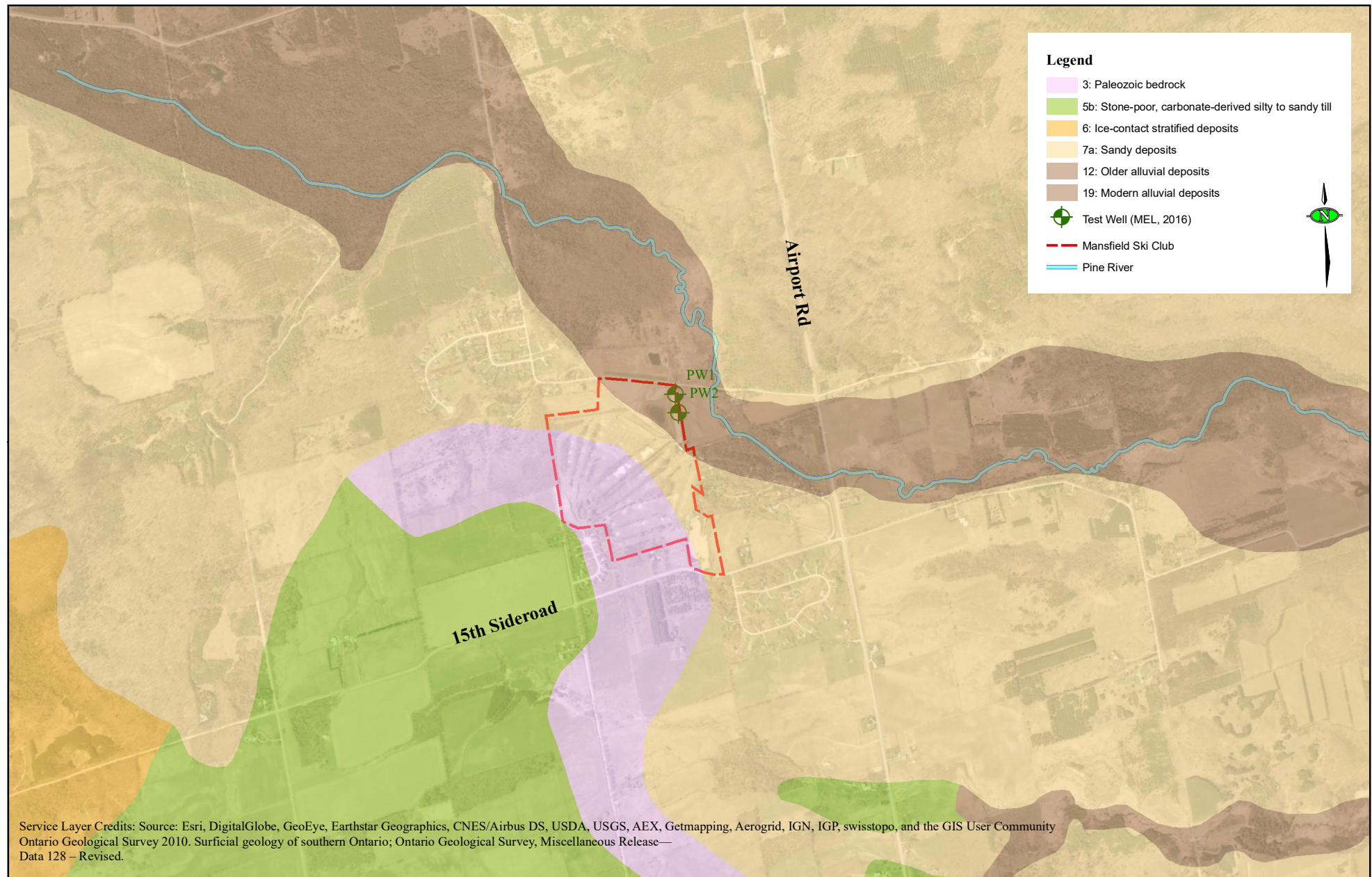


FIGURE 4

**QUATERNARY GEOLOGY MAP**  
**Hydrogeology and Test Drilling Report**  
**Mansfield Ski Club**  
*Mulmur Township, Ontario*

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## **APPENDIX A**

### **Well Location Map**

### **Table of Water Well Records**



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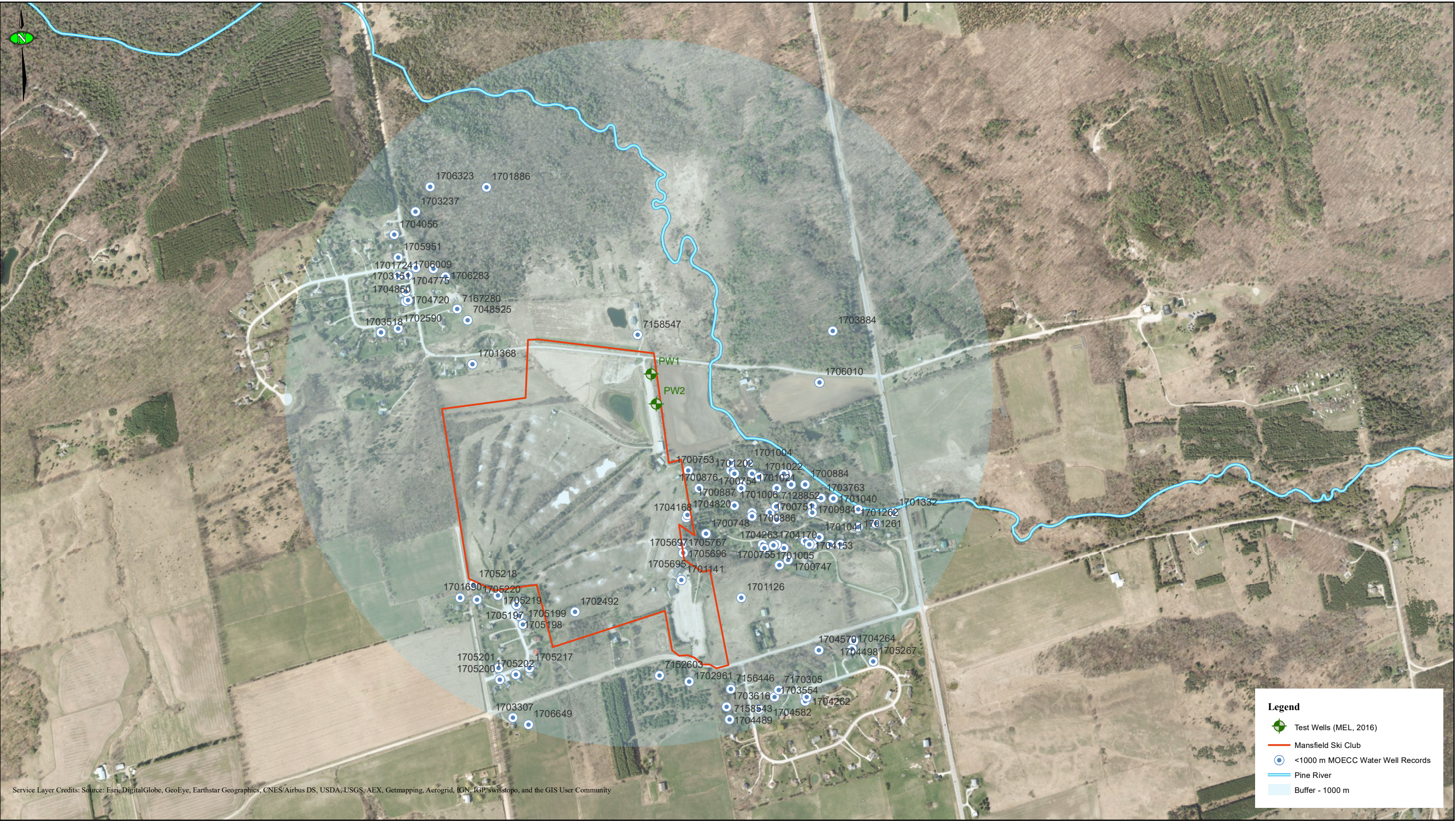
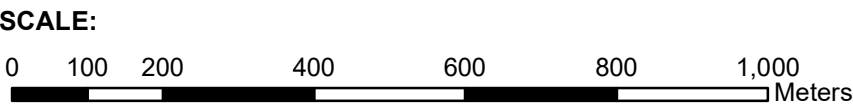


FIGURE A-1

**MOECC WATER WELL RECORD MAP**  
**Groundwater Exploration Program**  
**Mansfield Ski Club**  
*Mansfield, Ontario*



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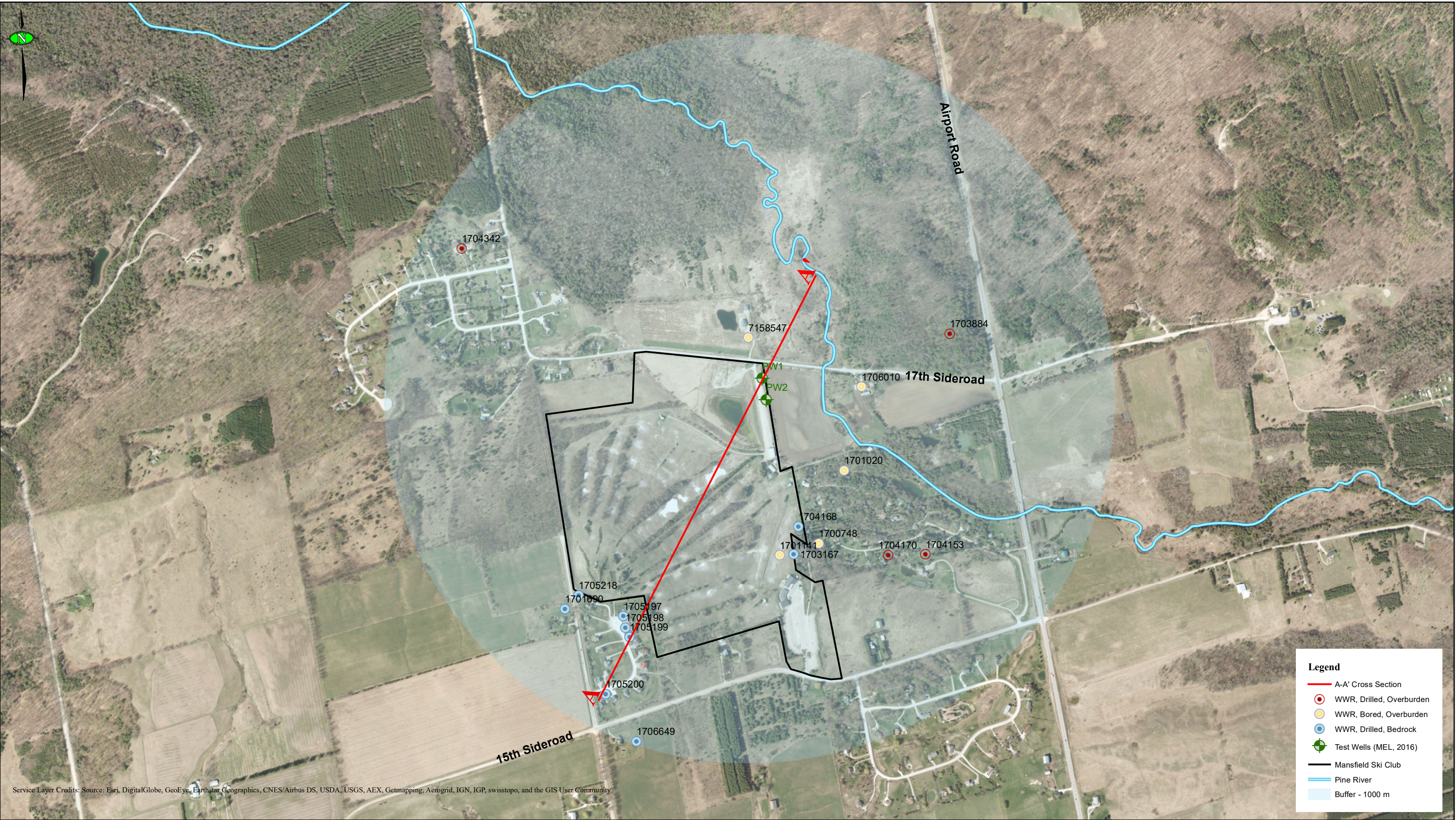
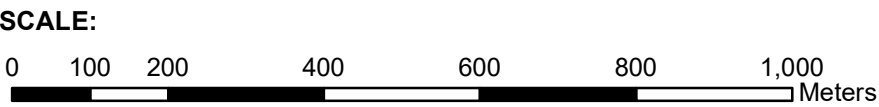


FIGURE A-2

**MOECC SELECTED WELL RECORD MAP**  
**Groundwater Exploration Program**  
**Mansfield Ski Club**  
*Mansfield, Ontario*



PROJECT: 510-161

DATE: June 2, 2016





Table A-1: MOECC Water Well Records

Well ID	Date Completed	Depth (m)	Depth to Bedrock (m)	Static Water Level (m)
1705198	9/10/1998	19.80	4.90	12.20
1704775	9/19/1994	30.50	24.40	11.60
7170305		18.30	0.00	8.20
1700879	7/4/1968	4.60	0.00	2.40
1705199	9/10/1998	16.80	5.20	9.10
1701202	5/14/1971	3.70	0.00	1.20
1704720	11/10/1993	18.30	0.00	9.10
1700749	6/20/1966	9.40	0.00	3.70
1705219	10/18/1998	21.30	4.30	13.70
1706649	4/29/2006	84.00	24.10	41.00
1701142	9/30/1970	9.10	0.00	6.10
1704425	8/20/1991	17.40	0.00	6.10
1701261	10/30/1971	8.50	0.00	5.50
1700751	9/2/1967	12.50	0.00	0.60
1704264	12/12/1990	16.80	0.00	9.10
1705767	12/17/2001	67.10	13.40	16.80
1701341	6/27/1972	8.50	0.00	6.10
1701040	12/12/1969	6.70	0.00	3.70
1701041	12/10/1969	7.60	0.00	5.50
1703518	9/14/1987	15.80	0.00	6.10
1706283	9/15/2004	45.70	93.00	0.00
1700752	9/14/1967	4.60	0.00	2.40
1701020	9/8/1969	7.90	0.00	3.70
1703554	11/30/1987	19.20	0.00	9.10
1703616	6/6/1988	6.10	3.70	2.70
1705695	7/26/2001	33.50	3.40	12.20
1706323	1/25/2005	18.30	0.00	16.80
1704498	2/10/1992	15.50	0.00	6.10
1700755	11/8/1967	7.60	0.00	7.30
1704262		33.20	21.30	9.40
1705200	9/10/1998	29.00	3.00	15.20
1705220	10/15/1998	26.50	5.20	11.60
1704820	10/20/1994	11.00	0.00	3.00
7156446	11/8/2010	9.90	0.00	2.60
1705692	6/21/2001	8.50	4.60	0.90
7152603		41.80	0.00	11.60
1703894	5/4/1989	24.70	17.70	9.10
7048525	7/13/2007	11.00	0.00	4.30
1701141	9/28/1970	6.40	0.00	2.70
1703237	11/24/1985	18.30	0.00	12.80
1705951	1/9/2003	46.90	0.00	0.00
1706009	1/20/2003	10.10	0.00	4.60

Table A-1: MOECC Water Well Records

Well ID	Date Completed	Depth (m)	Depth to Bedrock (m)	Static Water Level (m)
1701093	5/29/1970	5.50	0.00	2.10
1700876	9/25/1968	4.00	2.40	1.80
1700984	5/21/1969	6.70	0.00	3.40
1703159	8/8/1985	13.10	0.00	4.60
1701724	8/9/1974	26.20	0.00	11.60
1701094	5/23/1970	7.60	0.00	4.60
1705218	10/20/1998	27.40	4.90	12.20
1705693	6/27/2001	6.70	4.00	0.90
1705694	7/6/2001	30.50	4.60	0.00
1701690	6/3/1974	35.70	0.30	8.50
7158547	12/10/2010	10.40	0.00	0.00
1701092	6/3/1970	12.80	0.00	9.10
1700878	7/3/1968	7.90	0.00	3.70
1704342	4/30/1991	29.60	0.00	12.20
1701006	9/4/1969	11.60	11.00	8.50
1703763	2/17/1989	13.40	0.00	4.60
1705691	6/25/2001	11.00	10.40	0.90
1706010	1/19/2003	7.60	0.00	3.00
7158543	12/17/2010	15.20	0.00	0.00
1700747	12/15/1964	9.10	8.20	4.60
1700748	6/18/1966	7.90	0.00	3.00
1706005	12/16/2002	53.60	33.20	32.60
1705202	9/10/1998	23.20	3.40	14.60
7128852	11/1/2007	17.10	0.00	5.20
1701022	9/12/1969	6.10	0.00	2.40
1705899	8/8/2002	18.90	18.30	6.10
1703167	10/15/1985	19.80	12.20	4.60
1701332	6/12/1972	5.50	0.00	3.00
1700754	9/25/1967	8.50	0.00	0.00
1702961	6/10/1983	11.90	0.00	4.60
1700881	6/29/1968	8.20	0.00	3.70
1700884	4/19/1969	6.10	0.00	1.20
1705267	10/15/1998	9.10	0.00	1.80
1704170	4/4/1990	25.60	4.60	0.00
1701262	11/1/1971	6.70	0.00	4.30
1701021	9/9/1969	5.50	0.00	2.40
1701691	5/16/1974	42.70	0.00	9.10
1701886	4/22/1975	78.60	60.00	48.80
1704570	2/1/1992	18.30	0.00	0.00
1703884	2/28/1989	21.00	0.00	6.10
1701005	9/6/1969	6.10	0.00	4.00
1703307	1/13/1987	42.70	1.80	9.80

Table A-1: MOECC Water Well Records

[illegible]

**Table A-2: Selected Water Well Records - Detail**

<b>Well ID</b>	<b>Completion</b>	<b>Depth (m)</b>	<b>Top of Screen/Open Hole (m)</b>	<b>Static Water Level (m)</b>
PW1	Overburden, Drilled	13.1	7.9	2.18
PW2	Overburden, Drilled	13.1	7.9	1.55
1703884	Overburden, Drilled	21.03	18.9	6.09
1704342	Overburden, Drilled	29.57	27.43	12.19
1704170	Unfinished, Drilled	25.61		
1704153	Overburden, Drilled	24.4	22.56	9.15
7158547	Overburden, Bored	10.36	N/A	4.57
1706010	Overburden, Bored	7.62	N/A	3.05
1701020	Overburden, Bored	7.92	N/A	3.66
1700748	Overburden, Bored	7.92	N/A	3.05
1701141	Overburden, Bored	6.4	N/A	2.95
1704168	Bedrock, Drilled	12.19	8.53	4.57
1703167	Bedrock, Drilled	19.81	12.19	4.57
1705218	Bedrock, Drilled	27.44	6.09	12.19
1701690	Bedrock, Drilled	35.67	5.18	8.54
1705197	Bedrock, Drilled	22.56	6.1	10.67
1705198	Bedrock, Drilled	19.81	6.1	12.19
1705199	Bedrock, Drilled	16.77	6.1	9.15
1705200	Bedrock, Drilled	28.96	6.1	15.24
1706649	Bedrock, Drilled	25.61	7.93	12.5



## **APPENDIX A-1**

### **Selected Water Well Records**



Ministry of the Environment  
and Climate Change

Well Tag No. (Place Sticker and/or Print Below)

Tag#: A185277

## Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☐ Metric ☒ Imperial

Page 1 of 1

### Well Owner's Information

First Name: Last Name / Organization: Mansfield Ski Club E-mail Address: ☐ Well Constructed by Well Owner  
Mailing Address (Street Number/Name): 628213 15 SR Municipality: Province: Postal Code: Telephone No. (inc. area code):

### Well Location

Address of Well Location (Street Number/Name): 648200 15 SR Township: Mulmur Lot: 16 Concession: 6 EHS  
County/District/Municipality: Dufferin City/Town/Village: Province: Ontario Postal Code: Other: PW1  
UTM Coordinates: Zone: 8 Easting: 17575576 Northing: 4894800 Municipal Plan and Sublot Number:

### Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft)
				From To
Brown	Topsoil			0 1
Brown	Sand			1 3
Brown	Sand	gravel / Stones		3 9
Grey	medium fine Sand			9 37
Grey	Clay			37 43

Annular Space			Results of Well Yield Testing			
Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)	After test of well yield, water was:	Draw Down	Recovery	
From To			<input checked="" type="checkbox"/> Clear and sand free <input type="checkbox"/> Other, specify	Time (min) Water Level (m/ft)	Time (min) Water Level (m/ft)	
0 20	Benfonite Grout		If pumping discontinued, give reason:	Static Level 7.15		
20 39	Natural Sand Pack			1 11.4	1 8.65	
			Pump intake set at (m/ft)	2 12.15	2 7.93	
			Pumping rate (l/min / GPM)	3 12.4	3 7.67	
			Duration of pumping	4 12.5	4 7.56	
			1 hrs + 0 min	5 12.6	5 7.45	
			Final water level end of pumping (m/ft)	10 12.75	10 7.3	
			12.87	15 12.81	15	
			If flowing give rate (l/min / GPM)	20 12.84	20	
			Recommended pump depth (m/ft)	25 12.84	25	
			Recommended pump rate (l/min / GPM)	30 12.84	30	
			Well production (l/min / GPM)	40 12.86	40	
			Disinfected?	50 12.86	50	
			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	60 12.87	60	

Method of Construction		Well Use	
<input type="checkbox"/> Cable Tool <input checked="" type="checkbox"/> Rotary (Conventional) <input type="checkbox"/> Rotary (Reverse) <input type="checkbox"/> Boring <input type="checkbox"/> Air percussion <input type="checkbox"/> Other, specify	<input type="checkbox"/> Diamond <input type="checkbox"/> Jetting <input type="checkbox"/> Driving <input type="checkbox"/> Digging	<input type="checkbox"/> Public <input type="checkbox"/> Domestic <input type="checkbox"/> Livestock <input type="checkbox"/> Irrigation <input type="checkbox"/> Industrial <input type="checkbox"/> Other, specify	<input type="checkbox"/> Commercial <input type="checkbox"/> Municipal <input checked="" type="checkbox"/> Test Hole <input type="checkbox"/> Cooling & Air Conditioning <input type="checkbox"/> Dewatering <input type="checkbox"/> Monitoring

Construction Record - Casing			Status of Well	
Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)	
			From To	
6	Steel	.188	-2 26	
5	Steel	.188	31 39	

Construction Record - Screen			Status of Well	
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)	
			From To	
6	Steel	8	26 36	

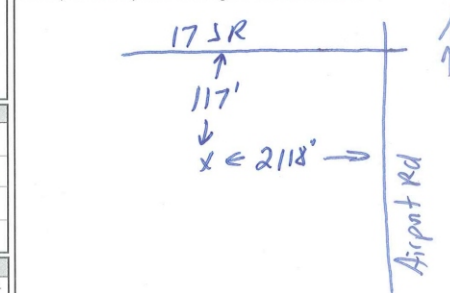
Water Details			Hole Diameter	
Water found at Depth (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested		Depth (m/ft)	Diameter (cm/in)
	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify		From To	
			0 39	8 1/2

Well Contractor and Well Technician Information		
Business Name of Well Contractor: <b>FRED CONSTABLE SON LTD</b>	Well Contractor's Licence No.: <b>1663</b>	
Business Address (Street Number/Name): <b>3519 5TH LINE</b>	Municipality:	
Province: <b>BRADFORD ON</b>	Business E-mail Address:	
Bus. Telephone No. (inc. area code):	Name of Well Technician (Last Name, First Name): <b>Thompson Steve</b>	
Well Technician's Licence No.: <b>2120</b>	Signature of Technician and/or Contractor: <i>[Signature]</i>	Date Submitted: <b>20160601</b>

0506E (2014/11) Ministry's Copy

### Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well owner's information package delivered: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Date Package Delivered: <b>20160530</b>	Ministry Use Only
	Date Work Completed:	Audit No.: <b>2212015</b>
		Received:

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FIGURE B-2

**WATER WELL RECORD PW1**  
**Hydrogeology and Test Drilling Report**  
**Mansfield Ski Club**  
Mulmur Township, Ontario



**Morrison Environmental Limited**  
Groundwater Consultants



Ministry of the Environment  
and Climate Change

Well Tag No. (Place Sticker and/or Print Below)

Tag#: A185276

## Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

Measurements recorded in: ☐ Metric ☒ Imperial

### Well Owner's Information

First Name: Mailing Address (Street Number/Name): 628213 15 SR Municipality: Mansfield Province: Postal Code: Telephone No. (inc. area code):  
Last Name / Organization: Mansfield Ski Club E-mail Address: ☐ Well Constructed by Well Owner

### Well Location

Address of Well Location (Street Number/Name): 648200 17 SR Township: Mulmur Lot: 16 Concession: 6 EHS  
County/District/Municipality: Dufferin City/Town/Village: Province: Ontario Postal Code:  
UTM Coordinates Zone: Easting: Northing: Municipal Plan and Sublot Number: Other: PW2  
NAD 83 17 57 5.88 9 48 9 47 18

### Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft)
Brown	Gravel	Shales		0 14
Grey	clay	Silt Sand		14 19
Grey	Fine Sand			19 23
Grey	Med Fine Sand			23 28
Grey	Fine Sand			28 37
Grey	Clay			37 39

Annular Space			Results of Well Yield Testing		
Depth Set at (m/ft)	From	To	Type of Sealant Used (Material and Type)	Volume Placed (m <sup>3</sup> /ft <sup>3</sup> )	After test of well yield, water was: <input checked="" type="checkbox"/> Clear and sand free <input type="checkbox"/> Other, specify
0	20		Bentonite		Draw Down
20	39		Sand Pack (Natural)		Time (min)

Method of Construction			Well Use		
<input checked="" type="checkbox"/> Cable Tool	<input type="checkbox"/> Diamond	<input type="checkbox"/> Public	<input type="checkbox"/> Commercial	<input type="checkbox"/> Not used	
<input checked="" type="checkbox"/> Rotary (Conventional)	<input type="checkbox"/> Jetting	<input type="checkbox"/> Domestic	<input type="checkbox"/> Municipal	<input type="checkbox"/> Dewatering	
<input type="checkbox"/> Rotary (Reverse)	<input type="checkbox"/> Driving	<input type="checkbox"/> Livestock	<input type="checkbox"/> Test Hole	<input type="checkbox"/> Monitoring	
<input type="checkbox"/> Boring	<input type="checkbox"/> Digging	<input type="checkbox"/> Irrigation	<input type="checkbox"/> Cooling & Air Conditioning		
<input type="checkbox"/> Air percussion		<input type="checkbox"/> Industrial			
<input type="checkbox"/> Other, specify		<input type="checkbox"/> Other, specify			

Construction Record - Casing			Status of Well		
Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)	From	To
6	Steel	.188	-2	26	
5	Steel	.188	36	39	

Construction Record - Screen			Status of Well		
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)	From	To
6	Steel	8	26	36	

Water Details			Hole Diameter		
Water found at Depth (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	Depth (m/ft)	From	To	Diameter (cm/in)
	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	0	39	8 1/2	

Well Contractor and Well Technician Information

Business Name of Well Contractor: FRED CONSTABLE & SON LTD. Well Contractor's Licence No.: 16613

Business Address (Street Number/Name): 3519 5TH LINE BRADFORD ON. L3Z 2A4 Municipality: Province: Postal Code: Business E-mail Address:

Bus. Telephone No. (inc. area code): Name of Well Technician (Last Name, First Name): Thompson Steve

Well Technician's Licence No.: 2170 Signature of Technician and/or Contractor: Date Submitted: 20160606

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Map of Well Location

Please provide a map below following instructions on the back.

17 SR  
402'  
X ← 2083' →  
Airport Rd

Comments:

Well owner's information package delivered: ☐ Yes ☒ No Date Work Completed: 20160530

Date Package Delivered: YYY YMM DDD  
Date Work Completed: YYY YMM DDD

Ministry Use Only  
Audit No.: 2212016  
Received:

FIGURE C-2







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1704342

MUNICIPALITY  
17006

CON.

COUNTY OR DISTRICT

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE

CON. BLOCK, TRACT, SURVEY, ETC.

LOT

DATE COMPLETED

DAY 30 MO 4 YR 91

**LOG OF OVERBURDEN AND BEDROCK MATERIALS** (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
			Top soil	0	1
			Clay, sand. Brown.	1	25.
			Blue clay sand.	25.	60.
			Brown sand.	60.	70.
			Blue clay sand	70	90.
			Sand.	90	97.

31

32

**41 WATER RECORD**

WATER FOUND AT - FEET	KIND OF WATER
92	1 <input checked="" type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERALS 6 <input type="checkbox"/> GAS

**51 CASING & OPEN HOLE RECORD**

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET
6	1 <input checked="" type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE 5 <input type="checkbox"/> PLASTIC	188	0 93

**SCREEN**

SIZE (S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
12.	5 INCHES	4 FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN	
stainless steel.	90	

**61 PLUGGING & SEALING RECORD**

DEPTH SET AT - FEET	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
FROM TO	
10-13	14-17
18-21	22-25
26-29	30-33

**71 PUMPING TEST**

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 <input type="checkbox"/> PUMP 2 <input checked="" type="checkbox"/> BAILER	7 GPM	1 HOURS
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING
40 FEET	90 FEET	15 MINUTES 30 MINUTES 45 MINUTES 60 MINUTES
IF FLOWING GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
	92 FEET	1 <input type="checkbox"/> CLEAR 2 <input checked="" type="checkbox"/> CLOUDY
RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
<input type="checkbox"/> SHALLOW <input checked="" type="checkbox"/> DEEP	92	5 GPM

**FINAL STATUS OF WELL**

1 <input checked="" type="checkbox"/> WATER SUPPLY 2 <input type="checkbox"/> OBSERVATION WELL 3 <input type="checkbox"/> TEST HOLE 4 <input type="checkbox"/> RECHARGE WELL	5 <input type="checkbox"/> ABANDONED, INSUFFICIENT SUPPLY 6 <input type="checkbox"/> ABANDONED, POOR QUALITY 7 <input type="checkbox"/> UNFINISHED 8 <input type="checkbox"/> DEWATERING
---	---

**WATER USE**

1 <input checked="" type="checkbox"/> DOMESTIC 2 <input type="checkbox"/> STOCK 3 <input type="checkbox"/> IRRIGATION 4 <input type="checkbox"/> INDUSTRIAL 5 <input type="checkbox"/> OTHER	5 <input type="checkbox"/> COMMERCIAL 6 <input type="checkbox"/> MUNICIPAL 7 <input type="checkbox"/> PUBLIC SUPPLY 8 <input type="checkbox"/> COOLING OR AIR CONDITIONING 9 <input type="checkbox"/> NOT USED
--	--

**METHOD OF CONSTRUCTION**

1 <input checked="" type="checkbox"/> CABLE TOOL 2 <input type="checkbox"/> ROTARY (CONVENTIONAL) 3 <input type="checkbox"/> ROTARY (REVERSE) 4 <input type="checkbox"/> ROTARY (AIR) 5 <input type="checkbox"/> AIR PERCUSSION	6 <input type="checkbox"/> BORING 7 <input type="checkbox"/> DIAMOND 8 <input type="checkbox"/> JETTING 9 <input type="checkbox"/> DRIVING 10 <input type="checkbox"/> DIGGING 11 <input type="checkbox"/> OTHER
---	---

**LOCATION OF WELL**

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.

Big Tree, Chick.

1405

1500 ft.

5th Line

91339

DRILLERS REMARKS

**CONTRACTOR**

NAME OF WELL CONTRACTOR	WELL CONTRACTOR'S LICENCE NUMBER
Same	3561
ADDRESS	
Box 13 Horning, N. H.	
NAME OF WELL TECHNICIAN	WELL TECHNICIAN'S LICENCE NUMBER
Same	7-0248
SIGNATURE OF TECHNICIAN	SUBMISSION DATE
7-91-64	DAY MO YR

**OFFICE USE ONLY**

DATA SOURCE	CONTRACTOR	DATE RECEIVED
	3561	MAY 23 1991
DATE OF INSPECTION	INSPECTOR	
REMARKS		

CSS.ES



Ministry  
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Environment

Ontario

The Ontario Water Resources Act

# WATER WELL RECORD

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1704170

MUNICIPALITY 17006

CON. H.S.E.

06

COUNTY OR DISTRICT

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE

CON. BLOCK, TRACT, SURVEY, ETC.

LOT 25-27

DATE COMPLETED

DAY 4 MO 4 YR 90

## LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
			Top soil.	0	1
			Brown Clay Gravel	1	15
			Blue Clay Sand Gravel	15	25
			Blue Clay Sand	25	78
			Sand	78	84
			Shale - Blue	84	

31

32

41

### WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER					
10-13	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	4 <input type="checkbox"/> MINERALS	6 <input type="checkbox"/> GAS	14	
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERALS	6 <input type="checkbox"/> GAS			
15-18	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	4 <input type="checkbox"/> MINERALS	6 <input type="checkbox"/> GAS	19	
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERALS	6 <input type="checkbox"/> GAS			
20-23	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	4 <input type="checkbox"/> MINERALS	6 <input type="checkbox"/> GAS	24	
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERALS	6 <input type="checkbox"/> GAS			
25-28	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	4 <input type="checkbox"/> MINERALS	6 <input type="checkbox"/> GAS	29	
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERALS	6 <input type="checkbox"/> GAS			
30-33	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	4 <input type="checkbox"/> MINERALS	6 <input type="checkbox"/> GAS	34	
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERALS	6 <input type="checkbox"/> GAS			

51

### CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
10-11	1 <input checked="" type="checkbox"/> STEEL			
	2 <input type="checkbox"/> GALVANIZED			
	3 <input type="checkbox"/> CONCRETE			
	4 <input type="checkbox"/> OPEN HOLE			
	5 <input type="checkbox"/> PLASTIC			
17-18	1 <input type="checkbox"/> STEEL			
	2 <input type="checkbox"/> GALVANIZED			
	3 <input type="checkbox"/> CONCRETE			
	4 <input type="checkbox"/> OPEN HOLE			
	5 <input type="checkbox"/> PLASTIC			
24-25	1 <input type="checkbox"/> STEEL			
	2 <input type="checkbox"/> GALVANIZED			
	3 <input type="checkbox"/> CONCRETE			
	4 <input type="checkbox"/> OPEN HOLE			
	5 <input type="checkbox"/> PLASTIC			

SCREEN

SIZE OF OPENING (SLOT NO.)	DIAMETER	LENGTH
	INCHES	FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN	41-44
		FEET

61

### PLUGGING & SEALING RECORD

DEPTH SET AT - FEET		MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
FROM	TO	
10-13	14-17	
18-21	22-25	
26-29	30-33	

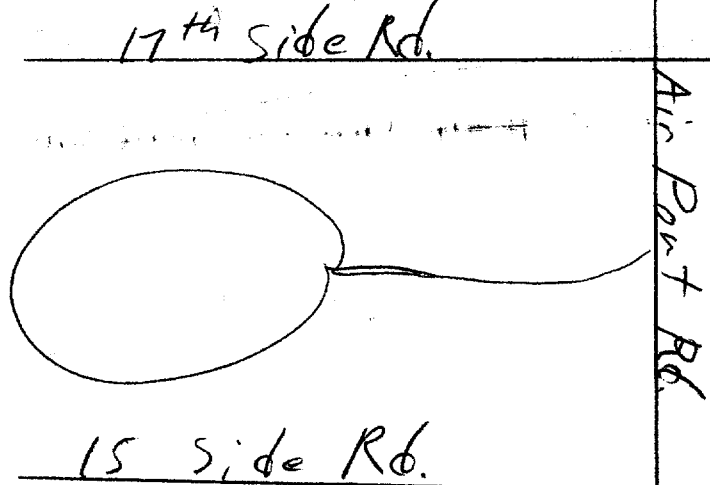
71

PUMPING TEST

PUMPING TEST METHOD		PUMPING RATE	DURATION OF PUMPING
1 <input type="checkbox"/> PUMP	2 <input type="checkbox"/> BAILER	GPM	15-16 HOURS 17-18 MINS.
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	
19-21	22-24	15 MINUTES	30 MINUTES
		26-28	29-31
		32-34	35-37
FEET	FEET	FEET	FEET
IF FLOWING GIVE RATE	PUMP TO BE SET AT	WATER AT END OF TEST	
GPM		1 <input type="checkbox"/> CLEAR	2 <input type="checkbox"/> CLOUDY
RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	43-45	46-49
<input type="checkbox"/> SHALLOW <input type="checkbox"/> DEEP		FEET RATE	GPM

### LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



61586

DRILLERS REMARKS

CONTRACTOR

NAME OF WELL CONTRACTOR	WELL CONTRACTOR'S LICENCE NUMBER
ADDRESS	7561
NAME OF WELL TECHNICIAN	WELL TECHNICIAN'S LICENCE NUMBER
SIGNATURE OF TECHNICIAN/CONTRACTOR	40298
SUBMISSION DATE	
DAY	MO
YR	

OFFICE USE ONLY

DATA SOURCE	CONTRACTOR	DATE RECEIVED
	3561	MAY 16 1990
DATE OF INSPECTION	INSPECTOR	
REMARKS		

CSS.ES



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# WATER WELL RECORD

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1704153

MUNICIP

17006

CON.

COUNTY OR DISTRICT

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE

CON. BLOCK, TRACT, SURVEY, ETC.

LOT 25-27

D.C.C.

Manmur

Plan 86

34

DATE COMPLETED

48-53

Mancefield

DAY

2

MO

3

YR

90

MINING

RC

ELEVATION

RC

BASIN CODE

II

III

IV

## LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
			Sandy Top soil.	0	1
			Brown Clay Sand.	1	15
			Brown Clay Sand Stones	15	40
			Sand.	40	42
			Blue Clay Sand	42	46
			Blue Clay	46	63
			Blue Clay Sand.	63	66
			Blue Clay	66	77
			Sand.	77	80

31

32

41 WATER RECORD			
WATER FOUND AT - FEET	KIND OF WATER		
10-13	1 <input checked="" type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	14
80	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERALS	15
15-18	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	19
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERALS	20
20-23	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	24
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERALS	25
25-28	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	29
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERALS	30
30-33	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	34
	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERALS	35

51 CASING & OPEN HOLE RECORD			
INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET
10-11	1 <input checked="" type="checkbox"/> STEEL	12	13-16
12	2 <input type="checkbox"/> GALVANIZED		
13	3 <input type="checkbox"/> CONCRETE		
14	4 <input type="checkbox"/> OPEN HOLE		
15	5 <input type="checkbox"/> PLASTIC		
17-18	1 <input type="checkbox"/> STEEL	19	20-23
19	2 <input type="checkbox"/> GALVANIZED		
20	3 <input type="checkbox"/> CONCRETE		
21	4 <input type="checkbox"/> OPEN HOLE		
22	5 <input type="checkbox"/> PLASTIC		
24-25	1 <input type="checkbox"/> STEEL	26	27-30
26	2 <input type="checkbox"/> GALVANIZED		
27	3 <input type="checkbox"/> CONCRETE		
28	4 <input type="checkbox"/> OPEN HOLE		
29	5 <input type="checkbox"/> PLASTIC		

61 PLUGGING & SEALING RECORD		
DEPTH SET AT - FEET	MATERIAL AND TYPE	CEMENT GROUT LEAD PACKER, ETC.
FROM	TO	
10-13	14-17	
18-21	22-25	
26-29	30-33	80

71 PUMPING TEST	
PUMPING TEST METHOD	10
1 <input type="checkbox"/> PUMP 2 <input checked="" type="checkbox"/> BAILER	
STATIC LEVEL	25
30	
WATER LEVEL END OF PUMPING	
70	
WATER LEVELS DURING	
15 MINUTES	30
30 MINUTES	
45 MINUTES	
60 MINUTES	30
IF FLOWING, GIVE RATE	
38-41	
PUMP INTAKE SET AT	
FEET	
WATER AT END OF TEST	
FEET	
1 <input type="checkbox"/> CLEAR 2 <input checked="" type="checkbox"/> CLOUDY	
RECOMMENDED PUMP TYPE	
1 <input type="checkbox"/> SHALLOW 2 <input checked="" type="checkbox"/> DEEP	
RECOMMENDED PUMP SETTING	
75	
RECOMMENDED PUMPING RATE	
4	

84 FINAL STATUS OF WELL	
1 <input type="checkbox"/> WATER SUPPLY	5 <input type="checkbox"/> ABANDONED, INSUFFICIENT SUPPLY
2 <input type="checkbox"/> OBSERVATION WELL	6 <input type="checkbox"/> ABANDONED, POOR QUALITY
3 <input type="checkbox"/> TEST HOLE	7 <input type="checkbox"/> UNFINISHED
4 <input type="checkbox"/> RECHARGE WELL	8 <input type="checkbox"/> DEWATERING
85-86 WATER USE	
1 <input checked="" type="checkbox"/> DOMESTIC	5 <input type="checkbox"/> COMMERCIAL
2 <input type="checkbox"/> STOCK	6 <input type="checkbox"/> MUNICIPAL
3 <input type="checkbox"/> IRRIGATION	7 <input type="checkbox"/> PUBLIC SUPPLY
4 <input type="checkbox"/> INDUSTRIAL	8 <input type="checkbox"/> COOLING OR AIR CONDITIONING
9 <input type="checkbox"/> OTHER	9 <input type="checkbox"/> NOT USED
87 METHOD OF CONSTRUCTION	
1 <input checked="" type="checkbox"/> CABLE TOOL	5 <input type="checkbox"/> BORING
2 <input type="checkbox"/> ROTARY (CONVENTIONAL)	6 <input type="checkbox"/> DIAMOND
3 <input type="checkbox"/> ROTARY (REVERSE)	7 <input type="checkbox"/> JETTING
4 <input type="checkbox"/> ROTARY (AIR)	8 <input type="checkbox"/> DRIVING
5 <input type="checkbox"/> AIR PERCUSSION	9 <input type="checkbox"/> DIGGING
	10 <input type="checkbox"/> OTHER

LOCATION OF WELL	
IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.	
17th	
Pine River Rd.	
61522	
DRILLERS REMARKS	

CONTRACTOR	
NAME OF WELL CONTRACTOR	WELL CONTRACTOR'S LICENCE NUMBER
Address	6135
NAME OF WELL TECHNICIAN	WELL TECHNICIAN'S LICENCE NUMBER
Signature of Technician/Contractor	7-0248
SUBMISSION DATE	
DAY	MO
YR	

OFFICE USE ONLY	
DATA SOURCE	CONTRACTOR
3561	
DATE OF INSPECTION	DATE RECEIVED
	APR 06 1990
REMARKS	INSPECTOR



Measurements recorded in: ☐ Metric ☒ Imperial

Page of

A106258

Well Location

Address of Well Location (Street Number/Name) 648199 SIDEROAD 17		Township Mulmer	Lot 17	Concession 6
County/District/Municipality Dufferin		City/Town/Village Lisle	Province Ontario	Postal Code L0M1M0
UTM Coordinates NAD 83	Zone 17	Easting 575541	Northing 4894906	Municipal Plan and Sublot Number
				Other

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft)	
				From	To
Brown	Top Soil			0	1
Brown	Sand	Gravel	Loose	1	10
Grey	Sand		Loose	10	32
Grey	Silt			32	34

Annular Space		
Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
From To		
0 8½	Bentinite Chips	
8½ 34	Filter Sand	

Method of Construction		Well Use		
<input type="checkbox"/> Cable Tool	<input type="checkbox"/> Diamond	<input type="checkbox"/> Public	<input type="checkbox"/> Commercial	<input type="checkbox"/> Not used
<input type="checkbox"/> Rotary (Conventional)	<input type="checkbox"/> Jetting	<input type="checkbox"/> Domestic	<input type="checkbox"/> Municipal	<input type="checkbox"/> Dewatering
<input type="checkbox"/> Rotary (Reverse)	<input type="checkbox"/> Driving	<input type="checkbox"/> Livestock	<input type="checkbox"/> Test Hole	<input type="checkbox"/> Monitoring
<input checked="" type="checkbox"/> Boring	<input type="checkbox"/> Digging	<input type="checkbox"/> Irrigation	<input type="checkbox"/> Cooling & Air Conditioning	
<input type="checkbox"/> Air percussion		<input type="checkbox"/> Industrial		
<input type="checkbox"/> Other, specify		<input type="checkbox"/> Other, specify		

Construction Record - Casing				Status of Well	
Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)	From	To
36	Concrete	3	+2	12½	
24	Galvanized	14ga	10	34	

<input checked="" type="checkbox"/> Water Supply	<input type="checkbox"/> Replacement Well	<input type="checkbox"/> Test Hole	<input type="checkbox"/> Recharge Well	<input type="checkbox"/> Dewatering Well	<input type="checkbox"/> Observation and/or Monitoring Hole	<input type="checkbox"/> Alteration (Construction)	<input type="checkbox"/> Abandoned, Insufficient Supply	<input type="checkbox"/> Abandoned, Poor Water Quality	<input type="checkbox"/> Abandoned, other, specify	<input type="checkbox"/> Other, specify
--	---	------------------------------------	--	--	---	--	---	--	--	---

Construction Record - Screen			
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)
			From To

Water Details		Hole Diameter	
Water found at Depth	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	Depth (m/ft)	Diameter (cm/in)
6 (m/ft) <input type="checkbox"/> Gas <input type="checkbox"/> Other, specify		From To	
Water found at Depth	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	0 22½	48
13 (m/ft) <input type="checkbox"/> Gas <input type="checkbox"/> Other, specify		22½ 34	32
Water found at Depth	Kind of Water: <input type="checkbox"/> Fresh <input type="checkbox"/> Untested		
(m/ft) <input type="checkbox"/> Gas <input type="checkbox"/> Other, specify			

Business Name of Well Contractor Johnson & Baetz		Well Contractor's Licence No. 3030
Business Address (Street Number/Name) 112 McGuinness		Municipality Brantford
Province On	Postal Code N5T 6R6	Business E-mail Address

Bus. Telephone No. (inc. area code) 8004654418	Name of Well Technician (Last Name, First Name) Darcy Avey Darcy
Well Technician's Licence No. 2988	Signature of Technician and/or Contractor [Signature]
	Date Submitted 20101210

Results of Well Yield Testing			
After test of well yield, water was: <input type="checkbox"/> Clear and sand free <input type="checkbox"/> Other, specify	Draw Down		Recovery
	Time (min)	Water Level (m/ft)	Time (min) Water Level (m/ft)
If pumping discontinued, give reason:	Static Level		10' 9"
	1		1
Pump intake set at (m/ft)	2		2
Pumping rate (l/min / GPM)	3		3
Duration of pumping hrs + min	4		4
Final water level end of pumping (m/ft)	5		5
If flowing give rate (l/min / GPM)	10		10
	15		15 12' 4"
Recommended pump depth (m/ft) 25	20		20
	25		25
Recommended pump rate (l/min / GPM) 5 Gpm	30		30 13' 10"
	40		40
Well production (l/min / GPM) 2.2 Gpm	50		50
	60		60 15' 3'
Disinfected? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			

Map of Well Location	
Please provide a map below following instructions on the back.	
Comments: TO Hwy/89	

Well owner's information package delivered <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Date Package Delivered Y Y Y Y M M D D 20101210	Ministry Use Only Audit No. 2122302 JAN 28 2011
	Date Work Completed 20101210	





# The Ontario Water Resources Act WATER WELL RECORD

Mark correct box with a checkmark, where applicable.

11

1706010

Municipality  
**17006**

Con. HS E 06

County or District DUFFERIN	Township/Borough/City/Town/Village MULMER.	Con block tract survey, etc. 6	Lot 17
	Address RA#2 L. SLE	Date completed 18 day 1 month 03 year	

Figure 1 illustrates the data structure for the 1997-1998 season. The diagram shows a grid of data points for various parameters across different basins. The parameters are: 21 (a single value), 10 (a single value), 12 (a single value), 17 (a single value), 18 (a single value), 24 (a single value), 25 (a single value), 26 (a single value), 30 (a single value), 31 (a single value), and 32 (a single value). The basins are labeled: North, RC, Elevation, RC, Basin Code, ii, iii, iv. The data points are represented by small squares with numbers inside, and the grid is organized into rows and columns.

[illegible][illegible]

41		10	14	15	21	<b>WATER RECORD</b>	
Water found at - feet		Kind of water					
10-13 <i>10-25</i>	1	<input checked="" type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur			14
	2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals			
15-18			6	<input type="checkbox"/> Gas			
	1	<input type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur			19
	2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals			
20-23			6	<input type="checkbox"/> Gas			
	1	<input type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur			24
	2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals			
25-28			6	<input type="checkbox"/> Gas			
	1	<input type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur			29
	2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals			
30-33			6	<input type="checkbox"/> Gas			
	1	<input type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur			34
	2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals			
			6	<input type="checkbox"/> Gas			

CASING & OPEN HOLE RECORD				
Inside diam inches	Material	Wall thickness inches	Depth - feet	
			From	To
10-11 36	<input type="checkbox"/> Steel <input type="checkbox"/> Galvanized <input checked="" type="checkbox"/> Concrete <input type="checkbox"/> Open hole <input type="checkbox"/> Plastic	12 3	0	25
17-18	<input type="checkbox"/> Steel <input type="checkbox"/> Galvanized <input type="checkbox"/> Concrete <input type="checkbox"/> Open hole <input type="checkbox"/> Plastic	19		20-23
24-25	<input type="checkbox"/> Steel <input type="checkbox"/> Galvanized <input type="checkbox"/> Concrete <input type="checkbox"/> Open hole <input type="checkbox"/> Plastic	26		27-30

SCREEN	54	65	75	90		
	Sizes of opening (Slot No.)	31-33	Diameter	34-38	Length	39-40
			inches		feet	
	Material and type		Depth at top of screen		30	
	SAND		41-44			
			feet			

61				<b>PLUGGING &amp; SEALING RECORD</b>			
<input type="checkbox"/> Annular space				<input type="checkbox"/> Abandonment			
Depth set at - feet		Material and type (Cement grout, bentonite, etc.)					
From	To						
0-13	7-17	HOLE PLUG					
18-21	22-25						
26-29	30-33						
		80					

PUMPING TEST	71 Pumping test method <sup>10</sup> 1 <input type="checkbox"/> Pump 2 <input type="checkbox"/> Bailer		Pumping rate <sup>11-14</sup> GPM		Duration of pumping <sup>15-16</sup> Hours <sup>17-18</sup> Mins	
	Static level		25 Water levels during 1 <input type="checkbox"/> Pumping 2 <input type="checkbox"/> Recovery		Water level end of pumping	
	19-21 <b>10</b> feet		22-24 feet		15 minutes <sup>26-28</sup> feet	
	22-24 feet		30 minutes <sup>29-31</sup> feet		45 minutes <sup>32-34</sup> feet	
	22-24 feet		60 minutes <sup>35-37</sup> feet		feet	
	If flowing give rate <sup>38-41</sup> GPM		Pump intake set at feet		Water at end of test <sup>42</sup> <input type="checkbox"/> Clear <input type="checkbox"/> Cloudy	
Recommended pump type <input checked="" type="checkbox"/> Shallow <input type="checkbox"/> Deep		Recommended pump setting <sup>43-45</sup> <b>21</b> feet		Recommended pump rate <sup>46-49</sup> <b>5</b> GPM		
50-53						

**FINAL STATUS OF WELL** 54

1 <input checked="" type="checkbox"/> Water supply	5 <input type="checkbox"/> Abandoned, insufficient supply	9 <input type="checkbox"/> Unfinished
2 <input type="checkbox"/> Observation well	6 <input type="checkbox"/> Abandoned, poor quality	10 <input type="checkbox"/> Replacement well
3 <input type="checkbox"/> Test hole	7 <input type="checkbox"/> Abandoned (Other)	
4 <input type="checkbox"/> Recharge well	8 <input type="checkbox"/> Dewatering	

**WATER USE** 55-56

1 <input checked="" type="checkbox"/> Domestic	5 <input type="checkbox"/> Commercial	9 <input type="checkbox"/> Not use
2 <input type="checkbox"/> Stock	6 <input type="checkbox"/> Municipal	10 <input type="checkbox"/> Other .....
3 <input type="checkbox"/> Irrigation	7 <input type="checkbox"/> Public supply	
4 <input type="checkbox"/> Industrial	8 <input type="checkbox"/> Cooling & air conditioning	

**METHOD OF CONSTRUCTION** 57

1 <input type="checkbox"/> Cable tool	5 <input type="checkbox"/> Air percussion	9 <input type="checkbox"/> Driving
2 <input type="checkbox"/> Rotary (conventional)	6 <input checked="" type="checkbox"/> Boring	10 <input type="checkbox"/> Digging
3 <input type="checkbox"/> Rotary (reverse)	7 <input type="checkbox"/> Diamond	11 <input type="checkbox"/> Other .....
4 <input type="checkbox"/> Rotary (air)	8 <input type="checkbox"/> Jetting	

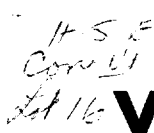
**LOCATION OF WELL**

In diagram below show distances of well from road and lot line.  
Indicate north by arrow.

The diagram is a hand-drawn sketch on a grid. A vertical line on the left is labeled '17 SIDE ROAD'. A horizontal line at the top is labeled 'AIRPORT RD' and 'TO MANSFIELD'. An arrow points upwards from the horizontal line, labeled 'APPROX 600\''. A horizontal double-headed arrow points from the vertical line to a dot labeled 'WELL', labeled 'APPROX 120\''. To the right of the well are three rectangular boxes labeled 'HOUSE', 'GARAGE SHED', and 'BARN'. A north arrow points towards the top right, labeled 'N'.

Name of Well Contractor <i>JOHNSON &amp; BAETZ</i>	Well Contractor's Licence No. <i>3030</i>
Address <i>BRANTFORD</i>	
Name of Well Technician <i>JOHN BAETZ</i>	Well Technician's Licence No. <i>T-333</i>
Signature of Technician/Contractor <i>[Signature]</i>	Submission date day      mo      yr

MINISTRY USE ONLY	Data source	58	Contractor	59-62	Date received	63-68	69
			3030		MAR 06 2003		
	Date of inspection		Inspector				
	Remarks						
	CSS.ES3						



2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

H	S	E	C	OG
---	---	---	---	----

LOT	25-27
-----	-------

0/6

DATE COMPLETED	8 19 48-53
----------------	------------

DAY 08 MO. SEPT. YR. 69

RC.	BASIN CODE
57	22

OFFICE USE ONLY	DATA SOURCE	58 CONTRACTOR	59-62	DATE RECEIVED	63-68
	1	1830		201069	
	DATE OF INSPECTION		INSPECTOR		
	REMARKS:				
	<div style="text-align: right;"> CSS.S8  <i>[Signature]</i>  J.B. </div>				





# WATER WELL RECORD

Water management in Ontario

1. PRINT ONLY IN SPACES PROVIDED  
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11

1701141

MUNICIP.

17006

CON.

11.5 E

06

COUNTY OR DISTRICT

DUFFERIN

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE

MULMUR

CON., BLOCK, TRACT, SURVEY, ETC.

H.S.E. 6

LOT

016

DATE COMPLETED

DAY 28 MO. SEPT YR. 70

R.R. 1, MANSFIELD, ONT.

393990

RC

ELEVATION

0990

RC

BASIN CODE

22

## LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
DARK BROWN	TOP SOIL	SANDY	DENSE	0'	1'
BROWN	CLAY		PACKED	1'	8'
BROWN	SAND	LAYERED WITH CLAY	POROUS	8'	10'
GREY	CLAY		PACKED	10'	21'

31

000160209

0008605

001060905

0021205

32

41

### WATER RECORD

WATER FOUND AT FEET	KIND OF WATER			
10-13	1 <input checked="" type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERAL
15-18	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERAL
20-23	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERAL
25-28	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERAL
30-33	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	2 <input type="checkbox"/> SALTY	4 <input type="checkbox"/> MINERAL

### 51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
10-11	1 <input type="checkbox"/> STEEL	12		
12-13	2 <input type="checkbox"/> GALVANIZED			
13-14	3 <input checked="" type="checkbox"/> CONCRETE			
14-15	4 <input type="checkbox"/> OPEN HOLE			
17-18	1 <input type="checkbox"/> STEEL	19		
19-20	2 <input type="checkbox"/> GALVANIZED			
20-21	3 <input type="checkbox"/> CONCRETE			
21-22	4 <input type="checkbox"/> OPEN HOLE			
24-25	1 <input type="checkbox"/> STEEL	26		
26-27	2 <input type="checkbox"/> GALVANIZED			
27-28	3 <input type="checkbox"/> CONCRETE			
28-29	4 <input type="checkbox"/> OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
31-33	34-38	39-40
MATERIAL AND TYPE		DEPTH TO TOP OF SCREEN
		41-44
		FEET

61

### PLUGGING & SEALING RECORD

DEPTH SET AT - FEET		MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
FROM	TO	
10-13	14-17	
18-21	22-25	
26-29	30-33	

71

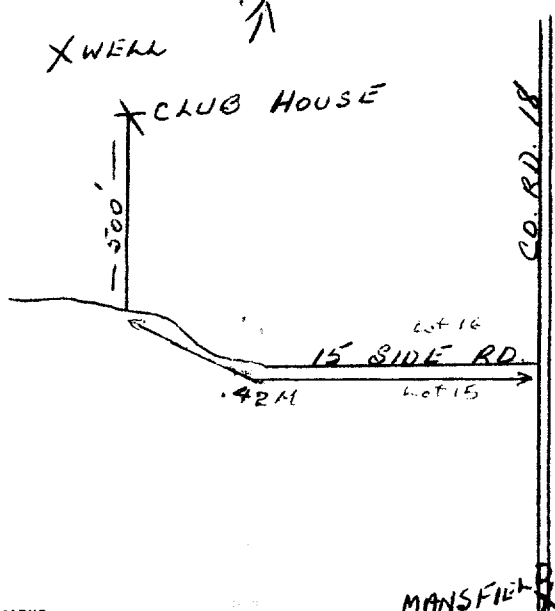
PUMPING TEST METHOD	PUMPING RATE		DURATION OF PUMPING	
	1 <input type="checkbox"/> PUMP	2 <input checked="" type="checkbox"/> BAILEY	GPM.	HOURS
10-13	1 <input checked="" type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR	01	00
15-18	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR		
20-23	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR		
25-28	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR		
30-33	1 <input type="checkbox"/> FRESH	3 <input type="checkbox"/> SULPHUR		

54

FINAL STATUS OF WELL	WATER LEVELS DURING			
	1 <input checked="" type="checkbox"/> WATER SUPPLY	2 <input type="checkbox"/> OBSERVATION WELL	3 <input type="checkbox"/> TEST HOLE	4 <input type="checkbox"/> RECHARGE WELL
55-56	1 <input type="checkbox"/> DOMESTIC	2 <input type="checkbox"/> STOCK	3 <input type="checkbox"/> IRRIGATION	4 <input type="checkbox"/> INDUSTRIAL
57	1 <input type="checkbox"/> CABLE TOOL	2 <input type="checkbox"/> ROTARY (CONVENTIONAL)	3 <input type="checkbox"/> ROTARY (REVERSE)	4 <input type="checkbox"/> ROTARY (AIR)

### LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

CONTRACTOR	NAME OF WELL CONTRACTOR		LICENCE NUMBER
	DOWLING WELL BORING		
	ADDRESS		
	R. R. 1, ALLISTON, ONT.		
	NAME OF DRILLER OR BORER		LICENCE NUMBER
	N. E. DOWLING		1830
	SIGNATURE OF CONTRACTOR		SUBMISSION DATE
	N. E. Dowling		DAY 5 MO. OCT YR. 70

OFFICE USE ONLY	DATA SOURCE	58	CONTRACTOR	59-62	DATE RECEIVED	63-68
	1		1830		221070	
	DATE OF INSPECTION		INSPECTOR			
	11/18/70		P/S			
REMARKS:						
CSS.S8						

OWRC COPY



Ontario

Ministry  
of the  
Environment

# WATER WELL RECORD

1704168

MUNICIP.

17006

CON.

H.S.E.

1. PRINT ONLY IN SPACES PROVIDED

2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11

COUNTY OR DISTRICT

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE

CON. BLOCK, TRACT, SURVEY ETC

LOT

DATE COMPLETED

DAY

MO

YR

## LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
			Topsoil	0	1
			Brown Clay stones	1	10
			Blue Clay	10	22
			Blue Shale	22	40

31

32

41 WATER RECORD	
WATER FOUND AT - FEET	KIND OF WATER
10-13	1 <input checked="" type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 4 <input type="checkbox"/> MINERALS 6 <input type="checkbox"/> GAS
15-18	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 4 <input type="checkbox"/> MINERALS 6 <input type="checkbox"/> GAS
20-23	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 4 <input type="checkbox"/> MINERALS 6 <input type="checkbox"/> GAS
25-28	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 4 <input type="checkbox"/> MINERALS 6 <input type="checkbox"/> GAS
30-33	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 4 <input type="checkbox"/> MINERALS 6 <input type="checkbox"/> GAS

51 CASING & OPEN HOLE RECORD			
INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET
10-11	1 <input checked="" type="checkbox"/> STEEL 2 <input checked="" type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE 5 <input type="checkbox"/> PLASTIC	188	0 28
17-18	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE 5 <input type="checkbox"/> PLASTIC		20-23
24-25	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE 5 <input type="checkbox"/> PLASTIC		27-30

SIZE OF OPENING (SLOT NO.)	DIAMETER	LENGTH
31-33	34-38	39-40
MATERIAL AND TYPE		DEPTH TO TOP OF SCREEN
		41-44
		FEET

61 PLUGGING & SEALING RECORD	
DEPTH SET AT - FEET	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER ETC.)
FROM	TO
10-13	14-17
18-21	22-25
26-29	30-33

71 PUMPING TEST	PUMPING TEST METHOD	10 PUMPING RATE	11-14 DURATION OF PUMPING
	1 <input type="checkbox"/> PUMP 2 <input checked="" type="checkbox"/> BAILER	1 GPM	15-16 HOURS 17-18 MINS
	STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING
	19-21	22-24	15 MINUTES 26-28 30 MINUTES 29-31 45 MINUTES 32-34 60 MINUTES 35-37
	15 FEET	34 FEET	10 FEET 18 FEET 25 FEET 25 FEET
IF FLOWING GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST	
	GPM	FEET	1 <input type="checkbox"/> CLEAR 2 <input checked="" type="checkbox"/> CLOUDY
	RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
	1 <input checked="" type="checkbox"/> SHALLOW 2 <input type="checkbox"/> DEEP	38 FEET	1 GPM

FINAL STATUS OF WELL	1 <input checked="" type="checkbox"/> WATER SUPPLY 2 <input type="checkbox"/> OBSERVATION WELL 3 <input type="checkbox"/> TEST HOLE 4 <input type="checkbox"/> RECHARGE WELL	5 <input type="checkbox"/> ABANDONED, INSUFFICIENT SUPPLY 6 <input type="checkbox"/> ABANDONED, POOR QUALITY 7 <input type="checkbox"/> UNFINISHED 8 <input type="checkbox"/> DEWATERING
	WATER USE	
	1 <input type="checkbox"/> DOMESTIC 2 <input type="checkbox"/> STOCK 3 <input type="checkbox"/> IRRIGATION 4 <input type="checkbox"/> INDUSTRIAL 5 <input type="checkbox"/> COMMERCIAL 6 <input type="checkbox"/> MUNICIPAL 7 <input type="checkbox"/> PUBLIC SUPPLY 8 <input type="checkbox"/> COOLING OR AIR CONDITIONING 9 <input type="checkbox"/> NOT USED	
METHOD OF CONSTRUCTION	1 <input type="checkbox"/> CABLE TOOL 2 <input type="checkbox"/> ROTARY (CONVENTIONAL) 3 <input type="checkbox"/> ROTARY (REVERSE) 4 <input type="checkbox"/> ROTARY (AIR) 5 <input type="checkbox"/> AIR PERCUSSION	6 <input type="checkbox"/> BORING 7 <input type="checkbox"/> DIAMOND 8 <input type="checkbox"/> JETTING 9 <input type="checkbox"/> DRIVING 10 <input type="checkbox"/> DIGGING 11 <input type="checkbox"/> OTHER

LOCATION OF WELL	
IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE INDICATE NORTH BY ARROW.	
DRILLERS REMARKS	

CONTRACTOR	NAME OF WELL CONTRACTOR	WELL CONTRACTOR'S LICENCE NUMBER
	ADDRESS	7561
	NAME OF WELL TECHNICIAN	WELL TECHNICIAN'S LICENCE NUMBER
	SIGNATURE OF TECHNICIAN/CONTRACTOR	7-0298
SUBMISSION DATE		DAY MO YR

OFFICE USE ONLY	DATA SOURCE	CONTRACTOR	DATE RECEIVED
	DATE OF INSPECTION	3561	MAY 16 1990
	REMARKS	INSPECTOR	
CSS.ES			

1. PRINT ONLY IN SPACES PROVIDED  
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
25	26	27	28
29	30	31	32
33	34	35	36
37	38	39	40
41	42	43	44
45	46	47	48
49	50	51	52
53	54	55	56
57	58	59	60
61	62	63	64
65	66	67	68
69	70	71	72
73	74	75	76
77	78	79	80
81	82	83	84
85	86	87	88
89	90	91	92
93	94	95	96
97	98	99	100

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
BROWN	TOP SOIL			0	1
CLAY		STONES	STONEV CLAY	1	40
GREY	SHALE	SLAB	SHALE	40	65

31	32
----	----

41	WATER RECORD
WATER FOUND AT - FEET	KIND OF WATER
10-13	1 <input checked="" type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR
14	2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
15-18	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR
19	2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
20-23	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR
24	2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
25-28	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR
29	2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
30-33	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR
34	2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL

51	CASING & OPEN HOLE RECORD		
INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET
10-11	1 <input checked="" type="checkbox"/> STEEL	12	13-16
17-18	2 <input type="checkbox"/> GALVANIZED	188	19
19	3 <input type="checkbox"/> CONCRETE	188	20-23
24-25	4 <input type="checkbox"/> OPEN HOLE	188	25
26	1 <input checked="" type="checkbox"/> STEEL	188	27-30
31	2 <input type="checkbox"/> GALVANIZED	188	32-34
35	3 <input type="checkbox"/> CONCRETE	188	36
37	4 <input type="checkbox"/> OPEN HOLE	188	38

SCREEN	SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
31-33	34-38	39-40	
		INCHES	FEET
	MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN	41-44
		FEET	45

61	PLUGGING & SEALING RECORD
DEPTH SET AT - FEET	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
FROM	TO
10-13	14-17
18-21	22-25
26-29	30-33

71	PUMPING TEST METHOD	10	PUMPING RATE	11-14	DURATION OF PUMPING
1 <input checked="" type="checkbox"/> PUMP 2 <input checked="" type="checkbox"/> BAILEY	4	15-16	17-18		
19-21	22-24	25	26-28		
29-31	32-34	35-37	38-41		
42	43-45	46-49	50-53		

54	FINAL STATUS OF WELL	5	ABANDONED, INSUFFICIENT SUPPLY
55-56	WATER USE	6	ABANDONED POOR QUALITY
57	METHOD OF DRILLING	7	UNFINISHED

LOCATION OF WELL
IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.
750'
W Mansfield Area
DRILLERS REMARKS:

CONTRACTOR	NAME OF WELL CONTRACTOR	LICENCE NUMBER
3602	3602	3602
ADDRESS	NAME OF DRILLER OR BORER	LICENCE NUMBER
3602	3602	3602
SIGNATURE OF CONTRACTOR	SUBMISSION DATE	NO. 10 85

OFFICE USE ONLY	DATA SOURCE	CONTRACTOR	DATE RECEIVED
011185	011185	011185	011185
REMARKS	REMARKS	REMARKS	REMARKS

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Mark correct box with a checkmark, where applicable.

11

1705218

17006 HS E 06

Part Lot 16

County or District <b>Duff</b>		Township/Borough/City/Town/Village <b>Pulmur</b>		Con block tract survey, etc. <b>6.</b>		Lot <b>18</b>	
Owner's surname <b>MANSEFIELD</b>		First name <b>RIDGE</b>		Address <b>CHABLETS INC. 467 EDGELEY BLVD. #14, CONCORD</b>		Date completed <b>20 10 98</b>	
Zone <b>21</b>		Easting <b>10</b>		Northing <b>17</b>		RC <b>18</b>	
Elevation <b>24</b>		RC <b>25</b>		Basin Code <b>26</b>		ii <b>27</b>	

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet	
				From	To
Black topsoil				0	1
Red clay				1	16
Red Shale				16	88
Blue Shale				88	90

31	32	33	34	35	36	37	38	39	40
----	----	----	----	----	----	----	----	----	----

41 WATER RECORD			
Water found at - feet	Kind of water		
10-13	1 <input checked="" type="checkbox"/> Fresh	3 <input checked="" type="checkbox"/> Sulphur	14 <input type="checkbox"/> Minerals
15-18	2 <input type="checkbox"/> Salty	4 <input type="checkbox"/> Gas	15 <input type="checkbox"/> Gas
19-22	1 <input type="checkbox"/> Fresh	3 <input type="checkbox"/> Sulphur	16 <input type="checkbox"/> Minerals
23-26	2 <input type="checkbox"/> Salty	4 <input type="checkbox"/> Gas	17 <input type="checkbox"/> Gas
27-30	1 <input type="checkbox"/> Fresh	3 <input type="checkbox"/> Sulphur	18 <input type="checkbox"/> Minerals
31-34	2 <input type="checkbox"/> Salty	4 <input type="checkbox"/> Gas	19 <input type="checkbox"/> Gas

51 CASING & OPEN HOLE RECORD			
Inside diam inches	Material	Wall thickness inches	Depth - feet
10-11	1 <input checked="" type="checkbox"/> Steel	12	13-16
12-15	2 <input type="checkbox"/> Galvanized	13	17-18
16-19	3 <input type="checkbox"/> Concrete	14	19-20
20-23	4 <input type="checkbox"/> Open hole	15	21-22
24-27	5 <input type="checkbox"/> Plastic	16	23-24

SCREEN	Sizes of opening (Slot No.)	Diameter inches	Length feet
	31-33	34-36	37-40
	Material and type		Depth at top of screen feet

61 PLUGGING & SEALING RECORD			
Annular space		Abandonment	
Depth set at - feet	Material and type (Cement grout, bentonite, etc.)	From	To
10-13	14-17		
18-21	22-25		
26-29	30-33		

71 PUMPING TEST		Pumping rate	Duration of pumping
1 <input type="checkbox"/> Pump	2 <input checked="" type="checkbox"/> Bailer	3 GPM	4 Hours
Static level	Water level end of pumping	Water levels during	1 <input checked="" type="checkbox"/> Pumping
19-21	22-24	15 minutes	30 minutes
40 feet	85 feet	85 feet	85 feet
If flowing give rate	GPM	Pump intake set at	Water at end of test
Recommended pump type	Recommended pump setting	Recommended pump rate	

LOCATION OF WELL	
In diagram below show distances of well from road and lot line. Indicate north by arrow.	
197379	

FINAL STATUS OF WELL	
1 <input type="checkbox"/> Water supply	5 <input type="checkbox"/> Abandoned, insufficient supply
2 <input type="checkbox"/> Observation well	6 <input type="checkbox"/> Abandoned, poor quality
3 <input type="checkbox"/> Test hole	7 <input type="checkbox"/> Abandoned (Other)
4 <input type="checkbox"/> Recharge well	8 <input type="checkbox"/> Dewatering
WATER USE	
1 <input type="checkbox"/> Domestic	5 <input type="checkbox"/> Commercial
2 <input type="checkbox"/> Stock	6 <input type="checkbox"/> Municipal
3 <input type="checkbox"/> Irrigation	7 <input type="checkbox"/> Public supply
4 <input type="checkbox"/> Industrial	8 <input type="checkbox"/> Cooling & air conditioning
METHOD OF CONSTRUCTION	
1 <input checked="" type="checkbox"/> Cable tool	5 <input type="checkbox"/> Air percussion
2 <input type="checkbox"/> Rotary (conventional)	6 <input type="checkbox"/> Boring
3 <input type="checkbox"/> Rotary (reverse)	7 <input type="checkbox"/> Diamond
4 <input type="checkbox"/> Rotary (air)	8 <input type="checkbox"/> Jetting

Name of Well Contractor	Well Contractor's Licence No.
Address	
Name of Well Technician	Well Technician's Licence No.
Signature of Technician/Contractor	Submission date

MINISTRY USE ONLY	
Data source	Contractor
Date of inspection	Inspector
Remarks	

CSS. ES9







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Mark correct box with a checkmark, where applicable.

1705197

17006  
Municipality

Con

06

County or District <i>Duff</i>	Township/Borough/City/Town/Village <i>Mulmur</i>	Con block tract survey, etc. <i>6</i>	Lot <i>2</i>
Address <i>417 ENGLEY BLVD. # 14, CONCORD</i>		Date completed <i>10</i> day <i>9</i> month <i>93</i> year	

[illegible][illegible]

41		WATER RECORD				42	
Water found at - feet		Kind of water					
10-13 <b>74</b>	1	<input checked="" type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur	14		
	2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals			
14-18			6	<input type="checkbox"/> Gas			
	1	<input type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur	19		
2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals				
20-23			6	<input type="checkbox"/> Gas			
	1	<input type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur	24		
2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals				
25-28			6	<input type="checkbox"/> Gas			
	1	<input type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur	29		
2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals				
30-33			6	<input type="checkbox"/> Gas			
	1	<input type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur	34		
2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals				
			6	<input type="checkbox"/> Gas			

51 CASING & OPEN HOLE RECORD					
Inside diam inches	Material	Wall thickness inches	Depth - feet		
			From	To	
10-11	<input checked="" type="checkbox"/> Steel <input type="checkbox"/> Galvanized <input type="checkbox"/> Concrete <input type="checkbox"/> Open hole <input type="checkbox"/> Plastic				13-16
6		188	0	20	
17-18	<input type="checkbox"/> Steel <input type="checkbox"/> Galvanized <input type="checkbox"/> Concrete <input type="checkbox"/> Open hole <input type="checkbox"/> Plastic				20-23
24-25	<input type="checkbox"/> Steel <input type="checkbox"/> Galvanized <input type="checkbox"/> Concrete <input type="checkbox"/> Open hole <input type="checkbox"/> Plastic				27-30

<b>SCREEN</b>	Sizes of opening (Slot No.)	31-33	Diameter	34-38	Length	39-40
			inches		feet	
	Material and type	Depth at top of screen			41-44	30
					feet	

61	<b>PLUGGING &amp; SEALING RECORD</b>			
<input type="checkbox"/> Annular space		<input type="checkbox"/> Abandonment		
Depth set at - feet		Material and type (Cement grout, bentonite, etc.)		
From	To			
10-13	14-17			
18-21	22-25			
26-29	30-33			
		80		

71	Pumping test method <sup>10</sup> 1 <input type="checkbox"/> Pump 2 <input checked="" type="checkbox"/> Bailer		Pumping rate <sup>11-14</sup> 5 GPM		Duration of pumping <sup>15-18</sup> 3 Hours 17-18 Mins	
	Static level		Water level end of pumping <sup>25</sup>		Water levels during 1 <input checked="" type="checkbox"/> Pumping 2 <input type="checkbox"/> Recovery	
	19-21 35 feet	22-24 10 feet	15 minutes <sup>26-28</sup> 10 feet	30 minutes <sup>29-31</sup> 10 feet	45 minutes <sup>32-34</sup> 10 feet	60 minutes <sup>35-37</sup> 10 feet
	If flowing give rate <sup>38-41</sup> GPM		Pump intake set at <sup>42</sup> <del>5</del> feet <input type="checkbox"/> Clear <input checked="" type="checkbox"/> Cloudy		Water at end of test	
	Recommended pump type <input type="checkbox"/> Shallow <input type="checkbox"/> Deep		Recommended pump setting <sup>43-45</sup> 10 feet		Recommended pump rate <sup>46-49</sup> 5 GPM	

**FINAL STATUS OF WELL** 54

1 <input checked="" type="checkbox"/> Water supply	5 <input type="checkbox"/> Abandoned, insufficient supply	9 <input type="checkbox"/> Unfinished
2 <input type="checkbox"/> Observation well	6 <input type="checkbox"/> Abandoned, poor quality	10 <input type="checkbox"/> Replacement well
3 <input type="checkbox"/> Test hole	7 <input type="checkbox"/> Abandoned (Other)	
4 <input type="checkbox"/> Recharge well	8 <input type="checkbox"/> Dewatering	

**WATER USE** 55-56

1 <input checked="" type="checkbox"/> Domestic	5 <input type="checkbox"/> Commercial	9 <input type="checkbox"/> Not used
2 <input type="checkbox"/> Stock	6 <input type="checkbox"/> Municipal	10 <input type="checkbox"/> Other .....
3 <input type="checkbox"/> Irrigation	7 <input type="checkbox"/> Public supply	
4 <input type="checkbox"/> Industrial	8 <input type="checkbox"/> Cooling & air conditioning	

**METHOD OF CONSTRUCTION** 57

1 <input checked="" type="checkbox"/> Cable tool	5 <input type="checkbox"/> Air percussion	9 <input type="checkbox"/> Driving .....
2 <input type="checkbox"/> Rotary (conventional)	6 <input type="checkbox"/> Boring	10 <input type="checkbox"/> Digging
3 <input type="checkbox"/> Rotary (reverse)	7 <input type="checkbox"/> Diamond	11 <input type="checkbox"/> Other .....
4 <input type="checkbox"/> Rotary (air)	8 <input type="checkbox"/> Jetting	

**LOCATION OF WELL**

In diagram below show distances of well from road and lot line.  
Indicate north by arrow.

5th line

15 Side Rd.

N

15 ft.

1/4 Mile

191277

Name of Well Contractor <i>H. J. Jones</i>	Well Contractor's Licence No. <i>3561</i>
Address <i>156 Grant St. J. Jones Hills</i>	
Name of Well Technician <i>H. J. Jones</i>	Well Technician's Licence No. <i>F0298</i>
Signature of Technician/Contractor <i>H. J. Jones</i>	Submission date day mo yr

MINISTRY USE ONLY	Data source	Contractor	Date received
	3561	SEP 2 1998	
Date of inspection	Inspector		
Remarks			
CSS. 99			



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Mark correct box with a checkmark, where applicable.

**1705198**

17006  
Municipality

Con. 54

06

County or District <i>Duff</i>	Township/Borough/City/Town/Village <i>Mulmar</i>	Con block tract survey, etc. <i>6</i>	Lot <i>3</i>
Address <i>467 EDGELEY BLVD. #14 CONCORD</i>		Date completed <i>10</i> day <i>9</i> month <i>98</i> year	

[illegible][illegible]

41		14 13 21				WATER RECORD	
Water found at - feet		Kind of water					
65	10-12	1	<input checked="" type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur	14	
	2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals			
	15-18	1	<input type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur	19	
	2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals			
	20-28	1	<input type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur	24	
	2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals			
	25-28	1	<input type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur	29	
	2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals			
	30-33	1	<input type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur	34	
	2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals			

51		CASING & OPEN HOLE RECORD			
Inside diam inches	Material	Wall thickness inches	Depth - feet		
			From	To	
10-11	<input checked="" type="checkbox"/> Steel <input type="checkbox"/> Galvanized <input type="checkbox"/> Concrete <input type="checkbox"/> Open hole <input type="checkbox"/> Plastic	12			
6		185	0	20	
17-18	<input type="checkbox"/> Steel <input type="checkbox"/> Galvanized <input type="checkbox"/> Concrete <input type="checkbox"/> Open hole <input type="checkbox"/> Plastic	19			
				20-23	
24-25	<input type="checkbox"/> Steel <input type="checkbox"/> Galvanized <input type="checkbox"/> Concrete <input type="checkbox"/> Open hole <input type="checkbox"/> Plastic	26			
				27-30	

<b>SCREEN</b>	Sizes of opening (Slot No.)	31-33	Diameter	34-38	Length	39-40
			inches		feet	
	Material and type			Depth at top of screen		30
				feet		

61		<b>PLUGGING &amp; SEALING RECORD</b>	
<input type="checkbox"/> Annular space		<input type="checkbox"/> Abandonment	
Depth set at - feet		Material and type (Cement grout, bentonite, etc.)	
From	To		
10-13	14-17		
18-21	22-25		
26-29	30-33		
	80		

71	Pumping test method <sup>10</sup> 1 <input type="checkbox"/> Pump 2 <input checked="" type="checkbox"/> Bailer		Pumping rate <sup>11-14</sup> 4 GPM		Duration of pumping <sup>17-18</sup> 3 Hours 0 Mins	
	Static level <sup>19-21</sup> 40 feet		Water level end of pumping <sup>22-24</sup> 60 feet		Water levels during <sup>25</sup> 1 <input checked="" type="checkbox"/> Pumping 2 <input type="checkbox"/> Recovery	
PUMPING TEST	15 minutes <sup>26-28</sup> 50 feet		30 minutes <sup>29-31</sup> 60 feet		45 minutes <sup>32-34</sup> 60 feet	
	60 minutes <sup>35-37</sup> 60 feet					
	If flowing give rate <sup>38-41</sup> GPM		Pump intake set at <sup>42</sup> feet		Water at end of test <sup>43</sup> <input type="checkbox"/> Clear <input checked="" type="checkbox"/> Cloudy	
	Recommended pump type <sup>46-49</sup> <input type="checkbox"/> Shallow <input checked="" type="checkbox"/> Deep		Recommended pump setting <sup>43-45</sup> 60 feet		Recommended pump rate <sup>46-49</sup> 4 GPM	

**FINAL STATUS OF WELL** 54

1 <input type="checkbox"/> Water supply	5 <input type="checkbox"/> Abandoned, insufficient supply	9 <input type="checkbox"/> Unfinished
2 <input type="checkbox"/> Observation well	6 <input type="checkbox"/> Abandoned, poor quality	10 <input type="checkbox"/> Replacement well
3 <input type="checkbox"/> Test hole	7 <input type="checkbox"/> Abandoned (Other)	
4 <input type="checkbox"/> Recharge well	8 <input type="checkbox"/> Dewatering	

**WATER USE** 55-56

1 <input checked="" type="checkbox"/> Domestic	5 <input type="checkbox"/> Commercial	9 <input type="checkbox"/> Not used
2 <input type="checkbox"/> Stock	6 <input type="checkbox"/> Municipal	10 <input type="checkbox"/> Other .....
3 <input type="checkbox"/> Irrigation	7 <input type="checkbox"/> Public supply	
4 <input type="checkbox"/> Industrial	8 <input type="checkbox"/> Cooling & air conditioning	

**METHOD OF CONSTRUCTION** <sup>57</sup>

1 <input checked="" type="checkbox"/> Cable tool	5 <input type="checkbox"/> Air percussion	9 <input type="checkbox"/> Driving
2 <input type="checkbox"/> Rotary (conventional)	6 <input type="checkbox"/> Boring	10 <input type="checkbox"/> Digging
3 <input type="checkbox"/> Rotary (reverse)	7 <input type="checkbox"/> Diamond	11 <input type="checkbox"/> Other .....
4 <input type="checkbox"/> Rotary (air)	8 <input type="checkbox"/> Jetting	

**LOCATION OF WELL**

In diagram below show distances of well from road and lot line.  
Indicate north by arrow.

5th line

N

15 ft

1/4 mile.

15 side Rd

191276

Name of Well Contractor <i>B. McLaugh</i>	Well Contractor's Licence No. <i>3561</i>
Address <i>156 Main St. French Mills</i>	
Name of Well Technician <i>T. J. Egan</i>	Well Technician's Licence No. <i>T-0298</i>
Signature of Technician/Contractor <i>B. McLaugh</i>	Submission date day      mo      yr

MINISTRY USE ONLY	Data source	58 Contractor	59-62	Date received	63-68	80
		3561		SEP 21 1998		
	Date of inspection	Inspector				
	Remarks					
	CSS. S9					



# The Ontario Water Resources Act

## WATER WELL RECORD


Print only in spaces provided.  
Mark correct box with a checkmark, where applicable.

1705199

17006  
Municipality

County or District <i>Duff</i>	Township/Borough/City/Town/Village <i>Mulmur</i>	Con block tract survey, etc. <i>6</i>	Lot <i>4</i>
Address <i>ALFEDGELEY BLVD. #14 CONCORD</i>		Date completed <i>10</i> day <i>9</i> month <i>1981</i> year	

[illegible]

41		10		14 15		21	
WATER RECORD							
Water found at - feet		Kind of water					
	1	<input type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur	14		
	2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals			
15-18 1	1	<input type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur	19		
	2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals			
20-23	1	<input type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur	24		
	2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals			
25-28	1	<input type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur	29		
	2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals			
30-33	1	<input type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur	34		
	2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals			

CASING & OPEN HOLE RECORD				
Inside diam inches	Material	Wall thickness inches	Depth - feet	
			From	To
10-11	<input checked="" type="checkbox"/> Steel <input type="checkbox"/> Galvanized <input type="checkbox"/> Concrete <input type="checkbox"/> Open hole <input type="checkbox"/> Plastic			
6 1/4		188	+3	20
17-18	<input type="checkbox"/> Steel <input type="checkbox"/> Galvanized <input type="checkbox"/> Concrete <input type="checkbox"/> Open hole <input type="checkbox"/> Plastic			
				20-23
24-25	<input type="checkbox"/> Steel <input type="checkbox"/> Galvanized <input type="checkbox"/> Concrete <input type="checkbox"/> Open hole <input type="checkbox"/> Plastic			
				27-30

<b>SCREEN</b>	Sizes of opening (Slot No.)	31-33	Diameter inches	34-38	Length feet	39-40
	Material and type			Depth at top of screen feet		

61		<b>PLUGGING &amp; SEALING RECORD</b>	
<input type="checkbox"/> Annular space		<input type="checkbox"/> Abandonment	
Depth set at - feet		Material and type (Cement grout, bentonite, etc.)	
From	To		
10-13	14-17		
18-21	22-25		
26-29	30-33		
		34	

PUMPING TEST	Pumping test method <sup>10</sup>		Pumping rate <sup>11-14</sup>		Duration of pumping <sup>17-18</sup>	
	1 <input type="checkbox"/> Pump 2 <input checked="" type="checkbox"/> Bailer		3 GPM		3 Hours 16 Mins	
	Static level		Water level end of pumping		25 Water levels during	
	19-21		22-24		1 <input checked="" type="checkbox"/> Pumping 2 <input type="checkbox"/> Recovery	
	30 feet		52 feet		15 minutes 26-28 30 minutes 29-31 45 minutes 32-34 60 minutes 35-37	
If flowing give rate <sup>38-41</sup>		Pump intake set at		Water at end of test <sup>42</sup>		
GPM		feet		<input type="checkbox"/> Clear <input checked="" type="checkbox"/> Cloudy		
Recommended pump type		Recommended pump setting		Recommended pump rate		
<input type="checkbox"/> Shallow <input checked="" type="checkbox"/> Deep		54 feet		2 GPM		

<b>FINAL STATUS OF WELL</b>			54
1 <input checked="" type="checkbox"/> Water supply	5 <input type="checkbox"/> Abandoned, insufficient supply	9 <input type="checkbox"/> Unfinished	
2 <input type="checkbox"/> Observation well	6 <input type="checkbox"/> Abandoned, poor quality	10 <input type="checkbox"/> Replacement well	
3 <input type="checkbox"/> Test hole	7 <input type="checkbox"/> Abandoned (Other)		
4 <input type="checkbox"/> Recharge well	8 <input type="checkbox"/> Dewatering		

---

<b>WATER USE</b>			55-56
1 <input checked="" type="checkbox"/> Domestic	5 <input type="checkbox"/> Commercial	9 <input type="checkbox"/> Not used	
2 <input type="checkbox"/> Stock	6 <input type="checkbox"/> Municipal	10 <input type="checkbox"/> Other .....	
3 <input type="checkbox"/> Irrigation	7 <input type="checkbox"/> Public supply		
4 <input type="checkbox"/> Industrial	8 <input type="checkbox"/> Cooling & air conditioning		

---

<b>METHOD OF CONSTRUCTION</b>			57
1 <input checked="" type="checkbox"/> Cable tool	5 <input type="checkbox"/> Air percussion	9 <input type="checkbox"/> Driving	
2 <input type="checkbox"/> Rotary (conventional)	6 <input type="checkbox"/> Boring	10 <input type="checkbox"/> Digging	
3 <input type="checkbox"/> Rotary (reverse)	7 <input type="checkbox"/> Diamond	11 <input type="checkbox"/> Other .....	
4 <input type="checkbox"/> Rotary (air)	8 <input type="checkbox"/> Jetting		

**LOCATION OF WELL**

In diagram below show distances of well from road and lot line.  
Indicate north by arrow.

lot line

1000 ft. TN

S.P.R.D.

1100 ft.

178273

Name of Well Contractor <i>TSK Corp</i>	Well Contractor's Licence No. <i>3561</i>
Address <i>156 Henry Miller</i>	
Name of Well Technician <i>TSK</i>	Well Technician's Licence No. <i>T-0298</i>
Signature of Technician/Contractor <i>[Signature]</i>	Submission date day mo yr

MINISTRY USE ONLY	Data source	58	Contractor	59-62	Date received	63-68
			3561		SEP 21 1998	
	Date of inspection		Inspector			
	Remarks					
	<div style="text-align: right;"> <b>CSS. \$9</b> </div>					



**The Ontario Water Resources Act**  
**WATER WELL RECORD**

Mark correct box with a checkmark, where applicable.

Municipality 17006 Con. HS 5 06

County or District <i>Duff</i>	Township/Borough/City/Town/Village <i>Mulmur</i>	Con block tract survey, etc. <i>6</i>	Lot <i>10</i>
Address <i>467 EDGELEY BLVD. #14 CONCORD</i>		Date completed <i>10</i> day <i>9</i> month <i>19</i> year	

**LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)**[illegible][illegible]

41		WATER RECORD				
Water found at - feet		Kind of water				
75	20-13	1	<input checked="" type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur	14
	2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals		
95	15-18	1	<input checked="" type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur	19
	2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals		
	20-23	1	<input type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur	24
	2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals		
	25-28	1	<input type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur	29
	2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals		
	30-33	1	<input type="checkbox"/> Fresh	3	<input type="checkbox"/> Sulphur	34
	2	<input type="checkbox"/> Salty	4	<input type="checkbox"/> Minerals		
				6	<input type="checkbox"/> Gas	

CASING & OPEN HOLE RECORD				
Inside diam inches	Material	Wall thickness inches	Depth - feet	
			From	To
10-11  6	1 <input checked="" type="checkbox"/> Steel 2 <input type="checkbox"/> Galvanized 3 <input type="checkbox"/> Concrete 4 <input type="checkbox"/> Open hole 5 <input type="checkbox"/> Plastic	188	0	20
17-18	1 <input type="checkbox"/> Steel 2 <input type="checkbox"/> Galvanized 3 <input type="checkbox"/> Concrete 4 <input type="checkbox"/> Open hole 5 <input type="checkbox"/> Plastic			
24-25	1 <input type="checkbox"/> Steel 2 <input type="checkbox"/> Galvanized 3 <input type="checkbox"/> Concrete 4 <input type="checkbox"/> Open hole 5 <input type="checkbox"/> Plastic			

<b>SCREEN</b>	Sizes of opening (Slot No.)	31-33	Diameter	34-38	Length	39-40
			inches		feet	
	Material and type	Depth at top of screen			41-44	30
					feet	

61 PLUGGING & SEALING RECORD			
<input type="checkbox"/> Annular space		<input type="checkbox"/> Abandonment	
Depth set at - feet		Material and type (Cement grout, bentonite, etc.)	
From	To		
10-13	14-17		
18-21	22-25		
26-29	30-33		

PUMPING TEST	71 Pumping test method <sup>10</sup> <input type="checkbox"/> Pump <input checked="" type="checkbox"/> Bailer		Pumping rate <sup>11-14</sup> <b>3</b> GPM		Duration of pumping <sup>15-18</sup> Hours ..... <b>2</b> ..... <sup>17-18</sup> Mins	
	Static level <sup>19-21</sup> <b>50</b> feet		Water level end of pumping <sup>22-24</sup> <b>91</b> feet		Water levels during <sup>25</sup> <input checked="" type="checkbox"/> Pumping <input type="checkbox"/> Recovery	
	15 minutes <sup>26-28</sup> <b>15</b> feet		30 minutes <sup>29-31</sup> <b>90</b> feet		45 minutes <sup>32-34</sup> <b>90</b> feet	
	60 minutes <sup>35-37</sup> <b>90</b> feet		If flowing give rate <sup>38-41</sup> GPM		Pump intake set at <sup>42</sup> feet	
	Recommended pump type <sup>43-45</sup> <input type="checkbox"/> Shallow <input checked="" type="checkbox"/> Deep		Recommended pump setting <sup>46-49</sup> <b>92</b> feet		Recommended pump rate <sup>50-53</sup> <b>2</b> GPM	

**FINAL STATUS OF WELL** 54

1 <input checked="" type="checkbox"/> Water supply	5 <input type="checkbox"/> Abandoned, insufficient supply	9 <input type="checkbox"/> Unfinished
2 <input type="checkbox"/> Observation well	6 <input type="checkbox"/> Abandoned, poor quality	10 <input type="checkbox"/> Replacement well
3 <input type="checkbox"/> Test hole	7 <input type="checkbox"/> Abandoned (Other)	
4 <input type="checkbox"/> Recharge well	8 <input type="checkbox"/> Dewatering	

**WATER USE** 55-56

1 <input checked="" type="checkbox"/> Domestic	5 <input type="checkbox"/> Commercial	9 <input type="checkbox"/> Not used
2 <input type="checkbox"/> Stock	6 <input type="checkbox"/> Municipal	10 <input type="checkbox"/> Other .....
3 <input type="checkbox"/> Irrigation	7 <input type="checkbox"/> Public supply	
4 <input type="checkbox"/> Industrial	8 <input type="checkbox"/> Cooling & air conditioning	

**METHOD OF CONSTRUCTION** <sup>57</sup>

1 <input type="checkbox"/> Cable tool	5 <input type="checkbox"/> Air percussion	9 <input type="checkbox"/> Driving
2 <input type="checkbox"/> Rotary (conventional)	6 <input type="checkbox"/> Boring	10 <input type="checkbox"/> Digging
3 <input type="checkbox"/> Rotary (reverse)	7 <input type="checkbox"/> Diamond	11 <input type="checkbox"/> Other .....
4 <input type="checkbox"/> Rotary (air)	8 <input type="checkbox"/> Jetting	

**LOCATION OF WELL**

In diagram below show distances of well from road and lot line.  
Indicate north by arrow.

191271

Name of Well Contractor <i>B. J. McLean</i>	Well Contractor's Licence No. <i>3561</i>
Address <i>156 Main St. Haining, Nib</i>	
Name of Well Technician <i>B. J. McLean</i>	Well Technician's Licence No. <i>T-0295</i>
Signature of Technician/Contractor <i>B. J. McLean</i>	Submission date day      mo      yr

MINISTRY USE ONLY	Data source	58	Contractor	59-62	Date received	63-68	80
			3561		SEP 21 1998		
	Date of inspection	Inspector					
	Remarks						
	<div style="text-align: right;"> <b>CSS. S9</b> </div>						

### Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.  
 • All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.  
 • Questions regarding completing this application can be directed to the Water Well Management Coordinator at 416-235-6203.  
 • **All metre measurements shall be reported to 1/10<sup>th</sup> of a metre.**  
 • Please print clearly in blue or black ink only.
- |  |                          |
|--|--------------------------|
|  | <b>Ministry Use Only</b> |
|--|--------------------------|

### Well Owner's Information and Location of Well Information

Ministry Use Only												
MUN					CON						LOT	

RR#/Street Number/Name			City/Town/Village			Site/Compartment/Block/Tract etc.		
GPS Reading			NAD	Zone	Easting	Northing	Unit Make/Model	Mode of Operation:
			8.3	17	575233	4893504	MAGILLAN	<input type="checkbox"/> Undifferentiated <input checked="" type="checkbox"/> Averaged <input type="checkbox"/> Differentiated, specify _____

## Log of Overburden and Bedrock Materials (see instructions)

[illegible]

Hole Diameter		
Depth	Metres	Diameter
From	To	Centimetres
0	20	8
23	84	6.

[illegible]

Casing			
6	<input checked="" type="checkbox"/> Steel <input type="checkbox"/> Fibreglass <input type="checkbox"/> Plastic <input type="checkbox"/> Concrete <input type="checkbox"/> Galvanized	158	+3
	<input type="checkbox"/> Steel <input type="checkbox"/> Fibreglass <input type="checkbox"/> Plastic <input type="checkbox"/> Concrete <input type="checkbox"/> Galvanized		
	<input type="checkbox"/> Steel <input type="checkbox"/> Fibreglass <input type="checkbox"/> Plastic <input type="checkbox"/> Concrete <input type="checkbox"/> Galvanized		

Screen			
Outside diam	<input type="checkbox"/> Steel	<input type="checkbox"/> Fibreglass	Slot No.
	<input type="checkbox"/> Plastic	<input type="checkbox"/> Concrete	
	<input type="checkbox"/> Galvanized		

No Casing or Screen		
<input checked="" type="checkbox"/> Open hole	26	84.

Test of Well Yield					
Pumping test method		Draw Down		Recovery	
<i>pump</i>		Time min	Water Level Metres	Time min	Water Level Metres
Pump intake set at - (metres)	<i>8.2</i>	Static Level	<i>41</i>		
Pumping rate (litres/min)	<i>8</i>	1	<i>45</i>	1	<i>78.2</i>
Duration of pumping		2	<i>46</i>	2	<i>72</i>
<i>2</i> hrs + ____ min					
Final water level end of pumping		3	<i>48</i>	3	<i>70.3</i>
<i>79.1</i> metres					
Recommended pump type.		4	<i>52</i>	4	<i>68.5</i>
<input type="checkbox"/> Shallow <input type="checkbox"/> Deep					
Recommended pump depth.	<i>80.1</i> metres	5	<i>60</i>	5	<i>65.1</i>
Recommended pump rate.	<i>7</i> (litres/min)	10	<i>71.5</i>	10	<i>56</i>
		15	<i>71.2</i>	15	
If flowing give rate -		20	<i>79.2</i>	20	<i>52.6</i>
(litres/min)		25	<i>79.2</i>	25	<i>58.7</i>
		30	<i>79.2</i>	30	<i>58.7</i>
If pumping discontinued, give reason.		40	<i>79.2</i>	40	<i>49.1</i>
		50	<i>79.2</i>	50	<i>48.5</i>
		60	<i>79.2</i>	60	<i>47.8</i>

Plugging and Sealing Record		<input checked="" type="checkbox"/> Annular space	<input type="checkbox"/> Abandonment
Depth set at - Metres		Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
From	To		
0	20	Bentonite	6.

Method of Construction			
<input checked="" type="checkbox"/> Cable Tool	<input type="checkbox"/> Rotary (air)	<input type="checkbox"/> Diamond	<input type="checkbox"/> Digging
<input type="checkbox"/> Rotary (conventional)	<input type="checkbox"/> Air percussion	<input type="checkbox"/> Jetting	<input type="checkbox"/> Other
<input type="checkbox"/> Rotary (reverse)	<input type="checkbox"/> Boring	<input type="checkbox"/> Driving	

Water Use			
<input checked="" type="checkbox"/> Domestic	<input type="checkbox"/> Industrial	<input type="checkbox"/> Public Supply	<input type="checkbox"/> Other
<input type="checkbox"/> Stock	<input type="checkbox"/> Commercial	<input type="checkbox"/> Not used	
<input type="checkbox"/> Irrigation	<input type="checkbox"/> Municipal	<input type="checkbox"/> Cooling & air conditioning	

Final Status of Well			
<input checked="" type="checkbox"/> Water Supply	<input type="checkbox"/> Recharge well	<input type="checkbox"/> Unfinished	<input type="checkbox"/> Abandoned, (Other) _____
<input type="checkbox"/> Observation well	<input type="checkbox"/> Abandoned, insufficient supply	<input type="checkbox"/> Dewatering	
<input type="checkbox"/> Test Hole	<input type="checkbox"/> Abandoned, poor quality	<input type="checkbox"/> Replacement well	

Well Contractor/Technician Information			
Name of Well Contractor <i>Sam</i>		Well Contractor's Licence No. <i>3501</i>	
Business Address (street name, number, city etc.) <i>R2 Shelburne</i>			
Name of Well Technician (last name, first name) <i>Sam</i>		Well Technician's Licence No. <i>298</i>	
Signature of Technician/Contractor <i>[Signature]</i>		Date Submitted YYYY MM DD	

Location of Well
In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.

A hand-drawn sketch of a rectangular area. The top horizontal boundary is labeled "15 SDRD" with an upward-pointing arrow above it labeled "N". The right vertical boundary is labeled "150 ft." with a downward-pointing arrow to its left. The bottom horizontal boundary is labeled "250 ft." with a rightward-pointing arrow above it. The left vertical boundary is labeled "Line" with a leftward-pointing arrow to its right. The entire sketch is enclosed within a rectangular frame.

Audit No. <b>z 46470</b>	Date Well Completed <b>2006</b> <b>04/29</b>
Was the well owner's information package delivered? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Date Delivered <b>2006</b> <b>04/12</b>

Ministry Use Only			
Data Source	Contractor 3561		
Date Received	YYYY	MM	DD
	MAY 10	2006	
Remarks	Well Record Number		



## **APPENDIX B**

**As Constructed PW1**

**Water Well Record**

**Grain Size Curves**

# AS CONSTRUCTED PW1

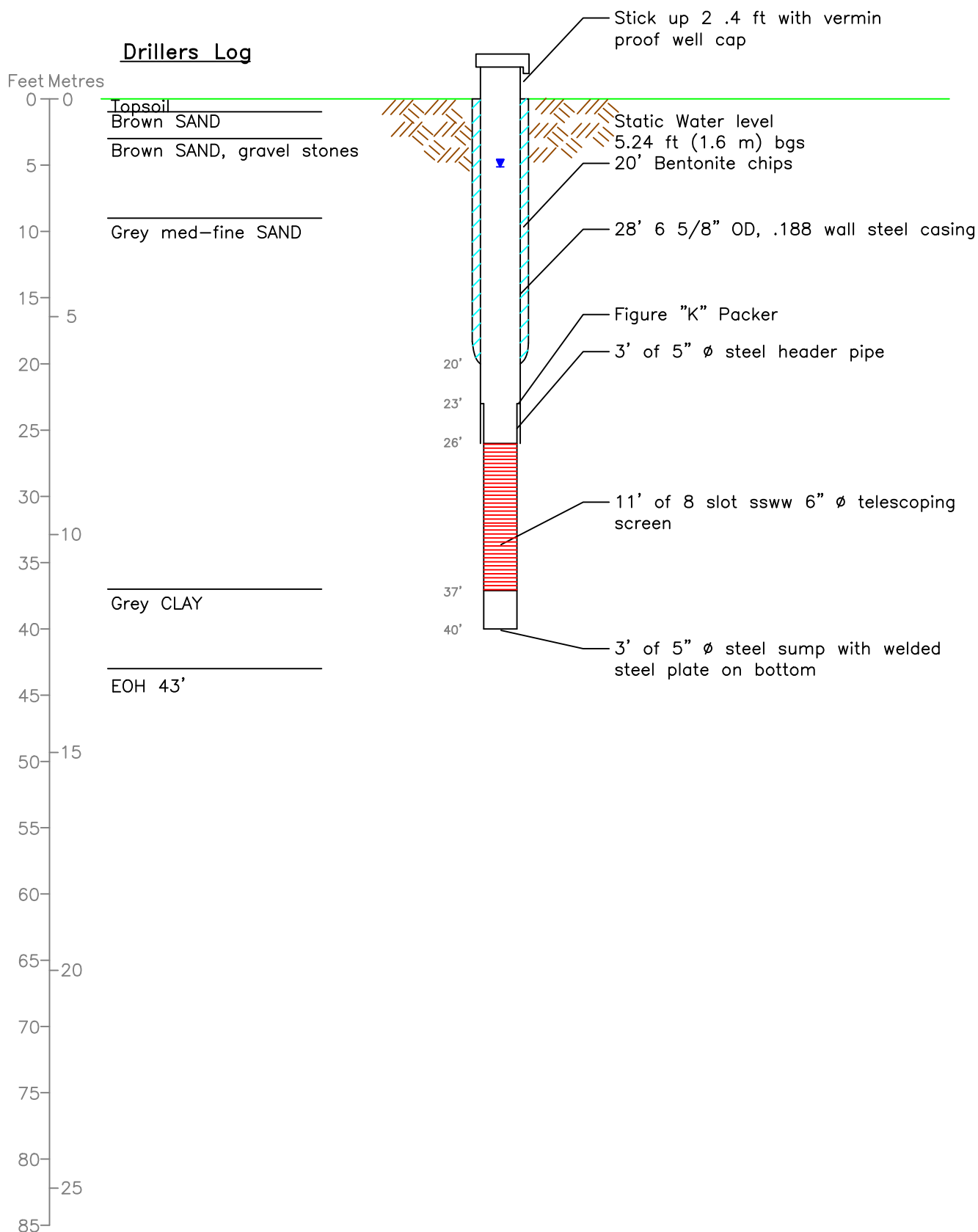


FIGURE B-1

## AS CONSTRUCTED PW1

Hydrogeology and Test Drilling Report

Mansfield Ski Club

Mulmur Township, Ontario



Morrison Environmental Limited

Groundwater Consultants



Ministry of the Environment  
and Climate Change

Well Tag No. (Place Sticker and/or Print Below)

Tag#: A185277

## Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☐ Metric ☒ Imperial

Page 1 of 1

### Well Owner's Information

First Name	Last Name / Organization	E-mail Address	<input type="checkbox"/> Well Constructed by Well Owner
	Mansfield Ski Club		
Mailing Address (Street Number/Name)	Municipality	Province	Postal Code
628213 15 SR			

### Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
648200 15 SR	Mulmur	16	6 EHS
County/District/Municipality	City/Town/Village	Province	Postal Code
Dufferin		Ontario	
UTM Coordinates	Zone	Eastings	Northings
NAD 83	17	575576	4894800
Municipal Plan and Sublot Number	Other		
	PW1		

### Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft)
				From To
Brown	Topsoil			0 1
Brown	Sand			1 3
Brown	Sand	gravel / Stones		3 9
Grey	medium fine Sand			9 37
Grey	Clay			37 43

Annular Space			Results of Well Yield Testing			
Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)	After test of well yield, water was:	Draw Down	Recovery	
From To			<input checked="" type="checkbox"/> Clear and sand free <input type="checkbox"/> Other, specify	Time (min) Water Level (m/ft)	Time (min) Water Level (m/ft)	
0 20	Benfonite Grout		If pumping discontinued, give reason:	Static Level 7.15		
20 39	Natural Sand Pack			1 11.4	1 8.65	
			Pump intake set at (m/ft)	2 12.15	2 7.93	
			Pumping rate (l/min / GPM)	3 12.4	3 7.67	
			Duration of pumping	4 12.5	4 7.56	
			1 hrs + 0 min	5 12.6	5 7.45	
			Final water level end of pumping (m/ft)	10 12.75	10 7.3	
			12.87	15 12.81	15	
			If flowing give rate (l/min / GPM)	20 12.84	20	
			Recommended pump depth (m/ft)	25 12.84	25	
			Recommended pump rate (l/min / GPM)	30 12.84	30	
			Well production (l/min / GPM)	40 12.86	40	
			Disinfected?	50 12.86	50	
			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	60 12.87	60	

Method of Construction		Well Use	
<input type="checkbox"/> Cable Tool <input checked="" type="checkbox"/> Rotary (Conventional) <input type="checkbox"/> Rotary (Reverse) <input type="checkbox"/> Boring <input type="checkbox"/> Air percussion <input type="checkbox"/> Other, specify	<input type="checkbox"/> Diamond <input type="checkbox"/> Jetting <input type="checkbox"/> Driving <input type="checkbox"/> Digging	<input type="checkbox"/> Public <input type="checkbox"/> Domestic <input type="checkbox"/> Livestock <input type="checkbox"/> Irrigation <input type="checkbox"/> Industrial <input type="checkbox"/> Other, specify	<input type="checkbox"/> Commercial <input type="checkbox"/> Municipal <input checked="" type="checkbox"/> Test Hole <input type="checkbox"/> Cooling & Air Conditioning <input type="checkbox"/> Dewatering <input type="checkbox"/> Monitoring

Construction Record - Casing				Status of Well	
Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)	From	To
6	Steel	.188	-2	26	
5	Steel	.188	34	39	

Construction Record - Screen				Status of Well	
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)	From	To
6	Steel	8	26	36	

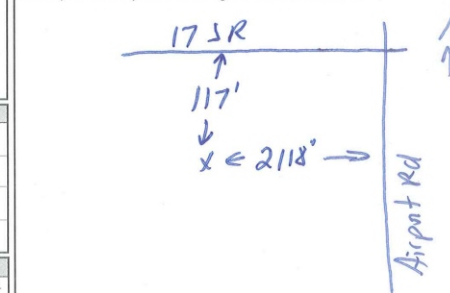
Water Details		Hole Diameter	
Water found at Depth (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	Depth (m/ft)	Diameter (cm/in)
	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	From To	
		0 39	8 1/2

Water found at Depth (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input type="checkbox"/> Untested
	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify
Water found at Depth (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input type="checkbox"/> Untested
	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify

Well Contractor and Well Technician Information	
Business Name of Well Contractor	Well Contractor's Licence No.
FRED CONSTABLE	1663
Business Address (Street Number/Name)	Municipality
3519 5TH LINE	
Province	Business E-mail Address
BRADFORD ON	
Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
	Thompson Steve
Well Technician's Licence No.	Signature of Technician and/or Contractor
2120	
0506E (2014/11)	Date Submitted
	20160601

### Map of Well Location

Please provide a map below following instructions on the back.



Comments:	Well owner's information package delivered <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Date Package Delivered	Ministry Use Only
		Y Y Y Y M M D D	Audit No. 2212015
		Date Work Completed	Received
		20160530	

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FIGURE B-2

**WATER WELL RECORD PW1**  
**Hydrogeology and Test Drilling Report**  
**Mansfield Ski Club**  
Mulmur Township, Ontario



**Morrison Environmental Limited**  
Groundwater Consultants

# GRAIN SIZE DISTRIBUTION

Project No.:

**510-161**

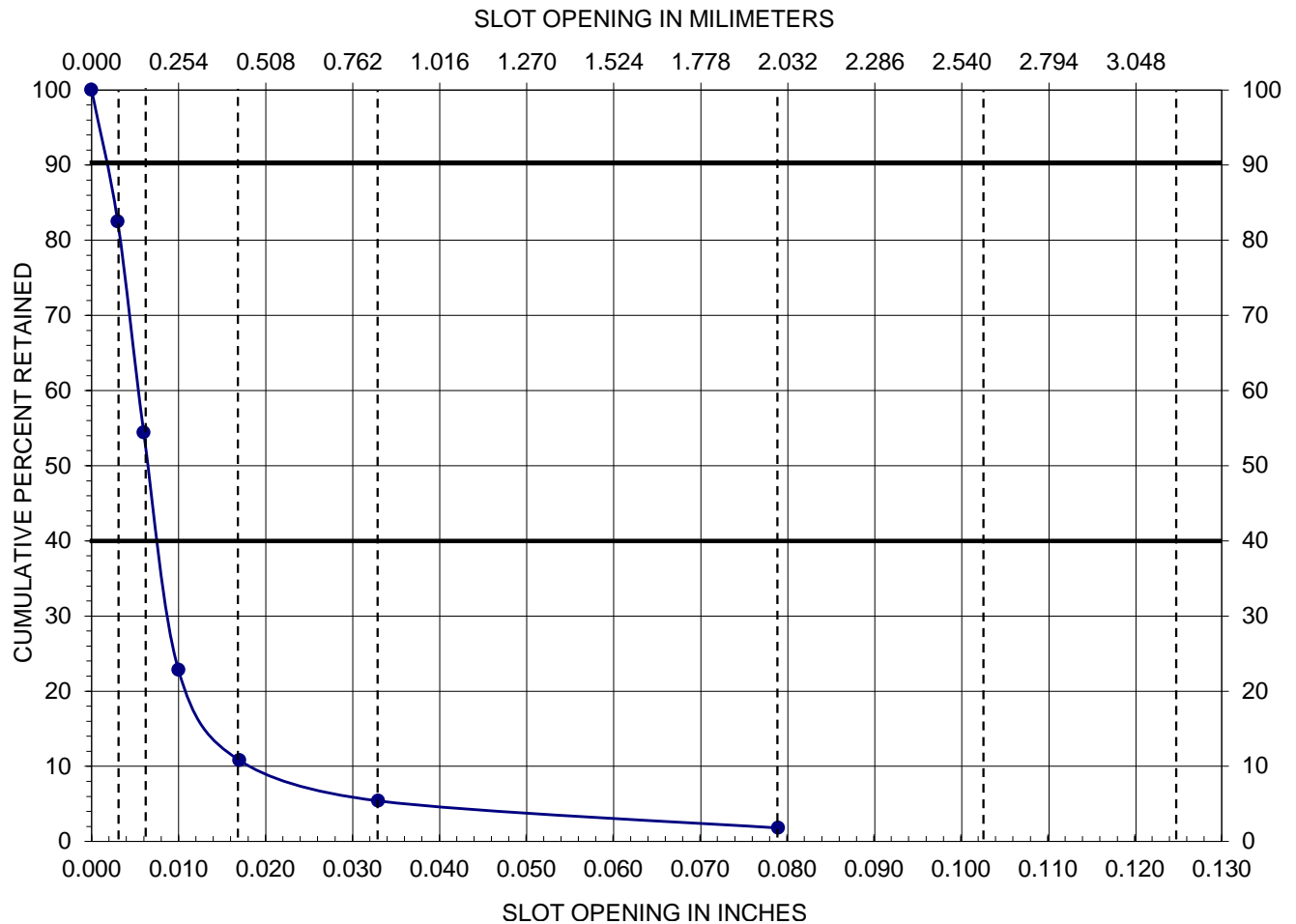
Date: 11-May-16

Hole No.: **PW1**

Sample No.:

**81**

Depth: **8-13 ft**



Standard Sieve Number	Sieve Opening (inches)	Cumulative		
		Weight Retained (gms)	Weight % Passing or Retained	% Retained
3/8"	0.375			
4	0.187			
10	0.079			1.8
20	0.033			5.4
40	0.017			10.8
60	0.010			22.8
100	0.006			54.4
200	0.003			82.5
	Pan			100
	Screen slot			

**Figure B-3**

# GRAIN SIZE DISTRIBUTION

Project No.:

**510-161**

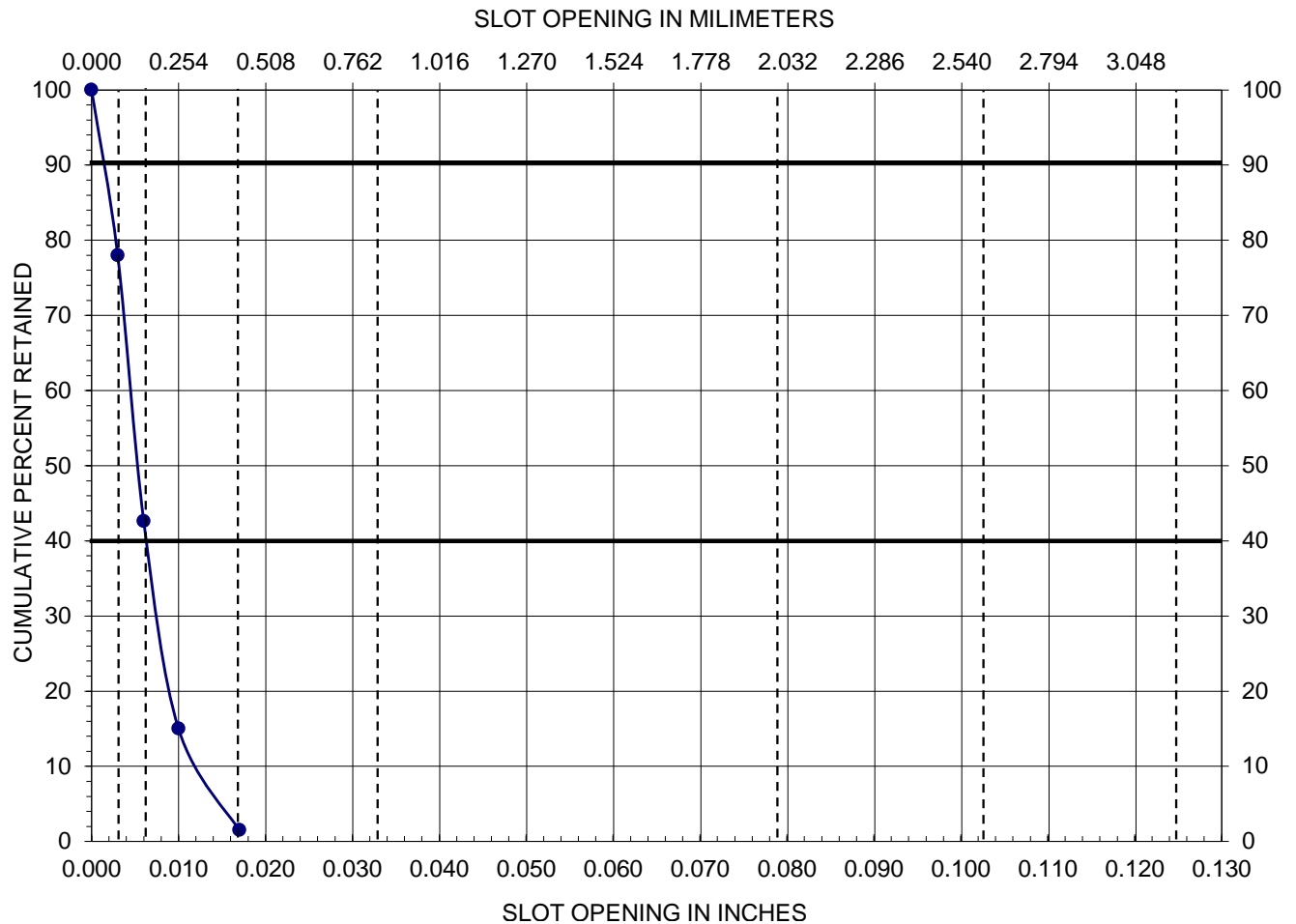
Date: 11-May-16

Hole No.: **PW1**

Sample No.:

**82**

Depth: **13-18 ft**



Standard Sieve Number	Sieve Opening (inches)	Cumulative		
		Weight Retained (gms)	Weight % Passing or Retained	% Retained
3/8"	0.375			
4	0.187			
10	0.079			
20	0.033			
40	0.017			1.5
60	0.010			15
100	0.006			42.6
200	0.003			78
	Pan			100
	Screen slot			

**Figure B-4**



# GRAIN SIZE DISTRIBUTION

Project No.:

**510-161**

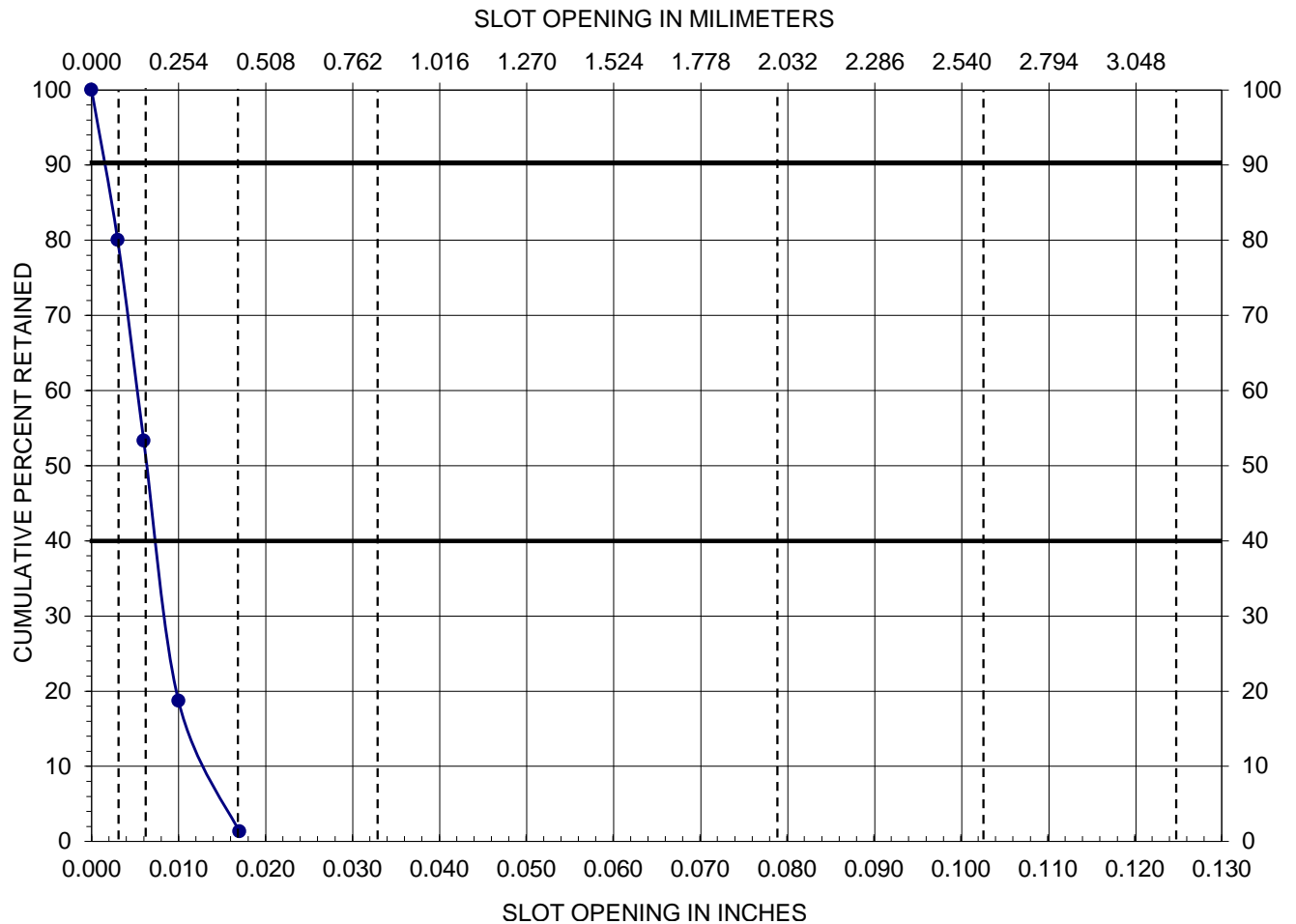
Date: 11-May-16

Hole No.: **PW1**

Sample No.:

**83**

Depth: **18-23 ft**



Standard Sieve Number	Sieve Opening (inches)	Cumulative		
		Weight Retained (gms)	Weight % Passing or Retained	% Retained
3/8"	0.375			
4	0.187			
10	0.079			
20	0.033			
40	0.017			1.3
60	0.010			18.7
100	0.006			53.3
200	0.003			80
	Pan			100
	Screen slot			

**Figure B-5**

# GRAIN SIZE DISTRIBUTION

Project No.:

**510-161**

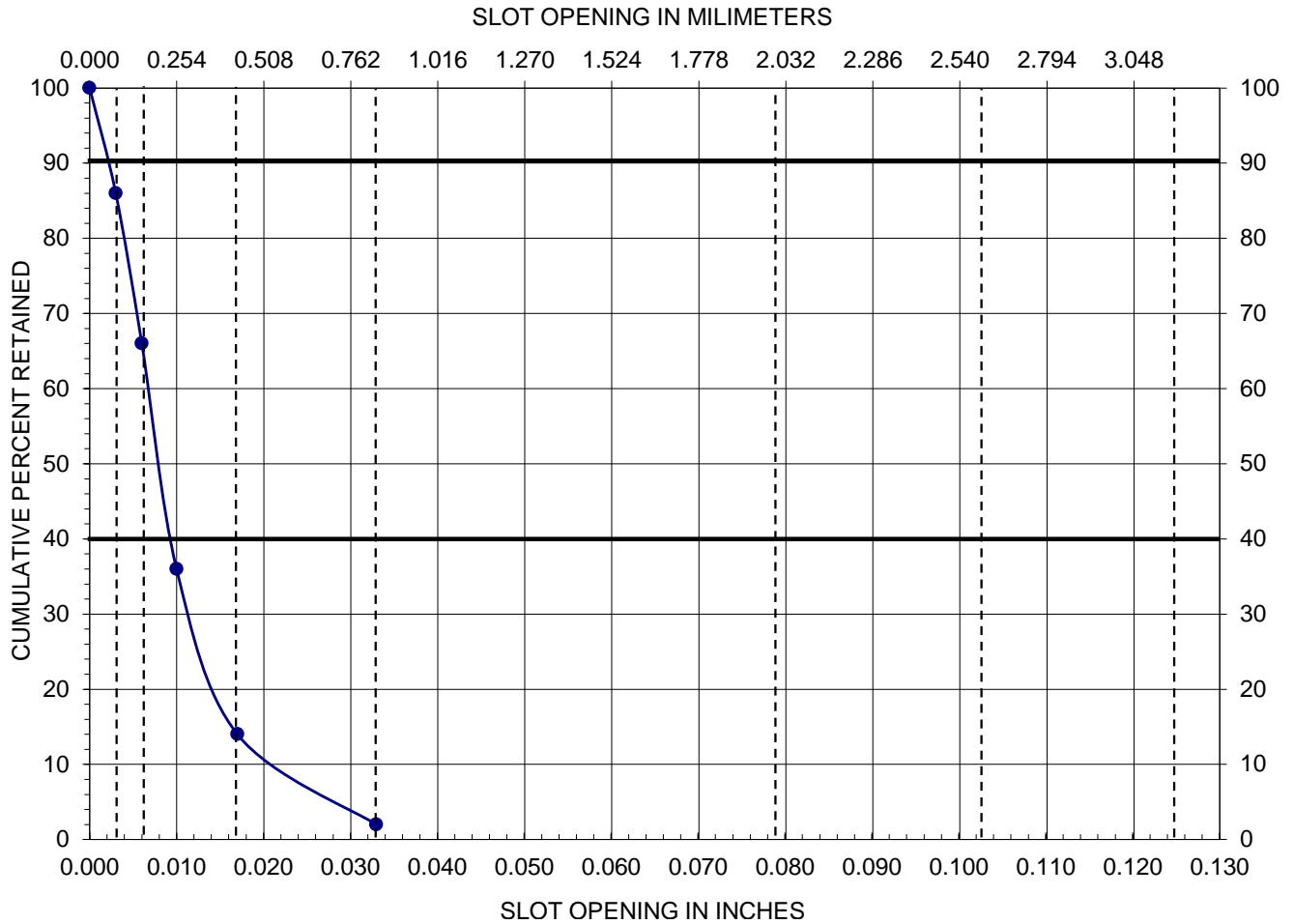
Date: 11-May-16

Hole No.: **PW1**

Sample No.:

**84**

Depth: **23-28 ft**



Standard Sieve Number	Sieve Opening (inches)	Cumulative		
		Weight Retained (gms)	Weight % Passing or Retained	% Retained
3/8"	0.375			
4	0.187			
10	0.079			
20	0.033			2
40	0.017			14
60	0.010			36
100	0.006			66
200	0.003			86
	Pan			100
	Screen slot			

**Figure B-6**

# GRAIN SIZE DISTRIBUTION

Project No.:

**510-161**

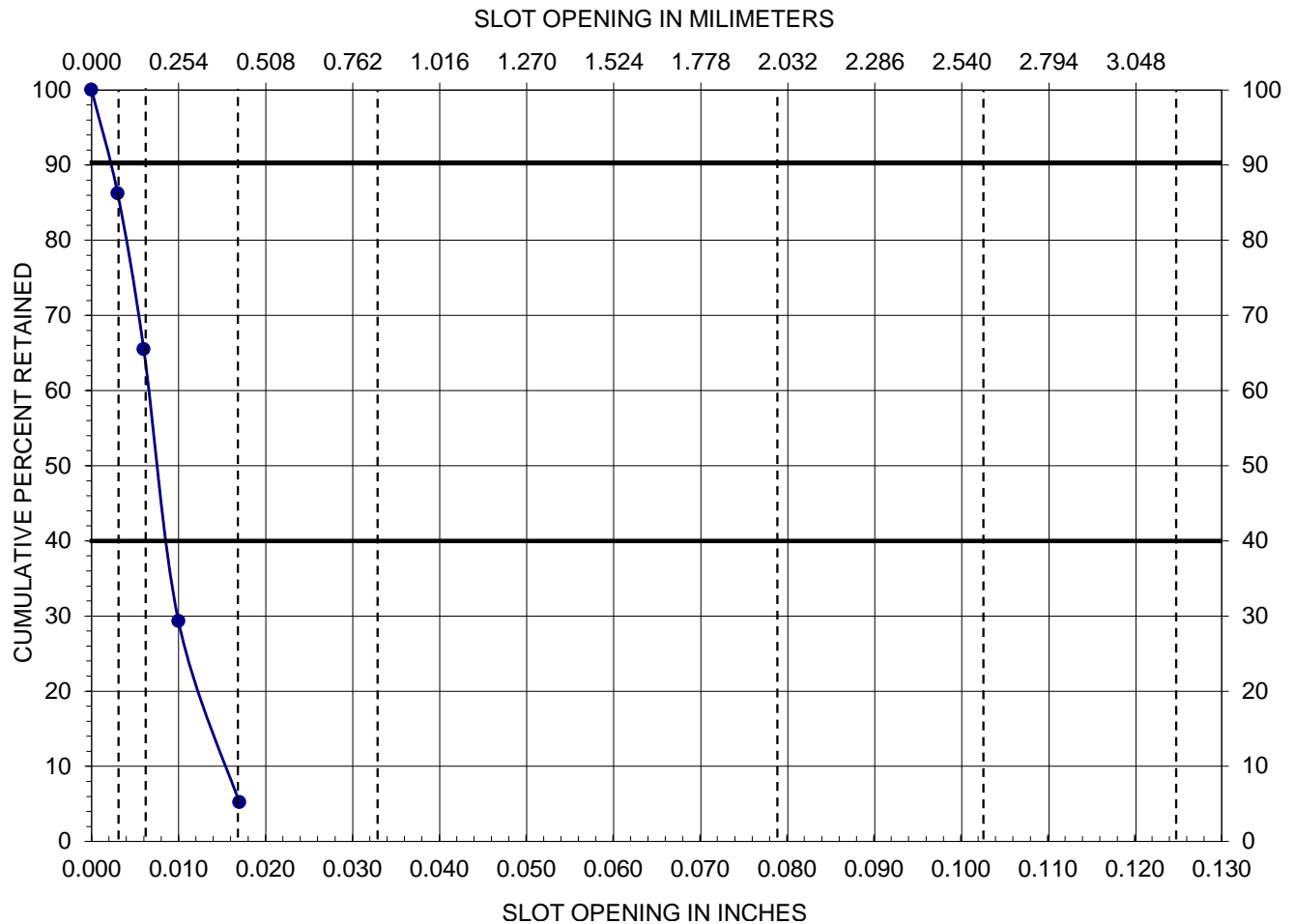
Date: 11-May-16

Hole No.: **PW1**

Sample No.:

**85**

Depth: **28-33 ft**



Standard Sieve Number	Sieve Opening (inches)	Cumulative		
		Weight Retained (gms)	Weight % Passing or Retained	% Retained
3/8"	0.375			
4	0.187			
10	0.079			
20	0.033			
40	0.017			5.2
60	0.010			29.3
100	0.006			65.5
200	0.003			86.2
	Pan			100
	Screen slot			

**Figure B-7**

# GRAIN SIZE DISTRIBUTION

Project No.:

**510-161**

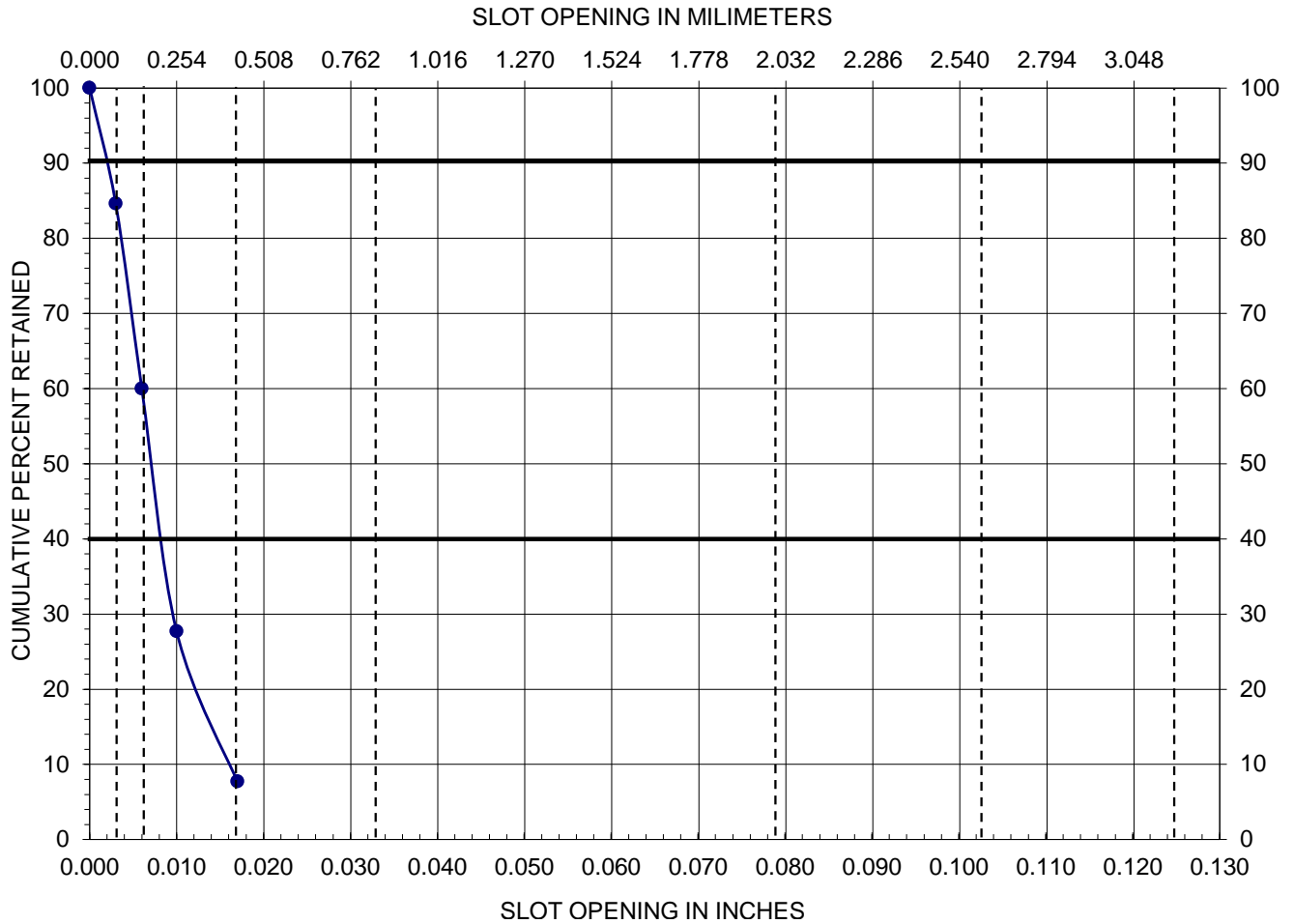
Date: 11-May-16

Hole No.: **PW1**

Sample No.:

**86**

Depth: **33-37 ft**



Standard Sieve Number	Sieve Opening (inches)	Cumulative		
		Weight Retained (gms)	Weight % Passing or Retained	% Retained
3/8"	0.375			
4	0.187			
10	0.079			
20	0.033			
40	0.017			7.7
60	0.010			27.7
100	0.006			60
200	0.003			84.6
	Pan			100
	Screen slot			

**Figure B-8**



## **APPENDIX C**

**As Constructed PW2**

**Water Well Record**

**Grain Size Curves**

# AS CONSTRUCTED PW2

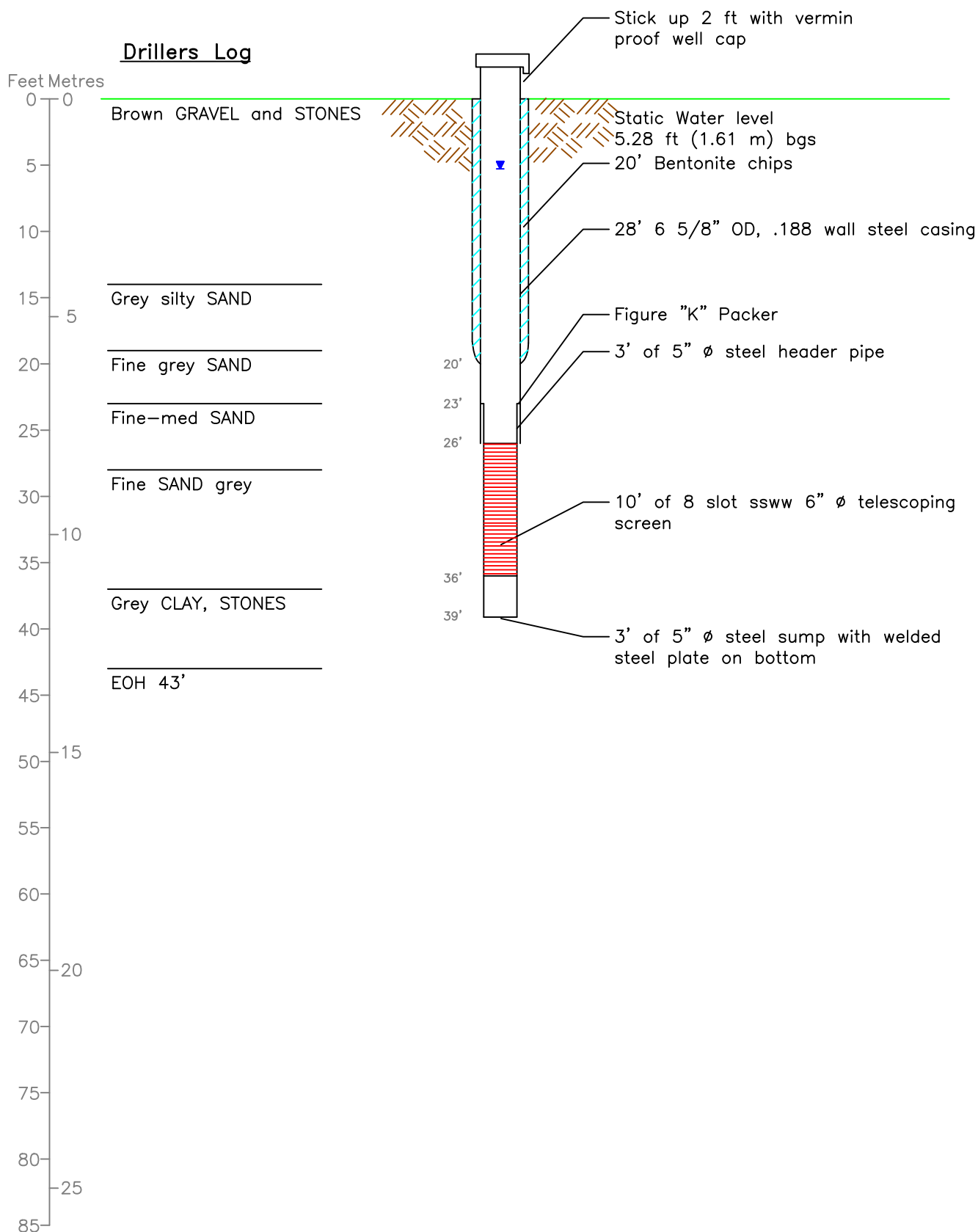


FIGURE C-1

## AS CONSTRUCTED PW2

Hydrogeology and Test Drilling Report

Mansfield Ski Club

Mulmur Township, Ontario



Morrison Environmental Limited

Groundwater Consultants



Ministry of the Environment  
and Climate Change

Well Tag No. (Place Sticker and/or Print Below)

Tag#: A185276

## Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

Measurements recorded in: ☐ Metric ☒ Imperial

### Well Owner's Information

First Name: Mailing Address (Street Number/Name): 628213 15 SR Municipality: Mansfield Province: Postal Code: Telephone No. (inc. area code):  
Last Name / Organization: Mansfield Ski Club E-mail Address: ☐ Well Constructed by Well Owner

### Well Location

Address of Well Location (Street Number/Name): 648200 17 SR Township: Mulmur Lot: 16 Concession: 6 EHS  
County/District/Municipality: Dufferin City/Town/Village: Province: Ontario Postal Code:  
UTM Coordinates Zone: Easting: Northing: Municipal Plan and Sublot Number: Other: PW2  
NAD 83 17 57 5.88 9 48 9 47 18

### Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft)
Brown	Gravel	Shales		0 14
Grey	Clay	Silt Sand		14 19
Grey	Fine Sand			19 23
Grey	Med Fine Sand			23 28
Grey	Fine Sand			28 37
Grey	Clay			37 39

Annular Space			Results of Well Yield Testing		
Depth Set at (m/ft)	From	To	Type of Sealant Used (Material and Type)	Volume Placed (m <sup>3</sup> /ft <sup>3</sup> )	After test of well yield, water was:
0	20		Bentonite		<input checked="" type="checkbox"/> Clear and sand free
20	39		Sand Pack (Natural)		<input type="checkbox"/> Other, specify

Method of Construction		Well Use	
<input checked="" type="checkbox"/> Cable Tool	<input type="checkbox"/> Diamond	<input type="checkbox"/> Public	<input type="checkbox"/> Commercial
<input checked="" type="checkbox"/> Rotary (Conventional)	<input type="checkbox"/> Jetting	<input type="checkbox"/> Domestic	<input type="checkbox"/> Municipal
<input type="checkbox"/> Rotary (Reverse)	<input type="checkbox"/> Driving	<input type="checkbox"/> Livestock	<input type="checkbox"/> Test Hole
<input type="checkbox"/> Boring	<input type="checkbox"/> Digging	<input type="checkbox"/> Irrigation	<input type="checkbox"/> Cooling & Air Conditioning
<input type="checkbox"/> Air percussion		<input type="checkbox"/> Industrial	
<input type="checkbox"/> Other, specify		<input type="checkbox"/> Other, specify	

Construction Record - Casing				Status of Well	
Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)	From	To
6	Steel	.188	-2	26	
5	Steel	.188	36	39	

Construction Record - Screen				Status of Well	
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)	From	To
6	Steel	8	26	36	

Water Details		Hole Diameter	
Water found at Depth (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	Depth (m/ft)	Diameter (cm/in)
	<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	From	To
		0	39 8 1/2

Business Name of Well Contractor: FRED CONSTABLE & SON LTD		Well Contractor's Licence No.: 16613
Business Address (Street Number/Name): 3519 5TH LINE BRADFORD ON. L3Z 2A4		Municipality:
Province:	Postal Code:	Business E-mail Address:
Bus. Telephone No. (inc. area code):	Name of Well Technician (Last Name, First Name): Thompson Steve	
Well Technician's Licence No.: 2170	Signature of Technician and/or Contractor:	Date Submitted: 20160606

Map of Well Location

Please provide a map below following instructions on the back.

17 SR  
402'  
X ← 2083' →  
Airport Rd

Comments:

Well owner's information package delivered: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Date Package Delivered: YYY Y M M D D 20160530	Date Work Completed: 20160530
Ministry Use Only		Audit No.: 2212016
Received:		

FIGURE C-2

# GRAIN SIZE DISTRIBUTION

Project No.:

**510-161 Mansfield**

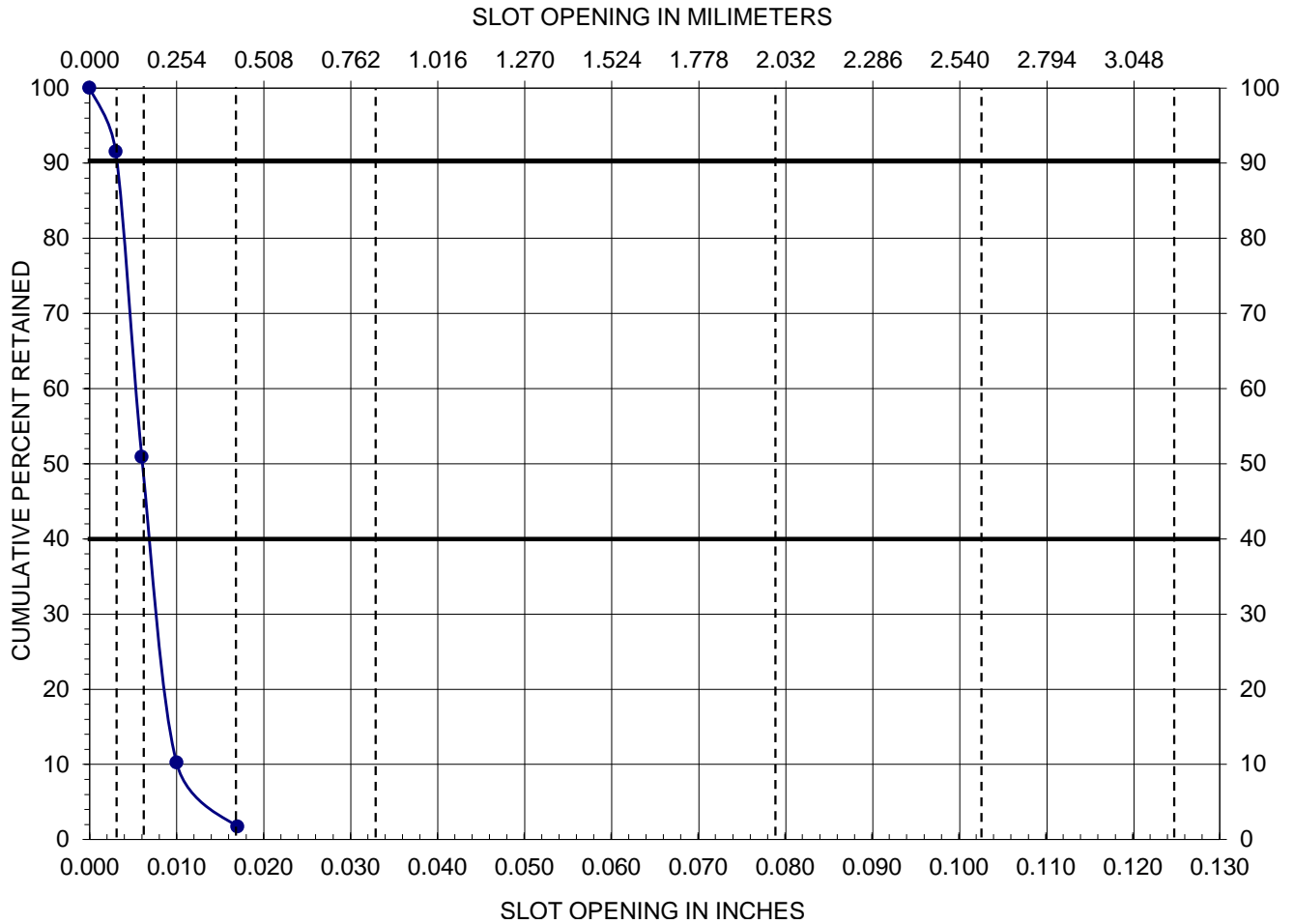
Date: 16-May-16

Hole No.: **PW2**

Sample No.:

**87**

Depth: **13-18 ft**



Standard Sieve Number	Sieve Opening (inches)	Cumulative		
		Weight Retained (gms)	Weight % Passing or Retained	% Retained
3/8"	0.375			
4	0.187			
10	0.079			
20	0.033			
40	0.017			1.7
60	0.010			10.2
100	0.006			50.9
200	0.003			91.5
	Pan			100
	Screen slot			

**Figure C-3**



# GRAIN SIZE DISTRIBUTION

Project No.:

**510-161 Mansfield**

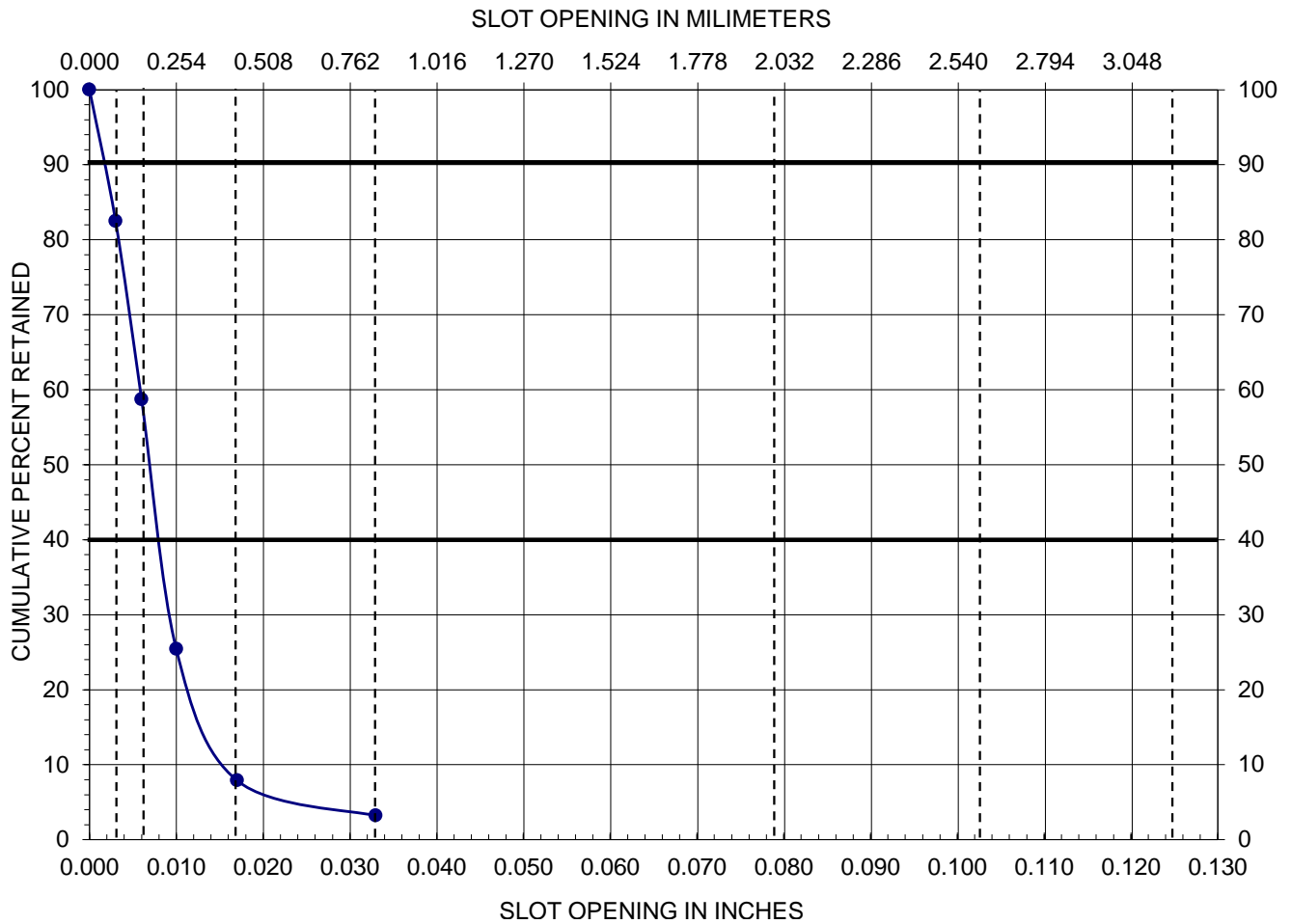
Date: 16-May-16

Hole No.: **PW2**

Sample No.:

**88**

Depth: **18-23 ft**



Standard Sieve Number	Sieve Opening (inches)	Cumulative		
		Weight Retained (gms)	Weight % Passing or Retained	% Retained
3/8"	0.375			
4	0.187			
10	0.079			
20	0.033			3.2
40	0.017			7.9
60	0.010			25.4
100	0.006			58.7
200	0.003			82.5
	Pan			100
	Screen slot			

**Figure C-4**

# GRAIN SIZE DISTRIBUTION

Project No.:

**510-161 Mansfield**

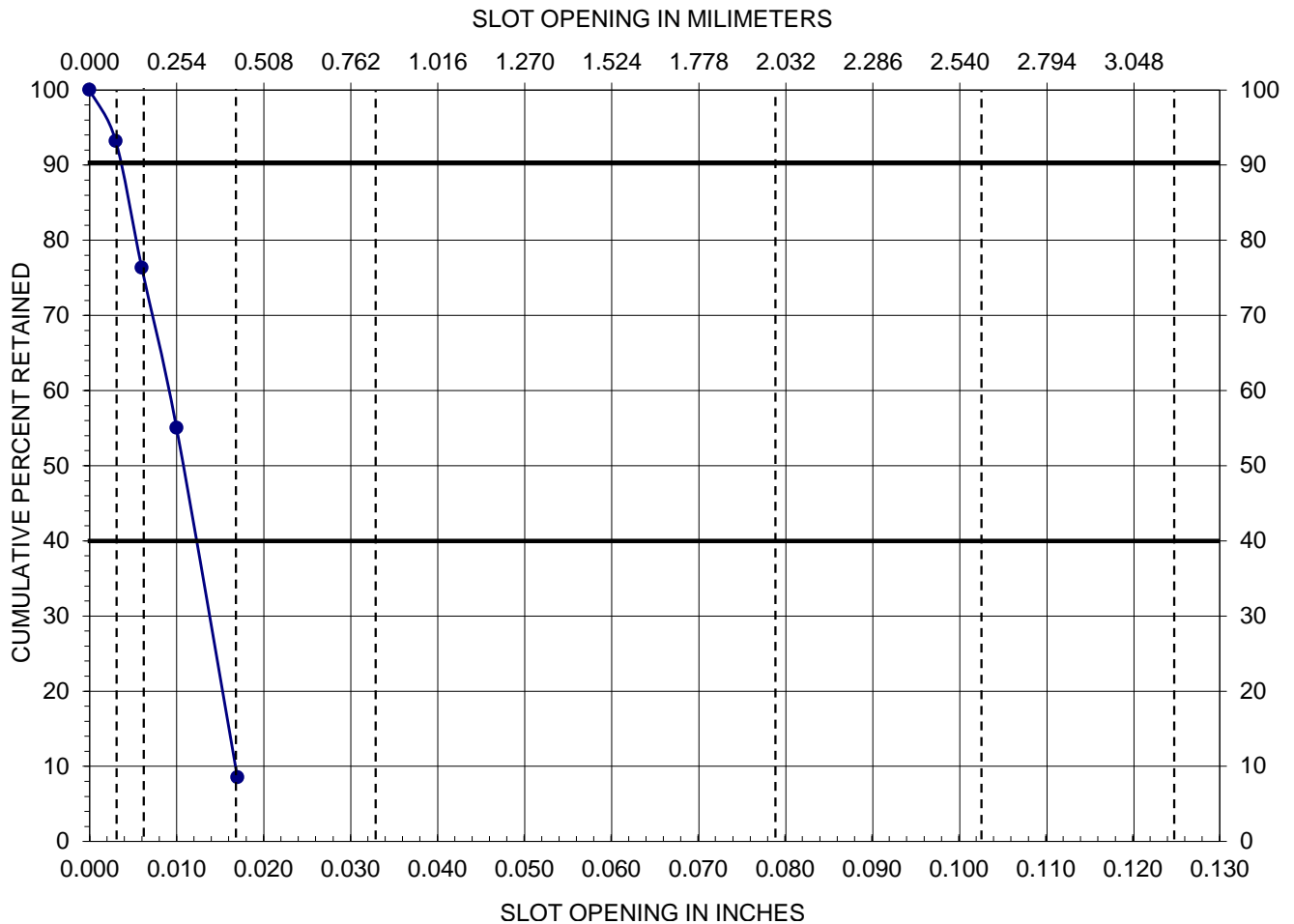
Date: 16-May-16

Hole No.: **PW2**

Sample No.:

**89**

Depth: **23-28 ft**



Standard Sieve Number	Sieve Opening (inches)	Cumulative		
		Weight Retained (gms)	Weight % Passing or Retained	% Retained
3/8"	0.375			
4	0.187			
10	0.079			
20	0.033			
40	0.017			8.5
60	0.010			55
100	0.006			76.3
200	0.003			93.2
	Pan			100
	Screen slot			

**Figure C-5**

# GRAIN SIZE DISTRIBUTION

Project No.:

**510-161 Mansfield**

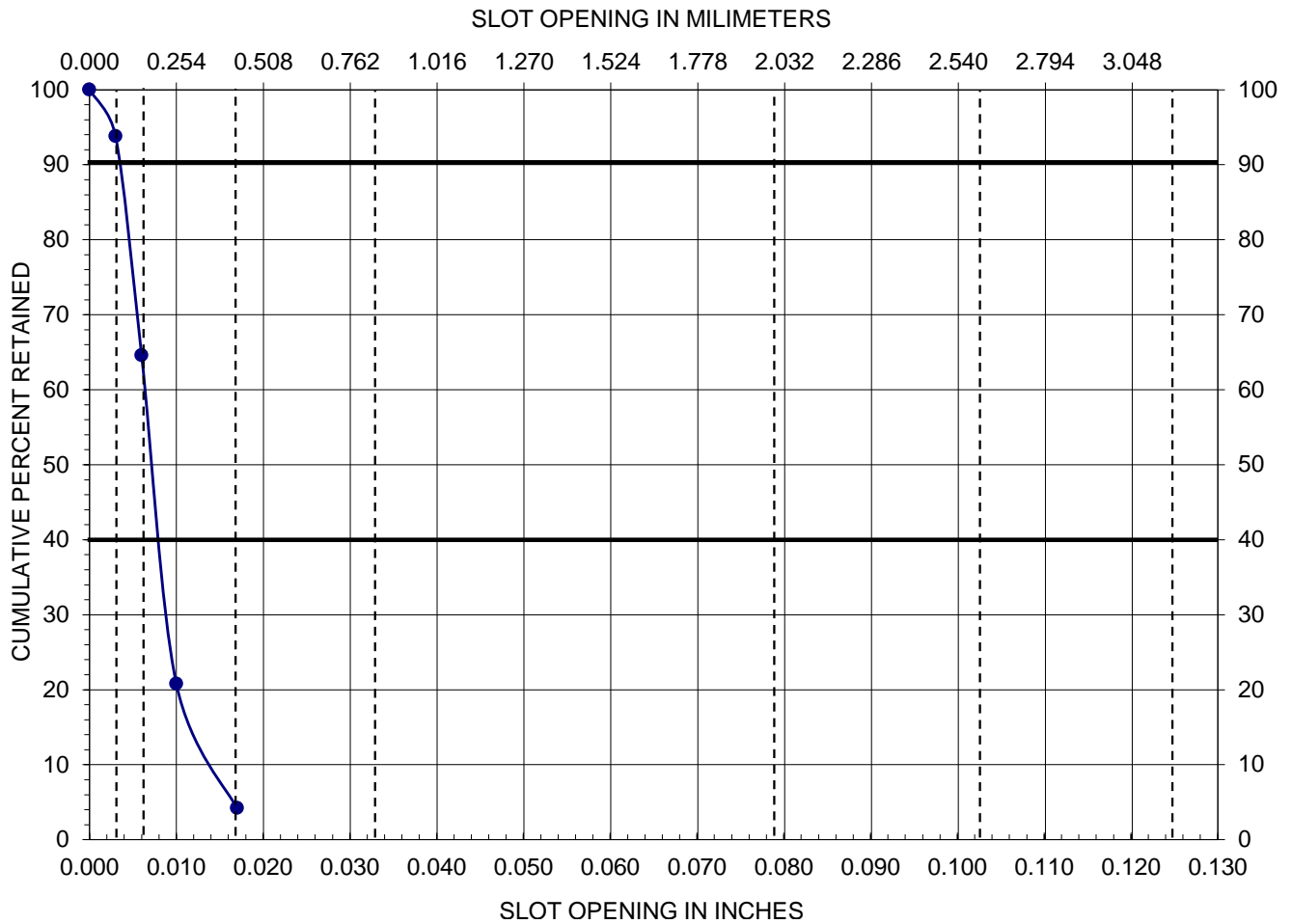
Date: 16-May-16

Hole No.: **PW2**

Sample No.:

**90**

Depth: **28-33 ft**



Standard Sieve Number	Sieve Opening (inches)	Cumulative		
		Weight Retained (gms)	Weight % Passing or Retained	% Retained
3/8"	0.375			
4	0.187			
10	0.079			
20	0.033			
40	0.017			4.2
60	0.010			20.8
100	0.006			64.6
200	0.003			93.8
	Pan			100
	Screen slot			

**Figure C-6**

# GRAIN SIZE DISTRIBUTION

Project No.:

**510-161 Mansfield**

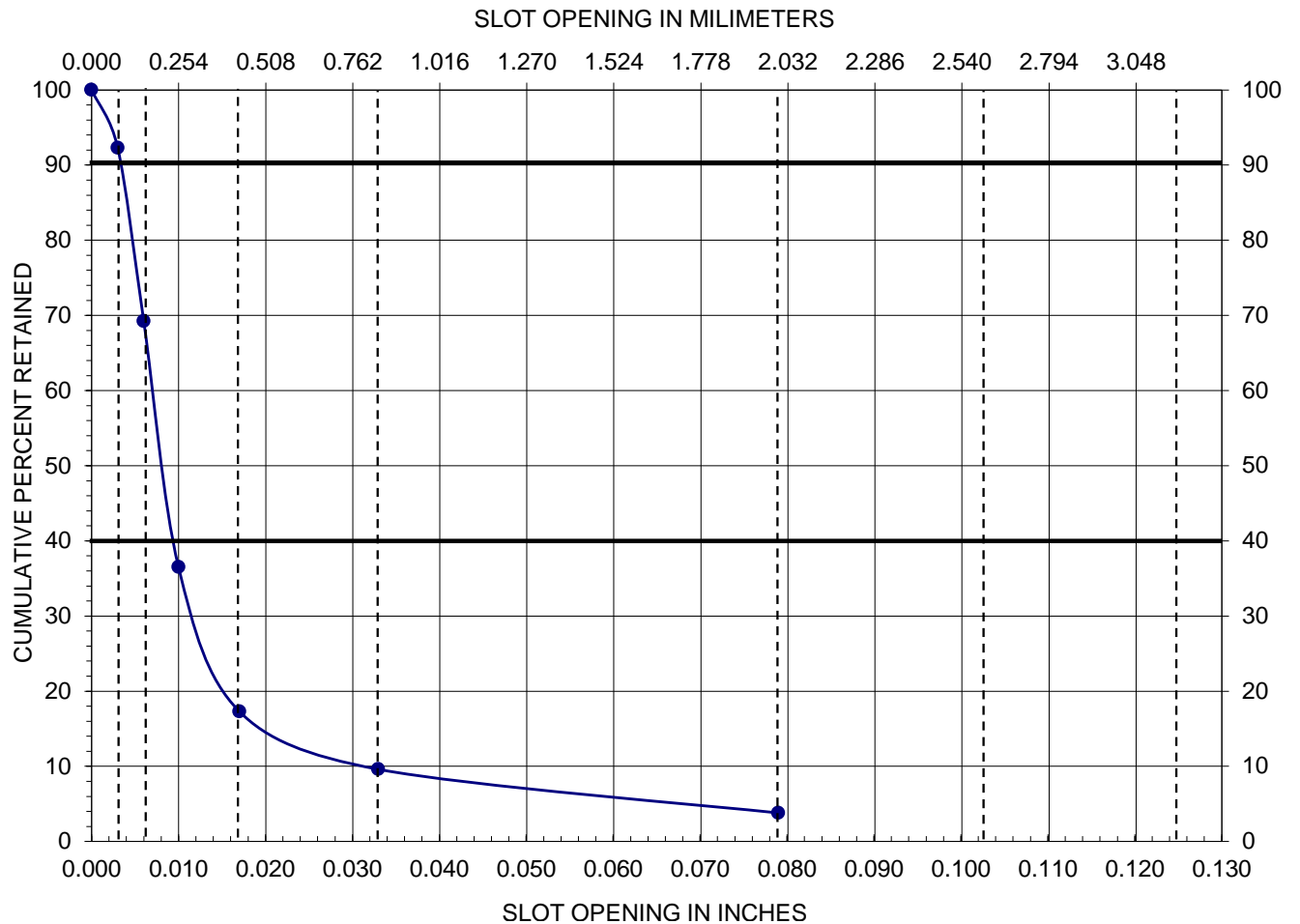
Date: 16-May-16

Hole No.: **PW2**

Sample No.:

**91**

Depth: **33-38 ft**



Standard Sieve Number	Sieve Opening (inches)	Cumulative		
		Weight Retained (gms)	Weight % Passing or Retained	% Retained
3/8"	0.375			
4	0.187			
10	0.079			3.8
20	0.033			9.6
40	0.017			17.3
60	0.010			36.5
100	0.006			69.2
200	0.003			92.3
	Pan			100
	Screen slot			

**Figure C-7**



## **APPENDIX D**

**Step Drawdown Test on PW1**

**Step Drawdown Test on PW2**

**Aquifer Performance Test on PW2**

# PW1 STEP TEST, DRAWDOWN VS TIME

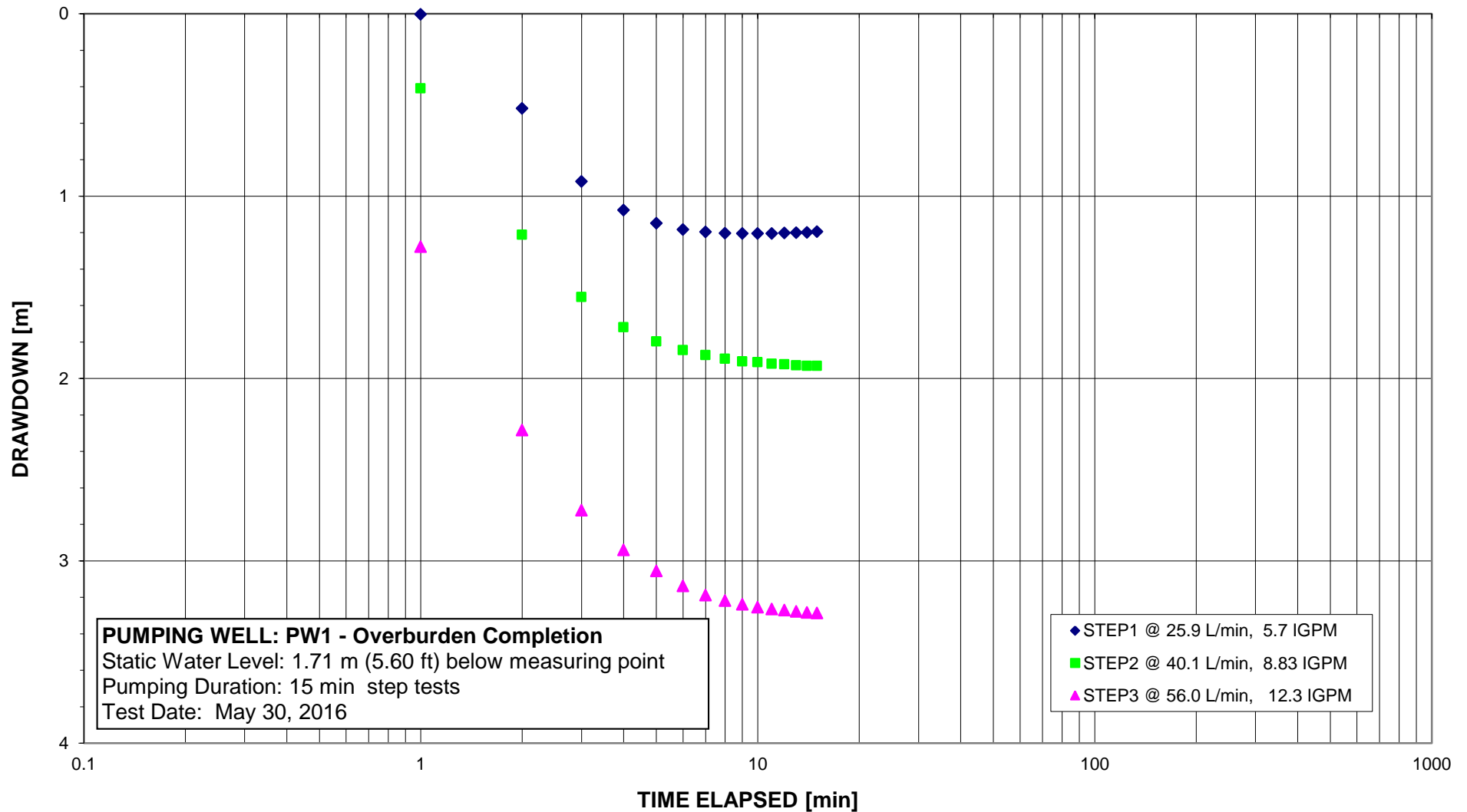


FIGURE D-1

## PW1 STEP DRAWDOWN TEST

Mansfield Ski Club  
 Drawdown vs. Time  
 Mulmur Township, Ontario

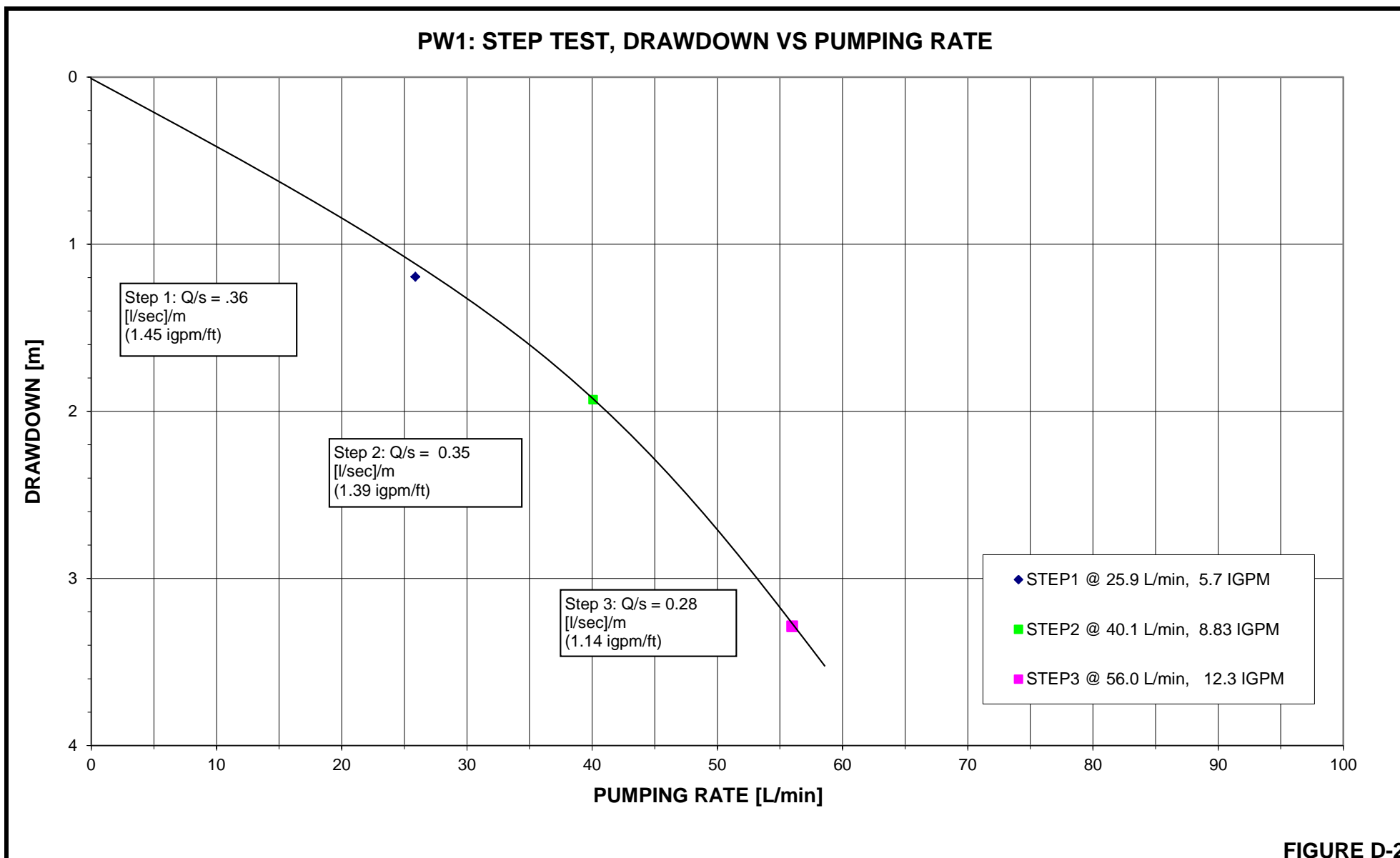
Project No.:

510-161

Date:

5/31/2016





**FIGURE D-2**

**PW1 STEP DRAWDOWN TEST**

Mansfield Ski Club  
Drawdown vs. Pumping Rate  
Mulmur, Ontario

Project No.:

510-161

Date:

May 31, 2016



*Morrison Environmental Limited*  
Groundwater Consultants

# PW2 STEP TEST, DRAWDOWN VS TIME

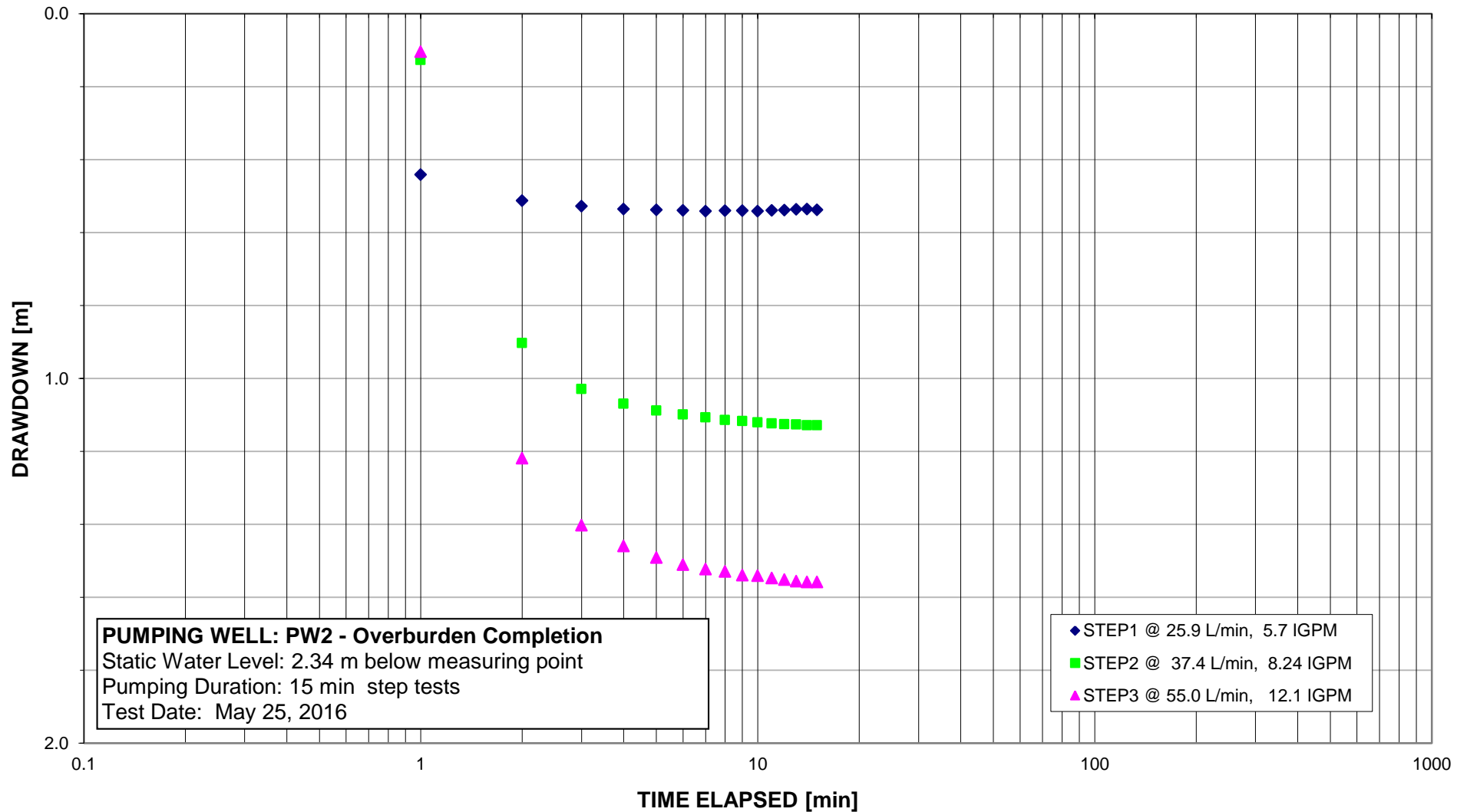


FIGURE D-3

## PW2 STEP DRAWDOWN TEST

Mansfield Ski Club  
 Drawdown vs. Time  
 Mulmur, Ontario

Project No.:

510-161

Date:

5/31/2016



*Morrison Environmental Limited*  
 Groundwater Consultants



# PW2: STEP TEST, DRAWDOWN VS PUMPING RATE

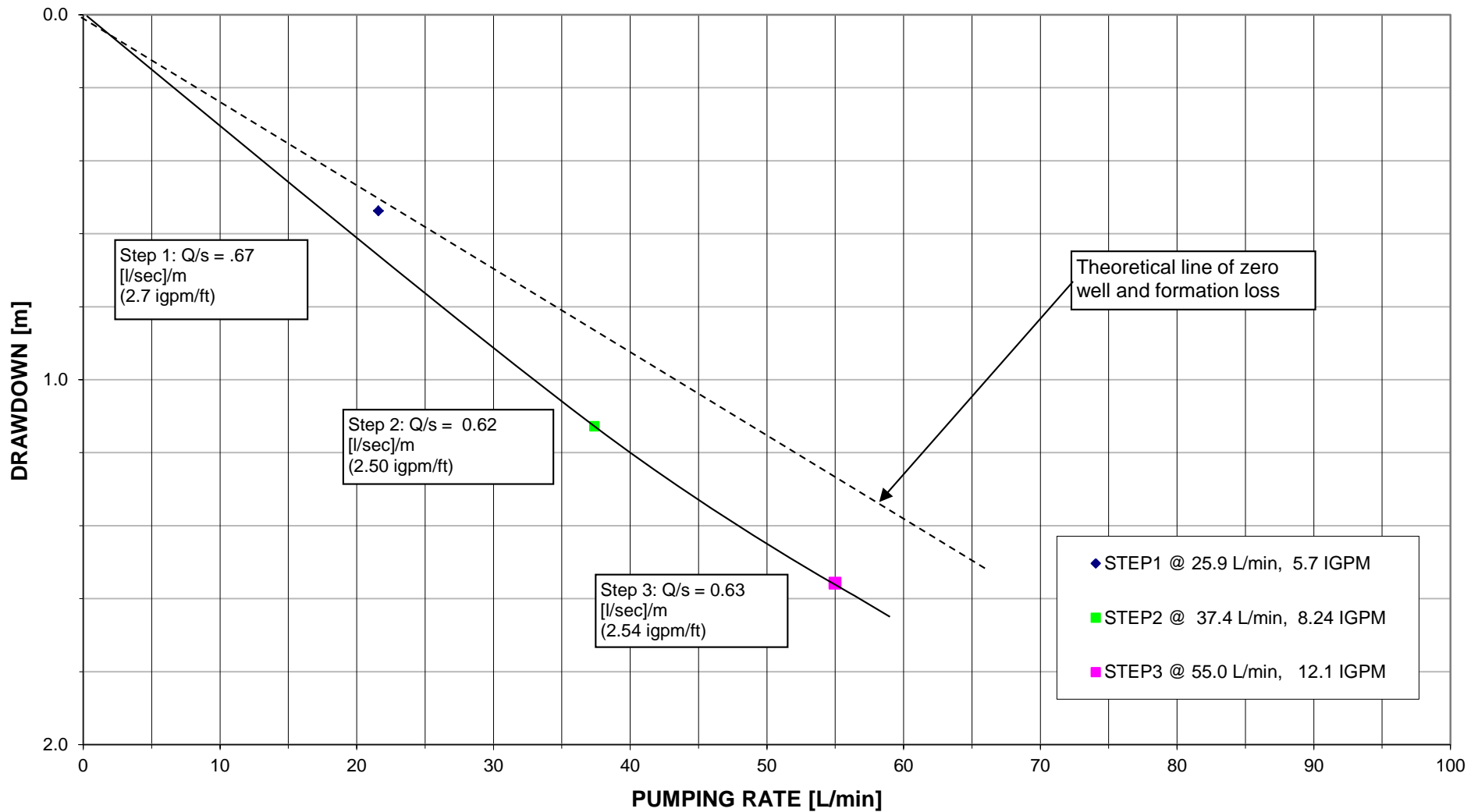


FIGURE D-4

## PW2 STEP DRAWDOWN TEST

Mansfield Ski Club  
Drawdown vs. Pumping Rate  
Mulmur, Ontario

Project No.:

510-161

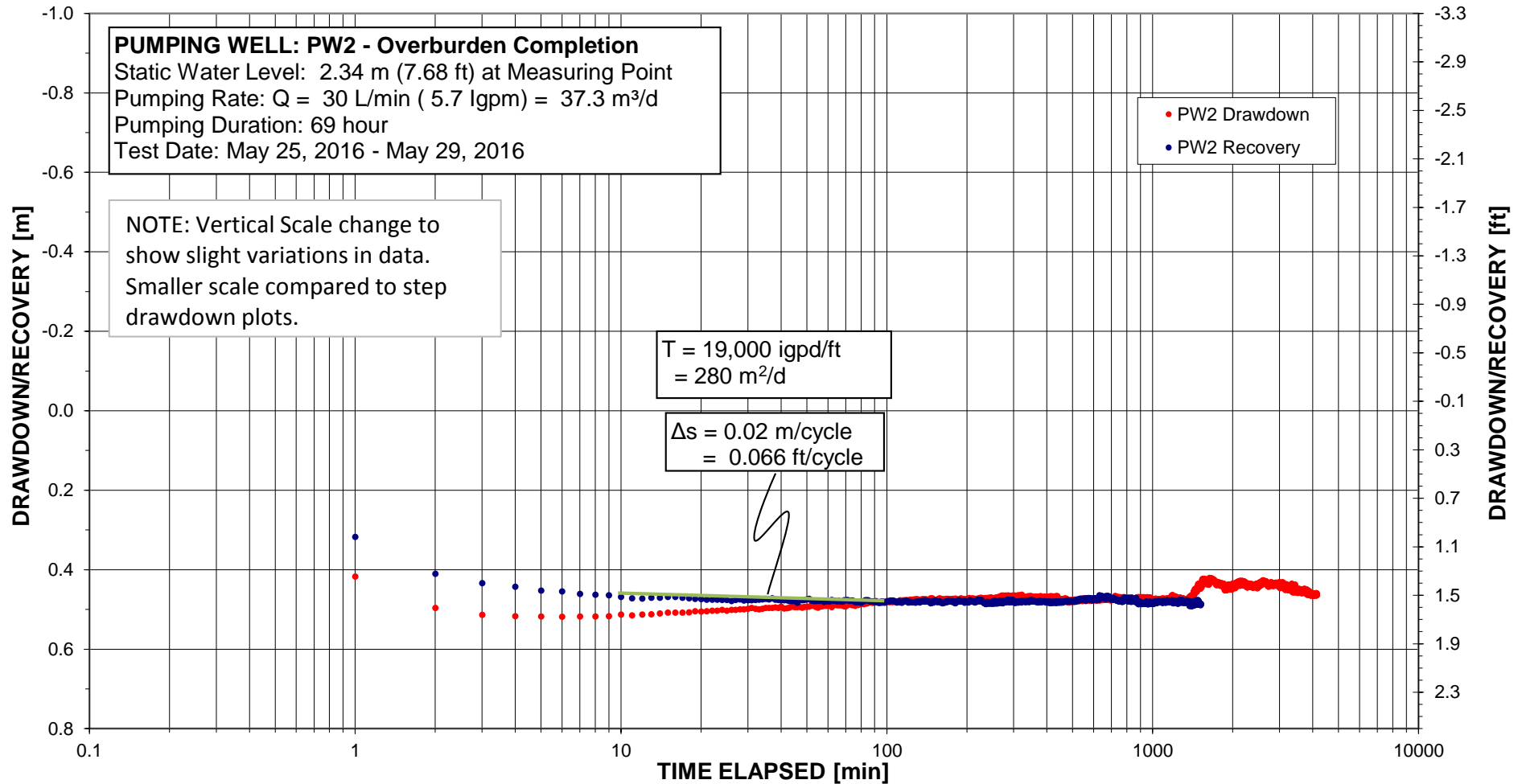
Date:

May 31, 2016



*Morrison Environmental Limited*  
Groundwater Consultants

## PW2: AQUIFER TEST, DRAWDOWN/RECOVERY VS TIME



**FIGURE D-5**

### PW2 PUMPING TEST- 69 hr

Mansfield Ski Club  
 Drawdown/Recovery vs. Time  
 Mulmur, Ontario

Project No.:

510-161

Date:

31-May-16



*Morrison Environmental Limited*  
 Groundwater Consultants

# PW2: 69 hr-PUMPING TEST, DRAWDOWN/RECOVERY VS TIME in OBSERVATION WELL PW1

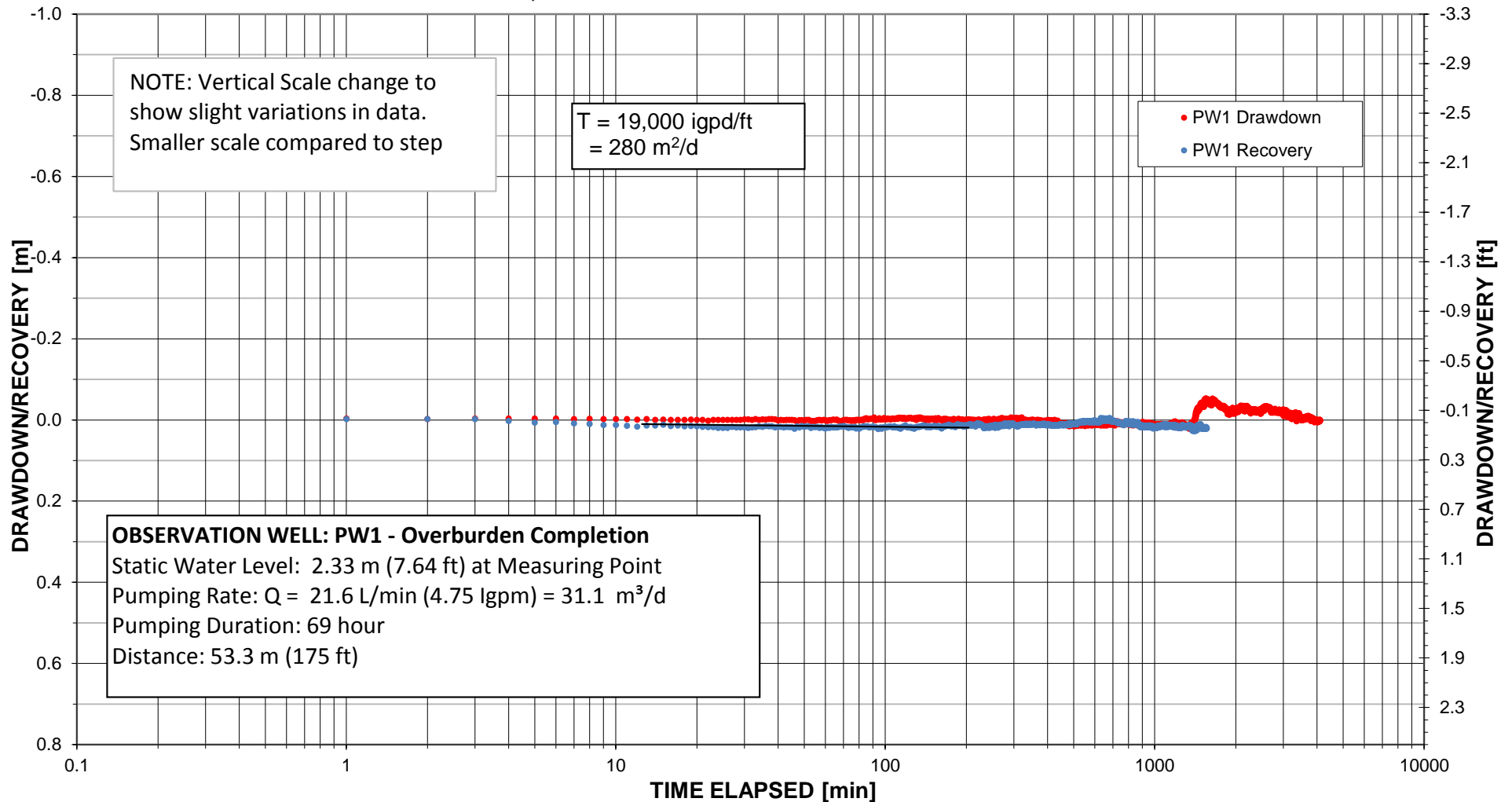


FIGURE D-6

## PW2 PUMPING TEST - (PW1 Obs. Well)

Mansfield Ski Club  
 Drawdown/Recovery vs. Time (Observation Well PW1)  
 Mulmur, Ontario

Project No.:

510-161

Date:

31-May-16



*Morrison Environmental Limited*  
 Groundwater Consultants

# PW2: 69 hr-PUMPING TEST, DRAWDOWN/RECOVERY VS TIME in OBSERVATION WELL OW1

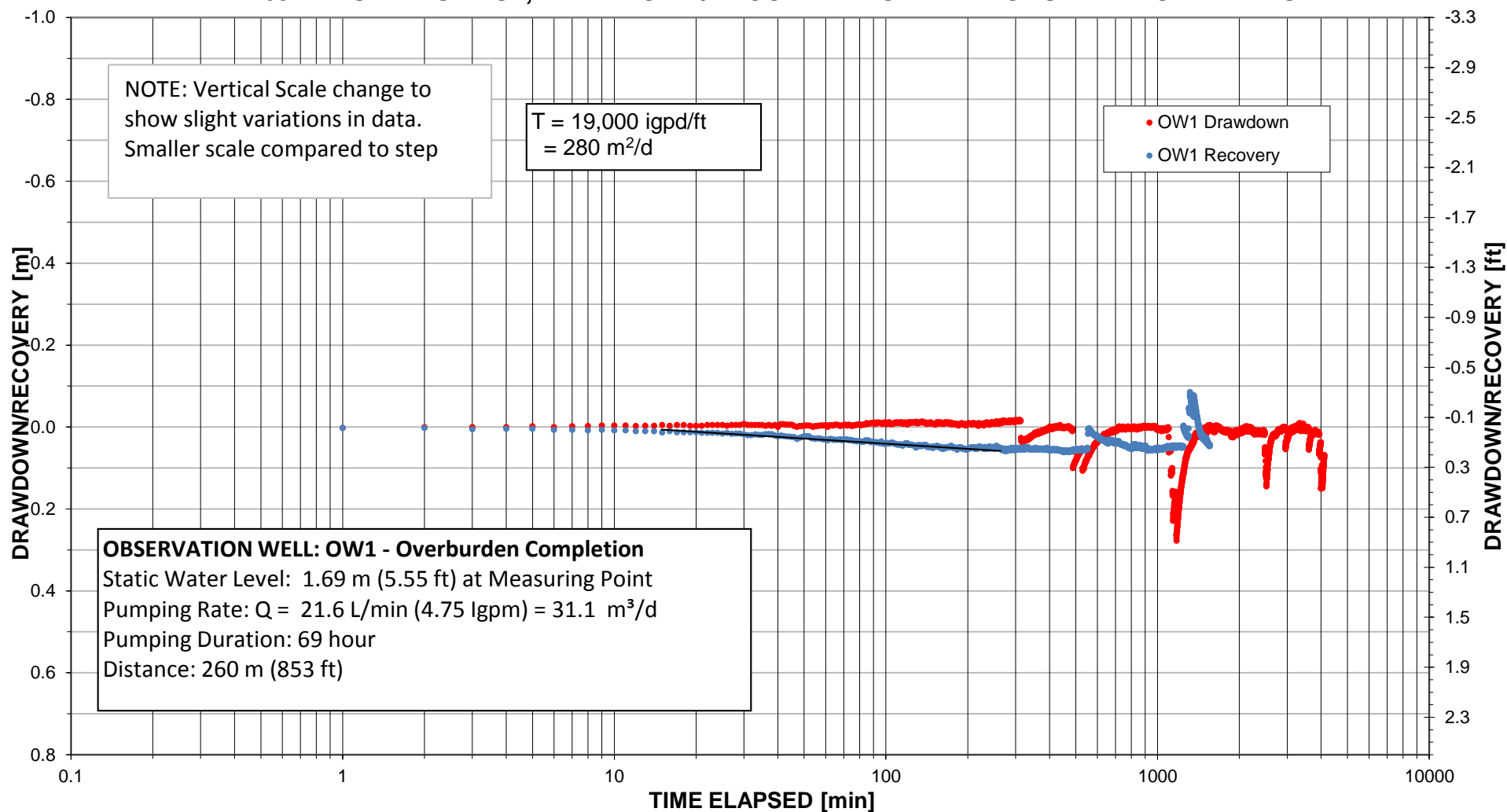


FIGURE D-7

## PW2 PUMPING TEST - (OW1 Obs. Well)

Mansfield Ski Club  
 Drawdown/Recovery vs. Time (Observation Well PW1)  
 Mulmur, Ontario

Project No.:

510-161

Date:

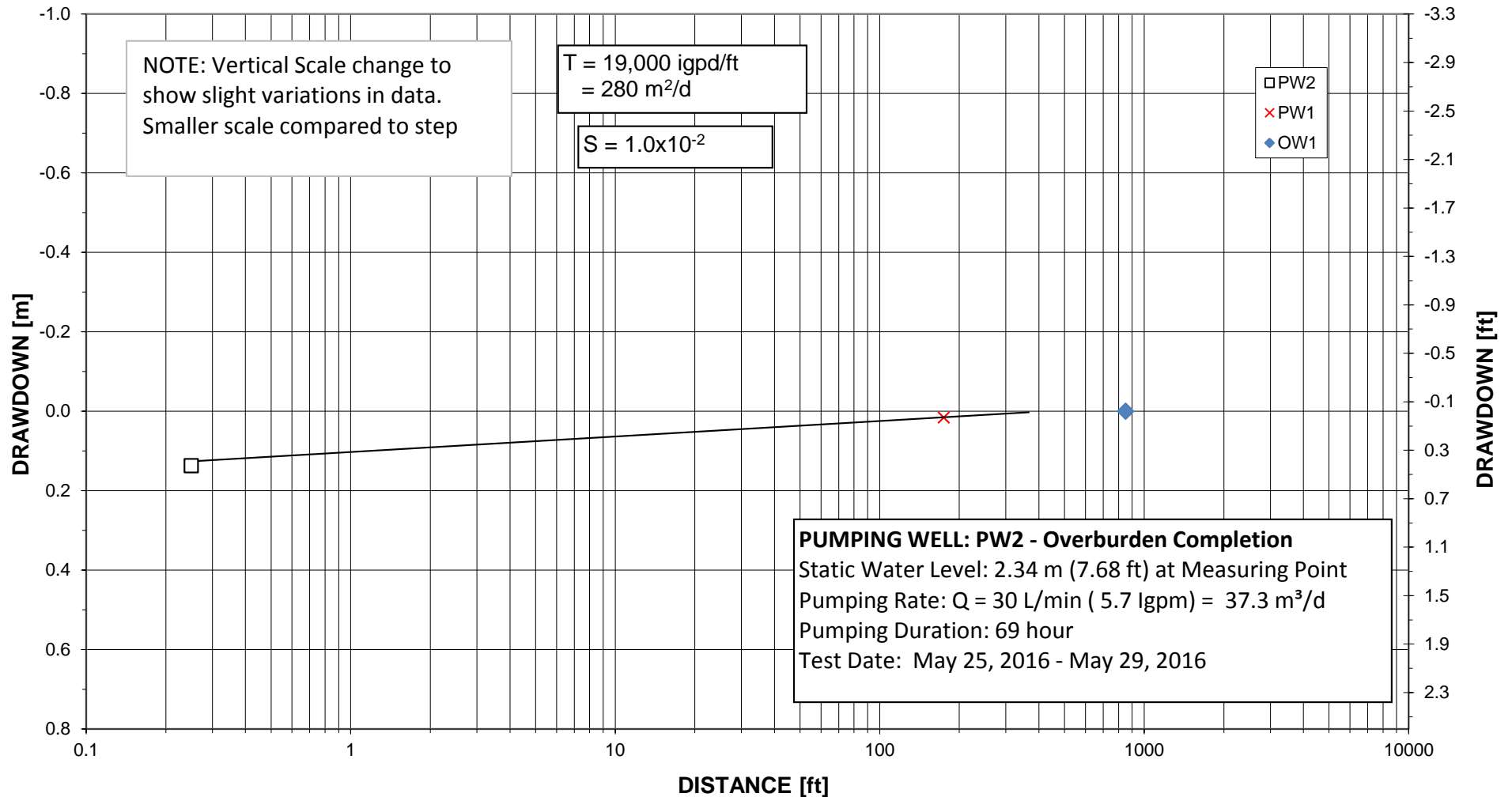
31-May-16



*Morrison Environmental Limited*  
 Groundwater Consultants



## PW2: 69 HOUR PUMPING TEST, DRAWDOWN VS DISTANCE



**FIGURE D-8**

### PW2 - 69 HOUR PUMPING TEST

Mansfield Ski Club  
 Drawdown vs. Distance  
 Mulmur, Ontario

Project No.:

510-161

Date:

31-May-16



*Morrison Environmental Limited*  
 Groundwater Consultants

## PW2: BAROMETRIC PRESSURE VS TIME

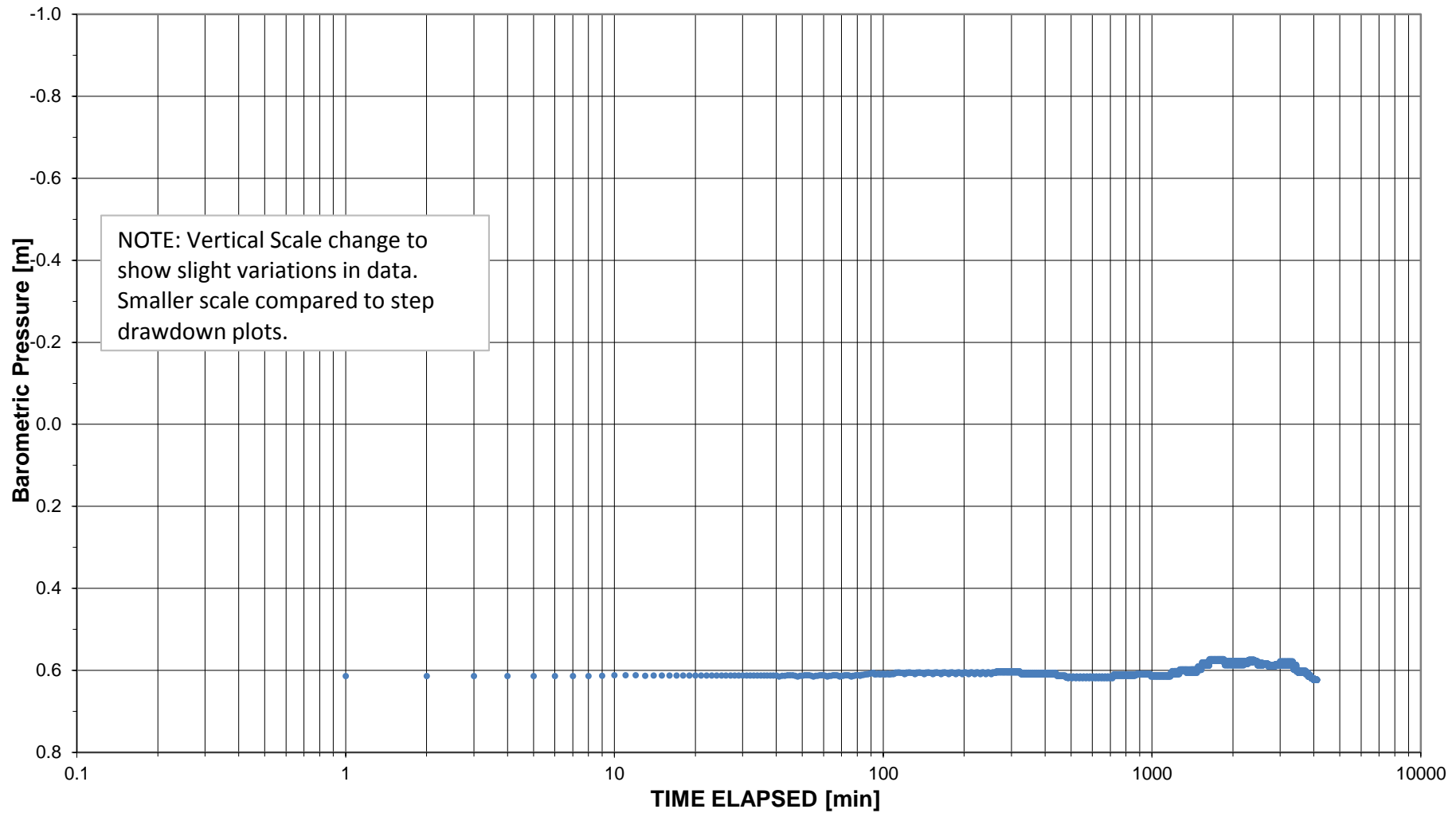


FIGURE D-9

### PW2 PUMPING TEST BAROMETRIC PRESSURE

Mansfield Ski Club  
Barometric Pressure  
Mulmur, Ontario

Project No.:

510-161

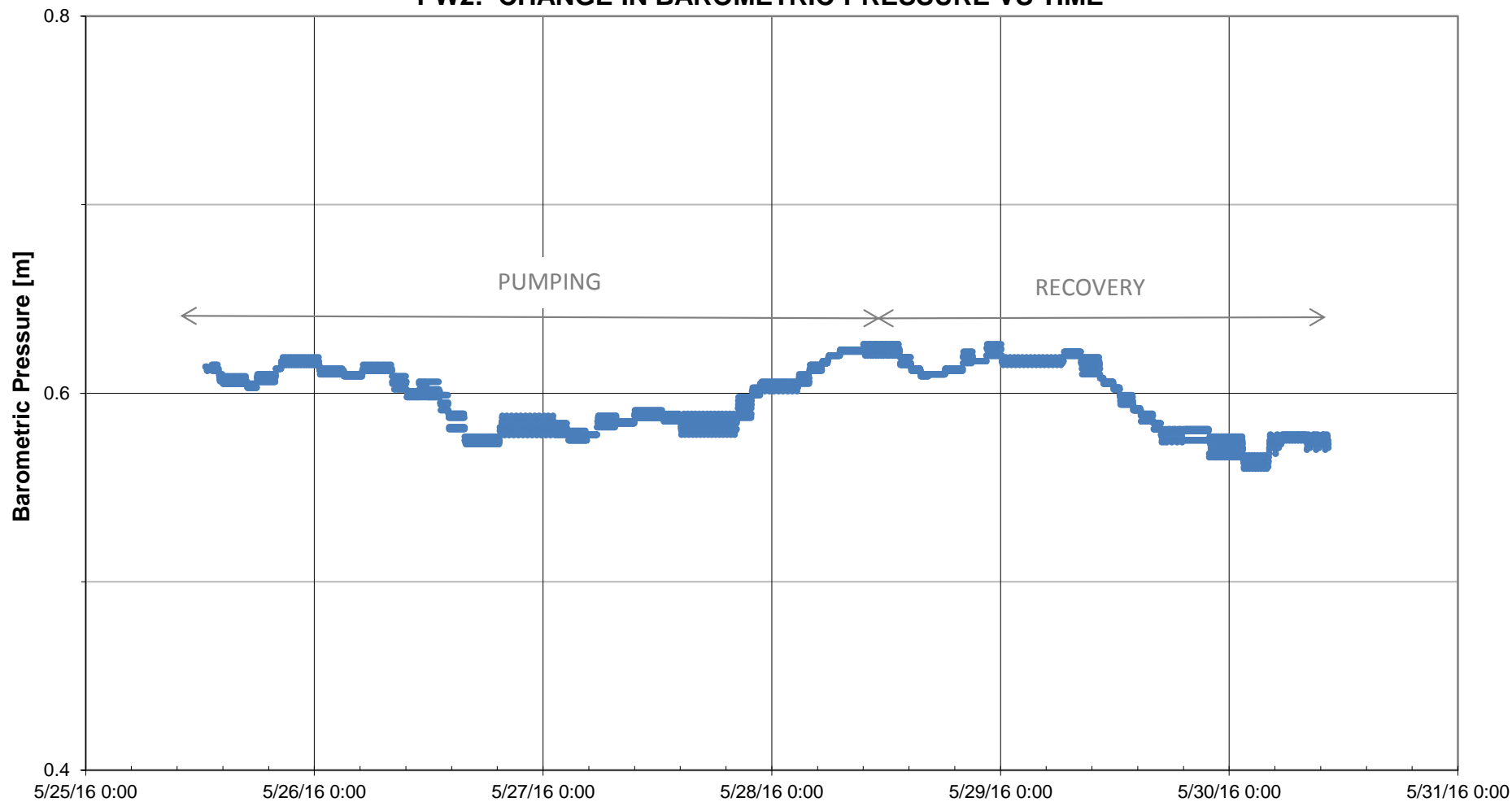
Date:

31-May-16



*Morrison Environmental Limited*  
*Groundwater Consultants*

**PW2: CHANGE IN BAROMETRIC PRESSURE VS TIME**



**FIGURE D-10**

**PW2 PUMPING TEST BAROMETRIC PRESSURE**

Mansfield Ski Club  
Barometric Pressure  
Mulmur, Ontario

Project No.:

510-161

Date:

31-May-16



*Morrison Environmental Limited*  
Groundwater Consultants

## **APPENDIX E**

### **Modelling of Groundwater Availability**

Drawdown in a well from pumping  
and interference from all other

### Drawdown and Interference at Pumping Well Locations

	PW1	PW2									OW1	
PW1	2.78	1.39									0.62	
PW2	1.39	2.78									0.62	
<b>Total Drawdown at each location (ft)</b>	<b>4.17</b>	<b>4.17</b>									<b>1.24</b>	
<i>Total Drawdown at each location (m)</i>	<i>1.27</i>	<i>1.27</i>									<i>0.38</i>	

Well	Q <sub>s</sub> (igpm)
PW1-PW2	40,000

Units		
S	1.0.E-02	
t	14	day(s)
T	19,000	igpd/ft

**Notes:** In Rows - Drawdown in feet at each location due to pumping of well in that row  
In Columns - Drawdown in feet in each column due to interference from pumping indicated well W/L elevation at each location is shown in bottom of row of matrix.

FIGURE E-1

#### Estimated Drawdown Matrix For Total Pumping Rate of 40 igpm

Groundwater Supply  
Mansfield Ski Club  
Mulmur, Ontario

Project No.: 505-161

Date: 7-Jun-16



Morrison Environmental Limited  
Groundwater Consultants



## **APPENDIX F**

### **Water Quality**

CLIENT NAME: MORRISON ENVIRONMENTAL LIMITED  
1087 MEYERSIDE DRIVE UNIT 1  
MISSISSAUGA, ON L5T1M5  
(905) 564-8944

ATTENTION TO: Don Hsu

PROJECT: 510-161

AGAT WORK ORDER: 16T098529

WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Coordinator

DATE REPORTED: Jun 01, 2016

PAGES (INCLUDING COVER): 9

VERSION\*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

\*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



## Certificate of Analysis

AGAT WORK ORDER: 16T098529

PROJECT: 510-161

5835 COOPERS AVENUE  
MISSISSAUGA, ONTARIO  
CANADA L4Z 1Y2  
TEL (905)712-5100  
FAX (905)712-5122  
<http://www.agatlabs.com>

CLIENT NAME: MORRISON ENVIRONMENTAL LIMITED

ATTENTION TO: Don Hsu

SAMPLING SITE:

SAMPLED BY:

### Water Quality Assessment (mg/L)

DATE RECEIVED: 2016-05-26

DATE REPORTED: 2016-06-01

		SAMPLE DESCRIPTION:		PW2
		SAMPLE TYPE:		Water
		DATE SAMPLED:		5/25/2016
Parameter	Unit	G / S	RDL	7584232
Electrical Conductivity	uS/cm		2	574
pH	pH Units	(6.5-8.5)	NA	7.91
Saturation pH				6.93
Langelier Index				0.98
Total Hardness (as CaCO <sub>3</sub> )	mg/L	(80-100)	0.5	311
Total Dissolved Solids	mg/L	500	20	324
Alkalinity (as CaCO <sub>3</sub> )	mg/L	(30-500)	5	277
Bicarbonate (as CaCO <sub>3</sub> )	mg/L		5	277
Carbonate (as CaCO <sub>3</sub> )	mg/L		5	<5
Hydroxide (as CaCO <sub>3</sub> )	mg/L		5	<5
Fluoride	mg/L	1.5	0.25	<0.25
Chloride	mg/L	250	0.50	11.0
Nitrate as N	mg/L	10.0	0.25	<0.25
Nitrite as N	mg/L	1.0	0.25	<0.25
Bromide	mg/L		0.25	<0.25
Sulphate	mg/L	500	0.50	40.2
Ortho Phosphate as P	mg/L		0.50	<0.50
Reactive Silica	mg/L		0.05	11.2
Ammonia as N	mg/L		0.02	<0.02
Total Phosphorus	mg/L		0.05	<0.05
Total Organic Carbon	mg/L		0.5	1.8
Colour	TCU	5	5	<5
Turbidity	NTU	5	0.5	1.6
Calcium	mg/L		0.05	88.3
Magnesium	mg/L		0.05	21.9
Sodium	mg/L	20 (200)	0.05	6.00
Potassium	mg/L		0.05	3.19
Aluminum	mg/L	0.1	0.004	0.006
Antimony	mg/L	0.006	0.003	<0.003
Arsenic	mg/L	0.025	0.003	<0.003

Certified By:

Amanjot Bhela



## Certificate of Analysis

AGAT WORK ORDER: 16T098529

PROJECT: 510-161

5835 COOPERS AVENUE  
MISSISSAUGA, ONTARIO  
CANADA L4Z 1Y2  
TEL (905)712-5100  
FAX (905)712-5122  
<http://www.agatlabs.com>

CLIENT NAME: MORRISON ENVIRONMENTAL LIMITED

ATTENTION TO: Don Hsu

SAMPLING SITE:

SAMPLED BY:

### Water Quality Assessment (mg/L)

DATE RECEIVED: 2016-05-26

DATE REPORTED: 2016-06-01

		SAMPLE DESCRIPTION:		PW2	
		SAMPLE TYPE:		Water	
		DATE SAMPLED:		5/25/2016	
Parameter	Unit	G / S	RDL	7584232	
Barium	mg/L	1	0.002	0.065	
Beryllium	mg/L		0.001	<0.001	
Boron	mg/L	5	0.010	0.035	
Cadmium	mg/L	0.005	0.001	<0.001	
Chromium	mg/L	0.05	0.003	<0.003	
Cobalt	mg/L		0.001	<0.001	
Copper	mg/L	1	0.003	<0.003	
Iron	mg/L	0.3	0.010	0.138	
Lead	mg/L	0.01	0.002	<0.002	
Manganese	mg/L	0.05	0.002	0.057	
Mercury	mg/L	0.001	0.0001	<0.0001	
Molybdenum	mg/L		0.002	<0.002	
Nickel	mg/L		0.003	<0.003	
Selenium	mg/L	0.01	0.004	<0.004	
Silver	mg/L		0.002	<0.002	
Strontium	mg/L		0.005	0.380	
Thallium	mg/L		0.006	<0.006	
Tin	mg/L		0.002	<0.002	
Titanium	mg/L		0.002	<0.002	
Tungsten	mg/L		0.010	<0.010	
Uranium	mg/L	0.02	0.002	<0.002	
Vanadium	mg/L		0.002	<0.002	
Zinc	mg/L	5	0.005	<0.005	
Zirconium	mg/L		0.004	<0.004	
% Difference/ Ion Balance	%		NA	1.02	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O.Reg.169/03(mg/L)

7584232 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analyte within the calibration range of the instrument and to reduce matrix interference.

Certified By:

Amanjot Bhela



## Guideline Violation

AGAT WORK ORDER: 16T098529

PROJECT: 510-161

5835 COOPERS AVENUE  
MISSISSAUGA, ONTARIO  
CANADA L4Z 1Y2  
TEL (905)712-5100  
FAX (905)712-5122  
<http://www.agatlabs.com>

CLIENT NAME: MORRISON ENVIRONMENTAL LIMITED

ATTENTION TO: Don Hsu

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	GUIDEVALUE	RESULT
7584232	PW2	O.Reg.169/03(mg/L)	Water Quality Assessment (mg/L)	Manganese	0.05	0.057
7584232	PW2	O.Reg.169/03(mg/L)	Water Quality Assessment (mg/L)	Total Hardness (as CaCO3)	(80-100)	311



## Quality Assurance

CLIENT NAME: MORRISON ENVIRONMENTAL LIMITED

AGAT WORK ORDER: 16T098529

PROJECT: 510-161

ATTENTION TO: Don Hsu

SAMPLING SITE:

SAMPLED BY:

Water Analysis															
RPT Date: Jun 01, 2016			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

### Water Quality Assessment (mg/L)

Electrical Conductivity	7578341		1760	1780	1.1%	< 2	96%	80%	120%	NA			NA		
pH	7578341		7.80	7.90	1.3%	NA	98%	90%	110%	NA			NA		
Total Dissolved Solids	7584321		528	548	3.7%	< 20	96%	80%	120%	NA			NA		
Alkalinity (as CaCO <sub>3</sub> )	7578341		306	312	1.9%	< 5	100%	80%	120%	NA			NA		
Bicarbonate (as CaCO <sub>3</sub> )	7578341		306	312	1.9%	< 5	NA			NA			NA		
Carbonate (as CaCO <sub>3</sub> )	7578341		<5	<5	NA	< 5	NA			NA			NA		
Hydroxide (as CaCO <sub>3</sub> )	7578341		<5	<5	NA	< 5	NA			NA			NA		
Fluoride	7584232	7584232	<0.25	<0.25	NA	< 0.05	98%	90%	110%	97%	90%	110%	107%	80%	120%
Chloride	7584232	7584232	11.0	11.4	3.6%	< 0.10	108%	90%	110%	103%	90%	110%	107%	80%	120%
Nitrate as N	7584232	7584232	<0.25	<0.25	NA	< 0.05	91%	90%	110%	100%	90%	110%	107%	80%	120%
Nitrite as N	7584232	7584232	<0.25	<0.25	NA	< 0.05	NA	90%	110%	108%	90%	110%	97%	80%	120%
Bromide	7584232	7584232	<0.25	<0.25	NA	< 0.05	109%	90%	110%	108%	90%	110%	106%	80%	120%
Sulphate	7584232	7584232	40.2	39.8	1.0%	< 0.10	101%	90%	110%	105%	90%	110%	105%	80%	120%
Ortho Phosphate as P	7584232	7584232	<0.50	<0.50	NA	< 0.10	104%	90%	110%	102%	90%	110%	106%	80%	120%
Reactive Silica	7584232	7584232	11.2	10.8	3.6%	< 0.05	99%	90%	110%	101%	90%	110%	99%	80%	120%
Ammonia as N	7581556		0.07	0.06	NA	< 0.02	90%	90%	110%	90%	90%	110%	95%	80%	120%
Total Phosphorus	7580403		0.18	0.17	NA	< 0.05	99%	80%	120%	100%	90%	110%	98%	70%	130%
Total Organic Carbon	7584321		3.2	3.5	9.0%	< 0.5	102%	90%	110%	103%	90%	110%	104%	80%	120%
Colour	7584321		<5	<5	NA	< 5	101%	90%	110%	NA			NA		
Turbidity	7584023		0.6	0.6	NA	< 0.5	105%	90%	110%	NA			NA		
Calcium	7584232	7584232	88.3	86.9	1.6%	< 0.05	101%	90%	110%	100%	90%	110%	100%	70%	130%
Magnesium	7584232	7584232	21.9	21.9	0.0%	< 0.05	101%	90%	110%	100%	90%	110%	105%	70%	130%
Sodium	7584232	7584232	6.00	6.07	1.2%	< 0.05	107%	90%	110%	107%	90%	110%	107%	70%	130%
Potassium	7584232	7584232	3.19	3.17	0.6%	< 0.05	106%	90%	110%	106%	90%	110%	108%	70%	130%
Aluminum	7583208		0.018	0.008	NA	< 0.004	91%	90%	110%	101%	90%	110%	98%	70%	130%
Antimony	7583208		<0.003	<0.003	NA	< 0.003	97%	90%	110%	97%	90%	110%	101%	70%	130%
Arsenic	7583208		<0.003	<0.003	NA	< 0.003	96%	90%	110%	99%	90%	110%	101%	70%	130%
Barium	7583208		0.013	0.013	0.0%	< 0.002	92%	90%	110%	99%	90%	110%	100%	70%	130%
Beryllium	7583208		<0.001	<0.001	NA	< 0.001	90%	90%	110%	99%	90%	110%	100%	70%	130%
Boron	7583208		<0.010	<0.010	NA	< 0.010	100%	90%	110%	100%	90%	110%	90%	70%	130%
Cadmium	7583208		<0.001	<0.001	NA	< 0.001	92%	90%	110%	96%	90%	110%	103%	70%	130%
Chromium	7583208		<0.003	<0.003	NA	< 0.003	93%	90%	110%	100%	90%	110%	101%	70%	130%
Cobalt	7583208		<0.001	<0.001	NA	< 0.001	93%	90%	110%	100%	90%	110%	100%	70%	130%
Copper	7583208		<0.003	<0.003	NA	< 0.003	95%	90%	110%	102%	90%	110%	100%	70%	130%
Iron	7583208		<0.010	<0.010	NA	< 0.010	90%	90%	110%	96%	90%	110%	105%	70%	130%
Lead	7583208		<0.002	<0.002	NA	< 0.002	94%	90%	110%	101%	90%	110%	102%	70%	130%
Manganese	7583208		<0.002	<0.002	NA	< 0.002	92%	90%	110%	99%	90%	110%	100%	70%	130%
Mercury	7581167		<0.0001	<0.0001	NA	< 0.0001	103%	90%	110%	105%	90%	110%	98%	80%	120%
Molybdenum	7583208		<0.002	<0.002	NA	< 0.002	100%	90%	110%	99%	90%	110%	102%	70%	130%



## Quality Assurance

CLIENT NAME: MORRISON ENVIRONMENTAL LIMITED

AGAT WORK ORDER: 16T098529

PROJECT: 510-161

ATTENTION TO: Don Hsu

SAMPLING SITE:

SAMPLED BY:

### Water Analysis (Continued)

RPT Date: Jun 01, 2016			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Nickel	7583208		<0.003	<0.003	NA	< 0.003	92%	90%	110%	99%	90%	110%	97%	70%	130%
Selenium	7583208		<0.004	<0.004	NA	< 0.004	95%	90%	110%	100%	90%	110%	103%	70%	130%
Silver	7583208		<0.002	<0.002	NA	< 0.002	90%	90%	110%	101%	90%	110%	100%	70%	130%
Strontium	7583208		0.066	0.068	3.0%	< 0.005	99%	90%	110%	105%	90%	110%	102%	70%	130%
Thallium	7583208		<0.006	<0.006	NA	< 0.006	93%	90%	110%	97%	90%	110%	99%	70%	130%
Tin	7583208		<0.002	<0.002	NA	< 0.002	98%	90%	110%	98%	90%	110%	102%	70%	130%
Titanium	7583208		<0.002	<0.002	NA	< 0.002	96%	90%	110%	93%	90%	110%	98%	70%	130%
Tungsten	7583208		<0.010	<0.010	NA	< 0.010	99%	90%	110%	95%	90%	110%	97%	70%	130%
Uranium	7583208		<0.002	<0.002	NA	< 0.002	97%	90%	110%	100%	90%	110%	101%	70%	130%
Vanadium	7583208		<0.002	<0.002	NA	< 0.002	91%	90%	110%	96%	90%	110%	99%	70%	130%
Zinc	7583208		0.006	0.005	NA	< 0.005	96%	90%	110%	102%	90%	110%	100%	70%	130%
Zirconium	7583208		<0.004	<0.004	NA	< 0.004	97%	90%	110%	95%	90%	110%	96%	70%	130%

Comments: NA signifies Not Applicable.

Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By:

*Amanjot Bhela*

## Method Summary

CLIENT NAME: MORRISON ENVIRONMENTAL LIMITED

AGAT WORK ORDER: 16T098529

PROJECT: 510-161

ATTENTION TO: Don Hsu

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Saturation pH		SM 2320 B	CALCULATION
Langelier Index		SM 2330B	CALCULATION
Total Hardness (as CaCO <sub>3</sub> )	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Alkalinity (as CaCO <sub>3</sub> )	INOR-93-6000	SM 2320 B	PC TITRATE
Bicarbonate (as CaCO <sub>3</sub> )	INOR-93-6000	SM 2320 B	PC TITRATE
Carbonate (as CaCO <sub>3</sub> )	INOR-93-6000	SM 2320 B	PC TITRATE
Hydroxide (as CaCO <sub>3</sub> )	INOR-93-6000	SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Reactive Silica	INOR-93-6047	AQ2 EPA-122A & SM 4500 SiO <sub>2</sub> D	AQ2 DISCRETE ANALYSER
Ammonia as N	INOR-93-6059	QuikChem 10-107-06-1-J & SM 4500 NH <sub>3</sub> -F	LACHAT FIA
Total Phosphorus	INOR-93-6057	QuikChem 10-115-01-3-A & SM 4500-P I	LACHAT FIA
Total Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310	SHIMADZU CARBON ANALYZER
Colour	INOR-93-6046	SM 2120 B	SPECTROPHOTOMETER
Turbidity	INOR-93-6044	SM 2130 B	NEPHELOMETER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Aluminum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Antimony	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Strontium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS



## Method Summary

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SAMPLING SITE:

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PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Tin	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Titanium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Tungsten	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zirconium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
% Difference/ Ion Balance		SM 1030 E	CALCULATION

