



Kollaard Associates

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Civil • Geotechnical •  
Structural • Environmental •  
Industrial Health & Safety

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December 18, 2008

070352

Novatech Engineering Consultants Ltd.  
Suite 200, 240 Michael Cowpland Drive  
Kanata, Ontario  
K2M 1P6

Attention: Mr. Murray Chown

RE: ADDITIONAL GROUNDWATER QUALITY INFORMATION  
PROPOSED VETERINARY CLINIC AND CAR WASH SITE  
DUNROBIN ROAD AT THOMAS A. DOLAN PARKWAY  
DUNROBIN, ONTARIO

Dear Sirs:

This letter provides additional well and hydrogeological information concerning the above noted site further to that provided in previous Kollaard Associates Inc. letters of April 28, 2008, July 24, 2008 and November 27, 2008. This present letter is provided to address seven items in a City of Ottawa email from Mr. Don Herweyer dated December 3, 2008 concerning this project.

The following information is provided in order of the items outlined in the above mentioned December 3, 2008, City of Ottawa email.

- The well records for the three wells put down at the site are attached as Appendix A. Please note that the original well at 2744 Dunrobin Road (proposed Veterinary Clinic site) was replaced by the well with Tag No. 068278. All three wells are indicated to be within a sand aquifer below a surficial clay layer. The "new" well at 2744 Dunrobin Road is some 4.4 metres shallower than the previous well.
- A City of Ottawa Certificate of Well Compliance for the first two wells at the site were included in the Kollaard Associates Inc. letter of July 24, 2008. A



Professional Engineers  
Ontario

Authorized by the Association of Professional Engineers  
of Ontario to offer professional engineering services.

Certificate of Well Compliance has been provided by Capital Water Supply Ltd. for the third well (the “new” well at 2744 Dunrobin Road). All three well certificates are provided in Appendix B.

- The “new” well at 2744 Dunrobin Road was pumped for six hours on December 15, 2008. Well water samples were obtained at hour 3 and hour 6 of the pumping and submitted to Accutest Laboratories Ltd. for the MOE “Subdivision Package” list of parameters and for VOC’s. All of the laboratory test results for the “new” well are provided in Appendix C. The results of this present testing indicate groundwater of similar quality to that previously tested for the “new well”, and no significant change in water quality between the 3 and 6 hour test results. The results of previous testing of an existing well at the adjacent Blue Heron storage site, 2730 Dunrobin Road, indicated to have been drilled in 1999, are provided in Appendix D, along with the MOE well record. A review of those test results indicate similar water quality to that of the “new” well. Accordingly, all of the above laboratory testing provides no indication that the groundwater quality at the site can expect to change significantly in the future.
- TDS measured for the well water samples are 806 and 800 for the 3 hour and 6 hour samples, respectively. The Ontario Drinking Water Standards (ODWS) for TDS is 500 milligrams per litre. The presence of TDS, which is an MOE aesthetic related parameter, will result in the water being either encrusting or corrosive to plumbing/plumbing fixtures. The degree of encrustation or corrosion is commonly indicated by the Ryznar Stability Index (RSI). The RSI value is calculated using the measured hardness, pH, alkalinity and TDS for the water. A RSI value of 7 indicates water that is neither encrusting or corrosive but this value is essentially non-existent for groundwater. Water with a RSI value below 7 is indicated to be encrusting and water with a RSI value above 7 is indicated to be corrosive. The degree of acceptable encrusting or corrosion that can be expected by an RSI value above or below 7 is subjective. To provide an indication of the degree of encrusting that can be expected for the present water samples, the calculated RSI value for water with the MOE maximum acceptable hardness, pH, alkalinity and TDS levels was compared to the calculated RSI for the present water samples. The RSI value calculated for the former case is 6.0 and that for the present water samples is 5.9. Accordingly, although the TDS for the water samples in question is above the ODWS the degree of encrustation that can be expected due to the level of TDS is indicated to be essentially the same to that which would be caused by water that meets the ODWS for the applicable parameters. Taste would also be the same or likely improved due to the relatively low chloride levels compared to the ODWS.
- Water samples with an elevated iron level typically test high for turbidity at the laboratory but within the ODWS at the well head. It is considered that this difference in test results is due to precipitation of iron in the sample during the



time the sample is obtained at the well and then tested at the laboratory. The well water for this site has elevated iron levels. Accordingly, it is considered that the above explains the difference between the laboratory and well head tests for turbidity. The well head test is considered to reflect the actual turbidity level for the supply aquifer.

- The Ministry of the Environment (MOE) indicates organic nitrogen is an operational parameter. It is our experience that organic nitrogen is present in varying amounts as a naturally occurring compound in most of the well water samples that we have tested for land development purposes. The MOE indicates that the presence of organic nitrogen can possibly indicate groundwater impact from septic systems. However the main indicators of septic system impact are bacteria and nitrate, neither of which are indicated to be above the ODWS for the wells at the site. It is pointed out that the laboratory test results for the 3 and 6 hour samples from the “new” well indicate that the level of organic nitrogen measured meets the ODWS.
- During the above mentioned six hours of pumping at the “new” well, observations of any water level changes were monitored at two near by observations wells. The observations wells consist of the existing well at 2242 Dunrobin Road (the proposed car wash site) and at the Blue Heron site, 2730 Dunrobin Road. The two observations wells are some 22 and 105 metres from the pumped well, respectively. As mentioned above the 3 hour and 6 hour samples from the pumped well were tested for VOC’s.

The results of water level draw down and recovery measurements for the pumping of the “new” well and the results of the monitoring at the observation wells are provided in the attached Appendix E. Based on the results of the well pumping, calculations were carried out to estimate the potential zone of influence at the “new” well at the field pumping rate and at the expected pumping rate of 3 cubic metres per day for the veterinary clinic. The car wash daily water requirement is indicated as some 1.5 cubic metres per day. The results of that calculation are provided in the attached Appendix F, and indicate a zone of influence/capture zone of some 39 metres for the field pumping rate of about 33 cubic metres per day, and some 4 metres for the expected maximum Veterinary Clinic daily requirement of 3 cubic metres per day.


No presence of VOC’s above the method reporting limit was indicated for either the 3 hour or 6 hour sample. In addition previous testing for VOC’s and total petroleum hydrocarbon reported in our previous letter of July 24, 2008 also indicated no presence of those parameters above the method reporting limit.

Based on the above it is considered that the reported hydrocarbon contamination plume in the vicinity of the intersection of Dunrobin Road and Thomas Dolan Parkway has not impacted that groundwater at the wells for the site and that pumping from the on site wells for the purposes of the proposed car wash and veterinary clinic should not influence the plume migration direction.

We trust this letter provides sufficient information for your present requirements. If you have any questions concerning this letter please do not hesitate to contact our office.

Yours truly,

Kollaard Associates Inc.

  
C. R. Morey, P. Eng.



Attachments: Appendices A to F



APPENDIX A

MINISTRY OF THE ENVIRONMENT WELL RECORDS FOR SITE WELLS  
SUPPLIED BY CAPITAL WATER SUPPLY LTD.

Ministry of  
the Environment

FAX NO. : 16138328209  
Well Tag No. (Place sticker above right corner)

Regulation 903 Ontario Water Resources Act

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AG51520

**A 051520**

Well-Owner's Information		E-mail Address		<input type="checkbox"/> Well Constructed by Well Owner	
First Name		Last Name			
MacBeth Mechanical Inc.					
Mailing Address (Street Number/Name, RR).		Municipality		Province	
13 Neely		Dunrobin		Ontario	
Postal Code		Telephone No. (inc. area code)			
N 0A 1 T0		611 383 2018			
Part A Construction and/or Major Alteration of a Well		Township		Lot	
Address of Well Location (Street Number/Name, RR)		Kanata		27	
2742 Dunrobin Road		City/Town/Village		Province	
County/District/Municipality		Dunrobin		Ontario	
Ottawa Carleton		Postal Code			
UTM Coordinates		GPS Unit Make		Mode of Operation: <input type="checkbox"/> Undifferentiated <input checked="" type="checkbox"/> Averaged	
Zone Easting		Model		<input type="checkbox"/> Differentiated, specify	
NAD 83 18 4 2 0 2 8 45 03 0 28 4		Garmin			
Overburden and Bedrock Materials (see instructions on the back of this form)					
General Colour		Most Common Material		Other Materials	
Brown		Clay		Packed	
Brown		Sand		0.61 11.58	
Gray		Sand		17.17	

Annular Space/Abandonment Sealing Record			
Depth Set at (Metres) From To		Type of Sealant Used (Material and Type)	Volume Placed (Cubic Metres)
7.61	0	Grouted - Bentonite Slurry	132m <sup>3</sup>

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

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

**Location of Well**

Please provide a map below showing:

- all property boundaries, and measurements sufficient to locate the well in relation to fixed points,
- an arrow indicating the North direction
- detailed drawings can be provided as attachments no larger than legal size (8.5" by 14")
- additional pictures of inside of well can also be provided

Results of Well Yield Testing			
Draw Down		Recovery	
Time (Min)	Water Level (Metres)	Time (Min)	Water Level (Metres)
Static Level	4.91	Static Level	
1	6.51	1	5.62
2	6.71	2	5.36
3	6.78	3	5.05
4	6.81	4	4.98
5	6.81	5	4.95
10	6.82	10	4.93
15	6.83	15	4.93
20	6.83	20	4.92
25	6.83	25	4.91
30	6.83	30	
40	6.83	40	
50	6.83	50	
60	6.83	60	

Water found at Depth	Kind of Water
17.0 Metres <input checked="" type="checkbox"/> Gas	<input checked="" type="checkbox"/> Fresh <input type="checkbox"/> Salty <input type="checkbox"/> Sulphur <input type="checkbox"/> Mine
Water found at Depth	Kind of Water
<input type="checkbox"/> Metres <input type="checkbox"/> Gas	<input type="checkbox"/> Fresh <input type="checkbox"/> Salty <input type="checkbox"/> Sulphur <input type="checkbox"/> Mine
Water found at Depth	Kind of Water
<input type="checkbox"/> Metres <input type="checkbox"/> Gas	<input type="checkbox"/> Fresh <input type="checkbox"/> Salty <input type="checkbox"/> Sulphur <input type="checkbox"/> Mine

Casing Used		Street Used		Casing and Well Details	
<input checked="" type="checkbox"/> Galvanized	<input type="checkbox"/> Galvanized	<input type="checkbox"/> Steel	<input type="checkbox"/> Steel	Diameter of the Hole (Centimeters)	15.88 0 - 16.94 / 16.9
<input type="checkbox"/> Fibreglass	<input type="checkbox"/> Fibreglass	<input type="checkbox"/> Plastic	<input type="checkbox"/> Plastic	Depth of the Hole (Metros)	17.98
<input type="checkbox"/> Concrete	<input type="checkbox"/> Concrete			Wall Thickness (Metros)	.48

No. Casing and Screen Used	Inside Diameter of the Casing (Metres)
<input type="checkbox"/> Open Hole	15.86
Disinfected?	Depth of the Casing (Metres)
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	+ 45 to 16.94

Ministry Use Only	
Audit No. <b>277320</b>	Well Contractor No.
Date Received (yyyy/mm/dd)	Date of Inspection (yyyy/mm/dd)
Remarks	

Date Well Completed (yyyy/mm/dd) 2008/3/12	Was the well owner's information package delivered? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Date the Well Record and Package Delivered to Well Owner (yyyy/mm/dd) 2008/3/19
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Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Capital Water Supply Ltd.	1   5   5   8

Business Address (Street No./Name, number, RR) Box 490	Municipality Stittsville
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Province	Postal Code	Business E-mail Address
Ontario	K2S1A6	office@capitalwater.ca

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
611383 611716	Miller, Stephen

Well Technician's Licence No.	Signature of Technician	Date Submitted (yyyy/mm/yy)
0097		2008/3/19



Ministry of  
the Environment

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

A.051505

A051505

Well Record

Regulation 903 Ontario Water Resources Act

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## Well Owner's Information

First Name <b>MacBeth Mechanical Inc.</b>	Last Name	E-mail Address	<input type="checkbox"/> Well Constructed by Well Owner
Mailing Address (Street Number/Name, RR) <b>13 Neely</b>	Municipality <b>Dunrobin</b>	Province <b>Ontario</b>	Postal Code <b>K0A1T0</b>
Telephone No. (inc. area code) <b>413 832 0180</b>			

## Part A Construction and/or Major Alteration of a Well

Address of Well Location (Street Number/Name, RR) <b>2744 Dunrobin Road</b>	Township <b>Kanata</b>	Lot <b>27</b>	Concession <b>3</b>
County/District/Municipality <b>Ottawa Carleton</b>	City/Town/Village <b>Dunrobin</b>	Province <b>Ontario</b>	Postal Code
UTM Coordinates Zone <b>NAD 83</b>	Easting <b>184202</b>	Northing <b>6850302</b>	GPS Unit Make <b>Garmin</b>
Mode of Operation: <input type="checkbox"/> Undifferentiated <input checked="" type="checkbox"/> Averaged		<input type="checkbox"/> Differentiated, specify _____	

## Overburden and Bedrock Materials (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (Metres) From	To
Brown	Clay		Packed	0	7.61
Brown	Sand			7.61	11.58
Gray	Sand			11.58	18.43

## Annular Space/Abandonment/Sealing Record

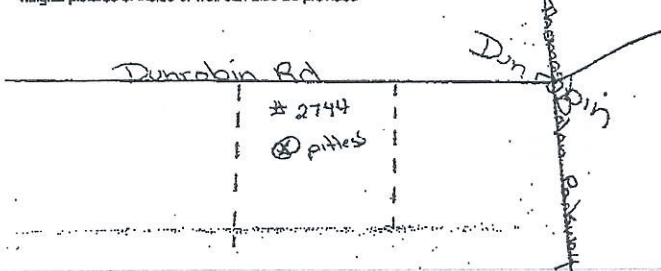
Depth Set at (Metres) From	To	Type of Sealant Used (Material and Type)	Volume Placed (Cubic Metres)
17.22	0	Grouted - Bentonite Slurry	132m3

<b>Method of Construction</b> <input type="checkbox"/> Cable Tool <input type="checkbox"/> Rotary (Conventional) <input type="checkbox"/> Rotary (Reverse) <input checked="" type="checkbox"/> Rotary (Air) <input type="checkbox"/> Air percussion <input type="checkbox"/> Other, specify _____	<input type="checkbox"/> Diamond <input type="checkbox"/> Jetting <input checked="" type="checkbox"/> Driving <input type="checkbox"/> Digging <input type="checkbox"/> Boring <input type="checkbox"/> Other, specify _____	<b>Water Use</b> <input type="checkbox"/> Public <input checked="" 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 type="checkbox"/> Test Hole <input type="checkbox"/> Cooling & Air Conditioning <input type="checkbox"/> Not used <input type="checkbox"/> Dewatering <input type="checkbox"/> Monitoring
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<b>Status of Well</b> <input 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"/> Abandoned, Insufficient Supply <input type="checkbox"/> Abandoned, Poor Water Quality <input type="checkbox"/> Abandoned, other, specify _____	<input type="checkbox"/> Observation and/or Monitoring Hole <input type="checkbox"/> Alteration (Construction) <input type="checkbox"/> Other, specify _____
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## Location of Well

Please provide a map below showing:  
 - all property boundaries, and measurements sufficient to locate the well in relation to fixed points,  
 - an arrow indicating the North direction  
 - detailed drawings can be provided as attachments no larger than legal size (8.5" by 14")  
 - digital pictures of inside of well can also be provided



## Results of Well Yield Testing

Check box if after test of well yield, water was: <input checked="" type="checkbox"/> Clear and sand free. <input type="checkbox"/> Cannot develop to sand-free state	Draw Down		Recovery	
	Time (Min)	Water Level (Metres)	Time (Min)	Water Level (Metres)
If pumping discontinued, give reason:  Pumping test method <u>submersible</u> Pump intake set at (Metres) <u>13.71</u> Pumping rate (Litres/min) <u>54.6</u> Duration of pumping <u>4</u> hrs + <u>    </u> min Final water level end of pumping (Metres) <u>7.82</u> Recommended pump type <input type="checkbox"/> Shallow <input checked="" type="checkbox"/> Deep Recommended pump depth <u>13.71</u> Metres Recommended pump rate (Litres/min) <u>45.5</u> If flowing give rate (Litres/min)	Static Level	<u>5.13</u>	Static Level	
	1	<u>6.58</u>	1	<u>6.18</u>
	2	<u>7.01</u>	2	<u>5.77</u>
	3	<u>7.38</u>	3	<u>5.59</u>
	4	<u>7.58</u>	4	<u>5.46</u>
	5	<u>7.63</u>	5	<u>5.40</u>
	10	<u>7.67</u>	10	<u>5.234</u>
	15	<u>7.74</u>	15	<u>5.18</u>
	20	<u>7.81</u>	20	<u>5.16</u>
	25	<u>7.72</u>	25	<u>5.13</u>
	30	<u>7.74</u>	30	
40	<u>7.81</u>	40		
50	<u>7.81</u>	50		
60	<u>7.87</u>	60		

<b>Water found at Depth</b> <b>17.22</b> Metres <input type="checkbox"/> Gas <input type="checkbox"/> Sulphur <input type="checkbox"/> Minerals <b>Kind of Water</b> <input type="checkbox"/> Fresh <input type="checkbox"/> Salty <input type="checkbox"/> Sulphur <input type="checkbox"/> Minerals	<b>Water found at Depth</b> Metres <input type="checkbox"/> Gas <input type="checkbox"/> Fresh <input type="checkbox"/> Salty <input type="checkbox"/> Sulphur <input type="checkbox"/> Minerals <b>Kind of Water</b> <input type="checkbox"/> Fresh <input type="checkbox"/> Salty <input type="checkbox"/> Sulphur <input type="checkbox"/> Minerals
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<b>Casing Used</b> <input type="checkbox"/> Galvanized <input checked="" type="checkbox"/> Steel <input type="checkbox"/> Fibreglass <input type="checkbox"/> Plastic <input type="checkbox"/> Concrete	<b>Screen Used</b> <input type="checkbox"/> Galvanized <input checked="" type="checkbox"/> Steel <input type="checkbox"/> Fibreglass <input type="checkbox"/> Plastic <input type="checkbox"/> Concrete	<b>Casing and Well Details</b> Diameter of the Hole (Centimetres) <b>17.22 / 17.22 - 18</b> Depth of the Hole (Metres) <b>18.43</b> Wall Thickness (Metres) <b>.48</b>
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<b>No Casing and Screen Used</b> <input type="checkbox"/> Open Hole Disinfected? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Inside Diameter of the Casing (Metres) <b>15.86</b> Depth of the Casing (Metres) <b>+ 1.21 to 17.22</b>
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<b>Ministry Use Only</b> Audit No. <b>2-77321</b> Date Received (yyyy/mm/dd) <b>2008/3/19</b>	Well Contractor No. Date of Inspection (yyyy/mm/dd)
Remarks	

Date Well Completed <b>2008/3/17</b>	Was the well owner's information package delivered? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Date the Well Record and Package Delivered to Well Owner (yyyy/mm/dd) <b>2008/3/18</b>
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## Well Contractor and Well Technician Information

Business Name of Well Contractor <b>Capital Water Supply Ltd.</b>	Well Contractor's Licence No. <b>1 5 5 8</b>
Business Address (Street No./Name, number, RR) <b>Box 490</b>	Municipality <b>Stittsville</b>
Province <b>Ontario</b>	Postal Code <b>K2A1A6</b>
Business E-mail Address <b>office@capitalwater.ca</b>	
Bus. Telephone No. (inc. area code) <b>613 833 1746</b>	Name of Well Technician (Last Name, First Name) <b>Miller, Stephen</b>
Well Technician's Licence No. <b>1000917</b>	Signature of Technician <i>[Signature]</i>
Date Submitted (yyyy/mm/dd) <b>2008/3/19</b>	



Measurements recorded in: ☐ Metric ☐ Imperial

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### Well Owner's Information

First Name	Last Name / Organization	E-mail Address	<input type="checkbox"/> Well Constructed by Well Owner
MacBath	MacBath Mechanical Inc.		
Mailing Address (Street Number/Name)	Municipality	Province	Postal Code Telephone No. (inc. area code)
13 Neely	Durham	Ontario	K9B 4L1 / 905-332-0100

## Well Location

Address of Well Location (Street Number/Name)		Township	Lot	Concession	
2744 Dunrobin Road		Kanata	27	3	
County/District/Municipality		City/Town/Village	Province		Postal Code
Ottawa Carleton		Dunrobin	Ontario		
UTM Coordinates	Zone	Easting		Northing	
NAD 83	18	12 0 2 17 5		5 0 13 0 13 0 11	
		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/d)	
				From	To
Brown	Clay		Packed	0	6.40
Brown	Sand	Silt	Fine	6.40	11.27
Brown	Sand		Fine	11.27	12.19
Gray	Sand			12.19	14.02

### Annular Space

[illegible]

### Results of Well Yield Testing

Alter test of well yield, water was:	Draw Down		Recovery	
	Time (min)	Water Level (mvl)	Time (min)	Water Level (mvl)
<input type="checkbox"/> Clear and sand free <input type="checkbox"/> Other specify				
If pumping discontinued, give reason:	Static Level	5.19		
	1	6.80	1	3.95
Pump intake set at (m/ft)	2	7.22	2	5.45
12.10				
Pumping rate (l/min / GPM)	3	7.50	3	5.28
54.6				
Duration of pumping	4	7.56	4	5.22
1 hrs + min	5	7.58	5	5.20
Final water level end of pumping (mvl)	10	7.60	10	
7.61				
If flowing give rate (l/min / GPM)	15	7.61	15	
	20	7.61	20	
Recommended pump depth (mvl)	25	7.62	25	
12.19				
Recommended pump rate (l/min / GPM)	30	7.61	30	
45.5				
Well production (l/min / GPM)	40	7.61	40	
	50	7.62	50	
Disinfected?	60	7.61	60	
<input type="checkbox"/> Yes <input type="checkbox"/> No				

### Method of Construction

<input type="checkbox"/> Cahn Triet	<input type="checkbox"/> Diamond	<input type="checkbox"/> Public	<input type="checkbox"/> Commercial	<input type="checkbox"/> Not used
<input type="checkbox"/> Rotary (Convexional)	<input type="checkbox"/> Jetting	<input type="checkbox"/> Duneptic	<input type="checkbox"/> Municipal	<input type="checkbox"/> Dewatering
<input type="checkbox"/> Rotary (Reverse)	<input type="checkbox"/> Drilling	<input type="checkbox"/> Livestock	<input type="checkbox"/> Test Hole	<input type="checkbox"/> Maintaining
<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 _____		

## Well Use

<input type="checkbox"/> Cahn Triet	<input type="checkbox"/> Diamond	<input type="checkbox"/> Public	<input type="checkbox"/> Commercial	<input type="checkbox"/> Not used
<input type="checkbox"/> Rotary (Convexional)	<input type="checkbox"/> Jetting	<input type="checkbox"/> Duneptic	<input type="checkbox"/> Municipal	<input type="checkbox"/> Dewatering
<input type="checkbox"/> Rotary (Reverse)	<input type="checkbox"/> Drilling	<input type="checkbox"/> Livestock	<input type="checkbox"/> Test Hole	<input type="checkbox"/> Maintaining
<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

Inside Diameter (mm)	Open Hole OR Material (Galvanized, Fiberglass, Concrete, Plastic, Steel)	Wall Thickness (mm)	Depth (mm)		<input 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"/> Abandonment (Construction) <input type="checkbox"/> Abandoned
			From	To	
15.86	Steel	48	4-45	12-80	

## Status of Well

Inside Diameter (mm)	Open Hole OR Material (Galvanized, Fiberglass, Concrete, Plastic, Steel)	Wall Thickness (mm)	Depth (mm)		<input 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"/> Abandonment (Construction) <input type="checkbox"/> Abandoned
			From	To	
15.86	Steel	48	4-45	12-80	

## Construction Record - Screen

Outside Diameter (mm)	Material (Plastic, Galvanized Steel)	Slot No.	Depth (mm)		<input type="checkbox"/> Water Quality <input type="checkbox"/> Abandoned, other specify <input type="checkbox"/> Other, specify
			From	To	
14.	Steel	8	12.80	14.02	

### Map of Well Location

Please provide a map below following instructions on the back.

### Water Details

Water found at Depth 12.00 (mft)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	Depth (mft)	Diameter (in)
<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	From To		
Water found at Depth (mft) <input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	Kind of Water: <input type="checkbox"/> Fresh <input type="checkbox"/> Untested	0 12.80	15.0
		12.80 14.02	14
Water found at Depth (mft) <input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	Kind of Water: <input type="checkbox"/> Fresh <input type="checkbox"/> Untested		

## Hole Diameter

Water found at Depth 12.00 (mft)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	Depth (mft)	Diameter (in)
<input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	From To		
Water found at Depth (mft) <input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	Kind of Water: <input type="checkbox"/> Fresh <input type="checkbox"/> Untested	0 12.80	15.0
		12.80 14.02	14
Water found at Depth (mft) <input type="checkbox"/> Gas <input type="checkbox"/> Other, specify	Kind of Water: <input type="checkbox"/> Fresh <input type="checkbox"/> Untested		

## Well Contractor and Well Technician Information

Business Name of Well Contractor		Well Contractor's License No.	
Capital Water Supply Ltd.		1-0-5-1-9	
Business Address (Street Number/Name)		Municipality	
Box 490		Springville	
Province	Postal Code	Business E-mail Address	
Ontario	K2B 1A6	office@capitalwater.ca	
Rust. Telephone No. (area code)	Name of Well Technician (Last Name, First Name)		
416-238-1760	Miller, Stephen		
Well Technician's License No.		Signature of Technician and/or Contractor Date Submitted	
		2008-08-08	

Comments

Well owner's information package delivered	Date Package Delivered	Ministry Use Only Audit No. <b>Z 84396</b> Pr. Item No.
	Date Work Completed	
<input type="checkbox"/> Yes		
<input checked="" type="checkbox"/> No	20090308	



APPENDIX B

WELL COMPLIANCE CERTIFICATES FOR ON SITE WELLS



# CERTIFICATE OF WELL COMPLIANCE

Capital Water Supply Ltd. DO HEREBY CERTIFY that I am licensed to drill wells in the Province of Ontario, and that I have supervised the drilling of a well on the property of MacBerh Mechanical (Name of Landowner), located at 2744 Dunrobin Road (Legal Description, Lot/Plan No.) in the City of Ottawa (Geographical Township of ).

LOT 26 CONC 3 PLAN # S/L #  
 CERTIFY FURTHER that, I am aware of the well drilling requirements, the guidelines, recommendations and regulations of the Ministry of the Environment governing well installations in the Province of Ontario, and the standards specified in any subdivision agreement and hydrogeological report applicable to this site and City Standards.

AND DO HEREBY CERTIFY THAT the said well has been drilled, cased, grouted (cement or bentonite) as applicable and constructed in strict conformity with the standards required.

Signed this 17 day of March, 2008

[Signature]  
 Well Driller/Company

The Engineer on behalf of the landowner set out above Certifies that he/she has inspected the well and it was constructed in accordance with the specifications in O.Reg. 903. This report ~~and the Hydrogeological Report~~ with regards to casing length and grouting requirements.

SIGNED this 28th day of July 2008

[Signature]  
 Engineer

for KOLL AND ASSOCIATES INC.

Shaping our future together  
 Ensemble, pour l'avenir

CITY OF OTTAWA  
 Client Service Centre  
 1043 Victoria Street  
 Ottawa, ON K2P 1P8

VILLE D'OTTAWA  
 Centre de service  
 1043, rue Victoria  
 Ottawa, ON K2P 1P8







# CERTIFICATE OF WELL COMPLIANCE

Capital Water Supply Ltd. DO HEREBY CERTIFY that I am licensed to drill wells in the Province of Ontario, and that I have supervised the drilling of a well on the property of MacBeth Mechanical (Name of Landowner), located at 2742 Dunrobin Road (Legal Description, Lot/Plan No.) in the City of Ottawa (Geographical Township of \_\_\_\_\_).

LOT 26 CONC 3 PLAN# \_\_\_\_\_ S/L# \_\_\_\_\_  
CERTIFY FURTHER that, I am aware of the well drilling requirements, the guidelines, recommendations and regulations of the Ministry of the Environment governing well installations in the Province of Ontario, and the standards specified in any subdivision agreement and hydrogeological report applicable to this site and City Standards.

AND DO HEREBY CERTIFY THAT the said well has been drilled, cased, grouted (cement or bentonite) as applicable and constructed in strict conformity with the standards required.

Signed this 12 day of March, 2008

Well Driller/Company [Signature]

The Engineer on behalf of the landowner set out above Certifies that he/she has inspected the well and it was constructed in accordance with the specifications in O.Reg. 903, this report ~~and the Hydrogeological Report~~ with regards to casing length and grouting requirements.

SIGNED this 28<sup>th</sup> day of July, 2008

[Signature]  
Engineer

for KOLLAND ASSOCIATES INC.

Shaping our future together  
Ensemble, formons notre avenir

City of Ottawa  
Client Services Centre  
1044 Victoria Street  
Ottawa, ON K1H 1A1

Ville d'Ottawa  
Centre de services  
1043, rue Victoria  
Ottawa, ON K1H 1A1





WATER SUPPLY LTD.

**WELL DRILLING**

P.O. Box 490  
Stittsville, Ontario  
K2S 1A6  
www.capitalwater.ca

Stittsville  
(613) 836-1766

Richmond  
(613) 838-7845

Almonte  
(613) 256-1766

Fax  
(613) 838-5899

## CERTIFICATE OF WELL COMPLIANCE

We, Capital Water Supply Ltd., do hereby certify that we are licensed to drill water wells in the Province of Ontario, and that we have drilled the well on the property of MacBeth Mechanical located at 2744 Dunrobin Road in the township of Kanata

We certify further that we are aware of the drilling requirements of the Township of Kanata, recommendations and regulations of the Ministry of the Environment governing well installations in the Province of Ontario and the standards specified in any subdivision agreement and hydro-geological report applicable to the site noted by the owner.

And I do hereby certify that the said well has been drilled, cased and grouted to the standards required.

SIGNED THIS 3 Day of September 2008

Engineer

Well Driller/Company

The landowner of the lot set out above certifies that the best of the owner's knowledge and belief all statements set out above are true.

SIGNED THIS Day of 20

Landowner.



APPENDIX C

RESULTS OF FIELD AND LABORATORY TESTING OF  
“NEW” WELL WATER SAMPLES

RESULTS OF THE FIELD WATER QUALITY MEASUREMENTS  
FOR TEST WELL #A068278

Time Since Pumping Test Started [hours]	Turbidity [NTU]	Temperature [°C]	pH	Total Dissolved Solids [mg/l]	Conductivity [µs]	Free Chlorine [mg/l]
1	0.0	8.2	7.35	611	1190	0
2	0.0	8.2	7.36	572	1146	0
3	0.0	8.3	7.36	584	1157	0
4	0.0	8.3	7.41	575	1157	0
5	0.0	8.1	7.40	573	1148	0
6	0.0	7.8	7.43	577	1149	0

# REPORT OF ANALYSIS

Chain of Custody Number: 95548

**P.O. Number:**  
**Matrix:**

LAB ID:				GUIDELINE			
Sample Date:				ODWSOG			
Sample ID:							
PARAMETER				UNITS	MRL	681684	681685
Alkalinity as CaCO3	mg/L	5		261		261	
Chloride	mg/L	1		182		179	
Colour	TCU	2		5		2	
Conductivity	uS/cm	5		1230		1240	
Dissolved Organic Carbon	mg/L	0.5		2.3		2.6	
Fluoride	mg/L	0.10		<0.10		<0.10	
Hydrogen Sulphide	mg/L	0.01		0.01		0.02	
N-NH3 (Ammonia)	mg/L	0.02		0.05		0.05	
N-NO2 (Nitrite)	mg/L	0.10		<0.10		<0.10	
N-NO3 (Nitrate)	mg/L	0.10		<0.10		<0.10	
pH				7.86		7.84	
Phenols	mg/L	0.001		0.001		<0.001	
Sulphate	mg/L	1		101		102	
Tannin & Lignin	mg/L	0.1		0.3		0.3	
TDS (COND - CALC)	mg/L	5		800		806	
Total Kjeldahl Nitrogen	mg/L	0.10		0.17		0.16	
Turbidity	NTU	0.1		26.6		23.9	
Hardness as CaCO3	mg/L	1		503		510	
Ion Balance		0.01		1.03		1.05	
Calcium	mg/L	1		129		130	
Magnesium	mg/L	1		44		45	
Potassium	mg/L	1		7		8	
Sodium	mg/L	2		61		61	
Iron	mg/L	0.03		1.72		1.75	
Manganese	mg/L	0.01		0.13		0.13	

**Comment:**

APPROVAL/

~~Ewan McRobbie~~  
~~Inorganic Lab Supervisor~~



## ACCUTEST LABORATORIES - A New Bodycote Company

## REPORT OF ANALYSIS

Client: Kollaard Associates Inc.  
215 Sanders St., Box 189  
Kempville, ON  
K0G 1J0

Attention: Mr. Randy Morey

Report Number: 2831425  
Date: 2008-12-18  
Date Submitted: 2008-12-15  
Project: 070352

Chain of Custody Number: 95548

P.O. Number:  
Matrix:

Water

PARAMETER	UNITS	MRL	LAB ID:		TYPE	LIMIT	UNITS
			Sample Date:	Sample ID:			
Total Coliforms	cf/100mL		681675 2008-12-15	681676 2008-12-15	MAC	0	cf/100mL
Escherichia Coli	cf/100mL			12:33 3hr	MAC	0	cf/100mL
Heterotrophic Plate Count	cf/1mL						
Faecal Coliforms	cf/100mL		0	0			
Faecal Streptococcus	cf/100mL		24	60			
			0	0			
			0	0			

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:

  
Jennifer Mitchell  
Microbiology Lab Supervisor

Client: Kollaard Associates Inc.  
215 Sanders St., Box 189  
Kemptville, ON  
K0G 1J0

Attention: Mr. Randy Morey

Report Number: 2831432  
Date: 2008-12-18  
Date Submitted: 2008-12-15

Project: 070352

Chain of Custody Number: 95548

P.O. Number:

Chain of Custody Number: 95548					Matrix:		Water	
PARAMETER			LAB ID:		681684 2008-12-15 3:33 6Hr	681685 2008-12-15 12:33 3Hr	GUIDELINE	
			UNITS	MRL				
VOLATILE ORGANIC COMPOUNDS - VOCs								
1,1,1,2-tetrachloroethane	ug/L	0.5						
1,1,1-trichloroethane	ug/L	0.4	<0.5					
1,1,1,2,2-tetrachloroethane	ug/L	0.5	<0.4					
1,1,1,2,2-trichloroethane	ug/L	0.4	<0.5					
1,1-dichloroethane	ug/L	0.4	<0.4					
1,1-dichloroethylene	ug/L	0.5	<0.4					
1,2-dibromoethane	ug/L	1.0	<0.5					
1,2-dichlorobenzene	ug/L	0.4	<1.0					
1,2-dichloroethane	ug/L	0.5	<0.4					
1,2-dichloropropane	ug/L	0.5	<0.5					
1,3,5-trimethylbenzene	ug/L	0.3	<0.5					
1,3-dichlorobenzene	ug/L	0.4	<0.3					
1,4-dichlorobenzene	ug/L	0.4	<0.4					
Benzene	ug/L	0.4	<0.4					
Bromodichloromethane	ug/L	0.5	<0.4					
Bromoform	ug/L	0.3	<0.5					
Bromomethane	ug/L	0.4	<0.3					
c-1,2-Dichloroethylene	ug/L	0.5	<0.4					
c-1,3-Dichloropropylene	ug/L	0.2	<0.5					
Carbon Tetrachloride	ug/L	0.5	<0.2					
Chloroethane	ug/L	1.0	<0.5					
Chloroform	ug/L	0.5	<1.0					
Chloromethane	ug/L	1.0	<0.5					
Dibromochloromethane	ug/L	0.3	<1.0					
Dichloromethane	ug/L	4.0	<0.3					
Ethylbenzene	ug/L	0.5	<4.0					
m/p-xylene	ug/L	1.0	<0.5					
Monochlorobenzene	ug/L	0.2	<1.0					
o-xylene	ug/L	0.5	<0.2					
			<0.5					

MRL = Method Reporting Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

APPROVAL:

Mina Nasirai  
Organic Lab Supervisor



**ACCUTEST LABORATORIES - A New Bodycote Company**

Chain of Custody Number: 95548

Chain of Custody Number: 35040	LAB ID:						GUIDELINE		
	Sample Date:								
	Sample ID:								
	PARAMETER	UNITS	MRL	681684 2008-12-15 3:33 6Hr	681685 2008-12-15 12:33 3Hr				ODWSOG
	Styrene	ug/L	0.5	<0.5	<0.5				
	1,1,2-Dichloroethylene	ug/L	0.4	<0.4	<0.4				ug/L
	1,1,3-Dichloropropylene	ug/L	0.2	<0.2	<0.2				ug/L
	Tetrachloroethylene	ug/L	0.3	<0.3	<0.3				ug/L
	Toluene	ug/L	0.5	<0.5	<0.5				ug/L
	Trichloroethylene	ug/L	0.3	<0.3	<0.3				ug/L
	Trichlorofluoromethane	ug/L	0.5	<0.5	<0.5				ug/L
	Vinyl Chloride	ug/L	0.2	<0.2	<0.2				ug/L
	VOC SURROGATES	%		104	105				
	1,2-dichloroethane-d4	%		98	96				
	4-bromofluorobenzene	%		99	98				
	Toluene-d8								

Comment:

Organic Lab Supervisor

APPENDIX D

RESULTS OF PREVIOUS LABORATORY TESTING OF  
WELL WATER SAMPLE AND WELL RECORD  
FOR 2730 DUNROBIN ROAD



Client: Kollaard Associates Inc.  
215 Sanders St, Box189  
Kemptville, ON  
K0G 1J0

Attention: Dean Tataryn

Report Number: 2523587  
Date: 2005-11-28  
Date Submitted: 2005-11-18

Project: 050175

P.O. Number:

Matrix: Water

PARAMETER	LAB ID:		UNITS	MDL	426586		426587		GUIDELINE	
	Sample Date:	Sample ID:			2005-11-17	TW1-1hr	2005-11-17	TW1-6hr	TYPE	LIMIT
Alkalinity as CaCO3			mg/L	5	231		232		OG	500
Chloride			mg/L	1	95		101		AO	250
Colour			TCU	2	4		3		AO	5
Conductivity			uS/cm	5	839		846		AO	5
Dissolved Organic Carbon			mg/L	0.5	2.1		1.6		MAC	1.5
Fluoride			mg/L	0.10	0.34		0.36		AO	0.05
Hydrogen Sulphide			mg/L	0.01	<0.01		<0.01		MAC	1.0
N-NH3 (Ammonia)			mg/L	0.02	0.04		0.06		MAC	10.0
N-NO2 (Nitrite)			mg/L	0.10	<0.10		<0.10		AO	6.5-8.5
N-NO3 (Nitrate)			mg/L	0.10	<0.10		<0.10		AO	500
pH					7.80		7.86		AO	500
Phenols			mg/L	0.001	<0.001		<0.001		AO	500
Sulphate			mg/L	1	62		65		AO	500
Tannin & Lignin			mg/L	0.1	<0.1		<0.1		AO	500
TDS (COND - CALC)			mg/L	5	545		550		AO	500
Total Kjeldahl Nitrogen			mg/L	0.05	0.16		0.14		AO	1.0
Turbidity			NTU	0.1	17.7		3.2		OG	100
Hardness as CaCO3			mg/L	1	391		388		AO	100
Ion Balance				0.01	1.04		1.00			
Calcium			mg/L	1	112		111			
Magnesium			mg/L	1	27		27			
Potassium			mg/L	1	4		4			
Sodium			mg/L	2	23		23			
Iron			mg/L	0.03	2.16		0.50			
Manganese			mg/L	0.01	0.15		0.20			

MDL = Method Detection Limit INC = Incomplete AO = Aesthetic Objective OG = Operational Guideline MAC = Maximum Allowable Concentration IMAC = Interim Maximum Allowable Concentration

Comment:

APPROVAL:

  
Ewan McRobbie  
Inorganic Lab Supervisor

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

7/21

COPY

County or District <b>OTTAWA CARLETON</b>	Township/Borough/City/Town/Village <b>KANATA RURAL (March)</b>	Con block tract survey, etc. <b>CONCESSION 4</b>	Lot <b>27</b>
Owner's surname <b>BLACK CONSTRUCTION</b>	First Name <b>First Name</b>	Address <b>2123 Chalmers Rd, Ottawa, Ont.</b>	Date completed <b>19 08 97</b> day month year

[illegible]

WATER RECORD		
Water found at - feet	Kind of water	
4347	<input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Salty	<input type="checkbox"/> Sulphur <input checked="" type="checkbox"/> Minerals <input type="checkbox"/> Gas
	<input type="checkbox"/> Fresh <input type="checkbox"/> Salty	<input type="checkbox"/> Sulphur <input type="checkbox"/> Minerals <input type="checkbox"/> Gas
	<input type="checkbox"/> Fresh <input type="checkbox"/> Salty	<input type="checkbox"/> Sulphur <input type="checkbox"/> Minerals <input type="checkbox"/> Gas
	<input type="checkbox"/> Fresh <input type="checkbox"/> Salty	<input type="checkbox"/> Sulphur <input type="checkbox"/> Minerals <input type="checkbox"/> Gas
	<input type="checkbox"/> Fresh <input type="checkbox"/> Salty	<input type="checkbox"/> Sulphur <input type="checkbox"/> Minerals <input type="checkbox"/> Gas

CASING & OPEN HOLE RECORD				
Inside diam inches	Material	Wall thickness inches	Depth - feet	
			From	To
6 1/4"	<input checked="" type="checkbox"/> Steel <input type="checkbox"/> Galvanized <input type="checkbox"/> Concrete <input type="checkbox"/> Open hole <input type="checkbox"/> Plastic	0.158	+2	43
Screen	<input type="checkbox"/> Steel <input type="checkbox"/> Galvanized <input type="checkbox"/> Concrete <input type="checkbox"/> Open hole <input type="checkbox"/> Plastic		43	47
	<input type="checkbox"/> Steel <input type="checkbox"/> Galvanized <input type="checkbox"/> Concrete <input type="checkbox"/> Open hole <input type="checkbox"/> Plastic			

SCREEN	Sizes of opening (Slot No.)	Diameter	Length
	SLOT #5	5 1/2 inches	4 feet
	Material and type	Depth at top of screen	
	Stainless / plastic	43 feet	

PLUGGING & SEALING RECORD			
<input checked="" type="checkbox"/> Annular space		<input type="checkbox"/> Abandonment	
Depth set at - feet		Material and type (Cement grout, bentonite, etc.)	
From	To		
0	10	Holeplug grout.	

PUMPING TEST	Pumping test method <input type="checkbox"/> Pump <input checked="" type="checkbox"/> Bailer		Pumping rate 10 GPM		Duration of pumping 1 Hours 0 Mins	
	Static level	Water level end of pumping	Water levels during <input checked="" type="checkbox"/> Pumping <input type="checkbox"/> Recovery			
	18 feet	24 feet	15 minutes 24 feet	30 minutes 24 feet	45 minutes 24 feet	60 minutes 24 feet
	If flowing give rate — GPM		Pump intake set at 40 feet		Water at end of test <input checked="" type="checkbox"/> Clear <input type="checkbox"/> Cloudy	
	Recommended pump type <input type="checkbox"/> Shallow <input checked="" type="checkbox"/> Deep		Recommended pump setting 40 feet		Recommended pump rate 5 GPM	

**FINAL STATUS OF WELL**

☒ Water supply      ☐ Abandoned, insufficient supply      ☐ Unfinished

☐ Observation well      ☐ Abandoned, poor quality      ☐ Replacement well

☐ Test hole      ☐ Abandoned (Other)

☐ Recharge well      ☐ Dewatering

**WATER USE**

<input checked="" type="checkbox"/> Domestic	<input type="checkbox"/> Commercial	<input type="checkbox"/> Not use
<input type="checkbox"/> Stock	<input type="checkbox"/> Municipal	<input type="checkbox"/> Other .....
<input type="checkbox"/> Irrigation	<input type="checkbox"/> Public supply	
<input type="checkbox"/> Industrial	<input type="checkbox"/> Cooling & air conditioning	

**METHOD OF CONSTRUCTION**


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

**LOCATION OF WELL**

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

The diagram shows a well located 20m from the road and 20m from the plot boundary. The road is labeled 'Nunrobin Rd.' and the plot is labeled 'Hosdalan Plot'. A north arrow is shown in the top-left corner.

208800

Name of Well Contractor <b>STANTON DRILLING INC</b>	Well Contractor's Licence No. <b>4875</b>
Address <b>Box 219, Falkenham, Ont.</b>	
Name of Well Technician <b>Jeff Stanton</b>	Well Technician's Licence No. <b>T-0086</b>
Signature of Technician/Contractor 	Submission date day <b>7</b> mo <b>08</b> yr <b>99</b>

MINISTRY USE ONLY			



December 2008

070352

APPENDIX E  
“NEW” WELL PUMPING OBSERVATIONS

Kollaard File 070352

DRAWDOWN DATA WELL TAG #A068278

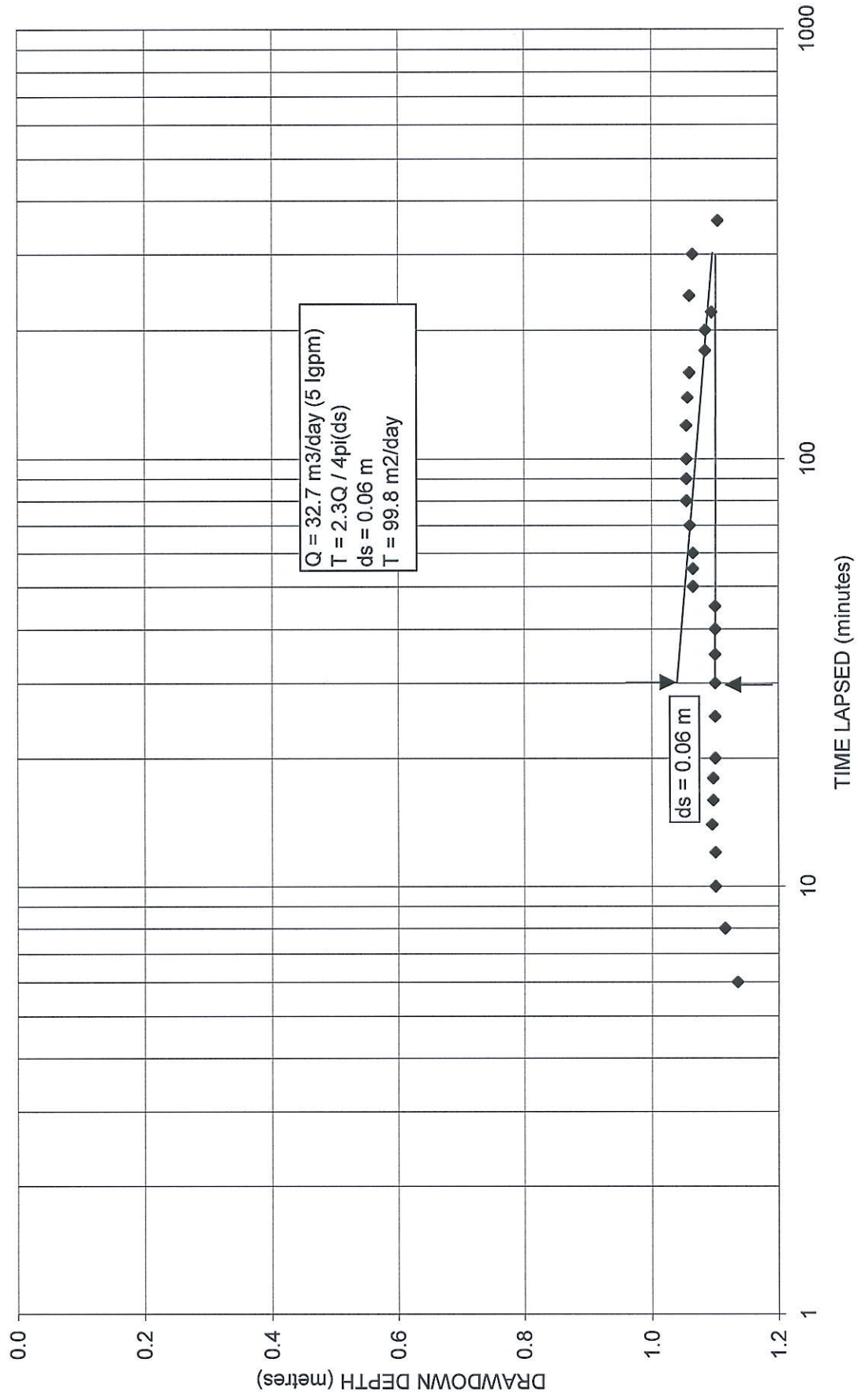
Pump Rate

5 gal/min

Time of Day	Time Lapsed (minutes)	Depth (metres)	h-ho (metres)
9:33	0	5.085	0.000
9:39	6	6.220	1.135
9:41	8	6.200	1.115
9:43	10	6.185	1.100
9:45	12	6.185	1.100
9:47	14	6.180	1.095
9:49	16	6.182	1.097
9:51	18	6.182	1.097
9:53	20	6.185	1.100
9:58	25	6.185	1.100
10:03	30	6.185	1.100
10:08	35	6.185	1.100
10:13	40	6.185	1.100
10:18	45	6.185	1.100
10:23	50	6.150	1.065
10:28	55	6.150	1.065
10:33	60	6.150	1.065
10:43	70	6.145	1.060
10:53	80	6.140	1.055
11:03	90	6.140	1.055
11:13	100	6.140	1.055
11:33	120	6.140	1.055
11:53	140	6.142	1.057
12:13	160	6.145	1.060
12:33	180	6.170	1.085
12:53	200	6.170	1.085
13:13	220	6.180	1.095
13:33	240	6.145	1.060
14:33	300	6.150	1.065
15:33	360	6.190	1.105



WELL DRAWDOWN VS. TIME-Kollaard File 070352

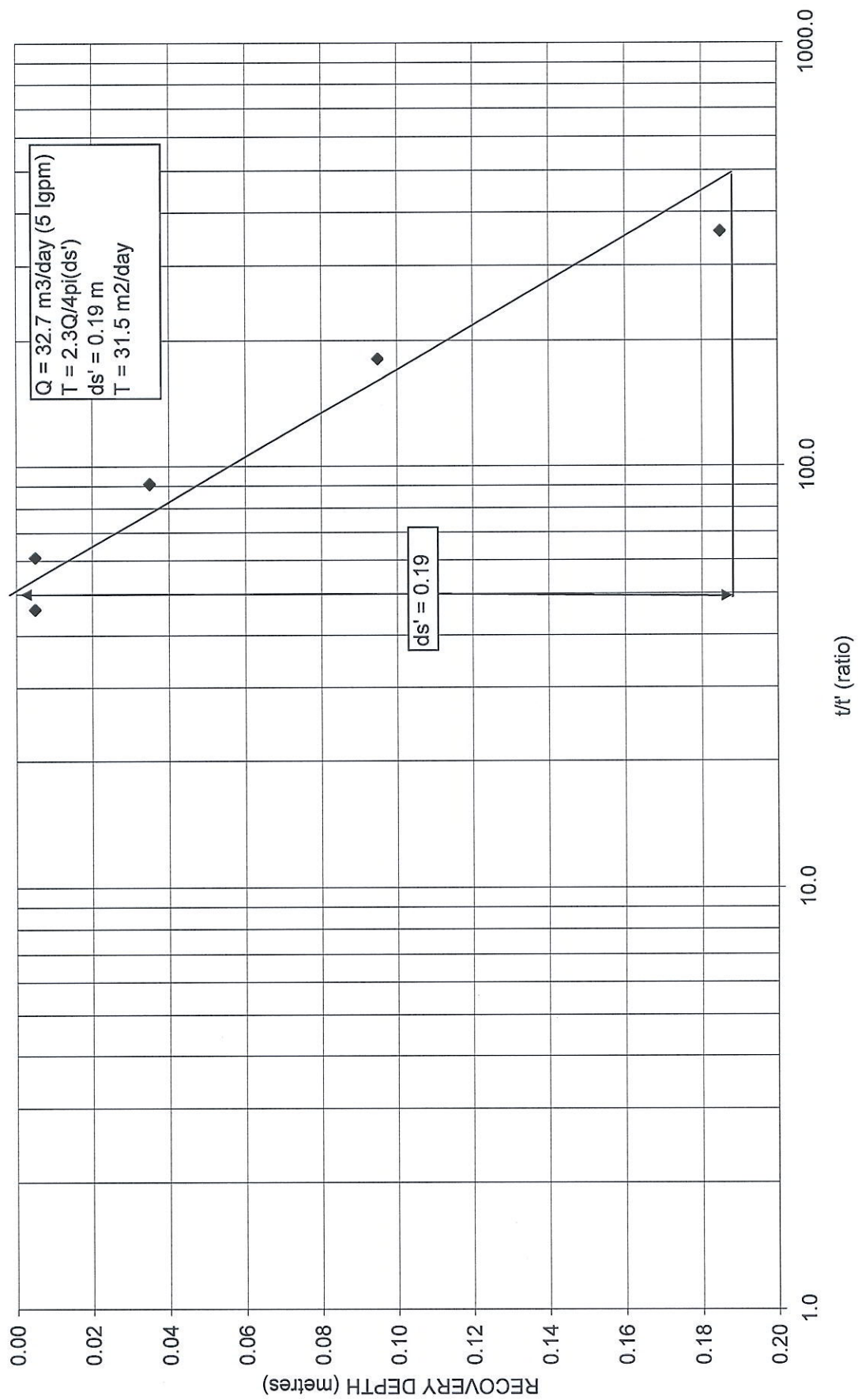


Kollaard File 070352

RECOVERY DATA WELL TAG #A068278

Recovery Time t' (minutes)	t / t' (ratio)	Depth (metres)	h-ho (metres)
0		6.19	1.11
1	361.0	5.27	0.19
2	181.0	4.99	0.09
4	91.0	5.05	0.04
6	61.0	5.08	0.00
8	46.0	5.09	0.00
100%	RECOVERY AFTER	8.00	MINUTES.





DRAWDOWN IN OBSERVATION WELLS  
DURING PUMPING OF TEST WELL TAG #A068278

PUMPED WELL: WELL TAG #A068278  
OBSERVATION WELL: 2730 Dunrobin Road  
DISTANCE BETWEEN  
PUMPED WELL AND OBSERVATION WELL: 105 metres

Time of Day	Time Lapsed (minutes)	Depth (metres)	h-ho (metres)
9:33 (Before Start)	0	4.945	0.000
10:33	60	4.950	0.005
11:33	120	4.955	0.010
12:33	180	4.955	0.010
13:33	240	4.950	0.005
14:33	300	4.955	0.010
4:03 (Recovery)	390	4.950	0.005

PUMPED WELL: WELL TAG #A068278  
OBSERVATION WELL: WELL TAG #A051529  
DISTANCE BETWEEN  
PUMPED WELL AND OBSERVATION WELL: 21.5 metres

Time of Day	Time Lapsed (minutes)	Depth (metres)	h-ho (metres)
9:33 (Before Start)	0	4.995	0.000
10:33	60	5.010	0.015
11:33	120	5.010	0.015
12:33	180	5.010	0.015
13:33	240	5.030	0.035
14:33	300	5.015	0.020
4:03 (Recovery)	390	4.995	0.000



APPENDIX F  
ZONE OF INFLUENCE CALCULATIONS

## Steady State Capture Zone Calculation

$$Y_{\max} = \frac{Q}{2KbI}$$

where	Q	Pump Rate, m <sup>3</sup> /day
	K	Hydraulic conductivity, m/day
	b	aquifer thickness, m
	I	hydraulic gradient, dimensionless

from Fetter, C.W., 2011, Applied Hydrogeology, 4th edition, Upper Saddle River, New Jersey, Prentice Hall.

Given:

Q	32.7 m3/day	
I	<u>5.085 - 4.995</u>	hydraulic gradient between the two test wells on site,
	21.5	based on static water levels

For a confined aquifer, that is fully penetrated,  $T = Kb$   
 Transmissivity 99.8 m<sup>2</sup>/day, from pumping test data

$$Y_{\max} = \frac{Q}{2\pi}$$

Y max 39 m

At a pumping rate of 5 igpm (32.7 m<sup>3</sup>/day), the radius of the well capture zone is about 39 metres.

The expected demand for the proposed use is about 3000L/day.

Given:

Q 3 m<sup>3</sup>/day  
Y max 3.59 m

Equation assumes:

fully penetrating, confined aquifer of infinite lateral extent of isotropic media