

July 22, 2022

File: 101593.001

Jubalani Vineyard and Winery  
8005 Jock Trail  
Richmond, Ontario  
K0A 2Z0

Attention: Mr. Tom Moul

**Re: Hydrogeological Investigation  
8005 Jock Trail  
Richmond, Ontario**

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This letter presents the results of a groundwater quality and quantity assessment for the existing Jubalani Vineyard and Winery at 8005 Jock Trail in Richmond, Ontario.

## **INTRODUCTION**

The existing property has an area of approximately 15.2 hectares and is located at 8005 Jock Trail in Richmond, Ontario. The site is bounded to the south by Jock Trail, to west and east by rural residential and agricultural lands, and to the north by the Jock River. The site location is presented on Figure 1 (Appendix A).

The objective of the investigation presented herein is:

- To demonstrate that the quality of the well water meets the Ontario Drinking Water Standards and maximum treatable limits prescribed in Ontario Ministry of Environment, Conservation and Parks (MECP) Procedure D-5-5; and
- To demonstrate that the quantity of water meets the MECP requirements.

## **SITE GEOLOGY**

In general, the subject property is relatively flat. The subject site consists of vineyards, grassy areas, two ponds, a commercial building, and one residential dwelling at the north end of the site. Surficial geology maps (Ontario Geologic Survey, 2010) indicate that the site is underlain by predominantly coarse-textured, foreshore to basinal, glaciomarine deposits of sand and gravel with minor silt and clay and the northern edge of the site is underlain by stone-poor silt to sand textured till.

Paleozoic bedrock geology mapping (Armstrong and Dodge, 2007) indicates that the subject site is underlain by dolostone, with minor shale and sandstone of the Oxford Formation

(Beekmantown Group). A northwest-southeast oriented fault is located southwest of the subject site, which identifies sandstone, shale, limestone and dolostone of the Rockcliffe Formation.

A search of the Ministry of Environment, Conservation and Parks (MECP) water well records (<https://www.ontario.ca/environment-and-energy/map-well-records>) returned ten water well records within 500 m of the site. The ten water well records are provided in Appendix B. The well depths range from 12.5 m BGS to 79.2 m BGS, with an average well depth of 37.3 m BGS. The recommended pumping rates provided by the well drillers range from 11 litres per minute (L/min) to 76 L/min, with an average of 35 L/min. All water wells are completed in limestone bedrock, with the exception of one well record which is completed in sandstone bedrock.

Based on the Paleozoic bedrock geology mapping and MECP water well records within 500 m of the subject site, the water supply aquifer consists of limestone bedrock of either the Oxford or Rockcliffe Formation. It is noted that due to the similarity between dolostone and limestone bedrock, dolostone of the Oxford Formation is often identified as limestone on water well records. Nevertheless, it is anticipated that the bedrock aquifer is consistent within 500 metres of the subject site and the mapped bedrock fault.

## TOPOGRAPHY AND DRAINAGE

Topographic mapping data indicates that elevations across the site range from approximately 105 m above mean sea level (AMSL) to 107 m AMSL. There is no clear elevation trend and it is anticipated that drainage of the subject site is north towards the Jock River at the north end of the site and south towards Jock Trail at the south end of the site.

## WATER QUALITY AND QUANTITY

### Test Well Construction

An existing on-site private well was utilized as the test well for the hydrogeological investigation. The MECP water well record is provided in Appendix B and the construction details are summarized in Table 1. The approximate location of the water well is provided on the Site Plan (Figure 1, Appendix A).

**Table 1: On-Site Water Well Construction Details**

Well Construction Details – TW22-01	
Depth to Bedrock	0.9 m below ground surface (BGS)
Length of Well Casing	6.7 m

### Well Construction Details – TW22-01

Length of Well Casing Above Ground Surface	0.6 m
Length of Well Casing Below Ground Surface	6.1 m
Depth Water Found	33.5 m BGS
Total Well Depth	36.6 m BGS
Bedrock Description	Limestone

The on-site private well is considered to be in good condition and meets the O.Reg 903 minimum casing requirements.

#### Groundwater Quantity

A pumping test was carried out on the water well by a member of GEMTEC staff on March 16, 2022. The well was pumped at rates ranging from 70 L/min to 90 L/min for a period of eight hours. The water from the pumping test was discharged to the ground surface approximately 10 m away from the test well such that the discharge flow was away from the well head. The initial pumping rate was 90 L/min, but the discharge hose length was increased about two hours into the test to avoid flooding the field onsite and change the discharge location to the ditch adjacent to Jock Trail. The increased hose length reduced the pumping rate to 75 L/min, which was the rate for the remainder of the test apart from the flow rate after five hours, which had temporarily decreased to 70 L/min.

Water level and flow rate measurements were taken at regular intervals throughout the pumping test. Water levels were also taken during the recovery phase of the pumping test (after the pump was turned off). The pumping test drawdown and recovery graph is provided in Appendix C.

During the pumping test, the water level decreased approximately 5.3 m from a static water level of 1.3 m below ground surface (BGS). Following the first 3 minutes, where the water level decreased approximately 5.3 m, the water level stabilized around 6.6 m BGS, occasionally rising to 0.3 m higher before stabilizing again at about 6.6 m BGS. This continued for the remainder of the 8-hour test. Frequent flow rate measurements confirmed that the pumping ranged from a rate of approximately 70 L/min to 90 L/min. The pumping test withdrew approximately 33,600 L.

The transmissivity of the water supply aquifer was estimated from the pumping test drawdown data using Aqtesolv (Version 4.5), a commercially available software program from HydroSOLVE Inc. An analysis of the pumping test and recovery data was carried out using the Cooper-Jacob

and Theis recovery method of analyses. Due to the high productivity of the water supply aquifer, transmissivity could not be accurately estimated. As depicted in the drawdown and recovery graph (Appendix C) and as discussed above, the water level stabilized during pumping and returned to a near static level following pumping quickly. The maximum drawdown in the water level of the well was approximately 5.3 m following 3 minutes of pumping at a flow rate of 90 L/min. Based on a static water level of 1.3 m BGS, the total well depth of 37.4 m BGS and the water level after 3 minutes of pumping, the remaining available drawdown in the well is approximately 30.8 m.

### **Groundwater Quality**

A water sample was collected by a member of GEMTEC staff from an outdoor tap on the winery on January 26, 2022. The test well, TW22-01, was sampled after eight hours of pumping on March 16, 2022. The samples were submitted to Paracel Laboratories, a CALA-certified laboratory, located in Ottawa for analysis of 'subdivision package' parameters. Copies of the laboratory certificates of analysis for the water samples are provided in Appendix D.

Field measurements were taken at regular intervals throughout the pumping test and are summarized in Appendix D.

The results of the laboratory analysis on the water samples are also summarized in Appendix D along with the applicable standards, guidelines and objectives provided in the Ontario Drinking Water Quality Standards (ODWQS).

The following comments are provided regarding the drinking water quality and exceedances of the ODWQS:

### **Bacteriological Results**

Total chlorine measurements at the time of bacteriological sampling confirmed that total chlorine concentrations in the groundwater were non-detectable.

The results of the bacteriological analysis of the January 26 and March 16, 2022 water samples indicate the concentration of bacteria indicator species such as total coliforms, E.coli and fecal coliforms, were determined to be non-detectable in both of the water samples. Based on the bacteriological testing, the water is suitable for consumption.

### **Chemical Results**

The results of the chemical testing on the water samples indicate the operational guidelines for hardness and organic nitrogen, and the warning level for sodium were exceeded in one or both of the water samples. In addition, nitrate concentrations exceeded 2.5 mg/L, which does not exceed the ODWQS maximum acceptable concentration, but the City of Ottawa Hydrogeological and Terrain Analysis Guidelines indicate that additional sampling events are required when nitrate concentrations are between 2.5 mg/L and 10 mg/L.

The above noted exceedances are discussed in the follow sections:

### **Hardness**

The hardness of the water samples was reported to be 312 mg/L and 307 mg/L as CaCO<sub>3</sub>, which exceeds the ODWQS operational guideline for hardness. Water having a hardness above 100 mg/L as CaCO<sub>3</sub> is often softened for domestic use. Water softeners are widely used throughout rural areas to treat hardness and there is no upper treatable limit for hardness. The ODQWS indicate that hardness levels exceeding 200 mg/L as CaCO<sub>3</sub> is considered poor but tolerable, and hardness levels exceeding 500 mg/L as CaCO<sub>3</sub> is considered to be unacceptable for most domestic purposes.

Water softening by conventional sodium ion exchange water softeners that use sodium chloride may introduce relatively high concentrations of sodium into the drinking water, which may be of concern to persons on a sodium restricted diet. The use of potassium chloride in the water softener (which adds potassium to the water instead of sodium) could be considered as a means of keeping sodium concentrations in softened water at the background level. Alternatively, consideration could be given to providing a cold-water bypass water line for drinking water purposes that is not treated by a water softener.

### **Organic Nitrogen and Nitrate**

The organic nitrogen of the water sample as measured 8 hours into pumping was calculated to be 0.19 mg/L (calculated by subtracting the reported ammonia from Total Kjeldahl Nitrogen), which exceeds the ODWQS operational guideline for organic nitrogen. Excess organic nitrogen in a water supply can result in operational difficulties in water treatment equipment (i.e., chlorination) and may be responsible for taste and odour problems; however, the presence of this parameter at elevated concentrations in the water supply is not considered to be a health-related risk.

The nitrate concentrations, as measured in the background sample and 8 hours into pumping were 2.7 mg/L, and 4.7 mg/L, respectively. As discussed above, the City of Ottawa Hydrogeological and Terrain Analysis Guidelines indicates that additional sampling events are required when nitrate concentrations are between 2.5 mg/L and 10 mg/L. If nitrate concentrations increase over time or seasonal fluctuations result in nitrate concentrations exceeding the ODWQS maximum acceptable concentration, the construction of a new well with an increased casing depth may be required. As outlined in MECP Guideline D-5-5, nitrate is a contamination indicator and concentrations greater than 10 mg/L may cause blood related problems (i.e., methaemoglobinaemia) in infants and small children.

### **Sodium**

The sodium concentrations, as measured in the background sample and 8 hours into pumping were 25.3 mg/L, and 22.0 mg/L, respectively. These concentrations of sodium exceed the health-

related warning level limit of 20 mg/L, while meeting the aesthetic objective of 200 mg/L. The concentrations of sodium reported may be significant for persons with medical conditions requiring low salt diets. Accordingly, as listed in MECP Guideline D-5-5, the local Medical Officer of Health should be notified in order to alert persons with relevant medical conditions. Since water softening results in high sodium levels, consideration could be given to providing a cold-water bypass water line for drinking purposes.

## **LAND USE ASSESSMENT**

Based on a review of aerial mapping, the site is surrounded by predominantly agricultural and rural residential land. As such the elevated concentrations of nitrate and organic nitrogen observed in the water quality results may be the result of nitrate leaching to the groundwater system from manure and/or fertilizers applied to the local agricultural lands.

## **CONCLUSIONS AND RECOMMENDATIONS**

Based on the results of the hydrogeological investigation, the quantity and quality of water from the water supply aquifer is considered sufficient for the proposed residential use. The pumping test of test well TW22-01, a technically representative on-site private well, indicated that the test well is capable of sustaining pumping rates of greater than 70 L/min to 90 L/min for a period of 8 hours, which is much greater than the anticipated 10.4 L/min required by the onsite winery and event facility based on a water demand corresponding to a maximum septic flow of 10,000 L/day multiplied by a factor of 1.5. It is noted that the water level recovered 99% after 105 minutes of the pump being turned off. Furthermore, the test well is currently in use as a private water supply well (drilled in 2014) and no water quantity issues have been reported.

The results of the physical, chemical and bacteriological analyses indicate that the water quality in the supply aquifer meets the ODWQS and is considered to be safe for consumption under current site conditions. Treatment such as a conventional water softener and a reverse osmosis system may be desired to treat hardness and organic nitrogen exceedances, respectively.

The following provides recommendations regarding well construction specifications and water quality treatment are provided below.

### **Water Supply Recommendation**

- If required, any new water well should be constructed in accordance with local and MECP regulations (O.Reg 903);
- If desired by the property owner, a conventional water softener may be used to treat minor aesthetic objective and operational guideline exceedances of the ODWQS such as hardness;

- Excess organic nitrogen in a water supply can result in operational difficulties in water treatment equipment (i.e., chlorination) and may be responsible for taste and odour problems; however, the presence of this parameter at elevated concentrations in the water supply is not considered to be a health-related risk.
- The City of Ottawa Hydrogeological and Terrain Analysis Guidelines indicate that additional sampling events are required when nitrate concentrations are between 2.5 mg/L and 10 mg/L. As such, it is recommended that the property owner completes seasonal water quality sampling for nitrates and utilizes a reverse osmosis system for the water supply as well as ultraviolet (UV) treatment as a precautionary measure. If nitrate concentrations increase over time or seasonal fluctuations result in nitrate concentrations exceeding the ODWQS maximum acceptable concentration, the construction of a new well with an increased casing depth may be required.
- Water softening by conventional sodium ion exchange water softeners that use sodium chloride may introduce relatively high concentrations of sodium into the drinking water, which may be of concern to persons on a sodium restricted diet. The use of potassium chloride in the water softener (which adds potassium to the water instead of sodium) could be considered as a means of keeping sodium concentrations in softened water at the background level. Alternatively, consideration could be given to providing a cold-water bypass water line for drinking water purposes that is not treated by a water softener.

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



Andy Weatherson, M.Env.Sc., P.Geo.  
Intermediate Hydrogeologist



Jean-Philippe Gobeil, M.Sc., P.Geo.  
Hydrogeologist



## REFERENCES

Armstrong, D.K. and Dodge, J.E.P. 2007. Paleozoic geology of southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 219

Ontario Geological Survey. 2010. Surficial geology of Southern Ontario. Ontario Geological Survey, Miscellaneous Release-Data 128-Revision 1.

Ontario Geological Survey. 2011. 1:250 000 scale bedrock geology of Ontario. Ontario Geological Survey, Miscellaneous Release-Data 126-Revision 1.

Ontario Ministry of the Environment and Climate Change. 1996. Procedure D-5-5, Technical Guideline for Private Wells: Water Supply Assessment. August 1996.



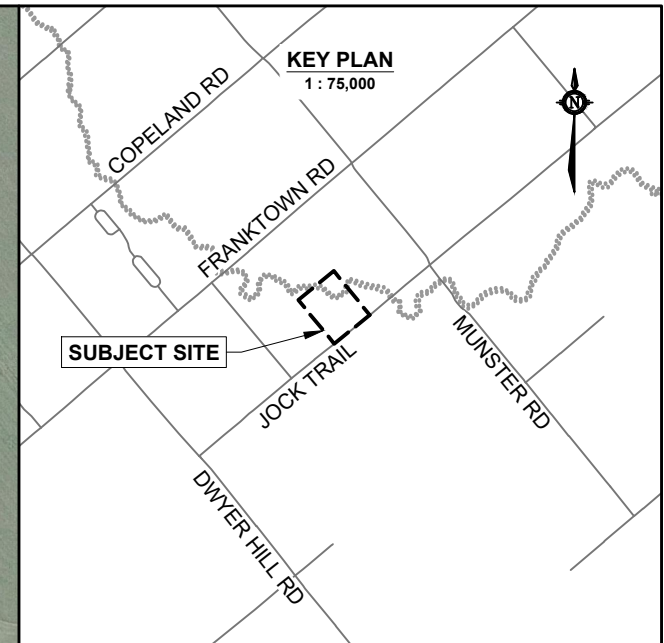


## **APPENDIX A**

Figure



N:\PROJECTS\101593.001\DRAWING\1.DRAWINGS\101593.001\_PTTW\_R0\_2022-07.DWG



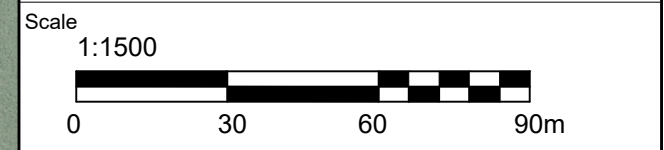
**LEGEND**

TW # ← TEST WELL ID

TEST WELL LOCATION  
(current investigation by GEMTEC)

--- APPROXIMATE PROPERTY BOUNDARY

— DITCH



32 Steacie Drive  
Ottawa, ON K2K 2A9  
Tel: (613) 836-1422  
www.gemtec.ca  
ottawa@gemtec.ca

Drawing  
**SITE PLAN**

Client  
**JABULANI WINERY**

Project <b>101593.001</b>	<b>HYDROGEOLOGICAL INVESTIGATION JABULANI WINERY 8005 JOCK TRAIL AOTTAWA, ONTARIO</b>
Drwn by <b>S.L.</b>	
Chkd by <b>JP.G.</b>	

Date <b>JULY, 2022</b>	Rev. <b>0</b>	<b>FIGURE 1</b>
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## **APPENDIX B**

### MECP Water Well Records





W... (Print Below) A144812

Measurements recorded in: Metric Imperial

Address of Well Location (Street Number/Name) 8005 Jock Trail, Township Goulbourn, Lot W/P 9, Concession 3, County/District/Municipality Ottawa-Carleton, City/Town/Village Richmond, Province Ontario, Postal Code, UTM Coordinates, Municipal Plan and Sublot Number RP-4R18665, Other Part 1

Overburden and Bedrock Materials/Abandonment Sealing Record table with columns: General Colour, Most Common Material, Other Materials, General Description, Depth (m/ft) From, To. Includes handwritten notes: Well #1 - Tag A043500 - Sept 19/06, Well #2 Tag A144812

Annular Space table with columns: Depth Set at (m/ft) From, To, Type of Sealant Used (Material and Type), Volume Placed (m³)

Results of Well Yield Testing table with columns: After test of well yield, water was, Draw Down (Time, Water Level), Recovery (Time, Water Level), Pump intake set at, Pumping rate, Duration of pumping, Final water level end of pumping, If flowing give rate, Recommended pump depth, Recommended pump rate, Well production, Disinfected?

Method of Construction and Well Use checkboxes: Cable Tool, Rotary (Conventional/Reverse), Boring, Air percussion, Diamond, Jetting, Driving, Digging, Public, Domestic, Livestock, Irrigation, Industrial, Commercial, Municipal, Test Hole, Cooling & Air Conditioning, Not used, Dewatering, Monitoring, Other, specify

Construction Record - Casing table with columns: Inside Diameter (cm/in), Open Hole OR Material, Wall Thickness (cm/in), Depth (m/ft) From, To, Status of Well

Construction Record - Screen table with columns: Outside Diameter (cm/in), Material, Slot No., Depth (m/ft) From, To

Water Details and Hole Diameter tables. Water Details: Water found at Depth, Kind of Water. Hole Diameter: Depth (m/ft) From, To, Diameter (cm/in)

Well Contractor and Well Technician Information: Business Name of Well Contractor Air Rock Drilling Co. Ltd., Well Contractor's Licence No. 1119, Business Address, Municipality Richmond, Province ON, Postal Code K0A 2Z0, Business E-mail Address air-rock@sympatico.ca

Bus. Telephone No. (inc. area code) 6138382170, Name of Well Technician (Last Name, First Name) Hanna, Jeremy, Well Technician's Licence No. T3632, Signature of Technician and/or Contractor, Date Submitted 2014 07 31

Map of Well Location: Please provide a map below following instructions on the back. Includes handwritten map showing location relative to Greens Road and #8005 Jock Trail Well #2, 1.9KM distance.

Well owner's information package delivered, Date Package Delivered 2014 07 24, Date Work Completed 2014 07 21, Ministry Use Only: Audit No. Z166968, Received SEP 02 2014



316/4e

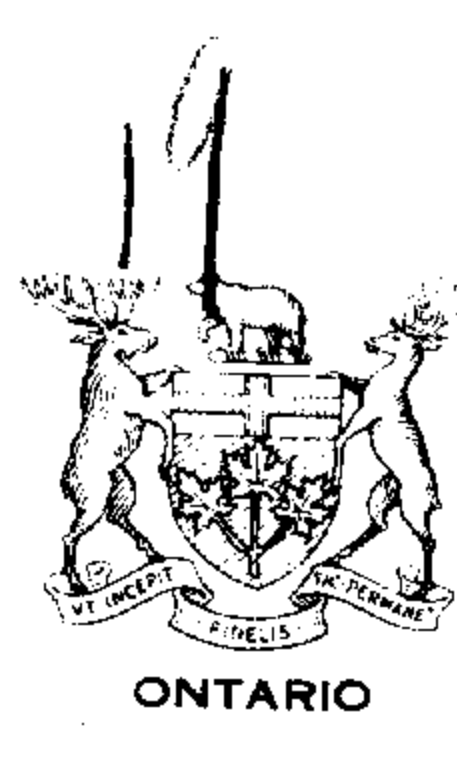
OK  
2403

UTM | 1 | 8 | Z | 4 | 2 | 7 | 3 | 0 | 0 | E

| 5 | R | 4 | 9 | 9 | 7 | 9 | 4 | 0 | N

Elev. | 4 | R | 0 | 3 | 5 | 0 |

Basin | 2 | 5 | | | |



15 No. 2403  
**RECEIVED**  
DEC 21 1949  
GEOLOGICAL BRANCH  
DEPARTMENT OF MINES

The Well Drillers Act  
Department of Mines, Province of Ontario

# Water Well Record

County or District... *Carleton* .. Tp. *Coulbourne* .. Con. *III* Lot *8* .. Pt. Lot ..  
Owner... [redacted] .. Address... *Richmond* .. Acres... *1.00* ..  
Date Completed... *Aug 27/48* .. Cost of Well (not including pump)... *200.00* ..

### Pipe and Casing Record

### Pumping Test

Casing diameter(s) ... *4"* ..  
Length(s) of casing(s) ... *10'* ..  
Length of screen ... *no screen* ..  
Type of screen ..  
Type of pump ... *no pump* ..  
Capacity of pump ..  
Depth of pump setting ..

Date ... *Aug 27/48* ..  
Developed Capacity ... *200 G.P.H.* ..  
Duration of Test ... *1 hr.* ..  
Pumping Rate ..  
Drawdown ..  
Static level of completed well ... *20'* ..  
Is well a gravel-wall type? ... *gravel* ..

### Water Record

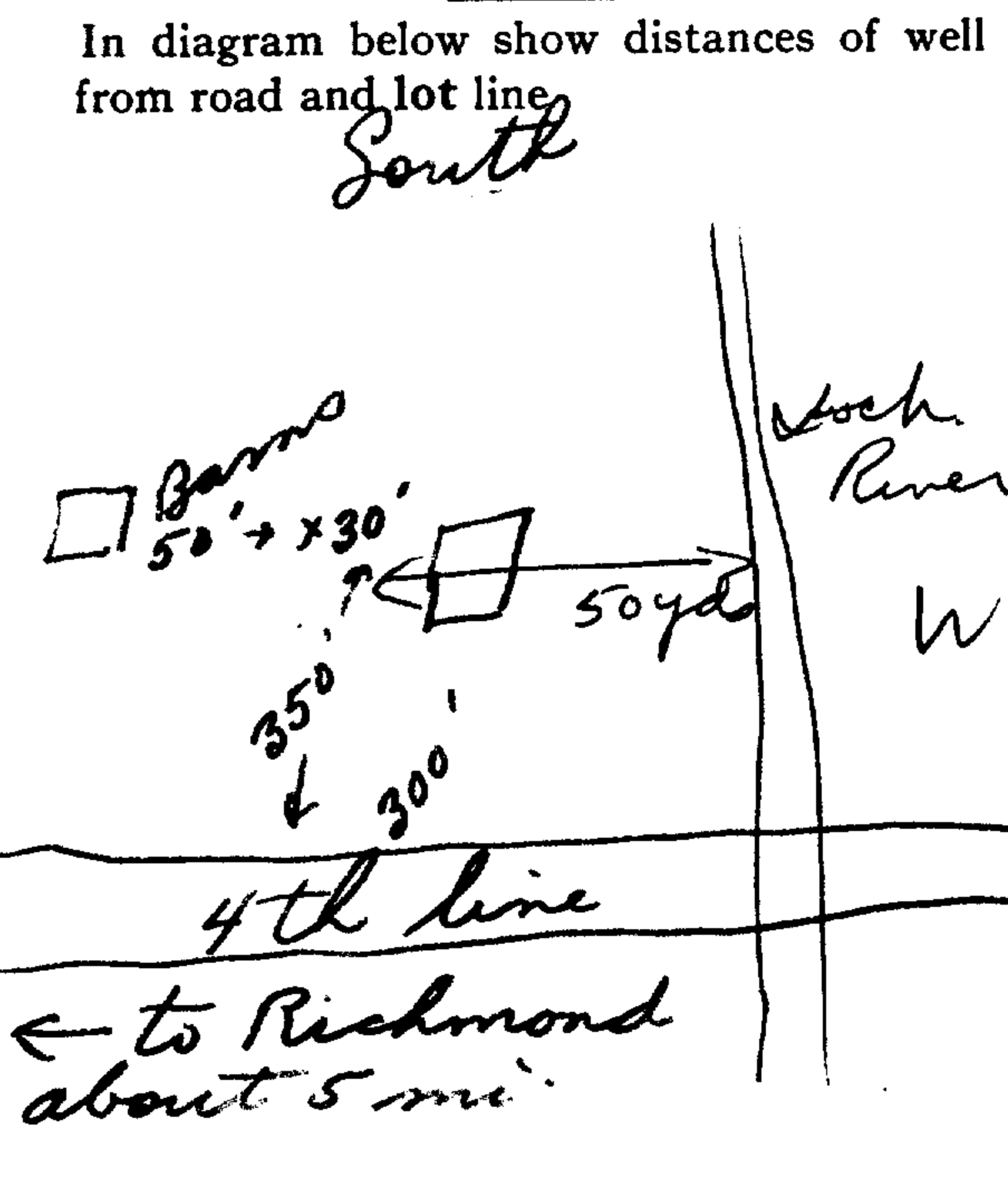
Kind (fresh or mineral) ... *fresh* ..  
Quality (hard, soft, contains iron, sulphur etc.) ... *hard* ..  
Appearance (clear, cloudy, coloured) ... *clear* ..  
For what purpose(s) is the water to be used? ... *barn* ..  
How far is well from possible source of contamination? ... *200 ft* ..  
What is source of contamination? ... *stable* ..  
Enclose a copy of any mineral analysis that has been made of water ..

Depth(s) to Water Horizon(s)	Kind of Water	No. of Feet Water Rises
<i>50'</i>		<i>30'</i>
<i>75'</i>		<i>55'</i>

### Well Log

Drift and Bedrock Record	From	To
	O ft.	ft.
<i>gravel</i>		<i>10. ft.</i>
<i>Limestone rock</i>	<i>10'</i>	<i>75'</i>

### Location of Well



Situation: Is well on upland, in valley, or on hillside? ... *flat* ..  
Drilling Firm ... *FP Sparks* ..  
Address ... *Stittsville* ..  
Recorded by ... *FP Sparks* .. Address ... *Stittsville* ..  
Date ... *Dec 8/49* .. Licence Number ... *133* ..

38 4.9  
 UTM 1182 4273110 E  
 Elev. 409 810 610 N  
 Basin 215

316/4e



GROUND WATER BRANCH  
 SEP 8 15 1959 No  
 ONTARIO WATER RESOURCES COMMISSION

~~2405~~

The Ontario Water Resources Commission Act, 1957

# WATER WELL RECORD

County or District CARLETON Township, Village, Town or City GOULBOURN  
 Con. 3 Lot 88 Date completed 3 July 59  
 (day month year)  
 Owner [REDACTED] Address 27 WILTHROW CITYVIEW  
 (print in block letters)

## Casing and Screen Record

## Pumping Test

Inside diameter of casing 5"  
 Total length of casing 22'  
 Type of screen -  
 Length of screen -  
 Depth to top of screen -  
 Diameter of finished hole 5"

Static level 10  
 Test-pumping rate 20 G.P.M.  
 Pumping level 20  
 Duration of test pumping 1 HR  
 Water clear or cloudy at end of test CLEAR  
 Recommended pumping rate 5 G.P.M.  
 with pumping level of 10

## Well Log

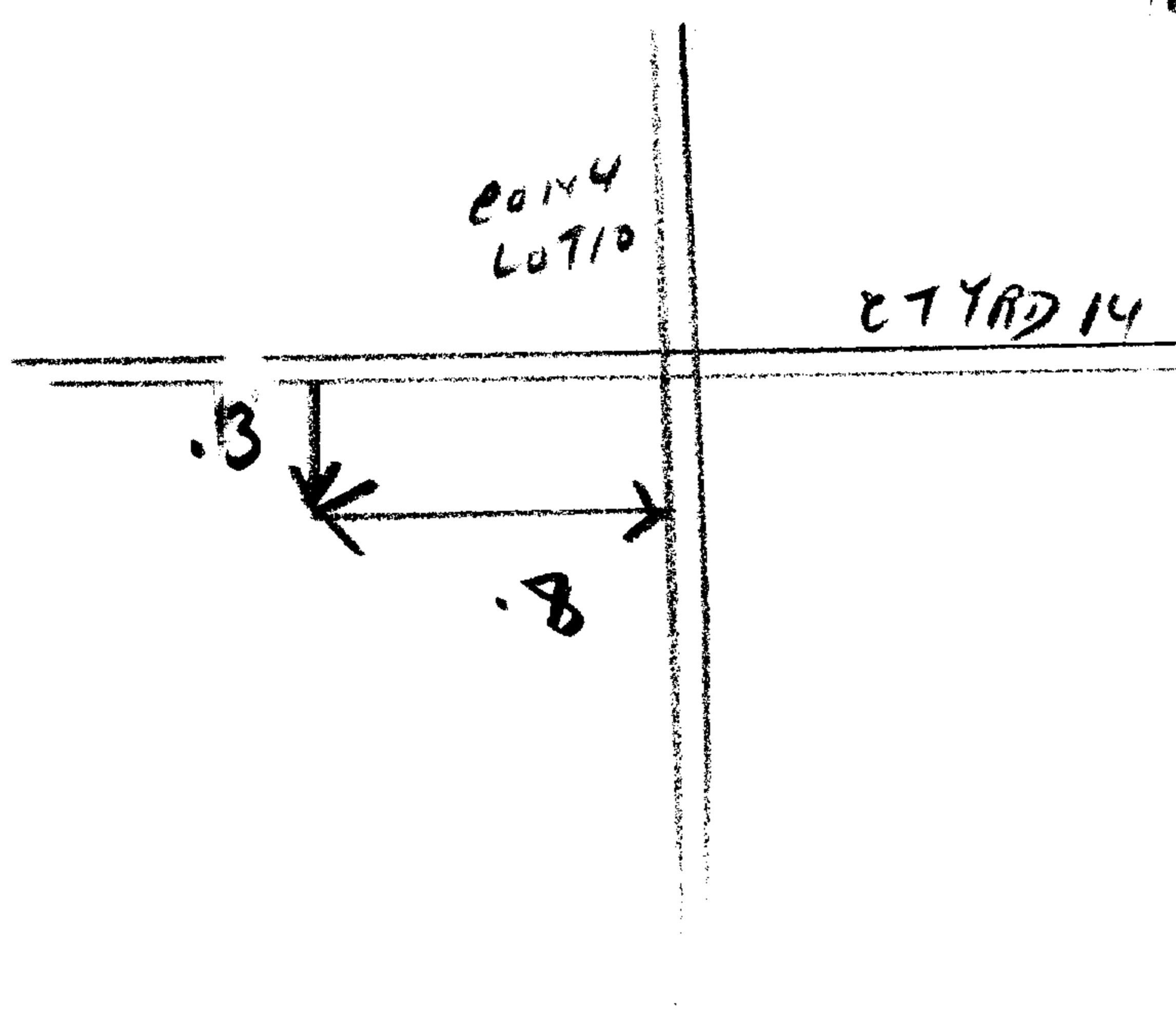
## Water Record

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	No. of feet water rises	Kind of water (fresh, salty, sulphur)
<u>TILL &amp; BOULDERS</u>	<u>0</u>	<u>20</u>			
<u>LIMESTONE</u>	<u>20</u>	<u>126</u>	<u>85</u>	<u>75</u>	<u>FRESH</u>

For what purpose(s) is the water to be used?  
HOUSE  
 Is well on upland, in valley, or on hillside?  
 Drilling Firm BEAIRD PHILLIPS DRILLING CO  
 Address OTTAWA  
 Licence Number 231  
 Name of Driller M SZTEPA  
 Address \_\_\_\_\_  
 Date AUG 31/59  
 (Signature of Licensed Drilling Contractor) [Signature]

## Location of Well

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



316/4e



GROUND WATER BRANCH  
15 No 2400  
MAY 16 1963  
ONTARIO WATER RESOURCES COMMISSION

UTM 118 4217171210 E

CONR 114 191980510 N

The Ontario Water Resources Commission Act

Elev. 903.50

# WATER WELL RECORD

Basin 25 Carleton

Township, Village, Town or City Goulbourn

Con. 3 Lot ~~WX2~~ 9

Date completed 23rd April 1963  
(day month year)

Address Richmond Ont.

### Casing and Screen Record

Inside diameter of casing 6 1/4"  
Total length of casing 16'  
Type of screen  
Length of screen  
Depth to top of screen  
Diameter of finished hole 6"

### Pumping Test

Static level 14'  
Test-pumping rate 10 G.P.M.  
Pumping level 35'  
Duration of test pumping 30 min  
Water clear or cloudy at end of test clear  
Recommended pumping rate 5' G.P.M.  
with pump setting of 85' feet below ground surface

### Well Log

### Water Record

#### Overburden and Bedrock Record

	From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
<u>clay.</u>	<u>0</u>	<u>13'</u>		
<u>limestone rock.</u>	<u>13</u>	<u>100</u>	<u>85"</u>	<u>fresh.</u>

For what purpose(s) is the water to be used? house & farm

Is well on upland, in valley, or on hillside? upland

Drilling or Boring Firm McNeill McLaughlin

Address Orkton Ont.

Licence Number 874

Name of Driller or Borer McNeill McLaughlin

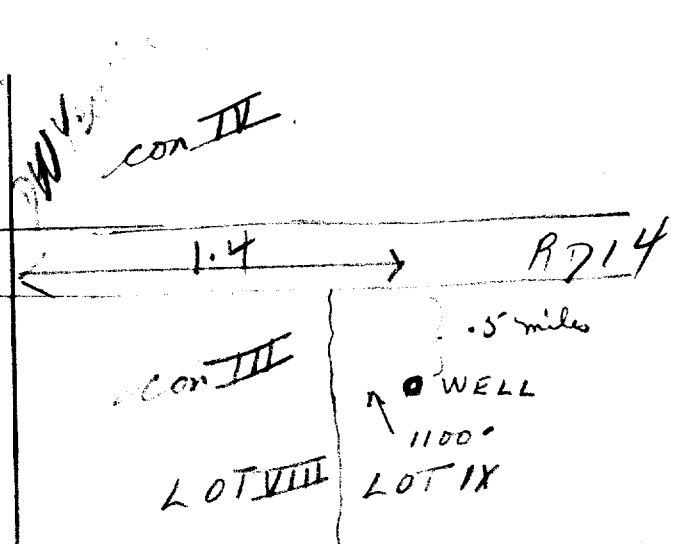
Address Orkton Ont.

Date April 23 1963

McNeill McLaughlin  
(Signature of Licensed Drilling or Boring Contractor)

### Location of Well

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





# WATER WELL RECORD

3164E

Water management in Ontario 1. PRINT ONLY IN SPACES PROVIDED

2. CHECK  CORRECT BOX WHERE APPLICABLE

11

1511577

MUNICIP. 15003

CON. C6N

02

COUNTY OR DISTRICT

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE

CON., BLOCK, TRACT, SURVEY, ETC.

LOT 25-27

Carleton Place

Southdown

2

8008

DATE COMPLETED

20 10 71

DAY MO YR

RC. ELEVATION 4 2500 5 25 6 25 7 25 8 25 9 25 10 25 11 25 12 25 13 25 14 25 15 25 16 25 17 25 18 25 19 25 20 25 21 25 22 25 23 25 24 25 25 25 26 25 27 25 28 25 29 25 30 25 31 25 32 25 33 25 34 25 35 25 36 25 37 25 38 25 39 25 40 25 41 25 42 25 43 25 44 25 45 25 46 25 47 25

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

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
grey	clay	hardpan		0	8
grey	limestone			8	41

31

0008205/14

0041215

32

41

### WATER RECORD

### 51 CASING & OPEN HOLE RECORD

WATER FOUND AT - FEET	KIND OF WATER
0041 1-13	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

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
05 10-11	1 <input checked="" type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE	188	0	0030
17-18	1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input checked="" type="checkbox"/> OPEN HOLE			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			27-30

SCREEN	SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
			INCHES
			DEPTH TO TOP OF SCREEN
			FEET

### 61 PLUGGING & SEALING RECORD

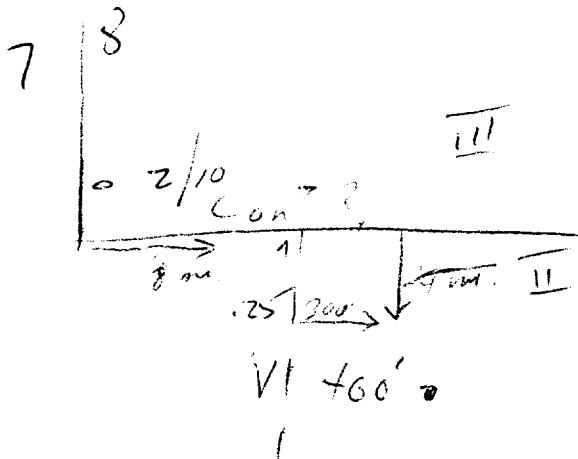
DEPTH SET AT - FEET	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)		
		FROM	TO
10-13	14-17		
18-21	22-25		
26-29	30-33		

71

PUMPING TEST	PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING	
	1 <input type="checkbox"/> PUMP 2 <input checked="" type="checkbox"/> BAILER	0021	01	15-16 HOURS 17-18 MINS. 00
	STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	
	0002 19-21	010 22-24	15 MINUTES 26-28	30 MINUTES 29-31
IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST		
		1 <input type="checkbox"/> CLEAR 2 <input checked="" type="checkbox"/> CLOUDY		
RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTINGS	RECOMMENDED PUMPING RATE		
1 <input checked="" type="checkbox"/> SHALLOW 2 <input type="checkbox"/> DEEP	020	0010		
50-53 002.6 GPM./FT. SPECIFIC CAPACITY				

### LOCATION OF WELL

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



DRILLERS REMARKS:

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	
	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 DRILLING	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

CONTRACTOR	NAME OF WELL CONTRACTOR	LICENCE NUMBER
	Denny Harris Well Drilling	3644
	ADDRESS	1304 326 Richmond Ont
	NAME OF DRILLER OR BORER	LICENCE NUMBER
John Durack		
SIGNATURE OF CONTRACTOR	SUBMISSION DATE	
Denny Harris	22 Oct 71	

OFFICE USE ONLY	DATA SOURCE	CONTRACTOR	DATE RECEIVED
	1	3644	120172
	DATE OF INSPECTION	INSPECTOR	
		K	
REMARKS:			





Ontario

# WATER WELL RECORD

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

11

1516320

MUNICIPALITY 15003

CON. CON

03

COUNTY OR DISTRICT: Carleton  
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Southdown  
CON., BLOCK, TRACT, SURVEY, ETC.: Con 3  
LOT: 008  
ADDRESS: RR#1, Richmond Ont.  
DATE COMPLETED: 06 09 77

UTM: 21 18 427100 4998180 4 0348 4 26

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

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
grey	sand			0	2
grey	limestone			2	125

31 0002228 0125215  
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER			
10-13 0/20	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

INCHES DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
10-11 06	1 <input checked="" type="checkbox"/> STEEL	12	0	0022
	2 <input type="checkbox"/> GALVANIZED			
	3 <input type="checkbox"/> CONCRETE			
	4 <input type="checkbox"/> OPEN HOLE			
17-18	1 <input type="checkbox"/> STEEL	19		20-23
	2 <input type="checkbox"/> GALVANIZED			
	3 <input type="checkbox"/> CONCRETE			
	4 <input type="checkbox"/> OPEN HOLE			
24-25	1 <input type="checkbox"/> STEEL	26		27-30
	2 <input type="checkbox"/> GALVANIZED			
	3 <input type="checkbox"/> CONCRETE			
	4 <input type="checkbox"/> OPEN HOLE			

SCREEN

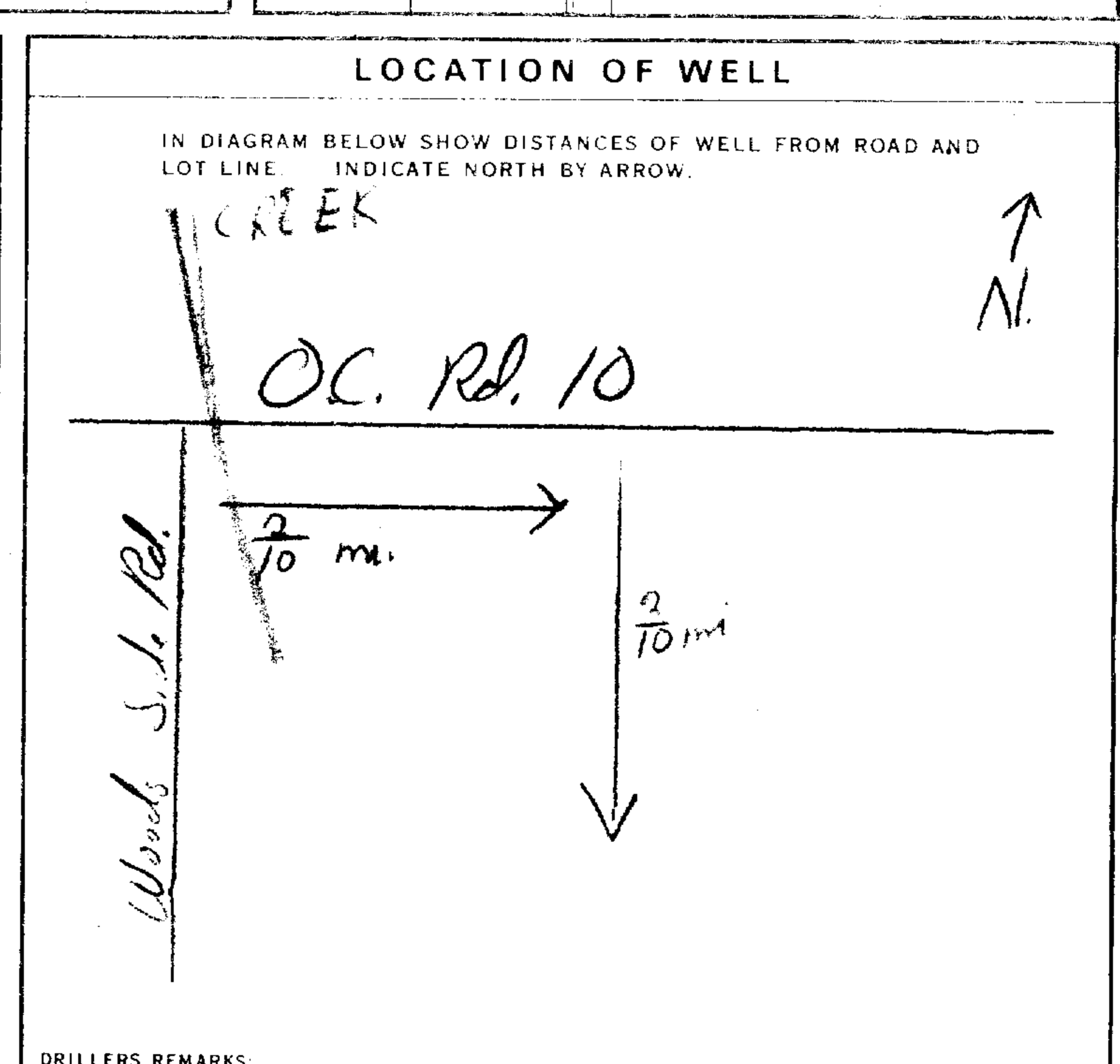
SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
31-33	34-38	39-40
MATERIAL AND TYPE		DEPTH TO TOP OF SCREEN
		41-44
		80

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	PUMPING RATE	DURATION OF PUMPING	
		11-14 GPM	15-16 HOURS
1 <input type="checkbox"/> PUMP 2 <input checked="" type="checkbox"/> BAILER	0020	01	00
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	
19-21	22-24	15 MINUTES	30 MINUTES
-00.020	020	020	020
26-28	29-31	45 MINUTES	60 MINUTES
020	020	020	020
IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST	
0005	GPM	FEET	42
RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMP RATE	46-49
1 <input checked="" type="checkbox"/> SHALLOW 2 <input type="checkbox"/> DEEP	020	0010	GPM



54 FINAL STATUS OF WELL

1  WATER SUPPLY  
2  OBSERVATION WELL  
3  TEST HOLE  
4  RECHARGE WELL

5  ABANDONED, INSUFFICIENT SUPPLY  
6  ABANDONED POOR QUALITY  
7  UNFINISHED

55-56 WATER USE

1  DOMESTIC  
2  STOCK  
3  IRRIGATION  
4  INDUSTRIAL  
5  COMMERCIAL  
6  MUNICIPAL  
7  PUBLIC SUPPLY  
8  COOLING OR AIR CONDITIONING  
9  NOT USED

57 METHOD OF DRILLING

1  CABLE TOOL  
2  ROTARY (CONVENTIONAL)  
3  ROTARY (REVERSE)  
4  ROTARY (AIR)  
5  AIR PERCUSSION  
6  BORING  
7  DIAMOND  
8  JETTING  
9  DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Henry Mains Well Drilling  
LICENCE NUMBER: 3644  
ADDRESS: Box 326, Richmond Ont.  
NAME OF DRILLER OR BORER: Henry Mains  
SIGNATURE OF CONTRACTOR: [Signature]  
SUBMISSION DATE: 8 9 77

OFFICE USE ONLY

DATA SOURCE: 58  
CONTRACTOR: 3644  
DATE RECEIVED: 100178  
DATE OF INSPECTION: MAY 15/78  
INSPECTOR: [Signature]  
REMARKS: BONNY BROOK FARM  
P   
WI



# WATER WELL RECORD

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

11 1516570 15003 CON 02

COUNTY OR DISTRICT: Peel TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Houlbourn CON., BLOCK, TRACT, SURVEY, ETC.: Con 2 LOT: 010

DATE COMPLETED: DAY 09 MO 06 YR 78

GRID: 97960 4 0340 4 26

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
grey	clay			0	6
grey	gravel			6	12
grey	limestone			12	84

31 0006205 0012211 0084215

32

41 WATER RECORD

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

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
10-11	<input checked="" type="checkbox"/> STEEL	.188	0	02.1
17-18	<input type="checkbox"/> STEEL			20-23
24-25	<input type="checkbox"/> STEEL			27-30

SCREEN

SIZE(S) 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.)
10-13	14-17
18-21	22-25
26-29	30-33

71 PUMPING TEST

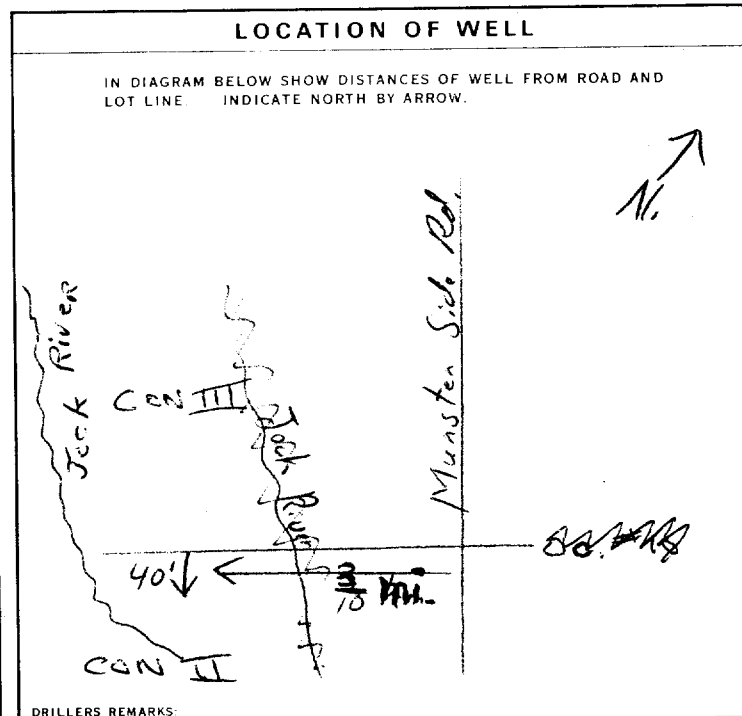
PUMPING TEST METHOD:  PUMP  BAILER

PUMPING RATE: 0020 GPM DURATION OF PUMPING: 01 00 HOURS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING PUMPING			
003 FEET	025 FEET	15 MINUTES: 025 FEET	30 MINUTES: 025 FEET	45 MINUTES: 025 FEET	60 MINUTES: 025 FEET

RECOMMENDED PUMP TYPE:  SHALLOW  DEEP

RECOMMENDED PUMP SETTING: 025 FEET RECOMMENDED PUMPING RATE: 0010 GPM



FINAL STATUS OF WELL: 1

WATER USE: 01

METHOD OF DRILLING: 5

CONTRACTOR: Henry Mains Well Drilling, 3644 Bay 326, Richmond Ont.

NAME OF DRILLER OR BORER: Henry Mains

SIGNATURE OF CONTRACTOR: \_\_\_\_\_

SUBMISSION DATE: DAY 12 MO 6 YR 78

OFFICE USE ONLY

DATA SOURCE: 1 CONTRACTOR: 3644 DATE RECEIVED: 120778

DATE OF INSPECTION: 15/5/79 INSPECTOR: Km. J.P.P.

REMARKS: \_\_\_\_\_

CSS.88



Ontario

# WATER WELL RECORD

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

11

1517125

MUNICIP. 15003

CON. CON

02

COUNTY OR DISTRICT <i>Coquitlam</i>	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE <i>Douglas</i>	CON., BLOCK, TRACT, SURVEY, ETC. <i>Con 2</i>	LOT <i>008</i>
DATE COMPLETED DAY <i>11</i> MO <i>07</i> YR. <i>77</i>			
DEPTH <i>997099</i>	RC <i>5</i>	ELEVATION <i>0300</i>	RC <i>5</i>
BASIN CODE <i>26</i>			

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

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
<i>grey</i>	<i>clay</i>	<i>stones</i>		<i>0</i>	<i>6</i>
<i>grey</i>	<i>limestone</i>			<i>6</i>	<i>120</i>

31 *000620512* *0120215*

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
<i>0/15</i>	1 <input checked="" type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
<i>0/19</i>	1 <input checked="" 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
<i>06 24</i>	1 <input checked="" type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE	<i>.188</i>	<i>0/020</i>

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET	MATERIAL AND TYPE	CEMENT GROUT LEAD PACKER, ETC.
<i>10-13</i>		
<i>18-21</i>		

71 PUMPING TEST METHOD

1  PUMP 2  BAILER

PUMPING RATE *0/00* GPM

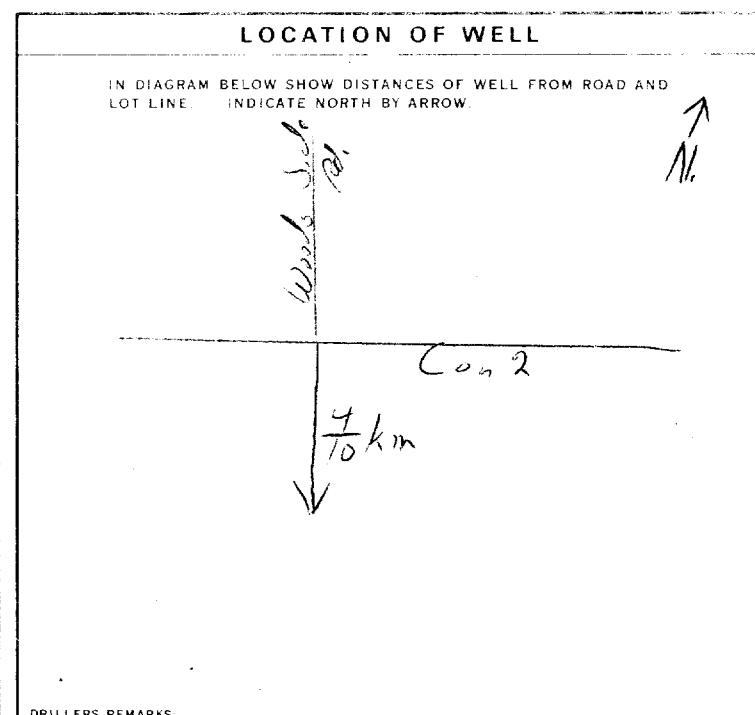
DURATION OF PUMPING *01 00* HOURS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING
<i>000</i>	<i>020</i>	15 MINUTES <i>020</i> 30 MINUTES <i>020</i> 45 MINUTES <i>020</i> 60 MINUTES <i>020</i>

RECOMMENDED PUMP TYPE  SHALLOW  DEEP

RECOMMENDED PUMP SETTING *020* FEET

RECOMMENDED PUMPING RATE *0010* GPM



FINAL STATUS OF WELL *1*

WATER USE *01*

METHOD OF DRILLING *5*

CONTRACTOR

NAME OF WELL CONTRACTOR *Henry Meins Well Drilling* LICENCE NUMBER *3644*

ADDRESS *Box 326, Richmond Ont*

NAME OF DRILLER OR BORER *Henry Meins* LICENCE NUMBER

SIGNATURE OF CONTRACTOR

SUBMISSION DATE DAY *14* MO *7* YR. *77*

OFFICE USE ONLY

DATA SOURCE *1* CONTRACTOR *3644* DATE RECEIVED *240979*

DATE OF INSPECTION INSPECTOR *Km*

REMARKS

P

WI

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

11

1533393

Municipality 15003 Con. COB

County or District: Ottawa Carleton; Township/Borough/City/Town/Village: Goulbourn; Con block tract survey, etc.: 3; Lot: 9; Address: 7730 Jock Trail Road Richmond, Ontario; Date completed: 19 day 11 month 02 year

Northings: 10, 12, 17, 18, 24, 25, 26, 30, 31; Elevation: 220; Basin Code: K2S1 KOA

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions) table with columns: General colour, Most common material, Other materials, General description, Depth - feet (From, To)

31, 32

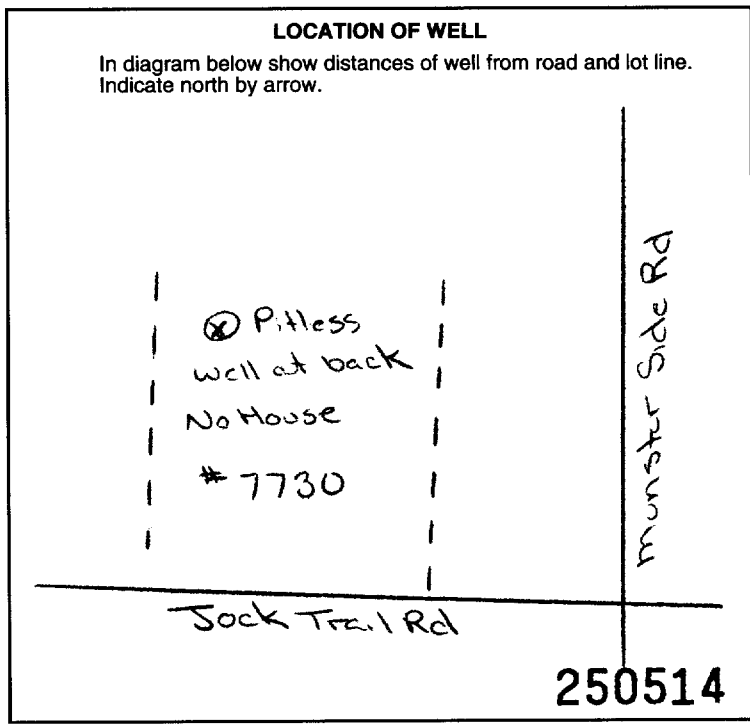
41 WATER RECORD table with columns: Water found at - feet, Kind of water

51 CASING & OPEN HOLE RECORD table with columns: Inside diam inches, Material, Wall thickness inches, Depth - feet (From, To)

54 SCREEN table with columns: Sizes of opening (Slot No.), Diameter inches, Length feet, Material and type, Depth at top of screen feet

61 PLUGGING & SEALING RECORD table with columns: Annular space, Abandonment, Depth set at - feet, Material and type (Cement grout, bentonite, etc.)

71 PUMPING TEST table with columns: Pumping test method, Pumping rate, Duration of pumping, Water levels during, Pump intake set at, Water at end of test, Recommended pump type, Recommended pump setting, Recommended pump rate



FINAL STATUS OF WELL, WATER USE, METHOD OF CONSTRUCTION sections with checkboxes for various options

Name of Well Contractor: Capital Water Supply Ltd.; Well Contractor's Licence No.: 1558; Address: P.O. Box 490 Stittsville, Ontario K2S 1A6; Name of Well Technician: S. Miller; Well Technician's Licence No.: T0097; Submission date: day 20 mo 11 yr 02

MINISTRY USE ONLY section with fields: Data source: 1558; Date received: DEC 17 2002; Date of inspection; Inspector; Remarks: CSS.E32

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.

Ministry Use Only

Well Owner's Information and Location of Well Information

RR#/Street Number/Name: 8005 Jock Trail City/Town/Village: Richmond Hill Site/Compartment/Block/Tract etc.: RP4R18665 Part 1

GPS Reading NAD Zone Easting Northing: 813 18 427819 4998106 Unit Make/Model: Mageolon Mode of Operation:  Undifferentiated  Averaged  Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Metres To
	<u>Sandy Clay</u>			<u>0</u>	<u>0.91</u>
	<u>Grey limestone</u>			<u>0.91</u>	<u>60.96</u>
	<u>White Sandstone</u>			<u>60.96</u>	<u>79.24</u>

Hole Diameter

Depth From	Metres To	Diameter Centimetres
<u>0</u>	<u>79.24</u>	<u>15.23</u>

Water Record

Water found at 77.42 metres Kind of Water:  Fresh  Sulphur  Gas  Salty  Minerals  Other: TESTED

After test of well yield, water was CLEAR & NOT TESTED

Chlorinated  Yes  No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Metres To
<u>15.88</u>	<input checked="" type="checkbox"/> Steel <input type="checkbox"/> Fibreglass <input type="checkbox"/> Plastic <input type="checkbox"/> Concrete <input type="checkbox"/> Galvanized	<u>4.8</u>	<u>0</u>	<u>6.71</u>

Screen

No Casing or Screen

Open hole

Test of Well Yield

Pumping test method	Draw Down	Recovery
	Time min / Water Level Metres	Time min / Water Level Metres
<u>Subpump</u>		
Pump intake set pt (metres) <u>13.15</u>	Static Level <u>3.04</u>	<u>10.62</u>
Pumping rate (litres/min) <u>57.11</u>	1 <u>5.68</u>	1 <u>6.37</u>
Duration of pumping <u>1</u> hrs + <u>0</u> min	2 <u>7.10</u>	2 <u>4.43</u>
Final water level end of pumping <u>10.62</u> metres	3 <u>8.00</u>	3 <u>3.60</u>
Recommended pump type <u>Deep</u>	4 <u>8.55</u>	4 <u>3.42</u>
Recommended pump depth <u>73.15</u> metres	5 <u>8.98</u>	5 <u>3.40</u>
Recommended pump rate (litres/min) <u>57.11</u>	10 <u>9.86</u>	10 <u>3.38</u>
If flowing give rate (litres/min) <u>57.11</u>	15 <u>10.13</u>	15 <u>3.36</u>
	20 <u>10.40</u>	20 <u>3.35</u>
	25 <u>10.40</u>	25 <u>3.34</u>
	30 <u>10.40</u>	30 <u>3.33</u>
	40 <u>10.40</u>	40 <u>3.32</u>
	50 <u>10.58</u>	50 <u>3.32</u>
	60 <u>10.62</u>	60 <u>3.32</u>

Plugging and Sealing Record

Depth set at - Metres From 6.10 To 0

Material and type (bentonite slurry, neat cement slurry) etc. Neat Cement Slurry

Volume Placed (cubic metres) 0.1362

Method of Construction

Cable Tool  Rotary (air)  Diamond  Digging  Rotary (conventional)  Air percussion  Jetting  Other  Rotary (reverse)  Boring  Driving

Water Use

Domestic  Industrial  Public Supply  Other  Stock  Commercial  Not used  Irrigation  Municipal  Cooling & air conditioning

Final Status of Well

Water Supply  Recharge well  Unfinished  Abandoned, (Other)  Observation well  Abandoned, insufficient supply  Dewatering  Test Hole  Abandoned, poor quality  Replacement well

Location of Well

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

Audit No. Z 48719 Date Well Completed 2006 09 15

Was the well owner's information package delivered?  Yes  No Date Delivered 2006 09 19

Well Contractor/Technician Information

Name of Well Contractor: THE ROCK DRILLING CO LTD (119) Well Contractor's Licence No. 1119

Business Address (street name, number, city etc.): #1 Richmond Ont K0A2Z0

Name of Well Technician (last name, first name): HOSAN DAN Well Technician's Licence No. 13058

Signature of Technician/Contractor: [Signature] Date Submitted 2006 09 19

Ministry Use Only

Data Source: Contractor 1119

Date Received OCT 11 2006 Date of Inspection YYY MM DD

Remarks: Well Record Number:



## **APPENDIX C**

### Pumping Test Data



# GEMTEC

CONSULTING ENGINEERS  
AND SCIENTISTS

Pumping Test Analysis Report

Project: Hydrogeological Investigation

Project Number: 101593.001

Client: Tom Moul (Jubalani Vineyard and Winery)

Location: 8005 Jock Trail, Richmond, Ontario

Test Conducted by: SE

Pumping Well: TW22-01

P-Test Date: Mar. 16th, 2022

Analysis Performed by: AW

Method: Manual Measurements

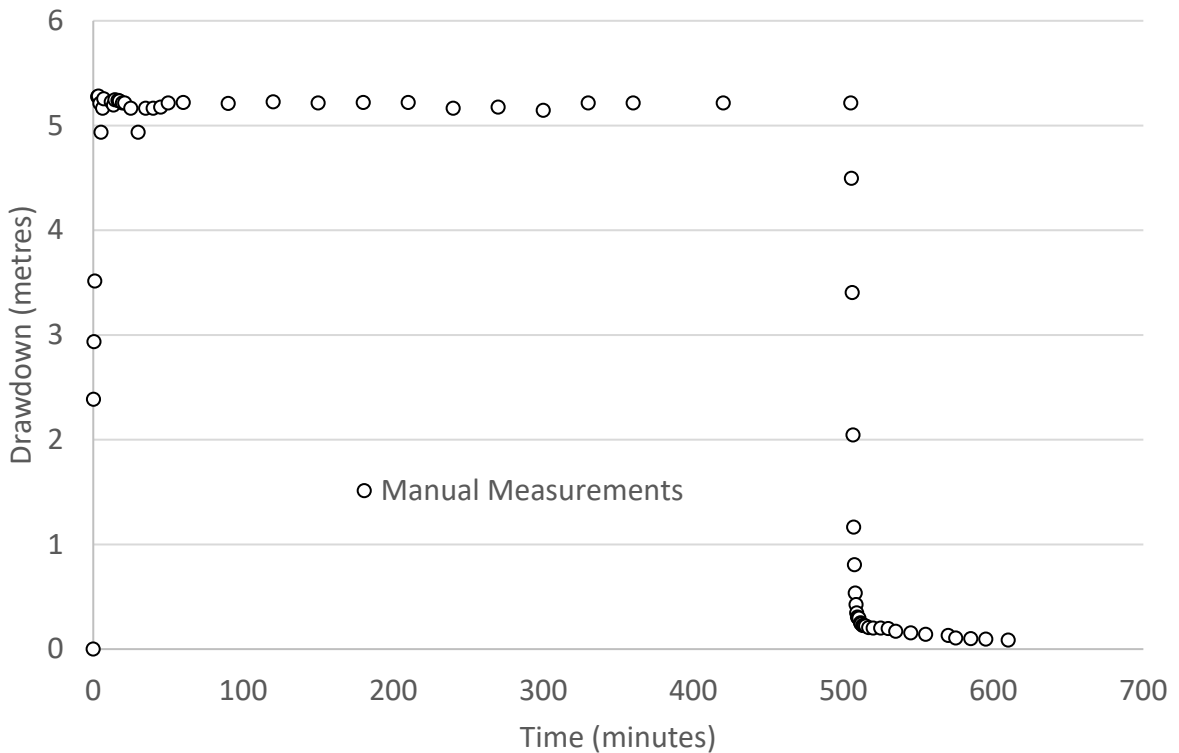
Analysis Date: Jun. 23rd, 2022

Aquifer Thickness: 36.1 m

Discharge: 70 L/min to 90 L/min

Duration: 8 hours

## Pumping Test Data (TW22-01): Drawdown and Recovery



### Water Levels TW22-01

Static : 1.85 m below top of casing

TOC = 0.52 m above ground surface

End of pump test (8 hours): 7.05 m below top of casing

Following recovery (1.75 hours): 1.92 m below top of casing



## **APPENDIX D**

### Water Quality Data



**Table D1**

## Summary of Measured Field Parameters

Test Well	Time Since Initiation of Pumping (Hours)	Temp (°C)	pH (-)	EC <sup>1</sup> (µS/cm)	Turbidity <sup>2</sup> (NTU)	Chlorine (mg/L)	Colour (ACU <sup>3</sup> )	Colour (TCU <sup>4</sup> )	Comments
TW22-01	1	9.5	6.59	690	1.31	-	-	-	Clear, no odour
	2	9.5	7.28	704	0.47	-	-	-	Clear, no odour
	3	9.4	7.40	734	0.47	-	-	-	Clear, no odour
	4	9.7	7.46	738	0.49	0	0	0	Clear, no odour
	5	9.7	7.64	762	0.39	-	-	-	Clear, no odour
	6	9.3	7.80	726	0.60	-	-	-	Clear, no odour
	7	9.4	7.83	742	0.38	0	0	0	Clear, no odour

## Notes:

1. EC: Electrical Conductivity
2. Turbidity is taken to be the average of three consecutive measurements.
3. ACU: Actual Colour Units (unfiltered)
4. TCU: True Colour Units (field-filtered using 0.45-micron filter)

**Table D2**

Summary of Laboratory Parameters Analyzed

Parameter		Units	PW-8005 Lab ID: 2205351-01 01/26/2022	TW22-01 8 hr Lab ID: 2212320-02 03/16/2022	TW22-01 8 hr (Filtered) Lab ID: 2212320-03 03/16/2022	ODWQS	Standard
Microbial Parameters	E. Coli	CFU/100 mL	ND (1)	ND (1)	N/A	0	MAC
	Fecal Coliforms	CFU/100 mL	ND (1)	ND (1)	N/A	0	MAC
	Total Coliforms	CFU/100 mL	ND (1)	ND (1)	N/A	0	MAC
	Heterotrophic Plate Count	CFU/mL	10	10	N/A	-	-
General Inorganics	Alkalinity, total	mg/L	231	198	N/A	30-500	OG
	Ammonia as N	mg/L	0.01	0.01	N/A	-	-
	Dissolved Organic Carbon	mg/L	0.6	1.1	N/A	5/10	AO/MCT
	Colour	TCU	ND (2)	2	N/A	5/7	AO/MCT
	Colour, apparent	ACU	2	2	N/A	5/7	AO/MCT
	Conductivity	uS/cm	747	780	N/A	-	-
	Hardness	mg/L	<b>312</b>	<b>307</b>	N/A	80-100	OG
	pH	pH Units	7.6	7.7	N/A	6.5-8.5	OG
	Phenolics	mg/L	ND (0.001)	ND (0.001)	N/A	-	-
	Total Dissolved Solids	mg/L	450	452	N/A	500	AO
	Sulphide	mg/L	ND (0.02)	ND (0.02)	N/A	0.05	AO

NOTES

- |  |  |
|--|--|
| 1. ODWS = Ontario Drinking Water Standards                     | 2. MAC = Maximum Acceptable Concentration                    |
| 3. OG = Operational Guidelines                                 | 4. AO = Aesthetic Objectives                                 |
| 5. ND = Not Detectable   | 6. WL = Warning Level for a Person on Sodium Restricted Diet |
| 7. MCT = Maximum Concentration Considered Reasonably Treatable |  |

Parameter		Units	PW-8005	TW22-01 8 hr	TW22-01 8 hr (Filtered)	ODWQS	Standard
			Lab ID: 2205351-01 01/26/2022	Lab ID: 2212320-02 03/16/2022	Lab ID: 2212320-03 03/16/2022		
General Inorganics	Tannin & Lignin	mg/L	ND (0.1)	ND (0.1)	N/A	-	-
	Total Kjeldahl Nitrogen	mg/L	0.1	0.2	N/A	-	-
	Organic Nitrogen	mg/L	0.09	0.19	N/A	0.15	OG
	Turbidity	NTU	0.2	ND (0.1)	N/A	5/5	AO/MCT
Anions	Chloride	mg/L	64	91	N/A	250/250	AO/MCT
	Fluoride	mg/L	0.4	0.3	N/A	1.5	MAC
	Nitrate as N	mg/L	2.7	4.7	N/A	10	MAC
	Nitrite as N	mg/L	0.24	ND (0.05)	N/A	1.0	MAC
	Sulphate	mg/L	59	32	N/A	500/500	AO/MCT
Metals	Mercury	0.0001	N/A	ND (0.0001)	ND (0.0001)	0.001	MAC
	Aluminum	0.001	N/A	ND (0.001)	ND (0.001)	0.1	MAC
	Antimony	0.0005	N/A	0.0009	ND (0.0005)	0.006	MAC
	Arsenic	0.001	N/A	ND (0.001)	ND (0.001)	0.01	MAC
	Barium	0.001	N/A	0.181	0.187	1.0	MAC
	Beryllium	0.0005	N/A	ND (0.0005)	ND (0.0005)	-	-
	Boron	0.01	N/A	0.07	0.09	5.0	MAC
	Cadmium	0.0001	N/A	ND (0.0001)	ND (0.0001)	0.005	MAC
	Calcium	0.1	83.4	86.6	N/A	-	-

NOTES

1. ODWS = Ontario Drinking Water Standards
3. OG = Operational Guidelines
5. ND = Not Detectable
7. MCT = Maximum Concentration Considered Reasonably Treatable

2. MAC = Maximum Acceptable Concentration
4. AO = Aesthetic Objectives
6. WL = Warning Level for a Person on Sodium Restricted Diet

Parameter	Units	PW-8005	TW22-01 8 hr	TW22-01 8 hr (Filtered)	ODWQS	Standard	
		Lab ID: 2205351-01 01/26/2022	Lab ID: 2212320-02 03/16/2022	Lab ID: 2212320-03 03/16/2022			
Metals	Chromium	0.001	N/A	ND (0.001)	ND (0.001)	0.05	MAC
	Cobalt	0.0005	N/A	ND (0.0005)	ND (0.0005)	-	-
	Copper	0.0005	N/A	0.0008	0.0008	-	-
	Iron	0.1	ND (0.1)	ND (0.1)	N/A	0.3/5-10	AO/MCT
	Lead	0.0001	N/A	ND (0.0001)	ND (0.0001)	0.010	MAC
	Magnesium	0.2	25.1	22.2	N/A	-	-
	Manganese	0.005	0.006	ND (0.005)	N/A	0.05/1.0	AO/MCT
	Molybdenum	0.0005	N/A	0.0010	0.0009	-	-
	Nickel	0.001	N/A	ND (0.001)	ND (0.001)	-	-
	Potassium	0.1	3.4	2.5	N/A	-	-
	Selenium	0.001	N/A	0.001	0.001	0.05	MAC
	Silver	0.0001	N/A	ND (0.0001)	ND (0.0001)	-	-
	Sodium	0.2	<b>25.3</b>	<b>22.0</b>	N/A	20/200/200	WL/AO/MCT
	Strontium	0.01	N/A	0.86	0.94	7.0	MAC
	Thallium	0.001	N/A	ND (0.001)	ND (0.001)	-	-
	Uranium	0.0001	N/A	0.0008	0.0008	0.02	MAC
	Vanadium	0.0005	N/A	ND (0.0005)	ND (0.0005)	-	-
Zinc	0.005	N/A	ND (0.005)	ND (0.005)	-	-	

NOTES

- |  |  |
|--|--|
| 1. ODWS = Ontario Drinking Water Standards                     | 2. MAC = Maximum Acceptable Concentration                    |
| 3. OG = Operational Guidelines                                 | 4. AO = Aesthetic Objectives                                 |
| 5. ND = Not Detectable   | 6. WL = Warning Level for a Person on Sodium Restricted Diet |
| 7. MCT = Maximum Concentration Considered Reasonably Treatable |  |

## Certificate of Analysis

**GEMTEC Consulting Engineers and Scientists Limited**

32 Steacie Drive  
Kanata, ON K2K 2A9  
Attn: Andrius Paznekas

Client PO:  
Project: 101593.001  
Custody: 15865

Report Date: 1-Feb-2022  
Order Date: 26-Jan-2022

**Order #: 2205351**

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
2205351-01	PW-8005

Approved By:



Mark Foto, M.Sc.  
Lab Supervisor

Certificate of Analysis

Report Date: 01-Feb-2022

Client: GEMTEC Consulting Engineers and Scientists Limited

Order Date: 26-Jan-2022

Client PO:

Project Description: 101593.001

**Analysis Summary Table**

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	27-Jan-22	27-Jan-22
Ammonia, as N	EPA 351.2 - Auto Colour	27-Jan-22	28-Jan-22
Anions	EPA 300.1 - IC	27-Jan-22	27-Jan-22
Colour	SM2120 - Spectrophotometric	27-Jan-22	27-Jan-22
Colour, apparent	SM2120 - Spectrophotometric	27-Jan-22	27-Jan-22
Conductivity	EPA 9050A- probe @25 °C	27-Jan-22	27-Jan-22
Dissolved Organic Carbon	MOE E3247B - Combustion IR, filtration	31-Jan-22	31-Jan-22
E. coli	MOE E3407	27-Jan-22	27-Jan-22
Fecal Coliform	SM 9222D	27-Jan-22	27-Jan-22
Heterotrophic Plate Count	SM 9215C	27-Jan-22	27-Jan-22
Metals, ICP-MS	EPA 200.8 - ICP-MS	27-Jan-22	27-Jan-22
pH	EPA 150.1 - pH probe @25 °C	27-Jan-22	27-Jan-22
Phenolics	EPA 420.2 - Auto Colour, 4AAP	28-Jan-22	1-Feb-22
Hardness	Hardness as CaCO <sub>3</sub>	27-Jan-22	27-Jan-22
Sulphide	SM 4500SE - Colourimetric	28-Jan-22	28-Jan-22
Tannin/Lignin	SM 5550B - Colourimetric	27-Jan-22	27-Jan-22
Total Coliform	MOE E3407	27-Jan-22	27-Jan-22
Total Dissolved Solids	SM 2540C - gravimetric, filtration	27-Jan-22	28-Jan-22
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	27-Jan-22	27-Jan-22
Turbidity	SM 2130B - Turbidity meter	27-Jan-22	27-Jan-22

Certificate of Analysis

Report Date: 01-Feb-2022

Client: GEMTEC Consulting Engineers and Scientists Limited

Order Date: 26-Jan-2022

Client PO:

Project Description: 101593.001

<b>Client ID:</b>	PW-8005	-	-	-
<b>Sample Date:</b>	26-Jan-22 14:30	-	-	-
<b>Sample ID:</b>	2205351-01	-	-	-
<b>MDL/Units</b>	Drinking Water	-	-	-

**Microbiological Parameters**

E. coli	1 CFU/100mL	ND	-	-	-
Fecal Coliforms	1 CFU/100mL	ND	-	-	-
Total Coliforms	1 CFU/100mL	ND	-	-	-
Heterotrophic Plate Count	10 CFU/mL	10	-	-	-

**General Inorganics**

Alkalinity, total	5 mg/L	231	-	-	-
Ammonia as N	0.01 mg/L	0.01	-	-	-
Dissolved Organic Carbon	0.5 mg/L	0.6	-	-	-
Colour	2 TCU	<2	-	-	-
Colour, apparent	2 ACU	2	-	-	-
Conductivity	5 uS/cm	747	-	-	-
Hardness	mg/L	312	-	-	-
pH	0.1 pH Units	7.6	-	-	-
Phenolics	0.001 mg/L	<0.001	-	-	-
Total Dissolved Solids	10 mg/L	450	-	-	-
Sulphide	0.02 mg/L	<0.02	-	-	-
Tannin & Lignin	0.1 mg/L	<0.1	-	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	0.1	-	-	-
Turbidity	0.1 NTU	0.2	-	-	-

**Anions**

Chloride	1 mg/L	64	-	-	-
Fluoride	0.1 mg/L	0.4	-	-	-
Nitrate as N	0.1 mg/L	2.7	-	-	-
Nitrite as N	0.05 mg/L	0.24	-	-	-
Sulphate	1 mg/L	59	-	-	-

**Metals**

Calcium	0.1 mg/L	83.4	-	-	-
Iron	0.1 mg/L	<0.1	-	-	-
Magnesium	0.2 mg/L	25.1	-	-	-
Manganese	0.005 mg/L	0.006	-	-	-
Potassium	0.1 mg/L	3.4	-	-	-
Sodium	0.2 mg/L	25.3	-	-	-

Certificate of Analysis

Report Date: 01-Feb-2022

Client: GEMTEC Consulting Engineers and Scientists Limited

Order Date: 26-Jan-2022

Client PO:

Project Description: 101593.001

**Method Quality Control: Blank**

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>Anions</b>									
Chloride	ND	1	mg/L						
Fluoride	ND	0.1	mg/L						
Nitrate as N	ND	0.1	mg/L						
Nitrite as N	ND	0.05	mg/L						
Sulphate	ND	1	mg/L						
<b>General Inorganics</b>									
Alkalinity, total	ND	5	mg/L						
Ammonia as N	ND	0.01	mg/L						
Dissolved Organic Carbon	ND	0.5	mg/L						
Colour	ND	2	TCU						
Colour, apparent	ND	2	ACU						
Conductivity	ND	5	uS/cm						
Phenolics	ND	0.001	mg/L						
Total Dissolved Solids	ND	10	mg/L						
Sulphide	ND	0.02	mg/L						
Tannin & Lignin	ND	0.1	mg/L						
Total Kjeldahl Nitrogen	ND	0.1	mg/L						
Turbidity	ND	0.1	NTU						
<b>Metals</b>									
Calcium	ND	0.1	mg/L						
Iron	ND	0.1	mg/L						
Magnesium	ND	0.2	mg/L						
Manganese	ND	0.005	mg/L						
Potassium	ND	0.1	mg/L						
Sodium	ND	0.2	mg/L						
<b>Microbiological Parameters</b>									
E. coli	ND	1	CFU/100mL						
Fecal Coliforms	ND	1	CFU/100mL						
Total Coliforms	ND	1	CFU/100mL						
Heterotrophic Plate Count	ND	10	CFU/mL						



Certificate of Analysis

Report Date: 01-Feb-2022

Client: GEMTEC Consulting Engineers and Scientists Limited

Order Date: 26-Jan-2022

Client PO:

Project Description: 101593.001

**Method Quality Control: Duplicate**

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>Anions</b>									
Chloride	52.7	1	mg/L	52.5			0.4	10	
Fluoride	0.43	0.1	mg/L	0.42			0.7	10	
Nitrate as N	ND	0.1	mg/L	ND			NC	10	
Nitrite as N	ND	0.05	mg/L	ND			NC	10	
Sulphate	41.5	1	mg/L	41.6			0.1	10	
<b>General Inorganics</b>									
Alkalinity, total	196	5	mg/L	197			0.6	14	
Ammonia as N	0.104	0.01	mg/L	0.100			3.9	17.7	
Dissolved Organic Carbon	0.5	0.5	mg/L	0.6			17.5	37	
Colour	2	2	TCU	2			0.0	12	
Colour, apparent	2	2	ACU	2			0.0	12	
Conductivity	442	5	uS/cm	454			2.7	5	
pH	7.3	0.1	pH Units	7.3			0.3	3.3	
Phenolics	ND	0.001	mg/L	ND			NC	10	
Total Dissolved Solids	408	10	mg/L	398			2.5	10	
Sulphide	ND	0.02	mg/L	ND			NC	10	
Tannin & Lignin	0.8	0.1	mg/L	0.8			1.3	11	
Total Kjeldahl Nitrogen	0.18	0.1	mg/L	0.23			NC	16	
Turbidity	0.9	0.1	NTU	0.9			1.1	10	
<b>Metals</b>									
Calcium	7.1	0.1	mg/L	7.1			0.0	20	
Iron	ND	0.1	mg/L	ND			NC	20	
Magnesium	1.7	0.2	mg/L	1.8			3.3	20	
Manganese	ND	0.005	mg/L	ND			NC	20	
Potassium	0.6	0.1	mg/L	0.6			1.7	20	
Sodium	14.5	0.2	mg/L	14.6			1.2	20	
<b>Microbiological Parameters</b>									
E. coli	ND	1	CFU/100mL	ND			NC	30	
Fecal Coliforms	ND	1	CFU/100mL	ND			NC	30	
Total Coliforms	ND	1	CFU/100mL	ND			NC	30	
Heterotrophic Plate Count	ND	10	CFU/mL	10			NC	30	

Certificate of Analysis

Report Date: 01-Feb-2022

Client: GEMTEC Consulting Engineers and Scientists Limited

Order Date: 26-Jan-2022

Client PO:

Project Description: 101593.001

**Method Quality Control: Spike**

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>Anions</b>									
Chloride	62.8	1	mg/L	52.5	103	77-123			
Fluoride	1.33	0.1	mg/L	0.42	90.4	79-121			
Nitrate as N	1.05	0.1	mg/L	ND	105	79-120			
Nitrite as N	0.991	0.05	mg/L	ND	99.1	84-117			
Sulphate	50.9	1	mg/L	41.6	93.6	74-126			
<b>General Inorganics</b>									
Ammonia as N	0.347	0.01	mg/L	0.100	99.0	81-124			
Dissolved Organic Carbon	11.9	0.5	mg/L	0.6	112	60-133			
Phenolics	0.024	0.001	mg/L	ND	96.6	67-133			
Total Dissolved Solids	104	10	mg/L	ND	104	75-125			
Sulphide	0.52	0.02	mg/L	ND	104	79-115			
Tannin & Lignin	1.7	0.1	mg/L	0.8	91.8	71-113			
Total Kjeldahl Nitrogen	1.99	0.1	mg/L	0.23	88.0	81-126			
<b>Metals</b>									
Calcium	14500	0.1	mg/L	7090	73.9	80-120			QM-07
Iron	2040	0.1	mg/L	7.6	81.2	80-120			
Magnesium	10100	0.2	mg/L	1770	83.7	80-120			
Manganese	45.9	0.005	mg/L	1.56	88.8	80-120			
Potassium	8560	0.1	mg/L	570	79.9	80-120			QM-07
Sodium	8850	0.2	mg/L	ND	88.5	80-120			

Certificate of Analysis

Report Date: 01-Feb-2022

Client: **GEMTEC Consulting Engineers and Scientists Limited**

Order Date: 26-Jan-2022

Client PO:

Project Description: **101593.001**

**Qualifier Notes:**

*Sample Qualifiers :*

*QC Qualifiers :*

QM-07 : The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.

**Sample Data Revisions**

None

**Work Order Revisions / Comments:**

None

**Other Report Notes:**

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated



Parcel Order Number

2205351

Chain Of Custody  
Ontario Drinking Water Samples

No 15865

Client Name: <b>GEMTEC</b>	Project Ref: <b>101593.ccl</b>	Waterworks Name:	Samples Taken By:
Contact Name: <b>Andrius Paznekas</b>	Waterworks Number:	Name: <b>Brent R</b>	
Address:	PO #:	Signature: <i>[Signature]</i>	
After Hours Contact:	E-mail: <b>Andrius.Paznekas@GEMTEC.ca</b>	Page ___ of ___	Turn Around Time Required:
Telephone: <b>613-295-8425</b>	Fax:	<input type="checkbox"/> 1 day <input type="checkbox"/> 2 day <input type="checkbox"/> 3 day <input checked="" type="checkbox"/> 4 day	
		Public Health Unit:	

Samples Submitted Under: (Indicate ONLY one)		Sample Type: R = Raw ; T = Treated ; D = Distribution ; P = Plumbing		Source Type: G = Ground Water ; S = Surface Water		Reportable: Requires AWQJ reporting as per Regulation - Y = Yes ; N = No		Required Analyses								
<input type="checkbox"/> ON REG 170/03	<input type="checkbox"/> ON REG 319/08	<input type="checkbox"/> Private Well														
<input type="checkbox"/> ON REG 243/07	<input checked="" type="checkbox"/> Other	<b>oreg 169/07</b>														
Have LSN forms been submitted to MOE/MOHLTC?: <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A		Are these samples for human consumption?: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		All information must be completed before samples will be processed.		SAMPLE COLLECTED		# of Containers	Free/Combined Chlorine Residual mg/L	Standing / Flushed: S / F (REG 243)	Total Coliform/E. Coll	HPC	Lead	THM	Subdivision	Bacteria
LOCATION NAME	SAMPLE ID	Sample Type: R/T/D/P	Source Type: G/S	Reportable: Y/N	Resample	DATE	TIME									
1	PW - 8005	RGNM				Jan. 26, 22	14:30	6								
2																
3																
4																
5																
6																
7																
8																
9																
10																

Comments: <b>7 colour in ACU / TCU</b>		Method of Delivery: <b>Walkin</b>	
Relinquished By (Sign): <i>[Signature]</i>	Received By Driver/Depot: <i>[Signature]</i>	Received at Lab: <b>Sinecymon Dokman</b>	Verified By: <i>[Signature]</i>
Relinquished By (Print): <b>Brent Redmond</b>	Date/Time: <b>01/26/22 3:24pm</b>	Date/Time: <b>Jan 26, 2022 04:33</b>	Date/Time: <b>Jan 26, 22 17:16</b>
Date/Time: <b>Jan. 26, 22: 15:20</b>	Temperature: <b>6.3 °C</b>	Temperature: <b>7.6 °C</b>	pH Verified: <input checked="" type="checkbox"/> By: <b>BS</b>

## Certificate of Analysis

**GEMTEC Consulting Engineers and Scientists Limited**

32 Steacie Drive  
Kanata, ON0 K2K 2A9  
Attn: Brent Redmond

Client PO:  
Project: 101593.001  
Custody: 15614

Report Date: 29-Mar-2022  
Order Date: 16-Mar-2022

**Order #: 2212320**

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
2212320-02	TW22-01 8hr
2212320-03	TW22-01 8hr (Filtered)

Approved By:



Mark Foto, M.Sc.  
Lab Supervisor

Certificate of Analysis

Report Date: 29-Mar-2022

Client: GEMTEC Consulting Engineers and Scientists Limited

Order Date: 16-Mar-2022

Client PO:

Project Description: 101593.001

**Analysis Summary Table**

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	17-Mar-22	17-Mar-22
Ammonia, as N	EPA 351.2 - Auto Colour	18-Mar-22	18-Mar-22
Anions	EPA 300.1 - IC	17-Mar-22	18-Mar-22
Colour	SM2120 - Spectrophotometric	17-Mar-22	17-Mar-22
Colour, apparent	SM2120 - Spectrophotometric	17-Mar-22	17-Mar-22
Conductivity	EPA 9050A- probe @25 °C	17-Mar-22	17-Mar-22
Dissolved Organic Carbon	MOE E3247B - Combustion IR, filtration	21-Mar-22	21-Mar-22
E. coli	MOE E3407	17-Mar-22	17-Mar-22
Fecal Coliform	SM 9222D	17-Mar-22	17-Mar-22
Heterotrophic Plate Count	SM 9215C	17-Mar-22	17-Mar-22
Mercury by CVAA	EPA 245.2 - Cold Vapour AA	21-Mar-22	22-Mar-22
Metals, ICP-MS	EPA 200.8 - ICP-MS	18-Mar-22	18-Mar-22
pH	EPA 150.1 - pH probe @25 °C	17-Mar-22	17-Mar-22
Phenolics	EPA 420.2 - Auto Colour, 4AAP	21-Mar-22	21-Mar-22
Hardness	Hardness as CaCO <sub>3</sub>	18-Mar-22	18-Mar-22
Sulphide	SM 4500SE - Colourimetric	17-Mar-22	17-Mar-22
Tannin/Lignin	SM 5550B - Colourimetric	21-Mar-22	22-Mar-22
Total Coliform	MOE E3407	17-Mar-22	17-Mar-22
Total Dissolved Solids	SM 2540C - gravimetric, filtration	17-Mar-22	17-Mar-22
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	18-Mar-22	21-Mar-22
Turbidity	SM 2130B - Turbidity meter	18-Mar-22	18-Mar-22

Certificate of Analysis

Report Date: 29-Mar-2022

Client: GEMTEC Consulting Engineers and Scientists Limited

Order Date: 16-Mar-2022

Client PO:

Project Description: 101593.001

<b>Client ID:</b>	TW22-01 8hr	TW22-01 8hr (Filtered)	-	-
<b>Sample Date:</b>	16-Mar-22 16:00	16-Mar-22 16:00	-	-
<b>Sample ID:</b>	2212320-02	2212320-03	-	-
<b>MDL/Units</b>	Drinking Water	Drinking Water	-	-

**Microbiological Parameters**

E. coli	1 CFU/100mL	ND	-	-
Fecal Coliforms	1 CFU/100mL	ND	-	-
Total Coliforms	1 CFU/100mL	ND	-	-
Heterotrophic Plate Count	10 CFU/mL	10	-	-

**General Inorganics**

Alkalinity, total	5 mg/L	198	-	-
Ammonia as N	0.01 mg/L	0.01	-	-
Dissolved Organic Carbon	0.5 mg/L	1.1	-	-
Colour	2 TCU	2	-	-
Colour, apparent	2 ACU	2	-	-
Conductivity	5 uS/cm	780	-	-
Hardness	mg/L	307	-	-
pH	0.1 pH Units	7.7	-	-
Phenolics	0.001 mg/L	<0.001	-	-
Total Dissolved Solids	10 mg/L	452	-	-
Sulphide	0.02 mg/L	<0.02	-	-
Tannin & Lignin	0.1 mg/L	<0.1	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	0.2	-	-
Turbidity	0.1 NTU	<0.1	-	-

**Anions**

Chloride	1 mg/L	91	-	-
Fluoride	0.1 mg/L	0.3	-	-
Nitrate as N	0.1 mg/L	4.7	-	-
Nitrite as N	0.05 mg/L	<0.05	-	-
Sulphate	1 mg/L	32	-	-

**Metals**

Mercury	0.0001 mg/L	<0.0001	<0.0001	-	-
Aluminum	0.001 mg/L	<0.001	<0.001	-	-
Antimony	0.0005 mg/L	0.0009	<0.0005	-	-
Arsenic	0.001 mg/L	<0.001	<0.001	-	-
Barium	0.001 mg/L	0.181	0.187	-	-
Beryllium	0.0005 mg/L	<0.0005	<0.0005	-	-
Boron	0.01 mg/L	0.07	0.09	-	-
Cadmium	0.0001 mg/L	<0.0001	<0.0001	-	-

Certificate of Analysis

Report Date: 29-Mar-2022

Client: GEMTEC Consulting Engineers and Scientists Limited

Order Date: 16-Mar-2022

Client PO:

Project Description: 101593.001

	Client ID:	TW22-01 8hr	TW22-01 8hr (Filtered)	-	-
	Sample Date:	16-Mar-22 16:00	16-Mar-22 16:00	-	-
	Sample ID:	2212320-02	2212320-03	-	-
	MDL/Units	Drinking Water	Drinking Water	-	-
Calcium	0.1 mg/L	86.6	-	-	-
Chromium	0.001 mg/L	<0.001	<0.001	-	-
Cobalt	0.0005 mg/L	<0.0005	<0.0005	-	-
Copper	0.0005 mg/L	0.0008	0.0008	-	-
Iron	0.1 mg/L	<0.1	-	-	-
Lead	0.0001 mg/L	<0.0001	<0.0001	-	-
Magnesium	0.2 mg/L	22.2	-	-	-
Manganese	0.005 mg/L	<0.005	-	-	-
Molybdenum	0.0005 mg/L	0.0010	0.0009	-	-
Nickel	0.001 mg/L	<0.001	<0.001	-	-
Potassium	0.1 mg/L	2.5	-	-	-
Selenium	0.001 mg/L	0.001	0.001	-	-
Silver	0.0001 mg/L	<0.0001	<0.0001	-	-
Sodium	0.2 mg/L	22.0	-	-	-
Strontium	0.01 mg/L	0.86	0.94	-	-
Thallium	0.001 mg/L	<0.001	<0.001	-	-
Uranium	0.0001 mg/L	0.0008	0.0008	-	-
Vanadium	0.0005 mg/L	<0.0005	<0.0005	-	-
Zinc	0.005 mg/L	<0.005	<0.005	-	-



Certificate of Analysis

Report Date: 29-Mar-2022

Client: GEMTEC Consulting Engineers and Scientists Limited

Order Date: 16-Mar-2022

Client PO:

Project Description: 101593.001

**Method Quality Control: Blank**

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>Anions</b>									
Chloride	ND	1	mg/L						
Fluoride	ND	0.1	mg/L						
Nitrate as N	ND	0.1	mg/L						
Nitrite as N	ND	0.05	mg/L						
Sulphate	ND	1	mg/L						
<b>General Inorganics</b>									
Alkalinity, total	ND	5	mg/L						
Ammonia as N	ND	0.01	mg/L						
Dissolved Organic Carbon	ND	0.5	mg/L						
Colour	ND	2	TCU						
Colour, apparent	ND	2	ACU						
Conductivity	ND	5	uS/cm						
Phenolics	ND	0.001	mg/L						
Total Dissolved Solids	ND	10	mg/L						
Sulphide	ND	0.02	mg/L						
Tannin & Lignin	ND	0.1	mg/L						
Total Kjeldahl Nitrogen	ND	0.1	mg/L						
Turbidity	ND	0.1	NTU						
<b>Metals</b>									
Mercury	ND	0.0001	mg/L						
Aluminum	ND	0.001	mg/L						
Antimony	ND	0.0005	mg/L						
Arsenic	ND	0.001	mg/L						
Barium	ND	0.001	mg/L						
Beryllium	ND	0.0005	mg/L						
Boron	ND	0.01	mg/L						
Cadmium	ND	0.0001	mg/L						
Calcium	ND	0.1	mg/L						
Chromium	ND	0.001	mg/L						
Cobalt	ND	0.0005	mg/L						
Copper	ND	0.0005	mg/L						
Iron	ND	0.1	mg/L						
Lead	ND	0.0001	mg/L						
Magnesium	ND	0.2	mg/L						
Manganese	ND	0.005	mg/L						
Molybdenum	ND	0.0005	mg/L						
Nickel	ND	0.001	mg/L						
Potassium	ND	0.1	mg/L						
Selenium	ND	0.001	mg/L						
Silver	ND	0.0001	mg/L						
Sodium	ND	0.2	mg/L						
Strontium	ND	0.01	mg/L						
Thallium	ND	0.001	mg/L						
Uranium	ND	0.0001	mg/L						
Vanadium	ND	0.0005	mg/L						
Zinc	ND	0.005	mg/L						
<b>Microbiological Parameters</b>									
E. coli	ND	1	CFU/100mL						
Fecal Coliforms	ND	1	CFU/100mL						
Total Coliforms	ND	1	CFU/100mL						
Heterotrophic Plate Count	ND	10	CFU/mL						

Certificate of Analysis

Report Date: 29-Mar-2022

Client: GEMTEC Consulting Engineers and Scientists Limited

Order Date: 16-Mar-2022

Client PO:

Project Description: 101593.001

**Method Quality Control: Duplicate**

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>Anions</b>									
Chloride	90.4	1	mg/L	90.6			0.1	10	
Fluoride	0.26	0.1	mg/L	0.26			0.2	10	
Nitrate as N	4.75	0.1	mg/L	4.69			1.1	10	
Nitrite as N	ND	0.05	mg/L	ND			NC	10	
Sulphate	31.9	1	mg/L	31.5			1.3	10	
<b>General Inorganics</b>									
Alkalinity, total	28.6	5	mg/L	28.9			0.9	14	
Ammonia as N	ND	0.01	mg/L	0.012			NC	17.7	
Dissolved Organic Carbon	1.4	0.5	mg/L	1.1			27.4	37	
Colour	2	2	TCU	2			0.0	12	
Colour, apparent	2	2	ACU	2			0.0	12	
Conductivity	768	5	uS/cm	780			1.6	5	
pH	7.8	0.1	pH Units	7.8			0.3	3.3	
Phenolics	ND	0.001	mg/L	ND			NC	10	
Total Dissolved Solids	454	10	mg/L	452			0.4	10	
Sulphide	ND	0.02	mg/L	ND			NC	10	
Tannin & Lignin	ND	0.1	mg/L	ND			NC	11	
Total Kjeldahl Nitrogen	0.22	0.1	mg/L	0.22			2.6	16	
Turbidity	ND	0.1	NTU	ND			NC	10	
<b>Metals</b>									
Mercury	ND	0.0001	mg/L	ND			NC	20	
Aluminum	ND	0.001	mg/L	ND			NC	20	
Antimony	0.0009	0.0005	mg/L	0.0009			3.0	20	
Arsenic	ND	0.001	mg/L	ND			NC	20	
Barium	0.185	0.001	mg/L	0.181			2.4	20	
Beryllium	ND	0.0005	mg/L	ND			NC	20	
Boron	0.08	0.01	mg/L	0.07			5.8	20	
Cadmium	ND	0.0001	mg/L	ND			NC	20	
Calcium	87.8	0.1	mg/L	86.6			1.5	20	
Chromium	ND	0.001	mg/L	ND			NC	20	
Cobalt	ND	0.0005	mg/L	ND			NC	20	
Copper	0.0008	0.0005	mg/L	0.0008			1.4	20	
Iron	ND	0.1	mg/L	ND			NC	20	
Lead	ND	0.0001	mg/L	ND			NC	20	
Magnesium	23.6	0.2	mg/L	22.2			6.1	20	
Manganese	ND	0.005	mg/L	ND			NC	20	
Molybdenum	0.0010	0.0005	mg/L	0.0010			3.2	20	
Nickel	ND	0.001	mg/L	ND			NC	20	
Potassium	2.5	0.1	mg/L	2.5			1.8	20	
Selenium	0.001	0.001	mg/L	0.001			4.3	20	
Silver	ND	0.0001	mg/L	ND			NC	20	
Sodium	22.0	0.2	mg/L	22.0			0.2	20	
Thallium	ND	0.001	mg/L	ND			NC	20	
Uranium	0.0008	0.0001	mg/L	0.0008			3.0	20	
Vanadium	ND	0.0005	mg/L	ND			NC	20	
Zinc	ND	0.005	mg/L	ND			NC	20	
<b>Microbiological Parameters</b>									
E. coli	ND	1	CFU/100mL	ND			NC	30	
Fecal Coliforms	ND	1	CFU/100mL	ND			NC	30	
Total Coliforms	ND	1	CFU/100mL	ND			NC	30	
Heterotrophic Plate Count	ND	10	CFU/mL	10			NC	30	

Certificate of Analysis

Report Date: 29-Mar-2022

Client: GEMTEC Consulting Engineers and Scientists Limited

Order Date: 16-Mar-2022

Client PO:

Project Description: 101593.001

**Method Quality Control: Spike**

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
<b>Anions</b>									
Chloride	98.3	1	mg/L	90.6	77.3	77-123			
Fluoride	1.30	0.1	mg/L	0.26	104	79-121			
Nitrate as N	5.52	0.1	mg/L	4.69	82.9	79-120			
Nitrite as N	0.976	0.05	mg/L	ND	97.6	84-117			
Sulphate	41.0	1	mg/L	31.5	94.3	74-126			
<b>General Inorganics</b>									
Ammonia as N	0.261	0.01	mg/L	0.012	99.5	81-124			
Dissolved Organic Carbon	13.0	0.5	mg/L	1.1	119	60-133			
Phenolics	0.026	0.001	mg/L	ND	104	67-133			
Total Dissolved Solids	106	10	mg/L	ND	106	75-125			
Sulphide	0.49	0.02	mg/L	ND	97.4	79-115			
Tannin & Lignin	0.9	0.1	mg/L	ND	93.6	71-113			
Total Kjeldahl Nitrogen	2.16	0.1	mg/L	0.22	96.8	81-126			
<b>Metals</b>									
Mercury	0.0031	0.0001	mg/L	ND	103	70-130			
Aluminum	43.5	0.001	mg/L	0.397	86.2	80-120			
Antimony	44.3	0.0005	mg/L	0.915	86.8	80-120			
Arsenic	51.0	0.001	mg/L	0.213	102	80-120			
Barium	224	0.001	mg/L	181	86.6	80-120			
Beryllium	46.1	0.0005	mg/L	0.0205	92.2	80-120			
Boron	66.4	0.01	mg/L	16.8	99.2	80-120			
Cadmium	48.4	0.0001	mg/L	0.0048	96.8	80-120			
Calcium	9780	0.1	mg/L	ND	97.8	80-120			
Chromium	50.2	0.001	mg/L	0.181	100	80-120			
Cobalt	49.1	0.0005	mg/L	0.155	98.0	80-120			
Copper	46.9	0.0005	mg/L	0.834	92.2	80-120			
Iron	2420	0.1	mg/L	6.5	96.6	80-120			
Lead	45.1	0.0001	mg/L	0.0325	90.1	80-120			
Magnesium	30500	0.2	mg/L	22200	83.2	80-120			
Manganese	49.2	0.005	mg/L	0.826	96.7	80-120			
Molybdenum	47.5	0.0005	mg/L	1.03	92.9	80-120			
Nickel	47.8	0.001	mg/L	0.735	94.2	80-120			
Potassium	13000	0.1	mg/L	2500	105	80-120			
Selenium	46.9	0.001	mg/L	1.32	91.2	80-120			
Silver	47.1	0.0001	mg/L	0.0295	94.1	80-120			
Sodium	30600	0.2	mg/L	22000	85.4	80-120			
Thallium	44.4	0.001	mg/L	0.034	88.8	80-120			
Uranium	46.8	0.0001	mg/L	0.789	92.1	80-120			
Vanadium	51.3	0.0005	mg/L	0.173	102	80-120			
Zinc	45.4	0.005	mg/L	1.78	87.2	80-120			

Certificate of Analysis

Report Date: 29-Mar-2022

Client: **GEMTEC Consulting Engineers and Scientists Limited**

Order Date: 16-Mar-2022

Client PO:

Project Description: **101593.001**

**Qualifier Notes:**

*Sample Qualifiers :*

*QC Qualifiers :*

**Sample Data Revisions**

None

**Work Order Revisions / Comments:**

None

**Other Report Notes:**

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated



Parcel Order Number

2212320

Chain Of Custody  
Ontario Drinking Water Samples

No 15614

Client Name: GEMTEC	Project Ref: 101593.001	Waterworks Name:	Samples Taken By:
Contact Name: Brent Redmond	Quote #:	Waterworks Number:	Name: Brent Redmond
Address:	PO #:	Address:	Signature:
After Hours Contact:	E-mail: Brent.Redmond@GEMTEC.ca	Page ___ of ___	
Telephone: 43-571-9950	Fax:	Public Health Unit:	Turn Around Time Required: <input type="checkbox"/> 1 day <input type="checkbox"/> 2 day <input type="checkbox"/> 3 day <input checked="" type="checkbox"/> 4 day

Samples Submitted Under: (Indicate ONLY one)		Sample Type: R = Raw ; T = Treated ; D = Distribution; P = Plumbing						Required Analyses										
<input type="checkbox"/> ON REG 170/03 <input type="checkbox"/> ON REG 319/08 <input type="checkbox"/> Private Well <input type="checkbox"/> ON REG 243/07 <input checked="" type="checkbox"/> Other <i>Reg 169/03</i>		Source Type: G = Ground Water; S = Surface Water																
Have LSN forms been submitted to MOE/MOHLTC?: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A		Reportable: Requires AWQI reporting as per Regulation - Y = Yes; N = No																
Are these samples for human consumption?: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Sample Type: R/T/D/P	Source Type: G/S	Reportable: Y/N	Resample	SAMPLE COLLECTED		# of Containers	Free/Combined Chlorine Residual mg/L	Standing / Flushed: S/F (REG 243)	Total Coliform/E. Coll	HPC	Lead	THM	Subduction	Bacteriology	Trace Metals	C-14 + urea/H
All information must be completed before samples will be processed.						DATE	TIME											
1	TW22-01 4hr	R	G	N		Mar. 16 <sup>th</sup>	AM	8								X	X	
2	TW22-01 8hr	R	G	N		"	PM	11								X	X	X
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments: → colour in Acc f Yccr → Trace metals analysis sent to JCH		→ Please put 4hr sample on hold		Method of Delivery: walk-in
Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab:	Verified By:	
Relinquished By (Print): Brent Redmond	Date/Time: 03/16/22 4:55pm	Date/Time: March 17, 2022 10:50	Date/Time: Mar 17 2022 10:55	
Date/Time: Mar. 16. 22, 16:50	Temperature: 13.9 °C	Temperature: 3.0 °C	pH Verified: <input checked="" type="checkbox"/>	