Version 1.0
June 8, 2021 Matrix 15072-528

Mr. Dave Belanger
CITY OF GUELPH
29 Waterworks Pl.
Guelph, ON N1H 3A1

Subject: Private Water Well Impact Evaluation for Lafarge Canada Inc. Wellington County Quarry

Dear Mr. Belanger:

1 INTRODUCTION AND OBJECTIVES

Lafarge Canada Inc. has applied to amend their current Permit to Take Water (PTTW) and Certificate of Approval Industrial Sewage Works at their Wellington County Pit and Quarry (Wellington Quarry) located on the south side of Highway 124, in the townships of Guelph-Eramosa and Puslinch, Ontario. The proposed permit amendment seeks approval for dewatering to a minimum elevation of 285 m above sea level (asl; the approximate mapped top of the Vinemount Member (Mbr.) of the Eramosa Formation (Fm.) that is generally considered a groundwater aquitard). Lafarge engaged with the City of Guelph (the City) to update and apply the *City of Guelph and Township of Guelph/Eramosa, Tier Three Water Budget and Local Area Risk Assessment* (Tier Three assessment; Matrix 2017) groundwater model to evaluate the potential water supply and environmental impacts from the expansion of the Wellington Quarry. The numerical groundwater flow model (Tier Three model) was updated to better reflect existing conditions at the site based on new data, to simulate excavation and dewatering of the quarry to 285 m asl, and to assess a potential reduction in capacity of the City's municipal wells and impacts to adjacent surface water features.

The City retained Matrix Solutions Inc., according to the City's contract with Lafarge, to complete and document the modelling work based on scopes of work provided by Lafarge and Golder Associates Inc. (Golder 2020, 2019) and work plans developed by Matrix (Matrix 2020, 2019). Matrix worked with the City, Lafarge, and Golder to complete this project, which included sharing data between parties and consultations during data analysis, conceptual and numerical model refinement, and numerical model calibration. The project leveraged the experience and local knowledge of these parties gained through multiple years of data collection and analysis at the site and in the City of Guelph. Reporting of this technical work has been completed in draft (Matrix 2021).

The scope of work requested by Lafarge and Golder (Golder 2020) also included a task, in response to a request by the Ministry of the Environment, Conservation and Parks (MECP), to evaluate the potential additional drawdown at private water wells that may result from the proposed excavation and dewatering to 285 m asl at the Wellington Quarry. This letter report summarizes the results of this evaluation. The results of the conceptual and numerical modelling updates, as well as the numerical model predictions from the proposed excavation/dewatering at the Wellington Quarry to 285 m asl are detailed in Matrix (2021).

2 PRIVATE WATER WELL IMPACT EVALUATION

2.1 Data Assembly

A private water well dataset consisting of 36 water well records (WWRs) was initially assembled from the MECP Water Well Information System (WWIS; MECP 2021), considering a 500 m zone surrounding the Wellington Quarry extraction area (Figure 1). Twenty-two WWRs were initially filtered out where their well use was designated as "observation wells," "monitoring wells," "test holes," or where the WWRs described well abandonment (i.e., unlabelled white circles on Figure 1). An additional two WWRs located within the Lafarge property boundary (i.e., WWR ID 6704635 and 6704636; Figure 1), and designated as domestic water supply wells, were removed from consideration following a review by Lafarge staff; these wells are not used for water supply purposes but for monitoring. A third well (i.e., WWR ID 6715461; Figure 1) was removed from consideration because, while it was identified as having a well use of "livestock," it was also identified as a shallow overburden observation well and not a water supply well. Finally, one additional industrial supply well was identified on the Lafarge property by Lafarge staff for inclusion in the analysis (i.e., WWR ID 6712571; Figure 1). In summary, a total of 25 wells were filtered out of the private well impact evaluation (i.e., white circles on Figure 1), while 12 bedrock water supply wells were retained for further evaluation where the well use was specified as "domestic," "commercial," or "industrial" (i.e., green circles on Figure 1). These retained wells range in distance from the proposed quarry dewatering sump (Figure 1) from approximately 530 to 1,600 m and are within 500 m of the extraction area. Other general details about the wells (e.g., well depth, static water level, ground surface elevation, reported pump intake, and reported pumping rate) can be found in Table 1. Note that the reported pump intake and pumping rate are the recommended pump settings and pumping rates from the WWRs, respectively. Original WWRs for each of the 12 wells are found in Appendix A (MECP 2021).

TABLE 1 Private Water Well Details

Water Well Record ID	Easting (NAD83)	Northing (NAD83)	Distance from Proposed Dewatering Sump (m)	Well Use	Total Well Depth (m bgs)	Midpoint of Open Hole Interval (m bgs)	Static Water Level When Drilled (m bgs)	Ground Surface Elevation (Model)[1] (m asl)	Reported Recommended Pump Intake[2] (m bgs)	Reported Recommended Pump Intake[3] (m asl)	Reported Recommended Pumping Rate[2] (L/minute)	Reported Recommended Pumping Rate[2] (m^3/day)
6703318	558334	4815943	1,515	Water Supply - Domestic	48.8	33.1	12.8	318.9	19.8	299.1	57	82
6705230	558574	4816263	1,358	Water Supply - Domestic	42.7	29.7	11.6	320.9	18.3	302.6	30	44
6706927	559794	4816543	776	Water Supply - Domestic	32.6	20.8	7.6	310.9	30.5	280.4	19	27
6707288	558550	4816352	1,415	Water Supply - Domestic	40.5	27.3	9.8	321.9	24.4	297.5	38	55
6707880	558620	4816374	1,361	Water Supply - Domestic	23.2	18.9	14.9	321.9	18.3	303.6	38	55
6708796	559085	4815171	961	Water Supply - Domestic	32	22.7	9.1	311.7	19.8	291.9	38	55
6710019	559834	4816465	697	Water Supply - Domestic	60	33.1	10.7	311.4	53.9	257.5	76	109
6711941	558276	4816094	1,596	Water Supply - Commercial	36	25.1	10.7	318.6	18.3	300.3	34	49
6712349	558344	4815969	1,508	Water Supply - Commercial	43	30.0	15.2	319.2	24.4	294.8	38	55
6712388	559682	4816405	656	Water Supply - Domestic	30.5	19.9	9.1	311.2	24.4	286.8	57	82
7334558	559761	4816293	531	Water Supply - Domestic	48.8	28.5	8.8	311.5	36.6	274.9	45	65
6712571	558702	4815876	1,142	Water Supply - Industrial	54.9	31.2	2.1	306.3	12.0	294.3	227	327

Notes:
(1) As estimated from the City's groundwater flow model
(2) Values reported in WWRs (MECP 2021)
(3) Values reported in WWRs (MECP 2021) and converted to elevation based on ground surface elevation in the City of Guelph's groundwater flow model
NAD - North American Datum
bgs - below ground surface
asl - above sea level

2.2 Drawdown Estimation Due to Quarry Excavation/Dewatering

Well construction information for the 12 wells from the WWIS were used to develop an observation well dataset to evaluate the change in simulated water level at each well location (i.e., drawdown) between an existing conditions scenario and the excavation scenario (to 285 m asl) using the updated Tier Three model. This drawdown was evaluated considering both current (Excavation Scenario 1) and future municipal pumping rates (Excavation Scenario 2). These simulations are steady-state simulations and do not consider seasonal fluctuations but are considered representative of long-term average conditions. Details about the setup of each excavation scenario are found in Matrix (2021).

The water withdrawal and drawdown from the individual private wells was not simulated and no additional calibration at individual wells was completed due to the lack of data on current pumped water level. Water level data is only available at the time the well was drilled. An assessment of the additional drawdown due to private well use is provided in the next section.

Simulated water levels from the mid-point depth (Table 1) from each private well open bedrock interval were extracted from each model scenario in the groundwater flow model. The mid-point depth corresponded to various modelled aquifer units including the Guelph Fm., the Reformatory Quarry Mbr. of the Eramosa Fm., and the Goat Island Fm (Table 2). The mid-point of one private well (WWR ID 7334558) was interpreted to be in the Vinemount Mbr. aquitard. The simulated water levels for this well were extracted from the next shallowest aquifer unit (i.e., Reformatory Quarry Mbr.).

The simulated water levels and drawdown at each private well due to quarry excavation/dewatering to 285 m asl are presented in Table 2 for current and future municipal rates. In both scenarios, predicted drawdown ranges from 0.2 to 6.5 m at the 12 wells. Therefore, there is the potential for drawdown interference at all private wells due to quarry excavation/dewatering.

The simulated drawdown due to quarry excavation/dewatering was compared to the simulated available drawdown at each well, for each scenario, to determine where there is the potential that the private wells may not be able to sustainably provide water after full excavation/dewatering. Simulated available drawdown was estimated as the difference in elevation between the simulated water level prior to excavation/dewatering to 285 m asl, and the reported pump intake elevation (i.e., the recommended pump settings from the WWRs; Table 2). The simulated available drawdown was estimated separately considering simulated water level at each of the 12 wells under current municipal pumping (i.e., ranging from 3.3 to 43 m) and future municipal pumping (i.e., ranging from 2.5 to 41.5 m; Table 2). Simulated available drawdown was predicted to be exceeded as result of quarry excavation/dewatering for two of the 12 private wells considering both current and future municipal pumping but assuming the private wells are not in use (Table 2).

TABLE 2 Summary of Simulated Drawdown Due to Quarry Excavation/Dewatering (Assumes Private Wells Not in Use)

Water Well Record ID	Distance from Proposed Dewatering Sump (m)	Simulated Aquifer Unit at Midpoint of Open Hole	Reported Recommended Pump Intake[2] (m asl)	Simulated Available Drawdown Considering Pump Intake[3] (m)	Simulated Water Level Before Quarry Dewatering (m asl)	Simulated Water Level After Quarry Dewatering (m asl)	Simulated Drawdown from Quarry Dewatering Only (m)	Potential for Interference[4]	Estimated Drawdown from Quarry Dewatering > Simulated Available Drawdown
Excavation Scenario 1: Current Municipal Pumping									
6703318	1,515	Goat Island Fm.	299.1	5.8	304.9	302.3	2.6	Yes	No
6705230	1,358	Guelph Fm.	302.6	3.8	306.4	299.9	6.5	Yes	Yes
6706927	776	Reformatory Quarry Mbr.	280.4	22.5	302.9	298.6	4.3	Yes	No
6707288	1,415	Guelph Fm.	297.5	9.4	306.9	301.6	5.4	Yes	No
6707880	1,361	Guelph Fm.	303.6	3.3	306.9	301.1	5.8	Yes	Yes
6708796	961	Guelph Fm.	291.9	5.4	297.3	297.1	0.2	Yes	No
6710019	697	Goat Island Fm.	257.5	43.0	300.5	299.2	1.2	Yes	No
6711941	1,596	Guelph Fm.	300.3	6.2	306.5	303.3	3.1	Yes	No
6712349	1,508	Guelph Fm.	294.8	11.0	305.8	301.9	3.9	Yes	No
6712388	656	Guelph Fm.	286.8	16.4	303.2	297.4	5.8	Yes	No
7334558	531	Reformatory Quarry Mbr.[1]	274.9	27.4	302.3	296.5	5.9	Yes	No
6712571	1,142	Goat Island Fm.	294.3	8.3	302.7	299.5	3.2	Yes	No
Excavation Scenario 2: Future Municipal Pumping									
6703318	1,515	Goat Island Fm.	299.1	4.9	304.0	301.4	2.6	Yes	No
6705230	1,358	Guelph Fm.	302.6	3.1	305.7	299.2	6.5	Yes	Yes
6706927	776	Reformatory Quarry Mbr.	280.4	22.1	302.4	298.2	4.2	Yes	No
6707288	1,415	Guelph Fm.	297.5	8.6	306.1	300.8	5.3	Yes	No
6707880	1,361	Guelph Fm.	303.6	2.5	306.1	300.3	5.8	Yes	Yes
6708796	961	Guelph Fm.	291.9	5.3	297.2	297.0	0.2	Yes	No
6710019	697	Goat Island Fm.	257.5	41.5	299.0	297.8	1.2	Yes	No
6711941	1,596	Guelph Fm.	300.3	5.5	305.8	302.6	3.2	Yes	No
6712349	1,508	Guelph Fm.	294.8	10.3	305.1	301.1	3.9	Yes	No
6712388	656	Guelph Fm.	286.8	16.0	302.8	296.9	5.8	Yes	No
7334558	531	Reformatory Quarry Mbr.[1]	274.9	26.9	301.9	296.0	5.9	Yes	No
6712571	1,142	Goat Island Fm.	294.3	7.3	301.7	298.5	3.1	Yes	No

Notes:
(1) Simulated midpoint of open bedrock interval is Vinemount Mbr. aquitard; therefore, simulated water levels extracted from next shallowest aquifer: Reformatory Quarry Mbr.
(2) Values reported in water well records (MECP 2021) and converted to elevation based on ground surface elevation in the City of Guelph's groundwater flow model.
(3) Calculated as difference between simulated water level elevation before quarry dewatering (i.e., static water level) and reported recommended pump intake elevation. Simulated available drawdown declines from current to future municipal pumping conditions as the simulated static water level declines.
(4) 'Yes' if there is estimated drawdown at a private well from quarry dewatering.
asl - above sea level
Mbr. - Member
Fm. - Formation

2.3 Drawdown Estimation Due to Private Well Use

In Section 2.2, water withdrawal and drawdown from private wells was not simulated in the model. As a result, the drawdown solely due to private well use was estimated at each private well (Table 3) by dividing reported private well pumping rates by the well specific capacities. The goal was to assess this drawdown relative to the simulated available drawdown under current and future municipal pumping rates prior to Wellington Quarry excavation. The pumping rate at each private well (Table 3) was assumed to be equivalent to the recommended pumping rate reported in the WWRs, while the private well specific capacity (Table 3) was calculated by dividing the pumping test flow rate by the drawdown (both values were available or calculated from well testing data in the WWRs). The specific capacity for WWR ID 6710019 was calculated differently as this well was lacking the necessary drawdown data. Instead, the specific capacity was estimated as the average specific capacity of the other two wells where the open hole midpoint depth also occurred within Goat Island Fm. The estimated drawdown due to private well use ranged from 1.7 to 24.7 m (Table 3).

Table 3 summarizes the estimated drawdown due to private well use compared to the simulated available drawdown at each well for each scenario. Simulated available drawdown was exceeded by the estimated private well use for two of the private wells under current conditions and for four wells under future conditions. The simulated available drawdown was exceeded because available drawdown was calculated relative to a simulated static water level that was deeper than the static water level observed at the time of well testing. For one of the wells (WWR ID 6706927), an additional contributing factor was due to a recommended pump setting that was shallower than the setting that was tested at the time of drilling, but the recommended pumping rate was not reduced accordingly. The apparent inconsistency in available drawdown shows the uncertainties in the method and the data provided in the WWR. Regardless, the potential exceedance of available drawdown highlights that up to four of these wells do not have much available drawdown under pre-excavation conditions.

The simulated available drawdown may be exceeded at more private wells under future municipal pumping conditions because of the decline in simulated available drawdown under future conditions (Table 3; i.e., the simulated static water level depth is greater under future conditions relative to current conditions). It is recommended that additional site-specific private well investigation take place to refine the estimates of private well drawdown.

TABLE 3 Summary of Estimated Drawdown Due to Private Well Use Only

Water Well Record ID	Distance from Proposed Dewatering Sump (m)	Simulated Aquifer Unit at Midpoint of Open Hole	Simulated Available Drawdown Considering Pump Intake[2] (m)	Reported Recommended Pumping Rate[3] (m^3/day)	Estimated Specific Capacity (m^3/d/m)	Estimated Drawdown from Private Well Use Only (m)	Estimated Drawdown from Private Well Use > Simulated Available Drawdown
Current Municipal Pumping Without Excavation							
6703318	1,515	Goat Island Fm.	5.8	82	14.9	5.5	No
6705230	1,358	Guelph Fm.	3.8	44	11.9	3.7	No
6706927	776	Reformatory Quarry Mbr.	22.5	27	1.1	24.7	Yes
6707288	1,415	Guelph Fm.	9.4	55	6.4	8.5	No
6707880	1,361	Guelph Fm.	3.3	55	32.5	1.7	No
6708796	961	Guelph Fm.	5.4	55	8.9	6.1	Yes
6710019	697	Goat Island Fm.	43.0	109	30.7[4]	3.6	No
6711941	1,596	Guelph Fm.	6.2	49	16.8	2.9	No
6712349	1,508	Guelph Fm.	11.0	55	19.9	2.7	No
6712388	656	Guelph Fm.	16.4	82	11.2	7.3	No
7334558	531	Reformatory Quarry Mbr.[1]	27.4	65	3.7	17.7	No
6712571	1,142	Goat Island Fm.	8.3	327	46.4	7.0	No
Future Municipal Pumping Without Excavation							
6703318	1,515	Goat Island Fm.	4.9	82	14.9	5.5	Yes
6705230	1,358	Guelph Fm.	3.1	44	11.9	3.7	Yes
6706927	776	Reformatory Quarry Mbr.	22.1	27	1.1	24.7	Yes
6707288	1,415	Guelph Fm.	8.6	55	6.4	8.5	No
6707880	1,361	Guelph Fm.	2.5	55	32.5	1.7	No
6708796	961	Guelph Fm.	5.3	55	8.9	6.1	Yes
6710019	697	Goat Island Fm.	41.5	109	30.7[4]	3.6	No
6711941	1,596	Guelph Fm.	5.5	49	16.8	2.9	No
6712349	1,508	Guelph Fm.	10.3	55	19.9	2.7	No
6712388	656	Guelph Fm.	16.0	82	11.2	7.3	No
7334558	531	Reformatory Quarry Mbr.[1]	26.9	65	3.7	17.7	No
6712571	1,142	Goat Island Fm.	7.3	327	46.4	7.0	No

Notes:
(1) Simulated midpoint of open bedrock interval is Vinemount Mbr. aquitard; therefore, simulated water levels extracted from next shallowest aquifer: Reformatory Quarry Mbr.
(2) Calculated as difference between simulated water level elevation before quarry dewatering (i.e., static water level) and reported recommended pump intake elevation. Simulated available drawdown declines from current to future municipal pumping conditions as the simulated static water level declines.
(3) Values reported in WWRs (MECP 2021).
(4) Value estimated as the average specific capacity of the other two wells where the open hole midpoint depth occurred within the Goat Island Fm.
asl - above sea level
Mbr. - Member
Fm. - Formation

2.4 Total Drawdown Evaluation

The total estimated drawdown due to simulated quarry excavation/dewatering and estimated private well use is provided in Table 4 for Excavation Scenarios 1 (current municipal pumping) and 2 (future municipal pumping). This total drawdown was compared to the simulated available drawdown at each well, for each scenario to determine where there is the potential that the private well may not be able to sustainably provide water.

Total drawdown ranged from 4.8 to 28.9 m in both scenarios (Table 4). Simulated available drawdown was exceeded for seven of the 12 private wells considering current municipal pumping and exceeded for 8 of 12 private wells considering future municipal pumping (Table 4). Note, however, that for some of these wells, simulated available drawdown was evaluated to be exceeded solely as a result of quarry dewatering (see Section 2.2) or solely as a result of private well use (see Section 2.3).

TABLE 4 Summary of Total Estimated Drawdown Due to Quarry Excavation/Dewatering and Private Well Use

Water Well Record ID	Distance from Proposed Dewatering Sump (m)	Simulated Aquifer Unit at Midpoint of Open Hole	Simulated Available Drawdown Considering Pump Intake[(2)] (m)	Simulated Drawdown from Quarry Dewatering Only (m)	Estimated Drawdown from Private Well Use Only (m)	Total Estimated Drawdown (m)	Total Estimated Drawdown > Simulated Available Drawdown
Excavation Scenario 1: Current Municipal Pumping							
6703318	1,515	Goat Island Fm.	5.8	2.6	5.5	8.1	Yes
6705230	1,358	Guelph Fm.	3.8	6.5	3.7	10.2	Yes
6706927	776	Reformatory Quarry Mbr.	22.5	4.3	24.7	28.9	Yes
6707288	1,415	Guelph Fm.	9.4	5.4	8.5	13.9	Yes
6707880	1,361	Guelph Fm.	3.3	5.8	1.7	7.5	Yes
6708796	961	Guelph Fm.	5.4	0.2	6.1	6.3	Yes
6710019	697	Goat Island Fm.	43.0	1.2	3.6	4.8	No
6711941	1,596	Guelph Fm.	6.2	3.1	2.9	6.1	No
6712349	1,508	Guelph Fm.	11.0	3.9	2.7	6.7	No
6712388	656	Guelph Fm.	16.4	5.8	7.3	13.2	No
7334558	531	Reformatory Quarry Mbr.[1]	27.4	5.9	17.7	23.5	No
6712571	1,142	Goat Island Fm.	8.3	3.2	7.0	10.2	Yes
Excavation Scenario 2: Future Municipal Pumping							
6703318	1,515	Goat Island Fm.	4.9	2.6	5.5	8.1	Yes
6705230	1,358	Guelph Fm.	3.1	6.5	3.7	10.1	Yes
6706927	776	Reformatory Quarry Mbr.	22.1	4.2	24.7	28.9	Yes
6707288	1,415	Guelph Fm.	8.6	5.3	8.5	13.9	Yes
6707880	1,361	Guelph Fm.	2.5	5.8	1.7	7.5	Yes
6708796	961	Guelph Fm.	5.3	0.2	6.1	6.3	Yes
6710019	697	Goat Island Fm.	41.5	1.2	3.6	4.8	No
6711941	1,596	Guelph Fm.	5.5	3.2	2.9	6.1	Yes
6712349	1,508	Guelph Fm.	10.3	3.9	2.7	6.7	No
6712388	656	Guelph Fm.	16.0	5.8	7.3	13.2	No
7334558	531	Reformatory Quarry Mbr.[1]	26.9	5.9	17.7	23.5	No
6712571	1,142	Goat Island Fm.	7.3	3.1	7.0	10.2	Yes

Notes:
(1) Simulated midpoint of open bedrock interval is Vinemount Mbr. aquitard; therefore, simulated water levels extracted from next shallowest aquifer: Reformatory Quarry Mbr.
(2) Calculated as difference between simulated water level elevation before quarry dewatering (i.e., static water level) and reported recommended pump intake elevation. Simulated available drawdown declines from current to future municipal pumping conditions as the simulated static water level declines.
asl - above sea level
Mbr. - Member
Fm. - Formation

3 SUMMARY

Groundwater numerical modelling was previously completed for the City and Lafarge to assess the potential impacts of Wellington Quarry excavation and dewatering to 285 m asl on City municipal well capacity and on adjacent surface water features (Matrix 2021). The numerical model and excavation/dewatering scenario results were subsequently used to assess the potential additional drawdown at private water wells from proposed excavation/dewatering to 285 m asl at the Wellington Quarry, based on a request from MECP to Lafarge.

The evaluation in this document is based on the refined Tier Three model (Matrix 2021) and associated excavation scenarios. The model is the best available tool to estimate changes in groundwater levels associated with quarry excavation and dewatering. However, the model is a simplified representation informed by data and calibrated to observed conditions (Matrix 2021). The model is used to simulate future pumping and fully excavated/dewatered conditions under steady-state conditions. Additional confidence in the results can be provided through additional monitoring, testing and model calibration to new information and private well surveys.

Drawdown was predicted to occur as a result of quarry excavation/dewatering in all 12 domestic, commercial, and industrial private wells identified within 500 m of the excavation boundary, suggesting a potential for drawdown interference. The simulated available drawdown at private wells was predicted to be exceeded:

- at two wells due to quarry excavation/dewatering considering current municipal pumping conditions and future municipal pumping conditions
- at two wells due to private well use considering current municipal pumping conditions, and at 4 wells considering future municipal pumping conditions
- at seven wells considering total drawdown (i.e., quarry excavation/dewatering and private well use) considering current municipal pumping conditions, and at eight wells considering future municipal pumping conditions

The model provides an understanding of the potential private well interferences and impacts. The private wells are located within the area refined for the Tier Three model to represent the Wellington Quarry, but the private well locations were not the focus of the calibration; therefore, there may be greater differences between observed and simulated groundwater levels at these locations. Further, the magnitude of the simulated drawdown predictions does not account for the cross-connecting conditions for wells that intersect multiple aquifer/aquitard units. Therefore, the private well impacts may be larger or smaller than simulated. Additionally, estimates of drawdown due to private well use are based on data contained within the original WWRs. This data may not reflect how the wells are currently being pumped, nor may it reflect the current efficiency of the wells. The result of the analysis can be used to help design a monitoring and testing program to better understand and increase confidence in the potential impacts and assess mitigation measures.

4 CLOSURE

We trust that this letter report suits your present requirements. If you have any questions or comments, please call either of the undersigned at 519.722.3777.

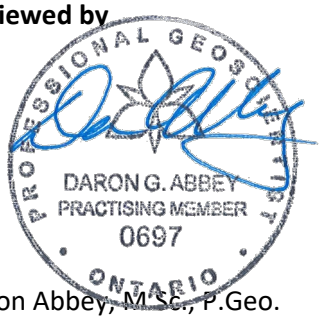
Yours truly,

MATRIX SOLUTIONS INC.

Jeffrey Melchin, M.Sc., P.Geo.
Hydrogeologist

June 8, 2021

Reviewed by



Daron Abbey, M.Sc., P.Geo.
Practice Lead, Geosciences

June 8, 2021

JM/vc
Attachments

VERSION CONTROL

Version	Date	Issue Type	Filename	Description
V0.1	21-May-2021	Draft	15072-528 Lafarge Private Well Impact Evaluation LR 2021-05-21 draft V0.1.docx	Issued to client for review
V1.0	08-Jun-2021	Final	15072-528 Lafarge Private Well Impact Evaluation LR 2021-06-08 final V1.0.docx	Issued to client

REFERENCES

Golder Associated Ltd. (Golder). 2019. *Staged Framework for the Scope of Work for the Groundwater Modeling of the Lafarge Wellington Quarry by Matrix*. St. Catharines, Ontario. October 18, 2019.

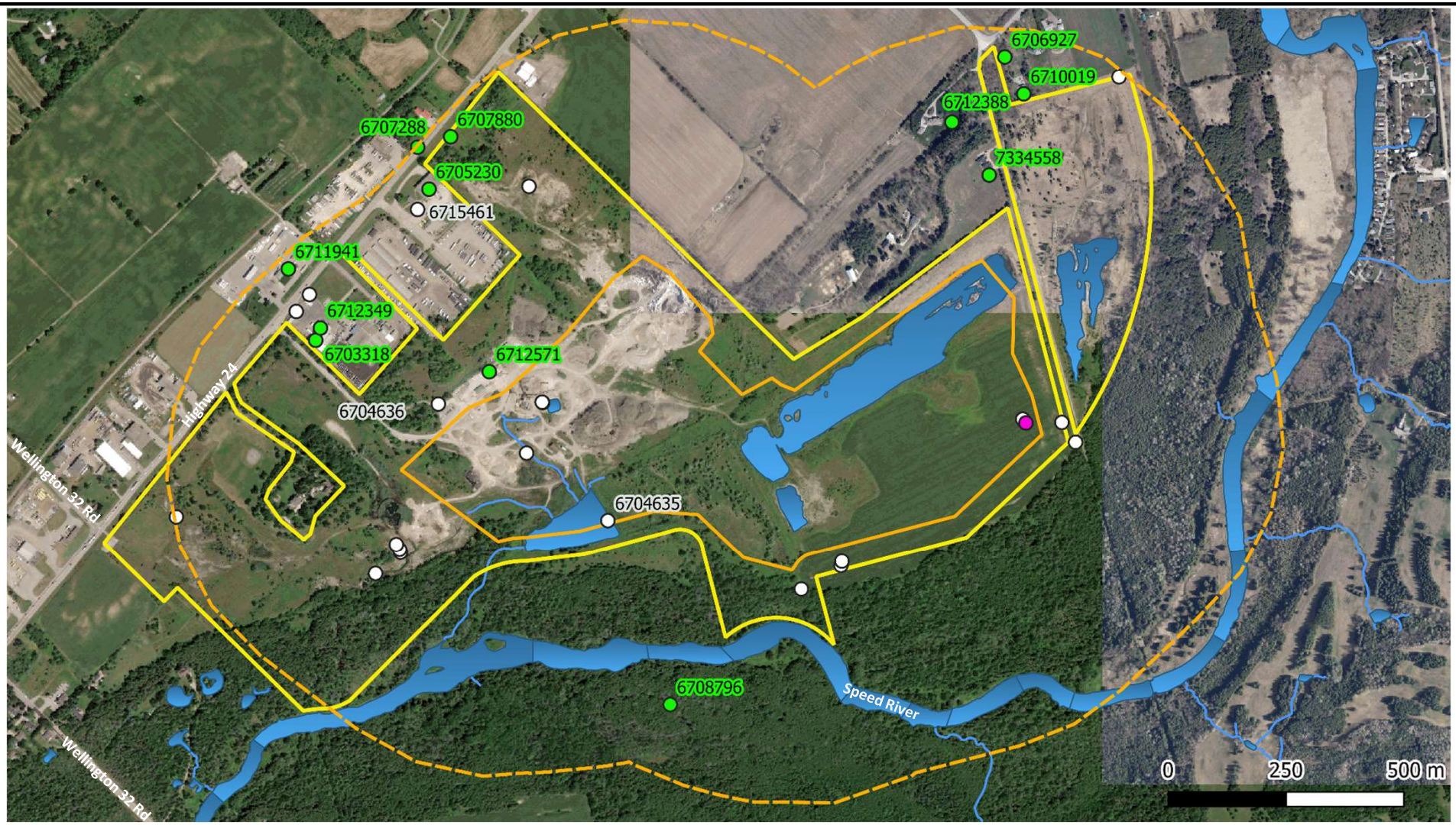
Golder Associates Ltd (Golder). 2020. *Scope of Work for Preparation of a Matrix Groundwater Flow Modelling Report and Additional Groundwater Flow Modelling of Impacts on Private Wells, Lafarge Wellington Quarry*. December 2020.

Matrix Solutions Inc. (Matrix). 2021. "Groundwater Modelling Report for Amendment of the Permit to Take Water for the Lafarge Canada Inc. Wellington County Quarry." Version 0.2. Draft prepared for City of Guelph and Lafarge Canada Inc. Guelph, Ontario. February 2021.

Matrix Solutions Inc. (Matrix). 2019. *Work Plan and Cost Estimate for Groundwater Modelling of the Lafarge Wellington Quarry*. Version 3.0. Prepared for the City of Guelph. Guelph, Ontario. November 29, 2019.

Matrix Solutions Inc. (Matrix). 2017. *City of Guelph and Township of Guelph/Eramosa, Tier Three Water Budget and Local Area Risk Assessment*. Prepared for Lake Erie Source Protection Region. Breslau, Ontario. March 2017.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2021. *Water Well Information System (WWIS)*. Accessed March 2021. https://www.ontario.ca/data/well-records



- Waterbody
- Watercourse
- Lafarge Property Boundary
- Lafarge Extraction Area
- 500 m Excavation Boundary Buffer
- Water Well Record Included in Impact Assessment[1] (i.e., domestic, commercial, and industrial)
- Water Well Record Excluded from Impact Assessment[1] (i.e., observation/monitoring wells, test holes, well abandonment records)
- Proposed Dewatering Sump

[1] Ontario Ministry of Environment, Conservation and Parks (MECP). 2021. Water Well Information System. Downloaded March 2, 2021.
Imagery (2018) Source: Esri, Maxarm GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

City of Guelph
Private Water Well Impact Evaluation for Lafarge Wellington Quarry

Private Water Well Evaluation Area

Date:	Project:	Technical:	Reviewer:	Drawn:
May 2021	15072	J. Melchin	D. Abbey	J. Langford

Figure 1

APPENDIX A
Water Well Records

UTM 17 558320 5486572 0

Rig - Bucyrus Erie 22WS

Elev. Watershed 1050

Basin 23

DIV. B
CON. "B"
LOT 6

CODED

Water management in Ontario

6703318

40P/8W

7

The Ontario Water Resources Commission Act

WATER WELL RECORD

Water Resources Commission
MAR 25 1969
Guelph

Corporation Division Wellington Township, Village, Town or City Guelph twsp.

Brack Shoemaker & Robinson survey project #641-64

Con. B Lot part of 6 Date completed 4th (day) March (month) 1969 (year)

Owner [redacted] (print in block letters) Address Guelph Ont.

Casing and Screen Record

Inside diameter of casing 5 inch

Total length of casing 57 ft

Type of screen --

Length of screen --

Depth to top of screen --

Diameter of finished hole 5 inch

Pumping Test

Static level 42 ft

Test-pumping rate 15 G.P.M.

Pumping level 60 ft

Duration of test pumping bailing test

Water clear or cloudy at end of test clear

Recommended pumping rate 15 G.P.M.

with pump setting of 65 feet below ground surface

Well Log

Overburden and Bedrock Record	From ft.	To ft.	Water Record: Depth(s) at which water(s) found	Water Record: Kind of water (fresh, salty, sulphur)
brown clay and stones	0	13	123	fresh
fine sand	13	20	160	
brown sand and gravel	20	53		
light brown rock	53	120		
dark brown rock	120	145		
light brown rock	145	160		
total dep th - 160 ft				

PERMIT NOT NEEDED

For what purpose(s) is the water to be used?
warehouse OFFICE USE ONLY

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

Drilling or Boring Firm
Graham Well Drilling
mailing)
Address) R R 2 Guelph Ont.

Licence Number 3282

Name of Driller or Borer James Hawkins

Address 70 Sheridan Street Guelph Ont.

Date March 22 nd 1969

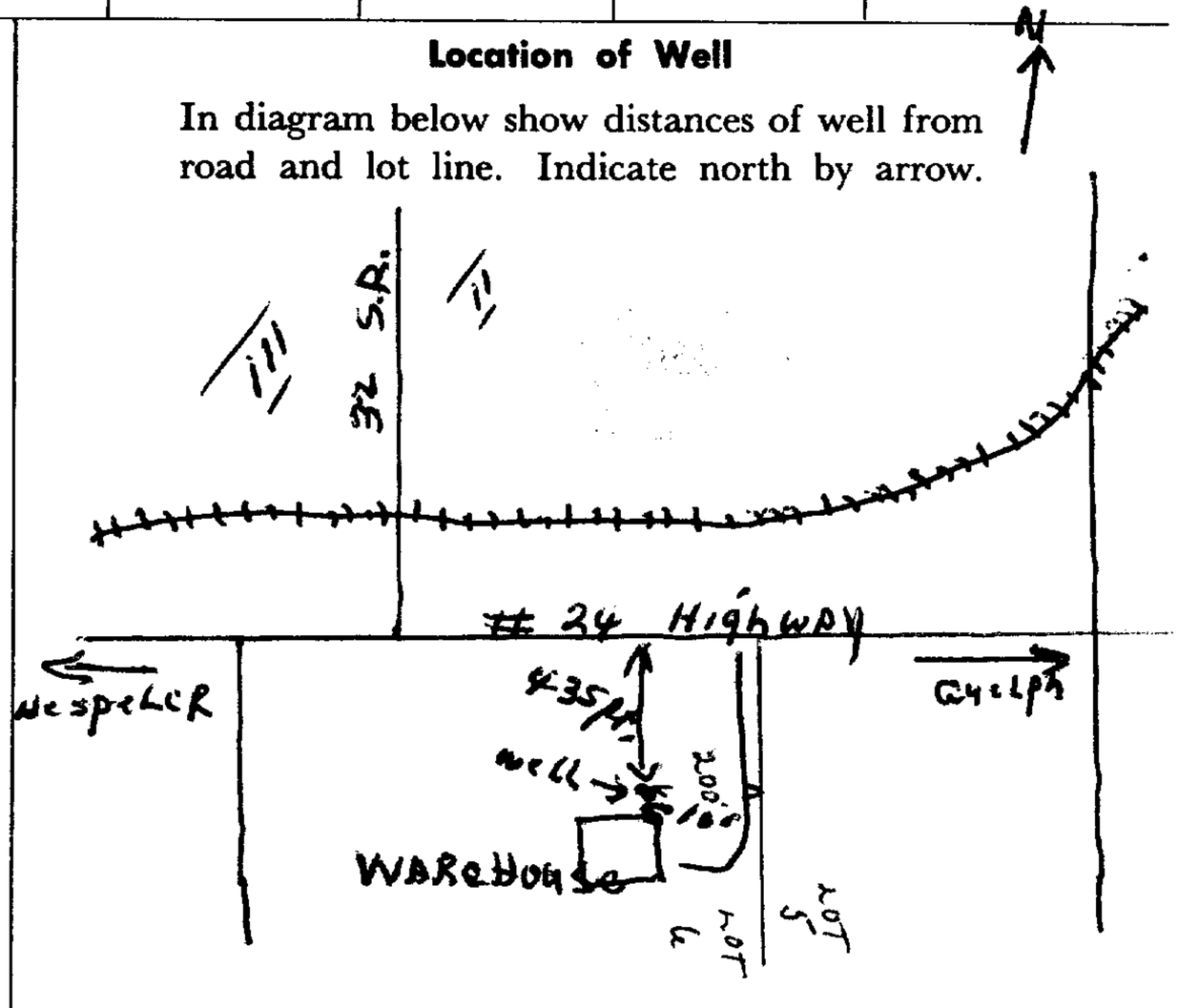
J L Graham per MCG
(Signature of Licensed Drilling or Boring Contractor)

Form 7

OWRC COPY

Location of Well

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



CSS.S8

MINISTRY OF THE ENVIRONMENT

The Ontario Water Resources Act

WATER WELL RECORD

40 P/BF

Ontario

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

11 | 6705230 | MUNICIP. 67005 | CON. CON B

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Wellington	Guelph	~~con 5 Div B~~ CON B	~~085~~ 5

[redacted]

R.R.# 7 GUELPH, Ontario

DATE COMPLETED: DAY 15 MO. 08 YR. 74

UTM ZONE | RC | ELEVATION 1055 | RC | BASIN CODE 23

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
	topsoil			0	1
Brown	clay	stones, gravel		1	16
Gray	"	" "		16	50
"	rock			50	92
Blue Gray	"			92	112
L. Grey	"			112	140
			Total Depth 140 ft.		

31 | 32

b1001|02 | b01|6605|12|11 | b05|2605|12|11 | b09|2206 | b11|2306 | b14|0206

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0135 ~~135-140~~	1 ☒ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
04 ~~4"~~	1 ☒ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE	.188	0	055
04	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☒ OPEN HOLE		55	0140
	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☒ BAILER

PUMPING RATE: 0008 GPM | DURATION OF PUMPING: 01 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☒ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
038 FEET	050 FEET	~~38~~ 038 FEET	FEET	FEET	FEET

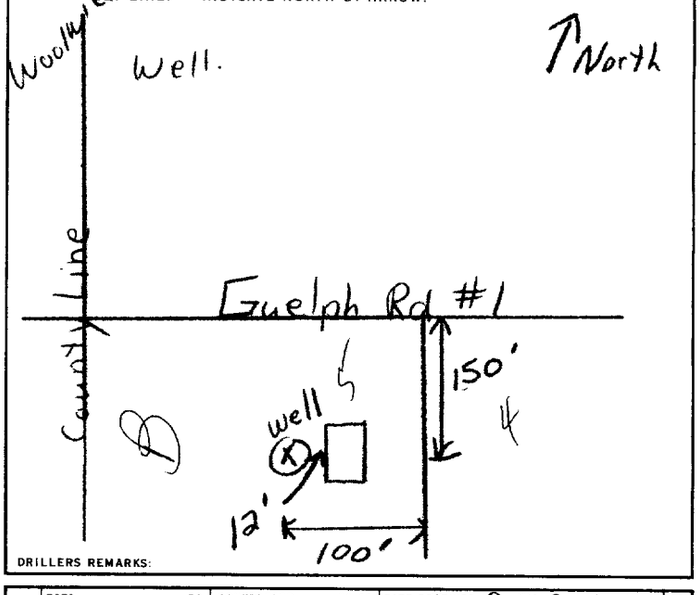
IF FLOWING, GIVE RATE: GPM | PUMP INTAKE SET AT: FEET | WATER AT END OF TEST: 1 ☐ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP | RECOMMENDED PUMP SETTING: 060 FEET | RECOMMENDED PUMPING RATE: 0008 GPM

0007 GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL 5816

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



DRILLERS REMARKS:

FINAL STATUS OF WELL 1
1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED POOR QUALITY; 7 ☐ UNFINISHED

WATER USE 01
1 ☒ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; ☐ OTHER; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED

METHOD OF DRILLING 2
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: GRAHAM WELL DRILLING LIMITED | LICENCE NUMBER: 2336

ADDRESS: 212 Waverley Drive, GUELPH, Ontario

NAME OF DRILLER OR BORER: RH Graham | LICENCE NUMBER: 10R

SIGNATURE OF CONTRACTOR: R.H. Graham | SUBMISSION DATE: DAY 15 MO. 8 YR. 74

OFFICE USE ONLY

DATA SOURCE 1 | CONTRACTOR 2336 | DATE RECEIVED 080974

DATE OF INSPECTION | INSPECTOR

REMARKS: CSS.88

P SH E

WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 07-091

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

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

11 6706927 MUNICIP 67012 CON. CON 05

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
[redacted]	Puslinch Twp.	V	011

DATE COMPLETED DAY 25 MO NOV YR 78

[redacted] RR 6 Guelph.

UTM ZONE 16320 RC 4 ELEVATION 1025 RC 4 BASIN CODE 23

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Topsoil		soft	0	2
Brown	gravel	sand + stones	Loose	2	14
Grey	sand	clay + stones	packed	14	21
Brown	Limestone		Broken	21	27
"	"		solid	27	74
Grey	"	brown streaks	med hard	74	82
Dark Brown	"		hard	82	89
Black	"		hard	89	107

31 0002602185 | 0014611281/2 | 0021228051/2 | 0027615711 | 0074616 | 0082215747/8

32 0089615731 | 0107815731

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0081 81	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
0098 98	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
06 6¼"	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	0030 29½
06 6¼"	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		29½	0107 107
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)
0	29½	bentonite drill cuttings.

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	0005 GPM	02 HOURS 00 MINS

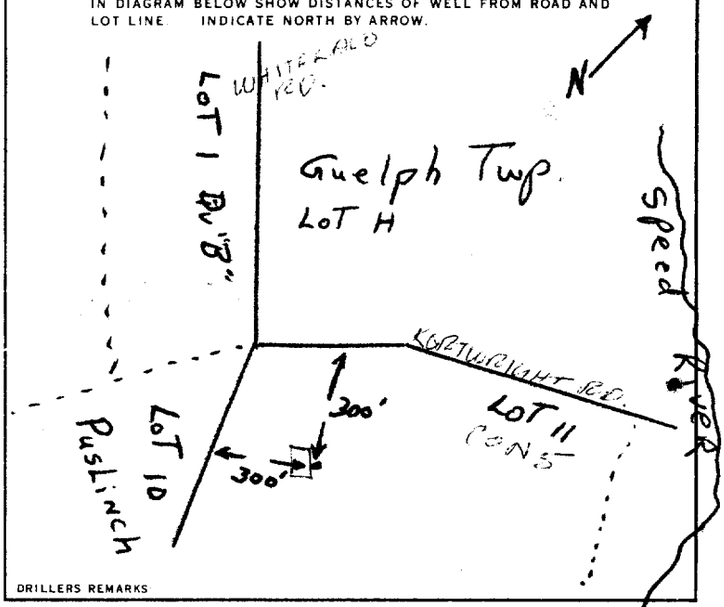
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
025 FEET	106 FEET	1 ☒ PUMPING 2 ☐ RECOVERY	106 FEET	106 FEET	106 FEET	106 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
— GPM	106 FEET	1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	100 FEET	0005 GPM

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

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE 01

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

METHOD OF DRILLING 4

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: Don P. Jacobson | LICENCE NUMBER: 2904

ADDRESS: RR 6 Guelph Ont.

NAME OF DRILLER OR BORER: " | LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: Don P. Jacobson | SUBMISSION DATE: DAY 30 MO. Nov YR 78

OFFICE USE ONLY

DATA SOURCE 1 | CONTRACTOR 2904 | DATE RECEIVED 250179

DATE OF INSPECTION | INSPECTOR

REMARKS: CSS.S8

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506—4—77

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

19/90

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

11 6707288

MUNICIP. CON.

COUNTY OR DISTRICT: [redacted]

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: [redacted]n Mills, Ontario

CON. BLOCK, TRACT, SURVEY, ETC.: 1 Div. B

LOT: 2

DATE COMPLETED: DAY 5 MO June YR 80

RC. ELEVATION RC. BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Top soil			0	1
Brown	Clay	Stones		1	28
Brown	Sand	Gravel		28	35
Brown	Clay	Gravel		35	43
L. Br.	Rock			43	85
M. Br.	Rock			85	96
Black	Rock			96	125
L. Gray	Rock			125	133
		Total Depth			133

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
70	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
133	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
5	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	46
5	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		46	133
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE: | DEPTH TO TOP OF SCREEN FEET:

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	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	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	10 GPM	1 HOURS — MINS

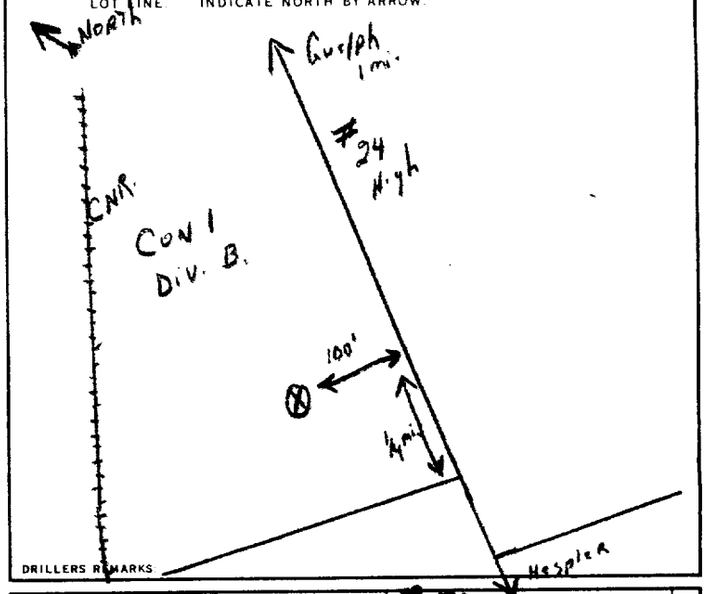
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☐ PUMPING 2 ☒ RECOVERY) 15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
32 FEET	60 FEET	32 FEET	FEET	FEET	FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	FEET	1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	80 FEET	10 GPM

LOCATION OF WELL

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



DRILLERS REMARKS:

1707 80

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

WATER USE

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

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: Graham Well Drilling Ltd. | LICENCE NUMBER: 2336

ADDRESS: Guelph, Ontario

NAME OF DRILLER OR BORER: R. Graham | LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: R. R. Graham | SUBMISSION DATE: DAY 30 MO June YR 80

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR | DATE RECEIVED

DATE OF INSPECTION | INSPECTOR

REMARKS:

CSS.ES

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506—4—77 FORM 7

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

6707880

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

11

MUNICIP. | CON.

COUNTY OR DISTRICT: [redacted]
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: GUELPH
CON. BLOCK, TRACT, SURVEY, ETC: CON 1 DIV B
LOT: L 2
DATE COMPLETED: DAY 22 MO May YR 84
[redacted] R #6 GUELPH
RC | ELEVATION | RC | BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
		clay sand		0	44
Brown		Lime rock		44	76
Brown					

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
76	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
5	1 ☒ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE	.188	0	48
			48	76
	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			
	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			

SCREEN

SIZE (S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

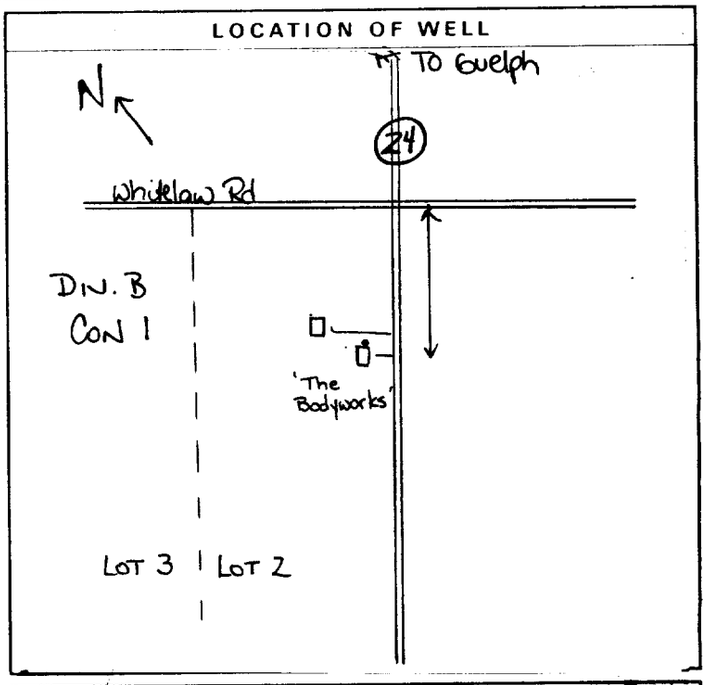
71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER
PUMPING RATE: 20 GPM
DURATION OF PUMPING: 1 HOURS ____ MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☐ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
40 FEET	60 FEET	60 FEET	60 FEET	60 FEET	60 FEET

IF FLOWING, GIVE RATE: ____ GPM
PUMP INTAKE SET AT: 70 FEET
WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 60 FEET
RECOMMENDED PUMPING RATE: 10 GPM

LOCATION OF WELL



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

WATER USE

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

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: Albert Earley — LICENCE NUMBER: 1906
ADDRESS: 202 Nieve St Guelph
NAME OF DRILLER OR BORER: Albert Earley — LICENCE NUMBER: 1906
SIGNATURE OF CONTRACTOR: Albert Earley
SUBMISSION DATE: DAY 22 MO May YR 84

MINISTRY OF THE ENVIRONMENT COPY

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR | DATE RECEIVED: 08 06 84
DATE OF INSPECTION: Aug 9/85 | INSPECTOR: MW
REMARKS

CSS.ES

FORM NO. 0506—4—77 FORM 7

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

6708796

WELLINGTON

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

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON. ~~BLOCK, TRACT, SURVEY, ETC.~~	LOT
[redacted]	RR.2 ELORA NOB 1S0	5	8

DATE COMPLETED: DAY 24 MO Mar YR. 87

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Black		Top soil		0	1
Brown		Clay and stones		1	39
		Lime rock		39	75
Blue		rock		75	85
Gray		rock		85	105
		Hole in rock 6"			

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
105	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
5	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE	188	0	44
			44	105
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	10 GPM	3 HOURS ____ MINS

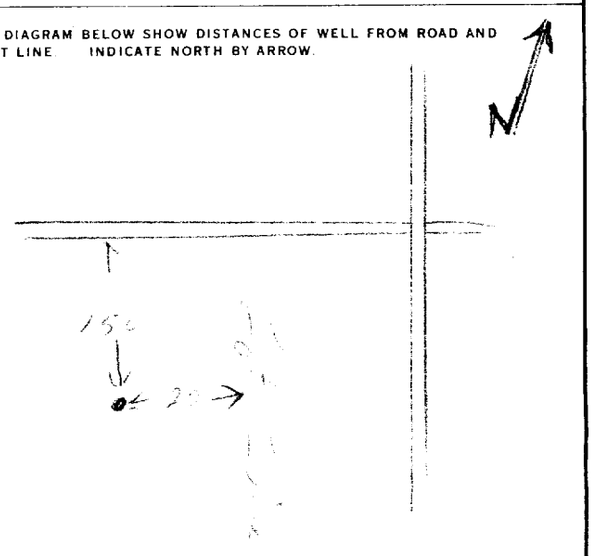
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING 1 ☐ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
30 FEET	50 FEET		50 FEET	50 FEET	50 FEET	50 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	60 FEET	1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☐ DEEP	65 FEET	10 GPM

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 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED
WATER USE	1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED
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	LICENCE NUMBER
Albert Earley	1906

ADDRESS	
202 Meeve St Guelph	

NAME OF DRILLER OR BORER	LICENCE NUMBER
Albert Earley	1906

SIGNATURE OF CONTRACTOR	SUBMISSION DATE
	DAY 24 MO. Jun YR. 87

OFFICE USE ONLY

DATA SOURCE	CONTRACTOR	DATE RECEIVED
		JUN 11 1987

DATE OF INSPECTION	INSPECTOR

REMARKS

CSS.ES

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506—4—77 FORM 7

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

6710019

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

11

MUNICIP. 67912 | CON. CON | 05

COUNTY OR DISTRICT [redacted] | TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE [illegible]KINCH | CON | BLOCK, TRACT, SURVEY, ETC 5 NIH | LOT 11

[redacted] 9 & WOODCREST (GUELPH) ON8 | DATE COMPLETED DAY 09 MO 09 YR 89

RC | ELEVATION | RC | BASIN CODE | II | III | IV

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
	FILL			0	5
GREY	CLAY / GRAVEL			5	19
WHITE	LIMESTONE			19	60
LIGHT BROWN	ROCK			60	80
DARK BROWN	ROCK			80	146
LIGHT GREY	ROCK			146	197
			TOTAL	197'	
		6" CASING DRIVE SHOE			

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
150	1 ☒ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
197	1 ☒ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
6¼	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	0	30
6"	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		20	197
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

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

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

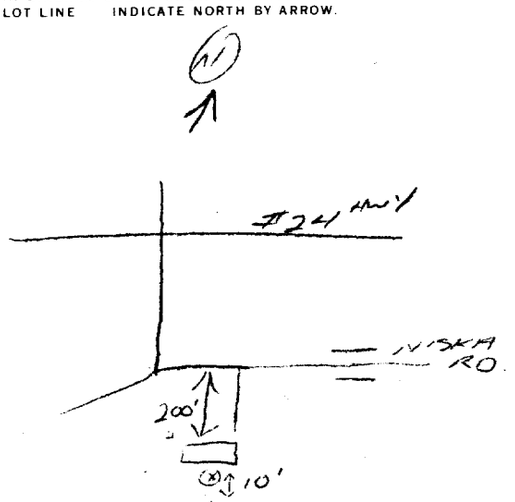
PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	20 GPM	1 HOURS ___ MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☒ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
35 FEET	FEET		35 FEET	FEET	FEET	FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST	RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
GPM	FEET	1 ☒ CLEAR 2 ☐ CLOUDY	☐ SHALLOW ☒ DEEP	177 FEET	20 GPM

LOCATION OF WELL

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



69133

DRILLERS REMARKS

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; ☐ DEWATERING

WATER USE

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

METHOD OF CONSTRUCTION

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

CONTRACTOR

NAME OF WELL CONTRACTOR: HANSON WELL DRILLING LTD | WELL CONTRACTOR'S LICENCE NUMBER: 663

ADDRESS: R.R. #5 GUELPH ONT N1H 6J2

NAME OF WELL TECHNICIAN: [illegible] HANSEN | WELL TECHNICIAN'S LICENCE NUMBER: T-0590

SIGNATURE OF TECHNICIAN/CONTRACTOR | SUBMISSION DATE: DAY 01 MO 16 YR 89

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR 2663 | DATE RECEIVED OCT 20 1989

DATE OF INSPECTION | INSPECTOR

REMARKS: CSS.ES

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Ministry of Environment and Energy
Ontario

The Ontario Water Resources Act
WATER WELL RECORD

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

11 (1 2)

6711941

Municipality 67005 (10 14) Con. DIV B (15 22 23 24)

5/96

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot (25-27)
WELLINGTON	GUELPH TWP DIV B	CON 2	PT 2

Owner's surname (28-47) First name	Address	Date completed (48-53)
UPI INC. Guelph, ONT.	SUITE 200 105 SILVERCREEK PARKWAY GUELPH, ONT.	11 day 03 month 96 year

21 (1 2) Zone (10) Easting (12 17) Northing (18 24) RC (25) Elevation (26 30) RC (31) Basin Code (ii iii iv 47)

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth – feet From	Depth – feet To
BROWN	CLAY	SAND - GRAVEL		0	45
L. BROWN	ROCK			45	95
M. BROWN	ROCK			95	118
			TOTAL DEPTH	118'	
		6" DRIVE SHOE			

31
32 (10 14 15 21 32 43 54 65 75 80)

41 WATER RECORD

Water found at – feet	Kind of water
118' (10 12)	1 ☒ Fresh 3 ☐ Sulphur 14; 2 ☐ Salty 4 ☐ Minerals; 6 ☐ Gas
(15 18)	1 ☐ Fresh 3 ☐ Sulphur 19; 2 ☐ Salty 4 ☐ Minerals; 6 ☐ Gas
(20 23)	1 ☐ Fresh 3 ☐ Sulphur 24; 2 ☐ Salty 4 ☐ Minerals; 6 ☐ Gas
(25 28)	1 ☐ Fresh 3 ☐ Sulphur 29; 2 ☐ Salty 4 ☐ Minerals; 6 ☐ Gas
(30 33)	1 ☐ Fresh 3 ☐ Sulphur 34; 2 ☐ Salty 4 ☐ Minerals; 6 ☐ Gas (60)

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth – feet From	Depth – feet To
(10 11) 6"	1 ☒ Steel (12); 2 ☐ Galvanized; 3 ☐ Concrete; 4 ☐ Open hole; 5 ☐ Plastic	.188	+1	47 (13 16)
(17 18) 6"	1 ☐ Steel (19); 2 ☐ Galvanized; 3 ☐ Concrete; 4 ☒ Open hole; 5 ☐ Plastic		47	118' (20 23)
(24 25)	1 ☐ Steel (26); 2 ☐ Galvanized; 3 ☐ Concrete; 4 ☐ Open hole; 5 ☐ Plastic			(27 30)

SCREEN

Sizes of opening (Slot No.) (31 33)	Diameter (34 38) inches	Length (39 40) feet
Material and type	Depth at top of screen (41 44) feet	(32)

61 PLUGGING & SEALING RECORD

☒ Annular space ☐ Abandonment

Depth set at – feet From	Depth set at – feet To	Material and type (Cement grout, bentonite, etc.)
0 (10 13)	25' (15 17)	BENSEAL
(18 21)	(22 25)	
(26 29)	(30 33) (60)	

71 PUMPING TEST

Pumping test method (10): 1 ☒ Pump 2 ☐ Bailer
Pumping rate (11 14): 15 GPM
Duration of pumping (15 16 Hours ... 17 18 Mins): 1 Hours 0 Mins

Static level	Water level end of pumping	Water levels during (23): 1 ☐ Pumping 2 ☒ Recovery			
(19 21) 35 feet	(22 24) 51 feet	15 minutes (26 28) 37 feet	30 minutes (29 31) 35 feet	45 minutes (32 34) 35 feet	60 minutes (35 37) 35 feet

If flowing give rate (38 41) GPM	Pump intake set at feet	Water at end of test (42): ☒ Clear ☐ Cloudy
Recommended pump type: ☐ Shallow ☒ Deep	Recommended pump setting (43 45): 60 feet	Recommended pump rate (46 49): 8 – 10 GPM

(50 53)

FINAL STATUS OF WELL (54)

1 ☒ Water supply; 2 ☐ Observation well; 3 ☐ Test hole; 4 ☐ Recharge well; 5 ☐ Abandoned, insufficient supply; 6 ☐ Abandoned, poor quality; 7 ☐ Abandoned (Other); 8 ☐ Dewatering; 9 ☐ Unfinished; 10 ☐ Replacement well

WATER USE (55 56)

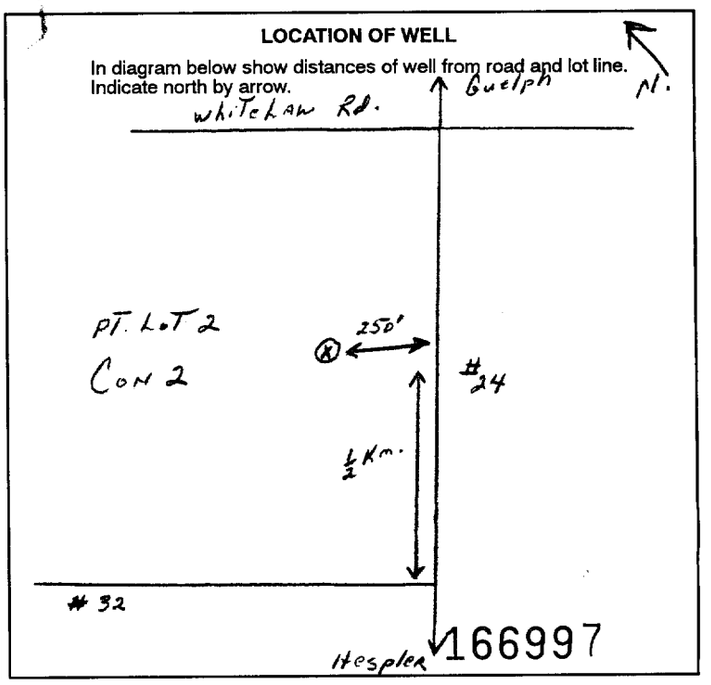
1 ☐ Domestic; 2 ☐ Stock; 3 ☐ Irrigation; 4 ☐ Industrial; 5 ☒ Commercial; 6 ☐ Municipal; 7 ☐ Public supply; 8 ☐ Cooling & air conditioning; 9 ☐ Not used; 10 ☐ Other .....

METHOD OF CONSTRUCTION (57)

1 ☐ Cable tool; 2 ☐ Rotary (conventional); 3 ☐ Rotary (reverse); 4 ☒ Rotary (air); 5 ☐ Air percussion; 6 ☐ Boring; 7 ☐ Diamond; 8 ☐ Jetting; 9 ☐ Driving; 10 ☐ Digging; 11 ☐ Other .....

LOCATION OF WELL

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



166997

Name of Well Contractor	Well Contractor's Licence No.
GRAHAM WELL DRILLING LTD	2336
Address: RR#5 ROCKWOOD, ONT. N0B-2K0	
Name of Well Technician: Jim Wilson	Well Technician's Licence No.: T-1924
Signature of Technician/Contractor: Robert W. Graham	Submission date: 030 day 03 mo 96 yr

MINISTRY USE ONLY

Data source (58)	Contractor (59-62)	Date received (63-68) (80)
	2336	MAY 10 1996
Date of inspection	Inspector	
Remarks		

CSS.ES

0506 (07/94) Front Form 9

2 - MINISTRY OF ENVIRONMENT & ENERGY COPY

Ministry of Environment and Energy
Ontario

The Ontario Water Resources Act
WATER WELL RECORD

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

11 (1 2) 6712349 Municipality 67005 (10 14) Con. DIV B (15 22 23 24)

89-97

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot (25-27)
WELLINGTON	~~PUSLINCH~~ GUELPH TWP.	DIV B	6

Owner's surname (28-47) First name	Address	Date completed (48-53)
VAN CON CONST.	47 Lewis Rd Guelph, ONT.	19 day 09 month 97 year

21 (1 2) U T M Zone (10) Easting (12 17) Northing (18 24) RC (25) Elevation (26 30) RC Basin Code (31 47) ii iii iv

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

	General colour	Most common material	Other materials	General description	Depth – feet From	Depth – feet To
	BROWN	SAND	GRAVEL		0	40
	BROWN	CLAY	GRAVEL		40	54
L.	BROWN	ROCK			54	98
M.	BROWN	ROCK			98	110
O.	BROWN	ROCK			110	141
				TOTAL DEPTH	141'	
			6" DRIVE SHOE			

31 32 (10 14 15 21 32 43 54 65 75 80)

71 WATER RECORD

Water found at – feet	Kind of water
138-141	1 [X] Fresh 2 [ ] Salty 3 [ ] Sulphur 4 [ ] Minerals 6 [ ] Gas
	1 [ ] Fresh 2 [ ] Salty 3 [ ] Sulphur 4 [ ] Minerals 6 [ ] Gas
	1 [ ] Fresh 2 [ ] Salty 3 [ ] Sulphur 4 [ ] Minerals 6 [ ] Gas
	1 [ ] Fresh 2 [ ] Salty 3 [ ] Sulphur 4 [ ] Minerals 6 [ ] Gas
	1 [ ] Fresh 2 [ ] Salty 3 [ ] Sulphur 4 [ ] Minerals 6 [ ] Gas

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth – feet From	Depth – feet To
6"	1 [X] Steel 2 [ ] Galvanized 3 [ ] Concrete 4 [ ] Open hole 5 [ ] Plastic	.188	+1	56
6"	1 [ ] Steel 2 [ ] Galvanized 3 [ ] Concrete 4 [X] Open hole 5 [ ] Plastic		56	141
	1 [ ] Steel 2 [ ] Galvanized 3 [ ] Concrete 4 [ ] Open hole 5 [ ] Plastic			

SCREEN

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

61 PLUGGING & SEALING RECORD

[X] Annular space [ ] Abandonment

Depth set at – feet From (10-13 / 18-21 / 26-29)	To (14-17 / 22-25 / 30-33)	Material and type (Cement grout, bentonite, etc.)
0	25	BENTONITE

71 PUMPING TEST

Pumping test method (10): 1 [X] Pump 2 [ ] Bailer
Pumping rate (11-14): 20 GPM
Duration of pumping (15-16 / 17-18): 1 Hours 0 Mins

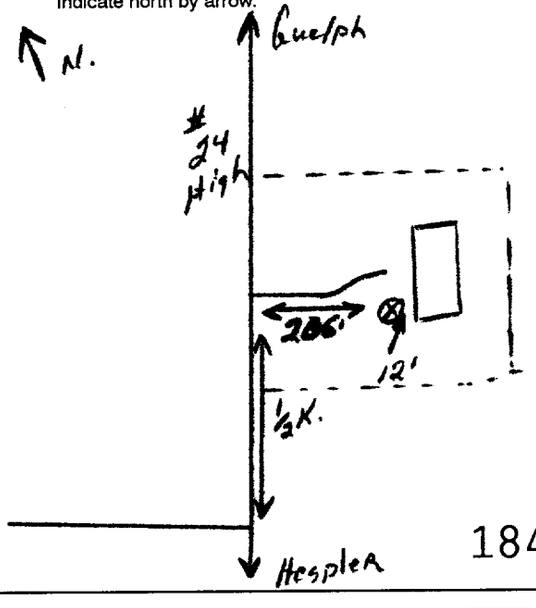
Static level (19-21)	Water level end of pumping (22-24)	Water levels during (25): 1 [X] Pumping 2 [ ] Recovery			
		15 minutes (26-28)	30 minutes (29-31)	45 minutes (32-34)	60 minutes (35-37)
50 feet	68 feet	66 feet	68 feet	68 feet	68 feet

If flowing give rate (38-41)	Pump intake set at	Water at end of test (42)
GPM	feet	[X] Clear [ ] Cloudy
Recommended pump type: [ ] Shallow [X] Deep	Recommended pump setting (43-45): 80 feet	Recommended pump rate (46-49): 10 GPM

(50-53)

LOCATION OF WELL

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



184445

FINAL STATUS OF WELL (54)

1 [X] Water supply 2 [ ] Observation well 3 [ ] Test hole 4 [ ] Recharge well 5 [ ] Abandoned, insufficient supply 6 [ ] Abandoned, poor quality 7 [ ] Abandoned (Other) 8 [ ] Dewatering 9 [ ] Unfinished 10 [ ] Replacement well

WATER USE (55-56)

1 [X] Domestic 2 [ ] Stock 3 [ ] Irrigation 4 [ ] Industrial 5 [X] Commercial 6 [ ] Municipal 7 [ ] Public supply 8 [ ] Cooling & air conditioning 9 [ ] Not used 10 [ ] Other .....

METHOD OF CONSTRUCTION (57)

1 [ ] Cable tool 2 [ ] Rotary (conventional) 3 [ ] Rotary (reverse) 4 [X] Rotary (air) 5 [ ] Air percussion 6 [ ] Boring 7 [ ] Diamond 8 [ ] Jetting 9 [ ] Driving 10 [ ] Digging 11 [ ] Other .....

Name of Well Contractor	Well Contractor's Licence No.
GRAHAM WELL DRILLING LTD	2336
Address: RR#5 Rockwood, ONT. N0B-2K0	
Name of Well Technician: Jim Wilson	Well Technician's Licence No.: T-1924.
Signature of Technician/Contractor: R. W. Graham	Submission date: day 30 mo 09 yr 97

MINISTRY USE ONLY

Data source (58)	Contractor (59-62): 2336	Date received (63-68): OCT 08 1997 (80)
Date of inspection	Inspector	
Remarks: CSS.S8		

0506 (07/94) Front Form 9

2 - MINISTER OF ENVIRONMENT & ENERGY COPY

Ministry of Environment and Energy
Ontario

The Ontario Water Resources Act
WATER WELL RECORD

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

11 — 6712388 — Municipality 67012 — Con. CON 05

110-97

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot
WELLINGTON	PUSLINCH	5	10

Owner's surname	First name	Address	Date completed
DETERCO HOMES INC.		RR#6 GUELPH, ONT. N1H-6J3	20 day 16 month 97 year

21 — Zone — Easting — Northing — RC — Elevation — RC — Basin Code — ii — iii — iv

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth – feet From	Depth – feet To
BROWN	SAND	GRAVEL		0	18
GREY	CLAY	STONES		18	30
BROWN	ROCK			30	100
			TOTAL DEPTH	100'	
		HUTTON RES.			
		6" DRIVE SHOE			

31

32

41 WATER RECORD

Water found at – feet	Kind of water
95-100	1 ☒ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth – feet From	Depth – feet To
6"	1 ☒ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic	.188	+1	31
6"	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☒ Open hole 5 ☐ Plastic		31	100
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			

SCREEN

Sizes of opening (Slot No.)	Diameter inches	Length feet
Material and type	Depth at top of screen feet	

61 PLUGGING & SEALING RECORD

☒ Annular space ☐ Abandonment

Depth set at – feet From	Depth set at – feet To	Material and type (Cement grout, bentonite, etc.)
0	25	BENTONITE

71 PUMPING TEST

Pumping test method: 1 ☒ Pump 2 ☐ Bailer
Pumping rate: 20 GPM
Duration of pumping: 1 Hours 0 Mins

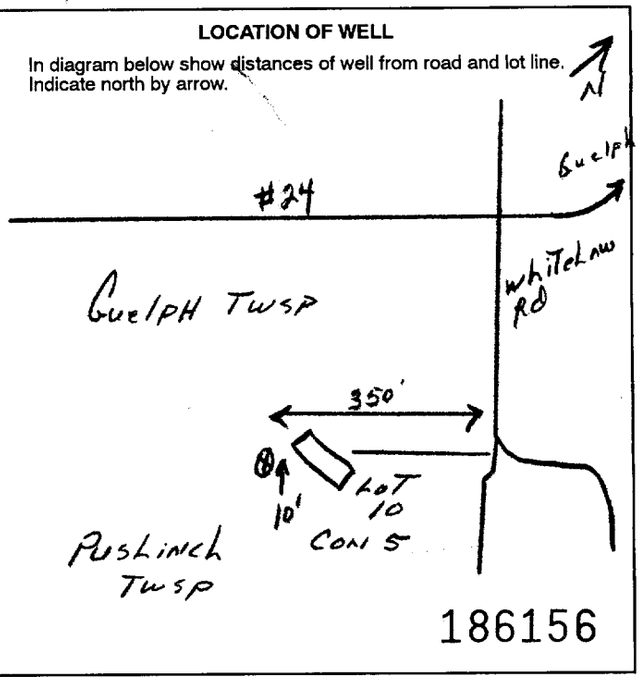
Static level	Water level end of pumping	Water levels during: 1 ☒ Pumping 2 ☐ Recovery			
		15 minutes	30 minutes	45 minutes	60 minutes
30 feet	62 feet	46 feet	57 feet	62 feet	62 feet

If flowing give rate	Pump intake set at	Water at end of test
GPM	feet	☒ Clear ☐ Cloudy

Recommended pump type	Recommended pump setting	Recommended pump rate
☐ Shallow ☒ Deep	80 feet	15 GPM

LOCATION OF WELL

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



186156

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 ☐ Abandoned (Other) 8 ☐ Dewatering 9 ☐ Unfinished 10 ☐ Replacement well

WATER USE

1 ☒ Domestic 2 ☐ Stock 3 ☐ Irrigation 4 ☐ Industrial 5 ☐ Commercial 6 ☐ Municipal 7 ☐ Public supply 8 ☐ Cooling & air conditioning 9 ☐ Not used 10 ☐ Other

METHOD OF CONSTRUCTION

1 ☐ Cable tool 2 ☐ Rotary (conventional) 3 ☐ Rotary (reverse) 4 ☒ Rotary (air) 5 ☐ Air percussion 6 ☐ Boring 7 ☐ Diamond 8 ☐ Jetting 9 ☐ Driving 10 ☐ Digging 11 ☐ Other

Name of Well Contractor	Well Contractor's Licence No.
GRAHAM WELL DRILLING LTD	2336
Address	
RR#5 ROCKWOOD, ONT.	N0B-2K0
Name of Well Technician	Well Technician's Licence No.
JIM WILSON	T-1924
Signature of Technician/Contractor	Submission date
Robert Graham	030 day 011 mo 97 yr

MINISTRY USE ONLY

Data source	Contractor	Date received
	2336	DEC 15 1997
Date of inspection	Inspector	
Remarks		

CSS.SS

0506 (07/94) Front Form 9

2 - MINISTER OF ENVIRONMENT & ENERGY COPY

Ministry of Environment and Energy
Ontario

The Ontario Water Resources Act
WATER WELL RECORD

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

11 — 6712571 — Municipality 67005 — Con

45 - 98

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot
WELLINGTON	GUELPH, TWP	Con 5-6	PT 7-8-9-10-11

Owner's surname	First name	Address	Date completed
LAFARGE CANADA INC		7051 WELLINGTON RD 124 P.O. BOX 188 NIH-6J9	01 day 06 month 98 year

21 — Zone — Easting — Northing — RC — Elevation — RC — Basin Code — ii — iii — iv

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth – feet From	Depth – feet To
BROWN		SAND - GRAVEL		0	10
LT BROWN	ROCK			10	58
D. BROWN	ROCK			58	105
GREY	ROCK			105	180
			TOTAL DEPTH	180'	
		6" DRIVE SHOE			

31

32

41 WATER RECORD

Water found at – feet	Kind of water
160	1 ☒ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
180	1 ☒ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth – feet From	Depth – feet To
6"	1 ☒ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic	.188	+2	25'
6"	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☒ Open hole 5 ☐ Plastic		25	180
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			

SCREEN

Sizes of opening (Slot No.)	Diameter inches	Length feet

Material and type — Depth at top of screen feet

61 PLUGGING & SEALING RECORD

☒ Annular space ☐ Abandonment

Depth set at – feet From	Depth set at – feet To	Material and type (Cement grout, bentonite, etc.)
0	25	BENTONITE

71 PUMPING TEST

Pumping test method: 1 ☒ Pump 2 ☐ Bailer
Pumping rate: 75 GPM
Duration of pumping: 1 Hours 0 Mins

Static level: 208 feet
Water level end of pumping: 10.89 feet

Water levels during: 1 ☒ Pumping 2 ☐ Recovery

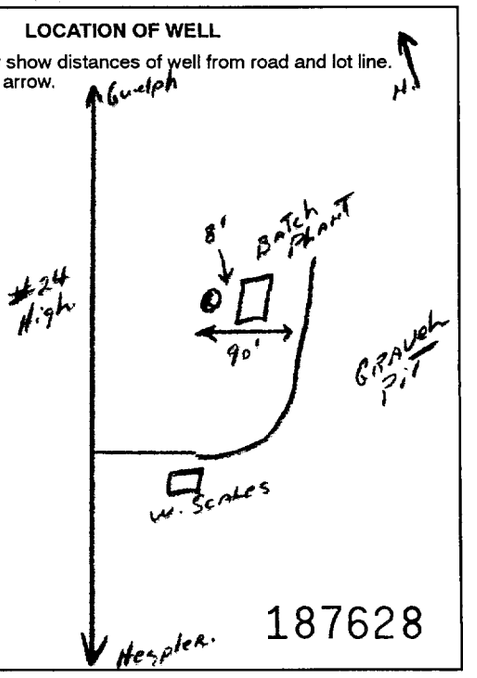
15 minutes	30 minutes	45 minutes	60 minutes
8.86 feet	9.94 feet	10.06 feet	10.89 feet

If flowing give rate: GPM
Pump intake set at: feet
Water at end of test: ☒ Clear ☐ Cloudy

Recommended pump type: ☐ Shallow ☒ Deep
Recommended pump setting: 12 m feet
Recommended pump rate: 60 GPM

LOCATION OF WELL

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



187628

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 ☐ Abandoned (Other)
8 ☐ Dewatering
9 ☐ Unfinished
10 ☐ Replacement well

WATER USE

1 ☐ Domestic
2 ☐ Stock
3 ☐ Irrigation
4 ☐ Industrial
5 ☐ Commercial
6 ☐ Municipal
7 ☐ Public supply
8 ☐ Cooling & air conditioning
9 ☐ Not used
10 ☐ Other

METHOD OF CONSTRUCTION

1 ☐ Cable tool
2 ☐ Rotary (conventional)
3 ☐ Rotary (reverse)
4 ☒ Rotary (air)
5 ☐ Air percussion
6 ☐ Boring
7 ☐ Diamond
8 ☐ Jetting
9 ☐ Driving
10 ☐ Digging
11 ☐ Other

Name of Well Contractor	Well Contractor's Licence No.
GRAHAM WELL DRILLING LTD	2336

Address: RR#5 ROCKWOOD, ONT. N0B-2K0

Name of Well Technician	Well Technician's Licence No.
Jim Wilson	T-1924

Signature of Technician/Contractor: Robert W Graham

Submission date: 030 day 06 mo 98 yr

MINISTRY USE ONLY

Data source 58 | Contractor 2336 59-62 | Date received JUL 10 1998 63-68 80

Date of inspection | Inspector

Remarks: CSS. S9

0506 (07/94) Front Form 9

2 - MINISTER OF ENVIRONMENT & ENERGY COPY

20-19

Ontario — Ministry of the Environment, Conservation and Parks

Measurements recorded in: ☐ Metric ☒ Imperial

Well Tag Tag#:A258085 ow)

A258085

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

[redacted] ID 7334558

Address of Well Location (Street Number/Name)	Township	Lot	Concession
4852 SIDE RD 10 N.	PUSLINCH	10	5
County/District/Municipality	**City/Town/Village**	**Province**	**Postal Code**
WELLINGTON	PUSLINCH	Ontario	N0B2J0
UTM Coordinates Zone / Easting / Northing	**Municipal Plan and Sublot Number**	**Other**	
NAD 8 3 / 7559761 / 4816293			

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BROWN	CLAY	STONES		0	15
BROWN	CLAY	GRAVEL		15	22
GREY	CLAY			22	26
T. BROWN	LIMESTONE			26	75
L. BROWN	ROCK			75	125
GREY	ROCK			125	160
			TOTAL DEPTH	160	FT

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	20	BENTONITE	

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☒ Other, specify AIR ROTARY

Well Use

☐ Public ☐ Commercial ☐ Not used
☒ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
6 1/8	STEEL	.188	+2	27
6 1/8	OPEN HOLE		27	160

Construction Record - Screen

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

Status of Well

☒ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Water Details

Water found at Depth (m/ft)	Gas	Kind of Water: Fresh / Untested / Other, specify
160	☐	
	☐	
	☐	

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	20	10"
20	160	6 1/8"

Results of Well Yield Testing

After test of well yield, water was:
☒ Clear and sand free
☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft): 120 FT

Pumping rate (l/min / GPM): 12 GPM

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (m/ft): 87'

If flowing give rate (l/min / GPM):

Recommended pump depth (m/ft): 120 FT

Recommended pump rate (l/min / GPM): 12 GPM

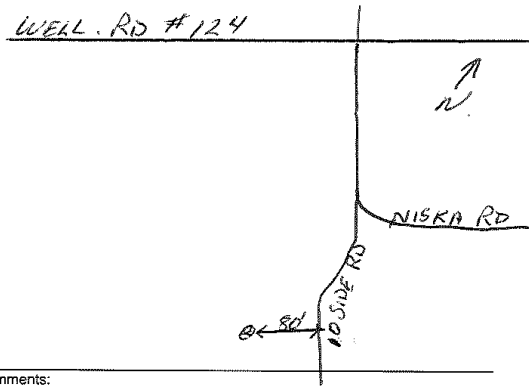
Well production (l/min / GPM): 12+ GPM

Disinfected? ☒ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level		29		
1		~~34~~	1	83
2		39	2	79
3		44	3	75
4		48	4	71
5		52	5	68
10		70	10	48
15		80	15	38
20		84	20	30
25		87	25	29
30		87	30	29
40		87	40	29
50		87	50	29
60		87	60	29

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Jim Wilson WELL DRILLING LTD	7385
Business Address (Street Number/Name)	**Municipality**
531 EBYCREST RD	WATERLOO
Province	**Postal Code**	**Business E-mail Address**
ON	N2J4G8	
Bus. Telephone No. (inc. area code)	**Name of Well Technician (Last Name, First Name)**
5196482412	WILSON Jim
Well Technician's Licence No.	**Signature of Technician and/or Contractor**	**Date Submitted**
7192		2019 05 30

Well owner's information package delivered: ☒ Yes ☐ No

Date Package Delivered: 2019 05 09

Date Work Completed: 2019 05 09

Ministry Use Only

Audit No. Z311041

Received JUN 07 2019

0506E (2018/12)

Ministry's Copy