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18 March 2021 SBM-21-0716

The Municipality of Middlesex Centre
10227 Ilderton Road, RR#2
Ilderton, ON, N0M 2A0

Attn: Jake DeRidder, C. Tech.
Development Review Coordinator

Re: **Brock Development Group**
Proposed 19 Residential Lots Development
Medway Road, Ballymote, Ontario

1. INTRODUCTION

This Site Servicing Memorandum (Memo) has been prepared by Strik, Baldinelli, Moniz Ltd (SBM) to address the site servicing requirement for the proposed development of 19 residential lots at Highbury Avenue North and Medway Road, Ballymote, Ontario. The site is bordered by general agricultural zones to its east and south, Hamlet Residential First Density zones across the Highbury Avenue North Right-of-Way (ROW) to the west and the Medway Road ROW to the north. This Memo is to determine the adequacy of the existing municipal services in support of Zoning By-law Amendment (ZBA) applications for the proposed lot severance.

2. SANITARY SERVICING CONSIDERATIONS

As per the Ballymote Waterworks Highbury Avenue as-constructed drawings provided by the Municipality, Project No. 92037 sheets 1, 2 6, and 7, all dated April 15, 1994, provided in Appendix A, the proposed development is not tributary to a sanitary sewer. There are no existing sanitary sewers on Highbury Avenue North ROW or Medway Road ROW and therefore, on-site septic systems are proposed.

The dimensions of the on-site septic system and contingency area are obtained from the Soil Report for Wastewater Servicing by BOS Engineering & Environmental Services Inc., dated January 4, 2021, provided in Appendix B. The system is schematically shown on Engineering Plans sheets 2A and 2B provided separately.

3. STORMWATER MANAGEMENT

The is no storm outlet for the proposed development to handle storm flows, therefore a soak-away pit is proposed on each property.

3.1 Pre-Development to Post-Development Conditions

Pre-development conditions were obtained from the topographical plan of survey by Callon Dietz Incorporated, File No. 20-23779 A, dated February 17, 2021, provided in Appendix C. The pre-development peak outflows

during different storm events are to be calculated as the design flow using the total area, runoff coefficients and average rainfall intensity as per Section 4.8 of Middlesex Centre Infrastructure Design Standards (MCIDS). Similarly, the post-development peak outflows are calculated and the differences between the pre-development to post-development are used to calculate the required storage and size of the soak-away pit.

The lot sizes are similar but varies, and therefore five different sizes of soakaway pit are designed for appropriate lot sizes. Pre to post development comparison is made in the Storm Water Management (SWM) calculations attached in Appendix C and the soak-away pit is designed to infiltrate and store any additional flows to balance the total outflow up to 100-year storm events (major event). Actual post-development C-values were calculated to be less than 0.40, but conservatively C-value of 0.50 was used in accordance with Section 4.8.3 of Municipality of Middlesex Centre Infrastructure Design Standards. Soak-away pits with dimensions 3.0 m wide by varying length at 1.0 m depth constructed with 19 mm clear stone will provide sufficient storages (void ratio of 0.35) required during 100-year storm events. It is noted that the soil condition on site is obtained from the BOS Engineering Soil Report mentioned above at 50 min/cm infiltration rate. This is also assuming that in pre-development condition, the ditches in the Highbury Avenue North ROW and Medway Road ROW is designed to take some outflows from the lots calculated with the runoff coefficient of 0.2. See below Table 1 for summary of the five different soakaway pit sizes for different lots.

Lot #	Dimension	2-yr Required Storage (m^3)	100-yr Required Storage (m^3)	Available Storage (m^3)
1, 2 & 3	3.0m x 26.5m x 1.0m	16.05	27.81	27.83
4	3.0m x 25.7m x 1.0m	15.54	26.92	26.99
5 to 14 & 17 to 19	3.0m x 22.1m x 1.0m	13.37	23.17	23.21
15	3.0m x 23.1m x 1.0m	13.96	24.20	24.26
16	4.0m x 21.0m x 1.0m	12.67	21.96	22.05

Table 1: Summary of Soakaway Pit Design

Lots 4, 5 and 16 are at the lowest elevations from each of the three rows, and there are surface ponding with depths of 18 mm, 60 mm, and 19 mm expected during storm events respectively. Draw down times of all surface ponding have been calculated to be approximately 11.0 hrs, 1.0 hr and 12.9 hrs respectively.

As the existing ditch on Medway Road ROW has an 800 mm diameter storm outlet, proposed driveway culverts are designed to match existing ditch flow capacity and the slopes of the existing ditches are to remain. A swale is proposed in between the lots and the field to direct all stormwater flow to the existing municipal ditch on Medway Road ROW generally matching the pre-development flow path.

4. WATER SERVICING CONSIDERATIONS

4.1 General Consideration

Water service connections are to be sized as per Section 5.9.1 of the MCIDS. Water services shall be a minimum of 25 mm (1”) internal diameter, equipped with approved corporation stop and curb stop with a curb box, and shall be installed as per Figure 5.10 Standard Installation of <50mm Water Service Connection and Layout Detail. The corporation stop shall be installed at the watermain, and a curb stop shall be installed 0.3 m from, and on the street side of, the property line as per Figure 5.11.

Based on the above criteria, a 25 mm (1") PEX water service connection with tracer wire full length is proposed, connecting to municipal water main with approved service saddles and main stops as per Figure 5.10. As per table A-7.6.3.1 of the Ontario Building Code 2012 (OBC), 60 m length of this water service connection can serve 57 fixture units, which is a conservative threshold for a single-family residential building. For reference, according to table 7.4.9.3 of OBC, a single-family dwelling with 3 bathroom groups, a clothes washer, a dishwasher, a floor drain, a laundry tray, and a sink will have 25.5 fixture units.

4.2 Fire-fighting Consideration

As per Section 5.8.1 of the MCIDS, the location of hydrants is subject to the requirements and approval of the Municipal Fire Department in accordance with the Ontario Building Code. As a general guide, hydrants must be located not more than 170 m apart along the length of the watermain and should be located at intersections where possible. There is an existing Municipal fire hydrant across the Medway Road available for Lots 1, 2, 3 and 4. There is also an existing Municipal fire hydrant at southeast side of Medway Road and Highbury Avenue North intersection and at the front of Lot 15. Because the distance between the hydrants appears greater than 170 m on Highbury Avenue North, the development is to follow the local rural requirements and guidelines as per the municipality and/or fire department.

5. LIMITATIONS

This memorandum was prepared by SBM Ltd. for the Municipality of Middlesex Centre and Brock Development Group. Use of this memorandum by any third party, or any reliance upon its findings, is solely the responsibility of that party. SBM Ltd. accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions undertaken as a result of this memorandum. Third party use of this memorandum, without the express written consent of the Consultant, denies any claims, whether in contract, tort, and/or any other cause of action in law, against the Consultant.

All findings and conclusions presented in this memorandum are based on site conditions as they appeared during the period of the investigation. This memorandum is not intended to be exhaustive in scope, or to imply a risk-free facility. It should be recognized that the passage of time may alter the designs, opinions, conclusions, and/or recommendations provided herein.

The design was limited to the documents referenced herein and on the SBM drawings provided separately. SBM Ltd. accepts no responsibility for the accuracy of the information provided by others. All designs, opinions, conclusions, and/or recommendations presented in this memorandum are based on the information available at the time of the review. This document is deemed to be the intellectual property of SBM Ltd. in accordance with Canadian copyright law.

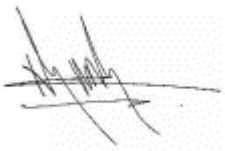
6. CLOSURE

We trust this memorandum meets your satisfaction and current needs. Should you have any questions or require additional information, please do not hesitate to contact the undersigned.

Respectfully submitted,

Strik, Baldinelli, Moniz Ltd.

Planning • Civil • Structural • Mechanical • Electrical

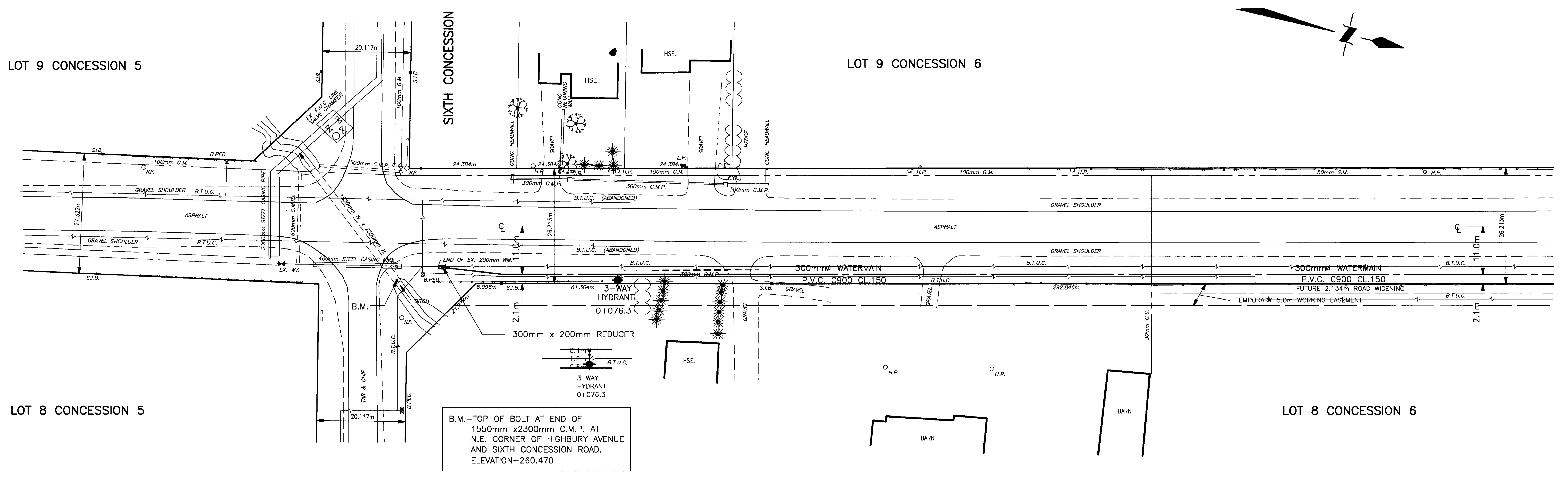


Nelson Guiot, P.Eng.
Engineer IV, Civil Department Manager

Juduk Lee, E.I.T
Civil Engineer In Training I

APPENDIX A

As-Constructed drawing from the Municipality, Project No. 92037 sheets 1, dated April 15, 1994
As-Constructed drawing from the Municipality, Project No. 92037 sheets 2, dated April 15, 1994
As-Constructed drawing from the Municipality, Project No. 92037 sheets 6, dated April 15, 1994
As-Constructed drawing from the Municipality, Project No. 92037 sheets 7, dated April 15, 1994



HIGHBURY AVENUE

STATION	℄ ELEV. OF PROP. W.M.	EX.GRD. ELEV. @ ℄ W.M.
–0+050		
0+000		
0+017	257.50	
0+020	257.50	
0+050	258.40	
0+100	259.85	
0+125	260.60	
0+150	260.60	
0+200	260.60	
0+250	260.60	

AS CONSTRUCTED NOTES	COMPLETION		No.	REVISIONS	DATE	BY
P.V.C. C900 CL.150 W.M.	NOV.30,1993	DESIGN: A.L.G.	1.	CITY OF LONDON REVISIONS "AS MARKED"	APR.21,1993	G.J.C.
25mmø P.E. W.S.	NOV.30,1993	DRAWN: J.D.A.	2.	"AS CONSTRUCTED" DRAWINGS	APR.15,1994	G.J.C.
		CHECKED: A.L.G.				
		APPROVED: D.J.Y.				
		DATE: MARCH 1993				

CONSULTANT

SPRIET ASSOCIATES
LONDON LIMITED
CONSULTING ENGINEERS
722 YORK STREET --LONDON (519) 672-4100--N5W 2S8

ENGR'S STAMP

CLIENT

TOWNSHIP OF LONDON

SCALE
5.0 m 0 10.0m Horizontal
0.5 m 0 1.0 m Vertical

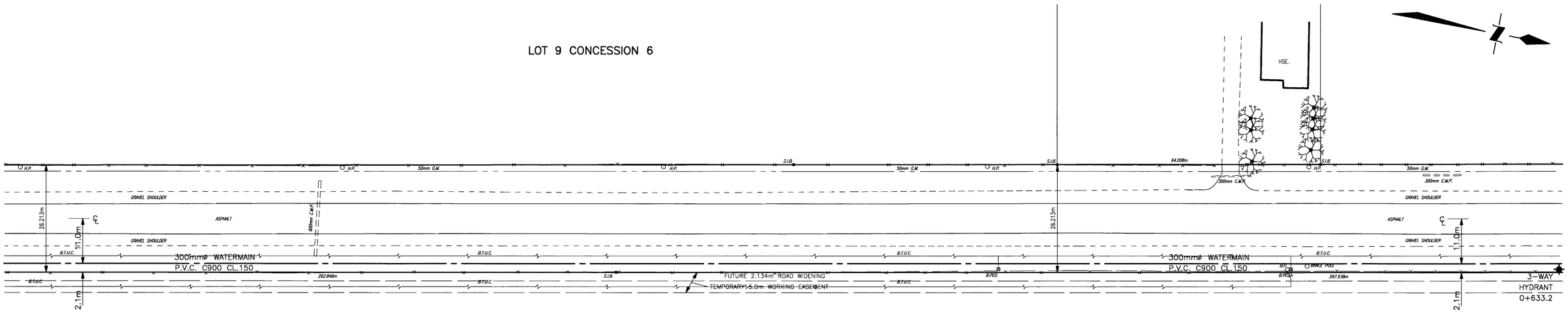
TITLE

BALLYMOTE WATERWORKS
HIGHBURY AVENUE
STA. 0+000 TO STA. 0+250

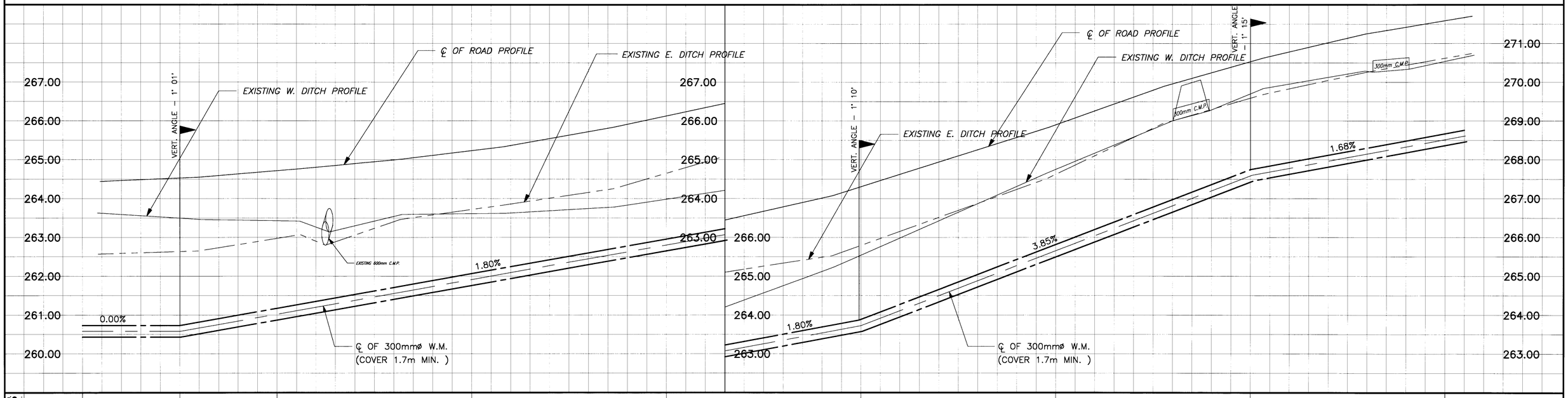
Project No. 92037

Sheet No. 1 of 9

Plan File No.



HIGHBURY AVENUE



STATION	0+250	0+275	0+300	0+350	0+400	0+450	0+500	0+550	0+600
℄ ELEV. EXIST. OR PROP. ELEV. ● W.M.	260.60	260.60	261.05	261.95	262.85	263.75	265.65	267.60	268.45

AS CONSTRUCTED NOTES	COMPLETION
P.V.C. C900 CL.150 W.M.	NOV.30,1993
25mmø P.E. W.S.	NOV.30,1993

DESIGN: A.L.G.
DRAWN: J.D.A.
CHECKED: A.L.G.
APPROVED: D.J.Y.
DATE: MARCH 1993

No.	REVISIONS	DATE	BY
1.	CITY OF LONDON REVISIONS "AS MARKED"	APR.21,1993	G.J.C.
2.	"AS CONSTRUCTED" DRAWINGS	APR.15,1994	G.J.C.

CONSULTANT
SPRIET ASSOCIATES
LONDON LIMITED
CONSULTING ENGINEERS
722 YORK STREET --LONDON (519) 672-4100--N5W 2S8

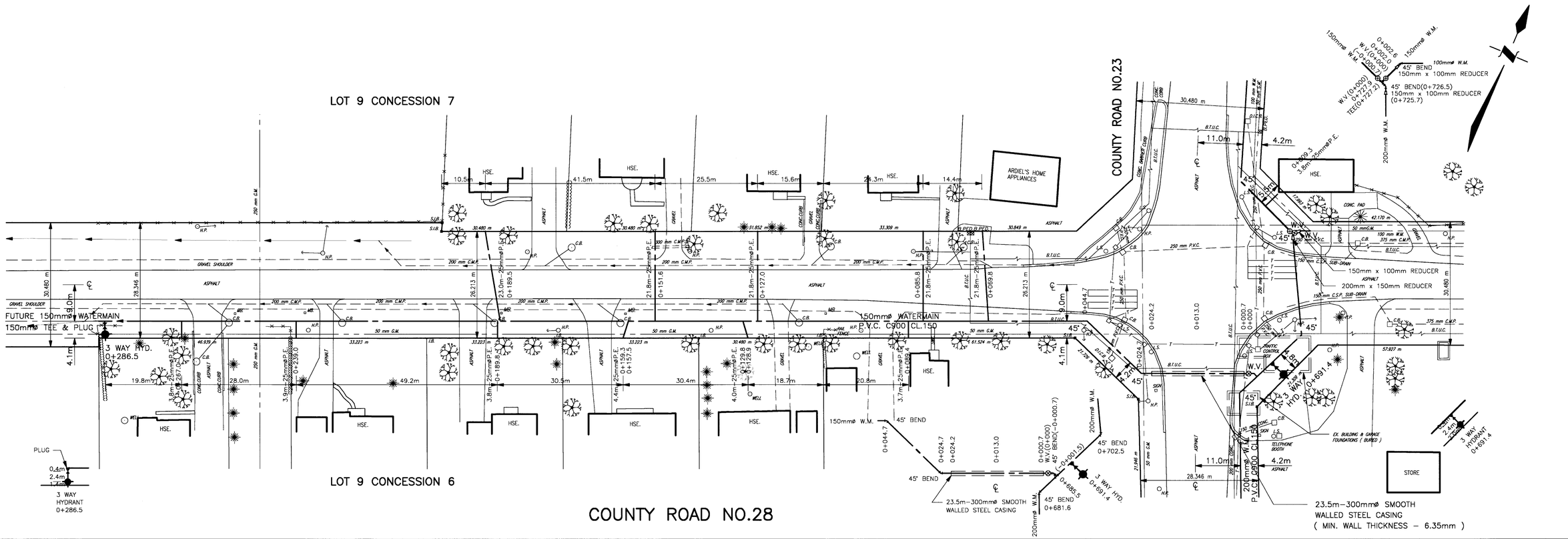
ENGR'S STAMP

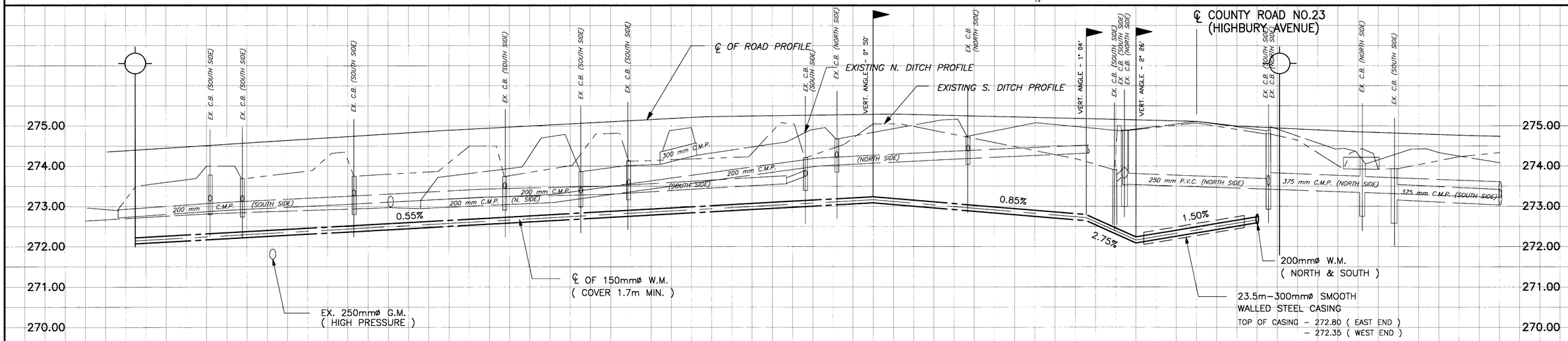
CLIENT
TOWNSHIP OF LONDON

SCALE
5.0 m 0 10.0m
0.5 m 0 1.0 m

TITLE
BALLYMOTE WATERWORKS
HIGHBURY AVENUE
STA. 0+250 TO STA. 0+600

Project No. 92037
Sheet No. 2 of 9
Plan File No.





STATION	0+263	0+250	0+228.5	0+200	0+150	0+100	0+080	0+050	0+027.5	0+015	0+000	0+015	0+050
EXIST. ELEV. ℄ W.M.													
PROP. ELEV. ℄ W.M.	272.15	272.20	272.37	272.50	272.75	273.05	273.15	272.90	272.70	272.15		272.60	

AS CONSTRUCTED NOTES	COMPLETION
P.V.C. C900 CL.150 W.M.	NOV.30,1993
25mmø P.E. W.S.	NOV.30,1993

DESIGN: A.L.G.
DRAWN: J.A.
CHECKED: A.L.G.
APPROVED: A.L.G.
DATE: 1992

No.	REVISIONS	DATE	BY
1.	"AS CONSTRUCTED" DRAWINGS	APR.15,1994	G.J.C.

CONSULTANT
SPRIET ASSOCIATES
LONDON LIMITED
CONSULTING ENGINEERS
722 YORK STREET – LONDON (519) 672–4100 – N5W 2S8

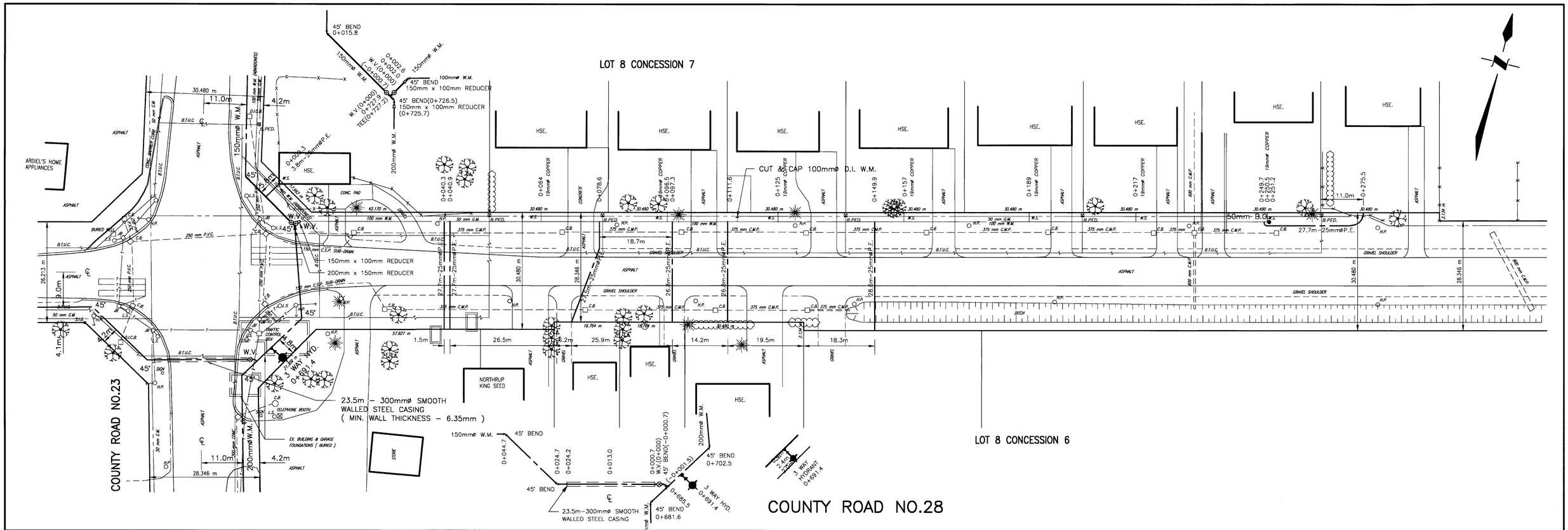
ENGR'S STAMP

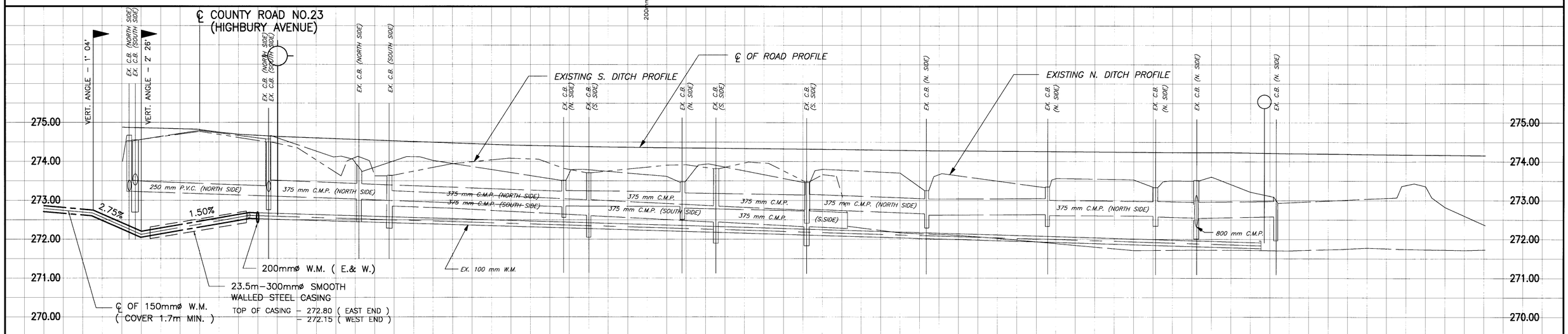
CLIENT
TOWNSHIP OF LONDON

SCALE
5.0 m 0 10.0m
0.5 m 0 1.0 m

TITLE
BALLYMOTE WATERWORKS
COUNTY ROAD NO.28
STA. 0+000 TO STA. 0+275

Project No. 92037
Sheet No. 6 of 9
Plan File No.





STATION	0+027.5	0+015	0+000	0+015	0+050	0+100	0+150	0+200	0+250	0+300
℄ ELEV. EX. C/O OF PROP. W.M.	272.70	272.15		272.60						
ELEV. ● W.M.										

AS CONSTRUCTED NOTES	COMPLETION
P.V.C. C900 CL.150 W.M.	NOV.30,1993
25mmø P.E. W.S.	NOV.30,1993

DESIGN: A.L.G.
DRAWN: J.D.A.
CHECKED: A.L.G.
APPROVED: D.J.Y.
DATE: MARCH 1993

No.	REVISIONS	DATE	BY
1.	"AS CONSTRUCTED" DRAWINGS	APR.15,1994	G.J.C.

CONSULTANT
SPRIET ASSOCIATES
LONDON LIMITED
CONSULTING ENGINEERS
722 YORK STREET --LONDON (519) 672-4100--N5W 2S8

ENGR'S STAMP

CLIENT
TOWNSHIP OF LONDON

SCALE
5.0 m 0 10.0m Horizontal
0.5 m 0 1.0 m Vertical

TITLE
BALLYMOTE WATERWORKS
COUNTY ROAD NO.28
STA. 0+000 TO STA. 0+325

Project No. 92037
Sheet No. 7 of 9
Plan File No.

APPENDIX B

Soil Report for Wastewater Servicing by BOS Engineering & Environmental Services Inc., dated January 4, 2021

SOIL TESTING FOR WASTEWATER SERVICING

Proposed Lot Divisions

Concession 6 N Part Lot 8

(Geographic Township of London)

Municipality of Middlesex Centre
County of Middlesex

Prepared for:

Brock Development Group Inc.
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London ON
N6A 1V7
519-281-6769, 519-697-0511
michelle@brockdg.com, shawn@brockdg.com

By:

BOS Engineering & Environmental Services Inc.
46 Donnybrook Rd. London Ontario, N5X 3C8
TEL: (519) 850-9987
EMAIL : a.bos@sympatico.ca

January 4, 2021

Table of Contents

1. INTRODUCTION

This report presents the results of a soils and sewage system assessment carried out at Municipal Address: 21488 Highbury Ave in the Municipality of Middlesex Centre, County of Middlesex. The property is described as Concession 6 N Part Lot 8 (Geographic Township of London) and is located in Ballymote. The 35 ha (86.4 ac) parcel is currently vacant. Frontage of all lots are to be onto Medway Road and Highbury Avenue North with 5 lots along Medway Road and 14 lots along Highbury Avenue. Proposed lots are will range in width from approximately 23m to 26m. Lot depths will be approximately 76 to 78m with an average lot size of 0.18 ha leaving a retained parcel of approximately 32.4 ha. Appendix A contains a map of the site location.

The lots are currently located on farm land. There are not any defined drainage patterns or roadside ditches along Highbury Avenue. A large road side ditch is present along Medway Rd.

The lots are currently proposed to be serviced with onsite wastewater treatment systems systems and private wells.

2. EXISTING SURFICIAL SOILS

Soil testing was conducted on November 26, 2020. A map of the site and test pit locations is presented in Appendix A together with soil test pits logs at nine (9) locations across the site.

The test pits were formed to depths of 1.4 to 1.5m. In all cases the underlying soils were comprised of clay to silty clay TILL with estimated soil percolation time in excess of 50 min/cm. Topsoil was generally 25 to 30 cm thick. At five (5) of the test pits there was a thin layer (22 to 46cm thick) of sand to sandy silt at varying shallow depths. Some of these layers (at TP 1 & TP 2) appeared to be pockets since they were water-bearing. The sandy layers were sampled and tested. Grain size analyses and classifications are presented in Appendix B. Assessment of the predominantly heavy soils was made in the field. Approximate soil test locations and test pit logs are presented in Appendix A.

Due to the variable depths and inconsistency of the sandy layers, a percolation time (T) of greater than 50 min/cm is recommended at this site for septic system design.

3. PROPOSED WASTEWATER TREATMENT SYSTEMS

In order to size the proposed wastewater treatment system, it is necessary to make assumptions regarding the house characteristics. In this case, a daily load of 3000 L/day was assumed in line with actual homes at a similar recent development in Bryanston. This assumed loading can include a 4-bedroom home with 300m2 of living area and up to 40 fixture units as outlined in Appendix E.

Based on the surficial soil as documented in section 2, conventional raised beds were sized requiring a minimum sand footprint of 750 m^2 or 23m wide x 33m deep. Therefore, a conventional raised bed would consume the entire rear yards of the lots. In Middlesex Centre, during lot creation, it is also required to designate an area for a second "contingency bed" for reconstruction in the event of bed failure. The proposed lot sizes are too small to allow this.

Therefore, enhanced pre-treatment (to CAN/BNQ 3680-600 standard) is required, allowing smaller "Type A" beds (approximately14m x 28m) as indicated on the sketch in Appendix E. This allows for a contingency bed that will partly overlap the primary bed area.

In order to attain the minimum setbacks from wells to septic systems, the water supply wells will be located in the front yards of the lots with the septic systems in the rear yards. The raised area location and direction of the proposed sand mantle drainage is dependent on both the existing topography and the proposed grading of the lots. There was not a topographical plan available at the time of reporting.

4. SEWAGE IMPACT ASSESSMENT

MOE Procedure D5-4 outlines a multi-step process to gauge the effects of the combined effluent discharges from all of the individual sewage systems in a development based on nitrogen as an indicator of groundwater impact potential.

4.1 Minimum Lot Size

Generally, if the average lot size is smaller than 1.0 ha in size with no lot being smaller than 0.8 ha, then a hydrogeological assessment is not required provided that the area is not hydrogeologically sensitive. This exemption does not apply to the subject lots as they are to be 0.18 ha in size.

4.2 System Isolation Considerations & Well Records

Where smaller lots than 1.0 ha are proposed, it is necessary to consider the status of isolation of the sewage effluent from the existing or potential supply aquifer. As with other lots in this area, the lots are to be serviced with private wells and on-site wastewater treatment systems to current OBC standards. Hence review of water well records for the area were reviewed to verify isolation and/or determine potential impacts of the sewage effluent on area wells.

There were 18 valid well records within approximately 500m of the proposed development site, 3 of which were professionally closed and sealed. Well locations and logs are presented in Appendices C and D, respectively. Following is a summary of the well logs:

Well #	Year Formed	Casing dia(cm)	Water Depth (m)	Pump Rate (lpm)	Soil Profile (m)	Status
4102089	1964	91	7.9	227	**0 – 2.4 Sandy Clay** 2.4 – 7.9 Hard Blue Clay	On highbury adjacent to proposed lots
4102091	1957	15	25.6	1365	0 – 1.3 Topsoil/Fill 1.3 – 2.4 Sand & Clay 2.4 – 22.6 Blue Clay 22.6 – 25.0 Hard Pan 25 .0 - 26.2 Sand & Gravel	
4102092	1962	91	3.1	22.8	0 – 0.30 Topsoil **0.3 – 1.5 Sand** 1.5 – 3.05 Blue Clay	185m west of highbury on medway
4102096	1967	91	3.7	13.7	**0 – 2.4 Sand** 2.4 – 3.7 Hard Blue Clay	110m west of highbury on medway
4102166	1959	12	42.4	26.5	0 – 3.1 Topsoil & Sandy Clay 3.1 – 9.1 Hard Pan 9.1 – 13.7 Sand 13.7 – 22.9 Clayey Sand & Sandy Hard Pan 22.9 – 27.4 Clay 27.4 – 30.2 Sand 30.2 – 42.4 Hard Pan & Clay 42.4 – 42.7 Sand/Gravel	
4105504	1971	91	5.5	9.1	0 – 1.5 Br. Clay 1.5 – 5.5 Blue Clay **5.5 – 5.8 Gravel** 5.8 – 8.5 Blue Clay Till	at monitoring wells on petrocan property
4106814	1974	12	18.3	45.5	0 – 4.6 Br. Clay 4.6 – 13.7 Blue Clay 13.7 – 20.4 Gravel	
4107096	1974	12	29.6	9.1	0 – 5.5 Br. Sand 5..5 – 29.6 Blue Clay Till 29.6 – 30.2 Gr. Sand 30.2 – 31.7 Blue Clay	

4107563	1976 1994 Closed	15	63.3	n/a	0 – 2.7 Sand 2.7 – 47.5 Gr. Clay 47.5 – 81.4 Blue Clay 22.6 – 81.4.0 Hard Pan	Closed Sealed (sulphur)
4107571	1976	15	10.1	27.3	0 – 3.1 Red Clay 3.1 – 9.1 Layered Clay & Gravel 9.1 – 10.1 Porous Gravel	
4108667	1978	12	9.4	36.4	0 – 9.4 Br. Clay 9.4 – 9.4 Sand & Clay 9.4 – 11.3 Br. Sand	
4110852	1987	12	23.8	46	0 – 1.5 Br. Clay 1.5 – 23.5 layered Sand & Clay 23.5 – 23.8 Gr. Gravel	
4111987	1989	15	30.2	27.3	0 – 2.7 Br. Sand 2.7 – 16.2 Gr. Clay 16.2 – 24.4 Clay -layered sand & silt 24.4 – 30.2 Gr. Clay 30.2 – 31.7 Gr. Sand 31.7 – 32.9 Gr.Clay	
4112242	1990	12	21.3	54.6	0 – 0.91 Br. Clay 0.91 – 18.3 Gr. Clay 18.3 – 21.3 Bl. Sand	
4112352	1991	15	14.9	45.5	0 – 3.7 Br. Sand & Clay 3.7 – 14.6 Gr. Clay & Sand 14.6 – 14.9 Gr. Sand	
4114496	2000		14.9		unknown	Closed Sealed
7045068	2007	2	4.6	n/a	0 – 0.9 Br. Sand Till 0.9 – 4.6 Gr. Clay & Sand 14.6 – 14.9 Gr. Clay till	Monitoring Well (5 wells)
7304894	2017	107	3.1		unknown	Closed Sealed

The soil profiles on the well logs are generally consistent with the shallow test pit data. Most non-closed deep wells are to an aquifer ranging from 9.4m to 30.2m in depth. There appears to be a clay overburden with some sand or silt lenses over the deeper aquifer with considerable unlayered clay to prevent migration of wastewater effluent. With the confined aquifer, wastewater effluent is expected to migrate to surface drainage swales and ditches where denitrification will occur.

There are four (4) shallow wells in proximity of the site, namely wells 4102092, 4102096, 4102089, and 4105504. The first two wells are approximately 185 m and 110m respectively west of Highbury Avenue and hence are unlikely to be affected by the development. However, well 4105504 on the Gas station property southeast of the intersection of Highbury and Medway Roads is shallow and adjacent the development. The status of this well should be examined since there is an existing deeper drilled well on the same property. Well 4102089 is also shallow and immediately adjacent the south end of the proposed

development and its status should therefore also be examined. Both of these shallow wells should be decommissioned and replaced, if not done already.

One deep well to the bedrock aquifer was decommissioned due to sulphur content.

Current pump rates for existing deeper wells range from 9 to 46 Litres/minute.

5. SUMMARY & RECOMMENDATIONS

To facilitate this development, it is recommended that:

1. Two shallow wells (Well 4105504 and Well 4102089) adjacent the development should be decommissioned (if not done already) and serviced with a replacement water supply, if necessary.

2. A preferred water supply for all of the new lots would be municipal water, if feasible.

3. The proposed development can accommodate sewage design loads of 3000 L/day on each lot as outlined in Appendix E.

4. Deep drilled wells should be located in the front yards of the development with septic systems and contingency areas in the rear yards.

5. Enhanced treatment of sewage (to CAN/BNQ 3680-600 standard) is required to facilitate use of smaller “Type A” distribution beds to fit the proposed lot sizes. These pre-treatment units will also reduce risks of shallow aquifer contamination.

6. The Ontario Building Code does apply to the sewage system construction.

The proposed sewage systems will be required to meet all regulations and required setbacks from wells outlined in Part 8 of the Ontario Building Code and CAN/BNQ 3680-600 standard.

7. Building permits will require lot grading plans and specific septic system designs for the individual lot developments.

BOS Engineering & Environmental Services Inc.

DRAFT

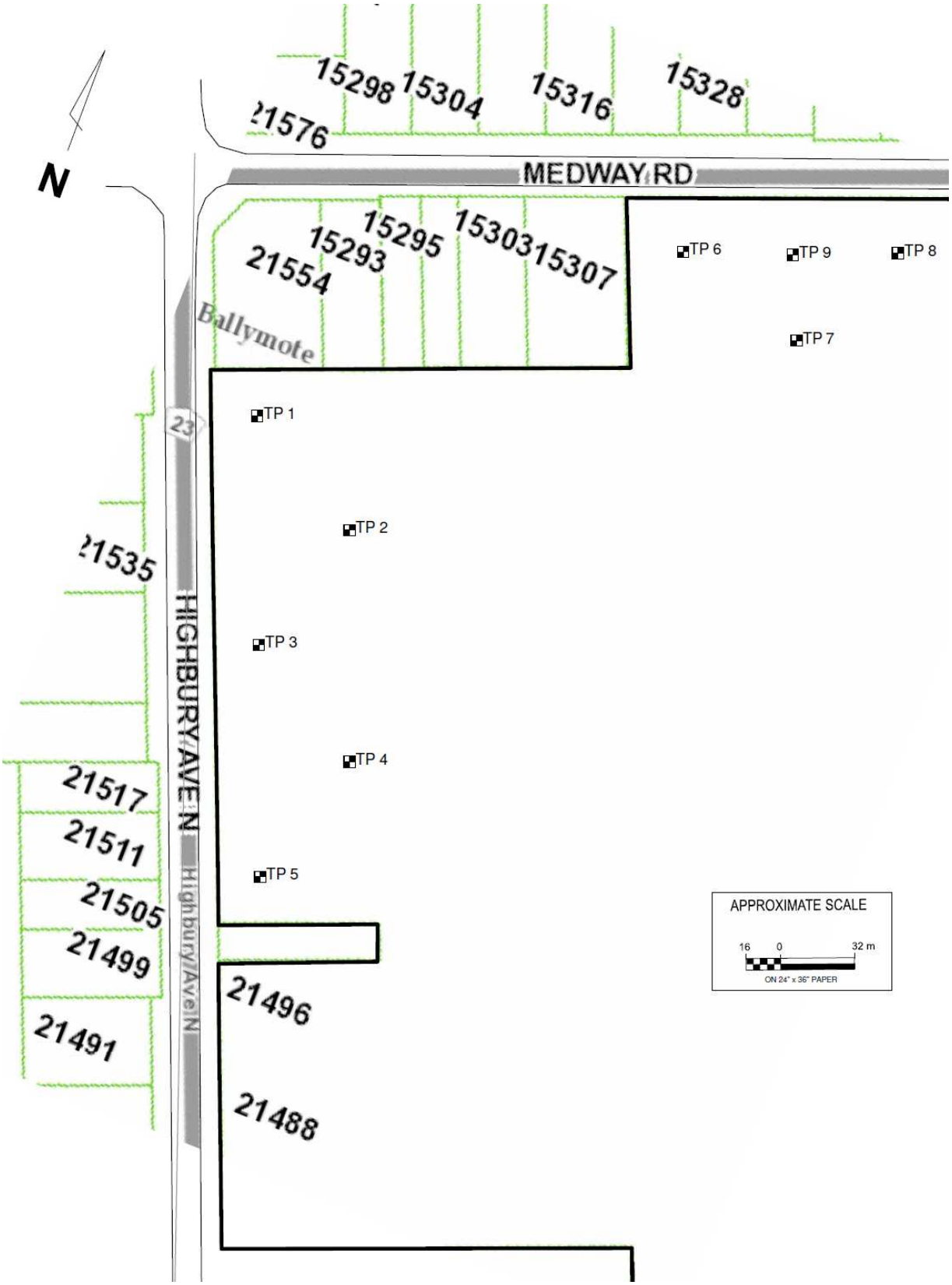
Art W. Bos, P.Eng.

Encl

- Appendix “A” – Map: Soil Test Locations & Logs
- Appendix “B” – Soil Grain Size Analysis of Selected Samples
- Appendix “C” – Map: Existing Water Well Records
- Appendix “D” – Individual Well Records (Provincial Database)
- Appendix “E” – Wastewater Treatment System Assumptions & Sizing

Appendix A

Map: Soil Test Locations & Logs


N
15298
15304
15316
15328
21576
MEDWAY RD
15295
15303
15307
15293
21554
Ballymote
TP 6
TP 9
TP 8
TP 7
TP 1
TP 2
TP 3
TP 4
TP 5
21535
HIGHBURY AVE N
Highbury Ave N
21517
21511
21505
21499
21491
21496
21488
APPROXIMATE SCALE
16 0 32 m
ON 24" x 36" PAPER

SITE SOIL INFORMATION

(BOS ENGINEERING – Nov 26, 2020)

TEST	DEPTH (cm)	SOIL TYPE
TP 1	0 - 30	TOPSOIL
	30 - 76	Hard Silty CLAY
	76 - 114	Sand (Tested: T = 8 min/cm)
	114 - 152	Gr. CLAY (T > 50 min/cm)
		Seepage @ 114 cm
TP 2	0 - 30	TOPSOIL
	30 - 76	Mottled Sandy SILT (Tested: T = 40 min/cm)
	76 - 152	Clay TILL (T >50 min/cm)
		Seepage @ 76cm
TP 3	0 - 30	TOPSOIL
	30 - 81	Mottled Silty CLAY (sand pockets)
	81 - 137	CLAY TILL (T >50 min/cm)
		No Seepage
TP 4	0 - 27	TOPSOIL
	27 - 69	Mottled Silty CLAY
	69 - 132	Gravelly CLAY TILL (cobbles) (T >50 min/cm)
		No Seepage
TP 5	0 - 30	TOPSOIL
	30 - 56	Mottled Silty CLAY
	56 - 127	Stoney Clay TILL (T >50 min/cm)
		(100mm TILE @ 81 cm)
		No Seepage
TP 6	0 - 30	TOPSOIL
	30 - 41	Silty CLAY
	41 - 81	Sand (Tested: T = 10 min/cm)
	81 - 107	Gr. SAND
	107 - 140	Clay TILL (T >50 min/cm)
		Seepage @ 81 cm
TP 7	0 - 30	TOPSOIL
	30 - 46	Gr. CLAY
	46 - 122	Gr. Mottled Silty CLAY (T >50 min/cm)
		No Seepage
TP 8	0 - 25	TOPSOIL
	25 - 48	Gr. CLAY
	48 - 76	SAND
	76 - 127	CLAY TILL (T >50 min/cm)
		No Seepage
TP 9	0 - 25	TOPSOIL
	25 - 69	Gr. Mottled CLAY
	69 - 91	Gravelly SAND (T = 10 min/cm)
	91 - 132	CLAY TILL (T >50 min/cm)
		No Seepage

Appendix B

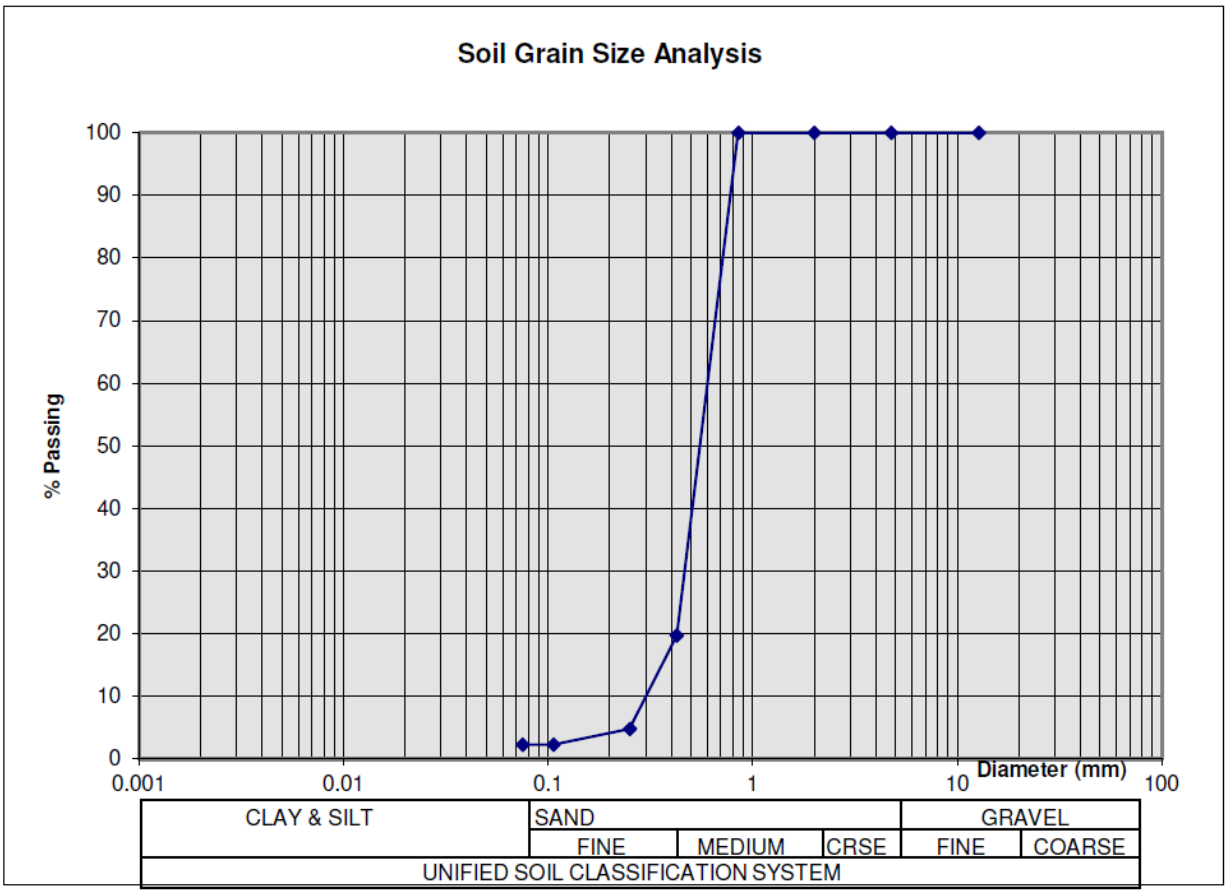
Soil Grain Size Analysis of Selected Samples

BOS Engineering Environmental Services

Project :	Ballymote Lots	***Client :***	Brock Development
Test Pit :	TP1	***RE:***	Waste Treatment System
Depth :	76 to 114 cm	***Proj. No .***	2011-22
Dry Mass:	117.0 g	***Date:***	Nov 27 20

CHART DATA

Sieve No.	Mass	Cum. Mass	Diam. (d)	% Passing
		0	12.7	100
4	0.0	0	4.75	100
10	0.0	0	2	100
20	0.0	0	0.85	100
40	94.0	94	0.425	20
60	17.4	111.4	0.25	5
140	2.9	114.3	0.106	2
200	0.0	114.3	0.075	2



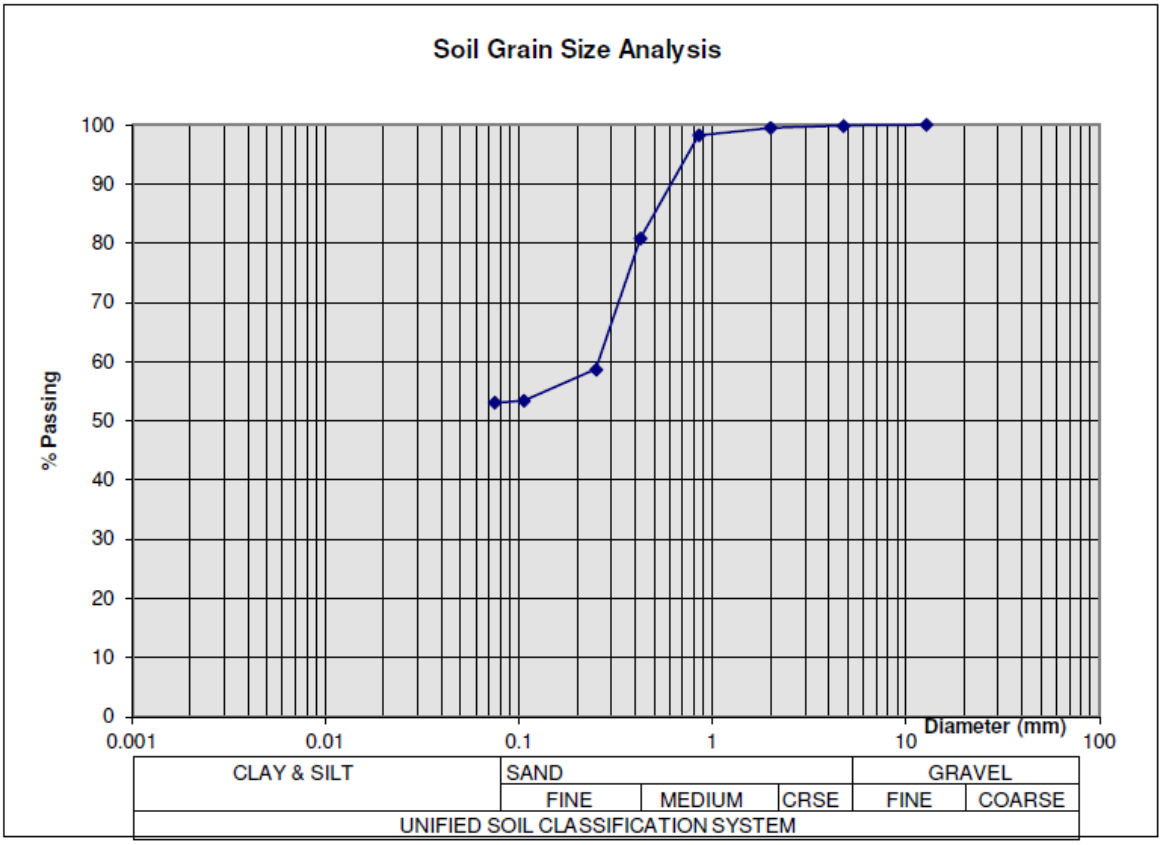
Unified System Classification:
SP Poorly Graded SAND (2% Finer than No. 200 sieve)
Est. Percolation Time: T = 8 min/cm

BOS Engineering Environmental Services

Project :	Ballymote Lots	*Client :*	Brock Development
Test Pit :	TP2	*RE:*	Waste Treatment System
Depth :	30 to 81 cm	*Proj. No.*	2011-22
Dry Mass:	124.9 g	*Date:*	Nov 27 20

CHART DATA

Sieve No.	Mass	Cum. Mass	Diam. (d)	% Passing
		0	12.7	100
4	0.2	0.2	4.75	100
10	0.4	0.6	2	100
20	1.6	2.2	0.85	98
40	21.7	23.9	0.425	81
60	27.7	51.6	0.25	59
140	6.6	58.2	0.106	53
200	0.4	58.6	0.075	53



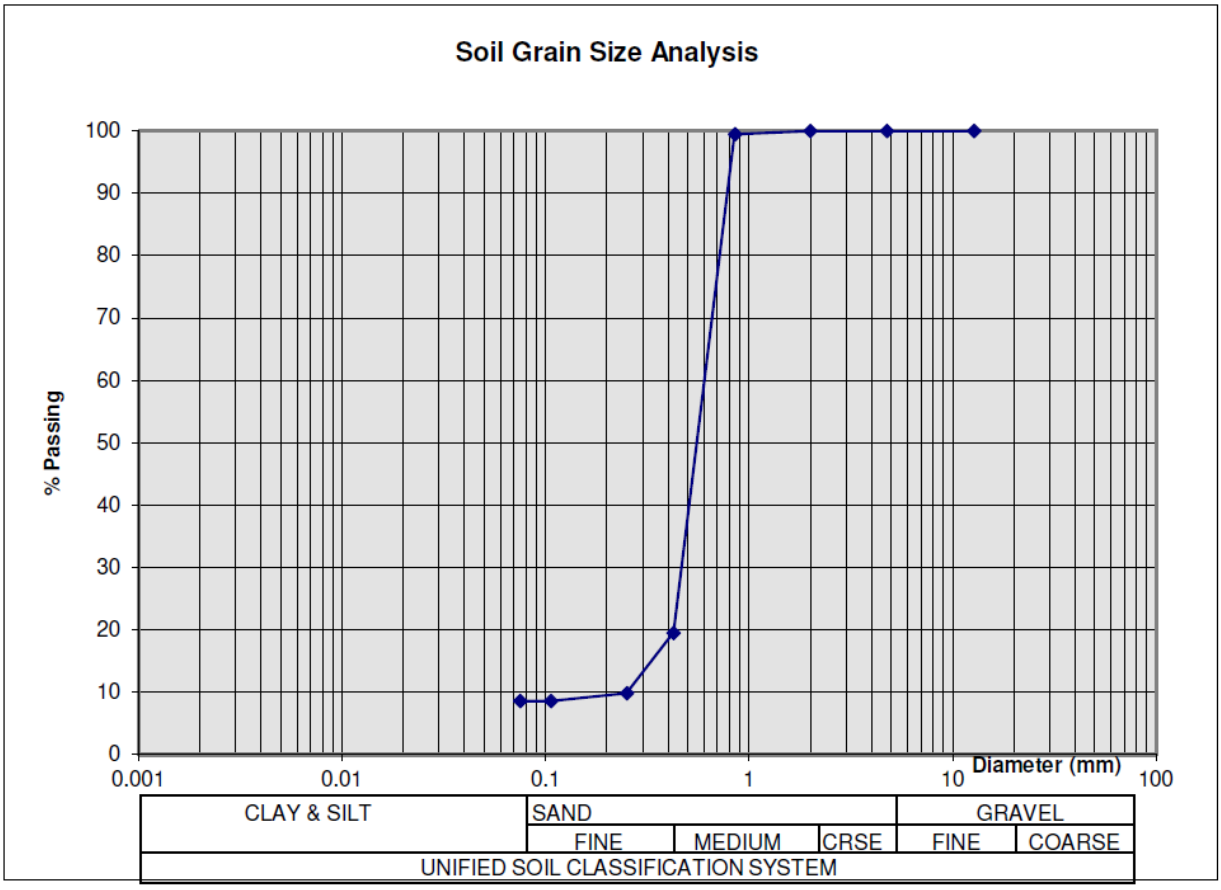
Unified System Classification:
Sandy SILT (53% Finer than No. 200 sieve)
Est. Percolation Time: T = 40 min/cm

BOS Engineering Environmental Services

Project :	Ballymote Lots	***Client :***	Brock Development
Test Pit :	TP6	***RE:***	Waste Treatment System
Depth :	41 to 81 cm	***Proj. No .***	2011-22
Dry Mass:	134.2 g	***Date:***	Nov 27 20

CHART DATA

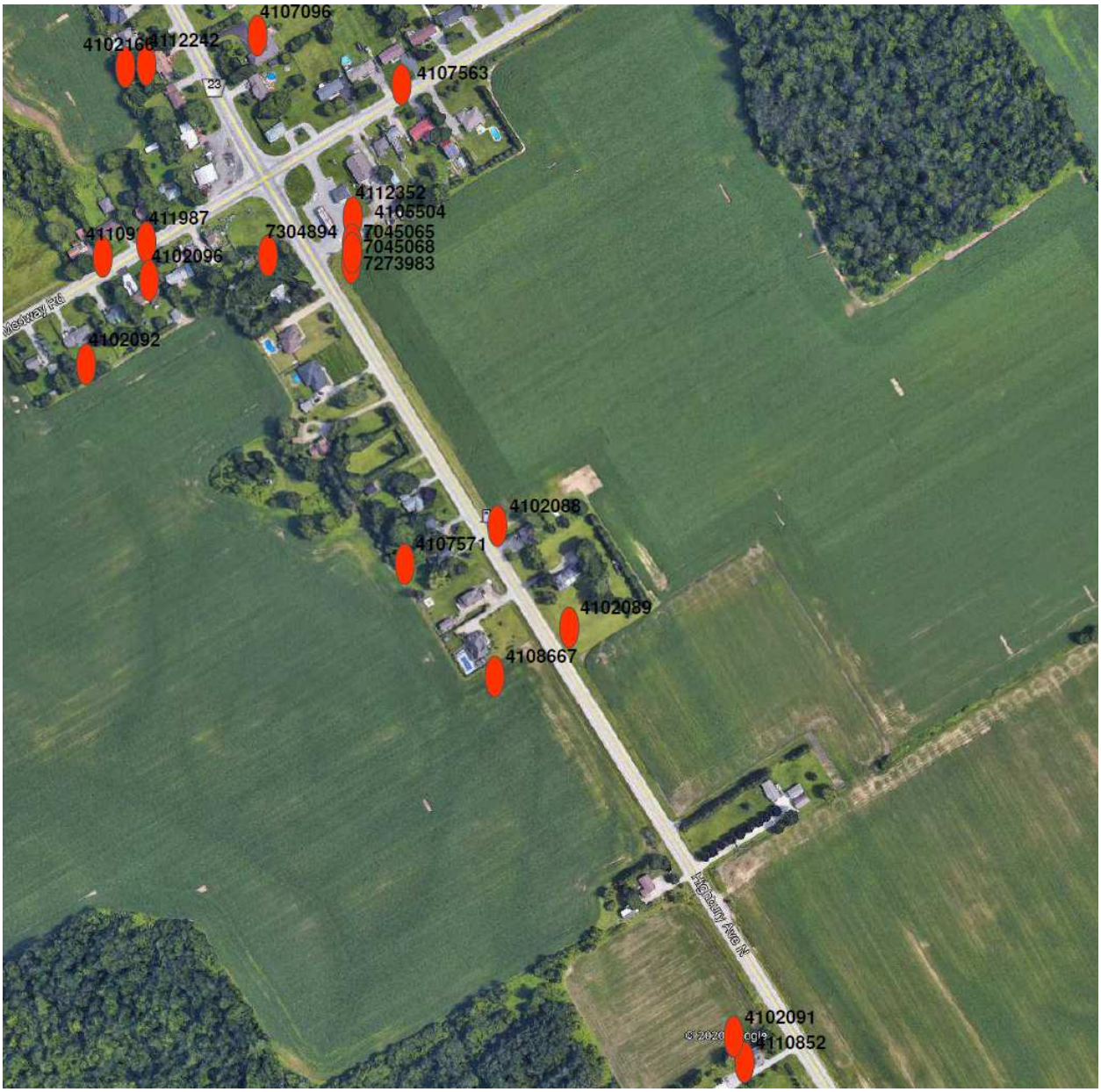
Sieve No.	Mass	Cum. Mass	Diam. (d)	% Passing
		0	12.7	100
4	0.0	0	4.75	100
10	0.0	0	2	100
20	0.7	0.7	0.85	99
40	107.3	108	0.425	20
60	13.0	121	0.25	10
140	1.7	122.7	0.106	9
200	0.0	122.7	0.075	9



Unified System Classification:
SM Sand Trace Silt (9% Finer than No. 200 sieve)
Est. Percolation Time: T = 10 min/cm

Appendix C

Map: Existing Water Well Records


4107096
4102166
4112242
4107563
4112352
4105504
411987
41109
7304894
7045065
7045068
7273983
4102096
4102092
4102088
4107571
4102089
4108667
4102091
4110852

Appendix D

Individual Well Records

UTM 17 Z 480700 E
5 R 4767600 N
Elev. 14 R 6900

The Ontario Water Resources Commission Act

WATER WELL RECORD

JUN 9 1964
41 No. 2089

Basin 2 MIDDLESEX Township, ~~Village, Town or City~~ LONDON
County or District
Lot 8 Date completed 11 May 1964
(day) (month) (year)
[redacted] ess. RR#1 Arva

Casing and Screen Record

Inside diameter of casing 6 to 18 ft 36 in
Total length of casing
Type of screen 18 to 26 ft 27 in
Length of screen
Depth to top of screen
Diameter of finished hole

Pumping Test

Static level 16
Test-pumping rate 50 G.P.M.
Pumping level 24
Duration of test pumping 1 hr
Water clear or cloudy at end of test clear
Recommended pumping rate 5 G.P.M.
with pump setting of 24 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)
sandy clay	0	8'	26 ft	fresh
hard blue clay	8	26		

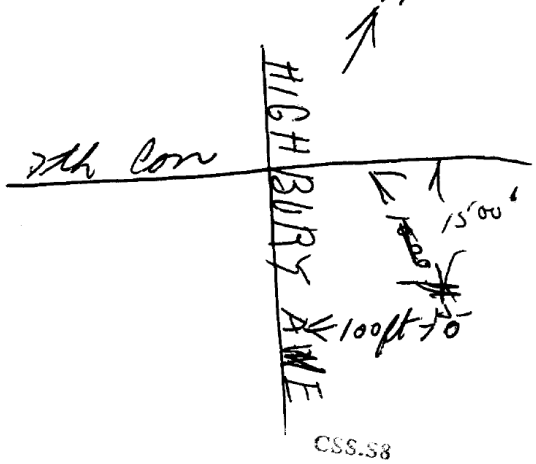
For what purpose(s) is the water to be used? house
Is well on upland, in valley, or on hillside? upland
Drilling or Boring Firm Roy Hudson
Address Arva
Licence Number 52
Name of Driller or Borer same
Address
Date May 11 1964
Roy Hudson
(Signature of Licensed Drilling or Boring Contractor)

Form 7 15M-60-4138

OWRC COPY

Location of Well

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



CSS.58

UTM 17 Z 480770 E
9 R 4767260 N
Elev. 9 R 0890
Basin 2

ONTARIO

RECEIVED
JAN 30 1957
GEOLOGICAL BRANCH
DEPARTMENT OF MINES

The Water-well Drillers Act, 1954
Department of Mines

41 No 2091

Water-Well Record

County or Territorial District ...Middlesex... Township, Village, Town or City ...London...
[redacted] n Village, Town or City) .....
Address ...R.R.1 Arva...

(day) (month) (year)

Pipe and Casing Record

Casing diameter(s) ...6¼"...
Length(s) ...84 ft...
Type of screen .....
Length of screen .....

Pumping Test

Static level ...1½ ft...
Pumping rate ...300 G.P.H...
Pumping level ...72 ft...
Duration of test ...8 hrs...

Well Log

Overburden and Bedrock Record	From ft.	To ft.
fill	0	1
top soil	1	3
clay	3	6
sand & clay	6	8
blue clay & boulders	8	74
hardpan	74	82
sand & gravel	82	86

Water Record

Depth(s) at which water(s) found	No. of feet water rises	Kind of water (fresh, salty, or sulphur)
82	84	fresh

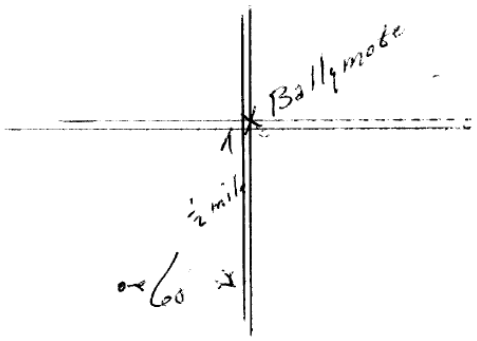
For what purpose(s) is the water to be used?
...Domestic...
Is water clear or cloudy? ...Clear...
Is well on upland, in valley, or on hillside? ...
...upland...
Drilling firm ...W. D. Hale...
Address ...Arva...
Name of Driller .....
Address .....
Licence Number ...476...

I certify that the foregoing statements of fact are true.

Date ....Wm Hale...
Signature of Licensee

Location of Well

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



UTM 17 E 480320
5 R 4767900 N
Elev. 4 R 0895

The Ontario Water Resources Commission Act

WATER WELL RECORD

GROUND WATER BRANCH
[redacted]
RES. 41 No. 2092

Basin 2 County or District MIDDLESEX
Township, Village, Town or City LONDON TWP
Con. 6 Lot 9
Date completed April 28 1962 (day month year)
Owner [redacted] (print in block letters)
Address RR #1 Arva Ont

Casing and Screen Record

Inside diameter of casing 36 in
Total length of casing 10 ft
Type of screen
Length of screen
Depth to top of screen
Diameter of finished hole 36

Pumping Test

Static level 4 ft
Test-pumping rate 2 G.P.M
Pumping level 8 ft
Duration of test pumping 1 hr
Water clear or cloudy at end of test Clear
Recommended pumping rate 5 G.P.M
with pump setting of 8 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)
Top soil	0	1	4	Fresh
Sand	1	5		
Blue clay rock	5	10		

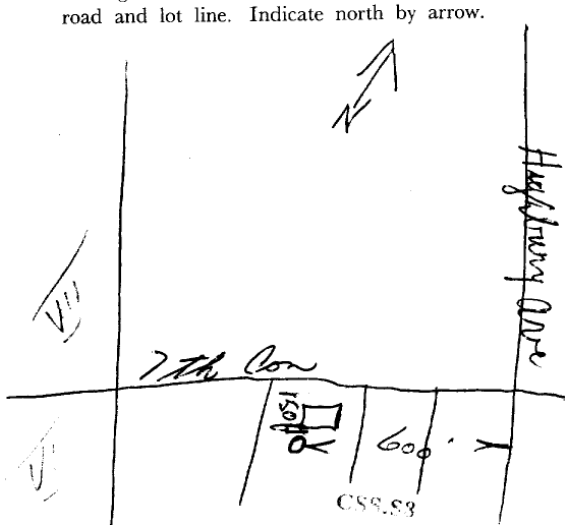
For what purpose(s) is the water to be used? house
Is well on upland, in valley, or on hillside? hillside
Drilling or Boring Firm Roy Hudson
Address Arva Ont
Licence Number 8
Name of Driller or Borer Roy Hudson
Address Arva Ont
Date April 28
Roy Hudson
(Signature of Licensed Drilling or Boring Contractor)

Form 7 15M Sets 60-5930

OWRC COPY

Location of Well

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



UTM 17 480380 E
15 4767960 N
Elev. 4 0895

The Ontario Water Resources Commission Act

WATER WELL RECORD

41 No. 2096

Basin 2 30 MIDDLESEX
County or District

Township, Village, Town or City LONDON

Con. 6 Lot 9

Date completed 8 (day) May (month) 1967 (year)

Owner [redacted]

Address RR#1 Arva

Casing and Screen Record

Inside diameter of casing 36 in
Total length of casing 12 ft
Type of screen
Length of screen
Depth to top of screen
Diameter of finished hole 36 in

Pumping Test

Static level 4 ft
Test-pumping rate 3 G.P.M.
Pumping level 12 ft
Duration of test pumping 1 hr
Water clear or cloudy at end of test clear
Recommended pumping rate 3 G.P.M.
with pump setting of 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)
Sandy clay	0	8	4 ft	fresh
hard blue clay	8	12 ft		

For what purpose(s) is the water to be used? D

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

Drilling or Boring Firm Roy Hudson

Address Arva Ont

Licence Number 107

Name of Driller or Borer Roy Hudson

Address

Date May 8 1967

Roy Hudson
(Signature of Licensed Drilling or Boring Contractor)

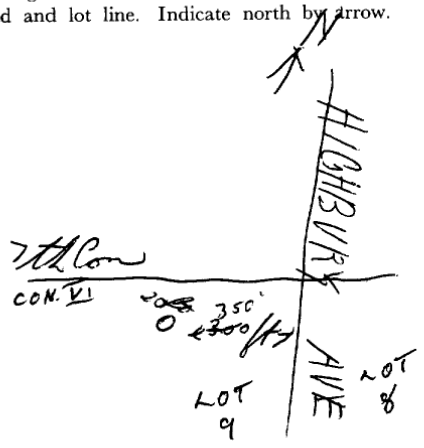
Form 7 15M-60-4138

OWRC COPY

40

Location of Well

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



UTM 17 Z 480400 E
5 R 4768140 N
Elev. 4 R 0895
Basin 2[illegible]

The Ontario Water Resources Commission Act, 1957

WATER WELL RECORD

41 No 2166

County or District MIDDLESEX Township, Village, Town or City LONDON TWP.

[redacted] Date completed 5 (day) NOV. (month) 1959 (year)

[redacted] Address 318 BOLER RD. BYRON ONT.

Casing and Screen Record

Inside diameter of casing 5" ø
Total length of casing 139 ft
Type of screen
Length of screen
Depth to top of screen
Diameter of finished hole 5 1/2

Pumping Test

Static level 10 ft
Test-pumping rate 350 per hr G.P.M.
Pumping level 20 ft
Duration of test pumping 4 hrs
Water clear or cloudy at end of test clear
Recommended pumping rate g. but G.P.M.
with pumping level of ~~350~~

Well Log

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)
Top soil	0	1			
sandy clay	1	10			
hard pan	10	20			
Hard pan, stones	20	30			
sand	30	45			
clay sand	45	65			
sandy hard pan	65	75			
clay	75	90			
sand	90	99			
hard pan	99	128			
clay	128	139			
sand gravel with water	139	140	139	12.9	fresh
MAY 12/60 - [illegible]			[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	135		

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

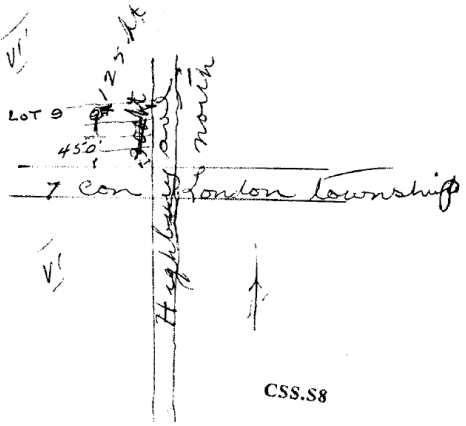
Is well on upland, in valley, or on hillside? upland

Drilling Firm Harold Seegrist
Address R.R. 6
London
Licence Number 367
Name of Driller Harold Seegrist
Address R.R. 6 London
Date Nov 5 / 59
H J Seegrist
(Signature of Licensed Drilling Contractor)

Form 5
15M-58-4149

Location of Well

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



CSS.S8

The Ontario Water Resources Commission Act

WATER WELL RECORD

40 P/3#

Water management in Ontario

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

11 | 4105504 | MUNICIP. 41008 | CON. CON | 06

COUNTY OR DISTRICT: MIDDLESEX
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: LONDON
CON., BLOCK, TRACT, SURVEY, ETC.: 6
LOT: 008
[redacted] RR#1 ARVA
DATE COMPLETED: DAY 27 MO 07 YR 71
7167958 | RC. 4 | ELEVATION 0898 | RC. 4 | BASIN CODE 2,3

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		PACKED	0	5
BLUE	CLAY		PACKED	5	18
	GRAVEL		LOOSE	18	19
BLUE	CLAY	BOULDERS	PACKED	19	28

31 | 0005605 | 0018305 | 0019 | 11 | 0028305/3

32

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0018	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
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☒ CONCRETE 4 ☐ OPEN HOLE			0028
36		3	0	28
	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 | LENGTH
MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN

61 PLUGGING & SEALING RECORD

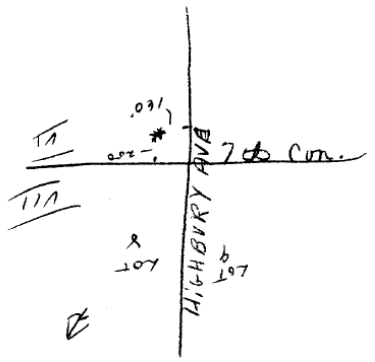
DEPTH SET AT – FEET FROM	DEPTH SET AT – FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☒ BAILER
PUMPING RATE: 4 GPM
DURATION OF PUMPING: HOURS MINS
STATIC LEVEL: 018 FEET
WATER LEVEL END OF PUMPING: 028 FEET
WATER LEVELS DURING: 1 ☐ PUMPING 2 ☒ RECOVERY
15 MINUTES FEET | 30 MINUTES FEET | 45 MINUTES FEET | 60 MINUTES 20 FEET
IF FLOWING, GIVE RATE GPM
PUMP INTAKE SET AT 27' FEET
WATER AT END OF TEST 1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE ☒ SHALLOW ☐ DEEP
RECOMMENDED PUMP SETTING 027' FEET
RECOMMENDED PUMPING RATE 0002 GPM
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 ☒ 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
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: ROY HUDSON | LICENCE NUMBER 2607
ADDRESS: R.R.#1 ARVA
WELL ENGINEER OR BORER: C. HAYDEN | LICENCE NUMBER 2552
CONTRACTOR: Hudson per EMAA | SUBMISSION DATE DAY 2 MO AUG YR 71

COPY

OFFICE USE ONLY
DATA SOURCE 1 | CONTRACTOR 2607 | DATE RECEIVED 230871
DATE OF INSPECTION 19, 6, 72 | INSPECTOR
REMARKS:
P
WI

MINISTRY OF THE ENVIRONMENT

The Ontario Water Resources Act

WATER WELL RECORD

40 P/38

Ontario

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

11 | 4106814 | MUNICIP. 41,008 | CON. CON | 06

COUNTY OR DISTRICT: [redacted] | TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: London | CON., BLOCK, TRACT, SURVEY, ETC.: con. VI | LOT: 008

DATE COMPLETED: DAY 10 MM 07 YR 74

Ballamate

4767451 4 902 4 23 MAY 05, 1976

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			0	15
blue	clay	stones		15	45
gravel				45	67

OWRC V.7

OWRC P.8

31 | 0015605 | 0045305 12 | 0067 11

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0060 ft	1 ☐ FRESH 3 ☐ SULPHUR / 2 ☐ SALTY 4 ☐ MINERAL
0063	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
05	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	0063
05	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE		63	0064
	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

METHOD: 1 ☑ PUMP | PUMPING RATE: 0010 GPM | DURATION OF PUMPING: 61 HOURS 30 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
006 FEET	015 FEET	015 FEET	015 FEET	015 FEET	015 FEET

1 ☑ PUMPING 2 ☐ RECOVERY

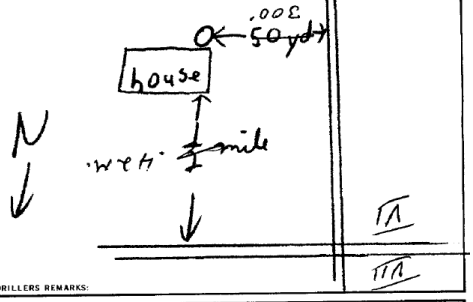
IF FLOWING, GIVE RATE: GPM | PUMP INTAKE SET AT: 15 FEET | WATER AT END OF TEST: 1 ☑ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: 1 ☑ SHALLOW ☐ DEEP | RECOMMENDED PUMP SETTING: 015 FEET | RECOMMENDED PUMPING RATE: 0010 GPM

001.1 GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL 8067

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: Mc Ford Well Drilling | LICENCE NUMBER: 3563

ADDRESS: 249 King Street E. Ingersoll

NAME OF DRILLER OR BORER: Ralph | LICENCE NUMBER: 3563

SIGNATURE OF CONTRACTOR: Mc Ford | SUBMISSION DATE: DAY ____ MO. ____ YR ____

OFFICE USE ONLY

DATA SOURCE: 1 | CONTRACTOR: 3563 | DATE RECEIVED: 180774

DATE OF INSPECTION: 13, 6, 75 | INSPECTOR: A

REMARKS: N.V.

CSS.88

P 2

WI 2

FORM 7 07-091

MINISTRY OF THE ENVIRONMENT COPY

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

WATER WELL RECORD

Ontario

40 P/38

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

11 | 4107096 | MUNICIP. 41005 | CON. CON | LOT 07

COUNTY OR DISTRICT [redacted] | TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE LONDON | CON., BLOCK, TRACT, SURVEY, ETC. 7 | LOT 008

[redacted] # 1 ARVA. ONT. | DATE COMPLETED DAY 25 MO 11 YR 74

21 | 4107096 | 17 | 4768149 | 4 | 895 | 4 | 23 | MAY 05, 1976

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BLACK	LOAM			0	2
BROWN	SAND	GRAVEL & STONES		2	18
BLUE	CLAY			18	97
GREY	SAND	SILT		97	99
BLUE	CLAY	STONES.		99	104

OWRC V.7

OWRC P.8

31 | 0002 8602 | 0011 6628 | 0097 3051 112 | 0099 2280 6 | 0104 3051 2

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0010	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
0097	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
05	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.244	0	0097
	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.) 008 | DIAMETER INCHES 05.000 | LENGTH FEET 07 | MATERIAL AND TYPE S.S. | DEPTH TO TOP OF SCREEN FEET 0097

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: 1 ☒ PUMP 2 ☐ BAILER | PUMPING RATE 0002 GPM | DURATION OF PUMPING 04 HOURS 30 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
013 FEET	104 FEET		104 FEET	104 FEET	104 FEET	104 FEET

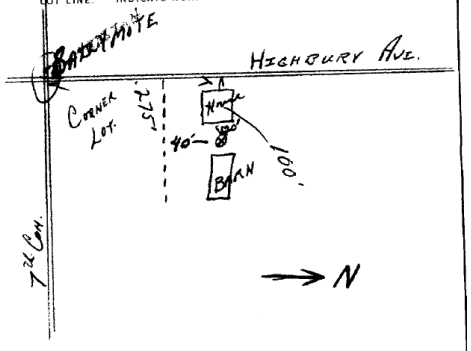
IF FLOWING, GIVE RATE ____ GPM | PUMP INTAKE SET AT 104 FEET | WATER AT END OF TEST 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP | RECOMMENDED PUMP SETTING 103 FEET | RECOMMENDED PUMPING RATE 0002 GPM

0000 GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL 8068

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 1 — 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: WAYNE STONER | LICENCE NUMBER 4809

ADDRESS: RR # 3 DENFIELD, ONT.

NAME OF DRILLER OR BORER: [redacted] | LICENCE NUMBER

SIGNATURE OF CONTRACTOR: Wayne Stoner | SUBMISSION DATE DAY 25 MO 11 YR 74

OFFICE USE ONLY

DATA SOURCE 1 | CONTRACTOR 4809 | DATE RECEIVED 24 01 75

DATE OF INSPECTION 13.6.75 | INSPECTOR

REMARKS:

P 7

CSS.88 | WI

FORM 7 07-09

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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 4107563 MUNICIP 4.1008 CON. CON 07

COUNTY OR DISTRICT: Middlesex
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: London
CON, BLOCK, TRACT, SURVEY, ETC: 7
LOT: 8
[redacted] R.R. # 1, Arva, Ontario
DATE COMPLETED: DAY 27 MO 06 YR 94
ELEVATION: RC
BASIN CODE: RC

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
		ABANDONED			
		Well # 41-7563			

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 5 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
	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.)
267	170	gravel / leadplug 170
170	7	Bentonite grout
7	0	concrete mix (dry)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☐ BAILER
PUMPING RATE: GPM
DURATION OF PUMPING: HOURS MINS
STATIC LEVEL: FEET
WATER LEVEL END OF PUMPING: FEET
WATER LEVELS DURING: 1 ☐ PUMPING 2 ☐ RECOVERY

15 MINUTES FEET	30 MINUTES FEET	45 MINUTES FEET	60 MINUTES 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: FEET
RECOMMENDED PUMPING RATE: GPM

LOCATION OF WELL

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

DRILLERS REMARKS: 132221

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
5 ☐ COMMERCIAL
6 ☐ MUNICIPAL
7 ☐ PUBLIC SUPPLY
8 ☐ COOLING OR AIR CONDITIONING
9 ☐ NOT USED
☐ 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
☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: Stainton's Ltd.
WELL CONTRACTOR'S LICENCE NUMBER: 4876
ADDRESS: R.R. #1 Arva, Ontario
NAME OF WELL TECHNICIAN: Wayne Stoner
WELL TECHNICIAN'S LICENCE NUMBER: T-0153
SIGNATURE OF TECHNICIAN/CONTRACTOR: K. M. Stainton
SUBMISSION DATE: DAY 30 MO 06 YR 94

MINISTRY OF THE ENVIRONMENT COPY

OFFICE USE ONLY

DATA SOURCE
CONTRACTOR: 4876
DATE RECEIVED: AUG 23 1994
DATE OF INSPECTION
INSPECTOR
REMARKS: ORIGINAL WATER WELL RECORD (4107563) ATTACHED. AUG. 23/94. AB.

CSS.88

FORM NO. 0506 (11/86) FORM 9

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

WATER WELL RECORD

40P/3B

Ontario

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11 | 14107563 | MUNICIP 41008 | CON. ØN | 07

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
MIDDLESEX	LONDON	7	008

[redacted] RR.1 ARVA ONT.

DATE COMPLETED: DAY 26 MO 03 YR 76

UTM 768100 | ELEVATION 6896 | 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	sand		fine	1	8
black	sand		meduim	8	9
grey	cl,y	sand and stones		9	156
black	limestone			156	164
brown	limestone			164	209
grey	limestone			209	267

31 | 1 | 02 | 0008 | 0008 | 0009 | 0009 | 0156 | 0205 | 28 | 1.2 | 0164 | 0215 | 0209 | 0215 | 1

32 | 0267 | 15

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0208	1 ☐ FRESH 3 ☒ SULPHUR / 2 ☐ SALTY 4 ☐ MINERAL
0265	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
07	1 ☒ STEEL / 2 ☐ GALVANIZED / 3 ☐ CONCRETE / 4 ☐ OPEN HOLE	240	0	0157
06 1/4	1 ☐ STEEL / 2 ☐ GALVANIZED / 3 ☐ CONCRETE / 4 ☒ OPEN HOLE		157	0267
	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: 1 ☐ PUMP 2 ☒ BAILER | PUMPING RATE 0005 GPM | DURATION OF PUMPING 02 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
092 FEET	170 FEET	FEET	170 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 200 FEET | RECOMMENDED PUMPING RATE 0005 GPM

GPM/FT. SPECIFIC CAPACITY

FINAL STATUS OF WELL 54: 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 55-56: 1

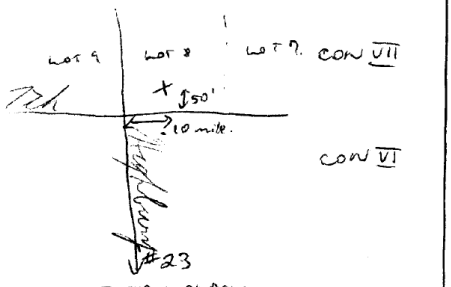
1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☒ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING 57: 2

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

LOCATION OF WELL

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



DRILLERS REMARKS: INTO LONDON.

CONTRACTOR

NAME OF WELL CONTRACTOR: Mervin Jones | LICENCE NUMBER: 3009

ADDRESS: R. R. #3, Thorndale, Ontario.

NAME OF DRILLER OR BORER: Murray Jones | LICENCE NUMBER: 3034

SIGNATURE OF CONTRACTOR: Mervin Jones | SUBMISSION DATE: DAY 30 MO 3 YR 76

OFFICE USE ONLY

DATA SOURCE 58: 1 | CONTRACTOR 59-62: 3009 | DATE RECEIVED 63-68: 050576

DATE OF INSPECTION: 24/11/77 | INSPECTOR: A

REMARKS: NIL. WELL BEHIND PUMP HOUSE

P AMP W ATER

CSS.58

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 MOE 07-091

MINISTRY OF THE ENVIRONMENT

The Ontario Water Resources Act

WATER WELL RECORD 40P/3B

Ontario

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

11 | 4107571 | MUNICIP. 41008 | CON. CON 06

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT 25-27
Middlesex	London	6	009

[redacted] RR#1 Arva

DATE COMPLETED 48-53: DAY 21 MO. 01 YR. 76

767680 RC. 4 ELEVATION 0902 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	TO
Red	Clay		Dense	0	10
Grey	Gravel	Clay	Layered	10	30
Grey	Gravel		Porous	30	33

OWRC

31 | 0010705166 | 0030211 0574 | 0033211 80

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0033 (10-13)	1 ☑ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL (14)
(15-18)	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL (19)
(20-23)	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL (24)
(25-28)	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL (29)
(30-33)	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL (34, 80)

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
~~6 5/8~~ 07 (10-11)	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE (12)	.231	0	~~33~~ 0033 (13-16)
(17-18)	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE (19)			(20-23)
(24-25)	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE (26)			(27-30)

SCREEN

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

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	80

71 PUMPING TEST

PUMPING TEST METHOD (10): 1 ☑ PUMP 2 ☐ BAILER
PUMPING RATE (11-14): 0006 GPM.
DURATION OF PUMPING: 48 HOURS (15-16) 00 MINS (17-18)

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (25) 1 ☑ PUMPING 2 ☐ RECOVERY: 15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
011 FEET (19-21)	011 FEET (22-24)	011 FEET (26-28)	011 FEET (29-31)	011 FEET (32-34)	011 FEET (35-37)

IF FLOWING GIVE RATE (38-41): GPM
PUMP INTAKE SET AT: 25 FEET
WATER AT END OF TEST (42): 1 ☑ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☑ DEEP
RECOMMENDED PUMP SETTING (43-45): 025 FEET
RECOMMENDED PUMPING RATE (46-49): 0006 GPM.
50-53 ___ GPM./FT. SPECIFIC CAPACITY

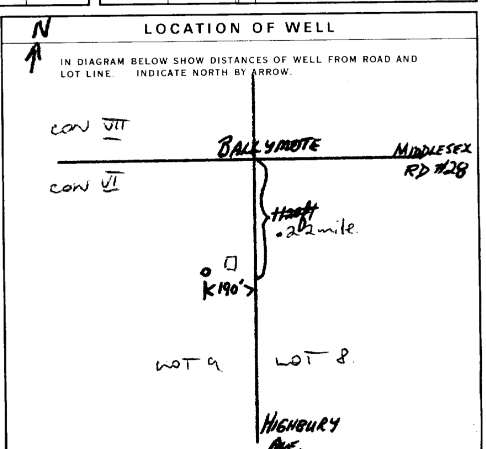
FINAL STATUS OF WELL (54) 1
1 ☑ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE (55-56) 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 (57) 1
1 ☑ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

LOCATION OF WELL

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



DRILLERS REMARKS:

CONTRACTOR

NAME OF WELL CONTRACTOR: John Wilson + Son Well Drilling — LICENCE NUMBER: 5466
ADDRESS: RR#1 Springfield, Ont. NOL2J0
NAME OF DRILLER OR BORER: Joe Humphrey — LICENCE NUMBER: —
SIGNATURE OF CONTRACTOR: [signature] — SUBMISSION DATE: DAY 24 MO. 3 YR. 76

OFFICE USE ONLY

DATA SOURCE (58): 1 — CONTRACTOR (59-62): 5466 — DATE RECEIVED (63-68): 100576 — 80
DATE OF INSPECTION: 24/11/77 — INSPECTOR: 2
REMARKS: NH — PITLESS ADAPTER — 12" ABOVE GROUND
CSS.S8
P [initials] W [initials]

FORM 7 07-091

MINISTRY OF THE ENVIRONMENT COPY

Ministry of the Environment

Ontario

The Ontario Water Resources Act

WATER WELL RECORD

4081/3h

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

11 4108667 MUNICIP 4V009 CON CON 06

COUNTY OR DISTRICT: Middlesex | TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: London | CON., BLOCK, TRACT, SURVEY, ETC.: Con 6 | LOT: 009

[redacted] R.1 Arva | DATE COMPLETED: DA 02 MO 10 YR 78

UTM | 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	TO
			Top soil	0	1
Brown	clay	small stone		1	10
Brown	clay	large stone		10	31
Brown	sand		coarse from 34-37	31	37

31 0001 02 001 0605 12 003 1605 13 0037 2810

32

51 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
003 27-32	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

52 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
05	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.244	0	34 0034
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 7 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN: SIZE(S) OF OPENING (SLOT NO.) 016 | DIAMETER 05000 INCHES | LENGTH 03 FEET | MATERIAL AND TYPE: Stainless steel | DEPTH TO TOP OF SCREEN 0034 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 06 HOURS 00 MINS

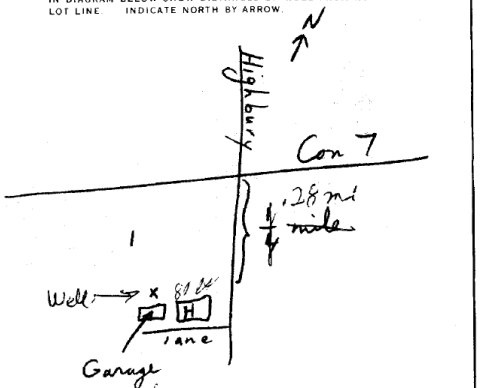
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
014 FEET	016 FEET		016 FEET	016 FEET	016 FEET	016 FEET

IF FLOWING, GIVE RATE: GPM | PUMP INTAKE SET AT 36 FEET | WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP | RECOMMENDED PUMP SETTING 036 FEET | RECOMMENDED PUMPING RATE 0008 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 54: 1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE 55-56: 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 57: 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: Leroy Parsons | LICENCE NUMBER: 4204

ADDRESS: R.R. 2 Ilderton

NAME OF DRILLER OR BORER: same | LICENCE NUMBER: 4204

SIGNATURE OF CONTRACTOR: Leroy Parsons | SUBMISSION DATE: DAY 2 MO 10 YR 78

OFFICE USE ONLY

DATA SOURCE 58: 1 | CONTRACTOR 59-62: 4204 | DATE RECEIVED 63-68: 181278 | 80

DATE OF INSPECTION: 10, 9, 79 | INSPECTOR: 7

REMARKS: P RM

CSS.58 WI RM

FORM NO. 0506-4-77

MINISTRY OF THE ENVIRONMENT COPY

Ministry of the Environment
Ontario

(18)

The Ontario Water Resources Act

40P/38

WATER WELL RECORD

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

11 4110852 SURFICIAL 41008 CON CON 06

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON, BLOCK, TRACT, SURVEY, ETC.	LOT
[redacted]	LONDON	CON 7 VI	9

DATE COMPLETED: DAY 24 MO 6 YR 87

[redacted] R. #1 Arva, Ontario N0M 1C0

767220 0880

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Black	Topsoil			0	1
Brown	Clay	Sand		1	5
Grey	Clay	Sand and Gravel	Layered	5	77
Grey	Gravel		Fine	77	78

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
78	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
5	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	188	0	78
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			
	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.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	10 GPM	1 HOURS 0 MINS

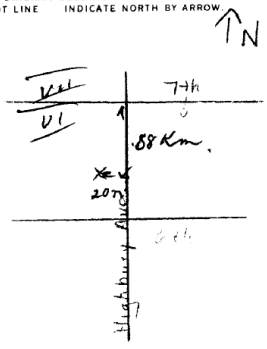
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
24 FEET	36 FEET		36 FEET	36 FEET	36 FEET	36 FEET

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	45 FEET	10 GPM

LOCATION OF WELL

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



DRILLERS REMARKS: 14401

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; 9 ☐ DEWATERING

WATER USE

1 ☒ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; ☐ OTHER; 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: Mervin Jones
WELL CONTRACTOR'S LICENCE NUMBER: 3009
ADDRESS: R. R. #3 Thorndale, Ontario N0M 2P0
NAME OF WELL TECHNICIAN: Murray S. Jones
WELL TECHNICIAN'S LICENCE NUMBER: T-0068
SIGNATURE OF TECHNICIAN/CONTRACTOR: Murray Jones
SUBMISSION DATE: DAY 25 MO 6 YR 87

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR | DATE RECEIVED: JUL 15 1987
DATE OF INSPECTION: 8 2 88 | INSPECTOR
REMARKS: PIT LESS
CSS.88

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

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 — 4111987 — MUNICIP 41008 — CON. CON. 106

COUNTY OR DISTRICT: MIDDLESEX
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: LONDON
CON: 6
BLOCK ~~TRACT, SURVEY~~, ETC:
LOT: 9
ADDRESS: [redacted] RR #1 ARVA. ONT.
DATE COMPLETED: DAY 20 MO 4 YR 89

21 — UTM ZONE 17 — EASTING 480376 — NORTHING 4767989 — ELEVATION 901 — 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	SAND	CLAY		0	9
GREY	CLAY	STONES		9	55
GREY	CLAY	SILT, SAND, STONES		55	80
GREY	CLAY	STONES		80	99
GREY	SAND	SILT		99	104
GREY	CLAY	STONES		104	108

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
99	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
6¼	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	+2	99
5¼	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	97 104	98 108
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE(S) OF OPENING (SLOT NO.): 12 — DIAMETER: 5 10 INCHES — LENGTH: 5 FEET
MATERIAL AND TYPE: S.S. — DEPTH TO TOP OF SCREEN: 99 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

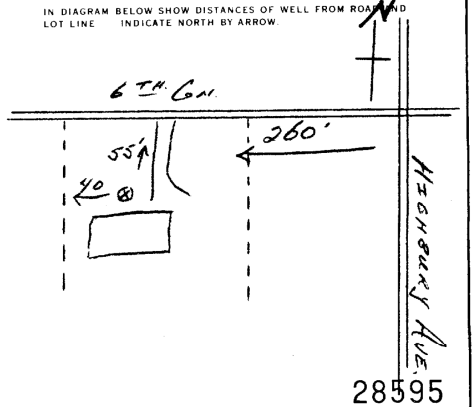
PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER
PUMPING RATE: 6 GPM
DURATION OF PUMPING: 9 HOURS ___ MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☒ PUMPING 2 ☐ RECOVERY) 15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
12 FEET	106 FEET	81 FEET	98 FEET	102 FEET	103 FEET

IF FLOWING, GIVE RATE: ___ GPM
PUMP INTAKE SET AT: 106 FEET
WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 106 FEET
RECOMMENDED PUMPING RATE: 6 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 9 ☐ 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: STONER WELL DRILLING LTD.
WELL CONTRACTOR'S LICENCE NUMBER: 4871
ADDRESS: RR #3 DENFIELD.
NAME OF WELL TECHNICIAN: W. STONER
WELL TECHNICIAN'S LICENCE NUMBER: 70153
SIGNATURE OF TECHNICIAN/CONTRACTOR: W. Stoner
SUBMISSION DATE: DAY 20 MO 4 YR 89

OFFICE USE ONLY

DATA SOURCE — CONTRACTOR: 4871 — DATE RECEIVED: FEB 23 1990
DATE OF INSPECTION — INSPECTOR
REMARKS

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Ministry of the Environment
Ontario

(6)

The Ontario Water Resources Act

WATER WELL RECORD

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

11 — 4112352 — MUNICIP 41008 — CON. CON 06

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON. BLOCK, TRACT, SURVEY, ETC.	LOT
MIDDLESEX	LONDON	6	8

OWNER (SURNAME FIRST)	ADDRESS	DATE COMPLETED
B.W.H. HOLDINGS INC.	R. R. #1 Arva, Ontario NOM - 1C0	DAY 03 MO 04 YR 91

21 — UTM ZONE 17 — EASTING 480565 — NORTHING 4768000 — RC — ELEVATION 900 — 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
Black	Topsoil			0	1
Brown	Sand	Clay		1	12
Grey	Clay	Sand		12	48
Grey	Sand		Coarse	48	49

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
49	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	0	49
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			
	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: 1 ☒ PUMP 2 ☐ BAILER — PUMPING RATE: 10 GPM — DURATION OF PUMPING: 48 HOURS ___ MINS

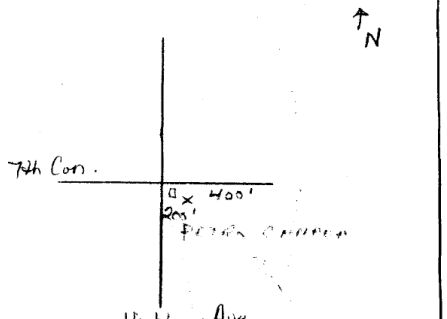
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
7 FEET	21 FEET		21 FEET	21 FEET	21 FEET	21 FEET

IF FLOWING GIVE RATE: ___ GPM — PUMP INTAKE SET AT: 33 FEET — WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP — RECOMMENDED PUMP SETTING: 35 FEET — RECOMMENDED PUMPING RATE: 10 GPM

LOCATION OF WELL

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



67992

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; 5 ☒ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED; ☐ 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; ☐ DIGGING; ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: MERVIN JONES DRILLING LTD. — WELL CONTRACTOR'S LICENCE NUMBER: 3009

ADDRESS: R. R. #3 Thorndale, Ontario NOM 2P0

NAME OF WELL TECHNICIAN: MURRAY S. JONES — WELL TECHNICIAN'S LICENCE NUMBER: T-0068

SIGNATURE OF TECHNICIAN/CONTRACTOR: Mervin Jones — SUBMISSION DATE: DAY 04 MO 04 YR 91

OFFICE USE ONLY

DATA SOURCE — CONTRACTOR: 3009 — DATE RECEIVED: MAY 02 1991

DATE OF INSPECTION — INSPECTOR

REMARKS: CSS.S8

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86)

Ontario Ministry of the Environment

The Ontario Water Resources Act

WATER WELL RECORD

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

11 **4114496** Municipality 41008 Con CON 06

County or District	Township/Borough/City/Town/Village	Con	block	tract	survey, etc.	Lot
Middlesex	London	6				8

Owner's surname	First Name	Address	Date completed (day month year)
BWH Holdings Inc.		2404 Highbury Ave. R.R.# 1 Arva	20 06 00

21 Zone | Easting | Northing | 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
	PREVIOUSLY DRILLED			0	49

31

32

41 WATER RECORD

Water found at - feet	Kind of water
10-13	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas 14
15-18	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 5 ☐ Gas 19
20-23	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas 24
25-28	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas 29
30-33	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas 34 60

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
10-11	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic 12			13-16
17-18	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic 19			20-23
24-25	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic 26			27-30

SCREEN

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

61 PLUGGING & SEALING RECORD

☐ Annular space ☒ Abandonment

Depth set at - feet From	Depth set at - feet To	Material and type (Cement grout, bentonite, etc.)
10-13 0	14-17 47	Bentonite
18-21 47	22-25 49	Pea Gravel
26-29	30-33	60

71 PUMPING TEST

Pumping test method 10: 1 ☐ Pump 2 ☐ Bailer
Pumping rate 11-14 GPM
Duration of pumping 15-16 Hours 17-18 Mins

Static level feet 19-21	Water level end of pumping feet 22-24	Water levels during 25: 1 ☐ Pumping 2 ☐ Recovery			
		15 minutes feet 26-28	30 minutes feet 29-31	45 minutes feet 32-34	60 minutes feet 35-37

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 feet
Recommended pump rate 46-49 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

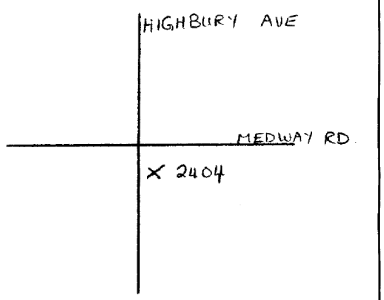
1 ☐ Domestic 2 ☐ Stock 3 ☐ Irrigation 4 ☐ Industrial 5 ☐ Commercial 6 ☐ Municipal 7 ☐ Public supply 8 ☐ Cooling & air conditioning 9 ☐ Not use 10 ☐ Other

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.



217711

Name of Well Contractor	Well Contractor's Licence No.
Mervin Jones Drilling Ltd.,	3009
Address: 22264 Fairview Rd, Thorndale, Ontario N0M 2P0	
Name of Well Technician: Murray S. Jones	Well Technician's Licence No.: T0068
Signature of Technician/Contractor: Murray S Jones	Submission date: 20 06 09

MINISTRY USE ONLY

Data source 58 | Contractor 59-62: 3009 | Date received 63-68: JUL 13 2000 | 80
Date of inspection | Inspector
Remarks: CSS.ES0

0506 (11/98) Front Form 9

2 - MINISTRY OF THE ENVIRONMENT COPY

Ontario Ministry of the Environment

Well Tag Number (Place sticker and print number below): A 044681

Well Record

Regulation 903 Ontario Water Resources Act

page 1 of 1

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 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only

[redacted]

Address of Well Location (County/District/Municipality): 21559 Highbury Rd. N

Township | Lot | Concession

RR#/Street Number/Name: 21559 Highbury Rd. N

City/Town/Village: Ballymote

Site/Compartment/Block/Tract etc.

GPS Reading: NAD 83 | Zone 17 | Easting 480163 | Northing 4768177

Unit Make/Model: Garmin Etrex

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	Depth To (Metres)
GREY	CLAY			3'	15'
brown	SAND	rocks	Sandy hill	0'	3'
	"cluster of 5 wells"				

Hole Diameter

Depth From	Depth To (Metres)	Diameter (Centimetres)
0'	4"	

Water Record

Water found at ___ Metres / Kind of Water

- ___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
- ___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
- ___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:

After test of well yield, water was ☐ Clear and sediment free ☐ Other, specify

Chlorinated ☐ Yes ☐ No

Construction Record

Inside diam (centimetres)	Material	Wall thickness (centimetres)	Depth From	Depth To (Metres)
Casing				
2'	☐ Steel ☐ Fibreglass ☑ Plastic ☐ Concrete ☐ Galvanized		0	3'
	☐ Steel ☐ Fibreglass ☑ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☑ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam		Slot No.		
2'	☐ Steel ☐ Fibreglass ☑ Plastic ☐ Concrete ☐ Galvanized		3'	15'
No Casing or Screen				
	☐ Open hole			

Test of Well Yield

Pumping test method	Draw Down Time (min)	Draw Down Water Level (Metres)	Recovery Time (min)	Recovery Water Level (Metres)
Pump intake set at - (metres)	Static Level			
Pumping rate - (litres/min)	1		1	
Duration of pumping ___hrs +___ min	2		2	
Final water level end of pumping ___metres	3		3	
Recommended pump type. ☐ Shallow ☐ Deep	4		4	
Recommended pump depth. ___metres	5		5	
Recommended pump rate. (litres/min)	10		10	
	15		15	
If flowing give rate - (litres/min)	20		20	
	25		25	
If pumping discontinued, give reason.	30		30	
	40		40	
	50		50	
	60		60	

Plugging and Sealing Record

☑ Annular space ☐ Abandonment

Depth set at - Metres From	Depth set at - Metres To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	3'	Bentonite chips	3'
3'	15'	Silica SAND	15'

Method of Construction

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

Water Use

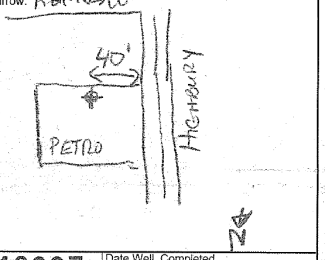
☐ Domestic ☐ Industrial ☐ Public Supply ☐ Other
☐ Stock ☐ Commercial ☑ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

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 49987

Date Well Completed: 2007 / 05 / 17

Was the well owner's information package delivered? ☑ Yes ☐ No

Date Delivered: 2007 / 06 / 11

Well Contractor/Technician Information

Name of Well Contractor: LONDON SOIL TEST LTD | Well Contractor's Licence No.: 7190

Business Address (street name, number, city etc.): R.R.6 DUNDALK ON N0C 1B0

Name of Well Technician (last name, first name): McRAE DON | Well Technician's Licence No.: 7370

Signature of Technician/Contractor | Date Submitted: 2007/05/24

Ministry Use Only

Data Source	Contractor: 7190
Date Received: JUN 14 2007	Date of Inspection
Remarks	Well Record Number

0506E (09/03) Contractor's Copy ☐ Ministry's Copy ☒ Well Owner's Copy ☐ *Cette formule est disponible en français*

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☑ Imperial

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

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
21559 Highbury Ave. N.	Middlesex Centre	9	6

County/District/Municipality	City/Town/Village	Province	Postal Code
Middlesex	Arva	Ontario	N0M1C0

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	480503	4768176		

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
	NO Previous Report Found. 42" Dug Well				
			top soil	0	1
			Chips and Dust	1	7
			Hole Plug	7	8.5
			Washed Peastone	8.5	10

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)

Method of Construction

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

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	To

Construction Record - Screen

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

Water Details

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

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)

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)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☑ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

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.
Stainton's Ltd	4876

Business Address (Street Number/Name)	Municipality
21937 Highbury Ave N	Arva

Province	Postal Code	Business E-mail Address
ON	N0M1C0	Staintons@xplornet.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
5196593359	Stainton, Brent F.

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
11485	Brent F Stainton	Y Y Y Y M M D D

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
☐ Yes ☐ No	Y Y Y Y M M D D	Audit No.: Z242464
	Date Work Completed: 20170517	Received: FEB 02 2018

506E (2014/11) Ministry's Copy

Appendix E

Wastewater Treatment System Assumptions & Sizing

WASTEWATER TREATMENT SYSTEM ASSUMPTIONS AND SIZING

MIDDLESEX CENTRE REQUIRES SUFFICIENT SPACE FOR A CONTINGENCY BED DURING LOT CREATION.
HENCE, TERTIARY PRETREATMENT SYSTEMS ARE REQUIRED FOR PROPOSED LOT SIZES.

ASSUMED HOUSE CHARACTERISTICS

FIXTURE UNITS - SUMMARY

ITEM	No.	LOAD	TOTAL
1.FULL BATHROOM	4	6	24
INDIVIDUAL ITEMS :			
2. ANY TYPE OF BATH	2	1.5	3.0
3. FLUSH TANK TOILETS	1	4	4
4a.SHOWER(1 HEAD)	0	1.5	0
4b.SHOWER(3 HEAD)	0	4.5	0
5.FLOOR DRAIN	1	2 - 4	3
6.LAVATORY (DOMESTIC)	1	1.5	1.5
7.BIDET	0	1	0
8. KITCHEN SINK	1	1.5	1.5
9. DISHWASHER (to sink trap)	1	0	0
10. LAUNDRY TUB	1	1.5	1.5
11. CLOTHES WASHER	1	1.5	1.5
12. DRINKING FOUNTAIN	0	0.5	0
13. GARBAGE GRINDER	0	3	0
TOTAL UNITS			**40.0**

NO. OF BEDROOMS: 4
TOTAL LIVING AREA: 300 m²

WASTE SYSTEM - DESIGN CAPACITY

BASE LOAD (4 BEDROOM):	2000
1. F. U. OPTION (40 - 20) X 50 :	1000
2. L. A. OPTION (300- 200)/10 X 100:	1000
ADD HIGHER OF ITEM 1 OR 2	
DESIGN LOAD	**= 3000 L/DAY**

CAN/BNQ 3680-600 TYPE "A" BED SEPTIC SYSTEM DESIGN CALCULATIONS AND DIMENSIONS

1. DESIGN LOAD = 3000 L/DAY (SEE "DESIGN CAPACITY")

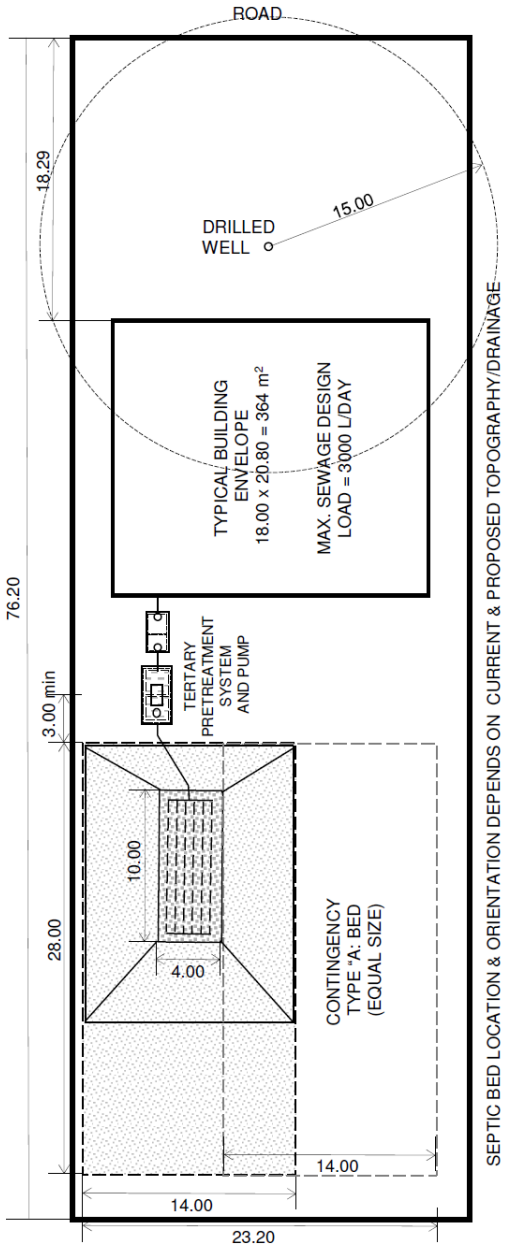
2. TERTIARY PRETREATMENT UNIT REQUIRED.

2. MIN. STONE BED AREA = 3000 / 75 = 40.0 m²
SPECIFIED: 10.00 X 4.00 = 40.0 m²

3. DISTRIBUTION PIPE: 6 RUNS EACH 8.80 m LONG @ 56 cm ON CENTRES; ALL PIPES 60 cm FROM EDGES OF STONE.

4. MIN. TOTAL SAND CONTACT AREA = QT/400 =375 m²
TOTAL SPECIFIED AREA INCL MANTLE = 20.90 X 18.00 = 376 m²

5. IMPORTED SAND : T = 6 to 8 min/cm



APPENDIX C

Topographical Plan of Survey by Callon Dietz Incorporated, File No. 20-23779 A, dated February 17, 2021
SWM Calculations

TOPOGRAPHICAL PLAN OF SURVEY

OF PART OF

NORTH HALF LOT 8, CONCESSION 6

(GEOGRAPHIC TOWNSHIP OF LONDON)

IN THE

MUNICIPALITY OF MIDDLESEX CENTRE
COUNTY OF MIDDLESEX

SCALE 1:1000 (Metric)

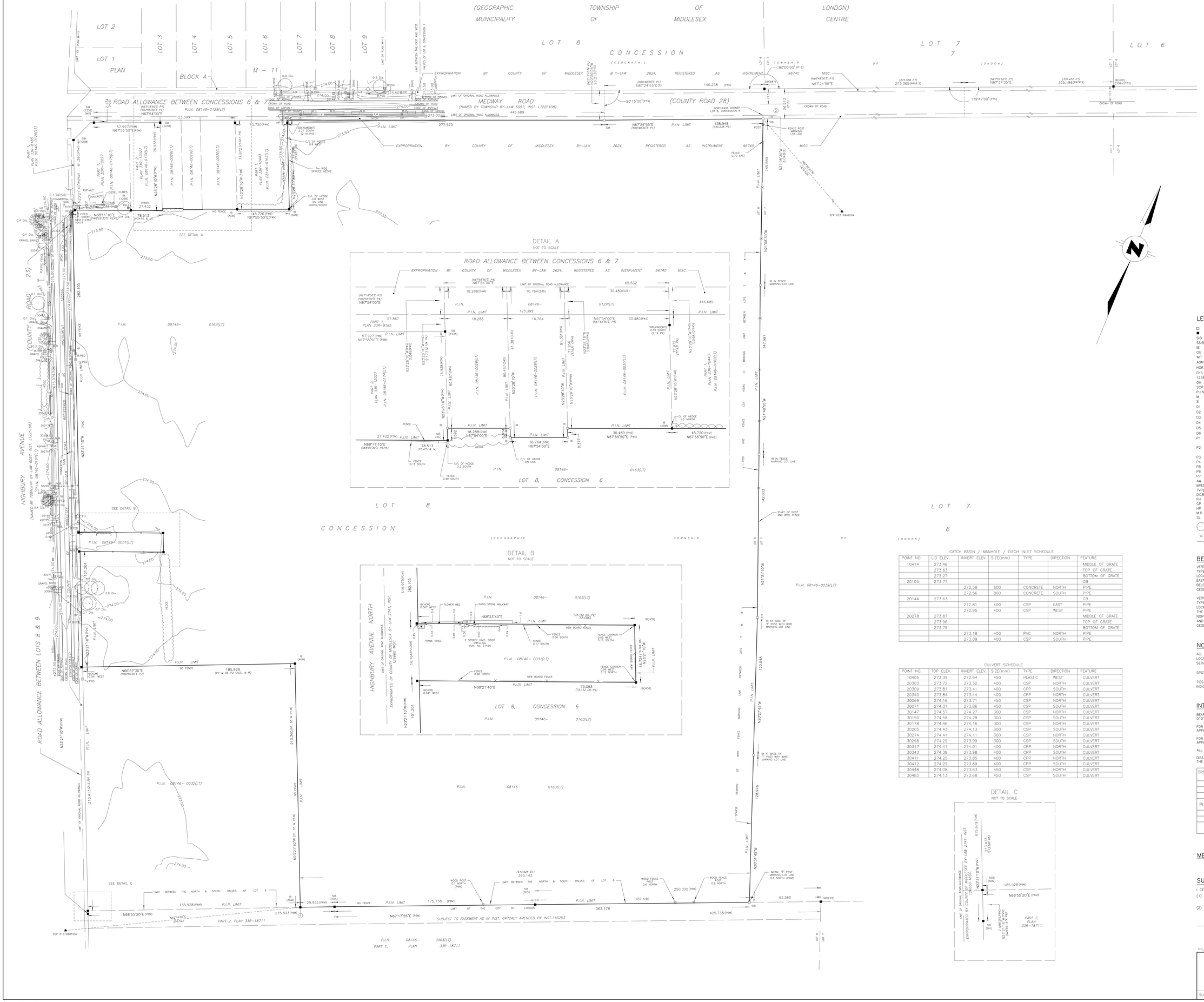
15 7.5 0 15 30 45 60 75

(SCALE IN METRES)

TERRY P. DIETZ
ONTARIO LAND SURVEYOR

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2154784

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR
In accordance with Regulation 1026, Section 29 (3)



LEGEND

⊡	DENOTES SURVEY MONUMENT SET
■	DENOTES SURVEY MONUMENT FOUND
SIB	DENOTES STANDARD IRON BAR
SSIB	DENOTES SHORT STANDARD IRON BAR
IB	DENOTES IRON BAR
OU	DENOTES ORIGIN UNKNOWN
WIT	DENOTES WITNESS
AGM	DENOTES ARCHIBALD, GRAY & McKAY, O.L.S.'s
HOR	DENOTES HOLSTEAD & REDMOND, O.L.S.'s
FKS	DENOTES FARNCOMB, KIRKPATRICK, & STIRLING, O.L.S.'s
1238	DENOTES MURRAY FRASER LIMITED
OH	DENOTES ONTARIO HYDRO
SCP	DENOTES SPECIFIED CONTROL POINT
P.I.N.	DENOTES PROPERTY IDENTIFIER NUMBER
M	DENOTES MEASURED
S	DENOTES SET
D1	DENOTES INST. 354908 (P.I.N. 08146-0163(LT))
D2	DENOTES INST. 464855 (P.I.N. 08146-0030(LT))
D3	DENOTES INST. 525818 (P.I.N. 08146-0029(LT))
D4	DENOTES INST. 574148 (P.I.N. 08146-0028(LT))
D5	DENOTES INST. 598709 (P.I.N. 08146-0032(LT))
D6	DENOTES INST. 708709 (P.I.N. 08146-0031(LT))
P1	DENOTES PLAN OF SURVEY ATTACHED EXPROPRIATION BY COUNTY OF MIDDLESEX BY-LAW 2624, INST. 96740 MISC.
P2	DENOTES PLAN OF SURVEY ATTACHED EXPROPRIATED BY COUNTY OF MIDDLESEX BY-LAW 2741, INST. 126660 MISC.
P3	DENOTES PLAN 33R-8185
P4	DENOTES PLAN 33R-10443
P5	DENOTES PLAN 33R-12027
P6	DENOTES PLAN 33R-18711
P7	DENOTES AGM PLAN OF SURVEY DATED AUGUST 8, 2008.
AW	DENOTES AERIAL WIRES
BPED	DENOTES BELL PEDESTAL
TYPED	DENOTES CABLE PEDESTAL
DICB	DENOTES DITCH INLET CATCH BASIN
FH	DENOTES FIRE HYDRANT
GP	DENOTES GUARD POST
HP	DENOTES HYDRO POLE
M.B.	DENOTES MAIL BOX
SL	DENOTES STREET LIGHT
	DENOTES DECIDUOUS TREE
	DENOTES MISCELLANEOUS TRAFFIC SIGN
	DENOTES POLE ANCHOR

BENCHMARK

VERTICAL CONTROL: CITY OF LONDON MONUMENT BM02-50
TYPE: BOLT
LOCATION: BRICK PRIVACY WALL ON THE SOUTHWEST CORNER OF SUNNINGDALE ROAD EAST AND SOUTH WENIGE DRIVE, BOLT SET IN THE NORTH FACE OF THE WALL, 0.21m BELOW BRICK AND 0.71m WEST OF THE 45 DEGREE ANGLE OF THE WALL.
GEODETIC ELEVATION: 259.153m

VERTICAL CONTROL: CITY OF LONDON MONUMENT BM02-43
TYPE: BOLT
LOCATION: CONCRETE BOX CULVERT CROSSING SUNNINGDALE ROAD EAST, 320m WEST OF THE CENTRELINE OF HIGHBURY AVENUE NORTH. BOLT SET IN THE EAST FACE ON THE NORTH SIDE OF SUNNINGDALE ROAD EAST, 0.12m SOUTH OF THE NORTHEAST CORNER AND 0.12m DOWN FROM THE TOP.
GEODETIC ELEVATION: 260.902m

NOTES

ALL BURIED SERVICES (WITH THE EXCEPTION OF SEWER INVERTS) WERE DERIVED FROM FIELD LOCATES. THE EXISTENCE OR PRECISE LOCATION WAS NOT DETERMINED BY THIS SURVEY. ALL SERVICES SHOULD BE VERIFIED BY FIELD LOCATES PRIOR TO CONSTRUCTION.

SPOT ELEVATIONS ARE FROZEN ON LAYER: "SPOT_ELEVATIONS"

TIES TO BUILDINGS ARE AT RIGHT ANGLES TO THE BOUNDARY LINES, UNLESS OTHERWISE INDICATED.

INTEGRATION DATA

BEARINGS ARE MTM GRID DERIVED FROM SPECIFIED CONTROL POINTS SCP 01019881057 AND SCP 02819942004, MTM ZONE 11, NAD83:CSRS:CBN+6-2010.0

FOR BEARING COMPARISONS, A ROTATION OF 0°48'10" COUNTER-CLOCKWISE, WAS APPLIED TO THE BEARINGS FROM P1, P2, P3, P4 & P5.

FOR BEARING COMPARISONS, A ROTATION OF 1°01'35" COUNTER-CLOCKWISE, WAS APPLIED TO THE BEARINGS FROM P6.

ALL DIMENSIONS SHOWN ARE MEASURED, UNLESS OTHERWISE NOTED.

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999993.

SPECIFIED CONTROL POINTS (SCP's): MTM ZONE 11, NAD83:CSRS:CBN+6-2010.0 COORDINATES TO URBAN ACCURACY PER SEC. 14 (2) OF O.REG. 216/10

POINT ID	NORTHING	EASTING
SCP 01019881057	4769753.206	407746.815
SCP 02819942004	4769802.013	409659.782

PLAN COORDINATES, MTM ZONE 11, NAD83:CSRS:CBN+6-2010.0

1	4769849.314	407929.612
2	4770641.072	408045.266

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN

METRIC DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

(1) THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
(2) THE SURVEY WAS COMPLETED ON THE 12th OF FEBRUARY, 2021.

DATE

TERRY P. DIETZ
ONTARIO LAND SURVEYOR

CATCH BASIN / MANHOLE / DITCH INLET SCHEDULE

POINT NO.	LID ELEV.	INVERT ELEV.	SIZE(mm)	TYPE	DIRECTION	FEATURE
10414	273.46					MIDDLE OF GRATE
	273.63					TOP OF GRATE
	273.27					BOTTOM OF GRATE
20105	273.77					CB
		272.58	600	CONCRETE	NORTH	PIPE
		272.56	800	CONCRETE	SOUTH	PIPE
20144	273.63					CB
		272.81	400	CSP	EAST	PIPE
		272.95	400	CSP	WEST	PIPE
20278	273.87					MIDDLE OF GRATE
	273.96					TOP OF GRATE
	273.79					BOTTOM OF GRATE
		273.18	400	PVC	NORTH	PIPE
		273.09	400	CSP	SOUTH	PIPE

CULVERT SCHEDULE

POINT NO.	TOP ELEV.	INVERT ELEV.	SIZE(mm)	TYPE	DIRECTION	FEATURE
10405	273.39	272.94	450	PLASTIC	WEST	CULVERT
20303	273.72	273.32	400	CSP	NORTH	CULVERT
20309	273.81	273.41	400	CPP	SOUTH	CULVERT
20340	273.84	273.44	400	CPP	NORTH	CULVERT
30069	274.16	273.71	450	CSP	NORTH	CULVERT
30071	274.31	273.86	450	CSP	SOUTH	CULVERT
30147	274.57	274.27	300	CSP	NORTH	CULVERT
30150	274.58	274.28	300	CSP	SOUTH	CULVERT
30178	274.46	274.16	300	CSP	NORTH	CULVERT
30205	274.43	274.13	300	CSP	SOUTH	CULVERT
30274	274.41	274.11	300	CSP	NORTH	CULVERT
30296	274.29	273.99	300	CSP	SOUTH	CULVERT
30317	274.41	274.01	400	CPP	NORTH	CULVERT
30343	274.38	273.98	400	CPP	SOUTH	CULVERT
30411	274.25	273.85	400	CPP	NORTH	CULVERT
30412	274.29	273.89	400	CPP	SOUTH	CULVERT
30448	274.08	273.63	450	CSP	NORTH	CULVERT
30483	274.13	273.68	450	CSP	SOUTH	CULVERT

C:_COvault\DWG\2020\2020-23779\23779 A.dwg February 17, 2021

Callon Dietz INCORPORATED
ONTARIO LAND SURVEYORS
CARLETON PLACE LONDON NORTH BAY
info@callondietz.com callondietz.com

ISO 9001 REGISTERED

SURVEY BY: LM/PK	DRAWN BY: BD	FILE No: 20-23779 A	PLAN No: E-1306

STRIK BALDINELLI MONIZ
PLANNING • CIVIL • STRUCTURAL • MECHANICAL • ELECTRICAL

LONDON LOCATION
1599 Adelaide St. N., Units 301 & 203
London, ON N5X 4E8
P: 519-471-6667

KITCHENER LOCATION
1415 Huron Rd., Unit 225
Kitchener, ON N2R 0L3
P: 519-725-8093

www.sbmltd.ca

sbm@sbmltd.ca

SWM Calculations

DATE:	March 18, 2021
JOB N0.:	SBM-21-0716
Client:	**Brock Development Group**
Project:	**Proposed Residential Development**
Location:	**Medway Road, Ballymote, Ontario**

CITY OF LONDON-3 CHICAGO RAINFALL DISTRIBUTION PARAMETERS*

Return Period (years)	A,B,C Parameters A	B	C
25mm	538.850	6.331	0.809
2	1290.000	8.500	0.860
5	1183.740	7.641	0.838
10	1574.382	9.025	0.860
25	2019.372	9.824	0.875
50	2270.665	9.984	0.876
100	2619.363	10.500	0.884
250	3048.220	10.030	0.888

* Intensity i=A/(t+B)^C (mm/hr)
* Section 6.2 of Municipality of Middlesex Centre IDS, City of London a,b, & c design parameters are used.

Runoff Coefficients from Section 4.8.3 of Municipality of Middlesex Centre Infrastructure Design Standards (IDS)

Parks, open space and playgrounds = 0.2
Standard Single Family Residential = 0.5

A201, A202 & A203 - LOT 1 (LARGEST AREA OF LOTS 1, 2 & 3)

LOT 1 - A201

PRE-DEVELOPMENT CONDITIONS (A201)

	Area (m^2)	
Total Site Area:	2241.28	
Runoff Coefficient C =	0.20	
5-Year Pre-Development Flows		
C-value =	0.20	
**Time of concentration t_c =	19	min
Intensity, i (@ t_c) =	74.60	mm/hr
Pre-Development Flow, Q_r = 2.78*C*i*A =	9.30	l/s
5-Year Post-Development Flows		
C-value =	0.50	
**Time of concentration t_c =	19	min
Intensity, i (@ t_c) =	75.62	mm/hr
Post-Development Flow, Q_r = 2.78*C*i*A =	23.56	l/s

POST-DEVELOPMENT CONDITIONS (A201)

	Area (m^2)	
Total Site Area:	2241.28	
C_{eq} = Sum(A*C)/Sum(A) =	0.50	
100-Year Pre-Development Flows		
C-value =	0.20	
**Time of concentration t_c =	19	min
Intensity, i (@ t_c) =	131.48	mm/hr
Pre-Development Flow, Q_r = 2.78*C*i*A =	16.38	l/s
100-Year Post-Development Flows		
C-value =	0.50	
**Time of concentration t_c =	19	min
Intensity, i (@ t_c) =	153.12	mm/hr
Post-Development Flow, Q_r = 2.78*C*i*A =	47.70	l/s

**Time of concentration from Section 4.8.2 - Municipality of Middlesex Centre - Infrastructure Design Standards

SOAK-AWAY PIT DETAILS

Stone Depth	1.0	m
Stone Width=	3.0	m
Stone Length=	26.5	m
19mm Clear Stone Void Ratio=	0.35	
Infiltration Rate=	1.33E-06	m/s
Storage (Total)=	27.825	m^3
Contact Area to Soil (Trench Side Walls Only)=	138.50	m^2

Design Infiltration rate calculation

Coefficient of permeability (K)=	0.1	cm/sec	(Conservative Assumption)
Percolation time (T)=	50	mins/cm	
Infiltration rate (1/T)	12	mm/hr	
Safety correction factor	2.5		(Table C3 TRCA)
Design Infiltration rate	1.33E-06	m/s	

INFILTRATION RATE CALCULATIONS

A=	138.500	m^2 Contact Area to Soil
I=	1.33E-06	m/s
A*I	1.85E-04	m^3/s

5 Year Design Storm Event

Duration (min.)	Intensity "i" (mm/hr)	Inflow, Q_i 2.78*C*i*A (l/s)	Volume In Qt*t*60/1000 (m^3)	Allowable Surface Outflow Q_o (l/s)	Exfiltration Volume (m^3)	Total Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
19	75.62	23.56	26.86	9.30	0.21	10.81	16.05
23	67.26	20.95	28.92	9.30	0.25	13.08	15.83
30	56.60	17.63	31.74	9.30	0.33	17.07	14.68
60	34.64	10.79	38.85	9.30	0.66	34.13	4.71
120	20.34	6.34	45.63	9.30	1.33	68.27	0.00
180	14.73	4.59	49.56	9.30	1.99	102.40	0.00

Reference: Soil Report for Wastewater Servicing by BOS Engineering & Environmental Services Inc. The percolation time (T) of the soil on-site is greater than 50 min/cm

Max. Storage Volume (m^3) = 16.05

100 Year Design Storm Event

Duration (min.)	Intensity "i" (mm/hr)	Inflow, Q_i 2.78*C*i*A (l/s)	Volume In Qt*t*60/1000 (m^3)	Allowable Surface Outflow Q_o (l/s)	Exfiltration Volume (m^3)	Total Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
19	131.48	40.96	46.70	16.38	0.21	18.89	27.81
23	117.50	36.61	50.52	16.38	0.25	22.87	27.65
30	99.36	30.95	55.72	16.38	0.33	29.83	25.89
60	60.87	18.96	68.27	16.38	0.66	59.65	8.62
120	35.32	11.00	79.22	16.38	1.33	119.30	0.00
180	25.28	7.88	85.06	16.38	1.99	178.95	0.00

Reference: Soil Report for Wastewater Servicing by BOS Engineering & Environmental Services Inc. The percolation time (T) of the soil on-site is greater than 50 min/cm

Max. Storage Volume (m^3) = 27.81

Total Storage Available within infiltration trench (m^3) =	**27.83**
Required 5 Year Storage (m^3) =	**16.05**
Required 100 Year Storage (m^3) =	**27.81**

Drawdown time for soak-away pit

5 year storm events	24.14	hrs
100 year storm events	41.83	hrs

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SWM Calculations

DATE: March 18, 2021
JOB N0.: SBM-21-0716

Client: Brock Development Group
Project: Proposed Residential Development
Location: Medway Road, Ballymote, Ontario

CITY OF LONDON-3 CHICAGO RAINFALL DISTRIBUTION PARAMETERS*

Return Period (years)	A,B,C Parameters A	B	C
25mm	538.850	6.331	0.809
2	1290.000	8.500	0.860
5	1183.740	7.641	0.838
10	1574.382	9.025	0.860
25	2019.372	9.824	0.875
50	2270.665	9.984	0.876
100	2619.363	10.500	0.884
250	3048.220	10.030	0.888

* Intensity i=A/(t+B)^C (mm/hr)
* Section 6.2 of Municipality of Middlesex Centre IDS, City of London a,b, & c design parameters are used.

Runoff Coefficients from Section 4.8.3 of Municipality of Middlesex Centre Infrastructure Design Standards (IDS)

Parks, open space and playgrounds = 0.2
Standard Single Family Residential = 0.5

A204 - LOT 4

PRE-DEVELOPMENT CONDITIONS (A204)

Area (m^2)
Total Site Area: 2170.03
Runoff Coefficient C = 0.20

5-Year Pre-Development Flows
C-value = 0.20
**Time of concentration t_c = 19 min
Intensity, i (@ t_c) = 74.60 mm/hr
Pre-Development Flow, Q_r = 2.78*C*i*A = 9.00 l/s

5-Year Post-Development Flows
C-value = 0.50
**Time of concentration t_c = 19 min
Intensity, i (@ t_c) = 75.62 mm/hr
Post-Development Flow, Q_r = 2.78*C*i*A = 22.81 l/s

POST-DEVELOPMENT CONDITIONS (A204)

Area (m^2)
Total Site Area: 2170.03
C_{eq} = Sum(A*C)/Sum(A) = 0.50

100-Year Pre-Development Flows
C-value = 0.20
**Time of concentration t_c = 19 min
Intensity, i (@ t_c) = 131.48 mm/hr
Pre-Development Flow, Q_r = 2.78*C*i*A = 15.86 l/s

100-Year Post-Development Flows
C-value = 0.50
**Time of concentration t_c = 19 min
Intensity, i (@ t_c) = 153.12 mm/hr
Post-Development Flow, Q_r = 2.78*C*i*A = 46.19 l/s

**Time of concentration from Section 4.8.2 - Municipality of Middlesex Centre - Infrastructure Design Standards

SOAK-AWAY PIT DETAILS

Stone Depth = 1.0 m
Stone Width= 3.0 m
Stone Length= 25.7 m
19mm Clear Stone Void Ratio= 0.35
Infiltration Rate= 1.33E-06 m/s
Storage (Total)= 26.985 m^3
Contact Area to Soil (Trench Side Walls Only)= 134.50 m^2

Design Infiltration rate calculation

Coefficient of permeability (K)=	0.1	cm/sec	(Conservative Assumption)
Percolation time (T)=	50	mins/cm	
Infiltration rate (1/T)	12	mm/hr	
Safety correction factor	2.5		(Table C3 TRCA)
Design Infiltration rate	1.33E-06	m/s	

INFILTRATION RATE CALCULATIONS

A= 134.500 m^2 Contact Area to Soil
I= 1.33E-06 m/s

A*I 1.79E-04 m^3/s

5 Year Design Storm Event

Duration (min.)	Intensity "i" (mm/hr)	Inflow, Q_i 2.78*C*i*A (l/s)	Volume In Qt*t*60/1000 (m^3)	Allowable Surface Outflow Q_o (l/s)	Exfiltration Volume (m^3)	Total Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
19	75.62	22.81	26.00	9.00	0.20	10.47	15.54
23	67.26	20.29	28.00	9.00	0.25	12.67	15.33
30	56.60	17.07	30.73	9.00	0.32	16.53	14.21
60	34.64	10.45	37.61	9.00	0.65	33.05	4.56
120	20.34	6.14	44.18	9.00	1.29	66.10	0.00
180	14.73	4.44	47.99	9.00	1.94	99.15	0.00

Reference: Soil Report for Wastewater Servicing by BOS Engineering & Environmental Services Inc. The percolation time (T) of the soil on-site is greater than 50 min/cm

Max. Storage Volume (m^3) = 15.54

100 Year Design Storm Event

Duration (min.)	Intensity "i" (mm/hr)	Inflow, Q_i 2.78*C*i*A (l/s)	Volume In Qt*t*60/1000 (m^3)	Allowable Surface Outflow Q_o (l/s)	Exfiltration Volume (m^3)	Total Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
19	131.48	39.66	45.21	15.86	0.20	18.29	26.92
23	117.50	35.44	48.91	15.86	0.25	22.14	26.77
30	99.36	29.97	53.95	15.86	0.32	28.88	25.07
60	60.87	18.36	66.10	15.86	0.65	57.76	8.34
120	35.32	10.65	76.70	15.86	1.29	115.51	0.00
180	25.28	7.63	82.35	15.86	1.94	173.27	0.00

Reference: Soil Report for Wastewater Servicing by BOS Engineering & Environmental Services Inc. The percolation time (T) of the soil on-site is greater than 50 min/cm

Max. Storage Volume (m^3) = 26.92

Total Storage Available within infiltration trench (m^3) = 26.99
Required 5 Year Storage (m^3) = 15.54
Required 100 Year Storage (m^3) = 26.92

Soakaway pit drawdown time at 0.18L/s infiltration rate
5 year storm events 24.07 hrs
100 year storm events 41.70 hrs

Surface pond drawdown time at 0.18L/s infiltration rate
All storm events 11.00 hrs

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SWM Calculations

DATE:	March 18, 2021
JOB N0.:	SBM-21-0716
Client:	**Brock Development Group**
Project:	**Proposed Residential Development**
Location:	**Medway Road, Ballymote, Ontario**

CITY OF LONDON-3 CHICAGO RAINFALL DISTRIBUTION PARAMETERS*

Return Period (years)	A,B,C Parameters A	B	C
25mm	538.850	6.331	0.809
2	1290.000	8.500	0.860
5	1183.740	7.641	0.838
10	1574.382	9.025	0.860
25	2019.372	9.824	0.875
50	2270.665	9.984	0.876
100	2619.363	10.500	0.884
250	3048.220	10.030	0.888

* Intensity i=A/(t+B)^C (mm/hr)
* Section 6.2 of Municipality of Middlesex Centre IDS, City of London a,b, & c design parameters are used.

Runoff Coefficients from Section 4.8.3 of Municipality of Middlesex Centre Infrastructure Design Standards (IDS)

Parks, open space and playgrounds = 0.2
Standard Single Family Residential = 0.5

A205 to A214 & A217 to A219 - LOT 6 (LARGEST AREA OF LOTS 5 to 14 & 17 to 19)

LOT 6 - A206

PRE-DEVELOPMENT CONDITIONS (A206)

	Area (m^2)	
Total Site Area:	1867.89	
Runoff Coefficient C =	0.20	
5-Year Pre-Development Flows		
C-value =	0.20	
**Time of concentration t_c =	19	min
Intensity, i (@ t_c) =	74.60	mm/hr
Pre-Development Flow, Q_r = 2.78*C*i*A =	7.75	l/s
5-Year Post-Development Flows		
C-value =	0.50	
**Time of concentration t_c =	19	min
Intensity, i (@ t_c) =	75.62	mm/hr
Post-Development Flow, Q_r = 2.78*C*i*A =	19.63	l/s

POST-DEVELOPMENT CONDITIONS (A206)

	Area (m^2)	
Total Site Area:	1867.89	
C_{eq} = Sum(A*C)/Sum(A) =	0.50	
100-Year Pre-Development Flows		
C-value =	0.20	
**Time of concentration t_c =	19	min
Intensity, i (@ t_c) =	131.48	mm/hr
Pre-Development Flow, Q_r = 2.78*C*i*A =	13.66	l/s
100-Year Post-Development Flows		
C-value =	0.50	
**Time of concentration t_c =	19	min
Intensity, i (@ t_c) =	153.12	mm/hr
Post-Development Flow, Q_r = 2.78*C*i*A =	39.76	l/s

**Time of concentration from Section 4.8.2 - Municipality of Middlesex Centre - Infrastructure Design Standards

SOAK-AWAY PIT DETAILS

Stone Depth	1.0	m
Stone Width=	3.0	m
Stone Length=	22.1	m
19mm Clear Stone Void Ratio=	0.35	
Infiltration Rate=	1.33E-06	m/s
Storage (Total)=	23.205	m^3
Contact Area to Soil (Trench Side Walls Only)=	116.50	m^2

Design Infiltration rate calculation

Coefficient of permeability (K)=	0.1	cm/sec	(Conservative Assumption)
Percolation time (T)=	50	mins/cm	
Infiltration rate (1/T)	12	mm/hr	
Safety correction factor	2.5		(Table C3 TRCA)
Design Infiltration rate	1.33E-06	m/s	

INFILTRATION RATE CALCULATIONS

A=	116.500	m^2 Contact Area to Soil
I=	1.33E-06	m/s
A*I	1.55E-04	m^3/s

5 Year Design Storm Event

Duration (min.)	Intensity "i" (mm/hr)	Inflow, Q_i 2.78*C*i*A (l/s)	Volume In Qt*t*60/1000 (m^3)	Allowable Surface Outflow Q_o (l/s)	Exfiltration Volume (m^3)	Total Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
19	75.62	19.63	22.38	7.75	0.18	9.01	13.37
23	67.26	17.46	24.10	7.75	0.21	10.91	13.19
30	56.60	14.70	26.45	7.75	0.28	14.23	12.23
60	34.64	8.99	32.37	7.75	0.56	28.45	3.92
120	20.34	5.28	38.03	7.75	1.12	56.90	0.00
180	14.73	3.82	41.30	7.75	1.68	85.36	0.00

Reference: Soil Report for Wastewater Servicing by BOS Engineering & Environmental Services Inc. The percolation time (T) of the soil on-site is greater than 50 min/cm

Max. Storage Volume (m^3) = 13.37

100 Year Design Storm Event

Duration (min.)	Intensity "i" (mm/hr)	Inflow, Q_i 2.78*C*i*A (l/s)	Volume In Qt*t*60/1000 (m^3)	Allowable Surface Outflow Q_o (l/s)	Exfiltration Volume (m^3)	Total Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
19	131.48	34.14	38.92	13.66	0.18	15.74	23.17
23	117.50	30.51	42.10	13.66	0.21	19.06	23.04
30	99.36	25.80	46.43	13.66	0.28	24.86	21.58
60	60.87	15.80	56.89	13.66	0.56	49.72	7.18
120	35.32	9.17	66.02	13.66	1.12	99.44	0.00
180	25.28	6.56	70.89	13.66	1.68	149.15	0.00

Reference: Soil Report for Wastewater Servicing by BOS Engineering & Environmental Services Inc. The percolation time (T) of the soil on-site is greater than 50 min/cm

Max. Storage Volume (m^3) = 23.17

Total Storage Available within infiltration trench (m^3) =	**23.21**
Required 5 Year Storage (m^3) =	**13.37**
Required 100 Year Storage (m^3) =	**23.17**

Drawdown time for soak-away pit

5 year storm events	23.91	hrs
100 year storm events	41.44	hrs

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SWM Calculations

DATE:	March 18, 2021
JOB N0.:	SBM-21-0716
Client:	**Brock Development Group**
Project:	**Proposed Residential Development**
Location:	**Medway Road, Ballymote, Ontario**

CITY OF LONDON-3 CHICAGO RAINFALL DISTRIBUTION PARAMETERS*

Return Period (years)	A,B,C Parameters A	B	C
25mm	538.850	6.331	0.809
2	1290.000	8.500	0.860
5	1183.740	7.641	0.838
10	1574.382	9.025	0.860
25	2019.372	9.824	0.875
50	2270.665	9.984	0.876
100	2619.363	10.500	0.884
250	3048.220	10.030	0.888

* Intensity i=A/(t+B)^C (mm/hr)
* Section 6.2 of Municipality of Middlesex Centre IDS, City of London a,b, & c design parameters are used.

Runoff Coefficients from Section 4.8.3 of Municipality of Middlesex Centre Infrastructure Design Standards (IDS)

Parks, open space and playgrounds = 0.2
Standard Single Family Residential = 0.5

A215 - LOT 15

PRE-DEVELOPMENT CONDITIONS (A215)

	Area (m^2)	
Total Site Area:	1950.43	
Runoff Coefficient C =	0.20	

5-Year Pre-Development Flows

C-value =	0.20	
**Time of concentration t_c =	19	min
Intensity, i (@ t_c) =	74.60	mm/hr
Pre-Development Flow, Q_r = 2.78*C*i*A =	8.09	l/s

5-Year Post-Development Flows

C-value =	0.50	
**Time of concentration t_c =	19	min
Intensity, i (@ t_c) =	75.62	mm/hr
Post-Development Flow, Q_r = 2.78*C*i*A =	20.50	l/s

POST-DEVELOPMENT CONDITIONS (A215)

	Area (m^2)
Total Site Area:	1950.43
C_{eq} = Sum(A*C)/Sum(A) =	0.50

100-Year Pre-Development Flows

C-value =	0.20	
**Time of concentration t_c =	19	min
Intensity, i (@ t_c) =	131.48	mm/hr
Pre-Development Flow, Q_r = 2.78*C*i*A =	14.26	l/s

100-Year Post-Development Flows

C-value =	0.50	
**Time of concentration t_c =	19	min
Intensity, i (@ t_c) =	153.12	mm/hr
Post-Development Flow, Q_r = 2.78*C*i*A =	41.51	l/s

**Time of concentration from Section 4.8.2 - Municipality of Middlesex Centre - Infrastructure Design Standards

SOAK-AWAY PIT DETAILS

Stone Depth	1.0	m
Stone Width=	3.0	m
Stone Length=	23.1	m
19mm Clear Stone Void Ratio=	0.35	
Infiltration Rate=	1.33E-06	m/s
Storage (Total)=	24.255	m^3
Contact Area to Soil (Trench Side Walls Only)=	121.50	m^2

Design Infiltration rate calculation

Coefficient of permeability (K)=	0.1	cm/sec	(Conservative Assumption)
Percolation time (T)=	50	mins/cm	
Infiltration rate (1/T)	12	mm/hr	
Safety correction factor	2.5		(Table C3 TRCA)
Design Infiltration rate	1.33E-06	m/s	

INFILTRATION RATE CALCULATIONS

A=	121.500	m^2 Contact Area to Soil
I=	1.33E-06	m/s
A*I	1.62E-04	m^3/s

5 Year Design Storm Event

Duration (min.)	Intensity "i" (mm/hr)	Inflow, Q_i 2.78*C*i*A (l/s)	Volume In Qt*t*60/1000 (m^3)	Allowable Surface Outflow Q_o (l/s)	Exfiltration Volume (m^3)	Total Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
19	75.62	20.50	23.37	8.09	0.18	9.41	13.96
23	67.26	18.23	25.16	8.09	0.22	11.39	13.77
30	56.60	15.35	27.62	8.09	0.29	14.85	12.77
60	34.64	9.39	33.81	8.09	0.58	29.71	4.10
120	20.34	5.52	39.71	8.09	1.17	59.42	0.00
180	14.73	3.99	43.13	8.09	1.75	89.13	0.00

Reference: Soil Report for Wastewater Servicing by BOS Engineering & Environmental Services Inc. The percolation time (T) of the soil on-site is greater than 50 min/cm

Max. Storage Volume (m^3) = 13.96

100 Year Design Storm Event

Duration (min.)	Intensity "i" (mm/hr)	Inflow, Q_i 2.78*C*i*A (l/s)	Volume In Qt*t*60/1000 (m^3)	Allowable Surface Outflow Q_o (l/s)	Exfiltration Volume (m^3)	Total Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
19	131.48	35.65	40.64	14.26	0.18	16.44	24.20
23	117.50	31.86	43.96	14.26	0.22	19.90	24.06
30	99.36	26.94	48.49	14.26	0.29	25.96	22.53
60	60.87	16.50	59.41	14.26	0.58	51.91	7.49
120	35.32	9.58	68.94	14.26	1.17	103.83	0.00
180	25.28	6.85	74.02	14.26	1.75	155.74	0.00

Reference: Soil Report for Wastewater Servicing by BOS Engineering & Environmental Services Inc. The percolation time (T) of the soil on-site is greater than 50 min/cm

Max. Storage Volume (m^3) = 24.20

Total Storage Available within infiltration trench (m^3) =	**24.26**
Required 5 Year Storage (m^3) =	**13.96**
Required 100 Year Storage (m^3) =	**24.20**

Drawdown time for soak-away pit

5 year storm events	23.94	hrs
100 year storm events	41.49	hrs

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SWM Calculations

DATE: March 18, 2021
JOB N0.: SBM-21-0716

Client: Brock Development Group
Project: Proposed Residential Development
Location: Medway Road, Ballymote, Ontario

CITY OF LONDON-3 CHICAGO RAINFALL DISTRIBUTION PARAMETERS*

Return Period (years)	A,B,C Parameters A	B	C
25mm	538.850	6.331	0.809
2	1290.000	8.500	0.860
5	1183.740	7.641	0.838
10	1574.382	9.025	0.860
25	2019.372	9.824	0.875
50	2270.665	9.984	0.876
100	2619.363	10.500	0.884
250	3048.220	10.030	0.888

* Intensity i=A/(t+B)^C (mm/hr)
* Section 6.2 of Municipality of Middlesex Centre IDS, City of London a,b, & c design parameters are used.

Runoff Coefficients from Section 4.8.3 of Municipality of Middlesex Centre Infrastructure Design Standards (IDS)

Parks, open space and playgrounds = 0.2
Standard Single Family Residential = 0.5

A216 - LOT 16

PRE-DEVELOPMENT CONDITIONS (A216)

	Area (m^2)
Total Site Area:	1770.41
Runoff Coefficient C =	0.20

5-Year Pre-Development Flows

C-value =	0.20	
**Time of concentration t_c =	19	min
Intensity, i (@ t_c) =	74.60	mm/hr
Pre-Development Flow, Q_r = 2.78*C*i*A =	7.34	l/s

5-Year Post-Development Flows

C-value =	0.50	
**Time of concentration t_c =	19	min
Intensity, i (@ t_c) =	75.62	mm/hr
Post-Development Flow, Q_r = 2.78*C*i*A =	18.61	l/s

POST-DEVELOPMENT CONDITIONS (A216)

	Area (m^2)
Total Site Area:	1770.41
C_{eq} = Sum(A*C)/Sum(A) =	0.50

100-Year Pre-Development Flows

C-value =	0.20	
**Time of concentration t_c =	19	min
Intensity, i (@ t_c) =	131.48	mm/hr
Pre-Development Flow, Q_r = 2.78*C*i*A =	12.94	l/s

100-Year Post-Development Flows

C-value =	0.50	
**Time of concentration t_c =	19	min
Intensity, i (@ t_c) =	153.12	mm/hr
Post-Development Flow, Q_r = 2.78*C*i*A =	37.68	l/s

**Time of concentration from Section 4.8.2 - Municipality of Middlesex Centre - Infrastructure Design Standards

SOAK-AWAY PIT DETAILS

Stone Depth	1.0	m
Stone Width=	4.0	m
Stone Length=	21.0	m
19mm Clear Stone Void Ratio=	0.35	
Infiltration Rate=	1.33E-06	m/s
Storage (Total)=	29.4	m^3
Contact Area to Soil (Trench Side Walls Only)=	134.00	m^2

Design Infiltration rate calculation

Coefficient of permeability (K)=	0.1	cm/sec	(Conservative Assumption)
Percolation time (T)=	50	mins/cm	
Infiltration rate (1/T)	12	mm/hr	
Safety correction factor	2.5		(Table C3 TRCA)
Design Infiltration rate	1.33E-06	m/s	

INFILTRATION RATE CALCULATIONS

A=	134.000	m^2 Contact Area to Soil
I=	1.33E-06	m/s
A*I	1.79E-04	m^3/s

5 Year Design Storm Event

Duration (min.)	Intensity "i" (mm/hr)	Inflow, Q_i 2.78*C*i*A (l/s)	Volume In Qt*t*60/1000 (m^3)	Allowable Surface Outflow Q_o (l/s)	Exfiltration Volume (m^3)	Total Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
19	75.62	18.61	21.21		0.20	0.20	21.01
23	67.26	16.55	22.84		0.25	0.25	22.59
30	56.60	13.93	25.07		0.32	0.32	24.75
60	34.64	8.52	30.69		0.64	0.64	30.04
120	20.34	5.01	36.05		1.29	1.29	34.76
180	14.73	3.62	39.15		1.93	1.93	37.22

Reference: Soil Report for Wastewater Servicing by BOS Engineering & Environmental Services Inc. The percolation time (T) of the soil on-site is greater than 50 min/cm

Max. Storage Volume (m^3) = 37.22

100 Year Design Storm Event

Duration (min.)	Intensity "i" (mm/hr)	Inflow, Q_i 2.78*C*i*A (l/s)	Volume In Qt*t*60/1000 (m^3)	Allowable Surface Outflow Q_o (l/s)	Exfiltration Volume (m^3)	Total Volume Out Q_o*t*60/1000 (m^3)	Difference/ Storage (m^3)
19	131.48	32.36	36.89		0.20	0.20	36.68
23	117.50	28.92	39.90		0.25	0.25	39.66
30	99.36	24.45	44.01		0.32	0.32	43.69
60	60.87	14.98	53.92		0.64	0.64	53.28
120	35.32	8.69	62.58		1.29	1.29	61.29
180	25.28	6.22	67.19		1.93	1.93	65.26

Reference: Soil Report for Wastewater Servicing by BOS Engineering & Environmental Services Inc. The percolation time (T) of the soil on-site is greater than 50 min/cm

Max. Storage Volume (m^3) = 65.26

Total Storage Available within infiltration trench (m^3) = **29.40**
Required 5 Year Storage (m^3) = **37.22**
Required 100 Year Storage (m^3) = **65.26**

Soakaway pit drawdown time at 0.18L/s infiltration rate
5 year storm events 57.87 hrs
100 year storm events 101.46 hrs

Surface pond drawdown time at 0.18L/s infiltration rate
All storm events 12.90 hrs