Proposed Utica Pit Hydrogeologic Assessment Uxbridge, Regional Municipality of Durham, Ontario July 2013

Prepared for: Vicdom Sand and Gravel (Ontario) Limited Box 1359 Uxbridge, Ontario L9P 1N6

Prepared by: GENIVAR Inc. 1091 Gorham Street, Suite 301 Newmarket, Ontario L3Y 8X7

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Project No. 131-15683-00

July 9, 2013

Mr. Bruno Giordano Vicdom Sand and Gravel (Ontario) Limited Box 1359 Uxbridge, Ontario L9P 1N6

Re:

Proposed Utica Pit

Hydrogeologic Assessment

Uxbridge, Regional Municipality of Durham, Ontario

Dear Sirs:

We are pleased to submit this final report for the above-noted project. The report provides the results of the groundwater and surface water assessment for the proposed Utica Pit application to be operated as a sand and gravel pit above the groundwater table. Findings are summarized in the executive summary provided at the front of the report. Details are provided in the report text and technical information is appended.

Thank you for the opportunity to complete the hydrogeologic assessment. Please contact us if there are any questions.

Yours truly, GENIVAR Inc.

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Jason T. Balsdon, M.A.Sc., P.Eng. Consulting Engineer - Director, Environment

JTB:nah

Executive Summary

Vicdom Sand and Gravel (Ontario) Limited is applying for a Category 3, Class A licence for the proposed Utica Pit to operate an above water table pit in proximity to its existing licence east of Lake Ridge Road. The property is located at the northwest corner of the intersection of Lake Ridge Road and Goodwood Road within Lot 15 of Concessions 7 and 8, in the Township of Uxbridge. The village of Utica is located approximately 3.5 kilometres to the east as shown in Figure 1. This study was undertaken to meet the requirements of the Aggregate Resources Act (1990), Region of Durham Official Plan (2008), and the Oak Ridges Moraine Conservation Act (2001).

The proposed Utica Pit is located within an area of land that forms a recharge zone for groundwater and that is identified as a high aquifer vulnerability area. No well head protection areas are located below the proposed pit. The pit development above the water table will continue to function as a recharge zone and will not negatively affect the net recharge to the groundwater table. Therefore, no negative effects to groundwater quality or quantity are predicted and the water available for domestic water supply wells will not be negatively affected by the proposed pit.

Runoff from the existing property contributes to groundwater through infiltration from depressions and road ditches. Although development of the pit will reduce the amount of runoff leaving the property, runoff from the existing property does not contribute to local surface water features. The additional runoff that will be captured in the pit and that will flow off-site will continue to contribute to groundwater. Therefore, the change in runoff from the proposed pit will not affect regional surface water features.

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1. Introduction

1.1 Background

Vicdom Sand and Gravel (Ontario) Limited (VICDOM) is applying for a Category 3, Class A licence for the proposed Utica Pit to operate an above water table pit in proximity to its existing licence east of Lake Ridge Road. The property is located at the northwest corner of the intersection of Lake Ridge Road and Goodwood Road within Lot 15 of Concessions 7 and 8, in the Township of Uxbridge. The village of Utica is located approximately 3.5 kilometres (km) to the east as shown in Figure 1.

1.2 Objectives and Scope

The primary purpose of the study was to address the requirements of the Oak Ridges Moraine Conservation Plan by completing a hydrogeologic assessment of potential effects of the proposed Utica Pit on groundwater and surface water resources. This study was undertaken to meet the requirements of the Aggregate Resources Act (1990), Region of Durham Official Plan (2008), and the Oak Ridges Moraine Conservation Act (2001).

The main objectives of the hydrogeologic assessment are as follows.

- > To determine the groundwater and surface water setting within the vicinity of the proposed pit.
- > To assess the interconnections between the surface water system and groundwater.
- > To predict the potential effects of the proposed pit on local groundwater and surface water resources.
- > To recommend mitigation measures, if required, to protect local water resources.
- > To document the study findings.

1.3 Methodology

To address the requirements of the Oak Ridges Moraine Conservation Plan and to obtain site-specific hydrogeologic information regarding the groundwater and surface water systems, possible groundwater and surface water interactions, and input to pit development, the following activities were undertaken.

- > The available topographic and geological mapping for the property area was reviewed and analyzed to interpret the hydrogeologic conditions at the proposed pit.
- Ministry of the Environment (MOE) water well record summaries for the proposed pit and adjacent properties were collected and analyzed to investigate groundwater well depths, geologic profiles, and historic water levels. Water well information is provided in Appendix A.
- A reconnaissance visit was completed on April 24, 2013, to measure water levels within two existing wells on the property, to survey the elevation of the two wells to a benchmark, and to investigate for seeps, springs, and other components of groundwater and surface water systems.
- Data were collected with historic information and analyzed. A water balance assessment for the property was also completed. Findings are presented in the following report and technical data are appended.

2. Hydrogeologic Setting

2.1 Topography and Physiography

The property is located in a hilly area with a number of small knobs and low-lying areas. The maximum elevation on the property is about 351.5 m above sea level (m asl) in the western portion of the property, and the minimum elevation is below 338 m asl within a depression located in the central portion of the property just west of the existing house.

Drainage on the property is dominantly by infiltration into the sandy soil, with a component of runoff toward the low-lying areas. The largest low-lying area on the property is located within the central portion of the property where runoff may periodically accumulate and infiltrate into the subsurface. Localized low-lying areas along the southern and eastern limits of the property allow for some runoff to ditches along the road right-of-ways or through culverts that extend below the roads.

According to Chapman and Putnam (1984), the property is located within the Oak Ridges Moraine physiographic feature, a glacial landform that extends from Orangeville to near Trenton. Regionally, this moraine has a generally hummocky topography. Land within the region is primarily farmland and rural residential, with some patches of undeveloped sand/gravel highlands covered with bush.

2.2 Geology

2.2.1 Regional Geology

The available geological information for the Uxbridge area indicates that the surficial materials are lacustrine in origin. Exposures from sand and gravel pits in the Uxbridge area confirm the complexity of the deposition of the Oak Ridges Moraine. Two major geological units are recognized, and two less dominant surficial units are important.

Windblown sand occurs on the surface of the Oak Ridges Moraine wherever sand is exposed to wind. Sand veneers of several centimetres thickness are common throughout the Uxbridge area, and the thickness was observed to be approximately 8 metres (m) in some areas. Beneath the windblown sand, the Halton Till is a silty to sandy glacial till which was deposited along the south slope of the Oak Ridges Moraine. The till may range from a few centimetres in thickness to several metres in thickness, and there is a general thickening southward down the flank of the moraine.

Beneath and/or interbedded with the Halton Till is a glaciolacustrine sand and silt. Laminated sand to silt is present at surface overlying most of the sand and gravel materials that currently are being mined in the Uxbridge area. Thicknesses range from zero to more than 15 m, and are commonly in the 3 m to 6 m range. Beneath the laminated sand and silt, glaciofluvial sand and gravel deposits are present and exposed in the major pits in the Uxbridge area. This grouping of materials includes subaqueous fans and deltas as well as a closely associated series of ice-contact glaciofluvial materials. The subaqueous fans and deltas commonly contain sand and gravel and the ice-contact materials tend to contain irregular lenses and layers of gravelly material within a sand matrix that contains some gravel. This group of material commonly exceeds 10 m in thickness and locally may exceed 20 m to 30 m in some of the larger excavations.

2.2.2 Local Geology

Mapping in the vicinity of the proposed pit indicates that the material consists of ice-contact stratified drift, consisting dominantly of sand and gravel (Gwyn and DiLabio, 1973).

Existing water wells on and around the property provide an understanding of the local geology. In addition, an exploratory borehole was completed under the direction of VICDOM in August 2012 and completed as an observation well. Well information is provided in Appendix A.

Subsurface material is dominantly sand and gravel beneath the topsoil. In the vicinity of the proposed pit the sand and gravel generally ranges in thickness from about 28 m to over 38 m below ground surface (m bgs). Layers of fine-grained material, such as clay and silt, are also identified, but do not form a continuous unit in the area. Two well records of note include the following.

- 1) Well ID Number 1909715 indicates silt and clay from about 9.7 m bgs to 27.4 m bgs. However the well is located within an area that contains a sand and gravel pit.
- 2) Well ID Number 4603926 indicates medium sand to a depth of about 157 m bgs, although a static water level of about 51.8 m bgs is documented. It is likely that layers of fine-grained material occur within the sand, which required the completion of the deeper water well.

Based on the soil sampling of the exploratory borehole completed on the property (Well Tag No. A006365), sand and gravel was confirmed to occur to a depth of at least 40 m bgs.

Sand and gravel pits are present immediately to the north and to the east of the proposed pit. The presence of these two pits confirms the abundance of sand and gravel resources in the area.

2.3 Groundwater Setting

2.3.1 Regional Groundwater Setting

The property is underlain by the Oak Ridges Aquifer system, a complex of closely associated aquifers that are quite thick in the vicinity of the property. An unconfined aquifer within the uppermost sand unit is common, with deeper confined aquifers that are protected by overlying layers of fine-grained material. Considering the high topographic elevation of the area, the property is located within a groundwater recharge area.

Owing to the presence of near surface sand and gravel, the area in the vicinity of the proposed pit is identified as a High Aquifer Vulnerability Area in Map B2, Schedule B, of the Regional Municipality of Durham Official Plan. This mapping indicates that the groundwater is vulnerable to water quality impacts from land uses in the area. It is noted, however, that pits are not recognised as a direct threat to groundwater resources.

Water supplies for the rural development within the regional area are dominantly obtained from groundwater wells. The closest municipal groundwater use is for the Town of Uxbridge located about 5 km to the northwest of the proposed pit. No wellhead protection areas are located below the proposed pit.

2.3.2 Local Hydrogeology

The information contained in the MOE water well records, which is provided in Appendix A, indicates that most water wells in the vicinity of the proposed pit obtain groundwater from a deep unconfined aquifer. Based on the well records, the water table for this unconfined aquifer ranged from about 19.8 m bgs to 29.9 mbgs at the time of well installation. For the deep well completed at a depth of about 181.4 m bgs (Well ID Number 4603926) the static water level at the time of well construction was about 51.8 mbgs, which likely indicates the groundwater pressure within a deeper confined aquifer.

The groundwater depth and elevation for the two wells on the property are provided below. Well locations are shown in Figure 2. It is noted that the water level likely represents the high water table level as the level was measured during the spring on April 24, 2013, shortly after the spring snowmelt and a period of precipitation. No groundwater seeps or springs were identified during the reconnaissance visit of April 24, 2013.

WELL DESIGNATION	WELL ID NUMBER	TOP OF CASING (m asi)	DEPTH TO WATER TABLE (mbgs)	WATER TABLE ELEVATION (m asi)
DW-1	4605678	346.48	25.41	321.07
MW13-1	7187320	347.21	25.49	321.72

NOTES: 1) 'm asl' indicates metres above sea level

2) 'm bgs' indicates metres below ground surface

The depth to the water table will vary across the property owing to differences in the elevation of the water table and of ground surface. Based on a maximum water table elevation of 321.72 m asl and a 1.5 m separation between the high water table and the base on an above water table pit, the base of the pit could be located at an elevation of about 323.22 m asl.

The direction of horizontal groundwater movement could not be determined based on elevations from two wells, although an easterly to southeasterly flow direction is inferred based on topography and the available groundwater elevations.

2.4 Surface Water Setting

The proposed pit is located within the Uxbridge Brook subwatershed within the jurisdiction of the Lake Simcoe Region Conservation Authority. Uxbridge Brook is located to the north of the property with a tributary that originates in a low-lying area located about 200 m northeast of the property as shown in Figure 1.

No perennial watercourses occur on the property. Figure 3 presents the subcatchments on the property and Table 1 outlines the conditions of each subcatchment. In summary, during pre-development conditions a majority of the property drains toward a low-lying area within SC1 where the runoff infiltrates into the subsurface. Subcatchments SC2, SC4, and SC5 drain toward the north side of Goodwood Road where water can infiltrate into the subsurface and flow below the road through culverts at SC4 and SC5. Subcatchment SC3 also drains toward Goodwood Road, but excess runoff will move through a culvert below the road and flow to a depression on the property to the south where water can infiltrate into the subsurface. Subcatchments SC6 and SC7 drain towards the ditch on the west side of Lake Ridge Road where infiltration will also occur. Therefore, in summary, runoff from the property does not contribute

directly to surface water features. The runoff can move as overland flow to low-lying areas where the water will infiltrate into the subsurface and contribute to groundwater.

2.5 Water Balance

Climatic data from the Oshawa Water Pollution Control Plant (WPCP) climatological station are presented in Figure B-1, Appendix B, for annual precipitation and temperature. Based on the normalized data for 1971 to 2000, the annual precipitation averages about 877.8 millimetres/annum (mm/a). The wettest year on record occurred in 2006 with a total of 1,073.7 mm/a and the driest year occurred in 1994 with 677.0 mm/a of precipitation.

The water balance for the proposed pit was estimated using available climatic data from the on-line resources provided by Environmental Canada and the MOE infiltration guidelines. Water budget data from the Oshawa WPCP climatological station are summarized in Tables B-1 to B-3, Appendix B. The water budget data for the 30 Year Normal, the wettest year, and the driest year are summarized below. A soil moisture holding capacity of 75 mm was considered owing to the coarse-grained soil and medium to deep rooted crops.

YEAR	TOTAL PRECIPITATION (mm)	ACTUAL EVAOPTRANSPIRATION (mm)	UNADJUSTED MOISTURE SURPLUS (mm)
30 Year Normal	877.8	475.0	402.8
2006 (Wet Year)	1,073.7	569.9	503.8
1994 (Dry Year)	677.0	418.3	258.7

NOTE: 'mm' indicates millimetres for the year indicated.

As expected, a calculated water surplus typically occurs during the winter, spring, and fall months, with a water deficit during the summer months. It should be noted that the majority of water surplus in the winter accumulates as snow. Snowmelt during the spring results in the runoff and/or infiltration of precipitation that is effectively equivalent to the winter and spring water surplus.

Based on the hilly topography (0.1), sandy soil type (0.4), and cultivated land use (0.1), an infiltration rate of about 60% (0.6) is estimated. Therefore, an average runoff coefficient of about 0.4 is reasonable for the proposed pit for pre-development conditions. Thus, a 30 Year Normal annual runoff of about 161.1 mm/a and an annual infiltration of about 241.7 mm/a are reasonable.

Within low-lying areas with no outlets for runoff contribution to surface water features the runoff will infiltrate into the subsurface and contribute to groundwater. Within these areas an infiltration factor of 1 is reasonable. Some periodic seasonal accumulation of runoff may occur within the depressions as a result of excess runoff, but will be minor owing to the permeable nature of the sandy soil. No surface water accumulation was observed on the property on April 24, 2013.

3. Impact Assessment

The area proposed for excavation above the water table is presented in Figure 2.

3.1 Subcatchment Analysis

To assess the relationships between groundwater and surface water, and to obtain the data required for an environmental impact assessment of the proposed pit development, a subcatchment analysis was performed for the property and adjacent land.

The property was subdivided into seven contributing subcatchments based upon topography as well as pre-development and post-development conditions, with locations shown in Figure 3. A summary of land use for subcatchments under pre-development and post-development conditions is provided in Table 1. In summary, for post-development conditions the majority of the subcatchments drain into the proposed pit, with only the outside portion of the perimeter berms continuing to drain towards the adjacent roads. The total area of excavation is about 15.4 ha and the net drainage area transfer (i.e. area of off-site runoff transferred to on-site runoff) from pre-development to post-development conditions is approximately 1.9 ha.

3.2 Infiltration Analysis

The amount of infiltration and runoff that occurs within the local subcatchments during pre and post-development conditions was determined by estimating runoff and infiltration for component subcatchments. The results of the calculations for the 30 Year Normal, a wet year (2006), and a dry year (1994) are shown in Table 2 (pre-development) and Table 3 (post-development).

Table 4 presents the predicted net change in water balance for the proposed pit. In summary, the pit development will result in a net increase in infiltration within the property limits. Runoff to the road ditches and toward the property to the south, via the culvert below Goodwood Road, will decrease by between about 73% to 77% of pre-development conditions. However, as this runoff will continue to flow into the ditches and depressions for infiltration into the subsurface, there will be no impact to regional surface water features. This infiltration will continue to contribute to groundwater and will maintain the supply of water to local water wells.

3.3 Surface Water Assessment

No impacts are predicted for the regional surface water system as a result of the proposed pit. The regional groundwater system will continue to contribute to regional watercourses and low-lying areas.

3.4 Effect on Local Water Wells

Development of the pit as an above water table operation will not have a negative effect on local groundwater resources. The configuration of the regional groundwater system will not be impacted and its contribution to recharge of the deeper aquifers will be similar during pre and post-development conditions. The underlying low permeable units of clayey soil will continue to protect the quantity and quality of the water available to deeper local water wells.

3.5 Slope Stability Considerations

Based on the geotechnical characteristics of the sand and gravel, it is recommended that the final rehabilitated sideslopes of the extraction areas be no steeper than 3:1 (horizontal: vertical). These sideslopes will provide long-term stability and will allow for maximum resource removal. Localized sideslope maintenance may be required. The slopes for the extraction area sideslopes may be reduced as required for operations or rehabilitation.

3.6 Compliance With ORMCP

The property is located within the Oak Ridges Moraine Conservation Plan (ORMCP) area. The ORMCP requires that the quantity and quality of groundwater and surface water are maintained and where possible improved or restored.

According to common industry findings for above water table pit development and based on GENIVAR's 20 years of experience in groundwater monitoring at similar pits, above water table extraction is not known to negatively affect groundwater quality. However, to meet and exceed the Provincial requirements as established by the ARA Provincial Standards and the ORMCP, a detailed groundwater assessment was completed to evaluate the possible effects of the above water table extraction on groundwater resources.

No predicted change in overall infiltration of the water surplus to the groundwater table will maintain the groundwater recharge characteristics of the property. It is predicted that the cumulative effect of the proposed pit and the adjacent existing pits will continue to contribute water to the subsurface and maintain the existing water resources.

Water quality impacts are not anticipated and operation of the pit in accordance with prescribed conditions and Technical Standards and Safety Authority (TSSA) requirements will protect water quality. The sandy soil and attenuation capacity around the property will also prevent detectable changes in suspended solids or temperature within the groundwater.

In summary, it is predicted that the development of the proposed Utica Pit will not result in adverse effects to the local or regional groundwater and surface water quantity or quality. Thus, based on the hydrogeologic assessment results for the proposed Utica Pit and the presence of the adjacent pits with no documented impacts or water complaints, a groundwater and surface water monitoring program is not recommended.

Conclusions and Recommendations

The results of the hydrogeologic assessment for the proposed Utica Pit as an above the water table operation is summarized below.

- > The proposed Pit is located within an area of land that forms a recharge zone for groundwater and that is identified as a high aquifer vulnerability area. No well head protection areas are located below the proposed pit.
- > The pit development will not negatively affect the net recharge to the groundwater table. Therefore, no negative effects to groundwater quality or quantity are predicted and the water available for domestic water supply wells will not be negatively affected by the proposed pit.
- Runoff from the existing property contributes to groundwater through infiltration from depressions and road ditches. Although development of the pit will reduce the amount of runoff leaving the property, the additional runoff that is captured in the pit will continue to contribute to groundwater.
- Runoff from the existing property does not contribute to local surface water features. Therefore, the change in runoff from the proposed pit will not affect regional surface water features.

We recommend that the contents of this report should be considered as input for other work being completed for the proposed pit.

Prepared by:

GENIVAR Inc.

Jason T. Balsdon, M.A.Sc., P.Eng.

Consulting Engineer – Director, Environment

5. References

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Gwyn, Q.H.J. and DiLabio, R.N.W., 1973. Quaternary Geology of the Newmarket Area, Southern Ontario. Ontario Div. Mines, Prelim. Map P.386, Geol. Ser., scale 1:50,000. Geology 1972.

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Tables

TABLE 1 SUMMARY OF CONDITIONS AT SUBCATCHMENTS PROPOSED UTICA PIT

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	SC5	southeastern portion of property. Runoff drains to a low-lying ind into an off-site ditch located on the north side of Goodwood	Area outside of the 30 m buffer setback will be excavated. Runoff will collect in the base of the pit and will recharge the soil. For the berm area, about 50% will induce unoff toward the pit and about 50% will maintain runoff toward the road.
	SC6	Southeastern portion of property. Runoff drains in an easterly direction to a road ditch located on the west side of Lake Ridge Road.	wea outside of the 30 m buffer setback will be excavated. Runoff will collect in the ase of the pit and will recharge the soil. For the berm area, about 50% will induce unoff toward the pit and about 50% will maintain runoff toward the road.
	SC7	Northeastern portion of property. Runoff drains in an easterly direction to a road ditch located on the west side of Lake Ridge Road.	area outside of the 30 m buffer setback will be excavated. Runoff will collect in the ase of the pit and will recharge the soil. For the berm area, about 50% will induce anoff toward the pit and about 50% will maintain runoff toward the road.

1)"SC" denotes subcatchment area.

WATER BALANCE CALCULATIONS, PRE-DEVELOPMENT CONDITIONS - 30 YEAR NORMAL PROPOSED UTICA PIT **TABLE 2A**

Subcatchment Area ID SC1 - Excludes Set-Back SC1 - Set-Back SC1 - Total	Infiltration Factor	Area (m²) 111,792 2,597 114,389	Moisture Surplus (m³/a) 45,030 1,046 46,076	Infiltration Runoff (m³/a) (m³/a) 45,030 0 1,046 0	Runoff (m³/a)	Flow Direction Runoff drains into low-lying area for recharge. Runoff drains into low-lying area for recharge.
SC2 - Excludes Set-Back SC2 - Set-Back SC2 - Total	0.6	1,889 3,647 5,536	761 1,469 2,230	457 881 1 338	304 588 897	Runoff drains toward road ditch north of Goodwood Road. Runoff drains toward road ditch north of Goodwood Road.
SC3 - Excludes Set-Back SC3 - Set-Back	9.0 0.6	11,093	4,468	2,681	1,535	Runoff drains to culvert that extends below Goodwood Road, which is connected to a watercourse that drains to a closed depression. Runoff drains to culvert that extends below Goodwood Road, which is connected to a watercourse that drains to a closed depression.
0		20,618	8,305	4,983	3,322	The state of the s
SC4 - Excludes Set-Back SC4 - Set-Back SC4 - Total		1,372 3,002 4,374	553 1,209 1,762	553 1,209 1,762	0 0 0	Runoff drains toward low-lying area. Runoff drains toward low-lying area.
SC5 - Excludes Set-Back SC5 - Set-Back SC5 - Total	0.6	21,685 8,441 30,126	8,735 3,400 12,135	5,241 2,040 7,281	3,494 1,360 4,854	Runoff drains toward road ditch north of Goodwood Road. Runoff drains toward road ditch north of Goodwood Road.
SC6 - Excludes Set-Back SC6 - Set-Back SC6 - Total	0.6	1,015 3,552 4,567	409 1,431 1,840	245 858 1,104	164 572 736	Runoff drains toward road ditch west of Lake Ridge Road. Runoff drains toward road ditch west of Lake Ridge Road.
SC7 - Excludes Set-Back SC7 - Set-Back SC7 - Total	0.6 0.6	5,348 6,801 12,149	2,154 2,739 4,893	1,292 1,644 2,936	862 1,096 1,957	Runoff drains toward road ditch west of Lake Ridge Road. Runoff drains toward road ditch west of Lake Ridge Road.
Totals		191,759	77,241	62,479	11,761	

- 1) "SC" denotes subcatchment area.
 - 2) "m" denotes metres.
 3) "a" denotes annum.
- 4) Moisture surplus is 402.8 mm/a based on 30-Year normal data per Table B-1, Appendix B.

WATER BALANCE CALCULATIONS, PRE-DEVELOPMENT CONDITIONS - WET YEAR (2006) PROPOSED UTICA PIT **TABLE 2B**

Subcatchment	Infiltration	Area	Moisture	Infiltration Runoff	Runoff	Flow
Area ID	Factor	(m^2)	Surplus (m ³ /a)	(m³/a)	(m³/a)	Direction
- Excludes Set-Back	-	111,792	56,321	56,321	0	Runoff drains into low-lying area for recharge
SC1 - Set-Back	7	2,597	1,308	1,308	0	Runoff drains into low-lying area for rechards
SC1 - Total		114,389	57,629	57,629	0	and the second s
SC2 - Excludes Set-Back	9.0	1,889	952	571	381	Runoff drains toward road ditch north of Goodwood Dood
SC2 - Set-Back	9.0	3,647	1,837	1,102	735	Runoff drains toward road ditch north of Goodwood Bood.
SC2 - Total		5,536	2,789	1,673	1,116	STATE OF THE PROPERTY OF THE P
SC3 - Excludes Set-Back	9.0	11,093	5,589	3,353	2,235	Runoff drains to culvert that extends below Goodwood Road which is
SC3 - Set-Back	9.0	9,525	4,799	2,879	1,920	connected to a watercourse that drains to a closed depression. Runoff drains to culvert that extends below Goodwood Road, which is
ŀ						connected to a watercourse that drains to a closed denression
SC3 - lotal		20,618	10,387	6,232	4,155	
SC4 - Excludes Set-Back	_	1,372	691	691	0	Runoff drains toward low-lying area
SC4 - Set-Back	-	3,002	1,512	1,512	0	Runoff drains toward low-lying area
SC4 - Total		4,374	2,204	2,204	0	
SC5 - Excludes Set-Back	9.0	21,685	10,925	6,555	4.370	Runoff drains toward road ditch porth of Goodwood Dood
SC5 - Set-Back	9.0	8,441	4,253	2,552	1,701	Runoff drains toward road diffeh north of Goodwood Road
SC5 - Total		30,126	15,178	9,107	6,071	Total Total Total Total Total
SC6 - Excludes Set-Back	9.0	1,015	511	307	204	Runoff drains toward road ditch west of Lake Didge Dead
SC6 - Set-Back	9.0	3,552	1,790	1.074	716	Runoff drains toward road ditch west of lake blace beau
SC6 - Total		4,567	2,301	1,380	920	ייייני מייני בייני בייני איני איני איני איני אינ
SC7 - Excludes Set-Back	9.0	5,348	2,694	1.617	1.078	Runoff drains foward road diffeh west of Lake Didas Dood
SC7 - Set-Back	9.0	6,801	3,426	2,056	1,370	Runoff drains toward road difch west of Lake Didge Dood
SC7 - Total		12,149	6,120	3,672	2,448	The state of the s
Totals		191,759	809'96	81,898	14.710	
			£.			

^{1) &}quot;SC" denotes subcatchment area.

^{2) &}quot;m" denotes metres.
3) "a" denotes annum.

⁴⁾ Moisture surplus is 503.5 mm/a based on a wet year (2006) per Table B-2. Appendix B.

WATER BALANCE CALCULATIONS, PRE-DEVELOPMENT CONDITIONS - DRY YEAR (1994) PROPOSED UTICA PIT TABLE 2C

Nee ID Factor (m²) Surplus (m³/a) (m³/a) (m³/a) m³/a Diagrate sack 1 111,792 28,921 0 Runoff drains into low-lying area of 672 0 Runoff drains to low-lying area of 672 0 Runoff drains to low-lying area of 672 0 Runoff drains to low-lying area of 672 0 Runoff drains toward road ditch area of 672 0 Runoff drains toward road ditch area of 672 0 Runoff drains toward road ditch area of 672 0 Runoff drains toward road ditch area of 672 0 Runoff drains toward road ditch area of 672 0 Runoff drains toward road ditch area of 672 0 Runoff drains toward road ditch area of 672 0 Runoff drains toward road ditch area of 672 0 Runoff drains toward road ditch area of 672 0 Runoff drains toward road ditch area of 672 0 Runoff drains toward road ditch area of 672 0 Runoff drains toward road ditch area of 672 0 Runoff drains toward road ditch area of 672 0 Runoff drains toward road ditch area of 672 <th>Subcatchment</th> <th>Infiltration</th> <th>Area</th> <th>Moisture</th> <th>Infiltration Runoff</th> <th>Runoff</th> <th>Flow</th>	Subcatchment	Infiltration	Area	Moisture	Infiltration Runoff	Runoff	Flow
(*) 11 111,792 28,921 28,921 0 1 2,597 672 672 0 0 0.6 1,889 489 29,592 0 0.6 3,647 943 566 377 0 0.6 1,889 489 293 195 0 0.6 1,636 1,432 859 573 0 0.6 11,093 2,870 1,722 1,148 1 0.6 9,525 2,464 1,479 986 1 1,372 3,876 1,148 0 2,134 1 1,372 3,555 3,550 2,134 0 1 1,372 3,346 2,244 0 0 1 1,372 3,346 2,134 3,117 0 1 4,374 1,132 1,130 874 1,56 0 1 0.6 8,441 2,184 1,30 8,44	Area ID	Factor	(m^2)	Surplus (m³/a)	(m³/a)	(m³/a)	Direction
1 2,597 672 672 0 0 114,389 29,592 29,592 0 0 0.6 1,889 489 29,592 0 0.6 3,647 943 566 377 0.6 3,647 943 566 377 0.6 1,093 2,870 1,722 1,148 1 0.6 9,525 2,464 1,479 986 1 1,372 3,244 3,200 2,134 1 1,372 3,544 3,55 3,56 2,244 1 3,002 777 777 0 1 3,002 777 777 0 0.6 8,441 2,184 1,310 874 0.6 8,441 2,184 1,310 874 0.6 8,441 2,184 1,310 874 0.6 8,441 2,184 1,310 874 0.6 3,522 919	- Excludes Set-Back	_	111,792	28,921	28,921	0	Runoff drains into low-lying area for recharde
(0.6 1,889 29,592 29,592 0 (0.6 1,889 489 293 195 (0.6 1,889 489 293 195 (0.6 3,647 943 566 377 (0.6 1,1,093 2,870 1,722 1,148 (0.6 9,525 2,464 1,479 986 (1 1,372 355 3,200 2,134 (1 1,372 355 355 0 (1 4,374 1,132 1,132 0 (0.6 21,685 5,610 3,366 2,244 (0.6 8,441 2,184 1,310 874 (0.6 8,441 2,184 1,310 874 (0.6 8,441 2,184 1,310 874 (0.6 8,441 2,184 1,310 874 (0.6 8,441 2,184 1,310 874 (0.6 8,441 2,63	- Sef-Back	-	2,597	672	672	0	Runoff drains into low-lying area for recharde
0.6 1,889 489 293 195 0.6 3,647 943 566 377 0.6 1,536 1,432 859 573 0.6 9,525 2,464 1,722 1,148 1 20,618 5,334 3,200 2,134 1 1,372 355 355 0 1 4,374 1,132 1,132 0 0 21,685 5,610 3,366 2,244 8,441 2,184 1,310 874 0.6 8,441 2,184 1,310 874 0.6 8,441 2,184 1,310 874 0.6 8,441 2,184 1,310 874 0.6 8,441 2,184 1,310 874 0.6 1,015 263 551 368 0.6 3,552 919 551 473 0.6 5,348 1,383 830 553	SC1 - Total		114,389	29,592	29,592	0	
0.6 3,647 943 566 377 6,536 1,432 859 573 7 0.6 11,093 2,870 1,722 1,148 1 0.6 9,525 2,464 1,479 986 1 20,618 5,334 3,200 2,134 1 1,372 355 355 0 1 4,374 1,132 1,132 0 1 4,374 1,132 1,132 0 1 4,374 1,132 1,132 0 1 4,374 1,132 1,132 0 1 2,1685 5,610 3,366 2,244 8,441 2,184 1,310 874 0.6 8,441 2,184 1,310 874 0.6 1,015 263 158 105 0.6 4,567 1,181 709 473 0.6 5,348 1,383 830 553	- Excludes Set-Back	9.0	1,889	489	293	195	Runoff drains toward road ditch north of Goodwood Road
5,536 1,432 859 573 0.6 11,093 2,870 1,722 1,148 0.6 9,525 2,464 1,479 986 1 20,618 5,334 3,200 2,134 1 1,372 355 355 0 1 4,374 1,132 1,132 0 1 4,374 1,132 1,132 0 1 4,374 1,132 1,132 0 1 2,1685 5,610 3,366 2,244 8,441 2,184 1,310 874 0.6 8,441 2,184 1,310 874 0.6 8,441 2,184 1,310 874 0.6 8,441 2,184 1,310 874 0.6 1,015 263 158 105 0.6 3,552 919 551 368 0.6 5,348 1,383 830 553 0.6	- Set-Back	9.0	3,647	943	566	377	Runoff drains toward road ditch north of Goodwood Road
0.6 11,093 2,870 1,722 1,148 0.6 9,525 2,464 1,479 986 1 20,618 5,334 3,200 2,134 1 1,372 355 350 2,134 1 3,002 777 777 0 1 4,374 1,132 1,132 0 21,685 5,610 3,366 2,244 8,441 2,184 1,310 874 0.6 8,441 2,184 1,310 874 0.6 8,441 2,184 1,310 874 0.6 8,441 2,184 1,310 874 0.6 8,441 2,184 1,310 874 0.6 1,015 263 158 105 0.6 3,552 919 551 368 0.6 5,348 1,383 830 553 0.6 6,801 1,759 1,257 105 47,304 4,567 1,244 106 6,801 1,759 1,264 <td>SC2 - Total</td> <td></td> <td>5,536</td> <td>1,432</td> <td>859</td> <td>573</td> <td>The state of the s</td>	SC2 - Total		5,536	1,432	859	573	The state of the s
0.6 9,525 2,464 1,479 986 1 20,618 5,334 3,200 2,134 1 1,372 355 355 0 1 3,002 777 777 0 4,374 1,132 1,132 0 0.6 21,685 5,610 3,366 2,244 8,441 2,184 1,310 874 0.6 8,441 2,184 1,310 874 0.6 1,015 263 158 105 0.6 3,552 919 551 368 4,567 1,181 709 473 0.6 5,348 1,383 830 553 0.6 6,801 1,759 1,056 704 12,149 3,143 1,886 1,257 181 191,759 42,664 7,554	Excludes Set-Back	9.0	11,093	2,870	1,722	1,148	Runoff drains to culvert that extends below Goodwood Road, which is
1.0.0 9,525 2,464 1,479 986 1 1,372 355 350 2,134 1 1,372 355 355 0 1 3,002 777 777 0 1 4,374 1,132 1,132 0 0.6 21,685 5,610 3,366 2,244 8,441 2,184 1,310 874 0.6 8,441 2,184 4,676 3,117 0.6 1,015 263 158 105 4,567 1,181 709 473 0.6 5,348 1,383 830 553 0.6 6,801 1,759 704 1 12,149 3,143 1,886 1,257 181 42,654 7,554	100 H	ď	707		ļ		connected to a watercourse that drains to a closed depression.
1 20,618 5,334 3,200 2,134 1 1,372 355 355 0 1 3,002 777 777 0 0 4,374 1,132 1,132 0 1 21,685 5,610 3,366 2,244 0.6 8,441 2,184 1,310 874 0.6 8,441 2,184 4,676 3,117 0.6 1,015 263 158 105 0.6 3,552 919 551 368 4,567 1,181 709 473 0.6 5,348 1,383 830 553 0.6 6,801 1,759 1,056 704 12,149 3,143 1,886 1,257 48is 49,608 42,654 7,554	OCT-Dach	9.	6,525	2,464	1,4/9	986	Runoff drains to culvert that extends below Goodwood Road, which is
1 1,372 3,554 3,500 2,134 1 1,372 355 355 0 1 3,002 777 777 0 0 21,685 5,610 3,366 2,244 0.6 8,441 2,184 1,310 874 0.6 1,015 263 158 105 0.6 1,015 263 158 105 0.6 3,552 919 551 368 4,567 1,181 709 473 0.6 5,348 1,383 830 553 0.6 6,801 1,759 1,056 704 12,149 3,143 1,886 1,257 tals 191,759 49,608 42,054 7,554	Total		20.618	5 23/	0000	1010	writteded to a watercourse that drains to a closed depression.
1 1,372 355 355 0 1 3,002 777 777 0 4,374 1,132 1,132 0 0 8,441 2,184 1,310 874 0.6 8,441 2,184 1,310 874 0.6 1,015 2,63 4,676 3,117 0.6 1,015 263 158 105 4,567 1,181 709 473 4,567 1,383 830 553 6,801 1,759 1,056 704 105 5,348 1,383 830 553 105 6,801 1,759 1,056 704 11,759 1,986 1,257 754 181 1,257 754			010,02	t 0000	3,200	2,134	
1 3,002 777 777 0 4,374 1,132 1,132 0 0.6 21,685 5,610 3,366 2,244 0.6 8,441 2,184 1,310 874 0.6 1,015 2,63 4,676 3,117 0.6 3,552 919 551 368 4,567 1,181 709 473 0.6 5,348 1,383 830 553 0.6 6,801 1,759 1,056 704 12,149 3,143 1,886 1,257 tals 191,759 49,608 42,054 7,554	Excludes set-Back	-	1,372	355	355	0	Runoff drains toward low-lying area.
4,374 1,132 1,132 0 0.6 21,685 5,610 3,366 2,244 0.6 8,441 2,184 1,310 874 0.6 1,015 263 158 105 0.6 3,552 919 551 368 0.6 5,348 1,383 830 553 0.6 6,801 1,759 1,056 704 12,149 3,143 1,886 1,257 tals 191,759 49,608 42,054 7,554	Set-Back	-	3,002	777	777	0	Runoff drains toward low-lying area
0.6 21,685 5,610 3,366 2,244 0.6 8,441 2,184 1,310 874 0.6 1,015 263 158 105 0.6 3,552 919 551 368 0.6 5,348 1,383 830 553 0.6 6,801 1,759 1,056 704 12,149 3,143 1,886 1,257 tals 191,759 49,608 42,054 7,554	Total		4,374	1,132	1,132	0	
0.6 8,441 2,184 1,310 874 0.6 30,126 7,794 4,676 3,117 0.6 1,015 263 158 105 0.6 3,552 919 551 368 4,567 1,181 709 473 0.6 5,348 1,383 830 553 0.6 6,801 1,759 1,056 704 12,149 3,143 1,886 1,257 tals 191,759 49,608 42,054 7,554	Excludes Set-Back	9.0	21,685	5,610	3,366	2.244	Runoff drains toward road ditch north of Goodwood Boad
30,126 7,794 4,676 3,117 0.6 1,015 263 158 105 0.6 3,552 919 551 368 4,567 1,181 709 473 0.6 5,348 1,383 830 553 0.6 6,801 1,759 1,056 704 12,149 3,143 1,886 1,257 tals 191,759 49,608 42,054 7,554	Set-Back	9.0	8,441	2,184	1,310	874	Runoff drains toward road ditch north of Goodwood Road
0.6 1,015 263 158 105 0.6 3,552 919 551 368 0.6 4,567 1,181 709 473 0.6 5,348 1,383 830 553 0.6 6,801 1,759 1,056 704 12,149 3,143 1,886 1,257 12,149 49,608 42,054 7,554	Total		30,126	7,794	4,676	3,117	
0.6 3,552 919 551 368 4,567 1,181 709 473 0.6 5,348 1,383 830 553 0.6 6,801 1,759 1,056 704 12,149 3,143 1,886 1,257 tals 191,759 49,608 42,054 7,554	Excludes Set-Back	9.0	1,015	263	158	105	Runoff drains toward road ditch west of Lake Didge Dood
4,567 1,181 709 473 0.6 5,348 1,383 830 553 0.6 6,801 1,759 1,056 704 12,149 3,143 1,886 1,257 tals 191,759 49,608 42,054 7,554	Set-Back	9.0	3,552	919	551	368	Runoff drains toward road differ west of Lake Didge Dood
0.6 5,348 1,383 830 553 0.6 6,801 1,759 1,056 704 12,149 3,143 1,886 1,257 tals 191,759 49,608 42,054 7,554	Total		4,567	1,181	709	473	היינים מיינים מיינים איכין כן במאם ויומפת
0.6 6,801 1,759 1,056 704 12,149 3,143 1,886 1,257 Totals 191,759 49,608 42,054 7,554	Excludes Set-Back	9.0	5,348	1,383	830	Γ	Runoff drains toward road ditch west of Lake Ridge Road
Totals 12,149 3,143 1,886 1,257 Totals 191,759 49,608 42,054 7,554	Set-Back	9.0	6,801	1,759	1,056		Runoff drains toward road diffeh west of Lake Ridge Dood
191,759 49,608 42,054	Total		12,149	3,143	1,886		
	Totals		191,759	49,608	42,054	7.554	

- 1) "SC" denotes subcatchment area.
 - 2) "m" denotes metres.
 - 3) "a" denotes annum.
- 4) Moisture surplus is 258.7 mm/a based on a dry year (1994) per Table B-3, Appendix B.

WATER BALANCE CALCULATIONS, POST-DEVELOPMENT CONDITIONS - 30 YEAR NORMAL PROPOSED UTICA PIT **TABLE 3A**

WOL	Direction	hardee soil	Runoff drains from berm into bit, where it rechardes soil	road ditch		charges soil	here it rechardes soil	toh		shardes soil	here it rechardes soil	art below road.		shardes soil	here it rechardes soil	ich.		hardes soil	here it rechardes soil	ich.		hardes soil.	here it recharges soil.	ch.		hardes soil.	here it rechardes soil	CD COMPANY OF THE PROPERTY OF			
1		Runoff collects in nit and rechardes soil	Runoff drains from berm int	Runoff drains from berm to road ditch		Runoff collects in pit and rechardes soil	Runoff from berm into nit where it rechardes soil	Runoff from berm to road ditch		Runoff collects in pit and recharges soil	Runoff from berm into pit where it rechardes soil	Runoff from berm to to culvert below road		Runoff collects in pit and rechardes soil	Runoff from berm into bit, where it recharges soil	Runoff from berm to road ditch		Runoff collects in pit and rechardes soil	Runoff from berm into pit, where it recharges soil	Runoff from berm to road ditch		Runoff collects in pit and recharges soil	Runoff from berm into pit, where it recharges soil	Runoff from berm to road ditch		Runoff collects in pit and recharges soil	Runoff from berm into pit, where it recharges soil	Runoff from berm to road ditch			
Runoff	(m ³ /a)	0	0	209	209	0	0	294	294	0	0	292	767	0	0	242	242	0	0	680	680	0	0	286	286	0	0	548	548	3 026	1 1
Infiltration	(m ³ /a)	45.030	523	314	45,867	761	734	441	1,936	4,468	1.918	1,151	7,538	553	605	363	1,520	8,735	1,700	1,020	11,455	409	715	429	1,553	2,154	1,370	822	4,346	74.214	
Moisture	Surplus (m ³ /a)	45,030	523	523	46,076	761	734	734	2,230	4,468	1,918	1,918	8,305	553	605	605	1,762	8,735	1,700	1,700	12,135	409	715	715	1,840	2,154	1,370	1,370	4,893	77.241	
Area	(m ²)	111,792	1,298	1,298	114,389	1,889	1,823	1,823	5,536	11,093	4,763	4,763	20,618	1,372	1,501	1,501	4,374	21,685	4,221	4,221	30,126	1,015	1,776	1,776	4,567	5,348	3,400	3,400	12,149	191,759	
Infiltration	Factor	_	_	9.0		1	_	9.0		1	-	9.0		4	-	9.0		_	_	9.0		Y-	~	9.0		-	τ-	9.0			
Subcatchment	Area ID	SC1 - Excludes Set-Back	SC1 - Set-Back - Internal 50% of berm	SC1 - Set-Back - External 50% of berm	SC1 - Total	SC2 - Excludes Set-Back	SC2 - Set-Back - Internal 50% of berm	SC2 - Set-Back - External 50% of berm	SC2 - Total	SC3 - Excludes Set-Back	SC3 - Set-Back - Internal 50% of berm	SC3 - Set-Back - External 50% of berm	SC3 - Total	SC4 - Excludes Set-Back	SC4 - Set-Back - Internal 50% of berm	SC4 - Set-Back - External 50% of berm	SC4 - Total	SC5 - Excludes Set-Back	SC5 - Set-Back - Internal 50% of berm	SC5 - Set-Back - External 50% of berm	SC5 - Total	SC6 - Excludes Set-Back	SC6 - Set-Back - Internal 50% of berm	SC6 - Set-Back - External 50% of berm	SC6 - Total	SC7 - Excludes Set-Back	SC7 - Set-Back - Internal 50% of berm	SC7 - Set-Back - External 50% of berm	SC7 - Total	Totals	

I) "SC" denotes subcatchment area.

^{2) &}quot;m" denotes metres.
3) "a" denotes annum.

⁴⁾ Moisture surplus is 402.8 mm/a based on 30-Year normal data per Table B-1, Appendix B.

WATER BALANCE CALCULATIONS, POST-DEVELOPMENT CONDITIONS - WET YEAR (2006) PROPOSED UTICA PIT TABLE 3B

Subcatchment	Infiltration	Area	Moisture	Infiltration	Runoff	Flow
	Factor	(m^2)	Surplus (m³/a)	(m ³ /a)	(m^3/a)	Direction
SC1 - Excludes Set-Back	-	111,792	56,321	56,321	0	Runoff collects in pit and recharges soil
SC1 - Set-Back - Internal 50% of berm	-	1,298	654	654	0	Runoff drains from berm into pit, where it rechanges soil
SC1 - Set-Back - External 50% of berm	9.0	1,298	654	392	262	Runoff drains from berm to road ditch.
SC1 - Total		114,389	57,629	57,367	262	
SC2 - Excludes Set-Back	-	1,889	952	952	0	Runoff collects in pit and rechardes soil
SC2 - Set-Back - Internal 50% of berm		1,823	919	919	0	Runoff from berm into nit where it recharass soil
SC2 - Set-Back - External 50% of berm	9.0	1,823	919	551	367	Runoff from berm to road ditch
SC2 - Total		5,536	2,789	2,422	367	
SC3 - Excludes Set-Back	1	11,093	5,589	5,589	0	Runoff collects in pit and rechardes soil
SC3 - Set-Back - Internal 50% of berm	-	4,763	2,399	2,399	0	Runoff from berm into bit where it recharaes soil
SC3 - Set-Back - External 50% of berm	9.0	4,763	2,399	1,440	096	Runoff from berm to to culvert below road
SC3 - Total		20,618	10,387	9,428	096	
SC4 - Excludes Set-Back	-	1,372	691	691	0	Runoff collects in pit and recharges soil
SC4 - Set-Back - Internal 50% of berm	, —	1,501	756	756	0	Runoff from berm into bit where it rechardes soil
SC4 - Set-Back - External 50% of berm	9.0	1,501	756	454	302	Runoff from berm to road ditch.
SC4 - Total		4,374	2,204	1,901	302	
SC5 - Excludes Set-Back	~	21,685	10,925	10,925	0	Runoff collects in pit and rechardes soil.
SC5 - Set-Back - Internal 50% of berm	-	4,221	2,126	2,126	0	Runoff from berm into pit, where it rechardes soil
SC5 - Set-Back - External 50% of berm	9.0	4,221	2,126	1,276	851	Runoff from berm to road ditch.
SC5 - lotal		30,126	15,178	14,327	851	
SC6 - Excludes Set-Back	-	1,015	511	511	Г	Runoff collects in pit and recharges soil.
SC6 - Set-Back - Internal 50% of berm	_	1,776	895	895	0	Runoff from berm into pit, where it recharges soil.
SC6 - Set-Back - External 50% of berm	9.0	1,776	895	537	358	Runoff from berm to road ditch.
SC6 - Total		4,567	2,301	1,943	358	
SC7 - Excludes Set-Back	-	5,348	2,694	2,694	Г	Runoff collects in pit and recharges soil.
SC/ - Set-Back - Internal 50% of berm	_	3,400	1,713	1,713	0	Runoff from berm into pit, where it recharges soil
SC/ - Set-Back - External 50% of berm	9.0		1,713	1,028	685	Runoff from berm to road ditch.
SC/ - Lotal		12,149	6,120	5,435	685	
Totals		191,759	809'96	92,823	3,785	

^{1) &}quot;SC" denotes subcatchment area.

^{2) &}quot;m" denotes metres.
3) "a" denotes annum.
4) Moisture surplus is 503.8 for a wet year per Table B-2, Appendix B.

TABLE 3C WATER BALANCE CALCULATIONS, POST-DEVELOPMENT CONDITIONS - DRY YEAR (1994) PROPOSED UTICA PIT

Subcatchment	Infiltration	Area	Moisture	Infiltration Runoff	Runoff	
Area ID	Factor	(m ²)	Surplus (m ³ /a)	(m ³ /a)	(m ³ /a)	Direction
SC1 - Excludes Set-Back	1	111,792	28,921	28.921	0	Runoff collects in pit and rechardes soil
SC1 - Set-Back - Internal 50% of berm		1,298	336	336	0	Runoff drains from berm into pit where it recharges soil
SC1 - Set-Back - External 50% of berm	9.0	1,298	336	202	134	Runoff drains from berm to road ditch.
SC1 - Total		114,389	29,592	29,458	134	
SC2 - Excludes Set-Back	1-	1,889	489	489	0	Runoff collects in pit and rechardes soil
SC2 - Set-Back - Internal 50% of berm	_	1,823	472	472	0	Runoff from berm into nit where it rechards soil
SC2 - Set-Back - External 50% of berm	9.0	1.823	472	283	189	Runoff from berm to road ditch
SC2 - Total		5,536	1,432	1,244	189	
SC3 - Excludes Set-Back	<u>_</u>	11,093	2,870	2,870	0	Runoff collects in pit and recharges soil
SC3 - Set-Back - Internal 50% of berm	44	4,763	1,232	1,232	0	Runoff from berm into pit, where it rechardes soil
SC3 - Set-Back - External 50% of berm	9.0	4,763	1,232	739	493	Runoff from berm to to culvert below road
SC3 - Total		20,618	5,334	4,841	493	
SC4 - Excludes Set-Back	-	1,372	355	355	0	Runoff collects in pit and recharges soil.
SC4 - Set-Back - Internal 50% of berm	_	1,501	388	388	0	Runoff from berm into pit, where it rechardes soil
SC4 - Set-Back - External 50% of berm	9.0	1,501	388	233	155	Runoff from berm to road ditch.
SC4 - Total		4,374	1,132	976	155	
SC5 - Excludes Set-Back	-	21,685	5,610	5,610		Runoff collects in pit and rechardes soil.
SC5 - Set-Back - Internal 50% of berm	—	4,221	1,092	1,092	0	Runoff from berm into pit, where it recharges soil
SC5 - Set-Back - External 50% of berm	9.0	4,221	1,092	655	437	Runoff from berm to road ditch.
SC5 - Total		30,126	7,794	7,357	437	
SC6 - Excludes Set-Back	-	1,015	263	263	Г	Runoff collects in pit and recharges soil
SC6 - Set-Back - Internal 50% of berm	form	1,776	459	459	0	Runoff from berm into bit, where it rechardes soil
SC6 - Set-Back - External 50% of berm	9.0	1,776	459	276	184	Runoff from berm to road ditch.
SC6 - Total		4,567	1,181	866	184	
SC7 - Excludes Set-Back	_	5,348	1,383	1,383		Runoff collects in pit and recharges soil.
SC7 - Set-Back - Internal 50% of berm	-	3,400	880	880	0	Runoff from berm into pit, where it recharges soil
	9.0	3,400	880	528	352	Runoff from berm to road ditch.
SC/ - Iotal		12,149	3,143	2,791	352	
Totals		191,759	49,608	47,664	1,944	

^{1) &}quot;SC" denotes subcatchment area.

^{2) &}quot;m" denotes metres.
3) "a" denotes annum.

⁴⁾ Moisture surplus is 258.7 mm/a based on a dry year per Tahle B-3, Appendix B.

TABLE 4
SUMMARY OF WATER BALANCE CALCULATIONS
PROPOSED UTICA PIT

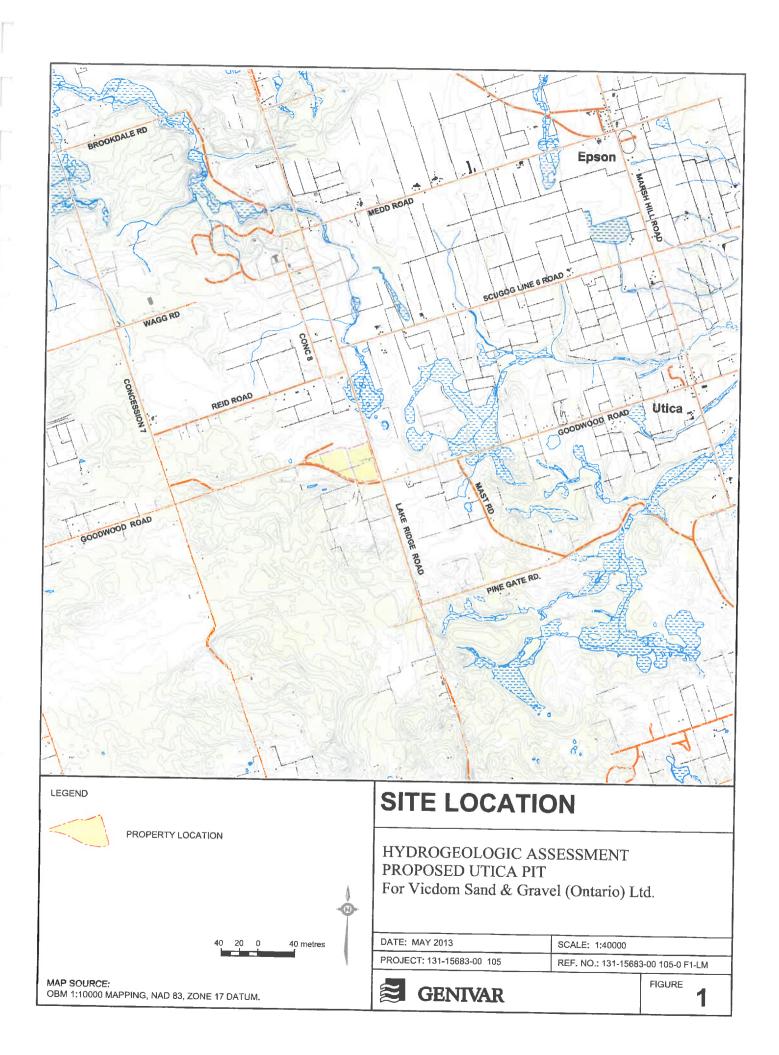
	PROPERTY II	PROPERTY INFILTRATION	RUNOFF TO R	RUNOFF TO ROAD DITCHES	RUNOFF TO PROPER	RUNOFF TO PROPERTIES TO THE SOUTH
CLIMATIC CONDITION	Pre-development	Post-development	Pre-development	Post-development	Pre-development	Post-development
30-Year Normal	65,479	74,214	8,439	2,259	3,322	797
Wet Year (2006)	81,898	92,823	10,555	2,825	4.155	960
Dry Year (1994)	42,054	47,664	5,420	1,451	2,134	493
Net Change	13.3% lr	13.3% Increase	73.2% Decrease	ecrease	76.9% Decrease	ecrease

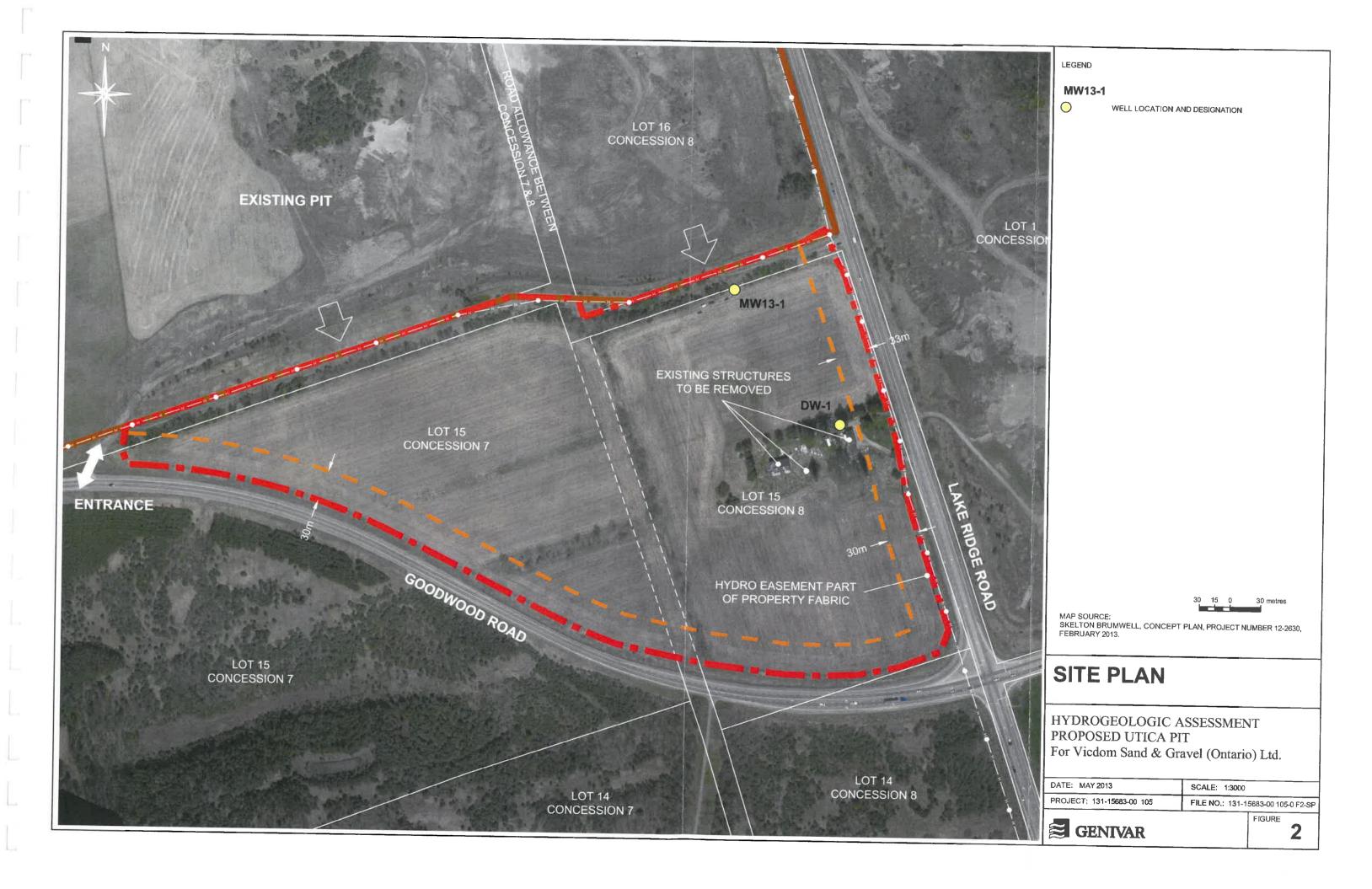
NOTES:

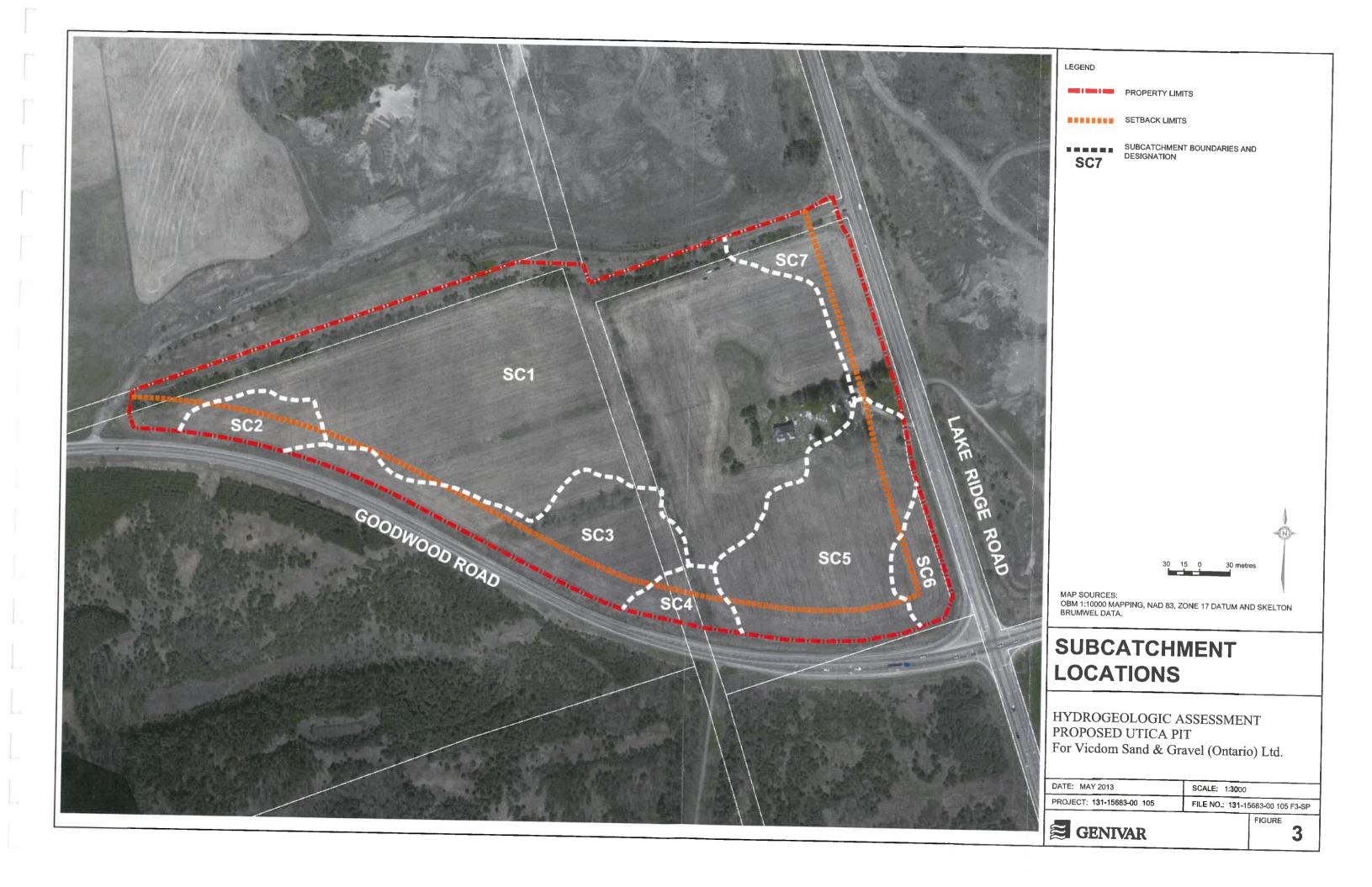
1) Units in cubic metres per annum (m³/a).

H:\Proj\13\15683-00\105 Hydrogeological Study\0414010\Tech\Water Balance\Water Balance Summary.xls}Summary Table 4











Appendix A

Water Well Information

Well Record Data

This interactive map allows you to search and view well record information from reported wells in Ontario.

Full dataset is available on the MOE data download page

(http://www.ene.gov.on.ca/environment/en/resources/collection/data_downloads/index.htm).

Search interactive map

3900 lake ridge road, uxbridge

Search

Current Map Display

1 result found for 3900 lake ridge road, uxbridge in Ontario.



Latitude: 44.066404, Longitude: -79.057703 (UTM Zone: 17, Easting: 655549.17, Northing: 4881082.02)

This website and all of the information it contains are provided "as is" without warranty of any kind, whether express or implied. <u>View the terms of use</u>

(http://www.ene.gov.on.ca/environment/en/resources/collection/data_downloads/STDPROD_078135.html).

Filed with tags: water wells

(http://www.ene.gov.on.ca/environment/en/main/contents/details?term=water_wells)

Well Audit Number: none
Well Tag Number: none

This table contains information from the original well record and any subsequent updates.

Address of Well Location	Township	Lot	Concession
not available	Uxbridge Township (Uxbridge	e) 015	CON 08
County/District/Municipality	City/Town/Village	Province	Postal Code
DURHAM		ON	n/a
UTM Coordinates	Municipal Plan and Sublot Number	Other	

NAD83 — Zone 17 Easting: 654513.9 Northing: 4880382

Overburden and Bedrock Materials Interval

General Colour	Most Common Material (Other Materials	General Description	De	Depth		
				Fn	om	To	
	GRVL			0	ft	53 ft	
	MSND			53	3 ft	90 ft	
	FSND			90	o ft	123 ft	
	FSND (GRVL		13	23 ft	125 ft	

Annular Space/Abandonment Sealing Record Results of Well Yield Testing

Annula	ir Space/Abandoi	nment Seam	ng kecora	Results of Well Held	resung	
Depth	Type of Sealar	nt Used	Volume		Draw Down	Recovery
From	To (Material and	Туре)	Placed	After test of well yield, water was CLEAR	Time Water (min) level	Time Water (min) level
Method	d of Construction	Well Use		If pumping discontinued, give	SWL91 ft	
Rotary	(Convent.)	Livestock		reason	1	
		Domestic		, , , , , , , , , , , , , , , , , , , ,		
				Pump intake set at	2	
Status	of Well			,	3	
Water S	Supply			Pumping Rate	4	
Constr	uction Record - C	asing		3 GPM	-	
Inside	Open Hole OR mater	ial Depth		Duration of Pumping	5	
Diameter		From	То	36 h:0 m	10	
4 inch	STEEL		122 ft	Final water level 117 ft	15	
Constr	uction Record - S	creen		If flowing give rate	20	
Outside	MaterialX	Depth			25	
Diameter		From	To	Recommended pump depth		
		122 ft	125 ft		30	
				Recommended pump rate	40	
Well Co	ontractor and We	ell Technicia	n	Well Production	45	
Welf Cont	ractor's Licence Number		3414	PUMP	50	
				Disinfected?	60	
				Motor Details		Iala Diamai

Water Details	Hole I	Diameter	
Water Found at Depth	Kind	Depth	Diameter
125 ft	Fresh	From	To

Audit Number: none

Date Well Completed: September 23, 1956 **Date Well Record Received by MOE:** November

30, 1956

Well Record Number: 1906265

Well ID Number: 1906265

Well Audit Number: none Well Tag Number: none

This table contains information from the original well record and any subsequent updates.

Well	100		-
well	LUC	ati	on

 Address of Well Location
 Township
 Lot
 Concession

 not available
 Scugog Township (Reach) 001
 CON 04

 County/District/Municipality
 City/Town/Village
 Province
 Postal Code

 DURHAM
 ON
 n/a

 UTM Coordinates
 Municipal Plan and Sublot Number Other

NAD83 — Zone 17 Easting: 654814.9 Northing: 4880223

Overburden and Bedrock Materials Interval

General Colour	Most Common Materia	of Other Materials	General Description	Depth	
				From	To
BRWN	SAND			0 ft	21 ft
BRWN	MSND			21 ft	30 ft
BRWN	CLAY	SAND		30 ft	59 ft
BRWN	FSND			59 ft	75 ft
BRWN	FSND	MGRD		75 ft	99 ft

Annular Space/Abandonment Sealing Record Results of Well Yield Testing

-united to	opace/ Abanaon	mone ocum	3 140001.0	11000110 01 17011 71010 1			
Depth	Type of Sealant	Used	Volume		Draw	Down	Recovery
	of Construction	well Use Commerical	Placed	After test of well yield, water was CLEAR If pumping discontinued, give	(min) SWI	Water level .65 ft	Time Water (min) level
				reason	1		
Status o	of Well			Pump intake set at	2		
Water Su Constru	ipply ction Record - Ca	sing		Pumping Rate 30 GPM	4		
Inside	Open Hole OR materia	Depth		Duration of Pumping	5		
Diameter		From	To	12 h:0 m	10		
6 inch	STEEL		85 ft	Final water level 85 ft	15	70 ft	15
Constru	ction Record - So	reen		If flowing give rate	20		
Outside Diameter 6 Inch	MaterialX	Depth From 82 ft	то 96 ft	Recommended pump depth 95 ft	25 30	78 ft	30
Well Co	ntractor and Wel	l Technician		Recommended pump rate 30 GPM Well Production	40 45	85 ft	45
Well Contra	ctor's Licence Number		3136	PUMP Disinfected?	50 60	85 ft	60

Water DetailsHole DiameterWater Found at Depth KindDepthDiameter75 ftFreshFromTo

Audit Number: none

Date Well Completed: October 30, 1981 **Date Well Record Received by MOE:** January 08, 1982

Well Audit Number: none Well Tag Number: none

This table contains information from the original well record and any subsequent updates.

Well Location

Address of Well Location	Township	Lot	Concession
not available	Scugog Township (Reach)001	CON 04
County/District/Municipality	City/Town/Village	Province	Postal Code
DURHAM		ON	n/a

UTM Coordinates NAD83 - Zone 17 Easting: 654909.9 Northing: 4880275

Overburden and Bedrock Materials Interval

General Colour	Most Common Material Other Materials	General Description	Depth	
			From	To
	GRVL		0ft	30 ft
	MEND		30 ft	OF ft

Municipal Plan and Sublot Number Other

Annular Space/Abandonment Sealing Record			Results of Well Yield Testing				
Depth		Type of Sealant	Used	Volume		Draw Down	Recovery
From	To	(Material and T	ype)	Placed	After test of well yield, water was	Time Water (min) level	Time Water (min) level
Method	l of Co	onstruction	Well Use		CLEAR	SWL90 ft	
Cable T	loc		Livestock		If pumping discontinued, give		
			Domestic		reason	1	
Shahua	-6 107-				Pump intake set at	2	
Status		;11				3	
Water S	upply				Pumping Rate	4	
Constr	uction	Record - Ca	sing		4 GPM	7	
Inside	Ope	n Hole OR materia	l Depth		Duration of Pumping	5	
Diameter			From	To	4 h:0 m	10	
2 inch	STE	EL		95 ft	Final water level		
					90 ft	15	
Constr	uction	Record - So	reen		If flowing give rate	20	
Outside	Mate	ria/X	Depth			25	
Diameter			From	To	Recommended pump depth		
						30	
					Recommended pump rate	40	
Well Co		tor and Wel	l Techniciar	1	Well Production	45	
		Ucence Number		2419	PUMP	50	
rren conti	40.0/3	some namer		2,13	Disinfected?	60	

Water De	tails	Hole Diamete	г
Water Found a	t Depth Kind	Depth Diamete	r
90 ft	Fresh	From To	

Audit Number: none

Date Well Completed: October 01, 1954 Date Well Record Received by MOE: November

26, 1954

Page 1 of 1

Well Record Number: 1909715

Well ID Number: 1909715

Well Audit Number: 32652 Well Tag Number: none

This table contains information from the original well record and any subsequent updates.

Well Loca		Toward	f		Lot	C	ession	
Address of We		Townsh		المساملة المساملة المساملة			.ess <i>ion</i> N 08	
not availat			wn/Village	ip (Uxbridge)	Province		al Code	
County/District DURHAM	зу типісіранцу	City/rui	mii) vinage		ON	n/a		
UTM Coordina	tae	Municlo	al Plan and Sul	dot Number	Other	11/0		
NADB3 — Zon		romen	DI 7 1011 UNO 301	JOE TENTILE	oma			
Easting: 6543								
Northing: 488								
Overburd	en and Bedrock	Materials I	nterval					
General Colou	r Most Common Mate	rial Other Materia	ils General De	escription	Dep	th		
					Fron	77	To	
BRWN	SAND	GRVL	LOOS		0 fi		32 ft	
BRWN	SILT	CLAY	SOFT		32	-	45 ft	
GREY	SILT	CLAY	SOFT		45		90 ft	
GREY	FSND	SILT	PCKD		90		95 ft	
GREY	CSND	SILT	PCKD		95		101 ft	
GREY	MSND	SILT	GRVL		10:	1 ft	142 ft	
Annular !	Space/Abandoni	ment Sealin	g Record	Results of	Well Yie	ld T	esting	
Depth	Type of Sealant		Volume				Draw Down	Recovery
From To	(Material and Ty	rpe)	Placed	After test of we was	li yield, wal	ter	Time Water	Time Water
				WdS			(min) level	(min) level
Method of Construction Well Use				If pumping disc	ontinued, a	ive	SWL	
Rotary (C	onvent.)	Industrial		reason			1	
							2	
Charles of	l Maril			Pump Intake se	et at		_	
Status of Water Sup							3	
	יייי tion Record - Ca	cina		Pumping Rate			4	
Inside	Open Hole OR material	_		Duration of Pur	nnina		5	
Diameter	open more on material	From	To	Duration of Por	nping		10	
6 Inch	STEEL		111 ft	Final water leve	e/			
							15	
Construc	tion Record - Sc	reen		If flowing give	rate		20	
Outside	MaterialX	Depth					25	
Diameter		From	To	Recommended	pump dept	rh:		
6 Inch		111 ft	121 ft				30	
				Recommended	pump rate		40	
	tractor and Well	Techniciar	1	Well Production			45	
Informat				Well Floatiction	,		50	
Well Contrac	tor's Licence Number		1930	Disinfected?			30	
							60	
				Water Det	ails			Hole Diamete
				Water Found a		d		Depth Diamete
				110 ft	Fre	esh		From To

Audit Number: 32652

Date Well Completed: February 01, 1989

Date Well Record Received by MOE: April 18,

Well Audit Number: none Well Tag Number: none

This table contains information from the original well record and any subsequent updates.

Wal	II I	.ocation	

Address of Well Location	Township	Lot	Concession
not available	Scugog Township (Reach)	001	CON 05
County/District/Municipality	City/Town/Village	Province	Postal Code
DURHAM		ON	n/a
LITM Coordinates	Municipal Plan and Subjet Number	Other	

NAD83 — Zone 17 Easting: 654814.9

Overburden and Bedrock Materials Interval

General Colour	Most Common Material Other Materials		General Description	Depth		
				From	To	
	PRDG			0 ft	3 ft	
BRWN	SAND	STNS	LOOS	3 ft	26 ft	
BRWN	GRVL	DRY	LOOS	26 ft	34 ft	
BRWN	SAND	GRVL	LOOS	34 ft	87 ft	
BRWN	MSND	LOOS		87 ft	113 ft	

Annula	r Spac	e/Abandon	ment Sealin	g Record	Results of Well Yield	Testir	ng	
Depth		Type of Sealant	Used	Volume		Draw	Down	Recovery
From	To	(Material and T)	/pe)	Placed	After test of well yield, water was		Water) level	Time Water (min) level
Method	of Co	nstruction	Well Use		CLEAR		.84 ft	. ,
Cable T	ool		Domestic		If pumping discontinued, give	2111	10416	
/- 1					reason	1		
					Pump intake set at	2		
Status	of Wel					3		
Water S	Supply				Pumping Rate	4		
Constr	uction	Record - Ca	sing		10 GPM	7		
Inside	Open	Hole OR material	l Depth		Duration of Pumping	5		
Diameter			From	To	1 h:0 m	10		
6 Inch	STE	≣L		110 ft	Final water level			
					93 ft	15	93 ft	15
Constr	uction	Record - Sc	reen		If flowing give rate	20		
Outside	Mater	iaiX	Depth			25		
Diameter			From	To	Recommended pump depth			
6 Inch			110 ft	113 ft	90 ft	30		
			. =		Recommended pump rate 8 GPM	40		
		or and Wel	i Techniciar	ı	Well Production	45		
Inform				4700	BAILER	50		
Well Contractor's Licence Number 47			4738	Disinfected?				
						60	93 ft	60

Water Deta	ails	Hole D	iameter
Water Found at	Depth Kind	Depth	Diameter
87 ft	Fresh	From T	io .

Audit Number: none

Date Well Completed: March 30, 1982

Date Well Record Received by MOE: August 13,

Well Audit Number: none Well Tag Number: none

This table contains information from the original well record and any subsequent updates.

		!
MF COLL	LOC	ation

Address of Well Location	Township	Lot	Concession
not available	Scugog Township (Reach)	001	CON 04
County/District/Municipality	City/Town/Village	Province	Postal Code
DURHAM		ON	n/a
IITM Coordinates	Municipal Plan and Sublot Number	Other	

NAD83 - Zone 17

Easting: 654942.9 Northing: 4880309

Overburden and Bedrock Materials Interval

Most Common Materia	l Other Materials	General Description		Depth	
				From	To
LOAM				0 ft	1 ft
SAND				1 ft	3 ft
STNS				3 ft	33 ft
SAND				33 ft	84 ft
SAND				84 ft	92 ft
CLAY	STNS			92 ft	131 ft
SAND				131 ft	133 ft
CLAY	STNS			133 ft	220 ft
SAND				220 ft	231 ft
	LOAM SAND STNS SAND SAND CLAY SAND CLAY	LOAM SAND STNS SAND SAND CLAY SAND CLAY STNS SAND CLAY STNS	SAND STNS SAND SAND CLAY SAND CLAY STNS SAND CLAY STNS	LOAM SAND STNS SAND SAND CLAY STNS SAND CLAY STNS SAND CLAY STNS	From CLAY STNS 133 ft CLAY STNS 133 ft 13

Annula	Annular Space/Abandonment Sealing Record								Recovery
Depth From Oft Method	70 218 ft	Type of Sealant Used (Material and Type) onstruction Well Use		Placed was		f well yield, water CLEAR discontinued, give	(min)	Water level .82 ft	Time Water (min) level
Rotary			Livestock		reason		1		
reacting ,	(COTTVE)	,	Domestic		Pump Intak	e set at	2		
Status Water 9		I			Pumping Ra	ate 8 GPM	4		
Constr	uction	Record - Ca	sing		Duration of	Pumping	5		
Inside	Open	Hole OR materia	•			4 h:0 m	10		
Diameter 4 inch	STE	ĒL	From	To 223 ft	Final water If flowing g	120 ft	15 20	120 ft	15
Constr	uction	Record - Sc	reen				25		
Outside Diameter	Mater	ialX	Depth From	To	Recommen	ded pump depth 140 ft	25 30		
4 inch			223 ft	231 ft	Recommen	ded pump rate 7 GPM	40		
Well C	ontraci	or and Wel	l Techniciar	1	Well Produ	ction	45		
Inform						BAILER	50		
Well Cont	ractor's Li	cence Number		1413	Disinfected	17	60	120 ft	60

Water Details **Hole Diameter** Water Found at Depth Kind Depth Diameter Fresh From To 231 ft

Audit Number: none

Results of Well Yield Testing

Date Well Completed: May 08, 1974

Date Well Record Received by MOE: June 05,

Well Audit Number: Z122962 Well Tag Number: none

This table contains information from the original well record and any subsequent updates.

Well Location

Address of Well Location

Township

Lot

30 REGIONAL RD. 21 County/District/Municipality

Scugog Township (Reach) 001
City/Town/Village Provide

CON 04

DURHAM

SCUGOG

Province Postal Code
ON n/a

UTM Coordinates

Municipal Plan and Sublot Number Other

NAD83 — Zone 17 Easting: 654984 Northing: 4880288

Overburden and Bedrock Materials Interval

General Colour Most Common Material Other Materials General Description

Depth From

To

0 ft

,

Results of Well Yield Testing
Annular Space/Abandonment Sealing Record

Depth Type of Sealant Used Volume
From To (Material and Type) Placed
BENTONOTE GROUT

e After test of well yield, water
was

Draw Down Recovery
Time Water Time Water
(min) level (min) level

Method of Construction Well Use
Other Method Not Used

Other Method DECOM.

Not Used rea

221 ft

Status of Well
Abandoned-Other
Construction Record - Casing

Inside Open Hole OR material Depth
Diameter From
5 inch STEEL 5 ft

Construction Record - Screen

Outside MaterialX Depth

Diameter From To

Well Contractor and Well Technician
Information

Well Contractor's Licence Number 1663

SWL79.6 ft If pumping discontinued, give reason 2 Pump intake set at 3 Pumping Rate 5 Duration of Pumping 10 Final water level 15 If flowing give rate 20 25 Recommended pump depth 30 Recommended pump rate 40

Well Production 45
50
Disinfected?
Y 60

Water Details

Water Found at Kind

Depth

Hole Diameter
Depth Diameter
From To
5 ft 221 ft 5 Inch

Audit Number: Z122962

Date Well Completed: November 29, 2010

Date Well Record Received by MOE: February

Untested

01, 2011

Well Audit Number: none Well Tag Number: none

This table contains information from the original well record and any subsequent updates.

Well Loc	nėlau						
Address of V		T					
not availa		Towns			Lot	Cancession	
	icie ict/Municipality			ship (Uxbridge)		CON 07	
DURHAM	исц минипранту	City/T	own/Village		Province	Postal Code	
UTM Coordin	ster	Mary Inc			ON	n/a	
NAD83 - Zo		Милкс	ipal Plan and Si	ublot Number	Other		
Easting: 654							
Northing: 48							
-	ien and Bedrock	Materiale '	Intonesi				
	ur Most Common Mat			Description	Donati		
		array outlier mater	ivis Generali	Jesa Iption	Depth From	To	
BLCK	LOAM				0 ft	2 ft	
BRWN	CLAY	SNDY	LOAM		2 ft	19 ft	
BRWN	SAND	LOOS			19 ft		
YLLW	CLAY	SOFT			42 ft		
BRWN	SAND	LOOS			67 ft	-	
BRWN	SAND	PCKD			98 fi		
BRWN	SAND	CLAY	LYRD		125		
				Results of V			
Annular	Space/Abandon	ment Sealir	ng Record	results of t	ven Her		
Depth	Type of Sealant		Volume	After test of well	yield, water	Draw Down	Recovery
From To	(Material and T	ype)	Placed	was		Time Wate	
0 ft 20) ft			CLE	AR	(min) level	
Method o	of Construction	Well Use		If pumping disco	ntinued, giv	SWL98 f	t
Cable Too	I	Domestic		reason		1	
				_		2	
				Pump intake set	at	_	
Status of	Well			Pumping Rate		3	
Water Sup	opły			10 0	DM	4	
Construc	tion Record - Ca	sing		Duration of Pump		5	
Inside	Open Hole OR material	Depth		2 h:0	-	10	
Diameter		From	To	Final water level		10	
6 inch	STEEL		116 ft	108	ft	15	
5 inch	STEEL		130 ft	If flowing give ra	te	20	
						25	
	tion Record - Sc			Recommended p			
Outside Diameter	MateriaiX	Depth	_	115		30	
6 Inch		From	To	Recommended po		40	
o men		113 ft	120 ft	8 Gi Well Production	PM	45	
Wall Can				BAIL	FD		
Informat	tractor and Well	Technician		Disinfected?		50	
	or's Licence Number		4743			60	
Contract	or a module isomine!		T/73	Water Detai	ils		Hole Diameter
				Water Found at D			Depth Diameter
				98 ft	Fresh	1	From To
					501	•	

Audit Number: none

Date Well Completed: October 21, 1992

Date Well Record Received by MOE: December 03, 1992

Well Audit Number: none Well Tag Number: none

This table contains information from the original well record and any subsequent updates.

Well L	ocation						
	of Well Location	Tr	wriship				
поt ava				obio (distributi	Lot	Concession	
County/D	Nistrict/Municipality		ty/Town/Village	ship (Uxbridge		CON 07	
DURHA	•	φ.	y, . own, ymage		Province	Postal Code	
UTM Cool	dinates	Mı	unicipal Plan and S	Zublak Alumban	ON	n/a	
NAD63 -	Zone 17		- Many Bridge	obiot Namber	Other		
Easting: (553644.9						
Northing:	4880343					5	
Overb	urden and Bedrock	Materia	is Interval				
General C	alour Mast Common Mat	erial Other Ma	aterials General	Description	Depth		
	1044				From	To	
	LOAM				0 ft	2 ft	
	MSND				2 ft	515 ft	
	CLAY GRVL				515	ft 580 ft	
Ammidia					580 1	ft 595 ft	
Depth Depth	r Space/Abandon			Results of V	Well Yield	d Testing	
From	Type of Sealant To (Material and T)		Volume			Draw Don	n Recovery
	(Platerial and 1)	ype)	Placed	After test of well	l yield, water	Time Wat	
Metho	of Construction	100-10-11		was	EAR	(min) leve	
Cable T		Well Use		If pumping disco		CWI 47	,
Cuore 1	501	Domestic	:	reason	riun ve a, give	1	
						_	
Status	of Wall			Pump intake set	at	2	
Water S						3	
	iction Record - Ca	eine		Pumping Rate		4	
Inside	Open Hole OR material	Depth		40 0		•	
Diameter	The second of the second	From	To	Duration of Pump	_	5	
6 inch	STEEL		595 ft	4 h:	0 m	10	
			0,53 /(Final water level 280	1 64	15	
Constru	iction Record - Sci	een		If flowing give rat		_	
Outside	MaterialX	Depth		and the same same same same same same same sam		20	
Diameter		From	To	Recommended pu	ımp depth	25	
				350		30	
				Recommended pu		40	
Informa	ntractor and Well	Technicia	an	20 G Well Production	iPM .	45	
	ctor's Licence Number		2518	PUN	1P	50	
				Disinfected?		60	
						00	
				Water Detail			Hole Diameter
				Water Found at De	-		Depth Diameter
				595 ft	Fresh		From To

Audit Number: none

Date Well Completed: July 04, 1968

Date Well Record Received by MOE: July 04,

Well Audit Number: none Well Tag Number: none

Well Location

This table contains information from the original well record and any subsequent updates.

WCII EC												
Address of		ocation		Towns	hip		Lot	a	oncess	ion		
not avai	llable			Uxbr	idge Towns	ihlp (Uxbrldge			ON 0			
County/DE	strict/M	unicipality			own/VIIIage	AND CONDINGE	Province		ostal C	-		
DURHAN	М				-		ON			one		
UTM Coord	linates			Munici	pal Plan and Si	uhlot Number	Other	rı,	/a			
NAD83 :	Zone 17	7				- Diot Harrige	Other					
Easting: 65	53664.9)										
Northing: 4	488042	3										
Overbu	rden	and Bedroci	(Mate	ials I	nterval							
General Co	Jour I	Most Common Mai	terial Othe	Materi	als General ()escriptos						
					un Ochicia, p	rescription	Dep		_			
BRWN	9	SAND	DRY	,			Froi		To			
BRWN	(CLAY	PCK				0 f	_	18			
BRWN	9	SAND	DRY	_			18		43			
BRWN		SND	LOO				43		95			
GREY		CLAY	HAR	_			95			4 ft		
Annula		ce/Abandon						4 ft		5ft		
Depth	Spa	Type of Sealant		ealin		Results of V	Vell Yie	ıld 1	resti	ng		
•	Το	(Material and T			Volume				Dra	w Down		Recovery
	•	(· · · · · · · · · · · · · · · · · · ·	ype		Placed	After test of well	yield, wat	er	Tim	e Water		Time Water
Method	of Co		104-11			Waş CLE	A.D.			1) level		(min) level
Delega do		Well (CLE			SW	L95 ft		(*****)	
Rotary (Convent.) Dome		Domes	tic		If pumping discourseson	nunuea, g	ve					
						reason			1			
Chat						Pump intake set a	a t		2			
Status o		H				· unp make set i	71		3			
Water Su						Pumping Rate						
	ction	Record - Ca	sing			8 G	PM		4			
Inside	Open	Hole OR material	Depth			Duration of Pump			5			
Diameter			From		To	2 h:(-		10			
5 inch	STE	EL			116 ft	Final water level			10			
						102	ft		15	102 ft	:	15
Construc	ction	Record - Sci	reen			If flowing give rat	e		20			
Outside	Mater	iaiX	Depth						-			
Diameter			From		To .	Recommended pu	mp depth		25			
5 inch			116	ft	124 ft	115	ft		30			
						Recommended pu	mp rate		40			
Well Con	tract	or and Well	Techni	cian		7 G	M					
Informat	_					Well Production			45			
Well Contract	tor's Lic	ence Number			1413	BAIL	ER		50			
						Disinfected?				400.0		
									60	102 ft	6	00
						Water Detail	S			н	ole	Diameter
						Water Found at De	pth Kind				ept	
						124 ft	Fresi	า			m	To

Audit Number: none

Date Well Completed: April 16, 1979

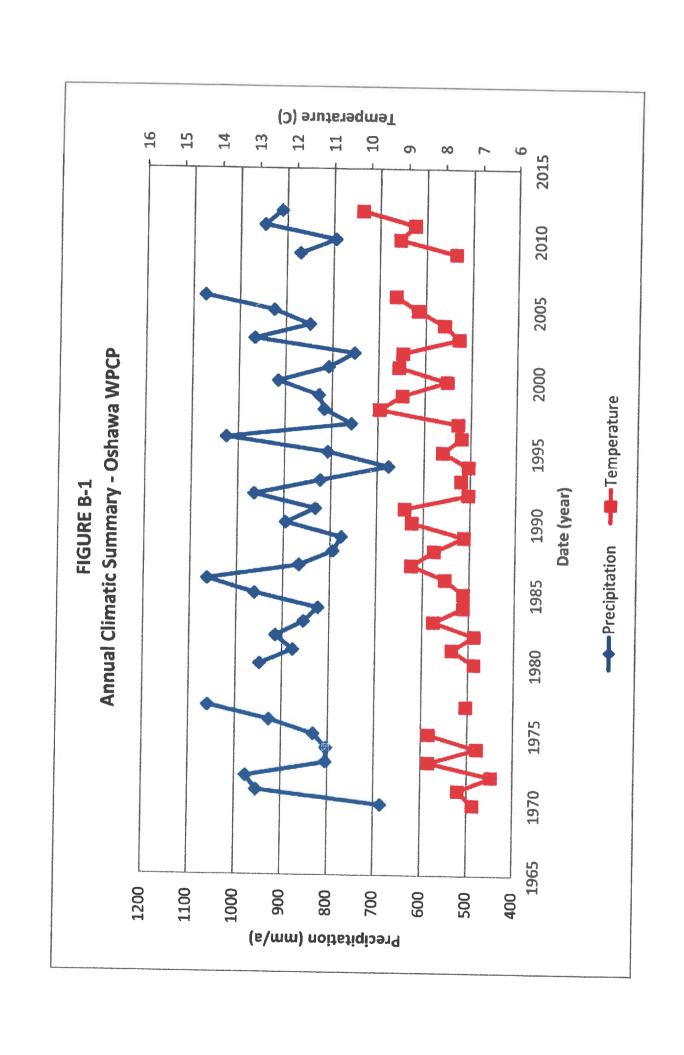
Date Well Record Received by MOE: May 10, 1979

		istry of Environment	Well	Tag No. (Place Sticker	r and/or Print Below)	LCEIVED	Well F	Record
Measu	rements recorded in:	Metric Tumperi	al /	100636	Regi	detion 903 Ontario		1
	Owner's Information		(PESSO)		National Company		age /	of /
First Na	978970	Last Neme / Organi		, ,	E-mail Address		☐ Wek	Constructed
Mailing	Address (Street Number/N	tame)	E . 300, 5.3	Municipality	Province Postal	Code Talenho	by W	(ell Owner
Mall I	Cox 135	9		Matrida	4 8	11116 905	68/7	7117
	of Well Location (Street N	umber/Name)		Township	Lat		3 6 9 7	-13159
County	District/Municipality	Kidge k	was a			Conces	ision Zarak	i.
	, ,			City/Town/Village	1. 1	Province	Postal	Code
	ordinates Zone Easting	Northing	heliquag	Municipal Plan and Sul		Ontario		
	rden and Bedrock Male	4130 417 W	016-27					
General	Colour Most Corr	mon Material	Owning Rec	ther Materials	hé back of this form) General Descr		Deny	oth (m/li)
4	- 1 3			(1		From	To
· ·			**************************************	23 3 d 5	1111111111111	for more services	1 (1	1 4
7 -	4 7 - a 4	/	. 228	1	and the state of t	1 17 s hadden of price was realistical.	A.	100
Book	Winds Track of The State of Contract of Co	. /		7	The second secon	ATTACLE MANAGEMENT AND ADDRESS OF THE PARTY	Control of the Contro	
	60%	6 - refer - full recessor and constraint (2004)	- 1700 / (Blatte Ave.	and the second	and the second s	ESSECURITION COMMISS, 48 - 4	509	\$
	- Vitra Editablished on Promotomerature of Consulty of	Charles authorized an engineering the place of the forest and the second	Alaba di Madiliana ana an	To the second se	SP feetberger or "bream " three file from register assessment	innopped Antipological special conference		
	William and the state of the st		THE RESERVE OF THE PERSON OF T	in a second seco	Contrative the first annual management of a second property of the property of the second of a second property of the second property of the second of a second property of the second property o	PRE, AND STREET, A		1
	and the second s	with retribute consequentables the frequenciation.	and a distributed an incidence	AD A MODE	25 Mary 100 Colon (1994)	the processing of the first operations and the second solutions and the second	TO VERTER STREET, ST	-
		AMMONT SAME READ THE PROPERTY AND A 199	Wigi-Mir correspondent spragation	dan yana yana dan dan dan dan dan dan dan dan dan	Andrew to the control of the control	TAM 4 year		1 hearthurse
		Annular Space			The second secon			
Depth : From	Set at (m/h) To	Type of Sealant Use (Malarial and Type)	ed	Volume Placed	After test of well visit water was	Well Yield Testin	Re	Boovery
	Section 1	CA CA	decommendation of the first	(m ¹ /h ²)	Clear and sand free	Time Water (min) (min)	evel Time \	Water Level
MONTH AND ADDRESS OF THE PARTY		- Transportation	er-folders (Fig. 46)	7.5	If pumping discontinued, give rea	Static Static	1,1,000	311871)
mentanencon const.	The Chimpenson and American	the said the said of the said	AND THE PARTY OF T			Level	1	
	The state of the s	Mellin - inhandretation Communications	TOWN,	Y a north-combination and a second	Pump intake set at (m/ft)	2	2	seconds.
					Common Control			
Cable T	hod of Construction	☐ Public	Commic		Pumping, rate (Vmin / GPM)	3	3	N Periodo
Rotary (Conventional) Detting	☐ Comestic	(Manicip	al Dewatering	Duration of pumping	4	4	
Boring	Digging	Livestock Imigation	☐ Test Ho	le Monitoring & Air Conditioning	hrs + min Final water level and of pumping	5	5	The second discount of
⊒ ijir piero ⊒ Other ii	useon pocity	☐ Industrial ☐ Other, specif		With Shideling	Lance waster sever and or briting	10	10	
	Construction R		×	I E Santa Paran	If flowing give rate (Vinin / GPM)	15	15	
Inside Diamater	Open Hole Off Material (Galvanized, Fibreglass,	Wall De	pth (m/ft)	Status of Midelt Water Supply	Recommended pump depth (m/	20	20	
(cm/in)	Concrete, Plastic, Steel)	Thickness (covin) From	To	Replacement Well Test Hole		25	25	
1. 10 1	1296	100	37	Recharge Well	Recommended pump rate (f/min / GPM)	30	30	
		And the second s		Dewatering Weil Observation and/or		40	40	***************************************
	v * hteret in de historie officielle principle de			Monitoring Hole	Well production (Vmin / GPM)	50		
The second secon	Physical of the SSA disconnection regign regign		-	(Construction)	Disinfected?	The sales and the sales are a second	50	indiano integracio
	Construction Re	cord - Screen		Abandoned, Insufficient Supply	Yes No	60	60	
Outside Drameter	Material	A. Marianetta	olin (m/ft;	Abandened, Poor Water Quality	Please provide a map below follow	Well Location	troude	
(crrvin)	(Plastic, Galvanized, Steet)	From	То	Abandoned, other, specify	or saneway	### 12 T	r bagn.	
011	i harring l	10 37	80					
				Other, specify	The state of the s	RMMorene ung 2		
	Water Deta	ılls <u> </u>		ole Diameter	(X) F	- he in	/	
ater toun	d at Depth Kind of Water	Fresh L Upfeste	d Depti	(m/fi) Diameter To (cm/in)	11 B			
ater four	d at Depth Kind of Weter.	Fresh / Unteste		170 /			1	
(in	(ft) Gas Other spec	STV SELECT	and the second desired the second desired to					
	at Depth Kind of Water:		d	- Ingleson			1.8	
	Well Contractor	and Well Technici	an information				Šī	
1 2	me or Well Contractor			Contractor's Licence No			1	
siness Ad	dreus (Street Number/Nam	201	1	5 F 18				
11:	alega (allest Molliber/Man		Mun	nicipality	Comments		Ai p	
wince	Postsi Code	Business E-mail Ad	dress	- The state of the	X r	Vull-122	100	2
Telenhow	Ne No May area over Albert		4.4.		Well owner's Date Package Deliv	ered Mint	stry Use O	hly
1 2 1	e No. (Inc. area code) Nam				information package delivered	Audit No.	1070	310
Technicia	n's Licence No Signature o	Technician and/or C	ontractor Date	Submitted	Date Work Complet	ed	TOIS	じょし
6E (12/2007	4 4	*	10	OF THE COMP	PNo Phila to the			
	,			Well Owner's Cop	/	© Cureen	s Printer for Or	otario, 2007

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Appendix B

Climatic Data



CLIMATIC WATER BUDGET: 1971 - 2000 (Normal Year) PROPOSED UTICA PIT TABLE B-1

				Thornthwaite (1948)	lite (1948)				tom		Tho	rothwaite ar	Thornthwaite and Mather (4057)		
	T CO		Potential		Adjusted							Change in	Call language		
Month	Temperature	Heat	Evapo-	Daylight	Potential	Total	Surplus	Deficit	PPT -	Accumulated	Storage	_	Actual Evapo-	Moisture	Unadjusted
	(၁)	Index	transpiration	Value	transpiration	Precipitation (mm)	(mm)	(mm)	PET	Water Loss	(mm)	9	transpiration	Deficit	Moisture
			(mm)		(mm)				()	(mm)		(mm)	(mm)	(EE)	snidins (ww)
January	-5.7	0.0	0.0	0.765	0.0	71	71.0	0.0	71.0	00	100	(See of			
February	4.8	0.0	0.0	0.871	0.0	527	52.7	2 6	2 7	9 6	224.1	0.0	0.0	0.0	71.0
March	-0.1	0.0	00	986	2 0	5.53	32.7	0 0	7.70	0.0	277.4	0.0	0.0	0.0	52.7
April	63	1 4	25.7	2 4	2 6	02.3	62.3	0.0	62.3	0.0	75.0	0.0	0.0	0.0	62.3
M ×	10.0	0	100	2 2	7.07	73.7	44.4	0.0	4.4	0.0	75.0	0.0	28.7	0.0	44.4
le Do	10.01	0 0	7.00	1.231	61.2	74.7	13.5	0.0	13.5	0.0	75.0	0.0	61.2	0	4
or series	0.00	. o	20.00	1.293	89.1	90.6	0.0		-8.5	-8.5	66.5	50.05	89.1	2	2
, and	50.3		82.8	1.269	105.0	67.3	0.0		-37.7	-46.2	39.0	-27.5	. «	5 5	0.0
August	19.6	7.9	79.9	1.173	93.8	83.3	0.0		-10.5	3,6	34.0	2 4	2 6	7.01	0.0
September	15.4	5.5	62.8	1.048	65.8	87.9	22.1		22.4		1 9	7 6	B. / O	n n	0.0
October	9.1	2.5	37.1	0.918	34.1	86.3	22.2		- 6	9 6	0 0	1.77	8.69	0.0	0.0
November	1.4	0.7	16.7	0 803	7	7 6	2.00	_	22.2	0.0	75.0	18.5	7.7	0.0	13.7
December	-2.5	0 0		0.741	÷ c	20.00	0 0 0		66.5	0.0	75.0	0.0	13.4	0.0	66.5
TOTA! S (mm)		36.4		1	0.0	(8./	/8./	٦	78.7	0.0	153.7	0.0	0.0	0.0	78.7
		1			D. L64	877.8	443.4	26.6	386.8	-111.3	1,227.2	0.0	475.0	16.0	402.8
			Tot	Total Water Surplus	snlc	386.8	E E				TOT	AL MOISTEIL	TOTAL MOISTURE SURPLUS	402 8	

1) Evapotrans, = Evapotranspiration.

2) Water budget based on Thornthwaite Method. Adjusted for latitude and daylight.

3) (°C) - Represents calculated mean of daily temperatures for the month. 4) Data from the Oahawa WPCP Climatological Station, Environment Canada on-line

4) Data from the Oahawa WHCP cumuroongrea organov, current and precipitation minus adjusted potential evaportanspiration.
5) Water Surplus (Thornthwaite 1945) is calculated as total precipitation minus actual potential evaportanspiration and change in soil moisture.
6) Unadjusted Moisture Surplus (Thornthwaite and Mather, 1957) is calculated as total precipitation minus actual potential evaportanspiration and change in soil moisture.
7) Slorage represents soil water holding capacity. Considered 75 mm based on sand and gravel and medium rooted crops (com) for pre-development to deep roots (pasture) for rehabilitation.
8) Slorage represents soil water holding capacity. Considered 75 mm based on sand and gravel and medium rooted crops (com) for pre-development to deep roots (pasture) for rehabilitation.
8) Slorage represents soil water holding capacity. Considered 75 mm based on sand and gravel and medium rooted crops (com) for pre-development to deep roots (pasture) for rehabilitation.
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8) Slorage represents soil water holding capacity. Considered 75 mm based on sand and gravel and medium rooted crops (com) for pre-development to deep roots (pasture) for rehabilitation.
8) Slorage represents soil water holding capacity. Considered 75 mm based on sand and gravel and medium rooted crops (com) for pre-development to deep rooted crops (pasture) for pre-development to deep rooted crops

E

TOTAL MOISTURE SURPLUS 402.8

CLIMATIC WATER BUDGET: 2006 (Wet Year) PROPOSED UTICA PIT TABLE B-2

L				Thornthwaite (1948)	ito /1948)				a.						
-			Dotombial		1						_	Thornthwaite and Mather (1957)	Mather (1957)		
Month	Temperature	Heat	Evapo-	Daylight	Adjusted	Total	Supplies	1,0370	PPT.	Accumulated		Change in Soil Actual Europ	Actual Eugan		Unadjusted
	()	Index	transpiration	Correction	Evapo-	Precipitation	culding/	James (mark)	PET	Potential	Storage	Moisture (mm)	franchization	E	Moisture
-	5		(mm)	Value	transpiration	(mm)	î l		(mm)	Water Loss	(mm)	(delta S)	lionalidensis (www)	(ww)	Surplus
	0	0.0	0.0	0.765	0.0	0 00	000	000		(mam)		,	,		(mm)
	-3.7	0.0	0.0	0.871	0.0	80.00	000	0.0	9.0	0.0	75.0	0.0	0.0	0.0	99.9
	0.8	0.1	2.6	0.986	9 0	62.3	0 L	0.0	85.9	0.0	160.9	0.0	0.0	0.0	85.9
	7.2	1.7	31.1	1 116	34.7	20.2	30.6	0.0	50.6	0.0	75.0	0.0	2.6	0.0	50.6
	12.8	1.4	59.5	1 231	73.5	2.67	4 t	0.0	5.4	0.0	75.0	0.0	34.7	0.0	44.5
	18.5	7.2	0.06	1 293	116.4	200.7		0.0	7.5	0.0	75.0	0.0	73.2	0.0	7.5
_	21.4	0.6	106.1	1.269	134.6	187.4	0.0	55.3	-65.3	-65.3	30.7	-44.3	95.4	21.0	0.0
	20.5	8.4	101.1	1.173	118.6	100	32.0	0.0	32.8	0.0	63.5	32.8	134.6	0.0	0.0
September	15.8	5.7	75.4	1.048	79.0	106 a	2, 5	00.4	4.00.4	-66.4	30.0	-33.5	85.7	32.9	0.0
	9.1	2.5	40.5	0.918	37.2	152	2, 7, 0	0.0	27.3	0.0	57.9	27.9	79.0	0.0	0.0
_	5.8	1.3	24.4	0.803	19.6	73.4	0.0	0 0	5.4.0	0.0	75.0	17.1	37.2	0.0	7.76
	2.8	0.4	10.7	0.741	0 %	71.8	0.5.0	0.0	53.8	0.0	75.0	0.0	19.6	0.0	53.8
TOTALS (mm)		40.4			623.8	1073.7	584 B	0.0	03.0	0.0	75.0	0.0	8.0	0.0	63.8
							2		P	-131./	868.0	0.0	569.9	53.9	503.8
			Tot	Total Water Surplus	snlc	449.9	mm					TOTAL MOISTINE SUBBILIE	01100110	0	

1) Evapotrans. = Evapotranspiration

2) Water budget based on Thornthwaite Method. Adjusted for lattinge and daylight

5) Water Surplus (Thomthwaite, 1945) is calculated as total precipitation minus adjusted potential evaportranspiration 3) (°C) - Represents calculated mean of daily temperatures for the month 4) Date from the Oshawa WPCP Climatological Station, Environment Canada on-tree

6) Unadjusted Molsture Surplus (Thomthweite and Malher, 1957) is calculated as total precipitation minus actual potential evaportranspiration and change in soil moisture.

7) Storage represents soil water holding capacity. Considered 75 mm bassed on sand and gravel and medium rooted crops (com) for pre-development to deep rooted crops (basture) for rehabilitation.

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E

TOTAL MOISTURE SURPLUS 503.8

CLIMATIC WATER BUDGET: 1994 (Dry Year) PROPOSED UTICA PIT TABLE B-3

				77.					,						
				пошти	I DOMITHWAITE (1948)						-				
	Mean	1000	Potential	Daylight	Adiusted	Total						I nornthwaite and Mather (1957	d Mather (1957)		
Month	Temper	Lear	Fivano			3	Surming	Dafirit	- 144	Accumulated		Change in Soil Actual Evang-	Actual Evang.	Moiotruo	The section of the se
		ndex	Lvapo	Correction	Potential	Precipitation			PET	Potential	Storage	, , , , , , , , , , , , , , , , , , , ,	2	AIDICION	Outdoinsted
	ature		transpiration	Value	Evano-	(mm)	(mm)	(EEE)			(mm)	Ē	transpiration	Deficit	Moisture
January	-11.1	0.0	00	725		/			(MIM)	Water Loss	,	(delta S)	(mm)	(mm)	Currelin
Eobaron.	1.0		2 (3	0.0	07.1	67.1	0.0	67.1	0.0	1421	00	, , ,		Culpins
reordary	7:1-	0.0	0.0	0.871	0.0	37.2	37.0	0	37.0	200	1 1 2 1	0.0	0.0	0.0	67.1
March	-0.01	0.0	0.0	0.986	0.0	1 4	9 4	9 0	37.72	0.0	179.3	0.0	0.0	0.0	37.2
April	6.5	1.5	29.8	1 1 1 1 8	200	0.6	0.1	0.0	41.6	0.0	75.0	0.0	0.0	0 0	416
May	400			2 :	23.5	70.3	45.1	0.0	45.1	0,0	75.0	00	22.2		2 .
,	0.0	3.2	5.TC	1.231	63.3	98.6	25.3	00	25.2	0		2 0	23.55	0.0	45.1
June	17.8	6.8	88.0	1 293	1137	44.0	200	0.0	6.0.0	0.0	0.00	0:0	63.3	0.0	25.3
- Aluk	20.6	40	400	200		o ‡	0.0	69.1	-69.1	-69.1	28.9	-46.1	40.7	22.0	200
	2	2	0.50	1.269	130.6	33.7	0.0	696	98.0	166.1	0		7.00	22.0	0.0
August	18.3	7.1	90.6	1.173	106.3	67.2	0	10.4	200	-100.	0.0	6.02-	54.6	76.0	0.0
September	16.1	5.8	79.0	1 048	200		2 6	- 100	-38.	-225.2	3.0	-5.0	52.2	54.1	00
October	8.6	000	A6.2	0.00	200	2.00	0.0	2.5	-2.5	-227.8	3.0	0.0	80.2	25	9 0
November	ď	7	200	0.310	6.24	7.77	0.0	20.3	-20.3	-248.1	3.0	00	22.2		9 0
i announce	2 0	?	20.3	0.803	21.1	81.7	9.09	0.0	60.6		969	5 6	7.77	50.3	0.0
December	0.3	0.0		0.741	00	546	62.0	9 6	2 5	0 0	03.0	9.09	21.1	0.0	0.0
TOTALS (mm)		36.9			207		03.0	0.0	53.5	0.0	75.0	11.4	0.8	0.0	42.4
					4.4.6	0.77.0	330.7	225.2	82.4	-936.2	730.9	0.0	418.3	176.1	258.7
			To	Total Water Surplus	. snjo	82.6					•	CITATION MOISTINGE CITATION	0110010	1	

Evapotrans, = Evapotranspiration.

2) Water budget based on Thornthwaite Method. Adjusted for latitude and daylight

3) (°C) - Represents calculated mean of dally temperatures for the month

4) Data from the Oshawa WPCP Climatological Station, Environment Canada on-line

6) Unadjusted Moisture Surplus (Thomthweite and Mather, 1957) is calculated as total precipitation minus actual potential evapotranspiration and change in soil moisture 5) Water Surplus (Thornthwaite, 1948) is calculated as total precipitation minus acjusted potential evapotranspiration

7) Storage represents soil water holding capacity Considered 75 mm based on sand and gravel and medium rooted crops (com) for pre-development to deep moted crops (pasture) for rehabilitation

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mm

TOTAL MOISTURE SURPLUS 258.7