HYDROGEOLOGIC EVALUATION
PROPOSED RESIDENTIAL DEVELOPMENT
PART LOTS 1 & 2, CONCESSION 6
TOWNSHIP OF GREY HIGHLANDS (EUPHRASIA)

Prepared For:
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TABLE OF CONTENTS **PAGE**

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1.0 INTRODUCTION

It is proposed to develop a 45-lot common element condominium development on a 29.7 hectare parcel of land in part of Lots 1 and 2, Concession 6, Geographic Township of Euphrasia, Township of Grey Highlands. The property is generally square-shaped, and is located to the northeast of the intersection of the 7th Line and Grey County Road 30. Figures 1 and 2 show the location of the proposed development.

It is proposed to service the development with individual water wells and private subsurface sewage disposal systems. As shown on Figure 2, the current proposed site plan indicates that the 45lots are to be situated within the central portion of the of the common element condominium development, with the balance to remain for open space, common element roads, recreational and stormwater management purposes.

The development is located on lands of rolling to hilly relief, with slopes to the east and west from a centrally-situated north-to-south trending hillock. Overall relief is about 16 metres, from a central high elevation of about 418m atop the hill, down to about 412m within the western periphery of the site and down to a low of about 402m near the eastern limit of the site. The brow of the Beaver Valley is located about 100m to the east. The lands are currently undeveloped with a mix of open pasture and scrub vegetation. Lands to the south, west and north are rural, with scattered residential homes. Lands to the east are occupied by the Beaver Valley Ski Club and a rural residential subdivision along Windy Lane. According to on-site and NTS mapping, Wodehouse Creek flows generally southwards within the low area along the eastern periphery of the site, before turning east in the vicinity of Windy Lane. A seasonal tributary of Wodehouse Creek flows northwards within the western periphery of the site, and joins Wodehouse Creek well to the north of the site.

During December 2006, one test well was drilled on the property and, along with two existing off-site wells, were subjected to 6-hour pumping tests on January 10 and 11, 2007 to assess the availability and quality of groundwater for residential use. A soils and shallow groundwater inspection to characterize upper soil and shallow groundwater conditions was conducted January 10, 2007. This report describes the well construction and testing program, background geology and hydrogeology, on-site soil and shallow groundwater conditions, the applicability of Provincial Sewage Risk Assessment guidelines and the preliminary suitability of soils for sewage systems.

A Karst Evaluation Report, dated December 8, 2006 and prepared by Daryl W. Cowell & Associates Inc., provides an evaluation of karst features on and in the vicinity of the site.

2.0 GEOLOGY AND HYDROGEOLOGY

The proposed development is situated within the Horseshoe Moraines physiographic region of southern Ontario, a horseshoe-shaped region west of the Niagara Escarpment typified locally by irregular stony knobs and ridges which are composed mostly of till. According to Ontario Geological Survey Map P.3251 "Quaternary Geology of the Markdale-Owen Sound Area", the soils over most of the site consist of till, either a stony till with a sandy silt matrix or a till with a clayey silt matrix.

Based on the test pit data and the water well records for the test wells, the overburden beneath the upland portions of the site is in excess of 10m deep. Local quaternary mapping and the 2006 Karst Evaluation indicate shallow overburden conditions in the vicinity of the lower western and eastern portions of the site.

The bedrock beneath the site consists of dolostone of the Guelph or Amabel Formations. The dolostone will be underlain by shale of the Queenston Formation.

According to the Ministry of the Environment Map 78-5, the Guelph-Amabel Aquifer is present beneath the site. This bedrock aquifer system is well recognized as a high-potential aquifer. Well yields are normally acceptable and domestic supplies can be readily obtained throughout the area. Due to the thin, fine-grained overburden, no viable aquifers typically exist in the overburden.

3.0 WELL CONSTRUCTION

The following information was derived from the well records completed by the drilling contractor for the test wells, Neumann Well Drilling of Dundalk. Figure 2 shows the location of the test wells. Copies of the water well records are included in the appendix.

3.1 Test Well 1 (On-Site):

Contractor's Log of Formations Penetrated

Depth (m)	Materials
0 - 0.6	topsoil
0.6 - 10.7	clay with stones
10.7 - 13.7	white limestone
13.7 - 16.8	cavernous rock
16.8 - 22.55	limestone

Water was reported to have been located in the bedrock at a depth of 22.3 metres below grade.

Casing Record:

Length:	19.2m
Setting:	0.6m above grade to 18.6m below grade

Diameter:	15.88cm ID, 16.83cm OD
Wall Thickness:	0.48cm
Material:	steel
Open Hole:	18.6m to 22.6m below grade
Reported Annular Seal:	Grout from grade to 12.2m below grade

3.2 Test Well 2 (Southern of the Two Off-Site Wells):

Contractor's Log of Formations Penetrated

Depth (m)	Materials
0 - 19.2	brown clay
19.2 - 23.2	clay with stones
23.2 - 31.4	limestone
31.4 - 49.7	blue shale
49.7 - 59.7	limestone
59.7 - 67.7	blue/red shale

Water was reported to have been located in the bedrock at depths of 47.5 and 54.9 metres below grade.

Casing Record:

Length:	68.3m
Setting:	0.6m above grade to 67.7m below grade
Diameter:	0.6m above to 24.1m below grade - 15.88cm ID, 16.83cm OD 24.1m to 67.7m - 12.7cm ID slotted liner
Wall Thickness:	0.48cm
Material:	steel
Reported Annular Seal:	Grout from grade to 15.2m below grade

3.3 Test Well 3 (Northern of the Two Off-Site Wells):

Contractor's Log of Formations Penetrated

Depth (m)	Materials
0 - 4.6	brown clay
4.6 - 15.2	clay with gravel
15.2 - 18.6	clay with stones
18.6 - 31.4	limestone
31.4 - 49.1	blue shale
49.1 - 59.4	shale with limestone

59.4 - 63.1 blue shale
63.1 - 63.7 red shale

Water was reported to have been located in the bedrock at depths of 30.5 and 56.3 metres below grade.

Casing Record:

Length:	64.3m
Setting:	0.6m above grade to 63.7m below grade
Diameter:	0.6m above to 19.2m below grade - 15.88cm ID, 16.83cm OD 19.2m to 63.7m - 12.7cm ID slotted liner
Wall Thickness:	0.48cm
Material:	steel

Reported Annular Seal: Grout from grade to 15.2m below grade

4.0 WELL TESTING

4.1 Pumping Tests:

4.1.1 Test Well 1:

Test Well 1 was subjected to a 6 hour pumping test at 36 litres per minute on January 10, 2007. Water levels were observed in the test well on a regular basis during pumping and for a 995 minute period of recovery after pumping ceased. Water levels were observed using an electronic water level meter. Pumping rates were measured using a calibrated container. Water was discharged from the well to the ground surface downslope of the well to the east.

Figure 3 is a semi-logarithmic plot of the test results showing the drawdown of the water level in the test well versus the elapsed time from the start of pumping and residual drawdown versus the ratio of time from the start of pumping to the time from the end of pumping (ratio t/t'). The raw pumping test data are included in the appendix.

The water level in Test Well 1 lowered 0.05m during the first minute of pumping at 36 litres per minute and assumed a very shallow, slowly steepening downward trend. The shallow downward trend continued to steepen slightly throughout the pumping test.

The final water level in the well was 15.1m below grade. Maximum drawdown was 0.44m, which represents 5 percent of the column of water in the well (9.43m).

The water level returned to within 0.16m of the original static water level (64% recovery) within 60 minutes of the conclusion of pumping. Full water level recovery was observed to have occurred within 995 minutes of the conclusion of pumping.

A total of 12,960 litres of water were pumped from the well during the 6 hour pumping

test. The Ontario Building Code indicates that a 4 bedroom house will normally require a maximum of about 2000 litres of water per day. Given the acceptable rate of water level recovery following the test (i.e. pumping plus full recovery within 24 hours), the yield of Test Well 1 is considered more than adequate for normal domestic service.

4.1.2 Test Well 2:

Test Well 2 is an unutilized domestic well located nearby to the northeast of the proposed subdivision. The well was drilled in 2003 and will be placed in service when the lot on which it is located is sold. Test Well 2 was pumped simultaneously with Test Well 3.

Test Well 2 was subjected to a 6 hour pumping test at 16 litres per minute on January 11, 2007. Water levels were observed in the test well on a regular basis during pumping and for a 1035 minute period of recovery after pumping ceased. Water levels were observed using an electronic water level meter. Pumping rates were measured using a calibrated container. Water was discharged from the well to the roadside ditch along Windy Lane.

Figure 4 is a semi-logarithmic plot of the test results showing the drawdown of the water level in the test well versus the elapsed time from the start of pumping and residual drawdown versus the ratio of time from the start of pumping to the time from the end of pumping (ratio t/t'). The raw pumping test data are included in the appendix.

The water level in Test Well 2 lowered 1.80m during the first minute of pumping at 16 litres per minute and assumed a slowly steepening, shallow downward trend. The shallow downward trend continued to steepen slightly throughout the pumping test, with slight variance between 30 and 90 minutes due to pumping rate correction.

The final water level in the well was 40.0m below grade. Maximum drawdown was 7.30m, which represents 21 percent of the column of water in the well (35.0m).

The water level returned to within 1.45m of the original static water level (80% recovery) within 60 minutes of the conclusion of pumping. Full water level recovery was observed to have occurred within 1035 minutes of the conclusion of pumping.

A total of 5760 litres of water were pumped from the well during the 6 hour pumping test. The Ontario Building Code indicates that a 4 bedroom house will normally require a maximum of about 2000 litres of water per day. Given the acceptable rate of water level recovery following the test, the yield of Test Well 2 is considered more than adequate for normal domestic service.

4.1.3 Test Well 3:

Test Well 3 is an unutilized domestic well located nearby to the northeast of the proposed subdivision. The well was drilled in 2003 and will be placed in service when the lot on which it is located is sold. Test Well 3 was pumped simultaneously with Test

Well 2.

Test Well 3 was subjected to a 6 hour pumping test at 16 litres per minute on January 11, 2007. Water levels were observed in the test well on a regular basis during pumping and for a 1035 minute period of recovery after pumping ceased. Water levels were observed using an electronic water level meter. Pumping rates were measured using a calibrated container. Water was discharged from the well to the roadside ditch along Windy Lane.

Figure 5 is a semi-logarithmic plot of the test results showing the drawdown of the water level in the test well versus the elapsed time from the start of pumping and residual drawdown versus the ratio of time from the start of pumping to the time from the end of pumping (ratio t/t'). The raw pumping test data are included in the appendix.

The water level in Test Well 3 lowered 0.37m during the first minute of pumping at 16 litres per minute and assumed a slowly steepening, shallow downward trend. The shallow downward trend continued to steepen slightly through the early portions of the pumping test, with slight variance due to pumping rate correction. A steady downward trend was established after about 90 minutes, this downward trend lasting the remainder of the pumping test.

The final water level in the well was 35.35m below grade. Maximum drawdown was 2.49m, which represents 8 percent of the column of water in the well (30.84m).

The water level returned to within 1.44m of the original static water level (58% recovery) within 60 minutes of the conclusion of pumping. Full water level recovery was observed to have occurred within 1041 minutes of the conclusion of pumping.

A total of 5760 litres of water were pumped from the well during the 6 hour pumping test. The Ontario Building Code indicates that a 4 bedroom house will normally require a maximum of about 2000 litres of water per day. Given the acceptable rate of water level recovery following the test, the yield of Test Well 3 is considered more than adequate for normal domestic service.

4.2 Interference:

Where possible, water levels in selected wells within about 200m are typically observed during low-rate domestic-type well pumping tests. Due to the low pumping rates involved and typical off-site domestic well use which often obscures any impact which might have occurred, interference observations in wells more distant are not normally useful.

During the pumping of Test Well 1, the water level in the closest off-site well (OW1) was observed on a regular basis during the test. OW1 is a drilled well located approximately 100m to the south of Test Well 1. The water level in OW1 was observed to lower 0.03m during the pumping of Test Well 1, an insignificant impact. The water level observations for OW1 are shown on Figure 6. The observation data are included in the appendix.

During the combined testing of Test Wells 2 and 3, a drilled well (OW2) located 58m north of Test Well 2 and 90m south of Test Well 3 was observed on a regular basis. Although other wells are located in the vicinity of Windy Lane and Test Wells 2 and 3, the home which OW2 serves is seasonal and was not in use during the testing period. As such, OW2 provides an ideal observation well as well use will not have interfered with possible impacts from the pumping test. The water level in OW2 lowered a total of 2.5m by the conclusion of pumping from Test Wells 2 and 3. While significant, this degree of interference is relatively minor in comparison to the available drawdown in the test wells (e.g. 31 to 35 metres). The water level observations for OW2 are shown on Figure 7. The observation data are included in the appendix.

It should be noted that aquifer conditions in the vicinity of Test Well 1 will differ from that in the vicinity of Test Wells 2 and 3, as Test Wells 2 and 3 are located near the brow of the Beaver Valley, while Test Well 1 is located somewhat inland of the brow. Static water levels near the brow will be lower than inland, due to the drainage effect of the valley. Wells near the brow will often be necessarily drilled deeper into the underlying Queenston shale to provide adequate available drawdown. Although the yield and interference potential identified at Test Wells 2 and 3 are entirely adequate for domestic purposes, it is anticipated that wells within the proposed development will tend to exhibit performance more typical of Test Well 1, rather than that of Test Wells 2 and 3, as the proposed subdivision is located somewhat inland of the brow of the valley.

Widely spaced drilled wells on relatively large, privately serviced lots, operating on a domestic supply-demand basis do not normally cause adverse mutual water level interference. In this case, acceptable degrees of drawdown during testing and acceptable water level recovery after testing indicates that cones of influence will be of limited size and will be very limited in duration during normal domestic use. It should be noted that in excess of 2.9 to 6 times the maximum daily water demand of a normal four bedroom home was pumped from each of the test wells with acceptable impact to aquifer resources.

There were no complaints of adverse water supply interference reported during the testing program.

4.3 Well Testing Summary:

	Test Well 1	Test Well 2	Test Well 3
Date of Test	Jan. 10, 2007	Jan. 11, 2007	Jan. 11, 2007
Static Water Level (m below grade)	13.12	32.70	32.86
Water Level Drawdown (m)	0.44	7.30	2.49
Pumping Water Level (m below grade)	13.56	40.00	35.35
Pumping Rate (L/min)	36	16	16
Duration	6 hours	6 hours	6 hours
Specific Capacity (L/min/m)	82	2.2	40
Available Drawdown (m)	9.43	35.00	30.74
Percent Available Drawdown Used	5%	21%	8%
Coefficient of Transmissivity (m^2/day)	78	2.0	6.5
Safe Yield*	36L/min	16 L/min	16 L/min

Only drilled wells completed in accordance with Ontario Regulation 903 are recommended.

5.0 WATER QUALITY

5.1 Bacteriological Water Quality:

Samples of water was collected from the three test wells at the conclusion of their respective pumping tests and submitted to Maxxam Analytics Inc. for bacteriological analysis. The samples were collected in laboratory-supplied bottles and stored in an ice-packed cooler for transport.

The sample from Test Well 1 was reported to contain no Total Coliform or E. Coli bacteria and a low and acceptable level of background bacteria.

The sample from Test Well 2 contained a low, but detectable level of Total Coliform bacteria (6 CFU/100mL), no detectable E.Coli bacteria and a low and acceptable level of background bacteria.

The sample from Test Well 3 was reported as overgrowth.

Test Wells 2 and 3 were drilled in 2003 and have remained dormant since that time. Although the pumping contractor reported chlorinating the wells prior to the pumping test, the long-term dormancy likely contributed to the detection of Coliform bacteria and/or bacteria overgrowth. Test Wells 2 and 3 should be fully disinfected and purged

prior to re-sampling.

The acceptable bacteriological quality of water from TW1 indicates that the aquifer is bacteriologically secure on-site, however TW2 and TW3 must be re-sampled to confirm this condition.

Copies of the laboratory analytical reports are included with the general chemistry results in the appendix.

5.2 Chemical Analysis:

Samples of water were collected from the test wells at the conclusion of their respective pumping tests and submitted to Maxxam Analytics Inc. for general chemical analysis. The samples were collected in laboratory-supplied bottles and stored in an ice-packed cooler for transport.

The general quality of water from the wells is similar and typical of groundwater in southern Ontario. The water from the wells is slightly alkaline with a pH value of 8.1 to 8.3. The water from the wells is typically hard, with a hardness value of between 220 and 310 mg/L as $CaCO_3$.

The sodium content of the water from TW1 at 29mg/L slightly exceeds the level at which it is recommended that the local Medical Officer of Health be notified so that physicians for persons on sodium-restricted diets can be advised (20mg/L), but is well below the aesthetic Drinking Water Quality Standard of 200mg/L.

The turbidity of the water from Test Wells 2 and 3 (121 and 5.5NTU) and the colour of the water from Test Well 3 are elevated. The water from these wells was visibly slightly turbid (particularly Test Well 2) at the conclusion of the pumping tests. As above, the dormancy of the wells will have contributed to short-term elevated turbidity and colour in the water. Additional well development prior to introduction of the wells to service will reduce turbidity and colour to acceptable levels.

All other parameters determined were at acceptable concentrations.

Copies of the laboratory analytical results are included in the appendix.

6.0 SOILS INVESTIGATION

6.1 Test Pits:

Eight test pits were excavated using backhoe equipment on January 10, 2007. The test pits ranged in depth from 1.4 to 1.7 metres, averaging 1.5m. The soil profile was logged in each hole and representative soil samples were collected from each identified soil horizon for subsequent classification, analysis and storage. Figure 2 shows the approximate test pit locations. The following table provides a summary of the analytical results for selected, representative soil samples.

Table 1 : Summary of Soil Analytical Data

Test Pit/ Sample	Depth (m)	Grain-Size Distribution				"k" (cm/sec)	T-Time (min/cm)
		Clay %	Silt %	Sand %	Gravel %		
2/1	0.9	34	62	4	0	10^{-7}	>50
4/2	1.2	22	56	22	0	10^{-6}	45 to 49
5/3	0.6	32	57	11	0	10^{-7}	>50
7/4	0.9	21	51	28	0	10^{-6}	45 to 49
8/5	0.5	22	41	37	0	10^{-6}	45 to 49

Note: The above coefficients of permeability ("k" values) and T-times (percolation rates) are estimates based on field observation, laboratory grain-size analysis, experience with similar soils and guidelines of the Ontario Building Code.

The typical soil profile consists of a very compact sandy silt with some clay and overlying a dense clayey silt. The upper sandy silt exhibits a T-time in the range of 45 to 49 minutes per centimetre while the underlying clayey silt exhibits a T-time in excess of 50 minutes per centimetre. The underlying clayey silt was not encountered at Test Pits 3 and 7 while the overlying sandy silt was not encountered at Test Pit 5.

Complete test pit logs and grain-size curves are included in the appendix.

6.2 Shallow Groundwater Conditions:

Shallow groundwater and/or evidence of shallow groundwater (i.e. soil mottling, discolouration) was encountered in most test pits on January 10, 2007. The following table summarizes the watertable observations.

Test Pit	Inferred High Watertable Level
TP1	emergent water at 0.3m below grade
TP2	emergent water at 0.5m below grade
TP3	emergent water at 0.6m below grade
TP4	emergent water at 0.6m below grade
TP5	emergent water at 0.8m below grade
TP6	emergent water at 0.8m below grade

TP7	No groundwater or evidence of groundwater encountered to 1.5m below grade
TP8	emergent water at 0.6m below grade

Samples of emergent groundwater were collected from Test Pits 4 and 8 to confirm the nitrate content of shallow groundwater. The samples were collected in laboratory-supplied bottles, stored in an ice-packed cooler for transport and submitted to Maxxam Analytics Inc. for chemical analysis. The samples were reported by the laboratory to contain no detectable nitrate. Copies of the laboratory analytical results are included in the appendix.

6.3 Preliminary Septic System Design:

Under the Ontario Building Code, for a Class 4 sewage disposal system to operate effectively, the leaching bed must be located in soil with a percolation rate (T-time) of between 1 and 50 minutes per centimetre and the base of the absorption trenches must be situated at least 0.9m above the high ground water table, bedrock or a soil with a permeability of greater than 50 minutes per centimetre. To achieve a normal, in-ground installation, the high groundwater table, rock or soil with a permeability of greater than 50 min/cm must be situated at least 1.5 to 1.8 metres below grade.

Due to elevated watertable conditions and the presence of low-permeability soils at most test pits, except for a small area in the vicinity of Test Pit 7, the bases of tile trenches are required to be raised above grade. Fully raised tile beds are recommended in the vicinity of Test Pits 1 and 2 while partially raised tile beds (bases of tile trenches 0.1m to 0.4m above grade) are recommended in the vicinity of Test Pits 3, 4, 5, 6 and 8.

Site specific test pits are recommended on a lot-by-lot basis at septic system approval stage to confirm soil and shallow groundwater conditions.

7.0 DEVELOPMENT IMPACT

Under the current Ministry of the Environment "Technical Guideline For Individual On-Site Sewage Systems : Water Quality Impact Risk Assessment", each proposed development utilizing individual on-site sewage systems requires an assessment of groundwater impact potential. The purpose of the assessment is to ensure that the discharge from the individual on-site sewage systems will have a minimal effect on groundwater and the present or potential use of adjacent properties. Following the determination of background shallow groundwater nitrate levels, the assessment involves a three-step process, with the need to advance to the next step dependant on the requirements of the previous step. Where the background nitrate content of shallow groundwater exceeds 10 mg/L, additional development cannot normally be supported.

The background nitrate content of shallow groundwater from the test pits was non-

detectable.

Under Step 1 of the guideline, for developments where the lot size for each private residence within the development is one hectare or larger (with no lots being less than 0.8ha in area), the risk that the limits imposed by the guideline may be exceeded is considered acceptable with no additional hydrogeologic assessment. The proposed lots are less than 0.8ha in size, therefore Step 1 of the guideline does not apply to this development.

Step 2 of the guideline is only applicable where groundwater resources can be confidently demonstrated to be hydraulically isolated from potential sewage pathways, which will not the case for this proposed development.

To calculate the maximum lot density of the 29.7 hectare site, under Step 3 of the MOE guideline, a mass-balance calculation is used to assess the development impact potential of the proposed lots. Under the current MOE guideline only infiltrating precipitation and the volume of water contained in the sewage may be considered as dilutants for the nitrate contained in septic effluent. To establish the infiltration rate, the percentage of the local water surplus which may infiltrate is calculated using the Rational Method approach. According to the soil evaluation, the soil profile consists mainly of fine-grained sediments with some minor sandy components (infiltration factor 15%), the overall relief is rolling to hilly (infiltration factor 15%) and the cover will be mixed (infiltration factor 15%), all resulting in an infiltration factor of 45%. The average annual water surplus for the area is about 406mm (16 inches). As such, the annual infiltration rate will be 183mm (45% of 380mm), representing 18% of average annual precipitation at the Durham weather station (1024.4mm). This value is reduced slightly (5% to 8%) to account for the overall effects of impervious areas (i.e. to 168mm/year). Accordingly, approximately 4.99×10^7 litres of water will annually join the groundwater regime on the entire parcel.

The following mass-balance formula is used to calculate the maximum permissible annual sewage loading:

$$Q_T C_T = Q_S C_S + Q_P C_P$$

Where:

Q_T = Sum of Q_S and Q_P
C_T = Maximum nitrate concentration
Q_S = Volume of sewage (1000 L/day/lot)
C_S = Nitrate content of sewage (40 mg/L)
Q_P = Infiltration
C_P = Nitrate content of shallow groundwater (zero)

Therefore:

$(Q_S + 4.99 \times 10^7 \text{ L/yr}) \times 10\text{mg/L} = (Q_S \times 40\text{mg/L}) + (4.99 \times 10^7 \text{ L/yr} \times 0\text{mg/L})$
$Q_S = 1.66 \times 10^7 \text{L/yr}$

The above assessment approach, conducted in accordance with Ministry of the Environment Guidelines, does not consider sewage dilution by groundwater flow-through nor does it consider denitrification processes in the subsurface. As such, the assessment will over-estimate the actual degree of groundwater impact of the proposed lots, this considered a safety factor.

Based on a sewage generation rate of 1000L/day as specified by the guideline, the maximum lot density allowable on the 29.7 hectare property under the current Ministry of the Environment Guideline is 45 lots.

8.0 CONCLUSIONS

1. Test Wells 1, 2 and 3 have safe yields of 36, 16 and 16 litres per minute, respectively. Based on acceptable rates of water level recovery following testing and acceptable mutual interference potential, these well yields are considered sufficient for domestic use. Aquifer yield is indicated to likely be more favourable within the proposed development area and Test Well 1, in comparison to yield in the vicinity of Test Wells 2 and 3, which are located near the brow of the Beaver Valley.

2. Only drilled wells completed in accordance with Ontario Regulation 903 are recommended.

3. The bacteriological quality of water from Test Well 1 was acceptable. The bacteriological quality of water from Test Wells 2 and 3 indicated slightly elevated levels of coliform bacteria, or overgrowth, likely a result of the dormancy of these wells since construction in 2003. While the quality of water from on-site Test Well 1 will be more representative of on-site water quality, Test Wells 2 and 3 should be chlorinated, purged and re-sampled to confirm bacteriological water quality for these wells.

4. The chemical quality of the water from the test wells was similar and acceptable. The sodium content of the water from Test Well 1 slightly exceeds the level at which it is recommended that the local Medical Officer of Health be notified so that physicians for persons on sodium-restricted diets can be advised (20mg/L), but is well below the aesthetic Drinking Water Quality Standard of 200mg/L. Extended re-development of Test Wells 2 and 3 will reduce turbidity and colour to acceptable levels following dormancy.

5. Widely-spaced drilled wells in normal domestic use on the large proposed lots represent an acceptable and low risk of disruptive water level interference based on good aquifer response during and following testing.

6. Under the current Ministry of the Environment guidelines, the 29.7 hectare development can theoretically support up to 45 lots from a sewage impact viewpoint.

7. The soils investigation identified the soil profile to typically consist of a very compact sandy silt overlying a dense clayey silt.

8. Partially to fully raised tile beds are recommended for most of the development due predominant high watertable conditions and the presence of low-permeability soils at relatively shallow depths. Site-specific test pits are recommended on a lot-by-lot basis at individual sewage disposal system approval stage.

9. Site plan analysis is recommended to confirm that partially to fully raised tile beds are viable for the 45 lots with all required setbacks (e.g. from water wells, houses, lot lines, etc...).

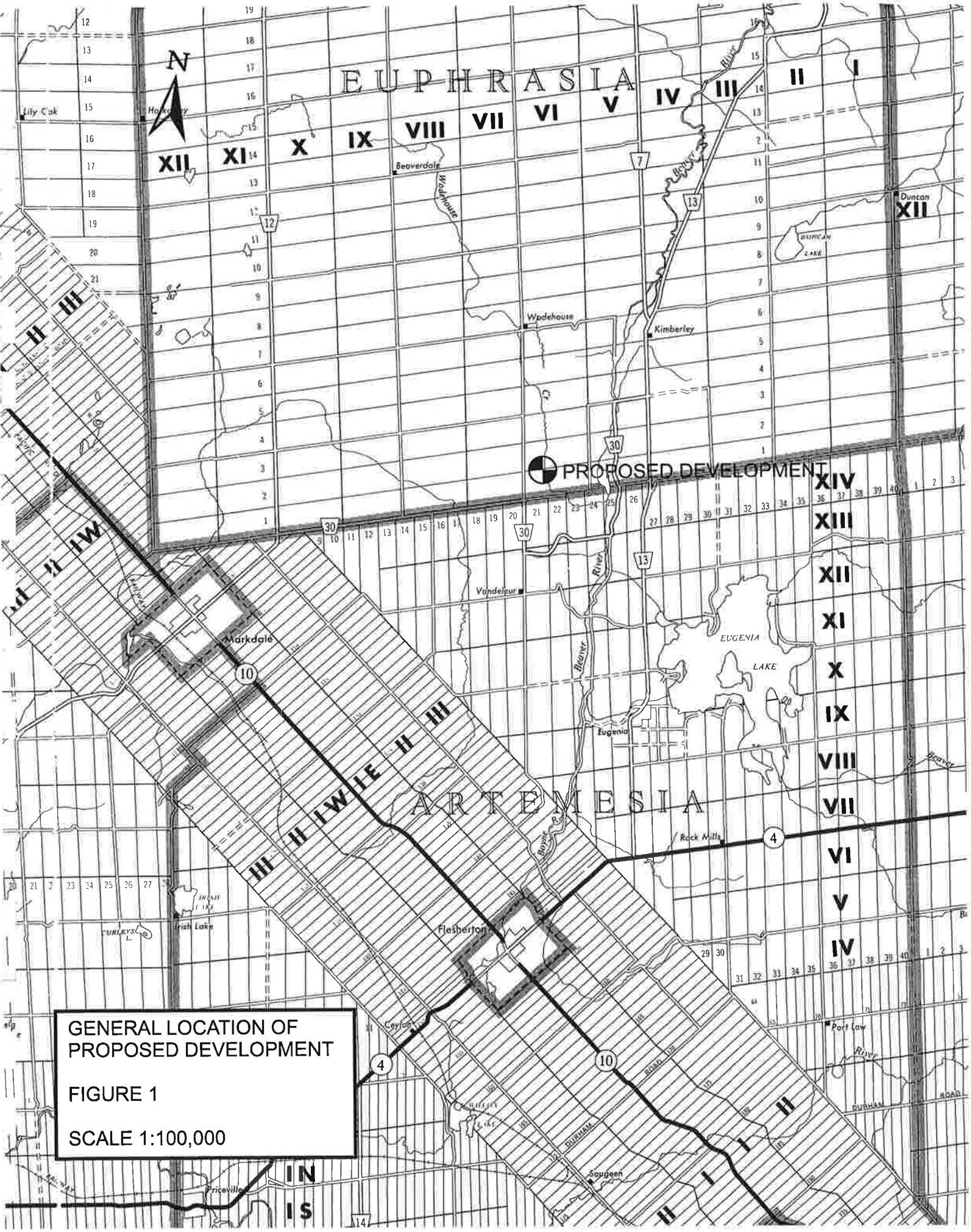
10. From water supply, development impact and preliminary sewage system suitability viewpoints, the proposed 29.7 hectare development is considered viable, subject to the conclusions, limitations and recommendations outlined in this report.

IAN D. WILSON ASSOCIATES LIMITED

Geoffrey Rether, B.Sc., P.Geo.

June 20, 2007

FIGURES AND APPENDIX



GENERAL LOCATION OF PROPOSED DEVELOPMENT

FIGURE 1

SCALE 1:100,000

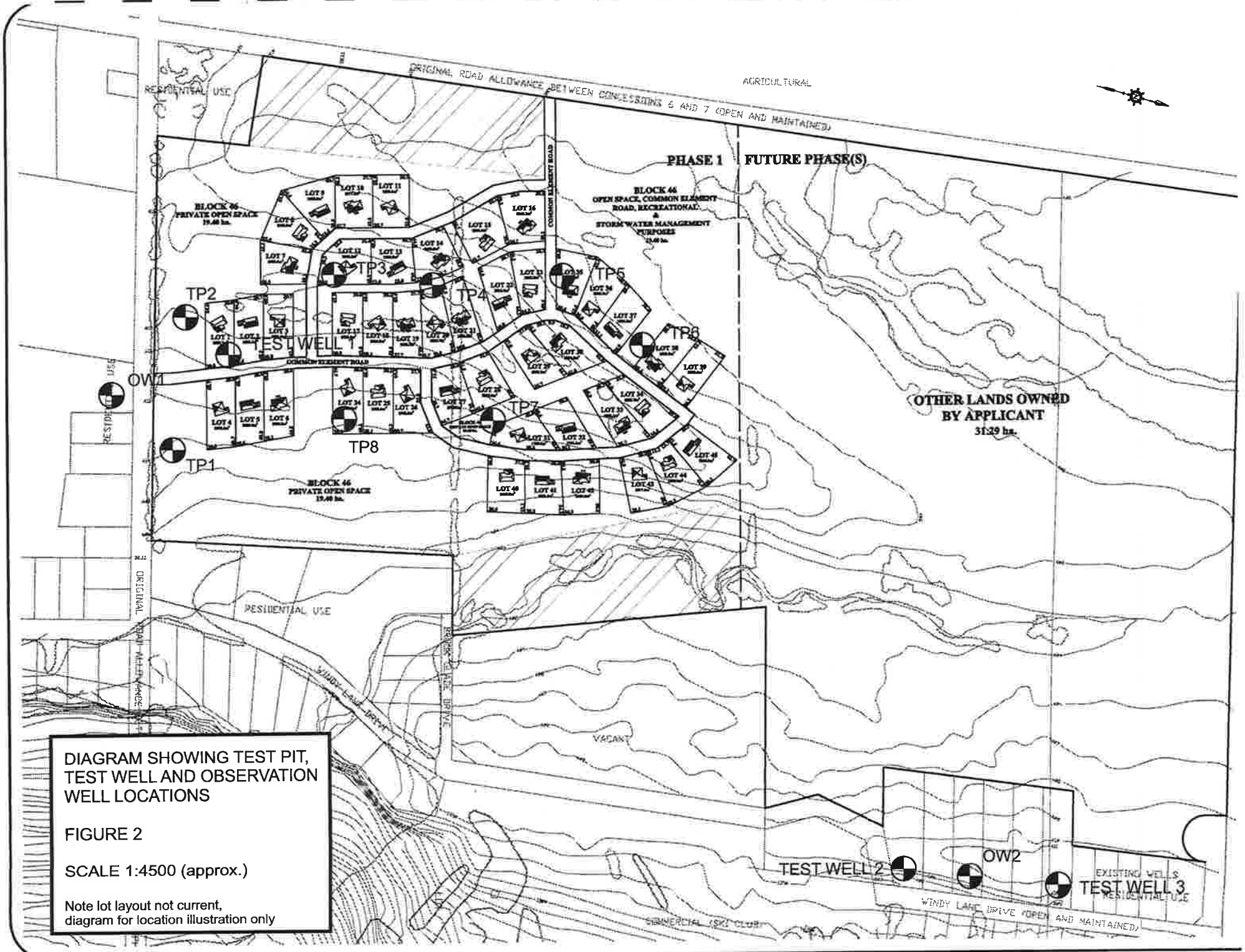


DIAGRAM SHOWING TEST PIT, TEST WELL AND OBSERVATION WELL LOCATIONS

FIGURE 2

SCALE 1:4500 (approx.)

Note lot layout not current, diagram for location illustration only

Lots 1&2, Conc. 6, Euphrasia

Test Well 1 Pumping Test

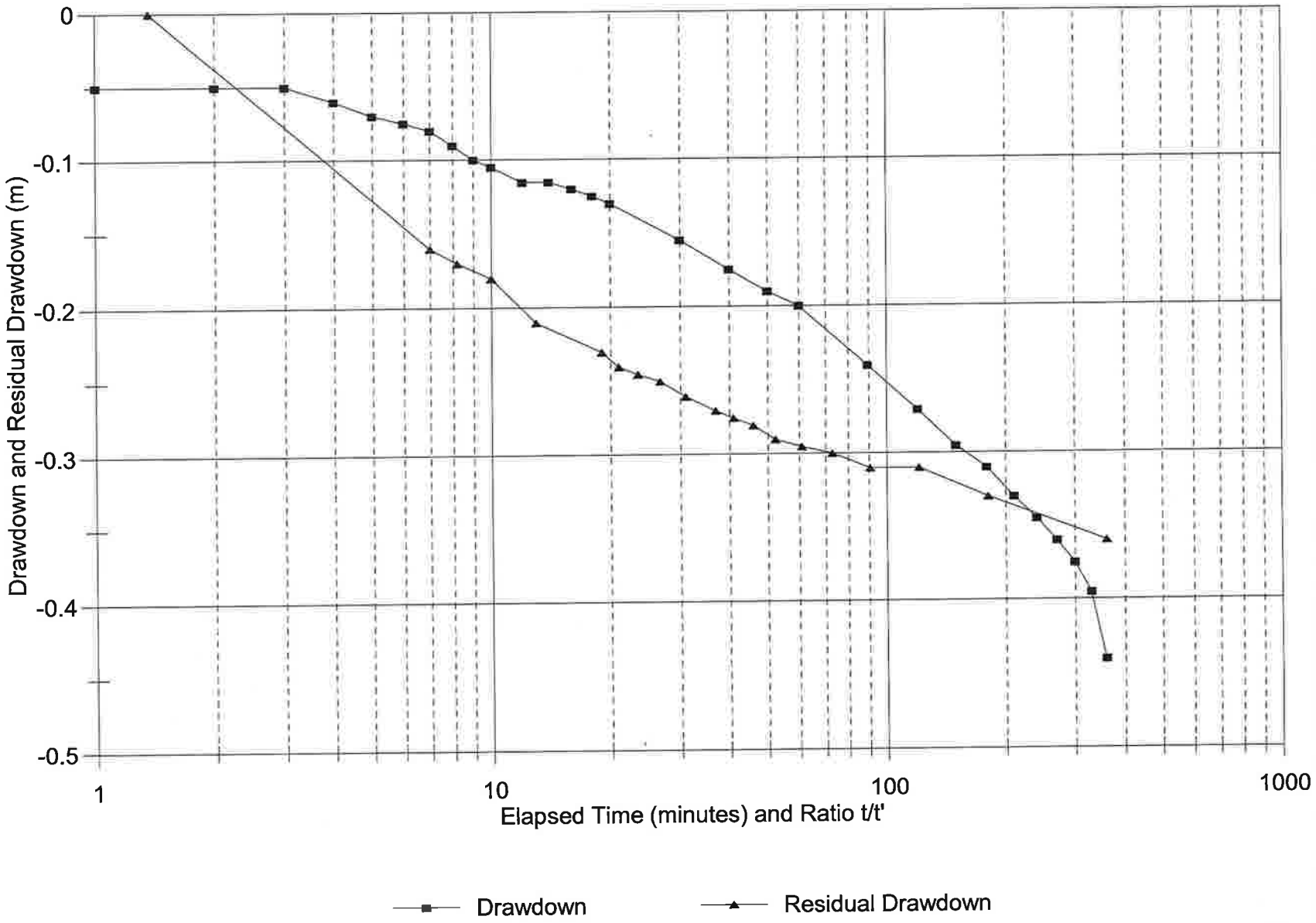


Figure 3

Lots 1&2, Conc. 6, Euphrasia

Test Well 2 Pumping Test

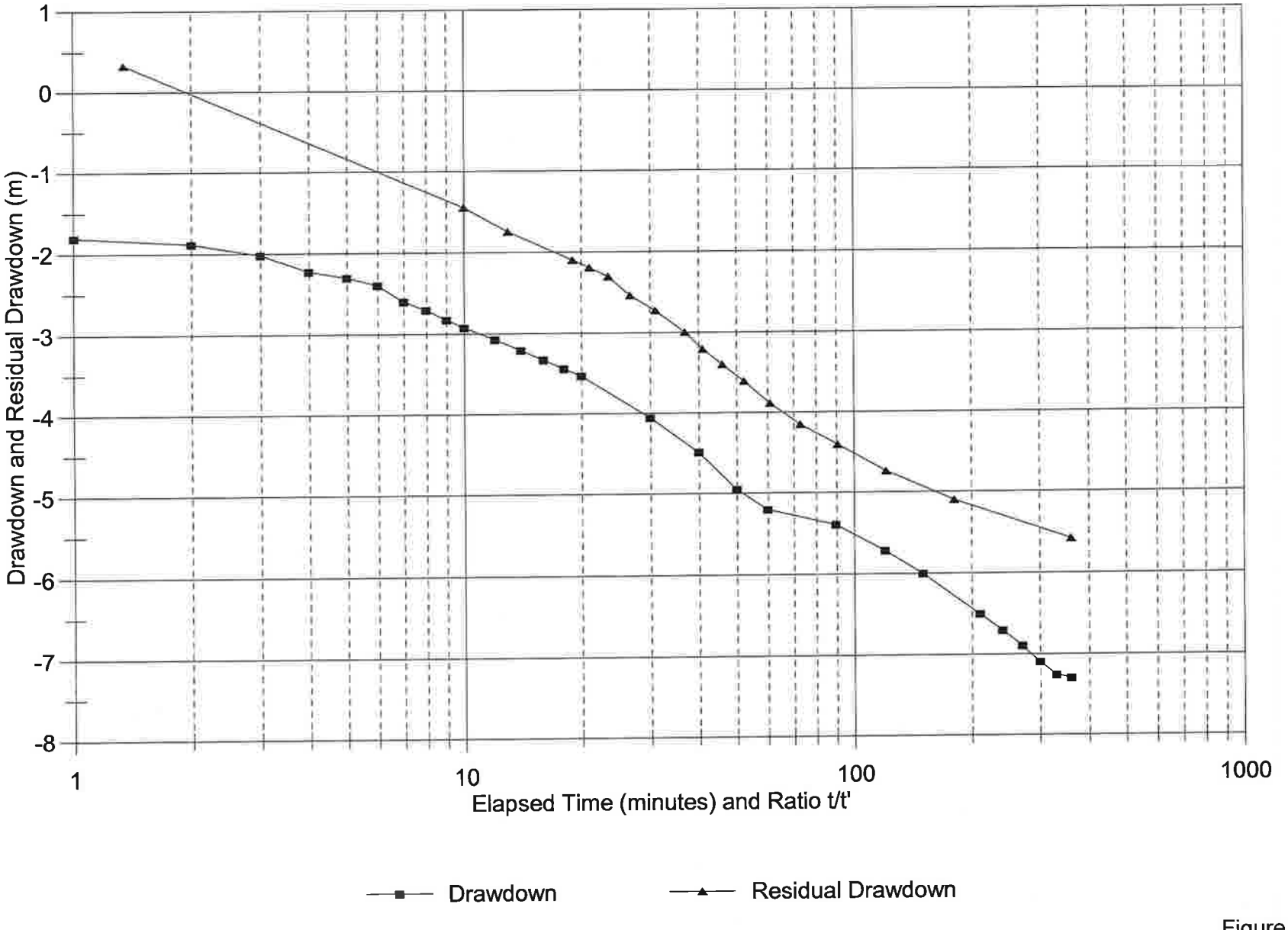


Figure 4

Lots 1&2, Conc. 6, Euphrasia

Test Well 3 Pumping Test

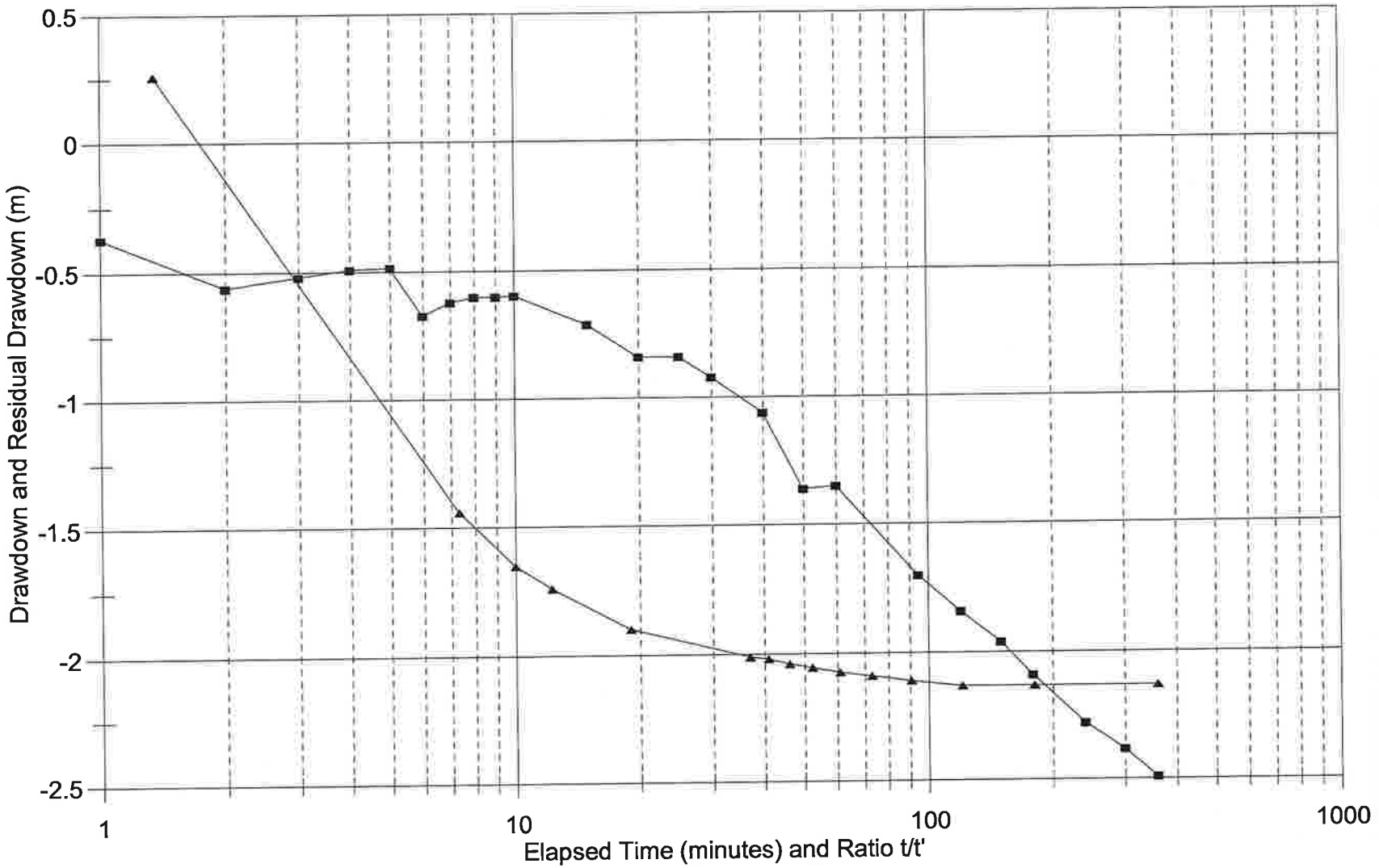


Figure 5

Lots 1&2, Conc. 6, Euphrasia

January 10, 2007 Observations - OW1

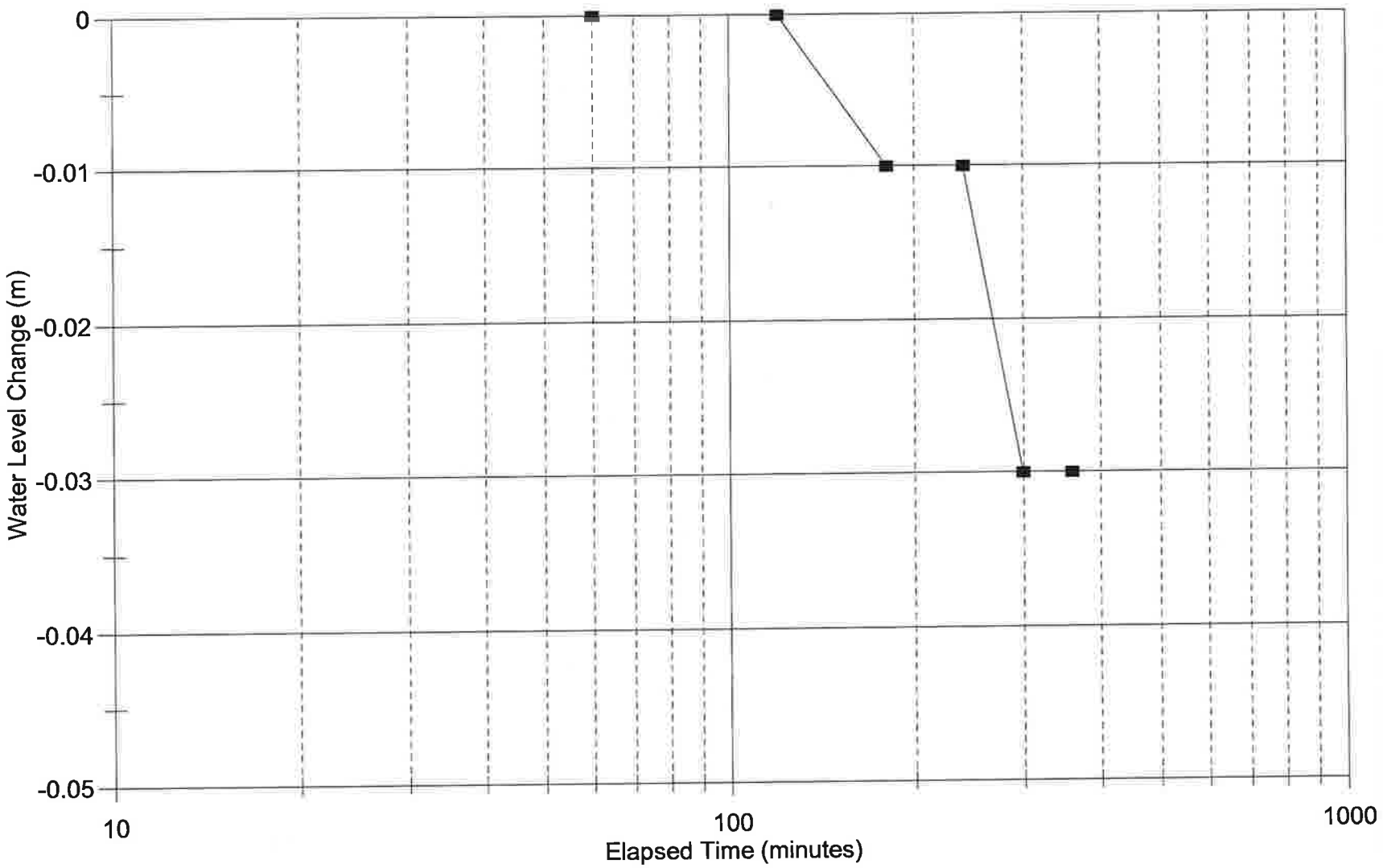


Figure 6

Lots 1&2, Conc. 6, Euphrasia

January 11, 2007 Observations - OW2

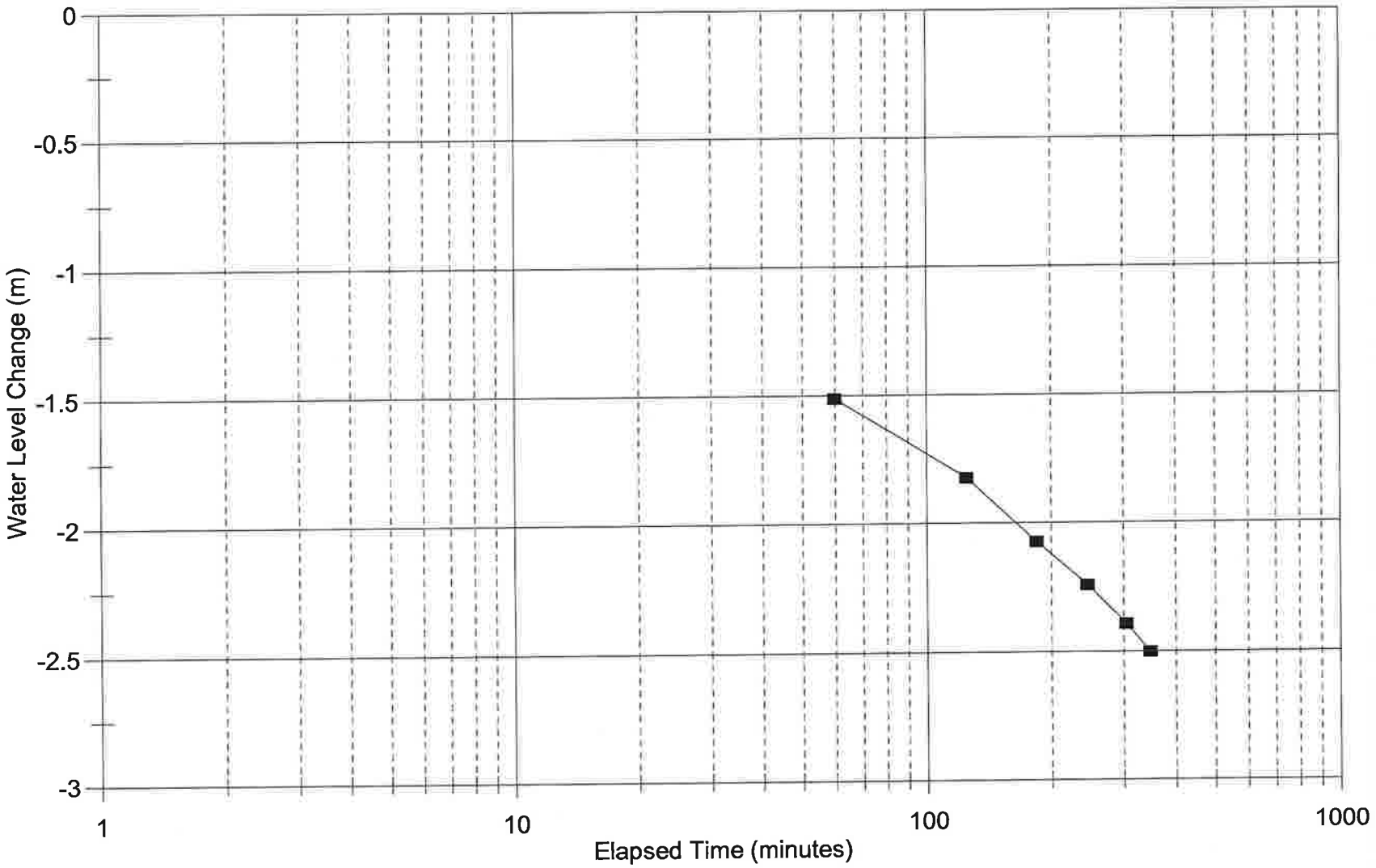


Figure 7

Proposed Residential Development
Lots 1 and 2, Concession 6, Euphrasia

Test Well 1

Date of Test: January 10, 2007
Static Water Level: 13.89m below measuring point
Measuring Point: 0.77m above grade
Pumping Rates: 36L/min

Elapsed Time (minutes)*	Recovery Elapsed Time (minutes)	Pumping Water Level (m bmp)	Water Level Drawdown (m)	Recovery Water Level (m bmp)	Residual Drawdown (m)
0		13.890	0.000		
1		13.940	-0.050		
2		13.940	-0.050		
3		13.940	-0.050		
4		13.950	-0.060		
5		13.960	-0.070		
6		13.965	-0.075		
7		13.970	-0.080		
8		13.980	-0.090		
9		13.990	-0.100		
10		13.995	-0.105		
12		14.005	-0.115		
14		14.005	-0.115		
16		14.010	-0.120		
18		14.015	-0.125		
20		14.020	-0.130		
30		14.045	-0.155		
40		14.065	-0.175		
50		14.080	-0.190		
60		14.090	-0.200		
90		14.130	-0.240		
120		14.160	-0.270		
150		14.185	-0.295		
180		14.200	-0.310		
210		14.220	-0.330		
240		14.235	-0.345		
270		14.250	-0.360		
300		14.265	-0.375		
330		14.285	-0.395		
360		14.330	-0.440		
361	1			14.250	-0.360
181	2			14.220	-0.330
121	3			14.200	-0.310
91	4			14.200	-0.310
73	5			14.190	-0.300
61	6			14.185	-0.295
52.4	7			14.180	-0.290
46	8			14.170	-0.280
41	9			14.165	-0.275
37	10			14.160	-0.270
31	12			14.150	-0.260
26.7	14			14.140	-0.250
23.5	16			14.135	-0.245
21	18			14.130	-0.240
19	20			14.120	-0.230
13	30			14.100	-0.210
10	40			14.070	-0.180
8.2	50			14.060	-0.170
7	60			14.050	-0.160

1.4	995			13.890	0.000

Note * Recovery Shown as Ratio t/t'

Proposed Residential Development
Lots 1 and 2, Concession 6, Euphrasia

Test Well 2

Date of Test: January 11, 2007
Static Water Level: 33.20m below measuring point
Measuring Point: 0.5m above grade
Pumping Rates: 16L/min

Note * Recovery Shown as Ratio t/t'

Elapsed Time (minutes)*	Recovery Elapsed Time (minutes)	Pumping Water Level (m bmp)	Water Level Drawdown (m)	Recovery Water Level (m bmp)	Residual Drawdown (m)
0		33.20	0.00		
1		35.00	-1.80		
2		35.08	-1.88		
3		35.22	-2.02		
4		35.42	-2.22		
5		35.50	-2.30		
6		35.59	-2.39		
7		35.80	-2.60		
8		35.90	-2.70		
9		36.02	-2.82		
10		36.12	-2.92		
12		36.27	-3.07		
14		36.40	-3.20		
16		36.52	-3.32		
18		36.63	-3.43		
20		36.72	-3.52		
30		37.25	-4.05		
40		37.68	-4.48		
50		38.15	-4.95		
60		38.40	-5.20		
90		38.59	-5.39		
120		38.91	-5.71		
150		39.20	-6.00		
210		39.70	-6.50		
240		39.90	-6.70		
270		40.09	-6.89		
300		40.30	-7.10		
330		40.46	-7.26		
360		40.50	-7.30		
361	1			38.77	-5.57
181	2			38.29	-5.09
121	3			37.93	-4.73
91	4			37.60	-4.40
73	5			37.35	-4.15
61	6			37.08	-3.88
52.4	7			36.80	-3.60
46	8			36.59	-3.39
41	9			36.40	-3.20
37	10			36.19	-2.99
31	12			35.92	-2.72
26.7	14			35.74	-2.54
23.5	16			35.50	-2.30
21	18			35.39	-2.19
19	20			35.30	-2.10
13	30			34.94	-1.74
10	40			34.65	-1.45
1.3	1035			33.20	0.00

Proposed Residential Development
Lots 1 and 2, Concession 6, Euphrasia

Test Well 3

Date of Test: January 11, 2007
Static Water Level: 33.46m below measuring point
Measuring Point: 0.60m above grade
Pumping Rates: 16L/min

Note * Recovery Shown as Ratio t/t'

Elapsed Time (minutes)*	Recovery Elapsed Time (minutes)	Pumping Water Level (m bmp)	Water Level Drawdown (m)	Recovery Water Level (m bmp)	Residual Drawdown (m)
0		33.46	0.00		
1		33.83	-0.37		
2		34.02	-0.56		
3		33.98	-0.52		
4		33.95	-0.49		
5		33.95	-0.48		
6		34.13	-0.67		
7		34.08	-0.62		
8		34.06	-0.60		
9		34.06	-0.60		
10		34.06	-0.59		
15		34.17	-0.71		
20		34.30	-0.84		
25		34.30	-0.84		
30		34.38	-0.92		
40		34.52	-1.06		
50		34.82	-1.36		
60		34.81	-1.35		
95		35.16	-1.70		
120		35.30	-1.84		
150		35.42	-1.96		
180		35.55	-2.09		
240		35.74	-2.28		
300		35.84	-2.38		
360		35.95	-2.49		
361	1			35.59	-2.13
181	2			35.59	-2.13
121	3			35.59	-2.13
91	4			35.57	-2.11
73	5			35.55	-2.09
61	6			35.54	-2.07
52.4	7			35.52	-2.06
46	8			35.50	-2.04
41	9			35.48	-2.02
37	10			35.47	-2.01
19	20			35.36	-1.90
12.3	32			35.20	-1.74
10	40			35.11	-1.65
7.3	57			34.90	-1.44
1.3	1041			33.20	0.26

Proposed Residential Development
Lots 1 and 2, Concession 6, Euphrasia

Observation Well Data

January 10, 2007 Observations (Test Well 1 Pumping)

Observation Well 1

Elapsed Time (minutes)	Water Level (m bmp)	Water Level Change (m)
-15	13.09	0.00
60	13.09	0.00
120	13.09	0.00
180	13.10	-0.01
240	13.10	-0.01
300	13.12	-0.03
360	13.12	-0.03

January 11, 2007 Observations (Test Wells 2 and 3 Pumping)

Observation Well 2

Elapsed Time (minutes)	Water Level (m bmp)	Water Level Change (m)
-14	32.63	0.00
60	34.14	-1.51
125	34.45	-1.82
185	34.70	-2.07
245	34.87	-2.24
305	35.02	-2.39
347	35.13	-2.50

TEST PIT LOGS **Completed January 10, 2007**

TEST PIT	DEPTH (m)	MATERIALS
TP1	0 - 0.2	dark brown TOPSOIL
	0.2 - 1.1	grey-brown, very compact, wet clayey SILT with some fine sand
	1.1 - 1.5	grey, dense, dry SILT with some clay and fine sand

- Test Pit stable and wet upon completion
- Emergent groundwater observed at 0.3m below grade

TP2	0 - 0.2	dark brown TOPSOIL
	0.2 - 0.7	brown, compact, wet SILT with some clay and fine sand
	0.7 - 1.5	grey, dense, dry clayey SILT with traces of fine sand

- Test Pit stable and wet upon completion
- Emergent groundwater observed at 0.5m below grade
- Sample 1 - 0.9m
  Clay - 34%
  Silt - 62%
  Sand - 4%

TP3	0 - 0.2	dark brown TOPSOIL
	0.2 - 1.5	grey-brown, compact to very compact, wet SILT with some clay and fine sand

- Test Pit stable and wet upon completion
- Emergent groundwater observed at 0.6m below grade

TP4	0 - 0.2	dark brown TOPSOIL
	0.2 - 0.7	brown, loose, wet silty SAND
	0.7 - 1.7	brown-gray, dense, dry SILT with some clay and fine sand

- Test Pit unstable and wet upon completion
- Emergent groundwater observed at 0.6m below grade
- Sample 2 - 1.2m
  Clay - 22%
  Silt - 56%
  Sand - 22%

TEST PIT LOGS **Completed January 10, 2007**

TEST PIT	DEPTH (m)	MATERIALS
TP5	0 - 0.2	dark brown TOPSOIL
	0.2 - 1.5	grey to grey-brown, compact to very compact, wet clayey SILT with some fine sand

- Test Pit stable and wet upon completion
- Emergent groundwater observed at 0.8m below grade
- Sample 3 - 0.6m
  Clay - 32%
  Silt - 57%
  Sand - 11%

TP6	0 - 0.2	dark brown TOPSOIL
	0.2 - 1.0	brown, lightly compact, dry to wet silty SAND with traces of clay, stony
	1.0 - 1.4	grey, dense, dry clayey SILT, stony

- Test Pit stable and wet upon completion
- Emergent groundwater observed at 0.8m below grade

TP7	0 - 0.1	dark brown TOPSOIL
	0.1 - 1.5	brown to grey-brown, dense, dry SILT with some clay and sand, stony

- Test Pit stable and dry upon completion
- No emergent groundwater encountered
- Sample 4 - 0.9m
  Clay - 21%
  Silt - 51%
  Sand - 28%

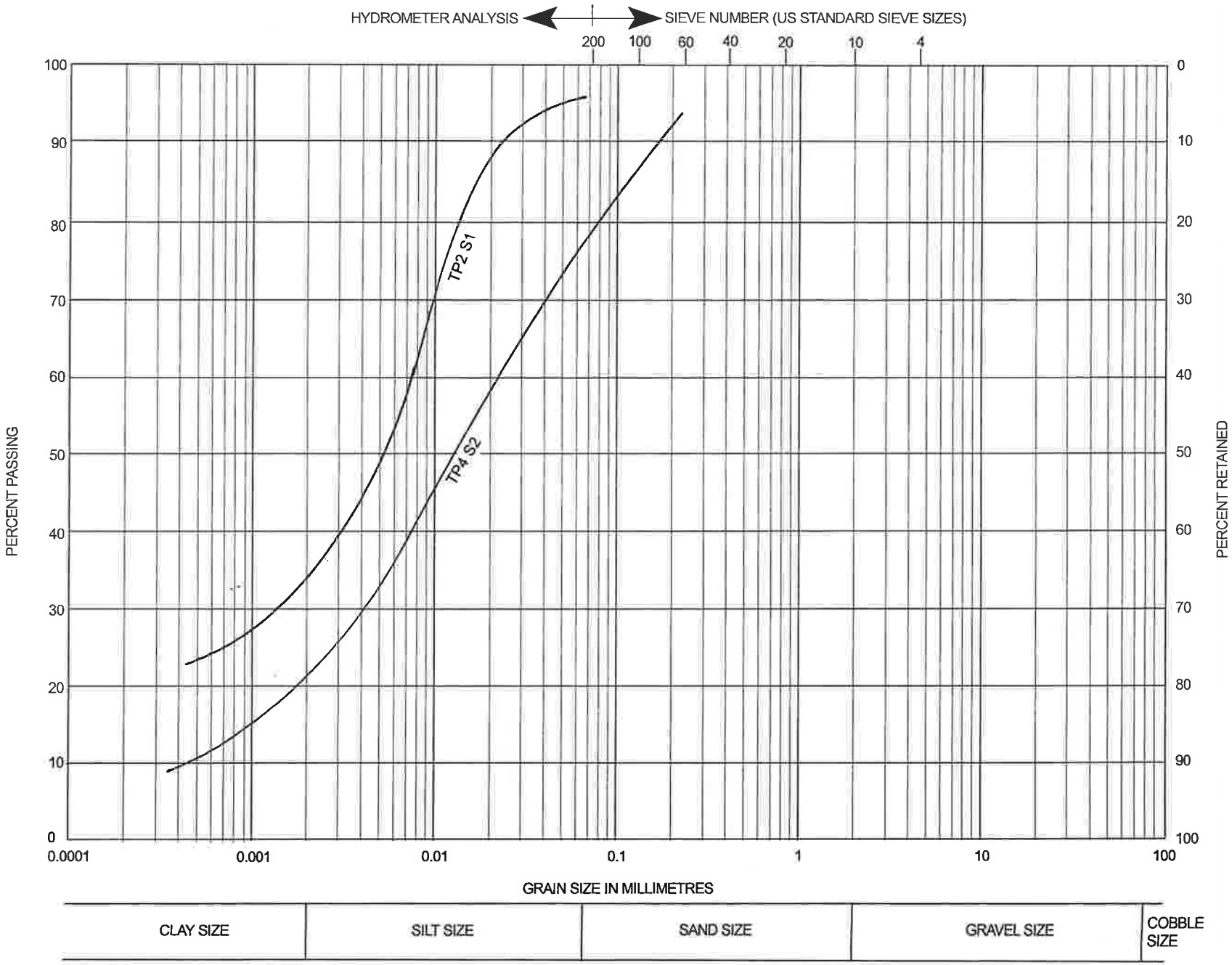
TEST PIT LOGS **Completed January 10, 2007**

TEST PIT	DEPTH (m)	MATERIALS
TP8	0 - 0.2	dark brown TOPSOIL
	0.2 - 0.8	brown, lightly compact, wet sandy SILT with some clay
	0.8 - 1.3	grey, dense, dry clayey SILT with some fine sand, stony

- Test Pit stable and wet upon completion
- Emergent groundwater observed at 0.6m below grade
- Sample 5 - 0.5m
  Clay - 22%
  Silt - 41%
  Sand - 37%

GRAIN SIZE DISTRIBUTION CHART

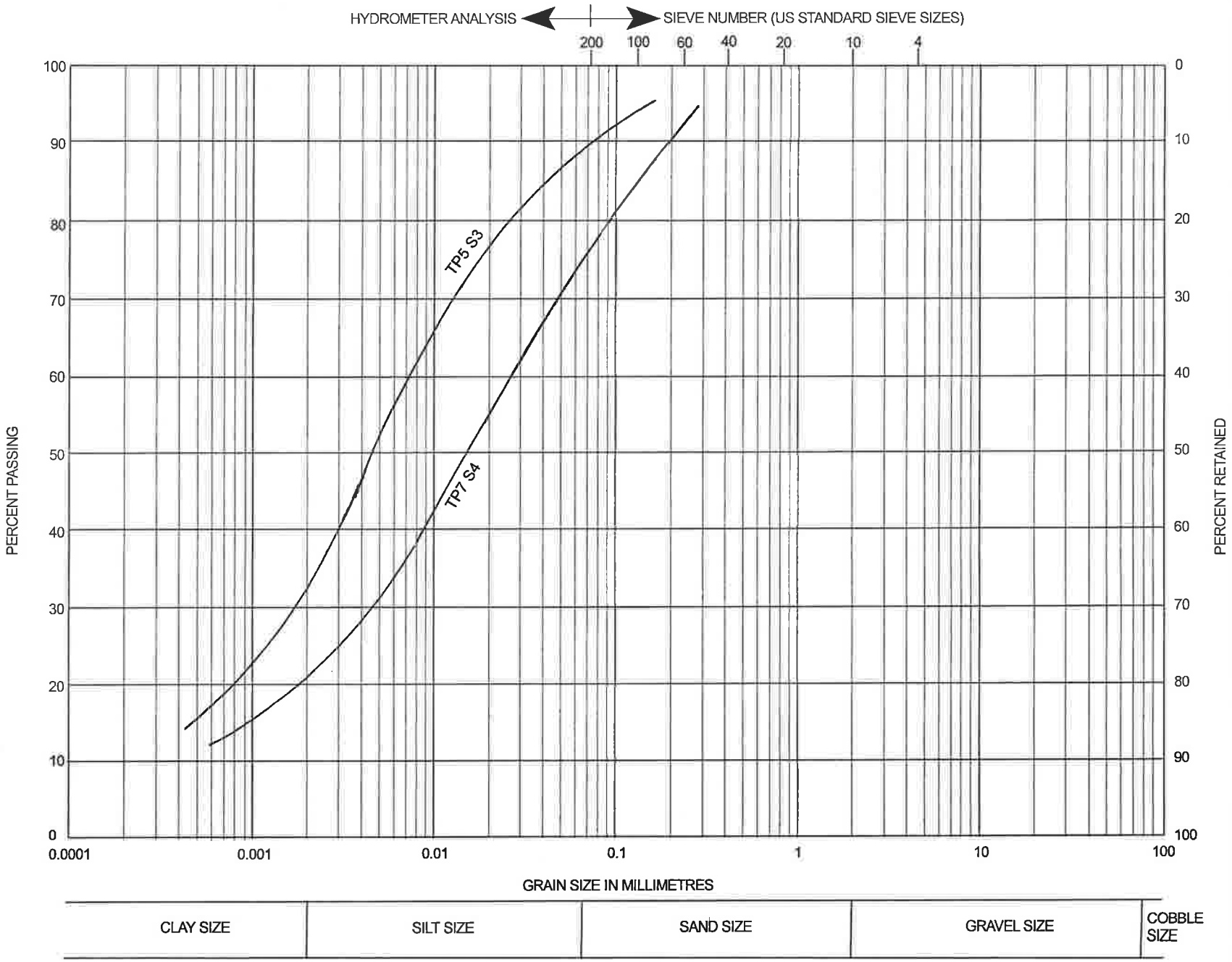
PROJECT / SAMPLE	Test Pits 2 and 4	DATE



IAN D. WILSON ASSOCIATES LIMITED

GRAIN SIZE DISTRIBUTION CHART

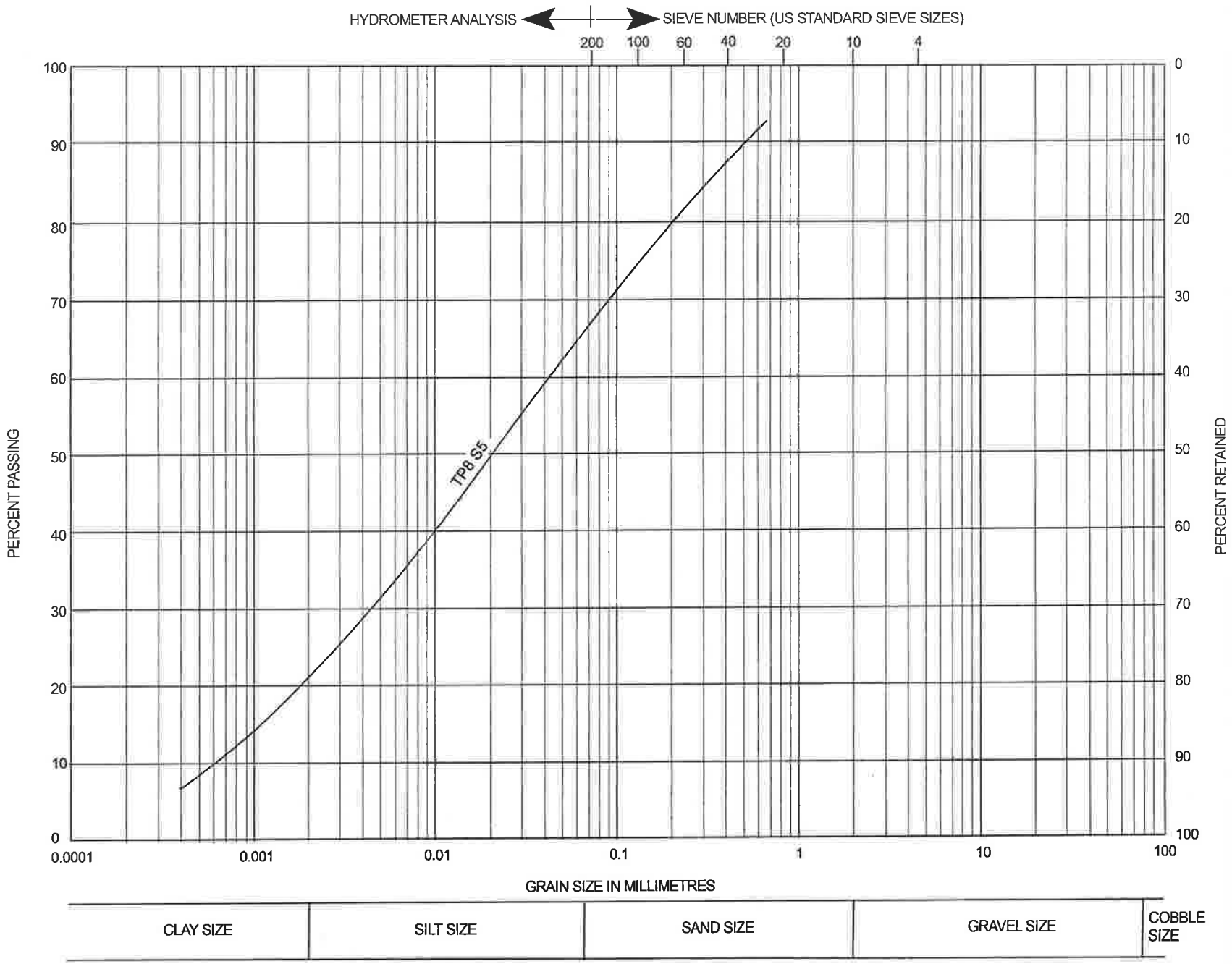
PROJECT / SAMPLE	DATE
Test Pits 5 and 7	



IAN D. WILSON ASSOCIATES LIMITED

GRAIN SIZE DISTRIBUTION CHART

PROJECT / SAMPLE	Test Pit 8	DATE



IAN D. WILSON ASSOCIATES LIMITED

Your Project #: KIENER
Your C.O.C. #: 00498346

Attention: Geoff Rether
Ian D Wilson Associates Ltd
PO Box 299
76722 Airport Rd
Clinton, ON
N0M 1L0

Report Date: 2007/01/18

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A703737
Received: 2007/01/12, 11:15

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Alkalinity	3	N/A	2007/01/16	Ont SOP 0083	SM 2320B
Carbonate, Bicarbonate and Hydroxide	3	N/A	2007/01/15		
Chloride by Automated Colourimetry	3	N/A	2007/01/17	CAM SOP 0463	SM 4500 Cl E
Colour	3	N/A	2007/01/17	CAM SOP-00412	APHA 2120
Conductivity	3	N/A	2007/01/16	CAM SOP-0414	SM 2510
Dissolved Organic Carbon (DOC)	1	N/A	2007/01/15	Ont SOP 0622	SM 5310 B
Dissolved Organic Carbon (DOC)	2	N/A	2007/01/16	Ont SOP 0622	SM 5310 B
Fluoride	3	2007/01/16	2007/01/17	Ont SOP-0621	APHA 4500FC
Hardness (calculated as CaCO3)	3	N/A	2007/01/15	ATL SOP 00048	SM 2340B
Lab Filtered Metals by ICPMS	3	2007/01/16	2007/01/17	CAM SOP-00447	EPA 6020
Ion Balance (% Difference)	3	N/A	2007/01/15		
Anion and Cation Sum	3	N/A	2007/01/15		
Coliform/ E. coli, CFU/100mL	3	N/A	2007/01/12	CAM SOP-00551	MOEE E3407
Ammonia-N	2	N/A	2007/01/16	CAM SOP 0441	US GS I-2522-90
Ammonia-N	1	N/A	2007/01/17	CAM SOP 0441	US GS I-2522-90
Nitrate (NO3) and Nitrite (NO2) in Water	5	N/A	2007/01/16	Ont SOP-0100	SM 4500 NO3 I
pH	3	N/A	2007/01/16	Ont SOP 0067	SM 4500H
Orthophosphate	3	N/A	2007/01/17	CAL SOP-0196	SM 4500 P-F
Sat. pH and Langelier Index (@ 20C)	3	N/A	2007/01/15		
Sat. pH and Langelier Index (@ 4C)	3	N/A	2007/01/15		
Sulphate by Automated Colourimetry	3	N/A	2007/01/17	SOP 0848	EPA 375.4
Total Dissolved Solids (TDS calc)	3	N/A	2007/01/15		
Turbidity	3	N/A	2007/01/13	CAM SOP-00417	APHA 2130

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

../2

Your Project #: KIENER
Your C.O.C. #: 00498346

Attention: Geoff Rether
Ian D Wilson Associates Ltd
PO Box 299
76722 Airport Rd
Clinton, ON
N0M 1L0

Report Date: 2007/01/18

CERTIFICATE OF ANALYSIS

-2-

Encryption Key Andrew Turner
18 Jan 2007 11:59:57 -05:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

CHRISTINE GRIPTON, Project Manager
Email: Christine.Gripton@maxxamanalytics.com
Phone# (519) 652-9444 Ext:250

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CAEAL have approved this reporting process and electronic report format.

For Service Group specific validation please refer to the Validation Signature Page

Maxxam Job #: A703737
Report Date: 2007/01/18

Ian D Wilson Associates Ltd
Client Project #: KIENER
Project name:
Sampler Initials:

RESULTS OF ANALYSES OF WATER

Maxxam ID		Q50433		
Sampling Date		2007/01/10 16:30		
COC Number		00498346		
	Units	**TEST WELL 1**	**RDL**	**QC Batch**
INORGANICS				
Total Ammonia-N	mg/L	0.13	0.05	1144379
Colour	TCU	ND	5	1145852
Conductivity	umho/cm	745	2	1144891
Fluoride (F-)	mg/L	ND	0.1	1145445
Hardness (CaCO3)	mg/L	310	1	1144526
Dissolved Organic Carbon	mg/L	0.7	0.1	1144141
Orthophosphate (P)	mg/L	ND	0.01	1145110
pH	pH	8.1	N/A	1144889
Dissolved Sulphate (SO4)	mg/L	11	1	1145109
Turbidity	NTU	0.3	0.1	1143780
Alkalinity (Total as CaCO3)	mg/L	304	1	1144892
Dissolved Chloride (Cl)	mg/L	52	1	1145095
Nitrite (N)	mg/L	0.02	0.01	1144355
Nitrate (N)	mg/L	1.3	0.1	1144355
RCAP CALCULATIONS				
Anion Sum	me/L	7.87	N/A	1144530
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	301	1	1144518
Calculated TDS	mg/L	386	1	1144539
Carb. Alkalinity (calc. as CaCO3)	mg/L	4	1	1144518
Cation Sum	me/L	7.58	N/A	1144530
Ion Balance (% Difference)	%	1.88	N/A	1144529
Langelier Index (@ 20C)	N/A	1.00	N/A	1144536
Langelier Index (@ 4C)	N/A	0.753	N/A	1144537
Saturation pH (@ 20C)	N/A	7.12	N/A	1144536
Saturation pH (@ 4C)	N/A	7.36	N/A	1144537

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: A703737
Report Date: 2007/01/18

Ian D Wilson Associates Ltd
Client Project #: KIENER
Project name:
Sampler Initials:

RESULTS OF ANALYSES OF WATER

Maxxam ID		Q50434		
Sampling Date		2007/01/11 16:00		
COC Number		00498346		
	Units	**TEST WELL 2**	**RDL**	**QC Batch**
INORGANICS				
Total Ammonia-N	mg/L	0.24	0.05	1144380
Colour	TCU	ND	5	1145852
Conductivity	umho/cm	533	2	1144896
Fluoride (F-)	mg/L	0.4	0.1	1145445
Hardness (CaCO3)	mg/L	250	1	1144526
Dissolved Organic Carbon	mg/L	1.5	0.1	1144851
Orthophosphate (P)	mg/L	ND	0.01	1145110
pH	pH	8.3	N/A	1144895
Dissolved Sulphate (SO4)	mg/L	13	1	1145109
Turbidity	NTU	121	0.3	1143780
Alkalinity (Total as CaCO3)	mg/L	280	1	1144897
Dissolved Chloride (Cl)	mg/L	3	1	1145095
Nitrite (N)	mg/L	ND	0.01	1144355
Nitrate (N)	mg/L	ND	0.1	1144355
RCAP CALCULATIONS				
Anion Sum	me/L	6.00	N/A	1144530
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	275	1	1144518
Calculated TDS	mg/L	287	1	1144539
Carb. Alkalinity (calc. as CaCO3)	mg/L	6	1	1144518
Cation Sum	me/L	5.68	N/A	1144530
Ion Balance (% Difference)	%	2.80	N/A	1144529
Langelier Index (@ 20C)	N/A	1.11	N/A	1144536
Langelier Index (@ 4C)	N/A	0.864	N/A	1144537
Saturation pH (@ 20C)	N/A	7.23	N/A	1144536
Saturation pH (@ 4C)	N/A	7.48	N/A	1144537

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: A703737
Report Date: 2007/01/18

Ian D Wilson Associates Ltd
Client Project #: KIENER
Project name:
Sampler Initials:

RESULTS OF ANALYSES OF WATER

Maxxam ID		Q50435		Q50436		
Sampling Date		2007/01/11 15:45		2007/01/11 13:00		
COC Number		00498346		00498346		
	Units	**TEST WELL 3**	**QC Batch**	**TEST PIT 4**	**RDL**	**QC Batch**
INORGANICS						
Total Ammonia-N	mg/L	0.15	1144379		0.05	1144379
Colour	TCU	6	1145852		5	1145852
Conductivity	umho/cm	459	1144896		2	1144896
Fluoride (F-)	mg/L	0.2	1145445		0.1	1145445
Hardness (CaCO3)	mg/L	220	1144526		1	1144526
Dissolved Organic Carbon	mg/L	2.1	1144851		0.1	1144851
Orthophosphate (P)	mg/L	ND	1145110		0.01	1145110
pH	pH	8.2	1144895		N/A	1144895
Dissolved Sulphate (SO4)	mg/L	ND	1145109		1	1145109
Turbidity	NTU	5.5	1143780		0.1	1143780
Alkalinity (Total as CaCO3)	mg/L	234	1144897		1	1144897
Dissolved Chloride (Cl)	mg/L	3	1145095		1	1145095
Nitrite (N)	mg/L	ND	1144355	ND	0.01	1144494
Nitrate (N)	mg/L	0.1	1144355	ND	0.1	1144494
Nitrate + Nitrite	mg/L			ND	0.1	1144494
RCAP CALCULATIONS						
Anion Sum	me/L	4.79	1144530		N/A	
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	230	1144518		1	
Calculated TDS	mg/L	231	1144539		1	
Carb. Alkalinity (calc. as CaCO3)	mg/L	3	1144518		1	
Cation Sum	me/L	4.86	1144530		N/A	
Ion Balance (% Difference)	%	0.674	1144529		N/A	
Langelier Index (@ 20C)	N/A	0.908	1144536		N/A	
Langelier Index (@ 4C)	N/A	0.658	1144537		N/A	
Saturation pH (@ 20C)	N/A	7.30	1144536		N/A	
Saturation pH (@ 4C)	N/A	7.55	1144537		N/A	

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: A703737
Report Date: 2007/01/18

Ian D Wilson Associates Ltd
Client Project #: KIENER
Project name:
Sampler Initials:

RESULTS OF ANALYSES OF WATER

Maxxam ID		Q50437		
Sampling Date		2007/01/11 13:30		
COC Number		00498346		
	Units	**TEST PIT 8**	**RDL**	**QC Batch**
INORGANICS				
Nitrite (N)	mg/L	0.01	0.01	1144494
Nitrate (N)	mg/L	ND	0.1	1144494
Nitrate + Nitrite	mg/L	ND	0.1	1144494

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: A703737
Report Date: 2007/01/18

Ian D Wilson Associates Ltd
Client Project #: KIENER
Project name:
Sampler Initials:

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		Q50433	Q50434	Q50435		
Sampling Date		2007/01/10 16:30	2007/01/11 16:00	2007/01/11 15:45		
COC Number		00498346	00498346	00498346		
	Units	**TEST WELL 1**	**TEST WELL 2**	**TEST WELL 3**	**RDL**	**QC Batch**
METALS						
Dissolved Aluminum (Al)	ug/L	ND	ND	ND	5	1145468
Dissolved Antimony (Sb)	ug/L	ND	ND	ND	1	1145468
Dissolved Arsenic (As)	ug/L	ND	ND	ND	1	1145468
Dissolved Barium (Ba)	ug/L	13	31	20	5	1145468
Dissolved Beryllium (Be)	ug/L	ND	ND	ND	0.5	1145468
Dissolved Boron (B)	ug/L	12	680	350	10	1145468
Dissolved Cadmium (Cd)	ug/L	ND	ND	ND	0.1	1145468
Dissolved Calcium (Ca)	ug/L	71000	56000	54000	200	1145468
Dissolved Chromium (Cr)	ug/L	ND	ND	ND	5	1145468
Dissolved Cobalt (Co)	ug/L	ND	ND	ND	0.5	1145468
Dissolved Copper (Cu)	ug/L	ND	2	2	1	1145468
Dissolved Iron (Fe)	ug/L	ND	ND	ND	50	1145468
Dissolved Lead (Pb)	ug/L	ND	ND	ND	0.5	1145468
Dissolved Magnesium (Mg)	ug/L	33000	26000	21000	50	1145468
Dissolved Manganese (Mn)	ug/L	ND	4	ND	2	1145468
Dissolved Molybdenum (Mo)	ug/L	ND	1	ND	1	1145468
Dissolved Nickel (Ni)	ug/L	ND	ND	ND	1	1145468
Dissolved Potassium (K)	ug/L	950	7900	5700	200	1145468
Dissolved Selenium (Se)	ug/L	ND	ND	ND	2	1145468
Dissolved Silicon (Si)	ug/L	2500	3900	3100	50	1145468
Dissolved Silver (Ag)	ug/L	ND	ND	ND	0.1	1145468
Dissolved Sodium (Na)	ug/L	29000	11000	5300	100	1145468
Dissolved Strontium (Sr)	ug/L	63	3200	1700	1	1145468
Dissolved Thallium (Tl)	ug/L	ND	ND	ND	0.05	1145468
Dissolved Titanium (Ti)	ug/L	ND	ND	ND	5	1145468
Dissolved Uranium (U)	ug/L	0.3	0.7	0.6	0.1	1145468
Dissolved Vanadium (V)	ug/L	ND	ND	ND	1	1145468
Dissolved Zinc (Zn)	ug/L	6	ND	ND	5	1145468
NUTRIENTS						
Dissolved Phosphorus (P)	ug/L	ND	ND	ND	50	1145468

ND = Not detected
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: A703737
Report Date: 2007/01/18

Ian D Wilson Associates Ltd
Client Project #: KIENER
Project name:
Sampler Initials:

MICROBIOLOGY (WATER)

Maxxam ID		Q50433	Q50434	Q50435		
Sampling Date		2007/01/10 16:30	2007/01/11 16:00	2007/01/11 15:45		
COC Number		00498346	00498346	00498346		
	Units	**TEST WELL 1**	**TEST WELL 2**	**TEST WELL 3**	**RDL**	**QC Batch**
MICROBIOLOGICAL						
Background	CFU/100mL	22	75	>200	N/A	1143685
Collform	CFU/100mL	0	6	40 (1)	N/A	1143685
Escherichia coli	CFU/100mL	0	0	6 (1)	N/A	1143685

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Values reported may be biased low due to overgrowth.

Maxxam Job #: A703737
Report Date: 2007/01/18

Ian D Wilson Associates Ltd
Client Project #: KIENER
Project name:
Sampler Initials:

GENERAL COMMENTS

Results relate only to the items tested.

Ian D Wilson Associates Ltd
Attention: Geoff Rether
Client Project #: KIENER
P.O. #:
Project name:

Quality Assurance Report

Maxxam Job Number: OA703737

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1143780 BMO	QC STANDARD	Turbidity	2007/01/13		96	%	85 - 115
	Method Blank	Turbidity	2007/01/13	ND, RDL=0.1		NTU	
	RPD	Turbidity	2007/01/13	5.0		%	25
1144141 AHA	MATRIX SPIKE	Dissolved Organic Carbon	2007/01/15		NC (1)	%	75 - 125
	Spiked Blank	Dissolved Organic Carbon	2007/01/15		101	%	75 - 125
	Method Blank	Dissolved Organic Carbon	2007/01/15	ND, RDL=0.1		mg/L	
	RPD	Dissolved Organic Carbon	2007/01/15	0.3		%	20
1144355 ADB	MATRIX SPIKE	Nitrite (N)	2007/01/16		101	%	75 - 125
		Nitrate (N)	2007/01/16		95	%	75 - 125
	Spiked Blank	Nitrite (N)	2007/01/16		104	%	85 - 115
		Nitrate (N)	2007/01/16		93	%	85 - 125
	Method Blank	Nitrite (N)	2007/01/16	ND, RDL=0.01		mg/L	
		Nitrate (N)	2007/01/16	ND, RDL=0.1		mg/L	
	RPD	Nitrite (N)	2007/01/16	NC		%	25
		Nitrate (N)	2007/01/16	NC		%	25
1144379 ADB	MATRIX SPIKE [Q50433-03]	Total Ammonia-N	2007/01/16		97	%	80 - 120
	Spiked Blank	Total Ammonia-N	2007/01/16		104	%	80 - 120
	Method Blank	Total Ammonia-N	2007/01/16	ND, RDL=0.05		mg/L	
	RPD [Q50433-03]	Total Ammonia-N	2007/01/16	NC		%	25
1144380 ADB	MATRIX SPIKE	Total Ammonia-N	2007/01/17		93	%	80 - 120
	Spiked Blank	Total Ammonia-N	2007/01/17		102	%	80 - 120
	Method Blank	Total Ammonia-N	2007/01/17	ND, RDL=0.05		mg/L	
	RPD	Total Ammonia-N	2007/01/17	0.6		%	25
1144494 ADB	MATRIX SPIKE	Nitrite (N)	2007/01/16		102	%	75 - 125
		Nitrate (N)	2007/01/16		102	%	75 - 125
	Spiked Blank	Nitrite (N)	2007/01/16		101	%	85 - 115
		Nitrate (N)	2007/01/16		99	%	85 - 125
	Method Blank	Nitrite (N)	2007/01/16	ND, RDL=0.01		mg/L	
		Nitrate (N)	2007/01/16	ND, RDL=0.1		mg/L	
		Nitrate + Nitrite	2007/01/16	ND, RDL=0.1		mg/L	
	RPD	Nitrite (N)	2007/01/16	NC		%	25
		Nitrate (N)	2007/01/16	NC		%	25
1144851 AHA	MATRIX SPIKE	Dissolved Organic Carbon	2007/01/16		97	%	75 - 125
	Spiked Blank	Dissolved Organic Carbon	2007/01/16		102	%	75 - 125
	Method Blank	Dissolved Organic Carbon	2007/01/16	0.1, RDL=0.1		mg/L	
	RPD	Dissolved Organic Carbon	2007/01/16	8.8		%	20
1144891 YPA	QC STANDARD	Conductivity	2007/01/16		101	%	85 - 115
	Method Blank	Conductivity	2007/01/16	ND, RDL=2		umho/cm	
	RPD	Conductivity	2007/01/16	0.1		%	25
1144892 YPA	QC STANDARD	Alkalinity (Total as CaCO3)	2007/01/16		102	%	85 - 115
	Method Blank	Alkalinity (Total as CaCO3)	2007/01/16	1, RDL=1		mg/L	
	RPD	Alkalinity (Total as CaCO3)	2007/01/16	0.5		%	25
1144896 YPA	QC STANDARD	Conductivity	2007/01/16		102	%	85 - 115
	Method Blank	Conductivity	2007/01/16	ND, RDL=2		umho/cm	
	RPD	Conductivity	2007/01/16	0		%	25
1144897 YPA	QC STANDARD	Alkalinity (Total as CaCO3)	2007/01/16		97	%	85 - 115
	Method Blank	Alkalinity (Total as CaCO3)	2007/01/16	ND, RDL=1		mg/L	
	RPD	Alkalinity (Total as CaCO3)	2007/01/16	NC		%	25
1145095 DRM	MATRIX SPIKE	Dissolved Chloride (Cl)	2007/01/17		104	%	75 - 125
	QC STANDARD	Dissolved Chloride (Cl)	2007/01/17		98	%	80 - 120
	Spiked Blank	Dissolved Chloride (Cl)	2007/01/17		98	%	80 - 120
	Method Blank	Dissolved Chloride (Cl)	2007/01/17	ND, RDL=1		mg/L	
	RPD	Dissolved Chloride (Cl)	2007/01/17	1.8		%	20
1145109 DRM	MATRIX SPIKE	Dissolved Sulphate (SO4)	2007/01/17		NC (2)	%	75 - 125

Ian D Wilson Associates Ltd
Attention: Geoff Rether
Client Project #: KIENER
P.O. #:
Project name:

Quality Assurance Report (Continued)

Maxxam Job Number: OA703737

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1145109 DRM	QC STANDARD	Dissolved Sulphate (SO4)	2007/01/17		101	%	80 - 120
	Spiked Blank	Dissolved Sulphate (SO4)	2007/01/17		102	%	80 - 120
	Method Blank	Dissolved Sulphate (SO4)	2007/01/17	ND, RDL=1		mg/L	
	RPD	Dissolved Sulphate (SO4)	2007/01/17	4.8		%	25
1145110 DRM	MATRIX SPIKE	Orthophosphate (P)	2007/01/17		109	%	75 - 125
	QC STANDARD	Orthophosphate (P)	2007/01/17		100	%	80 - 120
	Spiked Blank	Orthophosphate (P)	2007/01/17		101	%	80 - 120
	Method Blank	Orthophosphate (P)	2007/01/17	ND, RDL=0.01		mg/L	
	RPD	Orthophosphate (P)	2007/01/17	0.6		%	25
1145445 SAC	MATRIX SPIKE	Fluoride (F-)	2007/01/17		98	%	75 - 125
	Spiked Blank	Fluoride (F-)	2007/01/17		97	%	75 - 125
	Method Blank	Fluoride (F-)	2007/01/17	ND, RDL=0.1		mg/L	
	RPD	Fluoride (F-)	2007/01/17	NC		%	25
1145468 AHE	MATRIX SPIKE						
	[Q50434-01]	Dissolved Aluminum (Al)	2007/01/17		95	%	80 - 120
		Dissolved Antimony (Sb)	2007/01/17		101	%	80 - 120
		Dissolved Arsenic (As)	2007/01/17		101	%	80 - 120
		Dissolved Barium (Ba)	2007/01/17		99	%	80 - 120
		Dissolved Beryllium (Be)	2007/01/17		102	%	75 - 125
		Dissolved Boron (B)	2007/01/17		88	%	75 - 125
		Dissolved Cadmium (Cd)	2007/01/17		101	%	80 - 120
		Dissolved Calcium (Ca)	2007/01/17		85	%	75 - 125
		Dissolved Chromium (Cr)	2007/01/17		99	%	80 - 120
		Dissolved Cobalt (Co)	2007/01/17		96	%	80 - 120
		Dissolved Copper (Cu)	2007/01/17		95	%	80 - 120
		Dissolved Iron (Fe)	2007/01/17		98	%	80 - 120
		Dissolved Lead (Pb)	2007/01/17		97	%	80 - 120
		Dissolved Magnesium (Mg)	2007/01/17		88	%	80 - 120
		Dissolved Manganese (Mn)	2007/01/17		97	%	80 - 120
		Dissolved Molybdenum (Mo)	2007/01/17		102	%	80 - 120
		Dissolved Nickel (Ni)	2007/01/17		95	%	80 - 120
		Dissolved Potassium (K)	2007/01/17		96	%	75 - 125
		Dissolved Selenium (Se)	2007/01/17		100	%	80 - 120
		Dissolved Silicon (Si)	2007/01/17		96	%	75 - 125
		Dissolved Silver (Ag)	2007/01/17		98	%	80 - 120
		Dissolved Sodium (Na)	2007/01/17		95	%	75 - 125
		Dissolved Strontium (Sr)	2007/01/17		93	%	80 - 120
		Dissolved Thallium (Tl)	2007/01/17		97	%	75 - 125
		Dissolved Titanium (Ti)	2007/01/17		97	%	75 - 125
		Dissolved Uranium (U)	2007/01/17		99	%	80 - 120
		Dissolved Vanadium (V)	2007/01/17		100	%	80 - 120
		Dissolved Zinc (Zn)	2007/01/17		97	%	80 - 120
		Dissolved Phosphorus (P)	2007/01/17		98	%	75 - 125
	Spiked Blank	Dissolved Aluminum (Al)	2007/01/17		98	%	85 - 115
		Dissolved Antimony (Sb)	2007/01/17		101	%	85 - 115
		Dissolved Arsenic (As)	2007/01/17		98	%	85 - 115
		Dissolved Barium (Ba)	2007/01/17		99	%	85 - 115
		Dissolved Beryllium (Be)	2007/01/17		104	%	85 - 115
		Dissolved Boron (B)	2007/01/17		101	%	85 - 115
		Dissolved Cadmium (Cd)	2007/01/17		100	%	85 - 115
		Dissolved Calcium (Ca)	2007/01/17		96	%	85 - 115
		Dissolved Chromium (Cr)	2007/01/17		101	%	85 - 115
		Dissolved Cobalt (Co)	2007/01/17		100	%	85 - 115
		Dissolved Copper (Cu)	2007/01/17		99	%	85 - 115
		Dissolved Iron (Fe)	2007/01/17		101	%	85 - 115

Ian D Wilson Associates Ltd
Attention: Geoff Rether
Client Project #: KIENER
P.O. #:
Project name:

Quality Assurance Report (Continued)

Maxxam Job Number: OA703737

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1145468 AHE	Spiked Blank	Dissolved Lead (Pb)	2007/01/17		97	%	85 - 115
		Dissolved Magnesium (Mg)	2007/01/17		97	%	85 - 115
		Dissolved Manganese (Mn)	2007/01/17		100	%	85 - 115
		Dissolved Molybdenum (Mo)	2007/01/17		101	%	85 - 115
		Dissolved Nickel (Ni)	2007/01/17		98	%	85 - 115
		Dissolved Potassium (K)	2007/01/17		97	%	85 - 115
		Dissolved Selenium (Se)	2007/01/17		100	%	85 - 115
		Dissolved Silicon (Si)	2007/01/17		96	%	85 - 115
		Dissolved Silver (Ag)	2007/01/17		99	%	85 - 115
		Dissolved Sodium (Na)	2007/01/17		97	%	85 - 115
		Dissolved Strontium (Sr)	2007/01/17		97	%	85 - 115
		Dissolved Thallium (Tl)	2007/01/17		97	%	85 - 115
		Dissolved Titanium (Ti)	2007/01/17		96	%	85 - 115
		Dissolved Uranium (U)	2007/01/17		97	%	85 - 115
		Dissolved Vanadium (V)	2007/01/17		102	%	85 - 115
		Dissolved Zinc (Zn)	2007/01/17		99	%	85 - 115
		Dissolved Phosphorus (P)	2007/01/17		92	%	85 - 115
	Method Blank	Dissolved Aluminum (Al)	2007/01/17	ND, RDL=5		ug/L	
		Dissolved Antimony (Sb)	2007/01/17	ND, RDL=1		ug/L	
		Dissolved Arsenic (As)	2007/01/17	ND, RDL=1		ug/L	
		Dissolved Barium (Ba)	2007/01/17	ND, RDL=5		ug/L	
		Dissolved Beryllium (Be)	2007/01/17	ND, RDL=0.5		ug/L	
		Dissolved Boron (B)	2007/01/17	ND, RDL=10		ug/L	
		Dissolved Cadmium (Cd)	2007/01/17	ND, RDL=0.1		ug/L	
		Dissolved Calcium (Ca)	2007/01/17	ND, RDL=200		ug/L	
		Dissolved Chromium (Cr)	2007/01/17	ND, RDL=5		ug/L	
		Dissolved Cobalt (Co)	2007/01/17	ND, RDL=0.5		ug/L	
		Dissolved Copper (Cu)	2007/01/17	ND, RDL=1		ug/L	
		Dissolved Iron (Fe)	2007/01/17	ND, RDL=50		ug/L	
		Dissolved Lead (Pb)	2007/01/17	ND, RDL=0.5		ug/L	
		Dissolved Magnesium (Mg)	2007/01/17	ND, RDL=50		ug/L	
		Dissolved Manganese (Mn)	2007/01/17	ND, RDL=2		ug/L	
		Dissolved Molybdenum (Mo)	2007/01/17	ND, RDL=1		ug/L	
		Dissolved Nickel (Ni)	2007/01/17	ND, RDL=1		ug/L	
		Dissolved Potassium (K)	2007/01/17	ND, RDL=200		ug/L	
		Dissolved Selenium (Se)	2007/01/17	ND, RDL=2		ug/L	
		Dissolved Silicon (Si)	2007/01/17	ND, RDL=50		ug/L	
		Dissolved Silver (Ag)	2007/01/17	ND, RDL=0.1		ug/L	
		Dissolved Sodium (Na)	2007/01/17	ND, RDL=100		ug/L	
		Dissolved Strontium (Sr)	2007/01/17	ND, RDL=1		ug/L	
		Dissolved Thallium (Tl)	2007/01/17	ND, RDL=0.05		ug/L	
		Dissolved Titanium (Ti)	2007/01/17	ND, RDL=5		ug/L	
		Dissolved Uranium (U)	2007/01/17	ND, RDL=0.1		ug/L	
		Dissolved Vanadium (V)	2007/01/17	ND, RDL=1		ug/L	
		Dissolved Zinc (Zn)	2007/01/17	ND, RDL=5		ug/L	
		Dissolved Phosphorus (P)	2007/01/17	ND, RDL=50		ug/L	
	RPD [Q50434-01]	Dissolved Aluminum (Al)	2007/01/17	NC		%	25
		Dissolved Antimony (Sb)	2007/01/17	NC		%	25
		Dissolved Arsenic (As)	2007/01/17	NC		%	25
		Dissolved Barium (Ba)	2007/01/17	1.5		%	25
		Dissolved Beryllium (Be)	2007/01/17	NC		%	25
		Dissolved Boron (B)	2007/01/17	1.3		%	25
		Dissolved Cadmium (Cd)	2007/01/17	NC		%	25
		Dissolved Calcium (Ca)	2007/01/17	1		%	25
		Dissolved Chromium (Cr)	2007/01/17	NC		%	25

Ian D Wilson Associates Ltd
Attention: Geoff Rether
Client Project #: KIENER
P.O. #:
Project name:

Quality Assurance Report (Continued)

Maxxam Job Number: OA703737

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
1145468 AHE	RPD [Q50434-01]	Dissolved Cobalt (Co)	2007/01/17	NC		%	25
		Dissolved Copper (Cu)	2007/01/17	NC		%	25
		Dissolved Iron (Fe)	2007/01/17	NC		%	25
		Dissolved Lead (Pb)	2007/01/17	NC		%	25
		Dissolved Magnesium (Mg)	2007/01/17	0.3		%	25
		Dissolved Manganese (Mn)	2007/01/17	NC		%	25
		Dissolved Molybdenum (Mo)	2007/01/17	NC		%	25
		Dissolved Nickel (Ni)	2007/01/17	NC		%	25
		Dissolved Potassium (K)	2007/01/17	0.2		%	25
		Dissolved Selenium (Se)	2007/01/17	NC		%	25
		Dissolved Silicon (Si)	2007/01/17	1		%	25
		Dissolved Silver (Ag)	2007/01/17	NC		%	25
		Dissolved Sodium (Na)	2007/01/17	0.6		%	25
		Dissolved Strontium (Sr)	2007/01/17	0.03		%	25
		Dissolved Thallium (Tl)	2007/01/17	NC		%	25
		Dissolved Titanium (Ti)	2007/01/17	NC		%	25
		Dissolved Uranium (U)	2007/01/17	0.6		%	25
		Dissolved Vanadium (V)	2007/01/17	NC		%	25
		Dissolved Zinc (Zn)	2007/01/17	NC		%	25
		Dissolved Phosphorus (P)	2007/01/17	NC		%	25
1145852 KTH	QC STANDARD	Colour	2007/01/17		98	%	85 - 115
	Method Blank	Colour	2007/01/17	ND, RDL=1		TCU	
	RPD [Q50434-01]	Colour	2007/01/17	NC		%	25

ND = Not detected
NC = Non-calculable
RPD = Relative Percent Difference
QC Standard = Quality Control Standard
SPIKE = Fortified sample
(1) DOC recovery in the matrix spiked sample was not calculated. Because of the high concentration of this compound in the parent sample, the relative difference between the spiked and un-spiked concentrations is not sufficiently significant to permit reliable recovery calculation.
(2) Sulfate recovery in the matrix spiked sample was not calculated. Because of the high concentration of this compound in the parent sample, the relative difference between the spiked and un-spiked concentrations is not sufficiently significant to permit reliable recovery calculation.

Validation Signature Page

Maxxam Job #: A703737

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Christina Nervo

CHRISTINA NERVO, Scientific Services

MARIA BONGOLAN, ANALYST II

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CAEAL have approved this reporting process and electronic report format.

Ontario Ministry of the Environment

Well tag number (if number is below): A049864 / A049864

Well Record

Regulation 903 Ontario Water Resources Act

Test Well 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 Help Desk (Toll Free) at 1-888-396-9355.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only — MUN | CON | LOT

Well Owner's Information and Location of Well Information

First Name	Last Name	Mailing Address (Street Number/Name, RR, Lot, Concession)			
MARTIN	KIENER	67 YONGE ST	Suite 1251		
County/District/Municipality	Township/City/Town/Village	Province	Postal Code	Telephone Number (include area code)	
	TORONTO	Ontario	M5E 1S8		

Address of Well Location (County/District/Municipality)	Township	Lot	Concession
GREY COUNTY	EUPHRASIA	1	6
RR#/Street Number/Name	City/Town/Village	Site/Compartment/Block/Tract etc.	

GPS Reading: NAD 83 | Zone 17 | Easting 555042 | Northing 4911080 | Unit Make/Model: MAGELLAN | Mode of Operation: ☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see Instructions)

Imperial Measurement

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To
	TOPSOIL			0	2 FT
	CLAY	STONES		2	35
WHT	LIMESTONE			35	45
	CAVERNOUS	ROCK		45	55
	LIMESTONE			55	74

Hole Diameter

Depth From	Depth To	Diameter Centimetres

Water Record

Water found at ___ Metres	Kind of Water		
73 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				
6 1/4"	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	.188	+2	61
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
No. Casing or Screen				
6"	☒ Open hole		61	74

Test of Well Yield

Pumping test method: Submersible Pump

	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Pump intake set at - (metres)	Static Level	44		46
Pumping rate - (litres/min) 6pm	1	45.5	1	44
Duration of pumping 15 hrs + ___ min	2	46	2	44
Final water level end of pumping 46 metres	3	46	3	44
Recommended pump type: ☐ Shallow ☒ Deep	4	46	4	44
Recommended pump depth. 60 metres	5	46	5	44
Recommended pump rate. 06pm (litres/min)	10		10	
If flowing give rate - (litres/min)	15		15	
If pumping discontinued, give reason.	20		20	
	25		25	
	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	40'	Bentonite GROUT	.4m3

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

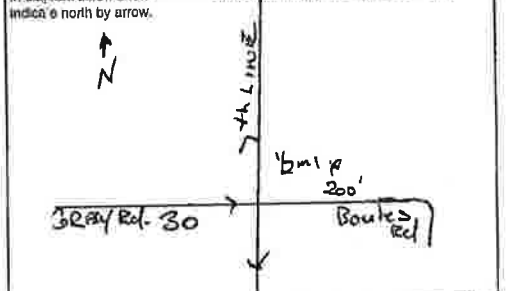
☒ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☐ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☐ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Well Contractor/Technician Information

Name of Well Contractor	Well Contractor's Licence No.
NEUMANN WELL DRILLING	7015
Business Address (street name, number, city etc.)	
RR#4 DUNDALK	
Name of Well Technician (last name, first name)	Well Technician's Licence No.
GILLIES TOM	T-1958
Signature of Technician/Contractor: X Tom Gillies	Date Submitted YYYY MM DD

Location of Well

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



Audit No. Z 59151

Date Well Completed: YYYY 2006 MM 12 DD 15

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

Date Delivered: YYYY 2006 MM 12 DD 15

Ministry Use Only

Date Source	Contractor
Date Received YYYY MM DD	Date of Inspection YYYY MM DD
Remarks	Well Record Number

0506E (08/2006) **Ministry's Copy**

Cette formule est disponible en français

Ontario Ministry of Environment and Energy

The Ontario Water Resources Act
WATER WELL RECORD

#1

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

Sol Test Well 2

County or District	Township/Borough/City/Town/Village	Con block tract survey etc.	Lot
GREY	EUPHRASIA	Con 6	2

Owner's surname	First Name	Address of Well Location	Date completed (day month year)
KIENER	MARTIN		25 6 03

Zone | Easting | Northing

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet From	Depth - feet To
BRN	CLAY			0	63
	CLAY	STONES		63	76
	LIMESTONE			76	103
BLUE	SHALE			103	163
	LIMESTONE			163	196
BLUE/GRY	SHALE			196	222

WATER RECORD

Water found at - feet	Kind of water		
156	☒ Fresh ☐ Salty	☐ Sulphur ☐ Minerals ☐ Gas	
180	☐ Fresh ☐ Salty	☐ Sulphur ☒ Minerals ☐ Gas	
	☐ Fresh ☐ Salty	☐ Sulphur ☐ Minerals ☐ Gas	
	☐ Fresh ☐ Salty	☐ Sulphur ☐ Minerals ☐ Gas	
	☐ Fresh ☐ Salty	☐ Sulphur ☐ Minerals ☐ Gas	

CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
6 1/4	☒ Steel ☐ Galvanized ☐ Concrete ☐ Open hole ☐ Plastic	.188	+2	79
6	☐ Steel ☐ Galvanized ☐ Concrete ☒ Open hole ☐ Plastic		79	222
5	☐ Steel ☐ Galvanized ☐ Concrete ☐ Open hole ☒ Plastic	SLOTTED LINER	163	222

SCREEN

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

Material and type	Depth at top of screen feet

PLUGGING & SEALING RECORD

☒ Annular space ☐ Abandonment

Depth set at - feet From	Depth set at - feet To	Material and type (Cement grout, bentonite, etc.)
0	50	Bentonite Grout

PUMPING TEST

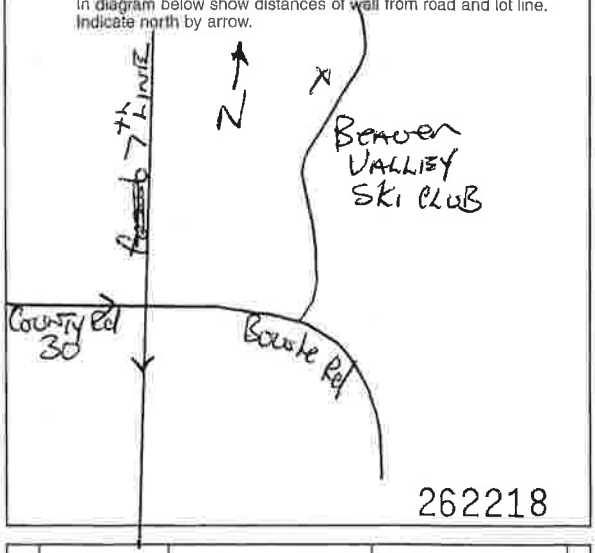
Pumping test method: ☐ Pump ☒ Bailer
Pumping rate: 4 GPM
Duration of pumping: 2 Hours ___ Mins

Static level	Water level end of pumping	Water levels during ☐ Pumping ☐ Recovery: 15 minutes	30 minutes	45 minutes	60 minutes
105 feet	160 feet	160 feet	160 feet	160 feet	160 feet

If flowing give rate: GPM
Pump intake set at: feet
Water at end of test: ☐ Clear ☒ Cloudy
Recommended pump type: ☐ Shallow ☒ Deep
Recommended pump setting: 190 feet
Recommended pump rate: 3-4 GPM

LOCATION OF WELL

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



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FINAL STATUS OF WELL

☒ Water supply ☐ Observation well ☐ Test hole ☐ Recharge well
☐ Abandoned, insufficient supply ☐ Abandoned, poor quality ☐ Abandoned (Other) ☐ Dewatering
☐ Unfinished ☐ Replacement well

WATER USE

☒ Domestic ☐ Stock ☐ Irrigation ☐ Industrial
☐ Commercial ☐ Municipal ☐ Public supply ☐ Cooling & air conditioning
☐ Not use ☐ Other

METHOD OF CONSTRUCTION

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

Name of Well Contractor	Well Contractor's Licence No.
NEUMANN WELL DRILLING	7015

Address: RR#4 DUNDALK

Name of Well Technician	Well Technician's Licence No.
TOM GILLIES	T-1958

Signature of Technician/Contractor: [signature]
Submission date: day mo yr

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0506 (05/02) Front Form 9

Ontario Ministry of Environment and Energy

The Ontario Water Resources Act
WATER WELL RECORD

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

Test Well 3 #2

County or District	Township/Borough/City/Town/Village	Con. block tract survey, etc.	Lot
GREY	EUPHEMIA	CON 6	2
Owner's surname / **First Name**	**Address of Well Location**	**Date completed**	
KIBNER / MARTIN		27 day 6 month 03 year	

Zone | Easting | Northing

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet From	Depth - feet To
BRN	CLAY			0	15
	CLAY	GRAVEL		15	50
	CLAY	STONES		50	61
	LIMESTONE			61	103
BLUE	SHALE			103	161
	SHALE	LIMESTONE		161	195
BLUE	SHALE			195	207
RED	SHALE			207	209

WATER RECORD

Water found at - feet	Kind of water		
100	☒ Fresh ☐ Salty	☐ Sulphur ☐ Minerals ☐ Gas	
185	☐ Fresh ☐ Salty	☐ Sulphur ☐ Minerals ☐ Gas	
	☐ Fresh ☐ Salty	☐ Sulphur ☐ Minerals ☐ Gas	
	☐ Fresh ☐ Salty	☐ Sulphur ☐ Minerals ☐ Gas	
	☐ Fresh ☐ Salty	☐ Sulphur ☐ Minerals ☐ Gas	

AIR LIFT 10 GPM

CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness Inches	Depth - feet From	Depth - feet To
6 1/4	☒ Steel ☐ Galvanized ☐ Concrete ☐ Open hole ☐ Plastic	.188	+2	63
6	☐ Steel ☐ Galvanized ☐ Concrete ☒ Open hole ☐ Plastic		63	209
5	☐ Steel ☐ Galvanized ☐ Concrete ☐ Open hole ☒ Plastic	SLOTTED LINER	150	209

SCREEN

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

PLUGGING & SEALING RECORD

☒ Annular space ☐ Abandonment

Depth set at - feet From	Depth set at - feet To	Material and type (Cement grout, bentonite, etc.)
0	50	Bentonite Grout

PUMPING TEST

Pumping test method: ☒ Pump ☐ Bailer
Pumping rate: 7 GPM
Duration of pumping: 5 Hours ___ Mins

Static level	Water level end of pumping	Water levels during ☒ Pumping ☐ Recovery: 15 minutes	30 minutes	45 minutes	60 minutes
104 feet	128 feet	128 feet	128 feet	128 feet	128 feet

If flowing give rate: ___ GPM
Pump intake set at: ___ feet
Water at end of test: ☐ Clear ☒ Cloudy
Recommended pump type: ☐ Shallow ☒ Deep
Recommended pump setting: 190 feet
Recommended pump rate: 7 GPM

FINAL STATUS OF WELL

☒ Water supply ☐ Observation well ☐ Test hole ☐ Recharge well
☐ Abandoned, insufficient supply ☐ Abandoned, poor quality ☐ Abandoned (Other) ☐ Dewatering
☐ Unfinished ☐ Replacement well

WATER USE

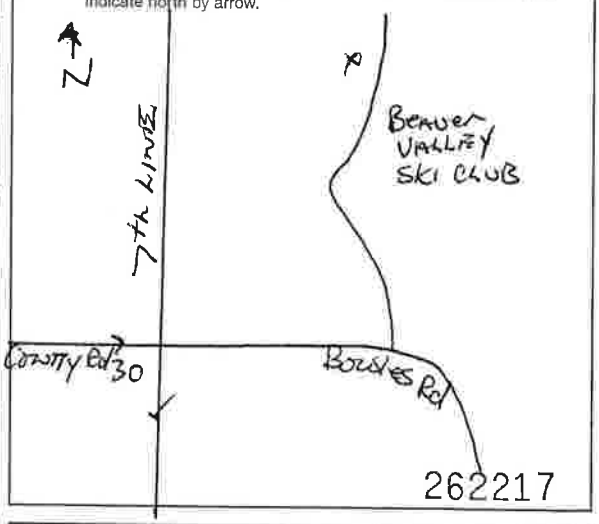
☒ Domestic ☐ Stock ☐ Irrigation ☐ Industrial
☐ Commercial ☐ Municipal ☐ Public supply ☐ Cooling & air conditioning
☐ Not use ☐ Other

METHOD OF CONSTRUCTION

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

LOCATION OF WELL

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



Name of Well Contractor	Well Contractor's Licence No.
NEUMANN WELL DRILLING	7015
Address RR#4 DUNDALK	
Name of Well Technician TOM GILLIES	**Well Technician's Licence No.** 7-1958
Signature of Technician/Contractor	**Submission date** day mo yr

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