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2011 ANNUAL MONITORING REPORT

Tansley Quarry
Hanson Brick Ltd.
Burlington, Ontario

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REPORT

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1.0 INTRODUCTION

1.1 Background and Purpose

In 2002, Golder Associates Ltd. (Golder) was retained by Hanson Brick Ltd. (Hanson) to conduct a pre-application hydrogeological assessment of the current Tansley Quarry site and its environments. The assessment involved monitoring well drilling and installation, hydraulic conductivity testing, water quality testing, a private water well survey and groundwater level modelling to assess potential impacts on surrounding water wells and water seepage into the quarry. A monitoring program was subsequently established comprising annual water quality sampling and quarterly water level monitoring at on-site and private wells.

On March 21, 2007 Hanson entered into an Agreement with a number of private well owners comprising the Tremaine Neighbourhood Association (TNA). Hanson also entered into an Adaptive Groundwater Management Plan (AMP) Agreement with the Region of Halton on May 8, 2007. Both agreements provide that Hanson shall proactively ensure a continuous supply of potable water to property owners whose wells may be adversely affected by the quarry operation. To this end, construction of a Private Communal Water System (PCWS) began in December 2011 and is scheduled for completion in December 2012.

In June 2007, Golder conducted further hydrogeological investigations at the Tansley Quarry site and surrounding area in order to fulfill the Pre-development Requirements set out in Section 2.2 of the AMP (Appendix A). The program comprised five basic elements including a baseline survey of private wells within a 1,000 m radius of the quarry, yield testing of selected private wells, installation of additional monitoring wells and leveloggers for monitoring groundwater level fluctuation in and around the quarry, repair of existing TNA wells and updating of the existing hydrogeological model.

A monitoring report and updated hydrogeological assessment of the Tansley Quarry were submitted in March 2008 in fulfilment of Hanson's requirement under Section 2.3 of the AMP to provide an initial monitoring report within 90 days of issuance of its Aggregate Resources Act (ARA) Licence. The ARA Licence was issued by the Ministry of Natural Resources (MNR) on December 20, 2007 based upon a 9-drawing Site Plan. The AMP and Drawing 7 of the Site Plan also provide for a long term groundwater monitoring program, with monthly reports during Year 1 and annual reports thereafter.

1.2 Site Description and Quarry Development

Tansley Quarry is situated on part of Lots 1 and 2, Concession 1, north of Dundas Street, within the Geographic Township of Nelson, City of Burlington, Region of Halton. It is bounded to the north by No. 1 Side Road, to the east by Tremaine Road, to the south by Highway 407 and to the west by the CNR railway line (Figure 1).

Development at the Tansley Quarry site began on September 10, 2007 under a Burlington Municipal Site Alteration Permit. Excavation of overburden began on September 17, 2007 within the Sinking Cut stage (Figure 2). Approximately 436,000 m^3 of overburden was removed from the sinking cut between September 17 and December 20, 2007. Extraction of shale began in January 2008 after the ARA licence was issued.

Hanson's contractor began dewatering the excavation pit around the second week of October 2007. Pumping was frequent until mid-November 2007 and then tapered off by the end of the month. Hanson began dewatering of the site during the first week of December 2007 with discharge from the quarry sump being diverted towards

the woodlot located approximately 150 m north of the excavation. Hanson made efforts to keep the discharged water on-site with rock check dams, straw bales and silt fencing being installed around all culverts, inlets and outlets to ensure filtration of any runoff before it left the site. Pumping times and volumes increased during December 2007 and early 2008 because of increased precipitation; however pumping was sporadic due to frequent breakdown of the pumps and their inability to move water up a high vertical lift of approximately 14 m to 20 m.

Pumping from the quarry sump was carried out on an intermittent basis throughout 2009 to 2011. Pumping occurred for an average of 6 hours per day and daily pumping volumes averaged 410 m^3/day.

Figure 2 shows the operational progress at the Tansley Quarry. Figure 3 provides cross sections North-South and East-West across the excavation. The excavation was surveyed by TLS Inc. on March 3, 2009. Although ice in the bottom of the excavation prevented obtaining an elevation of the quarry floor and sump floor, the elevation of the bottom of the quarry near the edge of the ice was surveyed at 149.02 metres above sea level (masl). Based on this ground elevation and estimates of the sump depth and ice thickness provided by Hanson, the quarry floor elevation was estimated at approximately 148 masl and the elevation of the base of the sump estimated at approximately 146 masl. Hanson indicated that by the end of 2010 the sump was approximately 30 m long by 10 m wide by 1 m deep. The excavation covered an area of approximately 3.2 ha and the floor of the excavation had been lowered by approximately 4 m to an elevation of approximately 144 masl by the end of 2010, with the base of the sinking cut approximately 2 m lower at an elevation of 142 masl. A total of 90,932 metric tonnes of shale was extracted in 2010. Based on an elevation survey carried out in March 2012, the floor of the base of the excavation was lowered by approximately 3 m to 141 masl with the base of the sump estimated at approximately 140 masl. Approximately 20,000 metric tonnes of shale was extracted in 2011.

Prior to June 2009, water pumped from the quarry sump was discharged to the woodlot northeast of the sinking cut. However, the sump discharge is currently directed to a decant pond located adjacent to the sinking cut (Figure 2). Water in the decant pond is allowed to settle for at least 24 hours prior to being discharged to the watercourse east of the pond under conditions as outlined in Certificate of Approval (C of A), Industrial Sewage Works No. 4408 7AUL75 (Appendix A) issued on February 4, 2008.

1.3 Precipitation

Figure 4 shows the monthly precipitation for the Millgrove Station and Hamilton Airport from 2002 to 2010. The Millgrove Station, located at an elevation of 255.1 masl, was discontinued in April 2006, and hence data from Hamilton Airport, which is located within a 25 km radius of the site at a similar elevation of 237.7 masl, have been utilized to date.

Figure 5 shows the water budget (precipitation and surplus) for the Hamilton Airport from 2002 to 2010. The water budget assumes a 150 mm holding capacity for fine to sandy loam that supports pasture and shrubs, similar to pre-development site conditions. The surplus is the water that remains in the soil after evapotranspiration. On an average annual basis, the surplus indicates water available for infiltration and runoff. This available water can potentially affect groundwater levels. The water budget shows that water was available for infiltration and runoff during January to May, and November to December 2011. The highest precipitation (>110 mm) was observed in March and April. As with previous years, the period from June to October 2011 was relatively dry with little water available for infiltration and runoff.

2.0 GROUNDWATER LEVEL MONITORING

Groundwater levels at the Tansley Quarry are monitored using a network of on-site and off-site monitoring wells and private wells (Figure 6). The monitoring well network comprises the on-site MW-Series well nests, off-site TW-Series wells and a number of private wells.

Groundwater level monitoring at the site commenced in the Fall of 2002 and is ongoing. Quarry activity began in the Fall 2007 with the stripping of approximately 10 m to 15 m of overburden to expose the shale and by early 2008 the excavation had advanced approximately 9 m into the shale in the sinking cut.

The on-site MW-Series monitoring well network comprises a total of 11 well nests. Each well nest consists of a shallow well installed in the overburden (O) and a well installed in the deep shale (D). In addition, well nests MW-01, MW-02, MW-04, MW-05, MW-08 and MW-10 have an intermediate well installed in the upper shale (I) and well nests MW-05, MW-06, MW-09 and MW-11 have a well straddling the overburden/shale contact (S). Logs showing well installation details are presented in Appendix B.

Static water level measurements have been collected at monitor wells MW-01 to MW-08 from September 2002 to present. Loggers have been installed in well MW-05I and well MW-03D since October 2005 and June 2005 respectively. Water level measurements at well nests MW-09, MW-10, MW-11 and wells MW-05S and MW-06S have been collected since August 2007. Water levels in the MW-Series wells were collected quarterly with the exception of the year 2008. Water levels were collected monthly during 2008 as required by Section 4.1 of the AMP. Water levels in well nests MW-04, MW-05 and MW-11 were collected monthly through 2011 on Hanson's initiative in order to more closely monitor groundwater levels in the vicinity of the Hendervale private wells. Loggers were installed in all the shallow wells in well nests MW-01 to MW-08 in September 2007 with the exception of well MW-01 which was blocked.

The off-site TW-Series wells (TW-1, TW-2 and TW-3) were drilled in August 2007 as part of a Class Environmental Assessment for a Private Communal Water System (PCWS). The three test wells were located in the vicinity of the Tansley Quarry to determine if groundwater could be a viable source of water for the PCWS. These wells have also been included as part of the monitoring network to provide additional information on surrounding area groundwater elevations. Well logs are presented in Appendix B.

Water levels have also been monitored, where available, from a network of 11 private wells since 2005 to the present. These private wells comprise eight TNA wells (wells owned by members of the TNA namely Featherstone, Finucci, Wiggins and the five Hendervale wells) and three wells identified under the 2007 Baseline Survey (Bekkers, Simms and Wettlaufer). Private well names reflect either the names of the property owners or the name of the property. Private well details are provided in Table 1, and where possible, associated with an MOE Water Well Record number. The MOE Water Well Record for each well is provided in Appendix B. All private wells were installed with data loggers suspended from direct read cables. Loggers have been installed in the Featherstone, Finucci and Hendervale Barn wells since June 2005. Loggers have been installed in the Hendervale ABC Barn, Hendervale XYZ Barn and Hendervale Cottage wells since February 2006 and in the Hendervale House well since 2007. Loggers were installed in the Bekkers, Simms, Wiggins and Wettlaufer wells in early 2008. The logger in the Wettlaufer well was subsequently removed by the tenants in June 2008.

Water level elevations based on manual water level measurements are presented in Table 2. Water level elevations based on manual measurements and logger data are presented on hydrographs in Appendix C.

2.1 Water Levels in MW-Series Wells

2.1.1 Well Nest MW-01

Well nest MW-01 is located at the northeastern corner of the site along Tremaine Road (Figure 6) and is approximately 675 m north of the quarry face. This nest is comprised of an overburden, intermediate shale and deep shale well. Since 2002, the groundwater levels in the overburden well varied between 163.02 masl and 165.54 masl (Figure C.1). Groundwater levels in the intermediate well varied between 161.14 masl and 164.64 masl and groundwater levels in the deep bedrock well ranged from 158.19 masl to 161.27 masl. Groundwater levels measured in the deep shale well from 2008 onwards were slightly lower than the pre-2008 levels. The groundwater levels all occur in the overburden. The overburden and intermediate bedrock well water levels are very similar over the monitoring period. The intermediate shale well appears to have shown a few meters of drawdown during the initial sinking cut excavation in 2007-2008 but has since recovered to the level of the overburden well being within a meter of ground surface. The groundwater levels in the intermediate well show consistently elevated water levels that may be impacted by infiltration of water from the nearby drainage ditch. The groundwater level in the deep shale well also declined during the sinking cut period and has remained 1 m to 2 m below the pre-sinking cut period. The groundwater level in the deep shale well is approximately 5 m below the overburden/intermediate shale water levels indicating downward hydraulic gradients.

2.1.2 Well Nest MW-02

Well nest MW-02 is located at the north end of the site and is approximately 675 m north of the quarry face. The nest is comprised of an overburden, intermediate shale and deep shale well. Over the 2002 to 2011 period, groundwater levels in the overburden well ranged between 164.94 masl and 166.66 masl. Groundwater levels in the intermediate shale well varied between 159.79 masl and 162.63 masl, approximately 5 m below the overburden water levels. The groundwater levels in the deep shale well varied between 152.50 masl and 159.02 masl or about 8 m below that of the intermediate well and 4 m to 5 m below the bedrock surface (Figure C.2).

The water level trends in the three wells at this location show seasonal fluctuations and downward gradients and no significant influence of quarry development. It should be noted that the groundwater level in the deep shale well rose by approximately 6.5 m over the 11 month period from October 2010 to August 2011. Following the 6.5 m water level rise, the water level stabilized at or just above the bedrock surface. This is indicative of the development of a hydraulic connection between the deep shale well and the intermediate shale well across the intervening bentonite seal, such that water levels recorded in the deep well are now representative of intermediate shale water levels.

2.1.3 Well Nest MW-03

The MW-03 well nest is located along the northwest edge of the quarry adjacent to No. 1 Sideroad and is approximately 675 m northwest of the quarry face. This nest is comprised of an overburden and deep shale well. Over the 10 year monitoring period, the groundwater levels in the overburden well varied between 159.88 masl and 164.81 masl, and water levels in the deep well ranged between 158.88 masl and 164.17 masl

(Figure C.3). These groundwater levels all occur in the overburden and are indicative of a slight downward gradient of groundwater flow. Although both the overburden and deep shale well showed a decline in groundwater levels in 2007, the groundwater levels in the overburden well has rebounded to pre-2007 levels whereas the groundwater levels in the deep shale well have remained approximately 1 m to 2 m below pre-2007 levels.

2.1.4 Well Nest MW-04

Well nest MW-04 is located on the western edge of the quarry site adjacent to the CNR railway line and is approximately 300 m from the quarry face. Over the 2002 to 2011 period, groundwater levels in the overburden well varied between 162.48 masl and 166.77 masl. Prior to initiation of the sinking cut in September 2007, groundwater levels in the intermediate and deep shale wells occurred in the overburden, and ranged between approximately 161 masl and 165 masl (Figure C.4). Since initiation of the sinking cut in September 2007, groundwater levels in the intermediate and deep wells have declined several meters and now occur in the shale bedrock. The water levels in the intermediate well now occur slightly below the top of the bedrock surface, approximately 4 to 5 m below pre-sinking cut levels and range between 156.50 and 159.00 masl (Figure C.4). The groundwater level in the deep well, that has historically been similar to that in the intermediate well, showed the same response to the sinking cut. However, the deep well has been affected by pumping during the annual groundwater quality sampling events. It appears that the bentonite seal separating the intermediate and deep wells has progressively tightened up isolating the deeper shale well. Accordingly, the rate of recovery of the deep well has significantly slowed and static conditions have not been re-established. The groundwater levels have not recovered to the levels observed prior to the 2008 sampling event.

2.1.5 Well Nest MW-05

Well nest MW-05 is located at the southwestern end of the quarry site and is approximately 50 m southwest of the quarry face. This well nest is comprised of overburden well, overburden/bedrock straddle well, intermediate well and deep well. Groundwater levels in the overburden well ranged between 159.62 masl and 163.96 masl. Groundwater levels in the straddle well ranged between 157.36 masl and 160.66 masl. Both the overburden and straddle wells reflects seasonal fluctuations (Figure C.5).

Prior to initiation of the sinking cut in August 2007, groundwater levels in the intermediate well ranged between 158.41 masl and 161.73 masl and occurred in the overburden. By 2008, the groundwater levels in the intermediate well were approximately 10 m lower than historical levels at approximately 150 masl and occurred within the upper shale bedrock. Although the groundwater level in the intermediate well increased to approximately 151 masl by the beginning of 2009, the groundwater levels subsequently fell by approximately 3 m to 148 masl by mid-2009. Since July 2009, the water levels have gradually declined from approximately 148 masl to 147.50 masl by the end of 2011. The mid-2009 groundwater level decline was likely due to the discontinuation of sump water discharge to the wooded area near MW-05. Based on the proximity of MW-05 to the quarry pit and the current pit floor elevation of approximately 140 masl it would appear that the water level in the intermediate well is being influenced by the dewatering activities at the pit.

Groundwater level recovery in the deep well MW-05D is very slow, consistent with the very low hydraulic conductivity of the deep shale bedrock. The water levels have never stabilised and since late 2008 they have also been influenced by hydraulic conductivity testing and water quality sampling events.

2.1.6 Well Nest MW-06

Well nest MW-06 is located on the eastern edge of the quarry site and approximately 30 m northeast of the quarry face. Over the 2002 to 2011 period, groundwater levels in the overburden well ranged between 159.27 masl and 164.58 masl. Groundwater levels in the straddle well installed in mid-2007 were very similar to the overburden groundwater levels, ranging between 158.22 masl and 161.91 masl. In general, the groundwater levels in the overburden and straddle wells were slightly lower (approximately 1 to 2 m) than the water levels observed before August 2007, prior to initiation of the sinking cut. The decline in water levels can be attributed to the proximity of the wells to the excavation.

Groundwater levels in the deep well were very similar to the groundwater levels in the overburden well prior to initiation of the sinking cut but have since shown large fluctuations of up to 20 m. Groundwater levels in the deep well show the effects of hydraulic conductivity testing and purging during the annual water quality sampling events. The deep shale water levels apparently have not stabilised due to the very low hydraulic conductivity of the shale. Groundwater levels observed at MW-06 are indicative of downward gradients induced by the quarry.

2.1.7 Well Nest MW-07

The MW-07 well nest is located near the centre of the property and 400 m north of the quarry face. The well nest is comprised of an overburden and deep well. The groundwater levels in the overburden well varied between 161.27 and 165.63 masl (Figure C.7) and showed a slight seasonal fluctuation over the 2002 to 2011 monitoring period. Groundwater levels in the deep shale well were relatively constant between 2002 and 2010, ranging between 151.89 masl and 152.93 masl. The groundwater levels in the overburden well were confined to the overburden and deep bedrock groundwater levels were all within the upper shale. However, the groundwater level in the deep shale well rose by approximately 6.5 m over the six month period from January 2011 to July 2011. Following the 6.5 m water level rise, the water levels were at the top of the bedrock surface, which may be indicative of the development of a hydraulic connection between the deep shale bedrock and upper shale bedrock. Water levels recorded in the deep well are now considered representative of upper bedrock water levels. Groundwater levels observed at well nest MW-07 are indicative of downward gradients of groundwater flow. No significant influence of quarry related drawdown is noted other than a decline in the overburden levels during the initial development of the sinking cut.

2.1.8 Well Nest MW-08

Well nest MW-08 is located at the centre of the quarry site and 300 m north of the quarry face. The well nest is comprised of an overburden, intermediate and deep well. Groundwater levels in the overburden well ranged between 159.00 and 163.17 masl. Groundwater levels in the intermediate well ranged between 158.51 masl and 162.31 masl while groundwater levels in the deep well fluctuated between 157.65 masl and 162.57 masl (Figure C.8). All groundwater levels occurred in the overburden. The overburden and deep groundwater levels

were similar through 2010 and showed an increasing trend with levels higher than those observed in 2009 but within the range of historical levels. The groundwater levels at MW-08 are indicative of a downward vertical gradient of groundwater flow. There appears to be a drawdown effect during the sinking cut period but the levels subsequently recovered to pre sinking cut levels.

2.1.9 Well Nest MW-09

Well nest MW-09 is located approximately 80 m northwest of the quarry face. Groundwater levels varied between approximately 160 and 165 masl in the overburden well (Figure C.9). Groundwater levels in the overburden well showed a seasonal pattern of fluctuation of approximately 3 m to 4 m.

Groundwater levels in the straddle well showed a decline in water levels from approximately 162 masl in August 2007 to 155 masl in January 2008 then varied between approximately 155 and 157 masl in subsequent years. The groundwater levels in the straddle well appear to be affected by the dewatering of the quarry as they remain over 5 m below those observed prior to the beginning of extraction. Groundwater levels in the overburden and straddle wells all occur in the overburden.

Groundwater levels in the deep well were restricted to the deep shale bedrock. Groundwater levels have been affected by hydraulic conductivity testing and annual water quality sampling. The hydrograph shows that the groundwater in the deep shale is recovering very slowly and the elevations are not representative of static conditions.

2.1.10 Well Nest MW-10

Well nest MW-10 is located approximately 150 m northwest of the quarry face. Groundwater levels varied between approximately 160 masl and 167 masl in the overburden well (Figure C.10). Groundwater levels in the intermediate well ranged between 156.50 masl and 162.50 masl. Groundwater levels in the overburden and intermediate wells all occurred in the overburden and showed a similar pattern of seasonal groundwater level fluctuation of approximately 2.5 m to 5.0 m.

Groundwater levels in the deep well have been recovering very slowly and show the influence of hydraulic conductivity testing and water quality sampling events. These groundwater levels are still recovering and are therefore not representative of static conditions.

Groundwater levels within the MW-10 well nest are indicative of a downward gradient of groundwater flow with little evidence of quarry related drawdown.

2.1.11 Well Nest MW-11

Well nest MW-11 is located approximately 300 m northeast of the quarry face on property adjacent to the quarry and is comprised of an overburden, straddle and deep well. The groundwater levels in the overburden and straddle well were similar and displayed similar seasonal trends in water level fluctuation of approximately 2 m to 3 m (Figure C.11). The groundwater levels in both wells ranged between approximately 162.50 masl and

167 masl. Groundwater levels in the overburden and straddle wells occur in the overburden within approximately 3 m of ground surface.

Groundwater levels in the deep shale well were restricted to the deep shale layers. Groundwater levels in the deep well are recovering very slowly and have not reached static conditions due to hydraulic conductivity testing and annual water quality sampling events (Figure C.11).

2.2 Water Levels in TW-Series Wells

In August 2007, three test wells (TW-1, TW-2 and TW-3) were drilled in the vicinity of the Tansley Quarry to determine if groundwater could be used as a viable source of water for a PCWS. These wells were included as part of the monitoring network to provide additional information on surrounding area groundwater elevations.

Well TW-1 was completed at a depth of 18.29 metres below ground surface (mbgs). The well was cased through overburden to the top of bedrock (15.98 mbgs), and the lower 3 m left as open hole in the weathered shale. Groundwater levels in TW-1 ranged between 162.58 masl and 165.55 masl and show a slight seasonal level fluctuation trend (Figure C.12).

Well TW-2 was cased through overburden to a depth of 18.3 mbgs and finished as open hole in the overburden to a depth of 32 mbgs. The well has been dry since its construction in August 2007 (Figure C.13).

Well TW-3 was cased through overburden to the top of bedrock (19.82 mbgs) and completed as open hole in shale to a depth of 23.62 mbgs. Groundwater levels at well TW-3 ranged between 154.52 masl and 167.55 masl showing similar level fluctuations to that of TW-1(Figure C.14).

2.3 Water Levels in Private Wells

Groundwater level hydrographs for the 11 private wells monitored for water levels are presented on Figures C.15 to C.25. The groundwater levels and magnitude of groundwater level fluctuation was within the range of historical observations. In general, groundwater levels were typically higher in the first part of each year following spring melt, and lower for the second half of the year.

Water levels in the Featherstone well showed seasonal fluctuations (Figure C.15). In December 2008, Hanson installed a cistern at the Featherstone residence as the primary water supply. The well was therefore no longer used to supply the residence. As a result, water levels in the Featherstone well rose to approximately 166 masl (Figure C.15). Water level readings have been recorded less frequently in the Featherstone well since December 10, 2008 as the logger was set to event based recording and records only after a 0.5% change in water levels. The discontinuation of well use meant that logger recording was no longer triggered by pumping induced drawdown.

Groundwater levels in the Finucci well (Figure C.16) recorded subsequent to the initiation of the sinking cut in August 2007 were within the general range of historical groundwater levels recorded at the well prior to quarry operation. The logger in the Finucci well malfunctioned in 2009 and was subsequently replaced in March 2010.

The groundwater level hydrograph for the Hendervale Main Barn well (Figure C.17) fluctuated between approximately 158 masl and 165 masl. There appears to have been a greater demand on the well since October 2009; however the well recovers to the same static level when not in use. The Hendervale Cottage well (Figure C.18) and Hendervale House well (Figure C.21) continued to show similar water level trends. Groundwater levels in the Hendervale ABC Barn well (Figure C.19) and Hendervale XYZ Barn well (Figure C.20) reflect usage of one or both wells in May and August 2010 that resulted in a drawdown of approximately 4 to 5 m. Similarly, the hydrographs show heavy usage of the wells in the latter half of 2011, resulting in a drawdown of approximately 8 to 10 m. It should be noted that the wells are relatively close and installed at similar depth therefore pumping of one well is usually reflected in the water levels of the other. It should be noted that all the barn wells now pump into a common cistern before the water is distributed on the site.

The groundwater levels at the Simms well (Figure C.22) have shown large fluctuations in ground water levels over time. Groundwater level fluctuations of up to 27 m (the full depth of the well) have been observed in the Simms well and they are considered to be a characteristic of the well construction (i.e., the well production may rely primarily on wellbore storage with a depth of 27 m and diameter of 1 m).

The groundwater level in the Wettlaufer well showed little variation over the available monitoring period from January to June 2008. The logger installed in the Wettlaufer well was removed by the tenants in June 2008 (Figure C.23). The logger has not been re-installed in the Wettlaufer well to date.

Groundwater levels in the Wiggins well ranged between approximately 153 masl and 165 masl between late 2007 and the end of 2009. Hanson installed a cistern in December 2008 and the use of the well as a source of domestic water supply was discontinued in January 2009. Since the installation of the cistern and the cessation of well usage, the groundwater levels have risen slightly, fluctuating between approximately 165 masl and 167 masl (Figure C.24).

Groundwater levels at the Bekkers well ranged between approximately 148 masl and 158 masl (Figure C.25) and showed a pattern indicative of seasonal groundwater fluctuations and a large reliance on well bore storage noted by levels periodically approaching the bottom of the well. The logger in the Bekkers well failed in October 2009 and was subsequently replaced in February 2010.

2.4 Summary of Groundwater Levels

Based on groundwater monitoring at the Tansley Quarry, the following general statements can be made regarding groundwater levels and groundwater flow:

- Figure C.26 shows the static water level for MW-Series monitor wells compared to the monthly precipitation data. Overall, the groundwater levels show a seasonal fluctuation that corresponds to the wet and dry seasons and the quarry dewatering.
- In general, water levels in the deep wells remained relatively unchanged or showed a slight increasing (recovery) trend. Water levels in wells MW-04D, MW-05D, MW-06D, MW-09D, MW-10D and MW-11D have not reached static conditions due to the removal of water from the wells during annual sampling events coupled with the slow recovery rates of these wells associated with the very low hydraulic conductivities.

- Groundwater levels in intermediate wells MW04I, MW-05I and straddle wells MW-06S and MW-09S showed the strongest response to dewatering of the excavation. Based on the proximity of these wells to the excavation and the current elevation of the floor of the excavation (approximately 140 masl) it would appear that the groundwater levels at these locations are being influenced by dewatering activities at the site.
- With the exception of well nest MW-08 located at the centre of the site, groundwater levels observed at nested monitoring wells are indicative of a downward gradient of groundwater flow with water levels influenced by on-site discharge and precipitation during various parts of the year.
- The range of water level fluctuations observed in the private wells was within the range of historical groundwater level responses.

3.0 HYDRAULIC CONDUCTIVITY RESPONSE IN DEEP SHALE

The results of the 10 years (2002 to end of 2011) of groundwater level monitoring across the site have provided additional insight into the hydraulic conductivity of the deep shale underlying the site at depths below approximately 25 m to 30 m. The monitoring wells are nested to generally include an overburden well, an intermediate shale well and a deep shale well as indicated in the well nest construction detail provided on the respective hydrographs for each groundwater level monitoring location provided in Appendix C.

Over the monitoring period, groundwater levels in some of the deep shale wells have responded in close synchronicity with the shallow wells at specific monitoring locations, notably MW-01, MW-02, MW-03, MW-07 and MW-08, all located in the northern half of the site (Figure 6). The groundwater levels generally reflect stabilized conditions and downward gradients where the levels in the deep shale are 5 m to 15 m below the groundwater levels in the overburden. In some of the deep shale wells (MW-01, 03 and 08), there was a slight groundwater level decrease in response to the excavation of the sinking cut. Hydraulic conductivity testing of these deep shale wells produced results varying from 8×10^{-8} m/s to 6×10^{-10} m/s. These are all moderately low to low hydraulic conductivity results but consistent with wells that show seasonal groundwater level responses.

The deep shale wells at the other locations (MW-04, 05, 06, 09, 10 and 11) located in the southern half of the site have shown anomalous response conditions over the monitoring period and none of these wells have reached stabilized groundwater level conditions due to the extremely low hydraulic conductivity conditions in the deep shale. Two of the deep shale wells (MW-04 and 06) initially recorded groundwater levels that were synchronous with the levels in the shallow wells including showing drawdown response to the excavation of the sinking cut (Figures C.4 and C.6 in Appendix C). The wells were subsequently developed by bailing for groundwater quality sampling on three occasions as indicated on the respective hydrographs. Following development, the wells ceased to respond with the shallow wells and began very slow linear recoveries as indicated on the respective hydrographs. These linear recoveries were analyzed for hydraulic conductivity by the Hvorslev method and the results are noted on the respective hydrographs in Appendix C.

The hydraulic conductivity results for MW-04D varied between 3×10^{-13} m/s to 5×10^{-14} m/s representing extremely low and essentially impermeable conditions. Similar results were obtained for MW-06D (4×10^{-12} m/s to 6×10^{-14} m/s). Both MW-04D and MW-06D showed a more rapid recovery response following the initial sampling which has been attributed to leakage across the bentonite seals in the boreholes. In the case of

MW-04D, the hydraulic conductivity of the more rapid 17 m groundwater level rise was analyzed and found to be 6 x 10^{-12} m/s which likely represents the leakage response. This leakage is only significant due to the much lower hydraulic conductivity of the enclosing shale.

Monitoring well MW-05 has not shown indications of vertical seal leakage and the groundwater level response has shown a long term, very slow linear recovery interrupted by sampling events (Figure C.5, Appendix C). The hydraulic conductivity of the deep shale analyzed from the recovery trends varied between 2 x 10^{-13} m/s to 5 x 10^{-14} m/s reflecting extremely low hydraulic conductivity conditions.

Monitoring wells MW-09, 10 and 11 were installed in mid 2007 prior to excavation of the quarry sinking cut. The deep shale wells were installed in single boreholes and sealed to surface with both bentonite and bentonite/Portland cement grout. Leakage has not been an issue and the recoveries have been very slow and linear (Figures C.9, C.10 and C.11 in Appendix C). The groundwater levels in these wells have not stabilized but water was initially added to each well to carry out falling head hydraulic conductivity tests. The recovery trends were downward and a similar situation was initially noted in MW-05D following the addition of water. The trends suggest that the stabilized groundwater levels in these wells could occur between approximately 145 masl and 150 m. The hydraulic conductivity results associated with the very slow recoveries in these wells varied between 2 x 10^{-13} m/s and 3 x10^{-14} m/s.

The ongoing monitoring of groundwater levels has indicated that the deep shale at and below elevations of approximately 130 masl is generally of very low hydraulic conductivity and essentially impermeable. This is also consistent with the salinity of the associated pore water which is greater than sea water based on the water quality monitoring to date. Several more years will be required before the deep monitoring wells record stabilized groundwater level conditions.

4.0 GROUNDWATER QUALITY

Groundwater quality sampling of MW-Series monitoring wells and off-site private wells was conducted between November 14 and 17, 2011. As per previous water quality sampling carried out in November 2002, May 2003, January 2007, October 2008, November/December 2009 and October 2010, all samples were analysed for a broad suite of general inorganic parameters and metals (including mercury and cyanide) as well as phenol. Groundwater quality results were compared to the Ontario Drinking Water Standards (ODWS) dated June 2006 and for the purposes of discharge to surface water courses, the results were also compared to the Provincial Water Quality Objectives (PWQO) dated July 1994. Water quality results are tabulated in Appendix D.

In order to ensure that samples taken were representative of groundwater conditions and to ensure the high quality of the analytical results the following quality assurance procedures were put in place for water quality sampling:

MW-Series Monitoring Wells

- Samples were collected using dedicated Waterra® tubing or dedicated bailers; and
- Prior to sampling, wells were either purged of three well volumes or purged until the well was dry to ensure that a representative groundwater sample was collected.

Private Wells

- Unfiltered samples were collected from taps located within or outside the residence prior to water treatment; and
- Taps were allowed to run for 2 to 3 minutes prior to sampling in order to clear the water lines of standing water and ensure that samples taken were representative of fresh groundwater.

The following procedures were followed for collection of all water samples:

- Water samples were collected in bottles with the appropriate preservative for the specific analysis. The bottles were provided, and analysis completed, by Maxxam Analytics Inc.
- A new pair of nitrile gloves was used when collecting water samples from each well. Care was taken to avoid physical contact with the mouth of the bottles.
- Water samples were stored in a cooler with ice packs and transported to the laboratory within 24 hours of sample collection.

For quality control purposes a duplicate sample was taken for every 10 groundwater samples collected and submitted to the laboratory. The analytical results from the original samples and the corresponding field duplicate sample are an indicator of the reliability of the laboratory analytical procedures and field sampling methodology. Field duplicates were collected from wells MW-03D, MW-08I and the Hendervale House well.

Residents were notified individually by letter of the results of the water quality sampling at their well. The Maxxam certificate of analysis and a table summarizing the results of historical and current monitoring were also provided to the resident. Any exceedences of the applicable criteria were indicated in the letter and the resident provided with a contact number for the Medical Officer of Health in the event that they had any concerns.

4.1 On-site Monitor Wells

Samples were taken from 10 piezometer nests (MW-01 to MW-10) located on the Tansley Quarry site and one piezometer nest (MW-11) located on the Hendervale property in order to provide baseline water quality relative to nearby private wells. Well MW-06D was not sampled as sufficient water was not available in the well after purging. Water quality results for the on-site wells are presented in Tables D.1 and D.2 of Appendix D. Maxxam laboratory certificates are provided in Appendix E.

Table 3 provides a summary of water quality exceedances of ODWS. In general, the analytical results were below the ODWS criteria with the exception of alkalinity, aluminum, arsenic, barium, boron, cadmium, chloride, chromium, copper, hardness, iron, lead, manganese, selenium, sodium, sulphate, sulphide, turbidity, uranium and zinc. The pH levels were within the ODWS specified range in all sampled wells except MW05-D.

- Aluminum (0.14 mg/L to 1.1 mg/L) exceeded the ODWS Operational Guidelines (OG) of 0.1 mg/L in MW-01I, MW-04O, MW-05S and MW-08D.
- Alkalinity (553 mg/L to 707 mg/L) exceeded the OG in wells MW-02O, MW-07O and MW-08O only.

- Hardness exceeded the OG of 80-100 mg/L in all samples with concentrations ranging between 270 mg/L to 35,000 mg/L.
- pH levels were below the OG range of 6.5-8.5 only in well MW-05D (pH of 6.43). According to the ODWS, a pH level lower than 6.5 may result in corrosion of specific types of pipe.

It should be noted that the ODWS OG are non health-related criteria that may negatively affect the treatment and distribution of water.

- Chloride, sulphate, sulphide, copper, sodium, manganese, iron, turbidity and zinc exceeded the ODWS Aesthetic Objectives (AO). AOs are non health-related criteria that reflect parameters that may impair the colour, smell or taste of water.
- Barium, cadmium, chromium, lead and selenium exceeded the Maximum Acceptable Concentration (MAC) in a number of the wells sampled. Parameters that exceed the MAC have known or suspected adverse health effects when present above a certain concentration. The concentration of barium exceeded the MAC of 1 mg/L in four wells installed in the overburden and one well installed in the deep shale with concentrations ranging from 1.1 mg/L to 32 mg/L. The MAC for cadmium (0.005 mg/L) was exceeded in six wells with concentrations ranging between 0.009 mg/L and 0.075 mg/L. Chromium (0.052 mg/L to 3.8 mg/L) exceeded the MAC of 0.05 mg/L at 14 of the 31 wells sampled whereas lead (0.011 mg/L to 1.8 mg/L) exceeded the MAC at 16 of the 31 wells sampled. Selenium exceeded the MAC of 0.01 mg/L at wells MW-09D (0.053 mg/L) and MW-10D (0.08 mg/L).
- Arsenic and uranium exceeded the ODWS Interim Maximum Acceptable Concentrations (IMAC) in several of the wells sampled. Arsenic exceeded the IMAC of 0.025 mg/L in 14 of the 31 wells sampled, with concentrations ranging between 0.03 mg/L to 0.78 mg/L. Arsenic is a carcinogen and must be removed by treatment where present in drinking water at levels above this concentration. Uranium (0.022 mg/L to 0.19 mg/L) exceeded the IMAC of 0.2 mg/L in 5 of the 31 wells sampled. Uranium may result in kidney damage when ingested in large quantities.
- Boron concentrations (5.1 mg/L to 6.6 mg/L) exceeded the ODWS IMAC of 5 mg/L in a number of the intermediate and deep shale wells and one overburden well namely MW-01D, MW-02D, MW-04I, MW-04D, MW-05D, MW-07O, MW-07D, MW-08I, MW-09D, MW-10D and MW-11D. Infants, the elderly and individuals with kidney diseases are the most susceptible to the toxic effects of boron compounds.

A summary of exceedances of PWQO are provided in Table 4. The 2011 analytical results were below the PWQO with the exception of aluminum, arsenic, boron, cadmium, cobalt, copper, iron, lead, molybdenum, nickel, phosphorous, silver, thallium, uranium, vanadium and zinc. The pH level measured in well MW05-D was below the PWQO specified pH range. It should be noted that, with the exception of aluminum and chloride which were filtered prior to analysis, all other samples were unfiltered for comparison to PWQO in Table 4. In all cases, the sample bottles contained visible sediment therefore the results may be biased high due to metals present in the sediment.

Overall, the analytical results indicate that the groundwater is very hard and mineralized with naturally occurring substances, including sodium, potassium, magnesium, calcium, chloride and sulphate. Groundwater is relatively fresh in the shallow overburden, with salinity increasing with depth as seen in the MW-04 well nest where chloride in the shallow overburden well (depth = 7.6 m) ranges between 4.0 and 12.2 mg/L, the intermediate well

(depth = 30 m) ranges between 984 and 1,800 mg/L and the deep well (depth = 44 m) ranges between 9,180 and 45,000 mg/L. High salinity is associated with the deep shale pore water, coupled with low hydraulic conductivity of the shale bedrock and limited groundwater recharge and circulation.

4.2 Private Wells

During November 2011, water samples were collected from seven private wells (Finucci, Sicard, Sugiyami, Hendervale House, Hendervale Cottage, Simms and Bekkers) and from a cistern that was constructed on the Hendervale farm property in 2011 to supply water to the Hendervale barns. Water quality samples were not obtained from the following wells:

- Featherstone and Wiggins wells as cisterns have been installed at those properties and the wells are no longer in use.
- Hendervale ABC Barn, XYZ Barn and Main Barn wells, as the barn well pump systems were presently disabled and water was pumped to the barns from a cistern. The cistern water was sampled.
- Eno/Myers well (previously called Des Roches) as the residents indicated that the well was not in use in 2011.
- Robinson well which is no longer sampled as it is sometimes filled with municipal water.
- Stevenson well located on the Hanson property which was not accessible for water quality sampling.

Samples were collected from taps located prior to private water treatment systems. All samples were analysed for a broad suite of general inorganic parameters, metals (including mercury and cyanide) and phenol.

Inorganic water quality results are presented in Tables D.3 to D.17 of Appendix D and Maxxam laboratory certificates provided in Appendix E. Water quality exceedances of ODWS for AOs, OGs, IMAC and MAC are summarized in Table 5. The data showed that:

- Groundwater is consistently hard, exceeding the ODWS OG of 80 – 100 mg/L in all cases in 2011. The exceedances of the OGs for hardness have been seen historically. The ODWS OGs are non health-related criteria that may negatively affect the treatment and distribution of water.
- Sulphate, chloride, iron, manganese, sodium and turbidity showed exceedances of the ODWS AOs. These exceedances of the AOs have also been observed in historical water quality analysis where available. AOs are non health-related criteria that reflect parameters that may impair the colour, smell or taste of water.
- Although groundwater from only the Sicard, Sugiyami and Bekkers wells exceeded the ODWS AO of 200 mg/L for sodium, all wells with the exception of the Simms well exceeded the 20 mg/L criterion for notification of the local Medical Officer.
- Boron exceeded the IMAC of 5 mg/L at the Sicard well (7.2 mg/L) and the Sugiyami well (5.7 mg/L). Boron has historically exceeded the ODWS criteria in water samples taken from the Sicard and Sugiyami wells. Elderly persons, infants and individuals with kidney diseases are most susceptible to the toxic effects of boron.

5.0 QUARRY PUMPING RATES

A summary of the 2011 records of sump discharge are presented in Table 6 and summarized on Figure 7. Pumping volumes were provided by Hanson and calculated based on the water level rise in the decant pond and the known geometry of the pond. Based on these volumes, in virtually all instances the daily discharge exceeded 50 m^3/day above which a Permit to Take Water (PTTW) is required. Over the 2011 period, the discharge rate ranged between 24 m^3/day to 808 m^3/day, with an average discharge rate of 419 m^3/day. On average, the sump pump was operated for five hours each day.

The total estimated volume of water pumped from the quarry in 2011 was 71,493 m^3 based on the reported daily pumping volumes. Based on past experience with shallow shale quarries in southern Ontario, the groundwater contribution to the total volume of water captured on-site is approximately 10% to 30%, therefore the majority of water pumped from the quarry was likely surface water derived from direct catchment precipitation.

A site visit was carried out on Friday, April 20, 2012 to examine the dewatering arrangement. The site was actively quarrying and shipping shale. The low portion of the quarry bottom was partially flooded with 0.25 m to 1.5 m of water. Dewatering was being carried out by a portable diesel pump set up at the quarry sump that discharged via piping to the decant pond from a 15 cm (6-inch) diameter pipe. This dewatering was actively lowering the water level in the quarry bottom as noted by the retreating beaches. The discharge rate was estimated with a 20 L pail and stop watch. The pail filled between 1 and 2 seconds indicating a pump discharge rate of approximately 10 to 20 L/s. Golder subsequently learned that a flow meter was installed on the discharge line near the pump in March 2012 and further understands that the meter has generally confirmed the previous estimates of pumping discharge.

It is understood that the pump is operated daily while site operations are in progress. This can vary for the full shift or until the sump is drained down depending upon the volume of water accumulated in the quarry bottom from groundwater and runoff. The source of groundwater inflow to the quarry was clearly evident as seepage from the granular alluvial deposits (6 to 8 m thick) that over lie low permeability glacial till where the contact forms a spring line. The points of inflow included the western and southern faces of the overburden cut. The combined overburden seepage inflow was visually estimated at approximately 1 to 3 L/s following a relatively dry period. Seepage from the exposed 10 m shale face was limited to areas of wetness below a few shale bedding seams. Based on our observations, the majority of the water that accumulates in the quarry sump is derived from surface runoff. This becomes clear when viewing the periods of low precipitation such as during summer months when only minor pumping is required (Table 6).

6.0 LOGGER INSTALLATION AND WELL REPAIRS

6.1 Logger installation

Loggers were not installed in any additional wells located in and around the Tansley Quarry in 2011. Loggers are currently installed in the following private wells:

Featherstone	Hendervale XYZ Barn
Finucci	Hendervale House
Hendervale Main Barn	Simms
Hendervale Cottage	Wiggins
Hendervale ABC Barn	Bekkers

The loggers are installed by suspension from direct read cables to allow for downloading data without the services of a licensed water well technician to open the wells. The wells were selected to provide an indication of the potential effects of quarrying at various distances (between 0.20 km and 1.0 km) and directions from the quarry boundary as well as at various depths in the overburden and shale (approximately 10 m to 27 m).

It should be noted that the Wettlaufer well was fitted with a logger in January 2008. However in June 2008 the logger and pipe were removed by the tenants in order to conduct works on the well. Hanson has no plans to re-install the datalogger in the Wettlaufer well at this time.

Of the six wells (Bekkers, Paccione, Proud, Simms, Wettlaufer and Wiggins) originally identified for logger installation under the 2007 Baseline Survey, two well owners (Paccione and Proud) have not consented to the logger installation due to issues regarding public disclosure of data obtained from the monitoring program. As of the end of 2011, permission was not received from the well owners for logger installation.

Loggers have been installed in all the overburden, straddle and selected intermediate and deep shale wells as outlined below. A logger was not installed in the overburden well in well nest MW-01 as the PVC pipe was pinched. In addition, a logger has not been installed in the intermediate well in the MW-02 well nest due to the small diameter (< 19 cm) of the PVC pipe. Wells MW-01I, MW-01D, and MW08-D will be fitted with dataloggers in 2012.

Well		Logger Installed	
		Yes	No
MW-01	Overburden		●
	Intermediate		●
	Deep		●
MW-02	Overburden	●	
	Intermediate		●
	Deep	●	
MW-03	Overburden	●	
	Deep	●	
MW-04	Overburden	●	
	Intermediate	●	
	Deep	●	
MW-05	Overburden	●	
	Straddle	●	
	Intermediate	●	
	Deep	●	

Well		Logger Installed	
		Yes	No
MW-06	Overburden	●	
	Straddle	●	
	Deep	●	
MW-07	Overburden	●	
	Deep	●	
MW-08	Overburden	●	
	Intermediate	●	
	Deep		●
MW-09	Overburden	●	
	Straddle	●	
	Deep	●	
MW-10	Overburden	●	
	Intermediate	●	
	Deep	●	
MW-11	Overburden	●	
	Straddle	●	
	Deep	●	

6.2 Well Repairs and Water Supply Systems Modification

The following table provides a list of additional works undertaken by Hanson since 2008 as part of Section 2.2 of the AMP. No additional well repairs or water supply systems modification has been undertaken by Hanson since 2010.

Date	Work Completed
May 2009	A 3,000 imperial gallon (approximately 14 m^3) capacity cistern was installed on the Robinson property to provide potable water for the residence.
December 2008	A cistern was installed at the Featherstone residence. Water from the cistern is used as the primary water supply for the residence. A cistern was also installed at the Wiggins residence.
August 2008	It was discovered that the logger in the Hendervale ABC well was removed from the well, the direct read cable cut and the riser pipe and pitless adapter broken. Work on the well involved conducting a downhole camera investigation, removal of the broken riser pipe from the well, installation of new riser pipe and pitless adapter, and replacement of logger and direct read cable
June 2008	Hanson's contractor modified the existing cistern installed at the Finucci property by attaching a stainless steel riser to the cistern thereby raising the access port above ground level. This work improved the sanitary issues of having the port at ground level and the cistern accessible to surface runoff.

7.0 IMPACT ASSESSMENT

The following sections provide an assessment of the impacts of the water takings at the Tansley Quarry on the groundwater, surface water and natural environment. Assessment of the impacts of the water taking was undertaken through a review of groundwater level data from a number of on-site monitoring wells and off-site private wells available prior to (July 2002 to August 2007) and after (September 2007 to December 2011) initiation of quarrying activities.

7.1 Radius of Influence

The current configuration of monitoring wells (MW-Series and TW-Series wells) and private wells provides coverage to observe the effects of quarry dewatering on groundwater levels in the vicinity of the Tansley Quarry. Prior to mid-2009, Hanson discharged sump water to the woodlot located northwest of the sump. However, as of June 2009, Hanson discharged sump water to the lined decant pond at ground surface. Two consecutive years of data (i.e., 2010 and 2011) collected subsequent to the commissioning of the decant pond and therefore unaffected by artificial recharge were used to determine the radius of influence of quarry dewatering.

A review of the 2010 and 2011 groundwater levels suggest that the potential influence of quarry dewatering may extend to approximately 500 m from the 2011 quarry face within the upper (intermediate) shale. The following illustrates the effects of quarry dewatering at various distances from the quarry face:

- **Less than 100 m from the quarry face**

Wells MW-05, MW-06 and MW-09 are located less than 100 m from the existing quarry face. Well MW-06S located 30 m from the quarry face and installed 4 m into the shale showed a decline in water levels of approximately 3 m. Well MW-05I located 50 m from the quarry face (but closer to the quarry sump) and installed 15 m into the shale showed a decline in water levels of approximately 12 m apparently as a result of quarry dewatering activities. Well MW-09 located 80 m from the quarry face showed a water level decline of approximately 6 m in the straddle well installed approximately 3 m into top of rock. No discernible influence of quarry dewatering was observed in the deep shale wells in these individual well nests where the levels are still recovering to static conditions following sampling events. The overburden wells at MW-05 and MW-09 indicated no significant influence to quarry dewatering. The overburden well at MW-06 showed an overburden water level decline of approximately 2 m.

- **150 m from the quarry face**

Groundwater levels in the overburden well at MW-10 showed a decline of approximately 3 m but have recovered to within pre-sinking cut levels. Intermediate well MW-10I located 150 m from the quarry face and installed 8 m into the shale bedrock showed an initial decline of approximately 2.5 m in response to quarry dewatering but recovered to within pre-sinking cut levels. The deep shale well at this location has not yet recovered to static conditions.

- **300 m from the quarry face**

Wells MW-04, MW-08 and MW-11 are located approximately 300 m from the quarry face. Well MW-04I installed 20 m into the shale bedrock and MW-04D installed 35 m into bedrock showed an average 4 m decline in

groundwater levels due to quarry dewatering. Bedrock wells in well nest MW-08 showed an average decline of less than 1 m in response to quarry dewatering activities. However bedrock wells in well nest MW-11 showed no discernible influence of quarry dewatering. Although groundwater levels in the overburden wells installed in well nests MW-04, MW-08 and MW-11 were lowered by approximately 1 m following the start of shale mining, groundwater levels have rebounded to within historical levels and show seasonal fluctuations consistent with historical water level data.

- **500 m from the quarry face**

The overburden well in the MW-07 well nest initially showed a decline of approximately 2 m during the sinking cut period; however the groundwater levels have recovered to pre-sinking cut levels and continue to show seasonal fluctuations. The initial observed decline may have been in response to both the low precipitation observed in 2007 and the initiation of the sinking cut.

Figure 8 shows the interpolated drawdown in the upper shale based on observed drawdown at the monitoring wells. Figure 10 shows the interpreted meters of drawdown at the monitoring wells and the inferred area of pit dewatering influence. Based on the drawdown contours, the radius of influence of quarry dewatering extends approximately 500 m from the quarry face (Figure 9). The range of drawdown and the radius of influence are consistent with that predicted by the revised numerical model for the site (Golder, 2008). In general the greatest drawdown (approximately 12 m) due to the sinking cut stage dewatering is observed in wells located within 100 m of the quarry face. The magnitude of groundwater drawdown reduces with increasing distance from the sump. However the effects of dewatering are not seen in all wells located at similar distances from the sump and installed at similar depths in the shale bedrock. These observations are consistent with anisotropy associated with the variable extent of alluvial deposits overlying the till and possibly the fractured nature of the shale bedrock.

7.2 Well Interference Response

On March 21, 2007 Hanson entered into an Agreement with a number of private well owners comprising the TNA. Hanson also entered into an AMP Agreement with the Region of Halton on May 8, 2007 (Appendix A). Both agreements provide that Hanson shall proactively ensure a continuous supply of potable water to property owners whose wells may be adversely affected by the quarry operation. In addition to assuring the supply of water to property owners whose wells are adversely affected by the quarry operations the AMP also requires Hanson to construct and operate a PCWS which will service all properties identified within the Potential Zone of Influence as outlined in the AMP. PCWS construction began in December 2011 and is scheduled for completion in December 2012. By following the requirements of the AMP and the PCWS agreement, Hanson will ensure that all property owners within the Zone of Influence of the quarry are provided with a continuous supply of potable water. To date, Hanson has provided cisterns to the Featherstone, Robinson and Wiggins residences. The existing cistern at the Finucci residence was also upgraded to improve sanitary issues caused by having the access port at ground level and the cistern accessible to surface runoff. There have been no long term impacts on private wells in the area that have affected water supplies.

7.3 Impacts on Surface Water

On-site water courses are intermittent features and not groundwater fed hence impacts to surface water features are limited to the effects of the discharged water on the downstream environment. Discharge from the quarry sump is regulated by the C of A for Industrial Sewage Works No. 4408-7AUL75 (Appendix A) issued on February 4, 2008.

The C of A also requires that prior to discharging from the decant pond, the pond contents must have been allowed to settle for a minimum of 24 hours and the contents must be sampled for water quality.

The C of A requirements ensure that the water discharged from the decant pond will not contain suspended material or oils and grease that may negatively affect the downstream water features. In addition, sediment traps have been deployed along the site boundary to reduce the suspended sediment load in surface runoff leaving the site.

7.4 Impacts on Natural Environment

The development of the Tansley Quarry has resulted in some localized drawdown of the groundwater levels in the vicinity of the quarry. The dewatering of the quarry from periodic pumping of the accumulated groundwater and run-off in the quarry sump results in the periodic discharge of water from the site settling ponds through the intermittent on-site drainage course.

Based upon the natural features that are present on the Tansley Quarry site and their characteristics, no significant negative impacts were noted from the Tansley Quarry water takings and discharges. No on-site plant community is dependent upon the groundwater resource and no off-site vegetation within the zone of groundwater drawdown is dependent upon groundwater. Considering no individual species of plants on or around the site are dependent upon groundwater resources, no negative impact upon the locally resident plants or wildlife has occurred.

The roadside wetlands and the on-site drainage features are adapted to cycles of periodic inundation and drying. All of the plants present in these areas are tolerant of seasonal drying and no negative impacts from the periodic discharge of quarry water are expected. An on-site settling pond and sediment traps and filter cloth-covered dikes are present at the upstream ends of the culverts discharging from the site. These should continue to be a satisfactory means of removing entrained sediments from the drainage features that carry water off the site.

8.0 SUMMARY AND CONCLUSIONS

Based on the above information the following conclusions can be made:

- 2011 groundwater levels in the shallow monitoring wells ranged from 159.27 masl to 166.34 masl. The groundwater levels in wells straddling the overburden/shale contact ranged from 152.60 masl to 165.75 masl. The groundwater levels in the intermediate monitoring wells installed in the upper shale horizons ranged from 147.35 masl to 164.60 masl. The groundwater levels in the deep shale monitoring wells ranged from 119.17 masl to 161.09 masl.

- Groundwater levels in intermediate wells MW04I and MW-05I, straddle wells MW-06S and MW-09S, and deep well MW04I showed the strongest response to dewatering of the excavation ranging from approximately 3 m in well MW-06S to approximately 12 m at well MW-05I.
- The effects of pumping are not seen in all wells located at similar distances from the sump and installed at similar depths in the shale bedrock, consistent with anisotropy associated with the fractured nature of the shale bedrock.
- The range of groundwater level fluctuations seen in private wells were within the range of historical groundwater level responses although the static groundwater levels at the Finucci well remain slightly lower than that observed in 2007.
- A preliminary review of the groundwater levels suggest that the potential influence of quarry dewatering may extend approximately 500 m from the sinking cut.
- The groundwater quality results indicate that the groundwater in and around the quarry is very hard and mineralized with naturally occurring substances, such as sodium, potassium, magnesium, calcium, chloride and sulphate. Groundwater is relatively fresh in the shallow overburden, with salinity increasing with depth.
- The groundwater quality parameters in the monitoring wells were below the ODWS criteria with the exception of aluminum, alkalinity, hardness, chloride, sulphate, sulphide, copper, sodium, manganese, iron, turbidity, barium, cadmium, chromium, lead, selenium, arsenic, uranium and boron. These exceedances are considered to be naturally occurring in groundwater in the shale bedrock.
- The groundwater quality parameters in the monitoring wells were below PWQO criteria with the exception of aluminum, arsenic, boron, cadmium, cobalt, copper, iron, lead, molybdenum, nickel, silver, thallium, total phosphorus, uranium, vanadium and zinc. These exceedances are considered to be naturally occurring in groundwater in the shale bedrock.
- Groundwater quality in private wells showed non health-related ODWS exceedances of hardness, sulphate, chloride, iron, manganese, sodium and turbidity. In all instances, sodium exceeded the 20 mg/L limit above which the local Medical Officer should be notified. Boron exceeded the IMAC at the Sicard and Sugiyami wells.
- During 2011, the daily sump discharge consistently exceeded the maximum daily discharge of 50,000 L/day based on the limit above which a PTTW is required.

9.0 RECOMMENDATIONS

- The installed pump and meter should be calibrated on an annual basis;
- Monitoring of groundwater levels should be continued in 2012;
- Water quality sampling should be conducted annually at MW-Series well nests and private wells; and
- In 2012, Hanson should apply for a PTTW for its discharge from the sump.

Report Signature Page

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TABLES

Table 1
Private Well Details
Tansley Quarry - Hanson Brick Ltd.

Property	Current Monitoring	MOE Well Record No.	Water Use	Measured Well Depth (m)	Casing Diameter (cm)	Formation Screened
Bekkers	WL, WQ	2810528	Domestic	22.7	91	Shale
Featherstone	WL	2804215	Domestic	24.5	15	Shale
Finucci	WL, WQ	2807948	Domestic	16.5	15	Shale
Hendervale Main Barn	WL, WQ	2808781	Domestic	12.8	15	Shale
Hendervale ABC Barn	WL, WQ	2808540	Domestic	>29	15	Shale
Hendervale XYZ Barn	WL, WQ	2808537	Domestic	21.4	15	Shale
Hendervale House	WL, WQ	2802793	Domestic	19.4	15	Shale
Hendervale Cottage	WL, WQ		Domestic	8.9	15	Overburden
Sicard	WQ	2803908	Domestic	≈18	15	Shale
Simms	WL, WQ	2804679	Domestic	27.4	76	Shale
Sugiyama	WQ	2807647	Domestic	15	15	Shale
Wettlaufer		2807684	Domestic	20.7	15	Shale
Wiggins	WL	2803806	Domestic	18.2	15	Shale

Notes:
1) Water well records were assigned based on well location, construction details, owner's name and address where available, etc.
2) WL indicates well currently monitored for water levels.
3) WQ indicates well currently monitored for water quality.
4) MOE well records assigned to Hendervale property could not be assigned to each well on property.
5) Owner indicated that Hendervale House well was deepened from original depth of approximately 8 m to 26 m.
6) MOE well records assigned to Stevenson property (currently owned by Hanson Brick) could not be correlated with well currently identified on property.
7) Sicard and Sugiyama well depths are approximate (provided by owner).

Table 2
Groundwater Level Elevations in MW-Series and TW-Series Wells
September 30, 2002 to December 21, 2011
Tansley Quarry - Hanson Brick Ltd

Hole	Piezometer	Location		Ground Elev (m)	Stick-up (m)	Top of pipe	30-Sep-02	7-Oct-02	10-Oct-02	25-Oct-02	31-Oct-02	17-Dec-02	7-Jan-03	14-Feb-03	20-Mar-03	21-Apr-03	5-May-03	16-Jun-03	14-Jul-03	31-Oct-03
		Easting (m)	Northing (m)			elevation (masl)														
MW-01	Overburden	596395	4809597	164.78	0.76	165.54								163.16	163.60	164.29	164.09	164.40	163.52	163.80
	Intermediate			164.78	0.80	165.58		162.56	162.56	162.28	162.36	162.51	163.10	163.18	163.61	164.27	164.23	164.39	163.49	163.78
	Deep			164.78	0.75	165.53		160.39	160.30	160.14	160.06	159.41	159.43	159.74	159.62	160.19	160.26	160.41	160.23	159.79
MW-02	Overburden	596248	4809618	166.58	0.78	167.36		165.64	165.58	165.49	165.64	165.59	165.96	166.66	166.16	166.35	166.31	166.23	165.65	165.93
	Intermediate			166.58	0.76	167.34		160.36	160.31	160.09	160.07	159.79	159.90	162.02	160.19	160.88	160.88	161.29	161.06	160.57
	Deep			166.58	0.74	167.32		152.93	153.15	152.79	152.77	152.50	152.60	152.61	152.69	152.73	152.77	152.70	152.72	152.89
MW-03	Overburden	596108	4809606	169.31	0.81	170.12	162.22	162.12	162.32	162.08	161.87	162.19	162.13	161.91	161.74	162.14	162.01	162.41	162.61	162.16
	Deep			169.31	0.75	170.06	162.04	162.04	162.06	162.00	161.96	162.04	161.92	161.82	161.86	162.15	162.28	162.36	162.47	161.61
MW-04	Overburden	595911	4809070	167.85	0.97	168.82	163.79	163.94	163.90	163.69	163.67	163.48	163.49	163.48	163.69	164.81	165.04	165.41	165.21	164.71
	Intermediate			167.85	0.94	168.79	161.53	161.51	161.49	161.36	161.33	161.23	161.21	161.14	161.15	161.80	162.03	162.37	162.00	161.71
	Deep			167.85	0.87	168.72	162.15	163.82	163.85	163.63	163.64	163.41	163.41	164.38	163.60	164.65	164.93	161.24	163.06	162.75
MW-05	Overburden	596135	4808768	166.88	0.88	167.76	160.40	160.33	160.31	160.16	160.09	159.92	159.87	159.76	159.72	160.40	160.73	162.16	161.70	160.45
	Intermediate			166.88	0.84	167.72	158.67	158.68	158.65	158.55	158.64	158.80	158.87	158.78	158.81	159.61	159.75	160.22	159.40	159.25
	Deep			166.88	0.81	167.69	130.45	130.62	130.63	130.84	130.93	131.28	131.50	131.71	132.00	132.16	132.20	132.32	132.44	132.75
	Straddle	596134	4808769	167.03	0.95	167.98														
MW-06	Overburden	596355	4808896	165.97	0.98	166.95	161.76	161.71	161.70	161.62	161.58	161.37	161.30	161.20	161.11	162.31	162.82	163.58	162.92	162.11
	Deep			165.97	0.90	166.87	161.25	161.17	161.15	161.02	160.93	160.94	160.97	161.02	160.87	162.36	162.85	163.67	162.61	161.58
	Straddle	596351	4808892	166.05	0.84	166.89														
MW-07	Overburden	596099	4809348	166.89	0.85	167.74	163.46	163.38	163.34	163.14	163.12	162.70	162.64	162.71	162.85	164.07	164.24	164.79	164.43	163.79
	Deep			166.89	0.87	167.76	152.00	152.05	152.00	151.97	152.04	151.96	152.10	151.99	152.26	152.28	152.27	152.29	152.38	152.53
MW-08	Overburden	596295	4809190	162.79	0.87	163.66	160.57	160.36	160.25	160.05	160.00	159.76	159.89	160.19	160.49	161.09	161.07	161.39	161.06	160.39
	Intermediate			162.79	0.84	163.63	160.46	160.26	160.19	159.97	159.95	159.66	159.75	159.91	160.05	160.78	160.80	161.13	160.88	160.33
	Deep			162.79	0.82	163.61	160.51	160.33	160.26	160.26	160.04	159.77	159.94	160.24	160.47	161.09	161.06	161.39	161.07	160.42
MW-09	Overburden	596166	4809014	165.53	0.76	166.29														
	Straddle	596166	4809014		0.82	166.35														
	Deep	596164	4809012		1.06	166.59														
MW-10	Overburden	596045	4809002	166.77	0.88	167.65														
	Intermediate	596045	4809002		0.94	167.71														
	Deep	596046	4809003		0.83	167.60														
MW-11	Overburden	595869	4808946	168.31	1.01	169.32														
	Straddle	595870	4808946		1.04	169.35														
	Deep	595871	4808948		1.12	169.42														
TW-1		595581	4808946	167.64	0.88	168.52														
TW-2		595621	4810361	176.33	0.82	177.15														
TW-3		596411	4810003	166.85	0.70	167.55														

Notes:
1. Shallow wells have screened intervals no deeper than 30' (9 m) below ground, completed in overburden. The overburden ranged from 7 m to 9 m thick in the boreholes on-site.
2. Intermediate wells have screens within the upper/shallow bedrock, to depths no greater than 100' (30 m) below ground.
3. Deep wells have screen intervals at depths between 100' and 150' below ground, (30 m to 50 m).

Table 2
Groundwater Level Elevations in MW-Series and TW-Series Wells
September 30, 2002 to December 21, 2011
Tansley Quarry - Hanson Brick Ltd

Hole	Piezometer	Location		Ground Elev (m)	Stick-up (m)	Top of pipe	12-Jan-04	5-Apr-04	15-Jul-04	15-Oct-04	28-Jan-05	3-May-05	31-Aug-05	24-Mar-06	16-Jun-06	10-Aug-06	9-Jan-07	30-Apr-07	27-Jun-07	7-Aug-07
		Easting (m)	Northing (m)			elevation (masl)														
MW-01	Overburden	596395	4809597	164.78	0.76	165.54	164.31	164.57	163.82	163.02	164.10	164.48	165.54	164.45	163.84	163.94	165.54	164.45	163.40	
	Intermediate			164.78	0.80	165.58	164.25	164.55	163.80	162.99	164.11	164.47	162.46	164.45	163.86	163.93	164.64	164.45	163.38	
	Deep			164.78	0.75	165.53	160.59	160.80	160.60	160.22	160.62	160.74	159.76	160.70	160.61	160.79	160.90	161.27	160.75	
MW-02	Overburden	596248	4809618	166.58	0.78	167.36	166.10	166.29	165.88	165.27	166.30	166.21	165.16	166.15	165.69	165.93	166.40	166.25	165.51	
	Intermediate			166.58	0.76	167.34	161.61	161.87	161.62	161.12	161.60	161.78	160.50	161.71	161.51	161.93	162.63	162.55	162.25	
	Deep			166.58	0.74	167.32	153.02	153.09	153.15	153.01	152.99	153.06	152.93	152.95	153.04	153.01	153.26	153.21	153.12	
MW-03	Overburden	596108	4809606	169.31	0.81	170.12	163.40	163.68	162.65	162.76	162.64	163.17	162.05	163.06	162.08	163.68	164.37	164.01	162.36	
	Deep			169.31	0.75	170.06	163.28	163.71	163.02	162.63	162.99	163.35	162.14	163.16	162.64	163.33	164.17	164.15	163.08	
MW-04	Overburden	595911	4809070	167.85	0.97	168.82	166.10	166.37	165.87	164.71	165.72	166.39	164.56	166.14	165.80	165.95	166.77	166.45	165.10	
	Intermediate			167.85	0.94	168.79	162.72	163.17	162.69	162.12	162.80	163.35	161.31	163.01	162.75	162.52	163.54	163.61	162.77	
	Deep			167.85	0.87	168.72	162.81	163.36	163.10	162.01	163.42	163.97	161.98	163.20	162.95	162.81	164.15	163.69	162.81	
MW-05	Overburden	596135	4808768	166.88	0.88	167.76	161.50	163.66	161.97	160.66	161.34	163.96	160.75	162.94	162.16	161.47	163.36	163.66	161.85	160.98
	Intermediate			166.88	0.84	167.72	160.24	160.78	160.15	159.45	161.73	161.05	158.41	160.45	160.19	159.79	160.90	161.07	160.23	160.17
	Deep			166.88	0.81	167.69	132.94	133.10	133.16	133.11	133.47	133.71	133.94	134.25		134.49	134.75	134.89	134.99	135.69
	Straddle	596134	4808769	167.03	0.95	167.98														160.66
MW-06	Overburden	596355	4808896	165.97	0.98	166.95	163.66	164.33	163.76	163.25	163.13	164.29	163.27	164.32	163.80	163.63	164.58	164.34	163.97	163.79
	Deep			165.97	0.90	166.87	163.71	164.32	163.91	162.85	163.43	164.34	162.07	164.19	163.25	163.34	164.46	164.48	163.23	162.07
	Straddle	596351	4808892	166.05	0.84	166.89														161.91
MW-07	Overburden	596099	4809348	166.89	0.85	167.74	165.12	165.32	165.54	164.32	164.95	165.21	163.91	165.08	164.75	164.96	165.63	165.38	164.39	
	Deep			166.89	0.87	167.76	152.70	152.72	152.86	152.57	152.47	152.58	152.60	152.56	152.61	152.67	152.93	152.91	152.83	
MW-08	Overburden	596295	4809190	162.79	0.87	163.66	161.62	161.85	161.51	160.99	161.73	161.90	160.56	162.04	161.70	161.83	162.55	162.45	161.59	
	Intermediate			162.79	0.84	163.63	161.31	161.58	161.26	160.83	161.29	161.46	160.21	161.43	161.22	161.56	162.31	162.06	161.42	
	Deep			162.79	0.82	163.61	161.64	161.86	161.51	161.03	161.68	161.91	160.58	162.06	161.72	161.86	162.57	162.44	161.61	
MW-09	Overburden	596166	4809014	165.53	0.76	166.29														163.42
	Straddle	596166	4809014		0.82	166.35														161.86
	Deep	596164	4809012		1.06	166.59														125.54
MW-10	Overburden	596045	4809002	166.77	0.88	167.65														163.88
	Intermediate	596045	4809002		0.94	167.71														162.36
	Deep	596046	4809003		0.83	167.60														125.09
MW-11	Overburden	595869	4808946	168.31	1.01	169.32														163.42
	Straddle	595870	4808946		1.04	169.35														163.58
	Deep	595871	4808948		1.12	169.42														126.30
TW-1		595581	4808946	167.64	0.88	168.52														
TW-2		595621	4810361	176.33	0.82	177.15														
TW-3		596411	4810003	166.85	0.70	167.55														

Notes:
1. Shallow wells have screened intervals no deeper than 30' (9 m) below ground, completed in overburden. The overburden ranged from 7 m to 9 m thick in the boreholes on-site.
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3. Deep wells have screen intervals at depths between 100' and 150' below ground, (30 m to 50 m).

Table 2
Groundwater Level Elevations in MW-Series and TW-Series Wells
September 30, 2002 to December 21, 2011
Tansley Quarry - Hanson Brick Ltd

Hole	Piezometer	Location		Ground Elev (m)	Stick-up (m)	Top of pipe	9-Aug-07	30-Aug-07	6-Dec-07	7-Dec-07	16-Jan-08	23-Jan-08	24-Jan-08	25-Jan-08	31-Jan-08	26-Feb-08	28-Mar-08	24-Apr-08	26-May-08	26-Jun-08
		Easting (m)	Northing (m)			elevation (masl)							AFTER TEST							
MW-01	Overburden	596395	4809597	164.78	0.76	165.54	165.54	165.54	165.54		163.73				163.48	164.40	164.46	164.10	164.00	163.99
	Intermediate			164.78	0.80	165.58	162.63	162.34	161.14		163.75				163.50	164.42	164.45	164.10	164.01	164.02
	Deep			164.78	0.75	165.53	160.32	160.04	159.53		158.35				158.19	158.27	158.32	158.43	158.42	158.27
MW-02	Overburden	596248	4809618	166.58	0.78	167.36	165.11	164.94	165.33		166.08				165.85	166.19	166.38	166.12	166.06	165.98
	Intermediate			166.58	0.76	167.34	161.95	161.77	160.93		160.56				160.42	160.25	160.15	160.13	160.12	160.03
	Deep			166.58	0.74	167.32	153.09	153.06	153.21		153.13				153.06	153.05	152.96	152.88	152.90	152.81
MW-03	Overburden	596108	4809606	169.31	0.81	170.12	162.49	161.92	161.10		161.20				161.17	161.86	161.81	162.05	160.92	160.60
	Deep			169.31	0.75	170.06	162.29	162.00	160.02		158.91				158.88	159.30	159.49	159.81	159.82	159.46
MW-04	Overburden	595911	4809070	167.85	0.97	168.82	163.79	163.60	162.48		162.97				163.19	163.88	164.48	164.65	164.64	164.50
	Intermediate			167.85	0.94	168.79	161.28	160.95	157.84		156.27				156.10	156.52	156.84	157.17	157.23	156.91
	Deep			167.85	0.87	168.72	161.37	161.02	157.95		156.35	156.39		156.25	156.16	156.81	156.96	157.27	157.29	157.04
MW-05	Overburden	596135	4808768	166.88	0.88	167.76	160.92	160.63		159.88	159.70		159.72		159.69	159.82	160.36	161.93	161.32	160.58
	Intermediate			166.88	0.84	167.72	159.91	159.69		153.55	150.23		149.45		149.40	150.21	149.40	149.60	149.88	149.16
	Deep			166.88	0.81	167.69	135.06	135.13		146.46	146.38		146.32		146.31	146.34	146.31	146.29	146.28	146.27
	Straddle	596134	4808769	167.03	0.95	167.98	160.62	160.35		158.56	157.58		157.44	157.46	157.36	157.72	158.23	159.06	158.58	157.80
MW-06	Overburden	596355	4808896	165.97	0.98	166.95	163.78	163.68	163.07		162.77		162.69	161.26	161.24	161.17	161.09	161.03	160.95	160.90
	Deep			165.97	0.90	166.87	162.05	161.70	159.37		158.96		159.20	152.91	152.63	151.60	150.65	149.95	149.17	148.65
	Straddle	596351	4808892	166.05	0.84	166.89	161.84	161.46	158.77		159.44		159.55	159.56	159.56	159.52	159.54	159.97	159.86	159.54
MW-07	Overburden	596099	4809348	166.89	0.85	167.74	163.84	163.49	161.62		161.28	161.27		161.50	161.45	162.09	162.92	163.33	163.42	163.13
	Deep			166.89	0.87	167.76	152.81	152.78		152.84	152.77	152.81		152.44	152.38	152.60	152.45	152.28	152.35	152.29
MW-08	Overburden	596295	4809190	162.79	0.87	163.66	160.96	160.60	159.56		159.21		159.15	160.11	159.01	159.00	159.23	159.36	159.33	159.26
	Intermediate			162.79	0.84	163.63	160.91	160.55	160.12		158.69	158.67		158.57	158.51	158.73	158.83	158.96	158.95	158.81
	Deep			162.79	0.82	163.61	160.99	160.63	159.63		159.17	159.20		157.65	158.97	159.02	159.21	159.34	159.30	159.22
MW-09	Overburden	596166	4809014	165.53	0.76	166.29	163.31	162.70	160.50		160.04	159.97		159.94	159.81	159.96	161.40	162.54	162.80	162.27
	Straddle	596166	4809014		0.82	166.35	161.83	161.43	156.77		154.32	154.38	154.35	154.44	154.31	154.76	154.91	155.01	155.02	154.90
	Deep	596164	4809012		1.06	166.59	125.38	125.44	125.53		125.54	125.51		151.51	151.33	151.18	151.00	150.93	150.85	150.78
MW-10	Overburden	596045	4809002	166.77	0.88	167.65	163.79	163.16	160.89		160.22	160.17		160.42	160.20	160.68	162.86	164.21	164.33	163.62
	Intermediate	596045	4809002		0.94	167.71	162.31	161.91	159.06		157.81	157.85		157.55	157.55	157.99	159.15	160.02	160.31	159.82
	Deep	596046	4809003		0.83	167.60	124.88	125.03	125.25		125.30	125.30		158.38	156.90	155.94	155.43	155.10	154.82	154.59
MW-11	Overburden	595869	4808946	168.31	1.01	169.32	163.37	163.14		162.41	163.03		163.44	163.47	163.37	164.25	164.84	164.99	164.66	164.37
	Straddle	595870	4808946		1.04	169.35	163.58	163.61		162.48	163.20		163.42	163.43	163.28	164.05	164.63	164.81	164.46	164.45
	Deep	595871	4808948		1.12	169.42	125.19	125.32		125.51	125.58		125.55	153.89	153.67	151.94	151.75	151.68	151.64	151.58
TW-1		595581	4808946	167.64	0.88	168.52					162.58					163.77	164.12	164.26	163.77	163.26
TW-2		595621	4810361	176.33	0.82	177.15					Dry					Dry	Dry	Dry	Dry	Dry
TW-3		596411	4810003	166.85	0.70	167.55					155.11					155.95	156.09	155.14	155.09	155.28

Notes:
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September 30, 2002 to December 21, 2011
Tansley Quarry - Hanson Brick Ltd

Hole	Piezometer	Location		Ground Elev (m)	Stick-up (m)	Top of pipe	28-Jul-08	27-Aug-08	29-Sep-08	7-Oct-08	28-Oct-08	21-Nov-08	23-Dec-08	21-Jan-09	27-Apr-09	24-Jul-09	26-Oct-09	30-Nov-09	26-Jan-10	5-Mar-10
		Easting (m)	Northing (m)			elevation (masl)														
MW-01	Overburden	596395	4809597	164.78	0.76	165.54	164.25	164.11	163.99	164.17	164.33	164.38	164.44	164.46	164.59	163.95	164.29	164.36	164.46	
	Intermediate			164.78	0.80	165.58	164.24	164.11	164.00	164.18	164.27	164.39	164.45	164.46	164.58	163.95	164.29	164.35	164.45	
	Deep			164.78	0.75	165.53	158.39	158.63	158.75	158.77	158.81	158.86	159.19	159.27	159.49	158.84	158.91	159.02	159.22	
MW-02	Overburden	596248	4809618	166.58	0.78	167.36	166.22	166.15	166.06	166.09	165.96	166.15	166.43	166.13	166.38	165.77	165.87	165.95	166.26	
	Intermediate			166.58	0.76	167.34	159.96	159.96	160.07	160.11	160.63	160.79	161.15	161.35	161.70	160.82	160.93	161.07	161.03	
	Deep			166.58	0.74	167.32	152.81	152.74	152.73	152.73	152.52	152.55	152.59	152.66	152.69	152.75	152.62	152.64	152.64	
MW-03	Overburden	596108	4809606	169.31	0.81	170.12	159.88	161.12	162.90	163.00	162.75	162.90	163.35	163.82	164.78	163.95	163.86	164.81	164.01	
	Deep			169.31	0.75	170.06	159.41	159.74	160.44	160.50	160.50	160.56	160.98	161.36	161.66	160.52	160.27	160.24	160.37	
MW-04	Overburden	595911	4809070	167.85	0.97	168.82	164.55	164.97	164.97	164.71	164.68	164.63	165.16	165.37	165.96	164.72	164.60	164.78	165.20	164.86
	Intermediate			167.85	0.94	168.79	157.07	157.54	157.89	157.92	157.95	157.96	158.43	158.88	159.02	157.56	157.24	157.17	157.20	157.00
	Deep			167.85	0.87	168.72	157.14	157.70	158.10	157.95	132.85	133.12	133.43	133.80	144.65	151.33	151.83	151.94	125.84	126.01
MW-05	Overburden	596135	4808768	166.88	0.88	167.76	160.17	160.61	160.42	160.34	159.91	159.89	160.09	160.78	162.47	160.57	159.82	159.63	159.77	159.62
	Intermediate			166.88	0.84	167.72	149.64	150.00	150.29	150.16	150.21	149.99	150.39	150.99	150.39	147.96	147.89	147.80	147.85	147.73
	Deep			166.88	0.81	167.69	146.23	146.20	146.19	146.17	133.08	133.13	133.18	133.33	133.49	133.70	133.81	133.88	127.03	127.06
	Straddle	596134	4808769	167.03	0.95	167.98	157.52	158.03	157.92	157.86	157.75	157.67	158.17	158.93	160.31	158.69	158.25	158.13	158.08	157.82
MW-06	Overburden	596355	4808896	165.97	0.98	166.95	160.82	160.75	160.71	160.69	159.56	159.46	160.02	160.08	160.52	159.64	159.37	159.36	159.76	
	Deep			165.97	0.90	166.87	148.28	148.17	148.22	148.24	152.06	152.94	152.05	151.56	160.60	159.21	159.34	159.19	138.83	
	Straddle	596351	4808892	166.05	0.84	166.89	159.52	160.00	159.81	159.76	159.65	159.59	160.12	160.18	158.22	159.74	159.46	159.33	159.83	
MW-07	Overburden	596099	4809348	166.89	0.85	167.74	163.11	163.88	164.01	163.97	164.14	164.13	164.55	164.59	164.84	163.87	163.92	164.03	164.26	
	Deep			166.89	0.87	167.76	152.27	152.18	152.19	152.08	151.90	151.91	151.89	152.06	152.03	152.06	151.95	152.05	152.06	
MW-08	Overburden	596295	4809190	162.79	0.87	163.66	159.39	159.65	159.74	159.77	159.85	159.94	160.28	160.40	160.72		160.13	160.22	161.15	
	Intermediate			162.79	0.84	163.63	159.01	159.28	159.41	159.42	159.45	159.50	159.77	159.94	160.19		159.56	159.71	159.85	
	Deep			162.79	0.82	163.61	159.38	159.63	159.74	159.77	159.83	159.94	160.28	160.39	160.71		160.06	160.15	161.10	
MW-09	Overburden	596166	4809014	165.53	0.76	166.29	162.26	163.54	162.88	162.63	162.40	162.16	163.89	164.14	164.64	162.43	154.69	161.18	161.95	
	Straddle	596166	4809014		0.82	166.35	155.19	155.63	155.82	155.81	155.89	155.77	156.10	156.40	156.30	155.08	161.29	154.77	154.92	
	Deep	596164	4809012		1.06	166.59	150.72	150.63	150.57	150.53	127.40	127.44	127.45	127.61	127.86	128.19	128.48	128.65	126.24	
MW-10	Overburden	596045	4809002	166.77	0.88	167.65	163.62	164.65	164.15	163.90	163.56	163.34	164.93	165.45	166.25	163.53	162.53	162.62	163.34	
	Intermediate	596045	4809002		0.94	167.71	159.97	161.01	161.07	161.02	160.40	160.40	161.42	161.84	162.01	159.90	159.21	159.16	159.06	
	Deep	596046	4809003		0.83	167.60	154.37	154.17	153.99	154.03	133.52	133.73	133.96	134.20	134.89	135.58	136.00	136.17	124.93	
MW-11	Overburden	595869	4808946	168.31	1.01	169.32	164.68	165.03	164.72	164.61	164.33	164.48	165.21	165.21	166.06	164.15	163.99	164.04	164.53	164.13
	Straddle	595870	4808946		1.04	169.35	164.48	164.80	164.78	164.61	164.39	164.47	165.08	165.18	165.95	164.40	164.19	164.32	164.73	164.38
	Deep	595871	4808948		1.12	169.42	151.53	151.48	151.45	151.39	132.63	132.70	132.82	133.04	133.51	134.11	134.60	134.81	136.59	136.71
TW-1		595581	4808946	167.64	0.88	168.52	163.84	164.52	164.10		163.69	163.86	164.71	164.69	165.38	168.52	163.89		164.38	
TW-2		595621	4810361	176.33	0.82	177.15	Dry	Dry	Dry		Dry	Dry	Dry	Dry	Dry	Dry	Dry		Dry	
TW-3		596411	4810003	166.85	0.70	167.55	154.67	154.70	154.73		155.66	162.98	156.66	156.83	156.55	167.55	155.91		156.83	

Notes:
1. Shallow wells have screened intervals no deeper than 30' (9 m) below ground, completed in overburden. The overburden ranged from 7 m to 9 m thick in the boreholes on-site.
2. Intermediate wells have screens within the upper/shallow bedrock, to depths no greater than 100' (30 m) below ground
3. Deep wells have screen intervals at depths between 100' and 150' below ground, (30 m to 50 m).

Table 2
Groundwater Level Elevations in MW-Series and TW-Series Wells
September 30, 2002 to December 21, 2011
Tansley Quarry - Hanson Brick Ltd

Hole	Piezometer	Location		Ground Elev (m)	Stick-up (m)	Top of pipe	12-Mar-10	25-Mar-10	26-Apr-10	19-May-10	28-Jun-10	27-Jul-10	31-Aug-10	30-Sep-10	18-Oct-10	1-Dec-10	23-Dec-10	26-Jan-11	24-Feb-11	21-Mar-11
		Easting (m)	Northing (m)			elevation (masl)														
MW-01	Overburden	596395	4809597	164.78	0.76	165.54		164.49				164.33			164.37			164.23		
	Intermediate			164.78	0.80	165.58		164.50				164.31			164.37			164.23		
	Deep			164.78	0.75	165.53		159.30				159.17			159.16			159.46		
MW-02	Overburden	596248	4809618	166.58	0.78	167.36		166.31			166.18	166.13			166.12			165.83		
	Intermediate			166.58	0.76	167.34		161.12			161.04	160.91			160.97			161.20		
	Deep			166.58	0.74	167.32		152.62			152.69	152.66			153.03			154.25		
MW-03	Overburden	596108	4809606	169.31	0.81	170.12		163.98				163.97			163.88			164.31		
	Deep			169.31	0.75	170.06		160.28				160.26			160.19			160.51		
MW-04	Overburden	595911	4809070	167.85	0.97	168.82		165.73	165.81	165.68	165.46	165.09	164.77	164.64	164.93	165.54	165.37	165.23	165.28	165.80
	Intermediate			167.85	0.94	168.79		157.20	157.37	157.30	157.27	157.12	157.02	156.98	157.08	157.30	157.41	157.42	157.41	157.65
	Deep			167.85	0.87	168.72		126.06	126.15	126.27	126.35	126.52	126.88	126.96	127.01	123.88	123.93	124.07	124.15	124.21
MW-05	Overburden	596135	4808768	166.88	0.88	167.76		159.97	160.64	160.72	160.60	160.36	160.07	159.83	159.85	159.85	159.96	159.88	159.79	160.34
	Intermediate			166.88	0.84	167.72		147.80	147.72	147.66	147.59	147.55	147.44	147.36	147.46	147.44	147.45	147.46	147.47	147.60
	Deep			166.88	0.81	167.69	127.07	127.08	127.12	127.14	127.17	127.16	127.19	127.24	127.21	127.24	127.26	127.29	127.32	127.34
	Straddle	596134	4808769	167.03	0.95	167.98	157.87	158.21	158.64	158.59	158.46	158.27	157.98	157.81	157.89	157.86	157.83	157.72	157.70	158.20
MW-06	Overburden	596355	4808896	165.97	0.98	166.95	159.73					159.87			159.36			159.55		
	Deep			165.97	0.90	166.87	138.95					139.17			139.30			137.40		
	Straddle	596351	4808892	166.05	0.84	166.89	159.87					159.77			159.17			159.66		
MW-07	Overburden	596099	4809348	166.89	0.85	167.74		164.56				164.03			164.10			164.15	164.27	
	Deep			166.89	0.87	167.76		152.01				151.96			152.00			152.60	152.92	
MW-08	Overburden	596295	4809190	162.79	0.87	163.66		161.38				162.06			161.94			161.70		
	Intermediate			162.79	0.84	163.63		160.00				159.79			159.83			160.08		
	Deep			162.79	0.82	163.61		161.40				162.06			161.95			161.69		
MW-09	Overburden	596166	4809014	165.53	0.76	166.29		163.35				162.50			161.21			162.84		
	Straddle	596166	4809014		0.82	166.35		155.09				155.12			155.14			155.47		
	Deep	596164	4809012		1.06	166.59		126.32				126.55			126.67			126.84		
MW-10	Overburden	596045	4809002	166.77	0.88	167.65		164.70				163.96			163.02			164.19		
	Intermediate	596045	4809002		0.94	167.71		159.73				159.49			159.29			159.91		
	Deep	596046	4809003		0.83	167.60		125.17				125.86			126.30			127.17		
MW-11	Overburden	595869	4808946	168.31	1.01	169.32			165.47	165.25	164.99	164.59	163.99	163.79	164.35	165.16	165.00	164.72	164.86	165.64
	Straddle	595870	4808946		1.04	169.35			165.38	165.18	164.89	164.56	164.20	164.12	164.48	165.23	164.91	164.70	164.71	165.32
	Deep	595871	4808948		1.12	169.42			137.11	137.16	137.42	137.51	137.70	137.90	137.96	129.45	129.51	129.62	129.74	129.82
TW-1		595581	4808946	167.64	0.88	168.52		165.19				164.39			164.50			164.27		
TW-2		595621	4810361	176.33	0.82	177.15		Dry				Dry			Dry			Dry		
TW-3		596411	4810003	166.85	0.70	167.55		156.53				155.10			155.71			156.69		

Notes:
1. Shallow wells have screened intervals no deeper than 30' (9 m) below ground, completed in overburden.
   The overburden ranged from 7 m to 9 m thick in the boreholes on-site.
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Table 2
Groundwater Level Elevations in MW-Series and TW-Series Wells
September 30, 2002 to December 21, 2011
Tansley Quarry - Hanson Brick Ltd

Hole	Piezometer	Location		Ground Elev (m)	Stick-up (m)	Top of pipe	18-Apr-11	19-May-11	21-Jun-11	21,26-Jul-11	25-Aug-11	20-Sep-11	28-Oct-11	14-Nov-11	25-Nov-11	21-Dec-11
		Easting (m)	Northing (m)			elevation (masl)										
MW-01	Overburden	596395	4809597	164.78	0.76	165.54	164.58			163.47		Dry				164.52
	Intermediate			164.78	0.80	165.58	164.60			163.48		162.86				164.53
	Deep			164.78	0.75	165.53	159.77			159.44		159.14				160.02
MW-02	Overburden	596248	4809618	166.58	0.78	167.36	166.37			165.76		165.48		166.10		166.40
	Intermediate			166.58	0.76	167.34	161.62			161.21		160.82		161.35		161.76
	Deep			166.58	0.74	167.32	156.43			158.40		158.19		158.63		159.02
MW-03	Overburden	596108	4809606	169.31	0.81	170.12	164.71			164.48		163.96		164.40		164.81
	Deep			169.31	0.75	170.06	160.92			160.82		160.43		160.72		161.09
MW-04	Overburden	595911	4809070	167.85	0.97	168.82	165.95	166.22	165.92	165.59		164.74	165.47	165.72	165.75	166.25
	Intermediate			167.85	0.94	168.79	157.92	158.20	158.16	157.68		157.46	157.77	157.71	157.97	158.32
	Deep			167.85	0.87	168.72	124.31	124.40	124.51	124.63		124.77	124.88	124.94	124.06	119.17
MW-05	Overburden	596135	4808768	166.88	0.88	167.76	161.04	162.63	162.10	161.22	160.54	160.24	160.15	160.19	160.13	160.49
	Intermediate			166.88	0.84	167.72	147.66	147.85	147.69	147.49	147.55	147.44	147.47	147.35	147.49	147.56
	Deep			166.88	0.81	167.69	127.37	127.38	127.40	127.41	127.45	127.46	127.46	127.47	126.11	126.15
	Straddle	596134	4808769	167.03	0.95	167.98	158.60	159.69	159.15	158.49	158.14	157.96	158.09	158.06	158.22	158.59
MW-06	Overburden	596355	4808896	165.97	0.98	166.95	160.32			159.97		159.36		159.27		159.98
	Deep			165.97	0.90	166.87	137.49			137.60		137.67		137.73	137.10	137.18
	Straddle	596351	4808892	166.05	0.84	166.89	160.43			160.06		159.41		159.34		160.09
MW-07	Overburden	596099	4809348	166.89	0.85	167.74	164.76			164.17		163.63		164.50		165.01
	Deep			166.89	0.87	167.76	154.03			156.74		156.71		157.01		156.95
MW-08	Overburden	596295	4809190	162.79	0.87	163.66	162.30			162.30		162.17		162.36		163.17
	Intermediate			162.79	0.84	163.63	160.47			160.11		159.74		160.29		160.74
	Deep			162.79	0.82	163.61	162.28			162.32		162.17		162.35		159.66
MW-09	Overburden	596166	4809014	165.53	0.76	166.29	164.57			163.19		161.59		161.24		163.06
	Straddle	596166	4809014		0.82	166.35	155.91			155.74		155.50		155.75		156.22
	Deep	596164	4809012		1.06	166.59	126.97			127.14		127.26		127.56		126.58
MW-10	Overburden	596045	4809002	166.77	0.88	167.65	166.34			164.59		162.91		163.29		164.90
	Intermediate	596045	4809002		0.94	167.71	161.31			160.68		160.08		160.50		161.57
	Deep	596046	4809003		0.83	167.60	127.90			129.13		130.06		131.10		129.32
MW-11	Overburden	595869	4808946	168.31	1.01	169.32	165.94	166.33		164.64		163.97	164.59	164.96	165.07	165.98
	Straddle	595870	4808946		1.04	169.35	165.50	165.75		164.98		164.00	164.90	165.09	165.18	165.73
	Deep	595871	4808948		1.12	169.42	129.92	130.03	130.24	129.51		130.92	131.20	131.45	128.90	129.01
TW-1		595581	4808946	167.64	0.88	168.52	165.55			164.52		163.72				165.54
TW-2		595621	4810361	176.33	0.82	177.15	Dry			Dry		Dry				Dry
TW-3		596411	4810003	166.85	0.70	167.55	157.15			154.52		155.32				156.79

Notes:
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3. Deep wells have screen intervals at depths between 100' and 150' below ground, (30 m to 50 m).

Table 3
Summary of 2011 Groundwater Quality Exceedances of ODWS
MW Series Monitoring Wells
Tansley Quarry - Hanson Brick Ltd.

Parameter	Aluminum	Alkalinity	Hardness	Chloride	Sulphate	Sulphide	Copper	Sodium	pH	Manganese	Iron	Turbidity	Zinc	Barium	Cadmium	Chromium	Lead	Selenium	Uranium	Arsenic	Boron
ODWS	0.1 mg/L	30-500 mg/L	80-100 mg/L	250 mg/L	500 mg/L	0.05 mg/L	1 mg/L	200 mg/L	6.5-8.5 pH units	0.05 mg/L	0.3 mg/L	1 NTU	5 mg/L	1 mg/L	0.005 mg/L	0.05 mg/L	0.01 mg/L	0.01 mg/L	0.02 mg/L	0.025 mg/L	5 mg/L
	OG	OG	OG	AO	AO	AO	AO	AO		AO	AO	AO	AO	MAC	MAC	MAC	MAC	MAC	MAC	IMAC	IMAC
MW-01O			740							0.27	12	250									
MW-01I	0.14		1000							5	130	77				0.12	0.064			0.034	
MW-01D			7200	13000	1910			6600		1.3	9.6	170									6.3
MW-02O		707	2100		1320					4.2	100	460				0.077	0.044			0.028	
MW-02I			980		1140					0.51	11	480									
MW-02D			6500	12500	2030			7000		1.4	11	290									5.8
MW-03O			870		900					0.51	11	600									
MW-03D			4900	6480	1650			3100		0.77	9.2	140									
MW-04O	1.1		560							1.2	26	780					0.024				
MW-04I			1700	1650	1800			1000		0.38	4.9	110									6.4
MW-04D			27000	45000	1540			17000		5.5	11	340			0.017				0.024	0.07	6.6
MW-05O			440				1.1			64	320	2700		3.5	0.009	0.33	0.23			0.098	
MW-05S	0.14		270							11	140	2700				0.12	0.063			0.083	
MW-05I			320							0.1	21	210								0.045	
MW-05D			35000	54800	1370			20000	6.43	8.5	170	520			0.075	0.68	0.17			0.14	5.5
MW-06O			320			0.31	4.7			190	3300	32000	11	32	0.028	3.8	1.8		0.19	0.78	
MW-06S			400							0.98	26	670									
MW-06D	Not sampled: Insufficient water																				
MW-07O		569	630							10	330	14000		1.9		0.28	0.16		0.029	0.081	5.6
MW-07D			10000	18100	1560			7800		1.7	6.5	330									6.1
MW-08O		553	880							4.1	110	710				0.095	0.058			0.03	
MW-08I			1700	1710	965			1300		0.24	1.8	30									5.7
MW-08D	0.47		27000	41500	1130		0.13	15000		9	200	1900		1.1			0.049			0.093	
MW-09O			380							1.2	35	3200				0.057	0.013				
MW-09S			760	252						1.2	34	920					0.013				
MW-09D			28000	46900	1470			18000		4.7	25	150						0.053			5.3
MW-10O			500							11	170	1500		2		0.14	0.12		0.027	0.054	
MW-10I			340							2.5	66	540				0.052	0.018			0.16	
MW-10D			25000	41700	1360			16000		2.5	18	280			0.012	0.62	0.011	0.08	0.022	0.031	6
MW-11O			390			0.06				3.6	89	840				0.14	0.031				
MW-11S			490							1.6	25	410									
MW-11D			26000	40700	1410			16000		5.1	84	140			0.014	0.6					5.1

Note:
ODWS: Ontario Drinking Water Standard, June 2006.
AO: Aesthetic Objective; MAC: Maximum Acceptable Concentration:
IMAC: Interim Maximum Acceptable Concentration; OG: Operational Guideline
Wells designated as: **O** = Overburden, **I** = Intermediate, **D** = Deep, **S** = Straddle

Table 4
Summary of 2011 Groundwater Quality Exceedances of PWQO
MW Series Monitoring Wells
Tansley Quarry - Hanson Brick Ltd.

Parameter	Aluminum	Arsenic	Boron	Cadmium	Cobalt	Copper	Iron	Lead	pH	Molybdenum	Nickel	Silver	Thallium	Total Phosphorous	Uranium	Vanadium	Zinc
PWQO	0.075 mg/L Interim	0.005 mg/L Interim	0.2 mg/L	0.0005 mg/L Interim	0.0009 mg/L	0.005 mg/L Interim	0.3 mg/L	0.005 mg/L Interim	6.5-8.5 pH units	0.04 mg/L	0.025 mg/L	0.0001 mg/L	0.0003 mg/L Interim	0.01 mg/L	0.005 mg/L	0.006 mg/L Interim	0.02 mg/L Interim
MW-01O					0.0046	0.016	12	0.01						0.4	0.011	0.012	0.051
MW-01I	0.14	0.034	0.22	0.0011	0.073	0.13	130	0.064			0.13		0.0006	5.3	0.017	0.13	0.43
MW-01D			6.3			0.03	9.6									0.014	
MW-02O		0.028	0.32	0.0009	0.044	0.091	100	0.044			0.093	0.0003	0.00057	4.4	0.02	0.094	0.27
MW-02I		0.006	1.8		0.0059	0.012	11	0.0064						0.36		0.012	0.039
MW-02D			5.8			0.025	11										
MW-03O			1.8		0.0057	0.01	11	0.0064					0.00007	0.35		0.012	0.041
MW-03D			4.6			0.018	9.2									0.013	0.12
MW-04O	1.1	0.008			0.016	0.027	26	0.024			0.027			0.85	0.0088	0.026	0.077
MW-04I			6.4		0.002		4.9							0.14			
MW-04D		0.07	6.6	0.017	0.031	0.18	11				0.22				0.024		
MW-05O		0.098		0.009	0.23	1.1	320	0.23			0.49		0.0018	14	0.012	0.25	1.2
MW-05S	0.14	0.083	1.4	0.0032	0.065	0.19	140	0.063			0.12	0.0006	0.0006	9.6		0.12	0.38
MW-05I		0.045	2.2		0.0012	0.009	21										0.032
MW-05D		0.14	5.5	0.075	0.081	0.8	170	0.17	6.43	0.049	0.3				0.009	0.19	1.6
MW-06O		0.78	3	0.028	2	4.7	3300	1.8		0.14	4.1	0.007	0.015	180	0.19	2.7	11
MW-06S		0.02			0.015	0.026	26	0.0087			0.031			0.89		0.026	0.082
MW-06D	Not sampled: Insufficient water																
MW-07O		0.081	5.6	0.002	0.16	0.35	330	0.16			0.36		0.0026	9.9	0.029	0.35	0.91
MW-07D			6.1				6.5										
MW-08O		0.03	1.1	0.001	0.056	0.093	110	0.058			0.12	0.0004	0.00046	3.9	0.015	0.11	0.28
MW-08I	0.08		5.7				1.8										
MW-08D	0.47	0.093	4.9		0.1	0.13	200	0.049			0.19				0.007	0.23	0.6
MW-09O		0.013	1.8		0.022	0.022	35	0.013			0.044	0.0002		1.1		0.04	0.14
MW-09S		0.016	3.7		0.021	0.018	34	0.013			0.046	0.0002		1.1		0.04	0.11
MW-09D		0.024	5.3	0.0012		0.033	25					0.0003			0.0057	0.0074	
MW-10O		0.054	0.24	0.0018	0.092	0.18	170	0.12			0.18	0.0006	0.0009	11	0.027	0.15	0.54
MW-10I		0.16	0.75	0.0011	0.031	0.031	66	0.018			0.06			2.4		0.049	0.15
MW-10D		0.031	6	0.012	0.012	0.051	18	0.011		0.24	0.38	0.0002			0.022	0.034	0.068
MW-11O		0.022	0.14	0.0007	0.045	0.11	89	0.031			0.1	0.0003	0.00044	2.4	0.0057	0.091	0.24
MW-11S		0.02	1.4		0.014	0.028	25	0.0096			0.028			1.6		0.025	0.069
MW-11D			5.1	0.014		0.068	84				0.095				0.01		0.37

Note:
PWQO: Provincial Water Quality Objectives, July 1994
Cadmium standard is 0.0002 mg/L when hardness < 100 mg/L and 0.0005 mg/L when hardness > 100 mg/L
Wells designated as: O = Overburden, I = Intermediate, D = Deep, S = Straddle

Table 5
Summary of 2011 Groundwater Quality Exceedances of ODWS
Private Wells
Tansley Quarry - Hanson Brick Ltd.

Parameter	Hardness	Sulphate	Chloride	Iron	Manganese	Sodium	Turbidity	Boron
ODWS	80-100 mg/L	500 mg/L	250 mg/L	0.3 mg/L	0.05 mg/L	200 mg/L	5 NTU	5 mg/L
	OG	AO	AO	AO	AO	AO	AO	IMAC
Finucci	520							
Featherstone	**Not Sampled - Cistern installed, well not in use**							
Sicard	950	999	1070		0.1	620		7.2
Wiggins	**Not Sampled - Cistern installed, well not in use**							
Sugiyami	1500	958	1810		0.17	760		5.7
Eno/Myers	**Not sampled - well not in use**							
Robinson	**Not sampled - well filled with municipal water**							
Stevenson	**Not sampled - well not in use**							
Hendervale House	580			0.37				
Hendervale Main Barn	**Not sampled - well not in use**							
Hendervale Cottage	590			0.46	0.051		2.1	
Hendervale ABC Barn	**Not sampled - well not in use**							
Simms	360							
Bekkers	780	762			0.071	210		

Note:

ODWS: Ontario Drinking Water Standard, June 2006

AO: Aesthetic Objective; MAC: Maximum Acceptable Concentration

IMAC: Interim Maximum Acceptable Concentration; OG: Operational Guideline

Table 6
2011 Daily Sump Discharge
Tansley Quarry - Hanson Brick Ltd.

Date	Total Daily (hrs)	Total Daily Volume Pumped (m^3)	Sump Dewatering Rate (m^3/hr)	(igal/min)
Saturday, January 01, 2011				
Sunday, January 02, 2011				
Monday, January 03, 2011	6.5	459	70.6	259
Tuesday, January 04, 2011	6	477	79.5	291
Wednesday, January 05, 2011	4.5	328	72.9	267
Thursday, January 06, 2011				
Friday, January 07, 2011				
Saturday, January 08, 2011				
Sunday, January 09, 2011				
Monday, January 10, 2011				
Tuesday, January 11, 2011				
Wednesday, January 12, 2011				
Thursday, January 13, 2011				
Friday, January 14, 2011				
Saturday, January 15, 2011				
Sunday, January 16, 2011				
Monday, January 17, 2011				
Tuesday, January 18, 2011	6.5	553	85.0	312
Wednesday, January 19, 2011	6.2	479	77.2	283
Thursday, January 20, 2011				
Friday, January 21, 2011	2.5	233	93.3	342
Saturday, January 22, 2011				
Sunday, January 23, 2011				
Monday, January 24, 2011				
Tuesday, January 25, 2011				
Wednesday, January 26, 2011				
Thursday, January 27, 2011	3	263	87.7	322
Friday, January 28, 2011	3	241	80.2	294
Saturday, January 29, 2011				
Sunday, January 30, 2011				
Monday, January 31, 2011				
Tuesday, February 01, 2011				
Wednesday, February 02, 2011				
Thursday, February 03, 2011				
Friday, February 04, 2011				
Saturday, February 05, 2011				
Sunday, February 06, 2011				
Monday, February 07, 2011	4.5	357	79.4	291
Tuesday, February 08, 2011				
Wednesday, February 09, 2011				
Thursday, February 10, 2011	4	195	48.8	179
Friday, February 11, 2011	4	375	93.6	343
Saturday, February 12, 2011				
Sunday, February 13, 2011				
Monday, February 14, 2011	7	464	66.3	243
Tuesday, February 15, 2011				
Wednesday, February 16, 2011				
Thursday, February 17, 2011	4	322	80.5	295
Friday, February 18, 2011	6	554	92.3	338
Saturday, February 19, 2011				
Sunday, February 20, 2011				
Monday, February 21, 2011				
Tuesday, February 22, 2011				
Wednesday, February 23, 2011				
Thursday, February 24, 2011	6	483	80.6	295
Friday, February 25, 2011	8	560	69.9	256
Saturday, February 26, 2011				
Sunday, February 27, 2011				
Monday, February 28, 2011	8	510	63.8	234
Tuesday, March 01, 2011	5	361	72.2	265
Wednesday, March 02, 2011				
Thursday, March 03, 2011				
Friday, March 04, 2011	5	480	96.0	352
Saturday, March 05, 2011				
Sunday, March 06, 2011				
Monday, March 07, 2011	7	560	79.9	293

Table 6
2011 Daily Sump Discharge
Tansley Quarry - Hanson Brick Ltd.

Date	Total Daily (hrs)	Total Daily Volume Pumped (m^3)	Sump Dewatering Rate (m^3/hr)	(igal/min)
Tuesday, March 08, 2011	6	506	84.3	309
Wednesday, March 09, 2011	7	559	79.9	293
Thursday, March 10, 2011				
Friday, March 11, 2011				
Saturday, March 12, 2011				
Sunday, March 13, 2011				
Monday, March 14, 2011				
Tuesday, March 15, 2011	4.5	430	95.6	351
Wednesday, March 16, 2011	5.8	575	99.2	364
Thursday, March 17, 2011	3.8	233	61.4	225
Friday, March 18, 2011	1			
Saturday, March 19, 2011				
Sunday, March 20, 2011				
Monday, March 21, 2011	4.6	431	93.7	344
Tuesday, March 22, 2011	6.8	609	89.5	328
Wednesday, March 23, 2011				
Thursday, March 24, 2011	4.8	471	98.1	360
Friday, March 25, 2011				
Saturday, March 26, 2011				
Sunday, March 27, 2011				
Monday, March 28, 2011	0.5	24	47.0	172
Tuesday, March 29, 2011	5.7	529	92.9	341
Wednesday, March 30, 2011	6.3	530	84.1	309
Thursday, March 31, 2011	5.5	529	96.1	352
Friday, April 01, 2011				
Saturday, April 02, 2011				
Sunday, April 03, 2011				
Monday, April 04, 2011	4	360	89.9	330
Tuesday, April 05, 2011	7.3	703	96.3	353
Wednesday, April 06, 2011	7	637	91.0	334
Thursday, April 07, 2011	6.5	613	94.3	346
Friday, April 08, 2011				
Saturday, April 09, 2011				
Sunday, April 10, 2011				
Monday, April 11, 2011				
Tuesday, April 12, 2011				
Wednesday, April 13, 2011				
Thursday, April 14, 2011	7	630	90.0	330
Friday, April 15, 2011	6.5	432	66.4	244
Saturday, April 16, 2011				
Sunday, April 17, 2011				
Monday, April 18, 2011	6.5	613	94.2	346
Tuesday, April 19, 2011				
Wednesday, April 20, 2011				
Thursday, April 21, 2011				
Friday, April 22, 2011				
Saturday, April 23, 2011				
Sunday, April 24, 2011				
Monday, April 25, 2011	3.3	403	122.2	448
Tuesday, April 26, 2011	6.3	574	91.1	334
Wednesday, April 27, 2011	6.8	684	100.6	369
Thursday, April 28, 2011	7.3	693	94.9	348
Friday, April 29, 2011				
Saturday, April 30, 2011				
Sunday, May 01, 2011				
Monday, May 02, 2011	7.3	724	99.1	363
Tuesday, May 03, 2011	5.7	561	98.4	361
Wednesday, May 04, 2011	7	676	96.5	354
Thursday, May 05, 2011	3.3	309	93.5	343
Friday, May 06, 2011				
Saturday, May 07, 2011				
Sunday, May 08, 2011				
Monday, May 09, 2011	6	428	71.4	262
Tuesday, May 10, 2011	6.5	597	91.9	337
Wednesday, May 11, 2011	7.5	707	94.3	346
Thursday, May 12, 2011	7	550	78.6	288

Table 6
2011 Daily Sump Discharge
Tansley Quarry - Hanson Brick Ltd.

Date	Total Daily (hrs)	Total Daily Volume Pumped (m^3)	Sump Dewatering Rate (m^3/hr)	(igal/min)
Friday, May 13, 2011				
Saturday, May 14, 2011				
Sunday, May 15, 2011				
Monday, May 16, 2011	7.8	699	89.6	328
Tuesday, May 17, 2011	7.2	557	77.4	284
Wednesday, May 18, 2011	7.3	633	86.7	318
Thursday, May 19, 2011	6.3	557	88.4	324
Friday, May 20, 2011				
Saturday, May 21, 2011				
Sunday, May 22, 2011				
Monday, May 23, 2011				
Tuesday, May 24, 2011	6.8	648	95.2	349
Wednesday, May 25, 2011	7.5	686	91.5	335
Thursday, May 26, 2011	5.1	459	89.9	330
Friday, May 27, 2011				
Saturday, May 28, 2011				
Sunday, May 29, 2011				
Monday, May 30, 2011	5.1	504	98.7	362
Tuesday, May 31, 2011	8	761	95.2	349
Wednesday, June 01, 2011	6.5	616	94.8	348
Thursday, June 02, 2011	7.8	729	93.4	342
Friday, June 03, 2011				
Saturday, June 04, 2011				
Sunday, June 05, 2011				
Monday, June 06, 2011	7.2	602	83.7	307
Tuesday, June 07, 2011	7.5	635	84.7	310
Wednesday, June 08, 2011	8.3	808	97.4	357
Thursday, June 09, 2011	5.8	567	97.8	359
Friday, June 10, 2011				
Saturday, June 11, 2011				
Sunday, June 12, 2011				
Monday, June 13, 2011	5.3	331	62.4	229
Tuesday, June 14, 2011	7.2	640	88.9	326
Wednesday, June 15, 2011	7	648	92.5	339
Thursday, June 16, 2011	7.2	623	86.5	317
Friday, June 17, 2011				
Saturday, June 18, 2011				
Sunday, June 19, 2011				
Monday, June 20, 2011	5.6	476	85.0	312
Tuesday, June 21, 2011	6	545	90.8	333
Wednesday, June 22, 2011	6	572	95.3	349
Thursday, June 23, 2011	8.5	769	90.4	332
Friday, June 24, 2011				
Saturday, June 25, 2011				
Sunday, June 26, 2011				
Monday, June 27, 2011	6	526	87.6	321
Tuesday, June 28, 2011	8.1	604	74.5	273
Wednesday, June 29, 2011	8.1	743	91.8	336
Thursday, June 30, 2011	3.5	276	78.9	289
Friday, July 01, 2011				
Saturday, July 02, 2011				
Sunday, July 03, 2011				
Monday, July 04, 2011	7	572	81.8	300
Tuesday, July 05, 2011	5.7	500	87.7	322
Wednesday, July 06, 2011	5	440	88.1	323
Thursday, July 07, 2011	2.3	132	57.5	211
Friday, July 08, 2011				
Saturday, July 09, 2011				
Sunday, July 10, 2011				
Monday, July 11, 2011	5.2	428	82.3	302
Tuesday, July 12, 2011	3.8	270	71.0	260
Wednesday, July 13, 2011	1.7	125	73.2	269
Thursday, July 14, 2011				
Friday, July 15, 2011	1.5	126	83.7	307
Saturday, July 16, 2011				
Sunday, July 17, 2011				

Table 6
2011 Daily Sump Discharge
Tansley Quarry - Hanson Brick Ltd.

Date	Total Daily (hrs)	Total Daily Volume Pumped (m^3)	Sump Dewatering Rate (m^3/hr)	(igal/min)
Monday, July 18, 2011	4.1	280	68.3	250
Tuesday, July 19, 2011	2	129	64.5	237
Wednesday, July 20, 2011	2	183	91.4	335
Thursday, July 21, 2011	1.5	79	52.7	193
Friday, July 22, 2011				
Saturday, July 23, 2011				
Sunday, July 24, 2011				
Monday, July 25, 2011	5.2	380	73.0	268
Tuesday, July 26, 2011	0.9	24	26.9	99
Wednesday, July 27, 2011	2	73	36.3	133
Thursday, July 28, 2011	1.8	98	54.2	199
Friday, July 29, 2011				
Saturday, July 30, 2011				
Sunday, July 31, 2011				
Monday, August 01, 2011				
Tuesday, August 02, 2011	5.2	347	66.7	245
Wednesday, August 03, 2011	4	306	76.5	280
Thursday, August 04, 2011	1.8	155	86.3	316
Friday, August 05, 2011				
Saturday, August 06, 2011				
Sunday, August 07, 2011				
Monday, August 08, 2011	5.5	453	82.3	302
Tuesday, August 09, 2011	7	498	71.1	261
Wednesday, August 10, 2011	2	205	102.6	376
Thursday, August 11, 2011	1.8	78	43.2	158
Friday, August 12, 2011				
Saturday, August 13, 2011				
Sunday, August 14, 2011				
Monday, August 15, 2011	5.5	404	73.5	269
Tuesday, August 16, 2011	1	73	72.9	267
Wednesday, August 17, 2011	0.5	24	48.8	179
Thursday, August 18, 2011				
Friday, August 19, 2011				
Saturday, August 20, 2011				
Sunday, August 21, 2011				
Monday, August 22, 2011	7	605	86.4	317
Tuesday, August 23, 2011	6	474	79.0	290
Wednesday, August 24, 2011				
Thursday, August 25, 2011	7	464	66.3	243
Friday, August 26, 2011				
Saturday, August 27, 2011				
Sunday, August 28, 2011				
Monday, August 29, 2011	4	330	82.5	303
Tuesday, August 30, 2011	3.25	169	52.0	191
Wednesday, August 31, 2011	2.5	49	19.5	71
Thursday, September 01, 2011	1.5	25	16.3	60
Friday, September 02, 2011	1	99	98.7	362
Saturday, September 03, 2011				
Sunday, September 04, 2011				
Monday, September 05, 2011				
Tuesday, September 06, 2011	6.5	532	81.9	300
Wednesday, September 07, 2011	6.25	503	80.4	295
Thursday, September 08, 2011	2.25	163	72.3	265
Friday, September 09, 2011				
Saturday, September 10, 2011				
Sunday, September 11, 2011				
Monday, September 12, 2011	4.5	354	78.7	288
Tuesday, September 13, 2011	1.5	72	48.1	176
Wednesday, September 14, 2011	1.5	72	48.3	177
Thursday, September 15, 2011	2	122	60.8	223
Friday, September 16, 2011				
Saturday, September 17, 2011				
Sunday, September 18, 2011				
Monday, September 19, 2011	3	148	49.2	181
Tuesday, September 20, 2011	4.5	275	61.2	224
Wednesday, September 21, 2011				

Table 6
2011 Daily Sump Discharge
Tansley Quarry - Hanson Brick Ltd.

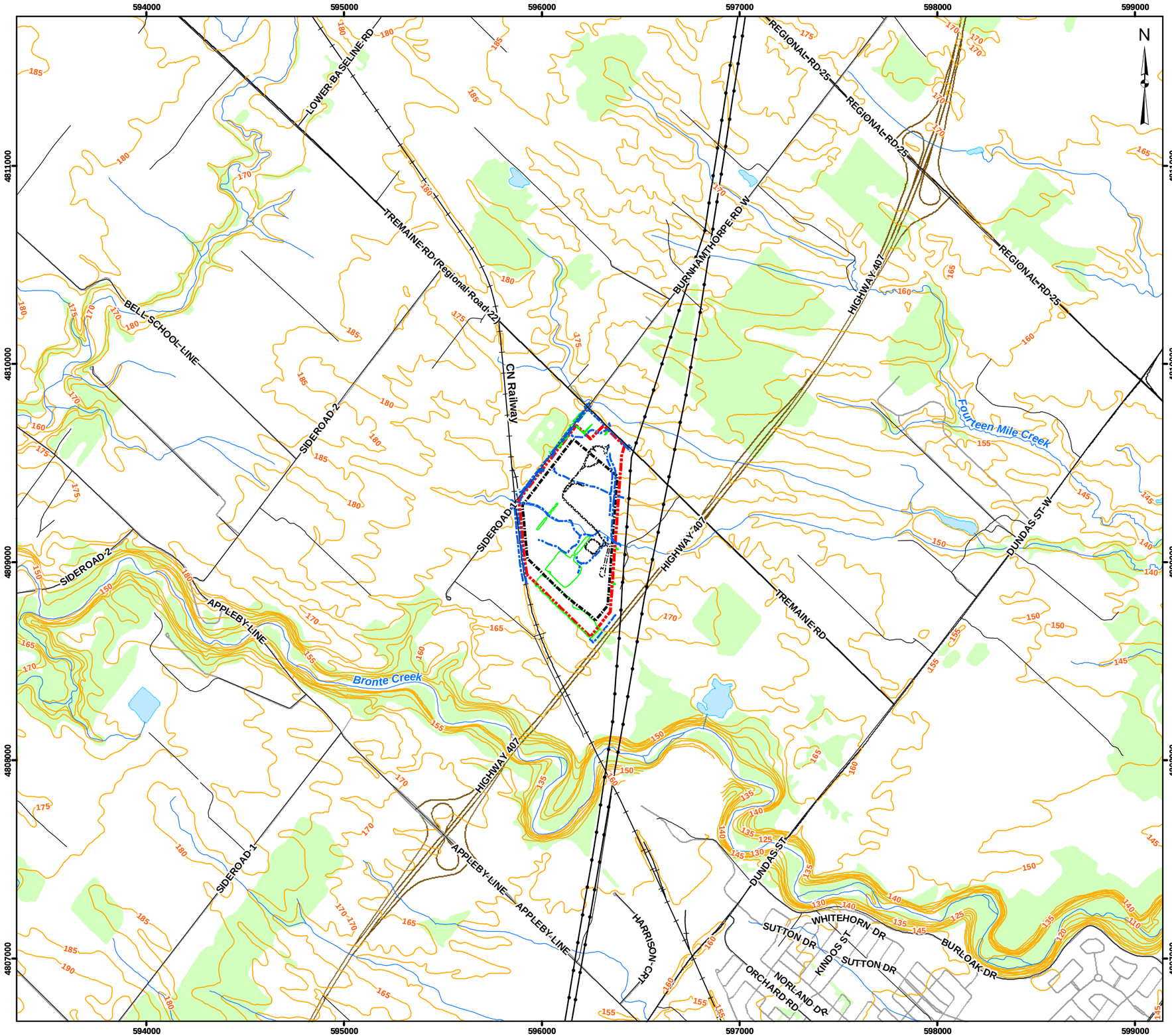
Date	Total Daily (hrs)	Total Daily Volume Pumped (m^3)	Sump Dewatering Rate (m^3/hr)	(igal/min)
Thursday, September 22, 2011	5.5	360	65.4	240
Friday, September 23, 2011				
Saturday, September 24, 2011				
Sunday, September 25, 2011				
Monday, September 26, 2011				
Tuesday, September 27, 2011	5.5	402	73.1	268
Wednesday, September 28, 2011	6.25	368	58.9	216
Thursday, September 29, 2011	7	381	54.4	200
Friday, September 30, 2011	5	287	57.5	211
Saturday, October 01, 2011				
Sunday, October 02, 2011				
Monday, October 03, 2011	5.5	429	78.1	286
Tuesday, October 04, 2011				
Wednesday, October 05, 2011				
Thursday, October 06, 2011				
Friday, October 07, 2011	4.25	259	60.9	223
Saturday, October 08, 2011				
Sunday, October 09, 2011				
Monday, October 10, 2011				
Tuesday, October 11, 2011	6	413	68.9	253
Wednesday, October 12, 2011	2.5	150	59.8	219
Thursday, October 13, 2011				
Friday, October 14, 2011	5	335	66.9	245
Saturday, October 15, 2011				
Sunday, October 16, 2011				
Monday, October 17, 2011	4.7	317	67.3	247
Tuesday, October 18, 2011	6.8	490	72.1	264
Wednesday, October 19, 2011				
Thursday, October 20, 2011				
Friday, October 21, 2011	4.3	379	88.1	323
Saturday, October 22, 2011				
Sunday, October 23, 2011				
Monday, October 24, 2011	6.5	422	64.8	238
Tuesday, October 25, 2011				
Wednesday, October 26, 2011	6	439	73.2	269
Thursday, October 27, 2011	6.5	456	70.1	257
Friday, October 28, 2011				
Saturday, October 29, 2011				
Sunday, October 30, 2011				
Monday, October 31, 2011	3.9	402	103.1	378
Tuesday, November 01, 2011	5.8	519	89.4	328
Wednesday, November 02, 2011	7.1	569	80.2	294
Thursday, November 03, 2011	7.2	540	75.0	275
Friday, November 04, 2011				
Saturday, November 05, 2011				
Sunday, November 06, 2011				
Monday, November 07, 2011	6.7	474	70.7	259
Tuesday, November 08, 2011	6.4	421	65.7	241
Wednesday, November 09, 2011	6.7	491	73.3	269
Thursday, November 10, 2011	5.5	375	68.1	250
Friday, November 11, 2011				
Saturday, November 12, 2011				
Sunday, November 13, 2011				
Monday, November 14, 2011	5.4	402	74.5	273
Tuesday, November 15, 2011	7.3	319	43.7	160
Wednesday, November 16, 2011	7.5	406	54.1	199
Thursday, November 17, 2011	7.5	368	49.0	180
Friday, November 18, 2011				
Saturday, November 19, 2011				
Sunday, November 20, 2011				
Monday, November 21, 2011	5.7	400	70.2	258
Tuesday, November 22, 2011	5.4	368	68.1	250
Wednesday, November 23, 2011				
Thursday, November 24, 2011	2.75	202	73.3	269
Friday, November 25, 2011	4.25	284	66.8	245
Saturday, November 26, 2011				

Table 6
2011 Daily Sump Discharge
Tansley Quarry - Hanson Brick Ltd.

Date	Total Daily (hrs)	Total Daily Volume Pumped (m^3)	Sump Dewatering Rate (m^3/hr)	(igal/min)
Sunday, November 27, 2011				
Monday, November 28, 2011	5.5	398	72.3	265
Tuesday, November 29, 2011	4.9	414	84.5	310
Wednesday, November 30, 2011				
Thursday, December 01, 2011				
Friday, December 02, 2011	4.9	378	77.2	283
Saturday, December 03, 2011				
Sunday, December 04, 2011				
Monday, December 05, 2011	5.5	468	85.1	312
Tuesday, December 06, 2011	6	438	72.9	267
Wednesday, December 07, 2011	6	456	75.9	278
Thursday, December 08, 2011	3	247	82.4	302
Friday, December 09, 2011				
Saturday, December 10, 2011				
Sunday, December 11, 2011				
Monday, December 12, 2011	3	210	70.0	257
Tuesday, December 13, 2011	7	557	79.5	292
Wednesday, December 14, 2011	5.5	405	73.7	270
Thursday, December 15, 2011	5	368	73.5	270
Friday, December 16, 2011				
Saturday, December 17, 2011				
Sunday, December 18, 2011				
Monday, December 19, 2011	5.5	448	81.5	299
Tuesday, December 20, 2011	6.5	517	79.6	292
Wednesday, December 21, 2011	7	490	70.0	257
Thursday, December 22, 2011	6.75	537	79.5	291
Friday, December 23, 2011				
Saturday, December 24, 2011				
Sunday, December 25, 2011				
Monday, December 26, 2011				
Tuesday, December 27, 2011				
Wednesday, December 28, 2011	4.5	352	78.1	286
Thursday, December 29, 2011	5	366	73.1	268
Friday, December 30, 2011	4.5	403	89.6	329
Saturday, December 31, 2011				
2011 Annual Total	**899**	**71,493**		

Note:
Discharge data provided by Hanson Brick Ltd.

FIGURES



LEGEND

- Railways
- Utility Line
- Topographic Elevation Contour (5m Interval)
- Ditch
- Watercourse
- Water Body
- Wetland
- Limit of Extraction
- Property Boundary
- Wooded Areas

NOTE

On-Site details obtained from 2009 topographic contour map updated with 2012 field survey data provided by Long Environmental Consultants Inc.

REFERENCE

Base Data - MNR NRVIS, obtained 2004, CANMAP v2005.4
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2006
Datum: NAD 83 Projection: UTM Zone 17N.

0 0.25 0.5 1 1.5
Kilometers

PROJECT
TANSLEY QUARRY
2011 ANNUAL MONITORING REPORT
HANSON BRICK LTD.

TITLE
SITE LOCATION PLAN

Golder Associates
Mississauga, Ontario

PROJECT NO. 021-1228			SCALE 1:20,000	Ver. 1.0
DESIGN	KD	18 Dec. 2006	FIGURE: 1	
GIS	KD	2 May. 2012		
CHECK	SW	2 May. 2012		
REVIEW	RB	2 May. 2012		

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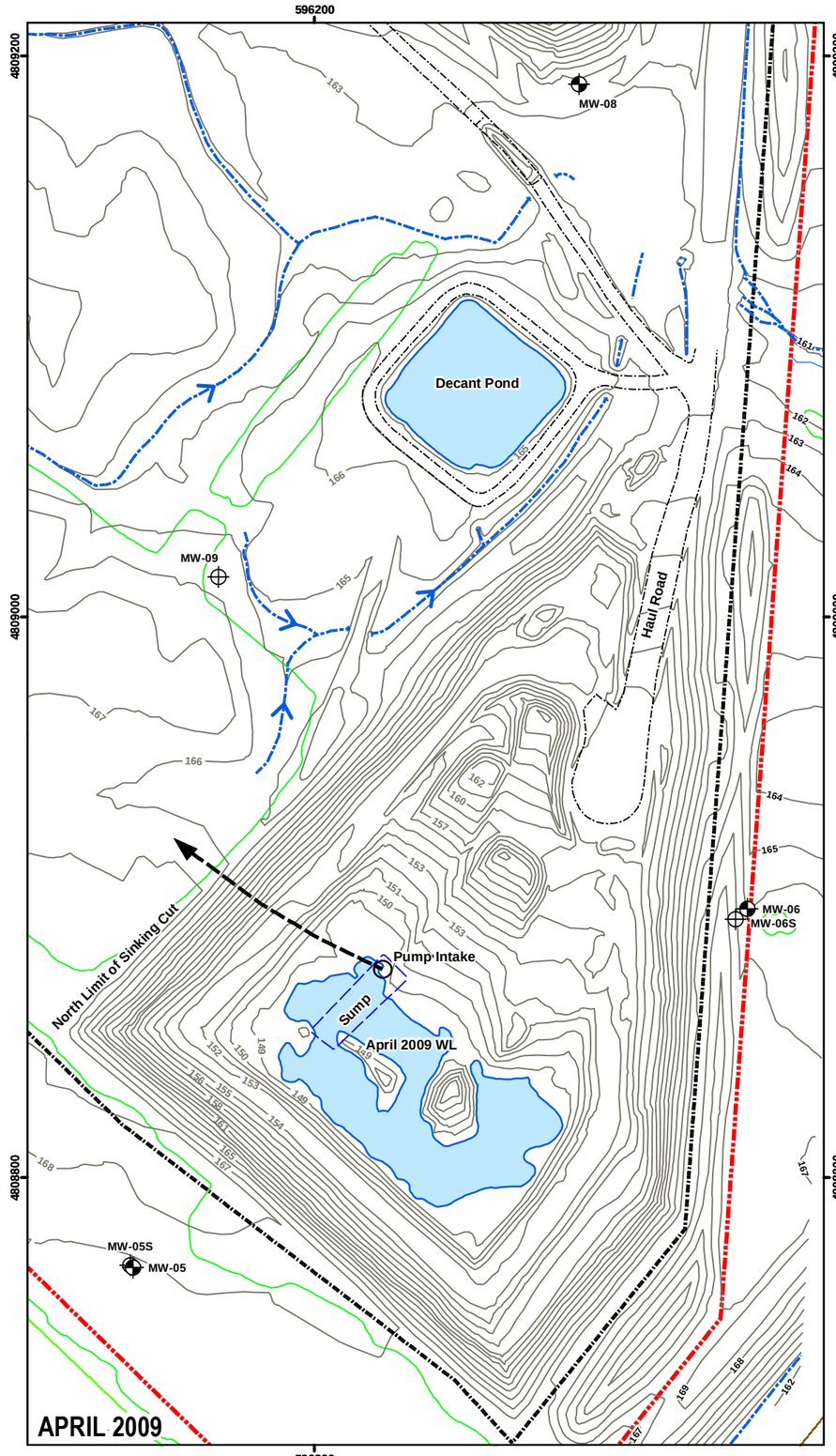
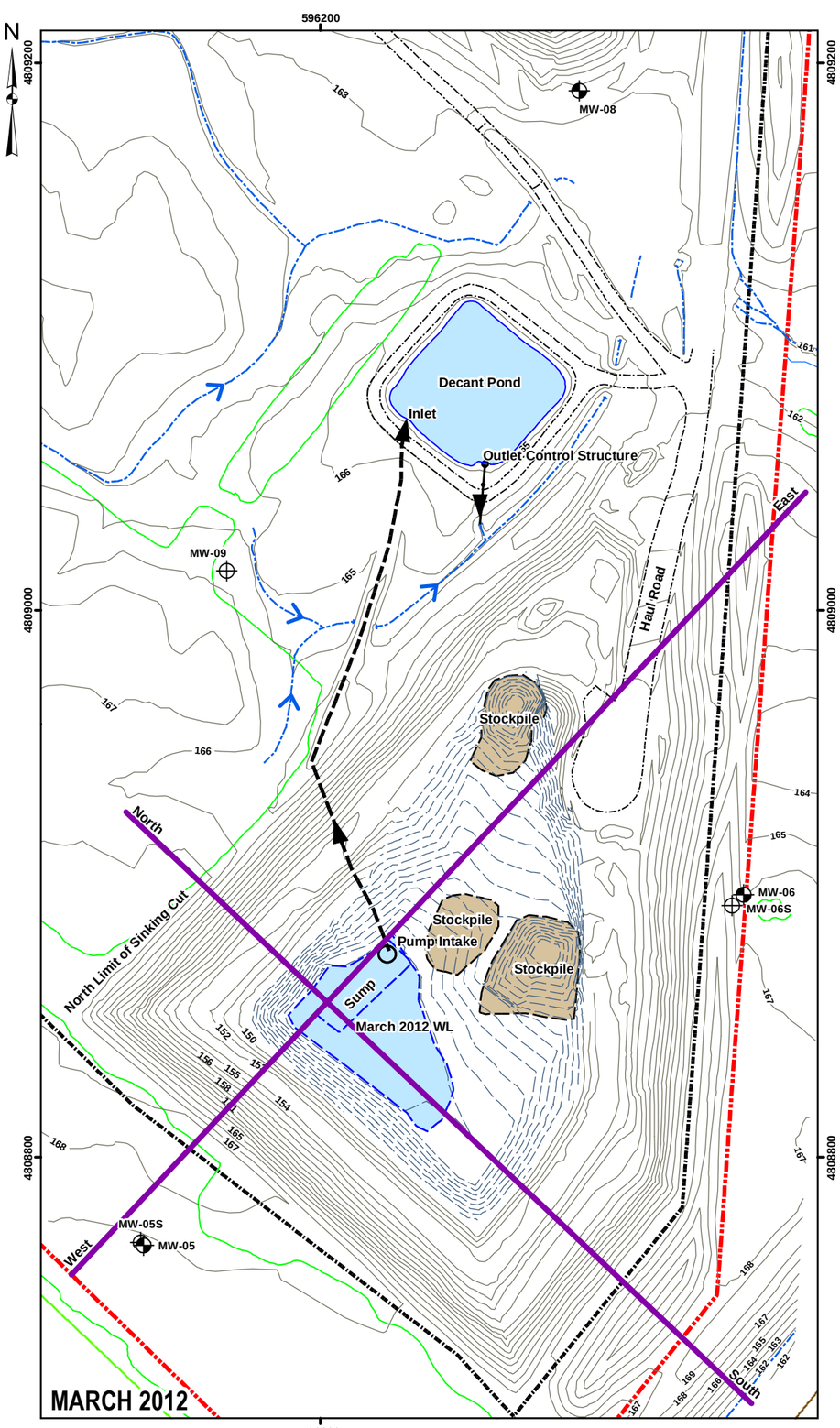




LEGEND

- Monitoring Well (Golder, 2002)
- Monitoring Well (Golder, 2007)
- Test Well (Golder, 2007)
- Section Locations
- Ditch
- Water Body
- Wetland
- Limit of Extraction
- Property Boundary
- Stockpile
- Wooded Areas

NOTE

1. On-Site details obtained from 2009 topographic contour map updated with 2012 field survey data provided by Long Environmental Consultants Inc.
2. Location of sump and pump intake are approximate.
3. Water in sump discharged to north woodlot prior to commissioning of the decant pond in June 2009.

REFERENCE

Base Data - MNR NRVIS, obtained 2004, CANMAP v2005.4
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2006
Datum: NAD 83 Projection: UTM Zone 17N.

0 25 50 100 150

Meters

PROJECT
TANSLEY QUARRY
2011 ANNUAL MONITORING REPORT
HANSON BRICK LTD.

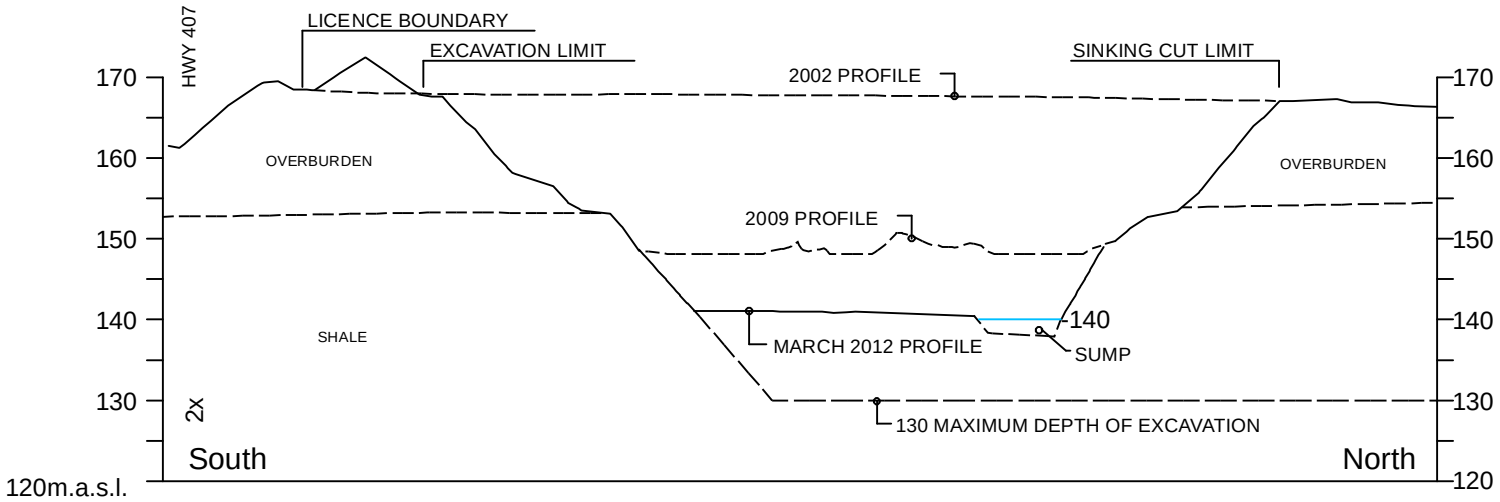
TITLE
OPERATIONAL PROGRESS

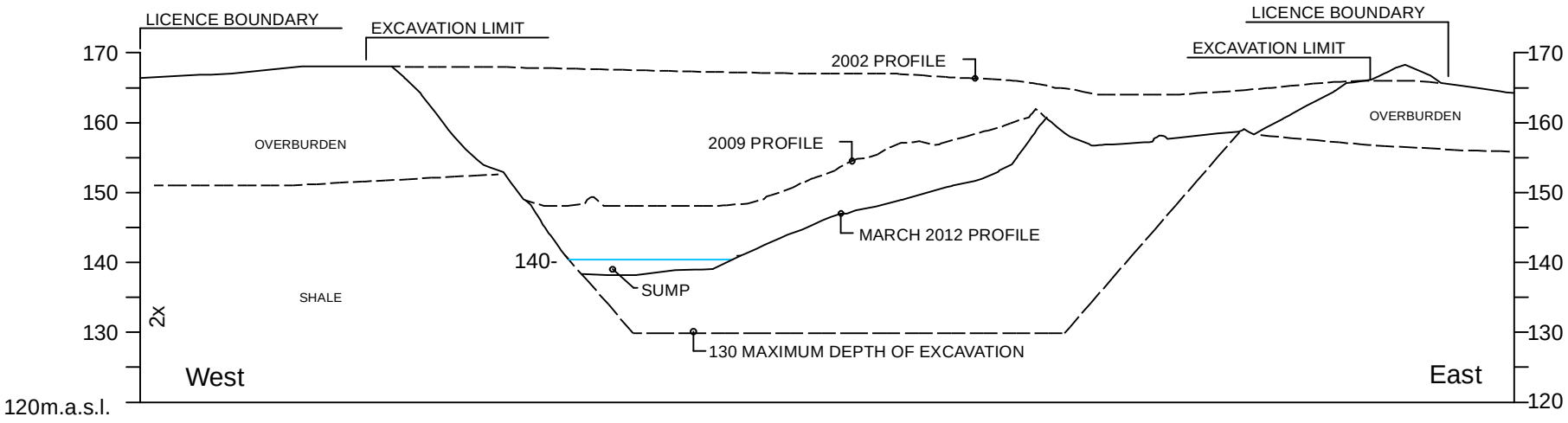
Golder Associates
Mississauga, Ontario

PROJECT NO. 021-1228			SCALE 1:2,000	Ver. 1.0
DESIGN	KD	18 Dec. 2006		
GIS	KD	2 May. 2012		
CHECK	SW	2 May. 2012		
REVIEW	RB	2 May. 2012		

FIGURE: 2

G:\Projects\2002\021-1228_Tremaine_Quarry\GIS\MXDs\Draft\2011_Annual_Report\Operational_Progress.mxd





SOURCE:

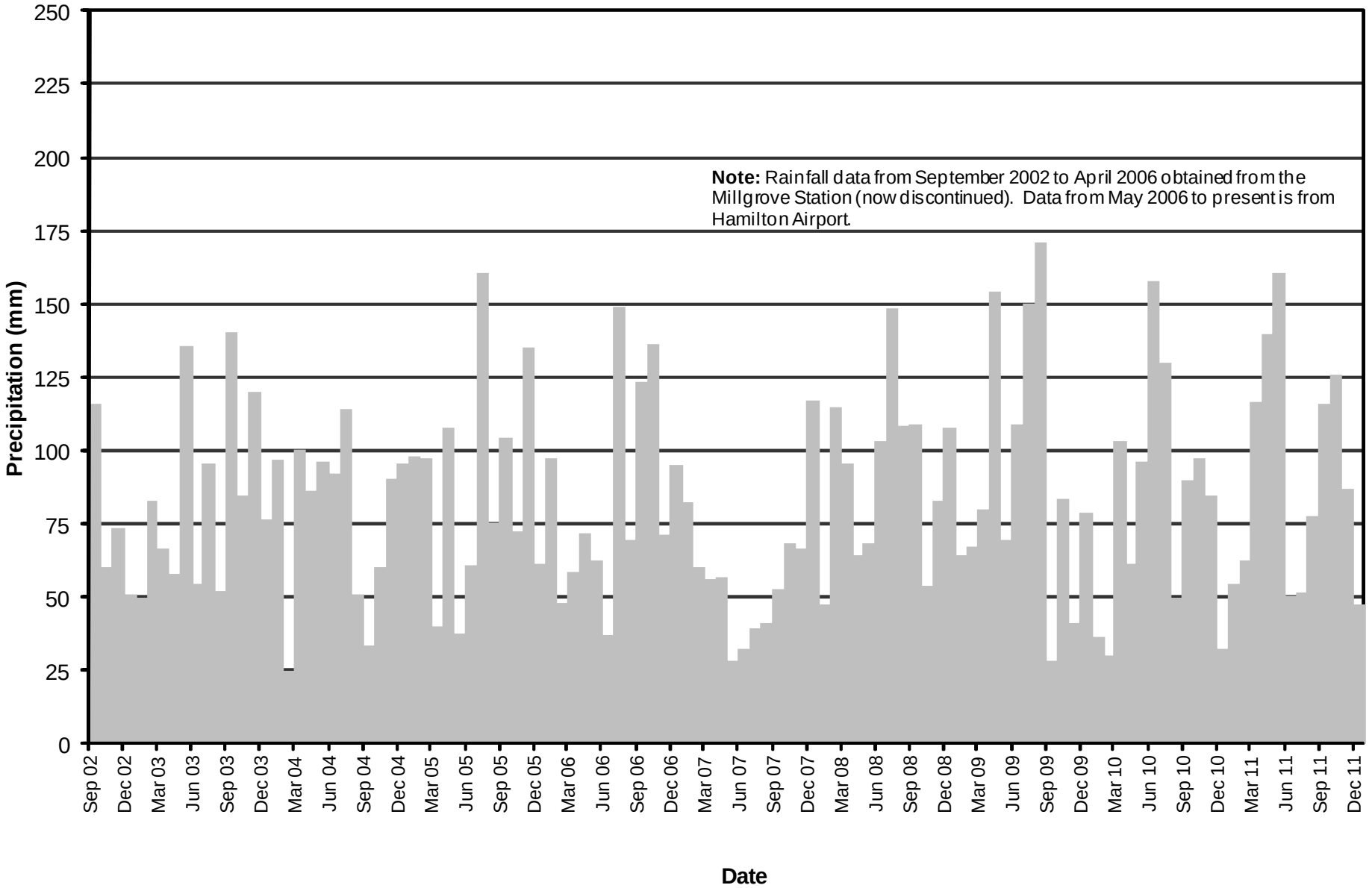
Long Environmental Consultants Inc., April 2012.

PROJECT	TANSLEY QUARRY 2011 ANNUAL MONITORING REPORT HANSON BRICK LTD.
TITLE	**CROSS - SECTIONS**

Golder Associates
Mississauga, Ontario

PROJECT NO. 021-1228			SCALE AS SHOWN	REV. 0.0
DESIGN	KD	12 Apr. 2012	**FIGURE: 3**	
GIS	KD	2 May. 2012		
CHECK	SW	2 May. 2012		
REVIEW	RB	2 May. 2012		

G:\Projects\2002\021-1228_Tremaine_Quarry\GIS\MXDs\Draft\2011_Annual_Report\Cross_Sections.mxd



PROJECT
TANSLEY QUARRY
2011 ANNUAL MONITORING REPORT
HANSON BRICK LTD.

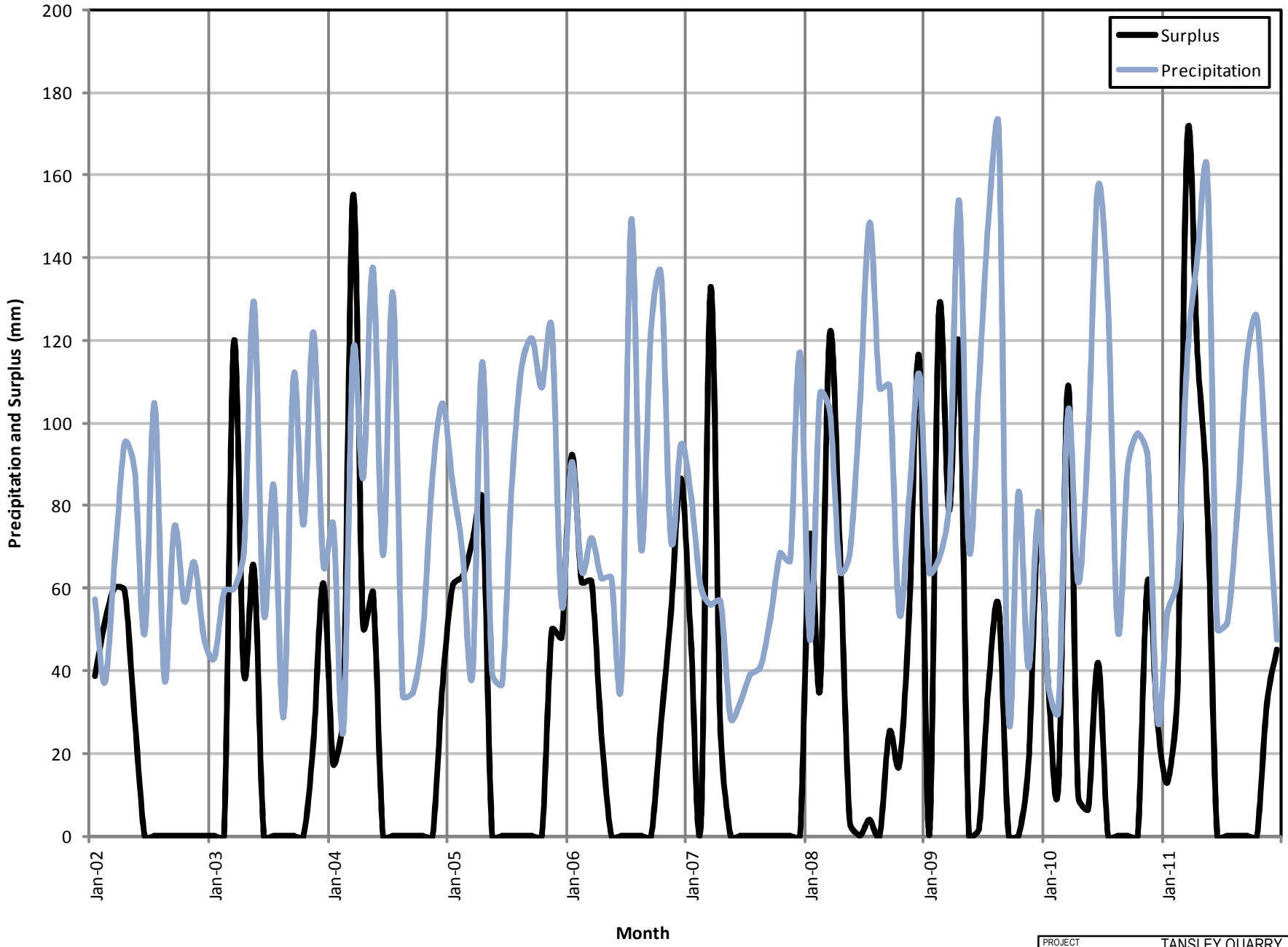
TITLE
MONTHLY PRECIPITATION (MM)
MILLGROVE STATION / HAMILTON AIRPORT

Golder Associates
Mississauga, Ontario

PROJECT NO. 021-1228			SCALE AS SHOWN	REV. 0.0
DESIGN	KD	12 Apr. 2012		
GIS	KD	2 May. 2012		
CHECK	SW	2 May. 2012		
REVIEW	RB	2 May. 2012		

FIGURE: 4

G:\Projects\2002\021-1228_Tremaine_Quarry\GIS\MXDs\Draft\2011_Annual_Report\Monthly_Precipitation.mxd



NOTE

1) Surplus indicates water available for infiltration and runoff.
2) Monthly water budget estimate using daily data to December 14, 2011; data has undergone only preliminary quality checking by Environment Canada.
3) Report will be updated with Environment Canada water balance information when the data becomes available.

PROJECT
TANSLEY QUARRY
2011 ANNUAL MONITORING REPORT
HANSON BRICK LTD.

TITLE
WATER BUDGET - HAMILTON AIRPORT
SEPTEMBER 2002 - DECEMBER 2011

Golder Associates
Mississauga, Ontario

PROJECT NO. 021-1228			SCALE AS SHOWN	REV. 0.0
DESIGN	KD	12 Apr. 2012		
GIS	KD	2 May. 2012		
CHECK	SW	2 May. 2012		
REVIEW	RB	2 May. 2012		

FIGURE: 5

G:\Projects\2002\021-1228_Tremaine_Quarry\GIS\MXDs\Draft\2011_Annual_Report\Water_Budget.mxd

595500 596000 596500 597000

4810000 4809500 4809000 4808500

TW-2 SIMMS PACCIONE WETTLAUFER TW-3 BEKKERS FEATHERSTONE ENO/MYERS WIGGINS MW-02 MW-03 STEVENSON MW-01 ROBINSON MW-07 Overburden Stockpile MW-08 FINUCCI MW-04 MW-10 MW-09 SUGIYAMA SICARD TW-1 MW-11 MW-06 MW-06S HENDERVALE HOUSE WELL HENDERVALE COTTAGE WELL HENDERVALE MAIN BARN WELL Quarry Excavation 2012 MW-05 MW-05S HENDERVALE XYZ BARNS WELL HENDERVALE ABC BARNS WELL

SIDEROAD 2 SIDEROAD 1 CN Railway BURNHAMTHORPE RD W HIGHWAY 407

185 180 175 160 155 150 145 140 165 170

N

LEGEND

- Private Well
- Private Well with Level Logger Installed
- Monitoring Well (Golder, 2002)
- Monitoring Well (Golder, 2007)
- Test Well (Golder, 2007)
- Railways
- Utility Line
- Topographic Elevation Contour (5m Interval)
- 2009 Topographic Elevation Contour (1m Interval)
- 2012 Topographic Elevation Contour (1m Interval)
- Ditch
- Watercourse
- Water Body
- Wetland
- Limit of Extraction
- Property Boundary
- Stockpile

NOTE

On-Site details obtained from 2009 topographic contour map updated with 2012 field survey data provided by Long Environmental Consultants Inc.

REFERENCE

Base Data - MNR NRVIS, obtained 2004, CANMAP v2005.4
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2006
Datum: NAD 83 Projection: UTM Zone 17N.
Imagery: First Base Solutions, 2002.

0 100 200 400 600

Meters

PROJECT
TANSLEY QUARRY
2011 ANNUAL MONITORING REPORT
HANSON BRICK LTD.

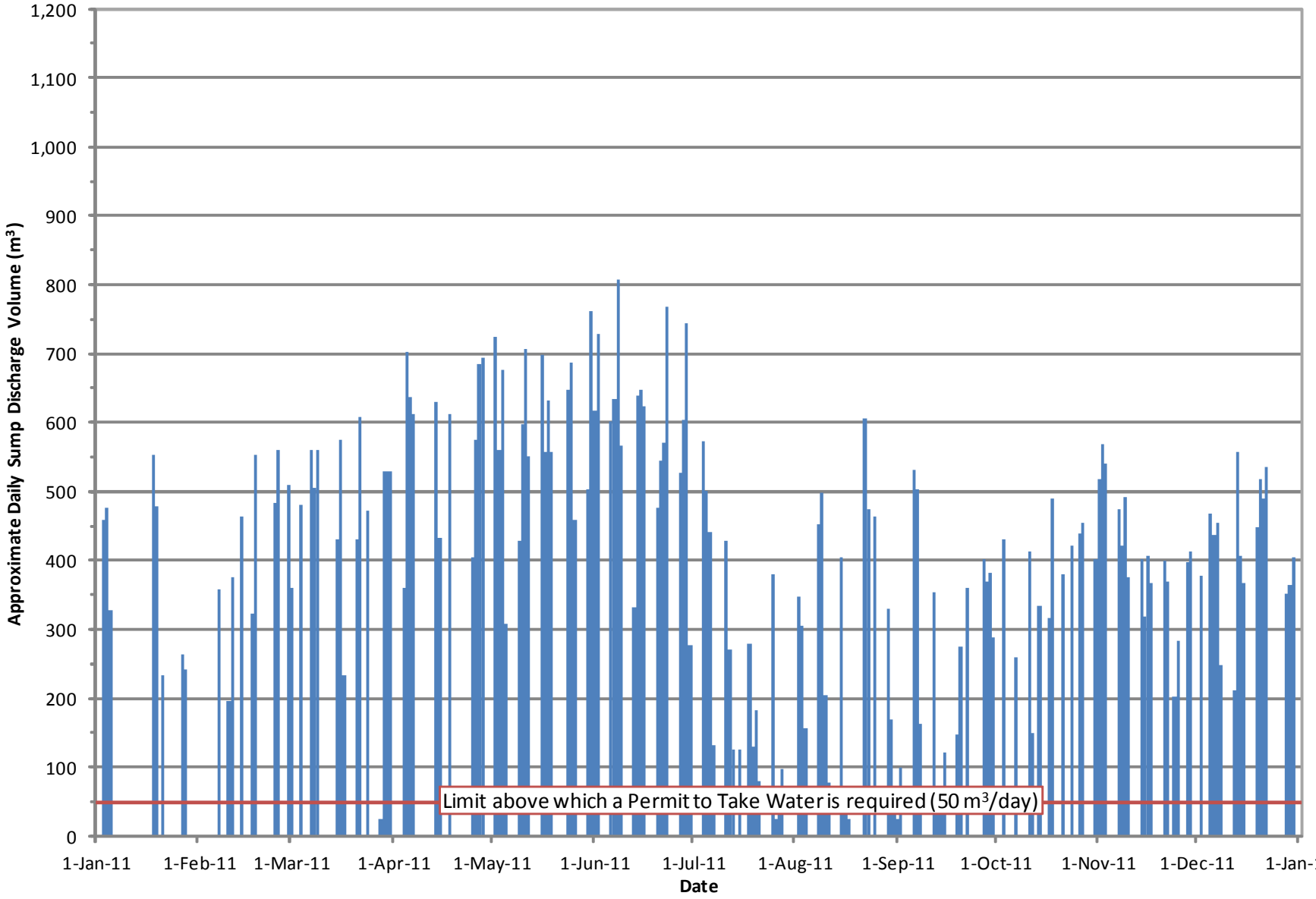
TITLE
MONITORING WELL NETWORK

Golder Associates
Mississauga, Ontario

PROJECT NO. 021-1228			SCALE 1:8,000	Ver. 1.0
DESIGN	KD	18 Dec. 2006		
GIS	KD	2 May. 2012		
CHECK	SW	2 May. 2012		
REVIEW	RB	2 May. 2012		

FIGURE: 6

G:\Projects\2002\021-1228_Tremaine_Quarry\GIS\MXDs\Draft\2011_Annual_Report\Well_Location.mxd



SOURCE:

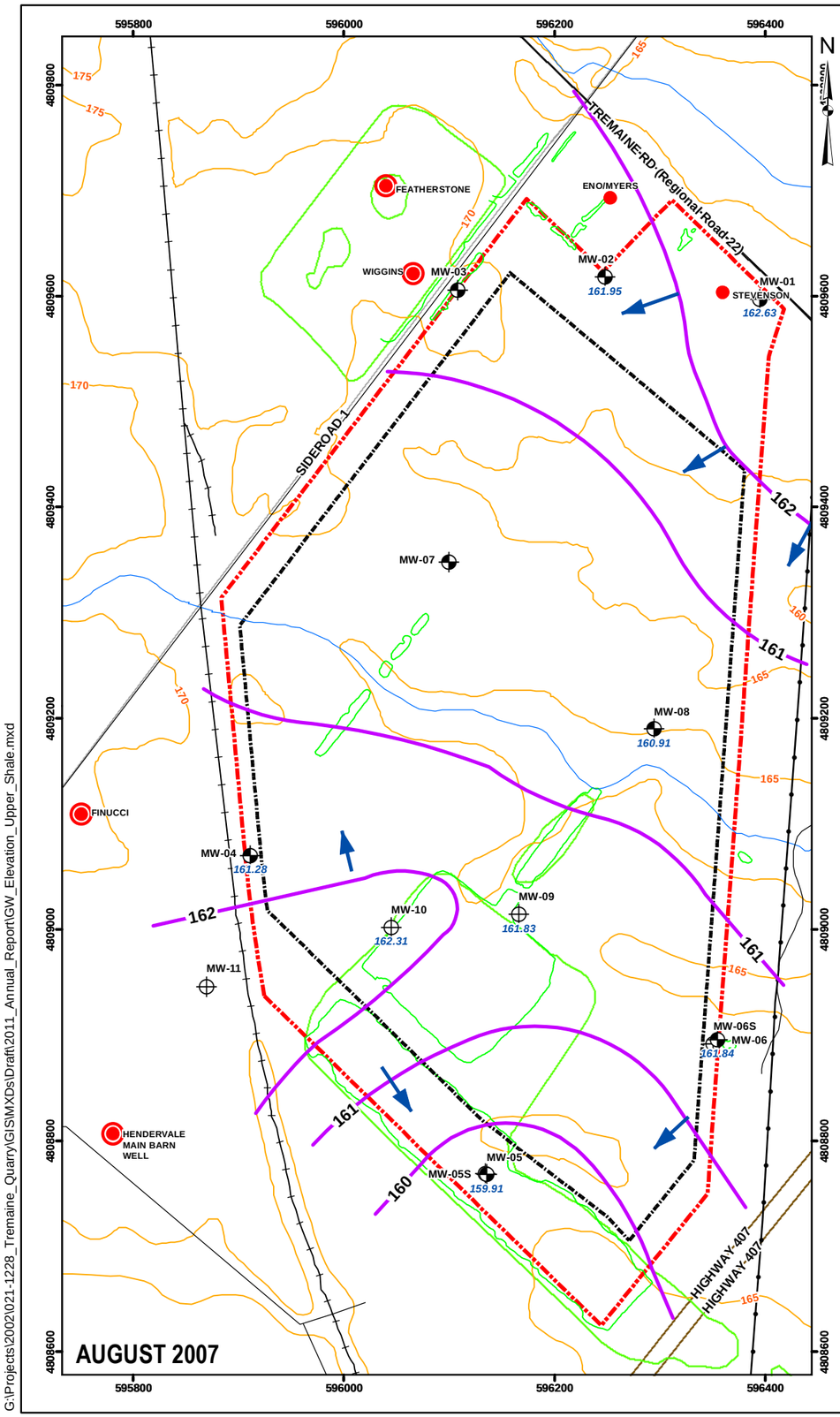
Long Environmental Consultants Inc.

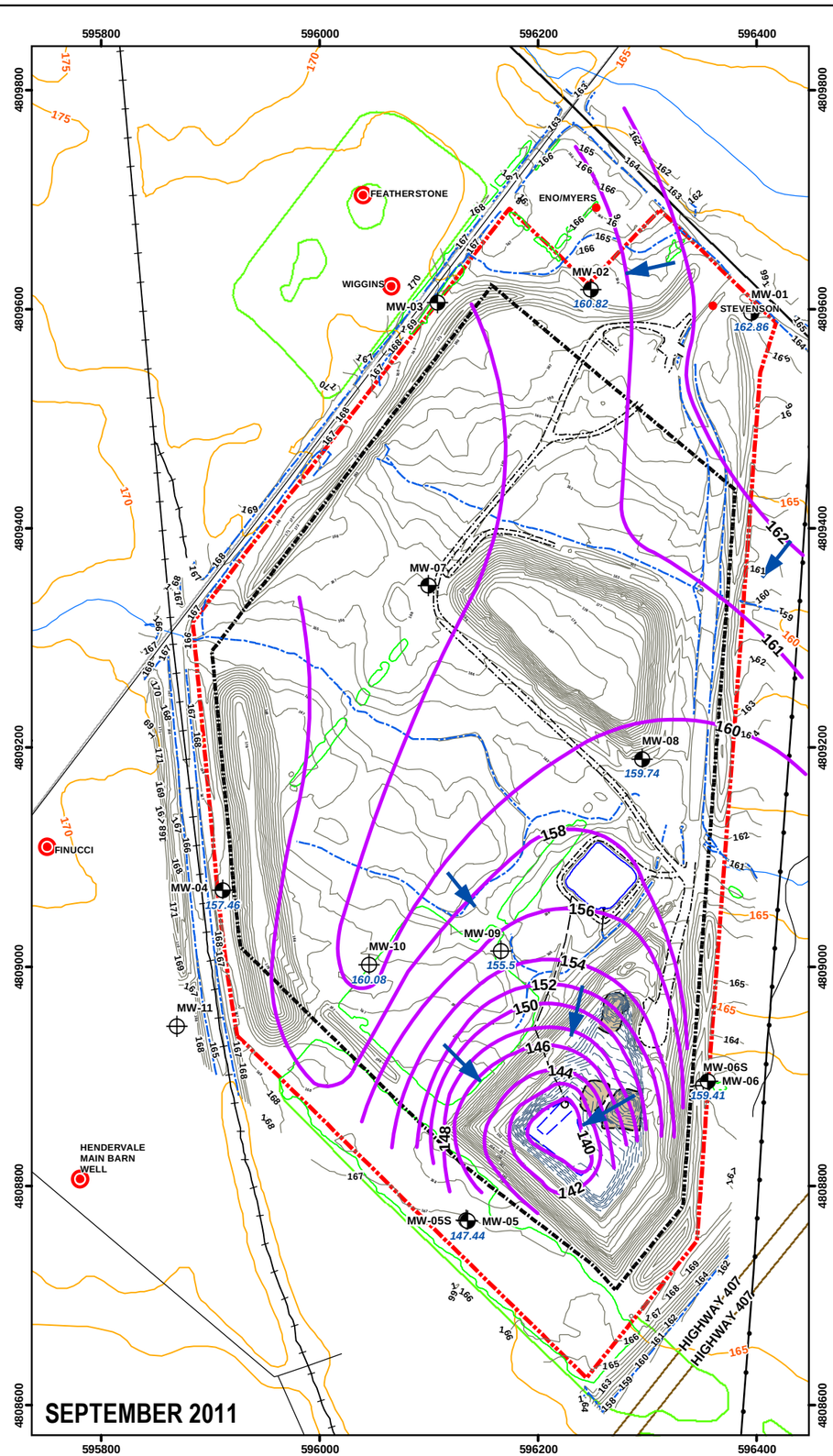
PROJECT	TANSLEY QUARRY 2011 ANNUAL MONITORING REPORT HANSON BRICK LTD.
TITLE	**2011 DAILY SUMP DISCHARGE VOLUMES**

Golder Associates
Mississauga, Ontario

PROJECT NO. 021-1228			SCALE AS SHOWN	REV. 0.0
DESIGN	KD	12 Apr. 2012	**FIGURE: 7**	
GIS	KD	2 May. 2012		
CHECK	SW	2 May. 2012		
REVIEW	RB	2 May. 2012		

G:\Projects\2002\021-1228_Tremaine_Quarry\GIS\MXDs\Draft\2011_Annual_Report\2011 Daily Sump Discharge Volumes.mxd





LEGEND

- Private Well
- Private Well with Level Logger Installed
- Monitoring Well (Golder, 2002)
- Monitoring Well (Golder, 2007)
- Test Well (Golder, 2007)
- Railways
- Utility Line
- Inferred Groundwater Direction
- Groundwater Elevation Contours
- Topographic Elevation Contour (5m Interval)
- 2009 Topographic Elevation Contour (1m Interval)
- 2012 Topographic Elevation Contour (1m Interval)
- Ditch
- Watercourse
- Water Body
- Wetland
- Limit of Extraction
- Property Boundary
- Stockpile
- Wooded Areas

NOTE

On-Site details obtained from 2009 topographic contour map updated with 2012 field survey data provided by Long Environmental Consultants Inc.

REFERENCE

Base Data - MNR NRVIS, obtained 2004, CANMAP v2005.4
Produced by Golder Associates Ltd under licence from
Ontario Ministry of Natural Resources, © Queens Printer 2006
Datum: NAD 83 Projection: UTM Zone 17N.

0 50 100 200 300 400
Meters

PROJECT
TANSLEY QUARRY
2011 ANNUAL MONITORING REPORT
HANSON BRICK LTD.

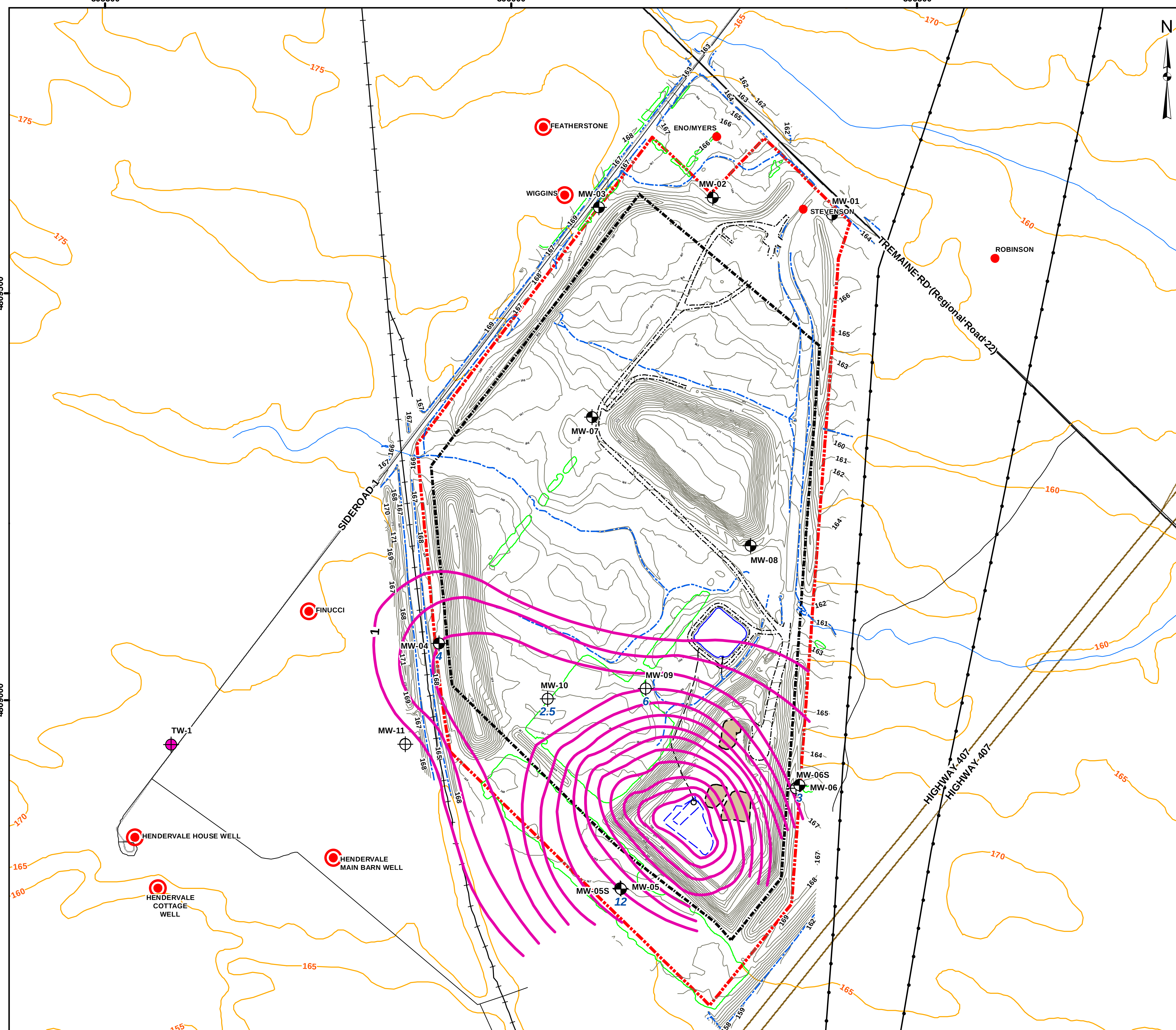
TITLE
GROUNDWATER ELEVATION UPPER (INTERMEDIATE) SHALE

Golder Associates
Mississauga, Ontario

PROJECT NO. 021-1228		SCALE 1:5,000	Ver. 1.0
DESIGN	KD	18 Dec. 2006	
GIS	KD	2 May. 2012	
CHECK	SW	2 May. 2012	
REVIEW	RB	2 May. 2012	

FIGURE: 8

G:\Projects\2002\021-1228_Tremaine_Quarry\GIS\MXDs\Draft\2011_Annual_Report\GW_Elevation_Upper_Shale.mxd



LEGEND

- Private Well
- Private Well with Level Logger Installed
- Monitoring Well (Golder, 2002)
- Monitoring Well (Golder, 2007)
- Test Well (Golder, 2007)
- Railways
- Utility Line
- Drawdown Contour
- Topographic Elevation Contour (5m Interval)
- 2009 Topographic Elevation Contour (1m Interval)
- Ditch
- Watercourse
- Water Body
- Wetland
- Limit of Extraction
- Property Boundary
- Stockpile

NOTE

On-Site details obtained from 2009 topographic contour map updated with 2012 field survey data provided by Long Environmental Consultants Inc.

REFERENCE

Base Data - MNR NRVIS, obtained 2004, CANMAP v2005.4
Produced by Golder Associates Ltd under licence from Ontario Ministry of Natural Resources, © Queens Printer 2006
Datum: NAD 83 Projection: UTM Zone 17N.

0 50 100 200 300 400
Meters

PROJECT
TANSLEY QUARRY
2011 ANNUAL MONITORING REPORT
HANSON BRICK LTD.

TITLE
DRAWDOWN IN UPPER (INTERMEDIATE) SHALE SEPTEMBER 2011

Golder Associates
Mississauga, Ontario

PROJECT NO. 021-1228			SCALE 1:5,000	Ver. 1.0
DESIGN	KD	18 Dec. 2006	**FIGURE: 9**	
GIS	KD	2 May. 2012		
CHECK	SW	2 May. 2012		
REVIEW	RB	2 May. 2012		

G:\Projects\2002\021-1228_Tremaine_Quarry\GIS\MXDs\Draft\2011_Annual_Report\DD_Upper_Shale.mxd

APPENDIX A

Adaptive Groundwater Management Plan (AMP) and Certificate of Approval, Industrial Sewage Works No. 4408-7AUL75

HANSON BRICK LTD.

TREMAINE QUARRY APPLICATIONS

ADAPTIVE GROUNDWATER MANAGEMENT PLAN (AMP)

1. RATIONALE AND GOAL

1.1 Hanson proposes to develop a 38.5 ha quarry in stages, over a relatively long period of time, producing 100,000 to 300,000 tonnes of shale annually. Hanson will first excavate the area described as "Sinking Cut Stage" and then excavate the area described as "Initial Stage", both areas are shown on Figure 1 and Figure 4. There are no predicted groundwater impacts during the Sinking Cut Stage. The Sinking Cut Stage will be completed in five to eight years. The Initial Stage will likely continue for another 10 to 20 years; Full Extraction will likely continue for another 40 to 60 years; and it may take approximately 80 years to fill the rehabilitated, 18.2 ha. lake, based upon average annual precipitation ("Surface Water Assessment Proposed Tremaine Quarry," Phillips Engineering Ltd., January 23, 2004) (Philips, 2004).

1.2 Excavation of shale bedrock during the Initial Stage from below the water table may influence the availability of potable water from private wells within the Potential Zone of Influence ("PZI"). The PZI in this context, refers to the potential drawdown contours, determined by the groundwater flow model shown on Figure 1 ("Hydrogeological Assessment of the Proposed Hanson Brick Tremaine Quarry, Burlington Ontario," Golder Associates, January 2004) (Golder, 2004). This model will be updated periodically as set out in subsection 5.2(h).

1.3 Properties listed in subsections 9.1 and 9.2 with wells within the 0.2 m PZI shown on Figure 1 are referred to herein as "Eligible Properties" and their owners from time to time are referred to as "Eligible Property Owners". Notwithstanding any changes to the PZI area based on additional modeling or data, it is agreed all provisions of this AMP applicable to Eligible Properties or Eligible Property Owners at the date of the AMP Agreement shall always apply to those Eligible Properties and Eligible Property Owners.

1.4 This AMP has been prepared to set out the program by which the potential effects of the quarry can be monitored and to guarantee that affected property owners will have access to an uninterrupted supply of potable water through well restoration; temporary imported water for onsite storage, or private communal water system ("PCWS"). Potable water means water that meets the drinking water quality standards set out in the *Safe Drinking Water Act*, 2002 and its regulations as amended or replaced by law governing drinking water.

1.5 The goals of this AMP are to:

a) Proactively ensure a continuous supply of potable water for property owners whose private wells may be adversely affected by the quarry operation; and

b) Update and refine the groundwater flow model, data and analysis, based upon measured data, to enable proactive prediction of the Potential Zone of Influence, as warranted.

1.6 The following attachments form part of this AMP and may be amended as outlined in subsection 5.2:

Figure 1	Potential Steady State Zones of Influence
Figure 2	Onsite Monitor Network
Figure 3	Communal Water Supply Line
Figure 4	Sinking Cut and Initial Stages
Table 1	Groundwater Level Monitoring Program
Table 2	Groundwater Quality Monitoring Program; and
Schedule 1	Expedited Arbitration for Technical Disputes

Reference in this AMP to Figures 1, 2, 3, and 4 Tables 1 and 2, Schedule 1, and the list in subsection 9.3, should be read to include amendments from time to time as provided for under this AMP and the AMP Agreement.

1.7 All reports prepared under this AMP will be prepared by experts selected and paid for by Hanson, and acceptable to the Region, and will provide for reliance by both Hanson and the Region.

1.8 This AMP is intended to provide the basis for a) an Adaptive Groundwater Management Plan Agreement, between the Region of Halton and Hanson Brick Ltd., b) agreements between owners of the existing business and residences listed in subsection 9.1 of this AMP and c) the Site Plan Drawing 7 – *"Adaptive Groundwater Management Plan"* that accompanies the *Aggregate Resources Act* (ARA) Licence, including excerpts of this AMP. The AMP includes 10 sections:

1. Rationale and Goal
2. Pre-Development Requirements;
3. Related Agreements;
4. Groundwater Monitoring Program;
5. Reporting and Annual Review;
6. Complaints Response Program;
7. Water Supply Restoration Program;
8. Communal Water Servicing;
9. Communal Water Supply Line; and
10. Definitions

2. PRE-DEVELOPMENT REQUIREMENTS

2.1 The groundwater flow model, Golder, 2004, indicates that two existing private wells could be affected, by up to 0.5 m of drawdown, by the completion of the Initial Stage as shown in Figure 1. These wells, (the Finucci Well and the Hendervale Farms' Main Barn Well) are predicted to have

sufficient capacity to sustain this order of drawdown. However, continuous monitoring of those wells, selected on and offsite monitor wells installed for the quarry; and monitoring of other potentially affected wells in the area will enable regular updating of the flow model and the corresponding PZI.

2.2 As soon as possible after the Halton Region Council has adopted the Official Plan Amendment, including policy amendments, to permit a private communal water system, Hanson will commence the class environmental assessment approval process for the establishment of the PCWS and will, to the extent permission from private landowners is granted:

a) Complete the baseline survey of private wells listed in subsection 9.1 and any other private wells located within 1,000 m of the boundaries of the site, generally on Tremaine and Burnhamthorpe Roads, No. 1 and No. 2 Sideroad, and including these lots substantially within the 0.2 M PZI :

Road	PIN
No. 2 Sideroad	07201-0008
No. 2 Sideroad	07201-0045
Tremaine Road	07201-0101
Tremaine Road	24927-0133

b) Complete upgrades, meter and monitor installations, for private wells listed in subsection 9.1. Upgrades, subject to the consent of the well owners, will include repairs to the existing wells and water systems, by Hanson's licensed contractor, at a cost of up to $3,000 (as adjusted annually to reflect C.P.I. increase plus GST) ("as Adjusted") per well.

c) After work in subsection 2 b) is completed, estimate yield of private wells ("Well Yield Estimate") for the Finucci well, the Wiggins well, Hendervale house well, Hendervale cottage well, Hendervale XYZ barn well. Well Yield will be estimated by the following procedure: i) remove pump from well, ii) conduct step drawdown test at 3 specific rates (30 minute test per step) iii) monitor well recovery to static conditions to within 90% of the initial water level; iv) pump well dry iv) monitor well recovery to static conditions to within 90% of the initial water level and v) determine an estimate of well yield by interpreting results of step drawdown test and results of monitoring water level recovery in well.

d) Complete the installation of the proposed initial onsite and offsite groundwater monitoring network comprised of the monitoring wells and private wells described in Tables 1.1 and 1.4 in the locations shown on Figure 1, a continuous groundwater level monitor and meter on the drilled well of the lands municipally known as 3369 Burnhamthorpe Road owned by Mr. Jack Proud as of the date of the AMP Agreement (PIN 24927-0021), and a continuous groundwater level monitor and meter on Productive Wells. A Productive Well is a well which, when pumped continuously, is capable of sustaining its pumping rate and recovering to 90% of its yield after 30 minutes.

2.3 Hanson will initiate the monitoring program, set out in section 4, upon issuance of the ARA Licence; and will complete the Initial Monitoring Report, described in section 5, within 90 days after issuance of the ARA Licence.

3. RELATED AGREEMENTS

3.1 Prior to issuance of the ARA Licence, Hanson will enter the following Agreements with the Region:

a) Adaptive Groundwater Management Plan Agreement (AMP Agreement)

b) Private Communal Water System Agreement

c) Transportation Servicing Agreement

d) Access Agreement

e) Framework Agreement

3.2 Hanson will provide the Region of Halton with letters of credit and other financial assurance required by the Region to guarantee Hanson's performance under the agreements referred to in 3.1, above.

4. GROUNDWATER MONITORING PROGRAM

4.1 The annual monitoring program will initially include (in the first year), to the extent permission from landowners is granted:

a) Monthly collection of water level data from transducers and data loggers from monitoring wells on Figure 1 and more particularly described as "continuous" in Tables 1.1 to 1.4, for the first Annual Report during the initial period of monitoring, with future expansion of data collection, as developed through reporting and annual review.

b) Monthly collection of manual water levels from the Existing Private Wells on Figures 1 and 2.

c) Monthly collection of continuous monitor and meter data from on-site and private monitoring wells referred to in paragraph 2.2(d).

4.2 Annual collection of water samples from the wells set out in Tables 1.1 to 1.4, for laboratory analysis for the parameter suite listed in Table 2. Hanson will collect quarterly water samples from Productive Wells of Eligible Property Owners who request re-sampling until the dwellings are connected to the PCWS.

5. REPORTING AND ANNUAL REVIEW

5.1 Annual reporting will be implemented during the first calendar year following issuance of ARA Licence and continue for the term of the AMP Agreement. The following interim reporting will be provided prior to the preparation of the first annual report:

a) An Initial Monitoring Report on the baseline survey and monitoring, described in sections 2 and 4, prepared to the standard of the annual reports, set out below, including updated modeling; and

b) Monthly submissions of all monitoring results, within 30 days of commencement of monthly monitoring, to the Ministry of Natural Resources (MNR), Ministry of Environment (MOE) and the Region of Halton Planning & Public Works Department, with a letter report and updated tables and hydrographs, during Year 1.

5.2 Annual reports will be submitted by April 30th each year, for the preceding calendar year, to the MNR, MOE and the Region of Halton Planning & Public Works Department. Summaries and any information collected that relates to each Eligible Property Owner's well will be provided by Hanson to the Eligible Property Owner. Annual Reports will be available for viewing at the Region and on the water informational website of Hanson Brick. The reports will include:

a) The results of groundwater level and quality monitoring for the period, with comparisons to the results of historical monitoring;

b) Assessment of the water levels and quality at the onsite and offsite monitors and private wells, for evidence of any adverse effects or indication that adverse effects may occur;

c) Review onsite and offsite monitors and private wells to assess, report and provide recommendations on their adequacy, configuration, replacement and monitoring frequency (i.e. manual or transducer recording), and on the need for additional testing to determine Well Yield Estimates;

d) Recommendations for setting triggers for Hanson to implement contingency mechanisms and responses to triggers, as identified in the Initial Monitoring Report, based upon the available monitoring data;

e) An opinion on the potential for and time frame over which one or more other private wells, referred to in subsection 2.2 a) might be compromised to the extent that restoration may be required;

f) An opinion about the sufficiency of data to predict whether the wells on lots substantially within the 0.2 m PZI listed in subsection 2.2 a) might be compromised to the extent that well restoration could be required;

g) A comparison of neighbouring wells assessments to previous modeling and assessments, with a recommendation for revising the model assumptions, and updating the scope of monitoring and modeling;

h) The modeling will be updated for the annual report that applies to the year that the Sinking Cut Stage is completed, and prior to commencing excavation beyond the northern limit of the Sinking Cut Stage;

i) A review of the Potential Zone of Influence, with recommendation for revising the zone and the configuration and measurement frequency for onsite and offsite monitors and private wells; and

j) A concise evaluation of the effects of the quarry operation, with recommendations for adjustment of Quarry operations to minimize adverse effects on water supply;

5.3 Notwithstanding the requirement to report annually, Hanson will report any unusual water level or quality data, during the year, within 30 days of detection. "Unusual data" refers to changes in levels or quality which were not anticipated, based upon previous modeling and monitoring.

5.4 Annual Reports will be submitted for the approval of the Region of Halton and at the same time, a summary and any information collected about any Eligible Property Owner's well will be provided by Hanson to the Eligible Property Owner.

5.5 Hanson will compensate the Region of Halton for its costs to administer this AMP and to review and approve the Annual Reports.

5.6 Hanson will comply at its expense with recommendations in the Annual Report within the timelines set out in the Annual Report. Revisions and amendments to this AMP, approved by the Region and the MNR as a result of Annual Report review and approval, will be reflected in an updated version but will not require formal amendments to the AMP Agreement, ARA Site Plan, or Permit to Take Water, unless so required by the approving agency. Hanson and the Region will confirm in writing that the revised AMP replaces Schedule A of the AMP Agreement. Such amendments will be binding on Hanson, and upon amendment, Hanson shall be responsible for preparing a consolidation of the AMP.

5.7 Any recommended change(s) to the operation of the quarry and/or to the ARA site plan will be submitted to the Ministry of Natural Resources to be formally reviewed and processed as a site plan amendment in accordance with section 16 of the Aggregate Resources Act.

5.8 Any revised or consolidated AMP will be circulated by Hanson to the Region, MOE, MNR, and Eligible Property Owners.

6. COMPLAINTS RESPONSE PROGRAM

6.1 This section 6 applies to responding to complaints about wells of Eligible Property Owners, except i) that complaints about the barn wells on the property municipally known as 5244 No. 1 Sideroad with PIN 07201-0018 ("the Hendervale Barn Well(s)") are to be resolved in accordance with section 7 and ii) as indicated below in subsections 6.7 and 6.8. Notwithstanding any potential future changes to the 0.2 m PZI, this section shall apply, and continue to apply to Eligible Properties to which it applied at the date of the AMP Agreement.

6.2 At any time prior to operation of the PCWS, Hanson will, at its expense, provide, install, and maintain (including any necessary cleaning and disinfection) a Cistern System for any of the Eligible Property Owners, upon request. A Cistern System refers to an underground storage tank and any plumbing required to connect the tank up to the property owner's internal water system, with a minimum storage capacity of 3,000 Imperial Gallons (13,600 litres). The tank will be installed in an area directed by the homeowner which is clear of trees, utilities and similar obstacles in close proximity to the dwelling, if, and that is clearly identified to, and approved by, Hanson.

6.3 Hanson will, at its cost, engage a local licenced Water Supply Maintenance Contractor, ("Contractor") on call 24/7, and Potable Water Supplier ("Water Supplier") for the Eligible Property Owners as set out in subsections 6.4, 6.5 and 6.6 and provide contact details to those owners.

6.4 Hanson will be responsible to keep the cisterns filled with water in the amounts set out in subsection 6.6. The cisterns will be equipped with a low level alarm. At any time that an Eligible Property Owner believes that the cistern requires refilling, he may contact the Water Supplier, who will fill the cistern at Hanson's expense.

6.5 The Eligible Property Owners may at any time they believe their water quality or quantity has been compromised, contact the Contractor at no charge or cost to the Region or the Owner (at Hanson's expense).

6.6 In the event that a complaint has been received pursuant to subsection 6.5 for an Eligible Property, the Contractor will provide as soon as practicable, and in any event within twenty-four hours of receiving the complaint, at Hanson's expense, a temporary supply in the form of trucked delivery of potable water, as frequently as required, in an amount up to the greater of:

a) the difference in daily volume between the Well Yield Estimate before excavation of the Initial Stage commenced and the Well Yield Estimate at the time of complaint, if the difference is more than 10%; or

b) 360 litres (79 imperial gallons) per day per resident with a minimum of 1000 litres (220 imperial gallons) per day for each Eligible Property.

6.7 This subsection 6.7 applies to wells on Eligible Properties set out in subsections 9.1 and 9.2 at the date of the Initial Monitoring Report ("Pre-existing Wells"). The Contractor will, as soon as practical, conduct a private well water system inspection on Pre-existing Wells, and complete any required maintenance or repair, at a cost of up to $3,000, as Adjusted, without authorization from Hanson. This is a one time expenditure per well by Hanson.

6.8 This subsection applies to i) Pre-existing Wells in subsection 9.1 properties that are Productive Wells, that is the Finucci well, Wiggins well, Hendervale house and cottage wells, ii) Pre-existing Wells in the subsection 9.2 properties that are Productive Wells at the date of the Initial Monitoring Report or an Annual Report iii) any Pre-existing Well on the property municipally known as 3500 Tremaine Road (PIN 07201-0064) that is a Productive Well at the date of the Initial Monitoring Report or Annual Report.

a) If the water supply has not been restored with the expenditures in subsection 6.7, the matter will be immediately referred to a qualified hydrogeologist selected by Hanson, and approved by the Region, (the "Hydrogeologist").

b) The Hydrogeologist shall, within six weeks of his or her retainer by Hanson complete an assessment and report on the well failure, the cause of the well failure (although cause of well failure does not affect Hanson's obligations in this section 6), whether it can be restored, and recommend a restoration option or options which will be based on consideration of all reasonable restoration options that can be achieved for a cost of less than $15,000 (as Adjusted). Restoration options shall include the well restoration options set out in subsection 7.3 below. Well restoration will be achieved if a well is restored to 90% of the Well Yield Estimate before the effect of the Quarry ("Successful Well Restoration").

c) Hanson will ensure that the Hydrogeologist's report is provided to the MOE, Region of Halton, and any Eligible Property Owner whose well is being restored. The Eligible Property Owner may engage a hydrogeologist to review the report up to an amount of $2,000, as Adjusted at Hanson's expense.

d) If the Hydrogeologist report concludes that restoration of water quality and/or quantity is not achievable at a cost of less than $15,000 (as Adjusted), Hanson will, at its cost, supply trucked, potable water in the amount set out in subsection 6.6, until connection to the PCWS is provided in subsection 6.9.

e) If the Hydrogeologist's report concludes that water quantity and/or quality can be restored by implementing a restoration option at a cost of less than $15,000 (as Adjusted) in addition to the $3,000, As Adjusted spent on repairs referred to in subsection 6.7, Hanson will, subject to obtaining the Owner's consent, implement the well restoration option at Hanson's expense, such expense to not more than $15,000 (as Adjusted).

f) If at some future date, the recommended restoration option fails, and a complaint is received with respect to a well which has been restored under this subsection, Hanson will investigate and implement further possible restoration measures. The cost of this investigation and restoration will not exceed $5,000 (as Adjusted). This is a one time expenditure per well by Hanson.

g) In the case where Hanson is unable to achieve Successful Well Restoration, Hanson will continue to be responsible to provide trucked potable water to the Eligible Property Owner pursuant to subsection 6.6.

6.9 The well restoration and trucked potable water supply program provided for in this section 6 will cease to apply once the property is connected to the PCWS, and supplied with potable water in compliance with the PCWS Agreement.

7. WATER SUPPLY RESTORATION PROGRAM

7.1 The Water Supply Restoration Program will be implemented to restore a) private wells beyond the 0.2M PZ1, b) private wells on lots listed in subsection 2.2 a), lots substantially within the 0.2 m PZI to the extent that these lots have wells within the 0.2 m PZI, c) lots within any future revised 0.2 m PZI, and d) the Hendervale Main Barn and ABC Barn Wells.

7.2 Wells will be restored under this section 7 if the Well Yield Estimate is reduced as a result of the quarry excavation. Successful Well Restoration is as defined in subsection 6.8 b). The objective is to restore water with an on-site groundwater supply, if feasible. As such, all feasible well restoration options will be explored first before connecting the property to the PCWS through subsection 7.5 b).

7.3 If a private well owner believes his well is compromised, he may contact Hanson. Hanson's Contractor and Hydrogeologist will investigate, at Hanson's costs, whether the well has been adversely affected by operation of the quarry, based upon Well Yield Estimates and historical groundwater monitoring data. If the Well Yield Estimate has not been reduced by more than 10% as a result of the operation of the quarry, Hanson will not be responsible to restore the well. If the Well Yield Estimate has been reduced by more than 10%, as a result of operation of the quarry, Hanson's Contractor and Hydrogeologist will recommend feasible restoration options through the steps in subsection 6.8 a) to e) except that the cost limit referred to in subsections 6.8 b) d) and e) will be $30,000 (as Adjusted). Feasible restoration options may include the following:

a) Well System Rehabilitation
The well system could be rehabilitated by deepening or replacement of pumps, pump lines flushing, etc., to improve well performance.

b) Well Replacement
The well could be replaced or augmented with a new well that could be located further from the quarry excavation. The feasibility of well replacement would be based on a test drilling program that could include more than one test well.

c) Additional Wells
Additional wells could be installed to supplement the supply of existing well(s). The feasibility of well replacement would be based upon a test drilling program that could include more than one test well.

d) Trickle Well(s) with Cistern(s)
Where feasible, the existing well(s) would be converted to a low yield pumping system, or installation of an additional well, including large diameter bored well(s) if appropriate; along with construction of a cistern to increase water storage.

7.4 While determining the cause of well failure and feasible options, Hanson will supply sufficient potable water to the owner. If it is found that the Quarry excavation did not compromise the well, and that the Owner's request is frivolous, Hanson may seek private remedies against the owners for costs of supplying potable water.

7.5 The Region, after considering the Hydrogeologist's report in consultation with Hanson and the MOE, will determine whether the well has been compromised by quarry caused interference and the feasibility of well restoration options. In the event that the Region determines that the well has been compromised by Hanson's quarry and

a) a well restoration option is feasible, the Region will determine which option and Hanson will implement it at Hanson's cost, or

b) well restoration options are not feasible, or if the restoration option fails to provide adequate supply of potable water, Hanson will continue to supply trucked, potable water until the owner of the well can be provided with water service by connection to the extended PCWS on an expeditious basis. The amount of water provided by the PCWS shall be a maximum rate of 2000 l/day/dwelling. The amount of water provided for private wells serving uses other than domestic use shall be the difference between the Well Yield Estimate before the effect of the quarry and the current Well Yield Estimate.

If Hanson, the Owner or Well Owner disagrees with the Region's determination in a) or b), Hanson, the Region, Owner or Well Owner may initiate expedited arbitration set out in Schedule 1 of this AMP by sending a Notice of Technical Arbitration to the other Parties within fourteen (14) calendar days of receipt of the determination.

7.6 Subsection 9.3 will be revised from time to time to include a list of any additional dwellings and buildings serviced by the private communal water system.

8. COMMUNAL WATER SERVICING

8.1 A private communal water system will be designed, constructed, maintained and operated to provide potable water supply to properties identified through the AMP process, all at Hanson's expense. Without derogating from the obligations in the PCWS Agreement or AMP Agreement, Hanson will operate the PCWS in compliance with the *Safe Drinking Water Act* and its regulations as amended or replaced from time to time. The PCWS may be expanded as a result of recommendations from the Reporting and Annual Review described above. The Environmental Study Report prepared for the Class Environmental Assessment shall evaluate all reasonable alternative solutions and identify a preferred option for the establishment of the PCWS, including the source of water. Prior to construction, the Region of Halton will approve the design, plans, specifications and location of the PCWS and any expansions to the PCWS. The PCWS will be completed in accordance with the PCWS Agreement.

8.2 The rural water line is expected to be of 100 mm diameter and located on Tremaine Road, from 300 m south of Highway 407 northerly to No. 1 Sideroad; then westerly on No. 1 Sideroad to the Hendervale residence at No. 5244 No. 1 Sideroad with PIN 07201-0018, as drawn on Figure 3. Hanson will install, at its own expense, prior to PCWS operation, a Service to, and a Service Valve on, the property line of all lots of record listed in subsections 9.1, 9.2 and 9.3.

8.3 In order to effect connection to the PCWS:

a) property owners listed in subsection 9.1 and 9.3 (as determined in subsection 7.5(b))

with dwellings at the time of installation of the PCWS, must install, at Hanson's expense, a Private Service from the Service Valve to the interior of dwellings identified in subsection 9.1, Water Meter, Backflow preventers, and, if requested by Hanson, a Remote Reader;

b) Property owners listed in subsection 9.2 (vacant lots) must install and pay for the Private Service, Water Meter, Backflow Preventer, and if requested by Hanson, Remote Reader;

c) Water Service components must be established, installed and maintained to Regional Standards; and

d) Individual property owners will abide by standard Water Service Terms provided by Hanson setting out the terms and conditions for the supply of water, including, but not limited to, all of the responsibilities in this section 8.

8.4 The property owners shall be responsible to maintain the Private Service and Backflow Preventer, including thawing of frozen Private Services. Hanson is not responsible to thaw frozen Private Services. At no time shall a Private Service be used to service more than one registered lot (Lot of Record) or dwellings not identified in section 9.

8.5 Hanson shall own and be responsible to maintain the Service, Water Meter, and Remote Reader. Hanson shall not be liable for any damages which may arise as a consequence of the thawing of frozen Water Service components, or the interruption or discontinuation of water supply as a result of an emergency, breakdown, repair or extension if reasonable notice of intention to interrupt or reduce service is given. Hanson will have the usual rights that a municipal water supplier and operator has such as the rights: to set limits on water use; to enter land and buildings in order to inspect, install, repair, alter or disconnect Water Service components; to discontinue or reduce the supply of water if the owner does not maintain the Private Service or Backflow Preventer or for non-payment of water bills.

8.6 Whenever Hanson connects a building or dwelling to the PCWS, Hanson will, at its own expense, decommission the well(s) using a Licenced Well Driller, and in accordance with the Wells Regulation (Ontario Regulation 903), subject to the owner's permission to use the well for monitoring purposes, and will decommission cistern systems to the satisfaction of the Region. Property owners may elect to continue to use their wells in addition to the PCWS water supply, on the conditions that a) there is no cost or liability to Hanson in relation to the well once the dwelling is connected, and b) the property owner establishes to the Region's satisfaction that the existing well and associated plumbing are in good structural condition, comply with applicable laws, guidelines and regulations including the MOE Wells Regulation and *Building Code Act,* and that the two water supply systems have been separated by a Backflow Preventer in accordance with Halton Region By-law nos. 157-05 and 42-04, as amended or replaced.

8.7 Hanson has agreed to assume the cost of maintaining the Private Communal Water System in perpetuity as further provided in the PCWS Agreement, unless municipal service becomes permitted and is available.

8.8 The serviced property owners connected to the PCWS will be expected to pay Hanson for their metered water consumption no more than the Region's 12-20 mm monthly meter charge and the water usage charge, as amended by the Region from time to time, excluding the cast iron watermain and wastewater surcharges, to be adjusted as such charges are amended by the Region from time to time, subject to private arrangements that Hanson may make with the property owners. Such private arrangements will not bind the Region.

8.9 It is predicted that there will be no impact on private wells within the first five years of Quarry operation, during which time only the Sinking Cut Stage area depicted on Figure 4 will be excavated. If despite concerted efforts by Hanson:

a) approvals, including but not limited to the Region's consent to commence construction of the PCWS, are not obtained for the PCWS by the earliest of :

(i) within 42 months from obtaining its ARA Licence or

(ii) prior to excavating beyond the Sinking Cut Stage;

or

b) if the PCWS is not constructed, installed, tested and fully operational within the earliest of

(i) 18 months of receiving the Region's consent to commence construction of the PCWS,

(ii) 5 years of issuance of the ARA Licence, or

(iii) prior to excavating beyond the Sinking Cut Stage,

then Hanson will cease excavation and dewatering and notify the Region and owners of properties listed in section 9. Subject to the extension in subsection 8.10, Hanson will rehabilitate the excavated area of the quarry, allow it to fill with water and surrender the ARA Licence.

8.10 If construction has been commenced within 6 months of the Region's authorization to commence construction but not completed, installed, tested and fully operational within the earlier of

a) 2 years of the Region's authorization to commence construction of the PCWS; or

b) 5 years of the issuance of the ARA Licence,

in both cases for reasons outside of Hanson's control, then Hanson is permitted an extra 6 months to complete construction. In no event shall there be excavation beyond the Sinking Cut Stage until the PCWS is fully installed, tested and operational.

8.11 If the ARA Licence is surrendered, suspended or revoked before the PCWS is fully operational then Hanson will continue to provide potable water to Eligible Property Owner, until Hanson's hydrogeology report, as approved by the Region, shows that there is no interference from the Quarry

operations on private wells.

9. COMMUNAL WATER SUPPLY LINE

The private communal water supply service will be initially available to the owner of any lot of record as set out in 9.1 and 9.2. The Potential Zone of Influence will be updated through the review process in section 5, and will assist, along with water level data and Well Yield Estimates, to identify wells that may be affected in the future by the quarry. The Private Communal Water Supply service will be provided to lots with wells that are affected by the operation of the quarry, and which cannot be restored, through the process set out in section 7. Additional lots that are connected to the PCWS will be added to 9.3.

9.1 Existing Dwellings and Buildings located within the 0.2M PZI

Address	Owner	Building to be connected	PIN
3278 Tremaine Road	Sicard	dwelling	07201-0072
3287 Tremaine Road	Sugiyama	dwelling	24927-0108
3451 Tremaine Road	Robinson	dwelling	24927-0022
3500 Tremaine Road	Eno/Myers	dwelling	07201-0064
3510 Tremaine Road	Hansen	dwelling	07201-0063
3466 Burhamthorpe Road	Bekker	dwelling	24927-0110
5493 No. 1 Sideroad	Featherstone	dwelling	07201-0049
5465 No. 1 Sideroad	Wiggins	dwelling	07201-0048
5300 No. 1 Sideroad	Finucci	dwelling	07201-0062
5244 No. 1 Sideroad	Hendervale	Main House Farm House Cottage	07201-0018

9.2 Existing Vacant Lots of Record located within the 0.2 M PZI

Road	Owner	# on Figure 3	PIN
Tremaine Road	Stevenson	1	07201-0066
Tremaine Road	Robinson	5	24927-0109
Tremaine Road	# 1251638 Ontario Inc.	6	07201 - 0011
No. 1 Sideroad	Ironrose Investments Ltd	2	07201-0104
No. 1 Sideroad	Ironrose Investments Ltd.	7	07201-0097
No. 1 Sideroad	Pelletterio	3	07201-0105

9.3 **Additional Dwellings, Buildings and lots which may be, or are, connected to the private communal water system through the Water Supply Restoration Program in section 7 of the AMP (to be revised as the program progresses).**

Address	Owner	Building	PIN	Status
52544 No. 1 Sideroad	Hendervale	Main Barn well	07201-0018	Potential connection

10.0 DEFINITIONS

In this AMP the following expressions have the meanings set out below.

ARA as defined in subsection 1.8

as Adjusted as defined in subsection 2.2 (b)

Backflow Preventer is the same as Backflow Prevention Device defined in the Regional Municipality of Halton By-law No. 42-04 as amended from time to time

Cistern System as defined in subsection 6.2

Contractor as defined in subsection 6.3

Eligible Properties as defined in subsection 1.3

Eligible Property Owners as defined in subsection 1.3

Hendervale Barn Wells as defined in subsection 6.1

Hydrogeologist as defined in subsection 6.8 (a)

Initial Stage as defined in subsection 1.1

MNR as defined in subsection 5.1 b)

MOE as defined in subsection 5.1 b)
Operative Agreements as defined in subsection 3.1

PCWS as defined in subsection 1.4

Potable Water is defined in subsection 1.4

Pre-existing Wells as defined in subsection 6.7

Private Service means the portion of the Service that is located on private property.

Productive Well as defined in subsection 2.2 d)

PZI as defined in subsection 1.2

Regional Standards means, for the Water Service, the standards required by the Region in By-law Nos. 42-04 and 157-05

Remote Reader means a device used to record the quantity of water and is locted in an area remote from the Water Meter to which it is connected.

Service means the pipe which is connected to a water main distribution system which is designed to carry potable water within the municipal right of way.

Service Valve means a device consisting of a valve and box located at the property boundary for controlling the flow of water to a Private Service.

Sinking Cut Stage as defined in subsection 1.1

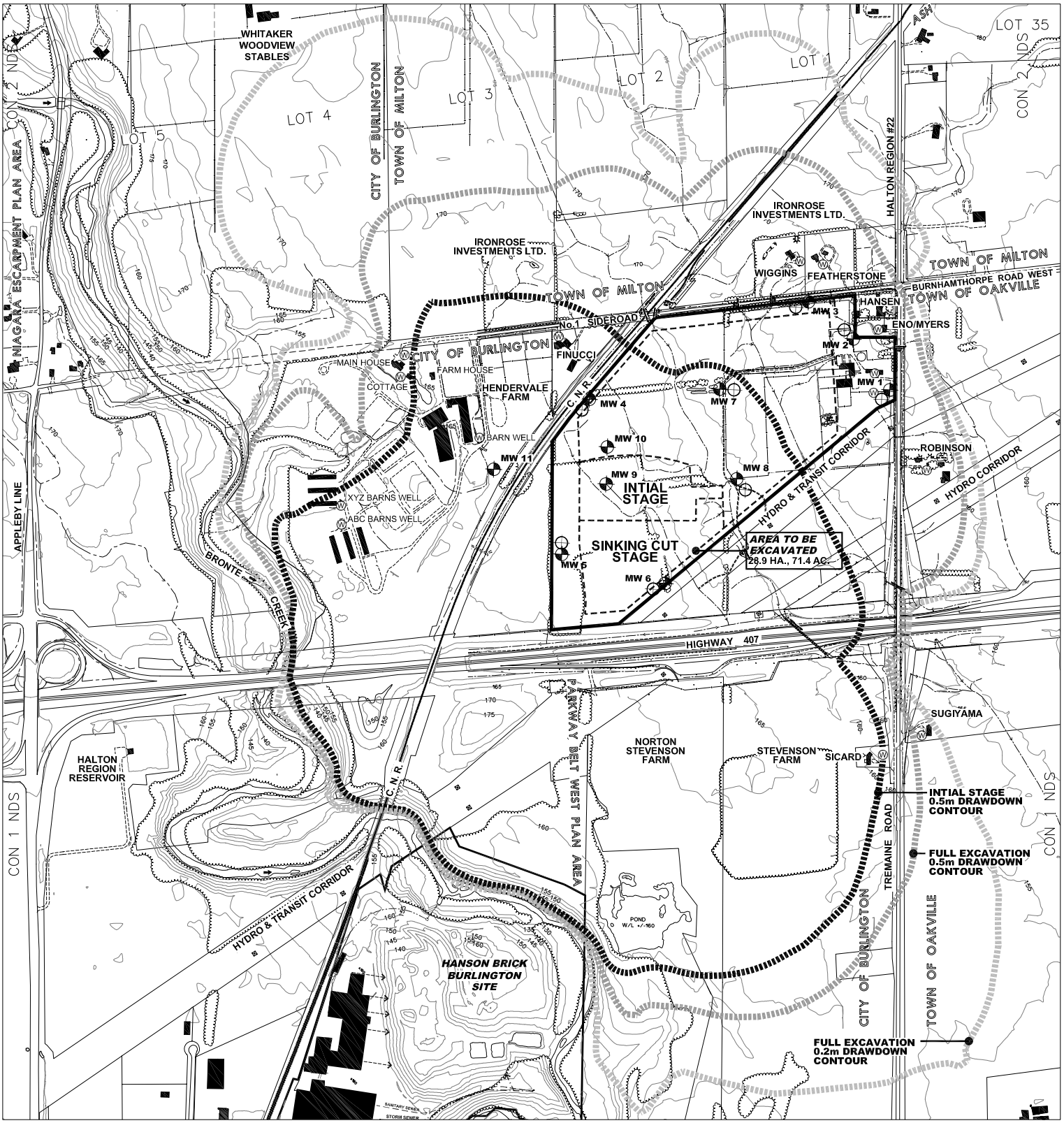
Successful Well Restoration as defined in subsection 6.8 b)

Water Meter means a device or mechanism which is the property of Hanson used for the purpose of measuring the flow and quantity of water consumed.

Water Service means all of the physical and mechanical equipment and devices to fully and completely service a property with water including the Water Meter.

Water Supplier as defined in subsection 6.3

Well Yield Estimate as defined in subsection 2.2 c)



INTIAL STAGE, 0.5m PZI

FULL EXCAVATION, 0.5m PZI

FULL EXCAVATION, 0.2m PZI

NESTED MONITOR WELLS 1-11

SHALLOW MONITOR WELLS 1-8

EXISTING PRIVATE WELLS

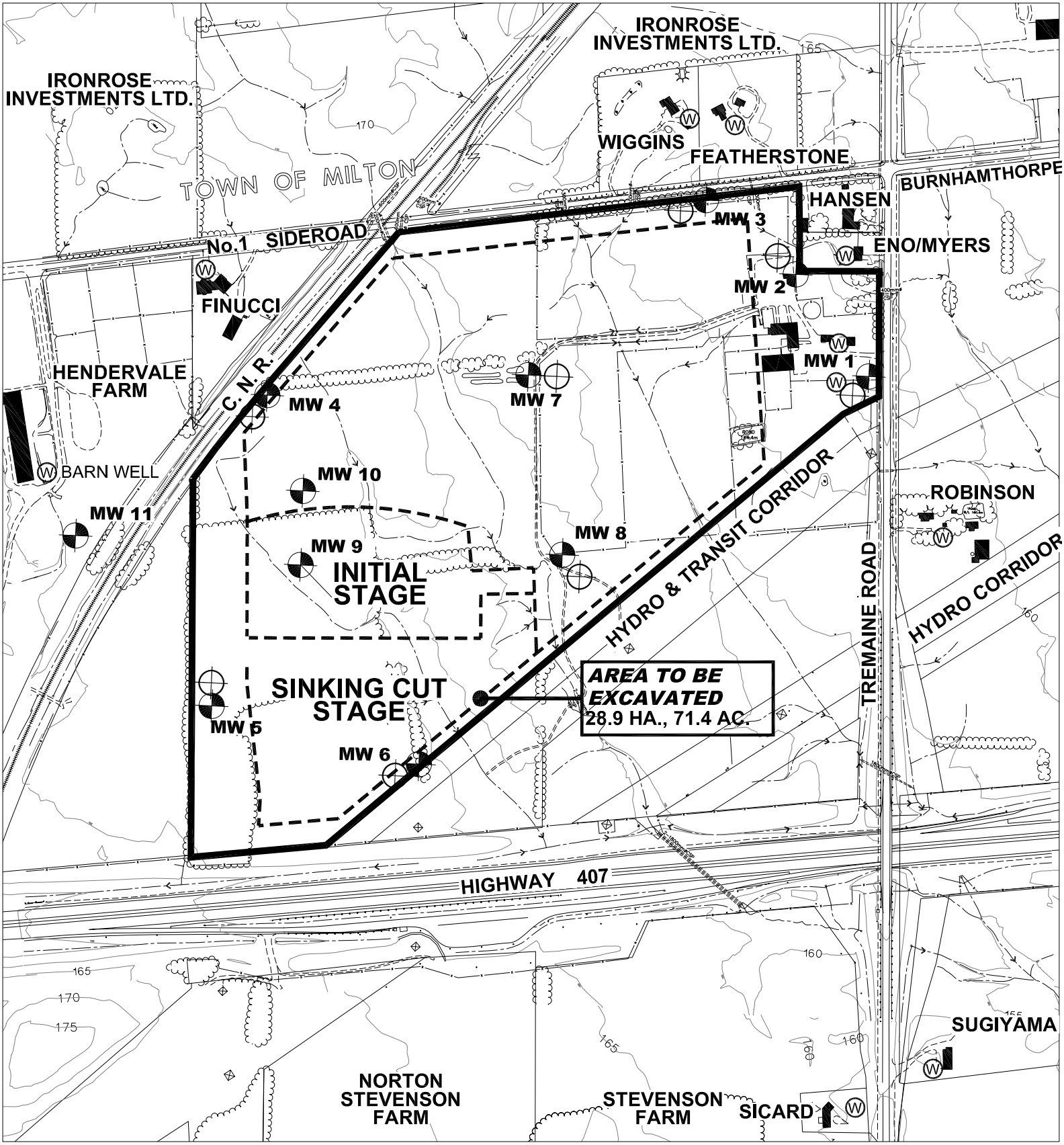
Source: Golder Associates, June 2005

Figure 1

POTENTIAL STEADY STATE ZONES OF INFLUENCE

Scale: 1: 12,500

13 November 2006



- EXISTING NESTED MONITOR WELLS MW1-MW8
- PROPOSED SHALLOW MONITOR WELLS MWS1-MWS8
- PROPOSED SENTINEL WELLS MW9-MW11
- EXISTING PRIVATE WELLS

Figure 2

ONSITE MONITOR NETWORK

Scale: 1: 6,000

Source: Golder Associates, June 2005

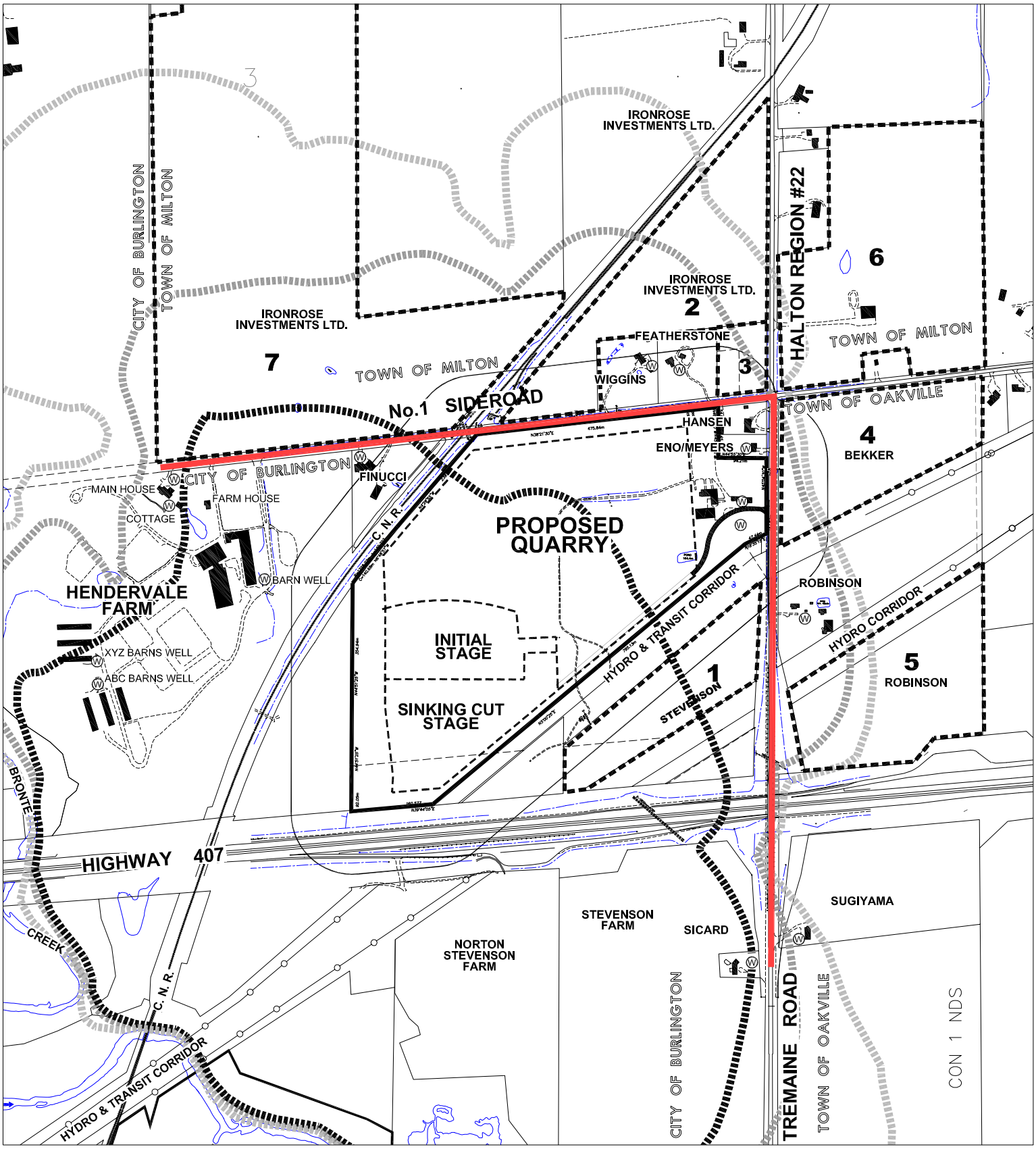
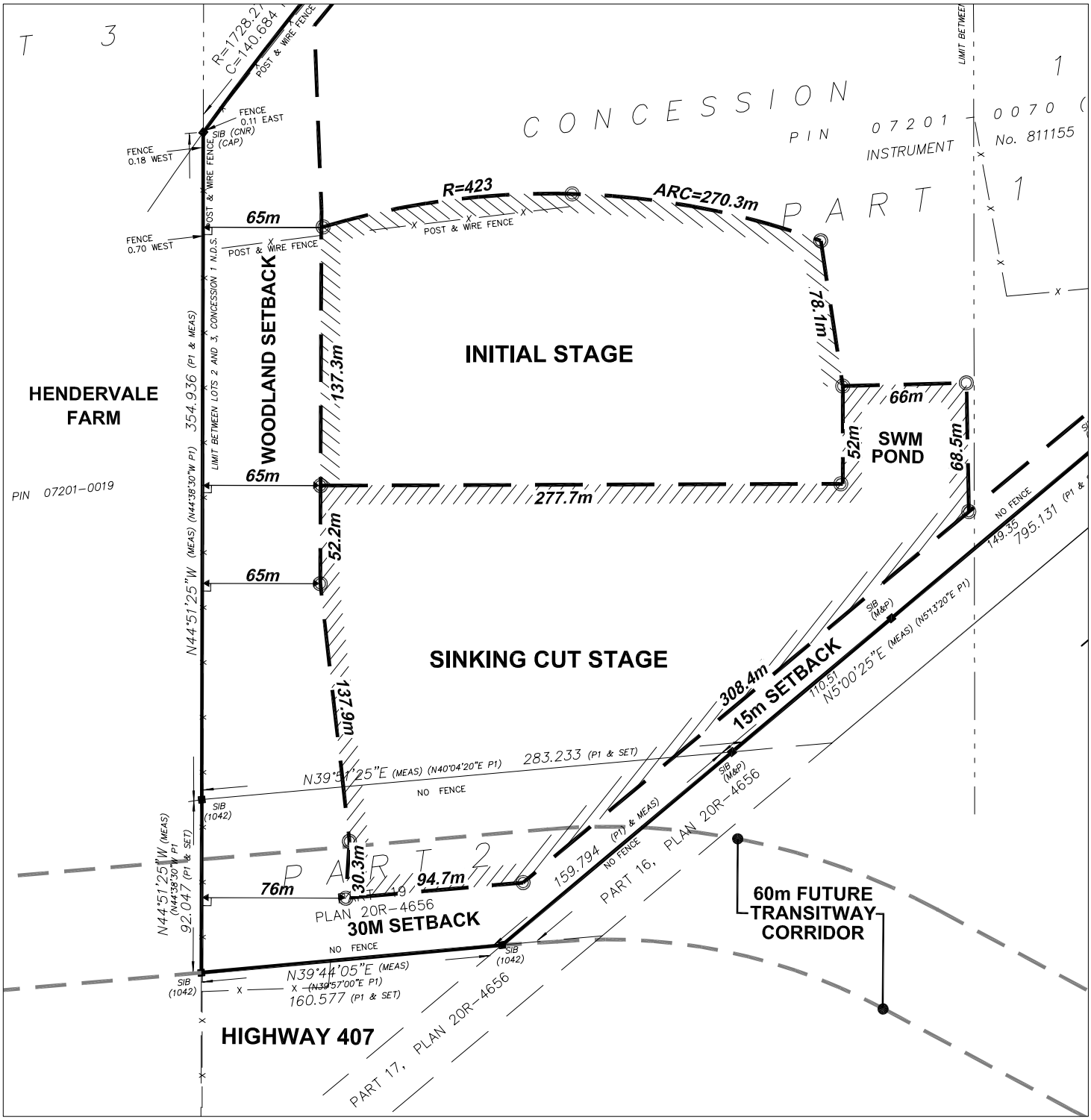


Figure 3

COMMUNAL WATER SUPPLY LINE

Scale: 1 : 10,000

13 November 2006



Source: Plan of Survey, 20R-14660 by Mackay Mackay & Peters Limited Completed 21 May 2002.

MAXIMUM DEPTH OF EXCAVATION
TO ELEVATION 130.0 m.a.s.l.

◎ 1.2m WOOD MARKER POSTS

Figure 4

SINKING CUT & INITIAL STAGES

NORTH

Scale: 1:3,000

13 November 2006

TABLE 1.1 Groundwater Level Monitoring Program

Monitoring well /depth	*Monitoring Frequency*	*Comments*
MW1S	M	Previously called MW01-C
MW1I	M	Previously called MW01-B
MW1D	M	Previously called MW01-A
MW2S	M	Previously called MW02-C
MW2I	M	Previously called MW02-B
MW2D	M	Previously called MW02-A
MW3S / 26-47'	M	Previously called MW03-B
MW3D / 110-130'	C	Previously called MW03-A
MW4S	M	Previously called MW04-C
MW4I	M	Previously called MW04-B
MW4D	M	Previously called MW04-A
MW5S	M	Previously called MW05-C
MW5I	C	Previously called MW05-B
MW5D	M	Previously called MW05-A
MW6S / 10-23'	C	Previously called MW05-B
MW6I / 75-95'	M	Previously called MW05-A
MW7S / 17-27'	M	Previously called MW07-B
MW7D / 125-145'	M	Previously called MW07-A
MW8S	M	Previously called MW08-C
MW8I	M	Previously called MW08-B
MW8D	M	Previously called MW07-A

Notes:

1. **Names for existing wells**
   Original names from Golder Associates (2004); Figures 8, 9, 10 &A.1 to A.8
   Reference: Golder Technical Memorandum, October 16, 2006
   Revised names from R.J. Long Table 1 revised October 28, 2006

2. **Proposed monitoring**
   M: Monthly (manual)
   C: Continuous (pressure transducer)
   MW 1-6 inclusive and MW 11 are intended as permanent monitoring wells as they are located beyond the limit of excavation
   S = Shallow, I = Intermediate, D = Deep Piezometers

TABLE 1.2 Proposed new sentinel dedicated monitoring wells

Monitoring well	*Monitoring Frequency*	*Comments*
MW9S	C	
MW9I	C	
MW9D	C	
MW10S	C	
MW10I	C	
MW10D	C	
MW11S	C	
MW11I	C	
MW11D	C	

TABLE 1.3 Proposed new shallow dedicated monitoring wells

Monitoring well	*Monitoring Frequency*	*Comments*
MWS1	C	
MWS2	C	
MWS3	C	
MWS4	C	
MWS5	C	
MWS6	C	
MWS7	C	
MWS8	C	

TABLE 1.4 Domestic wells

*Domestic well**	*Monitoring Frequency*	*Comments*
Featherstone	C	
Finucci	C	
Proud	C	
Hendervale Main House	C	
Hendervale Cottage	C	
Hendervale Main Barn	C	
Hendervale ABC Barns	C	
Hendervale XYZ Barns	C	
All other available wells	M	

Notes:

* Subject to receiving Owner's permission

TABLE 2 Groundwater Quality Monitoring Program

General Chemistry	Anions	Metals	Other
Alkalinity, ammonia as N, nitrate as N, nitrite as N, hardness, pH, TSS, turbidity, sulphide.	bromide, chloride, fluoride, sulphate.	aluminium, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, calcium, chromium, cobalt, copper, free cyanide, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, phosphate, phosphorous, total phosphorous, potassium, selenium, silicon, silver, sodium, strontium, thallium, tin, titanium, uranium, vanadium, zinc.	Phenols

NOTE: ANNUAL REVISIONS TO TABLES 1 AND 2 AND THE ADAPTIVE GROUNDWATER MANAGEMENT PLAN, THROUGH ANNUAL REPORT REVIEW AND APPROVAL, WILL NOT REQUIRE FORMAL AMENDMENTS TO THE AMP AGREEMENT, PTTW CONDITIONS OR SITE PLAN.

SCHEDULE 1

Expedited Arbitration for Technical Disputes

The following rules and procedure shall apply to any matter to be arbitrated by the Parties (Hanson, the Region, and Well Owner) under subsection 7.5 of the AMP

1. INITIATION OF ARBITRATION PROCEEDINGS

a) A Party wishing to initiate Expedited Arbitration shall send out a Notice of Technical Arbitration to the other Parties setting out the particulars of the matter in dispute and name a Technical Arbitrator (defined below) who is available to decide the matter within the time periods specified in this schedule.

b) For the purposes of this Schedule, a Technical Arbitrator shall mean an individual agreed between the Parties as being qualified in the subject matter of the dispute. The Technical Arbitrator shall be at arm's length from the Parties and shall not be a member of any firm regularly retained by any of the Parties. Hanson and the Region will establish a list of Technical Arbitrators and may add to or delete from the list upon mutual agreement between the Hanson and the Region.

2. EXCHANGE OF WRITTEN SUBMISSIONS

a) Within twenty-one (21) days after the delivery of the Notice of Technical Arbitration, each party shall send the other Parties and the Technical Arbitrator a statement ("the Written Submissions") setting out in sufficient detail, the facts and any contentions of law on which it relies, and the relief that it is seeking. The Written Submissions shall be accompanied by copies of all essential documents on which the party concerned relies and which have not previously been submitted by any party.

b) Within twenty-one (21) days of the receipt of the Written Submissions the Technical Arbitrator shall hold a hearing to determine the dispute. Further the Parties agree to continue to negotiate in good faith to attempt to resolve the dispute up to the date of such hearing.

3. DECISION

a) The Technical Arbitrator shall decide the procedure for the hearing to ensure that the dispute is resolved as fairly, efficiently and cost effectively as possible. By submitting to arbitration under this Schedule, the Parties shall be taken to have conferred on the Technical Arbitrator the jurisdiction and powers set out in this Schedule.

b) The Technical Arbitrator will send her or his decision to the Parties as soon as practicable after the conclusion of the hearing.

c) Any decision made by the Technical Arbitrator is final and binding.

4. COSTS OF ARBITRATION

Hanson will pay for the administrative costs of the arbitration including the costs of the Technical Arbitrator, and costs for the room, if any. Each party will bear its own costs in the arbitration.

5. ARBITRATIONS ACT

The rules and procedures of the Arbitrations Act shall apply to any arbitration undertaken hereunder except to the extent that they are modified by express provisions of this Schedule.

Ontario

Ministry of the Environment | Ministère de l'Environnement

CERTIFICATE OF APPROVAL
INDUSTRIAL SEWAGE WORKS
NUMBER 4408-7AUL75
Issue Date: February 4, 2008

Hanson Brick Ltd.
5155 Dundas St W PO Box 248
Burlington, Ontario
L7R 3Y2

Site Location: Tansley Quarry
West Side of Tremaine Rd South Side of No. 1 Sideroad
Burlington City, Regional Municipality of Halton

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

the establishment of sewage works for the collection, transmission, treatment and disposal of groundwater and surface water accumulating in the confines of the excavated area of the quarry , consisting of the following:

- one (1) sump, with minimum measurements of 10 metres wide, 10 metres long and 2 metres deep, equipped with a pump operating at a minimum of 300 litres per minute, discharging to the decant pond;

- one (1) decant pond with a total active volume of 2,900 cubic metres and a sediment storage volume of approximately 1,225 cubic metres, discharging via an outlet control structure, consisting of a hickenbottom structure with a 150 millimetre diameter reverse gradient pipe, control manhole and 300 millimetre diameter discharge pipe with a control valve, to an existing watercourse that drains to 14 Mile Creek;

- all other controls, electrical equipment, instrumentation, piping, pumps, valves and appurtenances essential for the proper operation of the aforementioned sewage works;

all in accordance with the following submitted supporting documents:

1. Application for Approval of Industrial Sewage Works submitted by Stephen Luckett of Hanson Brick Ltd. dated October 30, 2007;

2. Tansley Quarry - Design Report for Industrial Storm Drainage, dated November 2007, prepared by Long Environmental Consultants Inc.;

3. Electronic mail and attachments dated December 18, 2007 and January 14, 2008 from Bob Long of Long Environmental Consultants Inc. to Randy Chin of the Ministry of the Environment.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"Certificate" means this entire certificate of approval document, issued in accordance with Section 53 of the *Ontario Water Resources Act* , and includes any schedules;

"Director" means any Ministry employee appointed by the Minister pursuant to section 5 of the *Ontario Water Resources Act* ;

"District Manager" means the District Manager of the Halton-Peel District Office of the Ministry;

"Ministry" means the Ontario Ministry of the Environment;

"Owner" means Hanson Brick Ltd. and includes its successors and assignees; and

"works" means the sewage works described in the Owner's application, this certificate and in the supporting documentation referred to herein, to the extent approved by this certificate.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL CONDITION

(1) Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the works in accordance with the description given in this Certificate, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this Certificate.

(2) Where there is a conflict between a provision of any submitted document referred to in this Certificate and the Conditions of this Certificate, the Conditions in this Certificate shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

2. CHANGE OF OWNER

(1) The Owner shall notify the District Manager and the Director, in writing, of any of the following changes within 30 days of the change occurring:

(a) change of Owner or operating authority, or both;

(b) change of address of Owner or operating authority or address of new owner or operating authority;

(c) change of partners where the Owner or operating authority is or at any time becomes a

partnership, and a copy of the most recent declaration filed under the *Partnerships Registration Act* ;

(d) change of name of the corporation where the Owner or operator is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" (Form 1, 2 or 3 of O. Reg. 189, R.R.O. 1980, as amended from time to time), filed under the *Corporations Information Act* shall be included in the notification to the District Manager;

(2) In the event of any change in ownership of the works, the Owner shall notify in writing the succeeding owner of the existence of this certificate, and a copy of such notice shall be forwarded to the District Manager.

(3) The Owner shall ensure that all communications made pursuant to this condition will refer to this certificate's number.

3. OPERATIONS MANUAL

(1) The Owner shall prepare an operations manual prior to the commencement of operation of the sewage works, that includes, but not necessarily limited to, the following information:

(a) operating procedures for routine operation of the works;

(b) inspection programs, including frequency of inspection, for the works and the methods or tests employed to detect when maintenance is necessary;

(c) repair and maintenance programs, including the frequency of repair and maintenance for the works;

(d) contingency plans and procedures for dealing with potential spill, bypasses and any other abnormal situations and for notifying the District Manager; and

(e) complaint procedures for receiving and responding to public complaints.

(2) The Owner shall maintain the operations manual up to date through revisions undertaken from time to time and retain a copy at the location of the sewage works. Upon request, the Owner shall make the manual available for inspection and copying by Ministry personnel.

4. DISCHARGE OPERATIONS

(1) The decant pond shall be operated on a batch discharge basis such that the contents of the pond is allowed to settle for a period of at least 24 hours.

(2) Prior to initiating discharge from the decant pond, the Owner shall undertake pre-release water quality sampling, consisting of:

(a) the collection of a 4-Part composite sample, consisting of 4 grab samples from different locations in the pond; with

(b) the sample being analyzed for Total Suspended Solids and visible sheen; and

(c) analytical results conforming to Conditons 5 and 6.

5. EFFLUENT LIMITS

(1) The Owner shall design, construct and operate the works such that the concentrations of the materials named below as effluent parameters are not exceeded in the effluent from the works.

Table 1 - Effluent Limits

Effluent Parameter	**Concentration Limit** (milligrams per litre unless otherwise indicated)
Column 1	Column 2
Total Suspended Solids	15
Oil and Grease	10

(2) For the purposes of determining compliance with and enforcing subsection (1), non-compliance with respect to a Concentration Limit is deemed to have occurred when any single sample analyzed for a parameter named in Column 1 of subsection (1) is greater than the corresponding maximum concentration set out in Column 2 of subsection (1).

6. EFFLUENT - VISUAL OBSERVATIONS

Notwithstanding any other condition in this certificate, the Owner shall ensure that the effluent from the works is essentially free of floating and settleable solids and does not contain oil or any other substance in amounts sufficient to create a visible film, sheen or foam on the receiving waters.

7. EFFLUENT MONITORING AND RECORDING

The Owner shall, upon commencement of operation of the sewage works, carry out the following monitoring program:

(1) All samples and measurements taken for the purposes of this certificate are to be taken at a time and in a location characteristic of the quality and quantity of the effluent stream over the time period being monitored.

(2) Samples shall be collected of the contents of the decant pond prior to each discharge with samples analyzed for each parameter listed in Table 2:

Table 2 - Effluent Monitoring	
Frequency	Once each day of discharge
Sample Type	Grab
Parameters	Total Suspended Solids, Oil and Grease, Chloride, Sulphate, Boron, Iron and Zinc

(3) The methods and protocols for sampling, analysis and recording shall conform to the methods and protocols specified in the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" (August 1994), ISBN 0-7778-1880-9, as amended from time to time by more recently published editions.

(4) A continuous flow measuring device shall be installed and maintained to measure the flowrate of the effluent from the sewage works, with an accuracy to within plus or minus 15 per cent of the actual flowrate for the entire design range of the flow measuring device and the Owner shall measure, record and calculate the flowrate for each effluent stream on each day of sampling.

(5) The Owner shall retain for a minimum of three (3) years from the date of their creation, all records and information related to or resulting from the monitoring activities required by this certificate.

8. REPORTING

(1) One week prior to the start up of the operation of the works, the Owner shall notify the District Manager (in writing) of the pending start up date.

(2) In addition to the obligations under Part X of the *Environmental Protection Act* , the Owner shall, within 10 working days of the occurrence of any reportable spill as defined in Ontario Regulation 675/98, bypass or loss of any product, by-product, intermediate product, oil, solvent, waste material or any other polluting substance into the environment, submit a full written report of the occurrence to the District Manager describing the cause and discovery of the spill or loss, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation.

(3) The Owner shall prepare and submit a performance report to the District Manager on an annual basis within ninety (90) days following the end of the period being reported upon. The first such report shall cover the first annual period following the commencement of operation of the works and subsequent reports shall be submitted to cover successive annual periods following thereafter. The reports shall contain, but shall not be limited to, the following information:

(a) a summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in Condition 4, including an overview of the success and adequacy of the sewage works;

(b) a description of any operating problems encountered and corrective actions taken;

(c) a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the sewage works;

(d) a summary of any effluent quality assurance or control measures undertaken in the reporting period;

(e) a summary of the calibration and maintenance carried out on all effluent monitoring equipment.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the works are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the Certificate and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.

2. Condition 2 is included to ensure that the Ministry records are kept accurate and current with respect to approved works and to ensure that subsequent owners of the works are made aware of the certificate and continue to operate the works in compliance with it.

3. Condition 3 is included to ensure that a comprehensive operations manual governing all significant areas of operation, maintenance and repair is prepared, implemented and kept up-to-date by the owner and made available to the Ministry. Such a manual is an integral part of the operation of the works. Its compilation and use should assist the owner in staff training, in proper plant operation and in identifying and planning for contingencies during possible abnormal conditions. The manual will also act as a benchmark for Ministry staff when reviewing the owner's operation of the work.

4. Conditions 4, 5 and 6 are imposed to ensure that the effluent discharged from the works and meets the Ministry's effluent quality requirements thus minimizing environmental impact on the receiver.

6. Condition 7 is included to require the owner to demonstrate on a continual basis that the quality of the effluent from the approved works is consistent with the effluent limits specified in the certificate and that the approved works does not cause any impairment to the receiving watercourse.

7. Condition 8 is included to provide a performance record for future references and to ensure that the Ministry is made aware of problems as they arise, so that the Ministry can work with the Owner in resolving the problems in a timely manner.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal and in accordance with Section 47 of the Environmental Bill of Rights, S.O. 1993, Chapter 28, the Environmental Commissioner, within 15 days after receipt of this Notice, require a hearing by the Tribunal. The Environmental Commissioner will place notice of your appeal on the Environmental Registry. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., Suite 1700
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Environmental Commissioner
1075 Bay Street, 6th Floor
Suite 605
Toronto, Ontario
M5S 2B1

AND

The Director
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

This instrument is subject to Section 38 of the Environmental Bill of Rights, that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek leave to appeal within 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry at www.ene.gov.on.ca, you can determine when the leave to appeal period ends.

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 4th day of February, 2008

THIS CERTIFICATE WAS MAILED
ON Feb. 05, 2008
N.P
(Signed)

Mansoor Mahmood, P.Eng.
Director
Section 53, *Ontario Water Resources Act*

RC/
c: District Manager, MOE Halton-Peel
Robert J. Long, Long Environmental Consultants Inc. ✓

APPENDIX B

Borehole Logs

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW1

SHEET 1 OF 5

LOCATION: Refer to Plan

DRILLING DATE: Oct.1-3, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH	COLOUR % RETURN	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA DIP w.r.t. CORE AXIS	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
		GROUND SURFACE		163.80													
0	Overburden	One inch of grass sod overlying a rooty, moist SILT, trace clay, trace cobble, firm. (OH)		0.00 163.50													
		Compositional change: Firm/compact, fine SAND and SILT, brown, moist, rooty, occ. cobbles, rounded to sub-rounded. (TILL) (ML)		0.30 162.66													BENTONITE SEAL
1		TILL, Grades to very hard clay till, moist to slightly moist (almost dry), trace silt, trace gravel, no roots. Colour is mottled brown (more silty) and blue-grey (more clayey). (ML-CL)		1.14													
2																	
3																	
		Grades to firm-hard, dark grey to brown grey CLAY and SILT TILL. Slightly less firm than above, trace gravel. (ML-CL)		3.58 159.38													
4		Change to a moist, firm/hard clayey fine sand till (grey coloured). (ML-SM)		4.42 159.08													SAND
		Dry, crumbly, gravelly silt and clay till.		4.72													
5		Grey, firm-hard, moist SILT and CLAY TILL, gravelly, occ. cobble. (GM-ML)		4.88 158.08													
		Brown, moist-dry, fine to firm-hard CLAY and SILT TILL.		5.72 157.75													
6		Brown, moist-dry, fine to firm-hard SILTY SAND TILL.		6.05 157.44													
		Brown-grey, moist-dry, hard CLAY TILL, occ. cobbles, gravelly. (GM-CL) Basal TILL		6.36 156.56													
7																	
		Brown-grey, dry, cobbly SANDY TILL, very hard, dry. (SM)		7.24 155.65													
8																	
		Light brown-grey, dry, hard SANDY SILT TILL, occ. cobbles. (SM)		8.15 154.25													BENTONITE SEAL
9																	
	RQ Core	Very weak to weak, moderate to highly weathered red SHALE.		9.55	1									B,J BC			
10																	

CONTINUED NEXT PAGE

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MR

CHECKED:

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW1

SHEET 2 OF 5

LOCATION: Refer to Plan

DRILLING DATE: Oct.1-3, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH	COLOUR % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
10		*--- CONTINUED FROM PREVIOUS PAGE ---*															
		Very weak to weak, moderate to highly weathered red SHALE.												BC			
		1% Green coloured			1												
11														J			
					2									B/FX			
12														B/FX			
		Run 3: Pounded out of drill in minute pieces. Low RQD strictly mechanical.												FX			
13														FX			BENTONITE SEAL
					3									FX BC			
														FX			
14														FX			
		Run 4: As above															
	RQ Core				4									BC/FX			
15																	
		Red Shale, weak, slightly weathered 10% green coloured.												BC			
16														FX			
					5									FX			
														FX			
17														FX			
														FX			
														FX			
				145.80										FX			
18		Highly friable interval. Disking every 0.25".		18.00	6									BC			SAND
														BC			
				145.10										FX/B			
				18.70													
19		Discontinuities are all perpendicular to the core axis.												FX/B			
					7									FX/B			
														FX/B			
20														FX/B			
		CONTINUED NEXT PAGE															

DEPTH SCALE

1 : 50

LOGGED: MR

CHECKED:

Golder Associates

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW1

SHEET 3 OF 5

LOCATION: Refer to Plan

DRILLING DATE: Oct.1-3, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---														
20	RQ Core	Red shale, slightly weathered, weak to very weak. 10% grey-green coloured bands.			7								FX			SAND
													FX			
21					8								FX			
22													FX/B			
					9								FX/B			
23													BC			SAND
													FX/B			
		Friable and pitted in intervals of broken core (BC).											FX/B			
24					10								FX/B			
													FX/B			
25		Fracture surfaces are planar and smooth to rough.											FX/B			
													FX/B			PLUG BRIDGE/ROCK BRIDGE
					11								FX/B			
26													FX/B			
													FX/B			
27					12								FX/B			
													FX/B			
				135.96												
		Zone of broken core and increased weathering. Shale is highly friable, very weak and weathered.		27.84									FX/B			
28													BC/B			
					13								BC/B			BENTONITE SEAL
29													BC/B			
													BC/B			
					14											
30		*CONTINUED NEXT PAGE*														

DEPTH SCALE

1 : 50

LOGGED: MR

CHECKED:

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW1

SHEET 4 OF 5

LOCATION: Refer to Plan

DRILLING DATE: Oct.1-3, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH	COLOUR / % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---															
30	RQ Core	Zone of broken core and increased weathering. Shale is highly friable, very weak and weathered.			14									FX/B			
				132.91										FX/B			
31		Highly weathered and friable.		30.89										FX/B, gypsum coating first noted.			
					15									FX/B			
														FX/B			
														FX/B			BENTONITE SEAL
32				131.71										FX/B			
		Red shale, moderately weathered, weak, friable.		32.09										FX/B			
														FX/B			
33					16									FX/B			
														FX/B			
														FX/B, gypsum coating			
34														FX/B			
														FX/B			
														FX/B			
					17									FX/B			
35		Fracture surfaces are planar and smooth to rough.												FX/B			
														FX/B			
														FX/B			
														BC			
36														FX/B			
					18									FX/B, gypsum, 4mm			
														FX/B			
37				126.70													
		Extremely friable zone. Discontiniuites		37.10										FX/B			
														FX/B			
					19									FX/B			
38				125.80													
		Red shale, fresh, weak to moderately strong.		38.00										FX/B			
39																	
					20									FX/B			
														FX/B			SAND
40		*CONTINUED NEXT PAGE*															

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MR

CHECKED:

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW1

SHEET 5 OF 5

LOCATION: Refer to Plan

DRILLING DATE: Oct.1-3, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH	COLOUR % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---															
40		Red shale, fresh, weak to moderately strong.												B/F			
														BC			
														BC			
					21									B/FX			
41		10% grey-green coloured.												B/FX			
														B/FX			
42														B/FX			
					22									B/FX			
														B/FX			
														B/FX			
43	RQ Core			120.80													SAND
		Red shale, fresh, weak, 10% green coloured.		43.00													
														B/FX			
					23												
44														B/FX			
														B/FX			
45														B/FX			
					24									B/FX			
														B/FX			
46				117.67													
		END OF BOREHOLE		46.13													
47																	
48																	
49																	
50																	

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MR

CHECKED:

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW2

SHEET 1 OF 5

LOCATION: Refer to Plan

DRILLING DATE: Sept.26&30, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH / COLOUR / % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
		GROUND SURFACE		165.90												
0	AUGER	Dark brown soil, moist, loose, roots/organics. (OH)		0.00												
		TILL, brown, moist to slightly moist, firm to hard with depth, CLAYEY SAND and SILT, some gravel, occ. cobble. Coarser material is sub-ang to ang. (ML)		0.15												
				164.99												BENTONITE SEAL
1		As above Very dry and crumbly during sampling. (ML)		0.91												
2																
3																
				162.60												
		As above Colour changes to brownish-grey.		3.30												
4																
				161.73												
		TILL, grey, firm-hard, moist SILTY CLAY, occ. gravel. (GM-ML)		4.17												
5																SAND
6																
				158.89												
7		TILL, very hard, dry, brown bouldery CLAY SILT TILL, occ. cobbles. (CM)		7.01												
8																
				156.86												
9		BEDROCK Red shale, very weak, friable. Fresh, moderately weathered upper 3.05 to 4.57m from bedrock surface recovered as rubble/broken core.		9.04												BENTONITE SEAL
10																
		CONTINUED NEXT PAGE														

DEPTH SCALE

1 : 50

LOGGED: MR

CHECKED:

Golder Associates

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW2

SHEET 2 OF 5

LOCATION: Refer to Plan

DRILLING DATE: Sept.26&30, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH	COLOUR % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---															
10	AUGER	BEDROCK Red shale, very weak, friable. Fresh, moderately weathered upper 3.05 to 4.57m from bedrock surface recovered as rubble/broken core.		154.09													
11				11.81										FX			
12		Red shale with occasional (10%+/-) green coloured bands, weak. This interval recovered as broken core.			1									Broken Core			
13														FX			
14	HQ CORE			151.78	2									B			
		Intact core begins.		14.12										B/FX			BENTONITE SEAL
15					3									B/FX			
16														B/FX			
17					4									B/FX			
18					5									B/FX			
19														B/FX			SAND
20				145.90	6									B/FX			
		CONTINUED NEXT PAGE															

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: MR

CHECKED:

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW2

SHEET 3 OF 5

LOCATION: Refer to Plan

DRILLING DATE: Sept.26&30, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH	COLOUR / % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---															
20	HQ CORE	Red shale, weak, moderately weathered. Some very weak red shale bands. Friable.		20.00	6									B/FX			
21					7									B/FX			
22					8									B/FX			SAND
23				142.60										B/FX			
				23.30													
		Slight strength increase to moderately strong in green coloured shale bands.															
24					9									B/FX			
25					10									B/FX			
26		Discontinuity surfaces are perpendicular to core axis, planar and smooth. They appear to be bedding parallel, mechanically induced fractures.															
27					11									B/FX			SAND
28														B/FX			
29					12									B/FX			BENTONITE SEAL
30		*CONTINUED NEXT PAGE*			13									B/FX			

DEPTH SCALE

1 : 50

LOGGED: MR

CHECKED:

Golder Associates

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW2

SHEET 4 OF 5

LOCATION: Refer to Plan

DRILLING DATE: Sept.26&30, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR / % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---														
30		SHALE, Fresh to slightly weathered, weak, pitted and friable. Mainly red coloured, 5% to 10% green coloured bands, up to 10cm thick, spaced every 2 cm to 5 cm.			13								B/FX			
31													B/FX			
													B/FX			
													B/FX			
					14								B/FX			
32													B/FX			
													B/FX, gypsum coating			
													B/FX			
33													B/FX			
					15								B/FX			BENTONITE SEAL
		First gypsum coatings on joint surfaces noted at 29.18m and 32.10m.											B/FX			
34													B/FX			
													B/FX			
					16								B/FX			
35	HQ CORE												B/FX			
													B/FX, gypsum coatings 1mm, 4mm			
													B/FX			
36													B/FX			
					17								B/FX			
													B/FX			
37													B/FX			
													B/FX			
		Low RQD zone in red and green shales. Full of gypsum nodules.											B/FX, gypsum nodules			
					18								B/FX			
38													B/FX			
													B/FX			
													B/FX			
		As above, increased rock strength to moderately strong.											B/FX			
39													B/FX			
					19								B/FX, gypsum nodules			
													B/FX			SAND
40		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: MR

CHECKED:

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW2

SHEET 5 OF 5

LOCATION: Refer to Plan

DRILLING DATE: Sept.26&30, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH	COLOUR % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---															
40	HQ CORE	Red shale, moderately strong, fresh to slightly weathered. Rock is mainly red coloured with green bands (4"-2") every 1' to 2'.			20									B/FX			
41														B/FX			
42					21									B/FX			
43		Gypsum coat at 43.5, 3mm thick.			22									B/FX			SAND
44														B/FX			
45					23												
46				119.77													
		END OF BOREHOLE		46.13													
47																	
48																	
49																	
50																	

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MR

CHECKED:

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW3

SHEET 1 OF 4

LOCATION: Refer to Plan

DRILLING DATE: July 24 & 25, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH / COLOUR % RETURN	RECOVERY: TOTAL CORE % (80 60 40 20)	RECOVERY: SOLID CORE % (80 60 40 20)	R.Q.D. % (80 60 40 20)	FRACT. INDEX PER 0.3 (5 10 15 20)	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS (0 30 60 90)	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec (10^{-11} 10^{-9} 10^{-7} 10^{-5})	DIAMETRAL POINT LOAD INDEX (MPa) (2 4 6)	NOTES WATER LEVELS INSTRUMENTATION
		GROUND SURFACE		162.20												
0	AUGER	Brown, organic sandy silt (roots), compact.		0.00												
				161.59												
		TILL, moist to slightly moist, firm to hard, rooty first 0.6m, SILTY CLAY with angular cobbles and coarse gravel. (CL)		0.61												
1																
2																
3																
4																BENTONITE SEAL
5																
6				156.10												
		TILL, moist to dry, hard, mainly SILTY CLAY (CL), some sand, gravel and cobbles. Gravel and cobbles are sub-ang to sub-rounded.		6.10												
7																
8																
9																
10		*CONTINUED NEXT PAGE*														SAND

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: MR

CHECKED:

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW3

SHEET 2 OF 4

LOCATION: Refer to Plan

DRILLING DATE: July 24 & 25, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH / COLOUR / % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---														
10		TILL, moist to dry, hard, mainly SILTY CLAY (CL), some sand, gravel and cobbles. Gravel and cobbles are sub-ang to sub-rounded.		151.53												
		TILL, brown, hard, moist, gravelly SAND and SILT (SG-MG), some clay, some sub-rounded cobbles. (BASAL TILL)		10.67												
11		Auger refusal on Boulder. Coring through very hard grey till and cobbles as above.														
12	AUGER															SAND
13																
14				147.87												
		Completely weathered, very weak, green SHALE, original structure still visible.		14.33												
15																
				146.35												
16	HQ CORE	Fresh to slightly weathered, weak to moderately strong, red and green (predominantly red) coloured, massive to finely laminated SHALE.		15.85									B,FX			
													B,FX XJ			
					1								B,FX XJ			
17																BENTONITE SEAL
													XJ			
													B,FX			
		Fractures are bedding parallel and tend to be smooth and planar.											B,FX			
18					2								B,FX			
													B,FX XJ			
19													B,FX			
					3								B,FX			
													B,FX			
20													B,FX			
		CONTINUED NEXT PAGE														

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MR

CHECKED:

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW3

SHEET 3 OF 4

LOCATION: Refer to Plan

DRILLING DATE: July 24 & 25, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH	COLOUR % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---															
					3									B,FX			
				141.78													
		Fresh to slightly weathered, not friable, moderately strong to weak, mainly red coloured and massive with some green coloured bands. Thinly laminated.		20.42										B,FX			BENTONITE SEAL
					4									B			
														B			
														XJ			
														B,FX			
														B,FX			
		First noted occurence of gypsum.			5									B,FX, gypsum coating			
														B,FX			
														B,FX			
														B,FX			
					6									J			
														B			
														B,FX			
														B,FX			
														B,FX			
	HQ CORE													B,FX			
		Possible turbidity flow or debris torrent layer from 10.92m to 26.2m.			7									B,FX			
														B,FX			SAND
														B,FX			
														B,FX			
														B,FX			
					8									B,FX			
														B,FX			
														B,FX			
				134.46													
		Red SHALE, fresh to slightly weathered, weak to medium strong, occasional green coloured bands. Massive to thinly laminated.		27.74										FX			
														B, spun core gypsum coatings			
					9									FX			
														FX			
														FX			
					10									FX			
														FX			
		Discontinuities are fractures parallel to															
		CONTINUED NEXT PAGE															

DEPTH SCALE

1 : 50

LOGGED: MR

CHECKED:

Golder Associates

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW3

SHEET 4 OF 4

LOCATION: Refer to Plan

DRILLING DATE: July 24 & 25, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH	COLOUR % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
30		*--- CONTINUED FROM PREVIOUS PAGE ---*															
	HQ CORE	bedding. They are mainly mechanically induced. Red SHALE, fresh to slightly weathered, weak to medium strong, occasional green coloured bands. Massive to thinly laminated.			10									F			
31														FX			
					11									FX			SAND
														FX			
32														FX			
														FX			
														FX			
33														FX			
														FX			
					12									FX			
34																	
														B,FX			
35														BJ, gypsum coating			
														B,FX			
														B,FX			
36														B,FX			
					13									B,FX			
														B,FX			SAND
														B,FX			
37														B,FX			
					14									B,FX			
38														B, gypsum coating			
														B, gypsum coating			
														B,FX			
39					15									B,FX			
														B,FX			
				122.65													
		END OF HOLE		39.55													
40																	

DEPTH SCALE

1 : 50

LOGGED: MR

CHECKED:

Golder Associates

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW4

SHEET 1 OF 5

LOCATION: Refer to Plan

DRILLING DATE: July 4-9, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH	COLOUR % RETURN	RECOVERY TOTAL CORE % (80 60 40 20)	RECOVERY SOLID CORE % (80 60 40 20)	R.Q.D. % (80 60 40 20)	FRACT. INDEX PER 0.3 (5 10 15 20)	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS (0 30 60 90)	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	ROCK STRENGTH INDEX (R4 R3 R2 R1)	WEATHERING INDEX (W1 W2 W3 W4)	NOTES WATER LEVELS INSTRUMENTATION
		GROUND SURFACE		164.70													
0		Brown, moist, firm to hard TILL. Soil is a clayey silt, trace sub-rounded cobbles and gravel, some sand. Well-graded. (CL)		0.00													
1				163.48													BENTONITE SEAL
2		As above, firm, dry-slightly moist, friable, sandy silt, trace clay. (ML)		1.22													
				161.96													
3		Reddish brown, firm. Friable, dry-slightly moist, sandy silt and clay till, occ. sub-rounded gravel and cobbles. (CL/ML)		2.74													
4				160.43													
5	Overburden	Sandy TILL, grey brown, firm, friable silty sand, trace clay, trace gravel. Dry to slightly moist. (ML) Fines to sandy silt till.		4.27													
				158.91													
6		Gravelly TILL, reddish-brown, dense, moist silty sand to silty gravel, trace cobbles and clay.		5.79													SAND
				158.30													
7		Brown grey, firm to hard sandy silt, trace clay, trace gravel, moist TILL.		6.40													
				157.38													
8		Red-brown, moist-wet, gravelly silt, firm-hard 30% rock/cobbles (angular), wet rock (shale) at 7.6m, trace sand TILL. (MG)		7.32													
9				155.56													
		Inferred top of rock, moist, red-brown (80%) and green (20%), highly weathered, very weak, friable SHALE.		9.14													BENTONITE SEAL
10		*CONTINUED NEXT PAGE*															

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MR

CHECKED:

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW4

SHEET 2 OF 5

LOCATION: Refer to Plan

DRILLING DATE: July 4-9, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN	FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	ROCK STRENGTH INDEX	WEATH-ERING INDEX	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---															
10	Overburden	Inferred top of rock, moist, red-brown (80%) and green (20%), highly weathered, very weak, friable SHALE.		153.80													
				10.90	1									B			
11		Red SHALE, very weak R1/R2, friable, moderate to highly weathered (W3-W5)															BENTONITE SEAL
					2									B			
12														B			
13					3									B			
														B			
14														B			
					4												
15	RQ Core													B,FX			
				149.16										B,FX			
		Moderately weathered, weak to medium strong, red shale. All fractures/breaks are bedding parallel.		15.54													
16																	SAND
					5									B,FX			
														B,FX			
17														B,FX			
														C XJ			
					6									B,FX XJ			
18														B,FX			
														B,FX XJ			
19														FX			
					7												
														FX			
20														B,FX			
		CONTINUED NEXT PAGE															

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MR

CHECKED:

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW4

SHEET 3 OF 5

LOCATION: Refer to Plan

DRILLING DATE: July 4-9, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH	COLOUR % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	ROCK STRENGTH INDEX	WEATH-ERING INDEX	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---															
20				144.58	7												
		SHALE, friable, moderately weathered, moderately strong, significantly more competent.		20.12										B,FX			
														B,FX			
21					8									BC			
														B,FX			
				143.06													
		Weak to medium strong, friable, Tends to break along red.green colour contacts.		21.64										B,FX			
22														B,FX			
					9												
23														B,FX B			
		Fractures/breaks all bedding and smooth.												B,FX			
					10									B,FX			
24																	
														B,FX			
														B,FX			
25	RQ Core													B,FX B,FX			
					11									B,FX			
26																	
														B,FX			
														B,FX			
27					12									B,FX			
														B,FX			
														B,FX			
28																	SAND
														B,FX			
					13									B,FX			
29														B,FX			
				135.44													
		Slightly weathered, red (90%) and green (10%), medium strong, finely laminated SHALE.		29.26										FX,B			
					14												
30		*CONTINUED NEXT PAGE*															

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MR

CHECKED:

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW4

SHEET 4 OF 5

LOCATION: Refer to Plan

DRILLING DATE: July 4-9, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH	COLOUR % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	ROCK STRENGTH INDEX	WEATHERING INDEX	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---															
30	RQ Core	Slightly weathered, red (90%) and green (10%), medium strong, finely laminated SHALE.			14									FX,B			SAND
														FX,B			
														F,B			
31														FX,B			
					15												
		This interval not friable.												FX,B			
32														B,J, gypsum			
														B,FX			BENTONITE SEAL
														B,FX			
33		Fractures are all bedding parallel, smooth and planar.			16									B,FX, gypsum			
34														B,FX			
														B,FX			
		Green portions appear to be stronger.			17												
35														B,FX			
				129.35													
		Red-brown, moderately weathered (red) to slightly weathered (green) shale. Medium strong, (R2), friable (especially one day after recovery).		35.35										B,FX			
36														B,FX			
					18									B,FX			
														B			
37														B,FX			
														B,FX			
					19									B,FX			
38														B			
														B,FX			
														B,FX			
					20									B,FX			
39														B,FX			SAND
														B,FX			
40		*CONTINUED NEXT PAGE*															

DEPTH SCALE

1 : 50

LOGGED: MR

CHECKED:

Golder Associates

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW4

SHEET 5 OF 5

LOCATION: Refer to Plan

DRILLING DATE: July 4-9, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH	COLOUR % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	ROCK STRENGTH INDEX	WEATH-ERING INDEX	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---															
40	RQ Core	Red-brown, moderately weathered (red) to slightly weathered (green) shale. Medium strong, (R2), friable (especially one day after recovery).												J			
														V,B			
					21												
41														B,FX			
														B,FX			
														J			
														B			
42														B			SAND
					22												
														B			
43														B,FX			
														B,FX			
44																	
														B,FX			
					23												
45		Gypsum blebs/nodules at 45.24-45.24m.															
				118.68													
46		END OF HOLE		46.02													
47																	
48																	
49																	
50																	

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MR

CHECKED:

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW5

SHEET 1 OF 5

LOCATION: Refer to Plan

DRILLING DATE: July 10-11, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH / COLOUR / % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K_s cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
		GROUND SURFACE		160.50												
0	AUGER	Dry to slightly moist, loose-compact, yellow-brown silty sand to sandy silt, trace cobbles, gravel clay. (SM-ML)		0.00 / 159.59												
1		Firm, yellow-brown, moist to slightly moist, silty sand to sandy silt, some 5% gravel. (ML-TILL)		0.91 / 158.06												BENTONITE SEAL
2		Compact, moist, yellow-brown gravelly sand, some silt, trace clay, some cobbles. (TILL) (SG-ML)		2.44 / 157.30												
3		Yellow-brown, moist, compact, cobbley silty sand TILL. (SM)		3.20 / 155.78												
4																
5		Brown, damp, dense silty sand (SM), occ. gravel.		4.72 / 155.01												
		Brown, moist, dense silty sand to silty gravel. (SM-GM)		5.49 / 154.25												
6		Brown, moist, compact sand, trace some silt, some sub-ang gravel & cobbles, trace clay.		6.25 / 152.88												SAND
7		Brown-yellow brown, wet, very dense sand TILL, some silt, clay, gravel and cobbles. (SM)		7.62 / 152.12												
8		Grey, hard to very hard SILT, some sand, moist to slightly moist, some clay. (ML)		8.38												
9		Transition from moist to wet soil: water table inferred.														BENTONITE SEAL
10		*CONTINUED NEXT PAGE*														

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MR

CHECKED:

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW5

SHEET 2 OF 5

LOCATION: Refer to Plan

DRILLING DATE: July 10-11, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH	COLOUR % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---															
10		Brown, dense, moist silty coarse gravelly sand to silty gravel TILL. (SM-GM)		150.44 10.06 149.68													
11		Brown, dense moist SILT, trace gravel.		10.82 148.92													
12		Wet, dense, grey SAND and GRAVEL, some silt. (TILL) (SG-GM)		11.58 148.16													
13	AUGER	Brown, moist, hard, cobbley, gravelly SILT TILL. (SM)		12.34 146.63													BENTONITE SEAL
14		BEDROCK, highly weathered, very weak, friable red shale, easily augered.		13.87 144.65													
15																	
16	HQ CORE	Red SHALE, finely laminated, weak to moderately strong, slightly weathered.		15.85	1									B B			
17														B,FX			
18		Core is highly discked, reducing RQD.			2									B,FX B,FX B,FX B J			SAND
19					3									B,FX B,FX B,FX J			
20		*CONTINUED NEXT PAGE*												B,FX			

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: MR
CHECKED:

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW5

SHEET 3 OF 5

LOCATION: Refer to Plan

DRILLING DATE: July 10-11, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH	COLOUR % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---															
20		Red SHALE, finely laminated, weak to moderately strong, slightly weathered. Green shale bands are slightly stronger than the red shale bands. (Metalic sound when tapped with geologic hammer)			3									B,FX			
														B,FX			
					4									B,FX			
21														B,FX			
														B,FX			
22		Run 5: Core wet at about 22.86m below ground. Slight strength decrease and weathering increase at water table.			5									B,FX			
														B,FX			
23														B,FX			
														B,FX			
					6									B,FX			
24														B,FX			
														B,FX			
				135.81										B,FX			
		Red and green SHALE, moderate to slightly weathered, medium strong, finely laminated, not friable. Rock is up to 10% green coloured.		24.69										B,FX			
25	HQ CORE													B,FX			
					7									B,FX			
														B,FX			
26														B,FX			SAND
														BC			
		Discontinuities are planar and rough to smooth. (DISCKING)															
27					8									B,FX			
														B,FX			
														B,FX			
28														B,FX			
					9									B,FX			
														B,FX J			BENTONITE SEAL
29														B,FX			
					10									B,FX			
														B,FX			
30														B, gypsum, <2mm			
		CONTINUED NEXT PAGE															

DEPTH SCALE

1 : 50

LOGGED: MR

CHECKED:

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW5

SHEET 4 OF 5

LOCATION: Refer to Plan

DRILLING DATE: July 10-11, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH	COLOUR % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---															
30	HQ CORE	Red and green SHALE, moderate to slightly weathered, medium strong, finely laminated, not friable. Rock is up to 10% green coloured. * First gypsum coatings noted on fracture surfaces at 30.07m.			10									B B,FX B,FX B B			
31					11									FX, gypsum, <1mm FX			
32		Red SHALE, moderately strong, cannot be scratched with knife, slightly weathered. Finely laminated. Friable.		128.50 32.00										B,FX B,FX			BENTONITE SEAL
33					12									BC			
34														B,FX B,FX			
35					13									B,FX B,FX B,FX			
36		Discontinuities are planar and smooth to rough. They tend to be perpendicular to the core axis. they are interpreted as bedding/mechanically induced fractures.			14									B,FX B,FX B			
37														B,FX B,FX J			
38		Red shale, finely laminated, some debris flow/turbidity bedding. (38.46m-38.55m)			15									BC B,FX, gypsum, <1mm			
39		Note that approximately 6%-10% of the recovered core is coloured green.			16									B B,FX B,FX B,FX B,FX			SAND
40		*CONTINUED NEXT PAGE*			17												

DEPTH SCALE

1 : 50

LOGGED: MR

CHECKED:

Golder Associates

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW5

SHEET 5 OF 5

LOCATION: Refer to Plan

DRILLING DATE: July 10-11, 2002

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75

DRILLING CONTRACTOR: ALL TERRAIN DRILLING

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH	COLOUR % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---															
40	HQ CORE	Red SHALE, moderately strong, cannot be scratched with knife, slightly weathered. Finely laminated. Friable.												B,FX			
														B,FX			
					17									B,FX			
41														B,FX, gypsum coating			
														B			
														B,FX			
														B			
42					18									B,FX			SAND
														B			
43														B,FX			
					19												
44																	
45														B,FX			
					20									B,FX			
														B			
46				114.48										B			
		END OF HOLE		46.02													
47																	
48																	
49																	
50																	

DEPTH SCALE

1 : 50

LOGGED: MR

CHECKED:

MISS_ROCK 021-1228.GPJ GLDR_CAN.GDT 15/1/04 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW-05S

SHEET 1 OF 2

LOCATION: N 596134.0 ;E 4808769.0

DRILLING DATE: July 9, 2007

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME - 75 Track Mount

DRILLING CONTRACTOR: All-Terrain Drilling Limited

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD- Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols.

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE min/(m)	FLUSH / % RETURN / COLOUR	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3 m	DISCONTINUITY DATA: B Angle	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jn	HYDRAULIC CONDUCTIVITY K, cm/sec	Diametral Point Load Index (MPa)	RMC -'Q' AVG.	NOTES WATER LEVELS INSTRUMENTATION
		GROUND SURFACE		167.03																	
0		Compact, dry, brown SILT with some clay and trace to some gravel, (0.5 cm to 3.03 cm) subangular to subrounded (TILL)		0.00																	Cement
1																					
2																					
3		Occasional cobbles after 2.74 m depth																			
4				162.83																	
5		Compact, moist to wet, brown SANDY SILT with some gravel, and occasional cobble, subrounded to subangular, heterogeneous (TILL)		4.20																	Grout
6				160.63																	
7		Compact, saturated, brown SAND with some gravel and silt		6.40																	
8				158.87																	
9		Compact, wet, brown SILT with some sand and gravel Silt layer from 28.8 m to 30.5 m Becoming clayey at 9.29 m depth		8.16																	
10		*CONTINUED NEXT PAGE*																			

DEPTH SCALE

1 : 50

LOGGED: AI

CHECKED: SW

Golder Associates

MIS-RCK 004 021-1228 (2007).GPJ GAL-MISS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW-05S

SHEET 2 OF 2

LOCATION: N 596134.0 ;E 4808769.0

DRILLING DATE: July 9, 2007

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME - 75 Track Mount

DRILLING CONTRACTOR: All-Terrain Drilling Limited

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate

BD - Bedding; FO - Foliation; CO - Contact; OR - Orthogonal; CL - Cleavage

PL - Planar; CU - Curved; UN - Undulating; ST - Stepped; IR - Irregular

PO - Polished; K - Slickensided; SM - Smooth; Ro - Rough; MB - Mechanical Break

BR - Broken Rock

NOTE: For additional abbreviations refer to list of abbreviations & symbols.

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE min/(m)	FLUSH	COLOUR % RETURN	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3 m	DISCONTINUITY DATA: B Angle	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jn	HYDRAULIC CONDUCTIVITY K, cm/sec	Diametral Point Load Index (MPa)	RMC -'Q' AVG.	NOTES WATER LEVELS INSTRUMENTATION
10		*--- CONTINUED FROM PREVIOUS PAGE ---*																				
		Compact, wet, brown SILT with some sand and gravel		156.73																		
		Loose, grey, poorly graded, clean, homogeneous fine SAND		10.30																		Grout
11				155.45																		
		Very dense, brown SILTY fine SAND with gravel and cobbles		11.58																		
12																						
																						Hole Plug
13																						
																						Sand
14																						
15																						
				151.46																		
		Slightly weathered, very thinly bedded, brownish red and green SHALE		15.57											,BD,PL,UE ,BD,SH,UE							Screen
16															,SH, PL,UE,Ro ,SH, BD,UE,Ro							
															,PL,UE,Ro							
															,PL,UE,Ro							
17															,SH,BD,Ro							
															,PL,W,UE							Sand
															,PL,CU,UE							
18				148.90											,PL,UE,VR ,PL,Ro,B.C.							
		END OF DRILLHOLE		18.13																		
19																						
20																						

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: AI

CHECKED: SW

MIS-RCK 004 021-1228 (2007).GPJ GAL-MISS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW-06S

SHEET 1 OF 2

LOCATION: N 596351.0 ;E 4808892.0

DRILLING DATE: July 6 and 10, 2007

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME - 75 Track Mount

DRILLING CONTRACTOR: All-Terrain Drilling Limited

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD- Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols.

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE min/(m)	FLUSH / COLOUR / % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3 m	DISCONTINUITY DATA: B Angle	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jn	HYDRAULIC CONDUCTIVITY K, cm/sec	Diametral Point Load Index (MPa)	RMC -'Q' AVG.	NOTES WATER LEVELS INSTRUMENTATION
		GROUND SURFACE		166.05																	
0		Loose to compact, dry, brown SILT, some clay (TILL)		0.00																	
1																					
2																					
3		Some gravel from 8.44 m to 2.84 m depth		162.70																	
4		Slightly moist, brown SANDY SILT, some clay, cobble/gravel bands (TILL)		3.35																	Cement
5																					
6				160.27																	
7		Wet, brown SAND and GRAVEL		5.78																	Hole Plug
8		Silty sand, reddish brown, lens of clay, gravel at 7.32 m depth		158.13																	Sand
9		Reddish brown SILT, trace gravel (TILL)		7.92																	Screen
10		SHALE, reddish, slightly porous, slight weathering, some gravel		156.91 9.14																	
		CONTINUED NEXT PAGE																			

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MD

CHECKED: SW

MIS-RCK 004 021-1228 (2007).GPJ GAL-MISS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW-06S

SHEET 2 OF 2

LOCATION: N 596351.0 ;E 4808892.0

DRILLING DATE: July 6 and 10, 2007

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME - 75 Track Mount

DRILLING CONTRACTOR: All-Terrain Drilling Limited

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO - Foliation; CO - Contact; OR - Orthogonal; CL - Cleavage
PL - Planar; CU - Curved; UN - Undulating; ST - Stepped; IR - Irregular
PO - Polished; K - Slickensided; SM - Smooth; Ro - Rough; MB - Mechanical Break
BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols.

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE min/(m)	FLUSH	COLOUR % RETURN	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3 m	DISCONTINUITY DATA: B Angle	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jn	HYDRAULIC CONDUCTIVITY K, cm/sec	Diametral Point Load Index (MPa)	RMC -'Q' AVG.	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---																				
10		Moderately weathered, thinly bedded, redish brown and green SHALE		158.90 / 10.05																		Screen
11				154.80																		Sand
		END OF DRILLHOLE		11.25																		
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						

DEPTH SCALE

1 : 50

LOGGED: MD

CHECKED: SW

Golder Associates

MIS-RCK 004 021-1228 (2007).GPJ GAL-MISS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF BOREHOLE: MW-06

SHEET 1 OF 4

LOCATION: N 596354.90 ;E 4808896.00

BORING DATE:

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	SOIL PROFILE: STRATA PLOT	SOIL PROFILE: ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-9} 10^{-7} 10^{-5} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0		OVERBURDEN (TILL)									
1											Hole Plug
2											
3											
4											
5											Sand
6											
7											
8											Screen
9											
		SHALE (BEDROCK)		9.45							Sand
10											Hole Plug
		CONTINUED NEXT PAGE									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED:

CHECKED:

GTA-BHS 001 021-1228.GPJ GAL-MIS.GDT 4/12/12 PS

PROJECT: 021-1228

RECORD OF BOREHOLE: MW-06

SHEET 2 OF 4

LOCATION: N 596354.90 ;E 4808896.00

BORING DATE:

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-9} 10^{-7} 10^{-5} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		*--- CONTINUED FROM PREVIOUS PAGE ---*									
		SHALE (BEDROCK)									
11											
12											
13											
14											
15											Hole Plug
16											
17											
18											
19											
20		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED:

CHECKED:

GTA-BHS 001 021-1228.GPJ GAL-MIS.GDT 4/12/12 PS

PROJECT: 021-1228

RECORD OF BOREHOLE: MW-06

SHEET 3 OF 4

LOCATION: N 596354.90 ;E 4808896.00

BORING DATE:

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-9} 10^{-7} 10^{-5} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20		*--- CONTINUED FROM PREVIOUS PAGE ---*									
20		SHALE (BEDROCK)									Hole Plug
21											
22											Sand
23											
24											
25											
26											Screen
27											
28											
29											Sand
30		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED:

CHECKED:

GTA-BHS 001 021-1228.GPJ GAL-MIS.GDT 4/12/12 PS

PROJECT: 021-1228

RECORD OF BOREHOLE: MW-06

SHEET 4 OF 4

LOCATION: N 596354.90 ;E 4808896.00

BORING DATE:

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-9} 10^{-7} 10^{-5} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
30		SHALE (BEDROCK)									Sand
31											
32											
33											
34											
35		END OF BOREHOLE NOTE: 1. Borehole logging and well completion was not supervised by Golder.		34.67							
36											
37											
38											
39											
40											

DEPTH SCALE

1 : 50

Golder Associates

LOGGED:

CHECKED:

GTA-BHS 001 021-1228.GPJ GAL-MIS.GDT 4/12/12 PS

PROJECT: 021-1228

RECORD OF BOREHOLE: MW-07

SHEET 1 OF 5

LOCATION: N 596099.40 ;E 4809348.00

BORING DATE:

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	SOIL PROFILE: STRATA PLOT	SOIL PROFILE: ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-9} 10^{-7} 10^{-5} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0		OVERBURDEN (TILL)									
1											Hole Plug
2											
3											
4											
5											Screen
6											
7											
8											Sand
9											Hole Plug
10		*CONTINUED NEXT PAGE*									

GTA-BHS 001 021-1228.GPJ GAL-MIS.GDT 4/12/12 PS

DEPTH SCALE

1 : 50

Golder Associates

LOGGED:

CHECKED:

PROJECT: 021-1228

RECORD OF BOREHOLE: MW-07

SHEET 2 OF 5

LOCATION: N 596099.40 ;E 4809348.00

BORING DATE:

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-9} 10^{-7} 10^{-5} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		*--- CONTINUED FROM PREVIOUS PAGE ---*									
		OVERBURDEN (TILL)									
		SHALE (BEDROCK)		10.40							
11											
12											
13											
14											
15											Hole Plug
16											
17											
18											
19											
20		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED:

CHECKED:

GTA-BHS 001 021-1228.GPJ GAL-MIS.GDT 4/12/12 PS

PROJECT: 021-1228

RECORD OF BOREHOLE: MW-07

SHEET 3 OF 5

LOCATION: N 596099.40 ;E 4809348.00

BORING DATE:

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕; Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-9} 10^{-7} 10^{-5} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20		*--- CONTINUED FROM PREVIOUS PAGE ---*									
20		SHALE (BEDROCK)									
21											
22											
23											
24											
25											Hole Plug
26											
27											
28											
29											Sand
30		*CONTINUED NEXT PAGE*									

GTA-BHS 001 021-1228.GPJ GAL-MIS.GDT 4/12/12 PS

DEPTH SCALE

1 : 50

Golder Associates

LOGGED:

CHECKED:

PROJECT: 021-1228

RECORD OF BOREHOLE: MW-07

SHEET 4 OF 5

LOCATION: N 596099.40 ;E 4809348.00

BORING DATE:

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-9} 10^{-7} 10^{-5} 10^{-3}) / WATER CONTENT PERCENT (Wp ⊖W WI) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
30		*--- CONTINUED FROM PREVIOUS PAGE ---*									
		SHALE (BEDROCK)									Sand
31											
32											
33											
34											
35											
36											
37											
38											
39											Screen
40		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED:

CHECKED:

GTA-BHS 001 021-1228.GPJ GAL-MIS.GDT 4/12/12 PS

PROJECT: 021-1228

RECORD OF BOREHOLE: MW-07

SHEET 5 OF 5

LOCATION: N 596099.40 ;E 4809348.00

BORING DATE:

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-9} 10^{-7} 10^{-5} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
40		*--- CONTINUED FROM PREVIOUS PAGE ---*									
40		SHALE (BEDROCK)									Screen
41											
42											
43											
44											
45											Sand
		END OF BOREHOLE		45.72							
46		NOTE: 1. Borehole logging and well completion was not supervised by Golder. This hole was originally numbered MW-12.									
47											
48											
49											
50											

DEPTH SCALE

1 : 50

Golder Associates

LOGGED:

CHECKED:

GTA-BHS 001 021-1228.GPJ GAL-MIS.GDT 4/12/12 PS

PROJECT: 021-1228

RECORD OF BOREHOLE: MW-08

SHEET 1 OF 5

LOCATION: N 596294.70 ;E 4809190.00

BORING DATE:

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-9} 10^{-7} 10^{-5} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE									
0		OVERBURDEN (TILL)									
1											Hole Plug
2											
2											Sand
3											
4											
4											Screen
5											
6											
6		SHALE (BEDROCK)		6.10							
6											Sand
7											
8											
8											Hole Plug
9											
10											
		CONTINUED NEXT PAGE									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED:

CHECKED:

GTA-BHS 001 021-1228.GPJ GAL-MIS.GDT 4/12/12 PS

PROJECT: 021-1228

RECORD OF BOREHOLE: MW-08

SHEET 2 OF 5

LOCATION: N 596294.70 ;E 4809190.00

BORING DATE:

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-9} 10^{-7} 10^{-5} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		*--- CONTINUED FROM PREVIOUS PAGE ---*									
		SHALE (BEDROCK)									
11											Hole Plug
12											
13											
14											
15											
16											Sand
17											
18											
19											
20		*CONTINUED NEXT PAGE*									

DEPTH SCALE
1 : 50

Golder Associates

LOGGED:

CHECKED:

GTA-BHS 001 021-1228.GPJ GAL-MIS.GDT 4/12/12 PS

PROJECT: 021-1228

RECORD OF BOREHOLE: MW-08

SHEET 3 OF 5

LOCATION: N 596294.70 ;E 4809190.00

BORING DATE:

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-9} 10^{-7} 10^{-5} 10^{-3}) / WATER CONTENT PERCENT (Wp ⊖W WI) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20		*--- CONTINUED FROM PREVIOUS PAGE ---*									
20		SHALE (BEDROCK)									Sand
21											
22											
23											
24											Screen
25											
26											
27											
28											Sand
29											Hole Plug
30		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED:

CHECKED:

GTA-BHS 001 021-1228.GPJ GAL-MIS.GDT 4/12/12 PS

PROJECT: 021-1228

RECORD OF BOREHOLE: MW-08

SHEET 4 OF 5

LOCATION: N 596294.70 ;E 4809190.00

BORING DATE:

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-9} 10^{-7} 10^{-5} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
30		*--- CONTINUED FROM PREVIOUS PAGE ---*									
		SHALE (BEDROCK)									
31											
32											Hole Plug
33											
34											
35											
36											Sand
37											
38											
39											Screen
40		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED:

CHECKED:

GTA-BHS 001 021-1228.GPJ GAL-MIS.GDT 4/12/12 PS

PROJECT: 021-1228

RECORD OF BOREHOLE: MW-08

SHEET 5 OF 5

LOCATION: N 596294.70 ;E 4809190.00

BORING DATE:

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-9} 10^{-7} 10^{-5} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
40		SHALE (BEDROCK)									Screen
41											
42											
43											
44											
45											
46											
		END OF BOREHOLE		46.20							
47		NOTE: 1. Borehole logging and well completion was not supervised by Golder.									
48											
49											
50											

DEPTH SCALE

1 : 50

Golder Associates

LOGGED:

CHECKED:

GTA-BHS 001 021-1228.GPJ GAL-MIS.GDT 4/12/12 PS

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW-09

SHEET 1 OF 5

LOCATION: N 596166.0 ;E 4809014.0

DRILLING DATE: July 3 to 5, 2007

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME - 75 Track Mount

DRILLING CONTRACTOR: All-Terrain Drilling Limited

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD- Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols.

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE min/(m)	FLUSH / COLOUR % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3 m	DISCONTINUITY DATA: B Angle	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jn	HYDRAULIC CONDUCTIVITY K, cm/sec	Diametral Point Load Index (MPa)	RMC -'Q' AVG.	NOTES WATER LEVELS INSTRUMENTATION
		GROUND SURFACE		165.53																	
0		Stiff, brown clayey silt till with trace gravel and organics (TOPSOIL)		0.00																	
1				164.08																	
		Firm, brown SILT with some clay, sand, semirounded gravel and cobbles (TILL)		1.45																	
2																					
3																					
4																					
5																					
				159.75																	
6		Slightly firm, reddish brown CLAYEY SILT with very fine and very course semirounded sand, gravel and cobbles (TILL)		5.78																	(S)
7																					
8																					
				157.00																	
		Stiff, brown SILTY CLAY with very course sand and cobbles (TILL)		8.53																	
9																					(I)
				155.78																	
		Stiff, reddish brown SILTY CLAY (Weathered Shale)		9.75																	
10		*CONTINUED NEXT PAGE*																			

MIS-RCK 004 021-1228 (2007).GPJ GAL-MISS.GDT 25/9/09 DD

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: AK

CHECKED: SW

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW-09

SHEET 2 OF 5

LOCATION: N 596166.0 ;E 4809014.0

DRILLING DATE: July 3 to 5, 2007

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME - 75 Track Mount

DRILLING CONTRACTOR: All-Terrain Drilling Limited

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols.

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE min/(m)	FLUSH / COLOUR % RETURN	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3 m	DISCONTINUITY DATA: B Angle	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jn	HYDRAULIC CONDUCTIVITY K, cm/sec	Diametral Point Load Index (MPa)	RMC -'Q' AVG.	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---																			
10		Stiff, reddish brown SILTY CLAY (Weathered Shale)																			
11																					
12				153.34																	
		Stiff, reddish brown SILTY CLAY with some broken shale (Weathered Shale)		12.19																	
13																					
				151.81																	
		Slightly weathered, weak, very thinly to thinly bedded, redish brown and green SHALE		13.72																	
14					1									,JN,IR,Ro							
														,JN,IR,Ro							
														,JN,IR,Ro							
					2									,JN,IR,Ro							
														,FO,IR,Ro							
15														,BD,IR,Ro							
														,JN,IR,Ro							
														,FR,IR,Ro							
					3									,JN,IR,Ro							
16														,FO,IR,Ro							
														,JN,IR,Ro							
														,JN,ST,Ro							
														,JN,IR,Ro							
17														,FR,IR,Ro							
														,JN,IR,Ro							
														,JN,IR,Ro							
					4									,FR,IR,Ro							
18														,FR,IR,Ro							
					5									,JN,PL,SM							
														,JN,IR,Ro							
19														,FO,PL,SM							
					6									,FO,IR,Ro							
														,FO,IR,Ro							
														,JN,PL,Ro							
20		*CONTINUED NEXT PAGE*																			

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: AK

CHECKED: SW

MIS-RCK 004 021-1228 (2007).GPJ GAL-MISS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW-09

SHEET 3 OF 5

LOCATION: N 596166.0 ;E 4809014.0

DRILLING DATE: July 3 to 5, 2007

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME - 75 Track Mount

DRILLING CONTRACTOR: All-Terrain Drilling Limited

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD- Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols.

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE min/(m)	FLUSH	COLOUR % RETURN	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3 m	DISCONTINUITY DATA: B Angle	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jn	HYDRAULIC CONDUCTIVITY K, cm/sec	Diametral Point Load Index (MPa)	RMC -'Q' AVG.	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---																				
20		Slightly weathered, weak, very thinly to thinly bedded, redish brown and green SHALE			6										,JN,CU,Ro							
															,JN,IR,Ro							
															,FO,PL,SM							
															,FO,IR,Ro							
21					7										,JN,PL,Ro							
															,FO,IR,Ro							
															,JN,IR,Ro							
22															,BD,PL,Ro							
															,JN,IR,Ro							
															,BD,PL,Ro							
					8										,FR,IR,Ro							
23															,JN,IR,Ro							
															,JN,IR,Ro							
															,JN,IR,Ro							
															,JN,IR,Ro							
															,FO,IR,SM							
24					9										,JN,IR,Ro							
															,FO,IR,Ro							
															,JN,UE,SM							
															,FO,IR,Ro							
															,JN,IR,Ro							
25															,FR,IR,VR							
															,JN,,Ro							
															,BD,PL,Ro							
					10										,JN,PL,SM							
															,FR,IR,Ro							
26															,JN,IR,Ro							
															,FR,IR,SM							
															,JN,IR,Ro							
															,JN,IR,VR							
27					11																	
															,JN,CU,SM							
															,JN,PL,SM							
28															,JN,CU,SM							
															,FR,IR,Ro							
					12										,JN,IR,Ro							
29															,FR,PL,Ro							
															,JN,UE,Ro							
					13																	
30		*CONTINUED NEXT PAGE*																				

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: AK
CHECKED: SW

MIS-RCK 004 021-1228 (2007).GPJ GAL-MISS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW-09

SHEET 4 OF 5

LOCATION: N 596166.0 ;E 4809014.0

DRILLING DATE: July 3 to 5, 2007

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME - 75 Track Mount

DRILLING CONTRACTOR: All-Terrain Drilling Limited

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO - Foliation; CO - Contact; OR - Orthogonal; CL - Cleavage
PL - Planar; CU - Curved; UN - Undulating; ST - Stepped; IR - Irregular
PO - Polished; K - Slickensided; SM - Smooth; Ro - Rough; MB - Mechanical Break
BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols.

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE min/(m)	FLUSH	COLOUR % RETURN	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3 m	DISCONTINUITY DATA: B Angle	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jn	HYDRAULIC CONDUCTIVITY K, cm/sec	Diametral Point Load Index (MPa)	RMC -'Q' AVG.	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---																				
30		Slightly weathered, weak, very thinly to thinly bedded, redish brown and green SHALE			13										,JN,IR,SM							
31															,JN,IR,PO							
															,FR,IR,SM							
					14										,JN,UE,Ro							
32															,JN,IR,SM							
															,JN,PL,SM							
															,JN,IR,Ro							
															,JN,IR,SM							
33															,JN,IR,Ro							
					15										,FR,IR,Ro							
															,JN,IR,Ro							
34																						
					16										,FR,IR,Ro							
															,JN,UE,SM							
35															,JN,IR,Ro							
															,FR,IR,VR							
															,FR,IR,Ro							
															,JN,PL,SM							
36																						
					17										,JN,UE,SM							
															,JN,PL,Ro							
															,FR,IR,Ro							
37																						
															,JN,IR,Ro							
															,JN,PL,SM							
					18										,FO,IR,Ro							
38															,JN,IR,Ro							
															,JN,PL,SM							
															,FR,IR,VR							
															,JN,IR,Ro							
39															,JN,IR,Ro							
					19										,FR,IR,Ro							
															,JN,IR,Ro							
40															,JN,ST,Ro							
		CONTINUED NEXT PAGE																				

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: AK
CHECKED: SW

MIS-RCK 004 021-1228 (2007).GPJ GAL-MISS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW-09

SHEET 5 OF 5

LOCATION: N 596166.0 ;E 4809014.0

DRILLING DATE: July 3 to 5, 2007

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME - 75 Track Mount

DRILLING CONTRACTOR: All-Terrain Drilling Limited

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD- Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols.

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE min/(m)	FLUSH / % RETURN / COLOUR	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3 m	DISCONTINUITY DATA: B Angle	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jn	HYDRAULIC CONDUCTIVITY K, cm/sec	Diametral Point Load Index (MPa)	RMC -'Q' AVG.	NOTES WATER LEVELS INSTRUMENTATION
40		*--- CONTINUED FROM PREVIOUS PAGE ---*																			
				125.43	19									,JN,IR,Ro							
		Slightly weathered, weak, thinly bedded, redish brown and green SHALE		40.10										,JN,IR,Ro							
														,JN,PL,SM							
41					20									,JN,IR,Ro							(D)
														,JN,CU,SM							
														,FR,IR,Ro							
42														,JN,IR,Ro							
														,FR,IR,Ro							
					21									,FR,IR,VR							
														,FR,IR,VR							
														,FR,IR,Ro							
43				122.43										,JN,CU,SM							
		Slightly weathered, weak, layered, redish brown and green SHALE		43.10										,JN,IR,Ro							
														,FR,IR,Ro							
														,JN,PL,SM							
44					22									,JN,IR,Ro							
														,FR,IR,SM							
45																					
					23									,JN,PL,SM							
46				119.28																	
		END OF DRILLHOLE		46.25																	
47																					
48																					
49																					
50																					

DEPTH SCALE

1 : 50

LOGGED: AK

CHECKED: SW

Golder Associates

MIS-RCK 004 021-1228 (2007).GPJ GAL-MISS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW-10

SHEET 1 OF 5

LOCATION: N 596045.0 ;E 4809002.0

DRILLING DATE: June 20 to 21, 2007

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME - 75 Track Mount

DRILLING CONTRACTOR: All-Terrain Drilling Limited

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD- Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols.

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE min/(m)	FLUSH / COLOUR / % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3 m	DISCONTINUITY DATA: B Angle	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jn	HYDRAULIC CONDUCTIVITY K, cm/sec	Diametral Point Load Index (MPa)	RMC -Q' AVG.	NOTES WATER LEVELS INSTRUMENTATION
0		GROUND SURFACE		166.78																	
		Soft, brown clayey silt with organics and trace grey silt and gravel (TOPSOIL)		0.05																	
		Stiff, brown to grey brown CLAYEY SILT with semiangular gravel (TILL)																			
1																					
2																					
3																					Hole F
4				162.72																	
		Very soft, reddish brown very fine SANDY SILT with semirounded gravel and cobbles (TILL)		4.06																	
5																					
6																					(S)
7																					(I)
8																					Grout
				158.25																	
		Stiff, reddish brown CLAYEY SILT with trace sand and gravel (TILL)		8.53																	
9				157.79																	
		Soft, grey brown fine SILTY SAND with gravel (TILL)		8.99																	
				157.18																	
		Stiff, grey brown very fine SANDY SILT with coarse sand, gravel and cobble s (TILL)		9.60																	
10																					
		CONTINUED NEXT PAGE																			

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: AK

CHECKED: SW

MIS-RCK 004 021-1228 (2007).GPJ GAL-MISS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW-10

SHEET 2 OF 5

LOCATION: N 596045.0 ;E 4809002.0

DRILLING DATE: June 20 to 21, 2007

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME - 75 Track Mount

DRILLING CONTRACTOR: All-Terrain Drilling Limited

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols.

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE min/(m)	FLUSH	COLOUR % RETURN	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3 m	DISCONTINUITY DATA: B Angle	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jn	HYDRAULIC CONDUCTIVITY K, cm/sec	Diametral Point Load Index (MPa)	RMC -'Q' AVG.	NOTES WATER LEVELS INSTRUMENTATION
10		*--- CONTINUED FROM PREVIOUS PAGE ---*																				
		Stiff, reddish brown CLAYEY SILT with semiangular gravel (TILL)		156.64 10.14																		
				155.81																		
11		SHALE		10.97																		
12																						
13																						
14																						
				152.07																		
15		Slightly to moderately weathered, weak, very thinly to thinly bedded, redish brown and green SHALE		14.71	1										,FO,ST,Ro ,JN,IR,SM							Grout
16					3										,JN,IR,Ro ,JN,IR,Ro ,JN,IR,VR							
17					2										,FO,IR,Ro ,JN,IR,Ro ,JN,UE,SM ,JN,IR,Ro ,FR,CU,SM							
18															,FR,IR,Ro ,JN,IR,VR ,JN,IR,Ro ,JN,IR,Ro ,FO,PL,SM							
19					4										,JN,IR,Ro ,FO,IR,Ro ,FO,CU,Ro ,JN,PL,SM ,FO,IR,Ro ,JN,IR,Ro							
					5										,JN,UE,Ro ,JN,UE,Ro							
20		*CONTINUED NEXT PAGE*																				

DEPTH SCALE
1 : 50

Golder Associates

LOGGED: AK
CHECKED: SW

MIS-RCK 004 021-1228 (2007).GPJ GAL-MISS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW-10

SHEET 3 OF 5

LOCATION: N 596045.0 ;E 4809002.0

DRILLING DATE: June 20 to 21, 2007

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME - 75 Track Mount

DRILLING CONTRACTOR: All-Terrain Drilling Limited

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD- Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols.

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE min/(m)	FLUSH	COLOUR % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3 m	DISCONTINUITY DATA: B Angle	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jn	HYDRAULIC CONDUCTIVITY K, cm/sec	Diametral Point Load Index (MPa)	RMC -'Q' AVG.	NOTES WATER LEVELS INSTRUMENTATION
20		*--- CONTINUED FROM PREVIOUS PAGE ---*																				
		Slightly to moderately weathered, weak, very thinly to thinly bedded, redish brown and green SHALE			5										,JN,IR,SM							
															,FO,ST,Ro							
					6										,FO,PL,SM							
21															,BD,IR,Ro							
				145.48											,FO,IR,Ro							
		Highly weathered, very weak, thinly bedded, redish brown and green SHALE		21.30											,FO,ST,SM							
															,FO,PL,SM							
															,JN,PL,SM							
22					7										,JN,IR,Ro							
															,JN,IR,Ro							
															,JN,IR,Ro							
															,FO,ST,Ro							
				143.98																		
		Slightly weathered, weak, redish brown and green SHALE		22.80											,JN,IR,Ro							
23															,FR,PL,SM							
															,FR,ST,SM							
					8										,JN,PL,SM							
															,JN,IR,Ro							
24															,JN,UE,SM							
															,FR,IR,Ro							
															,JN,IR,Ro							
															,BD,PL,SM							
															,BD,IR,Ro							
25																						Grout
					9										,FO,PL,SM							
															,JN,ST,Ro							
															,FO,IR,SM							
															,JN,PL,SM							
															,JN,PL,SM							
26															,FO,IR,Ro							
															,FO,IR,Ro							
					10																	
															,JN,IR,Ro							
27																						
28					11										,FR,IR,Ro							
															,JN,IR,Ro							
29															,FO,PL,SM							
															,FO,ST,SM							
					12																	
															,JN,UE,SM							
30																						Hole Plug
		CONTINUED NEXT PAGE																				

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: AK

CHECKED: SW

MIS-RCK 004 021-1228 (2007).GPJ GAL-MISS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW-10

SHEET 4 OF 5

LOCATION: N 596045.0 ;E 4809002.0

DRILLING DATE: June 20 to 21, 2007

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME - 75 Track Mount

DRILLING CONTRACTOR: All-Terrain Drilling Limited

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO - Foliation; CO - Contact; OR - Orthogonal; CL - Cleavage
PL - Planar; CU - Curved; UN - Undulating; ST - Stepped; IR - Irregular
PO - Polished; K - Slickensided; SM - Smooth; Ro - Rough; MB - Mechanical Break
BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols.

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE min/(m)	FLUSH	COLOUR % RETURN	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3 m	DISCONTINUITY DATA: B Angle	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jn	HYDRAULIC CONDUCTIVITY K, cm/sec	Diametral Point Load Index (MPa)	RMC -'Q' AVG.	NOTES WATER LEVELS INSTRUMENTATION
30		*--- CONTINUED FROM PREVIOUS PAGE ---*																				
		Slightly weathered, weak, redish brown and green SHALE			12										,JN,CU,SM ,JN,IR,Ro							
31					13										,FO,IR,Ro ,FO,IR,Ro ,FO,IR,Ro							
32															,JN,PL,SM ,JN,UE,SM ,JN,PL,SM							
33					14										,FR,IR,Ro ,JN,PL,SM							Hole Plug
34					15										,FR,ST,SM ,FO,IR,Ro ,JN,PL,SM ,JN,IR,Ro ,JN,PL,SM ,JN,IR,Ro							
35																						
36					16										,JN,IR,Ro ,JN,PL,SM ,FO,IR,Ro ,JN,PL,SM							
37					17										,JN,UE,SM ,FR,IR,Ro ,FR,IR,Ro							Sand
38																						
39					18										,JN,IR,Ro ,JN,PL,SM ,FO,IR,Ro							Screen
40		*CONTINUED NEXT PAGE*			19																	

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: AK

CHECKED: SW

MIS-RCK 004 021-1228 (2007).GPJ GAL-MISS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW-10

SHEET 5 OF 5

LOCATION: N 596045.0 ;E 4809002.0

DRILLING DATE: June 20 to 21, 2007

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME - 75 Track Mount

DRILLING CONTRACTOR: All-Terrain Drilling Limited

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD- Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols.

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE min/(m)	FLUSH	COLOUR % RETURN	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3 m	DISCONTINUITY DATA: B Angle	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jn	HYDRAULIC CONDUCTIVITY K, cm/sec	Diametral Point Load Index (MPa)	RMC -'Q' AVG.	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---																				
40		Slightly weathered, weak, redish brown and green SHALE			19										,FR,ST,SM							
															,JN,PL,SM							
															,FO,PL,SM							
41															,JN,IR,Ro							
															,JN,IR,Ro							(D)
42					20										,JN,PL,VR						Screen	
															,JN,PL,Ro							
															,JN,IR,Ro							
43					21										,JN,ST,Ro							
															,JN,UE,Ro							
															,FR,UE,Ro							
44					22										,JN,PL,Ro							
															,JN,ST,SM							
															,JN,UE,SM							
45					23										,FO,PL,SM						Sand	
				121.11											,JN,IR,Ro							
		END OF DRILLHOLE		45.67																		
46																						
47																						
48																						
49																						
50																						

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: AK

CHECKED: SW

MIS-RCK 004 021-1228 (2007).GPJ GAL-MISS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW-11

SHEET 1 OF 5

LOCATION: N 595870.0 ;E 4808946.0

DRILLING DATE: July 11, 2007

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME - 75 Track Mount

DRILLING CONTRACTOR: All-Terrain Drilling Limited

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD- Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols.

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE min/(m)	FLUSH / COLOUR / % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3 m	DISCONTINUITY DATA: B Angle	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jn	HYDRAULIC CONDUCTIVITY K, cm/sec	Diametral Point Load Index (MPa)	RMC -'Q' AVG.	NOTES WATER LEVELS INSTRUMENTATION
		GROUND SURFACE		168.31																	
0		Compact, dry, brown SILT, trace clay (TILL)		0.00																	Hole Plug
1		Loose to compact silty clay till from 1.2 m to 2.4 m depth																			
2		Damp from 1.8 m to 2.4 m depth																			
3																					
4				164.04																	
		Dry, brown to grey SILT, trace gravel/cobbles, angular to subangular gravel (TILL)		4.27																	
5																					Grout
6																					(S)
				161.60																	
		Damp, brown to grey SANDY SILT with trace subangular rounded gravel, hetero (TILL)		6.71																	
7																					
8																					
				159.47																	
		Soft, grey to brown silty fine SAND (TILL)		8.84																	
9																					
10		*CONTINUED NEXT PAGE*																			

MIS-RCK 004 021-1228 (2007).GPJ GAL-MISS.GDT 25/9/09 DD

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MD & AK

CHECKED: SW

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW-11

SHEET 2 OF 5

LOCATION: N 595870.0 ;E 4808946.0

DRILLING DATE: July 11, 2007

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME - 75 Track Mount

DRILLING CONTRACTOR: All-Terrain Drilling Limited

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD- Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols.

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE min/(m)	FLUSH	COLOUR % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3 m	DISCONTINUITY DATA: B Angle	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jn	HYDRAULIC CONDUCTIVITY K, cm/sec	Diametral Point Load Index (MPa)	RMC -'Q' AVG.	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---																				
10		Soft, grey to brown silty fine SAND (TILL)																				
11																						
12																						
13																						
14																						
				153.43																		
15		Slightly to moderately weathered, weak, thinly bedded, redish brown and green SHALE		14.88	1										,JN,IR,Ro ,JN,CU,SM							Grout
															,JN,IR,Ro							
															,JN,IR,VR							
16					2										,JN,IR,Ro							
															,JN,IR,Ro							
															,JN,IR,SM							
				151.55											,JN,IR,Ro							
		Moderately to highly weathered, thinly bedded, redish brown SHALE with some thin greyish green beds		16.76											,JN,IR,SM							
17					3										,JN,IR,SM							
															,JN,IR,Ro							
18															,JN,IR,SM							
															,JN,IR,SM							
															,JN,IR,SM							
															,JN,IR,Ro							
															,JN,IR,Ro							
19					4										,JN,ST,Ro							
															,JN,IR,SM							
															,JN,IR,Ro							
															,JN,IR,SM							
															,JN,IR,Ro							
															,JN,IR,Ro							
															,JN,ST,SM							
20				148.31											,JN,IR,SM							
		CONTINUED NEXT PAGE																				

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MD & AK

CHECKED: SW

MIS-RCK 004 021-1228 (2007).GPJ GAL-MISS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW-11

SHEET 3 OF 5

LOCATION: N 595870.0 ;E 4808946.0

DRILLING DATE: July 11, 2007

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME - 75 Track Mount

DRILLING CONTRACTOR: All-Terrain Drilling Limited

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate; BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage; PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular; PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break; BR - Broken Rock

NOTE: For additional abbreviations refer to list of abbreviations & symbols.

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE min/(m)	FLUSH	COLOUR % RETURN	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3 m	DISCONTINUITY DATA: B Angle	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jn	HYDRAULIC CONDUCTIVITY K, cm/sec	Diametral Point Load Index (MPa)	RMC -'Q' AVG.	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---																				
20		Slightly weathered, thinly bedded, redish brown SHALE with some thin green beds		20.00											,JN,IR,Ro							
															,JN,IR,SM							
															,JN,IR,Ro							
					5										,JN,IR,Ro							
21															,JN,IR,Ro							
															,JN,IR,Ro							
															,JN,IR,SM							
22					6										,JN,IR,SM							
															,JN,IR,Ro							
23															,JN,IR,Ro							
															,JN,IR,Ro							
															,JN,IR,Ro							
															,JN,IR,Ro							
24					7										,JN,ST,Ro							
															,JN,IR,SM							
															,JN,IR,Ro							
															,JN,IR,SM							
25															,JN,IR,Ro							Grout
															,JN,IR,SM							
															,JN,IR,Ro							
					8										,JN,IR,SM							
															,JN,IR,Ro							
26				142.10											,JN,IR,Ro							
		Slightly weathered, very thinly to thinly bedded, weak, redish brown and green SHALE		26.21											,JN,CU,SM							
															,JN,IR,SM							
															,JN,IR,SM							
					9										,JN,IR,SM							
27															,JN,IR,Ro							
															,JN,IR,Ro							
															,JN,IR,Ro							
															,JN,IR,SM							
28					10										,JN,IR,Ro							
															,JN,IR,Ro							
															,JN,IR,Ro							
29															,JN,IR,SM							
					11										,JN,IR,Ro							
															,JN,IR,SM							
30		*CONTINUED NEXT PAGE*																				

DEPTH SCALE

1 : 50

LOGGED: MD & AK

CHECKED: SW

Golder Associates

MIS-RCK 004 021-1228 (2007).GPJ GAL-MISS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW-11

SHEET 4 OF 5

LOCATION: N 595870.0 ;E 4808946.0

DRILLING DATE: July 11, 2007

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME - 75 Track Mount

DRILLING CONTRACTOR: All-Terrain Drilling Limited

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO - Foliation; CO - Contact; OR - Orthogonal; CL - Cleavage
PL - Planar; CU - Curved; UN - Undulating; ST - Stepped; IR - Irregular
PO - Polished; K - Slickensided; SM - Smooth; Ro - Rough; MB - Mechanical Break
BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols.

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE min/(m)	FLUSH	COLOUR % RETURN	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3 m	DISCONTINUITY DATA: B Angle	DIP w.r.t. CORE AXIS	TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jn	HYDRAULIC CONDUCTIVITY K, cm/sec	Diametral Point Load Index (MPa)	RMC -'Q' AVG.	NOTES WATER LEVELS INSTRUMENTATION
		--- CONTINUED FROM PREVIOUS PAGE ---																				
30		Slightly weathered, very thinly to thinly bedded, weak, redish brown and green SHALE			11										,JN,IR,Ro							
															,JN,IR,SM							
31															,JN,IR,Ro							
															,JN,IR,SM							
					12										,JN,IR,Ro							
															,JN,IR,Ro							Grout
32															,JN,IR,Ro							
															,JN,IR,Ro							
															,JN,IR,Ro							
33					13										,JN,IR,Ro							
															,JN,IR,Ro							
															,JN,IR,Ro							
															,JN,IR,SM							
															,JN,IR,Ro							
															,JN,UE,Ro							
34					14										,JN,IR,SM							
															,JN,IR,PO							
35																						Hole Plug
															,JN,IR,SM							
					15										,JN,IR,Ro							
36															,JN,IR,Ro							
															,JN,PL,SM							
37																						Sand
					16										,JN,IR,SM							
															,JN,PL,PO							
38															,FR,IR,Ro							
															,JN,PL,Ro							
39					17										,JN,CU,Ro							Screen
															,JN,IR,Ro							
40		*CONTINUED NEXT PAGE*			18																	

DEPTH SCALE

1 : 50

LOGGED: MD & AK

CHECKED: SW

Golder Associates

MIS-RCK 004 021-1228 (2007).GPJ GAL-MISS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF DRILLHOLE: MW-11

SHEET 5 OF 5

LOCATION: N 595870.0 ;E 4808946.0

DRILLING DATE: July 11, 2007

DATUM:

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME - 75 Track Mount

DRILLING CONTRACTOR: All-Terrain Drilling Limited

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD- Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols.

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE min/(m)	FLUSH	COLOUR % RETURN	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3 m	DISCONTINUITY DATA: B Angle	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jn	HYDRAULIC CONDUCTIVITY K, cm/sec	Diametral Point Load Index (MPa)	RMC 'Q' AVG.	NOTES WATER LEVELS INSTRUMENTATION
40		*--- CONTINUED FROM PREVIOUS PAGE ---*																				
		Slightly weathered, very thinly to thinly bedded, weak, redish brown and green SHALE													,JN,IR,VR							
															,JN,PL,PO							
					18										,FR,IR,VR							
41															,FR,UE,Ro							
															,JN,IR,SM							
															,JN,IR,Ro							
															,JN,PL,Ro							
															,JN,IR,Ro							(D)
42					19										,JN,PL,Ro						Screen	
															,FR,ST,Ro							
															,JN,UE,Ro							
															,JN,IR,Ro							
															,JN,IR,Ro							
43															,JN,FL,Ro							
					20										,FR,PL,SM							
															,JN,CU,PO							
44																						
															,JN,UE,SM							
															,JN,IR,Ro							
					21										,FR,IR,SM							
45															,JN,IR,Ro						Sand	
															,JN,IR,Ro							
															,JN,ST,Ro							
					22										,JN,FL,Ro							
				122.39											,JN,IR,Ro							
															,JN,UE,Ro							
46		END OF DRILLHOLE		45.92																		
47																						
48																						
49																						
50																						

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MD & AK

CHECKED: SW

MIS-RCK 004 021-1228 (2007).GPJ GAL-MISS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF BOREHOLE: TW1

SHEET 1 OF 2

LOCATION: N 4808946.0 ;E 595581.0

BORING DATE: August 29, 2007

DATUM:

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		167.64							
0	Air Rotary Drilling 152.4 mm Diameter	Dense, brown, fine grained SILT (TILL) (HALTON TILL)		0.00							
1											
2											
3											
4											▽ Sept. 14/07
5											
6				161.54							
		Dense, brown, fine grained SILT, some gravel , trace clay (TILL) (HALTON TILL)		6.10							
7											
8											
9											
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MD

CHECKED: SMD

MIS-BHS 001 021-1228 (2007).GPJ GAL-MIS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF BOREHOLE: TW1

SHEET 2 OF 2

LOCATION: N 4808946.0 ;E 595581.0

BORING DATE: August 29, 2007

DATUM:

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
10	Air Rotary Drilling 152.4 mm Diameter	Dense, brown, fine grained SILT, some gravel , trace clay (TILL) (HALTON TILL)									
11											
12											
13											
14											
15											
16				151.66							
		Weathered red SHALE		15.98							Casing ends at 15.98m depth Open hole to 18.29m depth
17											
18				149.35							
		END OF BOREHOLE		18.29							
19											
20											

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MD

CHECKED: SMD

MIS-BHS 001 021-1228 (2007).GPJ GAL-MIS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF BOREHOLE: TW2

SHEET 1 OF 4

LOCATION: N 4810362.0 ;E 595617.0

BORING DATE: August 29, 2007

DATUM:

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		176.33							
0	Air Rotary Drilling 152.4 mm Diameter	Dense, brown/grey fine grained SILT, trace gravel (TILL) (HALTON TILL)		0.00							
1											
2											
3											
4											
5											
6											
7											
8											
9											
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MD

CHECKED: SMD

MIS-BHS 001 021-1228 (2007).GPJ GAL-MIS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF BOREHOLE: TW2

SHEET 2 OF 4

LOCATION: N 4810362.0 ;E 595617.0

BORING DATE: August 29, 2007

DATUM:

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		*--- CONTINUED FROM PREVIOUS PAGE ---*									
	Air Rotary Drilling 152.4 mm Diameter	Dense, brown/grey fine grained SILT, trace gravel (TILL) (HALTON TILL)									
11											
12											
13											
14											
15											
16											
17											
18				158.03							
		Dense, reddish brown fine grained SILT, some gravel (TILL) (HALTON TILL)		18.30							Casing ends at 18.3m depth Open hole to 32.01m depth
19											
20		*CONTINUED NEXT PAGE*									

MIS-BHS 001 021-1228 (2007).GPJ GAL-MIS.GDT 25/9/09 DD

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MD

CHECKED: SMD

PROJECT: 021-1228

RECORD OF BOREHOLE: TW2

SHEET 3 OF 4

LOCATION: N 4810362.0 ;E 595617.0

BORING DATE: August 29, 2007

DATUM:

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20		*--- CONTINUED FROM PREVIOUS PAGE ---*									
20	Air Rotary Drilling 152.4 mm Diameter	Dense, reddish brown fine grained SILT, some gravel (TILL) (HALTON TILL)									
21											
22											
23											
24											
25											
26											
27											
28											
29											
30		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MD

CHECKED: SMD

MIS-BHS 001 021-1228 (2007).GPJ GAL-MIS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF BOREHOLE: TW2

SHEET 4 OF 4

LOCATION: N 4810362.0 ;E 595617.0

BORING DATE: August 29, 2007

DATUM:

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
30		*--- CONTINUED FROM PREVIOUS PAGE ---*									
30	Air Rotary Drilling 152.4 mm Diameter	Dense, reddish brown fine grained SILT, some gravel (TILL) (HALTON TILL)									
32				144.32							
32		END OF BOREHOLE		32.01							
33											
34											
35											
36											
37											
38											
39											
40											

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MD

CHECKED: SMD

MIS-BHS 001 021-1228 (2007).GPJ GAL-MIS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF BOREHOLE: TW3

SHEET 1 OF 3

LOCATION: N 4810005.0 ;E 596410.0

BORING DATE: August 29, 2007

DATUM:

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		166.85							
0	Air Rotary Drilling 152.4 mm Diameter	Dense, brown fine grained SILT, trace gravel (TILL) (HALTON TILL)		0.00							
6				160.76							
		Dense, brown fine grained SILT, some gravel (TILL) (HALTON TILL)		6.09							
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MD

CHECKED: SMD

MIS-BHS 001 021-1228 (2007).GPJ GAL-MIS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF BOREHOLE: TW3

SHEET 2 OF 3

LOCATION: N 4810005.0 ;E 596410.0

BORING DATE: August 29, 2007

DATUM:

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
10	Air Rotary Drilling 152.4 mm Diameter	Dense, brown fine grained SILT, some gravel (TILL) (HALTON TILL)									
11											
12				154.65							
		Dense, brownish grey, fine grained SILT, trace gravel, trace weathered shalt throughout (TILL) (HALTON TILL)		12.20							
13											
											Sept. 14/07
14											
15											
16											
17											
18											
19											
20				147.03							
		Red SHALE		19.82							
		CONTINUED NEXT PAGE									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MD

CHECKED: SMD

MIS-BHS 001 021-1228 (2007).GPJ GAL-MIS.GDT 25/9/09 DD

PROJECT: 021-1228

RECORD OF BOREHOLE: TW3

SHEET 3 OF 3

LOCATION: N 4810005.0 ;E 596410.0

BORING DATE: August 29, 2007

DATUM:

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20		*--- CONTINUED FROM PREVIOUS PAGE ---*									
20	Air Rotary Drilling 152.4 mm Diameter	Red SHALE									Casing ends at 20.4m depth Open hole to 23.62m depth
				143.23							
		END OF BOREHOLE		23.62							
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: MD

CHECKED: SMD

MIS-BHS 001 021-1228 (2007).GPJ GAL-MIS.GDT 25/9/09 DD

Ontario Ministry of the Environment

Well T: A 036659 (number below)

A036659

Bekkers Well Record

Regulation 903 Ontario Water Resources Act

page ___ of ___

Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.
- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Management Coordinator at 416-235-6203.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only

MUN | CON | LOT

Well Owner's Information and Location of Well Information

First Name	Last Name	Mailing Address (Street Number/Name, RR,Lot,Concession)
BEKKERS WINCREST KENNELS		2012 DUNDAS ST WEST

County/District/Municipality	Township/City/Town/Village	Province	Postal Code	Telephone Number (include area code)
HALTON	OAKVILLE	Ontario	L6H4Z3	

Address of Well Location (County/District/Municipality)	Township	Lot	Concession
HALTON	~~O~~ TRAFALGAR.	35	1

RR#/Street Number/Name	City/Town/Village	Site/Compartment/Block/Tract etc.
3451 TREMAINE RD	OAKVILLE	

GPS Reading: NAD 83 | Zone 17 | Easting 596446 | Northing 4809920

Unit Make/Model:

Mode of Operation: ☐ Undifferentiated ☐ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To
BROWN	TOP-SOIL			0	.3
BROWN	CLAY		HARD	.3	5.18
GREY	CLAY	SILT		5.18	13.71
GREY	CLAY	SAND		13.71	16.76
GREY	CLAY	STONES	HARD	16.76	21.33
RED	SHALE			21.33	22.86

SHALE IN BOTTOM FAR AS COULD BORE

Hole Diameter

Depth From	Depth To	Diameter Centimetres
0	22.86	12.192

Water Record

Water found at Metres	Kind of Water		
5.18 m	☐ Fresh	☐ Sulphur	☐ Gas ☐ Salty ☐ Minerals ☐ Other:
13.71 m	☐ Fresh	☐ Sulphur	☐ Gas ☐ Salty ☐ Minerals ☐ Other:
21.33 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
Casing				
91.44	☐ Steel ☐ Fibreglass ☐ Plastic ☑ Concrete ☐ Galvanized	7.62	0	22.86
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		

No Casing or Screen

☐ Open hole

Test of Well Yield

Pumping test method	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Pump intake set at - (metres)	Static Level			
Pumping rate - (litres/min)	1		1	
Duration of pumping ____hrs +____ min	2		2	
Final water level end of pumping ____metres	3		3	
Recommended pump type. ☐ Shallow ☐ Deep	4		4	
Recommended pump depth 21.33 metres	5		5	
Recommended pump rate. 18.92 (litres/min)	10		10	
	15		15	
If flowing give rate - (litres/min)	20		20	
	25		25	
If pumping discontinued, give reason. DRY HOLE ON COMPLETION	30		30	
	40		40	
	50		50	
	60		60	

Plugging and Sealing Record

☑ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	2.45	BENSEAL	
2.45	22.86	FILTER SAND	

Method of Construction

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

Water Use

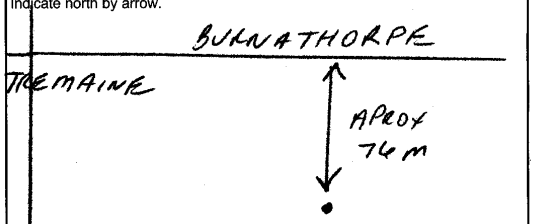
☑ Domestic ☐ Industrial ☐ Public Supply ☐ Other
☐ Stock ☐ Commercial ☐ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

Final Status of Well

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

Location of Well

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



Audit No. Z 40625

Date Well Completed YYYY 2006 MM 3 DD 7

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

Date Delivered YYYY MM DD

Well Contractor/Technician Information

Name of Well Contractor	Well Contractor's Licence No.
JOHNSON & BAETZ	3030

Business Address (street name, number, city etc.)	
19 MACBRIDE COURT	BRANTFORD

Name of Well Technician (last name, first name)	Well Technician's Licence No.
BAETZ JOHN	

Signature of Technician/Contractor	Date Submitted YYYY MM DD
X	

Ministry Use Only

Data Source	Contractor
Date Received APR 25 2006 YYYY MM DD	Date of Inspection YYYY MM DD
Remarks	Well Record Number

0506E (09/03) Contractor's Copy ☐ Ministry's Copy ☐ Well Owner's Copy ☐

Cette formule est disponible en français

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

Featherstone 30 M / 5F

WATER WELL RECORD

Ontario

2804215

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

11

MUNICIP. 28602 CON. DS N C 02

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC	LOT
Halton	Burlington Town of Milton (Nelson)	2ND.S	001

[redacted] NCASTER. DATE COMPLETED DAY 18 MO. July 07 YR. 73

[redacted] 09476 RC 4 ELEVATION 0560 RC 4 BASIN CODE 24

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
brown	clay			0	12
grey	silty clay			12	31
grey	clay	gravel		31	53
silty blue	clay			53	59
red	clay			59	66
red	shale			66	82

OWRC P-9

31 0012605 0031126506 0053120511 0059130506 0066705 0082717

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
006.9	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
0074	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ~~☒ OPEN HOLE~~	188	0	068
06			68	~~82~~
06	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE			0082
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

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

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☒ BAILER

PUMPING RATE: 1½ 0002 GPM — DURATION OF PUMPING: 01 HOURS 30 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
024 FEET	080 FEET	080 FEET	080 FEET	080 FEET	080 FEET

WATER LEVELS DURING: 1 ☑ PUMPING 2 ☐ RECOVERY

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

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP — RECOMMENDED PUMP SETTING 080 FEET — RECOMMENDED PUMPING RATE 0002 1½ GPM

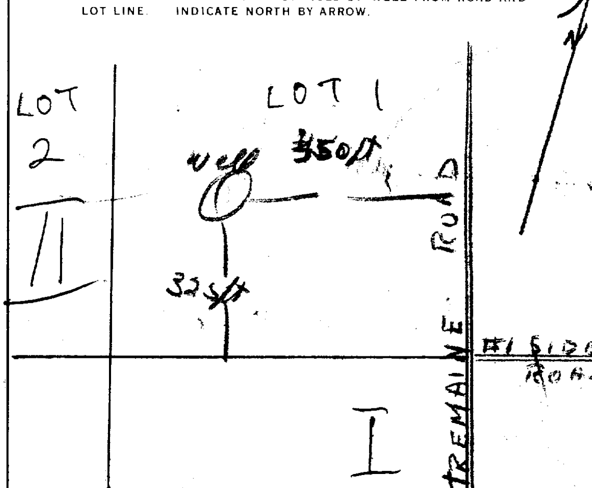
FINAL STATUS OF WELL: 1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

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

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

LOCATION OF WELL

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



DRILLERS REMARKS:

CONTRACTOR
NAME OF WELL CONTRACTOR: Burton Ruttan — LICENCE NUMBER: 4602
ADDRESS: Milton R R 2
NAME OF DRILLER OR BORER: same — LICENCE NUMBER:
SIGNATURE OF CONTRACTOR: Burton Ruttan — SUBMISSION DATE DAY 18 MO. July YR. 73

OFFICE USE ONLY
DATA SOURCE 1 — CONTRACTOR 4602 — DATE RECEIVED 230773
DATE OF INSPECTION — INSPECTOR
REMARKS: CSS.S8

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 07-091

Finucci

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

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

11 — 2807948 — MUNICIP 28,6,02 — CON. DS, N, , 01

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON, BLOCK, TRACT, SURVEY, ETC	LOT
Halton	City of Burlington	Conc .1NDS	3

ADDRESS: [redacted] 333 Warminster Dr., Oakville, L6L-4N1

DATE COMPLETED: DAY 14 MO 01 YR 92

21 — UTM — NORTHING — RC — ELEVATION — RC — BASIN CODE — I II III IV

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Clay	Sand	Loose	0	32
Brown	Clay	Sand & Boulders	Loose	32	34
Red	Clay	Sand	Loose	34	39
Red	Shale		Hard	39	55

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
39	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼ IN	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	+1	39
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		39	55
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

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

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

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☒ BAILER

PUMPING RATE: 4.5 GPM — DURATION OF PUMPING: 1 HOURS 0 MINS

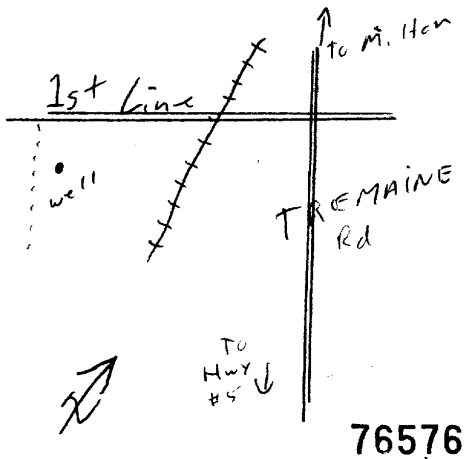
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
19 FEET	50 FEET	50 FEET	50 FEET	50 FEET	50 FEET

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

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP — RECOMMENDED PUMP SETTING: FEET — RECOMMENDED PUMPING RATE: 4.0 GPM

LOCATION OF WELL

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



76576

DRILLERS REMARKS

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

WATER USE (55-56)
1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING ☐ OTHER 9 ☐ NOT USED

METHOD OF CONSTRUCTION (57)
1 ☒ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: O'Connor Well Drilling Ltd. — WELL CONTRACTOR'S LICENCE NUMBER: 4005

ADDRESS: RR#1 Millgrove, Ont., LOR-1W0

NAME OF WELL TECHNICIAN: W. Howe — WELL TECHNICIAN'S LICENCE NUMBER: T-0518

SIGNATURE OF TECHNICIAN/CONTRACTOR: John O'Connor — SUBMISSION DATE: DAY ____ MO ____ YR ____

OFFICE USE ONLY

DATA SOURCE (58) — CONTRACTOR (59-62): 4005 — DATE RECEIVED (63-68): JAN 20 1992

DATE OF INSPECTION — INSPECTOR

REMARKS

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Hendervale House or Hendervale Cottage

UTM. 17 Z 5T95T620 Con I DSN
E 4 R 481081630 CODED Lot 3
Elev. 5 R 05T50
Basin 24

2802793

The Ontario Water Resources Commission Act

WATER WELL RECORD

County or District: HALTON
~~Township, Village~~, Town ~~or City~~: BURLINGTON
Con.: ONE DSN
Lot: 3
Date completed: 12 (day) NOV. (month) 1968 (year)

[redacted]ress: R.R # 6 MILTON

Casing and Screen Record

Inside diameter of casing: 30"
Total length of casing: 26'
Type of screen: —
Length of screen: —
Depth to top of screen: —
Diameter of finished hole: 30"

Pumping Test

Static level: 8'
RECOVERY ~~Test-pumping~~ rate: 2 G.P.M.
Pumping level: ~~24'~~
Duration of test pumping: ~~ONE HOUR~~
Water clear or cloudy at end of test: CLEAR
Recommended pumping rate: 5 G.P.M.
with pump setting of 24' feet below ground surface

Well Log

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
TOPSOIL	0	1	21	FRESH
BROWN CLAY	1	12		
HARDPAN	12	21		
SAND & GRAVEL	21	27		

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

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

Drilling or Boring Firm: MILTON WELL BORING

Address: 6751 WALKERS LINE
R.R. # 2 MILTON

Licence Number: 156

Name of Driller or Borer: M. PELTIER

Address: SAME AS ABOVE

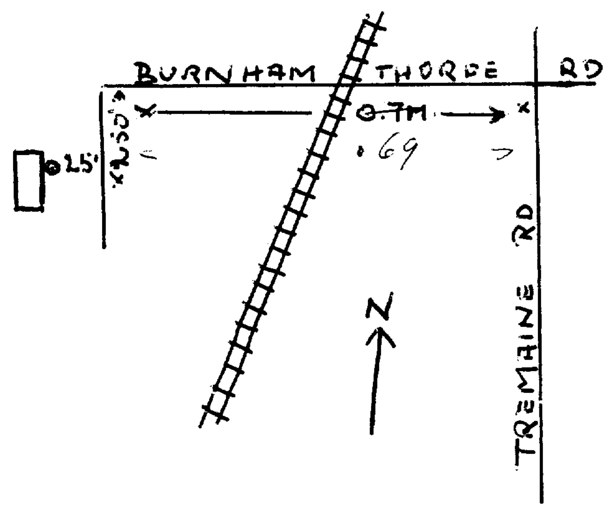
Date: DEC 3, 1968

(Signature of Licensed Drilling or Boring Contractor)

Form 7 15M-60-4138

Location of Well

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



CSS.S8

OWRC COPY

Hendervale ABC Barn or Hendervale XYZ Barn

Ministry of the Environment
Ontario

WELL # 1.

The Ontario Water Resources Act

WATER WELL RECORD

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

11 (1 2) 2808537 MUNICIP 28001 (10 14) CON. CON 10 1 (15 22 23 24)

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON. BLOCK, TRACT, SURVEY, ETC.	LOT 25-27
HALTON	HALTON HILLS	CON.1	1&2

OWNER (SURNAME FIRST) 28-47	ADDRESS	DATE COMPLETED 48-53
HENDERVALE STABLES	#1 SIDE RD MILTON ONT.	DAY 05 MO 07 YR 96

21 (1 2) UTM ZONE (10) EASTING (12 17) NORTHING (18 24) RC (25) ELEVATION (26 30) RC BASIN CODE (31) II III IV (47)

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BROWN	CLAY			0	14
GRAY	CLAY			14	43
RED	SHALE			43	100

31 (1 2)

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

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
95	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	+1	49
6¼	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC	---	49	100
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE(S) OF OPENING (SLOT NO.) 31-33	DIAMETER 34-38 INCHES	LENGTH 39-40 FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN 41-44 FEET	45

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER ETC.)
10-13	14-17	
18-21	22-25	
26-29	30-33	80

71 PUMPING TEST

PUMPING TEST METHOD 10: 1 ☐ PUMP 2 ☒ BAILER

PUMPING RATE 11-14: 12 GPM

DURATION OF PUMPING 15-16 HOURS 2 17-18 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (25) 1 ☒ PUMPING 2 ☐ RECOVERY			
		15 MINUTES 26-28	30 MINUTES 29-31	45 MINUTES 32-34	60 MINUTES 35-37
39 FEET (19-21)	82 FEET (22-24)	64 FEET	75 FEET	82 FEET	82 FEET

IF FLOWING, GIVE RATE 38-41: ---------- GPM

PUMP INTAKE SET AT: ---------- FEET

WATER AT END OF TEST 42: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

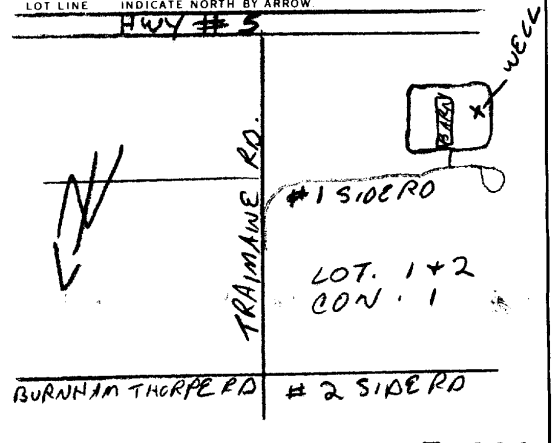
RECOMMENDED PUMP SETTING 43-45: 95 FEET

RECOMMENDED PUMPING RATE 46-49: 10 GPM

50-53

LOCATION OF WELL

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



74931

DRILLERS REMARKS

FINAL STATUS OF WELL 54

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

WATER USE 55-56

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

METHOD OF CONSTRUCTION 57

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

CONTRACTOR

NAME OF WELL CONTRACTOR: CORE'S WELL DRILLING

WELL CONTRACTOR'S LICENCE NUMBER: 1660

ADDRESS: 264 BRONTE ST. UNIT #10 MILTON ONT.

NAME OF WELL TECHNICIAN: ROD CORE

WELL TECHNICIAN'S LICENCE NUMBER: TO-479

SIGNATURE OF TECHNICIAN/CONTRACTOR

SUBMISSION DATE: DAY ____ MO ____ YR ____

OFFICE USE ONLY

DATA SOURCE 58

CONTRACTOR 59-62: 1660

DATE RECEIVED 63-68: MAY 08 1997

DATE OF INSPECTION

INSPECTOR

REMARKS

CSS. S

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Hendervale ABC Barn or Hendervale XYZ Barn

Ministry of the Environment — Ontario

WELL #2

The Ontario Water Resources Act

WATER WELL RECORD

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

11 — 2808540 — MUNICIP 28005 — CON. CON 01

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON, BLOCK, TRACT, SURVEY, ETC	LOT
HALTON	HALTON HILLS	CON. 1	1&2

OWNER (SURNAME FIRST)	ADDRESS	DATE COMPLETED
HENDERVALE STABLES	#1 SIDE RD MILTON ONT.	DAY 15 MO 08 YR 96

21 — UTM ZONE — EASTING — NORTHING — RC — ELEVATION — RC — BASIN CODE — II — III — IV

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BROWN	CLAY			0	12
GRAY	CLAY			12	40
RED	SHALE			40	106

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
103	2 ☒ SALTY
	1 ☐ FRESH 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	1 ☒ STEEL	.188	+1	47
6¼	4 ☒ OPEN HOLE	---	47	106
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

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

MATERIAL AND TYPE — DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☐ PUMP 2 ☒ BAILER	8 GPM	1 HOURS --- MINS

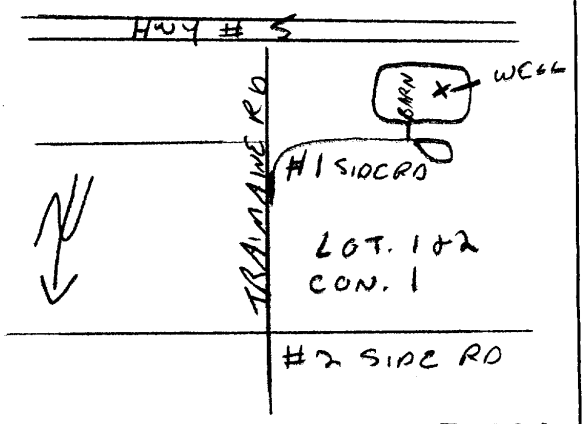
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☐ PUMPING 2 ☐ RECOVERY)	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
44 FEET	95 FEET		60 FEET	78 FEET	95 FEET	95 FEET

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

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	101 FEET	8 GPM

LOCATION OF WELL

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



74934

DRILLERS REMARKS

FINAL STATUS OF WELL

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

WATER USE

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

METHOD OF CONSTRUCTION

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

CONTRACTOR

NAME OF WELL CONTRACTOR	WELL CONTRACTOR'S LICENCE NUMBER
CORE'S WELL DRILLING	1660

ADDRESS: 264 BRONTE ST. UNIT 310 MILTON ONT.

NAME OF WELL TECHNICIAN	WELL TECHNICIAN'S LICENCE NUMBER
ROD CORE & ART CLARK	TO-479

SIGNATURE OF TECHNICIAN/CONTRACTOR: R. Core — SUBMISSION DATE: DAY ___ MO. ___ YR. ___

OFFICE USE ONLY

DATA SOURCE	CONTRACTOR	DATE RECEIVED
	1660	MAY 08 1997

DATE OF INSPECTION — INSPECTOR

REMARKS: CSS. S

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Hendervale Main Barn

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

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

11 (1 2) 2808781 MUNICIP 28001 (10 14) CON. CON 10 1 (15 22 23 24)

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON, BLOCK, TRACT, SURVEY, ETC	LOT (25-27)
HALTON	HALTON HILLS	CON.1	1&2

OWNER (SURNAME FIRST) (28-47)	ADDRESS	DATE COMPLETED (48-53)
HENDERVALE STABLES	5244 #1 SIDE RD MILTON ONT. L9T-2Y1	DAY 10 MO 04 YR 97

21 (1 2) UTM ZONE (10) EASTING (12 17) NORTHING (18 24) RC (25) ELEVATION (26 30) RC (30) BASIN CODE (31) II III IV (47)

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
	BROWN CLAY			0	4
	BROWN CLAY AND STONES			4	18
	RED CLAY			18	22
	RED SHALE			22	54

31 (1 2 10 14 15 21 32 43 54 65 75 80)

32 (1 2 10 14 15 21 32 43 54 65 75 80)

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
(10-13) 50	(14) 1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
(15-18)	(19) 1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
(20-23)	(24) 1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
(25-28)	(29) 1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
(30-33)	(34) 1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS (80)

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
(10-11) 6¼	(12) 1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	+1	(13-16) 27
(17-18) 6¼	(19) 1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		27	(20-23) 54
(24-25)	(26) 1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			(27-30)

SCREEN

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

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
(10-13)	(14-17)	
(18-21)	(22-25)	
(26-29)	(30-33) (80)	

71 PUMPING TEST

PUMPING TEST METHOD (10)	PUMPING RATE (11-14)	DURATION OF PUMPING (15-16 HOURS, 17-18 MINS)
1 ☐ PUMP 2 ☒ BAILER	7 GPM	1 HOURS MINS

STATIC LEVEL (19-21)	WATER LEVEL END OF PUMPING (22-24)	WATER LEVELS DURING (25) 1 ☒ PUMPING 2 ☐ RECOVERY	15 MINUTES (26-28)	30 MINUTES (29-31)	45 MINUTES (32-34)	60 MINUTES (35-37)
16 FEET	47 FEET		30 FEET	47 FEET	47 FEET	47 FEET

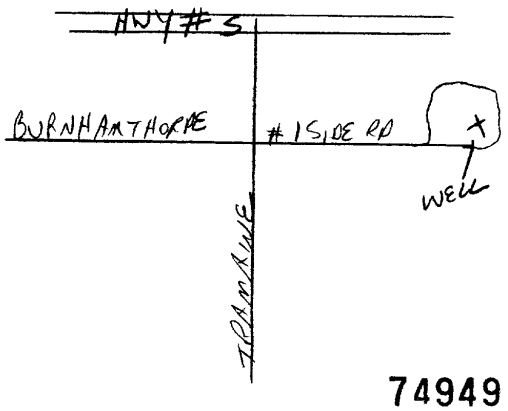
IF FLOWING GIVE RATE (38-41)	PUMP INTAKE SET AT	WATER AT END OF TEST (42)
GPM	FEET	1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING (43-45)	RECOMMENDED PUMPING RATE (46-49)
☐ SHALLOW ☒ DEEP	50 FEET	6-7 GPM

(50-53)

LOCATION OF WELL

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



74949

DRILLERS REMARKS

FINAL STATUS OF WELL (54)

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

WATER USE (55-56)

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

METHOD OF CONSTRUCTION (57)

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

CONTRACTOR

NAME OF WELL CONTRACTOR	WELL CONTRACTOR'S LICENCE NUMBER
CORE'S WELL DRILLING	1660

ADDRESS: 264 BRONTE ST. UNIT#10 MILTON ONT.

NAME OF WELL TECHNICIAN	WELL TECHNICIAN'S LICENCE NUMBER
ROD CORE ART CLARK	TO-479

SIGNATURE OF TECHNICIAN/CONTRACTOR: R. Core

SUBMISSION DATE: DAY ____ MO ____ YR. ____

OFFICE USE ONLY

DATA SOURCE (58)	CONTRACTOR (59-62)	DATE RECEIVED (63-68) (80)
	1660	JUN 17 1998

DATE OF INSPECTION | INSPECTOR

REMARKS: CSS. S9

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Sicard

The Ontario Water Resources Commission Act

WATER WELL RECORD

3 0 m / 5 f.

Water management in Ontario

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

11 | 2803908 | MUNICIP. 28602 | CON. DS N C QX

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
HALTON	BURLINGTON	1 N.D.S.	001

[redacted] 63 DUNDAS ST. (#5 HWY)

DATE COMPLETED: DAY 04 MO. 09 YR. 72

UTM: 08770 | RC: 4 | ELEVATION: 0520 | RC: 6 | BASIN CODE: 24

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH – FEET FROM	DEPTH – FEET TO
	TOPSOIL			0	3
BROWN	CLAY			3	15
RED	CLAY			15	21
RED	SHALE			21	52

31 | 0003 02 | 0015 6 05 | 0021 7 05 | 0052 7 17

32

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0030	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☒ MINERAL
0051	1 ☒ FRESH 2 ☐ SALTY 3 ☒ SULPHUR 4 ☒ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH – FEET FROM	DEPTH – FEET TO
06	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	22 0022
06	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		22	0052 52
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

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

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☐ PUMP 2 ☒ BAILER	0002 GPM	02 HOURS 00 MINS.

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING PUMPING 1 ☒ 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
044 FEET	0048 FEET	048 FEET	048 FEET	048 FEET	048 FEET	048 FEET

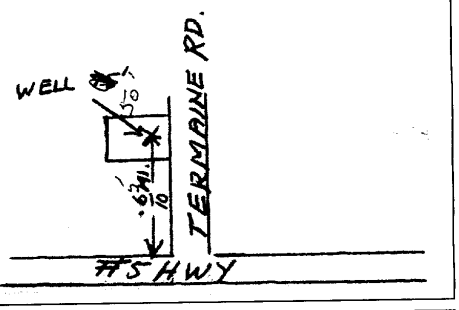
IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM.	49 FEET	1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	049 FEET	0002 GPM.

50-53: 0005 GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL

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



DRILLERS REMARKS:

FINAL STATUS OF WELL

54: 1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

WATER USE

55-56: 01

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

METHOD OF DRILLING

57: 1 ☒ CABLE TOOL; 2 ☐ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Peter Spotswood Well Drilling | LICENCE NUMBER: 1815

ADDRESS: 2442 Marwak Ct, Burlington

NAME OF DRILLER OR BORER: Ed Boyle | LICENCE NUMBER: 1815

SIGNATURE OF CONTRACTOR: G. Carmichael | SUBMISSION DATE: DAY ____ MO. ____ YR. ____

OWRC COPY

OFFICE USE ONLY

DATA SOURCE	CONTRACTOR	DATE RECEIVED
1	1815	110972

DATE OF INSPECTION | INSPECTOR

REMARKS: CSS.S8

P | WI

Simms

30 M 5F

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

WATER WELL RECORD

Ontario

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

2804679 | 28602 DS_N_C 02

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
HALTON	~~ERAMOSA~~ Town of Milton & Nelson	4 NDS	001 4

OWNER (SURNAME FIRST)	ADDRESS	DATE COMPLETED
MCAMMCE FARMS	RR 6 MILTON	DAY 8 MO. NOV YR. 74

2804679 17 595308 4809884 4 590 4 24 NOV 07, 1975 S5

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BROWN	TOPSOIL			0	1
"	CLAY		HARD PACKED	1	22
GREY	"	BLUE CLAY, SANDLAYERS	MIXED	22	63
BROWN	SAND	STONES	WATER BEARING	63	72
RED	SHALE	GREEN SHALE	HARD	72	90

WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
63	☒ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
72	☒ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL

CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
30	☐ STEEL ☐ GALVANIZED ☒ CONCRETE ☐ OPEN HOLE	2½	0	6½
2"	☐ STEEL ☒ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE	16ga	66	90
	☐ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE			

SCREEN

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

PLUGGING & SEALING RECORD

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

PUMPING TEST

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

STATIC LEVEL	WATER LEVEL END OF PUMPING
FEET	FEET

WATER LEVELS DURING ☐ PUMPING ☐ RECOVERY

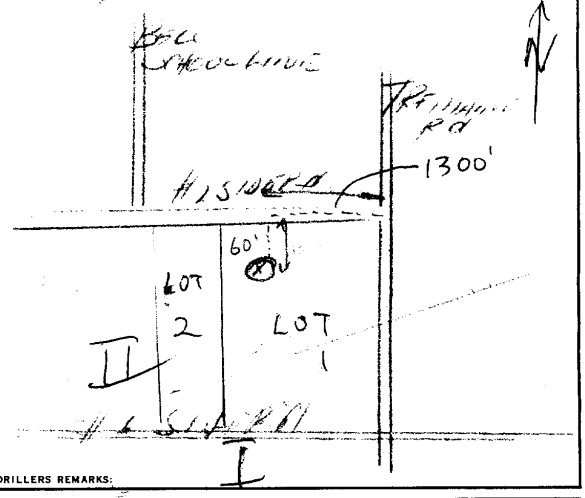
15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
FEET	FEET	FEET	FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	86 FEET	☐ CLEAR ☒ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	86 FEET	2 GPM

LOCATION OF WELL

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



DRILLERS REMARKS:

FINAL STATUS OF WELL	☒ WATER SUPPLY ☐ OBSERVATION WELL ☐ TEST HOLE ☐ RECHARGE WELL ☐ ABANDONED, INSUFFICIENT SUPPLY ☐ ABANDONED, POOR QUALITY ☐ UNFINISHED
WATER USE	☒ DOMESTIC ☐ STOCK ☐ IRRIGATION ☐ INDUSTRIAL ☐ OTHER ☐ COMMERCIAL ☐ MUNICIPAL ☐ PUBLIC SUPPLY ☐ COOLING OR AIR CONDITIONING ☐ NOT USED
METHOD OF DRILLING	☐ CABLE TOOL ☐ ROTARY (CONVENTIONAL) ☐ ROTARY (REVERSE) ☐ ROTARY (AIR) ☐ AIR PERCUSSION ☒ BORING ☐ DIAMOND ☐ JETTING ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR	LICENCE NUMBER
MILTON WELL DRILLING	3637

ADDRESS: 6251 WATERDOWN LINE RR2 MILTON

NAME OF DRILLER OR BORER	LICENCE NUMBER
MARCEL PELTIER	3637

SIGNATURE OF CONTRACTOR: M. Peltier — SUBMISSION DATE: DAY 13 MO. NOV YR. 74

OFFICE USE ONLY

1 10275.

J.B

CSS.S8 JP

OWNER'S COPY

FORM 7 07-091

Sugiyama

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
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11 2807647 MUNICIP. 2805 CON. DS N 101

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON. BLOCK, TRACT, SURVEY, ETC.	LOT
HALTON	TOWN OF OAKVILLE	CON.1 N.D.S.	35

OWNER (SURNAME FIRST)	ADDRESS	DATE COMPLETED
FUJI MACHINE SHOP	~~811 MAC PHEARSON RD.~~ OAKVILLE,ONT. L6J 4Z3	DAY 31 MO 8 YR 90

21 UTM ZONE | EASTING | NORTHING | RC | ELEVATION | RC | BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BROWN	CLAY		LOOSE	0	12
RED	CLAY		LOOSE	12	18
RED	SHALE		HARD	18	50

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
48	1 ☐ FRESH 2 ☒ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	+1	25
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC		25	50
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

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

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

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

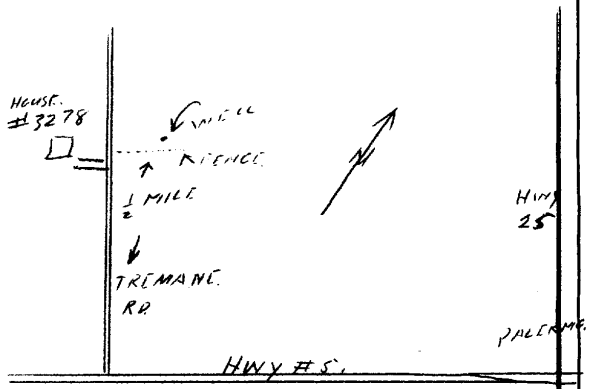
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☒ PUMPING 2 ☐ RECOVERY)			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
17 FEET	46 FEET	46 FEET	46 FEET	46 FEET	46 FEET

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

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	48 FEET	2 GPM

LOCATION OF WELL

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



76398

DRILLERS REMARKS

FINAL STATUS OF WELL	1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED ☐ DEWATERING
WATER USE	1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED
METHOD OF CONSTRUCTION	1 ☒ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR	WELL CONTRACTOR'S LICENCE NUMBER
OCONNOR WELL DRILLING LTD.	4005

ADDRESS: RR # 1 MILLGROVE,ONT. L0R 1V0

NAME OF WELL TECHNICIAN	WELL TECHNICIAN'S LICENCE NUMBER
W.HOWE	T-0518

SIGNATURE OF TECHNICIAN/CONTRACTOR: P. O'Connor

SUBMISSION DATE: DAY ___ MO. ___ YR. ___

OFFICE USE ONLY

DATA SOURCE	CONTRACTOR	DATE RECEIVED
	4005	SEP 12 1990

DATE OF INSPECTION | INSPECTOR

REMARKS

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Wettlaufer

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

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11 — 2807684 — MUNICIP 28602 — CON. DS N — LOT 02

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON. BLOCK, TRACT, SURVEY ETC	LOT
[redacted]	CITY OF BURLINGTON	CON.2 N.D.S.	2

[redacted] 5364 #2 SIDE RD.
TON, ONT. L9T 2Y1

DATE COMPLETED: DAY 12 MO 10 YR 90

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

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BROWN	CLAY		LOOSE	0	8
BROWN	SAND		LOOSE	8	15
BROWN	CLAY	SAND	LOOSE	15	43
RED	CLAY		LOOSE	43	45
RED	SHALE		HARD	45	60

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
57	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	+1	45
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		45	60
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

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

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☐ PUMP 2 ☒ BAILER	2 GPM	1 HOURS 30 MINS

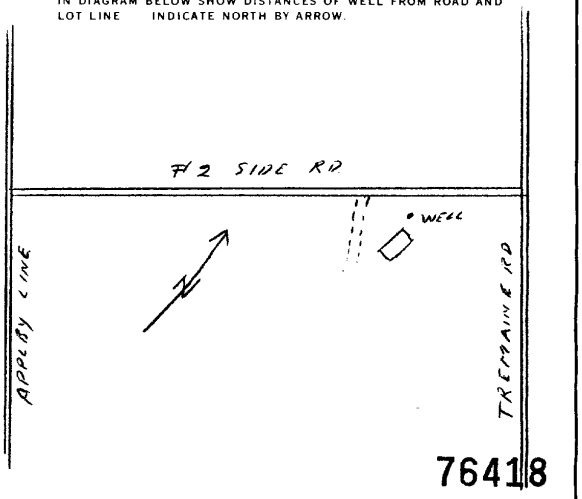
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☒ PUMPING 2 ☐ RECOVERY)	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
18 FEET	57 FEET		57 FEET	57 FEET	57 FEET	57 FEET

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

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

LOCATION OF WELL

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



DRILLERS REMARKS

7641 8

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

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

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

CONTRACTOR

NAME OF WELL CONTRACTOR: O'CONNOR WELL DRILLING LTD.
WELL CONTRACTOR'S LICENCE NUMBER: 4005
ADDRESS: RR # 1 MILLGROVE, ONT. L0R 1V0
NAME OF WELL TECHNICIAN: W. HOWE
WELL TECHNICIAN'S LICENCE NUMBER: T-0513
SIGNATURE OF TECHNICIAN/CONTRACTOR: J.B. O'Connor
SUBMISSION DATE: DAY ____ MO ____ YR ____

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR 4005 | DATE RECEIVED NOV 08 1990
DATE OF INSPECTION | INSPECTOR
REMARKS

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Wiggins

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The Ontario Water Resources Commission Act

WATER WELL RECORD

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11 (1 2) 2803806 MUNICIP. 28602 (10 14) CON. DS N C 02 (15 22 23 24)

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Halton	Burlington	2 N. D. S.	001 (25-27)

OWNER (SURNAME FIRST) [redacted] ADDRESS Grove Park, Burlington

DATE COMPLETED (48-53) DAY 24 MO. Jan 01 YR 72

093380 (24) RC 4 (25) ELEVATION 0515 (26) RC 5 (30) BASIN CODE 24 (31) (I II III IV) (47)

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH – FEET FROM	DEPTH – FEET TO
Brown	Clay			0	10
Grey	Clay			10	50
Red	Shale			50	62

31 0010605 0050205 0062717

32 (1 2) (10 14 15) (21) (32) (43) (54) (65) (75) (80)

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0060 (10-13)	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL (14)
(15-18)	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL (19)
(20-23)	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL (24)
(25-28)	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL (29)
(30-33)	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL (34) (80)

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH – FEET FROM	DEPTH – FEET TO
06 (10-11) 6¼	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE (12)	188	0	~~53~~ 0053 (13-16)
(17-18)	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE (19)		53	0062 (20-23) ~~62~~
(24-25)	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE (26)			(27-30)

SCREEN

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

61 PLUGGING & SEALING RECORD

DEPTH SET AT – FEET FROM	DEPTH SET AT – FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
(10-13)	(14-17)	
(18-21)	(22-25)	
(26-29)	(30-33) (80)	

71 PUMPING TEST

PUMPING TEST METHOD (10): 1 ☐ PUMP 2 ☒ BAILER

PUMPING RATE (11-14): 0011 GPM. DURATION OF PUMPING (15-16) 01 HOURS (17-18) 30 MINS.

STATIC LEVEL (19-21)	WATER LEVEL END OF PUMPING (22-24)	WATER LEVELS DURING (25): 1 ☒ PUMPING 2 ☐ RECOVERY			
		15 MINUTES (26-28)	30 MINUTES (29-31)	45 MINUTES (32-34)	60 MINUTES (35-37)
025 FEET	049 FEET	049 FEET	049 FEET	049 FEET	049 FEET

IF FLOWING, GIVE RATE (38-41) GPM. PUMP INTAKE SET AT FEET. WATER AT END OF TEST (42): ☒ 1 CLEAR 2 ☐ CLOUDY

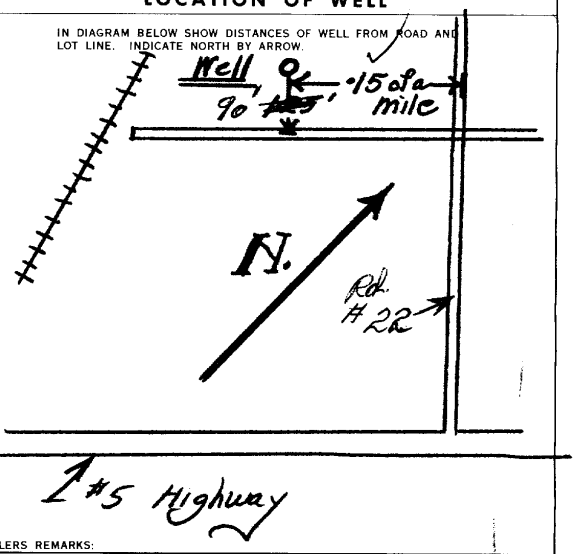
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

RECOMMENDED PUMP SETTING (43-45) 050 FEET. RECOMMENDED PUMPING RATE (46-49) 0005 GPM.

(50-53) 0005 GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL

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



DRILLERS REMARKS:

FINAL STATUS OF WELL (54)

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

WATER USE (55-56) 01

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

METHOD OF DRILLING (57)

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

CONTRACTOR

NAME OF WELL CONTRACTOR: G.J. Wallis — LICENCE NUMBER: 5417

ADDRESS: RR#2 Stney Creek

NAME OF DRILLER OR BORER: Same — LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: George J Wallis — SUBMISSION DATE: DAY 18 MO. 4 YR. 72

OWRC COPY

OFFICE USE ONLY

DATA SOURCE (58): 1 — CONTRACTOR (59-62): 5417 — DATE RECEIVED (63-68): 240472 (80)

DATE OF INSPECTION — INSPECTOR

REMARKS: CSS.S8

P M WI

APPENDIX C

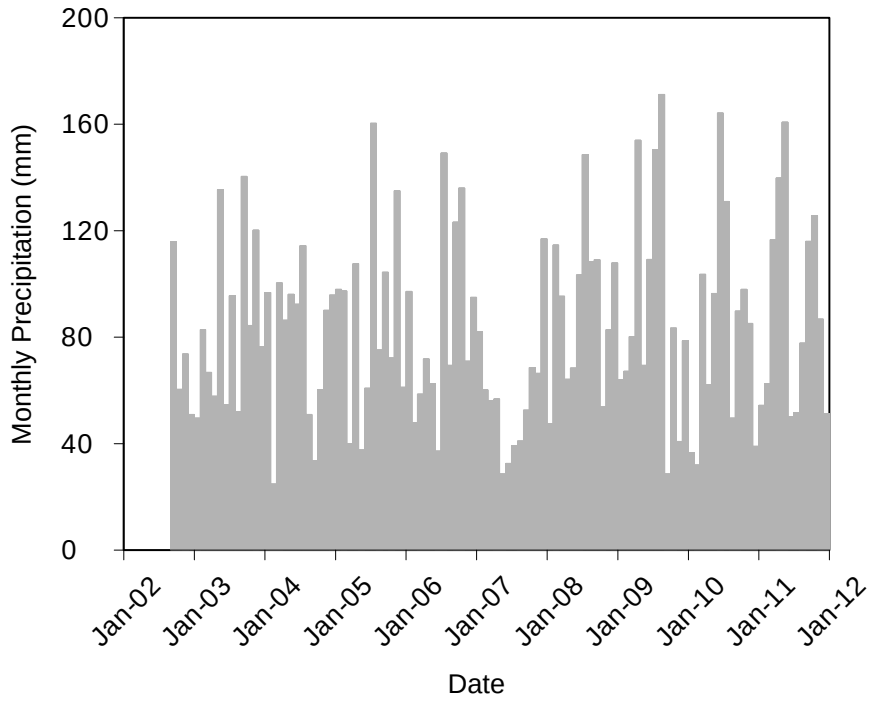
Groundwater Level Hydrographs

May 2012
Report No. 021-1228

Appendix C Hydrograph Details
Tansley Quarry - Hanson Brick Ltd.

Rainfall Data

Rainfall data from September 2002 to April 2006 obtained from the Millgrove Station (now discontinued). Data from May 2006 to present is from Hamilton Airport.



Well Completion Legend

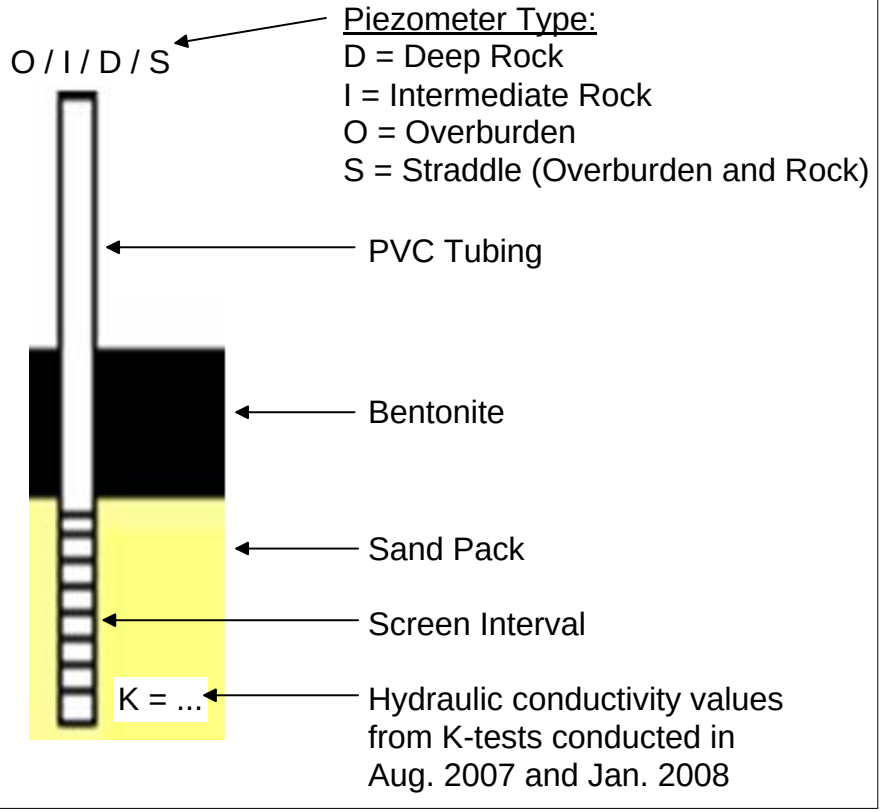
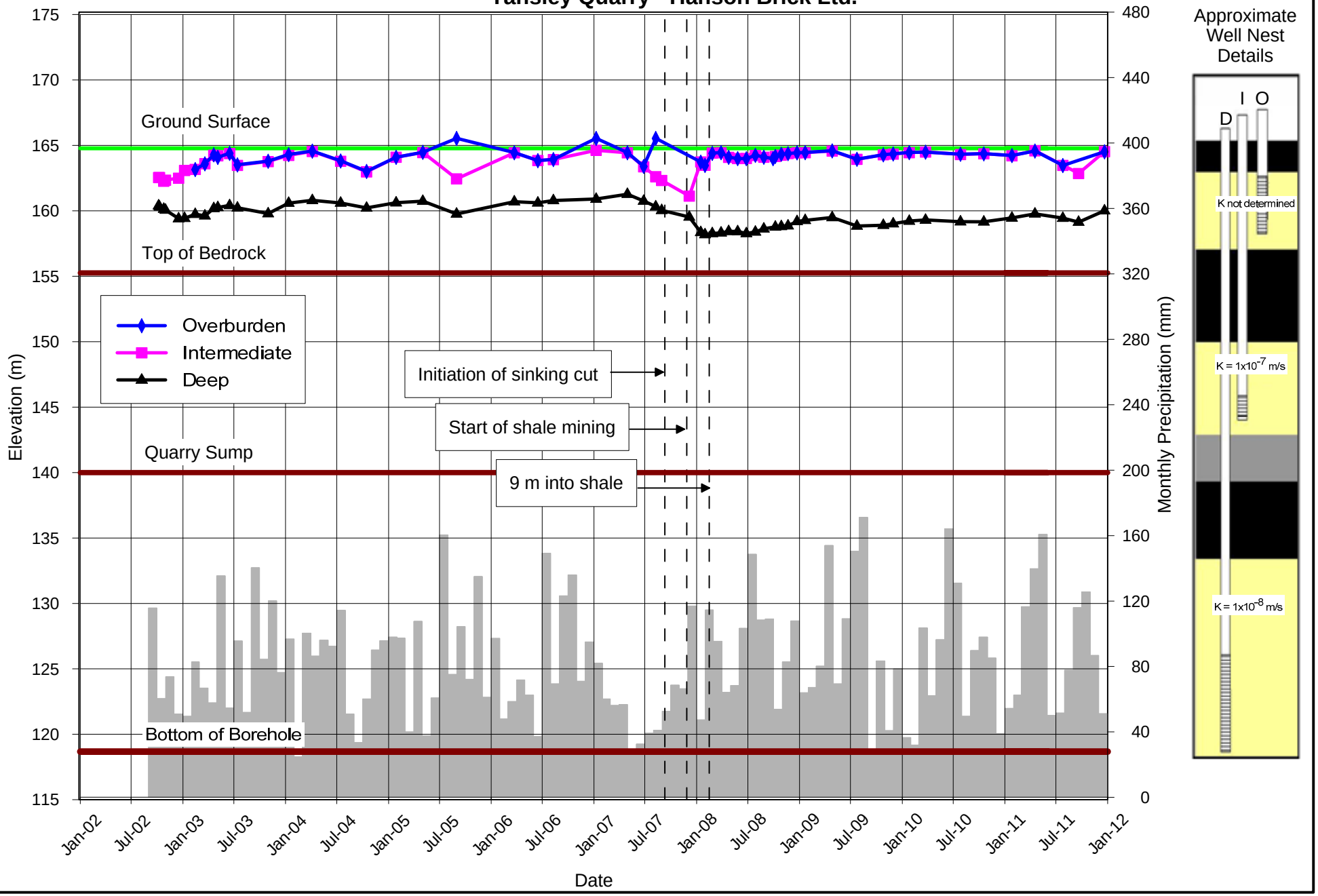
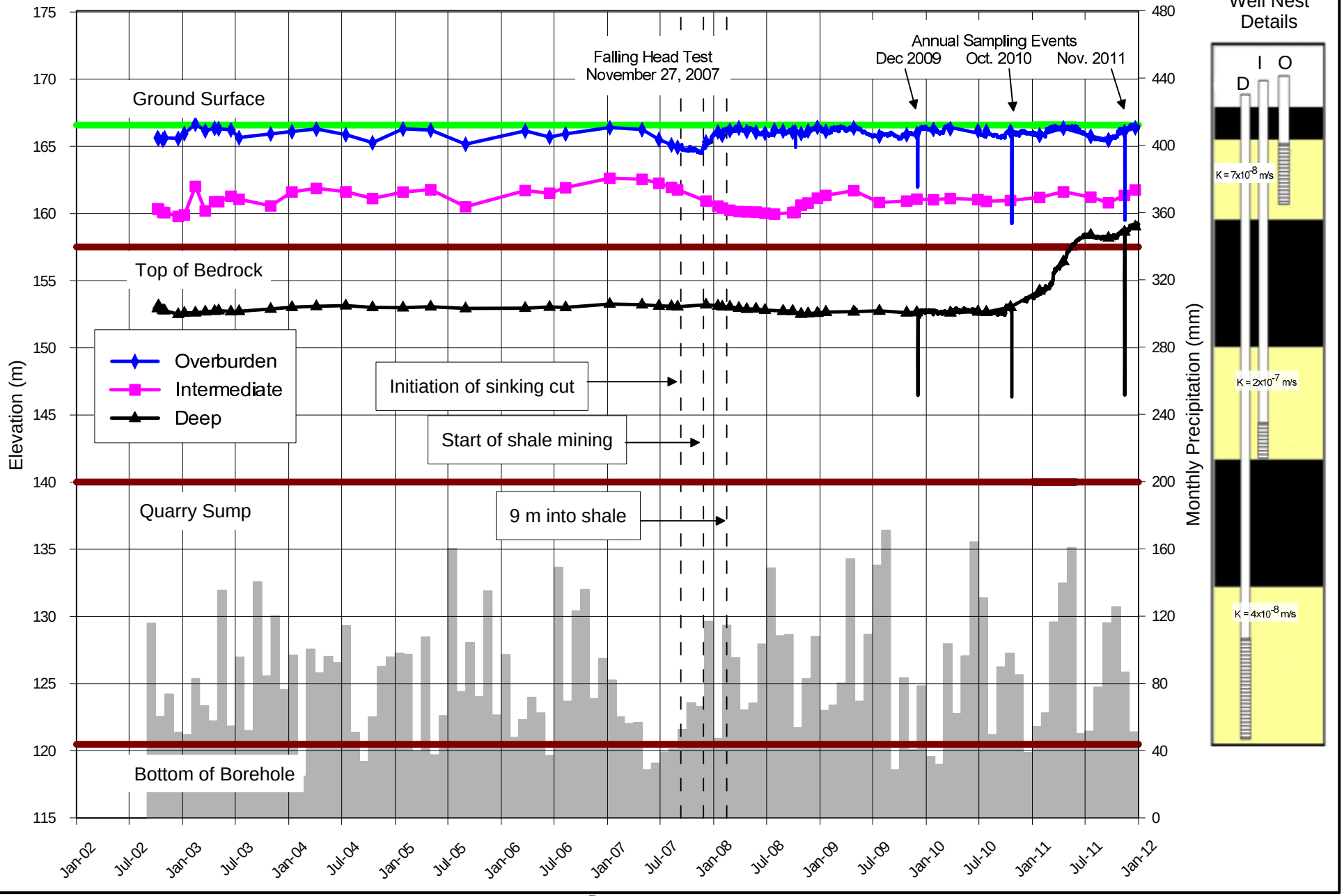


Figure C.1: Monitoring Well MW-01 Hydrograph
Tansley Quarry - Hanson Brick Ltd.



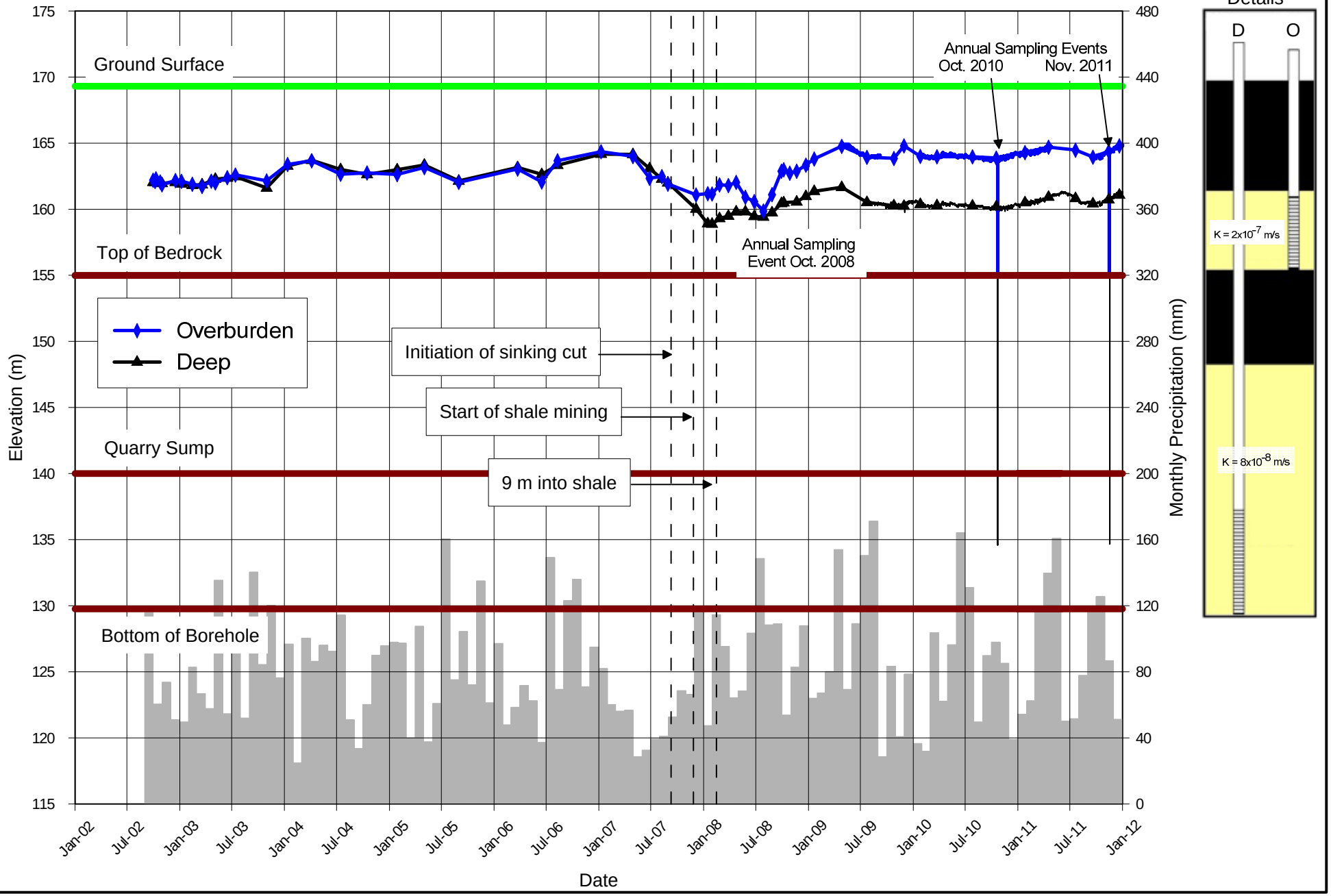
Golder Associates

Figure C.2: Monitoring Well MW-02 Hydrograph
Tansley Quarry - Hanson Brick Ltd.

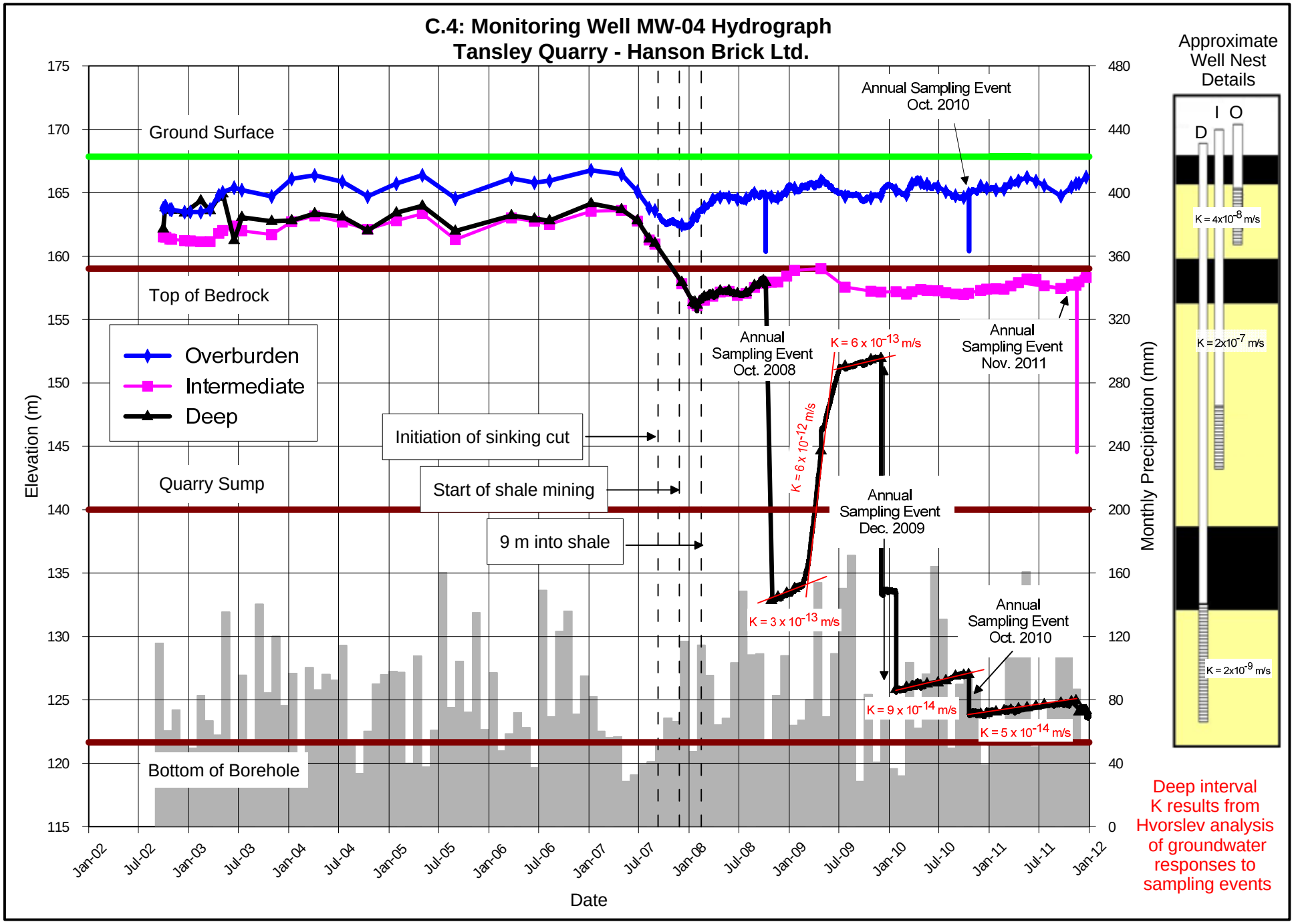


Golder Associates

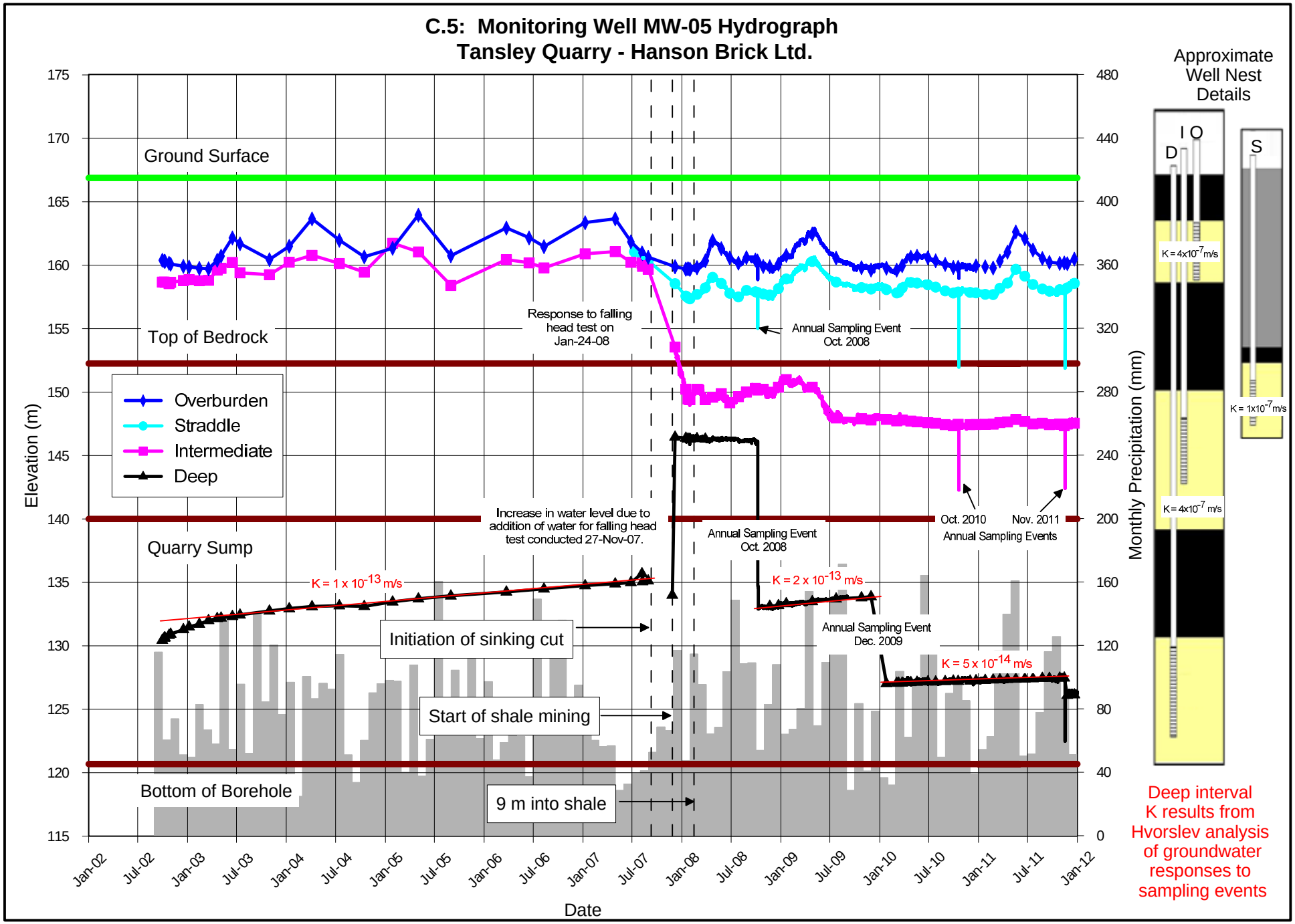
Figure C.3: Monitoring Well MW-03 Hydrograph
Tansley Quarry - Hanson Brick Ltd.



C.4: Monitoring Well MW-04 Hydrograph
Tansley Quarry - Hanson Brick Ltd.



C.5: Monitoring Well MW-05 Hydrograph
Tansley Quarry - Hanson Brick Ltd.



C.6: Monitoring Well MW-06 Hydrograph
Tansley Quarry - Hanson Brick Ltd.

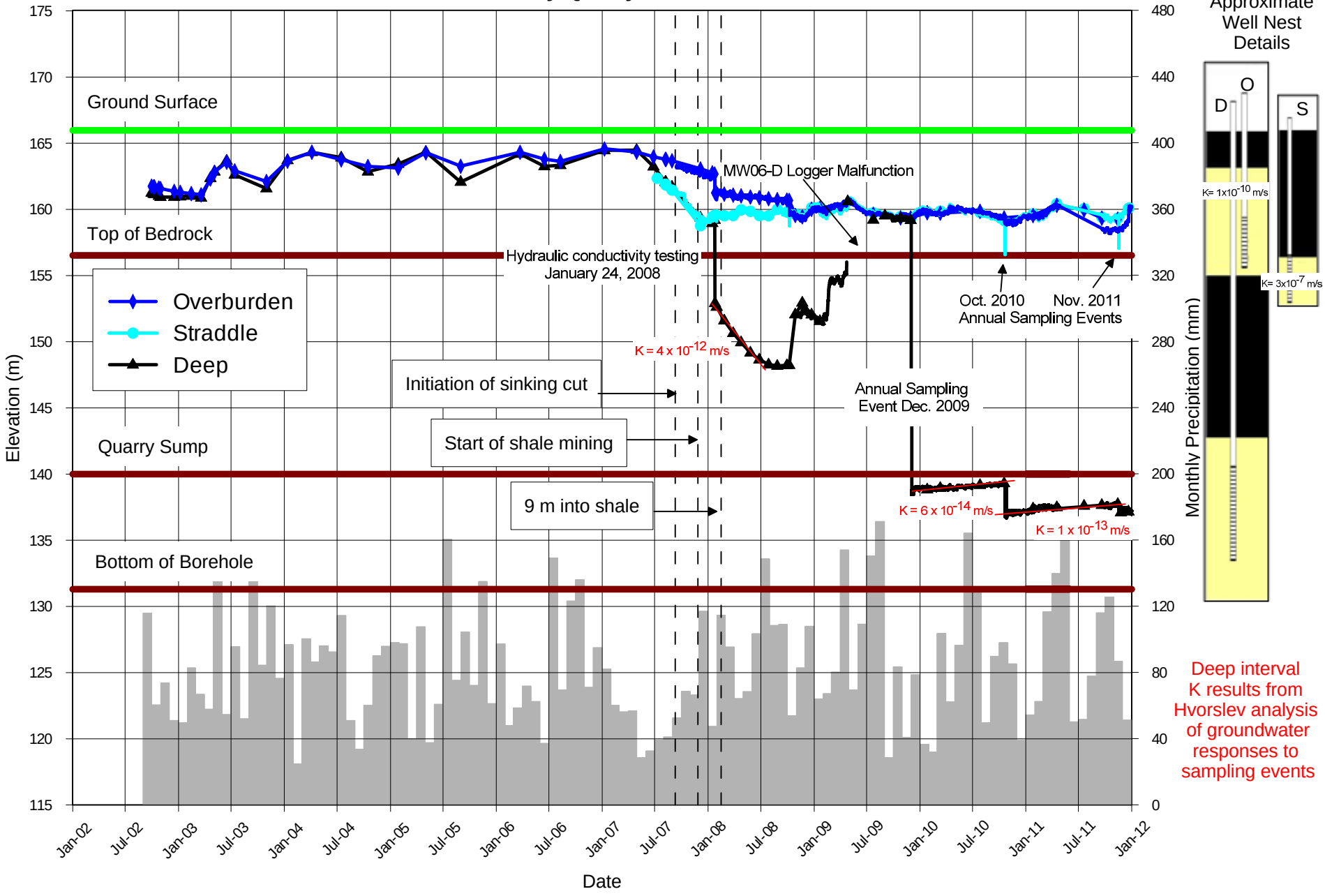
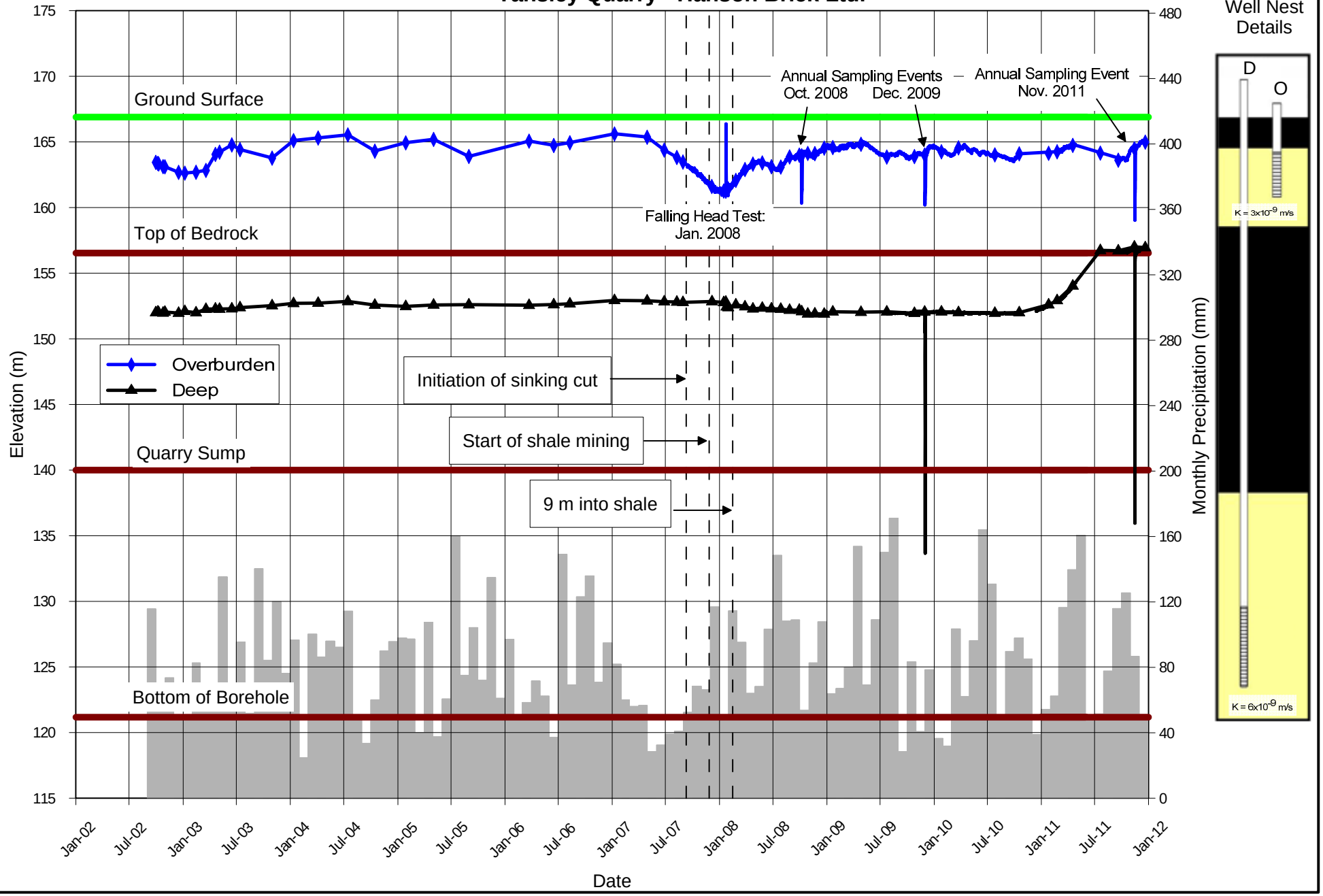


Figure C.7: Monitoring Well MW-07 Hydrograph
Tansley Quarry - Hanson Brick Ltd.



Golder Associates

Figure C.8: Monitoring Well MW-08 Hydrograph
Tansley Quarry - Hanson Brick Ltd.

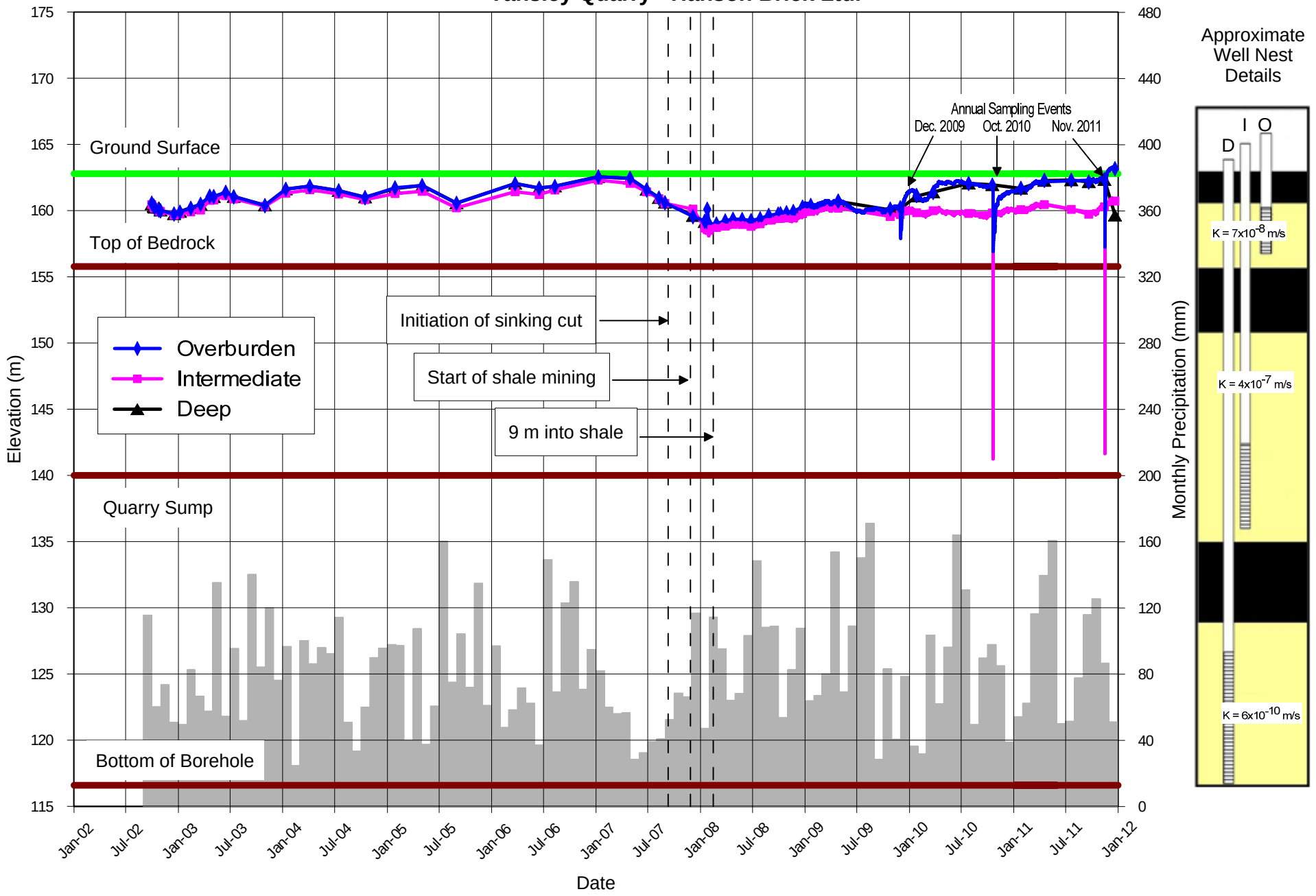


Figure C.9: Monitoring Well MW-09 Hydrograph
Tansley Quarry - Hanson Brick Ltd.

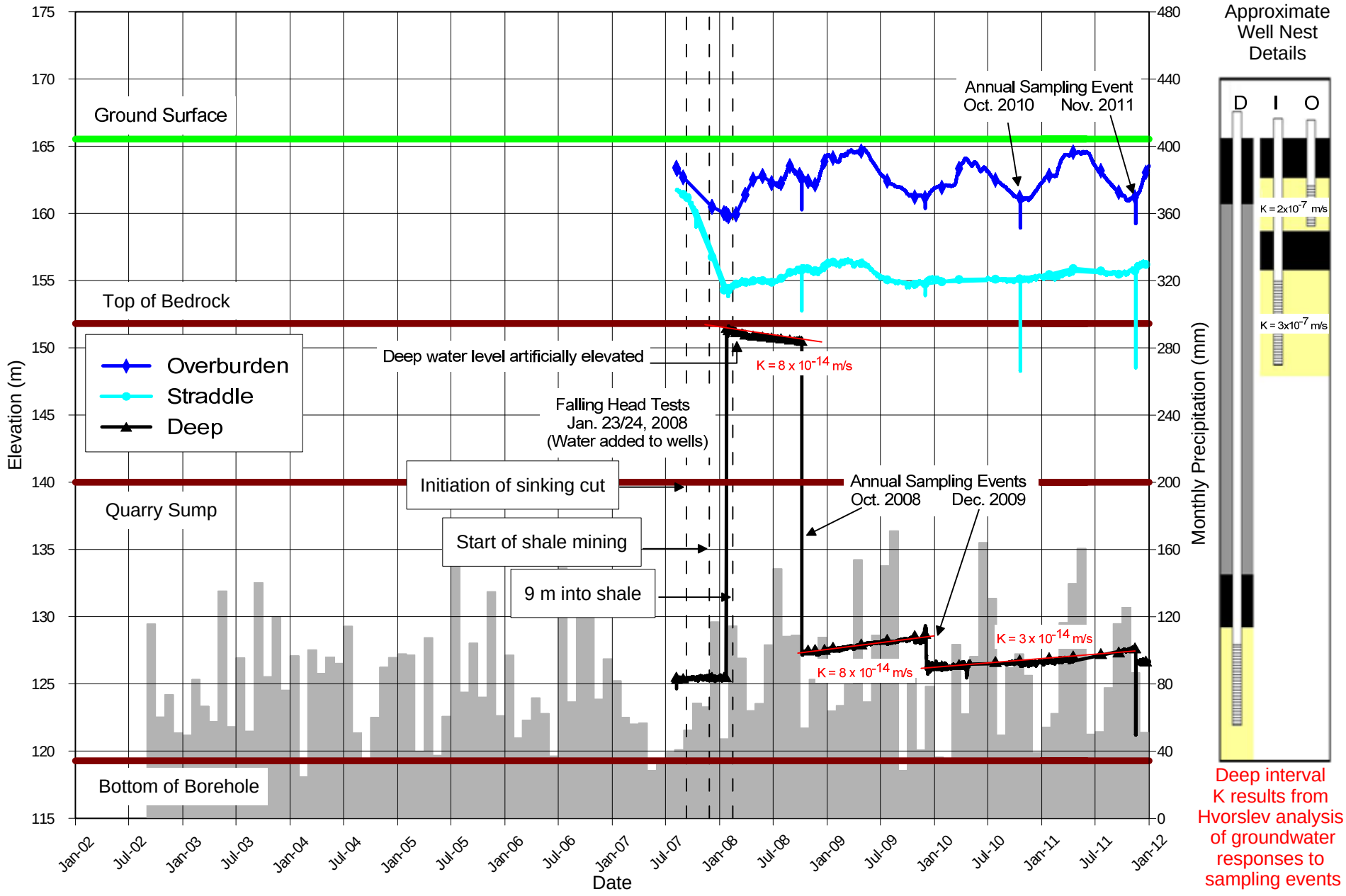


Figure C.10: Monitoring Well MW-10 Hydrograph
Tansley Quarry - Hanson Brick Ltd.

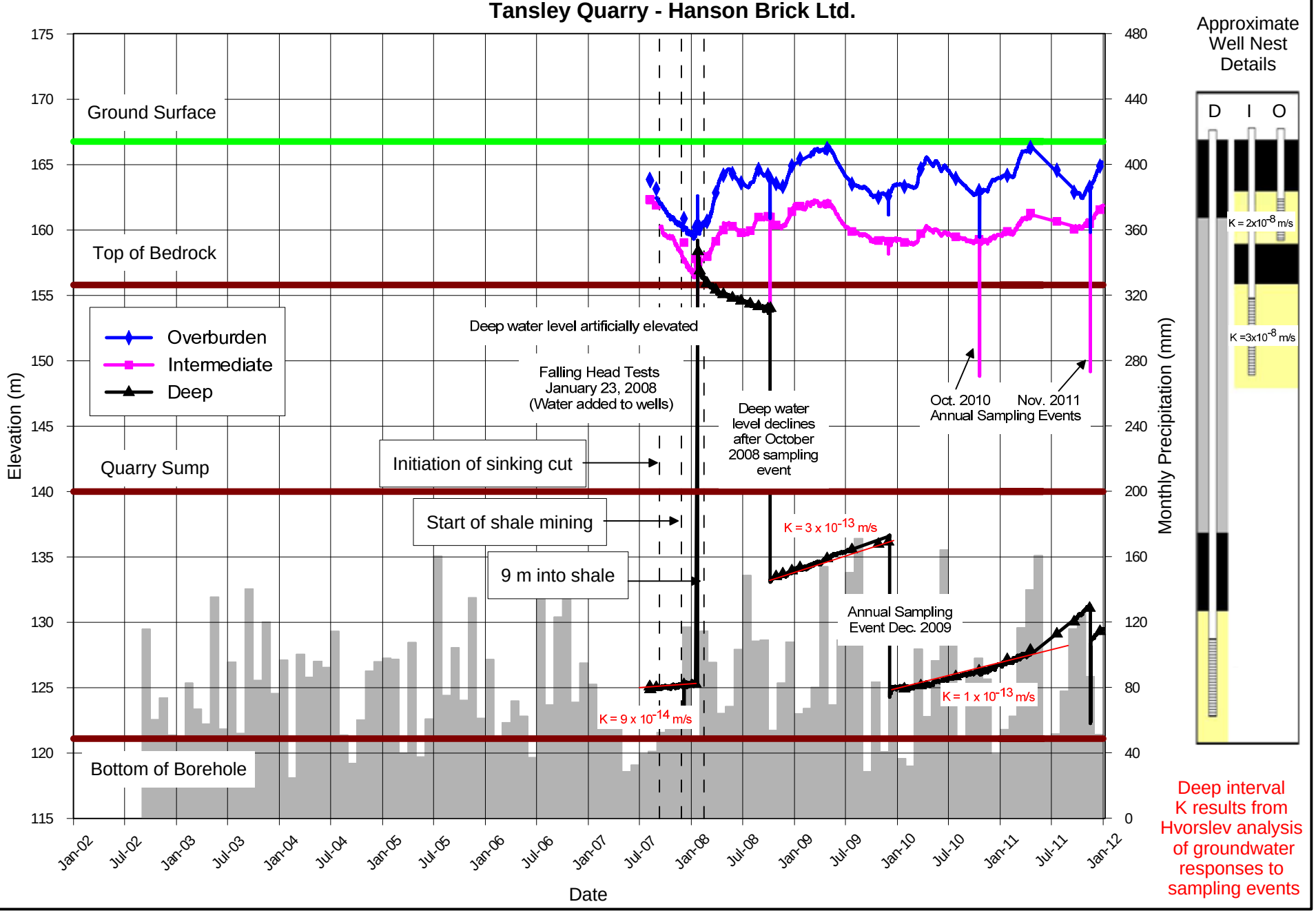
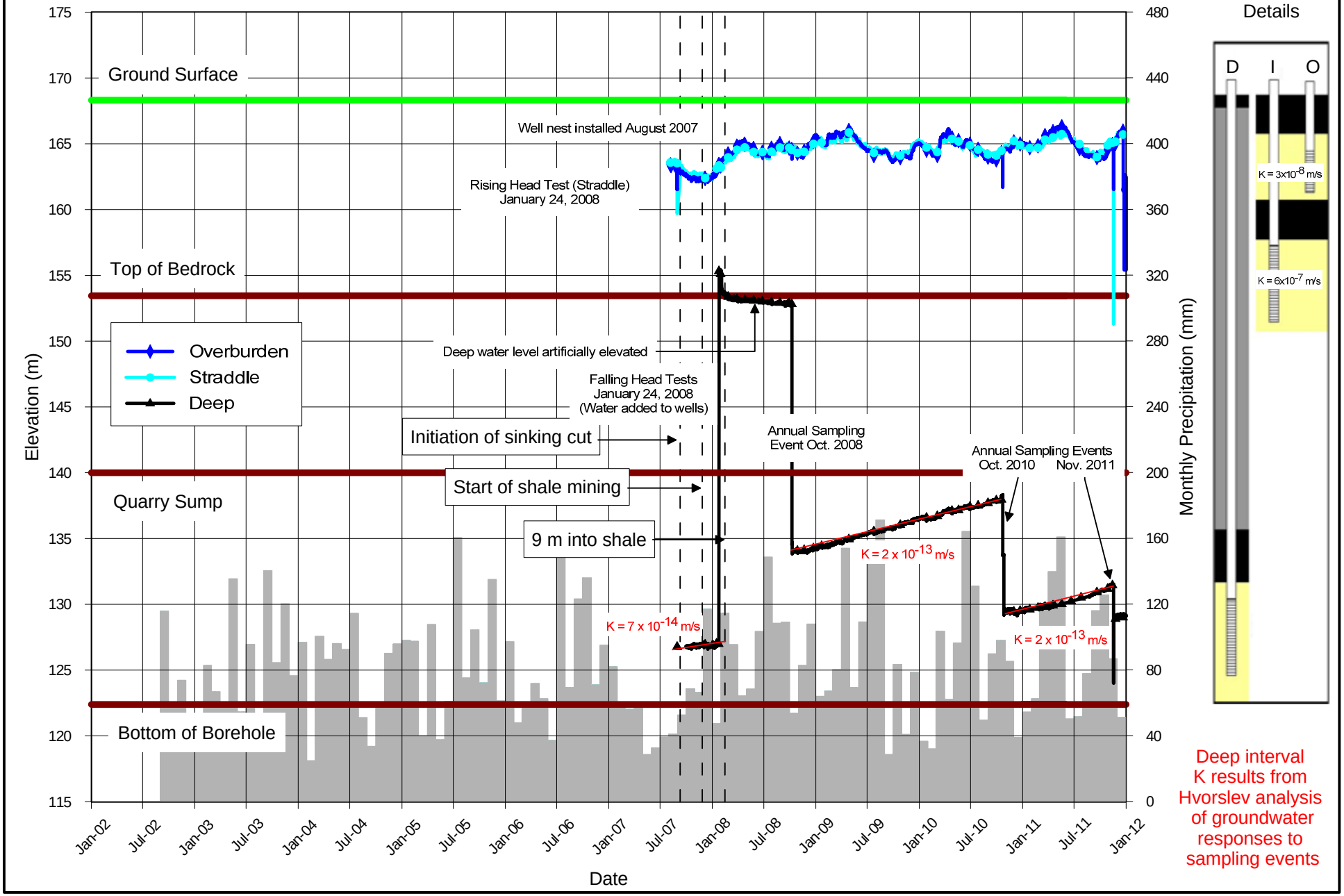


Figure C.11: Monitoring Well MW-11 Hydrograph
Tansley Quarry - Hanson Brick Ltd.



Deep interval K results from Hvorslev analysis of groundwater responses to sampling events

Figure C.12: Monitoring Well TW-1 Hydrograph
Tansley Quarry - Hanson Brick Ltd.

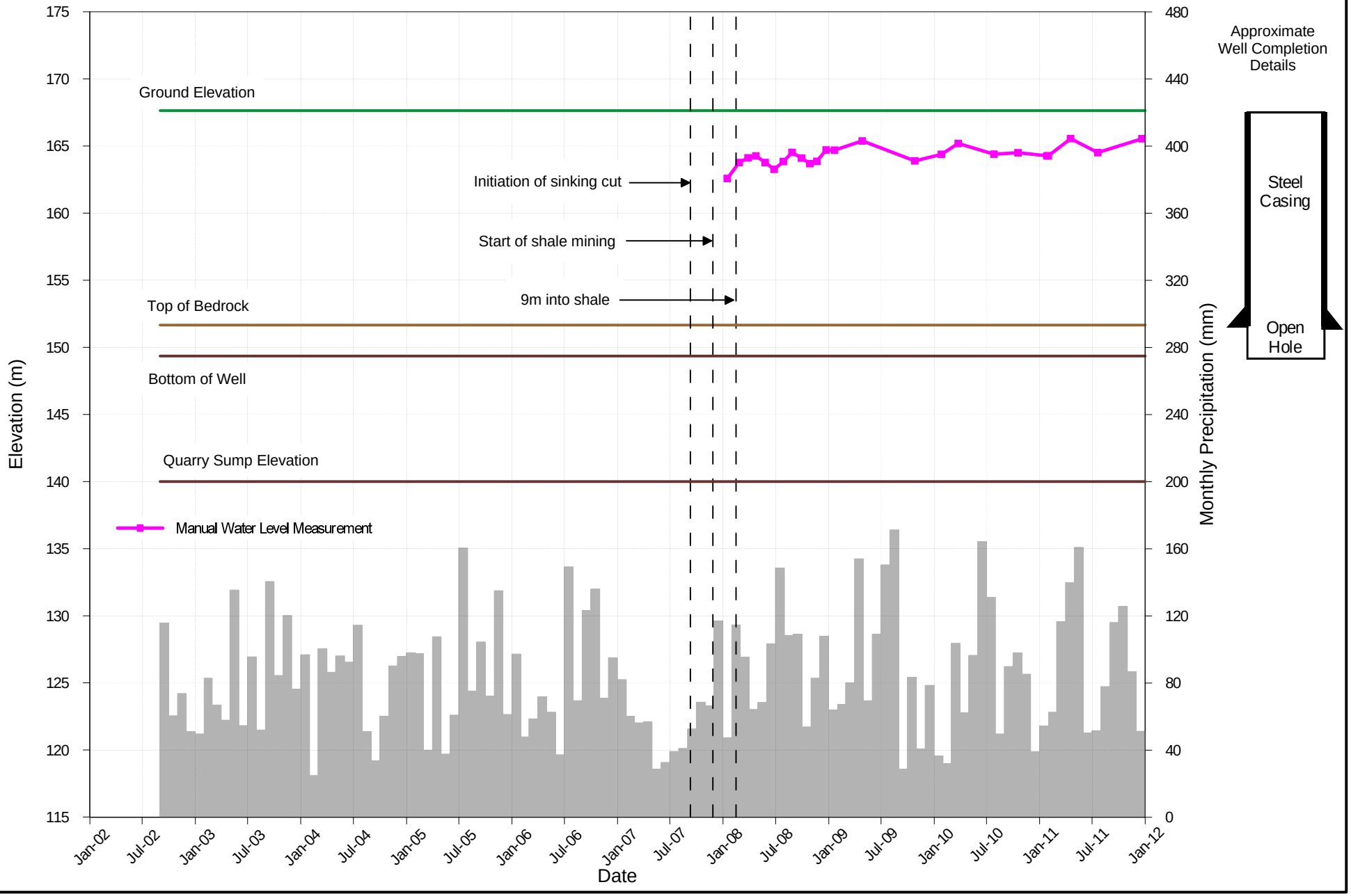


Figure C.13: Monitoring Well TW-2 Hydrograph
Tansley Quarry - Hanson Brick Ltd.

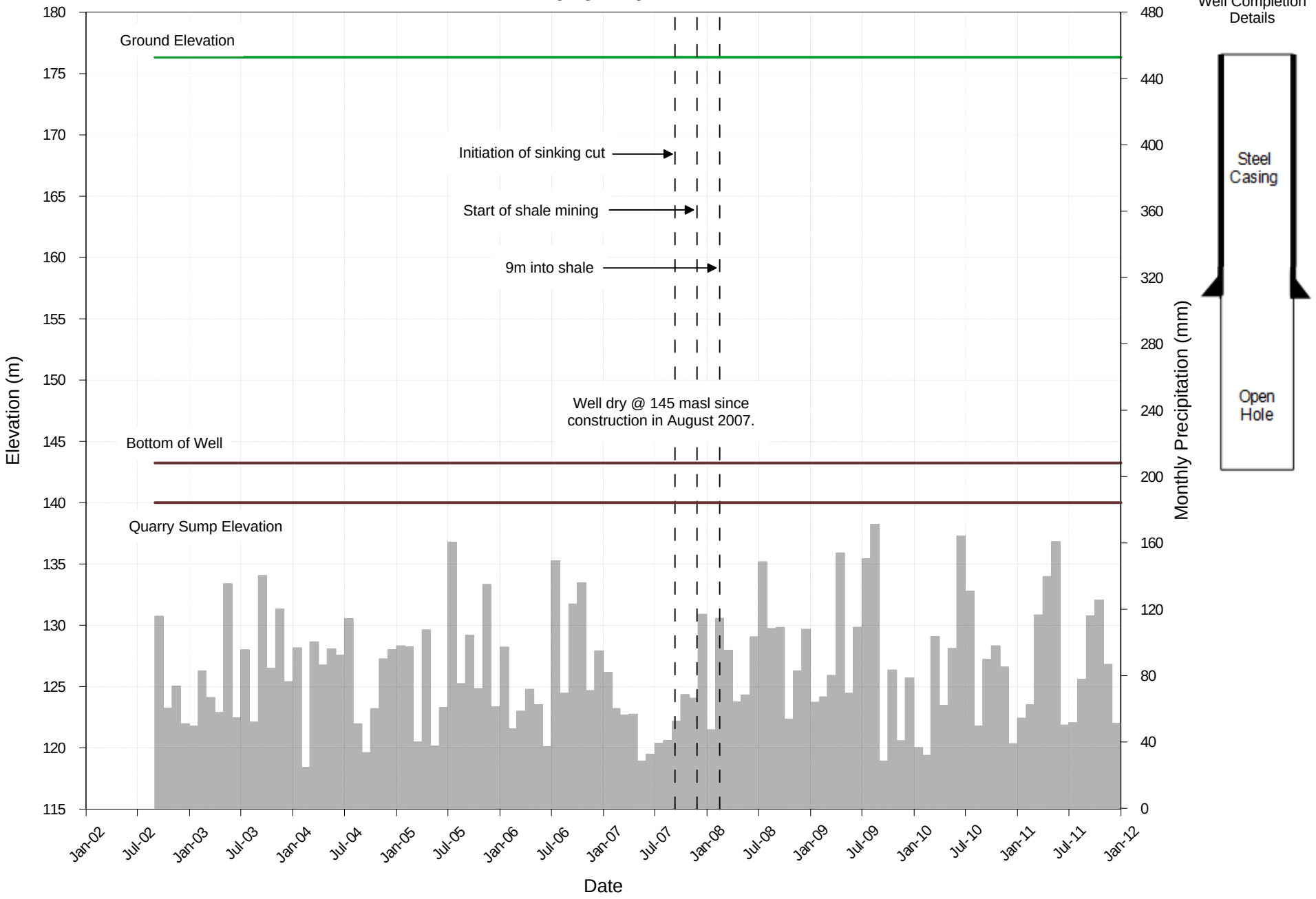


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Figure C.14: Monitoring Well TW-3 Hydrograph
Tansley Quarry - Hanson Brick Ltd.

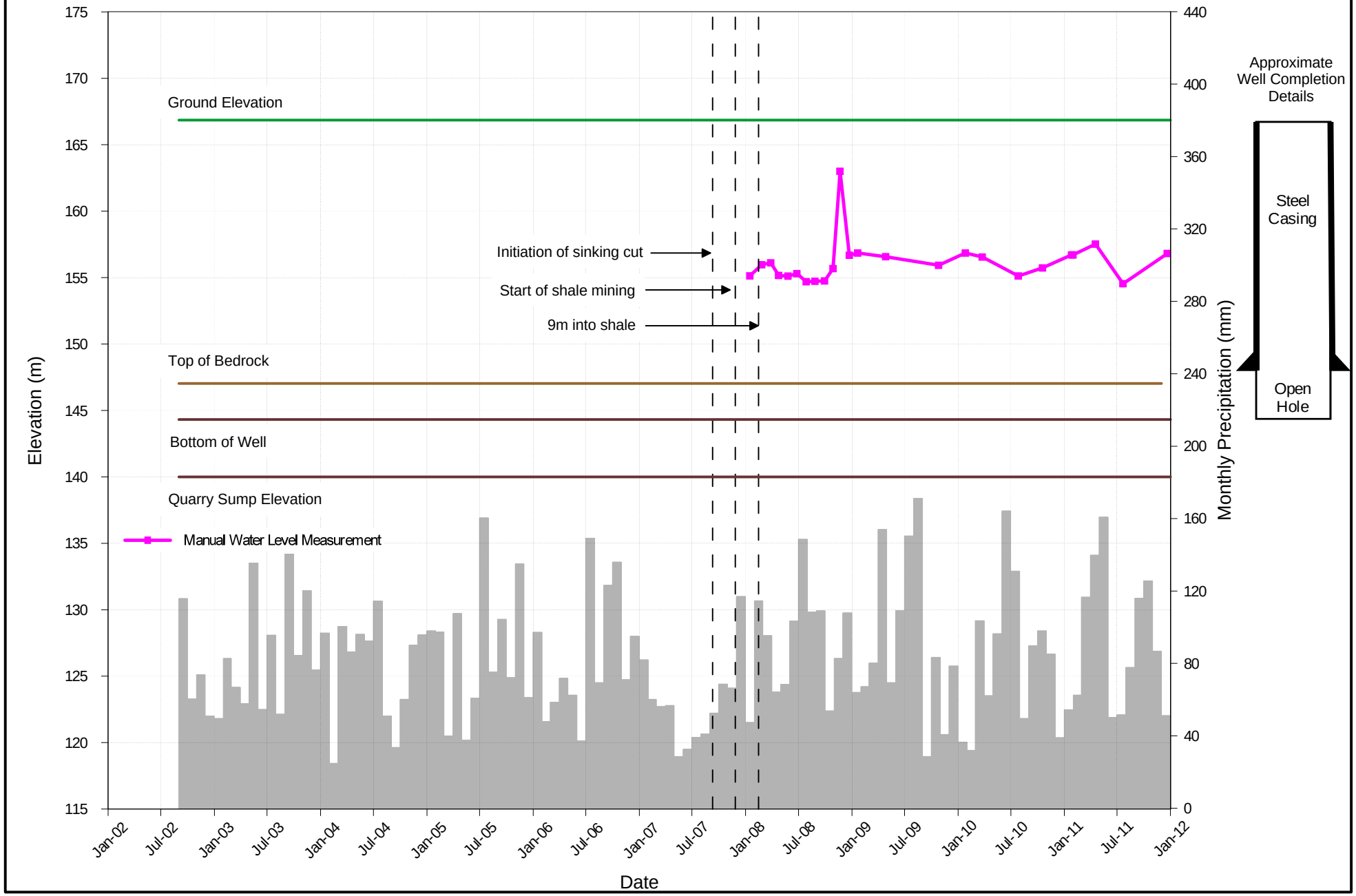

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Figure C.15: Featherstone Well
Tansley Quarry - Hanson Brick Ltd.

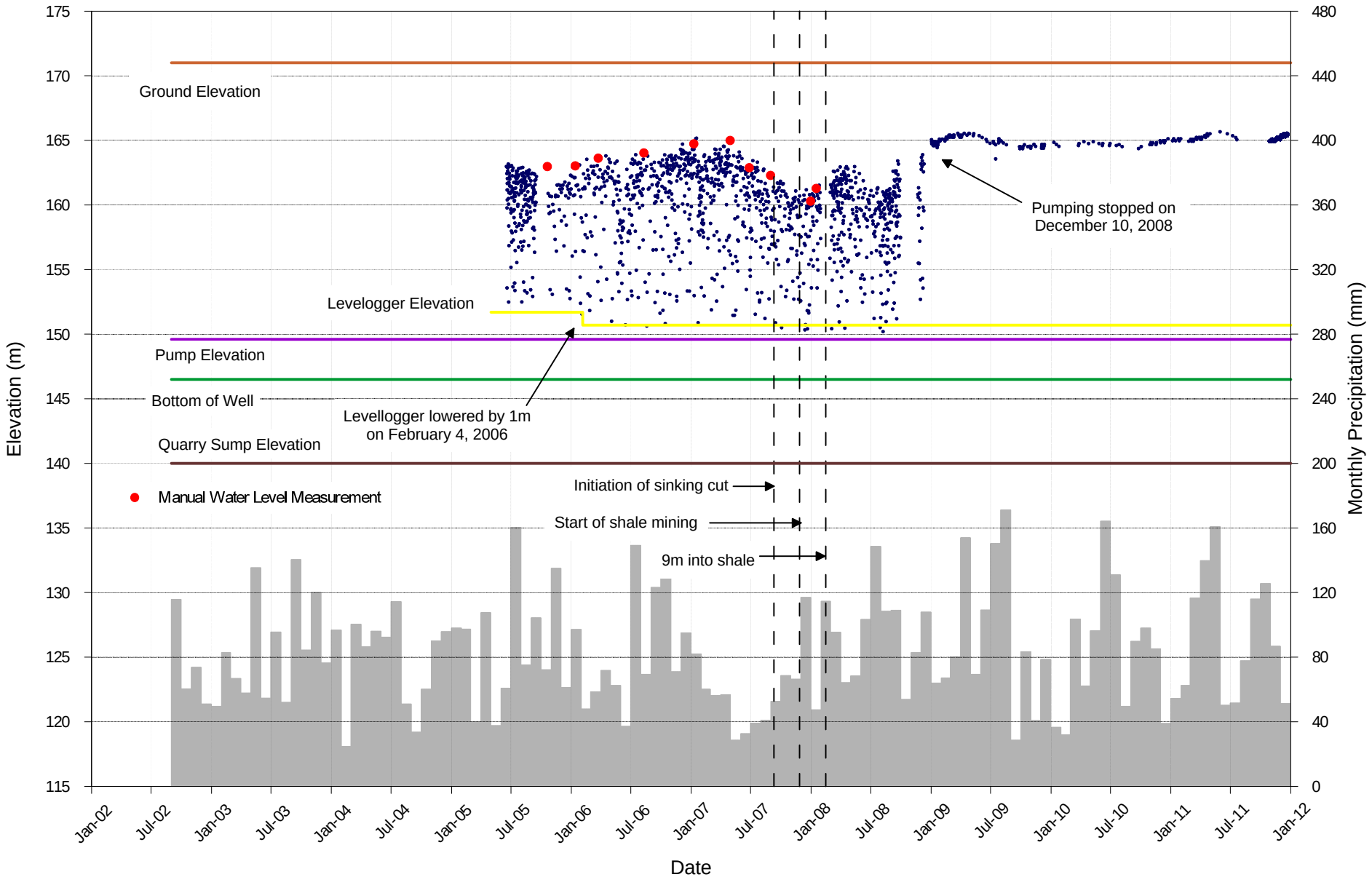


Figure C.16: Finucci Well
Tansley Quarry - Hanson Brick Ltd.

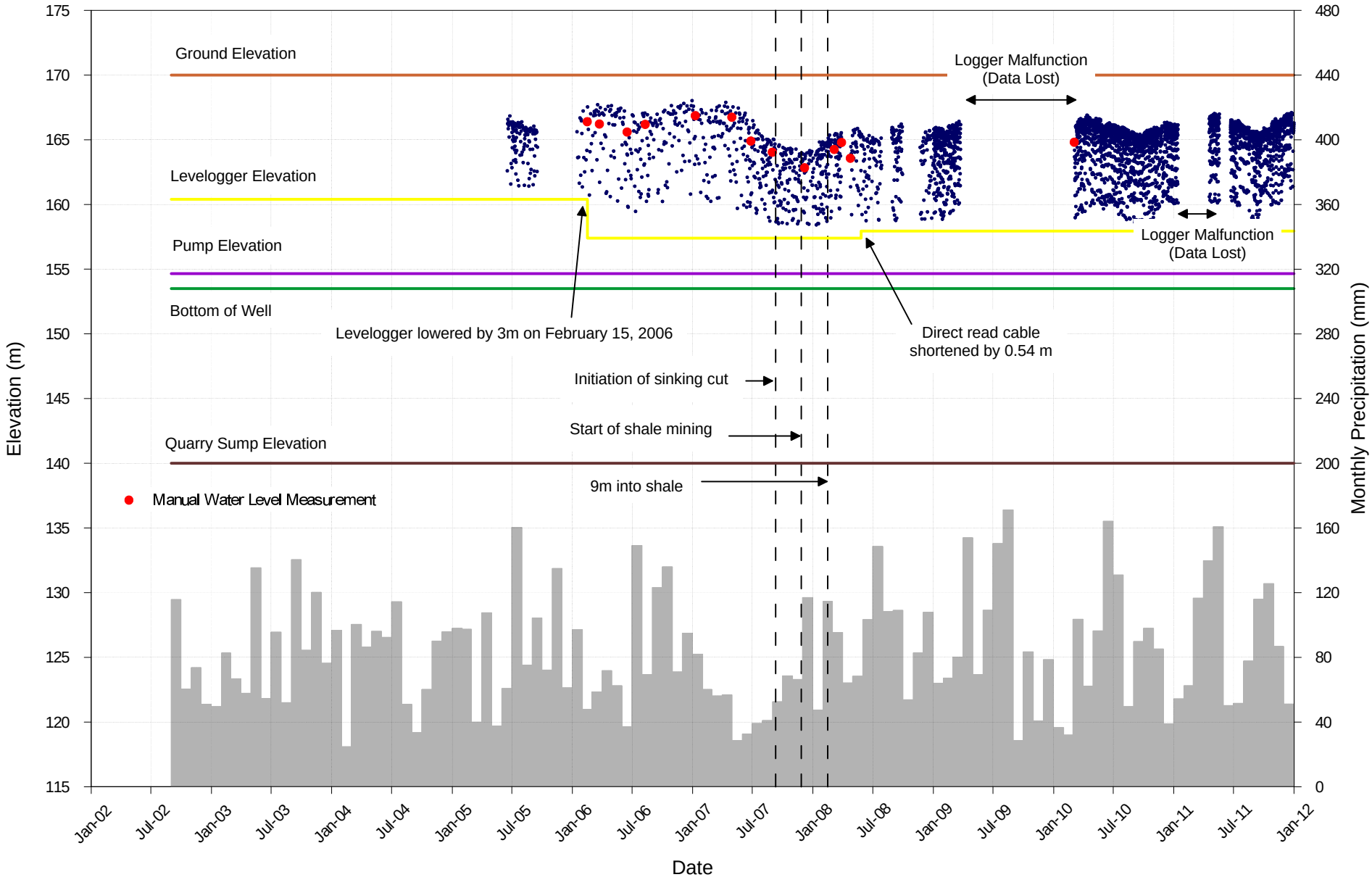


Figure C.17: Hendervale Main Barn Well
Tansley Quarry - Hanson Brick Ltd.

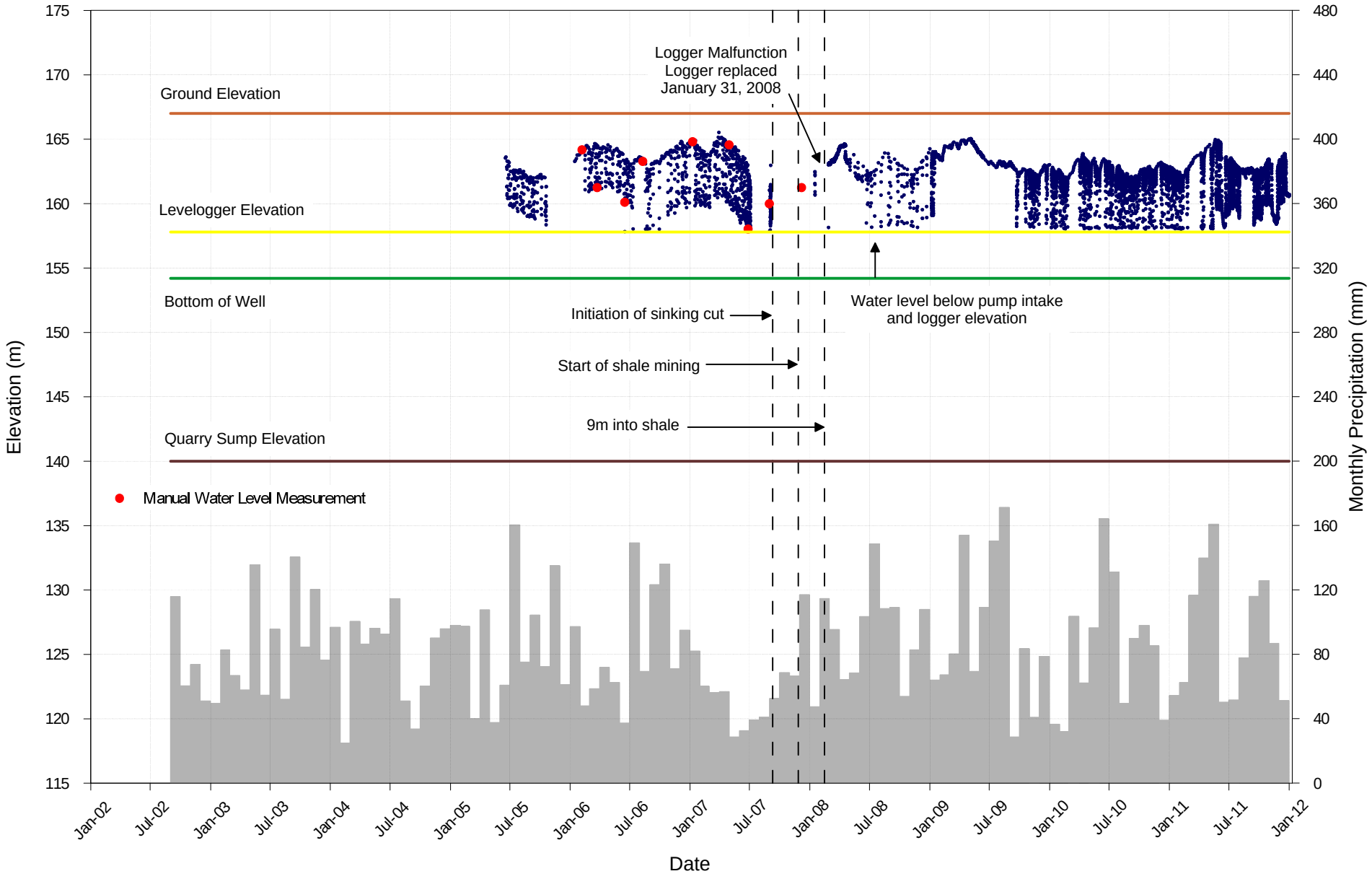


Figure C.18: Hendervale Cottage Well
Tansley Quarry - Hanson Brick Ltd.

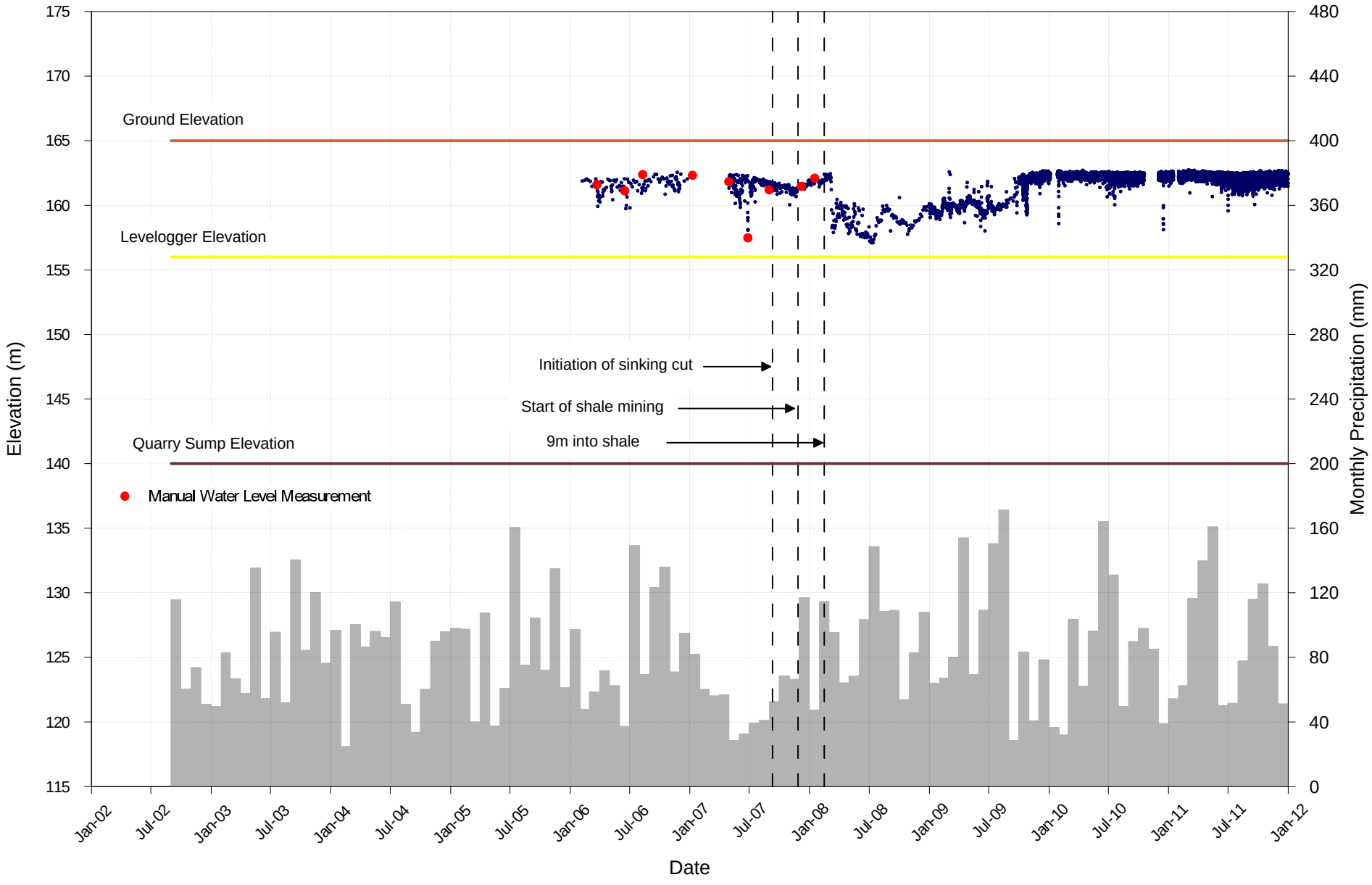


Figure C.19: Hendervale ABC Barn Well
Tansley Quarry - Hanson Brick Ltd.

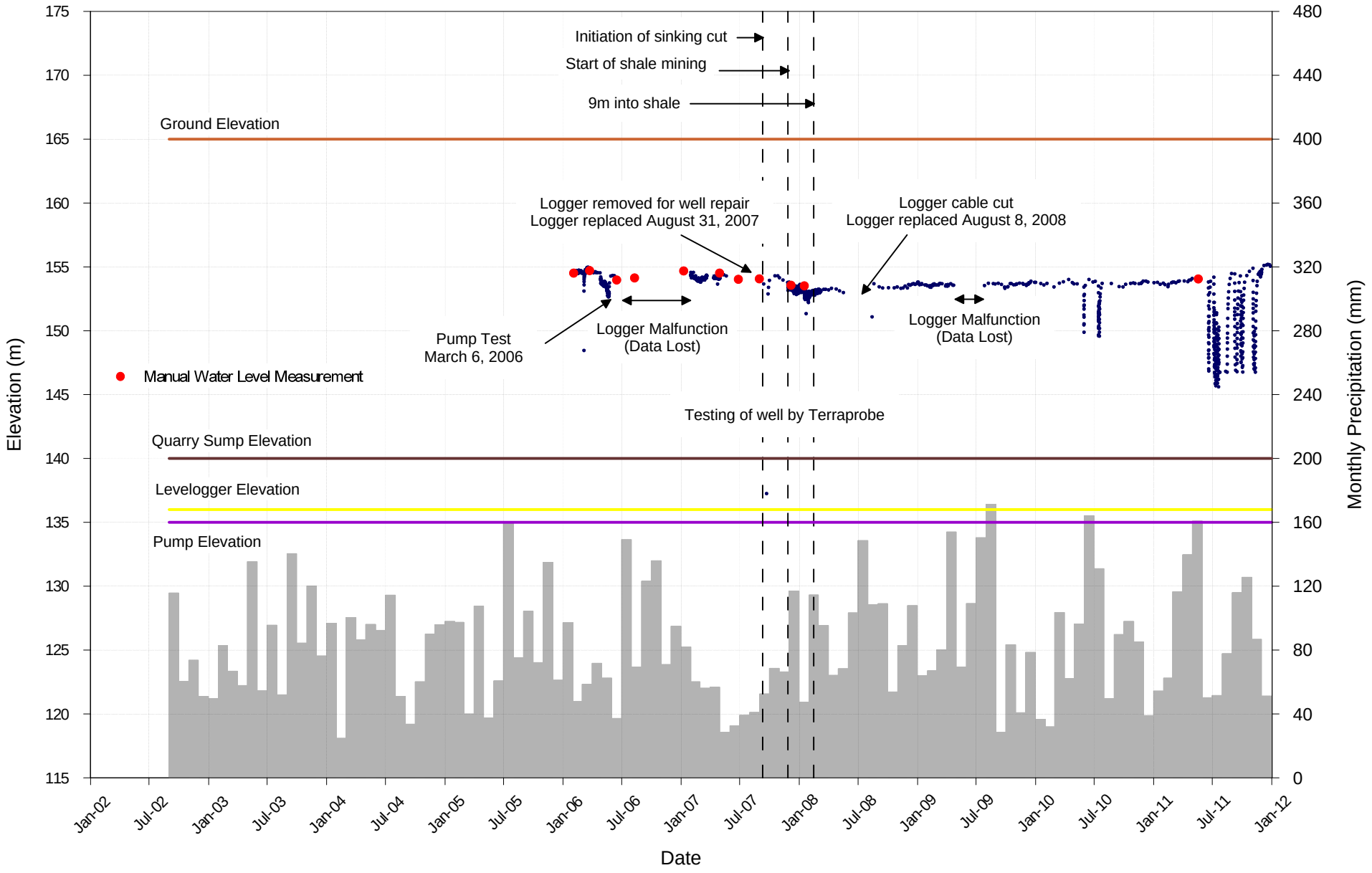


Figure C.20: Hendervale XYZ Barn Well
Tansley Quarry - Hanson Brick Ltd.

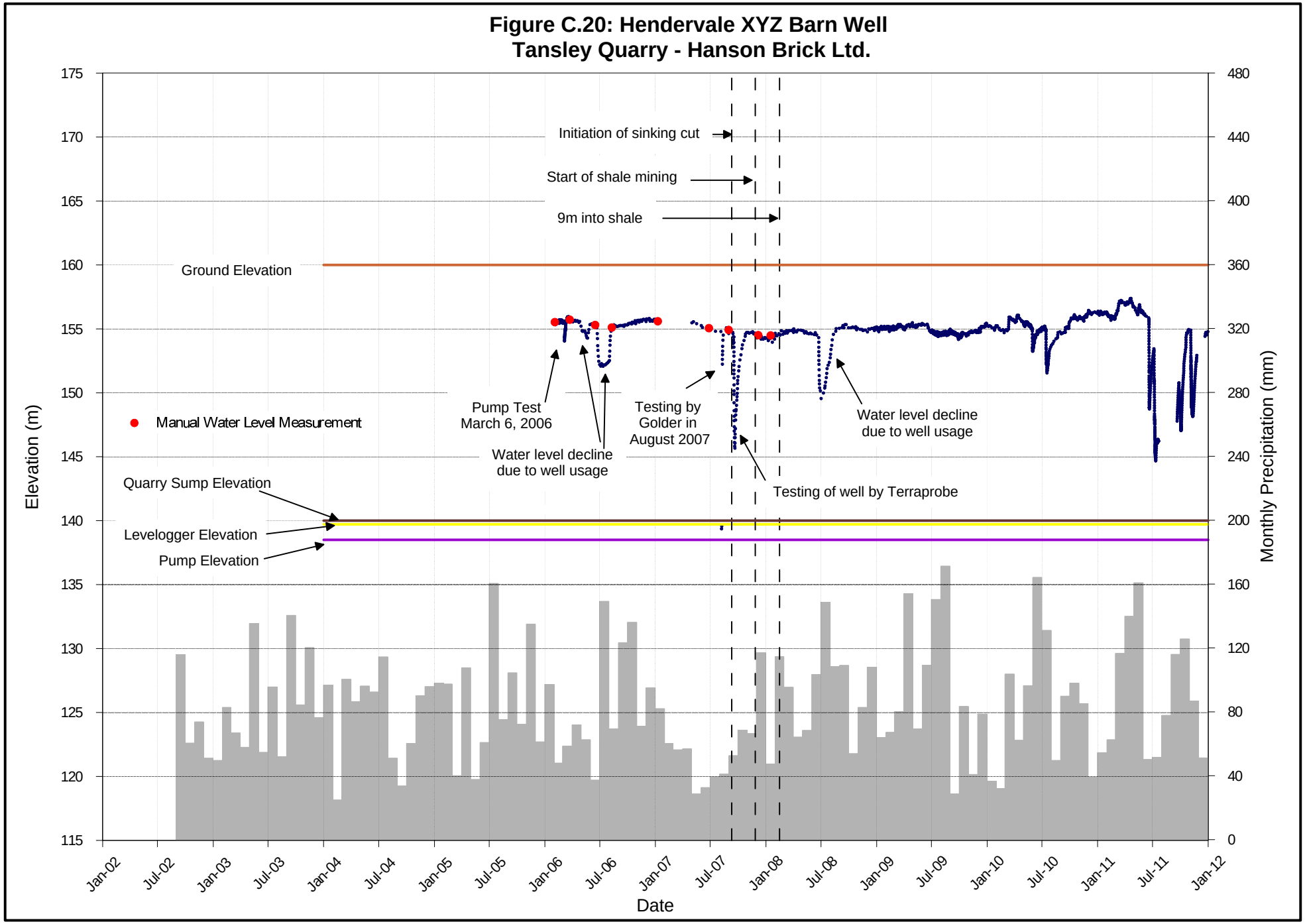


Figure C.21: Hendervale House Well
Tansley Quarry - Hanson Brick Ltd.

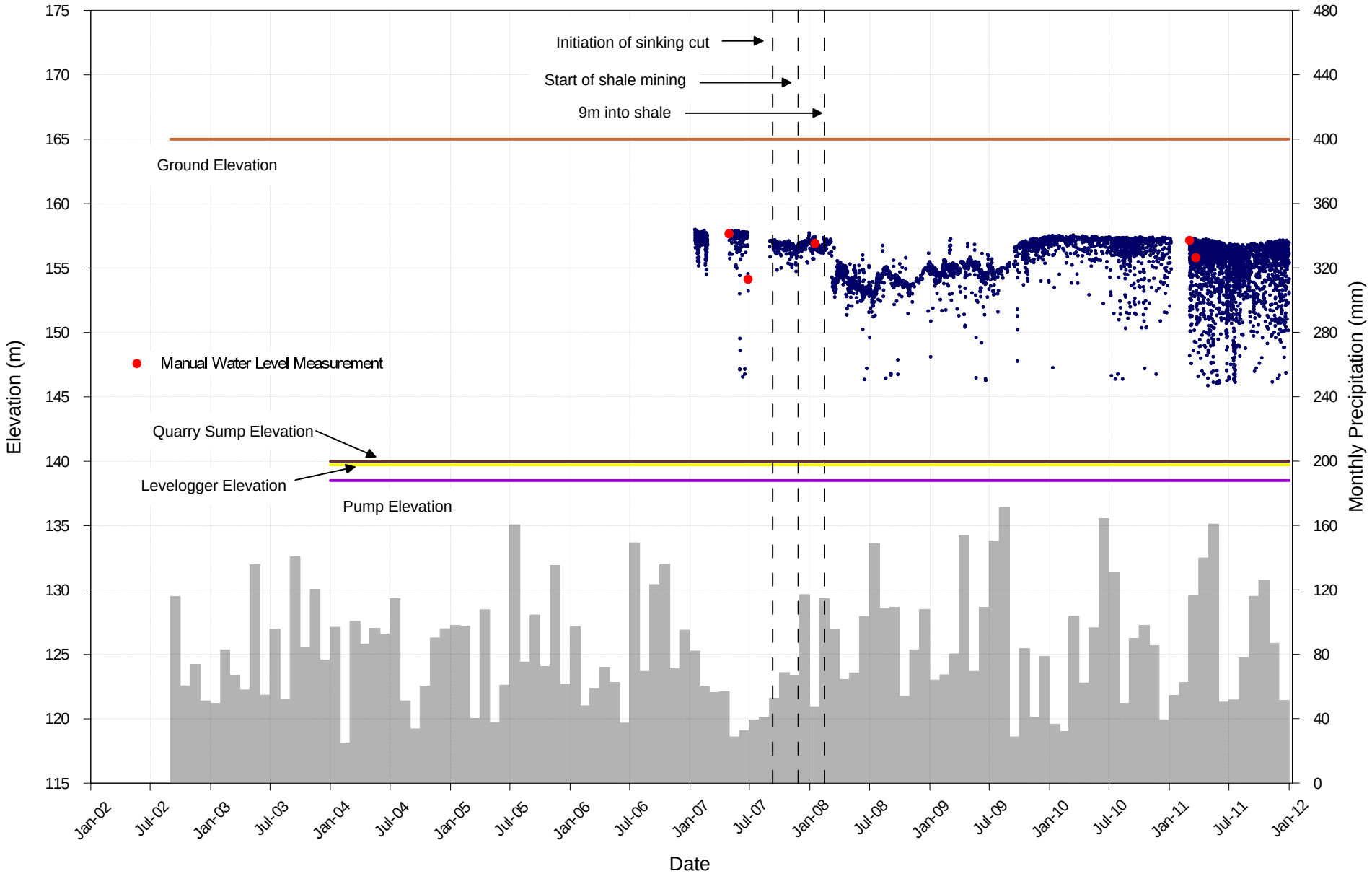


Figure C.22: Simms Well
Tansley Quarry - Hanson Brick Ltd.

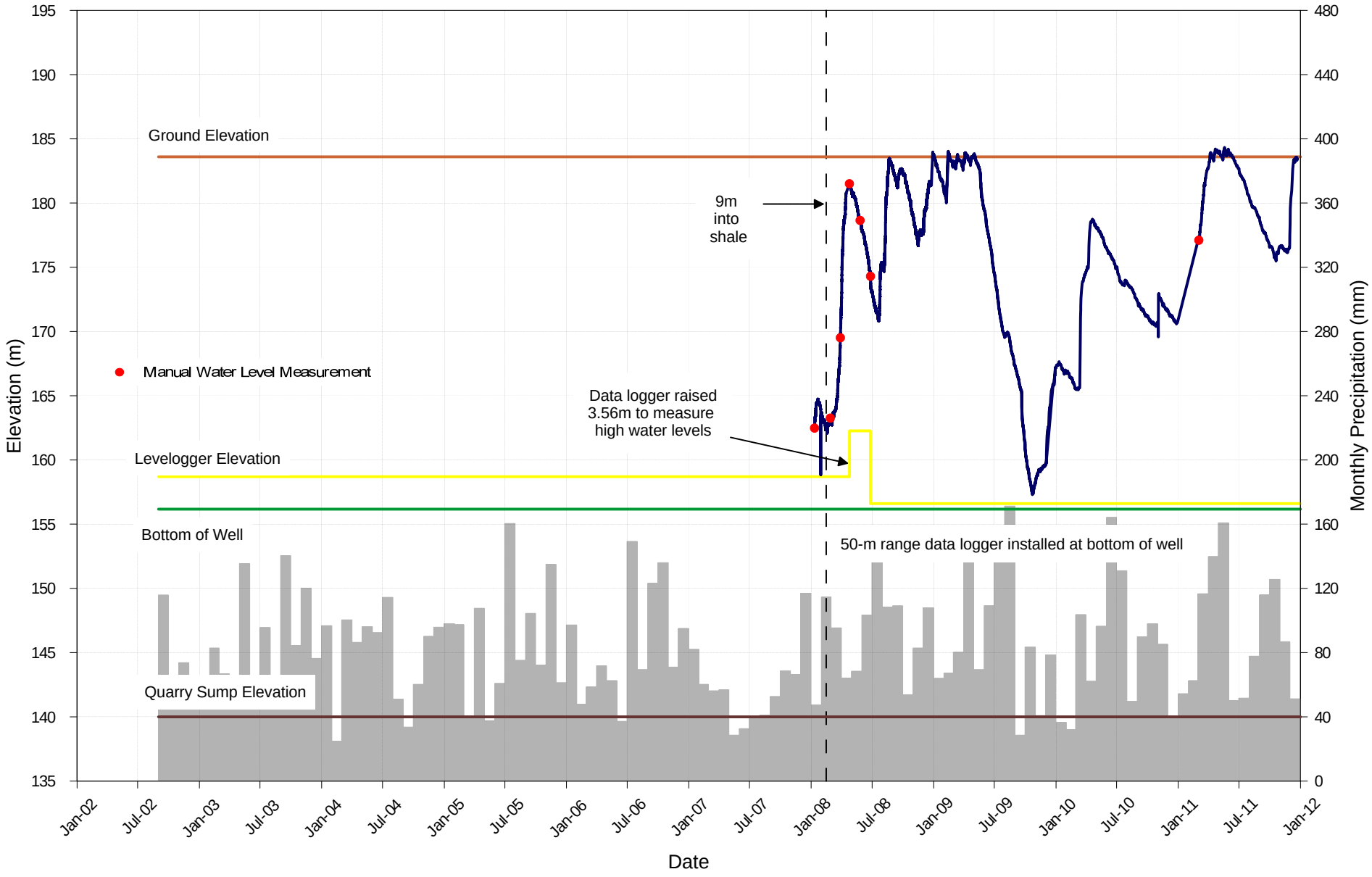


Figure C.23: Wettlaufer Well
Tansley Quarry - Hanson Brick Ltd.

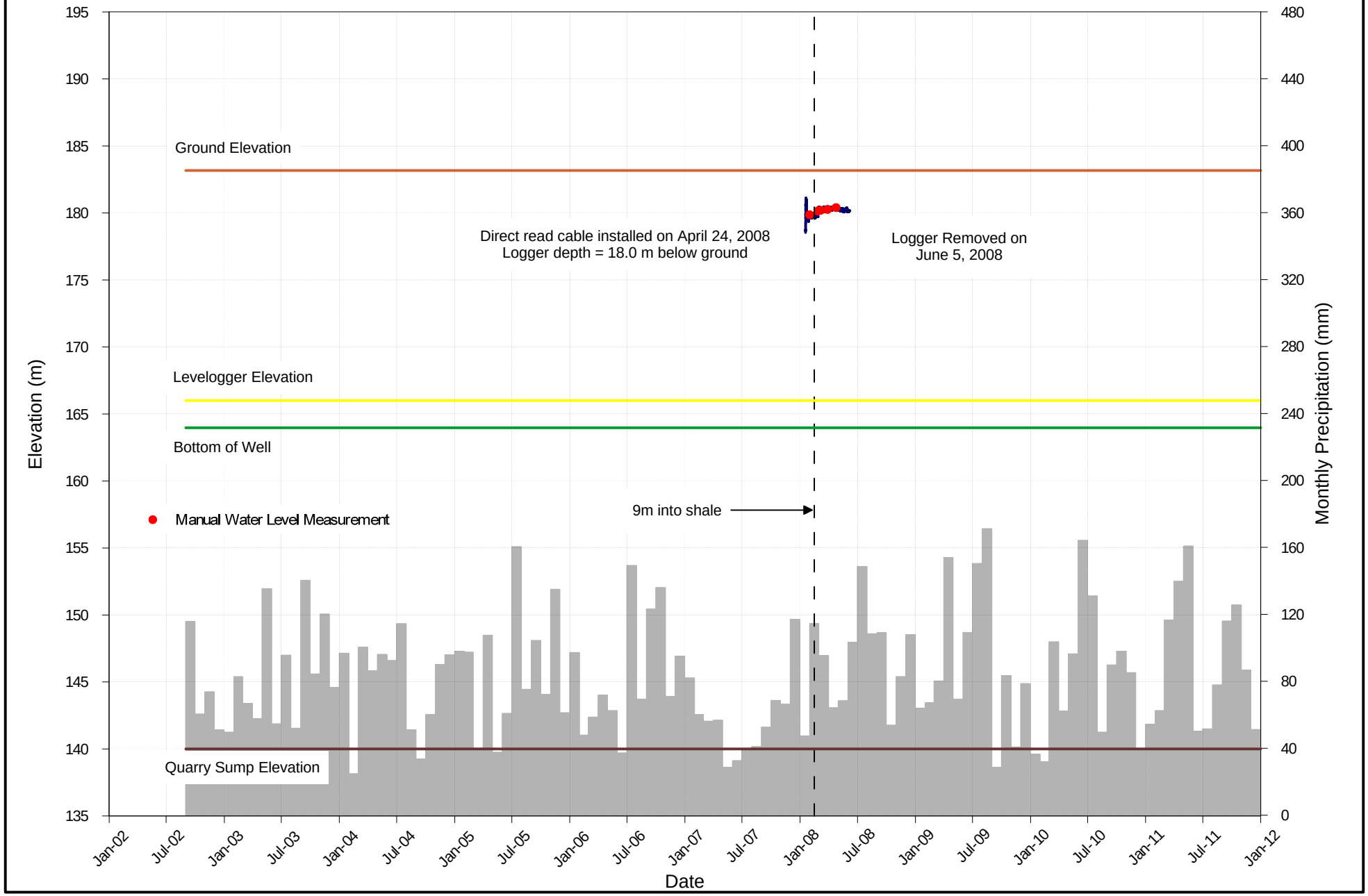


Figure C.24: Wiggins Well
Tansley Quarry - Hanson Brick Ltd.

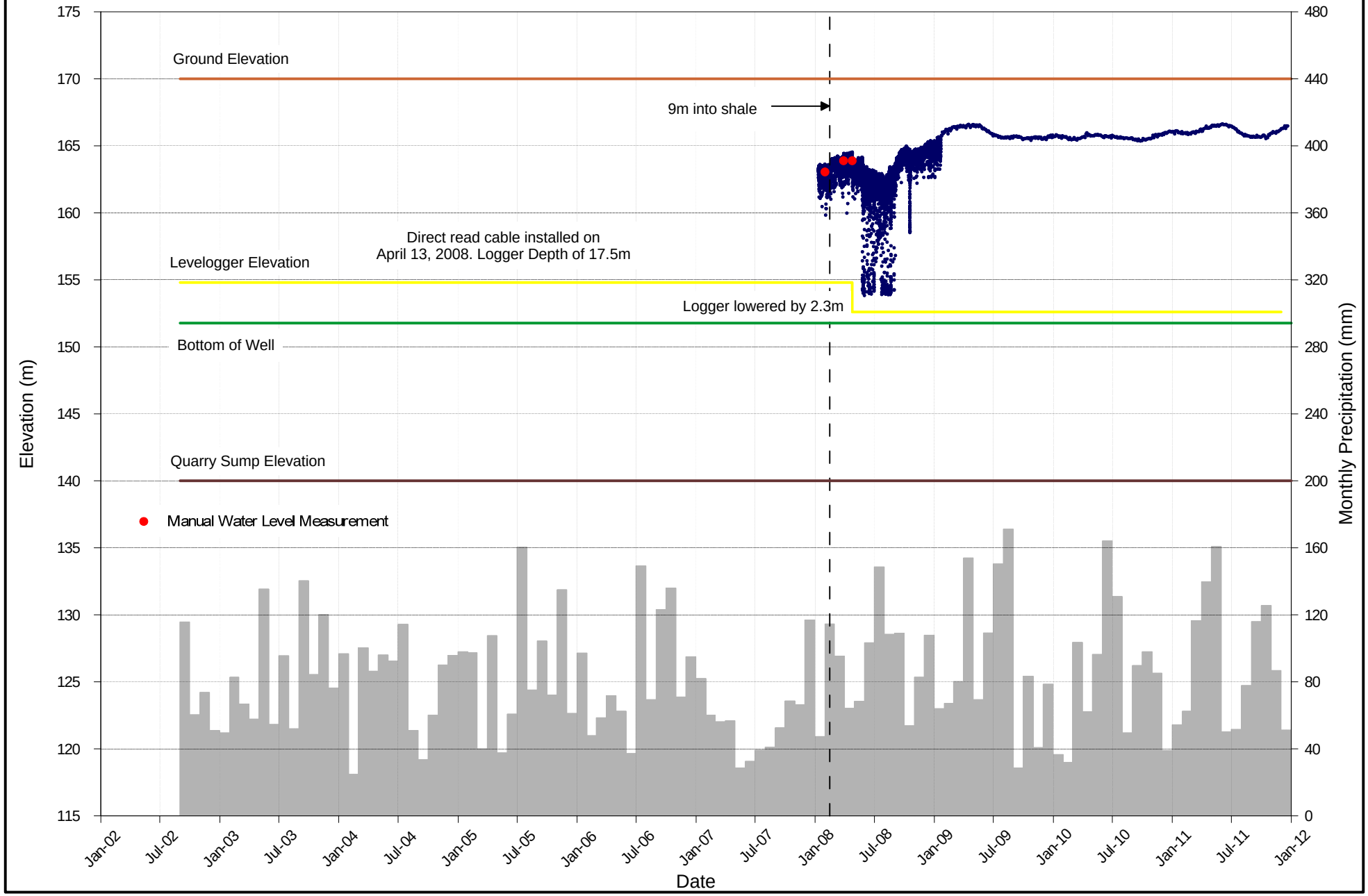


Figure C.25: Bekkers Well
Tansley Quarry - Hanson Brick Ltd.

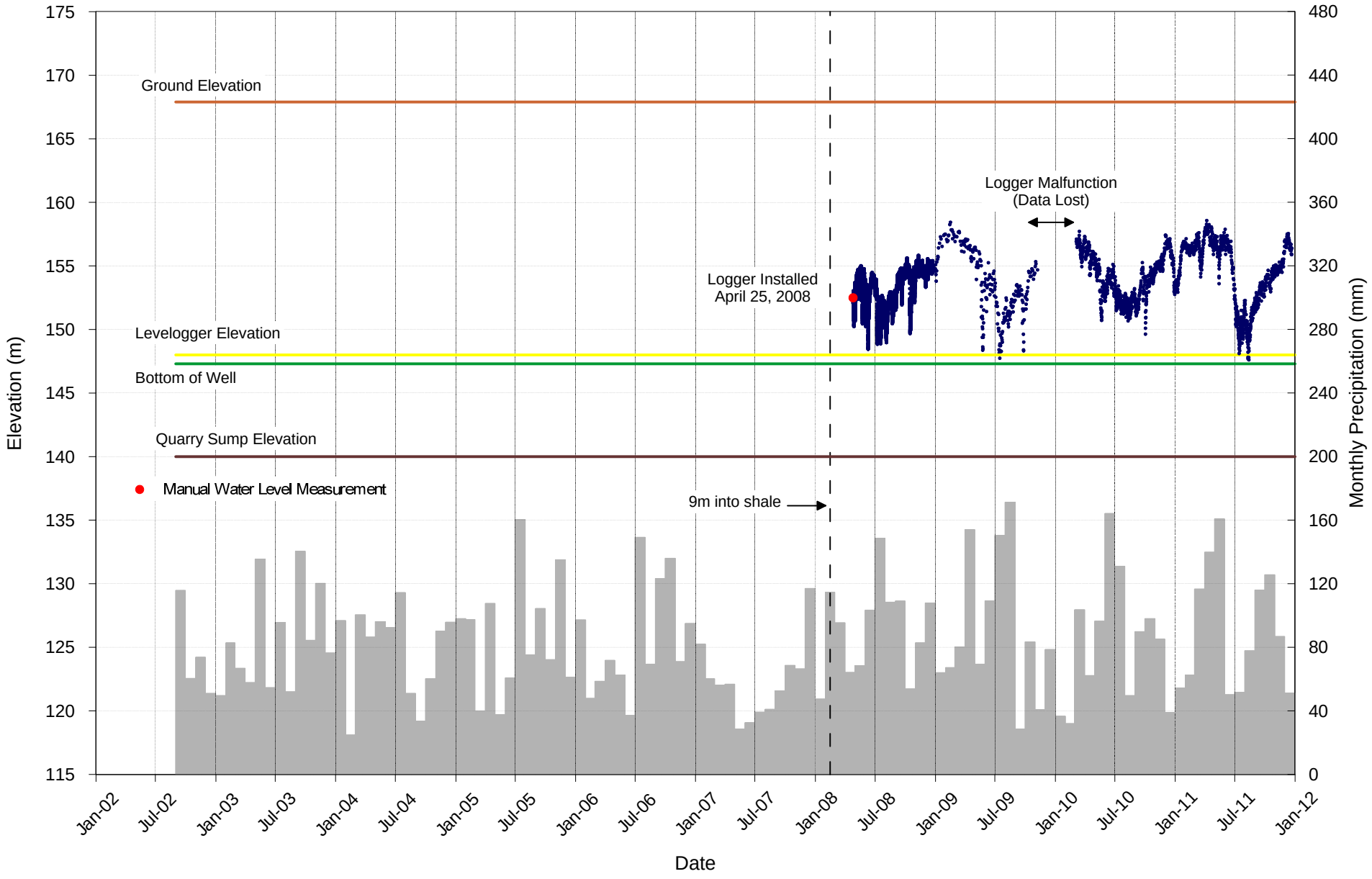
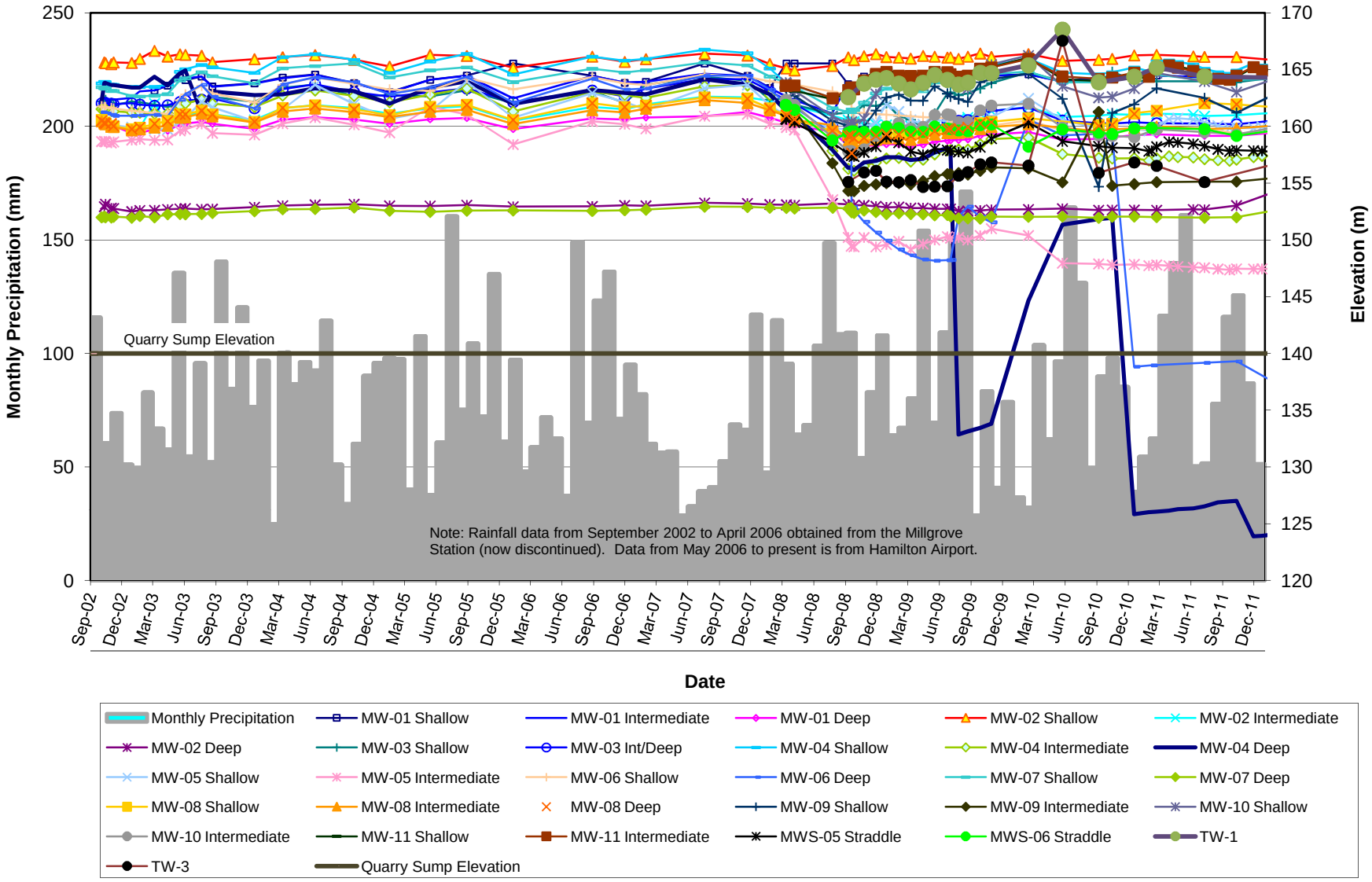


Figure C.26: Combined Static Water Levels and Precipitation with Time
Tansley Quarry - Hanson Brick Ltd.



APPENDIX D

Groundwater Quality Results

May 2012
Report No. 021-1228

Golder Associates

TABLE D.1
Summary of Groundwater Quality in On-Site Monitoring Wells
Tansley Quarry Site, Burlington, Ontario

Parameter	Units	ODWS (June 2006)	PWQO (July 1994)	MW-01 shallow		MW-01 intermediate							MW-01 deep							MW-02 shallow						
				Oct-10	Nov-11	Nov-02	May-03	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11	Nov-02	May-03	Jan-07	Oct-08	Dec-09	Oct-10	Oct- 10 DUP 2	Nov-11	Nov-02	May-03	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11
aluminum	mg/L	0.1	[0.075] a		0.068	0.039	0.075	**0.11**		0.063	0.074	**0.14**	< 0.05	< 0.05	< 0.3	< 0.5	< 0.1	**0.1**	< 0.1	< 0.05	0.019	**0.123**	**0.23**	0.053	**0.079**	**0.17**	0.033
alkalinity	mg $CaCO_3$/L	30-500	-		366	376	487	508		459	452	443	125	49	34	33	36	34	33	35	387	630	738	666	695	700	707
ammonia as N	mg/L	-	-		< 0.05	0.36	0.14	0.23		0.16	0.05	0.13	7.5	14.2	23	21	22	20	20	18	0.38	0.15	0.38	0.38	0.27	< 0.05	0.13
antimony	mg/L	-	[0.02]		< 0.0005	< 0.0005	0.0011	< 0.001		0.0005	< 0.0005	< 0.0005	< 0.005	< 0.005	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01	< 0.005	0.0008	0.0007	< 0.001	0.0008	< 0.0005	< 0.0005	< 0.0005
arsenic	mg/L	0.025	[0.005]		< 0.001	0.003	0.003	< 0.001		0.001	< 0.001	< 0.001	< 0.02	< 0.02	< 0.05	< 0.1	< 0.02	**0.031**	**0.027**	< 0.02	0.005	**0.007**	**0.006**	0.005	0.005	0.002	0.002
barium	mg/L	1	-		0.038	0.026	0.020	0.017		0.014	0.015	0.016	0.066	< 0.05	< 0.3	< 0.5	< 0.1	< 0.1	< 0.1	0.022	0.043	0.034	0.027	0.02	0.018	0.016	0.015
beryllium	mg/L	-	1.1		< 0.0005	< 0.001	< 0.001	< 0.0005		< 0.0005	< 0.0005	< 0.0005	< 0.01	< 0.01	< 0.03	< 0.05	< 0.01	< 0.01	< 0.01	< 0.005	< 0.001	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
bismuth	mg/L	-	-		< 0.001	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.01	< 0.01	< 0.05	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
boron	mg/L	5	0.2		0.057	**0.223**	0.127	0.15		0.16	0.14	0.11	**3.26**	**5.16**	**4.2**	**6.8**	**5.7**	**6.1**	**5.8**	**5.5**	**0.302**	**0.269**	**0.3**	**0.3**	**0.32**	**0.3**	**0.34**
bromide	mg/L	-	-		< 1	< 0.5	< 0.5	< 1.0		< 1	< 1	< 1	47	124	202	214	192	160	169	138	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
cadmium	mg/L	0.005	0.0005		< 0.0001	< 0.0001	< 0.0001	< 0.0001		< 0.0001	< 0.0001	< 0.0001	< 0.001	< 0.001	< 0.005	< 0.01	< 0.002	< 0.002	< 0.001	< 0.001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
calcium	mg/L	-	-		64	137	110	110		120	110	98	789	1720	2400	2600	2400	2500	2700	2000	136	154	210	200	220	210	210
chloride	mg/L	250	-		183	35	61.1	111		157	214	183	4690	11600	19400	19800	16700	16300	17200	13000	39.4	23.9	25	11	10	11	11
chromium	mg/L	0.05	-		< 0.005	< 0.005	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.05	< 0.05	< 0.3	< 0.5	< 0.1	< 0.1	< 0.1	< 0.05	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
cobalt	mg/L	-	0.0009		**0.005**	0.0009	0.0007	**0.018**		**0.013**	**0.0046**	**0.0043**	**0.0018**	< 0.001	< 0.03	< 0.05	< 0.01	< 0.01	< 0.01	< 0.005	0.0008	**0.0010**	**0.015**	**0.023**	**0.0072**	**0.0016**	**0.0068**
copper	mg/L	1	[0.005] b		0.001	< 0.0005	0.0005	< 0.001		< 0.001	< 0.001	0.002	< 0.005	< 0.005	< 0.05	< 0.1	< 0.02	< 0.02	< 0.02	< 0.05	0.0005	< 0.0005	< 0.001	< 0.001	< 0.005	< 0.001	< 0.001
fluoride	mg/L	1.5	-		0.6	0.3	0.2	0.2		0.3	0.2	0.3	0.4	0.3	0.2	0.3	0.3	0.2	< 1 (1)	0.3	0.3	0.4	0.3	0.3	0.3	0.2	0.3
free cyanide	mg/L	0.2	0.005		< 0.002	< 0.001	< 0.001	< 0.002		< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002	0.002	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
hardness	mg $CaCO_3$/L	80-100	-		740	786	1128	1000		1100	1100	1000	2650	6124	8400	9300	8400	8800	9600	7200	654	1287	1900	1900	2200	1900	2100
iron	mg/L	0.3	0.3		< 0.1	**0.56**	**1.29**	0.068		0.2	0.13	0.25	**0.59**	**6.94**	**9.6**	< 10	**8**	**6.5**	**8.6**	**4.1**	**4.03**	**8.09**	**6.9**	**2.9**	**1.6**	**0.96**	**1.6**
lead	mg/L	0.01	[0.005] c		< 0.0005	< 0.0005	< 0.0005	< 0.0005		< 0.0005	< 0.0005	< 0.0005	< 0.005	< 0.005	< 0.03	< 0.05	< 0.01	< 0.01	< 0.01	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
magnesium	mg/L	-	-		140	107	206	190		200	200	180	165	442	550	670	580	610	660	530	75.9	219	330	340	400	340	370
manganese	mg/L	0.05	-		0.01	0.63	0.123	0.09		0.058	0.031	0.031	0.516	1.16	1.3	1.6	1	1	2	1.1	0.838	0.658	0.4	0.34	0.26	0.22	0.46
mercury	mg/L	0.001	0.0002		< 0.0001	< 0.00005	< 0.00005	< 0.0001		0.0002	< 0.0001	< 0.0001	< 0.00005	0.00006	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.00005	< 0.00005	< 0.0001	< 0.0015 (1)	< 0.0001	< 0.0001	< 0.0001
molybdenum	mg/L	-	0.04		0.0016	**0.044**	0.004	0.002		0.002	0.002	0.0018	0.036	0.021	< 0.05	< 0.1	**0.05**	< 0.02	< 0.02	0.006	**0.059**	0.022	0.008	0.005	0.003	0.003	0.0037
nickel	mg/L	-	0.025		< 0.001	0.003	< 0.001	0.003		0.004	0.002	0.002	< 0.01	< 0.01	< 0.05	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	0.004	0.001	0.003	0.004	0.008	0.005	0.002
nitrate as N	mg/L	10	-		1.1	< 0.2	< 0.2	0.1		0.6	0.7	0.6	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
nitrite as N	mg/L	1	-		< 0.01	< 0.2	< 0.2	0.07		< 0.01	0.01	< 0.01	< 20	< 20	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.2	< 0.2	0.02	< 0.01	< 0.01	< 0.01	< 0.01
pH	pH Units	6.5-8.5	6.5-8.5		7.84	7.93	7.86	7.90		7.6	7.88	7.61	8	7.27	7.0	7.4	6.9	6.97	7.02	7.12	7.4	7.58	7.9	8.1	7.8	7.57	7.52
phenol	mg/L	-	0.005		< 0.001	< 0.001	< 0.002	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.020**	< 0.001	< 0.001	< 0.001	0.002	**0.008**	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
phosphate	mg/L	-	-		< 0.01	< 1	< 1	< 0.01		< 0.01	0.01	0.01	< 1	< 1	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 1	< 1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
phosphorous	mg/L	-	-		< 0.1	-	-	< 0.05		< 0.1	< 0.1	< 0.1	-	-	< 3	< 10	< 2	< 2.00	< 2.00	< 1	< 0.05	-	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1
total phosphorous	mg/L	-	0.01		**0.4**	**8.33**	**11.9**	**5.7**		**14.0**	**3.2**	**5.3**	**0.607**	**0.418**	**0.27**	**0.27**	**0.34**	< 0.1	< 5	< 3	**0.217**	**0.124**	**11**	**2.3**	**10.0**	**1.1**	**4.4**
potassium	mg/L	-	-		1.8	8.9	5.5	6.1		6.1	5.5	4.9	63.6	108	130	150	140	150	150	130	9.1	7.6	10	10	10	9.3	9.5
selenium	mg/L	0.01	0.1		0.005	< 0.002	< 0.002	< 0.002		0.002	0.003	0.003	0.023	0.036	< 0.1	< 0.2	< 0.040	0.093	0.058	< 0.04	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
silicon	mg/L	-	-		6.8	5.87	6.53	8.4		8.0	7.4	7.4	2.18	3.18	< 3	< 5	3	3	3	2.9	7.12	8.53	11	10	11	9.1	10
silver	mg/L	-	0.0001		< 0.0001	< 0.0001	< 0.0001	< 0.0001		< 0.0001	< 0.0001	< 0.0001	< 0.001	< 0.001	< 0.005	< 0.01	< 0.002	< 0.002	< 0.002	< 0.001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
sodium	mg/L	200 d	-		42	76	51.9	54		56	52	52	2320	5530	6100	8000	6600	7200	7500	5800	115	117	75	76	85	68	75
strontium	mg/L	-	-		1.1	2.45	2.17	2		2.3	2.1	1.9	16.2	35.8	47	55	51	54	59	43	2.89	3.37	4.2	4.4	4.1	4.4	4.8
sulphide	mg/L	0.05	-		< 0.01	0.07	0.02	0.02		0.03	< 0.02	< 0.02	0.01	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.43	0.07	0.14	< 0.02	< 0.02	< 0.02	< 0.02
sulphate	mg/L	500	-		157	501	702	389		496	445	385	1080	1780	1730	2130	1890	1820	1830	1910	530	797	1070	1160	1410	1410	1320
thallium	mg/L	-	0.0003		< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005	< 0.00005	< 0.00005	< 0.0005	< 0.0005	< 0.003	< 0.005	< 0.001	< 0.001	< 0.001	< 0.0005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
tin	mg/L	-	-	**Note:**	< 0.001	< 0.001	< 0.001	< 0.001	**Note:**	< 0.001	< 0.001	< 0.001	< 0.01	< 0.01	< 0.05	< 0.1	< 0.02	< 0.02	< 0.02	< 0.01	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
titanium	mg/L	-	-	Well has never	< 0.005	< 0.005	0.008	0.007	Insufficient	< 0.005	< 0.005	0.005	< 0.05	< 0.05	< 0.3	< 0.5	< 0.1	< 0.1	< 0.1	< 0.05	< 0.005	0.008	0.012	< 0.005	< 0.005	0.018	< 0.005
TSS	mg/L	-	-	been sampled.	620	6970	20400	15000	water.	20000	4500	2900	1010	375	810	770	610	600	660	560	100000	49900	24000	47000	14000	1700	7600
turbidity	NTU	1	-	Blocked	250	17.3	7.2	11900		16000	2900	77	16.8	12.5	350	360	280	300	400	170	44	5.2	20100	18000	31000	3600	460
uranium	mg/L	0.02	[0.005]	since 2002.	**0.0083**	**0.0202**	**0.0138**	**0.011**		**0.012**	**0.011**	**0.0098**	**0.0152**	**0.0053**	< 0.005	< 0.01	< 0.002	< 0.002	< 0.002	< 0.001	**0.0145**	**0.0196**	**0.019**	**0.018**	**0.016**	**0.018**	**0.018**
vanadium	mg/L	-	[0.006]		0.0025	0.0038	0.002	< 0.001		< 0.001	0.002	0.0038	< 0.005	< 0.05	**0.057**	< 0.1	< 0.02	**0.076**	**0.066**	< 0.01	0.0024	0.0018	< 0.001	0.001	0.004	0.002	< 0.0005
zinc	mg/L	5	[0.02]		0.005	< 0.005	< 0.005	0.007		< 0.005	< 0.005	< 0.005	< 0.05	< 0.05	< 0.3	< 0.5	< 0.1	< 0.1	< 0.1	< 0.05	0.006	0.008	0.008	0.009	< 0.03	< 0.005	< 0.01

NOTES:
Shaded area indicates an exceedance of the MOE Ontario Drinking Water Standard (June 2006) for that specific parameter.
Bolded areas indicate an exceedance of the MOE Provincial Water Quality Objectives (July 1994) for that specific parameter.
[ ] indicate interim PWQO concentration
a = interim PWQO at pH > 6.5 to 9.0 measured in clay-free samples.
b = interim PWQO if hardness greater than 20 mg/L.
c = interim PWQO if hardness greater than 80 mg/L
d = Local Medical Office of Health should be notified when sodium concentrations exceed 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium reduced diets.
(1) Sample bottle contained visible sediment. Results may be biased high due to analyte present in sediment.

TABLE D.1
Summary of Groundwater Quality in On-Site Monitoring Wells
Tansley Quarry Site, Burlington, Ontario

Parameter	Units	ODWS (June 2006)	PWQO (July 1994)	MW-02 intermediate							MW-02 deep						MW-03 shallow							MW-03 Deep		
				Nov-02	May-03	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11	Nov-02	May-03	Jan-07	Oct-08	Dec-09	Nov-11	Nov-02	May-03	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11	Nov-02	May-03	Jan-07
aluminum	mg/L	0.1	[0.075] a	**0.1**	0.026	**0.28**	**0.19**	**0.27**	**0.15**	0.006	0.056	< 0.05	< 0.3	< 0.3	< 0.5	< 0.3	0.019	**0.456**	**0.15**	**0.11**	**0.14**	0.032	0.006	**0.128**	< 0.050	< 0.05
alkalinity	mg $CaCO_3$/L	30-500	-	225	118	133	139	141	129	140	111	36	36	32	51	35	133	104	140	114	110	109	175	40	29	56
ammonia as N	mg/L	-	-	1.86	2.82	2.09	1.5	1.6	1.5	1.5	7.28	13	16	17	18	16	0.61	0.55	1.36	1.20	1.8	1.2	0.89	9.2	11.3	13.5
antimony	mg/L	-	[0.02]	0.0008	< 0.0005	< 0.001	< 0.0005	< 0.0005	0.0009	< 0.0005	< 0.01	< 0.01	< 0.05	< 0.03	< 0.05	< 0.03	< 0.0005	< 0.0005	< 0.001	0.0026	< 0.0005	0.0006	< 0.0005	< 0.005	< 0.005	< 0.01
arsenic	mg/L	0.025	[0.005]	< 0.002	< 0.002	0.003	0.003	0.003	0.003	0.001	< 0.02	< 0.02	< 0.05	< 0.05	< 0.1	< 0.05	0.004	0.004	0.003	**0.015**	0.004	0.003	0.002	< 0.02	< 0.02	< 0.01
barium	mg/L	1	-	0.042	0.021	0.009	0.008	0.009	0.007	0.007	< 0.05	< 0.05	< 0.3	< 0.3	< 0.5	< 0.1	0.038	0.031	0.012	0.011	0.010	0.014	0.008	< 0.05	< 0.05	< 0.05
beryllium	mg/L	-	1.1	< 0.001	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.01	< 0.01	< 0.03	< 0.03	< 0.05	< 0.03	< 0.001	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.01	< 0.01	< 0.005
bismuth	mg/L	-	-	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.01	< 0.01	< 0.05	< 0.05	< 0.1	< 0.05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.01	< 0.01	< 0.01
boron	mg/L	5	0.2	**2.04**	**2.9**	**1.9**	**1.8**	**1.8**	**2**	**1.8**	**3.34**	**5.23**	**5.6**	**7.1**	**6**	**5.5**	**0.778**	**0.911**	**1.2**	**1.2**	**1.2**	**1.3**	**0.98**	**5.17**	**5.68**	**3.8**
bromide	mg/L	-	-	2.2	4.9	3	< 1	1	2	< 10	56	124	134	153	148	154	< 0.5	< 0.5	6	3	6	7	< 1	70	94	142
cadmium	mg/L	0.005	0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.001	< 0.001	< 0.005	< 0.005	< 0.01	< 0.005	< 0.0001	< 0.0001	0.0003	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.001	< 0.001	< 0.001
calcium	mg/L	-	-	110	272	230	190	200	180	190	824	1620	2000	2000	2000	1900	125	142	210	180	190	220	140	1220	1590	1400
chloride	mg/L	250	-	244	438	182	113	87	147	106	4920	11200	13000	12900	12400	12500	30.5	30.8	492	281	518	574	78	6720	9780	11500
chromium	mg/L	0.05	-	0.001	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.05	< 0.05	< 0.3	< 0.3	< 0.5	< 0.3	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.05	< 0.05	< 0.05
cobalt	mg/L	-	0.0009	**0.0029**	< 0.0001	**0.0093**	**0.022**	**0.01**	< 0.0005	< 0.0005	< 0.001	< 0.001	< 0.03	< 0.03	< 0.05	< 0.03	0.0004	0.0002	**0.015**	**0.021**	**0.011**	**0.0051**	< 0.0005	< 0.001	< 0.001	**0.005**
copper	mg/L	1	[0.005] b	**0.0065**	< 0.005	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.005	< 0.005	< 0.05	< 0.05	< 0.1	< 0.05	< 0.0005	0.0009	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.005	< 0.005	< 0.01
fluoride	mg/L	1.5	-	0.4	0.5	0.3	0.2	0.2	0.2	0.3	0.4	0.4	0.3	0.3	0.3	< 1	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.2
free cyanide	mg/L	0.2	0.005	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.002
hardness	mg $CaCO_3$/L	80-100	-	424	1122	1100	990	1000	940	980	2780	5831	6700	7200	7100	6500	577	760.5	1100	950	1000	1000	870	4370	5871	5200
iron	mg/L	0.3	0.3	0.15	**1.68**	**0.85**	**0.8**	**1.1**	**0.8**	< 0.1	**2.16**	**6.59**	**6.9**	**6.8**	< 10	< 5	**0.67**	**1.96**	**0.54**	< 0.1	**0.7**	**1.1**	< 0.1	**3.65**	**4.46**	**4.7**
lead	mg/L	0.01	[0.005] c	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.005	< 0.005	< 0.03	< 0.03	< 0.05	< 0.03	< 0.0005	0.0008	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.005	< 0.005	< 0.005
magnesium	mg/L	-	-	36	106	130	130	130	120	120	176	427	430	510	520	450	63.8	98.2	150	120	130	120	120	317	460	380
manganese	mg/L	0.05	-	0.228	0.199	0.18	0.17	0.16	0.13	0.13	0.575	1.03	1	1.2	1.2	0.98	0.189	0.156	0.15	0.13	0.14	0.14	0.1	0.575	0.735	0.62
mercury	mg/L	0.001	0.0002	< 0.00005	< 0.00005	< 0.0001	< 0.0015 (1)	< 0.0001	< 0.0001	< 0.0001	< 0.00005	0.00008	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.00005	0.00006	< 0.0001	< 0.0015 (1)	< 0.0001	< 0.0001	< 0.0001	< 0.00005	< 0.00005	< 0.0001
molybdenum	mg/L	-	0.04	**0.048**	0.021	0.012	0.009	0.009	0.009	0.0085	0.024	0.015	< 0.05	< 0.05	< 0.1	< 0.03	**0.048**	0.02	0.008	0.013	0.007	0.012	0.006	0.013	0.012	< 0.01
nickel	mg/L	-	0.025	0.003	< 0.001	0.003	0.002	0.004	< 0.001	< 0.001	< 0.01	< 0.01	< 0.05	< 0.05	< 0.1	< 0.05	0.002	< 0.001	0.003	0.002	0.003	< 0.001	< 0.001	< 0.01	< 0.01	< 0.01
nitrate as N	mg/L	10	-	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.1	< 0.1	0.3	< 0.1	0.6	< 0.2	< 0.2	< 0.1
nitrite as N	mg/L	1	-	< 2	< 0.2	< 0.01	< 0.01	0.03	< 0.01	0.03	< 20	< 20	0.02	< 0.01	< 0.01	< 0.1	< 0.2	< 0.2	< 0.01	0.01	0.14	0.02	0.22	< 20	< 20	0.02
pH	pH Units	6.5-8.5	6.5-8.5	8.14	7.93	8	8.1	7.9	7.74	7.73	7.77	7.23	7.2	7.4	7.2	7.16	7.76	7.93	7.90	8.00	7.7	7.76	7.78	7.44	7.28	7.30
phenol	mg/L	-	0.005	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.011**	< 0.001	0.005	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.023**
phosphate	mg/L	-	-	< 1	< 1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 1	< 1	< 0.01	< 0.01	< 0.01	< 0.01	< 1	< 1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 1	< 1	< 0.01
phosphorous	mg/L	-	-	-	-	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	-	-	< 3	< 5	< 10	< 5	< 0.05	-	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	-	-	< 0.5
total phosphorous	mg/L	-	0.01	**2.95**	**2.04**	**2.7**	**1.5**	**5.7**	**0.1**	**0.36**	**0.142**	**0.089**	**0.077**	**0.15**	**0.82**	**2**	**0.176**	**10.2**	**8.4**	**6.4**	**30.0**	**5.0**	**0.35**	**0.278**	**0.076**	**0.21**
potassium	mg/L	-	-	17.3	26.2	21	19	18	17	17	60.4	101	120	130	120	110	15.5	12.9	14	13	12	16	9.4	78.1	94.4	80
selenium	mg/L	0.01	0.1	< 0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.024	0.032	< 0.1	< 0.1	< 0.2	< 0.1	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.002	< 0.002	0.033	0.03	< 0.02
silicon	mg/L	-	-	3.51	4.3	5.6	5.5	6.0	5.1	4.7	2.18	3.19	< 3	< 3	< 5	< 3	5.40	5.99	6.4	6	6.9	6.5	5.5	3.19	3.27	2.3
silver	mg/L	-	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.001	< 0.001	< 0.005	< 0.005	< 0.01	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.001	< 0.001	< 0.001
sodium	mg/L	200 d	-	318	546	270	200	180	200	210	2380	5590	5800	6700	6200	5800	98.4	111	280	210	170	320	130	2920	4330	3400
strontium	mg/L	-	-	2.52	7.22	10	12	11	11	11	16.8	33.800	36	42	41	39	6.86	8.98	11	12	11	13	10	25.6	32.7	29
sulphide	mg/L	0.05	-	0.18	0.01	0.05	< 0.02	< 0.02	< 0.02	< 0.02	0.01	< 0.01	< 0.02	< 0.02	0.25	< 0.02	0.37	0.31	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.01	< 0.02
sulphate	mg/L	500	-	542	1330	1200	1090	1080	1120	1140	1230	1920	1950	1890	2010	2030	651	836	884	813	953	933	900	1360	1610	1540
thallium	mg/L	-	0.0003	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.0005	< 0.0005	< 0.003	< 0.003	< 0.005	< 0.003	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.0005	< 0.0005	< 0.0005
tin	mg/L	-	-	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.01	< 0.01	< 0.05	< 0.05	< 0.1	< 0.05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.01	< 0.01	< 0.01
titanium	mg/L	-	-	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.05	< 0.05	< 0.3	< 0.3	0.5	< 0.3	< 0.005	0.016	0.007	< 0.005	< 0.005	< 0.005	< 0.005	< 0.05	< 0.05	< 0.05
TSS	mg/L	-	-	5300	3570	32000	2200	6500	360	920	214	203	240	81	800	540	58400	28300	24000	6500	12000	21000	5800	456	118	140
turbidity	NTU	1	-	19.1	2.5	17800	2200	7800	320	480	4.0	6.8	179	71	720	290	1.3	5.0	10700	3600	14000	19000	600	11.1	5.2	105
uranium	mg/L	0.02	[0.005]	**0.0153**	0.0028	0.0005	0.0002	0.0004	0.0002	0.0003	**0.0099**	0.0024	< 0.005	< 0.005	< 0.01	< 0.005	**0.0059**	0.0015	0.0007	0.0023	0.0005	0.0003	0.0005	0.0021	< 0.0010	< 0.001
vanadium	mg/L	-	[0.006]	0.0024	< 0.0005	< 0.001	< 0.001	0.003	< 0.001	< 0.0005	< 0.005	< 0.05	**0.064**	< 0.05	< 0.1	< 0.03	0.0014	0.0015	< 0.001	**0.007**	0.003	0.003	0.0006	< 0.05	< 0.05	< 0.01
zinc	mg/L	5	[0.02]	< 0.05	**0.023**	0.005	< 0.005	< 0.005	< 0.01	< 0.025	< 0.05	< 0.05	< 0.3	< 0.3	< 0.5	< 0.3	< 0.05	< 0.005	0.018	< 0.005	< 0.005	< 0.005	< 0.025	< 0.05	< 0.05	**0.23**

NOTES:
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[ ] indicate interim PWQO concentration
a = interim PWQO at pH > 6.5 to 9.0 measured in clay-free samples.
b = interim PWQO if hardness greater than 20 mg/L.
c = interim PWQO if hardness greater than 80 mg/L
d = Local Medical Office of Health should be notified when sodium concentrations exceed 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium reduced diets.
(1) Sample bottle contained visible sediment. Results may be biased high due to analyte present in sediment.

TABLE D.1
Summary of Groundwater Quality in On-Site Monitoring Wells
Tansley Quarry Site, Burlington, Ontario

Parameter	Units	ODWS (June 2006)	PWQO (July 1994)	MW-03 Deep					MW-04 shallow							MW-04 intermediate							MW-04 deep					
				Oct-08	Dec-09	Oct-10	Nov-11	Nov-11 DUP 3	Nov-02	May-03	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11	Nov-02	May-03	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11	May-03	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11
aluminum	mg/L	0.1	[0.075] a	< 0.3	0.074	**0.11**	**< 0.05**	**< 0.05**	< 0.005	0.068	**0.28**	**0.2**	**0.32**	0.038	**1.1**	0.006	**0.289**	**0.1**	**0.14**	**0.14**	0.031	0.064	< 0.05	< 0.05	< 0.5	**0.5**	NOT SAMPLED	< 0.3
alkalinity	mg $CaCO_3$/L	30-500	-	74	88	72	56	53	385	419	391	413	390	387	384	55	56	56	51	50	50	55	172	126	34	66		102
ammonia as N	mg/L	-	-	4.7	5.7	7.9	9.6	9.9	0.32	0.25	0.16	< 0.05	0.53	< 0.05	< 0.05	4.86	4.97	8.2	5.9	6.3	6	5.7	8.7	23.4	25	34		37
antimony	mg/L	-	[0.02]	< 0.03	< 0.0005	< 0.005	< 0.005	< 0.005	< 0.0005	< 0.0005	< 0.001	0.0007	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0005	< 0.005	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.005	< 0.01	< 0.05	< 0.03		< 0.03
arsenic	mg/L	0.025	[0.005]	< 0.05	< 0.005	< 0.01	< 0.01	0.011	0.004	**0.006**	< 0.001	< 0.001	< 0.001	< 0.001	0.003	< 0.002	< 0.002	< 0.005	< 0.01	< 0.005	< 0.005 (1)	< 0.005	< 0.02	< 0.01	< 0.1	< 0.3		**0.059**
barium	mg/L	1	-	< 0.3	0.017	< 0.05	0.025	0.025	0.083	0.082	0.06	0.065	0.058	0.056	0.096	0.013	0.010	< 0.03	< 0.05	0.007	0.007	0.008	0.087	0.075	< 0.5	< 0.3		< 0.1
beryllium	mg/L	-	1.1	< 0.03	< 0.0005	< 0.005	< 0.005	< 0.005	< 0.001	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.001	< 0.001	< 0.003	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.01	< 0.005	< 0.05	< 0.03		< 0.03
bismuth	mg/L	-	-	< 0.05	< 0.001	< 0.01	< 0.01	< 0.01	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001	< 0.005	< 0.01	< 0.001	0.002	< 0.001	< 0.01	< 0.01	< 0.1	< 0.05		< 0.05
boron	mg/L	5	0.2	**3.6**	**4.7**	**4.6**	**4.6**	**5.1**	**0.353**	**0.286**	0.071	0.12	0.11	0.078	0.06	**6.46**	**6.99**	**6**	**6.9**	**6.5**	**6.4**	**5.9**	**2.38**	**3.3**	**6.2**	**5.4**		**6.3**
bromide	mg/L	-	-	37	31	62	< 500	< 500	< 0.5	< 0.5	< 1.0	< 1.0	< 1	< 1	< 1	11.3	10.3	14	17	21	16	21	103	183	398	401		572
cadmium	mg/L	0.005	0.0005	< 0.005	< 0.0001	< 0.001	< 0.001	< 0.001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0002	< 0.0001	**0.0006**	< 0.0005	< 0.001	< 0.0001	< 0.0001	< 0.0001	**0.0017**	< 0.001	< 0.01	< 0.005		**0.006**
calcium	mg/L	-	-	540	470	870	1300	1300	65.2	64.1	88	84	78	77	130	433	380	450	530	510	460	480	1440	3700	6600	5300		7700
chloride	mg/L	250	-	3220	2440	4980	6480	6470	12.2	5.8	8.0	4.0	4	5	4	1120	984	1320	1540	1800	1500	1650	9180	16800	34700	32700		45000
chromium	mg/L	0.05	-	< 0.3	< 0.005	< 0.05	< 0.05	< 0.05	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.03	< 0.05	< 0.005	< 0.005	< 0.005	< 0.05	< 0.05	< 0.5	< 0.3		< 0.3
cobalt	mg/L	-	0.0009	< 0.03	**0.0037**	< 0.005	< 0.005	< 0.005	**0.0011**	0.0009	**0.019**	**0.022**	**0.015**	**0.001**	**0.0076**	0.0008	0.0002	**0.019**	**0.021**	**0.0086**	< 0.0005	< 0.003	< 0.001	< 0.005	< 0.05	< 0.03		< 0.03
copper	mg/L	1	[0.005] b	< 0.05	< 0.001	< 0.01	< 0.02	< 0.01	0.0008	< 0.0005	0.001	< 0.001	< 0.001	< 0.001	**0.007**	< 0.005	< 0.005	< 0.005	< 0.01	< 0.005	< 0.005 (1)	< 0.001	**0.0124**	< 0.01	< 0.1	< 0.05		< 0.1
fluoride	mg/L	1.5	-	0.3	0.4	0.3	0.3	0.3	0.4	0.3	0.2	0.2	0.3	0.2	0.2	0.6	0.7	0.5	0.6	0.5	0.5	0.6	0.3	0.2	0.1	0.1		< 0.1
free cyanide	mg/L	0.2	0.005	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.002	< 0.002	< 0.002		< 0.002
hardness	mg $CaCO_3$/L	80-100	-	2200	1800	3300	4900	5100	353	407.7	490	500	460	450	560	1600	1405	1600	1900	1900	1700	1700	4915	13000	23000	18000		27000
iron	mg/L	0.3	0.3	< 5	**1.2**	**2.8**	**2.3**	**2.5**	< 0.03	**0.52**	0.18	0.11	**0.50**	< 0.1	**3.3**	0.23	**0.56**	**0.71**	< 1	**0.9**	**0.75**	**0.92**	< 0.3	**17**	**29**	**24**		< 5
lead	mg/L	0.01	[0.005] c	< 0.03	< 0.0005	< 0.005	< 0.005	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0007	< 0.0005	**0.012**	< 0.0005	< 0.0005	< 0.003	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.005	< 0.005	< 0.05	< 0.03		< 0.03
magnesium	mg/L	-	-	200	160	280	410	430	46.1	60.1	66	71	65	62	61	125	110	130	150	140	130	130	316	820	1500	1200		1800
manganese	mg/L	0.05	-	0.27	0.2	0.39	0.52	0.54	1.01	0.769	0.28	0.38	0.310	0.180	0.55	0.205	0.17	0.21	0.26	0.22	0.19	0.21	1.13	2.4	3.7	2.8		5.1
mercury	mg/L	0.001	0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.00005	< 0.00005	< 0.0001	< 0.0015 (1)	0.0001	< 0.0001	< 0.0001	< 0.00005	< 0.00005	< 0.0001	< 0.0015 (1)	< 0.0001	< 0.0001	< 0.0001	< 0.00005	0.0001	< 0.0001	< 0.0001		< 0.0001
molybdenum	mg/L	-	0.04	< 0.05	0.006	< 0.01	0.006	0.006	0.024	0.012	0.005	0.007	0.005	0.006	0.0021	0.011	0.008	0.007	< 0.01	0.008	0.009	0.0087	0.03	0.012	< 0.1	< 0.05		< 0.03
nickel	mg/L	-	0.025	< 0.05	< 0.005	< 0.01	< 0.01	< 0.01	0.004	0.001	0.003	0.003	0.004	0.001	0.005	0.007	< 0.001	0.005	< 0.01	< 0.005	< 0.005 (1)	< 0.005	< 0.01	< 0.01	< 0.1	< 0.05		**0.19**
nitrate as N	mg/L	10	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	11	0.3	2.5	4.2	4.3	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.6	1.4	< 0.1	< 0.1		< 0.1
nitrite as N	mg/L	1	-	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.2	< 0.2	0.1	0.01	0.25	0.11	0.02	< 2.0	< 0.2	< 0.01	< 0.01	< 0.01	< 0.01	0.03	< 20	0.02	< 0.01	0.02		< 0.1
pH	pH Units	6.5-8.5	6.5-8.5	7.80	7.7	7.45	7.37	7.38	7.79	7.8	8.2	8.4	8.0	7.8	7.81	7.67	7.64	7.7	7.8	7.6	7.5	7.48	7.42	7.4	7.2	6.8		6.8
phenol	mg/L	-	0.005	< 0.001	< 0.001	< 0.001	0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	**0.025**	0.002	0.003		**0.07**
phosphate	mg/L	-	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 1	< 1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 1	< 1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 1	< 0.01	< 0.01	< 0.01		< 0.01
phosphorous	mg/L	-	-	< 5	< 0.1	< 1	< 1	< 1	< 0.05	< 0.05	< 0.05	< 0.1	< 0.1	< 0.1	0.41	< 0.05	< 0.05	< 0.3	< 1	< 0.1	< 0.1	< 0.1	< 0.5	< 0.5	< 10	< 5		< 5
total phosphorous	mg/L	-	0.01	**0.12**	**0.04**	**0.10**	< 1	< 0.40	**0.092**	**12**	**1.6**	**1.7**	**17.0**	**0.9**	**0.85**	**5.45**	**0.96**	**1.4**	**0.47**	< 0.1	**0.05**	**0.14**	**0.089**	**0.34**	**0.37**	**2.7**		**< 5**
potassium	mg/L	-	-	46	40	61	86	91	6.6	6.2	5	5.7	5.1	4.9	4.5	39.7	38.5	42	48	43	43	43	76.2	160	260	210		300
selenium	mg/L	0.01	0.1	< 0.1	0.01	< 0.02	< 0.02	< 0.02	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.009	< 0.002	< 0.01	< 0.02	0.012	< 0.01 (1)	< 0.01	< 0.02	< 0.02	< 0.2	**0.2**		< 0.2
silicon	mg/L	-	-	3.5	3.7	4	3.5	3.6	6.69	7.66	7.5	6.9	6.7	5.8	7.3	3.27	3.64	3	3.7	3.4	3.2	3.4	3.41	2.3	< 5	4		3.4
silver	mg/L	-	0.0001	< 0.005	< 0.0001	< 0.001	< 0.001	< 0.001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.001	< 0.0001	**0.0002**	< 0.0001	< 0.001	< 0.001	< 0.01	< 0.005		< 0.005
sodium	mg/L	200 d	-	1700	1300	2400	3200	3400	49.5	35.9	24	34	28	28	25	682	609	780	1100	1000	960	1100	3600	8000	15000	12000		17000
strontium	mg/L	-	-	13	12	20	30	31	3.25	3.23	1.4	2	1.8	1.5	1.4	14.2	11.8	11	13	13	12	13	29.9	77	130	110		170
sulphide	mg/L	0.05	-	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.27	0.03	< 0.02	< 0.02	0.06	< 0.02	< 0.02	0.05	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02		< 0.02
sulphate	mg/L	500	-	1230	1260	1450	1650	1560	106	70.2	80	122	116	103	116	1630	1600	1730	1670	1870	1750	1800	762	1070	1250	1340		1540
thallium	mg/L	-	0.0003	< 0.003	< 0.00005	< 0.0005	< 0.0005	< 0.0005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.0003	< 0.0005	< 0.00005	< 0.00005	< 0.00005	< 0.0005	< 0.0005	< 0.005	< 0.003		< 0.003
tin	mg/L	-	-	< 0.05	< 0.001	< 0.01	< 0.01	< 0.01	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.005	< 0.01	< 0.001	< 0.001	< 0.001	< 0.01	< 0.01	< 0.1	< 0.05		< 0.05
titanium	mg/L	-	-	< 0.3	< 0.005	< 0.05	< 0.05	< 0.05	< 0.005	< 0.005	0.012	0.009	0.008	< 0.005	0.009	< 0.005	-	< 0.03	< 0.05	< 0.005	0.008	< 0.005	< 0.05	< 0.05	< 0.5	< 0.3		< 0.3
TSS	mg/L	-	-	36	100	190	370	490	74300	30500	2500	2800	21000	750	2500	8680	1740	5400	1100	1100	91	380	501	1000	540	3600		1600
turbidity	NTU	1	-	27	66	100	140	140	13	50	1710	2600	31000	4300	780	11.2	24	2440	1100	1100	57	110	188	518	380	4600		340
uranium	mg/L	0.02	[0.005]	< 0.005	< 0.0001	< 0.001	< 0.001	< 0.001	**0.0074**	0.0041	**0.0058**	**0.0093**	**0.0081**	**0.0078**	**0.0082**	0.0011	0.0002	< 0.0005	< 0.001	< 0.0001	< 0.0001	0.0004	**0.0075**	0.001	< 0.01	< 0.005		**0.023**
vanadium	mg/L	-	[0.006]	< 0.05	< 0.005	< 0.01	0.006	0.007	0.002	0.0014	0.002	0.003	0.001	< 0.001	0.004	< 0.0050	< 0.0050	< 0.005	< 0.01	< 0.005	< 0.005 (1)	< 0.003	< 0.05	< 0.01	< 0.1	< 0.3		< 0.05
zinc	mg/L	5	[0.02]	< 0.3	**0.034**	**< 0.05**	**0.085**	**< 0.05**	< 0.005	< 0.005	0.008	< 0.005	0.005	< 0.005	0.016	< 0.050	0.007	< 0.03	< 0.05	< 0.03	< 0.005	< 0.005	< 0.05	**0.073**	< 0.5	< 0.3		< 0.3

NOTES:
Shaded area indicates an exceedance of the MOE Ontario Drinking Water Standard (June 2006) for that specific parameter.
Bolded areas indicate an exceedance of the MOE Provincial Water Quality Objectives (July 1994) for that specific parameter.
[ ] indicate interim PWQO concentration
a = interim PWQO at pH > 6.5 to 9.0 measured in clay-free samples.
b = interim PWQO if hardness greater than 20 mg/L.
c = interim PWQO if hardness greater than 80 mg/L
d = Local Medical Office of Health should be notified when sodium concentrations exceed 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium reduced diets.
(1) Sample bottle contained visible sediment. Results may be biased high due to analyte present in sediment.

TABLE D.1
Summary of Groundwater Quality in On-Site Monitoring Wells
Tansley Quarry Site, Burlington, Ontario

Parameter	Units	ODWS (June 2006)	PWQO (July 1994)	MW-05 shallow							MW-05 straddle				MW-05 intermediate							MW-05 deep				MW-06 shallow		MW-06 straddle			
				Nov-02	May-03	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11	Oct-08	Dec-09	Oct-10	Nov-11	Nov-02	May-03	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11	Oct-08	Dec-09	Oct-10	Nov-11	Oct-08	Nov-11	Oct-08	Dec-09	Oct-10	Nov-11
aluminum	mg/L	0.1	[0.075] a	0.006	0.059		0.069	0.067	0.052	0.052	**0.34**	**0.32**	0.04	**0.14**	0.029	**0.194**		**0.1**	**0.130**	0.016	0.051		< 0.5		< 0.5		< 0.005	**0.16**	**0.71**	**0.46**	0.068
alkalinity	mg $CaCO_3$/L	30-500	-	310	344		326	275	302	300	271	296	294	285	179	180		178	264	252	285		32		36		309	324	312	315	320
ammonia as N	mg/L	-	-	0.21	0.05		0.1	0.05	< 0.05	0.12	0.51	0.65	0.54	0.75	1.99	1.87		1.7	1.8	2.1	1.6		43		39		1.1	0.47	0.66	0.48	0.17
antimony	mg/L	-	[0.02]	< 0.0005	< 0.0005		0.001	< 0.0005	< 0.0005	< 0.0005	0.001	< 0.0005	0.0011	< 0.0005	< 0.0005	< 0.0005		0.0005	< 0.0005	< 0.0005	< 0.0005		**0.07**		< 0.05		0.0009	0.0007	< 0.0005	0.0006	< 0.0005
arsenic	mg/L	0.025	[0.005]	< 0.002	< 0.002		< 0.001	< 0.001	< 0.001	< 0.001	**0.012**	**0.013**	**0.006**	**0.01**	0.002	< 0.002		0.002	0.002	0.002	< 0.001		< 0.1		< 0.1		0.002	0.005	0.003	0.005	**0.007**
barium	mg/L	1	-	0.07	0.081		0.078	0.061	0.06	0.058	0.068	0.077	0.066	0.067	0.016	0.022		0.016	0.021	0.019	0.021		< 0.5		< 0.2		0.12	0.05	0.054	0.062	0.051
beryllium	mg/L	-	1.1	< 0.001	< 0.001		< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.001	< 0.001		< 0.0005	< 0.0005	< 0.0005	< 0.0005		< 0.05		< 0.05		< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
bismuth	mg/L	-	-	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001		< 0.1		< 0.1		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
boron	mg/L	5	0.2	0.134	0.014		0.025	< 0.01	0.02	0.011	**1.1**	**1.0**	**1.0**	**1.2**	**3.58**	**3.38**		**4.1**	**3.1**	**2.7**	**2**		**5**		**6**		0.17	**0.28**	**0.23**	0.18	0.088
bromide	mg/L	-	-	< 0.5	0.5		< 1.000	< 1	< 1	< 1	< 1	< 1	< 1	< 1	1.3	4.4		1	< 1	2	< 1		587		747		< 1	< 1	< 1	< 1	< 1
cadmium	mg/L	0.005	0.0005	< 0.0001	< 0.0001		< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001		< 0.0001	< 0.0001	< 0.0001	< 0.0001		**0.01**		< 0.01		< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
calcium	mg/L	-	-	98.7	114		120	120	120	120	63	70	67	58	88.7	181		67	67	99	80		8800		10000		72	71	73	76	90
chloride	mg/L	250	-	14.6	5.7		13	20	26	31	8	5	8	9	150	**406**		105	74	176	74		50200		54800		10	4	6	9	8
chromium	mg/L	0.05	-	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005		< 0.5		< 0.5		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
cobalt	mg/L	-	0.0009	0.0006	< 0.0001		**0.022**	**0.013**	**0.001**	**0.001**	**0.023**	**0.013**	**0.004**	**0.0058**	< 0.0001	0.0003		**0.021**	**0.0054**	< 0.0005	**0.0018**		< 0.05		< 0.05		< 0.0005	**0.019**	**0.015**	**0.005**	**0.0013**
copper	mg/L	1	[0.005] b	0.0015	0.0009		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	0.001	0.0006	0.0005		< 0.001	< 0.001	< 0.001	< 0.001		< 0.1		< 0.1		< 0.001	< 0.001	< 0.001	0.001	< 0.001
fluoride	mg/L	1.5	-	0.2	0.1		0.1	0.1	0.1	0.1	0.3	0.3	0.2	0.3	0.7	0.7		0.7	0.5	0.4	0.4		< 0.1		< 0.1		0.3	0.2	0.2	0.2	0.1
free cyanide	mg/L	0.2	0.005	< 0.001	< 0.001		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001		< 0.002	< 0.002	< 0.002	< 0.002		< 0.002		< 0.002		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
hardness	mg $CaCO_3$/L	80-100	-	352	406.4		430	430	430	440	300	320	300	270	332	692.2		260	270	390	320		31000		35000		320	330	350	340	400
iron	mg/L	0.3	0.3	< 0.03	0.06		< 0.1	0.1	< 0.1	< 0.1	0.25	**0.60**	< 0.10	**0.49**	0.13	**0.47**		0.26	0.2	0.27	0.14		**29**		**37**		< 0.1	**0.39**	**0.6**	**0.7**	**0.8**
lead	mg/L	0.01	[0.005] c	< 0.0005	0.0010		< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005		< 0.0005	< 0.0005	< 0.0005	< 0.0005		< 0.05		< 0.05		< 0.0005	< 0.0005	< 0.0005	0.0006	< 0.0005
magnesium	mg/L	-	-	25.6	29.1		32	31	31	32	34	34	33	29	26.7	57.6		23	25	35	30		2100		2300		35	37	39	38	43
manganese	mg/L	0.05	-	1.29	0.051		0.038	0.032	0.004	0.003	0.063	0.078	0.033	0.045	0.044	0.072		0.06	0.033	0.036	0.033		4.7		5.1		0.15	0.075	0.067	0.056	0.038
mercury	mg/L	0.001	0.0002	< 0.00005	< 0.00005		< 0.0015 (1)	< 0.0001	< 0.0001	< 0.0001	< 0.0015 (1)	< 0.0001	< 0.0001	< 0.0001	< 0.00005	< 0.00005		< 0.0001	< 0.0001	< 0.0001	< 0.0001		< 0.0001		< 0.0001		< 0.0001	< 0.0015 (1)	< 0.0001	< 0.0001	< 0.0001
molybdenum	mg/L	-	0.04	0.016	< 0.001		< 0.001	< 0.001	< 0.001	< 0.0005	0.005	0.004	0.004	0.0047	0.013	0.011		0.009	0.005	0.004	0.0037		< 0.1		< 0.05		0.019	0.008	0.004	0.003	0.0014
nickel	mg/L	-	0.025	0.002	< 0.001		0.002	0.003	< 0.001	< 0.001	0.003	0.003	< 0.001	< 0.001	0.002	0.001		0.002	0.001	< 0.001	< 0.001		< 0.1		< 0.1		< 0.001	0.002	0.003	0.002	< 0.001
nitrate as N	mg/L	10	-	< 0.2	< 0.2		0.1	< 0.1	< 0.1	< 0.1	0.1	0.3	< 0.1	0.5	< 0.2	< 0.2		< 0.1	0.2	< 0.1	0.6		< 0.1		< 0.1		< 0.1	< 0.1	0.4	0.3	< 0.1
nitrite as N	mg/L	1	-	< 0.2	< 0.2		< 0.01	0.02	< 0.01	< 0.01	0.03	0.16	0.03	0.04	< 1.0	< 0.2		< 0.01	0.22	< 0.01	0.55		< 0.01		< 0.1		0.12	< 0.01	0.07	0.03	0.02
pH	pH Units	6.5-8.5	6.5-8.5	7.74	7.62		8.1	7.5	7.8	7.75	8.3	7.9	7.93	7.9	7.85	7.71		8.1	7.9	7.77	7.81		6.5		**6.43**		7.94	8.3	7.8	7.95	7.82
phenol	mg/L	-	0.005	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001		**0.006**		**0.11**		**<** 0.001	< 0.001	< 0.001	< 0.001	< 0.001
phosphate	mg/L	-	-	< 1	< 1		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 1	< 1		< 0.01	< 0.01	< 0.01	< 0.01		< 0.01		< 0.01		< 0.01	< 0.01	< 0.01	0.01	< 0.01
phosphorous	mg/L	-	-	< 0.05	< 0.05		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.05	< 0.05		< 0.1	< 0.1	< 0.1	< 0.1		< 10		< 10		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
total phosphorous	mg/L	-	0.01	**0.09**	**6.05**		**6**	**5**	**3**	**14**	**5.2**	**24.0**	**4.0**	**9.6**	**1.02**	**1.58**		**0.18**	**0.1**	**0.02**	< 0.1		**1.1**		< 5		**180**	**8.2**	**16**	**7.7**	**0.89**
potassium	mg/L	-	-	5.4	0.7		0.69	0.7	0.7	0.72	5.9	5.8	5.7	6.3	16.0	19.9		18	17	20	16		290		300		10	7.2	7.1	5.8	3.9
selenium	mg/L	0.01	0.1	< 0.002	< 0.002		< 0.002	< 0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002		< 0.002	< 0.002	< 0.002	< 0.002		< 0.2		< 0.2		< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
silicon	mg/L	-	-	5.37	5.29		5.7	5.6	5.1	5.1	11	11	9.7	8.6	4.03	4.21		5.4	6.0	5.6	5.6		< 5		< 5		5.2	8.5	10	9.4	10
silver	mg/L	-	0.0001	< 0.0001	< 0.0001		< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001		< 0.0001	< 0.0001	< 0.0001	< 0.0001		< 0.01		< 0.01		< 0.0001	< 0.0001	< 0.0001	< 0.0001	**0.0002**
sodium	mg/L	200 d	-	18.2	5.9		6.1	6.3	6.2	6.2	24	22	22	25	171	362		180	110	110	71		18000		19000		11	21	18	16	13
strontium	mg/L	-	-	1.6	0.244		0.21	0.19	0.19	0.2	6	5.5	6	6.6	7.02	9.57		6.8	7.8	14	13		180		210		5.1	5.5	5.1	4.3	2.4
sulphide	mg/L	0.05	-	0.25	0.04		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.01	< 0.01		< 0.02	< 0.02	< 0.02	< 0.02		0.06		0.04		0.31	< 0.02	0.05	0.08	< 0.02
sulphate	mg/L	500	-	103	69.6		80	90	96	111	38	46	52	52	270	276		244	136	179	130		1260		1370		94	49	54	60	63
thallium	mg/L	-	0.0003	< 0.00005	< 0.00005		< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.005		< 0.005		< 0.00005	< 0.00005	< 0.00005	0.00007	< 0.00005
tin	mg/L	-	-	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	**Note:**	< 0.1	**Note:**	< 0.1	**Note:**	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
titanium	mg/L	-	-	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	0.011	0.006	< 0.005	< 0.005	< 0.005	0.006		< 0.005	< 0.005	< 0.005	0.006	Insufficient	< 0.5	Insufficient	< 0.5	Insufficien	< 0.005	< 0.005	0.018	0.006	< 0.005
TSS	mg/L	-	-	91100	20800		1900	3300	4000	22000	15000	28000	3600	14000	1230	1750		350	86	< 10	200	water	1500	water	3800	water	290000	19000	24000	17000	1500
turbidity	NTU	1	-	6.8	48		340	3900	24	2700	7000	13000	3400	2700	2.4	19.7		130	96	15	210		530		520		32000	11000	23000	18000	670
uranium	mg/L	0.02	[0.005]	0.0049	0.0019		0.002	0.0019	0.0019	0.0019	0.0004	0.0003	0.0003	0.0002	0.0010	0.0005		0.0002	0.0002	0.0001	0.0004		< 0.01		< 0.01		**0.0081**	0.0022	0.0016	0.0011	0.0009
vanadium	mg/L	-	[0.006]	0.0013	0.001		0.001	< 0.001	< 0.001	< 0.0005	0.002	0.001	0.002	0.0008	0.0008	< 0.005		0.002	< 0.001	< 0.001	< 0.0005		< 0.1		**0.092**		< 0.0005	0.001	0.003	0.002	0.0006
zinc	mg/L	5	[0.02]	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006	< 0.005	0.006	< 0.005	< 0.005		< 0.005	< 0.005	< 0.005	< 0.005		< 0.5		< 0.5		< 0.005	< 0.005	0.006	0.005	0.007

NOTES:
Shaded area indicates an exceedance of the MOE Ontario Drinking Water Standard (June 2006) for that specific parameter.
Bolded areas indicate an exceedance of the MOE Provincial Water Quality Objectives (July 1994) for that specific parameter.
[ ] indicate interim PWQO concentration
a = interim PWQO at pH > 6.5 to 9.0 measured in clay-free samples.
b = interim PWQO if hardness greater than 20 mg/L.
c = interim PWQO if hardness greater than 80 mg/L.
d = Local Medical Office of Health should be notified when sodium concentrations exceed 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium reduced diets.
(1) Sample bottle contained visible sediment. Results may be biased high due to analyte present in sediment.

TABLE D.1
Summary of Groundwater Quality in On-Site Monitoring Wells
Tansley Quarry Site, Burlington, Ontario

Parameter	Units	ODWS (June 2006)	PWQO (July 1994)	MW-06 deep			MW-07 shallow				MW-07 deep				MW-08 shallow				MW-08 intermediate						MW-08 deep				MW-09 shallow			
				Oct-08	Oct-10	Nov-11	Oct-08	Nov-09	Oct-10	Nov-11	Oct-08	Dec-09	Oct-10	Nov-11	Oct-08	Nov-09	Oct-10	Nov-11	Oct-08	Nov-09	Oct-10	Oct-10 DUP 1	Nov-11	Nov-11 DUP 1	Oct-08	Dec-09	Oct-10	Nov-11	Oct-08	Nov-09	Oct-10	Nov-11
aluminum	mg/L	0.1	[0.075] a				**0.1**	**0.38**	**0.94**	0.049	< 0.3	< 0.1	< 0.1	< 0.3	**0.31**	**0.24**	0.042	0.028	< 0.05	0.013	0.065	< 0.05	**0.08**	**0.12**	0.005	< 0.005	< 0.3	**0.47**	**0.16**	0.070	0.020	0.029
alkalinity	mg $CaCO_3$/L	30-500	-				502	559	569	569	33	35	32	33	525	549	545	553	102	146	139	145	163	168	414	412	59	67	401	438	412	398
ammonia as N	mg/L	-	-				0.65	0.56	0.47	0.32	19	18	19	19	0.87	0.55	0.38	0.09	4.5	5.5	5.6	5	6.1	5.8	1.9	2.3	39	35	0.38	0.10	0.17	0.36
antimony	mg/L	-	[0.02]				0.0009	< 0.0005	0.0008	0.0005	< 0.03	< 0.01	< 0.01	< 0.03	0.0015	0.0005	0.0007	0.0005	< 0.005	< 0.0005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0005	< 0.0005	< 0.03	< 0.03	0.0006	< 0.0005	0.0012	< 0.0005
arsenic	mg/L	0.025	[0.005]				0.005	0.003	0.003	< 0.001	< 0.05	< 0.02	< 0.02	< 0.05	0.004	0.002	0.002	0.001	< 0.01	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	**0.006**	< 0.005	< 0.05	< 0.05	0.004	0.001	0.002	0.001
barium	mg/L	1	-				0.059	0.055	0.066	0.044	< 0.3	< 0.1	< 0.1	< 0.1	0.025	0.019	0.019	0.024	< 0.05	0.011	< 0.05	< 0.05	< 0.02	< 0.02	0.012	0.013	< 0.3	0.12	0.058	0.061	0.061	0.06
beryllium	mg/L	-	1.1				< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.03	< 0.01	< 0.01	< 0.03	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0005	< 0.0005	< 0.03	< 0.03	< 0.0005	< 0.0005	< 0.0005	< 0.0005
bismuth	mg/L	-	-				< 0.001	< 0.001	< 0.001	< 0.001	< 0.05	< 0.02	< 0.02	< 0.05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.01	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.001	< 0.001	< 0.05	< 0.05	< 0.001	< 0.001	< 0.001	< 0.001
boron	mg/L	5	0.2				**3.3**	**4.3**	**4.5**	**4.5**	**7.6**	**6.6**	**6.3**	**6.1**	**2.4**	**1.5**	**1.7**	**1.2**	**6.8**	**6.1**	**6.1**	**6.3**	**6.1**	**6**	**3.7**	**4.5**	**4.7**	**5.3**	**0.46**	**0.48**	**0.54**	**2.6**
bromide	mg/L	-	-				< 1	< 1	< 1	< 1	205	203	182	224	< 1	< 1	< 1	< 1	23	23	23	29	23	21	< 1	3	< 500	523	< 1	< 1	< 1	< 1
cadmium	mg/L	0.005	0.0005				< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.005	< 0.002	< 0.002	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.0001	< 0.0001	< 0.005	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0001
calcium	mg/L	-	-				70	66	72	65	3200	3000	2900	2900	150	110	120	93	460	450	530	530	450	440	110	290	5300	7900	56	60	59	51
chloride	mg/L	250	-				20	23	22	18	17500	17800	16000	18100	13	13	13	10	2110	2100	2240	2150	1710	1730	49	213	48500	41500	6	10	10	12
chromium	mg/L	0.05	-				< 0.005	< 0.005	< 0.005	< 0.005	< 0.3	< 0.1	< 0.1	< 0.3	< 0.005	< 0.005	< 0.005	< 0.005	< 0.05	< 0.005	< 0.05	< 0.05	< 0.05	< 0.05	< 0.005	< 0.005	< 0.3	< 0.3	< 0.005	< 0.005	< 0.005	< 0.005
cobalt	mg/L	-	0.0009				**0.026**	**0.013**	**0.005**	**0.0085**	< 0.03	< 0.01	< 0.01	< 0.03	**0.048**	**0.016**	**0.0087**	**0.0069**	**0.015**	**0.0077**	< 0.005	< 0.005	< 0.005	< 0.005	**0.0057**	**0.0016**	< 0.03	< 0.03	**0.011**	**0.0098**	**0.0014**	**0.0048**
copper	mg/L	1	[0.005] b				< 0.001	0.001	0.002	< 0.001	< 0.05	< 0.02	< 0.02	< 0.05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.01	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.001	< 0.001	< 0.05	< 0.1	< 0.001	< 0.001	< 0.001	< 0.001
fluoride	mg/L	1.5	-				0.4	0.5	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.3	0.2	0.3	0.5	0.4	0.4	0.4	0.4	0.5	0.3	0.3	< 0.1	< 0.1	0.3	0.2	0.2	0.2
free cyanide	mg/L	0.2	0.005				< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	<0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
hardness	mg $CaCO_3$/L	80-100	-				690	630	590	630	11000	10000	10000	10000	1100	940	990	880	1700	1700	2000	2000	1700	1700	620	1300	18000	27000	400	420	410	380
iron	mg/L	0.3	0.3				**1**	**0.8**	**1.6**	0.12	**6.5**	**6**	**5.1**	< 5	**0.87**	**0.4**	**0.54**	**0.21**	< 1	**1**	< 1	< 1	< 1	1.1	**0.74**	**0.7**	**8**	**18**	0.12	< 0.1	< 0.1	0.22
lead	mg/L	0.01	[0.005] c				< 0.0005	0.0006	0.0014	< 0.0005	< 0.03	< 0.01	< 0.01	< 0.03	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.005	< 0.0005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0005	< 0.0005	< 0.03	< 0.03	< 0.0005	< 0.0005	< 0.0005	< 0.0005
magnesium	mg/L	-	-				120	110	99	110	830	750	750	750	190	160	170	160	140	140	160	160	140	140	86	130	1200	1800	62	67	63	62
manganese	mg/L	0.05	-				0.22	0.18	0.3	0.16	1.6	1.5	1.4	1.4	0.29	0.16	0.17	0.11	0.2	0.19	0.21	0.22	0.19	0.19	0.1	0.15	2.6	4.2	0.066	0.042	0.035	0.051
mercury	mg/L	0.001	0.0002				**0.0017** (1)	**0.0022**	< 0.0015 (1)	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	**0.0036** (1)	**0.002**	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0015 (1)	< 0.0001	< 0.0015 (1)	< 0.0001	< 0.0001	< 0.0001
molybdenum	mg/L	-	0.04				0.011	0.007	0.007	0.0066	< 0.05	< 0.02	< 0.02	< 0.03	0.005	0.005	0.005	0.0044	< 0.01	0.007	< 0.01	< 0.01	0.006	0.006	0.004	0.006	< 0.05	< 0.03	0.013	0.006	0.007	0.0091
nickel	mg/L	-	0.025				0.004	0.003	0.003	0.001	< 0.05	< 0.02	< 0.02	< 0.05	0.006	0.004	0.002	0.002	< 0.01	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	0.003	< 0.001	< 0.05	< 0.05	0.002	0.002	< 0.001	0.001
nitrate as N	mg/L	10	-				< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.3	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	2.1	0.4	0.2
nitrite as N	mg/L	1	-				< 0.01	0.06	0.09	0.01	< 0.01	< 0.01	< 0.01	< 0.1	0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.03	0.04	< 0.01	0.01	0.05	< 0.1	0.05	< 0.01	0.04	0.03
pH	pH Units	6.5-8.5	6.5-8.5				**8.6**	7.6	7.79	7.7	7.4	7.0	7.0	7.0	8.3	7.7	7.69	7.65	7.9	7.8	7.55	7.59	7.64	7.58	8.1	7.9	6.76	6.75	8.2	7.9	7.87	7.85
phenol	mg/L	-	0.005				< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.03**	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.005	< 0.001	< 0.001	< 0.001	**0.26**	< 0.001	< 0.001	< 0.001	< 0.001
phosphate	mg/L	-	-				< 0.01	0.01	0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01
phosphorous	mg/L	-	-				< 0.1	< 0.1	0.12	< 0.1	< 5	< 2	< 2	< 5	< 0.1	< 0.1	< 0.1	< 0.1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 5	< 0.1	< 0.1	< 0.1	< 0.1
total phosphorous	mg/L	-	0.01				**22**	**32**	**25**	**9.9**	**0.28**	**0.14**	< 0.2 (1)	< 2	**76**	**110**	**6.7**	**3.9**	**0.051**	**0.04**	**0.03**	< 0.02	< 0.5	< 0.02	**0.062**	**0.04**	**8**	**< 5**	**1.2**	**1.3**	**0.2**	**1.1**
potassium	mg/L	-	-				8.1	7.4	7	6.5	160	140	140	140	20	16	16	13	45	44	46	47	42	41	24	31	190	270	18	13	12	9.9
selenium	mg/L	0.01	0.1				< 0.002	< 0.002	< 0.002	< 0.002	< 0.1	< 0.04	< 0.04	< 0.1	< 0.002	< 0.002	< 0.002	0.003	< 0.02	< 0.01	< 0.02	< 0.02	< 0.02	< 0.02	< 0.002	< 0.01	**0.14**	< 0.2	< 0.002	< 0.002	< 0.002	< 0.002
silicon	mg/L	-	-				9.5	9.5	10	8.7	4.6	5	5.5	< 3	9.7	8.0	7.7	7.0	4.2	3.8	3.9	4	4	4.9	6.1	5.6	< 3	3.6	8.9	8.6	8.4	8.4
silver	mg/L	-	0.0001				< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.005	< 0.002	< 0.002	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.0001	< 0.0001	< 0.005	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0001
sodium	mg/L	200 d	-				83	70	95	83	8000	6700	6600	6800	95	92	90	78	1200	1200	1300	1400	1100	1100	120	620	10000	16000	35	36	35	39
strontium	mg/L	-	-				3.8	3.5	3.6	2.9	63	63	60	64	15	10	12	8.1	12	12	13	13	12	12	16	12	110	170	7.3	5.2	6.4	5.9
sulphide	mg/L	0.05	-				< 0.02	0.08	0.1	0.02	< 0.02	0.02	< 0.02	< 0.02	0.12	0.31	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.13	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
sulphate	mg/L	500	-				202	193	181	182	1470	1550	1620	1560	706	631	576	423	1040	1040	1010	1010	965	976	413	522	1180	1130	70	70	68	59
thallium	mg/L	-	0.0003				< 0.00005	< 0.00005	0.00005	< 0.00005	< 0.003	< 0.001	< 0.001	< 0.003	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.0005	< 0.00005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.00005	< 0.00005	< 0.003	< 0.003	< 0.00005	< 0.00005	< 0.00005	< 0.00005
tin	mg/L	-	-	**Note:**	**Note:**	**Note:**	< 0.001	< 0.001	< 0.001	< 0.001	< 0.05	< 0.02	< 0.02	< 0.05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.01	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.001	< 0.001	< 0.05	< 0.05	< 0.001	< 0.001	< 0.001	< 0.001
titanium	mg/L	-	-	Insufficient	Insufficient	Insufficient	< 0.005	0.010	0.024	< 0.005	< 0.3	< 0.1	< 0.1	< 0.3	0.011	0.008	< 0.005	< 0.005	< 0.05	< 0.005	< 0.05	< 0.05	< 0.05	< 0.05	< 0.005	< 0.005	< 0.3	< 0.3	0.006	< 0.005	< 0.005	< 0.005
TSS	mg/L	-	-	water	water	water	46000	84000	91000	10000	400	460	150	310	130000	130000	9000	5700	92	60	27	26	32	29	32	22	44000	9100	1200	560	180	4900
turbidity	NTU	1	-				36000	100000	63000	14000	310	210	91	330	75000	140000	14000	710	64	48	14	22	30	21	12	25	96000	1900	3100	2400	330	3200
uranium	mg/L	0.02	[0.005]				**0.0079**	**0.0059**	**0.01**	**0.0065**	< 0.005	< 0.002	< 0.002	< 0.005	**0.0056**	**0.01**	**0.008**	**0.011**	< 0.001	0.0001	< 0.001	< 0.001	< 0.001	< 0.001	0.0025	0.0034	< 0.005	< 0.005	**0.0052**	0.0035	0.0032	0.0023
vanadium	mg/L	-	[0.006]				0.001	0.002	0.004	< 0.0005	< 0.05	< 0.02	< 0.02	< 0.03	0.002	< 0.001	< 0.001	0.0007	< 0.01	< 0.005	< 0.01	< 0.01	< 0.005	< 0.005	< 0.001	< 0.005	**0.14**	**< 0.1**	0.001	0.001	< 0.001	< 0.0005
zinc	mg/L	5	[0.02]				< 0.005	< 0.005	0.005	< 0.005	< 0.3	< 0.1	< 0.1	< 0.3	< 0.03	< 0.005	< 0.005	< 0.005	< 0.05	0.006	< 0.05	< 0.05	< 0.05	< 0.05	0.006	< 0.005	< 0.3	< 0.3	0.006	0.006	< 0.005	< 0.005

NOTES:
Shaded area indicates an exceedance of the MOE Ontario Drinking Water Standard (June 2006) for that specific parameter.
Bolded areas indicate an exceedance of the MOE Provincial Water Quality Objectives (July 1994) for that specific parameter.
[ ] indicate interim PWQO concentration
a = interim PWQO at pH > 6.5 to 9.0 measured in clay-free samples.
b = interim PWQO if hardness greater than 20 mg/L.
c = interim PWQO if hardness greater than 80 mg/L
d = Local Medical Office of Health should be notified when sodium concentrations exceed 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium reduced diets.
(1) Sample bottle contained visible sediment. Results may be biased high due to analyte present in sediment.

TABLE D.1
Summary of Groundwater Quality in On-Site Monitoring Wells
Tansley Quarry Site, Burlington, Ontario

Parameter	Units	ODWS (June 2006)	PWQO (July 1994)	MW-09 intermediate				MW-09 deep			MW-10 shallow				MW-10 intermediate				MW-10 deep			MW-11 shallow				MW-11 intermediate				MW-11 deep		
				Oct-08	Nov-09	Oct-10	Nov-11	Oct-08	Oct-10	Nov-11	Oct-08	Nov-09	Oct-10	Nov-11	Oct-08	Nov-09	Oct-10	Nov-11	Oct-08	Oct-10	Nov-11	Oct-08	Dec-09	Oct-10	Nov-11	Oct-08	Dec-09	Oct-10	Nov-11	Oct-08	Oct-10	Nov-11
aluminum	mg/L	0.1	[0.075] a	0.066	**0.61**	0.056	0.072			< 0.3	**1.2**	**0.66**	**0.17**	0.031	**4.8**	**0.41**	0.027	0.008			< 0.3	**0.7**	**0.36**	**4.8**	0.049	**0.13**	**0.13**	**0.078**	0.059		< 0.3	< 0.3
alkalinity	mg $CaCO_3$/L	30-500	-	175	305	261	239			52	396	475	472	485	381	394	400	416			40	308	321	322	341	458	431	453	450		44	50
ammonia as N	mg/L	-	-	2	2.5	2.2	1.7			40	1.4	0.47	0.43	0.13	1.9	1.6	0.92	0.82			34	0.29	0.18	0.21	0.18	1.4	1.3	1.3	1.5		31	34
antimony	mg/L	-	[0.02]	< 0.0005	< 0.0005	< 0.0005	< 0.0005			< 0.03	0.0014	0.0007	0.0009	< 0.0005	0.001	< 0.0005	< 0.0005	< 0.0005			< 0.03	< 0.0005	0.0006	0.0011	< 0.0005	< 0.0005	< 0.0005	0.0006	< 0.0005		< 0.03	< 0.03
arsenic	mg/L	0.025	[0.005]	0.002	0.004	0.003	0.002			< 0.05	0.004	0.003	0.004	0.003	0.005	0.004	0.004	0.004			< 0.05	0.002	0.005	0.005	0.003	**0.012**	**0.01**	**0.012**	**0.011**		< 0.05	**0.054**
barium	mg/L	1	-	0.058	0.067	0.04	0.065			0.13	0.088	0.093	0.09	0.044	0.073	0.063	0.078	0.068			0.12	0.074	0.054	0.2	0.057	0.021	0.020	0.023	0.025		< 0.300	0.14
beryllium	mg/L	-	1.1	< 0.0005	< 0.0005	< 0.0005	< 0.0005			< 0.03	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005			< 0.03	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005		< 0.03	< 0.03
bismuth	mg/L	-	-	< 0.001	< 0.001	< 0.001	< 0.001			< 0.05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001			< 0.05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001		< 0.05	< 0.05
boron	mg/L	5	0.2	**2.8**	**2.5**	**3.4**	**4.8**			**5.9**	**0.39**	0.17	0.17	0.11	**3.1**	**1.8**	**1.3**	**0.71**			**5.5**	0.17	0.13	0.089	0.085	**1.3**	**1.7**	**1.2**	**1.5**		**4.8**	**4.7**
bromide	mg/L	-	-	2	1	2	3			696	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1			0.538	< 1	< 1	1	< 1	< 1	< 1	< 1	< 1		500	500
cadmium	mg/L	0.005	0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0001			< 0.005	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001			< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001		**0.019**	< 0.005
calcium	mg/L	-	-	110	85	140	190			8100	67	74	67	63	58	53	58	41			7100	110	73	130	65	72	69	70	82		6300	7500
chloride	mg/L	250	-	142	115	196	252			46900	3	3	4	16	6	7	7	3			41700	7	14	3	2	9	11	9	10		35800	40700
chromium	mg/L	0.05	-	< 0.005	< 0.005	< 0.005	< 0.005			< 0.3	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005			< 0.3	< 0.005	< 0.005	0.014	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005		< 0.3	< 0.3
cobalt	mg/L	-	0.0009	**0.022**	**0.014**	**0.0049**	**0.0028**			< 0.03	**0.025**	**0.027**	**0.0022**	**0.0046**	**0.0065**	**0.011**	**0.0033**	< 0.005			< **0.03**	**0.023**	**0.015**	**0.013**	**0.0021**	**0.017**	**0.0013**	**0.0039**	**0.001**		< 0.03	< 0.03
copper	mg/L	1	[0.005] b	< 0.001	< 0.001	< 0.001	< 0.001			< 0.1	0.001	0.002	0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001			< 0.1	0.003	< 0.001	**0.013**	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001		< 0.05	< 0.1
fluoride	mg/L	1.5	-	0.4	0.5	0.3	0.4	**N**	**N**	< 0.1	0.3	0.3	0.2	0.2	0.3	0.3	0.2	0.2	**N**	**N**	< 0.1	0.3	0.3	0.2	0.1	0.2	0.2	0.3	0.3	**N**	0.1	0.1
free cyanide	mg/L	0.2	0.005	< 0.002	< 0.002	< 0.002	< 0.002	**O**	**O**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	**O**	**O**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	**O**	< 0.002	< 0.002
hardness	mg $CaCO_3$/L	80-100	-	450	390	600	760	**T**	**T**	28000	450	510	480	500	330	310	370	340	**T**	**T**	25000	500	450	550	390	470	430	450	490	**T**	21000	26000
iron	mg/L	0.3	0.3	**0.38**	**1**	**0.58**	**0.64**			**33**	**0.97**	**1**	**0.73**	< 0.1	**3.2**	**0.6**	0.3	< 0.1			**28**	**1.4**	**0.7**	**7.6**	**0.63**	**0.86**	**0.8**	**0.83**	**0.69**		**21**	**21**
lead	mg/L	0.01	[0.005] c	< 0.0005	< 0.0005	< 0.0005	< 0.0005	**S**	**S**	< 0.03	< 0.0005	0.0008	< 0.0005	< 0.0005	0.0011	< 0.0005	< 0.0005	< 0.0005	**S**	**S**	< 0.03	0.0011	< 0.0005	**0.0051**	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	**S**	< 0.03	< 0.03
magnesium	mg/L	-	-	45	42	57	69	**A**	**A**	1900	68	79	77	84	46	43	56	56	**A**	**A**	1700	57	65	58	54	71	62	66	70	**A**	1400	1800
manganese	mg/L	0.05	-	0.088	0.07	0.067	0.079	**M**	**M**	4.6	0.15	0.23	0.14	0.073	0.071	0.058	0.033	0.002	**M**	**M**	3.8	0.32	0.14	0.68	0.074	0.056	0.028	0.033	0.033	**M**	3.1	4
mercury	mg/L	0.001	0.0002	< 0.0015 (1)	< 0.0001	< 0.0015	< 0.0001	**P**	**P**	< 0.0001	< 0.0015 (1)	< 0.0015	< 0.0001	< 0.0001	< 0.0015 (1)	< 0.0001	< 0.0001	< 0.0001	**P**	**P**	< 0.0001	< 0.0015 (1)	**0.0003**	< 0.0001	< 0.0001	< 0.0015 (1)	< 0.0001	< 0.0001	< 0.0001	**P**	< 0.0001	< 0.0001
molybdenum	mg/L	-	0.04	0.008	0.005	0.007	0.0096	**L**	**L**	< 0.03	0.014	0.004	0.004	0.0025	0.006	0.004	0.003	0.0029	**L**	**L**	0.037	0.022	0.009	0.002	0.0045	0.003	0.003	0.003	0.0035	**L**	< 0.05	< 0.03
nickel	mg/L	-	0.025	0.003	0.004	< 0.001	< 0.001	**E**	**E**	< 0.05	0.004	0.006	0.001	< 0.001	0.003	0.002	< 0.001	< 0.001	**E**	**E**	< 0.05	0.005	0.005	0.009	< 0.001		< 0.001	< 0.001	< 0.001	**E**	< 0.05	< 0.05
nitrate as N	mg/L	10	-	< 0.1	< 0.1	< 0.1	1.8	**D**	**D**	< 0.1	0.5	0.4	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.7	**D**	**D**	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	**D**	< 0.1	< 0.1
nitrite as N	mg/L	1	-	< 0.01	< 0.01	0.02	0.44			< 0.1	0.02	0.03	0.05	< 0.01	< 0.01	0.06	0.08	0.1			< 0.1	< 0.01	0.03	0.02	0.02	< 0.01	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01
pH	pH Units	6.5-8.5	6.5-8.5	8.2	7.8	7.81	7.77			6.84	8.5	7.8	7.7	7.83	8.5	7.7	7.8	7.83			6.6	8.2	7.8	7.88	7.95	8.2	8.2	7.88	7.95		6.62	6.69
phenol	mg/L	-	0.005	< 0.001	< 0.001	< 0.001	< 0.001			**0.08**	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001			**0.05**	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001	**0.017**
phosphate	mg/L	-	-	< 0.01	< 0.01	< 0.01	< 0.01			< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		< 0.01	< 0.01
phosphorous	mg/L	-	-	< 0.1	< 0.1	< 0.1	< 0.1			< 5	< 0.1	0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1			< 5	0.12	< 0.1	0.45	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 5	< 5
total phosphorous	mg/L	-	0.01	**5.3**	**9**	**1.7**	**1.1**			< 0.1	**64**	**98**	**29**	**11**	**13**	**10**	**0.4**	**2.4**			< 0.1	**50**	**100**	**19**	**2.4**	**3.3**	**0.6**	**0.22**	**1.6**		< 1 (1)	< 5
potassium	mg/L	-	-	23	19	23	26			280	18	8.6	9.9	6.8	19	15	14	11			250	14	8.6	7.1	4.4	17	17	16	21		250	280
selenium	mg/L	0.01	0.1	< 0.002	< 0.002	< 0.002	< 0.002			< 0.2	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002			< 0.2	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002		**0.17**	< 0.2
silicon	mg/L	-	-	6.4	7.4	5.3	5.1			< 3	13	10	9.1	9.3	17	7.2	7.4	8.4			< 3	8.3	11	17	7.9	9.3	8.4	8.6	9.2		< 3	3.1
silver	mg/L	-	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001			< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001	< 0.0001			< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001		< 0.005	< 0.005
sodium	mg/L	200 d	-	150	110	210	290			17000	65	26	27	23	69	49	41	28			17000	53	26	13	21	62	64	55	76		13000	16000
strontium	mg/L	-	-	14	14	17	19			160	5.1	2.6	3.1	1.5	12	11	12	9.7			150	1.2	0.98	1.2	1.1	11	10	11	11		130	150
sulphide	mg/L	0.05	-	< 0.02	0.06	< 0.02	< 0.02			< 0.02	0.11	0.19	0.23	< 0.02	< 0.02	0.03	< 0.02	< 0.02			< 0.02	< 0.02	0.16	0.17	0.06	< 0.02	< 0.02	< 0.02	< 0.02		0.04	< 0.02
sulphate	mg/L	500	-	299	254	385	468			1470	83	58	58	58	50	60	57	39			**1360**	184	92	77	79	141	148	140	147		1390	1410
thallium	mg/L	-	0.0003	< 0.00005	< 0.00005	< 0.00005	< 0.00005			< 0.003	< 0.00005	< 0.00005	0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005			< 0.003	< 0.00005	< 0.00005	0.00006	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.003	< 0.003
tin	mg/L	-	-	< 0.001	< 0.001	< 0.001	< 0.001	**Note:**	**Note:**	< 0.05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**Note:**	**Note:**	< 0.05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**Note:**	< 0.05	< 0.05
titanium	mg/L	-	-	< 0.005	0.012	< 0.005	< 0.005	Insufficient	Insufficient	< 0.3	0.041	0.011	< 0.005	< 0.005	0.22	0.010	< 0.005	< 0.005	Insufficient	Insufficient	< 0.3	0.006	0.010	0.160	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	Insufficient	< 0.3	< 0.300
TSS	mg/L	-	-	8900	16000	3300	3100	water.	water.	390	150000	94000	91000	10000	25000	6500	440	2700	water.	water.	770	98000	190000	88000	2300	990	780	240	1900	water.	680	1200
turbidity	NTU	1	-	11000	20000	3400	920			150	50000	87000	94000	1500	9000	7500	340	540			280	44000	130000	62000	840	510	520	210	410		760	140
uranium	mg/L	0.02	[0.005]	0.0008	0.0003	0.0004	0.0008			< 0.005	**0.011**	0.0044	0.0037	0.0018	0.0022	0.0011	0.0008	0.0004			< 0.005	**0.011**	0.0046	0.0042	0.0033	0.0004	0.0003	0.0003	0.0004		**0.024**	**0.009**
vanadium	mg/L	-	[0.006]	0.002	0.001	< 0.001	< 0.0005			< 0.05	0.003	0.002	0.005	< 0.0005	**0.009**	0.001	< 0.001	0.0007			< 0.05	0.002	0.005	**0.01**	0.0008	< 0.001	< 0.001	< 0.001	< 0.0005		**0.11**	< 0.05
zinc	mg/L	5	[0.02]	< 0.005	< 0.005	< 0.005	< 0.005			< 0.3	< 0.005	0.007	< 0.005	0.005	0.006	< 0.005	< 0.005	< 0.005			< 0.3	0.007	< 0.005	**0.021**	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005		< 0.3	< 0.3

NOTES:
Shaded area indicates an exceedance of the MOE Ontario Drinking Water Standard (June 2006) for that specific parameter.
Bolded areas indicate an exceedance of the MOE Provincial Water Quality Objectives (July 1994) for that specific parameter.
[ ] indicate interim PWQO concentration
a = interim PWQO at pH > 6.5 to 9.0 measured in clay-free samples.
b = interim PWQO if hardness greater than 20 mg/L.
c = interim PWQO if hardness greater than 80 mg/L
d = Local Medical Office of Health should be notified when sodium concentrations exceed 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium reduced diets.
(1) Sample bottle contained visible sediment. Results may be biased high due to analyte present in sediment.

TABLE D.2
Groundwater Quality in On-Site Monitoring Wells - Total Metals Analyses
Tansley Quarry Site, Burlington, Ontario

Parameter	Units	ODWS (June 2006)	PWQO (July 1994)	MW-01 shallow		MW-01 intermediate					MW-01 deep					MW-02 shallow						MW-02 intermediate					MW-02 deep			
				Dec-10	Nov-11	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11	Jan-07	Oct-08	Dec-09	Oct-10	Oct-10 DUP 3	Nov-11	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11	Jan-07	Oct-08	Dec-09	Nov-11
aluminum	mg/L	0.1	[0.075] a		7.2	**180**		**360**	**60**	**66**	**5.9**	**5.9**	**6**	**6.2**	**3.4**	**540**	**750**	**85**	**22**	**25**	**43**	**240**	**30**	**57**	**3**	**5.6**	**2.800**	**0.920**	**12**	**3.3**
alkalinity	mg $CaCO_3$/L	30-500	-		366	-		459	-	443	-	-	36	-	35	-	-	695	700	700	707	-	-	141	129	140	-	-	51	35
ammonia as N	mg/L	-	-		< 0.05	-		-	-	0.13	-	-	-	-	18	-	-	-	< 0.05	0.06	0.13	-	-	-	1.5	1.5	-	-	-	16
antimony	mg/L	-	[0.02]		0.0006	< 0.01		< 0.005	< 0.0005	< 0.003	< 0.05	< 0.005	< 0.01	0.005	< 0.01	< 0.01	**0.088**	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.01	< 0.005	< 0.005	< 0.0005	< 0.0005	< 0.01	< 0.005	< 0.01	< 0.01
arsenic	mg/L	0.025	[0.005]		0.004	**0.093**		**0.140**	**0.028**	**0.034**	< 0.05	**0.014**	< 0.03	< 0.05	< 0.03	**0.22**	**0.24**	**0.03**	**0.01**	**0.01**	**0.03**	**0.13**	**0.014**	**0.03**	0.004	**0.006**	< 0.05	< 0.05	< 0.02	< 0.02
barium	mg/L	1	-		0.12	1.6		2.8	0.43	0.53	< 0.3	0.081	< 0.1	0.095	0.053	6	6.9	0.76	0.18	0.21	0.57	3.9	0.35	0.93	0.04	0.12	0.052	< 0.05	0.3	0.088
beryllium	mg/L	-	1.1		0.0006	0.012		0.021	0.0031	0.003	< 0.03	< 0.005	< 0.01	< 0.005	< 0.01	0.038	0.064	< 0.005	0.0013	0.0013	0.0023	0.017	< 0.005	< 0.005	< 0.0005	< 0.0005	< 0.005	< 0.005	< 0.01	< 0.01
bismuth	mg/L	-	-		< 0.001	< 0.01		< 0.01	< 0.001	< 0.005	< 0.05	< 0.01	< 0.03	< 0.01	< 0.03	< 0.01	0.15	< 0.01	0.001	< 0.001	< 0.001	< 0.01	< 0.01	< 0.01	< 0.001	< 0.001	< 0.01	< 0.01	< 0.02	< 0.02
boron	mg/L	5	0.2		0.059	**0.37**		**0.6**	0.19	**0.22**	**5.7**	**6.1**	**5.4**	**6.4**	**6.3**	**0.77**	**1.6**	**0.4**	**0.3**	**0.3**	**0.3**	**2**	**1.9**	**1.7**	**2.3**	**1.8**	**5.9**	**5.8**	**6.1**	**5.8**
bromide	mg/L	-	-		< 1	-		< 1	-	< 1	-	-	192	-	138	-	-	< 1	-	-	< 1	-	-	1	-	< 10	-	-	148	154
cadmium	mg/L	0.005	0.0005		0.0002	**0.002**		**0.004**	**0.0006**	**0.0011**	< 0.005	0.003	< 0.003	< 0.001	< 0.003	**0.007**	**0.011**	< 0.001	0.0002	0.0003	**0.0009**	**0.003**	< 0.001	< 0.001	< 0.0001	0.0001	**0.002**	< 0.001	< 0.002	< 0.002
calcium	mg/L	-	-		100	1100		2700	520	770	3500	2600	2400	2800	2000	4600	5800	880	340	370	830	2200	380	610	230	240	2100	1900	1900	2200
chloride	mg/L	250	-		-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
chromium	mg/L	0.05	-		0.01	0.36		0.6	0.11	0.12	< 0.3	< 0.05	< 0.1	< 0.5	< 0.1	1.2	1.3	0.2	0.04	0.04	0.08	0.54	0.054	0.110	0.006	0.012	< 0.05	< 0.05	< 0.1	< 0.1
cobalt	mg/L	-	0.0009		**0.0046**	**0.16**		**0.29**	**0.052**	**0.073**	< 0.03	< 0.01	< 0.01	< 0.005	< 0.01	**0.59**	**0.69**	**0.08**	**0.02**	**0.02**	**0.04**	**0.26**	**0.0280**	**0.0610**	**0.0028**	**0.0059**	< 0.01	< 0.01	**0.0100**	< 0.01
copper	mg/L	1	[0.005] b	N	**0.016**	**0.32**	N	**0.58**	**0.095**	**0.13**	**0.066**	**0.044**	**0.050**	**0.048**	**0.03**	**1.2**	**1.4**	**0.2**	**0.04**	**0.04**	**0.09**	**0.55**	**0.059**	**0.110**	0.004	**0.012**	**0.1**	**0.019**	**0.040**	**0.025**
fluoride	mg/L	1.5 - 2.4	-	O	0.6	-	O	-	-	0.3	-	-	-	-	0.3	-	-	-	0.2	0.2	0.3	-	-	-	0.2	0.3	-	-	-	< 1
free cyanide	mg/L	0.2	0.005	T	< 0.002	-	T	-	-	< 0.002	-	-	-	-	< 0.002	-	-	-	< 0.002	< 0.002	< 0.002	-	-	-	< 0.002	< 0.002	-	-	-	< 0.002
hardness	mg $CaCO_3$/L	80-100	-		740	-		-	-	1000	-	-	-	-	7200	-	-	-	1900	2000	2100	-	-	-	940	980	-	-	-	6500
iron	mg/L	0.3	0.3	S	**12**	**360**	S	**660**	**120**	**130**	**27**	**17**	**18**	**20**	**9.6**	**1300**	**1400**	**180**	**40**	**46**	**100**	**540**	**55**	**120**	**6**	**11**	**13**	**6.4**	**29.0**	**11**
lead	mg/L	0.01	[0.005] c	A	**0.01**	**0.16**	A	**0.29**	**0.054**	**0.064**	< 0.03	0.005	< 0.01	**0.009**	< 0.01	**0.43**	**0.55**	**0.07**	**0.02**	**0.02**	**0.04**	**0.2**	**0.024**	**0.050**	0.003	**0.0064**	< 0.005	< 0.005	**0.010**	< 0.01
magnesium	mg/L	-	-	M	150	310	M	620	270	270	800	660	580	720	500	790	1300	440	360	360	370	360	150	180	130	120	490	490	480	550
manganese	mg/L	0.05	-	P	0.27	6.7	P	16	2.7	5	2.2	1.7	1.6	1.8	1.3	37	39	5	1	1	4.2	18	2	4	0.34	0.51	1.3	1.1	1.8	1.4
mercury	mg/L	0.001	0.0002	L	< 0.0001	< 0.0001	L	0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0015 (1)	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0015 (1)	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
molybdenum	mg/L	-	0.04	E	0.0021	0.024	E	0.02	0.005	0.006	< 0.05	0.011	< 0.03	0.011	< 0.01	**0.049**	< 0.1	< 0.01	0.004	0.004	0.0067	0.038	0.013	0.01	0.01	0.0096	0.014	< 0.01	< 0.02	< 0.01
nickel	mg/L	-	0.025	D	0.011	**0.37**	D	**0.7**	**0.11**	**0.13**	< 0.05	< 0.01	< 0.03	< 0.05	< 0.03	**1.4**	**1.5**	**0.2**	**0.042**	**0.1**	**0.093**	**0.6**	**0.058**	**0.130**	0.006	0.012	< 0.01	< 0.01	**0.050**	< 0.02
nitrate as N	mg/L	10	-		1.1	-		0.6	-	0.6	-	-	< 0.1	-	< 0.1	-	-	< 0.1	< 0.1	< 0.1	< 0.1	-	-	< 0.1	< 0.1	< 0.1	-	-	< 0.1	< 0.1
nitrite as N	mg/L	1	-		< 0.01	-		< 0.01	-	< 0.01	-	-	< 0.01	-	< 0.05	-	-	< 0.01	< 0.01	< 0.01	< 0.01	-	-	0.03	< 0.01	0.03	-	-	< 0.01	< 0.1
pH	pH Units	6.5-8.5	6.5-8.5		7.84	-		-	-	7.61	-	-	-	-	7.12	-	-	-	7.57	7.56	7.52	-	-	-	7.74	7.73	-	-	-	7.16
phenol	mg/L	-	-		< 0.001	-		-	-	< 0.001	-	-	-	-	0.008	-	-	-	< 0.001	< 0.001	< 0.001	-	-	-	< 0.001	< 0.001	-	-	-	0.001
phosphate	mg/L	-	-		< 0.01	-		< 0.01	-	0.01	-	-	< 0.01	-	< 0.01	-	-	< 0.01	< 0.01	< 0.01	< 0.01	-	-	< 0.01	< 0.01	< 0.01	-	-	< 0.01	< 0.01
total phosphorous	mg/L	-	0.01		**0.4**	-		-	**3**	**5.3**	-	-	-	**0.15**	< 3	-	-	-	**1.1**	**1.1**	**4.4**	-	-	-	**0.17**	**0.36**	-	-	-	< 2
potassium	mg/L	-	-		4.3	66		100	18	19	170	150	140	160	130	160	200	26	15	15	17	97	26	28	21	19	130	120	110	130
selenium	mg/L	0.01	0.1		0.004	< 0.02		< 0.02	0.006	< 0.01	< 0.1	< 0.02	< 0.05	< 0.1	< 0.05	0.022	< 0.2	< 0.02	< 0.002	< 0.002	0.004	< 0.02	< 0.02	< 0.02	< 0.002	< 0.002	< 0.1	< 0.1	0.060	< 0.04
silicon	mg/L	-	-		6.8	23		450	77	73	12	12	11	11	7.4	39	97	100	40	43	53	28	48	79	9.7	13	8.1	4.9	18	6.9
silver	mg/L	-	0.0001		< 0.0001	**0.001**		**0.002**	**0.0004**	< 0.0005	< 0.005	< 0.001	< 0.003	< 0.001	< 0.003	**0.003**	< 0.01	< 0.001	**0.0002**	**0.0002**	**0.0003**	< 0.001	< 0.001	< 0.001	< 0.0001	0.0001	< 0.001	< 0.001	< 0.002	< 0.002
sodium	mg/L	200 d	-		41	46		85	59	52	8600	7500	6900	7200	6600	82	130	72	68	69	65	250	190	160	210	170	6600	6900	5600	7000
strontium	mg/L	-	-		1.3	4.2		9.0	3.4	3.9	69	52	49	61	44	14	19	5.7	4.6	4.6	5.5	15	11	12	13	12	43	41	40	45
sulphide	mg/L	0.05	-		< 0.02	-		-	-	< 0.02	-	-	-	-	< 0.02	-	-	-	< 0.020	< 0.020	< 0.020	-	-	-	< 0.020	0.02	-	-	-	< 0.02
sulphate	mg/L	500	-		157	-		-	-	385	-	-	-	-	1910	-	-	-	-	-	1320	-	-	-	-	1140	-	-	-	2030
thallium	mg/L	-	0.0003		0.00012	**0.0021**		**0.0041**	**0.00057**	**0.0006**	< 0.003	< 0.0005	< 0.001	< 0.0005	< 0.001	**0.0066**	**0.014**	**0.0009**	0.0002	0.0003	**0.00057**	**0.003**	**0.001**	**0.0007**	< 0.0001	0.0001	< 0.0005	< 0.0005	< 0.001	< 0.001
tin	mg/L	-	-	**Note:**	< 0.001	< 0.01	**Note:**	< 0.01	< 0.001	< 0.005	< 0.05	< 0.01	< 0.03	< 0.01	< 0.03	< 0.01	< 0.1	< 0.01	0.001	< 0.001	< 0.001	< 0.01	< 0.01	< 0.01	< 0.001	< 0.001	< 0.01	< 0.01	< 0.02	< 0.02
titanium	mg/L	-	-	Well has	0.18	1.9	Insufficient	7.1	1.1	0.84	< 0.3	0.089	0.1	0.1	< 0.1	4	11	1.5	0.56	0.61	0.97	2.5	0.6	0.89	0.06	0.14	< 0.05	< 0.05	0.2	< 0.1
TSS	mg/L	-	-	never been	620	-	water.	-	-	2900	-	-	-	-	560	-	-	-	1700	1600	7600	-	-	-	360	920	-	-	-	540
turbidity	NTU	1	-	sampled.	250	-		-	-	77	-	-	-	-	170	-	-	-	3600	3700	460	-	-	-	320	480	-	-	-	290
uranium	mg/L	0.02	0.005	Blocked	**0.011**	**0.032**		**0.043**	**0.017**	**0.017**	< 0.005	< 0.001	< 0.003	0.001	< 0.003	**0.068**	**0.11**	**0.027**	**0.020**	**0.021**	**0.020**	**0.031**	0.004	**0.007**	0.001	0.002	< 0.001	< 0.001	< 0.002	< 0.002
vanadium	mg/L	-	0.006	since 2002.	**0.012**	**0.39**		**0.70**	**0.12**	**0.13**	< 0.05	**0.016**	< 0.03	< 0.05	**0.014**	**1.3**	**1.6**	**0.18**	**0.05**	**0.05**	**0.09**	**0.52**	**0.062**	**0.1**	0.006	**0.012**	< 0.05	< 0.05	**0.050**	< 0.01
zinc	mg/L	5	0.02		**0.051**	**1**		**2**	**0.31**	**0.43**	< 0.3	**0.068**	< 0.1	**0.076**	< 0.1	**3.7**	**4.1**	**0.49**	**0.12**	**0.13**	**0.27**	**1.8**	**0.17**	**0.37**	0.02	**0.04**	**0.086**	< 0.05	**0.100**	**< 0.1**

NOTES:
Shaded area indicates an exceedance of the MOE Ontario Drinking Water Standard (June 2006) for that specific parameter.
Bolded areas indicate an exceedance of the MOE Provincial Water Quality Objectives (July 1994) for that specific parameter.
[ ] indicate interim PWQO concentration
a = interim PWQO at pH > 6.5 to 9.0 measured in clay-free samples.
b = interim PWQO if hardness greater than 20 mg/L.
c = interim PWQO if hardness greater than 80 mg/L
d = Local Medical Office of Health should be notified when sodium concentrations exceed 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium reduced diets.
(1) Sample bottle contained visible sediment. Results may be biased high due to analyte present in sediment.

TABLE D.2
Groundwater Quality in On-Site Monitoring Wells - Total Metals Analyses
Tansley Quarry Site, Burlington, Ontario

Parameter	Units	ODWS (June 2006)	PWQO (July 1994)	MW-03 shallow					MW-03 deep						MW-04 shallow					MW-04 intermediate					MW-04 deep				
				Jan-07	Oct-08	Dec-09	Oct-10	Nov-11	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11	Nov-11 DUP 3	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11
aluminum	mg/L	0.1	[0.075] a	**120**	**40**	**50**	**88**	**5.6**	**1.6**	**1.3**	**0.59**	**3.3**	**4.2**	**4.5**	**35**	**37**	**230**	**10**	**14**	**38**	**12**	**10**	**3**	**2.4**	**8**	**9**	**41**		**5.2**
alkalinity	mg $CaCO_3$/L	30-500	-	-	-	110	109	175	-	-	88	72	56	53	-	-	390	387	384	-	-	50	50	55	-	-	66		102
ammonia as N	mg/L	-	-	-	-	-	1.2	0.89	-	-	-	7.9	9.6	9.9	-	-	-	0.05	< 0.05	-	-	-	6	5.7	-	-	-		37
antimony	mg/L	-	[0.02]	< 0.01	< 0.005	0.003	< 0.005	< 0.0005	< 0.01	< 0.005	< 0.005	< 0.0005	< 0.005	< 0.005	< 0.001	< 0.005	< 0.005	< 0.005	< 0.0005	< 0.01	< 0.005	< 0.005	< 0.0005	< 0.0005	< 0.05	< 0.005	< 0.05		< 0.03
arsenic	mg/L	0.025	[0.005]	**0.067**	**0.043**	**0.038**	**0.051**	0.005	< 0.05	< 0.01	< 0.01	**0.007**	< 0.01	< 0.01	**0.021**	0.02	**0.120**	< 0.010	**0.008**	**0.014**	< 0.01	< 0.01	0.002	0.004	< 0.05	**0.015**	< 0.1		**0.07**
barium	mg/L	1	-	0.85	0.33	0.36	0.69	0.12	0.053	< 0.05	< 0.05	0.054	0.088	0.1	0.39	0.36	2.100	0.150	0.180	0.52	0.22	0.23	0.03	0.06	< 0.3	0.16	0.6		0.18
beryllium	mg/L	-	1.1	0.008	< 0.005	0.003	< 0.005	< 0.0005	< 0.005	< 0.005	< 0.005	< 0.0005	< 0.005	< 0.005	0.002	< 0.005	0.016	< 0.005	0.0009	< 0.005	< 0.005	< 0.005	< 0.0005	< 0.0005	< 0.03	< 0.005	< 0.05		< 0.03
bismuth	mg/L	-	-	< 0.01	< 0.01	0.005	< 0.01	< 0.001	< 0.01	< 0.01	< 0.01	< 0.001	< 0.01	< 0.01	< 0.001	< 0.01	< 0.01	< 0.01	< 0.001	< 0.01	< 0.01	< 0.01	< 0.001	< 0.001	< 0.05	< 0.01	< 0.1		< 0.05
boron	mg/L	5	0.2	**1.2**	**1.3**	**1.2**	**1.6**	**1.8**	**5.4**	**3.5**	**4.8**	**4.8**	**4.6**	**4.9**	0.098	0.16	**0.5**	0.1	0.1	**7.2**	**6.7**	**6.4**	**7.1**	**6.4**	**5**	**5.9**	**6.0**		**6.6**
bromide	mg/L	-	-	-	-	6	-	< 1	-	-	31	-	< 500	< 0.5	-	-	< 1	-	< 1	-	-	21	-	21	-	-	401		572
cadmium	mg/L	0.005	0.0005	**0.002**	< 0.001	**0.001**	**0.002**	< 0.0001	< 0.001	**0.002**	< 0.001	< 0.0001	< 0.001	< 0.001	**0.0009**	< 0.001	**0.0040**	< 0.0010	0.0004	**0.002**	< 0.001	< 0.001	0.0001	0.0002	< 0.005	**0.007**	< 0.01		**0.017**
calcium	mg/L	-	-	1800	790	1100	1400	240	2100	630	510	970	1200	1300	260	310	1600	120	170	760	590	630	500	540	5900	3900	6800		7900
chloride	mg/L	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
chromium	mg/L	0.05	-	0.3	0.096	0.110	0.180	0.011	< 0.05	< 0.05	< 0.05	0.006	< 0.05	< 0.05	0.077	0.065	0.400	< 0.050	0.022	0.09	< 0.05	< 0.05	< 0.005	0.006	< 0.3	0.096	< 0.5		< 0.3
cobalt	mg/L	-	0.0009	**0.13**	**0.045**	**0.049**	**0.083**	**0.0057**	< 0.005	< 0.005	< 0.005	**0.0012**	< 0.005	< 0.005	**0.042**	**0.037**	**0.240**	**0.011**	**0.016**	**0.037**	**0.01**	**0.01**	< 0.0005	**0.002**	< 0.03	< 0.03	< 0.05		**0.031**
copper	mg/L	1	[0.005] b	**0.34**	**0.12**	**0.14**	**0.23**	**0.01**	**0.033**	< 0.01	< 0.01	0.002	**0.018**	**0.016**	**0.074**	**0.066**	**0.420**	**0.019**	**0.027**	**0.1**	**0.034**	**0.030**	< 0.001	< 0.005	**0.24**	**0.13**	**0.80**		**0.18**
fluoride	mg/L	1.5 - 2.4	-	-	-	0.2	0.2	0.2	-	-	0.4	0.3	0.3	0.3	-	-	0.3	0.2	0.2	-	-	0.5	0.5	0.6	-	-	0.1		< 0.1
free cyanide	mg/L	0.2	0.005	-	-	-	< 0.002	< 0.002	-	-	-	< 0.002	< 0.002	< 0.002	-	-	-	< 0.002	< 0.002	-	-	-	0.002	< 0.002	-	-	-		< 0.002
hardness	mg $CaCO_3$/L	80-100	-	-	-	-	1000	870	-	-	-	3300	4900	5100	-	-	-	450	560	-	-	-	1700	1700	-	-	-		27000
iron	mg/L	0.3	0.3	**270**	**89**	**110**	**160**	**11**	**9.8**	**3.3**	**2.0**	**5.4**	**9.2**	**9.6**	**83**	**70**	**470**	**17**	**26**	**71**	**21**	**20**	**3**	**5**	**42**	**25**	**110**		**11**
lead	mg/L	0.01	[0.005] c	**0.12**	**0.047**	**0.054**	**0.087**	**0.0064**	< 0.005	< 0.005	< 0.005	0.0016	0.005	0.005	**0.046**	**0.061**	**0.280**	**0.014**	**0.024**	**0.03**	**0.012**	**0.014**	0.002	0.003	< 0.03	**0.013**	**0.060**		< 0.03
magnesium	mg/L	-	-	290	180	210	260	120	550	230	180	270	390	400	84	100	290	69	75	180	160	170	140	150	1200	920	1600		1800
manganese	mg/L	0.05	-	14	5.4	7.8	9.5	0.51	1.1	0.38	0.26	0.51	0.77	0.87	2.2	2.4	13.0	0.7	1.2	2.5	1.1	1.0	0.3	0.4	4.2	2.30	6.50		5.5
mercury	mg/L	0.001	0.0002	< 0.0001	< 0.0015 (1)	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0015 (1)	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0015 (1)	< 0.0001	< 0.0001	< 0.0001	0.0001	< 0.0001	< 0.0001		< 0.0001
molybdenum	mg/L	-	0.04	0.015	0.015	0.007	0.016	0.0095	< 0.01	0.012	< 0.01	0.007	0.006	0.006	0.007	< 0.01	0.02	< 0.01	0.0046	0.015	0.012	0.01	0.009	0.01	< 0.05	0.026	< 0.1		< 0.03
nickel	mg/L	-	0.025	**0.28**	**0.087**	**0.100**	**0.160**	0.011	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	< 0.01	**0.082**	**0.077**	**0.480**	0.020	**0.027**	**0.081**	0.021	0.02	< 0.001	0.006	< 0.05	< 0.1	< 0.1		**0.22**
nitrate as N	mg/L	10	-	-	-	0.3	< 0.1	0.6	-	-	< 0.1	< 0.1	< 0.1	< 0.1	-	-	2.5	4.2	4.3	-	-	< 0.01	0.1	< 0.1	-	-	< 0.1		< 0.1
nitrite as N	mg/L	1	-	-	-	0.14	0.02	0.22	-	-	0.01	< 0.01	< 0.01	< 0.01	-	-	0.25	0.11	0.02	-	-	< 0.01	0.01	0.03	-	-	0.02		< 0.1
pH	pH Units	6.5-8.5	6.5-8.5	-	-	-	7.76	7.78	-	-	-	7.45	7.37	7.38	-	-	8.0	7.8	7.8	-	-	-	7.5	7.48	-	-	-		6.8
phenol	mg/L	-	-	-	-	-	< 0.001	< 0.001	-	-	-	< 0.001	0.001	0.001	-	-	-	< 0.001	< 0.001	-	-	-	0.001	0.001	-	-	-		0.07
phosphate	mg/L	-	-	-	-	0.01	< 0.01	< 0.01	-	-	< 0.01	< 0.01	< 0.01	< 0.01	-	-	< 0.01	< 0.01	< 0.01	-	-	< 0.01	0.01	< 0.01	-	-	< 0.01		< 0.01
total phosphorous	mg/L	-	0.01	-	-	-	**9.1**	**0.35**	-	-	-	< 0.1	< 1	< 1	-	-	-	< **1**	**0.85**	-	-	-	< 0.1	**0.14**	-	-	-		< 5
potassium	mg/L	-	-	49	20	20	43	19	110	48	45	65	81	83	13	14	71	7.3	8.2	57	49	49	47	49	230	170	240		300
selenium	mg/L	0.01	0.1	< 0.02	< 0.02	0.01	< 0.02	< 0.002	< 0.1	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.002	< 0.02	< 0.02	< 0.02	< 0.002	< 0.02	< 0.02	< 0.02	< 0.002	0.002	< 0.1	< 0.02	< 0.2		< 0.2
silicon	mg/L	-	-	20	55	62	120	13	6.4	6.9	4.9	10	10	3.6	53	56	350	20	24	57	23	19	9.9	7	16	23	58		9
silver	mg/L	-	0.0001	< 0.001	< 0.001	**0.0005**	< 0.001	< 0.0001	< 0.001	**0.001**	< 0.001	**0.0002**	< 0.001	< 0.001	< 0.0003	< 0.001	**0.00100**	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.001	< 0.0001	< 0.0001	< 0.005	< 0.001	< 0.01		< 0.005
sodium	mg/L	200 d	-	250	190	160	290	170	5000	1700	1500	2500	3100	3100	23	34	49	28	28	930	1000	1100	1000	1000	13000	8900	14000		17000
strontium	mg/L	-	-	13	12	13	15	12	46	17	13	23	28	29	2	2.5	6.0	1.7	1.6	16	12	14	13	15	120	84	130		170
sulphide	mg/L	0.05	-	-	-	-	< 0.020	< 0.02	-	-	-	< 0.020	< 0.02	< 0.020	-	-	-	< 0.020	< 0.02	-	-	-	0.020	< 0.02	-	-	-		< 0.02
sulphate	mg/L	500	-	-	-	-	-	900	-	-	-	-	1650	1560	-	-	-	-	116.000	-	-	-	-	1800	-	-	-		1540
thallium	mg/L	-	0.0003	**0.0013**	< 0.0005	**0.0004**	**0.0011**	0.0001	< 0.0005	< 0.0005	< 0.0005	< 0.00005	< 0.0005	< 0.0005	**0.00044**	< 0.0005	**0.0029**	< 0.0005	0.00017	< 0.0005	< 0.0005	< 0.0005	< 0.00005	< 0.00005	< 0.003	< 0.0005	< 0.005		< 0.003
tin	mg/L	-	-	< 0.01	< 0.01	0.005	< 0.01	< 0.001	< 0.01	< 0.01	< 0.01	< 0.001	< 0.01	< 0.01	< 0.001	< 0.01	< 0.01	< 0.01	< 0.001	< 0.01	< 0.01	< 0.01	< 0.001	< 0.001	< 0.05	< 0.01	< 0.1	**Note:**	< 0.05
titanium	mg/L	-	-	1.8	0.9	0.86	2.6	0.14	< 0.05	< 0.05	< 0.05	0.15	0.071	0.16	0.78	0.7	5.3	0.23	0.3	0.64	0.22	0.25	0.089	0.064	< 0.3	0.36	0.6	Insufficient	< 0.3
TSS	mg/L	-	-	-	-	-	21000	5800	-	-	-	190	370	490	-	-	-	750	2500	-	-	-	91	380	-	-	-	water	1600
turbidity	NTU	1	-	-	-	-	19000	600	-	-	-	100	140	140	-	-	-	4300	780	-	-	-	57	110	-	-	-		340
uranium	mg/L	0.02	0.005	**0.012**	**0.007**	0.0040	**0.01**	0.0015	< 0.001	0.001	< 0.001	0.0002	< 0.001	< 0.001	**0.009**	**0.012**	**0.032**	**0.010**	**0.009**	**0.006**	0.001	0.003	0.0007	0.0011	< 0.005	**0.005**	< 0.01		**0.024**
vanadium	mg/L	-	0.006	**0.27**	**0.1**	**0.1**	**0.2**	**0.012**	< 0.05	< 0.01	< 0.01	< 0.005	**0.013**	**0.015**	**0.091**	**0.089**	**0.480**	**0.019**	**0.026**	**0.086**	**0.04**	**0.02**	< 0.005 (1)	0.01	< 0.05	< 0.05	< 0.1		< 0.05
zinc	mg/L	5	0.02	**0.96**	**0.31**	**0.35**	**0.48**	**0.041**	**0.99**	**0.23**	< 0.05	**0.083**	**0.12**	**0.15**	**0.24**	**0.22**	**1.40**	**0.05**	**0.08**	**0.26**	**0.072**	**0.100**	< 0.005	< 0.03	< 0.3	**0.2**	**0.6**		< 0.3

N O T S A M P L E D

NOTES:
Shaded area indicates an exceedance of the MOE Ontario Drinking Water Standard (June 2006) for that specific parameter.
Bolded areas indicate an exceedance of the MOE Provincial Water Quality Objectives (July 1994) for that specific parameter.
[ ] indicate interim PWQO concentration
a = interim PWQO at pH > 6.5 to 9.0 measured in clay-free samples.
b = interim PWQO if hardness greater than 20 mg/L.
c = interim PWQO if hardness greater than 80 mg/L.
d = Local Medical Office of Health should be notified when sodium concentrations exceed 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium reduced diets.
(1) Sample bottle contained visible sediment. Results may be biased high due to analyte present in sediment.

TABLE D.2
Groundwater Quality in On-Site Monitoring Wells - Total Metals Analyses
Tansley Quarry Site, Burlington, Ontario

Parameter	Units	ODWS (June 2006)	PWQO (July 1994)	MW-05 shallow					MW-05 straddle				MW-05 intermediate					MW-05 deep				MW-06 shallow				MW-06 straddle			
				Jan-07	Oct-08	Dec-09	Oct-10	Nov-11	Oct-08	Dec-09	Oct-10	Nov-11	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11	Oct-08	Dec-09	Oct-10	Nov-11	Oct-08	Dec-09	Oct-10	Nov-11	Oct-08	Dec-09	Oct-10	Nov-11
aluminum	mg/L	0.1	[0.075] a		**82**	**53**	**26**	**130**	**60**	**300**	**19**	**57**		**2.7**	**2**	**0.38**	**1.10**		**14**		**190**				**1800**	**230**	**330**	**210**	**12**
alkalinity	mg $CaCO_3$/L	30-500	-		-	275	302	300	-	296	294	285		-	264	252	285		32		36				309	-	312	-	320
ammonia as N	mg/L	-	-		-	-	< 0.05	0.12	-	-	0.54	0.75		-	-	2.1	1.6		-		39				1.1	-	0.66	-	0.17
antimony	mg/L	-	[0.02]		< 0.005	< 0.003	0.0005	< 0.005	< 0.005	< 0.005	< 0.0005	< 0.003		< 0.001	< 0.0005	< 0.0005	< 0.0005		**0.05**		< 0.03				< 0.03	< 0.005	< 0.005	0.01	< 0.0005
arsenic	mg/L	0.025	[0.005]		**0.049**	**0.032**	**0.021**	**0.098**	**0.045**	**0.230**	**0.023**	**0.083**		0.005	**0.010**	0.004	**0.045**		< 0.1		**0.14**				**0.78**	**0.069**	**0.110**	**0.051**	**0.02**
barium	mg/L	1	-		1.5	1.0	0.6	3.5	0.7	3.5	0.3	0.6		0.051	0.10	0.02	0.07		< 0.5		0.86				32	3.2	5.5	2.3	0.27
beryllium	mg/L	-	1.1		0.005	< 0.003	0.0016	0.006	< 0.005	0.017	0.0011	< 0.003		< 0.001	< 0.0005	< 0.0005	< 0.0005		< 0.05		< 0.03				0.11	0.014	0.020	0.007	0.001
bismuth	mg/L	-	-		< 0.01	< 0.005	< 0.001	< 0.01	< 0.01	< 0.01	< 0.001	< 0.005		< 0.001	< 0.001	< 0.001	< 0.001		< 0.1		< 0.05				< 0.05	< 0.01	< 0.01	< 0.01	< 0.001
boron	mg/L	5	0.2		< 0.1	< 0.05	0.038	0.13	**1.1**	**2.1**	**1.2**	**1.4**		**4**	**3**	**3**	**2.2**		**5**		**5.5**				**3**	**0.52**	**0.90**	**0.49**	0.1
bromide	mg/L	-	-		-	< 1	-	< 1	-	< 1	-	< 1		-	< 1	-	< 1		587		747				< 0.001	-	< 1	-	< 1
cadmium	mg/L	0.005	0.0005		**0.002**	**0.002**	**0.001**	**0.009**	**0.002**	**0.009**	0.0004	**0.0032**		< 0.0001	0.0001	< 0.0001	0.0004		**0.010**		**0.075**				**0.028**	**0.004**	**0.005**	**0.001**	0.000
calcium	mg/L	-	-		780	550	470	2100	920	4600	410	1400		80	75	100	91		8600		11000				20000	1700	2400	740	170
chloride	mg/L	250	-		-	-	-	-	-	-	-	-		-	-	-	-		-		-				-	-	-	-	-
chromium	mg/L	0.05	-		0.2	0.1	0.1	0.33	0.13	0.61	0.03	0.12		0.005	< 0.005	< 0.005	< 0.005		< 0.5		0.68				3.8	0.38	0.48	0.18	0.021
cobalt	mg/L	-	0.0009		**0.1**	**0.1**	**0.036**	**0.23**	**0.063**	**0.300**	**0.020**	**0.065**		**0.0022**	**0.0014**	< 0.0005	**0.0012**		< 0.05		**0.081**				**2**	**0.23**	**0.32**	**0.13**	**0.015**
copper	mg/L	1	[0.005] b	**N**	**0.47**	**0.35**	**0.17**	1.10	**0.16**	**0.87**	**0.05**	**0.19**	**N**	**0.01**	**0.01**	0.001	**0.009**	**N**	**0.10**	**N**	**0.80**	**N**	**N**	**N**	**4.7**	**0.4**	**0.5**	**0.15**	**0.026**
fluoride	mg/L	1.5 - 2.4	-	**O**	-	0.1	0.1	0.1	-	0.3	0.2	0.3	**O**	-	0.5	0.4	0.4	**O**	< 0.1	**O**	< 0.1	**O**	**O**	**O**	0.3	-	0.2	-	0.1
free cyanide	mg/L	0.2	0.005	**T**	-	-	< 0.002	< 0.002	-	-	< 0.002	< 0.002	**T**	-	-	< 0.002	< 0.002	**T**	-	**T**	< 0.002	**T**	**T**	**T**	< 0.002	-	-	-	< 0.002
hardness	mg $CaCO_3$/L	80-100	-		-	-	430	440	-	-	300	270		-	-	390	320		-		35000				320	-	-	-	400
iron	mg/L	0.3	0.3	**S**	**170**	**110**	**62**	**320**	**120**	**590**	**40**	**140**	**S**	**4.3**	**5.8**	**1.1**	**21.0**	**S**	**49.0**	**S**	**170**	**S**	**S**	**S**	**3300**	**360**	**530**	**210**	**26**
lead	mg/L	0.01	[0.005] c	**A**	**0.12**	**0.08**	**0.05**	**0.23**	**0.05**	**0.25**	**0.02**	**0.063**	**A**	0.003	0.0029	< 0.0005	0.0028	**A**	< 0.05	**A**	**0.17**	**A**	**A**	**A**	**1.8**	**0.14**	**0.16**	**0.057**	**0.0087**
magnesium	mg/L	-	-	**M**	100	73	63	190	110	470	66	140	**M**	23	24	35	33	**M**	2000	**M**	2500	**M**	**M**	**M**	2400	260	350	150	45
manganese	mg/L	0.05	-	**P**	14	16	7	64	7	37	3	11	**P**	0.18	0.13	0.04	0.1	**P**	5.00	**P**	8.50	**P**	**P**	**P**	190	16	22	7.2	0.98
mercury	mg/L	0.001	0.0002	**L**	< 0.0015 (1)	< 0.0001	< 0.0001	< 0.0001	< 0.0015 (1)	< 0.0001	< 0.0001	< 0.0001	**L**	< 0.0001	< 0.0001	< 0.0001	< 0.0001	**L**	< 0.0001	**L**	< 0.0001	**L**	**L**	**L**	< 0.0001	< 0.0015 (1)	< 0.0001	< 0.0001	< 0.0001
molybdenum	mg/L	-	0.04	**E**	0.012	0.006	0.004	0.022	< 0.01	0.02	0.006	0.009	**E**	0.009	0.005	0.004	0.0049	**E**	< 0.1	**E**	**0.049**	**E**	**E**	**E**	**0.14**	0.016	0.02	< 0.01	0.002
nickel	mg/L	-	0.025	**D**	0.19	0.15	**0.063 (1)**	**0.49**	0.12	**0.63**	**0.04**	**0.12**	**D**	0.004	0.003	< 0.001	0.002	**D**	< 0.1	**D**	**0.3**	**D**	**D**	**D**	**4.1**	**0.480**	**0.730**	**0.28**	**0.031**
nitrate as N	mg/L	10	-		-	< 0.1	< 0.1	< 0.1	-	0.3	< 0.1	0.5		-	0.2	< 0.1	0.6		< 0.1		< 0.1				< 0.1	-	0.4	-	< 0.1
nitrite as N	mg/L	1	-		-	0.02	< 0.01	< 0.01	-	0.16	0.03	0.04		-	0.22	< 0.01	0.55		< 0.01		< 0.1				0.12	-	0.07	-	0.02
pH	pH Units	6.5-8.5	6.5-8.5		-	-	7.8	7.75	-	-	7.93	7.9		-	-	7.77	7.81		-		6.43				7.94	-	-	-	7.82
phenol	mg/L	-	-		-	-	< 0.001	< 0.001	-	-	< 0.001	< 0.001		-	-	< 0.001	< 0.001		-		0.11				< 0.001	-	-	-	< 0.001
phosphate	mg/L	-	-		-	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01		-	< 0.01	< 0.01	< 0.01		< 0.01		< 0.01				< 0.01	-	< 0.01	-	< 0.01
total phosphorous	mg/L	-	0.01		-	-	**2.7**	**14**	-	-	**2.8**	**9.6**		-	-	< 0.1	< 0.1		-		< 5				**180**	-	-	**6.6**	**0.89**
potassium	mg/L	-	-		23	11	6.6	15	18	83	10	16		17	17	20	18		280		340				340	75	100	57	7.7
selenium	mg/L	0.01	0.1		< 0.02	< 0.01	< 0.002	< 0.02	< 0.02	< 0.02	< 0.002	< 0.01		< 0.002	< 0.002	< 0.002	< 0.002		< 0.2		< 0.2				< 0.1	< 0.02	< 0.02	< 0.02	< 0.002
silicon	mg/L	-	-		39	64	40	87	75	390	35	66		8.8	8.3	6.9	9.3		18		63				5.2	85	430	180	25
silver	mg/L	-	0.0001		< 0.001	< 0.0005	**0.0002**	< **0.001**	**0.001**	**0.005**	**0.0002**	**0.0006**		< 0.0001	< 0.0001	< 0.0001	< 0.0001		< 0.01		< 0.005				**0.007**	< 0.001	< 0.001	<0.001	< 0.0001
sodium	mg/L	200 d	-		6.8	6.8	6.7	11	25	45	24	28		170	110	110	78		17000		20000				70	26	31	22	11
strontium	mg/L	-	-		1.2	0.85	0.72	3.2	7.8	21	7.5	9.9		6.9	8.3	14	15		180		240				55	10	14	7	2.4
sulphide	mg/L	0.05	-		-	-	< 0.020	< 0.02	-	-	< 0.020	< 0.02		-	-	< 0.020	< 0.02		-		0.040				0.31	-	-	-	< 0.02
sulphate	mg/L	500	-		-	-	-	111	-	-	-	52		-	-	-	130		-		1370				94	-	-	-	63
thallium	mg/L	-	0.0003		**0.0013**	**0.0006**	**0.0004**	**0.0018**	< 0.0005	**0.0033**	0.0002	**0.0006**		< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.005		< 0.003				**0.015**	**0.0023**	**0.0031**	**0.0018**	0.00022
tin	mg/L	-	-		< 0.01	< 0.005	< 0.001	< 0.01	< 0.01	< 0.01	< 0.001	< 0.005		< 0.001	< 0.001	< 0.001	< 0.001	**Note:**	< 0.1	**Note:**	< 0.05	**Note:**	**Note:**	**Note:**	< 0.05	< 0.01	< 0.01	< 0.01	< 0.001
titanium	mg/L	-	-		1.3	0.77	0.52	1.5	0.76	5.6	0.38	1		0.056	0.039	0.015	0.028	Insufficient	< 0.5	Insufficient	0.96	Insufficient	Insufficient	Insufficient	9.1	2.3	4.7	2.1	0.22
TSS	mg/L	-	-		-	-	4000	22000	-	-	3600	14000		-	-	< 10	200	water	-	water	3800	water	water	water	290000	-	-	-	1500
turbidity	NTU	1	-		-	-	24	2700	-	-	3400	2700		-	-	15	210		-		520				32000	-	-	-	670
uranium	mg/L	0.02	0.005		**0.007**	0.0042	0.0038	**0.012**	0.005	**0.020**	0.002	0.005		0.0008	0.0002	0.0001	0.0006		< 0.01		**0.009**				**0.19**	**0.017**	**0.017**	**0.007**	0.002
vanadium	mg/L	-	0.006		**0.17**	**0.10**	**0.06**	**0.25**	**0.12**	**0.57**	**0.04**	**0.12**		0.006	0.004	< 0.001	0.0039		< 0.1		**0.19**				**2.7**	**0.42**	**0.57**	**0.24**	**0.026**
zinc	mg/L	5	0.02		**0.66**	**0.40**	**0.19**	**1.20**	**0.47**	**2.10**	**0.11**	**0.38**		**0.03**	0.013	< 0.005	**0.032**		< 0.5		**1.6**				**11**	**1.8**	**1.7**	**0.68**	**0.082**

NOTES:
Shaded area indicates an exceedance of the MOE Ontario Drinking Water Standard (June 2006) for that specific parameter.
Bolded areas indicate an exceedance of the MOE Provincial Water Quality Objectives (July 1994) for that specific parameter.
[ ] indicate interim PWQO concentration
a = interim PWQO at pH > 6.5 to 9.0 measured in clay-free samples.
b = interim PWQO if hardness greater than 20 mg/L.
c = interim PWQO if hardness greater than 80 mg/L
d = Local Medical Office of Health should be notified when sodium concentrations exceed 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium reduced diets.
(1) Sample bottle contained visible sediment. Results may be biased high due to analyte present in sediment.

TABLE D.2
Groundwater Quality in On-Site Monitoring Wells - Total Metals Analyses
Tansley Quarry Site, Burlington, Ontario

Parameter	Units	ODWS (June 2006)	PWQO (July 1994)	MW-06 deep			MW-07 shallow				MW-07 deep				MW-08 shallow				MW-08 intermediate						MW-08 deep			
				Oct-08	Oct-10	Nov-11	Oct-08	Nov-09	Oct-10	Nov-11	Oct-08	Dec-09	Oct-10	Nov-11	Oct-08	Nov-09	Oct-10	Nov-11	Oct-08	Nov-09	Oct-10	Oct-10 DUP 1	Nov-11	Nov-11 DUP 1	Oct-08	Dec-09	Oct-10	Nov-11
aluminum	mg/L	0.1	[0.075] a				**610**	**1200**	**380**	**170**	**6.7**	**2.0**	**0.4**	**2.4**	**1900**	**1300**	**140**	**51**	**2**	**1**	**0.29**	**0.74**	**0.61**	**0.55**	**0.88**	**0.41**	**670**	**97**
alkalinity	mg $CaCO_3$/L	30-500	-				-	559	-	569	-	35	32	33	-	549	545	553	-	146	139	145	163	168	-	412	59	67
ammonia as N	mg/L	-	-				-	-	-	0.32	-	-	19	19	-	-	0.38	0.09	-	-	5.6	5	6.1	5.8	-	-	39	35
antimony	mg/L	-	[0.02]				< 0.05	< 0.03	< 0.005	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.05	< 0.03	< 0.005	< 0.0005	< 0.005	< 0.0005	< 0.0005	< 0.0005	0.004	< 0.003	< 0.001	< 0.0005	< 0.03	< 0.03
arsenic	mg/L	0.025	[0.005]				**0.24**	**0.480**	**0.180**	**0.081**	< 0.01	< 0.03	**0.023**	< 0.02	**0.64**	**0.500**	**0.054**	**0.03**	< 0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	**0.006**	< 0.005	**0.39**	**0.093**
barium	mg/L	1	-				5.3	11.0	3.8	1.9	0.094	< 0.1	< 0.1	0.08	17	13	1	1	< 0.05	0.018	0.015	0.016	0.02	0.021	0.018	0.016	5	1.1
beryllium	mg/L	-	1.1				< 0.05	0.06	0.019	0.013	< 0.005	< 0.01	< 0.01	< 0.01	**0.097**	0.08	0.008	0.0031	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.003	< 0.003	< 0.001	< 0.0005	0.032	< 0.03
bismuth	mg/L	-	-				< 0.1	< 0.05	< 0.01	< 0.01	< 0.01	< 0.03	< 0.02	< 0.02	< 0.1	< 0.05	< 0.01	< 0.001	< 0.01	< 0.001	< 0.001	< 0.001	< 0.007	< 0.005	< 0.001	< 0.001	< 0.05	< 0.05
boron	mg/L	5	0.2				**3.1**	**6.9**	**5.5**	**5.6**	**6.6**	**6.4**	**7**	**6.1**	**4.2**	**3.7**	**2.0**	**1.1**	**5.9**	**6.2**	**6.1**	**5.9**	**5.7**	**5.6**	**3.7**	**4.6**	**6.8**	**4.9**
bromide	mg/L	-	-				-	< 1	-	< 1	-	203	-	224	-	< 1	-	< 1	-	23	-	-	23	21	-	3	-	523
cadmium	mg/L	0.005	0.0005				< 0.01	**0.026**	**0.004**	**0.002**	< 0.001	**0.013**	< 0.002	< 0.002	**0.018**	**0.017**	**0.001**	**0.001**	< 0.001	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	**0.0018**	0.0002	**0.026**	< 0.005
calcium	mg/L	-	-				3600	8100	2800	1300	2700	2900	3300	3400	11000	8000	740	520	430	470	460	460	580	590	150	260	11000	8600
chloride	mg/L	250	-				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
chromium	mg/L	0.05	-				1	2	0.6	0.28	< 0.05	< 0.1	< 0.1	< 0.1	3.3	2.1	0.2	0.095	< 0.05	< 0.005	< 0.005	< 0.005	< 0.03	< 0.03	0.018	< 0.005	1.3	< 0.3
cobalt	mg/L	-	0.0009				**0.54**	**1.10**	**0.36**	**0.16**	**0.006**	< 0.01	< 0.01	< 0.01	**1.9**	**1.3**	**0.1**	**0.056**	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.003	< 0.003	0.0007	< 0.0005	**0.63**	**0.1**
copper	mg/L	1	[0.005] b	**N**	**N**	**N**	**1.1**	**2.3**	**0.74**	**0.35**	**0.028**	**0.060**	< 0.020	< 0.02	**3.6**	**2.3**	**0.2**	**0.093**	< 0.01	0.001	< 0.001	< 0.001	< 0.005	< 0.005	**0.037**	< 0.001	**1.1**	**0.13**
fluoride	mg/L	1.5 - 2.4	-	**O**	**O**	**O**	-	0.5	-	0.3	-	0.3	0.2	0.2	-	0.3	0.2	0.3	-	0.4	0.4	0.4	0.4	0.5	-	0.3	< 0.1	< 0.1
free cyanide	mg/L	0.2	0.005	**T**	**T**	**T**	-	-	-	< 0.002	-	-	< 0.002	< 0.002	-	-	< 0.002	< 0.002	-	-	< 0.002	< 0.002	< 0.002	< 0.002	-	-	< 0.002	< 0.002
hardness	mg $CaCO_3$/L	80-100	-				-	-	-	630	-	-	10000	10000	-	-	990	880	-	-	2000	2000	1700	1700	-	-	18000	27000
iron	mg/L	0.3	0.3	**S**	**S**	**S**	**1100**	**2400**	**750**	**330**	**17**	**9**	**7**	**6.5**	**3500**	**2500**	**240**	**110**	**3**	**2**	**1.2**	**1.5**	**1.8**	**2.5**	**2.3**	**1.3**	**1300**	**200**
lead	mg/L	0.01	[0.005] c	**A**	**A**	**A**	**0.55**	**1.10**	**0.33**	**0.16**	**0.009**	**0.01**	< 0.01	< 0.01	**1.4**	**1.00**	**0.10**	**0.06**	< 0.005	0.0006	< 0.0005	< 0.0005	< 0.003	< 0.003	0.003	< 0.0005	**0.33**	**0.049**
magnesium	mg/L	-	-	**M**	**M**	**M**	740	1400	490	290	740	730	810	840	2000	1400	270	200	120	140	150	150	160	170	92	120	2400	1800
manganese	mg/L	0.05	-	**P**	**P**	**P**	30	67.0	22	10	1.6	1.5	1.6	1.7	110	82.0	6.4	4.1	0.22	0.20	0.21	0.21	0.24	0.25	0.15	0.16	31	9
mercury	mg/L	0.001	0.0002	**L**	**L**	**L**	**0.0017** [2]	**0.0022**	< 0.0015	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	**0.0036** [1]	**0.0020**	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0015 [1]	< 0.0001
molybdenum	mg/L	-	0.04	**E**	**E**	**E**	< 0.1	**0.080**	0.032	0.018	< 0.01	< 0.03	< 0.02	< 0.01	< 0.1	**0.070**	0.014	0.009	< 0.010	0.007	0.007	0.007	0.007	0.006	0.006	0.006	**0.14**	< 0.03
nickel	mg/L	-	0.025	**D**	**D**	**D**	**1.3**	**2.5**	**0.81**	**0.36**	< 0.01	< 0.03	< 0.02	< 0.02	**4.2**	**2.8**	**0.3**	**0.12**	< 0.010	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.019	0.003	**1.4**	**0.19**
nitrate as N	mg/L	10	-				-	< 0.1	-	< 0.1	-	< 0.1	< 0.1	< 0.1	-	< 0.1	< 0.1	0.3	-	< 0.1	0.1	0.1	< 0.1	< 0.1	-	< 0.1	< 0.1	< 0.1
nitrite as N	mg/L	1	-				-	0.06	-	0.01	-	< 0.01	< 0.01	< 0.1	-	< 0.01	0.02	< 0.01	-	< 0.01	0.01	< 0.01	0.03	0.04	-	0.01	0.05	< 0.1
pH	pH Units	6.5-8.5	6.5-8.5				-	-	-	7.7	-	-	6.97	7.02	-	-	7.69	7.65	-	-	7.55	7.59	7.64	7.58	-	-	6.76	6.75
phenol	mg/L	-	-				-	-	-	< 0.001	-	-	< 0.001	0.03	-	-	< 0.001	< 0.001	-	-	0.001	< 0.001	0.005	0.004	-	-	< 0.001	0.26
phosphate	mg/L	-	-				-	< 0.01	-	0.01	-	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	-	< 0.01	0.01	0.01	< 0.01	0.01	-	< 0.01	< 0.01	< 0.01
total phosphorous	mg/L	-	0.01				-	-	**34**	**9.9**	-	-	< 2	< 2	-	-	**6.7**	**3.9**	-	-	< 0.1	< 0.1	< 0.5	< 0.5	-	-	**26**	< 5
potassium	mg/L	-	-				160	230	100	69	140	140	160	160	410	250	63	22	43	46	47	47	49	50	27	28	450	300
selenium	mg/L	0.01	0.1				< 0.2	< 0.1	< 0.02	< 0.02	0.021	< 0.05	0.045	< 0.04	< 0.2	< 0.1	< 0.02	0.007	< 0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.002	< 0.01	0.1	< 0.1
silicon	mg/L	-	-				140	970	460	240	15	10	6.3	7.3	250	940	190	61	7.6	5.8	4.6	5.5	4.7	4.2	6.8	6.4	700	130
silver	mg/L	-	0.0001				< 0.01	< 0.005	**0.002**	< 0.001	< 0.001	< 0.003	< 0.002	< 0.002	< 0.01	< 0.005	< 0.001	**0.0004**	< 0.001	**0.0003**	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.005	< 0.005
sodium	mg/L	200 d	-				85	110	110	99	6600	6500	7200	7800	140	120	93	76	1100	1100	1100	1100	1300	1300	210	540	18000	15000
strontium	mg/L	-	-				14	25	11	6.6	56	60	66	68	53	41	14	8.3	12	12	14	14	16	16	17	13	200	170
sulphide	mg/L	0.05	-				-	-	-	0.02	-	-	< 0.020	< 0.02	-	-	< 0.020	< 0.02	-	-	< 0.020	< 0.020	< 0.02	< 0.020	-	-	0.130	< 0.02
sulphate	mg/L	500	-				-	-	-	182	-	-	-	1560	-	-	-	423	-	-	-	-	965	976	-	-	-	1130
thallium	mg/L	-	0.0003				**0.007**	**0.012**	**0.0045**	**0.0026**	< 0.0005	< 0.001	< 0.001	< 0.001	**0.014**	**0.010**	**0.002**	**0.00046**	< 0.0005	< 0.00005	< 0.00005	< 0.00005	< 0.0003	< 0.0003	< 0.00005	< 0.00005	**0.005**	< 0.003
tin	mg/L	-	-	**Note:**	**Note:**	**Note:**	< 0.1	< 0.05	0.012	< 0.01	< 0.01	< 0.03	< 0.02	< 0.02	< 0.1	< 0.05	< 0.01	< 0.001	< 0.01	< 0.001	< 0.001	< 0.001	< 0.005	< 0.005	0.001	< 0.001	0.11	< 0.05
titanium	mg/L	-	-	Insufficient	Insufficient	Insufficient	4.9	14	7.2	4	0.12	< 0.1	< 0.1	< 0.1	8.8	12	2.4	0.81	0.058	0.038	0.013	0.03	< 0.03	< 0.03	0.026	0.034	7.5	1.8
TSS	mg/L	-	-	water	water	water	-	-	-	10000	-	-	-	310	-	-	9000	5700	-	-	27	26	32	29	-	-	44000	9100
turbidity	NTU	1	-				-	-	-	14000	-	-	-	330	-	-	14000	710	-	-	14	22	30	21	-	-	96000	1900
uranium	mg/L	0.02	0.005				**0.086**	**0.140**	**0.047**	**0.029**	0.002	< 0.003	< 0.002	< 0.002	**0.13**	**0.08**	**0.02**	**0.015**	< 0.001	0.0002	0.0002	0.0002	0.0018	< 0.0005	0.0029	0.0043	**0.037**	**0.007**
vanadium	mg/L	-	0.006				**1.3**	**2.2**	**0.76**	**0.35**	< 0.01	< 0.03	**0.033**	< 0.01	**3.5**	**2.2**	**0.3**	**0.1**	< 0.01	< 0.005	< 0.005	< 0.005	0.006	< 0.003	0.002	< 0.005	**1.3**	**0.23**
zinc	mg/L	5	0.02				**3.3**	**6.1**	**2**	**0.91**	**0.059**	**0.100**	< 0.100	< 0.1	**10**	**7**	**1**	**0.3**	< 0.05	< 0.005	< 0.005	< 0.005	< 0.03	< 0.03	**0.069**	< 0.005	**3.9**	**0.6**

NOTES:
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[ ] indicate interim PWQO concentration
a = interim PWQO at pH > 6.5 to 9.0 measured in clay-free samples.
b = interim PWQO if hardness greater than 20 mg/L.
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d = Local Medical Office of Health should be notified when sodium concentrations exceed 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium reduced diets.
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TABLE D.2
Groundwater Quality in On-Site Monitoring Wells - Total Metals Analyses
Tansley Quarry Site, Burlington, Ontario

Parameter	Units	ODWS (June 2006)	PWQO (July 1994)	MW-09 shallow				MW-09 intermediate				MW-09 deep			MW-10 shallow				MW-10 intermediate			MW-10 deep		
				Oct-08	Nov-09	Oct-10	Nov-11	Oct-08	Nov-09	Oct-10	Nov-11	Oct-08	Oct-10	Nov-11	Oct-08	Nov-09	Oct-10	Nov-11	Oct-08	Oct-10	Nov-11	Oct-08	Oct-10	Nov-11
aluminum	mg/L	0.1	[0.075] a	**47**	**160**	**4**	**22**	**180**	**310**	**33**	**22**			**0.75**	**1000**	**1800**	**420**	**90**	**510**	**9.3**	**28**			**4.5**
alkalinity	mg $CaCO_3$/L	30-500	-	-	438	412	398	-	305	261	239			52	-	475	472	485	-	400	416			40
ammonia as N	mg/L	-	-	-	-	0.17	0.36	-	2.5	2.2	1.7			40	-	-	0.43	0.13	-	0.92	0.82			34
antimony	mg/L	-	[0.02]	< 0.001	< 0.005	< 0.0005	< 0.0005	< 0.005	< 0.005	< 0.0005	< 0.0005			0.0053	< 0.05	< 0.03	0.006	< 0.003	< 0.005	< 0.0005	< 0.0005			< 0.0005
arsenic	mg/L	0.025	[0.005]	**0.021**	**0.130**	0.004	**0.013**	**0.054**	**0.10**	**0.02**	**0.02**			**0.024**	**0.27**	**0.59**	**0.12**	**0.054**	**0.11**	**0.01**	**0.16**			**0.031**
barium	mg/L	1	-	0.44	2.0	0.1	0.3	2.1	4	0.48	0.28			0.15	13	26	5	2	6.9	0.3	0.56			0.19
beryllium	mg/L	-	1.1	0.003	0.008	< 0.0005	0.0011	0.009	0.017	0.0021	0.0012			0.0016	0.057	0.10	0.02	0.01	0.025	0.0007	0.0019			< 0.0005
bismuth	mg/L	-	-	< 0.001	< 0.01	< 0.001	< 0.001	< 0.01	< 0.01	< 0.001	< 0.001			< 0.001	< 0.1	< 0.05	< 0.01	< 0.005	< 0.01	< 0.001	< 0.001			< 0.001
boron	mg/L	5	0.2	**0.54**	**4.0**	**0.6**	**1.8**	**3.7**	**5.2**	**3.6**	**3.7**			**5.3**	**1.4**	**3.1**	**0.8**	**0.24**	**4.3**	**1.0**	**0.75**			**6**
bromide	mg/L	-	-	-	< 1	-	< 1	-	1	-	3			696	-	< 1	-	< 1	-	-	< 1			538
cadmium	mg/L	0.005	0.0005	**0.0008**	**0.0050**	< 0.0001	0.0003	**0.002**	**0.003**	0.0003	0.0002			**0.0012**	< 0.01	**0.0190**	**0.003**	**0.0018**	**0.005**	0.0001	**0.0011**			**0.012**
calcium	mg/L	-	-	280	1200	66	170	1300	2200	390	220			8800	7800	17000	2900	1200	2800	120	330			5600
chloride	mg/L	250	-	-	-	-	-	-	115	-	-			-	-	-		-	-	-	-			-
chromium	mg/L	0.05	-	0.12	0.41	0.01	0.057	0.36	0.52	0.06	0.043			0.035	2	4	1	0.14	0.79	0.01	0.052			0.62
cobalt	mg/L	-	0.0009	**0.049**	**0.160**	**0.004**	**0.022**	**0.16**	**0.26**	**0.03**	**0.021**			< 0.0005	**1.1**	**2.0**	**0.4**	**0.092**	**0.51**	**0.01**	**0.031**			**0.012**
copper	mg/L	1	[0.005] b	**0.054**	**0.170**	0.004	**0.022**	**0.15**	**0.20**	**0.02**	**0.018**			**0.033**	**1.4**	**2.5**	**0.6**	**0.18**	**0.43**	**0.01**	**0.031**			**0.051**
fluoride	mg/L	1.5 - 2.4	-	-	0.2	0.2	0.2	-	0.5	0.3	0.4			< 0.1	-	0.3	0.2	0.2	-	0.2	0.2			<0.1
free cyanide	mg/L	0.2	0.005	-	-	< 0.002	< 0.002	-	< 0.002	< 0.002	< 0.002			< 0.002	-	-	< 0.002	< 0.002	-	< 0.002	< 0.002			< 0.002
hardness	mg $CaCO_3$/L	80-100	-	-	-	410	380	-	-	600	760			28000	-	-	480	500	-	370	340			25000
iron	mg/L	0.3	0.3	**76**	**290**	**6**	**35**	**260**	**410**	**45**	**34**			**25**	**1700**	**3200**	**660**	**170**	**780**	**15**	**66**			**18**
lead	mg/L	0.01	[0.005] c	**0.026**	**0.090**	0.002	**0.013**	**0.1**	**0.2**	**0.02**	**0.013**			0.0041	**0.65**	**1**	**0.21**	**0.12**	**0.21**	0.0046	**0.018**			**0.011**
magnesium	mg/L	-	-	99	700	64	79	190	300	82	58			2000	1200	2300	490	220	480	66	94			1500
manganese	mg/L	0.05	-	2.4	7.1	0.2	1.2	10	18.0	2.4	1.2			4.7	71	150	28	11	27	1	2.5			2.5
mercury	mg/L	0.001	0.0002	< 0.0015 (1)	< 0.0001	< 0.0001	< 0.0001	< 0.0015 (1)	< 0.0001	< 0.0001	< 0.0001			< 0.0001	< 0.0015 (1)	< 0.0015	< 0.0001	< 0.0001	< 0.0015 (1)	< 0.0001	< 0.0001			< 0.0001
molybdenum	mg/L	-	0.04	0.015	**0.080**	0.008	0.010	0.035	**0.050**	**0.011**	0.012			0.0089	< 0.1	< 0.05	0.02	0.005	0.023	0.004	0.0045			**0.24**
nickel	mg/L	-	0.025	**0.1**	**0.3**	0.008	**0.044**	**0.36**	**0.6**	**0.071** (1)	**0.046**			0.006	**2.2**	**4.1**	**0.9**	**0.18**	**1**	0.019	**0.06**			**0.38**
nitrate as N	mg/L	10	-	-	2.1	0.4	0.2	-	< 0.1	< <0.1	1.8			< 0.1	-	0.4	< 0.1	< 0.1	-	< 0.1	0.7			0.1
nitrite as N	mg/L	1	-	-	< 0.01	0.04	0.03	-	< 0.01	0.02	0.44			< 0.1	-	0.03	0.05	< 0.01	-	0.08	0.1			< 0.1
pH	pH Units	6.5-8.5	6.5-8.5	-	-	7.87	7.85	-	7.8	7.81	7.77			6.84	-	-	7.7	7.83	-	7.8	7.83			6.6
phenol	mg/L	-	-	-	< -	< 0.001	< 0.001	-	< 0.001	< 0.001	< 0.001			0.08	-	-	< 0.001	< 0.001	-	< 0.001	< 0.001			0.05
phosphate	mg/L	-	-	-	< 0.01	0.01	< 0.01	-	< 0.01	< 0.01	< 0.01			< 0.01	-	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01			< 0.01
total phosphorous	mg/L	-	0.01	-	-	**0.14**	**1.1**	-	-	**1.8**	**1.1**			< 0.1	-	-	**26**	**11**	-	**0.56**	**2.4**			< 0.1
potassium	mg/L	-	-	30	150	13	17	88	130	30	26			310	270	360	120	30	150	15	18			240
selenium	mg/L	0.01	0.1	< 0.002	< 0.02	< 0.002	< 0.002	< 0.02	< 0.02	< 0.002	< 0.002			0.053	< 0.2	< 0.1	< 0.02	< 0.01	< 0.02	< 0.002	< 0.002			0.08
silicon	mg/L	-	-	70	310	14	39	77	420	51	38			< 3	190	1100	440	83	130	22	8.4			< 3
silver	mg/L	-	0.0001	**0.0003**	< 0.001	< 0.0001	**0.0002**	**0.003**	**0.002**	**0.0002**	**0.0002**			**0.0003**	< 0.01	**0.005**	**0.002**	**0.0006**	**0.001**	< 0.0001	0.0001			**0.0002**
sodium	mg/L	200 d	-	36	310	34	37	170	200	190	120			18000	74	67	29	26	85	35	31			16000
strontium	mg/L	-	-	8.9	48	6.6	7	22	34	18	19			180	24	40	8.9	4.5	27	12	13			120
sulphide	mg/L	0.05	-	-	-	< 0.02	< 0.02	-	-	< <0.02	< 0.02			< 0.02	-	-	0.230	< 0.02	-	<0.02	< 0.02			< 0.02
sulphate	mg/L	500	-	-	-	-	59	-	-	-	468			1470	-	-	-	58	-	-	39			1360
thallium	mg/L	-	0.0003	**0.00038**	**0.00150**	< 0.00005	0.00018	**0.0019**	**0.0026**	0.0003	0.0002			< 0.00005	**0.007**	**0.012**	**0.004**	**0.0009**	**0.004**	0.00009	0.00027			< 0.00005
tin	mg/L	-	-	0.001	< 0.01	< 0.001	< 0.001	< 0.01	< 0.01	< 0.001	< 0.001	**Note:**	**Note:**	< 0.001	< 0.1	< 0.05	< 0.01	< 0.005	< 0.01	< 0.001	< 0.001	**Note:**	**Note:**	< 0.001
titanium	mg/L	-	-	0.6	2.6	0.063	0.35	1.7	4.0	0.4	0.3	Insufficient	Insufficient	0.021	5.3	12	6.1	1.3	3.5	0.14	0.42	Insufficient	Insufficient	0.099
TSS	mg/L	-	-	-	-	180	4900	-	16000	3300	3100	water.	water.	390	-	-	91000	10000	-	440	2700	water.	water.	770
turbidity	NTU	1	-	-	-	330	3200	-	-	3400	920			150	-	-	94000	1500	-	340	540			280
uranium	mg/L	0.02	0.005	**0.0084**	**0.0420**	0.0034	0.0035	**0.01**	**0.02**	0.0023	0.0023			**0.0057**	**0.09**	**0.13**	**0.03**	**0.027**	**0.03**	0.0011	0.002			**0.022**
vanadium	mg/L	-	0.006	**0.092**	**0.320**	**0.008**	**0.04**	**0.32**	**0.52**	**0.06**	**0.04**			**0.0074**	**1.80**	**2.70**	**0.77**	**0.15**	**0.83**	**0.02**	**0.049**			**0.034**
zinc	mg/L	5	0.02	**0.37**	**1.30**	**0.03**	**0.14**	**1.1**	**1.3**	**0.1**	**0.11**			< 0.005	**5.5**	**9.6**	**2.0**	**0.5**	**2.5**	**0.045**	**0.15**			**0.068**

NOTES:
Shaded area indicates an exceedance of the MOE Ontario Drinking Water Standard (June 2006) for that specific parameter.
Bolded areas indicate an exceedance of the MOE Provincial Water Quality Objectives (July 1994) for that specific parameter.
[ ] indicate interim PWQO concentration
a = interim PWQO at pH > 6.5 to 9.0 measured in clay-free samples.
b = interim PWQO if hardness greater than 20 mg/L.
c = interim PWQO if hardness greater than 80 mg/L
d = Local Medical Office of Health should be notified when sodium concentrations exceed 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium reduced diets.
(1) Sample bottle contained visible sediment. Results may be biased high due to analyte present in sediment.

TABLE D.2
Groundwater Quality in On-Site Monitoring Wells - Total Metals Analyses
Tansley Quarry Site, Burlington, Ontario

Parameter	Units	ODWS (June 2006)	PWQO (July 1994)	MW-11 shallow				MW-11 intermediate				MW-11 deep		
				Oct-08	Dec-09	Oct-10	Nov-11	Oct-08	Dec-09	Oct-10	Nov-11	Oct-08	Oct-10	Nov-11
aluminum	mg/L	0.1	[0.075] a	**840**	**880**	**470**	**49**	**12**	**5**	**2**	**13**		**17**	**17**
alkalinity	mg $CaCO_3$/L	30-500	-	-	321	322	341	-	431	453	450		-	50
ammonia as N	mg/L	-	-	-	-	0.21	0.18	-	-	1.3	1.5		-	34
antimony	mg/L	-	[0.02]	< 0.05	< 0.03	< 0.005	< 0.0005	< 0.001	0.0006	< 0.0005	< 0.0005		< 0.03	< 0.03
arsenic	mg/L	0.025	[0.005]	**0.4**	**0.4**	**0.2**	**0.022**	**0.019**	**0.015**	**0.013**	**0.02**		**0.061**	< 0.05
barium	mg/L	1	-	18	18	9	1	0.14	0.085	0.057	0.18		< 0.3	0.31
beryllium	mg/L	-	1.1	< 0.05	0.04	0.024	0.0027	0.001	< 0.0005	< 0.0005	0.0006		< 0.03	< 0.03
bismuth	mg/L	-	-	< 0.1	< 0.05	< 0.01	< 0.001	< 0.001	< 0.001	0.003	< 0.001		< 0.05	< 0.05
boron	mg/L	5	0.2	**1.5**	**1.3**	**0.8**	**0.1**	**1.4**	**1.6**	**1.3**	**1.4**		**4.8**	**5.1**
bromide	mg/L	-	-	-	**<** 1	-	< 1	-	**<** 1	-	< 1		-	< 500
cadmium	mg/L	0.005	0.0005	< 0.0100	**0.0100**	**0.006**	**0.0007**	0.0002	< 0.0001	< 0.0001	0.0003		**0.013**	**0.014**
calcium	mg/L	-	-	7600	7800	3900	400	210	140	99	250		6700	7700
chloride	mg/L	250	-	-	-	**-**	-	-	-	-	-		-	-
chromium	mg/L	0.05	-	3.4	2.9	1.4	0.14	0.025	0.012	0.006	0.026		< 0.3	0.6
cobalt	mg/L	-	0.0009	**0.88**	**0.85**	**0.42**	**0.045**	**0.012**	**0.007**	**0.002**	**0.014**		< 0.030	< 0.03
copper	mg/L	1	[0.005] b	**2.3**	**2.3**	**1.1**	**0.11**	**0.022**	**0.011**	0.005	**0.028**	**N**	**0.096**	**0.068**
fluoride	mg/L	1.5 - 2.4	-	-	0.3	0.2	0.1	-	0.3	0.3	0.3	**O**	0.1	0.1
free cyanide	mg/L	0.2	0.005	-	-	< 0.002	< 0.002	-	-	< 0.002	< 0.002	**T**	< 0.002	< 0.002
hardness	mg $CaCO_3$/L	80-100		-	-	550	390	-	-	450	490		-	26000
iron	mg/L	0.3	0.3	**1700**	**1600**	**840**	**89**	**20**	**11**	**5**	**25**	**S**	**67**	**84**
lead	mg/L	0.01	[0.005] c	**0.68**	**0.66**	**0.35**	**0.031**	**0.008**	0.0046	0.0017	**0.0096**	**A**	< 0.03	< 0.03
magnesium	mg/L	-	-	960	960	480	100	87	70	72	86	**M**	1500	1800
manganese	mg/L	0.05	-	79	82	42	3.6	1.3	0.6	0.2	1.6	**P**	4.2	5.1
mercury	mg/L	0.001	0.0002	< 0.0015 (1)	**0.0003**	< 0.0001	**<** 0.0001	< 0.0015 (1)	< 0.0001	< 0.0001	< 0.0001	**L**	< 0.0001	< 0.0001
molybdenum	mg/L	-	0.04	< 0.1	< 0.05	0.029	0.0054	0.004	0.004	0.004	0.0039	**E**	< 0.05	< 0.03
nickel	mg/L	-	0.025	**1.8**	**1.8**	**0.9**	**0.1**	0.023	0.012	0.005	**0.028**	**D**	< 0.05	**0.095**
nitrate as N	mg/L	10	-	-	**<** 0.1	< 0.1	< 0.1	-	< 0.1	< 0.1	< 0.1		-	< 0.1
nitrite as N	mg/L	1	-	-	0.03	0.02	0.02	-	< 0.01	< 0.01	< 0.01		-	< 0.01
pH	pH Units	6.5-8.5	6.5-8.5	-	-	7.88	7.95	-	-	7.88	7.95		-	6.69
phenol	mg/L	-	-	-	-	< 0.001	< 0.001	-	-	< 0.001	< 0.001		< 0.001	0.017
phosphate	mg/L	-	-	-	**<** 0.01	< 0.01	< 0.01	-	**<** 0.01	< 0.01	< 0.01		< 0.01	< 0.01
total phosphorous	mg/L	-	0.01	-	-	**28**	**2.4**	-	-	**0.19**	**1.6**		< 5	< 5
potassium	mg/L	-	-	220	190	110	16	21	18	18	22		260	280
selenium	mg/L	0.01	0.1	< 0.2	< 0.1	< 0.02	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002		< 0.1	< 0.1
silicon	mg/L	-	-	86	790	550	67	27	17	12	27		25	3.1
silver	mg/L	-	0.0001	< 0.01	< 0.005	**0.003**	**0.0003**	< 0.0001	< 0.0001	< 0.0001	< 0.0001		< 0.005	< 0.005
sodium	mg/L	200 d	-	60	54	22	15	64	64	60	70		14000	16000
strontium	mg/L	-	-	16	16	8.5	1.8	12	11	12	11		130	160
sulphide	mg/L	0.05	-	-	-	0.170	0.06	-	-	< 0.020	< 0.02		0.040	< 0.02
sulphate	mg/L	500	-	-	-	-	79	-	-	-	147		-	1410
thallium	mg/L	-	0.0003	**0.009**	**0.007**	**0.004**	**0.00044**	0.00009	0.00007	< 0.00005	0.00012		< 0.003	< 0.003
tin	mg/L	-	-	< 0.100	< 0.05	< 0.01	< 0.001	< 0.001	< 0.001	0.001	< 0.001	**Note:**	< 0.05	< 0.05
titanium	mg/L	-	-	4.8	7.9	5.9	0.57	0.2	0.097	0.038	0.24	Insufficient	< 0.3	< 0.3
TSS	mg/L	-	-	-	-	88000	2300	-	-	240	1900	water.	-	1200
turbidity	NTU	1	-	-	-	62000	840	-	-	210	410		-	140
uranium	mg/L	0.02	0.005	**0.093**	**0.066**	**0.04**	**0.0057**	0.0017	0.0009	0.0008	0.0014		**0.011**	**0.01**
vanadium	mg/L	-	0.006	**1.6**	**1.6**	**0.9**	**0.091**	**0.025**	**0.011**	0.005	**0.025**		**0.140**	< 0.03
zinc	mg/L	5	0.02	**4.5**	**4.4**	**2.1**	**0.24**	**0.06**	**0.03**	0.02	**0.069**		**0.79**	**0.37**

NOTES:
Shaded area indicates an exceedance of the MOE Ontario Drinking Water Standard (June 2006) for that specific parameter.
Bolded areas indicate an exceedance of the MOE Provincial Water Quality Objectives (July 1994) for that specific parameter.
[ ] indicate interim PWQO concentration
a = interim PWQO at pH > 6.5 to 9.0 measured in clay-free samples.
b = interim PWQO if hardness greater than 20 mg/L.
c = interim PWQO if hardness greater than 80 mg/L
d = Local Medical Office of Health should be notified when sodium concentrations exceed 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium reduced diets.
(1) Sample bottle contained visible sediment. Results may be biased high due to analyte present in sediment.

Table D.3
Groundwater Quality - Bekkers Well
Tansley Quarry - Hanson Brick Ltd.

Parameter	Units	Criteria				BEKKERS				
		ODWS MAC	ODWS IMAC	ODWS AO	ODWS OG	Jul-07	Oct-08	Dec-09	Oct-10	Nov-11
aluminum	mg/L				0.1	0.038	0.01	0.012	0.015	<0.005
alkalinity	mg $CaCO_3$/L				30-500	362	435	77	295	172
ammonia-N	mg/L					0.31	<0.05	1.0	0.84	0.43
antimony	mg/L		0.006			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
arsenic	mg/L		0.025			<0.001	<0.001	<0.001	<0.001	<0.001
barium	mg/L	1				0.037	0.022	0.010	0.015	0.022
beryllium	mg/L					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
bismuth	mg/L					<0.001	<0.001	<0.001	<0.001	<0.001
boron	mg/L		5			0.69	0.46	1.8	1.5	1.5
bromide	mg/L					<1	<1	3	1	<10
cadmium	mg/L	0.005				<0.0001	<0.0001	<0.0001	<0.0001	0.0003
calcium	mg/L					140	130	190	190	190
chloride	mg/L			250		104	49	**264**	118	195
chromium	mg/L	0.05				<0.005	<0.005	<0.005	<0.005	<0.005
cobalt	mg/L					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
copper	mg/L			1		0.069	0.014	0.006	0.005	0.021
fluoride	mg/L	1.5 [a]				0.2	0.2	0.2	0.2	0.3
free cyanide	mg/L					<0.002	<0.002	<0.002	<0.002	<0.002
hardness	mg $CaCO_3$/L				80-100	**760**	**890**	**740**	**810**	**780**
iron	mg/L			0.3		<0.05	<0.1	<0.1	<0.1	<0.1
lead	mg/L	0.01 [c]				0.0063	<0.0005	0.0010	0.0014	0.0023
magnesium	mg/L					130	140	79	96	100
manganese	mg/L			0.05		0.043	0.011	**0.15**	**0.1**	**0.071**
mercury	mg/L					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
molybdenum	mg/L					0.007	0.007	0.018	0.016	0.015
nickel	mg/L					<0.001	<0.001	<0.001	<0.001	0.005
nitrate as N	mg/L	10.0 [b]				3	2.9	<0.1	2.4	1.3
nitrite as N	mg/L	1.0 [b]				0.11	<0.01	<0.01	0.06	0.05
pH	pH Units				6.5-8.5	8.1	8.2	7.8	7.91	7.96
phenol	mg/L					<0.001	<0.001	0.001	<0.001	<0.001
phosphate	mg/L					<0.01	<0.01	<0.01	<0.01	<0.01
total phosphorous	mg/L					0.005	0.01	<0.002	<0.002	0.007
potassium	mg/L					13	9.6	17	17	16
selenium	mg/L	0.01				<0.002	<0.002	<0.002	<0.002	<0.002
silicon	mg/L					6	6.4	4.3	4.5	5.3
silver	mg/L					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
sodium	mg/L			20/200 [f]		120	83	**260**	**260**	**210**
strontium	mg/L					6.1	5	12	12	11
sulphate	mg/L			500 [d]		**563**	**543**	**838**	**617**	**762**
sulphide	mg/L					<0.02	<0.02	<0.02	<0.02	<0.02
thallium	mg/L					<0.05	<0.00005	<0.00005	<0.00005	<0.00005
tin	mg/L					0.001	<0.001	<0.001	<0.001	<0.001
titanium	mg/L					<0.005	<0.005	<0.005	<0.005	<0.005
TSS	mg/L					<10	<10	<10	<10	<10
turbidity	NTU			5 [e]		1.4	0.3	0.6	0.3	<0.2
uranium	mg/L					0.0057	0.0074	0.0004	0.0017	0.003
vanadium	mg/L					<0.001	<0.001	<0.001	<0.001	0.0009
zinc	mg/L			5		0.04	0.032	<0.03	0.017	0.38

NOTES:

ODWS = Ontario Drinking Water Objectives, Standards and Guidelines, dated June 2006. MAC = maximum acceptable concentrations, IMAC = interim maximum acceptable concentrations, AO = aesthetic objective, OG = operational guideline.
Bold values exceed the ODWS June 2006 standard for that parameter

[a] Where fluoride is added to drinking water, it is recommended that the concentration be adjusted to 0.5-0.8 mg/L the optimum level for control of tooth decay. Where supplies contain naturally occurring fluoride at levels higher than 1.5 mg/L but less than 2.4 mg/L the Ministry of Health and Long Term Care recommends an approach through local boards of health to raise public and professional awareness to control excessive exposure to fluoride from other sources.

[b] Where both nitrate and nitrite are present, the total of the two should not exceed 10 mg/L (as nitrogen).

[c] This standard applies to water at the point of consumption. Since lead is a component in some plumbing systems, first flush water may contain higher concentrations of lead than water that has been flushed for five minutes.

[d] When sulphate levels exceed 500 mg/L, water may have a laxative effect on some people.

[e] Applicable for all waters at the point of consumption.

[f] The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on Sodium restricted diets.

"-" Parameter not analysed

Table D.4
Groundwater Quality - Eno/Myers Well
Tansley Quarry - Hanson Brick Ltd.

Parameter	Units	Criteria				ENO/MEYERS					
		ODWS MAC	ODWS IMAC	ODWS AO	ODWS OG	Sep-04	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11
aluminum	mg/L				0.1	**0.12**	0.036				
alkalinity	mg $CaCO_3$/L				30-500	360	372				
ammonia-N	mg/L					0.47	0.14				
antimony	mg/L		0.006			<0.002	<0.001				
arsenic	mg/L		0.025			<0.002	<0.001				
barium	mg/L	1				0.040	0.039				
beryllium	mg/L					<0.001	<0.0005				
bismuth	mg/L					<0.002	<0.001				
boron	mg/L		5			0.085	0.048				
bromide	mg/L					<0.1	<1				
cadmium	mg/L	0.005				<0.00007	0.0003				
calcium	mg/L					170	110				
chloride	mg/L			250		71	30				
chromium	mg/L	0.05				<0.002	<0.005				
cobalt	mg/L					0.0009	<0.0005				
copper	mg/L			1		0.037	0.002	**N**	**N**	**N**	**N**
fluoride	mg/L	1.5 [a]				0.31	0.4	**O**	**O**	**O**	**O**
free cyanide	mg/L					<0.002	<0.002	**T**	**T**	**T**	**T**
hardness	mg $CaCO_3$/L				80-100	**730**	**390**				
iron	mg/L			0.3		0.065	0.072	**S**	**S**	**S**	**S**
lead	mg/L	0.01 [c]				0.0011	<0.0005	**A**	**A**	**A**	**A**
magnesium	mg/L					75	34	**M**	**M**	**M**	**M**
manganese	mg/L			0.05		0.014	0.004	**P**	**P**	**P**	**P**
mercury	mg/L					<0.00005	<0.0001	**L**	**L**	**L**	**L**
molybdenum	mg/L					<0.002	<0.001	**E**	**E**	**E**	**E**
nickel	mg/L					<0.002	<0.001	**D**	**D**	**D**	**D**
nitrate as N	mg/L	10.0 [b]				9.4	0.7				
nitrite as N	mg/L	1.0 [b]				<0.01	0.02				
pH	pH Units				6.5-8.5	7.72	8.1				
phenol	mg/L					<0.001	<0.001				
phosphate	mg/L					<0.5	<0.01				
total phosphorous	mg/L					<0.01	<0.002				
potassium	mg/L					4.1	3				
selenium	mg/L	0.01				<0.002	<0.002				
silicon	mg/L					5.6	3.9				
silver	mg/L					<0.0001	<0.0001				
sodium	mg/L			20/200 [f]		39	23				
strontium	mg/L					1.8	0.76				
sulphide	mg/L					77	<0.02				
sulphate	mg/L			500 [d]		230	80				
thallium	mg/L					<0.0002	<0.00005				
tin	mg/L					<0.002	<0.001	**Note:**	**Note:**	**Note:**	**Note:**
titanium	mg/L					<0.01	<0.005	Well not in	Well not in	Well not in	Well not in
TSS	mg/L					2	2	use.	use.	use.	use.
turbidity	NTU			5 [e]		<0.1	1.6				
uranium	mg/L					0.0042	0.0024				
vanadium	mg/L					<0.002	<0.001				
zinc	mg/L			5		0.4	0.014				

NOTES:

ODWS = Ontario Drinking Water Objectives, Standards and Guidelines, dated June 2006. MAC = maximum acceptable concentrations, IMAC = interim maximum acceptable concentrations, AO = aesthetic objective, OG = operational guideline.

Bold values exceed the ODWS June 2006 standard for that parameter

[a] Where fluoride is added to drinking water, it is recommended that the concentration be adjusted to 0.5-0.8 mg/L the optimum level for control of tooth decay. Where supplies contain naturally occurring fluoride at levels higher than 1.5 mg/L but less than 2.4 mg/L the Ministry of Health and Long Term Care recommends an approach through local boards of health to raise public and professional awareness to control excessive exposure to fluoride from other sources.

[b] Where both nitrate and nitrite are present, the total of the two should not exceed 10 mg/L (as nitrogen)

[c] This standard applies to water at the point of consumption. Since lead is a component in some plumbing systems, first flush water may contain higher concentrations of lead than water that has been flushed for five minutes.

[d] When sulphate levels exceed 500 mg/L, water may have a laxative effect on some people.

[e] Applicable for all waters at the point of consumption.

[f] The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on Sodium restricted diets.

"-" Parameter not analysed

Table D.5
Groundwater Quality - Featherstone Well
Tansley Quarry - Hanson Brick Ltd.

Parameter	Units	Criteria				FEATHERSTONE							
		ODWS MAC	ODWS IMAC	ODWS AO	ODWS OG	Nov-02	Mar-03	Sep-04	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11
aluminum	mg/L				0.1	<0.005	0.007	<0.01	0.029	0.005			
alkalinity	mg $CaCO_3$/L				30-500	255	98	260	378	253			
ammonia-N	mg/L					1.22	0.3	1.2	0.38	1.2			
antimony	mg/L		0.006			<0.0005	<0.0005	<0.0005	<0.001	<0.0005			
arsenic	mg/L		0.025			<0.002	<0.002	<0.002	<0.001	<0.001			
barium	mg/L	1				0.017	0.008	0.02	0.019	0.015			
beryllium	mg/L					<0.001	<0.001	<0.001	<0.0005	<0.0005			
bismuth	mg/L					<0.001	<0.001	-	<0.001	<0.001			
boron	mg/L		5			1.28	0.397	1.400	0.54	1.4			
bromide	mg/L					0.5	0.5	0.6	<1	<1			
cadmium	mg/L	0.005				<0.0001	<0.0001	<0.0001	<0.0001	<0.0001			
calcium	mg/L					135	45.4	110	150	110			
chloride	mg/L			250		53.2	12.1	49	17	32			
chromium	mg/L	0.05				<0.005	<0.005	<0.005	<0.005	<0.005			
cobalt	mg/L					<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	N	N	N
copper	mg/L			1		0.0008	0.0138	<0.002	0.023	0.012	O	O	O
fluoride	mg/L	1.5 [a]				0.2	0.1	0.2	0.2	0.2	T	T	T
free cyanide	mg/L					<0.001	<0.001	<0.001	<0.002	<0.002			
hardness	mg $CaCO_3$/L				80-100	**724**	**197**	**570**	**480**	**600**			
iron	mg/L			0.3		**0.81**	0.12	**0.41**	0.24	**0.35**	S	S	S
lead	mg/L	0.01 [c]				<0.0005	<0.0005	<0.0005	0.0027	0.0043	A	A	A
magnesium	mg/L					93.7	20.4	73	41	79	M	M	M
manganese	mg/L			0.05		**0.06**	0.02	0.046	0.026	**0.051**	P	P	P
mercury	mg/L					<0.00005	<0.00005	<0.00005	<0.0001	<0.0001	L	L	L
molybdenum	mg/L					0.004	0.002	-	0.002	0.003	E	E	E
nickel	mg/L					<0.001	<0.001	0.001	<0.001	<0.001	D	D	D
nitrate as N	mg/L	10.0 [b]				<0.2	<0.2	<0.05	0.2	1.6			
nitrite as N	mg/L	1.0 [b]				<0.2	<0.2	<0.01	0.01	0.02			
pH	pH Units				6.5-8.5	7.71	7.46	8.19	8.1	8.1			
phenol	mg/L					<0.001	<0.001	<0.001	<0.001	<0.001			
phosphate	mg/L					<1	<1	<0.5	<0.01	<0.01			
total phosphorous	mg/L					0.005	0.033	<0.01	<0.002	0.011			
potassium	mg/L					13.5	4.5	11	5.9	12			
selenium	mg/L	0.01				<0.002	<0.002	<0.002	<0.002	<0.002			
silicon	mg/L					6.04	2.18	-	4.8	5.7			
silver	mg/L					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001			
sodium	mg/L			20/200 [f]		127	24.7	99.0	45	110			
strontium	mg/L					11.7	2.940	-	5.4	11			
sulphide	mg/L					0.04	<0.01	0.50	<0.02	0.74			
sulphate	mg/L			500 [d]		**601**	137	**560**	210	**559**			
thallium	mg/L					0.00006	<0.00005	<0.00005	<0.00005	<0.00005			
tin	mg/L					<0.001	<0.001	-	<0.001	0.001	**Note:**	**Note:**	**Note:**
titanium	mg/L					<0.005	<0.005	-	<0.005	<0.005	Cistern	Cistern	Cistern
TSS	mg/L					3	5	<2	<3	<10	installed.	installed.	installed.
turbidity	NTU			5 [e]		2.1	3.6	2.0	2	4.1	Well not in	Well not in	Well not in
uranium	mg/L					<0.0001	<0.0001	<0.0001	0.0005	<0.0001	use.	use.	use.
vanadium	mg/L					0.0016	0.0009	<0.002	<0.001	<0.001			
zinc	mg/L			5		0.006	0.012	0.007	0.024	0.025			

NOTES:

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Bold values exceed the ODWS June 2006 standard for that parameter

[a] Where fluoride is added to drinking water, it is recommended that the concentration be adjusted to 0.5-0.8 mg/L the optimum level for control of tooth decay. Where supplies contain naturally occurring fluoride at levels higher than 1.5 mg/L but less than 2.4 mg/L the Ministry of Health and Long Term Care recommends an approach through local boards of health to raise public and professional awareness to control excessive exposure to fluoride from other sources.

[b] Where both nitrate and nitrite are present, the total of the two should not exceed 10 mg/L (as nitrogen).

[c] This standard applies to water at the point of consumption. Since lead is a component in some plumbing systems, first flush water may contain higher concentrations of lead than water that has been flushed for five minutes.

[d] When sulphate levels exceed 500 mg/L, water may have a laxative effect on some people.

[e] Applicable for all waters at the point of consumption.

[f] The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on Sodium restricted diets.

"-" Parameter not analysed

Table D.6
Groundwater Quality - Finucci Well
Tansley Quarry - Hanson Brick Ltd.

Parameter	Units	Criteria				FINUCCI								
		ODWS MAC	ODWS IMAC	ODWS AO	ODWS OG	Nov-02	Duplicate Nov-02	Mar-03	Sep-04	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11
aluminum	mg/L				0.1	<0.005	<0.005	<0.005	0.012	0.005	0.006	0.010	<0.005	0.005
alkalinity	mg $CaCO_3$/L				30-500	391	394	389	400	402	417	404	405	408
ammonia-N	mg/L					0.50	0.50	0.92	1.30	0.76	0.28	1.3	1.2	0.25
antimony	mg/L		0.006			<0.0005	<0.0005	<0.0005	<0.0005	<0.001	0.0012	<0.0005	<0.0005	<0.0005
arsenic	mg/L		0.025			<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001
barium	mg/L	1				0.014	0.014	0.013	0.013	0.014	0.014	0.014	0.014	0.02
beryllium	mg/L					<0.001	<0.001	<0.001	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
bismuth	mg/L					<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
boron	mg/L		5			2.84	2.82	2.96	3.10	3.7	2.9	3.0	3.0	3.9
bromide	mg/L					<0.5	<0.5	<0.5	0.2	<1	<1	<1	<1	<1
cadmium	mg/L	0.005				<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
calcium	mg/L					111.0	97.2	107	89	100	92	89	98	130
chloride	mg/L			250		33.3	34.4	37.3	22	23	18	18	20	19
chromium	mg/L	0.05				<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
cobalt	mg/L					<0.0001	<0.0001	<0.0001	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
copper	mg/L			1		0.0064	0.0066	0.0035	0.011	0.027	0.022	0.016	0.01	0.015
fluoride	mg/L	1.5 [a]				0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.4
free cyanide	mg/L					<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002
hardness	mg $CaCO_3$/L				80-100	**627**	**553**	**597**	**510**	**490**	**510**	**520**	**520**	**520**
iron	mg/L			0.3		<0.03	<0.03	<0.03	0.03	**0.34**	<0.1	0.2	<0.1	<0.1
lead	mg/L	0.01 [c]				<0.0005	<0.0005	<0.0005	<0.0005	0.005	0.0022	0.0016	0.0013	0.0011
magnesium	mg/L					84.7	75.3	79.7	70	82	75	71	77	96
manganese	mg/L			0.05		0.008	0.008	0.015	0.015	0.011	0.011	0.017	0.013	0.038
mercury	mg/L					<0.00005	<0.00005	<0.00005	<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
molybdenum	mg/L					0.003	0.003	0.003	-	0.003	0.003	0.003	0.003	0.0043
nickel	mg/L					0.002	0.002	0.001	0.001	<0.001	0.001	0.001	<0.001	0.007
nitrate as N	mg/L	10.0 [b]				1.3	1.3	1.2	0.7	1.2	1.2	0.7	0.7	0.7
nitrite as N	mg/L	1.0 [b]				<0.2	<0.2	<0.2	0.2	0.02	<0.01	<0.01	<0.01	0.01
pH	pH Units				6.5-8.5	7.93	7.98	7.81	8.22	8.2	8.1	8.0	8.0	7.6
phenol	mg/L					<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
phosphate	mg/L					<1	<1	<1	<0.5	0.01	<0.01	<0.01	<0.01	<0.01
total phosphorous	mg/L					<0.002	<0.002	0.007	<0.01	0.002	0.006	<0.002	<0.1	<0.002
potassium	mg/L					29.6	26.5	25.5	23	27	25	23	27	34
selenium	mg/L	0.01				<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
silicon	mg/L					5.55	4.99	5.12	-	5.8	5.8	5.6	5.9	7.5
silver	mg/L					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001
sodium	mg/L			20/200 [f]		140	130	134	110	140	110	97	110	140
strontium	mg/L					14.3	14.1	13	-	15	15	14	16	21
sulphide	mg/L					<0.01	-	<0.01	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
sulphate	mg/L			500 [d]		437	446	440	-	392	351	338	354	341
thallium	mg/L					0.00006	0.00008	0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
tin	mg/L					<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001
titanium	mg/L					<0.005	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005
TSS	mg/L					2	2	2	2	<1	<10	<10	<10	<10
turbidity	NTU			5 [e]		0.2	0.2	1.1	0.5	3.5	0.3	2.0	1.3	<0.2
uranium	mg/L					0.0003	0.0003	0.0003	0.0002	0.0003	0.0003	0.0003	0.0002	0.0003
vanadium	mg/L					0.0023	0.0045	0.0026	<0.002	<0.001	<0.001	<0.001	<0.001	0.0005
zinc	mg/L			5		0.066	0.066	0.013	0.069	0.067	0.16	0.083	0.034	0.34

NOTES:

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[a] Where fluoride is added to drinking water, it is recommended that the concentration be adjusted to 0.5-0.8 mg/L the optimum level for control of tooth decay. Where supplies contain naturally occurring fluoride at levels higher than 1.5 mg/L but less than 2.4 mg/L the Ministry of Health and Long Term Care recommends an approach through local boards of health to raise public and professional awareness to control excessive exposure to fluoride from other sources.

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[d] When sulphate levels exceed 500 mg/L, water may have a laxative effect on some people.

[e] Applicable for all waters at the point of consumption.

[f] The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on Sodium restricted diets.

"-" Parameter not analysed

Table D.7
Groundwater Quality - Hendervale House Well
Tansley Quarry - Hanson Brick Ltd.

Parameter	Units	Criteria				HENDERVALE HOUSE									
		ODWS MAC	ODWS IMAC	ODWS AO	ODWS OG	Nov-02	Mar-03	Duplicate Mar-03	Sep-04	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11	Nov-11 DUP 2
aluminum	mg/L				0.1	<0.005	<0.005	<0.005	<0.01	<0.005	0.007	0.007	0.018	<0.005	<0.005
alkalinity	mg $CaCO_3$/L				30-500	356	357	362	360	380	353	360	356	350	355
ammonia-N	mg/L					0.43	0.5	0.5	0.47	0.63	0.54	0.54	0.36	0.29	0.29
antimony	mg/L		0.006			<0.0005	<0.0005	<0.0005	<0.002	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
arsenic	mg/L		0.025			0.013	0.013	0.013	0.013	0.01	0.007	0.013	0.008	0.008	0.008
barium	mg/L	1				0.028	0.024	0.023	0.024	0.021	0.019	0.025	0.025	0.038	0.035
beryllium	mg/L					<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
bismuth	mg/L					<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
boron	mg/L		5			0.51	0.707	0.705	0.550	0.79	0.82	0.75	0.7	0.95	0.88
bromide	mg/L					<0.5	<0.5	<0.5	<0.1	<1	<1	<1	<1	<1	<1
cadmium	mg/L	0.005				<0.0001	<0.0001	<0.0001	<0.00007	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
calcium	mg/L					91.3	82.8	81.4	72	93	80	85	94	130	120
chloride	mg/L			250		97.8	63.5	64.4	88	66	69	83	113	117	117
chromium	mg/L	0.05				<0.005	<0.005	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
cobalt	mg/L					0.0001	0.0002	0.0002	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
copper	mg/L			1		0.0045	0.0014	0.0015	0.002	0.019	0.025	0.018	0.03	0.036	0.03
fluoride	mg/L	1.5 [a]				0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
free cyanide	mg/L					<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
hardness	mg $CaCO_3$/L				80-100	**613**	**552**	**549**	**470**	**580**	**500**	**550**	**570**	**580**	**560**
iron	mg/L			0.3		**1.81**	**1.39**	**1.35**	**0.74**	**0.6**	**0.53**	**1.3**	**0.44**	**0.37**	**0.34**
lead	mg/L	0.01 [c]				<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
magnesium	mg/L					93.4	84	84.1	69	90	77	84	90	120	110
manganese	mg/L			0.05		**0.052**	0.046	0.045	0.029	0.032	0.036	0.042	0.034	0.033	0.03
mercury	mg/L					<0.00005	<0.00005	<0.00005	<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
molybdenum	mg/L					0.004	0.005	0.005	<0.005	0.005	0.005	0.005	0.004	0.0063	0.0058
nickel	mg/L					<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005
nitrate as N	mg/L	10.0 [b]				<0.2	<0.2	<0.2	0.1	<0.1	<0.1	<0.1	0.2	<0.1	0.1
nitrite as N	mg/L	1.0 [b]				<0.2	<0.2	<0.2	0.01	<0.01	<0.01	0.02	<0.01	0.03	0.03
pH	pH Units				6.5-8.5	7.74	7.61	7.57	7.67	8.1	8.2	8.0	7.97	8.03	7.98
phenol	mg/L					<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
phosphate	mg/L					<1	<1	<1	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
total phosphorous	mg/L					0.003	0.007	0.007	<0.01	<0.002	0.017	<0.002	<0.1	0.005	<0.1
potassium	mg/L					9.1	9.2	9.2	7.5	10	9.9	9.4	10	14	13
selenium	mg/L	0.01				<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
silicon	mg/L					9.92	9.12	9	-	10	8.7	9.2	9.8	13	12
silver	mg/L					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
sodium	mg/L			20/200 [f]		54.9	58.4	58.1	45.0	69	68	64	70	92	85
strontium	mg/L					4.37	4.55	4.59	4.60	5.1	5.3	5.6	6.3	8.1	7.6
sulphide	mg/L					0.01	0.01		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
sulphate	mg/L			500 [d]		187	213	215	190	210	229	197	197	190	183
thallium	mg/L					0.00007	<0.00005	0.00005	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
tin	mg/L					<0.001	<0.001	<0.001	<0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
titanium	mg/L					<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
TSS	mg/L					4	10	9	2	<1	<10	<10	<10	<10	<10
turbidity	NTU			5 [e]		2.2	**9.7**	**9.7**	**12**	3.5	2	**8**	3.6	1.3	1.7
uranium	mg/L					0.0015	0.0011	0.0011	0.0012	0.0011	0.0009	0.0012	0.0011	0.0018	0.0018
vanadium	mg/L					0.002	0.0025	0.0017	<0.002	<0.001	<0.001	<0.001	<0.001	0.0008	<0.0005
zinc	mg/L			5		0.007	0.01	0.01	0.007	0.026	0.009	0.006	0.016	0.019	0.011

NOTES:

ODWS = Ontario Drinking Water Objectives, Standards and Guidelines, dated June 2006. MAC = maximum acceptable concentrations, IMAC = interim maximum acceptable concentrations, AO = aesthetic objective, OG = operational guideline.

Bold values exceed the ODWS June 2006 standard for that parameter

[a] Where fluoride is added to drinking water, it is recommended that the concentration be adjusted to 0.5-0.8 mg/L the optimum level for control of tooth decay. Where supplies contain naturally occurring fluoride at levels higher than 1.5 mg/L but less than 2.4 mg/L the Ministry of Health and Long Term Care recommends an approach through local boards of health to raise public and professional awareness to control excessive exposure to fluoride from other sources.

[b] Where both nitrate and nitrite are present, the total of the two should not exceed 10 mg/L (as nitrogen)

[c] This standard applies to water at the point of consumption. Since lead is a component in some plumbing systems, first flush water may contain higher concentrations of lead than water that has been flushed for five minutes.

[d] When sulphate levels exceed 500 mg/L, water may have a laxative effect on some people.

[e] Applicable for all waters at the point of consumption.

[f] The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on Sodium restricted diets.

"-" Parameter not analysed

Table D.8
Groundwater Quality - Hendervale Cottage Well
Tansley Quarry - Hanson Brick Ltd.

Parameter	Units	Criteria				HENDERVALE COTTAGE				
		ODWS MAC	ODWS IMAC	ODWS AO	ODWS OG	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11
aluminum	mg/L				0.1	0.007	0.005	0.006	0.007	<0.005
alkalinity	mg $CaCO_3$/L				30-500	385	361	356	360	354
ammonia-N	mg/L					0.5	0.39	0.42	0.36	0.31
antimony	mg/L		0.006			<0.001	<0.0005	<0.0005	<0.0005	<0.0005
arsenic	mg/L		0.025			0.016	0.014	0.014	0.01	0.014
barium	mg/L	1				0.032	0.037	0.029	0.03	0.04
beryllium	mg/L					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
bismuth	mg/L					<0.001	<0.001	<0.001	<0.001	<0.001
boron	mg/L		5			0.52	0.44	0.48	0.4	0.67
bromide	mg/L					<1	<1	<1	<1	<1
cadmium	mg/L	0.005				<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
calcium	mg/L					100.0	92	90	100	130
chloride	mg/L			250		97	83	131	135	128
chromium	mg/L	0.05				<0.005	<0.005	<0.005	<0.005	<0.005
cobalt	mg/L					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
copper	mg/L			1		0.001	0.003	0.006	<0.001	0.002
fluoride	mg/L	1.5 [a]				0.2	0.2	0.2	0.2	0.2
free cyanide	mg/L					<0.002	<0.002	<0.002	<0.002	<0.002
hardness	mg $CaCO_3$/L				80-100	**610**	**510**	**580**	**560**	**590**
iron	mg/L			0.3		**1.4**	**1.1**	**1.3**	**1.1**	**0.46**
lead	mg/L	0.01 [c]				<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
magnesium	mg/L					85	68	78	86	100
manganese	mg/L			0.05		0.028	0.032	0.029	0.032	**0.051**
mercury	mg/L					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
molybdenum	mg/L					0.003	0.002	0.002	0.002	0.004
nickel	mg/L					<0.001	<0.001	<0.001	<0.001	<0.001
nitrate as N	mg/L	10.0 [b]				<0.1	<0.1	<0.1	<0.1	<0.1
nitrite as N	mg/L	1.0 [b]				<0.01	<0.01	<0.01	<0.01	<0.01
pH	pH Units				6.5-8.5	8.1	8.1	7.9	7.8	7.93
phenol	mg/L					<0.001	<0.001	<0.001	<0.001	<0.001
phosphate	mg/L					<0.01	<0.01	<0.01	0.01	<0.01
total phosphorous	mg/L					<0.002	0.014	<0.002	<0.1	0.008
potassium	mg/L					8.4	7.9	7.4	8	10
selenium	mg/L	0.01				<0.002	<0.002	<0.002	<0.002	<0.002
silicon	mg/L					11	10	9.6	11	12
silver	mg/L					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
sodium	mg/L			20/200 [f]		54.0	45	46	52	66
strontium	mg/L					4.20	4.3	4.3	4.6	5.6
sulphide	mg/L					<0.02	<0.02	<0.02	<0.02	<0.02
sulphate	mg/L			500 [d]		141	104	144	133	154
thallium	mg/L					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
tin	mg/L					<0.001	<0.001	<0.001	<0.001	<0.001
titanium	mg/L					<0.005	<0.005	<0.005	<0.005	<0.005
TSS	mg/L					<3	<10	<10	10	<10
turbidity	NTU			5 [e]		**12.7**	**8.5**	**17**	**8.5**	**2.1**
uranium	mg/L					0.0011	0.0009	0.0013	0.0012	0.0016
vanadium	mg/L					<0.001	<0.001	<0.001	<0.001	0.0008
zinc	mg/L			5		0.008	0.006	0.007	0.009	0.047

NOTES:
ODWS = Ontario Drinking Water Objectives, Standards and Guidelines, dated June 2006. MAC = maximum acceptable concentrations, IMAC = interim maximum acceptable concentrations, AO = aesthetic objective, OG = operational guideline.
Bold values exceed the ODWS June 2006 standard for that parameter

[a] Where fluoride is added to drinking water, it is recommended that the concentration be adjusted to 0.5-0.8 mg/L the optimum level for control of tooth decay. Where supplies contain naturally occurring fluoride at levels higher than 1.5 mg/L but less than 2.4 mg/L the Ministry of Health and Long Term Care recommends an approach through local boards of health to raise public and professional awareness to control excessive exposure to fluoride from other sources.

[b] Where both nitrate and nitrite are present, the total of the two should not exceed 10 mg/L (as nitrogen).

[c] This standard applies to water at the point of consumption. Since lead is a component in some plumbing systems, first flush water may contain higher concentrations of lead than water that has been flushed for five minutes.

[d] When sulphate levels exceed 500 mg/L, water may have a laxative effect on some people.

[e] Applicable for all waters at the point of consumption.

[f] The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.

"-" Parameter not analysed

Table D.9
Groundwater Quality - Hendervale Main Barn Well
Tansley Quarry - Hanson Brick Ltd.

Parameter	Units	Criteria				HENDERVALE MAIN BARN				
		ODWS MAC	ODWS IMAC	ODWS AO	ODWS OG	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11
aluminum	mg/L				0.1	**0.48**	0.035	**4.4**	0.07	
alkalinity	mg $CaCO_3$/L				30-500	170	175	220	238	
ammonia-N	mg/L					0.21	<0.05	0.31	0.18	
antimony	mg/L		0.006			<0.001	<0.0005	<0.0005	<0.0005	
arsenic	mg/L		0.025			<0.001	0.004	0.004	0.005	
barium	mg/L	1				0.21	0.02	0.047	0.027	
beryllium	mg/L					<0.0005	<0.0005	<0.0005	<0.0005	
bismuth	mg/L					<0.001	<0.001	<0.001	<0.001	
boron	mg/L		5			0.094	0.094	0.14	0.17	
bromide	mg/L					<1	<1	<1	<1	
cadmium	mg/L	0.005				<0.0001	<0.0001	<0.0001	<0.0001	
calcium	mg/L					55	46	58	67	
chloride	mg/L			250		8	6	14	12	
chromium	mg/L	0.05				<0.005	<0.005	<0.005	<0.005	
cobalt	mg/L					<0.0005	<0.0005	0.0014	<0.0005	
copper	mg/L			1		0.081	0.002	0.007	0.002	
fluoride	mg/L	1.5 [a]				<0.1	<0.1	0.1	0.1	
free cyanide	mg/L					<0.002	<0.002	<0.002	<0.002	
hardness	mg $CaCO_3$/L				80-100	**220**	**200**	**260**	**280**	
iron	mg/L			0.3		0.29	**0.34**	**3.6**	**0.47**	
lead	mg/L	0.01 [c]				<0.0005	<0.0005	0.0053	0.0022	
magnesium	mg/L					19	20	28	34	
manganese	mg/L			0.05		0.005	0.038	**0.1**	**0.074**	
mercury	mg/L					<0.0001	<0.0001	<0.0001	<0.0001	
molybdenum	mg/L					<0.001	<0.001	<0.001	<0.001	
nickel	mg/L					<0.001	<0.001	0.004	<0.001	
nitrate as N	mg/L	10.0 [b]				2.5	0.9	0.9	0.6	
nitrite as N	mg/L	1.0 [b]				0.01	<0.01	0.04	0.03	
pH	pH Units				6.5-8.5	8.1	8	7.9	7.78	
phenol	mg/L					<0.001	<0.001	<0.001	<0.001	
phosphate	mg/L					0.01	<0.01	0.16	0.03	
total phosphorous	mg/L					0.014	0.048	0.34	0.14	
potassium	mg/L					2.8	2.7	11	6	
selenium	mg/L	0.01				<0.002	<0.002	<0.002	<0.002	
silicon	mg/L					4.60	4.5	15	7.3	
silver	mg/L					<0.0001	<0.0001	<0.0001	<0.0001	
sodium	mg/L			20/200 [f]		9.4	8.5	12	13	
strontium	mg/L					0.58	0.84	1.1	1.4	
sulphide	mg/L					<0.02	<0.02	<0.02	<0.02	
sulphate	mg/L			500 [d]		34	29	45	53	
thallium	mg/L					<0.00005	<0.00005	0.00006	<0.00005	
tin	mg/L					<0.001	<0.001	<0.001	<0.001	**Note:**
titanium	mg/L					0.019	<0.005	0.18	<0.005	Well not in
TSS	mg/L					1	<10	46	10	use.
turbidity	NTU			5 [e]		**9.2**	2.4	**94**	**130**	
uranium	mg/L					0.0006	0.0004	0.0007	0.0004	
vanadium	mg/L					<0.001	<0.001	0.009	<0.001	
zinc	mg/L			5		0.170	0.14	0.20	0.07	

NOT SAMPLED

NOTES:

ODWS = Ontario Drinking Water Objectives, Standards and Guidelines, dated June 2006. MAC = maximum acceptable concentrations, IMAC = interim maximum acceptable concentrations, AO = aesthetic objective, OG = operational guideline.
Bold values exceed the ODWS June 2006 standard for that parameter

[a] Where fluoride is added to drinking water, it is recommended that the concentration be adjusted to 0.5-0.8 mg/L the optimum level for control of tooth decay. Where supplies contain naturally occurring fluoride at levels higher than 1.5 mg/L but less than 2.4 mg/L the Ministry of Health and Long Term Care recommends an approach through local boards of health to raise public and professional awareness to control excessive exposure to fluoride from other sources.

[b] Where both nitrate and nitrite are present, the total of the two should not exceed 10 mg/L (as nitrogen)

[c] This standard applies to water at the point of consumption. Since lead is a component in some plumbing systems, first flush water may contain higher concentrations of lead than water that has been flushed for five minutes.

[d] When sulphate levels exceed 500 mg/L, water may have a laxative effect on some people.

[e] Applicable for all waters at the point of consumption.

[f] The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.

"-" Parameter not analysed

Table D.10
Groundwater Quality - Hendervale ABC Barn Well
Tansley Quarry - Hanson Brick Ltd.

Parameter	Units	Criteria				HENDERVALE ABC BARN	
		ODWS MAC	ODWS IMAC	ODWS AO	ODWS OG	Oct-10	Nov-11
aluminum	mg/L				0.1	0.083	
alkalinity	mg $CaCO_3$/L				30-500	54	
ammonia-N	mg/L					<0.05	
antimony	mg/L		0.006			<0.0005	
arsenic	mg/L		0.025			<0.001	
barium	mg/L	1				0.014	
beryllium	mg/L					<0.0005	
bismuth	mg/L					<0.001	
boron	mg/L		5			0.03	
bromide	mg/L					<1	
cadmium	mg/L	0.005				0.0001	
calcium	mg/L					19	
chloride	mg/L			250		2	
chromium	mg/L	0.05				<0.005	
cobalt	mg/L					<0.0005	
copper	mg/L			1		0.003	NOT SAMPLED
fluoride	mg/L	1.5 [a]				<0.1	
free cyanide	mg/L					<0.002	
hardness	mg $CaCO_3$/L				80-100	57	
iron	mg/L			0.3		<0.1	
lead	mg/L	0.01 [c]				<0.0005	
magnesium	mg/L					3.5	
manganese	mg/L			0.05		0.006	
mercury	mg/L					<0.0001	
molybdenum	mg/L					<0.001	
nickel	mg/L					<0.001	
nitrate as N	mg/L	10.0 [b]				0.8	
nitrite as N	mg/L	1.0 [b]				<0.01	
pH	pH Units				6.5-8.5	7.64	
phenol	mg/L					<0.001	
phosphate	mg/L					0.01	
total phosphorous	mg/L					0.018	
potassium	mg/L					1.7	
selenium	mg/L	0.01				<0.002	
silicon	mg/L					0.96	
silver	mg/L					<0.0001	
sodium	mg/L			20/200 [f]		3.3	
strontium	mg/L					0.17	
sulphide	mg/L					<0.02	
sulphate	mg/L			500 [d]		6	
thallium	mg/L					0.00005	
tin	mg/L					<0.001	**Note:**
titanium	mg/L					<0.005	Well not in
TSS	mg/L					<10	use.
turbidity	NTU			5 [e]		1.6	
uranium	mg/L					0.0001	
vanadium	mg/L					0.001	
zinc	mg/L			5		0.011	

NOTES:

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Bold values exceed the ODWS June 2006 standard for that parameter

[a] Where fluoride is added to drinking water, it is recommended that the concentration be adjusted to 0.5-0.8 mg/L the optimum level for control of tooth decay. Where supplies contain naturally occurring fluoride at levels higher than 1.5 mg/L but less than 2.4 mg/L the Ministry of Health and Long Term Care recommends an approach through local boards of health to raise public and professional awareness to control excessive exposure to fluoride from other sources.

[b] Where both nitrate and nitrite are present, the total of the two should not exceed 10 mg/L (as nitrogen).

[c] This standard applies to water at the point of consumption. Since lead is a component in some plumbing systems, first flush water may contain higher concentrations of lead than water that has been flushed for five minutes.

[d] When sulphate levels exceed 500 mg/L, water may have a laxative effect on some people.

[e] Applicable for all waters at the point of consumption.

[f] The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.

"-" Parameter not analysed

Table D.11
Groundwater Quality - Hendervale Barn Cistern
Tansley Quarry - Hanson Brick Ltd.

Parameter	Units	Criteria				HENDERVALE BARN CISTERN
		ODWS MAC	ODWS IMAC	ODWS AO	ODWS OG	Nov-11
aluminum	mg/L				0.1	**0.11**
alkalinity	mg $CaCO_3$/L				30-500	368
ammonia-N	mg/L					0.27
antimony	mg/L		0.006			<0.0005
arsenic	mg/L		0.025			0.013
barium	mg/L	1				0.046
beryllium	mg/L					<0.0005
bismuth	mg/L					<0.001
boron	mg/L		5			0.33
bromide	mg/L					<1
cadmium	mg/L	0.005				<0.0001
calcium	mg/L					110
chloride	mg/L			250		19
chromium	mg/L	0.05				<0.005
cobalt	mg/L					<0.0005
copper	mg/L			1		0.005
fluoride	mg/L	1.5 [a]				0.2
free cyanide	mg/L					<0.002
hardness	mg $CaCO_3$/L				80-100	**450**
iron	mg/L			0.3		**1.6**
lead	mg/L	0.01 [c]				<0.0005
magnesium	mg/L					58
manganese	mg/L			0.05		**0.051**
mercury	mg/L					<0.0001
molybdenum	mg/L					0.0012
nickel	mg/L					<0.001
nitrate as N	mg/L	10.0 [b]				<0.1
nitrite as N	mg/L	1.0 [b]				0.06
pH	pH Units				6.5-8.5	8.1
phenol	mg/L					<0.001
phosphate	mg/L					<0.01
total phosphorous	mg/L					0.015
potassium	mg/L					5.2
selenium	mg/L	0.01				<0.002
silicon	mg/L					12
silver	mg/L					<0.0001
sodium	mg/L			20/200 [f]		21
strontium	mg/L					2.6
sulphide	mg/L					<0.02
sulphate	mg/L			500 [d]		94
thallium	mg/L					<0.00005
tin	mg/L					<0.001
titanium	mg/L					<0.005
TSS	mg/L					12
turbidity	NTU			5 [e]		**6.5**
uranium	mg/L					0.001
vanadium	mg/L					0.0016
zinc	mg/L			5		0.031

NOTES:

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Bold values exceed the ODWS June 2006 standard for that parameter

[a] Where fluoride is added to drinking water, it is recommended that the concentration be adjusted to 0.5-0.8 mg/L the optimum level for control of tooth decay. Where supplies contain naturally occurring fluoride at levels higher than 1.5 mg/L but less than 2.4 mg/L the Ministry of Health and Long Term Care recommends an approach through local boards of health to raise public and professional awareness to control excessive exposure to fluoride from other sources.

[b] Where both nitrate and nitrite are present, the total of the two should not exceed 10 mg/L (as nitrogen).

[c] This standard applies to water at the point of consumption. Since lead is a component in some plumbing systems, first flush water may contain higher concentrations of lead than water that has been flushed for five minutes.

[d] When sulphate levels exceed 500 mg/L, water may have a laxative effect on some people.

[e] Applicable for all waters at the point of consumption.

[f] The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.

"-" Parameter not analysed

Table D.12
Groundwater Quality - Robinson Well
Tansley Quarry - Hanson Brick Ltd.

Parameter	Units	Criteria				ROBINSON						
		ODWS MAC	ODWS IMAC	ODWS AO	ODWS OG	Jun-03	Sep-04	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11
aluminum	mg/L				0.1	<0.005	0.013	0.044				
alkalinity	mg $CaCO_3$/L				30-500	461	430	272				
ammonia-N	mg/L					0.24	0.09	0.16				
antimony	mg/L		0.006			<0.0005	<0.002	<0.001				
arsenic	mg/L		0.025			<0.002	<0.002	<0.001				
barium	mg/L	1				0.158	0.053	0.052				
beryllium	mg/L					<0.001	<0.001	<0.005				
bismuth	mg/L					<0.001	-	<0.001				
boron	mg/L		5			0.254	0.39	0.039				
bromide	mg/L					<0.5	<0.2	<1				
cadmium	mg/L	0.005				0.0001	0.00007	<0.0001				
calcium	mg/L					190.0	96	97				
chloride	mg/L			250		49.2	33	25				
chromium	mg/L	0.05				<0.005	<0.002	<0.005				
cobalt	mg/L					0.0011	<0.0005	<0.005	**N**	**N**	**N**	**N**
copper	mg/L			1		0.0102	<0.003	0.27	**O**	**O**	**O**	**O**
fluoride	mg/L	1.5 [a]				0.2	0.29	0.3	**T**	**T**	**T**	**T**
free cyanide	mg/L					<0.001	<0.002	<0.002				
hardness	mg $CaCO_3$/L				80-100	**1249**	**550**	**320**				
iron	mg/L			0.3		**0.50**	<0.02	0.15	**S**	**S**	**S**	**S**
lead	mg/L	0.01 [c]				<0.0005	<0.0005	0.0007	**A**	**A**	**A**	**A**
magnesium	mg/L					187.00	76	32	**M**	**M**	**M**	**M**
manganese	mg/L			0.05		**0.771**	**0.58**	0.033	**P**	**P**	**P**	**P**
mercury	mg/L					<0.00005	<0.00005	<0.0001	**L**	**L**	**L**	**L**
molybdenum	mg/L					0.002	<0.005	<0.001	**E**	**E**	**E**	**E**
nickel	mg/L					0.003	<0.002	0.004	**D**	**D**	**D**	**D**
nitrate as N	mg/L	10.0 [b]				<0.2	0.31	0.5				
nitrite as N	mg/L	1.0 [b]				<0.2	0.14	<0.01				
pH	pH Units				6.5-8.5	7.48	7.76	8				
phenol	mg/L					<0.001	<0.001	<0.001				
phosphate	mg/L					<1	<0.5	0.01				
total phosphorous	mg/L					0.050	<0.01	<0.05				
potassium	mg/L					8	5.1	3				
selenium	mg/L	0.01				<0.002	<0.002	<0.002				
silicon	mg/L					7.22	-	3.6				
silver	mg/L					<0.0001	<0.0001	<0.0001				
sodium	mg/L			20/200 [f]		40.4	30	23				
strontium	mg/L					6.93	4.3	0.83				
sulphide	mg/L					<0.01	<0.02	<0.02				
sulphate	mg/L			500 [d]		**720**	240	72				
thallium	mg/L					<0.00005	-	<0.00005				
tin	mg/L					<0.001	<0.05	<0.001	**Note:**	**Note:**	**Note:**	**Note:**
titanium	mg/L					<0.005	<0.01	<0.005	Well filled	Well filled	Well filled	Well not in
TSS	mg/L					3	2	<1	with municipal	with municipal	with municipal	use.
turbidity	NTU			5 [e]		2.5	0.62	1.3	water	water	water	
uranium	mg/L					0.0029	0.0035	0.0017				
vanadium	mg/L					0.0022	<0.002	<0.001				
zinc	mg/L			5		0.195	0.069	0.15				

NOTES:
ODWS = Ontario Drinking Water Objectives, Standards and Guidelines, dated June 2006. MAC = maximum acceptable concentrations, IMAC = interim maximum acceptable concentrations, AO = aesthetic objective, OG = operational guideline.
Bold values exceed the ODWS June 2006 standard for that parameter

[a] Where fluoride is added to drinking water, it is recommended that the concentration be adjusted to 0.5-0.8 mg/L the optimum level for control of tooth decay. Where supplies contain naturally occurring fluoride at levels higher than 1.5 mg/L but less than 2.4 mg/L the Ministry of Health and Long Term Care recommends an approach through local boards of health to raise public and professional awareness to control excessive exposure to fluoride from other sources.

[b] Where both nitrate and nitrite are present, the total of the two should not exceed 10 mg/L (as nitrogen).

[c] This standard applies to water at the point of consumption. Since lead is a component in some plumbing systems, first flush water may contain higher concentrations of lead than water that has been flushed for five minutes.

[d] When sulphate levels exceed 500 mg/L, water may have a laxative effect on some people.

[e] Applicable for all waters at the point of consumption.

[f] The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on Sodium restricted diets.

"-" Parameter not analysed

Table D.13
Groundwater Quality - Sicard Well
Tansley Quarry - Hanson Brick Ltd.

Parameter	Units	Criteria				SICARD							
		ODWS MAC	ODWS IMAC	ODWS AO	ODWS OG	Nov-02	Mar-03	Sep-04	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11
aluminum	mg/L				0.1	<0.005	<0.005	<0.01	<0.03	<0.005	<0.05	0.006	<0.005
alkalinity	mg $CaCO_3$/L				30-500	130	130	150	144	152	134	148	140
ammonia-N	mg/L					4.05	3.88	3.30	3.55	2.9	4.2	2.5	2.7
antimony	mg/L		0.006			<0.0005	<0.0005	<0.002	<0.005	<0.0005	<0.005	<0.0005	<0.0005
arsenic	mg/L		0.025			<0.02	<0.02	<0.002	<0.005	<0.005	<0.01	0.002	<0.005
barium	mg/L	1				0.011	0.011	0.009	<0.03	0.008	<0.05	0.009	0.009
beryllium	mg/L					<0.001	<0.001	<0.001	<0.003	<0.0005	<0.005	<0.0005	<0.0005
bismuth	mg/L					<0.001	0.001	-	<0.005	<0.001	<0.01	<0.001	<0.001
boron	mg/L		5			**6.7**	**6.74**	4.3	**7.2**	**6.5**	**6.5**	**6.9**	**7.2**
bromide	mg/L					20.9	21.1	16	16	17	21	12	13
cadmium	mg/L	0.005				<0.0001	<0.0001	<0.00007	<0.0005	<0.0001	<0.001	<0.0001	<0.0001
calcium	mg/L					372	355	270	370	280	370	240	300
chloride	mg/L			250		**1770**	**1940**	**1400**	**1660**	**1150**	**1780**	**955**	**1070**
chromium	mg/L	0.05				<0.05	<0.05	<0.002	<0.03	<0.005	<0.05	<0.005	<0.005
cobalt	mg/L					<0.0001	<0.0001	0.0081	<0.003	<0.0005	<0.005	<0.0005	<0.003
copper	mg/L			1		0.0155	0.0263	0.0120	0.029	0.018	0.02	0.025	0.021
fluoride	mg/L	1.5 [a]				<0.6	<0.6	<0.6	0.4	0.5	0.5	0.6	0.6
free cyanide	mg/L					<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
hardness	mg $CaCO_3$/L				80-100	**1350**	**1350**	**950**	**1400**	**1000**	**1300**	**860**	**950**
iron	mg/L			0.3		0.07	0.14	0.16	**0.37**	0.16	<1	**1.6**	<0.1
lead	mg/L	0.01 [c]				<0.0005	<0.0005	<0.0005	<0.003	<0.0005	<0.005	0.0006	<0.0005
magnesium	mg/L					101	112	89	110	86	110	73	84
manganese	mg/L			0.05		**0.126**	**0.125**	**0.100**	**0.12**	**0.1**	**0.13**	**0.07**	**0.10**
mercury	mg/L					<0.00005	<0.00005	<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
molybdenum	mg/L					0.008	<0.007	<0.007	0.008	0.009	<0.01	0.01	0.011
nickel	mg/L					<0.001	<0.001	0.002	<0.005	<0.001	<0.01	<0.001	<0.005
nitrate as N	mg/L	10.0 [b]				0.2	0.4	0.5	0.4	0.3	0.2	0.2	<0.1
nitrite as N	mg/L	1.0 [b]				<2	0.2	<0.01	0.09	0.01	<0.01	0.02	<0.01
pH	pH Units				6.5-8.5	7.66	7.56	7.74	7.8	8	7.9	7.76	7.82
phenol	mg/L					<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
phosphate	mg/L					<1	<1	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01
total phosphorous	mg/L					<0.002	<0.002	<0.01	0.005	0.026	<0.002	<0.002	<0.002
potassium	mg/L					35.8	37.8	33.0	40.0	35	42	33	39
selenium	mg/L	0.01				<0.02	<0.02	0.004	<0.01	<0.01	<0.02	<0.002	<0.01
silicon	mg/L					3.53	3.82	-	4.2	4.1	3.8	4	4.3
silver	mg/L					<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.001	<0.0001	<0.0001
sodium	mg/L			20/200 [f]		**982**	**1120**	**820**	**1100**	**850**	**1200**	**760**	**620**
strontium	mg/L					11.5	10.5	10	12	9.9	11	9.6	11
sulphide	mg/L					<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
sulphate	mg/L			500 [d]		**1020**	**1040**	**970**	**995**	**732**	**1030**	**952**	**999**
thallium	mg/L					<0.00005	<0.00005	-	<0.0003	<0.00005	<0.0005	<0.00005	<0.00005
tin	mg/L					<0.001	<0.001	<0.05	<0.005	<0.001	<0.01	<0.001	<0.001
titanium	mg/L					<0.005	<0.005	<0.01	<0.030	<0.005	<0.05	<0.005	<0.005
TSS	mg/L					3	3	2	3	<10	<10	10	10
turbidity	NTU			5 [e]		0.7	1.4	1.5	2.8	0.6	1.4	**11**	2.2
uranium	mg/L					0.0003	<0.0003	0.0003	<0.0005	0.0005	<0.001	0.0007	0.0006
vanadium	mg/L					0.0010	0.0005	<0.002	<0.005	<0.005	<0.01	<0.001	<0.003
zinc	mg/L			5		0.014	0.012	0.016	<0.030	<0.03	<0.05	0.032	0.022

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[d] When sulphate levels exceed 500 mg/L, water may have a laxative effect on some people.
[e] Applicable for all waters at the point of consumption.
[f] The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on Sodium restricted diets.
"-" Parameter not analysed

Table D.14
Groundwater Quality - Simms Well
Tansley Quarry - Hanson Brick Ltd.

Parameter	Units	Criteria				SIMMS				
		ODWS MAC	ODWS IMAC	ODWS AO	ODWS OG	Aug-07	Oct-08	Dec-09	Oct-10	Nov-11
aluminum	mg/L				0.1	0.007	0.041	0.019	0.008	0.007
alkalinity	mg $CaCO_3$/L				30-500	345	316	164	244	313
ammonia-N	mg/L					0.09	<0.05	<0.05	<0.05	<0.05
antimony	mg/L		0.006			0.0009	0.0008	0.0007	0.0008	0.0015
arsenic	mg/L		0.025			<0.001	<0.001	<0.001	<0.001	<0.001
barium	mg/L	1				0.055	0.052	0.068	0.062	0.072
beryllium	mg/L					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
bismuth	mg/L					<0.001	<0.001	<0.001	<0.001	<0.001
boron	mg/L		5			0.036	0.045	0.45	0.19	0.069
bromide	mg/L					<1	<1	<1	<1	<1
cadmium	mg/L	0.005				<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
calcium	mg/L					110	98	150	120	120
chloride	mg/L			250		7	6	7	6	4
chromium	mg/L	0.05				<0.005	<0.005	<0.005	<0.005	<0.005
cobalt	mg/L					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
copper	mg/L			1		0.015	0.07	0.008	0.007	0.022
fluoride	mg/L	1.5 [a]				0.2	0.2	0.2	0.2	0.2
free cyanide	mg/L					0.002	<0.002	<0.002	<0.002	<0.002
hardness	mg $CaCO_3$/L				80-100	**360**	**340**	**650**	**500**	**360**
iron	mg/L			0.3		<0.05	<0.1	<0.1	<0.1	<0.1
lead	mg/L	0.01 [c]				0.0007	**0.021**	0.0006	0.0005	0.0008
magnesium	mg/L					34	28	55	55	41
manganese	mg/L			0.05		<0.002	0.004	0.003	0.003	<0.002
mercury	mg/L					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
molybdenum	mg/L					<0.001	<0.001	0.004	0.003	0.0012
nickel	mg/L					<0.001	<0.001	0.002	<0.001	<0.001
nitrate as N	mg/L	10.0 [b]				3.8	4.3	0.4	1.7	1.6
nitrite as N	mg/L	1.0 [b]				<0.01	<0.01	<0.01	<0.01	<0.01
pH	pH Units				6.5-8.5	8.2	8.2	7.9	7.95	8.08
phenol	mg/L					<0.001	<0.001	<0.001	<0.001	<0.001
phosphate	mg/L					<0.01	<0.01	<0.01	<0.01	<0.01
total phosphorous	mg/L					<0.002	0.013	<0.002	<0.1	<0.1
potassium	mg/L					2.6	2.4	8.3	6.9	4
selenium	mg/L	0.01				<0.002	<0.002	<0.002	<0.002	<0.002
silicon	mg/L					5.3	5.1	3.3	4.1	6
silver	mg/L					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
sodium	mg/L			20/200 [f]		12	11	55	37	14
strontium	mg/L					0.74	0.63	4.6	3.4	0.98
sulphate	mg/L			500 [d]		49	38	**597**	295	<0.02
sulphide	mg/L					<0.02	<0.02	<0.02	<0.02	52
thallium	mg/L					<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
tin	mg/L					<0.001	<0.001	<0.001	<0.001	<0.001
titanium	mg/L					<0.005	<0.005	<0.005	<0.005	<0.005
TSS	mg/L					<10	<10	<10	<10	<10
turbidity	NTU			5 [e]		0.4	0.5	0.6	0.3	<0.2
uranium	mg/L					0.0027	0.0024	0.0041	0.0033	0.0036
vanadium	mg/L					<0.001	<0.001	<0.001	<0.001	0.0008
zinc	mg/L			5		2	2.1	1.6	1.4	2.6

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[a] Where fluoride is added to drinking water, it is recommended that the concentration be adjusted to 0.5-0.8 mg/L the optimum level for control of tooth decay. Where supplies contain naturally occurring fluoride at levels higher than 1.5 mg/L but less than 2.4 mg/L the Ministry of Health and Long Term Care recommends an approach through local boards of health to raise public and professional awareness to control excessive exposure to fluoride from other sources.

[b] Where both nitrate and nitrite are present, the total of the two should not exceed 10 mg/L (as nitrogen)

[c] This standard applies to water at the point of consumption. Since lead is a component in some plumbing systems, first flush water may contain higher concentrations of lead than water that has been flushed for five minutes.

[d] When sulphate levels exceed 500 mg/L, water may have a laxative effect on some people.

[e] Applicable for all waters at the point of consumption.

[f] The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on Sodium restricted diets.

"-" Parameter not analysed

Table D.15
Groundwater Quality - Stevenson Well
Tansley Quarry - Hanson Brick Ltd.

Parameter	Units	Criteria				STEVENSON						
		ODWS MAC	ODWS IMAC	ODWS AO	ODWS OG	Nov-02	Mar-03	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11
aluminum	mg/L				0.1	<0.005	0.017	0.03				
alkalinity	mg $CaCO_3$/L				30-500	340	318	412				
ammonia-N	mg/L					0.95	0.48	0.12				
antimony	mg/L		0.006			<0.0005	<0.0005	<0.001				
arsenic	mg/L		0.025			<0.002	<0.002	0.005				
barium	mg/L	1				0.029	0.019	0.043				
beryllium	mg/L					<0.001	<0.001	<0.0005				
bismuth	mg/L					<0.001	<0.001	<0.001				
boron	mg/L		5			1.40	1.39	0.12				
bromide	mg/L					0.9	1.4	<1				
cadmium	mg/L	0.005				<0.0001	<0.0001	<0.0001				
calcium	mg/L					136	158	160				
chloride	mg/L			250		134	152	88				
chromium	mg/L	0.05				<0.005	<0.005	<0.005				
cobalt	mg/L					<0.0001	<0.0001	<0.0005				
copper	mg/L			1		0.0025	0.006	0.004	**N**	**N**	**N**	**N**
fluoride	mg/L	1.5 [a]				0.3	0.3	0.2	**O**	**O**	**O**	**O**
free cyanide	mg/L					<0.001	<0.001	<0.002	**T**	**T**	**T**	**T**
hardness	mg $CaCO_3$/L				80-100	**890**	**901**	**510**				
iron	mg/L			0.3		0.21	0.03	**2.8**	**S**	**S**	**S**	**S**
lead	mg/L	0.01 [c]				0.0005	<0.0005	<0.0005	**A**	**A**	**A**	**A**
magnesium	mg/L					133	122	35	**M**	**M**	**M**	**M**
manganese	mg/L			0.05		**0.054**	0.020	0.022	**P**	**P**	**P**	**P**
mercury	mg/L					<0.00005	<0.00005	<0.0001	**L**	**L**	**L**	**L**
molybdenum	mg/L					0.005	0.004	0.001	**E**	**E**	**E**	**E**
nickel	mg/L					<0.001	<0.001	<0.001	**D**	**D**	**D**	**D**
nitrate as N	mg/L	10.0 [b]				1.0	1.0	7.3				
nitrite as N	mg/L	1.0 [b]				<0.2	<0.2	<0.01				
pH	pH Units				6.5-8.5	7.94	7.84	8.2				
phenol	mg/L					<0.001	<0.001	<0.001				
phosphate	mg/L					<1	1	0.02				
total phosphorous	mg/L					0.012	0.014	0.053				
potassium	mg/L					16.7	14.8	2.2				
selenium	mg/L	0.01				<0.002	<0.002	<0.002				
silicon	mg/L					6.23	5.44	6.8				
silver	mg/L					<0.0001	<0.0001	<0.0001				
sodium	mg/L			20/200 [f]		120	119	99				
strontium	mg/L					16.5	9.72	1.4				
sulphide	mg/L					0.02	<0.01	<0.02				
sulphate	mg/L			500 [d]		**531**	**564**	97				
thallium	mg/L					0.00008	<0.00005	<0.00005				
tin	mg/L					<0.001	<0.001	<0.001	**Note:**	**Note:**	**Note:**	**Note:**
titanium	mg/L					<0.005	<0.005	<0.005	Well	Well not	Well not	Well not in
TSS	mg/L					4	4	7	inaccessible	in use	in use	use.
turbidity	NTU			5 [e]		0.6	0.5	**13.8**				
uranium	mg/L					0.0008	0.0018	0.002				
vanadium	mg/L					0.0021	0.0022	<0.001				
zinc	mg/L			5		0.168	0.181	0.79				

NOTES:

ODWS = Ontario Drinking Water Objectives, Standards and Guidelines, dated June 2006. MAC = maximum acceptable concentrations, IMAC = interim maximum acceptable concentrations, AO aesthetic objective, OG operational guideline.

Bold values exceed the ODWS June 2006 standard for that parameter

[a] Where fluoride is added to drinking water, it is recommended that the concentration be adjusted to 0.5-0.8 mg/L the optimum level for control of tooth decay. Where supplies contain naturally occurring fluoride at levels higher than 1.5 mg/L but less than 2.4 mg/L the Ministry of Health and Long Term Care recommends an approach through local boards of health to raise public and professional awareness to control excessive exposure to fluoride from other sources.

[b] Where both nitrate and nitrite are present, the total of the two should not exceed 10 mg/L (as nitrogen).

[c] This standard applies to water at the point of consumption. Since lead is a component in some plumbing systems, first flush water may contain higher concentrations of lead than water that has been flushed for five minutes.

[d] When sulphate levels exceed 500 mg/L, water may have a laxative effect on some people.

[e] Applicable for all waters at the point of consumption.

[f] The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on Sodium restricted diets.

"-" Parameter not analysed

Table D.16
Groundwater Quality - Sugiyami Well
Tansley Quarry - Hanson Brick Ltd.

Parameter	Units	Criteria				SUGIYAMI					
		ODWS MAC	ODWS IMAC	ODWS AO	ODWS OG	Sep-04	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11
aluminum	mg/L				0.1	<0.01	<0.03	<0.05	<0.005	0.012	<0.005
alkalinity	mg $CaCO_3$/L				30-500	200	198	189	168	160	160
ammonia-N	mg/L					2.2	1.64	1.8	2.0	2.1	2.5
antimony	mg/L		0.006			<0.002	<0.005	<0.005	<0.0005	<0.0005	<0.0005
arsenic	mg/L		0.025			0.004	<0.005	<0.01	<0.005	<0.005	<0.005
barium	mg/L	1				0.013	<0.03	<0.05	0.012	0.013	0.015
beryllium	mg/L					<0.001	<0.003	<0.005	<0.0005	<0.0005	<0.0005
bismuth	mg/L					-	<0.005	<0.01	<0.001	<0.001	<0.001
boron	mg/L		5			4.2	**5.3**	4.5	5.0	**5.3**	**5.7**
bromide	mg/L					16	16	19	18	15	20
cadmium	mg/L	0.005				0.00007	<0.0005	<0.001	<0.0001	<0.0001	<0.0001
calcium	mg/L					320	380	340	360	420	480
chloride	mg/L			250		**1600**	**1590**	**1660**	**1620**	**1780**	**1810**
chromium	mg/L	0.05				<0.002	<0.03	<0.05	<0.005	<0.005	<0.005
cobalt	mg/L					<0.0005	<0.003	<0.005	<0.0005	<0.003	<0.003
copper	mg/L			1		0.027	0.026	0.035	0.034	0.018	0.059
fluoride	mg/L	1.5 [a]				0.47	0.3	0.3	0.4	0.4	0.4
free cyanide	mg/L					<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
hardness	mg $CaCO_3$/L				80-100	**1300**	**1500**	**1300**	**1400**	**1400**	**1500**
iron	mg/L			0.3		0.29	**0.6**	<1	**0.4**	0.27	0.27
lead	mg/L	0.01 [c]				0.0008	<0.003	<0.005	<0.0005	<0.0005	<0.0005
magnesium	mg/L					120	130	130	130	150	160
manganese	mg/L			0.05		**13**	**0.14**	**0.11**	**0.061**	**0.12**	**0.17**
mercury	mg/L					<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
molybdenum	mg/L					-	0.006	<0.01	0.006	0.007	0.0082
nickel	mg/L					<0.002	<0.005	<0.01	<0.005	<0.005	<0.005
nitrate as N	mg/L	10.0 [b]				0.65	0.2	3	1.6	1.7	1.1
nitrite as N	mg/L	1.0 [b]				0.078	0.04	0.01	0.05	0.02	0.13
pH	pH Units				6.5-8.5	7.5	7.8	8.1	7.7	7.69	7.74
phenol	mg/L					<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
phosphate	mg/L					0.5	<0.01	<0.01	<0.01	0.01	<0.01
total phosphorous	mg/L					<0.01	0.003	0.014	<0.002	<0.1	0.01
potassium	mg/L					34	40	38	38	44	50
selenium	mg/L	0.01				**0.012**	<0.01	<0.02	<0.01	<0.01	<0.01
silicon	mg/L					-	4.6	4.5	3.9	4.3	5
silver	mg/L					<0.0001	<0.0005	<0.001	<0.0001	<0.0001	<0.0001
sodium	mg/L			20/200 [f]		**760**	**920**	**870**	**880**	**960**	**760**
strontium	mg/L					-	21	20	21	24	27
sulphide	mg/L					0.1	<0.02	<0.02	<0.02	<0.02	<0.02
sulphate	mg/L			500 [d]		**820**	**865**	**802**	**907**	**1010**	**958**
thallium	mg/L					<0.0002	<0.0003	<0.0005	<0.00005	<0.00005	<0.00005
tin	mg/L					-	<0.005	<0.01	<0.001	<0.001	<0.001
titanium	mg/L					-	<0.030	<0.05	<0.005	<0.005	<0.005
TSS	mg/L					2	2	<10	<10	14	14
turbidity	NTU			5 [e]		1.1	**5.6**	2.1	2.7	1.5	1.1
uranium	mg/L					<0.0002	<0.0005	<0.001	0.0001	<0.0001	0.0002
vanadium	mg/L					<0.002	<0.005	<0.01	<0.005	<0.005	<0.003
zinc	mg/L			5		0.19	0.18	0.053	0.078	0.041	0.02

NOTES:
ODWS = Ontario Drinking Water Objectives, Standards and Guidelines, dated June 2006. MAC = maximum acceptable concentrations, IMAC = interim maximum acceptable concentrations, AO = aesthetic objective, OG = operational guideline.
Bold values exceed the ODWS June 2006 standard for that parameter

[a] Where fluoride is added to drinking water, it is recommended that the concentration be adjusted to 0.5-0.8 mg/L the optimum level for control of tooth decay. Where supplies contain naturally occurring fluoride at levels higher than 1.5 mg/L but less than 2.4 mg/L the Ministry of Health and Long Term Care recommends an approach through local boards of health to raise public and professional awareness to control excessive exposure to fluoride from other sources.

[b] Where both nitrate and nitrite are present, the total of the two should not exceed 10 mg/L (as nitrogen)

[c] This standard applies to water at the point of consumption. Since lead is a component in some plumbing systems, first flush water may contain higher concentrations of lead than water that has been flushed for five minutes.

[d] When sulphate levels exceed 500 mg/L, water may have a laxative effect on some people.

[e] Applicable for all waters at the point of consumption.

[f] The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on Sodium restricted diets.

"-" Parameter not analysed

Table D.17
Groundwater Quality - Wiggins Well
Tansley Quarry - Hanson Brick Ltd.

Parameter	Units	Criteria				WIGGINS							
		ODWS MAC	ODWS IMAC	ODWS AO	ODWS OG	Nov-02	Apr-03	Sep-04	Jan-07	Oct-08	Dec-09	Oct-10	Nov-11
aluminum	mg/L				0.1	<0.005	0.034	0.014	<0.005	0.005			
alkalinity	mg $CaCO_3$/L				30-500	171	178	170	181	173			
ammonia-N	mg/L					1.25	1.21	1.1	1.24	1.1			
antimony	mg/L		0.006			<0.0005	<0.0005	<0.002	<0.001	<0.0005			
arsenic	mg/L		0.025			<0.002	<0.002	<0.002	0.001	<0.001			
barium	mg/L	1				0.011	0.013	0.011	0.01	0.01			
beryllium	mg/L					<0.001	<0.001	<0.001	<0.0005	<0.0005			
bismuth	mg/L					<0.001	<0.001	-	<0.001	<0.001			
boron	mg/L		5			1.38	1.35	1.3	1.3	1.4			
bromide	mg/L					<0.5	<0.5	0.49	1	<1			
cadmium	mg/L	0.005				<0.0001	0.0001	<0.00007	<0.0001	<0.0001			
calcium	mg/L					143	138	130	150	150			
chloride	mg/L			250		41.7	46.9	40	40	29			
chromium	mg/L	0.05				<0.005	<0.005	<0.002	<0.005	<0.005			
cobalt	mg/L					<0.0001	<0.0001	<0.005	<0.0005	<0.0005			
copper	mg/L			1		0.0007	0.0059	0.004	0.023	0.027	**N**	**N**	**N**
fluoride	mg/L	1.5 [a]				0.2	0.2	0.23	0.2	0.2	**O**	**O**	**O**
free cyanide	mg/L					<0.001	<0.001	<0.002	<0.002	<0.002	**T**	**T**	**T**
hardness	mg $CaCO_3$/L				80-100	**679**	**637**	**620**	**670**	**680**			
iron	mg/L			0.3		**0.55**	**0.33**	**0.59**	**0.98**	**0.42**	**S**	**S**	**S**
lead	mg/L	0.01 [c]				<0.0005	<0.0005	0.0016	<0.0005	0.0013	**A**	**A**	**A**
magnesium	mg/L					77.70	70.5	72	81	88	**M**	**M**	**M**
manganese	mg/L			0.05		**0.088**	**0.086**	**0.08**	**0.086**	**0.084**	**P**	**P**	**P**
mercury	mg/L					<0.00005	<0.00005	<0.00005	<0.0001	<0.0001	**L**	**L**	**L**
molybdenum	mg/L					0.005	0.005	<0.005	0.005	0.006	**E**	**E**	**E**
nickel	mg/L					<0.001	<0.001	0.004	<0.001	0.002	**D**	**D**	**D**
nitrate as N	mg/L	10.0 [b]				<0.2	<0.2	0.05	0.2	<0.1			
nitrite as N	mg/L	1.0 [b]				<0.2	<0.2	0.018	<0.01	<0.01			
pH	pH Units				6.5-8.5	7.62	7.94	7.85	8.1	8.2			
phenol	mg/L					<0.001	<0.001	<0.001	<0.001	<0.001			
phosphate	mg/L					<1	<1	<0.5	<0.01	<0.01			
total phosphorous	mg/L					0.022	0.022	<0.01	0.016	0.02			
potassium	mg/L					10.8	10.3	10	13	12			
selenium	mg/L	0.01				<0.002	<0.002	<0.002	<0.002	<0.002			
silicon	mg/L					5.49	5.72	-	5.5	6.2			
silver	mg/L					<0.0001	<0.0001	<0.0001	<0.0001	<0.0001			
sodium	mg/L			20/200 [f]		108.0	98.8	97	110	120			
strontium	mg/L					10.20	10.2	11	11	12			
sulphide	mg/L					<0.01	<0.01	<0.02	<0.02	<0.02			
sulphate	mg/L			500 [d]		**686.0**	**710**	**750**	**684**	**693**			
thallium	mg/L					<0.00005	<0.00005	-	<0.00005	<0.00005			
tin	mg/L					<0.001	<0.001	0.05	<0.001	<0.001	**Note:**	**Note:**	**Note:**
titanium	mg/L					<0.005	<0.005	<0.01	<0.005	<0.005	Cistern	Cistern	Cistern
TSS	mg/L					2	2	2	<1	<10	installed.	installed.	installed.
turbidity	NTU			5 [e]		4.7	1.6	4.3	**6.2**	1.5	Well not in	Well not in	Well not in
uranium	mg/L					<0.0001	<0.0001	0.0002	<0.0001	<0.0001	use.	use.	use.
vanadium	mg/L					0.0026	0.0008	<0.002	<0.001	<0.001			
zinc	mg/L			5		0.006	0.098	0.025	0.015	0.02			

NOTES:

ODWS = Ontario Drinking Water Objectives, Standards and Guidelines, dated June 2006. MAC = maximum acceptable concentrations, IMAC = interim maximum acceptable concentrations, AO aesthetic objective, OG operational guideline.

Bold values exceed the ODWS June 2006 standard for that parameter

[a] Where fluoride is added to drinking water, it is recommended that the concentration be adjusted to 0.5-0.8 mg/L the optimum level for control of tooth decay. Where supplies contain naturally occurring fluoride at levels higher than 1.5 mg/L but less than 2.4 mg/L the Ministry of Health and Long Term Care recommends an approach through local boards of health to raise public and professional awareness to control excessive exposure to fluoride from other sources.

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[e] Applicable for all waters at the point of consumption.

[f] The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on Sodium restricted diets.

"-" Parameter not analysed

APPENDIX E

Maxxam Analytical Certificates

Your Project #: 021-1228
Site Location: TANSLEY QUARRY
Your C.O.C. #: 31614707, 316147-07-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2011/11/30

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1I1589
Received: 2011/11/17, 17:13

Sample Matrix: Water
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Alkalinity	1	N/A	2011/11/19	CAM SOP-00448	SM 2320B
Alkalinity	6	N/A	2011/11/22	CAM SOP-00448	SM 2320B
Anions	6	N/A	2011/11/23	CAM SOP-00435	SM 4110B
Anions	1	N/A	2011/11/24	CAM SOP-00435	SM 4110B
Free (WAD) Cyanide	7	N/A	2011/11/21	CAM SOP-00457	SM4500-CN-I modified
Fluoride	1	2011/11/19	2011/11/19	CAM SOP-00448	APHA 4500FC
Fluoride	6	2011/11/21	2011/11/22	CAM SOP-00448	APHA 4500FC
Hardness (calculated as CaCO3)	1	N/A	2011/11/21	CAM SOP 00102	SM 2340 B
Hardness (calculated as CaCO3)	6	N/A	2011/11/25	CAM SOP 00102	SM 2340 B
Mercury in Water by CVAA	4	2011/11/21	2011/11/22	CAM SOP-00453	EPA 7470
Mercury in Water by CVAA	3	2011/11/22	2011/11/23	CAM SOP-00453	EPA 7470
Lab Filtered Metals by ICPMS	1	2011/11/21	2011/11/21	CAM SOP-00447	EPA 6020
Dissolved Metals by ICPMS	5	N/A	2011/11/24	CAM SOP-00447	EPA 6020
Dissolved Metals by ICPMS	1	N/A	2011/11/28	CAM SOP-00447	EPA 6020
Total Metals Analysis by ICPMS	1	N/A	2011/11/24	CAM SOP-00447	EPA 6020
Total Metals Analysis by ICPMS	5	N/A	2011/11/25	CAM SOP-00447	EPA 6020
Total Metals Analysis by ICPMS	1	N/A	2011/11/29	CAM SOP-00447	EPA 6020
Ammonia-N	7	N/A	2011/11/24	CAM SOP-00441	US GS I-2522-90
Nitrate (NO3) and Nitrite (NO2) in Water	7	N/A	2011/11/24	CAM SOP-00440	SM 4500 NO3I/NO2B
pH	1	N/A	2011/11/19	CAM SOP-00448	SM 4500H
pH	6	N/A	2011/11/22	CAM SOP-00448	SM 4500H
Phenols (4AAP)	4	N/A	2011/11/21	CAM SOP-00444	MOE ROPHEN-E3179
Phenols (4AAP)	3	N/A	2011/11/23	CAM SOP-00444	MOE ROPHEN-E3179
Orthophosphate	7	N/A	2011/11/22	CAM SOP-00461	SM 4500 P-F
Sulphide	7	N/A	2011/11/21	CAM SOP-00455	SM 4500-S G
Total Phosphorus (Colourimetric)	7	2011/11/23	2011/11/24	CAM SOP-00407	SM 4500 P,B,F
Total Suspended Solids	7	N/A	2011/11/21	CAM SOP-00428	SM 2540D
Turbidity	1	N/A	2011/11/19	CAM SOP-00417	APHA 2130B
Turbidity	6	N/A	2011/11/20	CAM SOP-00417	APHA 2130B

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies

Your Project #: 021-1228
Site Location: TANSLEY QUARRY
Your C.O.C. #: 31614707, 316147-07-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2011/11/30

CERTIFICATE OF ANALYSIS

comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons. The extraction date for samples field preserved with methanol for F1 and Volatile Organic Compounds is considered to be the date sampled.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by Ontario Regulation 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

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

MATHURA THIRUKKUMARAN, CS Rep
Email: MThirukkumaran@maxxam.ca
Phone# (905) 817-5700

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

Total cover pages: 2

Maxxam Job #: B1I1589
Report Date: 2011/11/30

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KFS

RESULTS OF ANALYSES OF WATER

Maxxam ID		LR0541			LR0542		LR0543		
Sampling Date		2011/11/17			2011/11/17		2011/11/17		
COC Number		316147-07-01			316147-07-01		316147-07-01		
	Units	**MW-06O**	**RDL**	**QC Batch**	**MW-06I**	**RDL**	**MW-11O**	**RDL**	**QC Batch**
Calculated Parameters									
Hardness (CaCO3)	mg/L	320	1	2686391	400	1	390	1	2686391
Inorganics									
Total Ammonia-N	mg/L	1.1	0.05	2690063	0.17	0.05	0.18	0.05	2690063
Fluoride (F-)	mg/L	0.3	0.1	2687649	0.1	0.1	0.1	0.1	2688422
Free Cyanide	mg/L	<0.002	0.002	2687845	<0.002	0.002	<0.002	0.002	2687845
Orthophosphate (P)	mg/L	<0.01	0.01	2687902	<0.01	0.01	<0.01	0.01	2687901
pH	pH	7.94		2687650	7.82		7.95		2688428
Phenols-4AAP	mg/L	<0.001	0.001	2687475	<0.001	0.001	<0.001	0.001	2687475
Total Phosphorus	mg/L	160	2	2691986	0.9	0.2	2.9	0.2	2691986
Total Suspended Solids	mg/L	290000	1000	2687570	1500	50	2300	100	2687570
Sulphide	mg/L	0.31	0.02	2687694	<0.02	0.02	0.06	0.02	2687694
Turbidity	NTU	32000	40	2687603	670	1	840	1	2687603
Alkalinity (Total as CaCO3)	mg/L	309	1	2687648	320	1	341	1	2688425
Nitrite (N)	mg/L	0.12	0.01	2687289	0.02	0.01	0.02	0.01	2687825
Dissolved Chloride (Cl)	mg/L	10	1	2687798	8	1	2	1	2687815
Nitrate (N)	mg/L	<0.1	0.1	2687289	<0.1	0.1	<0.1	0.1	2687825
Nitrate + Nitrite	mg/L	0.2	0.1	2687289	<0.1	0.1	<0.1	0.1	2687825
Dissolved Bromide (Br-)	mg/L	<1	1	2687798	<1	1	<1	1	2687815
Dissolved Sulphate (SO4)	mg/L	94	1	2687798	63	1	79	1	2687815

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B1I1589
Report Date: 2011/11/30

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KFS

RESULTS OF ANALYSES OF WATER

Maxxam ID		LR0544		LR0545			LR0546		
Sampling Date		2011/11/17		2011/11/17			2011/11/17		
COC Number		316147-07-01		316147-07-01			316147-07-01		
	Units	**MW-11I**	**RDL**	**MW-11D**	**RDL**	**QC Batch**	**MW-03D**	**RDL**	**QC Batch**
Calculated Parameters									
Hardness (CaCO3)	mg/L	490	1	26000	1	2686391	4900	1	2686391
Inorganics									
Total Ammonia-N	mg/L	1.5	0.05	34	0.5	2690063	9.6	0.5	2690063
Fluoride (F-)	mg/L	0.3	0.1	0.1	0.1	2688422	0.3	0.1	2688422
Free Cyanide	mg/L	<0.002	0.002	<0.002	0.002	2687845	<0.002	0.002	2687845
Orthophosphate (P)	mg/L	<0.01	0.01	<0.01	0.01	2687901	<0.01	0.01	2687901
pH	pH	7.95		6.69		2688428	7.37		2688428
Phenols-4AAP	mg/L	<0.001	0.001	0.017	0.001	2687729	0.001	0.001	2687729
Total Phosphorus	mg/L	1.3	0.2	0.9	0.2	2691986	0.3	0.1	2691986
Total Suspended Solids	mg/L	1900	20	1200	20	2687577	370	10	2687577
Sulphide	mg/L	<0.02	0.02	<0.02	0.02	2687694	<0.02	0.02	2688987
Turbidity	NTU	410	1	140	0.4	2687603	140	0.4	2687603
Alkalinity (Total as CaCO3)	mg/L	450	1	50	1	2688425	56	1	2688425
Nitrite (N)	mg/L	<0.01	0.01	<0.01	0.01	2687825	<0.01	0.01	2687825
Dissolved Chloride (Cl)	mg/L	10	1	40700	500	2687815	6480	500	2687815
Nitrate (N)	mg/L	<0.1	0.1	<0.1	0.1	2687825	<0.1	0.1	2687825
Nitrate + Nitrite	mg/L	<0.1	0.1	<0.1	0.1	2687825	<0.1	0.1	2687825
Dissolved Bromide (Br-)	mg/L	<1	1	<500	500	2687815	<500	500	2687815
Dissolved Sulphate (SO4)	mg/L	147	1	1410	500	2687815	1650	500	2687815

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B1I1589
Report Date: 2011/11/30

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KFS

RESULTS OF ANALYSES OF WATER

Maxxam ID		LR0547		
Sampling Date		2011/11/17		
COC Number		316147-07-01		
	Units	**DUP3**	**RDL**	**QC Batch**
Calculated Parameters				
Hardness (CaCO3)	mg/L	5100	1	2686391
Inorganics				
Total Ammonia-N	mg/L	9.9	0.5	2690063
Fluoride (F-)	mg/L	0.3	0.1	2688422
Free Cyanide	mg/L	<0.002	0.002	2687845
Orthophosphate (P)	mg/L	<0.01	0.01	2687901
pH	pH	7.38		2688428
Phenols-4AAP	mg/L	0.001	0.001	2687729
Total Phosphorus	mg/L	0.4	0.1	2691986
Total Suspended Solids	mg/L	490	10	2687577
Sulphide	mg/L	<0.02	0.02	2687694
Turbidity	NTU	140	0.4	2687603
Alkalinity (Total as CaCO3)	mg/L	53	1	2688425
Nitrite (N)	mg/L	<0.01	0.01	2687825
Dissolved Chloride (Cl)	mg/L	6470	500	2687815
Nitrate (N)	mg/L	<0.1	0.1	2687825
Nitrate + Nitrite	mg/L	<0.1	0.1	2687825
Dissolved Bromide (Br-)	mg/L	<500	500	2687815
Dissolved Sulphate (SO4)	mg/L	1560	500	2687815

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KFS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LR0541			LR0542			LR0543		
Sampling Date		2011/11/17			2011/11/17			2011/11/17		
COC Number		316147-07-01			316147-07-01			316147-07-01		
	Units	**MW-06O**	**RDL**	**QC Batch**	**MW-06I**	**RDL**	**QC Batch**	**MW-11O**	**RDL**	**QC Batch**
Metals										
Mercury (Hg)	mg/L	<0.0001	0.0001	2689631	<0.0001	0.0001	2689631	<0.0001	0.0001	2688326
Dissolved Aluminum (Al)	ug/L	<5	5	2688125	68	5	2688767	49	5	2695145
Total Aluminum (Al)	ug/L	1800000	3000	2690888	12000	5	2691295	49000	30	2695568
Dissolved Antimony (Sb)	ug/L	0.9	0.5	2688125	<0.5	0.5	2688767	<0.5	0.5	2695145
Total Antimony (Sb)	ug/L	<30	30	2690888	<0.5	0.5	2691295	<0.5	0.5	2695568
Dissolved Arsenic (As)	ug/L	2	1	2688125	7	1	2688767	3	1	2695145
Total Arsenic (As)	ug/L	780	50	2690888	20	1	2691295	22	1	2695568
Dissolved Barium (Ba)	ug/L	120	2	2688125	51	2	2688767	57	2	2695145
Total Barium (Ba)	ug/L	32000	100	2690888	270	2	2691295	840	2	2695568
Dissolved Beryllium (Be)	ug/L	<0.5	0.5	2688125	<0.5	0.5	2688767	<0.5	0.5	2695145
Total Beryllium (Be)	ug/L	110	30	2690888	0.8	0.5	2691295	2.7	0.5	2695568
Dissolved Bismuth (Bi)	ug/L	<1	1	2688125	<1	1	2688767	<1	1	2695145
Total Bismuth (Bi)	ug/L	<50	50	2690888	<1	1	2691295	<1	1	2695568
Dissolved Boron (B)	ug/L	170	10	2688125	88	10	2688767	85	10	2695145
Total Boron (B)	ug/L	3000	500	2690888	96	10	2691295	140	10	2695568
Dissolved Cadmium (Cd)	ug/L	<0.1	0.1	2688125	<0.1	0.1	2688767	<0.1	0.1	2695145
Total Cadmium (Cd)	ug/L	28	5	2690888	0.4	0.1	2691295	0.7	0.1	2695568
Dissolved Calcium (Ca)	ug/L	72000	200	2688125	90000	200	2688767	65000	200	2695145
Total Calcium (Ca)	ug/L	20000000	10000	2690888	170000	200	2691295	400000	200	2695568
Dissolved Chromium (Cr)	ug/L	<5	5	2688125	<5	5	2688767	<5	5	2695145
Total Chromium (Cr)	ug/L	3800	300	2690888	21	5	2691295	140	5	2695568
Dissolved Cobalt (Co)	ug/L	<0.5	0.5	2688125	1.3	0.5	2688767	2.1	0.5	2695145
Total Cobalt (Co)	ug/L	2000	100	2690888	15	0.5	2691295	45	1	2695568
Dissolved Copper (Cu)	ug/L	<1	1	2688125	<1	1	2688767	<1	1	2695145
Total Copper (Cu)	ug/L	4700	50	2690888	26	1	2691295	110	1	2695568
Dissolved Iron (Fe)	ug/L	<100	100	2688125	800	100	2688767	630	100	2695145
Total Iron (Fe)	ug/L	3300000	5000	2690888	26000	100	2691295	89000	100	2695568
Dissolved Lead (Pb)	ug/L	<0.5	0.5	2688125	<0.5	0.5	2688767	<0.5	0.5	2695145
Total Lead (Pb)	ug/L	1800	30	2690888	8.7	0.5	2691295	31	0.5	2695568
Dissolved Magnesium (Mg)	ug/L	35000	50	2688125	43000	50	2688767	54000	50	2695145
Total Magnesium (Mg)	ug/L	2400000	3000	2690888	45000	50	2691295	100000	50	2695568
Dissolved Manganese (Mn)	ug/L	150	2	2688125	38	2	2688767	74	2	2695145

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B1I1589
Report Date: 2011/11/30

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KFS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LR0541			LR0542			LR0543		
Sampling Date		2011/11/17			2011/11/17			2011/11/17		
COC Number		316147-07-01			316147-07-01			316147-07-01		
	Units	**MW-06O**	**RDL**	**QC Batch**	**MW-06I**	**RDL**	**QC Batch**	**MW-11O**	**RDL**	**QC Batch**
Total Manganese (Mn)	ug/L	190000	100	2690888	980	2	2691295	3600	2	2695568
Dissolved Molybdenum (Mo)	ug/L	19	0.5	2688125	1.4	0.5	2688767	4.5	0.5	2695145
Total Molybdenum (Mo)	ug/L	140	30	2690888	2.0	0.5	2691295	5.4	0.5	2695568
Dissolved Nickel (Ni)	ug/L	<1	1	2688125	<1	1	2688767	<1	1	2695145
Total Nickel (Ni)	ug/L	4100	300	2690888	31	1	2691295	100	2	2695568
Dissolved Phosphorus (P)	ug/L	<100	100	2688125	<100	100	2688767	<100	100	2695145
Total Phosphorus (P)	ug/L	180000	5000	2690888	890	100	2691295	2400	100	2695568
Dissolved Potassium (K)	ug/L	10000	200	2688125	3900	200	2688767	4400	200	2695145
Total Potassium (K)	ug/L	340000	10000	2690888	7700	200	2691295	16000	200	2695568
Dissolved Selenium (Se)	ug/L	<2	2	2688125	<2	2	2688767	<2	2	2695145
Dissolved Silicon (Si)	ug/L	5200	50	2688125	10000	50	2688767	7900	50	2695145
Total Silicon (Si)	ug/L	1200000	3000	2690888	25000	50	2691295	67000	300	2695568
Total Selenium (Se)	ug/L	<100	100	2690888	<2	2	2691295	<2	2	2695568
Dissolved Silver (Ag)	ug/L	<0.1	0.1	2688125	0.2	0.1	2688767	<0.1	0.1	2695145
Total Silver (Ag)	ug/L	7	5	2690888	<0.1	0.1	2691295	0.3	0.1	2695568
Dissolved Sodium (Na)	ug/L	11000	100	2688125	13000	100	2688767	21000	100	2695145
Total Sodium (Na)	ug/L	70000	5000	2690888	11000	100	2691295	15000	100	2695568
Dissolved Strontium (Sr)	ug/L	5100	1	2688125	2400	1	2688767	1100	1	2695145
Total Strontium (Sr)	ug/L	55000	50	2690888	2400	1	2691295	1800	1	2695568
Dissolved Thallium (Tl)	ug/L	<0.05	0.05	2688125	<0.05	0.05	2688767	<0.05	0.05	2695145
Total Thallium (Tl)	ug/L	15	3	2690888	0.22	0.05	2691295	0.44	0.05	2695568
Dissolved Tin (Sn)	ug/L	<1	1	2688125	<1	1	2688767	<1	1	2695145
Total Tin (Sn)	ug/L	<50	50	2690888	<1	1	2691295	<1	1	2695568
Dissolved Titanium (Ti)	ug/L	<5	5	2688125	<5	5	2688767	<5	5	2695145
Total Titanium (Ti)	ug/L	9100	300	2690888	220	5	2691295	570	30	2695568
Dissolved Uranium (U)	ug/L	8.1	0.1	2688125	0.9	0.1	2688767	3.3	0.1	2695145
Total Uranium (U)	ug/L	190	5	2690888	2.0	0.1	2691295	5.7	0.1	2695568
Dissolved Vanadium (V)	ug/L	<0.5	0.5	2688125	0.6	0.5	2688767	0.8	0.5	2695145
Total Vanadium (V)	ug/L	2700	30	2690888	26	0.5	2691295	91	0.5	2695568
Dissolved Zinc (Zn)	ug/L	<5	5	2688125	7	5	2688767	<5	5	2695145
Total Zinc (Zn)	ug/L	11000	300	2690888	82	5	2691295	240	5	2695568

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B1I1589
Report Date: 2011/11/30

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KFS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LR0544			LR0545			LR0546		
Sampling Date		2011/11/17			2011/11/17			2011/11/17		
COC Number		316147-07-01			316147-07-01			316147-07-01		
	Units	**MW-11I**	**RDL**	**QC Batch**	**MW-11D**	**RDL**	**QC Batch**	**MW-03D**	**RDL**	**QC Batch**
Metals										
Mercury (Hg)	mg/L	<0.0001	0.0001	2688326	<0.0001	0.0001	2689631	<0.0001	0.0001	2688326
Dissolved Aluminum (Al)	ug/L	59	5	2688767	<300	300	2688767	<50	50	2688767
Total Aluminum (Al)	ug/L	13000	5	2690888	17000	300	2690888	4200	50	2690888
Dissolved Antimony (Sb)	ug/L	<0.5	0.5	2688767	<30	30	2688767	<5	5	2688767
Total Antimony (Sb)	ug/L	<0.5	0.5	2690888	<30	30	2690888	<5	5	2690888
Dissolved Arsenic (As)	ug/L	11	1	2688767	54	50	2688767	<10	10	2688767
Total Arsenic (As)	ug/L	20	1	2690888	<50	50	2690888	<10	10	2690888
Dissolved Barium (Ba)	ug/L	25	2	2688767	140	100	2688767	25	20	2688767
Total Barium (Ba)	ug/L	180	2	2690888	310	100	2690888	88	20	2690888
Dissolved Beryllium (Be)	ug/L	<0.5	0.5	2688767	<30	30	2688767	<5	5	2688767
Total Beryllium (Be)	ug/L	0.6	0.5	2690888	<30	30	2690888	<5	5	2690888
Dissolved Bismuth (Bi)	ug/L	<1	1	2688767	<50	50	2688767	<10	10	2688767
Total Bismuth (Bi)	ug/L	<1	1	2690888	<50	50	2690888	<10	10	2690888
Dissolved Boron (B)	ug/L	1500	10	2688767	4700	500	2688767	4600	100	2688767
Total Boron (B)	ug/L	1400	10	2690888	5100	500	2690888	4600	100	2690888
Dissolved Cadmium (Cd)	ug/L	<0.1	0.1	2688767	<5	5	2688767	<1	1	2688767
Total Cadmium (Cd)	ug/L	0.3	0.1	2690888	14	5	2690888	<1	1	2690888
Dissolved Calcium (Ca)	ug/L	82000	1000	2688767	7500000	10000	2688767	1300000	2000	2688767
Total Calcium (Ca)	ug/L	250000	200	2690888	7700000	10000	2690888	1200000	2000	2690888
Dissolved Chromium (Cr)	ug/L	<5	5	2688767	<300	300	2688767	<50	50	2688767
Total Chromium (Cr)	ug/L	26	5	2690888	600	300	2690888	<50	50	2690888
Dissolved Cobalt (Co)	ug/L	1.0	0.5	2688767	<30	30	2688767	<5	5	2688767
Total Cobalt (Co)	ug/L	14	0.5	2690888	<30	30	2690888	<5	5	2690888
Dissolved Copper (Cu)	ug/L	<1	1	2688767	<100	100	2688767	<20	20	2688767
Total Copper (Cu)	ug/L	28	1	2690888	68	50	2690888	18	10	2690888
Dissolved Iron (Fe)	ug/L	690	100	2688767	21000	5000	2688767	2300	1000	2688767
Total Iron (Fe)	ug/L	25000	100	2690888	84000	5000	2690888	9200	1000	2690888
Dissolved Lead (Pb)	ug/L	<0.5	0.5	2688767	<30	30	2688767	<5	5	2688767
Total Lead (Pb)	ug/L	9.6	0.5	2690888	<30	30	2690888	5	5	2690888
Dissolved Magnesium (Mg)	ug/L	70000	50	2688767	1800000	3000	2688767	410000	500	2688767
Total Magnesium (Mg)	ug/L	86000	50	2690888	1800000	3000	2690888	390000	500	2690888
Dissolved Manganese (Mn)	ug/L	33	2	2688767	4000	100	2688767	520	20	2688767

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B1I1589
Report Date: 2011/11/30

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KFS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LR0544			LR0545			LR0546		
Sampling Date		2011/11/17			2011/11/17			2011/11/17		
COC Number		316147-07-01			316147-07-01			316147-07-01		
	Units	**MW-11I**	**RDL**	**QC Batch**	**MW-11D**	**RDL**	**QC Batch**	**MW-03D**	**RDL**	**QC Batch**
Total Manganese (Mn)	ug/L	1600	2	2690888	5100	100	2690888	770	20	2690888
Dissolved Molybdenum (Mo)	ug/L	3.5	0.5	2688767	<30	30	2688767	6	5	2688767
Total Molybdenum (Mo)	ug/L	3.9	0.5	2690888	<30	30	2690888	6	5	2690888
Dissolved Nickel (Ni)	ug/L	<1	1	2688767	<50	50	2688767	<10	10	2688767
Total Nickel (Ni)	ug/L	28	1	2690888	95	50	2690888	<10	10	2690888
Dissolved Phosphorus (P)	ug/L	<100	100	2688767	<5000	5000	2688767	<1000	1000	2688767
Total Phosphorus (P)	ug/L	1600	100	2690888	<5000	5000	2690888	<1000	1000	2690888
Dissolved Potassium (K)	ug/L	21000	200	2688767	280000	10000	2688767	86000	2000	2688767
Total Potassium (K)	ug/L	22000	200	2690888	280000	10000	2690888	81000	2000	2690888
Dissolved Selenium (Se)	ug/L	<2	2	2688767	<200	200	2688767	<20	20	2688767
Dissolved Silicon (Si)	ug/L	9200	50	2688767	3100	3000	2688767	3500	500	2688767
Total Silicon (Si)	ug/L	27000	50	2690888	26000	3000	2690888	10000	500	2690888
Total Selenium (Se)	ug/L	<2	2	2690888	<100	100	2690888	<20	20	2690888
Dissolved Silver (Ag)	ug/L	0.1	0.1	2688767	<5	5	2688767	<1	1	2688767
Total Silver (Ag)	ug/L	<0.1	0.1	2690888	<5	5	2690888	<1	1	2690888
Dissolved Sodium (Na)	ug/L	76000	100	2688767	16000000	5000	2688767	3200000	1000	2688767
Total Sodium (Na)	ug/L	70000	100	2690888	16000000	5000	2690888	3100000	1000	2690888
Dissolved Strontium (Sr)	ug/L	11000	1	2688767	150000	50	2688767	30000	10	2688767
Total Strontium (Sr)	ug/L	11000	1	2690888	160000	50	2690888	28000	10	2690888
Dissolved Thallium (Tl)	ug/L	<0.05	0.05	2688767	<3	3	2688767	<0.5	0.5	2688767
Total Thallium (Tl)	ug/L	0.12	0.05	2690888	<3	3	2690888	<0.5	0.5	2690888
Dissolved Tin (Sn)	ug/L	<1	1	2688767	<50	50	2688767	<10	10	2688767
Total Tin (Sn)	ug/L	<1	1	2690888	<50	50	2690888	<10	10	2690888
Dissolved Titanium (Ti)	ug/L	<5	5	2688767	<300	300	2688767	<50	50	2688767
Total Titanium (Ti)	ug/L	240	5	2690888	<300	300	2690888	71	50	2690888
Dissolved Uranium (U)	ug/L	0.4	0.1	2688767	9	5	2688767	<1	1	2688767
Total Uranium (U)	ug/L	1.4	0.1	2690888	10	5	2690888	<1	1	2690888
Dissolved Vanadium (V)	ug/L	<0.5	0.5	2688767	<50 (1)	50	2688767	6	5	2688767
Total Vanadium (V)	ug/L	25	0.5	2690888	<30	30	2690888	13	5	2690888
Dissolved Zinc (Zn)	ug/L	<5	5	2688767	<300	300	2688767	85	50	2688767
Total Zinc (Zn)	ug/L	69	5	2690888	370	300	2690888	120	50	2690888

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Detection Limit was raised due to matrix interferences.

Maxxam Job #: B1I1589
Report Date: 2011/11/30

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KFS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LR0547		
Sampling Date		2011/11/17		
COC Number		316147-07-01		
	Units	**DUP3**	**RDL**	**QC Batch**
Metals				
Mercury (Hg)	mg/L	<0.0001	0.0001	2688326
Dissolved Aluminum (Al)	ug/L	<50	50	2688767
Total Aluminum (Al)	ug/L	4500	50	2690888
Dissolved Antimony (Sb)	ug/L	<5	5	2688767
Total Antimony (Sb)	ug/L	<5	5	2690888
Dissolved Arsenic (As)	ug/L	11	10	2688767
Total Arsenic (As)	ug/L	<10	10	2690888
Dissolved Barium (Ba)	ug/L	25	20	2688767
Total Barium (Ba)	ug/L	100	20	2690888
Dissolved Beryllium (Be)	ug/L	<5	5	2688767
Total Beryllium (Be)	ug/L	<5	5	2690888
Dissolved Bismuth (Bi)	ug/L	<10	10	2688767
Total Bismuth (Bi)	ug/L	<10	10	2690888
Dissolved Boron (B)	ug/L	5100	100	2688767
Total Boron (B)	ug/L	4900	100	2690888
Dissolved Cadmium (Cd)	ug/L	<1	1	2688767
Total Cadmium (Cd)	ug/L	<1	1	2690888
Dissolved Calcium (Ca)	ug/L	1300000	2000	2688767
Total Calcium (Ca)	ug/L	1300000	2000	2690888
Dissolved Chromium (Cr)	ug/L	<50	50	2688767
Total Chromium (Cr)	ug/L	<50	50	2690888
Dissolved Cobalt (Co)	ug/L	<5	5	2688767
Total Cobalt (Co)	ug/L	<5	5	2690888
Dissolved Copper (Cu)	ug/L	<10	10	2688767
Total Copper (Cu)	ug/L	16	10	2690888
Dissolved Iron (Fe)	ug/L	2500	1000	2688767
Total Iron (Fe)	ug/L	9600	1000	2690888
Dissolved Lead (Pb)	ug/L	<5	5	2688767
Total Lead (Pb)	ug/L	5	5	2690888
Dissolved Magnesium (Mg)	ug/L	430000	500	2688767
Total Magnesium (Mg)	ug/L	400000	500	2690888
Dissolved Manganese (Mn)	ug/L	540	20	2688767

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B1I1589
Report Date: 2011/11/30

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KFS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LR0547		
Sampling Date		2011/11/17		
COC Number		316147-07-01		
	Units	**DUP3**	**RDL**	**QC Batch**
Total Manganese (Mn)	ug/L	870	20	2690888
Dissolved Molybdenum (Mo)	ug/L	6	5	2688767
Total Molybdenum (Mo)	ug/L	6	5	2690888
Dissolved Nickel (Ni)	ug/L	<10	10	2688767
Total Nickel (Ni)	ug/L	<10	10	2690888
Dissolved Phosphorus (P)	ug/L	<1000	1000	2688767
Total Phosphorus (P)	ug/L	<1000	1000	2690888
Dissolved Potassium (K)	ug/L	91000	2000	2688767
Total Potassium (K)	ug/L	83000	2000	2690888
Dissolved Selenium (Se)	ug/L	<20	20	2688767
Dissolved Silicon (Si)	ug/L	3600	500	2688767
Total Silicon (Si)	ug/L	11000	500	2690888
Total Selenium (Se)	ug/L	<20	20	2690888
Dissolved Silver (Ag)	ug/L	<1	1	2688767
Total Silver (Ag)	ug/L	<1	1	2690888
Dissolved Sodium (Na)	ug/L	3400000	1000	2688767
Total Sodium (Na)	ug/L	3100000	1000	2690888
Dissolved Strontium (Sr)	ug/L	31000	10	2688767
Total Strontium (Sr)	ug/L	29000	10	2690888
Dissolved Thallium (Tl)	ug/L	<0.5	0.5	2688767
Total Thallium (Tl)	ug/L	<0.5	0.5	2690888
Dissolved Tin (Sn)	ug/L	<10	10	2688767
Total Tin (Sn)	ug/L	<10	10	2690888
Dissolved Titanium (Ti)	ug/L	<50	50	2688767
Total Titanium (Ti)	ug/L	160	50	2690888
Dissolved Uranium (U)	ug/L	<1	1	2688767
Total Uranium (U)	ug/L	<1	1	2690888
Dissolved Vanadium (V)	ug/L	7	5	2688767
Total Vanadium (V)	ug/L	15	5	2690888
Dissolved Zinc (Zn)	ug/L	<50	50	2688767
Total Zinc (Zn)	ug/L	150	50	2690888

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B1I1589
Report Date: 2011/11/30

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KFS

Test Summary

Maxxam ID LR0541 **Collected** 2011/11/17
Sample ID MW-06O **Shipped**
Matrix Water **Received** 2011/11/17

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2687648	N/A	2011/11/19	YOGESH PATEL
Anions	IC	2687798	N/A	2011/11/24	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2687845	N/A	2011/11/21	LOUISE HARDING
Fluoride	F	2687649	2011/11/19	2011/11/19	YOGESH PATEL
Hardness (calculated as CaCO3)		2686391	N/A	2011/11/21	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2689631	2011/11/22	2011/11/23	MAGDALENA CARLOS
Lab Filtered Metals by ICPMS	ICP/MS	2688125	2011/11/21	2011/11/21	HUA REN
Total Metals Analysis by ICPMS	ICP/MS	2690888	N/A	2011/11/25	HUA REN
Ammonia-N	LACH/NH4	2690063	N/A	2011/11/24	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2687289	N/A	2011/11/24	HELEN HE
pH	PH	2687650	N/A	2011/11/19	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2687475	N/A	2011/11/23	BRAMDEO MOTIRAM
Orthophosphate	AC	2687902	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687694	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2691986	2011/11/23	2011/11/24	VIORICA ROTARU
Total Suspended Solids	SLDS	2687570	N/A	2011/11/21	TEJPRATAP MISHRA
Turbidity	TURB	2687603	N/A	2011/11/19	NEIL DASSANAYAKE

Maxxam ID LR0542 **Collected** 2011/11/17
Sample ID MW-06I **Shipped**
Matrix Water **Received** 2011/11/17

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2688425	N/A	2011/11/22	YOGESH PATEL
Anions	IC	2687815	N/A	2011/11/23	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2687845	N/A	2011/11/21	LOUISE HARDING
Fluoride	F	2688422	2011/11/21	2011/11/22	YOGESH PATEL
Hardness (calculated as CaCO3)		2686391	N/A	2011/11/25	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2689631	2011/11/22	2011/11/23	MAGDALENA CARLOS
Dissolved Metals by ICPMS	ICP/MS	2688767	N/A	2011/11/24	AREFA DABHAD
Total Metals Analysis by ICPMS	ICP/MS	2691295	N/A	2011/11/24	HUA REN
Ammonia-N	LACH/NH4	2690063	N/A	2011/11/24	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2687825	N/A	2011/11/24	HELEN HE
pH	PH	2688428	N/A	2011/11/22	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2687475	N/A	2011/11/23	BRAMDEO MOTIRAM
Orthophosphate	AC	2687901	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687694	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2691986	2011/11/23	2011/11/24	VIORICA ROTARU
Total Suspended Solids	SLDS	2687570	N/A	2011/11/21	TEJPRATAP MISHRA
Turbidity	TURB	2687603	N/A	2011/11/20	NEIL DASSANAYAKE

Maxxam ID LR0543 **Collected** 2011/11/17
Sample ID MW-11O **Shipped**
Matrix Water **Received** 2011/11/17

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2688425	N/A	2011/11/22	YOGESH PATEL
Anions	IC	2687815	N/A	2011/11/23	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2687845	N/A	2011/11/21	LOUISE HARDING
Fluoride	F	2688422	2011/11/21	2011/11/22	YOGESH PATEL
Hardness (calculated as CaCO3)		2686391	N/A	2011/11/25	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2688326	2011/11/21	2011/11/22	MAGDALENA CARLOS

Maxxam Job #: B1I1589
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Golder Associates Ltd
Client Project #: 021-1228
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Sampler Initials: KFS

Test Summary

Dissolved Metals by ICPMS	ICP/MS	2695145	N/A	2011/11/28	AREFA DABHAD
Total Metals Analysis by ICPMS	ICP/MS	2695568	N/A	2011/11/29	AREFA DABHAD
Ammonia-N	LACH/NH4	2690063	N/A	2011/11/24	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2687825	N/A	2011/11/24	HELEN HE
pH	PH	2688428	N/A	2011/11/22	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2687475	N/A	2011/11/23	BRAMDEO MOTIRAM
Orthophosphate	AC	2687901	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687694	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2691986	2011/11/23	2011/11/24	VIORICA ROTARU
Total Suspended Solids	SLDS	2687570	N/A	2011/11/21	TEJPRATAP MISHRA
Turbidity	TURB	2687603	N/A	2011/11/20	NEIL DASSANAYAKE

Maxxam ID LR0544 **Collected** 2011/11/17
Sample ID MW-11I **Shipped**
Matrix Water **Received** 2011/11/17

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2688425	N/A	2011/11/22	YOGESH PATEL
Anions	IC	2687815	N/A	2011/11/23	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2687845	N/A	2011/11/21	LOUISE HARDING
Fluoride	F	2688422	2011/11/21	2011/11/22	YOGESH PATEL
Hardness (calculated as CaCO3)		2686391	N/A	2011/11/25	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2688326	2011/11/21	2011/11/22	MAGDALENA CARLOS
Dissolved Metals by ICPMS	ICP/MS	2688767	N/A	2011/11/24	AREFA DABHAD
Total Metals Analysis by ICPMS	ICP/MS	2690888	N/A	2011/11/25	HUA REN
Ammonia-N	LACH/NH4	2690063	N/A	2011/11/24	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2687825	N/A	2011/11/24	HELEN HE
pH	PH	2688428	N/A	2011/11/22	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2687729	N/A	2011/11/21	BRAMDEO MOTIRAM
Orthophosphate	AC	2687901	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687694	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2691986	2011/11/23	2011/11/24	VIORICA ROTARU
Total Suspended Solids	SLDS	2687577	N/A	2011/11/21	BANSARI RAY
Turbidity	TURB	2687603	N/A	2011/11/20	NEIL DASSANAYAKE

Maxxam ID LR0544 Dup **Collected** 2011/11/17
Sample ID MW-11I **Shipped**
Matrix Water **Received** 2011/11/17

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	2687729	N/A	2011/11/21	BRAMDEO MOTIRAM

Maxxam ID LR0545 **Collected** 2011/11/17
Sample ID MW-11D **Shipped**
Matrix Water **Received** 2011/11/17

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2688425	N/A	2011/11/22	YOGESH PATEL
Anions	IC	2687815	N/A	2011/11/23	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2687845	N/A	2011/11/21	LOUISE HARDING
Fluoride	F	2688422	2011/11/21	2011/11/22	YOGESH PATEL
Hardness (calculated as CaCO3)		2686391	N/A	2011/11/25	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2689631	2011/11/22	2011/11/23	MAGDALENA CARLOS
Dissolved Metals by ICPMS	ICP/MS	2688767	N/A	2011/11/24	AREFA DABHAD
Total Metals Analysis by ICPMS	ICP/MS	2690888	N/A	2011/11/25	HUA REN
Ammonia-N	LACH/NH4	2690063	N/A	2011/11/24	ALINA DOBREANU

Maxxam Job #: B1I1589
Report Date: 2011/11/30

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KFS

Test Summary

Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2687825	N/A	2011/11/24	HELEN HE
pH	PH	2688428	N/A	2011/11/22	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2687729	N/A	2011/11/21	BRAMDEO MOTIRAM
Orthophosphate	AC	2687901	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687694	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2691986	2011/11/23	2011/11/24	VIORICA ROTARU
Total Suspended Solids	SLDS	2687577	N/A	2011/11/21	BANSARI RAY
Turbidity	TURB	2687603	N/A	2011/11/20	NEIL DASSANAYAKE

Maxxam ID LR0546
Sample ID MW-03D
Matrix Water

Collected 2011/11/17
Shipped
Received 2011/11/17

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2688425	N/A	2011/11/22	YOGESH PATEL
Anions	IC	2687815	N/A	2011/11/23	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2687845	N/A	2011/11/21	LOUISE HARDING
Fluoride	F	2688422	2011/11/21	2011/11/22	YOGESH PATEL
Hardness (calculated as CaCO3)		2686391	N/A	2011/11/25	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2688326	2011/11/21	2011/11/22	MAGDALENA CARLOS
Dissolved Metals by ICPMS	ICP/MS	2688767	N/A	2011/11/24	AREFA DABHAD
Total Metals Analysis by ICPMS	ICP/MS	2690888	N/A	2011/11/25	HUA REN
Ammonia-N	LACH/NH4	2690063	N/A	2011/11/24	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2687825	N/A	2011/11/24	HELEN HE
pH	PH	2688428	N/A	2011/11/22	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2687729	N/A	2011/11/21	BRAMDEO MOTIRAM
Orthophosphate	AC	2687901	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2688987	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2691986	2011/11/23	2011/11/24	VIORICA ROTARU
Total Suspended Solids	SLDS	2687577	N/A	2011/11/21	BANSARI RAY
Turbidity	TURB	2687603	N/A	2011/11/20	NEIL DASSANAYAKE

Maxxam ID LR0547
Sample ID DUP3
Matrix Water

Collected 2011/11/17
Shipped
Received 2011/11/17

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2688425	N/A	2011/11/22	YOGESH PATEL
Anions	IC	2687815	N/A	2011/11/23	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2687845	N/A	2011/11/21	LOUISE HARDING
Fluoride	F	2688422	2011/11/21	2011/11/22	YOGESH PATEL
Hardness (calculated as CaCO3)		2686391	N/A	2011/11/25	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2688326	2011/11/21	2011/11/22	MAGDALENA CARLOS
Dissolved Metals by ICPMS	ICP/MS	2688767	N/A	2011/11/24	AREFA DABHAD
Total Metals Analysis by ICPMS	ICP/MS	2690888	N/A	2011/11/25	HUA REN
Ammonia-N	LACH/NH4	2690063	N/A	2011/11/24	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2687825	N/A	2011/11/24	HELEN HE
pH	PH	2688428	N/A	2011/11/22	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2687729	N/A	2011/11/21	BRAMDEO MOTIRAM
Orthophosphate	AC	2687901	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687694	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2691986	2011/11/23	2011/11/24	VIORICA ROTARU
Total Suspended Solids	SLDS	2687577	N/A	2011/11/21	BANSARI RAY
Turbidity	TURB	2687603	N/A	2011/11/20	NEIL DASSANAYAKE

Maxxam Job #: B1I1589
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Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KFS

Package 1	9.3°C
Package 2	6.7°C
Package 3	9.0°C
Package 4	6.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Sample LR0541-01: Metal analysis:Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Sample LR0543-01: Results for dissolved sodium are greater than total sodium. The results have been confirmed by re-analysis.

Sample LR0545-01: Metals Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Sample LR0546-01: Anions Anaysis: Due to high concentrations of the target analytes, sample required dilution. Detection limits were adjusted accordingly.

Metals Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Sample LR0547-01: Anions Anaysis: Due to high concentrations of the target analytes, sample required dilution. Detection limits were adjusted accordingly.

Metals Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location: TANSLEY QUARRY

Quality Assurance Report

Maxxam Job Number: MB1I1589

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2687289	HH	Matrix Spike	Nitrite (N)	2011/11/24		101	%	80 - 120
			Nitrate (N)	2011/11/24		NC	%	80 - 120
		Spiked Blank	Nitrite (N)	2011/11/24		99	%	85 - 115
			Nitrate (N)	2011/11/24		94	%	85 - 115
		Method Blank	Nitrite (N)	2011/11/24	<0.01		mg/L	
			Nitrate (N)	2011/11/24	<0.1		mg/L	
		RPD	Nitrite (N)	2011/11/24	NC		%	25
			Nitrate (N)	2011/11/24	0.5		%	25
2687475	BMO	Matrix Spike	Phenols-4AAP	2011/11/23		105	%	75 - 125
		Spiked Blank	Phenols-4AAP	2011/11/23		102	%	75 - 125
		Method Blank	Phenols-4AAP	2011/11/23	<0.001		mg/L	
		RPD	Phenols-4AAP	2011/11/23	NC		%	25
2687570	TEJ	QC Standard	Total Suspended Solids	2011/11/21		96	%	85 - 115
		Method Blank	Total Suspended Solids	2011/11/21	<10		mg/L	
		RPD	Total Suspended Solids	2011/11/21	NC		%	25
2687577	RAY	QC Standard	Total Suspended Solids	2011/11/21		98	%	85 - 115
		Method Blank	Total Suspended Solids	2011/11/21	<10		mg/L	
		RPD	Total Suspended Solids	2011/11/21	NC		%	25
2687603	NYS	QC Standard	Turbidity	2011/11/20		107	%	85 - 115
		Method Blank	Turbidity	2011/11/20	<0.2		NTU	
		RPD	Turbidity	2011/11/20	15.3		%	20
2687648	YPA	QC Standard	Alkalinity (Total as CaCO3)	2011/11/19		97	%	85 - 115
		Method Blank	Alkalinity (Total as CaCO3)	2011/11/19	<1		mg/L	
		RPD	Alkalinity (Total as CaCO3)	2011/11/19	0.4		%	25
2687649	YPA	Matrix Spike	Fluoride (F-)	2011/11/19		102	%	80 - 120
		Spiked Blank	Fluoride (F-)	2011/11/19		104	%	80 - 120
		Method Blank	Fluoride (F-)	2011/11/19	<0.1		mg/L	
		RPD	Fluoride (F-)	2011/11/19	NC		%	20
2687694	XQI	Matrix Spike	Sulphide	2011/11/21		93	%	80 - 120
		Spiked Blank	Sulphide	2011/11/21		93	%	80 - 120
		Method Blank	Sulphide	2011/11/21	<0.02		mg/L	
		RPD	Sulphide	2011/11/21	NC		%	20
2687729	BMO	Matrix Spike [LR0544-08]	Phenols-4AAP	2011/11/21		101	%	75 - 125
		Spiked Blank	Phenols-4AAP	2011/11/21		103	%	75 - 125
		Method Blank	Phenols-4AAP	2011/11/21	<0.001		mg/L	
		RPD [LR0544-08]	Phenols-4AAP	2011/11/21	NC		%	25
2687798	FD	Matrix Spike	Dissolved Chloride (Cl)	2011/11/24		NC	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/24		NC	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/24		NC	%	80 - 120
		Spiked Blank	Dissolved Chloride (Cl)	2011/11/24		100	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/24		105	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/24		104	%	80 - 120
		Method Blank	Dissolved Chloride (Cl)	2011/11/24	<1		mg/L	
			Dissolved Bromide (Br-)	2011/11/24	<1		mg/L	
			Dissolved Sulphate (SO4)	2011/11/24	<1		mg/L	
		RPD	Dissolved Chloride (Cl)	2011/11/24	2.8		%	20
			Dissolved Bromide (Br-)	2011/11/24	NC		%	20
			Dissolved Sulphate (SO4)	2011/11/24	3.2		%	20
2687815	FD	Matrix Spike	Dissolved Chloride (Cl)	2011/11/23		NC	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/23		107	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/23		NC	%	80 - 120
		Spiked Blank	Dissolved Chloride (Cl)	2011/11/23		100	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/23		99	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/23		101	%	80 - 120

Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location: TANSLEY QUARRY

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1589

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2687815	FD	Method Blank	Dissolved Chloride (Cl)	2011/11/23	<1		mg/L	
			Dissolved Bromide (Br-)	2011/11/23	<1		mg/L	
			Dissolved Sulphate (SO4)	2011/11/23	<1		mg/L	
		RPD	Dissolved Chloride (Cl)	2011/11/23	0.4		%	20
			Dissolved Bromide (Br-)	2011/11/23	NC		%	20
			Dissolved Sulphate (SO4)	2011/11/23	0.007		%	20
2687825	HH	Matrix Spike	Nitrite (N)	2011/11/24		106	%	80 - 120
			Nitrate (N)	2011/11/24		100	%	80 - 120
		Spiked Blank	Nitrite (N)	2011/11/24		103	%	85 - 115
			Nitrate (N)	2011/11/24		94	%	85 - 115
		Method Blank	Nitrite (N)	2011/11/24	<0.01		mg/L	
			Nitrate (N)	2011/11/24	<0.1		mg/L	
		RPD	Nitrate (N)	2011/11/24	NC		%	25
2687845	LHA	Matrix Spike	Free Cyanide	2011/11/21		95	%	80 - 120
		Spiked Blank	Free Cyanide	2011/11/21		101	%	80 - 120
		Method Blank	Free Cyanide	2011/11/21	<0.002		mg/L	
		RPD	Free Cyanide	2011/11/21	NC		%	25
2687901	DRM	Matrix Spike	Orthophosphate (P)	2011/11/22		97	%	75 - 125
		Spiked Blank	Orthophosphate (P)	2011/11/22		102	%	80 - 120
		Method Blank	Orthophosphate (P)	2011/11/22	<0.01		mg/L	
		RPD	Orthophosphate (P)	2011/11/22	NC		%	25
2687902	DRM	Matrix Spike	Orthophosphate (P)	2011/11/22		98	%	75 - 125
		Spiked Blank	Orthophosphate (P)	2011/11/22		101	%	80 - 120
		Method Blank	Orthophosphate (P)	2011/11/22	<0.01		mg/L	
		RPD	Orthophosphate (P)	2011/11/22	NC		%	25
2688125	HRE	Matrix Spike	Dissolved Aluminum (Al)	2011/11/21		91	%	80 - 120
			Dissolved Antimony (Sb)	2011/11/21		96	%	80 - 120
			Dissolved Arsenic (As)	2011/11/21		99	%	80 - 120
			Dissolved Barium (Ba)	2011/11/21		96	%	80 - 120
			Dissolved Beryllium (Be)	2011/11/21		94	%	80 - 120
			Dissolved Bismuth (Bi)	2011/11/21		97	%	80 - 120
			Dissolved Boron (B)	2011/11/21		NC	%	80 - 120
			Dissolved Cadmium (Cd)	2011/11/21		98	%	80 - 120
			Dissolved Calcium (Ca)	2011/11/21		96	%	80 - 120
			Dissolved Chromium (Cr)	2011/11/21		95	%	80 - 120
			Dissolved Cobalt (Co)	2011/11/21		93	%	80 - 120
			Dissolved Copper (Cu)	2011/11/21		93	%	80 - 120
			Dissolved Iron (Fe)	2011/11/21		96	%	80 - 120
			Dissolved Lead (Pb)	2011/11/21		95	%	80 - 120
			Dissolved Magnesium (Mg)	2011/11/21		92	%	80 - 120
			Dissolved Manganese (Mn)	2011/11/21		93	%	80 - 120
			Dissolved Molybdenum (Mo)	2011/11/21		97	%	80 - 120
			Dissolved Nickel (Ni)	2011/11/21		93	%	80 - 120
			Dissolved Phosphorus (P)	2011/11/21		93	%	80 - 120
			Dissolved Potassium (K)	2011/11/21		96	%	80 - 120
			Dissolved Selenium (Se)	2011/11/21		98	%	80 - 120
			Dissolved Silicon (Si)	2011/11/21		93	%	80 - 120
			Dissolved Silver (Ag)	2011/11/21		92	%	80 - 120
			Dissolved Sodium (Na)	2011/11/21		NC	%	80 - 120
			Dissolved Strontium (Sr)	2011/11/21		95	%	80 - 120
			Dissolved Thallium (Tl)	2011/11/21		93	%	80 - 120
			Dissolved Tin (Sn)	2011/11/21		103	%	80 - 120
			Dissolved Titanium (Ti)	2011/11/21		95	%	80 - 120
			Dissolved Uranium (U)	2011/11/21		99	%	80 - 120
			Dissolved Vanadium (V)	2011/11/21		93	%	80 - 120

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Golder Associates Ltd
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Client Project #: 021-1228
P.O. #:
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Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1589

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2688125	HRE	Matrix Spike	Dissolved Zinc (Zn)	2011/11/21		94	%	80 - 120
		Spiked Blank	Dissolved Aluminum (Al)	2011/11/21		92	%	80 - 120
			Dissolved Antimony (Sb)	2011/11/21		95	%	80 - 120
			Dissolved Arsenic (As)	2011/11/21		98	%	80 - 120
			Dissolved Barium (Ba)	2011/11/21		98	%	80 - 120
			Dissolved Beryllium (Be)	2011/11/21		94	%	80 - 120
			Dissolved Bismuth (Bi)	2011/11/21		98	%	80 - 120
			Dissolved Boron (B)	2011/11/21		92	%	80 - 120
			Dissolved Cadmium (Cd)	2011/11/21		98	%	80 - 120
			Dissolved Calcium (Ca)	2011/11/21		97	%	80 - 120
			Dissolved Chromium (Cr)	2011/11/21		95	%	80 - 120
			Dissolved Cobalt (Co)	2011/11/21		94	%	80 - 120
			Dissolved Copper (Cu)	2011/11/21		93	%	80 - 120
			Dissolved Iron (Fe)	2011/11/21		97	%	80 - 120
			Dissolved Lead (Pb)	2011/11/21		98	%	80 - 120
			Dissolved Magnesium (Mg)	2011/11/21		91	%	80 - 120
			Dissolved Manganese (Mn)	2011/11/21		93	%	80 - 120
			Dissolved Molybdenum (Mo)	2011/11/21		97	%	80 - 120
			Dissolved Nickel (Ni)	2011/11/21		95	%	80 - 120
			Dissolved Phosphorus (P)	2011/11/21		88	%	80 - 120
			Dissolved Potassium (K)	2011/11/21		96	%	80 - 120
			Dissolved Selenium (Se)	2011/11/21		97	%	80 - 120
			Dissolved Silicon (Si)	2011/11/21		92	%	80 - 120
			Dissolved Silver (Ag)	2011/11/21		94	%	80 - 120
			Dissolved Sodium (Na)	2011/11/21		92	%	80 - 120
			Dissolved Strontium (Sr)	2011/11/21		96	%	80 - 120
			Dissolved Thallium (Tl)	2011/11/21		95	%	80 - 120
			Dissolved Tin (Sn)	2011/11/21		102	%	80 - 120
			Dissolved Titanium (Ti)	2011/11/21		96	%	80 - 120
			Dissolved Uranium (U)	2011/11/21		101	%	80 - 120
			Dissolved Vanadium (V)	2011/11/21		94	%	80 - 120
			Dissolved Zinc (Zn)	2011/11/21		95	%	80 - 120
		Method Blank	Dissolved Aluminum (Al)	2011/11/21	<5		ug/L	
			Dissolved Antimony (Sb)	2011/11/21	<0.5		ug/L	
			Dissolved Arsenic (As)	2011/11/21	<1		ug/L	
			Dissolved Barium (Ba)	2011/11/21	<2		ug/L	
			Dissolved Beryllium (Be)	2011/11/21	<0.5		ug/L	
			Dissolved Bismuth (Bi)	2011/11/21	<1		ug/L	
			Dissolved Boron (B)	2011/11/21	<10		ug/L	
			Dissolved Cadmium (Cd)	2011/11/21	<0.1		ug/L	
			Dissolved Calcium (Ca)	2011/11/21	<200		ug/L	
			Dissolved Chromium (Cr)	2011/11/21	<5		ug/L	
			Dissolved Cobalt (Co)	2011/11/21	<0.5		ug/L	
			Dissolved Copper (Cu)	2011/11/21	<1		ug/L	
			Dissolved Iron (Fe)	2011/11/21	<100		ug/L	
			Dissolved Lead (Pb)	2011/11/21	<0.5		ug/L	
			Dissolved Magnesium (Mg)	2011/11/21	<50		ug/L	
			Dissolved Manganese (Mn)	2011/11/21	<2		ug/L	
			Dissolved Molybdenum (Mo)	2011/11/21	<0.5		ug/L	
			Dissolved Nickel (Ni)	2011/11/21	<1		ug/L	
			Dissolved Phosphorus (P)	2011/11/21	<100		ug/L	
			Dissolved Potassium (K)	2011/11/21	<200		ug/L	
			Dissolved Selenium (Se)	2011/11/21	<2		ug/L	
			Dissolved Silicon (Si)	2011/11/21	<50		ug/L	
			Dissolved Silver (Ag)	2011/11/21	<0.1		ug/L	

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Quality Assurance Report (Continued)

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QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2688125	HRE	Method Blank	Dissolved Sodium (Na)	2011/11/21	<100		ug/L	
			Dissolved Strontium (Sr)	2011/11/21	<1		ug/L	
			Dissolved Thallium (Tl)	2011/11/21	<0.05		ug/L	
			Dissolved Tin (Sn)	2011/11/21	<1		ug/L	
			Dissolved Titanium (Ti)	2011/11/21	<5		ug/L	
			Dissolved Uranium (U)	2011/11/21	<0.1		ug/L	
			Dissolved Vanadium (V)	2011/11/21	<0.5		ug/L	
			Dissolved Zinc (Zn)	2011/11/21	<5		ug/L	
		RPD	Dissolved Aluminum (Al)	2011/11/21	NC		%	20
			Dissolved Antimony (Sb)	2011/11/21	NC		%	20
			Dissolved Arsenic (As)	2011/11/21	NC		%	20
			Dissolved Barium (Ba)	2011/11/21	NC		%	20
			Dissolved Beryllium (Be)	2011/11/21	NC		%	20
			Dissolved Boron (B)	2011/11/21	0.3		%	20
			Dissolved Cadmium (Cd)	2011/11/21	NC		%	20
			Dissolved Calcium (Ca)	2011/11/21	NC		%	20
			Dissolved Chromium (Cr)	2011/11/21	NC		%	20
			Dissolved Cobalt (Co)	2011/11/21	NC		%	20
			Dissolved Copper (Cu)	2011/11/21	NC		%	20
			Dissolved Iron (Fe)	2011/11/21	NC		%	20
			Dissolved Lead (Pb)	2011/11/21	NC		%	20
			Dissolved Magnesium (Mg)	2011/11/21	2.1		%	20
			Dissolved Manganese (Mn)	2011/11/21	NC		%	20
			Dissolved Molybdenum (Mo)	2011/11/21	NC		%	20
			Dissolved Nickel (Ni)	2011/11/21	NC		%	20
			Dissolved Phosphorus (P)	2011/11/21	NC		%	20
			Dissolved Potassium (K)	2011/11/21	2.0		%	20
			Dissolved Selenium (Se)	2011/11/21	NC		%	20
			Dissolved Silicon (Si)	2011/11/21	0.9		%	20
			Dissolved Silver (Ag)	2011/11/21	NC		%	20
			Dissolved Sodium (Na)	2011/11/21	2.9		%	20
			Dissolved Strontium (Sr)	2011/11/21	NC		%	20
			Dissolved Thallium (Tl)	2011/11/21	NC		%	20
			Dissolved Titanium (Ti)	2011/11/21	NC		%	20
			Dissolved Uranium (U)	2011/11/21	NC		%	20
			Dissolved Vanadium (V)	2011/11/21	NC		%	20
			Dissolved Zinc (Zn)	2011/11/21	NC		%	20
2688326	MC	Matrix Spike	Mercury (Hg)	2011/11/22		109	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/22		110	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/22	<0.0001		mg/L	
		RPD	Mercury (Hg)	2011/11/22	NC		%	25
2688422	YPA	Matrix Spike	Fluoride (F-)	2011/11/22		91	%	80 - 120
		Spiked Blank	Fluoride (F-)	2011/11/22		101	%	80 - 120
		Method Blank	Fluoride (F-)	2011/11/22	<0.1		mg/L	
		RPD	Fluoride (F-)	2011/11/22	0.5		%	20
2688425	YPA	QC Standard	Alkalinity (Total as CaCO3)	2011/11/22		96	%	85 - 115
		Method Blank	Alkalinity (Total as CaCO3)	2011/11/22	<1		mg/L	
		RPD	Alkalinity (Total as CaCO3)	2011/11/22	0.4		%	25
2688767	ADA	Matrix Spike	Dissolved Aluminum (Al)	2011/11/24		102	%	80 - 120
			Dissolved Antimony (Sb)	2011/11/24		102	%	80 - 120
			Dissolved Arsenic (As)	2011/11/24		98	%	80 - 120
			Dissolved Barium (Ba)	2011/11/24		94	%	80 - 120
			Dissolved Beryllium (Be)	2011/11/24		101	%	80 - 120
			Dissolved Bismuth (Bi)	2011/11/24		94	%	80 - 120
			Dissolved Boron (B)	2011/11/24		NC	%	80 - 120

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Quality Assurance Report (Continued)

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QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2688767	ADA	Matrix Spike	Dissolved Cadmium (Cd)	2011/11/24		100	%	80 - 120
			Dissolved Calcium (Ca)	2011/11/24		NC	%	80 - 120
			Dissolved Chromium (Cr)	2011/11/24		98	%	80 - 120
			Dissolved Cobalt (Co)	2011/11/24		99	%	80 - 120
			Dissolved Copper (Cu)	2011/11/24		95	%	80 - 120
			Dissolved Iron (Fe)	2011/11/24		100	%	80 - 120
			Dissolved Lead (Pb)	2011/11/24		96	%	80 - 120
			Dissolved Magnesium (Mg)	2011/11/24		NC	%	80 - 120
			Dissolved Manganese (Mn)	2011/11/24		NC	%	80 - 120
			Dissolved Molybdenum (Mo)	2011/11/24		102	%	80 - 120
			Dissolved Nickel (Ni)	2011/11/24		98	%	80 - 120
			Dissolved Phosphorus (P)	2011/11/24		112	%	80 - 120
			Dissolved Potassium (K)	2011/11/24		NC	%	80 - 120
			Dissolved Selenium (Se)	2011/11/24		100	%	80 - 120
			Dissolved Silicon (Si)	2011/11/24		104	%	80 - 120
			Dissolved Silver (Ag)	2011/11/24		82	%	80 - 120
			Dissolved Sodium (Na)	2011/11/24		NC	%	80 - 120
			Dissolved Strontium (Sr)	2011/11/24		NC	%	80 - 120
			Dissolved Thallium (Tl)	2011/11/24		96	%	80 - 120
			Dissolved Tin (Sn)	2011/11/24		101	%	80 - 120
			Dissolved Titanium (Ti)	2011/11/24		101	%	80 - 120
			Dissolved Uranium (U)	2011/11/24		105	%	80 - 120
			Dissolved Vanadium (V)	2011/11/24		101	%	80 - 120
			Dissolved Zinc (Zn)	2011/11/24		99	%	80 - 120
		Spiked Blank	Dissolved Aluminum (Al)	2011/11/24		104	%	80 - 120
			Dissolved Antimony (Sb)	2011/11/24		99	%	80 - 120
			Dissolved Arsenic (As)	2011/11/24		96	%	80 - 120
			Dissolved Barium (Ba)	2011/11/24		96	%	80 - 120
			Dissolved Beryllium (Be)	2011/11/24		99	%	80 - 120
			Dissolved Bismuth (Bi)	2011/11/24		96	%	80 - 120
			Dissolved Boron (B)	2011/11/24		98	%	80 - 120
			Dissolved Cadmium (Cd)	2011/11/24		98	%	80 - 120
			Dissolved Calcium (Ca)	2011/11/24		103	%	80 - 120
			Dissolved Chromium (Cr)	2011/11/24		99	%	80 - 120
			Dissolved Cobalt (Co)	2011/11/24		100	%	80 - 120
			Dissolved Copper (Cu)	2011/11/24		98	%	80 - 120
			Dissolved Iron (Fe)	2011/11/24		101	%	80 - 120
			Dissolved Lead (Pb)	2011/11/24		98	%	80 - 120
			Dissolved Magnesium (Mg)	2011/11/24		103	%	80 - 120
			Dissolved Manganese (Mn)	2011/11/24		97	%	80 - 120
			Dissolved Molybdenum (Mo)	2011/11/24		99	%	80 - 120
			Dissolved Nickel (Ni)	2011/11/24		100	%	80 - 120
			Dissolved Phosphorus (P)	2011/11/24		110	%	80 - 120
			Dissolved Potassium (K)	2011/11/24		109	%	80 - 120
			Dissolved Selenium (Se)	2011/11/24		99	%	80 - 120
			Dissolved Silicon (Si)	2011/11/24		105	%	80 - 120
			Dissolved Silver (Ag)	2011/11/24		96	%	80 - 120
			Dissolved Sodium (Na)	2011/11/24		106	%	80 - 120
			Dissolved Strontium (Sr)	2011/11/24		95	%	80 - 120
			Dissolved Thallium (Tl)	2011/11/24		97	%	80 - 120
			Dissolved Tin (Sn)	2011/11/24		99	%	80 - 120
			Dissolved Titanium (Ti)	2011/11/24		99	%	80 - 120
			Dissolved Uranium (U)	2011/11/24		102	%	80 - 120
			Dissolved Vanadium (V)	2011/11/24		100	%	80 - 120
			Dissolved Zinc (Zn)	2011/11/24		99	%	80 - 120

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Quality Assurance Report (Continued)

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QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2688767	ADA	Method Blank	Dissolved Aluminum (Al)	2011/11/24	<5		ug/L	
			Dissolved Antimony (Sb)	2011/11/24	<0.5		ug/L	
			Dissolved Arsenic (As)	2011/11/24	<1		ug/L	
			Dissolved Barium (Ba)	2011/11/24	<2		ug/L	
			Dissolved Beryllium (Be)	2011/11/24	<0.5		ug/L	
			Dissolved Bismuth (Bi)	2011/11/24	<1		ug/L	
			Dissolved Boron (B)	2011/11/24	<10		ug/L	
			Dissolved Cadmium (Cd)	2011/11/24	<0.1		ug/L	
			Dissolved Calcium (Ca)	2011/11/24	<200		ug/L	
			Dissolved Chromium (Cr)	2011/11/24	<5		ug/L	
			Dissolved Cobalt (Co)	2011/11/24	<0.5		ug/L	
			Dissolved Copper (Cu)	2011/11/24	<1		ug/L	
			Dissolved Iron (Fe)	2011/11/24	<100		ug/L	
			Dissolved Lead (Pb)	2011/11/24	<0.5		ug/L	
			Dissolved Magnesium (Mg)	2011/11/24	<50		ug/L	
			Dissolved Manganese (Mn)	2011/11/24	<2		ug/L	
			Dissolved Molybdenum (Mo)	2011/11/24	<0.5		ug/L	
			Dissolved Nickel (Ni)	2011/11/24	<1		ug/L	
			Dissolved Phosphorus (P)	2011/11/24	<100		ug/L	
			Dissolved Potassium (K)	2011/11/24	<200		ug/L	
			Dissolved Selenium (Se)	2011/11/24	<2		ug/L	
			Dissolved Silicon (Si)	2011/11/24	<50		ug/L	
			Dissolved Silver (Ag)	2011/11/24	<0.1		ug/L	
			Dissolved Sodium (Na)	2011/11/24	<100		ug/L	
			Dissolved Strontium (Sr)	2011/11/24	<1		ug/L	
			Dissolved Thallium (Tl)	2011/11/24	<0.05		ug/L	
			Dissolved Tin (Sn)	2011/11/24	<1		ug/L	
			Dissolved Titanium (Ti)	2011/11/24	<5		ug/L	
			Dissolved Uranium (U)	2011/11/24	<0.1		ug/L	
			Dissolved Vanadium (V)	2011/11/24	<0.5		ug/L	
			Dissolved Zinc (Zn)	2011/11/24	<5		ug/L	
		RPD	Dissolved Aluminum (Al)	2011/11/24	NC		%	20
2688987	XQI	Matrix Spike	Sulphide	2011/11/21		93	%	80 - 120
		Spiked Blank	Sulphide	2011/11/21		87	%	80 - 120
		Method Blank	Sulphide	2011/11/21	<0.02		mg/L	
		RPD	Sulphide	2011/11/21	NC		%	20
2689631	MC	Matrix Spike	Mercury (Hg)	2011/11/23		106	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/23		101	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/23	<0.0001		mg/L	
		RPD	Mercury (Hg)	2011/11/23	NC		%	25
2690063	ADB	Matrix Spike	Total Ammonia-N	2011/11/24		101	%	80 - 120
		Spiked Blank	Total Ammonia-N	2011/11/24		100	%	85 - 115
		Method Blank	Total Ammonia-N	2011/11/24	<0.05		mg/L	
		RPD	Total Ammonia-N	2011/11/24	NC		%	20
2690888	HRE	Matrix Spike	Total Aluminum (Al)	2011/11/25		104	%	80 - 120
			Total Antimony (Sb)	2011/11/25		108	%	80 - 120
			Total Arsenic (As)	2011/11/25		104	%	80 - 120
			Total Barium (Ba)	2011/11/25		100	%	80 - 120
			Total Beryllium (Be)	2011/11/25		97	%	80 - 120
			Total Bismuth (Bi)	2011/11/25		101	%	80 - 120
			Total Boron (B)	2011/11/25		98	%	80 - 120
			Total Cadmium (Cd)	2011/11/25		101	%	80 - 120
			Total Calcium (Ca)	2011/11/25		NC	%	80 - 120
			Total Chromium (Cr)	2011/11/25		98	%	80 - 120
			Total Cobalt (Co)	2011/11/25		97	%	80 - 120

Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location: TANSLEY QUARRY

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1589

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2690888	HRE	Matrix Spike	Total Copper (Cu)	2011/11/25		98	%	80 - 120
			Total Iron (Fe)	2011/11/25		103	%	80 - 120
			Total Lead (Pb)	2011/11/25		100	%	80 - 120
			Total Magnesium (Mg)	2011/11/25		NC	%	80 - 120
			Total Manganese (Mn)	2011/11/25		99	%	80 - 120
			Total Molybdenum (Mo)	2011/11/25		108	%	80 - 120
			Total Nickel (Ni)	2011/11/25		96	%	80 - 120
			Total Phosphorus (P)	2011/11/25		114	%	80 - 120
			Total Potassium (K)	2011/11/25		108	%	80 - 120
			Total Silicon (Si)	2011/11/25		104	%	80 - 120
			Total Selenium (Se)	2011/11/25		100	%	80 - 120
			Total Silver (Ag)	2011/11/25		95	%	80 - 120
			Total Sodium (Na)	2011/11/25		NC	%	80 - 120
			Total Strontium (Sr)	2011/11/25		NC	%	80 - 120
			Total Thallium (Tl)	2011/11/25		99	%	80 - 120
			Total Tin (Sn)	2011/11/25		112	%	80 - 120
			Total Titanium (Ti)	2011/11/25		105	%	80 - 120
			Total Uranium (U)	2011/11/25		102	%	80 - 120
			Total Vanadium (V)	2011/11/25		100	%	80 - 120
			Total Zinc (Zn)	2011/11/25		100	%	80 - 120
		Spiked Blank	Total Aluminum (Al)	2011/11/25		105	%	80 - 120
			Total Antimony (Sb)	2011/11/25		105	%	80 - 120
			Total Arsenic (As)	2011/11/25		102	%	80 - 120
			Total Barium (Ba)	2011/11/25		101	%	80 - 120
			Total Beryllium (Be)	2011/11/25		99	%	80 - 120
			Total Bismuth (Bi)	2011/11/25		98	%	80 - 120
			Total Boron (B)	2011/11/25		98	%	80 - 120
			Total Cadmium (Cd)	2011/11/25		100	%	80 - 120
			Total Calcium (Ca)	2011/11/25		103	%	80 - 120
			Total Chromium (Cr)	2011/11/25		97	%	80 - 120
			Total Cobalt (Co)	2011/11/25		99	%	80 - 120
			Total Copper (Cu)	2011/11/25		99	%	80 - 120
			Total Iron (Fe)	2011/11/25		104	%	80 - 120
			Total Lead (Pb)	2011/11/25		100	%	80 - 120
			Total Magnesium (Mg)	2011/11/25		103	%	80 - 120
			Total Manganese (Mn)	2011/11/25		101	%	80 - 120
			Total Molybdenum (Mo)	2011/11/25		105	%	80 - 120
			Total Nickel (Ni)	2011/11/25		98	%	80 - 120
			Total Phosphorus (P)	2011/11/25		113	%	80 - 120
			Total Potassium (K)	2011/11/25		106	%	80 - 120
			Total Silicon (Si)	2011/11/25		103	%	80 - 120
			Total Selenium (Se)	2011/11/25		101	%	80 - 120
			Total Silver (Ag)	2011/11/25		99	%	80 - 120
			Total Sodium (Na)	2011/11/25		104	%	80 - 120
			Total Strontium (Sr)	2011/11/25		99	%	80 - 120
			Total Thallium (Tl)	2011/11/25		100	%	80 - 120
			Total Tin (Sn)	2011/11/25		109	%	80 - 120
			Total Titanium (Ti)	2011/11/25		105	%	80 - 120
			Total Uranium (U)	2011/11/25		100	%	80 - 120
			Total Vanadium (V)	2011/11/25		99	%	80 - 120
			Total Zinc (Zn)	2011/11/25		100	%	80 - 120
		Method Blank	Total Aluminum (Al)	2011/11/25	<5		ug/L	
			Total Antimony (Sb)	2011/11/25	<0.5		ug/L	
			Total Arsenic (As)	2011/11/25	<1		ug/L	
			Total Barium (Ba)	2011/11/25	<2		ug/L	

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location: TANSLEY QUARRY

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1589

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2690888	HRE	Method Blank	Total Beryllium (Be)	2011/11/25	<0.5		ug/L	
			Total Bismuth (Bi)	2011/11/25	<1		ug/L	
			Total Boron (B)	2011/11/25	<10		ug/L	
			Total Cadmium (Cd)	2011/11/25	<0.1		ug/L	
			Total Calcium (Ca)	2011/11/25	<200		ug/L	
			Total Chromium (Cr)	2011/11/25	<5		ug/L	
			Total Cobalt (Co)	2011/11/25	<0.5		ug/L	
			Total Copper (Cu)	2011/11/25	<1		ug/L	
			Total Iron (Fe)	2011/11/25	<100		ug/L	
			Total Lead (Pb)	2011/11/25	<0.5		ug/L	
			Total Magnesium (Mg)	2011/11/25	<50		ug/L	
			Total Manganese (Mn)	2011/11/25	<2		ug/L	
			Total Molybdenum (Mo)	2011/11/25	<0.5		ug/L	
			Total Nickel (Ni)	2011/11/25	<1		ug/L	
			Total Phosphorus (P)	2011/11/25	<100		ug/L	
			Total Potassium (K)	2011/11/25	<200		ug/L	
			Total Silicon (Si)	2011/11/25	<50		ug/L	
			Total Selenium (Se)	2011/11/25	<2		ug/L	
			Total Silver (Ag)	2011/11/25	<0.1		ug/L	
			Total Sodium (Na)	2011/11/25	<100		ug/L	
			Total Strontium (Sr)	2011/11/25	<1		ug/L	
			Total Thallium (Tl)	2011/11/25	<0.05		ug/L	
			Total Tin (Sn)	2011/11/25	<1		ug/L	
			Total Titanium (Ti)	2011/11/25	<5		ug/L	
			Total Uranium (U)	2011/11/25	<0.1		ug/L	
			Total Vanadium (V)	2011/11/25	<0.5		ug/L	
			Total Zinc (Zn)	2011/11/25	<5		ug/L	
		RPD	Total Barium (Ba)	2011/11/25	2.0		%	20
			Total Boron (B)	2011/11/25	0.4		%	20
			Total Calcium (Ca)	2011/11/25	0.1		%	20
			Total Chromium (Cr)	2011/11/25	NC		%	20
			Total Cobalt (Co)	2011/11/25	NC		%	20
			Total Copper (Cu)	2011/11/25	NC		%	20
			Total Iron (Fe)	2011/11/25	NC		%	20
			Total Magnesium (Mg)	2011/11/25	0.03		%	20
			Total Manganese (Mn)	2011/11/25	0.2		%	20
			Total Potassium (K)	2011/11/25	1.1		%	20
			Total Silicon (Si)	2011/11/25	1.3		%	20
			Total Silver (Ag)	2011/11/25	NC		%	20
			Total Sodium (Na)	2011/11/25	0.6		%	20
			Total Strontium (Sr)	2011/11/25	1.2		%	20
			Total Thallium (Tl)	2011/11/25	NC		%	20
2691295	HRE	Matrix Spike	Total Aluminum (Al)	2011/11/24		85	%	80 - 120
			Total Antimony (Sb)	2011/11/24		106	%	80 - 120
			Total Arsenic (As)	2011/11/24		105	%	80 - 120
			Total Barium (Ba)	2011/11/24		99	%	80 - 120
			Total Beryllium (Be)	2011/11/24		94	%	80 - 120
			Total Bismuth (Bi)	2011/11/24		103	%	80 - 120
			Total Boron (B)	2011/11/24		NC	%	80 - 120
			Total Cadmium (Cd)	2011/11/24		98	%	80 - 120
			Total Calcium (Ca)	2011/11/24		95	%	80 - 120
			Total Chromium (Cr)	2011/11/24		95	%	80 - 120
			Total Cobalt (Co)	2011/11/24		96	%	80 - 120
			Total Copper (Cu)	2011/11/24		92	%	80 - 120
			Total Iron (Fe)	2011/11/24		98	%	80 - 120

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Golder Associates Ltd
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Client Project #: 021-1228
P.O. #:
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Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1589

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2691295	HRE	Matrix Spike	Total Lead (Pb)	2011/11/24		101	%	80 - 120
			Total Magnesium (Mg)	2011/11/24		85	%	80 - 120
			Total Manganese (Mn)	2011/11/24		95	%	80 - 120
			Total Molybdenum (Mo)	2011/11/24		113	%	80 - 120
			Total Nickel (Ni)	2011/11/24		94	%	80 - 120
			Total Phosphorus (P)	2011/11/24		90	%	80 - 120
			Total Potassium (K)	2011/11/24		NC	%	80 - 120
			Total Silicon (Si)	2011/11/24		89	%	80 - 120
			Total Selenium (Se)	2011/11/24		108	%	80 - 120
			Total Silver (Ag)	2011/11/24		94	%	80 - 120
			Total Sodium (Na)	2011/11/24		NC (1)	%	80 - 120
			Total Strontium (Sr)	2011/11/24		100	%	80 - 120
			Total Thallium (Tl)	2011/11/24		99	%	80 - 120
			Total Tin (Sn)	2011/11/24		109	%	80 - 120
			Total Titanium (Ti)	2011/11/24		99	%	80 - 120
			Total Uranium (U)	2011/11/24		105	%	80 - 120
			Total Vanadium (V)	2011/11/24		95	%	80 - 120
			Total Zinc (Zn)	2011/11/24		93	%	80 - 120
		Spiked Blank	Total Aluminum (Al)	2011/11/24		86	%	80 - 120
			Total Antimony (Sb)	2011/11/24		104	%	80 - 120
			Total Arsenic (As)	2011/11/24		102	%	80 - 120
			Total Barium (Ba)	2011/11/24		98	%	80 - 120
			Total Beryllium (Be)	2011/11/24		97	%	80 - 120
			Total Bismuth (Bi)	2011/11/24		107	%	80 - 120
			Total Boron (B)	2011/11/24		92	%	80 - 120
			Total Cadmium (Cd)	2011/11/24		99	%	80 - 120
			Total Calcium (Ca)	2011/11/24		97	%	80 - 120
			Total Chromium (Cr)	2011/11/24		97	%	80 - 120
			Total Cobalt (Co)	2011/11/24		99	%	80 - 120
			Total Copper (Cu)	2011/11/24		97	%	80 - 120
			Total Iron (Fe)	2011/11/24		103	%	80 - 120
			Total Lead (Pb)	2011/11/24		107	%	80 - 120
			Total Magnesium (Mg)	2011/11/24		87	%	80 - 120
			Total Manganese (Mn)	2011/11/24		98	%	80 - 120
			Total Molybdenum (Mo)	2011/11/24		108	%	80 - 120
			Total Nickel (Ni)	2011/11/24		100	%	80 - 120
			Total Phosphorus (P)	2011/11/24		90	%	80 - 120
			Total Potassium (K)	2011/11/24		96	%	80 - 120
			Total Silicon (Si)	2011/11/24		88	%	80 - 120
			Total Selenium (Se)	2011/11/24		100	%	80 - 120
			Total Silver (Ag)	2011/11/24		97	%	80 - 120
			Total Sodium (Na)	2011/11/24		90	%	80 - 120
			Total Strontium (Sr)	2011/11/24		99	%	80 - 120
			Total Thallium (Tl)	2011/11/24		105	%	80 - 120
			Total Tin (Sn)	2011/11/24		105	%	80 - 120
			Total Titanium (Ti)	2011/11/24		102	%	80 - 120
			Total Uranium (U)	2011/11/24		106	%	80 - 120
			Total Vanadium (V)	2011/11/24		96	%	80 - 120
			Total Zinc (Zn)	2011/11/24		101	%	80 - 120
		Method Blank	Total Aluminum (Al)	2011/11/24	<5		ug/L	
			Total Antimony (Sb)	2011/11/24	<0.5		ug/L	
			Total Arsenic (As)	2011/11/24	<1		ug/L	
			Total Barium (Ba)	2011/11/24	<2		ug/L	
			Total Beryllium (Be)	2011/11/24	<0.5		ug/L	
			Total Bismuth (Bi)	2011/11/24	<1		ug/L	

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Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1589

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2691295	HRE	Method Blank	Total Boron (B)	2011/11/24	<10		ug/L	
			Total Cadmium (Cd)	2011/11/24	<0.1		ug/L	
			Total Calcium (Ca)	2011/11/24	<200		ug/L	
			Total Chromium (Cr)	2011/11/24	<5		ug/L	
			Total Cobalt (Co)	2011/11/24	<0.5		ug/L	
			Total Copper (Cu)	2011/11/24	<1		ug/L	
			Total Iron (Fe)	2011/11/24	<100		ug/L	
			Total Lead (Pb)	2011/11/24	<0.5		ug/L	
			Total Magnesium (Mg)	2011/11/24	<50		ug/L	
			Total Manganese (Mn)	2011/11/24	<2		ug/L	
			Total Molybdenum (Mo)	2011/11/24	<0.5		ug/L	
			Total Nickel (Ni)	2011/11/24	<1		ug/L	
			Total Phosphorus (P)	2011/11/24	<100		ug/L	
			Total Potassium (K)	2011/11/24	<200		ug/L	
			Total Silicon (Si)	2011/11/24	<50		ug/L	
			Total Selenium (Se)	2011/11/24	<2		ug/L	
			Total Silver (Ag)	2011/11/24	<0.1		ug/L	
			Total Sodium (Na)	2011/11/24	<100		ug/L	
			Total Strontium (Sr)	2011/11/24	<1		ug/L	
			Total Thallium (Tl)	2011/11/24	<0.05		ug/L	
			Total Tin (Sn)	2011/11/24	<1		ug/L	
			Total Titanium (Ti)	2011/11/24	<5		ug/L	
			Total Uranium (U)	2011/11/24	<0.1		ug/L	
			Total Vanadium (V)	2011/11/24	<0.5		ug/L	
			Total Zinc (Zn)	2011/11/24	<5		ug/L	
2691986	VRO	Matrix Spike	Total Phosphorus	2011/11/24		103	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/24		99	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/24		100	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/24	<0.02		mg/L	
		RPD	Total Phosphorus	2011/11/24	NC		%	20
2695145	ADA	Matrix Spike	Dissolved Aluminum (Al)	2011/11/28		98	%	80 - 120
			Dissolved Antimony (Sb)	2011/11/28		101	%	80 - 120
			Dissolved Arsenic (As)	2011/11/28		99	%	80 - 120
			Dissolved Barium (Ba)	2011/11/28		NC (2)	%	80 - 120
			Dissolved Beryllium (Be)	2011/11/28		99	%	80 - 120
			Dissolved Bismuth (Bi)	2011/11/28		92	%	80 - 120
			Dissolved Boron (B)	2011/11/28		NC (2)	%	80 - 120
			Dissolved Cadmium (Cd)	2011/11/28		98	%	80 - 120
			Dissolved Calcium (Ca)	2011/11/28		NC	%	80 - 120
			Dissolved Chromium (Cr)	2011/11/28		100	%	80 - 120
			Dissolved Cobalt (Co)	2011/11/28		99	%	80 - 120
			Dissolved Copper (Cu)	2011/11/28		95	%	80 - 120
			Dissolved Iron (Fe)	2011/11/28		99	%	80 - 120
			Dissolved Lead (Pb)	2011/11/28		95	%	80 - 120
			Dissolved Magnesium (Mg)	2011/11/28		NC	%	80 - 120
			Dissolved Manganese (Mn)	2011/11/28		NC	%	80 - 120
			Dissolved Molybdenum (Mo)	2011/11/28		105	%	80 - 120
			Dissolved Nickel (Ni)	2011/11/28		97	%	80 - 120
			Dissolved Phosphorus (P)	2011/11/28		107	%	80 - 120
			Dissolved Potassium (K)	2011/11/28		NC	%	80 - 120
			Dissolved Selenium (Se)	2011/11/28		99	%	80 - 120
			Dissolved Silicon (Si)	2011/11/28		105	%	80 - 120
			Dissolved Silver (Ag)	2011/11/28		76 (3)	%	80 - 120
			Dissolved Sodium (Na)	2011/11/28		NC (2)	%	80 - 120
			Dissolved Strontium (Sr)	2011/11/28		NC	%	80 - 120

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Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1589

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2695145	ADA	Matrix Spike	Dissolved Thallium (Tl)	2011/11/28		97	%	80 - 120
			Dissolved Tin (Sn)	2011/11/28		102	%	80 - 120
			Dissolved Titanium (Ti)	2011/11/28		104	%	80 - 120
			Dissolved Uranium (U)	2011/11/28		109	%	80 - 120
			Dissolved Vanadium (V)	2011/11/28		102	%	80 - 120
			Dissolved Zinc (Zn)	2011/11/28		96	%	80 - 120
		Spiked Blank	Dissolved Aluminum (Al)	2011/11/28		97	%	80 - 120
			Dissolved Antimony (Sb)	2011/11/28		99	%	80 - 120
			Dissolved Arsenic (As)	2011/11/28		98	%	80 - 120
			Dissolved Barium (Ba)	2011/11/28		101	%	80 - 120
			Dissolved Beryllium (Be)	2011/11/28		96	%	80 - 120
			Dissolved Bismuth (Bi)	2011/11/28		95	%	80 - 120
			Dissolved Boron (B)	2011/11/28		97	%	80 - 120
			Dissolved Cadmium (Cd)	2011/11/28		99	%	80 - 120
			Dissolved Calcium (Ca)	2011/11/28		96	%	80 - 120
			Dissolved Chromium (Cr)	2011/11/28		94	%	80 - 120
			Dissolved Cobalt (Co)	2011/11/28		98	%	80 - 120
			Dissolved Copper (Cu)	2011/11/28		96	%	80 - 120
			Dissolved Iron (Fe)	2011/11/28		97	%	80 - 120
			Dissolved Lead (Pb)	2011/11/28		96	%	80 - 120
			Dissolved Magnesium (Mg)	2011/11/28		92	%	80 - 120
			Dissolved Manganese (Mn)	2011/11/28		92	%	80 - 120
			Dissolved Molybdenum (Mo)	2011/11/28		99	%	80 - 120
			Dissolved Nickel (Ni)	2011/11/28		98	%	80 - 120
			Dissolved Phosphorus (P)	2011/11/28		101	%	80 - 120
			Dissolved Potassium (K)	2011/11/28		101	%	80 - 120
			Dissolved Selenium (Se)	2011/11/28		99	%	80 - 120
			Dissolved Silicon (Si)	2011/11/28		98	%	80 - 120
			Dissolved Silver (Ag)	2011/11/28		95	%	80 - 120
			Dissolved Sodium (Na)	2011/11/28		99	%	80 - 120
			Dissolved Strontium (Sr)	2011/11/28		97	%	80 - 120
			Dissolved Thallium (Tl)	2011/11/28		97	%	80 - 120
			Dissolved Tin (Sn)	2011/11/28		100	%	80 - 120
			Dissolved Titanium (Ti)	2011/11/28		96	%	80 - 120
			Dissolved Uranium (U)	2011/11/28		101	%	80 - 120
			Dissolved Vanadium (V)	2011/11/28		96	%	80 - 120
			Dissolved Zinc (Zn)	2011/11/28		97	%	80 - 120
		Method Blank	Dissolved Aluminum (Al)	2011/11/28	<5		ug/L	
			Dissolved Antimony (Sb)	2011/11/28	<0.5		ug/L	
			Dissolved Arsenic (As)	2011/11/28	<1		ug/L	
			Dissolved Barium (Ba)	2011/11/28	<2		ug/L	
			Dissolved Beryllium (Be)	2011/11/28	<0.5		ug/L	
			Dissolved Bismuth (Bi)	2011/11/28	<1		ug/L	
			Dissolved Boron (B)	2011/11/28	<10		ug/L	
			Dissolved Cadmium (Cd)	2011/11/28	<0.1		ug/L	
			Dissolved Calcium (Ca)	2011/11/28	<200		ug/L	
			Dissolved Chromium (Cr)	2011/11/28	<5		ug/L	
			Dissolved Cobalt (Co)	2011/11/28	<0.5		ug/L	
			Dissolved Copper (Cu)	2011/11/28	<1		ug/L	
			Dissolved Iron (Fe)	2011/11/28	<100		ug/L	
			Dissolved Lead (Pb)	2011/11/28	<0.5		ug/L	
			Dissolved Magnesium (Mg)	2011/11/28	<50		ug/L	
			Dissolved Manganese (Mn)	2011/11/28	<2		ug/L	
			Dissolved Molybdenum (Mo)	2011/11/28	<0.5		ug/L	
			Dissolved Nickel (Ni)	2011/11/28	<1		ug/L	

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location: TANSLEY QUARRY

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1589

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2695145	ADA	Method Blank	Dissolved Phosphorus (P)	2011/11/28	<100		ug/L	
			Dissolved Potassium (K)	2011/11/28	<200		ug/L	
			Dissolved Selenium (Se)	2011/11/28	<2		ug/L	
			Dissolved Silicon (Si)	2011/11/28	<50		ug/L	
			Dissolved Silver (Ag)	2011/11/28	<0.1		ug/L	
			Dissolved Sodium (Na)	2011/11/28	<100		ug/L	
			Dissolved Strontium (Sr)	2011/11/28	<1		ug/L	
			Dissolved Thallium (Tl)	2011/11/28	<0.05		ug/L	
			Dissolved Tin (Sn)	2011/11/28	<1		ug/L	
			Dissolved Titanium (Ti)	2011/11/28	<5		ug/L	
			Dissolved Uranium (U)	2011/11/28	<0.1		ug/L	
			Dissolved Vanadium (V)	2011/11/28	<0.5		ug/L	
			Dissolved Zinc (Zn)	2011/11/28	<5		ug/L	
		RPD	Dissolved Lead (Pb)	2011/11/28	NC		%	20
2695568	ADA	Matrix Spike	Total Aluminum (Al)	2011/11/29		NC (2)	%	80 - 120
			Total Antimony (Sb)	2011/11/29		107	%	80 - 120
			Total Arsenic (As)	2011/11/29		102	%	80 - 120
			Total Barium (Ba)	2011/11/29		102	%	80 - 120
			Total Beryllium (Be)	2011/11/29		104	%	80 - 120
			Total Bismuth (Bi)	2011/11/29		101	%	80 - 120
			Total Boron (B)	2011/11/29		103	%	80 - 120
			Total Cadmium (Cd)	2011/11/29		102	%	80 - 120
			Total Calcium (Ca)	2011/11/29		NC (2)	%	80 - 120
			Total Chromium (Cr)	2011/11/29		102	%	80 - 120
			Total Cobalt (Co)	2011/11/29		102	%	80 - 120
			Total Copper (Cu)	2011/11/29		102	%	80 - 120
			Total Iron (Fe)	2011/11/29		107	%	80 - 120
			Total Lead (Pb)	2011/11/29		101	%	80 - 120
			Total Magnesium (Mg)	2011/11/29		105	%	80 - 120
			Total Manganese (Mn)	2011/11/29		103	%	80 - 120
			Total Molybdenum (Mo)	2011/11/29		108	%	80 - 120
			Total Nickel (Ni)	2011/11/29		102	%	80 - 120
			Total Phosphorus (P)	2011/11/29		113	%	80 - 120
			Total Potassium (K)	2011/11/29		110	%	80 - 120
			Total Silicon (Si)	2011/11/29		113	%	80 - 120
			Total Selenium (Se)	2011/11/29		102	%	80 - 120
			Total Silver (Ag)	2011/11/29		101	%	80 - 120
			Total Sodium (Na)	2011/11/29		NC (2)	%	80 - 120
			Total Strontium (Sr)	2011/11/29		103	%	80 - 120
			Total Thallium (Tl)	2011/11/29		100	%	80 - 120
			Total Tin (Sn)	2011/11/29		106	%	80 - 120
			Total Titanium (Ti)	2011/11/29		110	%	80 - 120
			Total Uranium (U)	2011/11/29		104	%	80 - 120
			Total Vanadium (V)	2011/11/29		104	%	80 - 120
			Total Zinc (Zn)	2011/11/29		104	%	80 - 120
		Spiked Blank	Total Aluminum (Al)	2011/11/29		106	%	80 - 120
			Total Antimony (Sb)	2011/11/29		106	%	80 - 120
			Total Arsenic (As)	2011/11/29		100	%	80 - 120
			Total Barium (Ba)	2011/11/29		100	%	80 - 120
			Total Beryllium (Be)	2011/11/29		103	%	80 - 120
			Total Bismuth (Bi)	2011/11/29		99	%	80 - 120
			Total Boron (B)	2011/11/29		106	%	80 - 120
			Total Cadmium (Cd)	2011/11/29		101	%	80 - 120
			Total Calcium (Ca)	2011/11/29		106	%	80 - 120
			Total Chromium (Cr)	2011/11/29		101	%	80 - 120

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location: TANSLEY QUARRY

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1589

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2695568	ADA	Spiked Blank	Total Cobalt (Co)	2011/11/29		101	%	80 - 120
			Total Copper (Cu)	2011/11/29		101	%	80 - 120
			Total Iron (Fe)	2011/11/29		105	%	80 - 120
			Total Lead (Pb)	2011/11/29		100	%	80 - 120
			Total Magnesium (Mg)	2011/11/29		105	%	80 - 120
			Total Manganese (Mn)	2011/11/29		101	%	80 - 120
			Total Molybdenum (Mo)	2011/11/29		107	%	80 - 120
			Total Nickel (Ni)	2011/11/29		101	%	80 - 120
			Total Phosphorus (P)	2011/11/29		114	%	80 - 120
			Total Potassium (K)	2011/11/29		106	%	80 - 120
			Total Silicon (Si)	2011/11/29		103	%	80 - 120
			Total Selenium (Se)	2011/11/29		101	%	80 - 120
			Total Silver (Ag)	2011/11/29		102	%	80 - 120
			Total Sodium (Na)	2011/11/29		107	%	80 - 120
			Total Strontium (Sr)	2011/11/29		102	%	80 - 120
			Total Thallium (Tl)	2011/11/29		99	%	80 - 120
			Total Tin (Sn)	2011/11/29		105	%	80 - 120
			Total Titanium (Ti)	2011/11/29		107	%	80 - 120
			Total Uranium (U)	2011/11/29		101	%	80 - 120
			Total Vanadium (V)	2011/11/29		102	%	80 - 120
			Total Zinc (Zn)	2011/11/29		104	%	80 - 120
		Method Blank	Total Aluminum (Al)	2011/11/29	6, RDL=5		ug/L	
			Total Antimony (Sb)	2011/11/29	<0.5		ug/L	
			Total Arsenic (As)	2011/11/29	<1		ug/L	
			Total Barium (Ba)	2011/11/29	<2		ug/L	
			Total Beryllium (Be)	2011/11/29	<0.5		ug/L	
			Total Bismuth (Bi)	2011/11/29	<1		ug/L	
			Total Boron (B)	2011/11/29	<10		ug/L	
			Total Cadmium (Cd)	2011/11/29	<0.1		ug/L	
			Total Calcium (Ca)	2011/11/29	<200		ug/L	
			Total Chromium (Cr)	2011/11/29	<5		ug/L	
			Total Cobalt (Co)	2011/11/29	<0.5		ug/L	
			Total Copper (Cu)	2011/11/29	<1		ug/L	
			Total Iron (Fe)	2011/11/29	<100		ug/L	
			Total Lead (Pb)	2011/11/29	<0.5		ug/L	
			Total Magnesium (Mg)	2011/11/29	<50		ug/L	
			Total Manganese (Mn)	2011/11/29	<2		ug/L	
			Total Molybdenum (Mo)	2011/11/29	<0.5		ug/L	
			Total Nickel (Ni)	2011/11/29	<1		ug/L	
			Total Phosphorus (P)	2011/11/29	<100		ug/L	
			Total Potassium (K)	2011/11/29	<200		ug/L	
			Total Silicon (Si)	2011/11/29	<50		ug/L	
			Total Selenium (Se)	2011/11/29	<2		ug/L	
			Total Silver (Ag)	2011/11/29	<0.1		ug/L	
			Total Sodium (Na)	2011/11/29	130, RDL=100		ug/L	
			Total Strontium (Sr)	2011/11/29	<1		ug/L	
			Total Thallium (Tl)	2011/11/29	<0.05		ug/L	
			Total Tin (Sn)	2011/11/29	<1		ug/L	
			Total Titanium (Ti)	2011/11/29	<5		ug/L	
			Total Uranium (U)	2011/11/29	<0.1		ug/L	
			Total Vanadium (V)	2011/11/29	<0.5		ug/L	
			Total Zinc (Zn)	2011/11/29	5, RDL=5		ug/L	
		RPD	Total Aluminum (Al)	2011/11/29	3.1		%	20
			Total Antimony (Sb)	2011/11/29	NC		%	20
			Total Arsenic (As)	2011/11/29	NC		%	20

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location: TANSLEY QUARRY

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1589

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2695568	ADA	RPD	Total Barium (Ba)	2011/11/29	1.3		%	20
			Total Beryllium (Be)	2011/11/29	NC		%	20
			Total Bismuth (Bi)	2011/11/29	NC		%	20
			Total Boron (B)	2011/11/29	3.9		%	20
			Total Cadmium (Cd)	2011/11/29	NC		%	20
			Total Calcium (Ca)	2011/11/29	0.5		%	20
			Total Chromium (Cr)	2011/11/29	NC		%	20
			Total Cobalt (Co)	2011/11/29	NC		%	20
			Total Copper (Cu)	2011/11/29	1.2		%	20
			Total Iron (Fe)	2011/11/29	2.0		%	20
			Total Lead (Pb)	2011/11/29	NC		%	20
			Total Magnesium (Mg)	2011/11/29	0.7		%	20
			Total Manganese (Mn)	2011/11/29	2.7		%	20
			Total Molybdenum (Mo)	2011/11/29	10.4		%	20
			Total Nickel (Ni)	2011/11/29	NC		%	20
			Total Potassium (K)	2011/11/29	0.2		%	20
			Total Silicon (Si)	2011/11/29	2.0		%	20
			Total Selenium (Se)	2011/11/29	NC		%	20
			Total Silver (Ag)	2011/11/29	NC		%	20
			Total Sodium (Na)	2011/11/29	0.5		%	20
			Total Strontium (Sr)	2011/11/29	1		%	20
			Total Thallium (Tl)	2011/11/29	NC		%	20
			Total Tin (Sn)	2011/11/29	NC		%	20
			Total Titanium (Ti)	2011/11/29	5.9		%	20
			Total Uranium (U)	2011/11/29	2.9		%	20
			Total Vanadium (V)	2011/11/29	2.3		%	20
			Total Zinc (Zn)	2011/11/29	3.4		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) Metal analysis:The recovery in the matrix spike was not calculated (NC). Because of the high concentration of this analyte in the parent sample, the relative difference between the spiked and unspiked concentrations is not sufficiently significant to permit a reliable recovery calculation.
(2) The recovery in the matrix spike was not calculated (NC). Spiked concentration was less than 2x that native to the sample.
(3) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Validation Signature Page

Maxxam Job #: B1I1589

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

CRISTINA CARRIERE, Scientific Services

==========

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

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Your Project #: 021-1228
Site Location: TANSLEY QUARRY
Your C.O.C. #: 31614703, 316147-03-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2011/11/25

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1I0759
Received: 2011/11/16, 17:34

Sample Matrix: Water
Samples Received: 13

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Alkalinity	13	N/A	2011/11/17	CAM SOP-00448	SM 2320B
Anions	13	N/A	2011/11/23	CAM SOP-00435	SM 4110B
Free (WAD) Cyanide	13	N/A	2011/11/18	CAM SOP-00457	SM4500-CN-I modified
Fluoride	13	2011/11/17	2011/11/17	CAM SOP-00448	APHA 4500FC
Hardness (calculated as CaCO3)	13	N/A	2011/11/22	CAM SOP 00102	SM 2340 B
Mercury in Water by CVAA	9	2011/11/18	2011/11/18	CAM SOP-00453	EPA 7470
Mercury in Water by CVAA	4	2011/11/21	2011/11/22	CAM SOP-00453	EPA 7470
Dissolved Metals by ICPMS	2	N/A	2011/11/21	CAM SOP-00447	EPA 6020
Dissolved Metals by ICPMS	7	N/A	2011/11/22	CAM SOP-00447	EPA 6020
Dissolved Metals by ICPMS	4	N/A	2011/11/25	CAM SOP-00447	EPA 6020
Total Metals Analysis by ICPMS	9	N/A	2011/11/23	CAM SOP-00447	EPA 6020
Total Metals Analysis by ICPMS	4	N/A	2011/11/25	CAM SOP-00447	EPA 6020
Ammonia-N	13	N/A	2011/11/21	CAM SOP-00441	US GS I-2522-90
Nitrate (NO3) and Nitrite (NO2) in Water	13	N/A	2011/11/22	CAM SOP-00440	SM 4500 NO3I/NO2B
pH	13	N/A	2011/11/17	CAM SOP-00448	SM 4500H
Phenols (4AAP)	13	N/A	2011/11/21	CAM SOP-00444	MOE ROPHEN-E3179
Orthophosphate	13	N/A	2011/11/18	CAM SOP-00461	SM 4500 P-F
Sulphide	13	N/A	2011/11/18	CAM SOP-00455	SM 4500-S G
Total Phosphorus (Colourimetric)	13	2011/11/22	2011/11/23	CAM SOP-00407	SM 4500 P,B,F
Total Suspended Solids	13	N/A	2011/11/17	CAM SOP-00428	SM 2540D
Turbidity	7	N/A	2011/11/17	CAM SOP-00417	APHA 2130B
Turbidity	2	N/A	2011/11/18	CAM SOP-00417	APHA 2130B
Turbidity	4	N/A	2011/11/20	CAM SOP-00417	APHA 2130B

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and

Your Project #: 021-1228
Site Location: TANSLEY QUARRY
Your C.O.C. #: 31614703, 316147-03-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2011/11/25

CERTIFICATE OF ANALYSIS

performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons. The extraction date for samples field preserved with methanol for F1 and Volatile Organic Compounds is considered to be the date sampled.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by Ontario Regulation 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

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

MATHURA THIRUKKUMARAN, CS Rep
Email: MThirukkumaran@maxxam.ca
Phone# (905) 817-5700

==========

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Total cover pages: 2

Maxxam Job #: B1I0759
Report Date: 2011/11/25

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

RESULTS OF ANALYSES OF WATER

Maxxam ID		LQ6327		LQ6328		LQ6329		LQ6330		
Sampling Date		2011/11/16		2011/11/16		2011/11/16		2011/11/16		
COC Number		316147-03-01		316147-03-01		316147-03-01		316147-03-01		
	Units	**MW-09O**	**RDL**	**MW-09I**	**RDL**	**MW-09D**	**RDL**	**MW-10O**	**RDL**	**QC Batch**
Calculated Parameters										
Hardness (CaCO3)	mg/L	380	1	760	1	28000	1	500	1	2683766
Inorganics										
Total Ammonia-N	mg/L	0.36	0.05	1.7	0.05	40	0.5	0.13	0.05	2687099
Fluoride (F-)	mg/L	0.2	0.1	0.4	0.1	<0.1	0.1	0.2	0.1	2685388
Free Cyanide	mg/L	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	2686132
Orthophosphate (P)	mg/L	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	2686148
pH	pH	7.85		7.77		6.84		7.83		2685387
Phenols-4AAP	mg/L	<0.001	0.001	<0.001	0.001	0.08	0.01	<0.001	0.001	2686079
Total Phosphorus	mg/L	4.4	0.2	1.9	0.2	0.2	0.1	6.4	0.2	2689696
Total Suspended Solids	mg/L	4900	100	3100	50	390	20	10000	100	2685338
Sulphide	mg/L	<0.02	0.02	<0.02	0.02	<0.02	0.02	<0.02	0.02	2685775
Turbidity	NTU	3200	5	920	2	150	0.4	1500	2	2685747
Alkalinity (Total as CaCO3)	mg/L	398	1	239	1	52	1	485	1	2685383
Nitrite (N)	mg/L	0.03	0.01	0.44	0.01	<0.1	0.1	<0.01	0.01	2685777
Dissolved Chloride (Cl)	mg/L	12	1	252	2	46900	500	16	1	2685164
Nitrate (N)	mg/L	0.2	0.1	1.8	0.1	<0.1	0.1	<0.1	0.1	2685777
Nitrate + Nitrite	mg/L	0.2	0.1	2.2	0.1	<0.1	0.1	<0.1	0.1	2685777
Dissolved Bromide (Br-)	mg/L	<1	1	3	2	696	500	<1	1	2685164
Dissolved Sulphate (SO4)	mg/L	59	1	468	2	1470	500	58	1	2685164

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B1I0759
Report Date: 2011/11/25

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

RESULTS OF ANALYSES OF WATER

Maxxam ID		LQ6331			LQ6332		LQ6333		
Sampling Date		2011/11/16			2011/11/16		2011/11/16		
COC Number		316147-03-01			316147-03-01		316147-03-01		
	Units	**MW-10I**	**RDL**	**QC Batch**	**MW-10D**	**RDL**	**MW-05O**	**RDL**	**QC Batch**
Calculated Parameters									
Hardness (CaCO3)	mg/L	340	1	2683766	25000	1	440	1	2684715
Inorganics									
Total Ammonia-N	mg/L	0.82	0.05	2687099	34	0.5	0.12	0.05	2687099
Fluoride (F-)	mg/L	0.2	0.1	2685388	<0.1	0.1	0.1	0.1	2685388
Free Cyanide	mg/L	<0.002	0.002	2686132	<0.002	0.002	<0.002	0.002	2686132
Orthophosphate (P)	mg/L	<0.01	0.01	2686148	<0.01	0.01	<0.01	0.01	2686148
pH	pH	7.83		2685387	6.60		7.75		2685387
Phenols-4AAP	mg/L	<0.001	0.001	2686079	0.05	0.01	<0.001	0.001	2686079
Total Phosphorus	mg/L	2.3	0.2	2689696	0.4	0.2	17	0.2	2689696
Total Suspended Solids	mg/L	2700	100	2685338	770	20	22000	100	2685338
Sulphide	mg/L	<0.02	0.02	2685775	<0.02	0.02	<0.02	0.02	2685775
Turbidity	NTU	540	0.8	2685747	280	0.4	2700	4	2685747
Alkalinity (Total as CaCO3)	mg/L	416	1	2685383	40	1	300	1	2685383
Nitrite (N)	mg/L	0.10	0.01	2685171	<0.1	0.1	<0.01	0.01	2685777
Dissolved Chloride (Cl)	mg/L	3	1	2685164	41700	500	31	1	2685164
Nitrate (N)	mg/L	0.7	0.1	2685171	0.1	0.1	<0.1	0.1	2685777
Nitrate + Nitrite	mg/L	0.8	0.1	2685171	0.1	0.1	<0.1	0.1	2685777
Dissolved Bromide (Br-)	mg/L	<1	1	2685164	538	100	<1	1	2685164
Dissolved Sulphate (SO4)	mg/L	39	1	2685164	1360	100	111	1	2685164

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1I0759
Report Date: 2011/11/25

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

RESULTS OF ANALYSES OF WATER

Maxxam ID		LQ6334		LQ6335			LQ6336		LQ6337		
Sampling Date		2011/11/16		2011/11/16			2011/11/16		2011/11/16		
COC Number		316147-03-01		316147-03-01			316147-03-01		316147-03-01		
	Units	**MW-05I**	**RDL**	**MW-05S**	**RDL**	**QC Batch**	**MW-05D**	**RDL**	**MW-04O**	**RDL**	**QC Batch**
Calculated Parameters											
Hardness (CaCO3)	mg/L	320	1	270	1	2684715	35000	1	560	1	2684715
Inorganics											
Total Ammonia-N	mg/L	1.6	0.05	0.75	0.05	2687099	39	0.5	<0.05	0.05	2687099
Fluoride (F-)	mg/L	0.4	0.1	0.3	0.1	2685388	<0.1	0.1	0.2	0.1	2685388
Free Cyanide	mg/L	<0.002	0.002	<0.002	0.002	2686132	<0.002	0.002	<0.002	0.002	2686132
Orthophosphate (P)	mg/L	<0.01	0.01	<0.01	0.01	2686148	<0.01	0.01	<0.01	0.01	2686148
pH	pH	7.81		7.90		2685387	6.43		7.81		2685387
Phenols-4AAP	mg/L	<0.001	0.001	<0.001	0.001	2686079	0.11	0.01	<0.001	0.001	2686079
Total Phosphorus	mg/L	0.2	0.1	14	0.2	2689696	4.5	0.2	2.2	0.2	2689696
Total Suspended Solids	mg/L	200	20	14000	100	2685338	3800	100	2500	50	2685338
Sulphide	mg/L	<0.02	0.02	<0.02	0.02	2685775	0.04	0.02	<0.02	0.02	2685775
Turbidity	NTU	210	0.4	2700	4	2685747	520	0.8	780	1	2685747
Alkalinity (Total as CaCO3)	mg/L	285	1	285	1	2685383	36	1	384	1	2685383
Nitrite (N)	mg/L	0.55	0.01	0.04	0.01	2685171	<0.1	0.1	0.02	0.01	2685777
Dissolved Chloride (Cl)	mg/L	74	1	9	1	2685164	54800	500	4	1	2685164
Nitrate (N)	mg/L	0.6	0.1	0.5	0.1	2685171	<0.1	0.1	4.3	0.1	2685777
Nitrate + Nitrite	mg/L	1.1	0.1	0.6	0.1	2685171	<0.1	0.1	4.3	0.1	2685777
Dissolved Bromide (Br-)	mg/L	<1	1	<1	1	2685164	747	500	<1	1	2685164
Dissolved Sulphate (SO4)	mg/L	130	1	52	1	2685164	1370	500	116	1	2685164

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B1I0759
Report Date: 2011/11/25

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

RESULTS OF ANALYSES OF WATER

Maxxam ID		LQ6338			LQ6339		
Sampling Date		2011/11/16			2011/11/16		
COC Number		316147-03-01			316147-03-01		
	Units	**MW-04I**	**RDL**	**QC Batch**	**MW-04D**	**RDL**	**QC Batch**
Calculated Parameters							
Hardness (CaCO3)	mg/L	1700	1	2684715	27000	1	2684715
Inorganics							
Total Ammonia-N	mg/L	5.7	0.3	2687099	37	0.5	2687099
Fluoride (F-)	mg/L	0.6	0.1	2685388	<0.1	0.1	2685388
Free Cyanide	mg/L	<0.002	0.002	2686132	<0.002	0.002	2686132
Orthophosphate (P)	mg/L	<0.01	0.01	2686148	<0.01	0.01	2686148
pH	pH	7.48		2685387	6.80		2685387
Phenols-4AAP	mg/L	0.001	0.001	2686079	0.07	0.01	2686079
Total Phosphorus	mg/L	0.3	0.1	2689696	0.8	0.2	2689696
Total Suspended Solids	mg/L	380	20	2685338	1600	50	2685338
Sulphide	mg/L	<0.02	0.02	2685775	<0.02	0.02	2685775
Turbidity	NTU	110	0.2	2685747	340	0.8	2685747
Alkalinity (Total as CaCO3)	mg/L	55	1	2685383	102	1	2685383
Nitrite (N)	mg/L	0.03	0.01	2685777	<0.1	0.1	2685171
Dissolved Chloride (Cl)	mg/L	1650	10	2685164	45000	500	2685164
Nitrate (N)	mg/L	<0.1	0.1	2685777	<0.1	0.1	2685171
Nitrate + Nitrite	mg/L	<0.1	0.1	2685777	<0.1	0.1	2685171
Dissolved Bromide (Br-)	mg/L	21	5	2685164	572	100	2685164
Dissolved Sulphate (SO4)	mg/L	1800	5	2685164	1540	100	2685164

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Maxxam Job #: B1I0759
Report Date: 2011/11/25

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LQ6327		LQ6328		LQ6329		
Sampling Date		2011/11/16		2011/11/16		2011/11/16		
COC Number		316147-03-01		316147-03-01		316147-03-01		
	Units	**MW-09O**	**RDL**	**MW-09I**	**RDL**	**MW-09D**	**RDL**	**QC Batch**
Metals								
Mercury (Hg)	mg/L	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	2686207
Dissolved Aluminum (Al)	ug/L	29	5	72	5	<300	300	2692765
Total Aluminum (Al)	ug/L	22000	30	22000	5	750	5	2692898
Dissolved Antimony (Sb)	ug/L	<0.5	0.5	<0.5	0.5	<30	30	2692765
Total Antimony (Sb)	ug/L	<0.5	0.5	<0.5	0.5	5.3	0.5	2692898
Dissolved Arsenic (As)	ug/L	1	1	2	1	<50	50	2692765
Total Arsenic (As)	ug/L	13	1	16	1	24	1	2692898
Dissolved Barium (Ba)	ug/L	60	2	65	2	130	100	2692765
Total Barium (Ba)	ug/L	290	2	280	2	150	2	2692898
Dissolved Beryllium (Be)	ug/L	<0.5	0.5	<0.5	0.5	<30	30	2692765
Total Beryllium (Be)	ug/L	1.1	0.5	1.2	0.5	1.6	0.5	2692898
Dissolved Bismuth (Bi)	ug/L	<1	1	<1	1	<50	50	2692765
Total Bismuth (Bi)	ug/L	<1	1	<1	1	<1	1	2692898
Dissolved Boron (B)	ug/L	2600	10	4800	10	5900	500	2692765
Total Boron (B)	ug/L	1800	10	3700	10	5300	10	2692898
Dissolved Cadmium (Cd)	ug/L	<0.1	0.1	<0.1	0.1	<5	5	2692765
Total Cadmium (Cd)	ug/L	0.3	0.1	0.2	0.1	1.2	0.1	2692898
Dissolved Calcium (Ca)	ug/L	51000	400	190000	1000	8100000	10000	2692765
Total Calcium (Ca)	ug/L	170000	200	220000	200	8800000	200	2692898
Dissolved Chromium (Cr)	ug/L	<5	5	<5	5	<300	300	2692765
Total Chromium (Cr)	ug/L	57	5	43	5	35	5	2692898
Dissolved Cobalt (Co)	ug/L	4.8	0.5	2.8	0.5	<30	30	2692765
Total Cobalt (Co)	ug/L	22	0.5	21	0.5	<0.5	0.5	2692898
Dissolved Copper (Cu)	ug/L	<1	1	<1	1	<100	100	2692765
Total Copper (Cu)	ug/L	22	1	18	1	33	1	2692898
Dissolved Iron (Fe)	ug/L	220	100	640	100	33000	5000	2692765
Total Iron (Fe)	ug/L	35000	100	34000	100	25000	100	2692898
Dissolved Lead (Pb)	ug/L	<0.5	0.5	<0.5	0.5	<30	30	2692765
Total Lead (Pb)	ug/L	13	0.5	13	0.5	4.1	0.5	2692898
Dissolved Magnesium (Mg)	ug/L	62000	50	69000	50	1900000	3000	2692765
Total Magnesium (Mg)	ug/L	79000	50	58000	50	2000000	50	2692898
Dissolved Manganese (Mn)	ug/L	51	2	79	2	4600	100	2692765

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B1I0759
Report Date: 2011/11/25

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LQ6327		LQ6328		LQ6329		
Sampling Date		2011/11/16		2011/11/16		2011/11/16		
COC Number		316147-03-01		316147-03-01		316147-03-01		
	Units	**MW-09O**	**RDL**	**MW-09I**	**RDL**	**MW-09D**	**RDL**	**QC Batch**
Total Manganese (Mn)	ug/L	1200	2	1200	2	4700	2	2692898
Dissolved Molybdenum (Mo)	ug/L	9.1	0.5	9.6	0.5	<30	30	2692765
Total Molybdenum (Mo)	ug/L	10	0.5	12	0.5	8.9	0.5	2692898
Dissolved Nickel (Ni)	ug/L	1	1	<1	1	<50	50	2692765
Total Nickel (Ni)	ug/L	44	1	46	1	6	1	2692898
Dissolved Phosphorus (P)	ug/L	<100	100	<100	100	<5000	5000	2692765
Total Phosphorus (P)	ug/L	1100	100	1100	100	<100	100	2692898
Dissolved Potassium (K)	ug/L	9900	200	26000	200	280000	10000	2692765
Total Potassium (K)	ug/L	17000	200	26000	200	310000	200	2692898
Dissolved Selenium (Se)	ug/L	<2	2	<2	2	<200	200	2692765
Dissolved Silicon (Si)	ug/L	8400	50	5100	50	<3000	3000	2692765
Total Silicon (Si)	ug/L	39000	50	38000	50	3100	50	2692898
Total Selenium (Se)	ug/L	<2	2	<2	2	53	2	2692898
Dissolved Silver (Ag)	ug/L	<0.1	0.1	<0.1	0.1	<5	5	2692765
Total Silver (Ag)	ug/L	0.2	0.1	0.2	0.1	0.3	0.1	2692898
Dissolved Sodium (Na)	ug/L	39000	100	290000	100	17000000	5000	2692765
Total Sodium (Na)	ug/L	37000	100	120000	100	18000000	100	2692898
Dissolved Strontium (Sr)	ug/L	5900	1	19000	1	160000	50	2692765
Total Strontium (Sr)	ug/L	7000	1	19000	1	180000	1	2692898
Dissolved Thallium (Tl)	ug/L	<0.05	0.05	<0.05	0.05	<3	3	2692765
Total Thallium (Tl)	ug/L	0.18	0.05	0.16	0.05	<0.05	0.05	2692898
Dissolved Tin (Sn)	ug/L	<1	1	<1	1	<50	50	2692765
Total Tin (Sn)	ug/L	<1	1	<1	1	<1	1	2692898
Dissolved Titanium (Ti)	ug/L	<5	5	<5	5	<300	300	2692765
Total Titanium (Ti)	ug/L	350	5	320	5	21	5	2692898
Dissolved Uranium (U)	ug/L	2.3	0.1	0.8	0.1	<5	5	2692765
Total Uranium (U)	ug/L	3.5	0.1	2.3	0.1	5.7	0.1	2692898
Dissolved Vanadium (V)	ug/L	<0.5	0.5	<0.5	0.5	<50	50	2692765
Total Vanadium (V)	ug/L	40	0.5	40	0.5	7.4	0.5	2692898
Dissolved Zinc (Zn)	ug/L	<5	5	<5	5	<300	300	2692765
Total Zinc (Zn)	ug/L	140	5	110	5	<5	5	2692898

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B1I0759
Report Date: 2011/11/25

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LQ6330			LQ6331			LQ6332		
Sampling Date		2011/11/16			2011/11/16			2011/11/16		
COC Number		316147-03-01			316147-03-01			316147-03-01		
	Units	**MW-10O**	**RDL**	**QC Batch**	**MW-10I**	**RDL**	**QC Batch**	**MW-10D**	**RDL**	**QC Batch**
Metals										
Mercury (Hg)	mg/L	<0.0001	0.0001	2686207	<0.0001	0.0001	2686207	<0.0001	0.0001	2686207
Dissolved Aluminum (Al)	ug/L	31	5	2687927	8	5	2687928	<300	300	2692765
Total Aluminum (Al)	ug/L	90000	30	2689793	28000	30	2689793	4500	5	2692898
Dissolved Antimony (Sb)	ug/L	<0.5	0.5	2687927	<0.5	0.5	2687928	<30	30	2692765
Total Antimony (Sb)	ug/L	<3	3	2689793	<0.5	0.5	2689793	<0.5	0.5	2692898
Dissolved Arsenic (As)	ug/L	3	1	2687927	4	1	2687928	<50	50	2692765
Total Arsenic (As)	ug/L	54	5	2689793	160	1	2689793	31	1	2692898
Dissolved Barium (Ba)	ug/L	44	2	2687927	68	2	2687928	120	100	2692765
Total Barium (Ba)	ug/L	2000	10	2689793	560	2	2689793	190	2	2692898
Dissolved Beryllium (Be)	ug/L	<0.5	0.5	2687927	<0.5	0.5	2687928	<30	30	2692765
Total Beryllium (Be)	ug/L	9	3	2689793	1.9	0.5	2689793	<0.5	0.5	2692898
Dissolved Bismuth (Bi)	ug/L	<1	1	2687927	<1	1	2687928	<50	50	2692765
Total Bismuth (Bi)	ug/L	<5	5	2689793	<1	1	2689793	<1	1	2692898
Dissolved Boron (B)	ug/L	110	10	2687927	710	10	2687928	5500	500	2692765
Total Boron (B)	ug/L	240	50	2689793	750	10	2689793	6000	10	2692898
Dissolved Cadmium (Cd)	ug/L	<0.1	0.1	2687927	<0.1	0.1	2687928	<5	5	2692765
Total Cadmium (Cd)	ug/L	1.8	0.5	2689793	1.1	0.1	2689793	12	0.1	2692898
Dissolved Calcium (Ca)	ug/L	63000	200	2687927	41000	200	2687928	7100000	10000	2692765
Total Calcium (Ca)	ug/L	1200000	1000	2689793	330000	1000	2689793	5600000	200	2692898
Dissolved Chromium (Cr)	ug/L	<5	5	2687927	<5	5	2687928	<300	300	2692765
Total Chromium (Cr)	ug/L	140	30	2689793	52	5	2689793	620	5	2692898
Dissolved Cobalt (Co)	ug/L	4.6	0.5	2687927	<0.5	0.5	2687928	<30	30	2692765
Total Cobalt (Co)	ug/L	92	3	2689793	31	0.5	2689793	12	0.5	2692898
Dissolved Copper (Cu)	ug/L	<1	1	2687927	<1	1	2687928	<100	100	2692765
Total Copper (Cu)	ug/L	180	5	2689793	31	1	2689793	51	1	2692898
Dissolved Iron (Fe)	ug/L	<100	100	2687927	<100	100	2687928	28000	5000	2692765
Total Iron (Fe)	ug/L	170000	500	2689793	66000	100	2689793	18000	100	2692898
Dissolved Lead (Pb)	ug/L	<0.5	0.5	2687927	<0.5	0.5	2687928	<30	30	2692765
Total Lead (Pb)	ug/L	120	3	2689793	18	0.5	2689793	11	0.5	2692898
Dissolved Magnesium (Mg)	ug/L	84000	50	2687927	56000	50	2687928	1700000	3000	2692765
Total Magnesium (Mg)	ug/L	220000	300	2689793	94000	50	2689793	1500000	50	2692898
Dissolved Manganese (Mn)	ug/L	73	2	2687927	2	2	2687928	3800	100	2692765

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B1I0759
Report Date: 2011/11/25

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LQ6330			LQ6331			LQ6332		
Sampling Date		2011/11/16			2011/11/16			2011/11/16		
COC Number		316147-03-01			316147-03-01			316147-03-01		
	Units	**MW-10O**	**RDL**	**QC Batch**	**MW-10I**	**RDL**	**QC Batch**	**MW-10D**	**RDL**	**QC Batch**
Total Manganese (Mn)	ug/L	11000	10	2689793	2500	2	2689793	2500	2	2692898
Dissolved Molybdenum (Mo)	ug/L	2.5	0.5	2687927	2.9	0.5	2687928	37	30	2692765
Total Molybdenum (Mo)	ug/L	5	3	2689793	4.5	0.5	2689793	240	0.5	2692898
Dissolved Nickel (Ni)	ug/L	<1	1	2687927	<1	1	2687928	<50	50	2692765
Total Nickel (Ni)	ug/L	180	5	2689793	60	1	2689793	380	1	2692898
Dissolved Phosphorus (P)	ug/L	<100	100	2687927	<100	100	2687928	<5000	5000	2692765
Total Phosphorus (P)	ug/L	11000	500	2689793	2400	100	2689793	<100	100	2692898
Dissolved Potassium (K)	ug/L	6800	200	2687927	11000	200	2687928	250000	10000	2692765
Total Potassium (K)	ug/L	30000	1000	2689793	18000	200	2689793	240000	200	2692898
Dissolved Selenium (Se)	ug/L	<2	2	2687927	<2	2	2687928	<200	200	2692765
Dissolved Silicon (Si)	ug/L	9300	50	2687927	8400	50	2687928	<3000	3000	2692765
Total Silicon (Si)	ug/L	83000	300	2689793	45000	50	2689793	7700	50	2692898
Total Selenium (Se)	ug/L	<10	10	2689793	<2	2	2689793	80	2	2692898
Dissolved Silver (Ag)	ug/L	<0.1	0.1	2687927	<0.1	0.1	2687928	<5	5	2692765
Total Silver (Ag)	ug/L	0.6	0.5	2689793	0.1	0.1	2689793	0.2	0.1	2692898
Dissolved Sodium (Na)	ug/L	23000	100	2687927	28000	100	2687928	17000000	5000	2692765
Total Sodium (Na)	ug/L	26000	500	2689793	31000	100	2689793	16000000	100	2692898
Dissolved Strontium (Sr)	ug/L	1500	1	2687927	9700	1	2687928	150000	50	2692765
Total Strontium (Sr)	ug/L	4500	5	2689793	13000	1	2689793	120000	1	2692898
Dissolved Thallium (Tl)	ug/L	<0.05	0.05	2687927	<0.05	0.05	2687928	<3	3	2692765
Total Thallium (Tl)	ug/L	0.9	0.3	2689793	0.27	0.05	2689793	<0.05	0.05	2692898
Dissolved Tin (Sn)	ug/L	<1	1	2687927	<1	1	2687928	<50	50	2692765
Total Tin (Sn)	ug/L	<5	5	2689793	<1	1	2689793	<1	1	2692898
Dissolved Titanium (Ti)	ug/L	<5	5	2687927	<5	5	2687928	<300	300	2692765
Total Titanium (Ti)	ug/L	1300	30	2689793	420	5	2689793	99	5	2692898
Dissolved Uranium (U)	ug/L	1.8	0.1	2687927	0.4	0.1	2687928	<5	5	2692765
Total Uranium (U)	ug/L	27	0.5	2689793	2.0	0.1	2689793	22	0.1	2692898
Dissolved Vanadium (V)	ug/L	<0.5	0.5	2687927	0.7	0.5	2687928	<50	50	2692765
Total Vanadium (V)	ug/L	150	3	2689793	49	0.5	2689793	34	0.5	2692898
Dissolved Zinc (Zn)	ug/L	5	5	2687927	<5	5	2687928	<300	300	2692765
Total Zinc (Zn)	ug/L	540	30	2689793	150	5	2689793	68	5	2692898

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B1I0759
Report Date: 2011/11/25

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LQ6333		LQ6334		LQ6335		
Sampling Date		2011/11/16		2011/11/16		2011/11/16		
COC Number		316147-03-01		316147-03-01		316147-03-01		
	Units	**MW-05O**	**RDL**	**MW-05I**	**RDL**	**MW-05S**	**RDL**	**QC Batch**
Metals								
Mercury (Hg)	mg/L	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	2686207
Dissolved Aluminum (Al)	ug/L	52	5	51	5	140	5	2687927
Total Aluminum (Al)	ug/L	130000	50	1100	5	57000	30	2689793
Dissolved Antimony (Sb)	ug/L	<0.5	0.5	<0.5	0.5	<0.5	0.5	2687927
Total Antimony (Sb)	ug/L	<5	5	<0.5	0.5	<3	3	2689793
Dissolved Arsenic (As)	ug/L	<1	1	<1	1	10	1	2687927
Total Arsenic (As)	ug/L	98	10	45	1	83	5	2689793
Dissolved Barium (Ba)	ug/L	58	2	21	2	67	2	2687927
Total Barium (Ba)	ug/L	3500	20	68	2	630	10	2689793
Dissolved Beryllium (Be)	ug/L	<0.5	0.5	<0.5	0.5	<0.5	0.5	2687927
Total Beryllium (Be)	ug/L	6	5	<0.5	0.5	<3	3	2689793
Dissolved Bismuth (Bi)	ug/L	<1	1	<1	1	<1	1	2687927
Total Bismuth (Bi)	ug/L	<10	10	<1	1	<5	5	2689793
Dissolved Boron (B)	ug/L	11	10	2000	10	1200	10	2687927
Total Boron (B)	ug/L	130	100	2200	10	1400	50	2689793
Dissolved Cadmium (Cd)	ug/L	<0.1	0.1	<0.1	0.1	<0.1	0.1	2687927
Total Cadmium (Cd)	ug/L	9	1	0.4	0.1	3.2	0.5	2689793
Dissolved Calcium (Ca)	ug/L	120000	200	80000	1000	58000	400	2687927
Total Calcium (Ca)	ug/L	2100000	2000	91000	1000	1400000	1000	2689793
Dissolved Chromium (Cr)	ug/L	<5	5	<5	5	<5	5	2687927
Total Chromium (Cr)	ug/L	330	50	<5	5	120	30	2689793
Dissolved Cobalt (Co)	ug/L	0.8	0.5	1.8	0.5	5.8	0.5	2687927
Total Cobalt (Co)	ug/L	230	5	1.2	0.5	65	3	2689793
Dissolved Copper (Cu)	ug/L	<1	1	<1	1	1	1	2687927
Total Copper (Cu)	ug/L	1100	10	9	1	190	5	2689793
Dissolved Iron (Fe)	ug/L	<100	100	140	100	490	100	2687927
Total Iron (Fe)	ug/L	320000	1000	21000	100	140000	500	2689793
Dissolved Lead (Pb)	ug/L	<0.5	0.5	<0.5	0.5	<0.5	0.5	2687927
Total Lead (Pb)	ug/L	230	5	2.8	0.5	63	3	2689793
Dissolved Magnesium (Mg)	ug/L	32000	50	30000	50	29000	50	2687927
Total Magnesium (Mg)	ug/L	190000	500	33000	50	140000	300	2689793
Dissolved Manganese (Mn)	ug/L	3	2	33	2	45	2	2687927

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B1I0759
Report Date: 2011/11/25

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LQ6333		LQ6334		LQ6335		
Sampling Date		2011/11/16		2011/11/16		2011/11/16		
COC Number		316147-03-01		316147-03-01		316147-03-01		
	Units	**MW-05O**	**RDL**	**MW-05I**	**RDL**	**MW-05S**	**RDL**	**QC Batch**
Total Manganese (Mn)	ug/L	64000	20	100	2	11000	10	2689793
Dissolved Molybdenum (Mo)	ug/L	<0.5	0.5	3.7	0.5	4.7	0.5	2687927
Total Molybdenum (Mo)	ug/L	22	5	4.9	0.5	9	3	2689793
Dissolved Nickel (Ni)	ug/L	<1	1	<1	1	<1	1	2687927
Total Nickel (Ni)	ug/L	490	10	2	1	120	5	2689793
Dissolved Phosphorus (P)	ug/L	<100	100	<100	100	<100	100	2687927
Total Phosphorus (P)	ug/L	14000	1000	<100	100	9600	500	2689793
Dissolved Potassium (K)	ug/L	720	200	16000	200	6300	200	2687927
Total Potassium (K)	ug/L	15000	2000	18000	200	16000	1000	2689793
Dissolved Selenium (Se)	ug/L	<2	2	<2	2	<2	2	2687927
Dissolved Silicon (Si)	ug/L	5100	50	5600	50	8600	50	2687927
Total Silicon (Si)	ug/L	87000	500	9300	50	66000	300	2689793
Total Selenium (Se)	ug/L	<20	20	<2	2	<10	10	2689793
Dissolved Silver (Ag)	ug/L	<0.1	0.1	<0.1	0.1	<0.1	0.1	2687927
Total Silver (Ag)	ug/L	<1	1	<0.1	0.1	0.6	0.5	2689793
Dissolved Sodium (Na)	ug/L	6200	100	71000	100	25000	100	2687927
Total Sodium (Na)	ug/L	11000	1000	78000	100	28000	500	2689793
Dissolved Strontium (Sr)	ug/L	200	1	13000	1	6600	1	2687927
Total Strontium (Sr)	ug/L	3200	10	15000	1	9900	5	2689793
Dissolved Thallium (Tl)	ug/L	<0.05	0.05	<0.05	0.05	<0.05	0.05	2687927
Total Thallium (Tl)	ug/L	1.8	0.5	<0.05	0.05	0.6	0.3	2689793
Dissolved Tin (Sn)	ug/L	<1	1	<1	1	<1	1	2687927
Total Tin (Sn)	ug/L	<10	10	<1	1	<5	5	2689793
Dissolved Titanium (Ti)	ug/L	<5	5	6	5	<5	5	2687927
Total Titanium (Ti)	ug/L	1500	50	28	5	1000	30	2689793
Dissolved Uranium (U)	ug/L	1.9	0.1	0.4	0.1	0.2	0.1	2687927
Total Uranium (U)	ug/L	12	1	0.6	0.1	4.9	0.5	2689793
Dissolved Vanadium (V)	ug/L	<0.5	0.5	<0.5	0.5	0.8	0.5	2687927
Total Vanadium (V)	ug/L	250	5	3.9	0.5	120	3	2689793
Dissolved Zinc (Zn)	ug/L	<5	5	<5	5	6	5	2687927
Total Zinc (Zn)	ug/L	1200	50	32	5	380	30	2689793

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B1I0759
Report Date: 2011/11/25

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LQ6336			LQ6337			LQ6338		
Sampling Date		2011/11/16			2011/11/16			2011/11/16		
COC Number		316147-03-01			316147-03-01			316147-03-01		
	Units	**MW-05D**	**RDL**	**QC Batch**	**MW-04O**	**RDL**	**QC Batch**	**MW-04I**	**RDL**	**QC Batch**
Metals										
Mercury (Hg)	mg/L	<0.0001	0.0001	2688195	<0.0001	0.0001	2688195	<0.0001	0.0001	2688195
Dissolved Aluminum (Al)	ug/L	<500	500	2687928	1100	5	2687927	64	5	2687928
Total Aluminum (Al)	ug/L	190000	300	2689793	14000	5	2689793	2400	5	2689793
Dissolved Antimony (Sb)	ug/L	<50	50	2687928	<0.5	0.5	2687927	<0.5	0.5	2687928
Total Antimony (Sb)	ug/L	<30	30	2689793	<0.5	0.5	2689793	<0.5	0.5	2689793
Dissolved Arsenic (As)	ug/L	<100	100	2687928	3	1	2687927	<5 (1)	5	2687928
Total Arsenic (As)	ug/L	140	100	2689793	8	1	2689793	4	2	2689793
Dissolved Barium (Ba)	ug/L	<200	200	2687928	96	2	2687927	8	2	2687928
Total Barium (Ba)	ug/L	860	100	2689793	180	2	2689793	60	2	2689793
Dissolved Beryllium (Be)	ug/L	<50	50	2687928	<0.5	0.5	2687927	<0.5	0.5	2687928
Total Beryllium (Be)	ug/L	<30	30	2689793	0.9	0.5	2689793	<0.5	0.5	2689793
Dissolved Bismuth (Bi)	ug/L	<100	100	2687928	<1	1	2687927	<1	1	2687928
Total Bismuth (Bi)	ug/L	<50	50	2689793	<1	1	2689793	<1	1	2689793
Dissolved Boron (B)	ug/L	6000	1000	2687928	60	10	2687927	5900	10	2687928
Total Boron (B)	ug/L	5500	500	2689793	82	10	2689793	6400	10	2689793
Dissolved Cadmium (Cd)	ug/L	<10	10	2687928	0.2	0.1	2687927	<0.1	0.1	2687928
Total Cadmium (Cd)	ug/L	75	5	2689793	0.4	0.1	2689793	0.2	0.1	2689793
Dissolved Calcium (Ca)	ug/L	10000000	20000	2687928	130000	200	2687927	480000	200	2687928
Total Calcium (Ca)	ug/L	11000000	10000	2689793	170000	200	2689793	540000	1000	2689793
Dissolved Chromium (Cr)	ug/L	<500	500	2687928	<5	5	2687927	<5	5	2687928
Total Chromium (Cr)	ug/L	680	300	2689793	22	5	2689793	6	5	2689793
Dissolved Cobalt (Co)	ug/L	<50	50	2687928	7.6	0.5	2687927	<3 (1)	3	2687928
Total Cobalt (Co)	ug/L	81	30	2689793	16	0.5	2689793	2	1	2689793
Dissolved Copper (Cu)	ug/L	<100	100	2687928	7	1	2687927	<1	1	2687928
Total Copper (Cu)	ug/L	800	100	2689793	27	1	2689793	<5	5	2689793
Dissolved Iron (Fe)	ug/L	37000	10000	2687928	3300	100	2687927	920	100	2687928
Total Iron (Fe)	ug/L	170000	5000	2689793	26000	100	2689793	4900	100	2689793
Dissolved Lead (Pb)	ug/L	<50	50	2687928	12	0.5	2687927	<0.5	0.5	2687928
Total Lead (Pb)	ug/L	170	30	2689793	24	0.5	2689793	2.9	0.5	2689793
Dissolved Magnesium (Mg)	ug/L	2300000	5000	2687928	61000	50	2687927	130000	50	2687928
Total Magnesium (Mg)	ug/L	2500000	3000	2689793	75000	50	2689793	150000	50	2689793
Dissolved Manganese (Mn)	ug/L	5100	200	2687928	550	2	2687927	210	2	2687928

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Metal analysis:Detection Limit was raised due to matrix interferences.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B1I0759
Report Date: 2011/11/25

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LQ6336			LQ6337			LQ6338		
Sampling Date		2011/11/16			2011/11/16			2011/11/16		
COC Number		316147-03-01			316147-03-01			316147-03-01		
	Units	**MW-05D**	**RDL**	**QC Batch**	**MW-04O**	**RDL**	**QC Batch**	**MW-04I**	**RDL**	**QC Batch**
Total Manganese (Mn)	ug/L	8500	100	2689793	1200	2	2689793	380	2	2689793
Dissolved Molybdenum (Mo)	ug/L	<50	50	2687928	2.1	0.5	2687927	8.7	0.5	2687928
Total Molybdenum (Mo)	ug/L	49	30	2689793	4.6	0.5	2689793	10	0.5	2689793
Dissolved Nickel (Ni)	ug/L	<100	100	2687928	5	1	2687927	<5 (1)	5	2687928
Total Nickel (Ni)	ug/L	300	50	2689793	27	1	2689793	6	2	2689793
Dissolved Phosphorus (P)	ug/L	<10000	10000	2687928	410	100	2687927	<100	100	2687928
Total Phosphorus (P)	ug/L	<5000	5000	2689793	850	100	2689793	140	100	2689793
Dissolved Potassium (K)	ug/L	300000	20000	2687928	4500	200	2687927	43000	200	2687928
Total Potassium (K)	ug/L	340000	10000	2689793	8200	200	2689793	49000	200	2689793
Dissolved Selenium (Se)	ug/L	<200	200	2687928	<2	2	2687927	<10 (1)	10	2687928
Dissolved Silicon (Si)	ug/L	<5000	5000	2687928	7300	50	2687927	3400	50	2687928
Total Silicon (Si)	ug/L	63000	3000	2689793	24000	50	2689793	7000	50	2689793
Total Selenium (Se)	ug/L	<200	200	2689793	<2	2	2689793	2	2	2689793
Dissolved Silver (Ag)	ug/L	<10	10	2687928	<0.1	0.1	2687927	<0.1	0.1	2687928
Total Silver (Ag)	ug/L	<5	5	2689793	<0.1	0.1	2689793	<0.1	0.1	2689793
Dissolved Sodium (Na)	ug/L	19000000	10000	2687928	25000	100	2687927	1100000	1000	2687928
Total Sodium (Na)	ug/L	20000000	5000	2689793	28000	100	2689793	1000000	500	2689793
Dissolved Strontium (Sr)	ug/L	210000	100	2687928	1400	1	2687927	13000	1	2687928
Total Strontium (Sr)	ug/L	240000	50	2689793	1600	1	2689793	15000	1	2689793
Dissolved Thallium (Tl)	ug/L	<5	5	2687928	<0.05	0.05	2687927	<0.05	0.05	2687928
Total Thallium (Tl)	ug/L	<3	3	2689793	0.17	0.05	2689793	<0.05	0.05	2689793
Dissolved Tin (Sn)	ug/L	<100	100	2687928	<1	1	2687927	<1	1	2687928
Total Tin (Sn)	ug/L	<50	50	2689793	<1	1	2689793	<1	1	2689793
Dissolved Titanium (Ti)	ug/L	<500	500	2687928	9	5	2687927	<5	5	2687928
Total Titanium (Ti)	ug/L	960	300	2689793	300	5	2689793	64	5	2689793
Dissolved Uranium (U)	ug/L	<10	10	2687928	8.2	0.1	2687927	0.4	0.1	2687928
Total Uranium (U)	ug/L	9	5	2689793	8.8	0.1	2689793	1.1	0.1	2689793
Dissolved Vanadium (V)	ug/L	92	50	2687928	4.0	0.5	2687927	<3 (1)	3	2687928
Total Vanadium (V)	ug/L	190	50	2689793	26	0.5	2689793	5	3	2689793
Dissolved Zinc (Zn)	ug/L	<500	500	2687928	16	5	2687927	<5	5	2687928
Total Zinc (Zn)	ug/L	1600	300	2689793	77	5	2689793	<30 (2)	30	2689793

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Metal analysis:Detection Limit was raised due to matrix interferences.
(2) Detection Limit was raised due to matrix interferences.

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Maxxam Job #: B1I0759
Report Date: 2011/11/25

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LQ6339		
Sampling Date		2011/11/16		
COC Number		316147-03-01		
	Units	**MW-04D**	**RDL**	**QC Batch**
Metals				
Mercury (Hg)	mg/L	<0.0001	0.0001	2688195
Dissolved Aluminum (Al)	ug/L	<300	300	2687927
Total Aluminum (Al)	ug/L	5200	300	2689793
Dissolved Antimony (Sb)	ug/L	<30	30	2687927
Total Antimony (Sb)	ug/L	<30	30	2689793
Dissolved Arsenic (As)	ug/L	59	50	2687927
Total Arsenic (As)	ug/L	70	50	2689793
Dissolved Barium (Ba)	ug/L	<100	100	2687927
Total Barium (Ba)	ug/L	180	100	2689793
Dissolved Beryllium (Be)	ug/L	<30	30	2687927
Total Beryllium (Be)	ug/L	<30	30	2689793
Dissolved Bismuth (Bi)	ug/L	<50	50	2687927
Total Bismuth (Bi)	ug/L	<50	50	2689793
Dissolved Boron (B)	ug/L	6300	500	2687927
Total Boron (B)	ug/L	6600	500	2689793
Dissolved Cadmium (Cd)	ug/L	6	5	2687927
Total Cadmium (Cd)	ug/L	17	5	2689793
Dissolved Calcium (Ca)	ug/L	7700000	10000	2687927
Total Calcium (Ca)	ug/L	7900000	10000	2689793
Dissolved Chromium (Cr)	ug/L	<300	300	2687927
Total Chromium (Cr)	ug/L	<300	300	2689793
Dissolved Cobalt (Co)	ug/L	<30	30	2687927
Total Cobalt (Co)	ug/L	31	30	2689793
Dissolved Copper (Cu)	ug/L	<100	100	2687927
Total Copper (Cu)	ug/L	180	100	2689793
Dissolved Iron (Fe)	ug/L	<5000	5000	2687927
Total Iron (Fe)	ug/L	11000	5000	2689793
Dissolved Lead (Pb)	ug/L	<30	30	2687927
Total Lead (Pb)	ug/L	<30	30	2689793
Dissolved Magnesium (Mg)	ug/L	1800000	3000	2687927
Total Magnesium (Mg)	ug/L	1800000	3000	2689793
Dissolved Manganese (Mn)	ug/L	5100	100	2687927

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B1I0759
Report Date: 2011/11/25

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LQ6339		
Sampling Date		2011/11/16		
COC Number		316147-03-01		
	Units	**MW-04D**	**RDL**	**QC Batch**
Total Manganese (Mn)	ug/L	5500	100	2689793
Dissolved Molybdenum (Mo)	ug/L	<30	30	2687927
Total Molybdenum (Mo)	ug/L	<30	30	2689793
Dissolved Nickel (Ni)	ug/L	190	50	2687927
Total Nickel (Ni)	ug/L	220	50	2689793
Dissolved Phosphorus (P)	ug/L	<5000	5000	2687927
Total Phosphorus (P)	ug/L	<5000	5000	2689793
Dissolved Potassium (K)	ug/L	300000	10000	2687927
Total Potassium (K)	ug/L	300000	10000	2689793
Dissolved Selenium (Se)	ug/L	<200	200	2687927
Dissolved Silicon (Si)	ug/L	3400	3000	2687927
Total Silicon (Si)	ug/L	9000	3000	2689793
Total Selenium (Se)	ug/L	<200	200	2689793
Dissolved Silver (Ag)	ug/L	<5	5	2687927
Total Silver (Ag)	ug/L	<5	5	2689793
Dissolved Sodium (Na)	ug/L	17000000	5000	2687927
Total Sodium (Na)	ug/L	17000000	5000	2689793
Dissolved Strontium (Sr)	ug/L	170000	50	2687927
Total Strontium (Sr)	ug/L	170000	50	2689793
Dissolved Thallium (Tl)	ug/L	<3	3	2687927
Total Thallium (Tl)	ug/L	<3	3	2689793
Dissolved Tin (Sn)	ug/L	<50	50	2687927
Total Tin (Sn)	ug/L	<50	50	2689793
Dissolved Titanium (Ti)	ug/L	<300	300	2687927
Total Titanium (Ti)	ug/L	<300	300	2689793
Dissolved Uranium (U)	ug/L	23	5	2687927
Total Uranium (U)	ug/L	24	5	2689793
Dissolved Vanadium (V)	ug/L	<50 (1)	50	2687927
Total Vanadium (V)	ug/L	<50 (1)	50	2689793
Dissolved Zinc (Zn)	ug/L	<300	300	2687927
Total Zinc (Zn)	ug/L	<300	300	2689793

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Detection Limit was raised due to matrix interferences.

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Maxxam Job #: B1I0759
Report Date: 2011/11/25

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

Test Summary

Maxxam ID LQ6327 **Collected** 2011/11/16
Sample ID MW-09O **Shipped**
Matrix Water **Received** 2011/11/16

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2685383	N/A	2011/11/17	YOGESH PATEL
Anions	IC	2685164	N/A	2011/11/23	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686132	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2685388	2011/11/17	2011/11/17	YOGESH PATEL
Hardness (calculated as CaCO3)		2683766	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2686207	2011/11/18	2011/11/18	LAWRENCE CHEUNG
Dissolved Metals by ICPMS	ICP/MS	2692765	N/A	2011/11/25	HUA REN
Total Metals Analysis by ICPMS	ICP/MS	2692898	N/A	2011/11/25	HUA REN
Ammonia-N	LACH/NH4	2687099	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2685777	N/A	2011/11/22	HELEN HE
pH	PH	2685387	N/A	2011/11/17	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686079	N/A	2011/11/21	BRAMDEO MOTIRAM
Orthophosphate	AC	2686148	N/A	2011/11/18	DEONARINE RAMNARINE
Sulphide	ISE/S	2685775	N/A	2011/11/18	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2689696	2011/11/22	2011/11/23	VIORICA ROTARU
Total Suspended Solids	SLDS	2685338	N/A	2011/11/17	BANSARI RAY
Turbidity	TURB	2685747	N/A	2011/11/20	NEIL DASSANAYAKE

Maxxam ID LQ6327 Dup **Collected** 2011/11/16
Sample ID MW-09O **Shipped**
Matrix Water **Received** 2011/11/16

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Anions	IC	2685164	N/A	2011/11/23	FARI DEHDEZI
Orthophosphate	AC	2686148	N/A	2011/11/18	DEONARINE RAMNARINE

Maxxam ID LQ6328 **Collected** 2011/11/16
Sample ID MW-09I **Shipped**
Matrix Water **Received** 2011/11/16

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2685383	N/A	2011/11/17	YOGESH PATEL
Anions	IC	2685164	N/A	2011/11/23	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686132	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2685388	2011/11/17	2011/11/17	YOGESH PATEL
Hardness (calculated as CaCO3)		2683766	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2686207	2011/11/18	2011/11/18	LAWRENCE CHEUNG
Dissolved Metals by ICPMS	ICP/MS	2692765	N/A	2011/11/25	HUA REN
Total Metals Analysis by ICPMS	ICP/MS	2692898	N/A	2011/11/25	HUA REN
Ammonia-N	LACH/NH4	2687099	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2685777	N/A	2011/11/22	HELEN HE
pH	PH	2685387	N/A	2011/11/17	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686079	N/A	2011/11/21	BRAMDEO MOTIRAM
Orthophosphate	AC	2686148	N/A	2011/11/18	DEONARINE RAMNARINE
Sulphide	ISE/S	2685775	N/A	2011/11/18	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2689696	2011/11/22	2011/11/23	VIORICA ROTARU
Total Suspended Solids	SLDS	2685338	N/A	2011/11/17	BANSARI RAY
Turbidity	TURB	2685747	N/A	2011/11/20	NEIL DASSANAYAKE

Maxxam Job #: B1I0759
Report Date: 2011/11/25

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

Test Summary

Maxxam ID LQ6328 Dup
Sample ID MW-09I
Matrix Water

Collected 2011/11/16
Shipped
Received 2011/11/16

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2685383	N/A	2011/11/17	YOGESH PATEL
Fluoride	F	2685388	2011/11/17	2011/11/17	YOGESH PATEL
pH	PH	2685387	N/A	2011/11/17	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686079	N/A	2011/11/21	BRAMDEO MOTIRAM
Total Suspended Solids	SLDS	2685338	N/A	2011/11/17	BANSARI RAY

Maxxam ID LQ6329
Sample ID MW-09D
Matrix Water

Collected 2011/11/16
Shipped
Received 2011/11/16

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2685383	N/A	2011/11/17	YOGESH PATEL
Anions	IC	2685164	N/A	2011/11/23	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686132	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2685388	2011/11/17	2011/11/17	YOGESH PATEL
Hardness (calculated as CaCO3)		2683766	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2686207	2011/11/18	2011/11/18	LAWRENCE CHEUNG
Dissolved Metals by ICPMS	ICP/MS	2692765	N/A	2011/11/25	HUA REN
Total Metals Analysis by ICPMS	ICP/MS	2692898	N/A	2011/11/25	HUA REN
Ammonia-N	LACH/NH4	2687099	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2685777	N/A	2011/11/22	HELEN HE
pH	PH	2685387	N/A	2011/11/17	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686079	N/A	2011/11/21	BRAMDEO MOTIRAM
Orthophosphate	AC	2686148	N/A	2011/11/18	DEONARINE RAMNARINE
Sulphide	ISE/S	2685775	N/A	2011/11/18	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2689696	2011/11/22	2011/11/23	VIORICA ROTARU
Total Suspended Solids	SLDS	2685338	N/A	2011/11/17	BANSARI RAY
Turbidity	TURB	2685747	N/A	2011/11/18	NEIL DASSANAYAKE

Maxxam ID LQ6330
Sample ID MW-10O
Matrix Water

Collected 2011/11/16
Shipped
Received 2011/11/16

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2685383	N/A	2011/11/17	YOGESH PATEL
Anions	IC	2685164	N/A	2011/11/23	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686132	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2685388	2011/11/17	2011/11/17	YOGESH PATEL
Hardness (calculated as CaCO3)		2683766	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2686207	2011/11/18	2011/11/18	LAWRENCE CHEUNG
Dissolved Metals by ICPMS	ICP/MS	2687927	N/A	2011/11/21	AREFA DABHAD
Total Metals Analysis by ICPMS	ICP/MS	2689793	N/A	2011/11/23	AREFA DABHAD
Ammonia-N	LACH/NH4	2687099	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2685777	N/A	2011/11/22	HELEN HE
pH	PH	2685387	N/A	2011/11/17	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686079	N/A	2011/11/21	BRAMDEO MOTIRAM
Orthophosphate	AC	2686148	N/A	2011/11/18	DEONARINE RAMNARINE
Sulphide	ISE/S	2685775	N/A	2011/11/18	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2689696	2011/11/22	2011/11/23	VIORICA ROTARU
Total Suspended Solids	SLDS	2685338	N/A	2011/11/17	BANSARI RAY
Turbidity	TURB	2685747	N/A	2011/11/20	NEIL DASSANAYAKE

Maxxam Job #: B1I0759
Report Date: 2011/11/25

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

Test Summary

Maxxam ID LQ6331 **Collected** 2011/11/16
Sample ID MW-10I **Shipped**
Matrix Water **Received** 2011/11/16

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2685383	N/A	2011/11/17	YOGESH PATEL
Anions	IC	2685164	N/A	2011/11/23	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686132	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2685388	2011/11/17	2011/11/17	YOGESH PATEL
Hardness (calculated as CaCO3)		2683766	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2686207	2011/11/18	2011/11/18	LAWRENCE CHEUNG
Dissolved Metals by ICPMS	ICP/MS	2687928	N/A	2011/11/22	HUA REN
Total Metals Analysis by ICPMS	ICP/MS	2689793	N/A	2011/11/23	AREFA DABHAD
Ammonia-N	LACH/NH4	2687099	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2685171	N/A	2011/11/22	HELEN HE
pH	PH	2685387	N/A	2011/11/17	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686079	N/A	2011/11/21	BRAMDEO MOTIRAM
Orthophosphate	AC	2686148	N/A	2011/11/18	DEONARINE RAMNARINE
Sulphide	ISE/S	2685775	N/A	2011/11/18	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2689696	2011/11/22	2011/11/23	VIORICA ROTARU
Total Suspended Solids	SLDS	2685338	N/A	2011/11/17	BANSARI RAY
Turbidity	TURB	2685747	N/A	2011/11/17	NEIL DASSANAYAKE

Maxxam ID LQ6332 **Collected** 2011/11/16
Sample ID MW-10D **Shipped**
Matrix Water **Received** 2011/11/16

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2685383	N/A	2011/11/17	YOGESH PATEL
Anions	IC	2685164	N/A	2011/11/23	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686132	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2685388	2011/11/17	2011/11/17	YOGESH PATEL
Hardness (calculated as CaCO3)		2684715	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2686207	2011/11/18	2011/11/18	LAWRENCE CHEUNG
Dissolved Metals by ICPMS	ICP/MS	2692765	N/A	2011/11/25	HUA REN
Total Metals Analysis by ICPMS	ICP/MS	2692898	N/A	2011/11/25	HUA REN
Ammonia-N	LACH/NH4	2687099	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2685777	N/A	2011/11/22	HELEN HE
pH	PH	2685387	N/A	2011/11/17	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686079	N/A	2011/11/21	BRAMDEO MOTIRAM
Orthophosphate	AC	2686148	N/A	2011/11/18	DEONARINE RAMNARINE
Sulphide	ISE/S	2685775	N/A	2011/11/18	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2689696	2011/11/22	2011/11/23	VIORICA ROTARU
Total Suspended Solids	SLDS	2685338	N/A	2011/11/17	BANSARI RAY
Turbidity	TURB	2685747	N/A	2011/11/17	NEIL DASSANAYAKE

Maxxam ID LQ6333 **Collected** 2011/11/16
Sample ID MW-05O **Shipped**
Matrix Water **Received** 2011/11/16

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2685383	N/A	2011/11/17	YOGESH PATEL
Anions	IC	2685164	N/A	2011/11/23	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686132	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2685388	2011/11/17	2011/11/17	YOGESH PATEL
Hardness (calculated as CaCO3)		2684715	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2686207	2011/11/18	2011/11/18	LAWRENCE CHEUNG

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Golder Associates Ltd
Client Project #: 021-1228
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Sampler Initials: KS

Test Summary

Dissolved Metals by ICPMS	ICP/MS	2687927	N/A	2011/11/22	AREFA DABHAD
Total Metals Analysis by ICPMS	ICP/MS	2689793	N/A	2011/11/23	AREFA DABHAD
Ammonia-N	LACH/NH4	2687099	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2685777	N/A	2011/11/22	HELEN HE
pH	PH	2685387	N/A	2011/11/17	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686079	N/A	2011/11/21	BRAMDEO MOTIRAM
Orthophosphate	AC	2686148	N/A	2011/11/18	DEONARINE RAMNARINE
Sulphide	ISE/S	2685775	N/A	2011/11/18	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2689696	2011/11/22	2011/11/23	VIORICA ROTARU
Total Suspended Solids	SLDS	2685338	N/A	2011/11/17	BANSARI RAY
Turbidity	TURB	2685747	N/A	2011/11/17	NEIL DASSANAYAKE

Maxxam ID LQ6333 Dup
Sample ID MW-05O
Matrix Water

Collected 2011/11/16
Shipped
Received 2011/11/16

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2685777	N/A	2011/11/22	HELEN HE

Maxxam ID LQ6334
Sample ID MW-05I
Matrix Water

Collected 2011/11/16
Shipped
Received 2011/11/16

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2685383	N/A	2011/11/17	YOGESH PATEL
Anions	IC	2685164	N/A	2011/11/23	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686132	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2685388	2011/11/17	2011/11/17	YOGESH PATEL
Hardness (calculated as CaCO3)		2684715	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2686207	2011/11/18	2011/11/18	LAWRENCE CHEUNG
Dissolved Metals by ICPMS	ICP/MS	2687927	N/A	2011/11/22	AREFA DABHAD
Total Metals Analysis by ICPMS	ICP/MS	2689793	N/A	2011/11/23	AREFA DABHAD
Ammonia-N	LACH/NH4	2687099	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2685171	N/A	2011/11/22	HELEN HE
pH	PH	2685387	N/A	2011/11/17	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686079	N/A	2011/11/21	BRAMDEO MOTIRAM
Orthophosphate	AC	2686148	N/A	2011/11/18	DEONARINE RAMNARINE
Sulphide	ISE/S	2685775	N/A	2011/11/18	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2689696	2011/11/22	2011/11/23	VIORICA ROTARU
Total Suspended Solids	SLDS	2685338	N/A	2011/11/17	BANSARI RAY
Turbidity	TURB	2685747	N/A	2011/11/18	NEIL DASSANAYAKE

Maxxam ID LQ6334 Dup
Sample ID MW-05I
Matrix Water

Collected 2011/11/16
Shipped
Received 2011/11/16

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Mercury in Water by CVAA	CVAA	2686207	2011/11/18	2011/11/18	LAWRENCE CHEUNG
Ammonia-N	LACH/NH4	2687099	N/A	2011/11/21	ALINA DOBREANU

Maxxam Job #: B1I0759
Report Date: 2011/11/25

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

Test Summary

Maxxam ID LQ6335 **Collected** 2011/11/16
Sample ID MW-05S **Shipped**
Matrix Water **Received** 2011/11/16

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2685383	N/A	2011/11/17	YOGESH PATEL
Anions	IC	2685164	N/A	2011/11/23	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686132	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2685388	2011/11/17	2011/11/17	YOGESH PATEL
Hardness (calculated as CaCO3)		2684715	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2686207	2011/11/18	2011/11/18	LAWRENCE CHEUNG
Dissolved Metals by ICPMS	ICP/MS	2687927	N/A	2011/11/22	AREFA DABHAD
Total Metals Analysis by ICPMS	ICP/MS	2689793	N/A	2011/11/23	AREFA DABHAD
Ammonia-N	LACH/NH4	2687099	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2685171	N/A	2011/11/22	HELEN HE
pH	PH	2685387	N/A	2011/11/17	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686079	N/A	2011/11/21	BRAMDEO MOTIRAM
Orthophosphate	AC	2686148	N/A	2011/11/18	DEONARINE RAMNARINE
Sulphide	ISE/S	2685775	N/A	2011/11/18	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2689696	2011/11/22	2011/11/23	VIORICA ROTARU
Total Suspended Solids	SLDS	2685338	N/A	2011/11/17	BANSARI RAY
Turbidity	TURB	2685747	N/A	2011/11/17	NEIL DASSANAYAKE

Maxxam ID LQ6336 **Collected** 2011/11/16
Sample ID MW-05D **Shipped**
Matrix Water **Received** 2011/11/16

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2685383	N/A	2011/11/17	YOGESH PATEL
Anions	IC	2685164	N/A	2011/11/23	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686132	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2685388	2011/11/17	2011/11/17	YOGESH PATEL
Hardness (calculated as CaCO3)		2684715	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2688195	2011/11/21	2011/11/22	MAGDALENA CARLOS
Dissolved Metals by ICPMS	ICP/MS	2687928	N/A	2011/11/22	HUA REN
Total Metals Analysis by ICPMS	ICP/MS	2689793	N/A	2011/11/23	AREFA DABHAD
Ammonia-N	LACH/NH4	2687099	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2685777	N/A	2011/11/22	HELEN HE
pH	PH	2685387	N/A	2011/11/17	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686079	N/A	2011/11/21	BRAMDEO MOTIRAM
Orthophosphate	AC	2686148	N/A	2011/11/18	DEONARINE RAMNARINE
Sulphide	ISE/S	2685775	N/A	2011/11/18	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2689696	2011/11/22	2011/11/23	VIORICA ROTARU
Total Suspended Solids	SLDS	2685338	N/A	2011/11/17	BANSARI RAY
Turbidity	TURB	2685747	N/A	2011/11/17	NEIL DASSANAYAKE

Maxxam ID LQ6337 **Collected** 2011/11/16
Sample ID MW-04O **Shipped**
Matrix Water **Received** 2011/11/16

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2685383	N/A	2011/11/17	YOGESH PATEL
Anions	IC	2685164	N/A	2011/11/23	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686132	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2685388	2011/11/17	2011/11/17	YOGESH PATEL
Hardness (calculated as CaCO3)		2684715	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2688195	2011/11/21	2011/11/22	MAGDALENA CARLOS

Maxxam Job #: B1I0759
Report Date: 2011/11/25

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

Test Summary

Dissolved Metals by ICPMS	ICP/MS	2687927	N/A	2011/11/22	AREFA DABHAD
Total Metals Analysis by ICPMS	ICP/MS	2689793	N/A	2011/11/23	AREFA DABHAD
Ammonia-N	LACH/NH4	2687099	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2685777	N/A	2011/11/22	HELEN HE
pH	PH	2685387	N/A	2011/11/17	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686079	N/A	2011/11/21	BRAMDEO MOTIRAM
Orthophosphate	AC	2686148	N/A	2011/11/18	DEONARINE RAMNARINE
Sulphide	ISE/S	2685775	N/A	2011/11/18	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2689696	2011/11/22	2011/11/23	VIORICA ROTARU
Total Suspended Solids	SLDS	2685338	N/A	2011/11/17	BANSARI RAY
Turbidity	TURB	2685747	N/A	2011/11/17	NEIL DASSANAYAKE

Maxxam ID LQ6338 **Collected** 2011/11/16
Sample ID MW-04I **Shipped**
Matrix Water **Received** 2011/11/16

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2685383	N/A	2011/11/17	YOGESH PATEL
Anions	IC	2685164	N/A	2011/11/23	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686132	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2685388	2011/11/17	2011/11/17	YOGESH PATEL
Hardness (calculated as CaCO3)		2684715	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2688195	2011/11/21	2011/11/22	MAGDALENA CARLOS
Dissolved Metals by ICPMS	ICP/MS	2687928	N/A	2011/11/22	HUA REN
Total Metals Analysis by ICPMS	ICP/MS	2689793	N/A	2011/11/23	AREFA DABHAD
Ammonia-N	LACH/NH4	2687099	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2685777	N/A	2011/11/22	HELEN HE
pH	PH	2685387	N/A	2011/11/17	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686079	N/A	2011/11/21	BRAMDEO MOTIRAM
Orthophosphate	AC	2686148	N/A	2011/11/18	DEONARINE RAMNARINE
Sulphide	ISE/S	2685775	N/A	2011/11/18	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2689696	2011/11/22	2011/11/23	VIORICA ROTARU
Total Suspended Solids	SLDS	2685338	N/A	2011/11/17	BANSARI RAY
Turbidity	TURB	2685747	N/A	2011/11/20	NEIL DASSANAYAKE

Maxxam ID LQ6338 Dup **Collected** 2011/11/16
Sample ID MW-04I **Shipped**
Matrix Water **Received** 2011/11/16

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	2687928	N/A	2011/11/22	HUA REN
Turbidity	TURB	2685747	N/A	2011/11/20	NEIL DASSANAYAKE

Maxxam ID LQ6339 **Collected** 2011/11/16
Sample ID MW-04D **Shipped**
Matrix Water **Received** 2011/11/16

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2685383	N/A	2011/11/17	YOGESH PATEL
Anions	IC	2685164	N/A	2011/11/23	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686132	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2685388	2011/11/17	2011/11/17	YOGESH PATEL
Hardness (calculated as CaCO3)		2684715	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2688195	2011/11/21	2011/11/22	MAGDALENA CARLOS
Dissolved Metals by ICPMS	ICP/MS	2687927	N/A	2011/11/21	AREFA DABHAD
Total Metals Analysis by ICPMS	ICP/MS	2689793	N/A	2011/11/23	AREFA DABHAD

Maxxam Job #: B1I0759
Report Date: 2011/11/25

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

Test Summary

Ammonia-N	LACH/NH4	2687099	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2685171	N/A	2011/11/22	HELEN HE
pH	PH	2685387	N/A	2011/11/17	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686079	N/A	2011/11/21	BRAMDEO MOTIRAM
Orthophosphate	AC	2686148	N/A	2011/11/18	DEONARINE RAMNARINE
Sulphide	ISE/S	2685775	N/A	2011/11/18	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2689696	2011/11/22	2011/11/23	VIORICA ROTARU
Total Suspended Solids	SLDS	2685338	N/A	2011/11/17	BANSARI RAY
Turbidity	TURB	2685747	N/A	2011/11/17	NEIL DASSANAYAKE

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Package 1	9.0°C
Package 2	8.7°C
Package 3	10.0°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Sample LQ6327-01: Results for dissolved boron are greater than total boron. The results have been confirmed by re-analysis.

Sample LQ6328-01: Elevated ion balance result was confirmed by re-analysis.

Sample LQ6329-01: Metals Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Nitrite: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results for dissolved selenium and iron are greater than total selenium and iron. The results have been confirmed by re-analysis.

Sample LQ6330-01: Metals Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Sample LQ6332-01: Metals Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Nitrite: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Sample LQ6333-01: Metals Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Sample LQ6336-01: Metal analysis:Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.
Nitrite: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Sample LQ6339-01: Metals Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Nitrite: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
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Quality Assurance Report

Maxxam Job Number: MB1I0759

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2685164	FD	Matrix Spike						
		[LQ6327-01]	Dissolved Chloride (Cl)	2011/11/23		103	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/23		101	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/23		104	%	80 - 120
		Spiked Blank	Dissolved Chloride (Cl)	2011/11/23		99	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/23		104	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/23		99	%	80 - 120
		Method Blank	Dissolved Chloride (Cl)	2011/11/23	<1		mg/L	
			Dissolved Bromide (Br-)	2011/11/23	<1		mg/L	
			Dissolved Sulphate (SO4)	2011/11/23	<1		mg/L	
		RPD [LQ6327-01]	Dissolved Chloride (Cl)	2011/11/23	6.2		%	20
			Dissolved Bromide (Br-)	2011/11/23	NC		%	20
			Dissolved Sulphate (SO4)	2011/11/23	1		%	20
2685171	HH	Matrix Spike	Nitrite (N)	2011/11/22		101	%	80 - 120
			Nitrate (N)	2011/11/22		NC	%	80 - 120
		Spiked Blank	Nitrite (N)	2011/11/22		102	%	85 - 115
			Nitrate (N)	2011/11/22		95	%	85 - 115
		Method Blank	Nitrite (N)	2011/11/22	<0.01		mg/L	
			Nitrate (N)	2011/11/22	<0.1		mg/L	
		RPD	Nitrite (N)	2011/11/22	NC		%	25
			Nitrate (N)	2011/11/22	1.9		%	25
2685338	RAY	QC Standard	Total Suspended Solids	2011/11/17		97	%	85 - 115
		Method Blank	Total Suspended Solids	2011/11/17	<10		mg/L	
		RPD [LQ6328-02]	Total Suspended Solids	2011/11/17	2.6		%	25
2685383	YPA	QC Standard	Alkalinity (Total as CaCO3)	2011/11/17		97	%	85 - 115
		Method Blank	Alkalinity (Total as CaCO3)	2011/11/17	<1		mg/L	
		RPD [LQ6328-01]	Alkalinity (Total as CaCO3)	2011/11/17	2.2		%	25
2685388	YPA	Matrix Spike						
		[LQ6328-01]	Fluoride (F-)	2011/11/17		100	%	80 - 120
		Spiked Blank	Fluoride (F-)	2011/11/17		100	%	80 - 120
		Method Blank	Fluoride (F-)	2011/11/17	<0.1		mg/L	
		RPD [LQ6328-01]	Fluoride (F-)	2011/11/17	NC		%	20
2685747	NYS	QC Standard	Turbidity	2011/11/20		101	%	85 - 115
		Method Blank	Turbidity	2011/11/20	<0.2		NTU	
		RPD [LQ6338-01]	Turbidity	2011/11/20	0.5		%	20
2685775	XQI	Matrix Spike	Sulphide	2011/11/18		87	%	80 - 120
		Spiked Blank	Sulphide	2011/11/18		90	%	80 - 120
		Method Blank	Sulphide	2011/11/18	<0.02		mg/L	
		RPD	Sulphide	2011/11/18	NC		%	20
2685777	HH	Matrix Spike						
		[LQ6333-01]	Nitrite (N)	2011/11/22		102	%	80 - 120
			Nitrate (N)	2011/11/22		100	%	80 - 120
		Spiked Blank	Nitrite (N)	2011/11/22		101	%	85 - 115
			Nitrate (N)	2011/11/22		94	%	85 - 115
		Method Blank	Nitrite (N)	2011/11/22	<0.01		mg/L	
			Nitrate (N)	2011/11/22	<0.1		mg/L	
		RPD [LQ6333-01]	Nitrite (N)	2011/11/22	NC		%	25
			Nitrate (N)	2011/11/22	NC		%	25
2686079	BMO	Matrix Spike						
		[LQ6328-09]	Phenols-4AAP	2011/11/21		103	%	75 - 125
		Spiked Blank	Phenols-4AAP	2011/11/21		102	%	75 - 125
		Method Blank	Phenols-4AAP	2011/11/21	<0.001		mg/L	
		RPD [LQ6328-09]	Phenols-4AAP	2011/11/21	NC		%	25
2686132	LHA	Matrix Spike	Free Cyanide	2011/11/18		98	%	80 - 120
		Spiked Blank	Free Cyanide	2011/11/18		96	%	80 - 120

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Quality Assurance Report (Continued)

Maxxam Job Number: MB1I0759

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2686132	LHA	Method Blank	Free Cyanide	2011/11/18	<0.002		mg/L	
		RPD	Free Cyanide	2011/11/18	NC		%	25
2686148	DRM	Matrix Spike						
		[LQ6327-01]	Orthophosphate (P)	2011/11/18		101	%	75 - 125
		Spiked Blank	Orthophosphate (P)	2011/11/18		100	%	80 - 120
		Method Blank	Orthophosphate (P)	2011/11/18	<0.01		mg/L	
		RPD [LQ6327-01]	Orthophosphate (P)	2011/11/18	NC		%	25
2686207	LCH	Matrix Spike						
		[LQ6334-08]	Mercury (Hg)	2011/11/18		102	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/18		98	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/18	<0.0001		mg/L	
		RPD [LQ6334-08]	Mercury (Hg)	2011/11/18	NC		%	25
2687099	ADB	Matrix Spike						
		[LQ6334-03]	Total Ammonia-N	2011/11/21		NC	%	80 - 120
		Spiked Blank	Total Ammonia-N	2011/11/21		102	%	85 - 115
		Method Blank	Total Ammonia-N	2011/11/21	<0.05		mg/L	
		RPD [LQ6334-03]	Total Ammonia-N	2011/11/21	0.4		%	20
2687927	ADA	Matrix Spike	Dissolved Aluminum (Al)	2011/11/21		97	%	80 - 120
			Dissolved Antimony (Sb)	2011/11/21		99	%	80 - 120
			Dissolved Arsenic (As)	2011/11/21		96	%	80 - 120
			Dissolved Barium (Ba)	2011/11/21		97	%	80 - 120
			Dissolved Beryllium (Be)	2011/11/21		97	%	80 - 120
			Dissolved Bismuth (Bi)	2011/11/21		94	%	80 - 120
			Dissolved Boron (B)	2011/11/21		NC	%	80 - 120
			Dissolved Cadmium (Cd)	2011/11/21		98	%	80 - 120
			Dissolved Calcium (Ca)	2011/11/21		NC	%	80 - 120
			Dissolved Chromium (Cr)	2011/11/21		98	%	80 - 120
			Dissolved Cobalt (Co)	2011/11/21		100	%	80 - 120
			Dissolved Copper (Cu)	2011/11/21		96	%	80 - 120
			Dissolved Iron (Fe)	2011/11/21		98	%	80 - 120
			Dissolved Lead (Pb)	2011/11/21		94	%	80 - 120
			Dissolved Magnesium (Mg)	2011/11/21		NC	%	80 - 120
			Dissolved Manganese (Mn)	2011/11/21		98	%	80 - 120
			Dissolved Molybdenum (Mo)	2011/11/21		102	%	80 - 120
			Dissolved Nickel (Ni)	2011/11/21		98	%	80 - 120
			Dissolved Phosphorus (P)	2011/11/21		104	%	80 - 120
			Dissolved Potassium (K)	2011/11/21		101	%	80 - 120
			Dissolved Selenium (Se)	2011/11/21		99	%	80 - 120
			Dissolved Silicon (Si)	2011/11/21		100	%	80 - 120
			Dissolved Silver (Ag)	2011/11/21		95	%	80 - 120
			Dissolved Sodium (Na)	2011/11/21		NC	%	80 - 120
			Dissolved Strontium (Sr)	2011/11/21		NC	%	80 - 120
			Dissolved Thallium (Tl)	2011/11/21		92	%	80 - 120
			Dissolved Tin (Sn)	2011/11/21		100	%	80 - 120
			Dissolved Titanium (Ti)	2011/11/21		98	%	80 - 120
			Dissolved Uranium (U)	2011/11/21		99	%	80 - 120
			Dissolved Vanadium (V)	2011/11/21		98	%	80 - 120
			Dissolved Zinc (Zn)	2011/11/21		100	%	80 - 120
		Spiked Blank	Dissolved Aluminum (Al)	2011/11/21		99	%	80 - 120
			Dissolved Antimony (Sb)	2011/11/21		98	%	80 - 120
			Dissolved Arsenic (As)	2011/11/21		96	%	80 - 120
			Dissolved Barium (Ba)	2011/11/21		100	%	80 - 120
			Dissolved Beryllium (Be)	2011/11/21		99	%	80 - 120
			Dissolved Bismuth (Bi)	2011/11/21		99	%	80 - 120
			Dissolved Boron (B)	2011/11/21		103	%	80 - 120

Golder Associates Ltd
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Quality Assurance Report (Continued)

Maxxam Job Number: MB1I0759

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2687927	ADA	Spiked Blank	Dissolved Cadmium (Cd)	2011/11/21		99	%	80 - 120
			Dissolved Calcium (Ca)	2011/11/21		98	%	80 - 120
			Dissolved Chromium (Cr)	2011/11/21		99	%	80 - 120
			Dissolved Cobalt (Co)	2011/11/21		102	%	80 - 120
			Dissolved Copper (Cu)	2011/11/21		98	%	80 - 120
			Dissolved Iron (Fe)	2011/11/21		99	%	80 - 120
			Dissolved Lead (Pb)	2011/11/21		99	%	80 - 120
			Dissolved Magnesium (Mg)	2011/11/21		100	%	80 - 120
			Dissolved Manganese (Mn)	2011/11/21		100	%	80 - 120
			Dissolved Molybdenum (Mo)	2011/11/21		101	%	80 - 120
			Dissolved Nickel (Ni)	2011/11/21		101	%	80 - 120
			Dissolved Phosphorus (P)	2011/11/21		100	%	80 - 120
			Dissolved Potassium (K)	2011/11/21		101	%	80 - 120
			Dissolved Selenium (Se)	2011/11/21		96	%	80 - 120
			Dissolved Silicon (Si)	2011/11/21		99	%	80 - 120
			Dissolved Silver (Ag)	2011/11/21		96	%	80 - 120
			Dissolved Sodium (Na)	2011/11/21		104	%	80 - 120
			Dissolved Strontium (Sr)	2011/11/21		97	%	80 - 120
			Dissolved Thallium (Tl)	2011/11/21		97	%	80 - 120
			Dissolved Tin (Sn)	2011/11/21		101	%	80 - 120
			Dissolved Titanium (Ti)	2011/11/21		98	%	80 - 120
			Dissolved Uranium (U)	2011/11/21		102	%	80 - 120
			Dissolved Vanadium (V)	2011/11/21		96	%	80 - 120
			Dissolved Zinc (Zn)	2011/11/21		98	%	80 - 120
		Method Blank	Dissolved Aluminum (Al)	2011/11/21	<5		ug/L	
			Dissolved Antimony (Sb)	2011/11/21	<0.5		ug/L	
			Dissolved Arsenic (As)	2011/11/21	<1		ug/L	
			Dissolved Barium (Ba)	2011/11/21	<2		ug/L	
			Dissolved Beryllium (Be)	2011/11/21	<0.5		ug/L	
			Dissolved Bismuth (Bi)	2011/11/21	<1		ug/L	
			Dissolved Boron (B)	2011/11/21	<10		ug/L	
			Dissolved Cadmium (Cd)	2011/11/21	<0.1		ug/L	
			Dissolved Calcium (Ca)	2011/11/21	<200		ug/L	
			Dissolved Chromium (Cr)	2011/11/21	<5		ug/L	
			Dissolved Cobalt (Co)	2011/11/21	<0.5		ug/L	
			Dissolved Copper (Cu)	2011/11/21	<1		ug/L	
			Dissolved Iron (Fe)	2011/11/21	<100		ug/L	
			Dissolved Lead (Pb)	2011/11/21	<0.5		ug/L	
			Dissolved Magnesium (Mg)	2011/11/21	<50		ug/L	
			Dissolved Manganese (Mn)	2011/11/21	<2		ug/L	
			Dissolved Molybdenum (Mo)	2011/11/21	<0.5		ug/L	
			Dissolved Nickel (Ni)	2011/11/21	<1		ug/L	
			Dissolved Phosphorus (P)	2011/11/21	<100		ug/L	
			Dissolved Potassium (K)	2011/11/21	<200		ug/L	
			Dissolved Selenium (Se)	2011/11/21	<2		ug/L	
			Dissolved Silicon (Si)	2011/11/21	<50		ug/L	
			Dissolved Silver (Ag)	2011/11/21	<0.1		ug/L	
			Dissolved Sodium (Na)	2011/11/21	<100		ug/L	
			Dissolved Strontium (Sr)	2011/11/21	<1		ug/L	
			Dissolved Thallium (Tl)	2011/11/21	<0.05		ug/L	
			Dissolved Tin (Sn)	2011/11/21	<1		ug/L	
			Dissolved Titanium (Ti)	2011/11/21	<5		ug/L	
			Dissolved Uranium (U)	2011/11/21	<0.1		ug/L	
			Dissolved Vanadium (V)	2011/11/21	0.5, RDL=0.5		ug/L	
			Dissolved Zinc (Zn)	2011/11/21	<5		ug/L	

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Golder Associates Ltd
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Site Location: TANSLEY QUARRY

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I0759

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2687927	ADA	RPD	Dissolved Barium (Ba)	2011/11/21	0.5		%	20
			Dissolved Boron (B)	2011/11/21	3.3		%	20
			Dissolved Calcium (Ca)	2011/11/21	3.3		%	20
			Dissolved Cobalt (Co)	2011/11/21	NC		%	20
			Dissolved Copper (Cu)	2011/11/21	NC		%	20
			Dissolved Iron (Fe)	2011/11/21	NC		%	20
			Dissolved Magnesium (Mg)	2011/11/21	0.4		%	20
			Dissolved Manganese (Mn)	2011/11/21	NC		%	20
			Dissolved Potassium (K)	2011/11/21	1.5		%	20
			Dissolved Sodium (Na)	2011/11/21	1.7		%	20
2687928	HRE	Matrix Spike [LQ6338-07]	Dissolved Aluminum (Al)	2011/11/22		88	%	80 - 120
			Dissolved Antimony (Sb)	2011/11/22		100	%	80 - 120
			Dissolved Arsenic (As)	2011/11/22		101	%	80 - 120
			Dissolved Barium (Ba)	2011/11/22		95	%	80 - 120
			Dissolved Beryllium (Be)	2011/11/22		91	%	80 - 120
			Dissolved Bismuth (Bi)	2011/11/22		94	%	80 - 120
			Dissolved Boron (B)	2011/11/22		NC	%	80 - 120
			Dissolved Cadmium (Cd)	2011/11/22		95	%	80 - 120
			Dissolved Calcium (Ca)	2011/11/22		NC	%	80 - 120
			Dissolved Chromium (Cr)	2011/11/22		93	%	80 - 120
			Dissolved Cobalt (Co)	2011/11/22		92	%	80 - 120
			Dissolved Copper (Cu)	2011/11/22		88	%	80 - 120
			Dissolved Iron (Fe)	2011/11/22		96	%	80 - 120
			Dissolved Lead (Pb)	2011/11/22		92	%	80 - 120
			Dissolved Magnesium (Mg)	2011/11/22		NC	%	80 - 120
			Dissolved Manganese (Mn)	2011/11/22		91	%	80 - 120
			Dissolved Molybdenum (Mo)	2011/11/22		106	%	80 - 120
			Dissolved Nickel (Ni)	2011/11/22		91	%	80 - 120
			Dissolved Phosphorus (P)	2011/11/22		100	%	80 - 120
			Dissolved Potassium (K)	2011/11/22		NC	%	80 - 120
			Dissolved Selenium (Se)	2011/11/22		96	%	80 - 120
			Dissolved Silicon (Si)	2011/11/22		92	%	80 - 120
			Dissolved Silver (Ag)	2011/11/22		68 (1)	%	80 - 120
			Dissolved Sodium (Na)	2011/11/22		NC (2)	%	80 - 120
			Dissolved Strontium (Sr)	2011/11/22		NC	%	80 - 120
			Dissolved Thallium (Tl)	2011/11/22		91	%	80 - 120
			Dissolved Tin (Sn)	2011/11/22		104	%	80 - 120
			Dissolved Titanium (Ti)	2011/11/22		96	%	80 - 120
			Dissolved Uranium (U)	2011/11/22		97	%	80 - 120
			Dissolved Vanadium (V)	2011/11/22		94	%	80 - 120
			Dissolved Zinc (Zn)	2011/11/22		88	%	80 - 120
		Spiked Blank	Dissolved Aluminum (Al)	2011/11/22		95	%	80 - 120
			Dissolved Antimony (Sb)	2011/11/22		97	%	80 - 120
			Dissolved Arsenic (As)	2011/11/22		99	%	80 - 120
			Dissolved Barium (Ba)	2011/11/22		97	%	80 - 120
			Dissolved Beryllium (Be)	2011/11/22		98	%	80 - 120
			Dissolved Bismuth (Bi)	2011/11/22		99	%	80 - 120
			Dissolved Boron (B)	2011/11/22		98	%	80 - 120
			Dissolved Cadmium (Cd)	2011/11/22		99	%	80 - 120
			Dissolved Calcium (Ca)	2011/11/22		96	%	80 - 120
			Dissolved Chromium (Cr)	2011/11/22		96	%	80 - 120
			Dissolved Cobalt (Co)	2011/11/22		95	%	80 - 120
			Dissolved Copper (Cu)	2011/11/22		95	%	80 - 120
			Dissolved Iron (Fe)	2011/11/22		97	%	80 - 120

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Golder Associates Ltd
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Quality Assurance Report (Continued)

Maxxam Job Number: MB1I0759

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2687928	HRE	Spiked Blank	Dissolved Lead (Pb)	2011/11/22		101	%	80 - 120
			Dissolved Magnesium (Mg)	2011/11/22		93	%	80 - 120
			Dissolved Manganese (Mn)	2011/11/22		95	%	80 - 120
			Dissolved Molybdenum (Mo)	2011/11/22		102	%	80 - 120
			Dissolved Nickel (Ni)	2011/11/22		95	%	80 - 120
			Dissolved Phosphorus (P)	2011/11/22		104	%	80 - 120
			Dissolved Potassium (K)	2011/11/22		94	%	80 - 120
			Dissolved Selenium (Se)	2011/11/22		99	%	80 - 120
			Dissolved Silicon (Si)	2011/11/22		94	%	80 - 120
			Dissolved Silver (Ag)	2011/11/22		97	%	80 - 120
			Dissolved Sodium (Na)	2011/11/22		94	%	80 - 120
			Dissolved Strontium (Sr)	2011/11/22		98	%	80 - 120
			Dissolved Thallium (Tl)	2011/11/22		99	%	80 - 120
			Dissolved Tin (Sn)	2011/11/22		103	%	80 - 120
			Dissolved Titanium (Ti)	2011/11/22		97	%	80 - 120
			Dissolved Uranium (U)	2011/11/22		100	%	80 - 120
			Dissolved Vanadium (V)	2011/11/22		95	%	80 - 120
			Dissolved Zinc (Zn)	2011/11/22		98	%	80 - 120
		Method Blank	Dissolved Aluminum (Al)	2011/11/22	<5		ug/L	
			Dissolved Antimony (Sb)	2011/11/22	<0.5		ug/L	
			Dissolved Arsenic (As)	2011/11/22	<1		ug/L	
			Dissolved Barium (Ba)	2011/11/22	<2		ug/L	
			Dissolved Beryllium (Be)	2011/11/22	<0.5		ug/L	
			Dissolved Bismuth (Bi)	2011/11/22	<1		ug/L	
			Dissolved Boron (B)	2011/11/22	<10		ug/L	
			Dissolved Cadmium (Cd)	2011/11/22	<0.1		ug/L	
			Dissolved Calcium (Ca)	2011/11/22	<200		ug/L	
			Dissolved Chromium (Cr)	2011/11/22	<5		ug/L	
			Dissolved Cobalt (Co)	2011/11/22	<0.5		ug/L	
			Dissolved Copper (Cu)	2011/11/22	<1		ug/L	
			Dissolved Iron (Fe)	2011/11/22	<100		ug/L	
			Dissolved Lead (Pb)	2011/11/22	<0.5		ug/L	
			Dissolved Magnesium (Mg)	2011/11/22	<50		ug/L	
			Dissolved Manganese (Mn)	2011/11/22	<2		ug/L	
			Dissolved Molybdenum (Mo)	2011/11/22	<0.5		ug/L	
			Dissolved Nickel (Ni)	2011/11/22	<1		ug/L	
			Dissolved Phosphorus (P)	2011/11/22	<100		ug/L	
			Dissolved Potassium (K)	2011/11/22	<200		ug/L	
			Dissolved Selenium (Se)	2011/11/22	<2		ug/L	
			Dissolved Silicon (Si)	2011/11/22	<50		ug/L	
			Dissolved Silver (Ag)	2011/11/22	<0.1		ug/L	
			Dissolved Sodium (Na)	2011/11/22	<100		ug/L	
			Dissolved Strontium (Sr)	2011/11/22	<1		ug/L	
			Dissolved Thallium (Tl)	2011/11/22	<0.05		ug/L	
			Dissolved Tin (Sn)	2011/11/22	<1		ug/L	
			Dissolved Titanium (Ti)	2011/11/22	<5		ug/L	
			Dissolved Uranium (U)	2011/11/22	<0.1		ug/L	
			Dissolved Vanadium (V)	2011/11/22	0.9, RDL=0.5		ug/L	
			Dissolved Zinc (Zn)	2011/11/22	<5		ug/L	
		RPD [LQ6338-07]	Dissolved Aluminum (Al)	2011/11/22	3.9		%	20
			Dissolved Antimony (Sb)	2011/11/22	NC		%	20
			Dissolved Arsenic (As)	2011/11/22	NC		%	20
			Dissolved Barium (Ba)	2011/11/22	NC		%	20
			Dissolved Beryllium (Be)	2011/11/22	NC		%	20
			Dissolved Bismuth (Bi)	2011/11/22	NC		%	20

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location: TANSLEY QUARRY

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I0759

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2687928	HRE	RPD [LQ6338-07]	Dissolved Boron (B)	2011/11/22	1.3		%	20
			Dissolved Cadmium (Cd)	2011/11/22	NC		%	20
			Dissolved Calcium (Ca)	2011/11/22	0.03		%	20
			Dissolved Chromium (Cr)	2011/11/22	NC		%	20
			Dissolved Cobalt (Co)	2011/11/22	NC		%	20
			Dissolved Copper (Cu)	2011/11/22	NC		%	20
			Dissolved Iron (Fe)	2011/11/22	0.6		%	20
			Dissolved Lead (Pb)	2011/11/22	NC		%	20
			Dissolved Magnesium (Mg)	2011/11/22	1.7		%	20
			Dissolved Manganese (Mn)	2011/11/22	0.2		%	20
			Dissolved Molybdenum (Mo)	2011/11/22	0.3		%	20
			Dissolved Nickel (Ni)	2011/11/22	NC		%	20
			Dissolved Phosphorus (P)	2011/11/22	NC		%	20
			Dissolved Potassium (K)	2011/11/22	0.2		%	20
			Dissolved Selenium (Se)	2011/11/22	NC		%	20
			Dissolved Silicon (Si)	2011/11/22	0.3		%	20
			Dissolved Silver (Ag)	2011/11/22	NC		%	20
			Dissolved Sodium (Na)	2011/11/22	5.3		%	20
			Dissolved Strontium (Sr)	2011/11/22	0.5		%	20
			Dissolved Thallium (Tl)	2011/11/22	NC		%	20
			Dissolved Tin (Sn)	2011/11/22	NC		%	20
			Dissolved Titanium (Ti)	2011/11/22	NC		%	20
			Dissolved Uranium (U)	2011/11/22	NC		%	20
			Dissolved Vanadium (V)	2011/11/22	NC		%	20
			Dissolved Zinc (Zn)	2011/11/22	NC		%	20
2688195	MC	Matrix Spike	Mercury (Hg)	2011/11/22		120	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/22		105	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/22	<0.0001		mg/L	
		RPD	Mercury (Hg)	2011/11/22	NC		%	25
2689696	VRO	Matrix Spike	Total Phosphorus	2011/11/23		100	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/23		102	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/23		101	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/23	<0.02		mg/L	
		RPD	Total Phosphorus	2011/11/23	NC		%	20
2689793	ADA	Matrix Spike	Total Aluminum (Al)	2011/11/23		99	%	80 - 120
			Total Antimony (Sb)	2011/11/23		108	%	80 - 120
			Total Arsenic (As)	2011/11/23		101	%	80 - 120
			Total Barium (Ba)	2011/11/23		103	%	80 - 120
			Total Beryllium (Be)	2011/11/23		101	%	80 - 120
			Total Bismuth (Bi)	2011/11/23		96	%	80 - 120
			Total Boron (B)	2011/11/23		101	%	80 - 120
			Total Cadmium (Cd)	2011/11/23		101	%	80 - 120
			Total Calcium (Ca)	2011/11/23		NC	%	80 - 120
			Total Chromium (Cr)	2011/11/23		101	%	80 - 120
			Total Cobalt (Co)	2011/11/23		101	%	80 - 120
			Total Copper (Cu)	2011/11/23		99	%	80 - 120
			Total Iron (Fe)	2011/11/23		101	%	80 - 120
			Total Lead (Pb)	2011/11/23		98	%	80 - 120
			Total Magnesium (Mg)	2011/11/23		NC	%	80 - 120
			Total Manganese (Mn)	2011/11/23		98	%	80 - 120
			Total Molybdenum (Mo)	2011/11/23		109	%	80 - 120
			Total Nickel (Ni)	2011/11/23		100	%	80 - 120
			Total Phosphorus (P)	2011/11/23		114	%	80 - 120
			Total Potassium (K)	2011/11/23		104	%	80 - 120
			Total Silicon (Si)	2011/11/23		101	%	80 - 120

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Golder Associates Ltd
Attention: Sharon Wood
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Quality Assurance Report (Continued)

Maxxam Job Number: MB1I0759

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2689793 ADA	Matrix Spike	Total Selenium (Se)	2011/11/23		102	%	80 - 120
		Total Silver (Ag)	2011/11/23		93	%	80 - 120
		Total Sodium (Na)	2011/11/23		NC	%	80 - 120
		Total Strontium (Sr)	2011/11/23		NC	%	80 - 120
		Total Thallium (Tl)	2011/11/23		98	%	80 - 120
		Total Tin (Sn)	2011/11/23		107	%	80 - 120
		Total Titanium (Ti)	2011/11/23		104	%	80 - 120
		Total Uranium (U)	2011/11/23		103	%	80 - 120
		Total Vanadium (V)	2011/11/23		104	%	80 - 120
		Total Zinc (Zn)	2011/11/23		98	%	80 - 120
	Spiked Blank	Total Aluminum (Al)	2011/11/23		101	%	80 - 120
		Total Antimony (Sb)	2011/11/23		104	%	80 - 120
		Total Arsenic (As)	2011/11/23		99	%	80 - 120
		Total Barium (Ba)	2011/11/23		103	%	80 - 120
		Total Beryllium (Be)	2011/11/23		99	%	80 - 120
		Total Bismuth (Bi)	2011/11/23		99	%	80 - 120
		Total Boron (B)	2011/11/23		103	%	80 - 120
		Total Cadmium (Cd)	2011/11/23		100	%	80 - 120
		Total Calcium (Ca)	2011/11/23		101	%	80 - 120
		Total Chromium (Cr)	2011/11/23		99	%	80 - 120
		Total Cobalt (Co)	2011/11/23		100	%	80 - 120
		Total Copper (Cu)	2011/11/23		99	%	80 - 120
		Total Iron (Fe)	2011/11/23		100	%	80 - 120
		Total Lead (Pb)	2011/11/23		101	%	80 - 120
		Total Magnesium (Mg)	2011/11/23		97	%	80 - 120
		Total Manganese (Mn)	2011/11/23		99	%	80 - 120
		Total Molybdenum (Mo)	2011/11/23		105	%	80 - 120
		Total Nickel (Ni)	2011/11/23		100	%	80 - 120
		Total Phosphorus (P)	2011/11/23		104	%	80 - 120
		Total Potassium (K)	2011/11/23		104	%	80 - 120
		Total Silicon (Si)	2011/11/23		100	%	80 - 120
		Total Selenium (Se)	2011/11/23		103	%	80 - 120
		Total Silver (Ag)	2011/11/23		97	%	80 - 120
		Total Sodium (Na)	2011/11/23		102	%	80 - 120
		Total Strontium (Sr)	2011/11/23		99	%	80 - 120
		Total Thallium (Tl)	2011/11/23		101	%	80 - 120
		Total Tin (Sn)	2011/11/23		104	%	80 - 120
		Total Titanium (Ti)	2011/11/23		100	%	80 - 120
		Total Uranium (U)	2011/11/23		102	%	80 - 120
		Total Vanadium (V)	2011/11/23		101	%	80 - 120
		Total Zinc (Zn)	2011/11/23		99	%	80 - 120
	Method Blank	Total Aluminum (Al)	2011/11/23	<5		ug/L	
		Total Antimony (Sb)	2011/11/23	<0.5		ug/L	
		Total Arsenic (As)	2011/11/23	<1		ug/L	
		Total Barium (Ba)	2011/11/23	<2		ug/L	
		Total Beryllium (Be)	2011/11/23	<0.5		ug/L	
		Total Bismuth (Bi)	2011/11/23	<1		ug/L	
		Total Boron (B)	2011/11/23	<10		ug/L	
		Total Cadmium (Cd)	2011/11/23	<0.1		ug/L	
		Total Calcium (Ca)	2011/11/23	<200		ug/L	
		Total Chromium (Cr)	2011/11/23	<5		ug/L	
		Total Cobalt (Co)	2011/11/23	<0.5		ug/L	
		Total Copper (Cu)	2011/11/23	<1		ug/L	
		Total Iron (Fe)	2011/11/23	<100		ug/L	
		Total Lead (Pb)	2011/11/23	<0.5		ug/L	

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location: TANSLEY QUARRY

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I0759

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2689793	ADA	Method Blank	Total Magnesium (Mg)	2011/11/23	<50		ug/L	
			Total Manganese (Mn)	2011/11/23	<2		ug/L	
			Total Molybdenum (Mo)	2011/11/23	<0.5		ug/L	
			Total Nickel (Ni)	2011/11/23	<1		ug/L	
			Total Phosphorus (P)	2011/11/23	<100		ug/L	
			Total Potassium (K)	2011/11/23	<200		ug/L	
			Total Silicon (Si)	2011/11/23	<50		ug/L	
			Total Selenium (Se)	2011/11/23	<2		ug/L	
			Total Silver (Ag)	2011/11/23	<0.1		ug/L	
			Total Sodium (Na)	2011/11/23	110, RDL=100		ug/L	
			Total Strontium (Sr)	2011/11/23	1, RDL=1		ug/L	
			Total Thallium (Tl)	2011/11/23	<0.05		ug/L	
			Total Tin (Sn)	2011/11/23	<1		ug/L	
			Total Titanium (Ti)	2011/11/23	<5		ug/L	
			Total Uranium (U)	2011/11/23	<0.1		ug/L	
			Total Vanadium (V)	2011/11/23	<0.5		ug/L	
			Total Zinc (Zn)	2011/11/23	<5		ug/L	
		RPD	Total Barium (Ba)	2011/11/23	1.9		%	20
			Total Beryllium (Be)	2011/11/23	NC		%	20
			Total Bismuth (Bi)	2011/11/23	NC		%	20
			Total Boron (B)	2011/11/23	2.2		%	20
			Total Cadmium (Cd)	2011/11/23	NC		%	20
			Total Calcium (Ca)	2011/11/23	2.5		%	20
			Total Chromium (Cr)	2011/11/23	NC		%	20
			Total Cobalt (Co)	2011/11/23	NC		%	20
			Total Copper (Cu)	2011/11/23	NC		%	20
			Total Iron (Fe)	2011/11/23	NC		%	20
			Total Lead (Pb)	2011/11/23	NC		%	20
			Total Magnesium (Mg)	2011/11/23	2.0		%	20
			Total Manganese (Mn)	2011/11/23	NC		%	20
			Total Molybdenum (Mo)	2011/11/23	1.1		%	20
			Total Nickel (Ni)	2011/11/23	NC		%	20
			Total Potassium (K)	2011/11/23	3.4		%	20
			Total Silver (Ag)	2011/11/23	NC		%	20
			Total Sodium (Na)	2011/11/23	3.0		%	20
			Total Strontium (Sr)	2011/11/23	2.9		%	20
			Total Tin (Sn)	2011/11/23	NC		%	20
			Total Titanium (Ti)	2011/11/23	NC		%	20
			Total Vanadium (V)	2011/11/23	NC		%	20
			Total Zinc (Zn)	2011/11/23	NC		%	20
2692765	HRE	Matrix Spike	Dissolved Aluminum (Al)	2011/11/24		91	%	80 - 120
			Dissolved Antimony (Sb)	2011/11/24		95	%	80 - 120
			Dissolved Arsenic (As)	2011/11/24		96	%	80 - 120
			Dissolved Barium (Ba)	2011/11/24		95	%	80 - 120
			Dissolved Beryllium (Be)	2011/11/24		93	%	80 - 120
			Dissolved Bismuth (Bi)	2011/11/24		99	%	80 - 120
			Dissolved Boron (B)	2011/11/24		91	%	80 - 120
			Dissolved Cadmium (Cd)	2011/11/24		95	%	80 - 120
			Dissolved Calcium (Ca)	2011/11/24		94	%	80 - 120
			Dissolved Chromium (Cr)	2011/11/24		94	%	80 - 120
			Dissolved Cobalt (Co)	2011/11/24		95	%	80 - 120
			Dissolved Copper (Cu)	2011/11/24		94	%	80 - 120
			Dissolved Iron (Fe)	2011/11/24		97	%	80 - 120
			Dissolved Lead (Pb)	2011/11/24		99	%	80 - 120
			Dissolved Magnesium (Mg)	2011/11/24		91	%	80 - 120

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Quality Assurance Report (Continued)

Maxxam Job Number: MB1I0759

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2692765	HRE	Matrix Spike	Dissolved Manganese (Mn)	2011/11/24		94	%	80 - 120
			Dissolved Molybdenum (Mo)	2011/11/24		97	%	80 - 120
			Dissolved Nickel (Ni)	2011/11/24		94	%	80 - 120
			Dissolved Phosphorus (P)	2011/11/24		96	%	80 - 120
			Dissolved Potassium (K)	2011/11/24		93	%	80 - 120
			Dissolved Selenium (Se)	2011/11/24		96	%	80 - 120
			Dissolved Silicon (Si)	2011/11/24		90	%	80 - 120
			Dissolved Silver (Ag)	2011/11/24		92	%	80 - 120
			Dissolved Sodium (Na)	2011/11/24		90	%	80 - 120
			Dissolved Strontium (Sr)	2011/11/24		95	%	80 - 120
			Dissolved Thallium (Tl)	2011/11/24		97	%	80 - 120
			Dissolved Tin (Sn)	2011/11/24		99	%	80 - 120
			Dissolved Titanium (Ti)	2011/11/24		97	%	80 - 120
			Dissolved Uranium (U)	2011/11/24		100	%	80 - 120
			Dissolved Vanadium (V)	2011/11/24		92	%	80 - 120
			Dissolved Zinc (Zn)	2011/11/24		98	%	80 - 120
		Spiked Blank	Dissolved Aluminum (Al)	2011/11/24		92	%	80 - 120
			Dissolved Antimony (Sb)	2011/11/24		95	%	80 - 120
			Dissolved Arsenic (As)	2011/11/24		95	%	80 - 120
			Dissolved Barium (Ba)	2011/11/24		97	%	80 - 120
			Dissolved Beryllium (Be)	2011/11/24		95	%	80 - 120
			Dissolved Bismuth (Bi)	2011/11/24		101	%	80 - 120
			Dissolved Boron (B)	2011/11/24		92	%	80 - 120
			Dissolved Cadmium (Cd)	2011/11/24		96	%	80 - 120
			Dissolved Calcium (Ca)	2011/11/24		96	%	80 - 120
			Dissolved Chromium (Cr)	2011/11/24		95	%	80 - 120
			Dissolved Cobalt (Co)	2011/11/24		94	%	80 - 120
			Dissolved Copper (Cu)	2011/11/24		94	%	80 - 120
			Dissolved Iron (Fe)	2011/11/24		97	%	80 - 120
			Dissolved Lead (Pb)	2011/11/24		100	%	80 - 120
			Dissolved Magnesium (Mg)	2011/11/24		92	%	80 - 120
			Dissolved Manganese (Mn)	2011/11/24		94	%	80 - 120
			Dissolved Molybdenum (Mo)	2011/11/24		100	%	80 - 120
			Dissolved Nickel (Ni)	2011/11/24		95	%	80 - 120
			Dissolved Phosphorus (P)	2011/11/24		90	%	80 - 120
			Dissolved Potassium (K)	2011/11/24		94	%	80 - 120
			Dissolved Selenium (Se)	2011/11/24		96	%	80 - 120
			Dissolved Silicon (Si)	2011/11/24		91	%	80 - 120
			Dissolved Silver (Ag)	2011/11/24		94	%	80 - 120
			Dissolved Sodium (Na)	2011/11/24		92	%	80 - 120
			Dissolved Strontium (Sr)	2011/11/24		95	%	80 - 120
			Dissolved Thallium (Tl)	2011/11/24		99	%	80 - 120
			Dissolved Tin (Sn)	2011/11/24		100	%	80 - 120
			Dissolved Titanium (Ti)	2011/11/24		95	%	80 - 120
			Dissolved Uranium (U)	2011/11/24		102	%	80 - 120
			Dissolved Vanadium (V)	2011/11/24		94	%	80 - 120
			Dissolved Zinc (Zn)	2011/11/24		96	%	80 - 120
		Method Blank	Dissolved Aluminum (Al)	2011/11/24	<5		ug/L	
			Dissolved Antimony (Sb)	2011/11/24	<0.5		ug/L	
			Dissolved Arsenic (As)	2011/11/24	<1		ug/L	
			Dissolved Barium (Ba)	2011/11/24	<2		ug/L	
			Dissolved Beryllium (Be)	2011/11/24	<0.5		ug/L	
			Dissolved Bismuth (Bi)	2011/11/24	<1		ug/L	
			Dissolved Boron (B)	2011/11/24	<10		ug/L	
			Dissolved Cadmium (Cd)	2011/11/24	<0.1		ug/L	

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Quality Assurance Report (Continued)

Maxxam Job Number: MB1I0759

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2692765	HRE	Method Blank	Dissolved Calcium (Ca)	2011/11/24	<200		ug/L	
			Dissolved Chromium (Cr)	2011/11/24	<5		ug/L	
			Dissolved Cobalt (Co)	2011/11/24	<0.5		ug/L	
			Dissolved Copper (Cu)	2011/11/24	<1		ug/L	
			Dissolved Iron (Fe)	2011/11/24	<100		ug/L	
			Dissolved Lead (Pb)	2011/11/24	<0.5		ug/L	
			Dissolved Magnesium (Mg)	2011/11/24	<50		ug/L	
			Dissolved Manganese (Mn)	2011/11/24	<2		ug/L	
			Dissolved Molybdenum (Mo)	2011/11/24	<0.5		ug/L	
			Dissolved Nickel (Ni)	2011/11/24	<1		ug/L	
			Dissolved Phosphorus (P)	2011/11/24	<100		ug/L	
			Dissolved Potassium (K)	2011/11/24	<200		ug/L	
			Dissolved Selenium (Se)	2011/11/24	<2		ug/L	
			Dissolved Silicon (Si)	2011/11/24	<50		ug/L	
			Dissolved Silver (Ag)	2011/11/24	<0.1		ug/L	
			Dissolved Sodium (Na)	2011/11/24	<100		ug/L	
			Dissolved Strontium (Sr)	2011/11/24	<1		ug/L	
			Dissolved Thallium (Tl)	2011/11/24	<0.05		ug/L	
			Dissolved Tin (Sn)	2011/11/24	<1		ug/L	
			Dissolved Titanium (Ti)	2011/11/24	<5		ug/L	
			Dissolved Uranium (U)	2011/11/24	<0.1		ug/L	
			Dissolved Vanadium (V)	2011/11/24	0.9, RDL=0.5		ug/L	
			Dissolved Zinc (Zn)	2011/11/24	<5		ug/L	
		RPD	Dissolved Sodium (Na)	2011/11/24	6.7		%	20
2692898	HRE	Matrix Spike	Total Aluminum (Al)	2011/11/25		93	%	80 - 120
			Total Antimony (Sb)	2011/11/25		108	%	80 - 120
			Total Arsenic (As)	2011/11/25		106	%	80 - 120
			Total Barium (Ba)	2011/11/25		101	%	80 - 120
			Total Beryllium (Be)	2011/11/25		88	%	80 - 120
			Total Bismuth (Bi)	2011/11/25		97	%	80 - 120
			Total Boron (B)	2011/11/25		NC	%	80 - 120
			Total Cadmium (Cd)	2011/11/25		100	%	80 - 120
			Total Calcium (Ca)	2011/11/25		NC	%	80 - 120
			Total Chromium (Cr)	2011/11/25		93	%	80 - 120
			Total Cobalt (Co)	2011/11/25		96	%	80 - 120
			Total Copper (Cu)	2011/11/25		94	%	80 - 120
			Total Iron (Fe)	2011/11/25		97	%	80 - 120
			Total Lead (Pb)	2011/11/25		98	%	80 - 120
			Total Magnesium (Mg)	2011/11/25		NC	%	80 - 120
			Total Manganese (Mn)	2011/11/25		95	%	80 - 120
			Total Molybdenum (Mo)	2011/11/25		111	%	80 - 120
			Total Nickel (Ni)	2011/11/25		94	%	80 - 120
			Total Phosphorus (P)	2011/11/25		101	%	80 - 120
			Total Potassium (K)	2011/11/25		96	%	80 - 120
			Total Silicon (Si)	2011/11/25		96	%	80 - 120
			Total Selenium (Se)	2011/11/25		NC	%	80 - 120
			Total Silver (Ag)	2011/11/25		95	%	80 - 120
			Total Sodium (Na)	2011/11/25		NC	%	80 - 120
			Total Strontium (Sr)	2011/11/25		NC	%	80 - 120
			Total Thallium (Tl)	2011/11/25		97	%	80 - 120
			Total Tin (Sn)	2011/11/25		113	%	80 - 120
			Total Titanium (Ti)	2011/11/25		102	%	80 - 120
			Total Uranium (U)	2011/11/25		102	%	80 - 120
			Total Vanadium (V)	2011/11/25		95	%	80 - 120
			Total Zinc (Zn)	2011/11/25		NC	%	80 - 120

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location: TANSLEY QUARRY

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I0759

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2692898	HRE	Spiked Blank	Total Aluminum (Al)	2011/11/25		101	%	80 - 120
			Total Antimony (Sb)	2011/11/25		103	%	80 - 120
			Total Arsenic (As)	2011/11/25		102	%	80 - 120
			Total Barium (Ba)	2011/11/25		101	%	80 - 120
			Total Beryllium (Be)	2011/11/25		96	%	80 - 120
			Total Bismuth (Bi)	2011/11/25		100	%	80 - 120
			Total Boron (B)	2011/11/25		95	%	80 - 120
			Total Cadmium (Cd)	2011/11/25		99	%	80 - 120
			Total Calcium (Ca)	2011/11/25		105	%	80 - 120
			Total Chromium (Cr)	2011/11/25		99	%	80 - 120
			Total Cobalt (Co)	2011/11/25		100	%	80 - 120
			Total Copper (Cu)	2011/11/25		100	%	80 - 120
			Total Iron (Fe)	2011/11/25		103	%	80 - 120
			Total Lead (Pb)	2011/11/25		101	%	80 - 120
			Total Magnesium (Mg)	2011/11/25		103	%	80 - 120
			Total Manganese (Mn)	2011/11/25		100	%	80 - 120
			Total Molybdenum (Mo)	2011/11/25		104	%	80 - 120
			Total Nickel (Ni)	2011/11/25		99	%	80 - 120
			Total Phosphorus (P)	2011/11/25		107	%	80 - 120
			Total Potassium (K)	2011/11/25		108	%	80 - 120
			Total Silicon (Si)	2011/11/25		103	%	80 - 120
			Total Selenium (Se)	2011/11/25		101	%	80 - 120
			Total Silver (Ag)	2011/11/25		98	%	80 - 120
			Total Sodium (Na)	2011/11/25		104	%	80 - 120
			Total Strontium (Sr)	2011/11/25		101	%	80 - 120
			Total Thallium (Tl)	2011/11/25		102	%	80 - 120
			Total Tin (Sn)	2011/11/25		106	%	80 - 120
			Total Titanium (Ti)	2011/11/25		106	%	80 - 120
			Total Uranium (U)	2011/11/25		100	%	80 - 120
			Total Vanadium (V)	2011/11/25		100	%	80 - 120
			Total Zinc (Zn)	2011/11/25		100	%	80 - 120
		Method Blank	Total Aluminum (Al)	2011/11/25	<5		ug/L	
			Total Antimony (Sb)	2011/11/25	<0.5		ug/L	
			Total Arsenic (As)	2011/11/25	<1		ug/L	
			Total Barium (Ba)	2011/11/25	<2		ug/L	
			Total Beryllium (Be)	2011/11/25	<0.5		ug/L	
			Total Bismuth (Bi)	2011/11/25	<1		ug/L	
			Total Boron (B)	2011/11/25	<10		ug/L	
			Total Cadmium (Cd)	2011/11/25	<0.1		ug/L	
			Total Calcium (Ca)	2011/11/25	<200		ug/L	
			Total Chromium (Cr)	2011/11/25	<5		ug/L	
			Total Cobalt (Co)	2011/11/25	<0.5		ug/L	
			Total Copper (Cu)	2011/11/25	<1		ug/L	
			Total Iron (Fe)	2011/11/25	<100		ug/L	
			Total Lead (Pb)	2011/11/25	<0.5		ug/L	
			Total Magnesium (Mg)	2011/11/25	<50		ug/L	
			Total Manganese (Mn)	2011/11/25	<2		ug/L	
			Total Molybdenum (Mo)	2011/11/25	<0.5		ug/L	
			Total Nickel (Ni)	2011/11/25	<1		ug/L	
			Total Phosphorus (P)	2011/11/25	<100		ug/L	
			Total Potassium (K)	2011/11/25	<200		ug/L	
			Total Silicon (Si)	2011/11/25	<50		ug/L	
			Total Selenium (Se)	2011/11/25	<2		ug/L	
			Total Silver (Ag)	2011/11/25	<0.1		ug/L	
			Total Sodium (Na)	2011/11/25	<100		ug/L	

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location: TANSLEY QUARRY

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I0759

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2692898	HRE	Method Blank	Total Strontium (Sr)	2011/11/25	<1		ug/L	
			Total Thallium (Tl)	2011/11/25	<0.05		ug/L	
			Total Tin (Sn)	2011/11/25	<1		ug/L	
			Total Titanium (Ti)	2011/11/25	<5		ug/L	
			Total Uranium (U)	2011/11/25	<0.1		ug/L	
			Total Vanadium (V)	2011/11/25	<0.5		ug/L	
			Total Zinc (Zn)	2011/11/25	<5		ug/L	
		RPD	Total Aluminum (Al)	2011/11/25	NC		%	20
			Total Antimony (Sb)	2011/11/25	0.8		%	20
			Total Arsenic (As)	2011/11/25	NC		%	20
			Total Barium (Ba)	2011/11/25	2.9		%	20
			Total Beryllium (Be)	2011/11/25	NC		%	20
			Total Bismuth (Bi)	2011/11/25	NC		%	20
			Total Boron (B)	2011/11/25	0.9		%	20
			Total Cadmium (Cd)	2011/11/25	1.1		%	20
			Total Calcium (Ca)	2011/11/25	2.4		%	20
			Total Chromium (Cr)	2011/11/25	NC		%	20
			Total Cobalt (Co)	2011/11/25	NC		%	20
			Total Copper (Cu)	2011/11/25	2.5		%	20
			Total Iron (Fe)	2011/11/25	NC		%	20
			Total Lead (Pb)	2011/11/25	3.5		%	20
			Total Magnesium (Mg)	2011/11/25	0.6		%	20
			Total Manganese (Mn)	2011/11/25	0.05		%	20
			Total Molybdenum (Mo)	2011/11/25	4.4		%	20
			Total Nickel (Ni)	2011/11/25	NC		%	20
			Total Potassium (K)	2011/11/25	0.7		%	20
			Total Silicon (Si)	2011/11/25	NC		%	20
			Total Selenium (Se)	2011/11/25	1.4		%	20
			Total Silver (Ag)	2011/11/25	3.0		%	20
			Total Sodium (Na)	2011/11/25	1.9		%	20
			Total Strontium (Sr)	2011/11/25	0.7		%	20
			Total Thallium (Tl)	2011/11/25	4.2		%	20
			Total Tin (Sn)	2011/11/25	NC		%	20
			Total Titanium (Ti)	2011/11/25	NC		%	20
			Total Uranium (U)	2011/11/25	NC		%	20
			Total Vanadium (V)	2011/11/25	NC		%	20
			Total Zinc (Zn)	2011/11/25	2.0		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.
(2) Metal analysis:The recovery in the matrix spike was not calculated (NC). Because of the high concentration of this analyte in the parent sample, the relative difference between the spiked and unspiked concentrations is not sufficiently significant to permit a reliable recovery calculation.

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Validation Signature Page

Maxxam Job #: B1I0759

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

CRISTINA CARRIERE, Scientific Services

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

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Your Project #: 021-1228
Site Location: TANSLEY QUARRY
Your C.O.C. #: 31614702, 316147-02-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2011/11/24

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1H9938
Received: 2011/11/15, 16:43

Sample Matrix: Water
Samples Received: 10

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Alkalinity	10	N/A	2011/11/18	CAM SOP-00448	SM 2320B
Anions	10	N/A	2011/11/22	CAM SOP-00435	SM 4110B
Free (WAD) Cyanide	10	N/A	2011/11/18	CAM SOP-00457	SM4500-CN-I modified
Fluoride	10	2011/11/17	2011/11/18	CAM SOP-00448	APHA 4500FC
Hardness (calculated as CaCO3)	2	N/A	2011/11/21	CAM SOP 00102	SM 2340 B
Hardness (calculated as CaCO3)	2	N/A	2011/11/22	CAM SOP 00102	SM 2340 B
Hardness (calculated as CaCO3)	6	N/A	2011/11/23	CAM SOP 00102	SM 2340 B
Mercury in Water by CVAA	10	2011/11/18	2011/11/18	CAM SOP-00453	EPA 7470
Lab Filtered Metals by ICPMS	2	2011/11/18	2011/11/18	CAM SOP-00447	EPA 6020
Dissolved Metals by ICPMS	2	N/A	2011/11/22	CAM SOP-00447	EPA 6020
Dissolved Metals by ICPMS	6	N/A	2011/11/23	CAM SOP-00447	EPA 6020
Total Metals Analysis by ICPMS	5	N/A	2011/11/18	CAM SOP-00447	EPA 6020
Total Metals Analysis by ICPMS	5	N/A	2011/11/21	CAM SOP-00447	EPA 6020
Ammonia-N	10	N/A	2011/11/21	CAM SOP-00441	US GS I-2522-90
Nitrate (NO3) and Nitrite (NO2) in Water	10	N/A	2011/11/22	CAM SOP-00440	SM 4500 NO3I/NO2B
pH	10	N/A	2011/11/18	CAM SOP-00448	SM 4500H
Phenols (4AAP)	8	N/A	2011/11/18	CAM SOP-00444	MOE ROPHEN-E3179
Phenols (4AAP)	2	N/A	2011/11/21	CAM SOP-00444	MOE ROPHEN-E3179
Orthophosphate	1	N/A	2011/11/18	CAM SOP-00461	SM 4500 P-F
Orthophosphate	9	N/A	2011/11/22	CAM SOP-00461	SM 4500 P-F
Sulphide	10	N/A	2011/11/21	CAM SOP-00455	SM 4500-S G
Total Phosphorus (Colourimetric)	10	2011/11/18	2011/11/21	CAM SOP-00407	SM 4500 P,B,F
Total Suspended Solids	10	N/A	2011/11/18	CAM SOP-00428	SM 2540D
Turbidity	1	N/A	2011/11/19	CAM SOP-00417	APHA 2130B
Turbidity	9	N/A	2011/11/20	CAM SOP-00417	APHA 2130B

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

Your Project #: 021-1228
Site Location: TANSLEY QUARRY
Your C.O.C. #: 31614702, 316147-02-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2011/11/24

CERTIFICATE OF ANALYSIS

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons. The extraction date for samples field preserved with methanol for F1 and Volatile Organic Compounds is considered to be the date sampled.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by Ontario Regulation 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

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

MATHURA THIRUKKUMARAN, CS Rep
Email: MThirukkumaran@maxxam.ca
Phone# (905) 817-5700

==========

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Total cover pages: 2

Maxxam Job #: B1H9938
Report Date: 2011/11/24

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

RESULTS OF ANALYSES OF WATER

Maxxam ID		LQ2312			LQ2313			LQ2314		
Sampling Date		2011/11/15			2011/11/15			2011/11/15		
COC Number		316147-02-01			316147-02-01			316147-02-01		
	Units	**MW-07O**	**RDL**	**QC Batch**	**MW-03O**	**RDL**	**QC Batch**	**MW-08I**	**RDL**	**QC Batch**
Calculated Parameters										
Hardness (CaCO3)	mg/L	630	1	2685279	870	1	2685279	1700	1	2685279
Inorganics										
Total Ammonia-N	mg/L	0.32	0.05	2687093	0.89	0.05	2687093	6.1	0.3	2687093
Fluoride (F-)	mg/L	0.3	0.1	2686201	0.2	0.1	2686201	0.4	0.1	2686201
Free Cyanide	mg/L	<0.002	0.002	2686319	<0.002	0.002	2686319	<0.002	0.002	2686319
Orthophosphate (P)	mg/L	0.01	0.01	2687204	<0.01	0.01	2687204	<0.01	0.01	2687204
pH	pH	7.70		2686202	7.78		2686202	7.64		2686202
Phenols-4AAP	mg/L	<0.001	0.001	2686069	<0.001	0.001	2686069	0.005	0.001	2686856
Total Phosphorus	mg/L	13	0.4	2687050	3.4	0.1	2687050	0.05	0.02	2687050
Total Suspended Solids	mg/L	10000	100	2686425	5800	50	2686425	32	10	2686238
Sulphide	mg/L	0.02	0.02	2687266	<0.02	0.02	2687266	<0.02	0.02	2687266
Turbidity	NTU	14000	10	2685994	600	0.8	2685994	30	0.2	2685994
Alkalinity (Total as CaCO3)	mg/L	569	1	2686200	175	1	2686200	163	1	2686200
Nitrite (N)	mg/L	0.01	0.01	2686135	0.22	0.01	2686479	0.03	0.01	2686479
Dissolved Chloride (Cl)	mg/L	18	1	2686583	78	1	2686583	1710	20	2686583
Nitrate (N)	mg/L	<0.1	0.1	2686135	0.6	0.1	2686479	<0.1	0.1	2686479
Nitrate + Nitrite	mg/L	<0.1	0.1	2686135	0.8	0.1	2686479	<0.1	0.1	2686479
Dissolved Bromide (Br-)	mg/L	<1	1	2686583	<1	1	2686583	23	1	2686583
Dissolved Sulphate (SO4)	mg/L	182	1	2686583	900	5	2686583	965	20	2686583

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1H9938
Report Date: 2011/11/24

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

RESULTS OF ANALYSES OF WATER

Maxxam ID		LQ2315		LQ2316			LQ2317		
Sampling Date		2011/11/15		2011/11/15			2011/11/15		
COC Number		316147-02-01		316147-02-01			316147-02-01		
	Units	**MW-08D**	**RDL**	**MW-08O**	**RDL**	**QC Batch**	**MW-02I**	**RDL**	**QC Batch**
Calculated Parameters									
Hardness (CaCO3)	mg/L	27000	1	880	1	2685279	980	1	2685279
Inorganics									
Total Ammonia-N	mg/L	35	0.5	0.09	0.05	2687093	1.5	0.05	2687093
Fluoride (F-)	mg/L	<0.1	0.1	0.3	0.1	2686201	0.3	0.1	2686201
Free Cyanide	mg/L	<0.002	0.002	<0.002	0.002	2686319	<0.002	0.002	2686319
Orthophosphate (P)	mg/L	<0.01	0.01	<0.01	0.01	2687204	<0.01	0.01	2686148
pH	pH	6.75		7.65		2686202	7.73		2686202
Phenols-4AAP	mg/L	0.26	0.01	<0.001	0.001	2686856	<0.001	0.001	2686856
Total Phosphorus	mg/L	5.1	0.2	4.0	0.2	2687050	0.6	0.1	2687050
Total Suspended Solids	mg/L	9100	100	5700	100	2686425	920	10	2686238
Sulphide	mg/L	<0.02	0.02	<0.02	0.02	2687266	<0.02	0.02	2687266
Turbidity	NTU	1900	2	710	1	2685994	480	0.8	2685994
Alkalinity (Total as CaCO3)	mg/L	67	1	553	1	2686200	140	1	2686200
Nitrite (N)	mg/L	<0.1	0.1	<0.01	0.01	2686479	0.03	0.01	2686135
Dissolved Chloride (Cl)	mg/L	41500	500	10	1	2686583	106	10	2686583
Nitrate (N)	mg/L	<0.1	0.1	0.3	0.1	2686479	<0.1	0.1	2686135
Nitrate + Nitrite	mg/L	<0.1	0.1	0.3	0.1	2686479	<0.1	0.1	2686135
Dissolved Bromide (Br-)	mg/L	523	100	<1	1	2686583	<10	10	2686583
Dissolved Sulphate (SO4)	mg/L	1130	100	423	1	2686583	1140	10	2686583

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1H9938
Report Date: 2011/11/24

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

RESULTS OF ANALYSES OF WATER

Maxxam ID		LQ2318			LQ2319		LQ2320		
Sampling Date		2011/11/15			2011/11/15		2011/11/15		
COC Number		316147-02-01			316147-02-01		316147-02-01		
	Units	**MW-07D**	**RDL**	**QC Batch**	**MW-02D**	**RDL**	**MW-02O**	**RDL**	**QC Batch**
Calculated Parameters									
Hardness (CaCO3)	mg/L	10000	1	2685279	6500	1	2100	1	2685279
Inorganics									
Total Ammonia-N	mg/L	19	0.5	2687093	16	0.5	0.13	0.05	2687093
Fluoride (F-)	mg/L	0.2	0.1	2686201	<1 (1)	1	0.3	0.1	2686201
Free Cyanide	mg/L	<0.002	0.002	2686319	<0.002	0.002	<0.002	0.002	2686319
Orthophosphate (P)	mg/L	<0.01	0.01	2687204	<0.01	0.01	<0.01	0.01	2687204
pH	pH	7.02		2686202	7.16		7.52		2686202
Phenols-4AAP	mg/L	0.03	0.01	2686856	0.001	0.001	<0.001	0.001	2686856
Total Phosphorus	mg/L	0.19	0.04	2687050	0.29	0.04	6.2	0.2	2687050
Total Suspended Solids	mg/L	310	10	2686238	540	20	7600	100	2686425
Sulphide	mg/L	<0.02	0.02	2687266	<0.02	0.02	<0.02	0.02	2687266
Turbidity	NTU	330	0.4	2685994	290	0.4	460	0.8	2685994
Alkalinity (Total as CaCO3)	mg/L	33	1	2686200	35	1	707	1	2686200
Nitrite (N)	mg/L	<0.1	0.1	2686479	<0.1	0.1	<0.01	0.01	2686479
Dissolved Chloride (Cl)	mg/L	18100	200	2686583	12500	100	11	5	2686583
Nitrate (N)	mg/L	<0.1	0.1	2686479	<0.1	0.1	<0.1	0.1	2686479
Nitrate + Nitrite	mg/L	<0.1	0.1	2686479	<0.1	0.1	<0.1	0.1	2686479
Dissolved Bromide (Br-)	mg/L	224	10	2686583	154	10	<1	1	2686583
Dissolved Sulphate (SO4)	mg/L	1560	10	2686583	2030	10	1320	5	2686583

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

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Maxxam Job #: B1H9938
Report Date: 2011/11/24

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

RESULTS OF ANALYSES OF WATER

Maxxam ID		LQ2321		
Sampling Date		2011/11/15		
COC Number		316147-02-01		
	Units	**DUP-1**	**RDL**	**QC Batch**
Calculated Parameters				
Hardness (CaCO3)	mg/L	1700	1	2685279
Inorganics				
Total Ammonia-N	mg/L	5.8	0.3	2687093
Fluoride (F-)	mg/L	0.5	0.1	2686201
Free Cyanide	mg/L	<0.002	0.002	2686319
Orthophosphate (P)	mg/L	0.01	0.01	2687204
pH	pH	7.58		2686202
Phenols-4AAP	mg/L	0.004	0.001	2686856
Total Phosphorus	mg/L	<0.02	0.02	2687050
Total Suspended Solids	mg/L	29	10	2686238
Sulphide	mg/L	<0.02	0.02	2687266
Turbidity	NTU	21	0.2	2685994
Alkalinity (Total as CaCO3)	mg/L	168	1	2686200
Nitrite (N)	mg/L	0.04	0.01	2686479
Dissolved Chloride (Cl)	mg/L	1730	20	2686583
Nitrate (N)	mg/L	<0.1	0.1	2686479
Nitrate + Nitrite	mg/L	<0.1	0.1	2686479
Dissolved Bromide (Br-)	mg/L	21	1	2686583
Dissolved Sulphate (SO4)	mg/L	976	20	2686583

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1H9938
Report Date: 2011/11/24

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LQ2312			LQ2313			LQ2314		
Sampling Date		2011/11/15			2011/11/15			2011/11/15		
COC Number		316147-02-01			316147-02-01			316147-02-01		
	Units	**MW-07O**	**RDL**	**QC Batch**	**MW-03O**	**RDL**	**QC Batch**	**MW-08I**	**RDL**	**QC Batch**
Metals										
Mercury (Hg)	mg/L	<0.0001	0.0001	2686203	<0.0001	0.0001	2686203	<0.0001	0.0001	2686203
Dissolved Rubidium (Rb)	ug/L		0.2	2686777	3.5	0.2	2686777		0.2	2686777
Dissolved Aluminum (Al)	ug/L	49	5	2687542	6	5	2686777	80	50	2687542
Total Aluminum (Al)	ug/L	170000	50	2686697	5600	5	2686697	610	30	2686697
Dissolved Antimony (Sb)	ug/L	0.5	0.5	2687542	<0.5	0.5	2686777	<5	5	2687542
Total Antimony (Sb)	ug/L	<5	5	2686697	<0.5	0.5	2686697	4	3	2686697
Dissolved Arsenic (As)	ug/L	<1	1	2687542	2	1	2686777	<10	10	2687542
Total Arsenic (As)	ug/L	81	10	2686697	5	1	2686697	<5	5	2686697
Dissolved Barium (Ba)	ug/L	44	2	2687542	8	2	2686777	<20	20	2687542
Total Barium (Ba)	ug/L	1900	20	2686697	120	2	2686697	20	10	2686697
Dissolved Beryllium (Be)	ug/L	<0.5	0.5	2687542	<0.5	0.5	2686777	<5	5	2687542
Total Beryllium (Be)	ug/L	13	5	2686697	<0.5	0.5	2686697	<3	3	2686697
Dissolved Bismuth (Bi)	ug/L	<1	1	2687542	<1	1	2686777	<10	10	2687542
Total Bismuth (Bi)	ug/L	<10	10	2686697	<1	1	2686697	7	5	2686697
Dissolved Boron (B)	ug/L	4500	10	2687542	980	10	2686777	6100	100	2687542
Total Boron (B)	ug/L	5600	100	2686697	1800	10	2686697	5700	50	2686697
Dissolved Cadmium (Cd)	ug/L	<0.1	0.1	2687542	<0.1	0.1	2686777	<1	1	2687542
Total Cadmium (Cd)	ug/L	2	1	2686697	<0.1	0.1	2686697	<0.5	0.5	2686697
Dissolved Calcium (Ca)	ug/L	65000	200	2687542	140000	1000	2686777	450000	2000	2687542
Total Calcium (Ca)	ug/L	1300000	2000	2686697	240000	200	2686697	580000	1000	2686697
Dissolved Chromium (Cr)	ug/L	<5	5	2687542	<5	5	2686777	<50	50	2687542
Total Chromium (Cr)	ug/L	280	50	2686697	11	5	2686697	<30	30	2686697
Dissolved Cobalt (Co)	ug/L	8.5	0.5	2687542	<0.5	0.5	2686777	<5	5	2687542
Total Cobalt (Co)	ug/L	160	5	2686697	5.7	0.5	2686697	<3	3	2686697
Dissolved Copper (Cu)	ug/L	<1	1	2687542	<1	1	2686777	<10	10	2687542
Total Copper (Cu)	ug/L	350	10	2686697	10	1	2686697	<5	5	2686697
Dissolved Iron (Fe)	ug/L	120	100	2687542	<100	100	2686777	<1000	1000	2687542
Total Iron (Fe)	ug/L	330000	1000	2686697	11000	100	2686697	1800	500	2686697
Dissolved Lead (Pb)	ug/L	<0.5	0.5	2687542	<0.5	0.5	2686777	<5	5	2687542
Total Lead (Pb)	ug/L	160	5	2686697	6.4	0.5	2686697	<3	3	2686697
Dissolved Magnesium (Mg)	ug/L	110000	50	2687542	120000	50	2686777	140000	500	2687542
Total Magnesium (Mg)	ug/L	290000	500	2686697	120000	50	2686697	160000	300	2686697

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B1H9938
Report Date: 2011/11/24

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LQ2312			LQ2313			LQ2314		
Sampling Date		2011/11/15			2011/11/15			2011/11/15		
COC Number		316147-02-01			316147-02-01			316147-02-01		
	Units	**MW-07O**	**RDL**	**QC Batch**	**MW-03O**	**RDL**	**QC Batch**	**MW-08I**	**RDL**	**QC Batch**
Dissolved Manganese (Mn)	ug/L	160	2	2687542	100	2	2686777	190	20	2687542
Total Manganese (Mn)	ug/L	10000	20	2686697	510	2	2686697	240	10	2686697
Dissolved Molybdenum (Mo)	ug/L	6.6	0.5	2687542	6.0	0.5	2686777	6	5	2687542
Total Molybdenum (Mo)	ug/L	18	5	2686697	9.5	0.5	2686697	7	3	2686697
Dissolved Nickel (Ni)	ug/L	1	1	2687542	<1	1	2686777	<10	10	2687542
Total Nickel (Ni)	ug/L	360	10	2686697	11	1	2686697	<5	5	2686697
Dissolved Phosphorus (P)	ug/L	<100	100	2687542	<100	100	2686777	<1000	1000	2687542
Total Phosphorus (P)	ug/L	9900	1000	2686697	350	100	2686697	<500	500	2686697
Dissolved Potassium (K)	ug/L	6500	200	2687542	9400	200	2686777	42000	2000	2687542
Total Potassium (K)	ug/L	69000	2000	2686697	19000	200	2686697	49000	1000	2686697
Dissolved Selenium (Se)	ug/L	<2	2	2687542	<2	2	2686777	<20	20	2687542
Dissolved Silicon (Si)	ug/L	8700	50	2687542	5500	50	2686777	4000	500	2687542
Total Silicon (Si)	ug/L	240000	500	2686697	13000	50	2686697	4700	300	2686697
Total Selenium (Se)	ug/L	<20	20	2686697	<2	2	2686697	<10	10	2686697
Dissolved Silver (Ag)	ug/L	<0.1	0.1	2687542	<0.1	0.1	2686777	<1	1	2687542
Total Silver (Ag)	ug/L	<1	1	2686697	<0.1	0.1	2686697	<0.5	0.5	2686697
Dissolved Sodium (Na)	ug/L	83000	100	2687542	130000	100	2686777	1100000	1000	2687542
Total Sodium (Na)	ug/L	99000	1000	2686697	170000	100	2686697	1300000	500	2686697
Dissolved Strontium (Sr)	ug/L	2900	1	2687542	10000	1	2686777	12000	10	2687542
Total Strontium (Sr)	ug/L	6600	10	2686697	12000	1	2686697	16000	5	2686697
Dissolved Thallium (Tl)	ug/L	<0.05	0.05	2687542	<0.05	0.05	2686777	<0.5	0.5	2687542
Total Thallium (Tl)	ug/L	2.6	0.5	2686697	0.07	0.05	2686697	<0.3	0.3	2686697
Dissolved Tin (Sn)	ug/L	<1	1	2687542	<1	1	2686777	<10	10	2687542
Total Tin (Sn)	ug/L	<10	10	2686697	<1	1	2686697	<5	5	2686697
Dissolved Titanium (Ti)	ug/L	<5	5	2687542	<5	5	2686777	<50	50	2687542
Total Titanium (Ti)	ug/L	4000	50	2686697	140	5	2686697	<30	30	2686697
Dissolved Uranium (U)	ug/L	6.5	0.1	2687542	0.5	0.1	2686777	<1	1	2687542
Total Uranium (U)	ug/L	29	1	2686697	1.5	0.1	2686697	1.8	0.5	2686697
Dissolved Vanadium (V)	ug/L	<0.5	0.5	2687542	0.6	0.5	2686777	<5	5	2687542
Total Vanadium (V)	ug/L	350	5	2686697	12	0.5	2686697	6	3	2686697
Dissolved Zinc (Zn)	ug/L	<5	5	2687542	<25 (1)	25	2686777	<50	50	2687542
Total Zinc (Zn)	ug/L	910	50	2686697	41	5	2686697	<30	30	2686697

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Detection Limit was raised due to matrix interferences.

Maxxam Job #: B1H9938
Report Date: 2011/11/24

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
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ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LQ2315			LQ2316			LQ2317		
Sampling Date		2011/11/15			2011/11/15			2011/11/15		
COC Number		316147-02-01			316147-02-01			316147-02-01		
	Units	**MW-08D**	**RDL**	**QC Batch**	**MW-08O**	**RDL**	**QC Batch**	**MW-02I**	**RDL**	**QC Batch**
Metals										
Mercury (Hg)	mg/L	<0.0001	0.0001	2686203	<0.0001	0.0001	2686203	<0.0001	0.0001	2686203
Dissolved Rubidium (Rb)	ug/L		0.2	2686777		0.2	2686777	9.8	0.2	2686777
Dissolved Aluminum (Al)	ug/L	470	300	2687542	28	5	2687542	6	5	2686777
Total Aluminum (Al)	ug/L	97000	300	2686697	51000	30	2686336	5600	5	2686697
Dissolved Antimony (Sb)	ug/L	<30	30	2687542	0.5	0.5	2687542	<0.5	0.5	2686777
Total Antimony (Sb)	ug/L	<30	30	2686697	<0.5	0.5	2686336	<0.5	0.5	2686697
Dissolved Arsenic (As)	ug/L	<50	50	2687542	1	1	2687542	1	1	2686777
Total Arsenic (As)	ug/L	93	50	2686697	30	1	2686336	6	1	2686697
Dissolved Barium (Ba)	ug/L	120	100	2687542	24	2	2687542	7	2	2686777
Total Barium (Ba)	ug/L	1100	100	2686697	600	2	2686336	120	2	2686697
Dissolved Beryllium (Be)	ug/L	<30	30	2687542	<0.5	0.5	2687542	<0.5	0.5	2686777
Total Beryllium (Be)	ug/L	<30	30	2686697	3.1	0.5	2686336	<0.5	0.5	2686697
Dissolved Bismuth (Bi)	ug/L	<50	50	2687542	<1	1	2687542	<1	1	2686777
Total Bismuth (Bi)	ug/L	<50	50	2686697	<1	1	2686336	<1	1	2686697
Dissolved Boron (B)	ug/L	5300	500	2687542	1200	10	2687542	1800	10	2686777
Total Boron (B)	ug/L	4900	500	2686697	1100	10	2686336	1800	10	2686697
Dissolved Cadmium (Cd)	ug/L	<5	5	2687542	<0.1	0.1	2687542	<0.1	0.1	2686777
Total Cadmium (Cd)	ug/L	<5	5	2686697	1.0	0.1	2686336	0.1	0.1	2686697
Dissolved Calcium (Ca)	ug/L	7900000	10000	2687542	93000	400	2687542	190000	1000	2686777
Total Calcium (Ca)	ug/L	8600000	10000	2686697	520000	200	2686336	240000	200	2686697
Dissolved Chromium (Cr)	ug/L	<300	300	2687542	<5	5	2687542	<5	5	2686777
Total Chromium (Cr)	ug/L	<300	300	2686697	95	5	2686336	12	5	2686697
Dissolved Cobalt (Co)	ug/L	<30	30	2687542	6.9	0.5	2687542	<0.5	0.5	2686777
Total Cobalt (Co)	ug/L	100	30	2686697	56	0.5	2686336	5.9	0.5	2686697
Dissolved Copper (Cu)	ug/L	<100	100	2687542	<1	1	2687542	<1	1	2686777
Total Copper (Cu)	ug/L	130	50	2686697	93	1	2686336	12	1	2686697
Dissolved Iron (Fe)	ug/L	18000	5000	2687542	210	100	2687542	<100	100	2686777
Total Iron (Fe)	ug/L	200000	5000	2686697	110000	500	2686336	11000	100	2686697
Dissolved Lead (Pb)	ug/L	<30	30	2687542	<0.5	0.5	2687542	<0.5	0.5	2686777
Total Lead (Pb)	ug/L	49	30	2686697	58	0.5	2686336	6.4	0.5	2686697
Dissolved Magnesium (Mg)	ug/L	1800000	3000	2687542	160000	50	2687542	120000	50	2686777
Total Magnesium (Mg)	ug/L	1800000	3000	2686697	200000	50	2686336	120000	50	2686697

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B1H9938
Report Date: 2011/11/24

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LQ2315			LQ2316			LQ2317		
Sampling Date		2011/11/15			2011/11/15			2011/11/15		
COC Number		316147-02-01			316147-02-01			316147-02-01		
	Units	**MW-08D**	**RDL**	**QC Batch**	**MW-08O**	**RDL**	**QC Batch**	**MW-02I**	**RDL**	**QC Batch**
Dissolved Manganese (Mn)	ug/L	4200	100	2687542	110	2	2687542	130	2	2686777
Total Manganese (Mn)	ug/L	9000	100	2686697	4100	2	2686336	510	2	2686697
Dissolved Molybdenum (Mo)	ug/L	<30	30	2687542	4.4	0.5	2687542	8.5	0.5	2686777
Total Molybdenum (Mo)	ug/L	<30	30	2686697	8.7	0.5	2686336	9.6	0.5	2686697
Dissolved Nickel (Ni)	ug/L	<50	50	2687542	2	1	2687542	<1	1	2686777
Total Nickel (Ni)	ug/L	190	50	2686697	120	1	2686336	12	1	2686697
Dissolved Phosphorus (P)	ug/L	<5000	5000	2687542	<100	100	2687542	<100	100	2686777
Total Phosphorus (P)	ug/L	<5000	5000	2686697	3900	100	2686336	360	100	2686697
Dissolved Potassium (K)	ug/L	270000	10000	2687542	13000	200	2687542	17000	200	2686777
Total Potassium (K)	ug/L	300000	10000	2686697	22000	200	2686336	19000	200	2686697
Dissolved Selenium (Se)	ug/L	<200	200	2687542	3	2	2687542	<2	2	2686777
Dissolved Silicon (Si)	ug/L	3600	3000	2687542	7000	50	2687542	4700	50	2686777
Total Silicon (Si)	ug/L	130000	3000	2686697	61000	300	2686336	13000	50	2686697
Total Selenium (Se)	ug/L	<100	100	2686697	7	2	2686336	<2	2	2686697
Dissolved Silver (Ag)	ug/L	<5	5	2687542	<0.1	0.1	2687542	<0.1	0.1	2686777
Total Silver (Ag)	ug/L	<5	5	2686697	0.4	0.1	2686336	0.1	0.1	2686697
Dissolved Sodium (Na)	ug/L	16000000	5000	2687542	78000	100	2687542	210000	100	2686777
Total Sodium (Na)	ug/L	15000000	5000	2686697	76000	100	2686336	170000	100	2686697
Dissolved Strontium (Sr)	ug/L	170000	50	2687542	8100	1	2687542	11000	1	2686777
Total Strontium (Sr)	ug/L	170000	50	2686697	8300	1	2686336	12000	1	2686697
Dissolved Thallium (Tl)	ug/L	<3	3	2687542	<0.05	0.05	2687542	<0.05	0.05	2686777
Total Thallium (Tl)	ug/L	<3	3	2686697	0.46	0.05	2686336	0.13	0.05	2686697
Dissolved Tin (Sn)	ug/L	<50	50	2687542	<1	1	2687542	<1	1	2686777
Total Tin (Sn)	ug/L	<50	50	2686697	<1	1	2686336	<1	1	2686697
Dissolved Titanium (Ti)	ug/L	<300	300	2687542	<5	5	2687542	<5	5	2686777
Total Titanium (Ti)	ug/L	1800	300	2686697	810	30	2686336	140	5	2686697
Dissolved Uranium (U)	ug/L	<5	5	2687542	11	0.1	2687542	0.3	0.1	2686777
Total Uranium (U)	ug/L	7	5	2686697	15	0.1	2686336	1.5	0.1	2686697
Dissolved Vanadium (V)	ug/L	<100	100	2687542	0.7	0.5	2687542	<0.5	0.5	2686777
Total Vanadium (V)	ug/L	230	30	2686697	110	0.5	2686336	12	0.5	2686697
Dissolved Zinc (Zn)	ug/L	<300	300	2687542	<5	5	2687542	<25 (1)	25	2686777
Total Zinc (Zn)	ug/L	600	300	2686697	280	5	2686336	39	5	2686697

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Detection Limit was raised due to matrix interferences.

Maxxam Job #: B1H9938
Report Date: 2011/11/24

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LQ2318	LQ2319			LQ2320		
Sampling Date		2011/11/15	2011/11/15			2011/11/15		
COC Number		316147-02-01	316147-02-01			316147-02-01		
	Units	**MW-07D**	**MW-02D**	**RDL**	**QC Batch**	**MW-02O**	**RDL**	**QC Batch**
Metals								
Mercury (Hg)	mg/L	<0.0001	<0.0001	0.0001	2686203	<0.0001	0.0001	2686203
Dissolved Aluminum (Al)	ug/L	<300	<300	300	2687596	33	5	2687542
Total Aluminum (Al)	ug/L	2400	3300	100	2686336	43000	30	2686336
Dissolved Antimony (Sb)	ug/L	<30	<30	30	2687596	<0.5	0.5	2687542
Total Antimony (Sb)	ug/L	<10	<10	10	2686336	<0.5	0.5	2686336
Dissolved Arsenic (As)	ug/L	<50	<50	50	2687596	2	1	2687542
Total Arsenic (As)	ug/L	<20	<20	20	2686336	28	1	2686336
Dissolved Barium (Ba)	ug/L	<100	<100	100	2687596	15	2	2687542
Total Barium (Ba)	ug/L	80	88	40	2686336	570	2	2686336
Dissolved Beryllium (Be)	ug/L	<30	<30	30	2687596	<0.5	0.5	2687542
Total Beryllium (Be)	ug/L	<10	<10	10	2686336	2.3	0.5	2686336
Dissolved Bismuth (Bi)	ug/L	<50	<50	50	2687596	<1	1	2687542
Total Bismuth (Bi)	ug/L	<20	<20	20	2686336	<1	1	2686336
Dissolved Boron (B)	ug/L	6100	5500	500	2687596	340	10	2687542
Total Boron (B)	ug/L	6100	5800	200	2686336	320	10	2686336
Dissolved Cadmium (Cd)	ug/L	<5	<5	5	2687596	<0.1	0.1	2687542
Total Cadmium (Cd)	ug/L	<2	<2	2	2686336	0.9	0.1	2686336
Dissolved Calcium (Ca)	ug/L	2900000	1900000	10000	2687596	210000	200	2687542
Total Calcium (Ca)	ug/L	3400000	2200000	4000	2686336	830000	1000	2686336
Dissolved Chromium (Cr)	ug/L	<300	<300	300	2687596	<5	5	2687542
Total Chromium (Cr)	ug/L	<100	<100	100	2686336	77	5	2686336
Dissolved Cobalt (Co)	ug/L	<30	<30	30	2687596	6.8	0.5	2687542
Total Cobalt (Co)	ug/L	<10	<10	10	2686336	44	0.5	2686336
Dissolved Copper (Cu)	ug/L	<50	<50	50	2687596	<1	1	2687542
Total Copper (Cu)	ug/L	<20	25	20	2686336	91	1	2686336
Dissolved Iron (Fe)	ug/L	<5000	<5000	5000	2687596	1600	100	2687542
Total Iron (Fe)	ug/L	6500	11000	2000	2686336	100000	100	2686336
Dissolved Lead (Pb)	ug/L	<30	<30	30	2687596	<0.5	0.5	2687542
Total Lead (Pb)	ug/L	<10	<10	10	2686336	44	0.5	2686336
Dissolved Magnesium (Mg)	ug/L	750000	450000	3000	2687596	370000	50	2687542
Total Magnesium (Mg)	ug/L	840000	550000	1000	2686336	370000	50	2686336
Dissolved Manganese (Mn)	ug/L	1400	980	100	2687596	460	2	2687542

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
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ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LQ2318	LQ2319			LQ2320		
Sampling Date		2011/11/15	2011/11/15			2011/11/15		
COC Number		316147-02-01	316147-02-01			316147-02-01		
	Units	**MW-07D**	**MW-02D**	**RDL**	**QC Batch**	**MW-02O**	**RDL**	**QC Batch**
Total Manganese (Mn)	ug/L	1700	1400	40	2686336	4200	2	2686336
Dissolved Molybdenum (Mo)	ug/L	<30	<30	30	2687596	3.7	0.5	2687542
Total Molybdenum (Mo)	ug/L	<10	<10	10	2686336	6.7	0.5	2686336
Dissolved Nickel (Ni)	ug/L	<50	<50	50	2687596	2	1	2687542
Total Nickel (Ni)	ug/L	<20	<20	20	2686336	93	1	2686336
Dissolved Phosphorus (P)	ug/L	<5000	<5000	5000	2687596	<100	100	2687542
Total Phosphorus (P)	ug/L	<2000	<2000	2000	2686336	4400	100	2686336
Dissolved Potassium (K)	ug/L	140000	110000	10000	2687596	9500	200	2687542
Total Potassium (K)	ug/L	160000	130000	4000	2686336	17000	200	2686336
Dissolved Selenium (Se)	ug/L	<100	<100	100	2687596	<2	2	2687542
Dissolved Silicon (Si)	ug/L	<3000	<3000	3000	2687596	10000	50	2687542
Total Silicon (Si)	ug/L	7300	6900	1000	2686336	53000	50	2686336
Total Selenium (Se)	ug/L	<40	<40	40	2686336	4	2	2686336
Dissolved Silver (Ag)	ug/L	<5	<5	5	2687596	<0.1	0.1	2687542
Total Silver (Ag)	ug/L	<2	<2	2	2686336	0.3	0.1	2686336
Dissolved Sodium (Na)	ug/L	6800000	5800000	5000	2687596	75000	100	2687542
Total Sodium (Na)	ug/L	7800000	7000000	2000	2686336	65000	100	2686336
Dissolved Strontium (Sr)	ug/L	64000	39000	50	2687596	4800	1	2687542
Total Strontium (Sr)	ug/L	68000	45000	20	2686336	5500	1	2686336
Dissolved Thallium (Tl)	ug/L	<3	<3	3	2687596	<0.05	0.05	2687542
Total Thallium (Tl)	ug/L	<1	<1	1	2686336	0.57	0.05	2686336
Dissolved Tin (Sn)	ug/L	<50	<50	50	2687596	<1	1	2687542
Total Tin (Sn)	ug/L	<20	<20	20	2686336	<1	1	2686336
Dissolved Titanium (Ti)	ug/L	<300	<300	300	2687596	<5	5	2687542
Total Titanium (Ti)	ug/L	<100	<100	100	2686336	970	30	2686336
Dissolved Uranium (U)	ug/L	<5	<5	5	2687596	18	0.1	2687542
Total Uranium (U)	ug/L	<2	<2	2	2686336	20	0.1	2686336
Dissolved Vanadium (V)	ug/L	<30	<30	30	2687596	<0.5	0.5	2687542
Total Vanadium (V)	ug/L	<10	<10	10	2686336	94	0.5	2686336
Dissolved Zinc (Zn)	ug/L	<300	<300	300	2687596	<10 (1)	10	2687542
Total Zinc (Zn)	ug/L	<100	<100	100	2686336	270	5	2686336

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Detection Limit was raised due to matrix interferences.

Maxxam Job #: B1H9938
Report Date: 2011/11/24

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LQ2321		
Sampling Date		2011/11/15		
COC Number		316147-02-01		
	Units	**DUP-1**	**RDL**	**QC Batch**
Metals				
Mercury (Hg)	mg/L	<0.0001	0.0001	2686207
Dissolved Aluminum (Al)	ug/L	120	50	2687542
Total Aluminum (Al)	ug/L	550	30	2686336
Dissolved Antimony (Sb)	ug/L	<5	5	2687542
Total Antimony (Sb)	ug/L	<3	3	2686336
Dissolved Arsenic (As)	ug/L	<10	10	2687542
Total Arsenic (As)	ug/L	<5	5	2686336
Dissolved Barium (Ba)	ug/L	<20	20	2687542
Total Barium (Ba)	ug/L	21	10	2686336
Dissolved Beryllium (Be)	ug/L	<5	5	2687542
Total Beryllium (Be)	ug/L	<3	3	2686336
Dissolved Bismuth (Bi)	ug/L	<10	10	2687542
Total Bismuth (Bi)	ug/L	<5	5	2686336
Dissolved Boron (B)	ug/L	6000	100	2687542
Total Boron (B)	ug/L	5600	50	2686336
Dissolved Cadmium (Cd)	ug/L	<1	1	2687542
Total Cadmium (Cd)	ug/L	<0.5	0.5	2686336
Dissolved Calcium (Ca)	ug/L	440000	2000	2687542
Total Calcium (Ca)	ug/L	590000	1000	2686336
Dissolved Chromium (Cr)	ug/L	<50	50	2687542
Total Chromium (Cr)	ug/L	<30	30	2686336
Dissolved Cobalt (Co)	ug/L	<5	5	2687542
Total Cobalt (Co)	ug/L	<3	3	2686336
Dissolved Copper (Cu)	ug/L	<10	10	2687542
Total Copper (Cu)	ug/L	<5	5	2686336
Dissolved Iron (Fe)	ug/L	1100	1000	2687542
Total Iron (Fe)	ug/L	2500	500	2686336
Dissolved Lead (Pb)	ug/L	<5	5	2687542
Total Lead (Pb)	ug/L	<3	3	2686336
Dissolved Magnesium (Mg)	ug/L	140000	500	2687542
Total Magnesium (Mg)	ug/L	170000	300	2686336
Dissolved Manganese (Mn)	ug/L	190	20	2687542

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B1H9938
Report Date: 2011/11/24

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LQ2321		
Sampling Date		2011/11/15		
COC Number		316147-02-01		
	Units	**DUP-1**	**RDL**	**QC Batch**
Total Manganese (Mn)	ug/L	250	10	2686336
Dissolved Molybdenum (Mo)	ug/L	6	5	2687542
Total Molybdenum (Mo)	ug/L	6	3	2686336
Dissolved Nickel (Ni)	ug/L	<10	10	2687542
Total Nickel (Ni)	ug/L	<5	5	2686336
Dissolved Phosphorus (P)	ug/L	<1000	1000	2687542
Total Phosphorus (P)	ug/L	<500	500	2686336
Dissolved Potassium (K)	ug/L	41000	2000	2687542
Total Potassium (K)	ug/L	50000	1000	2686336
Dissolved Selenium (Se)	ug/L	<20	20	2687542
Dissolved Silicon (Si)	ug/L	4200	500	2687542
Total Silicon (Si)	ug/L	4900	300	2686336
Total Selenium (Se)	ug/L	<10	10	2686336
Dissolved Silver (Ag)	ug/L	<1	1	2687542
Total Silver (Ag)	ug/L	<0.5	0.5	2686336
Dissolved Sodium (Na)	ug/L	1100000	1000	2687542
Total Sodium (Na)	ug/L	1300000	500	2686336
Dissolved Strontium (Sr)	ug/L	12000	10	2687542
Total Strontium (Sr)	ug/L	16000	5	2686336
Dissolved Thallium (Tl)	ug/L	<0.5	0.5	2687542
Total Thallium (Tl)	ug/L	<0.3	0.3	2686336
Dissolved Tin (Sn)	ug/L	<10	10	2687542
Total Tin (Sn)	ug/L	<5	5	2686336
Dissolved Titanium (Ti)	ug/L	<50	50	2687542
Total Titanium (Ti)	ug/L	<30	30	2686336
Dissolved Uranium (U)	ug/L	<1	1	2687542
Total Uranium (U)	ug/L	<0.5	0.5	2686336
Dissolved Vanadium (V)	ug/L	<5	5	2687542
Total Vanadium (V)	ug/L	<3	3	2686336
Dissolved Zinc (Zn)	ug/L	<50	50	2687542
Total Zinc (Zn)	ug/L	<30	30	2686336

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B1H9938
Report Date: 2011/11/24

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

Test Summary

Maxxam ID LQ2312 **Collected** 2011/11/15
Sample ID MW-07O **Shipped**
Matrix Water **Received** 2011/11/15

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2686200	N/A	2011/11/18	YOGESH PATEL
Anions	IC	2686583	N/A	2011/11/22	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686319	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2686201	2011/11/17	2011/11/18	YOGESH PATEL
Hardness (calculated as CaCO3)		2685279	N/A	2011/11/23	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2686203	2011/11/18	2011/11/18	LAWRENCE CHEUNG
Dissolved Metals by ICPMS	ICP/MS	2687542	N/A	2011/11/23	VIVIANA CANZONIERI
Total Metals Analysis by ICPMS	ICP/MS	2686697	N/A	2011/11/21	HUA REN
Ammonia-N	LACH/NH4	2687093	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2686135	N/A	2011/11/22	HELEN HE
pH	PH	2686202	N/A	2011/11/18	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686069	N/A	2011/11/21	BRAMDEO MOTIRAM
Orthophosphate	AC	2687204	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687266	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2687050	2011/11/18	2011/11/21	VIORICA ROTARU
Total Suspended Solids	SLDS	2686425	N/A	2011/11/18	TEJPRATAP MISHRA
Turbidity	TURB	2685994	N/A	2011/11/20	NEIL DASSANAYAKE

Maxxam ID LQ2312 Dup **Collected** 2011/11/15
Sample ID MW-07O **Shipped**
Matrix Water **Received** 2011/11/15

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Anions	IC	2686583	N/A	2011/11/22	FARI DEHDEZI

Maxxam ID LQ2313 **Collected** 2011/11/15
Sample ID MW-03O **Shipped**
Matrix Water **Received** 2011/11/15

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2686200	N/A	2011/11/18	YOGESH PATEL
Anions	IC	2686583	N/A	2011/11/22	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686319	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2686201	2011/11/17	2011/11/18	YOGESH PATEL
Hardness (calculated as CaCO3)		2685279	N/A	2011/11/21	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2686203	2011/11/18	2011/11/18	LAWRENCE CHEUNG
Lab Filtered Metals by ICPMS	ICP/MS	2686777	2011/11/18	2011/11/18	VIVIANA CANZONIERI
Total Metals Analysis by ICPMS	ICP/MS	2686697	N/A	2011/11/21	HUA REN
Ammonia-N	LACH/NH4	2687093	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2686479	N/A	2011/11/22	HELEN HE
pH	PH	2686202	N/A	2011/11/18	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686069	N/A	2011/11/21	BRAMDEO MOTIRAM
Orthophosphate	AC	2687204	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687266	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2687050	2011/11/18	2011/11/21	VIORICA ROTARU
Total Suspended Solids	SLDS	2686425	N/A	2011/11/18	TEJPRATAP MISHRA
Turbidity	TURB	2685994	N/A	2011/11/20	NEIL DASSANAYAKE

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Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

Test Summary

Maxxam ID LQ2314 **Collected** 2011/11/15
Sample ID MW-08I **Shipped**
Matrix Water **Received** 2011/11/15

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2686200	N/A	2011/11/18	YOGESH PATEL
Anions	IC	2686583	N/A	2011/11/22	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686319	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2686201	2011/11/17	2011/11/18	YOGESH PATEL
Hardness (calculated as CaCO3)		2685279	N/A	2011/11/23	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2686203	2011/11/18	2011/11/18	LAWRENCE CHEUNG
Dissolved Metals by ICPMS	ICP/MS	2687542	N/A	2011/11/23	VIVIANA CANZONIERI
Total Metals Analysis by ICPMS	ICP/MS	2686697	N/A	2011/11/21	HUA REN
Ammonia-N	LACH/NH4	2687093	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2686479	N/A	2011/11/22	HELEN HE
pH	PH	2686202	N/A	2011/11/18	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686856	N/A	2011/11/18	BRAMDEO MOTIRAM
Orthophosphate	AC	2687204	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687266	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2687050	2011/11/18	2011/11/21	VIORICA ROTARU
Total Suspended Solids	SLDS	2686238	N/A	2011/11/18	SUBHASHCHANDRA PATEL
Turbidity	TURB	2685994	N/A	2011/11/19	NEIL DASSANAYAKE

Maxxam ID LQ2314 Dup **Collected** 2011/11/15
Sample ID MW-08I **Shipped**
Matrix Water **Received** 2011/11/15

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	2686856	N/A	2011/11/18	BRAMDEO MOTIRAM
Turbidity	TURB	2685994	N/A	2011/11/19	NEIL DASSANAYAKE

Maxxam ID LQ2315 **Collected** 2011/11/15
Sample ID MW-08D **Shipped**
Matrix Water **Received** 2011/11/15

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2686200	N/A	2011/11/18	YOGESH PATEL
Anions	IC	2686583	N/A	2011/11/22	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686319	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2686201	2011/11/17	2011/11/18	YOGESH PATEL
Hardness (calculated as CaCO3)		2685279	N/A	2011/11/23	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2686203	2011/11/18	2011/11/18	LAWRENCE CHEUNG
Dissolved Metals by ICPMS	ICP/MS	2687542	N/A	2011/11/23	VIVIANA CANZONIERI
Total Metals Analysis by ICPMS	ICP/MS	2686697	N/A	2011/11/21	HUA REN
Ammonia-N	LACH/NH4	2687093	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2686479	N/A	2011/11/22	HELEN HE
pH	PH	2686202	N/A	2011/11/18	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686856	N/A	2011/11/18	BRAMDEO MOTIRAM
Orthophosphate	AC	2687204	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687266	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2687050	2011/11/18	2011/11/21	VIORICA ROTARU
Total Suspended Solids	SLDS	2686425	N/A	2011/11/18	TEJPRATAP MISHRA
Turbidity	TURB	2685994	N/A	2011/11/20	NEIL DASSANAYAKE

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B1H9938
Report Date: 2011/11/24

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

Test Summary

Maxxam ID LQ2316 **Collected** 2011/11/15
Sample ID MW-08O **Shipped**
Matrix Water **Received** 2011/11/15

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2686200	N/A	2011/11/18	YOGESH PATEL
Anions	IC	2686583	N/A	2011/11/22	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686319	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2686201	2011/11/17	2011/11/18	YOGESH PATEL
Hardness (calculated as CaCO3)		2685279	N/A	2011/11/23	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2686203	2011/11/18	2011/11/18	LAWRENCE CHEUNG
Dissolved Metals by ICPMS	ICP/MS	2687542	N/A	2011/11/23	VIVIANA CANZONIERI
Total Metals Analysis by ICPMS	ICP/MS	2686336	N/A	2011/11/18	HUA REN
Ammonia-N	LACH/NH4	2687093	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2686479	N/A	2011/11/22	HELEN HE
pH	PH	2686202	N/A	2011/11/18	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686856	N/A	2011/11/18	BRAMDEO MOTIRAM
Orthophosphate	AC	2687204	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687266	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2687050	2011/11/18	2011/11/21	VIORICA ROTARU
Total Suspended Solids	SLDS	2686425	N/A	2011/11/18	TEJPRATAP MISHRA
Turbidity	TURB	2685994	N/A	2011/11/20	NEIL DASSANAYAKE

Maxxam ID LQ2317 **Collected** 2011/11/15
Sample ID MW-02I **Shipped**
Matrix Water **Received** 2011/11/15

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2686200	N/A	2011/11/18	YOGESH PATEL
Anions	IC	2686583	N/A	2011/11/22	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686319	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2686201	2011/11/17	2011/11/18	YOGESH PATEL
Hardness (calculated as CaCO3)		2685279	N/A	2011/11/21	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2686203	2011/11/18	2011/11/18	LAWRENCE CHEUNG
Lab Filtered Metals by ICPMS	ICP/MS	2686777	2011/11/18	2011/11/18	VIVIANA CANZONIERI
Total Metals Analysis by ICPMS	ICP/MS	2686697	N/A	2011/11/21	HUA REN
Ammonia-N	LACH/NH4	2687093	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2686135	N/A	2011/11/22	HELEN HE
pH	PH	2686202	N/A	2011/11/18	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686856	N/A	2011/11/18	BRAMDEO MOTIRAM
Orthophosphate	AC	2686148	N/A	2011/11/18	DEONARINE RAMNARINE
Sulphide	ISE/S	2687266	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2687050	2011/11/18	2011/11/21	VIORICA ROTARU
Total Suspended Solids	SLDS	2686238	N/A	2011/11/18	SUBHASHCHANDRA PATEL
Turbidity	TURB	2685994	N/A	2011/11/20	NEIL DASSANAYAKE

Maxxam ID LQ2317 Dup **Collected** 2011/11/15
Sample ID MW-02I **Shipped**
Matrix Water **Received** 2011/11/15

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Lab Filtered Metals by ICPMS	ICP/MS	2686777	2011/11/18	2011/11/18	VIVIANA CANZONIERI

Maxxam Job #: B1H9938
Report Date: 2011/11/24

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

Test Summary

Maxxam ID LQ2318 **Collected** 2011/11/15
Sample ID MW-07D **Shipped**
Matrix Water **Received** 2011/11/15

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2686200	N/A	2011/11/18	YOGESH PATEL
Anions	IC	2686583	N/A	2011/11/22	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686319	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2686201	2011/11/17	2011/11/18	YOGESH PATEL
Hardness (calculated as CaCO3)		2685279	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2686203	2011/11/18	2011/11/18	LAWRENCE CHEUNG
Dissolved Metals by ICPMS	ICP/MS	2687596	N/A	2011/11/22	HUA REN
Total Metals Analysis by ICPMS	ICP/MS	2686336	N/A	2011/11/18	HUA REN
Ammonia-N	LACH/NH4	2687093	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2686479	N/A	2011/11/22	HELEN HE
pH	PH	2686202	N/A	2011/11/18	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686856	N/A	2011/11/18	BRAMDEO MOTIRAM
Orthophosphate	AC	2687204	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687266	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2687050	2011/11/18	2011/11/21	VIORICA ROTARU
Total Suspended Solids	SLDS	2686238	N/A	2011/11/18	SUBHASHCHANDRA PATEL
Turbidity	TURB	2685994	N/A	2011/11/20	NEIL DASSANAYAKE

Maxxam ID LQ2318 Dup **Collected** 2011/11/15
Sample ID MW-07D **Shipped**
Matrix Water **Received** 2011/11/15

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Sulphide	ISE/S	2687266	N/A	2011/11/21	XUANHONG QIU

Maxxam ID LQ2319 **Collected** 2011/11/15
Sample ID MW-02D **Shipped**
Matrix Water **Received** 2011/11/15

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2686200	N/A	2011/11/18	YOGESH PATEL
Anions	IC	2686583	N/A	2011/11/22	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686319	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2686201	2011/11/17	2011/11/18	YOGESH PATEL
Hardness (calculated as CaCO3)		2685279	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2686203	2011/11/18	2011/11/18	LAWRENCE CHEUNG
Dissolved Metals by ICPMS	ICP/MS	2687596	N/A	2011/11/22	HUA REN
Total Metals Analysis by ICPMS	ICP/MS	2686336	N/A	2011/11/18	HUA REN
Ammonia-N	LACH/NH4	2687093	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2686479	N/A	2011/11/22	HELEN HE
pH	PH	2686202	N/A	2011/11/18	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686856	N/A	2011/11/18	BRAMDEO MOTIRAM
Orthophosphate	AC	2687204	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687266	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2687050	2011/11/18	2011/11/21	VIORICA ROTARU
Total Suspended Solids	SLDS	2686425	N/A	2011/11/18	TEJPRATAP MISHRA
Turbidity	TURB	2685994	N/A	2011/11/20	NEIL DASSANAYAKE

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Maxxam Job #: B1H9938
Report Date: 2011/11/24

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

Test Summary

Maxxam ID LQ2319 Dup
Sample ID MW-02D
Matrix Water

Collected 2011/11/15
Shipped
Received 2011/11/15

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2686200	N/A	2011/11/18	YOGESH PATEL
Fluoride	F	2686201	2011/11/17	2011/11/18	YOGESH PATEL
pH	PH	2686202	N/A	2011/11/18	YOGESH PATEL

Maxxam ID LQ2320
Sample ID MW-02O
Matrix Water

Collected 2011/11/15
Shipped
Received 2011/11/15

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2686200	N/A	2011/11/18	YOGESH PATEL
Anions	IC	2686583	N/A	2011/11/22	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686319	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2686201	2011/11/17	2011/11/18	YOGESH PATEL
Hardness (calculated as CaCO3)		2685279	N/A	2011/11/23	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2686203	2011/11/18	2011/11/18	LAWRENCE CHEUNG
Dissolved Metals by ICPMS	ICP/MS	2687542	N/A	2011/11/23	VIVIANA CANZONIERI
Total Metals Analysis by ICPMS	ICP/MS	2686336	N/A	2011/11/18	HUA REN
Ammonia-N	LACH/NH4	2687093	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2686479	N/A	2011/11/22	HELEN HE
pH	PH	2686202	N/A	2011/11/18	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686856	N/A	2011/11/18	BRAMDEO MOTIRAM
Orthophosphate	AC	2687204	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687266	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2687050	2011/11/18	2011/11/21	VIORICA ROTARU
Total Suspended Solids	SLDS	2686425	N/A	2011/11/18	TEJPRATAP MISHRA
Turbidity	TURB	2685994	N/A	2011/11/20	NEIL DASSANAYAKE

Maxxam ID LQ2321
Sample ID DUP-1
Matrix Water

Collected 2011/11/15
Shipped
Received 2011/11/15

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2686200	N/A	2011/11/18	YOGESH PATEL
Anions	IC	2686583	N/A	2011/11/22	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2686319	N/A	2011/11/18	LOUISE HARDING
Fluoride	F	2686201	2011/11/17	2011/11/18	YOGESH PATEL
Hardness (calculated as CaCO3)		2685279	N/A	2011/11/23	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2686207	2011/11/18	2011/11/18	LAWRENCE CHEUNG
Dissolved Metals by ICPMS	ICP/MS	2687542	N/A	2011/11/23	VIVIANA CANZONIERI
Total Metals Analysis by ICPMS	ICP/MS	2686336	N/A	2011/11/18	HUA REN
Ammonia-N	LACH/NH4	2687093	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2686479	N/A	2011/11/22	HELEN HE
pH	PH	2686202	N/A	2011/11/18	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2686856	N/A	2011/11/18	BRAMDEO MOTIRAM
Orthophosphate	AC	2687204	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687266	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2687050	2011/11/18	2011/11/21	VIORICA ROTARU
Total Suspended Solids	SLDS	2686238	N/A	2011/11/18	SUBHASHCHANDRA PATEL
Turbidity	TURB	2685994	N/A	2011/11/20	NEIL DASSANAYAKE

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Maxxam Job #: B1H9938
Report Date: 2011/11/24

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KS

Test Summary

Maxxam ID LQ2321 Dup
Sample ID DUP-1
Matrix Water

Collected 2011/11/15
Shipped
Received 2011/11/15

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2686479	N/A	2011/11/22	HELEN HE
Orthophosphate	AC	2687204	N/A	2011/11/22	DEONARINE RAMNARINE

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Package 1	9.3°C
Package 2	9.7°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Sample LQ2312-01: Metal analysis:Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Sample LQ2314-01: Metal analysis:Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Sample LQ2315-01: Metal analysis:Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Nitrite: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Sample LQ2317-01: Anions Analysis: Due to high concentrations of the target analytes, sample required dilution. Detection limits were adjusted accordingly.

Sample LQ2318-01: Metal analysis:Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Nitrite: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Sample LQ2319-01: Metal analysis:Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Nitrite: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Sample LQ2321-01: Metal analysis:Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Results relate only to the items tested.

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location: TANSLEY QUARRY

Quality Assurance Report

Maxxam Job Number: MB1H9938

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2685994	NYS	QC Standard	Turbidity	2011/11/20		100	%	85 - 115
		Method Blank	Turbidity	2011/11/20	<0.2		NTU	
		RPD [LQ2314-01]	Turbidity	2011/11/19	0.6		%	20
2686069	BMO	Matrix Spike	Phenols-4AAP	2011/11/21		105	%	75 - 125
		Spiked Blank	Phenols-4AAP	2011/11/21		99	%	75 - 125
		Method Blank	Phenols-4AAP	2011/11/21	<0.001		mg/L	
		RPD	Phenols-4AAP	2011/11/21	NC		%	25
2686135	HH	Matrix Spike	Nitrite (N)	2011/11/22		101	%	80 - 120
			Nitrate (N)	2011/11/22		100	%	80 - 120
		Spiked Blank	Nitrite (N)	2011/11/22		100	%	85 - 115
			Nitrate (N)	2011/11/22		98	%	85 - 115
		Method Blank	Nitrite (N)	2011/11/22	<0.01		mg/L	
			Nitrate (N)	2011/11/22	<0.1		mg/L	
		RPD	Nitrite (N)	2011/11/22	NC		%	25
			Nitrate (N)	2011/11/22	NC		%	25
2686148	DRM	Matrix Spike	Orthophosphate (P)	2011/11/18		101	%	75 - 125
		Spiked Blank	Orthophosphate (P)	2011/11/18		100	%	80 - 120
		Method Blank	Orthophosphate (P)	2011/11/18	<0.01		mg/L	
		RPD	Orthophosphate (P)	2011/11/18	NC		%	25
2686200	YPA	QC Standard	Alkalinity (Total as CaCO3)	2011/11/18		97	%	85 - 115
		Method Blank	Alkalinity (Total as CaCO3)	2011/11/18	<1		mg/L	
		RPD [LQ2319-01]	Alkalinity (Total as CaCO3)	2011/11/18	1.3		%	25
2686201	YPA	Matrix Spike						
		[LQ2319-01]	Fluoride (F-)	2011/11/18		98	%	80 - 120
		Spiked Blank	Fluoride (F-)	2011/11/18		98	%	80 - 120
		Method Blank	Fluoride (F-)	2011/11/18	<0.1		mg/L	
		RPD [LQ2319-01]	Fluoride (F-)	2011/11/18	NC (1)		%	20
2686203	LCH	Matrix Spike	Mercury (Hg)	2011/11/18		103	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/18		101	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/18	<0.0001		mg/L	
		RPD	Mercury (Hg)	2011/11/18	NC		%	25
2686207	LCH	Matrix Spike	Mercury (Hg)	2011/11/18		102	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/18		98	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/18	<0.0001		mg/L	
		RPD	Mercury (Hg)	2011/11/18	NC		%	25
2686238	SUP	QC Standard	Total Suspended Solids	2011/11/18		99	%	85 - 115
		Method Blank	Total Suspended Solids	2011/11/18	<10		mg/L	
		RPD	Total Suspended Solids	2011/11/18	NC		%	25
2686319	LHA	Matrix Spike	Free Cyanide	2011/11/18		97	%	80 - 120
		Spiked Blank	Free Cyanide	2011/11/18		104	%	80 - 120
		Method Blank	Free Cyanide	2011/11/18	<0.002		mg/L	
		RPD	Free Cyanide	2011/11/18	NC		%	25
2686336	HRE	Matrix Spike	Total Aluminum (Al)	2011/11/18		NC	%	80 - 120
			Total Antimony (Sb)	2011/11/18		110	%	80 - 120
			Total Arsenic (As)	2011/11/18		102	%	80 - 120
			Total Barium (Ba)	2011/11/18		99	%	80 - 120
			Total Beryllium (Be)	2011/11/18		91	%	80 - 120
			Total Bismuth (Bi)	2011/11/18		99	%	80 - 120
			Total Boron (B)	2011/11/18		87	%	80 - 120
			Total Cadmium (Cd)	2011/11/18		101	%	80 - 120
			Total Calcium (Ca)	2011/11/18		NC	%	80 - 120
			Total Chromium (Cr)	2011/11/18		95	%	80 - 120
			Total Cobalt (Co)	2011/11/18		93	%	80 - 120
			Total Copper (Cu)	2011/11/18		91	%	80 - 120
			Total Iron (Fe)	2011/11/18		99	%	80 - 120

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location: TANSLEY QUARRY

Quality Assurance Report (Continued)

Maxxam Job Number: MB1H9938

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2686336	HRE	Matrix Spike	Total Lead (Pb)	2011/11/18		98	%	80 - 120
			Total Magnesium (Mg)	2011/11/18		NC	%	80 - 120
			Total Manganese (Mn)	2011/11/18		NC	%	80 - 120
			Total Molybdenum (Mo)	2011/11/18		112	%	80 - 120
			Total Nickel (Ni)	2011/11/18		93	%	80 - 120
			Total Phosphorus (P)	2011/11/18		92	%	80 - 120
			Total Potassium (K)	2011/11/18		NC	%	80 - 120
			Total Silicon (Si)	2011/11/18		98	%	80 - 120
			Total Selenium (Se)	2011/11/18		98	%	80 - 120
			Total Silver (Ag)	2011/11/18		93	%	80 - 120
			Total Sodium (Na)	2011/11/18		NC	%	80 - 120
			Total Strontium (Sr)	2011/11/18		NC	%	80 - 120
			Total Thallium (Tl)	2011/11/18		96	%	80 - 120
			Total Tin (Sn)	2011/11/18		115	%	80 - 120
			Total Titanium (Ti)	2011/11/18		103	%	80 - 120
			Total Uranium (U)	2011/11/18		103	%	80 - 120
			Total Vanadium (V)	2011/11/18		97	%	80 - 120
			Total Zinc (Zn)	2011/11/18		91	%	80 - 120
		Spiked Blank	Total Aluminum (Al)	2011/11/18		95	%	80 - 120
			Total Antimony (Sb)	2011/11/18		106	%	80 - 120
			Total Arsenic (As)	2011/11/18		100	%	80 - 120
			Total Barium (Ba)	2011/11/18		98	%	80 - 120
			Total Beryllium (Be)	2011/11/18		94	%	80 - 120
			Total Bismuth (Bi)	2011/11/18		101	%	80 - 120
			Total Boron (B)	2011/11/18		91	%	80 - 120
			Total Cadmium (Cd)	2011/11/18		102	%	80 - 120
			Total Calcium (Ca)	2011/11/18		97	%	80 - 120
			Total Chromium (Cr)	2011/11/18		96	%	80 - 120
			Total Cobalt (Co)	2011/11/18		95	%	80 - 120
			Total Copper (Cu)	2011/11/18		95	%	80 - 120
			Total Iron (Fe)	2011/11/18		99	%	80 - 120
			Total Lead (Pb)	2011/11/18		100	%	80 - 120
			Total Magnesium (Mg)	2011/11/18		98	%	80 - 120
			Total Manganese (Mn)	2011/11/18		95	%	80 - 120
			Total Molybdenum (Mo)	2011/11/18		102	%	80 - 120
			Total Nickel (Ni)	2011/11/18		95	%	80 - 120
			Total Phosphorus (P)	2011/11/18		92	%	80 - 120
			Total Potassium (K)	2011/11/18		98	%	80 - 120
			Total Silicon (Si)	2011/11/18		98	%	80 - 120
			Total Selenium (Se)	2011/11/18		100	%	80 - 120
			Total Silver (Ag)	2011/11/18		95	%	80 - 120
			Total Sodium (Na)	2011/11/18		99	%	80 - 120
			Total Strontium (Sr)	2011/11/18		98	%	80 - 120
			Total Thallium (Tl)	2011/11/18		99	%	80 - 120
			Total Tin (Sn)	2011/11/18		109	%	80 - 120
			Total Titanium (Ti)	2011/11/18		102	%	80 - 120
			Total Uranium (U)	2011/11/18		101	%	80 - 120
			Total Vanadium (V)	2011/11/18		96	%	80 - 120
			Total Zinc (Zn)	2011/11/18		97	%	80 - 120
		Method Blank	Total Aluminum (Al)	2011/11/18	7, RDL=5		ug/L	
			Total Antimony (Sb)	2011/11/18	<0.5		ug/L	
			Total Arsenic (As)	2011/11/18	<1		ug/L	
			Total Barium (Ba)	2011/11/18	<2		ug/L	
			Total Beryllium (Be)	2011/11/18	<0.5		ug/L	
			Total Bismuth (Bi)	2011/11/18	<1		ug/L	

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location: TANSLEY QUARRY

Quality Assurance Report (Continued)

Maxxam Job Number: MB1H9938

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2686336	HRE	Method Blank	Total Boron (B)	2011/11/18	<10		ug/L	
			Total Cadmium (Cd)	2011/11/18	<0.1		ug/L	
			Total Calcium (Ca)	2011/11/18	<200		ug/L	
			Total Chromium (Cr)	2011/11/18	<5		ug/L	
			Total Cobalt (Co)	2011/11/18	<0.5		ug/L	
			Total Copper (Cu)	2011/11/18	<1		ug/L	
			Total Iron (Fe)	2011/11/18	<100		ug/L	
			Total Lead (Pb)	2011/11/18	<0.5		ug/L	
			Total Magnesium (Mg)	2011/11/18	55, RDL=50		ug/L	
			Total Manganese (Mn)	2011/11/18	<2		ug/L	
			Total Molybdenum (Mo)	2011/11/18	<0.5		ug/L	
			Total Nickel (Ni)	2011/11/18	<1		ug/L	
			Total Phosphorus (P)	2011/11/18	<100		ug/L	
			Total Potassium (K)	2011/11/18	<200		ug/L	
			Total Silicon (Si)	2011/11/18	<50		ug/L	
			Total Selenium (Se)	2011/11/18	<2		ug/L	
			Total Silver (Ag)	2011/11/18	<0.1		ug/L	
			Total Sodium (Na)	2011/11/18	<100		ug/L	
			Total Strontium (Sr)	2011/11/18	<1		ug/L	
			Total Thallium (Tl)	2011/11/18	<0.05		ug/L	
			Total Tin (Sn)	2011/11/18	<1		ug/L	
			Total Titanium (Ti)	2011/11/18	<5		ug/L	
			Total Uranium (U)	2011/11/18	<0.1		ug/L	
			Total Vanadium (V)	2011/11/18	<0.5		ug/L	
			Total Zinc (Zn)	2011/11/18	<5		ug/L	
		RPD	Total Aluminum (Al)	2011/11/18	0.7		%	20
			Total Antimony (Sb)	2011/11/18	NC		%	20
			Total Arsenic (As)	2011/11/18	NC		%	20
			Total Barium (Ba)	2011/11/18	1.9		%	20
			Total Beryllium (Be)	2011/11/18	NC		%	20
			Total Bismuth (Bi)	2011/11/18	NC		%	20
			Total Boron (B)	2011/11/18	3.5		%	20
			Total Cadmium (Cd)	2011/11/18	NC		%	20
			Total Calcium (Ca)	2011/11/18	1.7		%	20
			Total Chromium (Cr)	2011/11/18	NC		%	20
			Total Cobalt (Co)	2011/11/18	NC		%	20
			Total Copper (Cu)	2011/11/18	NC		%	20
			Total Iron (Fe)	2011/11/18	NC		%	20
			Total Lead (Pb)	2011/11/18	NC		%	20
			Total Magnesium (Mg)	2011/11/18	4.4		%	20
			Total Manganese (Mn)	2011/11/18	2.3		%	20
			Total Molybdenum (Mo)	2011/11/18	NC		%	20
			Total Nickel (Ni)	2011/11/18	NC (2)		%	20
			Total Potassium (K)	2011/11/18	2.5		%	20
			Total Silicon (Si)	2011/11/18	NC		%	20
			Total Selenium (Se)	2011/11/18	NC		%	20
			Total Silver (Ag)	2011/11/18	NC		%	20
			Total Sodium (Na)	2011/11/18	1.3		%	20
			Total Strontium (Sr)	2011/11/18	2.3		%	20
			Total Thallium (Tl)	2011/11/18	2.3		%	20
			Total Tin (Sn)	2011/11/18	NC		%	20
			Total Titanium (Ti)	2011/11/18	NC		%	20
			Total Uranium (U)	2011/11/18	NC		%	20
			Total Vanadium (V)	2011/11/18	NC		%	20
			Total Zinc (Zn)	2011/11/18	NC		%	20

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location: TANSLEY QUARRY

Quality Assurance Report (Continued)

Maxxam Job Number: MB1H9938

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2686425	TEJ	QC Standard	Total Suspended Solids	2011/11/18		98	%	85 - 115
		Method Blank	Total Suspended Solids	2011/11/18	<10		mg/L	
		RPD	Total Suspended Solids	2011/11/18	NC		%	25
2686479	HH	Matrix Spike						
		[LQ2321-01]	Nitrite (N)	2011/11/22		101	%	80 - 120
			Nitrate (N)	2011/11/22		105	%	80 - 120
		Spiked Blank	Nitrite (N)	2011/11/22		101	%	85 - 115
			Nitrate (N)	2011/11/22		99	%	85 - 115
		Method Blank	Nitrite (N)	2011/11/22	<0.01		mg/L	
			Nitrate (N)	2011/11/22	<0.1		mg/L	
		RPD [LQ2321-01]	Nitrite (N)	2011/11/22	NC		%	25
			Nitrate (N)	2011/11/22	NC		%	25
2686583	FD	Matrix Spike						
		[LQ2312-01]	Dissolved Chloride (Cl)	2011/11/22		106	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/22		104	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/22		NC	%	80 - 120
		Spiked Blank	Dissolved Chloride (Cl)	2011/11/22		103	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/22		94	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/22		104	%	80 - 120
		Method Blank	Dissolved Chloride (Cl)	2011/11/22	<1		mg/L	
			Dissolved Bromide (Br-)	2011/11/22	<1		mg/L	
			Dissolved Sulphate (SO4)	2011/11/22	<1		mg/L	
		RPD [LQ2312-01]	Dissolved Chloride (Cl)	2011/11/22	1.0		%	20
			Dissolved Bromide (Br-)	2011/11/22	NC		%	20
			Dissolved Sulphate (SO4)	2011/11/22	1.9		%	20
2686697	HRE	Matrix Spike	Total Aluminum (Al)	2011/11/21		NC	%	80 - 120
			Total Antimony (Sb)	2011/11/21		99	%	80 - 120
			Total Arsenic (As)	2011/11/21		98	%	80 - 120
			Total Barium (Ba)	2011/11/21		96	%	80 - 120
			Total Beryllium (Be)	2011/11/21		94	%	80 - 120
			Total Bismuth (Bi)	2011/11/21		98	%	80 - 120
			Total Boron (B)	2011/11/21		95	%	80 - 120
			Total Cadmium (Cd)	2011/11/21		97	%	80 - 120
			Total Calcium (Ca)	2011/11/21		96	%	80 - 120
			Total Chromium (Cr)	2011/11/21		95	%	80 - 120
			Total Cobalt (Co)	2011/11/21		94	%	80 - 120
			Total Copper (Cu)	2011/11/21		93	%	80 - 120
			Total Iron (Fe)	2011/11/21		98	%	80 - 120
			Total Lead (Pb)	2011/11/21		96	%	80 - 120
			Total Magnesium (Mg)	2011/11/21		92	%	80 - 120
			Total Manganese (Mn)	2011/11/21		93	%	80 - 120
			Total Molybdenum (Mo)	2011/11/21		98	%	80 - 120
			Total Nickel (Ni)	2011/11/21		94	%	80 - 120
			Total Phosphorus (P)	2011/11/21		94	%	80 - 120
			Total Potassium (K)	2011/11/21		96	%	80 - 120
			Total Silicon (Si)	2011/11/21		91	%	80 - 120
			Total Selenium (Se)	2011/11/21		95	%	80 - 120
			Total Silver (Ag)	2011/11/21		91	%	80 - 120
			Total Sodium (Na)	2011/11/21		92	%	80 - 120
			Total Strontium (Sr)	2011/11/21		95	%	80 - 120
			Total Thallium (Tl)	2011/11/21		94	%	80 - 120
			Total Tin (Sn)	2011/11/21		104	%	80 - 120
			Total Titanium (Ti)	2011/11/21		104	%	80 - 120
			Total Uranium (U)	2011/11/21		99	%	80 - 120
			Total Vanadium (V)	2011/11/21		94	%	80 - 120

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Quality Assurance Report (Continued)

Maxxam Job Number: MB1H9938

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2686697	HRE	Matrix Spike	Total Zinc (Zn)	2011/11/21		95	%	80 - 120
		Spiked Blank	Total Aluminum (Al)	2011/11/21		92	%	80 - 120
			Total Antimony (Sb)	2011/11/21		100	%	80 - 120
			Total Arsenic (As)	2011/11/21		97	%	80 - 120
			Total Barium (Ba)	2011/11/21		97	%	80 - 120
			Total Beryllium (Be)	2011/11/21		93	%	80 - 120
			Total Bismuth (Bi)	2011/11/21		96	%	80 - 120
			Total Boron (B)	2011/11/21		92	%	80 - 120
			Total Cadmium (Cd)	2011/11/21		98	%	80 - 120
			Total Calcium (Ca)	2011/11/21		95	%	80 - 120
			Total Chromium (Cr)	2011/11/21		94	%	80 - 120
			Total Cobalt (Co)	2011/11/21		94	%	80 - 120
			Total Copper (Cu)	2011/11/21		93	%	80 - 120
			Total Iron (Fe)	2011/11/21		97	%	80 - 120
			Total Lead (Pb)	2011/11/21		97	%	80 - 120
			Total Magnesium (Mg)	2011/11/21		92	%	80 - 120
			Total Manganese (Mn)	2011/11/21		94	%	80 - 120
			Total Molybdenum (Mo)	2011/11/21		98	%	80 - 120
			Total Nickel (Ni)	2011/11/21		95	%	80 - 120
			Total Phosphorus (P)	2011/11/21		91	%	80 - 120
			Total Potassium (K)	2011/11/21		96	%	80 - 120
			Total Silicon (Si)	2011/11/21		91	%	80 - 120
			Total Selenium (Se)	2011/11/21		97	%	80 - 120
			Total Silver (Ag)	2011/11/21		92	%	80 - 120
			Total Sodium (Na)	2011/11/21		91	%	80 - 120
			Total Strontium (Sr)	2011/11/21		96	%	80 - 120
			Total Thallium (Tl)	2011/11/21		94	%	80 - 120
			Total Tin (Sn)	2011/11/21		103	%	80 - 120
			Total Titanium (Ti)	2011/11/21		99	%	80 - 120
			Total Uranium (U)	2011/11/21		99	%	80 - 120
			Total Vanadium (V)	2011/11/21		93	%	80 - 120
			Total Zinc (Zn)	2011/11/21		95	%	80 - 120
		Method Blank	Total Aluminum (Al)	2011/11/21	<5		ug/L	
			Total Antimony (Sb)	2011/11/21	<0.5		ug/L	
			Total Arsenic (As)	2011/11/21	<1		ug/L	
			Total Barium (Ba)	2011/11/21	<2		ug/L	
			Total Beryllium (Be)	2011/11/21	<0.5		ug/L	
			Total Bismuth (Bi)	2011/11/21	<1		ug/L	
			Total Boron (B)	2011/11/21	<10		ug/L	
			Total Cadmium (Cd)	2011/11/21	<0.1		ug/L	
			Total Calcium (Ca)	2011/11/21	<200		ug/L	
			Total Chromium (Cr)	2011/11/21	<5		ug/L	
			Total Cobalt (Co)	2011/11/21	<0.5		ug/L	
			Total Copper (Cu)	2011/11/21	<1		ug/L	
			Total Iron (Fe)	2011/11/21	<100		ug/L	
			Total Lead (Pb)	2011/11/21	<0.5		ug/L	
			Total Magnesium (Mg)	2011/11/21	<50		ug/L	
			Total Manganese (Mn)	2011/11/21	<2		ug/L	
			Total Molybdenum (Mo)	2011/11/21	<0.5		ug/L	
			Total Nickel (Ni)	2011/11/21	<1		ug/L	
			Total Phosphorus (P)	2011/11/21	<100		ug/L	
			Total Potassium (K)	2011/11/21	<200		ug/L	
			Total Silicon (Si)	2011/11/21	<50		ug/L	
			Total Selenium (Se)	2011/11/21	<2		ug/L	
			Total Silver (Ag)	2011/11/21	<0.1		ug/L	

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Quality Assurance Report (Continued)

Maxxam Job Number: MB1H9938

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2686697 HRE	Method Blank	Total Sodium (Na)	2011/11/21	<100		ug/L	
		Total Strontium (Sr)	2011/11/21	<1		ug/L	
		Total Thallium (Tl)	2011/11/21	<0.05		ug/L	
		Total Tin (Sn)	2011/11/21	<1		ug/L	
		Total Titanium (Ti)	2011/11/21	<5		ug/L	
		Total Uranium (U)	2011/11/21	<0.1		ug/L	
		Total Vanadium (V)	2011/11/21	<0.5		ug/L	
		Total Zinc (Zn)	2011/11/21	<5		ug/L	
	RPD	Total Arsenic (As)	2011/11/21	NC		%	20
		Total Cadmium (Cd)	2011/11/21	NC		%	20
		Total Chromium (Cr)	2011/11/21	NC		%	20
		Total Copper (Cu)	2011/11/21	2.3		%	20
		Total Lead (Pb)	2011/11/21	NC		%	20
		Total Manganese (Mn)	2011/11/21	3.0		%	20
		Total Nickel (Ni)	2011/11/21	NC		%	20
		Total Selenium (Se)	2011/11/21	NC		%	20
		Total Silver (Ag)	2011/11/21	NC		%	20
		Total Zinc (Zn)	2011/11/21	1.2		%	20
2686777 VIV	Matrix Spike [LQ2317-01]	Dissolved Rubidium (Rb)	2011/11/18		98	%	80 - 120
		Dissolved Aluminum (Al)	2011/11/18		101	%	80 - 120
		Dissolved Antimony (Sb)	2011/11/18		104	%	80 - 120
		Dissolved Arsenic (As)	2011/11/18		94	%	80 - 120
		Dissolved Barium (Ba)	2011/11/18		91	%	80 - 120
		Dissolved Beryllium (Be)	2011/11/18		92	%	80 - 120
		Dissolved Bismuth (Bi)	2011/11/18		95	%	80 - 120
		Dissolved Boron (B)	2011/11/18		NC	%	80 - 120
		Dissolved Cadmium (Cd)	2011/11/18		99	%	80 - 120
		Dissolved Calcium (Ca)	2011/11/18		NC	%	80 - 120
		Dissolved Chromium (Cr)	2011/11/18		96	%	80 - 120
		Dissolved Cobalt (Co)	2011/11/18		95	%	80 - 120
		Dissolved Copper (Cu)	2011/11/18		88	%	80 - 120
		Dissolved Iron (Fe)	2011/11/18		96	%	80 - 120
		Dissolved Lead (Pb)	2011/11/18		91	%	80 - 120
		Dissolved Magnesium (Mg)	2011/11/18		NC	%	80 - 120
		Dissolved Manganese (Mn)	2011/11/18		95	%	80 - 120
		Dissolved Molybdenum (Mo)	2011/11/18		103	%	80 - 120
		Dissolved Nickel (Ni)	2011/11/18		91	%	80 - 120
		Dissolved Phosphorus (P)	2011/11/18		108	%	80 - 120
		Dissolved Potassium (K)	2011/11/18		NC	%	80 - 120
		Dissolved Selenium (Se)	2011/11/18		90	%	80 - 120
		Dissolved Silicon (Si)	2011/11/18		99	%	80 - 120
		Dissolved Silver (Ag)	2011/11/18		91	%	80 - 120
		Dissolved Sodium (Na)	2011/11/18		NC	%	80 - 120
		Dissolved Strontium (Sr)	2011/11/18		NC	%	80 - 120
		Dissolved Thallium (Tl)	2011/11/18		91	%	80 - 120
		Dissolved Tin (Sn)	2011/11/18		106	%	80 - 120
		Dissolved Titanium (Ti)	2011/11/18		99	%	80 - 120
		Dissolved Uranium (U)	2011/11/18		94	%	80 - 120
		Dissolved Vanadium (V)	2011/11/18		100	%	80 - 120
		Dissolved Zinc (Zn)	2011/11/18		NC	%	80 - 120
	Spiked Blank	Dissolved Rubidium (Rb)	2011/11/18		98	%	80 - 120
		Dissolved Aluminum (Al)	2011/11/18		103	%	80 - 120
		Dissolved Antimony (Sb)	2011/11/18		98	%	80 - 120
		Dissolved Arsenic (As)	2011/11/18		94	%	80 - 120

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Golder Associates Ltd
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Quality Assurance Report (Continued)

Maxxam Job Number: MB1H9938

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2686777 VIV	Spiked Blank	Dissolved Barium (Ba)	2011/11/18		93	%	80 - 120
		Dissolved Beryllium (Be)	2011/11/18		98	%	80 - 120
		Dissolved Bismuth (Bi)	2011/11/18		90	%	80 - 120
		Dissolved Boron (B)	2011/11/18		101	%	80 - 120
		Dissolved Cadmium (Cd)	2011/11/18		100	%	80 - 120
		Dissolved Calcium (Ca)	2011/11/18		99	%	80 - 120
		Dissolved Chromium (Cr)	2011/11/18		95	%	80 - 120
		Dissolved Cobalt (Co)	2011/11/18		95	%	80 - 120
		Dissolved Copper (Cu)	2011/11/18		92	%	80 - 120
		Dissolved Iron (Fe)	2011/11/18		97	%	80 - 120
		Dissolved Lead (Pb)	2011/11/18		92	%	80 - 120
		Dissolved Magnesium (Mg)	2011/11/18		101	%	80 - 120
		Dissolved Manganese (Mn)	2011/11/18		99	%	80 - 120
		Dissolved Molybdenum (Mo)	2011/11/18		99	%	80 - 120
		Dissolved Nickel (Ni)	2011/11/18		92	%	80 - 120
		Dissolved Phosphorus (P)	2011/11/18		107	%	80 - 120
		Dissolved Potassium (K)	2011/11/18		99	%	80 - 120
		Dissolved Selenium (Se)	2011/11/18		98	%	80 - 120
		Dissolved Silicon (Si)	2011/11/18		102	%	80 - 120
		Dissolved Silver (Ag)	2011/11/18		94	%	80 - 120
		Dissolved Sodium (Na)	2011/11/18		108	%	80 - 120
		Dissolved Strontium (Sr)	2011/11/18		100	%	80 - 120
		Dissolved Thallium (Tl)	2011/11/18		92	%	80 - 120
		Dissolved Tin (Sn)	2011/11/18		102	%	80 - 120
		Dissolved Titanium (Ti)	2011/11/18		99	%	80 - 120
		Dissolved Uranium (U)	2011/11/18		91	%	80 - 120
		Dissolved Vanadium (V)	2011/11/18		99	%	80 - 120
		Dissolved Zinc (Zn)	2011/11/18		97	%	80 - 120
	Method Blank	Dissolved Rubidium (Rb)	2011/11/18	<0.2		ug/L	
		Dissolved Aluminum (Al)	2011/11/18	6, RDL=5		ug/L	
		Dissolved Antimony (Sb)	2011/11/18	<0.5		ug/L	
		Dissolved Arsenic (As)	2011/11/18	<1		ug/L	
		Dissolved Barium (Ba)	2011/11/18	<2		ug/L	
		Dissolved Beryllium (Be)	2011/11/18	<0.5		ug/L	
		Dissolved Bismuth (Bi)	2011/11/18	<1		ug/L	
		Dissolved Boron (B)	2011/11/18	<10		ug/L	
		Dissolved Cadmium (Cd)	2011/11/18	<0.1		ug/L	
		Dissolved Calcium (Ca)	2011/11/18	<200		ug/L	
		Dissolved Chromium (Cr)	2011/11/18	<5		ug/L	
		Dissolved Cobalt (Co)	2011/11/18	<0.5		ug/L	
		Dissolved Copper (Cu)	2011/11/18	<1		ug/L	
		Dissolved Iron (Fe)	2011/11/18	<100		ug/L	
		Dissolved Lead (Pb)	2011/11/18	<0.5		ug/L	
		Dissolved Magnesium (Mg)	2011/11/18	<50		ug/L	
		Dissolved Manganese (Mn)	2011/11/18	<2		ug/L	
		Dissolved Molybdenum (Mo)	2011/11/18	<0.5		ug/L	
		Dissolved Nickel (Ni)	2011/11/18	<1		ug/L	
		Dissolved Phosphorus (P)	2011/11/18	<100		ug/L	
		Dissolved Potassium (K)	2011/11/18	<200		ug/L	
		Dissolved Selenium (Se)	2011/11/18	<2		ug/L	
		Dissolved Silicon (Si)	2011/11/18	<50		ug/L	
		Dissolved Silver (Ag)	2011/11/18	<0.1		ug/L	
		Dissolved Sodium (Na)	2011/11/18	<100		ug/L	
		Dissolved Strontium (Sr)	2011/11/18	<1		ug/L	
		Dissolved Thallium (Tl)	2011/11/18	<0.05		ug/L	

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Quality Assurance Report (Continued)

Maxxam Job Number: MB1H9938

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2686777	VIV	Method Blank	Dissolved Tin (Sn)	2011/11/18	<1		ug/L	
			Dissolved Titanium (Ti)	2011/11/18	<5		ug/L	
			Dissolved Uranium (U)	2011/11/18	<0.1		ug/L	
			Dissolved Vanadium (V)	2011/11/18	<0.5		ug/L	
			Dissolved Zinc (Zn)	2011/11/18	<5		ug/L	
		RPD [LQ2317-01]	Dissolved Rubidium (Rb)	2011/11/18	1.2		%	20
			Dissolved Aluminum (Al)	2011/11/18	NC		%	20
			Dissolved Antimony (Sb)	2011/11/18	NC		%	20
			Dissolved Arsenic (As)	2011/11/18	NC		%	20
			Dissolved Barium (Ba)	2011/11/18	NC		%	20
			Dissolved Beryllium (Be)	2011/11/18	NC		%	20
			Dissolved Bismuth (Bi)	2011/11/18	NC		%	20
			Dissolved Boron (B)	2011/11/18	10.1		%	20
			Dissolved Cadmium (Cd)	2011/11/18	NC		%	20
			Dissolved Calcium (Ca)	2011/11/18	2.7		%	20
			Dissolved Chromium (Cr)	2011/11/18	NC		%	20
			Dissolved Cobalt (Co)	2011/11/18	NC		%	20
			Dissolved Copper (Cu)	2011/11/18	NC		%	20
			Dissolved Iron (Fe)	2011/11/18	NC		%	20
			Dissolved Lead (Pb)	2011/11/18	NC		%	20
			Dissolved Magnesium (Mg)	2011/11/18	0.9		%	20
			Dissolved Manganese (Mn)	2011/11/18	1.7		%	20
			Dissolved Molybdenum (Mo)	2011/11/18	1.2		%	20
			Dissolved Nickel (Ni)	2011/11/18	NC		%	20
			Dissolved Phosphorus (P)	2011/11/18	NC		%	20
			Dissolved Potassium (K)	2011/11/18	4.0		%	20
			Dissolved Selenium (Se)	2011/11/18	NC		%	20
			Dissolved Silicon (Si)	2011/11/18	0.8		%	20
			Dissolved Silver (Ag)	2011/11/18	NC		%	20
			Dissolved Sodium (Na)	2011/11/18	2.2		%	20
			Dissolved Strontium (Sr)	2011/11/18	0.8		%	20
			Dissolved Thallium (Tl)	2011/11/18	NC		%	20
			Dissolved Tin (Sn)	2011/11/18	NC		%	20
			Dissolved Titanium (Ti)	2011/11/18	NC		%	20
			Dissolved Uranium (U)	2011/11/18	NC		%	20
			Dissolved Vanadium (V)	2011/11/18	NC		%	20
			Dissolved Zinc (Zn)	2011/11/18	NC (3)		%	20
2686856	BMO	Matrix Spike [LQ2314-09]	Phenols-4AAP	2011/11/18		97	%	75 - 125
		Spiked Blank	Phenols-4AAP	2011/11/18		97	%	75 - 125
		Method Blank	Phenols-4AAP	2011/11/18	<0.001		mg/L	
		RPD [LQ2314-09]	Phenols-4AAP	2011/11/18	NC		%	25
2687050	VRO	Matrix Spike	Total Phosphorus	2011/11/21		98	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/21		101	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/21		102	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/21	<0.02		mg/L	
		RPD	Total Phosphorus	2011/11/21	1.3		%	20
2687093	ADB	Matrix Spike	Total Ammonia-N	2011/11/21		102	%	80 - 120
		Spiked Blank	Total Ammonia-N	2011/11/21		101	%	85 - 115
		Method Blank	Total Ammonia-N	2011/11/21	<0.05		mg/L	
		RPD	Total Ammonia-N	2011/11/21	4.9		%	20
2687204	DRM	Matrix Spike [LQ2321-01]	Orthophosphate (P)	2011/11/22		97	%	75 - 125
		Spiked Blank	Orthophosphate (P)	2011/11/22		100	%	80 - 120
		Method Blank	Orthophosphate (P)	2011/11/22	<0.01		mg/L	

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Golder Associates Ltd
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Quality Assurance Report (Continued)

Maxxam Job Number: MB1H9938

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2687204	DRM	RPD [LQ2321-01]	Orthophosphate (P)	2011/11/22	NC		%	25
2687266	XQI	Matrix Spike [LQ2318-06]	Sulphide	2011/11/21		83	%	80 - 120
		Spiked Blank	Sulphide	2011/11/21		97	%	80 - 120
		Method Blank	Sulphide	2011/11/21	<0.02		mg/L	
		RPD [LQ2318-06]	Sulphide	2011/11/21	NC		%	20
2687542	VIV	Matrix Spike	Dissolved Aluminum (Al)	2011/11/23		97	%	80 - 120
			Dissolved Antimony (Sb)	2011/11/23		101	%	80 - 120
			Dissolved Arsenic (As)	2011/11/23		97	%	80 - 120
			Dissolved Barium (Ba)	2011/11/23		95	%	80 - 120
			Dissolved Beryllium (Be)	2011/11/23		101	%	80 - 120
			Dissolved Bismuth (Bi)	2011/11/23		99	%	80 - 120
			Dissolved Boron (B)	2011/11/23		101	%	80 - 120
			Dissolved Cadmium (Cd)	2011/11/23		100	%	80 - 120
			Dissolved Calcium (Ca)	2011/11/23		NC	%	80 - 120
			Dissolved Chromium (Cr)	2011/11/23		96	%	80 - 120
			Dissolved Cobalt (Co)	2011/11/23		95	%	80 - 120
			Dissolved Copper (Cu)	2011/11/23		92	%	80 - 120
			Dissolved Iron (Fe)	2011/11/23		95	%	80 - 120
			Dissolved Lead (Pb)	2011/11/23		97	%	80 - 120
			Dissolved Magnesium (Mg)	2011/11/23		NC	%	80 - 120
			Dissolved Manganese (Mn)	2011/11/23		NC	%	80 - 120
			Dissolved Molybdenum (Mo)	2011/11/23		102	%	80 - 120
			Dissolved Nickel (Ni)	2011/11/23		93	%	80 - 120
			Dissolved Phosphorus (P)	2011/11/23		96	%	80 - 120
			Dissolved Potassium (K)	2011/11/23		95	%	80 - 120
			Dissolved Selenium (Se)	2011/11/23		97	%	80 - 120
			Dissolved Silicon (Si)	2011/11/23		95	%	80 - 120
			Dissolved Silver (Ag)	2011/11/23		90	%	80 - 120
			Dissolved Sodium (Na)	2011/11/23		95	%	80 - 120
			Dissolved Strontium (Sr)	2011/11/23		98	%	80 - 120
			Dissolved Thallium (Tl)	2011/11/23		97	%	80 - 120
			Dissolved Tin (Sn)	2011/11/23		99	%	80 - 120
			Dissolved Titanium (Ti)	2011/11/23		93	%	80 - 120
			Dissolved Uranium (U)	2011/11/23		98	%	80 - 120
			Dissolved Vanadium (V)	2011/11/23		96	%	80 - 120
			Dissolved Zinc (Zn)	2011/11/23		96	%	80 - 120
		Spiked Blank	Dissolved Aluminum (Al)	2011/11/23		98	%	80 - 120
			Dissolved Antimony (Sb)	2011/11/23		96	%	80 - 120
			Dissolved Arsenic (As)	2011/11/23		94	%	80 - 120
			Dissolved Barium (Ba)	2011/11/23		95	%	80 - 120
			Dissolved Beryllium (Be)	2011/11/23		98	%	80 - 120
			Dissolved Bismuth (Bi)	2011/11/23		96	%	80 - 120
			Dissolved Boron (B)	2011/11/23		98	%	80 - 120
			Dissolved Cadmium (Cd)	2011/11/23		98	%	80 - 120
			Dissolved Calcium (Ca)	2011/11/23		93	%	80 - 120
			Dissolved Chromium (Cr)	2011/11/23		95	%	80 - 120
			Dissolved Cobalt (Co)	2011/11/23		96	%	80 - 120
			Dissolved Copper (Cu)	2011/11/23		94	%	80 - 120
			Dissolved Iron (Fe)	2011/11/23		95	%	80 - 120
			Dissolved Lead (Pb)	2011/11/23		97	%	80 - 120
			Dissolved Magnesium (Mg)	2011/11/23		98	%	80 - 120
			Dissolved Manganese (Mn)	2011/11/23		96	%	80 - 120
			Dissolved Molybdenum (Mo)	2011/11/23		99	%	80 - 120
			Dissolved Nickel (Ni)	2011/11/23		96	%	80 - 120

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Quality Assurance Report (Continued)

Maxxam Job Number: MB1H9938

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2687542 VIV	Spiked Blank	Dissolved Phosphorus (P)	2011/11/23		113	%	80 - 120
		Dissolved Potassium (K)	2011/11/23		95	%	80 - 120
		Dissolved Selenium (Se)	2011/11/23		96	%	80 - 120
		Dissolved Silicon (Si)	2011/11/23		96	%	80 - 120
		Dissolved Silver (Ag)	2011/11/23		95	%	80 - 120
		Dissolved Sodium (Na)	2011/11/23		98	%	80 - 120
		Dissolved Strontium (Sr)	2011/11/23		99	%	80 - 120
		Dissolved Thallium (Tl)	2011/11/23		97	%	80 - 120
		Dissolved Tin (Sn)	2011/11/23		97	%	80 - 120
		Dissolved Titanium (Ti)	2011/11/23		94	%	80 - 120
		Dissolved Uranium (U)	2011/11/23		97	%	80 - 120
		Dissolved Vanadium (V)	2011/11/23		97	%	80 - 120
		Dissolved Zinc (Zn)	2011/11/23		97	%	80 - 120
	Method Blank	Dissolved Aluminum (Al)	2011/11/23	<5		ug/L	
		Dissolved Antimony (Sb)	2011/11/23	<0.5		ug/L	
		Dissolved Arsenic (As)	2011/11/23	<1		ug/L	
		Dissolved Barium (Ba)	2011/11/23	<2		ug/L	
		Dissolved Beryllium (Be)	2011/11/23	<0.5		ug/L	
		Dissolved Bismuth (Bi)	2011/11/23	<1		ug/L	
		Dissolved Boron (B)	2011/11/23	<10		ug/L	
		Dissolved Cadmium (Cd)	2011/11/23	<0.1		ug/L	
		Dissolved Calcium (Ca)	2011/11/23	<200		ug/L	
		Dissolved Chromium (Cr)	2011/11/23	<5		ug/L	
		Dissolved Cobalt (Co)	2011/11/23	<0.5		ug/L	
		Dissolved Copper (Cu)	2011/11/23	<1		ug/L	
		Dissolved Iron (Fe)	2011/11/23	<100		ug/L	
		Dissolved Lead (Pb)	2011/11/23	<0.5		ug/L	
		Dissolved Magnesium (Mg)	2011/11/23	<50		ug/L	
		Dissolved Manganese (Mn)	2011/11/23	<2		ug/L	
		Dissolved Molybdenum (Mo)	2011/11/23	<0.5		ug/L	
		Dissolved Nickel (Ni)	2011/11/23	<1		ug/L	
		Dissolved Phosphorus (P)	2011/11/23	<100		ug/L	
		Dissolved Potassium (K)	2011/11/23	<200		ug/L	
		Dissolved Selenium (Se)	2011/11/23	<2		ug/L	
		Dissolved Silicon (Si)	2011/11/23	<50		ug/L	
		Dissolved Silver (Ag)	2011/11/23	<0.1		ug/L	
		Dissolved Sodium (Na)	2011/11/23	<100		ug/L	
		Dissolved Strontium (Sr)	2011/11/23	<1		ug/L	
		Dissolved Thallium (Tl)	2011/11/23	<0.05		ug/L	
		Dissolved Tin (Sn)	2011/11/23	<1		ug/L	
		Dissolved Titanium (Ti)	2011/11/23	<5		ug/L	
		Dissolved Uranium (U)	2011/11/23	<0.1		ug/L	
		Dissolved Vanadium (V)	2011/11/23	<0.5		ug/L	
		Dissolved Zinc (Zn)	2011/11/23	<5		ug/L	
	RPD	Dissolved Aluminum (Al)	2011/11/23	NC		%	20
		Dissolved Arsenic (As)	2011/11/23	5.2		%	20
		Dissolved Barium (Ba)	2011/11/23	5.0		%	20
		Dissolved Beryllium (Be)	2011/11/23	NC		%	20
		Dissolved Cadmium (Cd)	2011/11/23	NC		%	20
		Dissolved Calcium (Ca)	2011/11/23	3.0		%	20
		Dissolved Chromium (Cr)	2011/11/23	NC		%	20
		Dissolved Cobalt (Co)	2011/11/23	NC		%	20
		Dissolved Copper (Cu)	2011/11/23	NC		%	20
		Dissolved Iron (Fe)	2011/11/23	5.8		%	20
		Dissolved Lead (Pb)	2011/11/23	NC		%	20

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Quality Assurance Report (Continued)

Maxxam Job Number: MB1H9938

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2687542	VIV	RPD	Dissolved Magnesium (Mg)	2011/11/23	2.4		%	20
			Dissolved Manganese (Mn)	2011/11/23	4.1		%	20
			Dissolved Molybdenum (Mo)	2011/11/23	NC		%	20
			Dissolved Nickel (Ni)	2011/11/23	NC		%	20
			Dissolved Potassium (K)	2011/11/23	4.0		%	20
			Dissolved Sodium (Na)	2011/11/23	4.6		%	20
			Dissolved Strontium (Sr)	2011/11/23	5.4		%	20
			Dissolved Titanium (Ti)	2011/11/23	NC		%	20
			Dissolved Vanadium (V)	2011/11/23	NC		%	20
			Dissolved Zinc (Zn)	2011/11/23	NC		%	20
2687596	HRE	Matrix Spike	Dissolved Aluminum (Al)	2011/11/22		98	%	80 - 120
			Dissolved Antimony (Sb)	2011/11/22		94	%	80 - 120
			Dissolved Arsenic (As)	2011/11/22		94	%	80 - 120
			Dissolved Barium (Ba)	2011/11/22		93	%	80 - 120
			Dissolved Beryllium (Be)	2011/11/22		92	%	80 - 120
			Dissolved Bismuth (Bi)	2011/11/22		95	%	80 - 120
			Dissolved Boron (B)	2011/11/22		94	%	80 - 120
			Dissolved Cadmium (Cd)	2011/11/22		95	%	80 - 120
			Dissolved Calcium (Ca)	2011/11/22		NC	%	80 - 120
			Dissolved Chromium (Cr)	2011/11/22		92	%	80 - 120
			Dissolved Cobalt (Co)	2011/11/22		90	%	80 - 120
			Dissolved Copper (Cu)	2011/11/22		90	%	80 - 120
			Dissolved Iron (Fe)	2011/11/22		94	%	80 - 120
			Dissolved Lead (Pb)	2011/11/22		94	%	80 - 120
			Dissolved Magnesium (Mg)	2011/11/22		NC	%	80 - 120
			Dissolved Manganese (Mn)	2011/11/22		91	%	80 - 120
			Dissolved Molybdenum (Mo)	2011/11/22		97	%	80 - 120
			Dissolved Nickel (Ni)	2011/11/22		91	%	80 - 120
			Dissolved Phosphorus (P)	2011/11/22		99	%	80 - 120
			Dissolved Potassium (K)	2011/11/22		92	%	80 - 120
			Dissolved Selenium (Se)	2011/11/22		95	%	80 - 120
			Dissolved Silicon (Si)	2011/11/22		90	%	80 - 120
			Dissolved Silver (Ag)	2011/11/22		89	%	80 - 120
			Dissolved Sodium (Na)	2011/11/22		92	%	80 - 120
			Dissolved Strontium (Sr)	2011/11/22		NC	%	80 - 120
			Dissolved Thallium (Tl)	2011/11/22		93	%	80 - 120
			Dissolved Tin (Sn)	2011/11/22		100	%	80 - 120
			Dissolved Titanium (Ti)	2011/11/22		95	%	80 - 120
			Dissolved Uranium (U)	2011/11/22		96	%	80 - 120
			Dissolved Vanadium (V)	2011/11/22		92	%	80 - 120
			Dissolved Zinc (Zn)	2011/11/22		93	%	80 - 120
		Spiked Blank	Dissolved Aluminum (Al)	2011/11/22		98	%	80 - 120
			Dissolved Antimony (Sb)	2011/11/22		93	%	80 - 120
			Dissolved Arsenic (As)	2011/11/22		93	%	80 - 120
			Dissolved Barium (Ba)	2011/11/22		95	%	80 - 120
			Dissolved Beryllium (Be)	2011/11/22		93	%	80 - 120
			Dissolved Bismuth (Bi)	2011/11/22		95	%	80 - 120
			Dissolved Boron (B)	2011/11/22		96	%	80 - 120
			Dissolved Cadmium (Cd)	2011/11/22		96	%	80 - 120
			Dissolved Calcium (Ca)	2011/11/22		94	%	80 - 120
			Dissolved Chromium (Cr)	2011/11/22		92	%	80 - 120
			Dissolved Cobalt (Co)	2011/11/22		92	%	80 - 120
			Dissolved Copper (Cu)	2011/11/22		91	%	80 - 120
			Dissolved Iron (Fe)	2011/11/22		94	%	80 - 120
			Dissolved Lead (Pb)	2011/11/22		96	%	80 - 120

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Quality Assurance Report (Continued)

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QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2687596	HRE	Spiked Blank	Dissolved Magnesium (Mg)	2011/11/22		95	%	80 - 120
			Dissolved Manganese (Mn)	2011/11/22		92	%	80 - 120
			Dissolved Molybdenum (Mo)	2011/11/22		97	%	80 - 120
			Dissolved Nickel (Ni)	2011/11/22		92	%	80 - 120
			Dissolved Phosphorus (P)	2011/11/22		103	%	80 - 120
			Dissolved Potassium (K)	2011/11/22		93	%	80 - 120
			Dissolved Selenium (Se)	2011/11/22		95	%	80 - 120
			Dissolved Silicon (Si)	2011/11/22		95	%	80 - 120
			Dissolved Silver (Ag)	2011/11/22		94	%	80 - 120
			Dissolved Sodium (Na)	2011/11/22		96	%	80 - 120
			Dissolved Strontium (Sr)	2011/11/22		94	%	80 - 120
			Dissolved Thallium (Tl)	2011/11/22		94	%	80 - 120
			Dissolved Tin (Sn)	2011/11/22		99	%	80 - 120
			Dissolved Titanium (Ti)	2011/11/22		94	%	80 - 120
			Dissolved Uranium (U)	2011/11/22		97	%	80 - 120
			Dissolved Vanadium (V)	2011/11/22		92	%	80 - 120
			Dissolved Zinc (Zn)	2011/11/22		94	%	80 - 120
		Method Blank	Dissolved Aluminum (Al)	2011/11/22	<5		ug/L	
			Dissolved Antimony (Sb)	2011/11/22	<0.5		ug/L	
			Dissolved Arsenic (As)	2011/11/22	<1		ug/L	
			Dissolved Barium (Ba)	2011/11/22	<2		ug/L	
			Dissolved Beryllium (Be)	2011/11/22	<0.5		ug/L	
			Dissolved Bismuth (Bi)	2011/11/22	<1		ug/L	
			Dissolved Boron (B)	2011/11/22	<10		ug/L	
			Dissolved Cadmium (Cd)	2011/11/22	<0.1		ug/L	
			Dissolved Calcium (Ca)	2011/11/22	<200		ug/L	
			Dissolved Chromium (Cr)	2011/11/22	<5		ug/L	
			Dissolved Cobalt (Co)	2011/11/22	<0.5		ug/L	
			Dissolved Copper (Cu)	2011/11/22	<1		ug/L	
			Dissolved Iron (Fe)	2011/11/22	<100		ug/L	
			Dissolved Lead (Pb)	2011/11/22	<0.5		ug/L	
			Dissolved Magnesium (Mg)	2011/11/22	<50		ug/L	
			Dissolved Manganese (Mn)	2011/11/22	<2		ug/L	
			Dissolved Molybdenum (Mo)	2011/11/22	<0.5		ug/L	
			Dissolved Nickel (Ni)	2011/11/22	<1		ug/L	
			Dissolved Phosphorus (P)	2011/11/22	<100		ug/L	
			Dissolved Potassium (K)	2011/11/22	<200		ug/L	
			Dissolved Selenium (Se)	2011/11/22	<2		ug/L	
			Dissolved Silicon (Si)	2011/11/22	<50		ug/L	
			Dissolved Silver (Ag)	2011/11/22	<0.1		ug/L	
			Dissolved Sodium (Na)	2011/11/22	<100		ug/L	
			Dissolved Strontium (Sr)	2011/11/22	<1		ug/L	
			Dissolved Thallium (Tl)	2011/11/22	<0.05		ug/L	
			Dissolved Tin (Sn)	2011/11/22	<1		ug/L	
			Dissolved Titanium (Ti)	2011/11/22	<5		ug/L	
			Dissolved Uranium (U)	2011/11/22	<0.1		ug/L	
			Dissolved Vanadium (V)	2011/11/22	<0.5		ug/L	
			Dissolved Zinc (Zn)	2011/11/22	<5		ug/L	
		RPD	Dissolved Aluminum (Al)	2011/11/22	9.6		%	20
			Dissolved Antimony (Sb)	2011/11/22	NC		%	20
			Dissolved Arsenic (As)	2011/11/22	NC		%	20
			Dissolved Barium (Ba)	2011/11/22	2.5		%	20
			Dissolved Beryllium (Be)	2011/11/22	NC		%	20
			Dissolved Bismuth (Bi)	2011/11/22	NC		%	20
			Dissolved Boron (B)	2011/11/22	NC		%	20

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location: TANSLEY QUARRY

Quality Assurance Report (Continued)

Maxxam Job Number: MB1H9938

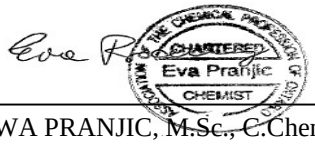
QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2687596	HRE	RPD	Dissolved Cadmium (Cd)	2011/11/22	NC		%	20
			Dissolved Calcium (Ca)	2011/11/22	4.1		%	20
			Dissolved Chromium (Cr)	2011/11/22	NC		%	20
			Dissolved Cobalt (Co)	2011/11/22	NC		%	20
			Dissolved Copper (Cu)	2011/11/22	NC		%	20
			Dissolved Iron (Fe)	2011/11/22	NC		%	20
			Dissolved Lead (Pb)	2011/11/22	NC		%	20
			Dissolved Magnesium (Mg)	2011/11/22	3.7		%	20
			Dissolved Manganese (Mn)	2011/11/22	NC		%	20
			Dissolved Molybdenum (Mo)	2011/11/22	NC		%	20
			Dissolved Nickel (Ni)	2011/11/22	NC		%	20
			Dissolved Phosphorus (P)	2011/11/22	NC		%	20
			Dissolved Potassium (K)	2011/11/22	4.9		%	20
			Dissolved Selenium (Se)	2011/11/22	NC		%	20
			Dissolved Silicon (Si)	2011/11/22	3.4		%	20
			Dissolved Silver (Ag)	2011/11/22	NC		%	20
			Dissolved Sodium (Na)	2011/11/22	5.3		%	20
			Dissolved Strontium (Sr)	2011/11/22	4.2		%	20
			Dissolved Thallium (Tl)	2011/11/22	NC		%	20
			Dissolved Tin (Sn)	2011/11/22	NC		%	20
			Dissolved Titanium (Ti)	2011/11/22	NC		%	20
			Dissolved Uranium (U)	2011/11/22	1.9		%	20
			Dissolved Vanadium (V)	2011/11/22	NC		%	20
			Dissolved Zinc (Zn)	2011/11/22	NC		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
(1) Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.
(2) Metal analysis:Detection Limit was raised due to matrix interferences.
(3) Detection Limit was raised due to matrix interferences.

Validation Signature Page

Maxxam Job #: B1H9938

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



EWA PRANJIC, M.Sc., C.Chem, Scientific Specialist

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Your Project #: 021-1228
Site#: Tansley Quarry
Site Location: TANSLEY QUARY
Your C.O.C. #: 31614701, 316147-01-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2011/11/22

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1H9105
Received: 2011/11/14, 17:18

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Alkalinity	3	N/A	2011/11/15	CAM SOP-00448	SM 2320B
Anions	3	N/A	2011/11/18	CAM SOP-00435	SM 4110B
Free (WAD) Cyanide	3	N/A	2011/11/16	CAM SOP-00457	SM4500-CN-I modified
Fluoride	3	2011/11/15	2011/11/15	CAM SOP-00448	APHA 4500FC
Hardness (calculated as CaCO3)	3	N/A	2011/11/18	CAM SOP 00102	SM 2340 B
Mercury in Water by CVAA	3	2011/11/17	2011/11/17	CAM SOP-00453	EPA 7470
Dissolved Metals by ICPMS	3	N/A	2011/11/18	CAM SOP-00447	EPA 6020
Total Metals Analysis by ICPMS	3	N/A	2011/11/21	CAM SOP-00447	EPA 6020
Ammonia-N	3	N/A	2011/11/21	CAM SOP-00441	US GS I-2522-90
Nitrate (NO3) and Nitrite (NO2) in Water	3	N/A	2011/11/16	CAM SOP-00440	SM 4500 NO3I/NO2B
pH	3	N/A	2011/11/15	CAM SOP-00448	SM 4500H
Phenols (4AAP)	3	N/A	2011/11/16	CAM SOP-00444	MOE ROPHEN-E3179
Orthophosphate	3	N/A	2011/11/16	CAM SOP-00461	SM 4500 P-F
Sulphide	3	N/A	2011/11/18	CAM SOP-00455	SM 4500-S G
Total Phosphorus (Colourimetric)	3	2011/11/18	2011/11/21	CAM SOP-00407	SM 4500 P,B,F
Total Suspended Solids	3	N/A	2011/11/22	CAM SOP-00428	SM 2540D
Turbidity	3	N/A	2011/11/15	CAM SOP-00417	APHA 2130B

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons. The extraction date for samples field preserved with methanol for F1 and Volatile Organic Compounds is

Your Project #: 021-1228
Site#: Tansley Quarry
Site Location: TANSLEY QUARY
Your C.O.C. #: 31614701, 316147-01-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2011/11/22

CERTIFICATE OF ANALYSIS

considered to be the date sampled.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by Ontario Regulation 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

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

MATHURA THIRUKKUMARAN, CS Rep
Email: MThirukkumaran@maxxam.ca
Phone# (905) 817-5700

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Total cover pages: 2

Maxxam Job #: B1H9105
Report Date: 2011/11/22

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARY
Sampler Initials: KFS

RESULTS OF ANALYSES OF WATER

Maxxam ID		LP8270		LP8271			LP8272		
Sampling Date		2011/11/14		2011/11/14			2011/11/14		
COC Number		316147-01-01		316147-01-01			316147-01-01		
	Units	**MW-01D**	**RDL**	**MW-01I**	**RDL**	**QC Batch**	**MW-01O**	**RDL**	**QC Batch**
Calculated Parameters									
Hardness (CaCO3)	mg/L	7200	1	1000	1	2681334	740	1	2681334
Inorganics									
Total Ammonia-N	mg/L	18	0.5	0.13	0.05	2685492	<0.05	0.05	2685492
Fluoride (F-)	mg/L	0.3	0.1	0.3	0.1	2682405	0.6	0.1	2682405
Free Cyanide	mg/L	<0.002	0.002	<0.002	0.002	2683426	<0.002	0.002	2683426
Orthophosphate (P)	mg/L	<0.01	0.01	0.01	0.01	2682806	<0.01	0.01	2682806
pH	pH	7.12		7.61		2682430	7.84		2682430
Phenols-4AAP	mg/L	0.008	0.001	<0.001	0.001	2683317	<0.001	0.001	2683317
Total Phosphorus	mg/L	0.3	0.1	7.3	0.2	2687050	0.37	0.04	2687050
Total Suspended Solids	mg/L	560	20	2900	100	2682535	620	20	2682535
Sulphide	mg/L	<0.02	0.02	<0.02	0.02	2683344	<0.02	0.02	2683344
Turbidity	NTU	170	0.4	77	0.2	2682579	250	0.4	2682616
Alkalinity (Total as CaCO3)	mg/L	35	1	443	1	2682434	366	1	2682434
Nitrite (N)	mg/L	<0.05	0.05	<0.01	0.01	2682757	<0.01	0.01	2682757
Dissolved Chloride (Cl)	mg/L	13000	100	183	1	2683224	183	1	2683224
Nitrate (N)	mg/L	<0.1	0.1	0.6	0.1	2682757	1.1	0.1	2682757
Nitrate + Nitrite	mg/L	<0.1	0.1	0.6	0.1	2682757	1.1	0.1	2682757
Dissolved Bromide (Br-)	mg/L	138	100	<1	1	2683224	<1	1	2683224
Dissolved Sulphate (SO4)	mg/L	1910	100	385	1	2683224	157	1	2683224

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1H9105
Report Date: 2011/11/22

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARRY
Sampler Initials: KFS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LP8270		LP8271		LP8272		
Sampling Date		2011/11/14		2011/11/14		2011/11/14		
COC Number		316147-01-01		316147-01-01		316147-01-01		
	Units	**MW-01D**	**RDL**	**MW-01I**	**RDL**	**MW-01O**	**RDL**	**QC Batch**
Metals								
Mercury (Hg)	mg/L	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	2684782
Dissolved Aluminum (Al)	ug/L	<50	50	140	5	68	5	2686735
Total Aluminum (Al)	ug/L	3400	100	66000	30	7200	5	2686984
Dissolved Antimony (Sb)	ug/L	<5	5	<0.5	0.5	<0.5	0.5	2686735
Total Antimony (Sb)	ug/L	<10	10	<3	3	0.6	0.5	2686984
Dissolved Arsenic (As)	ug/L	<20	20	<1	1	<1	1	2686735
Total Arsenic (As)	ug/L	<30	30	34	5	4	1	2686984
Dissolved Barium (Ba)	ug/L	22	20	16	2	38	2	2686735
Total Barium (Ba)	ug/L	53	50	530	10	120	2	2686984
Dissolved Beryllium (Be)	ug/L	<5	5	<0.5	0.5	<0.5	0.5	2686735
Total Beryllium (Be)	ug/L	<10	10	3	3	0.6	0.5	2686984
Dissolved Bismuth (Bi)	ug/L	<10	10	<1	1	<1	1	2686735
Total Bismuth (Bi)	ug/L	<30	30	<5	5	<1	1	2686984
Dissolved Boron (B)	ug/L	5500	100	110	10	57	10	2686735
Total Boron (B)	ug/L	6300	300	220	50	59	10	2686984
Dissolved Cadmium (Cd)	ug/L	<1	1	<0.1	0.1	<0.1	0.1	2686735
Total Cadmium (Cd)	ug/L	<3	3	1.1	0.5	0.2	0.1	2686984
Dissolved Calcium (Ca)	ug/L	2000000	2000	98000	200	64000	200	2686735
Total Calcium (Ca)	ug/L	2000000	5000	770000	1000	100000	200	2686984
Dissolved Chromium (Cr)	ug/L	<50	50	<5	5	<5	5	2686735
Total Chromium (Cr)	ug/L	<100	100	120	30	10	5	2686984
Dissolved Cobalt (Co)	ug/L	<5	5	4.3	0.5	5.0	0.5	2686735
Total Cobalt (Co)	ug/L	<10	10	73	3	4.6	0.5	2686984
Dissolved Copper (Cu)	ug/L	<50	50	2	1	1	1	2686735
Total Copper (Cu)	ug/L	30	30	130	5	16	1	2686984
Dissolved Iron (Fe)	ug/L	4100	1000	250	100	<100	100	2686735
Total Iron (Fe)	ug/L	9600	3000	130000	500	12000	100	2686984
Dissolved Lead (Pb)	ug/L	<5	5	<0.5	0.5	<0.5	0.5	2686735
Total Lead (Pb)	ug/L	<10	10	64	3	10	0.5	2686984
Dissolved Magnesium (Mg)	ug/L	530000	500	180000	50	140000	50	2686735
Total Magnesium (Mg)	ug/L	500000	1000	270000	300	150000	50	2686984
Dissolved Manganese (Mn)	ug/L	1100	20	31	2	10	2	2686735

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1H9105
Report Date: 2011/11/22

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARY
Sampler Initials: KFS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LP8270		LP8271		LP8272		
Sampling Date		2011/11/14		2011/11/14		2011/11/14		
COC Number		316147-01-01		316147-01-01		316147-01-01		
	Units	**MW-01D**	**RDL**	**MW-01I**	**RDL**	**MW-01O**	**RDL**	**QC Batch**
Total Manganese (Mn)	ug/L	1300	50	5000	10	270	2	2686984
Dissolved Molybdenum (Mo)	ug/L	6	5	1.8	0.5	1.6	0.5	2686735
Total Molybdenum (Mo)	ug/L	<10	10	6	3	2.1	0.5	2686984
Dissolved Nickel (Ni)	ug/L	<10	10	2	1	<1	1	2686735
Total Nickel (Ni)	ug/L	<30	30	130	5	11	1	2686984
Dissolved Phosphorus (P)	ug/L	<1000	1000	<100	100	<100	100	2686735
Total Phosphorus (P)	ug/L	<3000	3000	5300	500	400	100	2686984
Dissolved Potassium (K)	ug/L	130000	2000	4900	200	1800	200	2686735
Total Potassium (K)	ug/L	130000	5000	19000	1000	4300	200	2686984
Dissolved Selenium (Se)	ug/L	<40	40	3	2	5	2	2686735
Dissolved Silicon (Si)	ug/L	2900	500	7400	50	6800	50	2686735
Total Silicon (Si)	ug/L	7400	1000	73000	300	18000	50	2686984
Total Selenium (Se)	ug/L	<50	50	<10	10	4	2	2686984
Dissolved Silver (Ag)	ug/L	<1	1	<0.1	0.1	<0.1	0.1	2686735
Total Silver (Ag)	ug/L	<3	3	<0.5	0.5	<0.1	0.1	2686984
Dissolved Sodium (Na)	ug/L	5800000	1000	52000	100	42000	100	2686735
Total Sodium (Na)	ug/L	6600000	3000	52000	500	41000	100	2686984
Dissolved Strontium (Sr)	ug/L	43000	10	1900	1	1100	1	2686735
Total Strontium (Sr)	ug/L	44000	30	3900	5	1300	1	2686984
Dissolved Thallium (Tl)	ug/L	<0.5	0.5	<0.05	0.05	<0.05	0.05	2686735
Total Thallium (Tl)	ug/L	<1	1	0.6	0.3	0.12	0.05	2686984
Dissolved Tin (Sn)	ug/L	<10	10	<1	1	<1	1	2686735
Total Tin (Sn)	ug/L	<30	30	<5	5	<1	1	2686984
Dissolved Titanium (Ti)	ug/L	<50	50	5	5	<5	5	2686735
Total Titanium (Ti)	ug/L	<100	100	840	30	180	5	2686984
Dissolved Uranium (U)	ug/L	<1	1	9.8	0.1	8.3	0.1	2686735
Total Uranium (U)	ug/L	<3	3	17	0.5	11	0.1	2686984
Dissolved Vanadium (V)	ug/L	<10	10	3.8	0.5	2.5	0.5	2686735
Total Vanadium (V)	ug/L	14	10	130	3	12	0.5	2686984
Dissolved Zinc (Zn)	ug/L	<50	50	<5	5	5	5	2686735
Total Zinc (Zn)	ug/L	<100	100	430	30	51	5	2686984

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1H9105
Report Date: 2011/11/22

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARY
Sampler Initials: KFS

Test Summary

Maxxam ID LP8270 **Collected** 2011/11/14
Sample ID MW-01D **Shipped**
Matrix Water **Received** 2011/11/14

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2682434	N/A	2011/11/15	YOGESH PATEL
Anions	IC	2683224	N/A	2011/11/18	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2683426	N/A	2011/11/16	LOUISE HARDING
Fluoride	F	2682405	2011/11/15	2011/11/15	YOGESH PATEL
Hardness (calculated as CaCO3)		2681334	N/A	2011/11/18	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2684782	2011/11/17	2011/11/17	MAGDALENA CARLOS
Dissolved Metals by ICPMS	ICP/MS	2686735	N/A	2011/11/18	VIVIANA CANZONIERI
Total Metals Analysis by ICPMS	ICP/MS	2686984	N/A	2011/11/21	AREFA DABHAD
Ammonia-N	LACH/NH4	2685492	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2682757	N/A	2011/11/16	HELEN HE
pH	PH	2682430	N/A	2011/11/15	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2683317	N/A	2011/11/16	BRAMDEO MOTIRAM
Orthophosphate	AC	2682806	N/A	2011/11/16	DEONARINE RAMNARINE
Sulphide	ISE/S	2683344	N/A	2011/11/18	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2687050	2011/11/18	2011/11/21	VIORICA ROTARU
Total Suspended Solids	SLDS	2682535	N/A	2011/11/22	TEJPRATAP MISHRA
Turbidity	TURB	2682579	N/A	2011/11/15	NEIL DASSANAYAKE

Maxxam ID LP8271 **Collected** 2011/11/14
Sample ID MW-01I **Shipped**
Matrix Water **Received** 2011/11/14

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2682434	N/A	2011/11/15	YOGESH PATEL
Anions	IC	2683224	N/A	2011/11/18	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2683426	N/A	2011/11/16	LOUISE HARDING
Fluoride	F	2682405	2011/11/15	2011/11/15	YOGESH PATEL
Hardness (calculated as CaCO3)		2681334	N/A	2011/11/18	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2684782	2011/11/17	2011/11/17	MAGDALENA CARLOS
Dissolved Metals by ICPMS	ICP/MS	2686735	N/A	2011/11/18	VIVIANA CANZONIERI
Total Metals Analysis by ICPMS	ICP/MS	2686984	N/A	2011/11/21	AREFA DABHAD
Ammonia-N	LACH/NH4	2685492	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2682757	N/A	2011/11/16	HELEN HE
pH	PH	2682430	N/A	2011/11/15	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2683317	N/A	2011/11/16	BRAMDEO MOTIRAM
Orthophosphate	AC	2682806	N/A	2011/11/16	DEONARINE RAMNARINE
Sulphide	ISE/S	2683344	N/A	2011/11/18	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2687050	2011/11/18	2011/11/21	VIORICA ROTARU
Total Suspended Solids	SLDS	2682535	N/A	2011/11/22	TEJPRATAP MISHRA
Turbidity	TURB	2682579	N/A	2011/11/15	NEIL DASSANAYAKE

Maxxam ID LP8272 **Collected** 2011/11/14
Sample ID MW-01O **Shipped**
Matrix Water **Received** 2011/11/14

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2682434	N/A	2011/11/15	YOGESH PATEL
Anions	IC	2683224	N/A	2011/11/18	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2683426	N/A	2011/11/16	LOUISE HARDING
Fluoride	F	2682405	2011/11/15	2011/11/15	YOGESH PATEL
Hardness (calculated as CaCO3)		2681334	N/A	2011/11/18	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2684782	2011/11/17	2011/11/17	MAGDALENA CARLOS

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Maxxam Job #: B1H9105
Report Date: 2011/11/22

Golder Associates Ltd
Client Project #: 021-1228
Site Location: TANSLEY QUARY
Sampler Initials: KFS

Test Summary

Dissolved Metals by ICPMS	ICP/MS	2686735	N/A	2011/11/18	VIVIANA CANZONIERI
Total Metals Analysis by ICPMS	ICP/MS	2686984	N/A	2011/11/21	AREFA DABHAD
Ammonia-N	LACH/NH4	2685492	N/A	2011/11/21	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2682757	N/A	2011/11/16	HELEN HE
pH	PH	2682430	N/A	2011/11/15	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2683317	N/A	2011/11/16	BRAMDEO MOTIRAM
Orthophosphate	AC	2682806	N/A	2011/11/16	DEONARINE RAMNARINE
Sulphide	ISE/S	2683344	N/A	2011/11/18	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2687050	2011/11/18	2011/11/21	VIORICA ROTARU
Total Suspended Solids	SLDS	2682535	N/A	2011/11/22	TEJPRATAP MISHRA
Turbidity	TURB	2682616	N/A	2011/11/15	NEIL DASSANAYAKE

Maxxam ID LP8272 Dup
Sample ID MW-01O
Matrix Water

Collected 2011/11/14
Shipped
Received 2011/11/14

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Free (WAD) Cyanide	TECH/CN	2683426	N/A	2011/11/16	LOUISE HARDING

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Package 1	13.7°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Sample LP8270-01: Nitrite: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Metals Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Sample LP8271-01: Metals Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location: TANSLEY QUARY

Quality Assurance Report

Maxxam Job Number: MB1H9105

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2682405	YPA	Matrix Spike	Fluoride (F-)	2011/11/15		101	%	80 - 120
		Spiked Blank	Fluoride (F-)	2011/11/15		100	%	80 - 120
		Method Blank	Fluoride (F-)	2011/11/15	<0.1		mg/L	
		RPD	Fluoride (F-)	2011/11/15	1.4		%	20
2682434	YPA	QC Standard	Alkalinity (Total as CaCO3)	2011/11/15		96	%	85 - 115
		Method Blank	Alkalinity (Total as CaCO3)	2011/11/15	<1		mg/L	
		RPD	Alkalinity (Total as CaCO3)	2011/11/15	0.3		%	25
2682535	TEJ	QC Standard	Total Suspended Solids	2011/11/15		97	%	85 - 115
		Method Blank	Total Suspended Solids	2011/11/22	<10		mg/L	
		RPD	Total Suspended Solids	2011/11/22	0.7		%	25
2682579	NYS	QC Standard	Turbidity	2011/11/15		97	%	85 - 115
		Method Blank	Turbidity	2011/11/15	<0.2		NTU	
		RPD	Turbidity	2011/11/15	4.4		%	20
2682616	NYS	QC Standard	Turbidity	2011/11/15		103	%	85 - 115
		Method Blank	Turbidity	2011/11/15	<0.2		NTU	
		RPD	Turbidity	2011/11/15	NC		%	20
2682757	HH	Matrix Spike	Nitrite (N)	2011/11/16		103	%	80 - 120
			Nitrate (N)	2011/11/16		100	%	80 - 120
		Spiked Blank	Nitrite (N)	2011/11/16		106	%	85 - 115
			Nitrate (N)	2011/11/16		105	%	85 - 115
		Method Blank	Nitrite (N)	2011/11/16	<0.01		mg/L	
			Nitrate (N)	2011/11/16	<0.1		mg/L	
		RPD	Nitrite (N)	2011/11/16	NC		%	25
			Nitrate (N)	2011/11/16	1.6		%	25
2682806	DRM	Matrix Spike	Orthophosphate (P)	2011/11/16		102	%	75 - 125
		Spiked Blank	Orthophosphate (P)	2011/11/16		103	%	80 - 120
		Method Blank	Orthophosphate (P)	2011/11/16	<0.01		mg/L	
		RPD	Orthophosphate (P)	2011/11/16	NC		%	25
2683224	FD	Matrix Spike	Dissolved Chloride (Cl)	2011/11/18		98	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/18		91	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/18		NC	%	80 - 120
		Spiked Blank	Dissolved Chloride (Cl)	2011/11/18		99	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/18		93	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/18		101	%	80 - 120
		Method Blank	Dissolved Chloride (Cl)	2011/11/18	<1		mg/L	
			Dissolved Bromide (Br-)	2011/11/18	<1		mg/L	
			Dissolved Sulphate (SO4)	2011/11/18	<1		mg/L	
		RPD	Dissolved Chloride (Cl)	2011/11/18	NC		%	20
			Dissolved Bromide (Br-)	2011/11/18	NC		%	20
			Dissolved Sulphate (SO4)	2011/11/18	0.8		%	20
2683317	BMO	Matrix Spike	Phenols-4AAP	2011/11/16		110	%	75 - 125
		Spiked Blank	Phenols-4AAP	2011/11/16		104	%	75 - 125
		Method Blank	Phenols-4AAP	2011/11/16	<0.001		mg/L	
		RPD	Phenols-4AAP	2011/11/16	NC		%	25
2683344	XQI	Matrix Spike	Sulphide	2011/11/18		87	%	80 - 120
		Spiked Blank	Sulphide	2011/11/18		94	%	80 - 120
		Method Blank	Sulphide	2011/11/18	<0.02		mg/L	
		RPD	Sulphide	2011/11/18	NC		%	20
2683426	LHA	Matrix Spike [LP8272-06]	Free Cyanide	2011/11/16		94	%	80 - 120
		Spiked Blank	Free Cyanide	2011/11/16		96	%	80 - 120
		Method Blank	Free Cyanide	2011/11/16	<0.002		mg/L	
		RPD [LP8272-06]	Free Cyanide	2011/11/16	NC		%	25
2684782	MC	Matrix Spike	Mercury (Hg)	2011/11/17		111	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/17		98	%	80 - 120

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location: TANSLEY QUARY

Quality Assurance Report (Continued)

Maxxam Job Number: MB1H9105

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2684782	MC	Method Blank	Mercury (Hg)	2011/11/17	<0.0001		mg/L	
		RPD	Mercury (Hg)	2011/11/17	NC		%	25
2685492	ADB	Matrix Spike	Total Ammonia-N	2011/11/21		100	%	80 - 120
		Spiked Blank	Total Ammonia-N	2011/11/21		101	%	85 - 115
		Method Blank	Total Ammonia-N	2011/11/21	<0.05		mg/L	
		RPD	Total Ammonia-N	2011/11/21	NC		%	20
2686735	VIV	Matrix Spike	Dissolved Aluminum (Al)	2011/11/18		98	%	80 - 120
			Dissolved Antimony (Sb)	2011/11/18		102	%	80 - 120
			Dissolved Arsenic (As)	2011/11/18		96	%	80 - 120
			Dissolved Barium (Ba)	2011/11/18		93	%	80 - 120
			Dissolved Beryllium (Be)	2011/11/18		96	%	80 - 120
			Dissolved Bismuth (Bi)	2011/11/18		91	%	80 - 120
			Dissolved Boron (B)	2011/11/18		93	%	80 - 120
			Dissolved Cadmium (Cd)	2011/11/18		99	%	80 - 120
			Dissolved Calcium (Ca)	2011/11/18		NC	%	80 - 120
			Dissolved Chromium (Cr)	2011/11/18		96	%	80 - 120
			Dissolved Cobalt (Co)	2011/11/18		94	%	80 - 120
			Dissolved Copper (Cu)	2011/11/18		88	%	80 - 120
			Dissolved Iron (Fe)	2011/11/18		94	%	80 - 120
			Dissolved Lead (Pb)	2011/11/18		91	%	80 - 120
			Dissolved Magnesium (Mg)	2011/11/18		NC	%	80 - 120
			Dissolved Manganese (Mn)	2011/11/18		93	%	80 - 120
			Dissolved Molybdenum (Mo)	2011/11/18		103	%	80 - 120
			Dissolved Nickel (Ni)	2011/11/18		90	%	80 - 120
			Dissolved Phosphorus (P)	2011/11/18		99	%	80 - 120
			Dissolved Potassium (K)	2011/11/18		96	%	80 - 120
			Dissolved Selenium (Se)	2011/11/18		98	%	80 - 120
			Dissolved Silicon (Si)	2011/11/18		98	%	80 - 120
			Dissolved Silver (Ag)	2011/11/18		83	%	80 - 120
			Dissolved Sodium (Na)	2011/11/18		NC	%	80 - 120
			Dissolved Strontium (Sr)	2011/11/18		NC	%	80 - 120
			Dissolved Thallium (Tl)	2011/11/18		90	%	80 - 120
			Dissolved Tin (Sn)	2011/11/18		105	%	80 - 120
			Dissolved Titanium (Ti)	2011/11/18		97	%	80 - 120
			Dissolved Uranium (U)	2011/11/18		94	%	80 - 120
			Dissolved Vanadium (V)	2011/11/18		99	%	80 - 120
			Dissolved Zinc (Zn)	2011/11/18		90	%	80 - 120
		Spiked Blank	Dissolved Aluminum (Al)	2011/11/18		101	%	80 - 120
			Dissolved Antimony (Sb)	2011/11/18		97	%	80 - 120
			Dissolved Arsenic (As)	2011/11/18		93	%	80 - 120
			Dissolved Barium (Ba)	2011/11/18		93	%	80 - 120
			Dissolved Beryllium (Be)	2011/11/18		100	%	80 - 120
			Dissolved Bismuth (Bi)	2011/11/18		91	%	80 - 120
			Dissolved Boron (B)	2011/11/18		103	%	80 - 120
			Dissolved Cadmium (Cd)	2011/11/18		99	%	80 - 120
			Dissolved Calcium (Ca)	2011/11/18		98	%	80 - 120
			Dissolved Chromium (Cr)	2011/11/18		93	%	80 - 120
			Dissolved Cobalt (Co)	2011/11/18		95	%	80 - 120
			Dissolved Copper (Cu)	2011/11/18		92	%	80 - 120
			Dissolved Iron (Fe)	2011/11/18		96	%	80 - 120
			Dissolved Lead (Pb)	2011/11/18		92	%	80 - 120
			Dissolved Magnesium (Mg)	2011/11/18		98	%	80 - 120
			Dissolved Manganese (Mn)	2011/11/18		98	%	80 - 120
			Dissolved Molybdenum (Mo)	2011/11/18		99	%	80 - 120
			Dissolved Nickel (Ni)	2011/11/18		94	%	80 - 120

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location: TANSLEY QUARY

Quality Assurance Report (Continued)

Maxxam Job Number: MB1H9105

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2686735	VIV	Spiked Blank	Dissolved Phosphorus (P)	2011/11/18		98	%	80 - 120
			Dissolved Potassium (K)	2011/11/18		96	%	80 - 120
			Dissolved Selenium (Se)	2011/11/18		99	%	80 - 120
			Dissolved Silicon (Si)	2011/11/18		100	%	80 - 120
			Dissolved Silver (Ag)	2011/11/18		95	%	80 - 120
			Dissolved Sodium (Na)	2011/11/18		105	%	80 - 120
			Dissolved Strontium (Sr)	2011/11/18		100	%	80 - 120
			Dissolved Thallium (Tl)	2011/11/18		92	%	80 - 120
			Dissolved Tin (Sn)	2011/11/18		102	%	80 - 120
			Dissolved Titanium (Ti)	2011/11/18		97	%	80 - 120
			Dissolved Uranium (U)	2011/11/18		92	%	80 - 120
			Dissolved Vanadium (V)	2011/11/18		97	%	80 - 120
			Dissolved Zinc (Zn)	2011/11/18		96	%	80 - 120
		Method Blank	Dissolved Aluminum (Al)	2011/11/18	<5		ug/L	
			Dissolved Antimony (Sb)	2011/11/18	<0.5		ug/L	
			Dissolved Arsenic (As)	2011/11/18	<1		ug/L	
			Dissolved Barium (Ba)	2011/11/18	<2		ug/L	
			Dissolved Beryllium (Be)	2011/11/18	<0.5		ug/L	
			Dissolved Bismuth (Bi)	2011/11/18	<1		ug/L	
			Dissolved Boron (B)	2011/11/18	<10		ug/L	
			Dissolved Cadmium (Cd)	2011/11/18	<0.1		ug/L	
			Dissolved Calcium (Ca)	2011/11/18	<200		ug/L	
			Dissolved Chromium (Cr)	2011/11/18	<5		ug/L	
			Dissolved Cobalt (Co)	2011/11/18	<0.5		ug/L	
			Dissolved Copper (Cu)	2011/11/18	<1		ug/L	
			Dissolved Iron (Fe)	2011/11/18	<100		ug/L	
			Dissolved Lead (Pb)	2011/11/18	<0.5		ug/L	
			Dissolved Magnesium (Mg)	2011/11/18	<50		ug/L	
			Dissolved Manganese (Mn)	2011/11/18	<2		ug/L	
			Dissolved Molybdenum (Mo)	2011/11/18	<0.5		ug/L	
			Dissolved Nickel (Ni)	2011/11/18	<1		ug/L	
			Dissolved Phosphorus (P)	2011/11/18	<100		ug/L	
			Dissolved Potassium (K)	2011/11/18	<200		ug/L	
			Dissolved Selenium (Se)	2011/11/18	<2		ug/L	
			Dissolved Silicon (Si)	2011/11/18	<50		ug/L	
			Dissolved Silver (Ag)	2011/11/18	<0.1		ug/L	
			Dissolved Sodium (Na)	2011/11/18	<100		ug/L	
			Dissolved Strontium (Sr)	2011/11/18	<1		ug/L	
			Dissolved Thallium (Tl)	2011/11/18	<0.05		ug/L	
			Dissolved Tin (Sn)	2011/11/18	<1		ug/L	
			Dissolved Titanium (Ti)	2011/11/18	<5		ug/L	
			Dissolved Uranium (U)	2011/11/18	<0.1		ug/L	
			Dissolved Vanadium (V)	2011/11/18	<0.5		ug/L	
			Dissolved Zinc (Zn)	2011/11/18	<5		ug/L	
		RPD	Dissolved Lead (Pb)	2011/11/18	NC		%	20
2686984	ADA	Matrix Spike	Total Aluminum (Al)	2011/11/21		104	%	80 - 120
			Total Antimony (Sb)	2011/11/21		106	%	80 - 120
			Total Arsenic (As)	2011/11/21		102	%	80 - 120
			Total Barium (Ba)	2011/11/21		103	%	80 - 120
			Total Beryllium (Be)	2011/11/21		101	%	80 - 120
			Total Bismuth (Bi)	2011/11/21		99	%	80 - 120
			Total Boron (B)	2011/11/21		106	%	80 - 120
			Total Cadmium (Cd)	2011/11/21		103	%	80 - 120
			Total Calcium (Ca)	2011/11/21		NC	%	80 - 120
			Total Chromium (Cr)	2011/11/21		104	%	80 - 120

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Golder Associates Ltd
Attention: Sharon Wood
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Quality Assurance Report (Continued)

Maxxam Job Number: MB1H9105

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2686984	ADA	Matrix Spike	Total Cobalt (Co)	2011/11/21		106	%	80 - 120
			Total Copper (Cu)	2011/11/21		104	%	80 - 120
			Total Iron (Fe)	2011/11/21		106	%	80 - 120
			Total Lead (Pb)	2011/11/21		99	%	80 - 120
			Total Magnesium (Mg)	2011/11/21		103	%	80 - 120
			Total Manganese (Mn)	2011/11/21		106	%	80 - 120
			Total Molybdenum (Mo)	2011/11/21		107	%	80 - 120
			Total Nickel (Ni)	2011/11/21		106	%	80 - 120
			Total Phosphorus (P)	2011/11/21		105	%	80 - 120
			Total Potassium (K)	2011/11/21		103	%	80 - 120
			Total Silicon (Si)	2011/11/21		101	%	80 - 120
			Total Selenium (Se)	2011/11/21		103	%	80 - 120
			Total Silver (Ag)	2011/11/21		97	%	80 - 120
			Total Sodium (Na)	2011/11/21		NC	%	80 - 120
			Total Strontium (Sr)	2011/11/21		NC	%	80 - 120
			Total Thallium (Tl)	2011/11/21		98	%	80 - 120
			Total Tin (Sn)	2011/11/21		107	%	80 - 120
			Total Titanium (Ti)	2011/11/21		105	%	80 - 120
			Total Uranium (U)	2011/11/21		101	%	80 - 120
			Total Vanadium (V)	2011/11/21		104	%	80 - 120
			Total Zinc (Zn)	2011/11/21		105	%	80 - 120
		Spiked Blank	Total Aluminum (Al)	2011/11/21		101	%	80 - 120
			Total Antimony (Sb)	2011/11/21		104	%	80 - 120
			Total Arsenic (As)	2011/11/21		98	%	80 - 120
			Total Barium (Ba)	2011/11/21		101	%	80 - 120
			Total Beryllium (Be)	2011/11/21		96	%	80 - 120
			Total Bismuth (Bi)	2011/11/21		97	%	80 - 120
			Total Boron (B)	2011/11/21		100	%	80 - 120
			Total Cadmium (Cd)	2011/11/21		100	%	80 - 120
			Total Calcium (Ca)	2011/11/21		98	%	80 - 120
			Total Chromium (Cr)	2011/11/21		101	%	80 - 120
			Total Cobalt (Co)	2011/11/21		102	%	80 - 120
			Total Copper (Cu)	2011/11/21		102	%	80 - 120
			Total Iron (Fe)	2011/11/21		101	%	80 - 120
			Total Lead (Pb)	2011/11/21		99	%	80 - 120
			Total Magnesium (Mg)	2011/11/21		102	%	80 - 120
			Total Manganese (Mn)	2011/11/21		101	%	80 - 120
			Total Molybdenum (Mo)	2011/11/21		105	%	80 - 120
			Total Nickel (Ni)	2011/11/21		103	%	80 - 120
			Total Phosphorus (P)	2011/11/21		105	%	80 - 120
			Total Potassium (K)	2011/11/21		100	%	80 - 120
			Total Silicon (Si)	2011/11/21		100	%	80 - 120
			Total Selenium (Se)	2011/11/21		99	%	80 - 120
			Total Silver (Ag)	2011/11/21		97	%	80 - 120
			Total Sodium (Na)	2011/11/21		104	%	80 - 120
			Total Strontium (Sr)	2011/11/21		98	%	80 - 120
			Total Thallium (Tl)	2011/11/21		98	%	80 - 120
			Total Tin (Sn)	2011/11/21		103	%	80 - 120
			Total Titanium (Ti)	2011/11/21		98	%	80 - 120
			Total Uranium (U)	2011/11/21		100	%	80 - 120
			Total Vanadium (V)	2011/11/21		101	%	80 - 120
			Total Zinc (Zn)	2011/11/21		102	%	80 - 120
		Method Blank	Total Aluminum (Al)	2011/11/21	<5		ug/L	
			Total Antimony (Sb)	2011/11/21	<0.5		ug/L	
			Total Arsenic (As)	2011/11/21	<1		ug/L	

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Golder Associates Ltd
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Site Location: TANSLEY QUARY

Quality Assurance Report (Continued)

Maxxam Job Number: MB1H9105

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2686984	ADA	Method Blank	Total Barium (Ba)	2011/11/21	<2		ug/L	
			Total Beryllium (Be)	2011/11/21	<0.5		ug/L	
			Total Bismuth (Bi)	2011/11/21	<1		ug/L	
			Total Boron (B)	2011/11/21	<10		ug/L	
			Total Cadmium (Cd)	2011/11/21	<0.1		ug/L	
			Total Calcium (Ca)	2011/11/21	<200		ug/L	
			Total Chromium (Cr)	2011/11/21	<5		ug/L	
			Total Cobalt (Co)	2011/11/21	<0.5		ug/L	
			Total Copper (Cu)	2011/11/21	<1		ug/L	
			Total Iron (Fe)	2011/11/21	<100		ug/L	
			Total Lead (Pb)	2011/11/21	<0.5		ug/L	
			Total Magnesium (Mg)	2011/11/21	<50		ug/L	
			Total Manganese (Mn)	2011/11/21	<2		ug/L	
			Total Molybdenum (Mo)	2011/11/21	<0.5		ug/L	
			Total Nickel (Ni)	2011/11/21	<1		ug/L	
			Total Phosphorus (P)	2011/11/21	<100		ug/L	
			Total Potassium (K)	2011/11/21	<200		ug/L	
			Total Silicon (Si)	2011/11/21	<50		ug/L	
			Total Selenium (Se)	2011/11/21	<2		ug/L	
			Total Silver (Ag)	2011/11/21	<0.1		ug/L	
			Total Sodium (Na)	2011/11/21	<100		ug/L	
			Total Strontium (Sr)	2011/11/21	<1		ug/L	
			Total Thallium (Tl)	2011/11/21	<0.05		ug/L	
			Total Tin (Sn)	2011/11/21	<1		ug/L	
			Total Titanium (Ti)	2011/11/21	<5		ug/L	
			Total Uranium (U)	2011/11/21	<0.1		ug/L	
			Total Vanadium (V)	2011/11/21	<0.5		ug/L	
			Total Zinc (Zn)	2011/11/21	<5		ug/L	
		RPD	Total Chromium (Cr)	2011/11/21	NC		%	20
			Total Lead (Pb)	2011/11/21	1.2		%	20
			Total Zinc (Zn)	2011/11/21	1.8		%	20
2687050	VRO	Matrix Spike	Total Phosphorus	2011/11/21		98	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/21		101	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/21		102	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/21	<0.02		mg/L	
		RPD	Total Phosphorus	2011/11/21	1.3		%	20

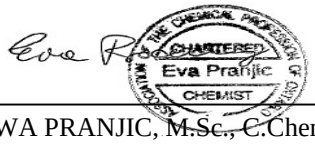
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Validation Signature Page

Maxxam Job #: B1H9105

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



EWA PRANJIC, M.Sc., C.Chem, Scientific Specialist

==========

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

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BEKKERS

Your Project #: 021-1228
Site#: Tansley Quarry
Your C.O.C. #: 31614705, 316147-05-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2012/01/06

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1I1627
Received: 2011/11/17, 17:13

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Alkalinity	1	N/A	2011/11/19	CAM SOP-00448	SM 2320B
Anions	1	N/A	2011/11/24	CAM SOP-00435	SM 4110B
Free (WAD) Cyanide	1	N/A	2011/11/21	CAM SOP-00457	SM4500-CN-I modified
Fluoride	1	2011/11/19	2011/11/19	CAM SOP-00448	APHA 4500FC
Hardness (calculated as CaCO3)	1	N/A	2011/11/22	CAM SOP 00102	SM 2340 B
Mercury in Water by CVAA	1	2011/11/21	2011/11/22	CAM SOP-00453	EPA 7470
Total Metals Analysis by ICPMS	1	N/A	2011/11/24	CAM SOP-00447	EPA 6020
Total Ammonia-N	1	N/A	2011/11/23	CAM SOP-00441	US GS I-2522-90
Nitrate (NO3) and Nitrite (NO2) in Water	1	N/A	2011/11/24	CAM SOP-00440	SM 4500 NO3I/NO2B
pH	1	N/A	2011/11/19	CAM SOP-00448	SM 4500H
Phenols (4AAP)	1	N/A	2011/11/22	CAM SOP-00444	MOE ROPHEN-E3179
Orthophosphate	1	N/A	2011/11/22	CAM SOP-00461	SM 4500 P-F
Sulphide	1	N/A	2011/11/21	CAM SOP-00455	SM 4500-S G
Total Phosphorus (Colourimetric)	1	2011/11/23	2011/11/23	CAM SOP-00407	APHA 4500 P,B,F
Total Suspended Solids	1	N/A	2011/11/18	CAM SOP-00428	SM 2540D
Turbidity	1	N/A	2011/11/19	CAM SOP-00417	APHA 2130B

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50

Your Project #: 021-1228
Site#: Tansley Quarry
Your C.O.C. #: 31614705, 316147-05-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2012/01/06

CERTIFICATE OF ANALYSIS

hydrocarbons. The extraction date for samples field preserved with methanol for F1 and Volatile Organic Compounds is considered to be the date sampled.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by Ontario Regulation 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Total cover pages: 2

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

RESULTS OF ANALYSES OF WATER

Maxxam ID		LR0708		
Sampling Date		2011/11/17		
COC Number		316147-05-01		
	Units	**SA-7**	**RDL**	**QC Batch**
Calculated Parameters				
Hardness (CaCO3)	mg/L	780	1	2685961
Inorganics				
Total Ammonia-N	mg/L	0.43	0.05	2689014
Fluoride (F-)	mg/L	0.3	0.1	2687649
Free Cyanide	mg/L	<0.002	0.002	2687845
Orthophosphate (P)	mg/L	<0.01	0.01	2687902
pH	pH	7.96		2687650
Phenols-4AAP	mg/L	<0.001	0.001	2687163
Total Phosphorus	mg/L	0.007	0.002	2690904
Total Suspended Solids	mg/L	<10	10	2686425
Sulphide	mg/L	<0.02	0.02	2687694
Turbidity	NTU	<0.2	0.2	2686783
Alkalinity (Total as CaCO3)	mg/L	172	1	2687648
Nitrite (N)	mg/L	0.05	0.01	2687289
Dissolved Chloride (Cl)	mg/L	195	10	2687798
Nitrate (N)	mg/L	1.3	0.1	2687289
Nitrate + Nitrite	mg/L	1.3	0.1	2687289
Dissolved Bromide (Br-)	mg/L	<10	10	2687798
Dissolved Sulphate (SO4)	mg/L	762	10	2687798

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LR0708		
Sampling Date		2011/11/17		
COC Number		316147-05-01		
	Units	**SA-7**	**RDL**	**QC Batch**
Metals				
Mercury (Hg)	mg/L	<0.0001	0.0001	2688195
Total Aluminum (Al)	ug/L	<5.0	5.0	2692307
Total Antimony (Sb)	ug/L	<0.50	0.50	2692307
Total Arsenic (As)	ug/L	<1.0	1.0	2692307
Total Barium (Ba)	ug/L	22	2.0	2692307
Total Beryllium (Be)	ug/L	<0.50	0.50	2692307
Total Bismuth (Bi)	ug/L	<1.0	1.0	2692307
Total Boron (B)	ug/L	1500	10	2692307
Total Cadmium (Cd)	ug/L	0.26	0.10	2692307
Total Calcium (Ca)	ug/L	190000	200	2692307
Total Chromium (Cr)	ug/L	<5.0	5.0	2692307
Total Cobalt (Co)	ug/L	<0.50	0.50	2692307
Total Copper (Cu)	ug/L	21	1.0	2692307
Total Iron (Fe)	ug/L	<100	100	2692307
Total Lead (Pb)	ug/L	2.3	0.50	2692307
Total Magnesium (Mg)	ug/L	100000	50	2692307
Total Manganese (Mn)	ug/L	71	2.0	2692307
Total Molybdenum (Mo)	ug/L	15	0.50	2692307
Total Nickel (Ni)	ug/L	4.9	1.0	2692307
Total Phosphorus (P)	ug/L	<100	100	2692307
Total Potassium (K)	ug/L	16000	200	2692307
Total Silicon (Si)	ug/L	5300	50	2692307
Total Selenium (Se)	ug/L	<2.0	2.0	2692307
Total Silver (Ag)	ug/L	<0.10	0.10	2692307
Total Sodium (Na)	ug/L	210000	100	2692307
Total Strontium (Sr)	ug/L	11000	1.0	2692307
Total Thallium (Tl)	ug/L	<0.050	0.050	2692307
Total Tin (Sn)	ug/L	<1.0	1.0	2692307
Total Titanium (Ti)	ug/L	<5.0	5.0	2692307
Total Uranium (U)	ug/L	3.0	0.10	2692307
Total Vanadium (V)	ug/L	0.87	0.50	2692307
Total Zinc (Zn)	ug/L	380	5.0	2692307

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

Test Summary

Maxxam ID LR0708
Sample ID SA-7
Matrix Water

Collected 2011/11/17
Shipped
Received 2011/11/17

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2687648	N/A	2011/11/19	YOGESH PATEL
Anions	IC	2687798	N/A	2011/11/24	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2687845	N/A	2011/11/21	LOUISE HARDING
Fluoride	F	2687649	2011/11/19	2011/11/19	YOGESH PATEL
Hardness (calculated as CaCO3)		2685961	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2688195	2011/11/21	2011/11/22	MAGDALENA CARLOS
Total Metals Analysis by ICPMS	ICP/MS	2692307	N/A	2011/11/24	HUA REN
Total Ammonia-N	LACH/NH4	2689014	N/A	2011/11/23	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2687289	N/A	2011/11/24	HELEN HE
pH	PH	2687650	N/A	2011/11/19	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2687163	N/A	2011/11/22	BRAMDEO MOTIRAM
Orthophosphate	AC	2687902	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687694	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2690904	2011/11/23	2011/11/23	VIORICA ROTARU
Total Suspended Solids	SLDS	2686425	N/A	2011/11/18	TEJPRATAP MISHRA
Turbidity	TURB	2686783	N/A	2011/11/19	NEIL DASSANAYAKE

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

Package 1	9.0°C
Package 2	6.7°C
Package 3	9.0°C
Package 4	6.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Sample LR0708-01: Anions Analysis: Due to high concentrations of the target analytes, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2686425	TEJ	QC Standard	Total Suspended Solids	2011/11/18		98	%	85 - 115
		Method Blank	Total Suspended Solids	2011/11/18	<10		mg/L	
		RPD [LR0710-02]	Total Suspended Solids	2011/11/18	NC		%	25
2686783	NYS	QC Standard	Turbidity	2011/11/19		98	%	85 - 115
		Method Blank	Turbidity	2011/11/19	<0.2		NTU	
		RPD	Turbidity	2011/11/19	NC		%	20
2687163	BMO	Matrix Spike	Phenols-4AAP	2011/11/22		101	%	75 - 125
		Spiked Blank	Phenols-4AAP	2011/11/22		97	%	75 - 125
		Method Blank	Phenols-4AAP	2011/11/22	<0.001		mg/L	
		RPD	Phenols-4AAP	2011/11/22	NC		%	25
2687266	XQI	Matrix Spike	Sulphide	2011/11/21		83	%	80 - 120
		Spiked Blank	Sulphide	2011/11/21		97	%	80 - 120
		Method Blank	Sulphide	2011/11/21	<0.02		mg/L	
		RPD	Sulphide	2011/11/21	NC		%	20
2687289	HH	Matrix Spike						
		[LR0709-01]	Nitrite (N)	2011/11/24		101	%	80 - 120
			Nitrate (N)	2011/11/24		NC	%	80 - 120
		Spiked Blank	Nitrite (N)	2011/11/24		99	%	85 - 115
			Nitrate (N)	2011/11/24		94	%	85 - 115
		Method Blank	Nitrite (N)	2011/11/24	<0.01		mg/L	
			Nitrate (N)	2011/11/24	<0.1		mg/L	
		RPD [LR0709-01]	Nitrite (N)	2011/11/24	NC		%	25
			Nitrate (N)	2011/11/24	0.5		%	25
2687648	YPA	QC Standard	Alkalinity (Total as CaCO3)	2011/11/19		97	%	85 - 115
		Method Blank	Alkalinity (Total as CaCO3)	2011/11/19	<1		mg/L	
		RPD [LR0707-01]	Alkalinity (Total as CaCO3)	2011/11/19	0.4		%	25
2687649	YPA	Matrix Spike						
		[LR0707-01]	Fluoride (F-)	2011/11/19		102	%	80 - 120
		Spiked Blank	Fluoride (F-)	2011/11/19		104	%	80 - 120
		Method Blank	Fluoride (F-)	2011/11/19	<0.1		mg/L	
		RPD [LR0707-01]	Fluoride (F-)	2011/11/19	NC		%	20
2687694	XQI	Matrix Spike						
		[LR0702-06]	Sulphide	2011/11/21		93	%	80 - 120
		Spiked Blank	Sulphide	2011/11/21		93	%	80 - 120
		Method Blank	Sulphide	2011/11/21	<0.02		mg/L	
		RPD [LR0702-06]	Sulphide	2011/11/21	NC		%	20
2687798	FD	Matrix Spike	Dissolved Chloride (Cl)	2011/11/24		NC	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/24		NC	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/24		NC	%	80 - 120
		Spiked Blank	Dissolved Chloride (Cl)	2011/11/24		100	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/24		105	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/24		104	%	80 - 120
		Method Blank	Dissolved Chloride (Cl)	2011/11/24	<1		mg/L	
			Dissolved Bromide (Br-)	2011/11/24	<1		mg/L	
			Dissolved Sulphate (SO4)	2011/11/24	<1		mg/L	
		RPD	Dissolved Chloride (Cl)	2011/11/24	2.8		%	20
			Dissolved Bromide (Br-)	2011/11/24	NC		%	20
			Dissolved Sulphate (SO4)	2011/11/24	3.2		%	20
2687845	LHA	Matrix Spike						
		[LR0702-04]	Free Cyanide	2011/11/21		95	%	80 - 120
		Spiked Blank	Free Cyanide	2011/11/21		101	%	80 - 120
		Method Blank	Free Cyanide	2011/11/21	<0.002		mg/L	
		RPD [LR0702-04]	Free Cyanide	2011/11/21	NC		%	25
2687902	DRM	Matrix Spike						
		[LR0702-01]	Orthophosphate (P)	2011/11/22		98	%	75 - 125

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2687902	DRM	Spiked Blank	Orthophosphate (P)	2011/11/22		101	%	80 - 120
		Method Blank	Orthophosphate (P)	2011/11/22	<0.01		mg/L	
		RPD [LR0702-01]	Orthophosphate (P)	2011/11/22	NC		%	25
2688195	MC	Matrix Spike [LR0706-08]	Mercury (Hg)	2011/11/22		120	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/22		105	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/22	<0.0001		mg/L	
		RPD [LR0706-08]	Mercury (Hg)	2011/11/22	NC		%	25
2688235	MC	Matrix Spike [LR0702-08]	Mercury (Hg)	2011/11/22		109	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/22		98	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/22	<0.0001		mg/L	
		RPD [LR0702-08]	Mercury (Hg)	2011/11/22	NC		%	25
2689014	ADB	Matrix Spike	Total Ammonia-N	2011/11/23		NC	%	80 - 120
		Spiked Blank	Total Ammonia-N	2011/11/23		105	%	85 - 115
		Method Blank	Total Ammonia-N	2011/11/23	<0.05		mg/L	
		RPD	Total Ammonia-N	2011/11/23	0.4		%	20
2689034	ADB	Matrix Spike	Total Ammonia-N	2011/11/24		96	%	80 - 120
		Spiked Blank	Total Ammonia-N	2011/11/24		100	%	85 - 115
		Method Blank	Total Ammonia-N	2011/11/24	<0.05		mg/L	
		RPD	Total Ammonia-N	2011/11/24	NC		%	20
2690904	VRO	Matrix Spike [LR0702-05]	Total Phosphorus	2011/11/23		101	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/23		97	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/23		99	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/23	<0.002		mg/L	
		RPD [LR0702-05]	Total Phosphorus	2011/11/23	NC		%	20
2690941	VRO	Matrix Spike	Total Phosphorus	2011/11/23		102	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/23		102	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/23		104	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/23	<0.002		mg/L	
		RPD	Total Phosphorus	2011/11/23	NC		%	20
2691983	VRO	Matrix Spike	Total Phosphorus	2011/11/24		92	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/24		99	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/24		97	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/24	<0.002		mg/L	
		RPD	Total Phosphorus	2011/11/24	6.7		%	20
2692307	HRE	Matrix Spike	Total Aluminum (Al)	2011/11/24		94	%	80 - 120
			Total Antimony (Sb)	2011/11/24		106	%	80 - 120
			Total Arsenic (As)	2011/11/24		100	%	80 - 120
			Total Barium (Ba)	2011/11/24		92	%	80 - 120
			Total Beryllium (Be)	2011/11/24		95	%	80 - 120
			Total Bismuth (Bi)	2011/11/24		102	%	80 - 120
			Total Boron (B)	2011/11/24		NC	%	80 - 120
			Total Cadmium (Cd)	2011/11/24		100	%	80 - 120
			Total Calcium (Ca)	2011/11/24		NC	%	80 - 120
			Total Chromium (Cr)	2011/11/24		95	%	80 - 120
			Total Cobalt (Co)	2011/11/24		97	%	80 - 120
			Total Copper (Cu)	2011/11/24		96	%	80 - 120
			Total Iron (Fe)	2011/11/24		101	%	80 - 120
			Total Lead (Pb)	2011/11/24		102	%	80 - 120
			Total Magnesium (Mg)	2011/11/24		NC	%	80 - 120
			Total Manganese (Mn)	2011/11/24		97	%	80 - 120
			Total Molybdenum (Mo)	2011/11/24		107	%	80 - 120
			Total Nickel (Ni)	2011/11/24		96	%	80 - 120

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2692307	HRE	Matrix Spike	Total Phosphorus (P)	2011/11/24		99	%	80 - 120
			Total Potassium (K)	2011/11/24		97	%	80 - 120
			Total Silicon (Si)	2011/11/24		80	%	80 - 120
			Total Selenium (Se)	2011/11/24		98	%	80 - 120
			Total Silver (Ag)	2011/11/24		98	%	80 - 120
			Total Sodium (Na)	2011/11/24		91	%	80 - 120
			Total Strontium (Sr)	2011/11/24		NC	%	80 - 120
			Total Thallium (Tl)	2011/11/24		102	%	80 - 120
			Total Tin (Sn)	2011/11/24		107	%	80 - 120
			Total Titanium (Ti)	2011/11/24		100	%	80 - 120
			Total Uranium (U)	2011/11/24		102	%	80 - 120
			Total Vanadium (V)	2011/11/24		96	%	80 - 120
			Total Zinc (Zn)	2011/11/24		98	%	80 - 120
		Spiked Blank	Total Aluminum (Al)	2011/11/24		92	%	80 - 120
			Total Antimony (Sb)	2011/11/24		100	%	80 - 120
			Total Arsenic (As)	2011/11/24		98	%	80 - 120
			Total Barium (Ba)	2011/11/24		97	%	80 - 120
			Total Beryllium (Be)	2011/11/24		94	%	80 - 120
			Total Bismuth (Bi)	2011/11/24		101	%	80 - 120
			Total Boron (B)	2011/11/24		95	%	80 - 120
			Total Cadmium (Cd)	2011/11/24		96	%	80 - 120
			Total Calcium (Ca)	2011/11/24		97	%	80 - 120
			Total Chromium (Cr)	2011/11/24		94	%	80 - 120
			Total Cobalt (Co)	2011/11/24		95	%	80 - 120
			Total Copper (Cu)	2011/11/24		95	%	80 - 120
			Total Iron (Fe)	2011/11/24		98	%	80 - 120
			Total Lead (Pb)	2011/11/24		101	%	80 - 120
			Total Magnesium (Mg)	2011/11/24		92	%	80 - 120
			Total Manganese (Mn)	2011/11/24		92	%	80 - 120
			Total Molybdenum (Mo)	2011/11/24		102	%	80 - 120
			Total Nickel (Ni)	2011/11/24		95	%	80 - 120
			Total Phosphorus (P)	2011/11/24		92	%	80 - 120
			Total Potassium (K)	2011/11/24		97	%	80 - 120
			Total Silicon (Si)	2011/11/24		91	%	80 - 120
			Total Selenium (Se)	2011/11/24		96	%	80 - 120
			Total Silver (Ag)	2011/11/24		95	%	80 - 120
			Total Sodium (Na)	2011/11/24		95	%	80 - 120
			Total Strontium (Sr)	2011/11/24		96	%	80 - 120
			Total Thallium (Tl)	2011/11/24		100	%	80 - 120
			Total Tin (Sn)	2011/11/24		101	%	80 - 120
			Total Titanium (Ti)	2011/11/24		100	%	80 - 120
			Total Uranium (U)	2011/11/24		102	%	80 - 120
			Total Vanadium (V)	2011/11/24		92	%	80 - 120
			Total Zinc (Zn)	2011/11/24		98	%	80 - 120
		Method Blank	Total Aluminum (Al)	2011/11/24	<5.0		ug/L	
			Total Antimony (Sb)	2011/11/24	<0.50		ug/L	
			Total Arsenic (As)	2011/11/24	<1.0		ug/L	
			Total Barium (Ba)	2011/11/24	<2.0		ug/L	
			Total Beryllium (Be)	2011/11/24	<0.50		ug/L	
			Total Bismuth (Bi)	2011/11/24	<1.0		ug/L	
			Total Boron (B)	2011/11/24	<10		ug/L	
			Total Cadmium (Cd)	2011/11/24	<0.10		ug/L	
			Total Calcium (Ca)	2011/11/24	<200		ug/L	
			Total Chromium (Cr)	2011/11/24	<5.0		ug/L	
			Total Cobalt (Co)	2011/11/24	<0.50		ug/L	

Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2692307	HRE	Method Blank	Total Copper (Cu)	2011/11/24	<1.0		ug/L	
			Total Iron (Fe)	2011/11/24	<100		ug/L	
			Total Lead (Pb)	2011/11/24	<0.50		ug/L	
			Total Magnesium (Mg)	2011/11/24	<50		ug/L	
			Total Manganese (Mn)	2011/11/24	<2.0		ug/L	
			Total Molybdenum (Mo)	2011/11/24	<0.50		ug/L	
			Total Nickel (Ni)	2011/11/24	<1.0		ug/L	
			Total Phosphorus (P)	2011/11/24	<100		ug/L	
			Total Potassium (K)	2011/11/24	<200		ug/L	
			Total Silicon (Si)	2011/11/24	<50		ug/L	
			Total Selenium (Se)	2011/11/24	<2.0		ug/L	
			Total Silver (Ag)	2011/11/24	<0.10		ug/L	
			Total Sodium (Na)	2011/11/24	<100		ug/L	
			Total Strontium (Sr)	2011/11/24	<1.0		ug/L	
			Total Thallium (Tl)	2011/11/24	<0.050		ug/L	
			Total Tin (Sn)	2011/11/24	<1.0		ug/L	
			Total Titanium (Ti)	2011/11/24	<5.0		ug/L	
			Total Uranium (U)	2011/11/24	<0.10		ug/L	
			Total Vanadium (V)	2011/11/24	<0.50		ug/L	
			Total Zinc (Zn)	2011/11/24	<5.0		ug/L	
		RPD	Total Aluminum (Al)	2011/11/24	NC		%	20
			Total Chromium (Cr)	2011/11/24	NC		%	20
			Total Copper (Cu)	2011/11/24	NC		%	20
			Total Silver (Ag)	2011/11/24	NC		%	20
			Total Zinc (Zn)	2011/11/24	NC		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Validation Signature Page

Maxxam Job #: B1I1627

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

CRISTINA CARRIERE, Scientific Services

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

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FINUCCI

Your Project #: 021-1228
Site#: Tansley Quarry
Your C.O.C. #: 31614705, 316147-05-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2012/01/06

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1I1627
Received: 2011/11/17, 17:13

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Alkalinity	1	N/A	2011/11/19	CAM SOP-00448	SM 2320B
Anions	1	N/A	2011/11/24	CAM SOP-00435	SM 4110B
Free (WAD) Cyanide	1	N/A	2011/11/21	CAM SOP-00457	SM4500-CN-I modified
Fluoride	1	2011/11/19	2011/11/19	CAM SOP-00448	APHA 4500FC
Hardness (calculated as CaCO3)	1	N/A	2011/11/22	CAM SOP 00102	SM 2340 B
Mercury in Water by CVAA	1	2011/11/21	2011/11/22	CAM SOP-00453	EPA 7470
Total Metals Analysis by ICPMS	1	N/A	2011/11/24	CAM SOP-00447	EPA 6020
Total Ammonia-N	1	N/A	2011/11/23	CAM SOP-00441	US GS I-2522-90
Nitrate (NO3) and Nitrite (NO2) in Water	1	N/A	2011/11/24	CAM SOP-00440	SM 4500 NO3I/NO2B
pH	1	N/A	2011/11/19	CAM SOP-00448	SM 4500H
Phenols (4AAP)	1	N/A	2011/11/22	CAM SOP-00444	MOE ROPHEN-E3179
Orthophosphate	1	N/A	2011/11/22	CAM SOP-00461	SM 4500 P-F
Sulphide	1	N/A	2011/11/21	CAM SOP-00455	SM 4500-S G
Total Phosphorus (Colourimetric)	1	2011/11/23	2011/11/23	CAM SOP-00407	APHA 4500 P,B,F
Total Suspended Solids	1	N/A	2011/11/18	CAM SOP-00428	SM 2540D
Turbidity	1	N/A	2011/11/19	CAM SOP-00417	APHA 2130B

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50

Your Project #: 021-1228
Site#: Tansley Quarry
Your C.O.C. #: 31614705, 316147-05-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2012/01/06

CERTIFICATE OF ANALYSIS

hydrocarbons. The extraction date for samples field preserved with methanol for F1 and Volatile Organic Compounds is considered to be the date sampled.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by Ontario Regulation 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Total cover pages: 2

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

RESULTS OF ANALYSES OF WATER

Maxxam ID		LR0702		
Sampling Date		2011/11/17		
COC Number		316147-05-01		
	Units	**SA-1**	**RDL**	**QC Batch**
Calculated Parameters				
Hardness (CaCO3)	mg/L	520	1	2685961
Inorganics				
Total Ammonia-N	mg/L	0.25	0.05	2689014
Fluoride (F-)	mg/L	0.4	0.1	2687649
Free Cyanide	mg/L	<0.002	0.002	2687845
Orthophosphate (P)	mg/L	<0.01	0.01	2687902
pH	pH	7.57		2687650
Phenols-4AAP	mg/L	<0.001	0.001	2687163
Total Phosphorus	mg/L	<0.002	0.002	2690904
Total Suspended Solids	mg/L	<10	10	2686425
Sulphide	mg/L	<0.02	0.02	2687694
Turbidity	NTU	<0.2	0.2	2686783
Alkalinity (Total as CaCO3)	mg/L	408	1	2687648
Nitrite (N)	mg/L	0.01	0.01	2687289
Dissolved Chloride (Cl)	mg/L	19	1	2687798
Nitrate (N)	mg/L	0.7	0.1	2687289
Nitrate + Nitrite	mg/L	0.7	0.1	2687289
Dissolved Bromide (Br-)	mg/L	<1	1	2687798
Dissolved Sulphate (SO4)	mg/L	341	1	2687798

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LR0702		
Sampling Date		2011/11/17		
COC Number		316147-05-01		
	Units	**SA-1**	**RDL**	**QC Batch**
Metals				
Mercury (Hg)	mg/L	<0.0001	0.0001	2688235
Total Aluminum (Al)	ug/L	5.3	5.0	2692307
Total Antimony (Sb)	ug/L	<0.50	0.50	2692307
Total Arsenic (As)	ug/L	<1.0	1.0	2692307
Total Barium (Ba)	ug/L	20	2.0	2692307
Total Beryllium (Be)	ug/L	<0.50	0.50	2692307
Total Bismuth (Bi)	ug/L	<1.0	1.0	2692307
Total Boron (B)	ug/L	3900	10	2692307
Total Cadmium (Cd)	ug/L	<0.10	0.10	2692307
Total Calcium (Ca)	ug/L	130000	200	2692307
Total Chromium (Cr)	ug/L	<5.0	5.0	2692307
Total Cobalt (Co)	ug/L	<0.50	0.50	2692307
Total Copper (Cu)	ug/L	15	1.0	2692307
Total Iron (Fe)	ug/L	<100	100	2692307
Total Lead (Pb)	ug/L	1.1	0.50	2692307
Total Magnesium (Mg)	ug/L	96000	50	2692307
Total Manganese (Mn)	ug/L	38	2.0	2692307
Total Molybdenum (Mo)	ug/L	4.3	0.50	2692307
Total Nickel (Ni)	ug/L	7.4	1.0	2692307
Total Phosphorus (P)	ug/L	<100	100	2692307
Total Potassium (K)	ug/L	34000	200	2692307
Total Silicon (Si)	ug/L	7500	50	2692307
Total Selenium (Se)	ug/L	<2.0	2.0	2692307
Total Silver (Ag)	ug/L	<0.10	0.10	2692307
Total Sodium (Na)	ug/L	140000	100	2692307
Total Strontium (Sr)	ug/L	21000	1.0	2692307
Total Thallium (Tl)	ug/L	<0.050	0.050	2692307
Total Tin (Sn)	ug/L	<1.0	1.0	2692307
Total Titanium (Ti)	ug/L	<5.0	5.0	2692307
Total Uranium (U)	ug/L	0.34	0.10	2692307
Total Vanadium (V)	ug/L	0.52	0.50	2692307
Total Zinc (Zn)	ug/L	340	5.0	2692307

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

Test Summary

Maxxam ID LR0702
Sample ID SA-1
Matrix Water

Collected 2011/11/17
Shipped
Received 2011/11/17

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2687648	N/A	2011/11/19	YOGESH PATEL
Anions	IC	2687798	N/A	2011/11/24	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2687845	N/A	2011/11/21	LOUISE HARDING
Fluoride	F	2687649	2011/11/19	2011/11/19	YOGESH PATEL
Hardness (calculated as CaCO3)		2685961	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2688235	2011/11/21	2011/11/22	MAGDALENA CARLOS
Total Metals Analysis by ICPMS	ICP/MS	2692307	N/A	2011/11/24	HUA REN
Total Ammonia-N	LACH/NH4	2689014	N/A	2011/11/23	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2687289	N/A	2011/11/24	HELEN HE
pH	PH	2687650	N/A	2011/11/19	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2687163	N/A	2011/11/22	BRAMDEO MOTIRAM
Orthophosphate	AC	2687902	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687694	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2690904	2011/11/23	2011/11/23	VIORICA ROTARU
Total Suspended Solids	SLDS	2686425	N/A	2011/11/18	TEJPRATAP MISHRA
Turbidity	TURB	2686783	N/A	2011/11/19	NEIL DASSANAYAKE

Maxxam ID LR0702 Dup
Sample ID SA-1
Matrix Water

Collected 2011/11/17
Shipped
Received 2011/11/17

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Free (WAD) Cyanide	TECH/CN	2687845	N/A	2011/11/21	LOUISE HARDING
Mercury in Water by CVAA	CVAA	2688235	2011/11/21	2011/11/22	MAGDALENA CARLOS
Orthophosphate	AC	2687902	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687694	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2690904	2011/11/23	2011/11/23	VIORICA ROTARU

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

Package 1	9.0°C
Package 2	6.7°C
Package 3	9.0°C
Package 4	6.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Sample LR0708-01: Anions Analysis: Due to high concentrations of the target analytes, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2686425	TEJ	QC Standard	Total Suspended Solids	2011/11/18		98	%	85 - 115
		Method Blank	Total Suspended Solids	2011/11/18	<10		mg/L	
		RPD [LR0710-02]	Total Suspended Solids	2011/11/18	NC		%	25
2686783	NYS	QC Standard	Turbidity	2011/11/19		98	%	85 - 115
		Method Blank	Turbidity	2011/11/19	<0.2		NTU	
		RPD	Turbidity	2011/11/19	NC		%	20
2687163	BMO	Matrix Spike	Phenols-4AAP	2011/11/22		101	%	75 - 125
		Spiked Blank	Phenols-4AAP	2011/11/22		97	%	75 - 125
		Method Blank	Phenols-4AAP	2011/11/22	<0.001		mg/L	
		RPD	Phenols-4AAP	2011/11/22	NC		%	25
2687266	XQI	Matrix Spike	Sulphide	2011/11/21		83	%	80 - 120
		Spiked Blank	Sulphide	2011/11/21		97	%	80 - 120
		Method Blank	Sulphide	2011/11/21	<0.02		mg/L	
		RPD	Sulphide	2011/11/21	NC		%	20
2687289	HH	Matrix Spike						
		[LR0709-01]	Nitrite (N)	2011/11/24		101	%	80 - 120
			Nitrate (N)	2011/11/24		NC	%	80 - 120
		Spiked Blank	Nitrite (N)	2011/11/24		99	%	85 - 115
			Nitrate (N)	2011/11/24		94	%	85 - 115
		Method Blank	Nitrite (N)	2011/11/24	<0.01		mg/L	
			Nitrate (N)	2011/11/24	<0.1		mg/L	
		RPD [LR0709-01]	Nitrite (N)	2011/11/24	NC		%	25
			Nitrate (N)	2011/11/24	0.5		%	25
2687648	YPA	QC Standard	Alkalinity (Total as CaCO3)	2011/11/19		97	%	85 - 115
		Method Blank	Alkalinity (Total as CaCO3)	2011/11/19	<1		mg/L	
		RPD [LR0707-01]	Alkalinity (Total as CaCO3)	2011/11/19	0.4		%	25
2687649	YPA	Matrix Spike						
		[LR0707-01]	Fluoride (F-)	2011/11/19		102	%	80 - 120
		Spiked Blank	Fluoride (F-)	2011/11/19		104	%	80 - 120
		Method Blank	Fluoride (F-)	2011/11/19	<0.1		mg/L	
		RPD [LR0707-01]	Fluoride (F-)	2011/11/19	NC		%	20
2687694	XQI	Matrix Spike						
		[LR0702-06]	Sulphide	2011/11/21		93	%	80 - 120
		Spiked Blank	Sulphide	2011/11/21		93	%	80 - 120
		Method Blank	Sulphide	2011/11/21	<0.02		mg/L	
		RPD [LR0702-06]	Sulphide	2011/11/21	NC		%	20
2687798	FD	Matrix Spike	Dissolved Chloride (Cl)	2011/11/24		NC	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/24		NC	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/24		NC	%	80 - 120
		Spiked Blank	Dissolved Chloride (Cl)	2011/11/24		100	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/24		105	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/24		104	%	80 - 120
		Method Blank	Dissolved Chloride (Cl)	2011/11/24	<1		mg/L	
			Dissolved Bromide (Br-)	2011/11/24	<1		mg/L	
			Dissolved Sulphate (SO4)	2011/11/24	<1		mg/L	
		RPD	Dissolved Chloride (Cl)	2011/11/24	2.8		%	20
			Dissolved Bromide (Br-)	2011/11/24	NC		%	20
			Dissolved Sulphate (SO4)	2011/11/24	3.2		%	20
2687845	LHA	Matrix Spike						
		[LR0702-04]	Free Cyanide	2011/11/21		95	%	80 - 120
		Spiked Blank	Free Cyanide	2011/11/21		101	%	80 - 120
		Method Blank	Free Cyanide	2011/11/21	<0.002		mg/L	
		RPD [LR0702-04]	Free Cyanide	2011/11/21	NC		%	25
2687902	DRM	Matrix Spike						
		[LR0702-01]	Orthophosphate (P)	2011/11/22		98	%	75 - 125

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2687902	DRM	Spiked Blank	Orthophosphate (P)	2011/11/22		101	%	80 - 120
		Method Blank	Orthophosphate (P)	2011/11/22	<0.01		mg/L	
		RPD [LR0702-01]	Orthophosphate (P)	2011/11/22	NC		%	25
2688195	MC	Matrix Spike [LR0706-08]	Mercury (Hg)	2011/11/22		120	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/22		105	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/22	<0.0001		mg/L	
		RPD [LR0706-08]	Mercury (Hg)	2011/11/22	NC		%	25
2688235	MC	Matrix Spike [LR0702-08]	Mercury (Hg)	2011/11/22		109	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/22		98	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/22	<0.0001		mg/L	
		RPD [LR0702-08]	Mercury (Hg)	2011/11/22	NC		%	25
2689014	ADB	Matrix Spike	Total Ammonia-N	2011/11/23		NC	%	80 - 120
		Spiked Blank	Total Ammonia-N	2011/11/23		105	%	85 - 115
		Method Blank	Total Ammonia-N	2011/11/23	<0.05		mg/L	
		RPD	Total Ammonia-N	2011/11/23	0.4		%	20
2689034	ADB	Matrix Spike	Total Ammonia-N	2011/11/24		96	%	80 - 120
		Spiked Blank	Total Ammonia-N	2011/11/24		100	%	85 - 115
		Method Blank	Total Ammonia-N	2011/11/24	<0.05		mg/L	
		RPD	Total Ammonia-N	2011/11/24	NC		%	20
2690904	VRO	Matrix Spike [LR0702-05]	Total Phosphorus	2011/11/23		101	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/23		97	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/23		99	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/23	<0.002		mg/L	
		RPD [LR0702-05]	Total Phosphorus	2011/11/23	NC		%	20
2690941	VRO	Matrix Spike	Total Phosphorus	2011/11/23		102	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/23		102	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/23		104	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/23	<0.002		mg/L	
		RPD	Total Phosphorus	2011/11/23	NC		%	20
2691983	VRO	Matrix Spike	Total Phosphorus	2011/11/24		92	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/24		99	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/24		97	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/24	<0.002		mg/L	
		RPD	Total Phosphorus	2011/11/24	6.7		%	20
2692307	HRE	Matrix Spike	Total Aluminum (Al)	2011/11/24		94	%	80 - 120
			Total Antimony (Sb)	2011/11/24		106	%	80 - 120
			Total Arsenic (As)	2011/11/24		100	%	80 - 120
			Total Barium (Ba)	2011/11/24		92	%	80 - 120
			Total Beryllium (Be)	2011/11/24		95	%	80 - 120
			Total Bismuth (Bi)	2011/11/24		102	%	80 - 120
			Total Boron (B)	2011/11/24		NC	%	80 - 120
			Total Cadmium (Cd)	2011/11/24		100	%	80 - 120
			Total Calcium (Ca)	2011/11/24		NC	%	80 - 120
			Total Chromium (Cr)	2011/11/24		95	%	80 - 120
			Total Cobalt (Co)	2011/11/24		97	%	80 - 120
			Total Copper (Cu)	2011/11/24		96	%	80 - 120
			Total Iron (Fe)	2011/11/24		101	%	80 - 120
			Total Lead (Pb)	2011/11/24		102	%	80 - 120
			Total Magnesium (Mg)	2011/11/24		NC	%	80 - 120
			Total Manganese (Mn)	2011/11/24		97	%	80 - 120
			Total Molybdenum (Mo)	2011/11/24		107	%	80 - 120
			Total Nickel (Ni)	2011/11/24		96	%	80 - 120

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2692307	HRE	Matrix Spike	Total Phosphorus (P)	2011/11/24		99	%	80 - 120
			Total Potassium (K)	2011/11/24		97	%	80 - 120
			Total Silicon (Si)	2011/11/24		80	%	80 - 120
			Total Selenium (Se)	2011/11/24		98	%	80 - 120
			Total Silver (Ag)	2011/11/24		98	%	80 - 120
			Total Sodium (Na)	2011/11/24		91	%	80 - 120
			Total Strontium (Sr)	2011/11/24		NC	%	80 - 120
			Total Thallium (Tl)	2011/11/24		102	%	80 - 120
			Total Tin (Sn)	2011/11/24		107	%	80 - 120
			Total Titanium (Ti)	2011/11/24		100	%	80 - 120
			Total Uranium (U)	2011/11/24		102	%	80 - 120
			Total Vanadium (V)	2011/11/24		96	%	80 - 120
			Total Zinc (Zn)	2011/11/24		98	%	80 - 120
		Spiked Blank	Total Aluminum (Al)	2011/11/24		92	%	80 - 120
			Total Antimony (Sb)	2011/11/24		100	%	80 - 120
			Total Arsenic (As)	2011/11/24		98	%	80 - 120
			Total Barium (Ba)	2011/11/24		97	%	80 - 120
			Total Beryllium (Be)	2011/11/24		94	%	80 - 120
			Total Bismuth (Bi)	2011/11/24		101	%	80 - 120
			Total Boron (B)	2011/11/24		95	%	80 - 120
			Total Cadmium (Cd)	2011/11/24		96	%	80 - 120
			Total Calcium (Ca)	2011/11/24		97	%	80 - 120
			Total Chromium (Cr)	2011/11/24		94	%	80 - 120
			Total Cobalt (Co)	2011/11/24		95	%	80 - 120
			Total Copper (Cu)	2011/11/24		95	%	80 - 120
			Total Iron (Fe)	2011/11/24		98	%	80 - 120
			Total Lead (Pb)	2011/11/24		101	%	80 - 120
			Total Magnesium (Mg)	2011/11/24		92	%	80 - 120
			Total Manganese (Mn)	2011/11/24		92	%	80 - 120
			Total Molybdenum (Mo)	2011/11/24		102	%	80 - 120
			Total Nickel (Ni)	2011/11/24		95	%	80 - 120
			Total Phosphorus (P)	2011/11/24		92	%	80 - 120
			Total Potassium (K)	2011/11/24		97	%	80 - 120
			Total Silicon (Si)	2011/11/24		91	%	80 - 120
			Total Selenium (Se)	2011/11/24		96	%	80 - 120
			Total Silver (Ag)	2011/11/24		95	%	80 - 120
			Total Sodium (Na)	2011/11/24		95	%	80 - 120
			Total Strontium (Sr)	2011/11/24		96	%	80 - 120
			Total Thallium (Tl)	2011/11/24		100	%	80 - 120
			Total Tin (Sn)	2011/11/24		101	%	80 - 120
			Total Titanium (Ti)	2011/11/24		100	%	80 - 120
			Total Uranium (U)	2011/11/24		102	%	80 - 120
			Total Vanadium (V)	2011/11/24		92	%	80 - 120
			Total Zinc (Zn)	2011/11/24		98	%	80 - 120
		Method Blank	Total Aluminum (Al)	2011/11/24	<5.0		ug/L	
			Total Antimony (Sb)	2011/11/24	<0.50		ug/L	
			Total Arsenic (As)	2011/11/24	<1.0		ug/L	
			Total Barium (Ba)	2011/11/24	<2.0		ug/L	
			Total Beryllium (Be)	2011/11/24	<0.50		ug/L	
			Total Bismuth (Bi)	2011/11/24	<1.0		ug/L	
			Total Boron (B)	2011/11/24	<10		ug/L	
			Total Cadmium (Cd)	2011/11/24	<0.10		ug/L	
			Total Calcium (Ca)	2011/11/24	<200		ug/L	
			Total Chromium (Cr)	2011/11/24	<5.0		ug/L	
			Total Cobalt (Co)	2011/11/24	<0.50		ug/L	

Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2692307	HRE	Method Blank	Total Copper (Cu)	2011/11/24	<1.0		ug/L	
			Total Iron (Fe)	2011/11/24	<100		ug/L	
			Total Lead (Pb)	2011/11/24	<0.50		ug/L	
			Total Magnesium (Mg)	2011/11/24	<50		ug/L	
			Total Manganese (Mn)	2011/11/24	<2.0		ug/L	
			Total Molybdenum (Mo)	2011/11/24	<0.50		ug/L	
			Total Nickel (Ni)	2011/11/24	<1.0		ug/L	
			Total Phosphorus (P)	2011/11/24	<100		ug/L	
			Total Potassium (K)	2011/11/24	<200		ug/L	
			Total Silicon (Si)	2011/11/24	<50		ug/L	
			Total Selenium (Se)	2011/11/24	<2.0		ug/L	
			Total Silver (Ag)	2011/11/24	<0.10		ug/L	
			Total Sodium (Na)	2011/11/24	<100		ug/L	
			Total Strontium (Sr)	2011/11/24	<1.0		ug/L	
			Total Thallium (Tl)	2011/11/24	<0.050		ug/L	
			Total Tin (Sn)	2011/11/24	<1.0		ug/L	
			Total Titanium (Ti)	2011/11/24	<5.0		ug/L	
			Total Uranium (U)	2011/11/24	<0.10		ug/L	
			Total Vanadium (V)	2011/11/24	<0.50		ug/L	
			Total Zinc (Zn)	2011/11/24	<5.0		ug/L	
		RPD	Total Aluminum (Al)	2011/11/24	NC		%	20
			Total Chromium (Cr)	2011/11/24	NC		%	20
			Total Copper (Cu)	2011/11/24	NC		%	20
			Total Silver (Ag)	2011/11/24	NC		%	20
			Total Zinc (Zn)	2011/11/24	NC		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Validation Signature Page

Maxxam Job #: B1I1627

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

CRISTINA CARRIERE, Scientific Services

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

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HENDERVALE CISTERN
(ABC Barn, XYZ Barn and Main Barn)

May 2012
Report No. 021-1228

Golder Associates

Your Project #: 021-1228
Site#: Tansley Quarry
Your C.O.C. #: 31614705, 316147-05-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2012/01/06

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1I1627
Received: 2011/11/17, 17:13

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Alkalinity	1	N/A	2011/11/19	CAM SOP-00448	SM 2320B
Anions	1	N/A	2011/11/24	CAM SOP-00435	SM 4110B
Free (WAD) Cyanide	1	N/A	2011/11/21	CAM SOP-00457	SM4500-CN-I modified
Fluoride	1	2011/11/19	2011/11/19	CAM SOP-00448	APHA 4500FC
Hardness (calculated as CaCO3)	1	N/A	2011/11/22	CAM SOP 00102	SM 2340 B
Mercury in Water by CVAA	1	2011/11/21	2011/11/22	CAM SOP-00453	EPA 7470
Total Metals Analysis by ICPMS	1	N/A	2011/11/24	CAM SOP-00447	EPA 6020
Total Ammonia-N	1	N/A	2011/11/23	CAM SOP-00441	US GS I-2522-90
Nitrate (NO3) and Nitrite (NO2) in Water	1	N/A	2011/11/24	CAM SOP-00440	SM 4500 NO3I/NO2B
pH	1	N/A	2011/11/19	CAM SOP-00448	SM 4500H
Phenols (4AAP)	1	N/A	2011/11/22	CAM SOP-00444	MOE ROPHEN-E3179
Orthophosphate	1	N/A	2011/11/22	CAM SOP-00461	SM 4500 P-F
Sulphide	1	N/A	2011/11/21	CAM SOP-00455	SM 4500-S G
Total Phosphorus (Colourimetric)	1	2011/11/23	2011/11/23	CAM SOP-00407	APHA 4500 P,B,F
Total Suspended Solids	1	N/A	2011/11/18	CAM SOP-00428	SM 2540D
Turbidity	1	N/A	2011/11/19	CAM SOP-00417	APHA 2130B

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50

Your Project #: 021-1228
Site#: Tansley Quarry
Your C.O.C. #: 31614705, 316147-05-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2012/01/06

CERTIFICATE OF ANALYSIS

hydrocarbons. The extraction date for samples field preserved with methanol for F1 and Volatile Organic Compounds is considered to be the date sampled.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by Ontario Regulation 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Total cover pages: 2

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

RESULTS OF ANALYSES OF WATER

Maxxam ID		LR0705		
Sampling Date		2011/11/17		
COC Number		316147-05-01		
	Units	**SA-4**	**RDL**	**QC Batch**
Calculated Parameters				
Hardness (CaCO3)	mg/L	450	1	2685961
Inorganics				
Total Ammonia-N	mg/L	0.27	0.05	2689014
Fluoride (F-)	mg/L	0.2	0.1	2687649
Free Cyanide	mg/L	<0.002	0.002	2687845
Orthophosphate (P)	mg/L	<0.01	0.01	2687902
pH	pH	8.10		2687650
Phenols-4AAP	mg/L	<0.001	0.001	2687163
Total Phosphorus	mg/L	0.015	0.002	2690904
Total Suspended Solids	mg/L	12	10	2686425
Sulphide	mg/L	<0.02	0.02	2687266
Turbidity	NTU	6.5	0.2	2686783
Alkalinity (Total as CaCO3)	mg/L	368	1	2687648
Nitrite (N)	mg/L	0.06	0.01	2687289
Dissolved Chloride (Cl)	mg/L	19	1	2687798
Nitrate (N)	mg/L	<0.1	0.1	2687289
Nitrate + Nitrite	mg/L	<0.1	0.1	2687289
Dissolved Bromide (Br-)	mg/L	<1	1	2687798
Dissolved Sulphate (SO4)	mg/L	94	1	2687798

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LR0705		
Sampling Date		2011/11/17		
COC Number		316147-05-01		
	Units	**SA-4**	**RDL**	**QC Batch**
Metals				
Mercury (Hg)	mg/L	<0.0001	0.0001	2688235
Total Aluminum (Al)	ug/L	110	5.0	2692307
Total Antimony (Sb)	ug/L	<0.50	0.50	2692307
Total Arsenic (As)	ug/L	13	1.0	2692307
Total Barium (Ba)	ug/L	46	2.0	2692307
Total Beryllium (Be)	ug/L	<0.50	0.50	2692307
Total Bismuth (Bi)	ug/L	<1.0	1.0	2692307
Total Boron (B)	ug/L	330	10	2692307
Total Cadmium (Cd)	ug/L	<0.10	0.10	2692307
Total Calcium (Ca)	ug/L	110000	200	2692307
Total Chromium (Cr)	ug/L	<5.0	5.0	2692307
Total Cobalt (Co)	ug/L	<0.50	0.50	2692307
Total Copper (Cu)	ug/L	4.9	1.0	2692307
Total Iron (Fe)	ug/L	1600	100	2692307
Total Lead (Pb)	ug/L	<0.50	0.50	2692307
Total Magnesium (Mg)	ug/L	58000	50	2692307
Total Manganese (Mn)	ug/L	51	2.0	2692307
Total Molybdenum (Mo)	ug/L	1.2	0.50	2692307
Total Nickel (Ni)	ug/L	<1.0	1.0	2692307
Total Phosphorus (P)	ug/L	<100	100	2692307
Total Potassium (K)	ug/L	5200	200	2692307
Total Silicon (Si)	ug/L	12000	50	2692307
Total Selenium (Se)	ug/L	<2.0	2.0	2692307
Total Silver (Ag)	ug/L	<0.10	0.10	2692307
Total Sodium (Na)	ug/L	21000	100	2692307
Total Strontium (Sr)	ug/L	2600	1.0	2692307
Total Thallium (Tl)	ug/L	<0.050	0.050	2692307
Total Tin (Sn)	ug/L	<1.0	1.0	2692307
Total Titanium (Ti)	ug/L	<5.0	5.0	2692307
Total Uranium (U)	ug/L	0.97	0.10	2692307
Total Vanadium (V)	ug/L	1.6	0.50	2692307
Total Zinc (Zn)	ug/L	31	5.0	2692307

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

Test Summary

Maxxam ID LR0705
Sample ID SA-4
Matrix Water

Collected 2011/11/17
Shipped
Received 2011/11/17

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2687648	N/A	2011/11/19	YOGESH PATEL
Anions	IC	2687798	N/A	2011/11/24	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2687845	N/A	2011/11/21	LOUISE HARDING
Fluoride	F	2687649	2011/11/19	2011/11/19	YOGESH PATEL
Hardness (calculated as CaCO3)		2685961	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2688235	2011/11/21	2011/11/22	MAGDALENA CARLOS
Total Metals Analysis by ICPMS	ICP/MS	2692307	N/A	2011/11/24	HUA REN
Total Ammonia-N	LACH/NH4	2689014	N/A	2011/11/23	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2687289	N/A	2011/11/24	HELEN HE
pH	PH	2687650	N/A	2011/11/19	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2687163	N/A	2011/11/22	BRAMDEO MOTIRAM
Orthophosphate	AC	2687902	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687266	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2690904	2011/11/23	2011/11/23	VIORICA ROTARU
Total Suspended Solids	SLDS	2686425	N/A	2011/11/18	TEJPRATAP MISHRA
Turbidity	TURB	2686783	N/A	2011/11/19	NEIL DASSANAYAKE

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Package 1	9.0°C
Package 2	6.7°C
Package 3	9.0°C
Package 4	6.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Sample LR0708-01: Anions Analysis: Due to high concentrations of the target analytes, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2686425	TEJ	QC Standard	Total Suspended Solids	2011/11/18		98	%	85 - 115
		Method Blank	Total Suspended Solids	2011/11/18	<10		mg/L	
		RPD [LR0710-02]	Total Suspended Solids	2011/11/18	NC		%	25
2686783	NYS	QC Standard	Turbidity	2011/11/19		98	%	85 - 115
		Method Blank	Turbidity	2011/11/19	<0.2		NTU	
		RPD	Turbidity	2011/11/19	NC		%	20
2687163	BMO	Matrix Spike	Phenols-4AAP	2011/11/22		101	%	75 - 125
		Spiked Blank	Phenols-4AAP	2011/11/22		97	%	75 - 125
		Method Blank	Phenols-4AAP	2011/11/22	<0.001		mg/L	
		RPD	Phenols-4AAP	2011/11/22	NC		%	25
2687266	XQI	Matrix Spike	Sulphide	2011/11/21		83	%	80 - 120
		Spiked Blank	Sulphide	2011/11/21		97	%	80 - 120
		Method Blank	Sulphide	2011/11/21	<0.02		mg/L	
		RPD	Sulphide	2011/11/21	NC		%	20
2687289	HH	Matrix Spike						
		[LR0709-01]	Nitrite (N)	2011/11/24		101	%	80 - 120
			Nitrate (N)	2011/11/24		NC	%	80 - 120
		Spiked Blank	Nitrite (N)	2011/11/24		99	%	85 - 115
			Nitrate (N)	2011/11/24		94	%	85 - 115
		Method Blank	Nitrite (N)	2011/11/24	<0.01		mg/L	
			Nitrate (N)	2011/11/24	<0.1		mg/L	
		RPD [LR0709-01]	Nitrite (N)	2011/11/24	NC		%	25
			Nitrate (N)	2011/11/24	0.5		%	25
2687648	YPA	QC Standard	Alkalinity (Total as CaCO3)	2011/11/19		97	%	85 - 115
		Method Blank	Alkalinity (Total as CaCO3)	2011/11/19	<1		mg/L	
		RPD [LR0707-01]	Alkalinity (Total as CaCO3)	2011/11/19	0.4		%	25
2687649	YPA	Matrix Spike						
		[LR0707-01]	Fluoride (F-)	2011/11/19		102	%	80 - 120
		Spiked Blank	Fluoride (F-)	2011/11/19		104	%	80 - 120
		Method Blank	Fluoride (F-)	2011/11/19	<0.1		mg/L	
		RPD [LR0707-01]	Fluoride (F-)	2011/11/19	NC		%	20
2687694	XQI	Matrix Spike						
		[LR0702-06]	Sulphide	2011/11/21		93	%	80 - 120
		Spiked Blank	Sulphide	2011/11/21		93	%	80 - 120
		Method Blank	Sulphide	2011/11/21	<0.02		mg/L	
		RPD [LR0702-06]	Sulphide	2011/11/21	NC		%	20
2687798	FD	Matrix Spike	Dissolved Chloride (Cl)	2011/11/24		NC	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/24		NC	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/24		NC	%	80 - 120
		Spiked Blank	Dissolved Chloride (Cl)	2011/11/24		100	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/24		105	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/24		104	%	80 - 120
		Method Blank	Dissolved Chloride (Cl)	2011/11/24	<1		mg/L	
			Dissolved Bromide (Br-)	2011/11/24	<1		mg/L	
			Dissolved Sulphate (SO4)	2011/11/24	<1		mg/L	
		RPD	Dissolved Chloride (Cl)	2011/11/24	2.8		%	20
			Dissolved Bromide (Br-)	2011/11/24	NC		%	20
			Dissolved Sulphate (SO4)	2011/11/24	3.2		%	20
2687845	LHA	Matrix Spike						
		[LR0702-04]	Free Cyanide	2011/11/21		95	%	80 - 120
		Spiked Blank	Free Cyanide	2011/11/21		101	%	80 - 120
		Method Blank	Free Cyanide	2011/11/21	<0.002		mg/L	
		RPD [LR0702-04]	Free Cyanide	2011/11/21	NC		%	25
2687902	DRM	Matrix Spike						
		[LR0702-01]	Orthophosphate (P)	2011/11/22		98	%	75 - 125

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2687902	DRM	Spiked Blank	Orthophosphate (P)	2011/11/22		101	%	80 - 120
		Method Blank	Orthophosphate (P)	2011/11/22	<0.01		mg/L	
		RPD [LR0702-01]	Orthophosphate (P)	2011/11/22	NC		%	25
2688195	MC	Matrix Spike [LR0706-08]	Mercury (Hg)	2011/11/22		120	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/22		105	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/22	<0.0001		mg/L	
		RPD [LR0706-08]	Mercury (Hg)	2011/11/22	NC		%	25
2688235	MC	Matrix Spike [LR0702-08]	Mercury (Hg)	2011/11/22		109	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/22		98	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/22	<0.0001		mg/L	
		RPD [LR0702-08]	Mercury (Hg)	2011/11/22	NC		%	25
2689014	ADB	Matrix Spike	Total Ammonia-N	2011/11/23		NC	%	80 - 120
		Spiked Blank	Total Ammonia-N	2011/11/23		105	%	85 - 115
		Method Blank	Total Ammonia-N	2011/11/23	<0.05		mg/L	
		RPD	Total Ammonia-N	2011/11/23	0.4		%	20
2689034	ADB	Matrix Spike	Total Ammonia-N	2011/11/24		96	%	80 - 120
		Spiked Blank	Total Ammonia-N	2011/11/24		100	%	85 - 115
		Method Blank	Total Ammonia-N	2011/11/24	<0.05		mg/L	
		RPD	Total Ammonia-N	2011/11/24	NC		%	20
2690904	VRO	Matrix Spike [LR0702-05]	Total Phosphorus	2011/11/23		101	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/23		97	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/23		99	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/23	<0.002		mg/L	
		RPD [LR0702-05]	Total Phosphorus	2011/11/23	NC		%	20
2690941	VRO	Matrix Spike	Total Phosphorus	2011/11/23		102	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/23		102	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/23		104	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/23	<0.002		mg/L	
		RPD	Total Phosphorus	2011/11/23	NC		%	20
2691983	VRO	Matrix Spike	Total Phosphorus	2011/11/24		92	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/24		99	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/24		97	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/24	<0.002		mg/L	
		RPD	Total Phosphorus	2011/11/24	6.7		%	20
2692307	HRE	Matrix Spike	Total Aluminum (Al)	2011/11/24		94	%	80 - 120
			Total Antimony (Sb)	2011/11/24		106	%	80 - 120
			Total Arsenic (As)	2011/11/24		100	%	80 - 120
			Total Barium (Ba)	2011/11/24		92	%	80 - 120
			Total Beryllium (Be)	2011/11/24		95	%	80 - 120
			Total Bismuth (Bi)	2011/11/24		102	%	80 - 120
			Total Boron (B)	2011/11/24		NC	%	80 - 120
			Total Cadmium (Cd)	2011/11/24		100	%	80 - 120
			Total Calcium (Ca)	2011/11/24		NC	%	80 - 120
			Total Chromium (Cr)	2011/11/24		95	%	80 - 120
			Total Cobalt (Co)	2011/11/24		97	%	80 - 120
			Total Copper (Cu)	2011/11/24		96	%	80 - 120
			Total Iron (Fe)	2011/11/24		101	%	80 - 120
			Total Lead (Pb)	2011/11/24		102	%	80 - 120
			Total Magnesium (Mg)	2011/11/24		NC	%	80 - 120
			Total Manganese (Mn)	2011/11/24		97	%	80 - 120
			Total Molybdenum (Mo)	2011/11/24		107	%	80 - 120
			Total Nickel (Ni)	2011/11/24		96	%	80 - 120

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2692307	HRE	Matrix Spike	Total Phosphorus (P)	2011/11/24		99	%	80 - 120
			Total Potassium (K)	2011/11/24		97	%	80 - 120
			Total Silicon (Si)	2011/11/24		80	%	80 - 120
			Total Selenium (Se)	2011/11/24		98	%	80 - 120
			Total Silver (Ag)	2011/11/24		98	%	80 - 120
			Total Sodium (Na)	2011/11/24		91	%	80 - 120
			Total Strontium (Sr)	2011/11/24		NC	%	80 - 120
			Total Thallium (Tl)	2011/11/24		102	%	80 - 120
			Total Tin (Sn)	2011/11/24		107	%	80 - 120
			Total Titanium (Ti)	2011/11/24		100	%	80 - 120
			Total Uranium (U)	2011/11/24		102	%	80 - 120
			Total Vanadium (V)	2011/11/24		96	%	80 - 120
			Total Zinc (Zn)	2011/11/24		98	%	80 - 120
		Spiked Blank	Total Aluminum (Al)	2011/11/24		92	%	80 - 120
			Total Antimony (Sb)	2011/11/24		100	%	80 - 120
			Total Arsenic (As)	2011/11/24		98	%	80 - 120
			Total Barium (Ba)	2011/11/24		97	%	80 - 120
			Total Beryllium (Be)	2011/11/24		94	%	80 - 120
			Total Bismuth (Bi)	2011/11/24		101	%	80 - 120
			Total Boron (B)	2011/11/24		95	%	80 - 120
			Total Cadmium (Cd)	2011/11/24		96	%	80 - 120
			Total Calcium (Ca)	2011/11/24		97	%	80 - 120
			Total Chromium (Cr)	2011/11/24		94	%	80 - 120
			Total Cobalt (Co)	2011/11/24		95	%	80 - 120
			Total Copper (Cu)	2011/11/24		95	%	80 - 120
			Total Iron (Fe)	2011/11/24		98	%	80 - 120
			Total Lead (Pb)	2011/11/24		101	%	80 - 120
			Total Magnesium (Mg)	2011/11/24		92	%	80 - 120
			Total Manganese (Mn)	2011/11/24		92	%	80 - 120
			Total Molybdenum (Mo)	2011/11/24		102	%	80 - 120
			Total Nickel (Ni)	2011/11/24		95	%	80 - 120
			Total Phosphorus (P)	2011/11/24		92	%	80 - 120
			Total Potassium (K)	2011/11/24		97	%	80 - 120
			Total Silicon (Si)	2011/11/24		91	%	80 - 120
			Total Selenium (Se)	2011/11/24		96	%	80 - 120
			Total Silver (Ag)	2011/11/24		95	%	80 - 120
			Total Sodium (Na)	2011/11/24		95	%	80 - 120
			Total Strontium (Sr)	2011/11/24		96	%	80 - 120
			Total Thallium (Tl)	2011/11/24		100	%	80 - 120
			Total Tin (Sn)	2011/11/24		101	%	80 - 120
			Total Titanium (Ti)	2011/11/24		100	%	80 - 120
			Total Uranium (U)	2011/11/24		102	%	80 - 120
			Total Vanadium (V)	2011/11/24		92	%	80 - 120
			Total Zinc (Zn)	2011/11/24		98	%	80 - 120
		Method Blank	Total Aluminum (Al)	2011/11/24	<5.0		ug/L	
			Total Antimony (Sb)	2011/11/24	<0.50		ug/L	
			Total Arsenic (As)	2011/11/24	<1.0		ug/L	
			Total Barium (Ba)	2011/11/24	<2.0		ug/L	
			Total Beryllium (Be)	2011/11/24	<0.50		ug/L	
			Total Bismuth (Bi)	2011/11/24	<1.0		ug/L	
			Total Boron (B)	2011/11/24	<10		ug/L	
			Total Cadmium (Cd)	2011/11/24	<0.10		ug/L	
			Total Calcium (Ca)	2011/11/24	<200		ug/L	
			Total Chromium (Cr)	2011/11/24	<5.0		ug/L	
			Total Cobalt (Co)	2011/11/24	<0.50		ug/L	

Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2692307	HRE	Method Blank	Total Copper (Cu)	2011/11/24	<1.0		ug/L	
			Total Iron (Fe)	2011/11/24	<100		ug/L	
			Total Lead (Pb)	2011/11/24	<0.50		ug/L	
			Total Magnesium (Mg)	2011/11/24	<50		ug/L	
			Total Manganese (Mn)	2011/11/24	<2.0		ug/L	
			Total Molybdenum (Mo)	2011/11/24	<0.50		ug/L	
			Total Nickel (Ni)	2011/11/24	<1.0		ug/L	
			Total Phosphorus (P)	2011/11/24	<100		ug/L	
			Total Potassium (K)	2011/11/24	<200		ug/L	
			Total Silicon (Si)	2011/11/24	<50		ug/L	
			Total Selenium (Se)	2011/11/24	<2.0		ug/L	
			Total Silver (Ag)	2011/11/24	<0.10		ug/L	
			Total Sodium (Na)	2011/11/24	<100		ug/L	
			Total Strontium (Sr)	2011/11/24	<1.0		ug/L	
			Total Thallium (Tl)	2011/11/24	<0.050		ug/L	
			Total Tin (Sn)	2011/11/24	<1.0		ug/L	
			Total Titanium (Ti)	2011/11/24	<5.0		ug/L	
			Total Uranium (U)	2011/11/24	<0.10		ug/L	
			Total Vanadium (V)	2011/11/24	<0.50		ug/L	
			Total Zinc (Zn)	2011/11/24	<5.0		ug/L	
		RPD	Total Aluminum (Al)	2011/11/24	NC		%	20
			Total Chromium (Cr)	2011/11/24	NC		%	20
			Total Copper (Cu)	2011/11/24	NC		%	20
			Total Silver (Ag)	2011/11/24	NC		%	20
			Total Zinc (Zn)	2011/11/24	NC		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Validation Signature Page

Maxxam Job #: B1I1627

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

CRISTINA CARRIERE, Scientific Services

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

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HENDERVALE COTTAGE

May 2012
Report No. 021-1228

Your Project #: 021-1228
Site#: Tansley Quarry
Your C.O.C. #: 31614705, 316147-05-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2012/01/06

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1I1627
Received: 2011/11/17, 17:13

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Alkalinity	1	N/A	2011/11/19	CAM SOP-00448	SM 2320B
Anions	1	N/A	2011/11/24	CAM SOP-00435	SM 4110B
Free (WAD) Cyanide	1	N/A	2011/11/21	CAM SOP-00457	SM4500-CN-I modified
Fluoride	1	2011/11/19	2011/11/19	CAM SOP-00448	APHA 4500FC
Hardness (calculated as CaCO3)	1	N/A	2011/11/22	CAM SOP 00102	SM 2340 B
Mercury in Water by CVAA	1	2011/11/21	2011/11/22	CAM SOP-00453	EPA 7470
Total Metals Analysis by ICPMS	1	N/A	2011/11/24	CAM SOP-00447	EPA 6020
Total Ammonia-N	1	N/A	2011/11/24	CAM SOP-00441	US GS I-2522-90
Nitrate (NO3) and Nitrite (NO2) in Water	1	N/A	2011/11/24	CAM SOP-00440	SM 4500 NO3I/NO2B
pH	1	N/A	2011/11/19	CAM SOP-00448	SM 4500H
Phenols (4AAP)	1	N/A	2011/11/22	CAM SOP-00444	MOE ROPHEN-E3179
Orthophosphate	1	N/A	2011/11/22	CAM SOP-00461	SM 4500 P-F
Sulphide	1	N/A	2011/11/21	CAM SOP-00455	SM 4500-S G
Total Phosphorus (Colourimetric)	1	2011/11/23	2011/11/23	CAM SOP-00407	APHA 4500 P,B,F
Total Suspended Solids	1	N/A	2011/11/18	CAM SOP-00428	SM 2540D
Turbidity	1	N/A	2011/11/19	CAM SOP-00417	APHA 2130B

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50

Your Project #: 021-1228
Site#: Tansley Quarry
Your C.O.C. #: 31614705, 316147-05-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2012/01/06

CERTIFICATE OF ANALYSIS

hydrocarbons. The extraction date for samples field preserved with methanol for F1 and Volatile Organic Compounds is considered to be the date sampled.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by Ontario Regulation 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Total cover pages: 2

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

RESULTS OF ANALYSES OF WATER

Maxxam ID		LR0706		
Sampling Date		2011/11/17		
COC Number		316147-05-01		
	Units	**SA-5**	**RDL**	**QC Batch**
Calculated Parameters				
Hardness (CaCO3)	mg/L	590	1	2685961
Inorganics				
Total Ammonia-N	mg/L	0.31	0.05	2689034
Fluoride (F-)	mg/L	0.2	0.1	2687649
Free Cyanide	mg/L	<0.002	0.002	2687845
Orthophosphate (P)	mg/L	<0.01	0.01	2687902
pH	pH	7.93		2687650
Phenols-4AAP	mg/L	<0.001	0.001	2687163
Total Phosphorus	mg/L	0.008	0.002	2690941
Total Suspended Solids	mg/L	<10	10	2686425
Sulphide	mg/L	<0.02	0.02	2687266
Turbidity	NTU	2.1	0.2	2686783
Alkalinity (Total as CaCO3)	mg/L	354	1	2687648
Nitrite (N)	mg/L	<0.01	0.01	2687289
Dissolved Chloride (Cl)	mg/L	128	1	2687798
Nitrate (N)	mg/L	<0.1	0.1	2687289
Nitrate + Nitrite	mg/L	<0.1	0.1	2687289
Dissolved Bromide (Br-)	mg/L	<1	1	2687798
Dissolved Sulphate (SO4)	mg/L	154	1	2687798

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1I1627
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Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LR0706		
Sampling Date		2011/11/17		
COC Number		316147-05-01		
	Units	**SA-5**	**RDL**	**QC Batch**
Metals				
Mercury (Hg)	mg/L	<0.0001	0.0001	2688195
Total Aluminum (Al)	ug/L	<5.0	5.0	2692307
Total Antimony (Sb)	ug/L	<0.50	0.50	2692307
Total Arsenic (As)	ug/L	14	1.0	2692307
Total Barium (Ba)	ug/L	40	2.0	2692307
Total Beryllium (Be)	ug/L	<0.50	0.50	2692307
Total Bismuth (Bi)	ug/L	<1.0	1.0	2692307
Total Boron (B)	ug/L	670	10	2692307
Total Cadmium (Cd)	ug/L	<0.10	0.10	2692307
Total Calcium (Ca)	ug/L	130000	200	2692307
Total Chromium (Cr)	ug/L	<5.0	5.0	2692307
Total Cobalt (Co)	ug/L	<0.50	0.50	2692307
Total Copper (Cu)	ug/L	2.1	1.0	2692307
Total Iron (Fe)	ug/L	460	100	2692307
Total Lead (Pb)	ug/L	<0.50	0.50	2692307
Total Magnesium (Mg)	ug/L	100000	50	2692307
Total Manganese (Mn)	ug/L	51	2.0	2692307
Total Molybdenum (Mo)	ug/L	4.0	0.50	2692307
Total Nickel (Ni)	ug/L	<1.0	1.0	2692307
Total Phosphorus (P)	ug/L	<100	100	2692307
Total Potassium (K)	ug/L	10000	200	2692307
Total Silicon (Si)	ug/L	12000	50	2692307
Total Selenium (Se)	ug/L	<2.0	2.0	2692307
Total Silver (Ag)	ug/L	<0.10	0.10	2692307
Total Sodium (Na)	ug/L	66000	100	2692307
Total Strontium (Sr)	ug/L	5600	1.0	2692307
Total Thallium (Tl)	ug/L	<0.050	0.050	2692307
Total Tin (Sn)	ug/L	<1.0	1.0	2692307
Total Titanium (Ti)	ug/L	<5.0	5.0	2692307
Total Uranium (U)	ug/L	1.6	0.10	2692307
Total Vanadium (V)	ug/L	0.75	0.50	2692307
Total Zinc (Zn)	ug/L	47	5.0	2692307

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

Test Summary

Maxxam ID LR0706
Sample ID SA-5
Matrix Water

Collected 2011/11/17
Shipped
Received 2011/11/17

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2687648	N/A	2011/11/19	YOGESH PATEL
Anions	IC	2687798	N/A	2011/11/24	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2687845	N/A	2011/11/21	LOUISE HARDING
Fluoride	F	2687649	2011/11/19	2011/11/19	YOGESH PATEL
Hardness (calculated as CaCO3)		2685961	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2688195	2011/11/21	2011/11/22	MAGDALENA CARLOS
Total Metals Analysis by ICPMS	ICP/MS	2692307	N/A	2011/11/24	HUA REN
Total Ammonia-N	LACH/NH4	2689034	N/A	2011/11/24	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2687289	N/A	2011/11/24	HELEN HE
pH	PH	2687650	N/A	2011/11/19	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2687163	N/A	2011/11/22	BRAMDEO MOTIRAM
Orthophosphate	AC	2687902	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687266	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2690941	2011/11/23	2011/11/23	VIORICA ROTARU
Total Suspended Solids	SLDS	2686425	N/A	2011/11/18	TEJPRATAP MISHRA
Turbidity	TURB	2686783	N/A	2011/11/19	NEIL DASSANAYAKE

Maxxam ID LR0706 Dup
Sample ID SA-5
Matrix Water

Collected 2011/11/17
Shipped
Received 2011/11/17

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Mercury in Water by CVAA	CVAA	2688195	2011/11/21	2011/11/22	MAGDALENA CARLOS

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Sampler Initials: KS

Package 1	9.0°C
Package 2	6.7°C
Package 3	9.0°C
Package 4	6.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Sample LR0708-01: Anions Analysis: Due to high concentrations of the target analytes, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2686425	TEJ	QC Standard	Total Suspended Solids	2011/11/18		98	%	85 - 115
		Method Blank	Total Suspended Solids	2011/11/18	<10		mg/L	
		RPD [LR0710-02]	Total Suspended Solids	2011/11/18	NC		%	25
2686783	NYS	QC Standard	Turbidity	2011/11/19		98	%	85 - 115
		Method Blank	Turbidity	2011/11/19	<0.2		NTU	
		RPD	Turbidity	2011/11/19	NC		%	20
2687163	BMO	Matrix Spike	Phenols-4AAP	2011/11/22		101	%	75 - 125
		Spiked Blank	Phenols-4AAP	2011/11/22		97	%	75 - 125
		Method Blank	Phenols-4AAP	2011/11/22	<0.001		mg/L	
		RPD	Phenols-4AAP	2011/11/22	NC		%	25
2687266	XQI	Matrix Spike	Sulphide	2011/11/21		83	%	80 - 120
		Spiked Blank	Sulphide	2011/11/21		97	%	80 - 120
		Method Blank	Sulphide	2011/11/21	<0.02		mg/L	
		RPD	Sulphide	2011/11/21	NC		%	20
2687289	HH	Matrix Spike						
		[LR0709-01]	Nitrite (N)	2011/11/24		101	%	80 - 120
			Nitrate (N)	2011/11/24		NC	%	80 - 120
		Spiked Blank	Nitrite (N)	2011/11/24		99	%	85 - 115
			Nitrate (N)	2011/11/24		94	%	85 - 115
		Method Blank	Nitrite (N)	2011/11/24	<0.01		mg/L	
			Nitrate (N)	2011/11/24	<0.1		mg/L	
		RPD [LR0709-01]	Nitrite (N)	2011/11/24	NC		%	25
			Nitrate (N)	2011/11/24	0.5		%	25
2687648	YPA	QC Standard	Alkalinity (Total as CaCO3)	2011/11/19		97	%	85 - 115
		Method Blank	Alkalinity (Total as CaCO3)	2011/11/19	<1		mg/L	
		RPD [LR0707-01]	Alkalinity (Total as CaCO3)	2011/11/19	0.4		%	25
2687649	YPA	Matrix Spike						
		[LR0707-01]	Fluoride (F-)	2011/11/19		102	%	80 - 120
		Spiked Blank	Fluoride (F-)	2011/11/19		104	%	80 - 120
		Method Blank	Fluoride (F-)	2011/11/19	<0.1		mg/L	
		RPD [LR0707-01]	Fluoride (F-)	2011/11/19	NC		%	20
2687694	XQI	Matrix Spike						
		[LR0702-06]	Sulphide	2011/11/21		93	%	80 - 120
		Spiked Blank	Sulphide	2011/11/21		93	%	80 - 120
		Method Blank	Sulphide	2011/11/21	<0.02		mg/L	
		RPD [LR0702-06]	Sulphide	2011/11/21	NC		%	20
2687798	FD	Matrix Spike	Dissolved Chloride (Cl)	2011/11/24		NC	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/24		NC	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/24		NC	%	80 - 120
		Spiked Blank	Dissolved Chloride (Cl)	2011/11/24		100	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/24		105	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/24		104	%	80 - 120
		Method Blank	Dissolved Chloride (Cl)	2011/11/24	<1		mg/L	
			Dissolved Bromide (Br-)	2011/11/24	<1		mg/L	
			Dissolved Sulphate (SO4)	2011/11/24	<1		mg/L	
		RPD	Dissolved Chloride (Cl)	2011/11/24	2.8		%	20
			Dissolved Bromide (Br-)	2011/11/24	NC		%	20
			Dissolved Sulphate (SO4)	2011/11/24	3.2		%	20
2687845	LHA	Matrix Spike						
		[LR0702-04]	Free Cyanide	2011/11/21		95	%	80 - 120
		Spiked Blank	Free Cyanide	2011/11/21		101	%	80 - 120
		Method Blank	Free Cyanide	2011/11/21	<0.002		mg/L	
		RPD [LR0702-04]	Free Cyanide	2011/11/21	NC		%	25
2687902	DRM	Matrix Spike						
		[LR0702-01]	Orthophosphate (P)	2011/11/22		98	%	75 - 125

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2687902	DRM	Spiked Blank	Orthophosphate (P)	2011/11/22		101	%	80 - 120
		Method Blank	Orthophosphate (P)	2011/11/22	<0.01		mg/L	
		RPD [LR0702-01]	Orthophosphate (P)	2011/11/22	NC		%	25
2688195	MC	Matrix Spike [LR0706-08]	Mercury (Hg)	2011/11/22		120	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/22		105	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/22	<0.0001		mg/L	
		RPD [LR0706-08]	Mercury (Hg)	2011/11/22	NC		%	25
2688235	MC	Matrix Spike [LR0702-08]	Mercury (Hg)	2011/11/22		109	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/22		98	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/22	<0.0001		mg/L	
		RPD [LR0702-08]	Mercury (Hg)	2011/11/22	NC		%	25
2689014	ADB	Matrix Spike	Total Ammonia-N	2011/11/23		NC	%	80 - 120
		Spiked Blank	Total Ammonia-N	2011/11/23		105	%	85 - 115
		Method Blank	Total Ammonia-N	2011/11/23	<0.05		mg/L	
		RPD	Total Ammonia-N	2011/11/23	0.4		%	20
2689034	ADB	Matrix Spike	Total Ammonia-N	2011/11/24		96	%	80 - 120
		Spiked Blank	Total Ammonia-N	2011/11/24		100	%	85 - 115
		Method Blank	Total Ammonia-N	2011/11/24	<0.05		mg/L	
		RPD	Total Ammonia-N	2011/11/24	NC		%	20
2690904	VRO	Matrix Spike [LR0702-05]	Total Phosphorus	2011/11/23		101	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/23		97	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/23		99	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/23	<0.002		mg/L	
		RPD [LR0702-05]	Total Phosphorus	2011/11/23	NC		%	20
2690941	VRO	Matrix Spike	Total Phosphorus	2011/11/23		102	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/23		102	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/23		104	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/23	<0.002		mg/L	
		RPD	Total Phosphorus	2011/11/23	NC		%	20
2691983	VRO	Matrix Spike	Total Phosphorus	2011/11/24		92	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/24		99	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/24		97	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/24	<0.002		mg/L	
		RPD	Total Phosphorus	2011/11/24	6.7		%	20
2692307	HRE	Matrix Spike	Total Aluminum (Al)	2011/11/24		94	%	80 - 120
			Total Antimony (Sb)	2011/11/24		106	%	80 - 120
			Total Arsenic (As)	2011/11/24		100	%	80 - 120
			Total Barium (Ba)	2011/11/24		92	%	80 - 120
			Total Beryllium (Be)	2011/11/24		95	%	80 - 120
			Total Bismuth (Bi)	2011/11/24		102	%	80 - 120
			Total Boron (B)	2011/11/24		NC	%	80 - 120
			Total Cadmium (Cd)	2011/11/24		100	%	80 - 120
			Total Calcium (Ca)	2011/11/24		NC	%	80 - 120
			Total Chromium (Cr)	2011/11/24		95	%	80 - 120
			Total Cobalt (Co)	2011/11/24		97	%	80 - 120
			Total Copper (Cu)	2011/11/24		96	%	80 - 120
			Total Iron (Fe)	2011/11/24		101	%	80 - 120
			Total Lead (Pb)	2011/11/24		102	%	80 - 120
			Total Magnesium (Mg)	2011/11/24		NC	%	80 - 120
			Total Manganese (Mn)	2011/11/24		97	%	80 - 120
			Total Molybdenum (Mo)	2011/11/24		107	%	80 - 120
			Total Nickel (Ni)	2011/11/24		96	%	80 - 120

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Attention: Sharon Wood
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Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2692307	HRE	Matrix Spike	Total Phosphorus (P)	2011/11/24		99	%	80 - 120
			Total Potassium (K)	2011/11/24		97	%	80 - 120
			Total Silicon (Si)	2011/11/24		80	%	80 - 120
			Total Selenium (Se)	2011/11/24		98	%	80 - 120
			Total Silver (Ag)	2011/11/24		98	%	80 - 120
			Total Sodium (Na)	2011/11/24		91	%	80 - 120
			Total Strontium (Sr)	2011/11/24		NC	%	80 - 120
			Total Thallium (Tl)	2011/11/24		102	%	80 - 120
			Total Tin (Sn)	2011/11/24		107	%	80 - 120
			Total Titanium (Ti)	2011/11/24		100	%	80 - 120
			Total Uranium (U)	2011/11/24		102	%	80 - 120
			Total Vanadium (V)	2011/11/24		96	%	80 - 120
			Total Zinc (Zn)	2011/11/24		98	%	80 - 120
		Spiked Blank	Total Aluminum (Al)	2011/11/24		92	%	80 - 120
			Total Antimony (Sb)	2011/11/24		100	%	80 - 120
			Total Arsenic (As)	2011/11/24		98	%	80 - 120
			Total Barium (Ba)	2011/11/24		97	%	80 - 120
			Total Beryllium (Be)	2011/11/24		94	%	80 - 120
			Total Bismuth (Bi)	2011/11/24		101	%	80 - 120
			Total Boron (B)	2011/11/24		95	%	80 - 120
			Total Cadmium (Cd)	2011/11/24		96	%	80 - 120
			Total Calcium (Ca)	2011/11/24		97	%	80 - 120
			Total Chromium (Cr)	2011/11/24		94	%	80 - 120
			Total Cobalt (Co)	2011/11/24		95	%	80 - 120
			Total Copper (Cu)	2011/11/24		95	%	80 - 120
			Total Iron (Fe)	2011/11/24		98	%	80 - 120
			Total Lead (Pb)	2011/11/24		101	%	80 - 120
			Total Magnesium (Mg)	2011/11/24		92	%	80 - 120
			Total Manganese (Mn)	2011/11/24		92	%	80 - 120
			Total Molybdenum (Mo)	2011/11/24		102	%	80 - 120
			Total Nickel (Ni)	2011/11/24		95	%	80 - 120
			Total Phosphorus (P)	2011/11/24		92	%	80 - 120
			Total Potassium (K)	2011/11/24		97	%	80 - 120
			Total Silicon (Si)	2011/11/24		91	%	80 - 120
			Total Selenium (Se)	2011/11/24		96	%	80 - 120
			Total Silver (Ag)	2011/11/24		95	%	80 - 120
			Total Sodium (Na)	2011/11/24		95	%	80 - 120
			Total Strontium (Sr)	2011/11/24		96	%	80 - 120
			Total Thallium (Tl)	2011/11/24		100	%	80 - 120
			Total Tin (Sn)	2011/11/24		101	%	80 - 120
			Total Titanium (Ti)	2011/11/24		100	%	80 - 120
			Total Uranium (U)	2011/11/24		102	%	80 - 120
			Total Vanadium (V)	2011/11/24		92	%	80 - 120
			Total Zinc (Zn)	2011/11/24		98	%	80 - 120
		Method Blank	Total Aluminum (Al)	2011/11/24	<5.0		ug/L	
			Total Antimony (Sb)	2011/11/24	<0.50		ug/L	
			Total Arsenic (As)	2011/11/24	<1.0		ug/L	
			Total Barium (Ba)	2011/11/24	<2.0		ug/L	
			Total Beryllium (Be)	2011/11/24	<0.50		ug/L	
			Total Bismuth (Bi)	2011/11/24	<1.0		ug/L	
			Total Boron (B)	2011/11/24	<10		ug/L	
			Total Cadmium (Cd)	2011/11/24	<0.10		ug/L	
			Total Calcium (Ca)	2011/11/24	<200		ug/L	
			Total Chromium (Cr)	2011/11/24	<5.0		ug/L	
			Total Cobalt (Co)	2011/11/24	<0.50		ug/L	

Golder Associates Ltd
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Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2692307	HRE	Method Blank	Total Copper (Cu)	2011/11/24	<1.0		ug/L	
			Total Iron (Fe)	2011/11/24	<100		ug/L	
			Total Lead (Pb)	2011/11/24	<0.50		ug/L	
			Total Magnesium (Mg)	2011/11/24	<50		ug/L	
			Total Manganese (Mn)	2011/11/24	<2.0		ug/L	
			Total Molybdenum (Mo)	2011/11/24	<0.50		ug/L	
			Total Nickel (Ni)	2011/11/24	<1.0		ug/L	
			Total Phosphorus (P)	2011/11/24	<100		ug/L	
			Total Potassium (K)	2011/11/24	<200		ug/L	
			Total Silicon (Si)	2011/11/24	<50		ug/L	
			Total Selenium (Se)	2011/11/24	<2.0		ug/L	
			Total Silver (Ag)	2011/11/24	<0.10		ug/L	
			Total Sodium (Na)	2011/11/24	<100		ug/L	
			Total Strontium (Sr)	2011/11/24	<1.0		ug/L	
			Total Thallium (Tl)	2011/11/24	<0.050		ug/L	
			Total Tin (Sn)	2011/11/24	<1.0		ug/L	
			Total Titanium (Ti)	2011/11/24	<5.0		ug/L	
			Total Uranium (U)	2011/11/24	<0.10		ug/L	
			Total Vanadium (V)	2011/11/24	<0.50		ug/L	
			Total Zinc (Zn)	2011/11/24	<5.0		ug/L	
		RPD	Total Aluminum (Al)	2011/11/24	NC		%	20
			Total Chromium (Cr)	2011/11/24	NC		%	20
			Total Copper (Cu)	2011/11/24	NC		%	20
			Total Silver (Ag)	2011/11/24	NC		%	20
			Total Zinc (Zn)	2011/11/24	NC		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Validation Signature Page

Maxxam Job #: B1I1627

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

CRISTINA CARRIERE, Scientific Services

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

HENDERVALE HOUSE

May 2012
Report No. 021-1228

Your Project #: 021-1228
Site#: Tansley Quarry
Your C.O.C. #: 31614705, 316147-05-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2012/01/06

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1I1627
Received: 2011/11/17, 17:13

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Alkalinity	1	N/A	2011/11/19	CAM SOP-00448	SM 2320B
Anions	1	N/A	2011/11/24	CAM SOP-00435	SM 4110B
Free (WAD) Cyanide	1	N/A	2011/11/21	CAM SOP-00457	SM4500-CN-I modified
Fluoride	1	2011/11/19	2011/11/19	CAM SOP-00448	APHA 4500FC
Hardness (calculated as CaCO3)	1	N/A	2011/11/22	CAM SOP 00102	SM 2340 B
Mercury in Water by CVAA	1	2011/11/21	2011/11/22	CAM SOP-00453	EPA 7470
Total Metals Analysis by ICPMS	1	N/A	2011/11/24	CAM SOP-00447	EPA 6020
Total Ammonia-N	1	N/A	2011/11/23	CAM SOP-00441	US GS I-2522-90
Nitrate (NO3) and Nitrite (NO2) in Water	1	N/A	2011/11/24	CAM SOP-00440	SM 4500 NO3I/NO2B
pH	1	N/A	2011/11/19	CAM SOP-00448	SM 4500H
Phenols (4AAP)	1	N/A	2011/11/22	CAM SOP-00444	MOE ROPHEN-E3179
Orthophosphate	1	N/A	2011/11/22	CAM SOP-00461	SM 4500 P-F
Sulphide	1	N/A	2011/11/21	CAM SOP-00455	SM 4500-S G
Total Phosphorus (Colourimetric)	1	2011/11/23	2011/11/23	CAM SOP-00407	APHA 4500 P,B,F
Total Suspended Solids	1	N/A	2011/11/18	CAM SOP-00428	SM 2540D
Turbidity	1	N/A	2011/11/19	CAM SOP-00417	APHA 2130B

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50

Your Project #: 021-1228
Site#: Tansley Quarry
Your C.O.C. #: 31614705, 316147-05-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2012/01/06

CERTIFICATE OF ANALYSIS

hydrocarbons. The extraction date for samples field preserved with methanol for F1 and Volatile Organic Compounds is considered to be the date sampled.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by Ontario Regulation 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Total cover pages: 2

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

RESULTS OF ANALYSES OF WATER

Maxxam ID		LR0707		
Sampling Date		2011/11/17		
COC Number		316147-05-01		
	Units	**SA-6**	**RDL**	**QC Batch**
Calculated Parameters				
Hardness (CaCO3)	mg/L	580	1	2685961
Inorganics				
Total Ammonia-N	mg/L	0.29	0.05	2689014
Fluoride (F-)	mg/L	0.2	0.1	2687649
Free Cyanide	mg/L	<0.002	0.002	2687845
Orthophosphate (P)	mg/L	<0.01	0.01	2687902
pH	pH	8.03		2687650
Phenols-4AAP	mg/L	<0.001	0.001	2687163
Total Phosphorus	mg/L	0.005	0.002	2690904
Total Suspended Solids	mg/L	<10	10	2686425
Sulphide	mg/L	<0.02	0.02	2687694
Turbidity	NTU	1.3	0.2	2686783
Alkalinity (Total as CaCO3)	mg/L	350	1	2687648
Nitrite (N)	mg/L	0.03	0.01	2687289
Dissolved Chloride (Cl)	mg/L	117	1	2687798
Nitrate (N)	mg/L	<0.1	0.1	2687289
Nitrate + Nitrite	mg/L	<0.1	0.1	2687289
Dissolved Bromide (Br-)	mg/L	<1	1	2687798
Dissolved Sulphate (SO4)	mg/L	190	1	2687798

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LR0707		
Sampling Date		2011/11/17		
COC Number		316147-05-01		
	Units	**SA-6**	**RDL**	**QC Batch**
Metals				
Mercury (Hg)	mg/L	<0.0001	0.0001	2688195
Total Aluminum (Al)	ug/L	<5.0	5.0	2692307
Total Antimony (Sb)	ug/L	<0.50	0.50	2692307
Total Arsenic (As)	ug/L	8.0	1.0	2692307
Total Barium (Ba)	ug/L	38	2.0	2692307
Total Beryllium (Be)	ug/L	<0.50	0.50	2692307
Total Bismuth (Bi)	ug/L	<1.0	1.0	2692307
Total Boron (B)	ug/L	950	10	2692307
Total Cadmium (Cd)	ug/L	<0.10	0.10	2692307
Total Calcium (Ca)	ug/L	130000	200	2692307
Total Chromium (Cr)	ug/L	<5.0	5.0	2692307
Total Cobalt (Co)	ug/L	<0.50	0.50	2692307
Total Copper (Cu)	ug/L	36	1.0	2692307
Total Iron (Fe)	ug/L	370	100	2692307
Total Lead (Pb)	ug/L	<0.50	0.50	2692307
Total Magnesium (Mg)	ug/L	120000	50	2692307
Total Manganese (Mn)	ug/L	33	2.0	2692307
Total Molybdenum (Mo)	ug/L	6.3	0.50	2692307
Total Nickel (Ni)	ug/L	<1.0	1.0	2692307
Total Phosphorus (P)	ug/L	<100	100	2692307
Total Potassium (K)	ug/L	14000	200	2692307
Total Silicon (Si)	ug/L	13000	50	2692307
Total Selenium (Se)	ug/L	<2.0	2.0	2692307
Total Silver (Ag)	ug/L	<0.10	0.10	2692307
Total Sodium (Na)	ug/L	92000	100	2692307
Total Strontium (Sr)	ug/L	8100	1.0	2692307
Total Thallium (Tl)	ug/L	<0.050	0.050	2692307
Total Tin (Sn)	ug/L	<1.0	1.0	2692307
Total Titanium (Ti)	ug/L	<5.0	5.0	2692307
Total Uranium (U)	ug/L	1.8	0.10	2692307
Total Vanadium (V)	ug/L	0.76	0.50	2692307
Total Zinc (Zn)	ug/L	19	5.0	2692307

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

Test Summary

Maxxam ID LR0707
Sample ID SA-6
Matrix Water

Collected 2011/11/17
Shipped
Received 2011/11/17

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2687648	N/A	2011/11/19	YOGESH PATEL
Anions	IC	2687798	N/A	2011/11/24	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2687845	N/A	2011/11/21	LOUISE HARDING
Fluoride	F	2687649	2011/11/19	2011/11/19	YOGESH PATEL
Hardness (calculated as CaCO3)		2685961	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2688195	2011/11/21	2011/11/22	MAGDALENA CARLOS
Total Metals Analysis by ICPMS	ICP/MS	2692307	N/A	2011/11/24	HUA REN
Total Ammonia-N	LACH/NH4	2689014	N/A	2011/11/23	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2687289	N/A	2011/11/24	HELEN HE
pH	PH	2687650	N/A	2011/11/19	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2687163	N/A	2011/11/22	BRAMDEO MOTIRAM
Orthophosphate	AC	2687902	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687694	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2690904	2011/11/23	2011/11/23	VIORICA ROTARU
Total Suspended Solids	SLDS	2686425	N/A	2011/11/18	TEJPRATAP MISHRA
Turbidity	TURB	2686783	N/A	2011/11/19	NEIL DASSANAYAKE

Maxxam ID LR0707 Dup
Sample ID SA-6
Matrix Water

Collected 2011/11/17
Shipped
Received 2011/11/17

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2687648	N/A	2011/11/19	YOGESH PATEL
Fluoride	F	2687649	2011/11/19	2011/11/19	YOGESH PATEL
pH	PH	2687650	N/A	2011/11/19	YOGESH PATEL

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

Package 1	9.0°C
Package 2	6.7°C
Package 3	9.0°C
Package 4	6.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Sample LR0708-01: Anions Analysis: Due to high concentrations of the target analytes, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2686425	TEJ	QC Standard	Total Suspended Solids	2011/11/18		98	%	85 - 115
		Method Blank	Total Suspended Solids	2011/11/18	<10		mg/L	
		RPD [LR0710-02]	Total Suspended Solids	2011/11/18	NC		%	25
2686783	NYS	QC Standard	Turbidity	2011/11/19		98	%	85 - 115
		Method Blank	Turbidity	2011/11/19	<0.2		NTU	
		RPD	Turbidity	2011/11/19	NC		%	20
2687163	BMO	Matrix Spike	Phenols-4AAP	2011/11/22		101	%	75 - 125
		Spiked Blank	Phenols-4AAP	2011/11/22		97	%	75 - 125
		Method Blank	Phenols-4AAP	2011/11/22	<0.001		mg/L	
		RPD	Phenols-4AAP	2011/11/22	NC		%	25
2687266	XQI	Matrix Spike	Sulphide	2011/11/21		83	%	80 - 120
		Spiked Blank	Sulphide	2011/11/21		97	%	80 - 120
		Method Blank	Sulphide	2011/11/21	<0.02		mg/L	
		RPD	Sulphide	2011/11/21	NC		%	20
2687289	HH	Matrix Spike						
		[LR0709-01]	Nitrite (N)	2011/11/24		101	%	80 - 120
			Nitrate (N)	2011/11/24		NC	%	80 - 120
		Spiked Blank	Nitrite (N)	2011/11/24		99	%	85 - 115
			Nitrate (N)	2011/11/24		94	%	85 - 115
		Method Blank	Nitrite (N)	2011/11/24	<0.01		mg/L	
			Nitrate (N)	2011/11/24	<0.1		mg/L	
		RPD [LR0709-01]	Nitrite (N)	2011/11/24	NC		%	25
			Nitrate (N)	2011/11/24	0.5		%	25
2687648	YPA	QC Standard	Alkalinity (Total as CaCO3)	2011/11/19		97	%	85 - 115
		Method Blank	Alkalinity (Total as CaCO3)	2011/11/19	<1		mg/L	
		RPD [LR0707-01]	Alkalinity (Total as CaCO3)	2011/11/19	0.4		%	25
2687649	YPA	Matrix Spike						
		[LR0707-01]	Fluoride (F-)	2011/11/19		102	%	80 - 120
		Spiked Blank	Fluoride (F-)	2011/11/19		104	%	80 - 120
		Method Blank	Fluoride (F-)	2011/11/19	<0.1		mg/L	
		RPD [LR0707-01]	Fluoride (F-)	2011/11/19	NC		%	20
2687694	XQI	Matrix Spike						
		[LR0702-06]	Sulphide	2011/11/21		93	%	80 - 120
		Spiked Blank	Sulphide	2011/11/21		93	%	80 - 120
		Method Blank	Sulphide	2011/11/21	<0.02		mg/L	
		RPD [LR0702-06]	Sulphide	2011/11/21	NC		%	20
2687798	FD	Matrix Spike	Dissolved Chloride (Cl)	2011/11/24		NC	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/24		NC	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/24		NC	%	80 - 120
		Spiked Blank	Dissolved Chloride (Cl)	2011/11/24		100	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/24		105	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/24		104	%	80 - 120
		Method Blank	Dissolved Chloride (Cl)	2011/11/24	<1		mg/L	
			Dissolved Bromide (Br-)	2011/11/24	<1		mg/L	
			Dissolved Sulphate (SO4)	2011/11/24	<1		mg/L	
		RPD	Dissolved Chloride (Cl)	2011/11/24	2.8		%	20
			Dissolved Bromide (Br-)	2011/11/24	NC		%	20
			Dissolved Sulphate (SO4)	2011/11/24	3.2		%	20
2687845	LHA	Matrix Spike						
		[LR0702-04]	Free Cyanide	2011/11/21		95	%	80 - 120
		Spiked Blank	Free Cyanide	2011/11/21		101	%	80 - 120
		Method Blank	Free Cyanide	2011/11/21	<0.002		mg/L	
		RPD [LR0702-04]	Free Cyanide	2011/11/21	NC		%	25
2687902	DRM	Matrix Spike						
		[LR0702-01]	Orthophosphate (P)	2011/11/22		98	%	75 - 125

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2687902	DRM	Spiked Blank	Orthophosphate (P)	2011/11/22		101	%	80 - 120
		Method Blank	Orthophosphate (P)	2011/11/22	<0.01		mg/L	
		RPD [LR0702-01]	Orthophosphate (P)	2011/11/22	NC		%	25
2688195	MC	Matrix Spike [LR0706-08]	Mercury (Hg)	2011/11/22		120	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/22		105	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/22	<0.0001		mg/L	
		RPD [LR0706-08]	Mercury (Hg)	2011/11/22	NC		%	25
2688235	MC	Matrix Spike [LR0702-08]	Mercury (Hg)	2011/11/22		109	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/22		98	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/22	<0.0001		mg/L	
		RPD [LR0702-08]	Mercury (Hg)	2011/11/22	NC		%	25
2689014	ADB	Matrix Spike	Total Ammonia-N	2011/11/23		NC	%	80 - 120
		Spiked Blank	Total Ammonia-N	2011/11/23		105	%	85 - 115
		Method Blank	Total Ammonia-N	2011/11/23	<0.05		mg/L	
		RPD	Total Ammonia-N	2011/11/23	0.4		%	20
2689034	ADB	Matrix Spike	Total Ammonia-N	2011/11/24		96	%	80 - 120
		Spiked Blank	Total Ammonia-N	2011/11/24		100	%	85 - 115
		Method Blank	Total Ammonia-N	2011/11/24	<0.05		mg/L	
		RPD	Total Ammonia-N	2011/11/24	NC		%	20
2690904	VRO	Matrix Spike [LR0702-05]	Total Phosphorus	2011/11/23		101	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/23		97	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/23		99	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/23	<0.002		mg/L	
		RPD [LR0702-05]	Total Phosphorus	2011/11/23	NC		%	20
2690941	VRO	Matrix Spike	Total Phosphorus	2011/11/23		102	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/23		102	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/23		104	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/23	<0.002		mg/L	
		RPD	Total Phosphorus	2011/11/23	NC		%	20
2691983	VRO	Matrix Spike	Total Phosphorus	2011/11/24		92	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/24		99	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/24		97	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/24	<0.002		mg/L	
		RPD	Total Phosphorus	2011/11/24	6.7		%	20
2692307	HRE	Matrix Spike	Total Aluminum (Al)	2011/11/24		94	%	80 - 120
			Total Antimony (Sb)	2011/11/24		106	%	80 - 120
			Total Arsenic (As)	2011/11/24		100	%	80 - 120
			Total Barium (Ba)	2011/11/24		92	%	80 - 120
			Total Beryllium (Be)	2011/11/24		95	%	80 - 120
			Total Bismuth (Bi)	2011/11/24		102	%	80 - 120
			Total Boron (B)	2011/11/24		NC	%	80 - 120
			Total Cadmium (Cd)	2011/11/24		100	%	80 - 120
			Total Calcium (Ca)	2011/11/24		NC	%	80 - 120
			Total Chromium (Cr)	2011/11/24		95	%	80 - 120
			Total Cobalt (Co)	2011/11/24		97	%	80 - 120
			Total Copper (Cu)	2011/11/24		96	%	80 - 120
			Total Iron (Fe)	2011/11/24		101	%	80 - 120
			Total Lead (Pb)	2011/11/24		102	%	80 - 120
			Total Magnesium (Mg)	2011/11/24		NC	%	80 - 120
			Total Manganese (Mn)	2011/11/24		97	%	80 - 120
			Total Molybdenum (Mo)	2011/11/24		107	%	80 - 120
			Total Nickel (Ni)	2011/11/24		96	%	80 - 120

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2692307	HRE	Matrix Spike	Total Phosphorus (P)	2011/11/24		99	%	80 - 120
			Total Potassium (K)	2011/11/24		97	%	80 - 120
			Total Silicon (Si)	2011/11/24		80	%	80 - 120
			Total Selenium (Se)	2011/11/24		98	%	80 - 120
			Total Silver (Ag)	2011/11/24		98	%	80 - 120
			Total Sodium (Na)	2011/11/24		91	%	80 - 120
			Total Strontium (Sr)	2011/11/24		NC	%	80 - 120
			Total Thallium (Tl)	2011/11/24		102	%	80 - 120
			Total Tin (Sn)	2011/11/24		107	%	80 - 120
			Total Titanium (Ti)	2011/11/24		100	%	80 - 120
			Total Uranium (U)	2011/11/24		102	%	80 - 120
			Total Vanadium (V)	2011/11/24		96	%	80 - 120
			Total Zinc (Zn)	2011/11/24		98	%	80 - 120
		Spiked Blank	Total Aluminum (Al)	2011/11/24		92	%	80 - 120
			Total Antimony (Sb)	2011/11/24		100	%	80 - 120
			Total Arsenic (As)	2011/11/24		98	%	80 - 120
			Total Barium (Ba)	2011/11/24		97	%	80 - 120
			Total Beryllium (Be)	2011/11/24		94	%	80 - 120
			Total Bismuth (Bi)	2011/11/24		101	%	80 - 120
			Total Boron (B)	2011/11/24		95	%	80 - 120
			Total Cadmium (Cd)	2011/11/24		96	%	80 - 120
			Total Calcium (Ca)	2011/11/24		97	%	80 - 120
			Total Chromium (Cr)	2011/11/24		94	%	80 - 120
			Total Cobalt (Co)	2011/11/24		95	%	80 - 120
			Total Copper (Cu)	2011/11/24		95	%	80 - 120
			Total Iron (Fe)	2011/11/24		98	%	80 - 120
			Total Lead (Pb)	2011/11/24		101	%	80 - 120
			Total Magnesium (Mg)	2011/11/24		92	%	80 - 120
			Total Manganese (Mn)	2011/11/24		92	%	80 - 120
			Total Molybdenum (Mo)	2011/11/24		102	%	80 - 120
			Total Nickel (Ni)	2011/11/24		95	%	80 - 120
			Total Phosphorus (P)	2011/11/24		92	%	80 - 120
			Total Potassium (K)	2011/11/24		97	%	80 - 120
			Total Silicon (Si)	2011/11/24		91	%	80 - 120
			Total Selenium (Se)	2011/11/24		96	%	80 - 120
			Total Silver (Ag)	2011/11/24		95	%	80 - 120
			Total Sodium (Na)	2011/11/24		95	%	80 - 120
			Total Strontium (Sr)	2011/11/24		96	%	80 - 120
			Total Thallium (Tl)	2011/11/24		100	%	80 - 120
			Total Tin (Sn)	2011/11/24		101	%	80 - 120
			Total Titanium (Ti)	2011/11/24		100	%	80 - 120
			Total Uranium (U)	2011/11/24		102	%	80 - 120
			Total Vanadium (V)	2011/11/24		92	%	80 - 120
			Total Zinc (Zn)	2011/11/24		98	%	80 - 120
		Method Blank	Total Aluminum (Al)	2011/11/24	<5.0		ug/L	
			Total Antimony (Sb)	2011/11/24	<0.50		ug/L	
			Total Arsenic (As)	2011/11/24	<1.0		ug/L	
			Total Barium (Ba)	2011/11/24	<2.0		ug/L	
			Total Beryllium (Be)	2011/11/24	<0.50		ug/L	
			Total Bismuth (Bi)	2011/11/24	<1.0		ug/L	
			Total Boron (B)	2011/11/24	<10		ug/L	
			Total Cadmium (Cd)	2011/11/24	<0.10		ug/L	
			Total Calcium (Ca)	2011/11/24	<200		ug/L	
			Total Chromium (Cr)	2011/11/24	<5.0		ug/L	
			Total Cobalt (Co)	2011/11/24	<0.50		ug/L	

Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2692307	HRE	Method Blank	Total Copper (Cu)	2011/11/24	<1.0		ug/L	
			Total Iron (Fe)	2011/11/24	<100		ug/L	
			Total Lead (Pb)	2011/11/24	<0.50		ug/L	
			Total Magnesium (Mg)	2011/11/24	<50		ug/L	
			Total Manganese (Mn)	2011/11/24	<2.0		ug/L	
			Total Molybdenum (Mo)	2011/11/24	<0.50		ug/L	
			Total Nickel (Ni)	2011/11/24	<1.0		ug/L	
			Total Phosphorus (P)	2011/11/24	<100		ug/L	
			Total Potassium (K)	2011/11/24	<200		ug/L	
			Total Silicon (Si)	2011/11/24	<50		ug/L	
			Total Selenium (Se)	2011/11/24	<2.0		ug/L	
			Total Silver (Ag)	2011/11/24	<0.10		ug/L	
			Total Sodium (Na)	2011/11/24	<100		ug/L	
			Total Strontium (Sr)	2011/11/24	<1.0		ug/L	
			Total Thallium (Tl)	2011/11/24	<0.050		ug/L	
			Total Tin (Sn)	2011/11/24	<1.0		ug/L	
			Total Titanium (Ti)	2011/11/24	<5.0		ug/L	
			Total Uranium (U)	2011/11/24	<0.10		ug/L	
			Total Vanadium (V)	2011/11/24	<0.50		ug/L	
			Total Zinc (Zn)	2011/11/24	<5.0		ug/L	
		RPD	Total Aluminum (Al)	2011/11/24	NC		%	20
			Total Chromium (Cr)	2011/11/24	NC		%	20
			Total Copper (Cu)	2011/11/24	NC		%	20
			Total Silver (Ag)	2011/11/24	NC		%	20
			Total Zinc (Zn)	2011/11/24	NC		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Validation Signature Page

Maxxam Job #: B1I1627

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

CRISTINA CARRIERE, Scientific Services

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

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Your Project #: 021-1228
Site#: Tansley Quarry
Your C.O.C. #: 31614705, 316147-05-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2012/01/06

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1I1627
Received: 2011/11/17, 17:13

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Alkalinity	1	N/A	2011/11/19	CAM SOP-00448	SM 2320B
Anions	1	N/A	2011/11/24	CAM SOP-00435	SM 4110B
Free (WAD) Cyanide	1	N/A	2011/11/21	CAM SOP-00457	SM4500-CN-I modified
Fluoride	1	2011/11/19	2011/11/19	CAM SOP-00448	APHA 4500FC
Hardness (calculated as CaCO3)	1	N/A	2011/11/22	CAM SOP 00102	SM 2340 B
Mercury in Water by CVAA	1	2011/11/21	2011/11/22	CAM SOP-00453	EPA 7470
Total Metals Analysis by ICPMS	1	N/A	2011/11/24	CAM SOP-00447	EPA 6020
Total Ammonia-N	1	N/A	2011/11/24	CAM SOP-00441	US GS I-2522-90
Nitrate (NO3) and Nitrite (NO2) in Water	1	N/A	2011/11/24	CAM SOP-00440	SM 4500 NO3I/NO2B
pH	1	N/A	2011/11/19	CAM SOP-00448	SM 4500H
Phenols (4AAP)	1	N/A	2011/11/22	CAM SOP-00444	MOE ROPHEN-E3179
Orthophosphate	1	N/A	2011/11/22	CAM SOP-00461	SM 4500 P-F
Sulphide	1	N/A	2011/11/21	CAM SOP-00455	SM 4500-S G
Total Phosphorus (Colourimetric)	1	2011/11/23	2011/11/24	CAM SOP-00407	APHA 4500 P,B,F
Total Suspended Solids	1	N/A	2011/11/18	CAM SOP-00428	SM 2540D
Turbidity	1	N/A	2011/11/19	CAM SOP-00417	APHA 2130B

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50

Your Project #: 021-1228
Site#: Tansley Quarry
Your C.O.C. #: 31614705, 316147-05-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2012/01/06

CERTIFICATE OF ANALYSIS

hydrocarbons. The extraction date for samples field preserved with methanol for F1 and Volatile Organic Compounds is considered to be the date sampled.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by Ontario Regulation 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Total cover pages: 2

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

RESULTS OF ANALYSES OF WATER

Maxxam ID		LR0710		
Sampling Date		2011/11/17		
COC Number		316147-05-01		
	Units	**DUP2**	**RDL**	**QC Batch**
Calculated Parameters				
Hardness (CaCO3)	mg/L	560	1	2685961
Inorganics				
Total Ammonia-N	mg/L	0.29	0.05	2689034
Fluoride (F-)	mg/L	0.2	0.1	2687649
Free Cyanide	mg/L	<0.002	0.002	2687845
Orthophosphate (P)	mg/L	<0.01	0.01	2687902
pH	pH	7.98		2687650
Phenols-4AAP	mg/L	<0.001	0.001	2687163
Total Phosphorus	mg/L	0.005	0.002	2691983
Total Suspended Solids	mg/L	<10	10	2686425
Sulphide	mg/L	<0.02	0.02	2687266
Turbidity	NTU	1.7	0.2	2686783
Alkalinity (Total as CaCO3)	mg/L	355	1	2687648
Nitrite (N)	mg/L	0.03	0.01	2687289
Dissolved Chloride (Cl)	mg/L	117	1	2687798
Nitrate (N)	mg/L	0.1	0.1	2687289
Nitrate + Nitrite	mg/L	0.1	0.1	2687289
Dissolved Bromide (Br-)	mg/L	<1	1	2687798
Dissolved Sulphate (SO4)	mg/L	183	1	2687798

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LR0710		
Sampling Date		2011/11/17		
COC Number		316147-05-01		
	Units	**DUP2**	**RDL**	**QC Batch**
Metals				
Mercury (Hg)	mg/L	<0.0001	0.0001	2688235
Total Aluminum (Al)	ug/L	<5.0	5.0	2692307
Total Antimony (Sb)	ug/L	<0.50	0.50	2692307
Total Arsenic (As)	ug/L	7.5	1.0	2692307
Total Barium (Ba)	ug/L	35	2.0	2692307
Total Beryllium (Be)	ug/L	<0.50	0.50	2692307
Total Bismuth (Bi)	ug/L	1.1	1.0	2692307
Total Boron (B)	ug/L	880	10	2692307
Total Cadmium (Cd)	ug/L	<0.10	0.10	2692307
Total Calcium (Ca)	ug/L	120000	200	2692307
Total Chromium (Cr)	ug/L	<5.0	5.0	2692307
Total Cobalt (Co)	ug/L	<0.50	0.50	2692307
Total Copper (Cu)	ug/L	30	1.0	2692307
Total Iron (Fe)	ug/L	340	100	2692307
Total Lead (Pb)	ug/L	<0.50	0.50	2692307
Total Magnesium (Mg)	ug/L	110000	50	2692307
Total Manganese (Mn)	ug/L	30	2.0	2692307
Total Molybdenum (Mo)	ug/L	5.8	0.50	2692307
Total Nickel (Ni)	ug/L	<1.0	1.0	2692307
Total Phosphorus (P)	ug/L	<100	100	2692307
Total Potassium (K)	ug/L	13000	200	2692307
Total Silicon (Si)	ug/L	12000	50	2692307
Total Selenium (Se)	ug/L	<2.0	2.0	2692307
Total Silver (Ag)	ug/L	<0.10	0.10	2692307
Total Sodium (Na)	ug/L	85000	100	2692307
Total Strontium (Sr)	ug/L	7600	1.0	2692307
Total Thallium (Tl)	ug/L	<0.050	0.050	2692307
Total Tin (Sn)	ug/L	<1.0	1.0	2692307
Total Titanium (Ti)	ug/L	<5.0	5.0	2692307
Total Uranium (U)	ug/L	1.8	0.10	2692307
Total Vanadium (V)	ug/L	<0.50	0.50	2692307
Total Zinc (Zn)	ug/L	11	5.0	2692307

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

Test Summary

Maxxam ID LR0710
Sample ID DUP2
Matrix Water

Collected 2011/11/17
Shipped
Received 2011/11/17

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2687648	N/A	2011/11/19	YOGESH PATEL
Anions	IC	2687798	N/A	2011/11/24	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2687845	N/A	2011/11/21	LOUISE HARDING
Fluoride	F	2687649	2011/11/19	2011/11/19	YOGESH PATEL
Hardness (calculated as CaCO3)		2685961	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2688235	2011/11/21	2011/11/22	MAGDALENA CARLOS
Total Metals Analysis by ICPMS	ICP/MS	2692307	N/A	2011/11/24	HUA REN
Total Ammonia-N	LACH/NH4	2689034	N/A	2011/11/24	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2687289	N/A	2011/11/24	HELEN HE
pH	PH	2687650	N/A	2011/11/19	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2687163	N/A	2011/11/22	BRAMDEO MOTIRAM
Orthophosphate	AC	2687902	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687266	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2691983	2011/11/23	2011/11/24	VIORICA ROTARU
Total Suspended Solids	SLDS	2686425	N/A	2011/11/18	TEJPRATAP MISHRA
Turbidity	TURB	2686783	N/A	2011/11/19	NEIL DASSANAYAKE

Maxxam ID LR0710 Dup
Sample ID DUP2
Matrix Water

Collected 2011/11/17
Shipped
Received 2011/11/17

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Total Suspended Solids	SLDS	2686425	N/A	2011/11/18	TEJPRATAP MISHRA

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

Package 1	9.0°C
Package 2	6.7°C
Package 3	9.0°C
Package 4	6.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Sample LR0708-01: Anions Analysis: Due to high concentrations of the target analytes, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2686425	TEJ	QC Standard	Total Suspended Solids	2011/11/18		98	%	85 - 115
		Method Blank	Total Suspended Solids	2011/11/18	<10		mg/L	
		RPD [LR0710-02]	Total Suspended Solids	2011/11/18	NC		%	25
2686783	NYS	QC Standard	Turbidity	2011/11/19		98	%	85 - 115
		Method Blank	Turbidity	2011/11/19	<0.2		NTU	
		RPD	Turbidity	2011/11/19	NC		%	20
2687163	BMO	Matrix Spike	Phenols-4AAP	2011/11/22		101	%	75 - 125
		Spiked Blank	Phenols-4AAP	2011/11/22		97	%	75 - 125
		Method Blank	Phenols-4AAP	2011/11/22	<0.001		mg/L	
		RPD	Phenols-4AAP	2011/11/22	NC		%	25
2687266	XQI	Matrix Spike	Sulphide	2011/11/21		83	%	80 - 120
		Spiked Blank	Sulphide	2011/11/21		97	%	80 - 120
		Method Blank	Sulphide	2011/11/21	<0.02		mg/L	
		RPD	Sulphide	2011/11/21	NC		%	20
2687289	HH	Matrix Spike						
		[LR0709-01]	Nitrite (N)	2011/11/24		101	%	80 - 120
			Nitrate (N)	2011/11/24		NC	%	80 - 120
		Spiked Blank	Nitrite (N)	2011/11/24		99	%	85 - 115
			Nitrate (N)	2011/11/24		94	%	85 - 115
		Method Blank	Nitrite (N)	2011/11/24	<0.01		mg/L	
			Nitrate (N)	2011/11/24	<0.1		mg/L	
		RPD [LR0709-01]	Nitrite (N)	2011/11/24	NC		%	25
			Nitrate (N)	2011/11/24	0.5		%	25
2687648	YPA	QC Standard	Alkalinity (Total as CaCO3)	2011/11/19		97	%	85 - 115
		Method Blank	Alkalinity (Total as CaCO3)	2011/11/19	<1		mg/L	
		RPD [LR0707-01]	Alkalinity (Total as CaCO3)	2011/11/19	0.4		%	25
2687649	YPA	Matrix Spike						
		[LR0707-01]	Fluoride (F-)	2011/11/19		102	%	80 - 120
		Spiked Blank	Fluoride (F-)	2011/11/19		104	%	80 - 120
		Method Blank	Fluoride (F-)	2011/11/19	<0.1		mg/L	
		RPD [LR0707-01]	Fluoride (F-)	2011/11/19	NC		%	20
2687694	XQI	Matrix Spike						
		[LR0702-06]	Sulphide	2011/11/21		93	%	80 - 120
		Spiked Blank	Sulphide	2011/11/21		93	%	80 - 120
		Method Blank	Sulphide	2011/11/21	<0.02		mg/L	
		RPD [LR0702-06]	Sulphide	2011/11/21	NC		%	20
2687798	FD	Matrix Spike	Dissolved Chloride (Cl)	2011/11/24		NC	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/24		NC	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/24		NC	%	80 - 120
		Spiked Blank	Dissolved Chloride (Cl)	2011/11/24		100	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/24		105	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/24		104	%	80 - 120
		Method Blank	Dissolved Chloride (Cl)	2011/11/24	<1		mg/L	
			Dissolved Bromide (Br-)	2011/11/24	<1		mg/L	
			Dissolved Sulphate (SO4)	2011/11/24	<1		mg/L	
		RPD	Dissolved Chloride (Cl)	2011/11/24	2.8		%	20
			Dissolved Bromide (Br-)	2011/11/24	NC		%	20
			Dissolved Sulphate (SO4)	2011/11/24	3.2		%	20
2687845	LHA	Matrix Spike						
		[LR0702-04]	Free Cyanide	2011/11/21		95	%	80 - 120
		Spiked Blank	Free Cyanide	2011/11/21		101	%	80 - 120
		Method Blank	Free Cyanide	2011/11/21	<0.002		mg/L	
		RPD [LR0702-04]	Free Cyanide	2011/11/21	NC		%	25
2687902	DRM	Matrix Spike						
		[LR0702-01]	Orthophosphate (P)	2011/11/22		98	%	75 - 125

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2687902	DRM	Spiked Blank	Orthophosphate (P)	2011/11/22		101	%	80 - 120
		Method Blank	Orthophosphate (P)	2011/11/22	<0.01		mg/L	
		RPD [LR0702-01]	Orthophosphate (P)	2011/11/22	NC		%	25
2688195	MC	Matrix Spike [LR0706-08]	Mercury (Hg)	2011/11/22		120	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/22		105	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/22	<0.0001		mg/L	
		RPD [LR0706-08]	Mercury (Hg)	2011/11/22	NC		%	25
2688235	MC	Matrix Spike [LR0702-08]	Mercury (Hg)	2011/11/22		109	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/22		98	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/22	<0.0001		mg/L	
		RPD [LR0702-08]	Mercury (Hg)	2011/11/22	NC		%	25
2689014	ADB	Matrix Spike	Total Ammonia-N	2011/11/23		NC	%	80 - 120
		Spiked Blank	Total Ammonia-N	2011/11/23		105	%	85 - 115
		Method Blank	Total Ammonia-N	2011/11/23	<0.05		mg/L	
		RPD	Total Ammonia-N	2011/11/23	0.4		%	20
2689034	ADB	Matrix Spike	Total Ammonia-N	2011/11/24		96	%	80 - 120
		Spiked Blank	Total Ammonia-N	2011/11/24		100	%	85 - 115
		Method Blank	Total Ammonia-N	2011/11/24	<0.05		mg/L	
		RPD	Total Ammonia-N	2011/11/24	NC		%	20
2690904	VRO	Matrix Spike [LR0702-05]	Total Phosphorus	2011/11/23		101	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/23		97	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/23		99	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/23	<0.002		mg/L	
		RPD [LR0702-05]	Total Phosphorus	2011/11/23	NC		%	20
2690941	VRO	Matrix Spike	Total Phosphorus	2011/11/23		102	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/23		102	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/23		104	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/23	<0.002		mg/L	
		RPD	Total Phosphorus	2011/11/23	NC		%	20
2691983	VRO	Matrix Spike	Total Phosphorus	2011/11/24		92	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/24		99	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/24		97	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/24	<0.002		mg/L	
		RPD	Total Phosphorus	2011/11/24	6.7		%	20
2692307	HRE	Matrix Spike	Total Aluminum (Al)	2011/11/24		94	%	80 - 120
			Total Antimony (Sb)	2011/11/24		106	%	80 - 120
			Total Arsenic (As)	2011/11/24		100	%	80 - 120
			Total Barium (Ba)	2011/11/24		92	%	80 - 120
			Total Beryllium (Be)	2011/11/24		95	%	80 - 120
			Total Bismuth (Bi)	2011/11/24		102	%	80 - 120
			Total Boron (B)	2011/11/24		NC	%	80 - 120
			Total Cadmium (Cd)	2011/11/24		100	%	80 - 120
			Total Calcium (Ca)	2011/11/24		NC	%	80 - 120
			Total Chromium (Cr)	2011/11/24		95	%	80 - 120
			Total Cobalt (Co)	2011/11/24		97	%	80 - 120
			Total Copper (Cu)	2011/11/24		96	%	80 - 120
			Total Iron (Fe)	2011/11/24		101	%	80 - 120
			Total Lead (Pb)	2011/11/24		102	%	80 - 120
			Total Magnesium (Mg)	2011/11/24		NC	%	80 - 120
			Total Manganese (Mn)	2011/11/24		97	%	80 - 120
			Total Molybdenum (Mo)	2011/11/24		107	%	80 - 120
			Total Nickel (Ni)	2011/11/24		96	%	80 - 120

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2692307	HRE	Matrix Spike	Total Phosphorus (P)	2011/11/24		99	%	80 - 120
			Total Potassium (K)	2011/11/24		97	%	80 - 120
			Total Silicon (Si)	2011/11/24		80	%	80 - 120
			Total Selenium (Se)	2011/11/24		98	%	80 - 120
			Total Silver (Ag)	2011/11/24		98	%	80 - 120
			Total Sodium (Na)	2011/11/24		91	%	80 - 120
			Total Strontium (Sr)	2011/11/24		NC	%	80 - 120
			Total Thallium (Tl)	2011/11/24		102	%	80 - 120
			Total Tin (Sn)	2011/11/24		107	%	80 - 120
			Total Titanium (Ti)	2011/11/24		100	%	80 - 120
			Total Uranium (U)	2011/11/24		102	%	80 - 120
			Total Vanadium (V)	2011/11/24		96	%	80 - 120
			Total Zinc (Zn)	2011/11/24		98	%	80 - 120
		Spiked Blank	Total Aluminum (Al)	2011/11/24		92	%	80 - 120
			Total Antimony (Sb)	2011/11/24		100	%	80 - 120
			Total Arsenic (As)	2011/11/24		98	%	80 - 120
			Total Barium (Ba)	2011/11/24		97	%	80 - 120
			Total Beryllium (Be)	2011/11/24		94	%	80 - 120
			Total Bismuth (Bi)	2011/11/24		101	%	80 - 120
			Total Boron (B)	2011/11/24		95	%	80 - 120
			Total Cadmium (Cd)	2011/11/24		96	%	80 - 120
			Total Calcium (Ca)	2011/11/24		97	%	80 - 120
			Total Chromium (Cr)	2011/11/24		94	%	80 - 120
			Total Cobalt (Co)	2011/11/24		95	%	80 - 120
			Total Copper (Cu)	2011/11/24		95	%	80 - 120
			Total Iron (Fe)	2011/11/24		98	%	80 - 120
			Total Lead (Pb)	2011/11/24		101	%	80 - 120
			Total Magnesium (Mg)	2011/11/24		92	%	80 - 120
			Total Manganese (Mn)	2011/11/24		92	%	80 - 120
			Total Molybdenum (Mo)	2011/11/24		102	%	80 - 120
			Total Nickel (Ni)	2011/11/24		95	%	80 - 120
			Total Phosphorus (P)	2011/11/24		92	%	80 - 120
			Total Potassium (K)	2011/11/24		97	%	80 - 120
			Total Silicon (Si)	2011/11/24		91	%	80 - 120
			Total Selenium (Se)	2011/11/24		96	%	80 - 120
			Total Silver (Ag)	2011/11/24		95	%	80 - 120
			Total Sodium (Na)	2011/11/24		95	%	80 - 120
			Total Strontium (Sr)	2011/11/24		96	%	80 - 120
			Total Thallium (Tl)	2011/11/24		100	%	80 - 120
			Total Tin (Sn)	2011/11/24		101	%	80 - 120
			Total Titanium (Ti)	2011/11/24		100	%	80 - 120
			Total Uranium (U)	2011/11/24		102	%	80 - 120
			Total Vanadium (V)	2011/11/24		92	%	80 - 120
			Total Zinc (Zn)	2011/11/24		98	%	80 - 120
		Method Blank	Total Aluminum (Al)	2011/11/24	<5.0		ug/L	
			Total Antimony (Sb)	2011/11/24	<0.50		ug/L	
			Total Arsenic (As)	2011/11/24	<1.0		ug/L	
			Total Barium (Ba)	2011/11/24	<2.0		ug/L	
			Total Beryllium (Be)	2011/11/24	<0.50		ug/L	
			Total Bismuth (Bi)	2011/11/24	<1.0		ug/L	
			Total Boron (B)	2011/11/24	<10		ug/L	
			Total Cadmium (Cd)	2011/11/24	<0.10		ug/L	
			Total Calcium (Ca)	2011/11/24	<200		ug/L	
			Total Chromium (Cr)	2011/11/24	<5.0		ug/L	
			Total Cobalt (Co)	2011/11/24	<0.50		ug/L	

Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2692307	HRE	Method Blank	Total Copper (Cu)	2011/11/24	<1.0		ug/L	
			Total Iron (Fe)	2011/11/24	<100		ug/L	
			Total Lead (Pb)	2011/11/24	<0.50		ug/L	
			Total Magnesium (Mg)	2011/11/24	<50		ug/L	
			Total Manganese (Mn)	2011/11/24	<2.0		ug/L	
			Total Molybdenum (Mo)	2011/11/24	<0.50		ug/L	
			Total Nickel (Ni)	2011/11/24	<1.0		ug/L	
			Total Phosphorus (P)	2011/11/24	<100		ug/L	
			Total Potassium (K)	2011/11/24	<200		ug/L	
			Total Silicon (Si)	2011/11/24	<50		ug/L	
			Total Selenium (Se)	2011/11/24	<2.0		ug/L	
			Total Silver (Ag)	2011/11/24	<0.10		ug/L	
			Total Sodium (Na)	2011/11/24	<100		ug/L	
			Total Strontium (Sr)	2011/11/24	<1.0		ug/L	
			Total Thallium (Tl)	2011/11/24	<0.050		ug/L	
			Total Tin (Sn)	2011/11/24	<1.0		ug/L	
			Total Titanium (Ti)	2011/11/24	<5.0		ug/L	
			Total Uranium (U)	2011/11/24	<0.10		ug/L	
			Total Vanadium (V)	2011/11/24	<0.50		ug/L	
			Total Zinc (Zn)	2011/11/24	<5.0		ug/L	
		RPD	Total Aluminum (Al)	2011/11/24	NC		%	20
			Total Chromium (Cr)	2011/11/24	NC		%	20
			Total Copper (Cu)	2011/11/24	NC		%	20
			Total Silver (Ag)	2011/11/24	NC		%	20
			Total Zinc (Zn)	2011/11/24	NC		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Validation Signature Page

Maxxam Job #: B1I1627

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

CRISTINA CARRIERE, Scientific Services

==========

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

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SICARD

May 2012
Report No. 021-1228

Your Project #: 021-1228
Site#: Tansley Quarry
Your C.O.C. #: 31614705, 316147-05-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2012/01/06

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1I1627
Received: 2011/11/17, 17:13

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Alkalinity	1	N/A	2011/11/19	CAM SOP-00448	SM 2320B
Anions	1	N/A	2011/11/24	CAM SOP-00435	SM 4110B
Free (WAD) Cyanide	1	N/A	2011/11/21	CAM SOP-00457	SM4500-CN-I modified
Fluoride	1	2011/11/19	2011/11/19	CAM SOP-00448	APHA 4500FC
Hardness (calculated as CaCO3)	1	N/A	2011/11/22	CAM SOP 00102	SM 2340 B
Mercury in Water by CVAA	1	2011/11/21	2011/11/22	CAM SOP-00453	EPA 7470
Total Metals Analysis by ICPMS	1	N/A	2011/11/24	CAM SOP-00447	EPA 6020
Total Ammonia-N	1	N/A	2011/11/23	CAM SOP-00441	US GS I-2522-90
Nitrate (NO3) and Nitrite (NO2) in Water	1	N/A	2011/11/24	CAM SOP-00440	SM 4500 NO3I/NO2B
pH	1	N/A	2011/11/19	CAM SOP-00448	SM 4500H
Phenols (4AAP)	1	N/A	2011/11/22	CAM SOP-00444	MOE ROPHEN-E3179
Orthophosphate	1	N/A	2011/11/22	CAM SOP-00461	SM 4500 P-F
Sulphide	1	N/A	2011/11/21	CAM SOP-00455	SM 4500-S G
Total Phosphorus (Colourimetric)	1	2011/11/23	2011/11/23	CAM SOP-00407	APHA 4500 P,B,F
Total Suspended Solids	1	N/A	2011/11/18	CAM SOP-00428	SM 2540D
Turbidity	1	N/A	2011/11/19	CAM SOP-00417	APHA 2130B

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50

Your Project #: 021-1228
Site#: Tansley Quarry
Your C.O.C. #: 31614705, 316147-05-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2012/01/06

CERTIFICATE OF ANALYSIS

hydrocarbons. The extraction date for samples field preserved with methanol for F1 and Volatile Organic Compounds is considered to be the date sampled.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by Ontario Regulation 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Total cover pages: 2

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

RESULTS OF ANALYSES OF WATER

Maxxam ID		LR0704		
Sampling Date		2011/11/17		
COC Number		316147-05-01		
	Units	**SA-3**	**RDL**	**QC Batch**
Calculated Parameters				
Hardness (CaCO3)	mg/L	950	1	2685961
Inorganics				
Total Ammonia-N	mg/L	2.7	0.05	2689014
Fluoride (F-)	mg/L	0.6	0.1	2687649
Free Cyanide	mg/L	<0.002	0.002	2687845
Orthophosphate (P)	mg/L	<0.01	0.01	2687902
pH	pH	7.82		2687650
Phenols-4AAP	mg/L	<0.001	0.001	2687163
Total Phosphorus	mg/L	<0.002	0.002	2690904
Total Suspended Solids	mg/L	10	10	2686425
Sulphide	mg/L	<0.02	0.02	2687266
Turbidity	NTU	2.2	0.2	2686783
Alkalinity (Total as CaCO3)	mg/L	140	1	2687648
Nitrite (N)	mg/L	<0.01	0.01	2687289
Dissolved Chloride (Cl)	mg/L	1070	10	2687798
Nitrate (N)	mg/L	<0.1	0.1	2687289
Nitrate + Nitrite	mg/L	<0.1	0.1	2687289
Dissolved Bromide (Br-)	mg/L	13	1	2687798
Dissolved Sulphate (SO4)	mg/L	999	10	2687798

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LR0704		
Sampling Date		2011/11/17		
COC Number		316147-05-01		
	Units	**SA-3**	**RDL**	**QC Batch**
Metals				
Mercury (Hg)	mg/L	<0.0001	0.0001	2688195
Total Aluminum (Al)	ug/L	<5.0	5.0	2692307
Total Antimony (Sb)	ug/L	<0.50	0.50	2692307
Total Arsenic (As)	ug/L	<5.0 (1)	5.0	2692307
Total Barium (Ba)	ug/L	9.1	2.0	2692307
Total Beryllium (Be)	ug/L	<0.50	0.50	2692307
Total Bismuth (Bi)	ug/L	<1.0	1.0	2692307
Total Boron (B)	ug/L	7200	10	2692307
Total Cadmium (Cd)	ug/L	<0.10	0.10	2692307
Total Calcium (Ca)	ug/L	300000	200	2692307
Total Chromium (Cr)	ug/L	<5.0	5.0	2692307
Total Cobalt (Co)	ug/L	<2.5 (1)	2.5	2692307
Total Copper (Cu)	ug/L	21	5.0	2692307
Total Iron (Fe)	ug/L	<100	100	2692307
Total Lead (Pb)	ug/L	<0.50	0.50	2692307
Total Magnesium (Mg)	ug/L	84000	50	2692307
Total Manganese (Mn)	ug/L	98	2.0	2692307
Total Molybdenum (Mo)	ug/L	11	0.50	2692307
Total Nickel (Ni)	ug/L	<5.0 (1)	5.0	2692307
Total Phosphorus (P)	ug/L	<100	100	2692307
Total Potassium (K)	ug/L	39000	200	2692307
Total Silicon (Si)	ug/L	4300	50	2692307
Total Selenium (Se)	ug/L	<10 (1)	10	2692307
Total Silver (Ag)	ug/L	<0.10	0.10	2692307
Total Sodium (Na)	ug/L	620000	1000	2692307
Total Strontium (Sr)	ug/L	11000	1.0	2692307
Total Thallium (Tl)	ug/L	<0.050	0.050	2692307
Total Tin (Sn)	ug/L	<1.0	1.0	2692307
Total Titanium (Ti)	ug/L	<5.0	5.0	2692307
Total Uranium (U)	ug/L	0.63	0.10	2692307
Total Vanadium (V)	ug/L	<2.5 (1)	2.5	2692307

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Metal analysis:Detection Limit was raised due to matrix interferences.

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LR0704		
Sampling Date		2011/11/17		
COC Number		316147-05-01		
	Units	**SA-3**	**RDL**	**QC Batch**
Total Zinc (Zn)	ug/L	22	5.0	2692307

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

Test Summary

Maxxam ID LR0704
Sample ID SA-3
Matrix Water

Collected 2011/11/17
Shipped
Received 2011/11/17

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2687648	N/A	2011/11/19	YOGESH PATEL
Anions	IC	2687798	N/A	2011/11/24	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2687845	N/A	2011/11/21	LOUISE HARDING
Fluoride	F	2687649	2011/11/19	2011/11/19	YOGESH PATEL
Hardness (calculated as CaCO3)		2685961	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2688195	2011/11/21	2011/11/22	MAGDALENA CARLOS
Total Metals Analysis by ICPMS	ICP/MS	2692307	N/A	2011/11/24	HUA REN
Total Ammonia-N	LACH/NH4	2689014	N/A	2011/11/23	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2687289	N/A	2011/11/24	HELEN HE
pH	PH	2687650	N/A	2011/11/19	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2687163	N/A	2011/11/22	BRAMDEO MOTIRAM
Orthophosphate	AC	2687902	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687266	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2690904	2011/11/23	2011/11/23	VIORICA ROTARU
Total Suspended Solids	SLDS	2686425	N/A	2011/11/18	TEJPRATAP MISHRA
Turbidity	TURB	2686783	N/A	2011/11/19	NEIL DASSANAYAKE

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Package 1	9.0°C
Package 2	6.7°C
Package 3	9.0°C
Package 4	6.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Sample LR0708-01: Anions Analysis: Due to high concentrations of the target analytes, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2686425	TEJ	QC Standard	Total Suspended Solids	2011/11/18		98	%	85 - 115
		Method Blank	Total Suspended Solids	2011/11/18	<10		mg/L	
		RPD [LR0710-02]	Total Suspended Solids	2011/11/18	NC		%	25
2686783	NYS	QC Standard	Turbidity	2011/11/19		98	%	85 - 115
		Method Blank	Turbidity	2011/11/19	<0.2		NTU	
		RPD	Turbidity	2011/11/19	NC		%	20
2687163	BMO	Matrix Spike	Phenols-4AAP	2011/11/22		101	%	75 - 125
		Spiked Blank	Phenols-4AAP	2011/11/22		97	%	75 - 125
		Method Blank	Phenols-4AAP	2011/11/22	<0.001		mg/L	
		RPD	Phenols-4AAP	2011/11/22	NC		%	25
2687266	XQI	Matrix Spike	Sulphide	2011/11/21		83	%	80 - 120
		Spiked Blank	Sulphide	2011/11/21		97	%	80 - 120
		Method Blank	Sulphide	2011/11/21	<0.02		mg/L	
		RPD	Sulphide	2011/11/21	NC		%	20
2687289	HH	Matrix Spike						
		[LR0709-01]	Nitrite (N)	2011/11/24		101	%	80 - 120
			Nitrate (N)	2011/11/24		NC	%	80 - 120
		Spiked Blank	Nitrite (N)	2011/11/24		99	%	85 - 115
			Nitrate (N)	2011/11/24		94	%	85 - 115
		Method Blank	Nitrite (N)	2011/11/24	<0.01		mg/L	
			Nitrate (N)	2011/11/24	<0.1		mg/L	
		RPD [LR0709-01]	Nitrite (N)	2011/11/24	NC		%	25
			Nitrate (N)	2011/11/24	0.5		%	25
2687648	YPA	QC Standard	Alkalinity (Total as CaCO3)	2011/11/19		97	%	85 - 115
		Method Blank	Alkalinity (Total as CaCO3)	2011/11/19	<1		mg/L	
		RPD [LR0707-01]	Alkalinity (Total as CaCO3)	2011/11/19	0.4		%	25
2687649	YPA	Matrix Spike						
		[LR0707-01]	Fluoride (F-)	2011/11/19		102	%	80 - 120
		Spiked Blank	Fluoride (F-)	2011/11/19		104	%	80 - 120
		Method Blank	Fluoride (F-)	2011/11/19	<0.1		mg/L	
		RPD [LR0707-01]	Fluoride (F-)	2011/11/19	NC		%	20
2687694	XQI	Matrix Spike						
		[LR0702-06]	Sulphide	2011/11/21		93	%	80 - 120
		Spiked Blank	Sulphide	2011/11/21		93	%	80 - 120
		Method Blank	Sulphide	2011/11/21	<0.02		mg/L	
		RPD [LR0702-06]	Sulphide	2011/11/21	NC		%	20
2687798	FD	Matrix Spike	Dissolved Chloride (Cl)	2011/11/24		NC	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/24		NC	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/24		NC	%	80 - 120
		Spiked Blank	Dissolved Chloride (Cl)	2011/11/24		100	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/24		105	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/24		104	%	80 - 120
		Method Blank	Dissolved Chloride (Cl)	2011/11/24	<1		mg/L	
			Dissolved Bromide (Br-)	2011/11/24	<1		mg/L	
			Dissolved Sulphate (SO4)	2011/11/24	<1		mg/L	
		RPD	Dissolved Chloride (Cl)	2011/11/24	2.8		%	20
			Dissolved Bromide (Br-)	2011/11/24	NC		%	20
			Dissolved Sulphate (SO4)	2011/11/24	3.2		%	20
2687845	LHA	Matrix Spike						
		[LR0702-04]	Free Cyanide	2011/11/21		95	%	80 - 120
		Spiked Blank	Free Cyanide	2011/11/21		101	%	80 - 120
		Method Blank	Free Cyanide	2011/11/21	<0.002		mg/L	
		RPD [LR0702-04]	Free Cyanide	2011/11/21	NC		%	25
2687902	DRM	Matrix Spike						
		[LR0702-01]	Orthophosphate (P)	2011/11/22		98	%	75 - 125

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2687902	DRM	Spiked Blank	Orthophosphate (P)	2011/11/22		101	%	80 - 120
		Method Blank	Orthophosphate (P)	2011/11/22	<0.01		mg/L	
		RPD [LR0702-01]	Orthophosphate (P)	2011/11/22	NC		%	25
2688195	MC	Matrix Spike [LR0706-08]	Mercury (Hg)	2011/11/22		120	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/22		105	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/22	<0.0001		mg/L	
		RPD [LR0706-08]	Mercury (Hg)	2011/11/22	NC		%	25
2688235	MC	Matrix Spike [LR0702-08]	Mercury (Hg)	2011/11/22		109	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/22		98	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/22	<0.0001		mg/L	
		RPD [LR0702-08]	Mercury (Hg)	2011/11/22	NC		%	25
2689014	ADB	Matrix Spike	Total Ammonia-N	2011/11/23		NC	%	80 - 120
		Spiked Blank	Total Ammonia-N	2011/11/23		105	%	85 - 115
		Method Blank	Total Ammonia-N	2011/11/23	<0.05		mg/L	
		RPD	Total Ammonia-N	2011/11/23	0.4		%	20
2689034	ADB	Matrix Spike	Total Ammonia-N	2011/11/24		96	%	80 - 120
		Spiked Blank	Total Ammonia-N	2011/11/24		100	%	85 - 115
		Method Blank	Total Ammonia-N	2011/11/24	<0.05		mg/L	
		RPD	Total Ammonia-N	2011/11/24	NC		%	20
2690904	VRO	Matrix Spike [LR0702-05]	Total Phosphorus	2011/11/23		101	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/23		97	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/23		99	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/23	<0.002		mg/L	
		RPD [LR0702-05]	Total Phosphorus	2011/11/23	NC		%	20
2690941	VRO	Matrix Spike	Total Phosphorus	2011/11/23		102	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/23		102	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/23		104	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/23	<0.002		mg/L	
		RPD	Total Phosphorus	2011/11/23	NC		%	20
2691983	VRO	Matrix Spike	Total Phosphorus	2011/11/24		92	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/24		99	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/24		97	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/24	<0.002		mg/L	
		RPD	Total Phosphorus	2011/11/24	6.7		%	20
2692307	HRE	Matrix Spike	Total Aluminum (Al)	2011/11/24		94	%	80 - 120
			Total Antimony (Sb)	2011/11/24		106	%	80 - 120
			Total Arsenic (As)	2011/11/24		100	%	80 - 120
			Total Barium (Ba)	2011/11/24		92	%	80 - 120
			Total Beryllium (Be)	2011/11/24		95	%	80 - 120
			Total Bismuth (Bi)	2011/11/24		102	%	80 - 120
			Total Boron (B)	2011/11/24		NC	%	80 - 120
			Total Cadmium (Cd)	2011/11/24		100	%	80 - 120
			Total Calcium (Ca)	2011/11/24		NC	%	80 - 120
			Total Chromium (Cr)	2011/11/24		95	%	80 - 120
			Total Cobalt (Co)	2011/11/24		97	%	80 - 120
			Total Copper (Cu)	2011/11/24		96	%	80 - 120
			Total Iron (Fe)	2011/11/24		101	%	80 - 120
			Total Lead (Pb)	2011/11/24		102	%	80 - 120
			Total Magnesium (Mg)	2011/11/24		NC	%	80 - 120
			Total Manganese (Mn)	2011/11/24		97	%	80 - 120
			Total Molybdenum (Mo)	2011/11/24		107	%	80 - 120
			Total Nickel (Ni)	2011/11/24		96	%	80 - 120

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2692307	HRE	Matrix Spike	Total Phosphorus (P)	2011/11/24		99	%	80 - 120
			Total Potassium (K)	2011/11/24		97	%	80 - 120
			Total Silicon (Si)	2011/11/24		80	%	80 - 120
			Total Selenium (Se)	2011/11/24		98	%	80 - 120
			Total Silver (Ag)	2011/11/24		98	%	80 - 120
			Total Sodium (Na)	2011/11/24		91	%	80 - 120
			Total Strontium (Sr)	2011/11/24		NC	%	80 - 120
			Total Thallium (Tl)	2011/11/24		102	%	80 - 120
			Total Tin (Sn)	2011/11/24		107	%	80 - 120
			Total Titanium (Ti)	2011/11/24		100	%	80 - 120
			Total Uranium (U)	2011/11/24		102	%	80 - 120
			Total Vanadium (V)	2011/11/24		96	%	80 - 120
			Total Zinc (Zn)	2011/11/24		98	%	80 - 120
		Spiked Blank	Total Aluminum (Al)	2011/11/24		92	%	80 - 120
			Total Antimony (Sb)	2011/11/24		100	%	80 - 120
			Total Arsenic (As)	2011/11/24		98	%	80 - 120
			Total Barium (Ba)	2011/11/24		97	%	80 - 120
			Total Beryllium (Be)	2011/11/24		94	%	80 - 120
			Total Bismuth (Bi)	2011/11/24		101	%	80 - 120
			Total Boron (B)	2011/11/24		95	%	80 - 120
			Total Cadmium (Cd)	2011/11/24		96	%	80 - 120
			Total Calcium (Ca)	2011/11/24		97	%	80 - 120
			Total Chromium (Cr)	2011/11/24		94	%	80 - 120
			Total Cobalt (Co)	2011/11/24		95	%	80 - 120
			Total Copper (Cu)	2011/11/24		95	%	80 - 120
			Total Iron (Fe)	2011/11/24		98	%	80 - 120
			Total Lead (Pb)	2011/11/24		101	%	80 - 120
			Total Magnesium (Mg)	2011/11/24		92	%	80 - 120
			Total Manganese (Mn)	2011/11/24		92	%	80 - 120
			Total Molybdenum (Mo)	2011/11/24		102	%	80 - 120
			Total Nickel (Ni)	2011/11/24		95	%	80 - 120
			Total Phosphorus (P)	2011/11/24		92	%	80 - 120
			Total Potassium (K)	2011/11/24		97	%	80 - 120
			Total Silicon (Si)	2011/11/24		91	%	80 - 120
			Total Selenium (Se)	2011/11/24		96	%	80 - 120
			Total Silver (Ag)	2011/11/24		95	%	80 - 120
			Total Sodium (Na)	2011/11/24		95	%	80 - 120
			Total Strontium (Sr)	2011/11/24		96	%	80 - 120
			Total Thallium (Tl)	2011/11/24		100	%	80 - 120
			Total Tin (Sn)	2011/11/24		101	%	80 - 120
			Total Titanium (Ti)	2011/11/24		100	%	80 - 120
			Total Uranium (U)	2011/11/24		102	%	80 - 120
			Total Vanadium (V)	2011/11/24		92	%	80 - 120
			Total Zinc (Zn)	2011/11/24		98	%	80 - 120
		Method Blank	Total Aluminum (Al)	2011/11/24	<5.0		ug/L	
			Total Antimony (Sb)	2011/11/24	<0.50		ug/L	
			Total Arsenic (As)	2011/11/24	<1.0		ug/L	
			Total Barium (Ba)	2011/11/24	<2.0		ug/L	
			Total Beryllium (Be)	2011/11/24	<0.50		ug/L	
			Total Bismuth (Bi)	2011/11/24	<1.0		ug/L	
			Total Boron (B)	2011/11/24	<10		ug/L	
			Total Cadmium (Cd)	2011/11/24	<0.10		ug/L	
			Total Calcium (Ca)	2011/11/24	<200		ug/L	
			Total Chromium (Cr)	2011/11/24	<5.0		ug/L	
			Total Cobalt (Co)	2011/11/24	<0.50		ug/L	

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Golder Associates Ltd
Attention: Sharon Wood
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P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2692307	HRE	Method Blank	Total Copper (Cu)	2011/11/24	<1.0		ug/L	
			Total Iron (Fe)	2011/11/24	<100		ug/L	
			Total Lead (Pb)	2011/11/24	<0.50		ug/L	
			Total Magnesium (Mg)	2011/11/24	<50		ug/L	
			Total Manganese (Mn)	2011/11/24	<2.0		ug/L	
			Total Molybdenum (Mo)	2011/11/24	<0.50		ug/L	
			Total Nickel (Ni)	2011/11/24	<1.0		ug/L	
			Total Phosphorus (P)	2011/11/24	<100		ug/L	
			Total Potassium (K)	2011/11/24	<200		ug/L	
			Total Silicon (Si)	2011/11/24	<50		ug/L	
			Total Selenium (Se)	2011/11/24	<2.0		ug/L	
			Total Silver (Ag)	2011/11/24	<0.10		ug/L	
			Total Sodium (Na)	2011/11/24	<100		ug/L	
			Total Strontium (Sr)	2011/11/24	<1.0		ug/L	
			Total Thallium (Tl)	2011/11/24	<0.050		ug/L	
			Total Tin (Sn)	2011/11/24	<1.0		ug/L	
			Total Titanium (Ti)	2011/11/24	<5.0		ug/L	
			Total Uranium (U)	2011/11/24	<0.10		ug/L	
			Total Vanadium (V)	2011/11/24	<0.50		ug/L	
			Total Zinc (Zn)	2011/11/24	<5.0		ug/L	
		RPD	Total Aluminum (Al)	2011/11/24	NC		%	20
			Total Chromium (Cr)	2011/11/24	NC		%	20
			Total Copper (Cu)	2011/11/24	NC		%	20
			Total Silver (Ag)	2011/11/24	NC		%	20
			Total Zinc (Zn)	2011/11/24	NC		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Validation Signature Page

Maxxam Job #: B1I1627

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

CRISTINA CARRIERE, Scientific Services

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

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SIMMS

Your Project #: 021-1228
Site#: Tansley Quarry
Your C.O.C. #: 31614705, 316147-05-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2012/01/06

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1I1627
Received: 2011/11/17, 17:13

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Alkalinity	1	N/A	2011/11/19	CAM SOP-00448	SM 2320B
Anions	1	N/A	2011/11/24	CAM SOP-00435	SM 4110B
Free (WAD) Cyanide	1	N/A	2011/11/21	CAM SOP-00457	SM4500-CN-I modified
Fluoride	1	2011/11/19	2011/11/19	CAM SOP-00448	APHA 4500FC
Hardness (calculated as CaCO3)	1	N/A	2011/11/22	CAM SOP 00102	SM 2340 B
Mercury in Water by CVAA	1	2011/11/21	2011/11/22	CAM SOP-00453	EPA 7470
Total Metals Analysis by ICPMS	1	N/A	2011/11/24	CAM SOP-00447	EPA 6020
Total Ammonia-N	1	N/A	2011/11/23	CAM SOP-00441	US GS I-2522-90
Nitrate (NO3) and Nitrite (NO2) in Water	1	N/A	2011/11/24	CAM SOP-00440	SM 4500 NO3I/NO2B
pH	1	N/A	2011/11/19	CAM SOP-00448	SM 4500H
Phenols (4AAP)	1	N/A	2011/11/22	CAM SOP-00444	MOE ROPHEN-E3179
Orthophosphate	1	N/A	2011/11/22	CAM SOP-00461	SM 4500 P-F
Sulphide	1	N/A	2011/11/21	CAM SOP-00455	SM 4500-S G
Total Phosphorus (Colourimetric)	1	2011/11/23	2011/11/23	CAM SOP-00407	APHA 4500 P,B,F
Total Suspended Solids	1	N/A	2011/11/18	CAM SOP-00428	SM 2540D
Turbidity	1	N/A	2011/11/19	CAM SOP-00417	APHA 2130B

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50

Your Project #: 021-1228
Site#: Tansley Quarry
Your C.O.C. #: 31614705, 316147-05-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2012/01/06

CERTIFICATE OF ANALYSIS

hydrocarbons. The extraction date for samples field preserved with methanol for F1 and Volatile Organic Compounds is considered to be the date sampled.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by Ontario Regulation 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Total cover pages: 2

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

RESULTS OF ANALYSES OF WATER

Maxxam ID		LR0709		
Sampling Date		2011/11/17		
COC Number		316147-05-01		
	Units	**SA-8**	**RDL**	**QC Batch**
Calculated Parameters				
Hardness (CaCO3)	mg/L	360	1	2685961
Inorganics				
Total Ammonia-N	mg/L	<0.05	0.05	2689014
Fluoride (F-)	mg/L	0.2	0.1	2687649
Free Cyanide	mg/L	<0.002	0.002	2687845
Orthophosphate (P)	mg/L	<0.01	0.01	2687902
pH	pH	8.08		2687650
Phenols-4AAP	mg/L	<0.001	0.001	2687163
Total Phosphorus	mg/L	0.012	0.002	2690904
Total Suspended Solids	mg/L	<10	10	2686425
Sulphide	mg/L	<0.02	0.02	2687266
Turbidity	NTU	<0.2	0.2	2686783
Alkalinity (Total as CaCO3)	mg/L	313	1	2687648
Nitrite (N)	mg/L	<0.01	0.01	2687289
Dissolved Chloride (Cl)	mg/L	4	1	2687798
Nitrate (N)	mg/L	1.6	0.1	2687289
Nitrate + Nitrite	mg/L	1.6	0.1	2687289
Dissolved Bromide (Br-)	mg/L	<1	1	2687798
Dissolved Sulphate (SO4)	mg/L	52	1	2687798

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LR0709		
Sampling Date		2011/11/17		
COC Number		316147-05-01		
	Units	**SA-8**	**RDL**	**QC Batch**
Metals				
Mercury (Hg)	mg/L	<0.0001	0.0001	2688235
Total Aluminum (Al)	ug/L	7.1	5.0	2692307
Total Antimony (Sb)	ug/L	1.5	0.50	2692307
Total Arsenic (As)	ug/L	<1.0	1.0	2692307
Total Barium (Ba)	ug/L	72	2.0	2692307
Total Beryllium (Be)	ug/L	<0.50	0.50	2692307
Total Bismuth (Bi)	ug/L	<1.0	1.0	2692307
Total Boron (B)	ug/L	69	10	2692307
Total Cadmium (Cd)	ug/L	<0.10	0.10	2692307
Total Calcium (Ca)	ug/L	120000	200	2692307
Total Chromium (Cr)	ug/L	<5.0	5.0	2692307
Total Cobalt (Co)	ug/L	<0.50	0.50	2692307
Total Copper (Cu)	ug/L	22	1.0	2692307
Total Iron (Fe)	ug/L	<100	100	2692307
Total Lead (Pb)	ug/L	0.80	0.50	2692307
Total Magnesium (Mg)	ug/L	41000	50	2692307
Total Manganese (Mn)	ug/L	<2.0	2.0	2692307
Total Molybdenum (Mo)	ug/L	1.2	0.50	2692307
Total Nickel (Ni)	ug/L	<1.0	1.0	2692307
Total Phosphorus (P)	ug/L	<100	100	2692307
Total Potassium (K)	ug/L	4000	200	2692307
Total Silicon (Si)	ug/L	6000	50	2692307
Total Selenium (Se)	ug/L	<2.0	2.0	2692307
Total Silver (Ag)	ug/L	<0.10	0.10	2692307
Total Sodium (Na)	ug/L	14000	100	2692307
Total Strontium (Sr)	ug/L	980	1.0	2692307
Total Thallium (Tl)	ug/L	<0.050	0.050	2692307
Total Tin (Sn)	ug/L	<1.0	1.0	2692307
Total Titanium (Ti)	ug/L	<5.0	5.0	2692307
Total Uranium (U)	ug/L	3.6	0.10	2692307
Total Vanadium (V)	ug/L	0.75	0.50	2692307
Total Zinc (Zn)	ug/L	2600	5.0	2692307

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1I1627
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Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

Test Summary

Maxxam ID LR0709
Sample ID SA-8
Matrix Water

Collected 2011/11/17
Shipped
Received 2011/11/17

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2687648	N/A	2011/11/19	YOGESH PATEL
Anions	IC	2687798	N/A	2011/11/24	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2687845	N/A	2011/11/21	LOUISE HARDING
Fluoride	F	2687649	2011/11/19	2011/11/19	YOGESH PATEL
Hardness (calculated as CaCO3)		2685961	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2688235	2011/11/21	2011/11/22	MAGDALENA CARLOS
Total Metals Analysis by ICPMS	ICP/MS	2692307	N/A	2011/11/24	HUA REN
Total Ammonia-N	LACH/NH4	2689014	N/A	2011/11/23	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2687289	N/A	2011/11/24	HELEN HE
pH	PH	2687650	N/A	2011/11/19	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2687163	N/A	2011/11/22	BRAMDEO MOTIRAM
Orthophosphate	AC	2687902	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687266	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2690904	2011/11/23	2011/11/23	VIORICA ROTARU
Total Suspended Solids	SLDS	2686425	N/A	2011/11/18	TEJPRATAP MISHRA
Turbidity	TURB	2686783	N/A	2011/11/19	NEIL DASSANAYAKE

Maxxam ID LR0709 Dup
Sample ID SA-8
Matrix Water

Collected 2011/11/17
Shipped
Received 2011/11/17

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2687289	N/A	2011/11/24	HELEN HE

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Package 1	9.0°C
Package 2	6.7°C
Package 3	9.0°C
Package 4	6.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Sample LR0708-01: Anions Analysis: Due to high concentrations of the target analytes, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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Quality Assurance Report

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2686425	TEJ	QC Standard	Total Suspended Solids	2011/11/18		98	%	85 - 115
		Method Blank	Total Suspended Solids	2011/11/18	<10		mg/L	
		RPD [LR0710-02]	Total Suspended Solids	2011/11/18	NC		%	25
2686783	NYS	QC Standard	Turbidity	2011/11/19		98	%	85 - 115
		Method Blank	Turbidity	2011/11/19	<0.2		NTU	
		RPD	Turbidity	2011/11/19	NC		%	20
2687163	BMO	Matrix Spike	Phenols-4AAP	2011/11/22		101	%	75 - 125
		Spiked Blank	Phenols-4AAP	2011/11/22		97	%	75 - 125
		Method Blank	Phenols-4AAP	2011/11/22	<0.001		mg/L	
		RPD	Phenols-4AAP	2011/11/22	NC		%	25
2687266	XQI	Matrix Spike	Sulphide	2011/11/21		83	%	80 - 120
		Spiked Blank	Sulphide	2011/11/21		97	%	80 - 120
		Method Blank	Sulphide	2011/11/21	<0.02		mg/L	
		RPD	Sulphide	2011/11/21	NC		%	20
2687289	HH	Matrix Spike						
		[LR0709-01]	Nitrite (N)	2011/11/24		101	%	80 - 120
			Nitrate (N)	2011/11/24		NC	%	80 - 120
		Spiked Blank	Nitrite (N)	2011/11/24		99	%	85 - 115
			Nitrate (N)	2011/11/24		94	%	85 - 115
		Method Blank	Nitrite (N)	2011/11/24	<0.01		mg/L	
			Nitrate (N)	2011/11/24	<0.1		mg/L	
		RPD [LR0709-01]	Nitrite (N)	2011/11/24	NC		%	25
			Nitrate (N)	2011/11/24	0.5		%	25
2687648	YPA	QC Standard	Alkalinity (Total as CaCO3)	2011/11/19		97	%	85 - 115
		Method Blank	Alkalinity (Total as CaCO3)	2011/11/19	<1		mg/L	
		RPD [LR0707-01]	Alkalinity (Total as CaCO3)	2011/11/19	0.4		%	25
2687649	YPA	Matrix Spike						
		[LR0707-01]	Fluoride (F-)	2011/11/19		102	%	80 - 120
		Spiked Blank	Fluoride (F-)	2011/11/19		104	%	80 - 120
		Method Blank	Fluoride (F-)	2011/11/19	<0.1		mg/L	
		RPD [LR0707-01]	Fluoride (F-)	2011/11/19	NC		%	20
2687694	XQI	Matrix Spike						
		[LR0702-06]	Sulphide	2011/11/21		93	%	80 - 120
		Spiked Blank	Sulphide	2011/11/21		93	%	80 - 120
		Method Blank	Sulphide	2011/11/21	<0.02		mg/L	
		RPD [LR0702-06]	Sulphide	2011/11/21	NC		%	20
2687798	FD	Matrix Spike	Dissolved Chloride (Cl)	2011/11/24		NC	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/24		NC	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/24		NC	%	80 - 120
		Spiked Blank	Dissolved Chloride (Cl)	2011/11/24		100	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/24		105	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/24		104	%	80 - 120
		Method Blank	Dissolved Chloride (Cl)	2011/11/24	<1		mg/L	
			Dissolved Bromide (Br-)	2011/11/24	<1		mg/L	
			Dissolved Sulphate (SO4)	2011/11/24	<1		mg/L	
		RPD	Dissolved Chloride (Cl)	2011/11/24	2.8		%	20
			Dissolved Bromide (Br-)	2011/11/24	NC		%	20
			Dissolved Sulphate (SO4)	2011/11/24	3.2		%	20
2687845	LHA	Matrix Spike						
		[LR0702-04]	Free Cyanide	2011/11/21		95	%	80 - 120
		Spiked Blank	Free Cyanide	2011/11/21		101	%	80 - 120
		Method Blank	Free Cyanide	2011/11/21	<0.002		mg/L	
		RPD [LR0702-04]	Free Cyanide	2011/11/21	NC		%	25
2687902	DRM	Matrix Spike						
		[LR0702-01]	Orthophosphate (P)	2011/11/22		98	%	75 - 125

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Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2687902	DRM	Spiked Blank	Orthophosphate (P)	2011/11/22		101	%	80 - 120
		Method Blank	Orthophosphate (P)	2011/11/22	<0.01		mg/L	
		RPD [LR0702-01]	Orthophosphate (P)	2011/11/22	NC		%	25
2688195	MC	Matrix Spike [LR0706-08]	Mercury (Hg)	2011/11/22		120	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/22		105	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/22	<0.0001		mg/L	
		RPD [LR0706-08]	Mercury (Hg)	2011/11/22	NC		%	25
2688235	MC	Matrix Spike [LR0702-08]	Mercury (Hg)	2011/11/22		109	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/22		98	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/22	<0.0001		mg/L	
		RPD [LR0702-08]	Mercury (Hg)	2011/11/22	NC		%	25
2689014	ADB	Matrix Spike	Total Ammonia-N	2011/11/23		NC	%	80 - 120
		Spiked Blank	Total Ammonia-N	2011/11/23		105	%	85 - 115
		Method Blank	Total Ammonia-N	2011/11/23	<0.05		mg/L	
		RPD	Total Ammonia-N	2011/11/23	0.4		%	20
2689034	ADB	Matrix Spike	Total Ammonia-N	2011/11/24		96	%	80 - 120
		Spiked Blank	Total Ammonia-N	2011/11/24		100	%	85 - 115
		Method Blank	Total Ammonia-N	2011/11/24	<0.05		mg/L	
		RPD	Total Ammonia-N	2011/11/24	NC		%	20
2690904	VRO	Matrix Spike [LR0702-05]	Total Phosphorus	2011/11/23		101	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/23		97	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/23		99	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/23	<0.002		mg/L	
		RPD [LR0702-05]	Total Phosphorus	2011/11/23	NC		%	20
2690941	VRO	Matrix Spike	Total Phosphorus	2011/11/23		102	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/23		102	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/23		104	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/23	<0.002		mg/L	
		RPD	Total Phosphorus	2011/11/23	NC		%	20
2691983	VRO	Matrix Spike	Total Phosphorus	2011/11/24		92	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/24		99	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/24		97	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/24	<0.002		mg/L	
		RPD	Total Phosphorus	2011/11/24	6.7		%	20
2692307	HRE	Matrix Spike	Total Aluminum (Al)	2011/11/24		94	%	80 - 120
			Total Antimony (Sb)	2011/11/24		106	%	80 - 120
			Total Arsenic (As)	2011/11/24		100	%	80 - 120
			Total Barium (Ba)	2011/11/24		92	%	80 - 120
			Total Beryllium (Be)	2011/11/24		95	%	80 - 120
			Total Bismuth (Bi)	2011/11/24		102	%	80 - 120
			Total Boron (B)	2011/11/24		NC	%	80 - 120
			Total Cadmium (Cd)	2011/11/24		100	%	80 - 120
			Total Calcium (Ca)	2011/11/24		NC	%	80 - 120
			Total Chromium (Cr)	2011/11/24		95	%	80 - 120
			Total Cobalt (Co)	2011/11/24		97	%	80 - 120
			Total Copper (Cu)	2011/11/24		96	%	80 - 120
			Total Iron (Fe)	2011/11/24		101	%	80 - 120
			Total Lead (Pb)	2011/11/24		102	%	80 - 120
			Total Magnesium (Mg)	2011/11/24		NC	%	80 - 120
			Total Manganese (Mn)	2011/11/24		97	%	80 - 120
			Total Molybdenum (Mo)	2011/11/24		107	%	80 - 120
			Total Nickel (Ni)	2011/11/24		96	%	80 - 120

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Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2692307	HRE	Matrix Spike	Total Phosphorus (P)	2011/11/24		99	%	80 - 120
			Total Potassium (K)	2011/11/24		97	%	80 - 120
			Total Silicon (Si)	2011/11/24		80	%	80 - 120
			Total Selenium (Se)	2011/11/24		98	%	80 - 120
			Total Silver (Ag)	2011/11/24		98	%	80 - 120
			Total Sodium (Na)	2011/11/24		91	%	80 - 120
			Total Strontium (Sr)	2011/11/24		NC	%	80 - 120
			Total Thallium (Tl)	2011/11/24		102	%	80 - 120
			Total Tin (Sn)	2011/11/24		107	%	80 - 120
			Total Titanium (Ti)	2011/11/24		100	%	80 - 120
			Total Uranium (U)	2011/11/24		102	%	80 - 120
			Total Vanadium (V)	2011/11/24		96	%	80 - 120
			Total Zinc (Zn)	2011/11/24		98	%	80 - 120
		Spiked Blank	Total Aluminum (Al)	2011/11/24		92	%	80 - 120
			Total Antimony (Sb)	2011/11/24		100	%	80 - 120
			Total Arsenic (As)	2011/11/24		98	%	80 - 120
			Total Barium (Ba)	2011/11/24		97	%	80 - 120
			Total Beryllium (Be)	2011/11/24		94	%	80 - 120
			Total Bismuth (Bi)	2011/11/24		101	%	80 - 120
			Total Boron (B)	2011/11/24		95	%	80 - 120
			Total Cadmium (Cd)	2011/11/24		96	%	80 - 120
			Total Calcium (Ca)	2011/11/24		97	%	80 - 120
			Total Chromium (Cr)	2011/11/24		94	%	80 - 120
			Total Cobalt (Co)	2011/11/24		95	%	80 - 120
			Total Copper (Cu)	2011/11/24		95	%	80 - 120
			Total Iron (Fe)	2011/11/24		98	%	80 - 120
			Total Lead (Pb)	2011/11/24		101	%	80 - 120
			Total Magnesium (Mg)	2011/11/24		92	%	80 - 120
			Total Manganese (Mn)	2011/11/24		92	%	80 - 120
			Total Molybdenum (Mo)	2011/11/24		102	%	80 - 120
			Total Nickel (Ni)	2011/11/24		95	%	80 - 120
			Total Phosphorus (P)	2011/11/24		92	%	80 - 120
			Total Potassium (K)	2011/11/24		97	%	80 - 120
			Total Silicon (Si)	2011/11/24		91	%	80 - 120
			Total Selenium (Se)	2011/11/24		96	%	80 - 120
			Total Silver (Ag)	2011/11/24		95	%	80 - 120
			Total Sodium (Na)	2011/11/24		95	%	80 - 120
			Total Strontium (Sr)	2011/11/24		96	%	80 - 120
			Total Thallium (Tl)	2011/11/24		100	%	80 - 120
			Total Tin (Sn)	2011/11/24		101	%	80 - 120
			Total Titanium (Ti)	2011/11/24		100	%	80 - 120
			Total Uranium (U)	2011/11/24		102	%	80 - 120
			Total Vanadium (V)	2011/11/24		92	%	80 - 120
			Total Zinc (Zn)	2011/11/24		98	%	80 - 120
		Method Blank	Total Aluminum (Al)	2011/11/24	<5.0		ug/L	
			Total Antimony (Sb)	2011/11/24	<0.50		ug/L	
			Total Arsenic (As)	2011/11/24	<1.0		ug/L	
			Total Barium (Ba)	2011/11/24	<2.0		ug/L	
			Total Beryllium (Be)	2011/11/24	<0.50		ug/L	
			Total Bismuth (Bi)	2011/11/24	<1.0		ug/L	
			Total Boron (B)	2011/11/24	<10		ug/L	
			Total Cadmium (Cd)	2011/11/24	<0.10		ug/L	
			Total Calcium (Ca)	2011/11/24	<200		ug/L	
			Total Chromium (Cr)	2011/11/24	<5.0		ug/L	
			Total Cobalt (Co)	2011/11/24	<0.50		ug/L	

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Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2692307	HRE	Method Blank	Total Copper (Cu)	2011/11/24	<1.0		ug/L	
			Total Iron (Fe)	2011/11/24	<100		ug/L	
			Total Lead (Pb)	2011/11/24	<0.50		ug/L	
			Total Magnesium (Mg)	2011/11/24	<50		ug/L	
			Total Manganese (Mn)	2011/11/24	<2.0		ug/L	
			Total Molybdenum (Mo)	2011/11/24	<0.50		ug/L	
			Total Nickel (Ni)	2011/11/24	<1.0		ug/L	
			Total Phosphorus (P)	2011/11/24	<100		ug/L	
			Total Potassium (K)	2011/11/24	<200		ug/L	
			Total Silicon (Si)	2011/11/24	<50		ug/L	
			Total Selenium (Se)	2011/11/24	<2.0		ug/L	
			Total Silver (Ag)	2011/11/24	<0.10		ug/L	
			Total Sodium (Na)	2011/11/24	<100		ug/L	
			Total Strontium (Sr)	2011/11/24	<1.0		ug/L	
			Total Thallium (Tl)	2011/11/24	<0.050		ug/L	
			Total Tin (Sn)	2011/11/24	<1.0		ug/L	
			Total Titanium (Ti)	2011/11/24	<5.0		ug/L	
			Total Uranium (U)	2011/11/24	<0.10		ug/L	
			Total Vanadium (V)	2011/11/24	<0.50		ug/L	
			Total Zinc (Zn)	2011/11/24	<5.0		ug/L	
		RPD	Total Aluminum (Al)	2011/11/24	NC		%	20
			Total Chromium (Cr)	2011/11/24	NC		%	20
			Total Copper (Cu)	2011/11/24	NC		%	20
			Total Silver (Ag)	2011/11/24	NC		%	20
			Total Zinc (Zn)	2011/11/24	NC		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Validation Signature Page

Maxxam Job #: B1I1627

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

CRISTINA CARRIERE, Scientific Services

==========

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

SUGIYAMA

May 2012
Report No. 021-1228

Your Project #: 021-1228
Site#: Tansley Quarry
Your C.O.C. #: 31614705, 316147-05-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2012/01/06

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B1I1627
Received: 2011/11/17, 17:13

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Alkalinity	1	N/A	2011/11/19	CAM SOP-00448	SM 2320B
Anions	1	N/A	2011/11/24	CAM SOP-00435	SM 4110B
Free (WAD) Cyanide	1	N/A	2011/11/21	CAM SOP-00457	SM4500-CN-I modified
Fluoride	1	2011/11/19	2011/11/19	CAM SOP-00448	APHA 4500FC
Hardness (calculated as CaCO3)	1	N/A	2011/11/22	CAM SOP 00102	SM 2340 B
Mercury in Water by CVAA	1	2011/11/21	2011/11/22	CAM SOP-00453	EPA 7470
Total Metals Analysis by ICPMS	1	N/A	2011/11/24	CAM SOP-00447	EPA 6020
Total Ammonia-N	1	N/A	2011/11/23	CAM SOP-00441	US GS I-2522-90
Nitrate (NO3) and Nitrite (NO2) in Water	1	N/A	2011/11/24	CAM SOP-00440	SM 4500 NO3I/NO2B
pH	1	N/A	2011/11/19	CAM SOP-00448	SM 4500H
Phenols (4AAP)	1	N/A	2011/11/22	CAM SOP-00444	MOE ROPHEN-E3179
Orthophosphate	1	N/A	2011/11/22	CAM SOP-00461	SM 4500 P-F
Sulphide	1	N/A	2011/11/21	CAM SOP-00455	SM 4500-S G
Total Phosphorus (Colourimetric)	1	2011/11/23	2011/11/23	CAM SOP-00407	APHA 4500 P,B,F
Total Suspended Solids	1	N/A	2011/11/18	CAM SOP-00428	SM 2540D
Turbidity	1	N/A	2011/11/19	CAM SOP-00417	APHA 2130B

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50

Your Project #: 021-1228
Site#: Tansley Quarry
Your C.O.C. #: 31614705, 316147-05-01

Attention: Sharon Wood
Golder Associates Ltd
Mississauga - Standing Offer
2390 Argentia Rd
Mississauga, ON
L5N 5Z7

Report Date: 2012/01/06

CERTIFICATE OF ANALYSIS

hydrocarbons. The extraction date for samples field preserved with methanol for F1 and Volatile Organic Compounds is considered to be the date sampled.

Maxxam Analytics is accredited by SCC (Lab ID 97) for all specific parameters as required by Ontario Regulation 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

(1) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Total cover pages: 2

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

RESULTS OF ANALYSES OF WATER

Maxxam ID		LR0703		
Sampling Date		2011/11/17		
COC Number		316147-05-01		
	Units	**SA-2**	**RDL**	**QC Batch**
Calculated Parameters				
Hardness (CaCO3)	mg/L	1500	1	2685961
Inorganics				
Total Ammonia-N	mg/L	2.5	0.05	2689014
Fluoride (F-)	mg/L	0.4	0.1	2687649
Free Cyanide	mg/L	<0.002	0.002	2687845
Orthophosphate (P)	mg/L	<0.01	0.01	2687902
pH	pH	7.74		2687650
Phenols-4AAP	mg/L	<0.001	0.001	2687163
Total Phosphorus	mg/L	0.010	0.002	2690904
Total Suspended Solids	mg/L	14	10	2686425
Sulphide	mg/L	<0.02	0.02	2687266
Turbidity	NTU	1.1	0.2	2686783
Alkalinity (Total as CaCO3)	mg/L	160	1	2687648
Nitrite (N)	mg/L	0.13	0.01	2687289
Dissolved Chloride (Cl)	mg/L	1810	10	2687798
Nitrate (N)	mg/L	1.1	0.1	2687289
Nitrate + Nitrite	mg/L	1.2	0.1	2687289
Dissolved Bromide (Br-)	mg/L	20	1	2687798
Dissolved Sulphate (SO4)	mg/L	958	10	2687798

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LR0703		
Sampling Date		2011/11/17		
COC Number		316147-05-01		
	Units	**SA-2**	**RDL**	**QC Batch**
Metals				
Mercury (Hg)	mg/L	<0.0001	0.0001	2688195
Total Aluminum (Al)	ug/L	<5.0	5.0	2692307
Total Antimony (Sb)	ug/L	<0.50	0.50	2692307
Total Arsenic (As)	ug/L	<5.0 (1)	5.0	2692307
Total Barium (Ba)	ug/L	15	2.0	2692307
Total Beryllium (Be)	ug/L	<0.50	0.50	2692307
Total Bismuth (Bi)	ug/L	<1.0	1.0	2692307
Total Boron (B)	ug/L	5700	10	2692307
Total Cadmium (Cd)	ug/L	<0.10	0.10	2692307
Total Calcium (Ca)	ug/L	480000	200	2692307
Total Chromium (Cr)	ug/L	<5.0	5.0	2692307
Total Cobalt (Co)	ug/L	<2.5 (1)	2.5	2692307
Total Copper (Cu)	ug/L	59	1.0	2692307
Total Iron (Fe)	ug/L	270	100	2692307
Total Lead (Pb)	ug/L	<0.50	0.50	2692307
Total Magnesium (Mg)	ug/L	160000	50	2692307
Total Manganese (Mn)	ug/L	170	2.0	2692307
Total Molybdenum (Mo)	ug/L	8.2	0.50	2692307
Total Nickel (Ni)	ug/L	<5.0 (1)	5.0	2692307
Total Phosphorus (P)	ug/L	<100	100	2692307
Total Potassium (K)	ug/L	50000	200	2692307
Total Silicon (Si)	ug/L	5000	50	2692307
Total Selenium (Se)	ug/L	<10 (1)	10	2692307
Total Silver (Ag)	ug/L	<0.10	0.10	2692307
Total Sodium (Na)	ug/L	760000	1000	2692307
Total Strontium (Sr)	ug/L	27000	1.0	2692307
Total Thallium (Tl)	ug/L	<0.050	0.050	2692307
Total Tin (Sn)	ug/L	<1.0	1.0	2692307
Total Titanium (Ti)	ug/L	<5.0	5.0	2692307
Total Uranium (U)	ug/L	0.18	0.10	2692307
Total Vanadium (V)	ug/L	<2.5 (1)	2.5	2692307

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Metal analysis:Detection Limit was raised due to matrix interferences.

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		LR0703		
Sampling Date		2011/11/17		
COC Number		316147-05-01		
	Units	**SA-2**	**RDL**	**QC Batch**
Total Zinc (Zn)	ug/L	20	5.0	2692307

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

Test Summary

Maxxam ID LR0703
Sample ID SA-2
Matrix Water

Collected 2011/11/17
Shipped
Received 2011/11/17

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Alkalinity	PH	2687648	N/A	2011/11/19	YOGESH PATEL
Anions	IC	2687798	N/A	2011/11/24	FARI DEHDEZI
Free (WAD) Cyanide	TECH/CN	2687845	N/A	2011/11/21	LOUISE HARDING
Fluoride	F	2687649	2011/11/19	2011/11/19	YOGESH PATEL
Hardness (calculated as CaCO3)		2685961	N/A	2011/11/22	AUTOMATED STATCHK
Mercury in Water by CVAA	CVAA	2688195	2011/11/21	2011/11/22	MAGDALENA CARLOS
Total Metals Analysis by ICPMS	ICP/MS	2692307	N/A	2011/11/24	HUA REN
Total Ammonia-N	LACH/NH4	2689014	N/A	2011/11/23	ALINA DOBREANU
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	2687289	N/A	2011/11/24	HELEN HE
pH	PH	2687650	N/A	2011/11/19	YOGESH PATEL
Phenols (4AAP)	TECH/PHEN	2687163	N/A	2011/11/22	BRAMDEO MOTIRAM
Orthophosphate	AC	2687902	N/A	2011/11/22	DEONARINE RAMNARINE
Sulphide	ISE/S	2687266	N/A	2011/11/21	XUANHONG QIU
Total Phosphorus (Colourimetric)	LACH/P	2690904	2011/11/23	2011/11/23	VIORICA ROTARU
Total Suspended Solids	SLDS	2686425	N/A	2011/11/18	TEJPRATAP MISHRA
Turbidity	TURB	2686783	N/A	2011/11/19	NEIL DASSANAYAKE

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Maxxam Job #: B1I1627
Report Date: 2012/01/06

Golder Associates Ltd
Client Project #: 021-1228

Sampler Initials: KS

Package 1	9.0°C
Package 2	6.7°C
Package 3	9.0°C
Package 4	6.3°C

Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Sample LR0708-01: Anions Analysis: Due to high concentrations of the target analytes, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2686425	TEJ	QC Standard	Total Suspended Solids	2011/11/18		98	%	85 - 115
		Method Blank	Total Suspended Solids	2011/11/18	<10		mg/L	
		RPD [LR0710-02]	Total Suspended Solids	2011/11/18	NC		%	25
2686783	NYS	QC Standard	Turbidity	2011/11/19		98	%	85 - 115
		Method Blank	Turbidity	2011/11/19	<0.2		NTU	
		RPD	Turbidity	2011/11/19	NC		%	20
2687163	BMO	Matrix Spike	Phenols-4AAP	2011/11/22		101	%	75 - 125
		Spiked Blank	Phenols-4AAP	2011/11/22		97	%	75 - 125
		Method Blank	Phenols-4AAP	2011/11/22	<0.001		mg/L	
		RPD	Phenols-4AAP	2011/11/22	NC		%	25
2687266	XQI	Matrix Spike	Sulphide	2011/11/21		83	%	80 - 120
		Spiked Blank	Sulphide	2011/11/21		97	%	80 - 120
		Method Blank	Sulphide	2011/11/21	<0.02		mg/L	
		RPD	Sulphide	2011/11/21	NC		%	20
2687289	HH	Matrix Spike						
		[LR0709-01]	Nitrite (N)	2011/11/24		101	%	80 - 120
			Nitrate (N)	2011/11/24		NC	%	80 - 120
		Spiked Blank	Nitrite (N)	2011/11/24		99	%	85 - 115
			Nitrate (N)	2011/11/24		94	%	85 - 115
		Method Blank	Nitrite (N)	2011/11/24	<0.01		mg/L	
			Nitrate (N)	2011/11/24	<0.1		mg/L	
		RPD [LR0709-01]	Nitrite (N)	2011/11/24	NC		%	25
			Nitrate (N)	2011/11/24	0.5		%	25
2687648	YPA	QC Standard	Alkalinity (Total as CaCO3)	2011/11/19		97	%	85 - 115
		Method Blank	Alkalinity (Total as CaCO3)	2011/11/19	<1		mg/L	
		RPD [LR0707-01]	Alkalinity (Total as CaCO3)	2011/11/19	0.4		%	25
2687649	YPA	Matrix Spike						
		[LR0707-01]	Fluoride (F-)	2011/11/19		102	%	80 - 120
		Spiked Blank	Fluoride (F-)	2011/11/19		104	%	80 - 120
		Method Blank	Fluoride (F-)	2011/11/19	<0.1		mg/L	
		RPD [LR0707-01]	Fluoride (F-)	2011/11/19	NC		%	20
2687694	XQI	Matrix Spike						
		[LR0702-06]	Sulphide	2011/11/21		93	%	80 - 120
		Spiked Blank	Sulphide	2011/11/21		93	%	80 - 120
		Method Blank	Sulphide	2011/11/21	<0.02		mg/L	
		RPD [LR0702-06]	Sulphide	2011/11/21	NC		%	20
2687798	FD	Matrix Spike	Dissolved Chloride (Cl)	2011/11/24		NC	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/24		NC	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/24		NC	%	80 - 120
		Spiked Blank	Dissolved Chloride (Cl)	2011/11/24		100	%	80 - 120
			Dissolved Bromide (Br-)	2011/11/24		105	%	80 - 120
			Dissolved Sulphate (SO4)	2011/11/24		104	%	80 - 120
		Method Blank	Dissolved Chloride (Cl)	2011/11/24	<1		mg/L	
			Dissolved Bromide (Br-)	2011/11/24	<1		mg/L	
			Dissolved Sulphate (SO4)	2011/11/24	<1		mg/L	
		RPD	Dissolved Chloride (Cl)	2011/11/24	2.8		%	20
			Dissolved Bromide (Br-)	2011/11/24	NC		%	20
			Dissolved Sulphate (SO4)	2011/11/24	3.2		%	20
2687845	LHA	Matrix Spike						
		[LR0702-04]	Free Cyanide	2011/11/21		95	%	80 - 120
		Spiked Blank	Free Cyanide	2011/11/21		101	%	80 - 120
		Method Blank	Free Cyanide	2011/11/21	<0.002		mg/L	
		RPD [LR0702-04]	Free Cyanide	2011/11/21	NC		%	25
2687902	DRM	Matrix Spike						
		[LR0702-01]	Orthophosphate (P)	2011/11/22		98	%	75 - 125

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2687902	DRM	Spiked Blank	Orthophosphate (P)	2011/11/22		101	%	80 - 120
		Method Blank	Orthophosphate (P)	2011/11/22	<0.01		mg/L	
		RPD [LR0702-01]	Orthophosphate (P)	2011/11/22	NC		%	25
2688195	MC	Matrix Spike [LR0706-08]	Mercury (Hg)	2011/11/22		120	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/22		105	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/22	<0.0001		mg/L	
		RPD [LR0706-08]	Mercury (Hg)	2011/11/22	NC		%	25
2688235	MC	Matrix Spike [LR0702-08]	Mercury (Hg)	2011/11/22		109	%	75 - 125
		Spiked Blank	Mercury (Hg)	2011/11/22		98	%	80 - 120
		Method Blank	Mercury (Hg)	2011/11/22	<0.0001		mg/L	
		RPD [LR0702-08]	Mercury (Hg)	2011/11/22	NC		%	25
2689014	ADB	Matrix Spike	Total Ammonia-N	2011/11/23		NC	%	80 - 120
		Spiked Blank	Total Ammonia-N	2011/11/23		105	%	85 - 115
		Method Blank	Total Ammonia-N	2011/11/23	<0.05		mg/L	
		RPD	Total Ammonia-N	2011/11/23	0.4		%	20
2689034	ADB	Matrix Spike	Total Ammonia-N	2011/11/24		96	%	80 - 120
		Spiked Blank	Total Ammonia-N	2011/11/24		100	%	85 - 115
		Method Blank	Total Ammonia-N	2011/11/24	<0.05		mg/L	
		RPD	Total Ammonia-N	2011/11/24	NC		%	20
2690904	VRO	Matrix Spike [LR0702-05]	Total Phosphorus	2011/11/23		101	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/23		97	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/23		99	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/23	<0.002		mg/L	
		RPD [LR0702-05]	Total Phosphorus	2011/11/23	NC		%	20
2690941	VRO	Matrix Spike	Total Phosphorus	2011/11/23		102	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/23		102	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/23		104	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/23	<0.002		mg/L	
		RPD	Total Phosphorus	2011/11/23	NC		%	20
2691983	VRO	Matrix Spike	Total Phosphorus	2011/11/24		92	%	80 - 120
		QC Standard	Total Phosphorus	2011/11/24		99	%	85 - 115
		Spiked Blank	Total Phosphorus	2011/11/24		97	%	85 - 115
		Method Blank	Total Phosphorus	2011/11/24	<0.002		mg/L	
		RPD	Total Phosphorus	2011/11/24	6.7		%	20
2692307	HRE	Matrix Spike	Total Aluminum (Al)	2011/11/24		94	%	80 - 120
			Total Antimony (Sb)	2011/11/24		106	%	80 - 120
			Total Arsenic (As)	2011/11/24		100	%	80 - 120
			Total Barium (Ba)	2011/11/24		92	%	80 - 120
			Total Beryllium (Be)	2011/11/24		95	%	80 - 120
			Total Bismuth (Bi)	2011/11/24		102	%	80 - 120
			Total Boron (B)	2011/11/24		NC	%	80 - 120
			Total Cadmium (Cd)	2011/11/24		100	%	80 - 120
			Total Calcium (Ca)	2011/11/24		NC	%	80 - 120
			Total Chromium (Cr)	2011/11/24		95	%	80 - 120
			Total Cobalt (Co)	2011/11/24		97	%	80 - 120
			Total Copper (Cu)	2011/11/24		96	%	80 - 120
			Total Iron (Fe)	2011/11/24		101	%	80 - 120
			Total Lead (Pb)	2011/11/24		102	%	80 - 120
			Total Magnesium (Mg)	2011/11/24		NC	%	80 - 120
			Total Manganese (Mn)	2011/11/24		97	%	80 - 120
			Total Molybdenum (Mo)	2011/11/24		107	%	80 - 120
			Total Nickel (Ni)	2011/11/24		96	%	80 - 120

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Golder Associates Ltd
Attention: Sharon Wood
Client Project #: 021-1228
P.O. #:
Site Location:

Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2692307	HRE	Matrix Spike	Total Phosphorus (P)	2011/11/24		99	%	80 - 120
			Total Potassium (K)	2011/11/24		97	%	80 - 120
			Total Silicon (Si)	2011/11/24		80	%	80 - 120
			Total Selenium (Se)	2011/11/24		98	%	80 - 120
			Total Silver (Ag)	2011/11/24		98	%	80 - 120
			Total Sodium (Na)	2011/11/24		91	%	80 - 120
			Total Strontium (Sr)	2011/11/24		NC	%	80 - 120
			Total Thallium (Tl)	2011/11/24		102	%	80 - 120
			Total Tin (Sn)	2011/11/24		107	%	80 - 120
			Total Titanium (Ti)	2011/11/24		100	%	80 - 120
			Total Uranium (U)	2011/11/24		102	%	80 - 120
			Total Vanadium (V)	2011/11/24		96	%	80 - 120
			Total Zinc (Zn)	2011/11/24		98	%	80 - 120
		Spiked Blank	Total Aluminum (Al)	2011/11/24		92	%	80 - 120
			Total Antimony (Sb)	2011/11/24		100	%	80 - 120
			Total Arsenic (As)	2011/11/24		98	%	80 - 120
			Total Barium (Ba)	2011/11/24		97	%	80 - 120
			Total Beryllium (Be)	2011/11/24		94	%	80 - 120
			Total Bismuth (Bi)	2011/11/24		101	%	80 - 120
			Total Boron (B)	2011/11/24		95	%	80 - 120
			Total Cadmium (Cd)	2011/11/24		96	%	80 - 120
			Total Calcium (Ca)	2011/11/24		97	%	80 - 120
			Total Chromium (Cr)	2011/11/24		94	%	80 - 120
			Total Cobalt (Co)	2011/11/24		95	%	80 - 120
			Total Copper (Cu)	2011/11/24		95	%	80 - 120
			Total Iron (Fe)	2011/11/24		98	%	80 - 120
			Total Lead (Pb)	2011/11/24		101	%	80 - 120
			Total Magnesium (Mg)	2011/11/24		92	%	80 - 120
			Total Manganese (Mn)	2011/11/24		92	%	80 - 120
			Total Molybdenum (Mo)	2011/11/24		102	%	80 - 120
			Total Nickel (Ni)	2011/11/24		95	%	80 - 120
			Total Phosphorus (P)	2011/11/24		92	%	80 - 120
			Total Potassium (K)	2011/11/24		97	%	80 - 120
			Total Silicon (Si)	2011/11/24		91	%	80 - 120
			Total Selenium (Se)	2011/11/24		96	%	80 - 120
			Total Silver (Ag)	2011/11/24		95	%	80 - 120
			Total Sodium (Na)	2011/11/24		95	%	80 - 120
			Total Strontium (Sr)	2011/11/24		96	%	80 - 120
			Total Thallium (Tl)	2011/11/24		100	%	80 - 120
			Total Tin (Sn)	2011/11/24		101	%	80 - 120
			Total Titanium (Ti)	2011/11/24		100	%	80 - 120
			Total Uranium (U)	2011/11/24		102	%	80 - 120
			Total Vanadium (V)	2011/11/24		92	%	80 - 120
			Total Zinc (Zn)	2011/11/24		98	%	80 - 120
		Method Blank	Total Aluminum (Al)	2011/11/24	<5.0		ug/L	
			Total Antimony (Sb)	2011/11/24	<0.50		ug/L	
			Total Arsenic (As)	2011/11/24	<1.0		ug/L	
			Total Barium (Ba)	2011/11/24	<2.0		ug/L	
			Total Beryllium (Be)	2011/11/24	<0.50		ug/L	
			Total Bismuth (Bi)	2011/11/24	<1.0		ug/L	
			Total Boron (B)	2011/11/24	<10		ug/L	
			Total Cadmium (Cd)	2011/11/24	<0.10		ug/L	
			Total Calcium (Ca)	2011/11/24	<200		ug/L	
			Total Chromium (Cr)	2011/11/24	<5.0		ug/L	
			Total Cobalt (Co)	2011/11/24	<0.50		ug/L	

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Quality Assurance Report (Continued)

Maxxam Job Number: MB1I1627

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2692307	HRE	Method Blank	Total Copper (Cu)	2011/11/24	<1.0		ug/L	
			Total Iron (Fe)	2011/11/24	<100		ug/L	
			Total Lead (Pb)	2011/11/24	<0.50		ug/L	
			Total Magnesium (Mg)	2011/11/24	<50		ug/L	
			Total Manganese (Mn)	2011/11/24	<2.0		ug/L	
			Total Molybdenum (Mo)	2011/11/24	<0.50		ug/L	
			Total Nickel (Ni)	2011/11/24	<1.0		ug/L	
			Total Phosphorus (P)	2011/11/24	<100		ug/L	
			Total Potassium (K)	2011/11/24	<200		ug/L	
			Total Silicon (Si)	2011/11/24	<50		ug/L	
			Total Selenium (Se)	2011/11/24	<2.0		ug/L	
			Total Silver (Ag)	2011/11/24	<0.10		ug/L	
			Total Sodium (Na)	2011/11/24	<100		ug/L	
			Total Strontium (Sr)	2011/11/24	<1.0		ug/L	
			Total Thallium (Tl)	2011/11/24	<0.050		ug/L	
			Total Tin (Sn)	2011/11/24	<1.0		ug/L	
			Total Titanium (Ti)	2011/11/24	<5.0		ug/L	
			Total Uranium (U)	2011/11/24	<0.10		ug/L	
			Total Vanadium (V)	2011/11/24	<0.50		ug/L	
			Total Zinc (Zn)	2011/11/24	<5.0		ug/L	
		RPD	Total Aluminum (Al)	2011/11/24	NC		%	20
			Total Chromium (Cr)	2011/11/24	NC		%	20
			Total Copper (Cu)	2011/11/24	NC		%	20
			Total Silver (Ag)	2011/11/24	NC		%	20
			Total Zinc (Zn)	2011/11/24	NC		%	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Validation Signature Page

Maxxam Job #: B1I1627

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

CRISTINA CARRIERE, Scientific Services

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

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At Golder Associates we strive to be the most respected global company providing consulting, design, and construction services in earth, environment, and related areas of energy. Employee owned since our formation in 1960, our focus, unique culture and operating environment offer opportunities and the freedom to excel, which attracts the leading specialists in our fields. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees who operate from offices located throughout Africa, Asia, Australasia, Europe, North America, and South America.

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