Faro Groundwater Investigations 2010:

As-built Report: Vangorda & Zone II Pumping Wells

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Yukon Government

Report Prepared by

srk consulting

SRK Consulting (Canada) Inc.
1CY001.047
April 2011

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FINAL

Yukon Government

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Executive Summary

SRK Consulting (SRK) was commissioned by the Yukon Government (YG) to undertake two groundwater related tasks at Faro Mine Complex in October 2010.

This report presents as-built details of the drilling and construction of the wells at the Zone II and Vangorda sites, and summarises the subsequent testing, sampling and monitoring activities that were undertaken by SRK and Denison Environmental Services (DES). The objectives of the drilling program included:

- The re-drilling and construction of a replacement Zone II pumping well.
- To determine internal water levels within the Vangorda Dump; and
- Establish a means of monitoring the phreatic levels within the Dump and provide a means to investigate the potential for drawing down the water level to control seepage and embankment stability.

At Zone II, the 2010 pumping well PW-10-06 was drilled by Foundex Drilling to the completion depth of 300 feet (91m). The final well construction included 6 inch (15cm) ID mild steel casing from surface to 83m depth, with 0.020 slot stainless steel continuous wrap screen from 83m to 90m. A sand pack (grain size 10-20) was placed around the screen, with a 4m bentonite seal layer on top of the sand. A 1m sediment trap was installed below the well screen. Once installed, the screened section of the well was developed by Foundex using the jetting technique. The Zone II PW-10-06 well was incorporated into the DES water level monitoring program. Details of the well are summarised in the table below.

A total of 5 groundwater monitoring wells were drilled at the Vangorda Dump, the locations of which are listed in the table below. Screens in four of the wells (PW-10-02 to 05) were located at the base of waste rock. The screen in well PW-10-1 was located within the original bedrock as no till horizon was encountered and it was not possible to differentiate between the waste rock and the bedrock. The wells were then constructed with 0.020 slotted well screens (3” diameter) within a sandpack, and a 4” riser pipe. The drill hole annular space was sealed with a 4m bentonite layer on the sandpack and grouted to surface. Pressure transducers with integrated data loggers were installed in wells PW-10-01, 02, 03, and 05, and programmed to record water levels on an hourly basis.

Summary of 2010 Pumping and monitoring wells at Zone II and Vangorda Dump

Well	Area	Northing	Easting	Depth (m)	Datum Elevation (masl*)	Datum	Datum Stick-up (m)	Well Screen Depth (mbgs)**	
								From	To
PW-10-06	Zone II	6913950	584784	91.6	1166.73	Top of steel	1.35	83	90
PW-10-01	Vangorda	6903022	593577	32.6	1149.08	Top of PVC	0.84	27.1	31.6
PW-10-02	Vangorda	6902814	593212	18.3	1139.30	Top of PVC	0.83	12.8	17.3
PW-10-03	Vangorda	6902669	593221	18.3	1137.72	Top of PVC	0.80	12.8	17.3
PW-10-04	Vangorda	6902508	593738	9.1	1141.69	Top of PVC	0.86	5.	8.2
PW-10-05	Vangorda	6902681	593561	41.8	1180.39	Top of PVC	0.86	34.7	40.8

File Ref: PROJECTS\01_SITES\FARO\2100_1CY001.047_Vangorda Zone II pumping wells\020_Project_Data\SRK\ Well locations\October28-2010_SurveyedDrill Holes_Corrected.xls.

* masl- metres above sea level

** mbgl- metres below ground surface

Four out of the five wells intersected the water table within the dump. Well PW-10-04, in the south west sector of the dump, was dry at the last monitoring round in mid-October 2010. The phreatic surface in the Vangorda dump is at a low elevation relative to the berms. Pressure transducers with integrated data loggers were installed in three of the five wells to record changes in groundwater elevations in the dump over time. This data will be managed by DES.

There was insufficient water within the dump to undertake test pumping. The testing carried out in PW-10-01 suggests low hydraulic conductivity in the bedrock.

The Vangorda 2010 wells were added to the routine water quality sampling program undertaken by DES. Water samples were taken in November 2010. Samples were collected for the standard suite of parameters DES collects for all groundwater wells, including dissolved metals and physical parameters, and sent to Maxxam Analytics.

The results of analysis conducted on water samples collected from the PW-10 wells at Vangorda indicated water chemistry at lower concentrations than the seepage water quality.

Recommendations for future work based on the findings of the 2010 Faro work are summarised below:

<u>At Zone II</u>

- A pressure transducer datalogger should be installed inside a small (1") PVC pitot tube located along the well riser pipe, to monitor water level variation over time.

<u>At Vangorda:</u>

- Groundwater level monitoring dataloggers should be downloaded regularly by DES. Freshet data will be important to collect as this data will provide information on the likely maximum phreatic surface elevations within the Vangorda dump. This data will be used to enhance the understanding of the site water balance.
- If phreatic surface elevations reach high levels in the freshet, additional test pumping of the installed wells could be conducted to determine hydraulic parameters of dump material. Both water level and hydraulic data should be used to update the water balance.
- Water level monitoring should be continued to allow assessment of risks to berm stability. If berm stability is considered to be at risk, the pumping wells can be used to draw down the dump phreatic surface. A management plan for disposal of pumped water will be required.
- The wells should be added to the Vangorda/ Grum quarterly water quality sampling rounds undertaken by DES.
- Levelogger should be installed in the remaining well.

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Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (Canada) Inc. (SRK) by Yukon Government (YG). These opinions are provided in response to a specific request from YG to do so, and are subject to the contractual terms between SRK and YG. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report.

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1 Introduction

SRK Consulting Inc. ("SRK") was requested by Patricia Randell and Karen Furlong of the Yukon Government ("YG") to complete the following tasks at the Vangorda and Faro mine sites associated with the Faro Mine Complex:

- Vangorda Waste Rock Dump:
  - To characterise the groundwater within the Vangorda waste dump, specifically to determine internal water levels;
  - To provide a system to monitor the phreatic levels within the dump and to provide a means to lower the water level within the dump to control seepage and embankment stability, if necessary.
- Zone II Area:
  - To design and supervise the re-drilling and construction of a replacement well for the Zone II pumping well.

Specific requirements of the 2010 program were provided by John Brodie, Chief Site Engineer of the Faro Technical Advisory Team (TAT), as outlined in the June 2010 memorandum titled "Zone II Well Replacement and Vangorda Drilling" (Brodie, 2010), as well as through personal communication with YG technical adviser Bill Slater and Christoph Wels, P.Geo., an hydrogeologist with significant site experience.

The two tasks were managed by YG as different projects. The Vangorda work was managed by Patricia Randell (Mine Closure) and the Zone II drilling was managed by Karen Furlong (Mine Operations and Maintenance). For this reason, the two projects will be described under their respective headings in this report.

The locations of the in-filled Zone II pit and Vangorda waste dumps are presented in Figure 1.

2 Zone II: Re-drilling of pumping well

2.1 Background

The outline of the Zone II pit is shown on Figure 2. Excavation of the Zone II pit was completed in the early 1980's, with its deepest point at elevation 1094.5m. After excavation, the pit was backfilled with waste rock from mining operations. Approximately 40 million tonnes of unclassified mine rock was dumped between the early 1980's and 1989. In October 1983, the partially backfilled pit overflowed contaminated water into the North Fork Rose Creek, which is located immediately down gradient of the Zone II pit. Zinc levels in North Fork Rose Creek increased tenfold (Robertson Geoconsultants, 1996).

In early 1991, a pumping well was installed within backfilled material at the deepest part of the pit, and fitted with a submersible pump. The objective of pumping was lowering of the water level within the pit to a depth of 74m (elevation of 1093.8 masl), which is below the pit "spill point" and would prevent further overflows to the North Fork Rose Creek.

Brodie (2010) reported that the well casing was damaged, resulting in potential issues with future pumping operations and management. A new pumping well was proposed to a depth of 90m.

2.2 Program Objectives and Work Program

2.2.1 Program objectives

The scope of the Zone II pumping well program included preparation of a tender document for the drilling, selection of the driller, and the design and supervision of the drilling and construction of the well.

2.2.2 Work program

The following provides a summary of the scope for the Zone II drilling program:

- Desktop information review;
- Drill tender preparation and selection process;
- Field Program – drilling and installation of well;
- Reporting.

2.2.3 Project team

The SRK project team consisted of Peter Healey (Principal), Dan Mackie (Senior Hydrogeologist) and Ben Green (Senior Hydrogeologist). The fieldwork was supervised by Ben Green. On-site logistical support from Ray Morrell and Kristian Autio from Denison Environmental Services (DES) was gratefully received.

2.3 Program Results

2.3.1 Well Construction

The Zone II drilling program started on 30 September 2010, with the well completed on Tuesday October 5th 2010. The weather during the drilling program was dry and cold. The location of the well is displayed in Figure 2. The well construction log is presented in Appendix A.

The drilling was undertaken by Foundex Drilling of Vancouver, BC, using a Barber DR 24 drill rig and the dual rotary technique, with air and water injection to return chips to surface. This method is preferable for drilling through unconsolidated, blocky material as anticipated in waste rock dumps.

The Zone II hole was drilled in two stages to allow for a reduction in hole size at depth. The first 100 feet (30m) were drilled with a 12 inch (30cm) diameter drill bit. A 10 inch (25cm) inner diameter (ID) mild steel casing was installed in the upper 30m and pressure grouted in place to form an annular seal. The well was continued with an 8 inch (20cm) diameter drill bit, which was lowered through the 10 inch steel casing. The hole was then drilled to the completion depth of 300 feet (91m). The final well construction included 6 inch (15cm) ID mild steel casing from surface to 83m depth, with 0.020 slot stainless steel continuous wrap screen from 83m to 90m. A sand pack (grain size 10-20) was placed around the screen, with a 4m bentonite seal layer on top of the sand. A 1m sediment trap was installed below the well screen.

The well details are summarised in Table 1. Full details of the well construction are presented in Appendix A.

Table 1: Summary of Zone II Pumping Well details

Well	YES Survey Reference	Northing	Easting	Depth (m)	TOC* Elevation (masl**)	TOC Stick-up (m)	Well Screen	
							From (m)	To (m)
Zone II (PW-10-06)	DH6	6913950	584784	91.6	1166.73	1.35	83	90

020_Project_Data\SRK\Well locations\October28-2010_SurveyedDrill Holes.xls
* TOC- Top of Casing
** masl- metres above sea leve

Once installed, the screened section of the well was developed by Foundex using the jetting technique. The jetting method involved installing a pipe fitted with a specialized tip down the inside of the well screen, then forcing high pressure water down the rods, horizontally out of the tip and into the well screen. This developing procedure is designed to settle the sandpack around the well screen and to flush out fine material from the sandpack and surrounding material. Development is conducted to improve the overall efficiency of the pumping well or, that is, to enable the well screen to take in water more freely and provide for better pump operation. The jetting method was continued for a period of 7 hours and SRK believes that this was adequate for the development of the well and that most of the fines had been removed. SRK had originally recommended that pumping or airlifting be carried out to assess the efficiency of the well. However YG deemed that this was not necessary. The Zone II PW-10-06 well was incorporated into the DES water level monitoring program.

Figure 3 presents water level data for the old and new Zone II pumping wells between March 13, 2010 and January 7, 2011, the end of the available record. Similarity in water level elevations between the old and new wells suggests that the two are highly connected. Water levels in the new well show the same trends as water levels in the old well, which is being pumped, and the elevations are almost identical. The similarity of water level elevations between the two wells during pumping of the original pumping well, which is approximately 37 meters from PW-10-06, indicates a high level of connection and provides a qualitative assessment of well efficiency: similarity in timing and scale of drawdown at PW-10-06 during pumping of the original pumping well suggests minimal lag time that could indicate the potential for well loss. Determination of actual well efficiency of PW-10-06 will not be possible until the pump is installed and tested. Monitoring at the original well during pumping of PW-10-06 will allow determination of well efficiency.

3 Vangorda Drilling Program

The location of the Vangorda waste rock dump is shown on Figure 1. Figure 4 shows the locations of the five wells within the dump.

3.1 Background

Construction of the Vangorda dump began in May 1990 with the construction of a till starter dyke around the perimeter of the facility. The facility was designed to contain the two main rock types from the Vangorda pit, sulphides and phyllites, both of which have the potential to be acid generating. The waste rock dump was located on an east-west trending ridge. Foundation soil conditions within the perimeter of the dump vary from a glacial till overburden to shallow bedrock.

The till overburden varies in thickness from 20m along the west side of the dump to less than a metre to the east. The design of the facility was modified in 1992, to accommodate more waste rock. In 1993, Pelly Construction Ltd (PCL) was commissioned to upgrade the seepage collection system around the perimeter of the dump and to initiate work on the re-sloping and capping of the waste within the dump. This work was completed in 1994. The seepage collection system was built to collect the seepage from the drains that were installed during construction of the till Starter dyke. The drains, ditch and seepage collection pond are shown in Figure 4.

Studies on the water balance of the Vangorda waste dump have been carried out by a number of parties since its construction. Monitoring of the seepage from the waste rock pile, seepage losses from the channel and piezometric head in the till berms included instrumentation located in weirs, groundwater wells and piezometers positioned in the berms.

Discrepancies in the water balance were noted based on observations and flow monitoring from the rock drains in the dump. Subsequent discussions with the Faro Technical Advisory Team (TAT) on the subject of the Vangorda water balance in 2009 recommended drilling in the dump to obtain information regarding the water level within the dump.

3.2 Program Objectives and Work Program

3.2.1 Program objectives

The objectives of this program were twofold;

- To characterise the groundwater within the Vangorda waste dump, specifically to determine internal water levels;
- To provide a system to monitor the phreatic levels within the dump and to provide a means to lower the water level within the dump to control seepage and embankment stability if necessary.

It was SRK's understanding that the data collected would eventually be used to provide a better understanding of the water balance within the dump. A follow-up phase involving the characterisation of the hydrogeological conditions within the dump would be undertaken during a second phase of the program at a later date. The scope of this program was therefore limited to the installation of monitoring wells and water level dataloggers that would provide the required information.

The wells were constructed with dual-purpose, to function firstly as groundwater monitoring wells and secondly to house submersible pumps to become pumping wells, if the need to remove water from the dump was ever required. The depths of the wells were constrained by the requirement not to penetrate through the low permeability foundation till material.

To assess dump water levels, pressure transducers with integrated data loggers were to be installed in wells where water was intersected to provide long term records of continuous (hourly) water levels. Groundwater quality sampling of the wells and water level monitoring would be integrated to the DES minesite sampling program.

The scope of the second phase of the work will be dependent on the data collected from the 2010 Vangorda wells installed in Phase 1, and may involve installation of pumps, where appropriate, and a program of test pumping to allow hydraulic properties of the waste rock material to be calculated. This data will feed into the Vangorda site water balance analysis.

3.2.2 Work program

- Desktop Information Review (Phase 1).
- Field Program Drill five wells (6” diameter, air rotary) located behind the berm on the east, west and south areas of the waste dumps. These wells will be constructed with 3” stainless steel well screen and 4” PVC riser pipe to allow for pumping options. The estimated depths of these wells between 20 to 40m. Short step pumping tests will be undertaken where necessary (Phase 1).
- As-Built Reporting (Phase 1).
- Hydrogeological Characterisation (Phase 2).
- Water Balance Analysis (Phase 2.)

3.2.3 Project team

The SRK project team consisted of Peter Healey (Principal), Dan Mackie (Senior Hydrogeologist) and Ben Green (Senior Hydrogeologist). The fieldwork was supervised by Ben Green. On site logistical support from Ray Morrell and Kristian Autio from Denison Environmental Services (DES) was gratefully received. Jay Cherian and the Faro environmental team assisted with collection of post-drilling water level and quality data. Technical advice, on site knowledge and the placement of wells is acknowledged from John Brodie, Bill Slater and Cassandra Hall.

3.3 Program Results

Phase 1 of the drilling program at Vangorda commenced on September 24, 2010, and was completed on September 30, 2010. Supervision and logging of the wells was undertaken by B. Green of SRK. The weather during the drilling program varied between cold with intermittent snow flurries, and warmer, wetter conditions. A total of 5, 6-inch (15cm) diameter wells were drilled, using the Foundex Barber DR 24 rig (Dual Rotary, air and water injection). The locations of which are displayed in Figure 4. Completion logs for each well are presented in Appendix A. A summary of the well collars and hole details are presented in Table2.

Table 2: Summary of Vangorda Pumping Wells

SRK Well	YES Survey Reference	Northing	Easting	Depth (m)	TOC Elevation (masl)	TOC Stick-up (m)
PW-10-01	DH1	6903022	593577	32.6	1149.08	0.95
PW-10-02	DH2	6902814	593212	18.3	1139.30	1.01
PW-10-03	DH3	6902669	593221	18.3	1137.72	0.93
PW-10-04	DH4	6902508	593738	9.1	1141.69	0.99
PW-10-05	DH5	6902681	593561	41.8	1180.39	0.99

Table Reference: \..\..\020_Project_Data\SRK\Well locations\October28-2010_SurveyedDrill Holes.xls

*TOC = top of PVC casing

Input to the locations of the wells was provided by the Faro technical advisory team (TAT). The final depth for each wells was determined by the depth of the till horizon beneath the dump. All of the wells with the exception of PW-10-01 were drilled approximately 1 m into the till before terminating the drillhole. Samples of the drill cuttings were not collected. Moisture content of the borehole chip returns was not recorded as it was necessary to drill with water when harder rock was intersected by the drill bit, and as a medium to lift the drill chips to surface.

Preliminary estimates of drill hole depths and elevation of the basal till unit were made from the available, 1-metre contour interval, pre-mining topography. The datum at the site has changed several times over the life of the mine, such that exact pre-mining ground elevations are not accurately known. Identification of basal till materials during drilling was the best indicator of where the actual pre-dump till surface was located.

Once drilled, each well was installed with a 0.020 slotted well screen around which a sand pack was placed. A sediment trap was installed below the well screen. In wells PW-10-02 and 053, the bottom of wellscreen was positioned within till, however the upper part of the wellscreen was within the waste rock. The sandpack was emplaced to 1-2m above the top of the well screen, also within waste rock. Details on the screened intervals are presented in Table 3. To form a seal around the well, a 4m thick layer of bentonite pellets were deposited, on top of which a cement- bentonite grout was pumped. A 3m length of 8 inch diameter casing was set into the top of the grout to form a protective case around the PVC riser pipe at surface. The top of casing (TOC) height was around 1m above surface.

Table 3: Well Screen Intervals

Drillhole	**Well screen**		**Total Depth (m)**	**Material**	**Observations**
	From (m)	**To (m)**			
PW-10-01	27.1	31.6	32.6	Bedrock	Till horizon anticipated around 1120m elev. No till seen, hole continued to 32.6m
PW-10-02	12.8	17.3	18.3	Waste Rock/till	Hole halted in till
PW-10-03	12.8	17.3	18.3	Waste Rock/till	Hole halted in till. Water table intersected around 14m.
PW-10-04	5.1	8.1	9.1	Waste Rock/till	Hole halted in till. No water intersected
PW-10-05	34.7	40.7	41.8	Waste Rock/till	Hole halted in till. Water recorded in sump 2 days later.

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The following points below summarise the installations for each of the wells.

- The till horizon in well PW-10-01 was not identified in the drill cuttings, and the drillhole was continued to 32m, and a screen installed. It was not possible to differentiate between the waste rock and the bedrock. The bedrock geology of the Vangorda dump area is phyllite, so it is likely that the final depth of PW-10-01 is within bedrock. Observed water levels in the well are at an elevation close to the base of the dump according to the pre-mining topography. The well was grouted to surface above the screen.
- The lower portions of the wellscreen in wells PW-10-02 and 03 were both installed across the waste rock- till interface, with the upper portions (>50%) within waste rock. Water levels recorded in these wells will effectively reflect the water table at the base of the dump.
- The well PW-10-04 did not record any water during and following installation. The wellscreen was installed across a soil horizon, and extending into waste rock at the top of the till horizon, representing the lower section of the dump. Water levels should reflect phreatic surface within the dump.
- Well PW-10-05 was drilled into the deepest section of the dump and installed with wellscreen within waste rock, above the till horizon. Although water was recorded in the well in October, it was probably residual water collecting in the sump. At the time of installation, it appears that the water level maybe below the base of dump.

Cross-sections with till intersection and well completion information are presented in Section 4.3.2.

The collar locations of the wells were surveyed in by Yukon Engineering Services (YES) using the NAD83, Zone 15 datum.

Following the drilling and installation of the wells, where water was intersected, development was undertaken using a surge block on the end of Waterra tubing. This process settled the sandpack, and flushed out fine material. Purging of the well was then undertaken using a length of Waterra tube with a non-return foot-valve attached, the process designed to pull groundwater into the well. The purging process drained the wells dry, with negligible recovery observed. Water level measurements were recorded before the water quality sampling rounds in October 2010. The results are presented in Table 4 below. Pressure transducers with integrated data loggers were installed in wells PW-10-01, 02, 03 and 05, and programmed to record water levels on an hourly basis. A barometric logger was installed in well PW-10-02, for barometric compensation.

Table 4: Water level measurements at Vangorda Pumping Wells (Oct 2010, DES)

Site	Collar elevation (masl*)	Date	Time	WL (mbtoc**)	TOC Stick-up (m) ***	Water Elevation(masl)
PW-10-01	1149.2	10/18/2010	14:05	23.40	0.95	1125.8
PW-10-02	1139.48	10/18/2010	15:54	14.14	1.01	1125.34
PW-10-03	1137.86	10/18/2010	14:10	14.30	0.93	1123.56
PW-10-04	1141.82	10/19/2010	16:40	Dry	0.99	-
PW10-05	1180.53	10/18/2010	14:27	41.72****	0.99	1138.82

Table Reference: P:\01_SITES\FARO\2100_1CY001.047_Vangorda Zone II pumping wells\020_Project_Data\SRK\Well locations

* masl- metres above sea level

** mbtoc- metres below top of casing

*** TOC- top of casing

**** Water level depth is within sump. May not be representative of phreatic surface

3.3.1 Test Pumping

Pumping tests were planned for each of the wells to derive the hydraulic properties of the waste rock in the dump, and to calculate an efficient pumping rate for each well. Following drilling, only PW 10-01 had sufficient water and recovery rate to support a useful test (based on purging results). A step test was attempted, by pumping the well at varying rates over time. Normally, a low pumping rate is initially selected, and both the water level in the well and the discharge from the riser pipe is recorded. Once steady state conditions are observed, the well is pumped for one hour at the low rate, with continuous monitoring of the water levels and discharge. The pumping rate is increased for the next ‘step’, and the process is repeated. Four or five steps are typically undertaken to complete the test. The recovery of groundwater levels to pre-test levels is also monitored. The step test data can be used to determine well efficiency, and optimal pumping rate for a constant rate test, which should be a part of Phase II of the study. A Grundfos 22 SQ 220 pump with a 2 inch diameter riser pipe was available for pumping. A generator was used to provide power to the pump.

In well PW-10-01, the step test could not be completed, as the well was drained within the first 5 minutes of pumping at the low rate. This response suggests a low bedrock hydraulic conductivity.

A pressure transducer with an integrated data logger was installed in the well to record the water level during the test and during the post-test recovery, recording on an hourly basis. The plot in Figure 5 presents collected data and shows that the groundwater level rapidly dropped to the bottom of the well.

3.3.2 Water level measurements in the Vangorda Dump

During the site visit, daily water level measurements were taken from both existing wells around the Vangorda dump and the newly installed wells. The existing P94 wells are completed within the berms of the dump and the PW-10 holes into the waste rock material of the dump itself. Figure 4 shows the locations of the cross sections through the Vangorda dump that are presented in Figures 6 to 9 (extracted from the SRK 2010 Annual Inspection Waste and Water Management Facilities report). Water levels for the PW-10 wells are plotted to suggest the position of the phreatic surface within the dump at the time of drilling.

The following points should be noted when looking at cross-sections:

- The original ground elevation for the Vangorda dump displayed on the sections is extrapolated from contour lines of pre-mining topographic data.
- Where cross-section lines do not intersect all monitoring wells, certain monitoring wells have been projected to the section. As such, due to topographic variation, ground elevations, or the till elevation, for these projected wells do not necessarily correlate with that at the section location. Locations where this occurs have been identified on the sections.

Based on the information collected from the PW-10 wells, the phreatic surface within the Vangorda dump at the time of drilling was at a relatively low level, coinciding closely with the pre-mining ground topography. Four out of the five wells hosted water (well PW-10-4 was still dry as of the monitoring round on October 18, 2010). The water intersected in PW-10-05 in October 2010 was located within the well sump. It should not be considered representative of the phreatic surface within the dump. Frequent monitoring of the water levels through manual and automatic logging methods will increase confidence in characterising the groundwater levels in the dump, and will demonstrate how the water levels in the dump react during the Spring freshet.

3.4 Water Quality Sampling

The Vangorda 2010 wells were added to the routine water quality sampling program undertaken by DES. Water samples were taken in November 2010. Samples were collected for the standard suite of parameters DES collects for all groundwater wells, including dissolved metals and physical parameters. Samples were analyzed at Maxxam Analytics, the results for which are presented in a memo from DES in Appendix B.

The chemistry of the water samples was compared to previous seepage samples from the waste rock, in the vicinity of each well. The locations of the seepage sampling sites can be seen in Figure 4. Values for pH, conductivity sulphate and zinc are compared between the sampling results from the 2010 monitoring wells and the nearest 2008 seepage chemistry locations in Table 5. The monitoring wells returned higher pH values than the seepage values, and in nearly all occasions had lower conductivity, sulphate and dissolved zinc values than initially expected based on seepage water quality.

Table 5: Selected chemical parameters to compare groundwater quality with seepage chemistry at Vangorda

Parameter / Source	Sample Type	pH	Conductivity (µS/cm)	Sulphate (SO^4) (mg/L)	Zinc (Zn) (mg/L)
PW-10-01 *	Groundwater well	7.45	17,300	17,000	0.008
VD-04 **	Seepage	3.1	40,300	68,000	15,900
VD-05	Seepage	4.89	44,800	79,000	16,600
PW-10-02	Groundwater well	7.44	1,870	850	51.9
PW-10-03	Groundwater well	7.09	2,049	930	34.1
VD-03	Seepage	6.08	8,380	6,100	720
VD-10	Seepage	5.64	20,800	30,000	3,840

Table file reference: P:\01_SITES\FARO\2100_1CY001.047_Vangorda Zone II pumping wells\0700_Reporting\VG_ZII_AsBuildRep_10Nov2010_V01\Appendices\Appendix 2- water chemistry

* Water sampling October 2010

** SRK, 2010 Faro Mine Complex 2010 Waste Rock and Seepage Monitoring Report- DRAFT

The chemistry data for the groundwater wells and the seepage locations listed in Table 5 above are relatively limited in extent, and the following observations should be treated as provisional.

While well development was limited due to lack of water, it should be noted that drilling water was sourced from Vangorda Creek from above the haul road. In 2009, sampling indicated that sulphate concentrations for Vangorda Creek were about 25mg/L. Therefore, the water quality in the wells does not indicate drilling water.

At PW-10-01, where high sulphide waste materials were deposited, high sulphate levels would be anticipated. The high sulphate- low zinc values recorded could indicate that the sulphate front has moved down into bedrock, but the zinc front is attenuated.

At the PW-10-02 and 03 wells, the higher zinc values could be indicative of the zinc front moving downwards. The lower sulphate values could be a result of the wells intersecting different waste rock materials, such as phyllites hosting zinc source materials. At least some of the waste rock in this area can be assumed to be phyllitic ore below cutoff grade, with sulphide content that was lower than the material in the “sulphide cell’, located in the vicinity of PW-10-01.

The reasons for the difference in water chemistry between the pumping wells and seepage points at the Vangorda dump are not apparent. Pumping wells are within the waste rock dump and the seep data is collected from where groundwater in the dump daylights at surface. Seep water quality data shows notably higher concentrations of zinc and sulphate, and lower pH values than the water collected from the pumping wells. The water level data from the pumping test recovery monitoring suggests that the influence of rainfall may have recharged the displaced water in the pumping wells. The chemistry of the groundwater samples from these wells may be more influenced by the rainfall chemistry, and groundwater not exposed to the waste rock in the dump for long enough to show effects of the waste rock.

4 Conclusions and Recommendations

4.1 Conclusions

Zone II Drilling:

- The pumping well PW-10-06 was completed to a depth of 91m. An 8” screened section was installed between 82m to 89m below surface. The well was developed upon completion.
- Water level data suggests that the new well is in close connection to the historic well.

Vangorda Drilling:

- Five wells were drilled into the Vangorda Dump. All were installed with 3” stainless steel, continuous wrap well screen and 4” riser pipe to work as both groundwater monitoring wells and pumping wells.
- Four out of the five wells intersected the water table within the dump. Well PW-10-04, in the south-west sector of the dump, was dry at the last monitoring round in mid-October 2010. During installation of the Well PW-10-01, no till horizon was intersected and it was not possible to differentiate between the waste rock and the bedrock. The wellscreen was installed in bedrock.
- The phreatic surface in the Vangorda dump is at a low elevation relative to the berms. Pressure transducers with integrated data loggers were installed in four of the five wells to record changes in groundwater elevations in the dump over time. This data will be managed by DES.
- There was insufficient water within the dump to undertake test pumping. The testing carried out in PW-10-01 suggests low bedrock hydraulic conductivity.
- The chemistry of water samples collected from the PW-10 wells at Vangorda are generally lower than the seepage water chemistry in the drains.

4.2 Recommendations

Zone II:

- A pressure transducer datalogger should be installed inside a small (1”) PVC pitot tube located along the well riser pipe, to monitor groundwater level variations during operations. Based on the data in Figure 3, as an alternate option, the logger could be installed in the old well, as there seems to be good hydraulic connection between the two wells (to be confirmed through testing).

Vangorda:

- Groundwater level monitoring dataloggers should be downloaded regularly by DES. Freshet data will be important to collect as this data will provide information on the likely maximum phreatic surface elevations within the Vangorda dump. This data will be used to enhance the understanding of the site water balance.
- If phreatic surface elevations reach high levels in the freshet, additional test pumping of the installed wells could be conducted to determine hydraulic parameters of dump material. Both water level and hydraulic data should be used to update the water balance.
- Water level monitoring should be continued to allow assessment of risks to berm stability. If berm stability is considered to be at risk, the pumping wells can be used to draw down the dump phreatic surface. A management plan for disposal of pumped water will be required.
- The wells should be added to the Vangorda/ Grum quarterly water quality sampling rounds undertaken by DES.

Prepared by

Ben Green

Senior Hydrogeologist

Reviewed by

Dan Mackie

Senior Hydrogeologist

Peter Healey

Principal Engineer

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

6 References

Brodie Consulting, 2010. *Zone II well replacement* and location. Memorandum

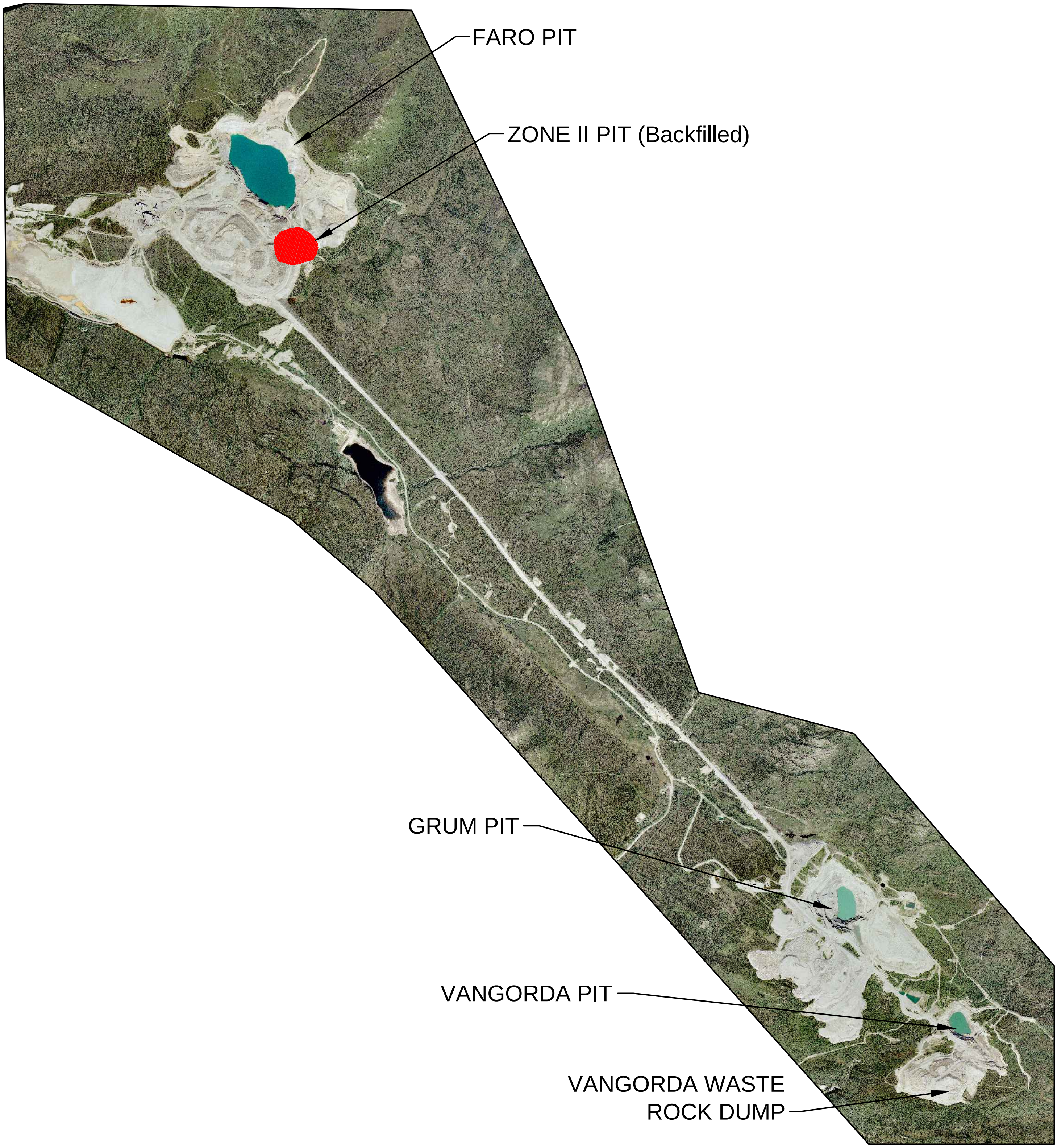
Brodie Consulting, 2010. *Zone II well replacement and Vangorda* Drilling. Memorandum

Robertson Geoconsultants Inc., *Anvil Range Mining Complex- Integrated Comprehensive Abandonment Plan*. Volume 2 of 3, Site Characterisation. November 1996

SRK, 2010 *Faro Mine Complex 2010 Waste Rock and Seepage Monitoring Report*- DRAFT

SRK, 2011. *2010 Annual Inspection Waste and Water Management Facilities Vangorda/Grum Faro Mine Complex, Yukon- DRAFT*

Figures



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Engineers and Scientists
Vancouver B.C.

Faro Mine Closure
Fermeture de la mine Faro

Faro Groundwater Investigations 2010

Faro Minesite with Locations of Zone II and Vangorda

Faro Mine Complex

SRK JOB NO.: 1CY001.047
FILE NAME: Location Map.dwg

DATE: Feb. 2011
APPROVED: BG
FIGURE: 1

J:\01_SITES\FARO\2100_1CY001.047_Vangorda Zone II pumping wells\040_AutoCAD\Location Map.dwg

SRK Consulting
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Faro Mine Closure
Fermeture de la mine Faro

Faro Groundwater Investigations 2010

Location Map of Zone II Pumping Well

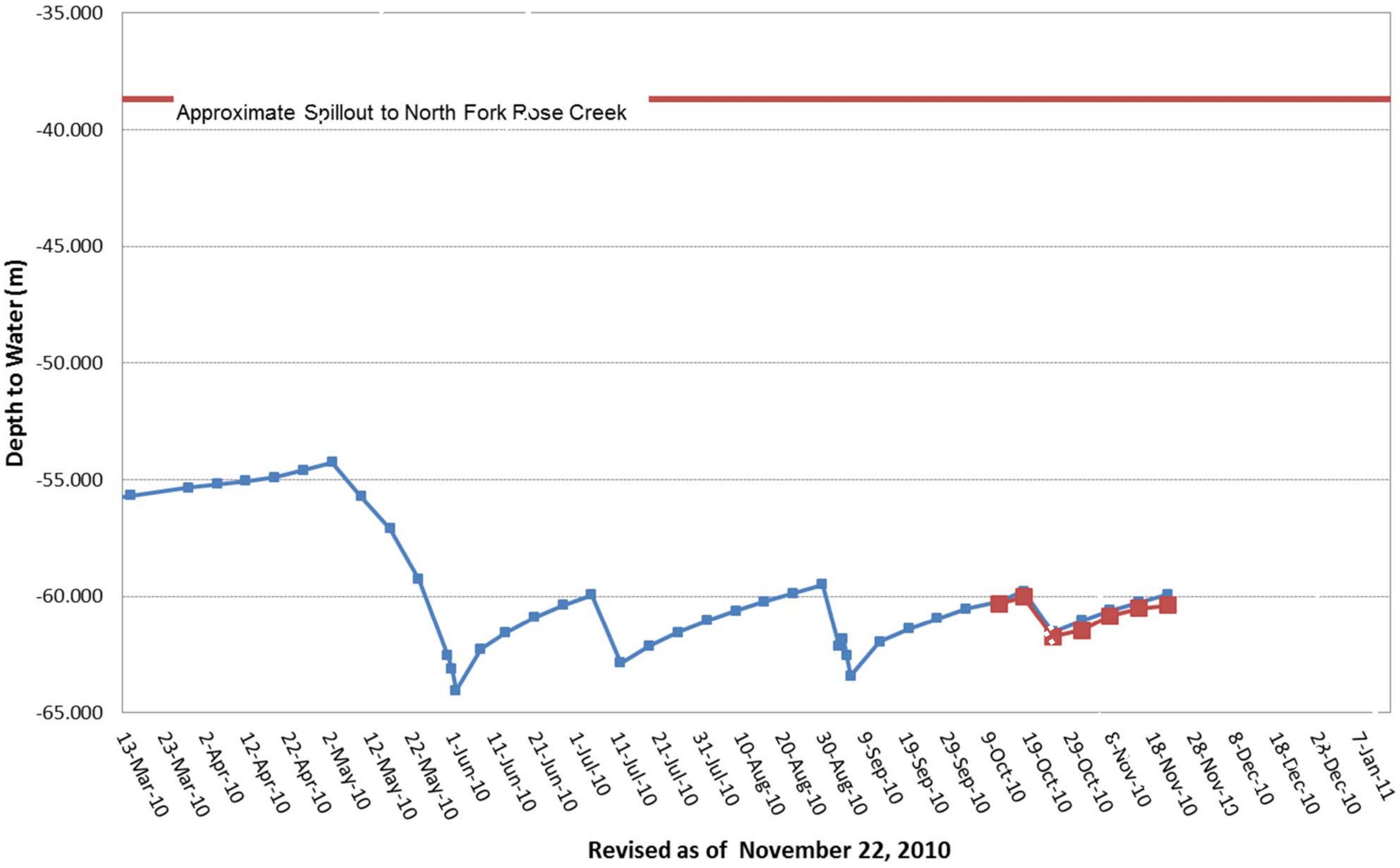
Faro Mine Complex

SRK JOB NO.:	1CY001.047
FILE NAME:	ZoneII 2010 PumpingWell.dwg

DATE:	APPROVED:	FIGURE:
Feb. 2011	PMH	2

J:\01_SITES\FARO\2100_1CY001.047_Vangorda Zone II pumping wells\040_AutoCAD\ZoneII 2010 PumpingWell.dwg

Measured Water Level in Faro Zone II Pit



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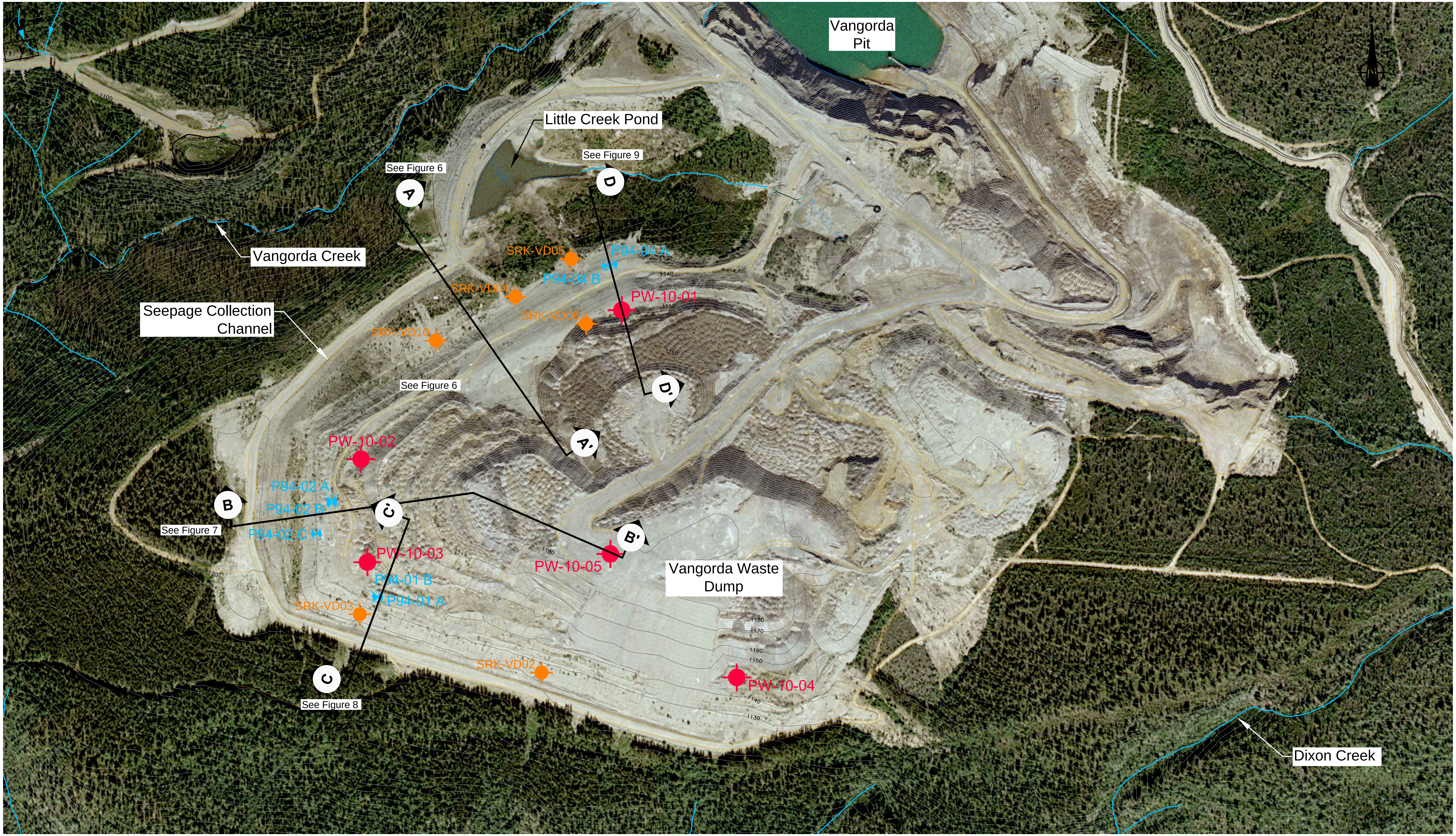
Job No: 1CY001.047	Faro Mine Complex	Zone II & Vangorda 2010 Drilling
Filename: Figure 3_Graphs_20110217.pptx		**Zone II Water level Monitoring Displaying Old and New Pumping Well Water levels**
		Date: April 2011 / Approved: / Figure: 3



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Vancouver B.C.

SRK JOB NO.: 1CY001.026
FILE NAME: Vangorda 2010 Monitoring Wells.dwg

Faro Mine Closure
Fermeture de la mine Faro

Faro Mine Complex
Final Closure and Remediation Plan

Faro Groundwater Investigation 2010

Vangorda Wasterock Dump
2010 Monitoring Wells

DATE:	APPROVED:	FIGURE:
Jan 2010	PMH	4

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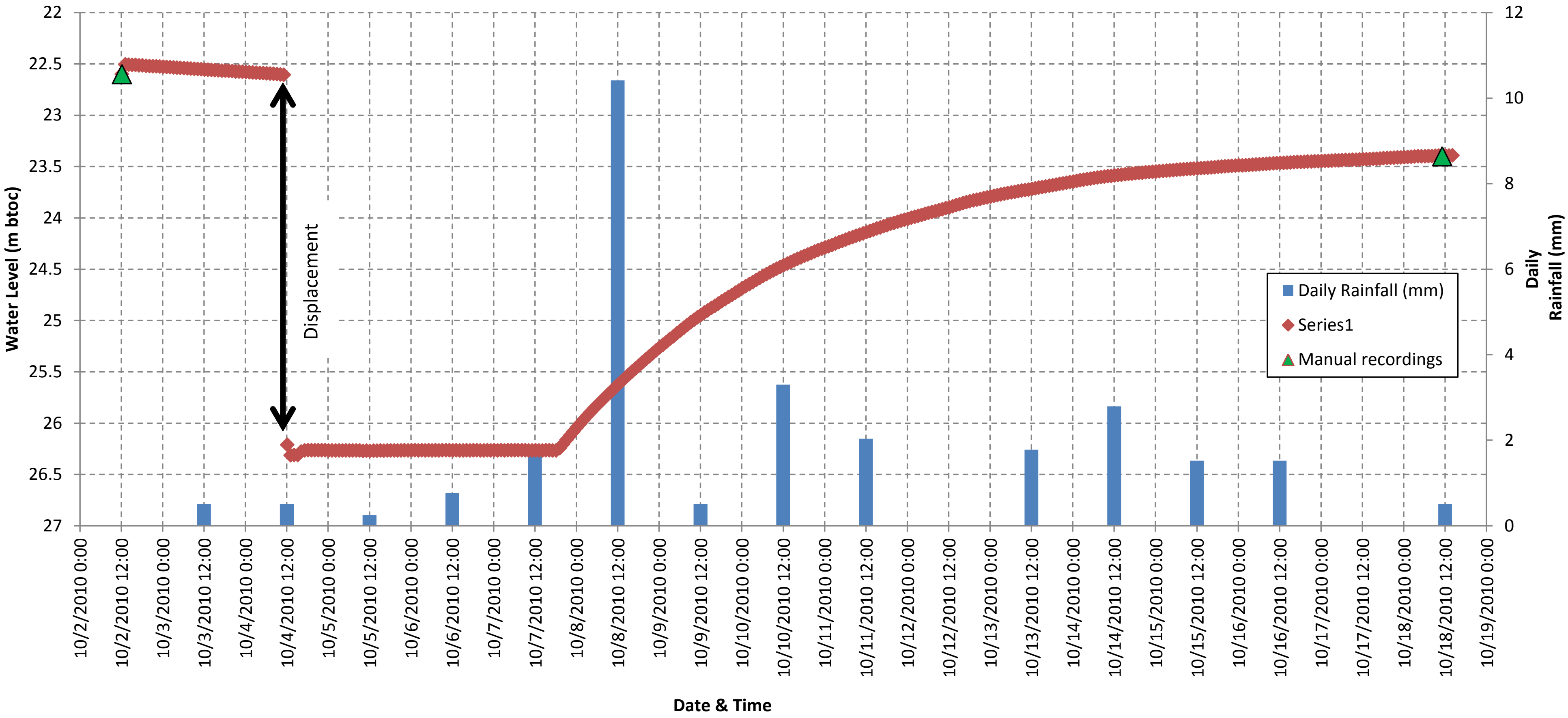

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VANCOUVER

Faro Mine Closure
Fermeture de la mine Faro

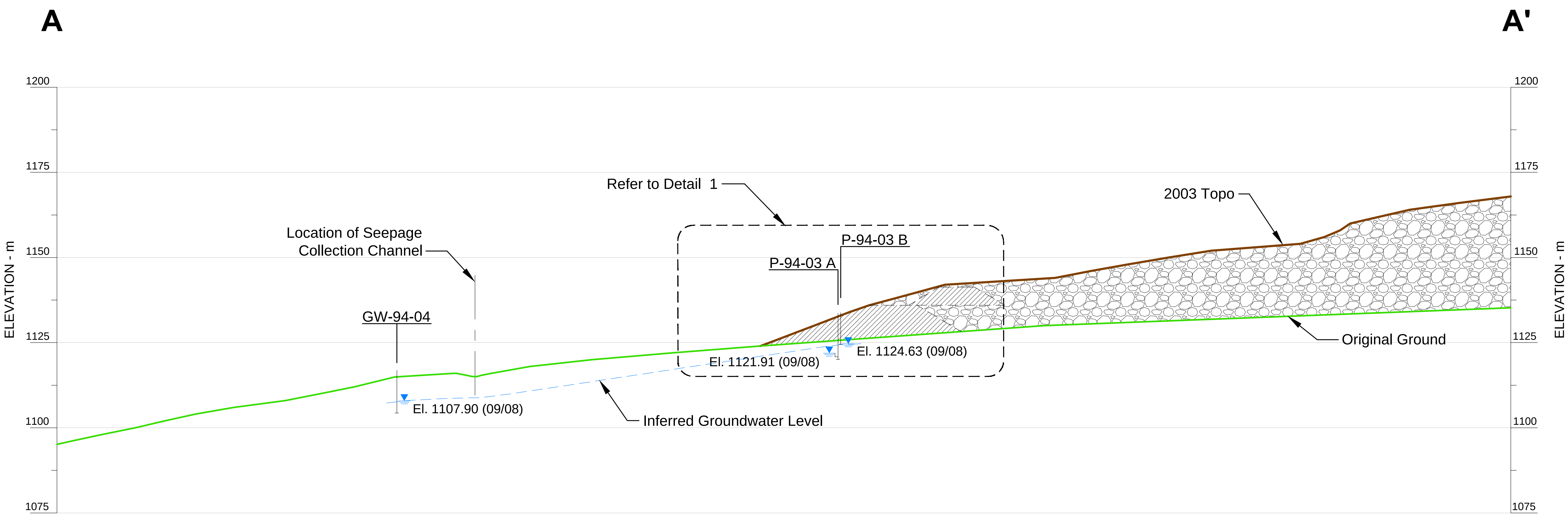
Faro Groundwater Investigations 2010
Vangorda & Zone II Pumping Wells

Response to Pumping In Well
PW-10-01

Job No: : 1CY001.047
Filename: Figure 5_Graphs_20110217.pptx

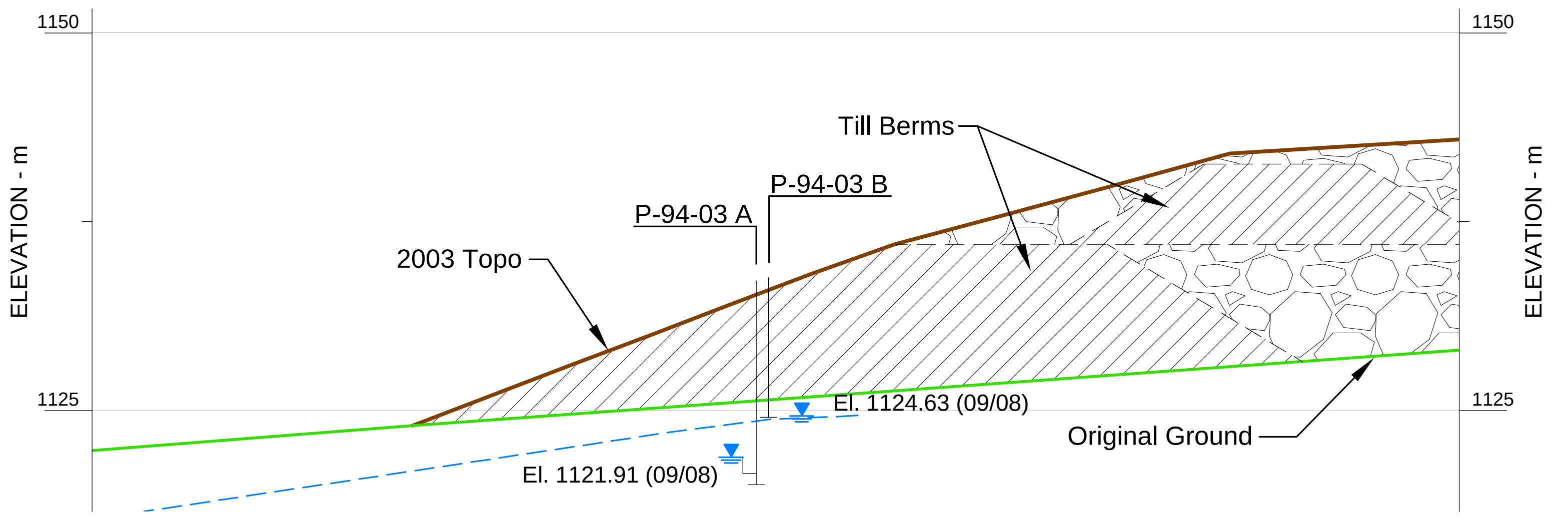
Faro Mine Complex

Date: Feb 2011
Approved: PMH
Figure: 5



A SECTION A-A'

0 10 20 30 40 50
Scale in Metres



1 Detail 1

0 5 10 15 20 25
Scale in Metres

LEGEND

▨	Phyllite Waste Rock
▨	Till

NOTE

1. Till berm locations based on available 1994 construction data.

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Faro Mine Closure
Fermeture de la mine Faro

Faro Groundwater Investigation 2010

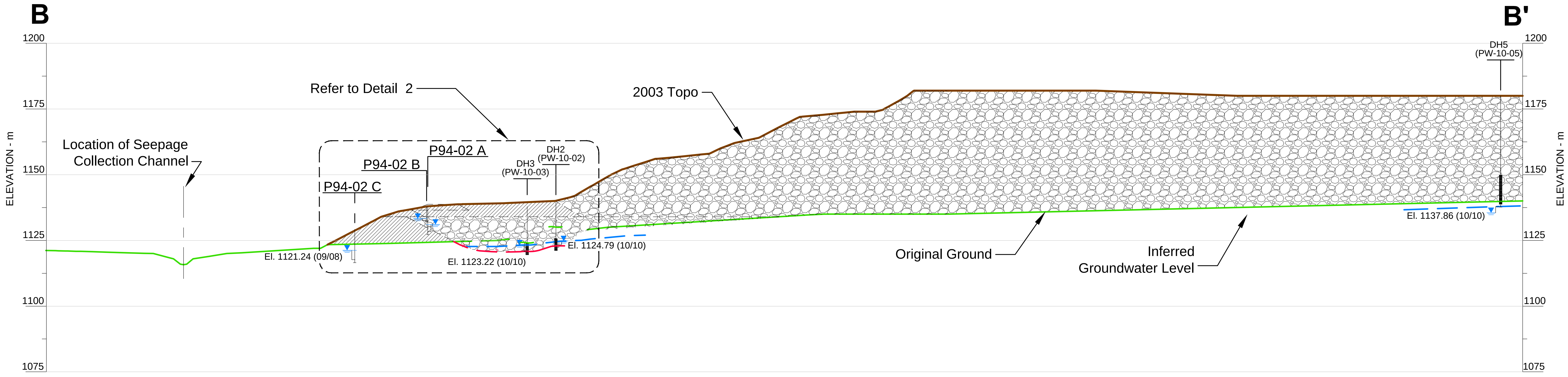
Vangorda Waste Dump
Section A

SRK JOB NO.: 1CD009.003
FILE NAME: SectionA.dwg

FARO MINE COMPLEX

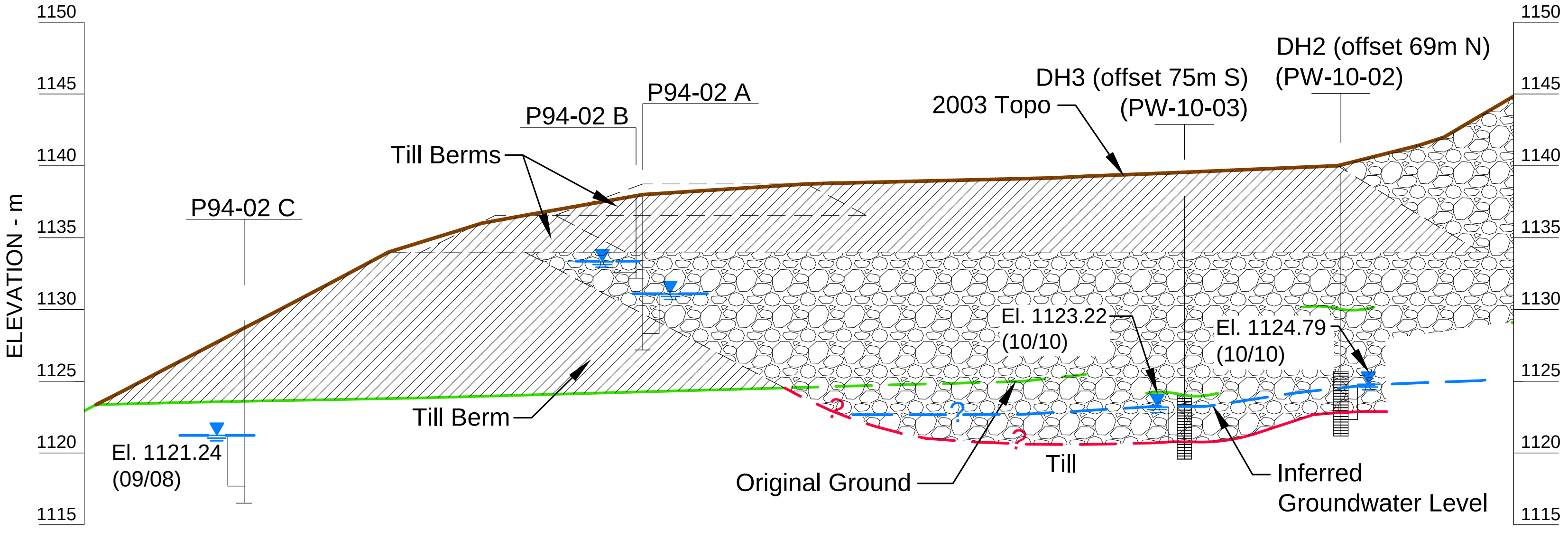
DATE: Feb. 2011
APPROVED: PMH
FIGURE: 6

J:\01_SITES\FARO\1107_1CD009.003_2010 Geot_Insp\040_AutoCAD\SectionA.dwg



B **SECTION B-B'**

0 10 20 30 40 50
Scale in Metres



2 **DETAIL 2**

0 5 10 15 20 25
Scale in Metres

LEGEND

▨	Phyllite Waste Rock
▨	Till
—	Original 1990 Topography (pre-mining)
—	Top of Till Horizon as Interpreted from Drilling
— —	Inferred Groundwater Level

NOTE

1. Till berm locations based on available 1994 construction data.
2. Water level is in sump below screen indicating water level is not currently within the dump.

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SRK JOB NO.: 1CY001.047
FILE NAME: SectionB.dwg

Faro Mine Closure
Fermeture de la mine Faro

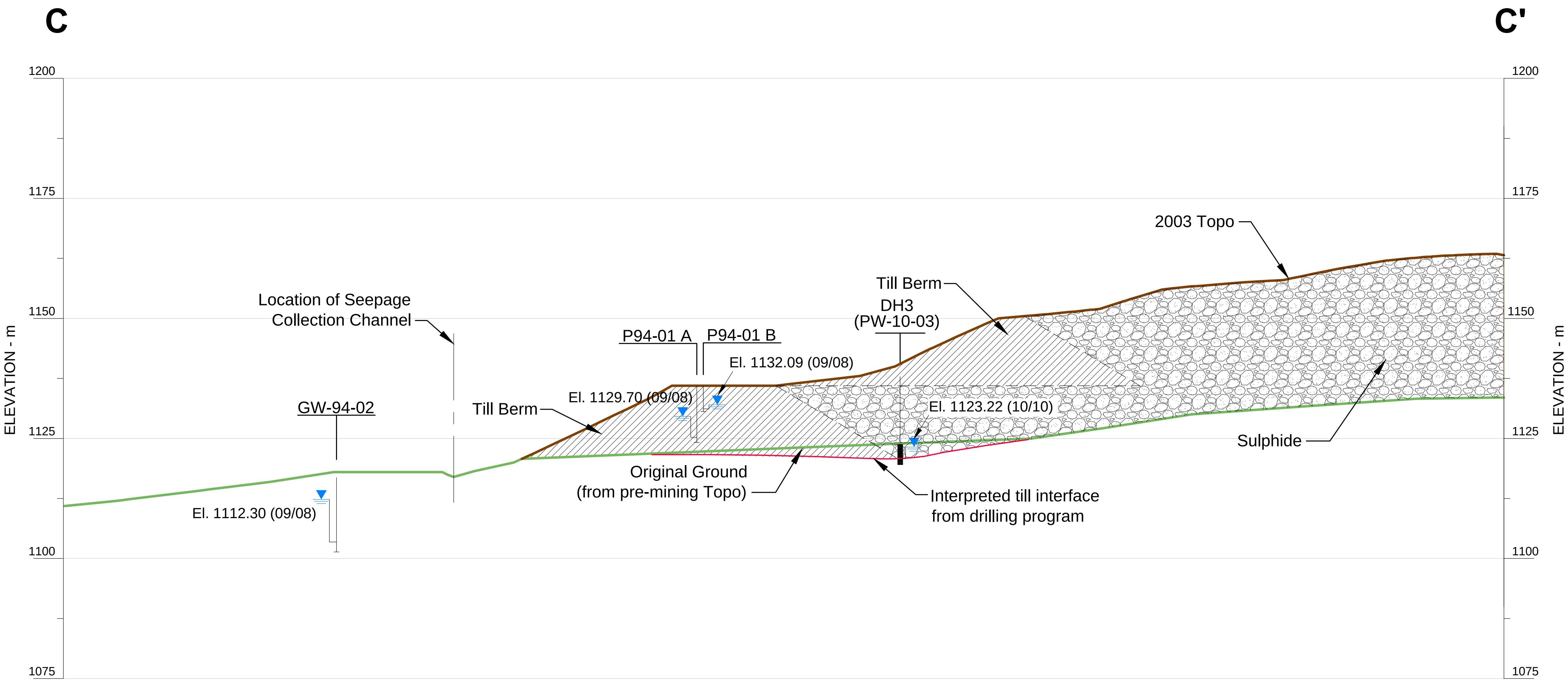
FARO MINE COMPLEX

Faro Groundwater Investigation 2010

Vangorda Waste Dump
Section B

DATE: Apr. 2011
APPROVED: JK
FIGURE: 7

J:\01_SITES\FARO\1107_1CD009.003_2010 Geot_Insp\040_AutoCAD\SectionB.dwg



C **SECTION C-C'**

0 10 20 30 40 50

Scale in Metres

LEGEND

▨	Phyllite Waste Rock
▨	Till

NOTE

1. Till berm locations based on available 1994 construction data.

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Faro Mine Closure
Fermeture de la mine Faro

Faro Groundwater Investigation 2010

Vangorda Waste Dump
Section C

SRK JOB NO.: 1CY001.047
FILE NAME: SectionC REV1.dwg

FARO MINE COMPLEX

DATE: APR. 2011
APPROVED: PMH
FIGURE: 8

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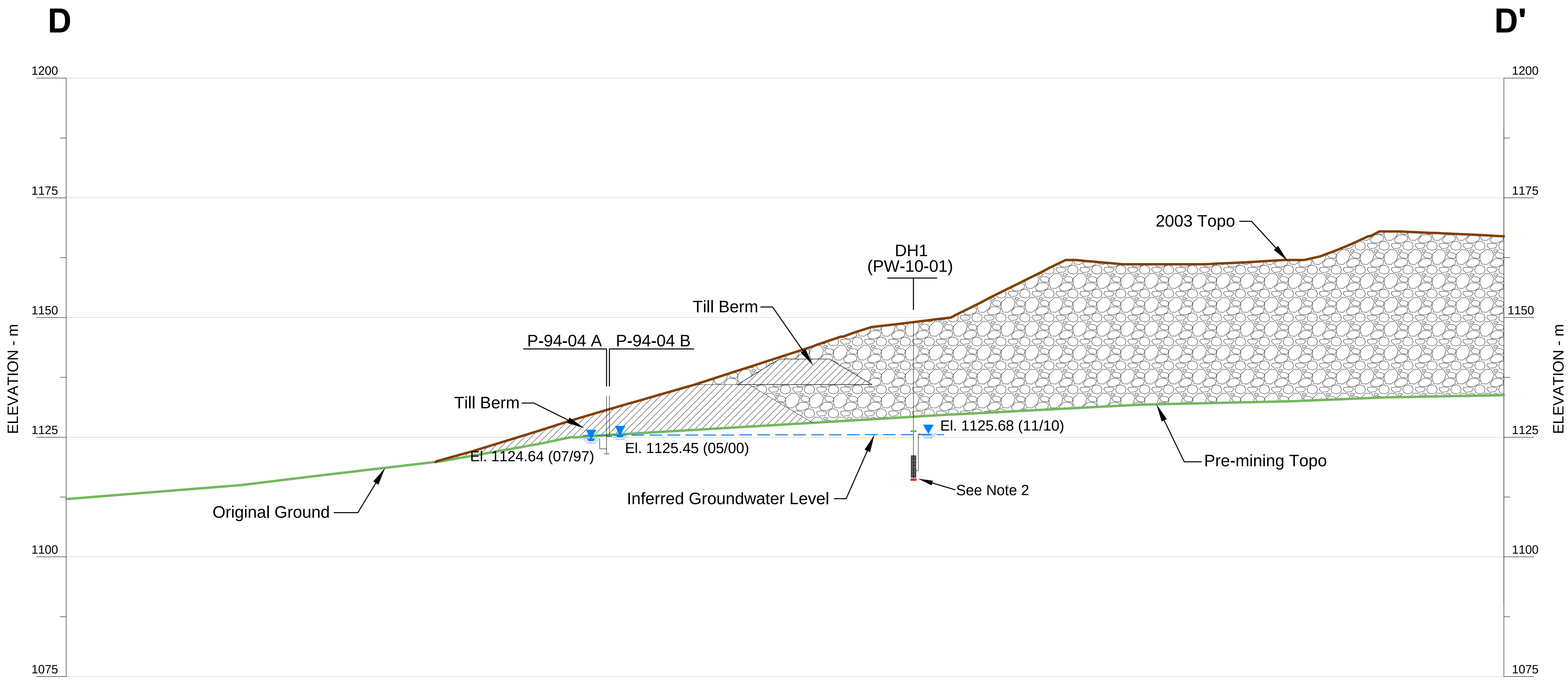

D SECTION D-D'

0 10 20 30 40 50

Scale in Metres

LEGEND

▩ Phyllite Waste Rock

▨ Till Berm

— Original Pre-mining Topography

NOTE

1. Till berm locations based on available 1994 construction data.
2. No till was encountered during drilling. It was not possible to differentiate between waste rock and bedrock.

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SRK JOB NO.: 1CY001.047
FILE NAME: SectionD.dwg

Faro Mine Closure
Fermeture de la mine Faro

FARO MINE COMPLEX

Faro Groundwater Investigation 2010

Vangorda Waste Dump
Section D

DATE: Feb. 2011
APPROVED: PMH
FIGURE: 9

J:\01_SITES\FARO\1107_1CD009.003_2010 Geot_Insp\040_AutoCAD\SectionD.dwg

Appendices

Appendix A: Well Construction Logs for Zone II and Vangorda

SRK CONSULTING (CANADA) INC.
Suite 2200 - 1066 West Hastings Street,
Vancouver, BC V6E 3X2
Main: 604.681.4196 Fax: 604.687.5532
Website: www.srk.com

Log of Borehole: PW-10-01 (DH1)

Project No.: 1CY001.047.0400

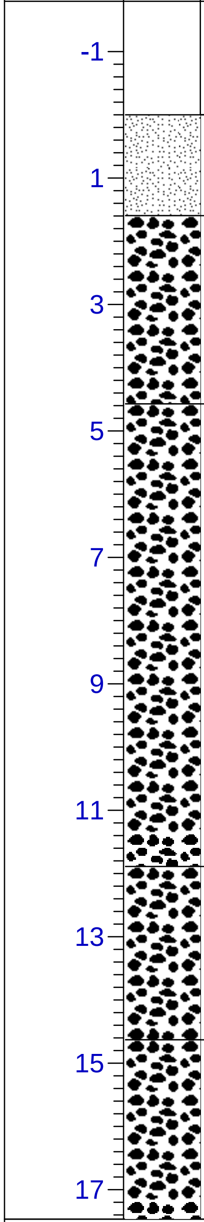
Project: Faro Groundwater Investigations 2010

Client: Yukon Government

Location: Vangorda Dump

Supervisor: BG

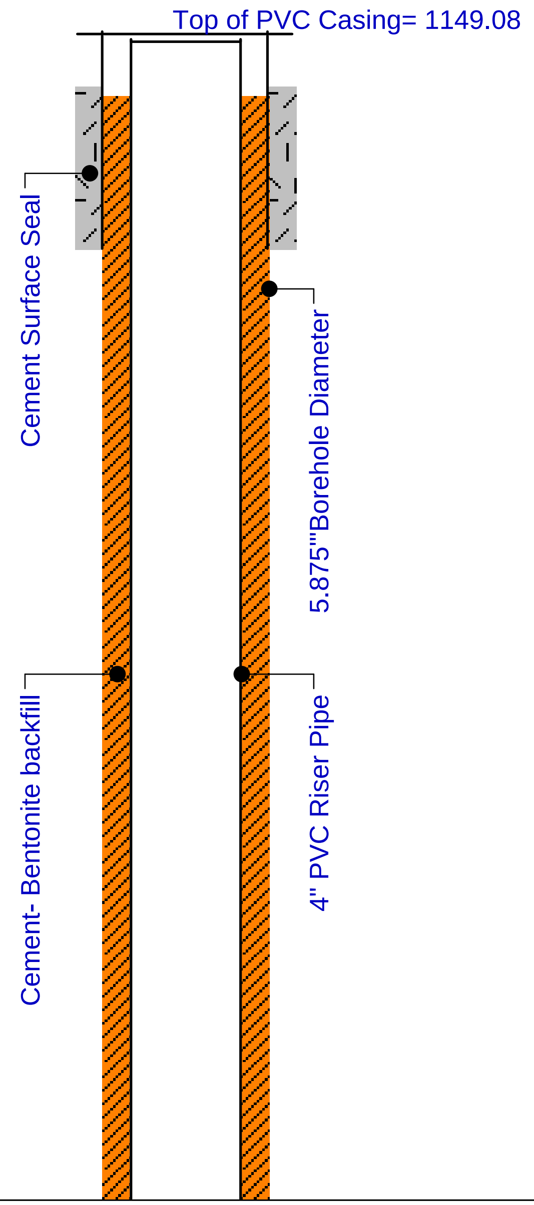
SUBSURFACE PROFILE



Description	Depth/Elev. (m)
Ground Surface	1148.3 0.0
Drill pad material **Sand**	1146.7 1.6
Waste Rock **Small chips (1-10mm) weathered phyllite**	1143.7 4.6
Waste Rock **Larger (5-20mm) grey phyllite chips**	1136.4 11.9
Waste Rock **Harder material- slower drilling rate. Small grey chips returned**	1133.6 14.6
Waste Rock **Brown phyllite chips retured, larger (5-15mm)**	

WELL DETAILS

Well Construction



Drilled By: Foundex Drilling

Drill Method: Dual Rotary

Drill Date: 23 September 2010

Drill Rig: Barber DR 24

Datum: NAD 83

Hole Size: 4 Inch

Notes: Casing stickup= 0.94m
Top of Steel Casing- 1149.19m

Sheet: 1 of 2

SRK CONSULTING (CANADA) INC.
Suite 2200 - 1066 West Hastings Street,
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Main: 604.681.4196 Fax: 604.687.5532
Website: www.srk.com

Log of Borehole: PW-10-01 (DH1)

Project No.: 1CY001.047.0400

Project: Faro Groundwater Investigations 2010

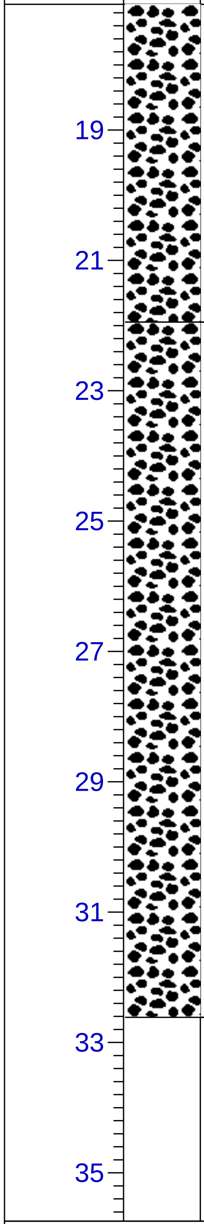
Client: Yukon Government

Location: Vangorda Dump

Supervisor: BG

SUBSURFACE PROFILE

Depth (m)	Symbol	Description	Depth/Elev. (m)



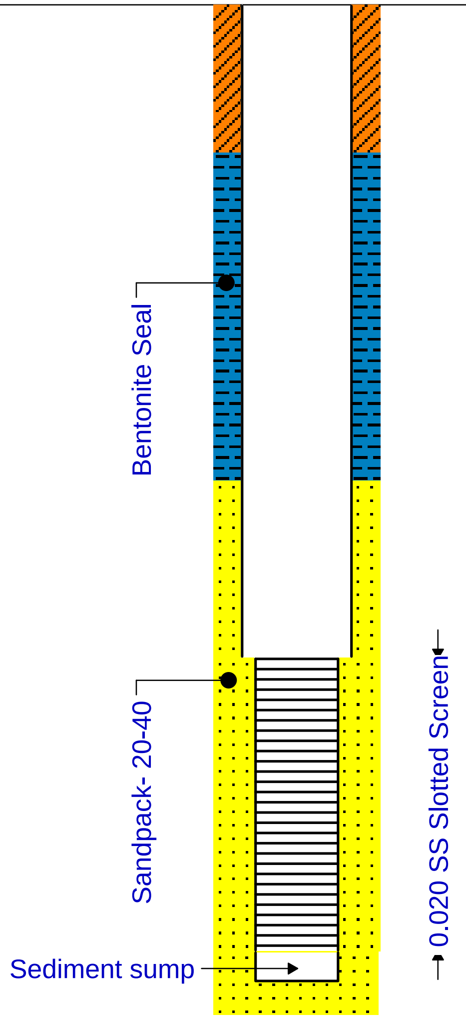
1126.3
21.9

Waste Rock
Hard, small phyllite chips, dark grey in colour. V dense material. Slow drilling rate Possible Bedrock?

1115.6
32.6

WELL DETAILS

Well Construction



End of Hole Depth = 32.6m

Drilled By: Foundex Drilling

Drill Method: Dual Rotary

Drill Date: 23 September 2010

Drill Rig: Barber DR 24

Datum: NAD 83

Hole Size: 4 Inch

Notes: Casing stickup= 0.94m
Top of Steel Casing- 1149.19m

Sheet: 2 of 2

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Suite 2200 - 1066 West Hastings Street,
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Main: 604.681.4196 Fax: 604.687.5532
Website: www.srk.com

Log of Borehole: PW-10-02 (DH2)

Project No.: 1CY001.047.0400

Project: Faro Groundwater Investigations 2010

Client: Yukon Government

Location: Vangorda Dump

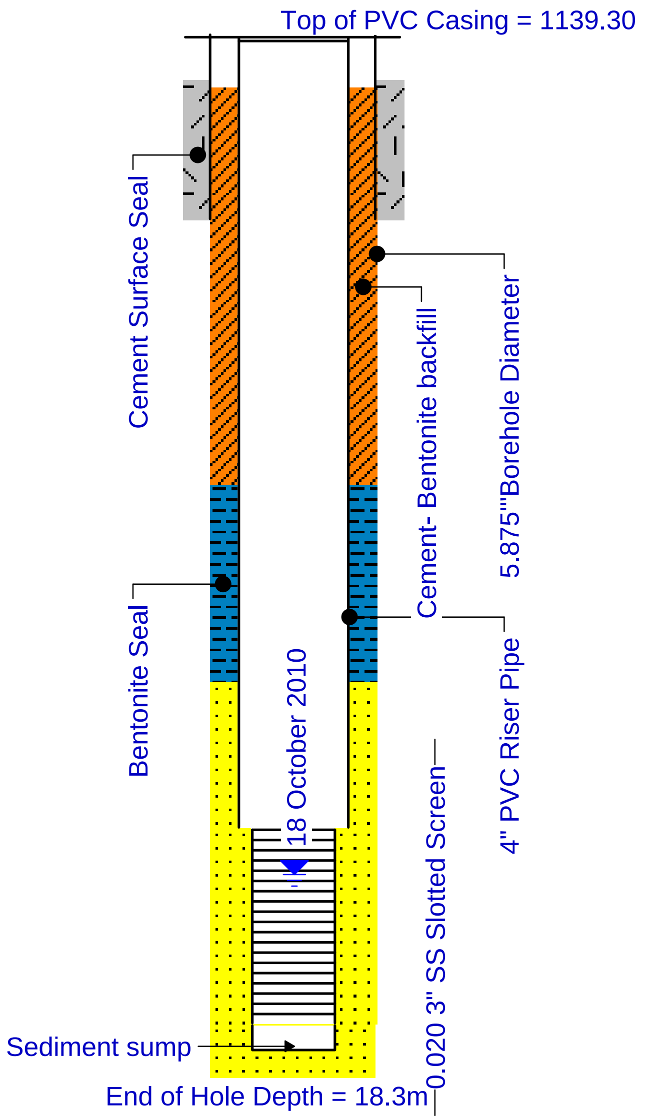
Supervisor: BG

SUBSURFACE PROFILE

Depth (m)	Symbol	Description	Depth/Elev. (m)
		Ground Surface	1138.5 0.0
		Drill pad material **Sand**	
		Waste Rock **Small chips (1-10mm) weathered grey phyllite**	1133.0 5.5
		Waste Rock **Larger (5-20mm) grey phyllite chips**	
		Waste Rock **Harder material- slower drilling rate. Small grey chips returned. Some oxide staining**	1123.2 15.2
		Till **Green- yellow clay rich till. Rounded gravel (20mm- 30mm)**	1120.2 18.3

WELL DETAILS

Well Construction



Drilled By: Foundex Drilling

Drill Method: Dual Rotary

Drill Date: 25 September 2010

Drill Rig: Barber DR 24

Datum: NAD 83

Hole Size: 4 Inch

Notes: Casing stickup= 1.01m
Top of Steel Casing- 1139.48m

Sheet: 1 of 1

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Website: www.srk.com

Log of Borehole: PW-10-03 (DH3)

Project No.: 1CY001.047.0400

Project: Faro Groundwater Investigations 2010

Client: Yukon Government

Location: Vangorda Dump

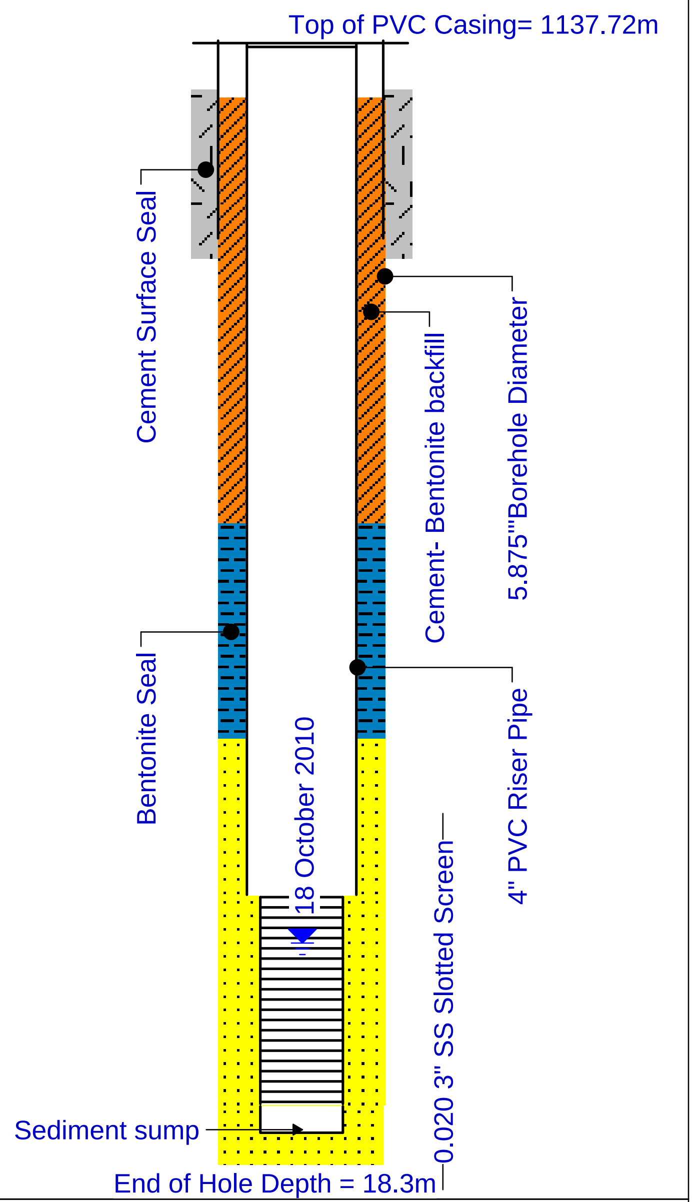
Supervisor: BG

SUBSURFACE PROFILE

Description	Depth/Elev. (m)
Ground Surface	1136.9 0.0
Drill pad material **Sand**	1136.0 0.9
Waste Rock **Medium- large chips with oxide staining**	1134.5 2.4
Waste Rock **Medium- large chips with limited oxide staining**	1132.3 4.6
Waste Rock **Angular, dark grey chips of phyllite, few quartz chips seen. Water added at 19m**	1124.1 12.8
Waste Rock **Angular, fine grained chips (2-5mm) returned. High water content**	1122.6 14.3
Waste Rock **med- fine grained chips. Wet, brown material towards 16m**	1120.5 16.5
	1118.6 18.3

WELL DETAILS

Well Construction



Drilled By: Foundex Drilling

Drill Method: Dual Rotary

Drill Date: 26 September 2010

Drill Rig: Barber DR 24

Datum: NAD 83

Hole Size: 4 Inch

Notes: Casing stickup= 0.94m
Top of Steel Casing- 1137.86m

Sheet: 1 of 1

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Website: www.srk.com

Log of Borehole: PW-10-04 (DH4)

Project No.: 1CY001.047.0400

Project: Faro Groundwater Investigations 2010

Client: Yukon Government

Location: Vangorda Dump

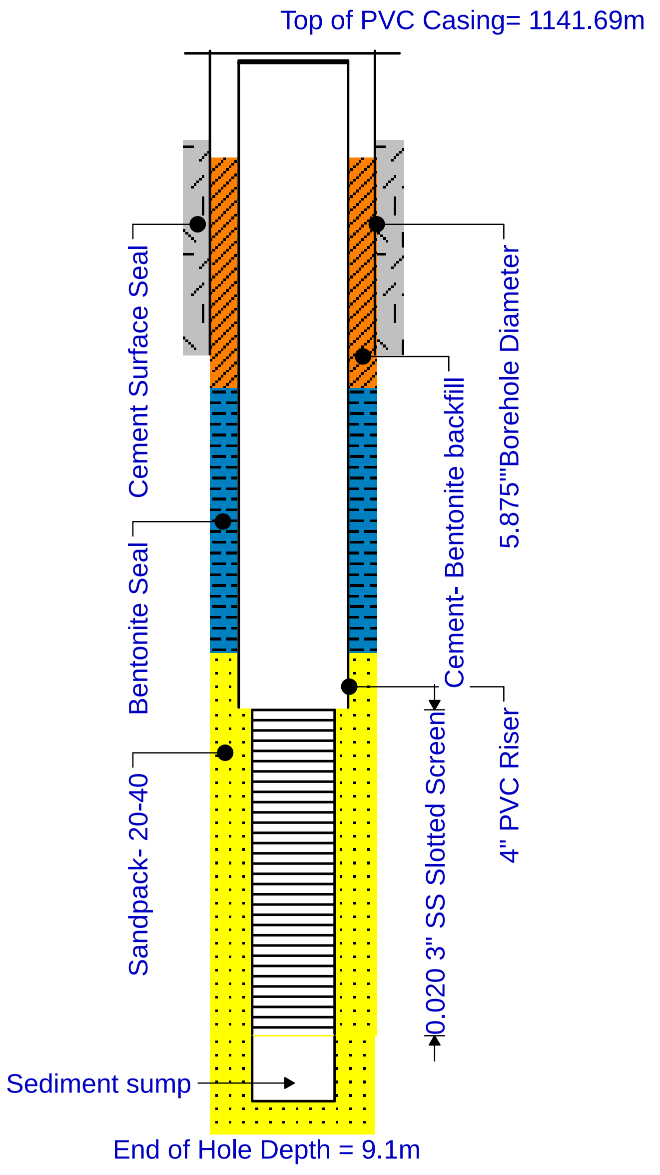
Supervisor: BG

SUBSURFACE PROFILE

Depth (m)	Symbol	Description	Depth/Elev. (m)
-1		**Ground Surface**	
		Drill pad material **Sand**	1140.8 0.0
1		***Waste Rock*** **Light brown chips- granite buoulder?**	1139.9 0.9
3 5		***Waste Rock*** **Grey, platey chips phyllite waste rock**	1139.0 1.8
7		***Soil*** **Brown humic soil. 50-60% wood fibres**	1134.4 6.4
9		***Till*** **Green coloured clay rich till**	1132.6 8.2
			1131.7 9.1

WELL DETAILS

Well Construction



Drilled By: Foundex Drilling

Drill Method: Dual Rotary

Drill Date: 27 September 2010

Drill Rig: Barber DR 24

Datum: NAD 83

Hole Size: 4 Inch

Notes: Casing stickup= 0.98m
Top of Steel Casing- 1141.81m

Sheet: 1 of 1

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Suite 2200 - 1066 West Hastings Street,
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Main: 604.681.4196 Fax: 604.687.5532
Website: www.srk.com

Log of Borehole: PW-10-05 (DH5)

Project No.: 1CY001.047.0400

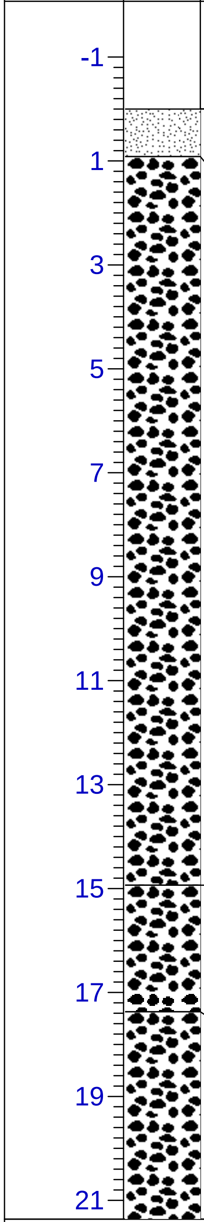
Project: Faro Groundwater Investigations 2010

Client: Yukon Government

Location: Vangorda Dump

Supervisor: BG

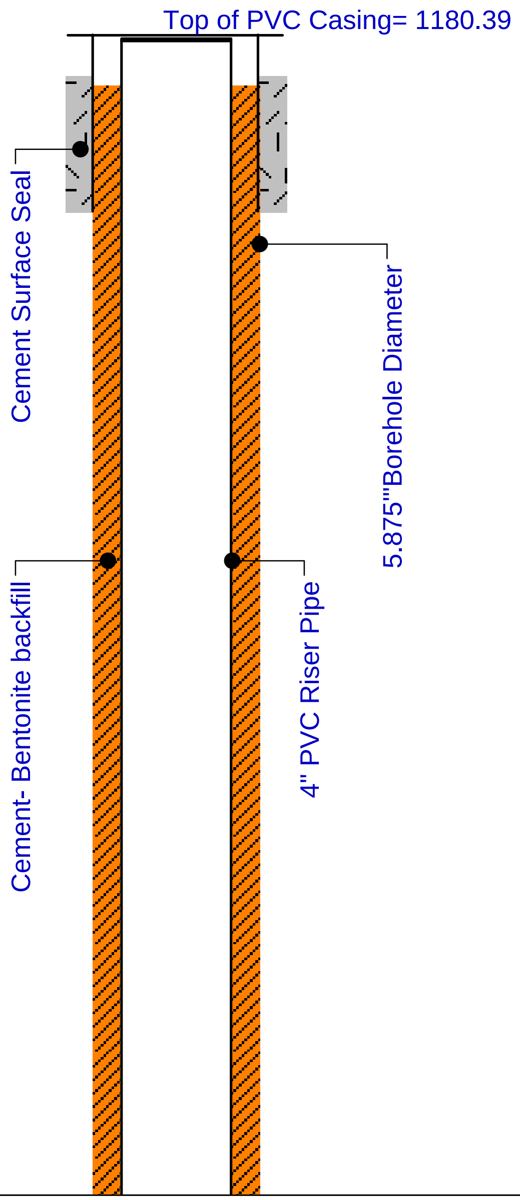
SUBSURFACE PROFILE



Description	Depth/Elev. (m)
Ground Surface	1179.5 0.0
Drill pad material Sand	
Waste Rock Small dark grey chips (1-10mm) weathered phyllite	
Waste Rock Sludgey brown- green material hosting small platey chips of phyllite (10-20mm)	1164.6 14.9
Waste Rock Alternating hard and soft material, returning pltey phyllite chips and wet sludgey material	1162.2 17.4

WELL DETAILS

Well Construction



Drilled By: Foundex Drilling

Drill Method: Dual Rotary

Drill Date: 28 September 2010

Drill Rig: Barber DR 24

Datum: NAD 83

Hole Size: 4 Inch

Notes: Casing stickup= 0.99m
Top of Steel Casing- 1180.53m

Sheet: 1 of 2

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Website: www.srk.com

Log of Borehole: PW-10-05 (DH5)

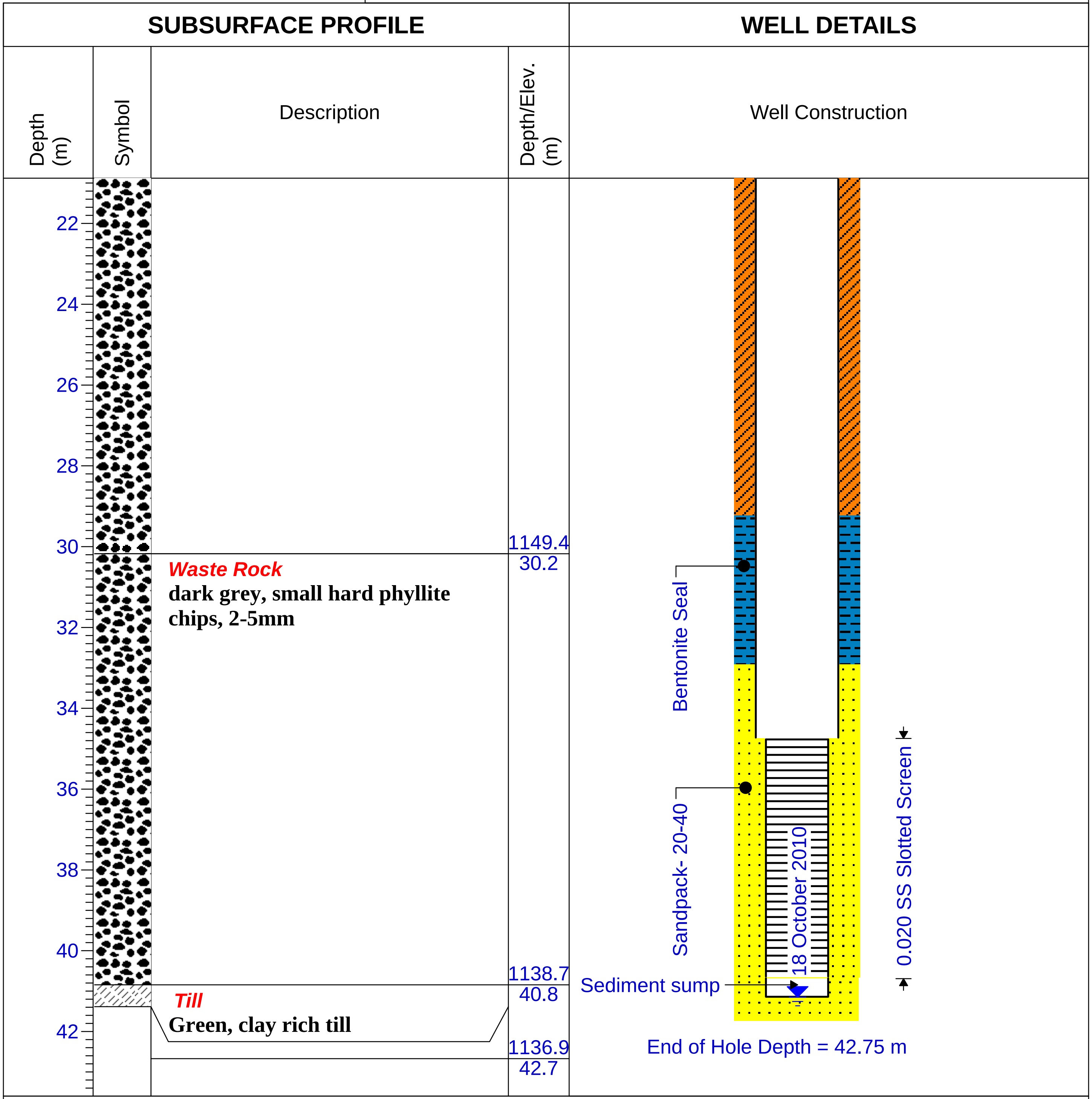
Project No.: 1CY001.047.0400

Project: Faro Groundwater Investigations 2010

Client: Yukon Government

Location: Vangorda Dump

Supervisor: BG



Drilled By: Foundex Drilling

Drill Method: Dual Rotary

Drill Date: 28 September 2010

Drill Rig: Barber DR 24

Datum: NAD 83

Hole Size: 4 Inch

Notes: Casing stickup= 0.99m
Top of Steel Casing- 1180.53m

Sheet: 2 of 2

SRK CONSULTING (CANADA) INC.
Suite 2200 - 1066 West Hastings Street,
Vancouver, BC V6E 3X2
Main: 604.681.4196 Fax: 604.687.5532
Website: www.srk.com

Log of Borehole: PW-10-06 (DH6)

Project No.: 1CY001.047.0400

Project: Faro Groundwater Investigations 2010

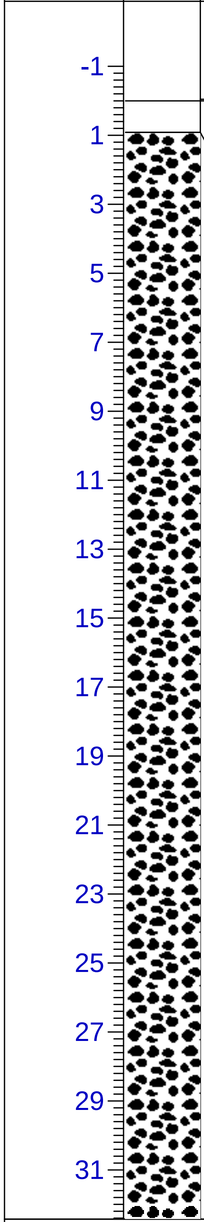
Client: Yukon Government

Supervisor: BG

Location: Zone II

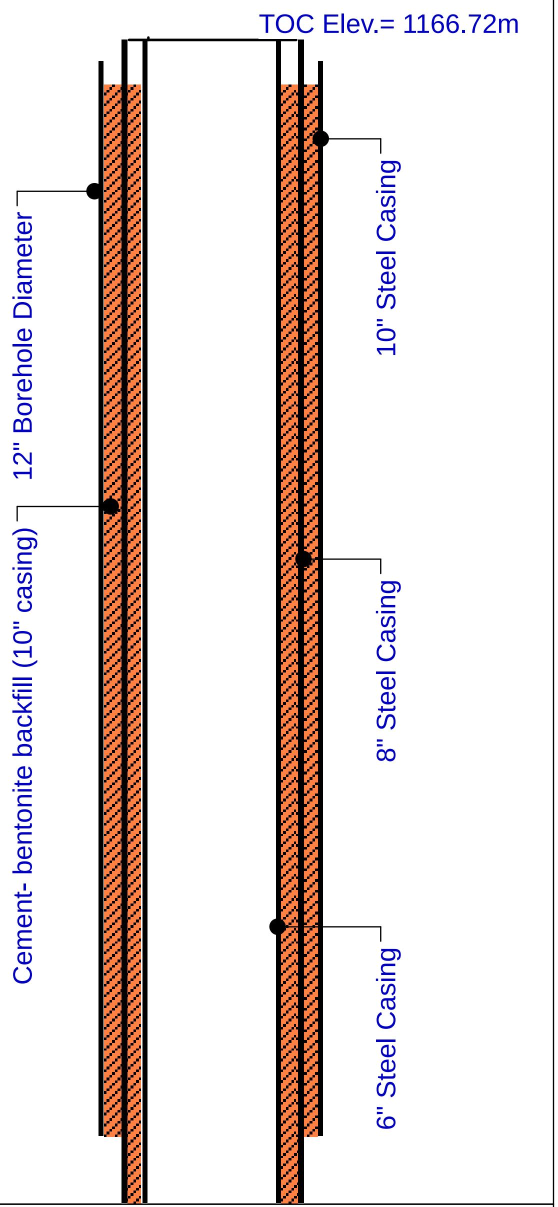
SUBSURFACE PROFILE

Depth (m)	Symbol	Description	Depth/Elev. (m)
		Ground Surface	1165.4 0.0
		Drill Pad Material **Coarse Sand**	
		Waste Rock **Waste Rock Material, phyllite chips**	



WELL DETAILS

Well Construction



Drilled By: Foundex Drilling

Drill Method: Dual Rotary

Drill Date: 4 October 2010

Drill Rig: Barber DR 24

Datum: NAD 83

Hole Size: 8- 10 Inch

Notes: Casing Stickup- 1.35m
Steel outer casing is TOC

Sheet: 1 of 3

SRK CONSULTING (CANADA) INC.
Suite 2200 - 1066 West Hastings Street,
Vancouver, BC V6E 3X2
Main: 604.681.4196 Fax: 604.687.5532
Website: www.srk.com

Log of Borehole: PW-10-06 (DH6)

Project No.: 1CY001.047.0400

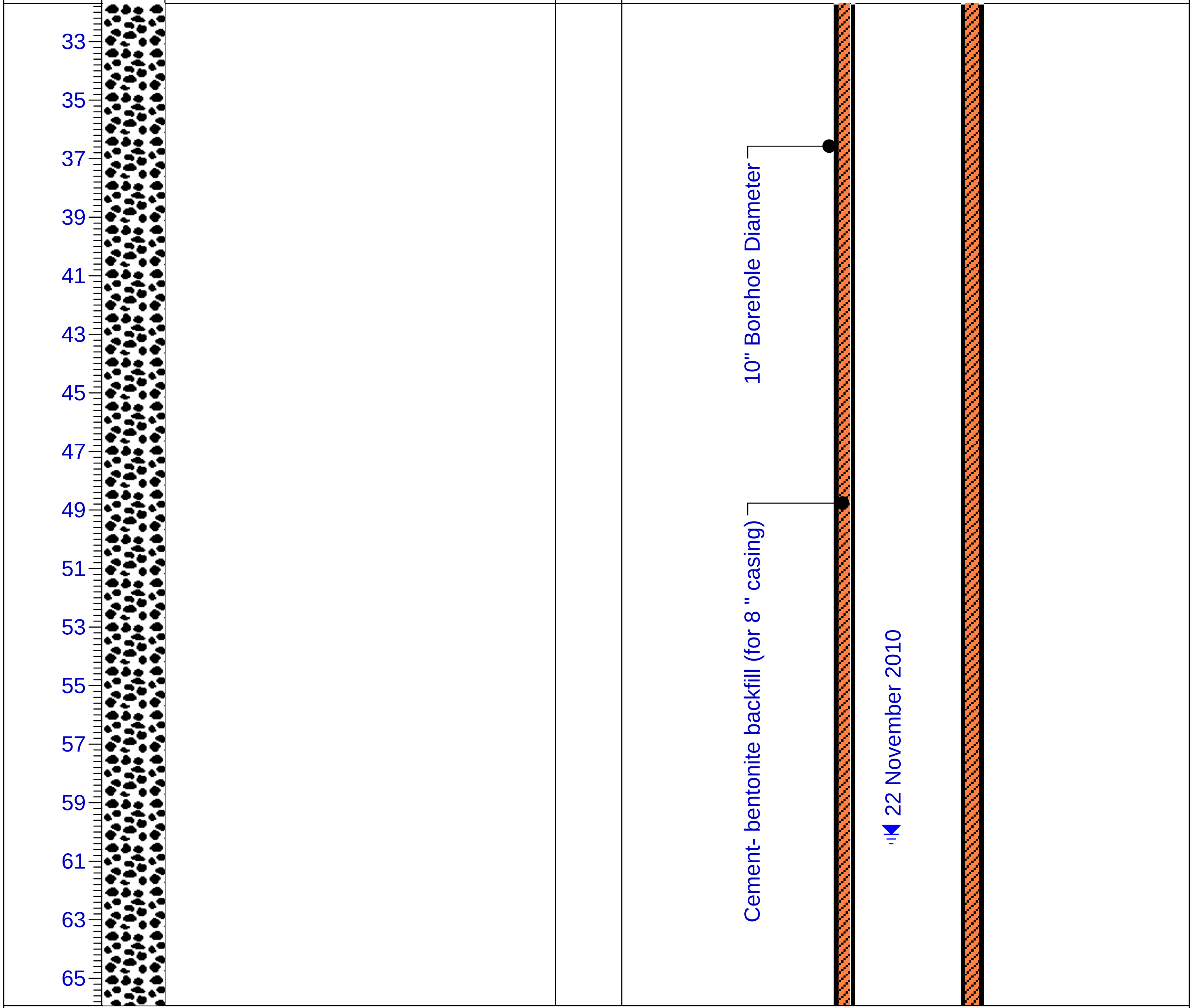
Project: Faro Groundwater Investigations 2010

Client: Yukon Government

Supervisor: BG

Location: Zone II

SUBSURFACE PROFILE				WELL DETAILS
Depth (m)	Symbol	Description	Depth/Elev. (m)	Well Construction



Drilled By: Foundex Drilling

Drill Rig: Barber DR 24

Notes: Casing Stickup- 1.35m
Steel outer casing is TOC

Drill Method: Dual Rotary

Datum: NAD 83

Drill Date: 4 October 2010

Hole Size: 8- 10 Inch

Sheet: 2 of 3

SRK CONSULTING (CANADA) INC.
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Project: Faro Groundwater Investigations 2010

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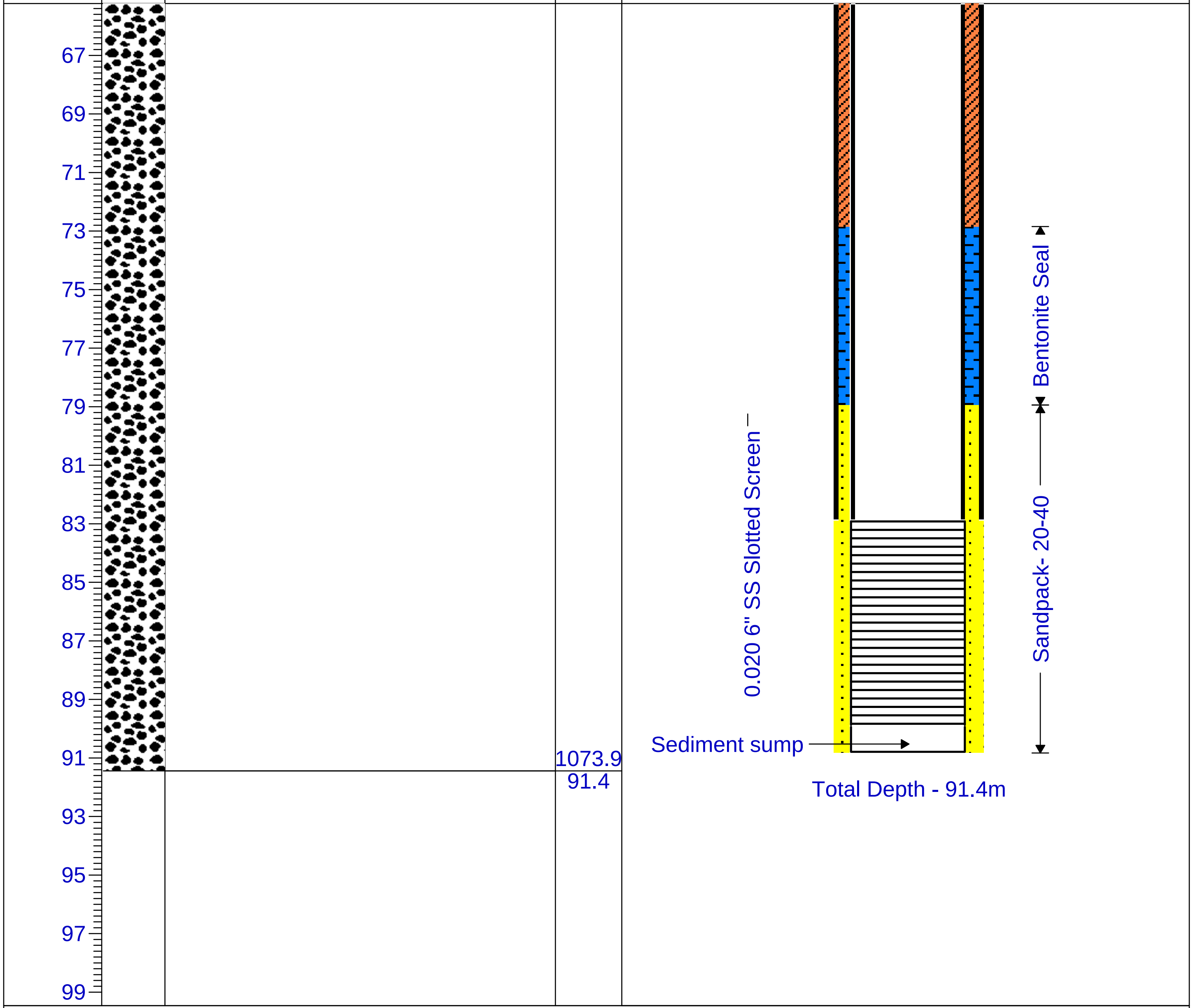
Location: Zone II

SUBSURFACE PROFILE

WELL DETAILS

Depth (m) | Symbol | Description | Depth/Elev. (m) | Well Construction



Drilled By: Foundex Drilling

Drill Rig: Barber DR 24

Notes: Casing Stickup- 1.35m
Steel outer casing is TOC

Drill Method: Dual Rotary

Datum: NAD 83

Drill Date: 4 October 2010

Hole Size: 8- 10 Inch

Sheet: 3 of 3

Appendix B: Hydrochemistry of Vangorda Monitoring Wells

Denison
Environmental
Services
a division of Denison Mines Inc.

Faro Mine Closure

MEMORANDUM

TO: Jay Cherian, DES Environmental Lead
DATE: November 16, 2010
FROM: Noella Gardiner
SUBJECT: *Vangorda Waste Rock Dump - Groundwater Monitoring – October 18 & 19, and November 3, 2010*

Background
In September 2010, five new groundwater pumping wells were installed at the Vangorda waste dump by SRK consulting. Groundwater identifications are; PW-10-01 (DH1), PW-10-02 (DH2), PW-10-03 (DH3), PW-10-04 (DH4) and PW-10-05 (DH5).

Water level data loggers were installed at PW-10-01, PW-10-02 and PW-10-03, by SRK Consulting Engineers and Scientists, in addition to a barologger in PW-10-03.

Denison Environmental Services (DES) collected water samples after the wells installations and downloaded data loggers. Note that while DES attempted further wells development prior to sample collection, the water levels remained low, and the wells were simply purged dry, and then samples collected when water levels had recovered.

Vangorda Groundwater Monitoring Program Description:

Wells were purged on October 18 and 19, 2010, with a bailer, where possible. Some wells were dry, and there was insufficient water in the remaining wells after purging to collect water samples. Details describing wells purging and logger downloads on October 18 and 19 are included in Table 1, attached.

Note that the well casing diameter is 4 inches at the ground surface down to the top of the well screen, and decreases to 2.5 inches over the screened interval. This change of pipe size causes difficulty in inserting waterra tubing into the pipe as the tube gets hung up at the lip of the pipe change. This is why bailers were used to purge and sample the wells.

The downloaded loggers data was forwarded to SRK Consulting Engineers and Scientists.

On November 3, 2010, water samples were collected on three of the five wells mentioned. Bailers were used to sample the wells. Field parameters (pH, electrical conductivity, and temperature) monitoring was undertaken using a Hanna Handheld Meter (see Table 2). Additional testing was undertaken through Maxxam analytics for a suite of parameters including anions and dissolved metal and testing results are included in Appendix A, attached.

MEMORANDUM

TABLES

Table 1 - 2010 SRK Vangorda Waste Dump Groundwater Wells and Solinst Data loggers

Date	**Site**	**Time**	**Water level data loggers downloaded Y/N**	**Comments**
October 18/10	PW-10-01 (DH1)	14:05	Y	10 litres purged dry. Water silty, dirty.
October 19/10	PW-10-01 (DH1)	14:00	-	Well dry.
October 18/10	PW-10-02 (DH2)	15:54	Y	Not enough water to purge with Waterra tube
October 19/10	PW-10-02 (DH2)	14:20	-	Bailer used to purge well. No water. Well dry.
October 18/10	PW-10-03 (DH3)	14:10	Y (Barologger downloaded as well)	
October 19/10	PW-10-03 (DH3)	13:45	-	14 litres purged with bailer. Water very dirty.
October 18/10	PW-10-04 (DH4)	16:40	-	Well dry.
October 18/10	PW-10-05 (DH5)	14:27	-	
October 19/10	PW-10-05 (DH5)	14:30	-	2 litres purged with bailer. Water very dirty.

Table 2 - 2010 SRK Vangorda Waste Dump Groundwater Wells and Field Parameters

Date	Site	Time	Temp. (°C)	pH	EC (µS/cm)	Depth to bottom (m btoc)	Water level (m btoc)	Water level data loggers downloaded Y/N	Comments
November 3/10	PW-10-01 (DH1)	10:30	16.7	7.84	>3999	32.6	23.40	-	Bailer used to collect sample. Water very warm. Sulphur smell.
November 3/10	PW-10-02 (DH2)	10:52	3.2	7.04	1861	16.297	14.51	-	Bailer used to collect sample.
November 3/10	PW-10-03 (DH3)	11:15	2.6	6.45	2014	16.251	14.50	-	Bailer used to collect sample.
November 3/10	PW-10-04 (DH4)	09:54	-	-	-	-	-	-	Well dry. Muddy bottom
November 3/10	PW-10-05 (DH5)	10:00	-	-	-	45.290	42.535	-	Bailer used. Very little water in well. No sample collected.

MEMORANDUM

APPENDIX A

Analytical Results – November 3, 2010

Groundwater Quality

Your Project #: NOV 3,2010-SPEC PROJ-VANGORDA
Site: WASTE ROCK
Your C.O.C. #: 08324999

Attention: Jay Cherian
DENISON ENVIRONMENTAL SERVICES
FARO CARE AND MAINTENANCE PROJ
BOX 280
FARO, YT
CANADA Y0B 1K0

Report Date: 2010/11/16

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B0A8624
Received: 2010/11/05, 14:00

Sample Matrix: Seepage
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Acidity pH 4.5 & pH 8.3	3	N/A	2010/11/08	BRN SOP-00281 R3.0	Based on SM-2310
Alkalinity - Water	2	2010/11/06	2010/11/06	BRN SOP-00264 R4.0	Based on SM2320B
Alkalinity - Water	1	2010/11/16	2010/11/16	BRN SOP-00264 R4.0	Based on SM2320B
Chloride by Automated Colourimetry	2	N/A	2010/11/08	BRN-SOP 00234 R3.0	Based on EPA 325.2
Chloride by Automated Colourimetry	1	N/A	2010/11/15	BRN-SOP 00234 R3.0	Based on EPA 325.2
Conductance - water	3	N/A	2010/11/06	BRN SOP-00264 R2.0	Based on SM-2510B
Hardness (calculated as CaCO3)	3	N/A	2010/11/15		
Ion Balance	3	N/A	2010/11/15	Calc	
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	3	N/A	2010/11/15	BRN SOP-00206	Based on EPA 200.8
Elements by ICPMS Low Level (dissolved)	3	N/A	2010/11/15	BRN SOP-00206	Based on EPA 200.8
Filter and HNO3 Preserve for Metals	3	N/A	2010/11/06	BRN WI-00006 R1.0	Based on EPA 200.2
pH Water	3	N/A	2010/11/06	BRN SOP-00264 R4.0	Based on SM-4500H+B
Sulphate by Automated Colourimetry	2	N/A	2010/11/08	BRN-SOP 00243 R1.0	Based on EPA 375.4
Sulphate by Automated Colourimetry	1	N/A	2010/11/15	BRN-SOP 00243 R1.0	Based on EPA 375.4
Total Suspended Solids-LowLevel	3	N/A	2010/11/08	BRN SOP-00277 R5.0	Based on SM-2540 D

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

Encryption Key

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

TABITHA RUDKIN, Project Manager
Email: TRudkin@maxxam.ca
Phone# (604) 638-2639

==
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: 1

Maxxam Job #: B0A8624
Report Date: 2010/11/16

DENISON ENVIRONMENTAL SERVICES
Client Project #: NOV 3,2010-SPEC PROJ-VANGORDA
Site Reference: WASTE ROCK
Sampler Initials: NG

RESULTS OF CHEMICAL ANALYSES OF SEEPAGE

Maxxam ID		Y25536			Y25537	Y25538		
Sampling Date		2010/11/03 10:30			2010/11/03 10:52	2010/11/03 11:15		
COC Number		08324999			08324999	08324999		
	Units	**PW-10-01**	**RDL**	**QC Batch**	**PW-10-02**	**PW-10-03**	**RDL**	**QC Batch**
Misc. Inorganics								
Acidity (pH 4.5)	mg/L	<0.5	0.5	4408036	<0.5	<0.5	0.5	4408036
Acidity (pH 8.3)	mg/L	168	0.5	4408036	42.7	60.6	0.5	4408036
Calculated Parameters								
Filter and HNO3 Preservation	N/A	FIELD	N/A	ONSITE	FIELD	FIELD	N/A	ONSITE
Ion Balance	N/A	1.2	0.01	4405432	1.1	1.0	0.01	4405432
Misc. Inorganics								
Alkalinity (Total as CaCO3)	mg/L	860	0.5	4431178	330	370	0.5	4405291
Alkalinity (PP as CaCO3)	mg/L	<0.5	0.5	4431178	<0.5	<0.5	0.5	4405291
Bicarbonate (HCO3)	mg/L	1000	0.5	4431178	400	450	0.5	4405291
Carbonate (CO3)	mg/L	<0.5	0.5	4431178	<0.5	<0.5	0.5	4405291
Hydroxide (OH)	mg/L	<0.5	0.5	4431178	<0.5	<0.5	0.5	4405291
Anions								
Dissolved Sulphate (SO4)	mg/L	17000	50	4428857	850	930	5	4410947
Dissolved Chloride (Cl)	mg/L	29	0.5	4428855	8.2	4.4	0.5	4410945
Physical Properties								
Conductivity	uS/cm	17300	1	4405287	1870	2040	1	4405287
pH	pH Units	7.45		4405274	7.44	7.09		4405274
Physical Properties								
Total Suspended Solids	mg/L	63	1	4405673	240	260	1	4405673

RDL = Reportable Detection Limit

Maxxam Job #: B0A8624
Report Date: 2010/11/16

DENISON ENVIRONMENTAL SERVICES
Client Project #: NOV 3,2010-SPEC PROJ-VANGORDA
Site Reference: WASTE ROCK
Sampler Initials: NG

LOW LEVEL DISSOLVED METALS IN WATER (SEEPAGE)

Maxxam ID		Y25536		Y25537	Y25538		
Sampling Date		2010/11/03 10:30		2010/11/03 10:52	2010/11/03 11:15		
COC Number		08324999		08324999	08324999		
	Units	**PW-10-01**	**RDL**	**PW-10-02**	**PW-10-03**	**RDL**	**QC Batch**
Misc. Inorganics							
Dissolved Hardness (CaCO3)	mg/L	19800	0.5	1230	1310	0.5	4405151
Dissolved Metals by ICPMS							
Dissolved Aluminum (Al)	ug/L	37	4	17	28	1	4417866
Dissolved Antimony (Sb)	ug/L	0.8	0.4	<0.1	0.2	0.1	4417866
Dissolved Arsenic (As)	ug/L	1.6	0.4	1.4	1.6	0.1	4417866
Dissolved Barium (Ba)	ug/L	41.4	0.4	79.3	50.0	0.1	4417866
Dissolved Beryllium (Be)	ug/L	<0.2	0.2	<0.05	<0.05	0.05	4417866
Dissolved Bismuth (Bi)	ug/L	<0.1	0.1	<0.03	<0.03	0.03	4417866
Dissolved Boron (B)	ug/L	<1000	1000	<300	<300	300	4417866
Dissolved Cadmium (Cd)	ug/L	<0.1	0.1	0.07	<0.03	0.03	4417866
Dissolved Chromium (Cr)	ug/L	3	2	1.5	2.2	0.5	4417866
Dissolved Cobalt (Co)	ug/L	366	0.1	49.0	75.7	0.03	4417866
Dissolved Copper (Cu)	ug/L	1	1	<0.3	0.3	0.3	4417866
Dissolved Iron (Fe)	ug/L	39500	20	1340	14000	5	4417866
Dissolved Lead (Pb)	ug/L	0.6	0.1	0.39	0.27	0.03	4417866
Dissolved Lithium (Li)	ug/L	181	10	31	13	3	4417866
Dissolved Manganese (Mn)	ug/L	48100	1	8890	19100	0.3	4417866
Dissolved Molybdenum (Mo)	ug/L	8	1	3.7	5.3	0.3	4417866
Dissolved Nickel (Ni)	ug/L	370	0.4	169	193	0.1	4417866
Dissolved Selenium (Se)	ug/L	1.0	0.8	<0.2	<0.2	0.2	4417866
Dissolved Silicon (Si)	ug/L	10600	2000	7750	8780	500	4417866
Dissolved Silver (Ag)	ug/L	0.1	0.1	<0.03	<0.03	0.03	4417866
Dissolved Strontium (Sr)	ug/L	5490	1	731	774	0.3	4417866
Dissolved Thallium (Tl)	ug/L	<0.04	0.04	0.06	0.02	0.01	4417866
Dissolved Tin (Sn)	ug/L	<0.2	0.2	<0.05	<0.05	0.05	4417866
Dissolved Titanium (Ti)	ug/L	<10	10	<3	<3	3	4417866
Dissolved Uranium (U)	ug/L	159	0.04	12.3	6.23	0.01	4417866
Dissolved Vanadium (V)	ug/L	<4	4	<1	<1	1	4417866
Dissolved Zinc (Zn)	ug/L	8	2	51.9	34.1	0.5	4417866
Dissolved Zirconium (Zr)	ug/L	39	2	<0.5	0.6	0.5	4417866
Dissolved Calcium (Ca)	mg/L	650	1	346	382	0.3	4405153
Dissolved Magnesium (Mg)	mg/L	4410	1	88.7	86.1	0.3	4405153

RDL = Reportable Detection Limit

Maxxam Job #: B0A8624
Report Date: 2010/11/16

DENISON ENVIRONMENTAL SERVICES
Client Project #: NOV 3,2010-SPEC PROJ-VANGORDA
Site Reference: WASTE ROCK
Sampler Initials: NG

LOW LEVEL DISSOLVED METALS IN WATER (SEEPAGE)

Maxxam ID		Y25536		Y25537	Y25538		
Sampling Date		2010/11/03 10:30		2010/11/03 10:52	2010/11/03 11:15		
COC Number		08324999		08324999	08324999		
	Units	**PW-10-01**	**RDL**	**PW-10-02**	**PW-10-03**	**RDL**	**QC Batch**
Dissolved Potassium (K)	mg/L	41	1	8.2	3.6	0.3	4405153
Dissolved Sodium (Na)	mg/L	775	1	19.3	14.2	0.3	4405153
Dissolved Sulphur (S)	mg/L	6840	200	314	325	50	4405153

RDL = Reportable Detection Limit

LOW LEVEL DISSOLVED METALS IN WATER (SEEPAGE) Comments

Sample Y25536-03 Elements by ICPMS Low Level (dissolved): RDL raised due to sample matrix interference.

Sample Y25537-03 Elements by ICPMS Low Level (dissolved): RDL raised due to sample matrix interference.

Sample Y25538-03 Elements by ICPMS Low Level (dissolved): RDL raised due to sample matrix interference.

Results relate only to the items tested.

DENISON ENVIRONMENTAL SERVICES
Attention: Jay Cherian
Client Project #: NOV 3,2010-SPEC PROJ-VANGORDA
P.O. #:
Site Reference: WASTE ROCK

Quality Assurance Report

Maxxam Job Number: VB0A8624

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
4405287 MM3	Spiked Blank	Conductivity	2010/11/06		101	%	80 - 120
	Method Blank	Conductivity	2010/11/06	<1		uS/cm	
	RPD	Conductivity	2010/11/06	2.0 (1)		%	20
4405291 MM3	Matrix Spike	Alkalinity (Total as CaCO3)	2010/11/06		NC	%	80 - 120
	Spiked Blank	Alkalinity (Total as CaCO3)	2010/11/06		101	%	80 - 120
	Method Blank	Alkalinity (Total as CaCO3)	2010/11/06	<0.5		mg/L	
		Alkalinity (PP as CaCO3)	2010/11/06	<0.5		mg/L	
		Bicarbonate (HCO3)	2010/11/06	<0.5		mg/L	
		Carbonate (CO3)	2010/11/06	<0.5		mg/L	
		Hydroxide (OH)	2010/11/06	<0.5		mg/L	
	RPD	Alkalinity (Total as CaCO3)	2010/11/06	1.2		%	20
		Alkalinity (PP as CaCO3)	2010/11/06	NC		%	20
		Bicarbonate (HCO3)	2010/11/06	1.2		%	20
		Carbonate (CO3)	2010/11/06	NC		%	20
		Hydroxide (OH)	2010/11/06	NC		%	20
4405673 TM8	Spiked Blank	Total Suspended Solids	2010/11/08		102	%	80 - 120
	Method Blank	Total Suspended Solids	2010/11/08	<1		mg/L	
4408036 WAY	Spiked Blank	Acidity (pH 8.3)	2010/11/08		110	%	80 - 120
	Method Blank	Acidity (pH 4.5)	2010/11/08	<0.5		mg/L	
		Acidity (pH 8.3)	2010/11/08	<0.5		mg/L	
	RPD	Acidity (pH 4.5)	2010/11/08	NC		%	20
		Acidity (pH 8.3)	2010/11/08	NC		%	20
4410945 KCG	Matrix Spike	Dissolved Chloride (Cl)	2010/11/08		NC	%	80 - 120
	Spiked Blank	Dissolved Chloride (Cl)	2010/11/08		98	%	80 - 120
	Method Blank	Dissolved Chloride (Cl)	2010/11/08	<0.5		mg/L	
	RPD	Dissolved Chloride (Cl)	2010/11/08	0.9		%	20
4410947 KCG	Matrix Spike	Dissolved Sulphate (SO4)	2010/11/08		NC	%	80 - 120
	Spiked Blank	Dissolved Sulphate (SO4)	2010/11/08		102	%	80 - 120
	Method Blank	Dissolved Sulphate (SO4)	2010/11/08	<0.5		mg/L	
	RPD	Dissolved Sulphate (SO4)	2010/11/08	1.8		%	20
4417866 AA1	Matrix Spike	Dissolved Arsenic (As)	2010/11/15		101	%	80 - 120
		Dissolved Beryllium (Be)	2010/11/15		106	%	80 - 120
		Dissolved Cadmium (Cd)	2010/11/15		105	%	80 - 120
		Dissolved Chromium (Cr)	2010/11/15		97	%	80 - 120
		Dissolved Cobalt (Co)	2010/11/15		101	%	80 - 120
		Dissolved Copper (Cu)	2010/11/15		100	%	80 - 120
		Dissolved Lead (Pb)	2010/11/15		97	%	80 - 120
		Dissolved Lithium (Li)	2010/11/15		104	%	80 - 120
		Dissolved Nickel (Ni)	2010/11/15		101	%	80 - 120
		Dissolved Selenium (Se)	2010/11/15		98	%	80 - 120
		Dissolved Uranium (U)	2010/11/15		70 (2)	%	80 - 120
		Dissolved Vanadium (V)	2010/11/15		98	%	80 - 120
		Dissolved Zinc (Zn)	2010/11/15		115	%	80 - 120
	Spiked Blank	Dissolved Arsenic (As)	2010/11/15		102	%	80 - 120
		Dissolved Beryllium (Be)	2010/11/15		105	%	80 - 120
		Dissolved Cadmium (Cd)	2010/11/15		102	%	80 - 120
		Dissolved Chromium (Cr)	2010/11/15		102	%	80 - 120
		Dissolved Cobalt (Co)	2010/11/15		101	%	80 - 120
		Dissolved Copper (Cu)	2010/11/15		103	%	80 - 120
		Dissolved Lead (Pb)	2010/11/15		105	%	80 - 120
		Dissolved Lithium (Li)	2010/11/15		105	%	80 - 120
		Dissolved Nickel (Ni)	2010/11/15		101	%	80 - 120
		Dissolved Selenium (Se)	2010/11/15		105	%	80 - 120
		Dissolved Uranium (U)	2010/11/15		107	%	80 - 120
		Dissolved Vanadium (V)	2010/11/15		101	%	80 - 120

Quality Assurance Report (Continued)

Maxxam Job Number: VB0A8624

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
4417866 AA1	Spiked Blank	Dissolved Zinc (Zn)	2010/11/15		97	%	80 - 120
	Method Blank	Dissolved Aluminum (Al)	2010/11/15	<0.2		ug/L	
		Dissolved Antimony (Sb)	2010/11/15	<0.02		ug/L	
		Dissolved Arsenic (As)	2010/11/15	<0.02		ug/L	
		Dissolved Barium (Ba)	2010/11/15	<0.02		ug/L	
		Dissolved Beryllium (Be)	2010/11/15	<0.01		ug/L	
		Dissolved Bismuth (Bi)	2010/11/15	<0.005		ug/L	
		Dissolved Boron (B)	2010/11/15	<50		ug/L	
		Dissolved Cadmium (Cd)	2010/11/15	<0.005		ug/L	
		Dissolved Chromium (Cr)	2010/11/15	<0.1		ug/L	
		Dissolved Cobalt (Co)	2010/11/15	<0.005		ug/L	
		Dissolved Copper (Cu)	2010/11/15	<0.05		ug/L	
		Dissolved Iron (Fe)	2010/11/15	<1		ug/L	
		Dissolved Lead (Pb)	2010/11/15	<0.005		ug/L	
		Dissolved Lithium (Li)	2010/11/15	<0.5		ug/L	
		Dissolved Manganese (Mn)	2010/11/15	<0.05		ug/L	
		Dissolved Molybdenum (Mo)	2010/11/15	<0.05		ug/L	
		Dissolved Nickel (Ni)	2010/11/15	<0.02		ug/L	
		Dissolved Selenium (Se)	2010/11/15	<0.04		ug/L	
		Dissolved Silicon (Si)	2010/11/15	<100		ug/L	
		Dissolved Silver (Ag)	2010/11/15	<0.005		ug/L	
		Dissolved Strontium (Sr)	2010/11/15	<0.05		ug/L	
		Dissolved Thallium (Tl)	2010/11/15	<0.002		ug/L	
		Dissolved Tin (Sn)	2010/11/15	<0.01		ug/L	
		Dissolved Titanium (Ti)	2010/11/15	<0.5		ug/L	
		Dissolved Uranium (U)	2010/11/15	<0.002		ug/L	
		Dissolved Vanadium (V)	2010/11/15	<0.2		ug/L	
		Dissolved Zinc (Zn)	2010/11/15	<0.1		ug/L	
		Dissolved Zirconium (Zr)	2010/11/15	<0.1		ug/L	
	RPD	Dissolved Aluminum (Al)	2010/11/15	18.1		%	20
		Dissolved Antimony (Sb)	2010/11/15	NC		%	20
		Dissolved Arsenic (As)	2010/11/15	NC		%	20
		Dissolved Barium (Ba)	2010/11/15	0.2		%	20
		Dissolved Beryllium (Be)	2010/11/15	NC		%	20
		Dissolved Bismuth (Bi)	2010/11/15	NC		%	20
		Dissolved Boron (B)	2010/11/15	NC		%	20
		Dissolved Cadmium (Cd)	2010/11/15	NC		%	20
		Dissolved Chromium (Cr)	2010/11/15	NC		%	20
		Dissolved Cobalt (Co)	2010/11/15	NC		%	20
		Dissolved Copper (Cu)	2010/11/15	2.0		%	20
		Dissolved Lead (Pb)	2010/11/15	NC		%	20
		Dissolved Lithium (Li)	2010/11/15	NC		%	20
		Dissolved Manganese (Mn)	2010/11/15	NC		%	20
		Dissolved Molybdenum (Mo)	2010/11/15	NC		%	20
		Dissolved Nickel (Ni)	2010/11/15	NC		%	20
		Dissolved Selenium (Se)	2010/11/15	NC		%	20
		Dissolved Silver (Ag)	2010/11/15	NC		%	20
		Dissolved Strontium (Sr)	2010/11/15	0.3		%	20
		Dissolved Thallium (Tl)	2010/11/15	NC		%	20
		Dissolved Tin (Sn)	2010/11/15	NC		%	20
		Dissolved Uranium (U)	2010/11/15	NC		%	20
		Dissolved Vanadium (V)	2010/11/15	NC		%	20
		Dissolved Zinc (Zn)	2010/11/15	NC		%	20
4428855 BB3	Spiked Blank	Dissolved Chloride (Cl)	2010/11/15		100	%	80 - 120
	Method Blank	Dissolved Chloride (Cl)	2010/11/15	<0.5		mg/L	

Quality Assurance Report (Continued)

Maxxam Job Number: VB0A8624

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
4428857 BB3	Spiked Blank	Dissolved Sulphate (SO4)	2010/11/15		93	%	80 - 120
	Method Blank	Dissolved Sulphate (SO4)	2010/11/15	<0.5		mg/L	
4431178 MM3	Spiked Blank	Alkalinity (Total as CaCO3)	2010/11/16		101	%	80 - 120
	Method Blank	Alkalinity (Total as CaCO3)	2010/11/16	<0.5		mg/L	
		Alkalinity (PP as CaCO3)	2010/11/16	<0.5		mg/L	
		Bicarbonate (HCO3)	2010/11/16	<0.5		mg/L	
		Carbonate (CO3)	2010/11/16	<0.5		mg/L	
		Hydroxide (OH)	2010/11/16	<0.5		mg/L	
	RPD	Alkalinity (Total as CaCO3)		TBA		%	20
		Alkalinity (PP as CaCO3)		TBA		%	20
		Bicarbonate (HCO3)		TBA		%	20
		Carbonate (CO3)		TBA		%	20
		Hydroxide (OH)		TBA		%	20

TBA = Result to follow
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.
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) Fails SQC rule#3. Four of 5 points in zone A or B same side of mean.
(2) Matrix Spike exceeds acceptance limits for U due to matrix interference. Reanalysis yields similar results.

Maxxam
Analytics Inc

8577 Commerce Court
Burnaby, BC V5A 4N5
www.maxxamanalytics.com

Phone: (604) 444-4808
Fax.: (604) 444-4511
Toll-Free: 1-800-440-4808

CHAIN-OF CUS YSIS REQUEST

08324999

PAGE 1 OF 1

LAB USE ONLY
MAXXAM JOB # 80A 8624

ANALYSIS REQUEST

LAB USE ONLY
COC #

COMPANY NAME: #4337 Denison Environmental Services

CLIENT PROJECT NO.: November 3, 2010 - SPEC PROJ - Vangorda Waste Rock D

COMPANY ADDRESS:
Box 280
Faro, Yukon
Y0B 1K0

TEL.: (867)994-2600 Ext. 106 - Lab

E-MAIL: jcherian@denisonenvironmental.com

FAX:

SAMPLER NAME (PRINT): N. Gardiner / B. Bekk / T. Parkin

PROJECT MANAGER: Jay Cherian

LABORATORY CONTACT: Ashley Nivison

	FIELD SAMPLE ID	MAXXAM LAB USE ONLY	MATRIX: GROUNDWATER	MATRIX: SURFACE WATER	MATRIX: DRINKING WATER	MATRIX: SOIL	MATRIX: OTHER	SAMPLING: DATE DD/MM/YY	SAMPLING: TIME	# CONTAINERS	Acidity	Alkalinity	Chloride	pH	Conductance (EC)	Sulphate	Total Suspended Solids (TSS)	LDL - Dissolved Metals (Field Filtered)	CSR - Dissolved Metals (Field Filtered)
1	PW-10-01		X					03/11/2010	10:30	3	X	X	X	X	X	X	X	X	
2	PW-10-02		X					03/11/2010	10:52	3	X	X	X	X	X	X	X	X	
3	PW-10-03		X					03/11/2010	11:15	3	X	X	X	X	X	X	X	X	
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			

TAT (Turnaround Time)

LESS THAN 5 DAY TAT MUST HAVE PRIOR APPROVAL

* Some exceptions apply - please contact laboratory

STANDARD	5 BUSINESS DAYS	☒
RUSH	3 BUSINESS DAYS	☐
RUSH	2 BUSINESS DAYS	☐
URGENT	1 BUSINESS DAY	☐

OTHER BUSINESS DAYS ______

PO NUMBER OR QUOTE NUMBER:

SPECIAL DETECTION LIMITS / CONTAMINANT TYPE:

☐ CCME
☐ CSR
☐ AB TIER 1
☐ OTHER

ACCOUNTING CONTACT:

SPECIAL REPORTING OR BILLING INSTRUCTIONS:

JARS USED: 9

LAB USE ONLY

ARRIVAL TEMPERATURE °C: 768 777

DUE DATE:

LOG IN CHECK:

RELINQUISHED BY	DATE DD/MM/YY	TIME	RECEIVED BY
RELINQUISHED BY SAMPLER: B. Bekk	04/11/2010	2:00 PM	Small's Expediting
RELINQUISHED BY:		1400	RECEIVED BY:
RELINQUISHED BY:		10 11 05	RECEIVED BY LABORATORY: C.Rosen

CUSTODY RECORD

COCFORM - BC - 20070822