

Deloitte & Touche

Anvil Range Mining Complex Monitor Mine Waste Rock Trial Covers: 2007 Data Summary

2007/08 - Task 18a

FINAL

Prepared for

Deloitte and Touche Inc.

on behalf of

Faro Mine Closure Planning Office

Prepared by



*Project Reference Number
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May 2008

Anvil Range Mining Complex
Monitor Mine Waste Rock Trial Covers:
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On behalf of

Faro Mine Closure Planning Office

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Executive Summary

Objectives and Primary Findings

This report summarizes the data collected from the waste rock trial covers at the Anvil Range Mining Complex during the 2007 monitoring season (May to November). The intent of this report is to document the field results and provide feedback on the quality of data collection. Where data collection problems are identified, this report provides recommendations to remedy the problems as well as mitigation measures that can be implemented to prevent similar problems from occurring again. This report does not contain a technical analysis of the data, but simply confirms that the instrumentation systems are working as expected, and that the data collected follows reasonable trends.

Detailed information regarding operation, calibration, suitability and accuracy of the monitoring instrumentation used to collect the data presented in this report is provided in the as-built report (SRK 2006a), and therefore is not repeated here.

Future Work Recommendations

The report provides a series of recommendations to improve data collection during subsequent monitoring years. These range from improved monitoring protocols to the provision of increased backup systems in case of problems.

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1 Introduction and Scope of Report

1.1 General

Deloitte & Touche Inc. (D&T) was appointed Interim Receiver of the property, assets and undertaking of Anvil Range Mining Corporation (ARMC), and its subsidiaries, Anvil Range Properties Inc., (collectively “Anvil”) pursuant to an Order of Mr. Justice Blair of the Ontario Court (General Division) dated April 12, 1998. SRK Consulting (Canada) Inc. (SRK) was retained by D&T, on behalf of the Faro Mine Closure Planning Office (FMCPO) to assist in the development of a Final Closure and Reclamation Plan (the “Plan”) for the Anvil Range Mining Complex. Based on current expectations, this Plan will be submitted to the relevant regulating authorities by February 2009. Engineering studies are being undertaken in the interim to provide the necessary scientific background information required to characterize and estimate costs for various closure methods that may be used in the Plan.

This report summarizes data collected between November 2006 and November 2007 under 2007/08 Task 18a, “Monitoring of Waste Rock Dump Trial Covers at Vangorda”, as stipulated in an SRK proposal dated April 13, 2007. The 2007/08 Task 18a follows 2006/07 Task 17a, “Monitor Mine Waste Rock Trial Covers”(SRK 2007), 2005/06 Task 20a, “Waste Rock Dump Cover Trials” (SRK 2006b), and 2004/05 Task 14a. No report was issued for 2004/05 Task 14a because construction of the cover trials was only completed in September 2004, and there was no data to report. An “as-built” report for the trial covers has been prepared as a separate report under 2004/05 Task 14a (SRK 2006a).

1.2 Background of the Project

The ARMC has about 185 million cubic meters of waste rock covering about 542 ha of surface area. Detailed geochemical characterization has confirmed that much of this waste rock is acid generating and contains leachable metals. As part of the Plan currently being developed for the ARMC, various mitigation methods for these waste rock piles are being considered. One of these methods includes physical covering of the waste rock piles.

The specific functions that a cover would have to perform have not been defined. However, the most likely functions would include:

- preventing direct exposure and contact with the waste rock;
- reducing, and possibly minimizing infiltration through the waste rock; and
- providing a medium that would allow re-vegetation of the piles.

Other potential functions have not been excluded, but there appears to be consensus within the Work Group responsible for the description and evaluation of the cover methods, that constructing covers

to act as oxygen barriers would not be beneficial. Significant oxidation of the waste rock has already occurred, effectively negating benefits offered by oxygen exclusion.

One of the single most challenging aspects of cover design for the site entails designing an infiltration reducing cover that will continue to perform effectively in the very long term, using the locally available till and glacio-fluvial soils. It is standard practice to make use of numerical models to assess the potential performance ranges of different cover configurations. However, the only reliable method to evaluate the physical aspects that determine long-term cover performance is to monitor site specific trial covers.

Subsequently, six trial covers (CT#1, CT#2A, CT#2B, CT#3A, CT#3B and CT #4) were constructed on the Vangorda waste rock pile in September 2004, as illustrated in Figures 1, 2 and 3. These trial covers have been designed to test a range of different physical performance criteria for the available materials, specifically focused towards evaluating performance as “infiltration reducing” covers. Detailed water balance instrumentation was installed in the trial covers in June 2005 (see Figures 4 through 8).

It is anticipated that these trial covers will be monitored for at least five years, and that the information gleaned from these covers will be used to optimize final cover designs for the ARMC. Although portions of monitoring data are missing, the overall data set can be used as base for the numerical model of the final cover design.

1.3 Scope of Work

This report summarizes the data collected from the trial covers during the 2007 monitoring season (November 2006 to November 2007). The intent of this report is to document the basic field results and provide feedback on the quality of data collection, as well as to document the changes made to the data collection system during the 2007 flow monitoring upgrade program. Where data collection problems are identified, this report provides recommendations to remedy the problems as well as mitigation measures that can be implemented to prevent similar problems from occurring again. This report does not contain a technical analysis of the data.

Instrumentation was re-commissioned by SRK in May 2007. ARMC personnel retrieved data from all data loggers every two weeks until September 12, 2007. Some additional, infrequent downloads was performed after that period by ARMC personnel, and the last download for the season was performed by Maritz Rykaart at the time of decommissioning of the instrumentation, on November 1st, 2007.

Detailed information regarding the monitoring instrumentation used to collect the data presented in this report, covering their operation, calibration, suitability and accuracy is provided in the as-built report (SRK 2006a), and therefore is not repeated here.

1.4 Methods

Six trial covers (Figures 2 and 3) were constructed in September 2004, in accordance with SRK design requirements. Construction was carried out by a local contractor, Tim Moon Construction, supported by ARMC staff and equipment. Construction supervision was carried out by two SRK engineers, Maritz Rykaart, P.Eng. and Peter Mikes, E.I.T. The instrumentation was installed in June 2005 by Mr. Rykaart. The instrumentation was commissioned in June 2005. Complete construction and instrumentation details are provided in an as-built report (SRK 2006a).

ARMC staff, including two UBC summer students, was trained by SRK to carry out the field monitoring for the 2007 monitoring season (May to November). A written monitoring protocol was provided to ARMC, and is included as Appendix A. Data was downloaded directly from the different data loggers onto a laptop computer. In addition, a series of readings were collected manually and converted into electronic format. All field data collected by ARMC was sent to SRK via e-mail.

SRK used the proprietary software linked to each of the data loggers to open and view the data to ensure that the loggers were operating satisfactorily. All data was collated into a master database at the end of the season. This master database converts raw field data into its final usable format by applying material specific calibration information. The figures illustrating the field data presented in this report (Figures 10 through 95) were created using this master database. Figures 10 through 95 do not show all the data collected to date. These figures only present the data collected during the 2007 monitoring season. As a result, figures presenting data as a graph will have lines extending from the end of the 2006 data set to the start of the 2007 data set. The range of the x-axis has been set to obscure this artefact but it can still be observed on the left hand side of the graph. Complete details of how data is prepared for input into the database and how the database was developed are included in the as-built report (SRK 2006a).

In addition to the data presented in this report, weather data are collected from two on-site weather stations, and annual snow surveys are conducted by staff from the Yukon Territorial Government (Janowicz *et al.* 2005, 2006, 2007). This data is not presented here, but will be used to compare the validity of the trial cover data when detailed data analysis is carried out following future years of monitoring.

1.5 Report Structure

Section 3 contains information associated with the series of automated data loggers collecting field monitoring data for the trial covers. The remainder of the instrumentation data is collected manually, the details of which are presented in Section 3. The final section of the report provides a summary of the action items arising from this data summary report.

2 Automated Instrumentation Data Logger Data

2.1 Davis Instruments Vantage Pro (Weather Stations and Satellite Stations)

Complete climatic data is collected at the Vangorda Waste Rock Pile trial cover location using two Davis Instruments Vantage Pro Weather stations. The first station is located on the sloped CT#1 trial cover and the second on the dividing berm between horizontal trial covers CT#2A and CT#2B. Figure 2 schematically illustrates these locations. Additional climatic data (air temperature and relative humidity), as well as shallow soil moisture and temperature data, are collected via two satellite Davis Instruments stations located approximately 25 m from these two primary weather stations, as illustrated in Figure 4. Figures 6 and 7 illustrate the locations of the soil moisture and temperature sensors installed as part of the satellite stations.

At each setup, the data from the weather station and the satellite station is collected by a Vantage Pro data logger housed in the weather-proof enclosure situated beneath the weather station. The data loggers collect and store primary climatic data, as listed in Table 1. This data is measured directly from the suite of climatic sensors. This data is also presented as time-series graphs in Figures 10 through 21, and spans from May through November 2007.

In addition to the sensor data listed in Table 1, the data logger uses this primary data to calculate a series of secondary climatic information. Since this report focuses on the integrity of the primary collected data, this reduced data was not reported. SRK did, however, review all this data to confirm that the data logger was operating satisfactorily, and that the data collected made sense. This data has also been imported into the central database for future use. Appendix B provides a brief summary of this data.

Maintenance or recalibration was not carried out on the weather or satellite stations in 2007; however, regular visual inspections by the monitoring staff concluded that there were no problems. The rechargeable batteries installed in 2006 were replaced at the beginning of the 2007 season. As a precautionary measure, a spare set of batteries were provided on site, but did not have to be used.

Review of the data revealed minor problems with the internal weather enclosure housing relative humidity sensor, which recorded erratic data for a period of time during May and June. This problem ceased once new desiccation packs were installed in the enclosure. Data recording for the weather station on CT#2A/B ceased on September 25, 2007. Fault tracing revealed that the rechargeable battery pack stopped working. A new battery pack will be installed at the start of the 2008 monitoring season.

Table 1: Summary of Primary Data Collected by Davis Instruments Vantage Pro Weather and Satellite Stations

Parameter	Location	Sample Frequency	Units	Figure	Comment
Rainfall	Both weather stations	Every 50-60 sec; output as hourly total	mm	Figure 10	Reported as “mean hourly”, but is in fact an hourly total; Rain rate (mm/hr) is also recorded (not presented)
Ambient Outside Air Temperature	Both weather and satellite stations	Every 10-12 sec; output as mean hourly	°C	Figure 11	Max/Min hourly also recorded at weather stations (not presented)
Relative Humidity	Both weather and satellite stations	Every 50-60 sec; output as mean hourly	%	Figure 12	Range of 0% to 100%
Solar Radiation	Both weather stations	Every 50-60 sec; output as mean hourly	W/m ²	Figure 13	“Hi solar radiation”, i.e. peak hourly solar radiation also recorded (not presented)
Barometric Pressure	Both weather stations	Every 50-60 sec; output as mean hourly	mm Hg	Figure 14	
Wind Speed	Both weather stations	Every 2.5-3 sec; output as mean hourly	km/hr	Figure 15	Max/Min hourly also recorded at weather stations (not presented)
Wind Direction	Both weather stations	Every 2.5-3 sec; output as mean hourly	N/E/S/W	Figure 16	Max hourly also recorded at weather stations (not presented)
Ultraviolet (UV) Index	Both weather stations	Every 50-60 sec; output as mean hourly	Scale 1 – 16	Figure 17	“Hi UV Index”, i.e. maximum hourly UV Index also recorded (not presented)
Soil Moisture ¹	Both satellite stations	Every 50-60 sec; output as mean hourly	Cb	Figure 18 (CT#1); Figure 21 (CT#2A)	Measured at two depths
Soil Temperature	Both satellite stations	Every 50-60 sec; output as mean hourly	°C	Figure 19 (CT#1); Figure 22 (CT#2A)	Measured at two depths

1. Soil Moisture is measured in units of centibar (Cb) according to the supplier, which is not a true unit of soil moisture. The true parameter measured by this instrument is, in actual fact, soil matric suction.

2.2 Campbell Scientific CR10X

2.2.1 General Setup

Two Campbell Scientific CR10X data loggers collect soil matric suction and temperature data from Campbell Scientific CS229 thermal conductivity sensors, as well as soil volumetric moisture content from Sentek Sensor Technologies EnviroSCAN sensors. Flow volumes from the tipping bucket flow gauges are also monitored by one of the CR10X data loggers. These data loggers are located adjacent to each other in the monitoring hut, as illustrated in Figures 4 and 5.

The first data logger (CR10X #1) collects the soil matric suction, temperature and volumetric moisture content data from CT#2A and 2B. The second data logger (CR10X #2) records the same suite of data from CT#1, CT#3A, CT#3B, and CT#4. In addition, the CR10X #2 data logger records

data from three tipping buckets used to measure the interflow from CT#3A, CT#3B and CT#4. Details of the instrument locations are presented in Figures 4 through 8.

Data collected by the CR10X data loggers are stored in a series of “Arrays” (i.e. a summary table of data). The soil matric suction, temperature and volumetric moisture content are recorded every six hours (midnight, 6AM, noon, and 6PM), whilst the interflow is recorded instantaneously (i.e. whenever there is flow data is recorded, irrespective of the time interval). Daily summary output of all the data is provided, which also includes information about the battery voltage for diagnostic purposes.

The runoff monitoring system was upgraded in August 2007 to include six additional tipping bucket flow gauges. On August 28, 2007 new programs were uploaded into the Campbell Scientific data loggers, which resulted in modified Array numbers from what has been reported to date. To avoid confusion, this data report only contains data which are consistent with the original arrays. Complete details of the array changes will be documented in the 2008 data report.

The Campbell Scientific data loggers are not decommissioned during winter months and as such data presented in this report spans from November 2006 (2006 data report ended at the beginning of November 2006) to November 2007. However, since programming changes resulted in Array changes data presented in this report related to the CR10X data loggers only contain data to August 28, 2007 or September 15, 2008 (another programming change was executed on this date). Complete data to November 2007 is available, and have been checked, but are not presented in this report as the post-processor requires modification.

2.2.2 Battery Voltage

The data loggers and instruments are powered by a 12V battery (one per data logger). These batteries are continuously recharged using solar energy (one solar panel per battery). The data logger has an internal protection circuit that will shut the logger down if the battery voltage drops below 10.5V, or exceeds 15V. For this reason, the data loggers have been programmed to record the battery voltage as part of the daily summary Array. Figure 22 presents the graph of daily minimum battery voltages measured for CR10X #1. Although not plotted, due to a post processor compatibility error, review of the raw data files confirmed that a similar trend can be seen for the battery voltage of CR10X #2.

The written monitoring protocol required a physical diagnostic check on the batteries and solar panels every time that the data is downloaded, which confirmed that both systems were functioning properly. Observation sheets are included as Appendix H.

2.2.3 Soil Matric Suction

Soil matric suction is measured in each trial cover using a series of Campbell Scientific CS229 thermal conductivity sensors. There are three to six sensors in each trial cover, as illustrated in Figures 6 to 8. Soil matric suction is recorded as a voltage differential by the data logger. This

voltage differential, through the application of material specific calibration curves, is converted to matric suction, expressed in kPa. This conversion is done by SRK during the process of transferring the raw data to a central database. Figures 23 through 28 illustrate the converted soil matric suction values recorded during the 2007 season.

The defective connection that caused in 2006 the failure of the CS229 sensors on CT#2A and CT#2B was fixed on June 7, 2007 as can be observed in Figures 24 and 25. Notwithstanding some data loss, all working sensors have performed as expected. The measurement values are within the expected range and the trends observed appear realistic.

2.2.4 Soil Temperature

The soil temperature is measured using the same CS229 thermal conductivity sensors, recording the soil matric suction. This occurs because the first step in recording the soil matric suction entails taking an in-situ soil temperature reading. Just as with the matric suction data, the raw data is recorded as a voltage and, through application of the material specific calibration curves in the post-processing phase, the soil temperature profiles illustrated in Figures 29 to 34 are produced.

The soil temperature data recorded appears realistic.

2.2.5 Soil Volumetric Moisture Content

A profile of soil volumetric moisture content is measured in each trial cover using Sentek Sensor Technologies EnviroSCAN probes. Each profile contains between seven and thirteen individual beads, as illustrated in Figures 6 to 8. The data recorded by the sensors is relative volumetric moisture content, expressed as a fraction, using a standard calibration curve. During the post-processing, these values are corrected to actual volumetric moisture contents by applying material specific calibration curves. This data is presented in Figures 35 through 40.

The processed data revealed that from April 19, 2007 the data collected from the EnviroSCAN sensors connected to CR10X #2 was erratic, as shown in Figures 35 and Figures 38 through 40. The error was only detected at the end of the season when the data was post-processed. The standard quality control checks executed immediately after field data is received every two weeks did not pick this error up, as there were no error flags in the raw data. The reason for the erratic data is most likely a loose wire connection, or possibly a defective wire. This fault will be traced and corrected during instrument commissioning in May 2008.

To avoid similar situations in the future, SRK will complete post processing of all data every two weeks.

2.2.6 Interflow Totals (Tipping Buckets)

Interflow is measured on CT#3A, CT#3B and CT#4. This interflow is measured using two methods. The first is a Seametrics flowmeter (see Section 2.4), and the second is a 0.2 mm tipping bucket, as

illustrated in Figures 5, 6 and 8. Instantaneous flow data from these tipping buckets is recorded by the CR10X #2 data logger in the form of a number of counts. As part of the post-processing, these counts are summed for every 24-hour period, and the total volume is calculated by multiplying the count number with the tip capacity. This daily data is presented in Figures 41 through 43. The tipping buckets have performed as expected, and the scarcity of data simply denotes a lack of interflow. It was also observed, during a site visit on October 11-12, 2007 that there was a significant amount of interflow trickling from the drainage pipes but the tipping mechanisms of the flow gauges were frozen, thus no data was recorded. SRK will investigate insulation options for these pipes during the transition period in October/November every year.

2.3 Lakewood Systems UL16 Data Logger (Soil Temperature)

Two thermistor strings, each with eight M-Squared thermistor beads, have been installed in the Grum Overburden Dump, as illustrated in Figure 9. These two thermistor strings (String A and String B) are monitored by a Lakewood UL16 data logger which records a relative voltage every twelve hours. These raw voltage profiles are presented in Figures 44 and 45, and confirm that the strings are performing as expected.

2.4 Seametrics DL75 Data Loggers (Surface Runoff and Interflow)

Surface runoff is measured from each trial cover using individual Seametrics flowmeters, each connected to an individual Seametrics DL75 data logger. Interflow from CT#3A, CT#3B and CT#4 is also measured with a similar setup (in addition to tipping buckets, as discussed in Section 2.2.6). Each of these nine flowmeters is located in a monitoring hut, with the flow directed to them through a series of buried drainage pipes, as illustrated in Figure 5.

The data loggers record an instantaneous flow rate every 60 seconds. This data is used to calculate an incremental flow volume. In addition, each data logger calculates a total volume and flow rate over a user specified timeframe, in this case the entire 2007 season. This surface runoff data is presented in Figures 46 through 50 and the interflow data is presented in Figure 51.

All flowmeters were performing as expected. Field staff, who visited the site almost daily throughout the 2007 field season, confirmed that they did not see any discernable runoff collect in the runoff drains at any time.

It should however be noted that the flowmeters will not record very low flows. To correct this situation, a series of six additional tipping bucket flowmeters were installed in 2007, as detailed in Appendix G. In addition, during the 2007 season the written monitoring protocol required a physical examination of the interflow pipes to monitor the presence of water to determine if an additional method of monitoring will be required. A record of these observations is included as Appendix C.

3 Manually Collected Instrumentation Data

3.1 M-Squared Thermistor Cables (Soil Temperature)

Four thermistor strings each with eight thermistor beads have been installed adjacent to the two strings connected to the Lakewood Systems data logger, in the Grum Overburden Dump. Their installation details are presented in Figure 9. These four thermistor strings are manually read at regular intervals by the site staff and the raw data is reported as resistances. These resistance values are converted to soil temperatures during the post-processing phase. The measured soil temperature profiles for the 2007 season from these four strings are shown in Figures 52 through 55. All thermistor strings performed as expected.

3.2 Sentek Sensor Technologies Diviner 2000 (Soil Volumetric Moisture Content)

Each trial cover has six to eight vertical PVC access tubes, as illustrated in Figure 5. A Sentek Sensor Technologies Diviner 2000 probe is inserted manually into each of these tubes to record an instantaneous reading of the soil volumetric moisture content profile at 10 cm intervals. Data was collected throughout the 2007 monitoring season from each of the 40 access tubes on a regular schedule. However, for most of the period, daily readings were taken. Data is recorded using a portable data logger, and expresses the results in terms of relative volumetric moisture content. During the post-processing stage, material specific calibration curves are applied. Figures 56 through 95 present the final volumetric moisture content profiles for each access tube. Data collected from these tubes confirm that the instrument performed as expected.

4 In-Situ Geotechnical Testing

4.1 Saturated Hydraulic Conductivity

In-situ saturated hydraulic conductivity was tested on all of the trial covers between August 24 and August 30, 2007, using single ring infiltrometers and Guelph permeameter fitted with a tension infiltrometer device. Table 2 summarizes the testing carried out on each test cover.

Table 2: Summary of Performed In-Situ Saturated Hydraulic Conductivity Tests

Trail Cover	Material Tested	Test Type	Number of Tests
CT#1	Till	Guelph permeameter	2
		Single ring infiltrometer	3
CT#2A	Till	Guelph permeameter	3
		Single ring infiltrometer	3
CT#2B	Till	Guelph permeameter	2
		Single ring infiltrometer	3
CT#3A	Glacio-Fluvial	Guelph permeameter	1
		Single ring infiltrometer	1
CT#3B	Glacio-fluvial	Guelph permeameter	1
		Single ring infiltrometer	1
CT#4	Till	Guelph permeameter	2
		Single ring infiltrometer	3

The Guelph permeameter was fitted with a Tension Infiltrator device, which allows the measurement of the saturated hydraulic conductivity without the need of a pilot hole. Tension infiltrometers consist of a porous disc base in contact with the tested material, and a Mariotte bubbler that keeps the head constant. The water reservoir of the Guelph permeameter is used as source for replacing the water lost during the test due to suction. In the case of CT#2A and CT#2B, where the surface of the covers is horizontal, the tests were performed directly on the surface, while in the case of the other trial covers an approximately horizontal pad was excavated on the inclined surface.

The ring infiltrometer tests were performed using 30 cm sections cut from 200 litre steel drums, with a diameter of 58 cm. The rings were pounded in the ground to a depth between 5 and 10 cm, then a sealing ring of bentonite paste was placed on the outside, at the base of the ring. In the case of the sloped trial covers, a horizontal pad was excavated first, then the rings were installed as previously described. The tests were performed as falling head test, meaning that the rings were filled with water and then left to drain, the draining rate being recorded.

Summary tables of the Guelph permeameter and ring infiltrometer test results are attached as Appendix D, while complete individual field data calculation sheets can be found in Appendix E.

4.2 In-Situ Density Testing

In-situ density testing was carried out on August 17, 2007, using a nuclear density probe. The test was performed by EBA Engineering Ltd. of Whitehorse, YT. Table 3 summarizes the tests completed and field data sheets are attached in Appendix F.

It should be noted that the maximum dry density of 2,130 kg/m³ used to calculate the percentage of standard Proctor compaction reflects the testing performed on the till used for the covers, and do not reflect the conditions on the glacio-fluvial material covering CT#3A and CT#3B. Appropriate corrections to the data on those covers are warranted.

Table 3: Summary of In-Situ Density Tests

Trial Cover	Material Tested	Number of Tests	Average Moisture Content (%)	Average Dry Density (kg/m ³)	Standard Proctor Compaction (%)
CT#1	Till	20	5.4	2,014	94.6
CT#2A	Till	15	4.9	2,104	98.6
CT#2B	Till	15	5.0	2,094	98.1
CT#3A	Glacio-Fluvial	15	2.1	1,952	89.6
CT#3B	Glacio-Fluvial	15	2.2	1,974	92.7
CT#4	Till	18	4.5	2,120	99.2

Again, the in-situ density data will be used for relative comparison changes in the soil profile over time, and the absolute values recorded are of less importance. In-situ density testing using a Troxler alone, although calibrated for the site specific soils, can be fraught with complexities. Therefore, at the appropriate times, suitable backup testing will be carried out, such as sand-cone replacement tests.

5 Action Items

This report documents the second full season of data collected for the trial covers constructed on the Vangorda waste rock pile. The trial covers were constructed in September 2004, and the instrumentation installation was carried out in June 2005. For the 2007 season, instrumentation was commissioned in April 2007, and shut down on November 1st 2007, when the ground temperatures remained consistently below freezing, effectively shutting down the system water balance. Data collection and instrumentation performance was good, and the partial loss of data experienced for some of the instruments will not significantly affect the overall quality of information. The following is a list of recommendations that should be implemented to ensure that the 2008 monitoring is successful:

- The instrumentation should be re-commissioned in May 2008.
- Continue with the protocol requiring field staff to carry out a manual diagnostic test on the battery and solar panel of each Campbell Scientific and Vantage Pro data logger.
- Install new battery packs for both Davis Instruments weather stations.
- The desiccant packs in each data logger weather enclosure must be replaced every two weeks. The removed desiccant packs must be dried out in the laboratory oven as per the manufacturer's instructions.
- The manual Grum Overburden Dump thermistors should be read at a bi-weekly frequency (i.e. once every two weeks).
- The manual moisture content profiles should be measured daily, whenever possible.
- SRK will not only perform basic quality control checks on the raw data received every two weeks, but will post-process the data at that time as well, in order to ensure minimal data loss.
- The post-processing protocols will be updated to include the instruments installed during the flow monitoring upgrade, as well as to include the instruments that will be installed within the newly constructed lysimeters.
- The problem with erratic EnviroSCAN sensor data will be traced and remedied. This is likely as a result of a poor wiring connection, or faulty wiring.
- SRK will evaluate insulation options for the drainage pipes in the monitoring hut during the transition season from October to November.
- Another round of in-situ density and hydraulic conductivity testing should be carried out on the trial covers in July/August 2008.

This report, “**Anvil Range Mining Complex, Monitor Mine Waste Rock Trial Covers, 2007 Data Summary: 2007/08 Task 18a - FINAL**”, has been prepared by SRK Consulting (Canada) Inc.

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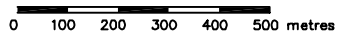
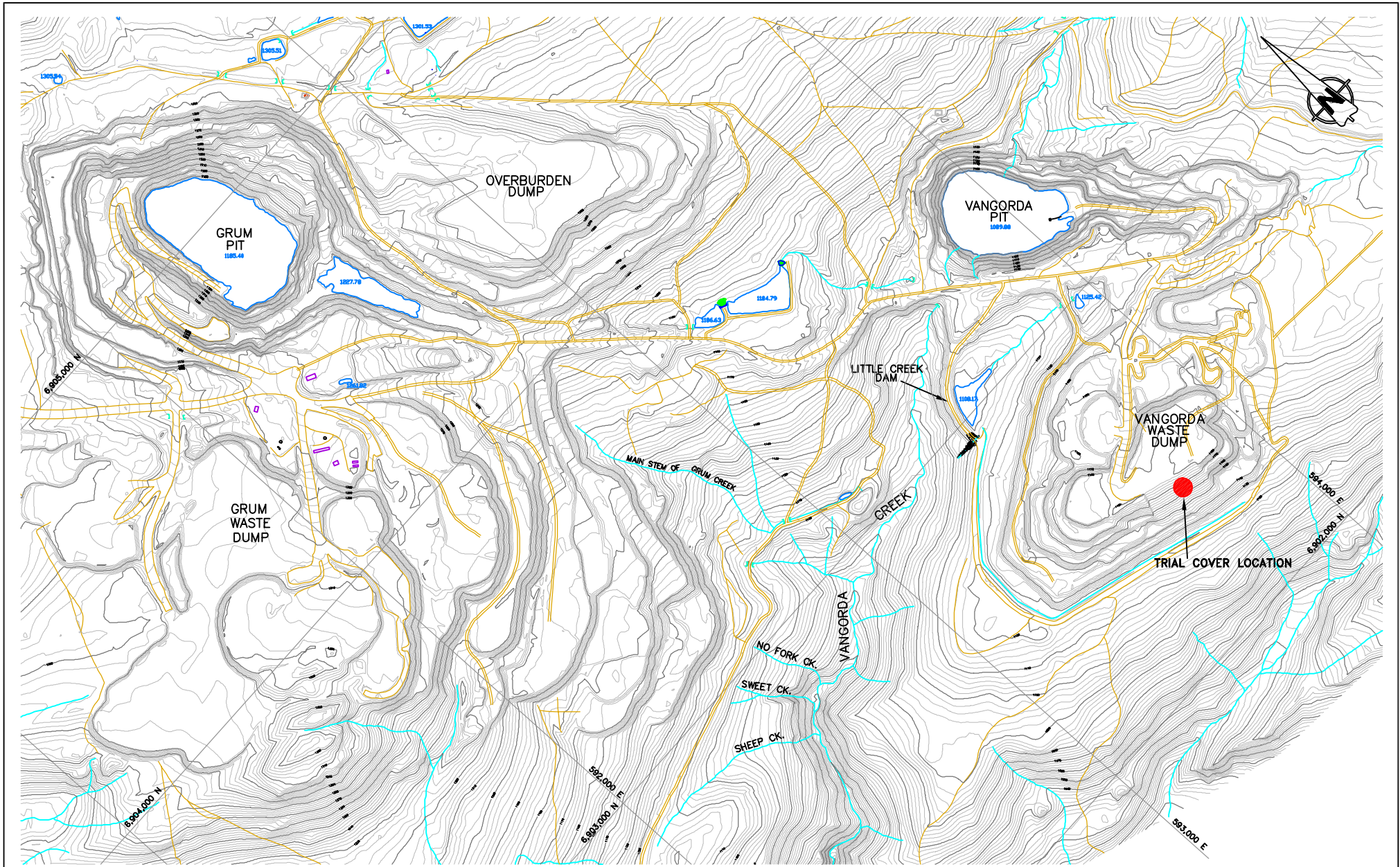
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Figures



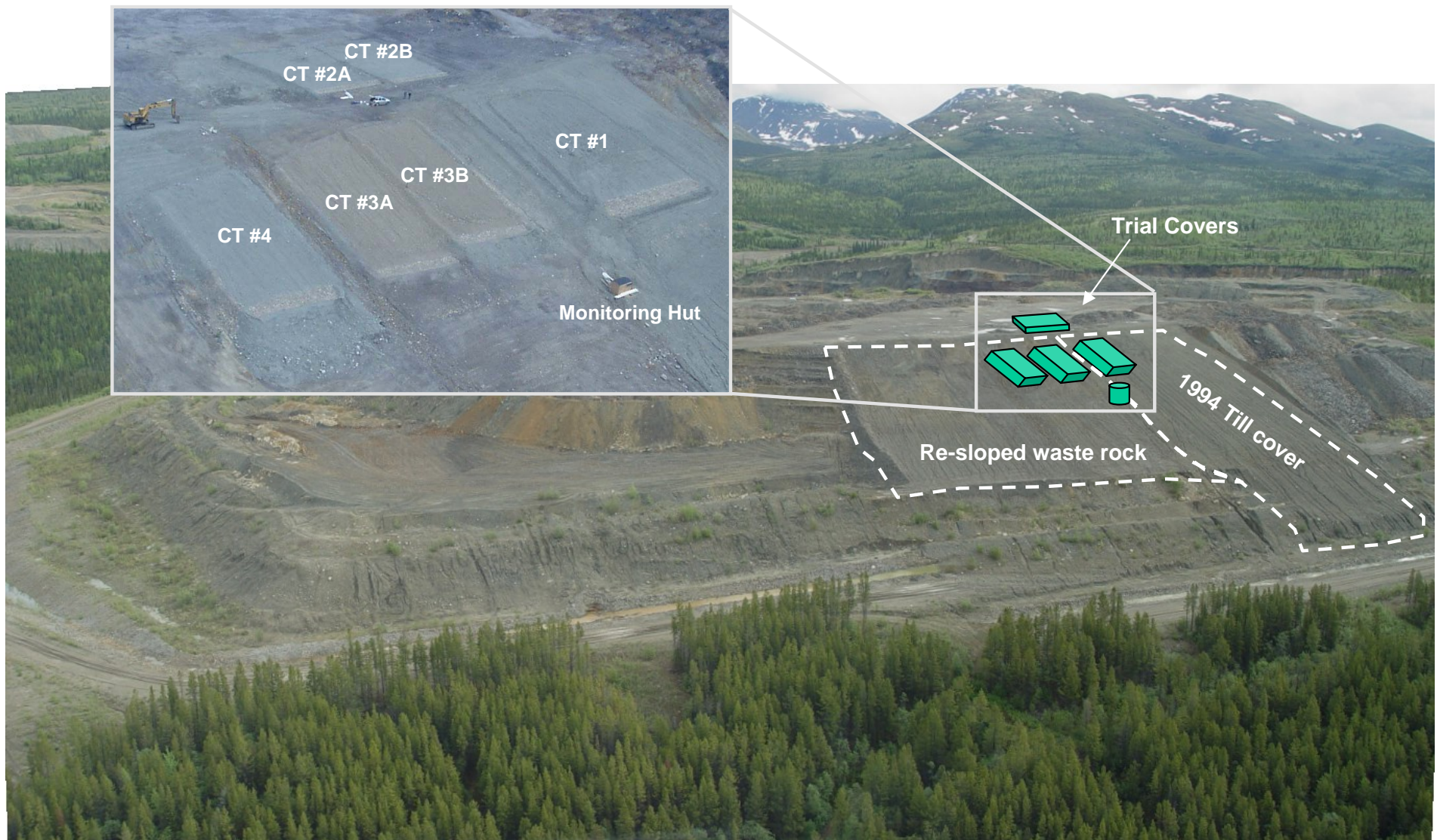

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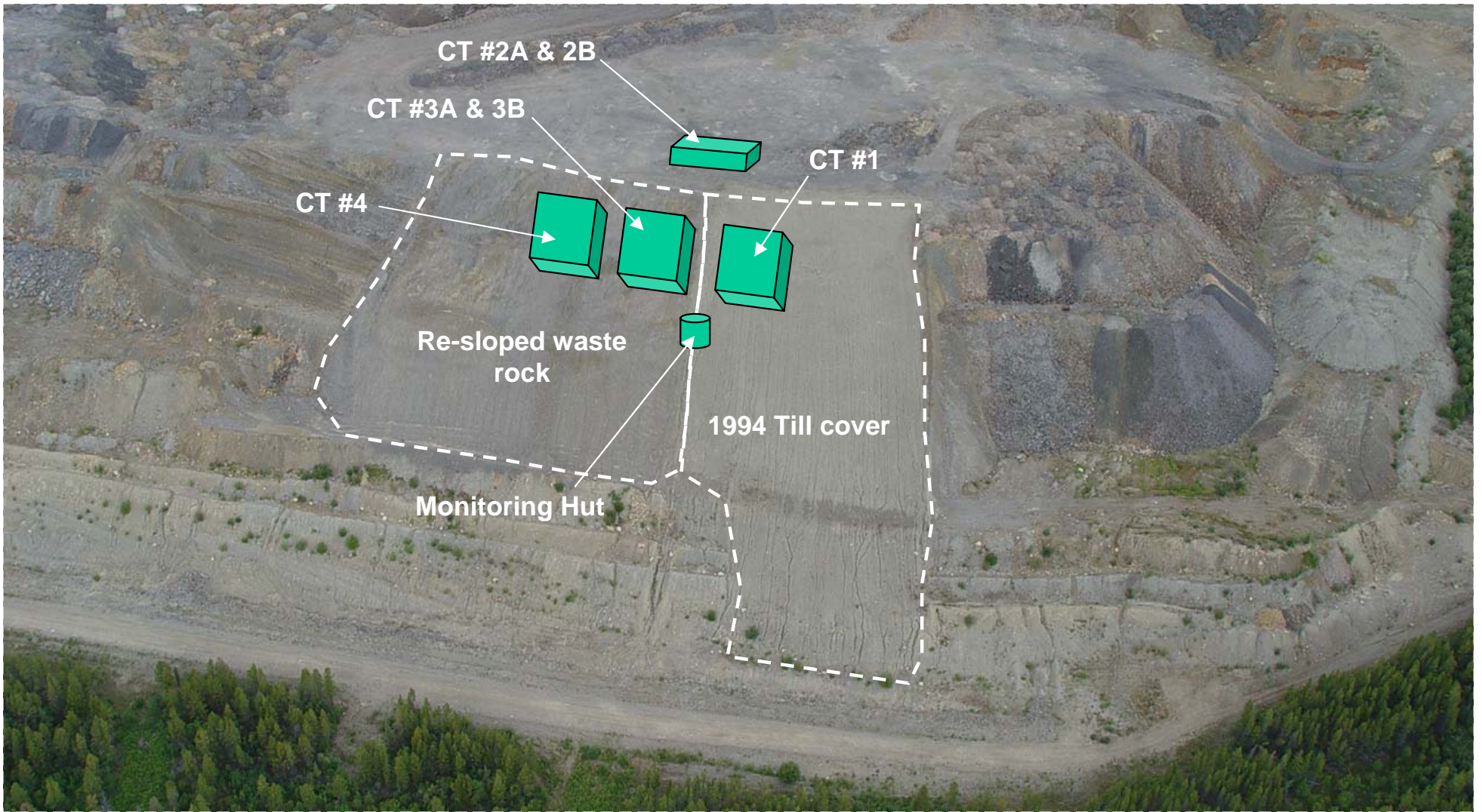


Anvil Range Mining Complex

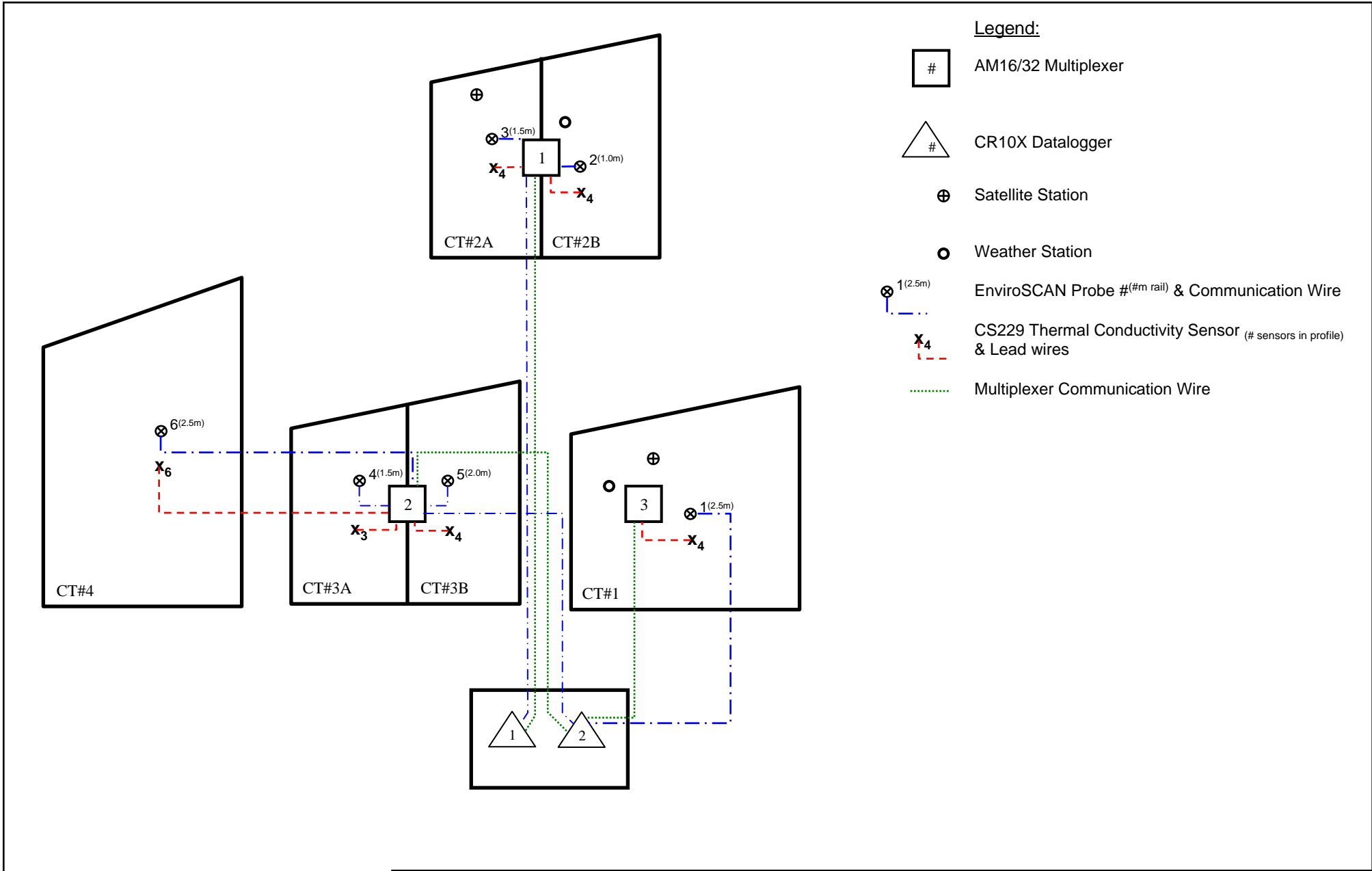
Monitor Mine Waste Rock Trial Covers 2005 Data Summary		
Location Plan for Trial Covers		
DATE: Mar. 2006	APPROVED: EMR	FIGURE: 1



 <p>SRK Consulting Engineers and Scientists VANCOUVER</p>	 <p>Deloitte & Touche</p>	Monitor Mine Waste Rock Trial Covers 2005 Data Summary		
		Looking towards the trial covers on Vangorda Waste rock pile		
Job No: 1CD003.071 Filename: Figures 4 to 8_20060322.ppt	Anvil Range Mining Complex	Date: March 2006	Approved: EMR	Figure: 2



		Monitor Mine Waste Rock Trial Covers 2005 Data Summary		
		Arial view of trial cover layout		
Job No: 1CD003.071 Filename: Figures 4 to 8_20060322.ppt	Anvil Range Mining Complex	Date: March 2006	Approved: EMR	Figure: 3



 <p>SRK Consulting Engineers and Scientists VANCOUVER</p>	 <p>Deloitte & Touche</p>	Monitor Mine Waste Rock Trial Covers 2005 Data Summary		
		Schematic trial cover layout showing automated soil suction, moisture instrumentation, datalogger as well as weather and satellite station locations		
Job No: 1CD003.071 Filename: Figures 4 to 8_20060322.ppt	Anvil Range Mining Complex	Date: March 2006	Approved: EMR	Figure: 4

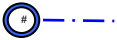
Legend:



Diviner 2000 Stations



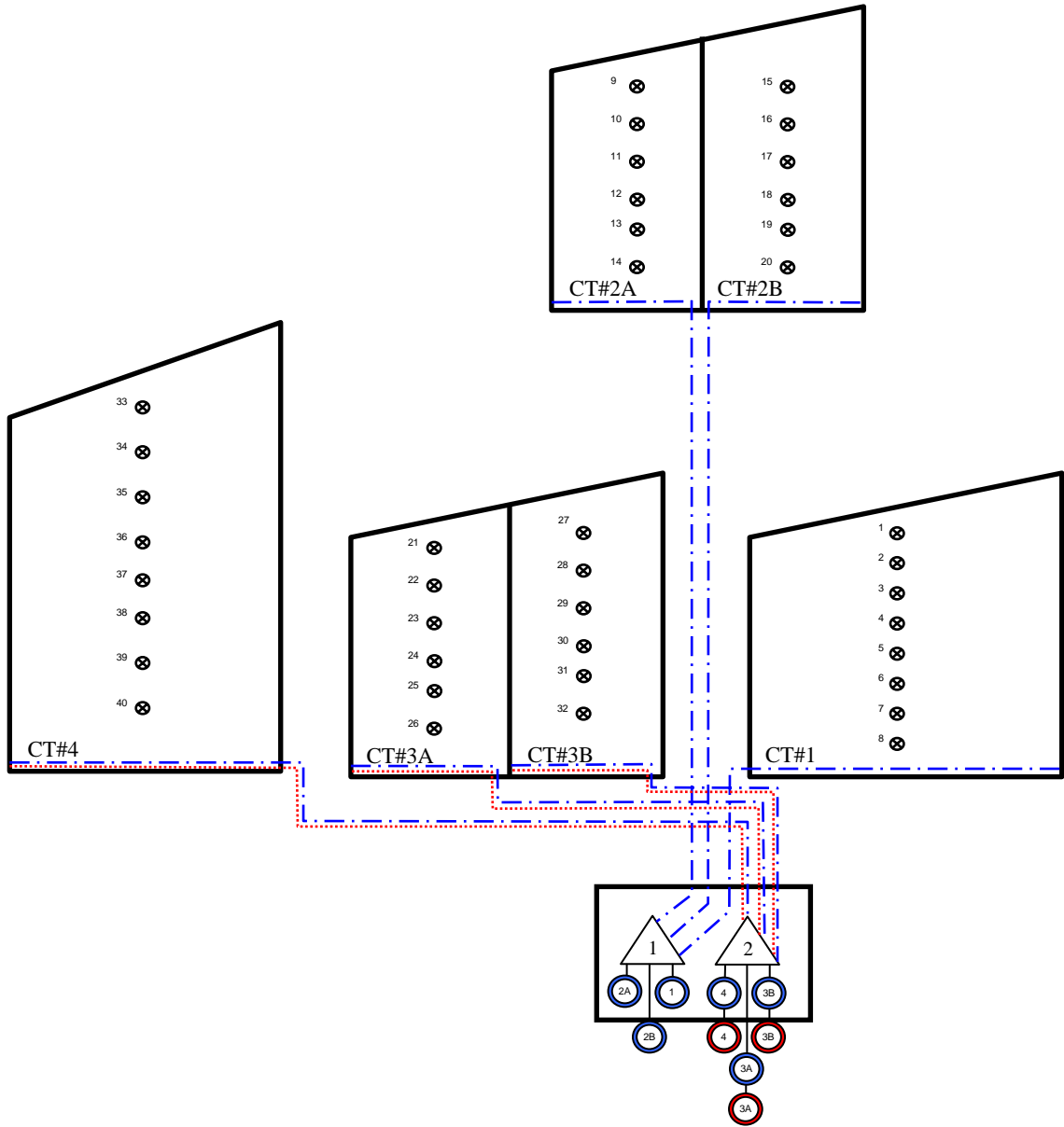
CR10X Datalogger



SeaMetrics Flowmeter & Conveyance Pipe (Runoff)



SeaMetrics Flowmeter & Conveyance Pipe plus Tipping Bucket (Interflow)



Monitor Mine Waste Rock Trial Covers
2005 Data Summary

Schematic trial cover layout showing
Diviner 2000 stations, surface runoff, and
interflow measurement locations

Job No: 1CD003.071
Filename: Figures 4 to 8_20060322.ppt

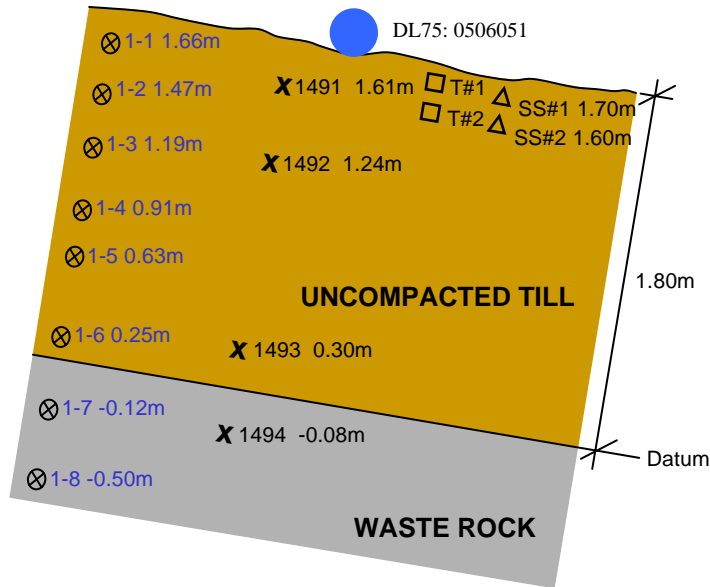
Anvil Range Mining Complex

Date:
March 2006

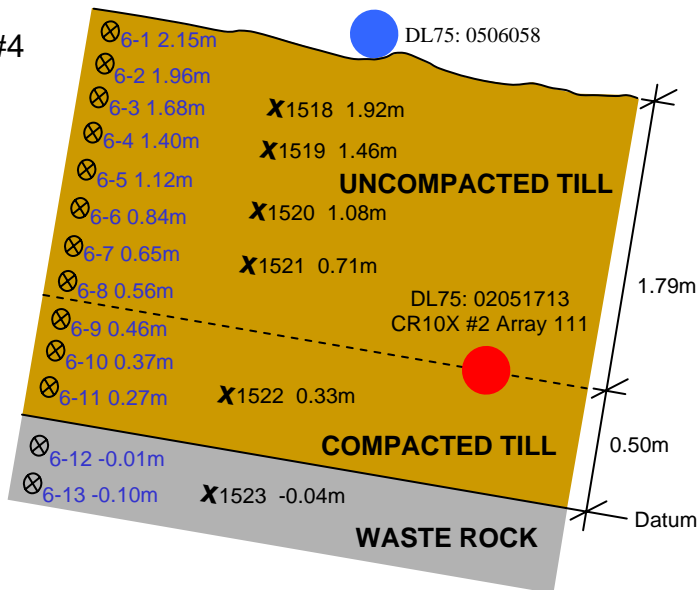
Approved:
EMR

Figure:
5

CT#1



CT#4



Legend:

- #-# #.##m EnviroSCAN Probe, s/n and depth
- # #.##m CS229 Thermal Conductivity Sensor, s/n and depth
- T## #.##m Satellite Station Soil Temperature probe and depth
- SS## #.##m Satellite Station Soil Moisture probe and depth
- DL75: # CR10X #2 Array # Seametrics Datalogger with Flowmeter and Tipping Bucket (Interflow)
- DL75: # Seametrics Datalogger with Flowmeter (Runoff)

Note:

- Depths measured from Datum
- Positive = up
- Negative = down



Monitor Mine Waste Rock Trial Covers
2005 Data Summary

**Schematic Instrument Profiles for
CT#1 and CT#4**

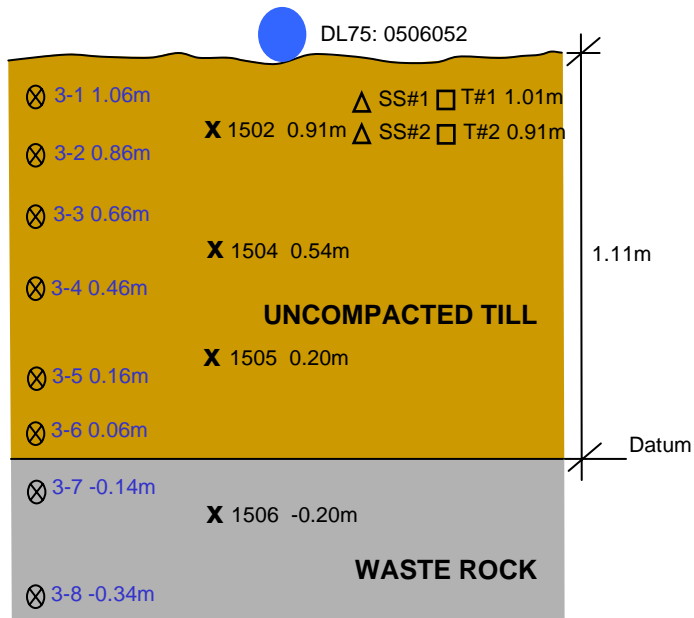
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Anvil Range Mining Complex

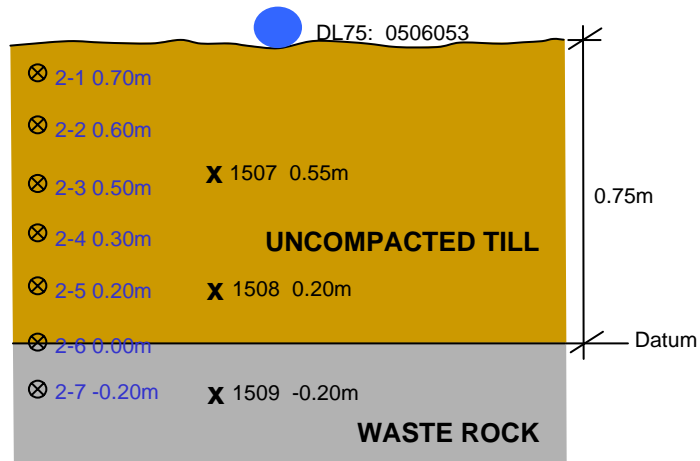
Date:
March 2006

Approved:
EMR

Figure: **6**



CT#2A



CT#2B

Legend:

- ⊗ #-#-#.#m EnviroSCAN Probe with bead s/n and depth
- X #-#-#.#m CS229 Thermal Conductivity Sensor bead s/n and depth
- T##-#.#m Satellite Station Temperature probe and depth
- △ SS##-#.#m Satellite Station Soil Moisture probe and depth
- DL75: # CR10X #2 Array # Seametrics Datalogger with Flowmeter and Tipping Bucket (Interflow)
- DL75: # Seametrics Datalogger with Flowmeter (Runoff)

Note:

- Depths measured from Datum
- Positive = up
- Negative = down



Monitor Mine Waste Rock Trial Covers
2005 Data Summary

**Schematic Instrument Profiles for
CT#2A and CT#2B**

Job No: 1CD003.071
Filename: Figures 4 to 8_20060322.ppt

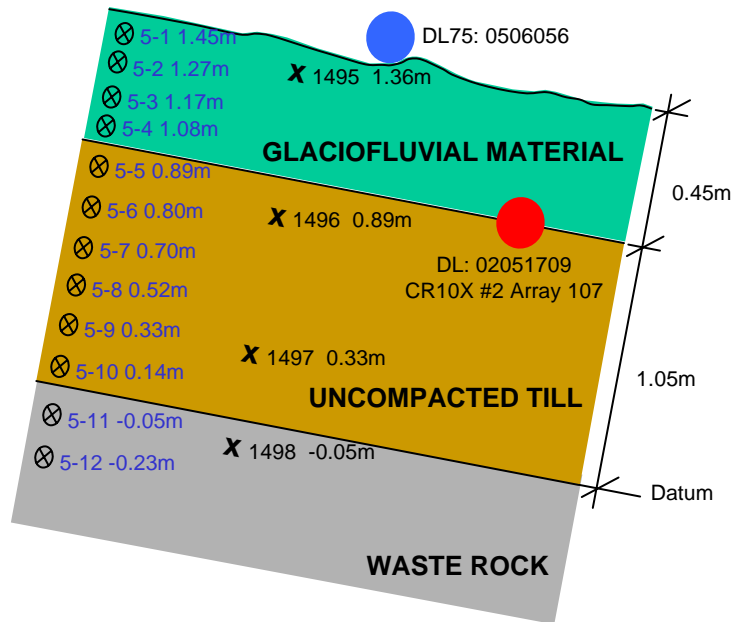
Anvil Range Mining Complex

Date:
March 2006

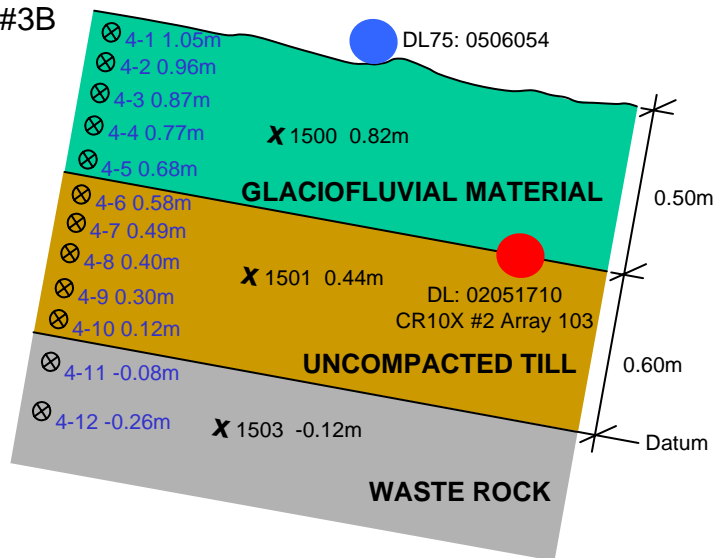
Approved:
EMR

Figure: **7**

CT#3A



CT#3B



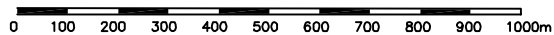
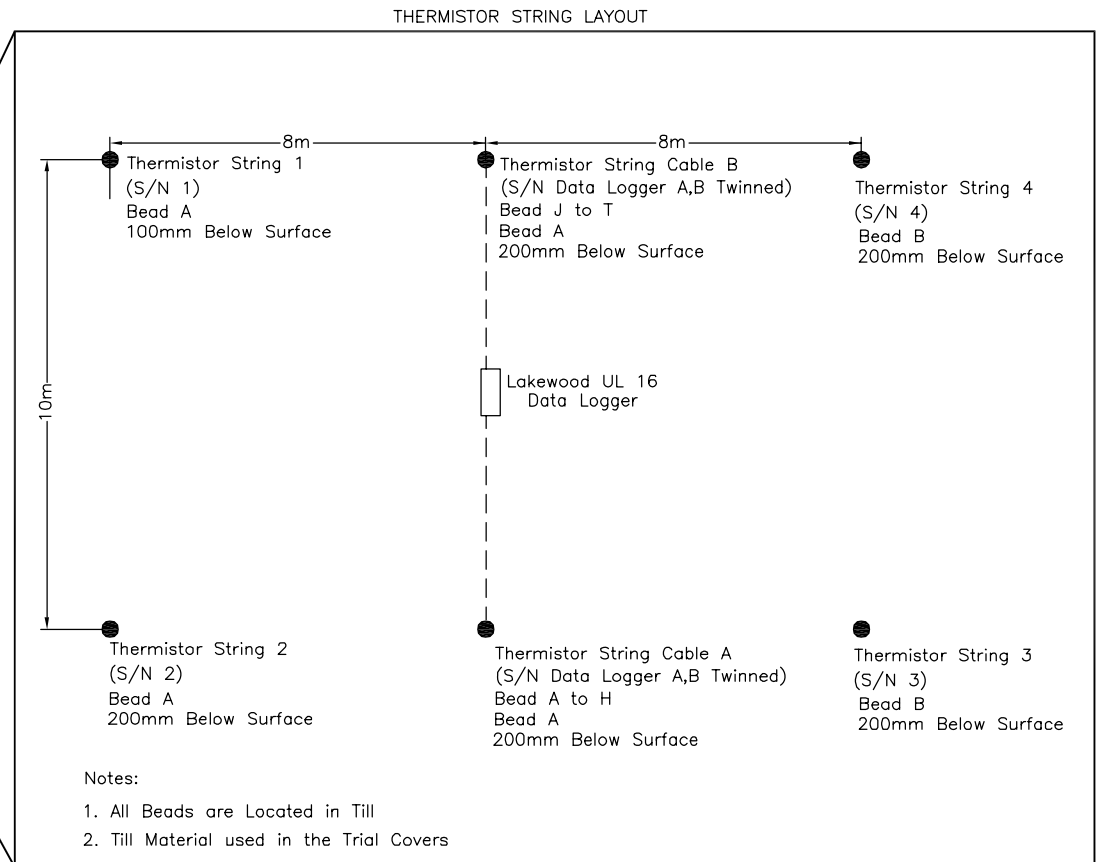
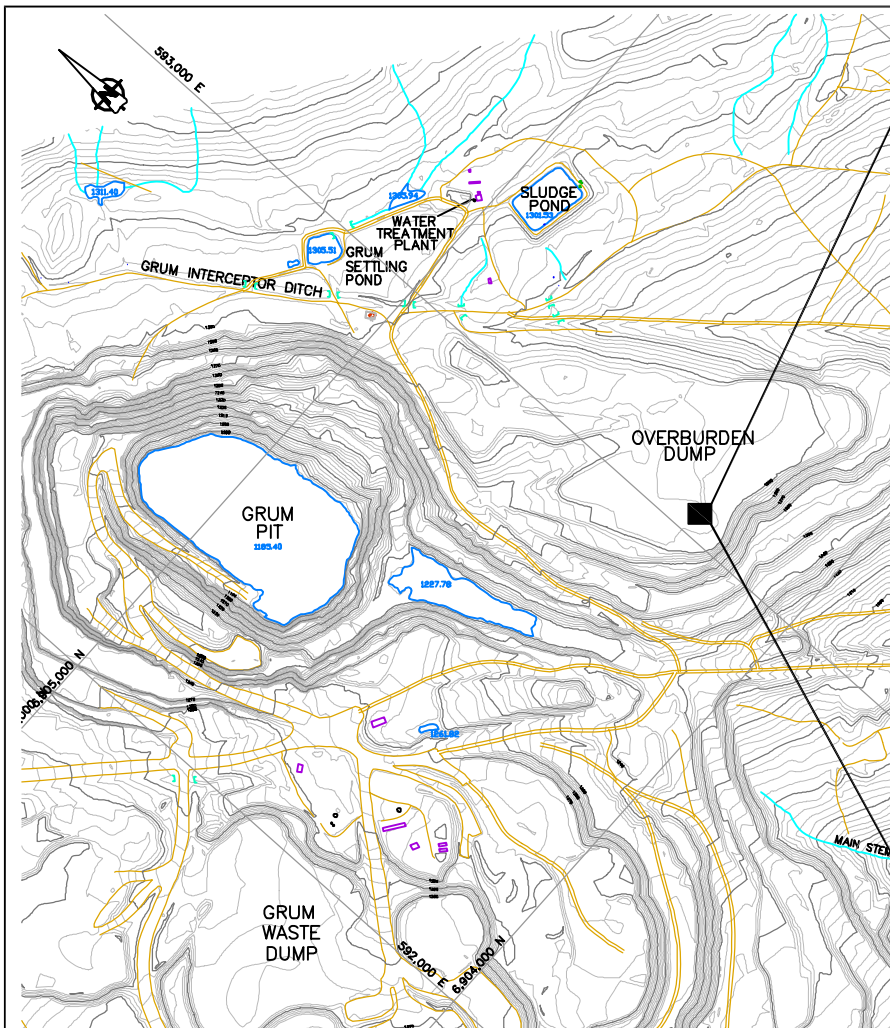
Legend:

- ⊗ #.#.#.#m EnviroSCAN Probe with bead s/n and depth
- X #.#.#.#m CS229 Thermal Conductivity Sensor bead s/n and depth
- T##.#.#.#m Satellite Station Temperature probe and depth
- △ SS##.#.#.#m Satellite Station Soil Moisture probe and depth
- DL75: # CR10X #2 Array # Seametrics Datalogger with Flowmeter and Tipping Bucket (Interflow)
- DL75: # Seametrics Datalogger with Flowmeter (Runoff)

Note:

- Depths measured from Datum
- Positive = up
- Negative = down

 SRK Consulting Engineers and Scientists VANCOUVER	 Deloitte & Touche	Monitor Mine Waste Rock Trial Covers 2005 Data Summary		
		Schematic Instrument Profiles for CT#3A and CT#3B		
Job No: 1CD003.071 Filename: Figures 4 to 8_20060322.ppt	Anvil Range Mining Complex	Date: March 2006	Approved: EMR	Figure: 8



THERMISTOR STRING PROFILES

Thermistor String 1 (S/N 1)		Thermistor String 2 (S/N 2)		Thermistor String 3 (S/N 3)		Thermistor String 4 (S/N 4)		Thermistor String Cable A (S/N Datalogger A,B Twinned)		Thermistor String Cable B (S/N Datalogger A,B Twinned)	
Bead	Depth (m)	Bead	Depth (m)	Bead	Depth (m)	Bead	Depth (m)	Bead	Depth (m)	Bead	Depth (m)
A	0.1	A	0.2	A	-0.65	A	0.2	A	0.2	J	0.2
B	0.6	B	0.7	B	-0.15	B	0.7	B	0.7	K	0.7
C	1.1	C	1.2	C	0.35	C	1.2	C	1.2	L	1.2
D	2.1	D	2.2	D	1.35	D	2.2	D	2.2	N	2.2
E	3.1	E	3.2	E	2.35	E	3.2	E	3.2	P	3.2
F	4.1	F	4.2	F	3.35	F	4.2	F	4.2	R	4.2
G	5.1	G	5.2	G	4.35	G	5.2	G	5.2	S	5.2
H	6.1	H	6.2	H	5.35	H	6.2	H	6.2	T	6.2

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Deloitte & Touche

Anvil Range Mining Complex

Monitor Mine Waste Rock Trial Covers
2005 Data Summary

Location Plan and Schematic
Thermistor Layout on
Grum Overburden Dump

DATE: Mar. 2006	APPROVED: EMR	FIGURE: 9
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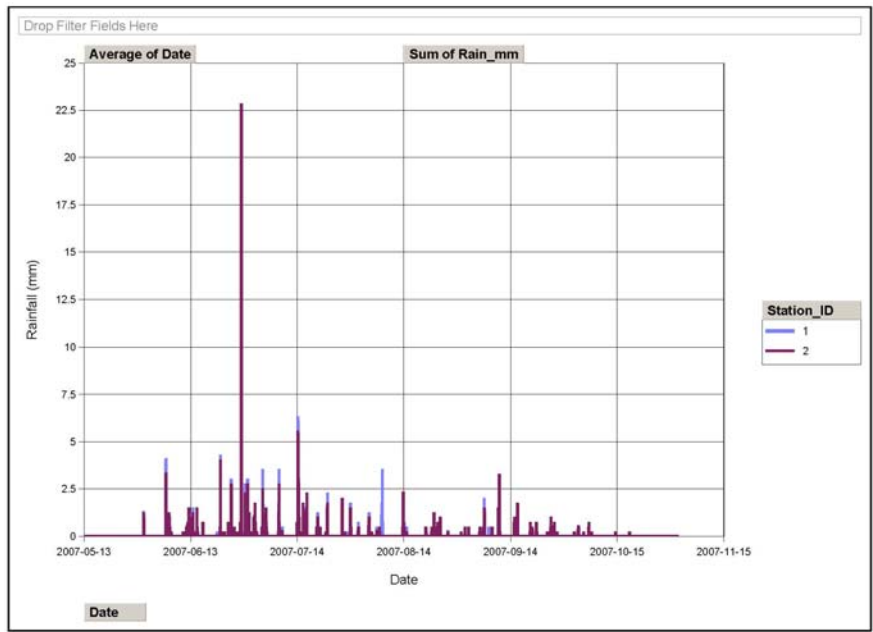


Figure 10: Total hourly rainfall on CT#1 & CT#2A, 2B recorded by the Davis Instruments Vantage Pro Weather Stations.

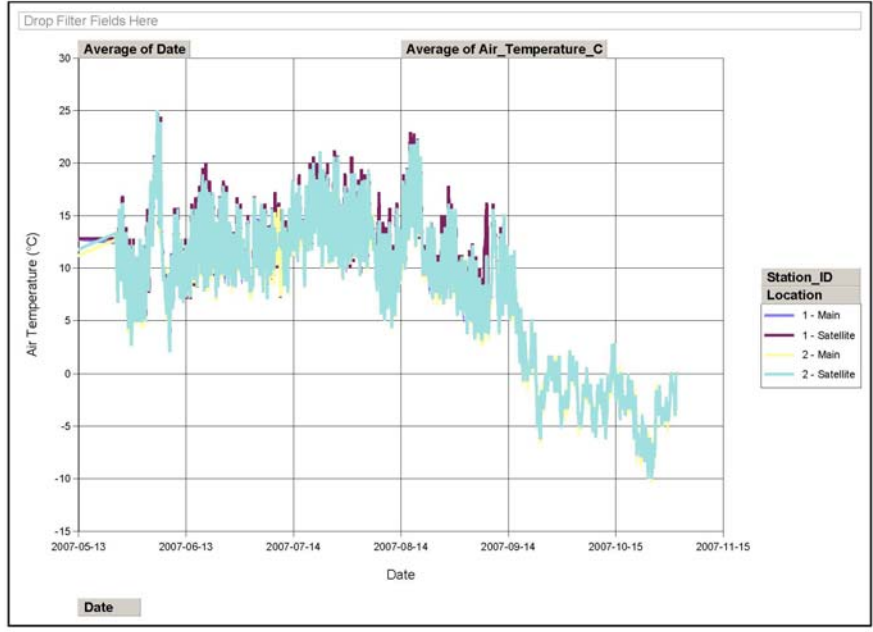


Figure 11: Mean hourly air temperature on CT#1 & CT#2A, 2B recorded by the Davis Instruments Vantage Pro Weather Stations and Satellite Stations.

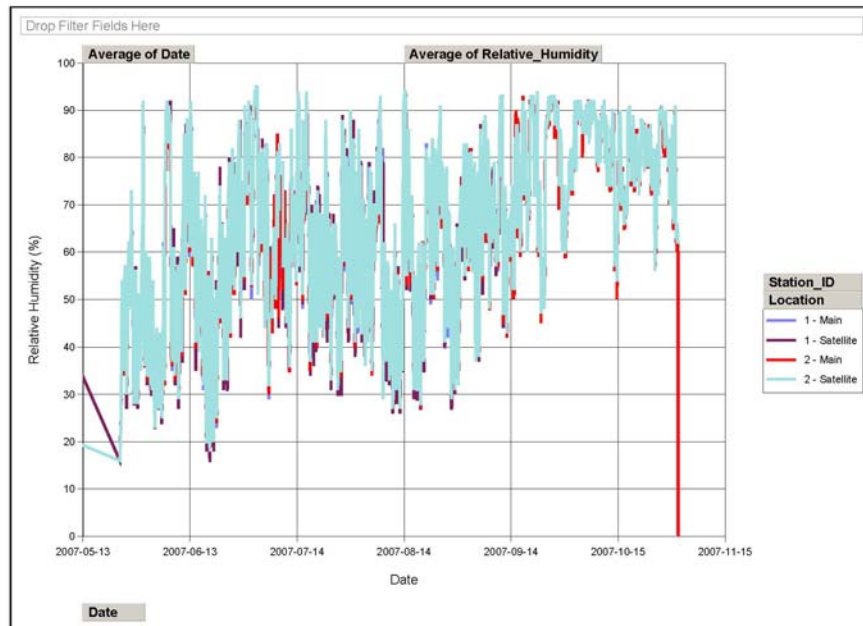


Figure 12: Mean hourly relative humidity on CT#1 & CT#2A, 2B recorded by the Davis Instruments Vantage Pro Weather Stations and Satellite Stations.

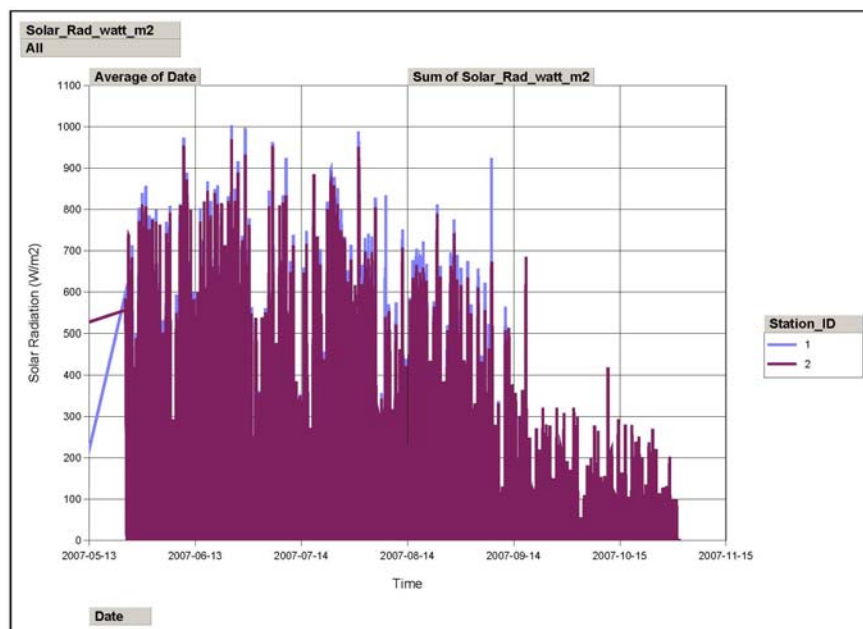


Figure 13: Mean hourly solar radiation on CT#1 & CT2A, 2B recorded by the Davis Instruments Vantage Pro Weather Stations.

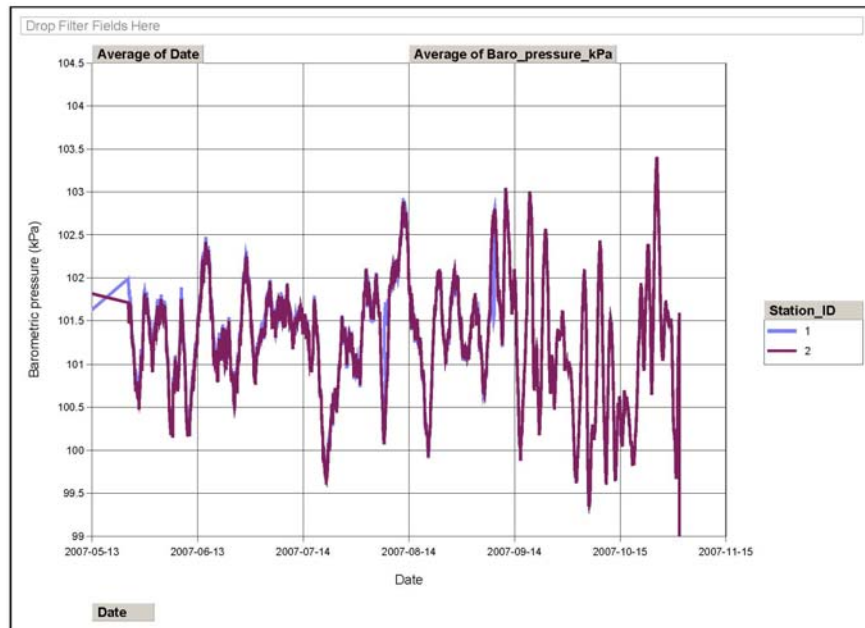


Figure 14: Mean hourly barometric pressure on CT#1 & CT#2A, 2B recorded by the Davis Instruments Vantage Pro Weather Stations.

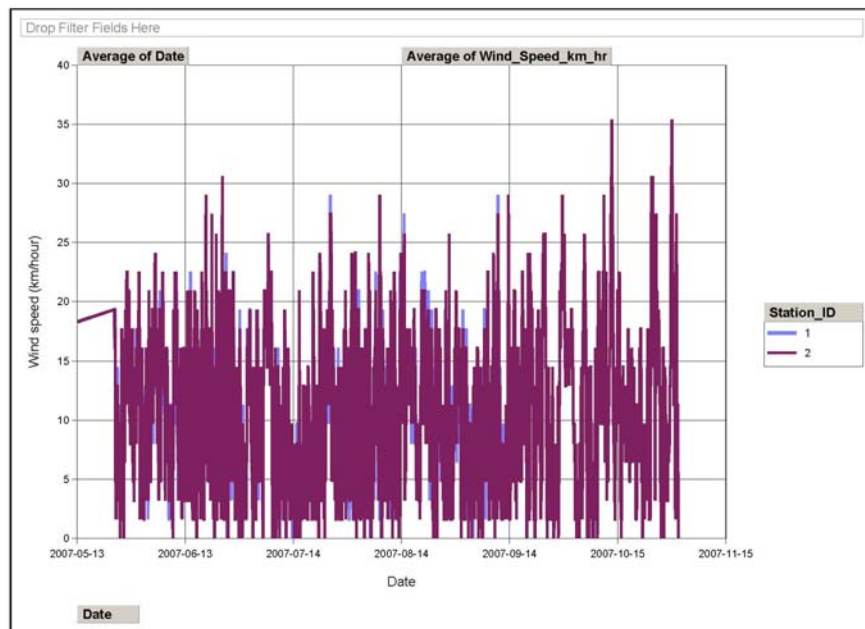


Figure 15: Mean hourly wind speed on CT#1 & CT#2A, 2B recorded by the Davis Instruments Vantage Pro Weather Stations.

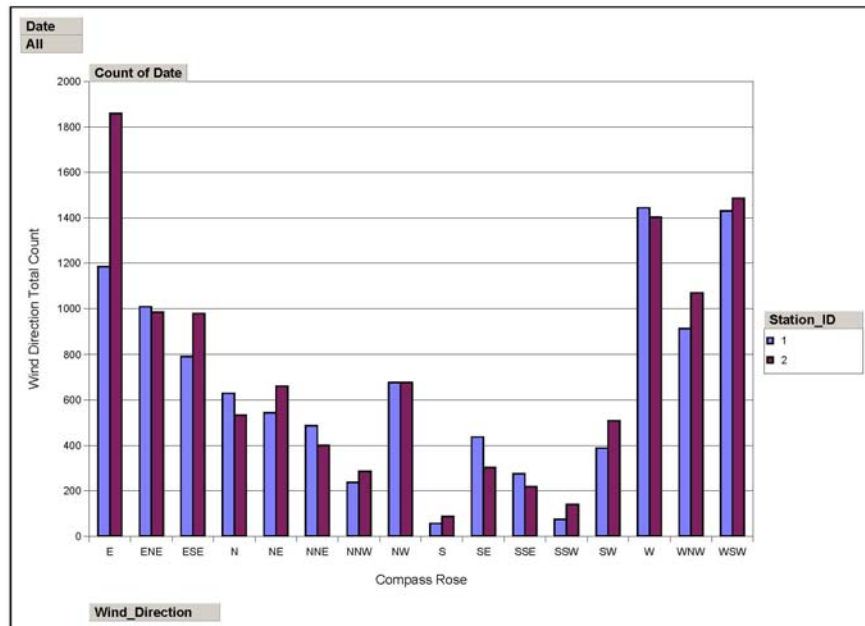


Figure 16: Wind direction totals (measured hourly) on CT#1 & CT#2A, 2B recorded by the Davis Instruments Vantage Pro Weather Stations.

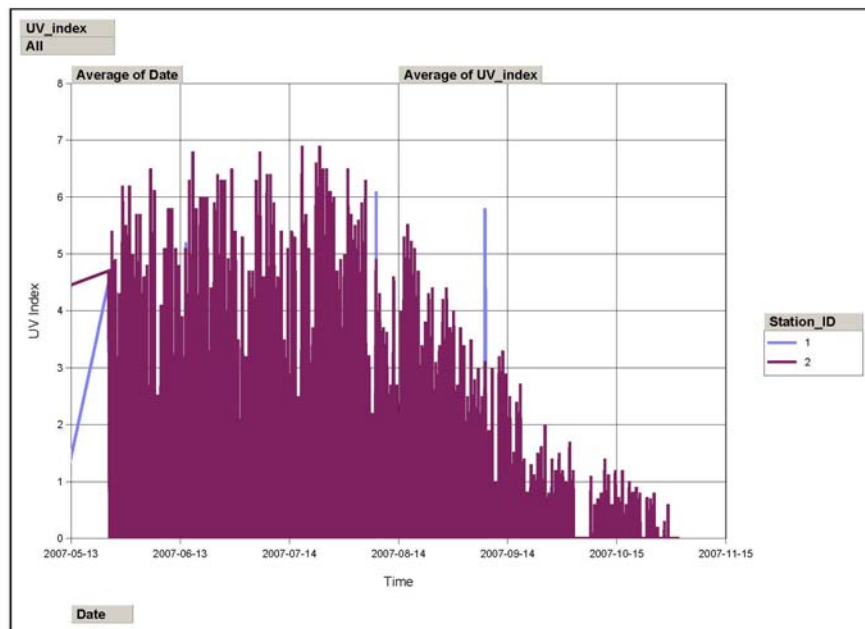


Figure 17: Mean hourly UV Index on CT#1 & CT#2A, 2B recorded by the Davis Instruments Vantage Pro Weather Stations.

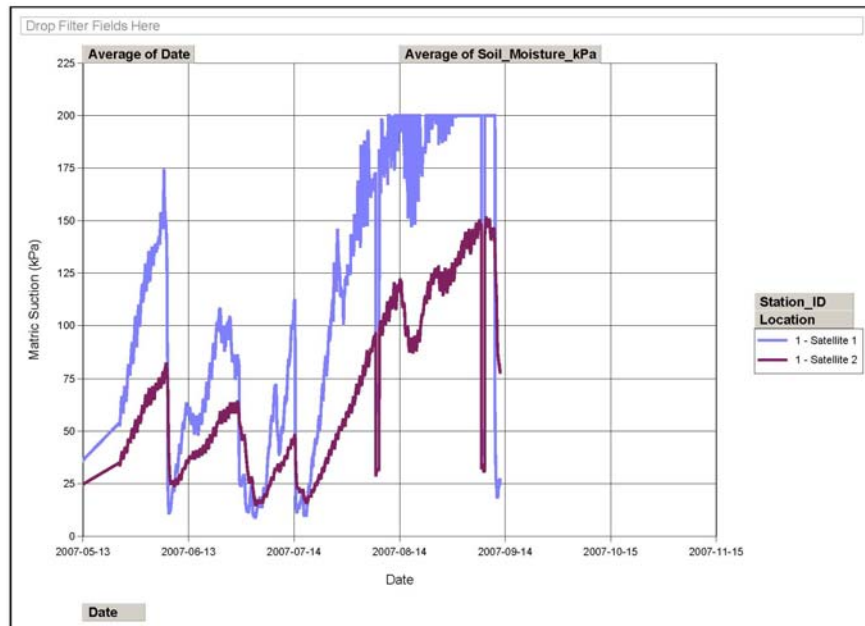


Figure 18: Mean hourly Matric Suction in CT#1 recorded by the Davis Instruments Vantage Pro Satellite Station.

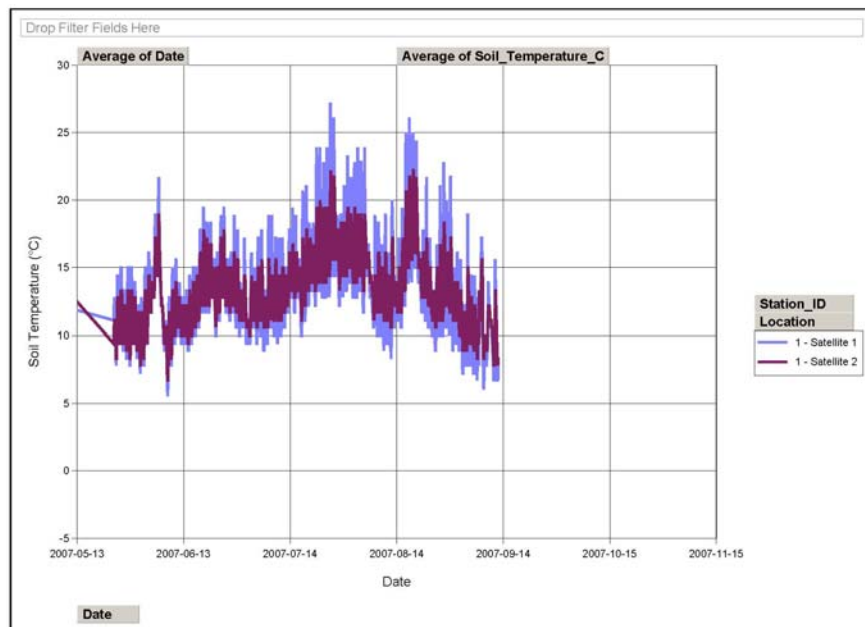


Figure 19: Mean hourly soil temperature in CT#1 recorded by the Davis Instruments Vantage Pro Satellite Station.

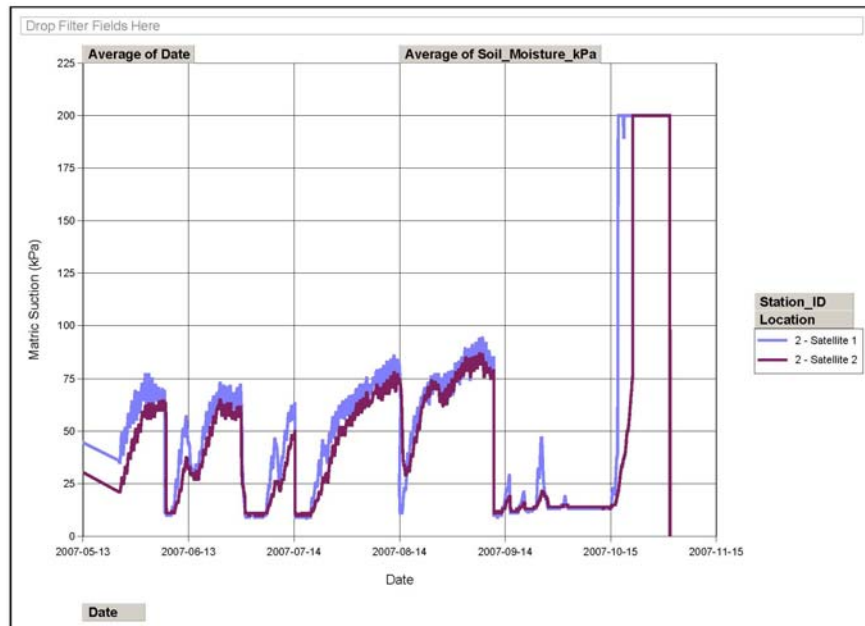


Figure 20: Mean hourly Matric Suction in CT#2A recorded by the Davis Instruments Vantage Pro Satellite Station.

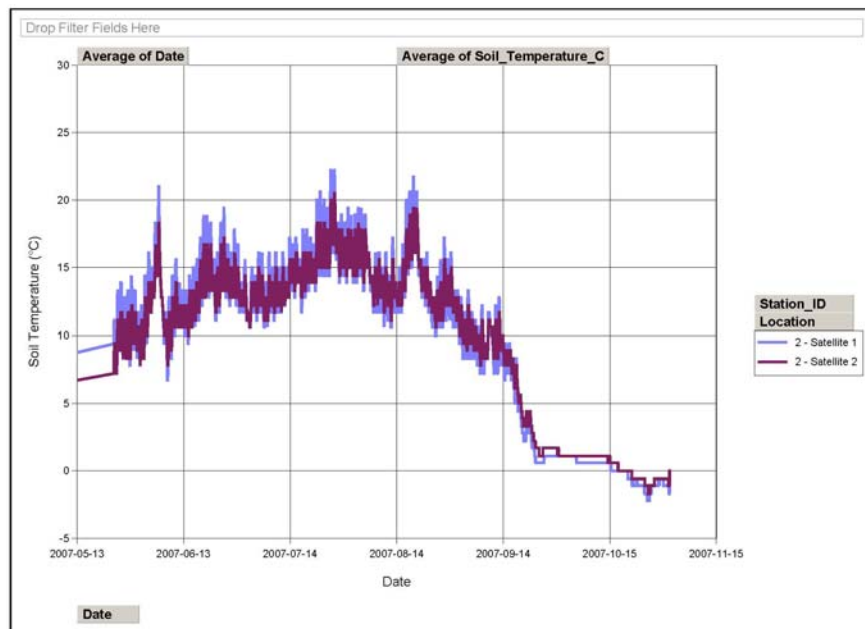


Figure 21: Mean hourly soil temperature in CT#2A recorded by the Davis Instruments Vantage Pro Satellite Station.

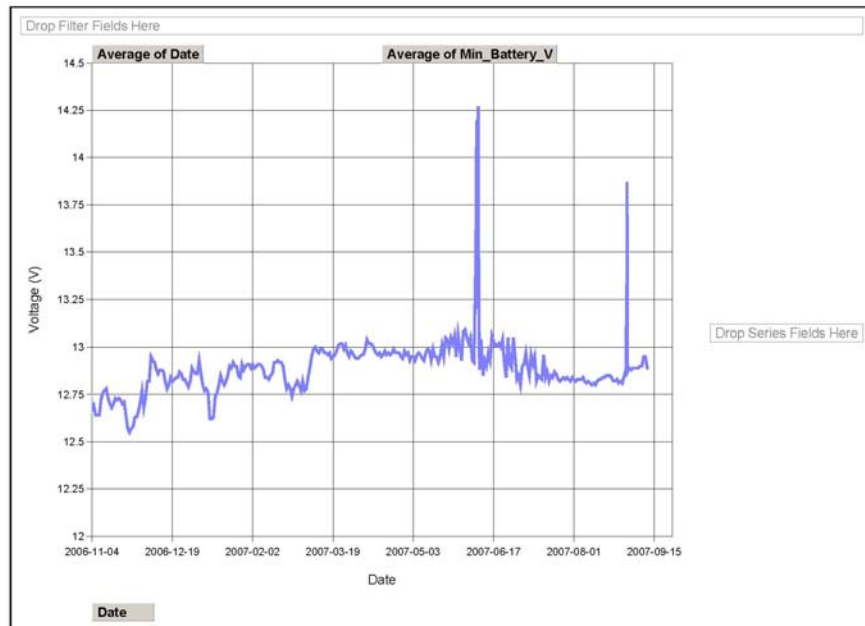


Figure 22: Daily battery voltage of the Campbell Scientific CR10X #1 Data Logger (Array 102).

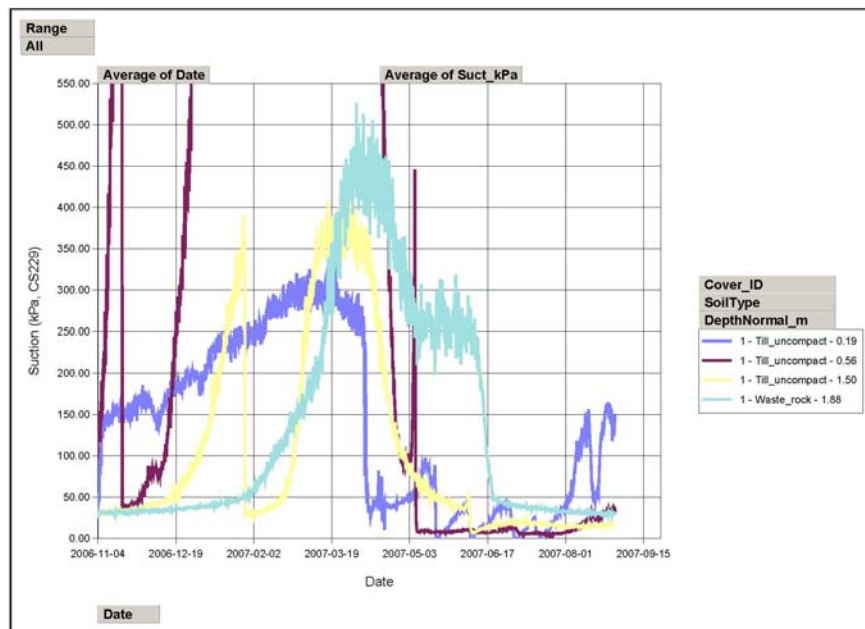


Figure 23: Soil matric suction measurements (taken every six hours) in CT#1 recorded by CS229 sensors connected to Campbell Scientific Data logger CR10X #2 (Array 168).

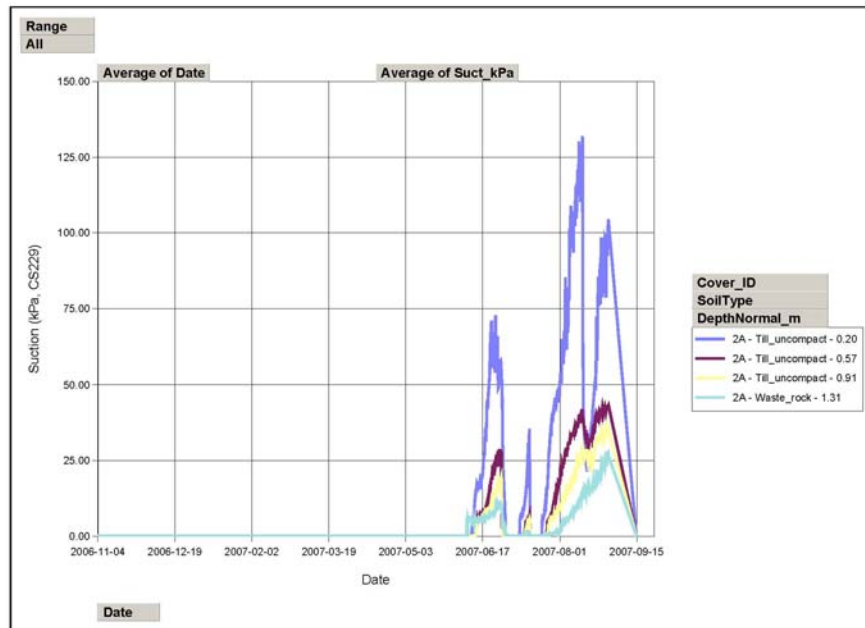


Figure 24: Soil matric suction measurements (taken every six hours) in CT#2A recorded by CS229 sensors connected to Campbell Scientific Data logger CR10X #1 (Array 130).

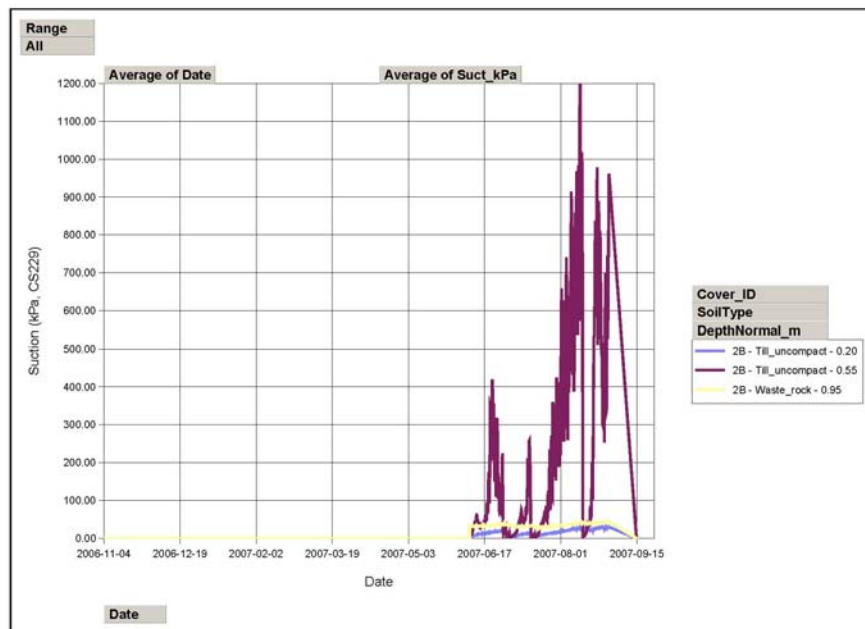


Figure 25: Soil matric suction measurements (taken daily) in CT#2B recorded by CS229 sensors connected to Campbell Scientific Data logger CR10X #1 (Array 130).

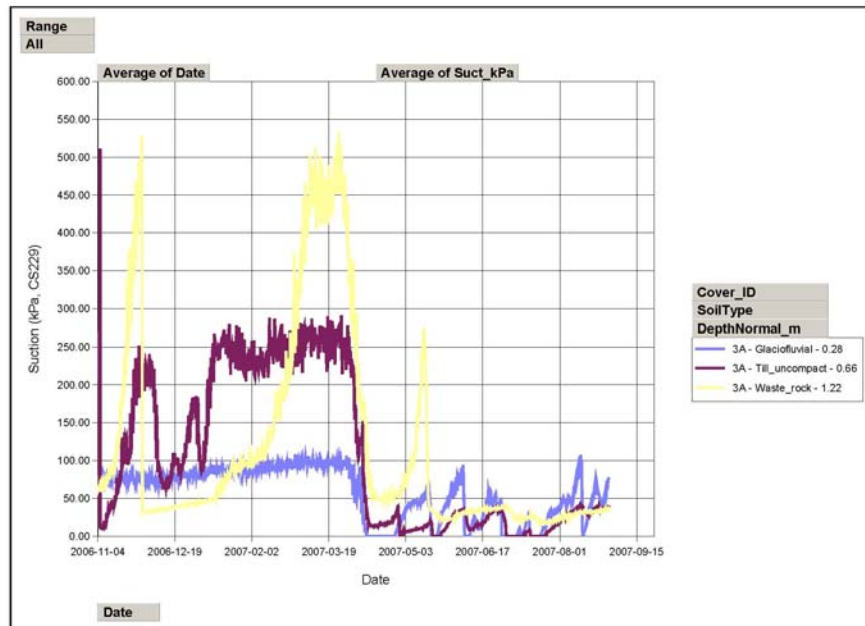


Figure 26: Soil matric suction measurements (taken every six hours) in CT#3A recorded by CS229 sensors connected to Campbell Scientific Data logger CR10X #2 (Array 168).

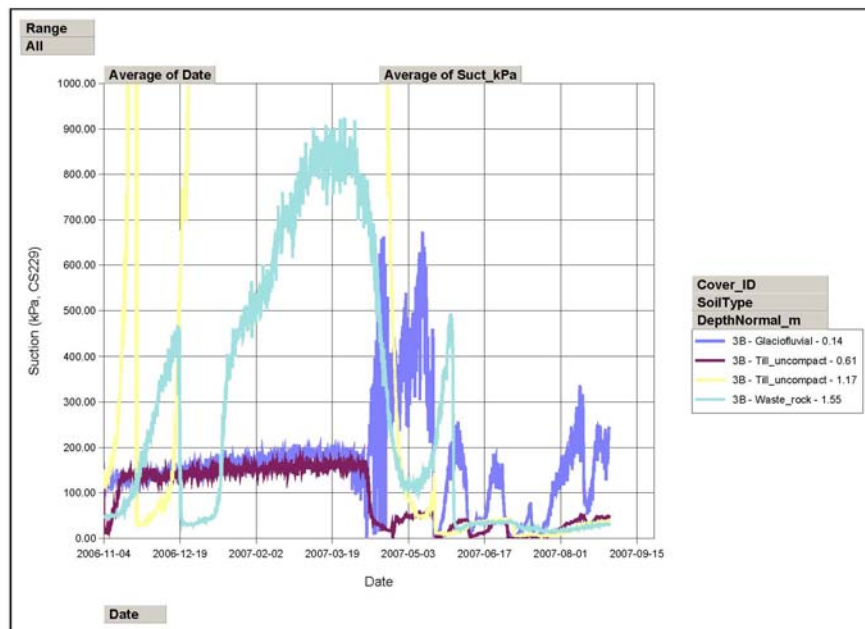


Figure 27: Soil matric suction measurements (taken every six hours) in CT#3B recorded by CS229 sensors connected to Campbell Scientific Data logger CR10X #2 (Array 168).

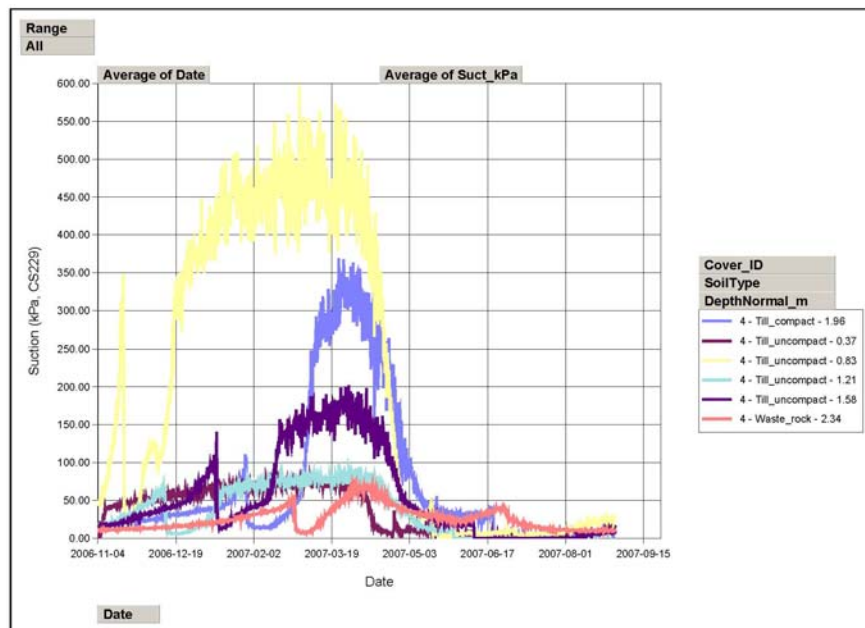


Figure 28: Soil matric suction measurements (taken every six hours) in CT#4 recorded by CS229 sensors connected to Campbell Scientific Data logger CR10X #2 (Array 168).

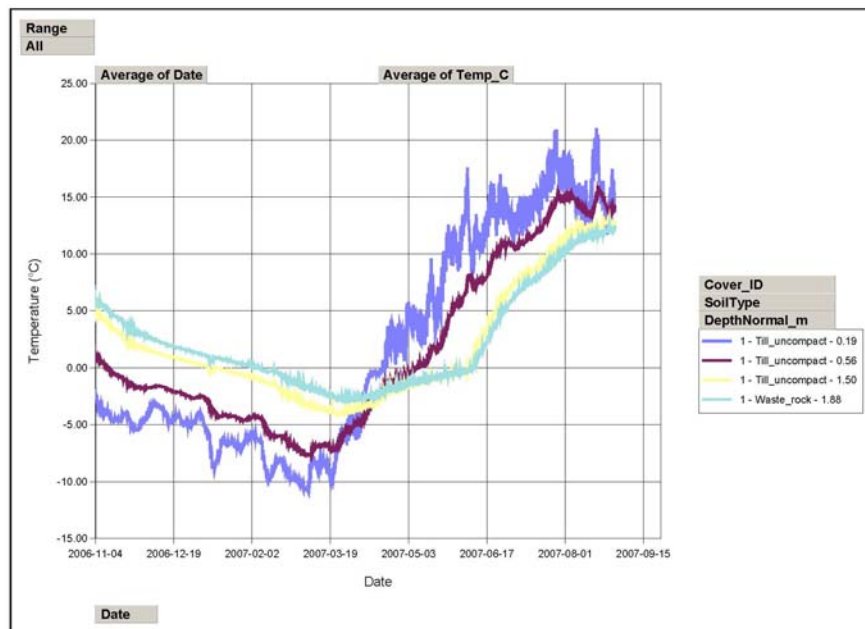


Figure 29: Soil temperature measurements (taken every six hours) in CT#1 recorded by CS229 sensors connected to Campbell Scientific Data logger CR10X #2 (Array 168).

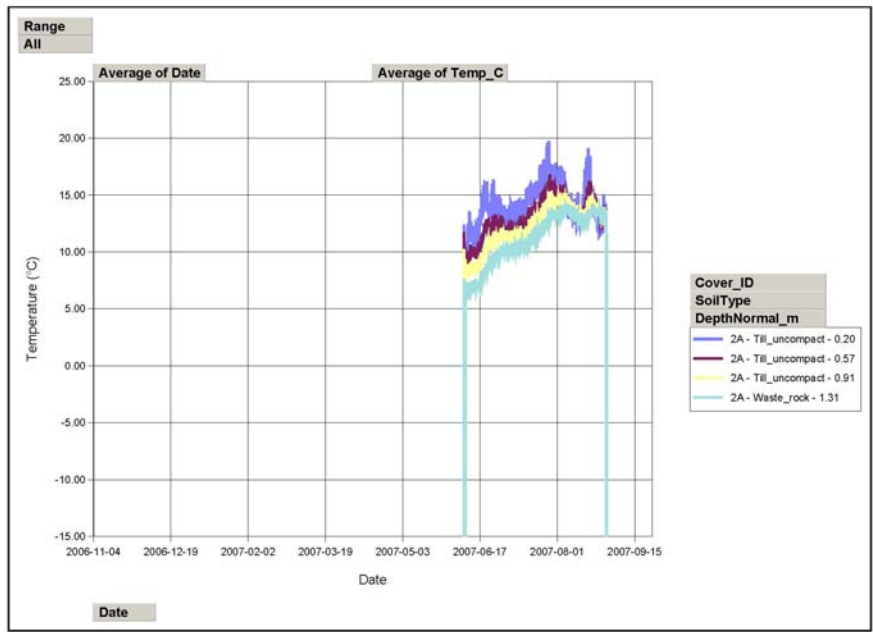


Figure 30: Soil temperature measurements (taken every six hours) in CT#2A recorded by CS229 sensors connected to Campbell Scientific Data logger CR10X #1 (Array 130).

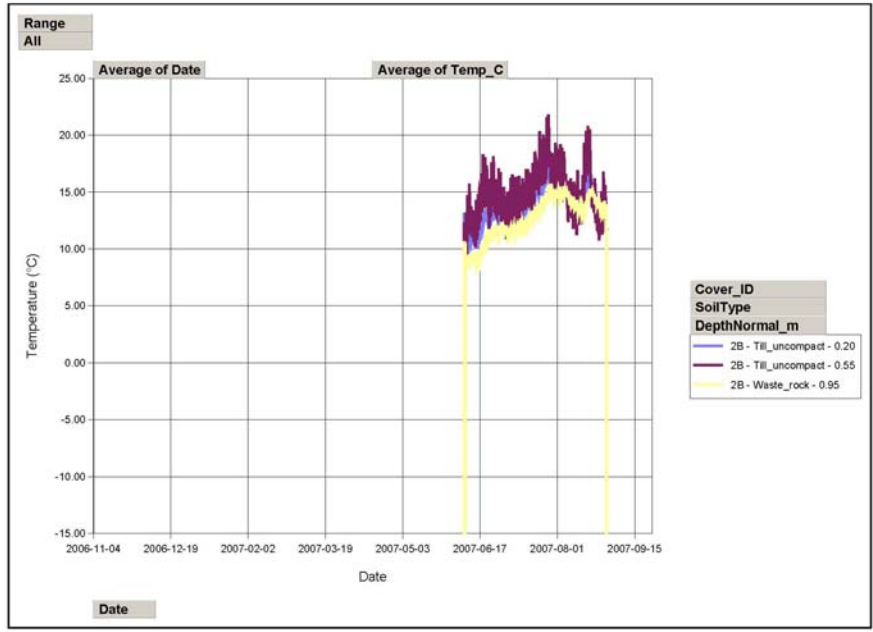


Figure 31: Soil temperature measurements (taken every six hours) in CT#2B recorded by CS229 sensors connected to Campbell Scientific Data logger CR10X #1 (Array 130).

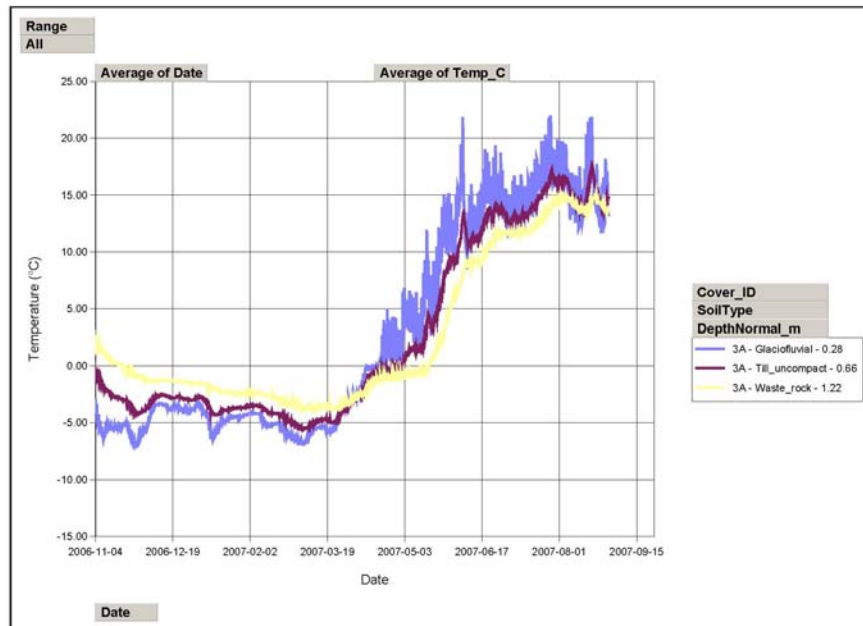


Figure 32: Soil temperature measurements (taken every six hours) in CT#3A recorded by CS229 sensors connected to Campbell Scientific Data logger CR10X #2 (Array 168).

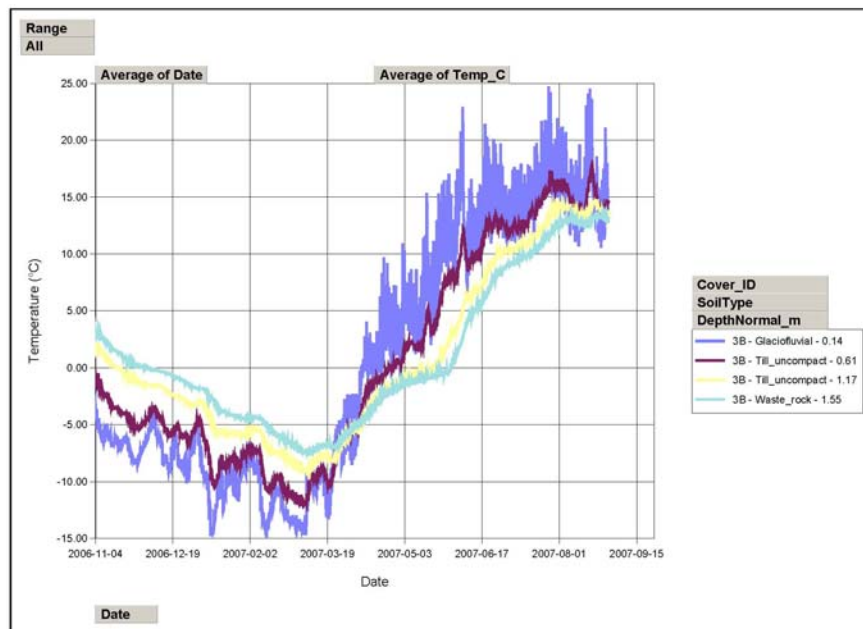


Figure 33: Soil temperature measurements (taken every six hours) in CT#3B recorded by CS229 sensors connected to Campbell Scientific Data logger CR10X #2 (Array 168).

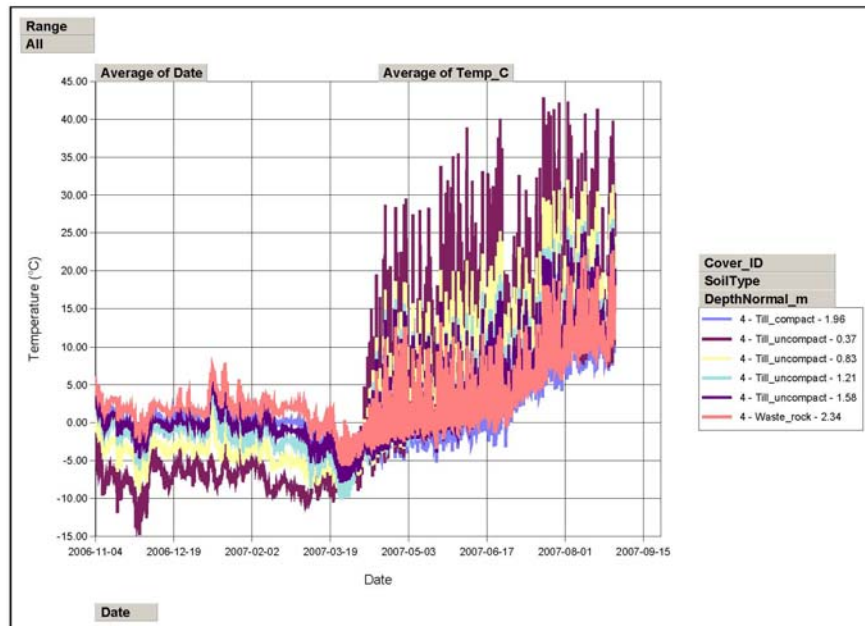


Figure 34: Soil temperature measurements (taken every six hours) in CT#4 recorded by CS229 sensors connected to Campbell Scientific Data logger CR10X #2 (Array 168).

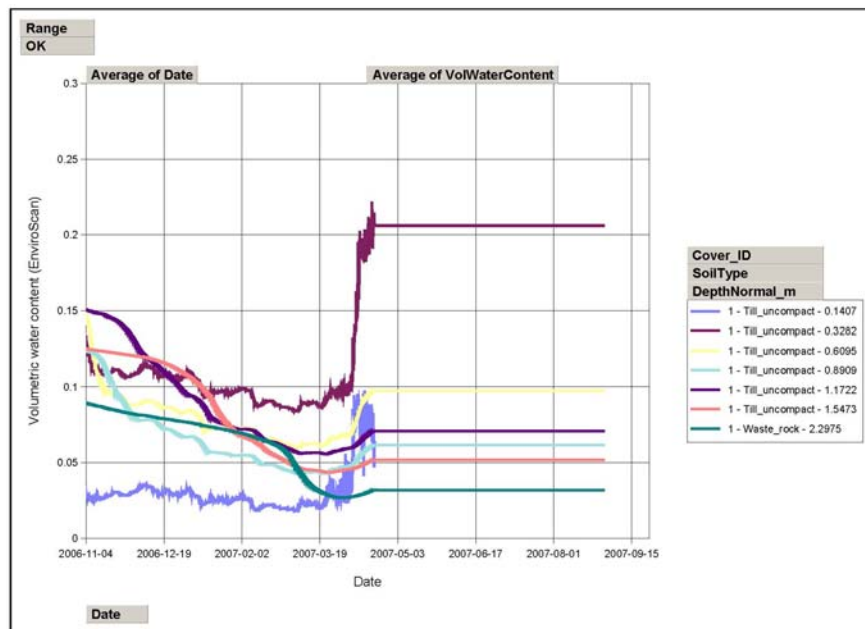


Figure 35: Volumetric moisture content measurements (taken every six hours) in CT#1 recorded by EnviroSCAN sensors connected to Campbell Scientific Data logger CR10X #2 (Array 168).

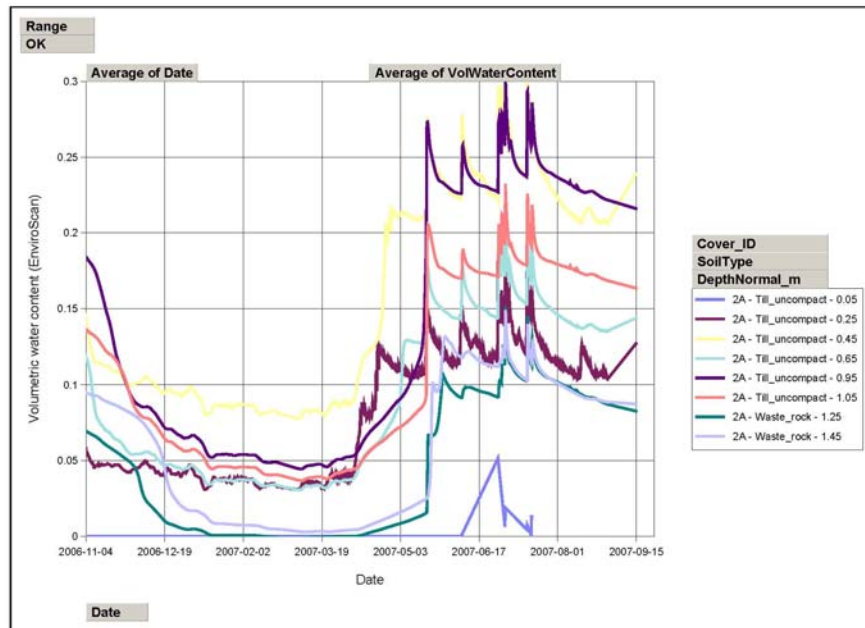


Figure 36: Volumetric moisture content measurements (taken every six hours) in CT#2A recorded by EnviroSCAN sensors connected to Campbell Scientific Data logger CR10X #1 (Array 130).

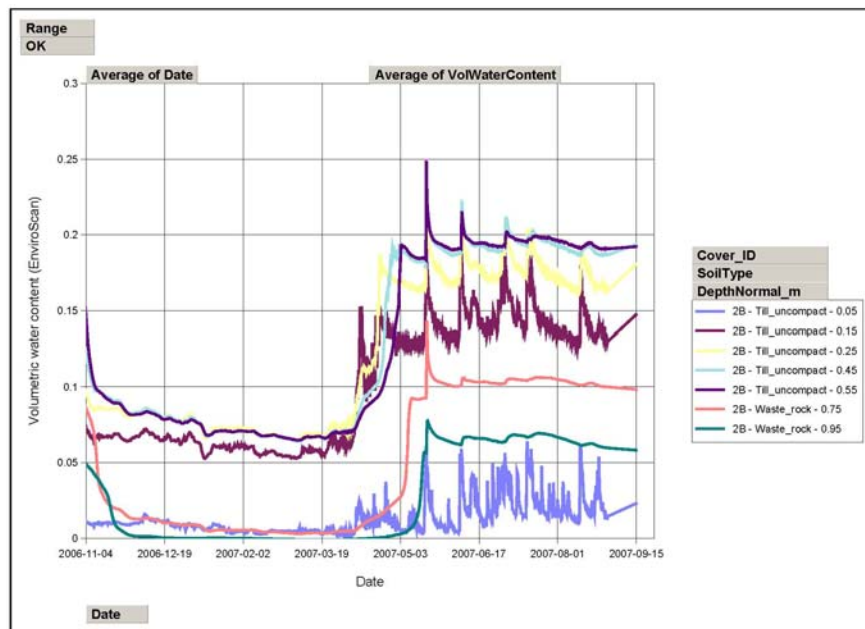


Figure 37: Volumetric moisture content measurements (taken every six hours) in CT#2B recorded by EnviroSCAN sensors connected to Campbell Scientific Data logger CR10X #1 (Array 130).

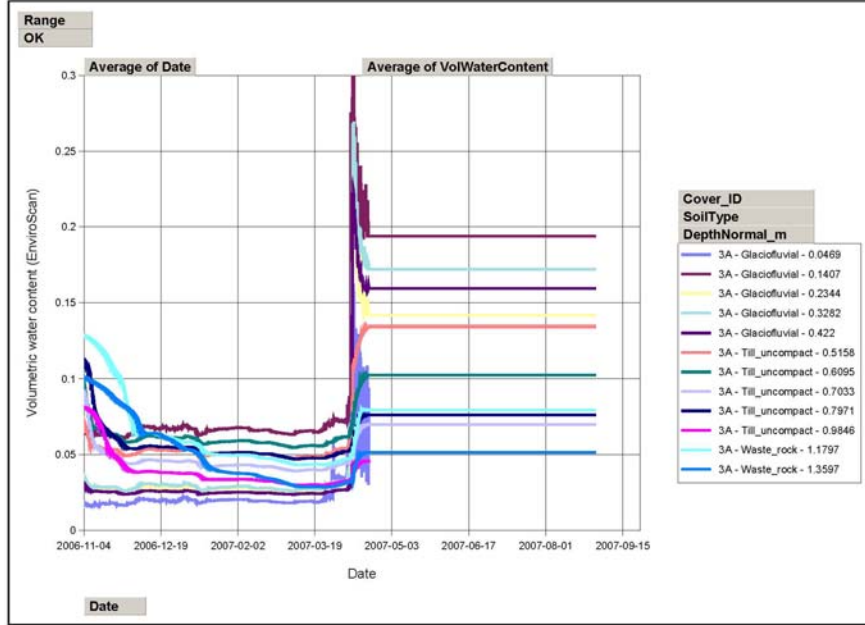


Figure 38: Volumetric moisture content measurements (taken every six hours) in CT#3A recorded by EnviroSCAN sensors connected to Campbell Scientific Data logger CR10X #2 (Array 168).

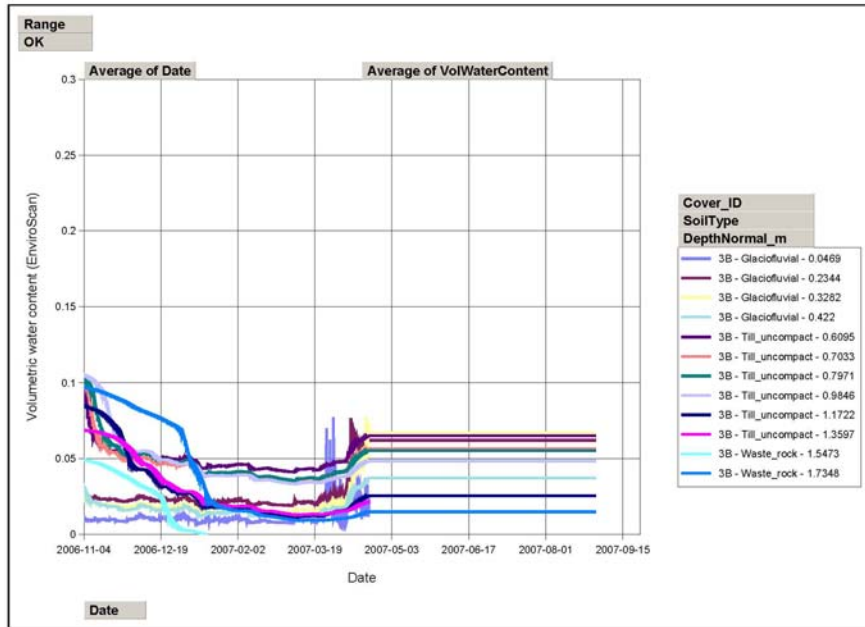


Figure 39: Volumetric moisture content measurements (taken every six hours) in CT#3B recorded by EnviroSCAN sensors connected to Campbell Scientific Data logger CR10X #2 (Array 168).

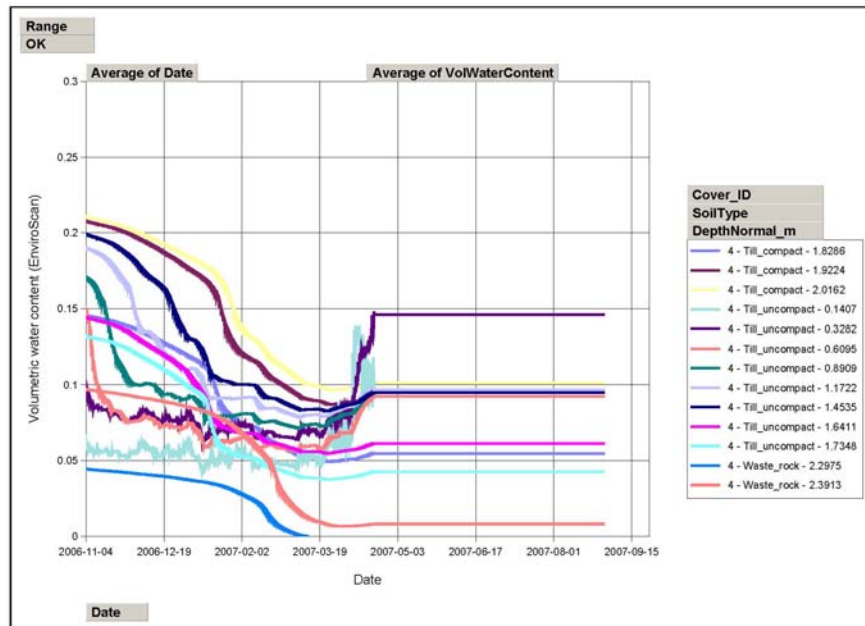


Figure 40: Volumetric moisture content measurements (taken every six hours) in CT#4 recorded by EnviroSCAN sensors connected to Campbell Scientific Data logger CR10X #2 (Array 168).

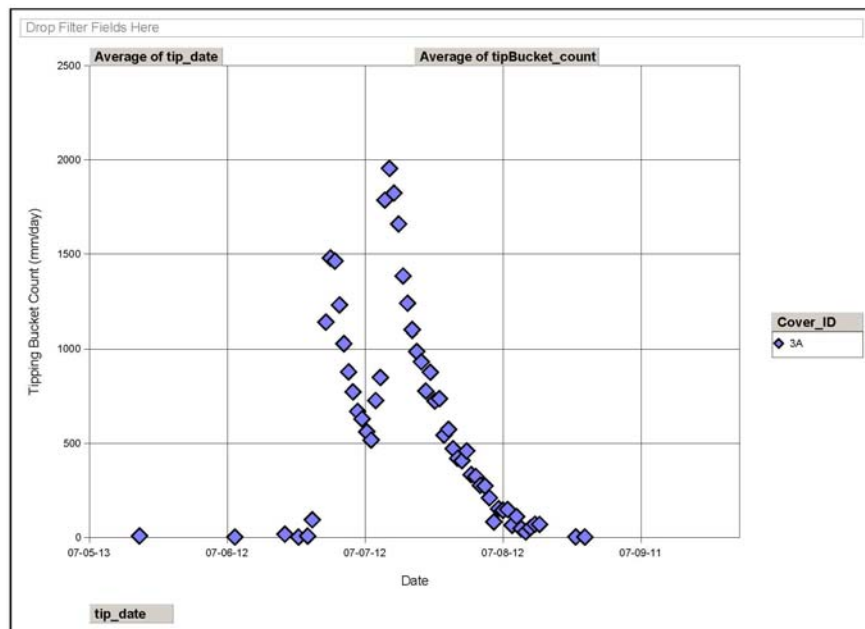


Figure 41: Interflow totals in CT#3A measured by a tipping bucket connected to Campbell Scientific Data logger CR10X #2 (Array 103).

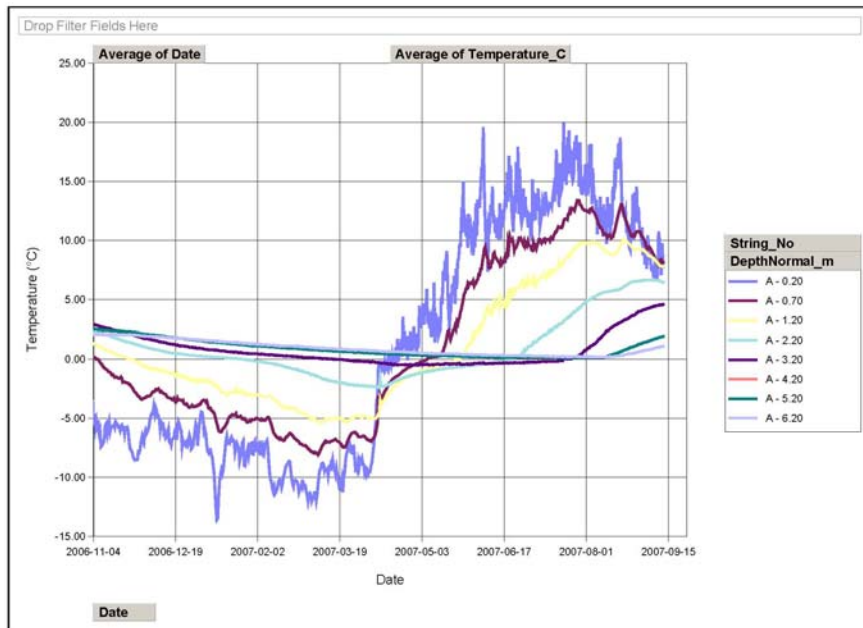


Figure 44: Soil temperature (measured every twelve hours) in Grum Overburden Dump by an M-squared thermistor string connected to a Lakewood Systems UL16 Data logger (Thermistor String A). Raw data displayed.

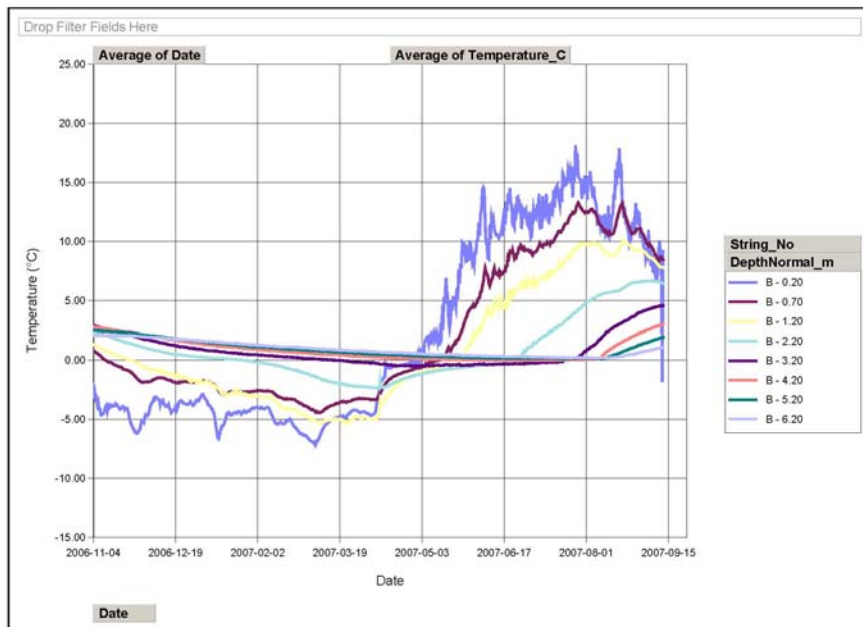


Figure 45: Soil temperature (measured every twelve hours) in Grum Overburden Dump by an M-squared thermistor string connected to a Lakewood Systems UL16 Data logger (Thermistor String B). Raw data displayed.

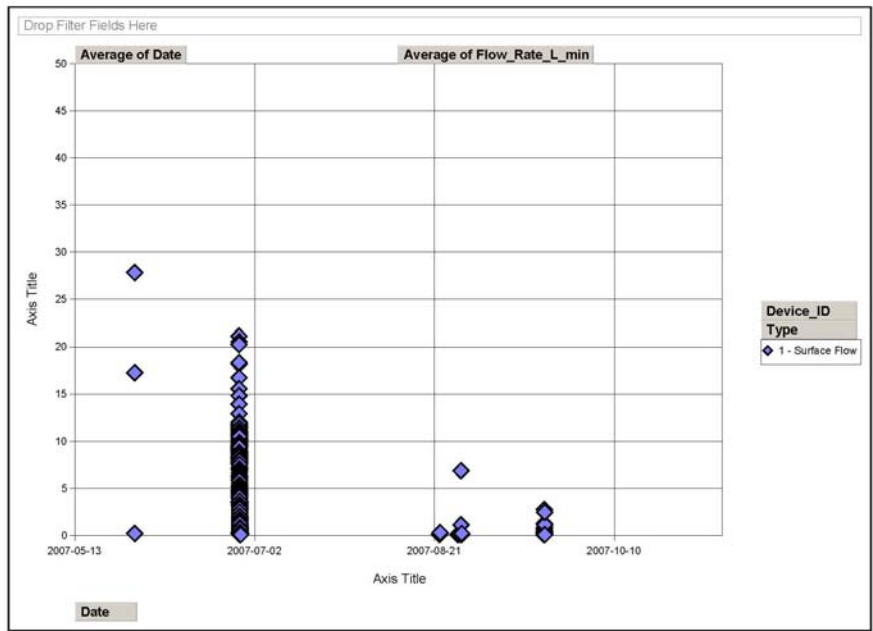


Figure 46: Surface runoff (measured every minute) on CT#1 by a Seametrics flowmeter connected to a Seametrics DL75 Data logger (File 0506051).

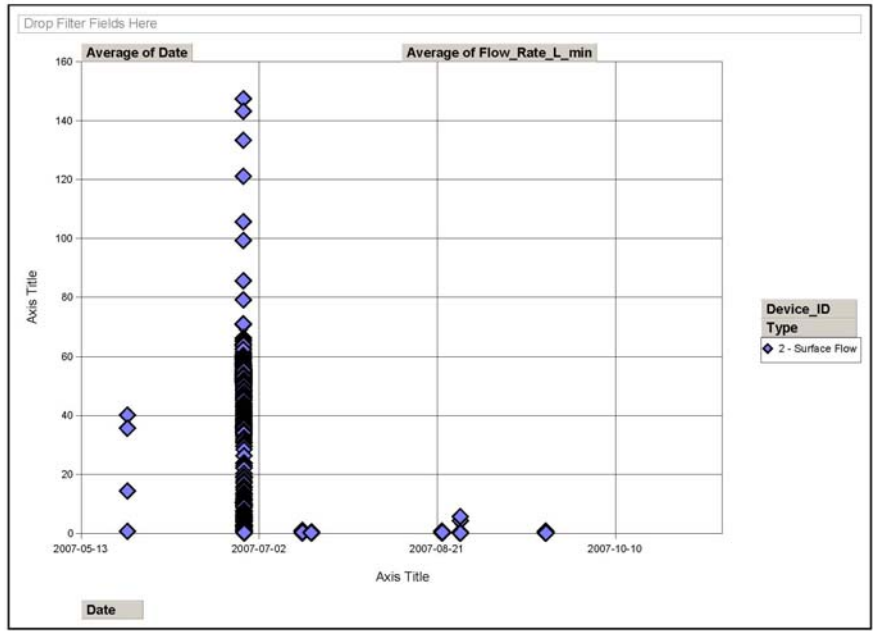


Figure 47: Surface runoff (measured every minute) on CT#2A by a Seametrics flowmeter connected to a Seametrics DL75 Data logger (File 0506052).

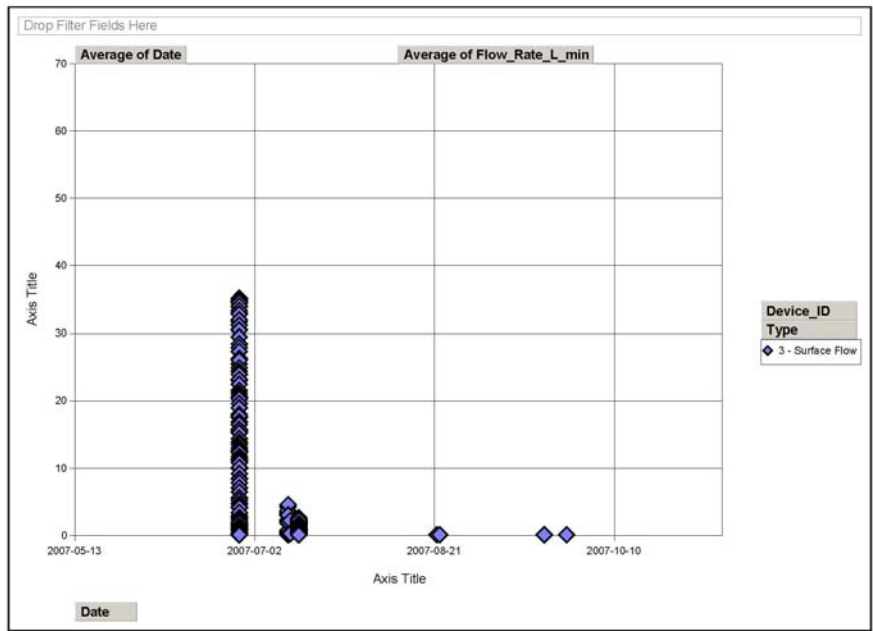


Figure 48: Surface runoff (measured every minute) on CT#2B by a Seametrics flowmeter connected to a Seametrics DL75 Data logger (File 0506053).

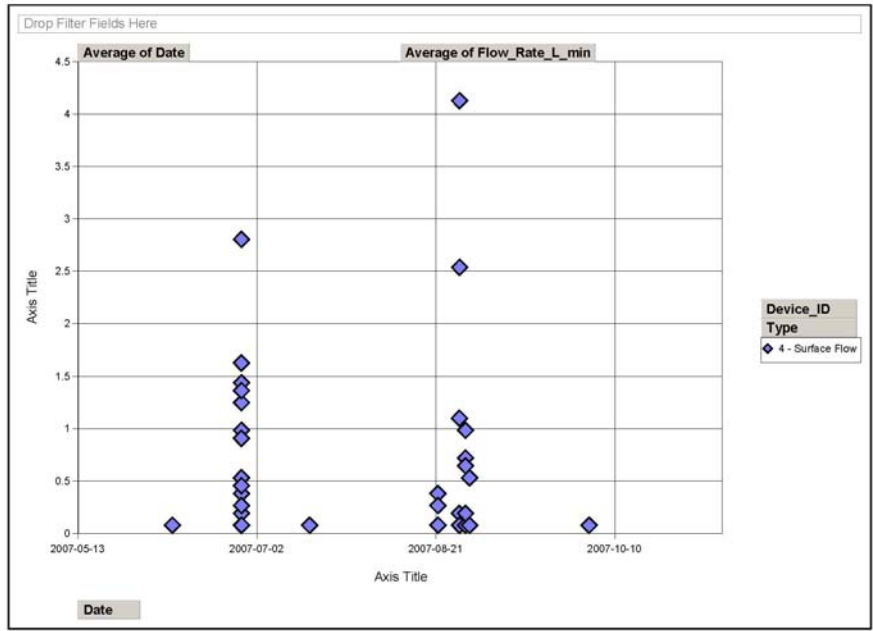


Figure 49: Surface runoff (measured every minute) on CT#3A by a Seametrics flowmeter connected to a Seametrics DL75 Data logger (File 0506054).

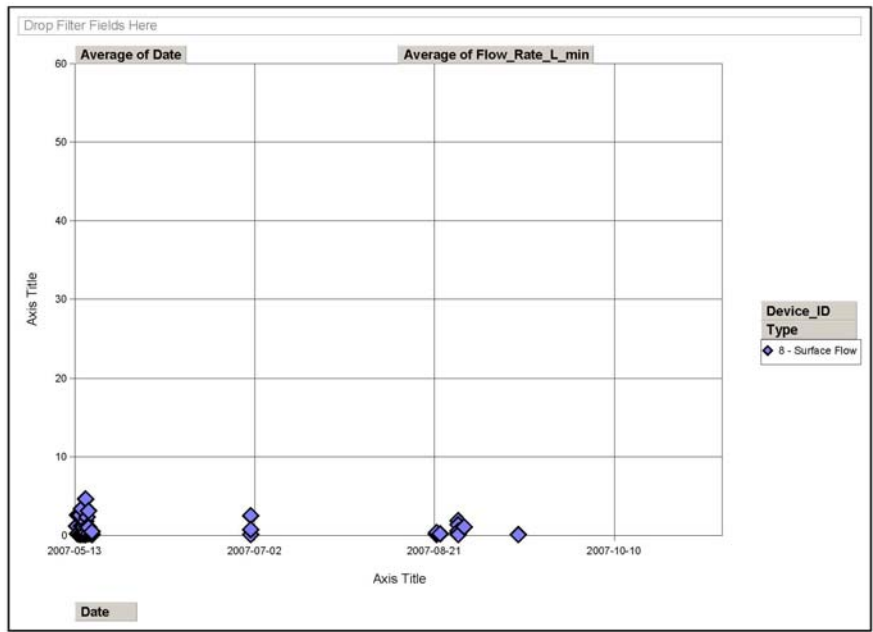


Figure 50: Surface runoff (measured every minute) on CT#4 by a Seametrics flowmeter connected to a Seametrics DL75 Data logger (File 0506058).

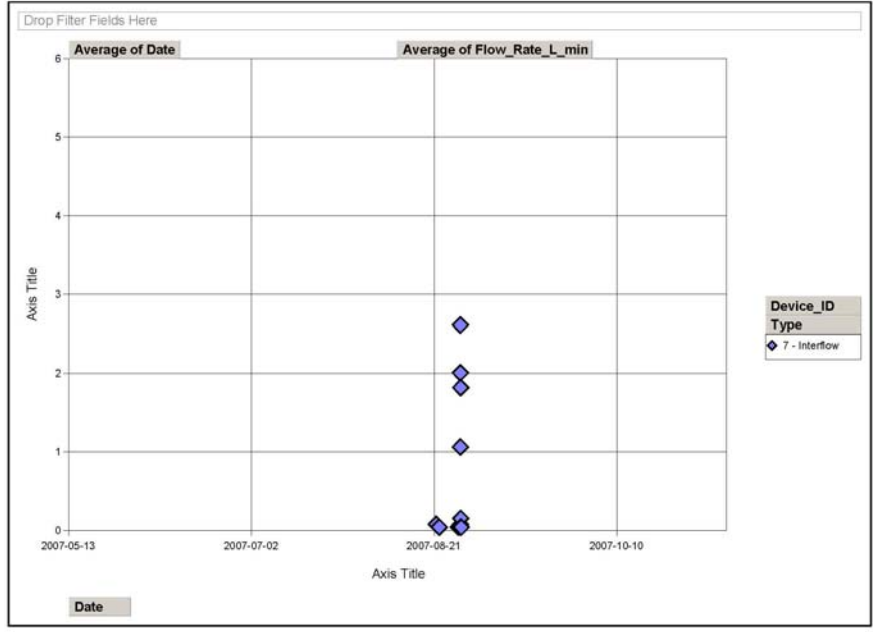


Figure 51: Interflow (measured every minute) in CT#3B by a Seametrics flowmeter connected to a Seametrics DL75 Data logger (File 0506057).

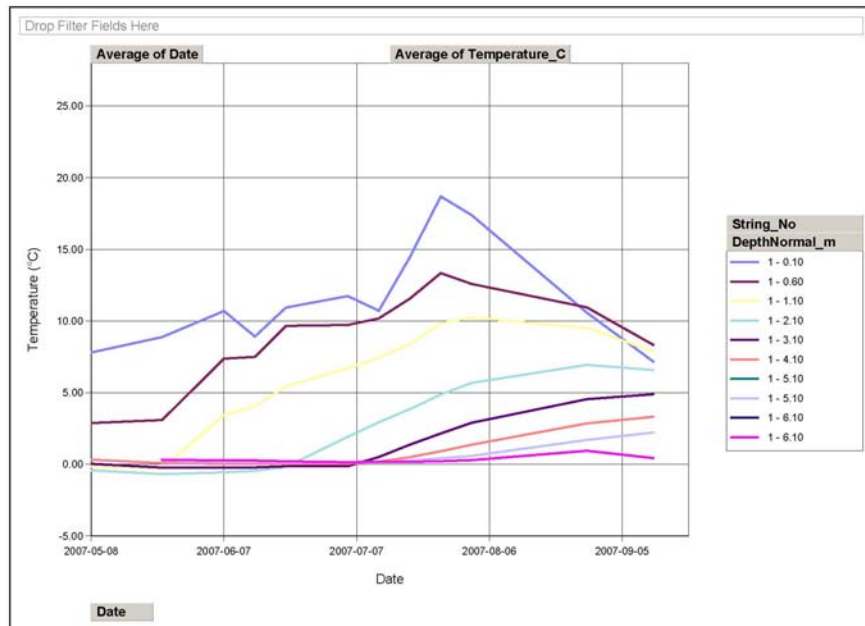


Figure 52: Monthly soil temperature measurements in Grum Overburden Dump by an M-Squared thermistor string measured manually (Thermistor String 1). Raw data expressed as resistances.

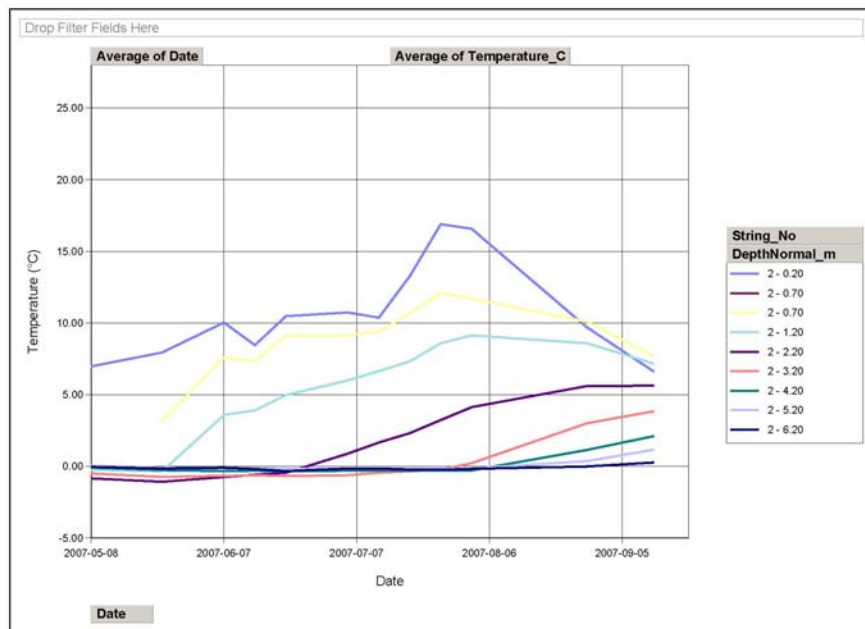


Figure 53: Monthly soil temperature measurements in Grum Overburden Dump by an M-Squared thermistor string measured manually (Thermistor String 2). Raw data expressed as resistances.

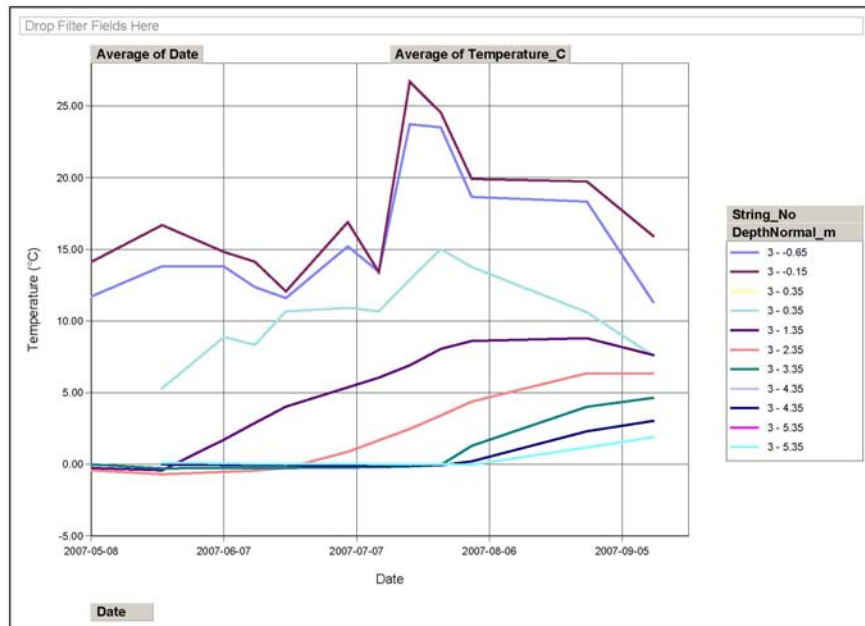


Figure 54: Monthly soil temperature measurements in Grum Overburden Dump by an M-Squared thermistor string measured manually (Thermistor String 3). Raw data expressed as resistances.

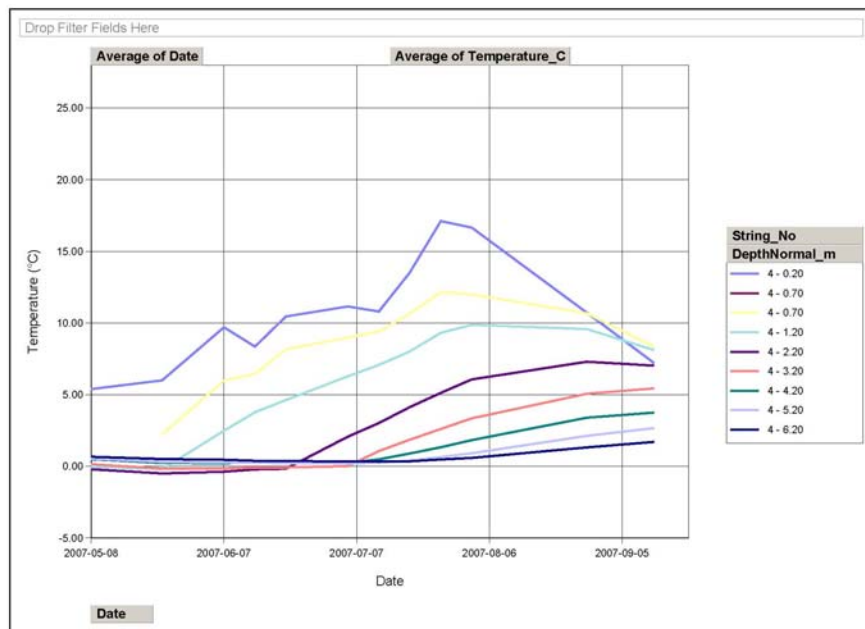


Figure 55: Monthly soil temperature measurements in Grum Overburden Dump by an M-Squared thermistor string measured manually (Thermistor String 4). Raw data expressed as resistances.

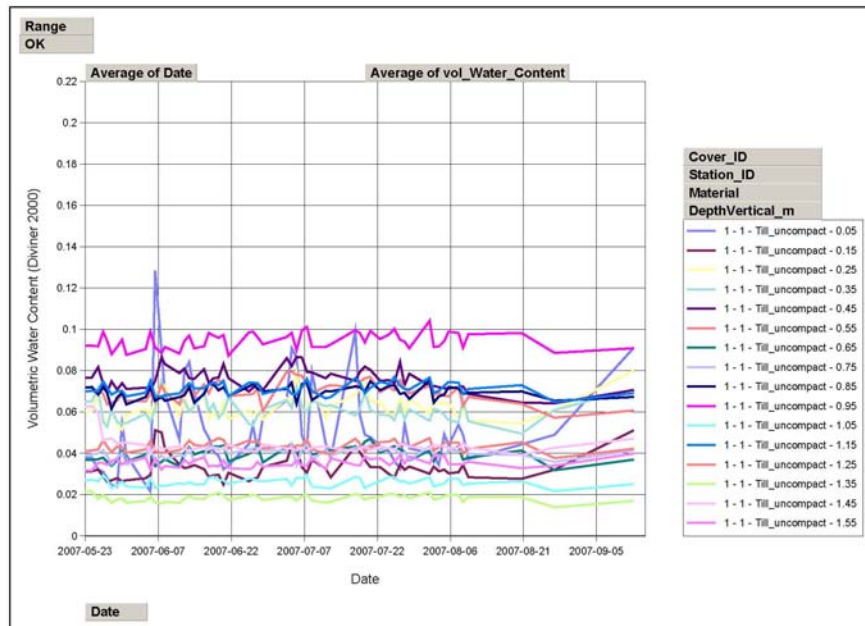


Figure 56: Daily volumetric moisture content in CT#1 (Station #1) measured manually by a Sentek Diviner 2000.

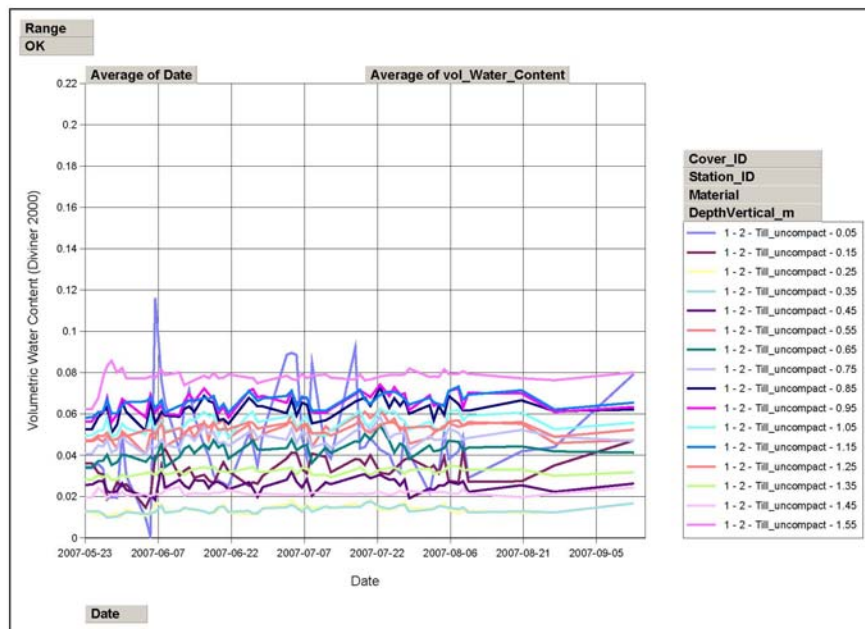


Figure 57: Daily volumetric moisture content in CT#1 (Station #2) measured manually by a Sentek Diviner 2000.

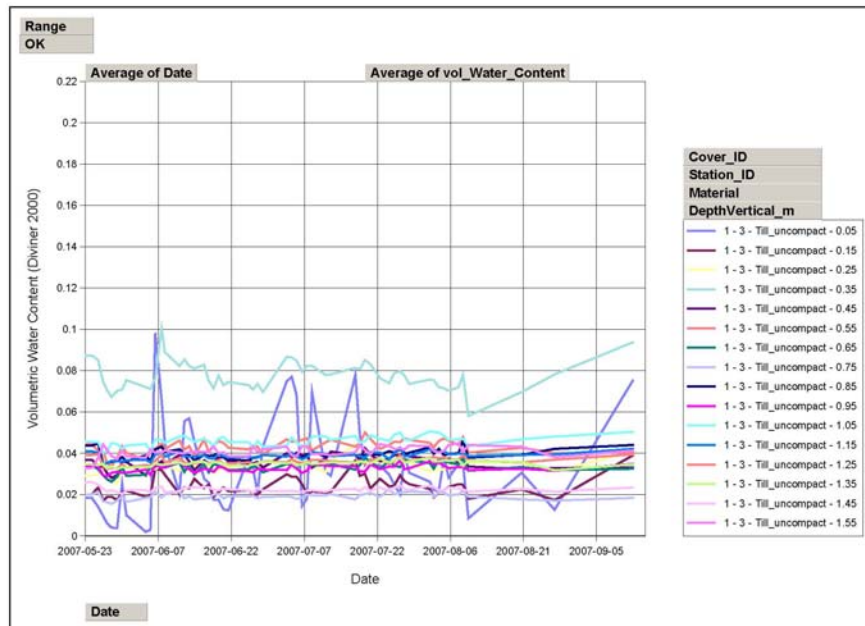


Figure 58: Daily volumetric moisture content in CT#1 (Station #3) measured manually by a Sentek Diviner 2000.

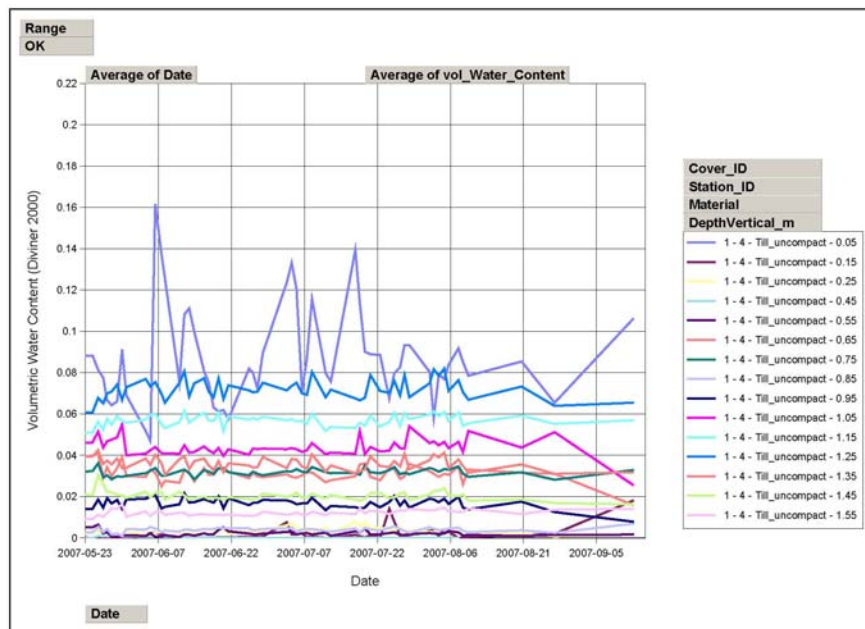


Figure 59: Daily volumetric moisture content in CT#1 (Station #4) measured manually by a Sentek Diviner 2000.

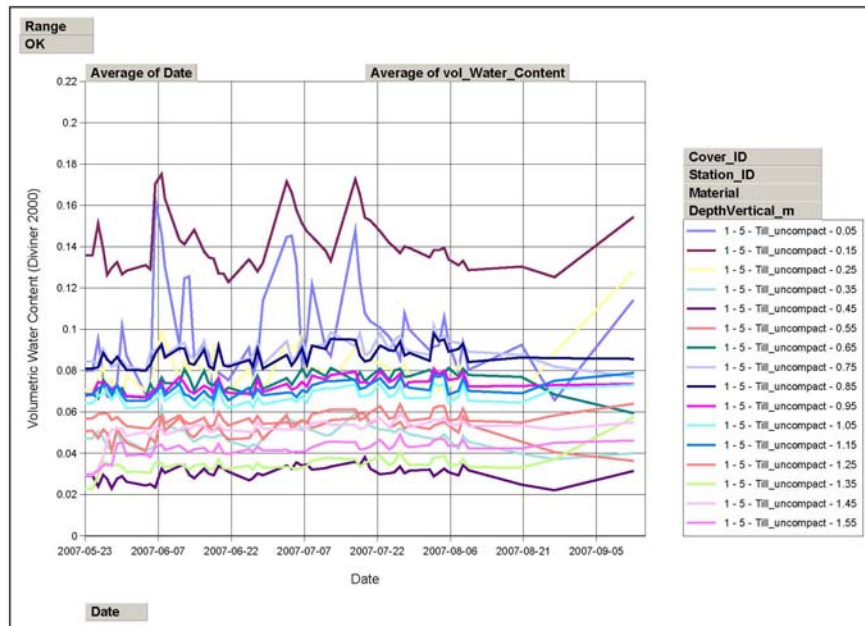


Figure 60: Daily volumetric moisture content in CT#1 (Station #5) measured manually by a Sentek Diviner 2000.

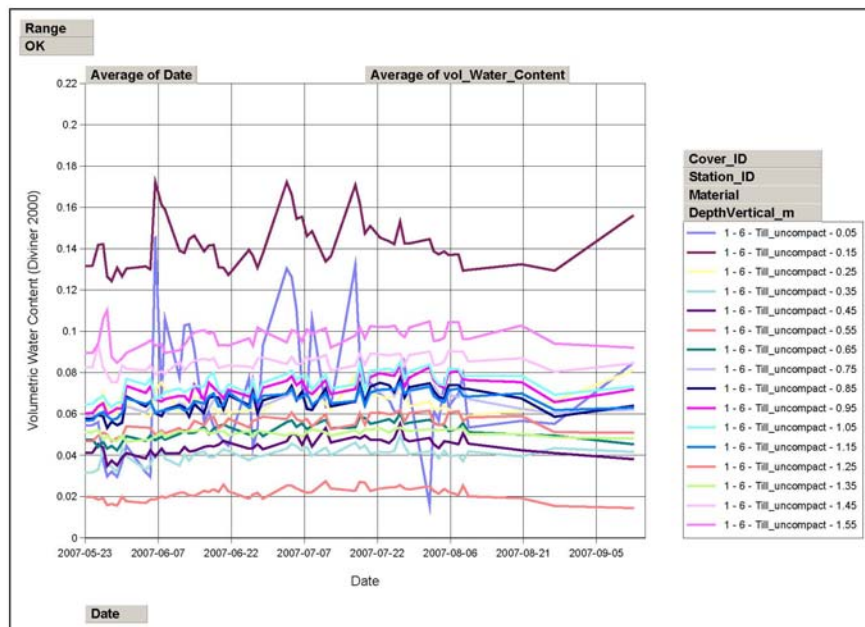


Figure 61: Daily volumetric moisture content in CT#1 (Station #6) measured manually by a Sentek Diviner 2000.

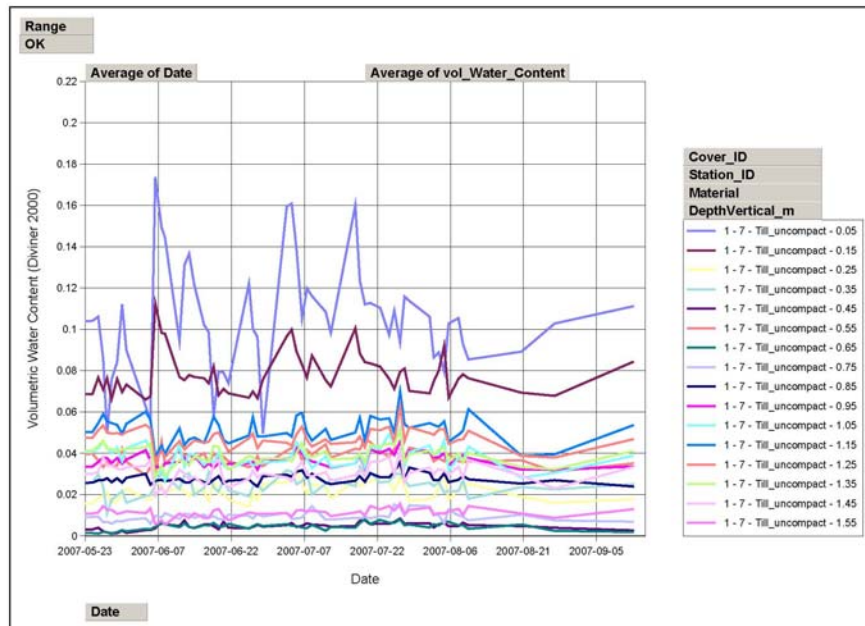


Figure 62: Daily volumetric moisture content in CT#1 (Station #7) measured manually by a Sentek Diviner 2000.

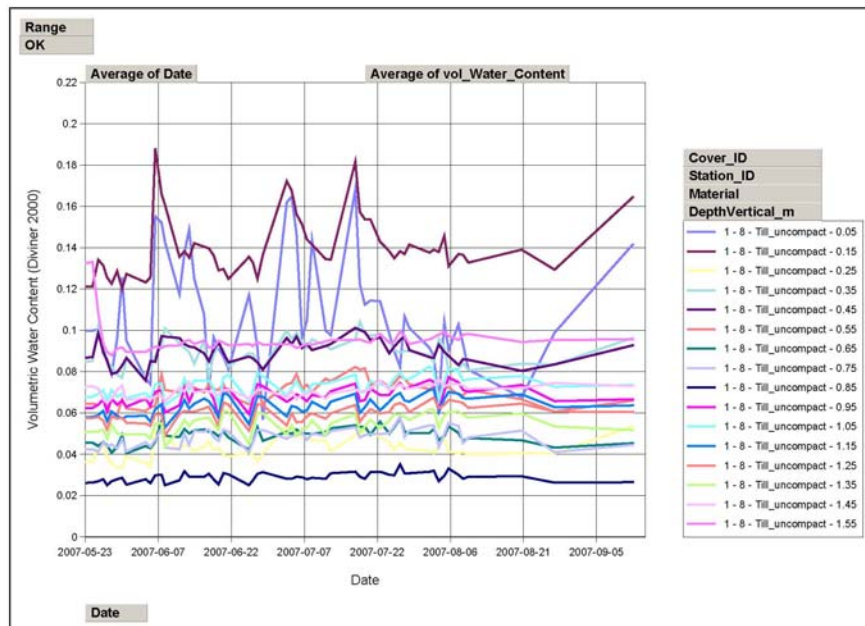


Figure 63: Daily volumetric moisture content in CT#1 (Station #8) measured manually by a Sentek Diviner 2000.

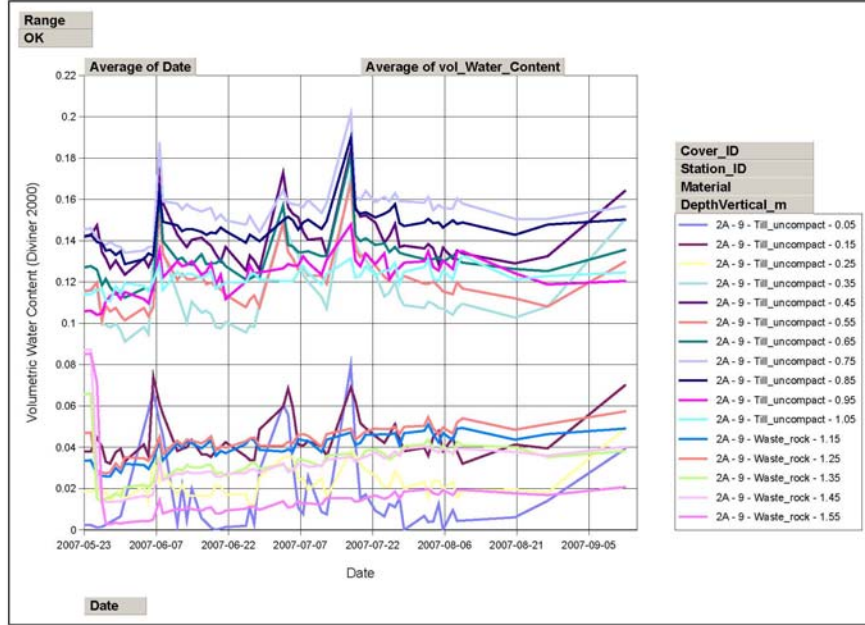


Figure 64: Daily volumetric moisture content in CT#2A (Station #9) measured manually by a Sentek Diviner 2000.

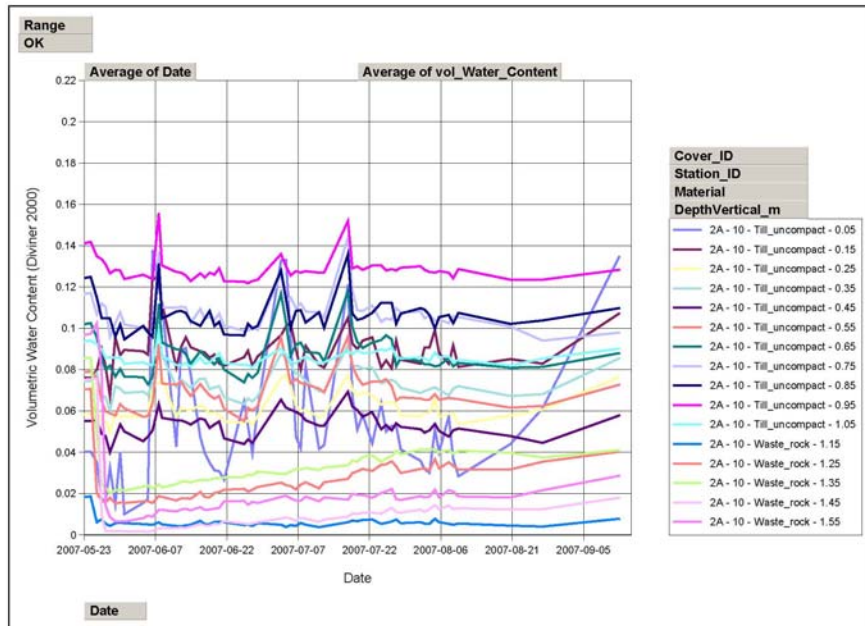


Figure 65: Daily volumetric moisture content in CT#2A (Station #10) measured manually by a Sentek Diviner 2000.

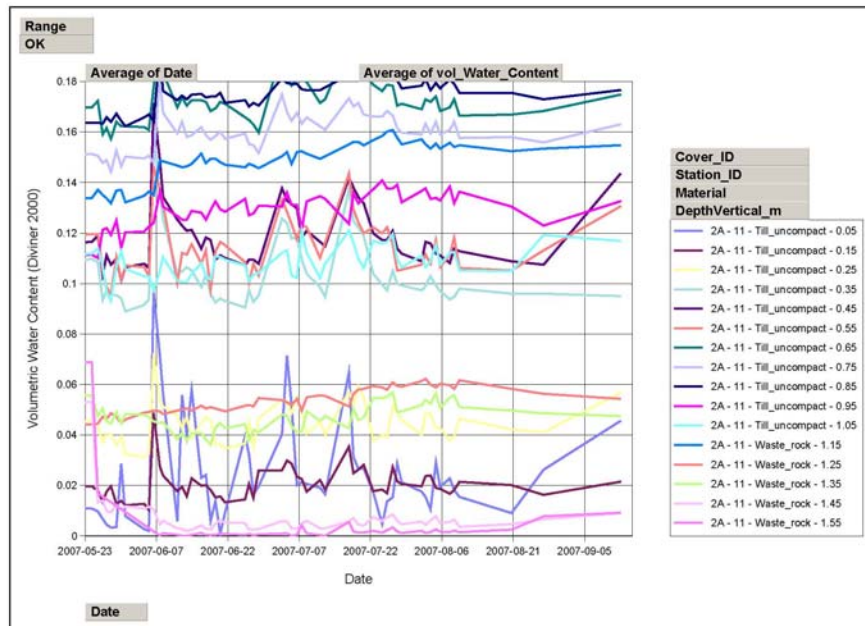


Figure 66: Daily volumetric moisture content in CT#2A (Station #11) measured manually by a Sentek Diviner 2000.

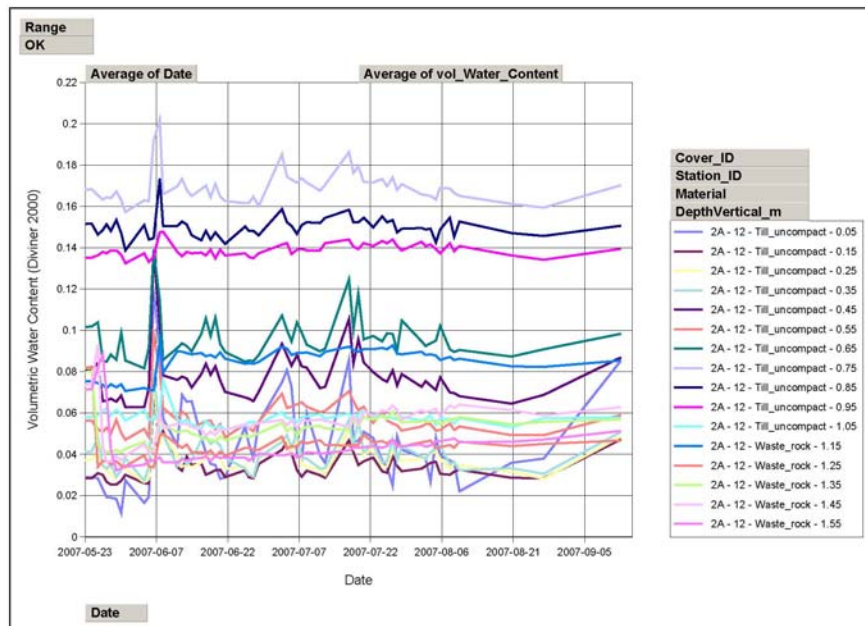


Figure 67: Daily volumetric moisture content in CT#2A (Station #12) measured manually by a Sentek Diviner 2000.

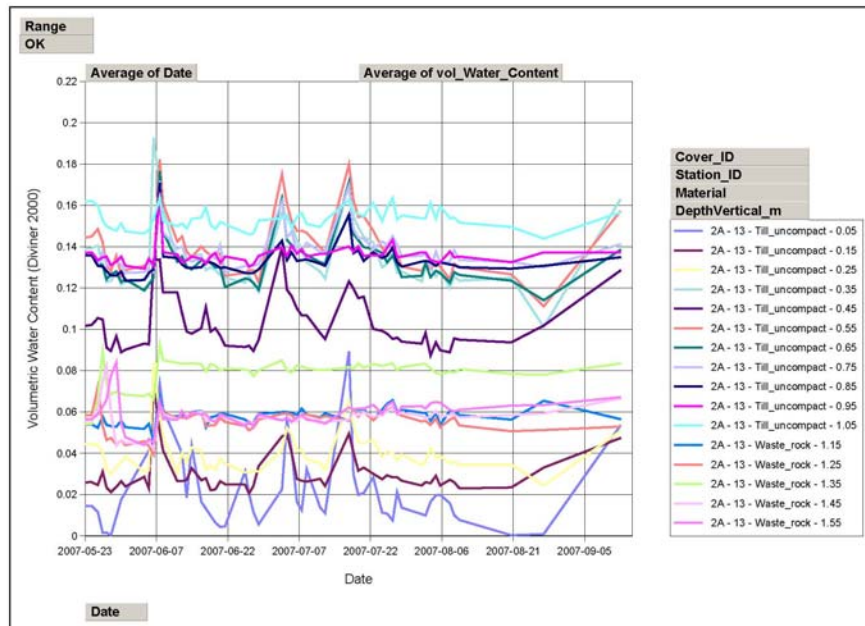


Figure 68: Daily volumetric moisture content in CT#2A (Station #13) measured manually by a Sentek Diviner 2000.

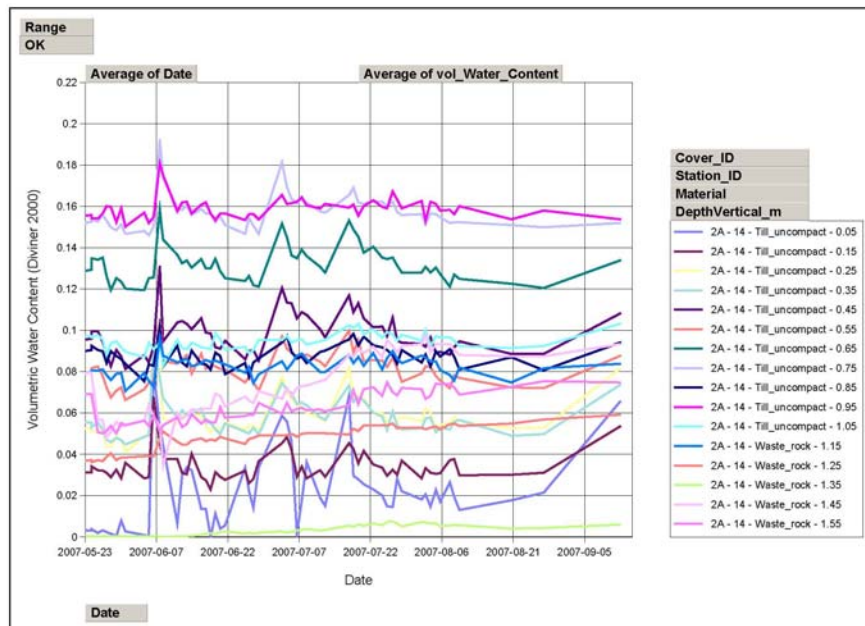


Figure 69: Daily volumetric moisture content in CT#2A (Station #14) measured manually by a Sentek Diviner 2000.

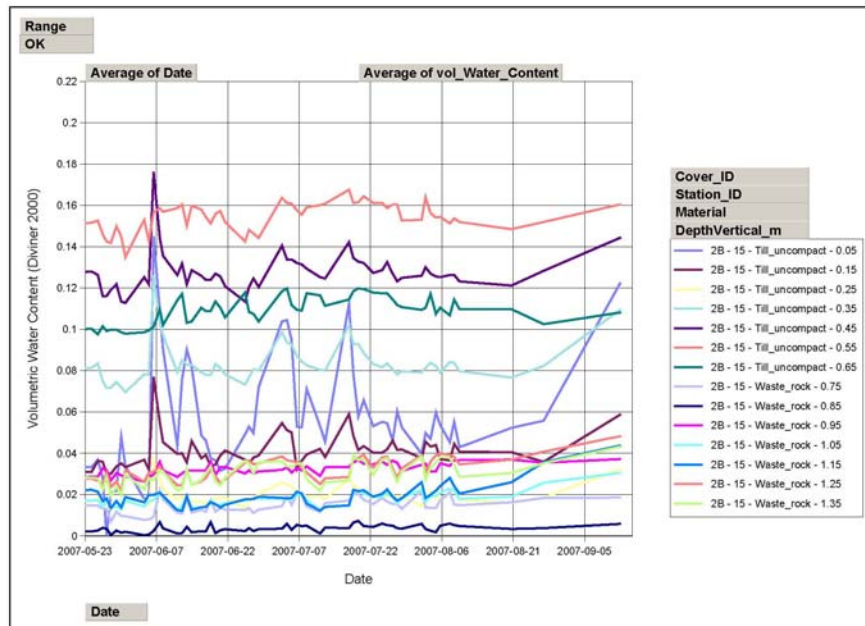


Figure 70: Daily volumetric moisture content in CT#2B (Station #15) measured manually by a Sentek Diviner 2000.

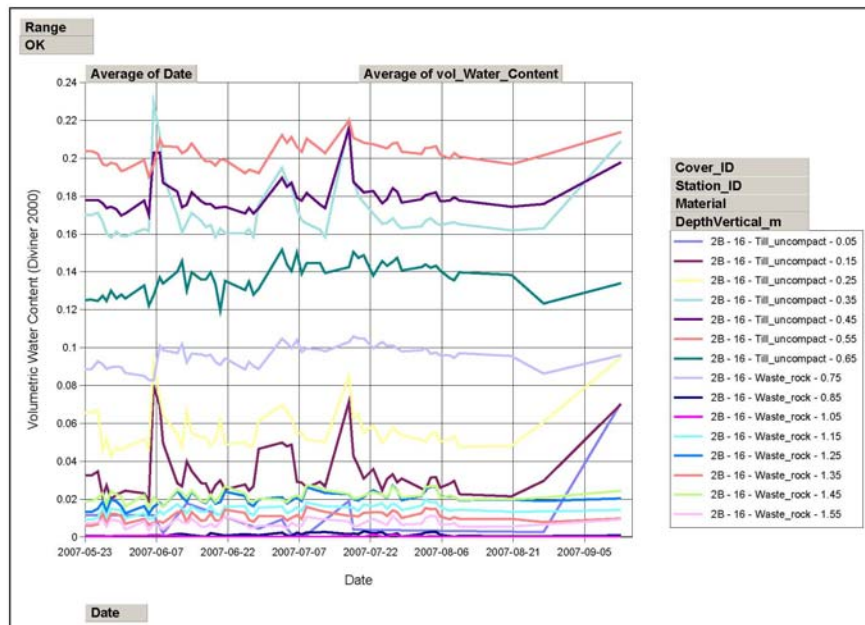


Figure 71: Daily volumetric moisture content in CT#2B (Station #16) measured manually by a Sentek Diviner 2000.

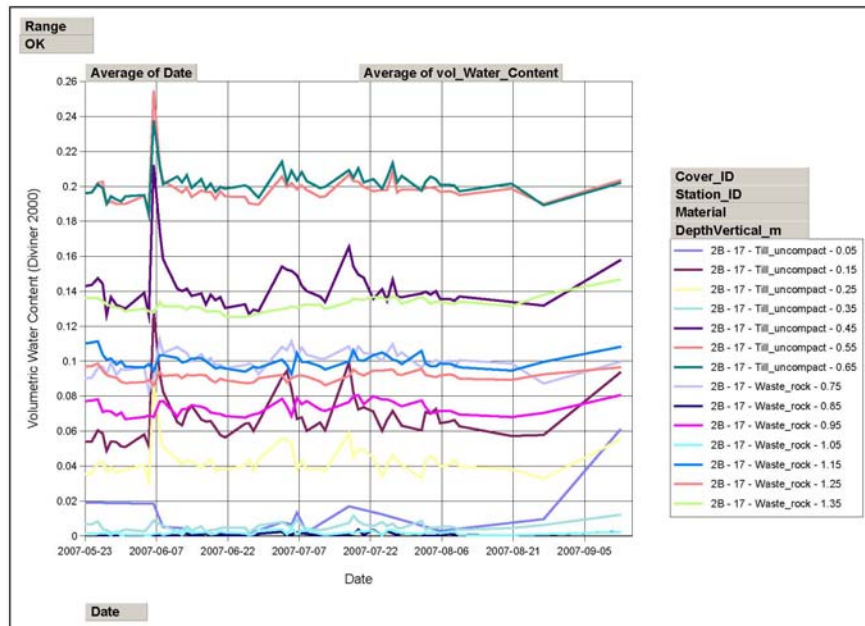


Figure 72: Daily volumetric moisture content in CT#2B (Station #17) measured manually by a Sentek Diviner 2000.

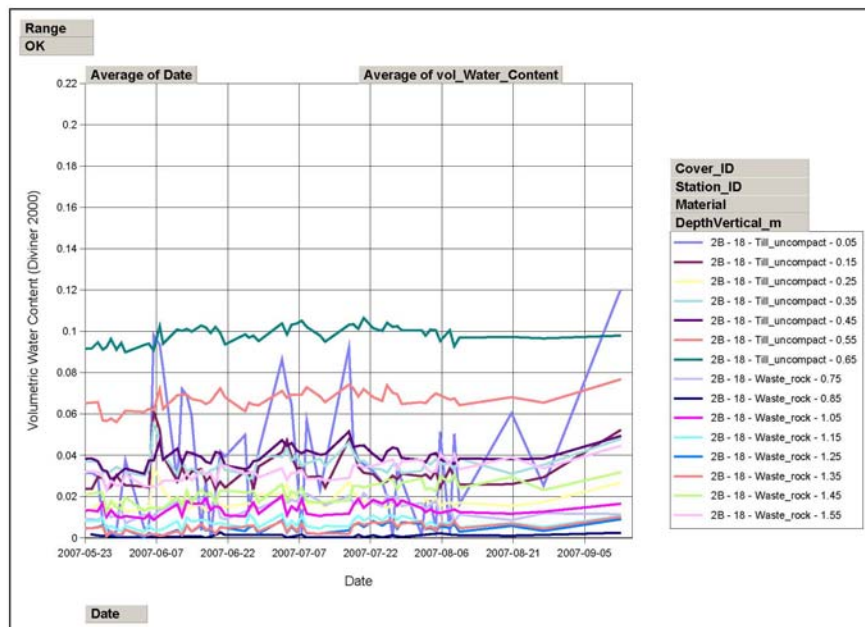


Figure 73: Daily volumetric moisture content in CT#2B (Station #18) measured manually by a Sentek Diviner 2000.

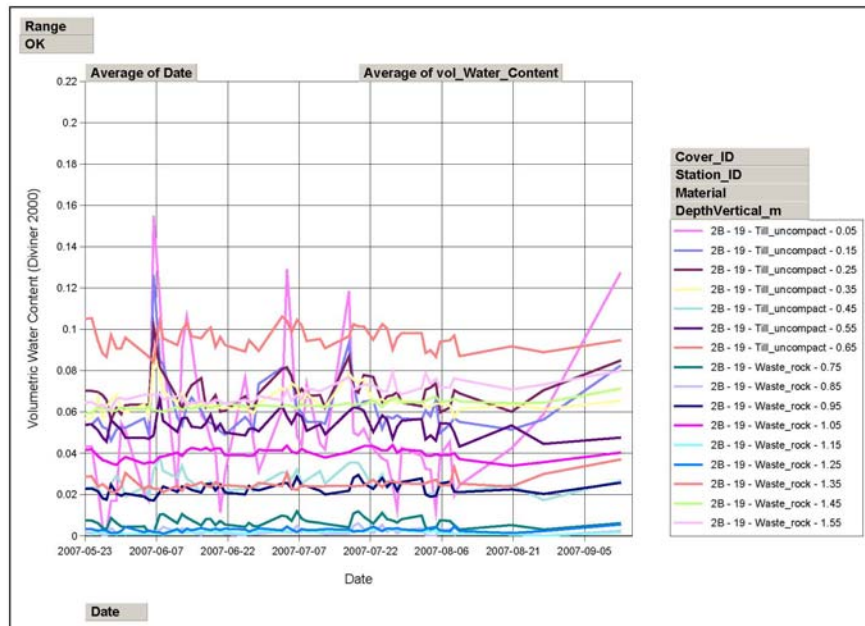


Figure 74: Daily volumetric moisture content in CT#2B (Station #19) measured manually by a Sentek Diviner 2000.

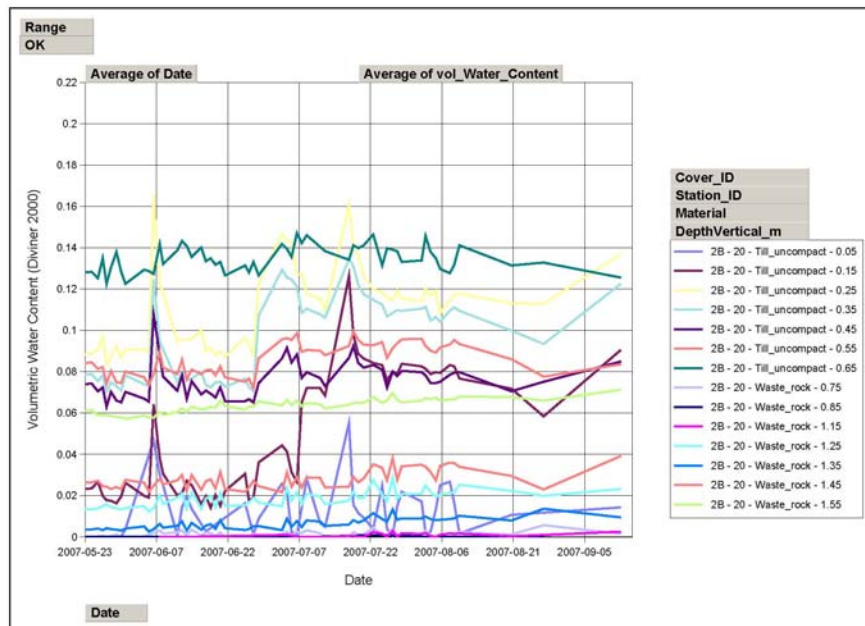


Figure 75: Daily volumetric moisture content in CT#2B (Station #20) measured manually by a Sentek Diviner 2000.

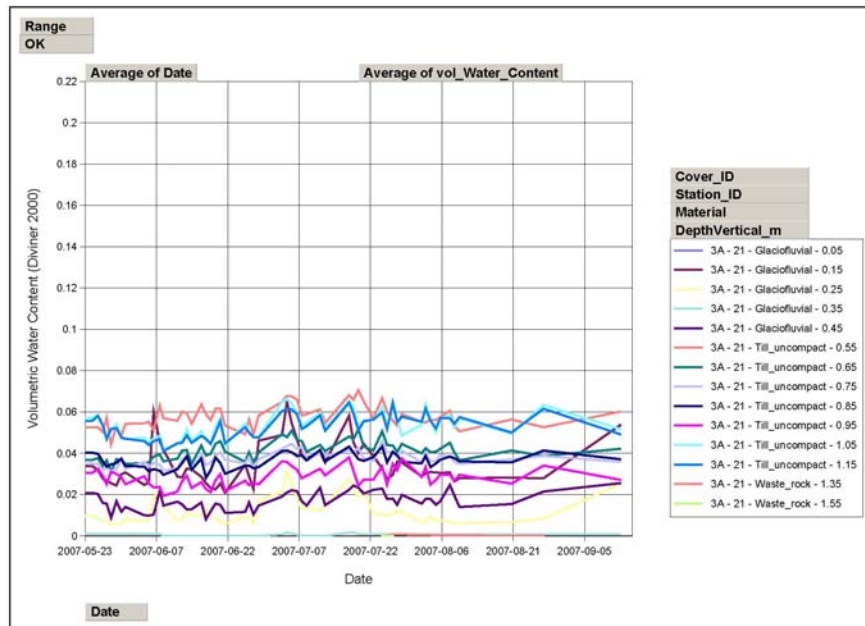


Figure 76: Daily volumetric moisture content in CT#3A (Station #21) measured manually by a Sentek Diviner 2000.

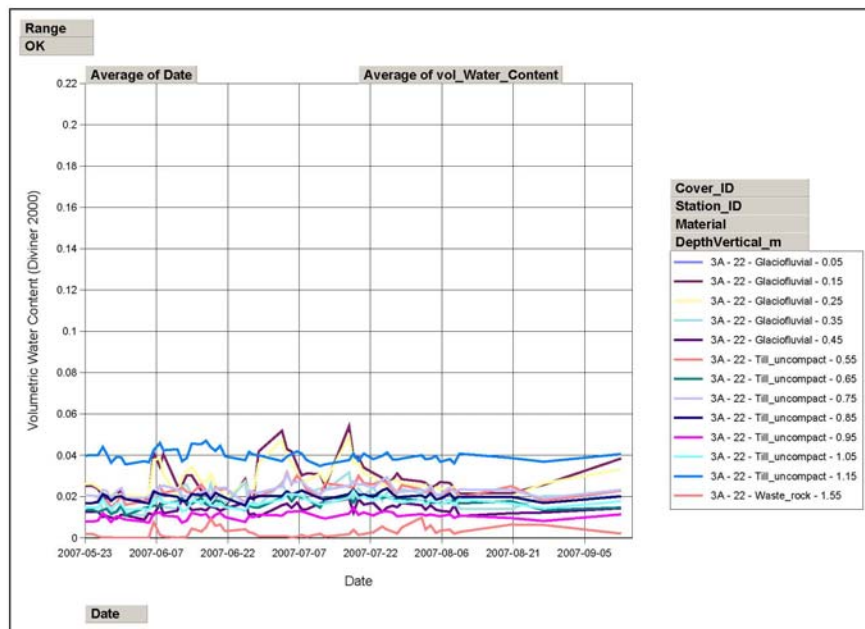


Figure 77: Daily volumetric moisture content in CT#3A (Station #22) measured manually by a Sentek Diviner 2000.

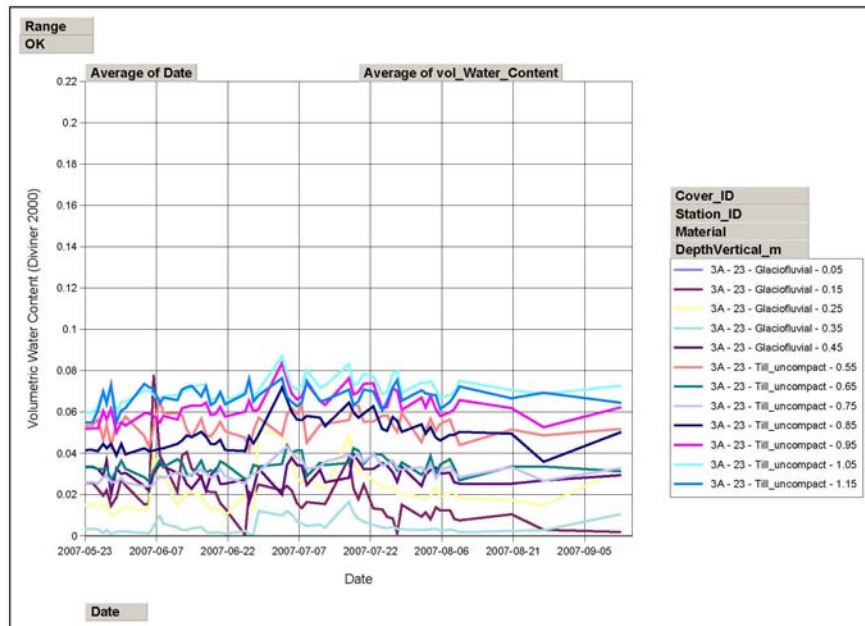


Figure 78: Daily volumetric moisture content in CT#3A (Station #23) measured manually by a Sentek Diviner 2000.

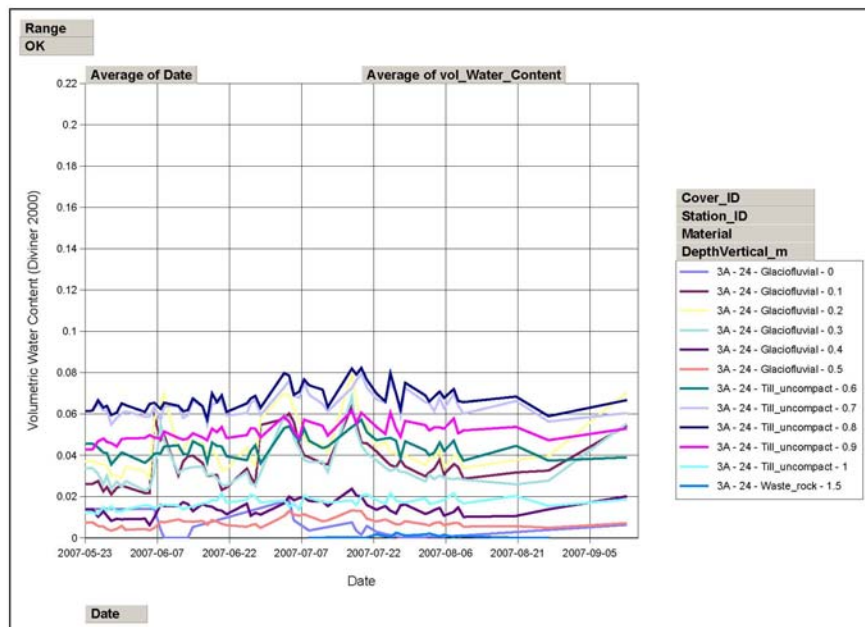


Figure 79: Daily volumetric moisture content in CT#3A (Station #24) measured manually by a Sentek Diviner 2000.

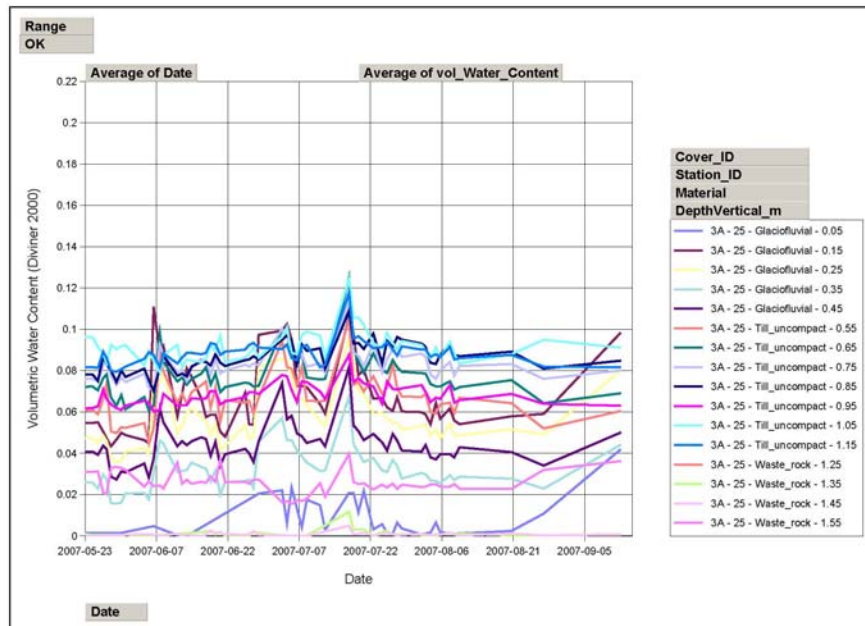


Figure 80: Daily volumetric moisture content in CT#3A (Station #25) measured manually by a Sentek Diviner 2000.

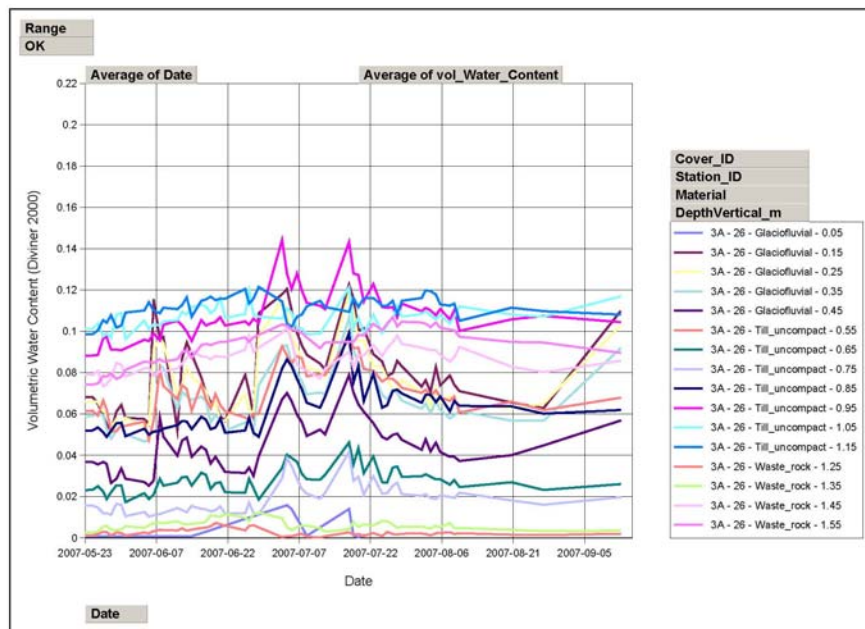


Figure 81: Daily volumetric moisture content in CT#3A (Station #26) measured manually by a Sentek Diviner 2000.

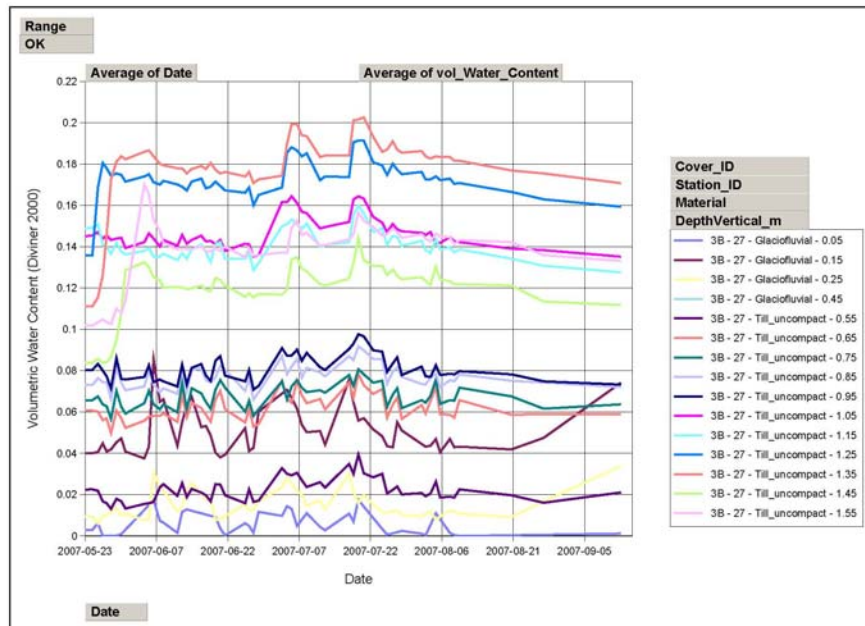


Figure 82: Daily volumetric moisture content in CT#3B (Station #27) measured manually by a Sentek Diviner 2000.

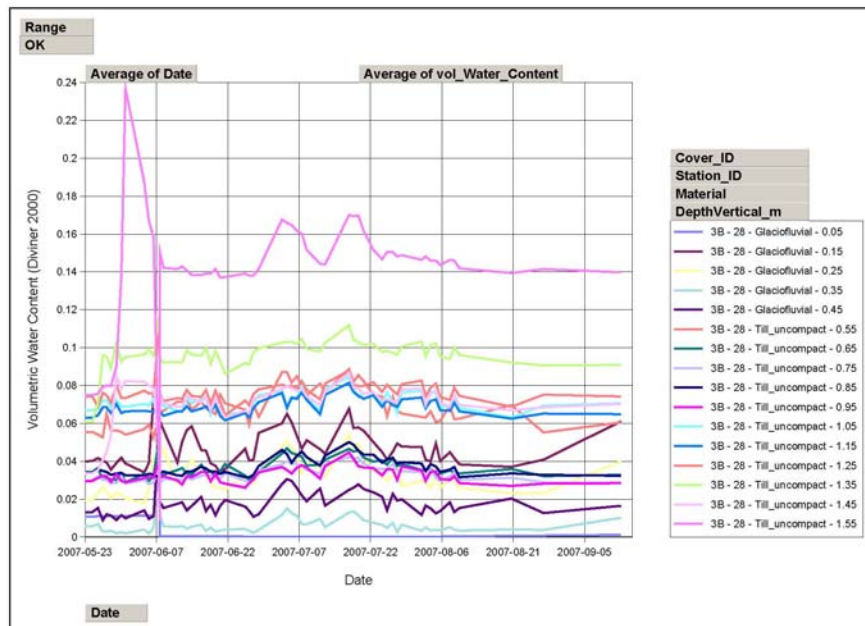


Figure 83: Daily volumetric moisture content in CT#3B (Station #28) measured manually by a Sentek Diviner 2000.

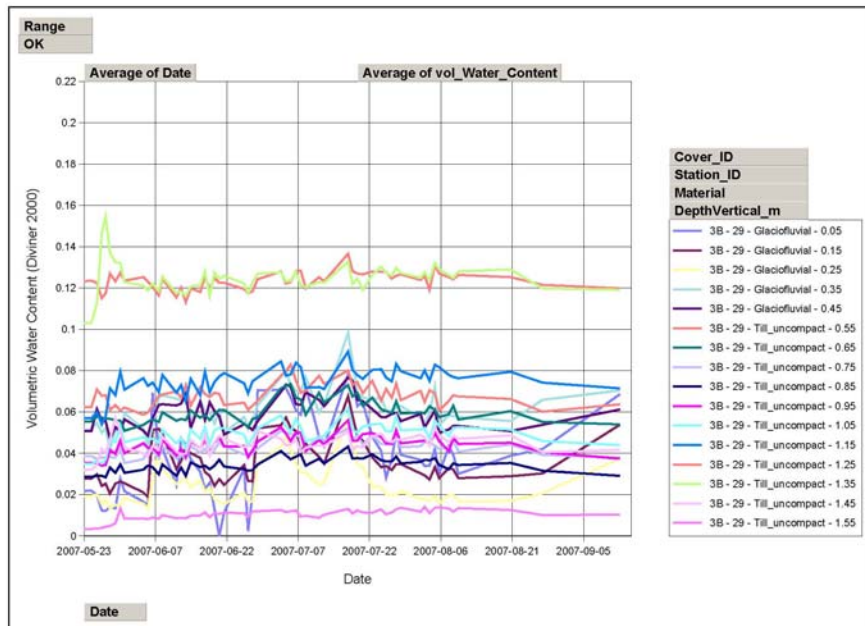


Figure 84: Daily volumetric moisture content in CT#3B (Station #29) measured manually by a Sentek Diviner 2000.

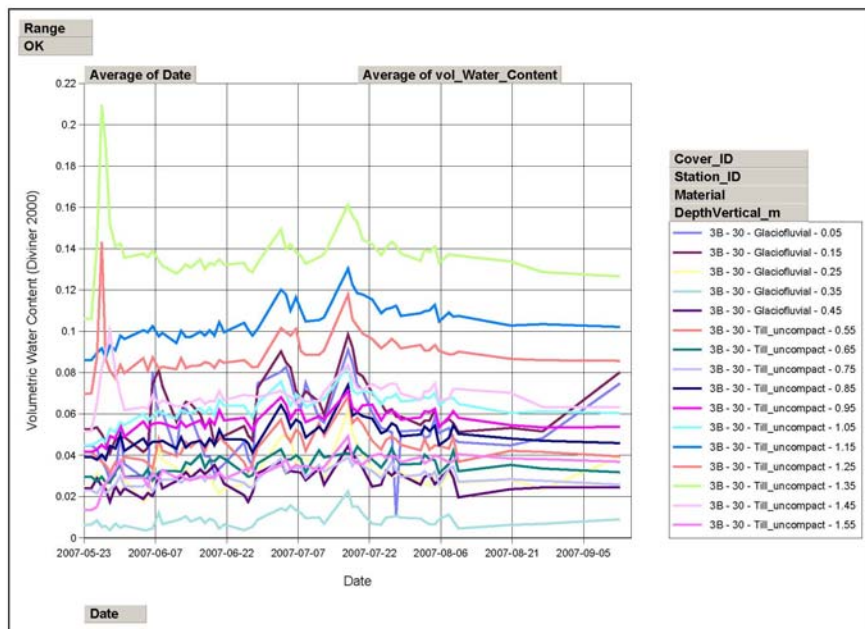


Figure 85: Daily volumetric moisture content in CT#3B (Station #30) measured manually by a Sentek Diviner 2000.

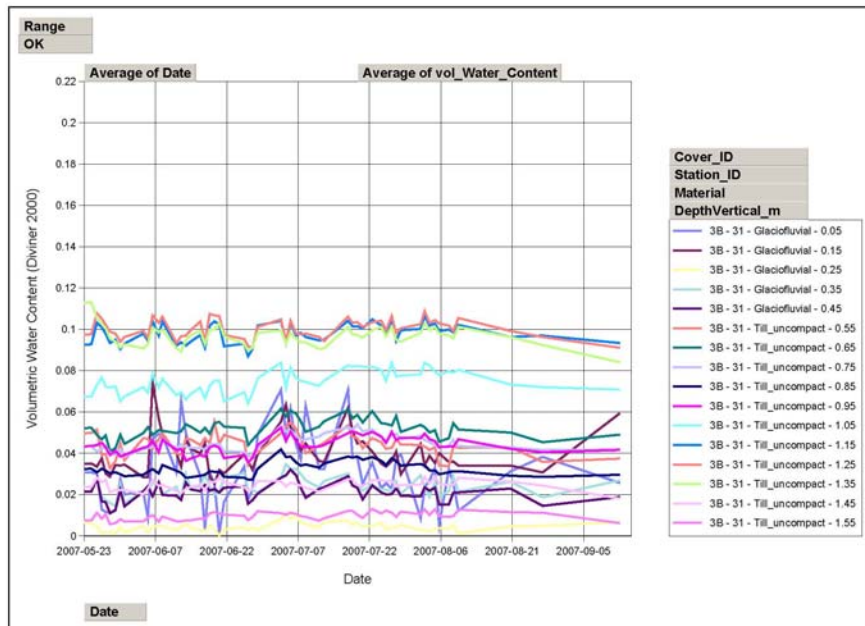


Figure 86: Daily volumetric moisture content in CT#3B (Station #31) measured manually by a Sentek Diviner 2000.

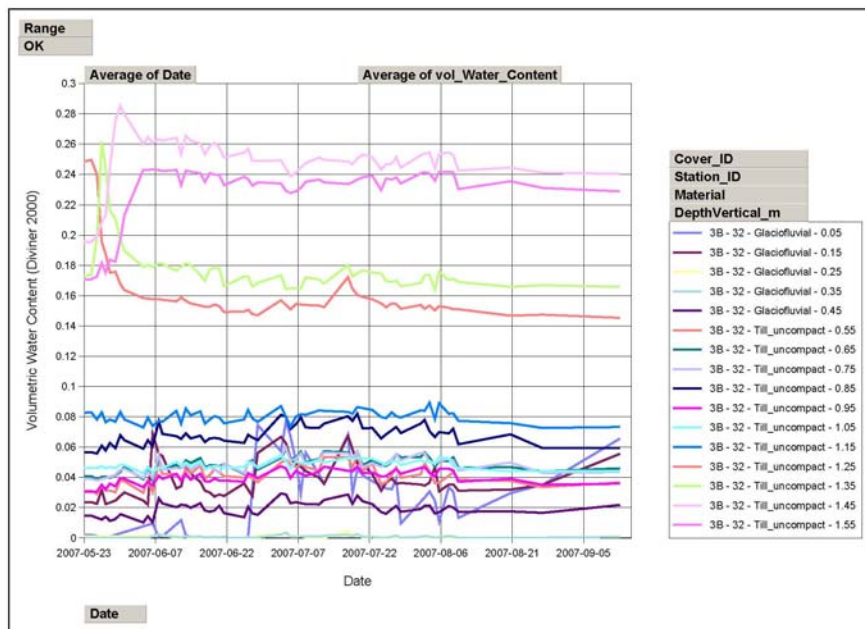


Figure 87: Daily volumetric moisture content in CT#3B (Station #32) measured manually by a Sentek Diviner 2000.

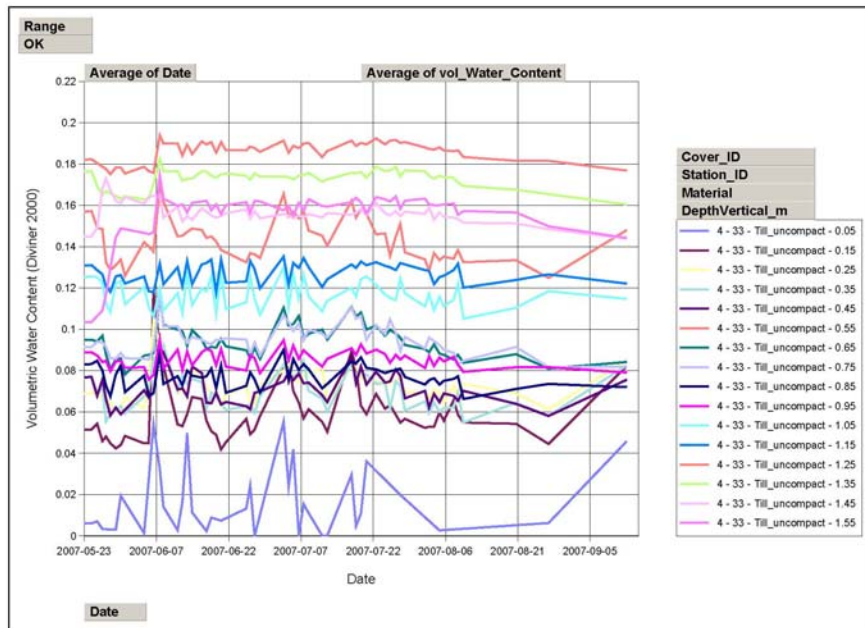


Figure 88: Daily volumetric moisture content in CT#4 (Station #33) measured manually by a Sentek Diviner 2000.

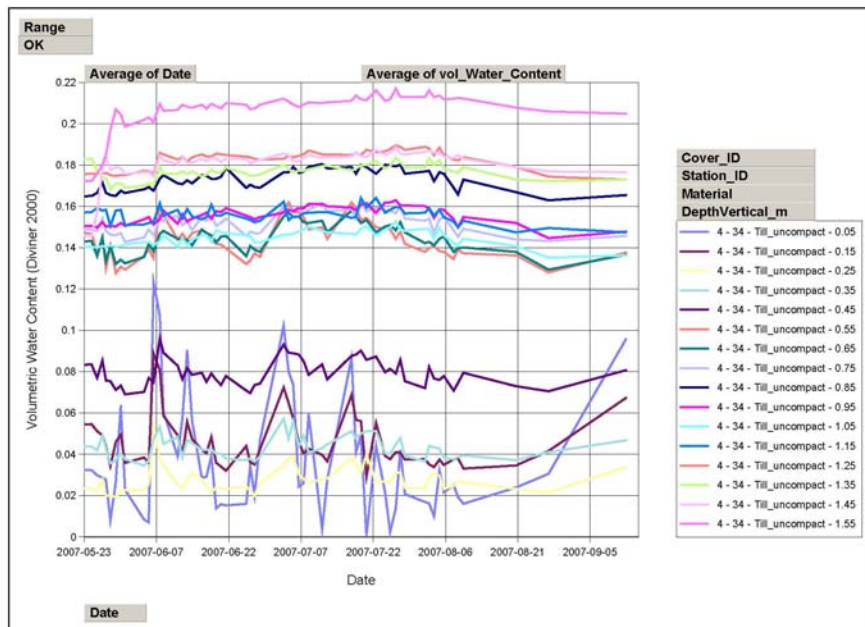


Figure 89: Daily volumetric moisture content in CT#4 (Station #34) measured manually by a Sentek Diviner 2000.

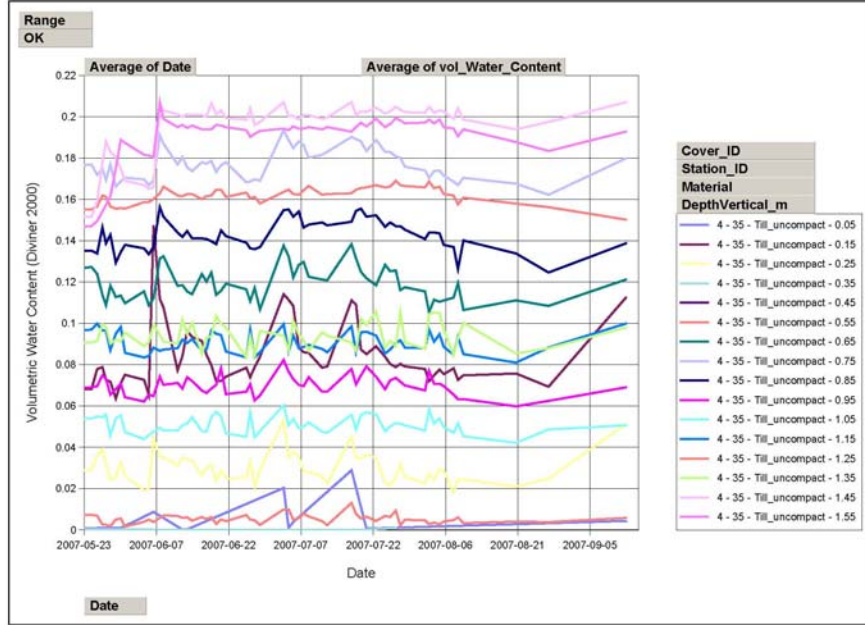


Figure 90: Daily volumetric moisture content in CT#4 (Station #35) measured manually by a Sentek Diviner 2000.

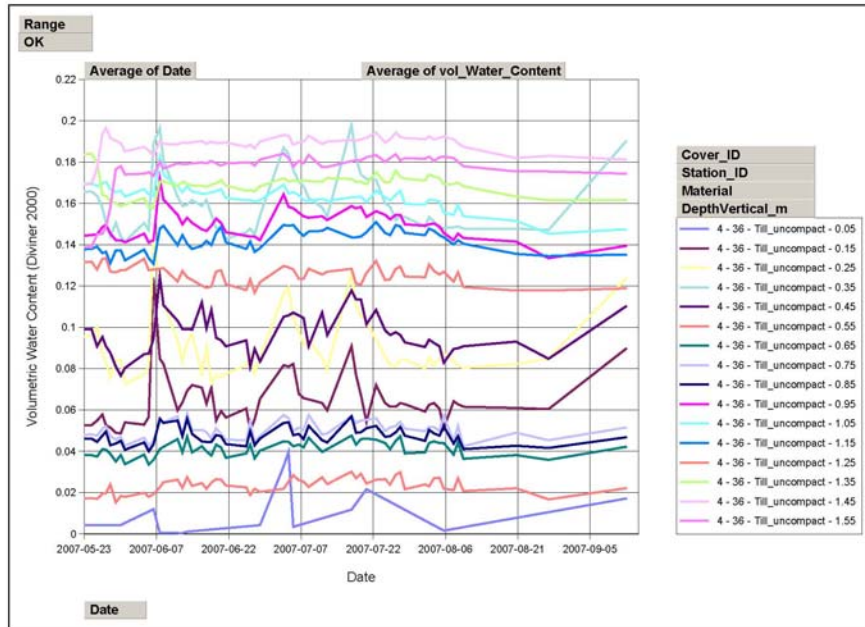


Figure 91: Daily volumetric moisture content in CT#4 (Station #36) measured manually by a Sentek Diviner 2000.

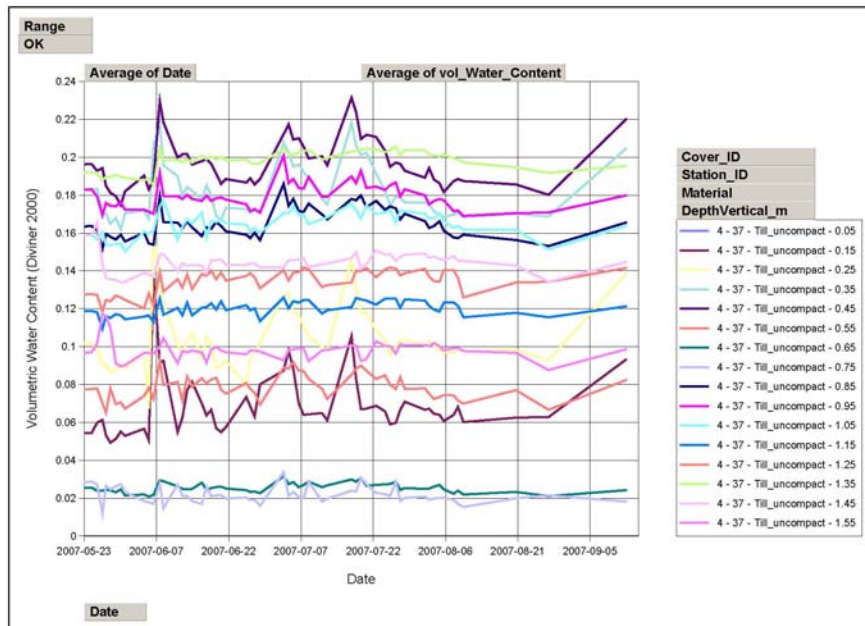


Figure 92: Daily volumetric moisture content in CT#4 (Station #37) measured manually by a Sentek Diviner 2000.

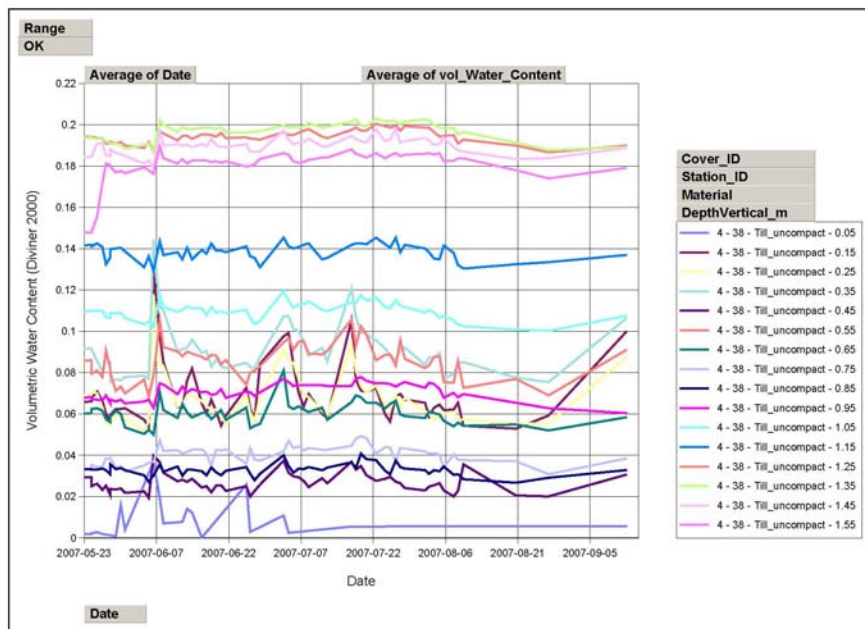


Figure 93: Daily volumetric moisture content in CT#4 (Station #38) measured manually by a Sentek Diviner 2000.

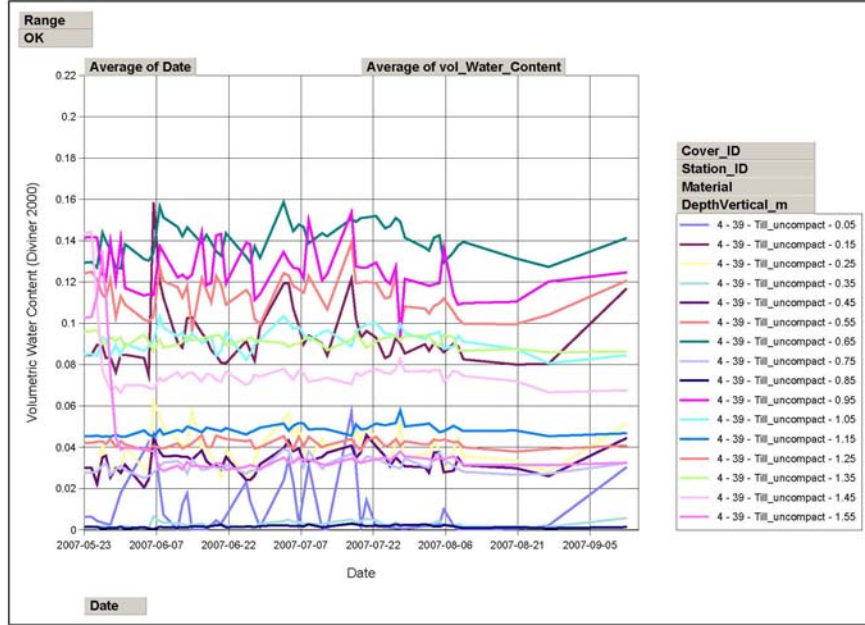


Figure 94: Daily volumetric moisture content in CT#4 (Station #39) measured manually by a Sentek Diviner 2000.

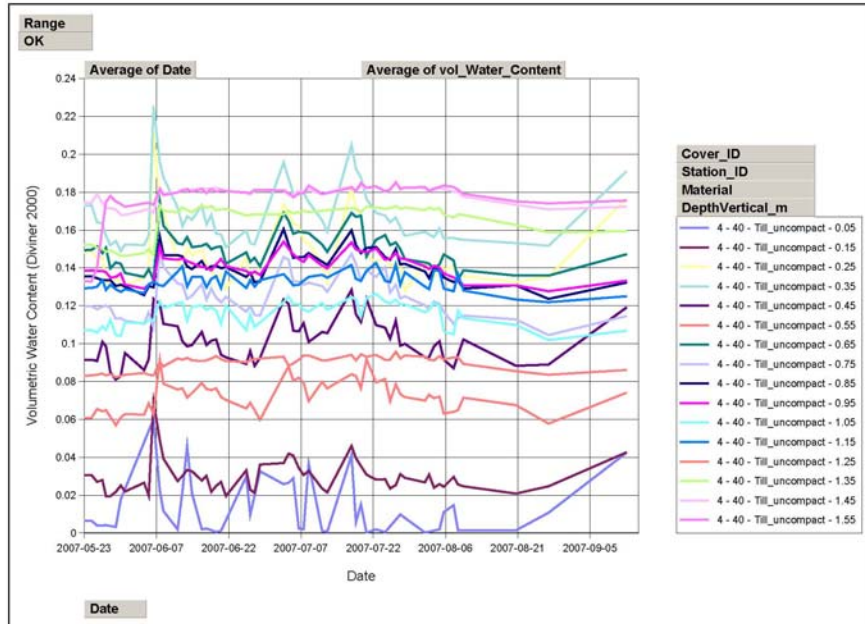


Figure 95: Daily volumetric moisture content in CT#4 (Station #40) measured manually by a Sentek Diviner 2000.

Appendix A
Summer 2008 Monitoring Requirements

Technical Memorandum

To:	Dana Haggar	Date:	May 24, 2007
cc:	Cam Scott	From:	Maritz Rykaart
Subject:	Summer 2007 Monitoring Requirements for Waste Rock and Tailings Test Covers	Project #:	1CD003.000

The instrumentation for the Vangorda waste rock trial covers was reinstalled and initiated between May 23 and May 24, 2006. The regular on-site monitoring should therefore commence immediately, and continue until freeze-up (likely October or November). It is our understanding that the monitoring will be carried out by the Anvil laboratory staff, supported by two summer students.

Maritz Rykaart has trained the two summer students on what the requirements for monitoring are.

This Technical Memorandum provides more detail on the monitoring frequency that we require for these cover trials, as well as for the two Rose creek tailings test pads that was constructed in April 2004.

Table 1 below list the details of the required monitoring. This level of monitoring has been based on the assumed availability the summer students. In the event that these students cannot be committed to this schedule, we would provide you with a less rigorous monitoring plan, to best suit your staff availability.

Table 1: Monitoring requirements for the Period May through October 2006

Task	Details	Required Frequency	Estimated Time Commitment
Downloading of data loggers & diagnostics test	2 x Campbell Scientific CR10X 2 x Davis Instruments 1 x Lakefield Instruments (on Grum Overburden Dump) 9 x Seametrics 1 x Diviner 2000	Weekly	3 hours
Manual moisture content readings	40 Access tubes using Diviner probe	Daily (whenever possible)	2 hours
Manual flow observations	6 x Flow discharge pipes at Instrumentation hut	Daily (whenever possible)	Included in time for manual moisture content readings
Manual thermistor readings	4 x Thermistor strings (on Grum Overburden Dump)	Weekly	Included in time for downloading data loggers
Tailings test pad survey	Complete survey of pins, rocks and tubes.	Bi-Weekly	5 hours

We have included an estimated time commitment for each of the tasks, in case it may assist in your planning requirements. These time commitments assume two people working together, departing from the guardhouse, completing the field task, returning to the guard house and preparing and sending the data to SRK.

All data collected must please be forwarded electronically to SRK on a Bi-Weekly basis, accompanied by the attached completed Information data sheet. If the data is too much to e-mail, please let us know so we can set up a dedicated site on our Portal onto which the data can be uploaded.

Appendix B
Additional Climatic Data Calculated and Stored by
Davis Instruments Vantage Pro Data Logger

Parameter	Description	Verification
Dew Point	Dew-point is the temperature to which air must be cooled for saturation (100% relative humidity) to occur, providing there is no change in water content. The dew-point is an important measurement used to predict the formation of dew, frost, and fog. Dew-point is also a good indicator of the air's actual water vapour content, unlike relative humidity, which takes the air's temperature into account. High dew-point indicates high vapour content; low dew-point indicates low vapour content. In addition a high dew-point indicates a better chance of rain and severe thunder storms.	Checked
Wind Run	Wind run is measurement of the "amount" of wind passing the station during a given period of time, expressed in either "miles of wind" or "kilometres of wind". WeatherLink calculates wind run by multiplying the average wind speed for each archive record by the archive interval.	Checked
Wind Chill	Wind chill takes into account how the speed of the wind affects our perception of air temperature. Your body warms the surrounding air molecules by transferring heat from your skin. If there's no air movement, this insulating layer of warm air molecules stays next to your body and offers some protection from cooler air molecules. Wind disperses this layer of warm air, causing the air temperature to "feel" colder. The faster the wind blows, the quicker the layer of warm air is dispersed, and the colder you feel. Above 76.7°F (24.8°C), wind movement has no effect on the apparent temperature. WeatherLink versions 5.1 and later use the Osczevski (1995) equation to calculate wind chill. This is the method adopted by the US National Weather Service in September of 2001.	Checked
Heat Index	The Heat Index uses the temperature and the relative humidity to determine how hot the air actually "feels." When humidity is low, the apparent temperature will be lower than the air temperature, since perspiration evaporates rapidly to cool the body. However, when humidity is high (i.e., the air is saturated with water vapour) the apparent temperature "feels" higher than the actual air temperature, because perspiration evaporates more slowly. WeatherLink uses the Steadman (1979 & 1998) formula to calculate Heat Index, which is more accurate than the method used by the Vantage Pro console and is calculated for all temperatures.	Checked
THW Index	The THW Index uses humidity, temperature and wind to calculate an apparent temperature that incorporates the cooling effects of wind on our perception of temperature.	Checked
THSW Index	The THSW Index uses humidity, temperature, the cooling effects of wind and the heating effects of direct solar radiation to calculate an apparent temperature.	Checked
Solar Energy	The amount of accumulated solar radiation energy over a period of time is measured in Langleys.	Checked
UV Dose	Measured in MED which stands for Minimum Erythral Dose, defined as the amount of sunlight exposure necessary to induce a barely perceptible redness of the skin within 24 hours after sun exposure. In other words, exposure to 1 MED will result in a reddening of the skin. Because different skin types burn at different rates, 1 MED for persons with very dark skin is different from 1 MED for persons with very light skin.	Checked
Heating DD	One heating degree-day is the amount of heat required to keep a structure at 65°F when the outside temperature remains one degree below the 65°F threshold for 24 hours. One heating degree-day is also the amount of heat required to keep that structure at 65°F when the temperature remains 24°F below that 65° threshold for 1 hour.	Checked
Cooling DD	One cooling degree-day is the amount of cooling required to keep a structure at 65°F when the outside temperature remains one degree above the 65°F threshold for 24 hours. One cooling degree-day is also the amount of cooling required to keep that structure at 65°F when the temperature remains 24°F above that 65° threshold for 1 hour.	Checked
Inside Temp	The temperature measured inside the console	Checked
Inside Humidity	The relative humidity measured inside the console	Transient problems
ET	Evapotranspiration is the measure of the quantity of moisture transpiring from the leaves of a crop and evaporating from the ground. ET values are calculated from measured data on wind run, air temperature, relative humidity, and solar radiation. The ET value is calculated once each hour using the data averaged over the prior hour	Checked

Appendix C
Summary Table of Test Cover Flow Monitoring Observations

2007 Vangorda Cover Testpads (CT) Flows

Date	Technician	CT 1	CT 2a	CT 2b	CT 3a	CT 3b	CT 4	Comments
May 24, 2007	John Minder	n	y	y	n	n	n	
May 25, 2007	John Minder	n	y	y	n	y	n	
May 26, 2007	John Minder	n	y	y	n	n	n	
May 27, 2007	John Minder	n	y	y	n	n	n	
May 28, 2007	John Minder	n	y	y	n	n	n	
May 29, 2007	John Minder	n	y	y	n	n	n	
May 30, 2007	John Minder	n	y	y	n	n	n	
May 31, 2007	John Minder	n	y	y	n	n	n	
June 4, 2007	John Minder	n	n	y	n	n	n	
June 5, 2007	John Minder	n	n	y	n	n	n	
June 6, 2007	John Minder	n	n	y	n	n	n	
June 7, 2007	John Minder	y	y	y	y	y	y	
June 8, 2007	Chris Croy	y	n	y	n	y	y	
June 11, 2007	John Minder	y	n	n	n	y	n	
June 12, 2007	John Minder	y	n	n	n	n	n	
June 13, 2007	John Minder	y	n	n	n	n	n	
June 14, 2007	Chris Croy	y	n	n	n	n	n	
June 16, 2007	John Minder	y	n	n	n	n	n	
June 17, 2007	John Minder	y	n	n	n	n	n	
June 18, 2007	John Minder	y	n	n	n	n	n	
June 19, 2007	Chris Croy	n	n	n	n	n	n	
June 20, 2007	John Minder	n	n	n	n	n	n	
June 21, 2007	Chris Croy	n	n	n	n	n	n	
June 25, 2007	John Minder	y	n	n	n	n	n	
June 26, 2007	Chris Croy	y	y	y	n	n	n	
June 27, 2007	Chris Croy	y	n	n	n	n	n	
June 28, 2007	Chris Croy	y	y	y	y	y	y	CT 1 & CT 2b steady streams
July 3, 2007	Chris Croy	y	y	y	n	y	y	
July 4, 2007	Chris Croy	y	y	y	y	y	y	
July 5, 2007	Chris Croy	y	n	y	n	y	n	
July 6, 2007	Chris Croy	y	n	n	n	y	n	
July 7, 2007	John Minder	y	n	n	n	n	n	
July 8, 2007	Chris Croy	n	n	n	n	n	n	
July 11, 2007	John Minder	y	n	n	n	n	n	
July 12, 2007	John Minder	n	n	n	n	n	n	
July 16, 2007	John Minder	y	n	y	n	y	y	
July 17, 2007	John Minder	y	y	y	y	y	y	
July 18, 2007	Chris Croy	y	n	y	n	y	y	
July 19, 2007	Chris Croy	y	n	n	n	y	n	
July 20, 2007	John Minder	y	n	n	n	n	n	
July 22, 2007	Chris Croy	n	n	n	n	n	n	
July 24, 2007	John Minder	n	n	n	n	n	n	
July 25, 2007	John Minder	n	n	n	n	n	n	
July 26, 2007	Chris Croy	n	n	n	n	n	n	
July 27, 2007	John Minder	n	n	n	n	n	n	
July 28, 2007	John Minder	n	n	n	n	n	n	
July 29, 2007	Chris Croy	n	n	n	n	n	n	
August 1, 2007	Chris Croy	n	n	n	n	n	n	
August 2, 2007	John Minder	n	n	n	n	n	n	
August 3, 2007	John Minder	n	n	n	n	n	n	
August 4, 2007	Chris Croy	n	n	n	n	n	n	
August 5, 2007	John Minder	n	n	n	n	n	n	
August 7, 2007	Chris Croy	n	n	n	n	n	n	
August 8, 2007	John Minder	n	n	n	n	n	n	
August 9, 2007	Chris Croy	n	n	n	n	n	n	
August 23, 2007	C.Croix / R.Meers	n	n	n	n	n	n	
August 27, 2007	C.McKinnon / R.Meers	n	n	n	n	n	n	
September 12, 2007	C.McKinnon / R.Meers	y	y	y	y	y	y	Buckets for CT2a, CT2b, & CT3b are all full

Appendix D
Summary of Saturated Hydraulic Conductivity Measurements

Table D.1: Summary of Saturated Hydraulic Conductivity Measurements using the Tension Infiltrator Attachment

Test Type	Test Section	Saturated Hydraulic Conductivity (cm/s)	Tested by	Comments
Guelph w/ tension infiltrator	CT#2A-1	3.60E-03	JM, TG	
Guelph w/ tension infiltrator	CT#2A-2	2.09E-04	JM, TG	
Guelph w/ tension infiltrator	CT#2A-3	-2.20E-04	JM, TG	
Guelph w/ tension infiltrator	CT#2B-1	1.39E-04	TG	
Guelph w/ tension infiltrator	CT#1-1	2.24E-04	TG	
Guelph w/ tension infiltrator	CT#1-2	-1.38E-05	TG	
Guelph w/ tension infiltrator	CT#4-1	-8.64E-06	TG	
Guelph w/ tension infiltrator	CT#4-2	3.24E-05	TG	
Guelph w/ tension infiltrator	CT#3A-1	4.18E-05	TG	
Guelph w/ tension infiltrator	CT#3B-1	--	JM, TG	test inconclusive, problems with porous disk
Guelph w/ tension infiltrator	CT#2B-2	6.70E-05	TG	

Table D.2: Summary of Hydraulic Conductivity Measurements using the Ring Infiltrometer Method

Test Type	Test Section	Saturated Hydraulic Conductivity (cm/s)	Tested by	Comments
Ring Infiltrometer	CT#1-2	7.56E-04	JM, TG	Only 2 data points
Ring Infiltrometer	CT#1-3	8.71E-05	JM, TG	
Ring Infiltrometer	CT#4-2	1.38E-05	JM, TG	
Ring Infiltrometer	CT#4-3	7.85E-05	JM, TG	
Ring Infiltrometer	CT#2B-3	4.06E-05	JM, TG	
Ring Infiltrometer	CT#2A-3	2.39E-05	JM, TG	
Ring Infiltrometer	CT#2A-1	4.38E-05	JM, students	
Ring Infiltrometer	CT#2A-2	9.14E-06	JM, students	Only 2 data points
Ring Infiltrometer	CT#2B-1	7.05E-05	JM, students	Only 2 data points
Ring Infiltrometer	CT#1-1	4.12E-05	JM, students	Only 2 data points
Ring Infiltrometer	CT#4-1	1.45E-05	JM, students	Only 2 data points
Ring Infiltrometer	CT#2B-2	6.55E-05	JM, students	Only 2 data points
Ring Infiltrometer	CT#3A-1	1.68E-04	JM, students	Only 2 data points
Ring Infiltrometer	CT#3B-1	4.86E-05	JM, students	Only 2 data points

Appendix E
Individual Calculation Sheets for Saturated Hydraulic Conductivity Data



Ring Infiltrometer Calculation Sheet

Location: Vangorda Waste Rock Dump
Date: 27-Aug-07
Test-Pit-No: CT#1-2
Operator: JM, TG

Inner Diameter of Ring: 56.3 cm
Inner Area of Ring: 2489.5 cm²
Lateral Divergence: 5 cm
Depth of Wetting Front: 55 cm
Water Entry Value: -1.5 cm
Average Depth of Water in Ring: 8.0 cm

No.	Time t date hh:mm	Δt min	Time Elapsed min	Water level cm	Change in Water Level cm	Infiltration Rate cm/hr
1	8-27-07 9:20			15.9		
	8-27-07 13:20	240	240	0	15.9	3.98
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Average Infiltration Rate: 3.98 cm/hr
Infiltration Rate (account for lateral divergence): 2.87 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs} : 7.56E-04 cm/sec



Ring Infiltrometer Calculation Sheet

Location: Vangorda Waste Rock Dump
Date: 27-Aug-07
Test-Pit-No: CT#1-3
Operator: JM, TG

Inner Diameter of Ring: 56 cm
Inner Area of Ring: 2463.0 cm²
Lateral Divergence: 5 cm
Depth of Wetting Front: 55 cm
Water Entry Value: -1.5 cm
Average Depth of Water in Ring: 9.5 cm

No.	Time t	Δt	Time Elapsed	Water level	Change in Water Level	Infiltration Rate
	date hh:mm	min	min	cm	cm	cm/hr
1	8-27-07 9:20 8-27-07 13:20	240	240	14.50 12.25	2.3	0.56
2	8-27-07 13:20 8-27-07 14:50	90	330	12.25 0.49	11.8	7.84
3	8-27-07 14:50 8-27-07 16:50	120	450	11.40 10.40	1.0	0.50
4	8-27-07 16:50 8-27-07 18:00	70	520	10.40 9.80	0.6	0.51
5	8-27-07 18:00 8-28-07 9:00	900	1420	9.80 3.80	6.0	0.40
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Average Infiltration Rate: 0.47 cm/hr
Infiltration Rate (account for lateral divergence): 0.34 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs} : 8.71E-05 cm/sec



Ring Infiltrometer Calculation Sheet

Location: Vangorda Waste Rock Dump
Date: 27-Aug-07
Test-Pit-No: CT#4-2
Operator: JM, TG

Inner Diameter of Ring: 55.6 cm
Inner Area of Ring: 2427.9 cm²
Lateral Divergence: 5 cm
Depth of Wetting Front: 55 cm
Water Entry Value: -1.5 cm
Average Depth of Water in Ring: 11.3 cm

No.	Time t	Δt	Time Elapsed	Water level	Change in Water Level	Infiltration Rate
	date hh:mm	min	min	cm	cm	cm/hr
1	8-27-07 10:15 8-27-07 13:25	190	190	12.70 12.40	0.3	0.09
2	8-27-07 13:25 8-27-07 15:00	95	285	12.40 12.30	0.1	0.06
3	8-27-07 15:00 8-27-07 16:55	115	400	12.30 12.30	0.0	0.00
4	8-27-07 16:55 8-27-07 18:10	75	475	12.30 12.20	0.1	0.08
5	8-27-07 18:10 8-28-07 10:08	958	1433	12.20 11.10	1.1	0.07
6	8-28-07 10:08 8-28-07 13:10	182	1615	11.10 11.00	0.1	0.03
7	8-28-07 13:10 8-28-07 15:10	120	1735	11.00 10.60	0.4	0.20
8	8-28-07 15:10 8-28-07 17:34	144	1879	10.60 10.60	0.0	0.00
9	8-28-07 17:34 8-29-07 8:45	911	2790	10.60 9.50	1.1	0.07
10	8-29-07 8:45 8-29-07 18:33	588	3378	9.50 8.70	0.8	0.08
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Average Infiltration Rate: 0.08 cm/hr
Infiltration Rate (account for lateral divergence): 0.06 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs} : 1.38E-05 cm/sec



Ring Infiltrometer Calculation Sheet

Location: Vangorda Waste Rock Dump
Date: 27-Aug-07
Test-Pit-No: CT#4-3
Operator: JM, TG

Inner Diameter of Ring: 56.4 cm
Inner Area of Ring: 2498.3 cm²
Lateral Divergence: 5 cm
Depth of Wetting Front: 55 cm
Water Entry Value: -1.5 cm
Average Depth of Water in Ring: 11.6 cm

No.	Time t date hh:mm	Δt min	Time Elapsed min	Water level cm	Change in Water Level cm	Infiltration Rate cm/hr
1	8-27-07 10:18 8-27-07 13:23	185	185	14.80 12.00	2.8	0.91
2	8-27-07 13:23 8-27-07 15:00	97	282	12.00 11.20	0.8	0.49
3	8-27-07 15:00 8-27-07 16:55	115	397	11.20 10.70	0.5	0.26
4	8-27-07 16:55 8-27-07 18:10	75	472	10.70 10.00	0.7	0.56
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Average Infiltration Rate: 0.44 cm/hr
Infiltration Rate (account for lateral divergence): 0.32 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs} : 7.85E-05 cm/sec



Ring Infiltrometer Calculation Sheet

Location: Vangorda Waste Rock Dump
Date: 27-Aug-07
Test-Pit-No: CT#2B-3
Operator: JM, TG

Inner Diameter of Ring: 56.9 cm
Inner Area of Ring: 2542.8 cm²
Lateral Divergence: 5 cm
Depth of Wetting Front: 55 cm
Water Entry Value: -1.5 cm
Average Depth of Water in Ring: 9.5 cm

No.	Time t	Δt	Time Elapsed	Water level	Change in Water Level	Infiltration Rate
	date hh:mm	min	min	cm	cm	cm/hr
1	8-27-07 10:35 8-27-07 12:55	140	140	17.90 13.00	4.9	2.10
2	8-27-07 12:55 8-27-07 14:55	120	260	13.00 8.60	4.4	2.20
3	8-27-07 14:55 8-27-07 16:55	120	380	8.60 7.50	1.1	0.55
4	8-27-07 16:55 8-27-07 18:00	65	445	7.50 7.20	0.3	0.28
5	8-27-07 18:00 8-28-07 9:00	900	1345	7.20 4.80	2.4	0.16
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Average Infiltration Rate: 0.22 cm/hr
Infiltration Rate (account for lateral divergence): 0.16 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs} : 4.06E-05 cm/sec



Ring Infiltrometer Calculation Sheet

Location: Vangorda Waste Rock Dump
Date: 28-Aug-07
Test-Pit-No: CT#2A-3
Operator: JM, TG

Inner Diameter of Ring: 57.7 cm
Inner Area of Ring: 2614.8 cm²
Lateral Divergence: 5 cm
Depth of Wetting Front: 55 cm
Water Entry Value: -1.5 cm
Average Depth of Water in Ring: 13.3 cm

No.	Time t	Δt	Time Elapsed	Water level	Change in Water Level	Infiltration Rate
	date hh:mm	min	min	cm	cm	cm/hr
1	8-28-07 10:40 8-28-07 11:40	60	60	15.40 14.70	0.7	0.70
2	8-28-07 11:40 8-28-07 13:10	90	150	14.70 14.30	0.4	0.27
3	8-28-07 13:10 8-28-07 15:15	125	275	14.30 13.80	0.5	0.24
4	8-28-07 15:15 8-28-07 17:30	135	410	13.80 13.10	0.7	0.31
5	8-28-07 17:30 8-29-07 7:44	854	1264	13.10 11.40	1.7	0.12
6	8-29-07 7:44 8-29-07 18:08	624	1888	11.40 9.80	1.6	0.15
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Average Infiltration Rate: 0.14 cm/hr
Infiltration Rate (account for lateral divergence): 0.10 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs} : 2.39E-05 cm/sec



Ring Infiltrometer Calculation Sheet

Location: Vangorda Waste Rock Dump
Date: 28-Aug-07
Test-Pit-No: CT#2A-1
Operator: JM

Inner Diameter of Ring: 56.7 cm
Inner Area of Ring: 2525.0 cm²
Lateral Divergence: 5 cm
Depth of Wetting Front: 55 cm
Water Entry Value: -1.5 cm
Average Depth of Water in Ring: 9.6 cm

No.	Time t	Δt	Time Elapsed	Water level	Change in Water Level	Infiltration Rate
	date hh:mm	min	min	cm	cm	cm/hr
1	8-18-07 12:00 8-18-07 12:43	43	43	11.10 10.50	0.6	0.84
2	8-18-07 12:43 8-18-07 13:31	48	91	10.50 9.80	0.7	0.88
3	8-18-07 13:31 8-18-07 14:15	44	135	9.80 9.40	0.4	0.55
4	8-18-07 14:15 8-18-07 15:33	78	213	9.40 9.10	0.3	0.23
5	8-18-07 15:33 8-18-07 16:34	61	274	9.10 8.90	0.2	0.20
6	8-18-07 16:34 8-18-07 17:59	85	359	8.90 8.50	0.4	0.28
7						
8						
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17						
18						
19						
20						

Average Infiltration Rate: 0.24 cm/hr
Infiltration Rate (account for lateral divergence): 0.17 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs} : 4.38E-05 cm/sec



Ring Infiltrometer Calculation Sheet

Location: Vangorda Waste Rock Dump
Date: 28-Aug-07
Test-Pit-No: CT#2A-2
Operator: JM

Inner Diameter of Ring: 56.75 cm
Inner Area of Ring: 2529.4 cm²
Lateral Divergence: 5 cm
Depth of Wetting Front: 55 cm
Water Entry Value: -1.5 cm
Average Depth of Water in Ring: 11.9 cm

No.	Time t	Δt	Time Elapsed	Water level	Change in Water Level	Infiltration Rate
	date hh:mm	min	min	cm	cm	cm/hr
1	8-19-07 10:25 8-19-07 13:34	189	189	12.40 11.20	1.2	0.38
2	8-19-07 13:34 8-19-07 16:54	200	389	11.20 11.00	0.2	0.06
3	8-21-07 10:01 8-21-07 17:05	424	3280	13.00 12.70	0.3	0.04
4						
5						
6						
7						
8						
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10						
11						
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13						
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15						
16						
17						
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19						
20						

Average Infiltration Rate: 0.05 cm/hr
Infiltration Rate (account for lateral divergence): 0.04 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs} : 9.14E-06 cm/sec



Ring Infiltrometer Calculation Sheet

Location: Vangorda Waste Rock Dump
Date: 28-Aug-07
Test-Pit-No: CT#2A-2
Operator: JM

Inner Diameter of Ring: 56.75 cm
Inner Area of Ring: 2529.4 cm²
Lateral Divergence: 5 cm
Depth of Wetting Front: 55 cm
Water Entry Value: -1.5 cm
Average Depth of Water in Ring: 11.9 cm

No.	Time t date hh:mm	Δt min	Time Elapsed min	Water level cm	Change in Water Level cm	Infiltration Rate cm/hr
1	8-19-07 10:25 8-19-07 13:34	189	189	12.40 11.20	1.2	0.38
2	8-19-07 13:34 8-19-07 16:54	200	389	11.20 11.00	0.2	0.06
3	8-21-07 10:01 8-21-07 17:05	424	3280	13.00 12.70	0.3	0.04
4						
5						
6						
7						
8						
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12						
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19						
20						

Average Infiltration Rate: 0.05 cm/hr
Infiltration Rate (account for lateral divergence): 0.04 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs} : 9.14E-06 cm/sec



Ring Infiltrometer Calculation Sheet

Location: Vangorda Waste Rock Dump
Date: 28-Aug-07
Test-Pit-No: CT#1-1
Operator: JM

Inner Diameter of Ring: 56.75 cm
Inner Area of Ring: 2529.4 cm²
Lateral Divergence: 5 cm
Depth of Wetting Front: 55 cm
Water Entry Value: -1.5 cm
Average Depth of Water in Ring: 9.9 cm

No.	Time t date hh:mm	Δt min	Time Elapsed min	Water level cm	Change in Water Level cm	Infiltration Rate cm/hr
1	8-19-07 14:00 8-19-07 16:58	178	178	11.60 9.50	2.1	0.71
2	8-21-07 10:28 8-21-07 17:11	403	3071	10.00 8.50	1.5	0.22
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Average Infiltration Rate: 0.22 cm/hr
Infiltration Rate (account for lateral divergence): 0.16 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs} : 4.12E-05 cm/sec



Ring Infiltrometer Calculation Sheet

Location: Vangorda Waste Rock Dump
Date: 28-Aug-07
Test-Pit-No: CT#4-1
Operator: JM

Inner Diameter of Ring: 56 cm
Inner Area of Ring: 2463.0 cm²
Lateral Divergence: 5 cm
Depth of Wetting Front: 55 cm
Water Entry Value: -1.5 cm
Average Depth of Water in Ring: 10.0 cm

No.	Time t date hh:mm	Δt min	Time Elapsed min	Water level cm	Change in Water Level cm	Infiltration Rate cm/hr
1	8-18-07 15:42 8-18-07 17:08	86	86	11.00 10.20	0.8	0.56
2	8-21-07 11:04 8-21-07 17:22	378	4420	9.70 9.20	0.5	0.08
3						
4						
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18						
19						
20						

Average Infiltration Rate: 0.08 cm/hr
Infiltration Rate (account for lateral divergence): 0.06 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs} : 1.45E-05 cm/sec



Ring Infiltrometer Calculation Sheet

Location: Vangorda Waste Rock Dump
Date: 28-Aug-07
Test-Pit-No: CT#2B-2
Operator: JM

Inner Diameter of Ring: 57.32 cm
Inner Area of Ring: 2580.5 cm²
Lateral Divergence: 5 cm
Depth of Wetting Front: 55 cm
Water Entry Value: -1.5 cm
Average Depth of Water in Ring: 13.1 cm

No.	Time t date hh:mm	Δt min	Time Elapsed min	Water level cm	Change in Water Level cm	Infiltration Rate cm/hr
1	8-18-07 12:25 8-18-07 13:31	66	66	13.00 12.80	0.2	0.18
2	8-18-07 13:31 8-18-07 14:35	64	130	12.80 12.70	0.1	0.09
3	8-18-07 14:35 8-18-07 15:59	84	214	12.70 11.00	1.7	1.21
4					0.0	
5	8-18-07 18:11 8-19-07 9:27	916	1262	17.90 12.20	5.7	0.37
6						
7						
8						
9						
10						
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12						
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16						
17						
18						
19						
20						

Average Infiltration Rate: 0.37 cm/hr
Infiltration Rate (account for lateral divergence): 0.27 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs} : 6.55E-05 cm/sec



Ring Infiltrometer Calculation Sheet

Location: Vangorda Waste Rock Dump
Date: 28-Aug-07
Test-Pit-No: CT#3A-1
Operator: JM

Inner Diameter of Ring: 56.7 cm
Inner Area of Ring: 2525.0 cm²
Lateral Divergence: 5 cm
Depth of Wetting Front: 55 cm
Water Entry Value: -1.5 cm
Average Depth of Water in Ring: 9.3 cm

No.	Time t	Δt	Time Elapsed	Water level	Change in Water Level	Infiltration Rate
	date hh:mm	min	min	cm	cm	cm/hr
1	8-19-07 15:06 8-19-07 17:03	117	117	11.80 6.80	5.0	2.56
2						
3	8-21-07 10:54 8-21-07 17:20	386	3014	12.10 6.30	5.8	0.90
4						
5						
6						
7						
8						
9						
10						
11						
12						
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15						
16						
17						
18						
19						
20						

Average Infiltration Rate: 0.90 cm/hr
Infiltration Rate (account for lateral divergence): 0.65 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs} : 1.68E-04 cm/sec



Ring Infiltrometer Calculation Sheet

Location: Vangorda Waste Rock Dump
Date: 28-Aug-07
Test-Pit-No: CT#3B-1
Operator: JM

Inner Diameter of Ring: 56.7 cm
Inner Area of Ring: 2525.0 cm²
Lateral Divergence: 5 cm
Depth of Wetting Front: 55 cm
Water Entry Value: -1.5 cm
Average Depth of Water in Ring: 8.5 cm

No.	Time t date hh:mm	Δt min	Time Elapsed min	Water level cm	Change in Water Level cm	Infiltration Rate cm/hr
1	8-19-07 14:25 8-19-07 17:00	155	155	12.00 4.30	7.7	2.98
2						
3	8-21-07 10:39 8-21-07 17:15	396	3050	9.70 8.00	1.7	0.26
4						
5						
6						
7						
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Average Infiltration Rate: 0.26 cm/hr
Infiltration Rate (account for lateral divergence): 0.19 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs} : 4.86E-05 cm/sec

Location: Vangorda Waste Rock Dump	Investigator: TG
Date: August 27, 2007	Depth of Well Hole: N/A, tension infiltrometer
Test No: CT#1-2	
Dominant Soil Type: Compacted glacial till	

Head = -200 mm						Head = -45 mm							
Reservoir(s) used: both						Reservoir(s) used: both							
Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R1 (cm/min)	Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R2 (cm/min)		
1	0	0:00:00	0.0	26.40	0.00	0.000	1	0	0:00:00	0.0	16.65	0.00	0.000
2	30	0:30:00	30.0	26.95	0.55	0.018	2	30	0:30:00	30.0	16.75	0.10	0.003
3	40	0:40:00	10.0	27.20	0.25	0.025	3	60	1:00:00	30.0	17.40	0.65	0.022
4	50	0:50:00	10.0	27.60	0.40	0.040	4	92	1:32:00	32.0	18.10	0.70	0.022
5	60	1:00:00	10.0	27.95	0.35	0.035	5	102	1:42:00	10.0	18.30	0.20	0.020
6	70	1:10:00	10.0	28.30	0.35	0.035	6	112	1:52:00	10.0	18.50	0.20	0.020
7							7	122	2:02:00	10.0	18.70	0.20	0.020
8							8						
9							9						
10							10						
11							11						
12							12						
13							13						
14							14						
15							15						
16							16						
17							17						
18							18						
19							19						
20							20						
21							21						
22							22						
23							23						
24							24						
25							25						
Steady rate for three consecutive readings (R1)					0.037	Steady rate for three consecutive readings (R2)					0.020		

Saturated Hydraulic Conductivity, K_s = -1.38E-05 cm/s

Location: Vangorda Waste Rock Dump	Investigator: JM, TG
Date: August 24, 2007	Depth of Well Hole: N/A, tension infiltrometer
Test No: CT#2A-1	
Dominant Soil Type: Compacted glacial till	

Head = -206 mm							Head = -60 mm						
Reservoir(s) used: inner							Reservoir(s) used: inner						
Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R1 (cm/min)	Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R2 (cm/min)		
1	0	0:00:00	0.0	48.30	0.00	0.000	1	0	0:00:00	0.0	9.20	0.00	0.000
2	6	0:06:00	6.0	48.60	0.30	0.050	2	1	0:01:00	1.0	13.60	4.40	4.400
3	11	0:11:00	5.0	49.00	0.40	0.080	3	2	0:02:00	1.0	17.90	4.30	4.300
4	15	0:15:00	4.0	49.20	0.20	0.050	4	3	0:03:00	1.0	23.20	5.30	5.300
5	20	0:20:00	5.0	49.60	0.40	0.080	5	4	0:04:00	1.0	26.30	3.10	3.100
6	25	0:25:00	5.0	49.80	0.20	0.040	6	5	0:05:00	1.0	30.60	4.30	4.300
7	30	0:30:00	5.0	50.00	0.20	0.040	7	6	0:06:00	1.0	38.00	7.40	7.400
8	35	0:35:00	5.0	50.60	0.60	0.120	8	7	0:07:00	1.0	42.10	4.10	4.100
9	40	0:40:00	5.0	50.80	0.20	0.040	9	8	0:08:00	1.0	46.20	4.10	4.100
10	50	0:50:00	10.0	50.80	0.00	0.000	10	9	0:09:00	1.0	50.40	4.20	4.200
11	57	0:57:00	7.0	50.80	0.00	0.000	11	10	0:10:00	1.0	56.40	6.00	6.000
12	62	1:02:00	5.0	50.90	0.10	0.020	12	11	0:11:00	1.0	58.70	2.30	2.300
13	82	1:22:00	20.0	51.00	0.10	0.005	13	12	0:12:00	1.0	62.50	3.80	3.800
14	100	1:40:00	18.0	51.40	0.40	0.022	14	13	0:13:00	1.0	66.50	4.00	4.000
15	120	2:00:00	20.0	51.60	0.20	0.010	15	14	0:14:00	1.0	70.70	4.20	4.200
16							16						
17							17						
18							18						
19							19						
20							20						
21							21						
22							22						
23							23						
24							24						
25							25						
Steady rate for three consecutive readings (R1)					0.012		Steady rate for three consecutive readings (R2)					4.000	

Saturated Hydraulic Conductivity, K_s = 3.60E-03 cm/s

Location: Vangorda Waste Rock Dump	Investigator: JM, TG
Date: August 25, 2007	Depth of Well Hole: N/A, tension infiltrometer
Test No: CT#2A-2	
Dominant Soil Type: Compacted glacial till	

Head = -200 mm							Head = -50 mm						
Reservoir(s) used: inner							Reservoir(s) used: both						
Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R1 (cm/min)	Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R2 (cm/min)		
1	0	0:00:00	0.0	22.00	0.00	0.000	1	0	0:00:00	0.0	30.30	0.00	0.000
2	20	0:20:00	20.0	25.40	3.40	0.170	2	10	0:10:00	10.0	31.30	1.00	0.100
3	30	0:30:00	10.0	31.50	6.10	0.610	3	20	0:20:00	10.0	32.40	1.10	0.110
4	40	0:40:00	10.0	37.00	5.50	0.550	4	30	0:30:00	10.0	33.80	1.40	0.140
5	50	0:50:00	10.0	43.10	6.10	0.610	5	45	0:45:00	15.0	35.60	1.80	0.120
6	70	1:10:00	20.0	53.90	10.80	0.540	6	60	1:00:00	15.0	37.20	1.60	0.107
7	90	1:30:00	20.0	58.50	4.60	0.230	7	75	1:15:00	15.0	38.70	1.50	0.100
8	110	1:50:00	20.0	63.40	4.90	0.245	8	90	1:30:00	15.0	40.60	1.90	0.127
9	130	2:10:00	20.0	68.80	5.40	0.270	9	110	1:50:00	20.0	42.80	2.20	0.110
10	150	2:30:00	20.0	74.40	5.60	0.280	10	125	2:05:00	15.0	44.50	1.70	0.113
11							11						
12							12						
13							13						
14							14						
15							15						
16							16						
17							17						
18							18						
19							19						
20							20						
21							21						
22							22						
23							23						
24							24						
25							25						
Steady rate for three consecutive readings (R1)						0.265	Steady rate for three consecutive readings (R2)						0.117

Saturated Hydraulic Conductivity, K_s = 2.09E-04 cm/s

Location: Vangorda Waste Rock Dump	Investigator: JM, TG
Date: August 25, 2007	Depth of Well Hole: N/A, tension infiltrometer
Test No: CT#2A-3	
Dominant Soil Type: Compacted glacial till	

Head = -185 mm							Head = -50 mm						
Reservoir(s) used: both							Reservoir(s) used: both						
Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R1 (cm/min)	Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R2 (cm/min)		
1	0	0:00:00	0.0	16.70	0.00	0.000	1	0	0:00:00	0.0	16.90	0.00	0.000
2	30	0:30:00	30.0	19.40	2.70	0.090	2	5	0:05:00	5.0	18.70	1.80	0.360
3	60	1:00:00	30.0	35.20	15.80	0.527	3	10	0:10:00	5.0	20.70	2.00	0.400
4	80	1:20:00	20.0	44.10	8.90	0.445	4	15	0:15:00	5.0	22.50	1.80	0.360
5	100	1:40:00	20.0	54.00	9.90	0.495	5	25	0:25:00	10.0	25.50	3.00	0.300
6	120	2:00:00	20.0	64.00	10.00	0.500	6	40	0:40:00	15.0	29.80	4.30	0.287
7	140	2:20:00	20.0	74.40	10.40	0.520	7	50	0:50:00	10.0	32.30	2.50	0.250
8	140	2:20:00	0.0	32.80			8	60	1:00:00	10.0	34.50	2.20	0.220
9	160	2:40:00	20.0	37.40	4.60	0.230	9	70	1:10:00	10.0	36.90	2.40	0.240
10	180	3:00:00	20.0	47.40	10.00	0.500	10	80	1:20:00	10.0	39.30	2.40	0.240
11	190	3:10:00	10.0	52.50	5.10	0.510	11	85	1:25:00	5.0	40.35	1.05	0.210
12	200	3:20:00	10.0	56.70	4.20	0.420	12						
13	210	3:30:00	10.0	61.10	4.40	0.440	13						
14							14						
15							15						
16							16						
17							17						
18							18						
19							19						
20							20						
21							21						
22							22						
23							23						
24							24						
25							25						
Steady rate for three consecutive readings (R1)					0.457	Steady rate for three consecutive readings (R2)					0.230		

Saturated Hydraulic Conductivity, K_s = -2.20E-04 cm/s

Location: Vangorda Waste Rock Dump	Investigator: JM, TG
Date: August 26, 2007	Depth of Well Hole: N/A, tension infiltrometer
Test No: CT2B-1	
Dominant Soil Type: Compacted glacial till	

Head = -190 mm							Head = -60 mm						
Reservoir(s) used: both							Reservoir(s) used: both						
Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R1 (cm/min)		Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R2 (cm/min)	
1	0	0:00:00	0.0	31.30	0.00	0.000	1	0	0:00:00	0.0	25.65	0.00	0.000
2	15	0:15:00	15.0	31.55	0.25	0.017	2	30	0:30:00	30.0	27.80	2.15	0.072
3	30	0:30:00	15.0	31.80	0.25	0.017	3	60	1:00:00	30.0	31.15	3.35	0.112
4	40	0:40:00	10.0	32.30	0.50	0.050	4	80	1:20:00	20.0	33.30	2.15	0.108
5	55	0:55:00	15.0	32.75	0.45	0.030	5	100	1:40:00	20.0	35.35	2.05	0.103
6	70	1:10:00	15.0	33.30	0.55	0.037	6						
7	85	1:25:00	15.0	33.75	0.45	0.030	7						
8	100	1:40:00	15.0	34.25	0.50	0.033	8						
9							9						
10							10						
11							11						
12							12						
13							13						
14							14						
15							15						
16							16						
17							17						
18							18						
19							19						
20							20						
21							21						
22							22						
23							23						
24							24						
25							25						
Steady rate for three consecutive readings (R1)						0.033	Steady rate for three consecutive readings (R2)						0.107

Saturated Hydraulic Conductivity, K_s = 1.39E-04 cm/s

Location: Vangorda Waste Rock Dump	Investigator: TG
Date: August 27, 2007	Depth of Well Hole: N/A, tension infiltrometer
Test No: CT#1-1	
Dominant Soil Type: Compacted glacial till	

Head = -200 mm							Head = -50 mm						
Reservoir(s) used: both							Reservoir(s) used: both						
Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R1 (cm/min)	Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R2 (cm/min)		
1	0	0:00:00	0.0	34.00	0.00	0.000	1	0	0:00:00	0.0	26.85	0.00	0.000
2	30	0:30:00	30.0	34.55	0.55	0.018	2	30	0:30:00	30.0	27.75	0.90	0.030
3	45	0:45:00	15.0	34.70	0.15	0.010	3	45	0:45:00	15.0	29.65	1.90	0.127
4	60	1:00:00	15.0	35.00	0.30	0.020	4	60	1:00:00	15.0	31.55	1.90	0.127
5	75	1:15:00	15.0	35.30	0.30	0.020	5	75	1:15:00	15.0	33.55	2.00	0.133
6	90	1:30:00	15.0	35.55	0.25	0.017	6						
7							7						
8							8						
9							9						
10							10						
11							11						
12							12						
13							13						
14							14						
15							15						
16							16						
17							17						
18							18						
19							19						
20							20						
21							21						
22							22						
23							23						
24							24						
25							25						
Steady rate for three consecutive readings (R1)						0.019	Steady rate for three consecutive readings (R2)						0.129

Saturated Hydraulic Conductivity, K_s = 2.24E-04 cm/s

Location: Vangorda Waste Rock Dump	Investigator: TG
Date: August 27, 2007	Depth of Well Hole: N/A, tension infiltrometer
Test No: CT#1-2	
Dominant Soil Type: Compacted glacial till	

Head = -200 mm						Head = -45 mm							
Reservoir(s) used: both						Reservoir(s) used: both							
Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R1 (cm/min)	Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R2 (cm/min)		
1	0	0:00:00	0.0	26.40	0.00	0.000	1	0	0:00:00	0.0	16.65	0.00	0.000
2	30	0:30:00	30.0	26.95	0.55	0.018	2	30	0:30:00	30.0	16.75	0.10	0.003
3	40	0:40:00	10.0	27.20	0.25	0.025	3	60	1:00:00	30.0	17.40	0.65	0.022
4	50	0:50:00	10.0	27.60	0.40	0.040	4	92	1:32:00	32.0	18.10	0.70	0.022
5	60	1:00:00	10.0	27.95	0.35	0.035	5	102	1:42:00	10.0	18.30	0.20	0.020
6	70	1:10:00	10.0	28.30	0.35	0.035	6	112	1:52:00	10.0	18.50	0.20	0.020
7							7	122	2:02:00	10.0	18.70	0.20	0.020
8							8						
9							9						
10							10						
11							11						
12							12						
13							13						
14							14						
15							15						
16							16						
17							17						
18							18						
19							19						
20							20						
21							21						
22							22						
23							23						
24							24						
25							25						
Steady rate for three consecutive readings (R1)					0.037	Steady rate for three consecutive readings (R2)					0.020		

Saturated Hydraulic Conductivity, K_s = -1.38E-05 cm/s

Location: Vangorda Waste Rock Dump	Investigator: TG
Date: August 28, 2007	Depth of Well Hole: N/A, tension infiltrometer
Test No: CT#4-1	
Dominant Soil Type: Compacted glacial till	

Head = -200 mm							Head = -50 mm						
Reservoir(s) used: inner							Reservoir(s) used: both						
Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R1 (cm/min)	Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R2 (cm/min)		
1	0	0:00:00	0.0	18.80	0.00	0.000	1	0	0:00:00	0.0	16.80	0.00	0.000
2	30	0:30:00	30.0	29.30	10.50	0.350	2	20	0:20:00	20.0	17.05	0.25	0.013
3	60	1:00:00	30.0	39.55	10.25	0.342	3	40	0:40:00	20.0	17.35	0.30	0.015
4	75	1:15:00	15.0	49.00	9.45	0.630	4	60	1:00:00	20.0	17.70	0.35	0.017
5	90	1:30:00	15.0	55.10	6.10	0.407	5	80	1:20:00	20.0	18.05	0.35	0.018
6	105	1:45:00	15.0	61.70	6.60	0.440	6						
7	120	2:00:00	15.0	68.20	6.50	0.433	7						
8	135	2:15:00	15.0	74.80	6.60	0.440	8						
9							9						
10							10						
11							11						
12							12						
13							13						
14							14						
15							15						
16							16						
17							17						
18							18						
19							19						
20							20						
21							21						
22							22						
23							23						
24							24						
25							25						
Steady rate for three consecutive readings (R1)						0.438	Steady rate for three consecutive readings (R2)						0.017

Saturated Hydraulic Conductivity, K_s = -8.64E-06 cm/s

Location: Vangorda Waste Rock Dump	Investigator: TG
Date: August 28, 2007	Depth of Well Hole: N/A, tension infiltrometer
Test No: CT#4-2	
Dominant Soil Type: Compacted glacial till	

Head = -180 mm							Head = -50 mm						
Reservoir(s) used: inner							Reservoir(s) used: both						
Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R1 (cm/min)	Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R2 (cm/min)		
1	0	0:00:00	0.0	33.00	0.00	0.000	1	0	0:00:00	0.0	36.85	0.00	0.000
2	10	0:10:00	10.0	34.10	1.10	0.110	2	15	0:15:00	15.0	37.10	0.25	0.017
3	15	0:15:00	5.0	33.80	-0.30	-0.060	3	30	0:30:00	15.0	37.30	0.20	0.013
4	20	0:20:00	5.0	34.30	0.50	0.100	4	50	0:50:00	20.0	37.85	0.55	0.028
5	25	0:25:00	5.0	35.05	0.75	0.150	5	100	1:40:00	50.0	39.40	1.55	0.031
6	30	0:30:00	5.0	35.95	0.90	0.180	6	150	2:30:00	50.0	41.00	1.60	0.032
7	35	0:35:00	5.0	36.80	0.85	0.170	7	170	2:50:00	20.0	41.60	0.60	0.030
8	40	0:40:00	5.0	37.70	0.90	0.180	8	180	3:00:00	10.0	41.90	0.30	0.030
9							9						
10							10						
11							11						
12							12						
13							13						
14							14						
15							15						
16							16						
17							17						
18							18						
19							19						
20							20						
21							21						
22							22						
23							23						
24							24						
25							25						
Steady rate for three consecutive readings (R1)						0.177	Steady rate for three consecutive readings (R2)						0.031

Saturated Hydraulic Conductivity, K_s = 3.24E-05 cm/s

Location: Vangorda Waste Rock Dump	Investigator: TG
Date: August 29, 2007	Depth of Well Hole: N/A, tension infiltrometer
Test No: CT#3A-1	
Dominant Soil Type: Glacio-fluvial	

Head = -207 mm							Head = -47 mm						
Reservoir(s) used: both							Reservoir(s) used: both						
Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R1 (cm/min)		Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R2 (cm/min)	
1	0	0:00:00	0.0	41.60	0.00	0.000	1	0	0:00:00	0.0	30.30	0.00	0.000
2	5	0:05:00	5.0	41.80	0.20	0.040	2	60	1:00:00	60.0	34.15	3.85	0.064
3	30	0:30:00	25.0	42.60	0.80	0.032	3	85	1:25:00	25.0	35.95	1.80	0.072
4	105	1:45:00	75.0	46.05	3.45	0.046	4	90	1:30:00	5.0	36.30	0.35	0.070
5	110	1:50:00	5.0	46.25	0.20	0.040	5	95	1:35:00	5.0	36.70	0.40	0.080
6	115	1:55:00	5.0	46.40	0.15	0.030	6	110	1:50:00	15.0	37.75	1.05	0.070
7	120	2:00:00	5.0	46.60	0.20	0.040	7						
8							8						
9							9						
10							10						
11							11						
12							12						
13							13						
14							14						
15							15						
16							16						
17							17						
18							18						
19							19						
20							20						
21							21						
22							22						
23							23						
24							24						
25							25						
Steady rate for three consecutive readings (R1)						0.037	Steady rate for three consecutive readings (R2)						0.073

Saturated Hydraulic Conductivity, K_s = 4.18E-05 cm/s

Problems with apparatus, test could not be completed

Location: Vangorda Waste Rock Dump Date: August 29, 2007 Test No: CT#3B-1 Dominant Soil Type: Glacio-fluvial	Investigator: TG Depth of Well Hole: N/A, tension infiltrometer
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Head = -185 mm							Head = mm						
Reservoir(s) used: both							Reservoir(s) used:						
Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R1 (cm/min)	Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R2 (cm/min)		
1	0	0:00:00	0.0	30.30	0.00	0.000	1		0:00:00	0.0	0.000		
2	10	0:10:00	10.0	30.80	0.50	0.050	2		0:00:00	0.0	0.000		
3	20	0:20:00	10.0	31.30	0.50	0.050	3		0:00:00	0.0	0.000		
4	30	0:30:00	10.0	31.45	0.15	0.015	4		0:00:00	0.0	0.000		
5	40	0:40:00	10.0		0.00	0.000	5		0:00:00	0.0	0.000		
6		0:00:00	0.0		0.00	0.000	6		0:00:00	0.0	0.000		
7		0:00:00	0.0		0.00	0.000	7		0:00:00	0.0	0.000		
8		0:00:00	0.0		0.00	0.000	8		0:00:00	0.0	0.000		
9		0:00:00	0.0		0.00	0.000	9		0:00:00	0.0	0.000		
10		0:00:00	0.0		0.00	0.000	10		0:00:00	0.0	0.000		
11							11						
12							12						
13							13						
14							14						
15							15						
16							16						
17							17						
18							18						
19							19						
20							20						
21							21						
22							22						
23							23						
24							24						
25							25						
Steady rate for three consecutive readings (R1)						0.000	Steady rate for three consecutive readings (R2)						0.000

Saturated Hydraulic Conductivity, K_s = #DIV/0! cm/s

Location: Vangorda Waste Rock Dump	Investigator: TG
Date: August 30, 2007	Depth of Well Hole: N/A, tension infiltrometer
Test No: CT#2B-2	
Dominant Soil Type: Compacted glacial till	

Head = -213 mm							Head = -50 mm						
Reservoir(s) used: inner							Reservoir(s) used: both						
Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R1 (cm/min)	Reading Number	Elapsed Time	Time Interval (min)	Water Level in Reservoir (cm)	Water Level Change (cm)	Rate of Water Level Change, R2 (cm/min)		
1	0	0:00:00	0.0	38.75	0.00	0.000	1	0	0:00:00	0.0	22.60	0.00	0.000
2	5	0:05:00	5.0	40.50	1.75	0.350	2	3	0:03:00	3.0	23.00	0.40	0.133
3	10	0:10:00	5.0	41.90	1.40	0.280	3	6	0:06:00	3.0	23.05	0.05	0.017
4	15	0:15:00	5.0	43.35	1.45	0.290	4	9	0:09:00	3.0	23.15	0.10	0.033
5	20	0:20:00	5.0	45.05	1.70	0.340	5	15	0:15:00	6.0	23.35	0.20	0.033
6	25	0:25:00	5.0	46.60	1.55	0.310	6	60	1:00:00	45.0	25.75	2.40	0.053
7	30	0:30:00	5.0	48.00	1.40	0.280	7	75	1:15:00	15.0	26.50	0.75	0.050
8	40	0:40:00	10.0	50.05	2.05	0.205	8	80	1:20:00	5.0	26.75	0.25	0.050
9	50	0:50:00	10.0	51.70	1.65	0.165	9						
10	60	1:00:00	10.0	53.40	1.70	0.170	10						
11	70	1:10:00	10.0	55.05	1.65	0.165	11						
12							12						
13							13						
14							14						
15							15						
16							16						
17							17						
18							18						
19							19						
20							20						
21							21						
22							22						
23							23						
24							24						
25							25						
Steady rate for three consecutive readings (R1)						0.167	Steady rate for three consecutive readings (R2)						0.051

Saturated Hydraulic Conductivity, K_s = 6.70E-05 cm/s

Appendix F
Field Measurements of In-Situ Density

DENSITY TEST RESULTS

ASTM Designation D2922 & D3017, or D1556

Project No: **W14101076**
 Project: S.R.K. Site Works Compaction Testing

Client: **S.R.K.**
 VANCOUVER, BC

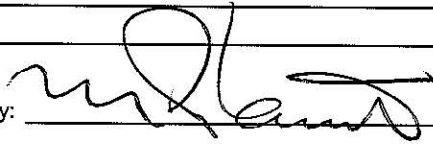
Att'n:

Test Apparatus: Nuclear Machine No: 37595
 Soil Description: Till -silt-sand-gravelly
 Temperature Air: _____ °C Soil: _____ °C
 Specified Compaction: 93.0
 Compaction Standard: Standard Proctor
 Minimum Dry Density: _____
 Maximum Dry Density: 2130
 Optimum M.C.: 9.0
 Date Tested: 2007.08.17 By: J.P.

Test No./ Probe Depth	Location	Elevation	% Moisture Content	Dry Density Kg/m ³	% Compaction
1 /200	CT4 1st row (5m from top) 1st from East (5m)		4.8	2096	98.4
2 /200	CT4 1st Row (5m from top) Middle of Pad		5.2	2097	98.5
3 /200	CT4 1st Row (5m from top) 1st from West (5m)		4.6	2232	102.0+
4 /200	CT4 2nd row (10m from top) 1st from East (5m)		4.7	2122	99.6
5 /200	CT4 2nd row (10m from top) Middle of Pad		4.3	2177	102.0+
6 /200	CT4 2nd row (10m from top) 1st from West (5m)		5.4	2079	97.6
7 /200	CT4 3rd Row (15m from top) 1st from East		4.6	2022	94.9
8 /200	CT4 3rd Row (15m from top) Middle of Pad		4.7	2127	99.9
9 /200	CT4 3rd Row (15m from top) 1st from West		3.6	2227	102.0+
10 /	CT4 4th Row (20m from top) 1st from West: Surface too high to			0	0.0
11 /200	CT4 4th Row (20m from top) Middle of Pad		5.0	2041	95.8
12 /200	4th Row (20m from top) 1st from West		4.3	2091	98.2
13 /200	CT4 5th Row (25m from top) 1st from East		4.6	2109	99.0
14 /200	CT4 5th Row (25m from top) Middle of Pad		4.7	2156	101.2
15 /200	CT4 5th Row (25m from top) 1st from West		3.7	2170	101.9
16 /200	CT4 6th Row (30m from top) 1st from East		4.2	2150	100.9

Remarks: 0.207% moisture for 0.5m L.A. (1.1)

Reviewed By: _____



c.c.
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S.R.K.
VANCOUVER, BC

DENSITY TEST RESULTS

ASTM Designation D2922 & D3017, or D1556

Project No: **W14101076**
 Project: S.R.K. Site Works Compaction Testing

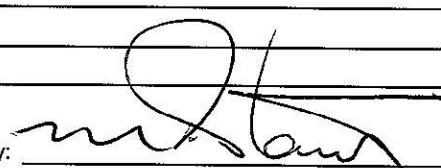
Client: **S.R.K.**
 VANCOUVER, BC

Att'n:

Test Apparatus: Nuclear Machine No: 37595
 Soil Description: Till -silt-sand-gravelly
 Temperature Air: _____ °C Soil: _____ °C
 Specified Compaction: 93.0
 Compaction Standard: Standard Proctor
 Minimum Dry Density: _____
 Maximum Dry Density: 2130
 Optimum M.C.: 9.0
 Date Tested: 2007.08.17 By: J.P.

Test No./ Probe Depth	Location	Elevation	% Moisture Content	Dry Density Kg/m ³	% Compaction
17/200	CT4 6th Row (30m from top) Middle of pad		4.9	2087	98.0
18/200	CT4 6th Row (30m from top) 1st from West		3.9	2058	96.6
19/200	CT3a 1st Row (5m from top) 1st from West		1.8	1970	92.5
20/200	CT3a 1st Row (5m from top) Middle of Pad		2.3	1929	90.6
21/200	CT3a 1st Row (5m from top) 1st from East		2.4	1929	90.6
22/200	CT3a 2nd Row (10m from top) 1st from East		2.1	1985	93.2
23/200	CT3a 2nd Row (10m from top) Middle of Pad		2.7	2002	94.0
24/200	CT3a 2nd Row (10m from top) 1st from West		1.4	1934	90.8
25/200	CT3a 2nd Row (10m from top) 1st from East		1.6	2038	95.7
26/200	CT3a 2nd Row (10m from top) Middle of Pad		1.9	1907	89.5
27/200	CT3a 2nd Row (10m from top) 1st from West		1.9	1940	91.1
28/200	CT3a 3rd Row (15m from top) 1st from East		1.8	1876	88.1
29/200	3rd Row (15m from top) Middle of Pad		2.5	1956	91.8
30/200	CT3a 3rd Row (15m from top) 1st from West		2.2	1952	91.6
31/200	CT3a 5th Row (25m from top) 1st from East		2.3	1984	93.1
32/200	CT3a 5th Row (25m from top) Middle of Pad		2.2	1914	89.9

Remarks: Control Test Site 17, 0.5 m Lift of Till.

Reviewed By: 

c.c.
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S.R.K.
VANCOUVER, BC

EBA Engineering

DENSITY TEST RESULTS

ASTM Designation D2922 & D3017, or D1556

Project No: **W14101076**
 Project: S.R.K. Site Works Compaction Testing

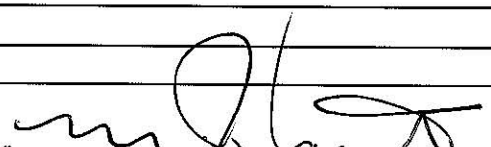
Client: **S.R.K.**
 VANCOUVER, BC

Att'n:

Test Apparatus: <u>Nuclear</u>	Machine No: <u>37595</u>
Soil Description: <u>Till -silt-sand-gravelly</u>	
Temperature Air: _____ °C	Soil: _____ °C
Specified Compaction: <u>93.0</u>	
Compaction Standard: <u>Standard Proctor</u>	
Minimum Dry Density: _____	
Maximum Dry Density: <u>2130</u>	
Optimum M.C.: <u>9.0</u>	
Date Tested: <u>2007.08.17</u>	By: <u>J.P.</u>

Test No./ Probe Depth	Location	Elevation	% Moisture Content	Dry Density Kg/m ³	% Compaction
33 /200	CT3a 5th Row (25m from top) 1st from West		1.7	1962	92.1
34 /200	CT3b 1st Row (5m from top) 1st from East		1.7	1976	92.8
35 /200	1st Row (5m from top) Middle of Pad		3.1	1947	91.4
36 /200	CT3b 1st Row (5m from top) 1st from West		2.3	2113	99.2
37 /200	CT3b 2nd Row (10m from top) 1st from East		1.7	1931	90.7
38 /200	CT3b 2nd Row (10m from top) Middle of Pad		1.9	1920	90.1
39 /200	CT3b 2nd Row (10m from top) 1st from West		2.5	1882	88.4
40 /200	CT3b 3rd Row (15m from top) 1st from East		1.7	1984	93.1
41 /200	CT3b 3rd Row (15m from top) Middle of Row		2.6	1944	91.3
42 /200	CT3b 3rd Row (15m from top) 1st from West		2.0	1999	93.8
43 /200	CT3b 4th Row (20m from top) 1st from East		1.6	2150	100.9
44 /200	CT3b 4th Row (20m from top) Middle of Row		4.2	1854	87.0
45 /200	CT3b 4th Row (20m from top) 1st from West		1.4	2012	94.5
46 /200	CT3b 5th row (25m from top) 1st from East		2.1	2024	95.0
47 /200	CT3b 5th Row (25m from top) Middle of Pad		1.8	1957	91.9
48 /200	CT3b 5th Row (25m from top) 1st from West		2.6	1913	89.8

Remarks: _____

Reviewed By: 

c.c.
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S.R.K.
VANCOUVER, BC



DENSITY TEST RESULTS

ASTM Designation D2922 & D3017, or D1556

Project No: **W14101076**
 Project: S.R.K. Site Works Compaction Testing

Client: **S.R.K.**
VANCOUVER, BC

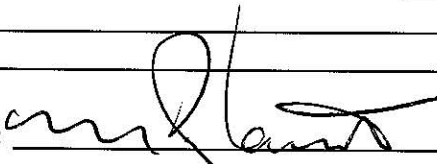
Att'n:

Test Apparatus: <u>Nuclear</u>	Machine No: <u>37595</u>
Soil Description: <u>Till -silt-sand-gravelly</u>	
Temperature Air: _____ °C Soil: _____ °C	
Specified Compaction: <u>93.0</u>	
Compaction Standard: <u>Standard Proctor</u>	
Minimum Dry Density: _____	
Maximum Dry Density: <u>2130</u>	
Optimum M.C.: <u>9.0</u>	
Date Tested: <u>2007.08.17</u> By: <u>J.P.</u>	

Test No./ Probe Depth	Location	Elevation	% Moisture Content	Dry Density Kg/m ³	% Compaction
49/200	CTI 1st Row (5m from top) 1st from East		5.1	1968	92.4
50/200	CTI 1st Row (5m from top) 2nd from East		6.0	1991	93.5
51/200	CTI 1st Row (5m from top) 2nd from West		6.2	2026	95.1
52/200	CTI 2nd Row (10m from top) 1st from East		4.2	2164	101.6
53/200	CTI 2nd Row (10m from top) 2nd from East		5.1	2017	94.7
54/200	CTI 2nd Row (10m from top) 2nd from West		4.6	1963	92.2
55/200	CTI 3rd Row (15m from top) 1st from East		5.3	2012	94.5
56/200	CTI 3rd Row (15m from top) 2nd from East		4.4	1933	90.8
57/200	CTI 3rd Row (15m from top) 2nd from West		5.8	1834	86.1
58/200	CTI 4th Row (20m from top) 1st from East		5.8	2071	97.2
59/200	CTI 4th Row (20m from top) 2nd from East		5.8	2074	97.4
60/200	CTI 4th Row (20m from top) 2nd from West		5.3	1999	93.8
61/200	CTI 5th Row (25m from top) 1st from East		5.7	2105	98.8
62/200	CTI 5th Row (25m from top) 3rd from East		6.1	2129	100.0
63/200	CTI 5th Row (25m from top) 2nd from West		6.3	2038	95.7
64/200	CTI 1st Row (5m from top) 1st from West		5.2	1985	93.2

Remarks: Control Test Strip Per 0.5 m East of T11

Reviewed By: _____



c.c.
FILE COPY

S.R.K.
VANCOUVER, BC

DENSITY TEST RESULTS

ASTM Designation D2922 & D3017, or D1556

Project No: **W14101076**
 Project: **S.R.K. Site Works Compaction Testing**

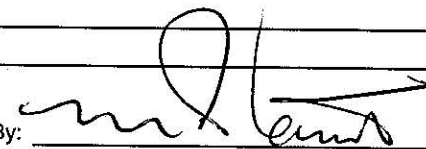
Client: **S.R.K.**
VANCOUVER, BC

Att'n:

Test Apparatus: <u>Nuclear</u>	Machine No: <u>37595</u>
Soil Description: <u>Till -silt-sand-gravelly</u>	
Temperature Air: _____ °C Soil: _____ °C	
Specified Compaction: <u>93.0</u>	
Compaction Standard: <u>Standard Proctor</u>	
Minimum Dry Density: _____	
Maximum Dry Density: <u>2130</u>	
Optimum M.C.: <u>9.0</u>	
Date Tested: <u>2007.08.17</u> By: <u>J.P.</u>	

Test No./ Probe Depth	Location	Elevation	% Moisture Content	Dry Density Kg/m ³	% Compaction
65/200	CTI 2nd Row (10m from top) 1st from West		5.2	1920	90.1
66/200	CTI 3rd Row (15m from top) 1st from West		6.1	1952	91.6
67/200	CTI 4th Row (20m from top) 1st from West		5.2	2031	95.4
68/200	CTI 5th Row (25m from top) 1st from West		5.4	2073	97.3
69/200	CT2b 1st (5m from South) 1st from East		5.3	2084	97.8
70/200	CT2b 1st (5m from South) Middle of Pad		6.1	2086	97.9
71/200	CT2b 1st (5m from South) 1st from West		2.7	2181	102.0+
72/200	CT2b 2nd (10m from South) 1st from East		5.6	2056	96.5
73/200	CT2b 2nd (10m from South) 1st from East		5.1	2149	100.9
74/200	CT2b 2nd (10m from South) 1st from West		5.5	2098	98.5
75/200	CTb2 3rd from South (15m) 1st from East		4.2	2104	98.8
76/200	CTb2 3rd from South (15m) Middle of Pad		4.3	2034	95.5
77/200	CTb2 3rd from South (15m) 1st from West		4.6	2112	99.2
78/200	CTb2 4th from South (20m) 1st from East		5.2	2103	98.7
79/200	CTb2 4th from South (20m) Middle of Pad		5.0	2101	98.6
80/200	CTb2 4th from South (20m) 1st from West		4.6	2071	97.2

Remarks: Control Test Strip For 0.5 m Lift of Till.

Reviewed By: 

c.c.
FILE COPY

S.R.K.
VANCOUVER, BC

DENSITY TEST RESULTS

ASTM Designation D2922 & D3017, or D1556

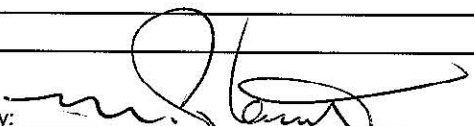
Project No: **W14101076**
 Project: S.R.K. Site Works Compaction Testing
 Client: **S.R.K.**
VANCOUVER, BC

Att'n:

Test Apparatus: <u>Nuclear</u>	Machine No: <u>37595</u>
Soil Description: <u>Till -silt-sand-gravelly</u>	
Temperature Air: _____ °C	Soil: _____ °C
Specified Compaction: <u>93.0</u>	
Compaction Standard: <u>Standard Proctor</u>	
Minimum Dry Density: _____	
Maximum Dry Density: <u>2130</u>	
Optimum M.C.: <u>9.0</u>	
Date Tested: <u>2007.08.17</u>	By: <u>J.P.</u>

Test No./ Probe Depth	Location	Elevation	% Moisture Content	Dry Density Kg/m ³	% Compaction
81 /200	CT2b 5th from South (25m) 1st from East		4.9	2093	98.3
82 /200	CT2b 5th from South (25m) Middle of Pad		4.1	2214	102.0+
83 /200	CT2b 5th from South (25m) 1st from West		5.6	2081	97.7
84 /200	CT2a 1st from South (5m) 1st from East		5.2	2205	102.0+
85 /200	CT2a 1st from South (5m) Middle of Pad		6.0	2122	99.6
86 /200	CT2a 1st from South (5m) 1st from West		4.8	2130	100.0
87 /200	CT2a 2nd from South (10m) 1st from East		4.5	2059	96.7
88 /200	CT2a 2nd from South (10m) Middle of Pad		4.7	2108	99.0
89 /200	CT2a 2nd from South (10m) 1st from West		5.5	2126	99.8
90 /200	CT2a 3rd from South (15m) 1st from East		4.0	1843	86.5
91 /200	CT2a 3rd from south (15m) Middle of Pad		3.9	2145	100.7
92 /200	CT2a 3rd from South (15m) 1st from West		5.3	2085	97.9
93 /200	CT2a 4th from South (20m) 1st from East		4.8	2198	102.0+
94 /200	CT2a 4th from South (20m) Middle of Pad		5.8	2048	96.2
95 /200	CT2a 4th from South (20m) 1st from West		5.1	2127	99.9
96 /200	CT2a 5th from South (25m) 1st from East		5.4	2031	95.4

Remarks: Control Test Site for CT2a of Till.

Reviewed By: 

C.C.
FILE COPY

S.R.K.
VANCOUVER, BC

Appendix G
2008 Flow Monitoring System Upgrade

1 Upgrade of the automated data collection system

As observed during the 2006 monitoring season (SRK 2007), a significant amount of flow representing run-off was reporting to the flow meters through the drain pipes at very low flow rates (i.e. dripping). These volumes could not be measured by the SeaMetrics flow meters designed for a minimum flow rate of 0.19 L/second (www.seametrics.com). To correct the situation, an upgrade of the run-off monitoring system was included among the tasks to be performed under the 2007/08 Project 17a (Appendix A).

The upgrade was to consist of the installation of six tipping bucket flow gauges as backup low-flow monitoring devices, following the model of the existing interflow monitoring system. In August 2007 six Texas Electronics model TE525M tipping bucket flow gauges were acquired and installed on site on the outside of the Vangorda monitoring hut attached to the south wall of the hut. The flow gauges were designed for measuring rainfall, with resolution of 0.1 mm/tip and accuracy of 5% at a flow rate of 0.39×10^{-3} L/second, which insures adequate accuracy for the low flow conditions observed on site.

The 2 inch drainage pipes were re-routed from the inside of the monitoring hut in such way that each pipe intercepts the funnel of one flow gauge. A Tee with a branch diameter of ½ inch and a flow-through diameter of 2 inch was installed at the vertical of each tipping bucket flow gauge, and a short section of ½ inch pipe was attached to the Tee, making the connection between the drainage pipe and the funnel of the flow gauge, to reduce splashing. In this way, at low flow the water would be dripping through the pipe into the funnel, and at high flow the excess water (which can not drain through the ½ inch pipe) would simply discharge straight from the 2 inch PVC drainage pipe after the volume was measured by the SeaMetrics flow meter.

The automated data collection was resolved by employing a Campbell Scientific SDM-SW8A device that allows the simultaneous monitoring of up to 8 tipping bucket flow gauges using one single control port of CR10X #1 data logger. The six TE525 flow gauges were connected to channels 1 through 6 of the SDM device, and the remaining channels were occupied by transferring two of the existing tipping bucket flow gauges (TBR#1 and TBR#2 measuring interflow) from CR10X #2. The total number of channels will be expanded to 15 in 2008 by installing a second SDM-SW8A device in parallel to the first one (15 will be the final number of tipping bucket flow gauges after the monitoring instruments of the lysimeter test will be installed in 2008). The shortcoming of using SDM devices to monitor flow is the fact that flow events are recorded as total flow at a 30 minutes resolution rather than instantaneously (as in the case of flow gauges connected directly to data loggers).

As part of streamlining the automated data collection, the connections of the CS229 Thermal Conductivity sensors pertaining to CT#2A and CT#2B were transferred from CR10X #1 to CR10X #2. The programs controlling data collection and processing by the CR10X data loggers were modified to reflect the changes in the structure and order of the monitored instruments. Monitoring data was collected according to the new structure starting with August 30, 2007.

Appendix H
Field Diagnostic Data Sheets

SRK Consulting
ARMC Waste Rock and Tailings Trial Covers- Information Data Sheet

for Maritz Rykaart

Date and Time:
 Downloaded by:

Davis Instruments Data Loggers (Weather Stations on CT#1 and CT#2A/2B)

<u>CT#1</u>	<u>CT#2A/2B</u>
Data successfully downloaded: <input type="text" value="Y"/>	Data successfully downloaded: <input type="text" value="Y"/>
Diagnostic test run: <input type="text" value="Y"/>	Diagnostic test run: <input type="text" value="Y"/>
Diagnostic test results: Console battery voltage: <input type="text"/>	Diagnostic test results: Console battery voltage: <input type="text" value="6.91"/>
Special Comments: <input type="text"/>	

Campbell Scientific CR10X Data Loggers (Located in Monitoring Hut)

<u>CR10X-1</u>	<u>CR10X-2</u>
Data successfully downloaded: <input type="text" value="Y"/>	Data successfully downloaded: <input type="text" value="Y"/>
Diagnostic test run: <input type="text" value="Y"/>	Diagnostic test run: <input type="text" value="Y"/>
Diagnostic Test Results: Battery Voltage: <input type="text" value="13.72"/>	Diagnostic Test Results: Battery Voltage: <input type="text" value="13.91"/>
Solar panel feed voltage if <11v: <input type="text"/>	Solar panel feed voltage if <11v: <input type="text"/>
Special Comments: <input type="text"/>	

Seametrics Data Loggers (Flowmeters in Monitoring Hut)

<u>Data successfully downloaded</u>		<u>Battery O.K.</u>	
CT#1 (DL#1):	<input type="text" value="N"/>		<input type="text" value="Y"/>
CT#2A (DL32):	<input type="text" value="N"/>		<input type="text" value="Y"/>
CT#2B (DL#3):	<input type="text" value="N"/>		<input type="text" value="Y"/>
CT#3A (DL#4):	<input type="text" value="N"/>		<input type="text" value="Y"/>
CT#3A-I (DL#5):	<input type="text" value="N"/>		<input type="text" value="Y"/>
CT#3B (DL#6):	<input type="text" value="N"/>		<input type="text" value="Y"/>
CT#3B-I (DL#7):	<input type="text" value="N"/>		<input type="text" value="Y"/>
CT#4 (DL#8):	<input type="text" value="N"/>		<input type="text" value="Y"/>
CT#4-I (DL#9):	<input type="text" value="N"/>		<input type="text" value="Y"/>
Has the daily flow check data been attached: <input type="text"/>			
Special Comments: <input type="text" value="No download as the com cable is broken"/>			

Lakewood Systems Data Logger (Thermistors on Grum O/B Dump)

Data successfully downloaded:

Manual readings taken on:

String #1: <input type="text"/>	String #3: <input type="text"/>
String #2: <input type="text"/>	String #4: <input type="text"/>

Special Comments:

Diviner 2000 Data Logger (Manual Moisture Content Probe)

Data successfully downloaded:

Special Comments:

Tailings Trial Cover Survey (Rose Creek Tailings)

Date completed:

Completed by:

Survey Data Forwarded Via: E-mail:
 Fax:

Special Comments:

SRK Consulting
ARMC Waste Rock and Tailings Trial Covers- Information Data Sheet

for Maritz Rykaart

Date and Time:
 Downloaded by:

Davis Instruments Data Loggers (Weather Stations on CT#1 and CT#2A/2B)

CT#1		CT#2A/2B	
Data successfully downloaded:	<input type="text" value="y"/>	Data successfully downloaded:	<input type="text" value="y"/>
Diagnostic test run:	<input type="text" value="y"/>	Diagnostic test run:	<input type="text" value="y"/>
Diagnostic test results:		Diagnostic test results:	
Console battery voltage:	<input type="text" value="6.81 V"/>	Console battery voltage:	<input type="text" value="6.76 V"/>
Special Comments:	<input type="text"/>		

Campbell Scientific CR10X Data Loggers (Located in Monitoring Hut)

CR10X-1		CR10X-2	
Data successfully downloaded:	<input type="text" value="y"/>	Data successfully downloaded:	<input type="text" value="y"/>
Diagnostic test run:	<input type="text" value="y"/>	Diagnostic test run:	<input type="text" value="y"/>
Diagnostic Test Results:		Diagnostic Test Results:	
Battery Voltage:	<input type="text" value="13.83"/>	Battery Voltage:	<input type="text" value="14.34"/>
Solar panel feed voltage if <11v	<input type="text" value="N/A"/>	Solar panel feed voltage if <11v	<input type="text" value="N/A"/>
Special Comments:	<input type="text"/>		

Seametrics Data Loggers (Flowmeters in Monitoring Hut)

Data successfully downloaded		Battery O.K.	
CT#1 (DL#1):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#2A (DL32):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#2B (DL#3):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#3A (DL#4):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#3A-I (DL#5):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#3B (DL#6):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#3B-I (DL#7):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#4 (DL#8):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#4-I (DL#9):	<input type="text" value="y"/>		<input type="text" value="y"/>
Has the daily flow check data been attached:			<input type="text" value="y"/>
Special Comments:	<input type="text"/>		

Lakewood Systems Data Logger (Thermistors on Grum O/B Dump)

Data successfully downloaded:

Manual readings taken on:

String #1:	<input type="text" value="y"/>	String #3:	<input type="text" value="y"/>
String #2:	<input type="text" value="y"/>	String #4:	<input type="text" value="y"/>

Special Comments:

Diviner 2000 Data Logger (Manual Moisture Content Probe)

Data successfully downloaded:

Special Comments:

Tailings Trial Cover Survey (Rose Creek Tailings)

Date completed:

Completed by:

Survey Data Forwarded Via: E-mail: Fax:

Special Comments:

SRK Consulting
ARMC Waste Rock and Tailings Trial Covers- Information Data Sheet

for Maritz Rykaart

Date and Time:

June 14, 2007	8:30AM
---------------	--------

Downloaded by:

Chris Croy	John Minder
------------	-------------

Davis Instruments Data Loggers (Weather Stations on CT#1 and CT#2A/2B)

CT#1		CT#2A/2B	
Data successfully downloaded:	<input type="checkbox" value="y"/>	Data successfully downloaded:	<input type="checkbox" value="y"/>
Diagnostic test run:	<input type="checkbox" value="y"/>	Diagnostic test run:	<input type="checkbox" value="y"/>
Diagnostic test results:		Diagnostic test results:	
Console battery voltage:	6.31V	Console battery voltage:	6.16V
Special Comments:			

Campbell Scientific CR10X Data Loggers (Located in Monitoring Hut)

CR10X-1		CR10X-2	
Data successfully downloaded:	<input type="checkbox" value="y"/>	Data successfully downloaded:	<input type="checkbox" value="y"/>
Diagnostic test run:	<input type="checkbox" value="y"/>	Diagnostic test run:	<input type="checkbox" value="y"/>
Diagnostic Test Results:		Diagnostic Test Results:	
Battery Voltage:	14.77V	Battery Voltage:	14.82V
Solar panel feed voltage if <11v	n/a	Solar panel feed voltage if <11v	n/a
Special Comments:			

Seametrics Data Loggers (Flowmeters in Monitoring Hut)

Data successfully downloaded		Battery O.K.	
CT#1 (DL#1):	<input type="checkbox" value="y"/>		<input type="checkbox" value="y"/>
CT#2A (DL32):	<input type="checkbox" value="y"/>		<input type="checkbox" value="y"/>
CT#2B (DL#3):	<input type="checkbox" value="y"/>		<input type="checkbox" value="y"/>
CT#3A (DL#4):	<input type="checkbox" value="y"/>		<input type="checkbox" value="y"/>
CT#3A-I (DL#5):	<input type="checkbox" value="y"/>		<input type="checkbox" value="y"/>
CT#3B (DL#6):	<input type="checkbox" value="y"/>		<input type="checkbox" value="y"/>
CT#3B-I (DL#7):	<input type="checkbox" value="y"/>		<input type="checkbox" value="y"/>
CT#4 (DL#8):	<input type="checkbox" value="y"/>		<input type="checkbox" value="y"/>
CT#4-I (DL#9):	<input type="checkbox" value="y"/>		<input type="checkbox" value="y"/>
Has the daily flow check data been attached:			<input type="checkbox" value="y"/>
Special Comments:			

Lakewood Systems Data Logger (Thermistors on Grum O/B Dump)

Data successfully downloaded:

Manual readings taken on:

String #1:	<input type="checkbox" value="y"/>	String #3:	<input type="checkbox" value="y"/>
String #2:	<input type="checkbox" value="y"/>	String #4:	<input type="checkbox" value="y"/>

Special Comments: _____

Diviner 2000 Data Logger (Manual Moisture Content Probe)

Data successfully downloaded:

Special Comments: _____

Tailings Trial Cover Survey (Rose Creek Tailings)

Date completed:

14-Jun-07

Completed by:

Chris Croy	John Minder
------------	-------------

Survey Data Forwarded Via: E-mail: Fax:

Special Comments: _____

SRK Consulting
ARMC Waste Rock and Tailings Trial Covers- Information Data Sheet

for Maritz Rykaart

Date and Time:
 Downloaded by:

Davis Instruments Data Loggers (Weather Stations on CT#1 and CT#2A/2B)

<u>CT#1</u>		<u>CT#2A/2B</u>	
Data successfully downloaded:	<input type="text" value="yes"/>	Data successfully downloaded:	<input type="text" value="yes"/>
Diagnostic test run:	<input type="text" value="yes"/>	Diagnostic test run:	<input type="text" value="yes"/>
Diagnostic test results:		Diagnostic test results:	
Console battery voltage:	<input type="text" value="6.96"/>	Console battery voltage:	<input type="text" value="6.3"/>
Special Comments:	<input type="text"/>		

Campbell Scientific CR10X Data Loggers (Located in Monitoring Hut)

<u>CR10X-1</u>		<u>CR10X-2</u>	
Data successfully downloaded:	<input type="text" value="yes"/>	Data successfully downloaded:	<input type="text" value="yes"/>
Diagnostic test run:	<input type="text" value="yes"/>	Diagnostic test run:	<input type="text" value="yes"/>
Diagnostic Test Results:		Diagnostic Test Results:	
Battery Voltage:	<input type="text" value="13.58"/>	Battery Voltage:	<input type="text" value="13.53"/>
Solar panel feed voltage if <11v	<input type="text"/>	Solar panel feed voltage if <11v	<input type="text"/>
Special Comments:	<input type="text"/>		

Seametrics Data Loggers (Flowmeters in Monitoring Hut)

<u>Data successfully downloaded</u>		<u>Battery O.K.</u>
CT#1 (DL#1):	<input type="text" value="yes"/>	<input type="text" value="yes"/>
CT#2A (DL32):	<input type="text" value="yes"/>	<input type="text" value="yes"/>
CT#2B (DL#3):	<input type="text" value="yes"/>	<input type="text" value="yes"/>
CT#3A (DL#4):	<input type="text" value="yes"/>	<input type="text" value="yes"/>
CT#3A-I (DL#5):	<input type="text" value="yes"/>	<input type="text" value="yes"/>
CT#3B (DL#6):	<input type="text" value="yes"/>	<input type="text" value="yes"/>
CT#3B-I (DL#7):	<input type="text" value="yes"/>	<input type="text" value="yes"/>
CT#4 (DL#8):	<input type="text" value="yes"/>	<input type="text" value="yes"/>
CT#4-I (DL#9):	<input type="text" value="yes"/>	<input type="text" value="yes"/>
Has the daily flow check data been attached:		<input type="text" value="yes"/>
Special Comments:	<input type="text"/>	

Lakewood Systems Data Logger (Thermistors on Grum O/B Dump)

Data successfully downloaded:

Manual readings taken on:

String #1:	<input type="text" value="yes"/>	String #3:	<input type="text" value="yes"/>
String #2:	<input type="text" value="yes"/>	String #4:	<input type="text" value="yes"/>

Special Comments:

Diviner 2000 Data Logger (Manual Moisture Content Probe)

Data successfully downloaded:

Special Comments:

Tailings Trial Cover Survey (Rose Creek Tailings)

Date completed:

Completed by:

Survey Data Forwarded Via: E-mail:

Fax:

Special Comments:

SRK Consulting
ARMC Waste Rock and Tailings Trial Covers- Information Data Sheet

for Maritz Rykaart

Date and Time:
 Downloaded by:

Davis Instruments Data Loggers (Weather Stations on CT#1 and CT#2A/2B)

CT#1

CT#2A/2B

Data successfully downloaded:	<input type="text"/>	Data successfully downloaded:	<input type="text"/>
Diagnostic test run:	<input type="text"/>	Diagnostic test run:	<input type="text"/>
Diagnostic test results:		Diagnostic test results:	
Console battery voltage:	<input type="text"/>	Console battery voltage:	<input type="text"/>
Special Comments:	<input type="text"/>		

Campbell Scientific CR10X Data Loggers (Located in Monitoring Hut)

CR10X-1

CR10X-2

Data successfully downloaded:	<input type="text"/>	Data successfully downloaded:	<input type="text"/>
Diagnostic test run:	<input type="text"/>	Diagnostic test run:	<input type="text"/>
Diagnostic Test Results:		Diagnostic Test Results:	
Battery Voltage:	<input type="text"/>	Battery Voltage:	<input type="text"/>
Solar panel feed voltage if <11v	<input type="text"/>	Solar panel feed voltage if <11v	<input type="text"/>
Special Comments:	<input type="text"/>		

Seametrics Data Loggers (Flowmeters in Monitoring Hut)

Data successfully downloaded

Battery O.K.

CT#1 (DL#1):	<input type="text"/>
CT#2A (DL#2):	<input type="text"/>
CT#2B (DL#3):	<input type="text"/>
CT#3A (DL#4):	<input type="text"/>
CT#3A-I (DL#5):	<input type="text"/>
CT#3B (DL#6):	<input type="text"/>
CT#3B-I (DL#7):	<input type="text"/>
CT#4 (DL#8):	<input type="text"/>
CT#4-I (DL#9):	<input type="text"/>

<input type="text"/>
<input type="text"/>
<input type="text"/>
<input type="text"/>
<input type="text"/>
<input type="text"/>
<input type="text"/>
<input type="text"/>
<input type="text"/>
<input type="text"/>

Has the daily flow check data been attached:

Special Comments:

Lakewood Systems Data Logger (Thermistors on Grum O/B Dump)

Data successfully downloaded:

Manual readings taken on:

String #1:	<input type="text" value="Y"/>	String #3:	<input type="text" value="Y"/>
String #2:	<input type="text" value="Y"/>	String #4:	<input type="text" value="Y"/>

Special Comments:

Diviner 2000 Data Logger (Manual Moisture Content Probe)

Data successfully downloaded:

Special Comments:

Tailings Trial Cover Survey (Rose Creek Tailings)

Date completed:
 Completed by:

Survey Data Forwarded Via: E-mail:
 Fax:

Special Comments:

SRK Consulting
ARMC Waste Rock and Tailings Trial Covers- Information Data Sheet

for Maritz Rykaart

Date and Time:
 Downloaded by:

Davis Instruments Data Loggers (Weather Stations on CT#1 and CT#2A/2B)

CT#1		CT#2A/2B	
Data successfully downloaded:	<input type="text" value="y"/>	Data successfully downloaded:	<input type="text" value="y"/>
Diagnostic test run:	<input type="text" value="y"/>	Diagnostic test run:	<input type="text" value="y"/>
Diagnostic test results:		Diagnostic test results:	
Console battery voltage:	<input type="text" value="6.95"/>	Console battery voltage:	<input type="text" value="6.83"/>
Special Comments:	<input type="text"/>		

Campbell Scientific CR10X Data Loggers (Located in Monitoring Hut)

CR10X-1		CR10X-2	
Data successfully downloaded:	<input type="text" value="y"/>	Data successfully downloaded:	<input type="text" value="y"/>
Diagnostic test run:	<input type="text" value="y"/>	Diagnostic test run:	<input type="text" value="y"/>
Diagnostic Test Results:		Diagnostic Test Results:	
Battery Voltage:	<input type="text" value="13.61"/>	Battery Voltage:	<input type="text" value="13.38"/>
Solar panel feed voltage if <11v	<input type="text"/>	Solar panel feed voltage if <11v	<input type="text"/>
Special Comments:	<input type="text"/>		

Seametrics Data Loggers (Flowmeters in Monitoring Hut)

Data successfully downloaded		Battery O.K.	
CT#1 (DL#1):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#2A (DL32):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#2B (DL#3):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#3A (DL#4):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#3A-I (DL#5):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#3B (DL#6):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#3B-I (DL#7):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#4 (DL#8):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#4-I (DL#9):	<input type="text" value="y"/>		<input type="text" value="y"/>
Has the daily flow check data been attached:			<input type="text" value="y"/>
Special Comments:	<input type="text"/>		

Lakewood Systems Data Logger (Thermistors on Grum O/B Dump)

Data successfully downloaded:

Manual readings taken on:

String #1:	<input type="text" value="y"/>	String #3:	<input type="text" value="y"/>
String #2:	<input type="text" value="y"/>	String #4:	<input type="text" value="y"/>

Special Comments:

Diviner 2000 Data Logger (Manual Moisture Content Probe)

Data successfully downloaded:

Special Comments:

Tailings Trial Cover Survey (Rose Creek Tailings)

Date completed:

Completed by:

Survey Data Forwarded Via: E-mail:

Fax:

Special Comments:

SRK Consulting
ARMC Waste Rock and Tailings Trial Covers- Information Data Sheet

for Maritz Rykaart

Date and Time:
 Downloaded by:

Davis Instruments Data Loggers (Weather Stations on CT#1 and CT#2A/2B)

CT#1		CT#2A/2B	
Data successfully downloaded:	<input type="text" value="y"/>	Data successfully downloaded:	<input type="text" value="y"/>
Diagnostic test run:	<input type="text" value="y"/>	Diagnostic test run:	<input type="text" value="y"/>
Diagnostic test results:		Diagnostic test results:	
Console battery voltage:	<input type="text" value="6.71 V"/>	Console battery voltage:	<input type="text" value="6.54 V"/>
Special Comments:	<input type="text"/>		

Campbell Scientific CR10X Data Loggers (Located in Monitoring Hut)

CR10X-1		CR10X-2	
Data successfully downloaded:	<input type="text" value="y"/>	Data successfully downloaded:	<input type="text" value="y"/>
Diagnostic test run:	<input type="text" value="y"/>	Diagnostic test run:	<input type="text" value="y"/>
Diagnostic Test Results:		Diagnostic Test Results:	
Battery Voltage:	<input type="text" value="13.55 V"/>	Battery Voltage:	<input type="text" value="14.76 V"/>
Solar panel feed voltage if <11v	<input type="text" value="n/a"/>	Solar panel feed voltage if <11v	<input type="text" value="n/a"/>
Special Comments:	<input type="text"/>		

Seametrics Data Loggers (Flowmeters in Monitoring Hut)

Data successfully downloaded		Battery O.K.	
CT#1 (DL#1):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#2A (DL32):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#2B (DL#3):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#3A (DL#4):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#3A-I (DL#5):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#3B (DL#6):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#3B-I (DL#7):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#4 (DL#8):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#4-I (DL#9):	<input type="text" value="y"/>		<input type="text" value="y"/>
Has the daily flow check data been attached:			<input type="text" value="y"/>
Special Comments:	<input type="text"/>		

Lakewood Systems Data Logger (Thermistors on Grum O/B Dump)

Data successfully downloaded:

Manual readings taken on:

String #1:	<input type="text" value="y"/>	String #3:	<input type="text" value="y"/>
String #2:	<input type="text" value="y"/>	String #4:	<input type="text" value="y"/>

Special Comments:

Diviner 2000 Data Logger (Manual Moisture Content Probe)

Data successfully downloaded:

Special Comments:

Tailings Trial Cover Survey (Rose Creek Tailings)

Date completed:

Completed by:

Survey Data Forwarded Via: E-mail:

Fax:

Special Comments:

SRK Consulting
ARMC Waste Rock and Tailings Trial Covers- Information Data Sheet

for Maritz Rykaart

Date and Time:
 Downloaded by:

Davis Instruments Data Loggers (Weather Stations on CT#1 and CT#2A/2B)

CT#1		CT#2A/2B	
Data successfully downloaded:	<input type="text" value="y"/>	Data successfully downloaded:	<input type="text" value="y"/>
Diagnostic test run:	<input type="text" value="y"/>	Diagnostic test run:	<input type="text" value="y"/>
Diagnostic test results:		Diagnostic test results:	
Console battery voltage:	<input type="text" value="6.48 V"/>	Console battery voltage:	<input type="text" value="6.39 V"/>
Special Comments:	<input type="text"/>		

Campbell Scientific CR10X Data Loggers (Located in Monitoring Hut)

CR10X-1		CR10X-2	
Data successfully downloaded:	<input type="text" value="y"/>	Data successfully downloaded:	<input type="text" value="y"/>
Diagnostic test run:	<input type="text" value="y"/>	Diagnostic test run:	<input type="text" value="y"/>
Diagnostic Test Results:		Diagnostic Test Results:	
Battery Voltage:	<input type="text" value="13.36 V"/>	Battery Voltage:	<input type="text" value="13.44 V"/>
Solar panel feed voltage if <11v	<input type="text" value="n/a"/>	Solar panel feed voltage if <11v	<input type="text" value="n/a"/>
Special Comments:	<input type="text"/>		

Seametrics Data Loggers (Flowmeters in Monitoring Hut)

Data successfully downloaded		Battery O.K.	
CT#1 (DL#1):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#2A (DL32):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#2B (DL#3):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#3A (DL#4):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#3A-I (DL#5):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#3B (DL#6):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#3B-I (DL#7):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#4 (DL#8):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#4-I (DL#9):	<input type="text" value="y"/>		<input type="text" value="y"/>
Has the daily flow check data been attached:			<input type="text" value="y"/>
Special Comments:	<input type="text"/>		

Lakewood Systems Data Logger (Thermistors on Grum O/B Dump)

Data successfully downloaded:

Manual readings taken on:

String #1:	<input type="text" value="y"/>	String #3:	<input type="text" value="y"/>
String #2:	<input type="text" value="y"/>	String #4:	<input type="text" value="y"/>

Special Comments:

Diviner 2000 Data Logger (Manual Moisture Content Probe)

Data successfully downloaded:

Special Comments:

Tailings Trial Cover Survey (Rose Creek Tailings)

Date completed:

Completed by:

Survey Data Forwarded Via: E-mail: Fax:

Special Comments:

SRK Consulting
ARMC Waste Rock and Tailings Trial Covers- Information Data Sheet

for Maritz Rykaart

Date and Time:
 Downloaded by:

Davis Instruments Data Loggers (Weather Stations on CT#1 and CT#2A/2B)

CT#1		CT#2A/2B	
Data successfully downloaded:	<input type="text" value="y"/>	Data successfully downloaded:	<input type="text" value="y"/>
Diagnostic test run:	<input type="text" value="y"/>	Diagnostic test run:	<input type="text" value="y"/>
Diagnostic test results:		Diagnostic test results:	
Console battery voltage:	<input type="text" value="6.84V"/>	Console battery voltage:	<input type="text" value="6.78V"/>
Special Comments:	<input type="text"/>		

Campbell Scientific CR10X Data Loggers (Located in Monitoring Hut)

CR10X-1		CR10X-2	
Data successfully downloaded:	<input type="text" value="y"/>	Data successfully downloaded:	<input type="text" value="y"/>
Diagnostic test run:	<input type="text" value="y"/>	Diagnostic test run:	<input type="text" value="y"/>
Diagnostic Test Results:		Diagnostic Test Results:	
Battery Voltage:	<input type="text" value="13.30V"/>	Battery Voltage:	<input type="text" value="13.36V"/>
Solar panel feed voltage if <11v	<input type="text" value="n/a"/>	Solar panel feed voltage if <11v	<input type="text" value="n/a"/>
Special Comments:	<input type="text"/>		

Seametrics Data Loggers (Flowmeters in Monitoring Hut)

Data successfully downloaded		Battery O.K.	
CT#1 (DL#1):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#2A (DL#2):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#2B (DL#3):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#3A (DL#4):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#3A-I (DL#5):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#3B (DL#6):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#3B-I (DL#7):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#4 (DL#8):	<input type="text" value="y"/>		<input type="text" value="y"/>
CT#4-I (DL#9):	<input type="text" value="y"/>		<input type="text" value="y"/>
Has the daily flow check data been attached:			<input type="text" value="y"/>
Special Comments:	<input type="text"/>		

Lakewood Systems Data Logger (Thermistors on Grum O/B Dump)

Data successfully downloaded:

Manual readings taken on:

String #1:	<input type="text" value="y"/>	String #3:	<input type="text" value="y"/>
String #2:	<input type="text" value="y"/>	String #4:	<input type="text" value="y"/>

Special Comments:

Diviner 2000 Data Logger (Manual Moisture Content Probe)

Data successfully downloaded:

Special Comments:

Tailings Trial Cover Survey (Rose Creek Tailings)

Date completed:

Completed by:

Survey Data Forwarded Via: E-mail: Fax:

Special Comments:

SRK Consulting
ARMC Waste Rock and Tailings Trial Covers- Information Data Sheet

for Maritz Rykaart

Date and Time:
 Downloaded by:

Davis Instruments Data Loggers (Weather Stations on CT#1 and CT#2A/2B)

CT#1		CT#2A/2B	
Data successfully downloaded:	<input type="text" value="yes"/>	Data successfully downloaded:	<input type="text" value="yes"/>
Diagnostic test run:	<input type="text" value="yes"/>	Diagnostic test run:	<input type="text" value="yes"/>
Diagnostic test results:		Diagnostic test results:	
Console battery voltage:	<input type="text" value="6.84"/>	Console battery voltage:	<input type="text" value="6.69"/>
Special Comments:	<input type="text"/>		

Campbell Scientific CR10X Data Loggers (Located in Monitoring Hut)

CR10X-1		CR10X-2	
Data successfully downloaded:	<input type="text" value="yes"/>	Data successfully downloaded:	<input type="text" value="yes"/>
Diagnostic test run:	<input type="text" value="yes"/>	Diagnostic test run:	<input type="text" value="yes"/>
Diagnostic Test Results:		Diagnostic Test Results:	
Battery Voltage:	<input type="text" value="13.54"/>	Battery Voltage:	<input type="text" value="13.60"/>
Solar panel feed voltage if <11v	<input type="text"/>	Solar panel feed voltage if <11v	<input type="text"/>
Special Comments:	<input type="text"/>		

Seametrics Data Loggers (Flowmeters in Monitoring Hut)

Data successfully downloaded		Battery O.K.	
CT#1 (DL#1):	<input type="text" value="no"/>		<input type="text" value="yes"/>
CT#2A (DL#2):	<input type="text" value="no"/>		<input type="text" value="yes"/>
CT#2B (DL#3):	<input type="text" value="no"/>		<input type="text" value="yes"/>
CT#3A (DL#4):	<input type="text" value="no"/>		<input type="text" value="yes"/>
CT#3A-I (DL#5):	<input type="text" value="no"/>		<input type="text" value="yes"/>
CT#3B (DL#6):	<input type="text" value="no"/>		<input type="text" value="yes"/>
CT#3B-I (DL#7):	<input type="text" value="no"/>		<input type="text" value="yes"/>
CT#4 (DL#8):	<input type="text" value="no"/>		<input type="text" value="yes"/>
CT#4-I (DL#9):	<input type="text" value="no"/>		<input type="text" value="yes"/>
Has the daily flow check data been attached:			<input type="text" value="yes"/>
Special Comments:	<input type="text" value="Download cable is broken"/>		

Lakewood Systems Data Logger (Thermistors on Grum O/B Dump)

Data successfully downloaded:

Manual readings taken on:

String #1:	<input type="text" value="yes"/>	String #3:	<input type="text" value="yes"/>
String #2:	<input type="text" value="yes"/>	String #4:	<input type="text" value="yes"/>

Special Comments:

Diviner 2000 Data Logger (Manual Moisture Content Probe)

Data successfully downloaded:

Special Comments:

Tailings Trial Cover Survey (Rose Creek Tailings)

Date completed:

Completed by:

Survey Data Forwarded Via: E-mail: Fax:

Special Comments: