2016 Geotechnical Annual Review, Minto Mine, YT

Prepared for

Minto Explorations Ltd.

Prepared by

SRK Consulting (Canada) Inc.
1CM002.048
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2016 Geotechnical Annual Review, Minto Mine, YT

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1 Introduction

On June 13-14, 2016, SRK Consulting (Canada) Inc. completed a geotechnical inspection of the Minto Mine site (Figure 1). The purpose of the inspection was to document the physical condition of the site based on visual observations and to provide geotechnical assessment, noting potential signs of physical instability such as erosion, differential settlement, sloughing or bulging of material, seepage, etc. The inspection is documented in the photographic compilation provided in Appendix A. This report summarizes the findings and recommendations.

This is the fifth year of geotechnical inspections of the site completed by SRK, with the first inspection completed in September 2012 (SRK 2012a). Previous inspections were completed by EBA Engineering Consultants Ltd.

This report is in partial fulfillment of the requirements of the existing Water License QZ14-031 Clause 100 and Quartz Licence QML-001 Paragraph 13.2 that require the physical stability of all engineered structures, works and installations be inspected by an engineer after the spring thaw of each year (by June).

Source: Capstone Mining

Figure 1: Site Location

2 Conditions

The geotechnical inspection was completed by Peter Mikes, PEng, of SRK. Heather Friday, EIT, of Minto accompanied Mr. Mikes during the inspection and was SRK's primary contact for information about the activities during the past year.

Weather during the site inspection was mostly sunny on June 13, 2016 with a brief rain shower in the afternoon, and overcast with light rain on June 14, 2016. Temperatures were estimated at approximately 10 °C in the morning, and up to approximately 20 °C in the afternoon. The site was generally dry on the first day of the inspection and wet on the second day of the inspection.

3 Scope

The following engineered structures, works, and installations were inspected during the site visit:

- Big Creek Bridge;
- Mill and camp site;
- Dry Stack Tailings Storage Facility and Mill Valley Fill Extension (Stage 1 and 2);
- Fuel containment facility;
- Main Waste Dump;
- Ore stockpiles;
- Reclamation Overburden Dump;
- Ice Rich Overburden Dump;
- South Diversion Ditch;
- Tailings Diversion Ditch
- Southwest Waste Dump;
- Main Pit including South Wall Buttress and In-Pit Dumps;
- Water Storage Dam;
- Area 118 and Area 2 Pit; and,
- Minto North Pit.

The Mill Water Pond and Minto Creek Detention Structure, which were part of previous year's inspections were not inspected in 2016. The Mill Water Pond has been filled with waste rock and no longer exists. The Minto Creek Detention Structure has been filled in as a result of construction of the Mill Valley Fill Extension Stage 2 and replaced with a seepage collection sump located further down valley.

During the inspection, previous year's reports, instrumentation data, design reports and monitoring guidance documents were reviewed as required to guide the inspections. The

instrumentation data was reviewed to check for indications of unusual performance or change in trends. Section 4 of this report presents a list of data reviewed, including the last data collection date.

4 Monitoring and Instrumentation Data

Table 4.1 lists instrumentation data reviewed as part of the inspection, with the date of the most recent data. Changes to the list of instrumentation compared to the last inspection are listed below the table in the notes.

Instrumentation plots are provided in the appendices. Data that has not been updated since the last geotechnical inspection is not included in the appendix. Appendix B provides a site-wide summary of the survey hub data including the direction of movement for each hub.

Table 4.1: Summary of Instrumentation Data

Facility	Instrumentation Type	List of Reviewed Instrumentation	Last Reading Date
Area 2 Pit	Inclinometers	A2I-1	May 2016
	Ground Temperature Cables	A2T-1	May 2016
Dry Stack Tailings Storage Facility and Mill Valley Fill Extension (DSTSF and MVFE)	Survey Hubs[1]	**Active:** DSSH14, DSSH17, DSSH24, *DSSH26, DSSH27, MV1, MV2.* **Destroyed in past year:** DSSH06, DSSH10, DSSH12, DSSH15, DSSH18, DSSH19, DSSH20, DSSH21, DSSH22, DSSH23, DSSH25	May 2016
	Inclinometers	**Destroyed in past year:** DSI-21	Oct 2015
	Piezometers	**Active:** DSP-05 (A and B), DSP-06 (A and B), *DSP-07 (1 to 6), DSP-08 (1 to 6), DSP-10* **Destroyed in past year:** *DSP-09*	June 2016
	Ground Temperature Cables	DST-10, DST-11, DST-13, DST-14, DST-15	June 2016
Main Waste Rock Dump (MWD)	Inclinometers	MDI-2	May 2016
Southwest Waste Dump (SWD)	Survey Hubs	SWD-01, SWD-01A, SWD-02, SWD-02A, SWD-04A, SWD-05A, SWD-06	May 2016
	Inclinometers	SDI-3	May 2016
	Piezometers	SDP-2 (A and B), SDP-3 (A and B), SDP-4 (A and B)	June 2016
	Ground Temperature Cables	SDT-1, SDT-2, SDT-3, SDT-4	April 2016
Main Pit	Survey Hubs [2]	**Active:** M73, M75, M76, M79, M80, M81, M82, M83, M84, *M85, M86, M87* **Destroyed in past year:** M69, M74	May 2016
	Ground Temperature Cables	MPDT-1, MPDT-2	May 2016

Facility	Instrumentation Type	List of Reviewed Instrumentation	Last Reading Date
Mill Water Pond (MWP)	Ground Temperature Cables[3]	**Destroyed in past year:** MWPT-1, MWPT-2	Feb 2016
Water Storage Pond Dam	Survey Hubs	WSP-1, WSP-3, WSP-4, WSP-5	May 2016
	Piezometers	WDP-2, WDP-3, WDP-3A, WDP-4, WDP-5, WDP-6, WDP-7, WDP-8, WDP-9, WDP-10, WDP-11, WDP-12, WDP-13	May 2016
	Ground Temperature Cables	WDT-1, WDT-2, WDT-3, WDT-4, WDT-5, WDT-6, WDT-7, WDT-8	March 2016

Note(s):

(1) Survey hub DSSH26 has replaced DSSH23, and survey hub DSSH27 has replaced DSSH25. The remaining survey hubs listed as destroyed are the result of construction of the MVFE Stage 2.

(2) Survey hub M69 has been replaced with M85, and survey hub M74 has been replaced by M86.

(3) The Mill Water Pond has been filled in and the instrumentation is no longer functional.

4.1 Area 2 Pit

Area 2 Pit instrumentation data is provided in Appendix C and includes a ground temperature cable (A2T-1) and an inclinometer (A2I-1) were installed in 2013 in the southeast corner of the planned Area 2 Stage 3 Pit.

The inclinometer data shows no movement trend has occurred over the last year. A shear occurred within the waste rock fill near surface during the initial year of data collection, with no significant movement since.

The ground temperature data indicates permafrost conditions down to an elevation of approximately 767 m. The bottom two sensors at elevations 765 m and 762m are consistently above 0 degrees and are situated in clay material.

4.2 Dry Stack Tailings Storage Facility

Instrumentation data for the Dry Stack Tailings Storage Facility (DSTSF) and Mill Valley Fill Extension (MVFE) are provided in Appendix D.

Movements in the Dry Stack Tailings Storage Facility (DSTSF) were first identified in early 2009. The Mill Valley Fill Extension (MVFE) Stage 1 was designed to mitigate the movement and construction of the facility, which began in January 2012, was nearly completed by March 2013. The survey hubs used to monitor rates of the DSTSF showed a deceleration ranging from 20 to 60 percent since the start of the MVFE Stage 1 placement. Construction of a second extension (MVFE Stage 2) began in late 2015 with construction nearly completed at the time of the June 2016 inspection. The MVFE Stage 2 doubles the size of the Stage 1 buttress.

Survey hub movement data are presented in Figure 1 to 19 of Appendix D. Nine survey hubs were moved in the past year as a result of the MVFE Stage 2 construction and these hubs are to be replaced following completion of construction. The remaining survey hubs on the DSTSF waste rock shell and tailings cover continue to show a decelerating trend, with movement rates decreasing by 20 to 95 percent in the past year.

Survey hubs DSSH23, DSSH24, and DSSH25 show signs of seasonal settlement. Each of these hubs were installed in 2013 over the tailings cover on the DSTSF. Hubs DSSH26 and DSSH27 were installed in 2016 to replace DSSH 23 and DSSH 25. The replacement hubs are mounted on standard lock blocks placed on the tailings surface. Data is currently being collected from both the old and new hubs to compare performance of the installation methods. Data collected during the first spring indicates some seasonality effects and settlement of the new lock blocks, but less so compared to the grouted survey hub posts.

Two additional hubs (ASH05 and ASH06) are located further to the south of the DSTSF on the airport access road (Appendix D, Figure 20). These hubs show no significant movement trend.

Piezometric data from the DSTSF are presented in Figures 21 to 23 in Appendix D. During construction of the MVFE Stage 2, excess pore pressures were generated at DSP-09 and DSP-10 (Figure 23, Appendix D). These sensors are located at the base of the Minto Creek Valley where the MVFE Stage 2 fill thickness is the largest and are located approximately 5 m below the original ground surface. Flow meter readings for the MVFE Stage 2 collection sump indicate that the drainage blanket at the base of the MVFE Stage 2 is functional. The high pore pressures are believed to be the result of winter construction and the preservation of frozen ground conditions within the foundation resulting in impeded dissipation of the generated pore pressure. Discussion on the remaining piezometers are provided in Appendix D.

As a result of the high pore pressure observed at DSP-09 and DSP-10, monitoring and inspection frequencies were increased during construction and two survey hubs (MV1 and MV2) were installed on the eastern slope of the MVFE Stage 2 in April 2016. Data from the survey hubs indicate an easterly movement of the slope at a rate of 0.3 mm/day and 0.8 mm/day (Figures 18 and 19, Appendix D). At this time, it is uncertain if this movement is related to the DSTSF movement, or due to the high pore pressures within the near surface fine-grained overburden similar to that observed at the Southwest Dump.

Ground temperature profiles are provided in Figures 24 to 28 of Appendix D. The temperature readings below the active layer in the instrumentation installed in 2013 are generally in equilibrium with the surrounding soils, or continue to show a slight cooling trend. The profiles indicate that warm permafrost is present at all locations, except in the lower portions of DST-11 and DST-13. DST-11 is located near the crest of the DSTSF, while DST-13 is located approximately 300 m east of the DSTSF in an undisturbed location.

Inclinometer data from DSI-21 is presented in Figure 29 of Appendix D. This instrument was destroyed in the past year with the last reading collected in October 2015. All of the inclinometers in the DSTSF area are now destroyed. The inclinometer results are consistent to those reported in the 2015 data review with a shear zone located approximately 11 m above the bedrock contact and 1 m below the tailings. The average movement rate in 2015 was 0.075 mm/day with a deceleration trend.

4.3 Main Waste Dump

Instrumentation data for the Main Waste Dump (MWD) are provided in Appendix E. Two inclinometers, MDI-1 and MDI-2, have been installed at the MWD. Of the two, only MDI-2 is functional. The last reading of MDI-1 was obtained in November 2012.

Inclinometer data from MDI-2 is presented in Figure 1 of Appendix E. There has been no movement trend detected in MDI-2 since 2012. The past movement at MDI-2 occurred primarily within rock fill and was determined to have been the result of the removal of the rock fill placed between the instrument location and the Main Pit (EBA 2011).

4.4 Southwest Waste Dump

Instrumentation data for the Southwest Dump (SWD) are provided in Appendix F.

Survey hub movement data are presented in Figure 1 to 9 of Appendix F. Some of these hubs, are disturbed due to heaving caused by frost action as evidenced by exposed concrete. This frost action is also evidenced by the seasonal variability in the movement data. As a result, the movement rates are questionable; however, the horizontal movement rates are believed to be representative of actual ground movements. Survey hub SWD06 is mounted on a standard lock-block and was installed within the past year to replace SWD01A. The movement rates at all hubs have slowed, or are similar, compared to movement rates in the June 2015 inspection.

Inclinometer data from SDI-3 is presented in Figure 10 of Appendix F. The displacement profile indicates an upper and lower shear zone with both shear zones having the same direction of movement orientated parallel to the slope of the bedrock surface. Movement rates in both shear zones are similar to those in 2015 with the upper shear zone moving approximately 0.4 mm/day and the lower zone moving approximately 0.07 mm/day.

The upper shear zone movement is suspected to be related to thawing of the permafrost colluvium with potentially high excess pore water pressures, which is supported by the slight warming trend in temperature data at SDT-2 and SDT-3. The movement rate is also suspected to be associated with waste rock resloping activities completed in the area in 2015. The movement rate of the upper shear zone is expected to decrease as the pore water pressure dissipates.

The lower shear zone is located 7 to 10 m above the bedrock contact in an ice-rich zone consisting of stratified ice (frequent 5 to 75 mm thick ice lenses). The conditions at this shear zone are similar to other movement zones observed at the DSTSF and south wall of the Main Pit believed to be caused by ice creep and/or plastic deformations.

Ground temperature data for the Southwest Dump are presented in Figures 11 to 14 of Appendix F. The profiles indicate that warm permafrost is present at all locations with time graphs of each sensor generally indicating a warming trend at all locations.

Piezometric data for the Southwest Dump are presented in Figure 15 of Appendix F. The pore pressures for all piezometers show a decreasing trend.

4.5 Main Pit

Instrumentation data for the Main Pit are provided in Appendix G.

The initial indication of movement in the Main Pit south wall was observed in April 2009. A waste rock buttress was subsequently designed and constructed. Substantial completion of the buttress

(South Wall Buttress) was completed in 2013. A detailed assessment and history of the physical stability associated with the Main Pit south wall is provided in the letter report “Detailed Review of Foundation Performance at Select Mine Waste Facilities and Main Pit South Wall” (SRK 2012b).

The Main Pit is a disposal location for waste rock with an NP:AP ratio less than 3 with the material to be placed below the final water elevation of the pit. In addition to the South Wall Buttress, several In-Pit Dumps have been constructed in the pit at various times that did not have the same stringent compaction requirements. The In-Pit Dump noted in Appendix A was end-dumped into the pit water with a high dump height and significant cracking and settlement has been observed since. In April 2015, construction of a new dump (SAT Dump) began that will be constructed on top of the tailings and will also buttress the In-Pit Dump.

Survey hub movement data for the Main Pit are presented in Figures 1 to 15 of Appendix G. The movement rate at M84, located near the crest of the In-Pit Dump has increased from 0.2mm/day to 0.7 mm/day. The remainder of the survey hubs show steady decelerating movement rates that range from 0.0 to 0.65 mm/day.

4.6 Mill Water Pond

Temperature data from the MWP (Mill Water Pond) prior to the pond decommissioning are presented in Figures 1 and 2 of Appendix H. Time-temperature plots of the two instrumentation locations show a slight warming trend.

4.7 Water Storage Pond Dam

Instrumentation data for the Water Storage Pond Dam are provided in Appendix I and consists of eight ground temperature cables, 13 vibrating wire piezometers, and five survey hubs.

Survey hub movement data are presented in Figure 1 and 2 of Appendix I. No significant movement was observed.

Ground temperature data are presented in Figures 3 to 10 of Appendix I. All temperature sensors are above zero and similar to previous years values.

Piezometric data are presented in Figures 11 to 14 of Appendix I. In general, pressures continue to follow historical patterns and fluctuate with the pond water elevation.

5 Results and Recommendations

Findings of the inspection are documented in the photographic compilation of figures in Appendix A. Fifteen figures provide a record of observations across the site.

A summary of the recommendations is provided in Table 5.1. Where appropriate, each recommendation includes a priority classification of low, medium, or high that should be addressed in 3, 1, and 0.5 years respectively.

Table 5.1: Summary of Recommendations

Area	Recommendations
Mill Site	• **(High Priority): The 'falling rocks' warning sign adjacent to the Seacans is small and easy to miss. A larger sign should be placed with an additional warning sign recommended at the opposite end near the Electrician Shop.** • Continue to monitor the retaining wall near the mill's apron feeder tunnel and maintain a photographic record of its condition.
Camp Site	• Continue to monitor the erosion channels to ensure the remedial measures have been effective.
Mill Valley Fill Extension	• **(Medium Priority): Additional survey hubs and inclinometers within the DSTSF and MVFE are planned. Some of this instrumentation, including at least one inclinometer near toe of the MVFE Stage 2 (near MV1), should investigate the cause of the observed movement.**
South Diversion Ditch	• **(High Priority): Clean the overflow spillway on both sides of the access road.**
Southwest Waste Dump	• (Low Priority): Surveys of the crack and depression locations should be compared to past dump surfaces to complement the assessment of the source/cause of the cracking (e.g. edge of historical waste rock bench?) • **(Medium Priority): The remainder of the survey hubs that have heaved should be replaced.**
South Wall Buttress / In-Pit Dump / SAT Dump	• **(High Priority):** o **M84 should be monitored on a minimum weekly basis during periods of active construction of the SAT Dump located to the north of the In-Pit dump.** o **Visual inspections of the In-Pit Dump above the SAT dump should be incorporated into the daily visual inspections that occur when SAT material is being placed in the SAT Dump.** o **An extensometer should be installed across the main crack to monitor displacement.** o **The crack endpoints should continue to be spray painted in order to monitor potential crack propagation.** • Continue to limit access to the In-Pit Dump area near M84.
Water Storage Dam	• Continue regular monitoring of the dam as per the OMS Manual.
Minto North Pit	• Continue monitoring as per the Minto Ground Control Plan.

Note(s):

(1) High and medium priority actions are highlighted in **bold**.

(2) Low, medium, and high priority recommendations should be addressed in 3, 1, and 0.5 years respectively.

This report, “2016 Geotechnical Annual Review, Minto Mine, YT”, was prepared by SRK Consulting (Canada) Inc.

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

6 References

EBA 2011. Main Waste Dump – 2011 Annual Review, Minto Mine, YT. EBA File Number: W14101068.037. September 30.

SRK, 2012a. 2012 Geotechnical Annual Review, Minto Mine, YT. Prepared for Minto Explorations Ltd. SRK Project Number: 1CM002.006.400. November.

SRK 2012b. Letter Report: Detailed Review of Foundation Performance at the South Waste Dump and Stability of the Main Pit South Wall. Prepared for Minto Explorations, Ltd. SRK Project Number: 219500.050. November 19.

Appendix A: Photographic Report

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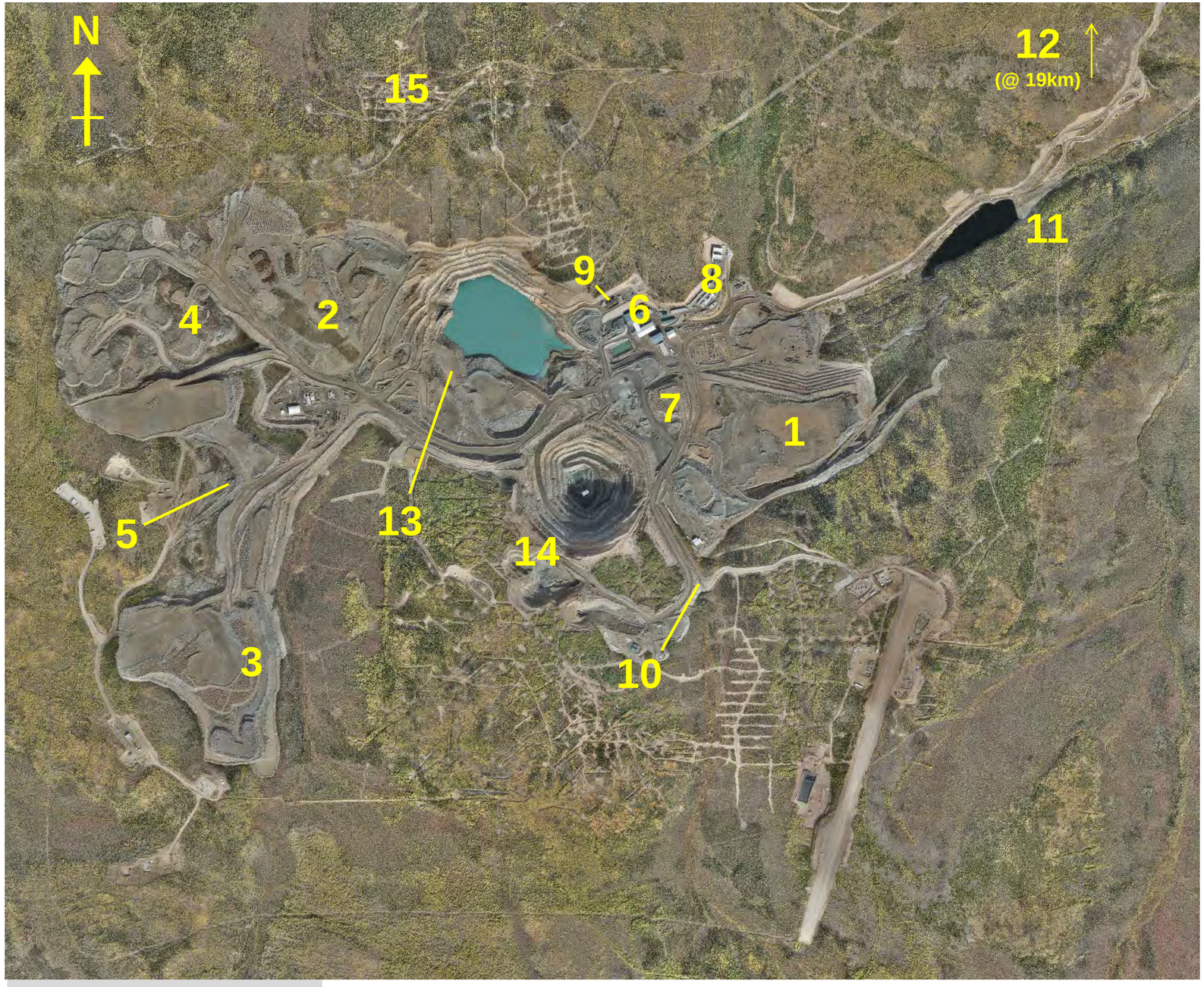

2014 Orthophoto.

Inspection Area Number

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2016 Geotechnical Inspection

Site Overview

Job No: 1CM002.048

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Minto Mine

Date: Nov 2016 | Approved: PHM | Figure: 1

1 Dry Stack Tailings Storage Facility

- Conditions are similar as the June 2015 inspection.
- Two survey hubs on the DSTSF cover that have experienced frost heave (DSSH 23 and DSSH 25) have been replaced by hubs DSSH 26 and DSSH 27 that are mounted on standard sized lock blocks.

- Photo (a) shows the south end of the DSTSF and exposed tailings from the TDD looking east.
- Photo (b) shows the former TDD and south end of the DSTSF.
- Photo (c) shows the vegetation growth at the eastern end of the DSTSF looking west.
- Photo (d) shows the east side of the waste rock shell
- Photos (e) and (f) show the crack on the WR shell at the north east corner of the DSTSF first observed in 2014. Compared to photographs from the June 2015 inspection, the crack is more continuous across the WR Shell crest. Pins have been set up to monitor crack width vs time.

Recommendations

- Continue to monitor the crack on the north-east corner of the DSTSF

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Dry Stack Tailings Storage Facility

Date:	Approved:	Figure:
Nov 2016	PHM	2

1 Dry Stack Tailings Storage Facility - Mill Valley Fill Extension

Construction of the MVFE Stage 2 began in late 2015 with construction nearly completed at the time of the June inspection.

During construction, significant pore pressures were generated at DSP-09 and DSP-10 (See Appendix B). These sensors are located at the base of the Minto Creek Valley where the MVFE Stage 2 fill thickness is the largest. The sensors are located approximately 5 m below the original ground surface in frozen ground (based on ground temperature data). Flow meter readings for the MVFE Stage 2 collection sump indicate that the drainage blanket at the base of the MVFE Stage 2 is functional. The high pore pressures are believed to be the result of winter construction and the preservation of frozen ground conditions within the foundation resulting in impeded dissipation of the generated pore pressure.

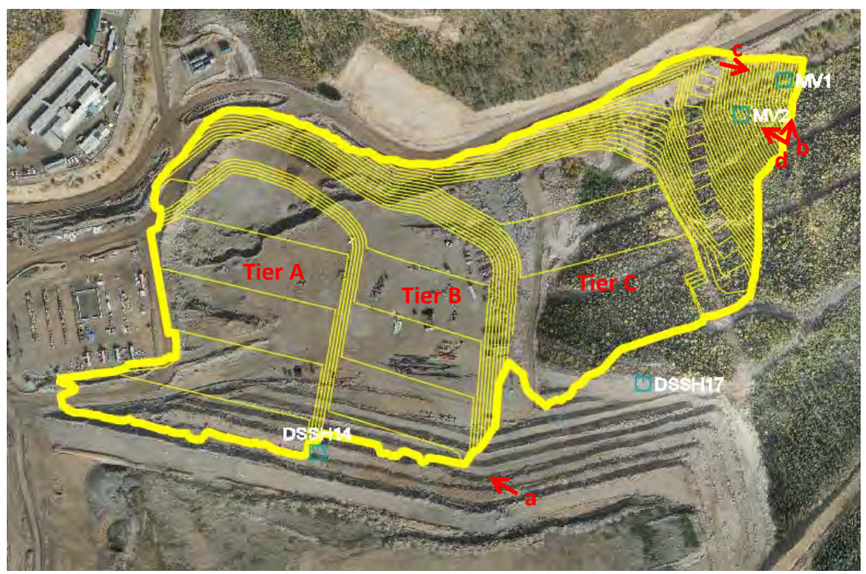
As a result of the high pore pressures, monitoring and inspection frequencies were increased during construction. In addition, two survey hubs (MV1 and MV2) were installed on the eastern slope of the MVFE Stage 2 in April 2016. Data from the survey hubs indicate an easterly movement of the slope at a rate of 0.3 mm/day and 0.8 mm/day. At this time, it is uncertain if this movement is related to the DSTSF movement, or due to the high pore pressures within the fine grained, near surface overburden (as observed at the Southwest Waste Dump).

No major signs of instability were observed at the time of the inspection.

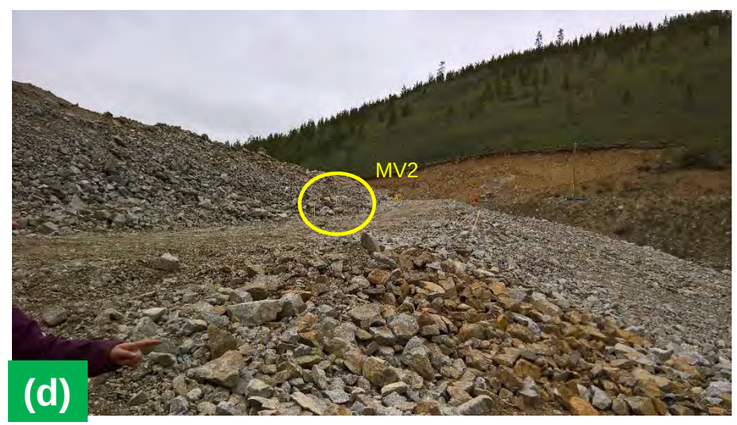
Recommendations

Medium priority: Additional survey hubs and inclinometers within the DSTSF and MVFE are planned. Some of this instrumentation, including at least one inclinometer near toe of the MVFE Stage 2 (near MV1), should investigate the cause of the observed movement.

- Photo (a): View of the top two tiers of the MVFE Stage 2.
- Photos (b), (c) and (d) show the eastern slope of the MVFE Stage 2 and the location of the survey hubs MV1 and MV2.



2014 Orthophoto with the MVFE Stage 2 design surface



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		Dry Stack Tailings Storage Facility – Mill Valley Fill Extension
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1 Dry Stack Tailings Storage Facility - Tailings Diversion Ditch

- In general, the berm and ditch appeared functional, with conditions in the western portion similar to those observed in previous inspections. No signs of instability or ditch obstructions were noted along the ditch alignment.
- The ditch outlet was excavated through placed waste rock. The slopes were steep, and a high amount of finer material was noted along the excavated slopes. This may be susceptible to erosion during large flow events.

(a) View of the upper, unarmoured portion of the diversion ditch. Vegetation growth is significant over a small portion of the ditch, but is not believed to be impacting the flow capacity due to the excess design capacity of the ditch.
(b) and (c) View of the lower, armoured diversion ditch. Rip-rap is well placed, and compacted, and the ditch is free of debris.
(d) View of the ditch outlet

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		Dry Stack Tailings Storage Facility – TDD
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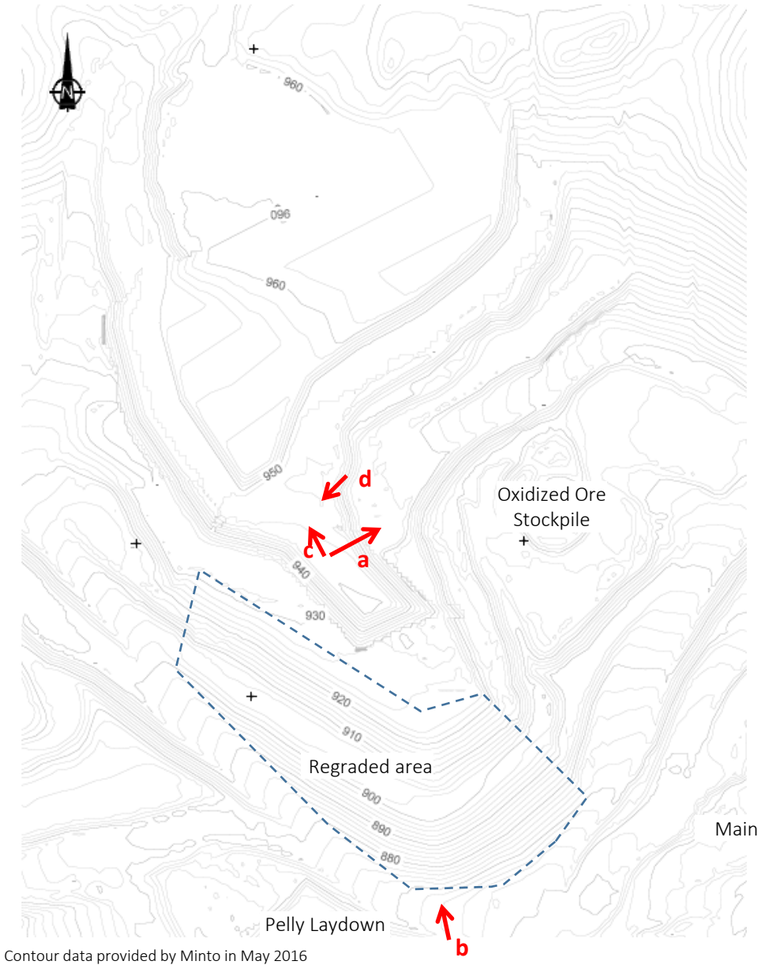
2 Main Waste Dump and Main Waste Dump Expansion

- Construction of the Main Waste Dump Expansion (MWDE) has been largely completed within the past year.
- No major signs of instability were observed.
- Minor cracking was observed near the crest of the MWDE (Photos (c) and (d)). Two parallel cracks approximately 15m long and 1 to 3 mm wide. The cracking is believed to be due to differential settlement of the waste rock due to differences in the fill height on either side of the cracks.

- Photo (a): Overview of the eastern face side of the MWDE looking northeast.
- Photo (b): View of the erosion visible on the regraded waste rock dump. Minor rills and gullies are present at the base of the regraded slope where vegetation is not yet established.



Contour data provided by Minto in May 2016

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2016 Geotechnical Inspection

Main Waste Dump

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Minto Mine

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3 Southwest Waste Dump

- Conditions of the Southwest Dump (SWD) are similar to those documented in the 2015 annual inspection.
- The crack noted in the 2015 inspection report has a length of 36 m, a width of 7.5m and a depth of 1 m.
- A depression (Photo (b)) was observed approximately 100 m northwest of the crack with a diameter of approximately 5 m and depth of 1 m.

- The approximate locations of these features are circled in Photo (a), with the surveyed locations noted on the 2014 orthophoto below. The orthophoto shows that the large crack occurs along a former angle of repost slope. The crack may be the result of settlement of fines with the coarse material near the base of the former angle of repost slope.

- Photo (d) shows an eroded slope as a result of dewatering of ponded water from the area south of the IROD. The pond is visible in Photo (a).

- Survey hub SWD-06 has been installed to replace SWD-01A that was impacted by frost heave. The remainder of the hubs that have experienced frost heave (SWD-02A, -03A, -04A, and -05A) have yet to be replaced due to accessibility issues.

Recommendations

- Continue to monitor the observed crack and depression area.
- **Medium Priority**: The remainder of the survey hubs that have heaved should be replaced.

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		Southwest Waste Dump	
Job No: 1CM002.048 Filename: AppA_2016InspectionPhoto.pptx	Minto Mine	Date: Nov 2016	Approved: PHM	Figure: **6**

4 Reclamation Overburden Dump

- Conditions at the Reclamation Overburden dump (ROD) remain the same as noted in previous years' inspections:
    - Slumping, settlement and tension cracks are expected in the dump as it is constructed with frozen overburden with thawing expected.
    - Discontinuous tension cracks and differential settlement observed along the perimeter crest.
    - Ground undulation is typically 0.3 m and is prevalent throughout the facility.

- Photo (a) shows a small slope failure first observed in 2014. The failure has not compromised the overall dump slope angle and as a result, the failure is not expected to reduce the overall stability of the dump. Historical vantage points for photographs were inaccessible by truck due to modified access road alignments.

5 Ice Rich Overburden Dump

- The IROD is completely contained by the Southwest Dump.
- Photo (b) shows an aerial photo of the IROD taken September 2015.
- No pooled water was observed around the perimeter of the IROD indicating that water is able to drain as per the original design intent.

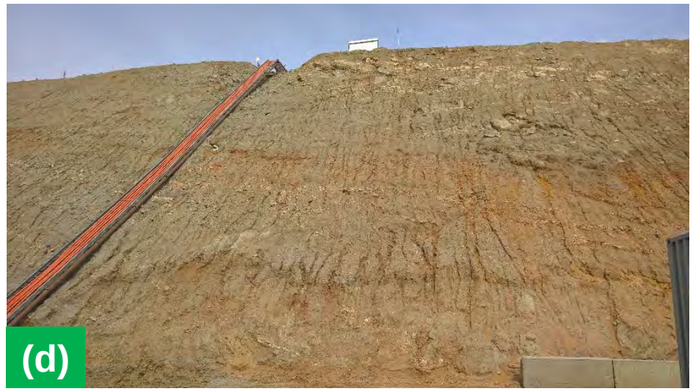
srk consulting	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	2016 Geotechnical Inspection
		Reclamation and Ice Rich Overburden Dumps
Job No: 1CM002.048 Filename: AppA_2016InspectionPhoto.pptx	Minto Mine	Date: Nov 2016 / Approved: PHM / Figure: 7

6 Mill Site

Conditions of the mill area are similar to those observed in previous inspections with minor ongoing erosion of the slope to the north of the mill, particularly near the location of the Seacans (Photos b and c) where cobble sized rocks have dented the Seacans.

Recommendations

- **High priority**: The ‘falling rocks’ warning sign (Photo b) is small and easy to miss. A larger sign should be placed with an additional warning sign placed at the opposite end near the Electrician Shop.



7 Ore Stockpiles

- The ore stockpiles were investigated briefly in passing. All slopes appeared in good condition: no slumping, bulges, cracks, or other signs of instability were observed.

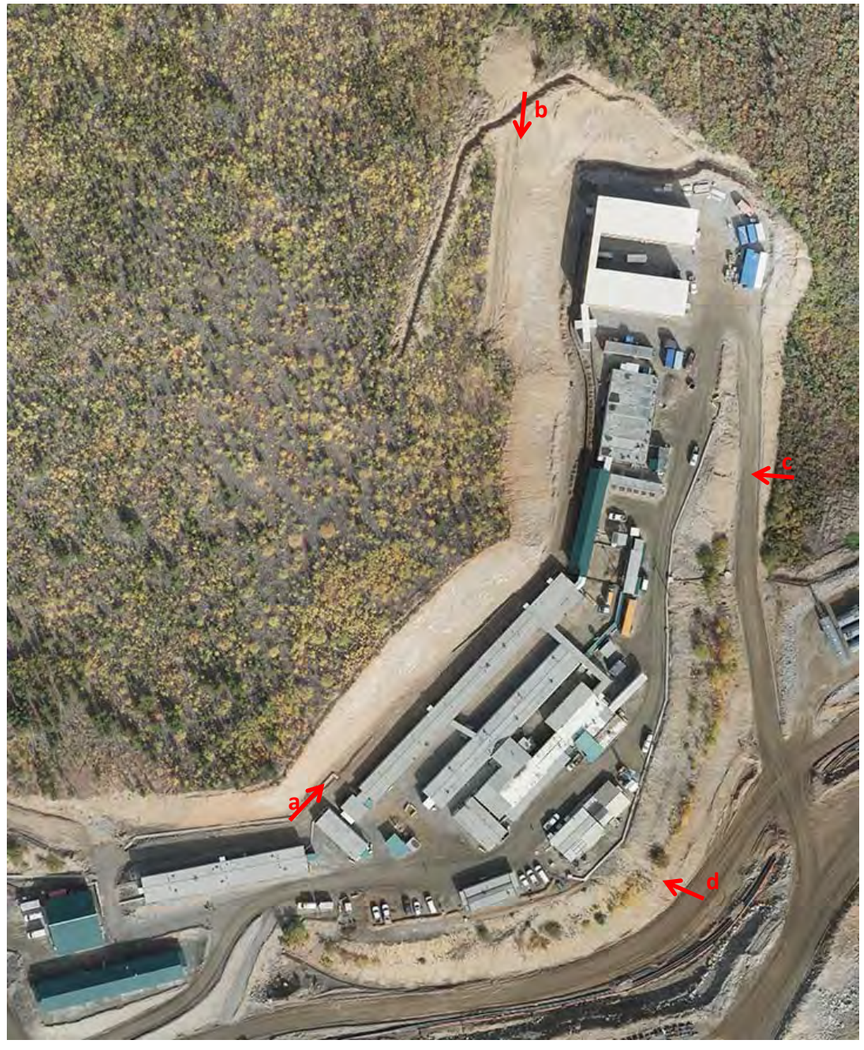
srk consulting	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	2016 Geotechnical Inspection
		Mill Site and Ore Stockpiles
Job No: 1CM002.048 Filename: AppA_2016InspectionPhoto.pptx	Minto Mine	Date: Nov 2016 / Approved: PHM / Figure: 8

8 Camp Site

Photo (a): Slope above the main camp site appears stable, with some minor erosion of sands and gravels observed. Eroded sand/gravel is generally present at the base of the slope with occasional cobbles/boulders up to 300 mm.
Photo (b): View of the crest of the slope above the expanded camp. The upper diversion ditch above the expanded camp pad is sloughing in areas, but is not impeding flow. No water was observed in the upper diversion ditch.
Photo (c) and (d): The erosion channels present on the slope below the camp pad have been mitigated and partially filled with rip-rap, and/or use of a pipe to convey surface runoff down the slope.

Recommendations

- Continue to monitor the erosion channels below the camp pad following larger rainfall events to evaluate if the remedial measures have been effective.



srk consulting	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	2016 Geotechnical Inspection		
		Camp Site		
Job No: 1CM002.048 Filename: AppA_2016InspectionPhoto.pptx	Minto Mine	Date: Nov 2016	Approved: PHM	Figure: **9**

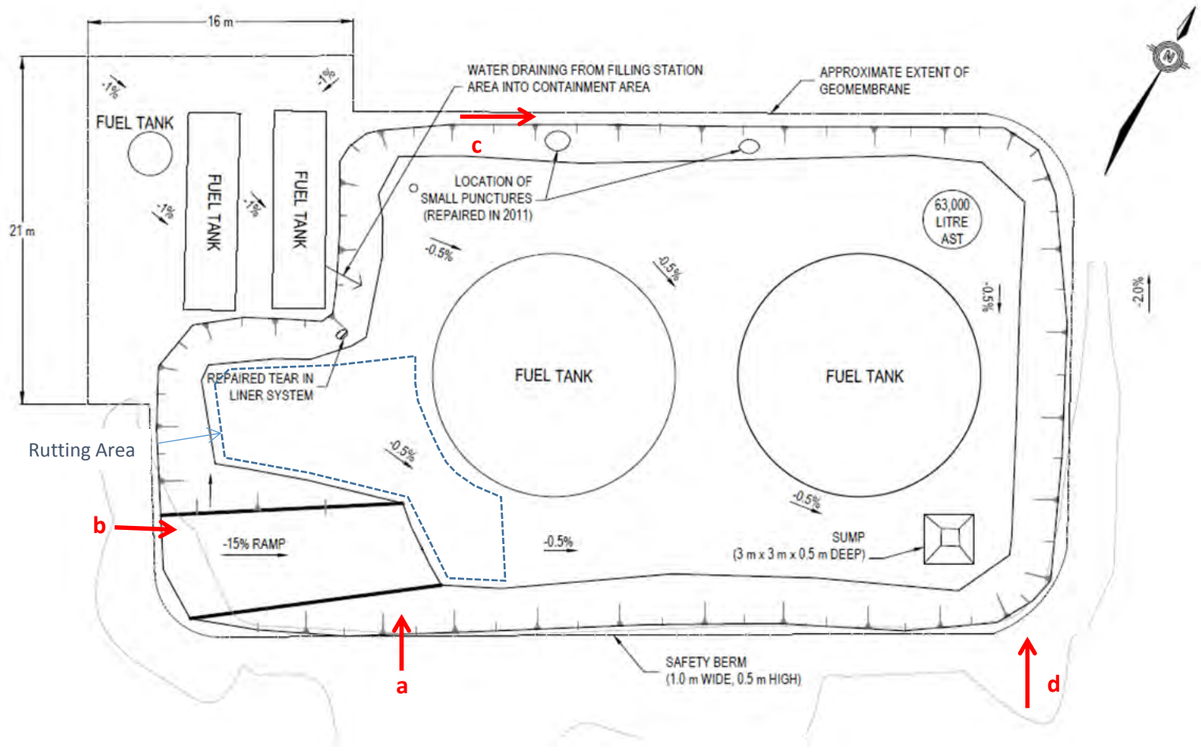
9 Fuel Containment Facility

Observations

- Conditions at the fuel containment facility are unchanged from the previous inspection in June 2015.
- Photos (a) to (d) show the condition of the liner on each side of the facility.
- The erosion gully along the access ramp (Photos (a) and (b)) appears to be unchanged compared to the June 2015 photos.
- No tears or defects in the liner were observed.
- Minor pooling was observed. The facility appears to drain into containment area as per design.
- No new rutting observed. Ruts are present in the southern half of the facility. Rutting is significant (approximate 2-3 inches deep) between the two tanks where equipment was turning. No liner is exposed as a result of the trafficking.

Recommendations

- The bedding layer over the geomembrane (150 mm thick) was not meant for heavy equipment. Vehicle access should be limited to the occasional visit with low ground pressure equipment.
- No actions required.



Source: Figure 1, EBA letter "Fuel Containment Facility – 2011 Annual Review, Minto Mine, YT", dated September 30, 2011.

Photograph vantage poin

srk consulting	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	2016 Geotechnical Inspection
		Fuel Containment Facility
Job No: 1CM002.048 Filename: AppA_2016InspectionPhoto.pptx	Minto Mine	Date: Nov 2016 / Approved: PHM / Figure: **10**

11 South Diversion Ditch

Source: 2014 Orthophoto

Photograph vantage point

- The South Diversion Ditch was inspected between the overflow spillway and the intake structure. The ditch along the Airport Access road was also inspected. The pipeline alignment between the overflow spillway and the Main Pit Confluence area was not inspected during the site visit.
- No signs of instability were noted along the side-slopes.
- Vegetation growth continues within the ditch (Photo (b) and (d)), but the impact on flow capacity is inconsequential at this time.

- Photo (a): The inlet structure at the upstream end of the ditch is unobstructed.
- Photos (b) and (c): Routine grading of the UG Portal Access Road has resulted in the creation of a small berm which extends across the South Diversion Ditch overflow spillway and into the Area 2 Pit, potentially reducing the capacity of the overflow spillway during large precipitation events.
- Photo (d): Exposed liner at the top of the west bank. Conditions the same as noted in previous inspections.
- Photo (e): Exposed geotextile along the airport road ditch alignment.

Recommendations

- **High Priority**: The overflow spillway should be cleaned and the area surveyed to ensure that the spillway meets the design requirements (minimum channel width and depth are met).
- Low Priority: Areas of exposed liner and geotextile should be covered to for protection and to prevent degradation.
- Low Priority: The vegetation within the South Diversion Ditch should be cleared.

srk consulting VANCOUVER	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	2016 Geotechnical Inspection
		South Diversion Ditch
Job No: 1CM002.048 Filename: AppA_2016InspectionPhoto.pptx	Minto Mine	Date: Nov 2016 / Approved: PHM / Figure: **11**

11 Water Storage Pond Dam

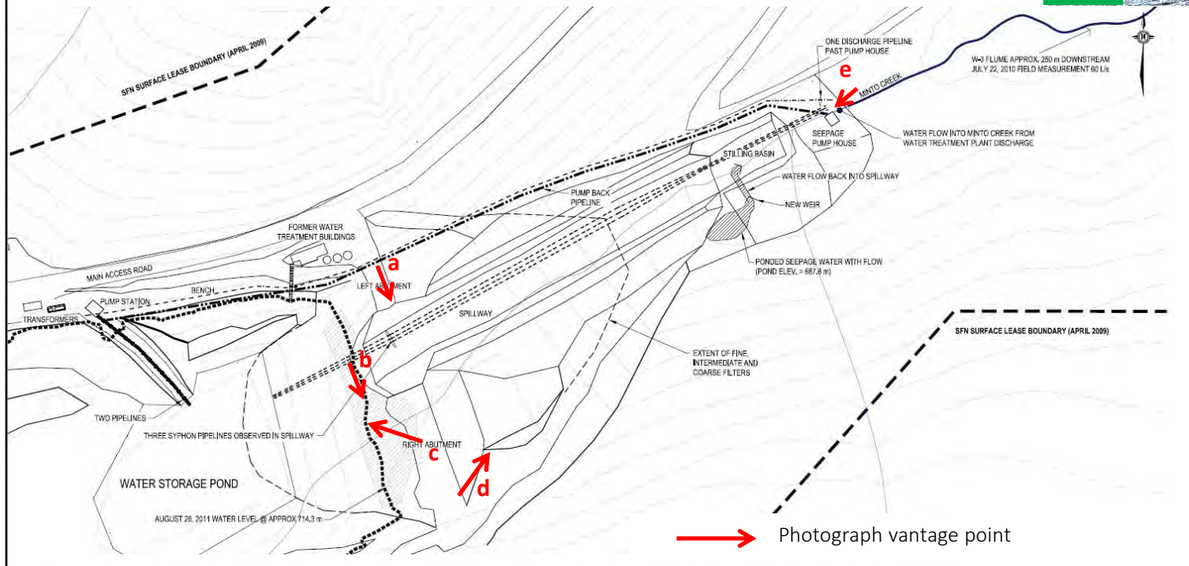
The June 2015 geotechnical inspection reported a large area of erosion on the left abutment of the dam that was exposed as a result of the water level being lower than the minimum operating level. During the 2016 inspection, the pond water level was within normal range and the erosion area could not be observed. It is understood that Minto has repaired the erosion in July 2015 after consulting with the Engineer of Record for the dam, TetraTech EBA.

- No signs of instability along the dam, or at the abutments other than the evident erosion on the upstream side of the dam at the left abutment.
- Seepage water downstream of the dam was clear and no accumulation of sediments was observed.
- The weir present downstream of the dam had an estimated flow rate of 1 L/s. Condition of the seepage water appears unchanged compared to the 2013 inspection. Water flow could not be heard in the rockfill adjacent to the seep. The water was clear with no turbidity.

Photo (a): View of the crest of the dam and spillway area in the foreground.
Photo (b) View of the right abutment.
Photo (c): View of the culvert outlet and WSP bank at the pump station. The outlet was undercut and additional fill was placed to secure the slope. Beneath the culvert, geotextile was placed and secured with rip-rap. The area appears unchanged compared to the 2015 inspection photos.
Photo (d): View of the downstream slope of the dam.
Photo (e): View of the seepage adjacent to the seepage pump house.

Recommendations

- Continue regular monitoring of the dam as per the OMS Manual.



Source: Figure 1, EBA letter "Water Storage Pond Dam– 2011 Physical Observation Report, Minto Mine, YT", dated September 30, 2011.

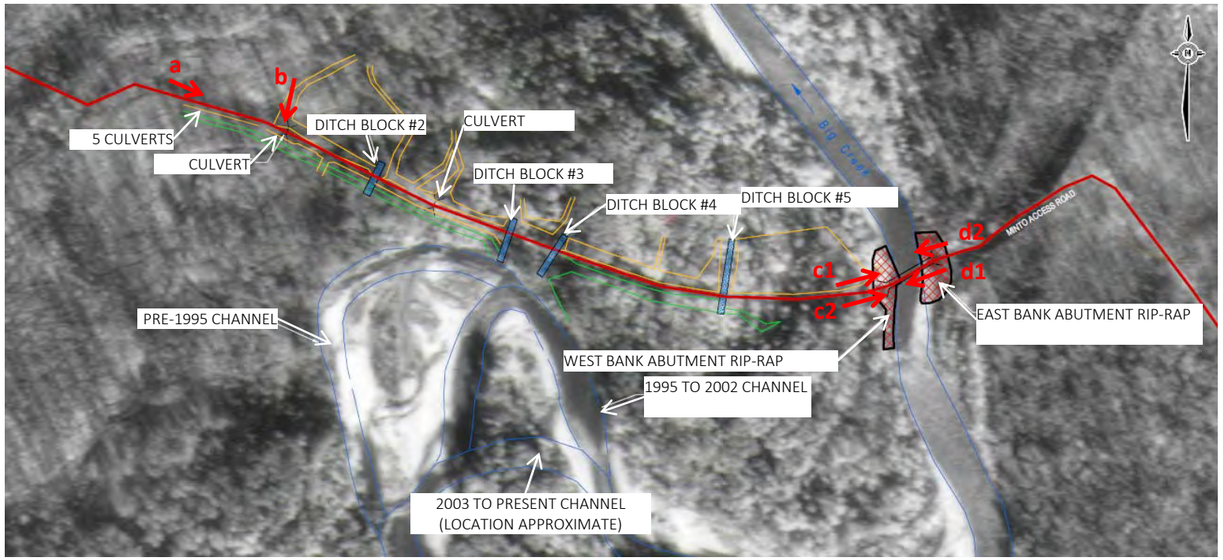
srk consulting	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	2016 Geotechnical Inspection	
		Water Storage Pond Dam	
Job No: 1CM002.048 Filename: AppA_2016InspectionPhoto.pptx	Minto Mine	Date: Nov 2016	Approved: PHM / Figure: **12**

12 Big Creek Bridge

- Conditions of the culverts are unchanged since the previous June 2015 inspection. The first culvert west of the bridge is in satisfactory condition.
- Photo (a) shows the downstream end of the group of 5 culverts, each with diameter of 1.1 m. The culverts are in satisfactory condition, with no blockages at either end. Exposed geotextile on the south side should be repaired.
- Photo (b) shows the downstream end of the 2nd culvert west of the bridge. Sediment accumulation should continue to be monitored and cleaned out if sediments continue to accumulate.
- Ditch Blocks #2 to #5 are unchanged from previous inspections and are in satisfactory condition. Ditch Block #1 has not been constructed.
- Photos (c) and (d) show the east and west abutments, respectively. The bridge abutments and road approaches are in good condition, with no signs of instability observed.

Recommendations

- Continue regular annual monitoring of sediment accumulation in the culverts, and clean out if sediments continue to accumulate.



Source: Figure 1, EBA letter "Big Creek Bridge– 2011 Annual Review, Minto Mine, YT", dated September 30, 2011.

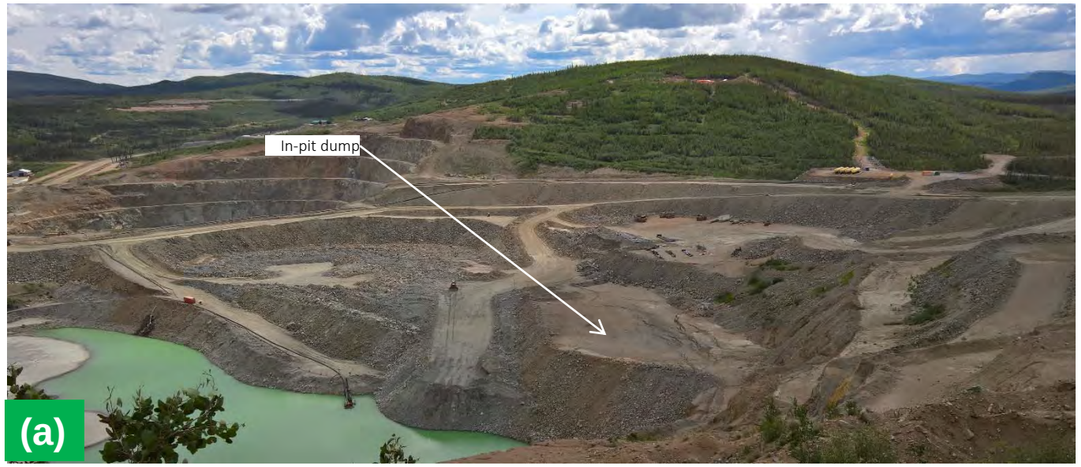
srk consulting	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	2016 Geotechnical Inspection
		Big Creek Bridge
Job No: 1CM002.048 Filename: AppA_2016InspectionPhoto.pptx	Minto Mine	Date: Nov 2016 / Approved: PHM / Figure: **13**

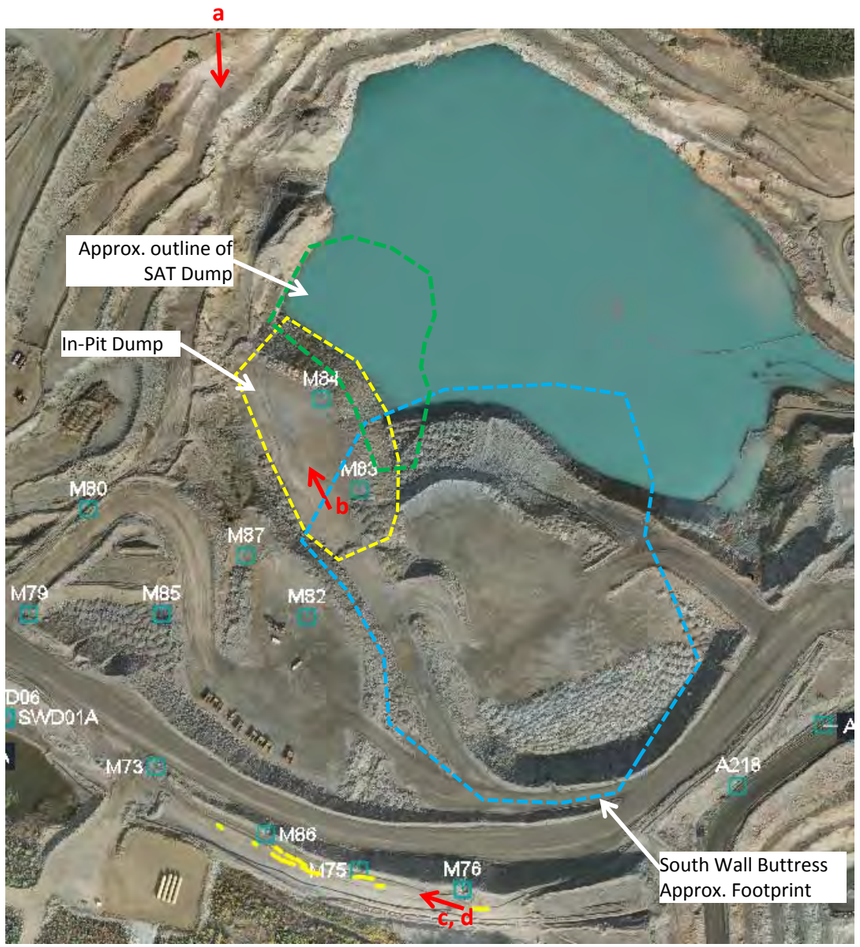
13 Main Pit, South Wall Buttress & In-Pit Dumps

Conditions in the Main Pit are similar to those documented in the June 2015 inspection report. Since the last inspection, one additional survey hub (M87) has been installed on Level 821 of the In-Pit Dump to monitor movement. Construction of the SAT dump located to the north of the In-Pit Dump began in April 2016.

The movement rate at survey hub M84, located near the crest of the In-Pit Dump has increased from 0.2 mm/day in the 2015 inspection report to 0.7 mm/day in May 2016. The direction of movement is to the east (bearing 104 degrees) and approximately perpendicular to Pit Wall (Appendix B). The remainder of survey hubs show steady or decelerating movement rates that range from 0 to 0.65 mm/day. The increase in movement rates may be due to undercutting of the slope during construction of the SAT dump ramp. A photo provided by Minto on July 30, 2016 indicates the undercut material has been replaced.

Additional cracking was observed along the former haul road south of the Main Pit between survey hubs M73 to M75. The crack locations are shown in the 2015 orthophoto below in yellow and in Photos (c) and (d). The cracking is parallel to the pit wall and is located approximately above the ultimate pit rim. The cracking is believed to be due to settlement of the waste rock within Main Pit.





Recommendations:

- **High Priority:**
  - M84 should be monitored on a minimum weekly basis during periods of active construction of the SAT Dump located to the north of the In-Pit dump.
  - Visual inspections of the In-Pit Dump above the SAT dump should be incorporated into the daily visual inspections that occur when SAT material is being placed in the SAT Dump.
  - An extensometer should be installed across the main crack to monitor displacement.
  - The crack endpoints should continue to be spray painted in order to monitor potential crack propagation.
- Continue to limit access to the In-Put Dump area near M84.

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Job No: 1CM002.048 Filename: AppA_2016InspectionPhoto.pptx	Minto Mine	Main Pit, South Wall Buttress, and In-pit Dumps	
		Date: Nov 2016	Approved: PHM / Figure: 14

14 Area 2 and 118 Pits

No signs of instability were observed at the Area 2 and 118 Pits

Photo a: View of the Area 2 Pit taken from the south side looking north.
Photo b: View of the Area 118 Pit looking west.

15 Minto North Pit

The Minto North Pit was visually observed from the rim at the north side of the pit. At the time of the inspection, the pit was active and scaling activities to remove loose, unstable materials from south end of the pit were ongoing. The benches were not inspected in detail.

Recommendations
Continue monitoring in accordance with the Minto Ground Control Plan.

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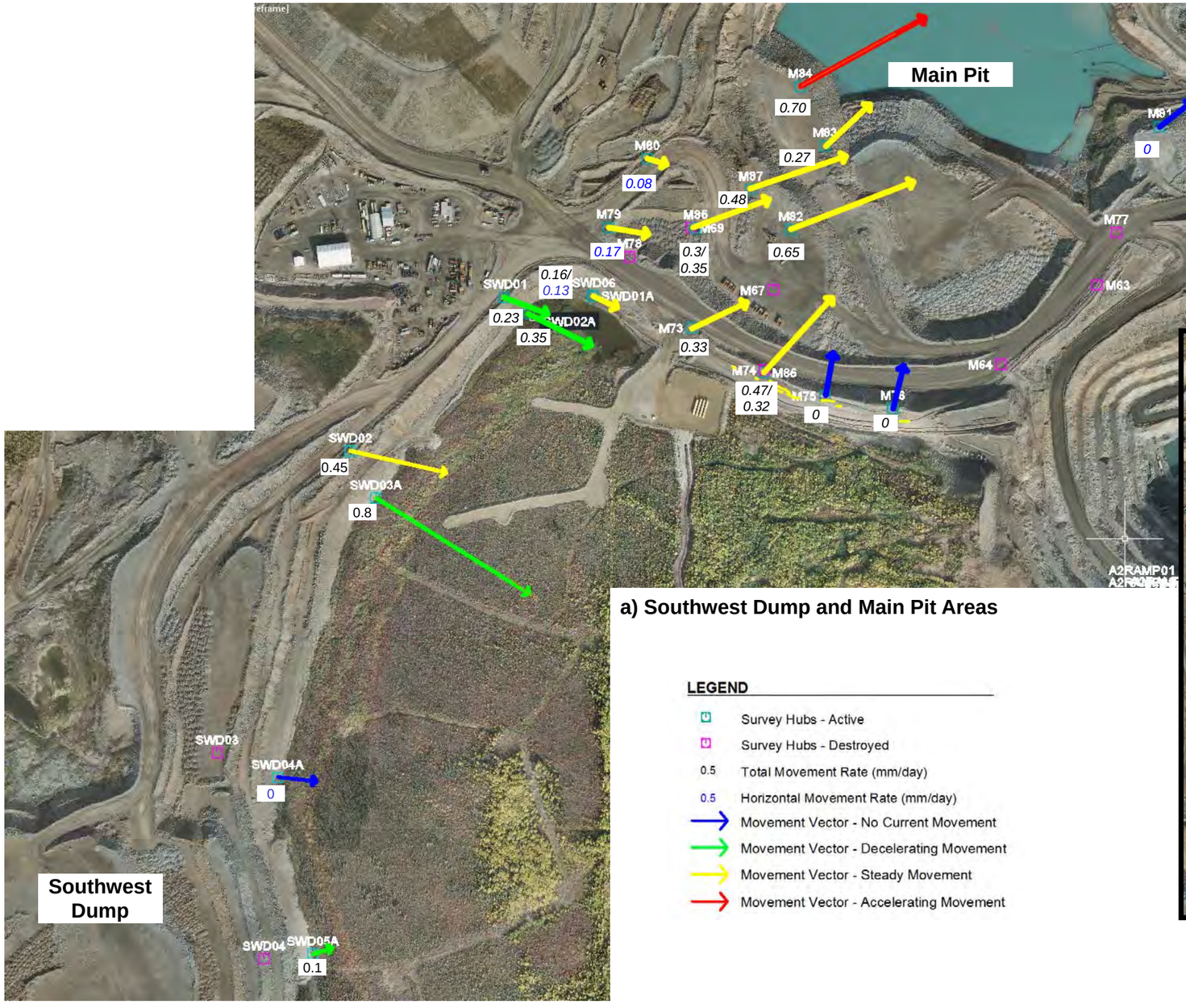
		Area 2, Area 118, and Minto North Pits
Job No: 1CM002.048 Filename: AppA_2016InspectionPhoto.pptx	Minto Mine	Date: Nov 2016 / Approved: PHM / Figure: 15

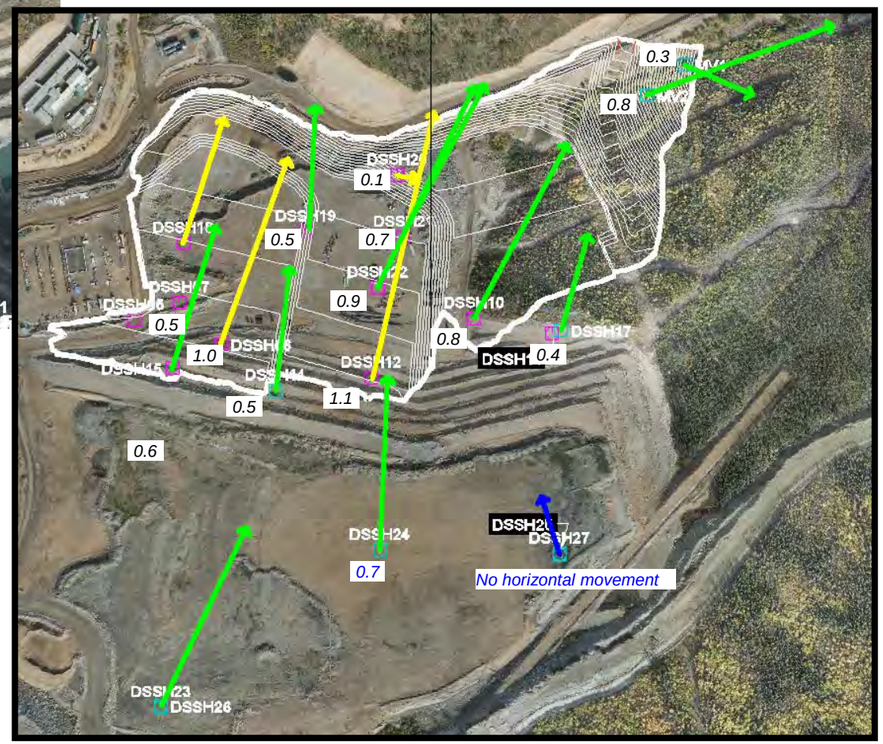
Appendix B: Survey Hub Summary



a) Southwest Dump and Main Pit Areas

LEGEND

- Survey Hubs - Active
- Survey Hubs - Destroyed
- 0.5 Total Movement Rate (mm/day)
- 0.5 Horizontal Movement Rate (mm/day)
- Movement Vector - No Current Movement
- Movement Vector - Decelerating Movement
- Movement Vector - Steady Movement
- Movement Vector - Accelerating Movement



b) Dry Stack Tailings Storage Facility

0.8

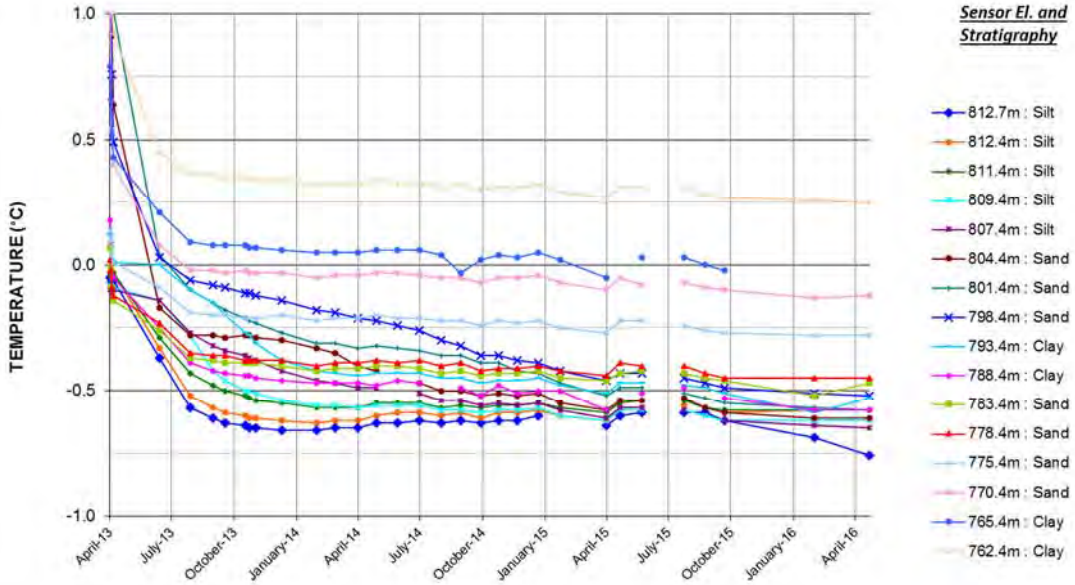
Notes:

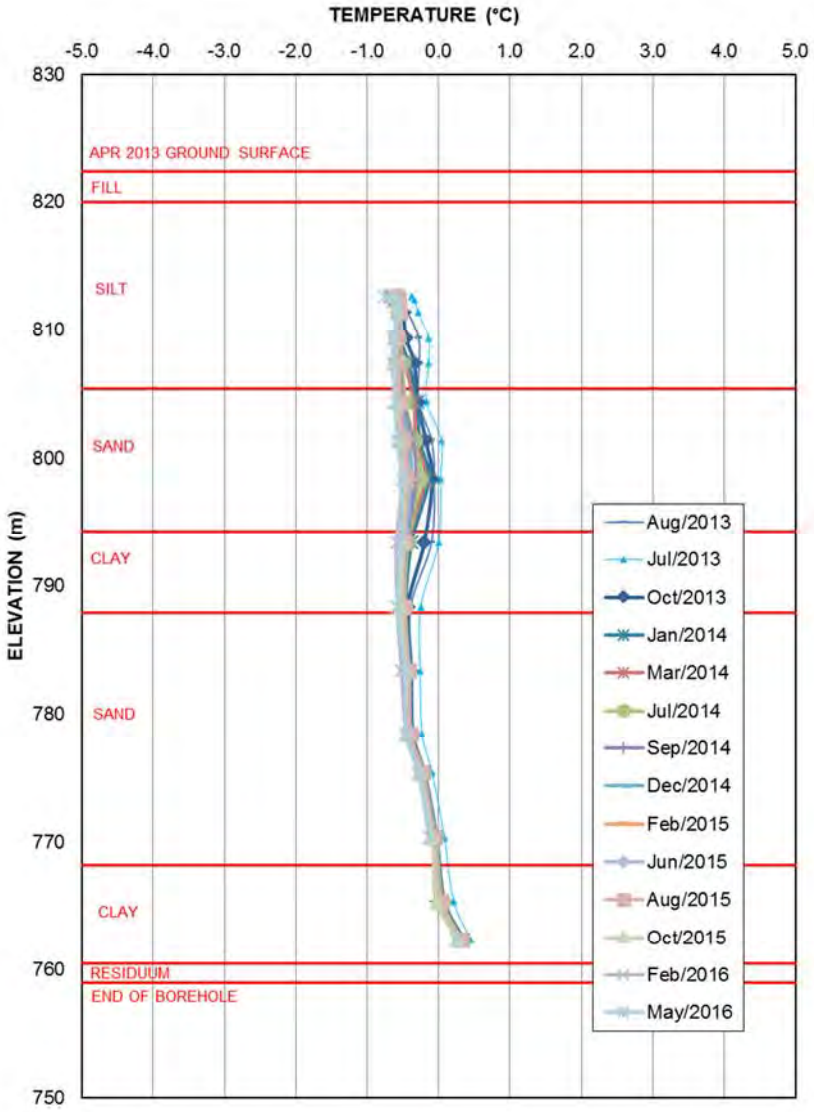
1. Movement vectors have been scaled by a factor of 250 (i.e. length equals 250 times the current velocity in mm/day) except for the blue vectors where no current movement is observed. The length of the blue vectors is arbitrary, but is included to show the direction of past movement.
2. The orthophoto was taken in 2014.
3. Movement vectors of destroyed survey hubs within the MVFE (Stage 1 and 2) footprint are prior to construction of the MVFE Stage 2.

Source file: \\VAN-SVR0\Projects\01_SITES\Minto\1CM002.050_2016 Geotech Op Support\!040_AutoCAD\1CM002.050-Site Plan Showing Instrumentation.dwg

srk consulting	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	2016 Survey Hub Data	
Job No: 1CM002.048 Filename: MintoSurveySummary11x17.pptx	Minto Mine	**Survey Hub Summary**	
		Date: August 2016	Prepared by: PHM
			Figure: **1**

Appendix C: Area 2 Pit Instrumentation Data





Source files:

1. AutoCAD: \\VAN-SVR0\Projects\01_SITES\Minto\1CM002.050_2016 Geotech Op Support\!040_AutoCAD\1CM002.050-Site Plan Showing Instrumentation.dwg
2. Excel instrumentation data: \\VAN-SVR0\Projects\01_SITES\Minto\!020_Site_Wide_Data\Geotechnical\Geotech Monitoring Data\GTC + Piezometer Instrumentation – DSTSF_2016-Geotech.xlsm

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Job No: 1CM002.048

Filename: ApB_Area2Pit.pptx

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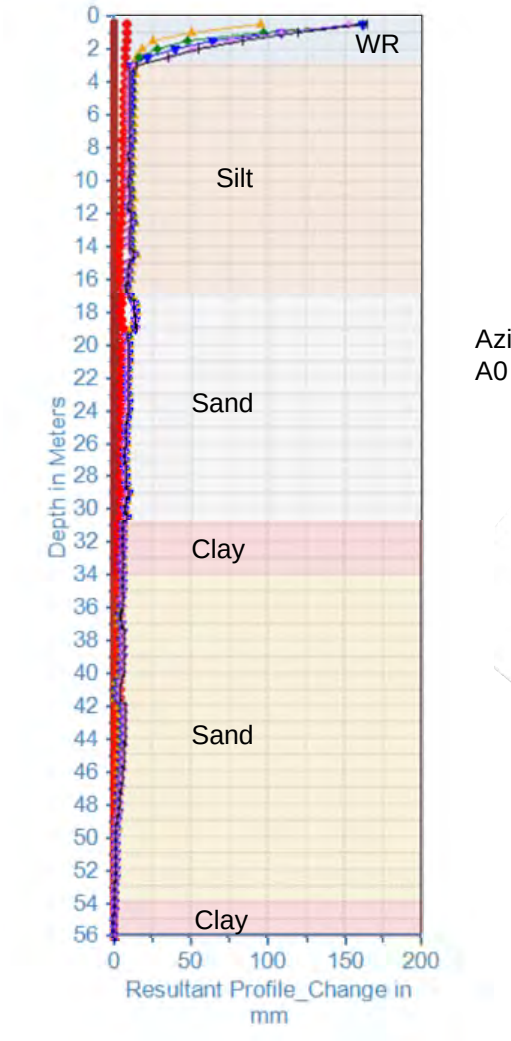
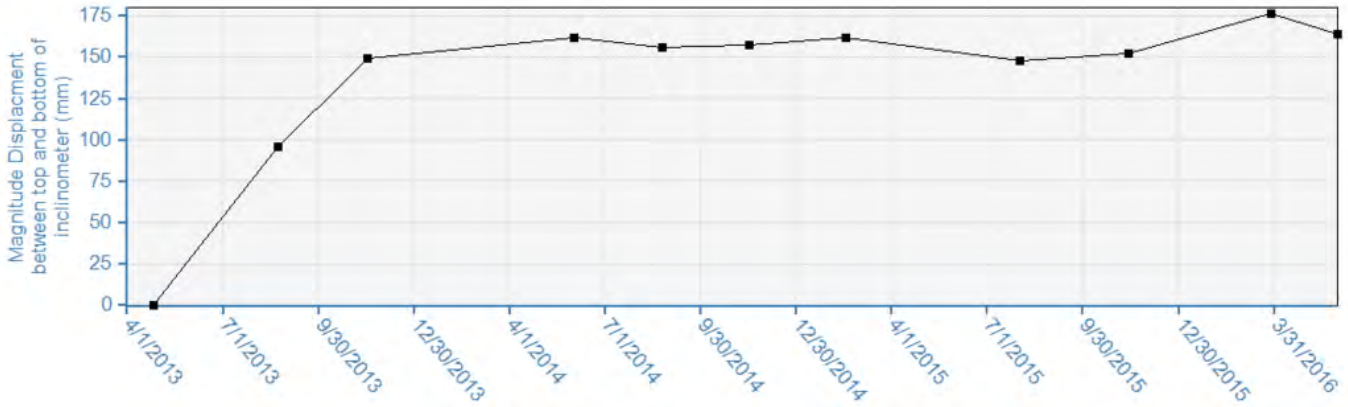
Minto Mine

Area 2 Pit Instrumentation Data

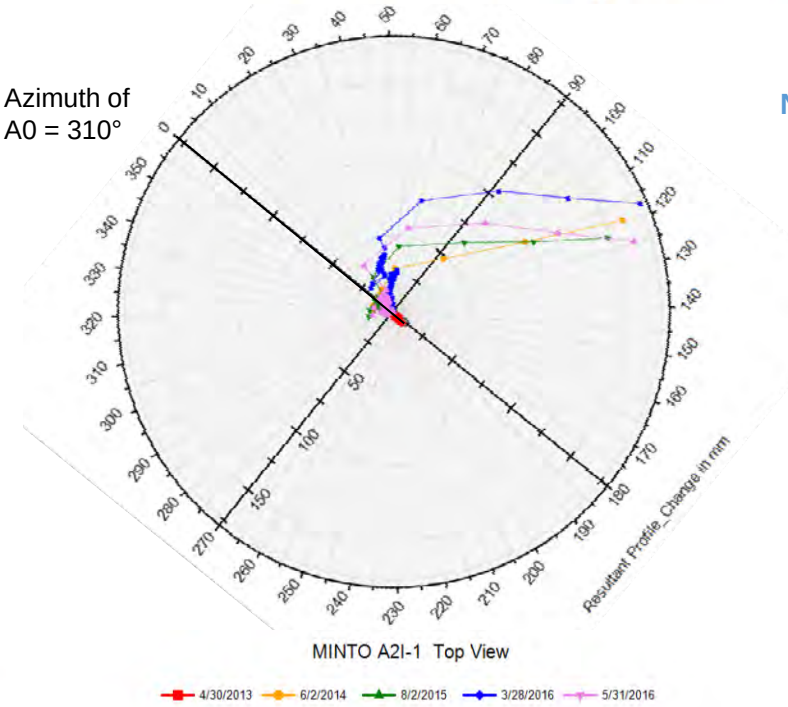
Ground Temperature Cable – A2T-1

Date:	Prepared by	Figure:
August 2016	PHM	1





Azimuth of A0 = 310°



North

Inclinometer location

Note: Inclinometer software (DigiPro2 v2.12.4) plots A0 as 0 degrees. The plot above has been rotated such that the orientation matches the plan (north is up).

Source files:

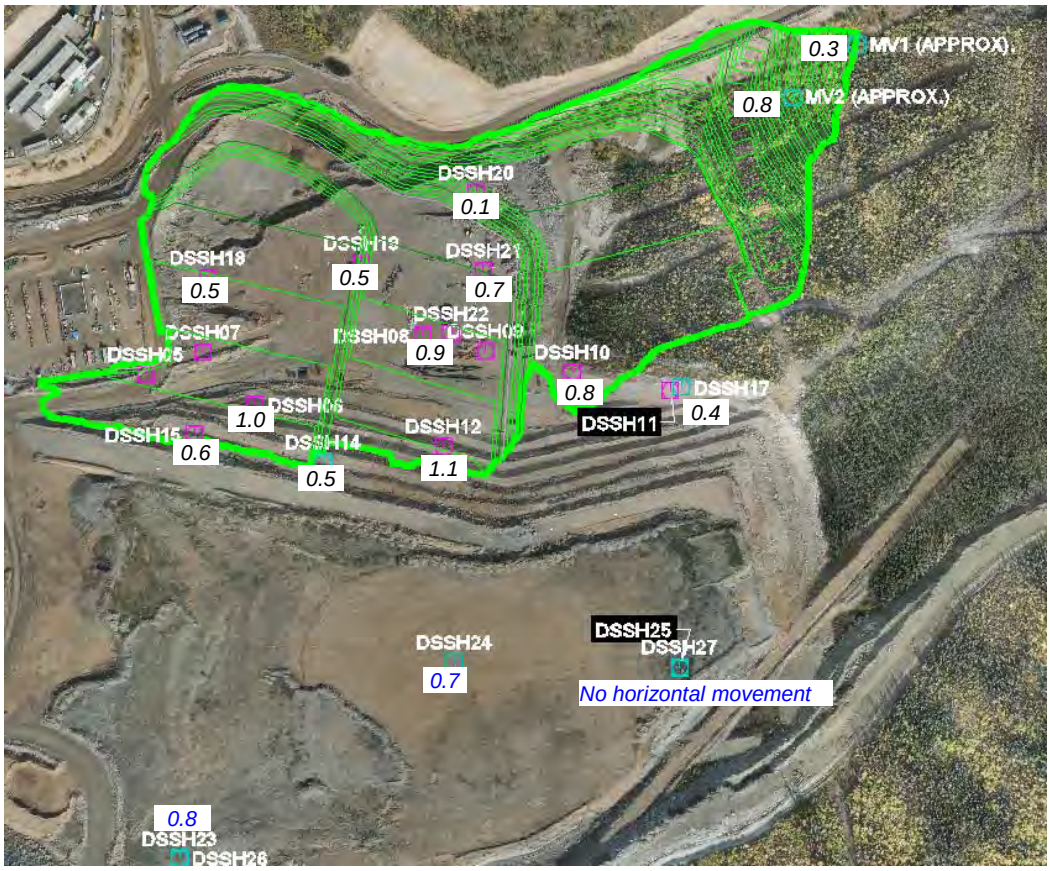
1. AutoCAD: \\VAN-SVR0\Projects\01_SITES\Minto\1CM002.050_2016 Geotech Op Support\!040_AutoCAD\1CM002.050-Site Plan Showing Instrumentation.dwg
2. Instrumentation data: \\VAN-SVR0\Projects\01_SITES\Minto\!020_Site_Wide_Data\Geotechnical\Geotech Monitoring Data\Minto SI Instrumentation Database.dpw

srk consulting	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	Area 2 Pit Instrumentation Data	
Job No: 1CM002.048 Filename: ApB_Area2Pit.pptx	Minto Mine	**Inclinometer A2I-1**	
		Date: August 2016	Prepared by PHM
		Figure: **2**	

Appendix D: Dry Stack Tailings Storage Facility Instrumentation Data

Legend/Notes

1. *Values in black are total movement rates in units of mm/day*
2. *Values in blue are horizontal movement rates in mm/day.*
3. *Survey hubs in cyan color are active.*
4. *Survey hubs in magenta area destroyed.*
5. *Survey hubs with no movement rates listed have been inactive for over one year.*



Active Survey Hubs

Survey Hub	Last Reading	Movement Rate (mm/day) June 2015	Movement Rate (mm/day) June 2016	Bearing (Cumulative)	Comments
DSSH14	5/31/2016	1.0	0.5	13	
DSSH17	5/31/2016	0.7	0.4	16	
DSSH24	5/31/2016	1.4	0.8	3	Horizontal movement rates. Movement rates affected by freeze/thaw effects and settlement of the cover.
DSSH26	5/31/2016	1.0	0.8	50	
DSSH27	5/31/2016	0.7	0.0	330	
MV1	7/12/2016	-	0.3	114	Easterly movement, may be related to high pore pressures as a result of MVFES2 fill placement on frozen foundation materials. In both cases, movement rates appear to be decelerating in June 2016.
MV2	7/12/2016	-	0.8	69	

Destroyed Survey Hubs in past year (prior to construction of MVFES2)

Survey Hub	Last Reading	Movement Rate (mm/day) June 15	Movement Rate (mm/day) At last reading	Bearing (Cumulative)	Comments
DSSH06	1/23/2016	1.0	1.0	17	
DSSH10	12/16/2015	0.9	0.8	23	
DSSH12	1/7/2016	1.1	1.1	7	
DSSH15	2/16/2016	0.8	0.6	17	
DSSH18	12/16/2015	0.53	0.53	18	
DSSH19	12/29/2015	0.6	0.5	9	
DSSH20	10/20/2015	0.0	0.1	95	
DSSH21	8/12/2015	0.7	0.7	28	
DSSH22	8/12/2015	1.0	0.9	26	

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DSTSF Instrumentation Data

DSTSF Survey Hub Summary

Job No: 1CM002.048

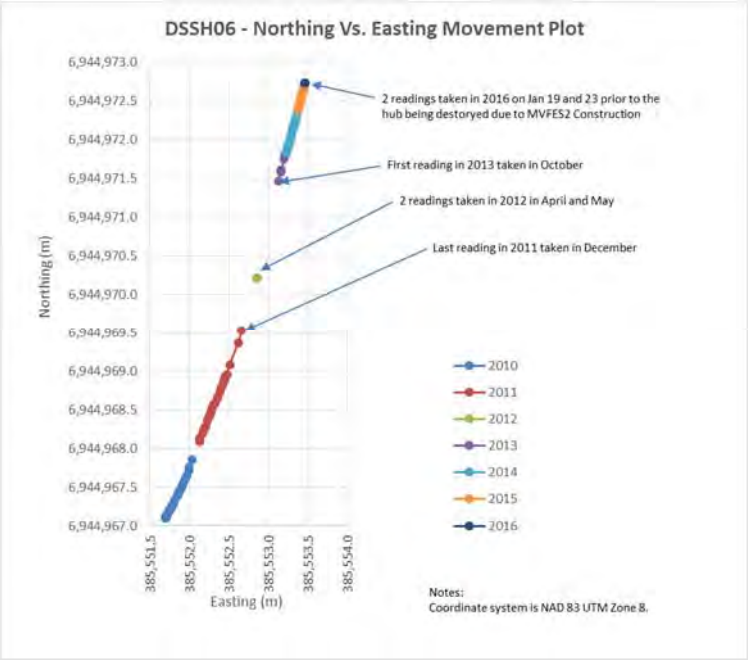
Filename: ApD_DSTSFPort.pptx

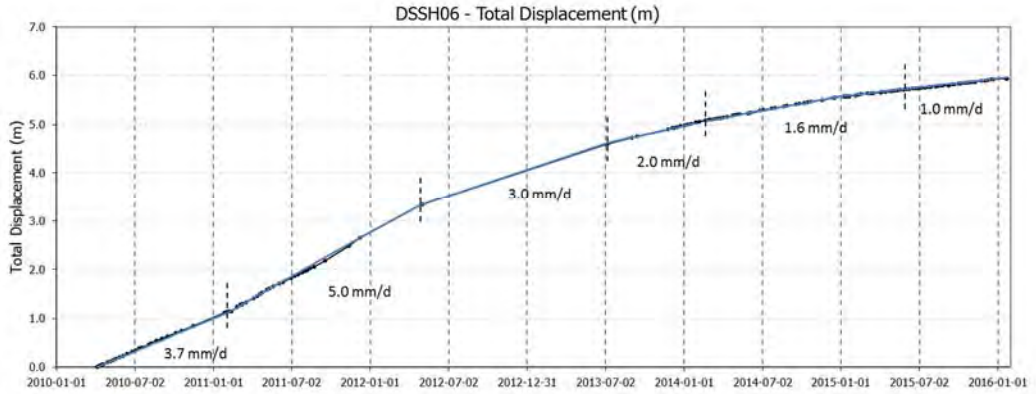
Minto Mine

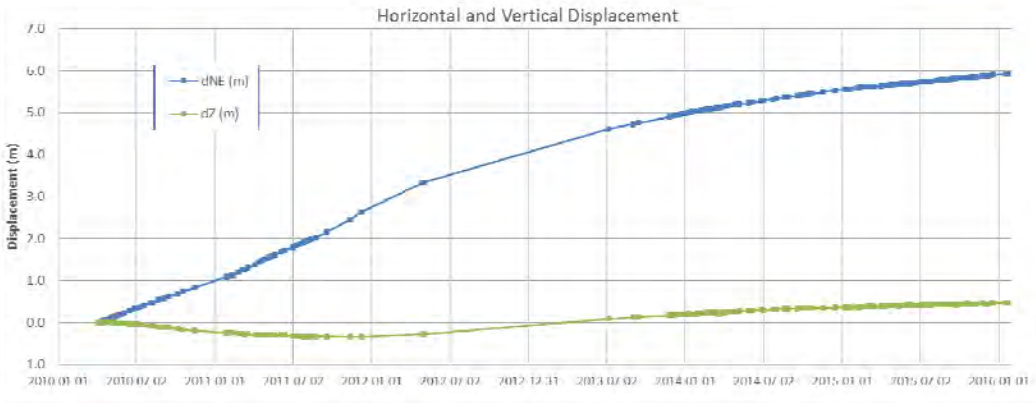
Date: August 2016 | Prepared by: PHM | Figure: 1

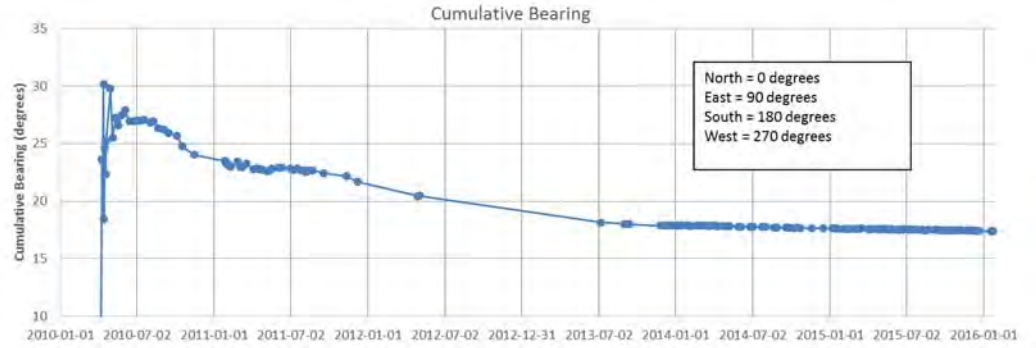
Source files:

1. AutoCAD: \\VAN-SVR0\Projects\01_SITES\Minto\1CM002.050_2016 Geotech Op Support\040_AutoCAD\1CM002.050-Site Plan Showing Instrumentation.dwg
2. Excel instrumentation data: \\VAN-SVR0\Projects\01_SITES\Minto\020_Site_Wide_Data\Geotechnical\Geotech Monitoring Data\DSTF, SWD, ASH and WSP Survey Hub Monitoring_PM_2016GeotechInsp.xlsm









Source files:

1. AutoCAD: \\VAN-SVR0\Projects\01_SITES\Minto\1CM002.050_2016 Geotech Op Support\!040_AutoCAD\1CM002.050-Site Plan Showing Instrumentation.dwg
2. Excel instrumentation data: \\VAN-SVR0\Projects\01_SITES\Minto\!020_Site_Wide_Data\Geotechnical\Geotech Monitoring Data\DSTF, SWD, ASH and WSP Survey Hub Monitoring_PM_2016GeotechInsp.xlsm

srk consulting

Job No: 1CM002.048

Filename: ApD_DSTSFLandscape.pptx

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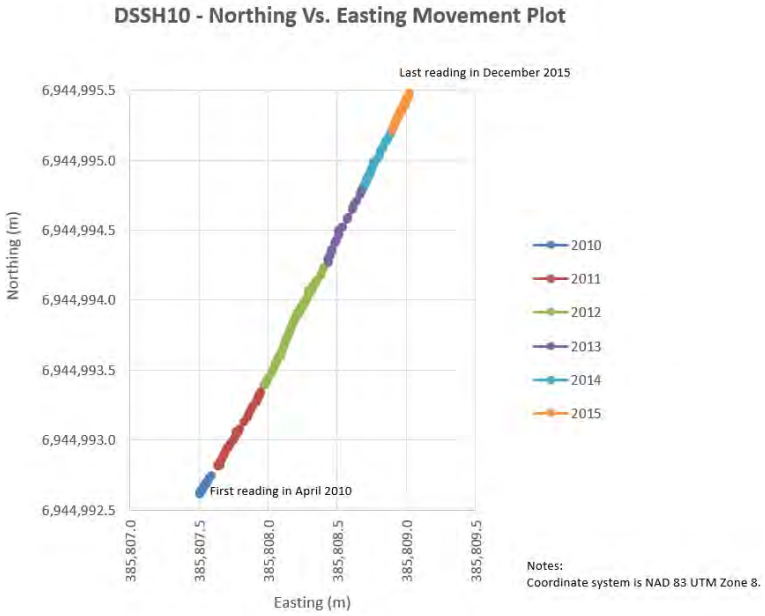
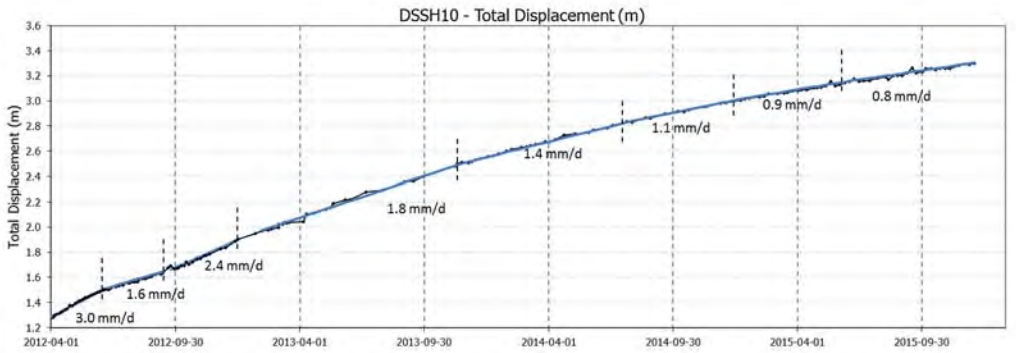
Minto Mine

DSTSF Instrumentation Data

DSTSF – DSSH06

Date:	Prepared by	Figure:
August 2016	PHM	**2**





Source files:

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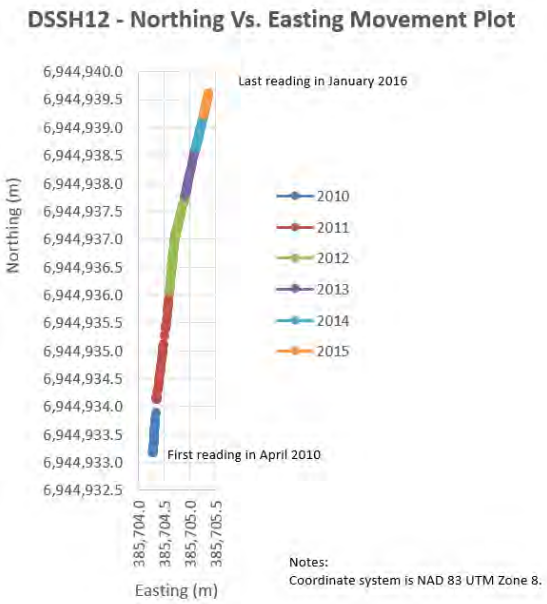
DSTSF Instrumentation Data

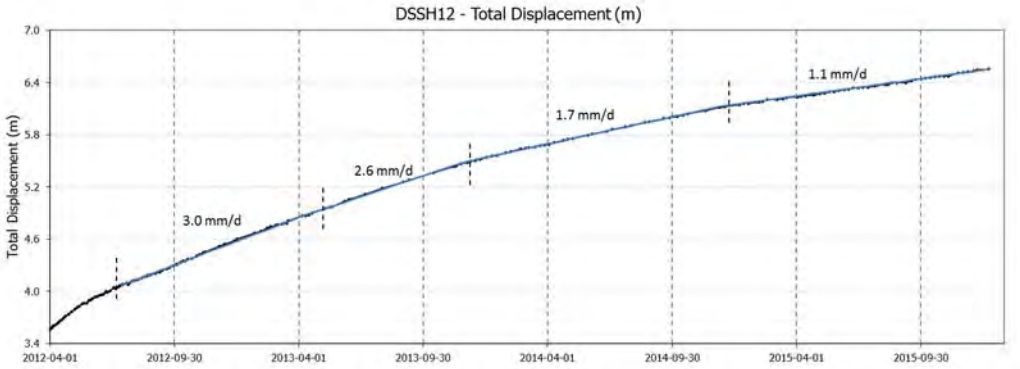
Survey Hub – DSSH10

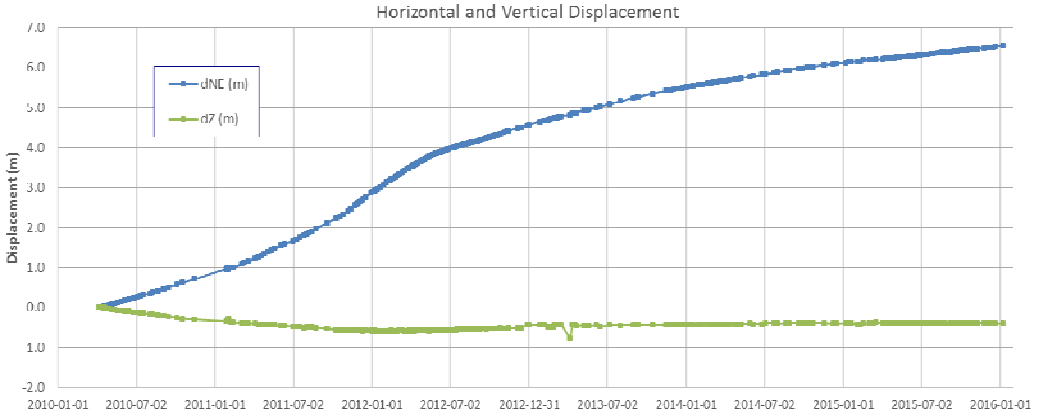
Job No: 1CM002.048
Filename: ApD_DSTSFLandscape.pptx

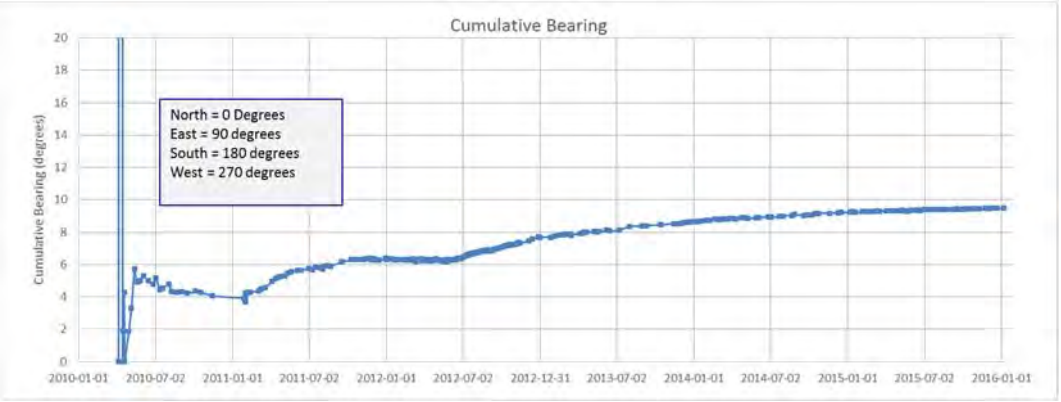
Minto Mine

Date:	Prepared by	Figure:
August 2016	PHM	3









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Job No: 1CM002.048

Filename: ApD_DSTSFLandscape.pptx

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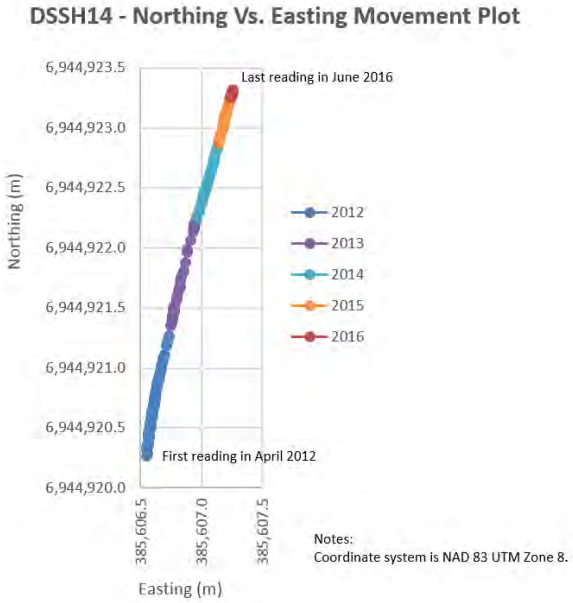
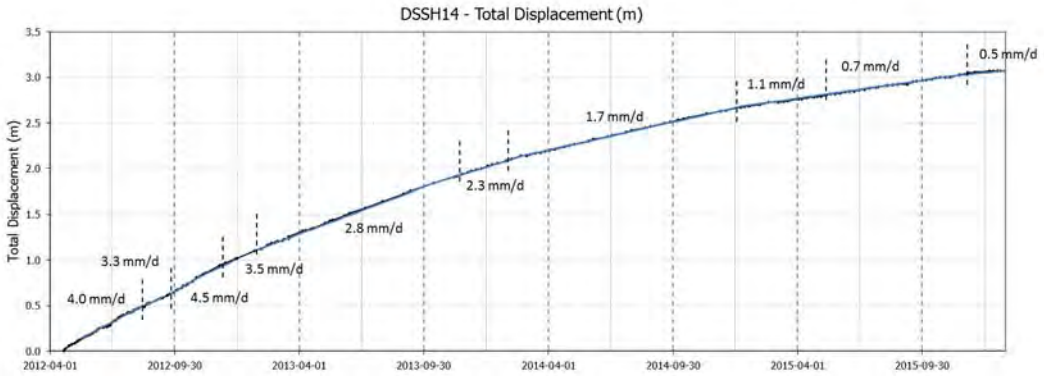
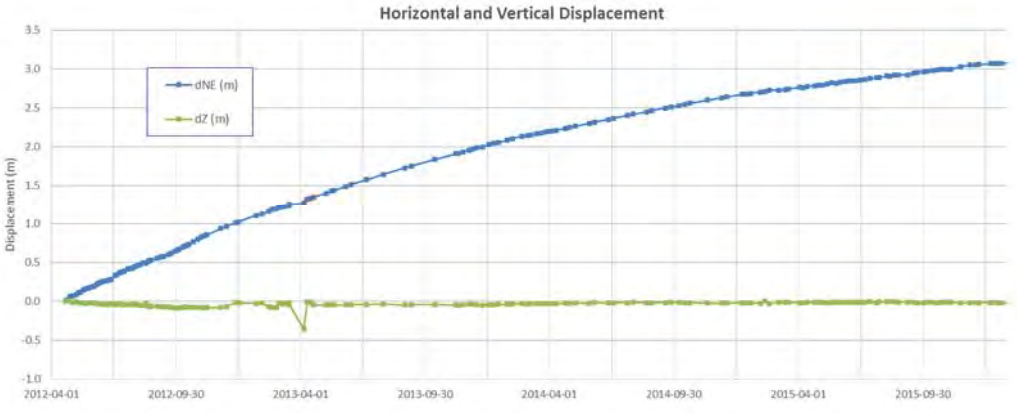
DSTSF Instrumentation Data

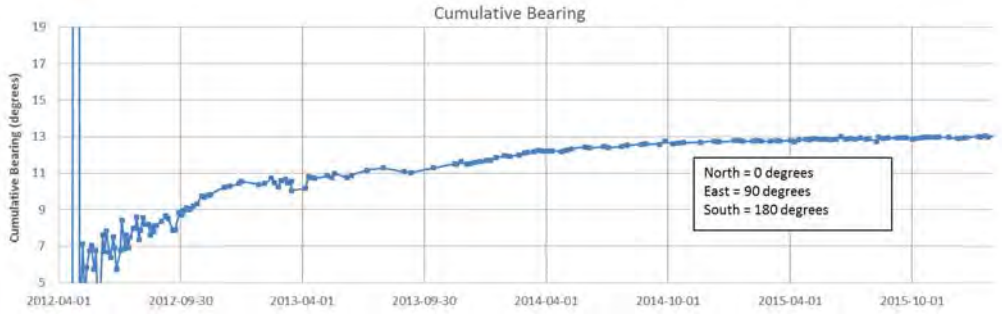
Survey Hub – DSSH12

Date:	Prepared by	Figure:
August 2016	PHM	4









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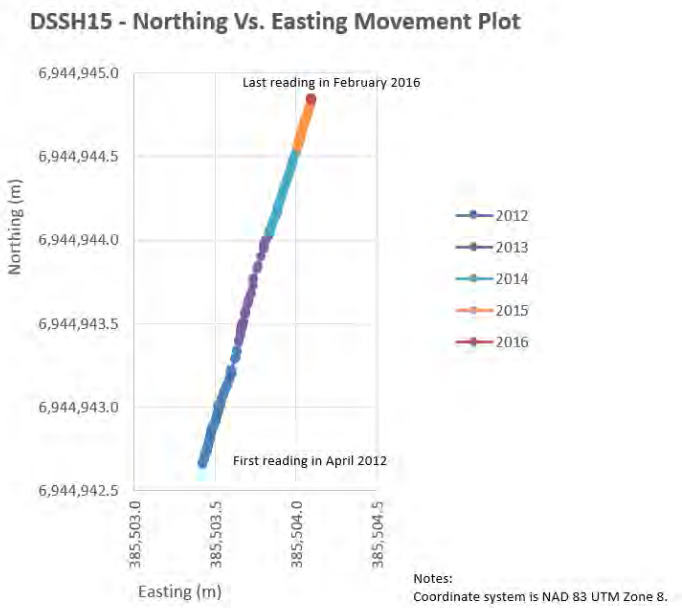
DSTSF Instrumentation Data

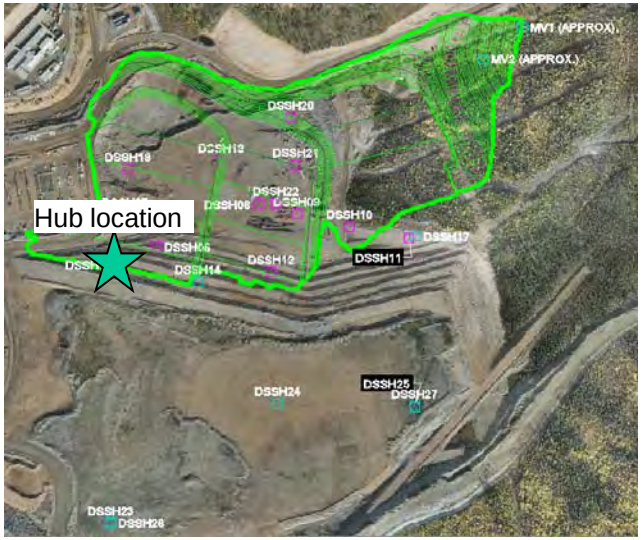
Survey Hub – DSSH14

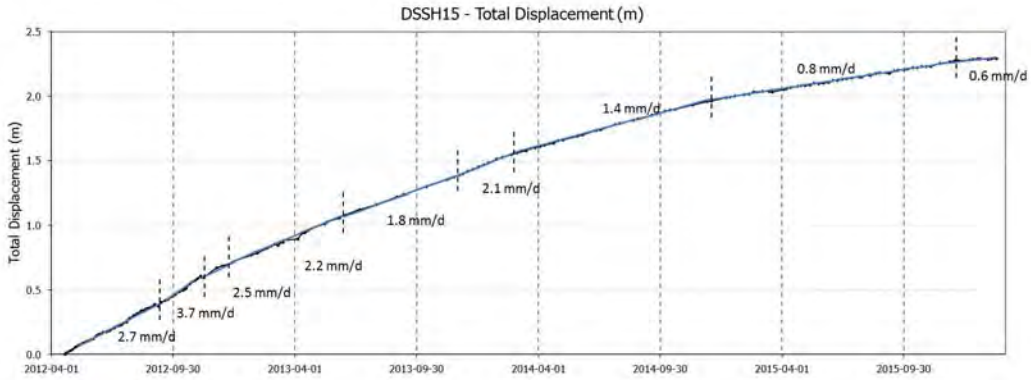
Job No: 1CM002.048
Filename: ApD_DSTSFLandscape.pptx

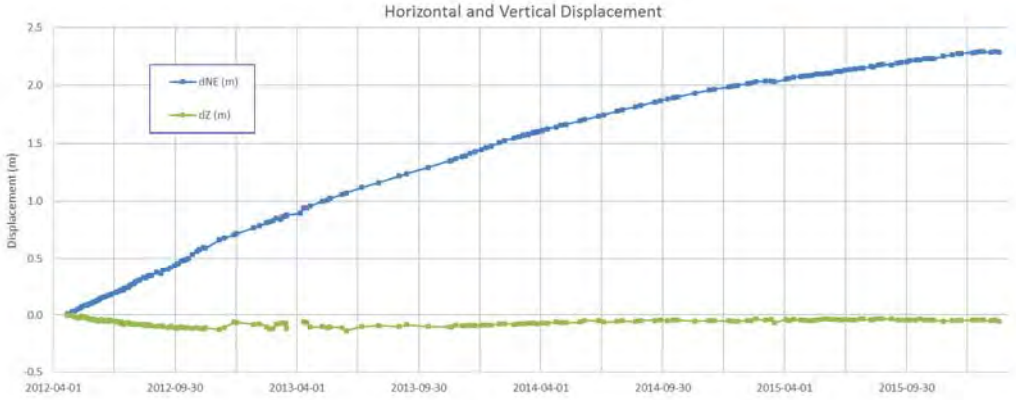
Minto Mine

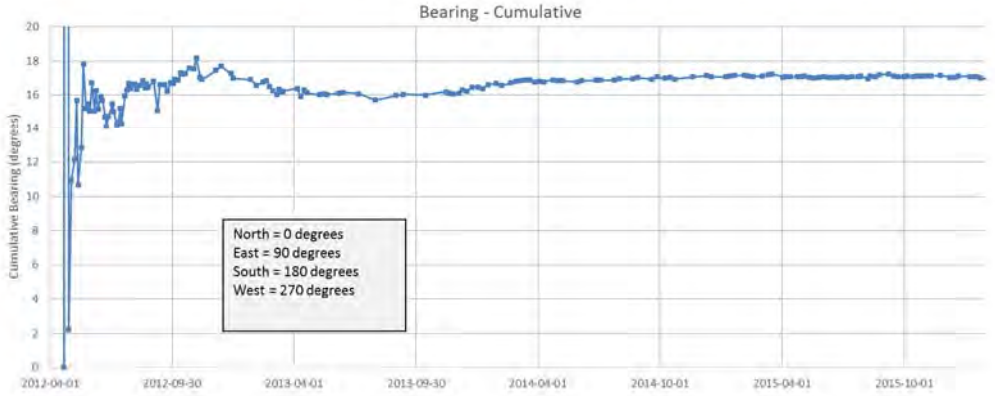
Date:	Prepared by	Figure:
August 2016	PHM	5











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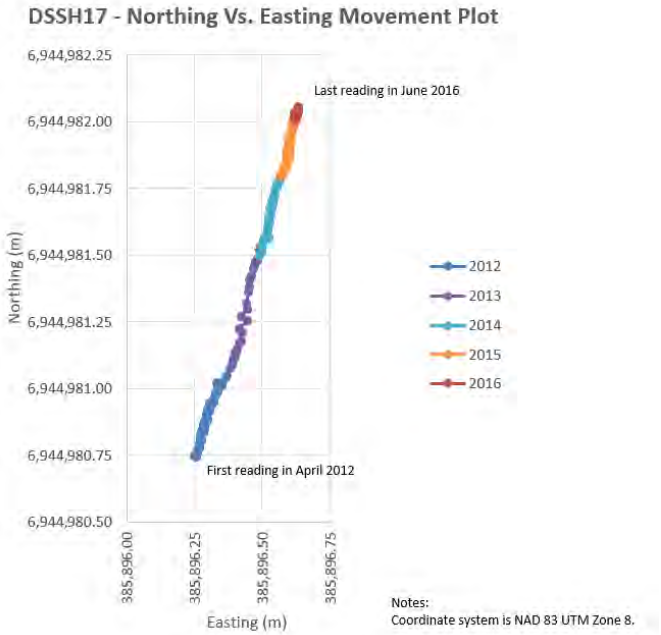
DSTSF Instrumentation Data

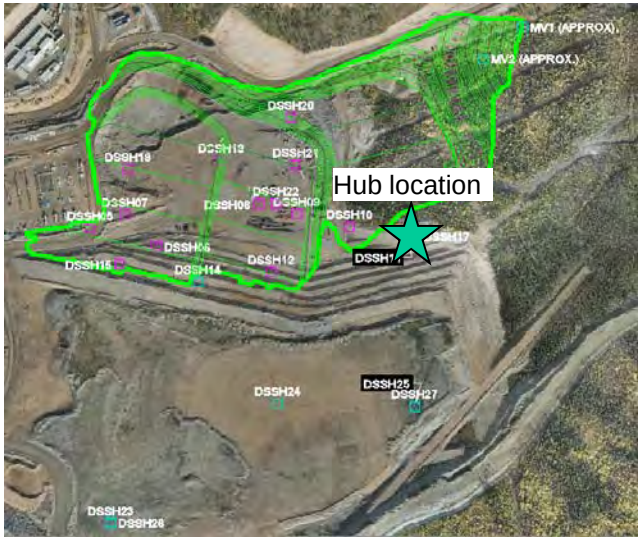
Survey Hub – DSSH15

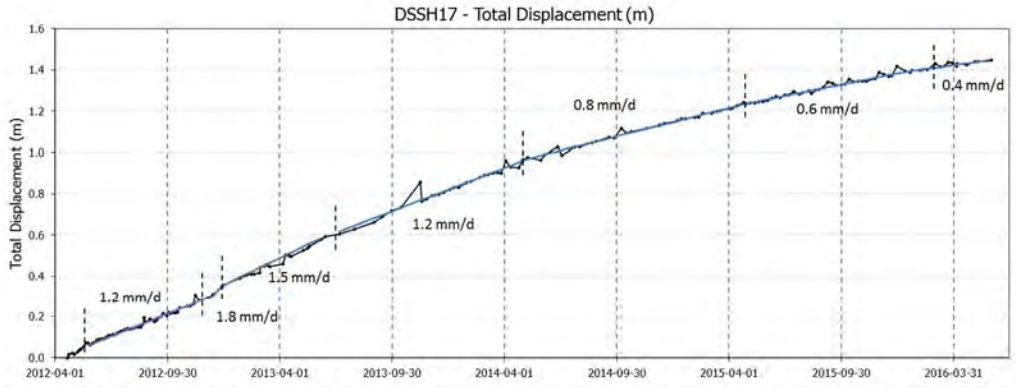
Job No: 1CM002.048
Filename: ApD_DSTSFLandscape.pptx

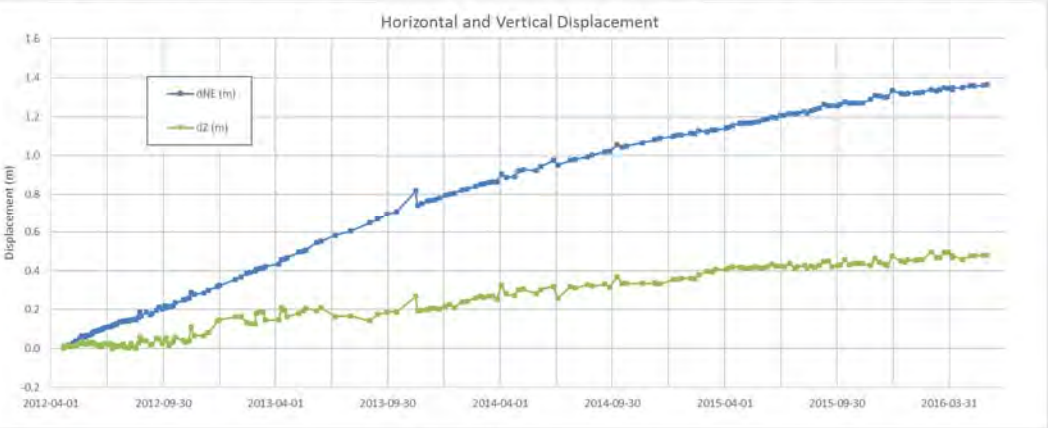
Minto Mine

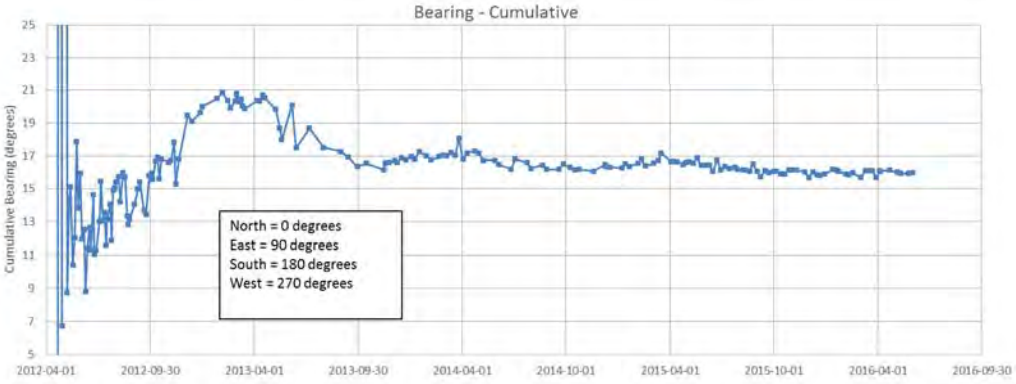
Date: August 2016
Prepared by: PHM
Figure: **6**











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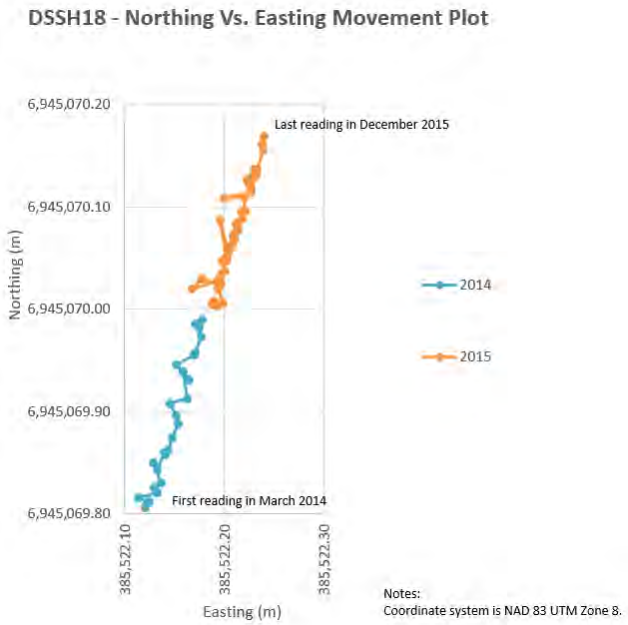
DSTSF Instrumentation Data

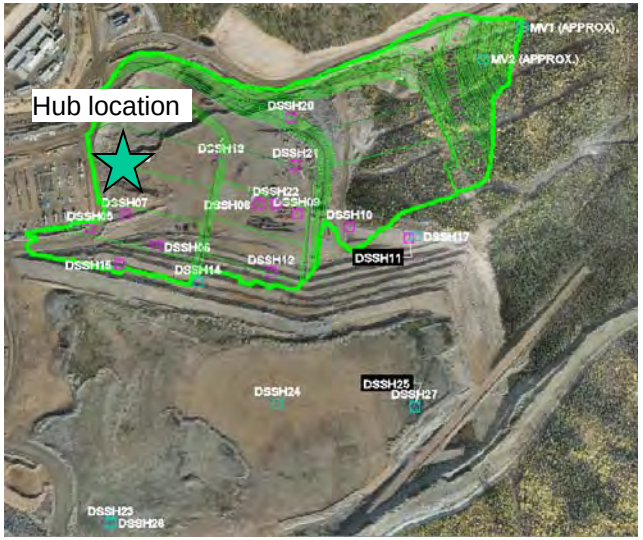
Survey Hub – DSSH17

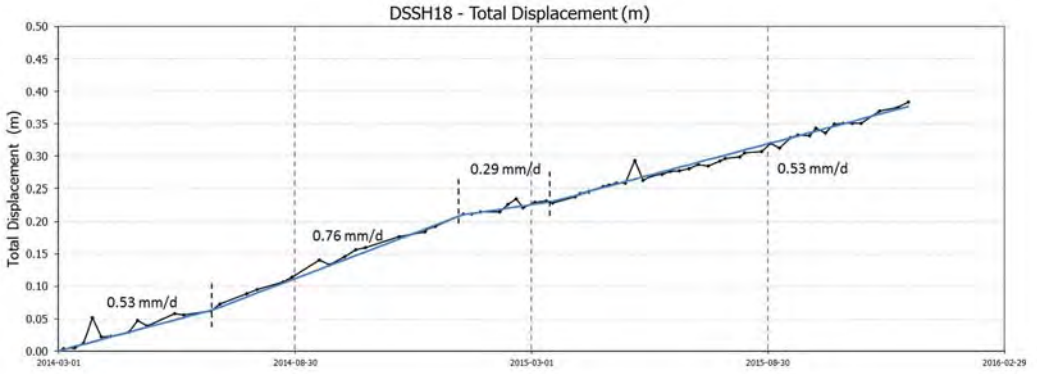
Job No: 1CM002.048
Filename: ApD_DSTSFLandscape.pptx

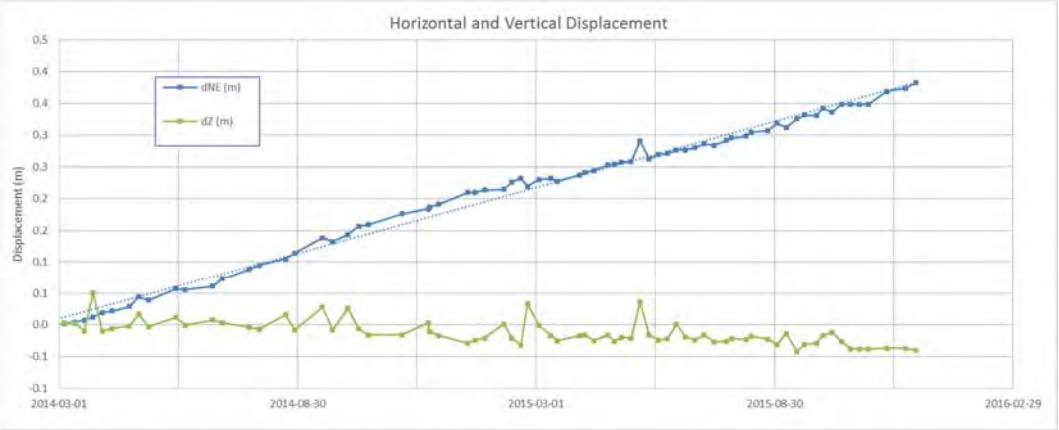
Minto Mine

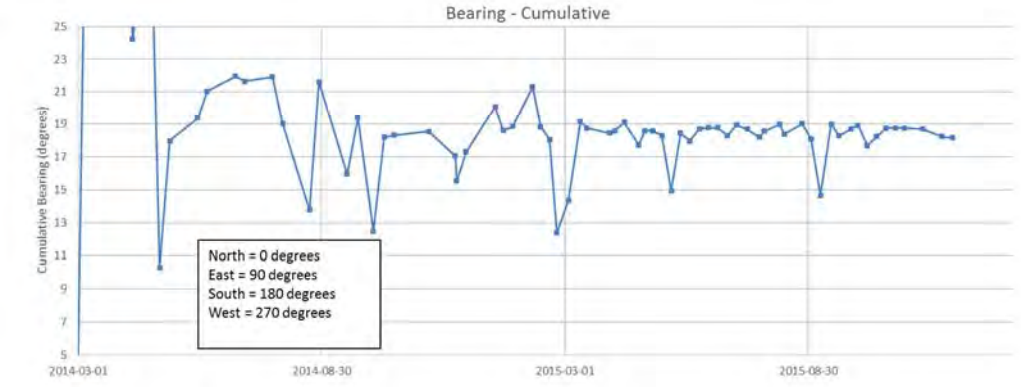
Date: August 2016
Prepared by: PHM
Figure: 7











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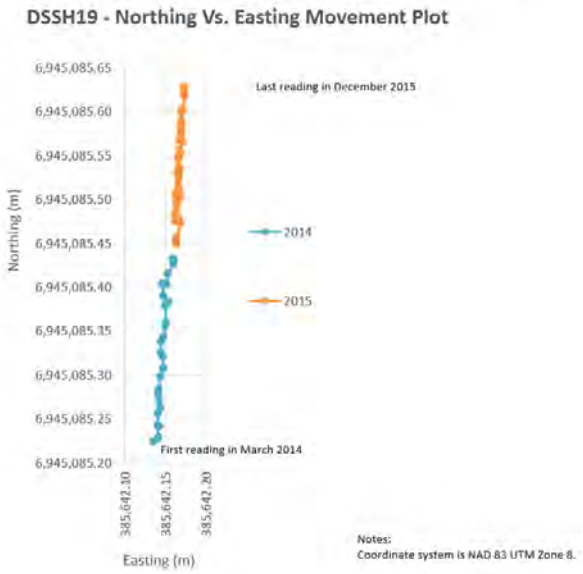
DSTSF Instrumentation Data

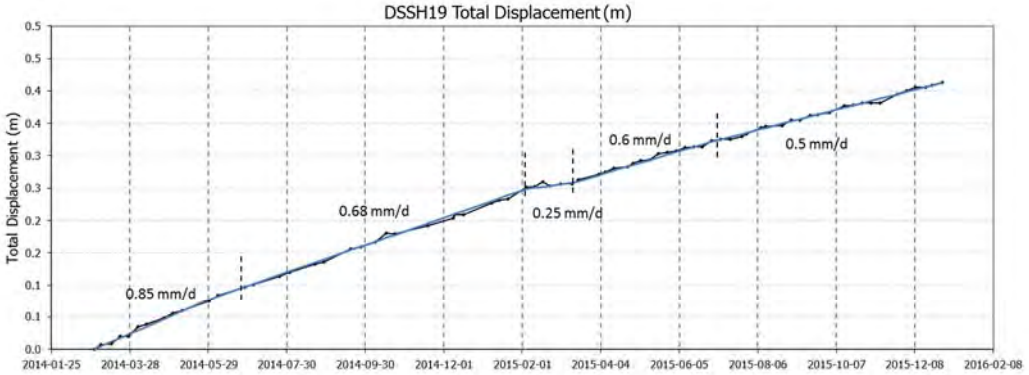
Survey Hub – DSSH18

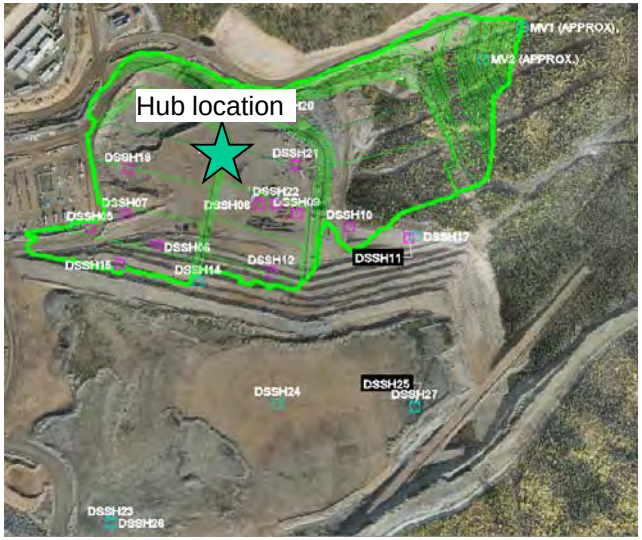
Job No: 1CM002.048
Filename: ApD_DSTSFLandscape.pptx

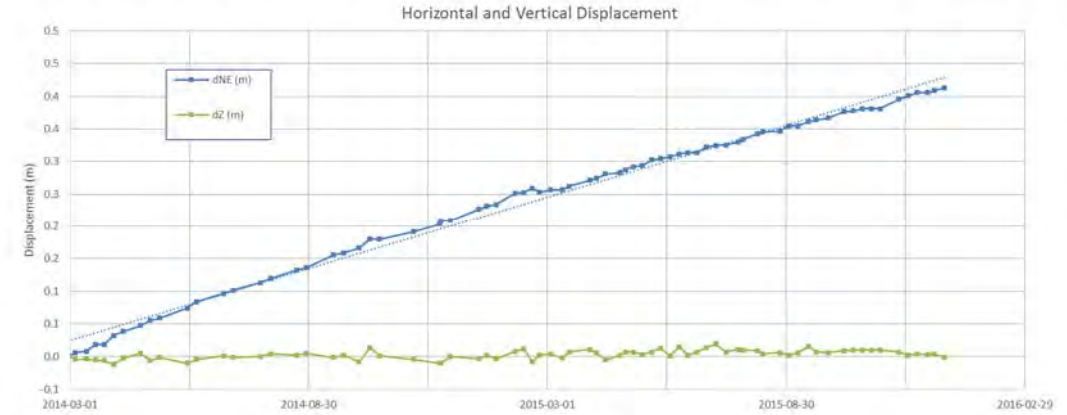
Minto Mine

Date: August 2016
Prepared by: PHM
Figure: **8**









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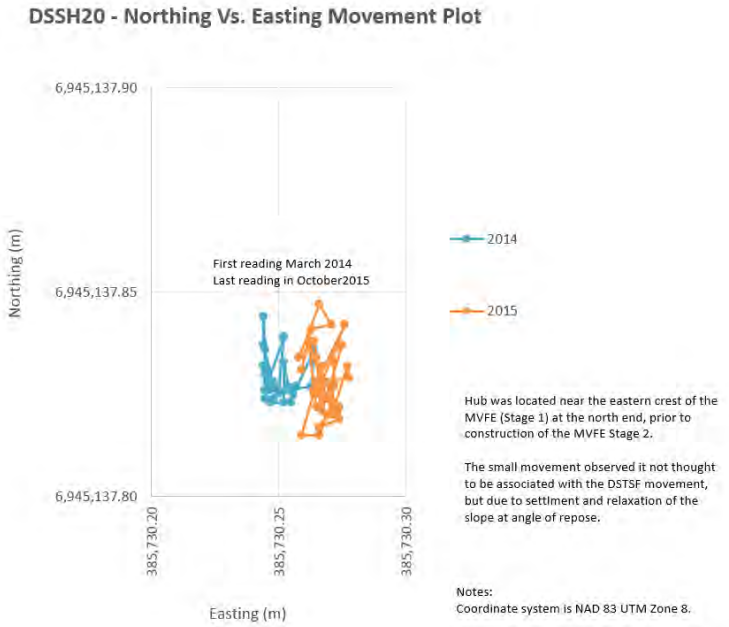
DSTSF Instrumentation Data

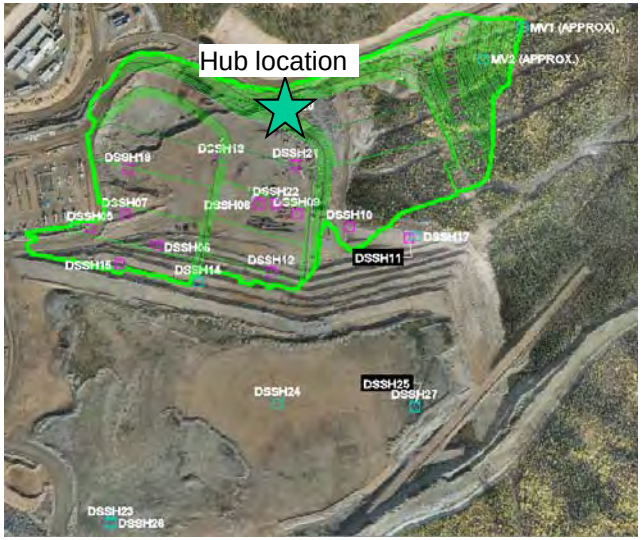
Survey Hub – DSSH19

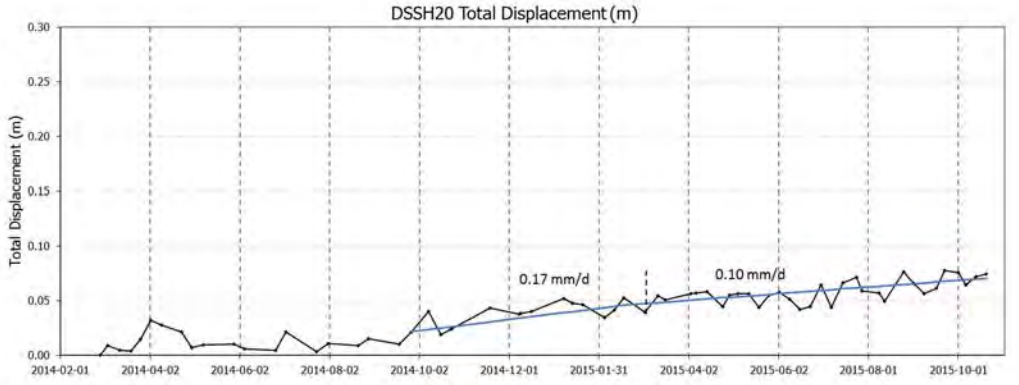
Job No: 1CM002.048
Filename: ApD_DSTSFLandscape.pptx

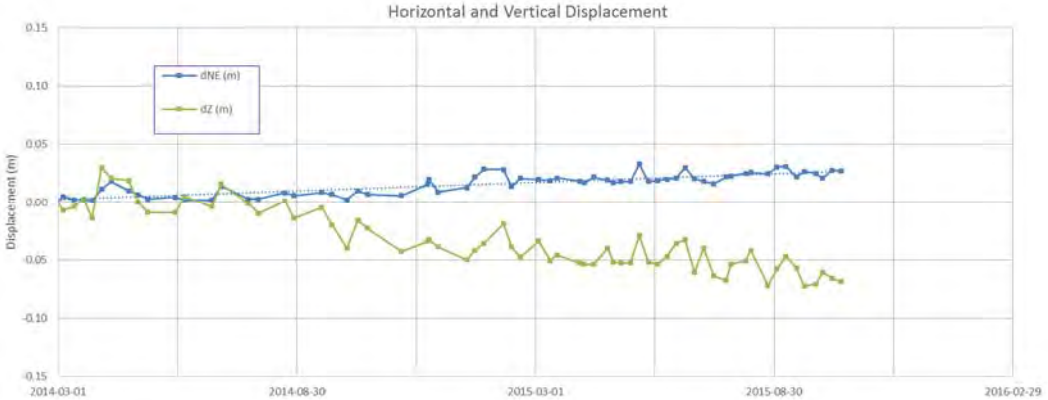
Minto Mine

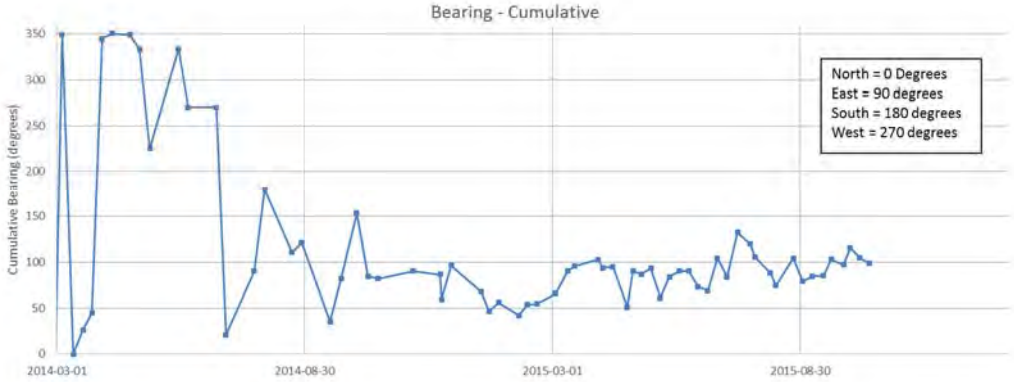
Date: August 2016
Prepared by: PHM
Figure: **9**











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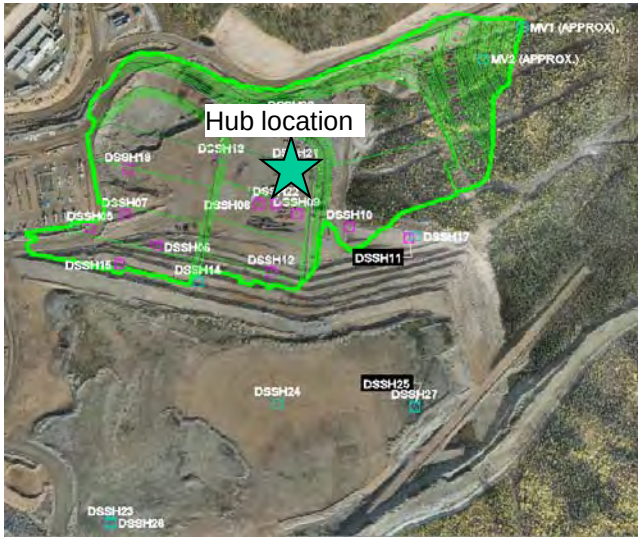
DSTSF Instrumentation Data

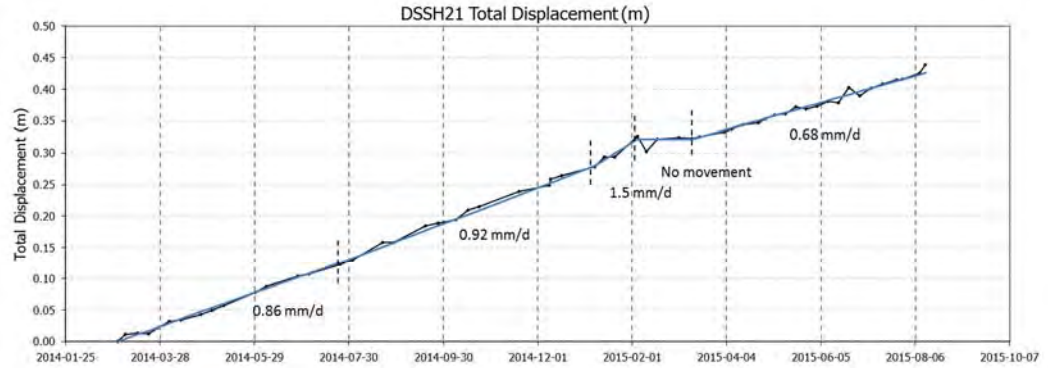
Survey Hub – DSSH20

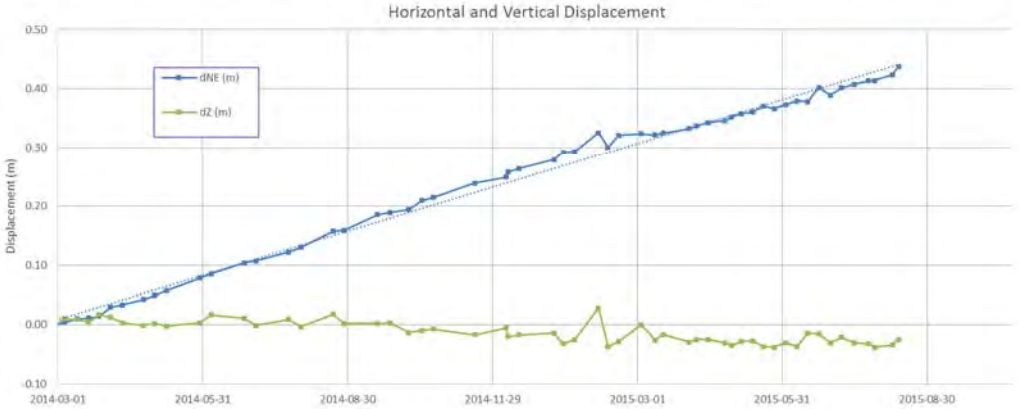
Job No: 1CM002.048
Filename: ApD_DSTSFLandscape.pptx

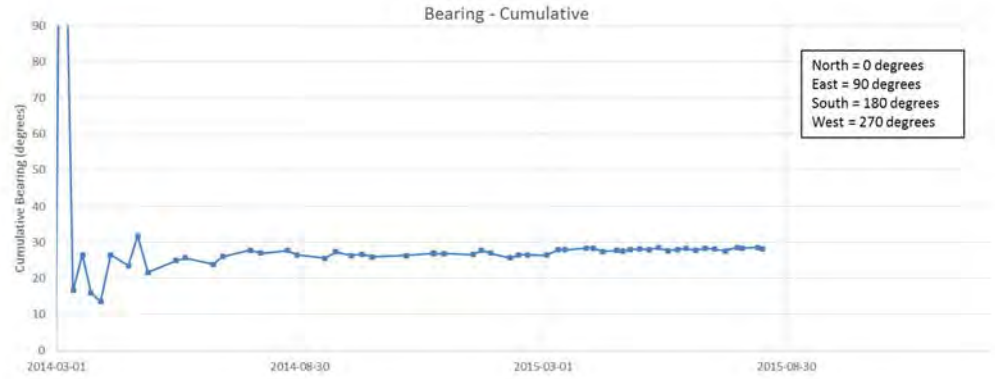
Minto Mine

Date: August 2016
Prepared by: PHM
Figure: **10**









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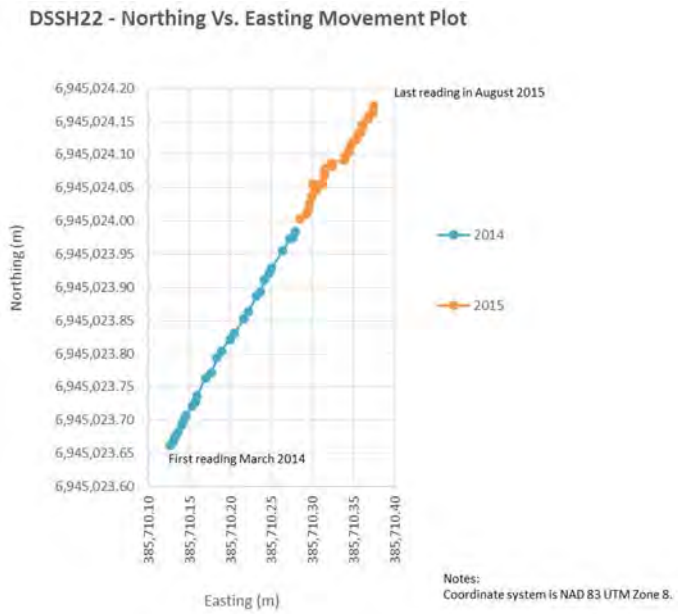
DSTSF Instrumentation Data

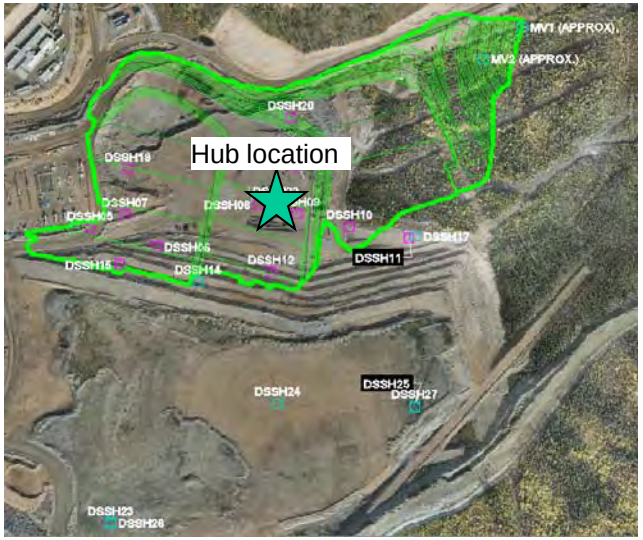
Survey Hub – DSSH21

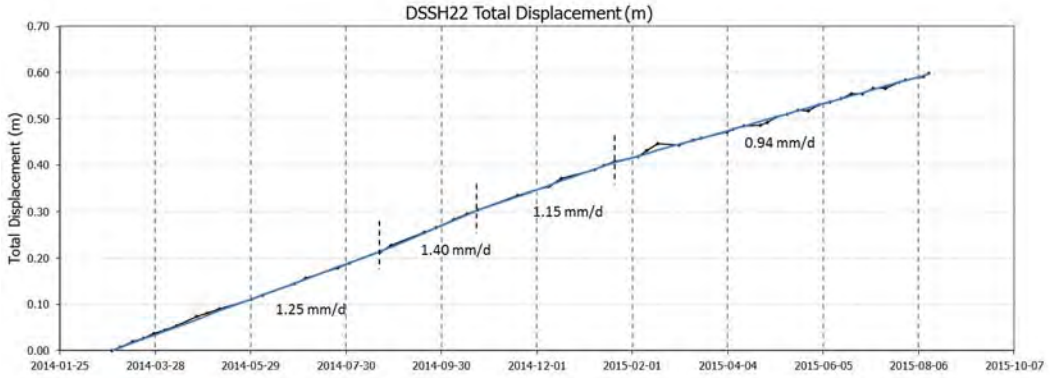
Job No: 1CM002.048
Filename: ApD_DSTSFLandscape.pptx

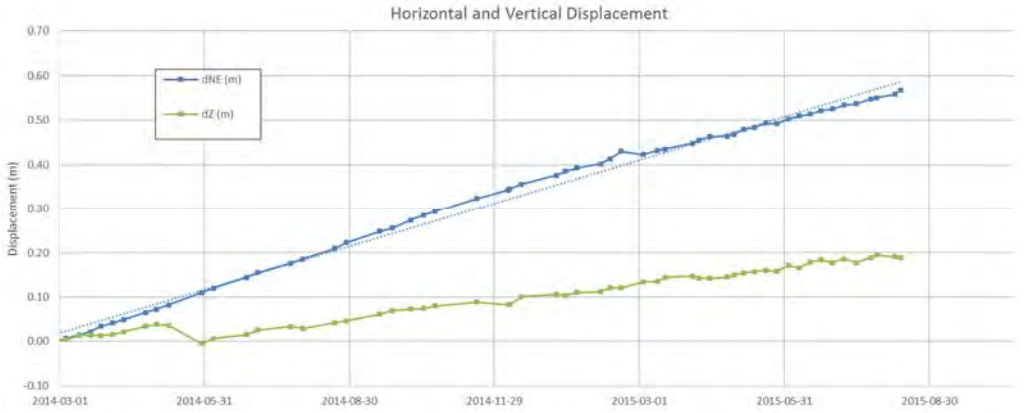
Minto Mine

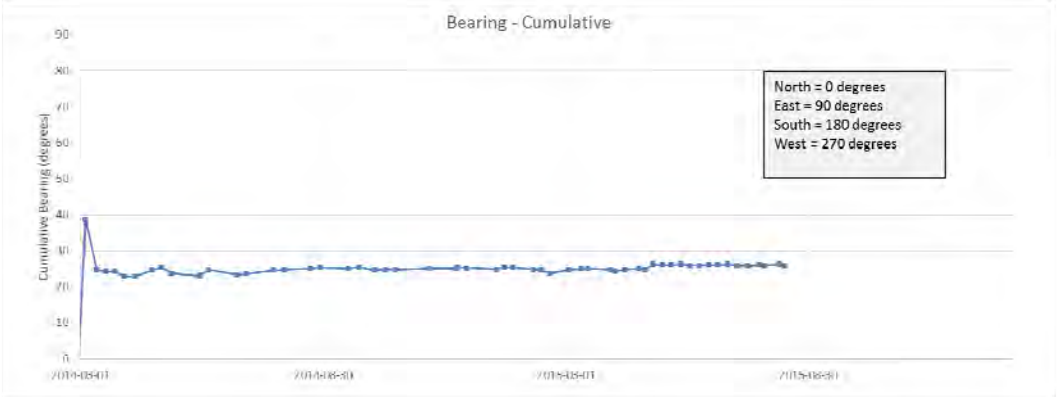
Date: August 2016
Prepared by: PHM
Figure: **11**











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OPERATED BY MINTO EXPLORATIONS LTD.

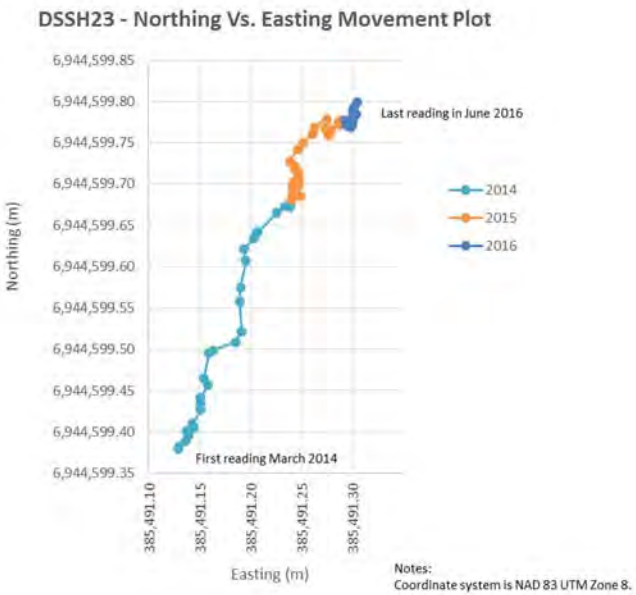
DSTSF Instrumentation Data

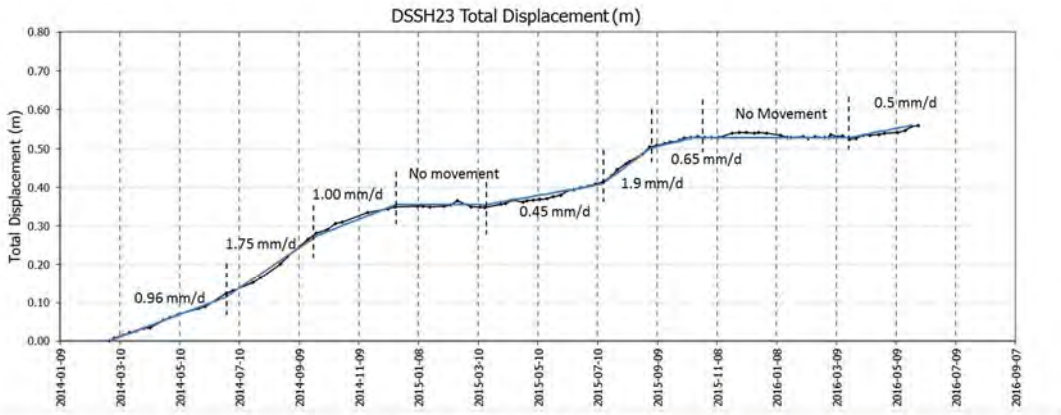
Survey Hub – DSSH22

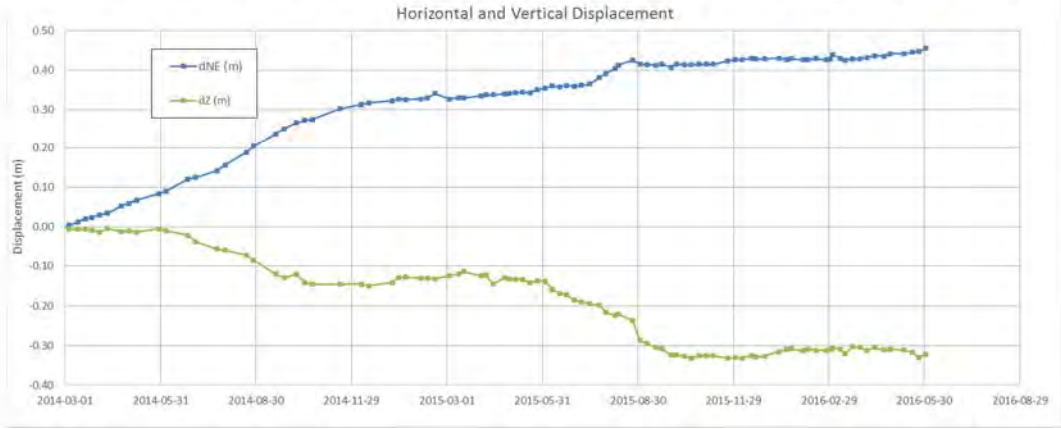
Job No: 1CM002.048
Filename: ApD_DSTSFLandscape.pptx

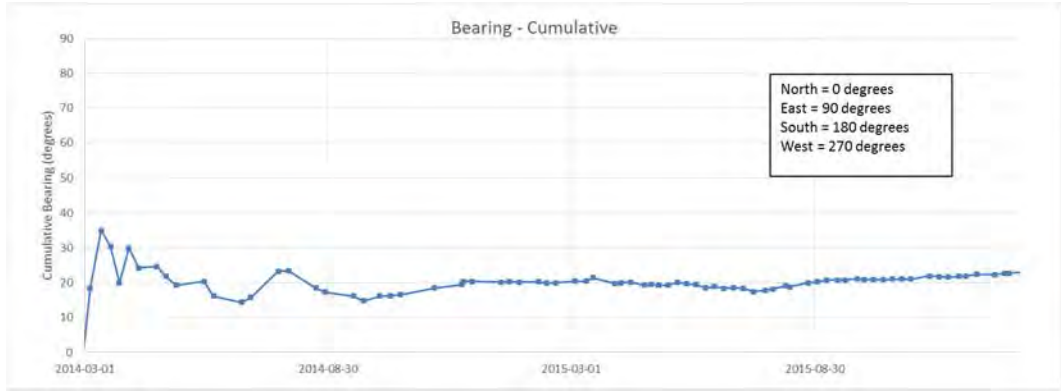
Minto Mine

Date: August 2016
Prepared by: PHM
Figure: **12**









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Job No: 1CM002.048

Filename: ApD_DSTSFLandscape.pptx

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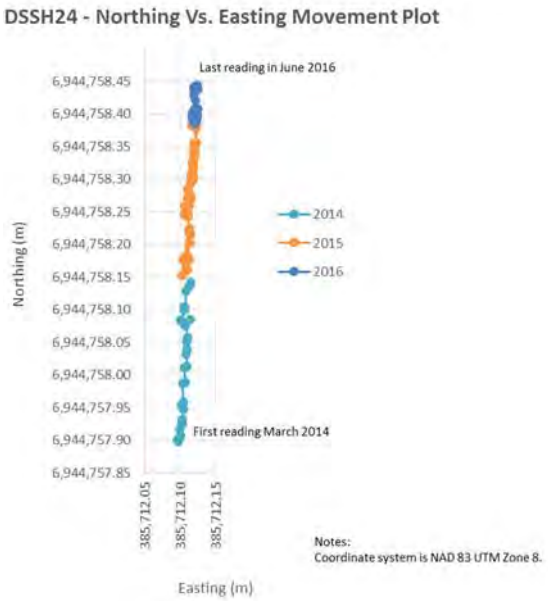
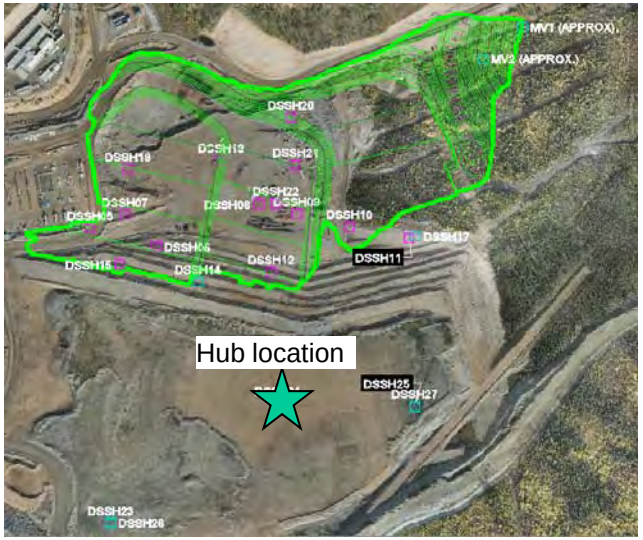
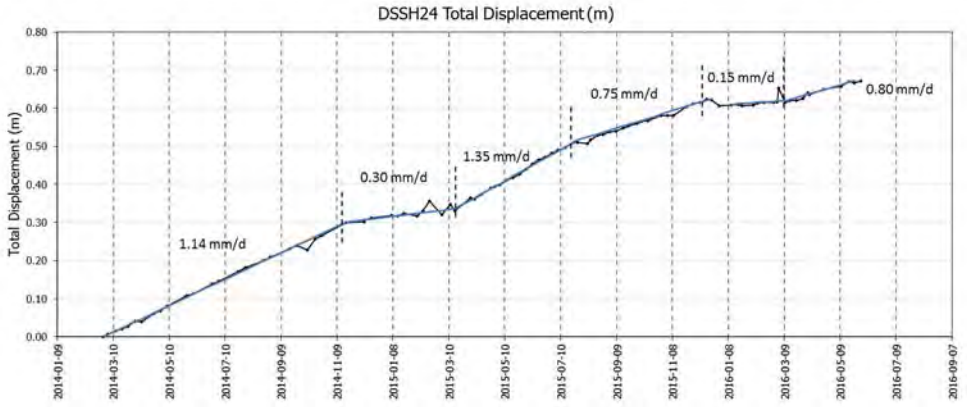
DSTSF Instrumentation Data

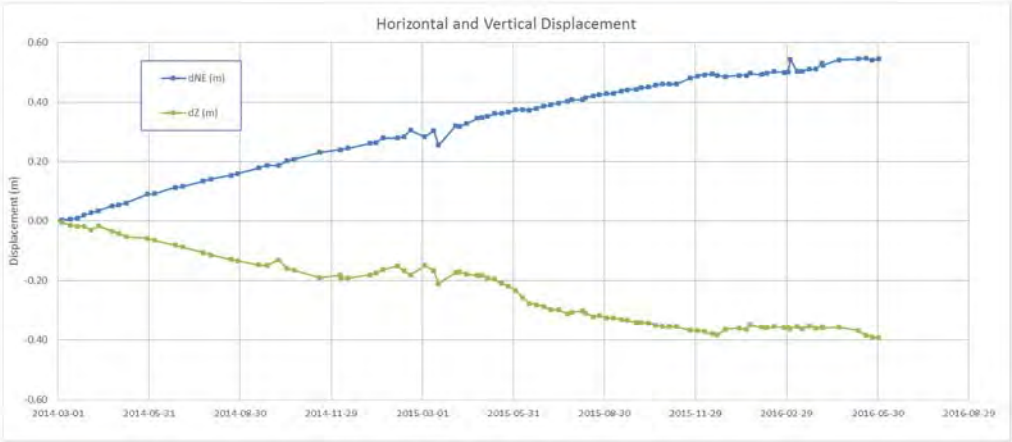
Survey Hub – DSSH23

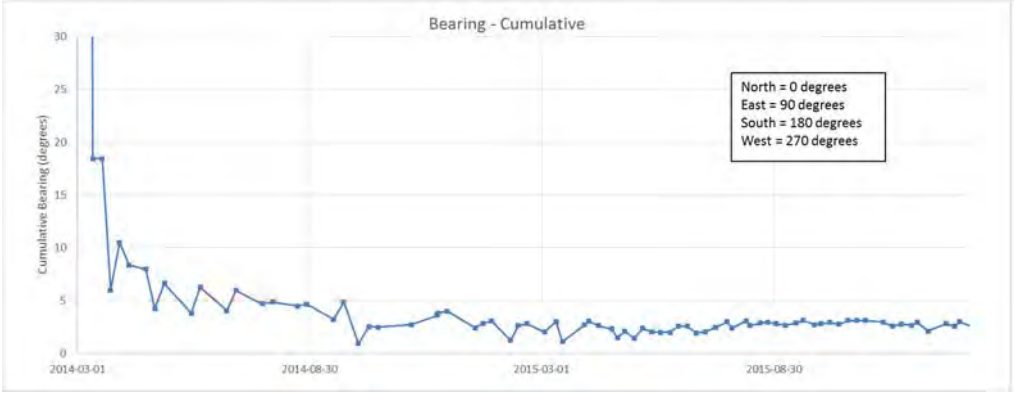
Date:	Prepared by	Figure:
August 2016	PHM	13











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DSTSF Instrumentation Data

Survey Hub – DSSH24

Job No: 1CM002.048
Filename: ApD_DSTSFLandscape.pptx

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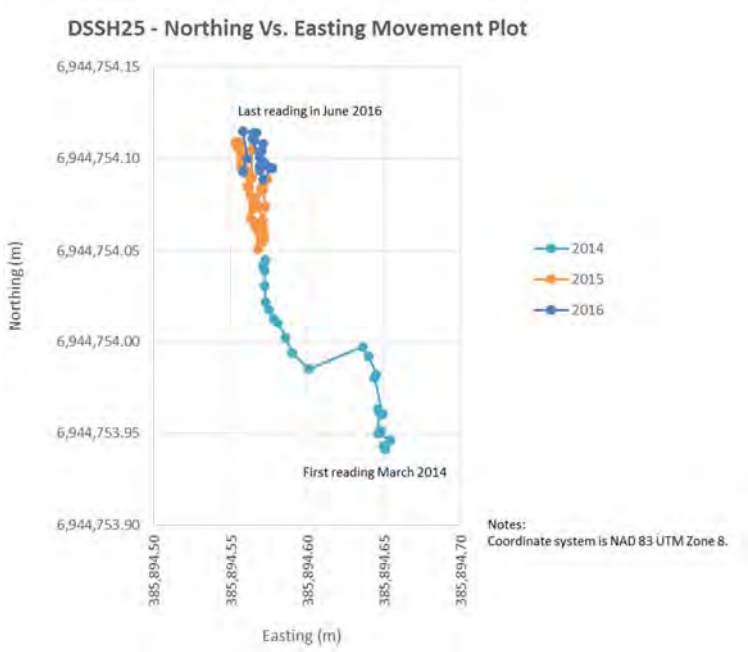
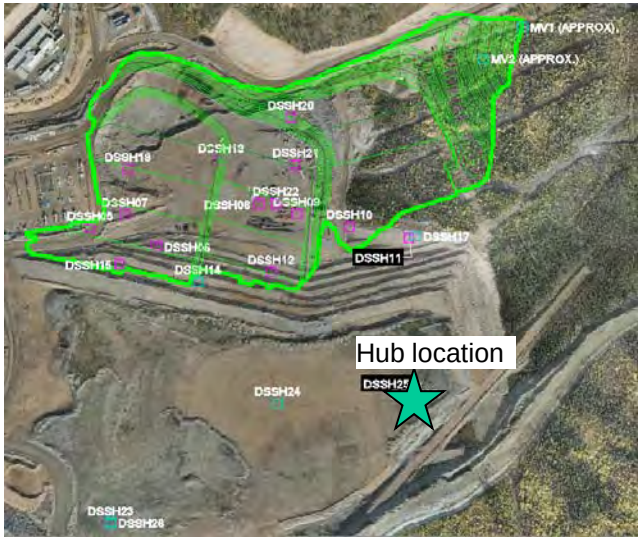
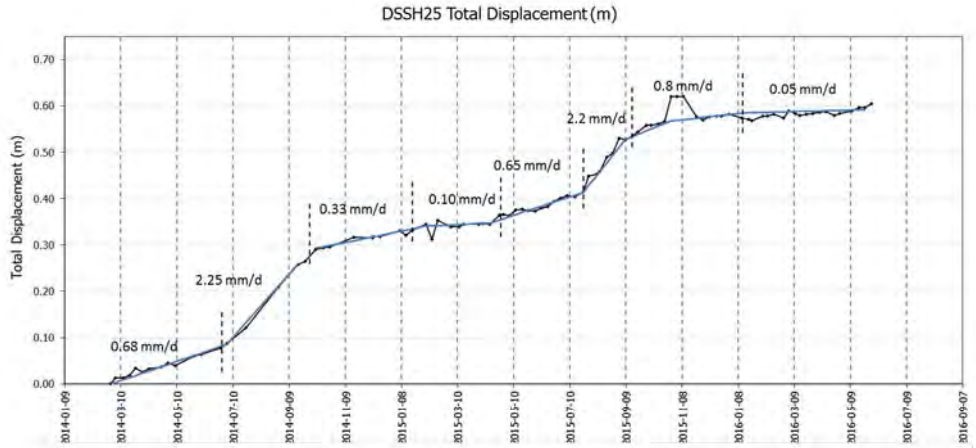
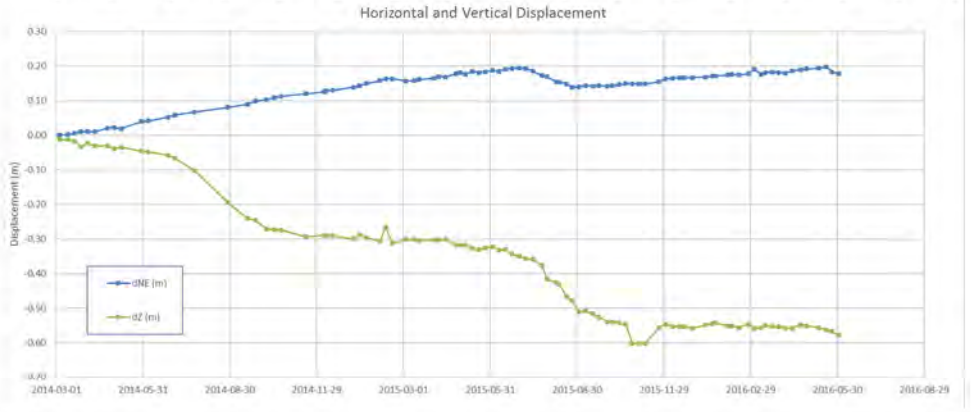
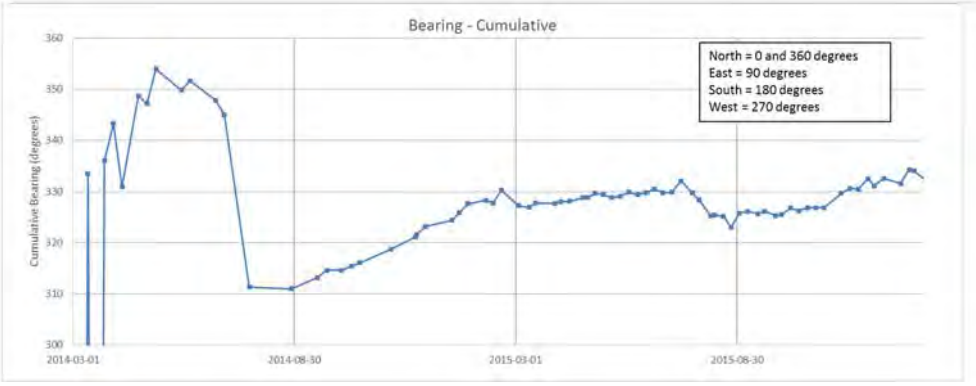
Date: August 2016
Prepared by: PHM
Figure: **14**











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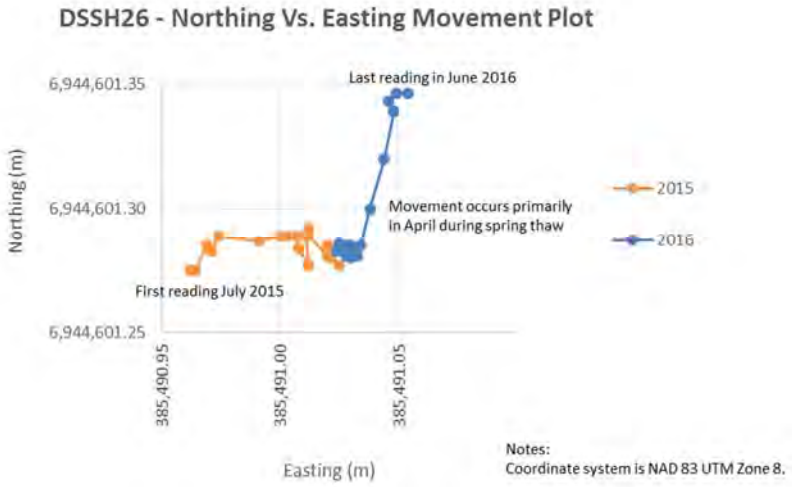
DSTSF Instrumentation Data

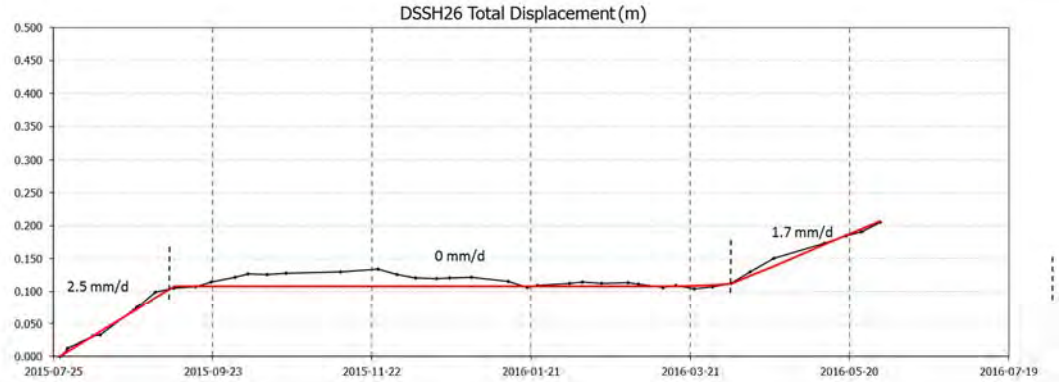
Survey Hub – DSSH25

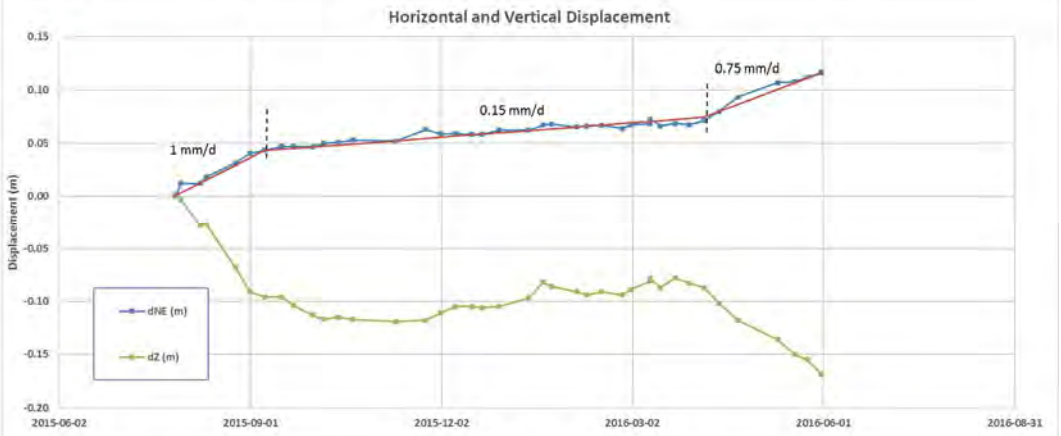
Job No: 1CM002.048
Filename: ApD_DSTSFLandscape.pptx

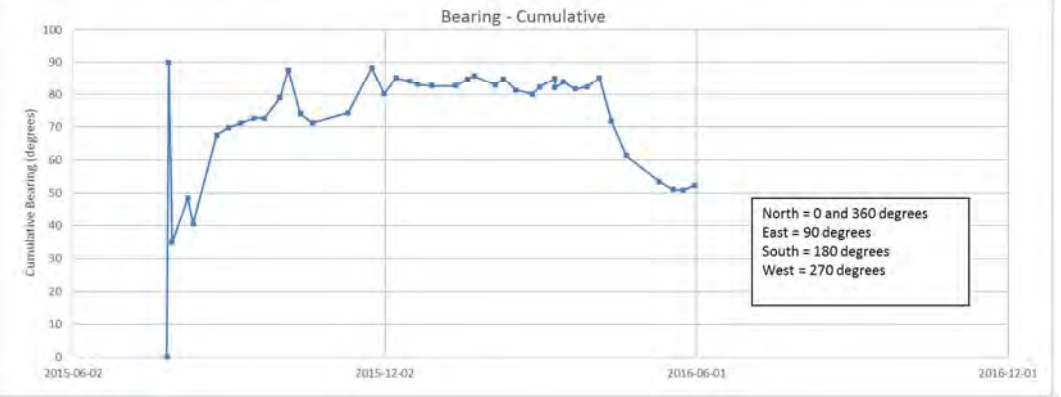
Minto Mine

Date: August 2016
Prepared by: PHM
Figure: **15**









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Job No: 1CM002.048

Filename: ApD_DSTSFLandscape.pptx

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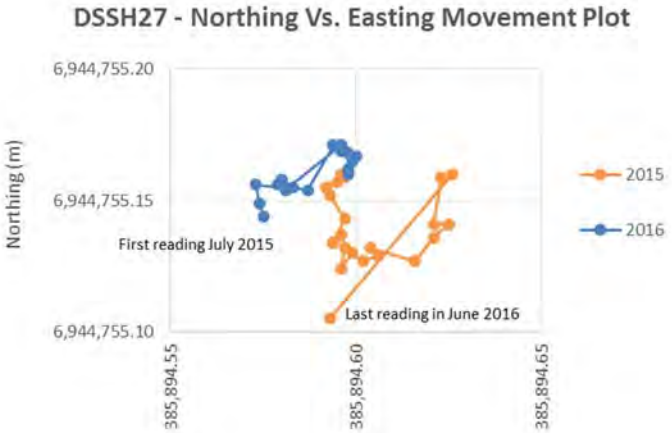
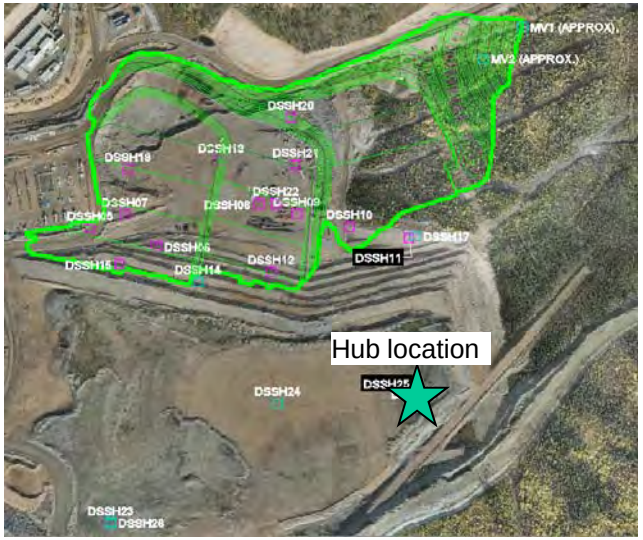
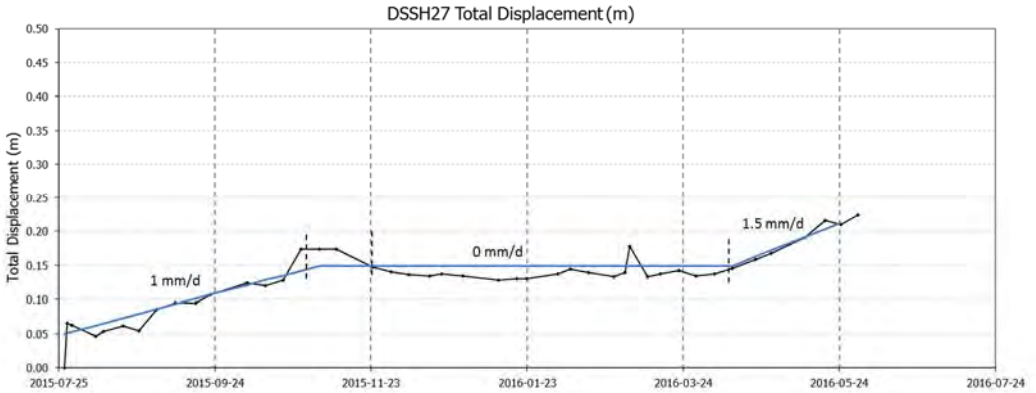
DSTSF Instrumentation Data

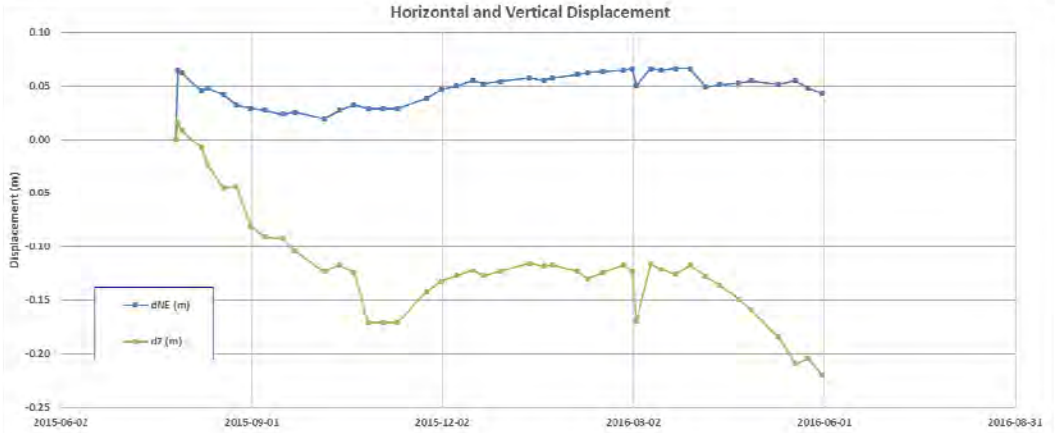
Survey Hub – DSSH26

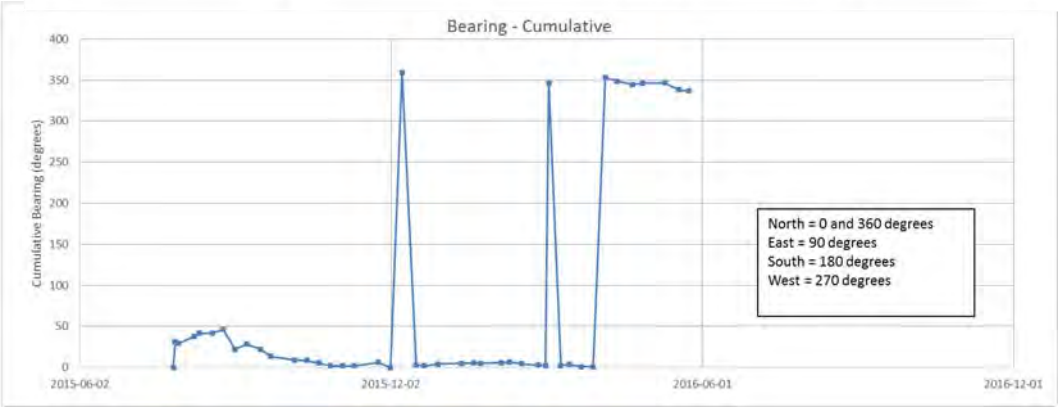
Date:	Prepared by	Figure:
August 2016	PHM	16











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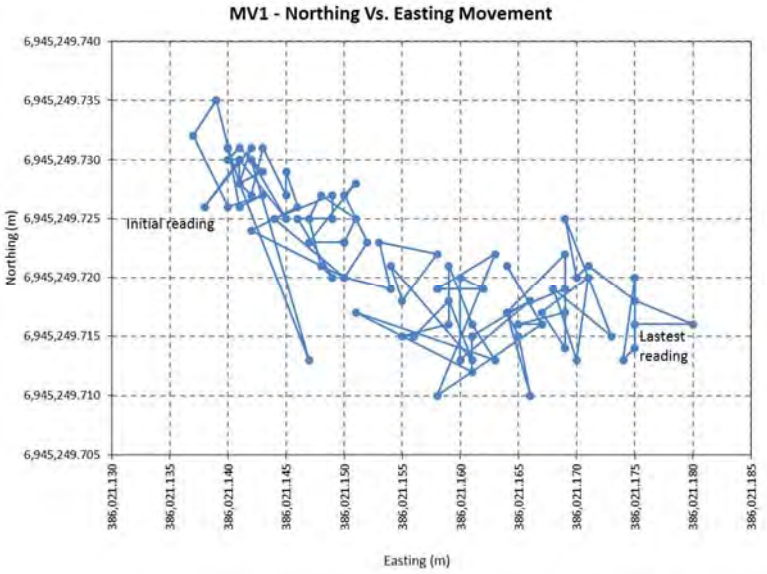
DSTSF Instrumentation Data

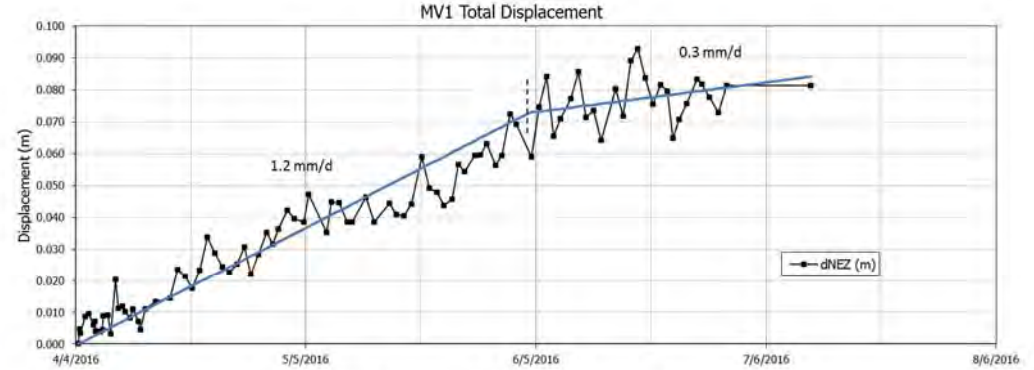
Survey Hub – DSSH27

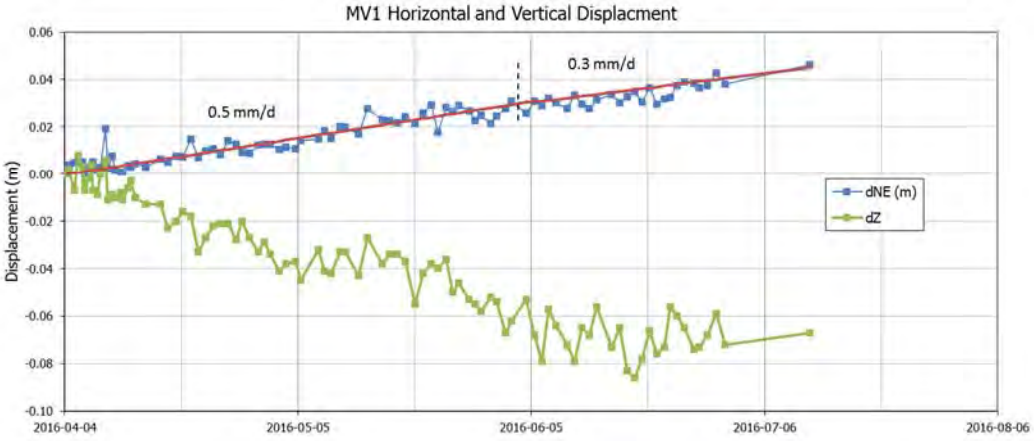
Job No: 1CM002.048
Filename: ApD_DSTSFLandscape.pptx

Minto Mine

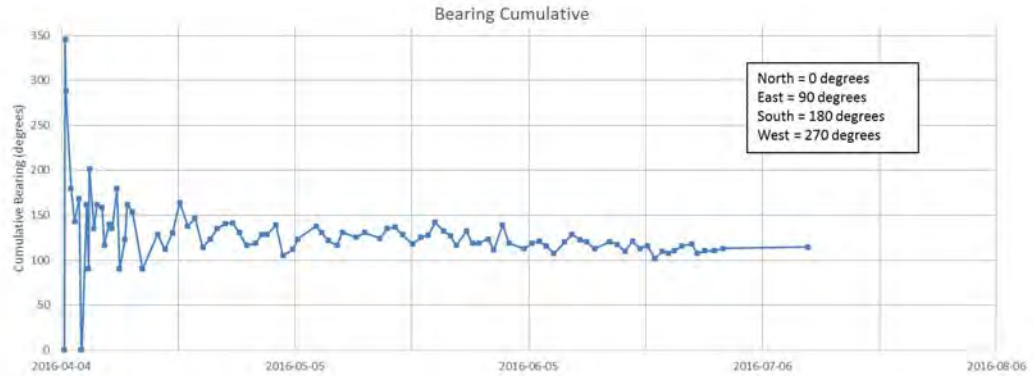
Date: August 2016
Prepared by: PHM
Figure: 17







Hub location



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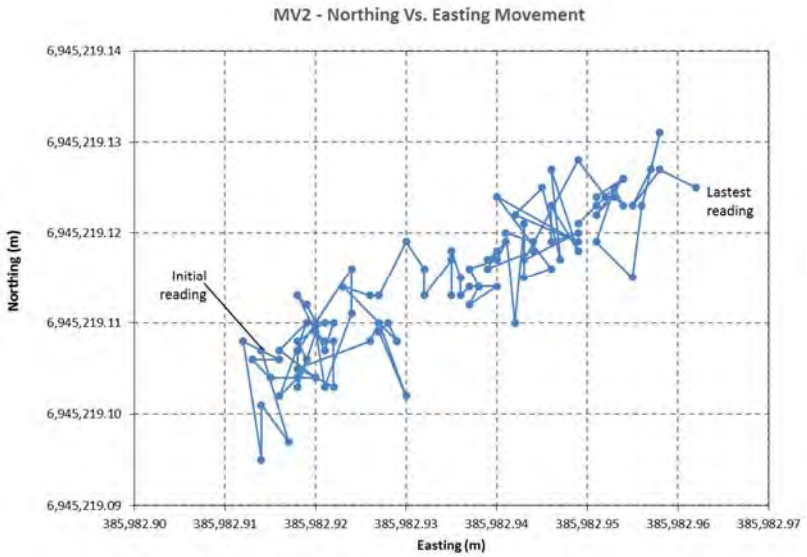
DSTSF Instrumentation Data

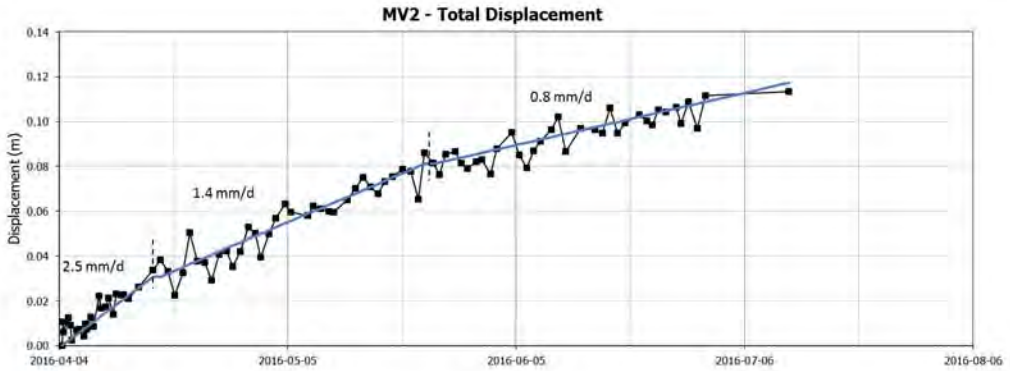
Survey Hub – MV1

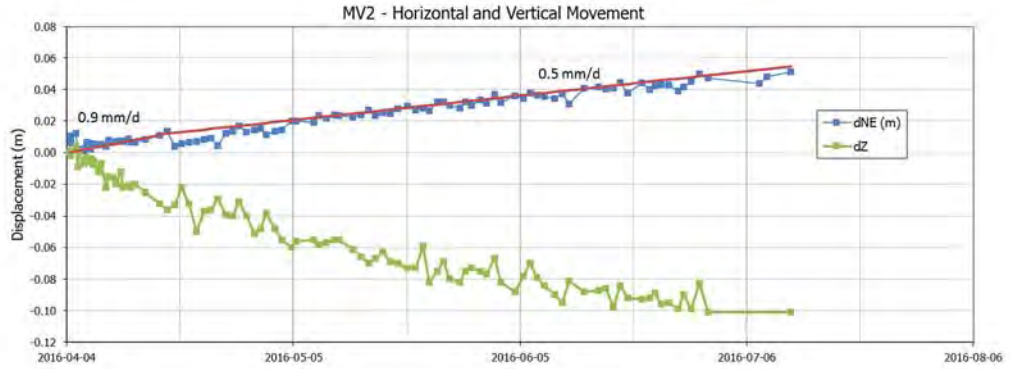
Job No: 1CM002.048
Filename: ApD_DSTSFLandscape.pptx

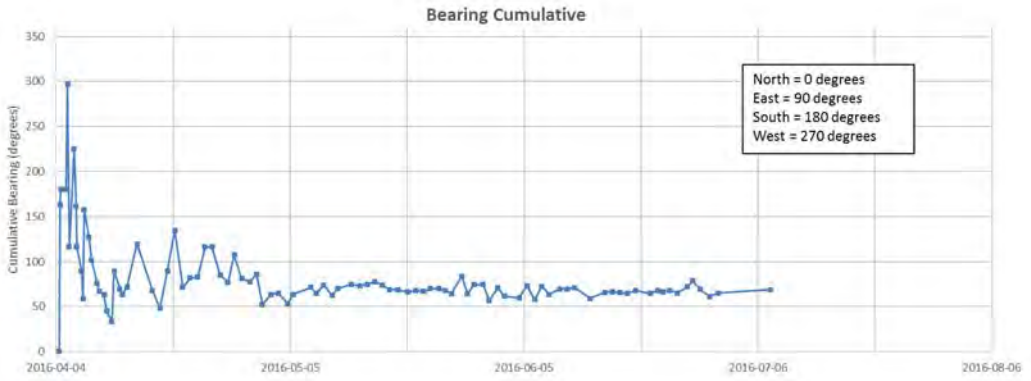
Minto Mine

Date: August 2016
Prepared by: PHM
Figure: **18**









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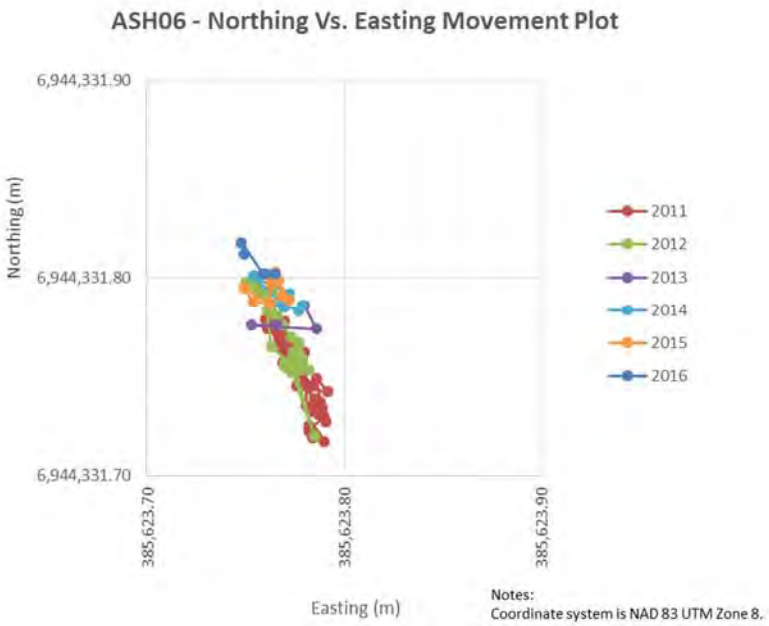
DSTSF Instrumentation Data

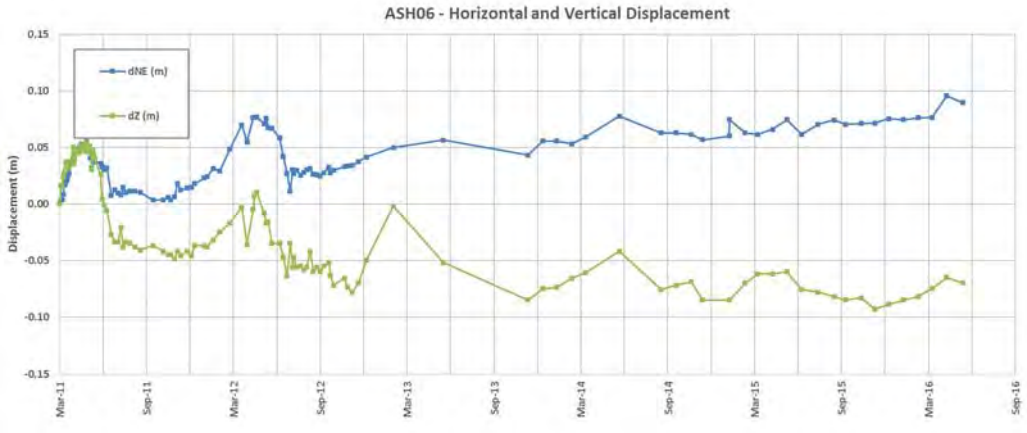
Survey Hub – MV2

Job No: 1CM002.048
Filename: ApD_DSTSFLandscape.pptx

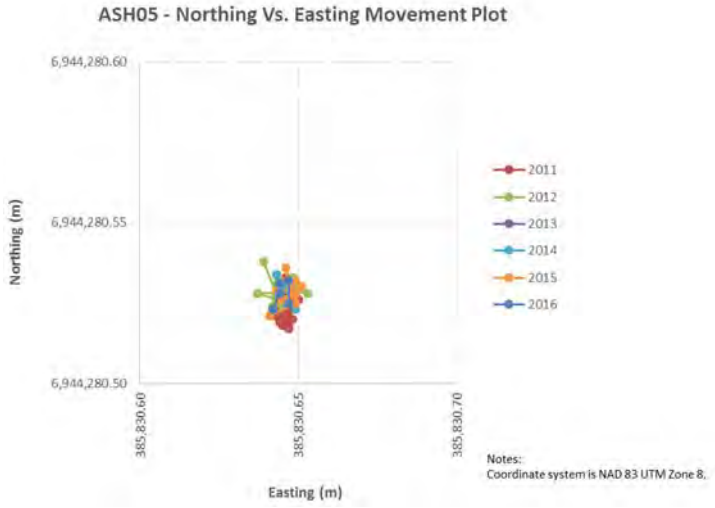
Minto Mine

Date:	Prepared by	Figure:
August 2016	PHM	19





Minor movement observed at ASH06 appears to be seasonal and suspected to be related to freeze-thaw effects near the surface.



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DSTSF Instrumentation Data

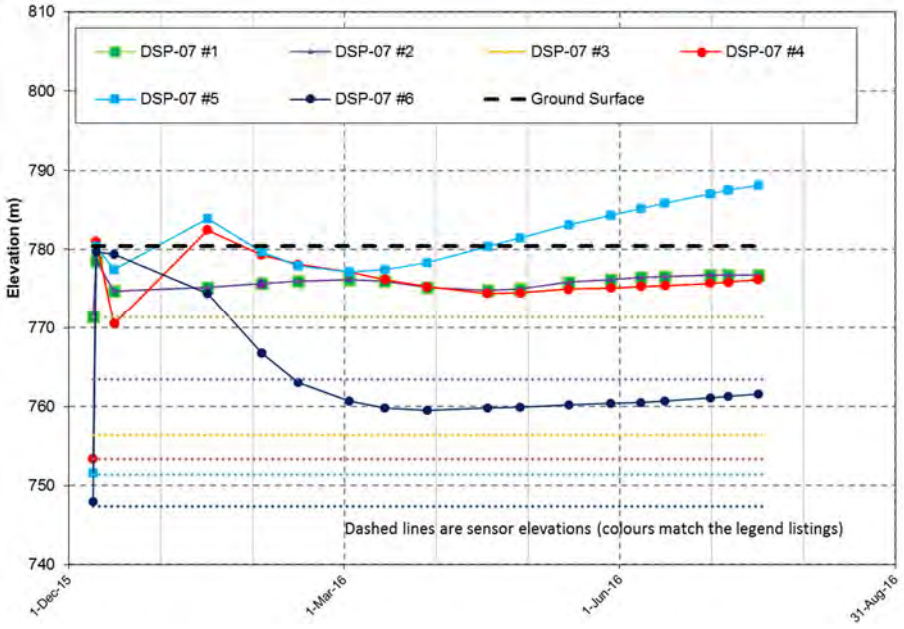
Survey Hubs – ASH05 and ASH06

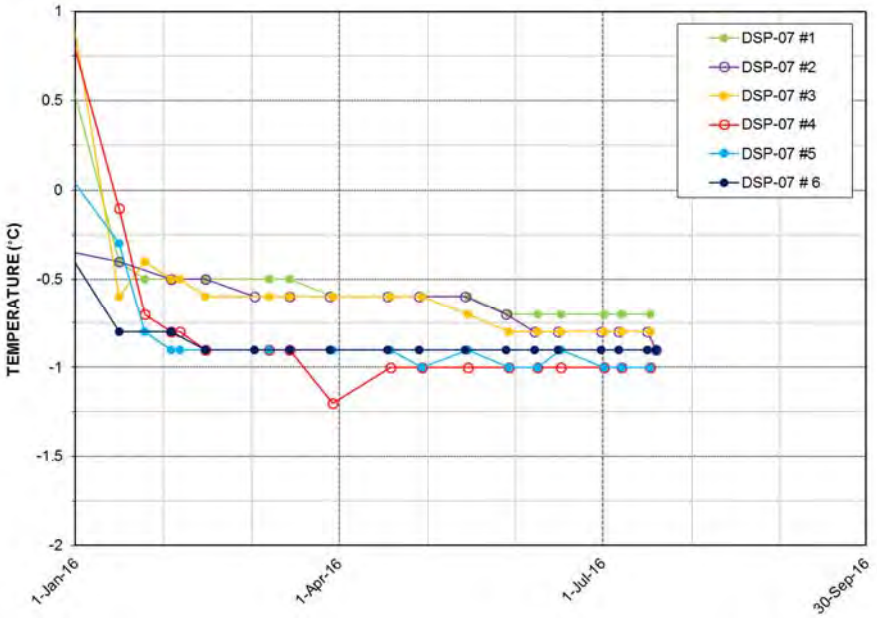
Job No: 1CM002.048
Filename: ApD_DSTSFLandscape.pptx

Minto Mine

Date: August 2016
Prepared by: PHM
Figure: **20**

Sensor #	Stratigraphy, Ice Description	Ice Description	Comment
1	Silt. Some clay, little sand, trace gravel, soft, wet, medium plastic, varved.	Vr, Ice/moisture content up to 50%.	
2	Sand, few gravel, loose, unrounded, no fines.	Vr. Mostly no visible ice, some small random ice lenses up to 1.5 cm thick.	
3	Clay, some silt, trace gravel and sand, wet, high plastic. (MC=50%)	Vr; Approx. 50% ice, lenses between 2 and 20 mm thick, parallel and nearly horizontal, interbedded with clay.	
4			
5			A shear zone at DSI-20 was identified in 2013-14 at an elevation of 752.5 -730m. The higher pore pressure observed at Sensor 5 may be related to pore pressue induced by on going movment.
6	Weathered Bedrock; Highly weathered granite. Rust staining. Friable.	Nbn. No excess ice.	Sensor 6 is believed to have a lower pore pressure due to the coarser sand/gravel material.





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Job No: 1CM002.048

Filename: ApD_DSTSFLandscape.pptx

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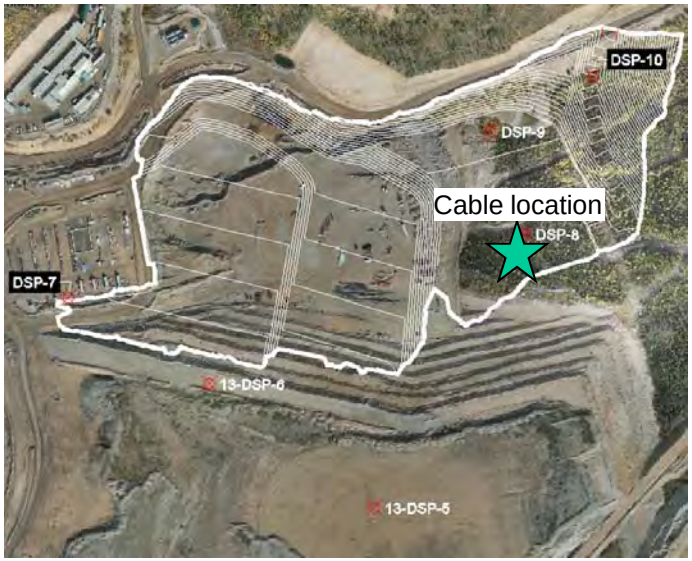
DSTSF Instrumentation Data

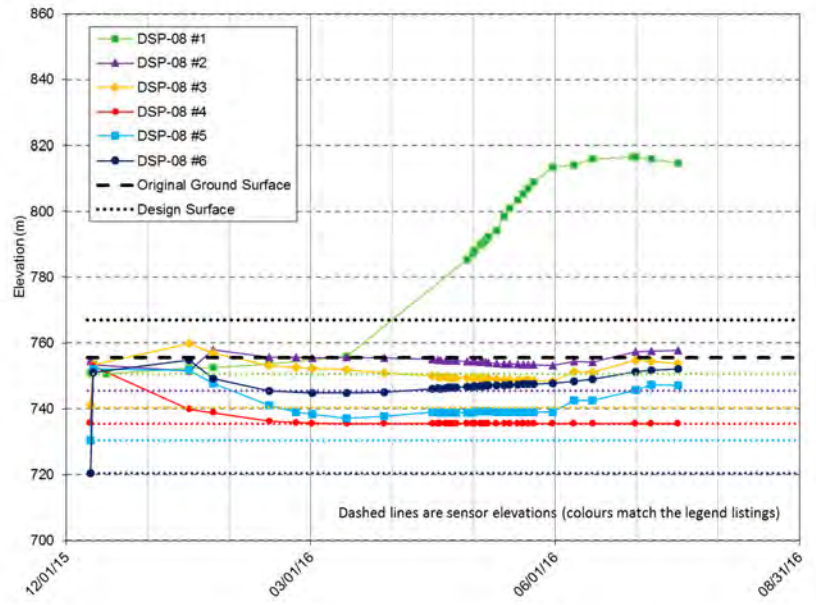
Piezometer – DSP-07

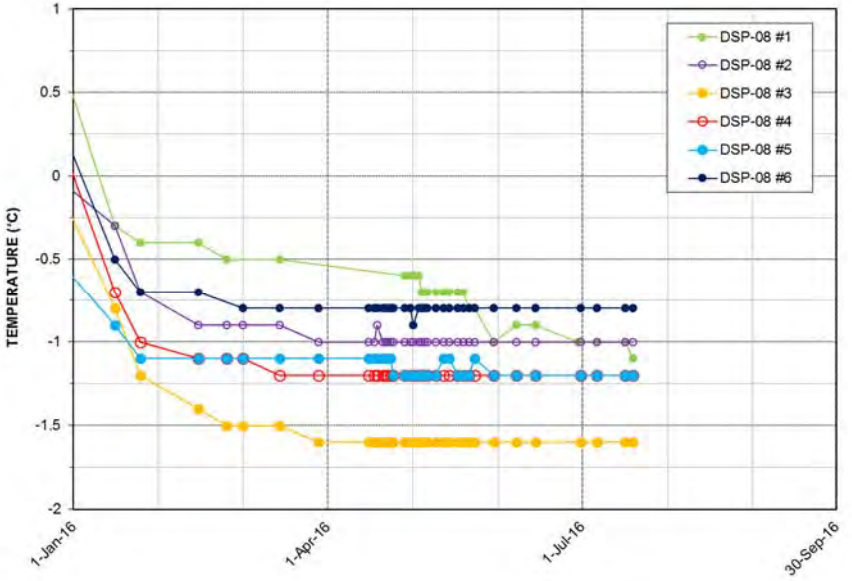
Date:	Prepared by	Figure:
August 2016	PHM	21



Notes:

1. Negative pressure readings are plotted at the elevation of the sensor in order to indicate dates readings were taken. Readings at Sensor 4 have been negative since February 2016.
2. The increase in pore pressure readings in Sensors 2, 3, 5, and 6 is estimated to be approximately 50% of the total stress added as a result of placement of the MVFE Stage 2 fill.
3. The pore pressure in Sensor 1 has increased by approx. 600 kPa during the MVFE Stage 2 construction. This sensor is located closest to surface (depth of 5m). Since the construction was completed over the sensor location, the readings appear to have peaked and pressure is beginning to dissipate. The temperature at Sensor 1 has also dropped significantly compared to the other sensors at DSP-08. The higher pore pressures at Sensor 1 may be the result of freezing and the expansion of pore water into ice.





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Filename: ApD_DSTSFLandscape.pptx

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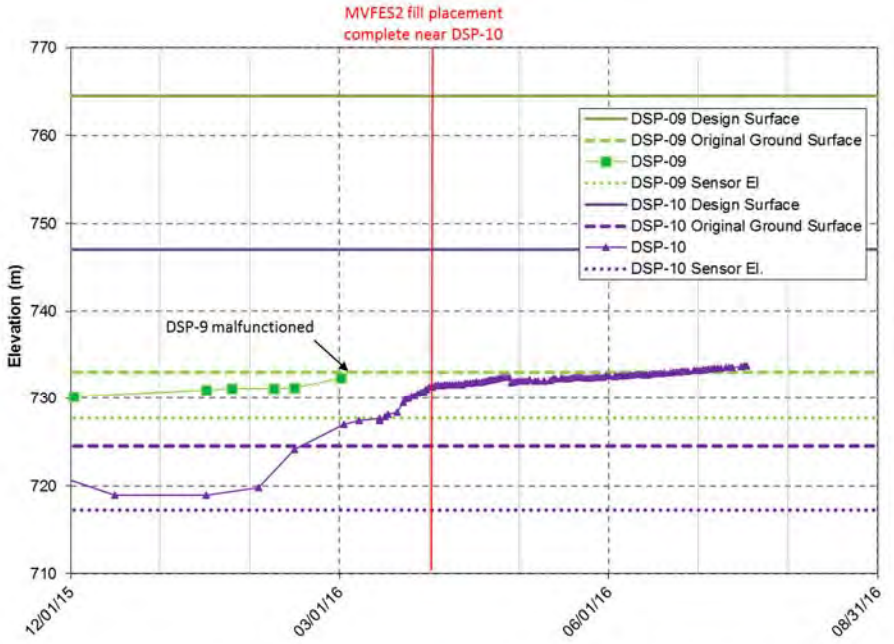
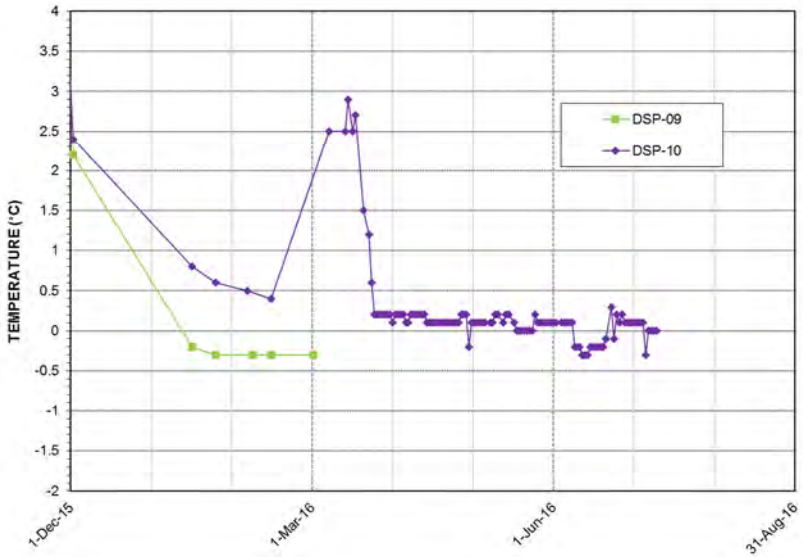
DSTSF Instrumentation Data

Piezometer – DSP-08

Date:	Prepared by	Figure:
August 2016	PHM	22





Notes:

1. The pore pressure sensors at DSP-9 and 10 are located approximately 5 m below original ground.
2. DSP-09 malfunctioned with the last reading on March 1, 2016
3. The large increase in pore pressure at DSP-10 is related to the fill placement over the sensor (approximately 23 m thick).
4. Since fill placement has been completed, the rate of increase in pore pressure is low.
5. Flow meter readings at the Minto Creek Detention Sump indicate that the blanket drain is functional and no water is building-up at the base of MVFE Stage 2.
6. Similar to DSP-08 Sensor 1, the temperature readings at DSP-10 show a slight cooling trend between April and July and the pore pressure increase since April may be due to ongoing freezing of the active layer.

Source files:

1. AutoCAD: \\VAN-SVR0\Projects\01_SITES\Minto\1CM002.050_2016 Geotech Op Support\!040_AutoCAD\1CM002.050-Site Plan Showing Instrumentation.dwg
2. Excel instrumentation data: \\VAN-SVR0\Projects\01_SITES\Minto\!020_Site_Wide_Data\Geotechnical\Geotech Monitoring Data\GTC + Piezometer Instrumentation - DSTSF_2016-Geotech.xlsm

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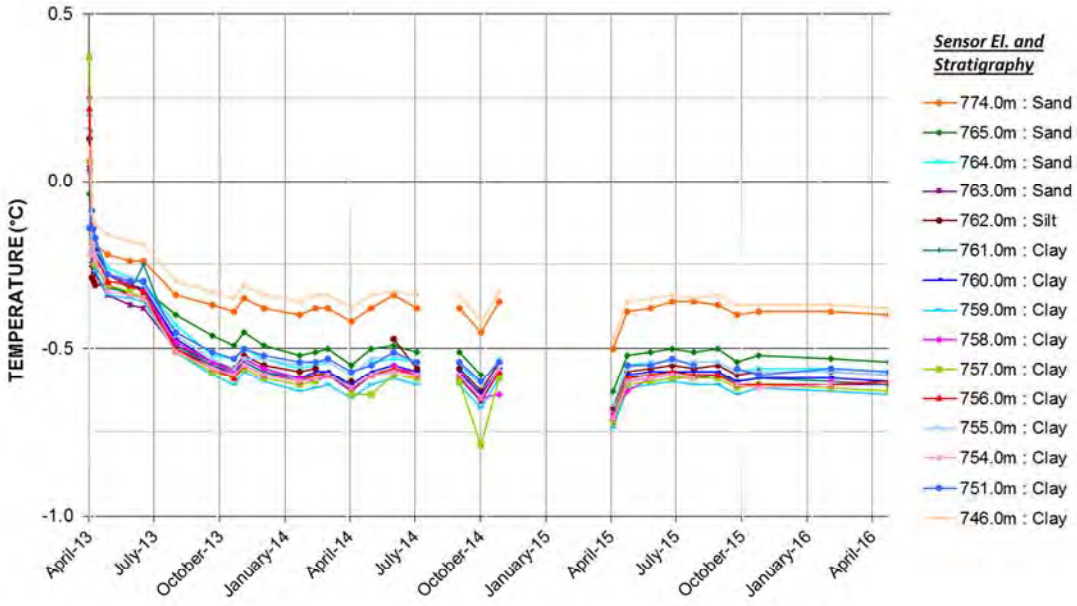
Job No: 1CM002.048
Filename: ApD_DSTSFLandscape.pptx

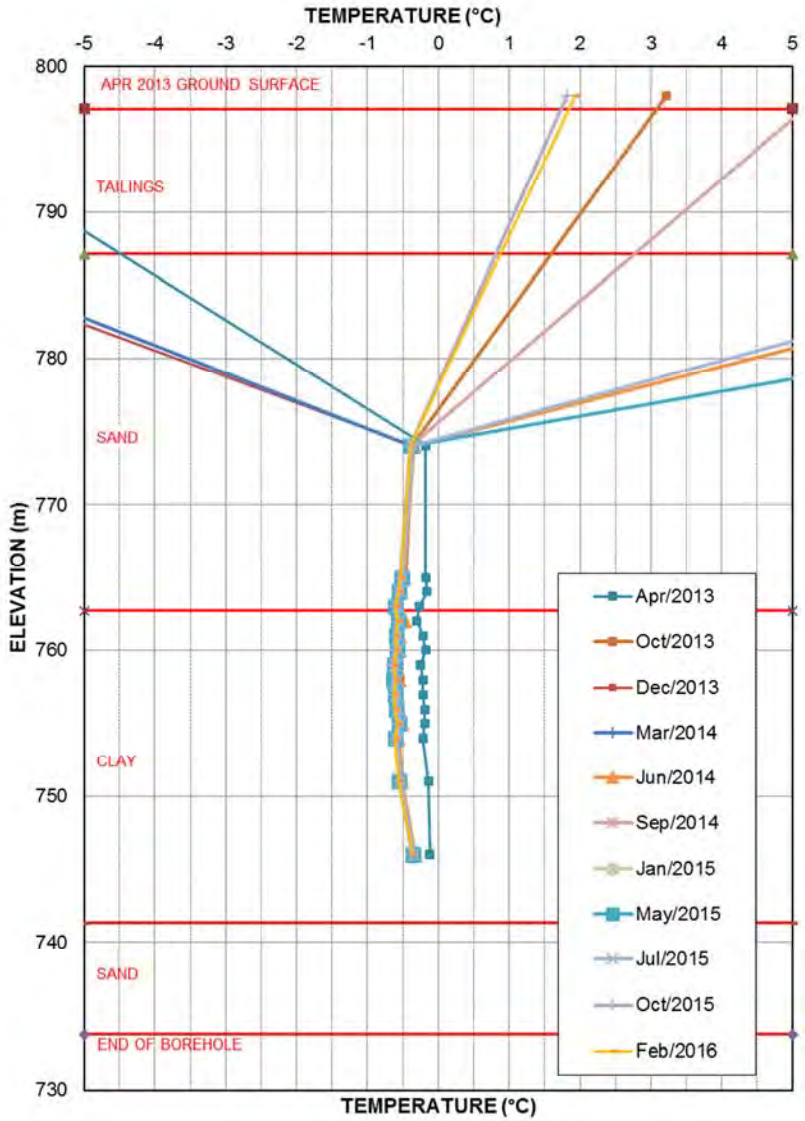
Minto Mine

DSTSF Instrumentation Data

Piezometers – DSP-09 and DSP-10

Date:	Prepared by	Figure:
August 2016	PHM	23





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DSTSF Instrumentation Data

Temperature Cable – DST-10

Job No: 1CM002.048

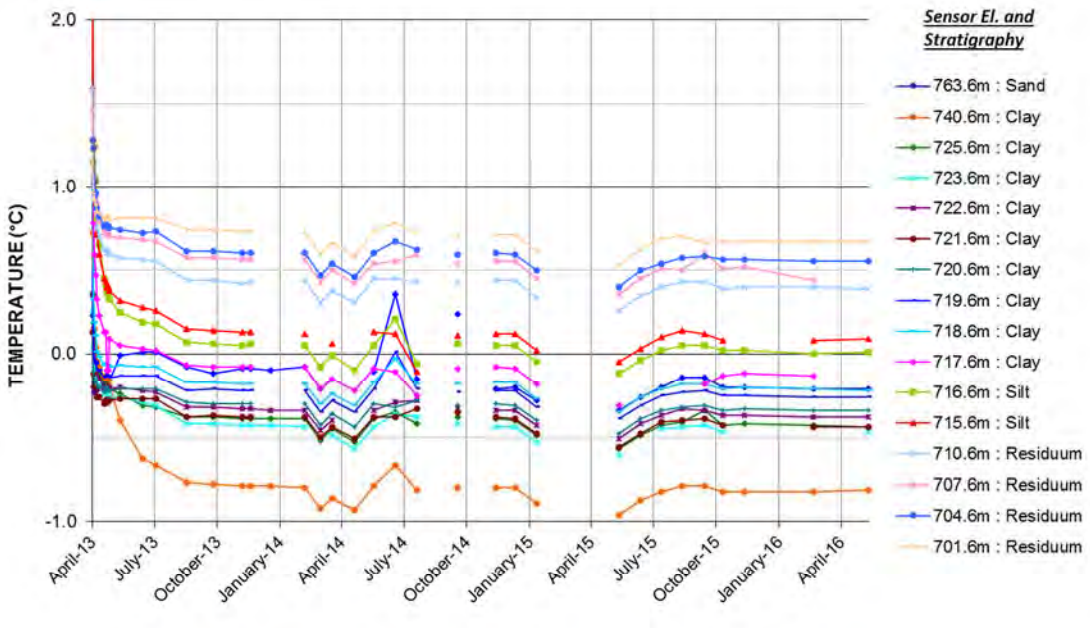
Filename: ApD_DSTSFLandscape.pptx

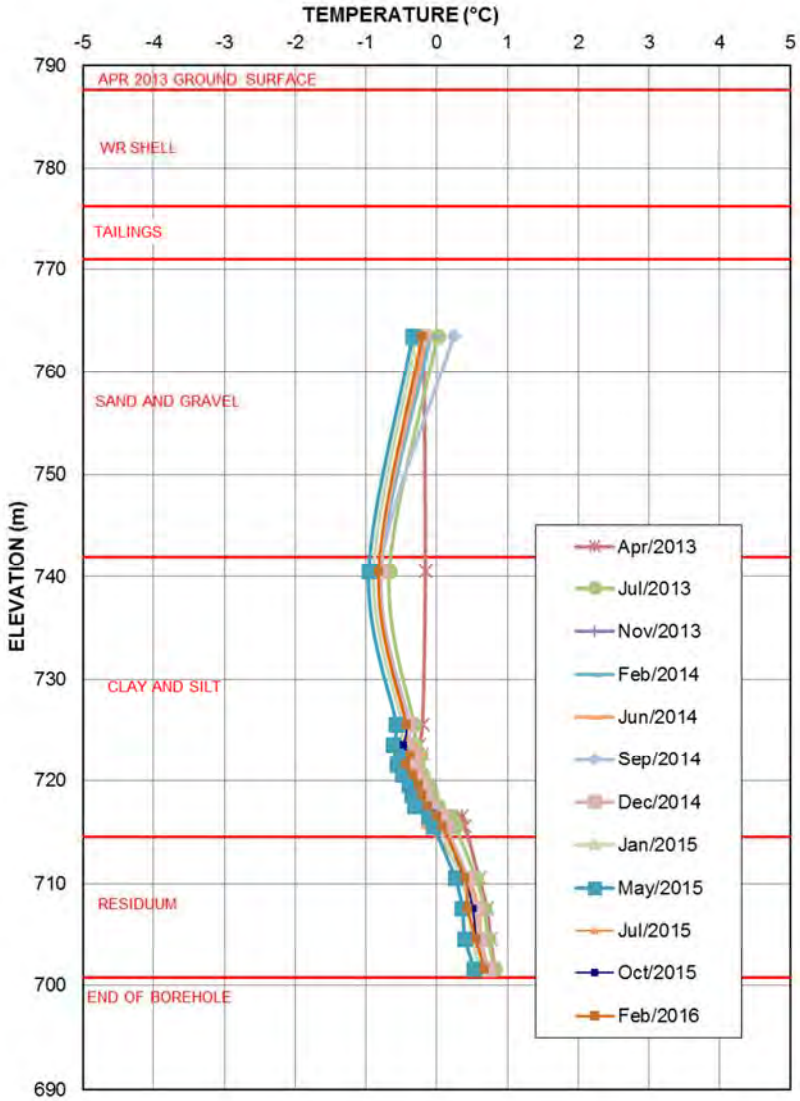
Minto Mine

Date: August 2016

Prepared by PHM

Figure: **24**





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2. Excel instrumentation data: \\VAN-SVR0\Projects\01_SITES\Minto\!020_Site_Wide_Data\Geotechnical\Geotech Monitoring Data\GTC + Piezometer Instrumentation – DSTSF_2016-Geotech.xlsm

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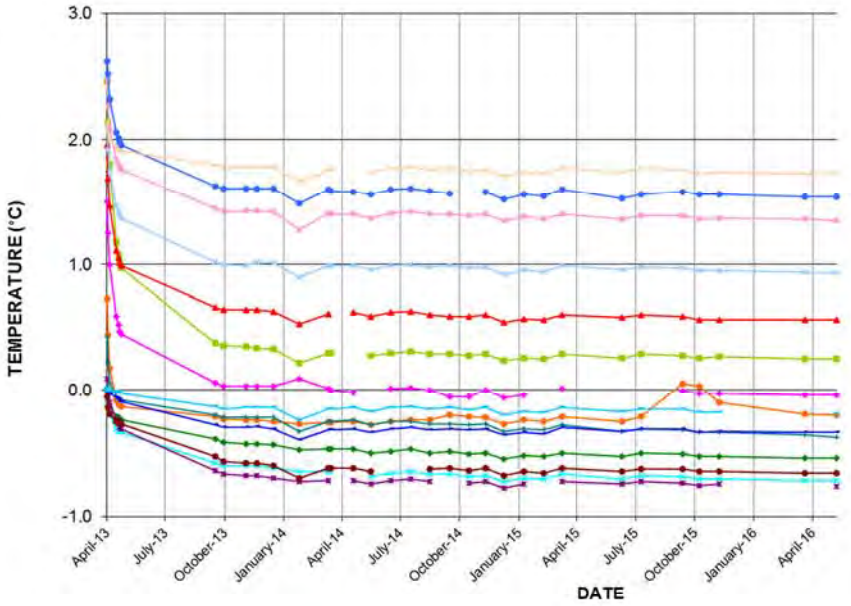
DSTSF Instrumentation Data

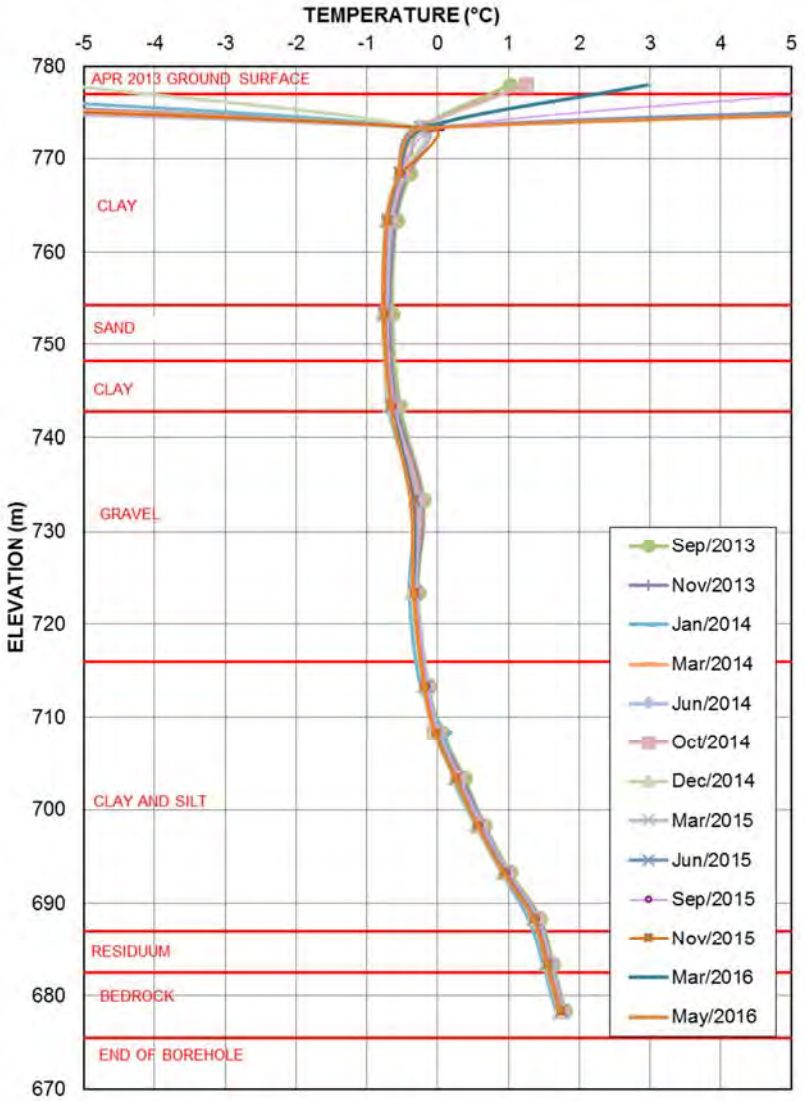
Temperature Cable – DST-11

Job No: 1CM002.048
Filename: ApD_DSTSFLandscape.pptx

Minto Mine

Date: August 2016
Prepared by: PHM
Figure: **25**





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Job No: 1CM002.048

Filename: ApD_DSTSFLandscape.pptx

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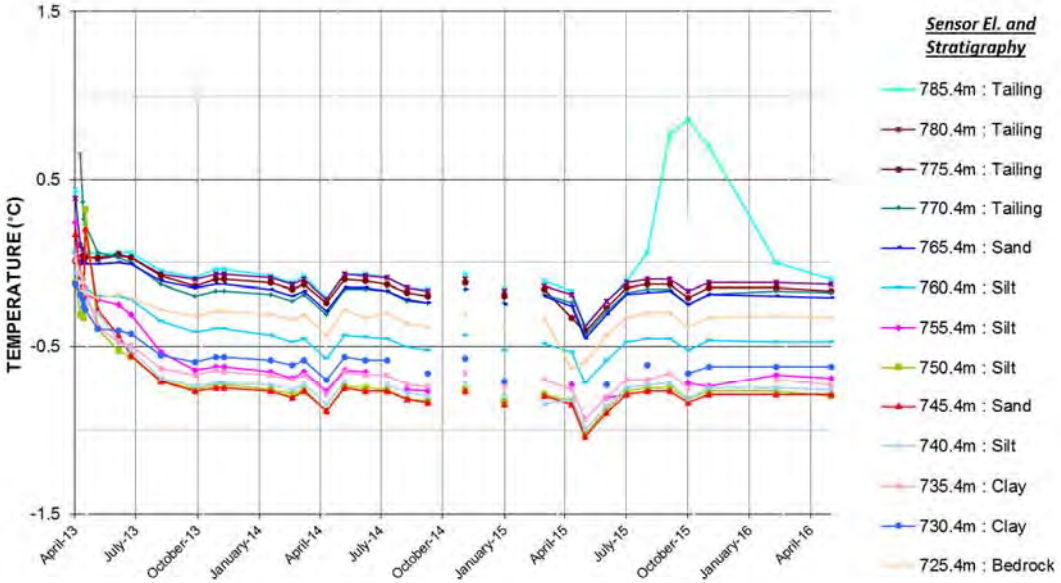
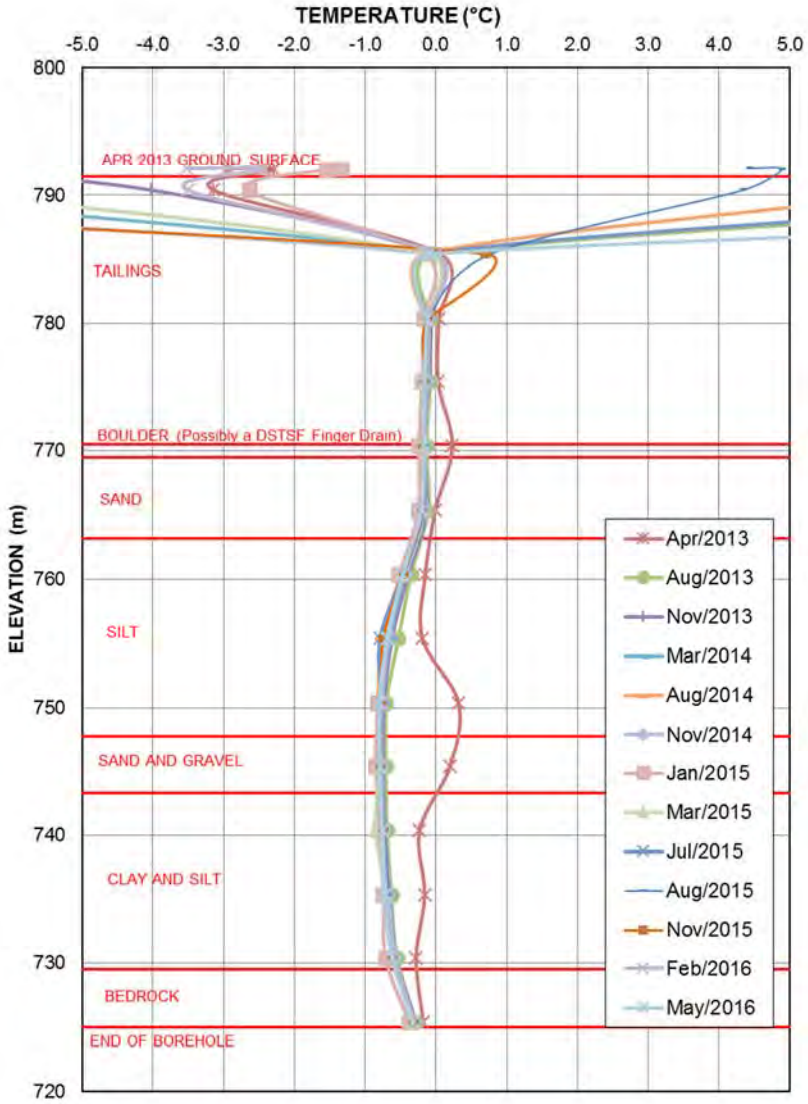
DSTSF Instrumentation Data

Temperature Cable – DST-13

Date:	Prepared by	Figure:
August 2016	PHM	**26**





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2. Excel instrumentation data: \\VAN-SVR0\Projects\01_SITES\Minto\!020_Site_Wide_Data\Geotechnical\Geotech Monitoring Data\GTC + Piezometer Instrumentation – DSTSF_2016-Geotech.xlsm

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DSTSF Instrumentation Data

Temperature Cable– DST-14

Job No: 1CM002.048

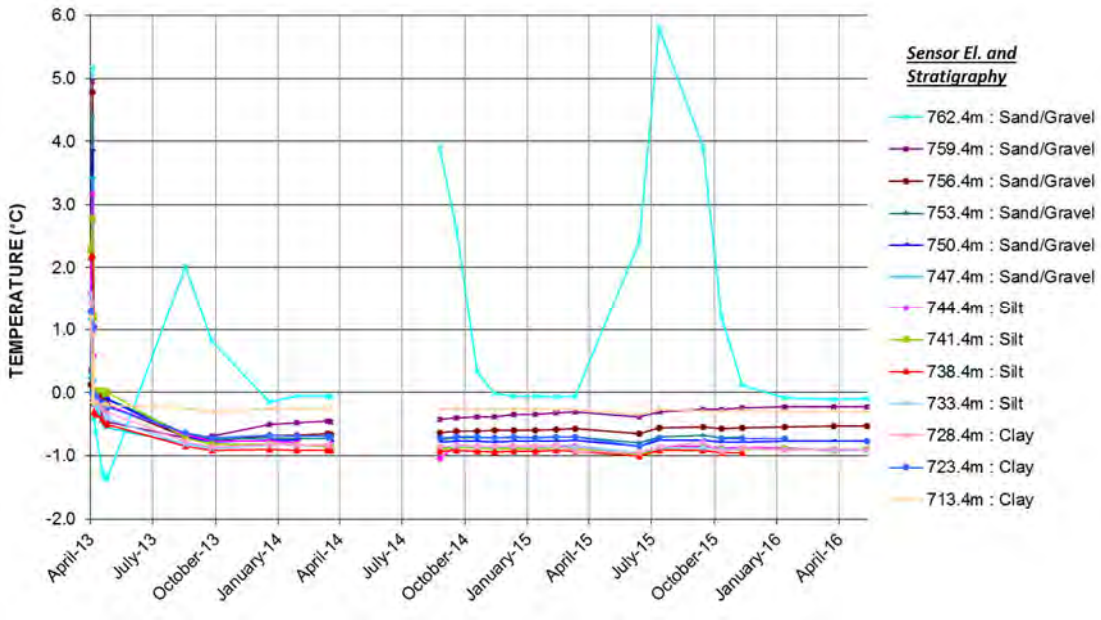
Filename: ApD_DSTSFLandscape.pptx

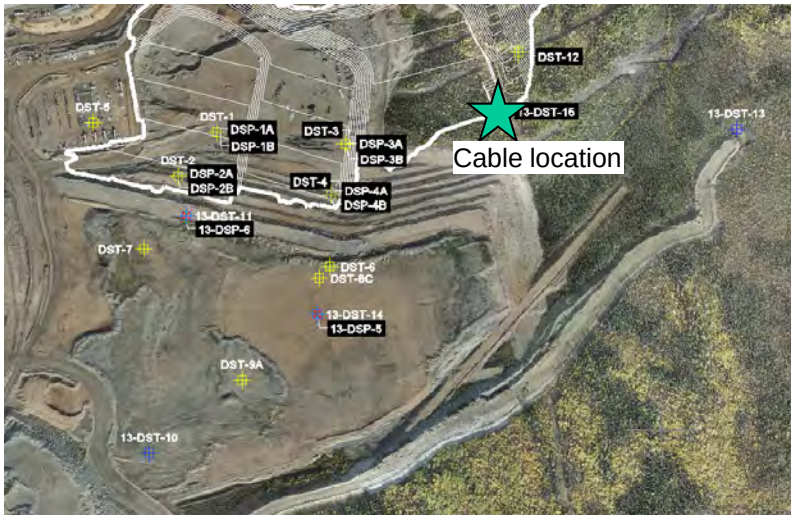
Minto Mine

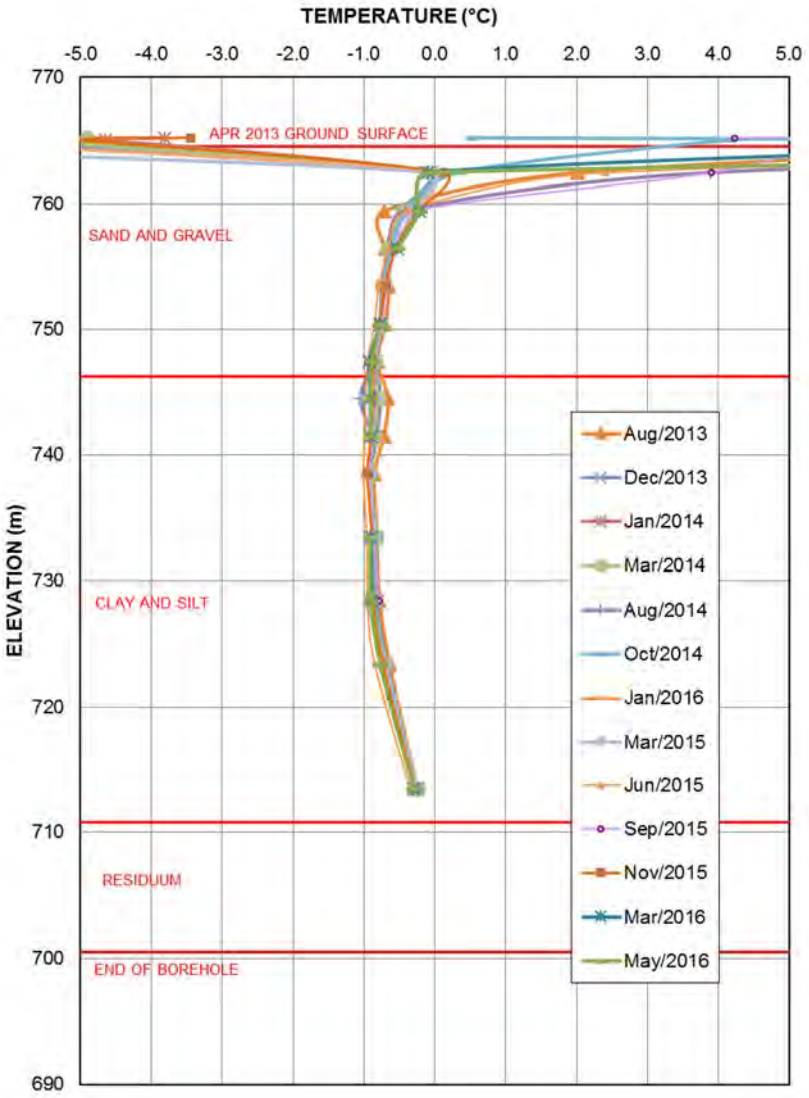
Date: August 2016

Prepared by: PHM

Figure: **27**







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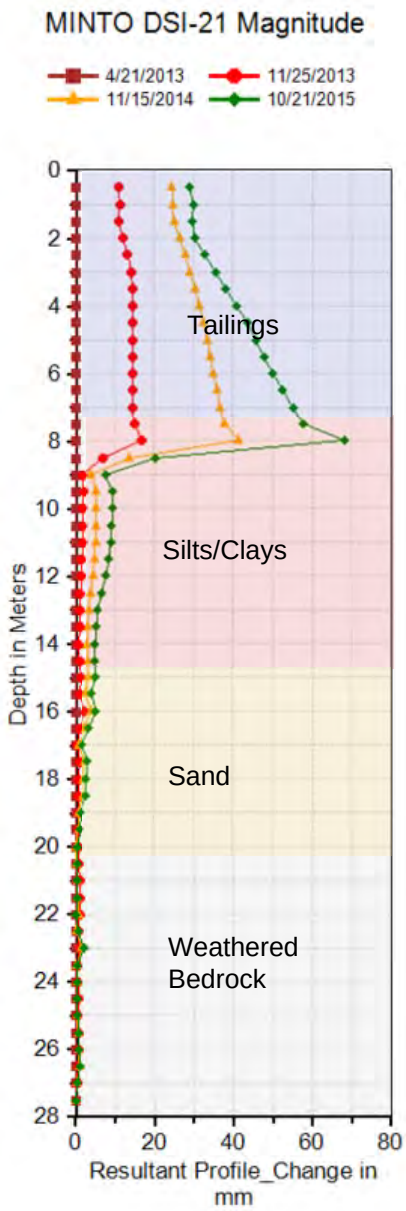
DSTSF Instrumentation Data

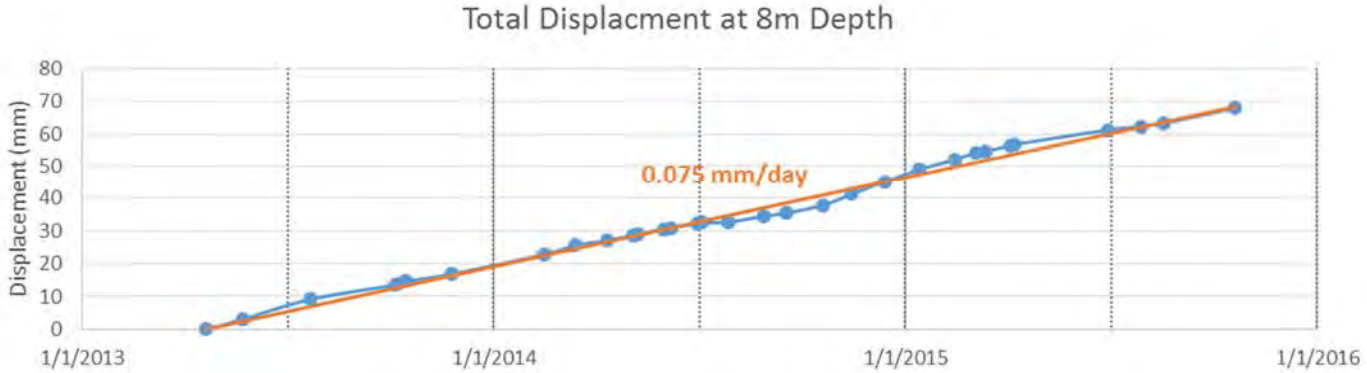
Temperature Cable – DST-15

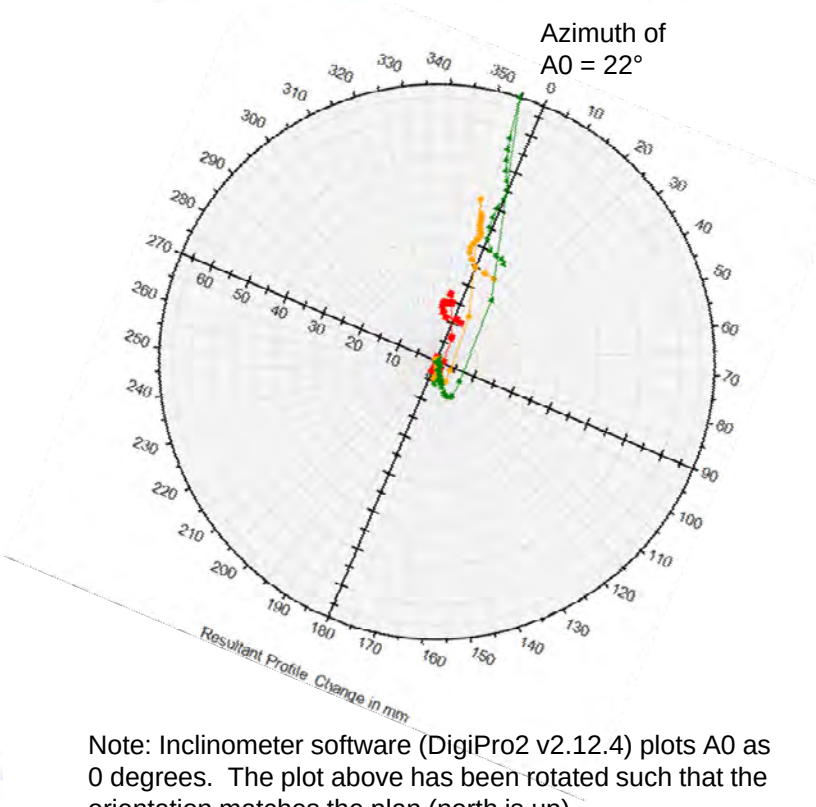
Job No: 1CM002.048
Filename: ApD_DSTSFLandscape.pptx

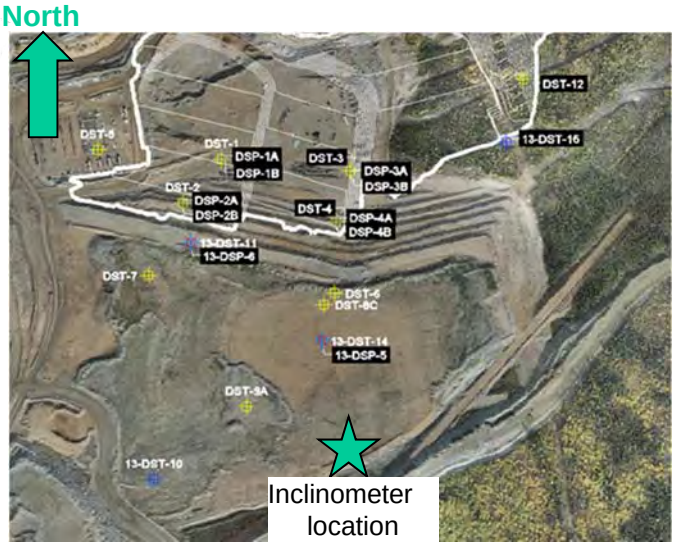
Minto Mine

Date: August 2016
Prepared by: PHM
Figure: **28**









Note: Inclinometer software (DigiPro2 v2.12.4) plots A0 as 0 degrees. The plot above has been rotated such that the orientation matches the plan (north is up).

Source files:

1. AutoCAD: \\VAN-SVR0\Projects\01_SITES\Minto\1CM002.050_2016 Geotech Op Support\!040_AutoCAD\1CM002.050-Site Plan Showing Instrumentation.dwg
2. Instrumentation data: \\VAN-SVR0\Projects\01_SITES\Minto\!020_Site_Wide_Data\Geotechnical\Geotech Monitoring Data\Minto SI Instrumentation Database.dpw

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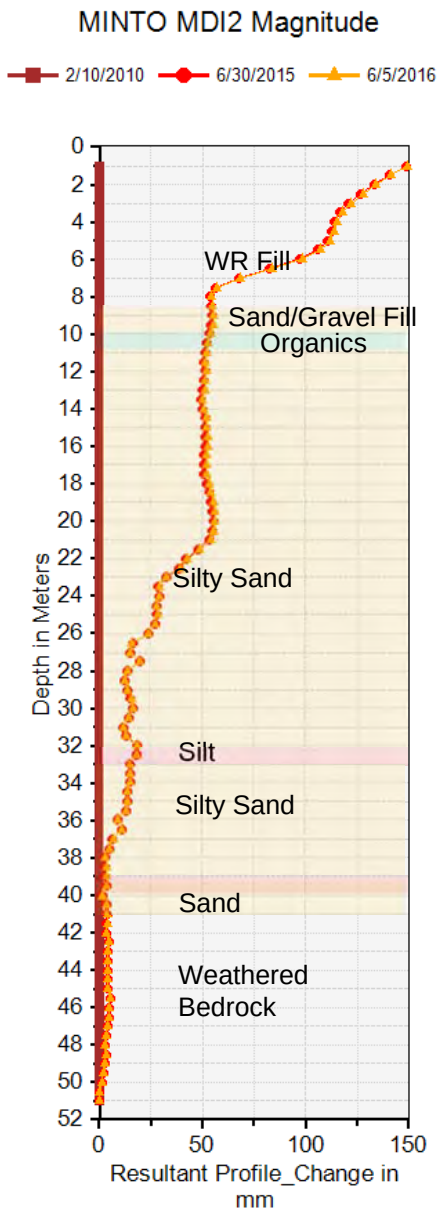
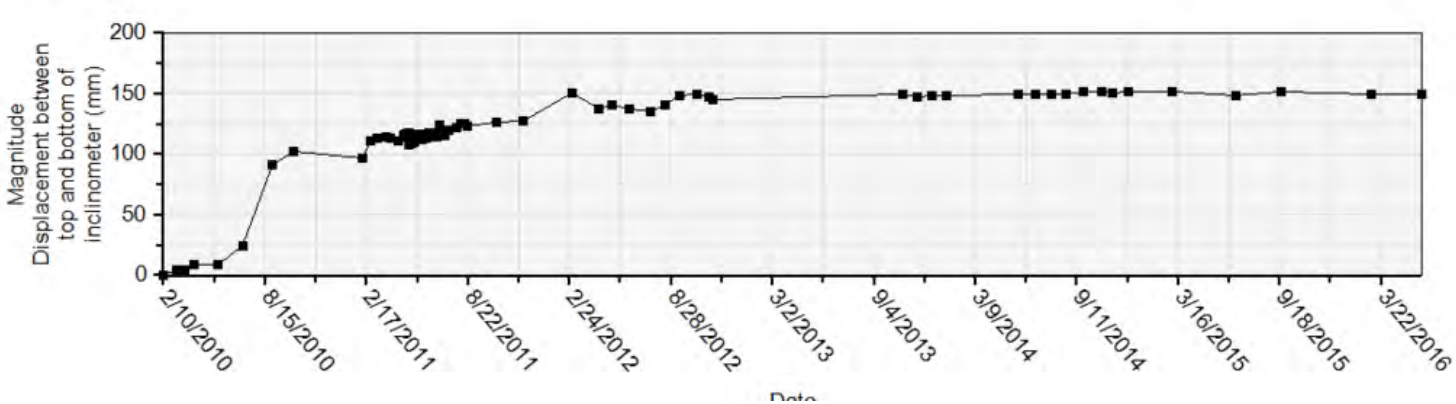
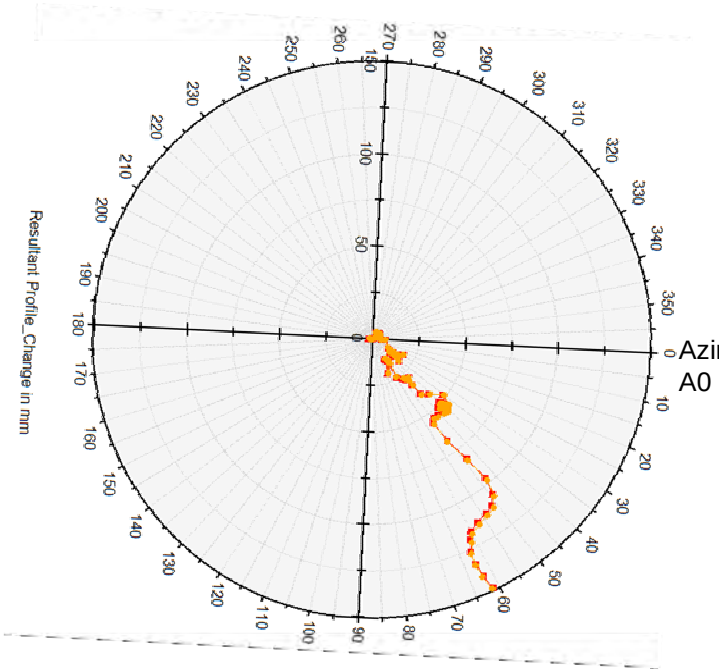
Job No: 1CM002.048 Filename: ApD_DSTSFLandscape.pptx	Minto Mine	**Inclinometer – DSI-21**
		Date: August 2016 / Prepared by: PHM / Figure: **29**

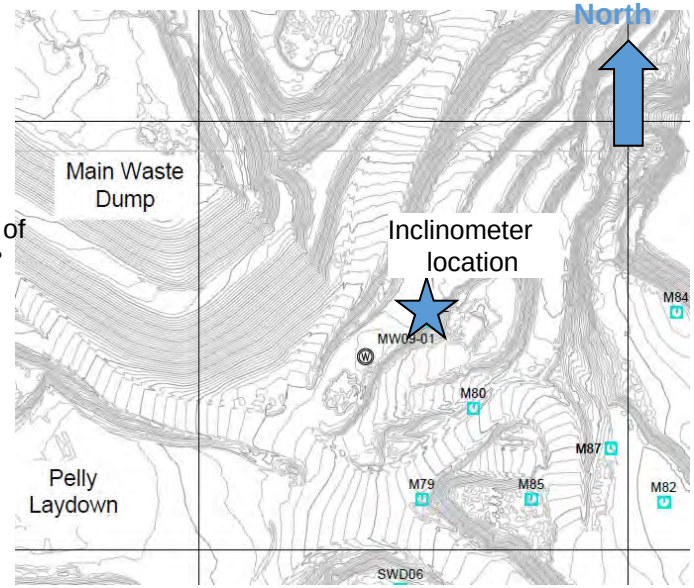
Appendix E: Main Waste Dump Instrumentation Data







Azimuth of A0 = 93°



Note: Inclinometer software (DigiPro2 v2.12.4) plots A0 as 0 degrees. The plot above has been rotated such that the orientation matches the plan (north is up).

Source files:

1. AutoCAD: \\VAN-SVR0\Projects\01_SITES\Minto\1CM002.050_2016 Geotech Op Support\!040_AutoCAD\1CM002.050-Site Plan Showing Instrumentation.dwg
2. Instrumentation data: \\VAN-SVR0\Projects\01_SITES\Minto\!020_Site_Wide_Data\Geotechnical\Geotech Monitoring Data\Minto SI Instrumentation Database.dpw

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Job No: 1CM002.048 Filename: ApD_MWDInstrumentation.pptx	Minto Mine	**Inclinometer – MDI-2**	
		Date: August 2016	Prepared by PHM
		Figure: **1**	

Appendix F: Southwest Dump Instrumentation Data

Legend/Notes

1. *Values in black are total movement rates in units of mm/day*
2. *Values in blue are horizontal movement rates in mm/day.*
3. *Survey hubs in cyan color are active.*
4. *Survey hubs in magenta area destroyed.*
5. *Survey hubs with no movement rates listed have been inactive for over one year.*

South West Dump Active Survey Hubs

Survey Hub	Last Reading	Movement Rate (mm/day)		Bearing (Cumulative)	Comments
		June 15	June 16		
SWD-01	5/9/2016	0.30	0.23	111	
SWD-01A	5/9/2016	0.00	0.13	116	Horizontal movement rate listed. Instrument is disturbed due to frost heave and is to be replaced by SWD-06
SWD-02	5/9/2016	0.45	0.45	103	
SWD-02A	5/9/2016	0.40	0.35	113	Instrument is disturbed due to frost heave.
SWD-03A	5/9/2016	1.7	0.80	121	Instrument is disturbed due to frost heave and is leaning.
SWD-04A	5/9/2016	0.00	0.00	95	Horizontal movement rates listed. Instrument is disturbed due to frost heave.
SWD-05A	5/9/2016	0.30	0.10	72	Instrument is disturbed due to frost heave.
SWD-06	5/9/2016		0.16	125	SWD-06 is a replacement hub for SWD-01A

Source files:

1. AutoCAD: \\VAN-SVR0\Projects\01_SITES\Minto\1CM002.050_2016 Geotech Op Support\!040_AutoCAD\1CM002.050-Site Plan Showing Instrumentation.dwg
2. Excel instrumentation data: \\VAN-SVR0\Projects\01_SITES\Minto\!020_Site_Wide_Data\Geotechnical\Geotech Monitoring Data\DSTF, SWD, ASH and WSP Survey Hub Monitoring_PM_2016GeotechInsp.xlsm

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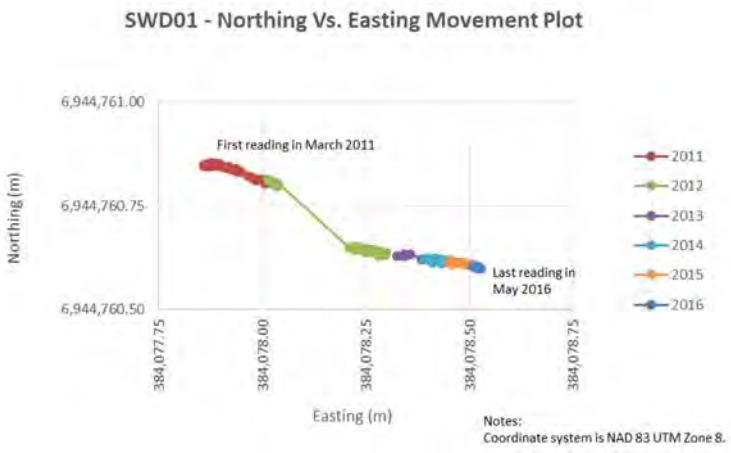
SWD Instrumentation Data

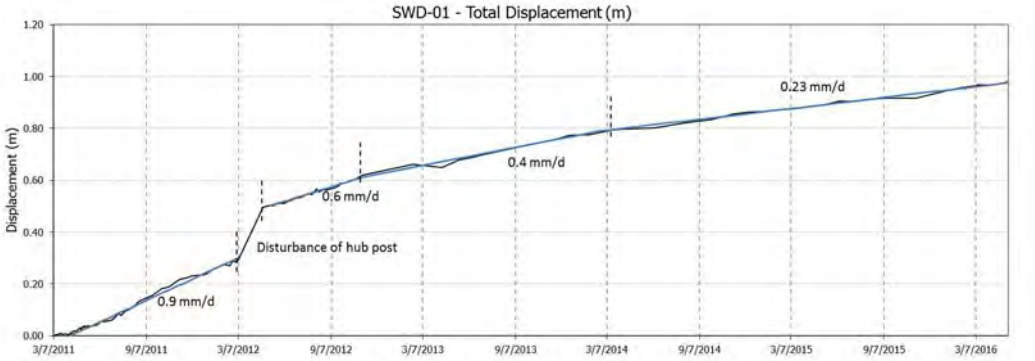
Southwest Dump Survey Hub Summary

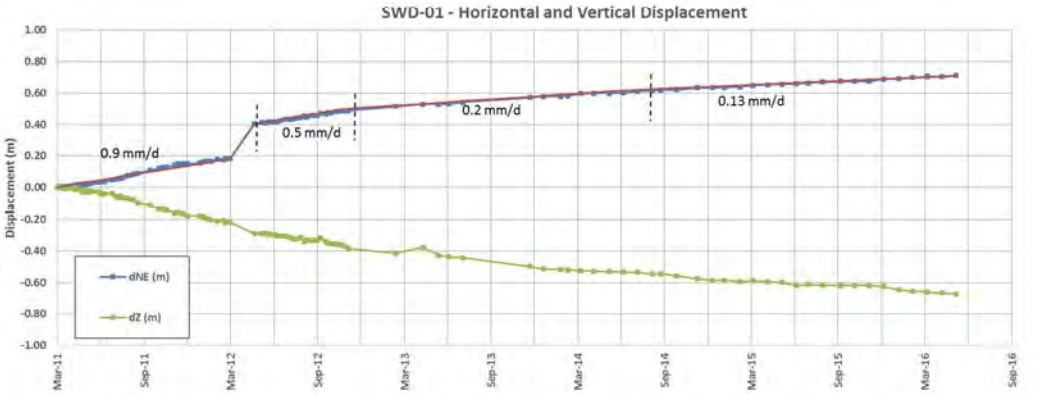
Job No: 1CM002.048
Filename: ApF_SWD Instrumentation.pptx

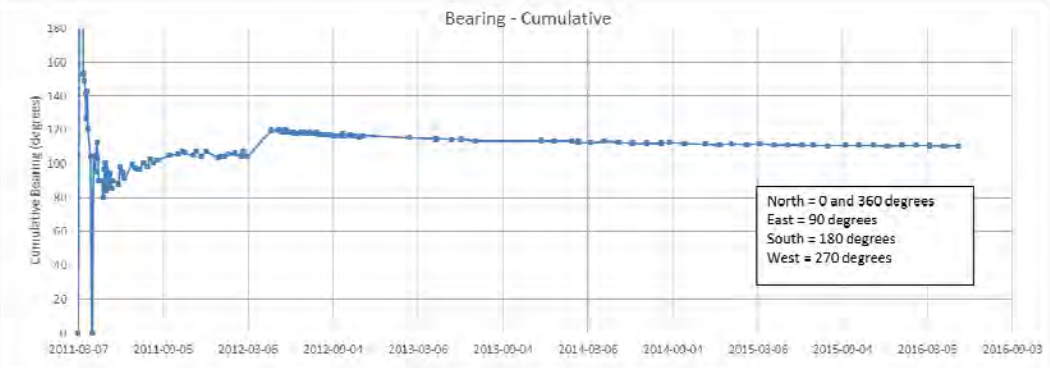
Minto Mine

Date: August 2016 | Prepared by PHM | Figure: 1









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2. Excel instrumentation data: \\VAN-SVR0\Projects\01_SITES\Minto\!020_Site_Wide_Data\Geotechnical\Geotech Monitoring Data\DSTF, SWD, ASH and WSP Survey Hub Monitoring_PM_2016GeotechInsp.xlsm

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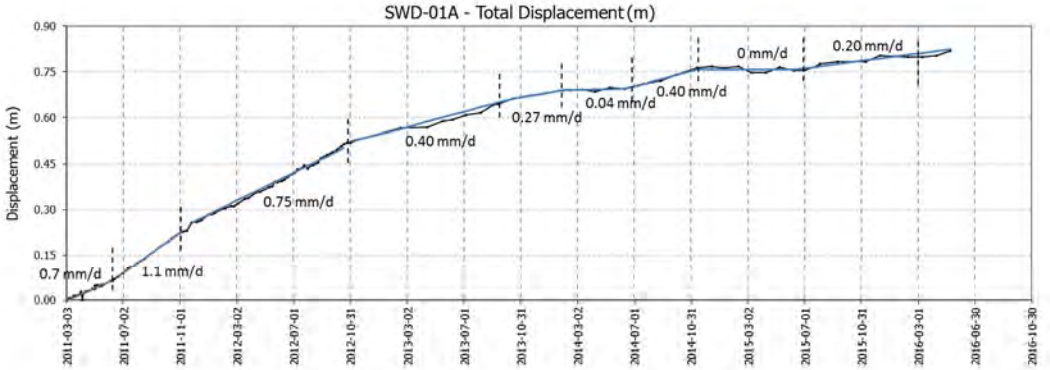
Job No: 1CM002.048
Filename: ApF_SWD Instrumentation.pptx

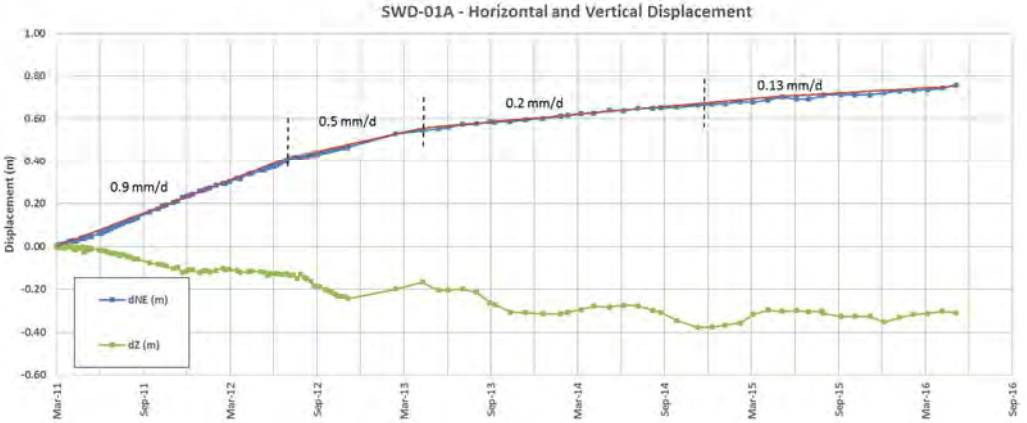
Minto Mine

SWD Instrumentation Data

Survey Hub – SWD-01

Date:	Prepared by	Figure:
August 2016	PHM	**2**





Notes

1. *Hub is disturbed (frost heave) and to be replaced by SWD-06*

Source files:

1. AutoCAD: \\VAN-SVR0\Projects\01_SITES\Minto\1CM002.050_2016 Geotech Op Support\!040_AutoCAD\1CM002.050-Site Plan Showing Instrumentation.dwg
2. Excel instrumentation data: \\VAN-SVR0\Projects\01_SITES\Minto\!020_Site_Wide_Data\Geotechnical\Geotech Monitoring Data\DSTF, SWD, ASH and WSP Survey Hub Monitoring_PM_2016GeotechInsp.xlsm

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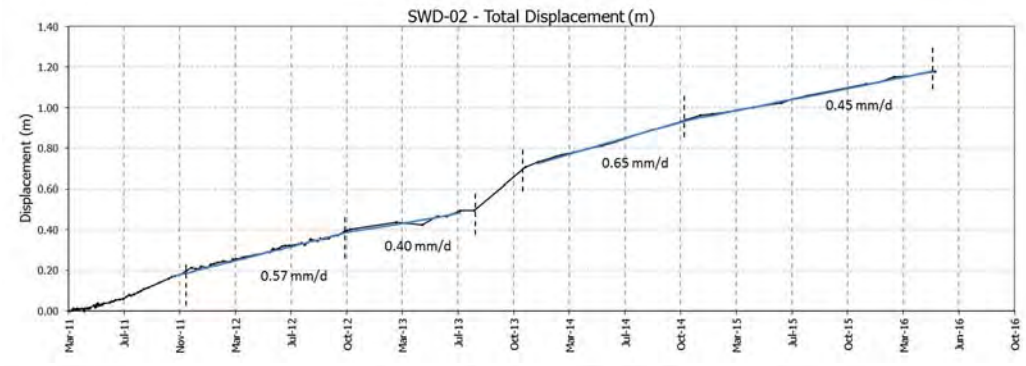
SWD Instrumentation Data

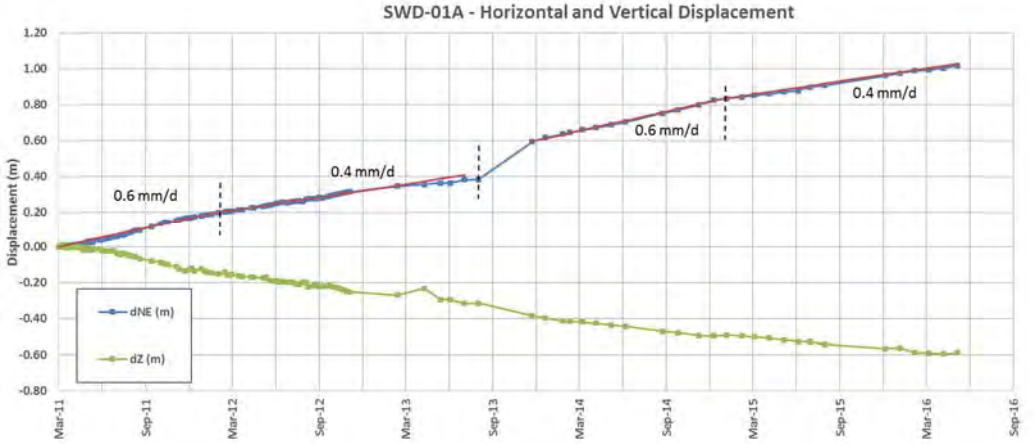
Survey Hub – SWD-01A

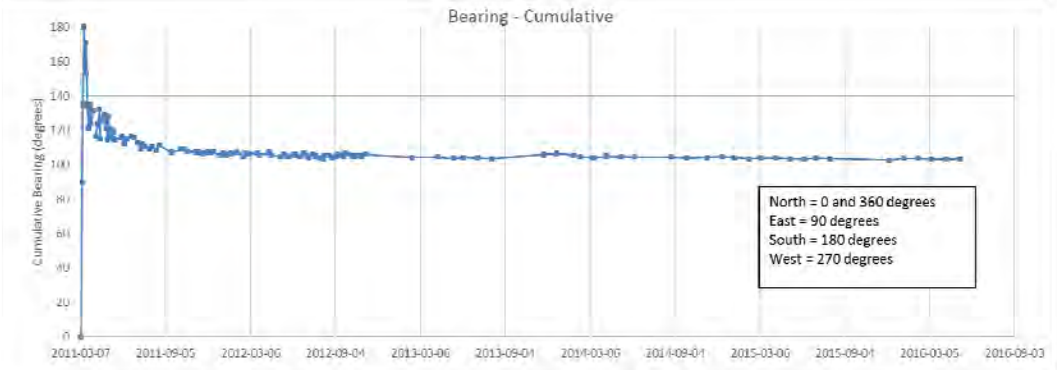
Job No: 1CM002.048
Filename: ApF_SWD Instrumentation.pptx

Minto Mine

Date: August 2016
Prepared by: PHM
Figure: **3**







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2. Excel instrumentation data: \\VAN-SVR0\Projects\01_SITES\Minto\!020_Site_Wide_Data\Geotechnical\Geotech Monitoring Data\DSTF, SWD, ASH and WSP Survey Hub Monitoring_PM_2016GeotechInsp.xlsm

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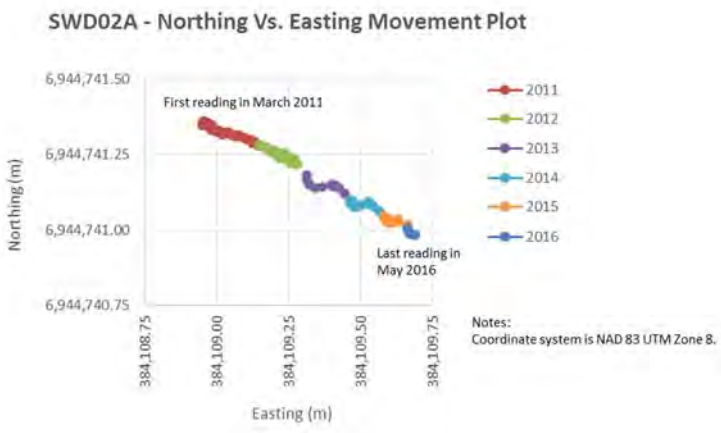
SWD Instrumentation Data

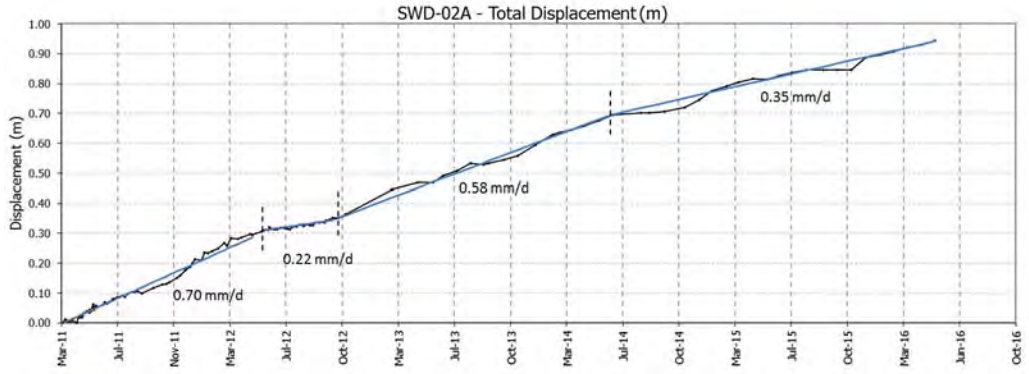
Survey Hub – SWD-02

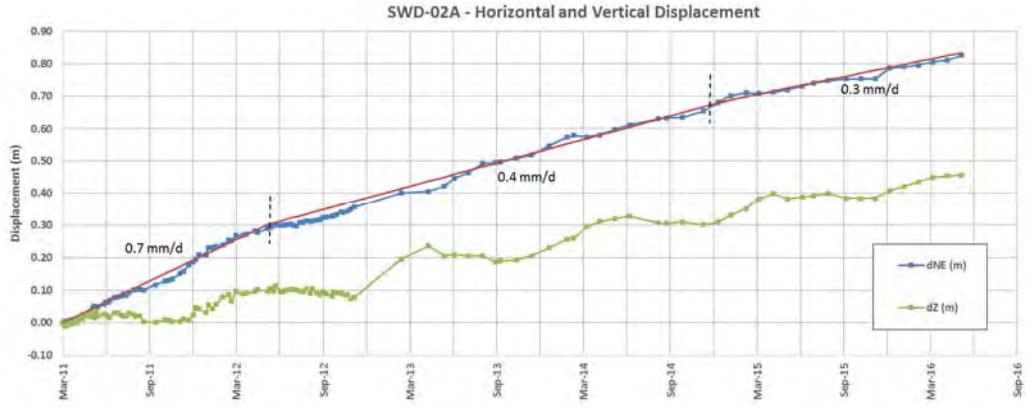
Job No: 1CM002.048
Filename: ApF_SWD Instrumentation.pptx

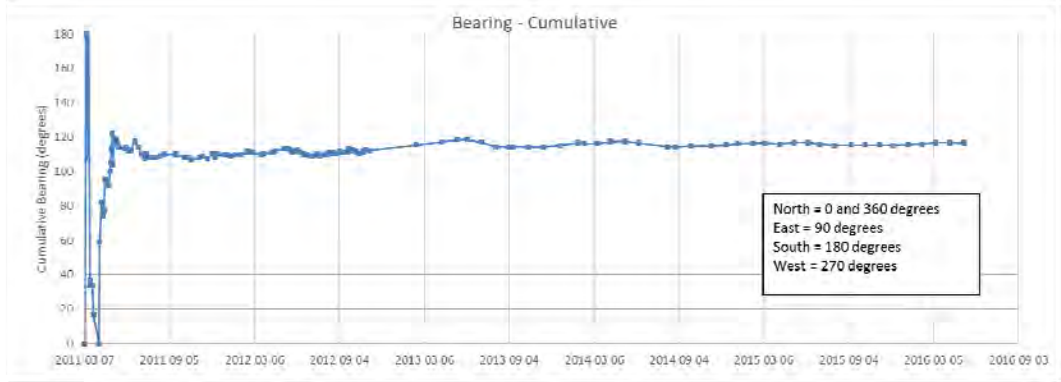
Minto Mine

Date: August 2016
Prepared by: PHM
Figure: **4**









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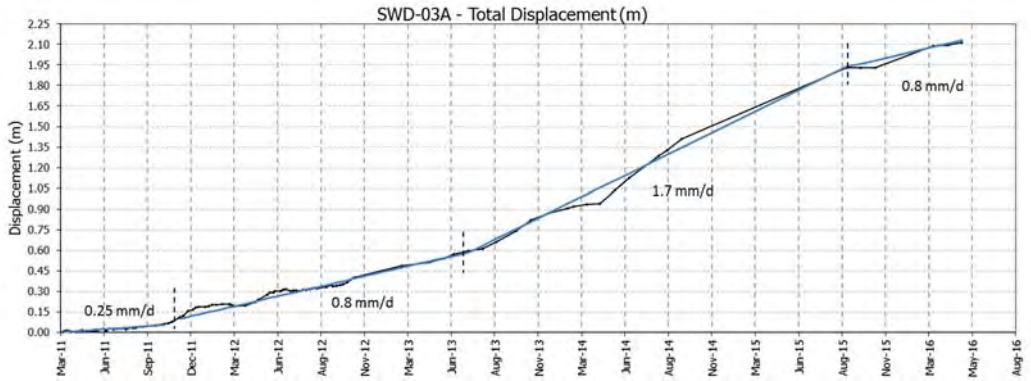
SWD Instrumentation Data

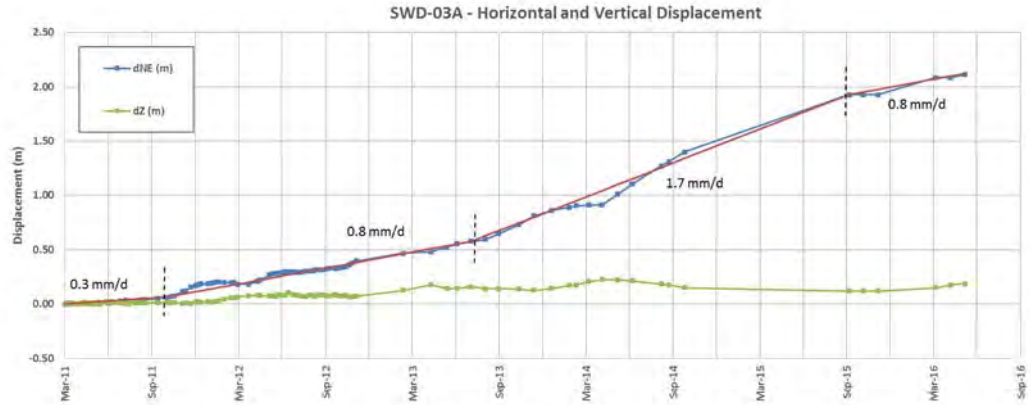
Survey Hub – SWD-02A

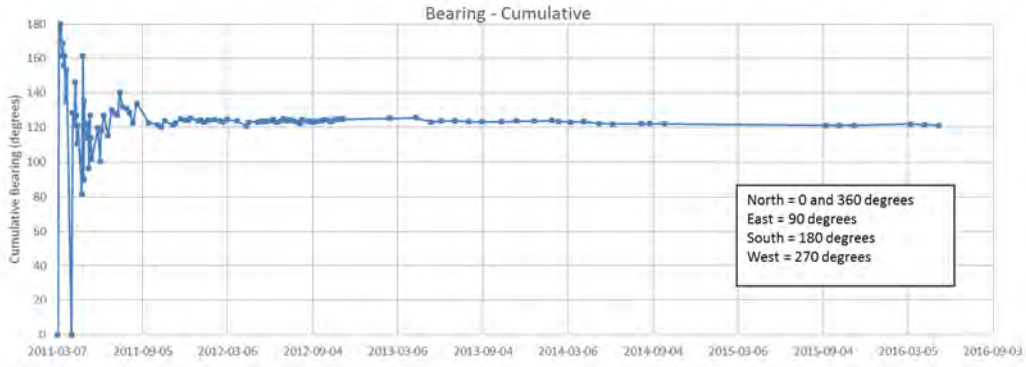
Job No: 1CM002.048
Filename: ApF_SWD Instrumentation.pptx

Minto Mine

Date: August 2016
Prepared by: PHM
Figure: **5**







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Job No: 1CM002.048

Filename: ApF_SWD Instrumentation.pptx

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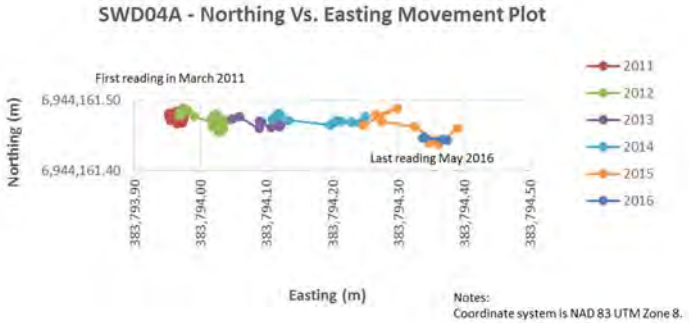
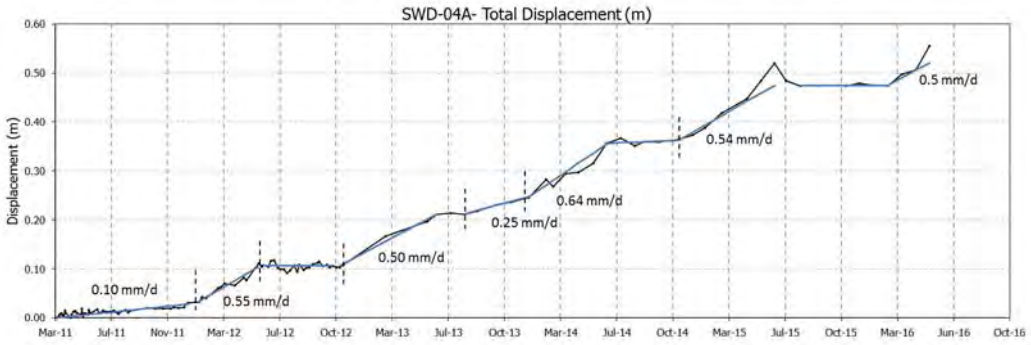
Minto Mine

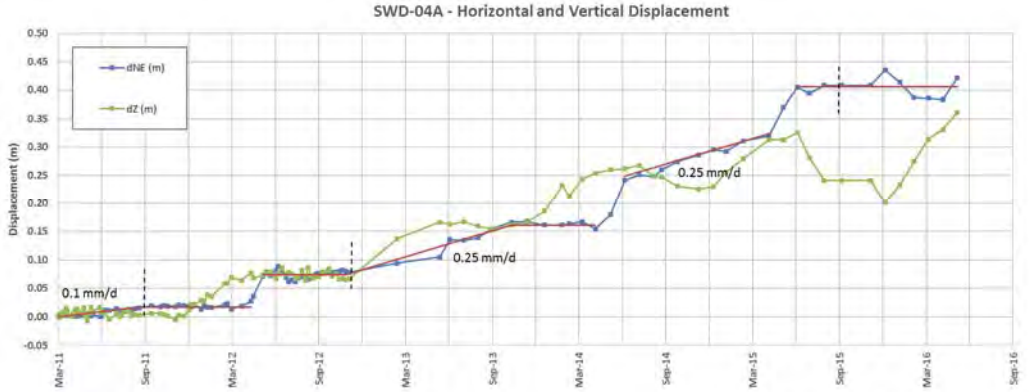
SWD Instrumentation Data

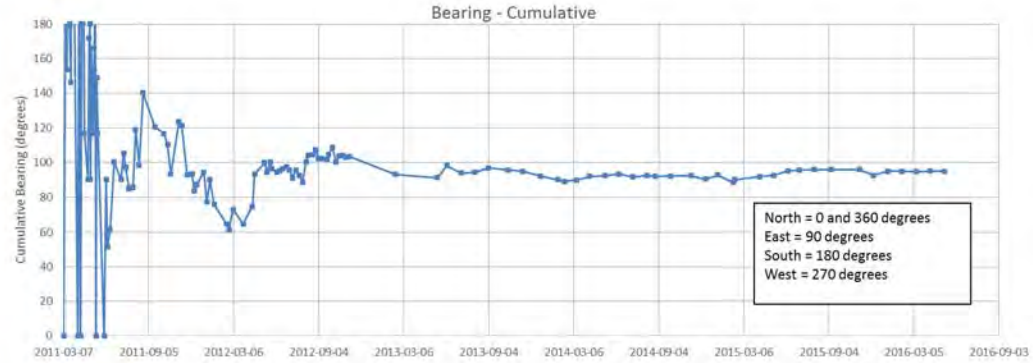
Survey Hub – SWD-03A

Date:	Prepared by	Figure:
August 2016	PHM	6









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Job No: 1CM002.048

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SWD Instrumentation Data

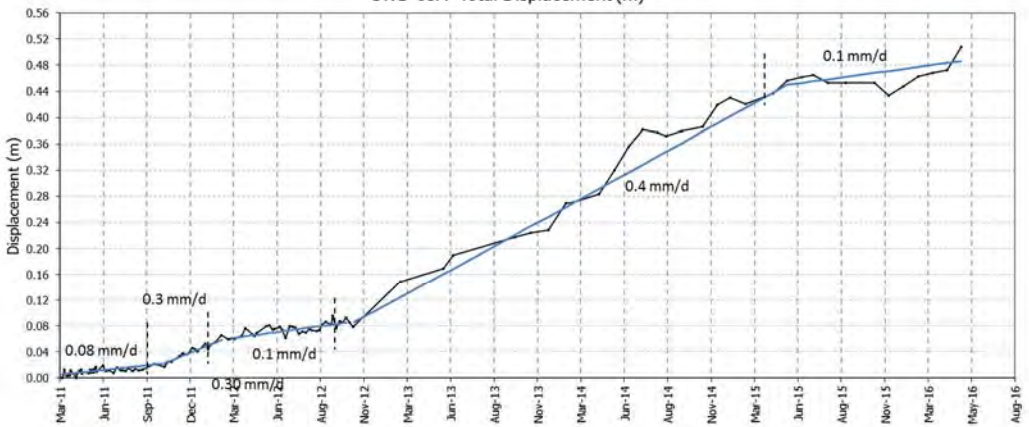
Survey Hub – SWD-04A

Date:	Prepared by	Figure:
August 2016	PHM	7

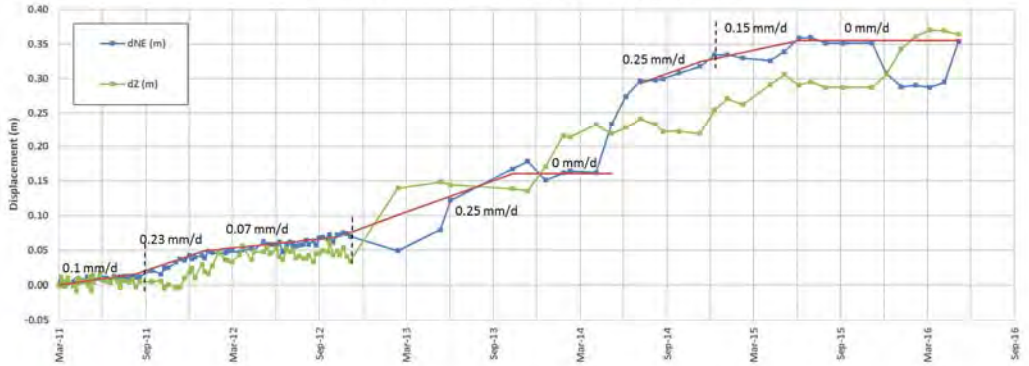
SWD05A - Northing Vs. Easting Movement Plot

Notes:
Coordinate system is NAD 83 UTM Zone 8.

SWD-05A- Total Displacement (m)



SWD-05A - Horizontal and Vertical Displacement



Bearing - Cumulative

Source files:

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SWD Instrumentation Data

Survey Hub – SWD-05A

Job No: 1CM002.048
Filename: ApF_SWD Instrumentation.pptx

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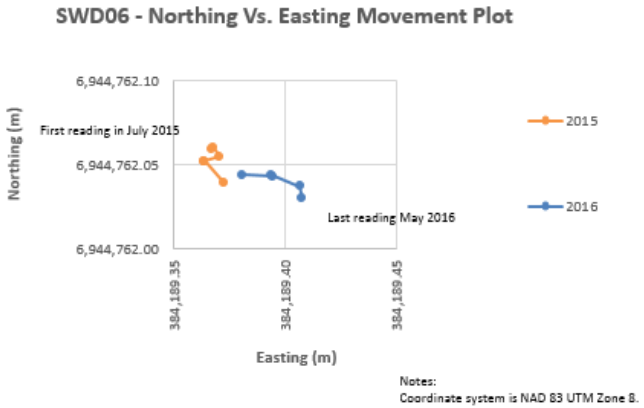
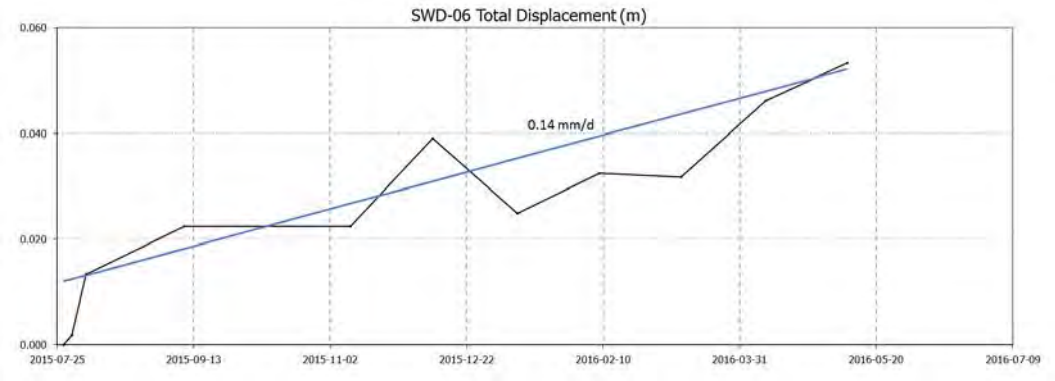
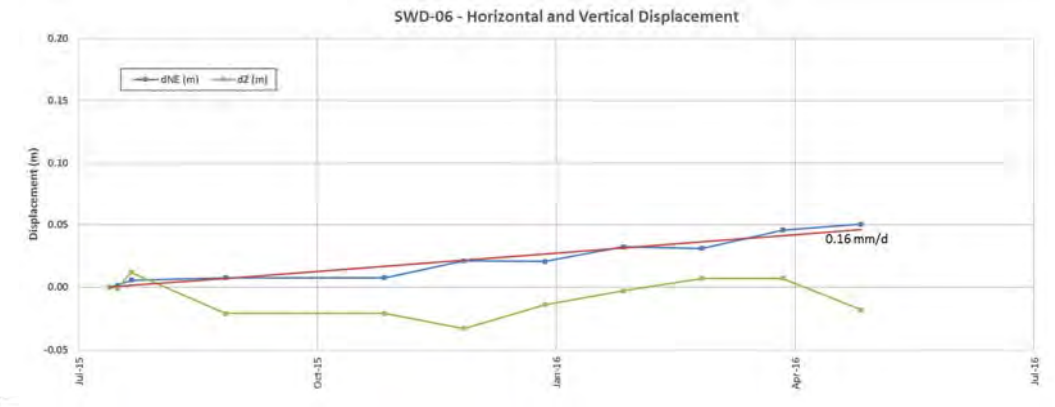
Date: August 2016
Prepared by: PHM
Figure: **8**

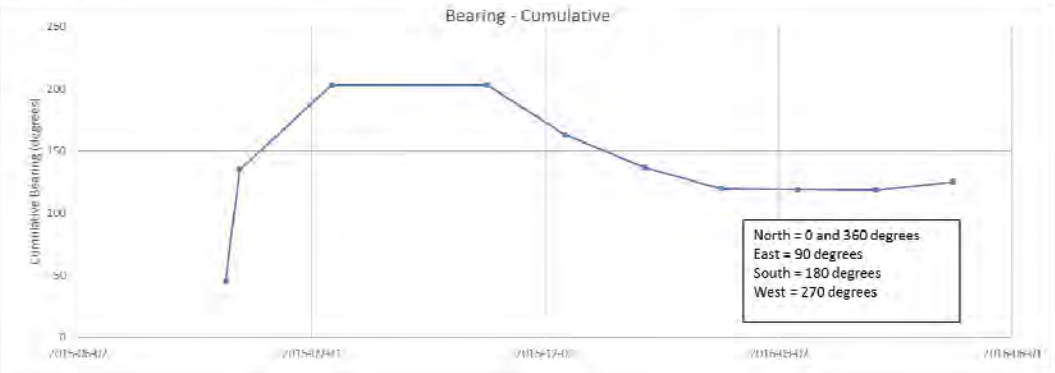




Notes

1. New hub is to replace SWD-01A that is disturbed by frost heave.





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Job No: 1CM002.048

Filename: ApF_SWD Instrumentation.pptx

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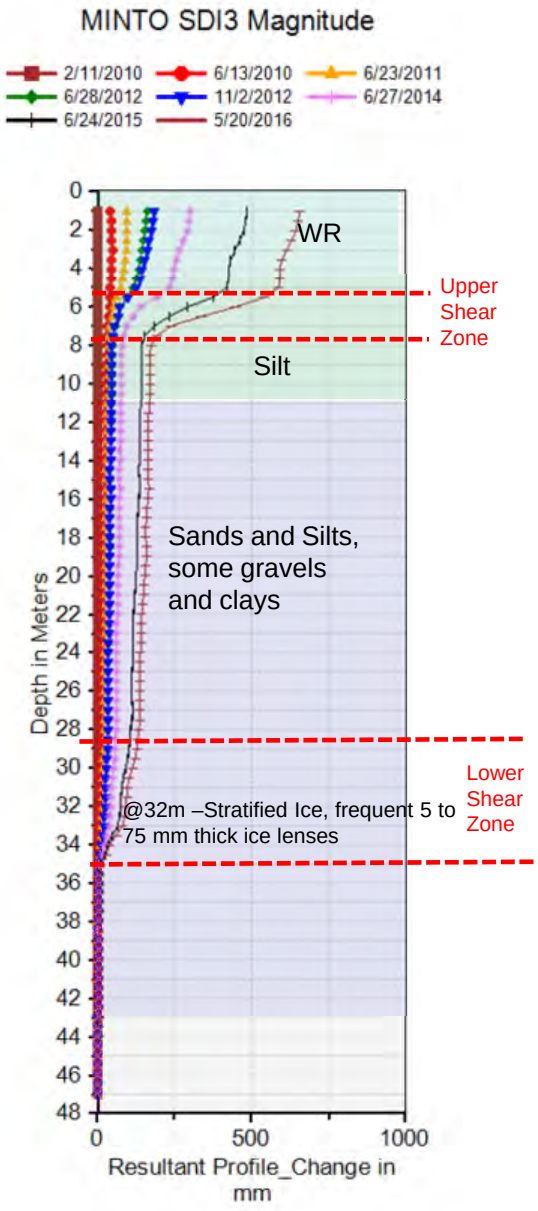
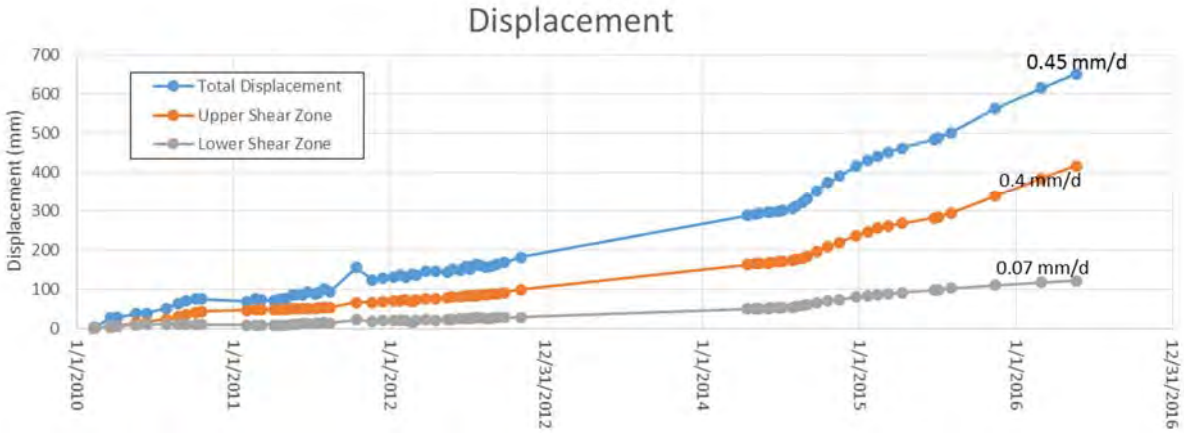
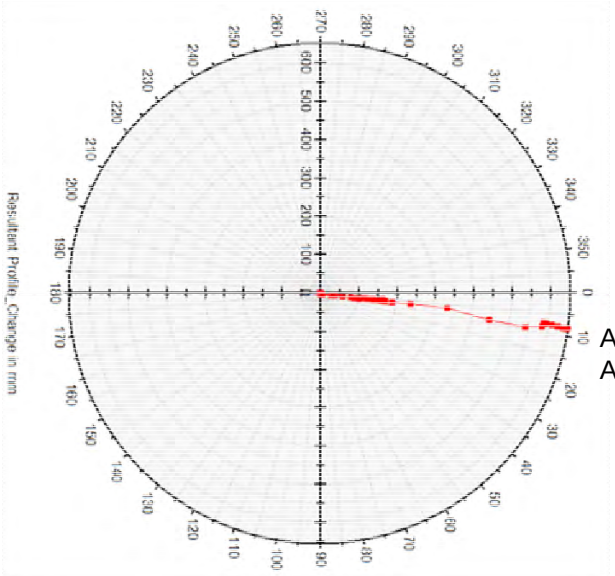
SWD Instrumentation Data

Survey Hub – SWD-06

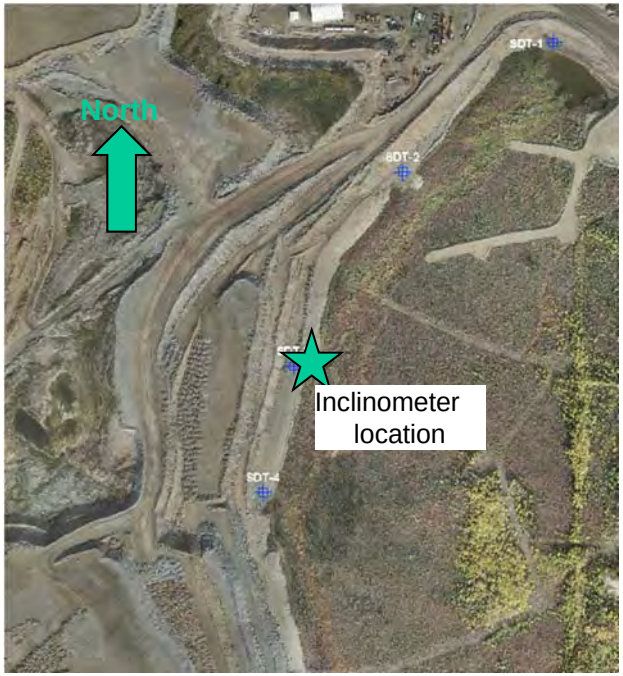
Date:	Prepared by	Figure:
August 2016	PHM	9







Azimuth of A0 = 90°



Note: Inclinometer software (DigiPro2 v2.12.4) plots A0 as 0 degrees. The plot above has been rotated such that the orientation matches the plan (north is up).

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SWD Instrumentation Data

Inclinometer – SDI-3

Job No: 1CM002.048

Filename: ApF_SWD Instrumentation.pptx

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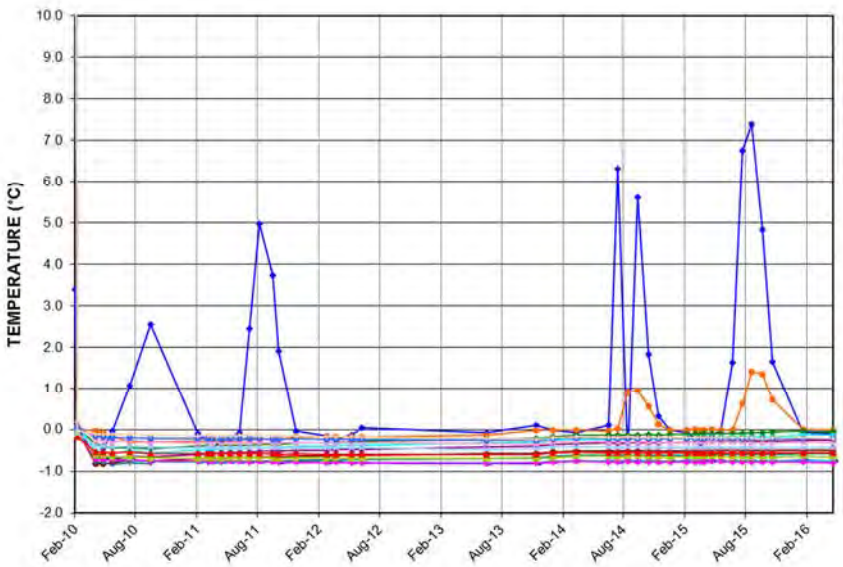
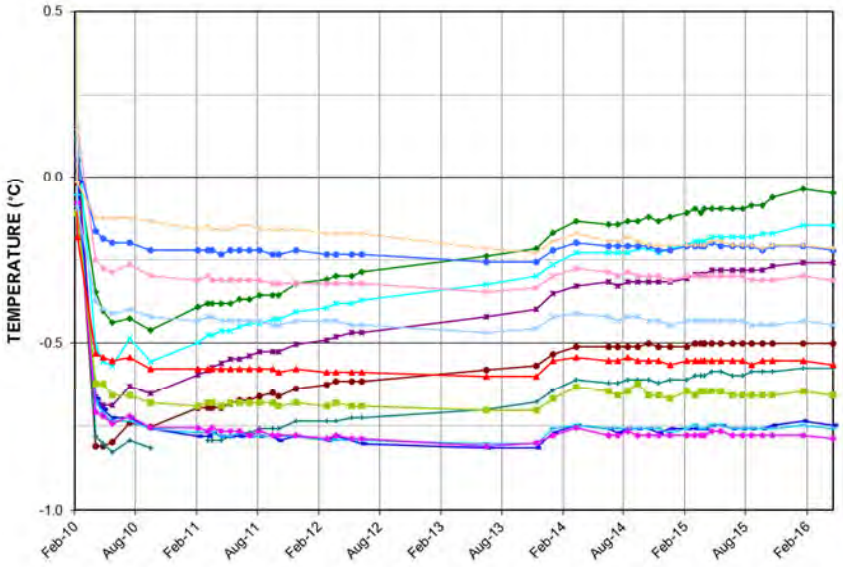
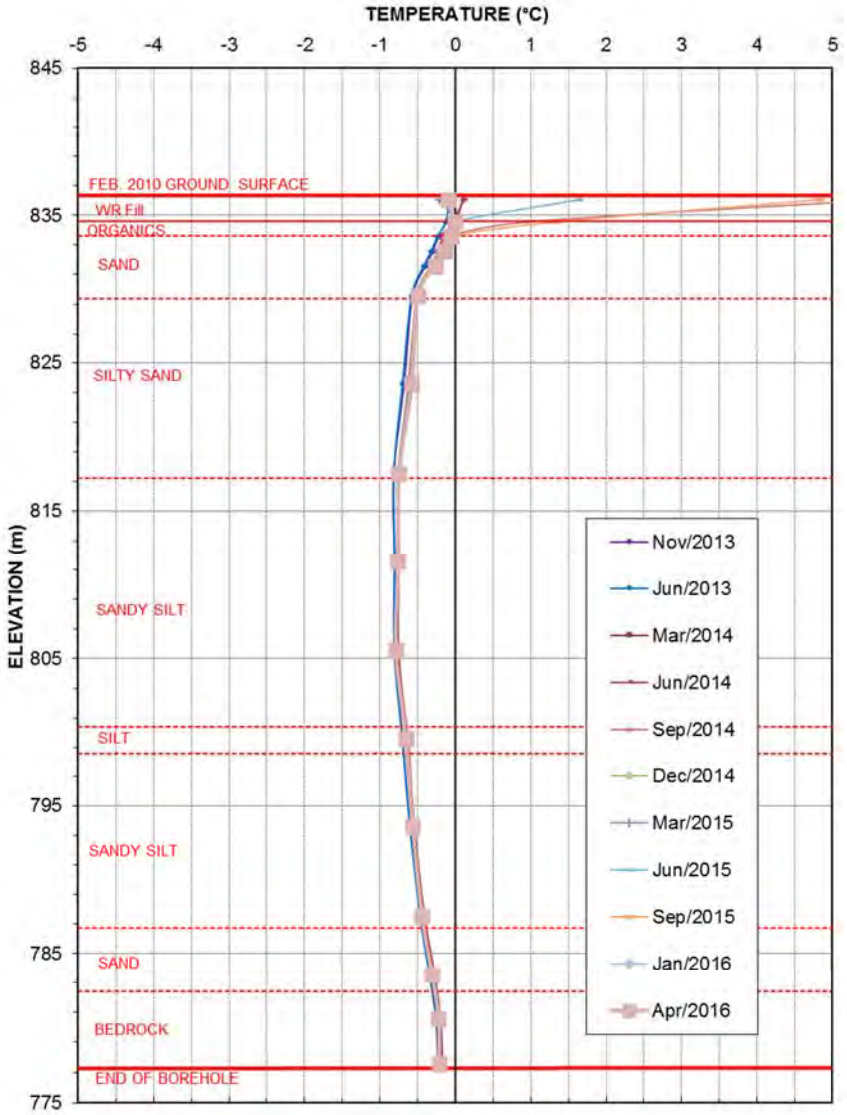
Date: August 2016

Prepared by PHM

Figure: **10**







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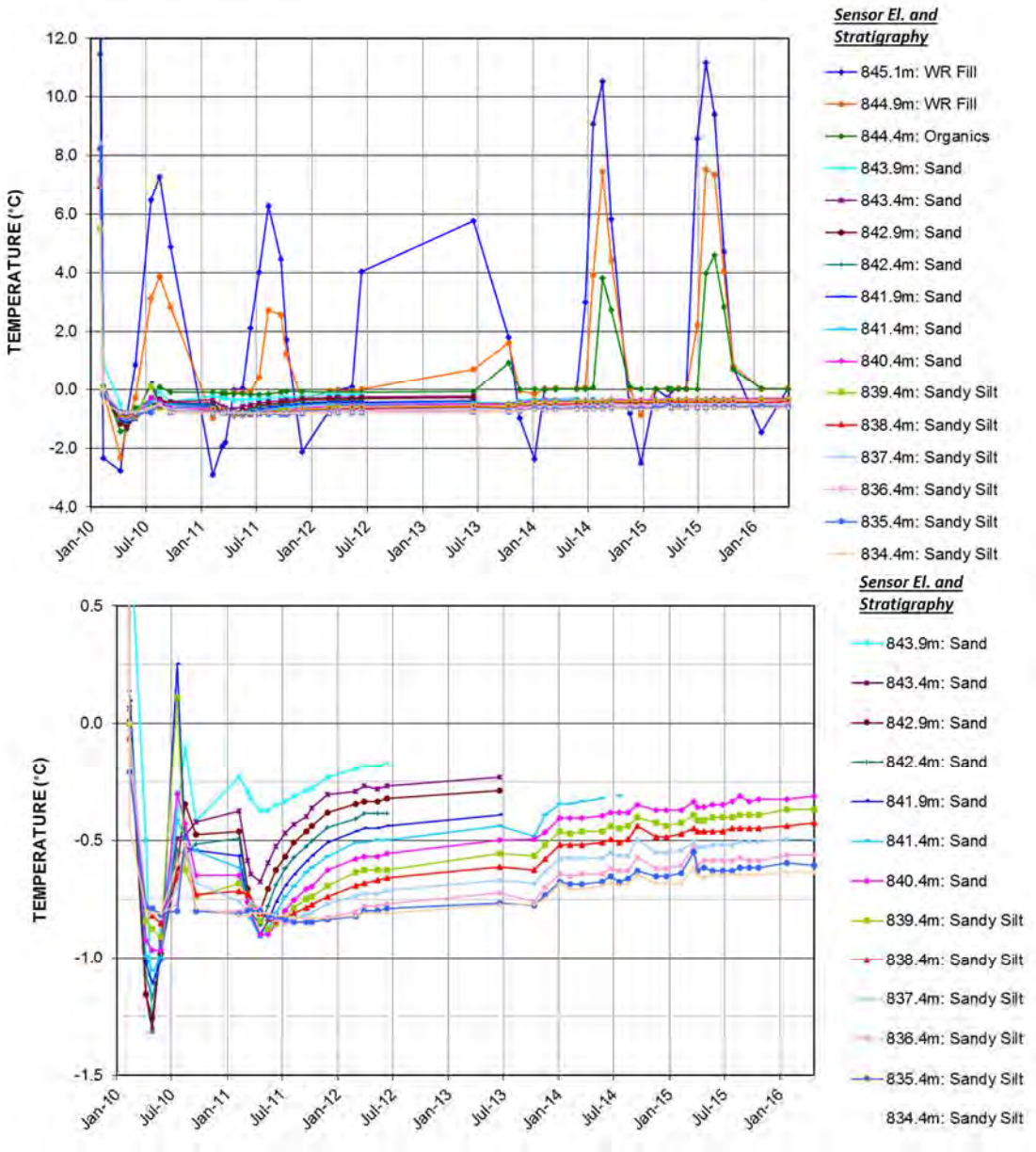
SWD Instrumentation Data

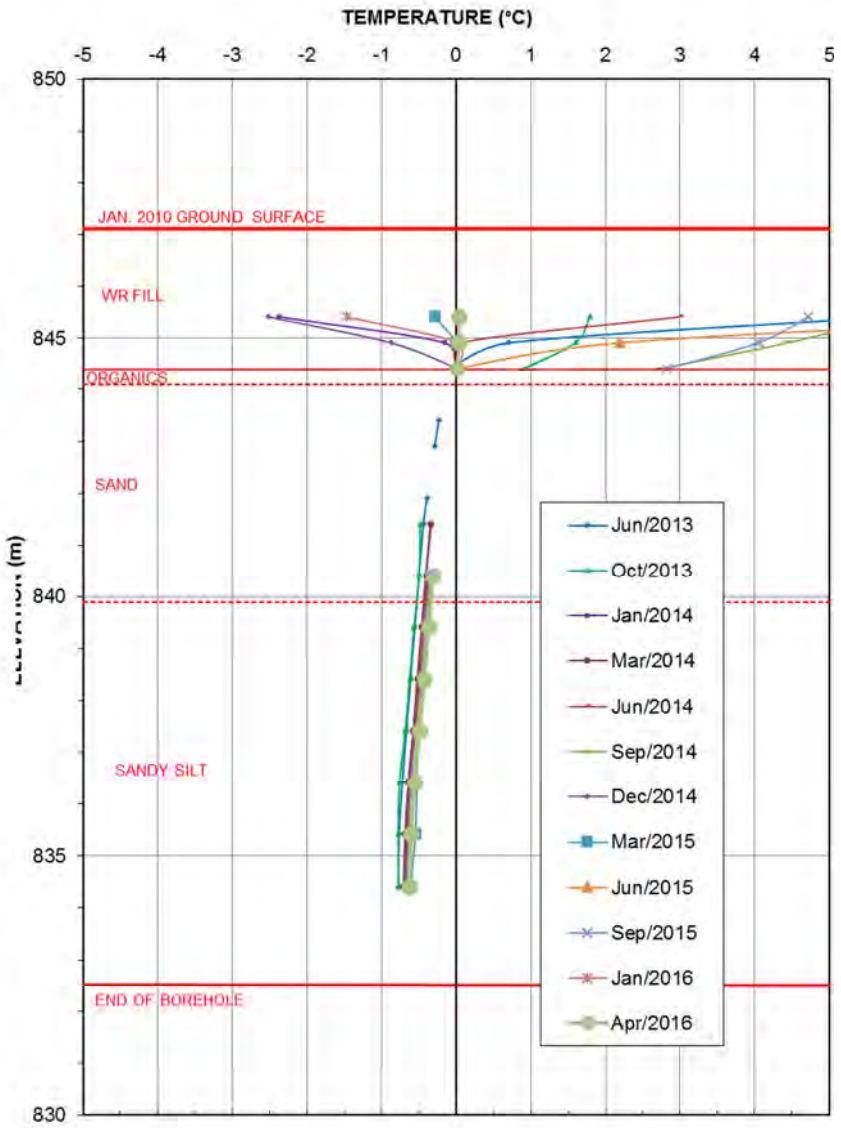
Temperature Cable – SDT-1

Job No: 1CM002.048
Filename: ApF_SWD Instrumentation.pptx

Minto Mine

Date: August 2016
Prepared by: PHM
Figure: 11





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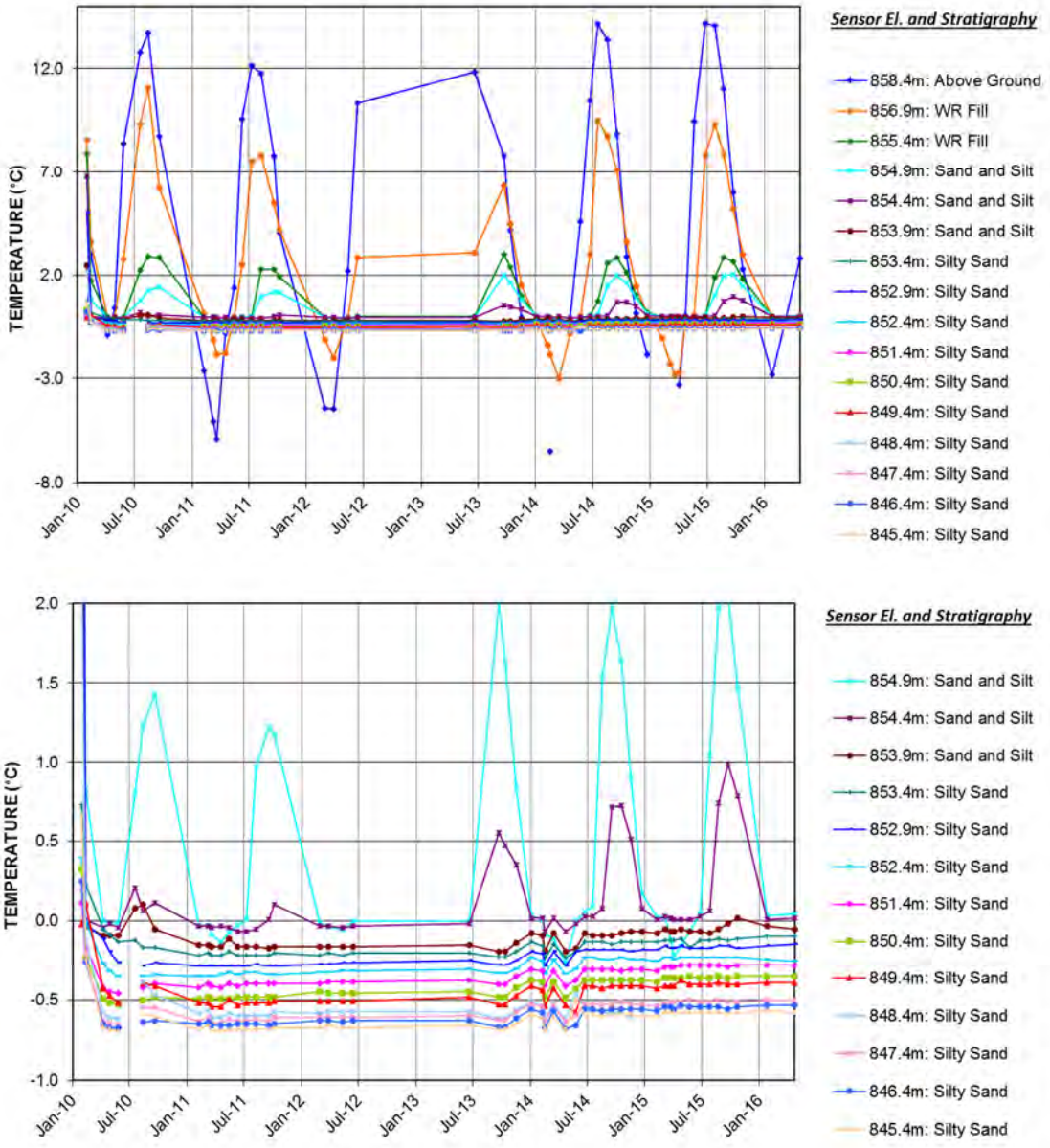
Job No: 1CM002.048 Filename: ApF_SWD Instrumentation.pptx	Minto Mine	**Temperature Cable – SDT-2**
		Date: August 2016 / Prepared by: PHM / Figure: **12**



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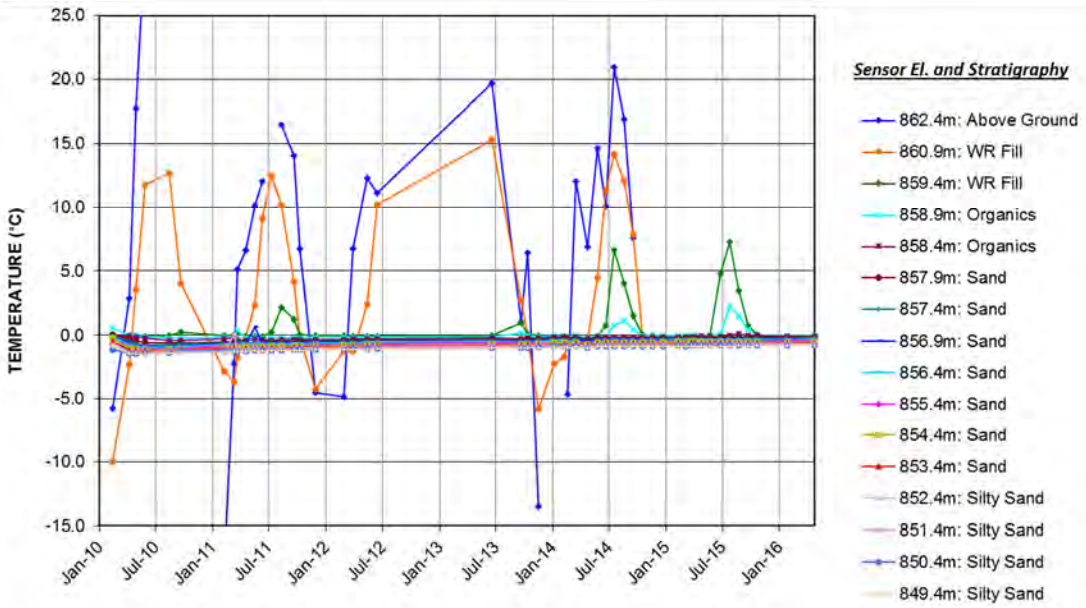
SWD Instrumentation Data

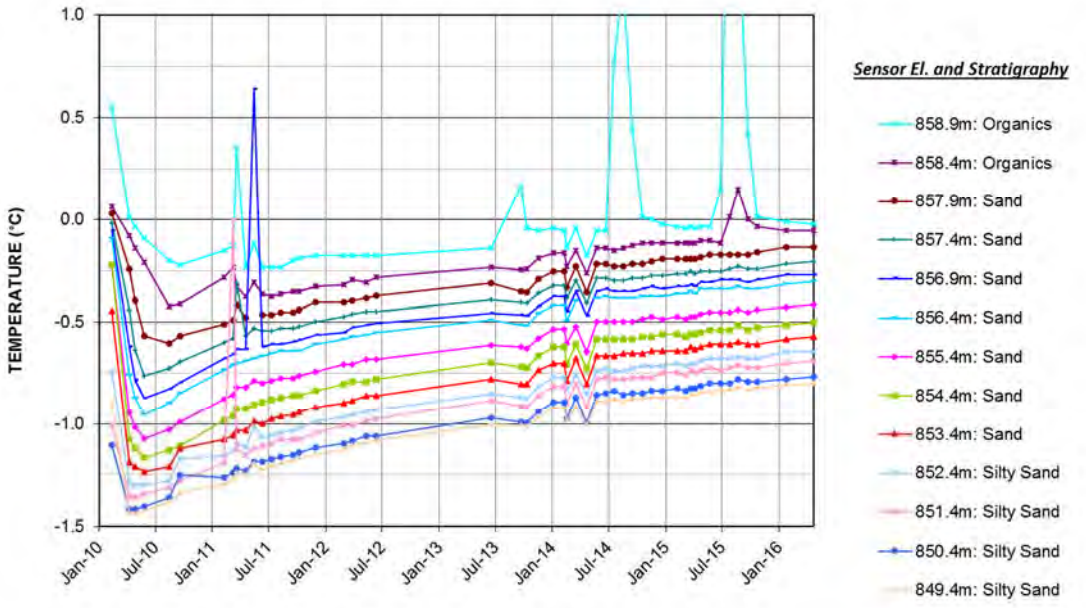
Temperature Cable – SDT-3

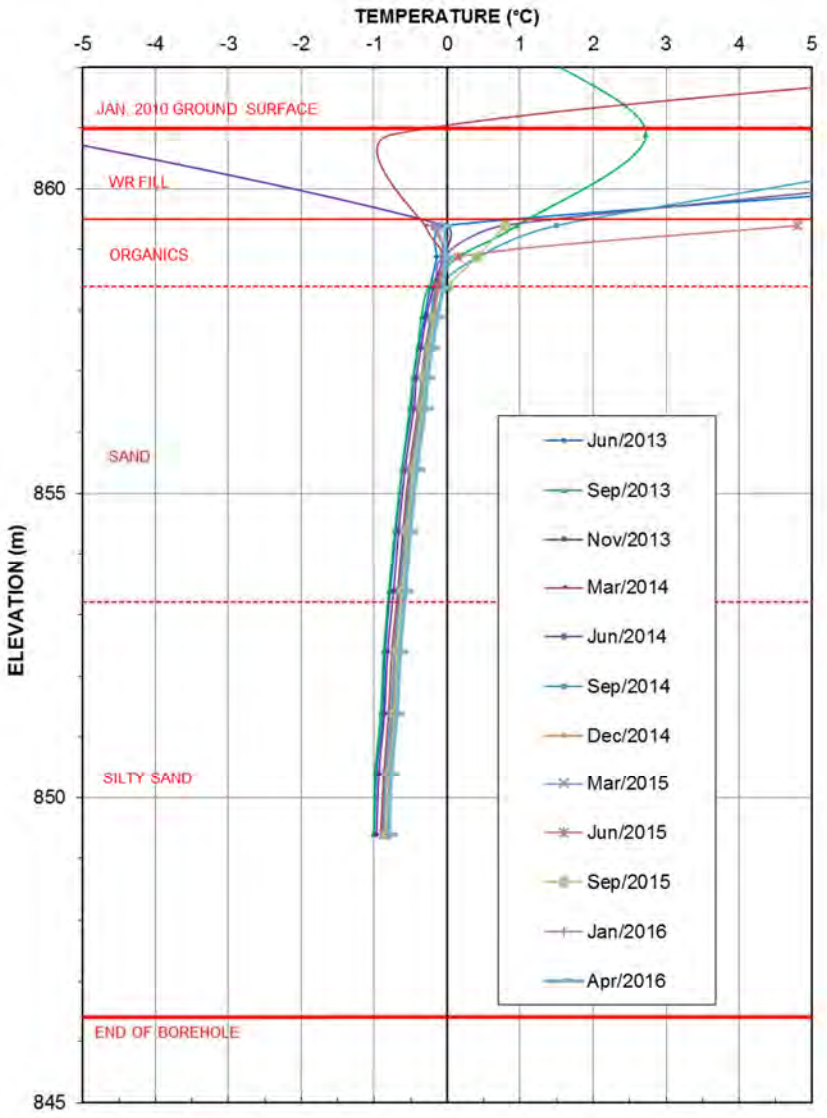
Job No: 1CM002.048
Filename: ApF_SWD Instrumentation.pptx

Minto Mine

Date: August 2016
Prepared by: PHM
Figure: **13**







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SWD Instrumentation Data

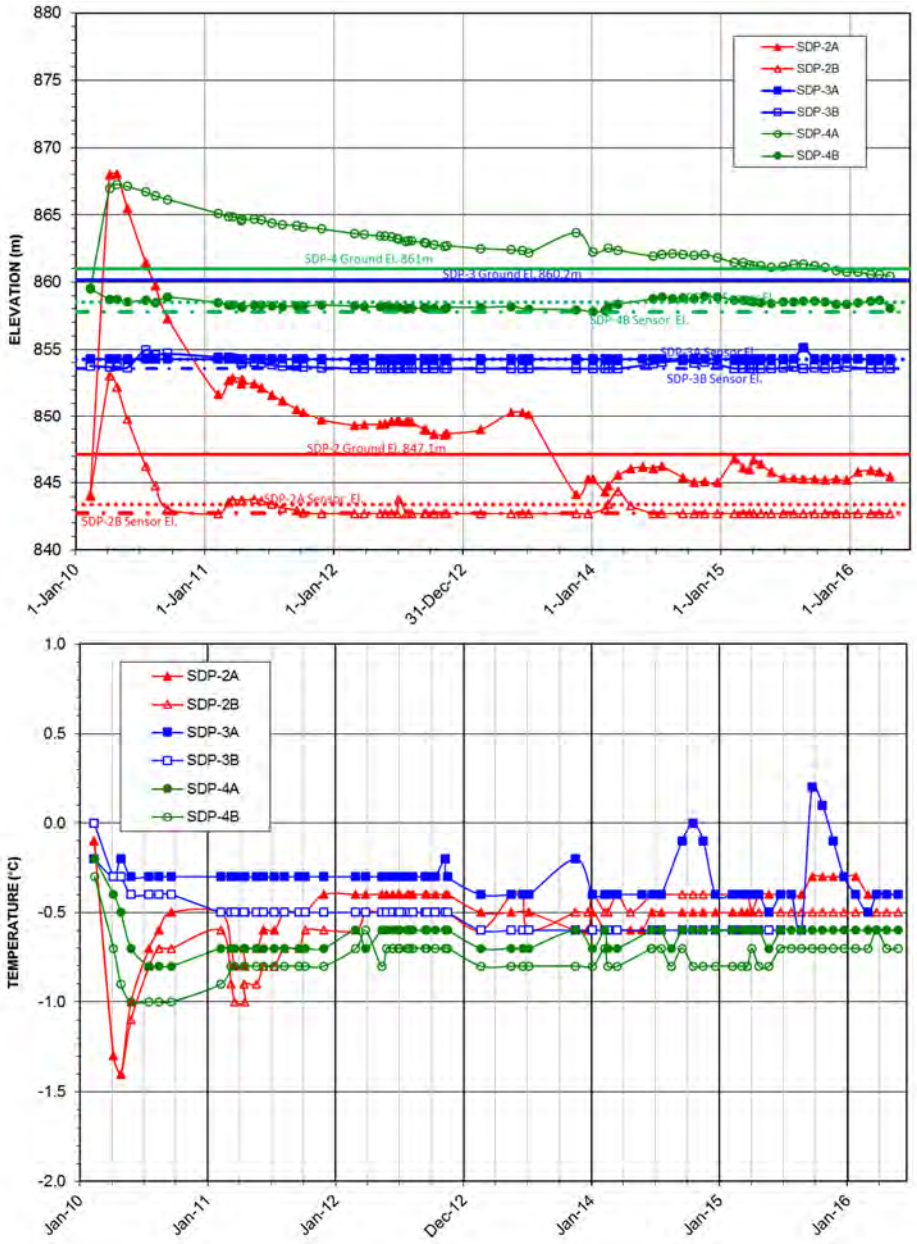
Temperature Cable – SDT-4

Job No: 1CM002.048
Filename: ApF_SWD Instrumentation.pptx

Minto Mine

Date:	Prepared by	Figure:
August 2016	PHM	14

Southwest Dump Piezometers and Ground Temperature Cables



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SWD Instrumentation Data

Southwest Dump Piezometers

Date:	Prepared by	Figure:
August 2016	PHM	15

Appendix G: Main Pit Instrumentation Data

Legend/Notes

1. *Values in black are total movement rates in units of mm/day*
2. *Values in blue are horizontal movement rates in mm/day.*
3. *Survey hubs in cyan color are active.*
4. *Survey hubs in magenta area destroyed.*
5. *Survey hubs with no movement rates listed have been inactive for over one year.*

Source files:

1. AutoCAD: \\VAN-SVR0\Projects\01_SITES\Minto\1CM002.050_2016 Geotech Op Support\!040_AutoCAD\1CM002.050-Site Plan Showing Instrumentation.dwg
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Main Pit Active Survey Hubs

Survey Hub	Last Reading	Movement Rate (mm/day)		Bearing (Cumulative)	Comments
		June 15	June 16		
M73	5/12/2016	0.3	0.3	65	Very slight deceleration can be observed on graph of total displacement
M75	5/12/2016	-	-	10	Steady movement and bearing. Hub is located on fill placed inside of the ultimate Main Pit crest. Observed movement suspected to be related to settlement of fill in the pit.
M76	5/12/2016	-	-	14	No significant horizontal movement. Observed movement is likely settlement of fill in Main Pit.
M79	5/12/2016	0.2	0.2	100	Horizontal Movement Rate listed. Steady movement, bearing has shifted towards the south.
M80	5/12/2016	0.1	0.1	107	Horizontal Movement Rate listed. Steady movement and bearing.
M81	5/16/2016	0.0	0.0	52	No significant horizontal movement. Observed movement is largely fill settlement.
M82	5/28/2016	0.65	0.65	52	
M83	5/28/2016	0.3	0.3	72	
M84	5/28/2016	0.1	0.7	104	**Accelerating movement, bearing shifting northward**
M85	5/16/2016	n/a	0.4	70	
M86	5/12/2016	n/a	0.3	47	
M87	5/28/2016	n/a	0.5	71	

Main Pit Survey Hubs Destroyed in past year

Survey Hub	Last Reading	Movement Rate (mm/day)		Bearing (Cumulative)	Comments
		June 15	At last reading		
M69	4/11/2016	0.5	0.3	85	
M74	4/11/2016	0.5	0.5	43	Steady movement and bearing. Hub is located on fill placed inside of the ultimate Main Pit crest. Observed movement suspected to be related to settlement of fill in the pit.

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Main Pit Instrumentation Data

Survey Hub Summary

Job No: 1CM002.048

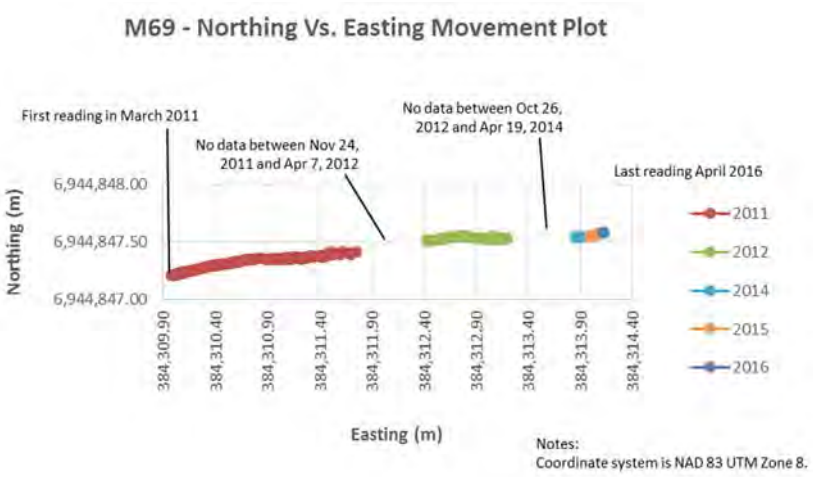
Filename: ApG_MainPitPort.pptx

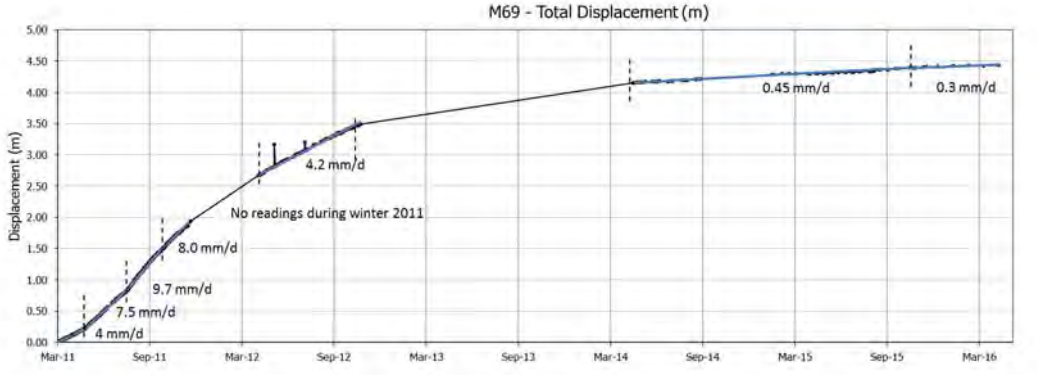
Minto Mine

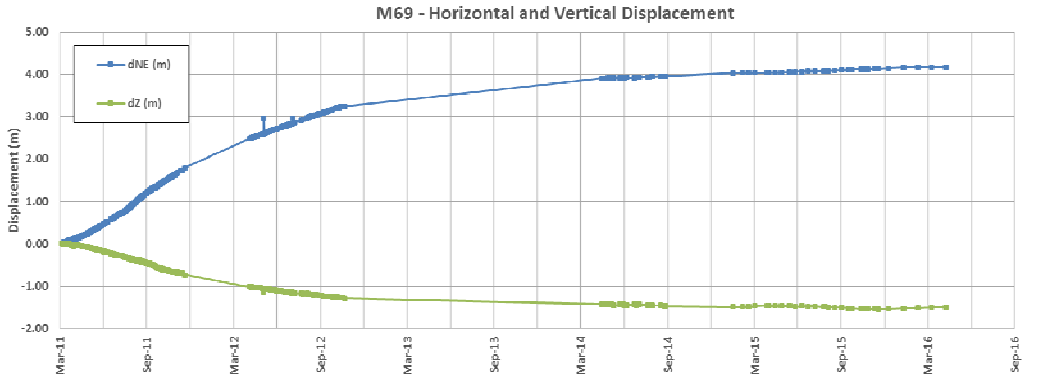
Date: August 2016

Prepared by: PHM

Figure: 1

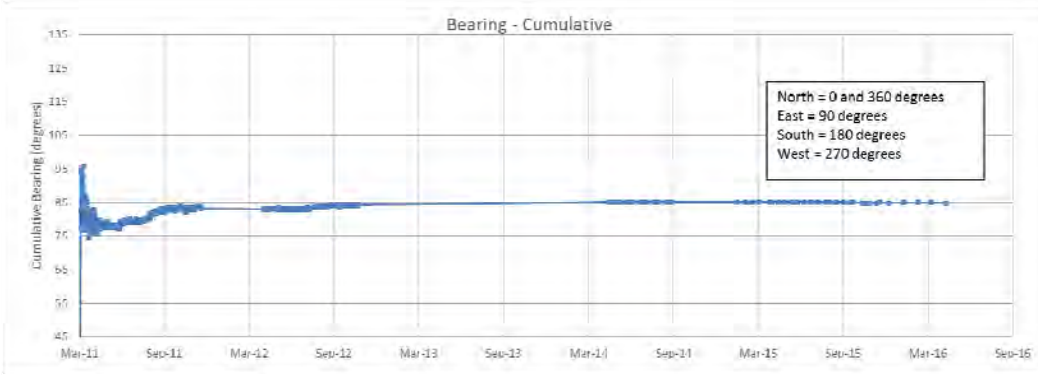






Notes

1. *Hub is to be replaced by M85.*



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Filename: ApG_MainPitInstrumentation.pptx

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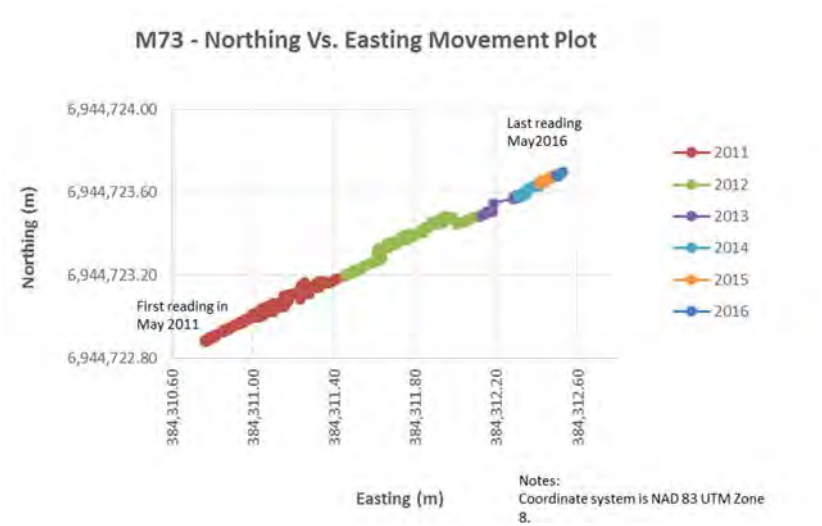
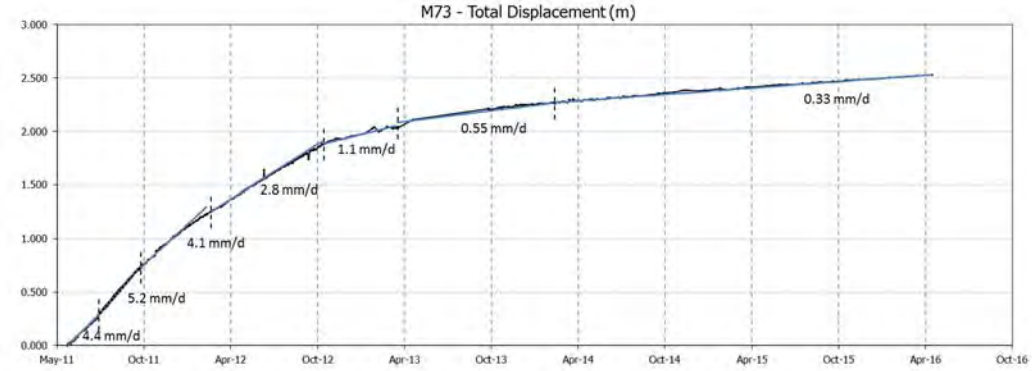
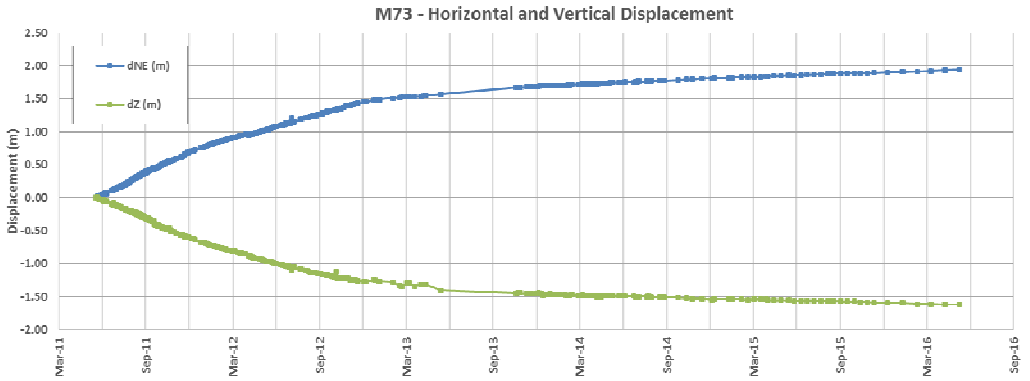
Main Pit Instrumentation Data

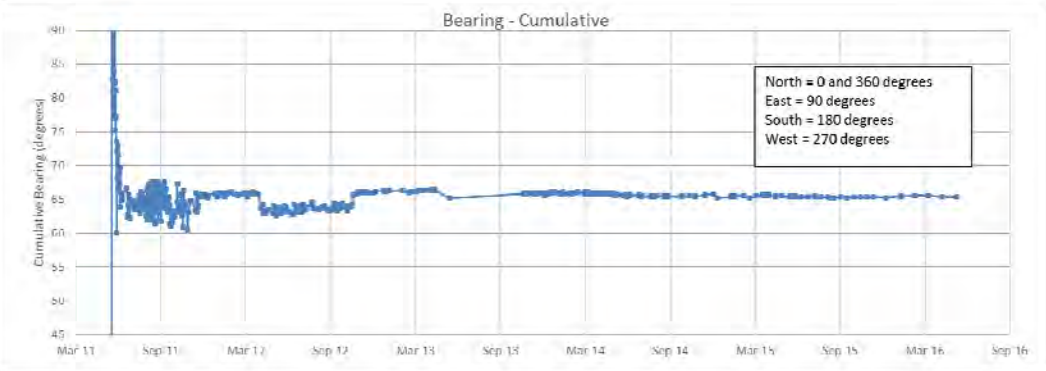
Survey Hub – M69

Date:	Prepared by	Figure:
August 2016	PHM	2









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Job No: 1CM002.048

Filename: ApG_MainPitInstrumentation.pptx

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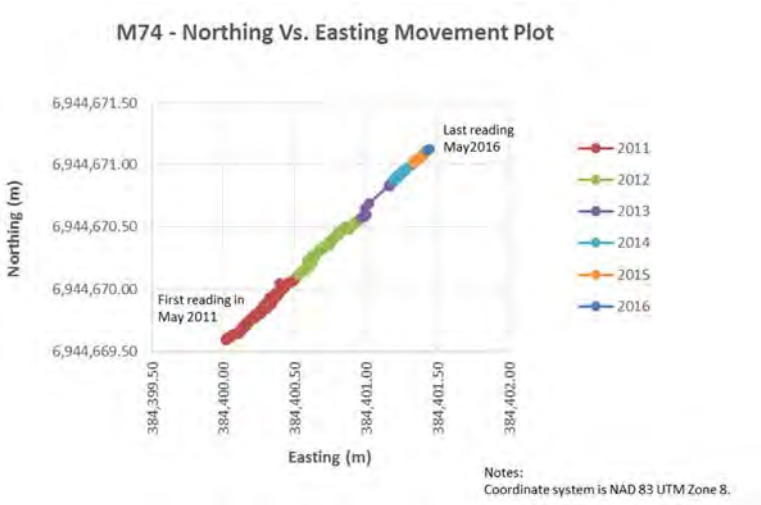
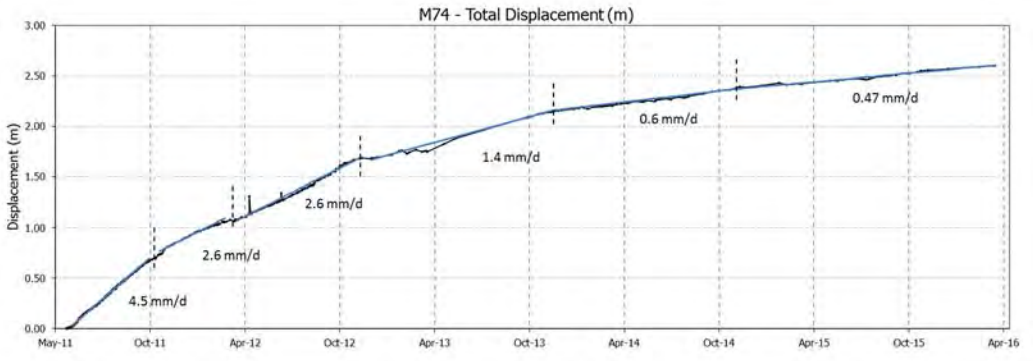
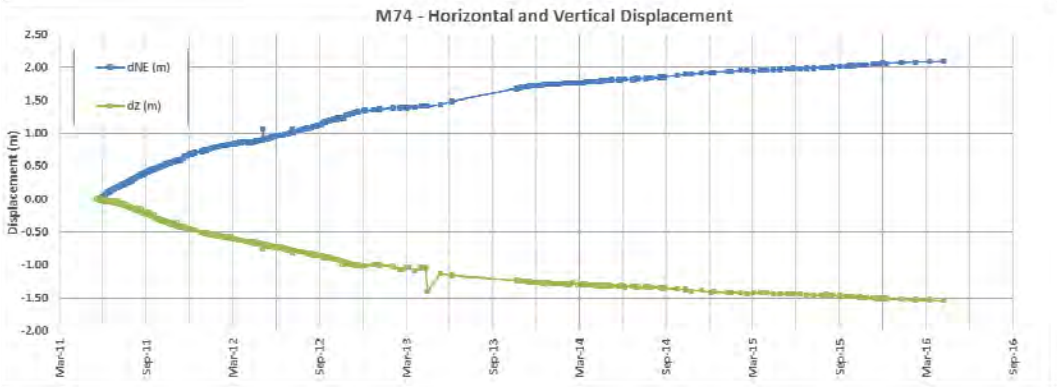
Main Pit Instrumentation Data

Survey Hub – M73

Date:	Prepared by	Figure:
August 2016	PHM	3

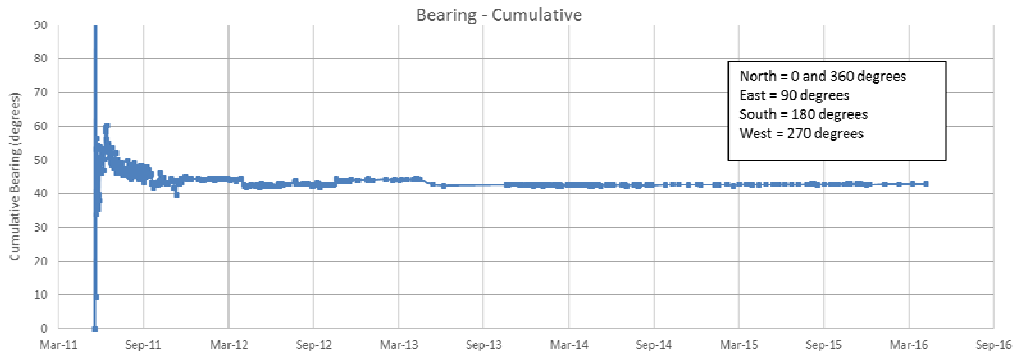






Notes

1. *Hub is to be replaced by M86.*



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2. Excel instrumentation data: \\VAN-SVR0\Projects\01_SITES\Minto\!020_Site_Wide_Data\Geotechnical\Geotech Monitoring Data\Minto Main Prism Monitoring_pm2016GeotechInspection.xlsm

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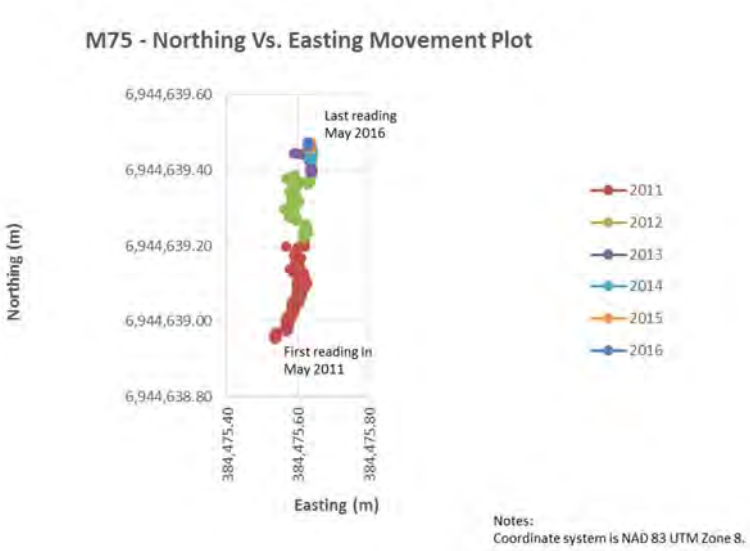
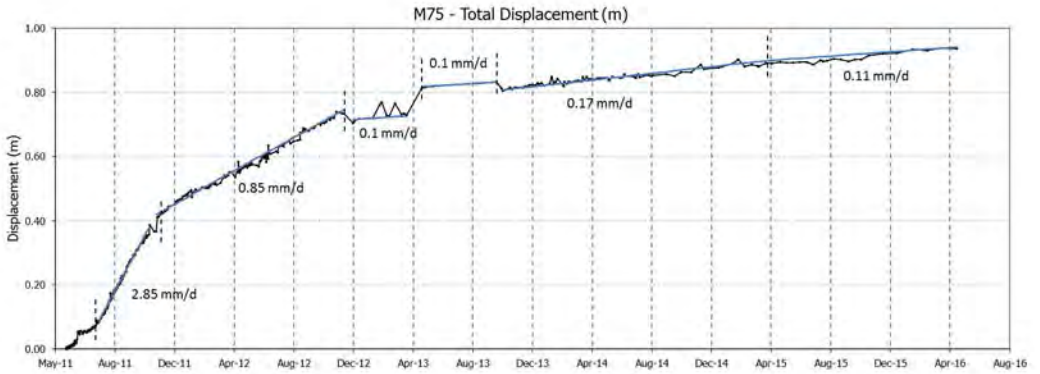
Minto Mine

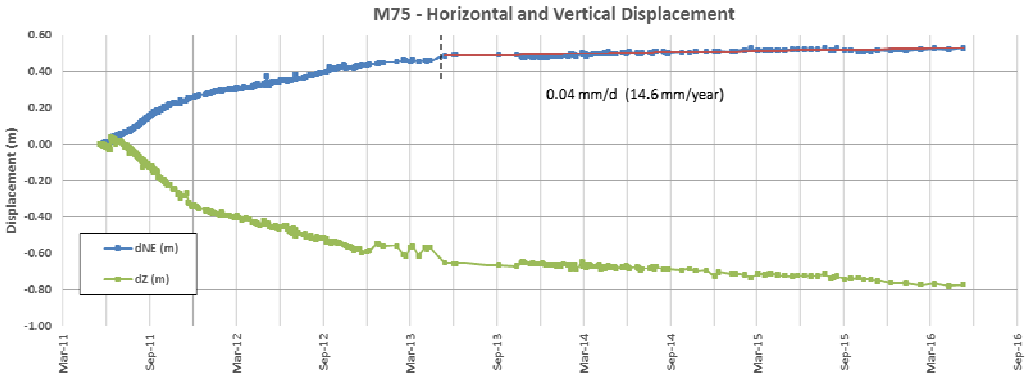
Main Pit Instrumentation Data

Survey Hub – M74

Date:	Prepared by	Figure:
August 2016	PHM	4







Notes

1. *Hub is to be replaced by M86.*

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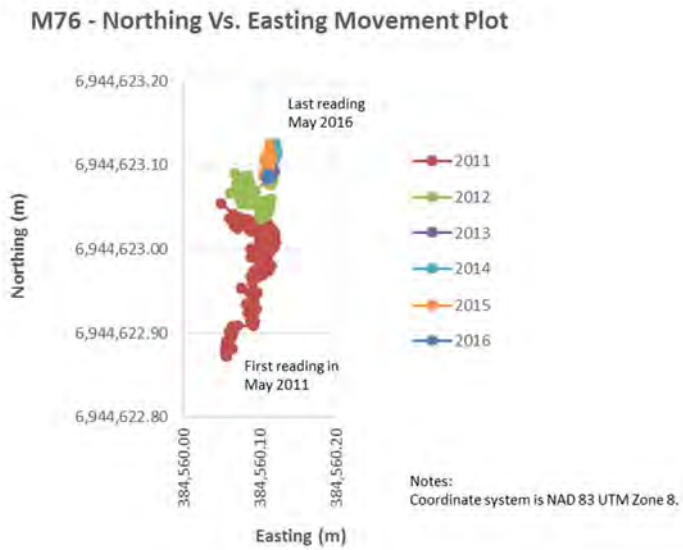
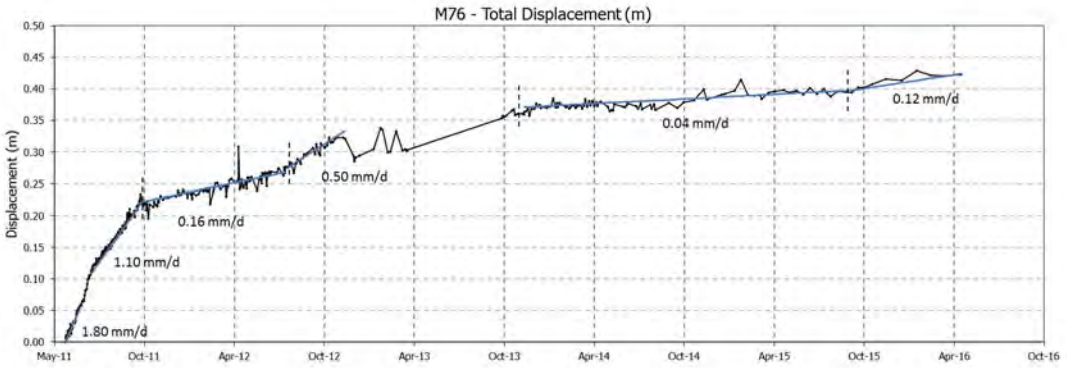
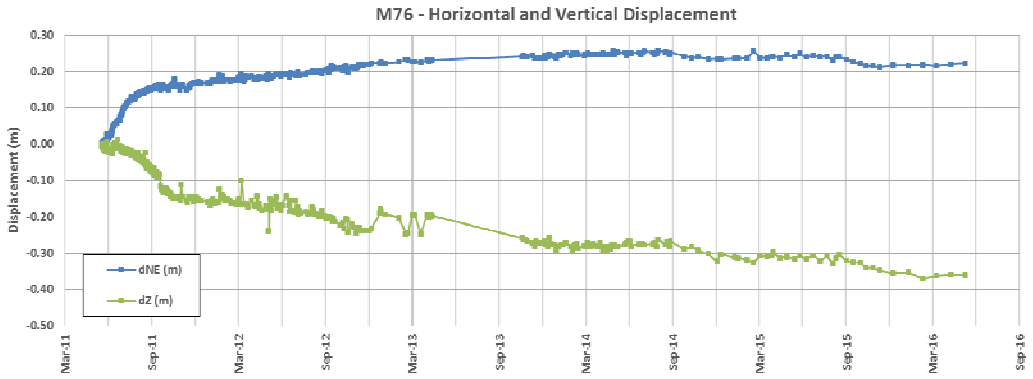
Main Pit Instrumentation Data

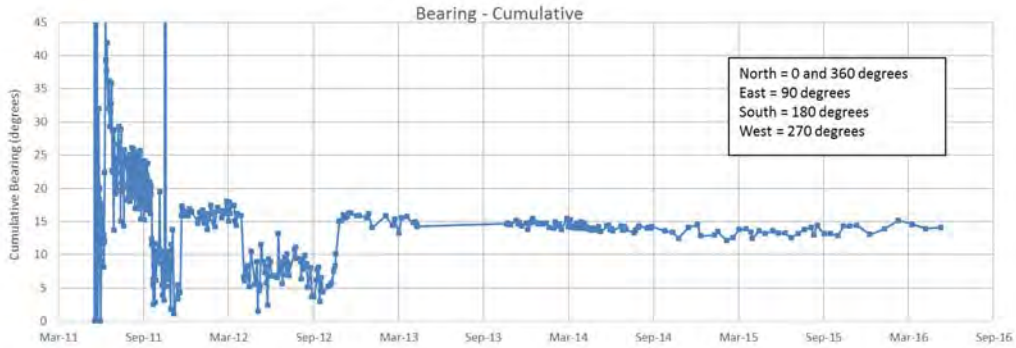
Survey Hub – M75

Date:	Prepared by	Figure:
August 2016	PHM	5









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Main Pit Instrumentation Data

Survey Hub – M76

Job No: 1CM002.048

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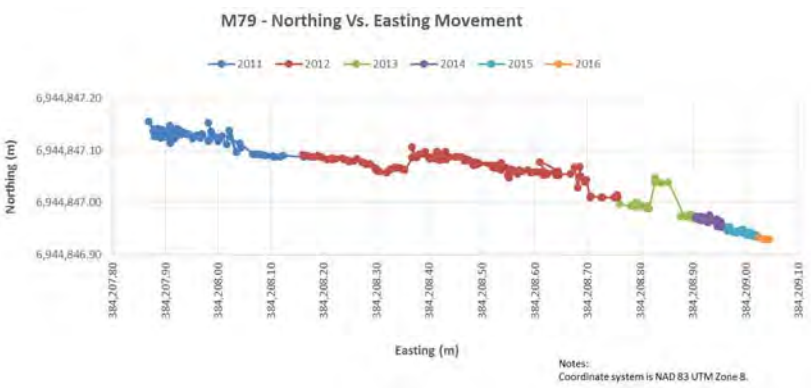
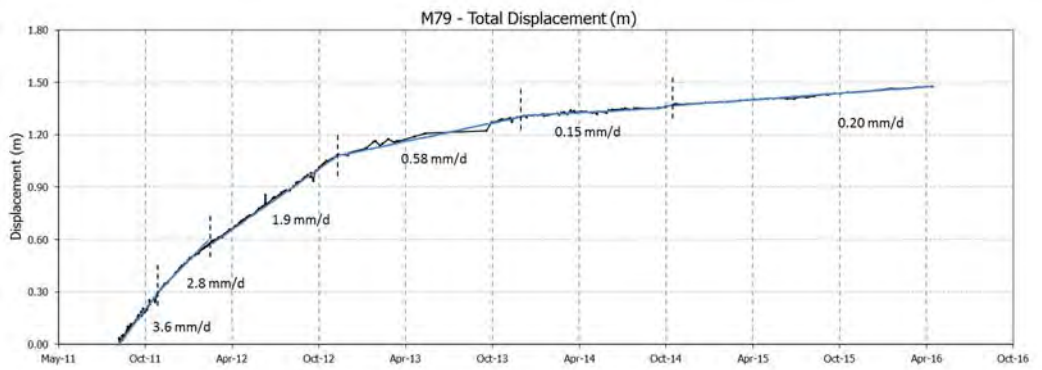
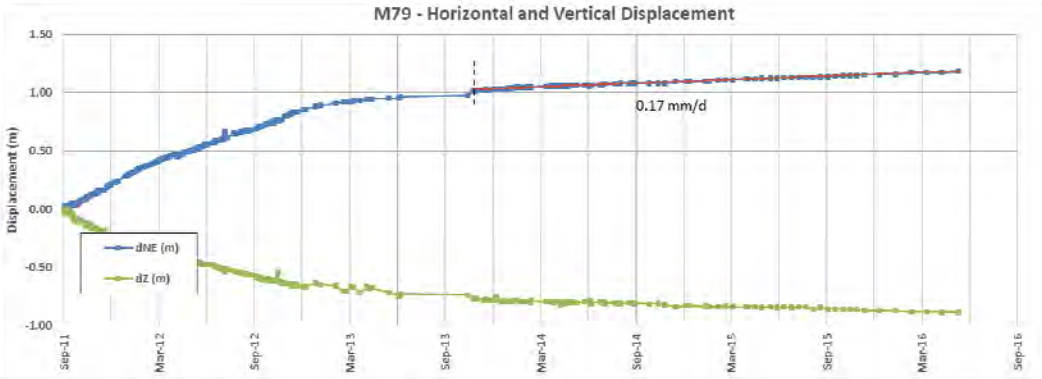
Date: August 2016

Prepared by PHM

Figure: **6**







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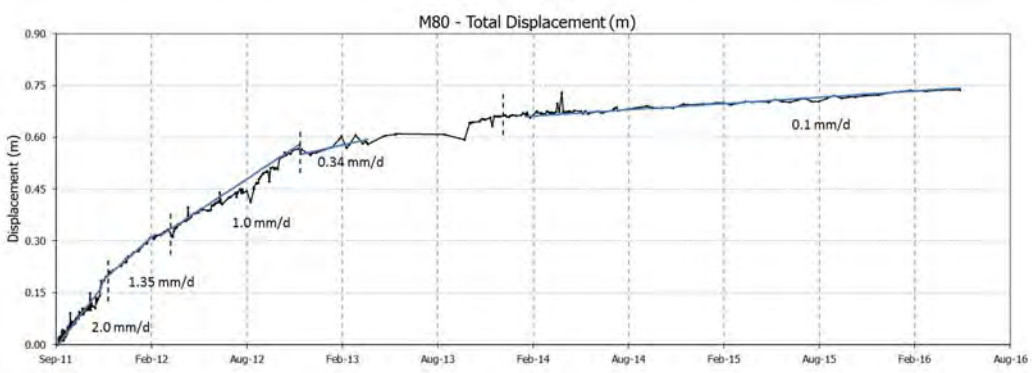
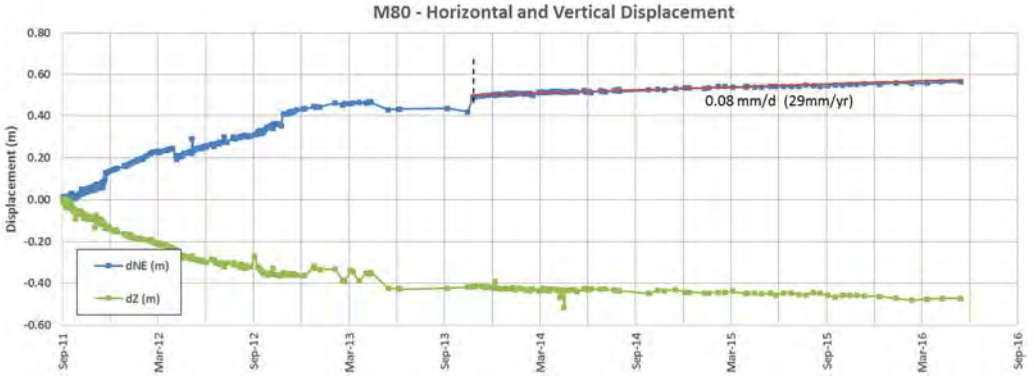
Main Pit Instrumentation Data

Survey Hub – M79

Date:	Prepared by	Figure:
August 2016	PHM	7





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2. Excel instrumentation data: \\VAN-SVR0\Projects\01_SITES\Minto\!020_Site_Wide_Data\Geotechnical\Geotech Monitoring Data\Minto Main Prism Monitoring_pm2016GeotechInspection.xlsm

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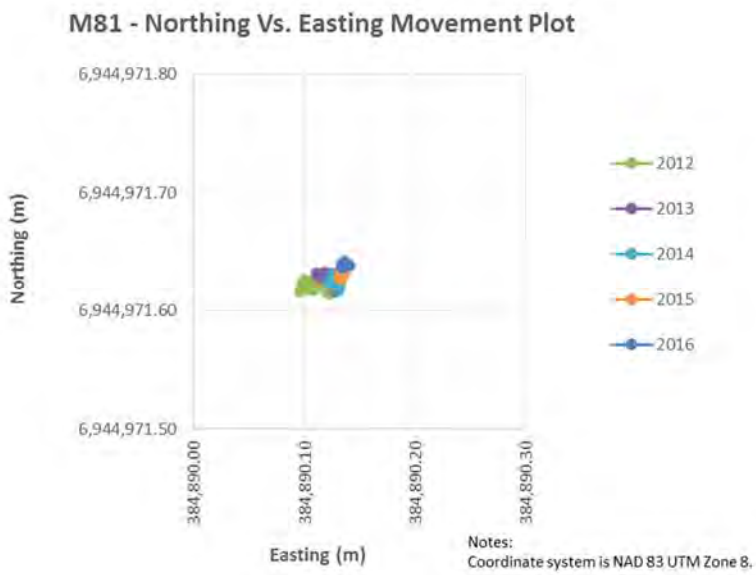
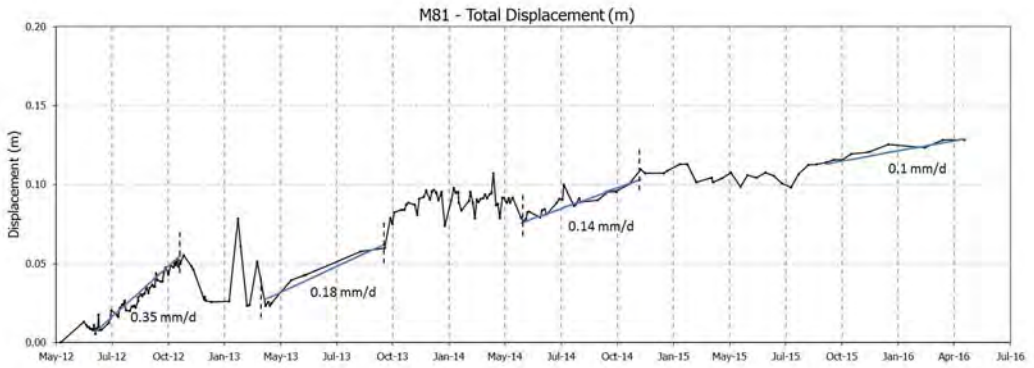
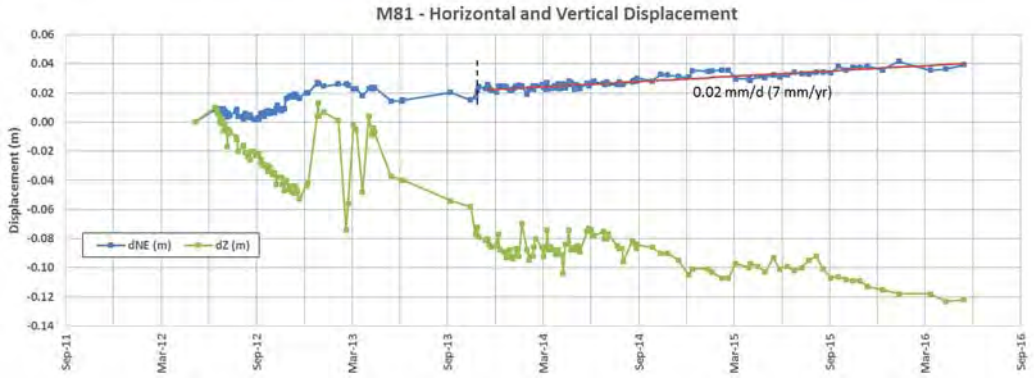
Main Pit Instrumentation Data

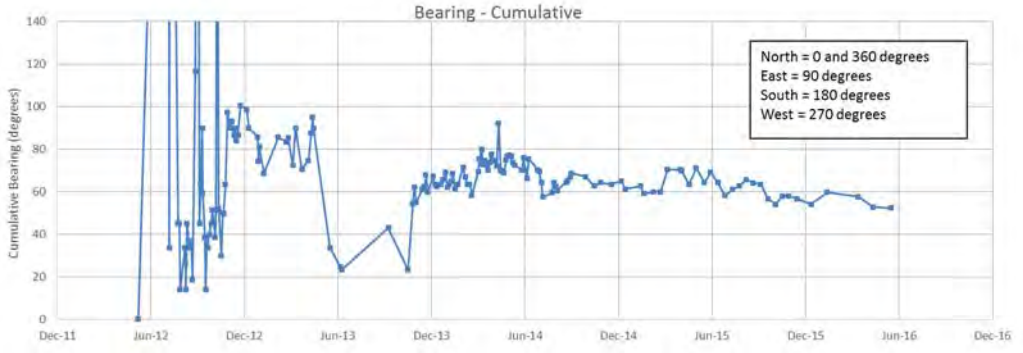
Survey Hub – M80

Date:	Prepared by	Figure:
August 2016	PHM	**8**









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Main Pit Instrumentation Data

Survey Hub – M81

Job No: 1CM002.048

Filename: ApG_MainPitInstrumentation.pptx

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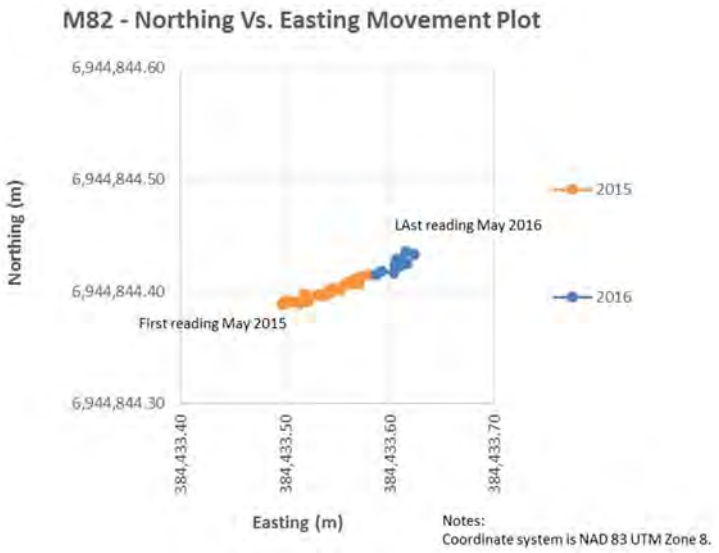
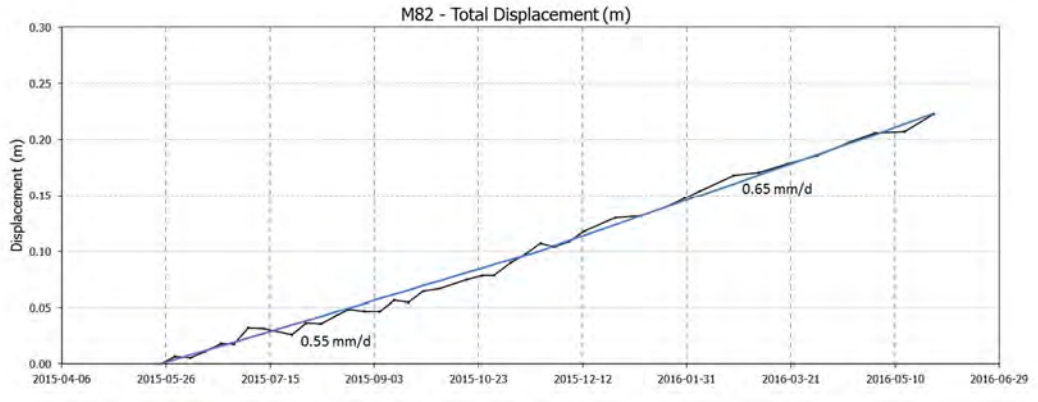
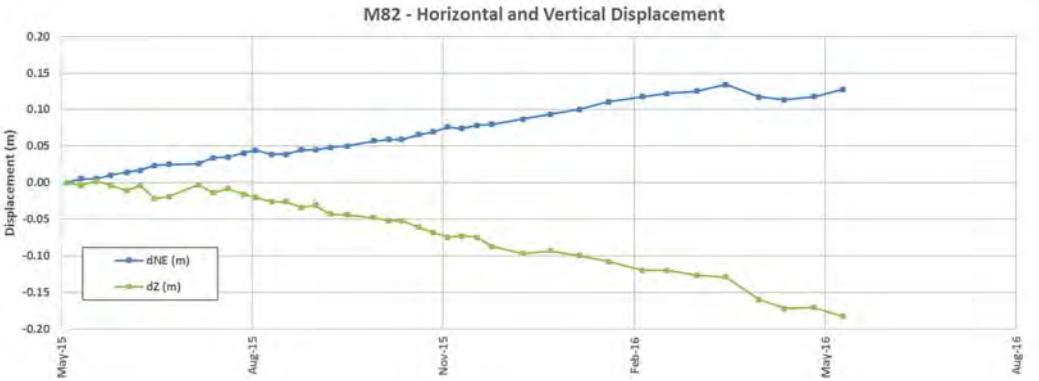
Date: August 2016

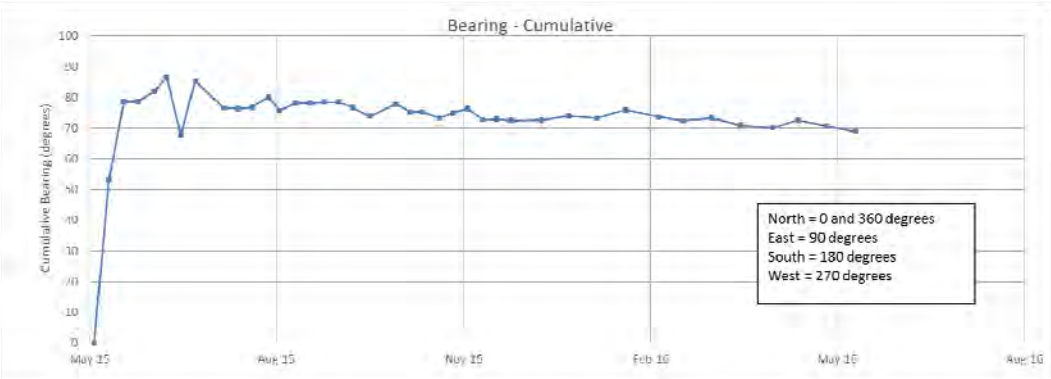
Prepared by: PHM

Figure: **9**









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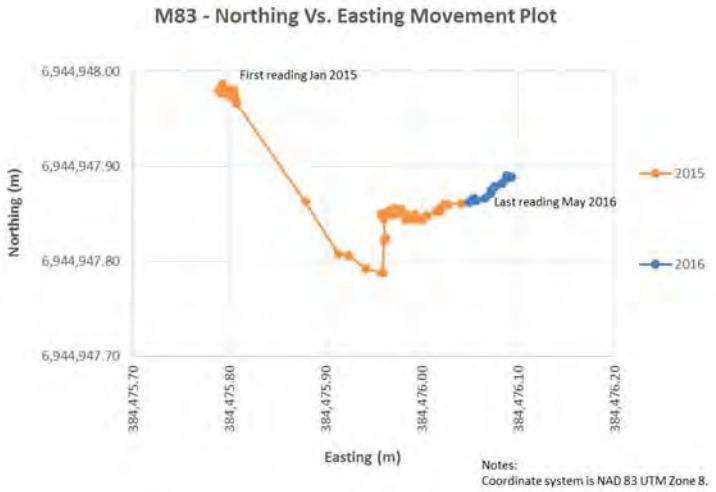
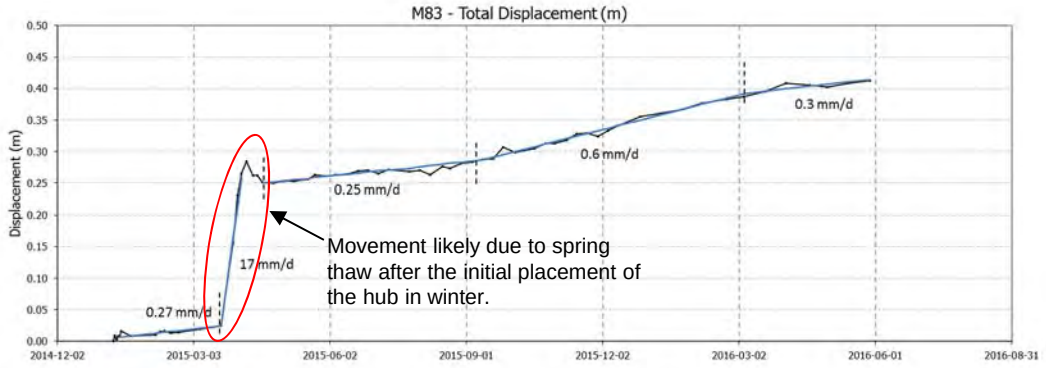
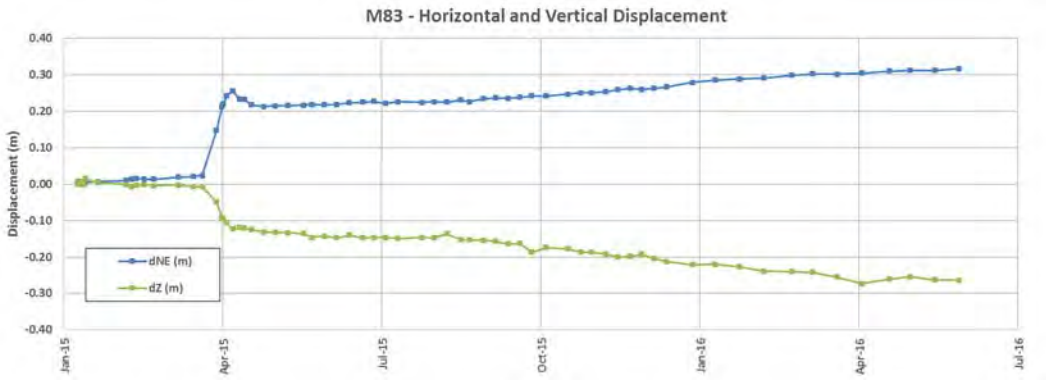
Main Pit Instrumentation Data

Survey Hub – M82

Date:	Prepared by	Figure:
August 2016	PHM	10







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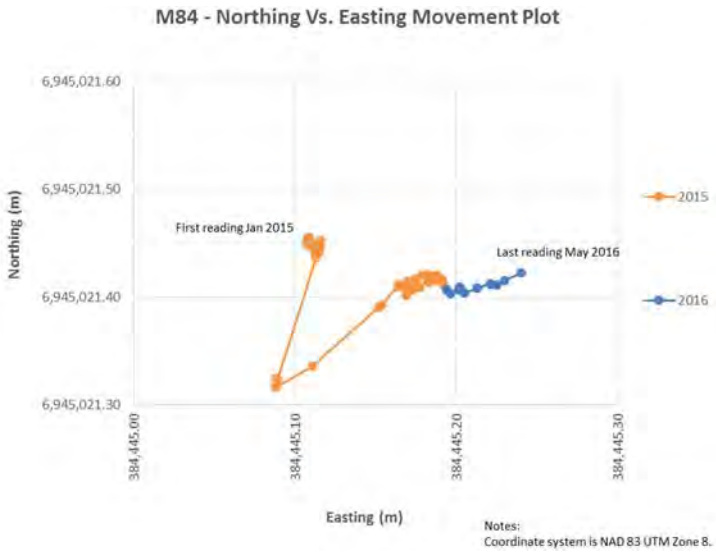
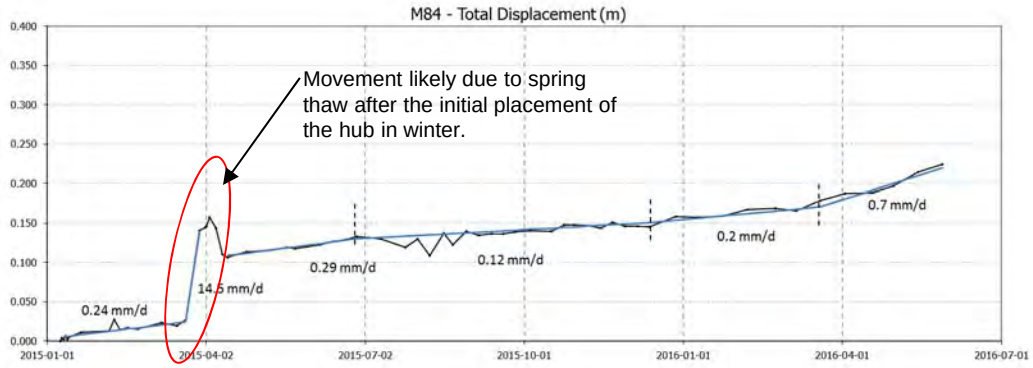
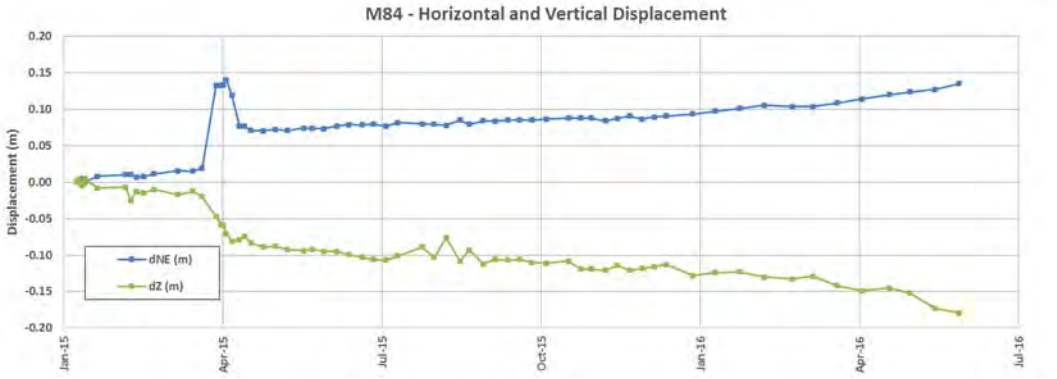
Main Pit Instrumentation Data

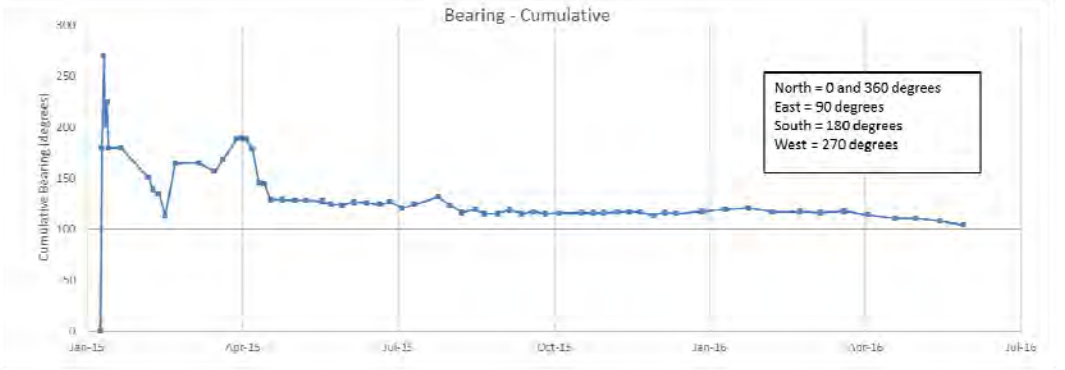
Survey Hub – M83

Date:	Prepared by	Figure:
August 2016	PHM	11









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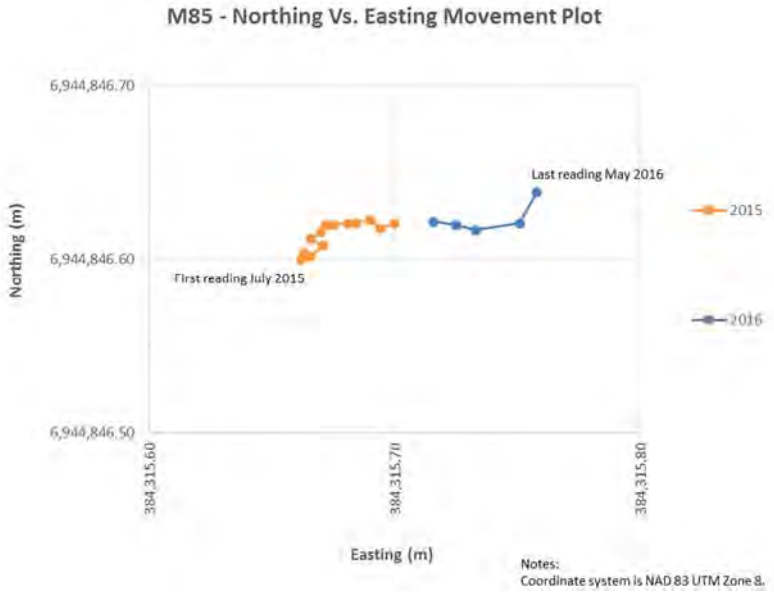
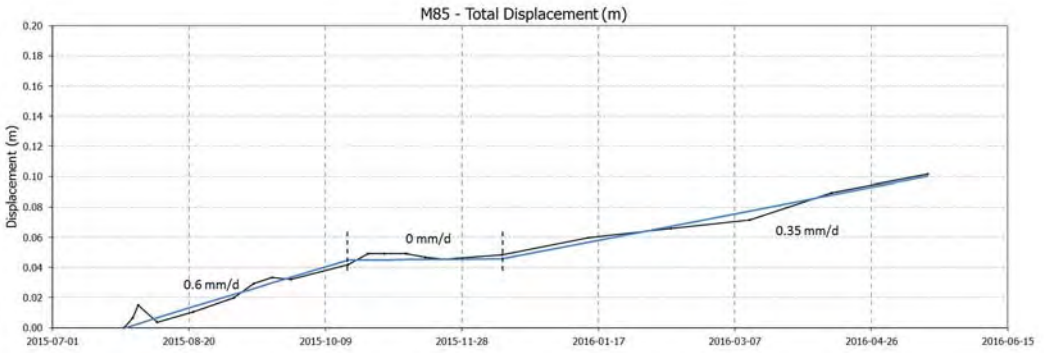
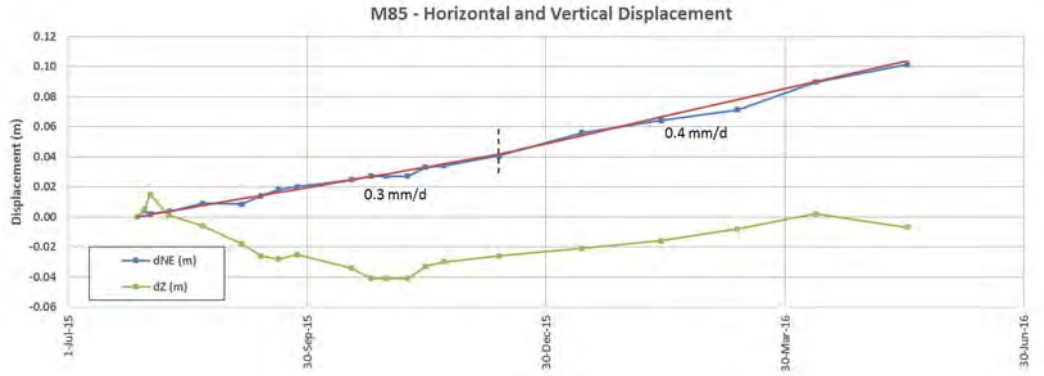
Main Pit Instrumentation Data

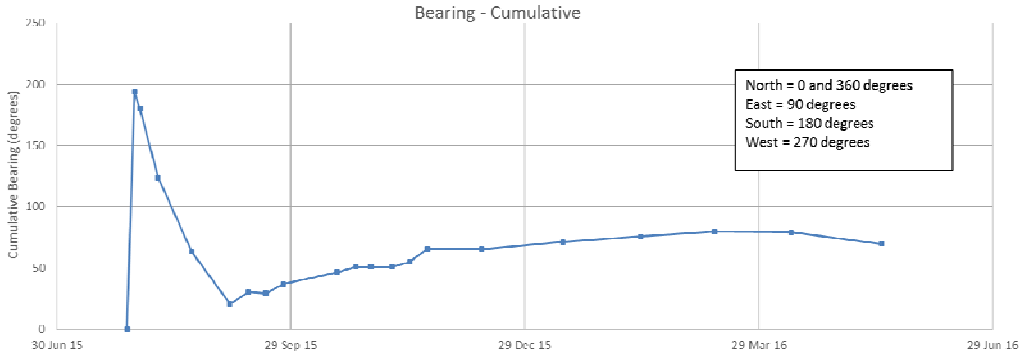
Survey Hub – M84

Date:	Prepared by	Figure:
August 2016	PHM	12









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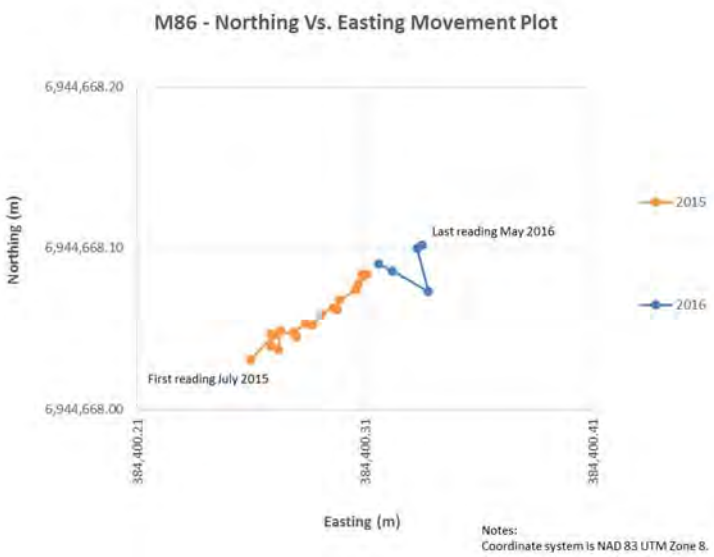
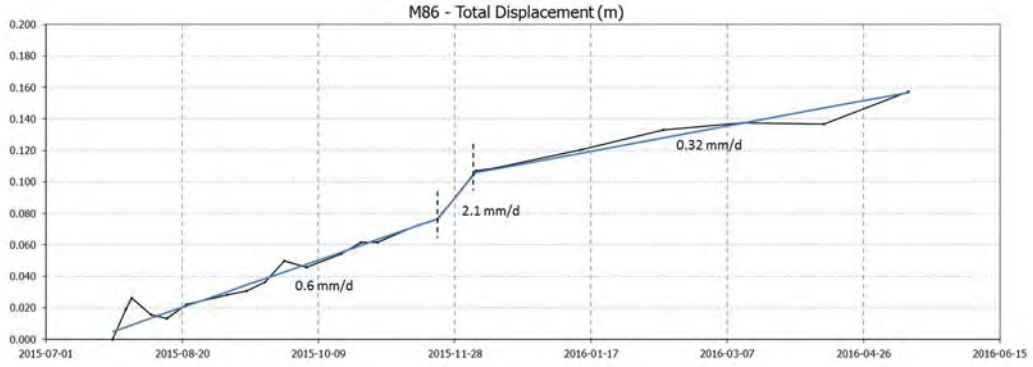
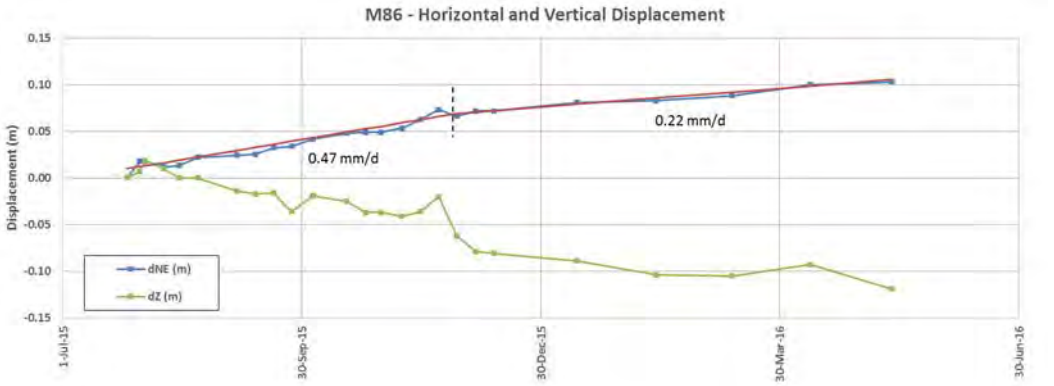
Main Pit Instrumentation Data

Survey Hub – M85

Date:	Prepared by	Figure:
August 2016	PHM	13

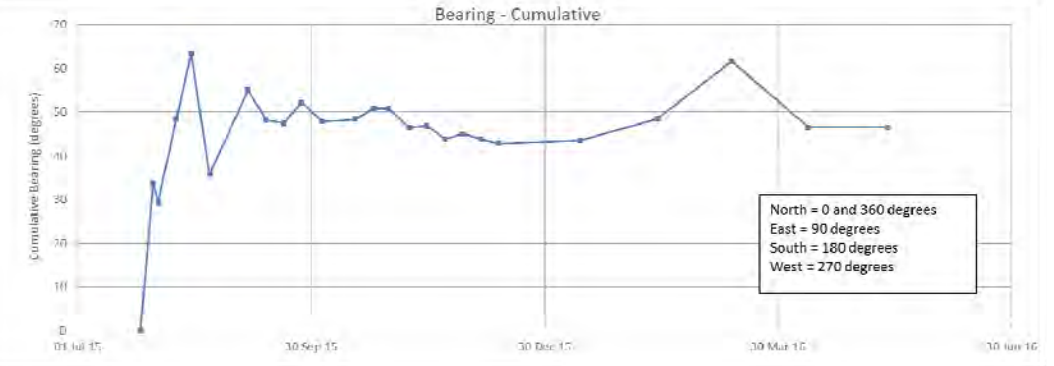






Notes

1. Hub is a replacement of M75.



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Job No: 1CM002.048

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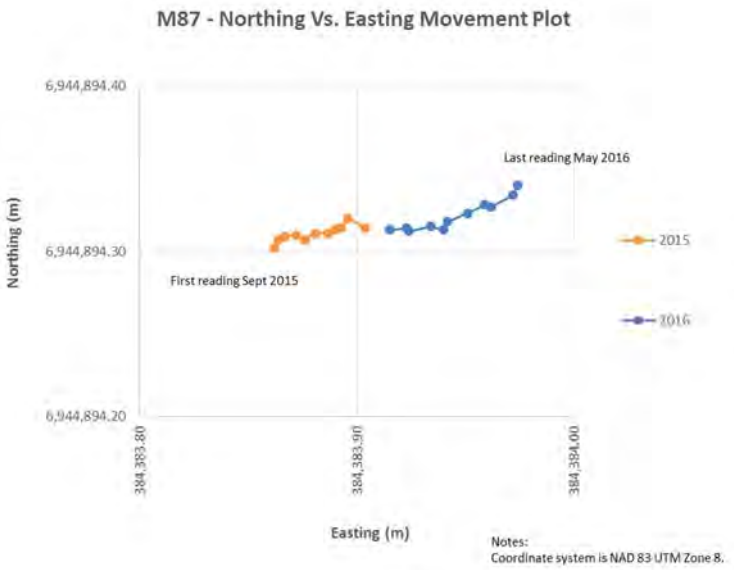
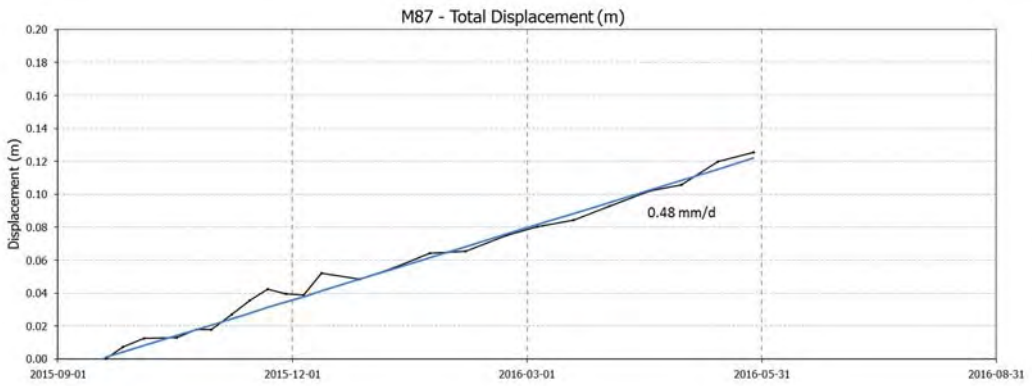
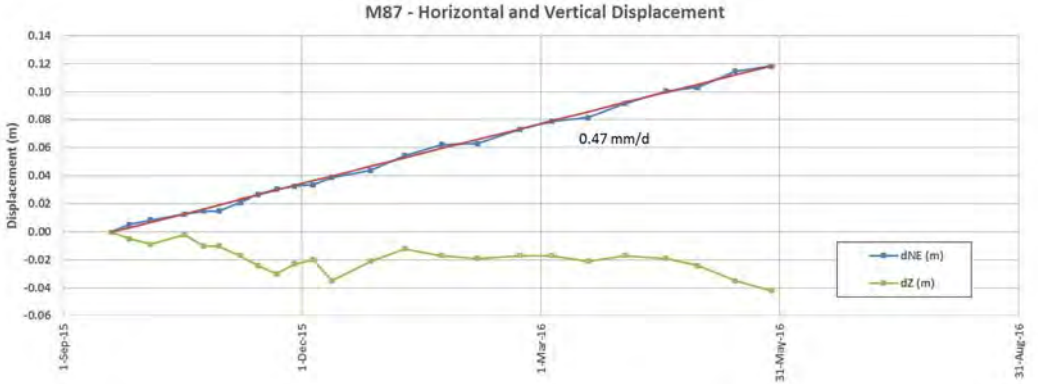
Main Pit Instrumentation Data

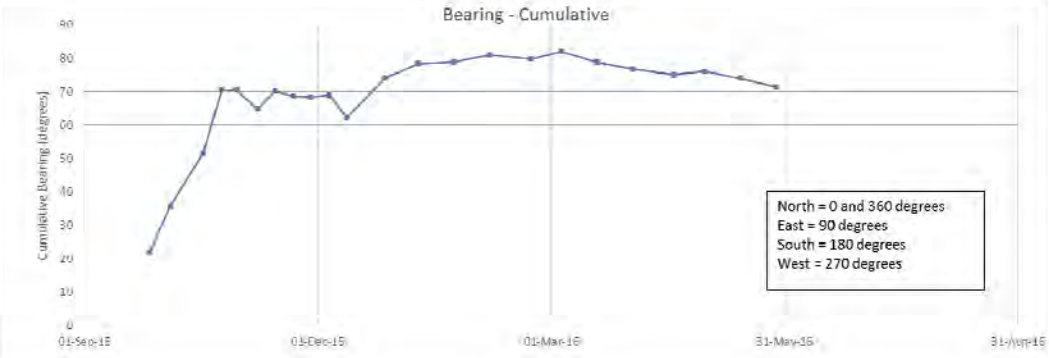
Survey Hub– M86

Date:	Prepared by	Figure:
August 2016	PHM	**14**









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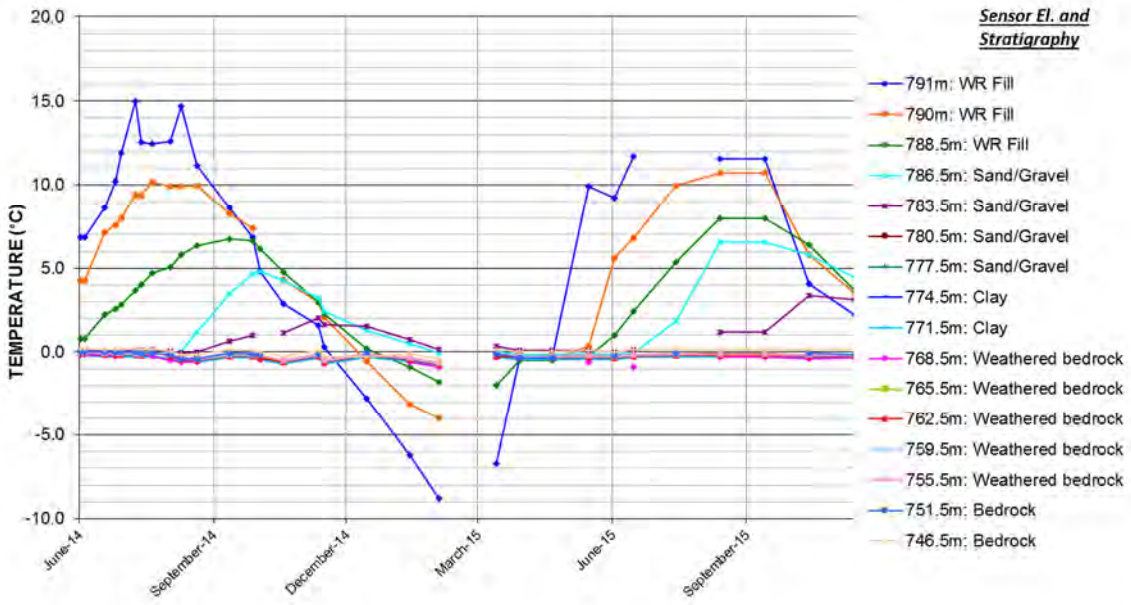
Job No: 1CM002.048
Filename: ApG_MainPitInstrumentation.pptx

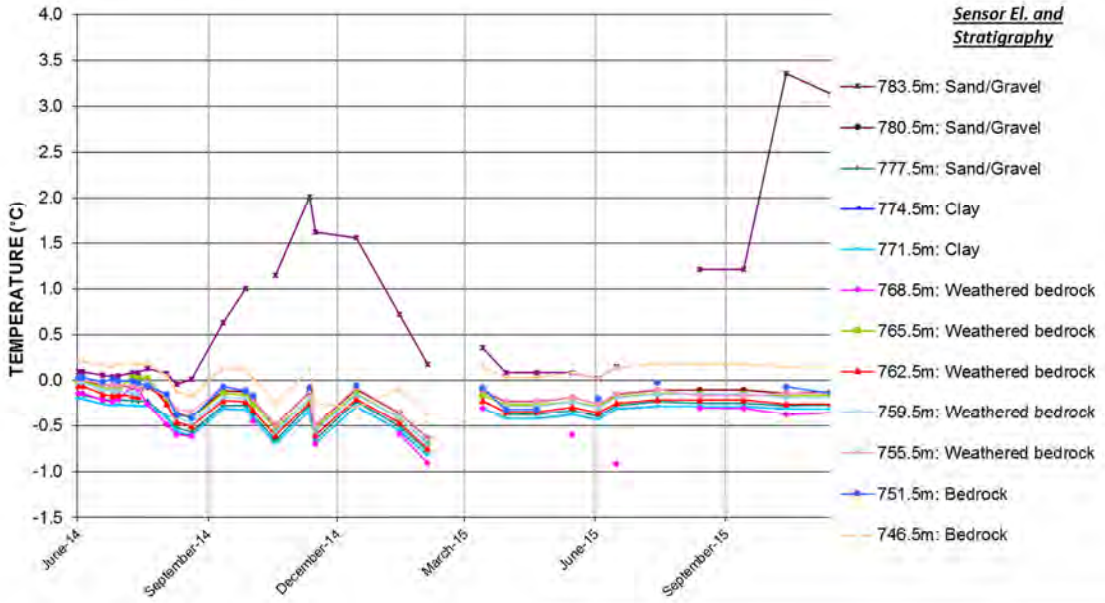
Minto Mine

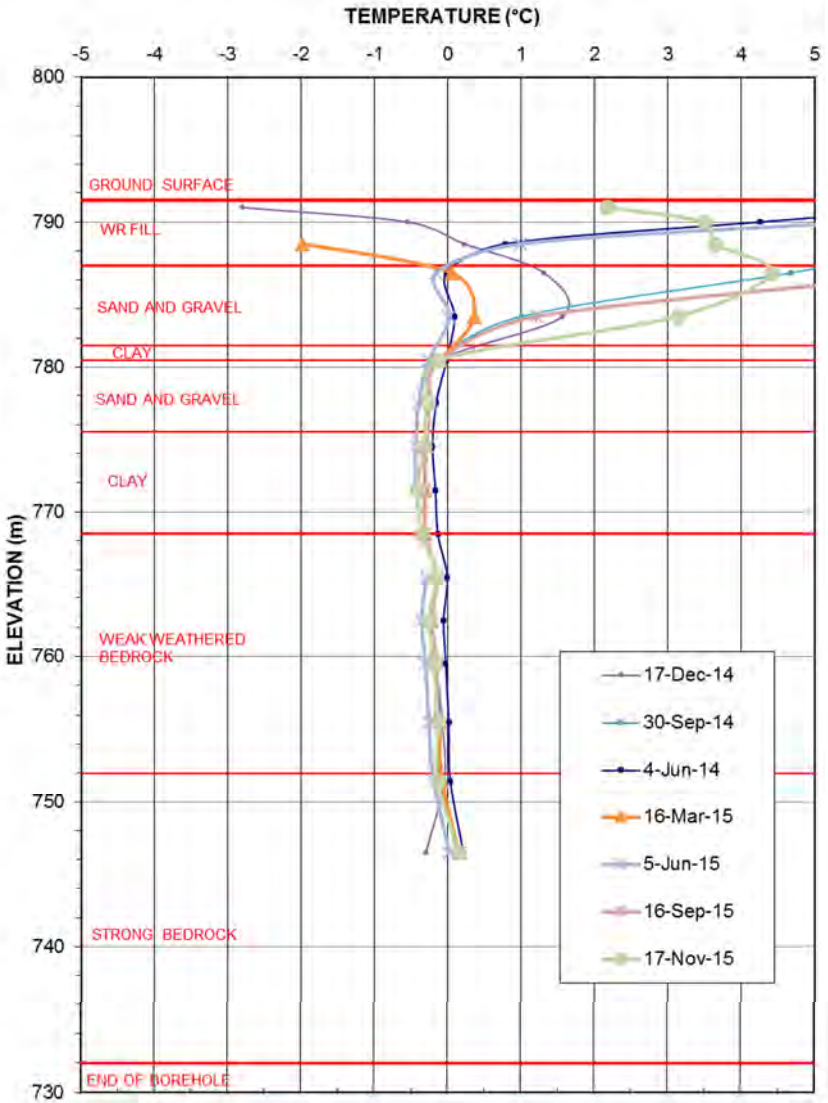
Main Pit Instrumentation Data

Survey Hub – M87

Date:	Prepared by	Figure:
August 2016	PHM	**15**







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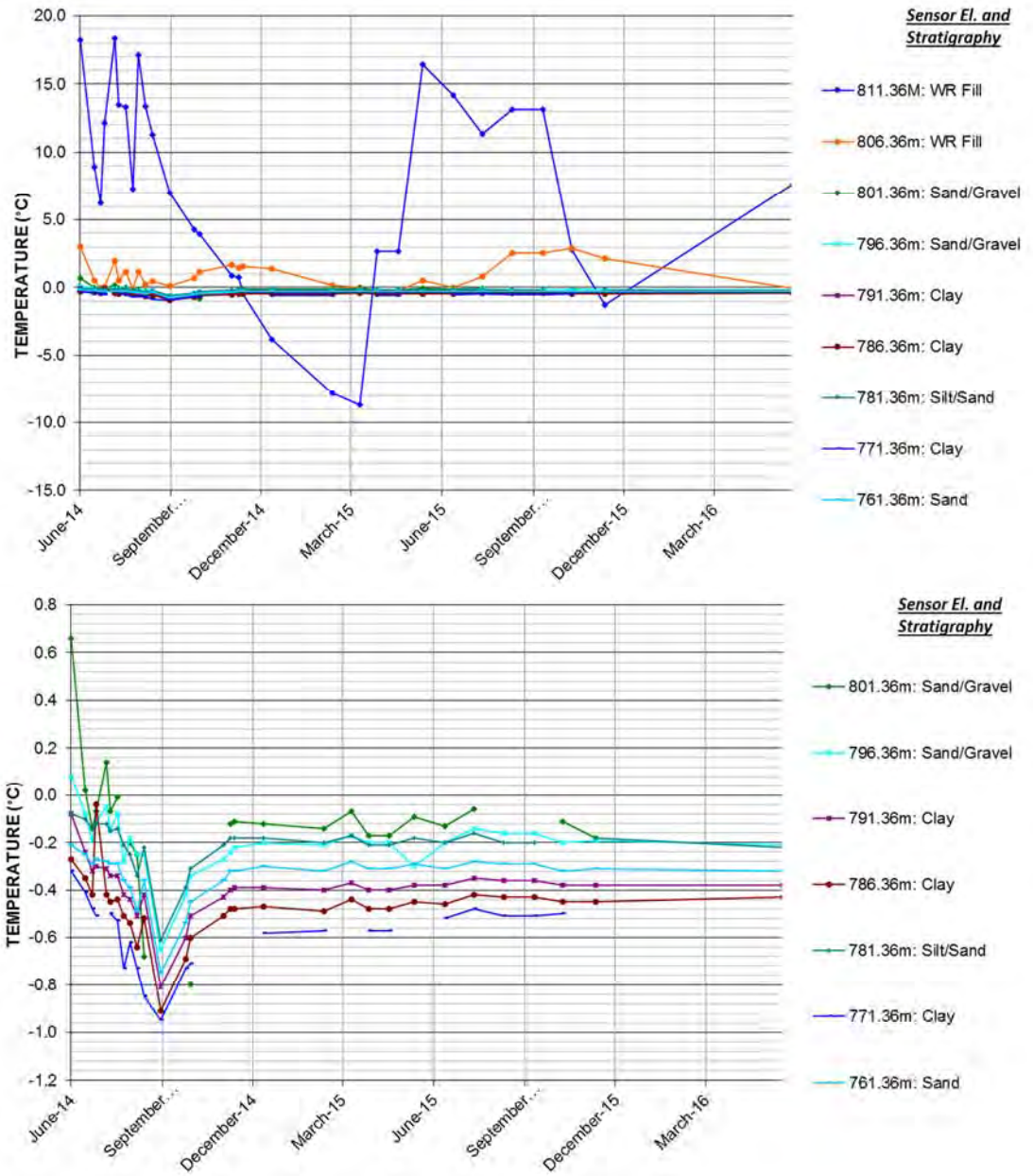
Main Pit Instrumentation Data

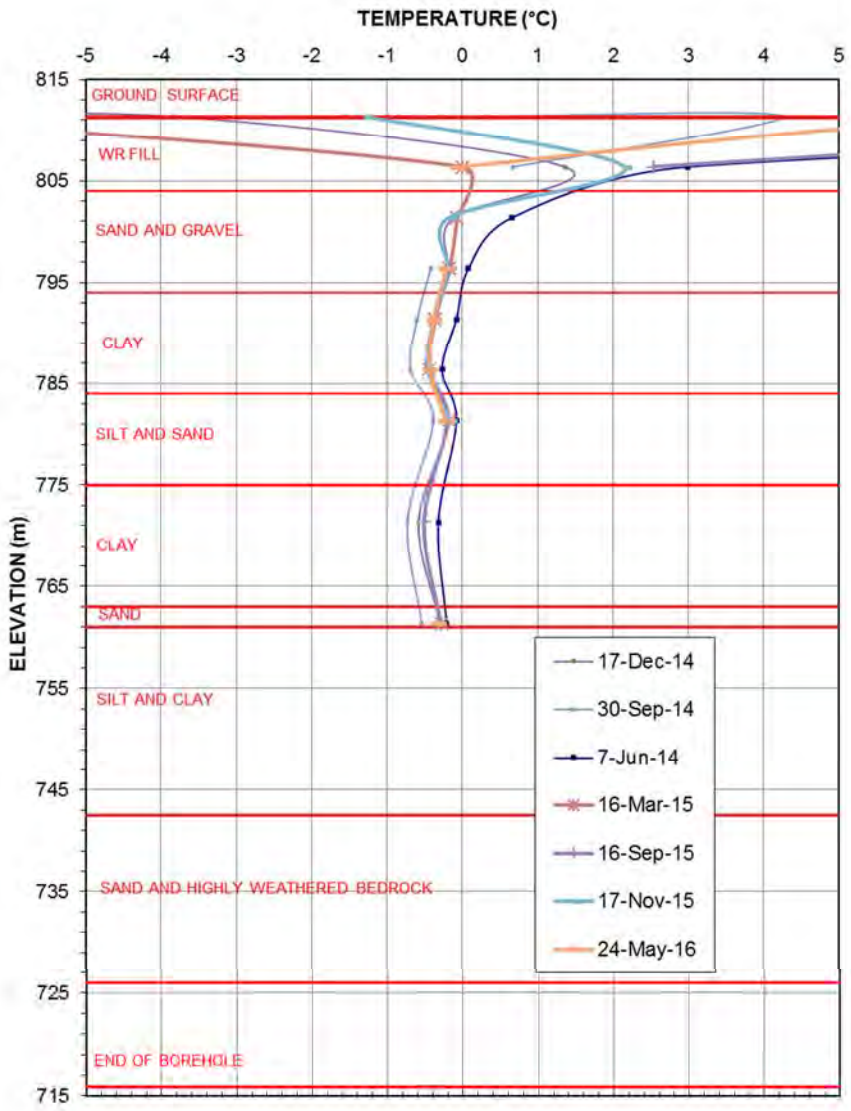
Temperature Cable – MPDT-1

Job No: 1CM002.048
Filename: ApG_MainPitInstrumentation.pptx

Minto Mine

Date: August 2016
Prepared by: PHM
Figure: **16**





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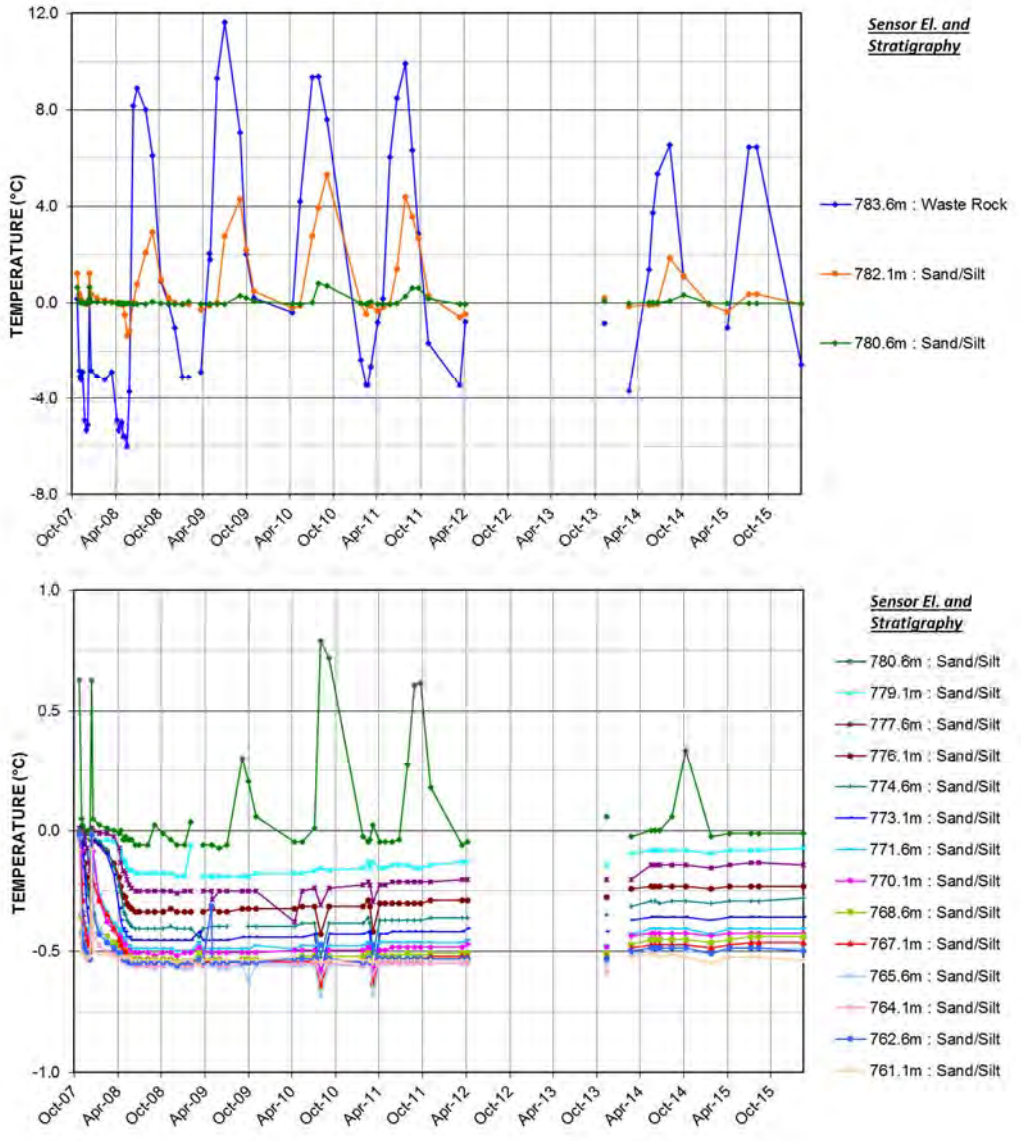
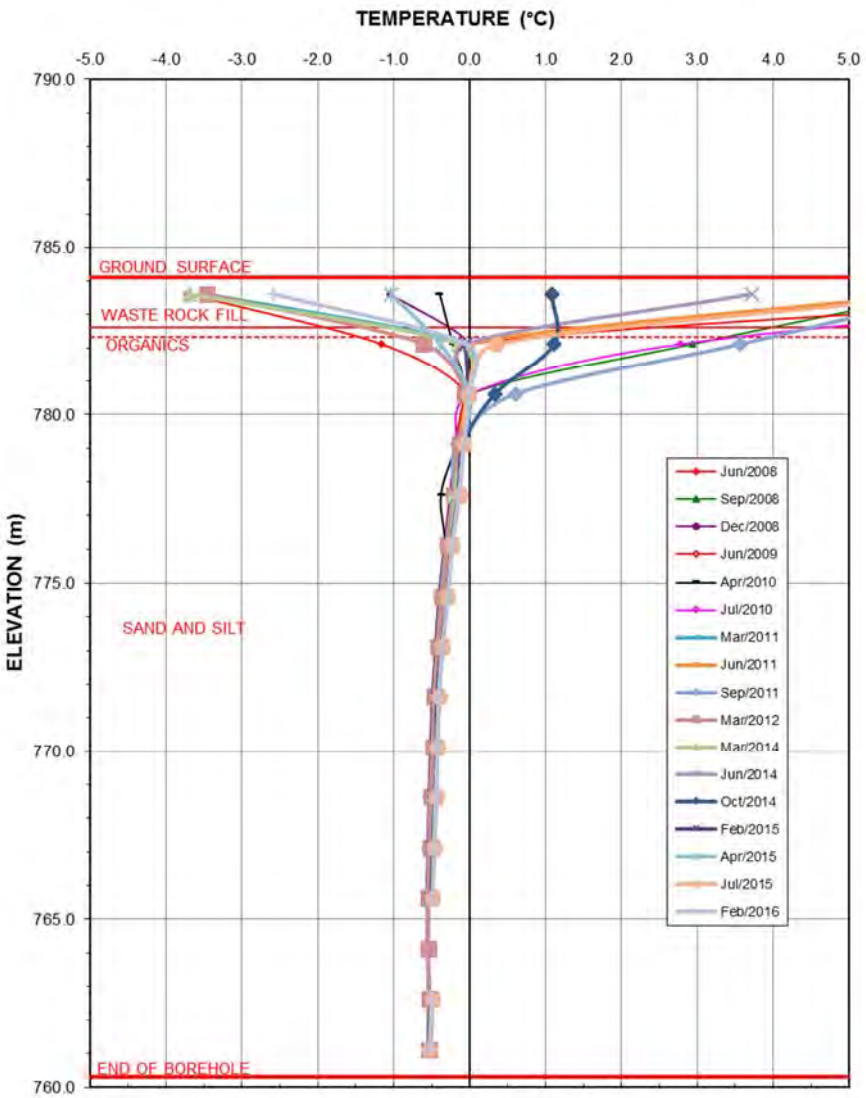
Main Pit Instrumentation Data

Temperature Cable – MPDT-2

Job No: 1CM002.048	Minto Mine	Date: August 2016	Prepared by PHM	Figure: 17
Filename: ApG_MainPitInstrumentation.pptx			

Appendix H: Mill Water Pond Instrumentation Data





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Mill Water Pond Instrumentation Data

Temperature Cable – MWPT-1

Job No: 1CM002.048

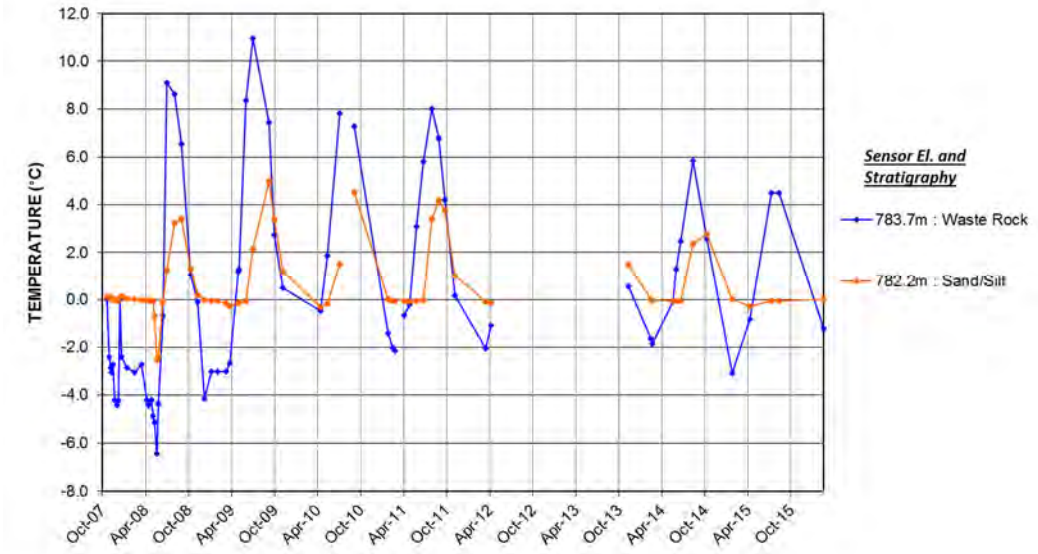
Filename: ApH_MillAreaThermistors.pptx

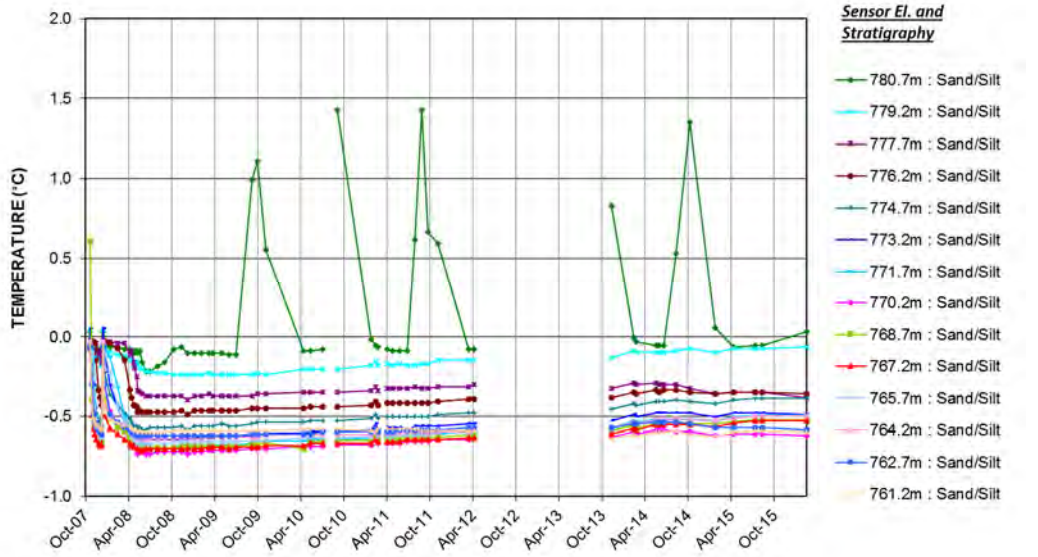
Minto Mine

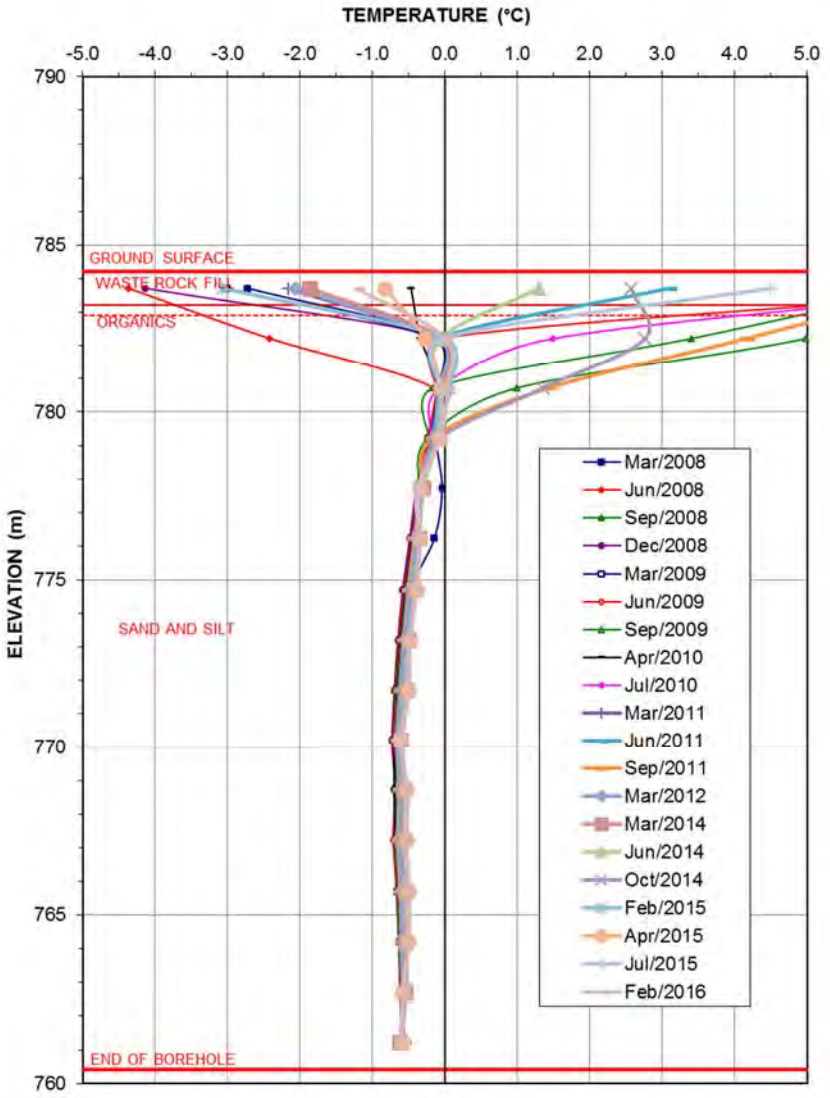
Date: August 2016

Prepared by: PHM

Figure: 1







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Mill Water Pond Instrumentation Data

Temperature Cable – MWPT-2

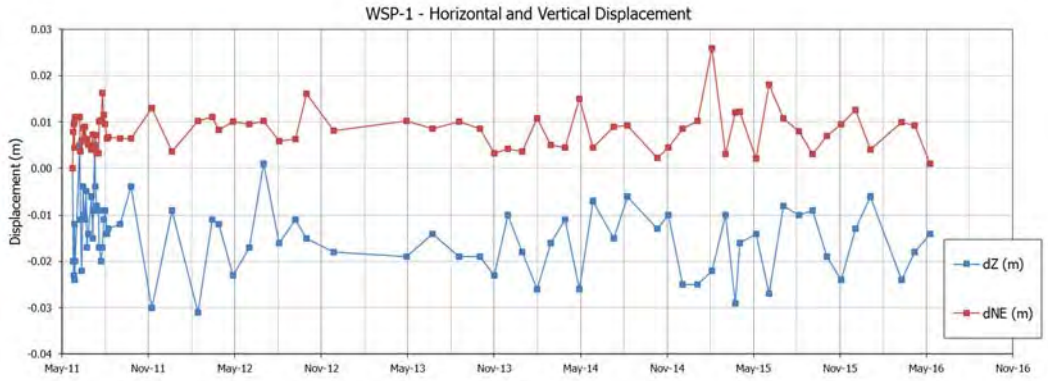
Job No: 1CM002.048

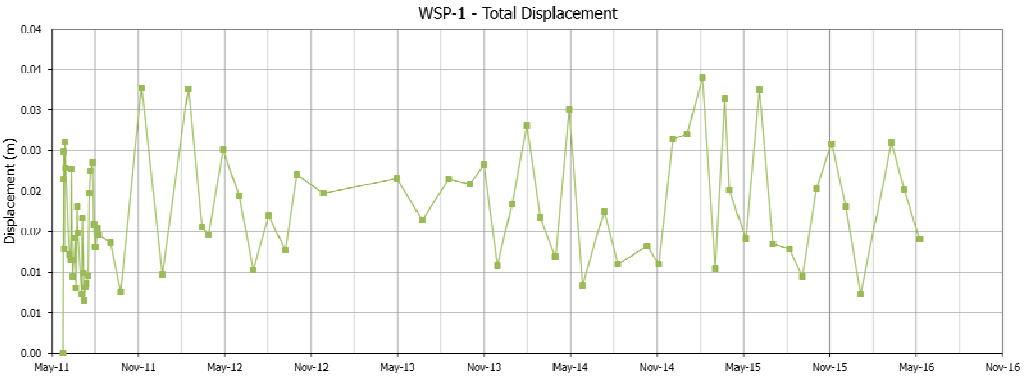
Filename: ApH_MillAreaThermistors.pptx

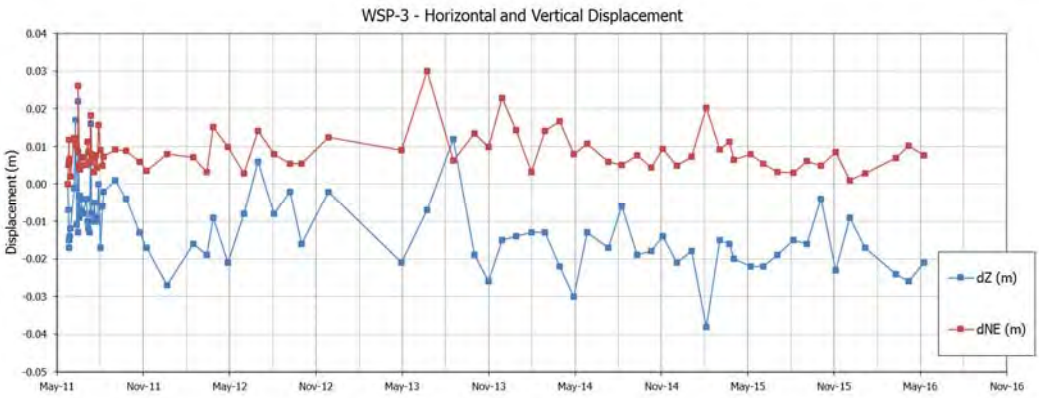
Minto Mine

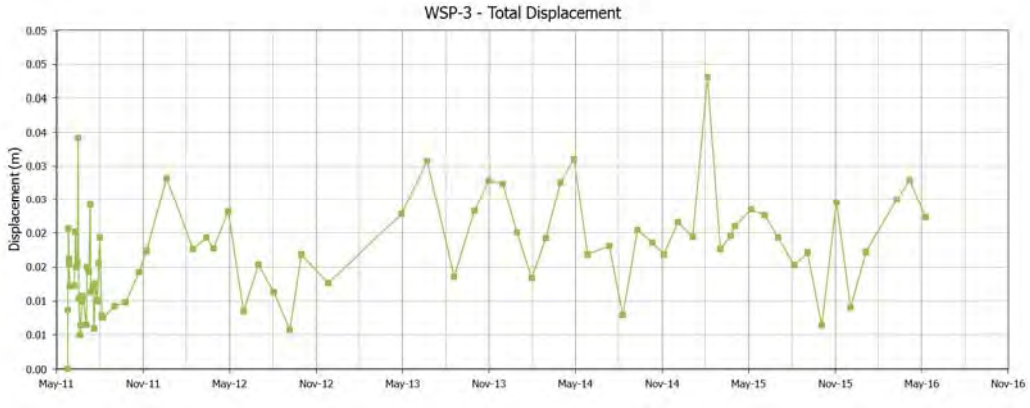
Date:	Prepared by	Figure:
August 2016	PHM	2

Appendix I: Water Storage Pond Instrumentation Data









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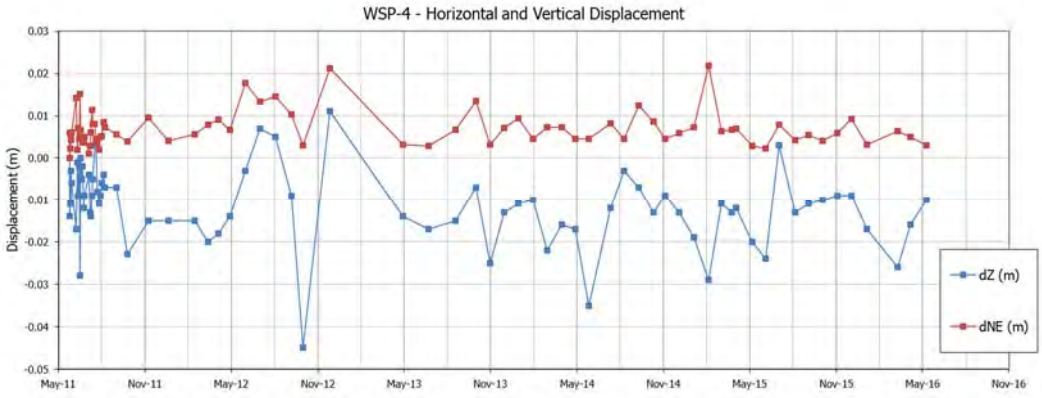
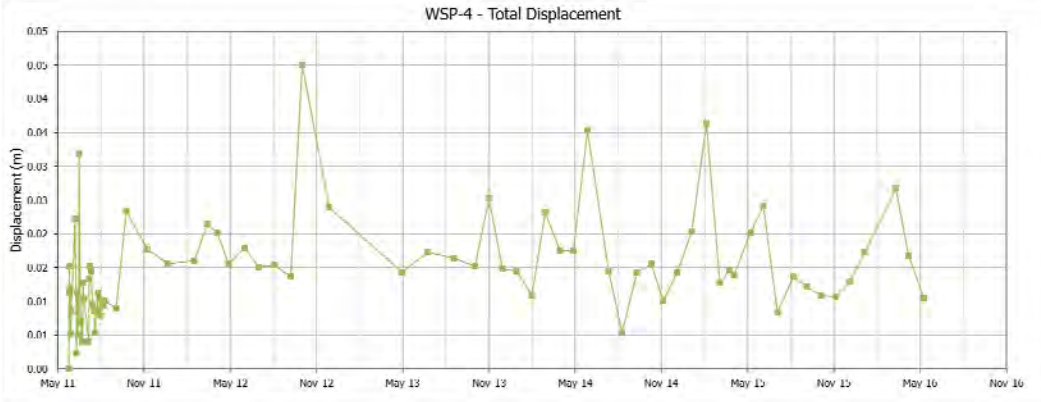
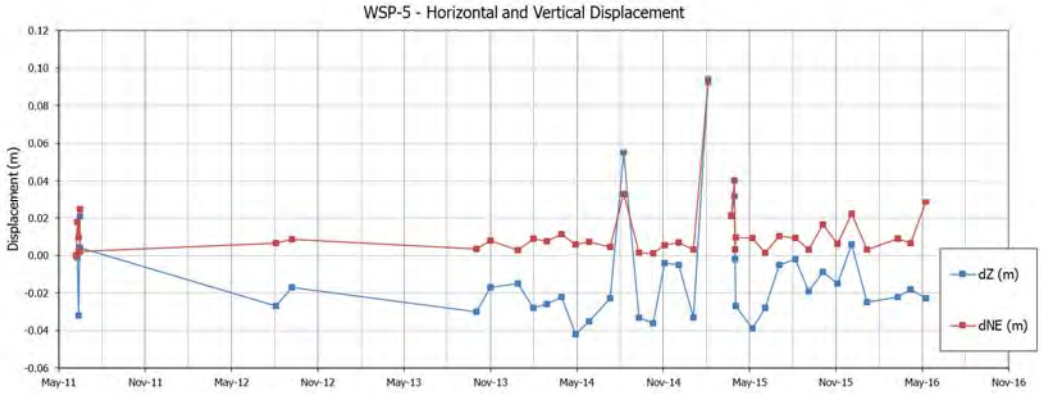
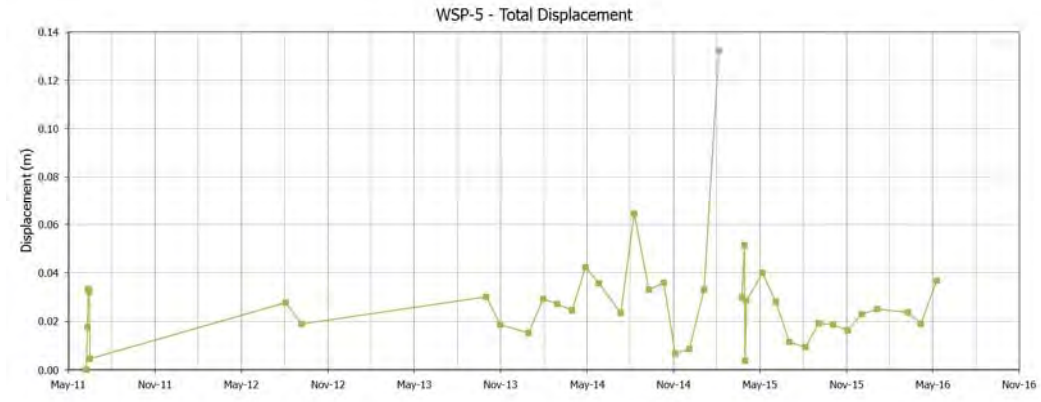
srk consulting	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	Water Storage Pond Data **Survey Hubs – WSP-1 and WSP-3**		
Job No: 1CM002.048 Filename: ApI_WaterStoragePondPort.pptx	Minto Mine	Date: August 2016	Prepared by: PHM	Figure: **1**









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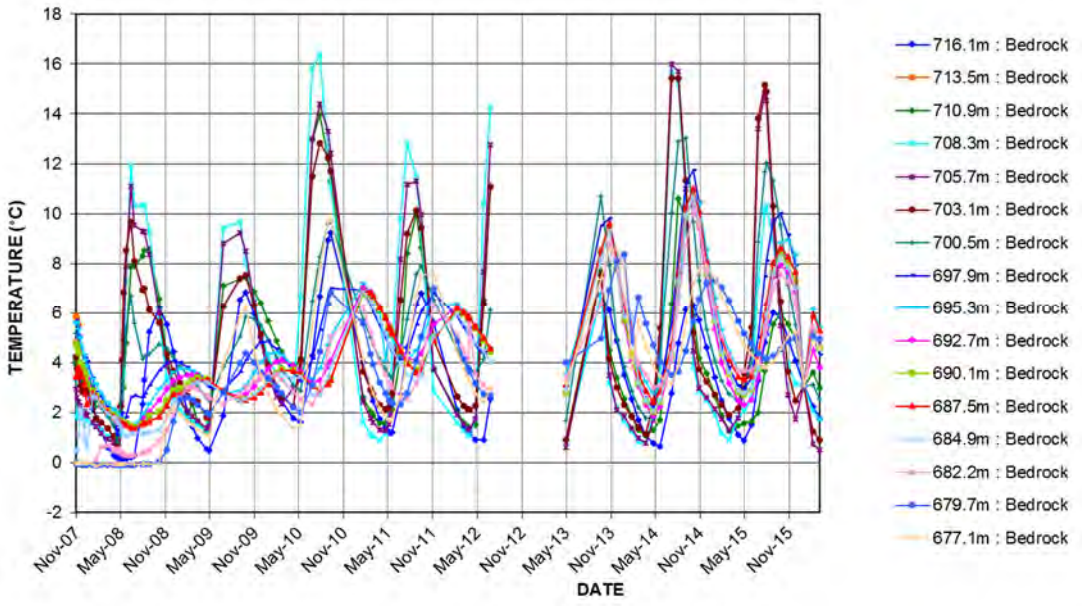
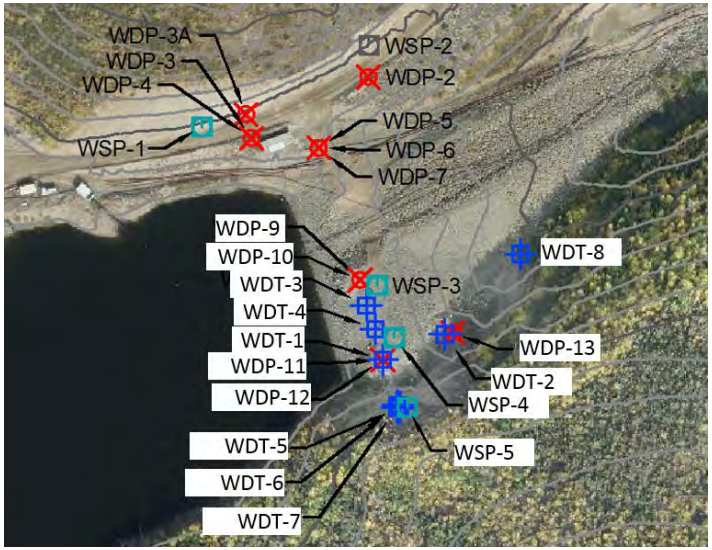
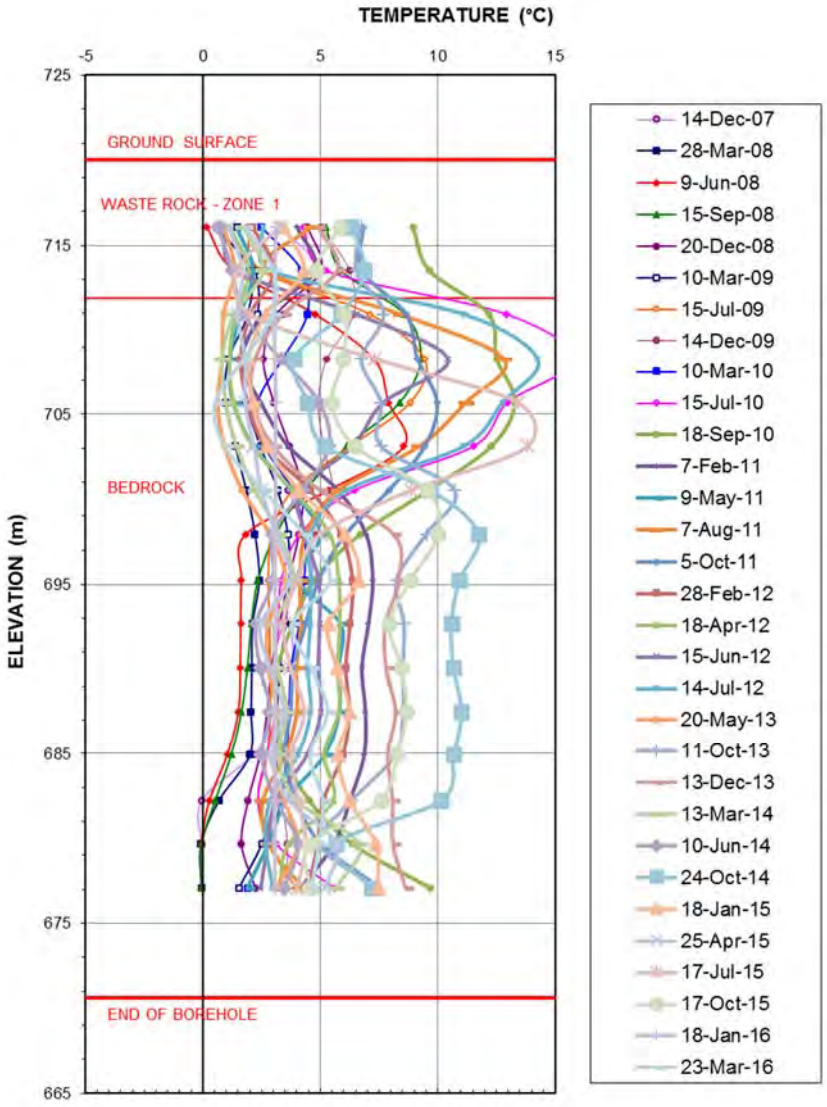
srk consulting	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	Water Storage Pond Data **Survey Hubs – WSP-4 and WSP-5**		
Job No: 1CM002.048 Filename: ApI_WaterStoragePondPort.pptx	Minto Mine	Date: August 2016	Prepared by: PHM	Figure: **2**







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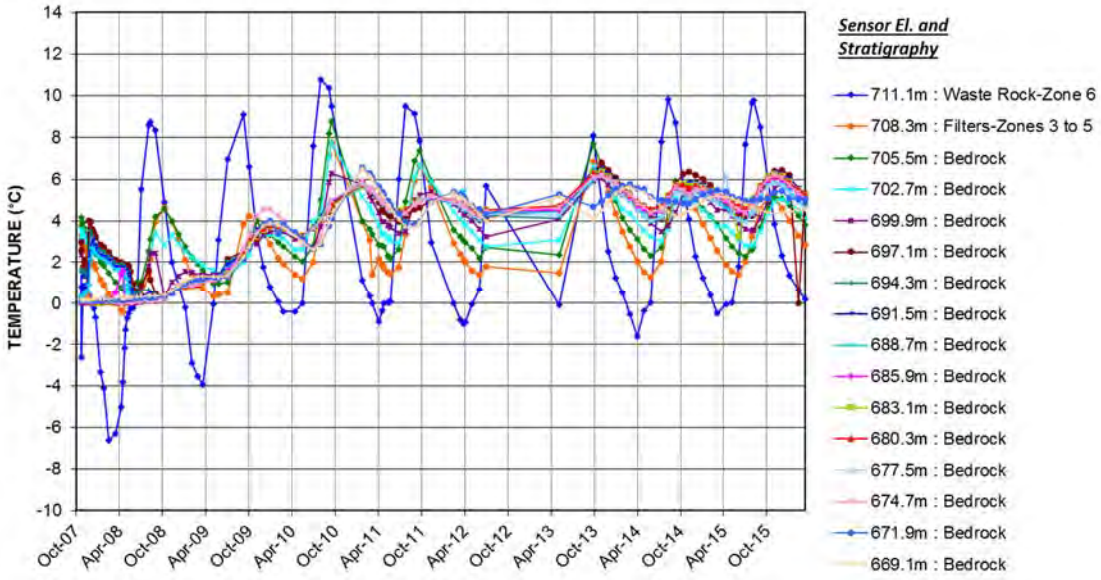
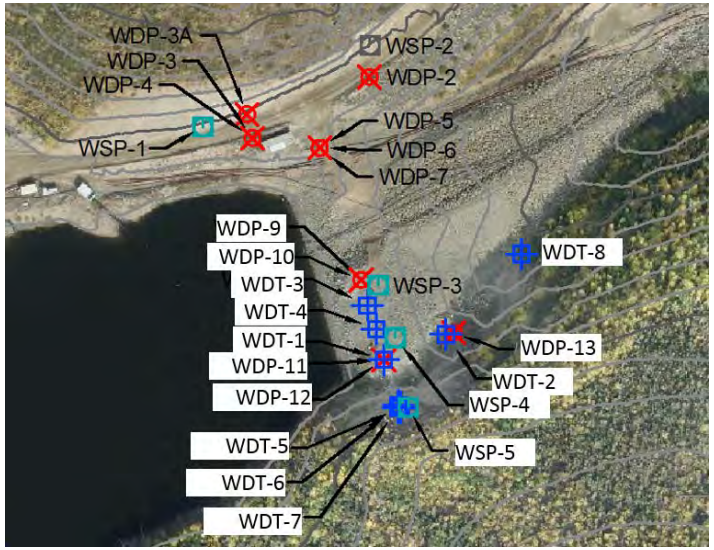
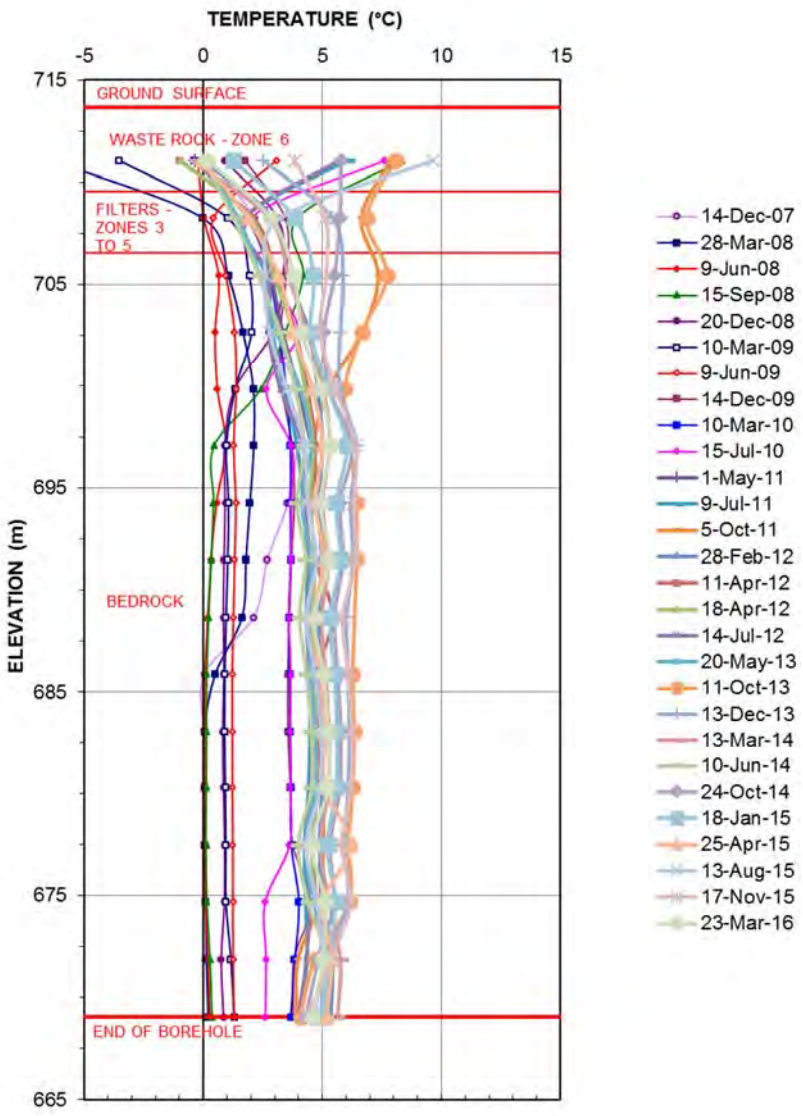
srk consulting	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	Water Storage Pond Data
		Temperature Cable – WDT-1
Job No: 1CM002.048 Filename: Apl_WaterStoragePond.pptx	Minto Mine	Date: August 2016 / Prepared by: PHM / Figure: **3**







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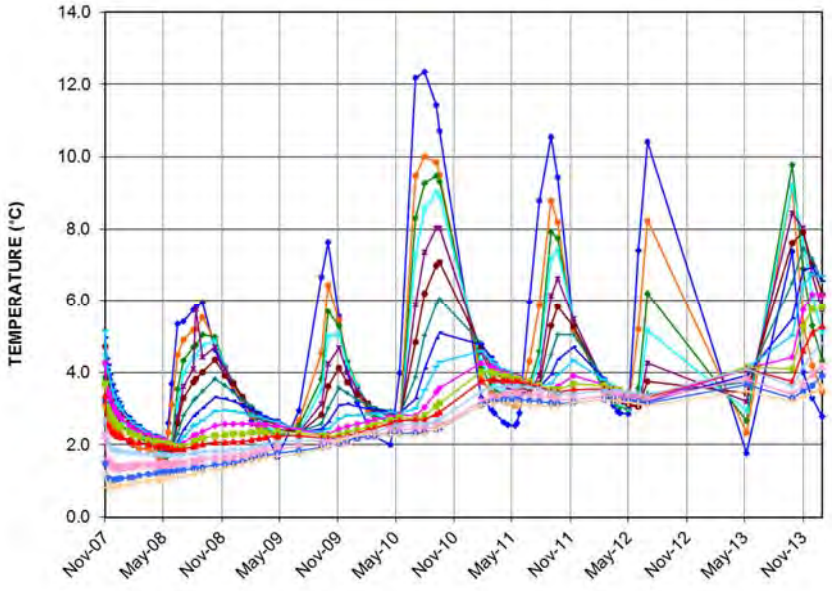
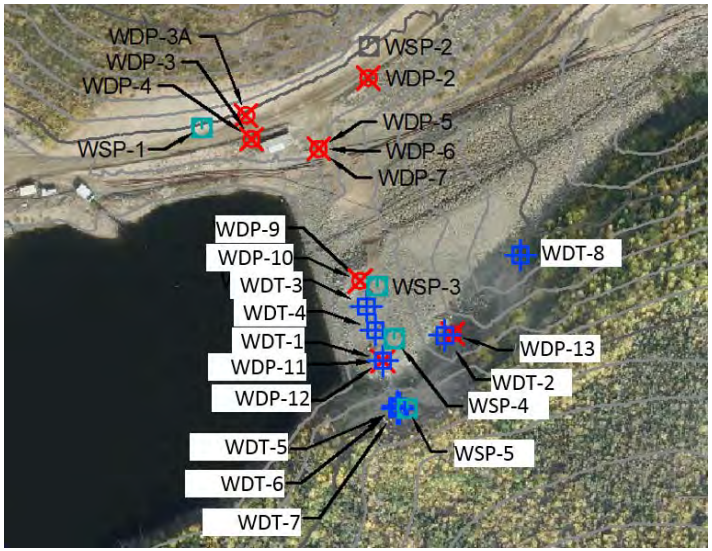
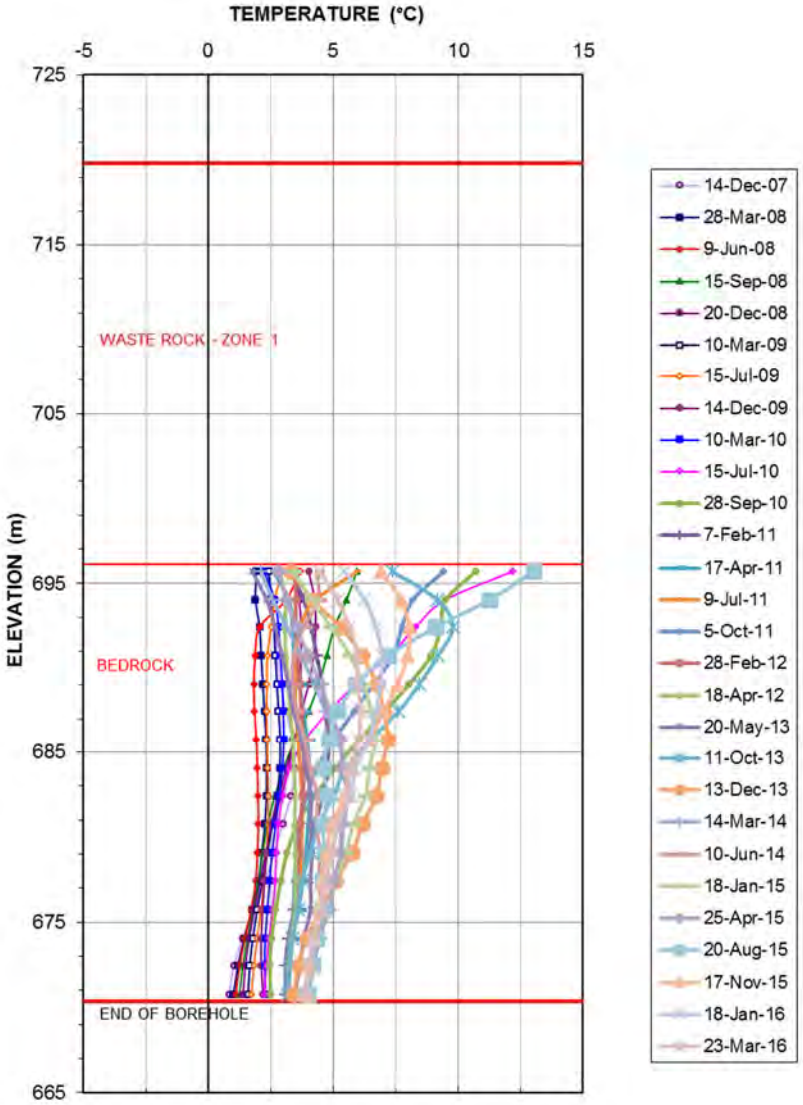
srk consulting	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	Water Storage Pond Data
		Temperature Cable – WDT-2
Job No: 1CM002.048 Filename: ApI_WaterStoragePond.pptx	Minto Mine	Date: August 2016 / Prepared by: PHM / Figure: 4







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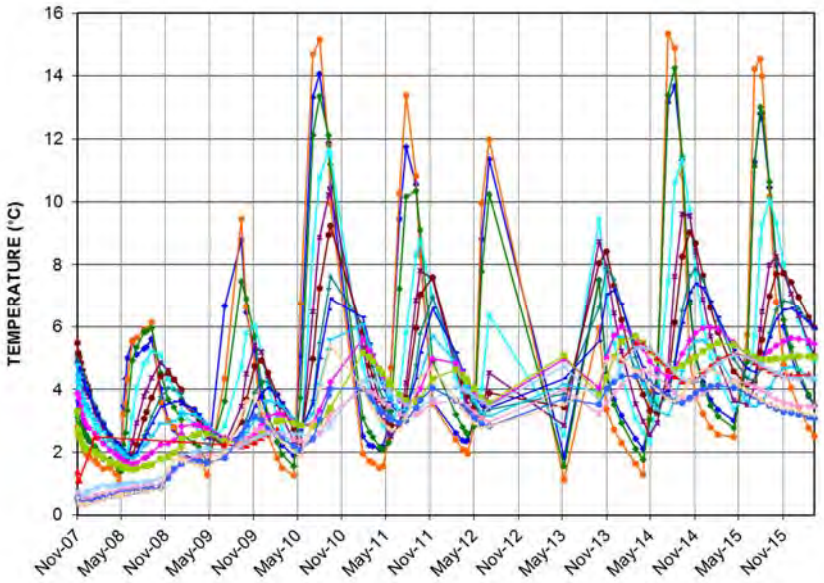
Water Storage Pond Data

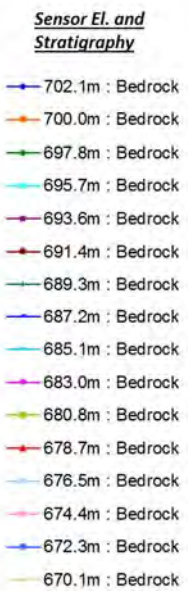
Temperature Cable – WDT-3

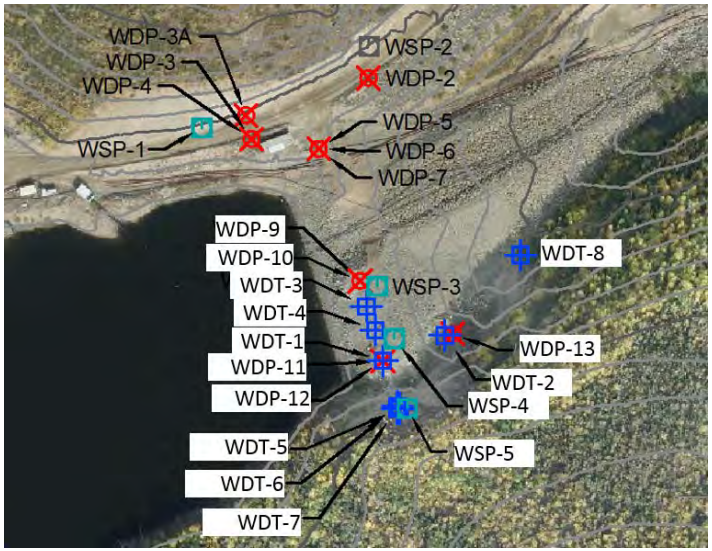
Job No: 1CM002.048
Filename: Apl_WaterStoragePond.pptx

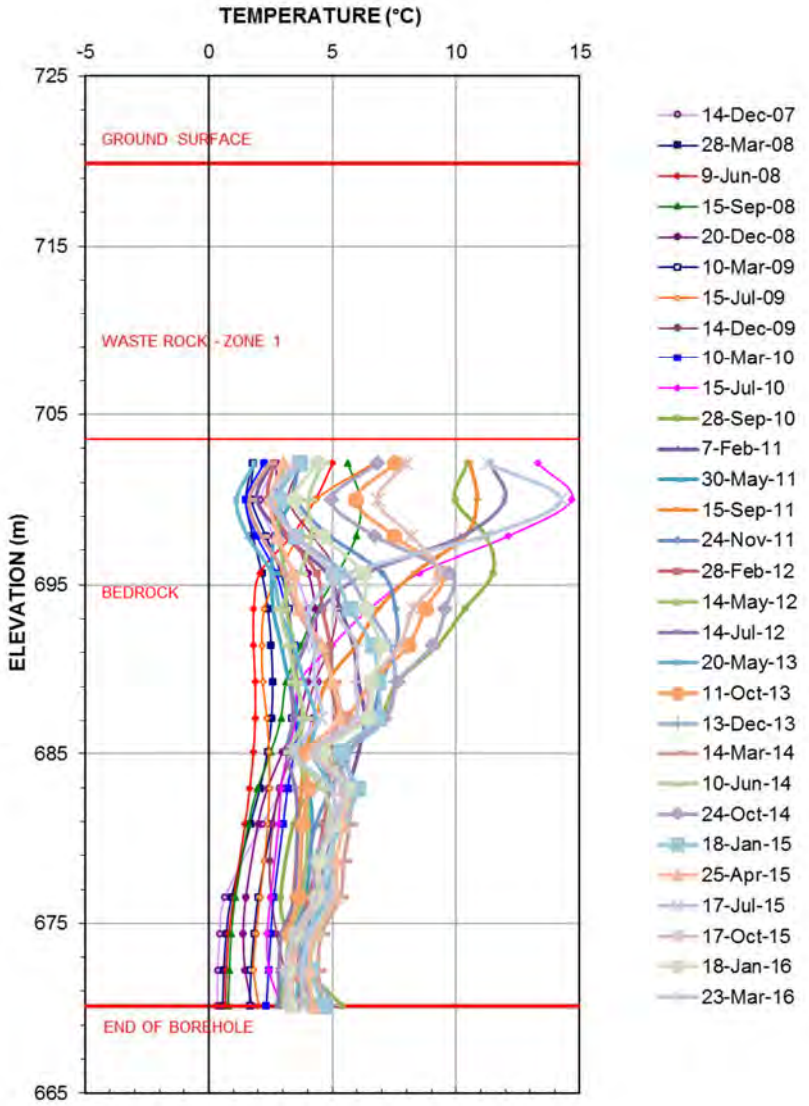
Minto Mine

Date:	Prepared by	Figure:
August 2016	PHM	5









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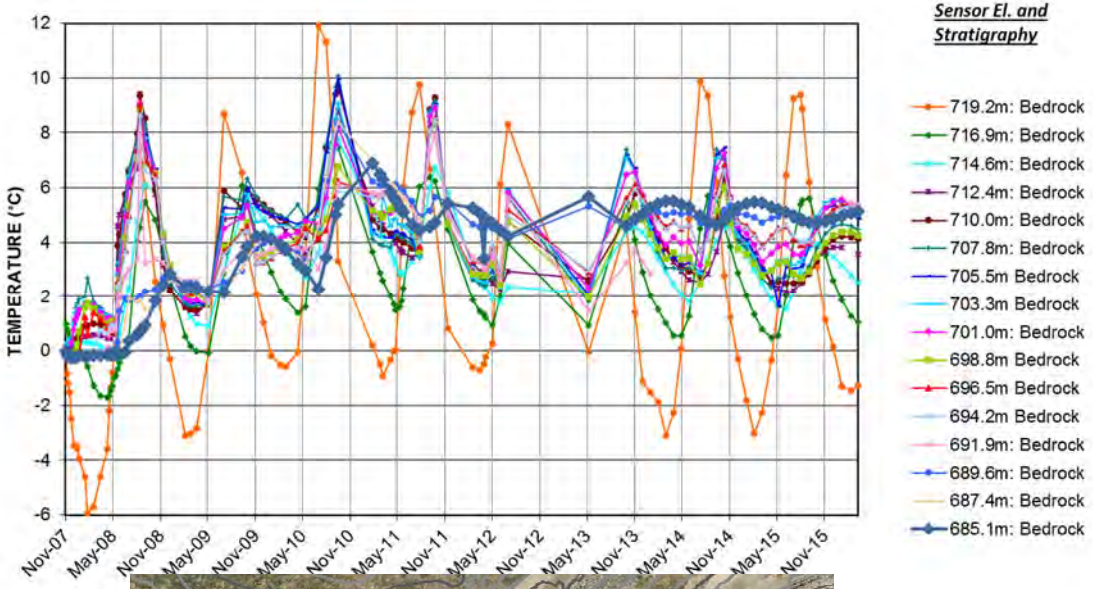
Water Storage Pond Data

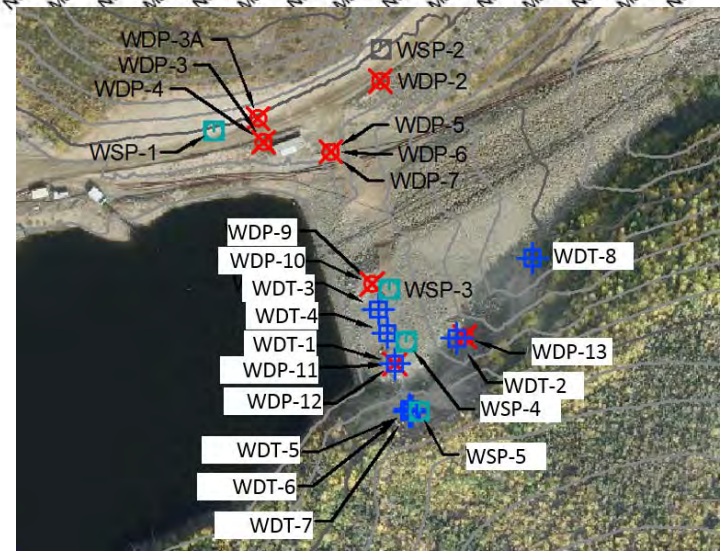
Temperature Cable – WDT-4

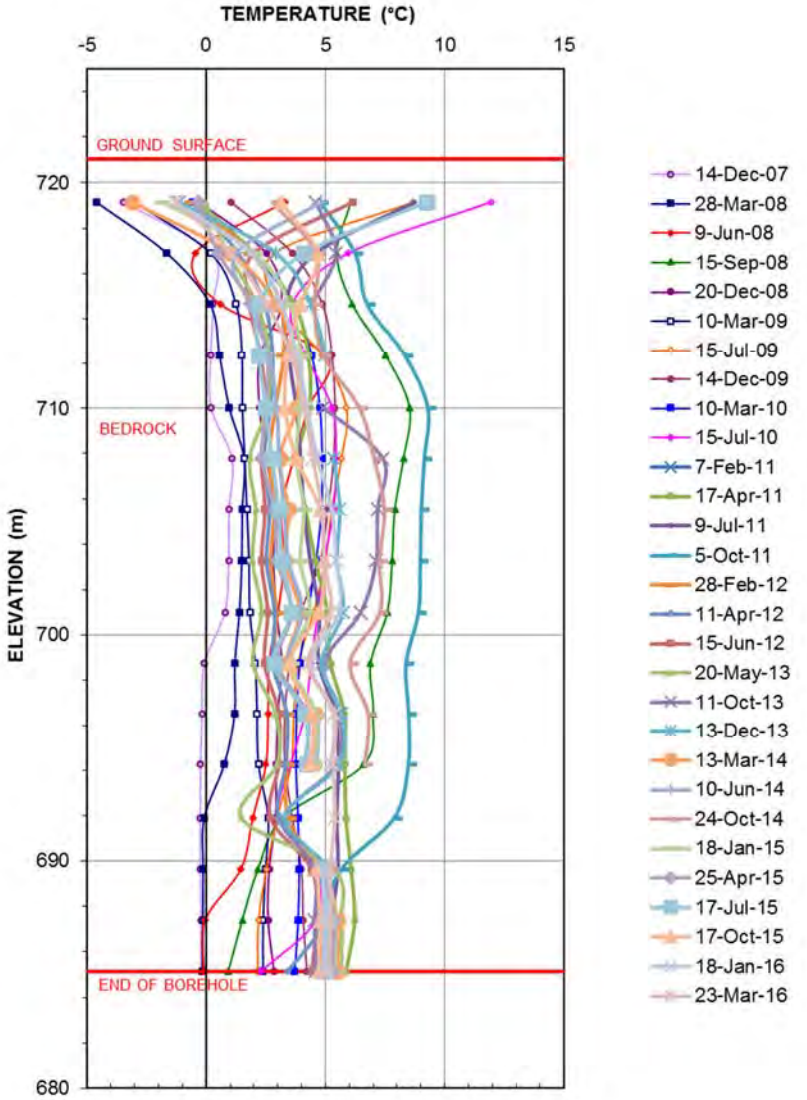
Job No: 1CM002.048
Filename: ApI_WaterStoragePond.pptx

Minto Mine

Date:	Prepared by	Figure:
August 2016	PHM	6







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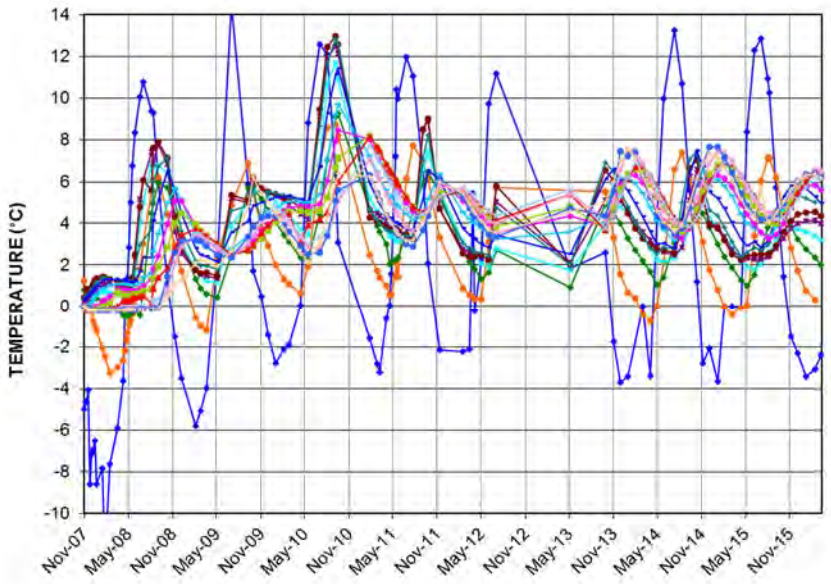
Water Storage Pond Data

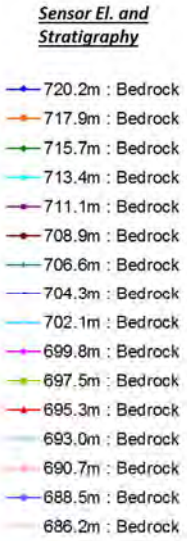
Temperature Cable – WDT-5

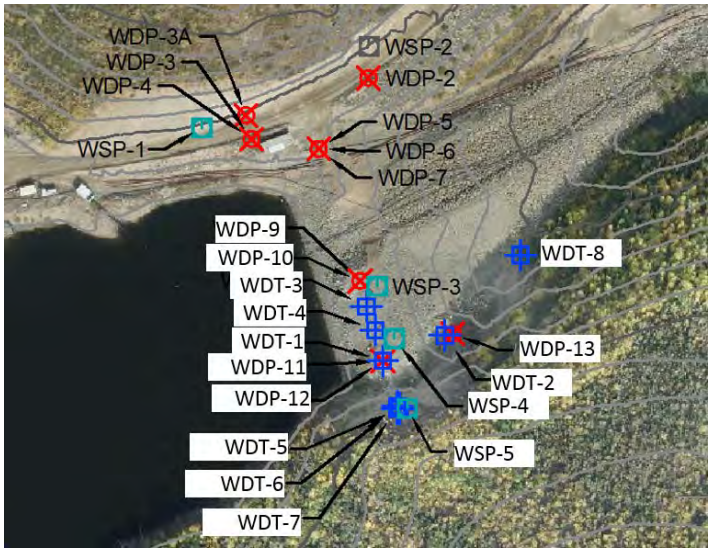
Job No: 1CM002.048
Filename: Apl_WaterStoragePond.pptx

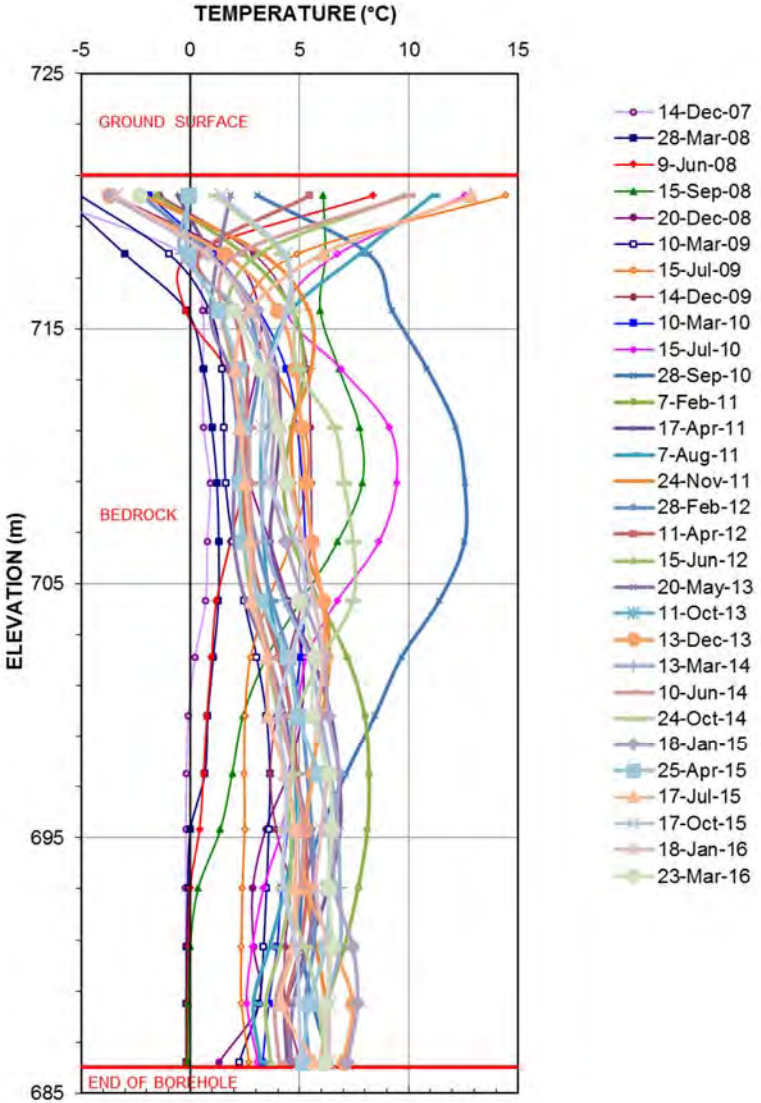
Minto Mine

Date: August 2016
Prepared by: PHM
Figure: 7









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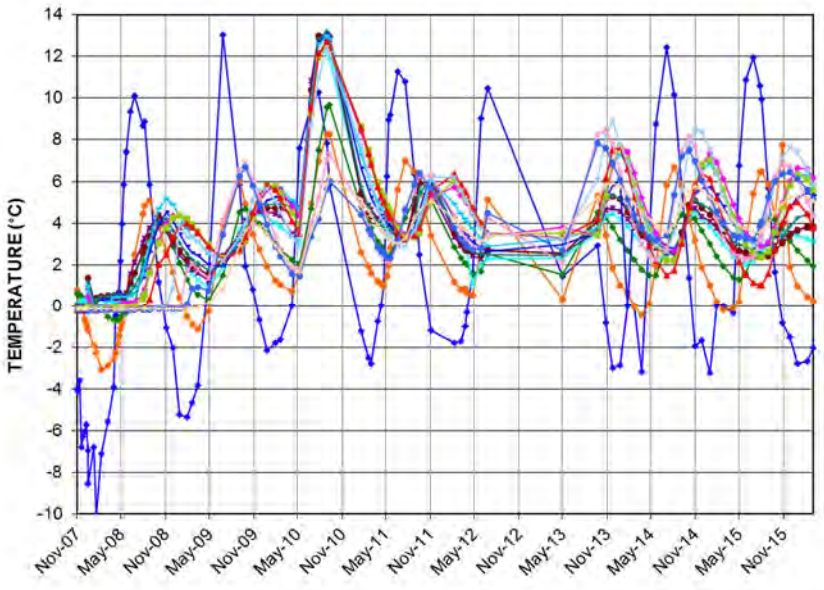
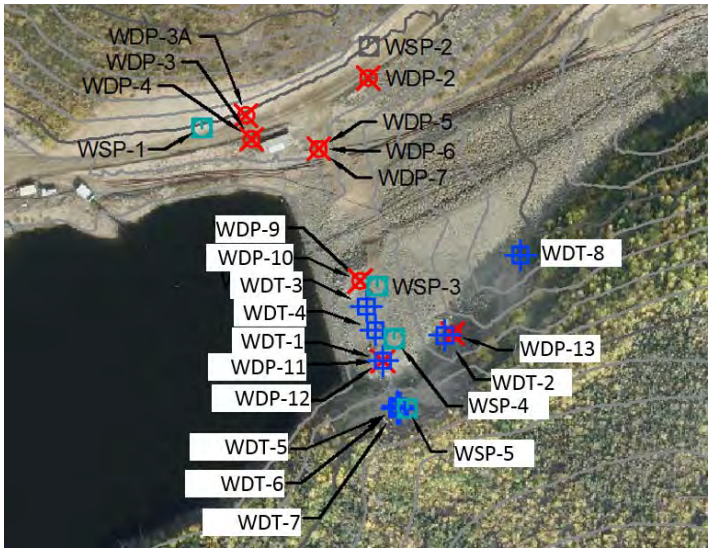
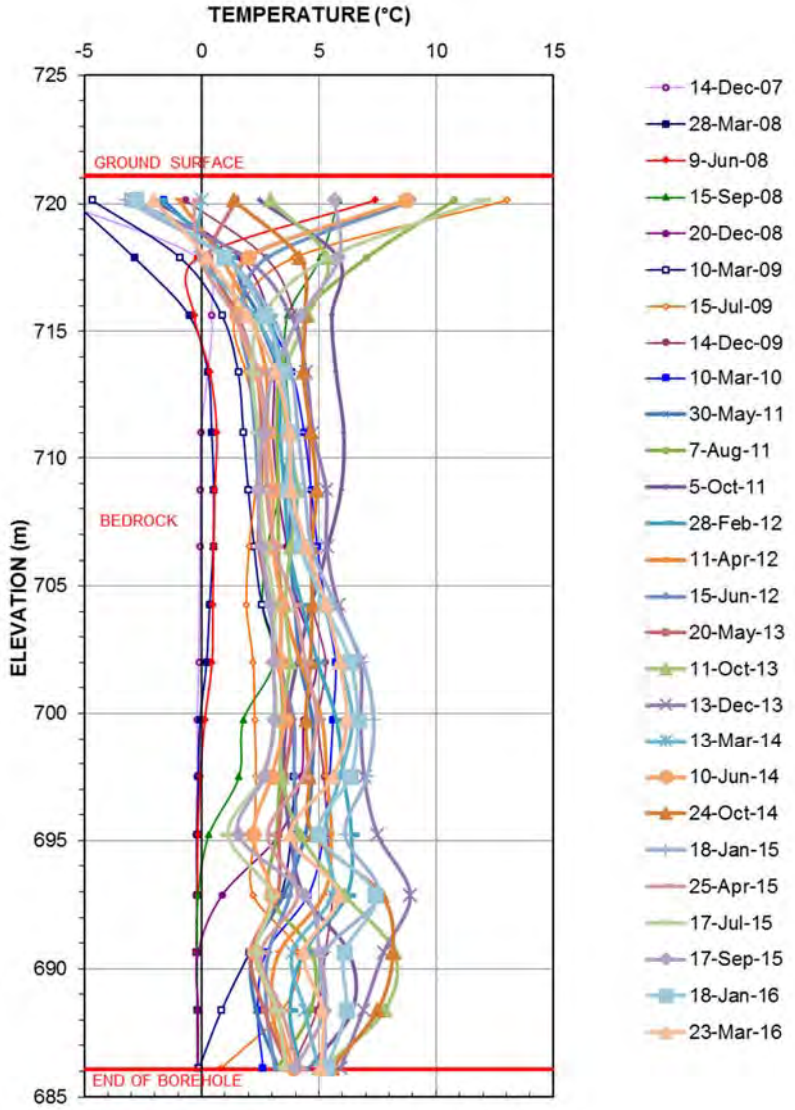
srk consulting	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	Water Storage Pond Data
Job No: 1CM002.048 Filename: ApI_WaterStoragePond.pptx	Minto Mine	**Temperature Cable – WDT-6**
		Date: August 2016 / Prepared by: PHM / Figure: **8**







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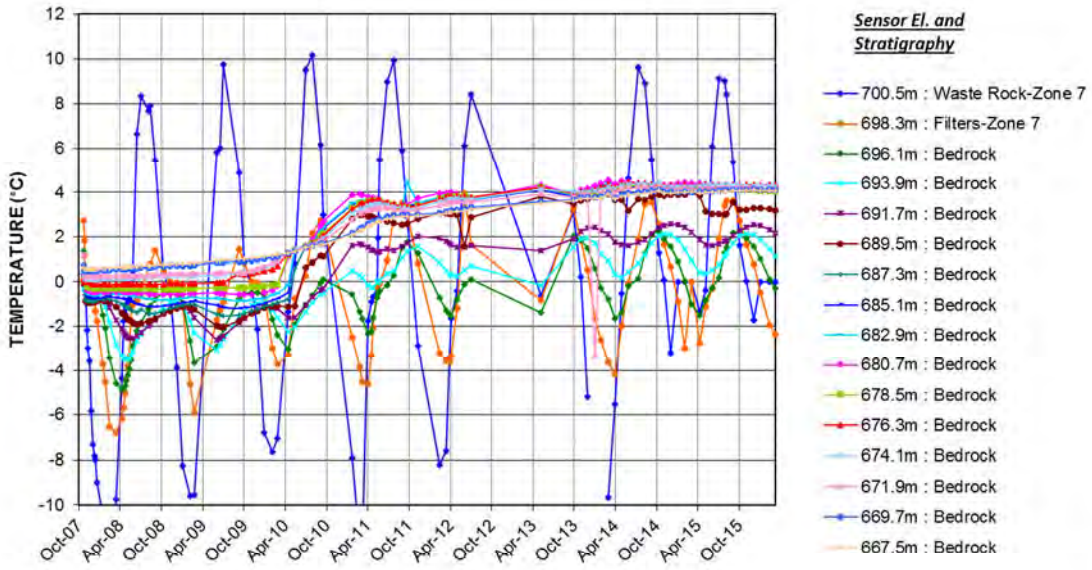
Water Storage Pond Data

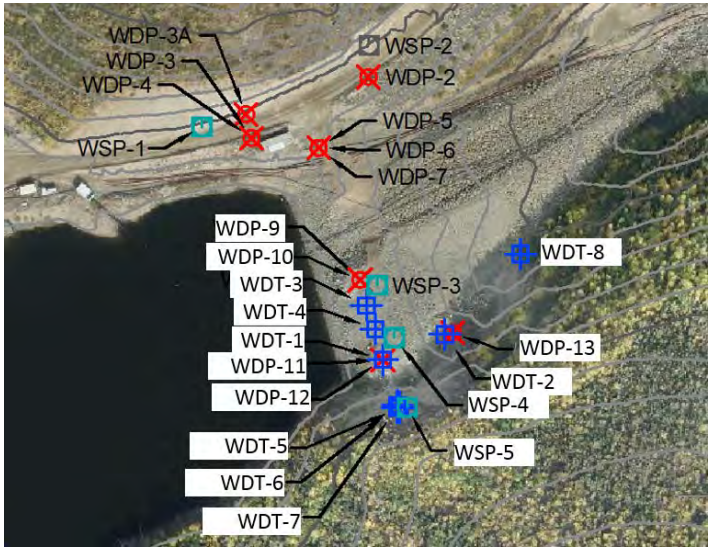
Temperature Cable – WDT-7

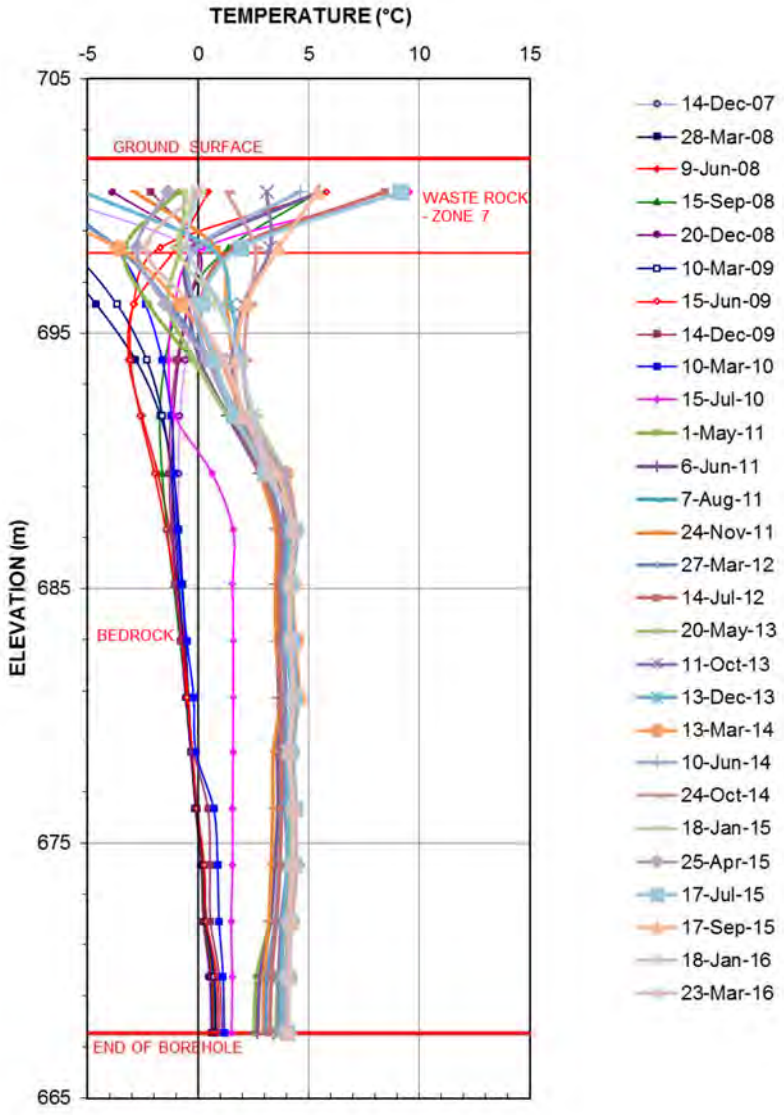
Job No: 1CM002.048
Filename: Apl_WaterStoragePond.pptx

Minto Mine

Date:	Prepared by	Figure:
August 2016	PHM	9







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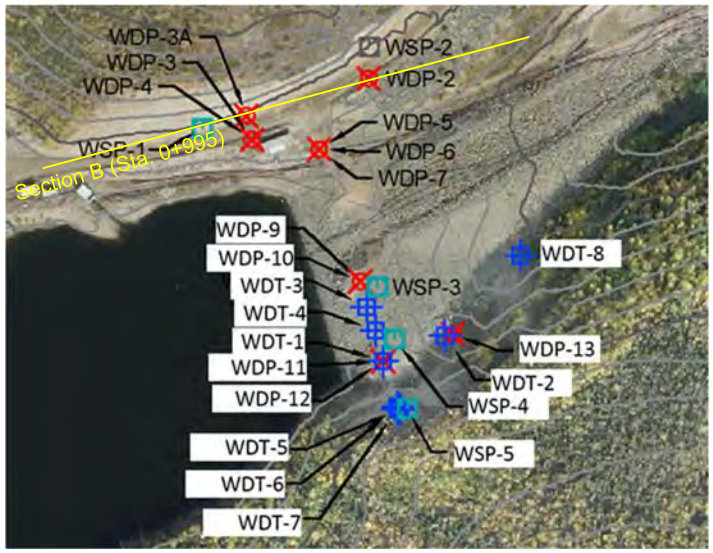
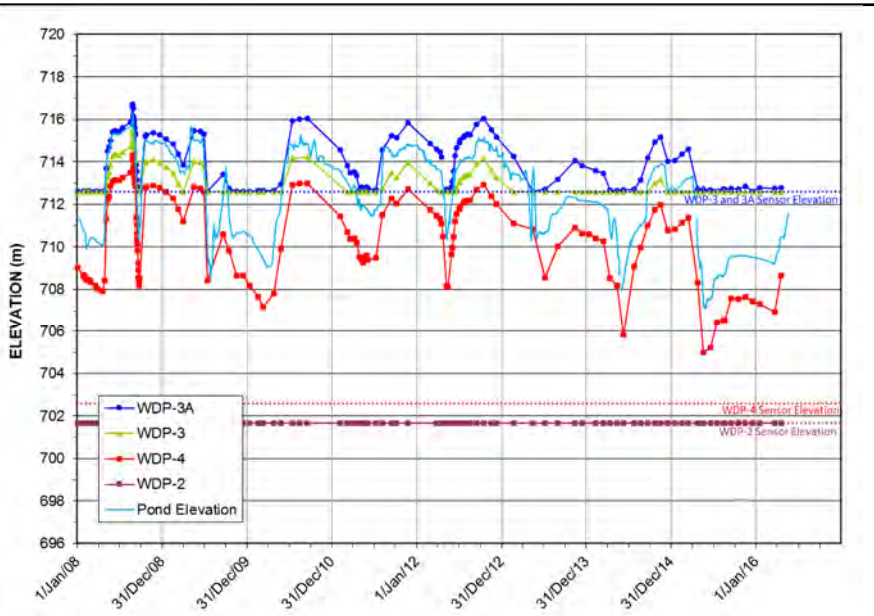
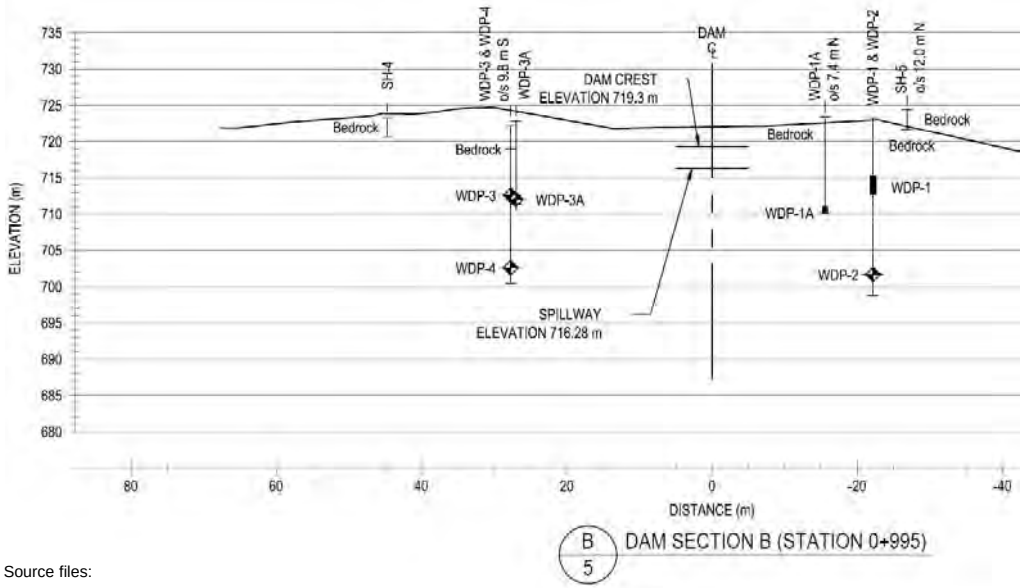
srk consulting	capstone MINTO MINE OPERATED BY MINTO EXPLORATIONS LTD.	Water Storage Pond Data
		Temperature Cable – WDT-8
Job No: 1CM002.048 Filename: ApI_WaterStoragePond.pptx	Minto Mine	Date: August 2016 / Prepared by: PHM / Figure: **10**







B
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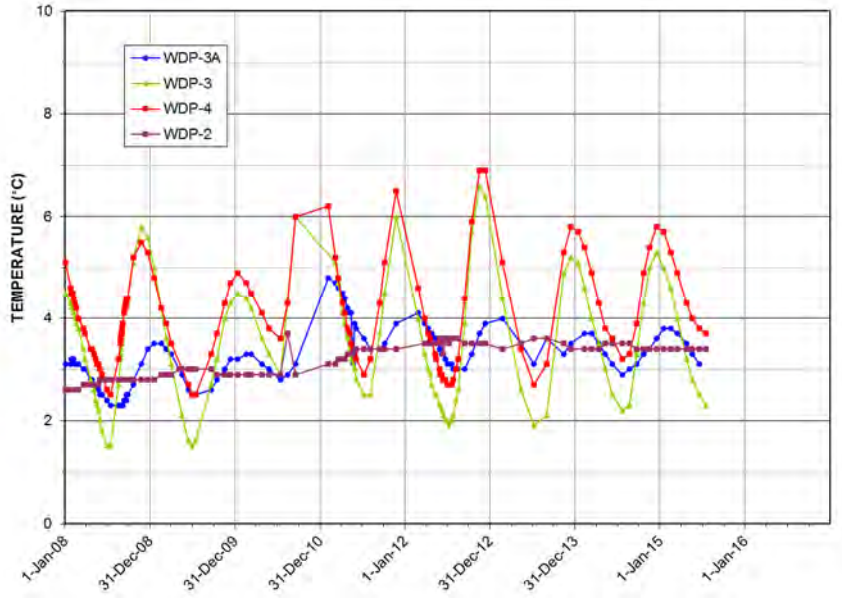
DAM SECTION B (STATION 0+995)



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3. Cross Section B from EBA (2011) report: Water Storage Pond Dam Geotechnical Instrumentation and Seepage Data Review" dated December 23, 2011.

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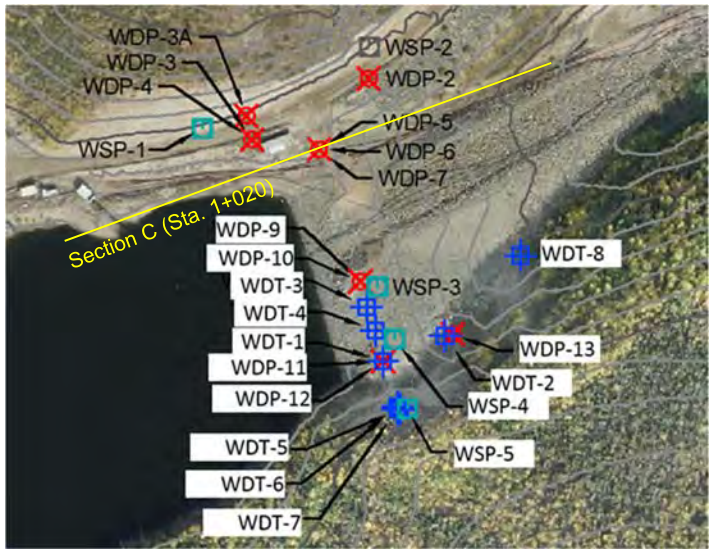
Water Storage Pond Data

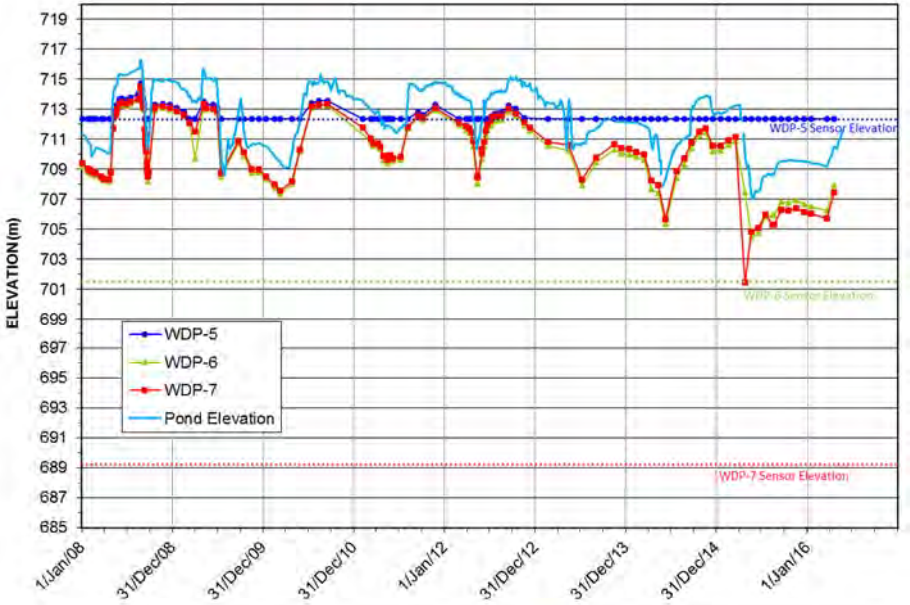
Piezometers – Left Abutment

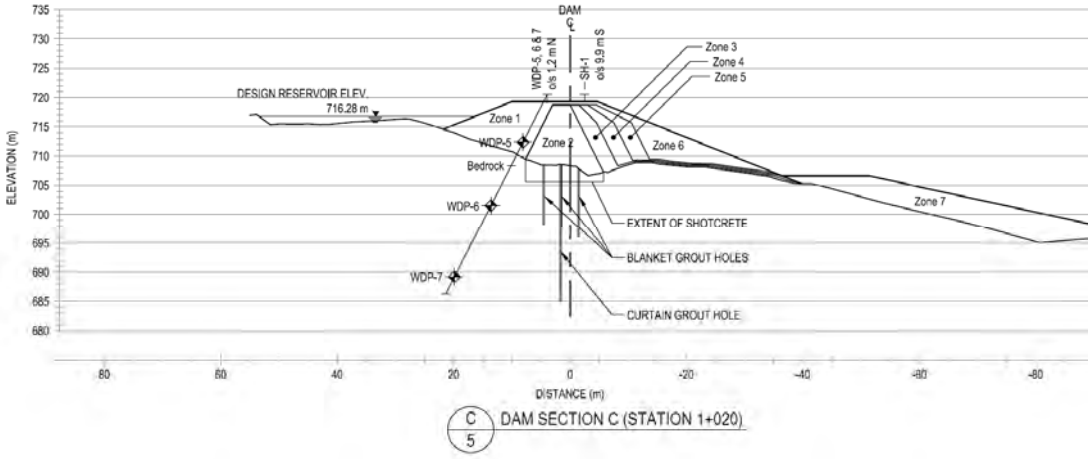
Job No: 1CM002.048
Filename: Apl_WaterStoragePond.pptx

Minto Mine

Date:	Prepared by	Figure:
August 2016	PHM	11







C
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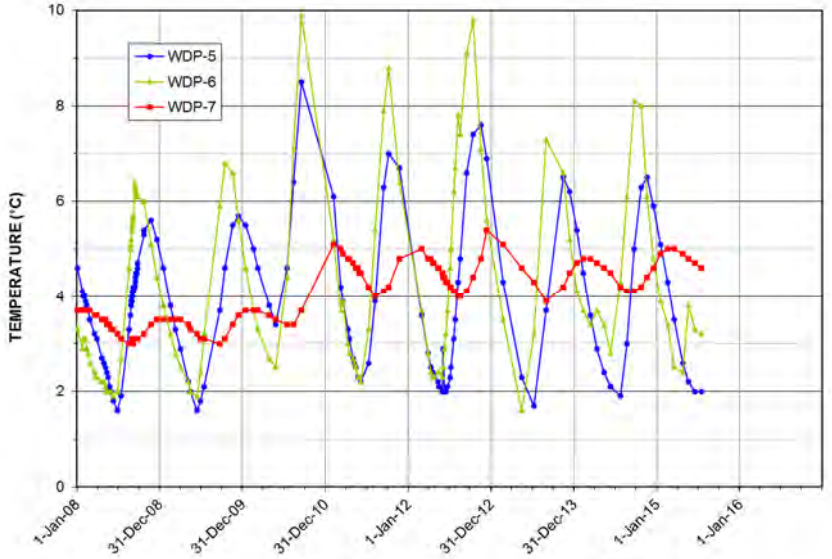
DAM SECTION C (STATION 1+020)



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3. Dam section from EBA (2011) report: Water Storage Pond Dam Geotechnical Instrumentation and Seepage Data Review" dated December 23, 2011.

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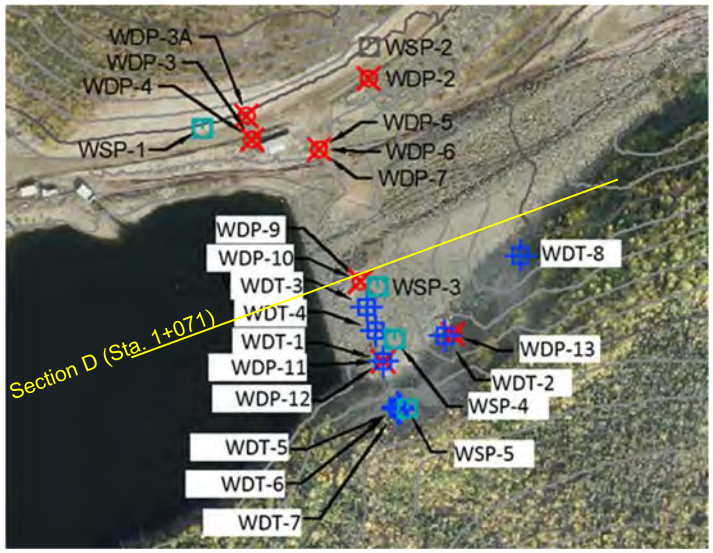
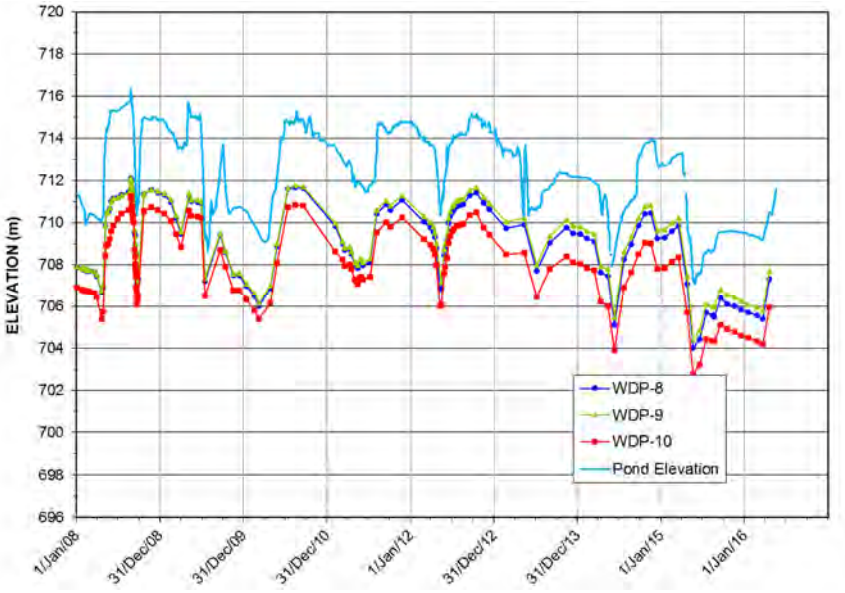
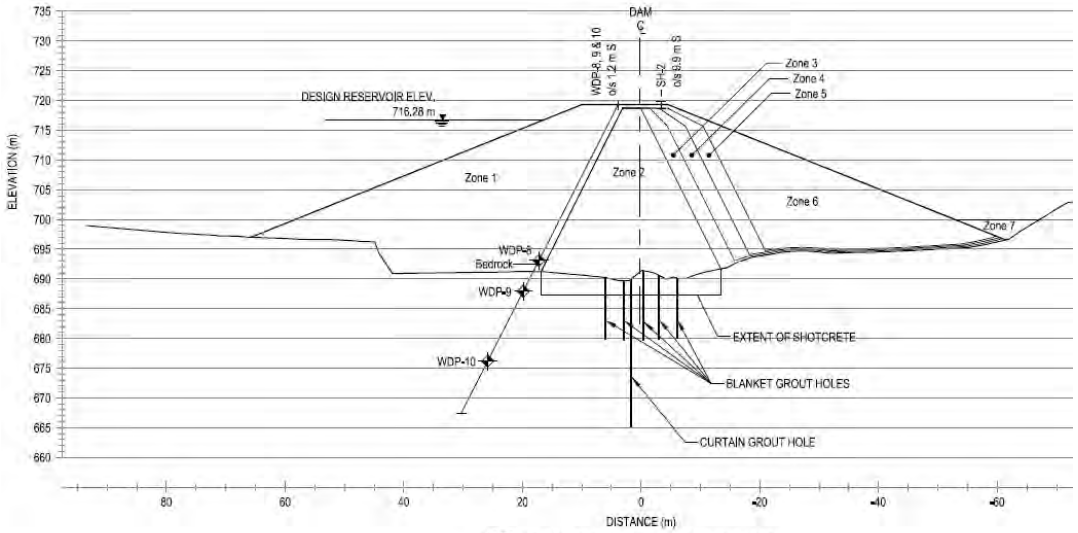
Water Storage Pond Data

Piezometers – Section C (Station 1+020)

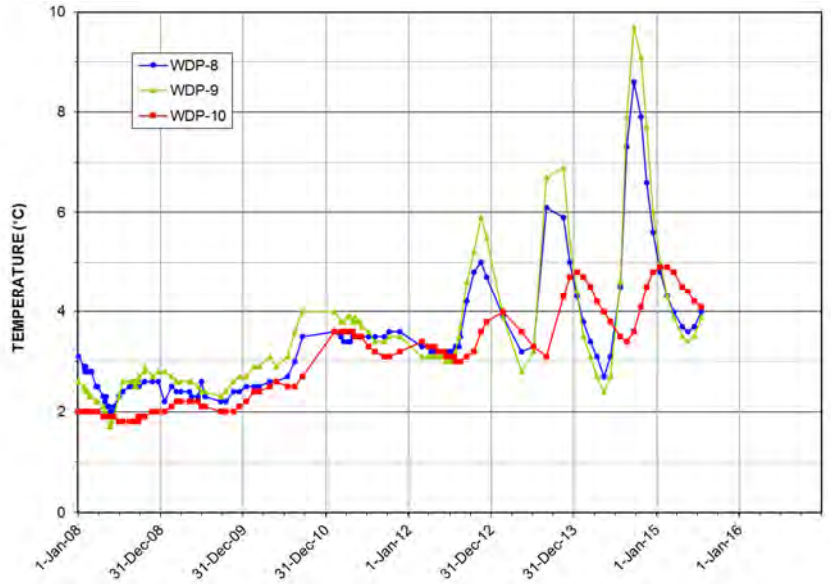
Date:	Prepared by	Figure:
August 2016	PHM	12







D 5 DAM SECTION D (STATION 1+071)



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3. Dam section from EBA (2011) report: Water Storage Pond Dam Geotechnical Instrumentation and Seepage Data Review" dated December 23, 2011.

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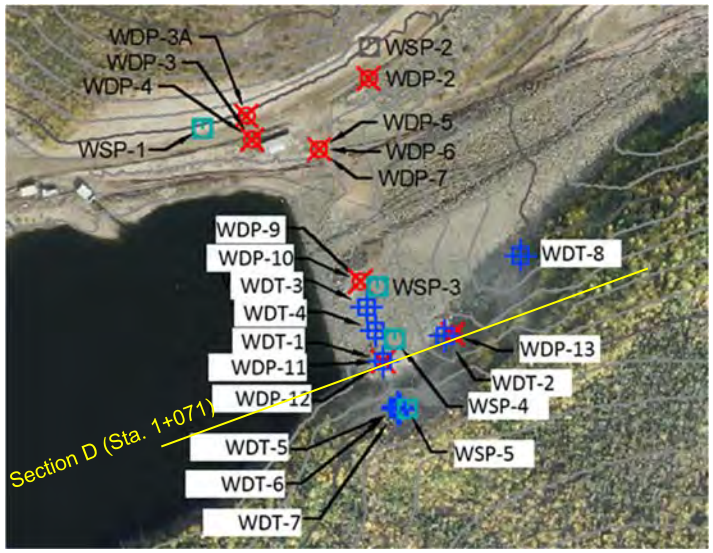
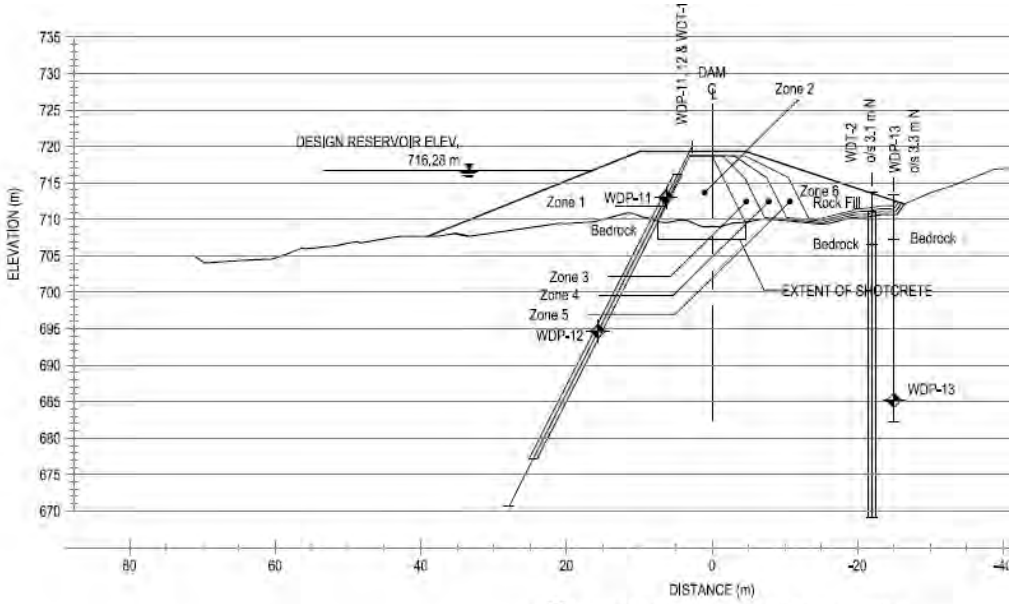
Water Storage Pond Data

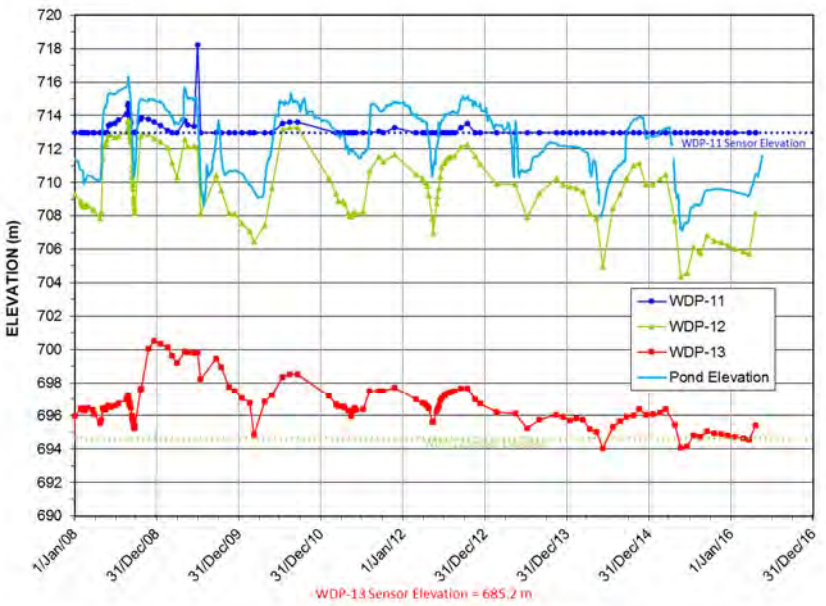
Piezometers – Section D (Station 1+071)

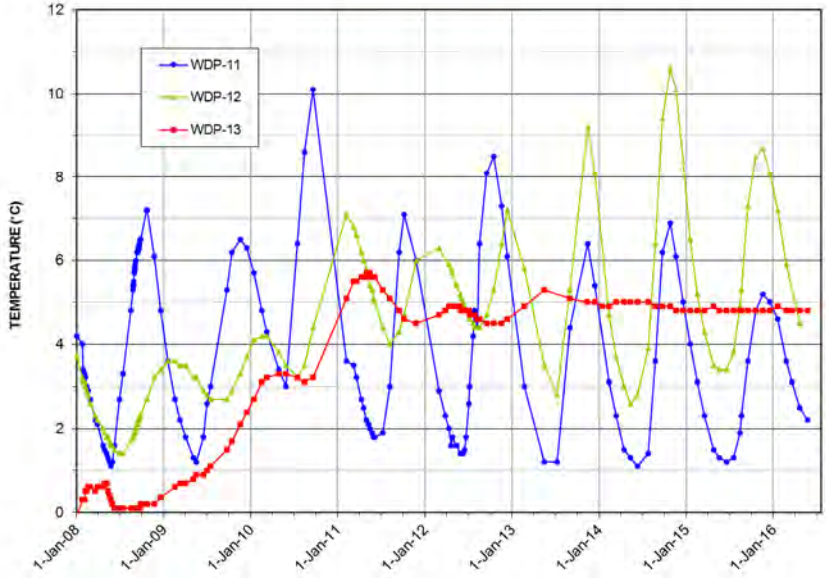
Date:	Prepared by	Figure:
August 2016	PHM	13





G/5 DAM SECTION G (STATION 1+105)





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3. Dam section from EBA (2011) report: Water Storage Pond Dam Geotechnical Instrumentation and Seepage Data Review" dated December 23, 2011.

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Water Storage Pond Data

Piezometers – Section G (Station 1+071)

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Filename: Apl_WaterStoragePond.pptx

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Date:	Prepared by	Figure:
August 2016	PHM	14