

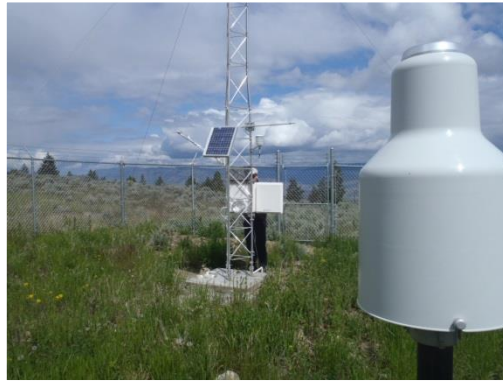
Appendix 6.1-A

2014 Climatology Report

AJAX PROJECT

**Environmental Assessment Certificate Application / Environmental Impact Statement
for a Comprehensive Study**

**KGHM AJAX MINING INC.
AJAX PROJECT**



2014 CLIMATOLOGY REPORT

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KGHM AJAX MINING INC. AJAX PROJECT

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EXECUTIVE SUMMARY

The Ajax Project (the Project) is a proposed open pit copper-gold mine located in the South-Central Interior of British Columbia (BC), Canada, near the City of Kamloops. The climate of the Ajax Project area is typical of the dry British Columbia Interior Region, with generally low total precipitation and high evaporation. Located in the rain shadow of the Coast Mountains, this area has a semi-arid steppe climate characterized by generally cool, dry winters and hot, dry summers, with low humidity.

The objective of this report is to provide a climatological characterization of the Ajax Project, primarily for purposes of water balance modelling, engineering design, water rights applications, and environmental assessments. This report presents site and regional climate, and provides corresponding estimated long-term values for the project area, which will be updated as additional information is obtained from ongoing data collection programs.

Meteorological data collection at the site commenced in August 2010 at the AJAXMET climate station and in August 2014 at the AJAXAQ-1 climate station. The available data include records of temperature, relative humidity, precipitation, and wind speed and direction. Active and inactive climate stations are located throughout the region, with several having two or more decades of climate data.

The key findings of this study, which apply to the Ajax Project area at elevation 950 m (unless noted otherwise), are summarized as follows:

- The long-term average annual temperature is estimated to be 6.4 °C, with average monthly temperatures ranging from 18.7 °C in July to -4.9 °C in December.
- Relative humidity varies throughout the year, but is typically highest in mid-winter and lowest in mid-summer, with respective estimated long-term monthly average values of approximately 88.5% in January and 48.6% in July.
- The average wind speed for the period of record is 2.3 m/s at the AJAXMET station and the wind blows predominantly north-westerly in the summer and south-south-easterly in the winter.
- The long-term mean annual precipitation is estimated to be 336 mm.
- Precipitation is reasonably evenly distributed throughout the year, although June and July are typically the wettest months due to convective storm activity.
- Approximately 30% of precipitation is expected to fall as snow, corresponding to the mean annual snowfall (snow water equivalent) of 101 mm.
- Approximately 70% of precipitation is expected to fall as rain, corresponding to the mean annual rainfall of 235 mm.
- The mean annual lake evaporation is estimated to be 585 mm.
- The 1 in 10 year maximum 24-hr precipitation is estimated to be 43.2 mm.
- The probable maximum 24-hr precipitation is estimated to be 219.1 mm.
- Sublimation was estimated to be 28 mm for the winter season.

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Appendix A	Regional and Project Climate Data Analysis
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ABBREVIATIONS

Ajax Project.....	the Project
Abacus Mining and Exploration Corporation	AME
British Columbia.....	BC
Coefficient of variation	CV,
El Nino Southern Oscillation	ENSO
Environment Canada	EC
Intensity-Duration-Frequency	IDF
In-Pit Mine Rock Storage Facility.....	IPMRSF
KGHM Ajax Mining Inc.....	KAM
Knight Piésold Ltd.....	KPL
Metres above sea level.....	masl
Mean annual discharge	MAD
Mean annual precipitation.....	MAP
Ministry of Forests, Lands and Natural Resource Operations.....	FLNRO
Pacific Climate Impacts Consortium	PCIC
Pacific Decadal Oscillation	PDO
Pacific Standard Time.....	PST
Potential Evapotranspiration.....	PET
Probable Maximum Precipitation	PMP
Rainfall Frequency Atlas of Canada	RFAC
Relative humidity	RH
Stk'emlupsemc te Secwepemc Nation	SSN,
Tailings Storage Facility	TSF

1 – INTRODUCTION

1.1 PROJECT DESCRIPTION

KGHM Ajax Mining Inc. proposes to develop the Ajax Project (Project), an open pit copper-gold mine at the historic Afton Mining Camp, south of the City of Kamloops, British Columbia (BC). The Project is located in the South-Central Interior of British Columbia, southeast of the junction of the Trans-Canada Highway No. 1 and the Coquihalla Highway (No. 5), within the Thompson Nicola Regional District.

The Project lies in the traditional territory of the Secwepemc Nation. Within the Secwepemc Nation, the Tk'emlúps te Secwepemc and the Skeetchestn Indian Band are the Aboriginal groups in closest proximity to the Project. In a cooperative effort, the Tk'emlúps te Secwepemc and Skeetchestn Indian Bands have formed the Stk'emlupsemc te Secwepemc Nation (SSN), as a division of the greater Secwepemc Nation. The Ashcroft Indian Band and Lower Nicola Indian Band, whose members are part of the Nlaka'pamux Nation also assert their Aboriginal rights to the Project area—an area of common interest with the SSN.

The Ajax property includes two historic pits: the Ajax West Pit, and the Ajax East Pit. Both pits were formerly mined in the 1980s and 1990s. As many as 25 rock types have been recognized in the Project area, some of which are “hybrid” units resulting from the intermixing of multiple rock types.

Key Project facilities include the Tailings Storage Facility (TSF), which is planned as a conventional tailings storage facility; water management ponds; Peterson Creek diversion, and the Tailings Embankments, which will be constructed using mine rock; and four mine rock storage facilities (MRSFs). The four MRSFs include:

- The South Mine Rock Storage Facility (SMRSF)
- East Mine Rock Storage Facility (EMRSF)
- West Mine Rock Storage Facility (WMRSF), and
- The In-Pit Mine Rock Storage Facility (IPMRSF).

Several facilities that will be part of the operation phase but not remain after project closure include the:

- Plant facilities and administration buildings
- Reclamation stockpiles
- Explosives facility
- Truck stop and fuel storage
- Power lines, and
- Access roads.

The mine plan for the Project predicts an operation based on a mill throughput of 65,000 tonnes of ore per day from the Ajax Pit with up to a 23 year mine life. The construction phase of the Project will be approximately two and a half years, and following the 23 year operation the decommissioning and closure phase is expected to take up to 5 years. Over the mine life the Project will produce approximately 140 million pounds of copper and 130,000 ounces of gold annually with the concentrate shipped by truck to the Port of Vancouver.

1.2 PREVIOUS STUDIES

Knight Piésold Ltd. (KPL) completed the *2012 Hydrometeorology Report* (Knight Piésold, 2012) in March 2013. This report supersedes the climatology portions (Sections 2 and 3) of the 2012 report.

2 – METEOROLOGY

2.1 INTRODUCTION

The climate of the project area is typical of the BC Interior Region, with generally low total precipitation and high evaporation that equate to dry conditions. Located in the rain shadow of the Coast Mountains, this area has a semi-arid steppe climate characterized by generally cool, dry winters and hot, dry summers, with low humidity (Canadian Climate Normals, 2003). Convective storm cell events are frequent in the summer months and, as a result, precipitation is generally highest in June and July.

2.2 PROJECT SITE STATION

The AJAXMET and AJAXAQ-1 climate stations are shown in Photo 2.1 and 2.2 and station details are summarised in Table 2.1.

The AJAXMET station was installed on August 2010 at an elevation of 950 metres above sea level (masl); five years of data are available from this station. The climate station monitors the following parameters:

- Air Temperature (°C)
- Relative Humidity (%)
- Atmospheric pressure (kPa)
- Precipitation (mm)
- Solar radiation (W/m^2),
- Wind speed (m/s), and
- Wind direction (Degrees from True North, and Standard Deviation).

The AJAXAQ-1 station was installed in August 2014 at an elevation of 1052 masl; four months of data are available from this station. The climate station monitors the following parameters:

- Air Temperature (°C)
- Relative Humidity (%)
- Atmospheric pressure (mmHg)
- Precipitation (mm)
- Solar radiation (W/m^2),
- Wind speed (m/s), and
- Wind direction (Degrees from True North, and Standard Deviation).



Photo 2.1 AJAXMET Climate Station

Photo 2.2 AJAXAQ-1 Climate Station

CR1000 dataloggers are installed at the stations and data are collected at hourly increments. The loggers are set to Pacific Standard Time (PST) to avoid data gaps and overlaps and to be consistent with standard monitoring practices.

Golder Associates installed an additional climate station in the Project area in November 2006. This station, which is known as the Goldmet climate station, is located at the current Project camp location at an elevation of 940 masl. Data from the GOLDMET station are considered to be of generally lower quality than the AJAXMET data due to the shortcomings of the station installation standards in 2006, therefore, these data have not been used in the following analyses, except to infill small data gaps in the AJAXMET climate record.

2.3 REGIONAL STATIONS

The climate analyses presented in this report are primarily based on short-term site specific data collected at the AJAXMET climate station and concurrent and long-term data collected at nearby regional stations operated by Environment Canada (EC) and the British Columbia Ministry of Forests, Lands and Natural Resource Operations (FLNRO).

The names, locations, and periods of record of the regional climate stations are summarised in Table 2.2, and the Project station locations are shown on Figure 2.1. The majority of the regional stations have been deactivated, with the only active EC stations being Kamloops Airport (1163780), Kamloops Pratt Road (116C8P0), Red Lake (1166658), Criss Creek (1162177) and Sun Peaks

(Upper) (116QK0M). Note though that the Sun Peaks station has no complete years of data. Data from most of the inactive EC stations were not used for the analyses, with the exception of the Logan Lake (1124668) and Kamloops Afton Mines (1163790) stations.

In addition to the EC station data, data from the Afton station, which is operated and maintained by the BC FLNRO and detailed in Table 2.2, were incorporated in the climate analyses. The Afton station is located approximately 4 km from the Project site at an elevation of 780 masl, and only provides reliable precipitation data during non-freeze months. Non-freeze months are defined as months that have a monthly mean temperature greater than zero degrees Celsius.

2.4 TEMPERATURE

Temperature data are recorded at the AJAXMET and AJAXAQ-1 climate stations using a Model HMP45C212 integrated temperature/relative humidity sensor. Hourly average, maximum, and minimum temperature data are recorded and the corresponding monthly mean temperatures collected thus far are presented in Table 2.3. A time series graph of AJAXMET and AJAXAQ-1 temperature data is provided in Figure A1 of Appendix A.

Site data are currently of insufficient length to provide estimates of temperature Normals for the Project area. Accordingly, AJAXMET station data were correlated with concurrent regional data from the EC Kamloops Airport station and the BC FLNRO Afton station. These stations were chosen for the analysis because of their proximity to the Project site and their reasonably long temperature records that overlap the AJAXMET station data period. It was found that both regional stations produced satisfactory results, with the Afton station data having a stronger correlation ($R^2=0.99$) with the Project data, as shown on Figure 2.2. The coefficient of determination, denoted R^2 , is used to describe how well a regression trend-line fits the data set. Due to the strong coefficient of determination, the regression equation shown on the figure was applied to the 25-year Afton station temperature record to generate a synthetic long-term temperature series for the AJAXMET climate station.

Data collected from the AJAXAQ-1 station are very short duration (4 months) and therefore not suitable for analysis, but they are consistently about 2°C cooler than the corresponding AJAXMET values, which is commensurate with the higher elevation of the AJAXAQ-1 station.

The estimated long-term temperature values for the Project site are summarised in Table 2.4. The mean annual temperature for the Project site is estimated to be 6.4 °C. The warmest months are July and August, with mean monthly temperatures of 18.7 °C and 17.8 °C, respectively. The coldest months are December and January, with mean monthly average temperatures of -4.9 °C and -4.5 °C, respectively.

The annual mean temperature varies from year to year, with a standard deviation of 0.6 °C. The maximum and minimum annual mean temperatures in the long-term synthesized temperature series are 7.2 °C and 5.7 °C, respectively.

It should be noted that there is evidence of a minor historical trend of increasing temperature in the region, as discussed in Section 4.1.

2.5 RELATIVE HUMIDITY

Relative humidity (RH) is recorded at the AJAXMET and AJAXAQ-1 climate stations using a Model HMP45C212 integrated temperature/relative humidity sensor. Hourly average, maximum and minimum relative humidity data are recorded at the stations. Monthly summaries of AJAXMET RH are provided in Table 2.5 and time series graphs of AJAXMET and AJAXAQ-1 climate station data are provided on Figure A2 of Appendix A. This figure indicates that the relative humidity recorded at the two stations is very similar, with values consistently slightly higher at the AJAXAQ-1 station.

Long-term estimates of RH for the Project area were generated by correlating the available concurrent data from the AJAXMET, Afton, and Kamloops Airport stations using linear regression analysis. Data collected from the AJAXAQ-1 station are very short duration (4 months) and therefore not suitable for analysis. Similar to the temperature regression results described in Section 2.4, data from the BC FLNRO Afton station correlated most strongly with data from the AJAXMET station, with an R^2 value of 0.97, as indicated on Figure 2.3. In comparison, correlation with data from the Kamloops Airport station produced an R^2 value of 0.61 as shown in Figure 2.3-2. The concurrent AJAXMET, AJAXAQ-1 and Afton data are presented in Table 2.5. The regression equation shown on Figure 2.3 was applied to the 25-year Afton station record to generate a synthetic long-term RH series for the Project, which is summarized in Table 2.6. Plots showing the month to month variation of RH are provided on Figure A3 of Appendix A.

The mean annual RH for the Project site is estimated to be 64.3%, with a standard deviation of 2.0%. The maximum RH typically occurs in January while the minimum is observed in July, with mean monthly values of 88.5% and 48.6%, respectively.

2.6 WIND VELOCITY AND DIRECTION

Wind velocity and direction data are collected at the AJAXMET and AJAXAQ-1 climate stations using a RM Young 05103AP-10 Wind Monitor, mounted on a 10 m tower and oriented to True North. Hourly wind speed and direction are recorded.

Recorded wind speed values are summarized in Table 2.7. At the AJAXMET station the mean annual wind speed during the period of record was 2.3 m/s, with monthly mean wind speeds ranging from 1.6 m/s to 3.1 m/s for the five year period. At the AJAXQ-1 station wind speeds over the short period of record were approximately 20% to 30% higher than at the AJAXMET station.

Wind roses for the AJAXMET station are provided on Figures 2.4-1 through 2.4-12, and indicate that the wind direction is variable throughout the measured record, with predominantly north-westerly winds in the summer and south-south-easterly winds in the winter. Wind roses for the AJAXAQ-1 station are provided on Figures 2.5-1 through 2.5-4, and indicate that the wind is primarily from the south-south-easterly direction during the data collection period of August through November 2014.

2.7 PRECIPITATION

2.7.1 General

Precipitation in the Project area occurs either as snow, rain, or a combination of both, with the latter generally occurring during the late fall or early spring periods. Total hourly precipitation data have been collected at the AJAXMET and AJAXAQ-1 climate stations since August 2010 and August

2014, respectively. A summary of the monthly precipitation records for these two stations is provided in Table 2.8, along with comparable values for the Environment Canada climate station at Kamloops Airport. Data are only available since December 2012 for the AJAXMET station because of instrumentation issues during the first two years of the station's operation.

2.7.2 Mean Annual Precipitation

In the 2012 Hydrometeorology Report (Knight Piésold, 2013), the mean annual rainfall, snowfall, and precipitation estimates for the Project area were stated as 310 mm, 94 mm, and 216 mm, respectively. These values were estimated entirely on the basis of regional information since no reliable site specific precipitation data were available at that time. However, as listed in Table 2.8, a limited amount of site precipitation data are now available, and these data indicate that the mean annual precipitation at the site is likely slightly greater than previously determined. This conclusion is based on the results of a double mass curve analysis involving the linear correlation of the cumulative concurrent monthly precipitation values for Kamloops Airport and AJAXMET. The analysis indicates that AJAXMET receives approximately 25% more precipitation than Kamloops Airport. Application of this factor to the 269 mm long-term mean annual precipitation (MAP) for Kamloops Airport results in a corresponding MAP estimate of 336 mm for the project area. This estimate is very close to, and therefore validated by, the 348 mm value derived from the BC PRISM model that is discussed in the 2012 Hydrometeorology Report.

This precipitation value is for an elevation of 950 m, and precipitation is estimated to vary by elevation throughout the Project area according to an orographic rate of 4.8% per 100 m, as discussed in the 2012 Hydrometeorology Report. A comparison of the very limited concurrent data for the AJAXMET and AJAXAQ-1 stations generally indicates an orographic effect.

2.7.3 Rainfall and Snowfall

In the 2012 Hydrometeorology Report, the rainfall/snowfall split of the annual precipitation was estimated to be 30%/70%. This split is still considered to be valid, and as such, the mean annual rainfall and snowfall values for the project area, at elevation 950 m, are estimated to be 101 mm and 235 mm, respectively.

2.7.4 Precipitation Distribution

The estimated mean annual precipitation for the project area was distributed on a monthly basis according to the precipitation pattern for Kamloops Afton Mine. The mean annual rainfall and snowfall values were distributed monthly according to a merger of the Red Lake and Kamloops Afton Mine precipitation patterns, with appropriate adjustments made to maintain the selected proportions of annual rainfall and snowfall. The estimated mean monthly precipitation, rainfall and snowfall values for the Project site are summarized in Table 2.9, along with comparable values for the key regional climate stations.

It should be noted that there is evidence in the regional historical precipitation and streamflow records of a trend towards more rain and less snow, commensurate with generally increasing temperatures. The potential for such a trend has not been considered in the rain/snow values presented in this report.

2.7.5 Wet and Dry Year Precipitation

Estimates of wet and dry year annual precipitation are required to assess the range of probable moisture conditions at the site. Wet and dry year annual precipitation totals were calculated based on a normally distributed probability of occurrence. The calculations require mean and standard deviation values for annual precipitation. The mean annual precipitation of 336 mm, as calculated in Section 2.7.2, was used for this analysis. A dimensionless measure of the standard deviation is the coefficient of variation (CV), which was estimated for the site to be 0.18, based on the average value for the following regional stations:

- Kamloops Airport CV = 0.20
- Logan Lake CV = 0.09
- Kamloops Afton Mines CV = 0.25
- Red Lake CV = 0.20
- Kamloops Pratt Road CV = 0.24
- Afton CV = 0.26, and
- Leighton Lake CV = 0.18.

This CV was multiplied by the MAP of 336 mm to produce a standard deviation estimate of 60 mm. The wet and dry annual precipitation values for various return periods are presented in Table 2.10, which indicates a 1 in 200 year wet annual precipitation of 452 mm and a 1 in 200 year dry annual precipitation of 168 mm.

2.7.6 Extreme 24 Hour Precipitation

The Rainfall Frequency Atlas of Canada (RFAC) (Hogg and Carr, 1985) provides a regional methodology for estimating the mean and standard deviation for the annual extreme rainfall values for various storm durations. However, as the RFAC was published in 1985, there is now more than 25 years of additional data available. Therefore, rather than directly adopting the RFAC statistics, estimates from the RFAC for Kamloops Airport were compared with corresponding statistics calculated from the Kamloops Airport historical extreme rainfall record. In particular, a comparison was made on the basis of the 24-hour extreme rainfall, once the Kamloops Airport historical record of annual daily precipitation extremes was converted to the equivalent 24 hour series using a factor of 1.13 (Hershfield, 1961). This comparison indicated much higher values for the historical record, and therefore the higher values were adopted as the basis for determining project specific values.

The RFAC recommends applying an orographic factor of 1.5 to 12-hour and 24-hour precipitation estimates for interior areas of BC with elevations greater than 800 m. This factor is designed to account for orographic precipitation increases typically associated with frontal storm systems that generally produce the most extreme long-duration (12-hour and 24-hour) rainfall. In the Project area, however, almost all rainfall during the summer months likely occurs as a result of convective storm activity, which is typically unaffected by elevation, and therefore one might argue that an orographic factor is not required. A review of Section 2.7.3 indicates otherwise, as there appears to be a regional summer orographic effect that corresponds to a 4.8% increase in elevation per 100 m elevation gain. Accordingly, it is considered prudent and appropriate to apply this factor to the Kamloops Airport statistics to translate them to the Project site. Furthermore, this factor is likely applicable to the full range of storm durations. As a result, return period extreme rainfall values for a variety of durations were estimated for the Project site by calculating them for Kamloops Airport

according to the values and methodology in the RFAC, and then prorating the results according to a 24-hour to daily factor of 1.13 and an orographic factor of 4.8% per 100 m. The results are presented in Table 2.11.

Examples of extreme precipitation events for the Project area are 43.2 mm, 51.1 mm and 68.5 mm, for the 24-hour 10, 25 and 200-year storm events, respectively. The probable maximum precipitation (PMP) is estimated to be 219.1 mm.

2.8 POTENTIAL EVAPOTRANSPIRATION (LAKE EVAPORATION)

There are no pan evaporation data available for the Project area and no evaporation values given for regional climate stations, which is not unusual given the difficulty in reliably collecting these data. Accordingly, evaporation values for the site were estimated on the basis of evaporation equations, and more particularly, potential evapotranspiration (PET) equations. PET is defined as the amount of evapotranspiration that would occur given an infinite supply of water from a crop surface, and is believed to reasonably represent lake evaporation conditions (Ponce, 1989). Such equations are commonly used, and generally provide reasonable estimates, but it must be understood that there is inherent uncertainty with any PET estimate when no reliable site specific data are available for calibration.

Monthly PET values for the Project were estimated using the Thornthwaite (Thornthwaite, 1955) and Hargreaves equations. The Hargreaves equation indicated year-round evaporation at the Project, which is believed to be unrealistic, and the results of this method have been discounted. The benefit of the Thornthwaite equation over other methods is that the equation only requires inputs of temperature values, which are usually available for a given project area. A limiting factor of the Thornthwaite equation is that 12 months of data in a year are always required; otherwise all data from the respective year must be ignored. Using the average monthly temperature values from the AJAXMET climate station, the Thornthwaite equation (measured) predicts reasonably consistent PET values for 2010, 2011 and 2012, ranging from 524 mm to 585mm, as shown in Table 2.12. Use of the long-term synthetic temperature series developed in Section 2.4 results in a mean annual PET of approximately 585mm, with mean monthly values ranging from zero in the winter to 130 mm in July. These values are considered to be reasonably representative of lake evaporation.

The Hydrologic Atlas of Canada indicates mean annual lake evaporation for the region of between 600 and 700 mm (Natural Resources Canada, 1978). This estimate is higher than the Thornthwaite estimate, which is not unexpected because the Atlas provides estimates for valley sites, which are typically warmer and therefore experience more evaporation than higher elevation sites in the same region. Since the Project site is at an elevation of 950m, it is expected that the calculated value would be lower than the Atlas value.

It should be noted that there is evidence in the historical climate records of a trend towards warmer temperatures, and accordingly slightly greater evaporation might occur than that estimated. However, any increases are likely to fall well within the uncertainty associated with the current estimates, and therefore the potential for such increases were not directly considered in the presented values.

2.9 SUBLIMATION

Sublimation is the process by which moisture is returned to the atmosphere directly from snow and ice without passing through the liquid phase (Liston and Sturm, 2004). The processes causing and influencing sublimation are not well understood, and many estimates and methods of estimation found in literature are site-specific, subject to significant uncertainty, and not easily extrapolated.

Sublimation values can vary substantially according to a number of factors, most notably terrain characteristics, vegetation cover, wind speed and humidity. Sublimation was assumed to be distributed fairly evenly over the period of November through February, when precipitation predominantly occurs as snow. Sublimation at the Project location was estimated to be 28 mm for the winter season. This estimate is roughly based on a general sublimation rate of approximately 30% of the average winter snowfall of 94 mm. This rate and the estimated sublimation total are generally consistent with values reported in the literature (Montesi et al., 2004; Strasser et al., 2008; Winkler and Moore, 2010).

The sublimation estimate is based on historical snowfall conditions, but as discussed in Section 4.1, there is evidence suggesting the possibility of generally warmer temperatures in the future, and accordingly less snowfall and less associated sublimation. However, any possible decreases in sublimation are likely within the uncertainty associated with the current estimates, and therefore the potential for such decreases were not directly considered in the presented values.

3 – CLIMATE CHANGE

There is a general consensus in the scientific community that the global atmosphere is warming and that worldwide climate patterns are changing as a result. According to the Pacific Climate Impacts Consortium (PCIC), mean temperatures in British Columbia are expected to increase by approximately 1.8 °C by the 2050s. Winter precipitation is predicted to increase by 8% with summer precipitation expected to decrease by 1%, and winter snowfall predicted to decrease by 58% (PCIC 2012). The estimated values represent the projected change from the 1961-1990 baseline. These changes could in turn affect streamflow patterns as warmer winters would raise freezing levels and decrease the amount of precipitation stored as snow during the winter months, which would also result in lower freshet flows due to the decreased snowpack.

Given these predicted changes in climate, there is some concern about whether or not historical flow and climate records reasonably represent conditions that might be expected over the next 30 years through project operations, or even longer time scales through project closure. In an effort to address this concern, historic trends of annual temperature, precipitation and unit runoff were examined. The Kamloops Airport climate station has the longest climate record available in the region (61 years of complete data: 1951-2011). This dataset was used to analyze long-term regional climate trends applicable to the project area.

3.1 CLIMATE TRENDS

Three temperature data sets were assessed and their trends are shown on Figure 3.1. All three trends indicate an overall increase in temperature and are significant at the 10% level, which means that one can be 90% confident that they're not simply due to random chance. The annual mean temperature appears to be increasing at a rate of approximately 0.3 °C per decade, which is generally consistent with the PCIC estimate quoted above.

Trend plots of annual precipitation, rain and snow are presented on Figure 3.2, and indicate a very slight increase in annual precipitation of approximately 3 mm per decade, which is not significant at the 10% level. However, more pronounced and statistically significant trends are evident in the rainfall and snowfall data, with rainfall showing an increase and snowfall showing a decrease, which is a pattern consistent with the noted increase in temperature.

A trend plot of annual maximum daily precipitation is presented on Figure 3.3, and it indicates no statistically significant trend.

These findings suggest that there may be persistent changes occurring in the climate, particularly with regards to temperature, and accordingly that mean climate conditions may be a little different (warmer, more rain, less snow) in the future than during the period of historical record.

3.2 CLIMATE CYCLES

Temperatures in BC are influenced by strong atmospheric and oceanic climate forcings, and accordingly the increasing temperature trend may be more attributable to climate cycles than unidirectional climate change. The two to five year El Nino Southern Oscillation (ENSO) is one such forcing, but even more prevalent is the Pacific Decadal Oscillation (PDO), which is a 20 to 30 year general fluctuation of surface sea water temperatures (above or below normal) in the North Pacific Ocean. This fluctuation is illustrated on Figure 3.4, which presents the variability of the PDO over

the past century. The cold phase of the PDO is generally associated with colder and wetter conditions in BC, and the warm phase is associated with warmer and drier conditions (Pike et al., 2008a). The Williams Lake (1961-2012) climate record spans two PDO cycles: the 1961-1976 period is during a cool phase, the 1977 to early 1998 period is during a generally warm phase, and the last decade has been a transition period, with the next cold phase likely just beginning, as indicated on Figure 3.4. Figure 3.5 presents the annual mean temperature trends for each phase of the PDO, and it is evident in this instance that the PDO is having very little influence, with a consistent increasing trend in all phases. Accordingly, it is reasonable to conclude that it is likely that increases in temperature will persist in the foreseeable future even with the expectation that we are entering the next cold phase of the PDO.

3.3 OTHER COMPARABLE GHG CONTRIBUTING FACILITIES IN BC

In accordance with the AIR/EISG, contributions from greenhouse gas emitting facilities in the province are included in the baseline report. British Columbia is responsible for only a small fraction of GHG emission, estimated to contribute approximately 8.9% of Canada's GHG emissions in 2008 (Live Smart BC 2015).

The B.C. Reporting Regulation of the *Greenhouse Gas Reduction (Cap and Trade) Act* requires that industrial facilities in BC that emit 10,000 tonnes or more of CO₂ eq per year report their emissions to government on an annual basis. The following information related to the mining industry can be found in the BC Greenhouse Gas Inventory Report 2012: (Ministry of the Environment 2012):

- The Energy Sector (which includes emissions from stationary and transport fuel combustion and fugitive emissions from the fossil fuel industry) accounted for 48,587 kt of BC GHG emissions in 2012 (79% of the total), an increase of 1.5% since 2009.
- Emissions from energy sub-sector 'a' (Stationary Combustion Sources) totalled 20,438 kt; emissions from energy sub-sector 'b' (Transport) were 23,334 kt.
- Stationary Combustion Sources from the mining and oil and natural gas extraction category totalled 1,759 kt CO₂ eq; this represented an increase of 24.2% and 520.0% in the 3-year and 10-year trends, respectively.
- Road Transportation accounts for the majority of GHG emissions in the energy Transport sub-sector category, with 14,581 kt CO₂ eq; the 3-year and 10-year trends showed a decrease of 6.1% and 0.7%, respectively.
- Off-road gasoline and diesel emissions are included as "other transportation", and totalled 3,572 kt CO₂ eq in 2012; the 3-year trend showed an increase of 49.8%; the key factors influencing this trend were described as forest, mining and agriculture off-road vehicle activity.
- Afforestation, Deforestation and other land use conversions produced a total of 3,558 kt in 2012, equal to 5.8% of total BC emissions; the 3-year trend showed an increase of 7.5%.

The BC government has introduced and enacted a number of additional pieces of climate-action legislation outlining the approach it is taking to reduce GHG emissions, including the *Greenhouse Gas Reduction Targets Act*, the *Clean Energy Act*, and the *Carbon Tax Act*.

3.4 COMMUNITY ENERGY EFFICIENCIES INVENTORY

The city of Kamloops signed the BC Climate Action Charter in 2007, pledging to significantly cut GHG emissions, and is working to become a carbon neutral government as part of its commitment

(City of Kamloops website, August 26, 2014). Local governments that are signatories to the Charter commit to measuring and reporting on their community's GHG emissions profile; work toward carbon neutrality in corporate emissions; plan for more compact, more energy efficient communities; and report annually on their progress toward achieving these goals (Ministry of Environment website, August 26, 2014). The city also set a goal of achieving municipal corporate carbon neutrality by 2012 and investing 100% of carbon offsets through local initiatives in partnership with other public and private sector entities (Hardman 2014). Annual corporate emissions reported by the city of Kamloops in 2013 were approximately 8,472 tonnes CO₂eq for emissions from services delivered directly by the local government and approximately 287 tonnes CO₂eq for emissions from contracted services (Hardman 2014). The city Corporate Energy and Emissions Plan is currently in development.

3.5 SUMMARY

A review of long-term regional climate and streamflow records indicates that hydrometeorological conditions may be slightly different in the future than during the period of historical record used for characterizing the climate and hydrology of the Project area. In particular, no changes are expected in terms of storm severity or peak flows, but temperatures are likely to be a little warmer (~0.5 °C over the next couple of decades), there is likely to be slightly more rain and less snow, and streamflow patterns will accordingly adjust with slightly higher winter base flows and slightly lower summer freshet flows. However, quantifying the changes with any certainty is not realistic, and there will still be considerable year to year variability in all conditions.

4 – REFERENCES

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5 – CERTIFICATION

This report was prepared, reviewed and approved by the undersigned.

ORIGINAL SIGNED

Prepared:

Jake McQueen, B.Sc.
Staff Scientist

ORIGINAL SIGNED

Reviewed:

Jaime Cathcart, Ph.D., P.Eng.
Specialist Hydrotechnical Engineer | Associate

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Approval that this document adheres to Knight Piésold Quality Systems:



TABLE 2.1

**KGHM AJAX MINING INC.
AJAX PROJECT**

AJAXMET CLIMATE STATION DETAILS

Print May/04/15 14:03:48

Station Name	Total Years of Record	Complete Years of Record	Start Year	End Year	Latitude	Longitude	Elevation (m)
AJAXAQ-1	0.5	0	2014	2014	50°34'49"N	120°26'8"W	1051
AJAXMET	5	3	2010	2014	50°38'32"N	120°27'44"W	950

M:\1\01\00246\33\A\Data\Task 3000 - Update Climatology Baseline\Analysis\7_AJAX Station.xlsx]Table 2.1

0	12DEC'14	ISSUED WITH REPORT VA101-246/33-3	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

TABLE 2.2

**KGHM AJAX MINING INC.
AJAX PROJECT**

REGIONAL CLIMATE STATION DETAILS

BRITISH COLUMBIA FORESTS, LANDS, and NATURAL RESOURCE OPERATIONS

Print May/04/15 14:10:12

Station Name	Station ID	Lat/Long	Active	Elevation (m)	Distance from Site (TSF) (km)	Start Year	End Year	Span of Record (years)	Complete Years	Mean Annual Precipitation (mm)
Afton	322	50.673 -120.482	Yes	780	4	1988	2014	27	6	234
Leighton Lake	307	50.615 -120.836	Yes	1167	21.3	1982	2014	33	6	292

ENVIRONMENT CANADA

Station Name	Station ID	Lat/Long	Active	Elevation (m)	Distance from Site (km)	Start Year	End Year	Span of Record (years)	Complete Years	Mean Annual Precipitation (mm)
Monte Creek	116NJ9F	50.653 -119.954	No	351	40.9	1986	2007	22	20	360
Pinantan Lake	1166JFR	50.716 -119.945	No	960	42.1	1986	2006	21	7	479
Sun Peaks (Lower)	116Q20D	50.882 -119.882	No	1260	52.4	1994	2008	15	0	N/A
Sun Peaks (Upper)	116QK0M	50.902 -119.918	Yes	2040	51.3	1994	2013	20	0	N/A
Sun Peaks Mountain	1168204	50.903 -119.911	No	1814	51.8	1980	2008	29	1	1024
Kamloops Valleyview	1163875	50.675 -120.253	No	347	19.9	1962	2005	44	32	283
Kamloops Pratt Road	116C8P0	50.600 -120.200	Yes	640	24.2	1986	2014	29	23	374
Kamloops Rayleigh	116L87J	50.818 -120.295	No	357	25.1	1986	2002	17	7	340
McLure	1165030	51.047 -120.222	No	381	49.4	1967	2009	43	35	450
Kamloops Airport	1163780	50.708 -120.450	Yes	345	6.9	1953	2014	62	60	269
Kamloops Cherry Creek	1163814	50.683 -120.583	No	556	4.9	1970	1974	5	3	258
Highland Valley Lornex	1123469	50.467 -121.017	No	1268	40.2	1967	2011	45	31	391
Highland Valley BCCL	1123468	50.500 -121.000	No	1470	37.2	1966	1989	24	10	385
Logan Lake	1124668	50.500 -120.817	No	1101	26.3	1971	2005	35	8	394
Red Lake	1166658	50.933 -120.800	Yes	1162	41	1974	2013	40	23	493
Criss Creek	1162177	51.033 -120.733	Yes	1122	45.3	1988	2013	26	23	449
Kamloops Afton Mines	1163790	51.666 -120.500	No	701	5	1977	1993	17	13	305

M:\101\00246\33\A\Data\Task 3000 - Update Climatology Baseline\Analysis\9_Regional climate station details.xlsx\Table 2.2 Climate Stations

NOTES:

- "COMPLETE YEARS" REFERS TO TOTAL PRECIPITATION DATA.
- BRITISH COLUMBIA FORESTS, LANDS, AND NATURAL RESOURCE OPERATIONS DATA DERIVED FROM <<http://bcwildfire.ca/weather/stations.htm>>.
- ENVIRONMENT CANADA DATA DERIVED FROM <www.climate.weatheroffice.ec.gc.ca/climatedata/canada_e.html>.

1	12DEC14	ISSUED WITH REPORT VA101-246/33-3	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

TABLE 2.3

**KGHM AJAX MINING INC.
AJAX PROJECT**

**AJAXMET, AJAXAQ-1 AND BC FLNRO AFTON CLIMATE STATIONS
MONTHLY MEAN TEMPERATURES**

Print May/04/15 14:11:10

Station	Period	Monthly Mean Temperature (°C)												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
AJAXMET	2010	-	-	-	-	-	-	18.7	16.8	11.3	7.6	-3.2	-3.5	-
	2011	-4.8	-6.9	1.0	3.5	9.2	13.3	15.6	17.9	15.5	5.9	-1.5	-2.8	5.5
	2012	-4.8	-2.7	1.0	6.4	10.3	12.4	19.0	19.0	14.6	5.7	0.4	-3.5	6.5
	2013	-6.0	-0.6	2.1	5.4	11.9	14.0	19.6	18.7	14.3	4.9	-2.7	-5.9	6.3
	2014	-3.5	-7.7	-0.1	5.9	10.9	14.2	20.3	18.7	13.1	8.5	-	-	
	Mean	-4.8	-4.5	1.0	5.3	10.6	13.5	18.6	18.2	13.8	6.5	-1.7	-3.9	6.1
AJAXAQ-1	2014	-	-	-	-	-	-	-	16.7	10.9	6.6	-4.5	-	-
	Mean	-	-	-	-	-	-	-	16.7	10.9	6.6	-4.5	-	-
Afton	2010	-0.2	1.3	4.7	7.8	10.8	15.2	20.4	18.2	12.9	8.6	-2.0	-2.7	7.9
	2011	-5.0	-5.7	2.6	5.5	10.9	15.1	17.4	19.5	16.6	6.8	-0.5	-2.3	6.7
	2012	-4.1	-2.3	2.5	7.9	12.0	14.1	20.5	20.3	15.6	6.7	1.6	-2.7	7.7
	2013	-5.5	-0.1	3.4	7.1	13.4	15.6	21.3	20.0	15.6	5.5	-2.0	-6.0	7.4
	2014	-3.0	-6.9	0.9	7.4	12.4	15.9	21.8	20.0	14.0	9.4	-	-	
	Mean	-3.6	-2.7	2.8	7.1	11.9	15.2	20.3	19.6	14.9	7.4	-0.7	-3.4	7.4

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NOTES:

1. BLANK MONTHS HAVE MISSING OR INCOMPLETE DATA (INCOMPLETE HAS BEEN DEFINED AS MONTHS WITH MORE THAN TWO DAYS OF MISSING DATA).
2. MONTHLY AVERAGES HAVE BEEN CALCULATED BASED ON AVERAGE DAILY DATA.

0	12DEC'14	ISSUED WITH REPORT VA101-246/33-3	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

TABLE 2.4

**KGHM AJAX MINING INC.
AJAX PROJECT**

**PROJECT SITE
ESTIMATED LONG-TERM TEMPERATURES**

Print May/04/15 14:12:40

Value	Monthly Temperature (°C)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	-4.5	-2.4	1.5	6.5	11.1	14.7	18.7	17.8	12.9	5.6	-0.1	-4.9	6.4
Standard Deviation	2.3	2.5	1.7	1.2	1.6	1.4	1.6	1.3	1.6	1.2	1.7	2.6	0.6
Maximum	-0.5	2.0	3.8	8.9	14.8	18.0	21.1	19.6	15.2	8.4	3.5	-1.7	7.2
Minimum	-7.0	-7.7	-2.7	3.8	8.1	12.8	15.8	13.6	10.0	4.0	-2.9	-9.8	5.7

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0	12DEC'14	ISSUED WITH REPORT VA101-246/33-3	JMQ	JGC
REV	DATE	DESCRIPTION	PREPD	REVD

TABLE 2.5

**KGHM AJAX MINING INC.
AJAX PROJECT**

**AJAXMET, AJAXAQ-1 AND BC FLNRO AFTON CLIMATE STATIONS
MONTHLY MEAN RELATIVE HUMIDITY**

Print May/04/15 14:13:55

Station	Period	Monthly Mean Relative Humidity (%)												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
AJAXMET	2010	-	-	-	-	-	-	43.1	53.4	68.6	66.9	78.8	84.2	-
	2011	84.5	72.8	71.3	55.6	62.8	59.5	55.7	42.6	44.1	68.6	72.8	79.7	64.2
	2012	72.1	81.5	61.7	58.6	47.1	65.2	50.7	43.4	46.0	67.8	85.3	87.3	63.9
	2013	91.4	76.5	66.6	58.1	55.6	64.9	42.1	49.6	58.6	74.4	89.7	85.0	67.7
	2014	88.4	70.0	69.2	56.6	61.2	53.8	42.0	53.2	58.1	71.0	-	-	62.3
	Mean	84.1	75.2	67.2	57.2	56.7	60.9	46.7	48.4	55.1	69.7	81.7	84.1	65.6
AJAXAQ-1	2014	-	-	-	-	-	-	-	56.4	62.3	73.7	77.3	-	-
	Mean	-	-	-	-	-	-	-	56.4	62.3	73.7	77.3	-	-
Afton	2010	86.6	88.2	60.9	52.8	58.0	57.6	42.9	53.8	67.5	68.1	78.5	86.5	66.8
	2011	88.7	73.1	70.8	49.7	58.3	54.7	52.7	40.2	43.7	67.8	68.5	76.1	62.0
	2012	66.8	80.3	57.2	55.9	44.5	63.9	51.3	43.5	48.7	67.6	84.7	88.3	62.7
	2013	93.5	81.6	68.5	58.2	58.4	70.7	42.8	54.7	64.3	82.2	95.8	91.7	71.9
	2014	94.0	73.4	74.9	60.7	66.5	45.7	45.7	59.7	66.6	80.2	-	-	66.7
	Mean	85.9	79.3	66.4	55.5	57.2	58.5	47.1	50.4	58.2	73.2	81.9	85.6	66.6

M:\1101100246\33\A\Data\Task 3000 - Update Climatology Baseline\Analysis\2_RelativeHumidity.xlsx\Table 2.5

NOTES:

1. BLANK MONTHS HAVE MISSING OR INCOMPLETE DATA (INCOMPLETE HAS BEEN DEFINED AS MONTHS WITH MORE THAN TWO DAYS OF MISSING DATA).
2. MONTHLY AVERAGES HAVE BEEN CALCULATED BASED ON AVERAGE DAILY DATA.

0	12DEC14	ISSUED WITH REPORT VA101-246/33-3	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

TABLE 2.6

**KGHM AJAX MINING INC.
AJAX PROJECT**

**PROJECT SITE
ESTIMATED LONG-TERM RELATIVE HUMIDITY**

Print May/04/15 14:15:08

Value	Monthly Relative Humidity (%)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	88.5	79.5	66.1	56.5	56.2	57.4	48.6	50.8	59.7	74.0	84.2	87.8	64.3
Standard Deviation	8.2	7.1	4.8	7.7	6.9	7.3	8.3	8.4	8.6	5.2	6.9	3.5	2.0
Maximum	99.8	99.8	75.5	73.8	72.2	71.4	66.9	68.7	74.0	85.2	97.3	92.1	67.5
Minimum	67.6	70.1	58.1	43.0	42.5	44.1	34.6	38.5	45.1	67.7	69.3	76.7	61.6

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0	12DEC14	ISSUED WITH REPORT VA101-246/33-3	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REVD

TABLE 2.7

**KGHM AJAX MINING INC.
AJAX PROJECT**

**AJAXMET CLIMATE STATION
WIND SPEED SUMMARY**

Print May/04/15 14:21:19

		Monthly Mean Wind Speed (m/s)												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
AJAXAQ-1	2014	-	-	-	-	-	-	-	2.1	2.7	2.9	2.8	-	-
	Mean	-	-	-	-	-	-	-	2.1	2.7	2.9	2.8	-	-
AJAXMET	2010	-	-	-	-	-	2.4	2.3	2.0	2.4	2.3	2.8	2.5	-
	2011	1.8	2.7	2.7	2.7	2.2	2.4	2.3	2.3	2.8	2.2	2.9	2.3	2.4
	2012	3.1	2.0	3.0	2.7	2.5	2.6	2.2	2.3	1.8	2.2	2.7	2.1	2.4
	2013	1.6	2.0	2.3	2.8	2.2	2.3	2.5	2.2	2.5	1.7	1.6	1.7	2.1
	2014	1.6	2.4	2.3	2.5	2.1	2.3	2.3	1.8	2.0	2.5	-	-	-
	Mean	2.0	2.3	2.6	2.7	2.3	2.4	2.3	2.1	2.3	2.2	2.5	2.1	2.3

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NOTES:

1. BLANK MONTHS HAVE MISSING OR INCOMPLETE DATA (INCOMPLETE HAS BEEN DEFINED AS MONTHS WITH MORE THAN TWO DAYS OF MISSING DATA).
2. MONTHLY AVERAGES HAVE BEEN CALCULATED BASED ON AVERAGE HOURLY DATA.

0	02DEC14	ISSUED WITH REPORT VA101-246/33-3	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

TABLE 2.8

**KGHM AJAX MINING INC.
AJAX PROJECT**

**SITE CLIMATE STATION
MONTHLY PRECIPITATION RECORDS**

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Station	Period	Monthly Mean Precipitation (mm)												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
AJAXMET	2012	-	-	-	-	-	-	-	-	-	-	-	26.4	-
	2013	18.4	3.8	29.7	27.9	67.8	76.1	3.1	18.4	31.1	8.7	41.0	26.3	352.2
	2014	10.7	5.3	21.1	34.5	40.6	44.8	35.0	45.0	19.7	-	-	-	-
	Mean	14.5	4.5	25.4	31.2	54.2	60.4	19.0	31.7	25.4	8.7	41.0	26.3	352.2
AJAXAQ-1	2014	-	-	-	-	-	-	-	57.4	18.0	18.5	19.6	-	-
	Mean	-	-	-	-	-	-	-	57.4	18.0	18.5	19.6	-	-
PROJECT SITE LONG TERM ESTIMATE	Mean	23.4	14.5	11.9	19.2	32.8	43.4	42.4	32.0	35.8	15.5	28.0	37.0	336.0
KAMLOOPS AIRPORT	2012	14.8	25.5	6.3	25.4	8.3	74.4	49.2	10	7.8	16.9	20.7	36.4	295.7
	2013	21.6	1	18.7	21.8	49.4	44.3	1.2	15.6	24.8	6.4	40.9	21.4	267.1
	2014	8.8	3.8	17.7	12.2	41.2	31.4	30.5	51.1	22.2	10	-	-	
	Mean	15.1	10.1	14.2	19.8	33.0	50.0	27.0	25.6	18.3	11.1	30.8	28.9	
	Long-term Mean	25.8	14.3	11.8	12.7	23.6	34.3	26.7	25.4	25.3	17.3	23.2	28.4	268.8

M:\1\01\00246\33\A\Data\Task 3000 - Update Climatology Baseline\Analysis\12_Precipitation_Monthly Record.xlsx\TTable 2.8

NOTES:

1. BLANK MONTHS HAVE MISSING OR INCOMPLETE DATA (INCOMPLETE HAS BEEN DEFINED AS MONTHS WITH MORE THAN TWO DAYS OF MISSING DATA).
2. MONTHLY VALUES HAVE BEEN CALCULATED BASED ON DAILY DATA.
3. KAMLOOPS AIRPORT LONG-TERM VALUES FROM TABLE 2.9.

1	30APR'15	ISSUED WITH REPORT VA101-246/33-3	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

TABLE 2.9

**KGHM AJAX MINING INC.
AJAX PROJECT**

**REGIONAL AND PROJECT SITE CLIMATE STATIONS
MONTHLY PRECIPITATION, RAIN, AND SNOW DISTRIBUTIONS**

Print May/04/15 14:26:04

Station	Value	Mean Monthly Values												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Kamloops Airport Elevation: 345 m	Precipitation (mm)	25.8	14.3	11.8	12.7	23.6	34.3	26.7	25.4	25.3	17.3	23.2	28.4	269
	% Annual Precip.	10%	5%	4%	5%	9%	13%	10%	9%	9%	6%	9%	11%	100%
	Rain (mm)	4.0	5.2	7.7	12.4	23.6	34.3	26.7	25.4	25.3	16.9	13.3	6.4	201
	% Rain	16%	37%	65%	98%	100%	100%	100%	100%	100%	98%	57%	23%	75%
	Snow Water Equivalent (mm)	21.8	9.0	4.1	0.3	0.0	0.0	0.0	0.0	0.0	0.4	9.9	22.0	68
	% Snow	84%	63%	35%	2%	0%	0%	0%	0%	0%	2%	43%	77%	25%
Kamloops Afton Mines Elevation: 701 m	Precipitation (mm)	21.3	13.2	10.8	17.4	29.8	39.4	38.5	29.1	32.5	14.1	25.4	33.6	305
	% Annual Precip.	7%	4%	4%	6%	10%	13%	13%	10%	11%	5%	8%	11%	100%
	Rain (mm)	1.4	4.8	8.2	16.7	29.4	39.4	38.5	29.1	32.5	13.7	10.6	3.7	228
	% Rain	6%	36%	76%	96%	99%	100%	100%	100%	100%	97%	42%	11%	75%
	Snow Water Equivalent (mm)	19.9	8.4	2.6	0.7	0.4	0.0	0.0	0.0	0.0	0.4	14.8	29.9	77
	% Snow	94%	64%	24%	4%	1%	0%	0%	0%	0%	3%	58%	89%	25%
Kamloops Pratt Road Elevation: 640 m	Precipitation (mm)	27.1	17.0	20.9	23.5	39.7	48.8	37.1	28.8	32.8	32.1	35.8	30.9	374
	% Annual Precip.	7%	5%	6%	6%	11%	13%	10%	8%	9%	9%	10%	8%	100%
	Rain (mm)	3.6	5.7	10.9	20.8	38.5	51.0	36.7	28.8	32.8	30.7	16.1	3.5	279
	% Rain	13%	34%	52%	88%	97%	105%	99%	100%	100%	96%	45%	11%	75%
	Snow Water Equivalent (mm)	23.5	11.2	10.1	2.7	1.2	-2.2	0.4	0.0	0.0	1.4	19.6	27.3	95
	% Snow	87%	66%	48%	12%	3%	-5%	1%	0%	0%	4%	55%	89%	25%
Red Lake Elevation: 1162 m	Precipitation (mm)	38.2	25.9	31.1	35.2	50.5	68.1	49.7	36.2	36.6	34.9	40.8	46.0	493
	% Annual Precip.	8%	5%	6%	7%	10%	14%	10%	7%	7%	7%	8%	9%	100%
	Rain (mm)	1.5	1.0	3.8	19.8	44.7	67.4	49.7	36.2	35.2	23.5	6.6	0.6	290
	% Rain	4%	4%	12%	56%	89%	99%	100%	100%	96%	68%	16%	1%	59%
	Snow Water Equivalent (mm)	36.8	24.9	27.3	15.4	5.8	0.6	0.0	0.0	1.4	11.3	34.2	45.4	203
	% Snow	96%	96%	88%	44%	11%	1%	0%	0%	4%	32%	84%	99%	41%
Logan Lake Elevation: 1101 m	Precipitation (mm)	32.7	21.9	22.2	21.9	40.9	48.8	38.7	40.4	26.2	29.3	37.0	34.2	394
	% Annual Precip.	8%	6%	6%	6%	10%	12%	10%	10%	7%	7%	9%	9%	100%
	Rain (mm)	7.3	3.0	4.9	13.5	35.4	47.8	38.7	40.4	25.7	20.8	9.0	3.8	250
	% Rain	22%	14%	22%	61%	86%	98%	100%	100%	98%	71%	24%	11%	63%
	Snow Water Equivalent (mm)	25.3	18.9	17.2	8.5	5.6	1.0	0.0	0.0	0.5	8.5	28.0	30.4	144
	% Snow	78%	86%	78%	39%	14%	2%	0%	0%	2%	29%	76%	89%	37%
Project Site (AJAXMET) Elevation: 950 m	Precipitation (mm)	23.4	14.5	11.9	19.2	32.8	43.4	42.4	32.0	35.8	15.5	28.0	37.0	336
	% Annual Precip.	7%	4%	4%	6%	10%	13%	13%	10%	11%	5%	8%	11%	100%
	Rain (mm)	2.3	2.9	4.2	16.3	32.8	43.4	42.4	32.0	35.8	13.2	5.6	3.7	235
	% Rain	10%	20%	35%	85%	100%	100%	100%	100%	100%	85%	20%	10%	70%
	Snow Water Equivalent (mm)	21.1	11.6	7.7	2.9	0.0	0.0	0.0	0.0	0.0	2.3	22.4	33.3	101
	% Snow	90%	80%	65%	15%	0%	0%	0%	0%	0%	15%	80%	90%	30%

M:\1101\00246\33\A\Task 3000 - Update Climatology Baseline\Analysis\3_Precipitation_Elevation_updated.xlsx\Table 2.9

NOTES:

1. BLANK MONTHS HAVE MISSING OR INCOMPLETE DATA (INCOMPLETE HAS BEEN DEFINED AS MONTHS WITH MORE THAN TWO DAYS OF MISSING DATA).
2. MONTHLY AVERAGES HAVE BEEN CALCULATED BASED ON AVERAGE DAILY DATA.

0	12DEC14	ISSUED WITH REPORT VA101-246/33-3	JMQ	JGC
REV	DATE	DESCRIPTION	PREPD	REVD

TABLE 2.10

**KGHM AJAX MINING INC.
AJAX PROJECT**

**PROJECT SITE
WET AND DRY YEAR PRECIPITATION**

Print May/28/15 8:27:51

Return Period		Precipitation (mm)
Dry	1:10 year dry (mean - 1.282 s.d.)	259
	1:20 year dry (mean - 1.645 s.d.)	238
	1:50 year dry (mean - 2.054 s.d.)	213
	1:100 year dry (mean - 2.326 s.d.)	197
	1:200 year dry (mean - 2.575 s.d.)	182
Wet	1:10 year wet (mean + 1.282 s.d.)	413
	1:20 year wet (mean + 1.645 s.d.)	434
	1:50 year wet (mean + 2.054 s.d.)	459
	1:100 year wet (mean + 2.326 s.d.)	475
	1:200 year wet (mean + 2.575 s.d.)	490

M:\1101\00246\33\A\Data\Task 3000 - Update Climatology Baseline\Analysis\4_Wet & Dry Year Precip.xls]Table 2.10 Afton Wet & Dry

NOTES:

1. PRECIPITATION ESTIMATES FOR ELEVATION 915 m, WITH A MEAN ANNUAL PRECIPITATION OF 336 mm.
2. STANDARD DEVIATION ESTIMATED FROM A COEFFICIENT OF VARIATION VALUE OF 0.18, CALCULATED AS THE AVERAGE OF THE COEFFICIENT OF VARIATIONS FROM SEVEN REGIONAL CLIMATE STATIONS.
3. S.D. = STANDARD DEVIATION = MEAN MULTIPLIED BY COEFFICIENT OF VARIATION.
4. ESTIMATED FREQUENCY FACTOR VALUES ASSUME A NORMAL DISTRIBUTION OF ANNUAL PRECIPITATION.

1	25MAY'15	ISSUED WITH REPORT VA101-246/33-3	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

TABLE 2.11

**KGHM AJAX MINING INC.
AJAX PROJECT**

PROJECT SITE INTENSITY-DURATION-FREQUENCY DATA

Print May/04/15 14:29:53

Rainfall		
Duration	Mean (mm)	St. Dev. (mm)
5 min	3.8	1.8
10 min	5.9	2.4
15 min	7.3	2.5
30 min	9.5	2.7
1 hr	10.3	3.0
2 hr	13.2	3.6
6 hr	20.5	4.7
12 hr	23.5	9.5
24 hr	29.3	10.7

EV1 Distribution	
Frequency Factor	Return Period (years)
-0.164	2
0.719	5
1.305	10
1.635	15
1.866	20
2.044	25
2.592	50
3.137	100
3.679	200
17.802	PMP

Return Period Rainfall Amounts (mm)

Duration	2 yrs	5 yrs	10 yrs	15 yrs	20 yrs	25 yrs	50 yrs	100 yrs	200 yrs	PMP
5 min	3.5	5.1	6.1	6.7	7.1	7.4	8.4	9.4	10.3	35.4
10 min	5.5	7.6	9.0	9.7	10.3	10.7	12.0	13.3	14.6	48.0
15 min	6.9	9.1	10.6	11.4	12.0	12.4	13.8	15.1	16.5	51.6
30 min	9.1	11.5	13.1	14.0	14.6	15.1	16.6	18.1	19.6	58.0
1 hr	9.8	12.4	14.1	15.1	15.8	16.3	17.9	19.6	21.2	63.0
2 hr	12.6	15.7	17.8	19.0	19.8	20.5	22.4	24.3	26.3	76.5
6 hr	19.7	23.9	26.7	28.3	29.4	30.2	32.8	35.4	38.0	104.9
12 hr	21.9	30.3	35.8	38.9	41.1	42.8	48.0	53.2	58.3	192.2
24 hr	27.6	37.0	43.2	46.8	49.2	51.1	57.0	62.8	68.5	219.1

Rainfall Intensity (mm/hr)

Duration	2 yrs	5 yrs	10 yrs	15 yrs	20 yrs	25 yrs	50 yrs	100 yrs	200 yrs	PMP
5 min	42.2	61.1	73.6	80.6	85.5	89.3	101.0	112.6	124.2	425.4
10 min	32.8	45.4	53.7	58.4	61.7	64.2	72.0	79.8	87.5	288.3
15 min	27.7	36.5	42.3	45.6	47.9	49.7	55.1	60.5	65.9	206.5
30 min	18.2	23.0	26.2	28.0	29.2	30.2	33.2	36.2	39.1	116.1
1 hr	9.8	12.4	14.1	15.1	15.8	16.3	17.9	19.6	21.2	63.0
2 hr	6.3	7.9	8.9	9.5	9.9	10.2	11.2	12.2	13.1	38.2
6 hr	3.3	4.0	4.5	4.7	4.9	5.0	5.5	5.9	6.3	17.5
12 hr	1.8	2.5	3.0	3.2	3.4	3.6	4.0	4.4	4.9	16.0
24 hr	1.1	1.5	1.8	1.9	2.1	2.1	2.4	2.6	2.9	9.1

M:\110100246\33\A\Data\Task 3000 - Update Climatology Baseline\Analysis\5_24hr rainfall.xlsx\Table 2.11_Kamloops

NOTES:

1. THE 24-HOUR MEAN AND STANDARD DEVIATION VALUES DERIVED FROM THE MOE KAMLOOPS AIRPORT DAILY RECORD TRANSLATED TO THE PROJECT SITE BY MULTIPLYING BY 1.13 TO CONVERT TO 24-HOUR VALUES AND ADDING 4.8% PER 100 m ELEVATION GAIN TO ACCOUNT FOR OROGRAPHIC EFFECTS.

0	12DEC14	ISSUED WITH REPORT VA101-246/33-3	JMO	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

TABLE 2.12

**KGHM AJAX MINING INC.
AJAX PROJECT**

**PROJECT SITE
ESTIMATED LONG-TERM POTENTIAL EVAPOTRANSPIRATION**

Print May/04/15 14:39

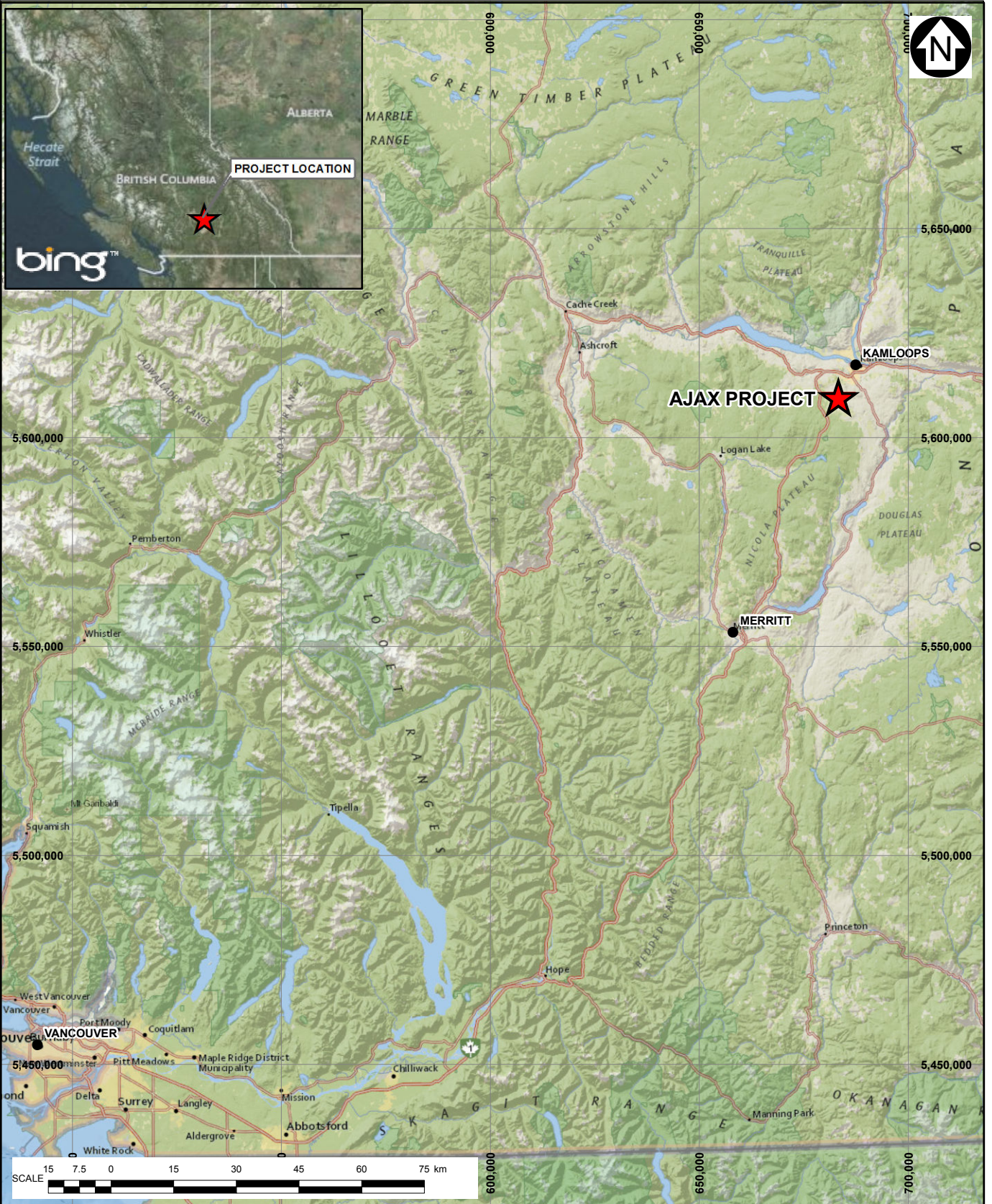
Method	Year	Evapotranspiration (mm)												Annual
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Thornthwaite equation Synthetic	1989	-	-	16	48	77	110	128	100	70	30	1	0	-
	1990	0	-	-	46	70	97	130	117	79	26	0	0	-
	1991	0	9	1	44	77	92	124	114	72	31	0	0	564
	1992		4	26	49	86	125	123	115	55	30	2	0	615
	1993	0	0	9	39	102	98	100	-	-	-	-	-	-
	1994	0	0	21	49	83	100	145	111	80	26	0	0	613
	1995	0	0	8	37	89	112	126	88	78	25	0	0	562
	1996	1	0	10	43	59	95	134	113	56	20	7	-	-
	1997	-	0	5	34	57	97	113	113	70	35	-	-	-
	1998	-	-	0	33	95	108	147	125	81	25	8	0	623
	1999	0	0	9	38	65	91	111	118	74	25	8	0	539
	2000	-	-	23	45	67	100	119	108	63	28	0	0	-
	2001	-	-	13	38	80	92	120	116	76	22	15	0	-
	2002	-	0	0	37	64	115	134	112	66	20	3	0	-
	2003	0	0	8	39	70	115	144	123	74	41	0	-	-
	2004	0	0	34	54	80	119	140	119	59	27	2	0	634
	2005	0	0	21	49	91	93	124	118	59	32	0	0	587
	2006	0	0	10	46	79	114	142	117	73	27	0	0	607
	2007	0	0	17	37	86	100	142	106	61	27	0	0	576
	2008	0	0	7	23	84	101	130	113	70	27	6	0	561
2009	0	0	0	37	79	113	146	122	81	21	7	0	606	
2010	0	2	20	40	67	97	132	108	64	36	0	0	566	
2011	0	0	9	27	67	97	112	115	83	28	0	0	538	
2012	0	0	9	41	75	90	133	120	76	27	3	0	574	
2013	0	0	13	36	83	100	138	118	78	22	0	0	590	
2014	0	0	0	38	77	102	141	119	69	40	0	-	-	
Average		0	1	12	40	77	103	130	114	71	28	3	0	585
Thornthwaite equation Measured	2010	-	-	-	-	-	101	131	108	62	37	0	0	-
	2011	0	0	6	22	64	94	110	115	85	29	0	0	524
	2012	0	0	6	39	72	88	133	122	80	28	2	0	569
	2013	0	0	12	33	82	99	137	119	78	24	0	0	585
	2014	0	0	0	36	76	100	142	120	72	41	-	-	-
Long-term est.		0	0	6	33	73	96	131	117	75	32	0	0	559

M:\110100246\33\A\Data\Task 3000 - Update Climatology Baseline\Analysis\6_PET_calculator.xlsx\Table 2.12

NOTES:

- POTENTIAL EVAPOTRANSPIRATION VALUES CALCULATED USING THE THORNTHWAITE EQUATION WERE BASED ON MEAN MONTHLY TEMPERATURE VALUES FOR THE CURRENT TEMPERATURE RECORD COLLECTED IN 2010-2014. THE THORNTHWAITE EQUATION ASSUMES THAT WHEN THE MEAN MONTHLY TEMPERATURE IS ZERO, PET IS ZERO.
- THE LONG-TERM POTENTIAL EVAPOTRANSPIRATION VALUES ARE BASED ON THE LONG-TERM MEAN MONTHLY TEMPERATURE VALUES ESTIMATED FOR THE PROJECT SITE USING THE THORNTHWAITE EQUATION.

0	12DEC14	ISSUED WITH REPORT VA101-246/33-3	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D



SAVED: M:\101\0024633\ANGIS\Figs\ProjectLocationMap.mxd; Jan 21, 2015 11:06 AM; admica

LEGEND:

- ★ PROJECT LOCATION
- COMMUNITY

NOTES:

1. BASE MAP: ESRI ARCGIS ONLINE MAPS.
2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N..
3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:1,300,000 FOR 8.5x11 (LETTER) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

KGHM AJAX MINING INC.

AJAX PROJECT

PROJECT LOCATION MAP

Knight Piésold
CONSULTING

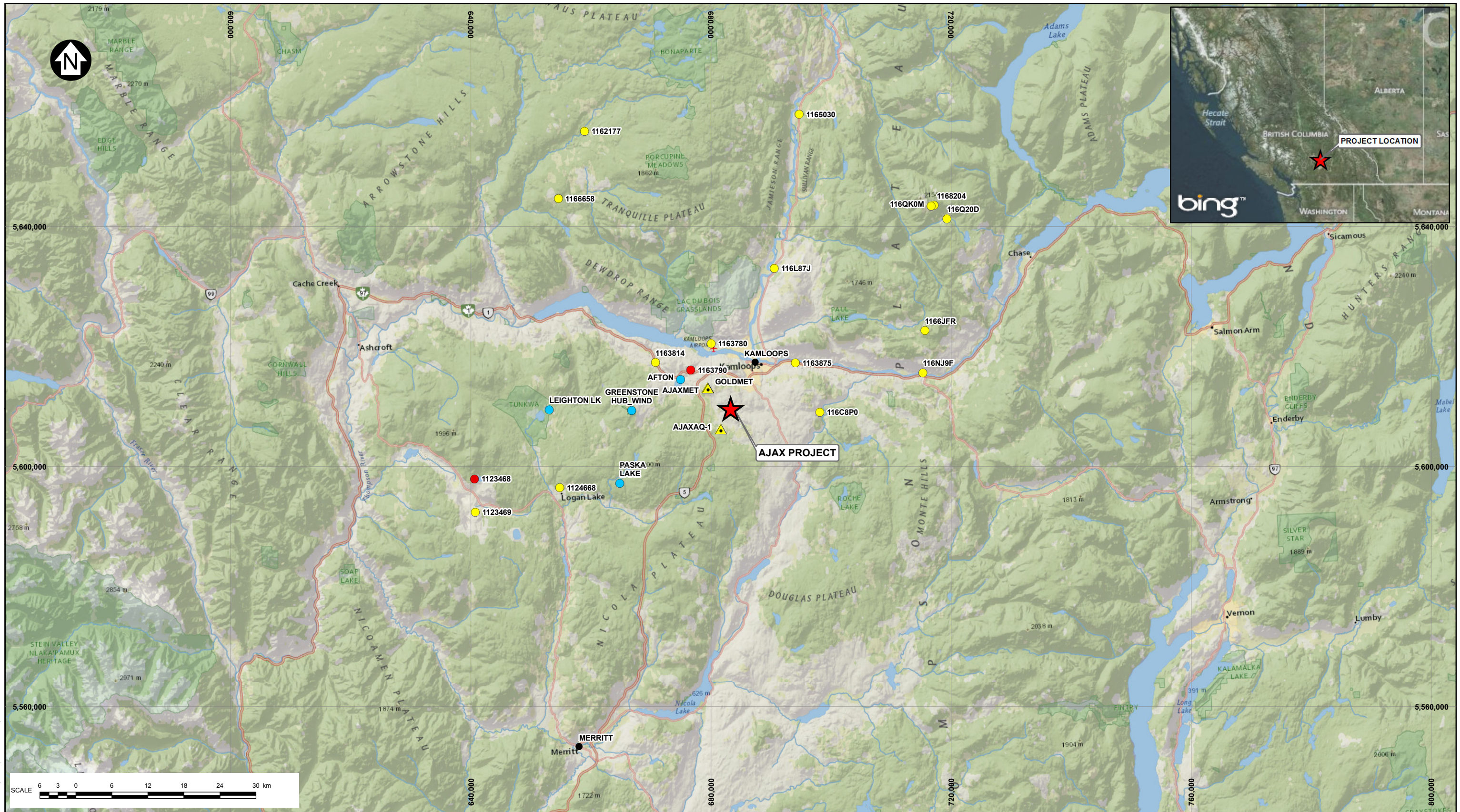
P/A NO.
VA101-246/33

REF NO.
3

FIGURE 1.1

REV
0

REV	DATE	DESCRIPTION	JMQ DESIGNED	AMD DRAWN	JGC REVIEWED
0	21JAN15	ISSUED WITH REPORT			



SAVED: M:\11010024633\VA\SIG\Figs\Climates\stations.mxd; Jan 21, 2015 11:24 AM; adrica

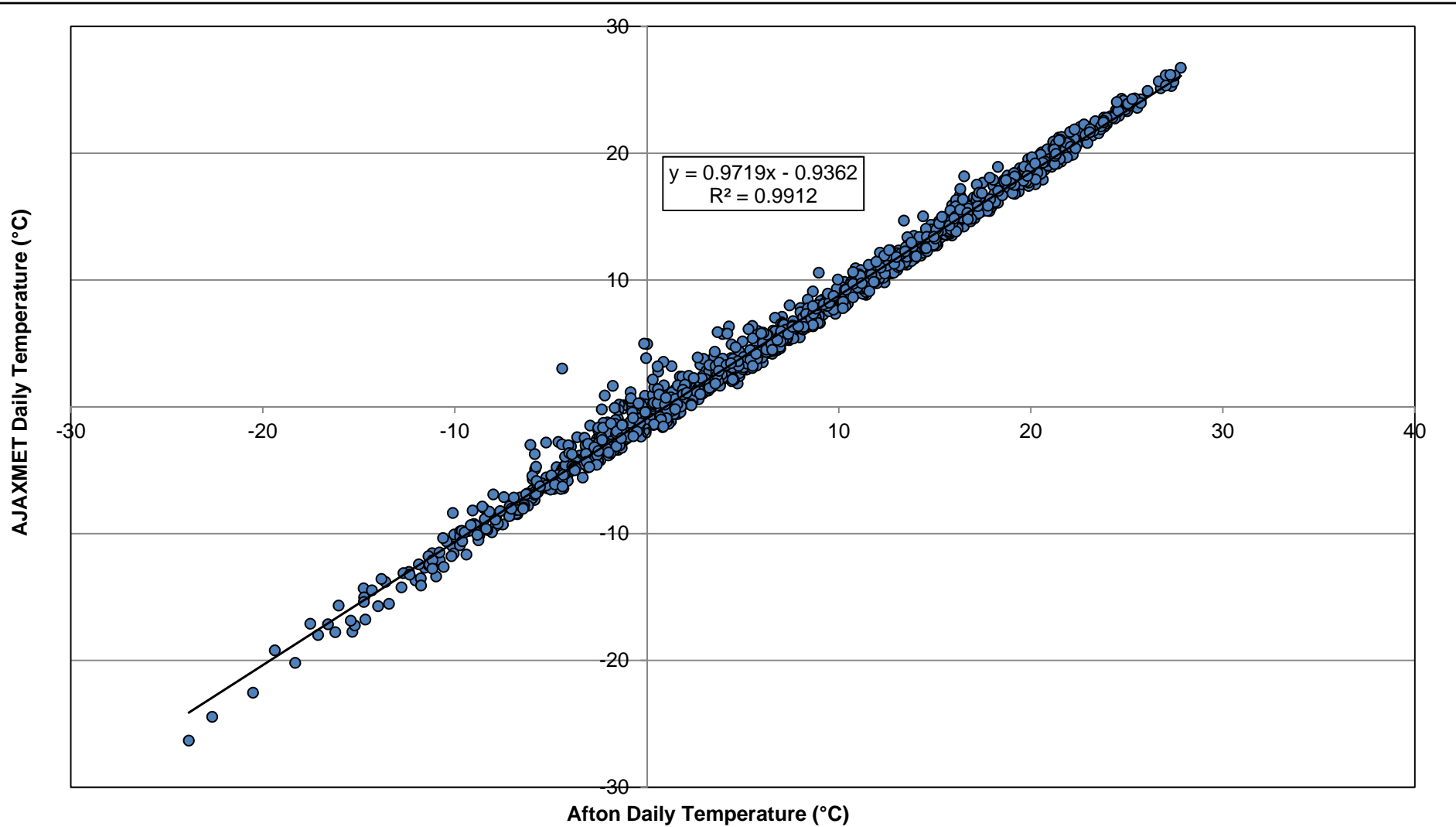
LEGEND:		
★	PROJECT LOCATION	
▲	ACTIVE PROJECT CLIMATE STATION	
●	ACTIVE REGIONAL ENVIRONMENT CANADA CLIMATE STATIONS	
●	ACTIVE REGIONAL FORESTRY CLIMATE STATIONS	
●	INACTIVE REGIONAL CLIMATE STATIONS	

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
0	21JAN15	ISSUED WITH REPORT	JMQ	AMD	JGC

NOTES:

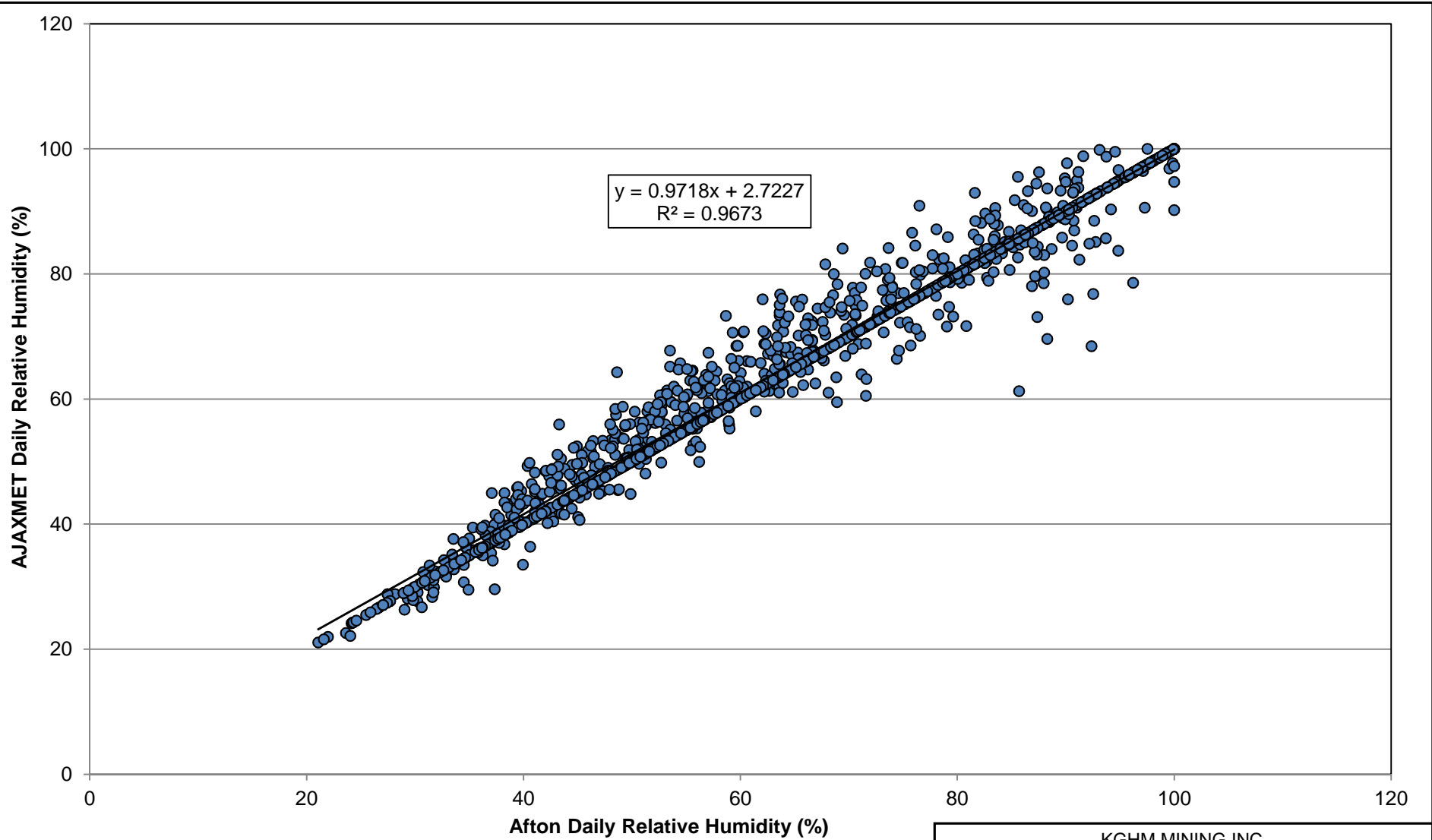
1. BASE MAP: ESRI ARCGIS ONLINE MAPS.
2. COORDINATE GRID IS IN METRES.
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N.
4. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:600,000 FOR 11X17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.
5. CLIMATE STATION LOCATIONS OBTAINED FROM ENVIRONMENT CANADA AND BC MINISTRY OF FORESTS.

KGHM AJAX MINING INC.	
AJAX PROJECT	
REGIONAL AND PROJECT CLIMATE STATIONS	
<i>Knight Piésold</i> CONSULTING	
PIA NO. VA101-246/33	REF NO. 3
FIGURE 2.1	
	REV 0



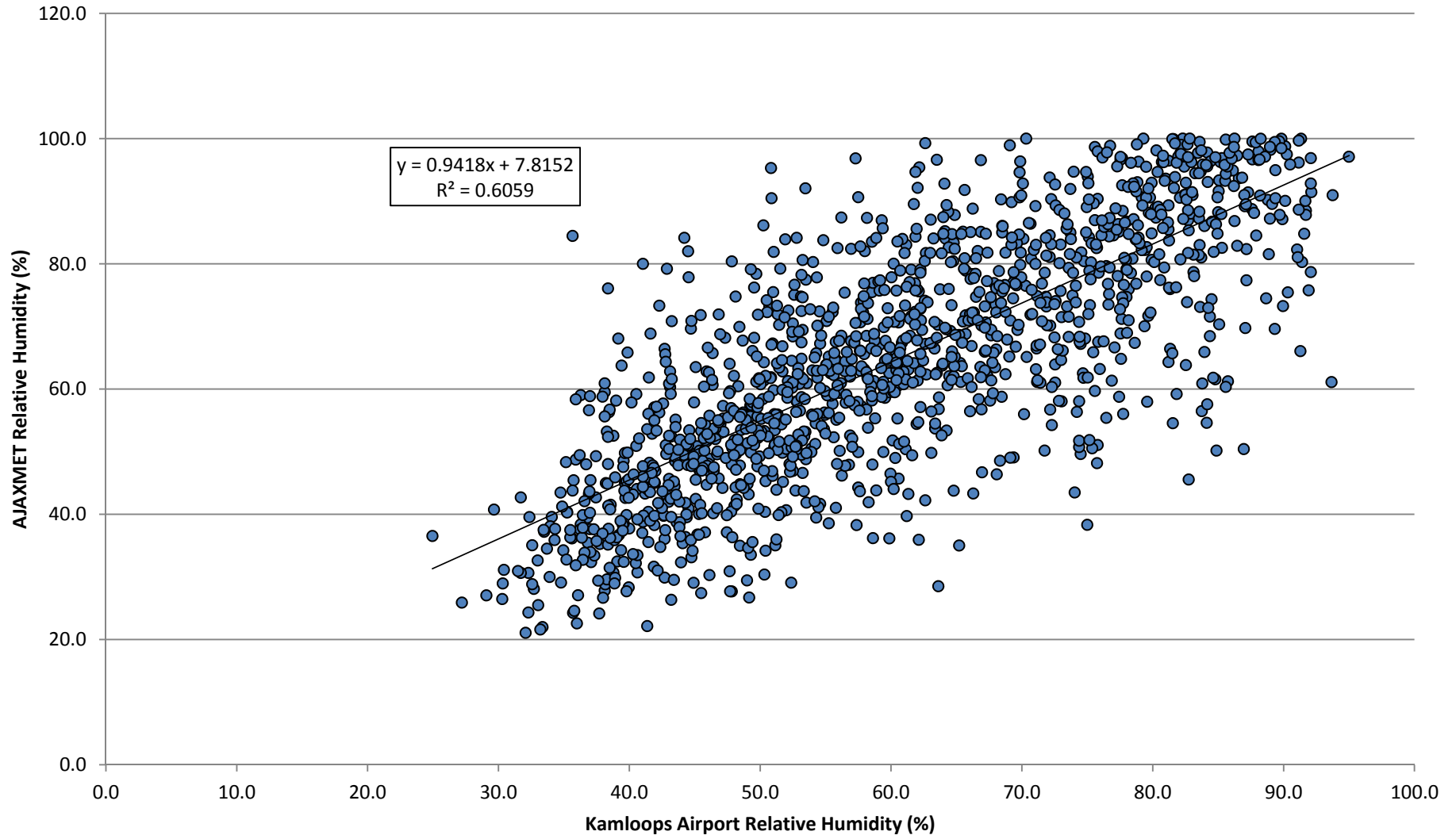
KGHM MINING INC.	
AJAX PROJECT	
AJAXMET AND BC FLNRO AFTON STATIONS DAILY TEMPERATURE REGRESSION	
	P/A NO. VA101-246/33
	REF. NO. 3
FIGURE 2.2	
REV 0	

0	12DEC'14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D



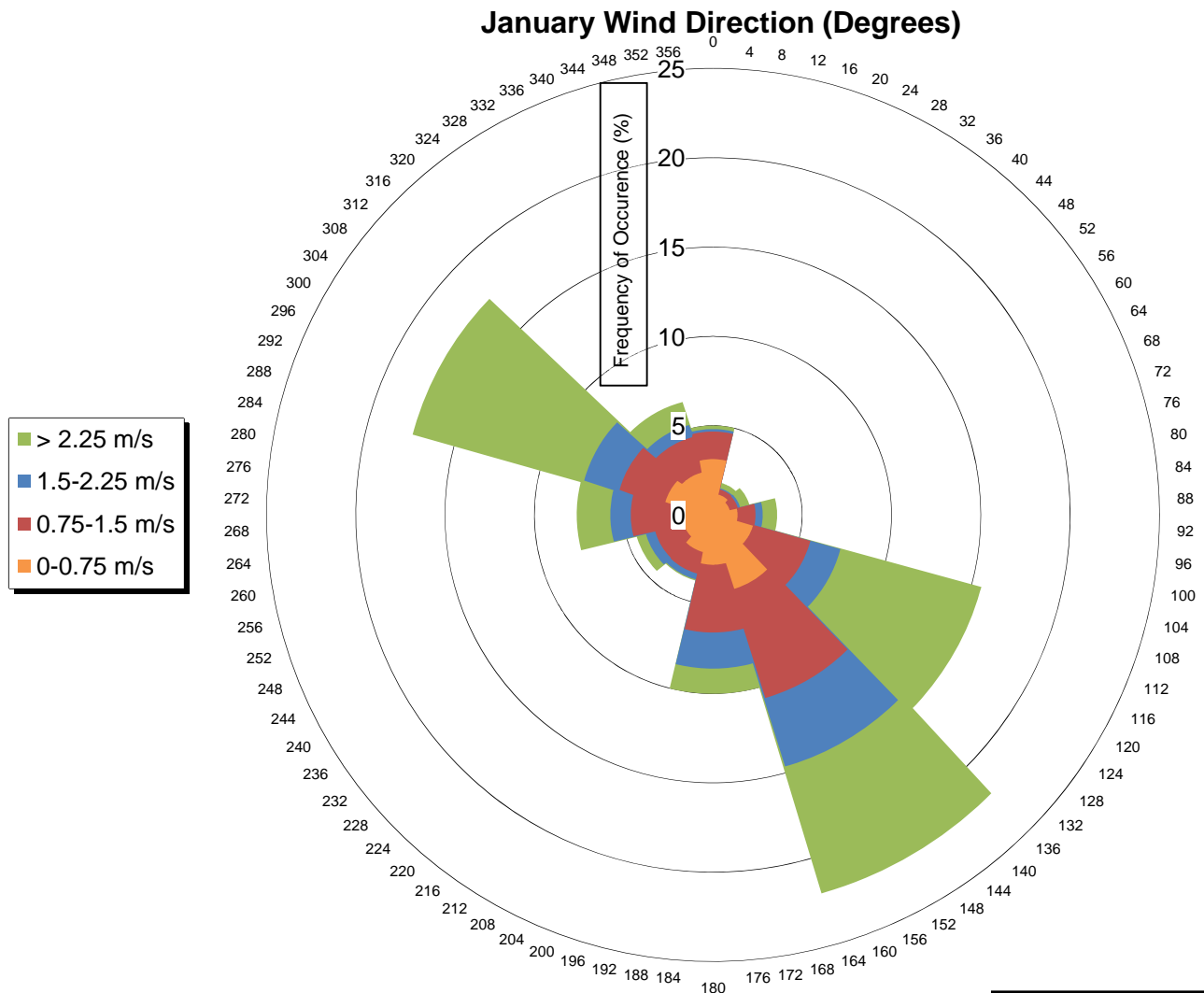
KGHM MINING INC.	
AJAX PROJECT	
AJAXMET AND BC FLNRO AFTON STATIONS DAILY RELATIVE HUMIDITY REGRESSION	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
	REF. NO. 3
FIGURE 2.3-1	
REV 0	

0	12DEC'14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D



KGHM MINING INC.	
AJAX PROJECT	
AJAXMET AND KAMLOOPS AIRPORT STATIONS DAILY RELATIVE HUMIDITY REGRESSION	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
	REF. NO. 3
FIGURE 2.3-2	
REV 0	

0	12DEC'14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D



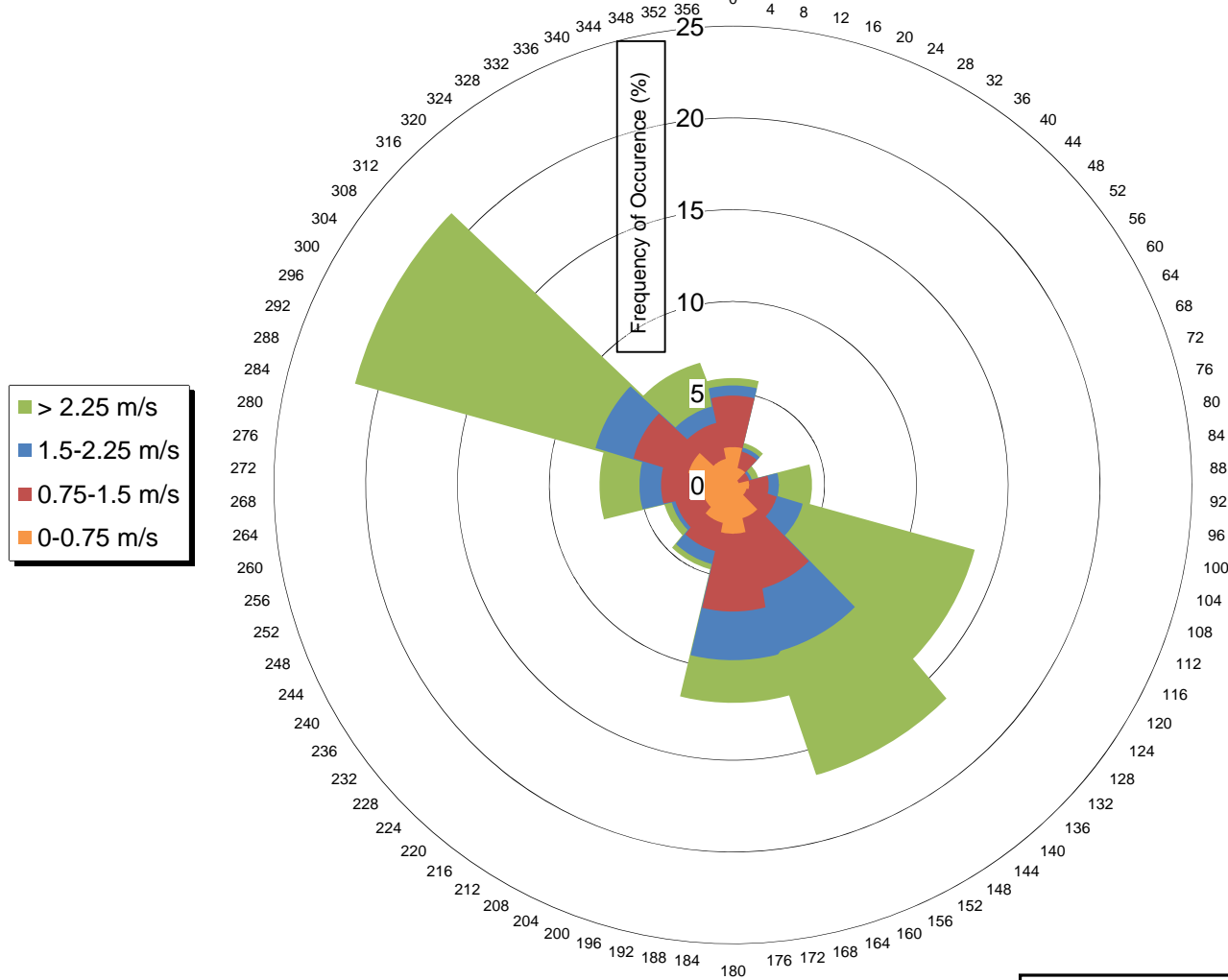
NOTES:

1. WIND DIRECTIONS ARE GROUPED IN 30° BRACKETS (E.G 15-45°, 45-75°)
2. THE WIND ROSE VALUES ARE BASED ON THE AVAILABLE HOURLY DATA.
3. THE PERIOD OF RECORD IS FROM AUGUST 2010 THROUGH OCTOBER 2014

KGHM AJAX MINING INC.	
AJAX PROJECT	
AJAXMET CLIMATE STATION JANUARY WIND ROSE 2010 TO 2014	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
FIGURE 2.4-1	
REF. NO. 3	REV 0

0	12DEC'14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

February Wind Direction (Degrees)



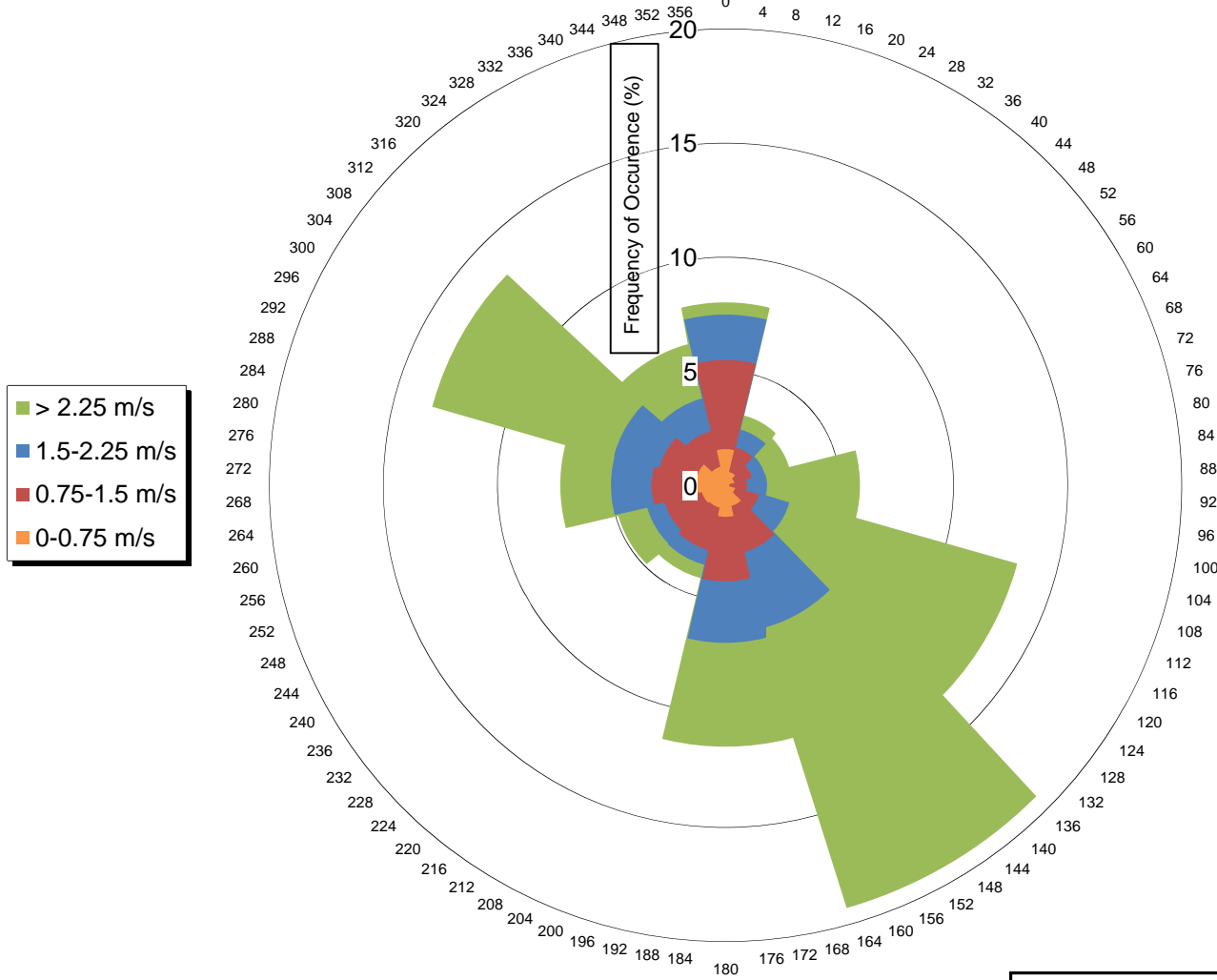
NOTES:

1. WIND DIRECTIONS ARE GROUPED IN 30° BRACKETS (E.G 15-45°, 45-75°)
2. THE WIND ROSE VALUES ARE BASED ON THE AVAILABLE HOURLY DATA.
3. THE PERIOD OF RECORD IS FROM AUGUST 2010 THROUGH OCTOBER 2014

KGHM AJAX MINING INC.	
AJAX PROJECT	
AJAXMET CLIMATE STATION FEBRUARY WIND ROSE 2010 TO 2014	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
	REF. NO. 3
FIGURE 2.4-2	
REV 0	

0	12DEC'14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

March Wind Direction (Degrees)



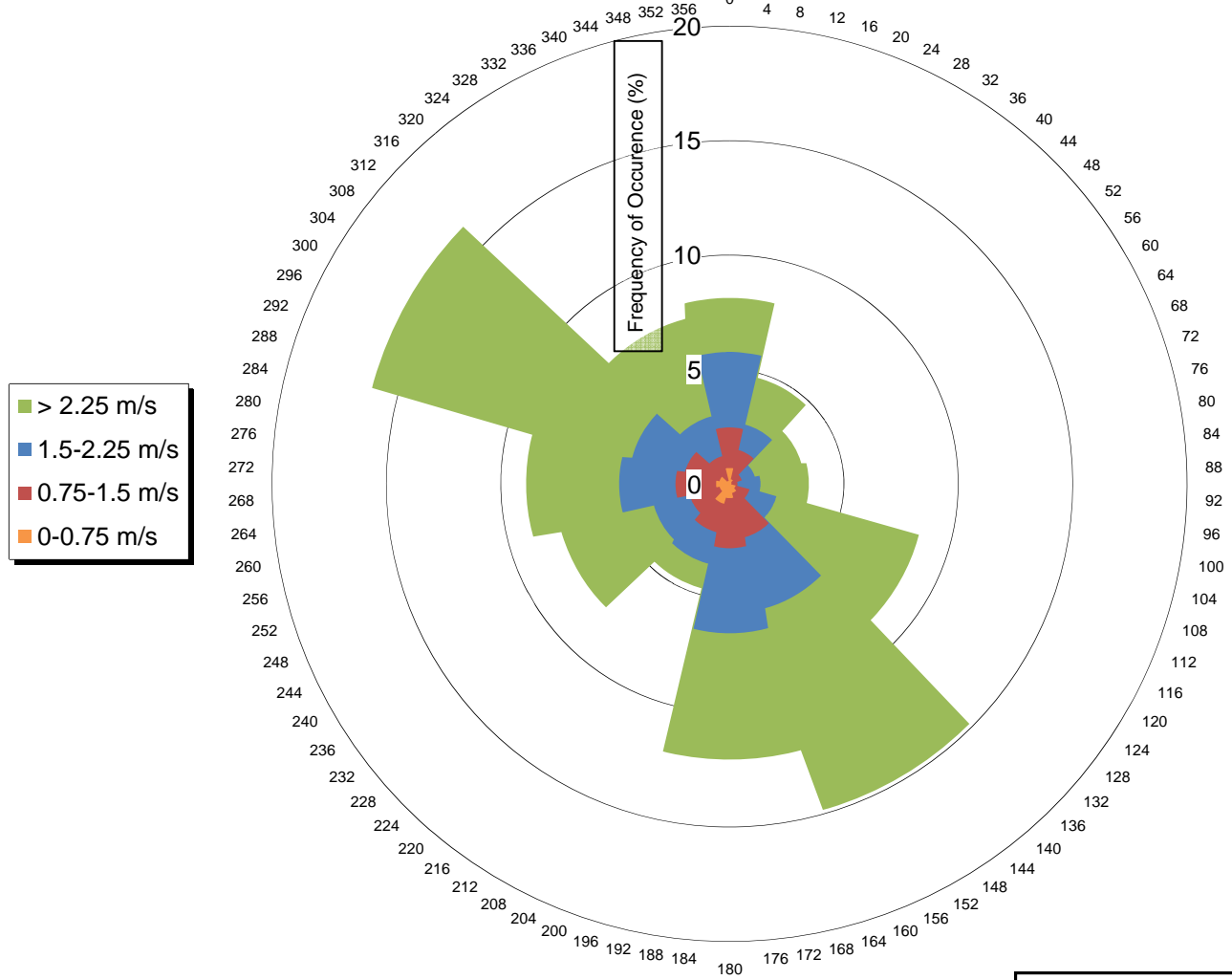
NOTES:

1. WIND DIRECTIONS ARE GROUPED IN 30° BRACKETS (E.G 15-45°, 45-75°)
2. THE WIND ROSE VALUES ARE BASED ON THE AVAILABLE HOURLY DATA.
3. THE PERIOD OF RECORD IS FROM AUGUST 2010 THROUGH OCTOBER 2014

KGHM AJAX MINING INC.	
AJAX PROJECT	
AJAXMET CLIMATE STATION MARCH WIND ROSE 2010 TO 2014	
	P/A NO. VA101-246/33
	REF. NO. 3
FIGURE 2.4-3	
	REV 0

0	12DEC'14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

April Wind Direction (Degrees)



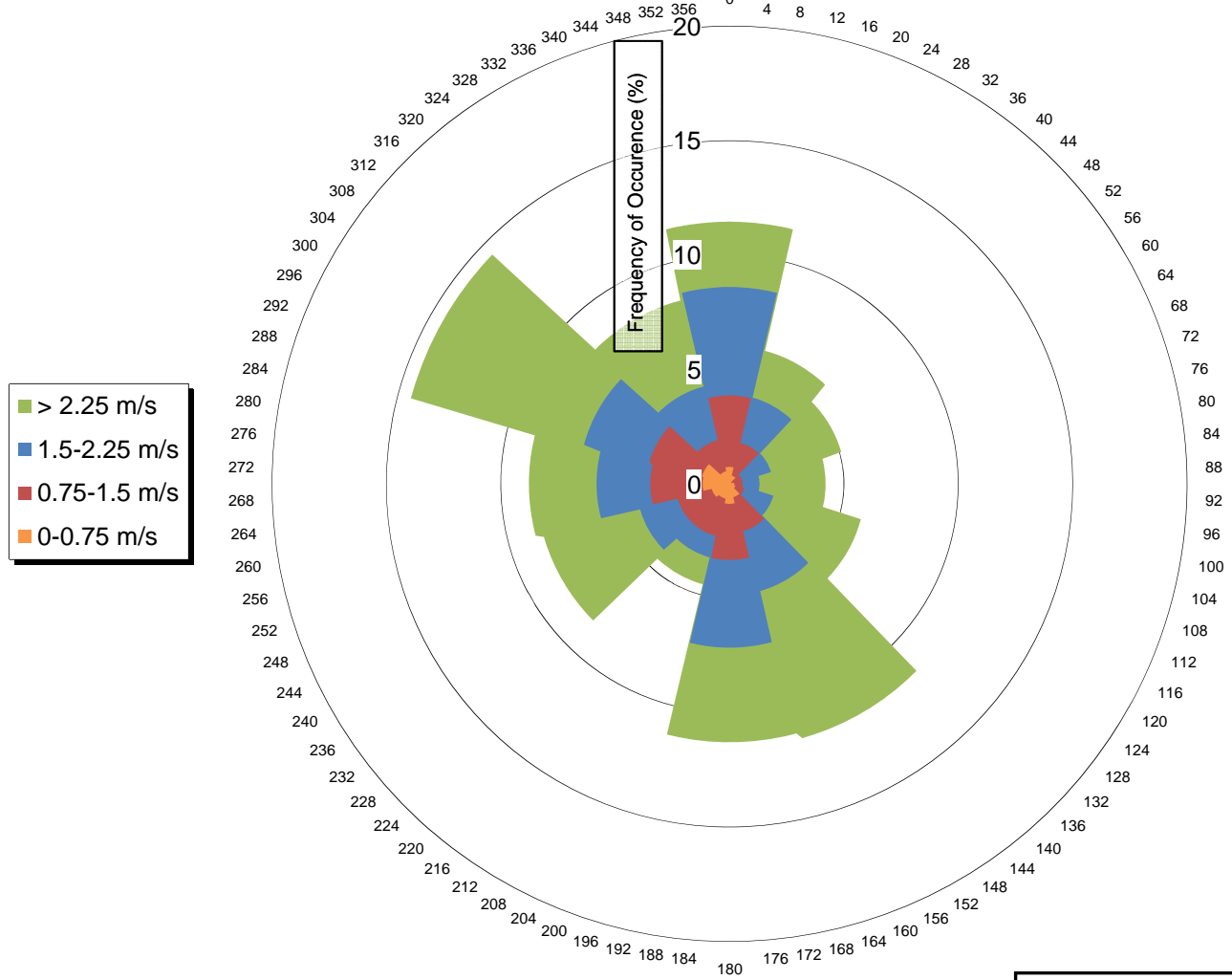
NOTES:

1. WIND DIRECTIONS ARE GROUPED IN 30° BRACKETS (E.G 15-45°, 45-75°)
2. THE WIND ROSE VALUES ARE BASED ON THE AVAILABLE HOURLY DATA.
3. THE PERIOD OF RECORD IS FROM AUGUST 2010 THROUGH OCTOBER 2014

KGHM AJAX MINING INC.	
AJAX PROJECT	
AJAXMET CLIMATE STATION APRIL WIND ROSE 2010 TO 2014	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
	REF. NO. 3
FIGURE 2.4-4	
REV 0	

0	12DEC'14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

May Wind Direction (Degrees)



■ > 2.25 m/s
■ 1.5-2.25 m/s
■ 0.75-1.5 m/s
■ 0-0.75 m/s

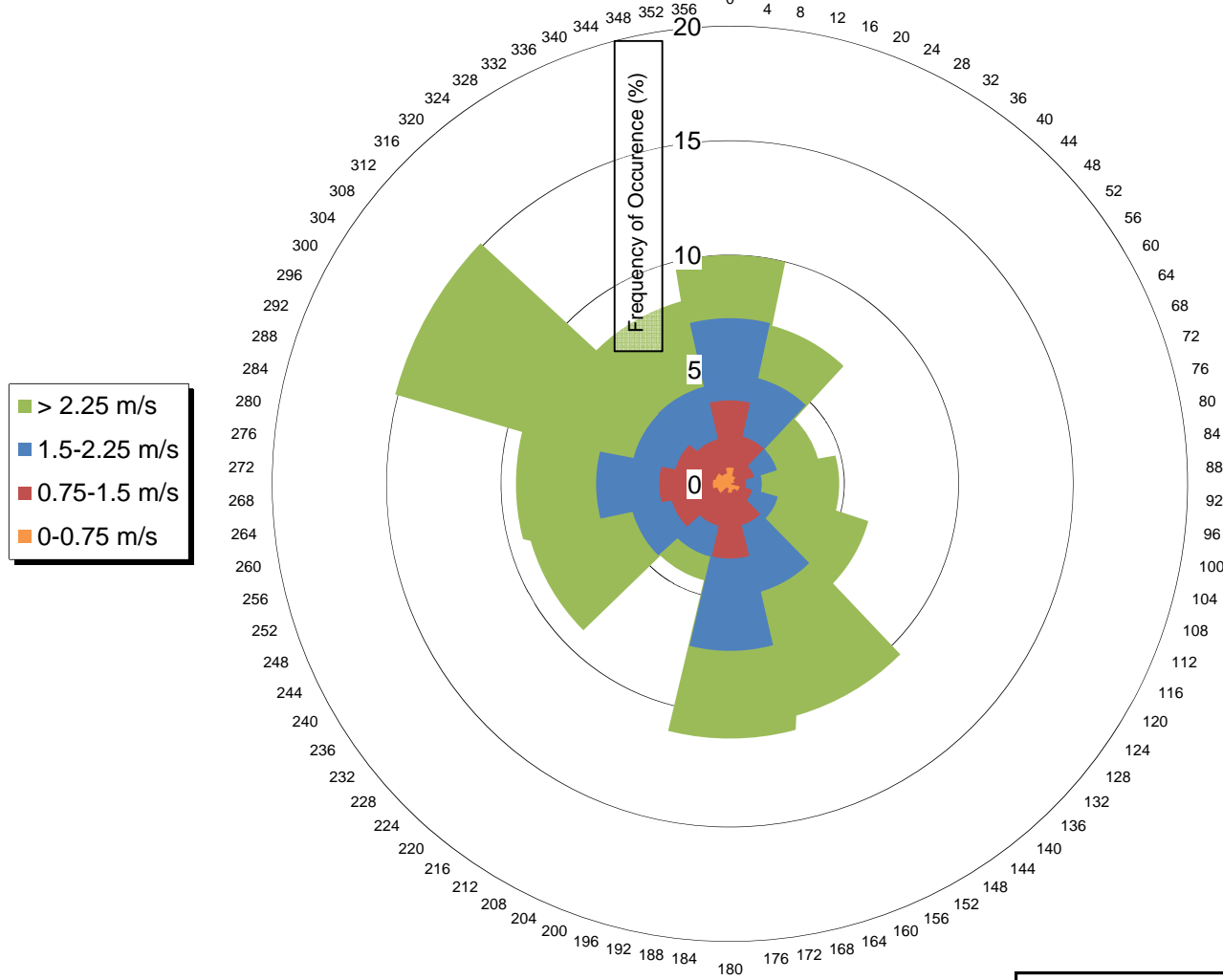
NOTES:

1. WIND DIRECTIONS ARE GROUPED IN 30° BRACKETS (E.G 15-45°, 45-75°)
2. THE WIND ROSE VALUES ARE BASED ON THE AVAILABLE HOURLY DATA.
3. THE PERIOD OF RECORD IS FROM AUGUST 2010 THROUGH OCTOBER 2014

KGHM AJAX MINING INC.	
AJAX PROJECT	
AJAXMET CLIMATE STATION MAY WIND ROSE 2010 TO 2014	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
	REF. NO. 3
FIGURE 2.4-5	
REV 0	

0	12DEC'14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

June Wind Direction (Degrees)



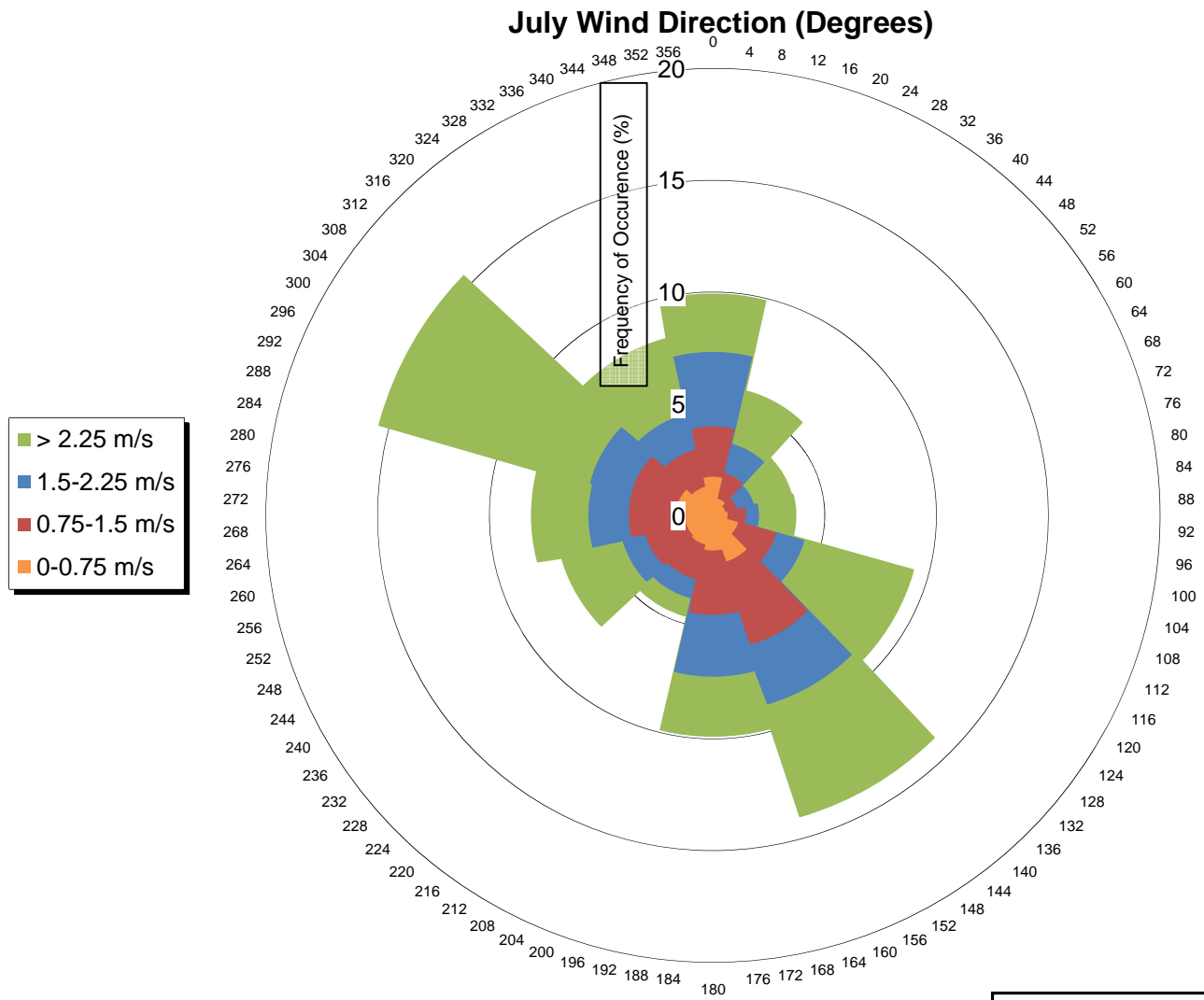
■ > 2.25 m/s
■ 1.5-2.25 m/s
■ 0.75-1.5 m/s
■ 0-0.75 m/s

NOTES:

1. WIND DIRECTIONS ARE GROUPED IN 30° BRACKETS (E.G 15-45°, 45-75°)
2. THE WIND ROSE VALUES ARE BASED ON THE AVAILABLE HOURLY DATA.
3. THE PERIOD OF RECORD IS FROM AUGUST 2010 THROUGH OCTOBER 2014

KGHM AJAX MINING INC.	
AJAX PROJECT	
AJAXMET CLIMATE STATION JUNE WIND ROSE 2010 TO 2014	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
	REF. NO. 3
FIGURE 2.4-6	
REV	0

0	12DEC'14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

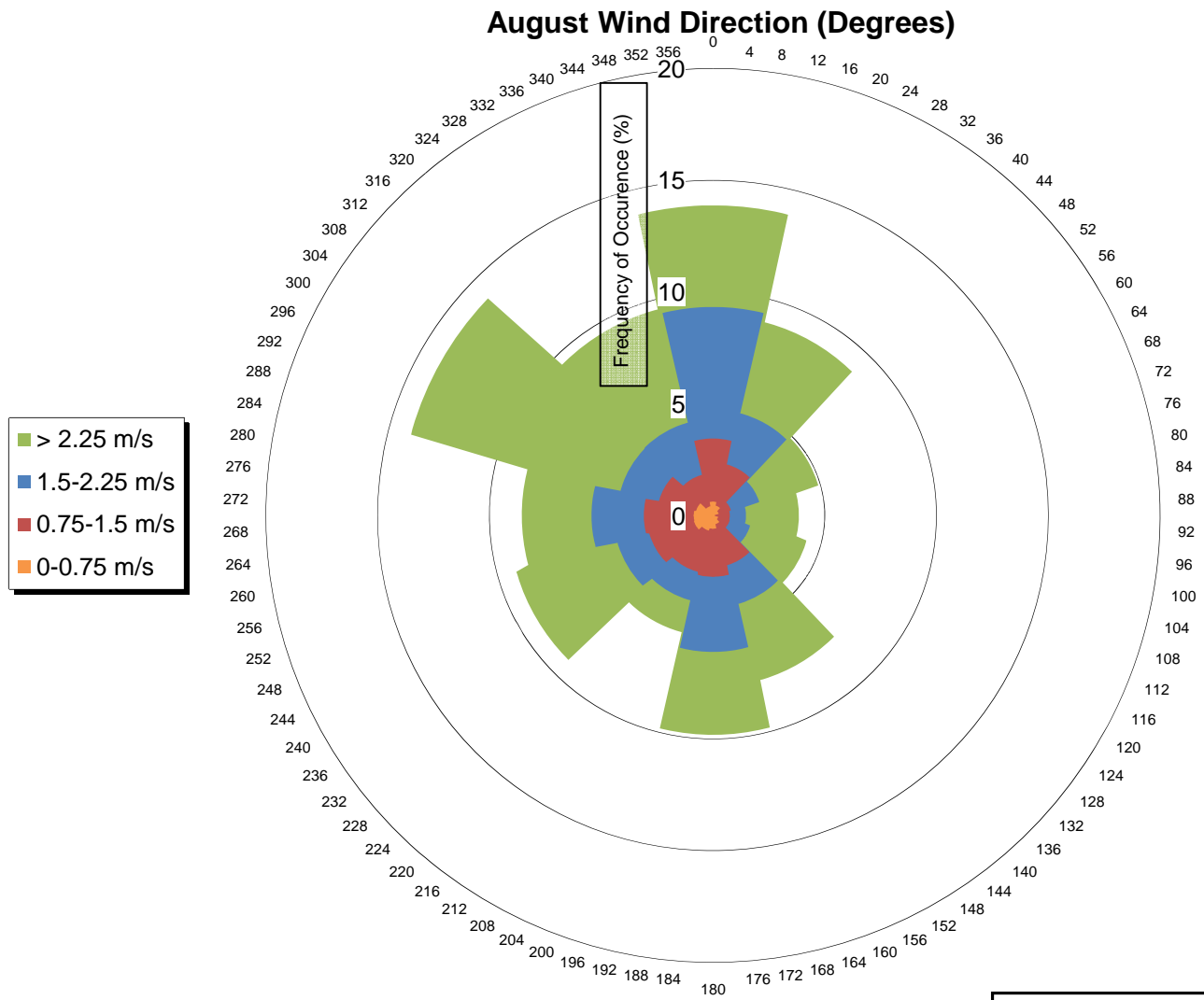


NOTES:

1. WIND DIRECTIONS ARE GROUPED IN 30° BRACKETS (E.G 15-45°, 45-75°)
2. THE WIND ROSE VALUES ARE BASED ON THE AVAILABLE HOURLY DATA.
3. THE PERIOD OF RECORD IS FROM AUGUST 2010 THROUGH OCTOBER 2014

KGHM AJAX MINING INC.	
AJAX PROJECT	
AJAXMET CLIMATE STATION JULY WIND ROSE 2010 TO 2014	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
REF. NO. 3	
FIGURE 2.4-7	
REV 0	

0	12DEC'14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

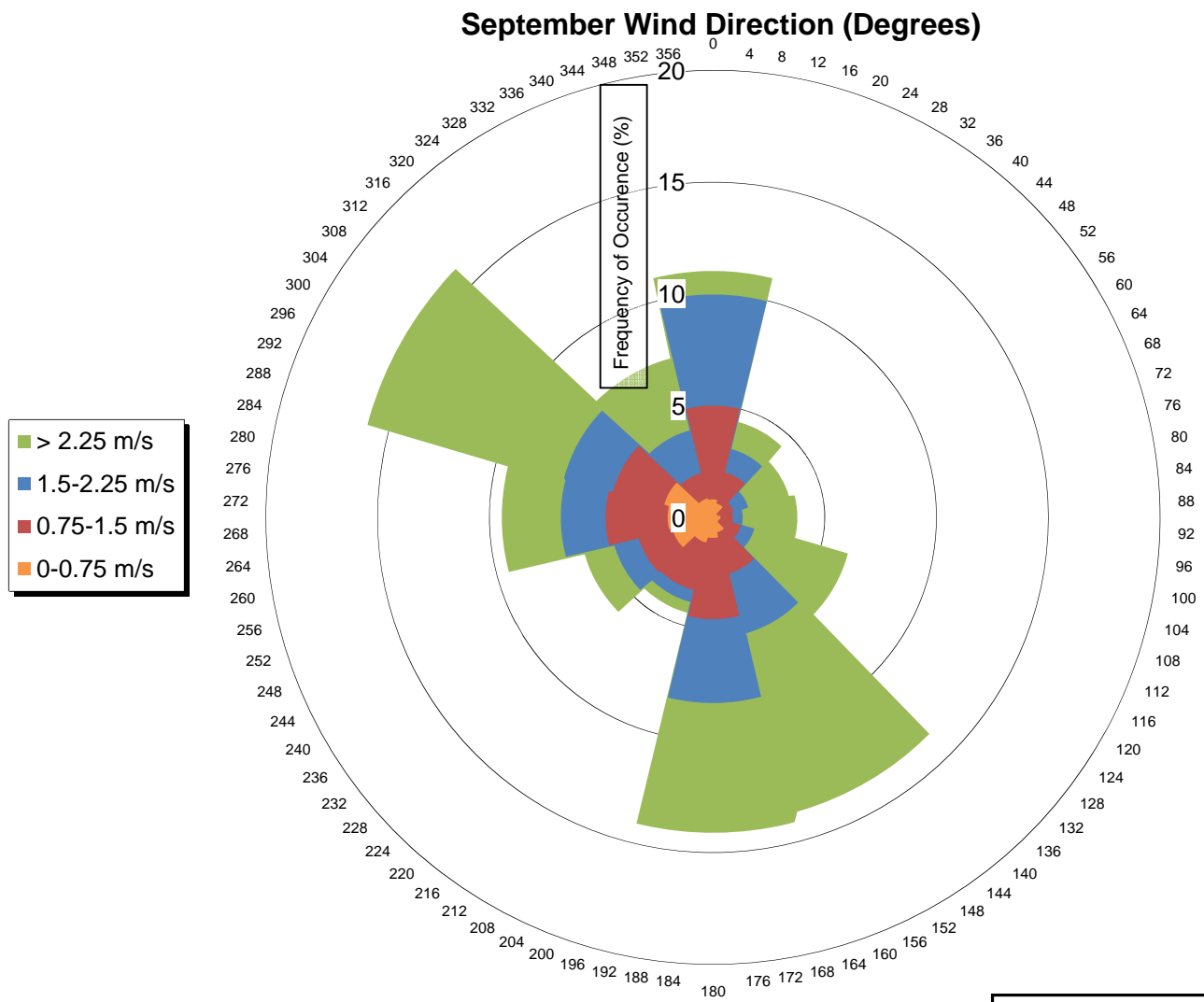


NOTES:

1. WIND DIRECTIONS ARE GROUPED IN 30° BRACKETS (E.G 15-45°, 45-75°)
2. THE WIND ROSE VALUES ARE BASED ON THE AVAILABLE HOURLY DATA.
3. THE PERIOD OF RECORD IS FROM AUGUST 2010 THROUGH OCTOBER 2014

KGHM AJAX MINING INC.		
AJAX PROJECT		
AJAXMET CLIMATE STATION AUGUST WIND ROSE 2010 TO 2014		
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33	REF. NO. 3
	FIGURE 2.4-8	
		REV 0

0	12DEC'14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D



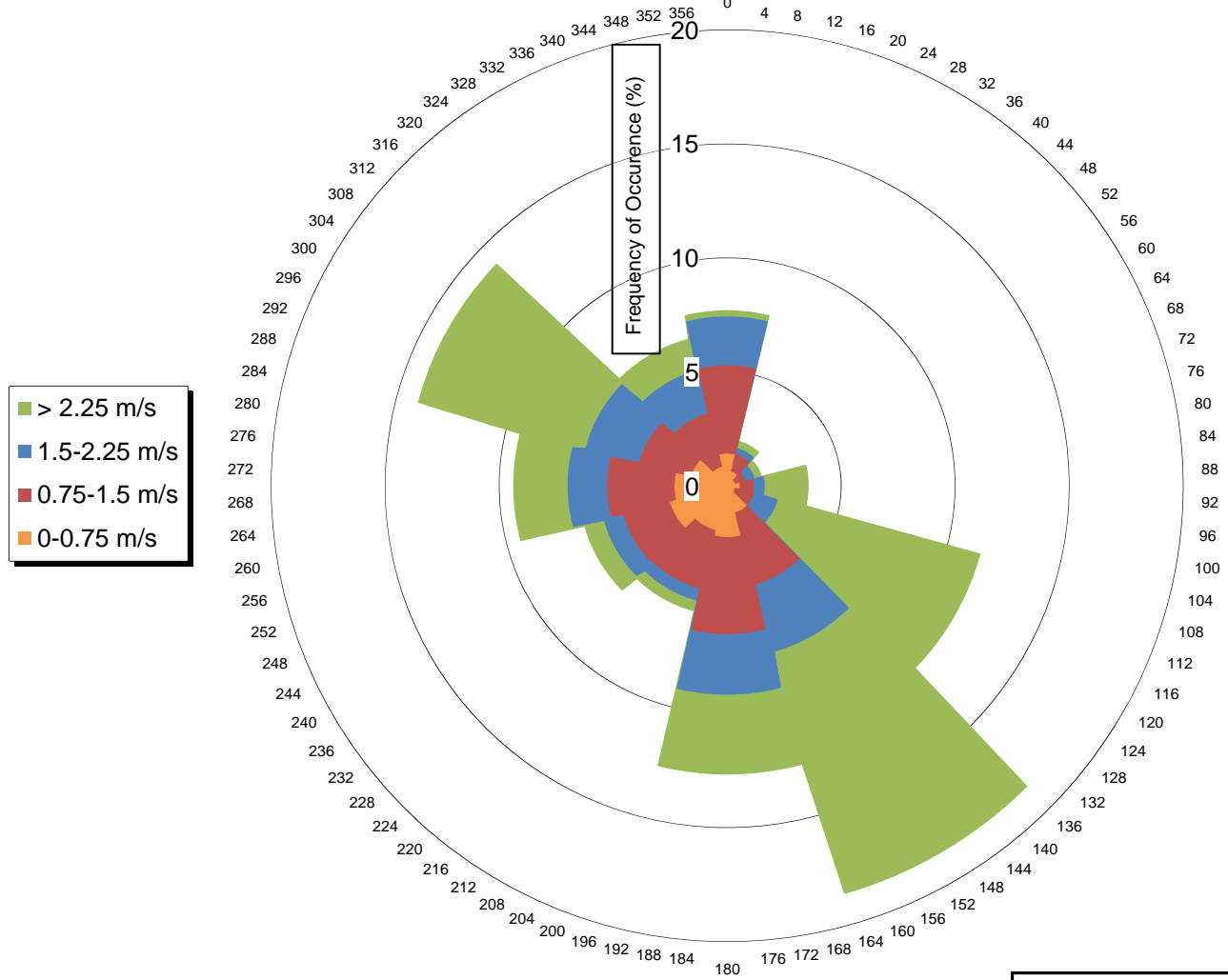
NOTES:

1. WIND DIRECTIONS ARE GROUPED IN 30° BRACKETS (E.G 15-45°, 45-75°)
2. THE WIND ROSE VALUES ARE BASED ON THE AVAILABLE HOURLY DATA.
3. THE PERIOD OF RECORD IS FROM AUGUST 2010 THROUGH OCTOBER 2014

KGHM AJAX MINING INC.	
AJAX PROJECT	
AJAXMET CLIMATE STATION SEPTEMBER WIND ROSE 2010 TO 2014	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
	REF. NO. 3
FIGURE 2.4-9	REV 0

0	12DEC'14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

October Wind Direction (Degrees)



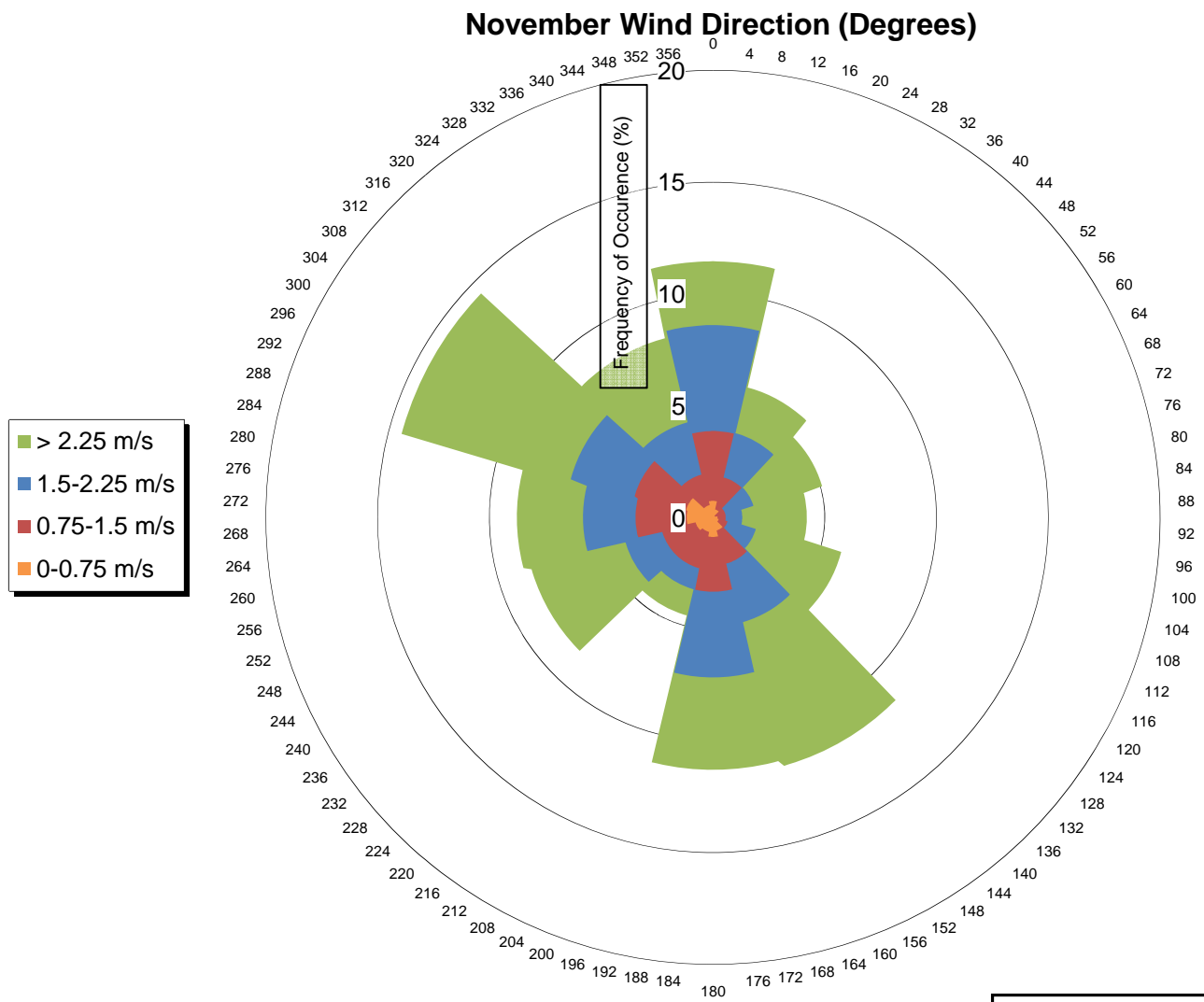
■ > 2.25 m/s
■ 1.5-2.25 m/s
■ 0.75-1.5 m/s
■ 0-0.75 m/s

NOTES:

1. WIND DIRECTIONS ARE GROUPED IN 30° BRACKETS (E.G 15-45°, 45-75°)
2. THE WIND ROSE VALUES ARE BASED ON THE AVAILABLE HOURLY DATA.
3. THE PERIOD OF RECORD IS FROM AUGUST 2010 THROUGH OCTOBER 2014

KGHM AJAX MINING INC.		
AJAX PROJECT		
AJAXMET CLIMATE STATION OCTOBER WIND ROSE 2010 TO 2014		
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33	REF. NO. 3
	FIGURE 2.4-10	
		REV 0

0	12DEC'14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

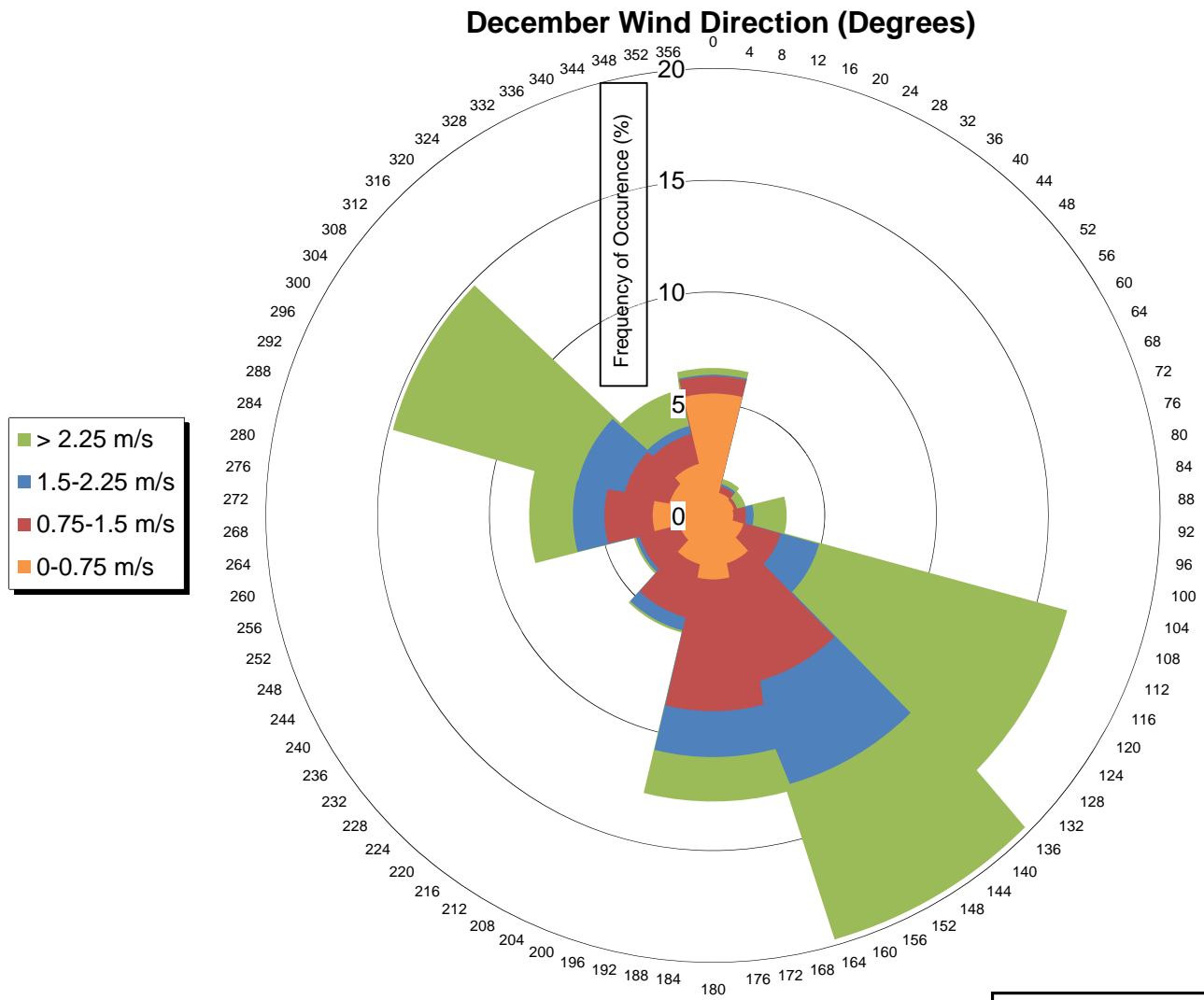


NOTES:

1. WIND DIRECTIONS ARE GROUPED IN 30° BRACKETS (E.G 15-45°, 45-75°)
2. THE WIND ROSE VALUES ARE BASED ON THE AVAILABLE HOURLY DATA.
3. THE PERIOD OF RECORD IS FROM AUGUST 2010 THROUGH OCTOBER 2014

KGHM AJAX MINING INC.	
AJAX PROJECT	
AJAXMET CLIMATE STATION NOVEMBER WIND ROSE 2010 TO 2014	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
REF. NO. 3	REV 0
FIGURE 2.4-11	

0	12DEC'14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

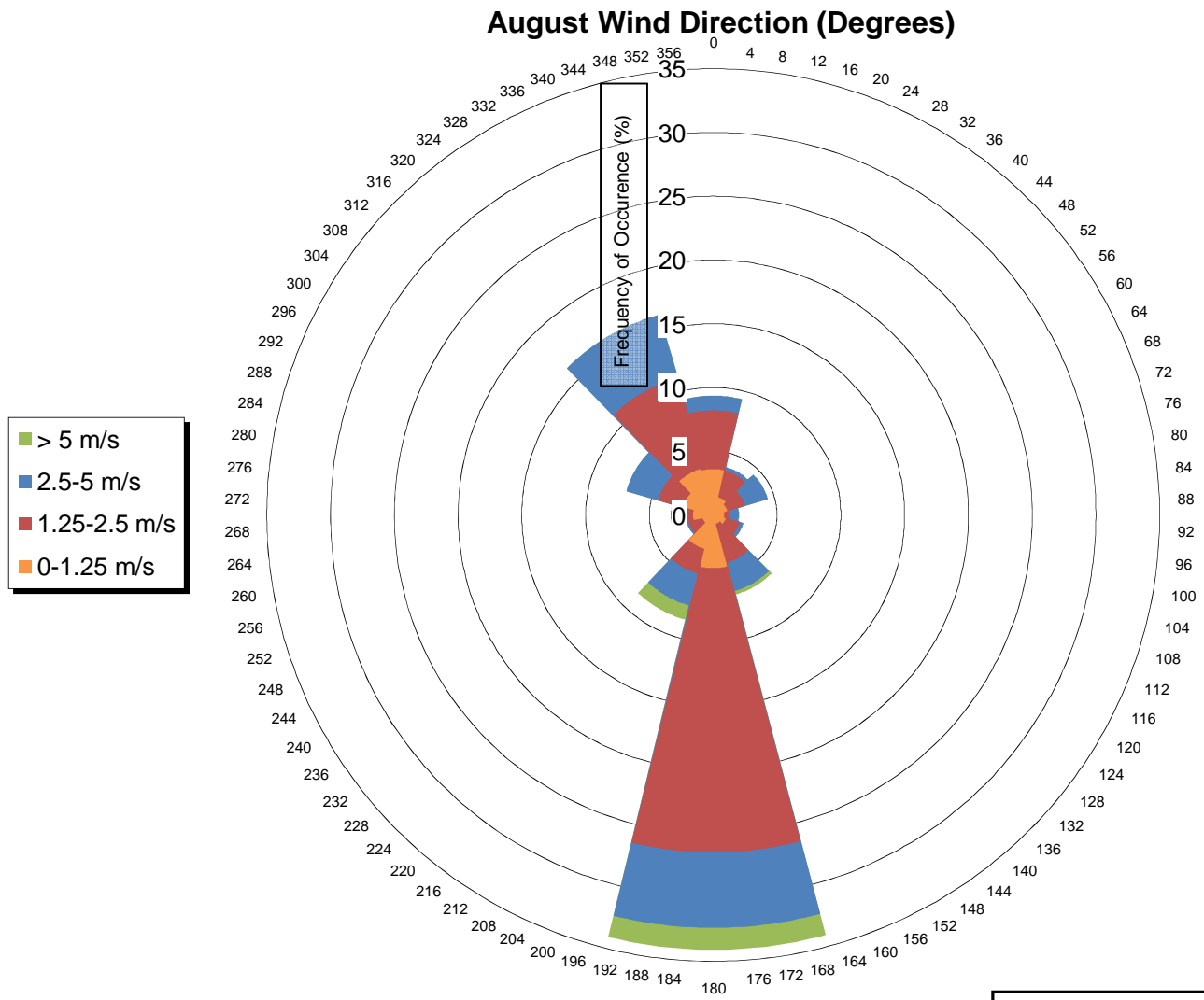


NOTES:

1. WIND DIRECTIONS ARE GROUPED IN 30° BRACKETS (E.G 15-45°, 45-75°)
2. THE WIND ROSE VALUES ARE BASED ON THE AVAILABLE HOURLY DATA.
3. THE PERIOD OF RECORD IS FROM AUGUST 2010 THROUGH OCTOBER 2014

KGHM AJAX MINING INC.	
AJAX PROJECT	
AJAXMET CLIMATE STATION DECEMBER WIND ROSE 2010 TO 2014	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33 REF. NO. 3 FIGURE 2.4-12 REV 0

0	12DEC'14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D



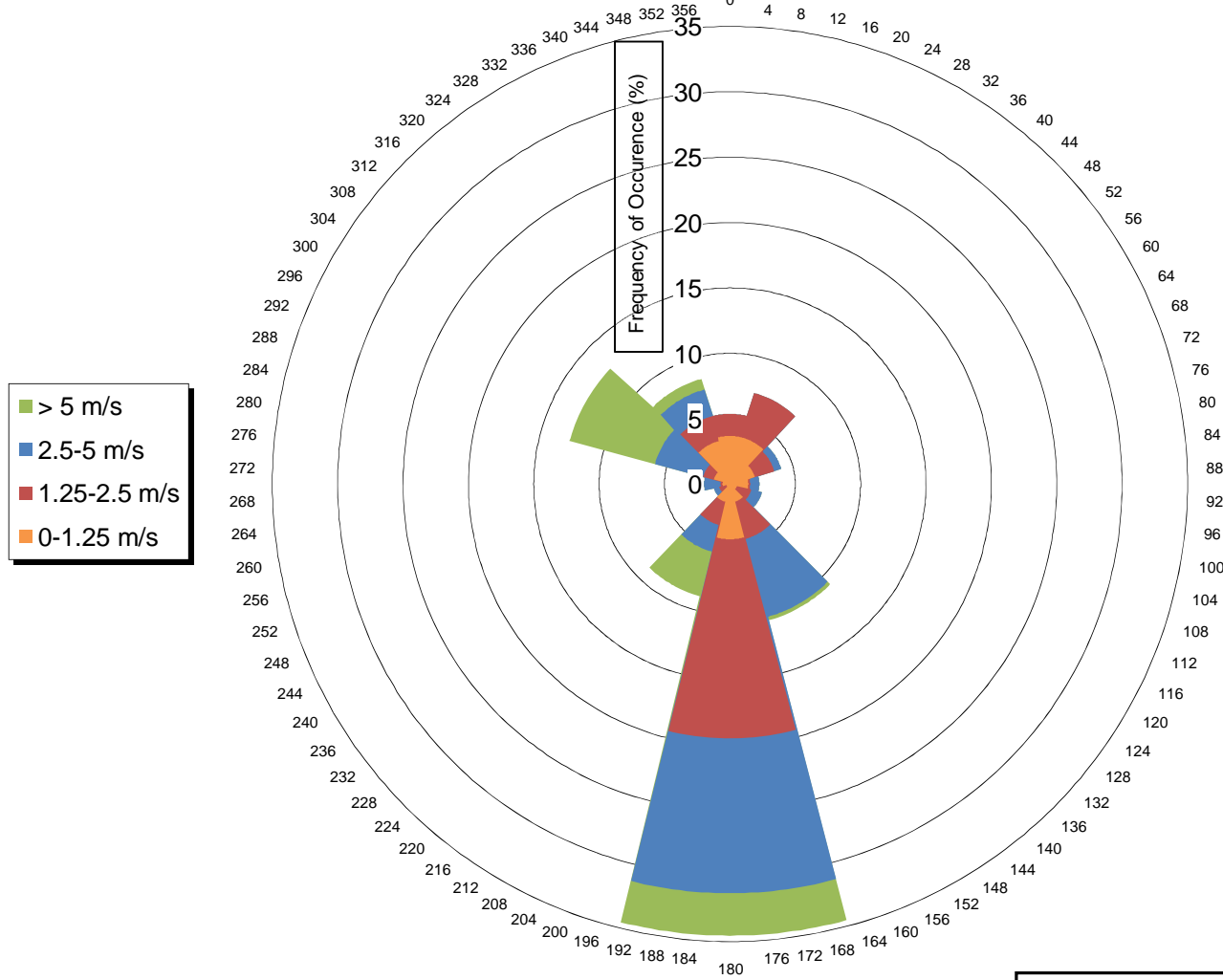
NOTES:

1. WIND DIRECTIONS ARE GROUPED IN 30° BRACKETS (E.G 15-45°, 45-75°)
2. THE WIND ROSE VALUES ARE BASED ON THE AVAILABLE HOURLY DATA.
3. THE PERIOD OF RECORD IS FROM AUGUST 2014 THROUGH NOVEMBER 2014

KGHM AJAX MINING INC.	
AJAX PROJECT	
AJAXAQ-1 CLIMATE STATION AUGUST WIND ROSE 2014	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
	REF. NO. 3
FIGURE 2.5-1	
REV 0	

0	12DEC'14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

September Wind Direction (Degrees)



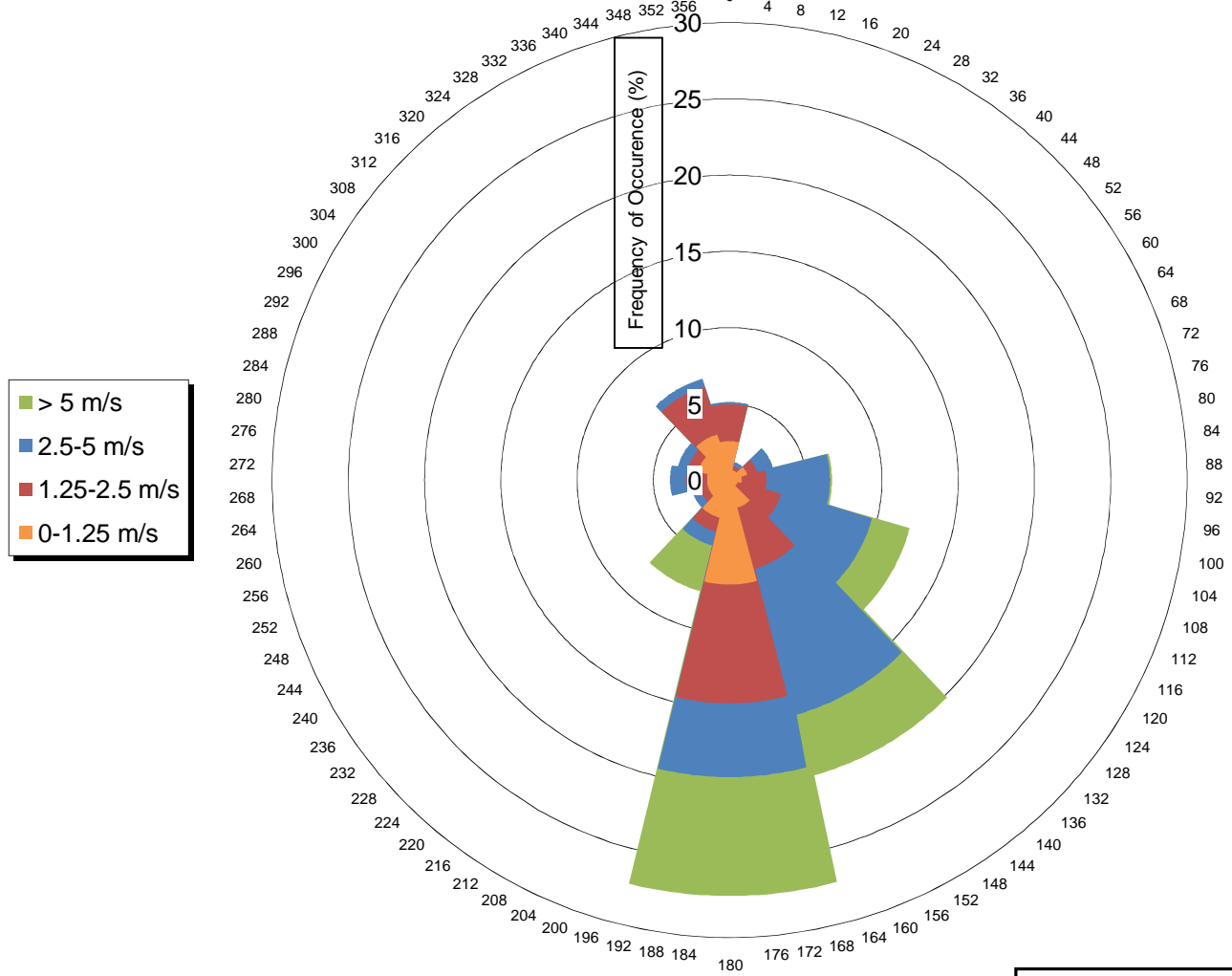
NOTES:

1. WIND DIRECTIONS ARE GROUPED IN 30° BRACKETS (E.G 15-45°, 45-75°)
2. THE WIND ROSE VALUES ARE BASED ON THE AVAILABLE HOURLY DATA.
3. THE PERIOD OF RECORD IS FROM AUGUST 2014 THROUGH NOVEMBER 2014

KGHM AJAX MINING INC.	
AJAX PROJECT	
AJAXAQ-1 CLIMATE STATION SEPTEMBER WIND ROSE 2014	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
FIGURE 2.5-2	REF. NO. 3 REV 0

0	12DEC'14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

October Wind Direction (Degrees)



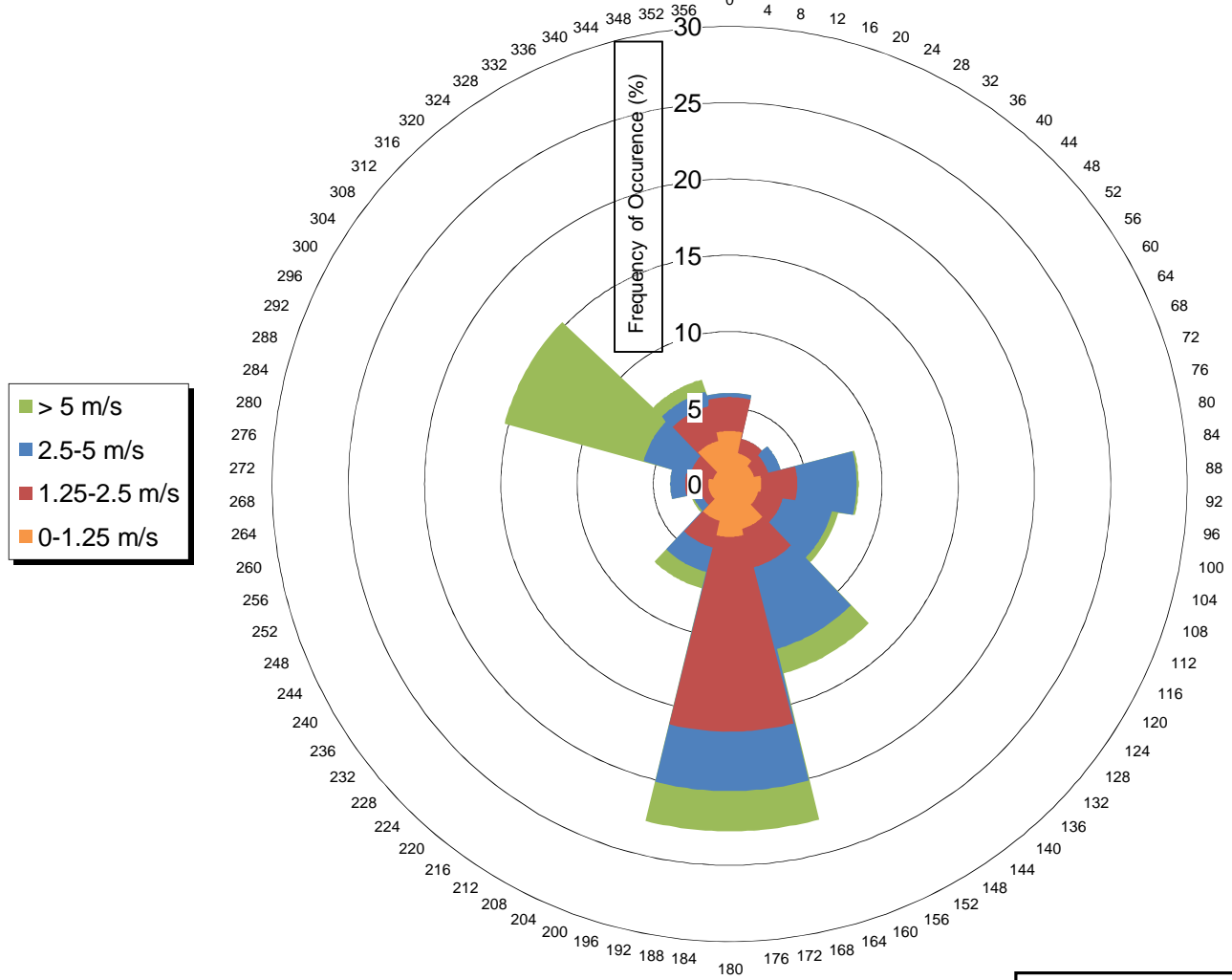
NOTES:

1. WIND DIRECTIONS ARE GROUPED IN 30° BRACKETS (E.G 15-45°, 45-75°)
2. THE WIND ROSE VALUES ARE BASED ON THE AVAILABLE HOURLY DATA.
3. THE PERIOD OF RECORD IS FROM AUGUST 2014 THROUGH NOVEMBER 2014

KGHM AJAX MINING INC.	
AJAX PROJECT	
AJAXAQ-1 CLIMATE STATION OCTOBER WIND ROSE 2014	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
	REF. NO. 3
FIGURE 2.5-3	
REV 0	

0	12DEC'14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

November Wind Direction (Degrees)

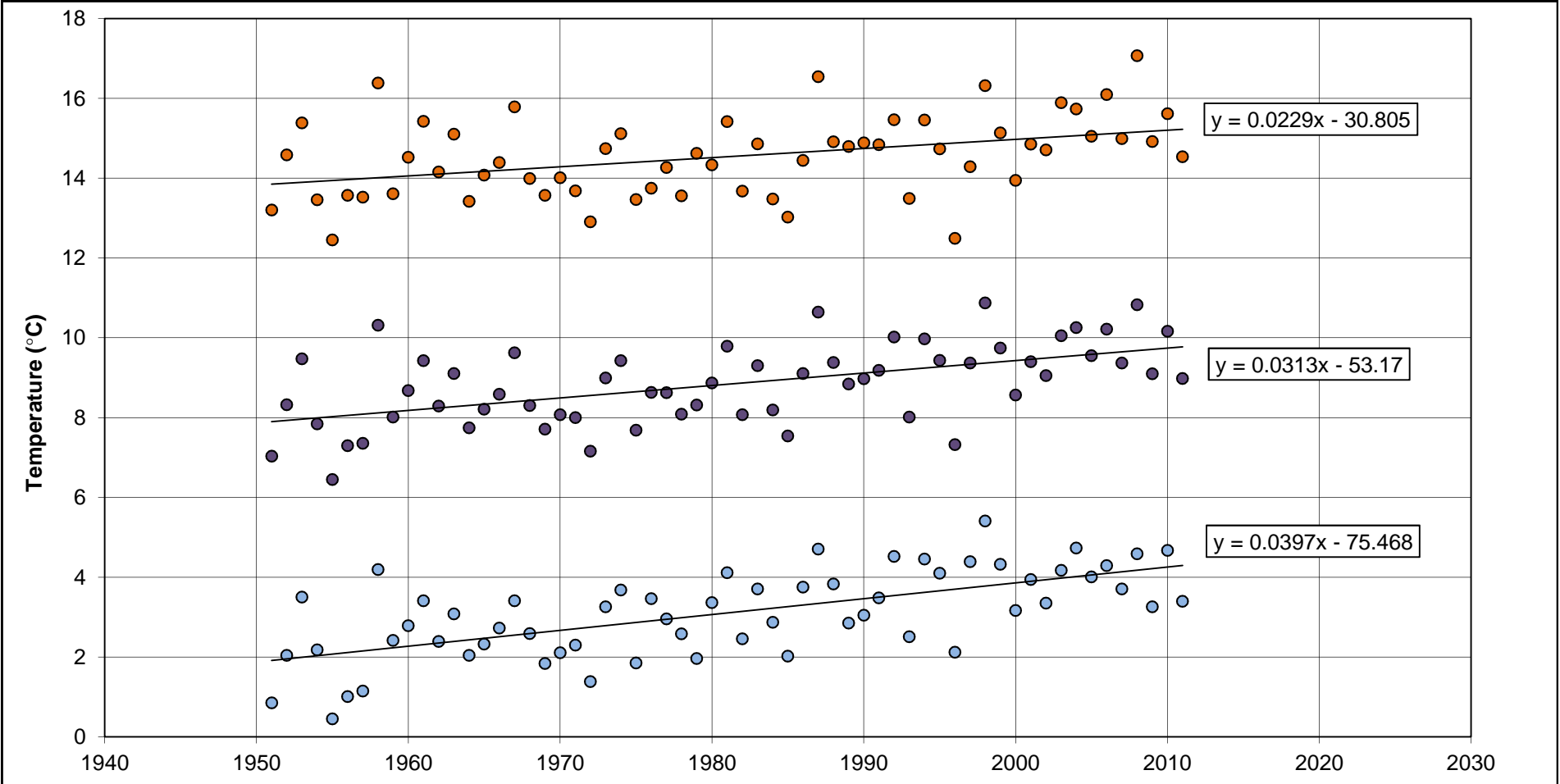


NOTES:

1. WIND DIRECTIONS ARE GROUPED IN 30° BRACKETS (E.G 15-45°, 45-75°)
2. THE WIND ROSE VALUES ARE BASED ON THE AVAILABLE HOURLY DATA.
3. THE PERIOD OF RECORD IS FROM AUGUST 2014 THROUGH NOVEMBER 2014

KGHM AJAX MINING INC.	
AJAX PROJECT	
AJAXAQ-1 CLIMATE STATION NOVEMBER WIND ROSE 2014	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
	REF. NO. 3
FIGURE 2.5-4	
	REV 0

0	12DEC'14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

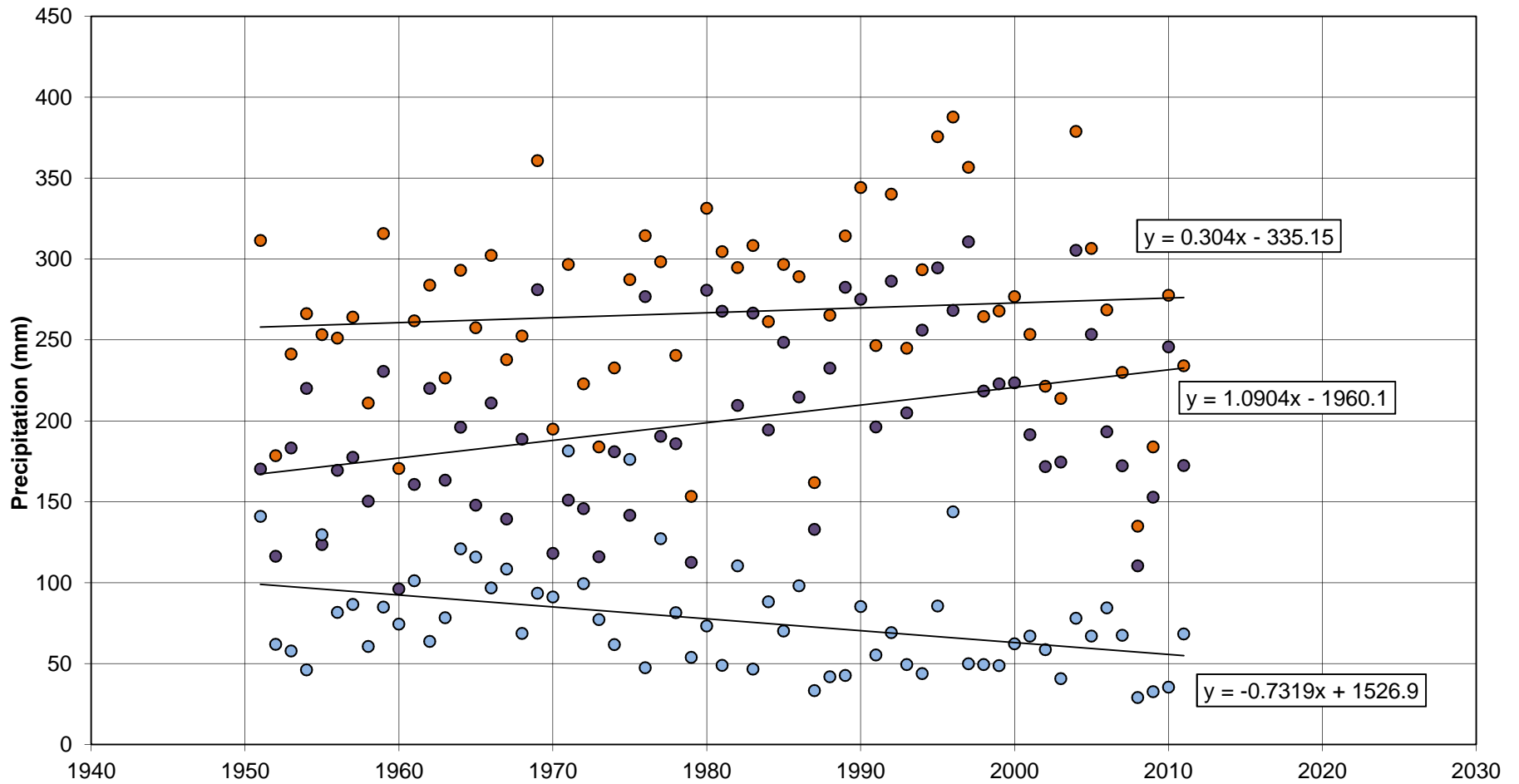


- Average Annual Mean Maximum Monthly Temperature
- Mean Annual Temperature
- Average Annual Mean Minimum Monthly Temperature

NOTES:
 1. YEARS WITH MISSING MONTHS WERE IGNORED.
 2. ALL OF THE TRENDLINES ARE SIGNIFICANT AT A 10% LEVEL OF SIGNIFICANCE.

KGHM MINING INC.	
AJAX PROJECT	
KAMLOOPS AIRPORT TEMPERATURE TRENDS	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
	REF. NO. 3
FIGURE 3.1	REV 0

0	12DEC14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D



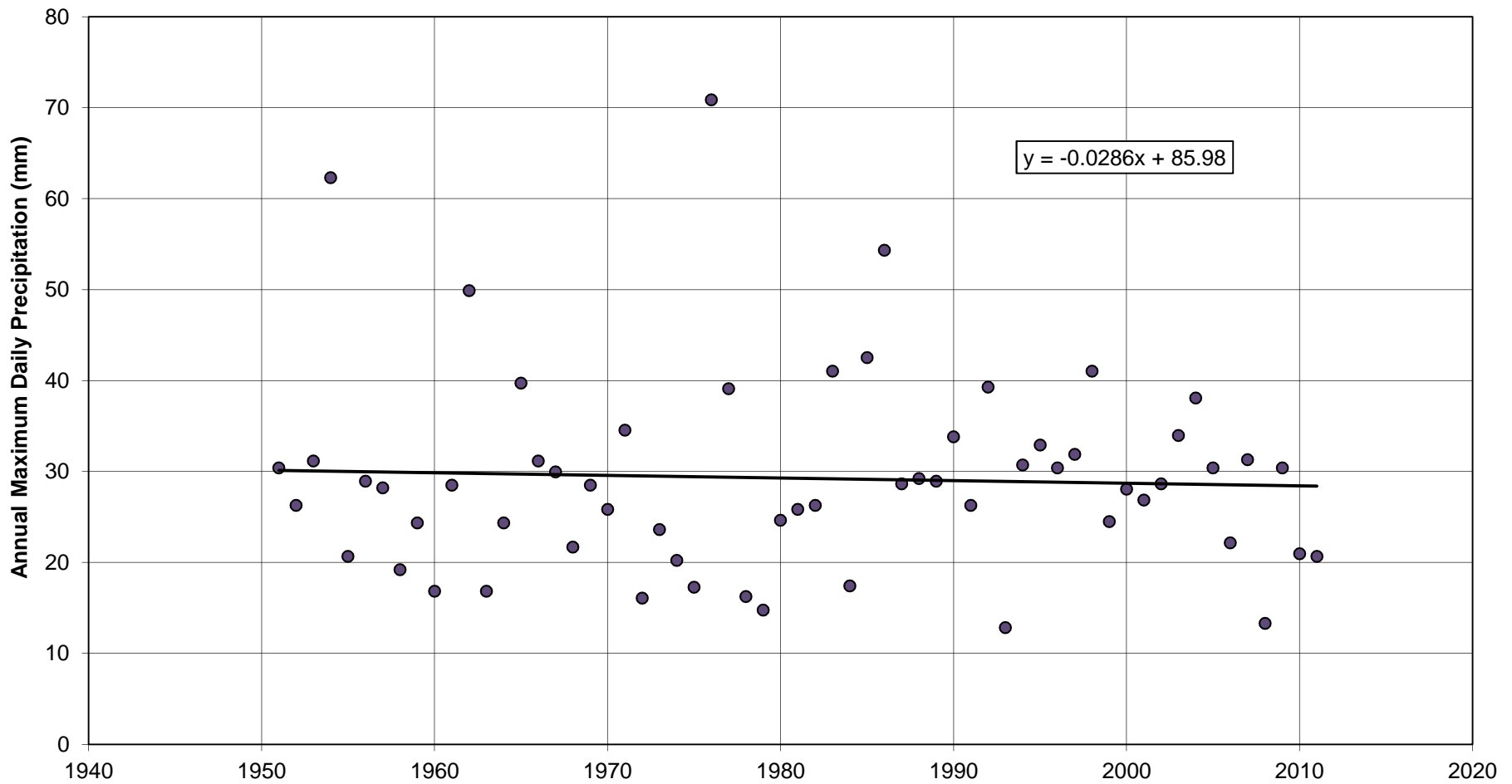
● Annual Precipitation ● Annual Rain ● Annual Snow

NOTES:

1. YEARS WITH MISSING MONTHS WERE IGNORED.
2. THE ANNUAL PRECIPITATION TRENDLINE IS NOT SIGNIFICANT AT A 10% LEVEL OF SIGNIFICANCE.
3. THE ANNUAL RAIN AND ANNUAL SNOW TRENDLINES ARE SIGNIFICANT AT A 10% LEVEL OF SIGNIFICANCE.

KGHM MINING INC.	
AJAX PROJECT	
KAMLOOPS AIRPORT PRECIPITATION TRENDS	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
REF. NO. 3	
FIGURE 3.2	
REV 0	

0	12DEC14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

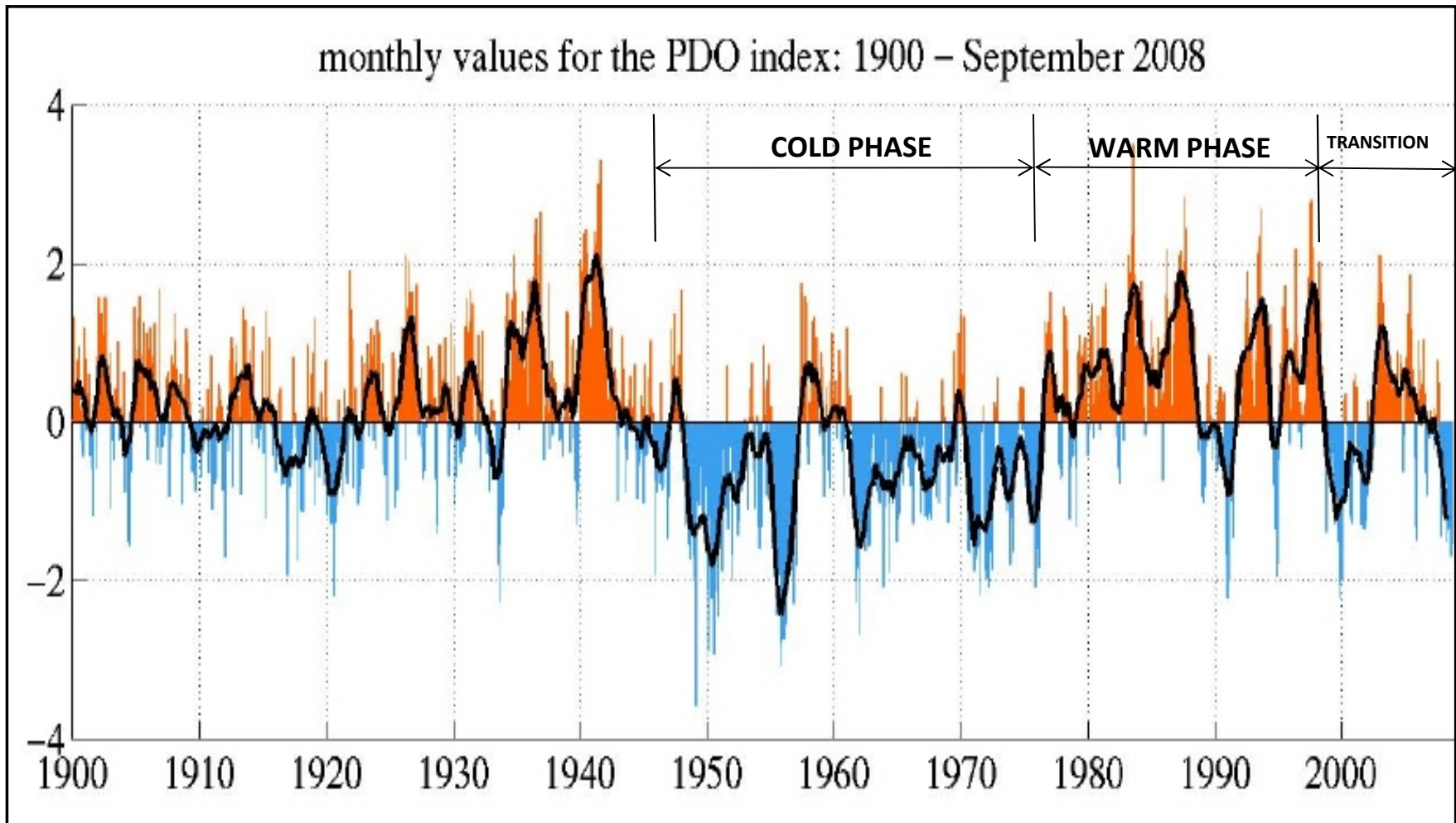


NOTES:

1. THE TRENDLINE IS NOT SIGNIFICANT AT A 10% LEVEL OF SIGNIFICANCE.

KGHM MINING INC.	
AJAX PROJECT	
KAMLOOPS AIRPORT ANNUAL MAXIMUM DAILY PRECIPITATION	
	P/A NO. VA101-246/33
	REF. NO. 3
FIGURE 3.3	
	REV 0

0	12DEC14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

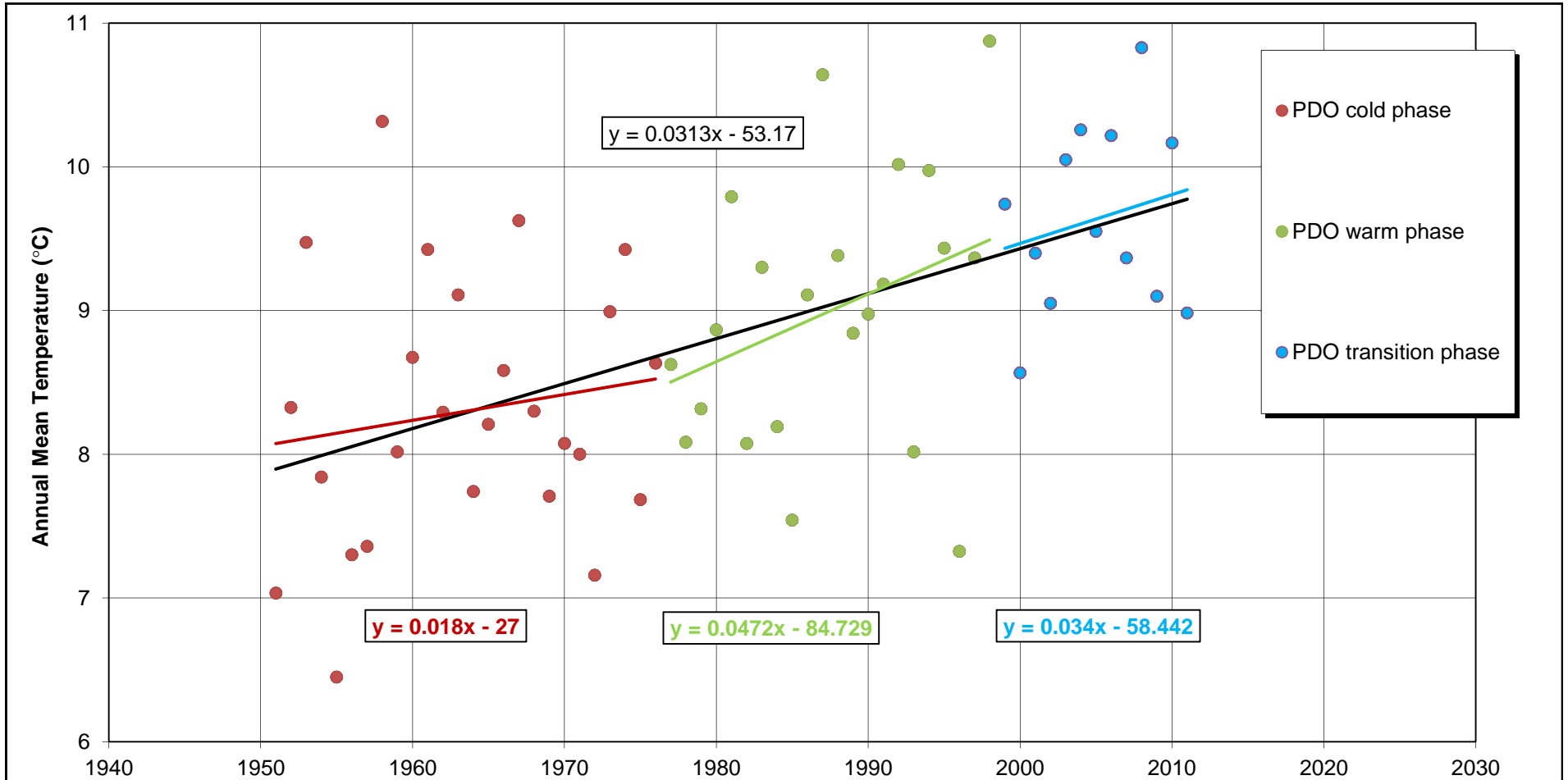


NOTES:

- SOURCE: JOINT INSTITUTE FOR THE STUDY OF THE ATMOSPHERE AND OCEAN
<http://jisao.washington.edu/pdo>

KGHM MINING INC.	
AJAX PROJECT	
THE PACIFIC DECADEAL OSCILLATION INDEX FOR THE 20 TH CENTURY	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-248/33
	REF. NO. 3
FIGURE 3.4	
	REV 0

0	12DEC'14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D



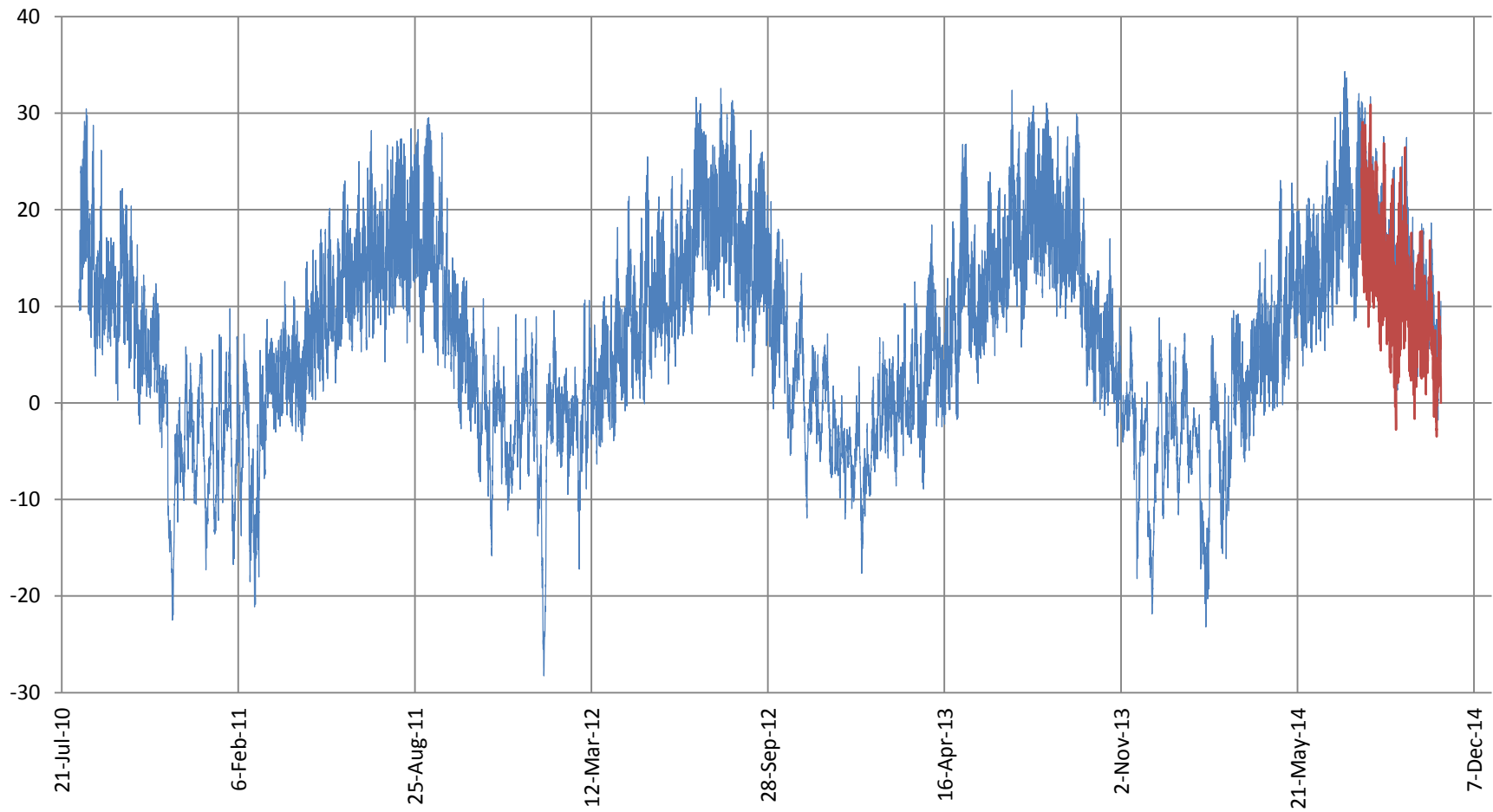
NOTES:
 1. YEARS WITH MISSING MONTHS WERE IGNORED.
 2. NONE OF THE TRENDLINES ARE SIGNIFICANT AT A 10% LEVEL OF SIGNIFICANCE.

KGHM MINING INC.	
AJAX PROJECT	
KAMLOOPS AIRPORT ANNUAL MEAN TEMPERATURE TRENDS PDO PHASES	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
	REF. NO. 3
FIGURE 3.5	
	REV 0

0	12DEC14	ISSUED WITH REPORT	JMQ	JGC
REV	DATE	DESCRIPTION	PREP'D	REV'D

APPENDIX A
REGIONAL AND PROJECT CLIMATE DATA ANALYSIS

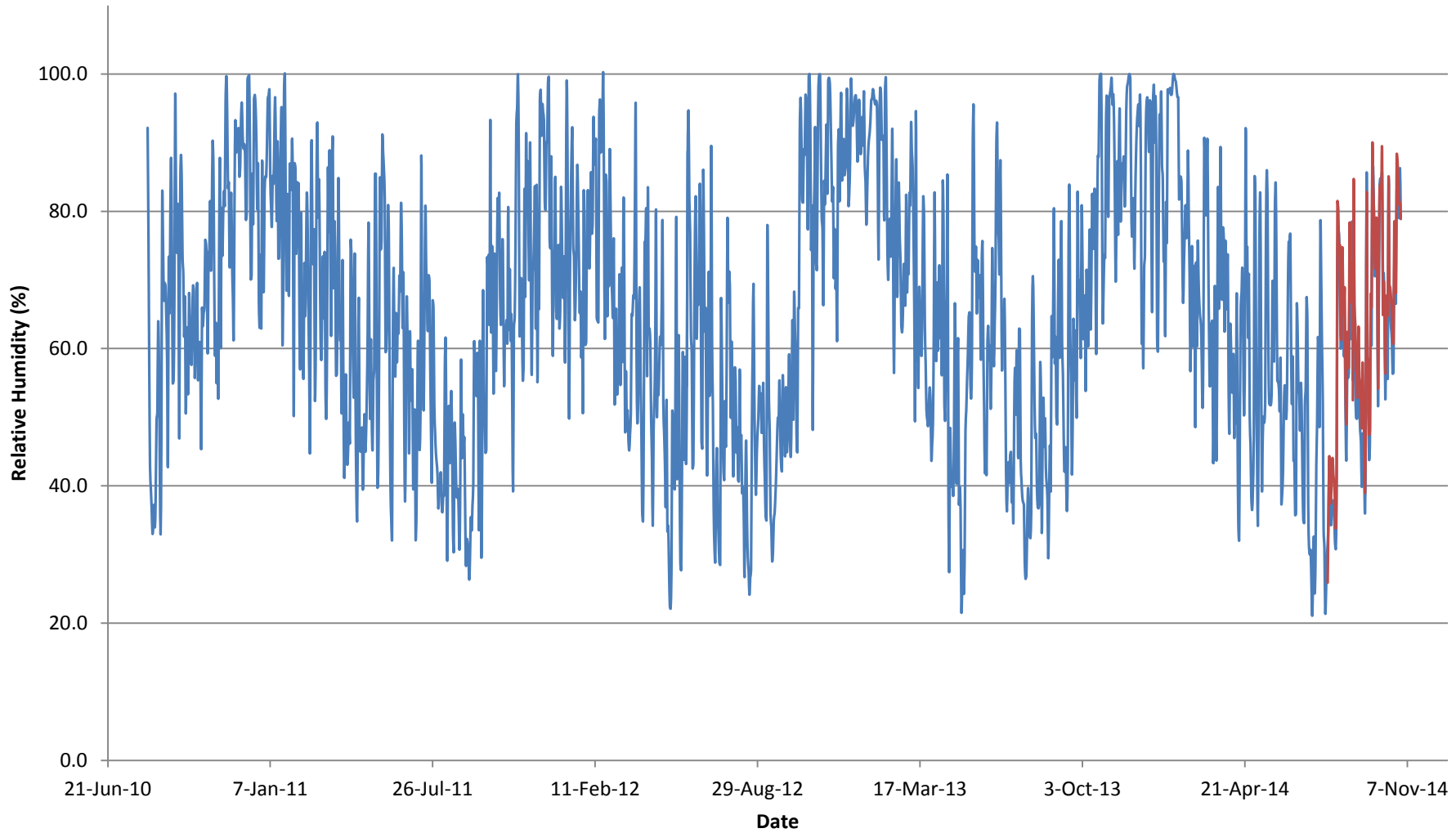
(Figures A1 to A9)



— AJAXMET — AJAXAQ-1

KGHM AJAX MINING INC.	
AJAX PROJECT	
AJAXMET AND AJAXAQ-1 CLIMATE STATION AVERAGE HOURLY TEMPERATURE	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
	REF. NO. 3
FIGURE A1	
REV 0	

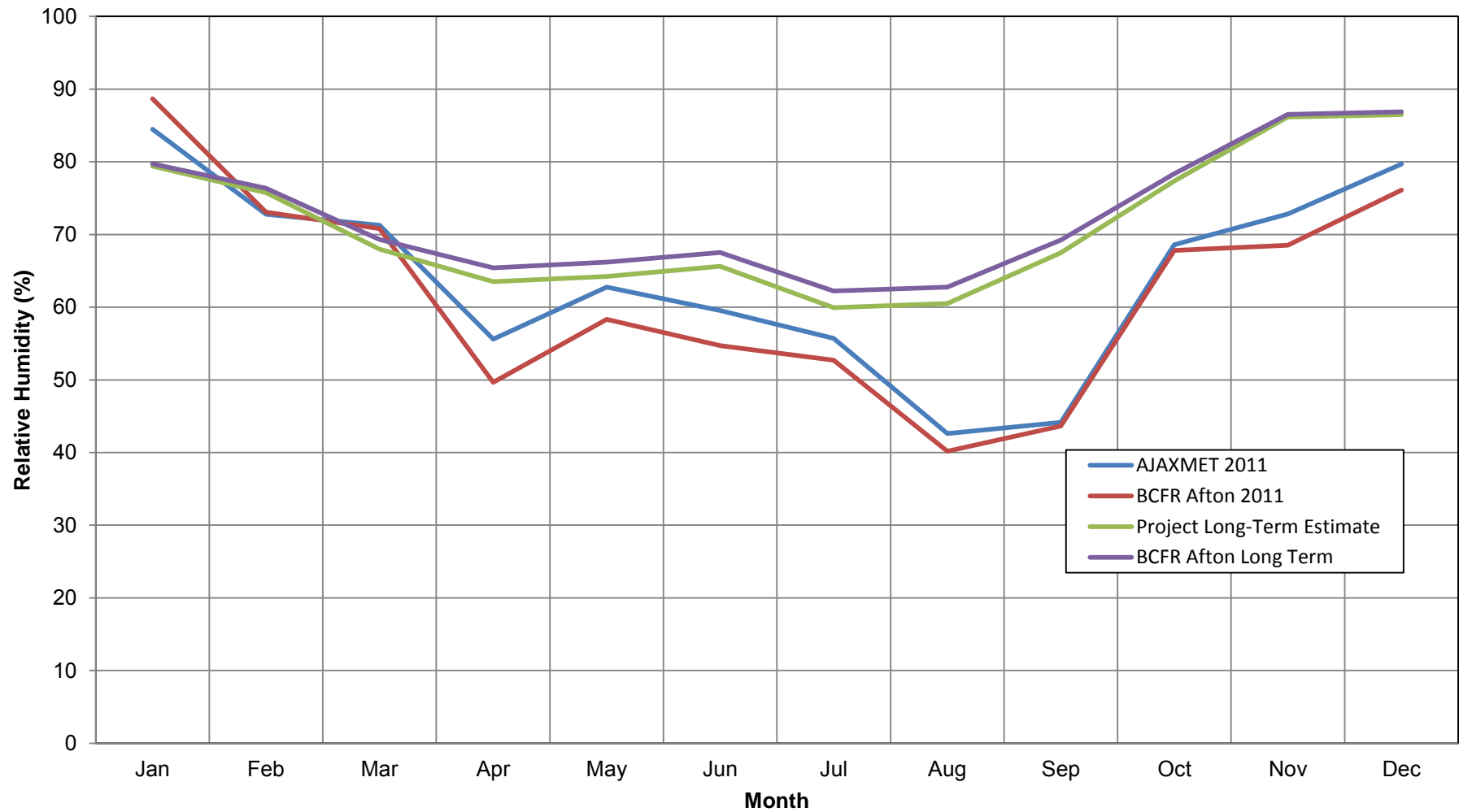
0	12DEC14	ISSUED WITH REPORT VA101-246/33	JMQ	JGC	JGC
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D



— AJAXMET — AJAXAQ-1

KGHM AJAX MINING INC.	
AJAX PROJECT	
AJAXMET and AJAXAQ-1 CLIMATE STATION DAILY AVERAGE RELATIVE HUMIDITY	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
	REF. NO. 3
FIGURE A2	
REV 0	

0	12DEC'14	ISSUED WITH REPORT VA101-246/33	JMQ	JGC	JGC
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D

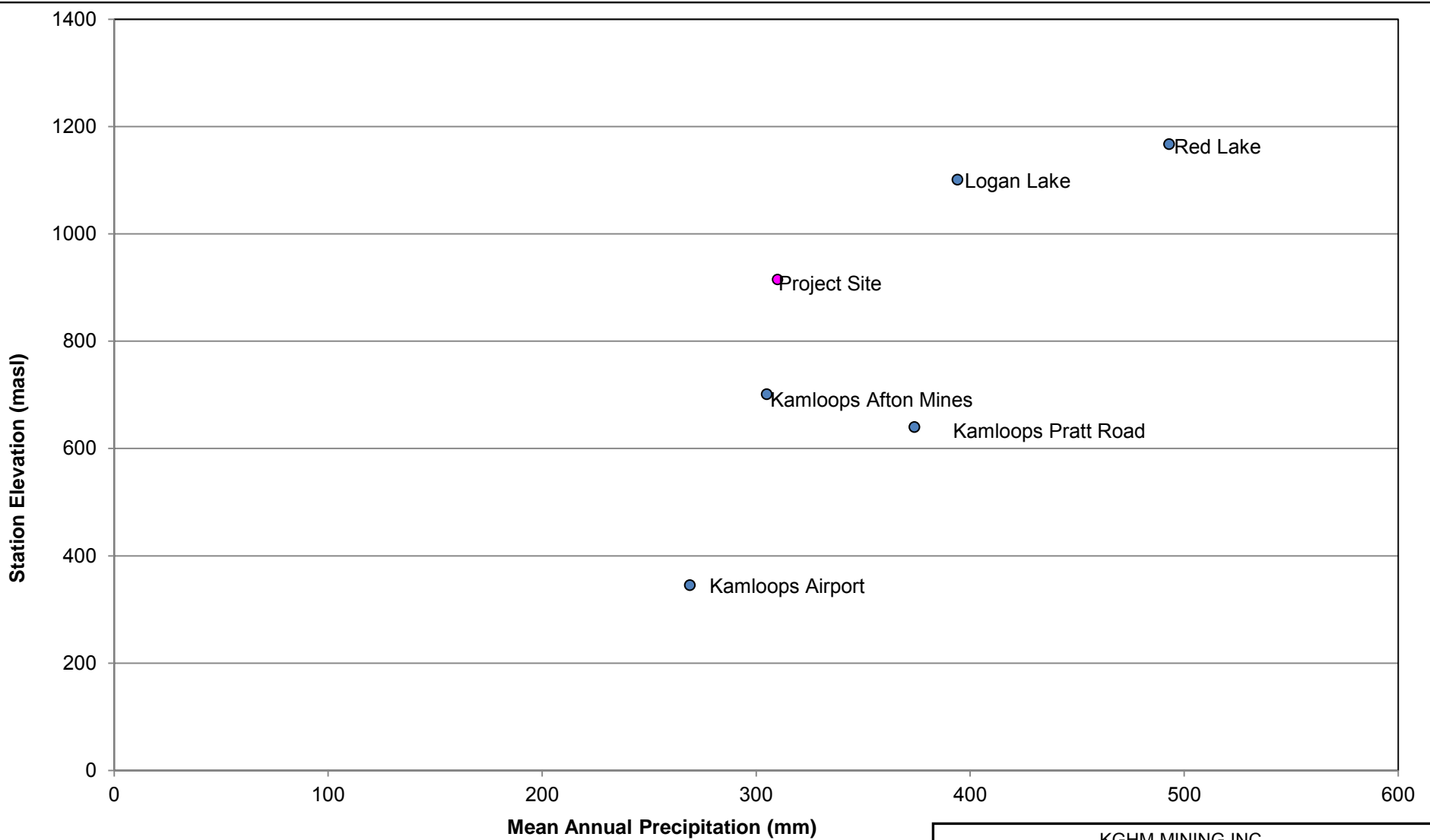


NOTES:

- 2011 climate data used to understand relationship between regional and project site relative humidity
- One year of complete RH data was required to determine correlation between stations

KGHM AJAX MINING INC.	
AJAX PROJECT	
PROJECT SITE AND REGIONAL CONCURRENT AND LONG-TERM RELATIVE HUMIDITY ESTIMATE	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
	REF. NO. 3
FIGURE A3	
REV 0	

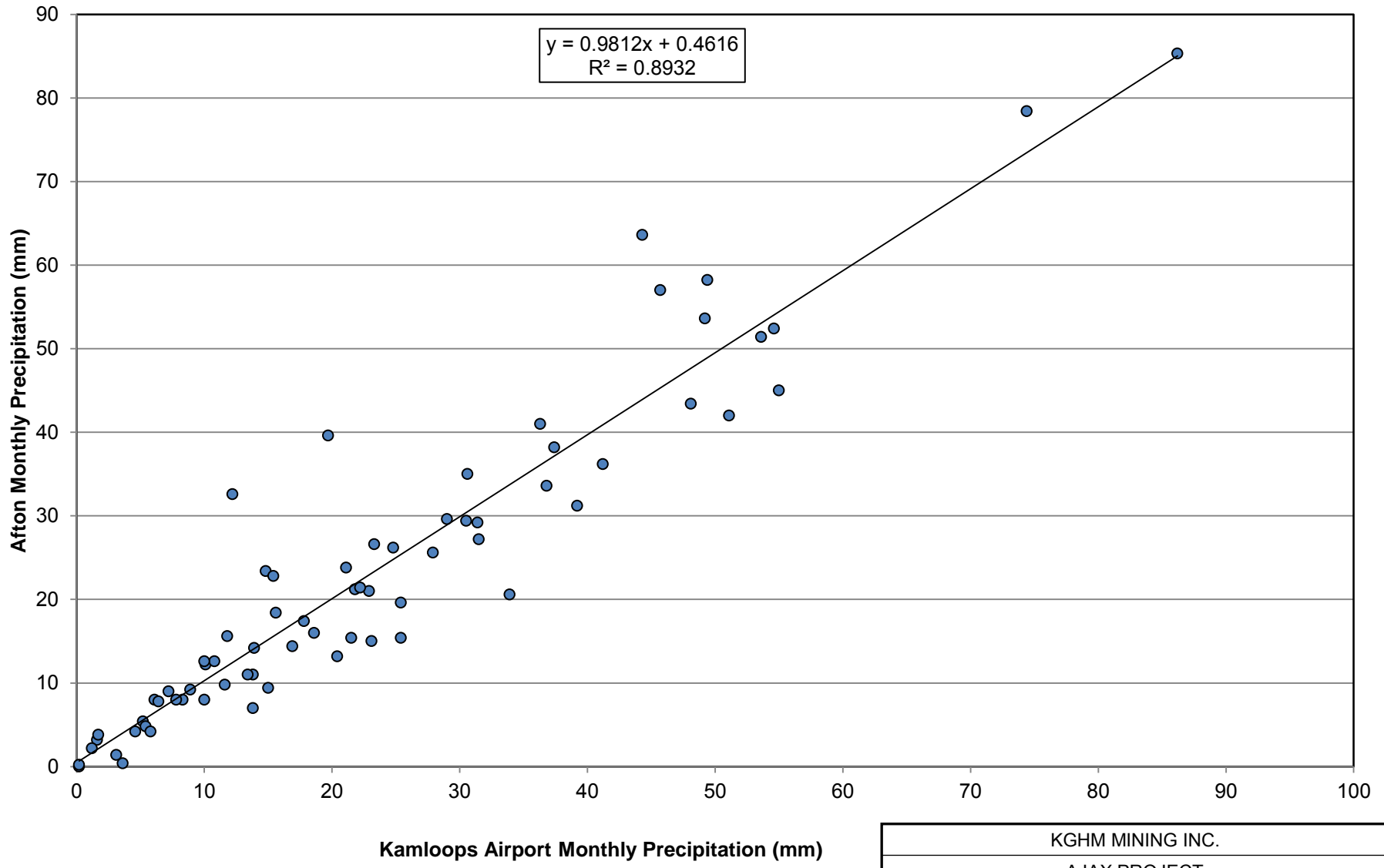
0	21JAN'15	ISSUED WITH REPORT VA101-246/33	JMQ	MH	JGC
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D



NOTE:
1. AJAXAQ-1 Station information not included due to lack of annual

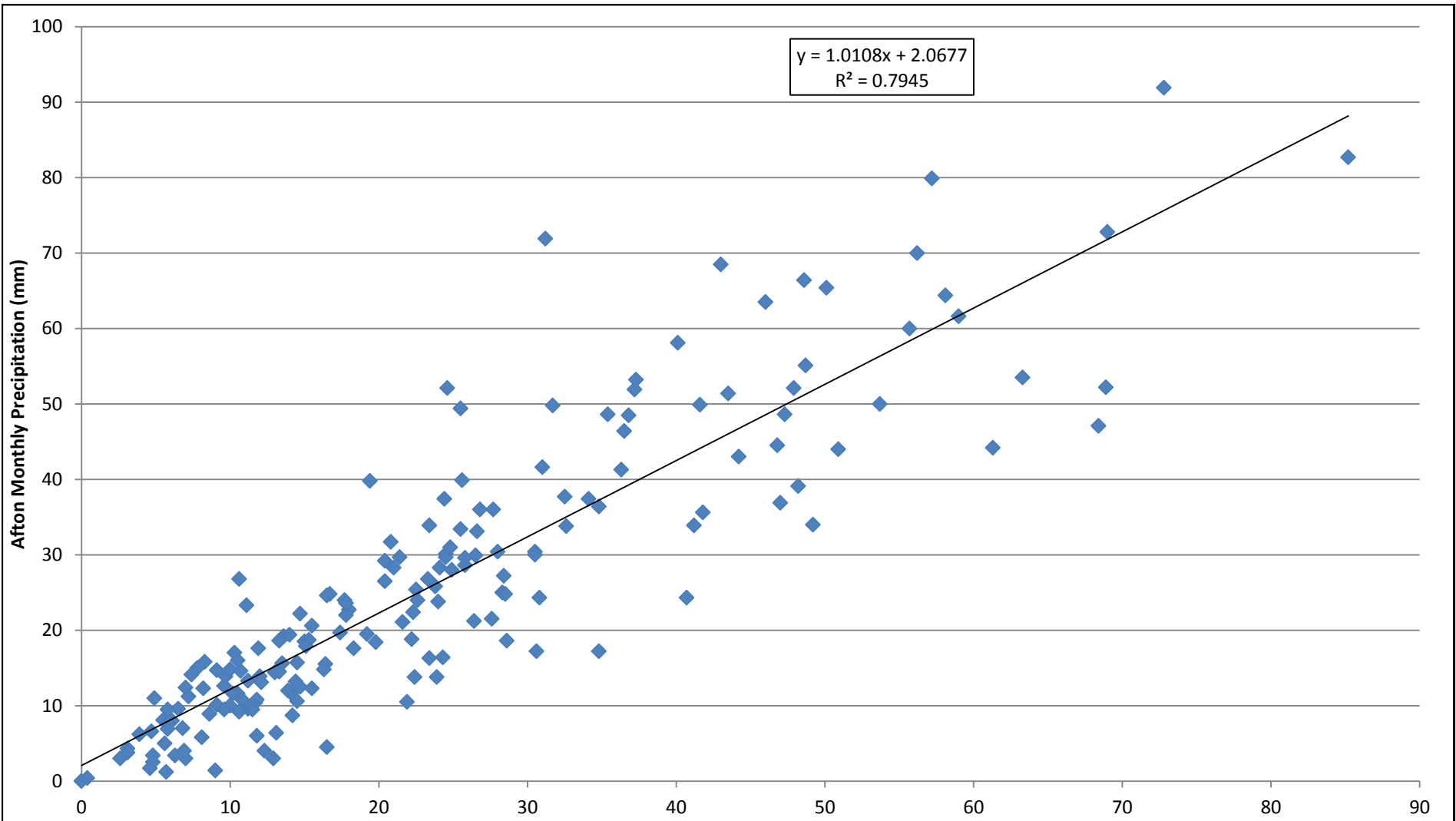
KGHM MINING INC.		
AJAX PROJECT		
REGIONAL AND PROJECT SITE CLIMATE STATION ELEVATIONS		
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33	REF. NO. 3
	FIGURE A4	
		REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	21JAN'14	ISSUED WITH REPORT	JMQ	JGC	JGC



KGHM MINING INC.	
AJAX PROJECT	
KAMLOOPS AIRPORT AND KAMLOOPS AFTON MINE CONCURRENT MONTHLY PRECIPITATION (2005 - 2014)	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
	REF. NO. 3
FIGURE A5	
REV 0	

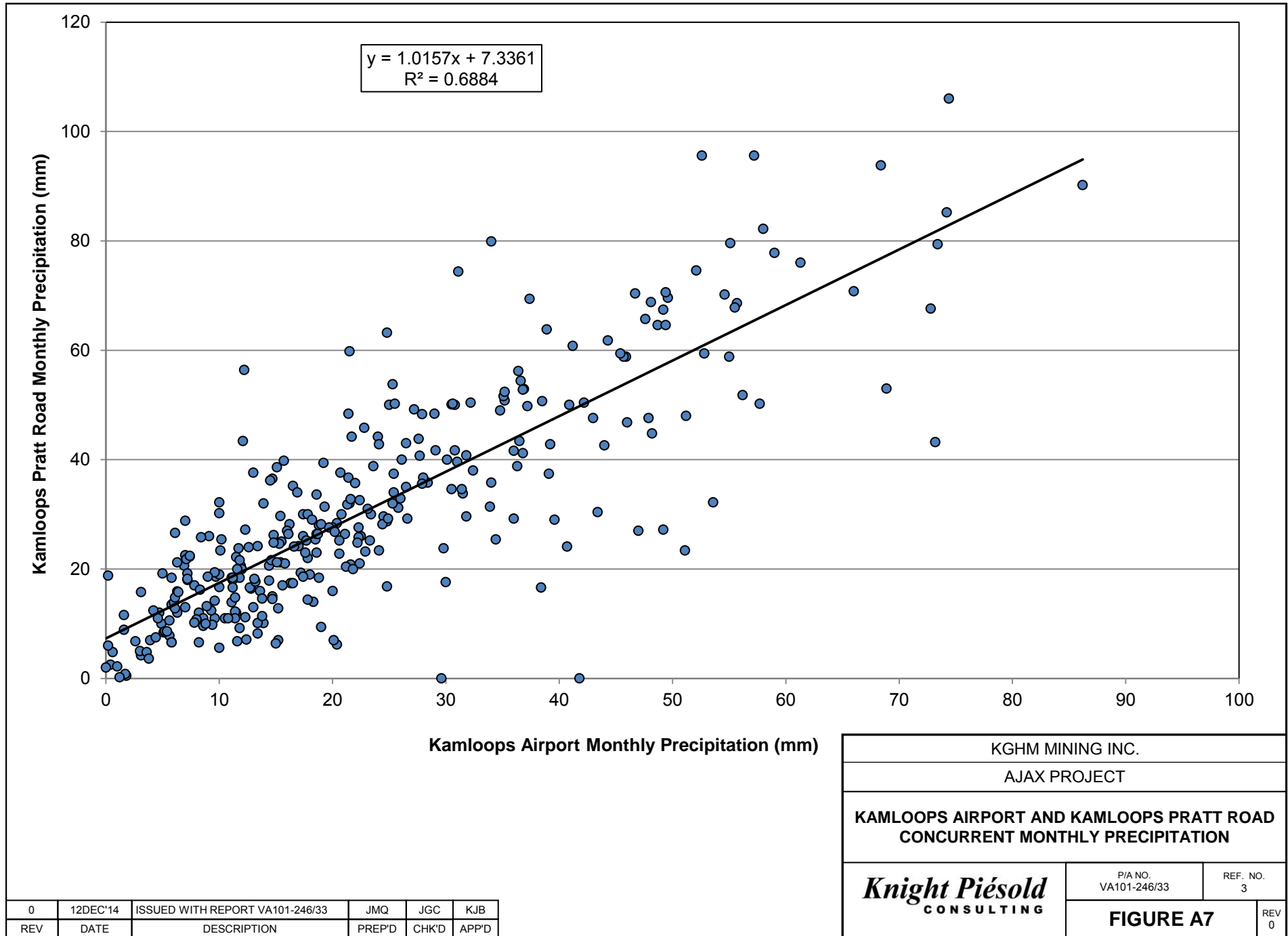
0	12DEC'14	ISSUED WITH REPORT VA101-246/33	JMQ	JGC	JGC
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D

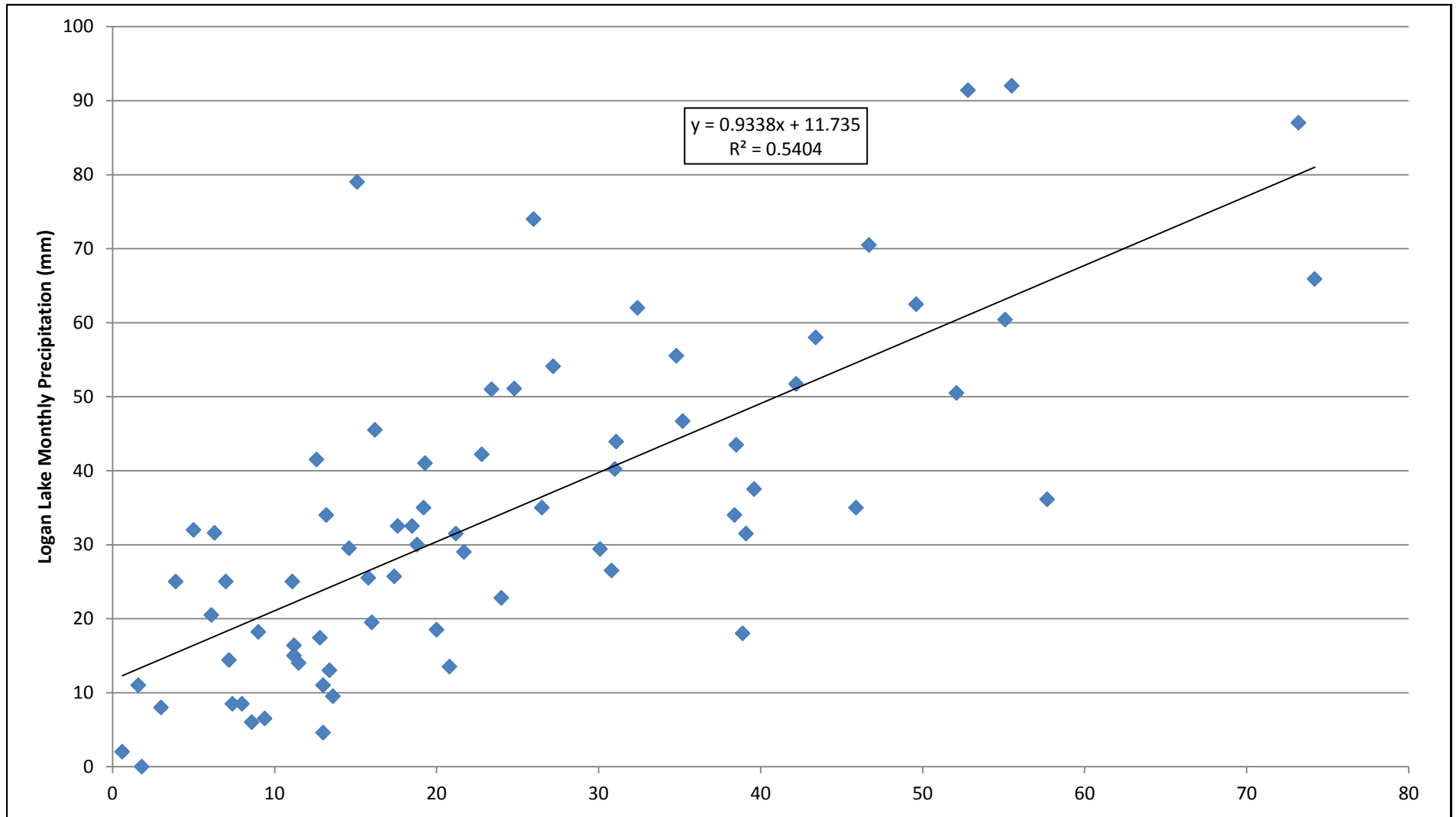


Kamloops Airport Monthly Precipitation (mm)

KGHM MINING INC.	
AJAX PROJECT	
KAMLOOPS AIRPORT AND KAMLOOPS AFTON MINES CONCURRENT MONTHLY PRECIPITATION (1977 - 1993)	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
	REF. NO. 3
FIGURE A6	
REV 0	

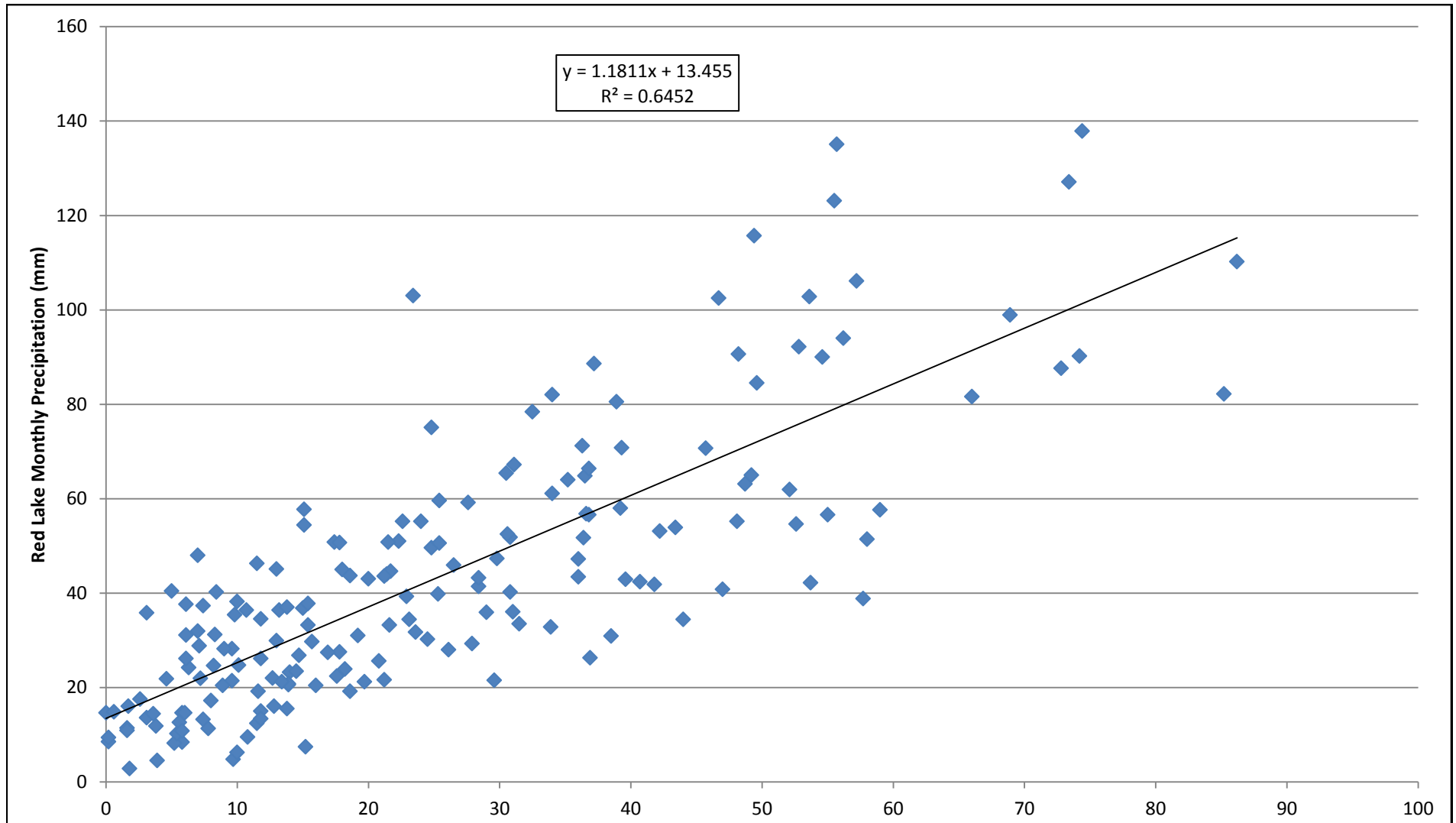
0	12DEC'14	ISSUED WITH REPORT VA101-246/33	JMQ	JGC	JGC
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D





KGHM MINING INC.	
AJAX PROJECT	
KAMLOOPS AIRPORT AND LOGAN LAKE CONCURRENT MONTHLY PRECIPITATION	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
	REF. NO. 3
FIGURE A8	
REV 0	

0	12DEC'14	ISSUED WITH REPORT VA101-246/33	JMQ	JGC	KJB
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D



Kamloops Airport Monthly Precipitation (mm)

KGHM MINING INC.	
AJAX PROJECT	
KAMLOOPS AIRPORT AND RED LAKE CONCURRENT MONTHLY PRECIPITATION	
<i>Knight Piésold</i> CONSULTING	P/A NO. VA101-246/33
	REF. NO. 3
FIGURE A9	
REV 0	

0	12DEC'14	ISSUED WITH REPORT VA101-246/33	JMQ	JGC	KJB
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D