EAGLE GOLD PROJECT

DUST CONTROL PLAN

Version 2013-01

MAY 2013

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1 INTRODUCTION

1.1 PROJECT SUMMARY

StrataGold Corporation (SGC), a directly held wholly owned subsidiary of Victoria Gold Corp. has proposed to construct, operate, close and reclaim a gold mine in central Yukon. The Eagle Gold Project ('the' Project) is located 85 km from Mayo, Yukon using existing highway and access roads. The Project will involve open pit mining at a production rate of approximately 10 million tonnes per year (Mt/y) ore, an average strip ratio (amount of waste: amount of ore) of 1.45:1.0 and gold extraction using a three stage crushing process, heap leaching, and a carbon adsorption, desorption, and recovery system over a 10 year mine life.

1.2 SCOPE AND OBJECTIVES

The objective of this Dust Control Plan is to describe the best management practices and mitigation measures that will be employed to minimize dust emissions from the Project. The scope of the plan includes dust control methods, ambient air quality monitoring procedures, and a description of existing meteorological conditions that may influence dust emissions and deposition.

This Dust Control Plan has been prepared in accordance with the Yukon Government Draft Plan Requirements for Quartz Mine Licensing (2012), Yukon Government Dust Management Plan Guidelines and with Decision Document terms and conditions. Decision Document terms and conditions include commitments made by SGC as part of the environmental assessment. Commitment #20 from Appendix A of the YESAB screening report states that SGC will develop and implement a Fugitive Dust Control Plan.

2 DUST CONTROL METHODS

The following sections provide a description of best management practices used throughout all Project phases and methods to control dust during construction and operations.

2.1 BEST MANAGEMENT PRACTICES

The following are Best Management Practices that will be implemented during all phases of the Project:

- Minimization of land clearing activities to the extent possible (e.g. do not disturb land beyond facility or road boundaries or areas required for construction).
- Construction of haul roads with low silt content material.
- Low speed limits for all mobile mine equipment.
- Trucks to maintain more than 15 seconds separation when possible to reduce respirable dust exposure to following truck.
- Site roads to be watered within 12 hours of previous wettings (e.g. rain or via water truck) on hot dry days and within 48 hours on cool humid days or as necessary.
- Orientation of material stockpiles so that the length is parallel with prevailing winds where possible.
- Establishment of waste rock storage area final surfaces early to enable re-vegetation.
- Delay blasting if conditions are unfavourable.
- Visual inspections to identify and address potential dust emissions.
- Timely response to dust complaints by adjacent land users.
- Record of dust suppression activities.

2.2 CONSTRUCTION PHASE

The primary sources of dust generated during the construction phase will be:

- Clearing and grubbing.
- Salvaging and stockpiling of overburden.
- Development of quarry and borrow areas.
- Traffic on existing and newly constructed site roads.

Project design includes the reduction of overall site road length to shorten haul distances to decrease maintenance and operations cost for the mine fleet. In turn, optimized road length will result in reduced dust emissions compared to roads of greater length. Similarly, cleared land will be minimized to the extent possible to reduce cost of material handling which will result in decreased vegetation and soil disturbance. Dust control options during mining, loading and dumping of topsoil and overburden are generally limited to dust suppression watering however; the construction plan includes the start of land clearing activities to occur as early in the spring as possible when soil moisture is optimal after break up.

Water will be used as a dust suppressant using a tank truck with spray bars for cleared surfaces, overburden stockpiles, borrow sites, and site roads as required during dry conditions. The water truck will be used as required to suppress visible dust emissions. The water truck capacity will be approximately 5,000 gallons (18,927 liters). The total estimated water use for dust suppression for site roads and cleared areas will be up to approximately 40 truckloads of water (200,000 gallons) per day during dry conditions. It is assumed that dust suppression will be required for up to approximately 20 days/month from June to September. During construction, the source of water for dust suppression will be an existing groundwater well located on the Dublin Gulch alluvial fan adjacent to Haggart Creek. This well was installed by previous land users to provide potable and drilling water for a mineral exploration camp at Dublin Gulch.

Chemical dust suppressants such as polymers or surfactants may be considered if raw water alone is not effective for dust control. Surfactant additives increase the ability of water to wet and suppress dust by reducing surface tension of water, which causes water to spread in smaller droplets. Water is better absorbed into the cleared area of roadbed rather than runoff or evaporation from road surfaces. Polymer additives function to seal surfaces so that fine particulate matter is not readily mobilized. SGC will notify Yukon Government if any chemical dust suppressant additives are considered prior to use.

Overburden stockpiles, borrow areas, and large cleared areas will be wetted as necessary to control dust by a water truck with spray bar. In the event the water truck application rate is not sufficient to control dust, additional measures such as construction of additional wind breaks or stationary misters.

2.3 OPERATIONS PHASE

The primary sources of dust generated during the operations phase of the Project will be:

- Open-pit mining including blasting, excavation, and ore/waste hauling and handling.
- Mining equipment, haul truck and other vehicle traffic.
- Ore processing including crushing, hauling, and conveying.

2.3.1 Blasting

Blasting is usually a relatively minor contributor to total dust emissions. The options for controlling dust from blasting are somewhat limited however Project planning includes delaying blasting under unfavourable wind and atmospheric conditions when possible to reduce dust.

Dust generated when processing mined materials, primarily occurs as a result of the mechanical handling of ore. At the ore processing plant the mineral is extracted through a variety of processes that usually involve particle size reduction.

2.3.2 Traffic

Water will be used as a dust suppressant using a tank truck with spray bars for cleared surfaces, stockpiles and site roads as required during dry conditions. The water truck capacity will be approximately 5,000 gallons (18,927 liters). The total estimated water use for dust suppression for site roads and cleared areas will be approximately 40 truckloads of water (200,000 gallons) per day during dry conditions. It is assumed that water will only be applied for dust suppression for approximately 20 days/month from June to September. During construction, the source of water for dust suppression will be Haggart Creek. During operations, the primary sources of water for dust suppression will be the Lower Dublin South Pond and an existing well adjacent to Haggart Creek.

Active site roads will be watered unless meteorological conditions (e.g., rain, frozen surfaces, etc.) are adequate to suppress dust to a degree that is equivalent to 3-hour periodic watering. Inactive roads will be watered if there is evidence of wind driven dust.

2.3.3 Ore Handling and Processing

The following is a description of the ore processing method and systems that includes a summary of dust control methods. Dust control design criteria is appended as Appendix A.

After blasting, ore from the open pit will be delivered by haul truck to the primary crusher, located north of the open pit. During regular operations, ore will be transported overland by covered conveyor from the primary crusher to the crushing and screening plants. During winter months the primary crushed ore will be conveyed to the 100 d ore storage pad. Once climatic conditions return to operational criteria for heap leach pad stacking the ore stockpiled on the 100 d storage pad will be fed back into the crushing system at the secondary crushing plant. The crushing system will produce an average particle size P80 6.4 mm for delivery to the heap leach pad.

Crushed ore will be transported by covered conveyor to the heap leach pad for stacking. Belt agglomeration will occur using lime and cement before it is stacked on the heap leach pad. Agglomeration will be achieved with cement and lime additions to the ore following tertiary crushing while the ore is traveling down the overland conveyor system. Ore will be stacked on a composite liner system in 10 m lifts using a stacking conveyor system.

Primary Crushing and Conveying

During regular operations, run-of-mine (ROM) ore will be delivered by haul trucks from the open pit to the primary gyratory crusher, located to the north of the open pit. ROM ore will be direct-dumped into the primary crusher dump pocket, or a small temporary ROM stockpile, if the primary crusher is not available for direct dumping. The ore will be direct-dumped into the dump hopper situated above the gyratory crusher, and will be discharged to the crusher with a discharge setting of 150 mm. The dump hopper will be enclosed on two sides. As dust is most easily entrained in the wind when material is falling through the air the truck the unloading will be sheltered from the wind. The primary crushed ore will be collected in the discharge pocket below the primary crusher. An apron feeder will regulate the discharge rate of the primary crushed ore. This crushed product will report to a 250 t bin by a system of conveyors. The conveyors will be fitted with covers along their entire length to prevent additional moisture addition to the ore, block wind entrainment of dust and reduce overall dust emissions. The discharge of the primary crusher as well as the apron feeder discharge will be located inside the crusher building and as such will be shielded from the prevailing winds. All transfer points within the primary crusher building will incorporated dust collection extraction points and the dust will be conveyed to one or more dust collectors.

Secondary Crushing and Conveying

The primary crushing discharge conveyor will deliver the primary crushed ore to a surge bin. Two belt feeders will regulate the ore feed rate from the surge bins to double deck vibrating screens (secondary screens) with apertures of 89 and 38 mm, respectively. The two separation decks produce a coarse and a fine product. The coarse product material will discharge to two Metso MP1000 (or equivalent) standard head cone crushers (secondary crushers), each with a closed side setting of 19 mm. The undersize material from the secondary screens will be combined with crushed material and conveyed to the tertiary crusher surge bin and will be ready for further processing. The secondary and tertiary crushing and screening devices will be enclosed within industrial buildings to control dust emissions.

Within each crushing section (secondary or tertiary) as ore is transferred from one conveyor to another the ore transfer point will be enclosed by a fabricated steel chute. Likewise at points of ore loading onto conveyors from screens or crushers there are fabricated carbon steel chutes. These material transfer points (chutes) serve to enclose the ore stream thus confining the fine particulate. By use of an exhaust fan and duct work these hoods are linked to an emissions control device (bag house). The control device will have particulate removal of 95 – 99% efficiency for 10 micron particulate to meet National and Territorial ambient air quality guidelines. The secondary and tertiary crushing buildings will each have a dedicated baghouse for dust control.

Tertiary Crushing and Conveying

Ore from the secondary crushing circuit will be conveyed to a feed bin prior to the last crushing stage. Material from the feed bin will be fed, in parallel, to four 4,300 x 8,500 mm inclined vibrating screens. The screen oversize material from the four screens will be fed to four Metso MP1000 (or equivalent) tertiary crushers operating in a closed circuit. Screen undersize material will be conveyed directly to a series of conveyors and then to the heap leach pad. The tertiary crusher discharge will be fed back to the vibratory screens thereby completing the closed circuit. Various ancillary equipment will include a dust collection system, overhead cranes, weightometers, samplers, maintenance hoists, and lubrication units for the crushers. All crushing and screening will be carried out inside the process building and shielded from the prevailing winds.

The majority of dust will be generated by the truck unloading, material transfer points and screens.

Mitigation for dust emissions from the crushing facility will be as follows:

- Truck Unloading Station
    - Shelter the dumping of ore from the wind by enclosing the truck dump to the maximum extent possible
    - By the use of fine spray or fog suppression
    - Dust extraction with conveyance to and processing in dust collectors
- Material Transfer Points
    - Drop heights will be reduced wherever practical to minimize air entrainment.
    - The use of sleeves and proper chute design will prevent air entrainment of the dust.
    - Dust extraction with conveyance to and processing in dust collectors
    - Conveyors will be covered or enclosed in buildings or conveyor galleries.
- Vibrating screens
    - Screens will be equipped with dust covers
    - Screen feed and screen discharge transfer points will be handled similarly as all material transfer points as described above.

Cement - lime addition and heap stacking

The Heap Leach Facility (HLF) conveyor system will be operated using a conveyor stacking system that will include:

- overland conveyors
- grasshopper-type portable transfer conveyors
- horizontal mobile bridge conveyor mounted on a dozer crawler carriage
- radial stacking conveyor, capable of powered luffing, slewing and stacking to a height of 10 m and fitted with a stinger

The HLF feed conveyors will be installed adjacent to the heap leach pad, and then extended as needed around the western circumference pad, from the crusher area. The grasshopper conveyors will transport the ore from the overland conveyors to the bridge conveyor. The ore will be placed in 10 m lifts using the radial stacker. The leach lifts will be constructed from east to west, retreating up the slope of the pad. As the stacker retreats, the grasshopper conveyors will be removed from the transfer train and relocated in an adjacent area so that the heap will be constructed from the toe upwards in a series of 60 m wide by 500 m long lifts.

As the crushed ore (final product material) is conveyed from the tertiary crushing area, lime and Portland cement will be added to the material on the conveyor at a controlled rate by screw conveyor or rotary valve, together with water to facilitate agglomeration (moisture control) of the heap leach feed material. As the crushed ore leach feed material passes from one conveyor to another en route to the HLF, the particles will be mixed with the these reagents for agglomeration. The agglomeration process will aid in binding small particles to larger particles and thereby assist in reducing dust emissions of small particles.

Dust is most is most easily entrained in the wind when the material is falling through the air at points of transfer. Therefore, it is important to reduce the drop heights of material transfer points wherever practical. The use of sleeves and proper chute design incorporating wind barriers will be used to minimize dust entrainment. Fixed transfer points will be sheltered from the wind by the use of enclosures. All conveyor belts will be covered and incorporate belt cleaners in order to reduce material carry back on the return strand of the conveyor.

Refinery

Smelting will take place in a diesel-fired tilting crucible furnace. The furnace will be equipped with hydraulic control of the tilt mechanism for the pouring of the molten gold melt product. The filtered precipitate will be mixed with fluxes, typically a combination of borax, niter and possibly silica sand. A cascading mould system will be included. Off gases from the melting furnace will be extracted with a fan and then discharged into a bag house to remove particulate matter. A dry aspirated dust collection system will control fumes and dust emissions from the smelting furnace. A canopy hood will be located over the furnace and collected fines will be dropped via a rotary air lock into a drum for manual removal as required. The bars of doré will be stored in a safe until they are despatched off the Property.

Assay Laboratory

The assay lab will be a will be a prefabricated modular structure located inside the ADR facility. This facility will house all necessary laboratory equipment for metallurgical grade testing and control. The lab will be equipped with all appropriate HVAC and chemical disposal equipment as needed. A dry aspirated dust collection system equipped with a single dust collector and exhaust fan with pick up hoods will be located at crushers, pulverizers, and workstations. Collected fines will be discharged via a rotary air lock into a drum that will be manually emptied as required.

2.4 INSPECTIONS AND RECORDS

Dust emissions and mitigation measures will be monitored by regular inspections and corrective actions taken when appropriate. Potential dust sources that will be inspected will include but are not necessarily limited to the following:

- Active land clearing, excavation and site preparation areas
- Borrow material quarries and stockpiles
- Overburden stockpile and construction material screening area(s)
- Open pit
- Eagle pup waste rock storage area
- Platinum gulch waste rock storage area
- Primary crusher
- Crushing and screening plant (including all dump pockets, transfer points, feed bins, etc.)
- Overland conveyor system from Crushing and Screening Plant to HLF
- Heap leach pad (including grasshopper and radial conveyor transfer and drop points)
- Inactive site roads
- Active site roads including haul and secondary site access roads

As necessary, and as the result of a site or area inspection, further mitigation measures or corrective actions will be implemented in a timely manner and subject to additional inspection to confirm satisfactory performance. Ongoing dust control concerns and corrective actions will be periodically reviewed by the Environmental Manager to determine if additional corrective actions, Project design, or operational changes are required.

2.5 RESPONSIBILITIES

The Mine Manager is responsible for the effective implementation of the Dust Control Plan, providing the resources needed for the implementation and continual improvement of the Plan and for participating in annual management review meetings.

Designated construction and operations personnel will conduct daily inspections for their assigned area(s) and will report any significant dust emission events/concerns to their Supervisor and the Environmental Manager.

Production Supervisors and Maintenance Supervisors (or designates) are responsible for addressing high priority corrective/maintenance actions within 24 hours; and for scheduling and following up on lower priority corrective/maintenance actions within an appropriate timeframe.

3 AIR QUALITY OBJECTIVES AND MONITORING

The following sections provide a summary of the air quality monitoring objectives and methods that will be used to monitor dust emissions during construction and operations.

It is anticipated that atmospheric Criteria Air Contaminants (CAC) will be emitted during the construction and operations phases of the Project. The primary CACs will result from dust emissions from overburden excavation and handling, most notably clearing, grading, drilling, blasting, loading/unloading, unpaved road traffic and emissions from diesel combustion from heavy vehicles and machinery.

3.1 AMBIENT AIR QUALITY OBJECTIVES

Canada and Yukon Ambient Air Quality Objectives define maximum allowable limits, for particulate matter, carbon monoxide (CO), sulphur dioxide (SO_2) and nitrogen dioxide (NO_2) (CCME 2000, Health Canada 2007). These objectives are summarized in Table 3.1-1.

Table 3.1-1: Canada/Yukon Ambient Air Quality Objectives and Standards

Substance (Units)	Averaging Period	CWSa	NAAQOb		
			Maximum Desirable	Maximum Acceptable	Maximum Tolerable
TSP (µg/m^3)	24-hour	–	–	120	400
	Annual	–	60	70	–
$PM_{2.5}$ (µg/m^3)	24-hour	30	–	–	–
NO_2 (µg/m^3)	One-hour	–	–	400	1,000
	24-hour	–	–	200	300
	Annual	–	60	100	–
CO (µg/m^3)	One-hour	–	15,000	35,000	–
	Eight-hour	–	6,000	15,000	20,000
SO_2 (µg/m^3)	One-hour	–	450	900	–
	24-hour	–	150	300	800
	Annual	–	30	60	–

Source: Stantec 2012

NOTES:

[a] Canadian Council of Ministers of the Environment (CCME 2000) Canada-wide Standard for Respirable Particulate Matter ($PM_{2.5}$). This objective is referenced to the 98th percentile 24-hr concentration averaged over three consecutive years.

[b] National Ambient Air Quality Objectives, or NAAQO (Health Canada 2007).

- Standard not established for these parameters.

Particulate matter is composed of several chemical species, and is defined in air quality management by particle size. Total suspended particulates (TSP) includes all-sized particles suspended in air; typically defined at its upper limit by a cut-off of 300 to 500 µm. $PM_{2.5}$ describes all fine-mode particles up to 2.5 µm. While TSP typically falls out of suspension close to the source, $PM_{2.5}$ can be transported several kilometers, and can settle over soil, vegetation and water leading to increased metal concentrations in the environment.

The National Ambient Air Quality Objectives (NAAQO) is rated as Desirable, Acceptable and Tolerable, and is historically defined as follows:

- Maximum Desirable Level is the long-term goal for Air Quality and provides a basis for anti-degradation policy for unpolluted parts of the country, and for the continuing development of control technology.
- Maximum Acceptable Level is intended to provide adequate protection against effects on soil, water, vegetation, materials, animals, visibility, personal comfort and well-being.
- Maximum Tolerable Level denotes time-based concentrations of air contaminants beyond which, due to a diminishing margin of safety, appropriate action is required to protect the health of the general population.

3.2 AMBIENT AIR QUALITY MONITORING

The air quality baseline data collection program currently implemented is recording TSP, $PM_{2.5}$ and metals for the purpose of establishing pre-disturbed, baseline conditions. The air quality baseline monitoring program began in late-August 2012; a Thermo Scientific Partisol 2025i Sequential Ambient Air Sampler was installed near the Camp climate station, in an area away from active exploration activities. The unit samples $PM_{2.5}$ over a continuous 24-hour period (midnight to midnight – Pacific Standard Time) and TSP alternately over a continuous 24 hour period every third day according to protocols established for the National Air Pollution Surveillance (NAPS) program.

Dustfall monitoring is a simple and cost-effective means of evaluating effects of particulate emissions downwind of the sources. Dustfall is airborne PM that accumulates on a horizontal surface due to gravitational settling and wet deposition. Dustfall monitoring stations will be installed during or prior to the construction phase of the Project. Equipment standards and siting recommendations from ASTM (2010) will be followed to the extent practicable. Four stations will be installed in areas of various distance and direction from the Project disturbance area.

3.2.1 Methods

As the Project moves into the construction phase, air quality monitoring will consist of two phases:

- Phase 1:
    - Dustfall: install passive dust monitors at four locations.
    - TSP: continue monitoring TSP using the existing Partisol Air Sampling unit near the lower camp climate station.

- Phase 2:
  - o Dustfall: if dustfall levels of 1.75 mg/dm^2/d are exceeded[1], additional dust mitigation measures will be implemented and chemical analyses of TSP will be carried out to determine the chemical composition of dust deposition for potential effects to human and ecological health.
  - o TSP: if the Yukon Ambient Air Quality Standard of 120 µg/m3 24 hour average or 60 µg/m3 as an annual geometric mean is exceeded, additional dust control mitigation measures will be implemented and chemical analyses of TSP will be carried out to determine the chemical composition of dust deposition for potential effects to human and ecological health

3.2.2 Locations

Dustfall monitoring station locations are shown on Figure 3.2-1. These are preliminary locations, which will be adjusted as needed to satisfy siting recommendations and accessibility considerations. Dustfall collectors will be installed far enough from roads (>100 m) so as not to be dominated by locally generated road dust.

- Dustfall station D1 will be co-located with the Potato Hills meteorological station. Although this station may be downwind of the Project area during certain weather conditions for monitoring dust produced by the Project, it is also far enough away from the center of proposed mining activity (approximately 3 to 4 km) to serve as a background reference for the area.
- Dustfall station D2 will be located at or near the Camp climate station and location of the Partisol Air Quality Sampler. This station will be representative of the Project area boundary.
- Dustfall Station D3 will be located below the hilltop just southeast of the Project area. This corresponds to the area of highest TSP concentrations and dustfall that were predicted by dispersion modeling.
- Dustfall Station D4 will be approximately 1.5 km south of the mine camp, to the east of the access road. This location is downwind of prevailing winds at the Camp station.

If the passive dust monitors indicate exceedance of levels, the air quality sampler may be moved or other samplers installed on the Property as appropriate.

3.2.3 Frequency

The sampling accumulation period for the dustfall stations will be one calendar month. The dustfall collectors will be changed out monthly and sent to a certified lab for analysis. Sampling procedures will follow those detailed in ASTM (2010).

The 2025i Partisol air quality sampler is set to sample for each particle size and is currently occurring on a 3-day cycle, from midnight to midnight (Pacific Standard Time) but will occur on a 6-day cycle once a baseline is established.

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[1] Environment Yukon does not have a dustfall objective; therefore, the BC dustfall objective (1.75 mg/dm^2/d) will be applied as the standard

3.2.4 Data Collection and Analysis

Total dustfall will be calculated in mg/dm^2/d, averaged over a 30-day period, to determine if the guideline of 1.75 mg/dm^2/d has been exceeded. Analysis of metals content in the dustfall will also be included in laboratory analysis.

The 2025i Partisol holds a filter supply magazine containing 16 filter cassettes. Filters used include a Pallflex TX40 HI20-WW 47 mm filter specified for TSP and PM 2.5 and a 37 mm MCE (mixed cellulose ester) filter specified for metals. Each filter is pre-weighed in triplicate according to procedures in U.S. EPA 2.12 Quality Assurance Handbook, Section 7. The filter weight is recorded along with the filter cassette number and placed into the cassette. Sixteen cassettes are placed into a magazine and shipped to site to be installed in the Partisol.

During a programmed sampling date, the 2025i maintains a temperature- and pressure-compensated flow of 16.67 L/min (1 m^3/hr) through the filter. Following completion of the programmed sampling event (24 hours) the sample filter is automatically transferred into the storage magazine. After 16 sampling events have been completed (8 for TSP and 8 for $PM_{2.5}$), the storage magazine will be shipped to an accredited laboratory for re-weighing.

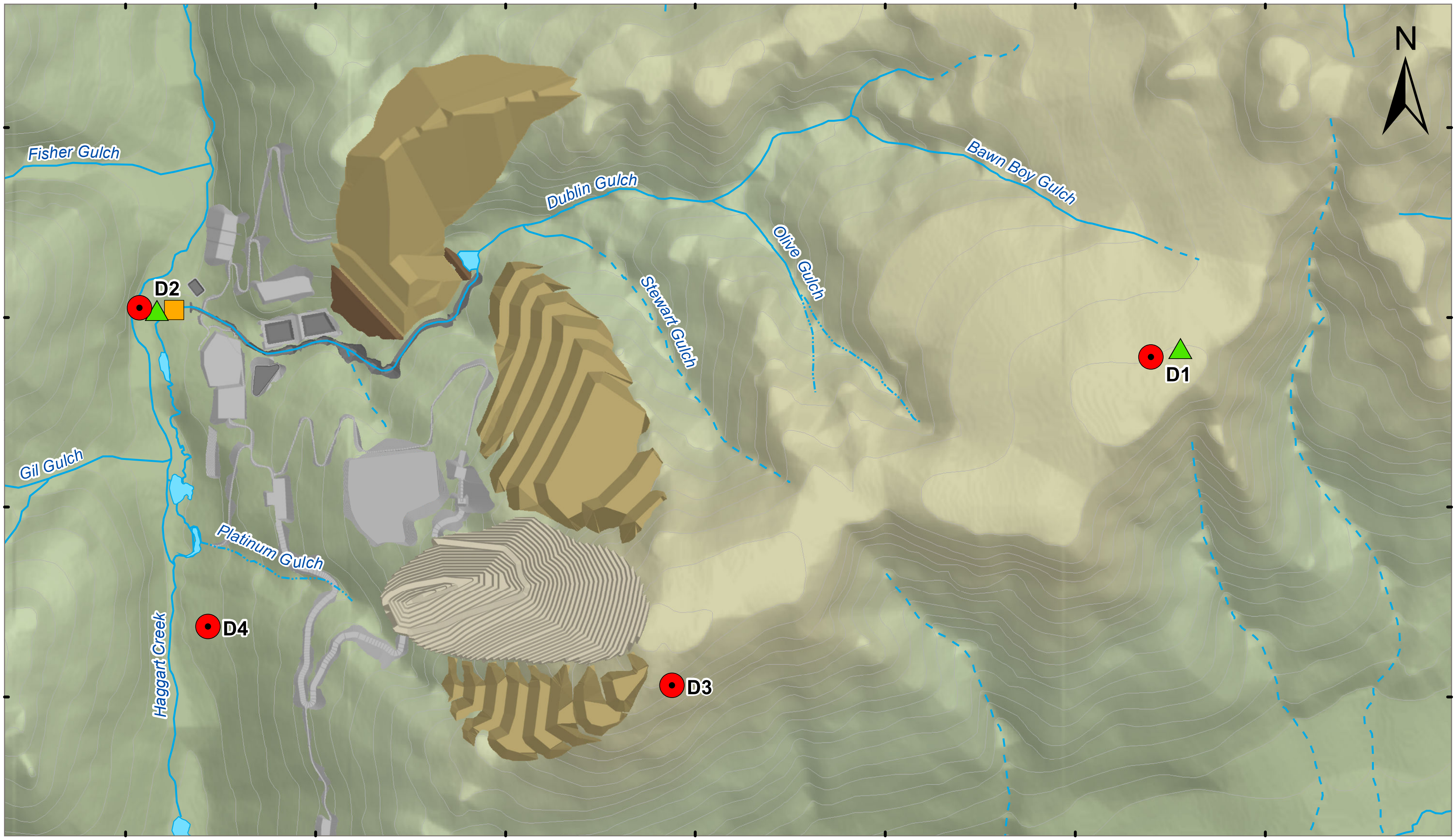
The re-weighing procedure is similar to that for pre-weighing. The sampled concentration is then determined as the net weight of the filter divided by the total flow volume over the sampling event (24 m^3). Chemical analysis of particulate samples (including but not necessarily limited to ammonia, arsenic, cadmium, chromium, mercury and lead) will also be performed on two samples every second magazine.

In addition to air quality sampling, dust control inspections will be conducted for site roads and facilities to determine the need for additional mitigation measures.

Data management and record keeping will be an integral part of the monitoring program. Dustfall, TSP and PM sampling and reporting will be performed in accordance with the industry standards (ASTM 2010). Data from the monitoring program will be reviewed monthly as dustfall results become available. If exceedance of any of the applicable objectives or standards is detected, then SGC will take the following actions:

1. Review all applicable air quality and meteorological data as well as metadata (e.g., records of Project activities during the exceedance period, inspection reports, field notes from monthly dustfall station visits, and any other information that may be relevant) to diagnose the conditions that led to the exceedance episode.
2. Based on findings from Step 1, modify or add mitigation measures to reduce airborne PM.
3. Notify Government of Yukon of the exceedance and any changes to mitigation measures.

Annual reports will be produced which contain the recorded total dustfall, metals concentrations in the dustfall, TSP and $PM_{2.5}$ with comparison to Yukon Ambient Air Quality Objectives. The reports will also contain the sampling QA/QC data recorded in the Partisol Sampler interval file and the results of any chemical lab analyses. High concentrations will be interpreted with respect to prevailing meteorological conditions recorded at the Property.



LEGEND

- Dustfall Station
- Climate Station
- Air Sampler
- Contour (100 ft)
- Watercourse (perennial)
- Watercourse (ephemeral)
- Watercourse (intermittent)
- Waterbody_Operations

NOTES
Data sources: Victoria Gold Corp., Stantec, Lorax Environmental.

STATUS
ISSUED FOR REVIEW

Scale: 1:30,000
500 250 0 500
Metres

PROJECTION	DATUM
UTM Zone 8	NAD83

FILE NO.
V23201707

CLIENT
StrataGold Corporation

eba
A TETRA TECH COMPANY

EAGLE GOLD PROJECT
YUKON TERRITORY

Dustfall Monitoring Locations

PROJECT	DWN	CKD	APVD	REV
Eagle Gold	SL	GC	GC	0

OFFICE	DATE
EBA-VANC	May 1, 2013

Figure 3.2-1

4 EXISTING ENVIRONMENT

The following sections have been excerpted from climate baseline data reports to provide a summary of existing conditions that may influence dust emissions and deposition.

4.1 SITE METEOROLOGY

The Project area is characterized by a continental-type climate with moderate annual precipitation and a large temperature range. Summers are short and can be hot, while winters are long and cold with moderate snowfall. Rainstorm events can occur frequently during the summer and may contribute between 30 to 40% of the annual precipitation. Higher elevations are typically snow-free by mid-June. Frost may occur at any time during the summer or fall.

Regional climatic data are available from several stations in the area, which provide a long-term database (Figure 4.1-1). Historical climatic information of the Project site was available from 1993–1996. Climate data collection was re-started in August 2007 at the Potato Hills climate station site (1,420 m asl), a historic data collection site, and a second climate station (Camp station) was installed in August 2009 at the old climate station site near the existing camp (823 m asl) (Figure 4.1-1). Both stations continue to operate.

The mean measured temperature at the site for the period of record is approximately -3°C, with a maximum temperature range from -42.1°C to 26.9°C (Stantec 2012). Regionally, the maximum historical temperature range at Mayo, YT was from -62.2°C to 36.1°C.

The measured annual rainfall at the site during the monitoring period has ranged from 186 mm to 462 mm. Snowpack surveys indicated snow depths (SWE) during this period ranged from 251 mm to 410 mm near the Potato Hills station and 93 mm to 110 mm near the Camp station from 2009 to 2011.

4.1.1 Temperature

Annually, spring thaw begins in April when daily maximum temperatures exceed 0°C, although daily mean temperatures may not rise above freezing until May. Annual maximums occur in July and daily mean temperatures begin to recede during late August and September. However, daily minimums may drop below freezing at night during August. Daily freezing conditions begin in October and annual minimums occur in January.

Monthly temperature data from the site climate stations for August 2007 through December 31, 2011 are provided in Table 4.1-1, and illustrated in Figure 4.1-2. The warmest and coldest months of the year tend to be July and January respectively. The mean January and July temperatures at the Potato Hills station were -16.7°C and 10.4°C, respectively. The maximum recorded temperature at the Potato Hills station (August 2007 through December 2011) was 26.9°C on July 30, 2009 and the minimum temperature recorded was -36.5°C on January 8, 2009; the total recorded temperature range was 63.4°C.

Table 4.1-1: Mean Monthly Temperature in the Eagle Gold Project Area, 2007 – 2011

	Month												
2007 – 2011	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
2007	Potato Hills Station												
Mean (°C)	–	–	–	–	–	–	–	10.7	1.0	-6.9	-9.9	-16.3	N/A
Maximum (°C)	–	–	–	–	–	–	–	21.3	11.6	2.1	-4.5	-8.7	N/A
Minimum (°C)	–	–	–	–	–	–	–	4.2	-9.4	-15.6	-17.3	-28.8	N/A
2008	**Potato Hills Station**												
Mean (°C)	-17.7	-17.3	-11.3	-4.8	3.3	8.7	8.1	6.1	1.9	-7.7	-10.9	-18.6	-4.2
Maximum (°C)	-5.6	-1.6	-1.0	6.2	16.7	19.9	17.9	14.4	10.8	5.4	-4.9	-7.4	19.9
Minimum (°C)	-35.6	-33.1	-32.7	-19.5	-4.2	1.4	1.0	-1.5	-10.6	-23.6	-22.6	-27.9	-35.6
2009	**Potato Hills Station**												
Mean (°C)	-19.3	-17.2	-16.8	-0.4	nm*	8.3*	12.6	7.4	3.3	-5.3	-12.8	-11.9	-1.9
Maximum (°C)	0.8	-8.8	-4.1	12.8	nm*	19.6*	26.9	20.3	14.6	1.5	-4.1	-3.2	26.9
Minimum (°C)	-36.5	-33.4	-27.3	-16.0	nm*	0.2*	1.2	-1.0	-8.7	-15.4	-21.8	-22.4	-36.5
	Camp Station												
Mean (°C)	–	–	–	–	–	–	–	9.7 [a]	6.2	-2.5	-13.6	-17.3	
Maximum (°C)	–	–	–	–	–	–	–	13.7 [a]	19.9	4.8	-0.2	1.6	
Minimum (°C)	–	–	–	–	–	–	–	0.9 [a]	-11.8	-13.6	-26.9	-35.5	
2010	**Potato Hills Station**												
Mean (°C)	-14.5	-9.7	-9.4	-1.8	5.2	8.8	10.5	9.7	2.3	-5.3	-11.7	-18.2	-2.8
Maximum (°C)	-4.6	3.1	3.4	9.9	20.2	18.7	21.0	0.7	13.2	5.7	0.9	-7.9	24.8
Minimum (°C)	-33.0	-28.8	-19.6	-11.8	-6.2	-0.1	4.1	24.8	-12.3	-11.8	-24.6	-27.6	-32.9
	Camp Station												
Mean (°C)	-17.1	-10.8	-6.9	1.1	8.3	12.1	13.6	12.1	4.5	-3.4	-13.5	-24.3	-1.8
Maximum (°C)	-4.4	2.5	6.5	14.8	24.8	22.9	25.9	29.3	17.6	11.8	6.3	-9.3	29.3
Minimum (°C)	-35.1	-28.0	-26.7	-16.5	-6.7	1.3	1.7	-0.7	-14.7	-17.5	-32.2	-39.3	-39.3

	Month												
2007 – 2011	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
2011	**Potato Hills Station**												
Mean (°C)	-15.5	-18.3	-13.9	-5.6	4.8	8.8	10.3	7.0	4.2	-5.7	-18.0	-13.1	-4.6
Maximum (°C)	-4.7	-2.6	2.1	7.0	20.4	19.3	20.2	17.7	23.8	2.4	-5.5	-3.2	23.8
Minimum (°C)	-30.7	-31.9	-26.0	-16.9	-10.2	-4.0	3.9	1.2	-11.4	-18.6	-29.8	-42.1	-42.1
	Camp Station												
Mean (°C)	-23.0	-21.3	-16.0	-3.2	7.7	11.6	12.9	9.3	5.1	-2.8	-19.5	-15.4	-4.6
Maximum (°C)	0.3	1.6	7.5	8.9	24.2	24.5	24.5	20.8	17.5	6.8	-3.6	-3.2	24.5
Minimum (°C)	-42.1	-42.0	-37.3	-21.2	-7.1	-3.7	1.7	-1.8	-5.6	-13.7	-41.1	-31.7	-42.1

Source: Stantec 2012

NOTES:
All values in degrees Celsius Minimum and Maximum values are extreme monthly means
[a] Data collection began August 21, 2009 – No available data
* Instrument error - missing data May 1 – June 6

The maximum recorded temperature at the Camp station (August 2009 to December 2011) was 29.3°C on August 4, 2010, and the minimum recorded temperature was -42.1°C (January 19, 2011; the total recorded temperature range was 71.4°C.

Comparison between the two climate stations indicates that, in general, the Potato Hills station is cooler than the Camp station in the summer as a result of temperature lapse rates. However, due to temperature inversions in the winter, the Camp station can be colder and has a larger temperature range. Night time and winter temperature inversions occur at the study area, as is common in Yukon. Inversions were recorded during late fall and the winters of 2009 to 2011. During the winter, inversions were sometimes greater than 5°C and occasionally lasted for 5 to 10 days.

Long-term temperature data from Mayo demonstrate there has not been any long-term warming or cooling trend in the region over the last 80 years. Over the period of record, the mean annual temperature at Mayo has fluctuated approximately 4°C. Over this period, there has been a larger variability in annual minimum temperatures, while annual maximum temperatures have stayed relatively constant.

4.1.2 Precipitation

Long-term estimates of precipitation for the area have been based on analyses of regional climate data from stations in Mayo, Dawson, Klondike, Elsa, and Keno Hill. Comparison of Project site data to Mayo data demonstrated that the Potato Hills station received approximately 1.3 times more monthly precipitation

This reflects the orographic effect common to mountainous regions and is evident in the Project site precipitation estimates. The estimated mean annual precipitation at the Project site ranges from 389 mm to 528 mm based on the elevation range at the Project site. Rainfall, snowfall, and surface lying moisture and snow are natural dust suppressants. As such, the area is not prone to prolonged dusty periods. Based on the regional and local data, monthly precipitation totals are highest in July and lowest in February. Snowfall begins in late September or October, and continues until May.

Precipitation data for the period of record (2007 through 2011) are summarized for the Potato Hills and Camp stations in Table 4.1-2 (Stantec 2012).

Table 4.1-2: Monthly Precipitation in the Eagle Gold Project Area, 2007 – 2011

	Month												
2007 – 2011	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
2007	**Potato Hills Station**												
Rainfall (mm)	–	–	–	–	–	–	–	24.0[a]	100.8	2.0	0.0	0.2	N/A
SWE (mm)	–	–	–	–	–	–	–	0.0[d]	–	–	–	–	–
2008	**Potato Hills Station**												
Rainfall (mm)	0.0	0.0	3.4	4.8	58.4	52	201.2	130	11.2	1.2	0.0	0.0	462
SWE (mm)	–	–	–	–	–				–	–	–	–	–
2009	**Potato Hills Station**												
Rainfall (mm)	0.0	0.0	0.0	1.6	*	50.6*	12.6	75.4	44.4	1.2	0.0	0.0	186
SWE (mm)	–	–	–	410**	–				–	–	–	–	
	Camp Station												
Rainfall (mm)	–	–	–	–	–	–	–	30.7[b]	34.8	7.8	0.0	0.0	N/A
SWE (mm)	–	–	–	110**	–				–	–	–	–	
2010	**Potato Hills Station**												
Rainfall (mm)	0	0	1	6.2	16.4	77.2	45.8	39.4	4.2	5.4	0	0	196
SWE (mm)			278**[$]	–	–								
	Camp Station												
Rainfall (mm)	0	0	5	9.4	19.6	61.8	34.2	28.4	16.8	12.2	7.8	0.0	195
SWE (mm)			99**[$]	–	–				–	–	–	–	
2011	**Potato Hills Station**												
Rainfall (mm)	0	0	0.2	7.2	21.2	38	92.8	83.8	34.4	0.4	0	0	278
SWE (mm)			251**[$]	–	–					–	–	–	

	Month												
2007 – 2011	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
	Camp Station												
Rainfall (mm)	0	0	11	9.6	16.2	31.2	74.8	43.6	40.2	8.8	0	0	235
SWE (mm)			93**$	–	–				–	–	–	–	

Source: Stantec 2012

NOTES:

* Instrument error - missing data May 1 – June 6, 2009

**Based on snow survey

[#] Data reported to March 31 2011

[a] Data collection began August 14, 2007

[b] Data collection began August 21, 2009

– = No available data

SWE = snow water equivalent

$ 2010 SWE data from March 31 2010 snow surveys

$ 2011 SWE data from March 31, 2011 snow surveys

4.1.2.1 Rainfall

The recent annual rainfall totals for the Potato Hills stations have ranged from 186 mm (2009) to 462 mm (2008). Rainfall totals are typically highest during the period June to August when temperatures typically remain above freezing as illustrated in Figure 4.1-3. There are notable differences seasonally between the stations, as the Camp station tends to receive more rainfall in the spring and fall compared to the Potato Hills station. This reflects the warmer average monthly temperatures in the spring and fall at the Camp station compared to the Potato Hills station.

4.1.2.2 Snow Data

Snow surveys were conducted near the Potato Hills and Camp station locations in April 2009, March 2010, and March 2011 (Stantec 2012). The results are summarized in Table 4.1-3.

Snow survey results for the Eagle Gold Project site were also compared to snow survey data collected in 2009 through 2011 from stations at Calumet and Mayo, located approximately 26 km and 48 km, to the southeast and south, respectively (Table 4.1-3). Regional historical data indicates that maximum snow depths and SWE occur in April, suggesting that the surveys were conducted close to the time of maximum snow depths and SWE at the study area.

Based on regression analysis of regional snowfall data, the estimated mean annual snowfall accumulation is 269 cm at Potato Hills and 190 cm at the Camp station. The largest accumulations occur during the period of November through January. Higher elevations have greater snow-packs. Snow depths are usually deepest in early April with snow persisting into May or June. Lower elevation snow depths are greatest in March with the snow gone by the start of May.

Table 4.1-3: Snow Survey Data Summary, 2009 – 2011

Site	Mar-09		Apr-09				May-09	
					Study Area			
	Calumet	Mayo	Calumet	Mayo	Potato Hills	Camp	Calumet	Mayo
Depth (cm)	86.0	50.0	103.0	59.0	126.0	69.0	98.0	0.0
Density	0.19	0.21	0.23	0.22	0.33	0.16	0.24	0.0
SWE (mm)	161.0	104.0	242.0	128.0	410.0	110.0	235.0	0.0
Site	**Mar-10**				**Apr-10**		**May-10**	
			Study Area					
	Calumet	**Mayo**	**Potato Hills**	**Camp**	**Calumet**	**Mayo**	**Calumet**	**Mayo**
Depth (cm)	68.0	45.0	103.0	50.0	77.0	0.0	57.0	0.0
Density	0.16	0.17	0.27	0.20	0.20	0.0	0.23	0.0
SWE (mm)	110.0	76.0	278.0	99.0	154.0	0.0	133.0	0.0

Site	Mar-11				Apr-11		May-11	
			Study Area					
	Calumet	Mayo	Potato Hills	Camp	Calumet	Mayo	Calumet	Mayo
Depth (cm)	88.0	55.0	105.0	55.0	84.0	23.0	61.0	0.0
Density	0.16	0.16	0.24	0.17	0.17	0.30	0.24	0.0
SWE (mm)	139.0	90.0	251.0	93.0	146.0	70.0	148.0	0.0

Source: Stantec 2012

NOTES:
Calumet and Mayo data from Yukon Environment

4.1.3 Wind

Monthly wind speed summaries have been derived from both site climate stations (Stantec 2012). Wind roses have been produced to illustrate wind vector trends at each station. Wind data have been recorded as a wind direction and wind speed as well as a gust speed. Wind direction and wind speed are recorded as the mean values for the recording interval (e.g., 15 minutes). Gust speeds are maximum instantaneous values for the recording interval.

The dominant wind direction at the Potato Hills station from 2007 through 2011 was from the west-northwest (Figure 4.1-4). The mean wind speed at the Potato Hills station measured from October 2007 to September 2011 was 2.6 m/s, the maximum sustained wind speed was 16.3 m/s, and the maximum recorded gust speed was 23.9 m/s, as measured in November, 2010 (Table 4.1-4).

The dominant wind direction at the Camp station from 2009 through 2011 was from the north and wind speed was notably lower than at Potato Hills (Figure 4.1-4). The mean wind speed at the Camp station measured from October 2007 to September 2011 was 1.4 m/s, the maximum sustained wind speed was 9.1 m/s, and the maximum recorded gust speed was 18.2 m/s, as measured in February 2011. (Table 4.1-4).

The difference in dominant wind directions and wind speeds between the stations reflects the local physiography of the study area. The Camp station is relatively protected in the Haggart Creek valley, and winds appear to be funneled down the valley axis, while the Potato Hills station is open to the prevailing winds from the west and north.

Monthly average wind speeds and maximum gust speeds were greatest in the late winter and early spring and lowest during the late summer and early fall months after which wind speeds tend to increase again.

Table 4.1-4: Mean Monthly Wind Speed and Gust Speed in the Eagle Gold Project Area, 2007 – 2011

	Month											
2007 – 2011	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
2007	**Potato Hills Station**											
Wind Speed (m/s)	–	–	–	–	–	–	–	2.3 [1]	2.34	2.95	2.96	0.82
Gust Speed (m/s)	–	–	–	–	–	–	–	13.92 [1]	12.62	18.00	20.41	12.25
2008	**Potato Hills Station**											
Wind Speed (m/s)	2.8	3.7	3.6	3.6	3.6	3.1	3.1	2.8	1.7	1.3	2.6	3.1
Gust Speed (m/s)	17.4	16.3	19.5	17.3	20.6	15.4	13.9	14.3	20.0	15.4	15.6	20.4
2009	**Potato Hills Station**											
Wind Speed (m/s)	3.2	2.5	3.2	3.0	3.1	2.7	2.9	2.0	2.0	3.4	2.5	2.1
Gust Speed (m/s)	18.0	15.0	20.4	15.8	13.9	19.9	19.1	15.0	15.8	15.2	18.6	20.2
	Camp Station											
Wind Speed (m/s)	–	–	–	–	–	–	–	1.4 [2]	1.3	1.2	1.1	0.8
Gust Speed (m/s)	–	–	–	–	–	–	–	–	11.0	10.1	11.0	13.7
2010	**Potato Hills Station**											
Wind Speed (m/s)	2.1	2.1	3.9	3.6	2.7	2.0	2.6	2.7	3.0	2.8	1.5	1.0
Gust Speed (m/s)	20.8	14.5	20.2	16.5	15.2	15.0	12.8	11.9	14.1	15.4	23.9	10.6
	Camp Station											
Wind Speed (m/s)	1.2	1.1	2.2	2.0	1.9	1.5	1.4	1.3	1.5	1.2	0.7	1.0
Gust Speed (m/s)	10.2	10.4	15.0	11.1	11.1	15.0	12.0	9.2	11.4	10.5	12.9	9.2
2011	**Potato Hills Station**											
Wind Speed (m/s)	2.0	3.2	3.4	3.2	3.4	2.0	1.8	2.3	1.2	0.3	2.2	0.4
Gust Speed (m/s)	14.1	19.5	15.0	14.8	18.6	13.7	13.2	16.7	15.8	10.6	14.8	13.0
	Camp Station											
Wind Speed (m/s)	0.6	1.2	1.3	1.8	1.7	1.5	1.3	1.3	1.4	0.9	1.0	0.2
Gust Speed (m/s)	5.8	18.2	7.8	10.8	17.9	15.7	10.2	9.6	11.0	9.2	12.0	13.3

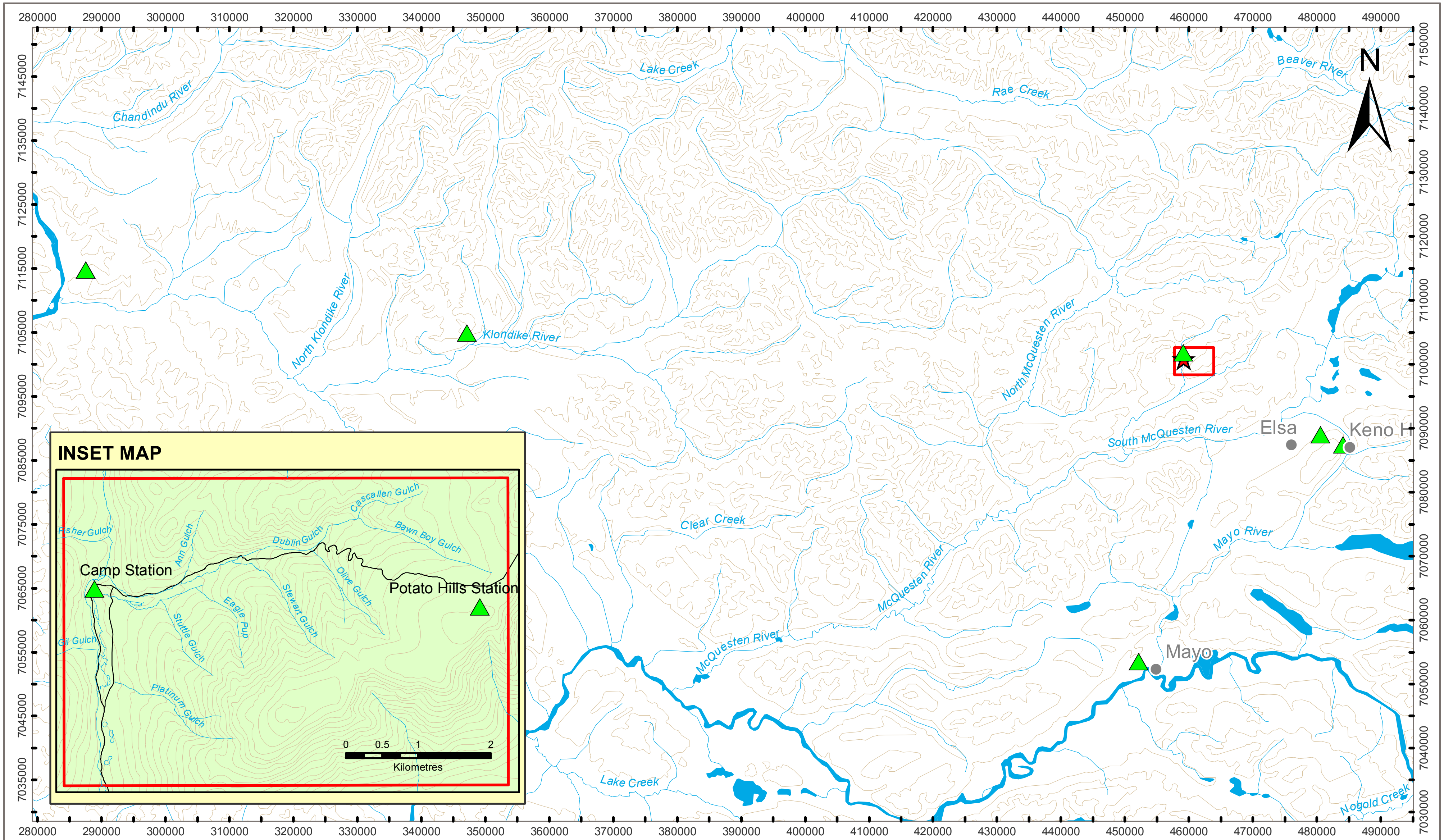
Source: Stantec 2012

NOTES:

1 Instrument error - missing data May 1 – June 6, 2009

2 Data collection began August 21, 2009

– = No available data



LEGEND

- Town / Village
- Climate Station
- Eagle Gold Project Site
- Inset Map
- Contour
- Watercourse
- Waterbody

NOTES

Base data source:
Stantec 2012

Scale: 1:850,000

10 5 0 10 20

Kilometres

PROJECTION	DATUM
UTM Zone 8	NAD83

FILE NO.
V23201707-6-2-3_Map015_ClimateData.mxd

CLIENT
StrataGold Corporation
TETRA TECH

STATUS
ISSUED FOR REVIEW

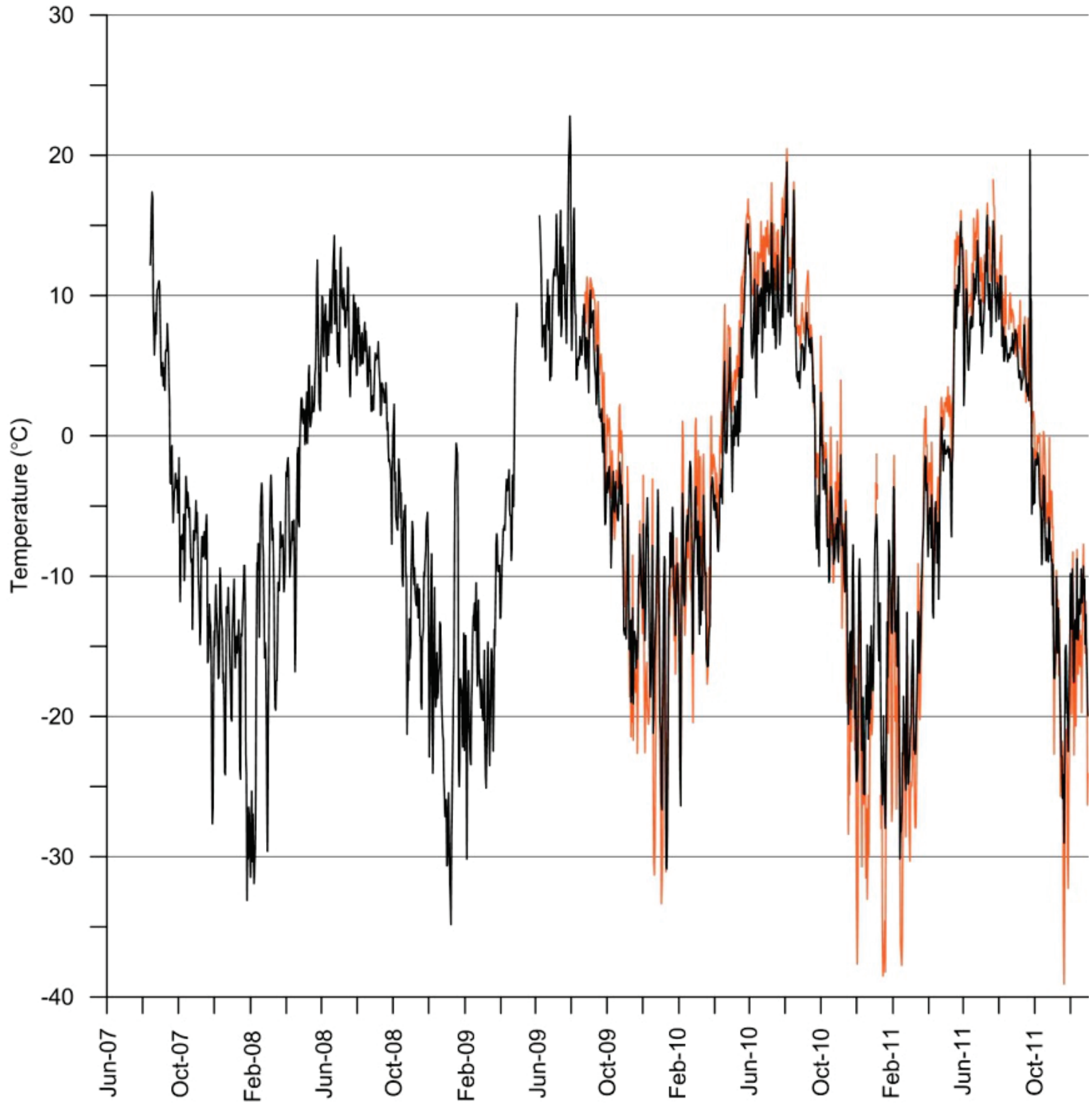
EAGLE GOLD PROJECT YUKON TERRITORY

Climate Station Locations

PROJECT	DWN	CKD	APVD	REV
Eagle Gold	KW	RH	RH	2

OFFICE	DATE
VANC	May 1, 2013

Figure 4.1-1



LEGEND

Potato Hills Station
Camp Station

Source: Stantec 2012

NOTES

Camp Station was relocated on September 23, 2010 to 782 m asl.

STATUS

ISSUED FOR USE

CLIENT

StrataGold Corporation

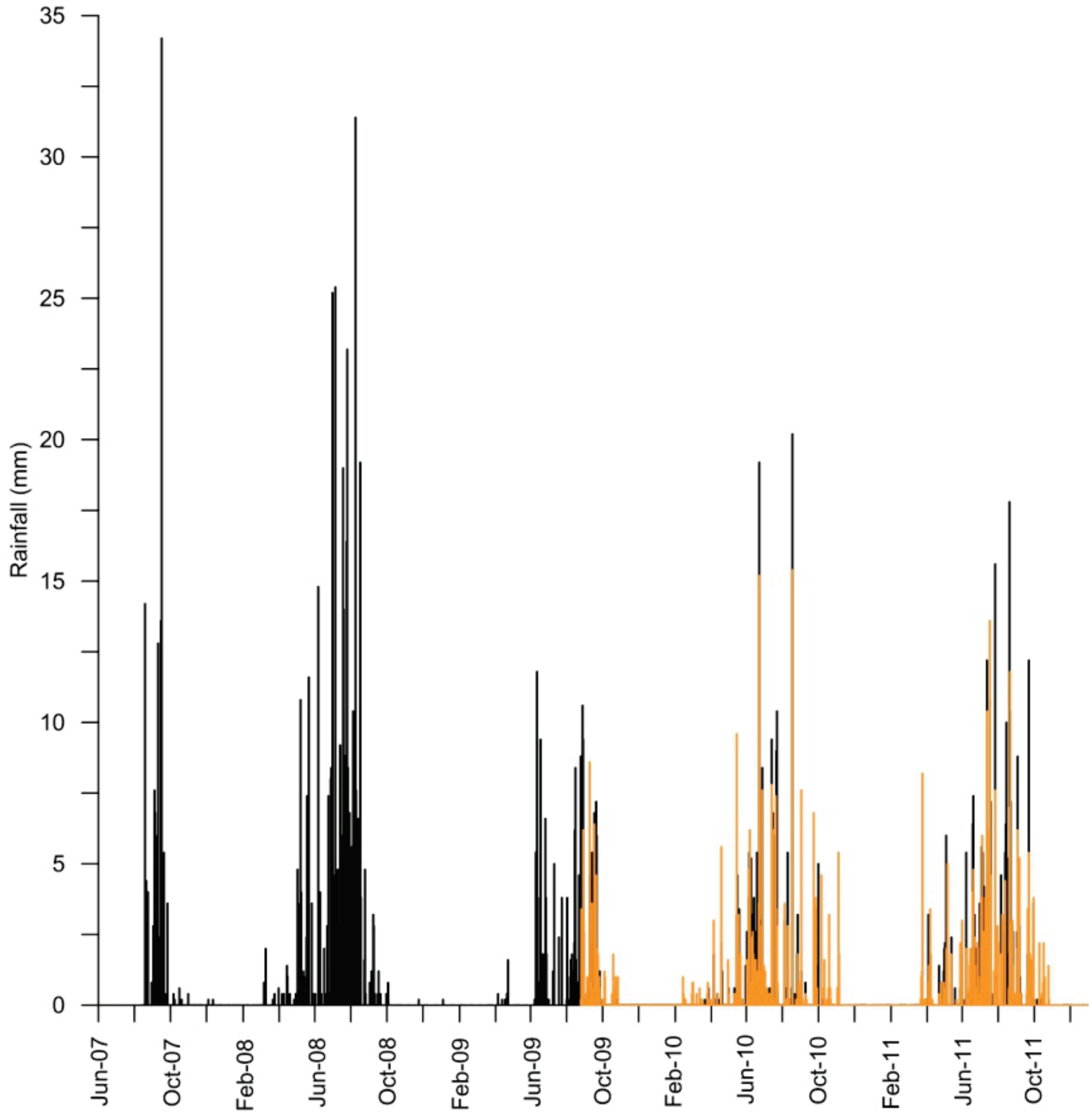
TETRA TECH

EAGLE GOLD PROJECT
YUKON TERRITORY

Project Area Daily Mean Temperatures

FILE NO. CDR001_PotatoHills-Camp_Temp				
PROJECT NO.	DWN	CKD	APVD	REV
Eagle Gold	KW	RH	RH	1
OFFICE	DATE			
VANC	May 1, 2013			

Figure 4.1-2



LEGEND

- Potato Hills Station
- Camp Station

Source: Stantec 2012

NOTES

STATUS
ISSUED FOR USE

CLIENT
StrataGold Corporation

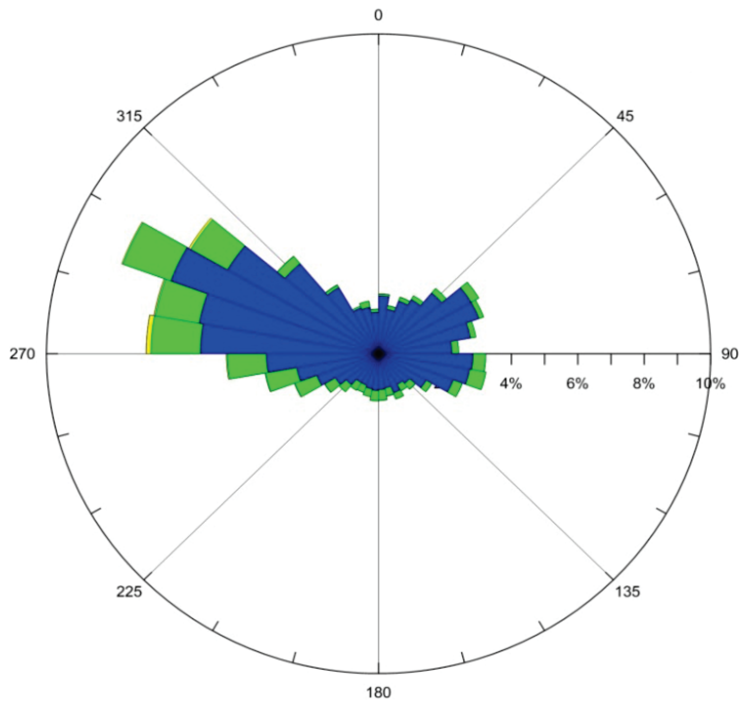
TETRA TECH

EAGLE GOLD PROJECT
YUKON TERRITORY

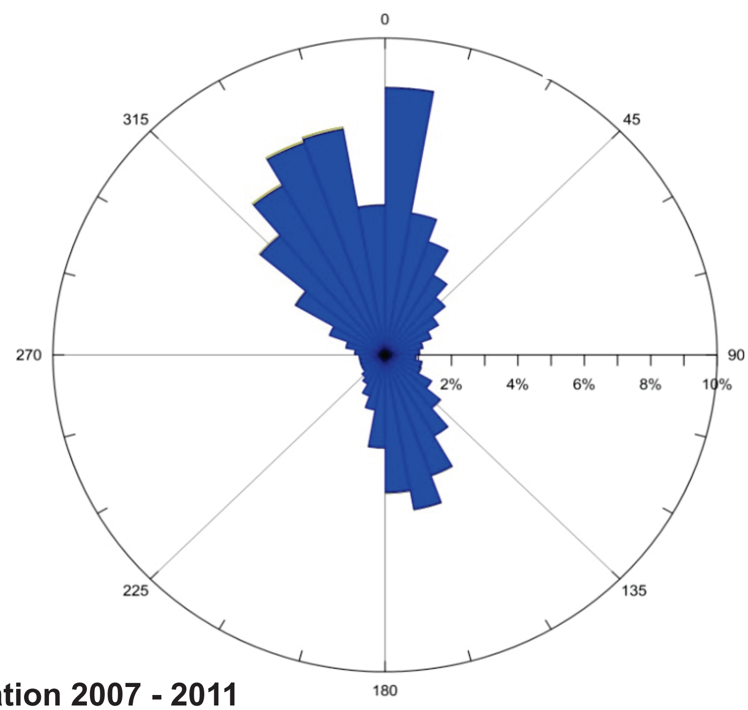
Project Area Daily Rainfall, 2007 - 2011

FILE NO. CDR002_PotatoHills-Camp_Rainfall				
PROJECT NO.	DWN	CKD	APVD	REV
Eagle Gold	KW	RH	RH	1
OFFICE	DATE			
VANC	May 1, 2013			

Figure 4.1-3



Potato Hills Climate Station 2007 - 2011



Camp Climate Station 2007 - 2011

LEGEND

Wind Speed (m/s)
<=5
>5 - 10
>10 - 15
>15

Source: Stantec 2012

NOTES

Wind Speed is in m/s

STATUS

ISSUED FOR USE

CLIENT

StrataGold Corporation

TETRA TECH

EAGLE GOLD PROJECT YUKON TERRITORY

Project Area Wind Rose Plots

FILE NO. CDR004_PotatoHills-Camp_Wind				
PROJECT NO.	DWN	CKD	APVD	REV
Eagle Gold	KW	RH	RH	1
OFFICE	DATE			
VANC	May 1, 2013			

Figure 4.1-4

5 REFERENCES

Canadian Council of Ministers of the Environment (CCME). 2000. Canada-wide Standard for Respirable Particulate Matter ($PM_{2.5}$).

Health Canada. 2007. National Ambient Air Quality Objectives. Available at: http://www.hcsc.gc.ca/ewh-semt/pubs/air/naaqo-onqaa/index-eng.php and http://www.hcsc.gc.ca/ewhsemt/ air/out-ext/reg-eng.php#a3.

Stantec (Stantec Consulting Ltd.). 2012. Eagle Gold Project: Climate, Final Report. Report prepared by Stantec for Victoria Gold Corporation. March 2012.

Yukon Environment. 2012. Dust Management Plan Guidelines. May 2012.

APPENDIX A

Dust control design criteria

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SPECIFICATION REVISION INDEX

Rev.	Issue Date	Issued for	Signatures				
			Prepared By	Reviewed By	Project Engineer	Project Manager	Client
A	23 May 2011	Internal Review	BD	RY	RY	MR	
B	10 Jun 2011	Client Review	BC	RY	RY	MR	

TABLE OF CONTENTS

1.0 GENERAL

1.1 SCOPE

.1 This design criteria shall form the basis of all dust control systems for the project site, and shall be read in conjunction with the referenced Codes and Standards.

.2 The scope of project areas that are governed by this design criteria will be:

- Primary Crushing
- Secondary Crushing
- Tertiary Crushing
- Refinery
- Laboratory.

.3 This design criteria will govern the production and contents of the following documents:

- Design Calculations
- Equipment performance specifications
- General arrangement drawings
- Detailed drawings
- Standard detail drawings.

1.2 CODES AND STANDARDS

.1 All design material, equipment manufacturing, fabrication, testing, installation and construction shall be in accordance with the latest edition of the applicable codes and standards of the following organizations. The organizations include, but are not limited to, the following:

Institution	Description
ABMA	American Bearing Manufacturers' Association
ACI	American Concrete Institute
AGMA	American Gear Manufacturers' Association
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
API	American Petroleum Institute
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers

Institution	Description
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
CEC	Canadian Electrical Code
CEMA	Conveyor Equipment Manufacturers' Association
CISC	Canadian Institute of Steel Construction
CSA	Canadian Standards Association
CWB	Canadian Welding Bureau
EEMAC	Electrical Equipment Manufacturers Association
FM	Factory Mutual
HI	Hydraulic Institute
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronics Engineers
IESNA	Illuminating Engineering Society of North America
IFE	Industrial Fasteners Institute
ISA	Instrument Society of America
ISMA	Industrial Silencer Manufacturers' Association
ISO	International Organization for Standardization
JIC	Joint Industrial Council
MHIA	Material Handling Industry of America
MHEA	Material Handling Engineers Association
MPTA	Mechanical Power Transmission Association
YWCHSB	Yukon Worker's Compensation Health and Safety Board
MSS	Manufacturers' Standardization Society
NACE	National Association of Corrosion Engineers
NBC	National Building Code of Canada
NEC	National Electrical Code (US)
NEMA	National Electrical Manufacturers' Association
NESC	National Electrical Safety Code
NFC	National Fire Code
NFPA	National Fire Protection Association
NFPI	National Fluid Power Institute
OSHA	Occupational Safety and Health Act
PFI	Pipe Fabrication Institute
PPI	Plastics Pipe Institute
RMA	Rubber Manufacturers' Association
SNT	Society of Non-Destructive Testing
SAE	Society of Automotive Engineers
SSPC	Steel Structure Painting Council
TEMA	Tubular Exchanger Manufacturers' Association
UL	Underwriters Laboratories
CUL	Underwriters Laboratories of Canada

Institution	Description
WHMIS	Workplace Hazardous Materials Information System
WCB	Worker's Compensation Board, British Columbia

.2 The codes and laws of Yukon, municipality or jurisdiction may take precedence over the aforementioned codes.

1.3 REFERENCE SPECIFICATIONS

.1 For equipment general specification, weather and all site data refer "02 10 00 TS – Site Conditions" unless otherwise noted in the equipment Criteria.

.2 For all piping data and information (pipe velocity, pipe material, and buried pipe) see "40 00 00 DC Piping Design Criteria".

.3 For all structural data and information see "05 00 00 DC Structural Design Criteria".

.4 For all electrical data and information see "26 00 00 DC Electrical Design Criteria".

.5 For all instrumentation data and control information see "40 90 00 DC Instrumentation Design Criteria".

.6 For all building services data and information see "24 00 00 DC HVAC Design Criteria".

1.4 DESIGN PARAMETERS

.1 The basic requirements of dust control systems shall be to:

- Minimize emissions to atmosphere
- Minimize loss of product from the process
- Maintain stack emissions below established criteria
- Maintain air quality standards.

.2 The dust control systems shall be designed based on the premise that the material handling equipment, such as screens, conveyors, chutes, and skirting, are designed and maintained to prevent spillage and loss of material, and that the skirting lengths and heights are suitable for the intended dust control systems.

.3 Aspirated systems shall be dedicated to individual process circuits, in order to provide flexibility with operations.

.4 Fogging systems shall be capable of reducing the fugitive dust emissions from transfer points, to 97.5% of those levels documented in USEPA –AP42 emission factors.

.5 The velocity of air entering exhaust hoods shall be such that it does not remove excess material from the process flow.

.6 Hoods shall be provided at the rear of transfer chutes, wherever the fall of material exceeds 3 metres, or if the receiving conveyor is inclined.

.7 All dust conveying ducting shall be round.

.8 All ducting shall be flanged in lengths that will enable ease of installation and future removal.

.9 Duct diameters shall be sized to ensure complete conveyance of all collected dust, from the point of collection, to the dust collection equipment.

.10 In no case shall the duct velocity, in dust conveying ducting, be less than 20 m/s.

.11 The duct velocity in “clean” air ducting, on the downstream side of dust collection equipment, shall not be less than 15.3 m/s.

.12 Duct cleanouts shall be provided such that the internals of all sections of dust conveying ducting can be inspected and cleaned out. Cleanouts shall be located on the top, or side of the duct, not on the bottom.

.13 Air flow measuring ports shall be provided in all branch ducts and all main ducts, to enable each section of the system to be tested and balanced.

.14 Air flow test ports shall not be located within six duct diameters upstream of any turbulence and not less than two duct diameters downstream of any turbulence.

.15 Dampers shall be provided in all branch ducts for air flow balancing. The dampers shall only be low leakage blast gate type, with means to lock the gates in the final balanced position.

.16 Branch entries into a main duct shall preferably enter at an angle of 30 degrees, but in no case shall the angle exceed 45 degrees.

.17 Branch entries shall enter a main such that the duct velocities are maintained throughout the fitting.

.18 The included angle for duct contractions and expansions shall not exceed 15 degrees.

.19 No two branch entries shall enter the main duct opposite each other in the same plane.

.20 90 degree bends shall be constructed of seven segments of straight ducting, and have a centreline radius of two and a half times the duct diameter.

.21 Bends of less than 90 degrees shall be constructed of a pro-rated number of segments of straight duct, and have a centreline radius of two and a half times the duct diameter.

.22 Exhaust stacks shall not have any impediment to straight through flow. The only allowable arrangement of weather protection is the stack head configuration, where the head is at least four times the duct diameter and the head diameter is 25 mm larger than the stack diameter.

.23 Exhaust stack discharge velocities shall be at least 15.3 m/s.

.24 Fan inlet ducts shall be configured to prevent uneven loading of the fan wheel.

.25 Fan discharge ducts shall remain straight for at least one fan inlet diameter before any bend, and that bend shall only be turned in the direction of fan rotation.

.26 All exterior surfaces of ducts shall be prepared to SSPC-3 prior to application of paint.

.27 Paint shall be applied to all exterior duct surfaces.

.28 Ducts shall be supported at the following intervals: 3 m spacing for 200 mm diameter and smaller: 4.5 m for 210 mm diameter through 480 mm and 6 m spacing for ducts larger than 480 mm diameter.

.29 Duct supports shall be designed for the weight of the ducting and fittings, plus the following allowance for material:

1.0	Mains Dust Load	% Full:	33 Vertical & 33 Horizontal
2.0	Sub mains Dust Load	% Full:	50 Vertical & 50 Horizontal
3.0	Branches Dust Load	% Full:	100 Vertical & 100 Horizontal

.30 Vertical ducts shall be supported at the base of the riser.

.31 Emissions to atmosphere, through dust collector exhaust stacks are limited to 32 mg/dsm^3 and an opacity of less than 7%.

1.5 SPECIFIC DUST CONTROL SYSTEMS

Dust control shall be provided in the following areas of the project:

.1 Primary Crusher Dump Pocket

Dump Pocket: No fixed system for dust control.

.2 Primary Crusher - Below the crusher

A dry aspirated dust collection system handled by a single dust collector and exhaust fan, with pick up hoods located at the following points:

- Primary crusher Apron Feeder
- Secondary crusher feed conveyor
- Winter ore storage feed conveyor
- The collected fines will be discharged back to the process via a rotary air lock onto the primary crusher discharge conveyor.

.3 Secondary Crusher Feed Bin

A dry aspirated dust collection system handled by a single bin vent located on the top of the secondary crusher feed bin will negate dust that is produced by the feed from the primary crusher discharge conveyor into the bin.

The collected fines will be discharged back to the secondary crusher feed bin.

.4 Secondary Crushing

A dry aspirated dust collection system handled by a single dust collector and exhaust fan, with pick up hoods located at the following points:

- Head chute of secondary crusher belt feeders
- Secondary crusher screens
- Secondary crusher discharges onto conveyor
- Head chute of secondary crusher discharge conveyor
- Discharge onto Tertiary crusher feed conveyor
- Head chute of tertiary crushing transfer conveyor
- The collected fines will be discharged back to the process via a rotary air lock onto the tertiary crushing feed bin conveyor.

.5 Tertiary Crushing Feed Bin

Multiple dry aspirated bin vents, located on the top of the tertiary crushing feed bin will negate dust that is produced by the feed from the tertiary crushing feed conveyor into the bin.

The collected fines will be discharged back to the tertiary crushing feed bin.

.6 Tertiary Crushing

A dry aspirated dust collection system handled by a single dust collector and exhaust fan, with pick up hoods located at the following points:

- Head chute of tertiary crusher belt feeders
- Tertiary crusher screens
- Tertiary crusher discharges onto conveyor
- Head chute of tertiary crushing discharge conveyor No 1
- Discharge onto Tertiary crushing discharge conveyor No 2.

The collected fines will be discharged back to the process via a rotary air lock onto the Tertiary crushing discharge conveyor No 2.

.7 Cement and Lime Addition

- Dry aspirated bin vents will be located on top of each of the cement and lime silos to negate dust emissions when the silos are being filled.
- Barren solution will be sprayed onto the tertiary crushing discharge conveyor No 2 at the discharge points of each cement and lime silo onto the conveyor, to control dust emissions at these locations.

.8 Refinery

- A dry aspirated dust collection system will control fumes and dust emissions from the smelting furnace.
- A canopy hood will be located over the furnace, and the temperature of the air enterning the dust collector will b e maintained below 200 degrees Celsius.
- The collected fines will be dropped, via a rotary air lock, into a drum for manual removal when needed.

.9 Laboratory - Sample Prep

- Dry aspirated dust collection system handled by a single dust collector and exhaust fan, with pick up hoods located at the following points:

  .a Crushers

  .b Pulverizers

.c Dust hood workstations

.d The collected fines will be discharged via a rotary air lock into a drum, that will be manually emptied on an as needed basis.

.10 Laboratory - Fire Assay

- Dry aspirated dust collection system handled by a single dust collector and exhaust fan, with pick up hoods located at the following points:

.a Flux mixing

.b Pulverizers

.c Parting hood

.d Furnace hoods

.e The collected fines will be discharged via a rotary air lock into a drum, that will be manually emptied on an as needed basis.

2.0 EQUIPMENT

2.1 DUST COLLECTORS

.1 Materials and equipment shall be standard products of established manufacturers who have continuously produced the type of equipment suitable for the conditions specified.

.2 All like-equipment shall be manufactured by a single source, to minimize spare parts.

.3 Dust collectors shall be of the reverse pulse type, utilising dry compressed air for purging the filters, whilst remaining on-line during the purge.

.4 Dust collectors shall be designed and manufactured for heavy duty mining applications.

.5 Filter materials shall be selected by the dust collector supplier to suit the properties of the anticipated materials including the moisture content, temperature and size.

.6 Cartridge filters shall not be used.

.7 Filter bags shall not exceed 3m in length.

2.2 DUST COLLECTOR EXHAUST FANS

.1 Fans shall be located on the clean side of the dust collector.

.2 Fans shall be heavy duty single inlet single width centrifugal fans, utilising radial impellers.

.3 Fans shall be belt driven and be mounted on a sub frame for mounting directly onto concrete or steel structures.

.4 Fans shall be complete with guards designed to fit around all rotating machinery including drive shafts and V-belts. All such guards shall be designed for easy removal and accessibility to equipment.

2.3 ROTARY VALVES

.1 Rotary valves shall be gear driven, cast iron, flanged units.

.2 Rotary valves shall be directly connected to the discharge flange of the dust collector hopper.

.3 The vanes of the rotary valve shall be adjustable and shall be fabricated of abrasion resistant steel.

END OF DESIGN CRITERIA