GOLDCORP
PORCUPINE GOLD MINES

# Hollinger Open Pit

# Best Management Plan

**Version 2 – March 2016**

**Table of Contents**

**List of Figures**



**List of Tables**



**Appendices**

# 1. Executive Summary

Located in Timmins, Ontario, Goldcorp Porcupine Gold Mines (PGM) currently operates underground mining and milling operations at its Hoyle Pond Mine, and Dome Mine and Mill. Until 2009, PGM also carried out open pit mining at the Pamour Mine.

A new open pit, referred to as the Hollinger Open Pit (the 'HOP') is currently being developed at the existing Hollinger Mine site in order to access potentially economic gold ore reserves from the past producing Hollinger Mine. This historic mine was the most prolific gold producing mine located within the Porcupine Camp. The current schedule has open pit mining operations lasting for an estimated 5 years, until 2020.

Activities associated with the HOP includes blasting, drilling, loading and hauling of ore and waste rock. All ore and portion of the mine rock from the HOP is hauled via a Transportation Corridor from the HOP site to the Dome Mill for processing. Although public roads are not used for material transport, the HOP is located immediately adjacent to the downtown core of the City of Timmins. Therefore, the generation of noise, dust, vibration and blast overpressure is of primary concern to PGM as it seeks to resume mining operations at the former Hollinger Mine site, while minimizing potential impacts to nearby residents and to the local environment.

Due to the close proximity of nearby residential, commercial and industrial land users, this Best Management Plan (BMP) was developed by PGM to act as a practical manual to address aspects relating to the management and monitoring of blasting and vibration, noise, fugitive dust, site reclamation and contingency plans for the open pit. To support the monitoring component of the BMP, PGM installed a state of the art monitoring system that monitors dust, noise and vibration in real time. The monitoring system and all data is maintained and managed by an independent consultant. Real time noise, dust data, and blast vibration reports are available on a publically accessible website. This BMP is a working document which may undergo periodic revisions to accommodate changes in the mine plan and site permitting while ensuring that the objectives of the BMP are consistently met.

Extensive technical studies were completed during the feasibility stage of the HOP in order to assess the potential environmental effects and to assist in establishing appropriate prevention and mitigation plans. As part of this process, PGM has worked closely with the City of Timmins (City) to develop an Agreement. This BMP is an important component of the Agreement and meets and/or exceeds the requirements of the Agreement.

## 2. Purpose and Scope

PGM developed this BMP, which incorporates best possible practices currently used within the mining industry worldwide, in order to identify preventative or mitigative measures which can be implemented to minimize potential impacts to nearby residents and land users to acceptable levels as defined by the City, regulatory agencies and PGM's corporate environmental standards. Specific sections of this BMP provide descriptions of the strategies utilized to mitigate and monitor environmental noise, fugitive dust emissions, ground vibrations, as well as outlining contingency plans to address potential unforeseen significant events. All of these factors are primary potential issues of concern for residential and commercial land users and for the City.

Previous BMP's submitted by PGM to the Ontario Ministry of Northern Development and Mines and the Ontario Ministry of the Environment and Climate Change for the HOP addressed noise and fugitive dust emissions (Valcoustics, 2011; PGM, 2011). These previous plans were utilized during the development of this BMP document which encompasses all activities associated with all phases of the HOP.

The HOP is divided into several phases:

- **Mining Phase** – includes open pit blasting, waste rock and ore haulage on a 24 hour schedule; and,
- **Closure Phase** - consists of final site reclamation activities after commercial operations cease.

The three principal potential impacts to local residents and other local land users originating from blasting and site operations consists of:

- Vibration (ground vibration) and Overpressure;
- Noise; and,
- Dust emissions (referred to as fugitive dust).

# 3. Blasting and Vibration

## *3.1 Open Pit Blasting*

The open pit has been developed using a conventional bench design to ensure pit wall stability and to facilitate pit access. Blasting in the open pit has been carried out using conventional mining explosive agents. Emulsion explosives has been applied in a series of boreholes in order to ensure safe and controlled blasts. Initial blasting during the construction phase has been carried out during dayshift hours at specified times publicized each day. There are no more than two blasts per day with a maximum of 60,000 tonnes blasted per day as per the site's Environmental Compliance Approval (ECA). Activating a blast is carried out in accordance with applicable legislative requirements, and when all appropriate safety measures are in place and weather conditions are suitable. As experience is gained with blasting, blasting times may be modified, ensuring legislative requirements are achieved.

Blasting is carried out while monitoring vibration, overpressure levels, fugitive dust and gas emissions while using safe blast design parameters to minimize impacts to local residents and other land users. The burden and explosive charge spacing is calculated using the blast hole diameter to determine the appropriate blast pattern size for proper fracturing while minimizing the potential for excessive air blast overpressure and vibration. In an iterative manner, the blast design is continuously refined as required in order to minimize vibration and noise. Blast events are restricted using multiple security personnel at key locations and are recorded using a video camera for use in post-blast analysis.

## *3.2 Safety Precautions*

### 3.2.1 Lightning Storms

Lightning strikes represent a particular safety concern if they occur during the pre-blast interval when the blast holes are loaded. To ensure both the safety of mine site personnel located within the open pit, and also to protect the public from possible fly rock generated from an unexpected blast, PGM has developed procedures for managing risks from lightning which is implemented when a lightning storm is approaching the HOP site. Refer to Appendix A for Managing Lightning Storm Procedure.

### 3.2.2 Blasting Notification Procedures

3.2.2.1 Mine Site Personnel

Blast notification is distributed electronically to key PGM personnel and designated external contacts prior to the blast. Information about the blast is displayed on notice boards throughout the HOP site, and is posted on the PGM Website. The blast notification contains such information as;

- Date and time of blast;
- Location of blast area (exclusion zone); and
- Location of blast guard personnel.

A blasting checklist is filled in by the open pit supervisor, blasting contractor or designate prior to all blasts in the open pit (Form 1, Appendix B).

3.2.2.2 General Public

PGM makes every effort to ensure that the general public is given advance warning of blasting events at the HOP site. Blast notifications are provided in the following formats:

- Blasting schedule posted on the PGM website;
- E-mail notification to persons that have registered with PGM and have requested advanced notification; and,
- Blasting schedule posted on strategically located bulletin boards in the vicinity of the HOP site.

### 3.2.3 Pre-blast Warning Procedures

As per mining regulations, pre-blast sirens are used to warn the general public and is audible in the vicinity of the open pit and to warn all PGM employees and surrounding community that blasting is in progress. The warning sirens are initiated prior to any blast as follows;

- **Warning #1** - the warning sirens are sounded at least 5 minutes prior to any blast for a period of 30 seconds;
- **Warning #2** - once all inspections have been made and it is deemed safe by the open pit supervisor or blasting contractor, a 90 second warning siren is sounded. The blast is aborted if it is not initiated within 3 minutes after Warning #2 has ended. On multiple blasts, the siren continues sounding until the final blast is clear; and

- If the blast is aborted for any reason, the siren is silenced and the above warning procedure is restarted, prior to the initiation of further blasting.

### 3.2.4 Blast Guard Personnel

Blast guard personnel are stationed at strategic locations and must follow the Blast Guard Personnel Procedure outlined in Appendix A.

## *3.3 Ground Vibration*

Ground vibrations are associated with different types of elastic waves propagating through the ground. The intensity of ground vibration is an elastic effect measured in units of peak particle velocity which is defined as the speed of excitation of particles within the ground. The detonation of an explosive to break down rock produces a very rapid and drastic increase in volume due to the conversion of the explosive from a solid to a gaseous state. For the purpose of this BMP, peak particle velocity is measured in millimetres per second (mm/s) (MOECC, 1978).

The intensity of ground vibration from open pit blasting is site-specific and is dependent upon a site's geological conditions, ground relief, distance from the blast, blasting techniques and the amount of explosives used. PGM incorporates appropriate strategies to ensure ground vibrations are minimized to within acceptable limits.

### 3.3.1 Pre-Blast Building Survey

PGM has retained a professional blasting consultant to conduct a pre-blast survey to identify pre-existing conditions affecting designated municipal buildings prior to initiating blasting activity at the HOP site. Additionally the consultant provided recommendations for inspections of commercial buildings and residential dwellings located within an appropriate radius of the pit. Where inspections were conducted, any pre-existing structural or cosmetic irregularities was recorded and discussed with the property owners in order to allow differentiation between pre-blasting building / property conditions and subsequent effects attributable to blasting events during construction and operations. As required, baseline vibration monitoring is completed in selected areas prior to initiating blasting activities.

### 3.3.2 Ground Vibration Monitoring

Ground vibration monitoring instrumentation (i.e. blasting seismographs) was included as a component of the Noise Monitoring Program (refer to Section 4), collectively referred to as the

Noise and Vibration Monitoring Instrumentation (NVMI) system. Monitoring locations are shown on Figure 3.1.

There are stationary ground vibration monitoring sites that have real-time monitoring instrument continuously recording ground vibrations. This instrumentation is set up alongside the stationary noise monitors and is connected through the same telemetry system to allow remote access to monitoring data by mine site management, and reports are available for public review on the website. Vibration data reports are generated on a daily basis. Additional portable vibration and noise monitors are used to monitor ground vibrations and noise in the vicinity of local residents and other local land users as required.

Figure 3.1 Monitoring Locations

3.3.2.1 Ground Vibration Criteria

The blast design criteria are developed with consideration for controlling ground vibrations, noise levels, and fly rock to minimize impacts on surrounding infrastructure around the HOP site. The criteria is developed based on empirical data from experience gained from the last two years of the Hollinger Open Pit project and previous operations at the Dome and Pamour properties.

The criterion for evaluating the magnitude of ground vibration is listed in Table 3.1, below. This criterion is applied throughout blasting carried out during mining phases. Real-time monitoring of ground vibration is carried out in order to allow PGM to mitigate ground vibration, as required, to below the criterion limit. The NVMI system incorporates a warning alarm to notify operators when the ground vibration criterion is exceeded. In the event of the upper limit being exceeded, blast design parameters are reviewed and adjusted to prevent a reoccurrence. These include the size of blast, diameter of holes, timing of blast, height of bench explosives quantity, and type.

Table 3.1 Ground Vibration Criteria (NPC 119)

| Parameter | Upper Limit (mm/s) |
|---|---|
| Vibration at residential and commercial building locations | 12.5 |

**Notes:**

1. Upper limit based on Ministry of Environment (MOECC) 'Standard Limits' defined in MOECC, 1985.

3.3.2.2 Ground Vibration Monitoring Stations

Real time vibration monitoring stations are located outside the circumference of the final pit perimeter. The vibration monitoring station locations was evaluated by a qualified independent consultant prior to the installation of the system.

## *3.4 Air blast Overpressure*

Air blast overpressure consists of sound waves which are inaudible to the human ear. The magnitude of air blast overpressure is influenced by a number of factors, such as:

- **Stemming ejection** - premature ejection of the stemming material from the blast hole resulting in excessive loss of explosive gases and energy;
- **Face bursting** - explosive releases of energy within the rock mass;
- **Climatic conditions** (e.g. wind direction, degree of cloud cover, presence of atmospheric inversions);
- **Local topography**; and

- **Pre-split blasting** - specific technique used to reduce damage to bench profiles during blasting.

People and animals may be sensitive to air blast overpressure levels. During blasting, sound monitoring of the inaudible spectrum frequency is carried out in the vicinity of sensitive municipal, commercial and residential areas.

### 3.4.1 Air blast Overpressure Monitoring

Activities associated with monitoring air blast overpressure in the vicinity of the HOP site is included in the discussion on noise monitoring presented in Section 4. Monitoring locations are shown on Figure 3.1.

#### 3.4.1.1 Air blast Overpressure Criteria

The criterion for evaluating the magnitude of air blast overpressure is listed in Table 3.2, below. This criterion applies during blasting carried out during construction and mining phases. Real-time monitoring of air blast overpressure data is carried out in order to allow PGM to mitigate this phenomenon, as required, to below the regulatory limits. The NVMI system incorporates a notification to operators when the air blast overpressure criterion has been exceeded.

Table 3.2 Air blast Overpressure Criteria (NPC 119)

| Parameter | Upper Limit (dB) |
|---|---|
| Sound (air blast overpressure) at residential and commercial building locations | 128 |

**Notes:**
1. Upper limit values based on MOECC 'Standard Limits' defined in MOECC, 1985.
2. dB units are in decibels

## *3.5 Vibration Mitigation*

Mitigation measures which is implemented in order to minimize ground vibration and air blast overpressure generated by blasting at the HOP site are discussed below.

### 3.5.1 Control of Blast hole Diameter

Standard blast hole diameters are used close to the center of the pit with the diameter further reduced within areas of the open pit located nearest to sensitive receptors (i.e. local residents and other local land users). The use of smaller blast hole diameters allows smaller quantities of explosives used during each blast event, resulting in the minimization of noise, ground vibration, air blast overpressure and the risk of rock fragments being ejected beyond the declared danger

zone surrounding blasting operations (referred to as 'fly rock' – refer to Section 3.5.4). Larger diameter blast holes may be used in the centre of the pit and as the pit deepens provided that modelling indicates vibration limits are not exceeded at sensitive receptors.

### 3.5.2 Blast hole Stemming Design

Stemming is a process used to fill a blast hole with an inert material (e.g. aggregate) to prevent the escape of blast gases which reduces the amount of air overpressure and fly rock generated from blasting. All production blast holes are stemmed with the minimum amount of clear stone as required.

### 3.5.3 Use of Electronic Detonators

PGM uses electronic detonators in the Hollinger pit which eliminates the potential for out of sequence detonation of blast holes, reduces ground vibrations and limits production of fly rock. Blast sizes and blast scheduling is adjusted, as required, based on data collected from the vibration monitoring stations in order to allow refinement of future blasting event design to further reduce vibration levels within the vicinity of the open pit.

### 3.5.4 Control of Fly rock

Fly rock is the term used to describe rock fragments which may be ejected during blasting events and which travel beyond the recognized danger zone surrounding the open pit. Stemming heights (see Section 3.5.2) are designed to minimize the risk of fly rock. Blasting mats are used until such time as modelling and practical experience demonstrates that there is no possibility of fly rock leaving the pit area. The blasting mats are placed over all loaded holes to contain the blasted rock and prevent fly rock. Measures are taken to ensure that placement of the mats does not interrupt the blasting circuits. An emulsion blasting agent is used to minimize fly rock, to reduce the likelihood of misfired holes and to minimize vibration levels.

In the unlikely event that fly rock lands beyond the Environmental Control Berm, then a thorough investigation is carried out in conjunction with the Engineering Department and Operations Department in order to determine the likely cause(s) and to ensure that future mitigating measures are in place to prevent reoccurrences.

### 3.5.5 Weather Monitoring

Where feasible, PGM plans to only blast during favourable conditions. Air blast overpressure data recorded during blasts are correlated to weather conditions to determine when site-specific favourable conditions exist. Pre-blast climatic conditions that is recorded includes: cloud ceiling

height, thunderstorm and lightning activity, air humidity, atmospheric pressure, air temperature, wind speed, and wind direction.

### 3.5.6 Environmental Control Berm

The Environmental Control Berm (ECB), with heights ranging from 10 m to 25 m, and an average height of 17 m, was constructed around the perimeter of the open pit operations. The construction of the berm was completed on October 14th, 2015 using approximately 6.3 million tonnes of non-acid generating and non-metal leaching waste rock with 0.8 million tonnes of overburden applied 0.3 m thick as cover and an MTO seed mixture for vegetation. Based on modelling data, it has been estimated that the presence of the ECB and the physical containment reduces air blast overpressure by approximately 5 dB. The construction of the ECB was carried out in a staged approach, with construction priority given to areas in proximity to sensitive receptors such as residential and commercial properties.

#### 3.5.6.1 Construction

The ECB is constructed out of waste rock and overburden from the HOP site. The ECB was constructed in a number of lifts not exceeding 5 m in height until the design height was achieved for the various segments surrounding the open pit.

#### 3.5.6.2 Vegetative Cover

Upon completion of each section of the ECB, a vegetative cover was applied onto the exposed berm surfaces to minimize the potential for fugitive dust emissions. The process to establish a vegetative cover included:

- Each segment of the ECB was constructed out of mined rock which was sloped to achieve a stable surface;
- Overburden was excavated and stockpiled on site during the construction phase was applied over the exposed rock;
- Organic material was applied over the overburden to act as a growth medium for vegetation as required;
- Various methods were used to establish a vegetative cover over the ECB to minimize soil erosion due to rainfall and windy conditions.

### *3.6 Feedback Procedure*

In the event that a community feedback is received regarding ground vibration, air blast overpressure, and/or monitoring indicates that these criteria have been exceeded, then the Feedback Reporting Procedure is followed as described in Appendix A.

### *3.7 Public Reporting*

A summary of the vibration and air blast overpressure monitoring program is made publicly accessible through daily reports via the PGM website.

# 4. Noise

Noise sources from both construction and operational phases of mine life are primarily associated with blasting, truck haulage and mine site infrastructure. In particular, noise assessments have identified heavy equipment used in the open pit operation as the primary source of noise from the HOP. As a result, PGM has developed noise control strategies to minimize noise generated from construction and mining activities which utilize:

- Monitoring noise levels within and outside of the HOP site perimeter;
- Monitoring noise levels generated by mining and ancillary equipment;
- Identifying and implementing mitigation measures, as required; and
- Documenting of noise monitoring and mitigation activities with report submissions to the regulatory agencies as per the site's Air-Noise ECA.

Central to the above strategies was the construction of an Environmental Control Berm (ECB) around the perimeter of the HOP site for the purposes of noise containment and attenuation.

Background noise monitoring studies were conducted to establish current conditions near sensitive receptor locations prior to open pit start-up. Additional noise assessments were completed prior to the initiation of the operation. Directional noise monitoring systems were installed to determine the source and location of the noise in relation to the receptors. Note that this monitoring system has yet been approved by the regulatory authorities. The following sections detail the approaches, methods and mitigation measures PGM implemented to ensure that regulatory noise limits are met and noise exposure is minimized for local residents and other local land users.

## *4.1 Monitoring Program*

### 4.1.1 Training

To effectively implement the noise monitoring system, appropriate training for supervisors and employees includes:

- Training in the proper use of fixed station and portable noise monitoring instrumentation as per manufacturer's instructions;
- Recognition of when and how noise emissions may become problematic;
- Recognition of which noise sources and operations are the most problematic;

- Following proper notification procedures, identifying actions required to mitigate noise emissions and completing the proper reports;
- Training of specific individuals in the use of portable noise monitoring equipment to verify noise levels at sensitive receptors;
- Ongoing guidance for those individuals responsible for carrying out noise related investigations; and,
- Training records are retained at the HOP site.

Refer to Appendix C for the BMP training program requirements developed for site personnel.

### 4.1.2 Monitoring Locations

To ensure suitable monitoring locations are identified, an assessment was completed by an independent qualified consultant prior to the installation of the monitoring system. The real time noise monitors were positioned at locations outside of the final pit perimeter in all directions. Monitoring locations are shown on Figure 3.1.

Monitoring instruments were placed strategically outside the ECB in the vicinity of sensitive receptors (e.g. local residents and other land users) and/or within pit operations as required. A monitoring program dedicated to tracking noise levels emanating from all open pit equipment was undertaken to determine performance. This monitoring program was subject to an external review process and was used to identify potential additional maintenance requirements for heavy machinery. Corrective actions were taken immediately following source identification and investigation if noise levels are found to exceed the acceptable noise criteria.

Temporary instruments are also placed strategically outside the ECB in the vicinity of sensitive receptors (e.g. local residents and other land users) or can be used to address complaints from the public. The directional noise monitoring instruments can also be used to determine the source and location of noise issues and/or investigate these complaints.

### 4.1.3 Monitoring Methods

To effectively assess the magnitude of noise and air blast overpressure during blasting, a network of real-time monitoring instrumentation is used which meets the following general specifications:

- Records statistical data;
- Records audio thresholds;
- Allows wireless data transmission;

- Produces daily reports including statistical analysis of noise / air blast overpressure levels; and
- Records wind direction, wind speed, temperature, humidity and rainfall.

At each monitoring location, noise levels are recorded 24 hours per day, 7 days per week and data is available for public viewing in real time. The data from alerts are sent to mine staff as they occur for internal review.

The portable noise and vibration monitoring instrumentation (NVMI) serve as additional units mobilized to areas of concern to assist in identifying a noise source(s) and determine if measures are required to mitigate noise level levels generated by the HOP. The portable NVMI incorporates a real time recording system, records UTM coordinates and provides web-based access. The portable NVMI is operated by trained PGM personnel or by a suitably qualified designate.

### 4.1.4 Noise Criteria

Noise levels are measured in decibel units (dB). A summary of typical noise levels associated with everyday activities are provided in Table 4.1 below. Human and structural response to noise levels are provided in Table 11.3.

Table 4.1 Typical Noise from Everyday Activities

| Noise Source | Noise Level (dB) | Description |
|---|---|---|
| Refrigerator humming | 40 | Faint |
| Moderate rainfall | 50 | Moderate |
| Dishwasher operating, conversation | 60 | Moderate |
| Vacuum cleaner | 70 | Loud |
| Busy street | 80 | Loud |
| Motorcycle (8m away) | 88 | Loud |
| Chainsaw | 100 | Very loud |
| Jet plane at take-off (close proximity) | 140 | Painful |

**Notes:**

1. Noise level data sourced from http://www.yalemedicalgroup.org/stw/Page.asp?PageID=STW000006

Noise level criteria for construction equipment are summarized in Table 4.2, below.

Table 4.2 Noise Level Criteria for Equipment Operating in Residential Zones

| **Equipment** | **Sound Level Limit at 15 m from equipment (dBA)** [i)] |
|---|---|
| Excavation equipment, dozers, loaders, backhoes, or similar (more than 75 kW power rating | 85 |
| Pneumatic breakers, or similar | 85 |
| Air Compressors | 76 |
| Tracked Drill | 100 |

**Notes:**

i) Sourced from MOECC, 1995, NPC 115. dBA units are in decibels with 'A' weighted filter

Noise levels typically fluctuates over a 24 hour period and hence there is a requirement to quantitatively assess overall noise exposure while accommodating this variability. This function is carried out using an equivalent continuous noise level meter which calculates an 'average noise energy' (referred to as Leq value).

Appropriate average noise level criteria were developed based upon the Ministry of the Environment (MOECC) guidelines (MOECC, 1995, NPC 115) that take into consideration the background of ambient noise levels also known as urban hum and as per the site's ECA for Air and Noise, as summarized in Table 4.3, below.

Table 4.3 Average Noise Level Criteria at Sensitive Receptor Locations

| Time of Day | Average Noise Values (dBA)[i] | | Reference |
|---|---|---|---|
| | Construction Phase [ii] | Operations Phase | |
| **0700-1900** | 65[iii] | 50[iii] | MOECC, 1995 |
| **1900-2300** | No activities scheduled | 45 [iii] (Class 2) | MOECC, 1995 |
| **2300-0700** | No activities scheduled | 45 [iii] | MOECC, 1995 |

**Notes:**

[i] Average noise level objectives ($L_{eq}$) measured over one hour periods.

[ii] Construction activities are limited to between the hours of 0700-1900 **[seven days a week].**

[iii] Average noise level **objective**; maybe adjusted to reflect ambient or background noise levels as defined in the MOECC guidelines (MOECC, 1995, NPC 205)

### 4.1.5 Inspections and Maintenance

Inspections of noise monitoring equipment is carried out by PGM to ensure that all systems are operating to specification as required. These inspections are completed as prescribed by the equipment manufacturer(s) during all phases of the HOP. Noise monitoring data and information is stored via the online monitoring system by a third party and is distributed and reviewed by the environmental department and operations personnel on a daily basis. This data is available for review by the regulatory agencies as part of the Air-Noise ECA reporting process and is available to the City and to local residents and other land users upon request.

Maintenance, audits and calibrations as per equipment specifications for noise monitoring equipment is undertaken by a suitably qualified independent consultant as per the site's Air-Noise ECA. Records of these activities are provided to PGM and is stored at the HOP site.

Should any malfunctions or failures occur with the stationary monitoring equipment, portable NVMI instrumentation is used as a temporary measure until the stationary monitoring equipment has been repaired. Documentation of any such incidents are included in a summary with routine reporting to MOECC.

## *4.2 Noise Mitigation*

### 4.2.1 Triggers for Noise Mitigation

Using the noise monitoring system described above, alerts are triggered if noise levels at the locations of sensitive receptors (i.e. local residents and other land users) reach 90% of the noise level objectives values listed in Table 4.3 based on the time of day or threshold values. Note that

noise criteria are logarithmic, therefore, 90% of 50 dB is actually 48 dB and 90% of 45 dB is actually 43 dB.

The Feedback Reporting Procedure included in Appendix A must be employed to mitigate noise levels when a noise level mitigation trigger or the maximum noise level criteria is reached.

### 4.2.2 Noise Mitigation Measures

4.2.2.1 Vehicles and Machinery

The following are protocols or restrictions enforced by the Operations supervisor or designate in order to mitigate noise generated during mine construction and operations:

- Installation of baffle plates and louvers on haul trucks to minimize noise being generated;
- Idling of equipment is restricted to the minimum necessary to perform the specified work;
- All mining related equipment is operated in an appropriate manner to minimize noise emissions;
- Where possible, minimize noise emissions from the dumping of rock from haul trucks by using methods such as dumping more slowly and making use of existing topography and/or temporary, mobile sound barriers to limit noise emissions;
- Strict enforcement of vehicle speed limits within the HOP site perimeter. On-site vehicles are restricted to the designated speed limits on all roads and the speed limits are posted and enforced;
- Additional signage to indicate appropriate speed limits and location of sensitive receptor areas;
- Where possible, localized berms or barricades are constructed at suitable locations where haul trucks typically shift gears (i.e. adjacent to sensitive receptors);
- Provision of training to all haul truck drivers regarding noise reduction initiatives and proper working procedures; and,
- Maximum use of broadband vehicle back-up alarms and additional visual alarms such as lights.

PGM ensures that equipment is maintained in an appropriate operating condition that prevents unnecessary noise, including but not limited to ensuring that the use of non-defective vehicle and machinery exhaust muffler systems, ensuring that loose components are properly secured

on moving vehicles/machinery and ensuring that machinery and vehicles are correctly lubricated. This is monitored via daily pre-start verifications on the equipment and the required preventive maintenance program.

#### 4.2.2.2 Blasting

Studies have indicated that vehicles and heavy machinery is the principal sources of noise at the HOP site. Blasting within the open pit; however, also act as a noise source. The construction of the Environmental Control Berm (ECB) around the perimeter of the open pit assists in reducing noise levels emanating from the HOP site. Additional details concerning the ECB are presented in Section 3.5.6.

### *4.3 Audit Procedure*

PGM retained an independent consultant to undertake an acoustic audit as per the site's ECA requirements. This audit was conducted as per MOECC Guideline NPC-233. The audit results were submitted to the MOECC for the approval of the site's ECA.

### *4.4 Feedback Procedure*

In the event that a community feedback is received regarding noise levels or monitoring indicates the noise criteria have been exceeded, then the Feedback Reporting Procedure must be followed as described in Appendix A.

### *4.5 Public Reporting*

A summary of the noise monitoring program and audits are made publicly available. Noise monitoring data is made accessible to the general public via the PGM website on an ongoing basis.

# 5. Fugitive Dust

Fugitive dust is defined as solid airborne particulate matter emitted from sources other than a conventional stack, chimney or exhaust. The principal sources of fugitive dust from the HOP includes various activities associated with the 1) open pit operation activities, 2) material handling, 3) road construction, and 4) unpaved road traffic.

Due to the mineralized nature of ore and mine rock associated with metalliferous mining operations, fugitive dust emissions may contain elevated concentrations of certain metals in comparison to rock sourced from other areas. In acknowledgement of this, this BMP was developed in accordance with the requirements of provincial regulatory guidelines and best practice (MOECC, 2008, MOECC, 2009)**.** The dust emission modelling results indicated that even under the worst case scenario various metal levels will not exceed regulated limits. The basic premise of the this BMP is that if general dust levels are kept below regulated limits, all metals associated with the fugitive dust will automatically also fall below regulated limits. To address the potential issue of fugitive dust emissions, the BMP provides details on the following steps:

- Identification of source(s) of fugitive dust emissions;
- Identification of particle size composition of particulate emissions;
- Description of fugitive dust control measures for each source;
- Schedule for implementation and operation of control measures;
- Implementation approach and training requirements;
- Inspection and maintenance procedures; and
- Record keeping to verify compliance.

Further details on how the above steps are implemented are provided in the following sections.

## *5.1 Fugitive Dust Monitoring Program*

PGM has integrated the current baseline monitoring program and an MOECC approved dust monitoring program into the BMP in order to meet the requirements of the Environmental Compliance Approval (ECA) for Air and Noise.

Open Pit Operation Activities

Fugitive Dust is generated from the development and operation activities within the Open Pit. Stripping and overburden removal is conducted using an excavator and haul truck combination,

and/or shovel and loader with truck combination as appropriate. Other equipment would include drills, dozers, graders, and other ancillary equipment.

Material Handling

Fugitive dust is generated by the materials handled during the development and operation activities of the open pit. Coarse ore from the mining activities is loaded into haul trucks using hydraulic shovels, hydraulic excavators and wheeled loaders. Materials used during the environmental berm, mine water pond and road construction typically consist of coarse aggregate generated on site as well as transported to the site.

Road Construction

Construction and maintenance of on-site access roads and the transportation corridor is required for the transportation of ore, mine rock and overburden from the Hollinger Open Pit site to the existing Dome Mill and Dome mine rock dumps. These roads and corridor are constructed using rock fill and coarse gravel. The construction and maintenance of these roads and corridor have the potential to generate fugitive dust.

Un-paved Road Construction

All roads within the Hollinger Open Pit are unpaved. These unpaved roads are used for a variety of activities from light vehicle traffic to haul trucks and heavy equipment activities associated with ore transportation, material handling and maintenance activities. These unpaved roads are potential sources of fugitive dust.

### 5.1.1 Background Conditions

Three background monitoring stations were initiated in 2009 to establish fugitive dust background levels for areas peripheral to the HOP Site, and these remain active throughout the HOP. These sites are located near the old Extendicare facility located in Schumacher, near the Mattagami Region Conservation Authority (MRCA) office located south of Gillies Lake, and at the Shania Twain Road.

Each monitoring station comprises:

- Two high volume discrete dust samplers to monitor metal levels, particulate matter smaller than 10 micrometers in diameter (referred to as $PM_{10}$) and total suspended particulate matter (TSP), respectively;
- A passive sampler to monitor sulphur dioxide ($SO_2$) and nitrogen dioxide ($NO_2$); and

- A jar apparatus for measuring dust fall.

All fugitive dust monitoring equipment is approved and audited by the MOECC as per the site's ECA requirements. The monitoring continues through the mining phases of the open pit and is updated as required with the approval of the MOECC.

### 5.1.2 Construction and Operations

To complement the background dust monitoring program described above, PGM initiated a fugitive dust monitoring program which utilizes four stationary real-time ambient air monitoring units that has the capability to:

- Provide real-time monitoring for particulates PM10, TSP, and oxides of nitrogen (NOx);
- Operate continuously while storing data; and
- Allow for remote administration and viewing via public web access.

#### 5.1.2.1 Training

Training is provided to operations supervisors and pit personnel to help them recognize when fugitive dust emissions could become significant and the appropriate notification procedures and actions required to mitigate the emissions. Records of personnel training is retained at the HOP site.

Refer to Appendix C for the BMP training program requirements developed for site personnel.

#### 5.1.2.2 Monitoring Locations

In addition to the already existing and active dust monitoring locations used to gather baseline background information, the real time dust monitors are positioned at locations outside of the final pit perimeter. Monitoring locations are shown on Figure 3.1. The collection of real-time dust concentration data allows PGM to improve dust management practices in response to changing environmental conditions. These dust monitoring stations are evaluated by an independent consultant.

#### 5.1.2.3 Fugitive Dust Criteria

In order to be in compliance with the 24 hour MOECC AAQC for PM10 and O. Reg. 419 Schedule 3 standard for TSP and to provide guidance to mitigate particulate emissions from the operation, a 30 minute action and trigger levels in the is applied to ensure that regulatory criteria is met for

fugitive dust concentrations during the construction and mining phases of the open pit. Refer to Table 5.1 for the Air Quality Criteria as required by MOECC.

Table 5.1 Air Quality Criteria

| Contaminant | Action Levels |
|---|---|
| $PM_{10}$ | 50 (µg / m3 / 24 hrs) |
| TSP | 120 (µg / m3 / 24 hrs) |
| NOx | 0.1 ppm / 24 hrs<br>0.2 ppm / 1hr |

**Note**s

[i] Values were derived from the MOECC limits using the most recent Ontario Ambient Air Quality Criteria (April, 2012).

## *5.2 Fugitive Dust Mitigation*

### 5.2.1 Triggers for Fugitive Dust Mitigation

In the event that a community feedback is received regarding fugitive dust or monitoring indicates the air emission criteria have been exceeded, then the Feedback Reporting Procedure must be followed as described in Appendix A.

The fugitive dust activation triggers includes:

- Activation of notifications on real-time fugitive dust monitors indicating that criteria listed in Table 5.1 have reached 80% of the limits; and,
- Receipt of community feedback concerning fugitive dust emissions from the HOP site.

### 5.2.2 Fugitive Dust Mitigation Measures

Fugitive dust management strategies are reviewed regularly and undergo continuous improvement based upon feedback from the local community, fugitive dust monitoring data, site observations, site inspections, meteorology reports etc. This progressive management approach allows for more effective, flexible control of fugitive dust emissions. Fugitive dust management strategies were implemented upon start-up of the open pit.

A range of fugitive dust mitigation measures employed at the HOP site are discussed below.

#### 5.2.2.1 Physical Containment

The construction of the Environmental Control Berm (ECB) around the perimeter of the open pit assisted in reducing fugitive dust emissions from the open pit area by acting as a physical barrier. The ECB itself has been identified as a potential source of fugitive dust. As the ECB is developed, a vegetative cover is established on the exposed slopes in order to minimize fugitive dust generation.

Additional details concerning the ECB are presented in Section 3.5.6.

#### 5.2.2.1 Mechanical Controls

Where appropriate, mechanical controls such as dust collectors on drills may be used to contain fugitive dust. Controlling the height of the dump point when loading into truck boxes and reducing the dump rate of materials helps to minimize fugitive dust emissions during haul truck loading and when dumping material or materials placement during construction activities.

#### 5.2.2.2 Erosion Protection

During the entire mine life (i.e. construction, operations and closure), progressive rehabilitation measures re implemented to reclaim exposed surfaces that are sources of fugitive dust. Examples of progressive rehabilitation include the establishment and maintenance of vegetative covers over exposed surfaces of bare rock or coarse aggregate etc.

#### 5.2.2.3 Weather Monitoring

Conditions that are considered unfavourable includes periods of dryness, high winds and high temperatures. Construction and operating activities are planned and managed based on daily weather forecast information (sourced from Environment Canada and real-time on-site meteorology data).

#### 5.2.2.4 Watering

The primary method of dust suppression is the application of water to access roads and other surface work areas. Water trucks are maintained at the HOP site for this purpose. An on-site mine water pond provides water for application purposes. Regular applications of water is conducted daily, with the frequency increased during adverse weather conditions. Watering activities are in compliance with the MOECC approved industrial permit to take water. Additional dust suppression techniques may be used in the case of more extreme conditions, as discussed below.

5.2.2.5 Dust Suppressants

MOECC approved dust suppressants are applied to access roads and other surfaces if the use of water alone is not sufficient to control fugitive dust emissions. The updated MOECC list of acceptable dust suppressants are reviewed to ensure that the suppressant is acceptable for use under the site-specific conditions at the HOP site. The application rate for the suppressant is confirmed with the supplier prior to use to ensure optimal dust suppression is achieved. The road surfaces shall be maintained in a manner such that application of dust suppressants works to maximize effectiveness.

5.2.2.6 Roadway Maintenance

All site roads are maintained in good condition, with regular inspections and timely repairs completed to minimize the silt loading on road surfaces. Where indicated, coarse aggregates are applied to areas of roadways where significant dust generation is observed during inspections.

5.2.2.7 Speed limit Enforcement

Operation of on-site vehicles are restricted to the designated speed limits on all roads and the speed limits are posted and enforced.

5.2.2.8 Progressive Reclamation

Progressive reclamation takes place during construction and mining phases. Covering and grading areas to stabilize exposed areas assists in reducing fugitive dust generation.

### *5.3 Audit Procedure*

PGM retained an independent consultant to undertake a fugitive dust audit as per the site's ECA requirements. Results of these audits are posted on the PGM website to allow access by the general public and other interested parties.

### *5.4 Public Reporting*

A summary of the fugitive dust monitoring program and audits are made publicly available on a daily basis. Fugitive dust monitoring data is made accessible by the general public via the PGM website.

## 6. Records

The following documents are retained on-site for a period of up to seven years and are available for review by interested parties and by the regulatory agencies:

**Blasting**

- Blasting schedules and checklists;
- Records of blast vibrations mitigation measures (stemming, blast hole diameter, detonators, timing);
- Climatic data;
- Video records of blast events; and
- Feedback logs and follow up actions.

**Vibration / Air blast Overpressure Monitoring**

- Vibration/air blast overpressure monitoring data and audit reports;
- Instrumentation maintenance, calibration and repair logs; and
- Feedback logs and follow up actions.

**Noise**

- Weekly monitoring equipment inspections and maintenance activities reports;
- Record of noise mitigation measures and strategies used; and
- Feedback logs and follow-up actions.

**Fugitive Dust**

- Results of inspections and road maintenance activities;
- Records of dust mitigation measures carried out; and
- Feedback logs and follow-up actions.

# 7. Community Interaction

## *7.1 Porcupine Gold Mine Community Liaison Coordinator*

One of the key methods by which the HOP interfaces with the local community and other interested parties (collectively referred to as 'stakeholders') is through the Porcupine Gold Mine Community Liaison Coordinator which acts as a key focal point for channelling information about the operations to the public. The Community Liaison Coordinator is available for the purposes of meeting with stakeholders as required.

## *7.2 Community Groups*

The HOP also engages with the local community by working with the Hollinger Project Community Advisory Committee (HPCAC) to provide a project-specific, multi-stakeholder venue for discussion of issues surrounding community feedback, project information, post-closure land use, and recommendations to PGM.

## *7.3 Community Feedback Protocol*

PGM established a web-based interactive 'Community Feedback Protocol' application (Appendix B) which allows stakeholders to provide immediate feedback to PGM on potential issues such as noise, vibration, dust or any other issues relevant to the HOP. An email address was created specifically for community feedback as part of the Community Feedback Protocol (community.feedback@goldcorp.com).

### 7.3.1 Routine Enquiries

PGM has developed procedures for managing routine enquiries received via telephone calls or electronic forms through the Community Feedback Protocol.

During business hours, enquiries are forwarded immediately to the Community Liaison Coordinator to take the required action. Incoming calls received outside office business hours are forwarded to the open pit dispatcher for immediate action, as required. Non-urgent issues are followed up within two business days.

Follow-up occurs with any stakeholder who contacts PGM via phone, interactive website or via e-mail. All enquiries submitted through the Community Feedback Protocol are recorded in a database, along with any resulting actions taken by PGM.

Feedback obtained via the Community Feedback Protocol assists PGM in becoming aware of issues that are of concern to stakeholders and helps the company address such concerns in a timely manner.

### 7.3.2 Feedback

In the event of feedback concerning noise, dust or vibration, the resolution process involves discussions between the complainant and the Community Liaison Coordinator or designate. The complainant is made fully aware of the monitoring and reporting procedures used for the mine. Every effort is made to ensure that concerns are addressed in a manner that results in a mutually acceptable outcome. The Feedback Reporting Procedures must be followed as described in Appendix A.

# 8. Site Preparation Phase

The Site Preparation Phase included all Hollinger site activities up to the start of the Construction Phase and specifically excludes blasting. Activities included probe drilling, ore definition drilling, initial overburden stripping, tree clearing, berm construction and construction of the haulage corridor. During this phase, work was conducted seven days per week on dayshift only from 0700 – 1900 hours. The Site Preparation Phase was excluded from the Agreement with the City. PGM operated with the intent of maintaining noise levels below 65 dBA and complied with the MOECC guidelines for dust emissions. The Complaint Resolution Protocol was in effect as described previously in Section 7.

# 9. Construction Phase

The Construction Phase commenced when blasting started and included initial blasting, overburden stripping, berm construction, and progressive rehabilitation. The construction period ceased upon completion of the Environmental Control Berm. During this phase, work was conducted seven days per week on dayshift only from 0700 to 1900 hours PGM operated with the intent of maintaining noise levels below 65 dBA. All of the measures in the proceeding Sections 3-7 were in affect during the Construction Phase.

# 10. Material Handling

Commencing with the overburden stripping and continuing during the construction phase of the HOP, overburden and blasted run of mine (ROM) rock was used to construct the environmental berm. It is estimated that a total of 7.1 M tonnes of combined overburden and rock was required to construct the berm. Of that total 0.8 M tonnes was overburden and 6.3 M tonnes was blasted run of mine rock.

Excess overburden and organic soils not used in the berm construction was separately and temporarily stockpiled on site to complete the progressive reclamation of the outside berm slopes prior to them being vegetated. Any excess overburden or organics was stockpiled on site to be used for the final site reclamation.

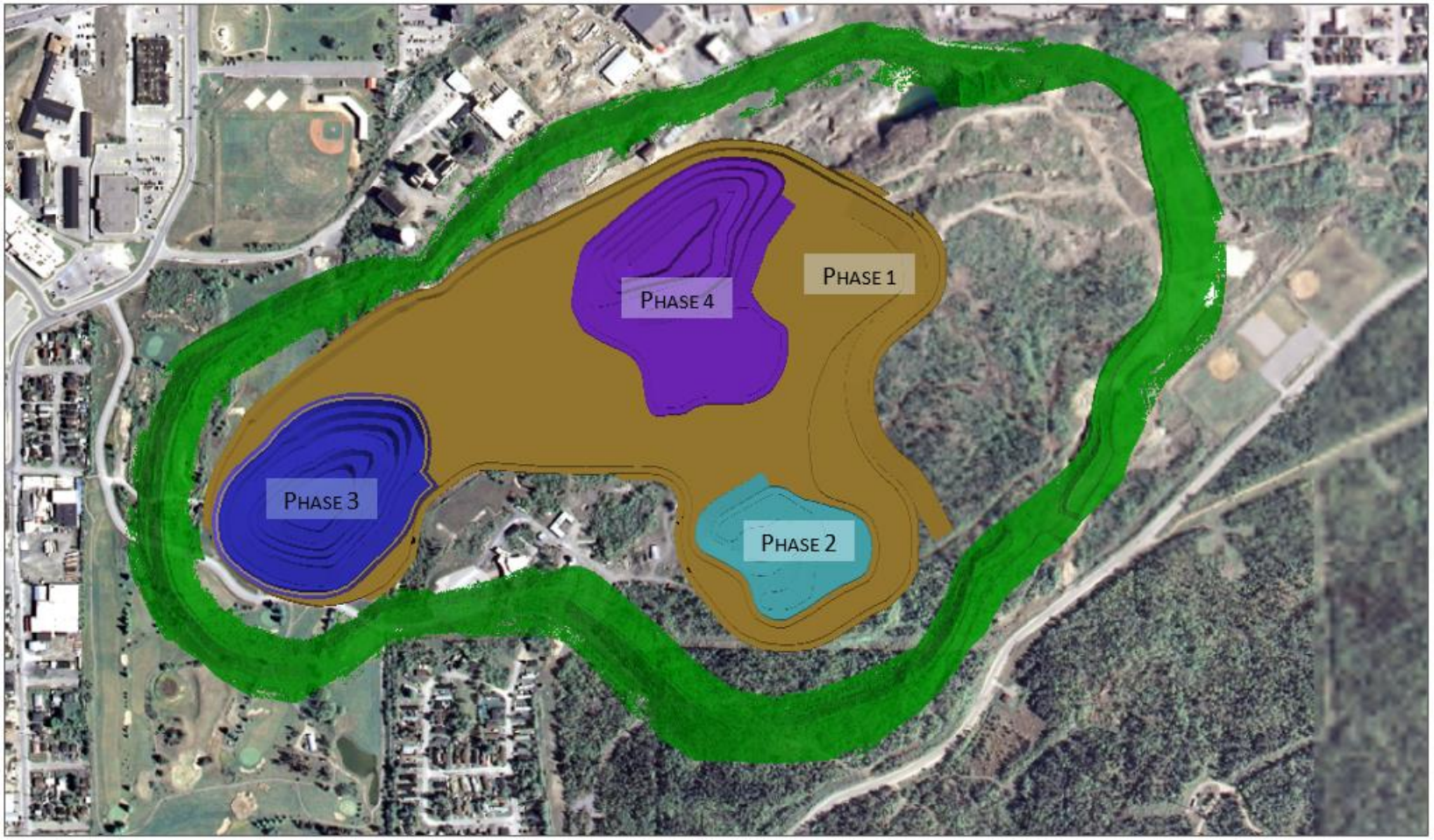
During the initial construction phase of the Hollinger pit, ore stockpiles were maintained on the Hollinger property until the transportation corridor between the Hollinger pit and the Dome mine was completed and the material was transported back to the Dome Mine site. The location of the temporary stockpile location is shown on Figure 10.1.

Once the Transport corridor was completed, ore stockpiles were no longer maintained on the Hollinger property as all ore and waste material was transported to the Dome Mine site for processing or disposal.

Initially waste rock as used to construct the berm. Some waste material was used to bring the transportation corridor haul road up to it final grade and added to the height of berms along the transportation corridor. Once the berm and transportation corridor construction was completed, waste rock mined from the pit was hauled back to waste dumps on the Dome Mine site. The Hollinger pit is scheduled to be mined as four phases as shown in Figure 10.2. Each phases are mined concurrently and have different completion dates. The completion of the open pit reclamation is expected within 3 to 5 years of commencement.

Figure 10.1 Temporary Stockpile Location

Figure 10.2 Hollinger Pit Development Phases



# 11. Contingency Plans for Significant Events

This section describes contingency plans initiated in the event that a serious situation has or may occur affecting City infrastructure or adjacent residents and businesses. In addition, this section describes the mitigating and monitoring strategies employed by PGM to reduce the likelihood and forewarn of significant events. Identified catastrophic events include vibration/concussion events, subsidence, and pit wall failures that can damage or render inoperable surrounding infrastructure.

## *11.1 Vibration and Air Blast Overpressure*

City infrastructure identified by the City's Public Works and Engineering Department as critical and impacted by vibration and/or air blast overpressure due to blasting includes: Hollinger Water Tower, City's Communication tower on top of the Water Tower, Moneta Booster Station, Hollinger Booster Station, and Vipond Booster Station (currently off line) and the neighbouring buried water main infrastructure.

Modelling of blast vibrations and air blast overpressures were modelled by PGM's blast consultant for areas adjacent to the pit boundary. Modelled results indicate that only the Water Tower, and several commercial buildings in the northwest sector of the pit would be above the MOECC vibration 12.5 mm/sec and air overpressure 128 dBL guideline limits. In order to reduce vibration at these locations PGM employs smaller diameter drill holes, shorter holes or decking to reduce pounds per delay and reduce vibration and overpressure levels to acceptable limits. The blasting consultant's studies indicate that the Environmental Control Berm resulted in a further 5 dBL reduction in air blast overpressure levels.

During the initial blasting at the Hollinger, blasts were closely monitored at multiple locations to determine if the modeled results corresponded to actual results. Based on the initial blast results, blast models and blast designs were modified accordingly to ensure that acceptable vibration and air overpressure levels were achieved at receptors peripheral to the pit. An initial program of signature hole blasts was conducted to confirm blast vibration characteristics in various rocks types / structural domains and to guide future blast designs. During the calibration of the blast model, any blasting activity within 140 meters of City infrastructure was closely monitored. At this distance, the model calculated expected vibration levels of 6 mm/sec using the planned design criteria.

As described in previous sections of the this BMP, PGM established four permanent vibration and noise monitoring station peripheral to and outside the Hollinger pit's Environmental Control

Berm. Additionally, two mobile stations are available to employ around the pit when specific vibration or air overpressure issues are identified. Vibration and air overpressure monitors were installed on City infrastructure as described below in the sections detailing contingency plans for the identified critical City infrastructure. This information is available on the PGM monitoring web site for public viewing.

Table 11.1 illustrates the maximum allowable ppv (mm/s) for structures and pipelines and Table 11.2 illustrates vibration thresholds for various types of infrastructure. Table 11.3 shows the human and structural response to various sound pressure levels.

Table 11.1 OPSS 120 Maximum Peak Particle Velocity Values (PPV)

| **Element** | **Frequency (Hz)** | **PPV (mm/s)** |
|---|---|---|
| Structures and pipelines | <40<br>>40 | 20<br>50 |
| Concrete and grout <72 hours from placement | NA | 10 |

Table 11.2 Vibration Limits for Various Infrastructure Types

| **Infrastructure Type** | **PPV Limit (mm/s)** | **Comments** |
|---|---|---|
| Power Transmission Towers | 100 | Concrete footings |
| Wooden Hydro Poles | 240 | |
| Electrical Sub-stations | 10 – 30 | Depending on which type. Manufacturer should be consulted. |
| Railway Tracks | 100 | |
| Water Pipelines | 50 | |
| Underground Fiber Optics Line | 100 | |
| Mine Plant and Industrial Buildings | 100 | Unoccupied structures of reinforced concrete or steel construction |

**Notes:**
Suggested by Richards and Moore (2007).

Table 11.3 Human and Structural Response to Sound Pressure Level

| decibel | Comments |
|---|---|
| 182 | 10% failure probability – multi-story steel construction |
| 175 | 10% failure probability – Low-rise masonry |
| 174 - 177 | 10% failure probability – framed construction 1 to 3 stories |
| 140 | Reasonable threshold for glass and plaster damage |
| 134 | USBM worst-case safe-level air blast criterion |
| 128 | MOECC Guideline for mines and quarries |
| 120 | Threshold of pain |
| 117 | Threshold of complaints, windows and dishes rattle |
| 98 | Riveter |
| 67 | Ordinary conversation |
| 40 | Hospital room |
| 20 | Whisper |
| 0 | Level of hearing |

Specific monitoring and contingency measures related to each of the identified City infrastructure entities are described in detail below.

### 11.1.1 Hollinger Water Tower

The closest and most critical City structure is the Hollinger Water Tower. There are currently two online ground movement instruments, extensometers (I-3 and I-4) located south of the tower, drilled toward historic workings.

A pre-blast structural inspection and foundation assessment was carried out to document the existing condition of the structure and evaluate any reinforcement requirements recommended by the consultant. In the event that reinforcement is required as a result of activities related to the Hollinger open pit, then PGM assumes all responsibility for the associated costs. Following blasting activity within 140 metres of the Water Tower or when vibration levels exceed 12.5 mm/sec, PGM personnel completes a visual inspection of the exterior to the facility to ensure that there is no obvious blast related damage. Annual structural inspections of the Water Tower is completed by an independent structural engineer, retained by PGM, to verify the structural

integrity of the tower. When the Water Tower is emptied of water, an inspection is conducted by the City and PGM personnel, or third-party consultant, to confirm the integrity and condition of the Water Towers wall.

A full time monitoring program is implemented at the tower location to include vibration and air blast overpressure readings from blasting activities. Because of the distance of the initial blasting activity, minimal impacts are expected at the tower. Blasts adjacent to the Water Tower are designed to reduce vibration and air overpressure to acceptable levels consistent with MOECC guidelines. Strain gauge(s) are installed to better monitor the impacts of blasting on the tower and are recorded/checked following all blasts within 140 metres of the water tower. If blast vibration or air overpressure levels exceed 12.5 mm/sec or 128 dB respectively then blasting in the immediate vicinity of the water tower is stopped until an inspection is completed of the tower and blast designs are modified to reduce affects to the allowable limits. In the event that the strain gauges show strain levels exceeding accepted tolerances due to blasting, then blasting within 140 meters of the Water Tower is curtailed and visual inspection of the tower completed by PGM personnel and until blast designs are modified to reduce vibration and air overpressure to acceptable levels

The operator of the Mattagami Water Filtration Plant is on the blasting notification list and confirmation is made prior to any blasting event scheduled for the Hollinger Open Pit. Reports are available online for the City detailing vibration and air overpressure levels related to blasting events. Inspection reports are also be available online for the City as described in the above sections related to specific infrastructure. In the event that the City's SCADA system detects a malfunction to the water tower related infrastructure then PGM shall be immediately notified and an inspection by City and PGM personnel is made of the facility to determine the cause of the malfunction. If the malfunction is blast related, then no further blasting activity takes place within 140 metres of the water tower until the cause of the malfunction has been identified and steps taken to ensure there is no reoccurrence.

### 11.1.2 Moneta Booster Station

The Moneta Booster Station is located at the northwest corner of Vipond Road and Moneta Avenue. It is a key pumping station for the City. A permanent vibration monitoring station is within close proximity to the structure. For blasting activity near the area and during the initial phase of pit blasting, monitoring instrumentation is used to record vibration and air blast overpressure levels at the booster station.

A pre-blast inspection of the station was conducted to identify the current condition of the structure. Subsequent inspections are completed by the independent consultant. The City provides vibration limits for any switches or electronic instrumentation affected by the blasting activity. These limits are used to set the targets of the blasting designs near the structure. In the event that the vibration limits are exceeded then the City is immediately notified by PGM.

The operator of the Mattagami Water Filtration Plant is on the blasting notification list and confirmation is made prior to any blasting event scheduled for the Hollinger Open Pit. In the event of a significant failure of the Moneta Station, the Hollinger and Vipond stations will be temporarily re-commissioned.

### 11.1.3 Hollinger Booster Station

This structure is presently used to provide additional chlorination to the municipal drinking water for users in the North-East quadrant of the City.

A pre-blast inspection of the station was completed to identify the current condition of the structure. Inspections are completed by the independent consultant. Due to this structure's location, the monitoring data from the water tower provides the necessary for vibration and air overpressure levels impacting the station. If there is an exceedance of 12.5 mm/sec then a visual inspection of the building and related infrastructure is completed by PGM and City personnel within two business days of the event.

The operator of the Mattagami Water Filtration Plant is on the blasting notification list and confirmation is made prior to any blasting event scheduled for the Hollinger Open Pit.

### 11.1.4 Neighbouring Buried Water main Infrastructure

Active water main infrastructure exists on the North Side of the HOP area as shown in Figure 11.1. The area of the piping is identified and the ground conditions are closely monitored during berm construction activity. Blasting vibrations are kept below 12.5 mm/sec at the pipe locations. Areas where water mains are buried is inspected by PGM personnel whenever blasting is within 140 meters to ensure the integrity of the lines.

The City has the ability to isolate breaks that may occur. PGM will assist with equipment and resources to access and repair any breaks resulting from mining activities.

### 11.1.5 City's Communication Tower

The main receiver for the City's communication system is located on the City Water Tower. Refer to the details in the Water Tower section regarding monitoring, mitigating and contingency actions. PGM has commissioned a communication company to review the options and costs of relocating the communication tower on top of the Water Tower to another location. PGM, in consultation with a blasting consultant, reviewed the likelihood of an event occurring that could compromise the integrity of the Water Tower and by extension the Communication Tower on top of the water tower.

Figure 11.1 Location of Water main Adjacent to North Perimeter of Hollinger Property

### 11.1.6 Reporting

Reports are available online for the City detailing vibration and air overpressure levels related to blasting events at the key infrastructure detailed in the proceeding sections. Vibration and overpressure monitoring results from PGM's stationary and two mobile monitors are available on a public web site. Inspection reports are available online for the City as described in the above sections related to specific infrastructure. In the event that the City's SCADA system detects a malfunction in any of the above infrastructure facilities, PGM shall be immediately notified and an inspection by City and PGM personnel is made of the facility to determine the cause of the malfunction. If the malfunction is blast related, then no further blasting activity takes place within an agreed to distance of the infrastructure until the cause of the malfunction has been identified and steps taken to ensure there is no reoccurrence.

## *11.2 Pit Wall Stability*

City infrastructure that could be impacted by slope instability includes the Water Tower and water mains.

PGM commissioned a geotechnical consulting firm to complete an assessment of the Hollinger pit walls stability. The results of the study are detailed in a report titled "Evaluation of Pit Slope Stability for the Proposed Hollinger Open Pit Mine in Consideration of Mine Void Intersections". A combination of three and two dimensional numeric slope stability models were employed by the consultant over the north wall of the pit. The three dimensional model was found to most accurately represent the slope stability conditions. A number of stope and pit wall interaction scenarios were modelled and evaluated using different joint spacing and orientations. Overall the report concluded that there is relatively little surface displacement at the crest level, provided that stopes are backfilled and sufficient time (several months up to two years) has elapsed between backfilling and pit development to allow for consolidation of the fill.

The stability of the high wall at the Hollinger Pit is monitored with the aid of survey prisms and regular daily documented visual inspections. As pit depth increases, a sophisticated Radar scanner was installed to continuously monitor the stability of the pit slope. This radar system detects movement with sub-millimeter accuracy in real time. The radar scanner monitors the wall stability across the entire wall being scanned, providing reliable early warning alerts of any progressive wall movements that could potentially lead to wall instability. The radar scanner scans the north wall where the Water Tower is located.

In the unlikely event that unexpected movement is detected on the north wall of the Hollinger pit or a precursor to a pit wall failure, the City is notified so that measures can be taken to minimize the impact of a wall failure on the Water Tower and the City's Communication Tower. These measures may include redirecting City water away from the Water Tower and isolating the Water Tower and emptying the Water Tower. In the event that a potential pit wall failure could affect surrounding commercial and residential properties affected personnel is notified, services isolated and areas evacuated as required.

### 11.2.1 Reporting

PGM will make available all pit wall monitoring data documenting pit wall movement, internal PGM geotechnical reports and any measures taken to stabilize pit walls as required.

## *11.3 Subsidence*

PGM has conducted detailed evaluations of all crown pillars and potential subsidence areas outside of the final pit limits and Environmental Control Berm area. Since 1999, PGM has either taken remedial measures to stabilize areas where subsidence have occurred, or may occur, or has isolated those areas from public access with fencing. Instrumentation and fill points have been established in areas where voids are present and there is a risk of subsidence. Figure 11.2 illustrates monitoring and fill point locations adjacent to the Hollinger Pit. Table 11.4 summarizes all measuring points and types of instrumentation employed, and frequency of monitoring. At monitoring points, various combinations of depth to fill, incremental displacements within the surrounding rock mass, and overburden movements with inclinometers are measured. Types of instruments for measuring displacements in rock include MPBX (multi point borehole extensometers) and extensometers.

Monthly subsidence monitoring reports are available as required. In the event that movement thresholds are exceeded the City is notified immediately, potential subsidence areas are isolated from the public and remedial plans are developed and implemented. Remediation may include filling voids with fill to stabilize the underlying void, stabilizing water levels, reinforcing rock masses, installing concrete caps, and installing shoring/piling to stop movement of unconsolidated material. Water levels are stabilized by controlling pit pumping rates.

A geotechnical consultant was retained to evaluate the stability of areas below the Environmental Control Berm. Based on the consultant's recommendations, remedial measures are implemented in selected areas to ensure the berm does not subside. Monitoring equipment

is installed to measure long term stability of areas where long term access is deemed unsafe or fenced off to prevent public access.

Key City infrastructure identified by the City is not considered at risk due to subsidence. Figures 11.2 to 11.4 show the voids and monitoring points in the vicinity of the Water Tower, Hollinger Booster Station and Water Mains. In the unlikely event that monitoring indicates a potential subsidence in any of these areas then the City is notified immediately, potential subsidence areas are isolated from the public and remedial plans are developed and implemented.

Figure 11.4 illustrates voids and monitoring locations in the area between the Ackland's and the Praxair buildings adjacent to Highway 101. A subsidence in this area has the potential to impact the stability of Highway 101. In the event that monitoring indicates the potential for subsidence, the City is immediately notified, fill is placed into voids, water levels are stabilized and mining activity adjacent to this area is stopped until the potential for subsidence has been removed. The potentially affected area is cordoned off if there is a risk to public safety. Similar measures are taken if surrounding commercial or residential property is threatened by a subsidence. PGM will work with the City and affected property owners, if any, to develop alternative safe access route(s).

Figure 11.2 Hollinger Perimeter Instrumentation Monitoring Locations

Figure 11.3 Water Tower and Hollinger Booster Station Voids and Monitoring Locations

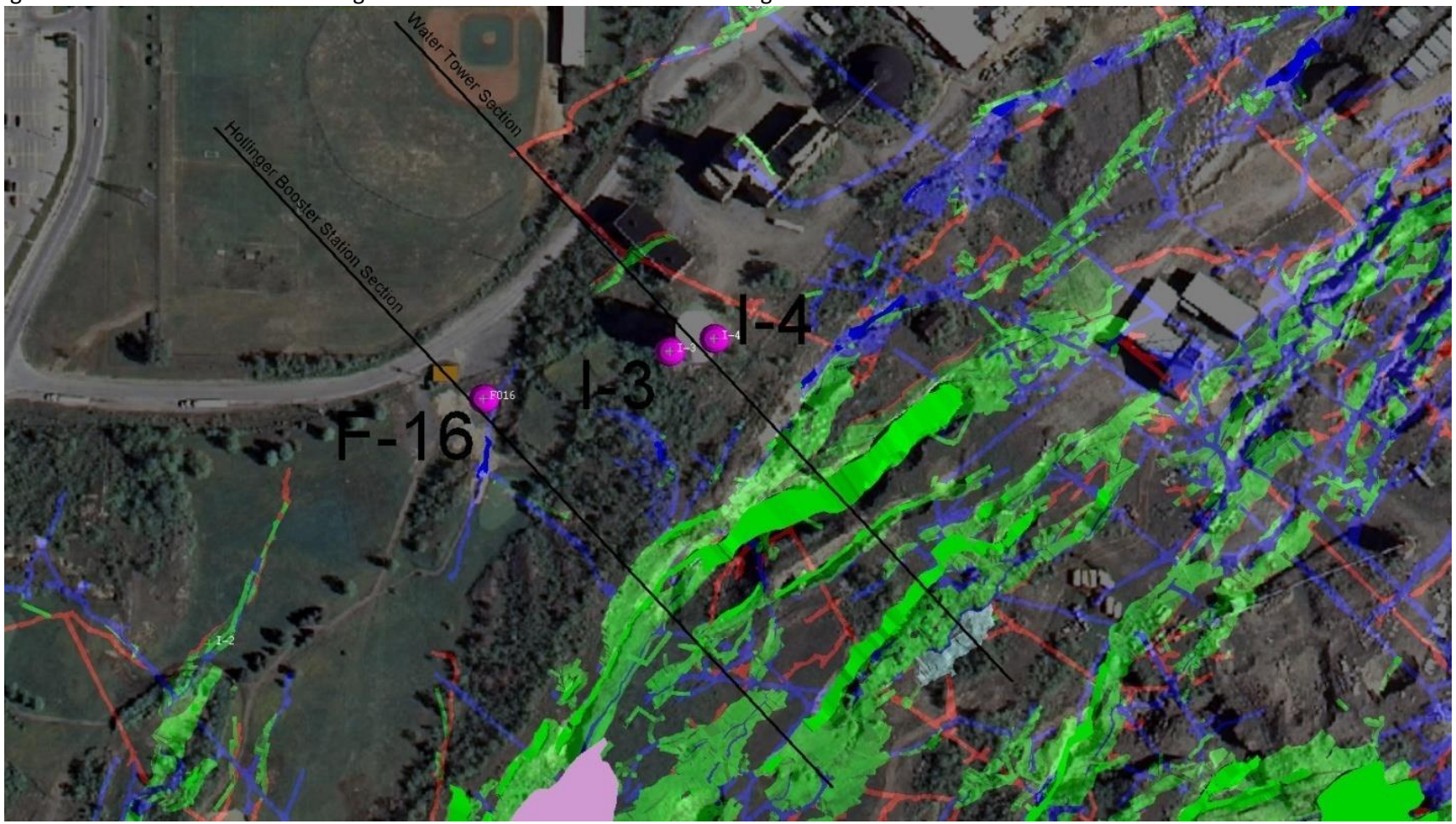


Figure 11.4 Water Tower and Hollinger Booster Station Voids Area – Sections

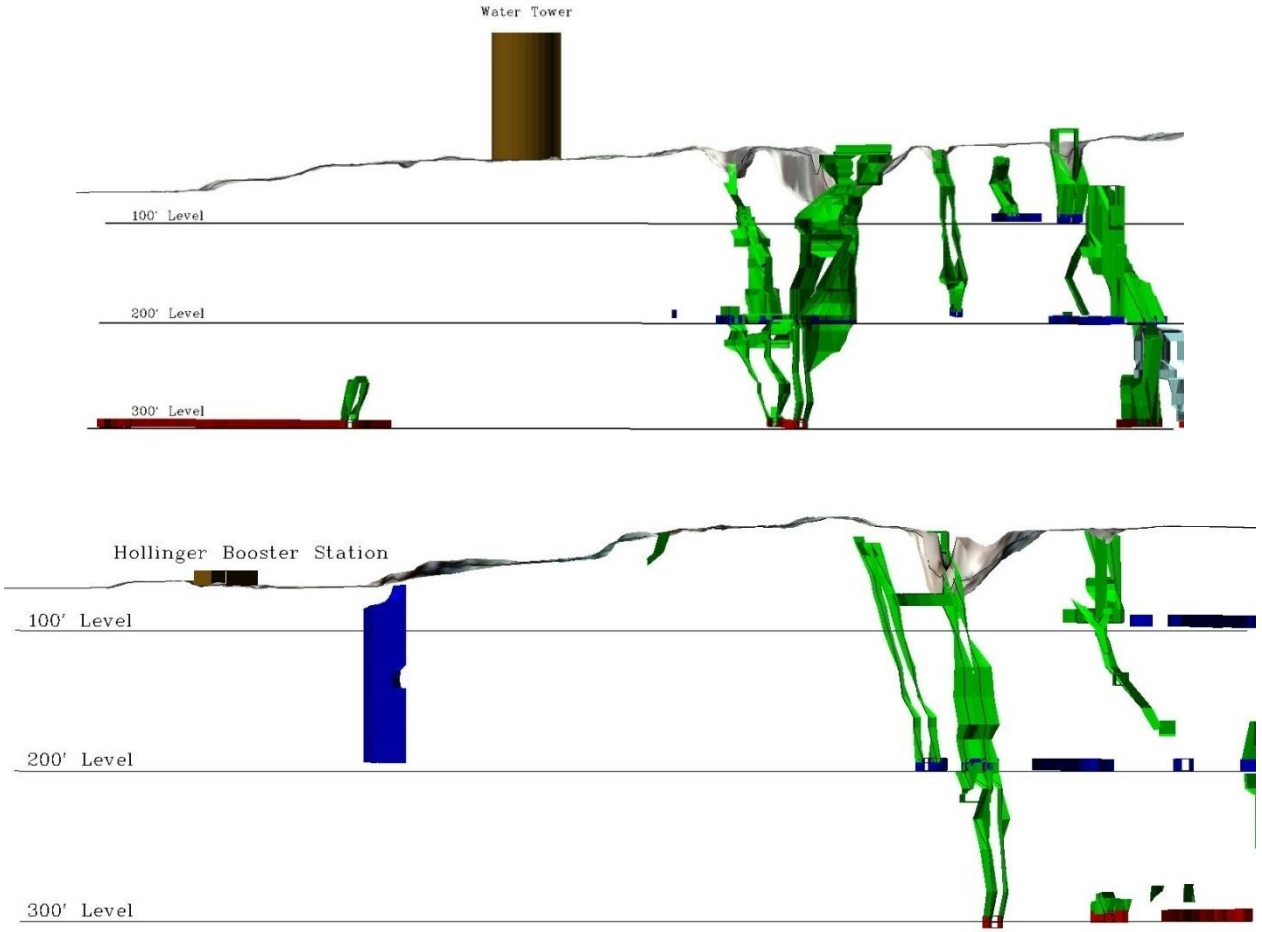
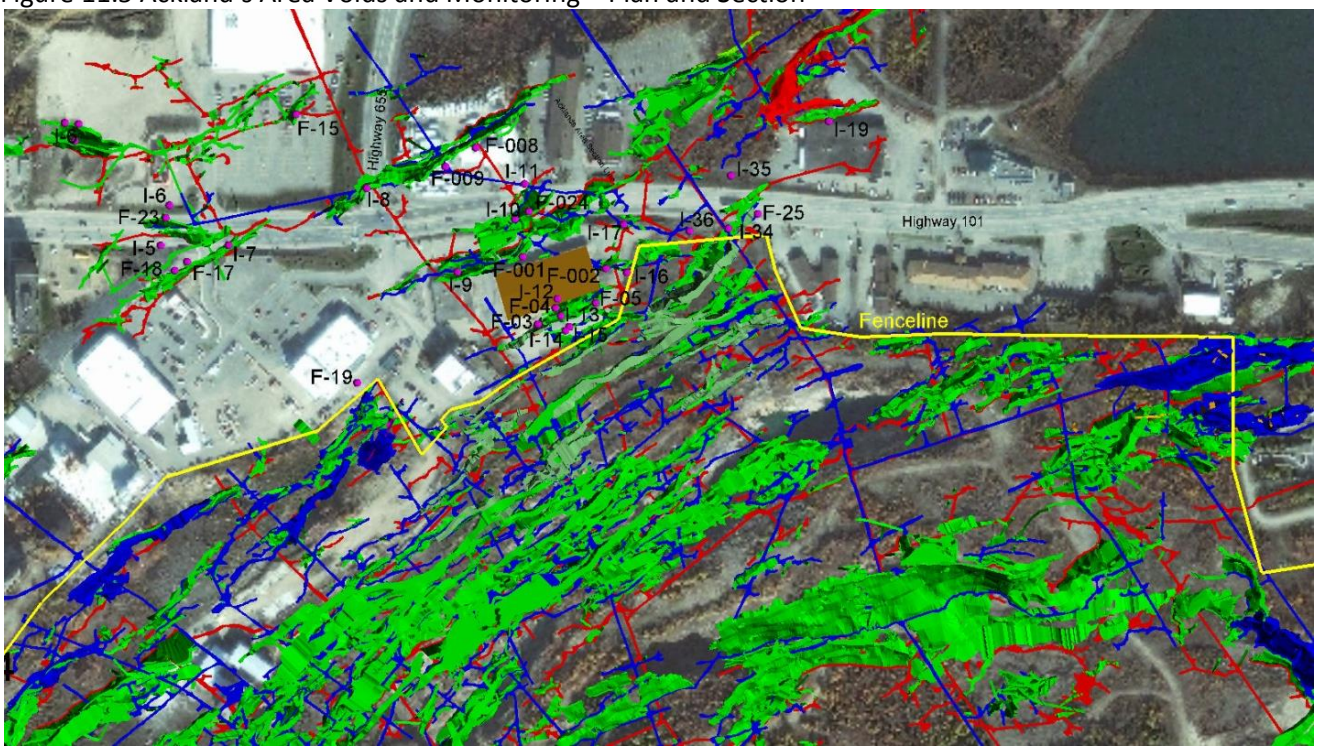


Figure 11.5 Ackland's Area Voids and Monitoring – Plan and Section



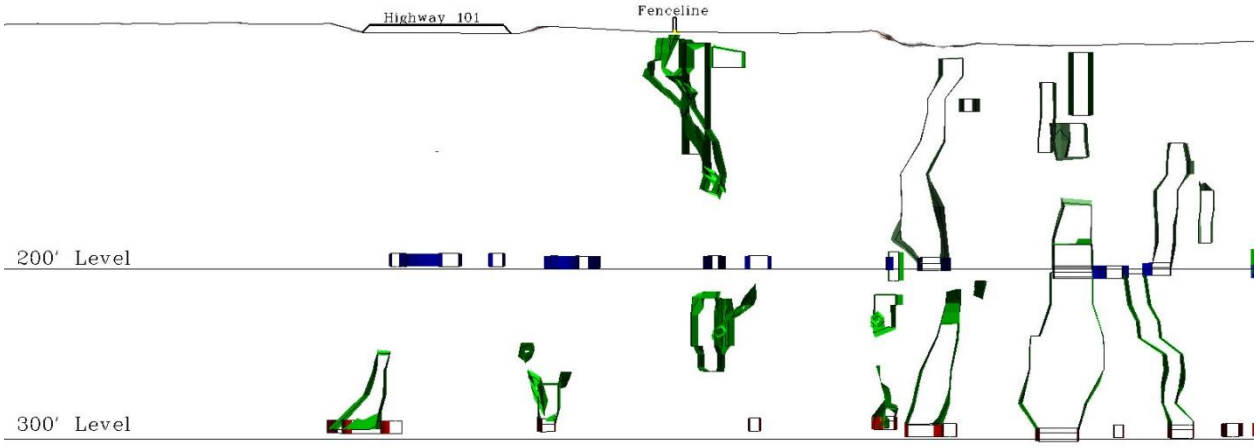



Table 11.4 Instrumentation Monitoring

| Instrument # | Area | Coordinates (NAD 83) | | Current Monitoring | Operating Monitoring |
|---|---|---|---|---|---|
| | | Northing | Easting | Frequency | Frequency |
| **EXTENSOMETERS** | | | | | |
| I-1 | Proshop | 476171 | 5368650 | Bi-annual | Monthly/ Weekly |
| I-2 | Fairway | 476222 | 5368850 | Bi-annual | Monthly/ Weekly |
| I-3 | Water Tower West | 476440 | 5368987 | Bi-annual | Monthly/ Weekly |
| I-4 | Water Tower East | 476461 | 5368993 | Bi-annual | Monthly/ Weekly |
| I-5 | Burger King South Sidewalk | 476625 | 5369337 | Bi-annual | Monthly/ Weekly |
| I-6 | Burger King North Sidewalk | 476632 | 5369369 | Bi-annual | Monthly/ Weekly |
| I-7 | A&W Sidewalk | 476679 | 5369337 | Bi-annual | Monthly/ Weekly |
| I-8 | 655 Merge | 476789 | 5369382 | Bi-annual | Monthly/ Weekly |
| I-9 | Curves | 476861 | 5369315 | Bi-annual | Monthly/ Weekly |
| I-10 | Super 8 South Sidewalk | 476907 | 5369357 | Bi-annual | Monthly/ Weekly |
| I-11 | Super 8 Nighthawk Trailers | 476915 | 5369385 | Bi-annual | Monthly/ Weekly |
| I-12 | Stope 6 (86EW12) - Acklands | 476940 | 5369293 | Bi-annual | Monthly/ Weekly |
| I-13 | Stope 6 (86EW12) - Acklands | 476943 | 5369279 | Bi-annual | Monthly/ Weekly |
| I-14 | Stope 6 (86EW12) - Acklands | 476947 | 5369268 | Bi-annual | Monthly/ Weekly |
| I-15 | Stope 86W12 - South of Acklands | 476950 | 5369271 | Bi-annual | Monthly/ Weekly |
| I-16 | Acklands GMM's | 476996 | 5369314 | Bi-annual | Monthly/ Weekly |
| I-17 | Acklands East - Algonquin | 477026 | 5369348 | Bi-annual | Monthly/ Weekly |
| I-19 | National Grocer | 477157 | 5369434 | Bi-annual | Monthly/ Weekly |
| I-20 | OK Tire | 477473 | 5369286 | Bi-annual | Monthly/ Weekly |
| I-25 | 66E17 Stope (South Muskoka Delivery Stope) | 477579 | 5369235 | Bi-annual | Monthly/ Weekly |
| I-26 | 66E17 Stope (South Muskoka Delivery Stope) | 477575 | 5369240 | Bi-annual | Monthly/ Weekly |

| | | | | | |
|---|---|---|---|---|---|
| I-33 | Acklands East - Algonquin | 477069 | 5369349 | Bi-annual | Monthly/ Weekly |
| I-34 | Acklands East - Algonquin | 477077 | 5369349 | Bi-annual | Monthly/ Weekly |
| I-35 | Acklands - Algonquin | 477079 | 5369391 | Bi-annual | Monthly/ Weekly |
| I-36 | Acklands - Algonquin | 477069 | 5369343 | Bi-annual | Monthly/ Weekly |
| I-37 | Acklands - Algonquin | 477077 | 5369349 | Bi-annual | Monthly/ Weekly |
| I-38 | Burnac | 476556 | 536942 | Bi-annual | Monthly/ Weekly |
| **FILL POINTS** | | | | | |
| F001 | stope # 3 - Acklands | 476913 | 5369327 | Bi-annual | Monthly/ Weekly |
| F002 | stope # 5 - Acklands | 476979 | 5369317 | Bi-annual | Monthly/ Weekly |
| F003 | fill point # 1 - Acklands | 476925 | 5369273 | Bi-annual | Monthly/ Weekly |
| F004 | fill point # 5 - Acklands | 476939 | 5369286 | Bi-annual | Monthly/ Weekly |
| F005 | fill point # 6 - Acklands | 476971 | 5369290 | Bi-annual | Monthly/ Weekly |
| F006 | east - Burnac | 476560 | 5369434 | Bi-annual | Monthly/ Weekly |
| F007 | west - Burnac | 476549 | 5369435 | Bi-annual | Monthly/ Weekly |
| F008 | east - N.H.T. Sales | 476876 | 5369414 | Bi-annual | Monthly/ Weekly |
| F009 | west - N.H.T. Sales | 476851 | 5369398 | Bi-annual | Monthly/ Weekly |
| F010 | # 9 fairway - H.G.C. | 476175 | 5368523 | Bi-annual | Monthly/ Weekly |
| F011 | pro-shop- H.G.C. | 476216 | 5368641 | Bi-annual | Monthly/ Weekly |
| F013 | M.D.S. - Spectrum | 477575 | 5369240 | Bi-annual | Monthly/ Weekly |
| F014 | MINI PUTT - Hollinger | 476465 | 5369172 | Bi-annual | Monthly/ Weekly |
| F015 | PRK. LOT -YIG's | 476733 | 5369441 | Bi-annual | Monthly/ Weekly |
| F016 | Stope 226 - Pump House | 476352 | 5368965 | Bi-annual | Monthly/ Weekly |
| F017 | East - Feldman | 476646 | 5369324 | Bi-annual | Monthly/ Weekly |
| F018 | West - Feldman | 476636 | 5369317 | Bi-annual | Monthly/ Weekly |

| | | | | | |
|---|---|---|---|---|---|
| F019 | Stope 33B - Feldman | 476781 | 5369227 | Bi-annual | Monthly/ Weekly |
| F020 | West - Schumacher Park | 477686 | 5369183 | Bi-annual | Monthly/ Weekly |
| F021 | Centre - Schumacher Park | 477688 | 5369181 | Bi-annual | Monthly/ Weekly |
| F022 | East - Schumacher Park | 477693 | 5369185 | Bi-annual | Monthly/ Weekly |
| F023 | Burger King - Algonquin | 476629 | 5369359 | Bi-annual | Monthly/ Weekly |
| F024 | Super 8 - Algonquin | 476918 | 5369363 | Bi-annual | Monthly/ Weekly |
| F025 | Acklands/BOC - Algonquin | 477100 | 5369360 | Bi-annual | Monthly/ Weekly |
| F026 | FH-1 Extendicare NW | 477487 | 5369168 | Bi-annual | Monthly/ Weekly |
| F027 | FH-2 Extendicare NW | | | Bi-annual | Monthly/ Weekly |
| F028 | FH-3 Extendicare NW | 477487 | 5369174 | Bi-annual | Monthly/ Weekly |
| F029 | Extendicare SE | 477612 | 5369166 | Bi-annual | Monthly/ Weekly |
| F030 | North – Former Gold Mine Tour | 476182 | 5368653 | Bi-annual | Monthly/ Weekly |
| F031 | South - Former Gold Mine Tour | 476682 | 5368249 | Bi-annual | Monthly/ Weekly |
| F032 | Stope Cap " B " - Luzenac | 476475 | 5369136 | Bi-annual | Monthly/ Weekly |
| F033 | Raise - Luzenac | 476474 | 5369149 | Bi-annual | Monthly/ Weekly |

**Notes:**
Bi-annual monitoring is typically conducted in April and October

# 12. Maintenance and Subsequent Land Use Commitments

Periodically over the life of the Open Pit operation and closure phases, activities beyond the mining operation is required to maintain existing infrastructure as well as construct new infrastructure in accordance to land use commitments with the City.

## *12.1 Environmental Control Berm (ECB) Maintenance*

Post construction and during the operational phase of the Hollinger Pit, occasional maintenance to the ECB may be required to address material settling, erosion or vegetation cover. These activities are outside of the normal operating scope of the Open Pit and as such would be exempt from the operating noise limits under NPC 205. These maintenance activities would be managed as per the noise objective of 65 dBA agreed upon in the Site Plan Development Agreement with the City. Any such maintenance activity shall only occur during the day time period of 0700 – 1900 hours unless there is an imminent threat to health and safety, infrastructure or the environment.

## *12.2 Storm Water Control Plan (SWCP) Structures*

As per of the Hollinger Open Pit's license to operate, PGM must construct and maintain and storm water control system to minimize impacts from the site's surface runoff. It is PGM's intention to have the control structures of the SWCP constructed during the ECB construction phase, some additional work may extend beyond the completion of the ECB. It is also anticipated that some maintenance activities will also be required to the control structures throughout the operating and closure phases of the Hollinger Open Pit. These activities are outside of the normal operating scope of the Open Pit and as such would be exempt from the operating noise limits under NPC 205. These maintenance activities would be managed as per the noise objective of 65dBA agreed upon in the Site Plan Development Agreement with the City. Any such maintenance activity shall only occur during the day time period of 0700 – 1900 hours unless there is an imminent threat to health and safety, infrastructure or the environment.

## *12.3 Land Use Commitments*

As part of the Agreement between Goldcorp Canada Ltd. and the Corporation of the City of Timmins, PGM has several commitments with regards land use and public safety during the mining and closure phases. These activities under the Agreement's initial Landscape Plans and Subsequent Land Use are outside of the normal operating scope of the Open Pit and as such would be exempt from the operating noise limits under NPC 205. These maintenance activities would be managed as per the noise objective of 65dBA agreed upon in the Site Plan Development

Agreement with the City. Any such maintenance activity shall only occur during the day time period of 0700 to 1900 hours.

### *12.4 Notification*

Prior to the commencement of the activities described in this section, a notification must be given two working days in advance to the MOECC and the City Planning Department. The two working days will provide sufficient time for acknowledgment of the activities and additional communications to the public regarding increased activity and noise levels.

# 13. References

MOECC, 1978. Ontario Ministry of Environment Noise Pollution Control (NPC) Branch Publication 115, *Construction Equipment.*

MOECC, 1978. Ontario Ministry of Environment *Model Municipal Noise Control By-Law, Final Report;* August, 1978.

MOECC, 1985. Ontario Ministry of Environment *Guidelines on Information Required for Assessment of Blasting Noise and Vibration*; December, 1985.

MOECC, 1995. *Sound Level Limits for Stationary Sources in Class 1 and 2 Areas [Urban]*; Publication NPC 205, October 1995.

MOECC, 1995. *Information to be Submitted for Approval of Stationary Sources of Sound*; Publication NPC 233. October 1995.

MOECC, 2008. *Operations Manual for Air Quality Monitoring in Ontario*; March, 2008.

MOECC, 2009. Technical Bulletin on *Review of Approaches to Manage Industrial Fugitive Dust Sources*, March, 2009.

PGM, 2011. *Best Management Plan Fugitive Dust Construction Activities*; PGM, November 22, 2011.

Valcoustics, 2011. *Best Management Practices for Environment Noise –Construction Activities*; Valcoustics Canada Ltd., November 23, 2011.

# Appendix A
# Operating Procedures

# Management of Lightning Storm Procedure

Lightning strikes represent a particular safety concern if they occur during the pre-blast interval when the blast holes are loaded. To ensure both the safety of mine site personnel located within the open pit, and also to protect the public from possible fly rock generated from an unexpected blast, the following are general guidelines to be followed to manage risk associated with lightning storm as they are approaching the HOP site.

- All crew members are responsible for reporting to their supervisor any lightning or thunder activity which may have the potential to affect open pit operations;

- Once notified, the supervisor immediately notifies the open pit supervisor who begins monitoring the active storm cell using a SKYSCAN or similar lightning detector;

- If at any point the lightening detector indicates that lightning activity is present within 30 to 60 kilometres from the open pit, blast hole loading ceases and matting procedures begins to cover all loaded blast holes;

- If at any point the lightning detector indicates that lightning activity is present at 15 Km from the open pit, all open pit personnel is evacuated;

- Guard personnel is posted at all entrances to the open pit to prevent entry until the storm system has passed. Guards remain within their vehicles with windows rolled up in order to protect them from lightning;

- Once the lightning detector has indicated that the storm event has passed beyond 15 Km from the open pit, all guard personnel is relieved of their posts and open pit operations resumes, other than explosives loading which resumes when the storm has passed beyond 60 km; and

- If a report of thunder or lightning is received and there are no loaded blast holes in the open pit (confirmed by both the blasting contractor and the open pit supervisor), then open pit operations will continue without interruption. Open pit personnel is instructed to follow appropriate safety procedures while the risk of lightning is present (e.g. remain within vehicles, ensure vehicle windows are rolled up etc.).

# Blast Guard Personnel Procedure

Blast guard personnel are stationed at strategic locations and must follow the following Blast Guard Personnel Procedure.

- A minimum of 15 minutes prior to blasting, guard personnel are stationed a safe distance from the blast site at all access points to the open pit to prevent inadvertent entry. What constitutes a safe distance is determined by the open pit supervisor in consultation with the blasting contractor;

- Guard personnel are positioned either outside or inside of their vehicles (for clear field of view) and are equipped with a portable radio. The open pit supervisor notifies by each guard when he/she is in position at his/her designated location;

- Guard personnel restricts access beyond their designated position to all people unless permission has been granted by the open pit supervisor or the blasting contractor;

- Under no circumstance is guard allowed to leave his/her designated position

- Following blasting, guard personnel remains at their designated positions until they receive permission to leave their post. This must be communicated to the guard by the open pit supervisor and must be repeated back by the guard personnel to the Supervisor to avoid miscommunication.

# Feedback Reporting Procedure – Vibration & Air Blast Overpressure

In the event that a community feedback is received regarding ground vibration, air blast overpressure, and/or monitoring indicates that these criteria have been exceeded, the following procedure must be followed.

- The supervisor/dispatcher confirms that the feedback or criteria exceedances was due to a blasting event;

- If the feedback is determined to be blasting related, then the operations supervisor or his/her designate investigates and identifies the source within one (1) hour and the supervisor or his/her designate logs/records the event and provides notification to engineering for follow up actions to prevent a re-occurrence;

- If the source cannot be identified, a designated person investigates the source of the feedback and documents all findings;

- The supervisor or his/her designate takes the appropriate action to reduce vibration/air blast overpressure to within acceptable levels during future blast events;

- Documentation is compiled identifying the source(s) and mitigation measures employed;

- Documents are reviewed and communicated between shifts; and

- Written feedback is given to the complainant(s) within two (2) business days.

# Feedback Reporting Procedure - Noise

In the event that a community feedback is received regarding noise, and/or monitoring indicates that these criteria have been exceeded, the following procedure must be followed.

- The supervisor/dispatcher reviews the audio recording to determine the source, and whether the noise level trigger is related to mining or construction activities or not;

- If the trigger is determined to be mining or construction related, then the operations supervisor or his/her designate investigates and identify the noise source;

- The supervisor or his/her designate takes the appropriate action to reduce noise to within acceptable levels;

- The supervisor or his/her designate confirms on the real-time monitor that noise levels have been reduced to within acceptable levels;

- The data is compiled identifying the source(s) and mitigation measures employed;

- The data is reviewed and communicated between shifts; and

- All data and documentation is available using the online monitoring system for review by regulatory agencies as part of reporting requirements. All data is also available to local residents and other local land users upon request.

# Feedback Reporting Procedure - Dust

In the event that a community feedback is received regarding fugitive dust, and/or monitoring indicates that air emission criteria have been exceeded, the following procedure must be followed.

- The pit supervisor or designate observes and make note of any visible fugitive dust emissions from the suspected source area once fugitive dust trigger(s) are activated;

- The pit supervisor or designate investigates if the fugitive dust incident is related to operations, or is related to other operations within the Timmins area;

- The pit supervisor or designate applies appropriate measures to mitigate the generation of dust. The success of the mitigation measure(s) is monitored and is adjusted, if possible/as required in order to provide the most effective solution;

- If a limit is exceeded, an incident report is filled in and filed and a report is generated for submission to the regulatory agency as part of reporting requirements; and

- Written feedback is provided within two business days if the concern was received from local residents and/or other local land users.

# Feedback Reporting Procedure – Noise, Dust, Vibration

In the event of feedback concerning noise, dust or vibration, the resolution process involves discussions between the complainant and the Community Liaison Coordinator or designate. The following procedure must be followed.

- The detail of the feedback is recorded in the Community Feedback Protocol Database;

- Unless otherwise specified in the proceeding sections of this BMP, preliminary investigations commences following the feedback being received to determine likely cause(s) ;

- In the event of an urgent issue that requires immediate attention, the Open Pit Supervisor is contacted and immediate action is taken to investigate and/or mitigate the issue;

- Appropriate mitigation measures are identified and implemented following an investigation into the feedback, if required. Mitigation measures are implemented by the open pit supervisor or designate;

- Following the implementation of mitigation measures, an assessment is carried out after an appropriate time interval in order to assess mitigation effectiveness; and

- Written feedback is provided within two business days.

# Appendix B
# Record Forms

# Form 1
# Blasting Checklist

## Supervisor Blasting Checklist

**Section A - Pre Blast Checklist - Supervisor Prior to 9:00 am**

| | | |
|---|---|---|
| 1. Have the Notice Boards been updated? | Yes | No |
| 2. Has the Community Relations Officer Been Notified? | Yes | No |
| 3. Have all Contractors been notified? | Yes | No |
| 4. Has the Airport been contacted? | Yes | No |
| 5. Is all the monitoring instrumentation functioning properly? | Yes | No |

**Section -B- Supervisor**

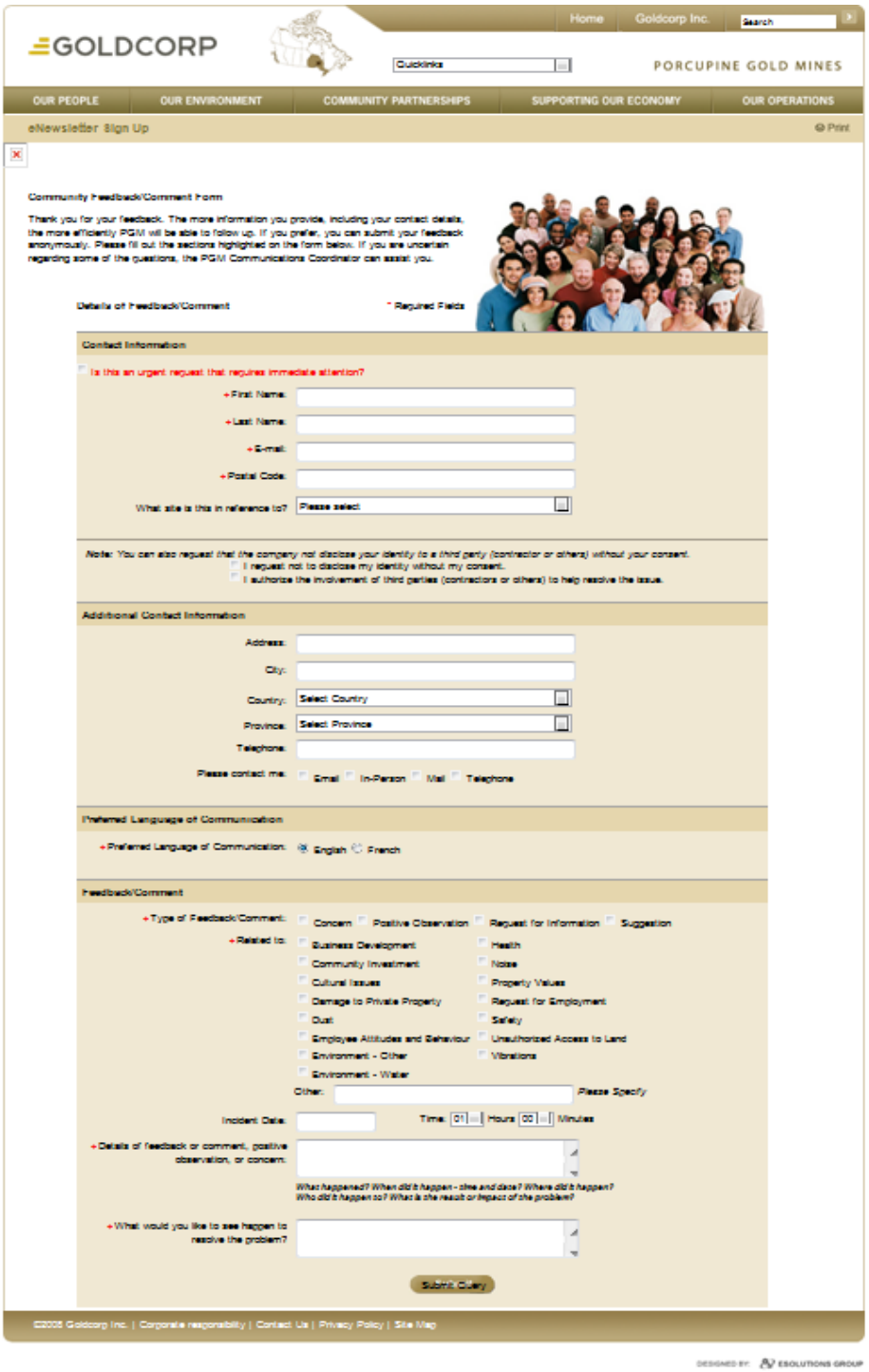
| | |
|---|---|
| Day | Sun / Mon / Tues / Wed / Thurs / Fri / Sat |
| Date | / / |
| Planned Blast Time | am pm |
| Pattern Number | |
| Time of Assessment | |

**Section C - Supervisor 2 hours prior to blast**

| | | |
|---|---|---|
| 6. Wind direction at the time of assessment? | | |
| 7. Wind Speed at the time of assessment? | | km/h |
| 8. Is the wind blowing towards the municipal or residential area? | Yes | No |
| 9. Current Cloud Cover | | |
| 10. Ceiling height | | ft |
| 11. Is it necessary to blast today? | Yes | No |

# Form 2

# Feedback / Comment Form




https://feedback.porcupinegoldmines.ca/en/feedback/detail.aspx

# Appendix C
# Training Programs

# Best Management Plan Training Programs

Training is provided to environmental personnel, dispatchers and dispatch coordinator, pit supervision, community liaison coordinator and designated Corporate Social Responsibility (CSR) personnel, pit equipment operators and engineering / geological personnel and pit maintenance employees. This training program describes their duties and responsibilities with respect to the Best Management Plan. Records and sign offs for training received is maintained and available for review. Elements relating to each area of responsibility are listed below:

**Environmental Personnel**

- Community Feedback Protocol;
- Use of monitoring systems including noise, dust, vibration and weather conditions;
- Protocol for responding to monitoring triggers or community feedback;
- Trigger or community feedback investigation procedure;
- Documentation of monitoring triggers or community feedback;
- Mitigation methods for noise and dust;
- Documentation of mitigation method employed;
- Government reporting requirements;
- Completion of reporting documentation.

**Dispatchers**

- Community Feedback Protocol;
- Use of monitoring systems including noise, dust, vibration and weather conditions;
- Protocol for responding to monitoring triggers or community feedback;
- Trigger or community feedback investigation procedure;
- Documentation of monitoring triggers or community feedback;
- Mitigation methods for noise and dust;
- Documentation of mitigation method employed.

**Pit Supervision**

- Community Feedback Protocol;
- Identifying and reporting areas/sources of potentially high noise and dust levels in pit;
- Use of monitoring systems including noise, dust, vibration and weather conditions;
- Protocol for responding to monitoring triggers or community feedback;
- Trigger or community feedback investigation procedure;
- Mitigation methods for noise and dust and vibration;
- Protocol for following up and documenting result of investigation and mitigation actions.

**Community Liaison Coordinator and Designated CSR Personnel**

- Community Feedback Protocol;
- Use of monitoring systems including noise, dust, vibration and weather conditions;

- Protocol for responding to monitoring triggers or community feedback;
- Trigger or community feedback investigation procedure;
- Documentation of monitoring triggers or community feedback;
- Mitigation methods for noise and dust;
- Documentation of mitigation method employed;
- Follow up to feedback/complaints from community.

**Pit Equipment Operators and Engineering / Geological Personnel**

- Community Feedback Protocol;
- Identifying and reporting areas/sources of potentially high noise and dust levels in pit;
- Completion of pre checks on equipment, reporting deficiencies that may result in high noise levels and taking equipment out of service as required;
- Function of monitoring systems including noise, dust, vibration and weather conditions;
- Protocol for responding to monitoring triggers or community feedback;
- Trigger or community feedback investigation procedure;
- Mitigation methods for noise and dust.

**Pit Maintenance Personnel**

- Community Feedback Protocol;
- Identifying and reporting areas/sources of potentially high noise and dust levels in pit;
- Completion of Preventive Maintenance on equipment, repairing deficiencies that may result in high noise levels and taking equipment out of service as required;
- Maintaining records of equipment maintenance;
- Function of monitoring systems including noise, dust, vibration and weather conditions;
- Protocol for responding to monitoring triggers or community feedback;
- Trigger or community feedback investigation procedure;
- Mitigation methods for noise and dust.