REPORT

Best Management Practices Plan for the Control of Fugitive Dust at Aberfoyle South Pit Expansion

CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada)

Submitted to:

CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada)

7366 McLean Road, R.R. #22
Cambridge, ON N3C 2V4

Submitted by:

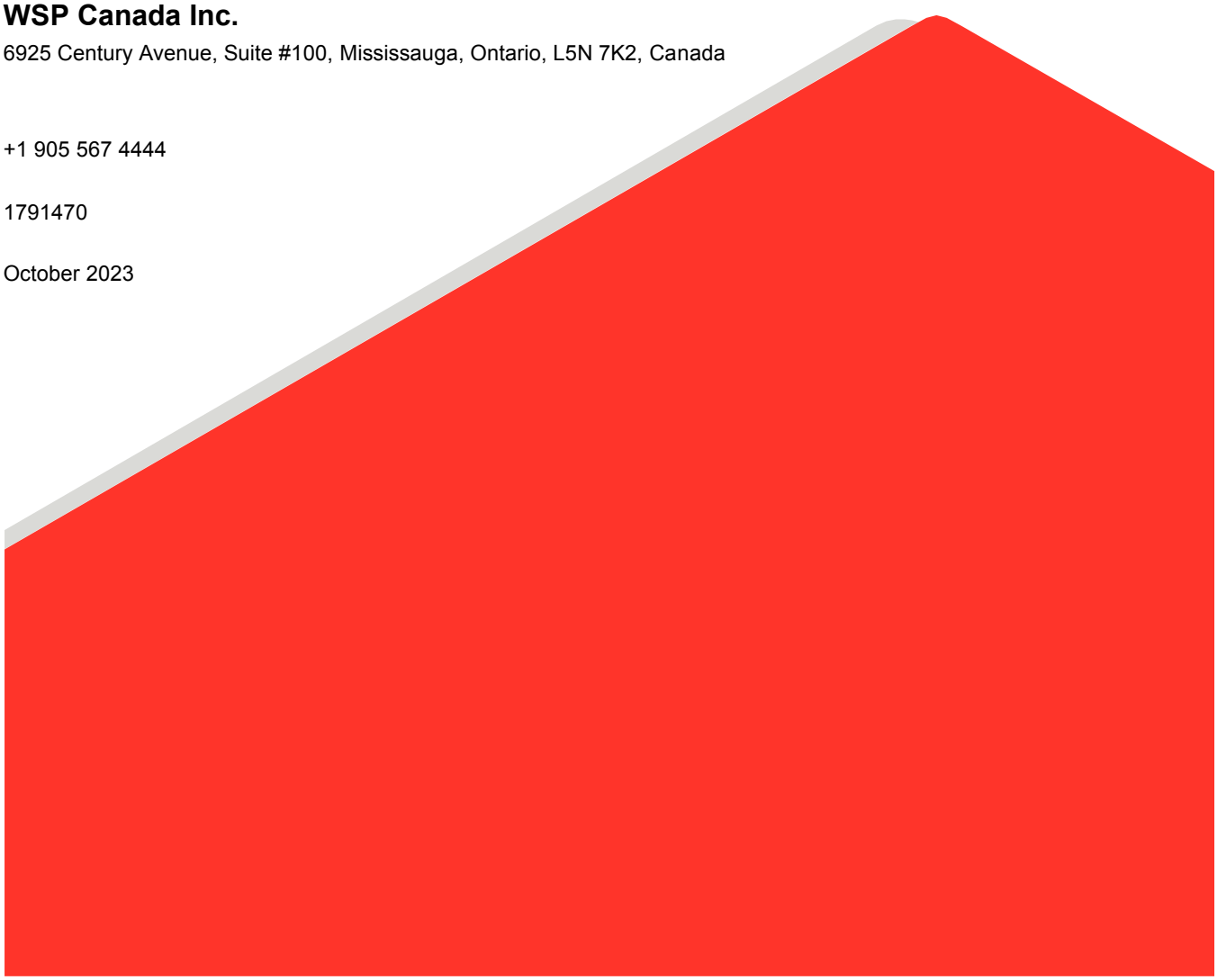
WSP Canada Inc.

6925 Century Avenue, Suite #100, Mississauga, Ontario, L5N 7K2, Canada

+1 905 567 4444

1791470

October 2023



FOREWORD

This Best Management Practices Plan (BMPP) documents the control of fugitive dust at the CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada) Aberfoyle South Pit Expansion located at 6947 Concession Road 2, Puslinch, Ontario (the Site), and has been prepared in accordance with Ontario Ministry of Environment, Conservation and Parks (MECP) Technical Bulletin - Management Approaches for Industrial Fugitive Dust Sources (February, 2017).

As operations change and new fugitive dust sources are added to the Site, this Plan will be updated as required. In order to maintain version control all pages in the Plan have been dated and documented with a version number. The version number will change if the entire report is reissued; if individual pages are provided to update small portions of the Plan then they will be issued with a subversion number and the updated pages will be listed on the following Version Control Page.

VERSION CONTROL

This Fugitive Dust Best Management Practices Plan (BMPP) has been prepared for CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada) to manage fugitive dust associated with the Aberfoyle South Pit Expansion. The BMPP should be reviewed periodically and updated if required. Therefore, it is necessary to have appropriate version control. This version control will allow facility personnel and compliance auditors to track and monitor changes to the BMPP over time.

Version	Date	Description of Changes	Updated Pages	Approved By
1.0	October 2023	Original document to support the proposed Aberfoyle South Pit Expansion under the Aggregate Resources Act	N/A	David Hanratty

Distribution List

PDF - CBM Aggregates

PDF - WSP Canada Inc.

Table of Contents

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

The purpose of this Plan is to document the Best Management Practices (BMPs) for the control of fugitive dust emissions from the activities taking place at the CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada) Aberfoyle South Pit Expansion located at 6947 Concession Road 2, Puslinch, Ontario (the Site), and to outline the decision making process that was used to develop these BMPs. This Plan was prepared in accordance with Ontario Ministry of Environment, Conservation and Parks (MECP) Technical Bulletin – Management Approaches for Industrial Fugitive Dust Sources (February 2017).

This Plan:

- identifies the main sources of fugitive dust emissions;
- identifies potential causes for high dust emissions and opacity resulting from these sources;
- outlines preventative and control measures in place or under development to minimize the likelihood of high dust emissions and opacity from the sources of fugitive dust emissions;
- provides an implementation schedule for the Plan, including training of Site personnel; and
- identifies inspection and maintenance procedures and monitoring initiatives to ensure effective implementation of the preventative and control measures.

The Plan follows the following structure:

- Section 2.0 provides a brief description of the proposed Site.
- Section 3.0 outlines the responsibilities held by the different employment levels at the Site.
- Section 4.0 documents the BMPs that are proposed to be put in place at the Site and the decision-making process used to develop these BMPs. This section follows the Plan, Do, Check, and Act (PDCA) cycle according to ISO guidelines.
  - The “Plan” section includes identification and characterization of the emission sources and existing BMPs at the Site.
  - The “Do” section includes a schedule for implementation of the proposed improvements.
  - The “Check” section includes a description of monitoring procedures and a recordkeeping system.
  - The “Act” section includes guidelines for periodic review of the BMPs in order to promote its continuous improvement.

2.0 SITE DESCRIPTION

Table 1 outlines the general Site information that is relevant to this Plan. Figure 1 shows the site layout, receptors and wind rose showing the predominant wind direction for the area.

Table 1: Site Description

Site	Aberfoyle South Pit Expansion
Location	6947 Concession Road 2, Puslinch, Ontario
Licence Area	44.8 hectares
Main Activities	Aggregate Pit – Dragline operation. Material extracted from above the water table is hauled off-site for processing (loaders, haul trucks) Material extracted from below the water table may be windrowed temporarily before being hauled off-site for processing (loaders, stockpiles, haul trucks)
Nearest Sensitive Receptors (Distance/Direction)	Closest Residential dwelling is approximately 20 m North (Receptor 1 on Figure 1). Additional residential dwellings within 300 m indicated on Figure 1
Predominant Wind Direction	W (Figure 1 inset)

3.0 RESPONSIBILITIES

The following identifies the responsibilities held by each of the employment levels at the Site as they pertain to this Plan.

3.1 Senior Management Representative

The Senior Management Representative, or designate, is responsible for:

- reviewing the effectiveness of the current dust control measures at the Site;
- ensuring the training of site personnel and contractors on the Plan and the best management practices to be implemented; and
- ensuring the required resources are in place to execute the Plan.

3.2 Operations Supervisor Representative

The Operations Supervisor Site Representative, or designate, is responsible for:

- reviewing the effectiveness of the current dust control measures at the Site;
- scheduling and coordinating the implementation of fugitive dust control measures; and
- maintaining documentation of schedules and logs.

3.3 Site Personnel and Contractors

All Site Personnel and Contractors are responsible for:

- reviewing the effectiveness of the current dust control measures at the Site; and
- following the dust control procedures that are currently in place.

4.0 FUGITIVE DUST EMISSIONS BEST MANAGEMENT PRACTICES PLAN

This section describes the fugitive dust control measures that will be implemented at the Site and the decision making process that has been used in the BMP development for the Site. This section follows the PDCA cycle according to the ISO guideline as follows:

- **Section 4.1 PLAN** - identifies and characterizes the emission sources and BMPs at the Site.
- **Section 4.2 DO** - documents the schedule for implementation of the proposed improvements.
- **Section 4.3 CHECK** - describes the monitoring procedures and a recordkeeping system.
- **Section 4.4 ACT** - describes the BMP review and update procedures in order to promote its continuous improvement.

4.1 PLAN – Identification and Characterization of Fugitive Dust Emission Sources

4.1.1 Identification of Fugitive Dust Emission Sources

Fugitive dust emissions are a result of mechanical disturbances of granular materials exposed to the air. Dust generated from these open sources is termed “fugitive” because it is not discharged to the atmosphere in a confined flow stream, such as emissions from an exhaust pipe or a stack (USEPA, 1995).

The mechanical disturbance may result from equipment movement, the wind, or both. Therefore, some fugitive dust emissions occur and/or intensified by equipment use, while others (i.e., wind erosion emissions) are independent of equipment used.

The main factors affecting the amount of fugitive dust emitted from a source include characteristics of the granular material being disturbed (i.e., particulate size distribution, density and moisture) and intensity and frequency of the mechanical disturbance (i.e., wind conditions and/or equipment use conditions). Precipitation and evaporation conditions can affect the moisture of the granular material being disturbed and, therefore, have an indirect effect on the amount of fugitive dust emitted.

Once dust is emitted, its travelling distance from the source is affected by climatic conditions, specifically wind speed, wind direction, and precipitation and particle size distribution. Higher wind speeds increase the distance travelled while precipitation can accelerate its deposition. Finer particulates can travel further before settling and, therefore, deserve increased attention.

Table 2 provides a list of the main sources of fugitive dust emissions at the Site.

Table 2: Sources of Fugitive Dust Emissions at the Site

Source Category	Activity/Source Location	Potential Causes for High Emissions and Opacity from Each Source	
		Parameters	Conditions
Unpaved Roadways	Vehicle traffic on unpaved roadways	number of vehicles weight of vehicles silt content wind speed moisture content	large heavy high high dry
Material Storage	Stockpiling soil and overburden for use in rehabilitation and/or overburden stockpile	moisture content silt content on the stockpile surface material size wind speed	 dry high fine high
Material Storage	Windrows for material extracted below the water table	moisture content silt content on the windrow surface material size wind speed	dry high fine high
Material Handling	Material extraction	moisture content material size material transfer rate wind speed	dry fine high high
	Loading and unloading materials		

4.1.2 Fugitive Dust Best Management Practices

Control measures to reduce fugitive dust emissions should take into account the sources of the dust emission, the dispersion conditions and the location of sensitive areas. Control measures are in place to minimize one or more factors leading to the generation and/or dispersion of fugitive dust emissions. These control measures can be classified as follows:

- **Preventative Procedure**: Measure pertaining to the design and installation of structures and the operating procedures which are implemented on a regular basis in order to prevent the generation of dust and/or the dispersion of dust emitted reaching sensitive areas.
- **Reactive Control Measures**: Measures which are implemented in the event of unexpected circumstances which can lead to the generation of dust and/or the dispersion of dust emitted reaching sensitive areas.

Table 3 lists preventative procedures and reactive control measure for fugitive dust emissions that are associated with the Site.

Table 3: Preventative Procedures and Control Measures for Fugitive Dust Emissions at the Site

Emission Source	BMPs		Description	Frequency
Unpaved Roadways	Preventative Procedure	Internal Road Maintenance	Ensure surface materials are smooth, reapply gravel to reduce silt content	As Needed
		Positioning/ Design of Internal Routes	Plan internal haul routes to maintain the shortest haul distances possible	Continual
		Speed Controls	Limit vehicle speed to 25 km/hr	Continual
	Reactive Control Measure	Watering and/or Calcium Application	Water and/or calcium will be applied as a dust suppressant during non-freezing conditions	At least 1 litre/m² after 24 hours of dryness
Paved Roadways	Preventative Procedure	Site Entrance Maintenance	Maintain a clean site entrance through sweeping and/or watering to reduce vehicle track-out of material	Continual/As Needed
Material Storage	Preventative Procedure	Windrow Placement	Locate windrows in designated areas, away from the northern and eastern property boundaries and maintain as low a windrow height as practical. They should also be placed to minimize haul distance.	Continual
		Reduce Storage time	Where practical, minimize the length of time material is stored on site to maintain high moisture content of stored material	Continual
		Vegetation of overburden	Vegetation of overburden piles/berms upon finalization of placement and shaping	Continual
Material Handling	Preventative Procedure	Maintain Minimum Drop Height	Material will be dropped from the shortest possible distance If material is on the ground, it will be pushed up with a loader to prevent the material from being tracked	Continual
	Reactive Control Measure	Reduced Activity	Material handling activities will be reduced during high wind conditions, when wind gusts exceed 40 km/hr, or when in close proximity to sensitive receptors and/or property line	During high wind or close proximity to receptors

The Centre for Excellence in Mining Innovation (CEMI) prepared a fugitive dust guidance document in 2010, which includes a risk management tool to assess if BMPs in place at a site adequately manage the risk associated with each source. Each fugitive dust source at the Site was assessed using this tool. See Appendix A for the risk factors used in the ranking process. Table 4 identifies the fugitive dust sources with their respective relative risk score for the Site.

Hours of operation will be restricted during any period in which a wind warning for the area has been issued by Environment and Climate Change Canada and during any time where weather, traffic and unusual events would compromise the ability of site alteration activities to be conducted in a safe and environmentally sound manner with due consideration of the public.

Table 4: Fugitive Dust Sources and Associated Relative Risk Scores

Source	Source Description	BMP (if any)	Relative Risk Score	Relative Risk Level
Unpaved Roads	Vehicle traffic on unpaved roadways	Road maintenance, Site entrance maintenance, speed controls and watering/calcium application	44	Low
Material Storage	Windrows	Windrow placement, reduced storage time, vegetation of overburden	11	Low
Material Handling	Material extraction Loading and unloading material	Maintaining minimal drop heights	77	Low

There are no sources that are considered to be “high” risk after the implementation of the BMPs, therefore it is reasonable to assume that having the BMPs in place will adequately manage the risk associated with each fugitive dust source.

4.2 DO – Implementation Schedule for the BMP Plan

All of the BMPs listed in Table 3 will be implemented at the Site.

All dust generating work performed at the Site, whether it is completed by CBM, or under contractual agreements, will conform to the requirements of this Plan.

Table 5 presents the process for implementing the BMPs for control of fugitive dust for any new emission sources at the Site as well as the corresponding start-up checklist that is to be completed. When new emission sources are added at the Site, they will be managed under the existing BMPs. Appendix B includes start-up checklists which are to be completed as new sources of fugitive dust are added i.e. new stockpiles or unpaved roads. The purpose of the checklists is to ensure that any new emission source will be managed following the same dust control procedures as the current sources at the Site and/or that new BMPs will be developed to adequately manage those sources.

Table 5: Implementation Process for New Emission Sources

New Emission Source	Examples	Start-up Checklists (Appendix B)
Unpaved roadways	New stretch of unpaved roadway	Unpaved Roadway Start-up Checklist
Material handling/storage	New loading/unloading procedures, new transfer point, new storage pile location	Material Handling/Storage Start-up Checklist

4.2.1 Training

All site personnel and contractors are to receive training on the requirements of this Plan. Dust BMP implementation will be incorporated into the Site training that is required prior to working on the property. These training records will be kept on site with all other training records.

4.3 CHECK – Inspection, Maintenance and Documentation

An inspection of the conformity with the BMPs will be documented monthly using the Dust Control Inspection Form (see Appendix C for an example form). A watering log has been included to record dust control activity pertaining to the unpaved road sources.

In the event of identifying a potential for dust generation, the inspector will add the incident to the Dust Generation Log (Appendix E). Corrective action is to be taken to eliminate the potential(s) for fugitive dust generation. It is expected that all deficiencies identified in inspections be addressed immediately. Reviews of the Dust Generation Logs will be done as part of the annual Plan review, explained in more detail in Section 4.4.

Table 6 provides a summary of the inspections that take place at the site under this Plan and the inspection frequency.

Table 6: Inspection Frequency Summary

Inspection Type	Frequency	Inspection Personnel
Roadways (Unpaved)	As needed after periods of 24 hours of dryness and/or wind speeds greater than 20 km/hour	Site Supervisor
Material handling/ storage	As needed after periods of 24 hours of dryness and/or wind speeds greater than 20 km/hour	Site Supervisor

4.4 ACT – Plan Review and Continuous Improvement

The Plan will be reviewed annually and updated as required. Review of the Plan is intended to evaluate the effectiveness of the dust control practices and focus on the identification of improvement opportunities that can reduce the risk of complaints related to fugitive dust emissions. The following will be completed during the annual Plan review:

- review of Dust Generation Logs and updates to BMPs as required;

- review of Start-up Checklists and updates to Figure 1 as required;
- review of training records and schedule training as required; and
- review of staff responsibilities and update as required.

Inspections and monitoring procedures assist CBM personnel with the maintenance of an effective BMP Plan.

5.0 REFERENCES

Centre for Excellence in Mining Innovation (CEMI). 2010. Guide to the Preparation of a Best Management Practices Plan for the Control of Fugitive Dust for the Ontario Mining Section. Version 1.0, June 2010.

Ontario Ministry of the Environment, Conservation and Parks. 2017. Technical Bulletin: Management Approaches for Industrial Fugitive Dust Sources. February 2017.

Ontario Ministry of the Environment, Conservation and Parks. 2017. Procedure for Preparing an Emission Summary and Dispersion Modelling Report – Version 4.0. February 2017.

United States Environmental Protection Agency (USEPA). 1995. AP-42 – Compilation of Air Pollutant Emission Factors – Fifth Edition. January 1995.

Signature Page

WSP Canada Inc.

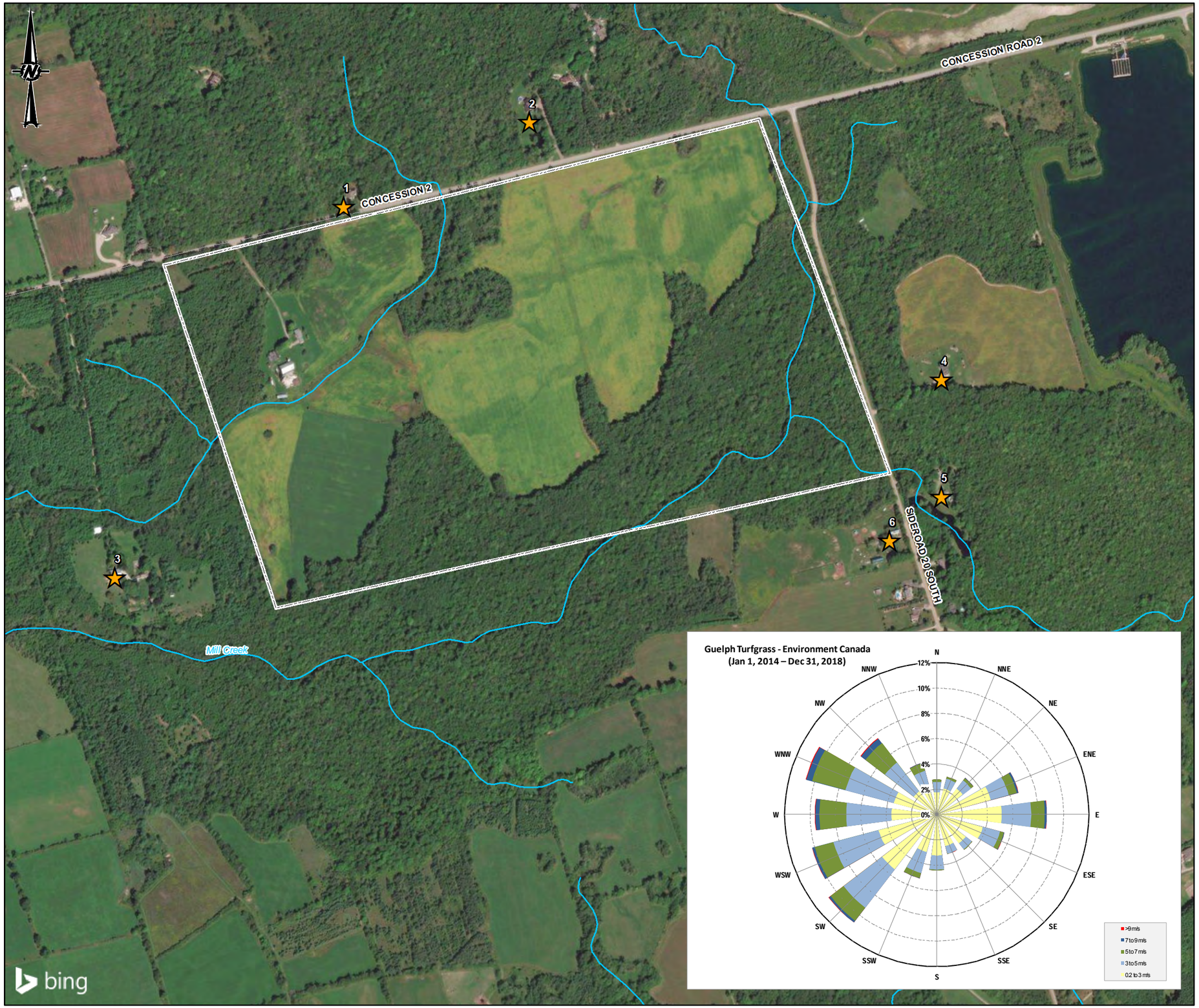
Bonnie Field, PEng
Air Quality Specialist

Katie Armstrong, MSc
Senior Air Quality Specialist

BF/KSA/mp

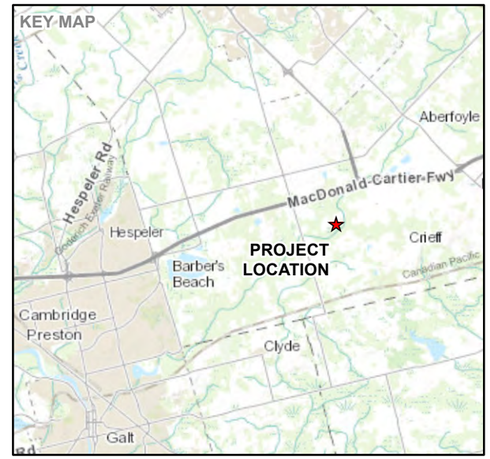
https://golderassociates.sharepoint.com/sites/21291g/deliverables/dust bmpp/final/1791470-r-rev0 cbm aberfoyle south pit expansion bmpp17oct2023.docx

FIGURES



LEGEND

- CLOSEST SENSITIVE RECEPTOR
- WATERCOURSE
- PROPERTY BOUNDARY



0 100 200 300 400

1:7,500 METRES

REFERENCE(S)

1. BASE DATA - MNRF LIO, 2018
PRODUCED BY GOLDER ASSOCIATES LTD UNDER LICENSE FROM
ONTARIO MINISTRY OF NATURAL RESOURCES AND FORESTRY, © QUEENS PRINTER 2018
2. IMAGERY - SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP, GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
© 2019 MICROSOFT CORPORATION © 2019 DIGITALGLOBE ©CNES (2019) DISTRIBUTION AIRBUS DS
3. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM:UTM ZONE 17

CLIENT
CBM AGGREGATES (CBM), A DIVISION OF ST. MARYS CEMENT INC. (CANADA)

PROJECT
FUGITIVE DUST BMPP, LAKE PIT

TITLE
SITE LOCATION PLAN AND WINDROSE

CONSULTANT

wsp

YYYY-MM-DD	2019-10-28
DESIGNED	PR
PREPARED	CGE
REVIEWED	KA
APPROVED	

PROJECT NO.	CONTROL	REV.	FIGURE
1791470	0001	1	1

APPENDIX A

Fugitive Risk Ranking

Fugitive Dust Risk Management Tool

Source	Path	Path	Source	Receptor	Path / Receptor	Path	Source	Source	Source	Source

Step 1 - Calculation of risks associated with fugitive dust sources

	Cells to be populated
	Drop-down menu
	Automatically

100	
75	
50	

			Risk Factors										
			1	2	3	4	5	6	7	8	9	10	11	Risk
Source ID Number	Description of the structure / equipment	Category	Frequency of process / activity that generates fugitive dust:	Position of the source related to sensitive areas (e.g.: communities, working areas):	Predominant wind direction is from the source to the closest sensitive area?	Relative amount of visible dust generated in the process / activity:	Dust composition	Dust size range (higher mass percentage)	Is there some wind barrier (e.g.: trees, buldings, landscape) which can prevent the emissions from this source to reach the closest sensitive area?	Is there some measure applied on regular basis to prevent dust emission from this source (preventative)?	Is there some measure applied to this source to reduce dust emission once it occur (reactive)?	Is there some monitoring procedure applied to this source related to fugitive dust control?	Monitoring data / information trigger some control measure?	Total Normal.
S_001	WCS - Worst Case Scenario	Process	Continuous	Close	Yes	High	Metals	Fine	No	No	No	No	No	100
S_002	Unpaved Roads	Unpaved road / area	Continuous	Close	Yes	Medium	No metals	Coarse	Yes	Yes	Yes	No	No	44
S_003	Material Storage	Material stockpile	Continuous	Medium	No	Low	No metals	Coarse	Yes	Yes	Yes	No	No	11
S_004	Material Handling and Excavation	Material transfer (drop operations)	Intermittent	Medium	No	Medium	No metals	Coarse	Yes	Yes	Yes	No	No	7

APPENDIX B

Start up Forms

Unpaved Roadways
Start-up Checklist

Roadway Characteristics	
Source ID:	
Location (note proximity to the property line):	
Length:	
Surface materials:	
Anticipated volume of vehicle traffic:	
Peak traffic time:	
Anticipated vehicle speed limit:	

Special Considerations for the Control of Dust Emissions

Implementation	Yes
Has this roadway been added to the water truck schedule?	
Has this roadway been added to the inspection protocol?	

Answering "Yes" to the implementation questions documents compliance with the Best Management Practice Plan for Control of Fugitive Dust Emissions.

Name of Plant Contact:		**Name of Supervisor:**	
Signature:		**Signature:**	
Date:		**Date:**	

Material Handling / Storage
Start-up Checklist

Unit Process Characteristics	
Source ID:	
Operation type:	
Location:	
Material being handled:	
Material handling rate:	
Peak handling time:	

Special Considerations for the Control of Dust Emissions

Implementation	Yes
Has the storgae pile been oriented with prevailings winds?	
Has the storage pile been oriented to reduce exposed surface area?	
Has the storage pile been placed to take advantage of natural wind breaks?	
Have material drop heights been discussed with the operators?	
Has this unit been added to the inspection logs?	

Answering "Yes" to the implementation questions documents compliance with the Best Management Practice Plan for Control of Fugitive Dust Emissions.

Name of Plant Contact:		**Name of Supervisor:**	
Signature:		**Signature:**	
Date:		**Date:**	

APPENDIX C

Dust Control Inspection Form

Dust Control Inspection Form

Date:

Inspector Name:

Monthly Inspection

Unpaved Roadways				
Please check all segments that were inspected: UPR ____				
If some segments were not inspected, pleased indicate below which segment and why it was not inspected.				
Inspection Items	**Response**	**Requirement**	**Conformance (Y or N)**	**Description of Non-Conformance**
Is visible dust observed from any section of roadway?		N		
Are appropriate load sizes maintained on haul vehicles?		Y		
Are roadways well maintained? (ie good housekeeping)		Y		
Has the watering log been maintained?		Y		
Has the non-conformance log been maintained?		Y		
Have previous non-conformances been rectified?		Y		

Monthly or Semi-Annual Inspection

Material Handling / Storage				
Please check all areas that were inspected: SS ____ COS ____				
If some areas were not inspected, pleased indicate below which area and why it was not inspected.				
Inspection Items	**Response**	**Requirement**	**Conformance (Y or N)**	**Description of Non-Conformance**
Is visible dust observed from any material handling location?		N		
Are low drop heights maintained?		Y		
Are material handling locations well maintained? (ie good housekeeping)		Y		
Has the activity log been maintained?		Y		
Has the non-conformance log been maintained?		Y		
Have previous non-conformances been rectified?		Y		

All non-conformances must be documented in the Non-Conformance Log

Inspector Sign Off: _____

APPENDIX D

Dust Control Activity Log

Unpaved Roads
Watering Log

Section of Roadway (Source ID)	Date	Description of Watering (Equipment used, amount of water applied)	Start Time	End Time	Operator Name & Company	Company Sign Off

Material Handling / Storage
Dust Control Activity Log

Material Handling / Storage Area (Source ID)	Date	Description of Activity	Start Time	End Time	Operator Name & Company	Company Sign Off

APPENDIX E

Non-Conformance Log

Dust Generation Log

Date	Time	Inspector Name	Potential or Actual Dust Generation Log		Cause	Action	Recommendation	Corrective Action Sign Off
			Location / Source ID	Activity / Process / Condition				

wsp.com