ADBRI
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Interim Dust Management Plan

Sellicks Hill Quarry

Version 1.17

13 January 2025

Record of Issue

Company	Site Contact	Version	Date Issued	Method of Delivery/ Comment
Southern Quarries	M Close	1.00	17/06/16	Email
Southern Quarries	M Close	1.01	29/06/16	Email
Southern Quarries	M Close	1.02	22/09/16	Email
Southern Quarries	M Close	1.03	30/06/17	Email
Southern Quarries	M Close	1.04	26/07/18	Email
Southern Quarries	M Close	1.05	29/08/18	Email
Southern Quarries	M Close	1.06	5/03/19	Email
Southern Quarries	M Close	1.07	22/10/19	Email
Southern Quarries	M Close	1.08	05/12/19	Email
Southern Quarries	M Close	1.09	04/09/2020	Email
Southern Quarries	M Close	1.10	10/09/2020	Email
Southern Quarries	R Low	1.11	28/01/2022	Email
Southern Quarries	R Low	1.12	22/02/2022	Email
Southern Quarries	R Low	1.13	5/10/2022	Email
Southern Quarries	R Low	1.14	28/11/2023	Email
Adbri Quarries	A Schutz	1.15	1/11/2024	Issued as Interim Plan
Adbri Quarries	A Schutz	1.16	20/12/2024	Update in response to EPA comments
Adbri Quarries	A Schutz	1.17	13/01/2025	Minor update in response to EPA comments

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List of Abbreviations

µm	micrometres (microns)
µg/m^3	micrograms per cubic metre
Air EPP	*Environment Protection (Air Quality) Policy* 2016
Air NEPM	*National Environment Protection (Ambient Air Quality) Measure*, as amended 2021
DDG	dust deposition gauge
DEM	Department for Energy and Mining
DMP	Dust Management Plan
EP Act	*Environment Protection Act* 1993
EPA	Environment Protection Authority
g/m^2/month	grams per square metre per month
ha	hectare
HME	Heavy mining equipment
km	kilometre
m	metres
mm	millimetre
MOP	Mine Operation Plan
NSW	New South Wales
OM	Adbri Operational Management
PEPR	Program for environmental protection and rehabilitation
PM	particulate matter
$PM_{2.5}$	particulate matter less than 2.5 µm in aerodynamic diameter
PM_{10}	particulate matter less than 10 µm in aerodynamic diameter
QM	Sellicks Hill Quarry Manager
RCS	respirable crystalline silica
SC	subcontractors
SP	site personnel
t	tonne
TARP	Trigger Action Response Plan
TSP	total suspended particulate matter
VKT	vehicle kilometres travelled

1 Introduction

Adbri Concrete and Quarries SA Pty Ltd (Adbri) operates the Sellicks Hill Quarry, an active limestone quarry located on Main South Road, Sellicks Hill, South Australia.

Products generated on-site include:

- A large number of aggregate classes ranging from 3 millimetres (mm) in size up to 10 tonne (t) rocks that are used in engineering projects
- Three classes of road bases
- Sand in a variety of sizes and gradings
- Agricultural soil conditioner

In recent years, Adbri has invested in improving its sustainability, focusing on better water use, reducing carbon footprints in processes, operations and facilities, and trialling products to decrease the likelihood of generating dust.

With an ongoing commitment to improving sustainability on-site and for the broader community, this Dust Management Plan (DMP) outlines the management measures and considerations that are to be implemented during operations at Sellicks Hill Quarry, aimed at improving air amenity in the community.

1.1 Background

Adbri is required under Licence Condition 1.1 - Dust Management Plan (U-390), to develop, implement and comply with an Environment Protection Authority (EPA) approved DMP. Furthermore, Licence Condition 1.1.4 includes '…*to require the licensee to revise the DMP to the satisfaction of the EPA and comply with the revised DMP*'.

A revised DMP was submitted to EPA for review in November 2023. The EPA reviewed the revised DMP in consultation with the Department for Energy and Mining (DEM), and on 29 May 2024, provided Adbri with a list of comments to be addressed and requesting that an updated revision of the DMP be submitted. In providing its comments on the revised DMP, EPA noted that Adbri is required to:

- Demonstrate all committed dust controls in the DMP are able to be conducted effectively.
- Identify the main dust contributors for the potential off-site impact and propose additional dust management measures in an Action Plan including reasonable implementation dates.
- Demonstrate the committed Community Engagement Plan is undertaken effectively with the local community.
- Assess/interpret the PM10, wind speed, and wind direction data collected by the air quality monitors on a regular basis especially during summer months (e.g. least monthly), and use the data analysis to inform on-going dust management.
- Ensure all dust monitors are operational and maintained on a regular basis so gaps in the data (short or long term) do not occur, noting the specific requirements of the DMP for valid data collection.

It was agreed with EPA that the DMP would undergo a comprehensive review to address the issues raised by EPA and DEM, which would be performed in two stages:

- An Interim DMP (this document) would be prepared and submitted to EPA by early November 2024 addressing the following requests for further information:
    - Include a list of dust suppression equipment
    - Include first draft of a Dust Management Strategy, with inclusion of current actionable upgrades and timelines for future actions
    - Include a separate Mitigation Measure Action Plan for shortlisted items for current action, including start and completion dates

  - Include the wheel wash related upgrades and other plant upgrades (to address drag-out) under consideration in the dust management strategy/action plan
  - Reformat the dust management actions into a revised Trigger Action Response Plan (TARP) structure, capturing current actions including blasting-related TARP actions
  - Include exceptions/safety overrides to any TARP actions
  - Update the trigger level for particulate matter less than 10 microns (µm) (PM_{10}) to 40 micrograms per cubic metre (µg/m^3)
  - Revise the TARP structure to consider seasonal requirements
  - Address actions for after-hours/weekends
  - Update the monitoring sites figure
  - Include a map of locations of dust suppression equipment
  - Include item on community engagement and refer to separate plan
  - Specify the frequency of the DMP review.
- A **Revised DMP** would then be submitted in early April 2025 following the completion of a dust emissions estimation and modelling study being completed for the quarry, which would include:
  - An evaluation of the predicted off-site dust impacts (including source apportionment) given by the dust study/modelling
  - Wind speed triggers based on the dust emission study findings
  - Consideration of risks and mitigation requirements in relation to respirable crystalline silica (RCS) based on the dust emission modelling study findings
  - An updated Dust Management Strategy and Mitigation Measure Action Plan
  - Additional guidance and clarity on acceptable/excessive dust plumes from key dust sources (e.g. photographs etc) and associated operational actions that may be taken to reduce emissions
  - An updated monitoring plan, including optimisation of monitoring site selection based on the dust emission modelling study findings, and additional details on reporting requirements.

1.2 Purpose of the Plan

As holder of the South Australian Environment Protection Authority (EPA) Licence No. 2052, Adbri is required to:

- Ensure environmental protection by implementing reasonable and practicable measures to reduce dust emissions.
- Manage the risks of environmental harm and supplement any measures already implemented.
- Demonstrate the use of reasonable and practicable management measures through a formal process.
- Ensure dust emissions from the premises are compliant with EPA legislation and best practice.

This Plan seeks to address the licence conditions and prevent environmental harm through formally addressing risks from the operations at Sellicks Hill Quarry and identifying subsequent management actions to reduce these risks.

2 Sellicks Hill Quarry

2.1 Site Location

Sellicks Hill Quarry is located within the Sellicks Hill Range in the City of Onkaparinga. The area is a semi-rural suburb of Adelaide, around 43 kilometres (km) south of Adelaide Airport (see **Figure 1**). The site is approximately 2.5 km southeast from the township of Sellicks Beach and 3 km southeast of Aldinga Beach, covering an area of approximately 261 hectares (ha).

2.2 Site Activities

2.2.1 Blasting

Sellicks Hill Limestone, Forktree Limestone and Heatherdale Shale are extracted from the open cut quarry through blasting. Blasting techniques were reviewed in 2018 by an independent consultancy that specialises in blast management. The consultancy specialises in quarry, construction and mine drilling and blasting technical support and conducts Nationally Accredited training, endorsed by SafeWork South Australia for the unit "*RIIBLA402D Monitor and control the effects of blasting on the environment*".

2.2.2 Material Handling and Processing Operations

There are currently three processing plants within the quarry, each with associated stockpiling areas:

- Main production plant for production of concrete and asphalt aggregates
- Plant 2 for production of road base
- Sand plant for production agricultural lime and sand

See **Appendix A** for production process flow diagrams for the main production plant and Plant 2. A concrete batching plant is on-site, as well as fuel storage and workshop facilities. These are identified in the facility layout (**Figure 1**). The concrete batching plant is also operated by AdBri, but as a separate entity, (licenced under EP Licence No. 1287) and is not part of the quarry operations.

Mobile quarrying equipment at the site is detailed in **Table 1**. This may change from time to time in size and total number of machines. Mobile crushing plant is also used within the quarry from time to time.

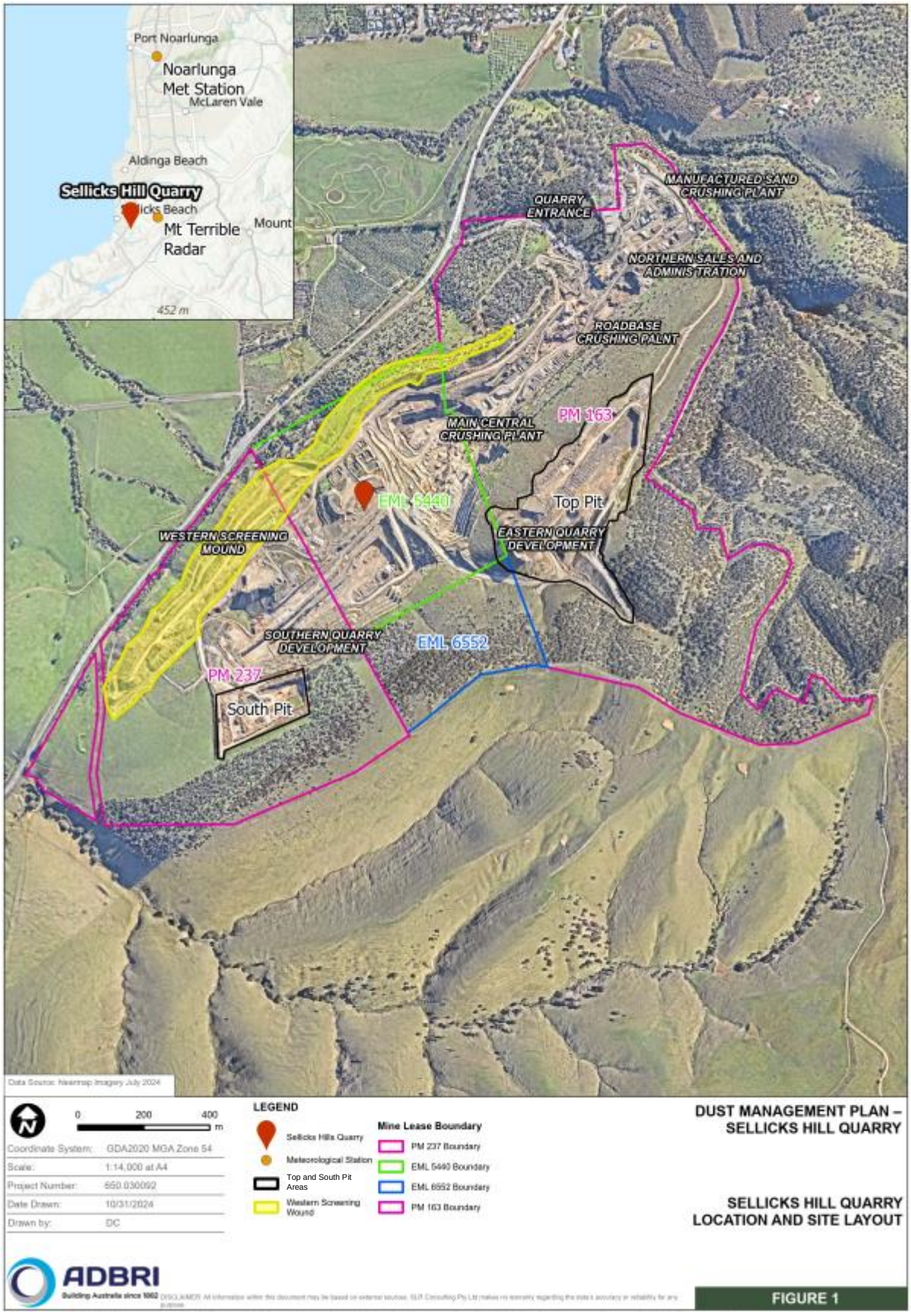
When contractors are used, they will bring their own plant and equipment to site.

Table 1 – Existing Mobile Quarrying Equipment at Sellicks Hill Quarry

Mobile Equipment	Unit Number(s)
Excavator (120 t)	1
Quarry truck (65 t)	4
Quarry truck (40 t)	2
Water cart	3
Front end loader (12 t)	2
Front end loader (6 t)	4
Grader	1
Skid Steer	1
Drill rigs (contractor)	3

Note: Mobile dust suppression equipment detailed in **Section 6.2** and **Table 6**.

Figure 1 – Sellicks Hill Quarry Location and Site Layout



2.2.3 Operating Hours

Sellicks Hill Quarry operates continuously (i.e. 24 hours/day) as approved by DEM under the Sites approved MOP.

The operating hours of the crushing plants are generally:

- Main plant 06:00 am to 04:00 am Monday to Friday (depending on demand)
- Plant #2 06:00 am to 04:00 pm Monday to Friday
- 06:00 am to 12:00 pm on Saturday, and in accordance with market needs.

These times do not include pre-start checks, maintenance of plant and equipment or development works, which vary due to demand.

Loading and distribution of materials can occur up to 24 hours per day.

2.2.4 Site Communications

Adbri inducts all employees that work on-site. There are also daily toolbox meetings held on-site for each shift.

Adbri onsite management discusses all aspects related to the operations of the quarry including, but not limited to, ensuring hazards are checked and identified risks and prevention controls are discussed and communicated with relevant employees on the site. This includes an assessment of forecast meteorological conditions to determine TARP conditions ahead of every shift and dust controls as required considering identified conditions.

2.3 Dust Emission Sources at Sellicks Hill Quarry

2.3.1 Particulate Matter Definitions

Dust emissions are made up of a combination of different particle size fractions. The size of the particle affects the potential health and amenity impacts, the dispersive properties of the dust plume, and also determines the selected management measures:

- $PM2_{.5}$:
    - Particulate of an aerodynamic diameter of less than 2.5 microns ($PM_{2.5}$) is typically associated with human health effects. These particles are small enough to deposit in the lower respiratory tract where they can then enter the bloodstream. There is sufficient evidence to suggest that acute and chronic exposure to $PM_{2.5}$ over long periods (years) can cause adverse health effects.
    - Air emissions from Sellicks Hill Quarry are dominated by mineral dust with particle sizes typically larger than $PM_{2.5}$. Therefore, particulate monitoring is focused on measurements of PM_{10} and TSP.
- PM10:
    - Particulate of an aerodynamic diameter of less than 10 microns (PM_{10}) is also typically associated with human health effects. These particles are termed thoracic particles, as they can be inhaled into the upper part of the airways and can penetrate down to the lungs. Further, if contaminated, these fine particles may pose a further health risk through absorption of the chemicals on the particles into the blood stream. Information obtained from the World Health Organisation (WHO) and the United States Environmental Protection Agency (USEPA) indicates that numerous scientific studies have linked particle pollution to a variety of health effects depending on chemical and physical properties.
    - PM_{10} includes $PM_{2.5}$ as well as respirable particulate that can deposit in the nose, throat and upper respiratory tract. Since air emissions from Sellicks Hill

Quarry are dominated by mineral dust, measurements of PM_{10} are used to assess potential human health effects related to particulate matter and to evaluate the effectiveness of dust management at the site (see **Section 8**).

- TSP:
    - Total suspended particulate matter (TSP) is defined as particulate matter with aerodynamic diameters less than 50 µm and includes $PM_{2.5}$ and PM_{10}. 'Dust' is typically defined as the difference between $PM_{2.5}$ and TSP, with particles larger than PM_{10} constituting nuisance dust that contributes to the soiling of exposed surfaces.

2.3.2 Respirable Crystalline Silica

Silica is silicon dioxide (SiO_2), a naturally occurring and widely abundant mineral that forms a major component of most rocks and soils. There are non-crystalline and crystalline forms of silicon dioxide. Mechanical processes such as crushing, cutting, drilling, grinding, sawing or polishing products containing silica can generate respirable particles (PM_{10}), small enough to penetrate deep into the lungs and can cause irreversible lung damage. Some of these compounds, referred to as respirable crystalline silica or RCS, can vary in composition and concentrations in emitted dust particles based on the composition of feed material and different mechanical processes of the industrial operation

2.3.3 Sources of Dust

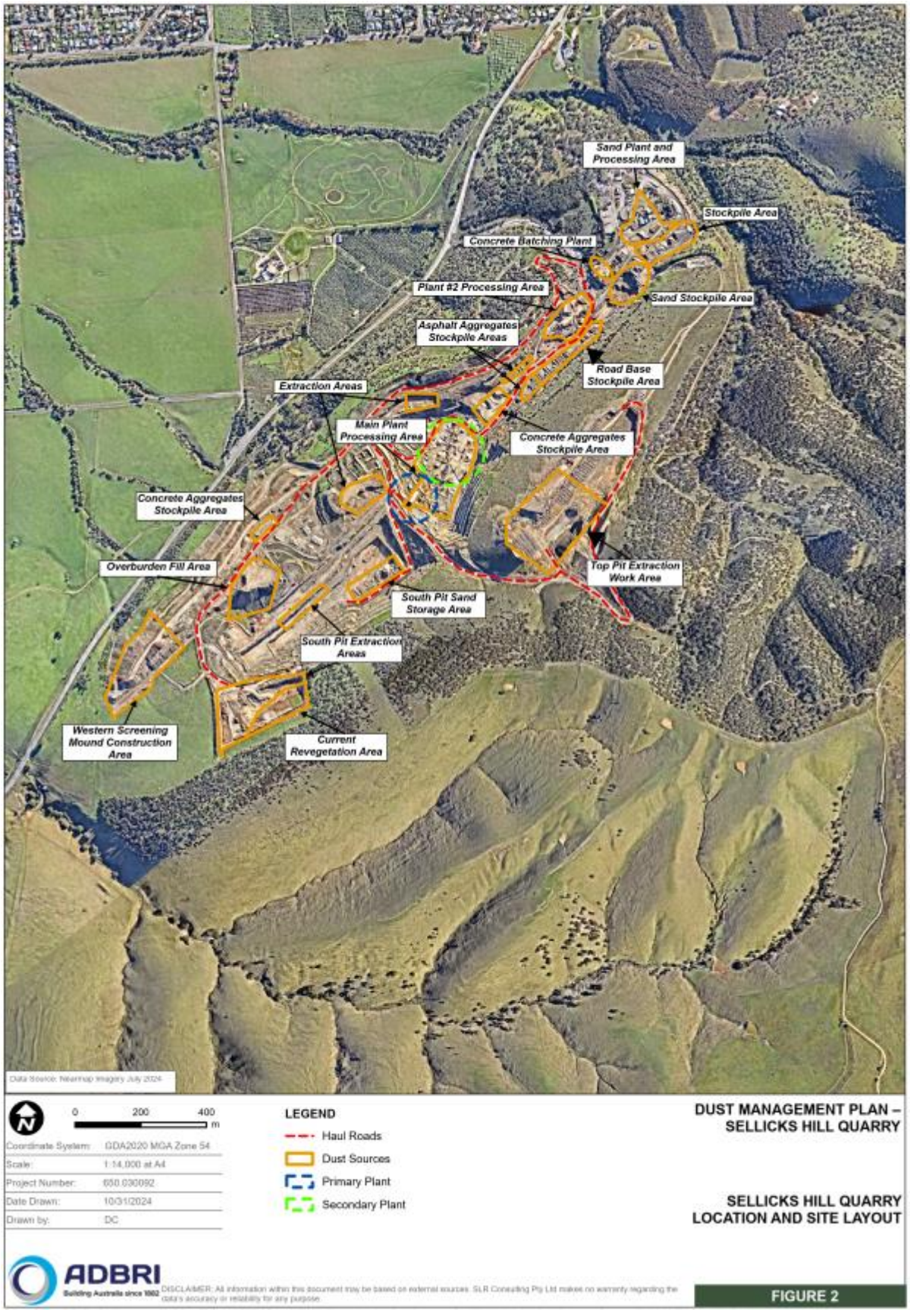
Sources of dust from the operations at the site include:

- Drilling and blasting
- Excavators
- Loading and unloading of material with HME
- Conveyors, transfer points and stacking conveyors
- Crushing and screening plants, including at start-up and shut-down
- Wheel generated dust from all vehicle movements
- Drag-out at quarry entrance
- Wind erosion, e.g. of fine material stockpiles, open areas, and the western screening mound.
- Access roads

There are also dust emissions from the concrete batching plant located onsite, which operate under a separate EPA licence from the quarry operations.

Figure 2 shows the locations of key potential dust sources at Sellicks Hill Quarry.

Figure 2 – Map of Key Dust Sources for Work Areas in 2024/2025 at Sellicks Hill Quarry



3 Receiving Environment

3.1 Local Topography

Sellicks Hill Range dominates the topography, reaching elevations of 360 metres (m). The range quickly drops in elevation to 120 m at South Road over a distance of 1.4 km. From there, the elevation gradually decreases to 50 m over a distance of 1.4 km to coastal cliffs and sandy beaches. The complex topography across the Mining Lease and its immediate surrounds means there is significant potential for localised wind flow patterns including gully winds, slope drainage flows etc, which will impact on the dispersion of dust from the quarry.

The quarry and mining tenements intersect a number of ephemeral creeks that have small but deep valley catchments.

The groundwater, approximately 80 m below the current quarry floor, is considered to be variable in quality and generally suitable for stock water. Sellicks Hill Quarry is unable to access groundwater from the Willunga Basin as it is prescribed under South Australia's *Landscape South Australia Act* 2019 (which superseded the *Natural Resources Management Act* 2004). As a result, the quarry had to rely upon mains potable water for dust suppression until recycled water infrastructure capital expenditure, including secondary dosing for health considerations was implemented in early 2020. Recycled water is currently utilised on site for dust suppression activities, reducing the reliance on potable water.

Topsoil varies considerably in depth from nil, where rock outcrops on the hills, to about 0.6 m depth on the creek banks. Vegetation has been historically cleared to enable grazing, with little significant vegetation remaining on-site (as reported in the MOP). Some revegetation plantings have occurred on the site, particularly on the screening 'amenity' mound that extends along the western boundary (see **Figure 1**).

3.2 Local Meteorology

Long-term temperature and rainfall information has been sourced from the Bureau of Meteorology (BoM) Noarlunga weather station, located 20 km to the north, as summarised in **Figure 3** and **Figure 4** respectively.

Warmer temperatures, low rainfall and higher wind speeds are experienced in summer months, whilst lower temperatures and high rainfall are experienced in the winter months.

Wind data for 2019-2023 recorded by the Mount Terrible weather station (radar), located 2.3 km to the east-northeast, are shown as wind roses in **Figure 5**. The circular format of the wind rose shows the direction the winds blew from and the length of each "spoke" around the circle shows how often the wind blew from that direction. The colour bands denote the wind speed category.

It is noted that the complex topography between and surrounding Sellicks Hill Quarry and the Mt Terrible Radar Station means that these wind roses may not be representative of conditions in all areas of the quarry. Meteorological modelling will be performed to investigate this further. Wind data collected at site as part of the dust monitoring program will also be considered and analysed for the meteorological modelling.

Figure 5 shows a strong seasonal pattern, with the summer months generally being windier with stronger gusts and south-southeast wind predominating (blowing towards the nearest sensitive receptors). During winter, winds are lighter and predominantly blow from the north-northwest (away from sensitive receptors). Spring and autumn are transition seasons, although strong winds from the southeast remain a significant feature.

Figure 3 – Monthly Temperature Trends – Noarlunga Weather Station

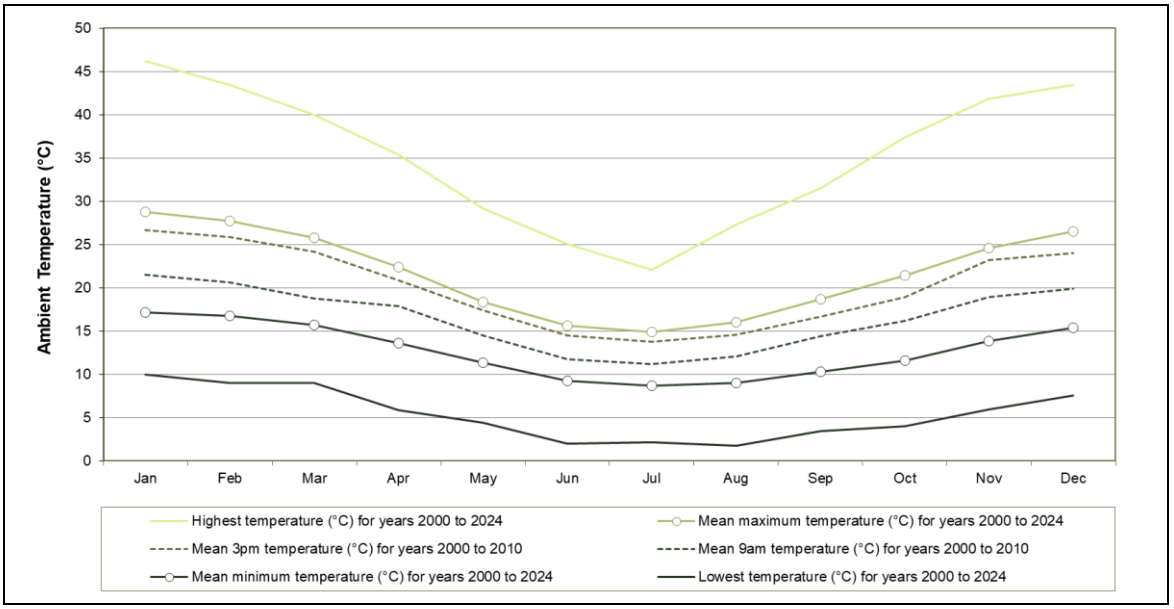


Figure 4 – Monthly Rainfall Trends – Noarlunga Weather Station

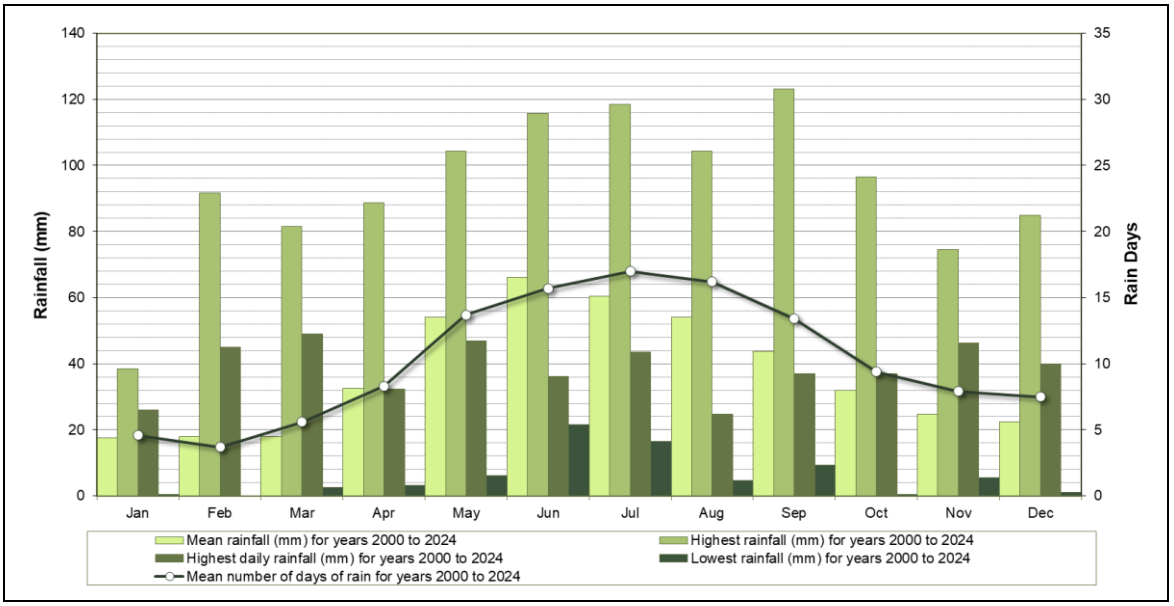
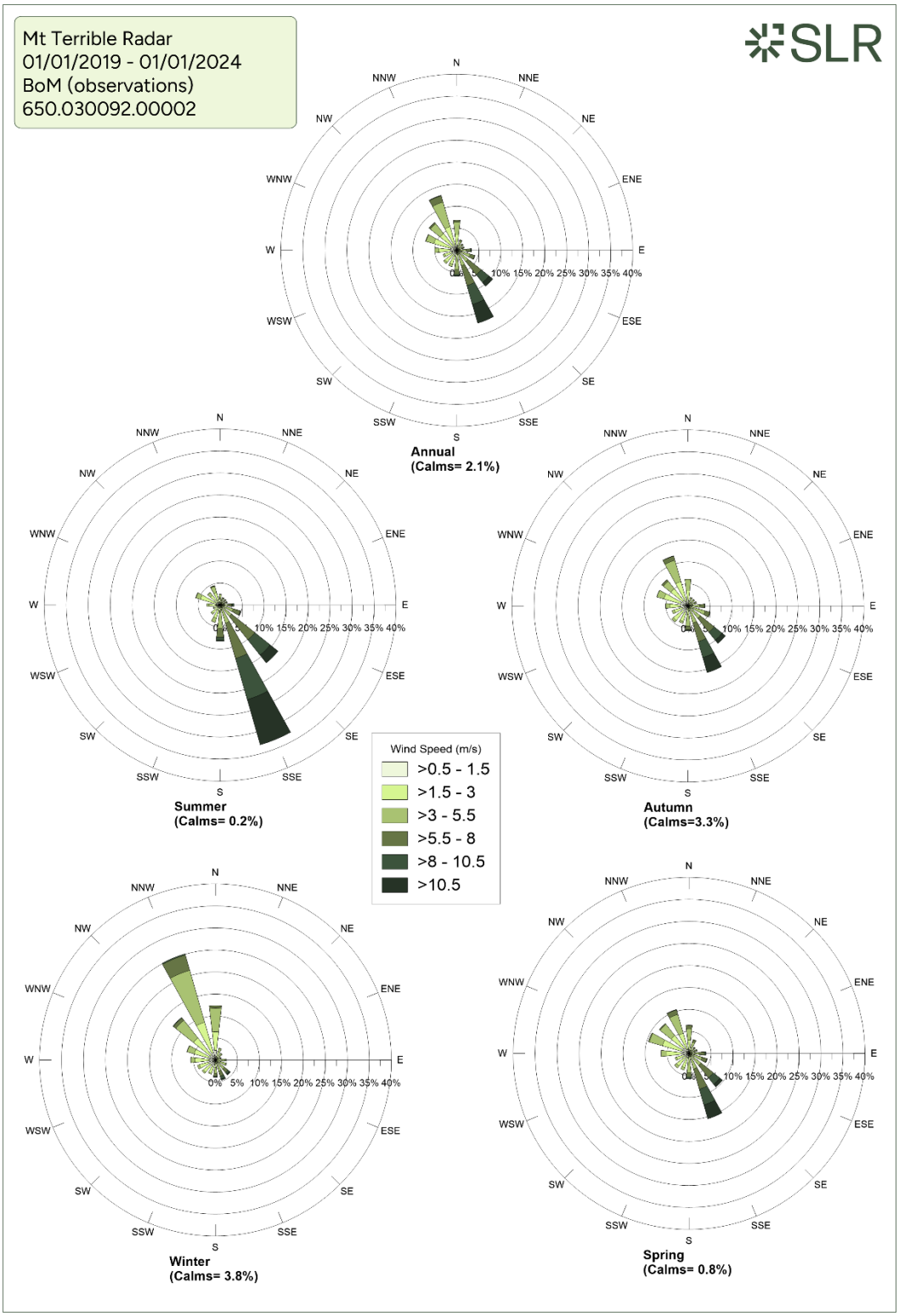


Figure 5 – Annual and Seasonal Wind Roses – Mt Terrible Radar Station



The above summary shows that during the summer months, when the potential for dust generation at Sellicks Hill Quarry is highest due to lower soil moisture contents and higher wind speeds, the predominant winds will blow any dust leaving the site towards the nearest sensitive receptors. Management of dust during summer is therefore a key priority.

3.3 Sensitive Receptors

Nearby existing residential receptors identified as potentially experiencing amenity impacts and nuisance dust include:

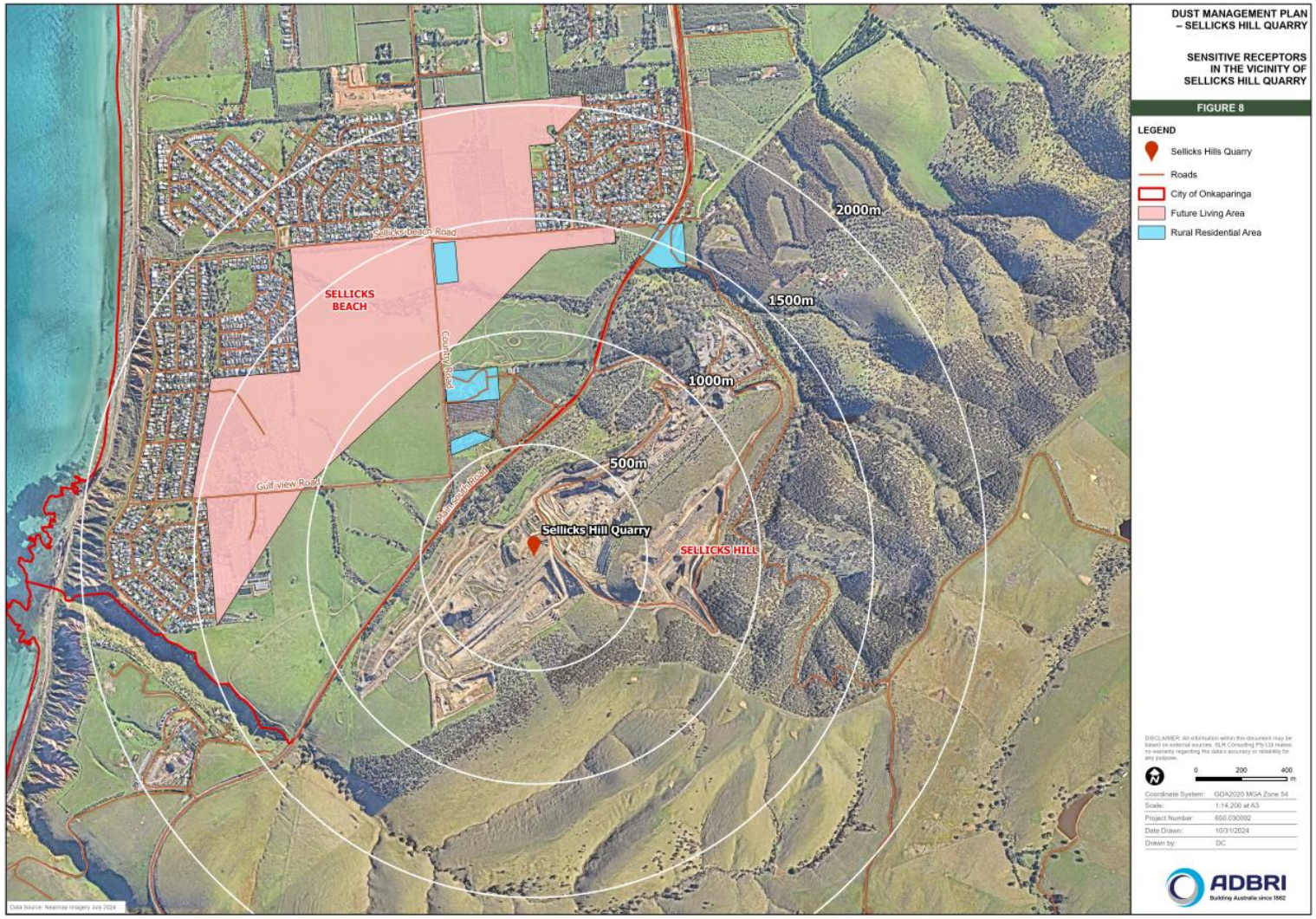
- Residents of Sellicks Beach, approximately 1 km to the west and northwest of the site.
- Residents of Sellicks Hill, approximately 500 m north of the northernmost trafficable area of the site.
- Two residences on Country Road, 400 m northwest of the site trafficable areas.
- Nan Hai Pu Tuo Temple, located 850 m southwest of the site.
- Rural residential developments to the west of Main South Road are potential receptors of deposited dust.

There is also a new residential development proposed for 1,700 homes to the east-southeast of the residential area currently at Sellicks Beach which would bring residential houses to the 500 m buffer zone from the edge of the current mining lease.

No other environmental receptors are considered to have the potential for harm by dust.

Figure 6 shows the locations of receptors at 500 m intervals from near of the crushing plant between the two active quarry pit areas.

Figure 6 – Sensitive Receptors in the Vicinity of Sellicks Hill Quarry



3.4 Background Air Quality

Sellicks Hill Quarry is the only significant potential industrial source of dust in the local area, with the nearest other quarry activity located approximately 10 km inland.

Other potentially significant sources of particulate matter in the area include:

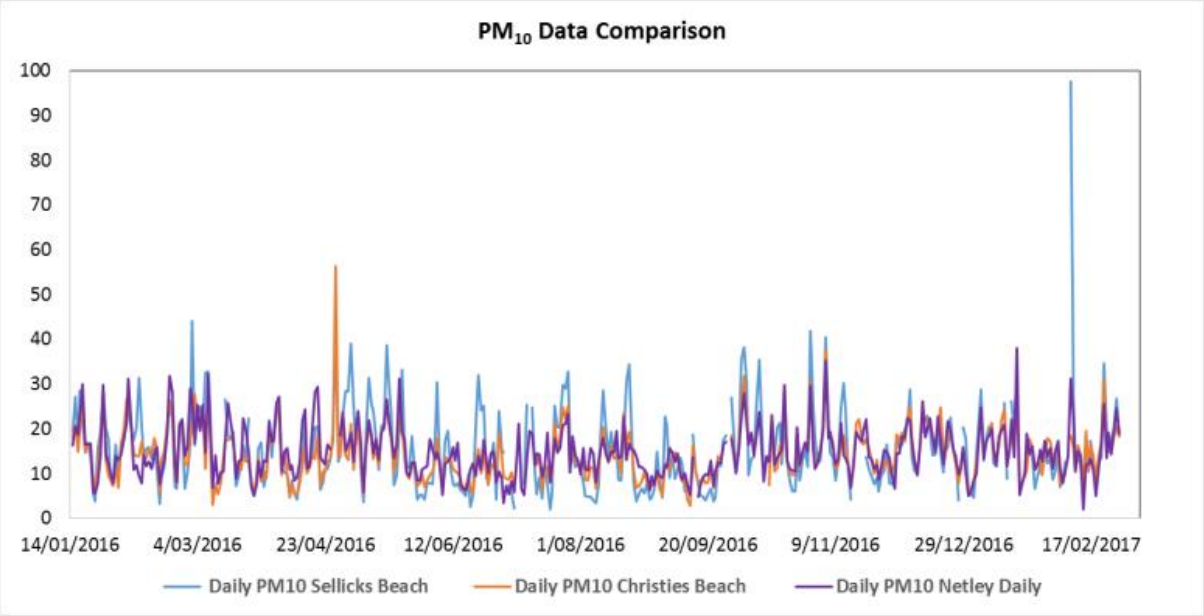
- Agricultural activities
- Sea spray and windblown sand
- Long-range transport of particulate matter within the airshed
- Intermittent short term extreme events associated with bush fires and dust storms
- A racetrack located at one of the properties on Country Road
- Current road works for Main South Road upgrade.

The EPA deployed a mobile air quality monitoring station at Sellicks Beach from January 2016 to February 2017 for ambient monitoring of TSP, PM_{10} and $PM_{2.5}$ (SA EPA, 2017).

Polar plots were provided for data analysis showing the correlation between particulate matter concentrations wind speeds and wind direction. It is understood that one exceedance of the PM_{10} ground level concentration criterion of 50 µg/m^3 was recorded over the monitoring period, which was attributed to hot, dry and strong southeasterly wind conditions.

Compared to other metropolitan EPA monitoring locations at Christies Beach and Netley, Sellicks Beach showed some higher (but also lower) daily concentrations for the monitoring period.

Figure 7 – Daily PM_{10} Concentrations Sellicks Beach, Christies Beach and Netley (2016-17)



Source: (SA EPA, 2017)

Figure 8 – Polar Plots of PM_{10} and TSP Concentrations Recorded at Sellicks Beach (2016-17)

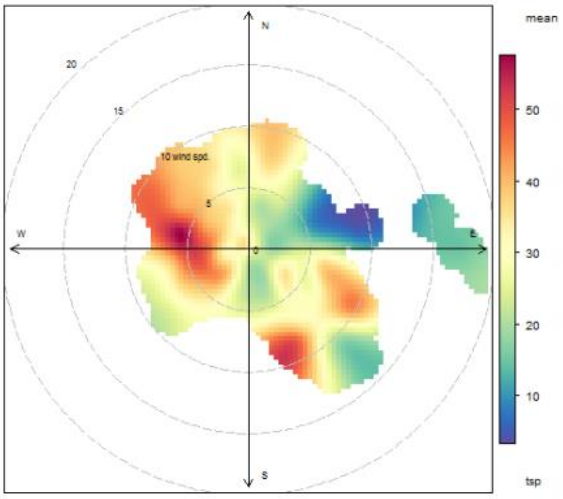


Figure 3 Polar plot for TSP (1-hour averaged data in µg/m³)

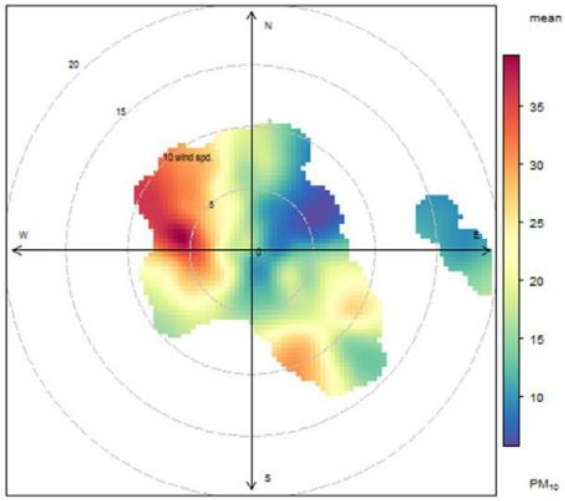


Figure 4 Polar plot for PM_{10} (1-hour averaged data in µg/m³)

Source: (SA EPA, 2017)

Observations in the summary conclusions in the report (SA EPA, 2017) included:

- Most TSP events were associated with relatively low to moderate wind speeds.
- There was a significant contribution to dust levels (TSP and PM10) associated with wind blowing from west of the monitoring station. It is suggested that sea salt may have contributed significantly to recorded particle levels in the Sellicks Beach/Sellicks Hill area, noting this phenomenon is quite common for coastal areas in other states.
- Both PM10 and PM2.5 generally remained below the ground level concentration criteria and exhibited similar trends to those observed at other monitoring locations in the Adelaide metropolitan region.

Additional review of regional air quality data to characterise background TSP, PM_{10} and $PM_{2.5}$ concentrations will be performed as part of the dust modelling study, and this section of the DMP will be updated.

4 Legislative Requirements

This DMP has been prepared with reference to:

- South Australian Environment Protection Act 1993.
- South Australian Environment Protection (Air Quality) Policy 2016.
- Interim criteria for respirable crystalline silica concentration in ambient air for mining and extractive industries (SA EPA, 2022)
- Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (NSW EPA, 2022)
- South Australian Mining Act 1971, which is enabled through an approved site-based Mine Operation Plan (MOP), updated in 2018
- Sellicks Hill Quarry Mining Lease
- Sellicks Hill Quarry EPA Licence

4.1 Environment Protection Act 1993

The Environment Protection Act 1993 (EP Act) is the legislative foundation for regulating air quality in South Australia. Section 25 of the EP Act defines a General Environmental Duty to take all reasonable and practical steps to prevent or minimise environmental harm. Environmental harm is defined under Section 5 of the EP Act as including harm, potential harm and environmental nuisance. Harm is further categorised as material or serious environmental harm, according to the nature and scale of its impacts.

From an air quality perspective, environmental harm is caused by air pollutants having toxic or adverse effects on human health or the environment. Effects may be long term (for example, chronic cardio-respiratory conditions) or short term (for example irritation of eyes and nose and triggering of asthma).

Environmental nuisance is often caused by odours or dust that interfere with the amenity of affected communities. Odours may be obnoxious, causing immediate discomfort. However, sometimes more pleasant odours can become unpleasant to people because they are exposed continuously. Dust may be visible as clouds and can deposit on surfaces, such as windowsills and doorsteps or cause soiling of clothes.

4.2 Environment Protection (Air Quality) Policy 2016

The General Environmental Duty is implemented through mandatory provisions of policies and environmental authorisations. In relation to air quality, the Environment Protection (Air Quality) Policy 2016 (Air EPP) incorporates a range of ground level concentrations, odour criteria and in-stack concentrations for assessing impacts of a wide range of air pollutants (SA Government, 2016).

The Air EPP Schedule 2 ground level concentration assessment criteria for particulate matter are presented in Table 2.

The current ground level concentration criteria for RCS in Schedule 2 of the Air EPP is only applicable for the assessment and design of industrial stack sources (SA EPA, 2022). The EPA, with input from SA Health, has therefore introduced a criterion to be used to ensure protection of communities from more diffuse sources, e.g. mining and extractive industries, based on an extensive literature review of current criteria for RCS in ambient air for mining and extractive industries. Based on this review, the EPA adopted an interim RCS criterion of 3 µg/m3 (annual average) for the PM10 size fraction of dust in ambient air for mining and extractive industries. The PM10 size fraction selected for this RCS criterion is based on a precautionary approach, to ensure communities are well protected from any adverse impact of RCS in ambient air (SA EPA, 2022).

Table 2 – SA Air EPP Ground Level Concentration Criteria for Particulate Matter

Pollutant	Classification	Averaging Time	Maximum Ground Level Concentration (µg/m^3)
$PM_{2.5}$	Toxicity	24 hours	25
		12 months	8
PM_{10}	Toxicity	24 hours	50
RCS (as PM_{10})	Group 1 carcinogen	annual	3 *

* As per: *Interim criteria for respirable crystalline silica concentration in ambient air for mining and extractive industries* (SA EPA, 2022)

There are no criteria set in the Air EPP for nuisance impacts associated with total suspended particulate (TSP) concentrations or dust deposition. In the absence of SA specific assessment criteria the following New South Wales (NSW) impact assessment criteria (NSW EPA, 2022) are commonly referred to for dust deposition in relation to nuisance dust:

- Maximum increase in dust deposition rate: 2 g/m2/month
- Maximum total dust deposition rate: 4 g/m2/month

4.3 Sellicks Hill Quarry Mining Lease and Mine Operation Plan/Program for Environment Protection and Rehabilitation

The Mining Lease for Sellicks Hill Quarry includes the dust-related conditions reproduced in **Table 3.**

Table 3 – Dust Related Mining Lease Conditions

Second Schedule	**Air Quality Monitoring** 4. The Tenement Holder must undertake continuous air quality monitoring, that considers all site operations, using Beta-Attenuation Mass monitors or equivalent technology.
	Air Quality Reporting 5. The Tenement Holder must report continuous air quality monitoring data in real time (where practicable) to the public on an unrestricted internet site.
Fourth Schedule	**Air Quality Outcome** 13. The Tenement Holder must, during construction and operation, ensure that there are no public health and/or nuisance impacts from dust generated by mining operations.
	Air Quality Criteria 14. The Tenement Holder is required to address the following matters for the purposes of Regulation 63(1)(c) of the Regulations in relation to clause 13: 14.1. Establish continuous air quality Beta-Attenuation Mass or equivalent technology monitors at locations, agreed by the Director of Mines (or other authorised officer), to demonstrate that PM_{10} levels are less than 50 µg/m^3 when measured over a 24-hour period (midnight to midnight) as specified in the *Environment Protection (Air Quality) Policy* 2016. 14.2. Each monitor must achieve 90% data availability for both ambient PM measurements, and meteorological measurements. 14.3. Continuous real time at intervals not more than 10 minutes – averaging period 24 hours (midnight to midnight). 14.4. Monitor in accordance with AS/NZS 3580.9.11:2016 (PM_{10}). 14.5. Establish Meteorological monitoring in accordance with AS/NZS 3580.14-2011 to measure and record (but not limited to) wind speed and direction, temperature, humidity, atmospheric pressure, solar radiation, rainfall and evaporation.

4.4 EPA Licence 2052

EPA Licence 2052 (expiry 30 November 2024) authorises Adbri to undertake the following prescribed activities at Sellicks Hill Quarry:

- 3(2)(e) Any other waste reprocessing facility
- 7(7) Extractive industries

Licence conditions relevant to dust emissions and management at the quarry are reproduced in **Table 4.**

Table 4 – Dust Related Licence Conditions: EPA Licence 2052

1.2 DUST MANAGEMENT PLAN (U - 1750) The licensee must:		
1.2.1	Develop and submit a Dust Management Plan (DMP) for approval by the EPA by the compliance date 20 December 2024.	
1.2.2	The DMP must include, but not limited to the following:	
	a Identification of all sources of dust emissions that may be generated by the activities at the Premises and their risk assessment;	**Section 2.3 Section 7**
	b Measures to be implemented to minimise the offsite impacts of dust emissions, including but not limited to cessation of operations in unfavourable weather conditions; and dust management on unsealed roads at the Premises	**Section 6.3**
	c Details of visual and meteorological criteria and monitoring to be undertaken in order to minimise offsite impacts of dust emissions	**Section 6.3, Section 8 and Table 17**
	d A Trigger Action Response Plan (TARP) incorporating the criteria identified in subclauses 2(a), 2 (b) and 2(c);	**Section 6.4 and Section 6.3**
	e A methodology for providing public access to the DMP (or any revised DMP approved in writing by the EPA)	**Section 9.1**
	f A methodology and framework for an annual review of the DMP which includes: i. the effectiveness of actions and strategies identified in the TARP: and ii. a review and analysis of the criteria identified in subclauses 2(a), 2 (b) and 2(c).	**Section 10.4**
1.2.3	Ensure that the TARP as specified in subclause 2(d) includes, but not be limited to, the following: a) Identification of criteria that will trigger the need to implement actions in response to dust incidents; b) Details of response strategies and remedial actions to be implemented in the event that trigger criteria are exceeded; c) Methodology and timeframes for reporting dust emission incidents; and d) How the effectiveness of remedial actions undertaken to address such incidents will be assessed.	**Section 12**
1.3	**DUST MONITORING PLAN (U-1741)** The licensee must:	
1.3.1	Submit a quarterly monitoring report to the EPA by the last day of January, April and October of each year for the preceding quarter that includes but need not be limited to: a) the results of dust and meteorological monitoring undertaken in accordance with the EPA approved DMP; b) interpretation of the monitoring results assessed in accordance with the criteria specified in subclause 1.a of this condition; details of criteria by which the monitoring results were assessed and interpreted (TARP) c) details of the immediate actions implemented as a result of the TARP to minimise dust emissions; d) details of corrective actions implemented to prevent future exceedance events; and	**Section 10.3**

	e) details on the management of the complaints in accordance with Condition U-1553 of this licence and summary of community engagement conducted.	
1.3.2	Submit an annual report to the EPA by the last day of August of each year that includes but need not be limited to: a) a trend analysis of data collected for the preceding 12-month period; and b) a review of the scope and operation of the strategies outlined in the DMP, including identified opportunities for improvement in dust management at the Premises.	**Section 12**
1.3.3	Ensure the most recent quarterly and annual reports are made available to the public;	**Section 10.3 and Section 12**
1.4	**GROUND LEVEL PARTICULATE NOTIFICATION (U-1755)** The licensee must:	
1.4.1	Provide notification to the EPA, within 48 hours, when the following particulate limits are exceeded at any of its monitoring locations outside the Premises: a) a PM10 concentration of 50 micrograms per cubic metre over a 24 hour averaging period; or	**Section 10.1**
1.4.2	Ensure any notification provided under sub paragraph 1 of this condition includes but is not limited to: a) the date; b) the cause; c) the measured particulate concentration over the 24 hour averaging period; and d) remedial actions taken to reduce particulate emissions from the Premises.	**Section 10.1**
1.5	**IMPOSE CONDITION (S – 334)** The EPA may, pursuant to section 45(3)(iii) of the Environment Protection Act 1993 impose or vary a condition of this licence, by notice in writing to the Licesee, requiring the revision of and/or implantation of the Dust Management Plan.	

5 Dust Management Strategy and Action Plan

5.1 Dust Management Strategy

The dust management strategy will be developed and added to over time. The intent is that longer term improvement measures are captured in the dust management strategy and as work progresses, measures identified as mature[1] to progress are moved to the mitigation measure action plan and given implementation commencement and completion timeframes.

The dust management strategy currently focuses on the work to update the DMP, first as an interim plan by early November 2024, and to carry out a dust study by end of March 2025 to better define the dust management and mitigations as currently being performed and to inform future management/mitigation options and a revised DMP by June 2025.

5.2 Mitigation Measure Action Plan

As part of implementing the Dust Management Strategy, a Mitigation Measure Action Plan has been developed for Sellicks Hill Quarry. This Action Plan outlines the sources and controls currently identified for:

a. future implementation as part of the continuous improvement of dust management at the site, or

b. for further investigation to assess their viability and potential efficacy before deciding if they are appropriate for future implementation.

The identification of actions currently listed in Mitigation Measure Action Plan has been informed by dust control investigations and capital works planning undertaken by Adbri in recent years, as well as the findings of independent dust audits performed at the site.

The Mitigation Measure Action Plan is to be regularly reviewed and updated as options analyses and capital works etc are completed. Timelines have been nominated for current actionable upgrades as well as future actions, and should also be updated as new information becomes available.

[1] sufficiently investigated, and funding allocated

Table 5 – Mitigation Measure Action Plan

Emission Source	Mitigation Measure	Status	Timeline (Completed by)			
			Feasibility Analysis	Budget Approval	Detailed Design	Implement ation
In Progress						
Wind erosion	Accelerate rehabilitation of the Western Screening Mound through annual seeding and topsoil dressing applied where practical	Ongoing				Ongoing
Wind erosion	Progressively rehabilitate exposed surfaces across the site, include spreading grass seeds and planting native trees, with ongoing maintenance	Ongoing				Ongoing
Construction of screening mound	Construct Western mound in accordance with engineering and geotechnical standards that enable shorter tipping distances	Ongoing				Ongoing
Whole of site	Installation of EBAMs to replace/supplement ADR sensors	In progress		Sept 2024		March 2025 [a]
	Development of a series of visual dust collages showing good and bad dust levels to further improve the on-site staff knowledge, e.g. - Haul road dust generation - Loading product material - Loading internal haul trucks - Stockpile dust generation	In progress				November 2024
Drag-out from gravel road between new wheel wash and weighbridge	Seal the road	In progress	Sept 2024	Approved	Completed	Dec 2024 [b]
Uncovered loads leaving site	Review if signage regarding requirements of load coverage is sufficient and upgrade if found insufficient	In progress				Nov 2024
	Review truck driver induction details regarding load coverage requirements and update if required	In progress				Nov 2024
	Perform TARP survey	In progress				Jan 2025

[a] Ordered end of October 2024. Installation date dependant on delivery date.
[b] Construction over end of year shutdown if contractor availability

Emission Source	Mitigation Measure	Status	Timeline (Completed by)			
			Feasibility Analysis	Budget Approval	Detailed Design	Implement ation
Future						
Tertiary sand open stockpile	Installation of Luffing Stacker	Future	Nov 2024			
Vertical Shaft Impact Crusher	Installation of enclosure	Future	Sept 2024	Submitted	Sept 2024	
Sand plant	Decision on decommissioning date [a]	Future	Sept 2024			
Completed						
Tertiary crusher surge bin	Installation of enclosure	Completed				Sept 2019
Diester secondary screens (x2)	Installation of enclosure	Completed				Jan 2020
Secondary sand open stockpile	Installation of a 500 t storage bin	Completed				Jan 2020
Primary dump chute	Installation of enclosure	Completed				Mar 2020
Quarry front entrance	Resealed front entrance to the quarry	Completed				Apr 2020
Primary crusher surge pile	Water sprays at conveyer drop off point (on to surge pile) automated to run when crusher and conveyer running	Completed				Sept 2024
Drag-out	Second wheel wash installed prior to the weighbridge	Completed				Feb 2024
Whole of site	Installation of CCTV camera to monitor dust levels across site (main plant process area) and provide information for internal complaints investigation and training	Completed				Mar 2024
Onsite Water	Installation of 50mm SA Water connection and 2 x 360kl tanks	Completed				Oct 2022
	Installation of recycled water system	Completed				Mar 2019
	Installation of a 375kl water tank and with a water truck quick fill system	Completed				Nov 2017
[a] Sand plant not to be operated during summer 2024/2025						

6 Dust Mitigation Measures

6.1 Hierarchy of Controls

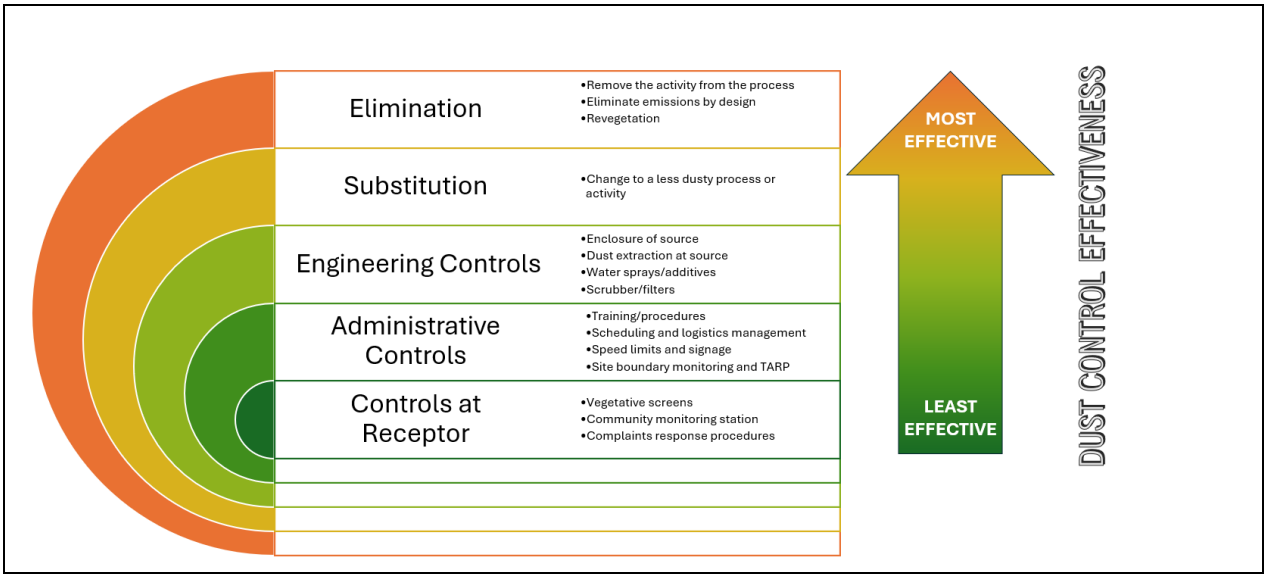
A control hierarchy approach is followed in specifying controls to be put in place to reduce the likelihood and/or the consequence of dust emissions from the quarry impacting nearby receptors, as shown in **Figure 9**. In considering controls for each risk, preference is given to elimination of the activity or equipment producing the risk, but where this is not practicable, substitution of that activity is considered, and so on.

The dust mitigation equipment used at Sellicks Hill Quarry is itemised in **Section 6.2**, along with details of the capacities and maintenance requirements of each. The controls to be implemented for each of the sources are discussed in **Section 6.3**.

In addition to having topographic barriers which provide an element of control of dust emissions in relation to pit retention, a primary control for dust on-site is the use of dust suppressants (water sprays) to control dust as both a prevention application and as a suppression application. Prevention is the application of water and/or suppressants to prevent dust from becoming airborne. Suppression is the use of water and/or suppressants to wet dust particles which have already become airborne, increasing their mass and causing them to settle more rapidly.

Continuous improvement will be sought across the site and across activities where practicable and economical as set out in the dust management strategy and mitigation measures action plan.

Figure 9 – Hierarchy of Dust Controls with Examples



6.2 Dust Mitigation Equipment Installed at Sellicks Hill Quarry

The fixed and mobile dust suppression equipment employed at Sellicks Hill Quarry is listed in **Table 6**. The details in this table will be better further developed as work progresses with the dust study. **Figure 10** shows the locations of the fixed plant, and typical/approximate locations of mobile plant.

Table 6 – Dust Control Equipment and Infrastructure at Sellicks Hill Quarry

Control	Number	Details	Capacity	Maintenance Requirements
Water spray dust mitigation activities and controls				
Water trucks for wetting of haul roads and work areas	3	2 x CAT 740 Articulated Dump Truck 1 x Mack Rigid Truck	2 x 35 KL 1 x 15 KL	General HME servicing Water tank repairs Tyre repairs
Fixed water sprays for dust suppression on stockpiles, production areas and conveyer transfer points		Details to be worked through for the dust study and updated in next plan update.		
Load spray boom for wetting of loads prior to tarping before departure from site	2	Automated via sensor when truck drives past		Inspections of water jets
Truck wheel wash to control drag-out from site to main road	2			Inspections of water jets Cleaning of FOD mats
Enclosure dust controls				
Shed enclosure of primary crusher and unloading bay	1	Details to be worked through for the dust study and updated in next plan update.	NA	
Enclosure over the tertiary crusher surge bin	1		NA	
Enclosure over the 500 t secondary sand bin	1		NA	
Enclosure of all conveyer transfer points			NA	
Screen covers (rubber)		Rubber seals	NA	To be replaced when deteriorated/broken
Other controls				
Drill rig dust control		Drill rig dust capture with hooding and cyclone for control	N/A	Maintained by sub-contractor

Figure 10 – Map of Dust Suppression Equipment at Sellicks Hill Quarry

6.3 Mitigation Measures to be Implemented for Key Dust Sources

All staff have a responsibility to take action to manage dust sources and record the action(s) taken. Specific responsibilities for implementing the controls in the following sections are assigned to:

- Adbri Operational Management (OM)
- Sellicks Hill Quarry Manager (QM)
- Leading Hands (LH)
- Site personnel (SP)
- Subcontractors (SC).

In addition to the source-specific mitigation measures listed in the following sections, the Mount Lofty Ranges District meteorological three-day forecasts will be obtained daily from the Bureau of Meteorology website (http://www.bom.gov.au) as representative of the conditions likely to be experienced at the site in the coming days. The forecasting information will be used to:

- Assess potential impacts and evaluate risks both ahead of time and in conjunction with the real continuous monitoring data.
- Generate alerts for predicted air quality events e.g. high winds.
- Allow site personnel to determine TARP conditions for shifts and pre-plan operations and implement additional management measures.

6.3.1 Shift Pre-plan, Prestart Meeting and Communications

Pre-planning takes place before every shift considering conditions from previous shift and forecasted conditions. Dust mitigation actions are planned for as relevant in relation to forecasted conditions and TARP Level.

Table 7 – Dust Controls and Mitigation Actions: Pre-planning

Activity	Controls		Responsibility
Pre-planning	**Normal state**		
	PP1	Deliver inductions to all new employees and relevant site personnel, as well as regular follow up training, in spring and summer, to highlight the importance of dust control	QM & LH
	PP2	Forecast weather conditions are to be checked prior to pre-start meetings for evaluation of TARP level conditions for shift	QM & LH
	PP3	Briefing on TARP conditions as identified for coming shift based on BoM weather forecast and dust monitoring data	QM & LH
	PP4	Selection of work areas (excavation and dumping) to be made also considering level of exposure to wind and off site visible dust plumes from work activities	QM & LH
	Level 1		
	PP5	Implementation of mitigation actions as per TARP Level 1 covered in pre-start meeting if TARP Level 1 conditions identified for shift.	QM, LH, & SP
	Level 2		
	PP6	Implementation of mitigation actions as per TARP Level 2 covered in pre-start meeting if TARP Level 2 conditions identified for shift.	QM, LH, & SP
	Level 3		
	PP7	Implementation of mitigation actions as per TARP Level 3 covered in pre-start meeting if TARP Level 3 conditions identified for shift.	QM, LH, & SP

6.3.2 Drilling and Blasting

Drilling and blasting mainly occurs in the Southern (South Pit PM237) and Eastern (Top Pit PM163) zones of the quarry. The drilling process is used to fragment the rock for subsequent blasting operations. Dust from blasting can sometimes be seen by the surrounding community.

Drilling and blasting activities are episodic in nature (i.e. once a week) and dust impacts are generally short term (i.e. for less than 30 minutes after a blasting event). The emissions from drilling depend on the number of holes drilled per blast, while the emissions from blasting generally depend on the blast area.

A proven method of control, which is used by some blasting operations located near residential areas, is to monitor weather conditions and only fire the blast when the prevailing winds are blowing away from sensitive receivers. However, blasting at Sellicks Hill Quarry is booked in advance of the activity, which causes difficulties when blasting needs to be postponed due to unfavourable prevailing winds.

While preventing the dust drifting towards boundaries with a higher population of neighbours may be controlled by waiting for wind speeds and directions to be favourable within practicable reason, leaving explosives in the ground overnight or for a period of days or weeks has inherent risks. The risks associated with delaying blasts to wait for improved prevailing winds include, but are not limited to, the following:

- Security of explosives
- Misfires:
    - Animals chewing (cutting) initiation leads causing misfires
    - Moisture (rain and/or groundwater) desensitising bulk explosives causing a misfire or fume event
    - Fuel from bulk explosives ingressing into detonator downlines causing a misfire (generally applies to periods greater than a week)
- Restricted access to quarry while sleeping shots
- Potential productivity losses as shot rock is not available for production

Sellicks Hill Quarry engaged an independent blast specialist to assess the most appropriate ways to control dust from drilling and blasting. The independent review found that:

- The highest concentration of dust is due to the face-floor dust source.
- This source of dust can be reduced by wetting down the floor in front of the blast within 30 minutes of the firing event. This reduces/stops the dust associated with the floor from being mobilised into the air. However, the dust from the face will not be stopped.
- The watering down of blasts (direct application of water on top of the blast) prior to a blasting event is not recommended if using ANFO or Heavy ANFO bulk explosives, as this will alter densities of the bulk explosives and potentially cause a misfire.

The controls to be implemented at Sellicks Hill Quarry to manage dust emissions from drilling and blasting are identified in **Table 8.**

Table 8 – Dust Controls and Mitigation Actions: Drilling and Blasting (Operated by Contractor)

Activity	Controls		Responsibility
Drilling	**Normal state**		
	D1	All drill rigs to have dust collectors installed and in use at all times	SC, QM and LH
	D2	Water cart to be used in the drill area prior to drilling during summer and/or dry and windy periods	QM, LH and SP
	Level 1		
	D3	Monitor conditions, especially if operating in more exposed area	QM and LH
	Level 2		
	D4	Monitor conditions, especially if operating in more exposed area and review drilling methods if dust from drilling is observed leaving the site boundary.	QM and LH
	Level 3		
	D5	Postpone drilling if dust from drilling is not able to be contained and observed leaving the site.	QM and LH
Blasting	**Normal state**		
	B1	Plan blasting activities for weekdays only	QM and LH
	B2	Blasting will preferentially occur when weather conditions are favourable (e.g. early afternoons) and in accordance with the TARP	QM and LH
	B3	Water cart to pre-wet blast and surrounding area prior to firing events and as soon as possible after firing events when required in dry conditions	QM, LH, and SP
	B4	Planning for selection of best conditions available in planned window for blast. Selection criteria as per blast management plan with preferred wind conditions being wind direction away from receptors and lower wind speeds.	QM and LH
	Level 1		
	B5	Blasting in Level 1 conditions only to occur if required for safety reasons	QM and LH
	B6	Ensure watering of blast area performed thoroughly if blasts are required for safety reasons	QM and LH
	Level 2		
	B7	Blasting in Level 2 conditions only to occur if required for safety reasons	QM and LH
	B8	Delay scheduled blast (if possible) until conditions improve	QM and LH
	B9	If blasting cannot be delayed, ensure watering of blast area performed thoroughly	QM and LH
	Level 3		
	B10	No blasting activity to occur at TARP Level 3	QM and LH
	B11	Blasting in Level 3 conditions only to occur if required for safety reasons to mitigate the risk of misfires.	OM, QM and LH
	Regarding delays of blasts, there are safety protocols that have to be followed that mean, on occasion, blasts may have to proceed in less favourable conditions. EPA ,DEM and the community will be notified if blasting is to be conducted under less than favourable conditions for safety reasons.		

6.3.3 Excavators

The mechanical disturbance of material associated with excavation is a source of dust, the rate of which is dependent on:

1. Rate of excavation and loading – the amount of material excavated (related to the size of the excavator and the intensity at which it is utilised).
2. Material physical properties – the potential for dust generation is increased for finer materials with greater silt content and lower moisture content. Coarser materials present less risk than finer materials.
3. Meteorological conditions – the moisture content of the material, especially in the surface layers, can be affected by ambient temperature, humidity, wind, incident solar radiation and rainfall.

Material from blasts is loaded to trucks with either excavators or front end loaders and transported to plant for unloading at the crusher or stockpile. Overburden is also loaded on to trucks by excavators and front end loaders for construction of the western screening mound and for sales as coarse fill or for dumping in storage/fill areas at site.

The controls to be implemented at Sellicks Hill Quarry to manage dust emissions from material excavation are identified in **Table 9**.

Table 9 – Dust Controls and Mitigation Actions: Material Excavation

Activity	Controls		Responsibility
Excavation	**Normal state**		
	E1	Selection of work area to consider level of exposure as per control/mitigation action PP4.	QM, LH and SP
	E2	Water cart and cannon to wet down work areas prior to and post excavation if/as required	SP
	Level 1		
	E3	Monitor conditions and divert to different work area if visible dust is observed leaving the site boundary from material excavation.	QM, LH and SP
	Level 2		
	E4	Modify operations and divert to excavation of material with less fines and higher moisture content (lower dust generation potential)	QM, LH and SP
	E5	Constrain operation hours in alignment with primary plant operation to avoid worst case daily conditions	QM and LH
	Level 3		
	E6	Cease material excavation operations (loading to trucks)	QM and LH

6.3.4 Loading and Unloading with HME

The loading and unloading of aggregate into and out of on-site haul trucks and off-site highway trucks release dust into the air. The rate of emission is related to:

- Aggregate physical properties – the potential for dust generation is increased for finer materials with greater silt content and lower moisture content.
- Meteorological conditions – the moisture content of the aggregate can be affected by ambient temperature, humidity, wind, incident solar radiation and rainfall.

The controls to be implemented at Sellicks Hill Quarry to manage dust emissions from material excavation are identified in **Table 10.**

Table 10 – Dust Controls and Mitigation Actions: Loading and Unloading

Activity	Controls		Responsibility
Loading and Unloading	**Normal state**		
	LU1	Selection of work area to consider level of exposure as per control/mitigation action PP4.	QM, LH and SP
	LU2	Minimisation/reduction of drop heights for loading and unloading	SP
	LU3	Trucks will not be overloaded (relevant for both sales and internal material transport)	SC and SP
	LU4	Material loads are sufficiently wetted [a] (visual assessment) to reduce dust, with sprinklers and water carts deployed as required (at loading and unloading areas in summer and/or windy and dry conditions)	QM, LH and SP
	LU5	Use a skid steer to remove accumulating material in loading and unloading areas, as required	SP
	LU6	Unloading at the Western Mound only in conditions as appropriate as per the current [b] construction methodology.	QM, LH and SP
	Level 1		
	LU7	Relocate loading and tipping/unloading activities to more sheltered areas	QM, LH and SP
	LU8	Modify operations to handling of material with less fines and higher moisture content (lower dust generation potential)	QM, LH and SP
	LU9	Deploy water cart with cannon to tipping in wind exposed areas	QM, LH and SP
	LU10	Increased watering using water sprays and/or water cannon to wet down material (for sales trucks)	QM, LH and SP
	Level 2		
	LU11	Relocate loading and tipping/unloading activities to more sheltered areas	QM, LH and SP
	LU12	Deploy water truck with cannon to tipping in wind exposed areas	QM, LH and SP
	LU13	Reduce vehicle speeds for uncovered loads (internal material movements only)	QM and LH
	Level 3		
	LU14	Relocate loading and tipping/unloading activities to only most sheltered areas (down low within pits)	QM, LH and SP
	LU15	Cease tipping on the western screening mound and exposed areas of the site until conditions improve	QM and LH
	[a] Different products/materials have different moisture specifications as per customer requirements. Water sprays to increase material moisture content for reduction of dust emissions from material handling is not an option for all materials. [b] Construction in stages/phases of slope.		

6.3.5 Conveyors, Transfer Points and Stacking Conveyors

The operation of conveyors and conveyor transfer points in the central crushing plant and northern section of the site can agitate the material being transferred and release dust into the air. The rate of emission is related to:

- Rate of transfer – the amount of material transferred.
- Distance of transfer – the length of the conveyor system.
- Number of conveyor transfer points.
- Number of conveyor drop points.

- Distance from drop point to ground/stockpile – a greater drop has an increased potential for disturbance and release of dust.
- Material physical properties – the potential for dust generation is increased for finer materials.
- Meteorological conditions – the moisture content of the material can be affected by ambient temperature, humidity, wind, incident solar radiation and rainfall.

Fines can also fall to the ground and collect below conveyors and conveyor transfer points only to be re-entrained into the air by the wind or wheel traffic. Sellicks Hill Quarry operates a substantial network of elevated conveyors.

The controls to be implemented at Sellicks Hill Quarry to manage dust emissions from material excavation are identified in **Table 11**.

Table 11 – Dust Controls and Mitigation Actions: Conveyors and Transfer Points

Activity	Controls		Responsibility
Conveyors and conveyor transfer points	**Normal state**		
	CT1	Location of plant in low lying areas (also applies to any mobile crushing and screening plant)	QM, LH and SP
	CT2	Location of plant in more exposed areas to be covered with additional engineered screening	OM, QM and LH
	CT3	Operation with transfer point water sprays [a]	SP
	CT4	Operation of plant area water sprays, and water carts deployed at loading, stockpiles and unloading areas in summer and/or windy and dry conditions	LH and SP
	CT5	Reduction of drop heights (operation with stockpiles at high levels)	QM, LH and SP
	CT6	Strip rubber socks (split sides) installed on all 5 mm or less product drop points to reduce emissions	QM, LH and SP
	CT7	Conveyor belt scrapers to be in use where possible [b]	LH and SP
	CT8	Fines collected under conveyors are to be cleaned regularly with a skid steer	LH and SP
	CT9	At the Sand Plant, conveyors are enclosed, and the tipping point and storage of material are contained within sheds	QM and LH
	Level 1		
	CT10	Selection of plant operated [c]	QM and LH
	CT11	Focus on reduction of drop heights (operation with stockpiles at high levels)	QM, LH and SP
	Level 2		
	CT12	Restrict operation hours [d]	QM and LH
	CT13	Selection of plant operated [c]	QM and LH
	Level 3		
	CT14	Cease crushing and screening until conditions improve.	QM and LH
	[a] Depending on material moisture content sprays at transfer points can cause blockages [b] Scrapers cannot be operated with patched belts [c] Primary crusher may not need to be operated if surge pile sufficient for production with secondary/tertiary plant. Plant 2 for production of road base material runs with higher material moisture rate. [d] Restriction on production by selection on operation hours. Production cannot run at lower rate.		

6.3.6 Crushing and Screening

Crushing and screening, which occurs in the central crushing and northern areas of the site, has the potential to be a major source of dust. The crushing has the potential to produce fines, while the agitation of the

material during crushing and screening tends to release fines from the surface of rock and aggregate, all of which can be entrained into the air. The rate of emission is related to:

- Feed rate of the crusher.
- Levels of crushing and screening – e.g. primary, primary and secondary, primary, secondary and tertiary.
- Material physical properties – the potential for dust generation is increased for crushing material with lower moisture content.
- Meteorological conditions – the moisture content of the material, can be affected by ambient temperature, humidity, wind, incident solar radiation and rainfall.

Agitated fines can also fall to the ground and collect around the crusher and be re-entrained into the air by the wind or wheel traffic.

The controls to be implemented at Sellicks Hill Quarry to manage dust emissions from crushing and screening are identified in **Table 11**.

Table 12 – Dust Controls and Mitigation Actions: Crushing and Screening

Activity	Controls		Responsibility
Central crushing plant	**Normal state**		
	CS1	Foaming agent used during crushing process to inhibit dust as required	LH and SP
	CS2	Water sprays used at the outputs of conveyors and transfer points where feasible	SP
	CS3	Water cart deployed/water sprays used prior to plant start-up procedures in summer and/or windy and dry conditions	LH and SP
	CS4	Skid steer used under the entry and exit points of conveyors	SC and SP
	CS5	Adjust operation hours to respond to TARP conditions	QM and LH
	Level 1		
	CS6	Selection of plant operated [c]	QM and LH
	Level 2		
	CS7	Restrict operation hours [d]	QM and LH
	CS8	Selection of plant operated [c]	QM and LH
	Level 3		
	CS9	Cease crushing and screening until conditions improve	QM and LH

Table 13 – Dust Controls and Mitigation Actions: Sand Plant

Activity	Controls		Responsibility
Sand Plant	**Normal state**		
	SP1	Plant only to be operated in favourable conditions (considering wind direction and wind speed) with existing control and mitigations in place	QM and LH
	Level 1		
	SP4	Plant not to be operated in adverse conditions	QM and LH
	Level 2		
	SP4	Plant not to be operated in adverse conditions	QM and LH
	Level 3		
	SP4	Plant not to be operated in adverse conditions	QM and LH
	Plant to be decommissioned and planned not to be used summer season 2024/2025		

6.3.7 Wheel Generated Dust

Haul and access roads are used extensively in quarrying operations by mobile equipment to move material in and out of the quarry. The road network at Sellicks Hill Quarry is extensive over the entire site.

The rate of wheel-generated dust emissions is dependent on several factors including:

- Vehicle kilometres travelled (VKT) – the amount of dust emitted is directly proportional to the distance each vehicle type travels on unpaved surfaces.
- Vehicle weight – heavier vehicles generally have a greater potential to mechanically disturb particulate in the unpaved surface, releasing it into the air as, in general, they have more contact with the road surface (larger and more numerous wheels).
- Vehicle speed – increased speed generally increases the potential to mechanically disturb particulate in the unpaved surface releasing it into the air.
- Surface physical properties – the potential for dust generation is increased for surfaces with greater silt contents and lower moisture contents.
- Meteorological conditions – the moisture content of an unpaved surface can be affected by ambient temperature, humidity, wind, incident solar radiation and rainfall.

The controls to be implemented at Sellicks Hill Quarry to manage wheel-generated dust emissions are identified in **Table 14**.

Table 14 – Dust Controls and Mitigation Actions: Wheel Generated Dust

Activity	Controls		Responsibility
Unpaved haul roads and trafficked areas around processing plants, stockpiles etc	**Normal state**		
	WG1	Ensure speeds are safe are minimised to reduce dust emissions at all times. Speed limit 20-30 km/hr on haul roads and 10 km/hr around plant areas	QM, LH and SP
	WG2	Haul roads and work areas to be maintained to reduce silt build up and road surface deterioration with regular sweeping, grading and dressing with aggregates.	QM, LH and SP
	WG3	Perform daily visual assessment of vehicle routes and re-route vehicles from problem areas until issue remediated	QM and LH
	WG4	Water cart deployed in dry and windy conditions, with water cart deployment prior to plant start-up procedures when required	QM, LH and SP
	WG5	Apply haul road dust suppressants (magnesium chloride (MgCl) additive) over the summer months, for road sections where efficient, allowing for more efficient water cart utilisation and decreased water consumption	QM and LH
	WG6	Water cart water sprays at end of evening shift.	LH and SP
	Level 1		
	WG7	Increase road watering rates	QM, LH and SP
	Level 2		
	WG8	Increase road watering rates	QM, LH and SP
	WG9	Reduce vehicle speeds	QM, LH and SP
	WG10	Re-route vehicles from problem areas (e.g. near site boundary; route not serviced by sprinkler etc.)	QM, LH and SP
	Level 3		
	WG11	Concentrate water cart and cannon usage to one route and limit vehicles to this route	QM, LH and SP

6.3.8 Drag-Out

Highway trucks used to take product off-site have the potential to take material onto public paved roadways. Material can drop from tailgates, vehicle surfaces where material may have collected during loading, and from wheels. Similarly, materials from third-party sites might also be deposited.

Light vehicles leaving site may contribute to drag-out, although to a lesser degree, by dropping and spreading material from wheels.

Fines from the deposited material have the potential to be entrained in the air from the paved surface by the wind or vehicular traffic (including public vehicular traffic).

The controls to be implemented at Sellicks Hill Quarry to manage dust emissions from drag-out are identified in **Table 15**.

Table 15 – Dust Controls and Mitigation Actions: Drag-Out

Activity	Controls		Responsibility
Drag-out on paved road entry way	**Normal state**		
	DO1	Tailgates to be locked	SC
	DO2	Spillage from side trails, tail gates and drawbars to be cleared prior to leaving site	SC and SP
	DO3	Maintain sprinkler boom (at wheel wash) to wet down loads prior to tarping.	LH and SP
	DO4	All loads leaving site to be covered. Maintain a designated tarping area with instructional load cover signage. and sprinklers available to wet down loads prior to tarping	QM and LH
	DO5	Rumble strips and wheel washes are to be used appropriately	LH
	DO6	Use street sweeper on quarry entrance and South Road as required (seasonal variation)	QM and LH
	DO7	Maintain wheel washers as per **Table 6**	QM and LH
	DO8	Maintain surfaces at the quarry entrance (sealed and unsealed) up to and around the weighbridge	OM and QM
	DO9	Ensure speeds are safe are minimised to reduce dust emissions at all times.	QM, LH, SP and SC
	DO10	Perform regular assessments of paved road surfaces to ensure they are in good working order	QM and LH
	DO11	Maintenance and clean-out of wheel washes	QM and LH
	Level 1		
	DO12	Increased street sweeper frequency [a]	QM and LH
	There are no other relevant mitigation actions in relation the Level 1 – 3 actions that apply for the entry road way for sales truck traffic. [a] Seasonally relevant		

6.3.9 Wind Erosion

Dust from the surface of stockpiles and exposed areas can potentially be entrained by the air (wind) passing over it. This source of dust is notable as it can occur at any time there is wind, whether there is site activity or not (including out of operational hours and shut-down periods). Entrainment can be accentuated by dust already in suspension which can aid the dislodgement of particulates on the surface. The rate of wind erosion related emission is related to:

- Area of surface exposed.
- Wind speed and direction – erosion is increased at higher wind speeds and can also be dependent on wind direction if, for example, the site and surrounding terrain is not flat and creates natural wind breaks and or increases turbulence.
- Surface physical properties – the potential for dust generation is increased for finer materials with greater silt content and lower moisture content.
- Other meteorological conditions – the moisture content of the surface can be affected by ambient temperature, humidity, wind, incident solar radiation and rainfall.

The controls to be implemented at Sellicks Hill Quarry to manage dust emissions associated with wind erosion of disturbed surfaces and stockpiles are identified in **Table 16**.

Table 16 – Dust Controls and Mitigation Actions: Wind Erosion

Activity	Controls		Responsibility
Wind erosion from stockpiles and plant area	**Normal state**		
	WE1	Locate stockpiles in shielded/sheltered areas where possible	QM and LH
	WE2	Minimise stockpile drop heights	QM, LH and SP
	WE3	Timed switched sprinklers used at regular intervals in summer, during shut-down periods and/or dry and windy conditions	LH and SP
	WE4	Use of dust suppressants/sealants, with temporary covers (e.g. encrusting agent) to be placed on stockpiles or areas that are not in use for longer periods (90 days)	QM, LH and SP
	WE5	Water cart water sprays across areas at end of evening shift.	LH and SP
	Level 1		
	WE6	Water sprays on open areas and stockpiles	LH and SP
	Level 2		
	WE7	Water sprays on open areas and stockpiles	LH and SP
	WE8	Application of dust block (suppressants/sealants) on areas not in use as appropriate	LH and SP
	Level 3		
	WE9	Watercart water sprays and water cannon target on problem areas as identified	LH and SP
Wind erosion from Western screening mound and open areas	**Normal state**		
	WE10	Short tipping to limit dust during deposition and facilitate faster rehabilitation	QM, LH and SP
	WE11	Self-sustaining vegetation planted as soon as practicable	QM and LH
	WE12	Water cart and cannon used to suppress dust	LH and SP
	WE13	Consider daily forecasts to inform construction activities to limit dust generating activities	QM and LH
	WE14	Seasonal construction of Western screening mound	QM
	WE15	Application of dust block (suppressants/sealants) on open areas not in use as appropriate	QM and LH
	WE16	Application of dust block (suppressants/sealants) on construction areas of Western screening mound at end of construction campaign	QM and LH
	Level 1		
	WE17	Water sprays on open areas	LH and SP
	Level 2		
	WE18	Water sprays on open areas	LH and SP
	WE19	Application of dust block (suppressants/sealants) on areas not in use as appropriate	LH and SP
	Level 3		
	WE20	Watercart water sprays and water cannon target on problem areas as identified	LH and SP

6.4 Trigger Action Response Plan

A Trigger Action Response Plan (TARP) is designed to ensure that potential dust impacts from site activities are minimised by monitoring conditions and dust concentrations at the site boundary and implementing appropriate management measures as required in the event that short-term PM_{10} levels are becoming elevated and exceed pre-determined 'trigger levels'.

The TARP also includes consideration of weather forecasts and on-site observations to enable appropriate management measures to be proactively taken, e.g. in preparation for adverse wind conditions. TARP conditions are assigned for every coming shift in the shift pre-planning considering forecasted weather condition and dust levels/conditions from the previous shift. Planning for dust controls and operations are undertaken accordingly.

For the dust monitoring input to the TARP trigger levels a 1-hour average time period has been selected as a practical time-step for identifying sustained elevated dust concentrations that could potentially result in an exceedance of the 24-hour average PM_{10} criterion, while providing sufficient time for additional mitigation measures to be implemented at the Site to reduce dust emissions before such an exceedance occurs.

The 1-hour average trigger levels are shown in

Table 17. The Level 1 -3 mitigation measures are listed in **Table 7** to **Table 16**.

A Level 1 TARP PM_{10} trigger level has been nominated at which point the Quarry Manager and or Leading Hand is to review wind conditions etc and determine if the dust is from the quarry or a background issue, confirm that all standard practices are being followed and become alert to any further increase that may require action.

If elevated PM_{10} concentrations continue to be recorded, (i.e. exceedance of TARP Level 2) this would prompt a review of the need to implement additional contingency controls and/or reduce the intensity of dust-generating activities where required (guidance for key dust sources provided in column 6 of

Table 17).

In addition to revision and application of dust controls and TARP Level 1-3 mitigation measures operations are also considered to reduce or move work away from more exposed areas depending on the conditions at the time.

It is noted that even if the increased PM_{10} concentrations are concluded to be due to elevated background levels rather than emissions from the quarry, steps should still be taken to minimise the additional incremental impacts from the quarry where possible.

An exceedance of TARP Level 3 would require more direct action to reduce dust levels, e.g., assessing whether dust-generating activities (including loading and unloading activities) need to be temporarily stopped until conditions improve.

When identifying contingency measures, the Quarry Manager and or Leading Hand must consider any potential health and safety risks associated with relocating or ceasing activities, such as:

- ensuring excavation/unloading areas are stable prior to relocating or ceasing activities
- preparations for blasts with explosives

Within the TARP control measures A **non-essential dust-generating activity** refers to any action or task that produces dust, but are not critical to the primary operations of extracting, processing or transport of materials including for sales. These activities may include, excessive vehicle movements, unnecessary non-critical material processing and handling, relocation of stockpiles, grading of haul roads, construction of the screening mound, and non-critical maintenance tasks.

The nominated 1-hour average PM_{10} TARP trigger level of 40 µg/m^3 and durations listed in

Table 17 will be reviewed during the annual DMP reviews based on monitoring data[2] collected at the site to ensure that the trigger level is appropriate for the ongoing monitoring and management of dust emissions from the quarry. It is also noted that with the implementation of the dust monitor upgrades (to EBAM units) the dust concentration trigger levels may require revision.

In relation to seasonal conditions TARP Level 1 occur approximately 75% of days in summer months.

[2] The upgrade of dust monitors to EBAMs from ADRs may show that a revision of the trigger level (40 µg/m^3) would be beneficial.

Table 17 – TARP Trigger Levels and Responses

Trigger Level	Weather Forecast	Measured /Observed Site Conditions	PM_{10} Concentration at Any Station	Response
Normal State	• Calm to light winds (<19 km/hr, or <5.5 m/s)	• Calm conditions, or wind felt on face and leaves rustle • No visible dust leaving site	1-Hour average PM_{10} at all monitoring stations <40 µg/m^3	• Note forecast and observed conditions and address in prestart meetings • Undertake quarterly maintenance of wind sensors. • Maintain standard (normal state) dust suppression activities
Level 1	• Moderate winds blowing from southeastern quadrant (20 – 29 km/hr, or 5.5 – 8 m/s) • Also <50% chance of rain	• Any wind sensor recording 20 – 30 km/hr, or 5.5 – 8 m/s blowing from eastern quadrant • Winds blowing from southeastern quadrant, (wind directions from east northeast (60°) to south (180°) • No rain in past 6 hours • Dust observed leaving site	1-hour reading at any monitoring station ≥40 µg/m^3	**Daily Weather Forecast:** • Communicate forecast conditions across site operations **Observed Site Conditions:** • Monitoring trigger alerts to be reviewed and correlated with weather conditions and wind directions. • Review operations via a visual inspection of dust emissions from current activities to ensure all normal state and TARP Level 1 dust mitigation measures are being appropriately implemented. **PM_{10} Trigger Level Exceeded:** • Determine if background levels may be a significant contributor to high levels being recorded (e.g. based on wind direction, information on bush fires in the region etc). • Quarry Manager and or Leading hand to identify any activity(s) and/or area(s) acting as a source of dust and implement or delegate additional control strategies and/or reduce intensity of identified activity(s) – see **Table 8** to **Table 16**. Continue to closely monitor dust concentrations being recorded.
Level 2	• Fresh winds blowing from southeastern quadrant (30 – 39 km/hr, or 8 – 11 m/s) • Also <90% chance of rain	• Any wind sensor recording 30 – 40 km/hr, or 8 – 11 m/s • Winds blowing from southeastern quadrant, (wind directions from east northeast	Two consecutive 1-hour readings at any monitoring station ≥40 µg/m^3	**Daily Weather Forecast:** • Communicate forecast conditions across site operations • Review daily activities based on forecast and modify dust-generating non-essential activities to reduce dust potential **Observed Site Conditions:** • Perform a visual inspection of dust emissions from current activities to ensure all standard and any previously identified contingency dust mitigation measures are being appropriately implemented.

Trigger Level	Weather Forecast	Measured /Observed Site Conditions	PM_{10} Concentration at Any Station	Response
		(60°) to south (180°), strong enough to cause small tree branches to move • No rain in past 12 hours • Dust observed leaving site		• Quarry manager and or Leading Hand to leave site and complete a visual inspection from Sellicks beach. **PM_{10} Trigger Level Exceeded:** • Quarry Manager and or Leading hand to implement or delegate additional control strategies for any new or previously identified dust sources – see **Table 8** to **Table 16**. • Remotely confirm timed/switched sprinklers are operating • Out-of-hours alerts to be investigated as soon as practicable to do so Continue to closely monitor dust concentrations being recorded.
Level 3	• Strong winds blowing from southeastern quadrant (>40 km/hr, or >11 m/s) • Also <90% chance of rain	• Any wind sensor recording >40 km/hr, or >11 m/s • Winds blowing from southeastern quadrant, (wind directions from east northeast (60°) to south (180°), strong enough to cause large tree branches to move • No rain in past 24 hours • Dust observed leaving site	Three consecutive 1-hour readings at any monitoring station ≥40 µg/m^3	**Daily Weather Forecast:** • Communicate forecast conditions across site operations • Cancel non-essential dust-generating activities (e.g. crushing may be able to cease, blasting delayed) **Observed Site Conditions:** • Perform a visual inspection of dust emissions from current activities to ensure all standard and any previously identified contingency dust mitigation measures are being appropriately implemented. • Quarry manager and or Leading Hand to leave site and complete a visual inspection from Sellicks beach. • Quarry Manager and or Leading hand to review contingency measure options again (see **Table 8** to **Table 16**) and implement or delegate additional control strategies for any new or previously identified dust sources. **PM_{10} Trigger Level Exceeded:** • STOP identified dust-generating activity(s) until conditions improve and PM_{10} levels reduce. Do not recommence identified activity(s) until such time that wind conditions change or it is deemed that sufficient dust suppression controls have been applied to the identified activity(s) • EPA and DEM to be notified if the 24-hour average PM_{10} levels exceed 50 µg /m^3. • Cintellate report to be filed if 24-hour average PM_{10} levels exceed 50 µg /m^3. Out-of-hours alerts to be investigated by end of next working day.

7 Sellicks Hill Quarry Dust Risk Assessment

7.1 Quantitative Dust Impact Assessment

A quantitative dust emissions impact assessment is being undertaken for Sellicks Hill Quarry and this Interim Dust Management Plan will be updated when the results of that assessment are available to replace the current risk assessment methodology.

The assessment will include the estimation of dust emission rates for key operational activities as well as fugitive emissions from wind erosion of disturbed soils, factoring in current dust mitigation measures implemented at the quarry as described elsewhere in this document. Dispersion of the estimated dust emissions will then be modelled based on site-representative meteorological data and local topographical information to predict off site dust levels throughout the year.

The key objectives of the dust assessment are to:

- Quantify risks to the nearest existing and potential future sensitive receptors and assess compliance with regulatory criteria
- Identify key dust sources contributing to off-site dust levels to assess the effectiveness of existing controls to managing cumulative offsite impacts and to target sources for additional controls
- Identify optimum locations for the siting of dust monitoring equipment

The assessment is scheduled to be completed by March 2025 and will be submitted to EPA for review and comment prior to being finalised.

For the purposes of this Interim Dust Management Plan, **Section 7.2** presents a qualitative risk assessment of dust emission sources at the quarry, as included in previous versions of the DMP.

7.2 Qualitative Risk Assessment

7.2.1 Methodology

The following definitions are provided for key risk assessment terms:

- **Likelihood**: the estimated probability or frequency of occurrence of an event over time (**Table 18**). Likelihood of occurrence has been largely based on experience of similar quarrying operations, but has considered additional activities associated with extractive industries.
- **Consequence**: the outcome or severity of an impact/event occurring (**Table 19**).
- **Risk**: a combination of the likelihood of an event occurring and the severity of outcome or consequence of the event (**Table 20**)

Table 18 – Description of Likelihood

Descriptor	Likelihood Criteria (read as either/or)
Almost certain	The event will occur The event is of a continuous nature The likelihood is high
Likely	The event will probably occur during the life of the quarrying operation
Possible	The event could occur during quarrying operations, and is expected to occur
Unlikely	The event could occur during quarrying operations, but is not expected to occur
Rare	The event has almost never occurred in similar operations, but conceivably could occur

Table 19 – Description of Consequence

Consequence Severity Rating	Element (read as either/or)		
	Social	**Environmental**	**Economic and Legal**
Insignificant	• Not of concern to local or wider community • No inquiries or complaints	• Possible impacts within the quarry boundaries and immediate environment but without noticeable consequence • No impacts of consequence at local, regional or State level	• No costs or limited costs for rehabilitation or mitigation • No breach of regulatory standards or licence conditions
Minor	• Not of significant concern to local or wider community • Isolated inquiries or complaints	• Some reversible impact within the quarry boundaries and immediate environment with no significant long-term changes • May be rehabilitated or alleviated without outside assistance	• Cost for any rehabilitation is minor • No breach of regulatory standards or licence conditions
Moderate	• General local concern • Multiple inquiries and/or complaints	• Significant changes within the quarry boundaries with potential for long term change and remediation required • Minor changes outside quarry boundaries that may be simply rehabilitated or alleviated with outside assistance	• Possible breach of legal obligations – inquiries and/or instruction from regulatory authorities
Major	• Will attract significant public concern • Widespread complaints and/or lobbying by representative groups	• Substantial and significant changes within and/or outside the quarry boundaries that can only be partially rehabilitated or alleviated • Long term consequences	• Major costs associated with rehabilitation/ alleviation obligations • Serious breach of legal obligations - regular inquiries by regulatory authorities and penalties for non-compliance
Catastrophic	• Major public outrage • Deaths or widespread health and economic effects on public	• Extreme permanent changes to social or natural environment that cannot be practically or significantly rehabilitated or alleviated	• Major costs associated with rehabilitation/ alleviation and penalties • Major breach of legal obligations - continual involvement of regulatory authorities and legal investigation for non-compliance

Table 20 – Qualitative Risk Matrix

			Likelihood of Consequence				
			E	D	C	B	A
			Rare	Unlikely	Possible	Likely	Almost Certain
Severity of Consequence	5	Insignificant	Low 5E	Low 5D	Low 5C	Moderate 5B	Moderate 5A
	4	Minor	Low 4E	Low 4D	Moderate 4C	High 4B	High 4A
	3	Moderate	Moderate 3E	Moderate 3D	High 3C	High 3B	Extreme 3A
	2	Major	High 2E	High 2D	Extreme 2C	Extreme 2B	Extreme 2A
	1	Catastrophic	High 1E	Extreme 1D	Extreme 1C	Extreme 1B	Extreme 1A

7.2.2 Risk Assessment

The findings of the risk assessments for off-site dust impacts associated with each of the identified potential dust-generating activities are presented in the following tables:

- Drilling and blasting (**Table 21**)
- Excavators (**Table 22**)
- Loading and unloading of material with HME (**Table 23**)
- Conveyors, transfer points and stacking conveyors (**Table 24**)
- Crushing and screening plants, including at start-up and shut-down (**Table 25**)
- Wheel generated dust from all vehicle movements (**Table 26**)
- Drag-out (**Table 27**)
- Wind erosion, e.g. of fine material stockpiles, open areas, and the western screening mound (**Table 28**)

In each table, the Primary Risk is based on no controls being applied, while the Residual Risk is based on the effective implementation of the control measures identified for each source in **Section 6.3**.

Table 21 – Risk Assessment: Drilling and Blasting

Location	Activity/Impact	Primary Risk (without Control)			Residual Risk (with Control)		
		Likelihood	Consequence	Risk	Likelihood	Consequence	Risk
Southern Area South Pit PM237	Preparatory drilling causing localised dust that can be seen off-site	Likely (B)	Moderate (3)	High (3B)	Unlikely (D)	Minor (4)	Low (4D)
	Blasting causing episodic TSP and PM_{10} causing off-site nuisance	Likely (B)	Moderate (3)	High (3B)	Possible (C)	Moderate (4)	Moderate (4C)
	Off-site health consequences from blasting	Possible (C)	Moderate (3)	High (3C)	Unlikely (D)	Minor (4)	Low (4D)
	Visible dust from blasting causing community concern	Almost certain (A)	Major (2)	Extreme (2A)	Almost certain (A)	Minor (4)	High (4A)
Eastern Area Top Pit PM163	Preparatory drilling causing localised dust that can be seen off-site	Likely (B)	Moderate (3)	High (3B)	Unlikely (D)	Minor (4)	Low (4D)
	Blasting causing episodic TSP and PM_{10} causing off-site nuisance	Possible (C)	Moderate (3)	High (3C)	Unlikely (D)	Minor (4)	Low (4D)
	Off-site health consequences from blasting	Unlikely (D)	Moderate (3)	Moderate (3D)	Unlikely (D)	Insig-nificant (5)	Low (5D)
	Visible dust from blasting causing community concern	Almost certain (A)	Major (2)	Extreme (2A)	Almost certain (A)	Minor (4)	High (4A)

Table 22 – Risk Assessment: Material Excavation

Location	Activity/Impact	Primary Risk (without Control)			Residual Risk (with Control)		
		Likelihood	Consequence	Risk	Likelihood	Consequence	Risk
Southern Area South Pit PM237	Finer aggregates during excavation and loading causing dust that moves off-site	Likely (B)	Moderate (3)	High (3B)	Unlikely (D)	Minor (4)	Low (4D)
Eastern Area Top Pit PM163	Finer aggregates during excavation and loading causing dust that moves off-site	Likely (B)	Moderate (3)	High (3B)	Unlikely (D)	Minor (4)	Low (4D)

Table 23 – Risk Assessment: Loading and Unloading

Location	Activity/Impact	Primary Risk (without Control)			Residual Risk (with Control)		
		Likelihood	Consequence	Risk	Likelihood	Consequence	Risk
Southern Area South Pit PM237	Finer aggregates during loading and unloading causing dust that moves off-site	Unlikely (D)	Moderate (3)	Moderate (3D)	Unlikely (D)	Minor (4)	Low (4D)
Eastern Area Top Pit PM163	Finer aggregates during loading and unloading causing dust that moves off-site	Unlikely (D)	Moderate (3)	Moderate (3D)	Unlikely (D)	Minor (4)	Low (4D)
Central Crushing	Finer aggregates during loading and unloading causing dust that moves off-site	Likely (B)	Moderate (3)	High (3B)	Unlikely (D)	Minor (4)	Low (4D)
Northern Area	Finer aggregates during loading and unloading causing dust that moves off-site	Likely (B)	Moderate (3)	High (3B)	Unlikely (D)	Minor (4)	Low (4D)
Western Mound	Finer aggregates during loading and unloading causing dust that moves off-site	Likely (B)	Moderate (3)	High (3B)	Unlikely (D)	Minor (4)	Low (4D)
Leaving Site	Drag-out from sales trucks off site transport	Likely (B)	Minor (4)	High (4B)	Unlikely (D)	Minor (4)	Low (4D)

Table 24 – Risk Assessment: Conveyors and Transfer Points

Location	Activity/Impact	Primary Risk (without Control)			Residual Risk (with Control)		
		Likelihood	Consequence	Risk	Likelihood	Consequence	Risk
Central Crushing Plant Area	Conveyor and conveyor transfer points moving aggregate within the central crushing area	Likely (B)	Moderate (3)	High (3B)	Unlikely (D)	Minor (4)	Low (4D)
Northern & Central Crushing Plant	Fines accumulating under the conveyor infrastructure	Likely (B)	Moderate (3)	High (3B)	Unlikely (D)	Minor (4)	Low (4D)
Northern area – Sand Plant	Conveyor and conveyor transfer points moving aggregate within the sand plant	Unlikely (D)	Moderate (3)	Moderate (3D)	Unlikely (D)	Minor (4)	Low (4D)

Table 25 – Risk Assessment: Crushing and Screening

Location	Activity/Impact	Primary Risk (without Control)			Residual Risk (with Control)		
		Likelihood	Consequence	Risk	Likelihood	Consequence	Risk
Central Crushing Plant Area	Crushing generating dust that is airborne and/or accumulates on the ground to become re-entrained in wind and leaving the site boundary	Likely (B)	Moderate (3)	High (3B)	Unlikely (D)	Minor (4)	Low (4D)
Northern area – Sand Plant	Crushing generating dust that is airborne and/or accumulates on the ground to become re-entrained in wind and leaving the site boundary	Likely (B)	Moderate (3)	High (3B)	Unlikely (D)	Minor (4)	Low (4D)

Table 26 – Risk Assessment: Wheel Generated Dust

Location	Activity/Impact	Primary Risk (without Control)			Residual Risk (with Control)		
		Likelihood	Consequence	Risk	Likelihood	Consequence	Risk
Southern Area	Excavator, FEL and truck movements creating dust that moves off-site	Likely (B)	Moderate (3)	High (3B)	Unlikely (D)	Minor (4)	Low (4D)
	Occasional use of light vehicles in the Southern D&B generating dust that moves off-site	Possible (C)	Minor (4)	Moderate (4C)	Unlikely (D)	Minor (4)	Low (4D)
Eastern Area	Excavator, FEL and truck movements creating dust that moves off-site	Likely (B)	Moderate (3)	High (3B)	Unlikely (D)	Minor (4)	Low (4D)
	Occasional use of light vehicles in the Eastern D&B generating dust that moves off-site	Unlikely (D)	Minor (4)	Low (4D)	Unlikely (D)	Minor (4)	Low (4D)
Central Crushing	FEL and truck movements creating dust that moves off-site	Possible (C)	Minor (4)	Moderate (4C)	Unlikely (D)	Minor (4)	Low (4D)
	Use of light vehicles generating dust that moves off-site	Possible (C)	Minor (4)	Moderate (4C)	Unlikely (D)	Minor (4)	Low (4D)
Northen Area	FEL and truck movements creating dust that moves off-site	Likely (B)	Moderate (3)	High (3B)	Unlikely (D)	Minor (4)	Low (4D)
	Use of light vehicles generating dust that moves off-site	Possible (C)	Minor (4)	Moderate (4C)	Unlikely (D)	Minor (4)	Low (4D)
Western Mound	FEL and truck movements creating dust that moves off-site	Likely (B)	Moderate (3)	High (3B)	Unlikely (D)	Minor (4)	Low (4D)
	Occasional use of light vehicles generating dust that moves off-site	Unlikely (C)	Minor (4)	Low (4D)	Unlikely (D)	Minor (4)	Low (4D)

Table 27 – Risk Assessment: Drag-out

Location	Activity/Impact	Primary Risk (without Control)			Residual Risk (with Control)		
		Likelihood	Consequence	Risk	Likelihood	Consequence	Risk
Northern Area	Materials dropping through tailgates or collecting on the wheels of vehicles, depositing on Main South Road and causing nuisance	Likely (B)	Moderate (3)	High (3B)	Unlikely (D)	Minor (4)	Low (4D)

Table 28 – Risk Assessment: Wind Erosion

Location	Activity/Impact	Primary Risk (without Control)			Residual Risk (with Control)		
		Likelihood	Consequence	Risk	Likelihood	Consequence	Risk
Central Crushing Area	Dust from the surface of stockpiles and other exposed areas leaving the site boundary through wind erosion	Likely (B)	Moderate (3)	High (3B)	Possible (C)	Minor (4)	Moderate (4C)
Northern Area	Dust from the surface of stockpiles and other exposed areas leaving the site boundary through wind erosion	Likely (B)	Moderate (3)	High (3B)	Possible (C)	Minor (4)	Moderate (4C)
Western Mound	Dust from the surface of the western mound leaving the site boundary through wind erosion	Likely (B)	Moderate (3)	High (3B)	Possible (C)	Minor (4)	Moderate (4C)

8 Dust Monitoring

8.1 Purpose

A dust monitoring program is implemented at Sellicks Hill Quarry to assist in managing potential off-site dust impacts and to assess the efficacy of the dust mitigation measures implemented at the site, to ensure compliance at nearby sensitive receptors.

The dust monitoring program is intended to inform stakeholders as to the impact of dust travelling off site associated with the Proposal and to delineate between quarry-generated dust and background dust.

8.2 Monitoring Locations and Instrumentation

8.2.1 PM_{10} Monitoring

Continuous and real-time monitoring of ambient PM_{10} concentrations using dust monitors is being undertaken at three locations on the site boundary. The monitors are designed for continuous unattended monitoring with continuous real-time data transmission.

The instruments have been sited in accordance with Australian Standard *Methods for the Sampling and Analysis of Ambient Air – Guide to Siting Air Monitoring Equipment* (AS/NZS 3580.1.1, 2016).

Each dust monitor has a co-located meteorological monitor. Meteorological monitoring is to be conducted in accordance with Australian Standard *Methods for sampling and analysis of ambient air - Meteorological monitoring for ambient air quality monitoring applications* (AS/NZS 3580.14, 2014).

Currently, the instruments installed are Thermo Fisher ADR1500 Dust Monitors, which utilise light-scattering photometer (nephelometer) technology. Adbri is currently in the processing of sourcing EBAM+ instruments (see **Table 5**), which are beta-attenuation monitors that are US EPA and AS/NZ Standards compliant (AS/NZS 3580.9.11, 2022). The EBAM+ instruments will replace the current ADRs. Potential future use of the ADRs for additional monitoring will be considered as part of the dust modelling study and the update of the dust monitoring program in the next version of the DMP.

The current PM_{10} monitoring locations are shown in **Figure 11**. The locations of the three dust monitors will be reviewed based on the results of dust modelling study to ensure the network is optimised to target key potential dust sources and predominant wind directions.

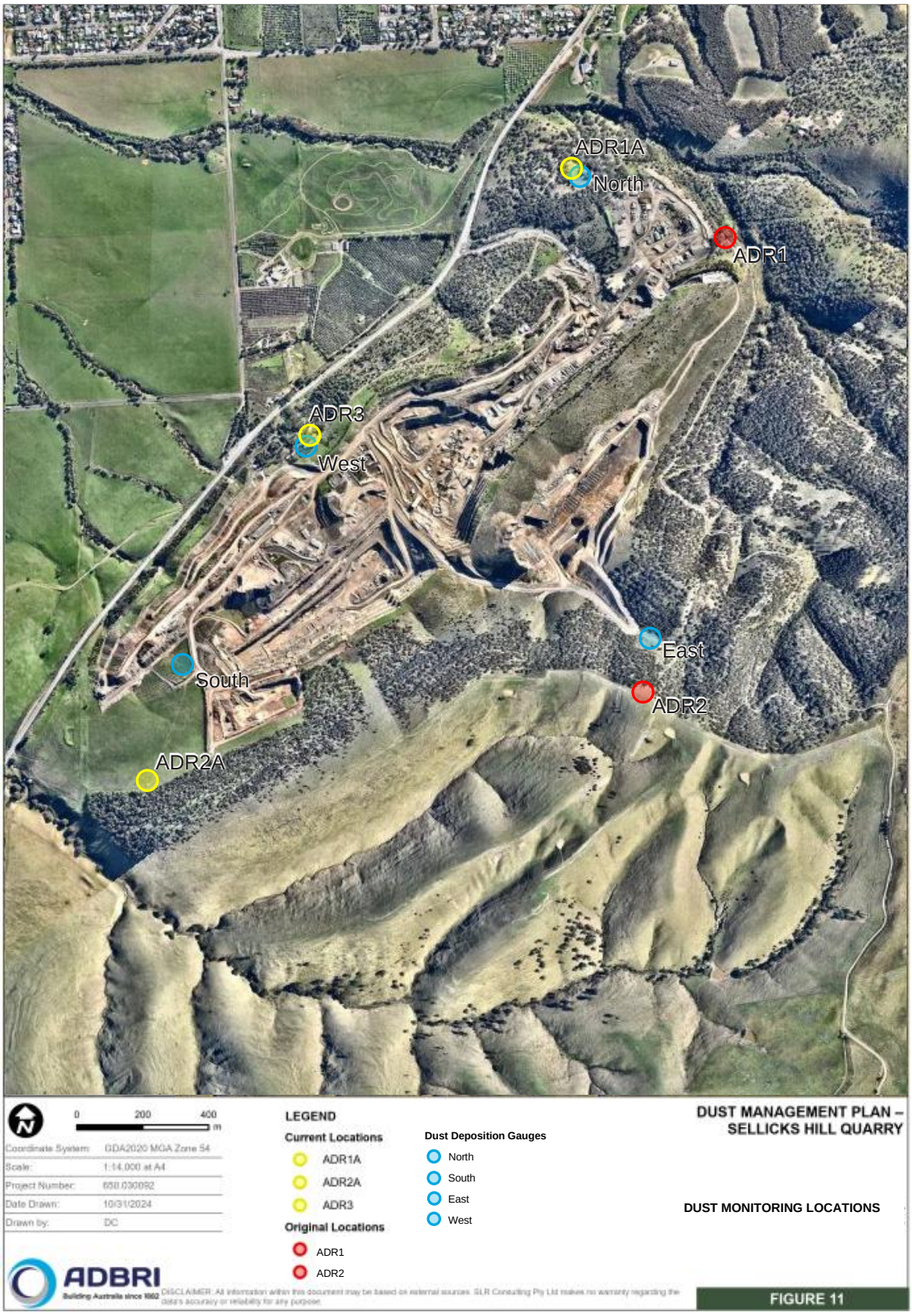
8.2.2 Dust Deposition Monitoring

Dust deposition monitoring using dust deposition gauges (DDGs) is also undertaken at four locations as shown in **Figure 11**.

Dust deposition monitoring is to be undertaken on a monthly basis, year round, in accordance with Australian Standard *Methods for sampling and analysis of ambient air, Determination of particulate matter – Deposited matter – Gravimetric method* (AS/NZS 3580.10.1, 2016)

The DDG sample bottles are to be collected each month and delivered to a NATA-accredited laboratory for measurement of insoluble solids within the maximum holding time specified in AS/NZS 3580.10.1, 2016.

Figure 11 – PM_{10} and Meteorological Monitoring Locations



8.3 Measured Parameters and Data Capture Rates

Recorded parameters at each monitoring location are listed in **Table 29**.

Data will be continuously generated in real time, web-hosted and relayed to the Quarry Manager and Operations Manager. Formal reporting will be undertaken by Adbri in line with the requirements set out in **Section 10**.

As outlined in **Table 29**, Adbri is aiming to meet the industry performance standard with respect to the operation of instruments (i.e. 90% data availability). In the event of monitoring interruption due to the failure of an instrument, repairs or a replacement instrument will be installed as soon as practicable.

ALS Environmental is engaged as a local, secondary supplier to ensure continual support for maintenance and calibration of dust monitoring equipment. Calibrations, maintenance and/or servicing will be undertaken on a quarterly basis by an external provider.

Consideration is also being given to developing a Contingency Plan, involving training staff, having spare equipment and, if required, changing equipment suppliers in order to avoid faults in monitoring equipment so that the minimum 90% data availability is achieved at the site.

Table 29 – Monitored PM_{10} and Meteorological Parameters at Sellicks Hill Quarry

Parameter Type	Parameter	Averaging Period	Units	Frequency	Minium Data Capture Target
Suspended particulate matter	PM_{10} concentration	10-minutes 1-hour average 24-hour average *(see Note 2)*	µg/Nm^3 *(see note 2)*	Continuous	90%
Deposited Dust	Dust deposition rate	1 month	g/m^2/month	Monthly	90%
Meteorology	Wind speed Wind direction Temperature Rainfall Humidity Atm pressure Solar radiation Evaporation	10-minutes 1-hour average	km/hr or m/s degrees from true North °C mm % kPa kW/m^2 mm/hour	Continuous	90%
Notes: 1. Corrected to 0°C, 1 atm 2. Midnight to midnight					

8.4 Data Analysis

The following analyses will be performed for quarterly report:

- Measured 24-hour average PM_{10} concentrations to be reviewed for compliance against the regulatory limit (see **Table 2**)
- Time series plots of 10-minute, 1-hour average (clock hours) and 24-hour average (midnight to midnight) PM_{10} concentrations at each monitoring site
- Tabulated data summaries of 10-minute, 1-hour average (clock hours) and 24-hour average (midnight to midnight) PM_{10} concentrations at each monitoring site
- Scatter plots for short term intervals (e.g. 10-minute averages) and triangulation to review/identify localised sources of dust when:
  - a Level 2 or 3 TARP trigger level is exceeded,
  - a non-compliance with the 24-hour regulatory criterion is recorded and/or

    - complaint.
- Should the analysis be inconclusive, or not valid due to localised differences in meteorological conditions, alternative analysis should be considered. This may include:
    - Preparation of 'pollution roses' or 'heat maps' to analyse the 10-minute and 1-hour average PM_{10} concentrations against concurrent wind conditions to identify key source locations relative to the monitoring sites.
    - Analysis of 'peak-to-mean' relationship between the maximum 1-hour average recorded each day and the 24-hour average recorded for the same day to assess whether the TARP trigger levels are appropriate to effectively manage dust

The above monthly data summaries will be collated for inclusion in the Quarterly Monitoring Report for submission to EPA (see **Section 10**).

9 Community Engagement and Feedback Management

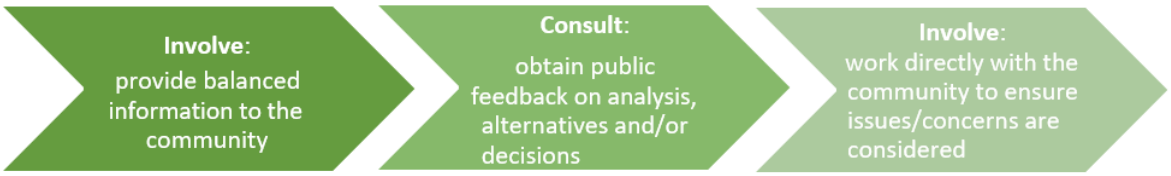
9.1 Community Engagement

Sellicks Hill Quarry has a long history of engaging directly with members of the community, community groups, regulators, local councils, members of parliament and other community stakeholders and this is something that will continue.

The **Sellicks Hill Quarry Community Engagement Plan** has the following objectives:

1. Provide relevant, timely and balanced information so people can contribute in a meaningful way.
2. Provide a contact point for people to have their say and to speak honestly.
3. Consider the needs and interests of all the stakeholders in decision-making processes.
4. Collaborate with peak bodies and other levels of Government to achieve common goals for the future.
5. Provide advance notice of visible blasts via email notification and post on Adbri Sellicks Hill Quarry website
6. The EPA-approved Dust Management Plan will be made publicly available via the Sellicks Quarry website.
7. The EPA-accepted Quarterly Compliance report will be made publicly available via the Adbri Sellicks Hill Quarry website.
8. Effectively communicate strategies being used to minimise environmental impacts at the site on sensitive receptors.
9. Engage directly with members of the community or community groups.
10. Attempt to minimise the number complaints received from the local community.

Different engagement levels may be appropriate in different situations. The following levels of engagement are relevant to Adbri's planned engagement activities, and these have been outlined in the **Community Engagement Plan**.



Any community complaints will be logged in the Cintellate system and will be addressed by the Operational Management Team (see **Section 11**).

9.2 Feedback Management

Feedback/complaints should be directed to the Quarry Operations Manager and/or the Quarry Manager via the community feedback email address (communityfeedback@southernquarries. com.au) as follows:

Adam Schutz
Quarry Operations Manager
Telephone: 08 8334 4704
Email: adam.schutz@adbri.com.au

Trevor Smith
Quarry Manager
Telephone: 08 8556 3007
Email: Trevor.Smith@adbri.com.au

The following procedure is to be followed on receipt of any feedback/complaint:

1. **Register** – The feedback/complaint will be entered onto the Complaints and Incident register by either the Operations Manager or the Quarry Manager. It will also be registered on the company's internal online management system Cintellate.
2. **Preliminary investigation** – Once the details are entered into the Complaints and Incident Register, a decision is reached to determine if the complaint is bona-fide. The complainant will be contacted directly to clarify their concerns as soon as possible, and no longer than 1-2 working days.
3. **Assigned actions** – Actions will be assigned in the Complaints and Incidents Register in order to respond to the specific complaint.
4. **Proposed action** – Communication with the complainant to discuss the proposed action will be organised.
5. **Close-Out** – Once the actions are completed satisfactorily, the complaint will be closed off and recorded in the Register.
6. **Failure to resolve a complaint** – There may be circumstances where the complaint is unable to be resolved. The complainant will then be notified, and the case will remain open and be reviewed at regular intervals (management meetings).

10 Reporting

10.1 Cintellate Incident Reports

All dust incidents will be recorded in Adbri's Cintellate system. Cintellate provides an electronic system for recording, reporting, monitoring and close-out of all environmental incidents. The following incidents are to be recorded:

- If 24-hour (daily) average PM_{10} levels exceed 50 µg/m^3
- If TARP Level 3 was triggered, including all actions taken to reduce dust emissions
- If a dust complaint was received

The EPA and DEM will be notified with 48 hours following an exceedance of the 24-hour (daily) average PM_{10} criteria at any of the monitoring locations outlined within the DMP.

Incident notifications will include but is not limited to:

- The date
- The suspected cause
- The measured particulate concentration over the 24 hour averaging period; and
- Remedial actions taken to reduce the particulate emissions from the site.

10.2 Monthly Reporting

The monthly data analysis findings (see **Section 8.4**) will be:

- Distributed by the Quarry Manager to Adbri Operational Management
- Disseminated to SP and SC through pre-start meetings, with a hard copy made available in the lunch room
- Posted on the Sellicks Hill Quarry webpage

10.3 Quarterly Monitoring Report

As per Licence Condition 1.1.3, Adbri must submit a Quarterly Monitoring Report to EPA by the 15th day in the month following the quarter, which is to include, but not be limited to, the following:

- The results of dust and meteorological monitoring undertaken in accordance with this DMP
- An interpretation of the 1-hour average PM_{10} monitoring results assessed in relation to TARP Trigger Levels and the 24-hour average PM_{10} criterion
- An interpretation of the Dust Deposition results
- Details of criteria by which monitoring results were assessed and interpreted (TARP)
- Details of the immediate actions implemented as a result of the TARP to minimise dust emissions
- Details of corrective actions implemented to prevent future exceedance events
- Details on the management of any complaints received during the quarter
- A summary of any community engagement conducted during the quarter.

The following monitoring data will also be included on an as needs basis (currently not requested):

- A tabulated summary and bar chart of the DDG results obtained during the quarter compared to longer term trend results.

The above quarterly report will be informed by the monthly data summaries prepared as outlined in **Section 8.4** and submitted to EPA by Adbri Operational Management.

The Quarterly Monitoring Report will be posted on the Sellicks Hill Quarry webpage, once approved by EPA and DEM.

11 Roles and Responsibilities

Roles and responsibilities for dust management at Sellicks Hill Quarry are outlined in **Table 30**.

Table 30 – Roles and Responsibilities

Personnel	Responsibilities – Mitigation Measures	Management Responsibilities
Adbri General Manager / Group Corporate Affairs Adviser		• Provide overall direction to management • Overall responsibility for the engagement strategy and ensuring activities are properly undertaken • Contact face with the media • Meet with community representatives as required • Seeking capital approvals
Adbri Operations Manager	• Facilitate the provision of training and inductions to all employees and site personnel to highlight the importance of dust control • Consider the potential generation and mitigation of dust emissions when planning site activities and site layout • Communicate specific site activities to community when dust is likely to be visible (e.g. blasting) • Ensure instructional signage is installed around quarry as required • Engineer controls for dust suppression (storage sheds, covers, bins)	• Overall environmental management for the site • Communication with the community • Identifying and addressing site improvements • Taking appropriate action in response to any complaints • Ensuring all complaints are closed off in a timely manner • Data entry to the Complaints and Incident Register (Cintellate) • Prepare and submit the Quarterly Monitoring Report to EPA and DEM • Ensure annual review of DMP is performed on schedule • Ensure Quarterly Monitoring Reports are posted on website • Preparation of annual compliance report
Quarry Manager/ Leading Hand	• Check environmental and meteorological conditions prior to start-up to assign TARP Level for next shift • Consider daily forecasts to inform construction activities to limit dust generation • Adjust and/or cease dust-generating activities in adverse meteorological conditions • Deploy water cart and sprinklers as necessary to wet surfaces and suppress dust as part of regular operations and in increased use in response to environmental conditions • Deploy use of chemical sup suppressants where required (ie. foaming agents, vital	• Ensure approved environmental strategies are implemented • Communication with the community • Maintenance of the Complaints and Incident Register (Cintellate) • Ensure site personnel receive appropriate environmental training • Report environmental incidents and corrective action to management • Monitoring for changes in TARP levels during shifts.

	bon matte encrusting agent, magnesium chloride) • Ensure speed of vehicles is safe and minimised to suppress dust at all times. • Assess road conditions and requirement for road dust suppressants. Re-route vehicles from problem areas where necessary • Maintain wheel wash and rumble grid in good order. • Ensure water reticulation on boundary stockpiles for dust suppression and irrigation of vegetation. • Ensure engineering controls in daily activities are being adhered to, i.e. locating stockpiles in shielded areas where possible, temporary covers and use of storage bins. • Maintain entry and exit point of quarry using a street sweeper at regular intervals.	
Site personnel and contractors	• Site activities are to be undertaken by trained contractors in accordance with Australian Standards • Communicate issues in relation to site conditions and environmental and dust mitigation controls required in real time • Prioritise dust mitigation in daily activities	

12 DMP Review

This Interim DMP will be reviewed at the completion of the dust modelling study in 2025, and thereafter on an annual basis and/or in the case of significant changes within the quarry.

As per License Condition 1.3.2, Adbri must submit an Annual Report to the EPA by the last day of August each year that includes but is not limited to:

a) A trend analysis of data collected for the preceding 12-month period; and
b) A review of the scope and operation of the strategies outlined within the Dust Management Plan, including identified opportunities for improvement in dust management at the Premises.

The annual reviews will include:

- An assessment of the effectiveness of the implemented dust management strategies and TARP trigger levels
- A review of the dust sources and emissions from the quarry operations
- The quarry's performance against the DMP objectives
- A review of the measures dust control measures being implemented
- A review of the quarterly reports and assessment of the appropriateness of the TARP trigger levels and responses detailed in

- **Table 17**
- A review of the monitoring results and siting of monitoring equipment.

A review may occur sooner if there is a material change in risk, legal requirements, stakeholder concerns or an incident relevant to dust management. Mitigation strategies will be reviewed for effectiveness and any corrective actions will be implemented.

The Annual Report will be posted on the Sellicks Hill Quarry webpage, once approved by EPA and DEM.

13 References

AS/NZS 3580.1.1. (2016). *Methods for Sampling and Analysis of Ambient Air, Method 1.1: Guide to siting air monitoring equipment.*

AS/NZS 3580.10.1. (2016). *Methods for Sampling and Analysis of Ambient Air, Method 10.1: Determination of Particulate Matter-Deposited Matter-Gravimetric Method, Australian/New Zealand Standard TM.*

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AS/NZS 3580.9.11. (2022). *Method 9.11: Determination of Suspended Particulate Matter – PM10 Beta Attenuation Monitor.*

NEPC. (2021). *National Environment Protection (Ambient Air Quality) Measure.* National Environment Protection Council.

NSW EPA. (2022, August). *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales.* New South Wales Environment Protection Authority.

SA EPA. (2017). *Sellicks Beach Air Quality Final Report, June 2017.*

SA EPA. (2022). *Interim criteria for respirable crystalline silica concentration in ambient air for mining and extractive industries.* South Australia Environment Protection Authority.

SA Government. (2016, July). Environment Protection (Air Quality) Policy 2016. South Australia.

Appendix A

Production Process Flow Diagrams

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Building Australia since 1882

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