

**AIR QUALITY MANAGEMENT PLAN
PREPARED FOR
HODGSON QUARRIES & PLANT PTY LTD
ROBERTS ROAD QUARRY, MAROOTA NSW 2756**

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Attachment 1: Dust Management Procedure



1. INTRODUCTION

Hodgson Quarries & Plant Pty Ltd operates the Roberts Road Sand Quarry is located on the corner of Roberts and Old Northern Road, Maroota the site spans across three (3) parcels of land 4405-4467 Old Northern Road, Maroota NSW 2756 (Lots 1 & 2, DP 228308 and Lot 2, DP 312327).

The site holds consent as an extractive industry (DA 267-11-99) and holds an Environment Protection Licence (EPL) for “crushing, grinding or separating” and “extractive activities” (EPL No. 6535). The proponent and quarry produces graded sand, gravel and pebble products for construction projects in the greater Sydney. The proponent has operated the quarry since 2000.

This Air Quality Management Plan (AQMP) has been undertaken in support of a modification application to import ENM and VENM on site to backfill spent portions of the quarry. The proposed activities, as well as current activities, have the potential to generate dust. To ensure ongoing compliance with licence conditions and prevent adverse impacts on the surrounding environment, this AQMP has been prepared for the implementation of both reactive and preventative dust management control measures. Dust and particulate emissions within the PM_{2.5}, PM₁₀ and Total Suspended Particulates (TSP) size range are the main contributors that affect air quality from quarry operation.

1.1 EXISTING AQMP

The site currently has an AQMP in place, as prepared by VGT Pty Ltd in 2016 (Ref: 2801 AQMP R4). This AQMP has been reviewed and its recommendations and mitigation measures for dust control are summarised below:

Reactive Dust Management

Visually assess activities during adverse weather conditions and modify activities as required to minimise dust, including:

- *Increase use of the water cart in dry weather*
- *Delaying non-essential earth-moving activities during periods of high wind*
- *Reducing truck speeds*

Extraction and Processing

...

Damping Down:

- *Hardstand and manoeuvring areas are to be kept in a sufficient state of dampness so as to minimise dust raised into the air by the passing of vehicles.*
- *Water is applied by water cart. Frequency of water application shall be as often as required so as to prevent dust rising into the air under the prevailing conditions.*
- *Potential dust generating material is to be processed and stored in a damp condition.*



Transportation

All vehicles are restricted to a speed limit of 30km/h. [Note: the site now implements more stringent traffic speed limits: walking pace or 5km/hr with all vehicles operating in low gear].

Trucks are covered when entering and leaving the premises carrying loads of potentially dust generating material.

All vehicle movements on unsealed areas are to be restricted to internal haul roads and working areas.

Wind Breaks and Bunds

Wind breaks of natural vegetation around the boundary of the site are to be established and maintained in accordance with the Rehabilitation Plan.

Bund walls are to be constructed at the corner of Roberts Road and Old Northern Road. [Note: this has been completed].

Progressive Rehabilitation

Progressively rehabilitate the site, where possible, to minimise the area exposed to wind erosion (Refer to Rehabilitation Plan for planting and watering details).

It is recommended that the measures outlined in the referenced AQMP (2016) continue to be implemented. Expansion on these measures and additional recommendations for dust control are detailed in the sections within this AQMP.

2. SITE DETAILS

Roberts Road Sand Quarry located across three (3) parcels of land spanning 4405-4467 Old Northern Road, Maroota NSW 2756 (Lots 1 & 2, DP 228308 and Lot 2, DP 312327). The combined area of the site is approximately 282,000 m².

The site is located approximately 49 km north-west of the Sydney central business district and is within The Hills Shire Council LGA. The site is within RU1 – Primary Production zoned land, as per The Hills Local Environmental Plan (LEP) 2019.

The site location in a local context is shown in Figure 2-1 and an aerial photograph of the site is shown in Figure 2-2.

Figure 2-1: Site Location in a Local Context

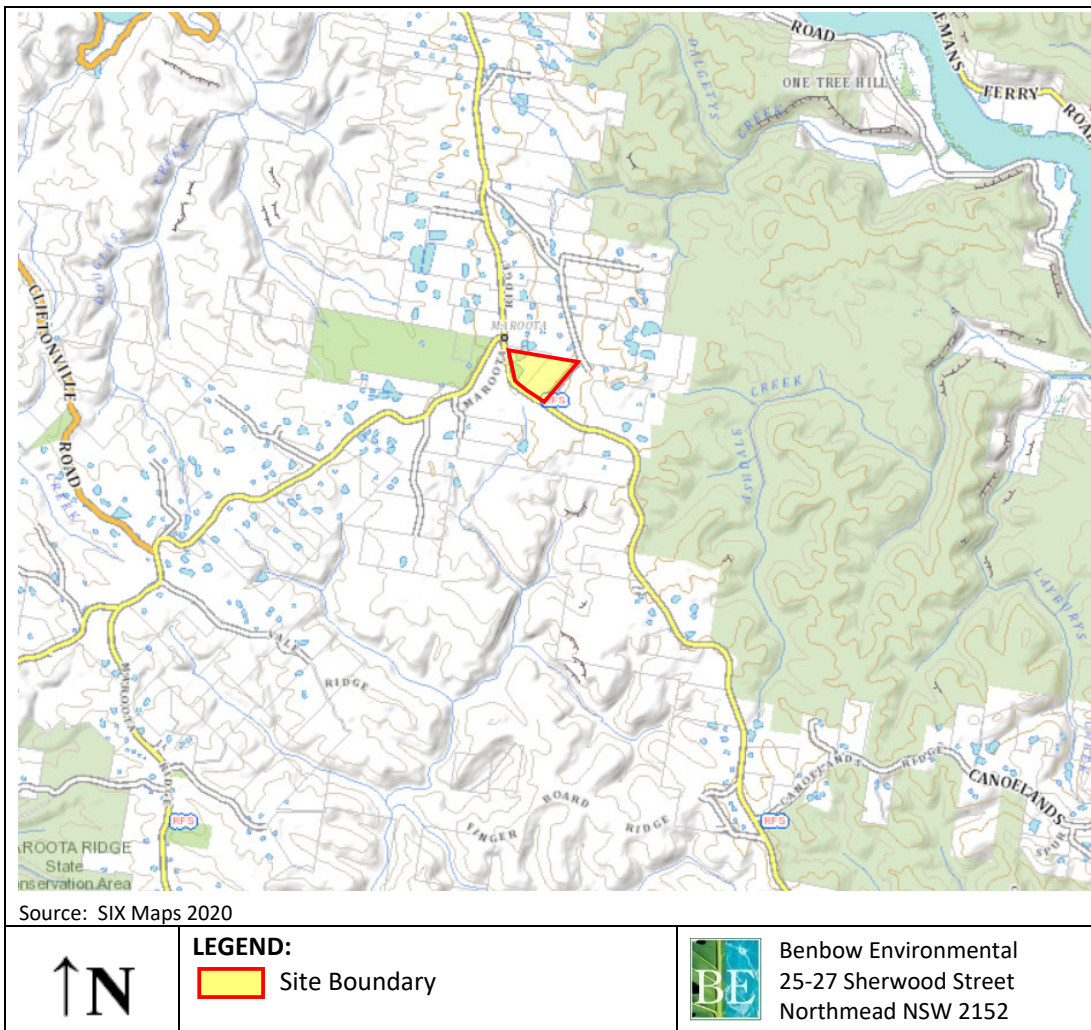
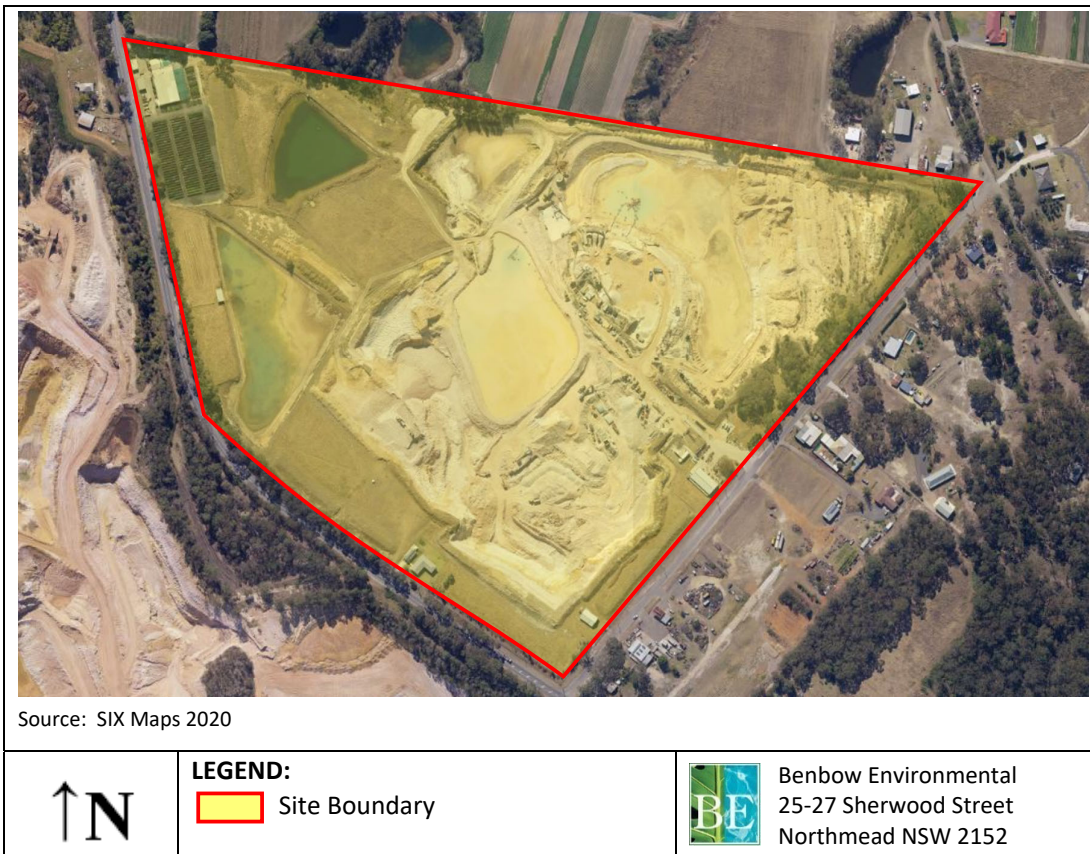


Figure 2-2: Aerial View of the Site



3. RELEVANT LEGISLATION AND CRITERIA

The following section provides the relevant legislation and criteria associated with dust and air emissions from site activities. The AQMP has been undertaken with reference to the below.

3.1 PROTECTION OF THE ENVIRONMENT OPERATIONS ACT 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) applies the following definitions relating to air pollution:

“Air pollution” means the emission into the air of any air impurity.

While “air impurity” includes smoke, dust (including fly ash), cinders, solid particles of any kind, gases, fumes, mists odours, and radioactive substances

The following sections of this Act have most relevance to the site:

- *Section 124 Operation of Plant - other than domestic plant*

The occupier of any premises who operates any plant in or on those premises in such a manner as to cause air pollution from those premises is guilty of an offence if the air pollution so caused, or any part of the air pollution so caused, is caused by the occupier’s failure:

(a) to maintain the plant in an efficient condition, or

(b) to operate the plant in a proper and efficient manner.

- *Section 126 Dealing with Materials*

(1) The occupier of any premises who deals with materials in or on those premises in such a manner as to cause air pollution from those premises is guilty of an offence if the air pollution so caused, or any part of the air pollution so caused, is caused by the occupiers failure to deal with those materials in a proper and efficient manner.

(2) In this section:

deal with materials means process, handle, move, store or dispose of the materials.

Materials includes raw materials, materials in the process of manufacture, manufactured materials, by-products or waste materials.

- *Section 127 Proof of causing pollution*

To prove that air pollution was caused from premises within the meaning of Sections 124 – 126, it is sufficient to prove that air pollution was caused on the premises, unless the defendant satisfies the court that the air pollution did not cause air pollution outside the premises.

- *Section 128 Standards of air impurities not to be exceeded*

(1) The occupier of any premises must not carry on any activity, or operate any plant, in or on the premises in such a manner as to cause or permit the emission at any point specified in or determined in accordance with the regulations of air impurities in excess of:

(a) The standard of concentration and the rate, or

(b) The standard of concentration or the rate.

Prescribed by the regulations in respect of any such activity or any such plant.

(2) Where neither such a standard nor rate has been so prescribed, the occupier of any premises must carry on any activity, or operate any plant, in or on the premises by such practicable means as may be necessary to prevent or minimise air pollution.

The proposed development is required to comply with this Act.

3.2 NSW ENVIRONMENT PROTECTION AUTHORITY

3.2.1 Environment Protection Licence (EPL)

The site holds an EPL (EPL No. 6535) for the following scheduled activities:

- Crushing, grinding or separating (> 100,000 – 500,000 tonnes processed); and
- Extractive activities (> 100,000 – 500,000 tonnes extracted, processed or stored).

The proposed modification and inclusion of ENM/VENM handling and processing would be within the current guidelines of the EPL.

The EPL conditions relating to air quality/dust emissions include:

03 – Dust

03.1 *The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.*

03.2 *All loaded trucks entering or leaving the premises must have their loads covered.*

04 Other operating conditions

04.1 *The licensee must prevent any tracking of mud on to public roads by vehicles leaving the premises.*

3.2.2 NSW EPA Air Quality Guidelines

The NSW EPA *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* provides guidance on methodology and thresholds that are to be used for air impact assessments. The relevant criteria for dust has been included as a guide for allowable off-site particulate emission levels associated with site activities.

Assessable pollutants (along with their corresponding limits) are summarised in Table 3-1.

Table 3-1: Relevant NSW EPA Limits for Particulates and Dust Deposition

Pollutant	Averaging Period	Concentration		Source
		µg/m³		
PM _{2.5}	24 Hours	25		DoE (2016)
	Annual	8		DoE (2016)
PM ₁₀	24 Hours	50		DoE (2016)
	Annual	25		DoE (2016)
Total Suspended Particulates (TSP)	Annual	90		NHMRC (1996)
		g/m²/month	g/m²/month	
Deposited Dust	Annual	2	4	NERDDC (1988)

3.3 AIR QUALITY CRITERIA

3.3.1 Conditions of Consent

As per conditions of consent (DA 267-11-99), the relevant conditions (28-37) relate to air quality management and dust emissions on site are presented below:

AIR QUALITY

Air Quality Criteria

28. *The Applicant shall take all practical steps to manage the development so that the ambient air quality goals for total suspended particles (TSP) of 90 $\mu\text{g}/\text{m}^3$ (annual average), particulate matter (PM₁₀) of 50 $\mu\text{g}/\text{m}^3$ (24 hours average) and 30 $\mu\text{g}/\text{m}^3$ (annual average) and the dust deposition goal of 4mg/m² (annual average) are not exceeded as a result of the development, when measured at any monitoring location specified in the Air Quality Management Plan.*

Air Quality Management

29. *The Applicant shall prepare an Air Quality Management Plan as part of the EMP. The Air Quality Management Plan shall:*

- (a) *identify existing and potential sources of dust deposition, TSP and fine particulates (PM₁₀ and PM_{2.5}) and specify appropriate monitoring intervals and locations. The purpose of the monitoring is to evaluate, assess and report on these emissions and the ambient impacts with the objective of understanding the development's contribution to levels of dust deposition, TSP and fine particulates in ambient air around the site;*
- (b) *provide a monitoring plan having regard to local meteorology and the relevant Australian Standards, identifying the methodologies to be used, including justification for monitoring intervals, weather conditions, seasonal variations, selecting locations, periods and times of measurements;*

- (c) *provide details of dust suppression measures for all sources of dust from the development, ... The use of a polymer in the water to minimise dust impacts shall be investigated as part of this Plan;*
- (d) *provide details of actions to ameliorate impacts if they exceed the relevant criteria; and*
- (e) *provide the design of the reactive management system intended to reduce the day-to-day impacts of dust and fine particulates due to the development.*

The Applicant shall implement the approved management plan as approved from time to time by the Secretary.

30. *Activities occurring at the premises must be carried out in a manner that will minimise emissions of dust from the premises.*

31. *The Applicant shall cease offending work at such times when the operations are resulting in visible dust emissions blowing in a direction so as to cross onto public roads or lands not owned by the Applicant.*

32. *The Applicant shall install, operate and maintain a sprinkler system to adequately water all cleared areas and stockpiles so as to minimise dust emissions to acceptable levels.*

33. *The Applicant shall ensure that all vehicular movements on unsealed areas are restricted to specific routes and that all vehicles within the subject site keep to a speed limit of 30 km/h. [Note: the site now implements more stringent traffic speed limits: walking pace or 5km/hr with all vehicles operating in low gear].*

34. *The Applicant shall ensure that trucks are covered when entering and leaving the premises carrying loads of potentially dust generating material.*

Air Quality Monitoring

35. *All monitoring equipment is to be installed and operational prior to commencement of construction.*

36. *Operation of dust deposition gauges and monitoring must be carried out in accordance with;*

- a) *Australian Standard 3580.10. 01 (1991) Particulates – Deposited Matter – Gravimetric Method. Approved method AM-19 referred to in Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales, December 1999.*
- b) *Australian Standard 2724.3 (1984) Particulate Matter – Determination of Total Suspended Particulates (TSP) - High Volume Sampler Gravimetric Method. Approved method AM 15 referred to in Approved Methods for the sampling and Analysis of Air Pollutants in New South Wales, December 1999.*
- c) *Australian Standard 3580.9.6 (1990) for Suspended Particulate Matter – PM10 High Volume Sampler with Size Selective Inlet-Gravimetric Method. Approved method AM-18 referred to in Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales, December 1999.*

37. *A meteorological station measuring wind speed and direction must be installed and operated by the Applicant at a site determined in consultation with the EPA.*

This AQMP has been undertaken in accordance with this condition of approval.

3.3.2 National Environmental Protection (Ambient Air Quality) Measure

The Australian Government *National Environmental Protection (Ambient Air Quality) Measure (2016)* standard for relevant pollutants (particulates) are described in Table 3-2. The aim of the measure is for the adequate protection of human health and well-being in relation to ambient air quality parameters.

As per the pollutant parameters referenced in Section 3.2.2, the standards for PM_{2.5} and PM₁₀ are adopted from the measure, and displayed below.

Table 3-2: National Environmental Protection (Ambient Air Quality) Measure Standards for Pollutants

Pollutant	Averaging Period	Concentration (µg/m ³)
PM _{2.5}	24 Hours	25
	Annual	8
PM ₁₀	24 Hours	50
	Annual	25

4. EXISTING ENVIRONMENT

4.1 CLIMATE

Long term climate data including temperature, wind run and rainfall was collected from the Bureau of Meteorology Automatic Weather Station (AWS) located in the Richmond RAAF. This AWS is closest to the site, approximately 25 km south-west of the site boundary, and is considered representative for the climate and local weather conditions on site.

The AWS has monthly statistics from 1993-2020 for mean minimum temperature, mean maximum temperature, and 1994-2020 for mean daily wind run and mean rainfall. The monthly and annual statistics are summarised in Table 4-1

Table 4-1: Climate Data from Richmond RAAF AWS

Month	Mean Minimum Temperature (°C)	Mean Maximum Temperature (°C)	Daily Wind Run (km)	Mean Rainfall (mm)
January	17.9	30.5	229	81.6
February	17.8	29.3	218	116.7
March	15.8	27.1	184	81.1
April	11.8	24.2	164	53.9
May	7.5	20.9	143	42.8
June	5.3	18	156	54.5
July	3.6	17.8	176	29.8
August	4.4	19.8	208	31.2
September	7.9	22.9	225	44.6
October	11.1	25.4	218	50
November	14.2	27.2	242	75.3
December	16.2	29.1	238	67.1
Annual	11.1	24.4	200	719.1

The mean minimum and maximum temperatures were lowest in July and highest in January. The daily wind run was lowest in May and highest in November. The mean rainfall was lowest in July and highest in February.

4.2 AIR QUALITY

4.2.1 Local Air Quality

Background air quality parameters for PM_{2.5} and PM₁₀ was obtained from the NSW EPA air quality monitoring station in Richmond. The Richmond air quality monitoring station is located inside the campus of the University of Western Sydney, Hawkesbury and is situated in the north of the Hawkesbury basin in a residential/semi-rural area. This station is located approximately 28 km

south-west of the subject site, and so while possibly indicative of background particulate concentrations for the general north-west area, it is not site specific and therefore insufficient for accurately estimating on-site impacts.

The relevant assessable pollutant parameters available from the monitoring station are PM_{2.5} and PM₁₀. Annual average concentrations of assessable pollutants from Richmond air quality monitoring station spanning the years 1994-2019 is displayed in Table 4-2. Note, parameter results unavailable for their respective year are displayed as “-”.

Table 4-2: Annual Average Particulate Emissions for Richmond Monitoring Station (1994-2019)

Year	PM _{2.5} Annual Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)
1994	-	23.2
1995	-	17.3
1996	-	14.7
1997	4.6	17.7
1998	3.5	-
1999	3.5	13.7
2000	4	14.9
2001	-	17.4
2002	-	21.7
2003	6.6	18.2
2004	6.5	18.4
2005	5.8	16.7
2006	5.9	17.4
2007	-	14.9
2008	7.3	13
2009	5.8	21.5
2010	4.2	13.1
2011	4.7	13.2
2012	5.3	15.1
2013	8.4	17.4
2014	6.7	15.4
2015	7.7	12.8
2016	7.9	16
2017	7	16
2018	8.1	18.7
2019	13.1	24.2
Average	6.3	16.9

4.3 ON-SITE AIR QUALITY

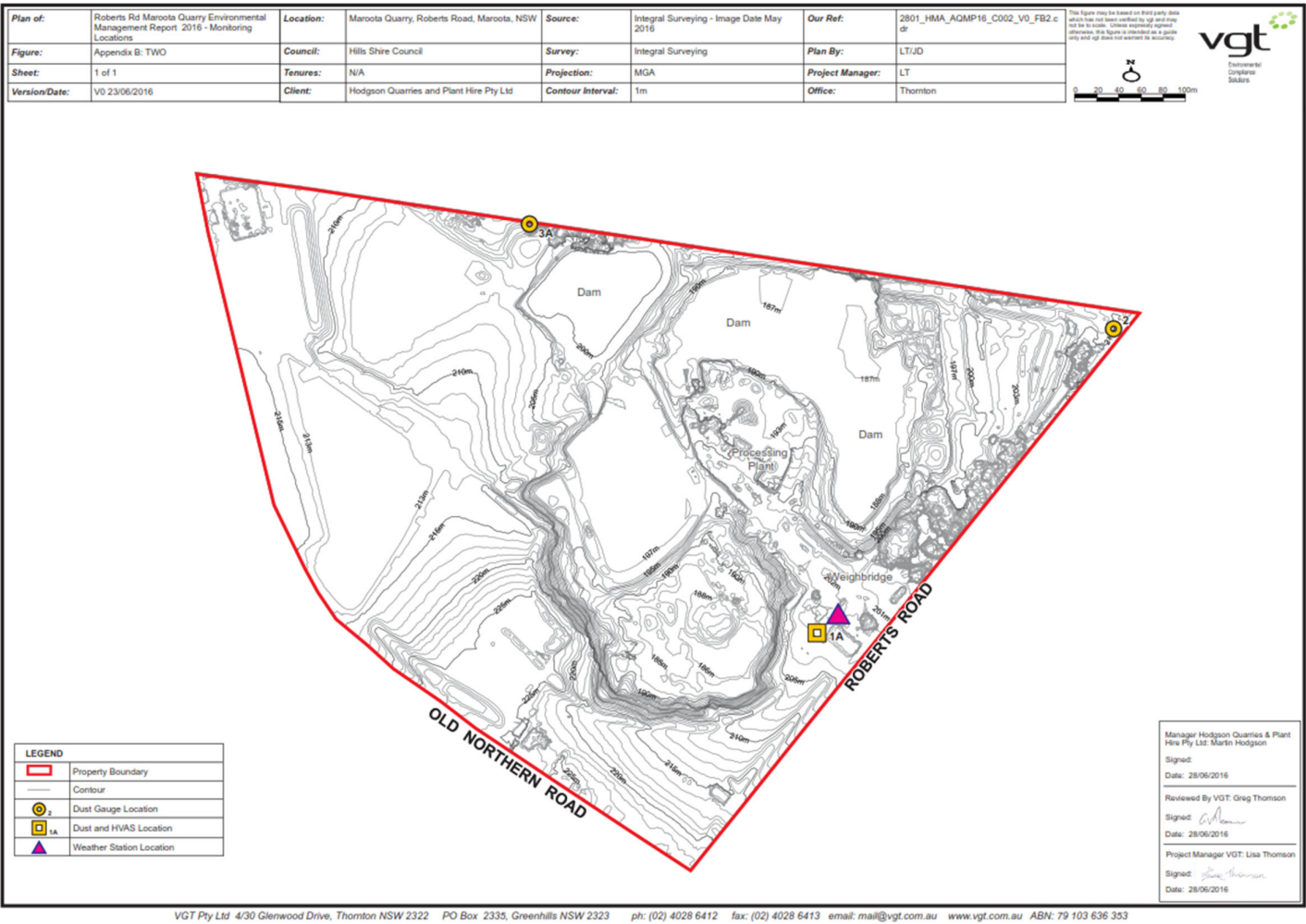
4.3.1 Air Quality Monitoring

Reactive and preventative dust monitoring is currently undertaken on site via 2 High Volume Active Samplers (HVAS) that each measure $PM_{2.5}$ and PM_{10} respectively. The HVAS are located along the south-eastern boundary at the entrance to the site. In addition to the HVAS, 3 dust deposition gauges are located on the north, east and south boundaries to capture insoluble solids. A weather monitoring station is located adjacent to the HVAS, near the site office.

Dust monitoring has been conducted in conjunction with the existing AQMP undertaken by VGT Pty Ltd. Figure 4-1 displays where the current dust monitoring locations are located.



Figure 4-1: Dust Monitor Locations on Site



4.3.2 Proposed Modification Site Activities

Dust generating activities and processes associated with the proposed modification include the above in addition to:

- Importation of ENM/VENM materials onto site;
- Application of ENM/VENM to backfill spent quarry portions;
- Truck movements in and out of the site; and
- Use of vehicles and equipment for grading and levelling ENM/VENM materials.

4.3.3 Current Site Activities

Dust generating activities and processes on site identified in the existing AQMP include:

- *Dozers ripping sandstone;*
- *Loading and unloading of raw material using dump trucks;*
- *Loading the hopper;*
- *Screening;*
- *Loading processed material into trucks;*
- *Traffic on unsealed haul road;*
- *Operation of diesel-powered plant and equipment; and*
- *Wind erosion from extraction and processing areas.*

These activities will continue to take place on site.

4.3.3.1 Dust Risk Areas

The dust generating activities can be grouped into categories for areas of management:

- Processing (extraction activities, loading/unloading, and placement of ENM/VENM materials);
- Truck movement (including haul roads); and
- Wind erosions (from exposed areas in processing and extraction).

Each management area is addressed below.

5. DUST MANAGEMENT

Air quality impacts from dispersed dust is from particles including size fractions known as TSP ($<50\text{ }\mu\text{m}$), PM_{10} ($<10\text{ }\mu\text{m}$) and $\text{PM}_{2.5}$ ($<2.5\text{ }\mu\text{m}$). Dust fractions $\text{PM}_{2.5}$ and PM_{10} (under 10 microns) are the most dangerous to human health due to their small size when they are inhaled as they are able to pass through the nose and throat and into the deeper parts of the lungs, posing a significant health concerns to the sensitive members of our community (such as the elderly or infirm). They are persistent in the environment and affect both air quality and visibility. Effective suppression and minimisation of fine particle movement off site is important for human health and the environment.

The following sections outline the reactive and preventative measures recommended on site for the management of dust emissions from current and proposed site activities. These methods incorporate the the management measures recommended for dust control by the existing AQMP detailed in Section 1.1.

The proponent will continue to incorporate the following dust management measures.

Table 5-1 summarises the recommended air quality management methods, their frequency and trigger thresholds for proposed for use on site. Approximate target dates and expected timeline for implementation is also provided.

5.1 CONTROL METHODS

5.1.1 Monitoring

As described in Section 3.3.1, air quality monitoring requirements for DA 267-11-99 includes the operation of dust deposition gauges and active dust monitoring on-site in line with the appropriate Australian Standards.

As per the conditions of consent, dust monitoring is conducted as follows:

- Insoluble Solids (dust gauges): every 30 days ± 2 days; and
- Particulates (HVAS: $\text{PM}_{2.5}$, PM_{10} and TSP): Every 6 days.

5.1.2 Water Sprays and Water Carts

Water sprays for dust suppression have long been utilised as effective dust controls during quarrying activities, coal and fines handling and mining practices.

Mist sprays or water aerosol systems atomise water to 10 microns or less, which binds fine-dispersion dust particles and draws them to the ground, preventing airborne migration of dust from a source. Sprays are mobile and may be positioned where they are most effective and best used during dust generating activities or dust mobilisation; these may be directed at dust generating activities to minimise emissions from the source, or at exposed or disturbed surface areas to minimise emissions during wind events or vehicle movements.

The site currently utilises a water cart on internal unsealed haul roads to prevent vehicle and wheel generated dust emissions. This can also be used reactively, particularly where wind events,

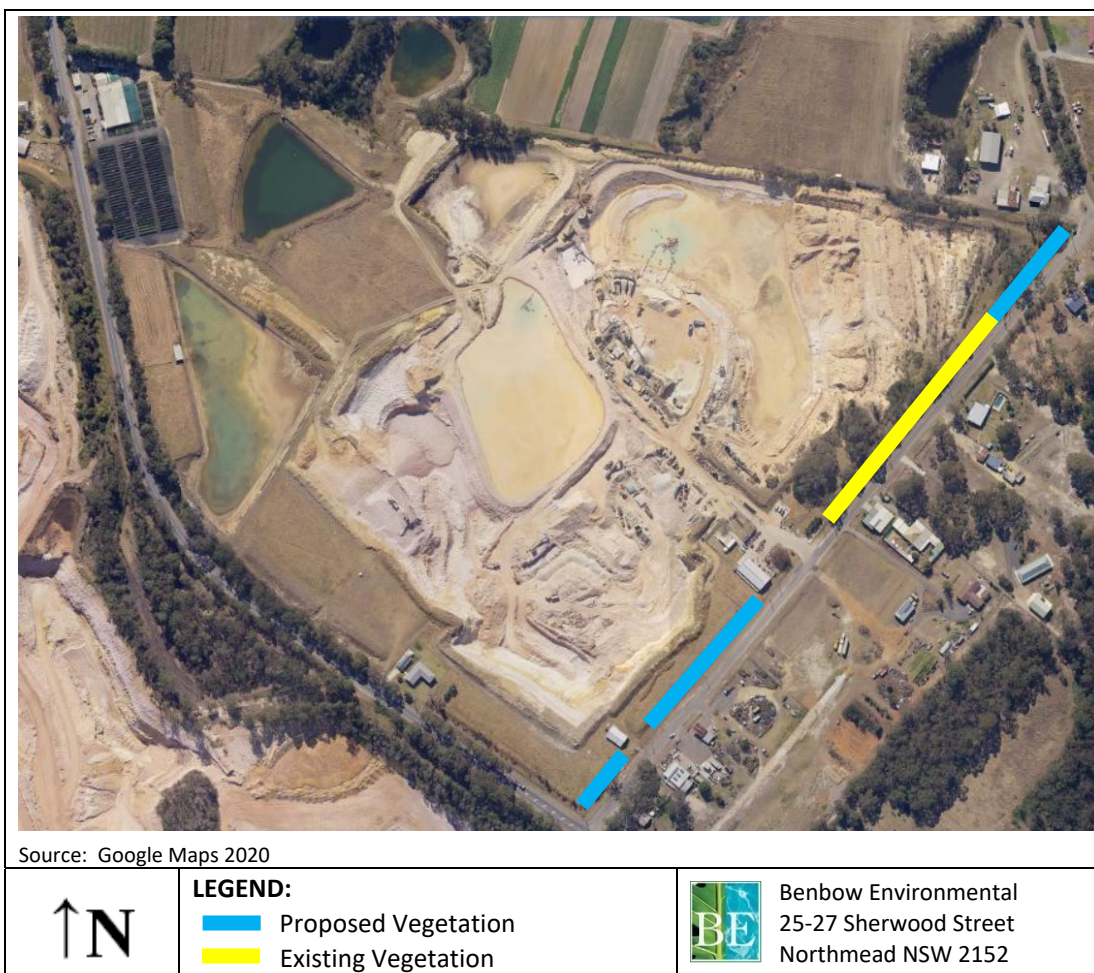
warm weather or consistent vehicle movements have disturbed the crust and reduced the efficiency of this dust suppression measure.

5.1.3 Earth Berm Vegetation

The proponent intends to increase the efficiency existing earth berms along Roberts Road by planting a vegetation screen on the berms.

The earth berm currently runs the eastern frontage of the site along Roberts Road, with small breaks for site structures and the entry driveway. The proposed berm vegetation layout is shown in Figure 5-1. The northern portion of the frontage has existing vegetation in place (yellow) and will not be altered. The proposed vegetation areas are highlighted in blue.

Figure 5-1: Proposed earth berm vegetation layout



The addition of vegetation along the perimeter berms will act as a wind screen to reduce windblown dust emissions from exiting the site. It is recommended that drought tolerant or low water requirement vegetation is planted across the Roberts Road earth berms.

5.1.4 Management Practices and Protocol

Management practices and application of the control methods will be utilised onsite to control dust risk areas and reduce potential impacts to offsite receivers.

A Dust Management Procedure has been included in this AQMP as Attachment 1. The procedure is a daily checklist for site staff to review and ensure that appropriate reactive and preventative control measures have been implemented.

The checklist is to be categorically completed at the start and end of each day (approximately 9am and 3pm). Daily observations and comments are to be noted and reviewed by site management. Issues or failings in dust management controls or mitigation measures are to be rectified as soon as practicably possible.

5.2 MANAGEMENT OF DUST RISK AREAS

5.2.1 Processing Activities

5.2.1.1 Reactive Measures

Mobile water sprays are to be used during on site dust generating activities such as:

- Extraction;
- Loading/unloading; and
- Placement of ENM/VENM materials.

Water sprays should be aimed to reduce dust generation, this can include:

- Directly at processing equipment;
- At the areas surrounding the activity to create more dust adhesion; and
- At materials just before or just after processing.

The site is to be continually visually assessed during dust generating activities and modify activities as required to minimise dust, including:

- Increase use of the water cart; and
- Delaying non-essential activities during periods of high wind.

5.2.1.2 Preventative Measures

The proposed modification includes the importing and application of ENM/VENM to spent portions of the quarry.

The application of ENM/VENM to disturbed areas on site will reduce potential dust emissions by covering finer, looser dust particles with coarser, larger materials; effectively smothering smaller materials with larger ones. In addition to using the ENM/VENM as a cover, water spraying the ENM/VENM as it is deposited will increase the effectiveness of the materials as a screen, and ensure that finer materials are covered by the application of courser ENM/VENM materials.



Once ENM/VENM has been deposited, the following practices should be conducted to prevent dust:

- Materials should then be sufficiently wet down with water sprays to crust the surface layer;
- Filled areas are to be inspected daily and included in the daily water cart route to ensure adequate observations are made; and
- Where surfaces have been disturbed by further vehicle movements or additional ENM/VENM application, water spraying should be undertaken to ensure a surface crust is present at all times.

5.2.2 Truck Movements

5.2.2.1 Reactive Measures

Water cart use should be utilised reactively where visible dust is created by vehicle movements, particularly where wind events, warm weather or consistent vehicle movements have disturbed the crust and reduced the efficiency of this dust suppression measure.

A more rigorous water cart regime may then be implemented where water carts are operating throughout the day on the most heavily used and/or affected haul roads.

The site is to be continually visually assessed during vehicle movements and modify activities as required to minimise dust, including:

- Increase use of the water cart;
- Delaying non-essential vehicle activities during periods of high wind;
- Reducing truck speeds; and
- Limit movements of vehicles.

5.2.2.2 Preventative Measures

- All vehicles are restricted to a speed limit of walking pace or 5km/hr with all vehicles operating in low gear;
- Trucks are covered when entering and leaving the premises carrying loads of potentially dust generating material;
- All vehicle movements on unsealed areas are to be restricted to internal haul roads and working areas;
- Water cart regiment should be implemented on haul roads at the beginning of each day prior to vehicle movements on site;
- Watering should be sufficient enough to form a crust on the road and adequately cover all unsealed roads within the site;
- Unsealed roads and ENM/VENM surfaces should be inspected during the initial water cart route and also during wind events; and
- Where these surfaces have been disturbed by site activities or environmental factors, they require spraying to ensure a surface crust is present at all times.

5.2.3 Wind Erosion

5.2.3.1 Reactive Measures

During wind events where airborne dust is being generated from unsealed areas:

- Sprays may be directed to the exposed or disturbed areas and positioned where practical upwind of these areas;
- Text notification will be sent to site management and dust warning light is to be automatically triggered during heightened wind speeds (>6 m/s or >20 km/h) from the north-west;
- Where the dust warning alert has been triggered where practical dust generating activities are to cease, disturbed areas are to be surveyed for visible dust generation, and water sprays are to be positioned to spray the sources; and
- Where visible dust can be observed moving across or off the site, sprays should be mobilised and directed towards the offending area.

The site is to be continually visually assessed during adverse weather conditions and modify activities as required to minimise dust, including:

- Increasing water cart usage in dry weather;
- Delaying non-essential earth-moving activities during periods of high wind; and

The nearest identified sensitive receivers are located beyond the eastern perimeter of the site, on Roberts Road.

5.2.3.2 Preventative Measures

- Damping Down:
 - ▶ Hardstand and manoeuvring areas are to be kept in a sufficient state of dampness so as to minimise dust raised into the air by the passing of vehicles;
 - ▶ Water is applied by water cart. Frequency of water application shall be as often as required so as to prevent dust rising into the air under the prevailing conditions;
 - ▶ Water should be applied so that the top layer is sufficiently damp. When done correctly, this should form a crust when dry; and
 - ▶ Potential dust generating material is to be processed and stored in a damp condition.
- Wind breaks of natural vegetation around the boundary of the site are to be established and maintained in accordance with the Rehabilitation Plan;
- Bund walls are to be maintained at the corner of Roberts Road and Old Northern Road;
- Progressively rehabilitate the site, where possible, to minimise the area exposed to wind erosion (Refer to Rehabilitation Plan for planting and watering details);
- The site weather monitoring station is to alarm and notify unfavourable weather conditions (such as high wind speeds, unfavourable directions etc) via text message to site management;
- Site signage with notification of alarms should be located at the site office to alert on-site staff of unfavourable weather conditions. Signage should read "DUST WARNING" with an accompanying notification blinking alert light and should be positioned in a way that it is visible to staff inside and outside of the office; and
- Site staff are to be appropriately trained to respond to these weather alerts to ensure that suppression sprays are mobilised immediately during these wind events.

Table 5-1: Air Quality Management Methods Summary

Dust Management Method	Potential Dust Generating Activity	Reactive/Preventative	Trigger Threshold	Frequency	Result	Implementation Date	Responsibility
Water Sprays Dust generating activities/disturbed areas	On-site activities	Reactive	Any dust generating activities such as extraction, application to land, loading/unloading of materials	During dust generating activities	Water sprays will reduce dust generation during site activities and reduce potential for emissions off-site	Immediately	All staff
	Wind events		Wind speeds >6 m/s or >20 km/h from NW/manually when visible dust emissions are migrating off-site	As required when alerted via on-site weather station	Reduction of off-site dust impacts at nearby sensitive receivers	Immediately	
Water Carts	Wheel generated dust	Reactive & Preventative	Dust emanating from internal haul roads, ENM/VENM areas and/or exposed/disturbed areas	Minimum once daily before vehicle movements and additionally where necessary depending on inspection, weather and vehicle movements	Unsealed roads and exposed/disturbed areas are sealed with a water crust and less likely to generate dust from vehicle movements or wind events	Immediately	Site management



Table 5-1: Air Quality Management Methods Summary

Dust Management Method	Potential Dust Generating Activity	Reactive/Preventative	Trigger Threshold	Frequency	Result	Implementation Date	Responsibility
ENM/VENM Application	ENM/VENM application to land Wind events	Reactive & Preventative	Any ENM/VENM application to land activities and areas	During ENM/VENM application to land activities As required when alerted via on-site weather station	Smother fine dust particles with large materials and limit disturbed/exposed surfaces	ASAP (Pending approval of modification)	Site management
Vegetated Earth Berms	Wind events	Preventative	-	-	Addition of vegetation to earth berms on Roberts Road will act as windbreak to limit dust emissions off-site and as a screen to nearby sensitive receivers	March 2021	Site management

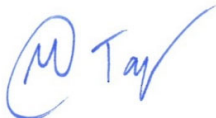
6. CONCLUSIONS AND RECOMMENDATIONS

The following reactive and preventative dust suppression measures have been recommended in this AQMP:

- Water sprays are used during dust generating activities such as extraction, loading/unloading of materials and ENM/VENM application to land;
- Weather station alerts management via text message when wind speeds of >6 m/s or >20 km/h emanating from the north-west are experienced on-site. Additionally, the DUST WARNING alert will be triggered to notify site staff of potential windblown dust on site;
- Where wind events have triggered the DUST WARNING alert (text message or dust warning light), water sprays are positioned to suppress airborne dust from offending areas;
- Reactive and preventative water cart usage – at least one trip on all unsealed haul roads at the beginning of each day prior to vehicle movements (preventative), and as required dependent on vehicle movements and environmental factors experienced on the day (reactive);
- ENM/VENM materials are applied to spent portions of the quarry to cover exposed/disturbed areas and limit airborne dispersion from these areas. Where materials are deposited, they should then be sufficiently sprayed to crust the surface layer. Surfaces are inspected daily during the morning water cart route. Where surfaces have been disturbed by site activities or environmental factors, they are to be sprayed to ensure a surface crust is present at all times.
- Increase the efficiency of existing earth berms along Roberts Road by planting drought tolerant/low water requirement vegetation to act as a screen on the perimeter and mitigate dust migration off site.

With the above measures in place on site, dust emissions generated from current and proposed site activities can be adequately managed and are expected to have minimal impact to the nearest sensitive receivers and surrounding environment.

This concludes the AQMP.



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7. LIMITATIONS

Our services for this project are carried out in accordance with our current professional standards for site assessment investigations. No guarantees are either expressed or implied.

This report has been prepared solely for the use of Hodgson Quarries & Plant Pty Ltd, as per our agreement for providing environmental services. Only Hodgson Quarries & Plant Pty Ltd is entitled to rely upon the findings in the report within the scope of work described in this report. Otherwise, no responsibility is accepted for the use of any part of the report by another in any other context or for any other purpose.

Although all due care has been taken in the preparation of this study, no warranty is given, nor liability accepted (except that otherwise required by law) in relation to any of the information contained within this document. We accept no responsibility for the accuracy of any data or information provided to us by Hodgson Quarries & Plant Pty Ltd for the purposes of preparing this report.

Any opinions and judgements expressed herein, which are based on our understanding and interpretation of current regulatory standards, should not be construed as legal advice.

ATTACHMENTS



DAILY DUST MANAGEMENT PROTOCOL CHECKLIST

Item no.	Action Required	Yes/No	Comments/Observations	Corrective Actions Taken	Initial
1	BOM Weather Forecast		Max Wind Speed _____ (High Alert: 6 m/s or >20 km/hr) Wind Direction from NW: Y / N If yes, time: _____ Dry Conditions Y / N Comment:		
2	Weather station & DUST HAZARD alert system with threshold (6 m/s or >20 km/h from NW) is working and in effect?				
3	Is water cart being used for haul road watering?		Previous time(s) of use: Scheduled time(s) of use:		
4	Is visible dust being generated?		Description (source, time, action):		
5	Is visible dust leaving the site?		Description (source, time, location):		
6	Are ENM/VENM deliveries occurring for today?		Time: Weather:		
7	Are water sprays used for unloading activities?				
8	Are trucks maintaining low speed limits?				
9	Are trucks covered when entering and leaving?				
10	Is the sealed entrance/exit driveway washed down?				
11	Any earth berm/vegetation maintenance works scheduled/being undertaken?				

Reviewed by:

.....
Name

.....
Signature

.....
Date/time