



OPERATIONAL DUST MONITORING & REMEDIAL ACTION PROGRAMME
VOYAGER II QUARRY, BGC PLANT CRUSHING & SCREENING
THE LAKES, WA
July 2024



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Quarry, BGC Plant Crushing & Screening, The Lakes, WA**

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Figure 2 – Layout of Operations Showing Dust Monitoring and Nearest Residence

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1 INTRODUCTION

The environmental factor assessed by the Environmental Protection Authority (EPA) relevant to this management plan is “dust”.

Management of dust is a key issue for all extractive industry operations. Whilst it is accepted that some dust generation is unavoidable during most types of ground disturbing activity, it is unacceptable for this dust to have health, environmental or significant amenity implications for the surrounding community.

The following quarry operations have the potential to cause dust lift-off:

- Drilling and blasting;
- Loading, hauling, conveyor movements;
- Crushing and screening involving primary, secondary and tertiary crushing with associated screening to various product specifications; and
- Trucking operations.

1.1 Legal Framework

Voyager Quarry was assessed under Part IV of the *Environmental Protection Act 1986* (see below). In addition to the updated Ministerial approval of the project (Statement 706 934 of April 2013), the proponent will need to comply with a range of statutory and policy requirements as outlined in Table 1 below.

The project, which was initially described within BGC’s Public Environmental Review (PER) (URS 2003), was referred to the EPA on 19 December 2001 by the Commissioner for Soil and Land Conservation.

Table 1. Statutory, policy and other guideline requirements

Agency	Statute/ Guideline	Applicability
Office of Environmental Protection Authority	<i>Environmental Protection Act 1986</i>	Ministerial Statement 706 followed by additions in Statement 872 and 934 (of April 2013) was issued under Part IV of the Act. Condition 706:M12 provides conditions to be met prior to clearing operations.
Department of Mines, Industry Regulation and Safety	<i>Work Health and Safety (Mines) Regulations 2022</i>	Occupation and safety measures required in regard to worker safety and health have relevance to the aspect of dust.
Department of Mines, Industry Regulation and Safety	<i>Environmental Management of Quarries (2021)</i>	Provides detailed guidelines in regard to dust management.
Department of Water and Environment Regulation	<i>Statutory Guidelines for Mining Proposals (2023)</i>	Quarry Crushing and screening operations are licensed under Part V of the Act and are subject to both Works Approvals and Operating Licences principally for the purpose of minimising dust emissions for crushing and screening operations.
Australian Standards	<i>AS/NZS 3580.1.1 2007 Methods for sampling and analyses of ambient air.</i>	Standards/guidelines for the placement of weather monitoring and air sampling units.

The quarry is at Lot 100 (Figure 1), Horton Road, The Lakes, Shire of Northam that is owned by BGC. In December 2001, the EPA determined the level of assessment for the proposal at PER, and this level of assessment was subject to a two week appeals process. A number of

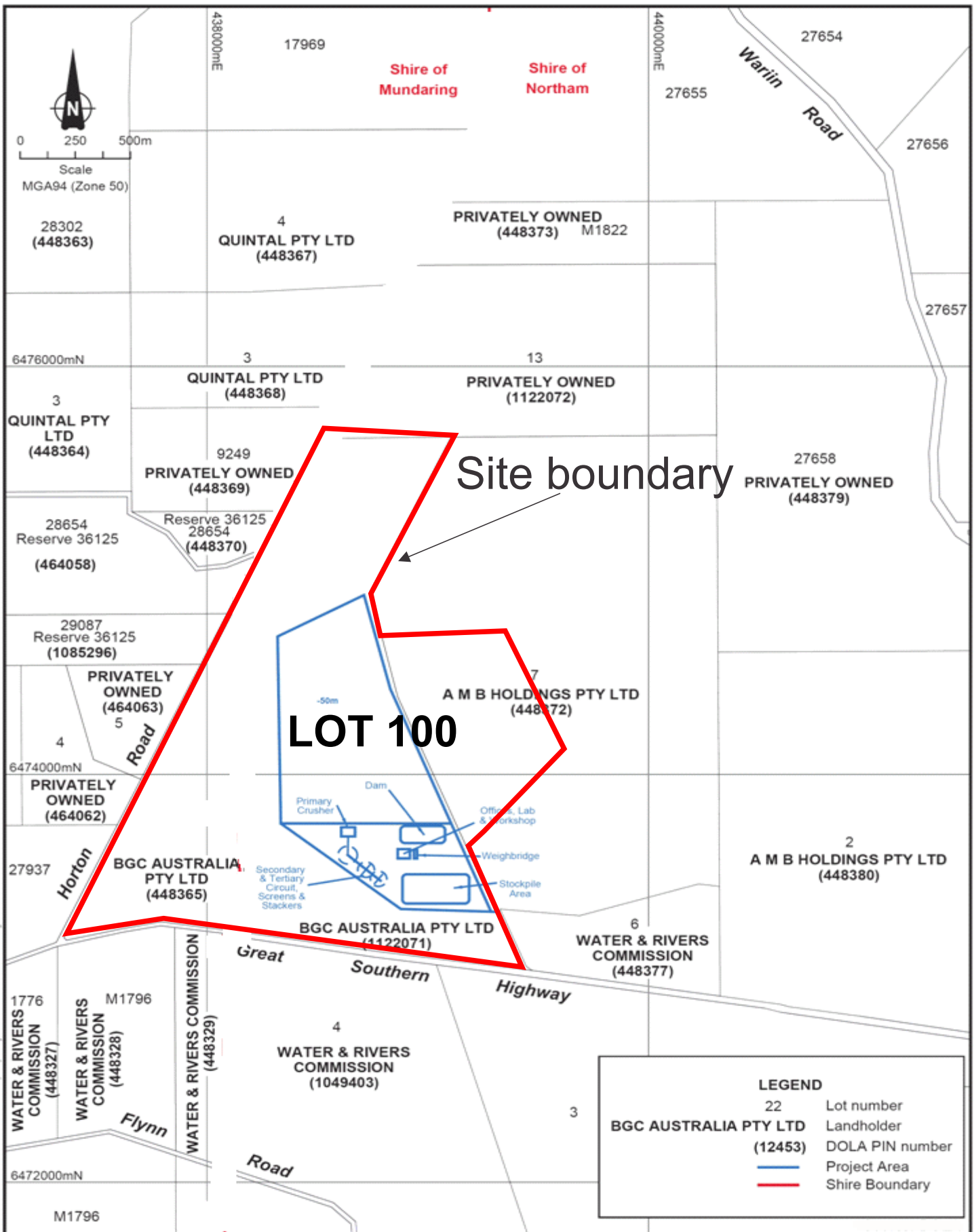


FIGURE 1
LOCATION OF THE QUARRY



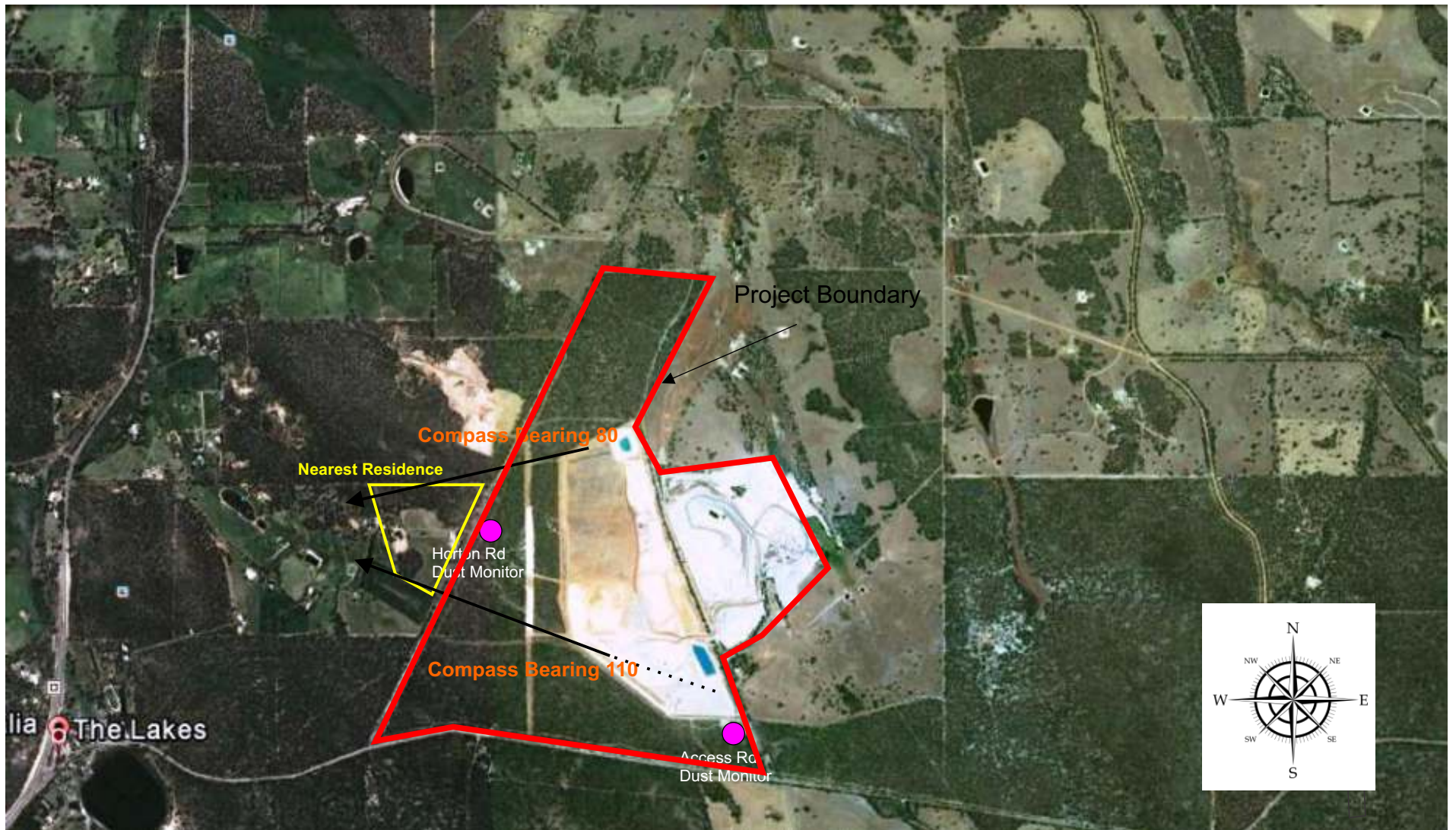


Figure 2 : Operational Area and location of dust monitors

appeals against the level of assessment were considered by the Minister for the Environment and dismissed on 1 May 2002. The subsequent PER document was released for public review for a period of eight weeks from 6 January 2003, closing on 3 March 2003. An extension was then provided to allow for further public submissions until April 2003. Following a review of the submissions, BGC modified its proposal and incorporated details of additional monitoring activities and data within its Response to Submissions (URS 2004).

2 PROJECT

The Voyager Quarry II is located at Lots 11 and 100 Horton Road (Avon Location 1881), The Lakes, Shire of Northam (Figure 1 & 2 indicate the project boundary).

The Voyager II quarry is for the extraction of a resource which is an extension of a Key Extraction Area designated in the Western Australian Planning Commission's Basic Raw Materials Planning Policy.

Ministerial Statement 706 set conditions on the construction and operation of a new quarry that was to replace the original Voyager Quarry, now nominated Voyager I. With expiry of the licence agreement between BGC and the landowner, the Operating Licence L5356 for crushing and screening at Voyager I was not renewed and was allowed to expire on 3rd October 2010. The new quarry, nominated Voyager II, was commissioned on 24th September 2010 under operating licence L8415.

Further to submission by BGC under Section 46 of the EP Act in October 2010, Statement 872 was issued in August 2011 replacing condition 706:M6.1 with new condition that extends the use of tertiary crushers to 19:00 hours on Saturdays. Further to this, under Section 46, Ministerial Statement 934 was issued in April 2013.

The development of the quarry will ultimately require the clearing of 91.5 ha of vegetation over the estimated 50 or-more-year life of the proposal. It is anticipated that the project's development will occur in six stages, with Stage 1 and Stage 2 being initially developed to provide room for the new below ground level facilities and infrastructure. Subsequent stages 3 and 4 have now been completed as well. All infrastructure, crushing and screening plants will be housed below ground level, and the site is surrounded by a buffer of trees and other vegetation.

2.1 Receiving Environment

The receiving environment relating to the aspect of dust is the amenity and health of nearby residents that could potentially be impacted by the proposed operations. Figure 2 indicates the nearest residential locations that are potentially at risk from dust emissions.

The nearest residence to the proposed quarry site is a privately owned property in the Shire of Mundaring, which will be approximately 560 m to the west of the operational area. Other settlements are located to the north and east of the proposed quarry site (Figure 2).

2.2 Potential Environmental Impacts of the Project

Concerns were originally raised by residents about dust from all operational aspects of the project. The potential for unacceptable off-site impacts from dust is most affected by the prevailing wind direction during dry summer conditions when east to south easterly winds prevail.

A large number of submissions were received on this particular issue during the publication of the project in 2002. The majority of these pertained to the perception that the proponent's old Voyager I operations was performing poorly with respect to management of dust. Concerns were also raised with respect to future operation of Voyager II and the potential impacts of dust on nearby residents' health, well-being and amenity.

3 PRINCIPAL ENVIRONMENTAL OBJECTIVES

3.1 BGC Objectives for Dust Management

The objective of the programme is to minimise and manage dust emissions that are directly emanating from and leaving the site associated with all operations including land clearing, excavations, blasting, stockpiles and general operational activities such as screening, crushing and transport.

3.2 Proponent Commitments

The proponent provided the following objectives for the dust management plan. The objectives are to ensure that:

- Nuisance dust levels are not experienced by neighbours and do not cause any health problems;
- Dust generated during the operational phases of the quarry expansion does not significantly impact on amenity;

The operational layout for the proposed quarry expansion will minimise dust and particulate emissions from the quarry.

4 DUST CONTROL STRATEGIES IMPLEMENTED TO DATE

The quarry operator will have had considerable experience over more than 30 years in

managing dust issues at the quarry; this experience has been applied and improvements made, where required, at the relocated quarry. Consequently, this previous experience is outlined below.

4.1 Potential Dust Sources in the Quarry Operations

The following quarry operations have the potential to cause dust emissions:

- Drilling and blasting;
- Materials movement – loading and unloading, conveyor transfer points;
- Materials processing – crushing and screening;
- Vehicle movement over unsealed ground;
- Vehicles leaving the premises with dust on chassis; and
- Vehicles leaving the premises without loads properly secured.

In the Voyager II quarry operation, BGC has modified its blasting practices to minimise the potential for blast dust to reach residences and obtains a Monday To Friday (weekly) wind direction prediction and quarry management set blasting for when wind conditions are favourable.

It should be noted, however, that Telemetered data of wind will over-ride the decisions based on predicted wind direction, this will be done half an hour before the blast.

Also, because regulations forbid explosives being left unattended in the ground when the quarry is closed, they must be detonated on Friday afternoons regardless of wind conditions if it has not been possible to detonate them earlier in the week.

This also is the case during storm events where lightning may be present; any explosives which are in the ground are required to be detonated, by law. It is expected that such circumstances may arise only on a few occasions each year.

When BGC responded to public submissions during the EIA process in 2002/03, the proponent identified that a number of actions have been undertaken over the last few years to improve dust management and other environmental issues at the old quarry. These improvements which included the use of improved capital equipment, facilities and procedures are outlined in Table 2.

Reports of inspections performed by the Department of Mines, Industry, Regulation and Safety (DMIRS) at the time for worker occupational health and safety purposes, note that dust management at the site particularly that associated with material processing activities, was of a high standard.

4.2 Dust Control Measures Implemented To Date

The following dust control measures apply to BGC operations:

Table 2 below includes those dust control measures implemented to date.

Improvement	Details of Improvement	Location of Implementation
Sealing access road	The access road was sealed with bitumen.	Access road
Revised blasting procedures (reduction in dust emissions)	<p>BGC issued an internal memo regarding blasting procedures. It included the following instructions:</p> <p>Delay blasting on days when wind strength and direction is likely to cause dust impacts on sensitive receptors;</p> <p>Plan blasting according to weekly wind predictions;</p> <p>Delay blasting as late as possible until conditions (winds) are favourable;</p> <p>Delay blasting if wind conditions are not favourable, however charges cannot be left in the ground over a weekend and cannot be delayed beyond Friday or if electrical storms are likely.</p> <p>BGC issued an internal memo for the revised blasting instructions, including:</p> <p>From the Southern end of the pit - South Easterlies (110 degrees) winds will be considered unfavourable moving to the Northern End of the pit Easterlies (80 degrees) will be considered unfavourable, so depending on where the shot is in the pit BGC Quarries will set the direction of the wind which is unfavourable each shot at the design stage.</p> <p>During periods when wind directions are towards sensitive residents, and wind speed measurements are in the band of 2m/s to</p>	Pit

Improvement	Details of Improvement	Location of Implementation
	<p>5m/s, blasting should be avoided. Literature review shows that PM 10 and even more so PM 2.5 deposition decreases with wind speed increasing.</p> <p>This needs to be reviewed by real-time telemetric data half an hour prior to blasting, as radio signals of any sort are not permitted during blasting.</p>	
	<ul style="list-style-type: none"> • Road sweeper on sealed roads • Water ground at pit floor prior and during blasting. 	Pit and surrounds
Reduced dust emissions	<ul style="list-style-type: none"> • Enclosure of the primary crusher to reduce noise and dust emissions. • A Fogger system installed in the Primary Crusher building. • Front end of primary crusher enclosed. • ROM bin enclosed with conveyor belting 	Primary crusher
	<p>A new sprinkler system is installed. The sprinkler system is more efficient as it waters areas and stockpiles when wind direction and speed are at a set level.</p> <ul style="list-style-type: none"> • Chutes enclosed on all stackers with water sprays. • Wash down bay installed at the plant. • Extra dam built to capture more storm water • Wheel wash <p>The pump now fills up the water truck five times quicker than the previous pump enabling more frequent watering.</p>	Stockpile areas

Improvement	Details of Improvement	Location of Implementation
Revised procedures for trucking movements	BGC issued an internal memo requiring mandatory use of tarpaulins on every departing load.	Overall

5 DUST CONTROL STRATEGIES EMPLOYED AT THE QUARRY

5.1 Strategies Required

There are two separate quarry operations to be considered when planning dust management strategies. These are

- Overburden removal: These are carried out close to surface wind conditions; special precautions and planning are required for these operations.
- Quarrying operations that include those activities listed in Section 4.1 and dust management strategies are required for each type of operation. However, the risk of dust emissions crossing the proponent's boundaries are less likely due to the depth of the quarry operations being well below ambient wind conditions.

The above are further detailed in the sections below.

5.2 Overburden Removal

5.2.1 Proponent commitments

The following commitments have been previously provided by the proponent in regard to dust management during overburden removal.

- Develop the quarry in a staged process so that possible impacts from overburden removal are limited to five separate occasions over the life of the quarry.
- Undertake overburden removal only under favourable weather conditions – principally during the wetter months or during north westerly winds
- Establish a phone link to the quarry manager for nearby residents.
- Keep residents informed of when activities are likely to occur.
- Control any large bare expanses of soil and overburden that are left exposed over the dry summer period.

- Ensure that dust control mechanisms (spray and tanker trucks) are implemented where and when required.
- Undertake visual monitoring of dust and utilise mobile dust monitoring equipment at the boundary or location of nearest sensitive residence during these activities and stop work if unfavourable wind conditions cause dust to lift-off in the direction of residences.

Action to be taken for the above commitments and additional dust control and management measures are outlined in Tables 3, 4 and 7.

Table 3. Strategies and control measures to minimise dust emissions during vegetation & overburden removal phase

Activity	Strategy or Control Measure	How
Overburden removal	Favourable weather conditions	Should be undertaken immediately after vegetation removal to prevent leaving an open, cleared area.
<u>Monitoring:</u> overburden removal	Conduct continual visual monitoring for dust lift off.	If dust emissions threaten to cross the boundary of Lots 11 and 100 – stop work immediately and do not resume until optimum weather conditions return or until water sprays have been applied.
	Maintain dust monitoring equipment and weather station.	As required by Section 6.

5.3 Quarrying Operations

5.3.1 Proponent commitments

The following actions have been implemented by the proponent in regard to dust management for quarrying operations.

- Certain haul roads sealed with asphalt.
- Watering the haul roads.
- Watering of benches and pit floors.
- Watering of stockpiles.
- Watering of shot-rock in the pit before it is loaded and hauled to the crushing plant.
- Using wet drilling practices for the quarrying operations.
- Using water sprays throughout the plant and at transfer points.
- Watering and covering loads when transporting material off-site.
- Road sweeper on sealed roads
- Implementing speed restrictions within the quarry.
- Enclosure of the primary crusher.
- Fogger system installed in primary crusher.

Quarry operational and dust management strategies, and improvements already implemented, have been carried forward into the new operations.

Table 4 below includes those strategies required to ensure that dust emissions are minimised during operational activities.

Table 4. Strategies and control measures to minimise dust emissions during quarry operations phase

Activity	Strategy or Control Measure	When	How
Buffers	Maintain vegetation buffers between the boundary of the operational area and adjacent land holdings.	Commence tree planting spring '07	Undertake tree planting as required.
Blasting	<p>BGC blast procedures include the following instructions:</p> <p>Use wet drilling techniques.</p> <p>Avoid blasting when wind direction is unfavourable (as per Table 2) in regard to dust dispersion. Confirm by observation of wind sock.</p> <p>Delay blasting until conditions (winds) are favourable.</p> <p>Delay blasting until the next day if conditions are not favourable, however charges cannot be left in the ground over a weekend or if electrical storms are anticipated.</p> <p>As and when required the ground below where the shot is to be wetted down prior to blasting.</p> <p>(The complaints register indicates changes to blasting procedures have substantially reduced dust emission impacts.)</p>	All actions to be carried out for the life of the quarry.	<p>Automatic weather station with data-logger on-line to operations area.</p> <p>Review five-day weather forecasts.</p>
Materials Movement	<p>Water down blasted rock before transfer to primary crusher.</p> <p>Use water sprays for loading and unloading of raw materials and product as required.</p> <p>Water sprays to conveyors and transfer points.</p>	All actions to be carried out for the life of the proposal	For stock piles use sprinkler systems at short regular intervals to maximise dust control and efficient water use.
Materials Processing	Water spray to rock-feed hoppers		Primary crusher enclosed.

Activity	Strategy or Control Measure	When	How
Fugitive dust	A water truck is available as required.	Current	As required – water truck.
Trucking	<p>Access roadways to be sealed and subject to water spray as required.</p> <p>Certain haul roads have been sealed with asphalt.</p> <p>Departing trucks to be covered by tarpaulin.</p> <p>Wheel wash</p> <p>Trucks to depart in clean condition.</p> <p>Truck to obey speed restrictions on quarry approach road outside of weighbridge and obey speed limits within the quarry as required by safety considerations.</p>	<p>Seal road prior to start of operations.</p> <p>All actions to be carried out for the life of the quarry.</p>	

6 WEATHER INFORMATION REQUIRED

Information required to ensure the best possible outcomes for dust management includes:

- Maintaining a weather station for monitoring wind data;
- Reviewing modelled wind forecasts for current and five-day (Monday to Friday) long-term weather information;
- Maintaining ambient dust monitoring equipment, in two locations at boundaries adjacent to nearby residents, to provide upwind and downwind suspended dust comparisons and live weather information;
- Visual monitoring of dust emissions and use of mobile dust monitoring equipment when required.

6.1 Weather monitoring requirements

Where there is the potential for dust lift-off, in order of importance, dust impacts on amenity are primarily influenced by:

- wind strength;
- wind direction; and
- ground level moisture.

As ground-level moisture is to be artificially controlled by spraying, the key parameters for managing the effectiveness of dust suppression and management are wind strength and wind direction.

For quarry planning purposes long-range weather forecasts are obtained on a weekly basis to ensure that adequate planning is in place for conditions likely to cause dust emissions. This information is followed up on daily basis by monitoring real-time data available from the dedicated weather station and direct observations of the wind sock.

The Quarry Operator must be aware when hot, dry and windy conditions are likely to occur and appropriate action should be taken in deploying water sprays on the day, before such conditions arise so as to prevent dust emissions or to avoid operations that would be most likely to cause excessive dust emissions.

6.1.1 Wind Direction and strength

The York Weather Station is located approximately 45 km east of the project area. Table 5 below provides Bureau of Meteorology average dominant 9 am and 3 pm wind directions

derived from Bureau of Meteorology weather station at York collected between 1957 and 2014.

Wind roses were down-loaded from:

http://www.bom.gov.au/climate/averages/wind/selection_map.shtml

Table 5. Dominant wind directions for York Weather Station derived from BoM seasonal wind roses.

Season	9am	3pm
Winter	West to North	West to North
Spring	East to South	South West to North West
Summer	South East	East to South East and West
Autumn	East to South	West and East (more variable)

Review of weather conditions to date shows that the information in Table 5 confirms that placing dust monitoring equipment on a north-west/south-east axis would enable both up-wind and down-wind dust data to be obtained under the most common weather conditions, especially during summer when the risk of dust emissions is highest due to strong desiccating east to south easterly winds.

6.1.2 Weather forecasting information

Modelled wind directions are obtained from Stass Environmental for The Lakes locality (Quarry location). The modelled data is site specific for The Lakes region, with a resolution of 8 km. This information is obtained every Monday morning; and provides a table of wind data for the following 5 days.

The best possible wind strength and wind direction forecasts can be obtained for at least five days ahead using the Stass Environmental modelling. On the basis of this information, blasting is not conducted when wind conditions are unfavourable. Note that blasting has to be undertaken, regardless of wind direction and speed, at times when an electrical storm is forecast, or on Friday afternoons (explosives cannot be left in the ground over the weekend).

7 DUST MONITORING REQUIREMENTS

The monitoring requirements have previously been derived from using conditions imposed by the DWER on similar activities in the near Perth area (Heavy Industrial) and the DWER licence conditions. Heavy Industrial EPA Policy and Regulations have been relied on from the Kwinana Environmental Protection Policy (EPP) Area A of 1999 and 2005.

DWER have recently issued a letter to BGC that these conditions should no longer be applicable and the appropriate NEPM (2013) guideline values should be adhered to and provided for in the relevant EMP (Operational Dust Management) report.

The following monitoring requirements are required:

BGC undertakes a dust monitoring programme for the purpose of determining off-site dust impact from the operation. The programme incorporates the following:

- i. TEOM and BAM dust monitors shall be installed in accordance with the Australian Standard 3580;
- ii. The dust monitors, referred to above (i) are installed at the locations as depicted in Figure 2;
- iii. PM10 and PM2.5 is to be monitored using the dust monitors referred to above as per Australian Standard 3580;
- iv. PM10 and PM 2.5 are measured and recorded for the purpose of obtaining a 24 hour average; and
- v. Monitors are installed to ensure wind direction, wind speed and temperature is measured and recorded as per Australian Standard 3580.
- vi. Wind sock continues to be used for visual operational management.
- vii. Hand held dust monitoring equipment will be utilised at appropriate locations during blasting.

BGC ensures that the dust monitors and wind data monitors referred to in the above section (i), are maintained and calibrated in accordance with the manufacturer's specifications and Australian Standard 3580.

8 RELEVANT STANDARDS

The following relevant standards apply to the measurement of atmospheric particulates are summarised in Table 6 below.

Table 6: Relevant standards applying to measurement of atmospheric particulates

Standard	Application
AS 3580.9.8-2001 AS 3580.9.11-2008	Method for sampling and analysis of ambient air - Determination of suspended particulate matter - PM(sub)10(/sub) continuous direct mass method using a tapered element oscillating microbalance analyser

AS 3580.1.1-2007	Ambient air – guide for the sighting of sampling units
KEPP Area A (1999) and (2005)	Criteria for PM10 levels

8.1 Performance criteria

The following are indicators for tracking the progress in managing and controlling dust emissions as per condition 12 of Ministerial Statement 706 and 934.

8.1.1 *Particulate Matter Averaging Period Criterion of Emissions Associated with Quarrying Activities*

- Particulate matter < 10µm (PM10) 50 µg/m³ per 24 hour period
- Particulate matter < 2.5µm (PM2.5) 25 µg/m per 24 hour period .

The values above are derived from National Environmental Protection Measures (NEPM 2014) guideline values.

The monitoring of particulate matter against the set criterion is to exclude samples where the impact of extraordinary events such as these listed below are likely to have influenced the monitoring results:

- bushfires;
- prescribed burning;
- dust storms;
- fog;
- fire incidents;
- road traffic;
- illegal activities; or
- any other agricultural or industrial activity

8.1.2 *Visual monitoring*

Visual monitoring of dust emissions will be the first line of action for dust management, particularly during overburden removal. Actions may be instigated without delay at the observed source of dust emission. In the case of overburden removal this would include ceasing the offending operation, application of water sprays and only restarting operation at a low intensity and slowly increased to ensure dust emissions are minimised. In the case of quarry operations, the application of corrective water sprays at the offending operation would be appropriate.

8.1.3 Short-term corrective monitoring

A short-term “corrective action” dust concentration target of 100 µg/m³ is used to assist in maintaining ambient standards. Should this target concentration of PM₁₀ particulates be exceeded, this would initiate management procedures as for Section 9 to ensure that ambient dust standards are met. The dust monitors are configured to send an email message to the appointed staff, notifying of the exceedance.

8.1.4 Complaints register

A complaints register will be maintained to verify that operating parameters are effective.

The complaints register will track any problems that are likely to occur in regard to visual amenity.

When completing the Annual Report, the Quarry Manager will indicate any remedial action that has been taken in regard to complaints received.

8.2 Ongoing Monitoring

Table 7 below provides all dust monitoring activities required to minimise the risk of dust emissions crossing the boundaries of Lot 11 and 100.

Table 7. Ongoing dust monitoring activities

Monitoring	Location	Parameter/Frequency
Visual dust monitoring.	All quarry locations.	Opportunistic observation of visual dust lift-off or emission.
Short-term Continuous Dust Monitoring. Emails sent to 5 representatives if concentrations exceed the 15min target level.	On NW/SE axis of operational area on boundaries of Lots 11 and 1.	PM10 of 150µg per 15min at one of the monitoring stations. The alarm will trigger an investigation into cause and determine appropriate actions from BGC staff.

Monitoring	Location	Parameter/Frequency
Wind direction and strength.	Locate weather station in accordance with appropriate standards/guidelines	Wind strength and Direction.
Complaints Register.	All quarry operations.	Log complaint as required by register.

9 TRIGGER ACTION RESPONSE PLAN

Table 8 below provides actions to be taken in the event that certain contingencies arise which are likely to cause dust emissions beyond the boundaries of Lots 11 and 100 based on the following Trigger Action Response Plan (TARP), is to be implemented at the BGC Quarry site as part of this Dust Management Plan (DMP).

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 NEPM 24-hour average criterion (as per Section 8.1.1), while providing sufficient time for additional mitigation measures to be implemented at the quarry to reduce dust emissions before such an exceedance occurs.

The short-term (1-hour average) trigger levels for the TARP have been set based on experience at the quarry site.

The 1-hour averages trigger levels and response

Table 8. Trigger Action Response

TARP Trigger Levels and Responses	Level	Action
Alert	$\geq 100 \mu\text{g}/\text{m}^3$ but $\leq 150 \mu\text{g}/\text{m}^3$	<ul style="list-style-type: none"> Review operations via a visual inspection of dust emissions from current activities to ensure all standard dust mitigation measures are being appropriately implemented. Determine if background levels maybe the key contributor to high levels being recorded (e.g., based on wind direction, information on bush fires in the region etc). Continue to closely monitor dust concentrations being recorded.
Action I	$\geq 150 \mu\text{g}/\text{m}^3$ but $\leq 200 \mu\text{g}/\text{m}^3$	<ul style="list-style-type: none"> Increase watering rates on haul roads where appropriate. Reduce speed of equipment /

		<p>vehicles.</p> <ul style="list-style-type: none"> • Consider holding off on blasting (if appropriate). • Note changed state and continue to closely monitor dust concentrations being recorded.
Action II	$\geq 200 \mu\text{g}/\text{m}^3$	<ul style="list-style-type: none"> • Review planned operations considering exposed areas • Cease any dust-producing activities not critical to ongoing operation of quarry (e.g., construction works, grading, clearing etc) or relocate relevant activities where possible away from sensitive receptors • Hold off on blasting • Note changed state and monitor for further change
NEPM standard of period is exceeded at either permanent dust monitoring point	$50 \mu\text{g}/\text{m}^3$ per 24-hour	<ul style="list-style-type: none"> • Notification to DWER within 24 hours compliance@dwer.wa.gov.au • Determination of the likely cause of the exceedance. • If at least partly due to the implementation of the proposal, contingency actions to be put in place to minimise impact to the nearest sensitive receptor.

An alert level has been nominated at which point it is proposed that quarry management would review the wind directions 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.

An exceedance of the interim trigger level (“Action I”) will alert quarry management to increasing short term concentrations which would prompt a review of the need to increase/relocate watering where required based on visible dust etc. It is noted that even if the increased PM10 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 the Action II trigger level would require more direct action to reduce dust levels, e.g., assessing whether dust-generating activities (including processing, loading and unloading activities) need to be temporarily stopped or relocated until conditions improve.

The nominated 1-hour average trigger levels listed in **Table 8** are to be reviewed as monitoring data is collected at the quarry site to ensure they are appropriate for the ongoing monitoring and management of dust emissions from BGC Voyager II Quarry.

10 ROLES AND RESPONSIBILITIES

The following table outlines personnel roles and responsibilities at the quarry.

ROLES	RESPONSIBILITIES
BGC Quarries General Manager	Ensure the adequate resources are provided to ensure compliance with this DMP.
Site Manager	<ul style="list-style-type: none"> ◦ Liaison with Regulatory Authorities, as required. ◦ Assist all personnel, including managers and contractors, to remain compliant with the DMP. ◦ Review and update DMP periodically. ◦ Identify areas of opportunity for improvement of dust management which may lead to improved performance. ◦ Act as the central registrar of any complaints received and ensure appropriate action is taken in the event of a complaint relating to nuisance or human health ◦ Conduct regular audits to validate that compliance with this dust management plan is achieved. ◦ Cease any activity that may constitute a breach to this dust management plan. ◦ Ensure that potential environmental hazards are identified and reported. ◦ Assist in the development of any relevant Work Instructions required for the safe operations of the Plant.
Site Supervisor	<ul style="list-style-type: none"> ◦ Assist Site Manager with overall review and compliance of the DMP. Lead overall compliance with the DMP. ◦ Ensure contract documentation specifies responsibilities of contractors consistent with the DMP. ◦ Ensure monitoring requirements are met. ◦ Ensure ongoing effective communication with all site personnel,

ROLES	RESPONSIBILITIES
	<p>including development of work procedures and ensuring staff are trained in their use.</p> <ul style="list-style-type: none"> ◦ Review breach, or potential breach, of any legislation and potential environmental hazards, and act where appropriate. ◦ Conduct inspections on a regular basis of potential dust sources and implemented control measures, more often during high risk periods. ◦ Ensure that potential environmental hazards are identified and reported. ◦ Liaise with regulatory authorities as required.
Site Personnel	<ul style="list-style-type: none"> ◦ Familiarise and remain compliant with the DMP ◦ Meet general environmental duties, facilitated and supported through appropriate training, work practices and event reporting. ◦ Report all incidents relating to dust, including visual dust observations and infrastructure maintenance requirements. ◦ Ensure all contractors, visitors and personnel always remain compliant with the DMP. ◦ Any person left in charge of the premises is aware of the conditions of the Licence and always has access to a copy of the Licence.

11 PERIODIC INTERNAL DOCUMENT REVIEW

BGC review site management documentation on an annual basis. Should the annual review indicate that the DMP can be improved or needs to be changed to reflect new operations, this will be attended to at that time.

Once the Dust Management Plan has been approved by DWER, there will be a 9 to 12 month period to allow BGC to purchase, upgrade and install new monitoring equipment and to gain background data on PM2.5.

12 LIMITATIONS

1. The conclusions presented in this report are relevant to the condition of the site and the state of legislation currently enacted as at the date of this report. We do not make any representation or warranty that the conclusions in this report will be applicable in the future as there may be changes in the condition of the site, applicable legislation or other factors that would affect the conclusions contained in this report.
2. Stass Environmental has used a degree of skill and care ordinarily exercised by reputable members of our profession practicing in the same or similar locality. Conclusions are based on representative samples or locations at the site, the intensity of those samples being in accordance with the usual levels of testing carried out for this type of investigation. Due to the inherent variability in natural soils we cannot warrant that the whole overall condition of the site is identical or substantially similar to the representative samples.
3. This report has been prepared for BGC and for the specific purpose to which it refers. No responsibility is accepted to any third party and neither the whole of the report or any part or reference thereto may be published in any document, statement or circular nor in any communication with third parties without our prior written approval of the form and context in which it will appear.
4. This report and the information contained in it is the intellectual property of Stass Environmental. BGC is granted an exclusive licence for the use of the report for the purpose described in the report.