EMISSIONS ASSESSMENT

FOR

THE PROPOSED EXTENSION TO YENNADON QUARRY, IRON MINE LANE, DOUSLAND, YELVERTON, DEVON, PL20 6NA

3rd July 2015 **Job No: 7397/EA**

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QUALITY CONTROL

This report has been prepared in accordance with John Grimes Partnership Ltd Quality Control Management System to British Standard EN ISO 9001 : 2000

Report Status:	FINAL		
Project Number:	**7397**		
	Engineer	Signature	Date
Report by:	**A. Robertson Associate Director**		**03/07/2015**
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	For and on behalf of John Grimes Partnership Ltd		

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CONTENTS

1.0 INTRODUCTION

1.1 Summary

1.1.1 An assessment of emissions from Yennadon Quarry has been prepared by John Grimes Partnership Ltd on behalf of Yennadon Stone Ltd to accompany the Environmental Statement in support of the extension to Yennadon Quarry.

1.1.2 Yennadon Quarry is currently active. It is proposed to extend the working area of the quarry to the north of the existing working area. In production terms, the extraction, processing and transport processes that have the potential to generate emissions are to remain identical to the existing operation.

1.13 This report should be read in conjunction with the Process Pollution Report (Appendix A8), which identified dust generated by the quarry as being potentially a source of nuisance dust to local residents (medium sensitivity). No other significant sources of air-borne emissions were identified.

1.1.4 This dust assessment quantifies the level of dust across the environs as existing and considers the likely impact of the proposed extension to Yennadon Quarry. This report has been prepared with reference to relevant guidelines.

1.2 Aims of the Emissions Assessment

1.2.1 In line with the scoping requirements, the purpose of this Emissions Assessment is to:

- Consider the existing site arrangements in terms of emissions (nuisance dust has been identified as the potential significant source of emissions) and the current impact on the surrounding environs; and
- Assess the potential for the proposed quarry extension to result in an increase in emissions (nuisance dust).

1.3 Methodology

1.3.1 BS 6069 (Part 2)[1] defines dust as solid particulate matter ranging in size from 1-75µm in diameter. Above this size, particles are classified as grit. Particles between 1µm and 10µm in size are referred to as PM_{10}. The GoodQuarry Guide[2] describes dust as airborne solid matter originating from either surface mineral workings or vehicles, which usually becomes airborne by some external force such as wind or mechanical disturbance, e.g. vehicle wheels.

1.3.2 The Government's Minerals Policy Statement 2[3], 2005 (MPS2) gives some guidance for control purposes and states "Larger particles, typically greater than 30µm in size, fall out of the atmosphere quickly under gravity and settle within 100m of the source. Intermediate size particles (10 – 30µm) are likely to travel up to 200 – 500m. Smaller particles (less than 10µm; i.e. PM_{10}) which make up a small proportion of the dust emitted from mineral workings are only deposited slowly but may travel 1000m or more".

1.3.3 MPS2 refers to the potential for the larger particle size dust generated from mineral activities to be a "nuisance". The visual perception of dust mainly relates to particles greater than 10µm in size. There are no nationally recognised standards for limiting dust having a particle size greater than 10µm. Therefore, the data from the dust monitoring survey was assessed using 'acceptable levels' guidance within the GoodQuarry Guide.

1.3.4 Guidance on acceptable limits for PM_{10}, which are designated a risk to health, is given in the UK National Air Quality Strategy[4]. PM_{10} particles typically found in the atmosphere are composed of a wide range of materials arising from a variety of sources including combustion sources (such as road traffic); secondary particles, mainly sulphate and nitrate formed by chemical reactions in the atmosphere; and dust can often be transported from far across Europe. This guidance sets objective levels for emissions to atmosphere for PM_{10} particulate matter as follows:

Particles (PM_{10}) (gravimetric)	50 µg m^{-3}, not to be exceeded more than 35 times a year	Daily mean
	40 µg m^{-3}	Annual mean

The Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043)

Table EA/01: Air Quality Objectives for PM_{10} Particulate Matter.

1.3.5 The data for the assessment of existing conditions was obtained from a dust monitoring survey carried out by John Grimes Partnership Ltd. A site-specific monitoring scheme was designed utilising both directional and non-directional monitors. This enabled a semi-quantitative measurement of depositional rates to be established. Dust levels were monitored at five locations around the quarry over a four week period from 10th August 2011 until 7th September 2011. Meteorological data was obtained for this period from Plymouth University and Plymouth Airport.

2.0 BASELINE CONDITIONS

2.1 Summary of Current Operations

2.1.1 The quarry process is described in detail in Appendix A8. Operational activities and features with the potential to create dust emissions are identified below:

i. Excavation / extraction of stone (pecking and ripping)
ii. On-site transfer of materials (loading/unloading and transportation)
iii. Material processing
iv. Roadways (on-site and compacted gravel access road)
v. Uncovered/Unvegetated stockpiles / bunds
vi. Rockfalls

2.2 Meteorological Data

2.2.1 Prevailing weather patterns within a particular area have a significant influence on the generation, transport, deposition and suppression of airborne dust. In order to assess how the local climate around Yennadon Quarry may influence the potential dust impact, wind speed and direction data has been obtained from the University of Plymouth and Plymouth Airport (provided in Appendix EA/01).

2.2.2 There are no Meteorological Office weather stations within the immediate locality of Yennadon Quarry or elsewhere on Dartmoor providing a full range of data. The nearest station that provides a full range of measurements is Mount Batten, Plymouth, about 16km southwest of the site and at an elevation of 50m above mean sea level. The wind rose data from this station covers the ten year period from January 1992 – December 2001 and is shown in Figure EA/01, which demonstrates that south-westerly winds are prevalent throughout this period. The monthly averages show wind speeds are significantly lower from May through until August. Typically wind speeds in the range from calm to gentle breeze (0 to 10 knots) occur for over six months per year. The data shows that wind speeds classed as moderate breeze (described as sufficient to raise dust and loose paper) or above occur for 47% of the time.

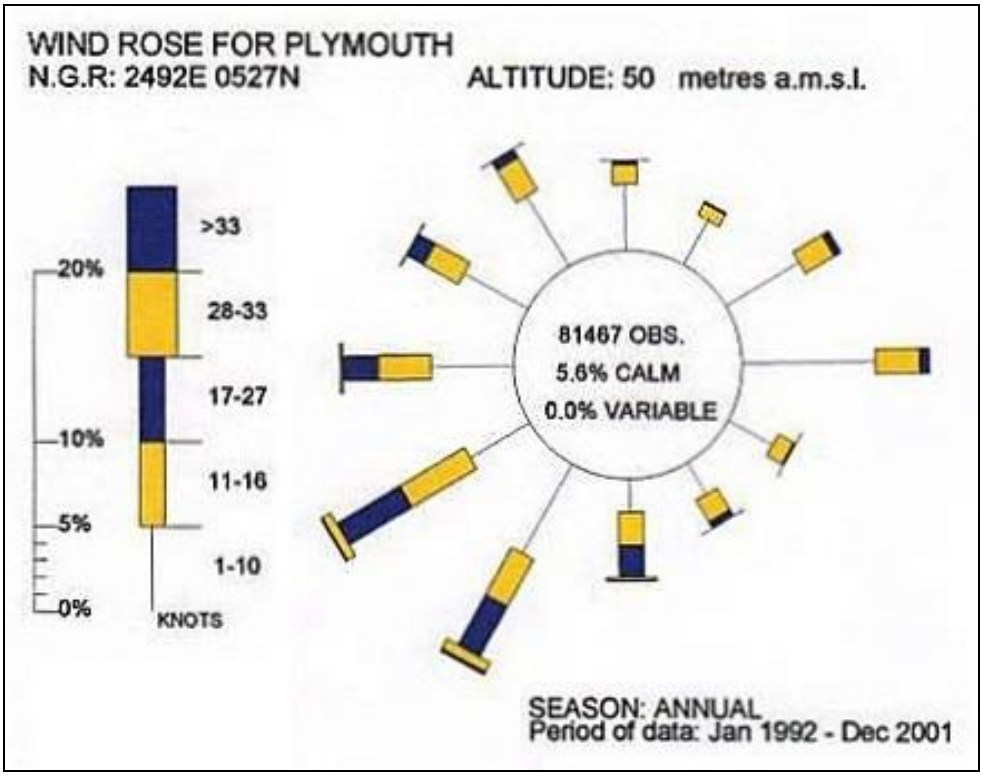

Figure EA/01: Ten Year Wind Rose for Plymouth

2.2.3 Regional rainfall data for Plymouth obtained from the Met. Office website shows that the region is an area of the UK with comparatively high rainfall of around 2,000mm per annum. More specifically for Dartmoor there are approximately half the days in the year when the rainfall is 1mm or greater and reference to MPS shows this is above the amount needed to suppress wind-blown dust and emissions. Consequently, there should be a significant degree of dust suppression by surface wetting and removal of entrained dust from the atmosphere.

2.2.4 During the four week dust monitoring period, south-westerly winds were prevalent. Typically wind speeds ranged from a light to a gentle breeze (1 to 9 knots). Rainfall fell on 15 days out of the 28 days of the dust monitoring period, with more than 1mm of rainfall falling on 13 days. Levels of daily rainfall greater than 1mm acts to suppress dust. Therefore the levels of rainfall received during the four week dust monitoring programme would have had an impact on measured dust levels.

2.2.5 The local topography around Yennadon Quarry will have a significant impact on the emission and dispersal of site dust. The quarry is located on the western flank of Yennadon Down, which forms an elongate hill with contours orientated approximately north-south. The highest point on Yennadon Down is 301m AOD to

the east of the quarry. The topography at the site slopes from around 269m AOD in the east to around 247m AOD in the west. Although the prevailing wind direction is from the south-west, the topography of Yennadon Down results in a more southerly local wind pattern. The site is also relatively sheltered from easterly winds.

2.2.6 Yennadon Down currently comprises open moorland. The Down is flanked on its northern boundary by Dousland Plantation and farmland. To its east is Yennadon Plantation, beyond which is Burrator Reservoir. Downwind from the prevailing south-westerly wind direction is predominantly farmland. Although Bowdens Plantation lies directly south of Yennadon Down, there are no significant wooded areas that particularly influence local wind patterns.

2.2.7 To the immediate west of Yennadon Down is a strip of fields used for grazing, beyond which is the village of Dousland, which lies at an elevation of approximately 200m AOD to 230m AOD. Dousland is the nearest residential community some 300m to the west. The closest house (Higher Yennadon) lies some 142m to the north-west of the existing quarry.

2.3 Dust Monitoring

2.3.1 In order to establish existing baseline conditions at the site a dust monitoring programme was undertaken. Dust was monitored on a weekly basis for a total of four weeks from 10th August 2011 until 7th September 2011. The monitoring results are provided in Appendix EA/02.

2.3.2 Five monitoring points were installed, three of which were directional and two were depositional (non-directional). The monitoring points are detailed below and locations shown on Figure EA/02.

ID	Type	Distance/ Direction	Purpose
DD1	Non-Directional	450m S	Up-wind control point
DS2	Directional	300m S	To assess road dust
DS3	Directional	300m W	Off-site control
DS4	Directional	300m N	Closest (down-wind) receptor
DD5	Non-Directional	NW quarry edge	To assess on-site dust

Table EA/02: Summary of Dust Monitoring Points

2.3.3 The gauges are designed to measure the tendency of an object to become dirty in a dusty atmosphere and collect the dust that is likely to impinge on objects on the earth's surface. Each of the three directional gauges was aligned to a compass point to measure dust flux rates from a particular quadrant. The directional gauges give an indication of directionality of any significant dust source.

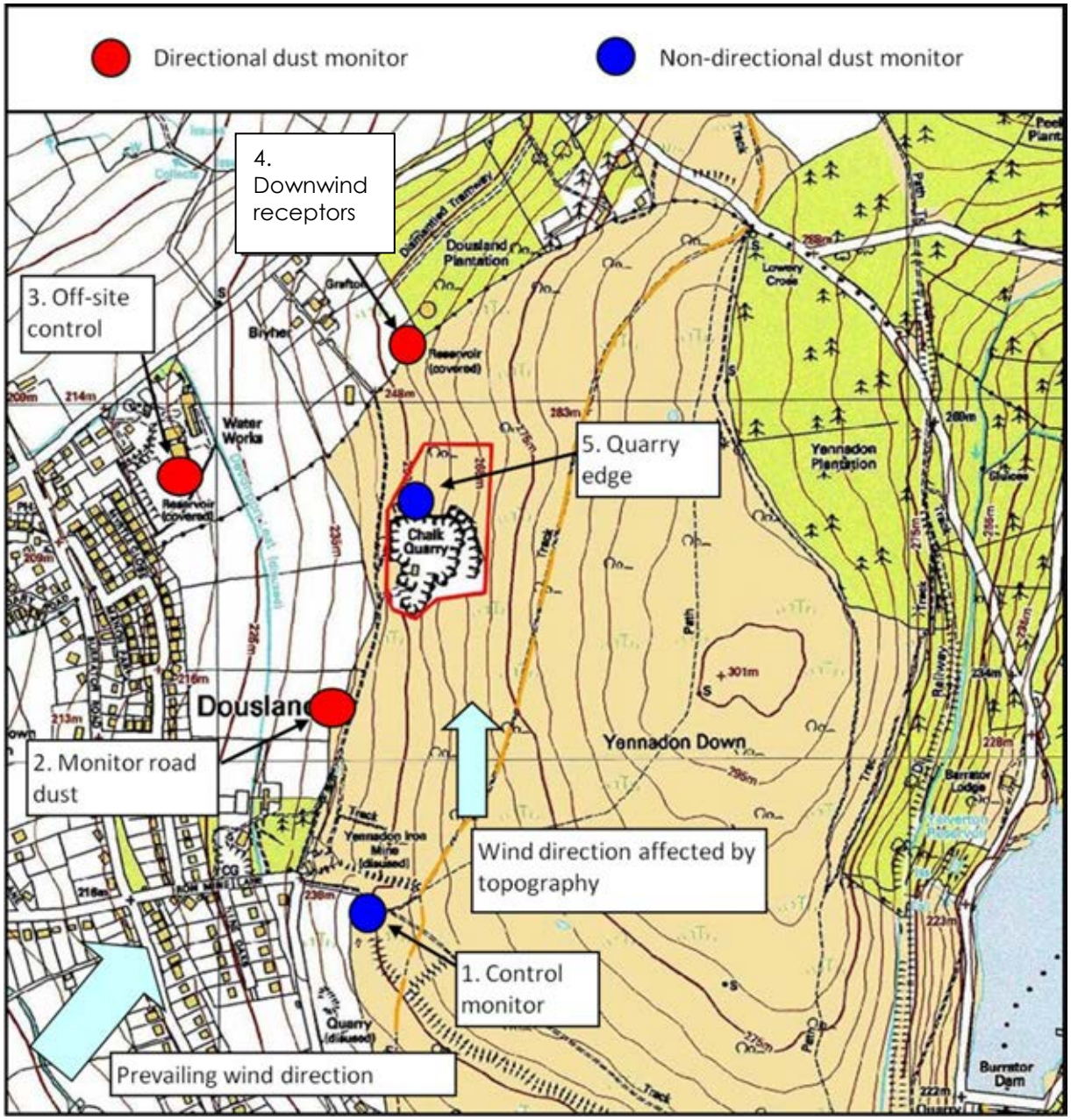

Figure EA/02: Location of Dust Monitoring Points

2.3.4 The dust monitoring results have been evaluated against 'Acceptable Levels' guidance within the GoodQuarry Guide. Table 7 of The GoodQuarry Guide provides recommendations for 'acceptable levels' which are based upon the public

response to dust depositional rates. Information from this table is summarised below and provided in full in Appendix EA/03. These 'acceptable levels' indicate that background levels of dust in a rural location can vary from 0.01% Effective Area Coverage (EAC)/day to 0.5% depending on the season (i.e. farming activity such as ploughing, increases during the summer months). Dust levels typically become noticeable by the public at 0.2% EAC/day, with complaints generally arising at 0.5% EAC/day.

Measure of Soiling (% EAC/day)	Typical Situation (background level)	Public Response
0.01	Rural	
0.02	Suburban/small town	
0.2		Noticeable
0.3 – 0.4	Urban	
0.5	Rural Summer Time	Possible complaint
0.7		Objectionable
0.8 – 1.0	Industrial	
2.0		Probably complaint
5		Serious complaint

EAC = Effective Area Coverage

Table EA/03: Acceptable Dust Levels (Source: The GoodQuarry Guide)

2.3.5 The dust monitoring also evaluated Absolute Area Coverage (AAC) over the seven-day period and assessed the measured AAC levels in accordance with the DustScan Ltd Significance Levels as follows:

Over 7-day test period		AAC – Significance Level				
		<80%	80% - 95%	95%-99%	99%-100%	100% for 45°
EAC Nuisance Potential	<2.5%	V. Low	V. Low	V. Low	Low	Medium
	2.5% - 5%	Low	Low	Low	Medium	High
	5% - 15%	Medium	Medium	Medium	High	High
	15% - 25%	High	High	High	High	V. High
	>25%	V. High	V. High	V. High	V. High	V. High

Table EA/04: Assessment Matrix for Potential Impact

2.3.6 A summary of the individual dust monitoring points and their results are provided below.

2.3.7 **Monitoring Point DD1:** This was a non-directional down-wind control monitor located approximately 450m to the south of the site, with predominantly rural land being down-wind. This monitoring point was an off-site control. A maximum EAC/day value of 0.1% was measured. This level is considered as being the typical background rural level. The AAC levels over a 7-day monitoring period ranged

from15.7% to 22.5%; and the EAC/7-day levels were 0.2% to 0.4%, which equates to very low impact.

2.3.8 **Monitoring Point DS2**: This directional monitoring point was located on the western side of the site's access road to the south of the quarry. This road comprises compacted stone (gravel and sand sized aggregates with very low fines) and vehicular movements have the potential to generate "nuisance" dust (predominantly large sized particles). Measured levels of dust were very low (maximum of 0.2% EAC/day). The maximum AAC/7-day interval was 35.8% and the maximum EAC/7-day was 1.3%, which equates to very low impact. The dust rose diagrams indicate that the dust does not appear to originate from a single source. The maximum measured EAC/day value would have to increase three-fold for the levels to be considered to cause a possible complaint and four-fold to be considered objectionable. Considering the dust originated from more than one source, the impact from dust generated along the access road, should the quarry operate at proposed full capacity, is considered to be low.

2.3.9 **Monitoring Point DS3**: This directional monitoring point was installed within the Water Treatment Works 300m west of the quarry, at the eastern edge of the main residential area of Dousland. This monitoring point was an off-site control. The results indicate that there is no single source of dust. The average weekly EAC%/day values range from 0.0 to 0.1. These levels are considered typical background level for a small town. The maximum AAC/7-day interval was 61.3% and the maximum EAC/7-day was 2.3%, which equates to very low impact. The highest levels of dust were generated from the south-west; west and north-west. The highest EAC%/day of 0.3% was measured at this location.

2.3.10 **Monitoring Point DS4:** This directional monitoring point was installed 300m north of the quarry. The results indicate that there appears to be no single source of dust. The levels are very low, with a maximum EAC/day value of 0.2%, with the highest levels being generated from the north. The maximum AAC/7-day interval was 42.7% and the maximum EAC/7-day was 1.1%, which equates to very low impact. Again, the maximum measured EAC/day value would have to increase three-fold for the levels to be considered to cause a possible complaint and four-fold to be considered objectionable. Considering the monitoring indicated that the dust originated from more than one source, the impact from dust generated from the quarry, should it operate at proposed full capacity, is considered to be low.

2.3.11 **Monitoring Point DD5:** DD5 was a non-directional control monitor located adjacent to the north western quarry edge. The monitoring point recorded a maximum EAC/day value of 0.1%. The maximum AAC/7-day interval was 25.2% and the maximum EAC/7-day was 0.6%, which equates to very low impact. The maximum measured EAC/day value would have to increase five-fold for the levels to be considered to cause a possible complaint and seven-fold to be considered objectionable. Given this monitoring point was located adjacent to the quarry, it is considered that the impact from dust generated from the actual quarry, should it operate at proposed full capacity, would be very low.

2.3.12 Although the highest recorded EAC/day value of 0.3% is regarded as being 'noticeable', it is below the 0.5% EAC/day level that typically gives rise to a 'possible complaint'. All of the results fall into the 'very low potential impact' category.

2.3.13 The directional dust gauges give no strong indication that dust from Yennadon Quarry predominates. Taking into account the prevailing wind direction and local topography, the residents north of the quarry are considered at most risk from nuisance dust from the quarry. However, the monitoring has shown deposited (nuisance) dust levels north of the quarry are at least three times below the guidance level for the onset of complaints. It is considered that should the quarry operate at the proposed full capacity of 10,000 tonnes per annum compared to the current average of approximately 5,500 tonnes per annum, the level of nuisance dust generated from the quarry are likely to be below the threshold that could give 'possible complaint'. Therefore, the risk of nuisance dust affecting the residents is considered to be low.

2.3.14 A preliminary assessment of the potential impacts of PM_{10} from Yennadon Quarry has been carried out in accordance with the framework given in Technical Guidance to the National Planning Policy Framework (2012)[5] and shown in Figure EA/03.

2.3.15 With regard to residential properties and other dust sensitive receptors within 1km of the site; the surrounding area is considered to be predominantly low sensitivity (i.e. rural farm land and open moorland), with some medium sensitivity land-uses (residential areas). No high sensitivity land-uses are present within 1km. Of the residential areas, the village of Dousland is the nearest residential community, with the majority of dwellings located approximately 300m to the west beyond a strip of fields used for grazing. There are only five residential dwellings downwind of the

quarry within 500m, the closest being Higher Yennadon, which lies some 142m to the north-west of the existing quarry.

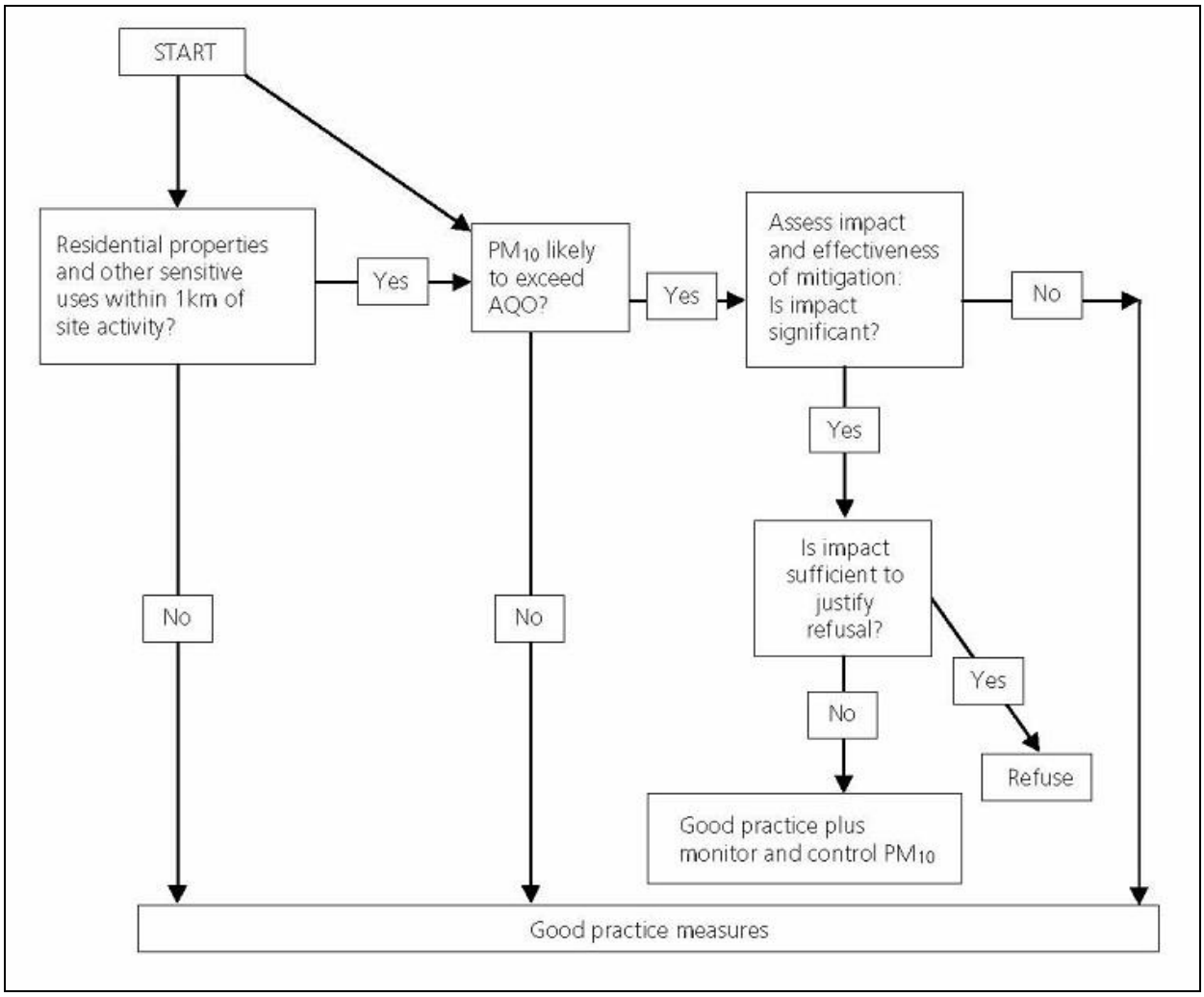

Figure EA/03: Site Assessment Flow Chart for Air Quality Objectives (AQO)

2.3.16 With regard to PM_{10} particulates, it is considered unlikely that Yennadon Quarry offers any potential impact from the quarrying operations because firstly, the dust monitoring programme has indicated that the overall dust levels are very low (and are likely to remain low should production levels increase); and secondly, the quarry processes (extraction of dimension stone) does not does not require LAPPC permits as it does not employ crushing/screening/drilling/blasting/etc., which are the main source of fine dust particulates. The background levels in the area are indicated to be well below Air Quality Objectives (from data published on DEFRA[6] and West Devon Borough Council[7] websites). Taking all of the above into account it is considered unlikely that PM_{10} particulates from Yennadon Quarry will result in Air Quality Objectives being exceeded.

2.3.17 It is considered that good practice measures (as discussed in Section 4.0) would ensure that dust emissions are controlled.

3.0 ASSESSMENT OF IMPACTS

3.1 Operational Impacts

3.1.1 As part of the planning proposal Yennadon Stone wish to reduce the maximum permitted amount of material removed from 14,000 tonnes per annum (t/a) down to 10,000t/a; as well as reducing the permitted HGV trips from 35 in any week down to 30. Over the past seven years the quarry has produced on average approximately 5,500 tonnes per annum, ranging from 4,500t to 6,280t. No additional machinery or staffing levels would be required to extend production to the maximum proposed limit of 10,000t. The extension of the quarry will not require the construction of any new structures (i.e. existing site offices and processing areas are to remain).

3.1.2 The operation methods at Yennadon Quarry that have the potential to generate nuisance dust will essentially remain unchanged during the working of the proposed extension. The only variations would be the requirement to remove / strip topsoil and overburden, the construction of a new bund; and a slight increase in the length of the haulage road from the quarry face to the material processing area. Therefore, the potential sources of dust during the operation of the proposed extension are as follows:

- Stripping of topsoil / overburden during the development stage of proposed extension - There is the potential that the stripping of topsoil and overburden may result in the generation of wind-blown dust during dry weather. All stripping works should be conducted in accordance with good practice guidelines (MAFF 2000: Good practice guide for handling soils[6]) to minimise dust generation.

- Pecking / ripping in the quarry extraction area – Extraction of stone using a pecker has the potential to produce minor amounts of wind-blown dust. There is not expected to be an increased requirement for pecking to occur as a result of the quarry extension.

- Rock falls – Any major rock falls have the potential to generate isolated moderate to high levels of wind-blown dust for a very short duration. There is no increase in the risk of potential rock falls associated with the proposed extension providing current inspections/appraisals are continued.

- Unvegetated stockpiles / bunds – The spoil produced from quarry waste is generally cobble-sized slate fragments (i.e. very little fines) and is considered unlikely to generate excessive airborne dust. Spoil within the quarry area should not give rise to visible dust emissions. However, the topsoil and overburden material, which will be used for restoration, contains more fine material and can be a potential source of dust prior to becoming vegetated. Guidance in MAFF 2000 (Good practice guide for handling soils) should be followed to reduce wind whipping of particles and minimise dust generation.

- On-site transfer of materials (loading, unloading and transportation) – There is the potential for minor amounts of dust to be generated by materials handling on-site. The stone material excavated is generally cobble to boulder-sized pieces of slate, which are unlikely to generate excessive airborne dust. The quarry process utilises minimal mechanical handling. No material is dropped from excessive heights. There is not expected to be any significant increase in the level of on-site transfer of material as a result of the quarry extension.

- Roadways (including haulage roads) – Within the quarry extraction area, haulage roads have the potential to produce minor amounts of dust. The haulage roads comprise stone material predominantly of cobble to boulder-sized pieces of slate, which are unlikely to generate excessive airborne dust. At the deeper levels within the quarry, groundwater issues usually result in the ground and lower haulage roads being damp. Within the processing area, the water used in the saw sheds result in the ground and roadways to the front being wet throughout the year, which prevents significant dust generation. The compacted stone access track has the potential to produce visible dust emissions following vehicle movements during prolonged dry weather. The increased length of haulage roads within an extended quarry are not expected to result in any significant increase in dust production as they comprise predominantly coarse stone material. The compacted stone access track has been identified as a potential source of visible dust. The level of dust from the access track is unlikely to increase above current levels as there will be no increase in traffic using this track as a result of the quarry extension.

- Processing – All stone cutting is conducted under a water spray, which reduces dust generation. However, tailings removed from the processing area and placed on spoil heaps can be a source of dust once dried. Yennadon Stone

currently covers the tailings with larger waste rock to mitigate the risk of wind-whipping. The current dust suppression methods are considered to be effective in mitigating dust generation in the processing area. There is not expected to be an increase in the amount of tailings produced as a result of the quarry extension.

3.1.3 It is considered that should the quarry operate at the proposed full capacity of 10,000t/a compared to the current average, the level of nuisance dust generated from the quarry is likely to be below the threshold that could give 'possible complaint'.

3.2 Significance of Impacts

3.2.1 The significance of the assessed impacts has been evaluated as summarised in Table EA/04 below.

Element	Geographical	Nature	Duration	Significance
Impact of dust affecting Local Residents	Local	Adverse	Long-term	Insignificant

Table EA/05: Summary of the Assessment of Potential Impacts

3.2.2 The geographical impact of nuisance dust is considered to be **local**. The prevailing wind direction is from the south-west. However, the local topography (the quarry lies on the western flank of Yennadon Down) will affect the low-level winds, which will direct the winds to the north. Local residents most likely to be affected by potential dust would be located to the north of the quarry. Residents to the west of the quarry could potentially be affected by easterly winds directing nuisance dust to the west. It is considered that wind-whipped dust could potentially be generated from uncovered/un-vegetated spoil heaps/bunds and from the compacted stone access track.

3.2.3 The nature of the impact of nuisance dust if occurring at significant levels is considered to be **adverse**.

3.2.4 The duration of the effect is considered to be **long-term** (greater than five years), but would cease on closure of the quarry and site restoration.

3.2.5 The dust monitoring programme demonstrated that there were several local sources of dust, with the off-site control to the west of Dousland measuring the highest levels of dust from the southwest, west and northwest (i.e. not from Yennadon Quarry).

Levels adjacent and down-wind of the quarry were not significantly elevated above the control monitors and typical background levels. The baseline conditions at the site indicate that levels of dust currently generated at the site are within 'Acceptable Levels'. Although these current dust levels are considered insignificant; the stripping of topsoil/overburden and the construction of bunds (prior to them being vegetated) have the potential to generate wind-whipped dust. Also during prolonged dry weather, the access track has the potential to generate wind-whipped and traffic / livestock generated dust. However, it is considered that levels of nuisance dust are unlikely to exceed a significance level of low to medium (Table EA/05). Therefore, the significance of the effect of nuisance dust is considered to be **minor**.

4.0 MITIGATION AND RESIDUAL EFFECTS

4.1 Mitigation Measures

4.1.1 The control of dust emissions from surface mineral extraction in accordance with the recommendations of MPS2 is ideally by the implementation of an appropriate dust control management system. Yennadon Quarry has implemented a Dust Management Plan, which includes the following dust suppression arrangements:

- Using water sprays within the saw sheds (processing area) to prevent dust being generated.
- Speed restrictions are currently employed by Yennadon Stone staff to minimise wheel generated dust along the access track. Employees of Yennadon Stone should continue to adhere to the **5 mph** speed limit on the access track. This speed limit is instructed during inductions, is stated in their employee manual and posted on site notice boards.
- Tailings are regularly cleared up and placed on stockpiles, which are immediately covered with larger cobbles to prevent wind-whipping of dust.
- Grassing/planting of bunds and open areas to minimise erosion.
- Visually monitor the processes within the quarry to ensure that no excessive dust is being generated.
- Monitor the amount of visual dust being generated on the compacted stone access track. Reviews should be carried out as to amount of dust being generated. Repairs or re-surfacing of the track should be carried out using very low-fines aggregate.
- Topsoil stripping and storage should be carried out in accordance with good practice guidelines (MAFF 2000: Good practice guide for handling soils) to

minimise dust generation. Wind speed and direction will be taken into account during such activities. Dust monitoring will be undertaken during stripping of overburden to ensure mitigation measures are effective. Water suppression techniques could also be utilised during prolonged dry periods for wetting tip/restoration work areas if required.

- Soil storage areas, soiled bunds and restored areas will be seeded and vegetated as soon as practicable. Guidance in MAFF 2000 (Good practice guide for handling soils) should be followed to reduce wind whipping of particles and minimise dust generation during bund construction. Trees, bushes and vegetation to be planted on bunds as appropriate to form wind breaks/dust screens.
- Positioning of stock piles to take advantage of shelter from the wind.
- Observation of weather forecasts and wind speed to decide on preventative/ mitigation measures.
- Dust control measures to form part of employees and contractors induction.

4.1.2 The Dust Management Plan includes an action plan, which includes the investigation and implementation of any corrective action required. Any incidents and complaints are recorded in a 'Dust Management Logbook'.

4.2 Residual Effects

4.2.1 The ongoing quarrying activities at Yennadon Quarry will inevitably give rise to some dust emissions although the potential impact at the nearest residential properties is not considered to be of any significance (assuming normal conditions and wind distribution patterns). Implementation of the mitigation measures described above will ensure that there will be no significant residual effects of the proposed quarry extension on local residents from dust.

4.2.2 It is anticipated that there will be temporary minor impacts on the local residents during the operation of the quarry extension. No permanent residual effects are anticipated.

5.0 CONCLUSIONS

5.1 The key findings of the Emissions Assessment are:

- The dust monitoring programme has determined that levels of dust currently being detected are within 'Acceptable Levels' and are typical of levels expected within a rural area within summer months.
- The off-site 'control' dust monitors have identified that there are several sources of dust being generated in the surrounding area.
- Operations at Yennadon Quarry that have the potential to generate nuisance dust will essentially remain unchanged during working of the proposed extension. The only variations would be the requirement to remove / strip topsoil and overburden, the construction of a new bund; and a slight increase in the length of the haulage road from the quarry face to the material processing area [the latter comprises coarse stone, which has minimal potential to generate dust]. Any increase in production rates to the maximum proposed level of 10,000 tonnes per annum are unlikely to result in dust emission levels exceeding acceptable levels.
- Proposed mitigation measures that have been recommended to ensure dust emissions are kept to a minimum during development and operation of the proposed quarry extension will ensure that there will be no significant residual effects.

REFERENCES

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8. MAFF (2000) Good practice guide for handling soils.

APPENDICES

APPENDIX EA/01

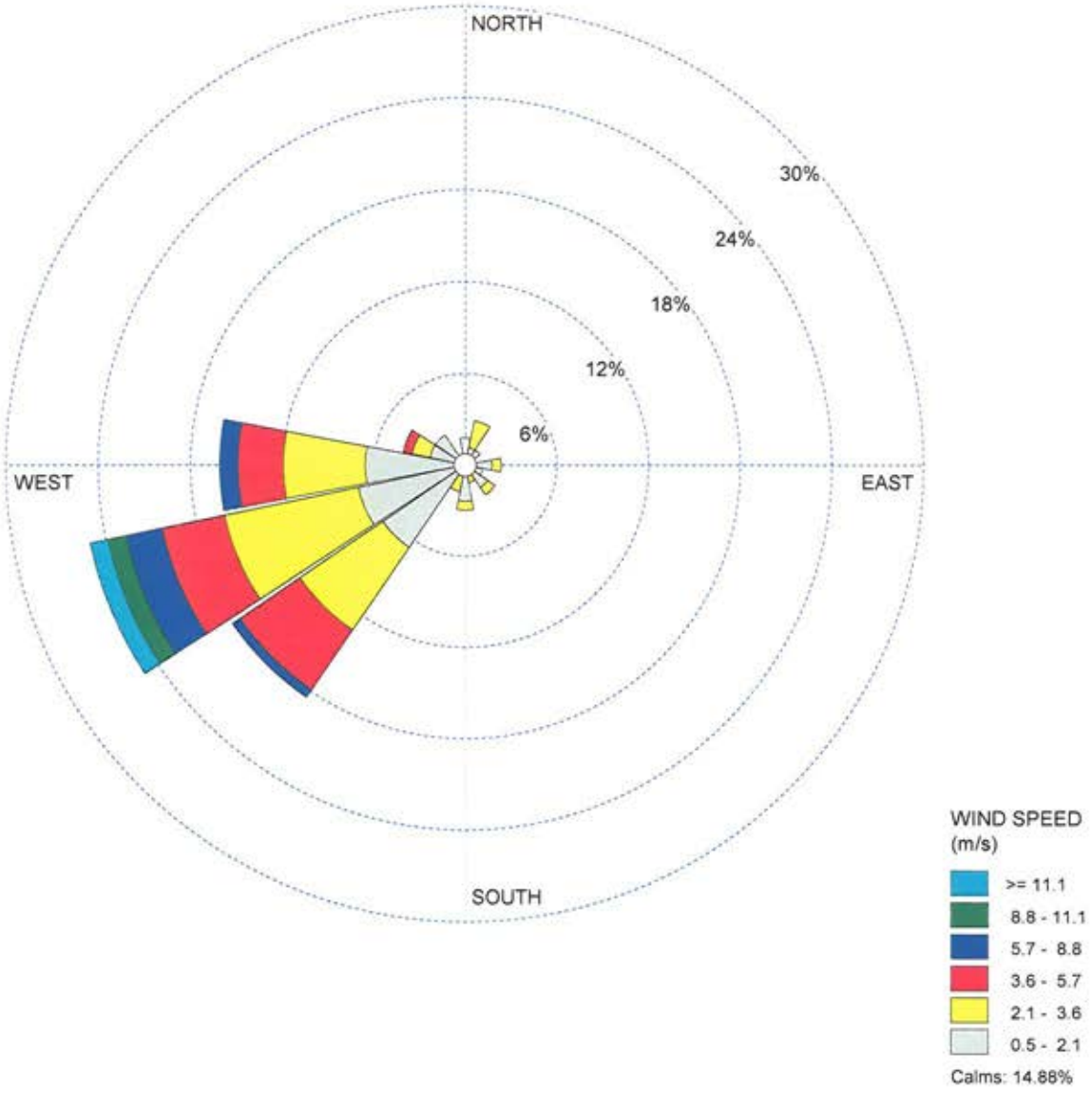
Meteorological Data

WIND ROSE PLOT:

METEROLOGICAL MONITORING - YENNADON QUARRY

DISPLAY:

Wind Speed
Direction (blowing from)



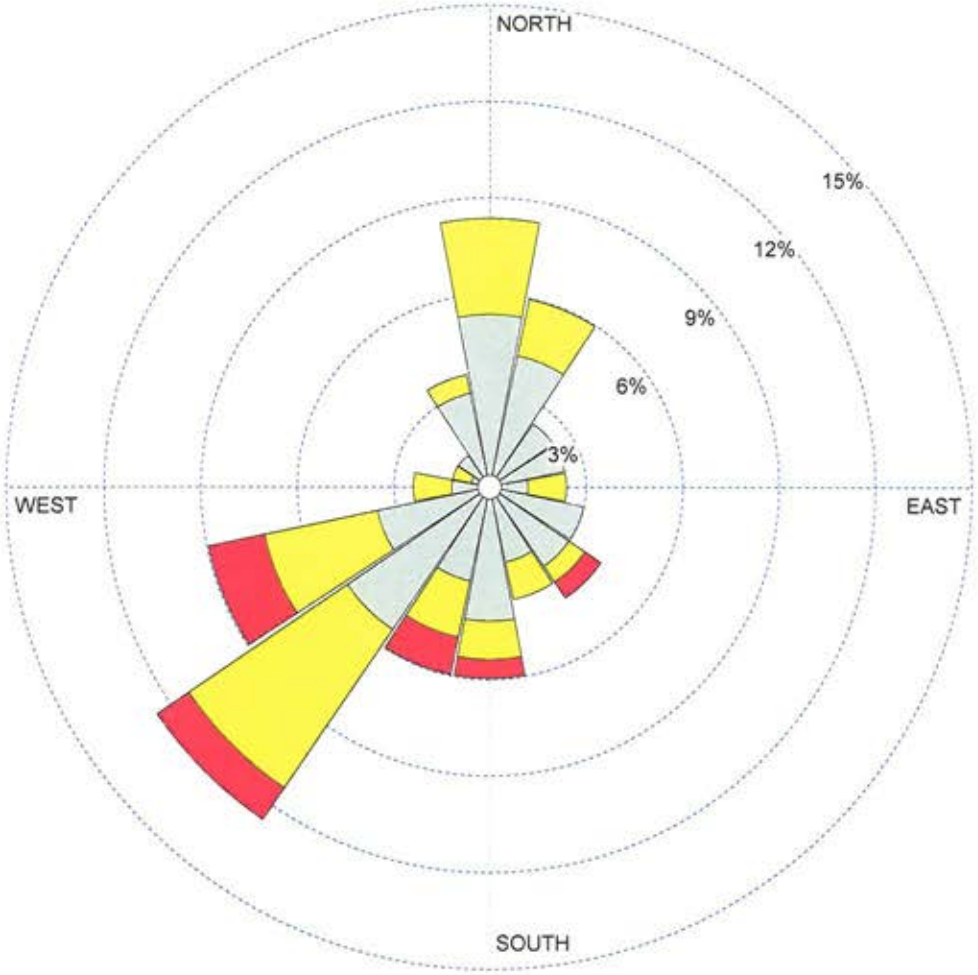
COMMENTS:	DATA PERIOD:	COMPANY NAME:	
(Data source - University of Plymouth and Weather Underground)	**Start Date: 11/08/2011 - 00:00** **End Date: 17/08/2011 - 23:00**	**JOHN GRIMES PARTNERSHIP LTD**	
		MODELER: **NS**	
	CALM WINDS: **14.88%**		
	AVG. WIND SPEED: **2.38 m/s**		PROJECT NO.: **7397**

WIND ROSE PLOT:

METEROLOGICAL MONITORING - YENNADON QUARRY

DISPLAY:

Wind Speed
Direction (blowing from)



WIND SPEED
(m/s)

- >= 11.1
- 8.8 - 11.1
- 5.7 - 8.8
- 3.6 - 5.7
- 2.1 - 3.6
- 0.5 - 2.1

Calms: 26.19%

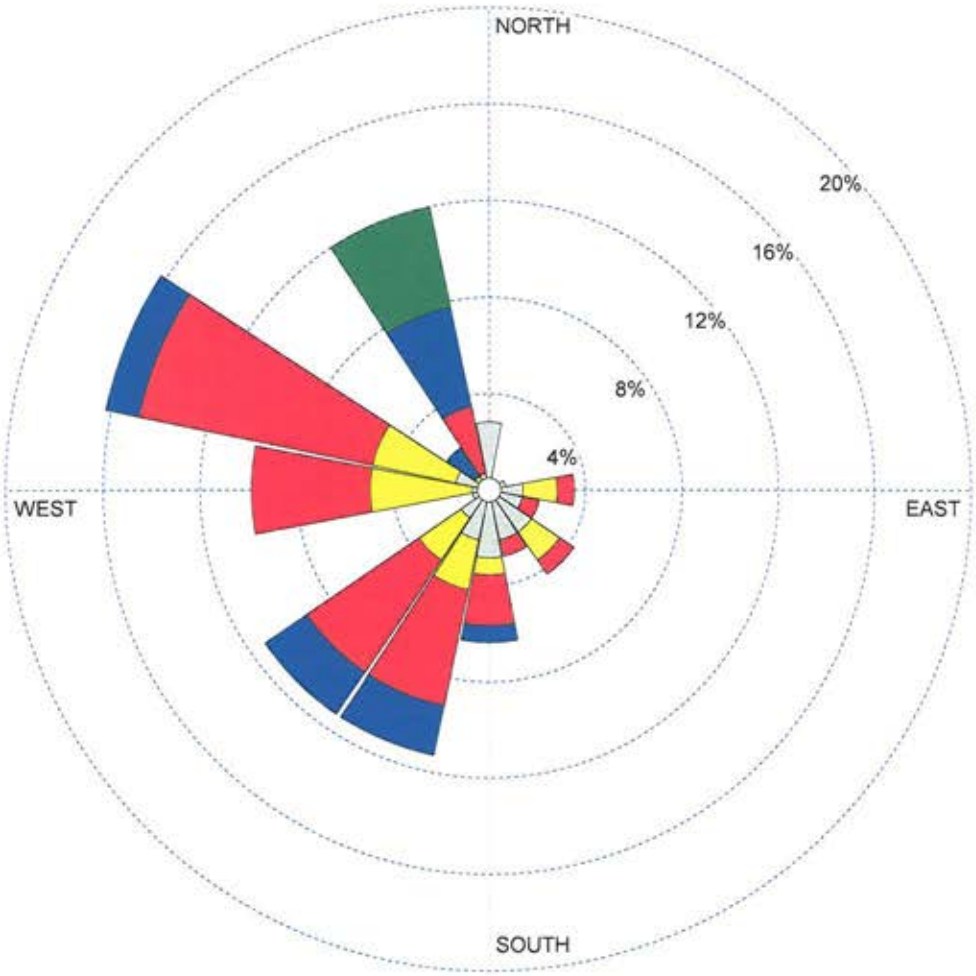
COMMENTS: (Data source - University of Plymouth and Weather Underground)	DATA PERIOD: **Start Date: 18/08/2011 - 00:00** **End Date: 24/08/2011 - 23:00**	COMPANY NAME: **JOHN GRIMES PARTNERSHIP LTD**	
		MODELER: **NS**	
	CALM WINDS: **26.19%**		
	AVG. WIND SPEED: **1.38 m/s**		PROJECT NO.: **7397**

WIND ROSE PLOT:

METEROLOGICAL MONITORING - YENNADON QUARRY

DISPLAY:

Wind Speed
Direction (blowing from)



WIND SPEED
(m/s)

- >= 11.1
- 8.8 - 11.1
- 5.7 - 8.8
- 3.6 - 5.7
- 2.1 - 3.6
- 0.5 - 2.1

Calms: 14.08%

COMMENTS:	DATA PERIOD:	COMPANY NAME:	
(Data source - University of Plymouth and Weather Underground)	**Start Date: 25/08/2011 - 00:00** **End Date: 31/08/2011 - 23:00**	**JOHN GRIMES PARTNERSHIP LTD**	
		MODELER: **NS**	
	CALM WINDS: **14.08%**		
	AVG. WIND SPEED: **3.40 m/s**		PROJECT NO.: **7397**

APPENDIX EA/02

Dust Monitoring Results

DustScan

DUST DISC SETTLEMENT REPORT

Client:	John Grimes Partnership	**Job Code:**	ZJGPYEN
Site:	Yennadon Quarry		

Our Ref:	Date Out:	Date In:	Interval (days)	AAC%	EAC%	AAC% /day	EAC% /day
25560/DD1/ZJGPYEN	10/08/2011	17/08/2011	7	22.5	0.3	3.2	0.0
25561/DD5/ZJGPYEN	10/08/2011	17/08/2011	7	23.7	0.6	3.4	0.1

[1] 24 hour average values are based on a sample from a 7 day period

DustScan

DUST DISC SETTLEMENT REPORT

Client:	John Grimes Partnership	**Job Code:**	ZJGPYEN
Site:	Yennadon Quarry		

Our Ref:	Date Out:	Date In:	Interval (days)	AAC%	EAC%	AAC% /day	EAC% /day
25634/DD1/ZJGPYEN	17/08/2011	24/08/2011	7	15.7	0.2	2.2	0.0
25635/DD5/ZJGPYEN	17/08/2011	24/08/2011	7	25.2	0.4	3.6	0.1

[1] 24 hour average values are based on a sample from a 7 day period

DustScan

DUST DISC SETTLEMENT REPORT

Client:	John Grimes Partnership	**Job Code:**	ZJGPYEN
Site:	Yennadon Quarry		

Our Ref:	Date Out:	Date In:	Interval (days)	AAC%	EAC%	AAC% /day	EAC% /day
25820/DD1/ZJGPYEN	24/08/2011	31/08/2011	7	16.4	0.3	2.3	0.0
25821/DD5/ZJGPYEN	24/08/2011	31/08/2011	7	17.0	0.3	2.4	0.0

[1] 24 hour average values are based on a sample from a 7 day period

DustScan

DUST DISC SETTLEMENT REPORT

Client:	John Grimes Partnership	**Job Code:**	ZJGPYEN
Site:	Yennadon Quarry		

Our Ref:	Date Out:	Date In:	Interval (days)	AAC%	EAC%	AAC% /day	EAC% /day
25930/DD1/ZJGPYEN	31/08/2011	07/09/2011	7	18.6	0.4	2.7	0.1
25931/DD5/ZJGPYEN	31/08/2011	07/09/2011	7	20.2	0.4	2.9	0.1

[1] 24 hour average values are based on a sample from a 7 day period

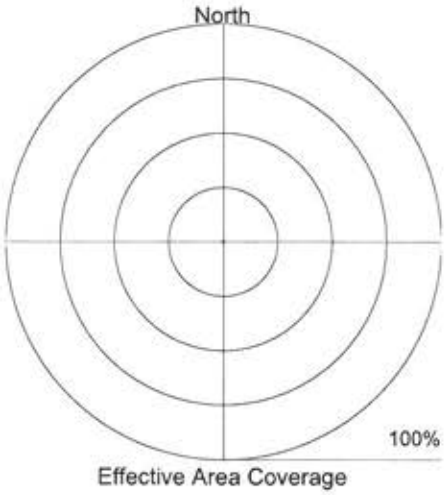
DustScan

DUST MONITORING REPORT

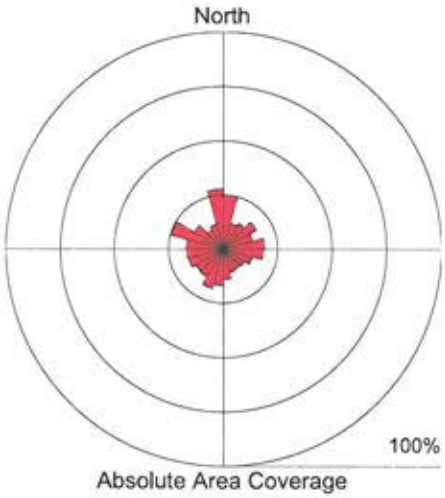
Client:	John Grimes Partnership	**Site:**	Yennadon Quarry
Point Ref:	DS2		
Date Out:	10 August 2011	**Date In:**	17 August 2011
Interval[1]:	7 days	**Our Ref:**	25557/DS2/ZJGPYEN

STATEMENT OF RESULTS

Segment	EAC% /Interval	AAC% /Interval	EAC% /Day	AAC% /Day	EAC N.Pot.[2]	AAC S.Sig.[3]
000°-015°	1.3	24.8	0.2	3.5	0	0
015°-030°	0.2	12.3	0.0	1.8	0	0
030°-045°	0.2	13.7	0.0	2.0	0	0
045°-060°	0.3	17.5	0.0	2.5	0	0
060°-075°	0.2	13.8	0.0	2.0	0	0
075°-090°	0.4	19.0	0.1	2.7	0	0
090°-105°	0.3	18.4	0.0	2.6	0	0
105°-120°	0.2	13.7	0.0	2.0	0	0
120°-135°	0.1	11.3	0.0	1.6	0	0
135°-150°	0.1	10.6	0.0	1.5	0	0
150°-165°	0.1	11.2	0.0	1.6	0	0
165°-180°	0.2	14.0	0.0	2.0	0	0
180°-195°	0.3	16.9	0.0	2.4	0	0
195°-210°	0.3	18.9	0.0	2.7	0	0
210°-225°	0.3	14.9	0.0	2.1	0	0
225°-240°	0.2	14.5	0.0	2.1	0	0
240°-255°	0.2	16.5	0.0	2.4	0	0
255°-270°	0.2	16.7	0.0	2.4	0	0
270°-285°	0.3	17.0	0.0	2.4	0	0
285°-300°	0.6	24.6	0.1	3.5	0	0
300°-315°	0.3	15.3	0.0	2.2	0	0
315°-330°	0.2	10.3	0.0	1.5	0	0
330°-345°	0.2	11.8	0.0	1.7	0	0
345°-360°	0.5	27.7	0.1	4.0	0	0



Effective Area Coverage



Absolute Area Coverage

The rose diagrams report the relative effect (or discolouration, EAC%) of the dust and the presence (density of coverage (AAC%) of dust over the whole period

[1] The recommended dust monitoring interval is 7 days

Assessment Matrix for Potential Impact

		AAC - Source Significance Level [3] (S.Sig.)				
		<80%	80%-95%	95%-99%	99%-100%	100% for 45°
EAC Nuisance Potential [2] (N.Pot.)	<2.5%	V Low	V Low	V Low	Low	Medium
	2.5%-5%	Low	Low	Low	Medium	High
	5%-15%	Medium	Medium	Medium	High	High
	15%-25%	High	High	High	High	V High
	>25%	V High	V High	V High	V High	V High

DustScan

DUST MONITORING REPORT

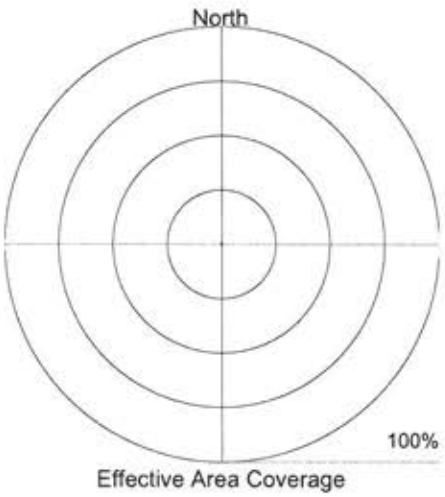
Client:	John Grimes Partnership	**Site:**	Yennadon Quarry
Point Ref:	DS2		
Date Out:	17 August 2011	**Date In:**	24 August 2011
Interval[1]:	7 days	**Our Ref:**	25636/DS2/ZJGPYEN

STATEMENT OF RESULTS

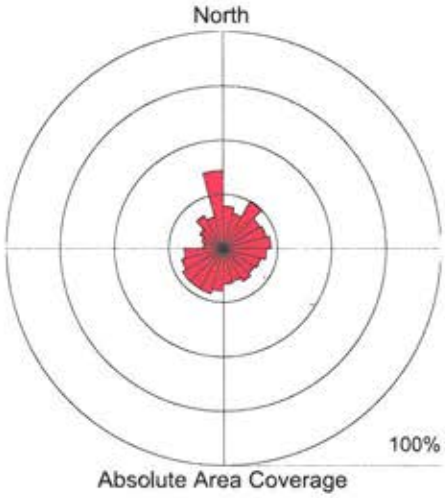
Effective Area Coverage (EAC%) / interval = 0.3
Absolute Area Coverage (AAC%) / interval = 18.8

Effective Area Coverage (EAC%) / day = 0.0
Absolute Area Coverage (AAC%) / day = 2.7

Segment	EAC% /Interval	AAC% /Interval	EAC% /Day	AAC% /Day	EAC N.Pot.[2]	AAC S.Sig.[3]
000°-015°	0.3	19.4	0.0	2.8	0	0
015°-030°	0.3	16.8	0.0	2.4	0	0
030°-045°	0.4	25.2	0.1	3.6	0	0
045°-060°	0.3	19.6	0.0	2.8	0	0
060°-075°	0.3	20.5	0.0	2.9	0	0
075°-090°	0.4	22.1	0.1	3.2	0	0
090°-105°	0.3	20.1	0.0	2.9	0	0
105°-120°	0.3	17.9	0.0	2.6	0	0
120°-135°	0.3	16.5	0.0	2.4	0	0
135°-150°	0.3	17.7	0.0	2.5	0	0
150°-165°	0.2	15.8	0.0	2.3	0	0
165°-180°	0.3	16.6	0.0	2.4	0	0
180°-195°	0.3	19.7	0.0	2.8	0	0
195°-210°	0.5	21.7	0.1	3.1	0	0
210°-225°	0.5	21.5	0.1	3.1	0	0
225°-240°	0.5	21.6	0.1	3.1	0	0
240°-255°	0.5	19.8	0.1	2.8	0	0
255°-270°	0.4	18.0	0.1	2.6	0	0
270°-285°	0.1	9.1	0.0	1.3	0	0
285°-300°	0.1	10.2	0.0	1.5	0	0
300°-315°	0.2	12.4	0.0	1.8	0	0
315°-330°	0.3	17.4	0.0	2.5	0	0
330°-345°	0.2	15.0	0.0	2.1	0	0
345°-360°	0.9	35.8	0.1	5.1	0	0



Effective Area Coverage



Absolute Area Coverage

The rose diagrams report the relative effect (or discolouration, EAC%) of the dust and the presence (density of coverage (AAC%) of dust over the whole period

[1] The recommended dust monitoring interval is 7 days

Assessment Matrix for Potential Impact

		AAC - Source Significance Level [3] (S.Sig.)				
		<80%	80%-95%	95%-99%	99%-100%	100% for 45°
EAC Nuisance Potential [2] (N.Pot.)	<2.5%	V Low	V Low	V Low	Low	Medium
	2.5%-5%	Low	Low	Low	Medium	High
	5%-15%	Medium	Medium	Medium	High	High
	15%-25%	High	High	High	High	V High
	>25%	V High	V High	V High	V High	V High

DustScan

DUST MONITORING REPORT

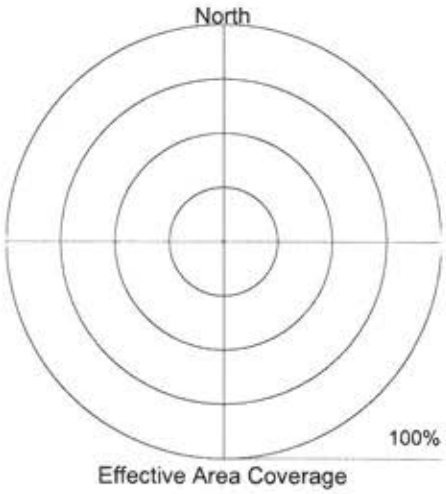
Client:	John Grimes Partnership	**Site:**	Yennadon Quarry
Point Ref:	DS2		
Date Out:	24 August 2011	**Date In:**	31 August 2011
Interval[1]:	7 days	**Our Ref:**	25822/DS2/ZJGPYEN

STATEMENT OF RESULTS

Effective Area Coverage (EAC%) / interval = 0.2
Absolute Area Coverage (AAC%) / interval = 11.2

Effective Area Coverage (EAC%) / day = 0.0
Absolute Area Coverage (AAC%) / day = 1.6

Segment	EAC% /Interval	AAC% /Interval	EAC% /Day	AAC% /Day	EAC N.Pot.[2]	AAC S.Sig.[3]
000°-015°	0.3	16.6	0.0	2.4	0	0
015°-030°	0.1	10.0	0.0	1.4	0	0
030°-045°	0.1	10.3	0.0	1.5	0	0
045°-060°	0.1	9.5	0.0	1.4	0	0
060°-075°	0.1	10.3	0.0	1.5	0	0
075°-090°	0.2	12.4	0.0	1.8	0	0
090°-105°	0.2	12.2	0.0	1.7	0	0
105°-120°	0.3	14.5	0.0	2.1	0	0
120°-135°	0.3	13.6	0.0	1.9	0	0
135°-150°	0.2	10.2	0.0	1.5	0	0
150°-165°	0.1	8.9	0.0	1.3	0	0
165°-180°	0.1	9.1	0.0	1.3	0	0
180°-195°	0.1	7.5	0.0	1.1	0	0
195°-210°	0.1	8.6	0.0	1.2	0	0
210°-225°	0.2	10.6	0.0	1.5	0	0
225°-240°	0.2	9.7	0.0	1.4	0	0
240°-255°	0.2	11.1	0.0	1.6	0	0
255°-270°	0.3	14.9	0.0	2.1	0	0
270°-285°	0.3	14.0	0.0	2.0	0	0
285°-300°	0.3	13.8	0.0	2.0	0	0
300°-315°	0.3	13.8	0.0	2.0	0	0
315°-330°	0.1	6.0	0.0	0.9	0	0
330°-345°	0.1	5.4	0.0	0.8	0	0
345°-360°	0.3	16.7	0.0	2.4	0	0



Effective Area Coverage

Absolute Area Coverage

The rose diagrams report the relative effect (or discolouration, EAC%) of the dust and the presence (density of coverage (AAC%) of dust over the whole period

[1] The recommended dust monitoring interval is 7 days

Assessment Matrix for Potential Impact

		AAC - Source Significance Level [3] (S.Sig.)				
		<80%	80%-95%	95%-99%	99%-100%	100% for 45°
EAC Nuisance Potential [2] (N.Pot.)	<2.5%	V Low	V Low	V Low	Low	Medium
	2.5%-5%	Low	Low	Low	Medium	High
	5%-15%	Medium	Medium	Medium	High	High
	15%-25%	High	High	High	High	V High
	>25%	V High	V High	V High	V High	V High

DustScan

DUST MONITORING REPORT

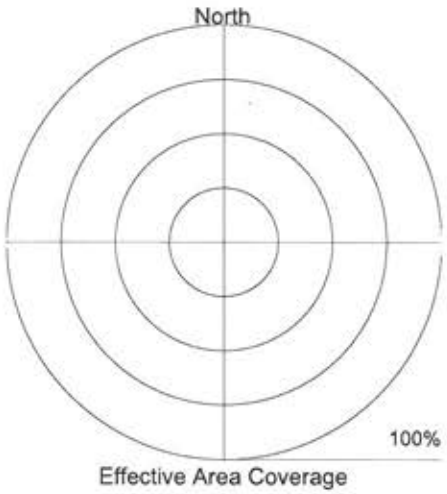
Client:	John Grimes Partnership	**Site:**	Yennadon Quarry
Point Ref:	DS2		
Date Out:	31 August 2011	**Date In:**	07 September 2011
Interval[1]:	7 days	**Our Ref:**	25932/DS2/ZJGPYEN

STATEMENT OF RESULTS

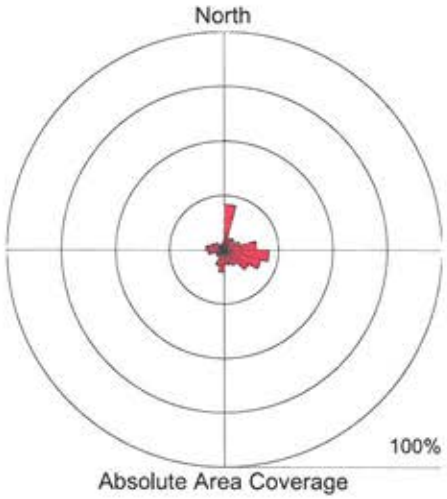
Effective Area Coverage (EAC%) / interval = 0.2
Absolute Area Coverage (AAC%) / interval = 8.3

Effective Area Coverage (EAC%) / day = 0.0
Absolute Area Coverage (AAC%) / day = 1.2

Segment	EAC% /Interval	AAC% /Interval	EAC% /Day	AAC% /Day	EAC N.Pot.[2]	AAC S.Sig.[3]
000°-015°	1.1	20.8	0.2	3.0	0	0
015°-030°	0.1	5.3	0.0	0.8	0	0
030°-045°	0.1	6.2	0.0	0.9	0	0
045°-060°	0.1	5.9	0.0	0.8	0	0
060°-075°	0.1	7.6	0.0	1.1	0	0
075°-090°	0.3	14.9	0.0	2.1	0	0
090°-105°	0.5	20.5	0.1	2.9	0	0
105°-120°	0.4	17.4	0.1	2.5	0	0
120°-135°	0.2	13.1	0.0	1.9	0	0
135°-150°	0.2	8.3	0.0	1.2	0	0
150°-165°	0.2	7.3	0.0	1.0	0	0
165°-180°	0.1	6.8	0.0	1.0	0	0
180°-195°	0.2	10.4	0.0	1.5	0	0
195°-210°	0.2	7.7	0.0	1.1	0	0
210°-225°	0.1	3.4	0.0	0.5	0	0
225°-240°	0.1	4.2	0.0	0.6	0	0
240°-255°	0.0	3.8	0.0	0.5	0	0
255°-270°	0.1	7.4	0.0	1.1	0	0
270°-285°	0.2	8.3	0.0	1.2	0	0
285°-300°	0.1	6.1	0.0	0.9	0	0
300°-315°	0.1	4.7	0.0	0.7	0	0
315°-330°	0.0	2.1	0.0	0.3	0	0
330°-345°	0.0	3.0	0.0	0.4	0	0
345°-360°	0.1	3.5	0.0	0.5	0	0



Effective Area Coverage



Absolute Area Coverage

The rose diagrams report the relative effect (or discolouration, EAC%) of the dust and the presence (density of coverage (AAC%) of dust over the whole period

[1] The recommended dust monitoring interval is 7 days

Assessment Matrix for Potential Impact

		AAC - Source Significance Level [3] (S.Sig.)				
		<80%	80%-95%	95%-99%	99%-100%	100% for 45°
EAC Nuisance Potential [2] (N.Pot.)	<2.5%	V Low	V Low	V Low	Low	Medium
	2.5%-5%	Low	Low	Low	Medium	High
	5%-15%	Medium	Medium	Medium	High	High
	15%-25%	High	High	High	High	V High
	>25%	V High	V High	V High	V High	V High

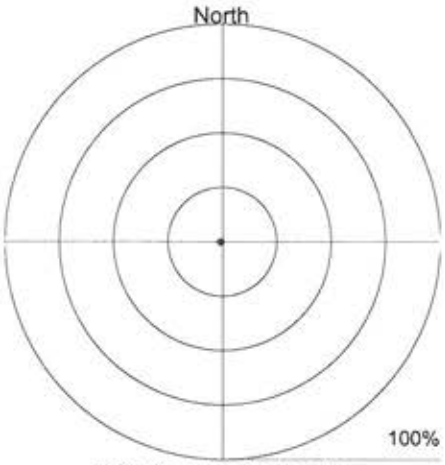
DustScan

DUST MONITORING REPORT

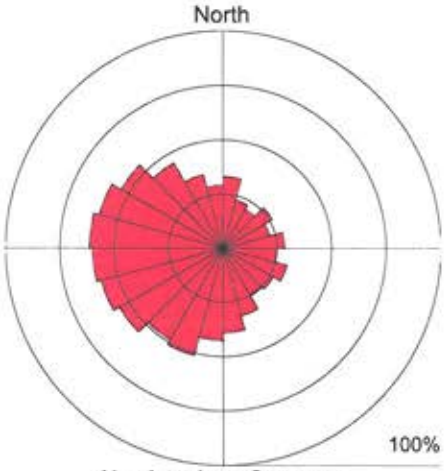
Client:	John Grimes Partnership	**Site:**	Yennadon Quarry
Point Ref:	DS3		
Date Out:	10 August 2011	**Date In:**	17 August 2011
Interval[1]:	7 days	**Our Ref:**	25558/DS3/ZJGPYEN

STATEMENT OF RESULTS

Segment	EAC% /Interval	AAC% /Interval	EAC% /Day	AAC% /Day	EAC N.Pot.[2]	AAC S.Sig.[3]
000°-015°	1.6	33.0	0.2	4.7	0	0
015°-030°	0.6	22.9	0.1	3.3	0	0
030°-045°	0.5	20.7	0.1	3.0	0	0
045°-060°	0.7	26.3	0.1	3.8	0	0
060°-075°	0.6	22.3	0.1	3.2	0	0
075°-090°	0.8	28.5	0.1	4.1	0	0
090°-105°	0.7	24.9	0.1	3.6	0	0
105°-120°	0.8	30.6	0.1	4.4	0	0
120°-135°	0.8	26.7	0.1	3.8	0	0
135°-150°	0.7	25.5	0.1	3.6	0	0
150°-165°	1.0	32.4	0.1	4.6	0	0
165°-180°	1.3	39.1	0.2	5.6	0	0
180°-195°	1.4	42.6	0.2	6.1	0	0
195°-210°	1.7	51.3	0.2	7.3	0	0
210°-225°	1.8	48.8	0.3	7.0	0	0
225°-240°	2.1	55.0	0.3	7.9	0	0
240°-255°	2.1	58.0	0.3	8.3	0	0
255°-270°	2.3	60.1	0.3	8.6	0	0
270°-285°	2.3	61.3	0.3	8.8	0	0
285°-300°	2.2	58.8	0.3	8.4	0	0
300°-315°	1.9	53.9	0.3	7.7	0	0
315°-330°	1.5	45.1	0.2	6.4	0	0
330°-345°	1.0	35.2	0.1	5.0	0	0
345°-360°	0.8	29.0	0.1	4.1	0	0



Effective Area Coverage



Absolute Area Coverage

The rose diagrams report the relative effect (or discolouration, EAC%) of the dust and the presence (density of coverage (AAC%) of dust over the whole period

[1] The recommended dust monitoring interval is 7 days

Assessment Matrix for Potential Impact

		AAC - Source Significance Level [3] (S.Sig.)				
		<80%	80%-95%	95%-99%	99%-100%	100% for 45°
EAC Nuisance Potential [2] (N.Pot.)	<2.5%	V Low	V Low	V Low	Low	Medium
	2.5%-5%	Low	Low	Low	Medium	High
	5%-15%	Medium	Medium	Medium	High	High
	15%-25%	High	High	High	High	V High
	>25%	V High	V High	V High	V High	V High

DustScan

DUST MONITORING REPORT

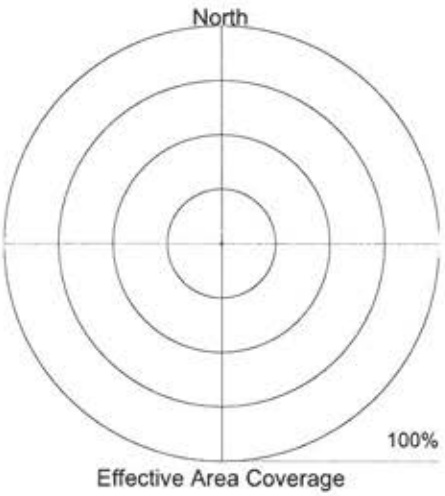
Client:	John Grimes Partnership	**Site:**	Yennadon Quarry
Point Ref:	DS3		
Date Out:	17 August 2011	**Date In:**	24 August 2011
Interval[1]:	7 days	**Our Ref:**	25637/DS3/ZJGPYEN

STATEMENT OF RESULTS

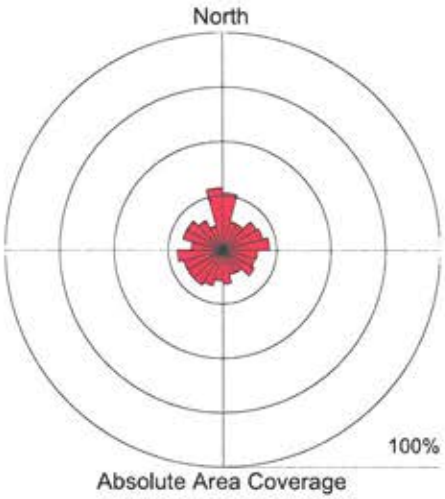
Effective Area Coverage (EAC%) / interval = 0.4
Absolute Area Coverage (AAC%) / interval = 17.4

Effective Area Coverage (EAC%) / day = 0.1
Absolute Area Coverage (AAC%) / day = 2.5

Segment	EAC% /Interval	AAC% /Interval	EAC% /Day	AAC% /Day	EAC N.Pot.[2]	AAC S.Sig.[3]
000°-015°	0.6	26.2	0.1	3.7	0	0
015°-030°	0.2	13.5	0.0	1.9	0	0
030°-045°	0.2	13.5	0.0	1.9	0	0
045°-060°	0.3	18.2	0.0	2.6	0	0
060°-075°	0.4	19.2	0.1	2.7	0	0
075°-090°	0.5	21.7	0.1	3.1	0	0
090°-105°	0.3	16.2	0.0	2.3	0	0
105°-120°	0.3	15.4	0.0	2.2	0	0
120°-135°	0.3	16.9	0.0	2.4	0	0
135°-150°	0.2	12.2	0.0	1.7	0	0
150°-165°	0.2	11.9	0.0	1.7	0	0
165°-180°	0.3	15.9	0.0	2.3	0	0
180°-195°	0.3	14.3	0.0	2.0	0	0
195°-210°	0.4	17.2	0.1	2.5	0	0
210°-225°	0.4	18.8	0.1	2.7	0	0
225°-240°	0.4	18.6	0.1	2.7	0	0
240°-255°	0.4	18.6	0.1	2.7	0	0
255°-270°	0.5	20.9	0.1	3.0	0	0
270°-285°	0.3	14.4	0.0	2.1	0	0
285°-300°	0.5	18.9	0.1	2.7	0	0
300°-315°	0.4	18.9	0.1	2.7	0	0
315°-330°	0.3	15.5	0.0	2.2	0	0
330°-345°	0.2	11.6	0.0	1.7	0	0
345°-360°	0.5	28.5	0.1	4.1	0	0



Effective Area Coverage



Absolute Area Coverage

The rose diagrams report the relative effect (or discolouration, EAC%) of the dust and the presence (density of coverage (AAC%) of dust over the whole period

[1] The recommended dust monitoring interval is 7 days

Assessment Matrix for Potential Impact

		AAC - Source Significance Level [3] (S.Sig.)				
		<80%	80%-95%	95%-99%	99%-100%	100% for 45°
EAC Nuisance Potential [2] (N.Pot.)	<2.5%	V Low	V Low	V Low	Low	Medium
	2.5%-5%	Low	Low	Low	Medium	High
	5%-15%	Medium	Medium	Medium	High	High
	15%-25%	High	High	High	High	V High
	>25%	V High	V High	V High	V High	V High

DustScan

DUST MONITORING REPORT

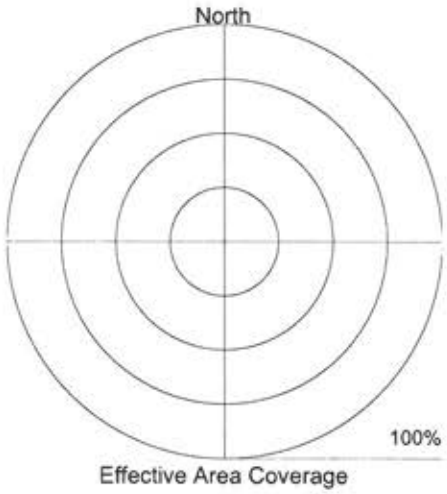
Client:	John Grimes Partnership	**Site:**	Yennadon Quarry
Point Ref:	DS3		
Date Out:	24 August 2011	**Date In:**	31 August 2011
Interval[1]:	7 days	**Our Ref:**	25823/DS3/ZJGPYEN

STATEMENT OF RESULTS

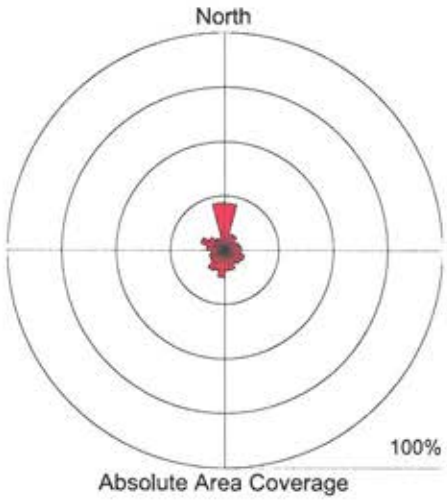
Effective Area Coverage (EAC%) / interval = 0.2
Absolute Area Coverage (AAC%) / interval = 9.4

Effective Area Coverage (EAC%) / day = 0.0
Absolute Area Coverage (AAC%) / day = 1.3

Segment	EAC% /Interval	AAC% /Interval	EAC% /Day	AAC% /Day	EAC N.Pot.[2]	AAC S.Sig.[3]
000°-015°	0.5	21.4	0.1	3.1	0	0
015°-030°	0.1	7.9	0.0	1.1	0	0
030°-045°	0.1	7.7	0.0	1.1	0	0
045°-060°	0.1	5.6	0.0	0.8	0	0
060°-075°	0.1	6.9	0.0	1.0	0	0
075°-090°	0.1	7.8	0.0	1.1	0	0
090°-105°	0.1	7.9	0.0	1.1	0	0
105°-120°	0.1	9.5	0.0	1.4	0	0
120°-135°	0.1	8.7	0.0	1.2	0	0
135°-150°	0.1	7.6	0.0	1.1	0	0
150°-165°	0.2	9.6	0.0	1.4	0	0
165°-180°	0.1	9.5	0.0	1.4	0	0
180°-195°	0.2	12.5	0.0	1.8	0	0
195°-210°	0.2	10.0	0.0	1.4	0	0
210°-225°	0.2	10.9	0.0	1.6	0	0
225°-240°	0.1	7.6	0.0	1.1	0	0
240°-255°	0.1	7.4	0.0	1.1	0	0
255°-270°	0.1	6.3	0.0	0.9	0	0
270°-285°	0.2	8.4	0.0	1.2	0	0
285°-300°	0.2	11.3	0.0	1.6	0	0
300°-315°	0.1	8.4	0.0	1.2	0	0
315°-330°	0.1	6.2	0.0	0.9	0	0
330°-345°	0.1	5.4	0.0	0.8	0	0
345°-360°	0.5	21.7	0.1	3.1	0	0



Effective Area Coverage



Absolute Area Coverage

The rose diagrams report the relative effect (or discolouration, EAC%) of the dust and the presence (density of coverage (AAC%) of dust over the whole period

[1] The recommended dust monitoring interval is 7 days

Assessment Matrix for Potential Impact

		AAC - Source Significance Level [3] (S.Sig.)				
		<80%	80%-95%	95%-99%	99%-100%	100% for 45°
EAC Nuisance Potential [2] (N.Pot.)	<2.5%	V Low	V Low	V Low	Low	Medium
	2.5%-5%	Low	Low	Low	Medium	High
	5%-15%	Medium	Medium	Medium	High	High
	15%-25%	High	High	High	High	V High
	>25%	V High	V High	V High	V High	V High

DustScan

DUST MONITORING REPORT

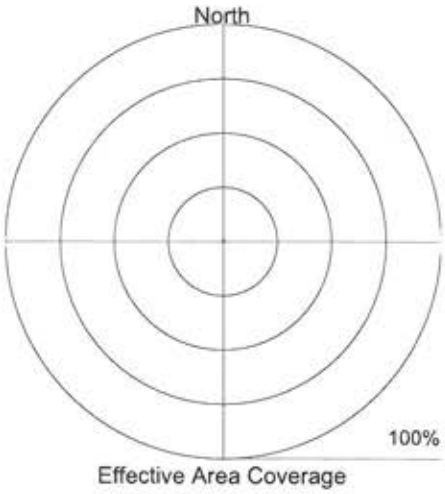
Client:	John Grimes Partnership	**Site:**	Yennadon Quarry
Point Ref:	DS3		
Date Out:	31 August 2011	**Date In:**	07 September 2011
Interval[1]:	7 days	**Our Ref:**	25933/DS3/ZJGPYEN

STATEMENT OF RESULTS

Effective Area Coverage (EAC%) / interval = 0.2
Absolute Area Coverage (AAC%) / interval = 10.5

Effective Area Coverage (EAC%) / day = 0.0
Absolute Area Coverage (AAC%) / day = 1.5

Segment	EAC% /Interval	AAC% /Interval	EAC% /Day	AAC% /Day	EAC N.Pot.[2]	AAC S.Sig.[3]
000°-015°	1.4	26.8	0.2	3.8	0	0
015°-030°	0.1	9.0	0.0	1.3	0	0
030°-045°	0.1	9.5	0.0	1.4	0	0
045°-060°	0.2	15.5	0.0	2.2	0	0
060°-075°	0.5	20.4	0.1	2.9	0	0
075°-090°	0.3	18.3	0.0	2.6	0	0
090°-105°	0.3	17.3	0.0	2.5	0	0
105°-120°	0.2	15.0	0.0	2.1	0	0
120°-135°	0.2	13.3	0.0	1.9	0	0
135°-150°	0.2	9.6	0.0	1.4	0	0
150°-165°	0.1	6.8	0.0	1.0	0	0
165°-180°	0.1	5.4	0.0	0.8	0	0
180°-195°	0.1	6.2	0.0	0.9	0	0
195°-210°	0.1	7.8	0.0	1.1	0	0
210°-225°	0.1	4.3	0.0	0.6	0	0
225°-240°	0.1	5.4	0.0	0.8	0	0
240°-255°	0.0	3.1	0.0	0.4	0	0
255°-270°	0.1	3.8	0.0	0.5	0	0
270°-285°	0.2	10.0	0.0	1.4	0	0
285°-300°	0.4	17.4	0.1	2.5	0	0
300°-315°	0.3	11.7	0.0	1.7	0	0
315°-330°	0.1	8.0	0.0	1.1	0	0
330°-345°	0.1	3.9	0.0	0.6	0	0
345°-360°	0.1	4.3	0.0	0.6	0	0



Effective Area Coverage

Absolute Area Coverage

The rose diagrams report the relative effect (or discolouration, EAC%) of the dust and the presence (density of coverage (AAC%) of dust over the whole period

[1] The recommended dust monitoring interval is 7 days

Assessment Matrix for Potential Impact

		AAC - Source Significance Level [3] (S.Sig.)				
		<80%	80%-95%	95%-99%	99%-100%	100% for 45°
EAC Nuisance Potential [2] (N.Pot.)	<2.5%	V Low	V Low	V Low	Low	Medium
	2.5%-5%	Low	Low	Low	Medium	High
	5%-15%	Medium	Medium	Medium	High	High
	15%-25%	High	High	High	High	V High
	>25%	V High	V High	V High	V High	V High

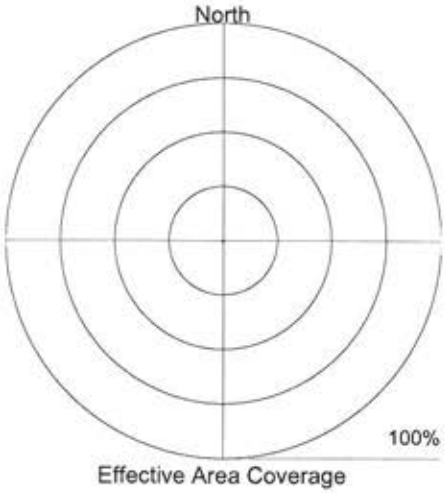
DustScan

DUST MONITORING REPORT

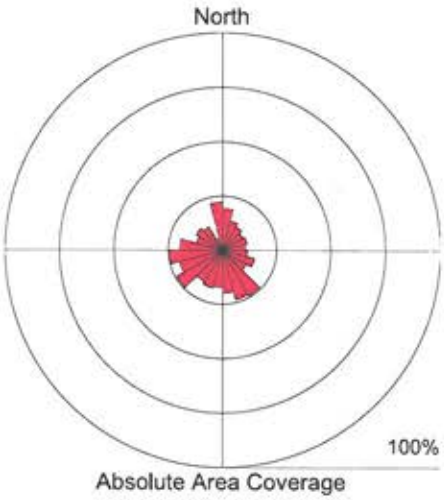
Client:	John Grimes Partnership	**Site:**	Yennadon Quarry
Point Ref:	DS4		
Date Out:	10 August 2011	**Date In:**	17 August 2011
Interval[1]:	7 days	**Our Ref:**	25559/DS4/ZJGPYEN

STATEMENT OF RESULTS

Segment	EAC% /Interval	AAC% /Interval	EAC% /Day	AAC% /Day	EAC N.Pot.[2]	AAC S.Sig.[3]
000°-015°	0.3	19.1	0.0	2.7	0	0
015°-030°	0.2	13.9	0.0	2.0	0	0
030°-045°	0.1	12.3	0.0	1.8	0	0
045°-060°	0.1	10.9	0.0	1.6	0	0
060°-075°	0.2	11.8	0.0	1.7	0	0
075°-090°	0.1	10.8	0.0	1.5	0	0
090°-105°	0.2	11.6	0.0	1.7	0	0
105°-120°	0.3	15.4	0.0	2.2	0	0
120°-135°	0.2	12.8	0.0	1.8	0	0
135°-150°	0.5	24.3	0.1	3.5	0	0
150°-165°	0.5	23.6	0.1	3.4	0	0
165°-180°	0.5	19.7	0.1	2.8	0	0
180°-195°	0.3	17.3	0.0	2.5	0	0
195°-210°	0.3	18.0	0.0	2.6	0	0
210°-225°	0.3	16.6	0.0	2.4	0	0
225°-240°	0.6	24.4	0.1	3.5	0	0
240°-255°	0.4	20.5	0.1	2.9	0	0
255°-270°	0.6	24.6	0.1	3.5	0	0
270°-285°	0.4	19.7	0.1	2.8	0	0
285°-300°	0.2	12.4	0.0	1.8	0	0
300°-315°	0.2	14.0	0.0	2.0	0	0
315°-330°	0.2	12.4	0.0	1.8	0	0
330°-345°	0.1	5.6	0.0	0.8	0	0
345°-360°	0.7	22.1	0.1	3.2	0	0



Effective Area Coverage



Absolute Area Coverage

The rose diagrams report the relative effect (or discolouration, EAC%) of the dust and the presence (density of coverage (AAC%) of dust over the whole period

[1] The recommended dust monitoring interval is 7 days

Assessment Matrix for Potential Impact

		AAC - Source Significance Level [3] (S.Sig.)				
		<80%	80%-95%	95%-99%	99%-100%	100% for 45°
EAC Nuisance Potential [2] (N.Pot.)	<2.5%	V Low	V Low	V Low	Low	Medium
	2.5%-5%	Low	Low	Low	Medium	High
	5%-15%	Medium	Medium	Medium	High	High
	15%-25%	High	High	High	High	V High
	>25%	V High	V High	V High	V High	V High

DustScan

DUST MONITORING REPORT

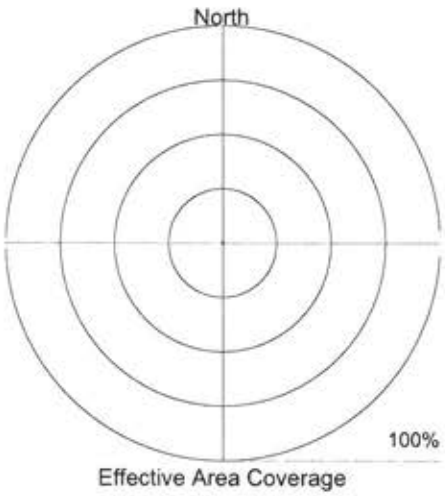
Client:	John Grimes Partnership	**Site:**	Yennadon Quarry
Point Ref:	DS4		
Date Out:	17 August 2011	**Date In:**	24 August 2011
Interval[1]:	7 days	**Our Ref:**	25638/DS4/ZJGPYEN

STATEMENT OF RESULTS

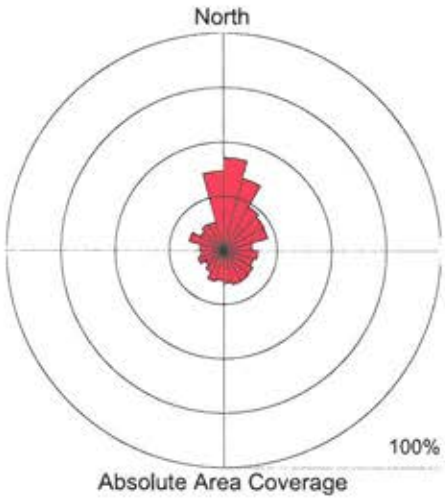
Effective Area Coverage (EAC%) / interval = 0.3
Absolute Area Coverage (AAC%) / interval = 17.8

Effective Area Coverage (EAC%) / day = 0.0
Absolute Area Coverage (AAC%) / day = 2.5

Segment	EAC% /Interval	AAC% /Interval	EAC% /Day	AAC% /Day	EAC N.Pot.[2]	AAC S.Sig.[3]
000°-015°	1.1	42.7	0.2	6.1	0	0
015°-030°	0.9	34.3	0.1	4.9	0	0
030°-045°	0.4	23.2	0.1	3.3	0	0
045°-060°	0.3	21.6	0.0	3.1	0	0
060°-075°	0.4	21.3	0.1	3.0	0	0
075°-090°	0.2	13.5	0.0	1.9	0	0
090°-105°	0.3	15.9	0.0	2.3	0	0
105°-120°	0.2	14.4	0.0	2.1	0	0
120°-135°	0.2	15.8	0.0	2.3	0	0
135°-150°	0.2	16.2	0.0	2.3	0	0
150°-165°	0.2	16.4	0.0	2.3	0	0
165°-180°	0.2	15.2	0.0	2.2	0	0
180°-195°	0.2	13.9	0.0	2.0	0	0
195°-210°	0.2	14.9	0.0	2.1	0	0
210°-225°	0.2	11.7	0.0	1.7	0	0
225°-240°	0.1	9.7	0.0	1.4	0	0
240°-255°	0.2	12.2	0.0	1.7	0	0
255°-270°	0.2	10.6	0.0	1.5	0	0
270°-285°	0.2	11.1	0.0	1.6	0	0
285°-300°	0.4	16.5	0.1	2.4	0	0
300°-315°	0.2	12.4	0.0	1.8	0	0
315°-330°	0.2	14.0	0.0	2.0	0	0
330°-345°	0.2	13.5	0.0	1.9	0	0
345°-360°	0.7	36.5	0.1	5.2	0	0



Effective Area Coverage



Absolute Area Coverage

The rose diagrams report the relative effect (or discolouration, EAC%) of the dust and the presence (density of coverage (AAC%) of dust over the whole period

[1] The recommended dust monitoring interval is 7 days

Assessment Matrix for Potential Impact

		AAC - Source Significance Level [3] (S.Sig.)				
		<80%	80%-95%	95%-99%	99%-100%	100% for 45°
EAC Nuisance Potential [2] (N.Pot.)	<2.5%	V Low	V Low	V Low	Low	Medium
	2.5%-5%	Low	Low	Low	Medium	High
	5%-15%	Medium	Medium	Medium	High	High
	15%-25%	High	High	High	High	V High
	>25%	V High	V High	V High	V High	V High

DustScan

DUST MONITORING REPORT

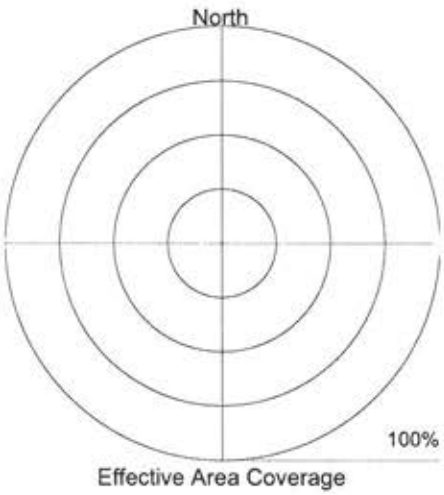
Client:	John Grimes Partnership	**Site:**	Yennadon Quarry
Point Ref:	DS4		
Date Out:	24 August 2011	**Date In:**	31 August 2011
Interval[1]:	7 days	**Our Ref:**	25824/DS4/ZJGPYEN

STATEMENT OF RESULTS

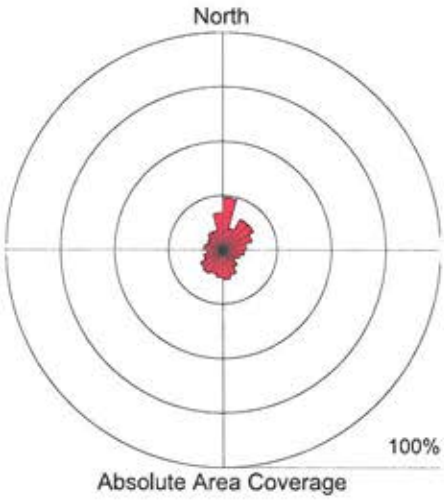
Effective Area Coverage (EAC%) / interval = 0.2
Absolute Area Coverage (AAC%) / interval = 11.6

Effective Area Coverage (EAC%) / day = 0.0
Absolute Area Coverage (AAC%) / day = 1.7

Segment	EAC% /Interval	AAC% /Interval	EAC% /Day	AAC% /Day	EAC N.Pot.[2]	AAC S.Sig.[3]
000°-015°	0.5	24.0	0.1	3.4	0	0
015°-030°	0.2	10.3	0.0	1.5	0	0
030°-045°	0.3	16.2	0.0	2.3	0	0
045°-060°	0.4	16.4	0.1	2.3	0	0
060°-075°	0.3	13.9	0.0	2.0	0	0
075°-090°	0.2	10.9	0.0	1.6	0	0
090°-105°	0.2	10.1	0.0	1.4	0	0
105°-120°	0.1	8.4	0.0	1.2	0	0
120°-135°	0.1	6.9	0.0	1.0	0	0
135°-150°	0.1	9.6	0.0	1.4	0	0
150°-165°	0.2	12.2	0.0	1.7	0	0
165°-180°	0.3	13.8	0.0	2.0	0	0
180°-195°	0.2	12.8	0.0	1.8	0	0
195°-210°	0.2	11.6	0.0	1.7	0	0
210°-225°	0.2	12.8	0.0	1.8	0	0
225°-240°	0.2	11.9	0.0	1.7	0	0
240°-255°	0.1	9.1	0.0	1.3	0	0
255°-270°	0.1	7.4	0.0	1.1	0	0
270°-285°	0.1	8.8	0.0	1.3	0	0
285°-300°	0.1	7.5	0.0	1.1	0	0
300°-315°	0.1	8.1	0.0	1.2	0	0
315°-330°	0.2	9.5	0.0	1.4	0	0
330°-345°	0.2	9.2	0.0	1.3	0	0
345°-360°	0.3	17.1	0.0	2.4	0	0



Effective Area Coverage



Absolute Area Coverage

The rose diagrams report the relative effect (or discolouration, EAC%) of the dust and the presence (density of coverage (AAC%) of dust over the whole period

[1] The recommended dust monitoring interval is 7 days

Assessment Matrix for Potential Impact

		AAC - Source Significance Level [3] (S.Sig.)				
		<80%	80%-95%	95%-99%	99%-100%	100% for 45°
EAC Nuisance Potential [2] (N.Pot.)	<2.5%	V Low	V Low	V Low	Low	Medium
	2.5%-5%	Low	Low	Low	Medium	High
	5%-15%	Medium	Medium	Medium	High	High
	15%-25%	High	High	High	High	V High
	>25%	V High	V High	V High	V High	V High

DustScan

DUST MONITORING REPORT

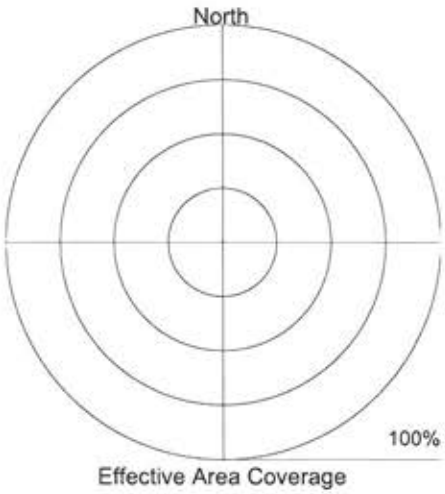
Client:	John Grimes Partnership	**Site:**	Yennadon Quarry
Point Ref:	DS4		
Date Out:	31 August 2011	**Date In:**	07 September 2011
Interval[1]:	7 days	**Our Ref:**	25934/DS4/ZJGPYEN

STATEMENT OF RESULTS

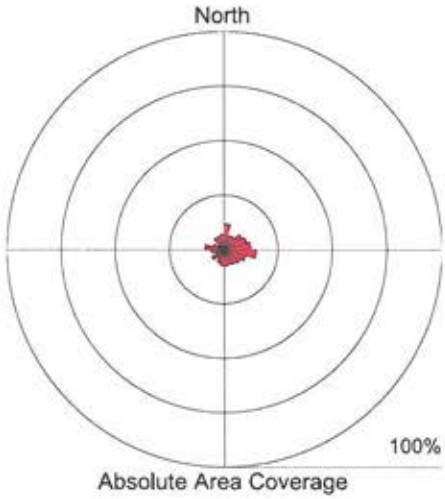
Effective Area Coverage (EAC%) / interval = 0.1
Absolute Area Coverage (AAC%) / interval = 7.8

Effective Area Coverage (EAC%) / day = 0.0
Absolute Area Coverage (AAC%) / day = 1.1

Segment	EAC% /Interval	AAC% /Interval	EAC% /Day	AAC% /Day	EAC N.Pot.[2]	AAC S.Sig.[3]
000°-015°	0.3	11.9	0.0	1.7	0	0
015°-030°	0.1	6.8	0.0	1.0	0	0
030°-045°	0.1	7.0	0.0	1.0	0	0
045°-060°	0.2	9.8	0.0	1.4	0	0
060°-075°	0.2	11.1	0.0	1.6	0	0
075°-090°	0.2	12.5	0.0	1.8	0	0
090°-105°	0.3	15.1	0.0	2.2	0	0
105°-120°	0.2	10.5	0.0	1.5	0	0
120°-135°	0.2	8.8	0.0	1.3	0	0
135°-150°	0.1	7.9	0.0	1.1	0	0
150°-165°	0.1	7.2	0.0	1.0	0	0
165°-180°	0.1	7.7	0.0	1.1	0	0
180°-195°	0.1	7.4	0.0	1.1	0	0
195°-210°	0.1	6.3	0.0	0.9	0	0
210°-225°	0.1	4.6	0.0	0.7	0	0
225°-240°	0.1	6.5	0.0	0.9	0	0
240°-255°	0.1	4.0	0.0	0.6	0	0
255°-270°	0.1	5.9	0.0	0.8	0	0
270°-285°	0.1	8.9	0.0	1.3	0	0
285°-300°	0.1	5.2	0.0	0.7	0	0
300°-315°	0.0	2.7	0.0	0.4	0	0
315°-330°	0.1	6.5	0.0	0.9	0	0
330°-345°	0.1	6.4	0.0	0.9	0	0
345°-360°	0.1	7.2	0.0	1.0	0	0



Effective Area Coverage



Absolute Area Coverage

The rose diagrams report the relative effect (or discolouration, EAC%) of the dust and the presence (density of coverage (AAC%) of dust over the whole period

[1] The recommended dust monitoring interval is 7 days

Assessment Matrix for Potential Impact

		AAC - Source Significance Level [3] (S.Sig.)				
		<80%	80%-95%	95%-99%	99%-100%	100% for 45°
EAC Nuisance Potential [2] (N.Pot.)	<2.5%	V Low	V Low	V Low	Low	Medium
	2.5%-5%	Low	Low	Low	Medium	High
	5%-15%	Medium	Medium	Medium	High	High
	15%-25%	High	High	High	High	V High
	>25%	V High	V High	V High	V High	V High

APPENDIX EA/03

Extract of Table 7 from the GoodQuarry Guide

GoodQuarry Guide - Dust

AIR POLLUTION — Table 7

Public response levels related to deposition rates.

Public Response	Typical Situation	Measure of soiling	
		% EAC/day	Equivalent mg/m^3/day*
	Rural	0.01	2.38
	Suburban/small town	0.02	4.76
Noticeable		0.2	47.6
	Urban	0.3 - 0.4	71.5 - 95.3
Possible complaint	Rural summer time	0.5	119.1
Objectionable		0.7	166.8
	Industrial	0.8 - 1.0	190.6 - 238.2
Probable complaint		2.0	476.4
Serious complaint		5	1191.1

*Based on conversion after Beaman and Kingsbury[74].

The standards adopted by other countries and perceived levels of nuisance dust are summarised in Table 8.

The wide range of values and subjective descriptions used to define 'acceptable' nuisance dust **deposition** or soiling, together with the fact that complaints are often received well below these levels, demonstrates the urgent requirement for an empirical standard to be adopted, based on the central feature of nuisance dust, i.e. as a visible effect. This should be differentiated from the important, but unrelated, monitoring of health-related **particulates** as the airborne concentration of a size-related fraction.

Source: GoodQuarry Guide – www.goodquarry.com