ENVIRONMENTAL PERMIT APPLICATION
ENVIRONMENTAL AND ACCIDENT RISK ASSESSMENT

CAULDON LOW QUARRY
STONEY LANE
CAULDON
STOKE-ON-TRENT
ST10 3EW

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CAULDON LOW QUARRY, STONEY LANE, CAULDON, STOKE-ON-TRENT

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Prepared for : Aggregate Industries UK Limited

Prepared by : Sirius Environmental Limited
The Beacon Centre for Enterprise
Dafen
Llanelli
SA14 8LQ

Written by :

David Rowe BSc (Hons) MSc
Environmental Consultant

Reviewed by :

Dylan Thomas BSc (Hons) PGDip MCIWM
Principal Environmental Consultant

Approved by :

Mark Griffiths BSc (Hons) MSc CEnv MCIWM CGeol
Environmental Director

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1.0 INTRODUCTION

1.1 Scope

1.1.1 This document presents an assessment of the risks to the environment posed by the operation of a mineral processing, roadstone coating and associated waste road planings recycling activities at Cauldon Low Quarry, Stoke-on-Trent.

1.2 Permitted Activities

Mineral Processing

1.2.1 The mineral processing activities comprise of crushing and screening of limestone that has been extracted from the confines of Cauldon Quarry. Screening and crushing operations are carried out via a three stage process to produce the various grades of limestone aggregates to be marketed.

Asphalt Recycling Facility

1.2.2 The Asphalt Recycling Facility will involve the physical treatment of non-hazardous waste bitumen bound road planings to produce a range of secondary aggregates for reuse, with the materials principally being processed to produce new asphalt on site. Physical treatment operations will take the form of mechanical crushing and screening/grading/sorting. All associated waste treatment and storage operations will be carried out externally within a designated area of the wider quarry complex.

Asphalt Manufacturing Facility

1.2.3 The asphalt plant will utilise primary aggregates sourced from the wider quarry activities and secondary aggregates produced at the adjacent Asphalt Recycling Facility. The plant will broadly comprise a cold feed system, drying and heating system, mixing tower, and asphalt storage silos.

1.3 Site Setting

Site Description

1.3.1 The permitted activities will be located within the confines of Cauldon Low Quarry, Stoney Lane, Cauldon, Stoke-on-Trent, Staffordshire, ST10 3EW. Cauldon Low Quarry forms part of wider complex of neighbouring limestone and shale quarries located to the east and north, and associated mineral processing and manufacturing facilities operated by other registered companies, but for which a common Mineral Planning Consent covers all mineral related activities at each defined quarry. The proposed site is situated approximately on National Grid Reference (NGR) SK 07761 48753, as illustrated on Drawing No. AI1008/08/01.

1.3.2 To date the quarry has been extracted to a elevation of ~285mAOD with future extraction proposed to a basal elevation of 215mAOD. The northern edge of the quarry is elevated at between ~280mADO and ~320mAOD, increasing to between ~320mAOD and ~350mAOD along the western and southern edges of the quarry void. The eastern edge of the Cauldon Low Quarry is currently defined by a spine of limestone rock that rises to an elevation of between ~300mAOD and ~325mAOD, and defines the boundary between Cauldon Low Quarry and Cauldon Limestone Quarry, which is the primary source of limestone for the Lafarge Cauldon Cement Works located to the north. The

spine of rock is proposed to be removed under future extraction options, for which a planning application is currently being determined.

1.3.3 Access and egress from the application site will be gained via a junction with an unclassified public road network located on the northwestern edge of the quarry, which subsequently provides access to the A52 located ~675m south of the junction.

1.3.4 Cauldon Low Quarry is located in a rural setting approximately 20km west of Stoke-on-Trent. Cauldon village is located approximately ~220m north of the quarry at it's nearest point and Cauldon Low village lies ~560m to the southwest. The extent of the approved extraction footprint for Cauldon Low Quarry and the operational areas for each of the proposed permitted activities is shown in **Drawing No. A11008/08/02.**

1.3.5 The nearest properties to the site include Cauldon Low Village hall located ~220m beyond the southwestern edge of the quarry's approved extraction footprint, Yew Tree Inn located ~50m to the north of the site access road and contractor compound, and an unnamed farm located ~100m to the south of the approved extraction footprint. Potential receptors to the site are further discussed in The Environmental & Accident Risk Assessment (Doc. Ref.: AI1008/05) that supports this application.

1.3.6 The proposed site is located within the administrative area of Staffordshire Moorlands District Council, which has two Air Quality Management Areas (AQMAs) designated within its Authority area that cover the site, but are restricted to the urban areas of Leek located ~12km to the northwest and Cellarhead located ~12km west of the site. The pollutant declared for both of these AQMA's is Nitrogen Dioxide (NO2)

1.3.7 There are three designated Sites of Special Scientific Interest (SSSI) and one Local Nature Reserve (LNS) located within 1km of the permit boundary.

1.3.8 There are no Areas of Outstanding Natural Beauty (AONB), National Nature Reserves (NNR), Ramsar Sites, Special Areas of Conservation (SAC) or Special Protected Areas (SPA) located within 1km of the site boundary.

1.3.9 There are 12 Grade II* Listed Buildings located within 1km of the site and 1 Scheduled Monument.

1.4 Potential Sensitive Receptors

1.4.1 **Table EARA1** summarises the potential sensitive receptors that have been identified through a desk top study of the locality and the corresponding minimum distance from the proposed permit boundary of the facility. The locations of the receptors are shown in **Drawing No. AI1008/08/04.**

Table EARA1: Identified Potential Sensitive Receptors within 1km of Cauldon Low Quarry

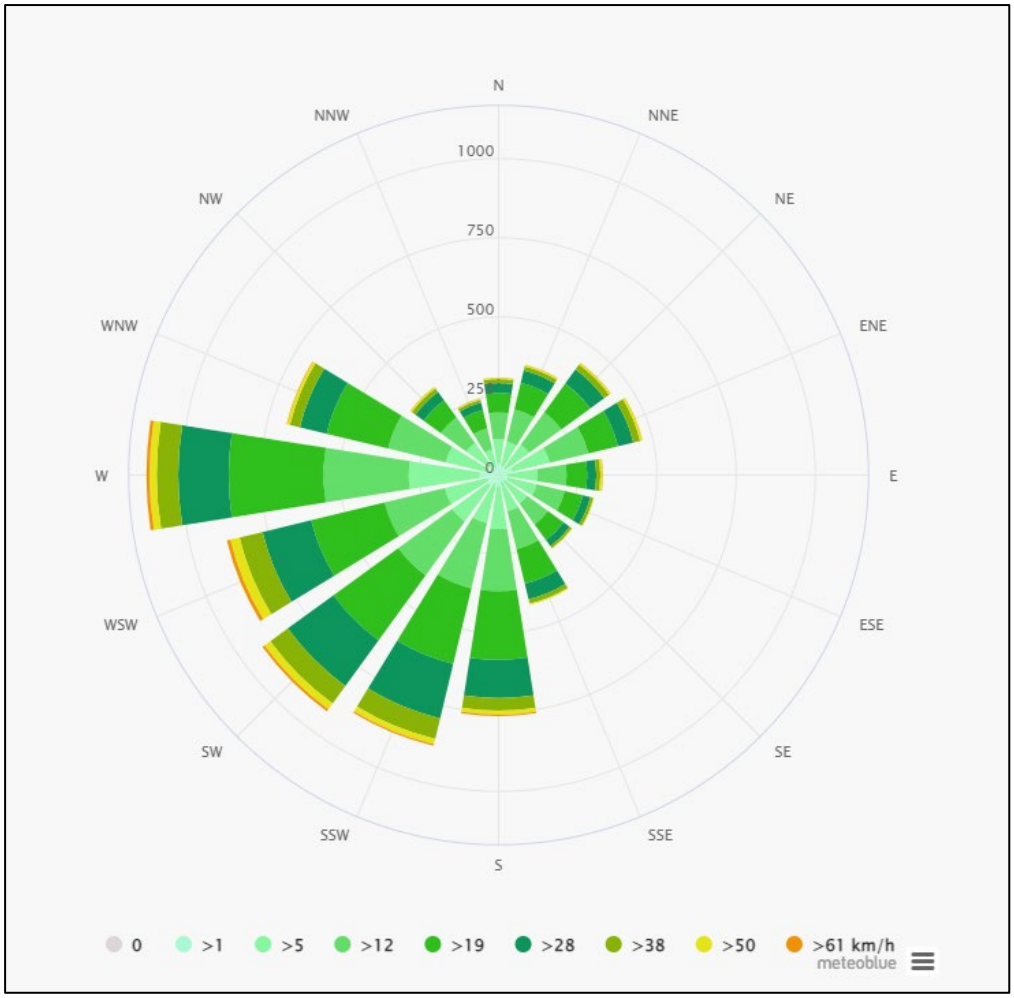
Ref.	Receptor Name	Receptor Type	Approximate Nearest Distance and Direction from Mineral Processing Activities (including access and internal haul road networks)	Approximate Nearest Distance and Direction from Asphalt Plant and Recycling Operations
R1	Cauldon Limestone Quarry	Industrial / Commercial	0m; E	290m; E
R2	Agricultural / Vegetated Land	Agriculture, woodlands & grassland.	0m+; All directions	80m+, All directions
R3	Cauldon Low SSSI	Site of Specific Scientific Interest (Geological)	0m+; N	220m, NNE
R4	Rue Hill SSSI	Site of Specific Scientific Interest (Ecological)	0m+, SE	780m; SE
R5	Unnamed Road	Residential / Public Highway	0m+; W & N	370m, W & N
R6	Yew Tree Inn	Commercial	140m; N	460m, N
R7	Cauldon Village	Residential	200m, N & NE	560m, NWN
R8	A52	Public Highway	200m; S	540m; S
R9	Lower Moorend Caravan Park	Residential & Commercial	215m; NW	540m; NW
R10	Cauldon Low Village Hall and associated dwellings & farmsteads along the A52	Residential & Commercial	230m, SW & S	520m; SW & S
R11	Stoney Lane	Residential	310m, W	680m; WNW
R12	Hemmings Lows View	Residential & Industrial / Commercial	330m, W	435m; WSW
R13	Cauldon Low Railway Cutting	Site of Specific Scientific Interest (Geological)	450m; N	780m; N
R14	Lafarge Cement Works	Industrial / Commercial	490m; NE	840m, NE
R15	Cauldon Low Village	Residential	625m; SW	860m; SW
R16	Ribden Low Bowl Barrow	Scheduled Monument – Grade II Listed Building	600m, SSW	875m, SSW
R17	Hoften's Croft Meadow	Local Nature Reserve	700m, SW	950m, SW
R18	Caldon Dales	Site of Specific Scientific Interest (Ecological)	750m; E	1.2km, E
R19	Secret Cloud House Holidays	Commercial	875m; W	1.3km; W
R20	Cauldon Shale Quarry	Industrial	400m; N	770m; N
R21	Rue Hill Quarry	Industrial	725m; SSE	1.2km; SSE
R22	B5417	Public Highway	475m, SSE	825m; SSE
R23	Lower Broomyshaw Farm	Residential/Industrial	950m, NW	1.3km; NW

Meteorological Conditions

1.4.2 The local wind speed and direction data has been obtained from the Meteoblue Meteorological Website for Cauldon. The wind rose, as shown by **Figure EARA1** shows the percentage of wind vector that could be generated in each of the 16 points of a compass.

1.4.3 The wind rose indicates that the predominant wind directions are from the west and the south western quadrant.

Figure EARA1: Wind Rose for Cauldon (Source: Meteoblue)



1.5 Risk Assessment

Risk Assessment Criteria

1.5.1 The risk assessment will be prepared using the widely accepted source-pathway-receptor methodology, and is the preferred method specified in the EA guidance. Where any complete source-pathway-receptor linkage exists, the magnitude of any such risk is qualified by the probability and consequence of any such risk occurring. The criteria to be adopted for the risk assessment are present in **Table EARA2**.

Table EARA2: Risk Assessment Criteria

Probability ⇨ Consequence ⇩	Very Low	Low	Moderate	High
Very Low	Negligible	Very Low	Low	Low-Moderate
Low	Very Low	Low	Low-Moderate	Moderate
Moderate	Low	Low-Moderate	Moderate	High
High	Low-Moderate	Moderate	High	Very high

1.5.2 An environmental and accident risk assessment for the facility operations is presented in **Appendix EARA1**. The assessment covers the following potential risks;

- Dust and particulates;
- Combustion Emissions;
- Odour;
- Mud and Debris on the road;
- Noise & Vibration;
- Accidents; and
- Abnormal conditions.

APPENDIX 1
Environmental and Accident Risk Assessment Matrix

Data and information				Judgement				Action (by permitting)	
Source	**Harm**	**Pathway**	**Receptor**	**Probability of exposure**	**Consequence**	**Magnitude of risk**	**Justification for magnitude**	**Risk management**	**Residual risk**
What is the agent or process with potential to cause harm?	*What are the harmful consequences if things go wrong?*	*How might the receptor come into contact with the source?*	*What is at risk? What do I wish to protect?*	*How likely is this contact?*	*How severe will the consequences be if this occurs?*	*What is the overall magnitude of the risk?*	*On what did I base my judgement?*	*How can I best manage the risk to reduce the magnitude?*	*What is the magnitude of the risk after management?*
Dust/Particulates									
Particulate matter and dusts from delivery vehicles, handling and unloading materials, trafficked mud and debris, and the storage and processing of aggregates	Harm to human health - respiratory irritation and illness.	Air transport, deposition then inhalation.	Local human population	Moderate	High	**High**	As the prevailing winds are from the west and southwest receptors are unlikely to be adversely affected by dust. Existing screening bunds are positioned along the edges of the site where residential receptors are located within close proximity of the edge of the quarry. The current basal levels fo the quarry are >30m below surface levels to the west and south of the quarry footprint. Receptors such as public highways and private roads are unlikely to be affected by dust due to their transient nature.	All haul routes will be adequately maintained; Mobile plant (including mineral processing units) will be regularly serviced and equipped with effective exhausts to prevent fume emissions; All conveyors systems will be fitted with wind boards or enclosed in housing; Processing plant and mineral/aggregate stockpiles will be positioned as far away from any site boundaries near to any sensitive receptors; Drop heights from conveyors and hydraulic loading shovels into processing plant, dumpers and HGVs will be minimised. Water bowsers will be used during dry conditions on the access road and any other trafficked areas; Vehicle speed control on access and other trafficked areas will be implemented by the Site Manager and must be adhered to with due regard to weather and ground conditions in order to reduce fugitive dust generation; AI shall ensure that all commercial vehicles pass through a wheel washing facility prior to leaving the site to prevent the deposition of material onto the public highway In the unlikely event that dust or mud from the site has been deposited on the public highway, a road sweeper will be employed The Site Manager or instructed site personnel will undertake regular inspections of the public highway in order to identify the need for any cleaning requirements. Observations from all inspections will be logged Loading and unloading of vehicles should ensure drop heights are minimised; Water sprays or surface binders will be utilised to maintain damp surfaces on exposed tip and stockpile faces and any exposed friable surfaces during dry and windy weather All site employees will receive appropriate training in order to ensure that they are conversant with the site dust control strategy A site speed limit will be enforced to limit dust suspension by vehicle wheels.	Low
	Nuisance - dust on property, clothing etc.	Air transport then deposition	Local human population	Moderate	Moderate	**Moderate**			Low

Data and information				Judgement				Action (by permitting)	
Source	**Harm**	**Pathway**	**Receptor**	**Probability of exposure**	**Consequence**	**Magnitude of risk**	**Justification for magnitude**	**Risk management**	**Residual risk**
Particulate matter and dusts from handling and unloading materials, storage of aggregates and waste road planings and the crushing and screening of waste road planings	Harm to human health - respiratory irritation and illness.	Air transport, deposition then inhalation.	Local human population	Low	High	**Moderate**	Most dust/particulates will deposit within 400m of the source. The nearest residential properties to the site are more than 400m from these operational areas. As the prevailing winds are from the west and southwest the above receptors are unlikely to be adversely affected by dust. Existing screening bunds are positioned along the edges of the site where residential receptors are located within close proximity of the edge of the quarry. The current basal levels of the quarry are >30m below surface levels to the west and south of the quarry footprint. Receptors such as public highways and private roads are unlikely to be affected by dust due to their transient nature.	Mobile plant (including waste processing plant) will be regularly serviced and equipped with effective exhausts to prevent fume emissions Fine particle fillers will be stored in silo's fitted with manhole and overpressure/negative pressure protection systems, and an exhaust filter comprising a mechanical dedusting filter and weather protection roof. Inlets and outlets will be designed to emit <10mg/m^3 of particulates Raw materials comprising a sub-3mm fractions will be stored in covered/sheltered bays. Water sprays or surface binders will be utilised to maintain damp surfaces on exposed tip and stockpile faces and any exposed friable surfaces during dry and windy weather All conveyors systems will be fitted with wind boards or enclosed in housing; Drop heights from conveyors and hydraulic loading shovels into processing plant, dumpers and HGVs will be minimised. Loading and unloading of vehicles should ensure drop heights are minimised All site employees will receive appropriate training in order to ensure that they are conversant with the site dust control strategy Water sprays or surface binders will be utilised to maintain damp surfaces on exposed tip and stockpile faces and any exposed friable surfaces during dry and windy weather	Very Low
	Nuisance - dust on property, clothing etc.	Air transport then deposition	Local human population	Low	Moderate	**Low-Moderate**			Very Low
Odours									
Fugitive odour emissions from roadstone coating process	Nuisance, loss of amenity	Air transport then inhalation.	Local human population	Moderate	Moderate	**Moderate**	Potential odours will be restricted to hot processes i.e. heating of roadstone and bitumen, handling of hot bitumen and finished product, and exhaust from plant and machinery. Nearest residential properties located over 200m from the asphalt plant. Receptors such as public highways and private roads are unlikely to be significantly affected by odours due to their transient nature.	Start-ups and shut-downs will be kept to a minimum in order to reduce emissions. Any fuel oil used in site shall have a certified sulphur content of no more than 1% wt/wt sulphur in fuel, or, if gas oil is used, no more than 0.1% wt/wt sulphur in fuel. Odour neutralizer equipment will be implemented in the stack of the asphalt plant to minimise odours produced from the hot mixing process. Bitumen storage tanks shall not be overfilled and care shall be taken throughout the delivery of bitumen to avoid venting of air from the tank that may cause an emission of odour. Temperature sensors will be used to ensure the temperature within the heated components of the plant is within the maximum specified limits. Odour will be assessed by olfactory monitoring at the site boundary at a suitable downwind location as part of the daily site checks. The number of start-ups and shut-downs will be kept to a minimum in order to reduce emissions. All plant, machinery and storage tanks will be inspected daily as part of management procedures for signs of any leaks or either odorous air or liquid.	Low

Data and information				Judgement				Action (by permitting)	
Source	**Harm**	**Pathway**	**Receptor**	**Probability of exposure**	**Consequence**	**Magnitude of risk**	**Justification for magnitude**	**Risk management**	**Residual risk**
Processing, handling and storage of minerals and waste road planings	Nuisance, loss of amenity	Air transport then inhalation.	Local human population	Very Low	Moderate	**Low**	Mineral processing and road planing recycling activities do not involve the use of materials or processed with a high odour generation potential. Nearest residential properties located over 200m from the asphalt plant. Receptors such as public highways and private roads are unlikely to be significantly affected by odours due to their transient nature.	-	Low
Mud and Debris									
Debris and mud on local roads Tracking of mud and debris onto public roads causing accident, hazards and nuisance to road users.	Nuisance, loss of amenity, road traffic accidents and harm to animal health	Vehicles entering and leaving site.	Local human population, livestock and wildlife. Road users	Low	Moderate	**Low-Moderate**	~850m of metalled internal road network already exists between site reception area and main access junction with public highway.	Entrance way and main site access roads are surfaced (tarmac or concrete). All vehicles hauling dusty materials will be sheeted (or instructed to do so) or fully enclosed where appropriate to avoid the loss of materials during transport. Water bowsers will be used during dry conditions on the access road and any other trafficked areas. Vehicles will be checked for mud prior to being dispatched. Wheel wash facilities are available with the wider quarry complex prior to leaving the site. All vehicles will be supervised during loading to ensure that vehicles are not overfilled. A mechanical road sweeper will be deployed along the metalled sections of quarry internal haul roads as necessary. Daily inspection of the site for mud and debris will be performed as part of the management procedures.	Low
Noise & Vibration									
Noise and vibration caused by engine noise and vibrations from site plant and equipment, lorry movements etc.	Nuisance, loss of amenity, loss of sleep or harm.	Noise through the air and vibration through the ground.	Local human population	Low	Moderate	**Low-Moderate**	Existing screening bunds are positioned along the edges of the site where residential receptors are located within close proximity of the edge of the quarry. The current basal levels fo the quarry are >30m below surface levels to the west and south of the quarry footprint.	All machinery used on site will be operated and maintained in accordance with manufacturers' recommendations. Vehicles will adhere to specified speed limits when entering and exiting the site along the Main road. Unloading, processing and loading the materials will be undertaken within strict operational parameters, to ensure that noise and vibration from this activity is mitigated as necessary. Noise monitoring will be undertaken if necessary. Should unacceptable emissions of noise or vibration occur, the incident will be noted, and a record made.	Very Low

Data and information				Judgement				Action (by permitting)	
Source	**Harm**	**Pathway**	**Receptor**	**Probability of exposure**	**Consequence**	**Magnitude of risk**	**Justification for magnitude**	**Risk management**	**Residual risk**
Accidents									
On site hazards: machinery, vehicles, surface water attenuation pond.	Bodily injury	Direct physical contact	Local human population	Low	High	**Moderate**	The site is fully secured to prevent trespass.	Facility will have perimeter fencing, lockable gates and CCTV installed. The site will be protected with remote surveillance out of normal hours of operation. All site staff and visitors will receive an induction to the site to ensure safety protocols are adhered to. Appropriate personal protective equipment (PPE) will be provided for all site staff, particularly those handling materials. Designated pedestrian routes are clearly marked around the site. In the event of any significant environmental emergency/incident, a representative of Aggregate Industries will notify the Environment Agency (EA) by telephone immediately, but first having due regard for the incident at hand and any remediation actions required to ensure the safety of site personnel and the immediate environment.	Low
Fire resulting from arson/vandalism or an accident causing the release of polluting materials (smoke or fumes) to air.	Bodily injury	Direct physical contact	Local human population	Very Low	Moderate	**Low**	The site is secured outside of operational hours.	Facility will have perimeter fencing, lockable gates and CCTV installed. The site will be protected with remote surveillance out of normal hours of operation. All plant and equipment will be inspected daily and serviced in line with manufacturers recommendations/specifications All visitors to the site (including personnel) must report to the site office to sign in. Fire fighting equipment will be available and maintained, and site operators will be trained in their correct use.	Very Low
Leaks and Spillages of potential polluting materials from on-site plant/vehicles, and associated refuelling/ maintenance operations.	Contamination of ground/surface waters.	Direct leakage, spillage onto permeable ground and then percolation to water table	Groundwater, surface water bodies and their associated habitats.	Moderate	Moderate	**Moderate**	Plant used will require refuelling and maintenance within their operating locations over areas of permeable hardstanding.	All operations will be closely monitored to allow immediate deployment of mitigation measures in the event of a spillage. Vehicles for dispatch will not be overfilled and will be supervised during loading. All plant and equipment will be inspected daily and serviced in line with manufacturers recommendations/specifications Highest risk operations (e.g. refuelling plant) will be undertaken with the necessary primary, secondary and tertiary containment measures e.g. funnels and drips trays provided with fuel bowsers Absorbent spill kits will be available for use should any spillage occur.	Low
Containment Damage from fuel/oils storage areas	Contamination of surrounding land, groundwater and surface water.	Direct run off from site across ground surface, indirect runoff via the soil layer or transport through soil/groundwater	Groundwater, surface water bodies and their associated habitats.	Low	Moderate	**High**	Application site located over permeable strata and that is designated as a Principal Aquifer. There are no licensed abstractions within 1km of the site.	All mobile fuel tanks will be of double skin construction and supplied with funnels and drip trays to assists refuelling operations. The effective capacities of all bunds will be maintained. Any repairs will be affected as soon as possible or within 5 working days (subject to replacement material availability). Mitigation measures will be undertaken immediately if there is a possibility of pollution.	Low

Data and information				Judgement				Action (by permitting)	
Source	**Harm**	**Pathway**	**Receptor**	**Probability of exposure**	**Consequence**	**Magnitude of risk**	**Justification for magnitude**	**Risk management**	**Residual risk**
Abnormal Conditions									
Power loss from emission control systems	Harm to human health and local habitats and surface water via fugitive emissions Nuisance to local human receptors via fugitive emissions	Airborne transport	Local human population, crops and local habitats. *(All receptors)*	Very Low	Low	**Very Low**	There are no major process plant items which rely on mains power. Most dust/particulates will deposit within 400m of the source. Receptors such as public highways and private roads are unlikely to be affected by odours due to their transient nature.	If power/water is lost for a sufficiently long period of time where it has the potential to affect ancillary functions outside of the permitted area (e.g. weighbridge, mess facilities wash-down area, then alternative means of power generation will be sought). Adequate sources of water are available within the wider quarry to support dust suppressions requirements. Process operations will be temporarily suspending in the event that the dust suppression plant/equipment are out of action during periods of dry weather.	Very low
Vandalism and security breach	Bodily injury	Direct physical contact	Local human population	Low	Moderate	**Low-Moderate**	-	Facility will have perimeter fencing, lockable gates and CCTV installed. The site will be protected with remote surveillance out of normal hours of operation. All visitors to the site (including personnel) must report to the site office to sign in. Wider quarry complex where the site is located is not accessible to the general public.	Very Low
Operator error	Bodily injury Harm to human health - respiratory irritation and illness. Nuisance – dust, olfactory, and noise emissions	Direct physical, air transport then deposit or inhalation, direct run off	Local human population, crops and local habitats. *(All receptors)*	Low	Moderate	**Low-Moderate**	-	Technically competent people will oversee the management of activities of the site, in accordance with the fit and proper person assessment. Training (including refresher training) will be given to all site staff on the environmental permit, health and safety and incident response.	Low
Emissions from plant or equipment due to abnormal conditions	Harm to human health - respiratory irritation and illness.	Air transport, deposition then inhalation.	Local human population	Very Low	Low	**Very Low**	Unlikely to affect nearest residential properties due to the intervening distances from the site.	Commissioning tests will be performed on all plant/ equipment, to ensure integrity, prior to full scale use. All machinery used on site will be operated and maintained in accordance with manufacturers' recommendations. Alarms and interlocks will be used on major items of plant and equipment to monitor performance. Strict operating guidelines will ensure adherence with start-up and shut down procedures. All machinery will be subject to regular checks and maintenance.	Very Low