



ENVIRONMENTAL MANAGEMENT SYSTEM

for
Keegan Quarries Ltd

**Trammon Quarry
Rathmolyon
Co. Meath**

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1.0 INTRODUCTION AND SCOPE

This Environmental Management System (EMS) has been prepared to define the Environmental Management System adopted by the Keegan Quarries Ltd quarry site at Tromman, Rathmolyon, Co. Meath.

The Environmental Management System provides a structured process for the achievement of environmental performance commitments. It includes the following elements:

- Environmental Policy
- Operational Phase Environmental Aspects and Impacts
- Legal & other Requirements
- Environmental Objectives, Targets and Management Programme
- Organisational Structure
- Training, Awareness and Competence
- Communication
- Documentation, Document Control & Records
- Environmental Operational Controls
- Environmental Measurement and Control

The main features of these elements are summarised below.

Environmental Policy

The Environmental Policy establishes the overall sense of direction and sets the principles of action for Keegan Quarries Ltd. It sets the overall goal as to the level of overall environmental responsibility and performance required of the Company, against which all subsequent action will be judged.

Operational Phase Environmental Aspects and Impacts

The first stage in the development of this Environmental Management System is an identification of the site activities which might have an impact on the receiving environment. This process identifies the significant environmental aspects that should be addressed as a priority by the Environmental Management System.

Legal & other Requirements

Legal and other requirements relevant to the environmental aspects of the operation of the site are identified.

Environmental Objectives, Targets and Management Programme

Environmental performance goals with detailed performance requirements, quantified where possible, are identified for the Keegan Quarries Ltd site. A programme, with designation of responsibility, means and time frames for achieving these objectives and targets is prepared and documented.

Organisational Structure

A description of the Keegan Quarries Ltd management structure with detailed information on the roles and responsibilities of management is provided together with accountabilities in respect of environmental management issues.

Training, Awareness and Competence

Keegan Quarries Ltd requires all personnel whose work may create a significant impact upon the environment to be competent on the basis of appropriate education, training and /or experience. The Environmental Management System documents how this objective will be achieved.

Communication

Keegan Quarries Ltd has procedures for internal communication between the various levels and functions of the company and for receiving, documenting and responding to relevant communication from interested parties. It also has a procedure for reporting to the relevant regulatory authorities.

Documentation, Document Control & Records

The environmental documentation describes the core elements of the management system and provides direction to related documentation. Environmental documents are controlled so as to ensure that they are readily identifiable and maintained in an orderly manner. Environmental records are maintained to demonstrate conformance to the requirements of the Environmental Management System.

Environmental Operational Controls

Keegan Quarries Ltd has identified site operations and activities associated with the identified significant environmental aspects. These operations and activities will be conducted to ensure that they are carried out under specified conditions. Implementation is accomplished through operational procedures and controls.

Environmental Measurement and Control

Monitoring, measuring and evaluating the key activities of the operation of all site activities will ensure that Keegan Quarries Ltd is performing in accordance with the stated Environmental Management Programme.

2.0 ENVIRONMENTAL MANAGEMENT SYSTEM REQUIREMENTS

2.1 ENVIRONMENTAL POLICY

Keegan Quarries Ltd has defined its intentions and principles in relation to its overall environmental performance in its Environmental Policy, which provides a framework for action and for setting its environmental objectives and targets.

The Environmental Policy establishes the overall sense of direction and sets the principles of action for the Company.

The Company's Management is responsible for defining the policy and for ensuring the necessary resources are provided so that it is implemented.

A copy of the Keegan Quarries Ltd Environmental Policy is presented in Appendix I and is summarised below.

Keegan Quarries Ltd ***Environmental Policy – Tromman Quarry***

Keegan Quarries Ltd *recognises its responsibilities to protect the environment and issues this policy as a statement of commitment of Keegan Quarries Ltd*

To achieve our environmental goals, Keegan Quarries Ltd is committed to:

- *Carry out all activities in a manner that prevents pollution and complies with the Conditions of its Planning Permissions and Licences*
- *The operation of an Environmental Management System*
- *Continual environmental improvement by utilising an Environmental Management Programme which defines our environmental Targets and Objectives*
- *Comply with all applicable legislation, regulations and industry based best practices (BAT)*
- *Maintain contingency plans on site to deal correctly with potential incidents*
- *Promote improvements in energy efficiency and resource usage giving due regard to sustainable development and waste minimisation.*
- *To continually enhance the environmental awareness of employees, suppliers and sub-contractors*
- *To operate a Good Neighbours Policy and strive to continually exist as a good neighbour with those living close to the site.*
- *Review our Environmental Policy annually and update and re-issue it as required.*
- *Maintain high standards of visual appearance of our site*
- *Facilitate where possible all interested parties with access to site operations or information.*

All employees are responsible for ensuring high standards of environmental care in conducting their personal work duties. Keegan Quarries Ltd are committed to a policy of continual environmental improvement of its environmental performance and this Policy reflects our commitment to protecting the environment.

2.2 ENVIRONMENTAL ASPECTS AND ENVIRONMENTAL IMPACTS

Keegan Quarries Ltd has identified the significant environmental aspects of all site activities.

The identification process considered the impact on the following:

- Human beings
- Flora and fauna
- Soils and geology
- Water and hydrogeology
- Air and climate
- Noise and vibration
- Landscape and visual
- Material assets
- Cultural heritage
- Traffic
- Interaction of these impacts

Consideration is given to normal and abnormal operations at the site such as temporary short term construction activities, construction of new plant areas, development of the quarry area, upgrade of existing plant, installation / upgrading of new site infrastructure, further development of fugitive dust containment systems and noise minimization techniques and potential emergency conditions of these aspects in Section 4 of this document.

Table 2.1a Environmental Aspects and Environmental Impacts

	Activity	Aspect	Impact
1	Overburden removal / Site excavation works	Noise emissions Air emissions Vibration Disturbance of flora Disturbance of fauna Discharge to surface water Potential loss of archaeological artifacts Traffic	Noise nuisance Dust nuisance Nuisance, potential cosmetic and structural damage Modification of habitat and potential reduction in biodiversity in the area Potential reduction in biodiversity in the area Surface water contamination, potential effect on aquatic flora and fauna Potential reduction in cultural heritage Increased pressure on road system
2	Upgrade of screening berms	Noise emissions Air emissions Vibration Disturbance of flora Disturbance of fauna Discharge to surface water Landscape changes	Noise nuisance Dust nuisance Nuisance, potential cosmetic and structural damage Modification of habitat and potential reduction in biodiversity in the area Potential reduction in biodiversity in the area Surface water contamination, potential effect on aquatic flora and fauna Potential for reduction and/or improvement in visual amenity
3	Blasting activities	Noise Emissions Vibration Air Overpressure	Noise Nuisance Nuisance, potential cosmetic and structural damage Nuisance, potential cosmetic and structural damage

Table 2.1b Environmental Aspects and Environmental Impacts

	Activity	Aspect	Impact
4	Operation of wheel wash and access road fixed sprinkler system	Air emissions Discharge to surface water Traffic Alteration of natural hydrology	Dust nuisance impact reduced Surface water contamination, potential effect on aquatic flora and fauna Reduced impact on local road system Change to flows in local surface waters, potential change to groundwater recharge and potential effects on flora and fauna
5	Effluent treatment	Discharge to groundwater	Surface water contamination, potential effect on aquatic flora and fauna

Table 2.1c Environmental Aspects and Environmental Impacts

	Activity	Aspect	Impact
6	Fuel storage and handling	Potential discharge to soil and groundwater	Potential soil and groundwater contamination
		Potential discharge to surface water	Potential Surface water contamination, potential effect on aquatic flora and fauna
		Fugitive air emissions	Odour nuisance
		Fuel containers	Waste for disposal
7	Material delivery, storage and handling	Potential discharge to surface water	Surface water contamination, potential effect on aquatic flora and fauna
		Air emissions	Dust nuisance
		Noise emissions	Noise nuisance
		Waste	Waste for disposal
		Traffic movements	Increased pressure on road system
8	Dust suppression systems	Discharge to surface water	Surface water contamination, potential effect on aquatic flora and fauna
		Potential discharge to soil and groundwater	Soil and groundwater contamination
		Traffic	Reduced impacts on local road system
		Water Recycling	Reduced pressure on local water supplies
		Reduced air emissions	Potential for nuisance decreased

Table 2.1d Environmental Aspects and Environmental Impacts

	Activity	Aspect	Impact
9	Excavation of quarry area	Noise emissions Air emissions Vibration Disturbance of flora Disturbance of fauna Discharge to surface water Landscape changes	Noise nuisance Dust nuisance Nuisance, potential cosmetic and structural damage Modification of habitat and potential reduction in biodiversity in the area Potential reduction in biodiversity in the area Surface water contamination, potential effect on aquatic flora and fauna Reduction in visual amenity
10	Aggregate Processing	Noise emissions Air emissions Traffic movements	Noise nuisance Dust nuisance Increased pressure on road system

Table 2.1e Environmental Aspects and Environmental Impacts

	Activity	Aspect	Impact
11	Water use for wheel wash and sprinkler system	Resource utilisation	Increased pressure on local water supplies
12	Electricity use	Resource utilisation	Decreased pressure on electricity supplies from new more efficient plant
13	Workforce administration	Employment Traffic Waste	Increased employment Increased pressure on road system Waste for disposal
14	Vehicle and plant maintenance	Noise emissions Air emissions Waste Discharge to surface water Potential discharge to soil and groundwater Reduced vehicle and plant noise emissions Reduced vehicle and plant air emissions	Noise nuisance Odour nuisance Waste for disposal Surface water contamination, potential effect on aquatic flora and fauna Soil and groundwater contamination Reduced potential for noise nuisance Reduced impact on ambient air quality

Table 2.1f Environmental Aspects and Environmental Impacts

	Activity	Aspect	Impact
15	Waste storage and handling	Potential discharge to soil and groundwater	Soil and groundwater contamination
		Potential discharge to surface water	Surface water contamination, potential effect on aquatic flora and fauna
		Air emissions	Dust and odour nuisance
		Traffic movements	Increased pressure on road system
		Animal pests and scavengers	Nuisance to neighbours and potential impact on native flora and fauna
		Windblown litter	Reduced amenity
		Re-use, recycling	Minimisation of the use of resources

2.3 LEGAL AND OTHER REQUIREMENTS

Keegan Quarries Ltd has identified the legal and other requirements applicable to the environmental aspects of all site activities. These requirements have been categorised under the following headings:

- Planning Permissions granted for the site TA/30334
- EPA *Environmental Management in the Extractive Industry (Non-Scheduled Minerals)*
- *Department of the Environment, Heritage and Local Government, Quarries and Ancillary Activities – Guidelines for Planning Authorities*
- *Air Quality Standards Regulations 2002, S.I. No. 271 of 2002*
- Air Pollution Act 1987
- EPA Acts, 1992 & 2003
- Waste Management Act 1996-2008

2.4 OBJECTIVES AND TARGETS

Keegan Quarries Ltd has identified and documented environmental performance objectives and targets relevant to the operation of all site activities. In establishing the objectives, the Company has considered the legal and other requirements, the significant environmental aspects of the operational and business requirements and the views of interested parties.

Environmental targets are set to achieve these objectives within a specified time frame. The objectives and targets will be reviewed regularly and will be modified as necessary to effect continual improvement.

The environmental objectives and targets are presented in Table 2.2.

2.5 ENVIRONMENTAL MANAGEMENT PROGRAMME

Keegan Quarries Ltd has established a programme for achieving its environmental objectives and targets.

Responsibility is designated at each level of function and level of the organisation responsible for achieving these objectives and targets. Methodology, time scales, priority and personnel are specifically identified in the programme. The Environmental Management Programme will be reviewed regularly and modified as required. The Environmental Management Programme is presented in Table 2.2.

Table 2.2.a Environmental Objectives, Targets Programme

Objective	Target	Action	Responsibility	Time Frame
1 Recycle surface water to minimise environmental impacts	1.1 Collect and divert all surface water to storage lagoons prior to discharge to ground	<ul style="list-style-type: none"> Construct surface water management system Regularly remove silts from storage lagoons to maintain capacity 	Quarry Manager	Completed in Nov 2009, ongoing
			Quarry Manager	Defined intervals
	1.2 Ensure no visible oil or grease on waters	<ul style="list-style-type: none"> Maintenance of fuel and waste storage facilities Operational Controls Emergency Response 	Quarry Manager	Continuous
			Quarry Manager	Continuous
2 Minimise impacts on groundwater supply	2.1 Minimise water usage	<ul style="list-style-type: none"> Re-use water for water suppression 	Quarry Manager	Continuous
3 Minimise potential for contamination of soil and groundwater	3.1 Ensure no contamination of soil or groundwater	<ul style="list-style-type: none"> Maintenance of fuel and waste storage facilities Operation controls Emergency Response Visual inspections Construction of surface water and groundwater management system 	Quarry Manager	At commencement of construction
			Quarry Manager	Continuous
			Quarry Manager	Continuous
			Quarry Manager	Continuous
			Quarry Manager	Continuous
4 Minimise noise nuisance	4.1 Noise levels shall not exceed $L_{Aeq, 1 \text{ hr}}$ of 55 dB(A), when measured at the nearest receptors to the site Monday to Friday between 08:00 to 22:00hrs and on Saturdays between 08:00 to 14:00hrs. Operations shall not exceed $L_{Aeq, 1 \text{ hr}}$ of 45dB(A) at all other times	<ul style="list-style-type: none"> Monitor noise levels at sensitive locations Effective handling of environmental noise complaints Restriction on working hours as per Planning Conditions 	Quarry Manager	Quarterly
			Quarry Manager	As required
			Quarry Manager	Continuous
	4.2 Ensure construction equipment complies with 84/532/EEC	<ul style="list-style-type: none"> Ensure contractors meet regulatory requirements Monitor noise emissions from site plant and machinery 	Quarry Manager	As required
5 Minimise vibrational nuisance and eliminate cosmetic and structural damage	5.1 No nuisance or damage as a result of vibration from blasting activities	<ul style="list-style-type: none"> Vibration management measures Effective handling of environmental complaints Controlled blast events 	Quarry Manager	As required
			Quarry Manager	As required
			Blast Contractor	Per Blast Event

Table 2.2b Environmental Objectives, Targets and Programme

Objective	Target	Action	Responsibility	Time Frame
6 Manage air emissions to minimise environmental impacts	6.1 Dust deposition not to exceed 350 mg/m ² /day averaged over 30 +-2 days	<ul style="list-style-type: none"> • Use of dust suppression systems [Section 4.5] • Maintenance of screens / bunds including planting • Monitoring of dust deposition [Section 5.1] 	Quarry Manager	Continuous
	6.2 No nuisance as a result of dust deposition	<ul style="list-style-type: none"> • Visual observations of dust levels [Section 5.1] • Effective handling of environmental complaints [Section 5.2] 	Quarry Manager Quarry Manager Quarry Manager Quarry Manager	On going Monthly Daily As required
7 Minimise overall impact on terrestrial flora and fauna	7.1 To safeguard protected species	<ul style="list-style-type: none"> • Retain habitat and re-vegetate to provide replacement habitat [Section 4.6] 	Quarry Manager	Continuous
8 Manage wastes to minimise environmental impacts	8.1 Ensure that waste generation is minimized and disposed of correctly	<ul style="list-style-type: none"> • Suitable inert waste materials will be recycled and reused on site [Section 4.9] 	Quarry Manager	Continuous
	8.2 Waste disposal in accordance with regulatory requirement	<ul style="list-style-type: none"> • Management procedures as per EMS-013 	Quarry Manager	Continuous
9 Efficient use of natural resources	14.1 Minimise water usage	<ul style="list-style-type: none"> • Re-use water for dust suppression, vehicle cleaning 	Quarry Manager	Continuous
	14.2 Minimise electricity usage	<ul style="list-style-type: none"> • Employee awareness training 	Quarry Manager	Continuous
10 Ensure appropriate response to unexpected or accidental emissions	15.1 To be in a position to respond to unexpected or accidental emissions	<ul style="list-style-type: none"> • Have detailed emergency response capability 	Quarry Manager	Continuous

3 IMPLEMENTATION OF THE ENVIRONMENTAL MANAGEMENT SYSTEM

3.1 STRUCTURE AND RESPONSIBILITY

Keegan Quarries Ltd has defined, documented and communicated roles, responsibilities and authorities in order to facilitate effective environmental management. Personnel who perform and verify work affecting the environment have the organisational freedom and authority to:

- Initiate action to prevent occurrence of environmental non-conformance;
- Identify and record any environmental problems;
- Initiate, recommend or provide solutions through designated channels;
- Verify the implementation of solutions;
- Control further processing until the non-conformity has been corrected.

The roles and responsibility of key personnel and Management are defined as follows.

Managing Director

The Managing Director has ultimate responsibility for the environment and is responsible for the provision of adequate resources and support to effect the implementation of the Company's Environmental Policy and Environmental Management System. The Managing Director's environmental responsibilities will include:

- Implementing the Environmental Policy and Management System;
- Liaising with and reporting to relevant interested bodies;
- Provision of resources as required to meet environmental targets;
- Providing for the ongoing assessment of environmental performance;
- Implementing programmes for process improvement where necessary;
- Environmental emergency contingency planning and training;
- Complaint recording and investigation;
- Dealing with environmental inquiries.

Quarry Manager

The Quarry Manager has overall responsibility for managing all aspects of the site operations in order to meet the requirements of this Environmental Management System. The Quarry Manager will be responsible for all environmental construction scheduling, personnel, transport and the installation and maintenance of environmental abatement/treatment systems and may delegate part of this responsibility to Engineers. The Quarry Manager has overall responsibility for recording and handling complaints.

The Quarry Manager is responsible for implementing environmental control requirements during site operation. He is responsible for promoting employees environmental awareness and for identifying training needs. The Quarry Manager has the authority to stop any site activity through designated channels in the event of potential or actual non – compliance and non-conformance with this management system until such time as such issues have been rectified.

Employees

All employees share responsibility for the environment and are obliged to perform their tasks in accordance with the procedures. They are responsible for ensuring adherence to all environmental controls.

Health & Safety and Environmental Committee

Members of this committee will include the Quarry Manager, Health & Safety Manager and the Managing Director. Meetings will be convened at monthly intervals to review the environmental aspects of the project, monitoring results, audit results, complaints and modifications to operational controls as required. An independent environmental consultant who will be retained by L.Beehan & Sons Ltd will also contribute to the Environmental Committee's meetings in which the results of all monthly environmental audits will be reviewed and discussed.

3.2 TRAINING, AWARENESS AND COMPETENCE

The Quarry Manager is responsible for ensuring that environmental training needs are established and documented for all personnel. Environmental training requirements are based on the tasks and operations for which the person is responsible and are reviewed as necessary. Training records will be maintained for relevant personnel.

Personnel performing tasks which can cause significant environmental impacts, will be competent on the basis of appropriate education, training and /or experience.

Environmental awareness amongst all employees will be promoted by relevant management functions.

All employees will receive environmental awareness training so as to ensure all employees are aware of:

- The importance of conformance with the Environmental Policy and associated procedures and with the requirements of the Environmental Management System;
- The significant environmental impacts, actual or potential, of their work activities and the environmental benefits of improved work practices;
- Their roles and responsibilities in achieving conformance with the Environmental Policy and procedures and with the requirements of the Environmental Management System, including emergency preparedness and response requirements;
- The potential consequences of departure from specified operating procedures.

Contractors coming on site must provide evidence that they have the knowledge and skills to perform the work in an environmentally responsibly manner. Alternatively, they must complete environmental awareness training organised by Keegan Quarries Ltd. The Quarry Manager is responsible for contractor approval.

3.3 COMMUNICATION

Keegan Quarries Ltd ensures relevant environmental information is communicated, internally and externally, as appropriate. The Managing Director or his delegate is responsible for environmental communications.

Internally information may be communicated by means of meetings, notice boards, e-mail, phone, or internal memo.

Externally information may be communicated by means of meetings, e-mail, phone, fax or post.

The detailed procedure for Communication is specified in EMS-006.

3.4 ENVIRONMENTAL MANAGEMENT SYSTEM DOCUMENTATION

The Environmental Management System (EMS) is documented with reference to *ISO 14001 Environmental Management Systems*. The core elements of the Environmental Management System and their interaction are described as well as providing direction to related documentation.

This EMS is supported by:

- Environmental Procedures;
- Inspection and Work Instructions;
- Workmanship Standards;
- Specifications & Drawings;
- Emergency Plan;
- Other documents.

3.5 DOCUMENT CONTROL

The Managing Director and individual members of the Environmental Team are responsible for the control of their own procedures. It is their responsibility to ensure the procedures are available to their subordinates as necessary and that old or obsolete documents are collected and destroyed or filed in the archives.

Documentation comprises of the following:

- The Environmental Management System Document;
- Environmental Procedures ;
- Work and Inspection Instructions;
- Drawings;
- Workmanship Standards;
- Specifications;
- Register of Legislation;
- Environmental Monitoring Records and Reports;
- Environmental Audit Reports.

4.0 OPERATION OF ENVIRONMENTAL MANAGEMENT SYSTEM

4.1 OPERATIONAL CONTROLS

The aspects of site activities that have the potential to have environmental impacts, either positive or negative are identified previously in Table 2.1. Keegan Quarries Ltd is committed to planning and executing site operations in a manner that will prevent environmental pollution and nuisance or disturbance to local residents living in the vicinity of the site boundaries. In particular the following overall approach has been adopted:

- Development and implementation of facilities and controls to prevent pollution, conserve resources and minimise waste;
- Development of site management procedures to ensure conformance with internal and external regulations and to ensure efficiency and effectiveness;
- Implementation of strategic management activities to anticipate and respond to changing environmental situations.

The following sections identify the detailed procedures for operational control. The EMS documents the manner in which each of the environmental aspects and impacts identified in Table 2.1 will be managed in order so that Keegan Quarries Ltd can meet its Environmental **Policy, Objectives and Targets** and minimise the potential for adverse environmental impacts as a result of all site activities.

4.2 SURFACE WATER

Collected surface water is recycled and used to supply the fixed sprinkler system along the site access road and also to supply the wheel wash also located along the site access road.

The following general guidelines have been considered in designing an effective surface water management system for the site.

- Solid inert waste will be disposed of by licensed removal from the site or by recycling on the site in a designated inert waste recycling location and in a manner that will not impact on surface waters.
- Fuels, lubricants and hydraulic fluids for equipment used on the site will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment in the designated storage location. Drip trays, mobile bunds and permanent bunded areas will be installed to minimize the potential for pollution of surface water bodies.
- Fuelling and lubrication of vehicles and mobile plant and equipment will not be carried out close to water courses and will be conducted on concrete surfaced areas

- All refill points for fuels, lubricants, hydraulic fluids or any other hydrocarbon based liquids will be located in a hardstanding bunded area.
- Any spillage of fuels, lubricants or hydraulic oils will be immediately contained and any contaminated soil removed from the site and properly disposed of by an appropriately licensed contractor.
- Foul drainage from site offices, canteen and toilets will be discharged to the biocycle system and percolation area
- All concreted surfaces used for refueling will be drained to a petrol/oil interceptor unit.
- Sites for use as storage areas, machinery depots, site offices, internal haul roads or the disposal of spoil will be located as far as is practicable from watercourses.
- All surface water collected on-site shall be diverted to the surface water settlement pond prior to discharge via a petrol/oil interceptor to surface water.
- No water shall be pumped from the quarry without passing through the settlement pond system
- The settlement lagoons shall be inspected weekly by the Site Manager and all settled solids shall be removed by pumping as required to ensure the capacity and efficiency of the lagoons is maintained at all times.

Absorbent materials such as absorbent booms and vermiculite will be held on site and any spillages of organic liquids such as oils, greases etc will be contained and cleaned up immediately. The contaminated absorbent material will be correctly stored in a designated area on-site prior to being collected and disposed of by an approved contractor.

All accidental discharge incidents shall be immediately reported to the environment department of Meath County Council by the Quarry Manager.

4.3 GROUNDWATER

The key issues relating to groundwater are maintaining continuity of site and local water supplies and protection of groundwater quality. The key features of the Environmental Management System which affect this resource are the implementation of effective controls to prevent contamination of groundwater resources and an effective monitoring programme to monitor groundwater quality and supply. The main controls planned for the protection of groundwater resources at the site and in the area are summarised in the following sections.

- Measures will be taken to minimise water demand where appropriate such as repairing / replacing any leaking pipework / hoses.
- Water for dust suppression will be abstracted from the settlement lagoons to minimise the volume of water extracted from ground.

- Wheel washing water will be recycled
- The presence of a biocycle unit and percolation area designed and constructed according to SR6:1991 (NSAI) will ensure that the potential for groundwater contamination from domestic waste water is controlled and maintained. A maintenance contract for the septic tank between the owner and the installer of the system will further ensure the system is working as designed at all times.
- Storage of wastes, fuels and hazardous materials will be in designated bunded storage areas to prevent any risk of contamination of groundwater.

Details of the monitoring programme are presented in Section 5 of this EMS.

4.4 NOISE AND VIBRATION

The controls and mitigation measures for the minimisation of noise and vibration impacts associated with the operation of all aspects of site operations are as follows:

General site activities

- Maintenance of site entrance road and internal haul roads to minimise noise and vibration impacts from trucks and quarry vehicles;
- Implementation of strict operating control procedures to minimise noise generation at source as outlined in EMS Procedure EMS-001;
- All site machinery to be shut down when not in use;
- All compressors used to be “sound reduced” models or enclosed or partially enclosed by acoustic shrouds;
- All ancillary pneumatic percussive tools to be fitted with mufflers or silencers;
- Pumps and mechanical static plant to be housed in acoustic enclosures;
- Noise limits to be maintained as specified in Planning Permission as granted by Meath County Council.
- Noise levels to be monitored as stipulated in site Planning Permission documentation as granted by Meath County Council.
- Noise monitoring to be conducted following a complaint of noise nuisance from any person residing adjacent the site boundaries.
- Drop heights for materials will be minimised;
- Low noise level reverse warning alarms consistent with site safety will be utilised;
- Compressors and pumps will be enclosed and insulated when in use;

- Muffling devices will be fitted to ensure that effective noise control is achieved;
- Engines and motors will be switched off when not in use;
- Regular maintenance of items of plant and machinery and site vehicles will be undertaken to ensure that they are operating efficiently;
- At no time will noise associated with site activities exceed 50B(A) expressed as an $L_{Aeq,1hr}$ during daytime hours between 07:00hrs – 18:00hrs Monday to Friday and 45B(A) expressed as an $L_{Aeq,15min}$ at all other times when measured at local noise sensitive receptors adjacent site boundaries.

The mitigation measures proposed will effectively control the noise and vibration impacts associated with the operation of the site so that adverse impacts on nearby residences will be minimised. A comprehensive monitoring programme has been devised in order to demonstrate that the prescribed noise and vibration limits will not be exceeded – this is discussed separately in Section 5.1 of this EMS.

4.5 AIR QUALITY

The proposed controls and mitigation measures for minimisation of impacts on air quality as a result of dust, odours and combustion gases generated by all site activities are summarised as follows:

General quarry site activities

- Use of mobile water sprays such as tractor drawn water bowlers fitted with water cannon during any site preparation activities including overburden removal, excavation of works area, internal roads, construction / erection of site plant e.g. site office and site welfare units.
- Regular spraying of material stockpiles and haul roads;
- Covering of loose loads of fine sized materials during transit;
- Installation of a permanent fixed water spray system along the site entrance road and within the quarry floor area.
- Regular use of a road sweeper unit on site entrance road and at site exit onto the local road network;
- Use of a wheelwash facility by all vehicles leaving the site to minimise carrying of dust beyond the site and onto public roads;
- Fitting of spray bars on all mobile and fixed processing plant
- The potential for odour nuisance as a result of waste handling and storage will be minimised through the regular licensed removal of waste off-site.

- Daily visual observations will also be made on fugitive dust levels; in the event of high dust levels, instructions will be given by the Quarry Manager or his delegate to curtail or cease the operation giving rise to the emissions;
- The routine monitoring of dust deposition levels at site boundaries to assess compliance with site planning conditions and to ensure that the residential amenity of local residential properties are not unacceptably impacted by site activities.

Precast Concrete Plant

The operation of the precast concrete products plant has a minimal impact on the receiving environment as all manufacturing activities occur within the purpose built factory unit.

4.6 ENVIRONMENTAL MONITORING

Monitoring involves the measurement of environmental parameters during site operation and identification of any changes in these parameters which may be attributed to these activities, so that proactive mitigation measures can be adopted to avoid the occurrence of adverse environmental impacts.

The pollutant of greatest concern is particulate matter (dust) emitted from general site activities, quarrying activities, aggregate crushing, screening and grading, vehicle movements on-site and to and from the site

Noise and vibrational impacts are also identified as the most significant impacts which are generated by site activities and from blasting at the quarry.

Regular monitoring of dust deposition levels, noise and vibration levels will ensure that site operations are conducted so as to minimise the impacts on the receiving environment and at local receptors in the vicinity of the quarry boundaries.

4.7 TERRESTRIAL HABITAT

While most of the site has been developed and major ecological changes have taken place, the following measures will be taken to further minimise the overall impact of site activities on flora and fauna.

There is no evidence that site activities have had a significant negative impact on the various fauna species associated with the area. There has been a loss of habitat for some species occurring, however these species will still occur elsewhere in the general area.

The Quarry Manager will implement control measures for the appropriate protection of Flora and Fauna and it is noted that removal of scrub from anywhere on the site should not take place during the nesting season (March 1st to August 31st) to comply with the wildlife Acts (1976 and 2000).

Mature trees on the site will be protected and preserved wherever possible.

Additional planting of native tree species and shrubs along the site boundary screening berms has and continues to provide new habitats for bird species and local fauna.

4.8 SOILS

The controls and mitigation measures for minimising the potential for soil contamination are summarised as follows:

- The drainage arrangements for the site will ensure that no uncontrolled discharge of drainage from the site occurs at any time, and hence no infiltration to soil;
- Storage of wastes, fuels and hazardous materials will be in designated bunded storage areas to prevent any risk of contamination of soil or groundwater;
- Designated areas will be provided for fuel handling and maintenance activities to minimise any risk of contamination of soil or groundwater;
- Hard standing areas are in place for the re-fuelling and servicing of site vehicles and plant;
- Oils, additives and solvents all to be securely stored in bunded areas or on Poly Spill Pallets.
- There is a designated hard standing area for concrete / asphalt delivery vehicles to washout following delivery / loading at each plant area. These areas are regularly cleaned.
- The hard standing refueling area and vehicle wash area will include a drainage system that will include an petrol/oil interceptor.
- Vehicle maintenance only occurs within a designated garage on a hard concreted floor.

4.9 EFFLUENT MANAGEMENT

Domestic effluent from staff offices, canteen and toilet areas are discharged to a biocycle unit and percolation area.

4.10 WASTE MANAGEMENT

The controls and mitigation measures for minimising the quantities of wastes generated and for minimising the potential impacts of storage and disposal of wastes are summarised as follows:

- Waste oil from maintaining vehicles and plant machinery and hazardous wastes are stored in a designated bunded storage area pending disposal by a licensed waste disposal contractor;
- Wherever possible materials from site construction activities and from workforce management and administration that are able to be recycled will be separated at source;
- Small containers will be strategically located close to offices, canteens and similar areas to separate useful paper, cardboard, wood, glass, plastics and metals;
- Operational activities including the delivery of materials will result in the generation of wastes such as wood off-cuts, plastic and cardboard packaging, shipping pallets and metals. Waste and materials separated for recycling will be collected on a monthly basis and transferred to storage containers in a designated Waste Storage Area on the site;
- Inspection of storage facilities for wastes and recyclables will be done on a daily basis.
- All general waste that is unable to be separated or is otherwise not suitable for recycling will be collected for off-site disposal by licensed waste disposal contractors at regular intervals. Records of quantities of wastes disposed of or sent off-site for recycling and the contractor used will be kept as outlined in procedure EMS-008.
- In order to ensure that site staff properly segregate waste materials, it is the responsibility of the Quarry Manager to ensure all staff are trained and made responsible for ensuring site housekeeping and the proper segregation of waste;
- The following classes of materials are segregated into individual storage containers;
 - Waste oils / greases / paints
 - Wood
 - Plastics
 - Glass
 - Cardboard / Paper
 - Domestic refuse
 - Metal
 - Contaminated soil (generated by oil spills etc)
 - Waste aggregate materials segregated into different size categories
 - Waste concrete / blocks
 - Batteries
 - Rubber conveyor belts
- All segregated wastes will be collected and sent for reuse or recycling by a suitable licensed waste contractor.
- Suitable licensed waste contractors will be employed by Keegan Quarries Ltd to ensure that waste materials which cannot be reused or recycled at the site are collected and correctly disposed of at a waste licensed facility.

4.11 TRAFFIC

The mitigation measures for minimising the impact of site associated traffic on the local road infrastructure are summarised as follows:

All HGV's shall pass through the wheelwash prior to site exit onto the public road.

The use of vehicle horns shall be banned on site

Appropriate lines of vision are available left and right of the site exit onto the public road.

HGV's shall not queue on the public road.

4.12 RESOURCE USE AND MANAGEMENT

Water use will be minimised by the adoption of efficient water management practices including the reuse of water from the settlement ponds in particular for dust suppression (sprinkler systems) and vehicle washing / hosing down operations;

- Energy use will be minimised by the adoption of energy efficient practices including the routine servicing of plant such as mobile / static generator units and vehicles;
- The consumption of raw materials will be reduced by minimising waste wherever possible;
- The recycling and reuse of materials will be maximised through the provision of facilities for source separation and workforce education.

4.13 EMERGENCY PREPAREDNESS AND RESPONSE

Keegan Quarries Ltd has established an environmental emergency preparedness and response procedure to ensure an appropriate response to unexpected or accidental incidents. The procedure details how potential accidents or emergency situations will be dealt with. The procedure is tested periodically as practicable.

The Emergency Preparedness and Response procedure will be reviewed at management review meetings and after the occurrence of major accidents or emergency situations. Relevant documentation will be reviewed and revised as appropriate. The detailed procedure for Emergency Response is specified in EMS-009.

5.0 MEASUREMENT AND CONTROL

5.1 MONITORING

All operations and activities, which can have a significant impact on the environment will be monitored and measured at regular intervals. This information will be recorded and used to track performance, relevant operational controls and conformance with the Company's environmental objectives and targets and to ensure and demonstrate compliance with Planning Permissions and Granted Licences as well as applicable National Legislation and Best Practice for the Quarry Sector *Irish Concrete Federation – Environmental Code 2nd Edition, October 2005* and *Environmental Management in the Extractive Industry, EPA 2004*

Results of monitoring and measurement are used to determine areas of success and to identify areas for corrective action and improvement. Results will be evaluated to ensure compliance with relevant Planning Conditions and environmental legislation and regulations and will be reviewed on a regular basis. Keegan Quarries Ltd will employ a suitably qualified environmental consultant to conduct independent environmental monitoring surveys, environmental audits and to assist the company in achieving its environmental objectives and targets.

Monitoring records will be submitted to Kildare County Council as required.

The Quarry Manager is responsible for ensuring that all required environmental monitoring, measurement and recording is conducted as per the Environmental Monitoring Programme which is summarised in Table 5.1.

The Environmental Monitoring Programme is expected to further evolve to reflect the views of all concerned parties with the intention of providing a comprehensive mechanism for ensuring that all potential environmental and human health impacts are accurately recorded, monitored, assessed and verified throughout the lifetime of the site.

Table 5.1 Environmental Monitoring Operations Programme

Environmental Aspect	Monitoring location	Monitoring frequency	Monitoring arrangements
Noise	Nearest inhabited residences at site boundaries (2 locations)	Quarterly	$L_{Aeq,1hr}$, $L_{A90,1hr}$, $L_{A10,1hr}$, L_{Amax} , $1/3$ octave frequency analysis according to <i>ISO 1996 Acoustics – Description and Measurement of Environmental Noise</i>
Vibration / Air Overpressure	Closest residence to the blast	Per blast	PPV (mm/sec) dB linear
Air quality Dust deposition	At agreed locations near site boundaries adjacent local residences	Monthly Continuous 30day average	Dust deposition rate using Bergerhoff dust deposit gauges according to <i>Standard Method VDI 2129</i>
Air quality	Material stockpiles, exposed site surfaces, haul roads, wheel washes	Daily	Visual inspection for dust emissions and effectiveness of dust suppression system
Surface Water & Groundwater	SW1 GW1-GW2	Quarterly	Sampling and laboratory analysis
Waste material	Waste storage areas	Daily	Visual inspection
Local roads outside site	As required	Daily	Visual inspection
Site housekeeping	Entire site	Weekly	Visual inspection
Monitoring reports	All monitoring data	Monthly	To be maintained on site / Submitted to Kildare Co Co
Independent Environmental Audit	All monitoring data	Annual	To review all previous months monitoring data and implementation of EMS

5.2 NONCONFORMANCE AND CORRECTIVE AND PREVENTATIVE ACTION

It is Keegan Quarries Ltd's policy to deal with all environmental non-conformances as soon as possible following identification. A series of checks and audits through out the process is designed to check for non-conformance. Corrective and preventative action is initiated immediately. Any changes in procedures resulting from these actions is implemented and recorded.

All non-conformances will be reviewed at the scheduled Health & Safety and Environmental Committee meetings.

The Quarry Manager is responsible for Corrective and Preventive Action.

The procedure for Corrective Action includes:

- the effective handling of environmental complaints and reports of environmental non-compliances;
- investigation of the cause of the non-compliances;
- determination of the corrective action needed to eliminate the cause of non-compliances;
- application of controls to ensure that Corrective Action is taken and that it is effective;

The procedure for Preventive Action includes:

- analyses of all related data to eliminate potential causes of non-compliances;
- determination of the steps needed to deal with any problem requiring preventive action;
- initiation of preventive action and application of controls to ensure that it is effective;
- relevant information on actions taken is submitted for management review;

5.3 RECORDS

All records required to demonstrate the effective operation of the Environmental Management System are maintained, stored and retained as detailed in Table 5.2.

Environmental records will be legible, identifiable and traceable to the activity involved. They will be readily retrievable and protected against damage, deterioration or loss. Records pertaining to the Environmental Management System are maintained for seven years. The method and time of disposal is authorised by the Quarry Manager. All records are stored in hard and soft copy form.

Table 5.2 Environment Records

Record Identification	Indexing	Filing	Retention	Responsibility
Non-conformance reports	Numerical	Environment	3 years	Quarry Manager
Environment Committee Minutes	Date	Environment	3 years	Quarry Manager
Management Reviews	Date	Environment	3 years	Quarry Manager
Internal Audit Reports	Date	Environment	3 years	Quarry Manager
External Audit Reports	Date	Environment	7 years	Quarry Manager
Complaints	Date	Environment	5 years	Quarry Manager
Incidents	Date	Environment	7 years	Quarry Manager
Enquiries	Date	Environment	5 years	Quarry Manager
Training	Alphabetical	Personnel	Indefinite *	Quarry Manager
Maintenance Records	Date	Maintenance	2 years	Quarry Manager
Monitoring Reports	Date	Environment	7 years	Quarry Manager
Report to Interested Parties	Date	Environment	7 years	Quarry Manager
Waste	Date	Environment	7 years	Quarry Manager

* Indefinite – Training records are maintained for as long as the employee works with Keegan Quarries Ltd

5.4 ENVIRONMENTAL MANAGEMENT SYSTEM AUDIT

Environmental Management System Audits will be carried out on an **Annual** basis to determine if the Environmental Management System conforms to planned arrangements and has been properly implemented and maintained. The auditors findings are recorded and where non-conformance or short comings are found, a non-conformance report is issued to the relevant person responsible, to take timely corrective action. The corrective action required is specified on the non-conformance report with the action date and responsibility. A follow up audit verifies that the corrective actions have been implemented and a judgment is made on the effectiveness of the action, once the auditor is satisfied, the form is signed off.

The Quarry Manager is responsible for planning, scheduling and documenting a comprehensive audit programme. Personnel not having responsibility for that area being audited will carry out audits. External environmental audits will be scheduled on a monthly basis, dependent on the on-going effectiveness of the system

An audit plan for the Keegan Quarries Ltd site is presented in Table 5.3.

Table 5.3 Audit plan

Audit Area	Frequency
Legal & other requirements	Annual
Objectives, targets & programme	Annual
Training	Annual
Communication	Annual
Documentation, control, records	Annual
Operational Control	Annual
Emergency preparedness	Annual
Monitoring & measurement	Annual
Non conformance, corrective action	Annual
Management Reviews	Annual

5.5 OVERALL MANAGEMENT REVIEW

The overall management review will take place biannually and will endeavor to ensure the continuing suitability, adequacy and effectiveness of the Environmental Management System. The Managing Director chairs this committee and all relevant site management is represented at this meeting.

The management review will discuss and review the following:

- Environmental Audits
- Compliance status with Quarry Registration Conditions
- Corrective Action Reports
- Environmental system effectiveness
- Environmental objectives, targets and programme
- Emergency preparedness and response procedure
- Continuous Improvement of environmental performance and initiatives

Records of all Management review meetings will be recorded and maintained.

6.0 ENVIRONMENTAL MONITORING PROGRAMME

A programme of water, noise and dust deposition monitoring is currently in place at the Keegan, Quarries Ltd Tromman site as required in current *Planning Permission Ref. TA/30334*

6.1 Noise Monitoring Programme

Monitoring Locations

The monitoring locations for the noise survey are in proximity to the closest noise sensitive receptors to the site as shown below in Figure 1.

The monitoring locations will be determined according to the guidelines in *ISO 1996 Acoustics - Description and Measurement of Environmental Noise* and the 2003 EPA publication, "*Environmental Noise Survey, Guidance Document*". Noise measurements will be taken at two locations at the closest houses to the plant, N1 – N2 as shown. The sound level meter will be located 1.3m above ground and at least 3.5m away from any sound reflecting objects. A windshield will be placed on the microphone to reduce any wind interference during measurements.

Figure 1 Proposed noise monitoring locations (N1 – N2)

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Instrumentation and methodology

Noise measurements are made according to the requirements of *ISO 1996: Acoustics - Description and Measurement of Environmental Noise* and according to the *EPA's guidelines on environmental noise measurement*. The measurements will be made using a calibrated integrating sound level meter. The instrument will be calibrated at 94 dB prior to and after use using a calibrated acoustical calibrator. The noise meter will be mounted on a tripod at 1.3m above ground level. The sound level meter will be a Type 1 instrument which is in accordance with IEC 651 regulations. The Time Weighting used will be Fast and the Frequency Weighting will be A-weighted as per IEC 651.

Noise monitoring is carried out over 30-minute monitoring periods at each location during periods when normal site activities are occurring and during suitable weather conditions and during the hours of 07:30 – 17:00. The main measurement parameter will be the equivalent continuous A-Weighted Sound Pressure Level, $L_{Aeq,T}$, over 30-minute monitoring intervals. A statistical

analysis of the measurement results will also be completed so that the percentile levels, $L_{AN,T}$, for $N = 90\%$ and 10% over specific measurement intervals were also recorded. The percentile levels represent the noise level in dB(A) exceeded for $N\%$ of the measurement time. Noise measurements will also include 1/3 octave band frequency analysis to determine the presence of tonal components of noise generated by site activities.

Survey Frequency

Noise monitoring surveys are conducted on a quarterly basis. The results of all noise monitoring surveys are forwarded to Kildare County Council within 2-weeks following the completion of each survey.

5.2 Dust Deposition Monitoring Programme

Monitoring Locations

The monitoring locations for the dust deposition surveys are at four boundary positions as shown below in Figure 2.

Figure 2 Dust deposition monitoring locations (D1 – D4)

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Instrumentation and Methodology

The procedure employed for dust deposition monitoring surveys is *Standard Method VDI 2129 (Determination of Dust fall using Bergerhoff Instrument)*. The dust deposition rate (expressed as a total solids value) will be measured by positioning four Bergerhoff dust deposit gauges at strategic locations near the boundaries of the site. The selection of sampling point locations will be completed after consideration of the requirements of *VDI 2129* with respect to the location of the samplers relative to buildings and other obstructions, height above ground and sample collection and analysis procedures.

Dust Deposition Rate is normally measured by gravimetrically determining the mass of particulates and dust deposited over a specified surface area over a period of one month (30 days +/- 2 days). The results are expressed as dust deposition rate in mass per unit area per day ($\text{mg}/\text{m}^2\text{-day}$).

Following the completion of each monitoring interval, the dust deposits in each gauge is determined gravimetrically and expressed as a dust deposition rate in $\text{mg}/\text{m}^2\text{-day}$ in accordance with the standard.

A figure of **350 $\text{mg}/\text{m}^2\text{-day}$** as per existing planning conditions are used to evaluate and assess measured dust levels.

This limit value is recommended by both the EPA and the Department of Environment, Heritage and Local Government to ensure that no nuisance effects will result from specified industrial activities. This guideline limit value of $350 \text{ mg}/\text{m}^2\text{-day}$ is obtained from the commonly applied *German TA Luft Air Quality Standard* emission limit value, which was established to protect against damage or impairments to property or amenities.

Dust Deposition Monitoring Survey Frequency

Quarterly dust deposition surveys are conducted at the site. The results of all dust deposition monitoring surveys are forwarded to Kildare County Council within 4-weeks following the completion of each survey.

5.3 SURFACE WATER MONITORING PROGRAMME

The following range of chemical analysis parameters are suggested as appropriate for the periodic monitoring of surface water discharges from the site.

MONITORING LOCATIONS

Surface water is sampled from the discharge point as shown in Figure 1.

METHODOLOGY

The following range of chemical analysis parameters shall be tested for.

- pH
- Suspended Solids
- Total Phosphorous
- Ortho Phosphate
- Total Hydrocarbons
- Temperature

All samples will be analysed by an accredited laboratory in accordance with the procedures in *Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998*.

SURFACE WATER MONITORING FREQUENCY

Surface water samples are taken and analysed on an annual basis. The results of all surface monitoring surveys will be forwarded to Kildare County Council within 4-weeks following the receipt of analysis of each survey.

Figure 1 Surface water monitoring location – SW1

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5.4 GROUNDWATER MONITORING PROGRAMME

Groundwater levels are conducted on a quarterly basis and samples are analysed as per the table below on an annual basis. The results of all groundwater monitoring surveys are forwarded to Kildare County Council within 4-weeks following the receipt of laboratory analysis reports.

MONITORING LOCATIONS

Groundwater is monitored at two locations. One from the onsite borehole adjacent to the site wheelwash and a second from a residential property off-site.

Table Analytical suite as referenced from SI No. 439 of 2000

Table	Parameter	Method	Standard
B	Cadmium	ICP-AES	5 µg/l
B	Copper	ICP-AES	2 µg/l
B	Lead	ICP-AES	10 µg/l
B	Chromium	ICP-AES	50 µg/l
B	Nitrite	Spectrophotometry	0.50 mg/l
B	Nitrate	Ion Chromatography	50 mg/l
C	Ammonium	ISE or Spectrophotometry	0.30 mg/l
C	Chloride	Titration with silver nitrate	250 mg/l
C	Colour	Colorimeter	
C	pH	<i>in situ</i> - pH Meter	6.5 - 9.5
C	Conductivity	<i>in situ</i> - Conductivity Meter	2500 µs cm ⁻¹
C	Iron	ICP-AES	200 µg/l
C	Manganese	ICP-AES	50 µg/l
C	Sodium	ICP-AES	200 mg/l
	Potassium	ICP-AES	NS
	Calcium	ICP-AES	NS
	Magnesium	ICP-AES	NS
	Alkalinity	Titration to pH 4.5	NS
C	Turbidity	Nephelometer	N T U
	Sulphate	Ion Chromatography	250 mg/l
	Diesel Range Organics	Solvent extraction and GC/MS	NS

APPENDIX I

Keegan Quarries Ltd Environmental Policy

Environmental Policy

Keegan Quarries Ltd recognises its responsibilities to protect the environment and issues this policy as a statement of commitment of Keegan Quarries Ltd.

To achieve our environmental goals, Keegan Quarries Ltd is committed to:

- Conducting all activities in a manner that prevents pollution and complies with the Conditions of Planning Permission and Licences
- The operation of an Environmental Management System
- Continual environmental improvement by utilising an Environmental Management Programme which defines our environmental Targets and Objectives
- Complying with all applicable legislation, regulations and industry based best practices including Best Available Technology
- Maintaining contingency plans on site to deal correctly with potential incidents
- Promoting improvements in energy efficiency and resource usage giving due regard to sustainable development and waste minimisation.
- Continually enhance the environmental awareness of employees, suppliers and sub-contractors
- Operating a Good Neighbours Policy and strive to continually exist as a good neighbour with those living close to the site.
- Reviewing our Environmental Policy annually and update and re-issue it as required.
- Maintaining high standards of visual appearance of our site
- Facilitating where possible all interested parties with access to site operations or information.

All employees are responsible for ensuring high standards of environmental care in conducting their personal work duties. Keegan Quarries Ltd are committed to a policy of continual environmental improvement of its environmental performance and this Policy reflects our commitment to protecting the environment.

J..Keegan
Director