DRAFT ENVIRONMENTAL MANAGEMENT PLAN

FOR THE PROPOSED ADDENDUM TO THE EXISTING NELSPRUIT QUARRY ENVIRONMENTAL MANAGEMENT PROGRAMME (MP/30/5/1/2/2/117 MR)

Pear Environmental Reference: 1630
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Prepared for:

Private Bag X26
Gallo Manor,
2059
Tel. No: (011) 657 0000
Fax. No: (011) 657 1092

Prepared by:

Postnet Suite 91
Private Bag X1
The Willows
0041
Tel. No: (011) 082 9864
Fax. No: (086) 668 1931

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ABBREVIATION & ACCRONYMS

A	Authorities
C	Contractors
CE	Consulting Engineers
D	Developer/Proponent
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DWS	Department of Water & Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Assessment Report
ELO	Environmental Liaison Officer
EMP	Environmental Management Programme
EO	Environmental Officer
ER	Engineers Representative
ESO	Environmental Site Officer
GNR	Government Notice Regulation
ha	Hectare
HIA	Heritage Impact Assessment
IEM	Integrated Environmental Management
I&AP	Interested and Affected Party
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEM: AQA	National Environmental Air Quality Act, 2004 (Act No. 39 of 2004)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
OA	Other Authority
OHSHA	Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)
PM	Project Manager
SAHRA	South African Heritage Resources Agency
SANS	South African National Standard

DEFINITIONS

Alien species	Plants and animals which do not arrive naturally in an area - they are brought in by humans. Alien plants often force indigenous species out of the area.
Aspect	Element of an organisation's activities, products or services that can interact with the environment.
Auditing	A systematic, documented, periodic and objective evaluation of how well the environmental management plan is being implemented and is performing with the aim of helping to safeguard the environment by: facilitating management control which would include meeting regulatory requirements. Results of the audit help the organisation to improve its environmental policies and management systems.
Biodiversity	The rich variety of plants and animals that live in their own environment. Fynbos is a good example of rich biodiversity in the Cape.
Built environment	Physical surroundings created by human activity, e.g. buildings, houses, roads, bridges and harbours.
Conservation	Protecting, using and saving resources wisely, especially the biodiversity found in an area.
Contamination	Polluting or making something impure.
Corrective (or remedial) action	Response required addressing an environmental problem that is in conflict with the requirements of the EMP. The need for corrective action may be determined through monitoring, audits or management review.
Degradation	The lowering of the quality of the environment through human activities, e.g. river degradation, soil degradation.
Ecology	The scientific study of the relationship between living things (animals, plants and humans) and their environment.

Environment	Our surroundings, including living and non-living elements, e.g. land, soil, plants, animals, air, water and humans. The environment also refers to our social and economic surroundings, and our effect on our surroundings.
Environmental Control Officer	A person who is responsible for the monitoring of the implementation of the requirements of an EMP
Environmental Officer	A person who is responsible for the implementation of the requirements of an EMP.
Environmental Impact	An environmental change caused by some human act
Environmental Management System (EMS)	EMS provides guidance on how to manage the environmental impacts of activities, products and services. They detail the organisational structure, responsibilities, practices, procedures, processes and resources for environmental management. The ISO14001 EMS standard has been developed by the International Standards Organisation.
Environmental Policy	Statement of intent and principles in relation to overall environmental performance, providing a framework for the setting of objectives and targets.
Impact	A description of the potential effect or consequence of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.
Indigenous species	Plants and animals that are naturally found in an area.
Infrastructure.	The network of facilities and services that are needed for economic activities, e.g. roads, electricity, water, sewerage.
Integrated	Mixing or combining all useful information and factors into a joint or unified whole. See Integrated Environmental Management below.

Integrated Environmental Management (IEM)	A way of managing the environment by including environmental factors in all stages of development. This includes thinking about physical, social, cultural and economic factors and consulting with all the people affected by the proposed developments. Also called "IEM".
Land use	The use of land for human activities, e.g. residential, commercial, industrial use.
Method Statement	Setting out in detail how the management actions contained in an EMP will be implemented, in order to ensure that the environmental objectives are achieved
Mitigation	Measures designed to avoid, reduce or remedy adverse impacts.
Policy	A set of aims, guidelines and procedures to help you make decisions and manage an organisation or structure. Policies are based on people's values and goals. See Integrated Metropolitan Environmental Policy.
Process	Development usually happens through a process - a number of planned steps or stages.
Proponent	Proponent. Entity which applies for environmental approval and is ultimately accountable for compliance to conditions stipulated in the Environmental authorisation (EA) and requirements of the EMP.
Public Participation Process	A process of involving the public in order to identify needs, address concerns, in order to contribute to more informed decision making relating to a proposed project, programme or development.

EXECUTIVE SUMMARY

Lafarge Mining South Africa (Pty) Ltd (Lafarge) currently operate an aggregate quarry outside of Nelspruit in the Mpumalanga Province. Lafarge were recently approached by the landowner with a proposal to swap portions of land out in order to accommodate additional agricultural development.

Essentially, the landowner has requested that a portion of land within the north-eastern corner of the existing Mineral Rights Area (MRA), approximately 14,500m^2 or 1.45 hectares in extent, be excluded from the current MRA in order to allow for the expansion of the surrounding agricultural activities (Area 1 as indicated in Appendix B of the BA Report). This area being proposed is currently undisturbed by mining activities and has no real value for Lafarge in terms of future mineral reserve. Within this area of proposed exclusion there are also marked historic graves which pose an ongoing management matter for Lafarge in terms of allowing community members continued access whilst also taking into account on going mining operations within the MRA. The exclusion of the demarcated graves area from the MRA would additionally make it easier for the community to access the site in order to pay their respects.

In agreement for this area to be excluded the landowner has proposed to exchange a portion of land currently outside of the existing MRA to Lafarge, approximately 10,200m^2 or 1.02 hectares in extent, for future mine planning. This area is located on the north-western corner of the existing MRA (Area 2 as indicated in Appendix B of the BA Report) immediately adjacent to the security guard house, entrance road and bench 6 of the quarry pit.

Based on the small extent of land being proposed for as part of the landowner exchange proposal, Lafarge, Pear Environmental (Pty) Ltd and the DMR agreed that a Basic Assessment (BA) Process be followed instead of a full Scoping & Environmental Impact Reporting (S&EIR) Process as outlined by the Section 102 Regulation from the MPRDA Regulations. The proposed project triggers certain listed activities which fall within the scheduled activities under the Environmental Impact Assessment (EIA) Regulations 2014; promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998). In light of the activity identified, the application procedure to be followed is a BA process.

1. DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

1.1 Details of EAP

The name and contact details of the EAP are included in Table 1 below:

Table 1: Name and Contact Details of EAP

Business Name of EAP:	Pear Environmental (Pty) Ltd		
Physical Address:	35 Knoppiesdoorn Avenue Lynwood Manor Gauteng 0081		
Postal Address:	Postnet Suite 91 Private Bag X1 The Willows 0041		
Tel No:	(011) 282 0733	**Fax No:**	086 668 1931
Cell No:	083 604 1854	**Email:**	craig@pearenvironmental.co.za

The names and expertise of the representatives of the EAP are included in Table 2 below:

Table 2: Names and Expertise of Representative of EAP

Name of Representative of the EAP	Education Qualifications	Experience at Environmental Assessments (yrs.)
Craig Allen	Bsc – Environmental Science BSc Hons – Environmental Management	12 Years
Demi Dalcos	BSc – Environmental Management	<1 Year

1.2 Principles of an EMP

The general principles contained within this document apply to all pre-construction and construction, operational maintenance activities and decommissioning. This EMP is compiled using the following concepts and implementation requirements so that the higher principles of sustainable development are realised:

- **Continuous improvement** - The project proponent (or implementing organisation) must commit to review and to continually improve environmental management, with the objective of improving overall environmental performance.
- **Broad level of commitment** - A broad level of commitment is required from all levels of management as well as the workforce in order for the development and implementation of this EMP to be successful and effective.
- **Flexible and responsive** - The implementation of the EMP must respond to new and changing circumstances, i.e. rapid short-term responses to problems or incidents. The document is a dynamic "living" document and thus regular planned review and revision of the EMP must be carried out.
- **Integration across operations** - This EMP must integrate across existing line functions and operational units such as health, safety and environmental departments in a company/project. This is done to change the redundant mind-set of seeing environmental management as a single domain unit.
- **Legislation** - It is understood that any development project during its construction phase is a dynamic activity within a dynamic environment. The Proponent, Engineer, Contractor and Sub-contractor must therefore be aware that certain activities conducted during construction may require further licensing or environmental approval, e.g. river or stream diversions, bulk fuel storage, waste disposal, etc. The Contractor/Operator must consult the ER, EO and ECO on a regular basis in this regard.

1.3 Description of the Aspects of the Activity

The landowner has requested that a portion of land within the north-eastern corner of the existing Mineral Rights Area (MRA), approximately 14,500m^2 or 1.45 hectares in extent, be excluded from the current MRA in order to allow for the expansion of the surrounding agricultural activities (Area 1 as indicated in Appendix B of the BA Report). This area being proposed is currently undisturbed by mining activities and has no real value for Lafarge in terms of future mineral reserve. Within this area of proposed exclusion there are also marked historic graves which pose an ongoing management matter for Lafarge in terms of allowing community members continued access whilst also taking into account on going mining operations within the MRA. The exclusion of the demarcated graves area from the MRA would additionally make it easier for the community to access the site in order to pay their respects.

In agreement for this area to be excluded the landowner has proposed to exchange a portion of land currently outside of the existing MRA to Lafarge, approximately 10,200m^2 or 1.02 hectares in extent, for future mine planning. This area is located on the north-western corner of the existing MRA (Area 2 as indicated in Appendix B of the BA Report) immediately adjacent to the security guard house, entrance road and bench 6 of the quarry pit.

1.4 Composite Map

See Figure 1 for a composite plan of the proposed land swap. No sensitive environments currently exist within the newly proposed area however should these be identified at any point then this composite map would need to be updated.

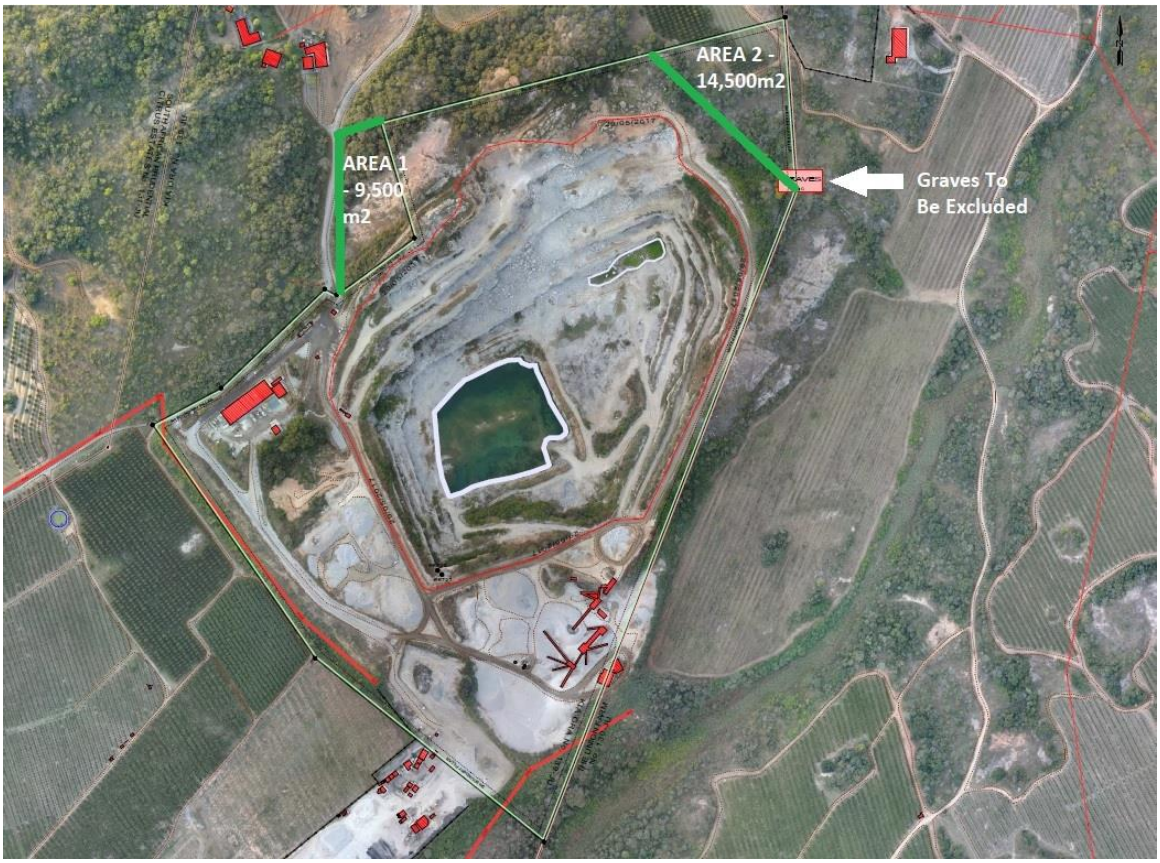

Figure 1: Composite Plan of the Proposed Land Swap

1.5 Description of Impact Management Objectives including Management Statements

Determination of Closure Objectives:

The existing rehabilitation plan which applies to the current quarry will cover the addition of the new area. This plan stipulates that quarry operations be developed on the basis that the rehabilitated areas will be made safe, stable, non-polluting and will be able to support self-sustaining ecosystems, similar to surrounding natural ecosystems.

To ensure that the rehabilitation plan is aligned with the closure objective, high-level risk assessment of the quarrying components was undertaken to establish the potential risks associated with therewith.

The major closure objectives as outlined in the existing EMPr are to:

1. Remove all product stockpiles.
2. Shaping and sloping of overburden dumps to no more than 30°.
3. For all benches:
    a. Investigate slope stability to determine the final safe / stable slope angle.
    b. Final step profiles of the rock slopes of the quarry will depend on consideration of the local and the overall stability, taking into account factors such as pre-existing joints, fault patterns, the presence of any gauge material, permeating ground water, and safety.
    c. Maintain stable sections of vertical benches to provide nesting sites, habitats for cliff adapted species, and to add visual interest / minimise visual impacts.
    d. Avoid long slopes, which could pose a safety hazard.
    e. Seeding of slopes with mixed natural grass species.
4. Discourage access to areas posing a safety hazard, with berms or barbed wire in accordance with applicable legal and regulatory requirements.
5. Stabilise rehabilitated ground against wind and water erosion.
6. Reduce residual impacts on ground and surface water as well as landscape character.
7. Establish self-sustaining natural vegetation cover on all areas.

Volumes and rate of water used required for the operation:

Not applicable as the new area will fall under the operation of the existing quarry.

Has a water use licence been applied for?

Not applicable as the new area will fall under the operation of the existing quarry.

1.6 Impacts to be mitigated in their respective phases

Name of Activity	Phase	Size & Scale of Disturbance	Mitigation Measures	Compliance with Standards	Implementation Time Period	Name of Activity
Access Roads Temporary Soil Storage Areas Fence Vegetation Clearing	Preparation of the area in order to begin quarrying by way of bench extension	Construction/ Stripping Phase	1,500m^2 Less than 150m^3 Approximately 300m Less than 1ha	<u>Loss of soils, erosion of the soils and impacts on land owner's livelihood:</u> Machinery to be used for the operation will be of good working conditions; Any hydrocarbon spill from the stripping will be remediated as soon as possible; Contaminated soil shall be removed and disposed of to an appropriate licensed landfill site in terms of NEMWA, or can be removed by a service provider that is qualified to clean the soil; The time in which soils are exposed during construction/preparation activities should remain as short as possible; Erosion control measures shall be implemented where deemed necessary; In general all steep slopes steeper than 1:3 or where the soils are more prone to erosion must be stabilised; If stockpiles are not going to be used immediately the stockpiles shall be rehabilitated to prevent erosion and resulting in the increase in turbidity; Runoff from stockpiles shall be detained in order to support growth of vegetation; Runoff from the stockpiles shall be suitably managed to ensure that the runoff volumes and velocities are similar to pre disturbed levels; Vegetation shall be used to promote infiltration of water into the stockpile instead of increasing runoff; and Stockpiles shall be maintained until the topsoil is required for rehabilitation purposes.	Implementation of mitigation measures will ensure that the activities in the proposed land swap do not have detrimental impacts on the soils, land use and land capability. Mitigation measures will ensure that the animal life within in the project is not affected by the proposed project.	During the construction/ stripping phase.

				<u>Loss of natural vegetation in the affected areas:</u> Ensure minimal disturbance of vegetation in areas not specifically earmarked for operations; Use existing track and roads in all instances as far as is practicable; Floral species of conservation concern, if encountered within the development footprint, are to be handled with care and the relocation of sensitive plant species to suitable similar habitat is to be overseen by a botanist; The proposed operational footprint shall be kept to the minimum; Prohibit the collection of any plant material for firewood or medicinal purposes; The existing integrity of flora surrounding the study area shall be upheld and no activities shall be carried out outside the footprint of the stripping areas; Edge effect control shall be implemented to avoid further habitat degradation outside of the proposed footprint area; All sensitive open space areas will be demarcated and access into these areas shall be prohibited; Construction vehicles shall only be allowed on designated roadways to limit the ecological footprint of the stripping; Implementation of an Alien Invasive Plant Species Management plan; Edge effects of activities including erosion and alien/ weed control will be strictly managed in the affected areas; All sites disturbed by quarrying activities shall be monitored for colonisation by exotic or invasive plants; and Exotic or invasive plants shall be controlled as they emerge; An alien vegetation control program must be developed and implemented within all disturbed areas. <u>Migration of animal life due to disturbance caused proposed land swap:</u>		

				The proposed operational footprint areas shall remain as small as possible and where possible be confined to already disturbed areas; Site activities will be conducted during daytime hours 07h00 – 17h30 to avoid night time noise disturbances and night time collisions with fauna; Vehicle speed will be reduced, particularly in highly vegetated areas to avoid deaths by vehicle impacts; No trapping or hunting of fauna is shall be permitted; Edge effects of all construction and operational activities, such as erosion and alien plant species proliferation, which may affect faunal habitat, need to be strictly managed; No informal fires in the vicinity of construction areas shall be permitted; An alien vegetation control plan must be developed and implemented in order to manage alien plant species occurring within the study area, and to prevent further faunal habitat loss; and Poaching will be prohibited at the prospecting site. <u>Deterioration of water quality in in the nearby streams and within the groundwater regime:</u> No operations shall be permitted within sensitive landscapes; No construction activities shall be permitted within 100 meters of water courses and/or drainage lines and within 500 m of wetlands and/or riparian zones without consent from the DWS; Rehabilitate areas that may have been mistakenly stripped; Any hydrocarbon spill from the site stripping will be remediated as soon as possible; No washing of vehicles shall be allowed outside demarcated areas. Washing bays for vehicles and other equipment shall be provided with appropriate soakaways, will be clearly demarcated and will not be allowed to contaminate any surface runoff; Sufficient areas shall be provided for the maintenance and washing of vehicles;		

				Refuelling of vehicles will only be allowed in designated areas; All quarrying equipment shall be parked in a demarcated area Drip trays shall be used when equipment is used for some time; On surface bulk storage of hydrocarbons must be situated in a dedicated area which will include a bund or a drain where necessary to contain any spillages during the use, loading and offloading of the material; Bunded areas shall contain 110% of the stored volume; Bund areas must be impermeable; Bund area must have a facility such as a valve/sump to drain or remove clean Stormwater. Contaminated water shall be pumped into a container for removal by an approved service provider; Regular inspections shall be carried out to ensure the integrity of the bundwalls; and Spill kits shall be made available and all personnel shall be trained and training records shall be made available on request; Ensure that topsoil is properly stored, away from the streams and drainage areas. <u>Water abstraction:</u> Any abstraction of water for quarrying purposes must be approved by DWS. <u>Air pollution through air pollutants' emissions, from the stripping site:</u> Wet suppression using will be conducted at areas with excessive dust emissions; Dust suppression measures shall be implemented on dry weather days and periods of high wind velocities; A speed limit of 40 km/hr shall apply to limit vehicle entrained dust from the unpaved roads; All construction equipment must be scheduled for preventative maintenance to ensure the functioning of the exhaust systems to reduce excessive emissions and limit air pollution; and		

				Appropriate dust suppression measures may include limiting the extent of open areas, reducing the frequency of disturbance and spraying with water. <u>Visual impacts on the surrounding communities and road users from the stripping:</u> The number of construction vehicles and machinery to be used shall be kept to a minimum; and Movement of vehicles shall be kept to outside busy hours to minimise the visual impacts on the neighboring residents. <u>Damage or destruction of sites with archaeological and cultural significance:</u> If archaeological sites or graves are exposed during construction work, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made; and The stripping of the sites will be away from any identified grave site or heritage sites. A buffer of 50 m will be created between the sites and the proposed drilling sites. <u>Impact from the influx of job seekers and employment of farm labourers:</u> Recruitment will not be undertaken on site; and Recruitment process shall favour locals, but farm labourers will not employed unless agreed to with the farm owner. <u>Waste Management:</u> Separation of waste All waste shall be separated into general waste and hazardous waste; Hazardous waste shall not be mixed with general waste and in doing so increase the quantities of hazardous waste to be managed; General waste can further be separated in waste that can be recycled and or reused;		

				No littering shall be allowed in and around the site, a sufficient number of bins shall be provided for the disposal of waste; and Where necessary dedicate a storage area on site for collection of construction waste. <u>Storage of waste:</u> No stockpiling of material shall be permitted within 100 m of water courses and/or drainage lines, or within 500 m of wetland and riparian areas; General waste will be collected in an adequate number of litter bins located throughout the quarry. Bins shall be located no more than 50 m from stripping; Bins must have lids in order to keep rain water out; Bins shall be emptied regularly to prevent the bins from overflowing; All work areas shall be kept clean and tidy at all times; All waste management facilities will be maintained in good working order; Waste shall be stored in demarcated areas according to type of waste; Runoff from any area demarcated for waste will be contained, treated and reused; Flammable substances must be kept away from sources of ignition and from oxidizing agents; Waste shall not be buried or burned on site; and The maximum retention time for temporary storage of waste generated shall not exceed 30 days, provided the waste does not present a health hazard or risk of odour. <u>Disposal of hazardous waste:</u> No dumping shall be allowed in or near the stripping site; Hazardous containers shall be disposed of at an appropriate licensed site; Hazardous waste will be removed and managed by an approved service provider;		

				A safe disposal certificate will be provided by the approved service provider as proof of responsible disposal of hazardous waste; and The safe disposal certificate shall be stored and provided on request. <u>Disposal of general waste:</u> No dumping shall take place in or near the stripping site; All general waste shall be disposed of to the nearest licensed landfill site; and The necessary permissions must be obtained to dispose of waste to a registered landfill site.		
Quarrying	Quarrying of the new area in terms of exposing resource for mining	Operational Phase	Approximately 1.02ha	All existing mitigation measures as outlined in the approved EMPr relevant to the Nelspruit Quarry will be applied to the operational phase of this portion of the quarry. As such this EMP merely serves as an Addendum to the overarching EMPr.	Implementation of mitigation measures will ensure that the activities in the proposed land swap do not have detrimental impacts.	During the operational phase.

1.7 Impact Management Outcomes

Name of Activity		Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
Access Roads	Preparation of the area in order to begin quarrying by way of bench extension	Loss of soils, erosion of the soils and impacts on landowners' livelihood.	Soils, Land capability and Land use	Construction/stripping & Operations	Rehabilitation of areas cleared of vegetation and dust control	Retain topsoil integrity for the reuse in rehabilitation Vegetation clearance shall be kept to a minimum. No clearance of vegetation outside demarcated areas
Temporary Soil Storage Areas		Contamination of surface water due to erosion of soils which will lead to increased turbidity as	Surface Water	Construction/stripping & Operations	Monitoring through rehabilitation and management of spoil sites	Retain topsoil integrity for the reuse in final rehabilitation. Comply with

		well as contamination from hydrocarbon spillages				the requirements of the NWA: no construction activities within 100 m of water courses and 500m of wetlands and riparian zones without consent from the DWS.
Fence		Destruction of graves and cultural heritage sites	Heritage & Archaeological Resources	Construction/stripping & Operations	Control through clear demarcation of areas to ensure avoidance of graves and other heritage sites	No destruction/loss of heritage resources
Vegetation Clearing		Loss of natural vegetation in the affected areas	Flora	Construction/stripping & Operations	Rehabilitation of areas cleared of vegetation. Control of alien invasive plant species	Comply with existing legislation National Environmental Management: Biodiversity Act 2004 (Act No 10 of 2004) and Alien and Invasive Species Regulations, 2014. No vegetation clearance outside of demarcated areas
		Migration of fauna due to disturbance caused by the proposed project.	Fauna	Construction/stripping & Operations	Relocation of affected species of conservation importance	Remain within the designated area demarcated for quarrying activities. Ensure minimal clearance of vegetation
		Air pollution through nuisance dust, PM10 and PM2.5 as well as emissions from construction vehicles and machinery.	Air Quality	Construction/stripping & Operations	Dust control measures	Comply with the requirements of the National Environmental Management: Air Quality

						Act, 2004: Dust Regulation guidelines.

1.8 Impact Management Outcomes

Name of Activity		Potential Impact	Mitigation Type	Time Period	Compliance with Standards
Access Roads	Preparation of the area in order to begin quarrying by way of bench extension	Loss of soils, erosion of the soils and impacts on landowners' livelihood.	Rehabilitation of areas cleared of vegetation and dust control	Construction/stripping & Operations	Retain topsoil integrity for the reuse in rehabilitation Vegetation clearance shall be kept to a minimum. No clearance of vegetation outside demarcated areas
Temporary Soil Storage Areas		Contamination of surface water due to erosion of soils which will lead to increased turbidity as well as contamination from hydrocarbon spillages	Monitoring through rehabilitation and management of spoil sites	Construction/stripping & Operations	Retain topsoil integrity for the reuse in final rehabilitation. Comply with the requirements of the NWA: no construction activities within 100 m of water courses and 500m of wetlands and riparian zones without consent from the DWS.
Fence		Destruction of graves and cultural heritage sites	Control through clear demarcation of areas to ensure avoidance of graves and other heritage sites	Construction/stripping & Operations	No destruction/loss of heritage resources
Vegetation Clearing		Loss of natural vegetation in the affected areas	Rehabilitation of areas cleared of vegetation. Control of alien invasive plant species	Construction/stripping & Operations	Comply with existing legislation National Environmental Management: Biodiversity Act 2004 (Act No 10 of 2004) and Alien and Invasive Species Regulations, 2014. No vegetation clearance outside of demarcated areas
		Migration of fauna due to disturbance caused by the proposed project.	Relocation of affected species of conservation importance	Construction/stripping & Operations	Remain within the designated area demarcated for quarrying activities. Ensure minimal clearance of vegetation
		Air pollution through nuisance dust, PM10 and PM2.5 as well as emissions from construction vehicles and machinery.	Dust control measures	Construction/stripping & Operations	Comply with the requirements of the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines.

2. FINANCIAL PROVISION

2.1. Closure Objectives Description

The existing rehabilitation plan which applies to the current quarry will cover the addition of the new area. This plan stipulates that quarry operations be developed on the basis that the rehabilitated areas will be made safe, stable, non-polluting and will be able to support self-sustaining ecosystems, similar to surrounding natural ecosystems.

To ensure that the rehabilitation plan is aligned with the closure objective, high-level risk assessment of the quarrying components was undertaken to establish the potential risks associated with therewith.

The major closure objectives as outlined in the existing EMPr are to:

1. Remove all product stockpiles.
2. Shaping and sloping of overburden dumps to no more than 30°.
3. For all benches:
    a. Investigate slope stability to determine the final safe / stable slope angle.
    b. Final step profiles of the rock slopes of the quarry will depend on consideration of the local and the overall stability, taking into account factors such as pre-existing joints, fault patterns, the presence of any gauge material, permeating ground water, and safety.
    c. Maintain stable sections of vertical benches to provide nesting sites, habitats for cliff adapted species, and to add visual interest / minimise visual impacts.
    d. Avoid long slopes, which could pose a safety hazard.
    e. Seeding of slopes with mixed natural grass species.
4. Discourage access to areas posing a safety hazard, with berms or barbed wire in accordance with applicable legal and regulatory requirements.
5. Stabilise rehabilitated ground against wind and water erosion.
6. Reduce residual impacts on ground and surface water as well as landscape character.
7. Establish self-sustaining natural vegetation cover on all areas.

2.2. Environmental Objectives & I&AP Consultation

The draft BAR and EMPr will be made available to all registered I&APs for a 30 day review and comment period. All comments received and responses provided to the stakeholders will be incorporated into the final BAR and EMPr, and will be collated into a Comments and Responses Report.

2.3. Rehabilitation Plan Approach

As mentioned previously, the operation of the new portion of the quarry will fall under the management and closure measures as stipulated in the existing, approved EMPr. Mapping of the actual operational activities cannot be undertaken.

Due to the nature of the activities, the potential impacts will be limited in spatial extent and will be of short duration. The management plan is provided in such a manner as to ensure rehabilitation when the quarry begins to prepare for closure. A detailed management plan has been provided to address the potential impacts associated with these activities.

The only rehabilitation that will specifically be required is re-vegetation:

- Re-vegetation: A suitably qualified ecologist will be appointed to determine the appropriate species that may be used for re-vegetating the specific areas.
- Re-vegetation efforts will be monitored every second month for a period of 6 months after the initial seeding. An effective vegetation cover of 45% must be achieved.

2.4. Rehabilitation Plan Compatibility with the Closure Objectives

Due to the nature of the activities, the stripping impacts will be very limited and of short duration. The management plan is in such a manner as to ensure rehabilitation when the quarry begins to prepare for closure. A detailed management plan has been provided to address the potential impacts associated with these activities.

2.5. Quantum of Financial Provision

The financial provision for the environmental rehabilitation and closure of any mine/prospecting and its associated operations forms an integral part of the MPRDA. Sections 41 (1) and, 41 (2), 41 (3) and 45 of the MPRDA deal with the financial provision for rehabilitation and closure. During 2012, the DMR made updated rates available for the calculation of the closure costs, where contractor's costs are not available, these apply.

The "Guideline Document for the Evaluation of Financial Provision made by the Mining Industry" was developed by the DMR in January 2005 in order to empower the personnel at Regional DMR offices to review the quantum determination for the rehabilitation and closure for mining sites. The closure cost estimate was determined in accordance with the DMR guidelines. The closure costs were calculated to be R2,767,440.05 as shown below.

Table 3: Financial Liability for Mine Closure

No.	Description	Unit	Quantity (A)	Master rate (B)	Multiplication factor (C)	Weighting factor 1 (D)	Amount (E=A*B*C*D)
1	Dismantling of **processing plant and related structures** (including overland conveyors and powerlines)	m^3	**6450,00**	15,41	1,00	1,10	R 109 368,32
2(A)	Demolition of **steel buildings and structures**	m^2	**100,00**	214,79	1,00	1,10	R 23 626,37
2(B)	Demolition of **reinforced concrete buildings and structures**	m^2	**200,00**	316,53	1,00	1,10	R 69 636,21
3	Rehabilitation of **access roads**	m^2	**2650,00**	38,43	1,00	1,10	R 112 022,86
4(A)	Demolition and rehabilitation of **electrified railway lines**	m	0,00	373,05	1,00	1,10	R 0,00
4(B)	Demolition and rehabilitation of **non-electrified railway lines**	m	0,00	203,49	1,00	1,10	R 0,00
5	Demolition of **housing and/or administration facilities**	m^2	**58,50**	429,57	1,00	1,10	R 27 642,86
6	**Opencast rehabilitation** including final voids and ramps	ha	**5,80**	218 629,41	0,52	1,10	R 725 324,93
7	Sealing of **shafts, adits and inclines**	m^3	0,00	115,30	1,00	1,10	R 0,00
8(A)	Rehabilitation of **overburden and spoils**	ha	**1,62**	150 124,03	1,00	1,10	R 267 521,02
8(B)	Rehabilitation of processing waste **deposits and**	ha	0,00	186 976,75	1,00	1,10	R 0,00

No.	Description	Unit	Quantity (A)	Master rate (B)	Multiplication factor (C)	Weighting factor 1 (D)	Amount (E=A*B*C*D)
	evaporation ponds (basic salt-producing waste)						
8(C)	Rehabilitation of processing waste **deposits and evaporation ponds (acidic, metal-rich waste)**	ha	0,00	543 069,13	0,76	1,10	R 0,00
9	Rehabilitation of **subsided areas**	ha	0,00	125 706,26	1,00	1,10	R 0,00
10	**General surface rehabilitation** (Pollution control dam, slurry, etc.)	ha	**2,15**	118 923,55	1,00	1,10	R 281 254,19
11	**River diversions**	ha	0,00	118 923,55	1,00	1,10	R 0,00
12	**Fencing**	m	0,00	135,65	1,00	1,10	R 0,00
13	**Water management**	ha	0,00	45 218,07	0,60	1,10	R 0,00
14	2 to 3 years of **maintenance and aftercare**	ha	**21,45**	15 826,32	1,00	1,10	R 373 422,09
15A	Specialist study	Sum	0,00		0,00	1,10	
15B	Specialist studies (soil remediation)	ha	0,00		0,00	1,10	
							R 1 989 818,84
Weighting factor 2		1.00					
		1.00					
Subtotal 1							**R 1 989 818,84**
Preliminary and General		6.0%	if Subtotal 1 > 100 000 000				
		12.0%	if Subtotal 1 < 100 000 000				R 238 778,26

No.	Description	Unit	Quantity (A)	Master rate (B)	Multiplication factor (C)	Weighting factor 1 (D)	Amount (E=A*B*C*D)
							R 2 228 597,10
	Contingency 10% of Subtotal 1						R 198 981,88
Subtotal 2							**R 2 427 578,99**
Add Vat (14%)							R 339 861,06
GRAND TOTAL							**R 2 767 440,05**

2.6. Financial Provision Confirmation

Lafarge make provision for the Financial Provision calculation by means of bank guarantees and for the year of 2018, this amount guaranteed with the DMR is R2,767,440.05.

3. MECHANISMS FOR MONITORING COMPLIANCE

3.1. Monitoring of Impact Management Actions

Refer to Table 5.

3.2. Monitoring & Reporting Frequency

Refer to Table 5.

3.3. Responsible Persons

In order for the EMP to be successfully implemented, all the role players involved in the project need to co-operate. For this to happen, role players must clearly understand their roles and responsibilities in the project, must be professional, form respectful and transparent relationships, and maintain open lines of communication.

[Construction/Stripping] - Potential role players or project teams will include the Authorities (A), Other Authority (OA), Proponent (P), Consulting Engineers (CE), Engineers Representative (ER), Environmental Site Officer (ESO), Environmental Control Officer (ECO), Quarry Manager (QM), Contractors (C), Environmental Assessment Practitioner (EAP). Further; landowners, interested and affected parties (I&APs) and the relevant environmental and project specialists are also important role players. Roles and Responsibilities may be revised pending operational changes.

Table 4: Functions and Responsibilities of the Project Team

KEY	FUNCTION	RESPONSIBILITY
P	Proponent	Proponent ultimately accountable for ensuring compliance to the EMP and conditions contained therein. The ECO must be contracted by the proponent (full time or part time depending on the size of the project) as an independent appointment to objectively monitor implementation of relevant environmental legislation, conditions of Environmental Authorisations (EA's, if applicable), and the EMP for the project. The proponent is further responsible for providing and giving mandate to enable the ECO to perform responsibilities. The proponent must ensure that the ECO is integrated as part of the project team.
CE	Consulting Engineer	Contracted by the proponent to design and specify the project engineering aspects. Generally the engineer runs the works contract. The CE may also fulfil the role of QM on the proponent's behalf (See QM).
QM	Quarry Manger	The QM has over-all responsibility for managing the project, contractors, and consultants and for ensuring that the environmental management requirements are met. The CE may also act as the QM. All decisions regarding environmental procedures must be approved by the QM. The QM has the authority to stop any construction activity in contravention of the EMP in accordance with an agreed warning procedure.
ER	Engineers Representative	The consulting ER on site. Has the power/mandate to issue site instructions and in some instances, variation orders to the contractor, following request by the EO or ECO. The ER oversees site works, liaison with Contractor and ECO.
ECO	Environmental Control Officer	An independent appointment to objectively monitor implementation of relevant environmental legislation, conditions of EA's if applicable, and the EMP for the project. The ECO must be on site prior to any site establishment and must endeavour to form an integral part of the project team. The ECO must be proactive and have access to specialist expertise as and when required, these include botanists, ecologists, etc. Further, the ECO must also have access to expertise such as game capture, snake catching, etc. The ECO must conduct audits on compliance to relevant environmental legislation, conditions of EA if applicable, and the EMP for the project. The size and sensitivity of the development, will determine the frequency at

KEY	FUNCTION	RESPONSIBILITY
		which the ECO will be required to conduct audits. (A minimum of a monthly site inspection must be undertaken). The ECO must be the liaison between the relevant authorities and the project team. The ECO must communicate and inform the proponent and consulting engineers of any changes to environmental conditions as required by relevant authoritative bodies. The ECO must ensure that the registration and updating of all relevant EMP documentation is carried out. The ECO must be suitably experienced with the relevant environmental management qualifications and preferably competent in construction/plant related methods and practices. The ECO must handle information received from whistle blowers as confidential and must address and report these incidences to the relevant authority as soon as possible.
C	Contractor	The principle contractor, hereafter known as the 'Contractor', is responsible for implementation and compliance with the requirements of the EMP and conditions of the EA's, contract and relevant environmental legislation. The Contractor must ensure that all sub-contractors have a copy of and are fully aware of the content and requirements of this EMP. The contractor should, where specified, provide Method Statements setting out in detail how the management actions contained in the EMP will be implemented.
ESO	Environmental Site Officer	The ESO is employed by the Contractor as his/her environmental representative to monitor, review and verify compliance with the EMP by the contractor. This is not an independent appointment; rather the ESO must be a respected member of the contractor's management team. Dependent on the size of the development the ESO must be on site one week prior to the commencement of construction/mobilisation. The ESO must ensure that he/she is involved at all phases of the constriction (from site clearance to rehabilitation).
A	Lead Authority	The authorities are the relevant environmental department that has issued the Environmental Authorisation, if applicable. The authorities are responsible for ensuring that the monitoring of the EMP and other authorisation documentation is carried out, this will be achieved by

KEY	FUNCTION	RESPONSIBILITY
		reviewing audit reports submitted by the ECO and conducting regular site visits.
OA	Other Authority	Other authorities are those that may be involved in the approval process of an EMP. Their involvement may include reviewing EMP's to ensure the accuracy of the information relevant to their specific mandate. Other authorities may be involved in the development, review or implementation of an EMP. For example if a specific development requires a water use licence for the relevant national authority then that authority should review and comment on the content of the particular section pertaining to that mandate.
EAP	Environmental Assessment Practitioner	The definition of an EAP in Section 1 of NEMA is "*the individual responsible for the planning, management and coordination of environmental impact assessments, strategic environmental assessments, environmental management plans or any other appropriate environmental instruments introduced through regulations".*

3.4. Time Period for Implementing Impact Management Actions

Refer to Table 5.

3.5. Mechanism for Monitoring Compliance

Refer to Table 5.

Table 5: Mechanisms for Monitoring

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements For Monitoring	Roles & Responsibilities (For The Execution Of The Monitoring Programmes)	Monitoring & Reporting Frequency & Time Periods For Implementing Impact Management Actions
Site Clearance and removal of vegetation. Stockpiling material from site clearance. Construction of and access Routes. Stormwater management. Storage of diesel and vehicle/machinery maintenance equipment. Water extraction from borehole and/or tank. Waste generation and management. Rehabilitation and restoration of disturbed areas.	Soil Erosion	Management and monitoring of soil stockpiles. Soils must be stored properly and revegetated to prevent erosion and to enable re-use during rehabilitation. Stockpiles must be visually inspected daily to ensure that no erosion is taking place	Environmental Manager/Quarry Manager	Daily Monitoring and Monthly Reporting
	Loss of Indigenous Plant Species	A suitably qualified ecologist or horticulturist may be required regarding the collection, propagation/storage and transplantation of plants if advised	Environmental Manager/Quarry Manager	Monthly monitoring and reporting.
	Faunal Habitat Loss	Adhere to law and best practice guidelines regarding the displacement and relocation of fauna. Where required fauna shall be relocated to an area with a similar habitat as the project area. Time construction activities to minimise faunal mortality. Poaching of fauna shall be prohibited. Uncontrolled fires shall not be permitted on site and persecution or hunting of fauna	Environmental Manager/Quarry Manager	Monthly monitoring and reporting.
	Proliferation of alien invasive species	Declared weeds and alien invasive species must be eradicated. Management of alien invasive plant shall be undertaken though throughout the implementation of a management plan.	Environmental Manager/Quarry Manager	Monthly monitoring and reporting.
	Nuisance dust and air emissions	During dry seasons, ensure that cleared (excavated) areas and unpaved surfaces are sprayed with water	Environmental Manager/Quarry Manager	Monthly monitoring and reporting.

	generation	obtained from an approved source to minimise dust generation. Set up PM2.5 and PM10 Monitoring sites in the area to monitor dust fall.		
	Increased pressure on the road network	Speed control and limitation of the times when quarry vehicles may be on the roads	Environmental Manager/Quarry Manager	Monthly monitoring and reporting.
	Soil disturbance resulting in the spread of alien	Alien invasive vegetation monitoring and control through Alien Invasive Management Plan	Environmental Manager/Quarry Manager	Monthly monitoring and reporting.
	Destruction of graves and cultural resources	No activities shall impact graves and sites of heritage or cultural importance	Environmental Manager/Quarry Manager	Monthly monitoring and reporting.
	Water Use	No water may be sources from rivers and streams without approval from the DWS. No clean water shall be used for dust suppression.	Environmental Manager/Quarry Manager	Monthly monitoring and reporting.
	Health and safety of personnel	Routine safety checks, safety training and Inspections to be carried out during the construction/stripping and operation phase to enforce the use of Personnel Protective Equipment (PPE).	Environmental Manager/Quarry Manager	Routine inspection and Quarterly reporting
	Waste Management	Maintain a waste manifest book to record volumes of waste leaving the site, including recyclables. Keep safe disposal certificates on file on site for Hazardous waste. Way Bridge slips must be obtained for all other waste streams and kept on file on site.	Environmental Manager/Quarry Manager	Monthly monitoring and reporting.
	Stormwater Management	Visual monitoring based on sediment. Clean water must be kept separate from contaminated water emanating from the project sites	Environmental Manager/Quarry Manager	Monthly monitoring and reporting.

3.6. Frequency Performance Assessment/Environment Audit Report Submission

Biennial environmental audits must be undertaken to ensure compliance with the EMPr and EA. The environmental audit reports must also include the financial provision. The reports must be submitted to the DMR.

3.7. Environmental Awareness Plan

Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work

An Environmental Awareness and Risk Assessment Schedule has been developed and is outlined in Table 6. The purpose of this schedule is to ensure that onsite employees are not only trained, but that the principles are continuously re-enforced.

Table 6: Environmental Training & Awareness Schedule

FREQUENCY	TIME ALLOCATION	OBJECTIVE
Induction (all staff and workers)	1 hour training on environmental awareness training as part of site induction	Develop an understanding of what is meant by the natural environmental and social environment and establish a common language as it relates to environmental, health, safety and community aspects. Establish a basic knowledge of the environmental legal framework and consequences of non -compliance. Clarify the content and required actions for the implementation of the Environmental Management Plan. Confirm the spatial extent of areas regarded as sensitive and clarify restrictions. Provide a detailed understanding of the definition, the method for identification and required response to emergency incidents.
Monthly Awareness Talks (all staff and workers)	30 minute awareness talks	Based on actual identified risks and incidents (if occurred) reinforce legal requirements, appropriate responses and measures for the adaptation of mitigation and/or management practices.
Risk Assessments (supervisor and workers involved in task)	Daily task based risk assessment	Establish an understanding of the risks associated with a specific task and the required mitigation and management measures on a daily basis as part of daily toolbox talks.

Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment

As prescribed in Table 6, Task/Issue based Risk Assessments must be undertaken with all workers involved in the specific tasks in order to establish an understanding of the risks associated with a specific task and the required mitigation and management measures contained in this report.

Environmental Awareness Training Content- Induction Training: The following environmental awareness training will be provided to all staff and workers who will be involved in stripping activities:

- Description of the approved prospecting activities and content of the prospecting right;
- An overview of the applicable legislation and regulations as they relate to environmental, health, safety and community;

Content and implementation of the approved EMPr specifically:

- Allocated roles and responsibilities;
- Management and mitigation measures; and
- Identification of risks and requirements adaptation.

Sensitive environments and features:

- Description of environmentally sensitive areas and features; and
- Prohibitions as it relates to activities in or in proximity to such areas.

Emergency Situations and Remediation:

- Methodology for the identification of areas where accidents and emergencies may occur, communities and individuals that may be affected;
- An overview of the response procedure;
- Equipment and resources;
- Designate of responsibilities;
- Communication, including communication with the potentially affected communities and responsible authorities; and
- Training schedule to ensure effective response.

Development of procedures and checklists: The following procedures will be developed and all staff and workers will be adequately trained on the content and implementation thereof:

Emergency Preparedness and Response: The procedure will be developed to specifically include risk identification, preparedness, response measures and reporting. The procedure will specifically include spill and fire risk, preparedness and response measures. The appropriate emergency control centres (fire department, hospitals etc.) will be identified and the contact numbers obtained and made available on site. The procedure must be developed in consultation will potentially affected landowners. In the even that risks are identified, which may affect adjacent landowners (or other persons), the procedure will include

appropriate communication strategy to inform such persons and provide response measures to minimise the impact.

Incident Reporting Procedure: Incident reporting will be undertaken in accordance with an established incident reporting procedure to:

- Provide details of the responsible person, including any person who
- Is responsible for the incident;
- Owns any hazardous substance involved in the incident;
- Was in control when the incident occurred.
- Provide details of the incident (time, date, location);
- The details of the cause of incident;
- Identify aspects of the environment affected;
- The details of corrective action taken; and
- The identification of any potential residual or secondary risks that must be monitored and corrected or managed.

Environmental and Social Audit Checklist: An environmental audit checklist will be establishes to include the environmental and social mitigation and management measures as developed and approved as part of the EMP. Non-conformances will be identified and corrective action taken where required.

3.8. Specific information required by the Competent Authority

No specific measures have been requested by the authorities.

4. UNDERTAKING

The EAP herewith confirms

a) The correctness of the information provided in the reports; ✓

b) The inclusion of comments and inputs from stakeholders and I&APS; ✓

c) The inclusion of comments and recommendations from the specialist reports where relevant; ✓ and

d) That the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein. ✓

Signature of environmental assessment practitioner:

Name of company: Pear environmental

Date: 25/10/2018