gate entrance. Although this means the enclosure does not prevent scavenging by animals such as baboons, it does minimise such activities.

Garden refuse. At present the garden refuse is being used to cover the surface of the waste dump to aid in the rehabilitation process. The garden refuse is spread over the sides of the waste dump to reduce erosion and provide nutrients to the soil. To ensure that the garden refuse does not inadvertently pollute the waste dump, Ulco employs a contractor to shift through the garden refuse and remove non-vegetable matter. This refuse is then disposed of in the waste tip with the domestic waste from the Township.

3.8.6 Environmental Monitoring

The SHE department is responsible for ensuring that the environmental monitoring is implemented and the results are reviewed and acted upon appropriately. Environmental monitoring includes;

- Water monitoring: Quality and quantity (through the upkeep of a water balance diagram).
- Dust fall out monitoring
- Noise monitoring
- Occupational health and safety monitoring
- Emission monitoring
- Monitoring of concurrent rehabilitation
- Consumption monitoring of waste, fuel and electricity

3.8.7 Environmental Training

The SHE Department is responsible for ensuring that the environmental awareness training is implemented by all employees and sub-contractors on the site. This is explained in detail in **Section 12**, Environmental Awareness Plan.

3.8.8 Environmental Stakeholders Forum

The Environmental Department is responsible for the establishment and management of an environmental forum of which relevant government officials, community representatives, AfriSam employees will meet on a quarterly basis to discuss environmental issues.

3.8.9 The Clinic

The Mine has a small clinic which is open for consultation four mornings a week. Only minor medical conditions or emergencies are treated at this clinic, with more serious cases being referred to the clinic in Delportshoop. Medical waste generated from the clinic primarily includes syringes and bandages, which are disposed of as medical waste.

3.8.10 Security

Twenty four hour security regulates entry and exit from the mine and the factory. Security guards also patrol the property.

3.8.11 Sub-contractors

Like all mines, Ulco make use of a number of sub-contractors to fulfil certain roles of the mining operation. The SHE Department resumes responsibility for the completion and endorsements of contracts between contractors and the mine, which include details pertaining to safety, health and environmental requirements. Current examples of contractors include:

- Drilling and Blasting contractors
- Cleaning contractors
- Security contractors
- Civils contractors
- Mechanical support contractors
- Catering contractors

3.8.12 Air conditioners

Ulco has a number of air conditioners through out the mine. Due to the age of the air conditioners the majority of them make use of CFC gases which are not ozone friendly.

3.8.13 Emergency Incidents

Emergency environmental incidents / accidents can be defined as incidents / accidents having the following criteria:

- The likelihood of these incidents / accidents occurring is considered to be very low or may never occur during the life of the Mine.
- The environmental impacts associated with these incidents / accidents may be significant.

It is essential that the Mine personnel know how to respond in the event of an environmental emergency situation in order to avoid significant environmental degradation / impacts or injury to human health. Ulco recognise the following potential incidents as environmental emergencies;

- Excessive diesel / oil spillages
- Bursting or leaking diesel tanks
- Leaking transformer oil
- Excessive dust emissions
- Coal dust explosion from the coal mills
- Fire
- Flooding
- Run away chemical reactions.

Management measures have been compiled for all of the above mentioned potential emergency incidents.

4 PUBLIC PARTICIPATION PROCESS (REGULATION 50(F))

(f) "details of the engagement process of interested and affected persons followed during the course of the assessment and an indication of how the issues raised by interested and affected persons have been addressed".

This EIA/EMP amendment has been compiled for an existing operation and represents an upgrade to the existing document. There have been no major changes in the operational activities since the approval of the existing EMP which may have resulted in a change to the impacts associated with the operation.

Hence no specific public participation process has been implemented for this EIA/ EMP upgrade.

4.1 ON GOING CONSULTATION

As Ulco is a going concern, consultation processes have been established and remain on going to ensure that interested and affected parties are kept informed on environmental matters and have an opportunity to raise any concerns.

On a quarterly basis an environmental forum is held at Ulco which includes representatives of;

- AfriSam
- The local farmers associated
- Municipal representatives
- The Ulco community
- The Delportshoop community
- Government Departments

Feedback from the meeting is used for on going environmental management purposes.

5 DESCRIPTION OF THE ENVIRONMENTAL IMPACT ASESSMENT (REGULARION 50I)

50I "an assessment of the nature, extent, duration probability, and significance of the identified potential environmental, social and cultural impacts of the proposed mining operation, including cumulative environmental impacts".
39(3) "An applicant who prepares an environmental management programme or an environmental management plan must –

(b) investigate, assess and evaluate the impact of his or her proposed prospecting or mining operations on –
(i) the environment;
(ii) the socio-economic conditions of any person who might be directly affected by the prospecting or mining operation; and
(iii) any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999), with the exception of the national estate contemplated in section 3(2)(i) (vi) and (vii) of that Act."

5.1 METHOD OF EVALUATION

The ranking system developed to identify the significance of the impacts created as a result of the mining operation has been developed to take cognisance of the requirements of the Minerals and Petroleum Resource Development Act, Act No. 28 of 2002 (MPRDA), Regulation 32(2)(k) of EIA regulation of the National Environmental Management Act, Act 107 of 1998 (NEMA) and the requirements of ISO 14001.

Regulation 50I of the MPRDA, stipulates that the Environmental Impact Assessment (EIA) must include "an assessment of the **nature**, **extent**, duration, **probability** and **significance** of the identified potential environmental, social and cultural impacts of the mining operation, including the **cumulative** environmental impacts".

Regulation 32(2)(k) of the NEMA stipulates that the "assessment of each identified potentially significant impact must include (i) **cumulative** impacts, (ii) the **nature** of the impact, (iii) the **extent** and **duration** of the impact, (iv) the **probability** of the impact occurring, (v) the **degree** to which the impact can be **reversed**, (vi) the **degree** to which the impact may cause **irreplaceable loss of resources**; and (vii) the **degree** to which the impact can be **mitigated**".

ISO 14001, section 4.3.1 Environmental Aspects stipulates that "the organisation shall establish, implement and maintain a procedure

a) to identify the environmental aspects of its activities, products and services within a defined scope of the environmental management system that it can control and those that it can influence taking into account planned or new developments, or new or modified activities, products and services, and
b) to determine those aspects that have or can have significant impacts on the environment"

When considering the above requirements and for the purpose of this report, the significance of impacts will be determined through the implementation of the following impact assessment model:

5.2 DEFINITIONS

The terms environment, activity, aspect and impact, will be used technically throughout this document, and so it is important to explain what is meant by each term in the context of the EIA.

- **Environment** (as defined in NEMA): The surroundings within which humans exist and that are made up of:
  - the land, water and atmosphere of the earth;
  - micro-organisms, plant and animal life;
  - any part or combination of the above, and the interrelationships among and between them; and
  - the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing;
- **Activity**: A specific deed, action or function, that takes place at Ulco (as described in **Section 3** of this report), such as;
  - Drilling and blasting.
  - Stockpiling.
  - Waste management.
- **Aspect**: Considered to be a direct effect of an activity, which has an influence on the environment. It is neither categorised as positive or negative. For example:

- Blasting (an activity) causes vibrations and noise (both are aspects of the activity).
- Re-vegetation (an activity) causes plant establishment and the creation of habitats (an aspect).

- **Impact**: The end-result of an aspect that occurred due to an activity, resulting in an influence on the environment. The influence is either positive or negative. The determination as to whether an impact is positive or negative is subjective. For example:
  - Vibrations, an aspect of blasting (an activity), cause structural damage to neighbouring houses (an impact – negative from the perspective of the homeowner).
  - Vegetation establishment, an aspect of the re-vegetation programme (an activity), prevents topsoil erosion and returns the area to its original condition (an impact – positive from the perspective of soil management and aesthetics).

5.2.1 Criteria to Consider when Determining Significance

The ranking of impacts / determination of significance is estimated using two criteria, namely Consequence and Probability. These consider the contributing factors / criteria listed in the legislation. The definitions of each are provided below.

The **Consequence** of an impact resulting from an aspect is expressed as a combination of:

- **Nature** of impact: An indication of the extent of the damage (negative impacts) or benefit (positive impacts) the impact inflicts on natural, cultural, and/or social functions (environment).
- **Extent** of impact: A spatial indication of the area impacted (i.e, how far from activity the impact is realised).
- **Duration** of impact: A temporal indication of the how long the effects of the impact will persist, assuming the activity creating the impact ceases. For example, the impact of noise is short lived (impact ceases when activity ceases) where as the impact of removing topsoil exists for a much longer period of time.
- **Frequency** of the impact occurring: An indication of how often an impact is likely to occur, as a result of an aspect from a particular activity. Note that this does not assess how often the *activity* occurs. It applies only to the likely frequency of an impact from the aspect of the activities. For example;
  - stockpiling takes place daily but the aspect of increased sediment load in water courses only occurs when it rains. Hence the frequency of this impact occurring is an average frequency on how often it rains.
  - An activity creating dust every day would result in the impact of dust fallout every day and hence the frequency of an impact occurring is daily.

The **Probability** of an impact resulting from an aspect is expressed as:

- **Probability** of impact occurring: An estimated indication of the potential for an impact to occur based on the specific parameters applicable to each operation. For example a blast will create vibrations however if the closest structure is so far away that it will not be effected by the vibrations, then the probability of an impact is low.

The **Significance** of an impact: Considering Consequence and Probability (defined above), Significance is an indication of how serious a negative impact is anticipated to be and how beneficial a positive impact may be.

5.3 Explanation of Impact Rating

5.3.1 Consequence and Probability

Using the criteria listed in the above, scores are assigned to each the criteria, as outlined in **Table 5.1**. The scoring range in **Table 5.1** has been selected to represent the scale in which varying impacts can occur. The combination of scores is then used to determine the **Consequence** and **Probability**, as described below. These are then plotted against each other on an xy-scatter chart to determine the Significance Rating of the impact, as shown in **Figure 5.1** – *Impact Significance Chart.* (In this figure the blue dots represent hypothetical impacts.)

- Consequence is expressed as the sum of all criteria in order to get a scope out of 100.
- Probability of the impact occurring is expressed as a score out of 100.

Table 5-1: Scoring for environment impact assessment criteria.

CONSEQUENCE	*Nature of Impact:*		
	Low	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes are not affected.	**1**
	Low-Medium	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes are affected insignificantly.	**5**
	Medium	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes are altered.	**10**
	Medium-High	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes are severely altered.	**15**
	High	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes will temporarily or permanently cease.	**25**
	Extent of Impact:		
	On-site	Impact occurs on-site (within the boundary of the mine).	**1**
	Neighbouring	Impact occurs within a 5km radius of the site.	**5**
	Local	Impact occurs within a 20km radius of the site.	**10**
	Regional	Impact occurs within a 100km radius of the site.	**15**
	National	Impact occurs within South Africa.	**25**
	Duration of Impact:		
	Very Short-term	The impact will cease within 1 week if the activity is stopped.	**1**
	Short-term	The impact will cease within 1 year if the activity is stopped.	**5**
	Medium-term	The impact will cease within 5 years if the activity is stopped.	**10**
	Long-term	After the operational life of the operation.	**15**
	Permanent	Where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.	**25**
	Frequency of Occurrence of the Impact:		
	Annually or less	Impact occurs at least once in a year or less frequently.	**1**
	6 months	Impact occurs at least once in 6 months.	**5**
	Monthly	Impact occurs at least once a month.	**10**
	Weekly	Impact occurs at least once a week.	**15**
	Daily	Impact occurs daily.	**25**
PROBABILITY	*Probability of Occurrence of the Impact:*		
	Improbable	The possibility of the impact materialising is very low either because of design or historic experience.	**10**
	Low	The possibility of the impact materialising is low either because of design or historic experience.	**30**
	Medium	There is a possibility that the impact will occur.	**60**
	High	There is a distinct possibility that the impact will occur.	**80**
	Definite	The impact will occur regardless of any prevention measures.	**100**

In **Figure 5.1** the positions of the impact rating boundary curves were defined by trial and error (based on more than 15 years' experience), using qualitative measures of the perceived significance of a wide range of impacts, from catastrophic aspects through to minor nuisances.

This rating system is weighted in such a way as to set impacts that are very likely to occur, but have very little consequence, as Low significance. Similarly, impacts with serious consequences but that are unlikely to occur are rated lower, than impacts with serious consequences that are likely to occur.

The significance of an impact is considered to be classified into one of the following; High, Medium-High, Medium, Low-Medium or Low (as shown in the Impact Significance Chart, **Figure 5.1**). The definition of each classification is provided below and focuses on the need for mitigation or management.

Significance:	
Low	Management measures may not be necessary, but in some instances are encouraged to ensure that the impact remains of Low significance.
Low-Medium	Management measures are usually encouraged to ensure that the impacts remain of Low-Medium significance.
Medium	Management measures are required to ensure, at minimum, the significance of the impact does not increase.
Medium-High	Management measures are required to reduce the significance of the impact to, at least, Medium significance.
High	Impact should be avoided, or if not possible, managed to reduce the significance of the impact to, at least, Medium significance (where possible).

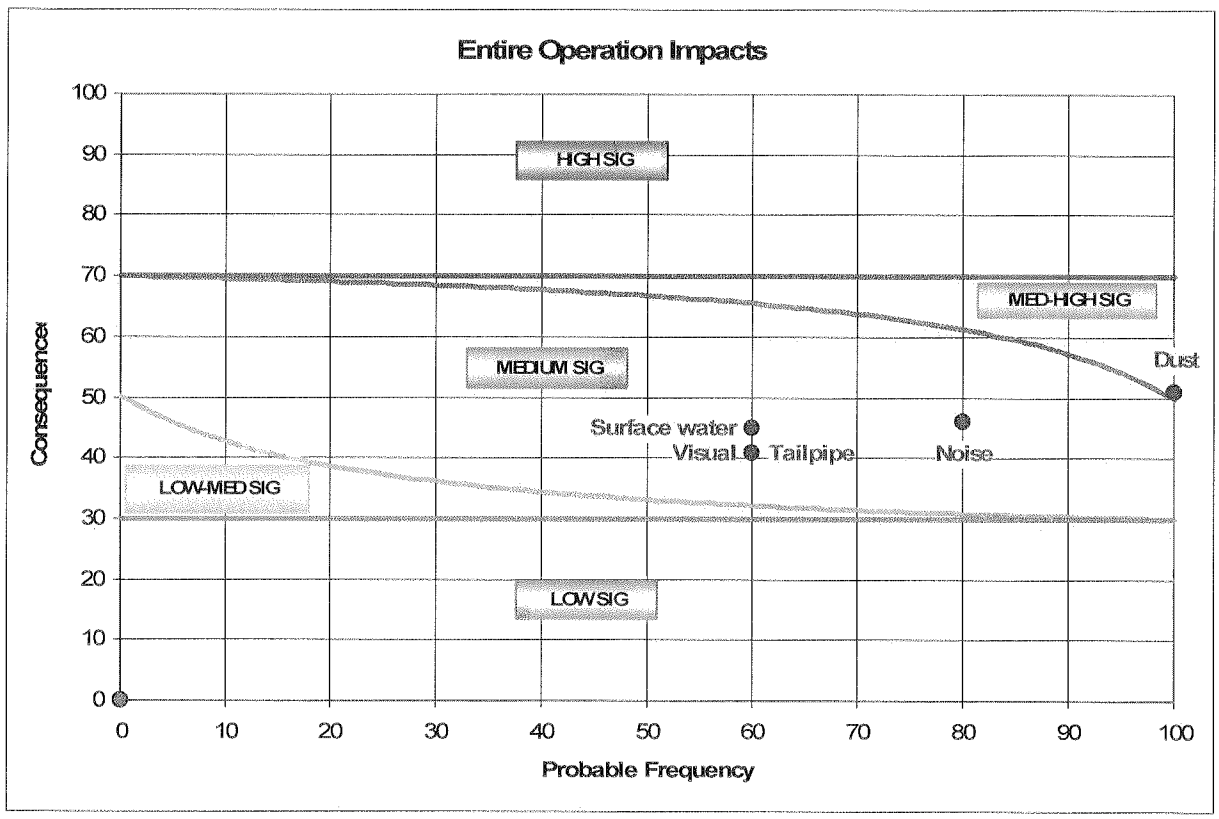


Figure 5-1: An example of an Impact Significance Chart

5.3.2 Additional Factors that Contribute to Significance of an Impact

Additional Factors that Contribute to Significance of an Impact

Additional factors that can contribute to the significance rating of an impact after it has been scored include Cumulative Impacts and input from I&AP (explained below). In these instances, more emphasis should be placed on management measures requirement.

- **Cumulative Impacts**: Cumulative Impacts will be considered where off-site activities (not related to the operation being evaluated) will result in the same impact at the receptors being considered. For example, dust will be considered cumulatively for a sand mine located adjacent to an unrehabilitated gold mine tailings dam. The spatial extent for the consideration of off-site cumulative impacts will be determined individually for each impact depending on factors such as the medium of dispersal of the pollutant causing the impact. Due to the rural location of Ulco there are very few impacts which can be considered cumulative.

- Impacts / Issues raised by **interested and Affected Parties**: Should interested and affected parties raise concerns or issues concerning any impact resulting from the activities of Ulco then this concern will influence the significant rating of the impact. However for this process no concerns have been raised.

6 ENVIRONMENTAL IMPACT ASSESSMENT

The following section represents the impact assessment of the activities undertaken at Ulco as described in **Section 3** on the baseline environment as described in **Section 2**. The impact assessment has been sub-divided into the order of the activities as described in **Section 3** of this report.

As this impact assessment is for an existing operation, where the management measures are in place due to the **current technology or infrastructure existing** on the site, then the mitigating effect of the technology / infrastructure has been considered while undertaking the impact assessment. For example if a conveyor belt has a partial cover, the impact rating has considered the mitigating effect of this partial cover.

The ranking of the impacts per activity in each of the Departments is presented in graphic form in specific sub headings.

Only if an impact is to be considered cumulatively or if an interested and affected party have raised the impact as an issued is it documented within the impact assessment and potentially the significance ranking re-evaluated and increased. Where there is no reference to either of the above, then it is considered as not applicable. Only significant impacts have been considered. Where an impact is so low that it is regarded as insignificant it has been listed, but not assessed in terms of the impact assessment.

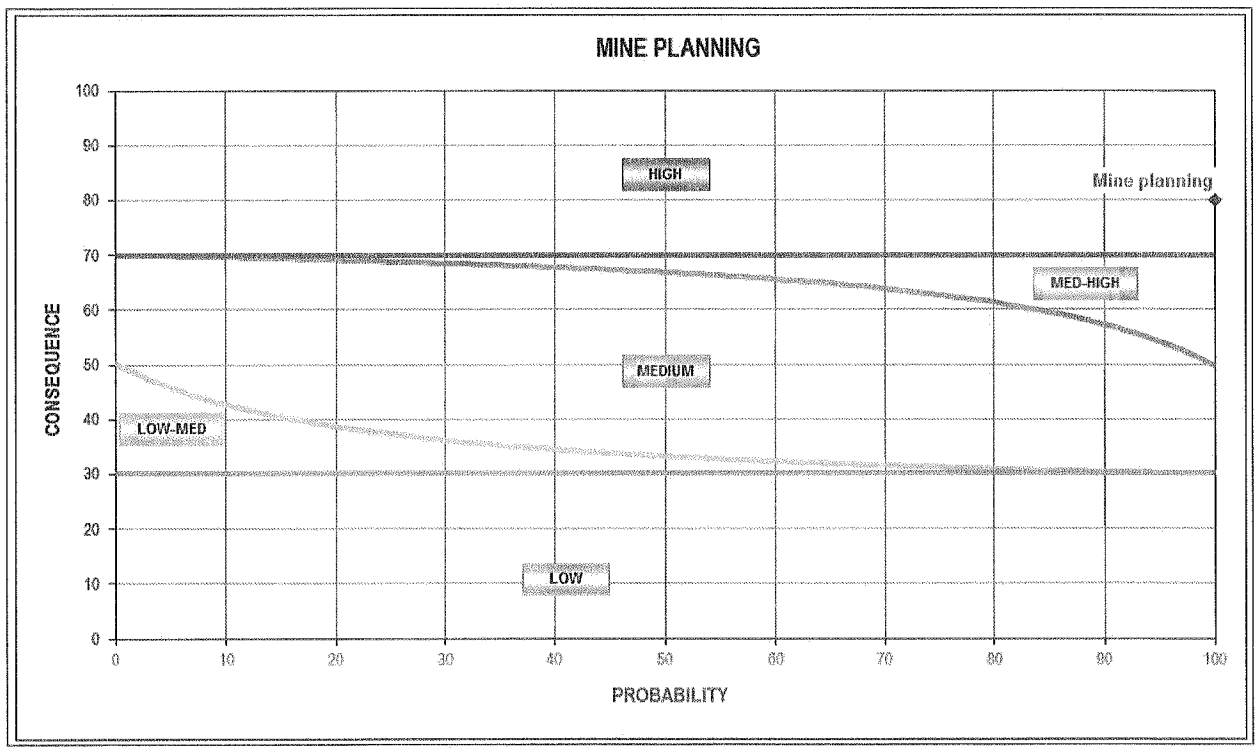
6.1 ENVIRONMENTAL IMPACT ASSESSMENT – MINING DEPARTMENT

The following impact assessment specifically evaluates the impacts of the mining activities as described in **Section 3.1** on the baseline environment at Ulco.

6.1.1 Mine and resource planning

Effective mine planning results in optimal utilisation of mineral resources. Clinker manufacturing is reliant on a specific grade of limestone to be processed. Through mine planning, low and high grade limestone reserves can be blended to generate the ideal grade for Clinker production. Through blending of reserves, there is less geological waste and therefore less impact on the land per ton of clinker generated. The positive impact of mine planning can be summarized as;

✓ Optimal utilisation of mineral resources – which results in the reduction of geological waste and the minimisation of the footprint of the mining impact per ton of clinker produced.



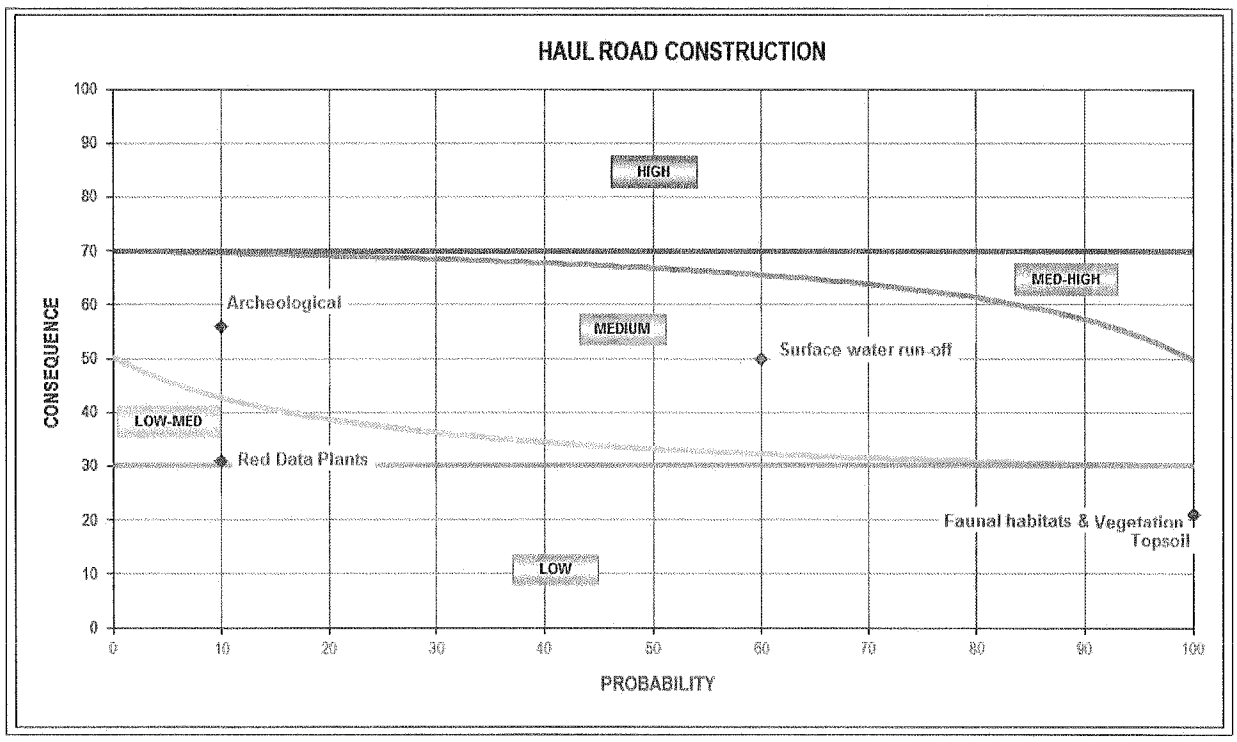
6.1.2 Haul road construction

Haul roads are developed both on mined out surfaces and ahead of the mining face into the undisturbed surrounding land. There are no significant impacts associated with haul roads on mined surfaces. The potential impacts associated with haul road construction ahead of the mining face can be summarised as follows:

DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
* Destruction of **vegetation** and habitats for **faunal** species	Low significance	The small area affected by development of haul roads will have a minimal impact on flora and fauna.
* Destruction of **red data plant** species		A limited number of red data species have been identified in the area of Ulco. Should the haul road be positioned in a manner that has a red data plant, it could be destroyed.
* Loss of **topsoil**	Low significance	During the clearing of the area to create the haul road topsoil may be lost. It is vital to keep topsoil for future rehabilitation. The amount of topsoil associated with haul roads is minimal.
* Potential destruction of **heritage resources**	Medium significance	Should the haul road progress through an identified heritage resource then it could be destroyed resulting in a significant impact.
* Altered **surface water run-off** patterns.	Medium significance	A haul road running through a surface water runoff channel could result in potential flooding or ponding. Storm water runoff requires consideration during the development of haul roads.

Insignificant impacts associated with haul road construction include:

- Noise – Due to the limited noise created and the low frequency of haul road construction activities.
- Tail pipe emissions – Due to the low frequency of haul road construction activities.
- Water pollution – Due to the low frequency of haul road construction activities
- Dust – Due to the limited extent of area being disturbed



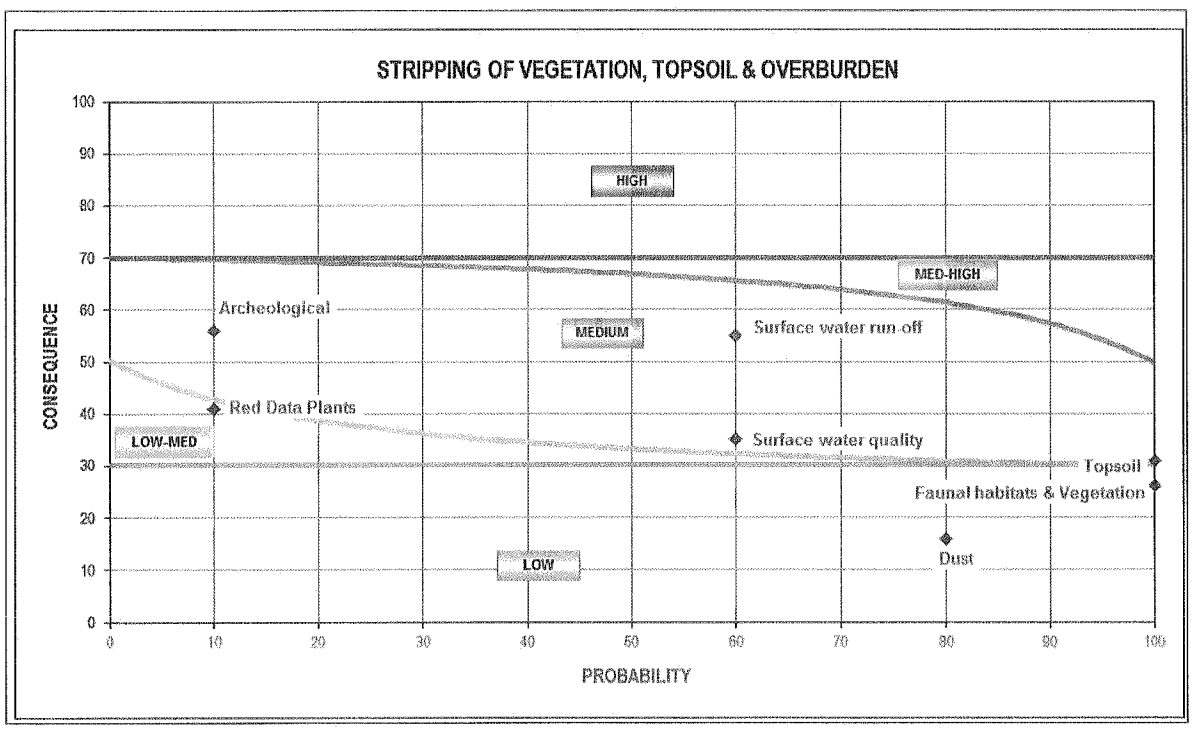
6.1.3 Stripping of Vegetation / Topsoil / Overburden

As the mining face advances into new limestone reserves, the vegetation, topsoil and overburden above the limestone is stripped and used in concurrent rehabilitation. Stripping takes place to approximately 60m ahead of the mining face. The potential negative impacts of these activities include:

DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
* Destruction of **vegetation** and habitats for **faunal** species	Low significance	There are no ecologically unique ecosystems ahead of the mining face however due to the size of the potential area that will be affected by stripping of topsoil and vegetation, the impact is ranked as medium.
* Destruction of **red data plant** species		A limited number of red data plants have been identified. Should stripping occur in an area which has a red data plant, it could be destroyed.
* Sterilisation / Loss of **topsoil**	Medium significance	During the clearing of the area to expose the limestone, topsoil may be lost. It is vital to keep topsoil for future rehabilitation.
* Destruction of **heritage resources**	Medium significance	If the stripping of vegetation goes through an identified heritage resource then it could be destroyed.
* Altered **surface water run-off** patterns.	Medium significance	Clearing of an area which acts as a natural surface run off channel could result in potential flooding or ponding.
* Impact on **water quality**	Medium significance	By disturbing the surface vegetation, runoff will be subjected to increased sediment load which could impact on natural surface water quality.
* Generation of **dust**	Low significance	Earth moving activities required for the stripping of the area will result in dust. The exposed surface left after the area has been stripped of vegetation will act as a potential source for wind blown dust.

Insignificant impacts include;

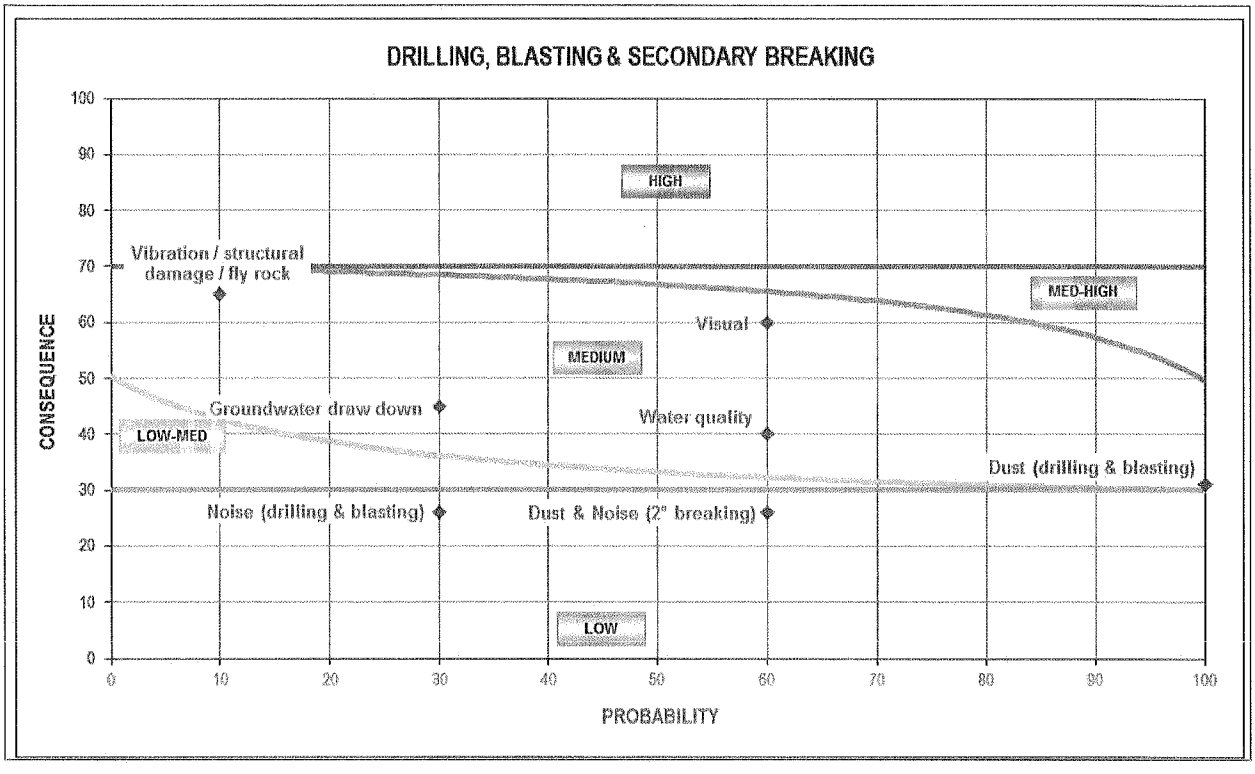
- Noise
- Tailpipe emissions



6.1.4 Drilling and blasting and secondary breaking

Drilling and blasting activities which is required to fragment the rock could result in the following negative impacts;

DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
* **Dust** generated during drilling and blasting.	Medium significance	Dust is generated from the drilling operations. The dust is limited. A cloud of dust will be generated during blasting activities. This cloud of dust could affect the adjacent road.
* **Noise** generated during drilling and blasting	Low significance	All drilling takes place within the quarries. All noise will be contained to within the quarries. The noise of the blast is restricted due to the blasts taking place within the quarries. There are no effected parties in close proximity to the mine who may be affected.
* **Dust and Noise** generated during secondary breaking	Low significance	All secondary breaking takes place within the quarries. The small amount of noise and dust will be confined to the mining area.
* **Visual impact** from the altering of the topography	Medium significance	The purpose of mining activities is to extract the mineral reserves which will have the inevitable effect of altering the topography of the land.
* **Water availability** resulting from groundwater draw down	Medium significance	The lowering of the topography will have an effect of creating a localised geohydrological drawn down which will reduce the availability of water in boreholes in close proximity to the mine.
* **Water pollution**	Medium significance	Explosives are high in nitrates. Potentially the nitrates from the explosive could impact on the quality of the water in boreholes in close proximity to the mine.
* **Fly rock / vibrations**	Medium significance	Fly rock may land on the adjacent road. Vibrations. Due to the distance between the blasting activities and the closest neighbours the potential for an impact from blasting vibrations and fly rock is low.



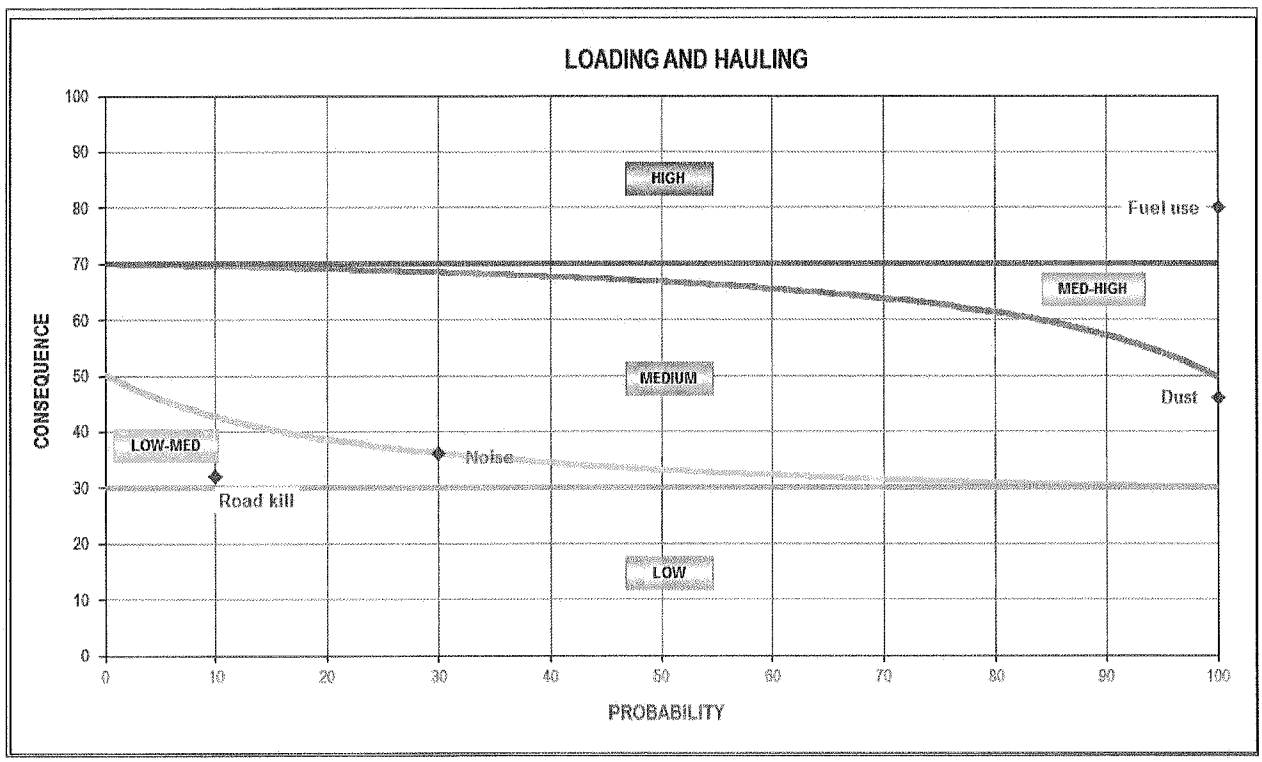
6.1.5 Loading and hauling

The potential impacts associated with loading and hauling of the blasted material from the quarry to the crushing plant is as follows:

DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
* **Dust**	**Medium significance**	Dust is generated during the material handling activities and the transport of the blasted rock along haul roads to the primary crusher.
* **Noise**		Noise is created as a result of the vehicle movements. However due to the remote location of the mine, it is not expected for the noise to impact on anyone.
* **Fuel consumption**	**High significance**	The haulage of material results in use of a non renewable resource (fuel). The impact of the use of a fuel are mainly realised off site.
* **Road kill**		Animals crossing the haul roads could be run over by vehicles.

Insignificant impacts include:

- Water quality through oil spillages / diesel leakages



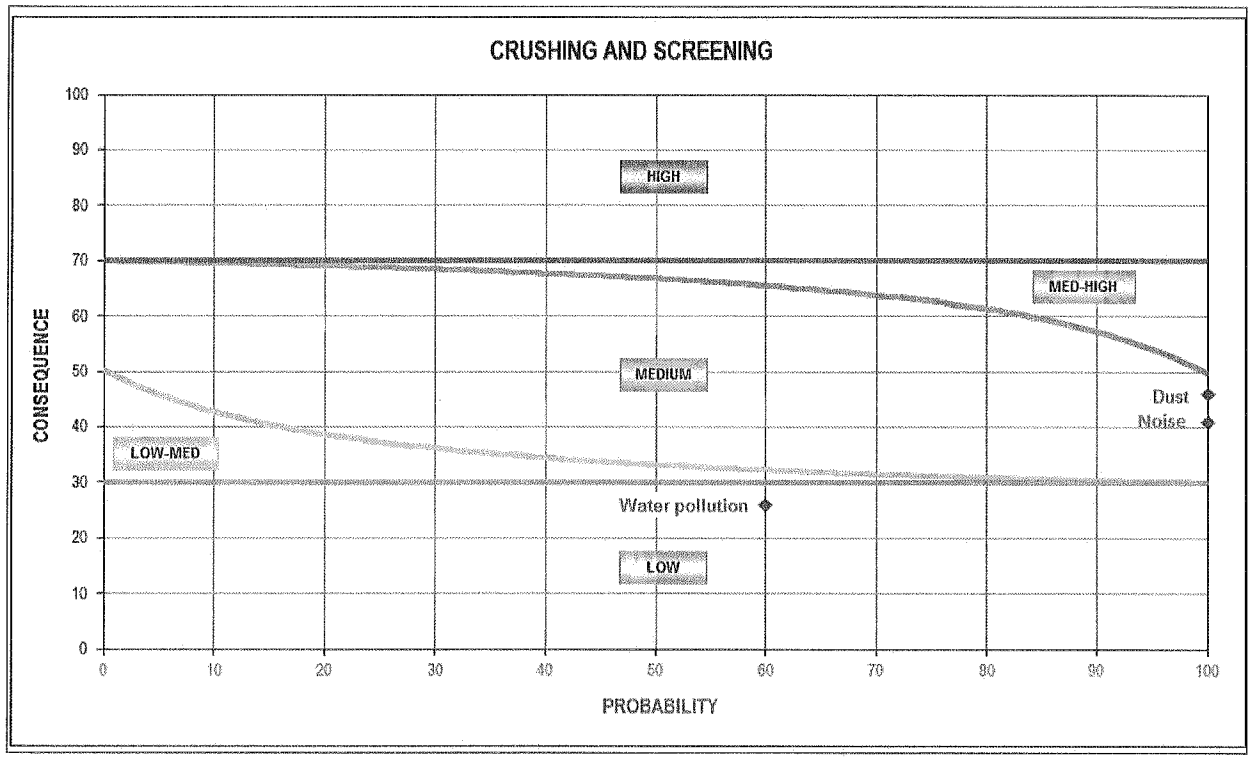
6.1.6 Crushing

The potential impacts associated with the crushing and screening operations are as follows:

DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
* **Dust**	**Medium significance**	Dust is generated during crushing, screening and material handling activities at the crushing plant specifically if the dust extraction equipment is malfunctioning.
* **Noise**	**Medium significance**	Noise is created as a result of crushing activities.
* **Water pollution**	**Low significance**	Storm water runoff from the crushing plant could be affected through oil spillages, diesel leaks and higher sediment loads in surface water runoff.

Insignificant impacts include;

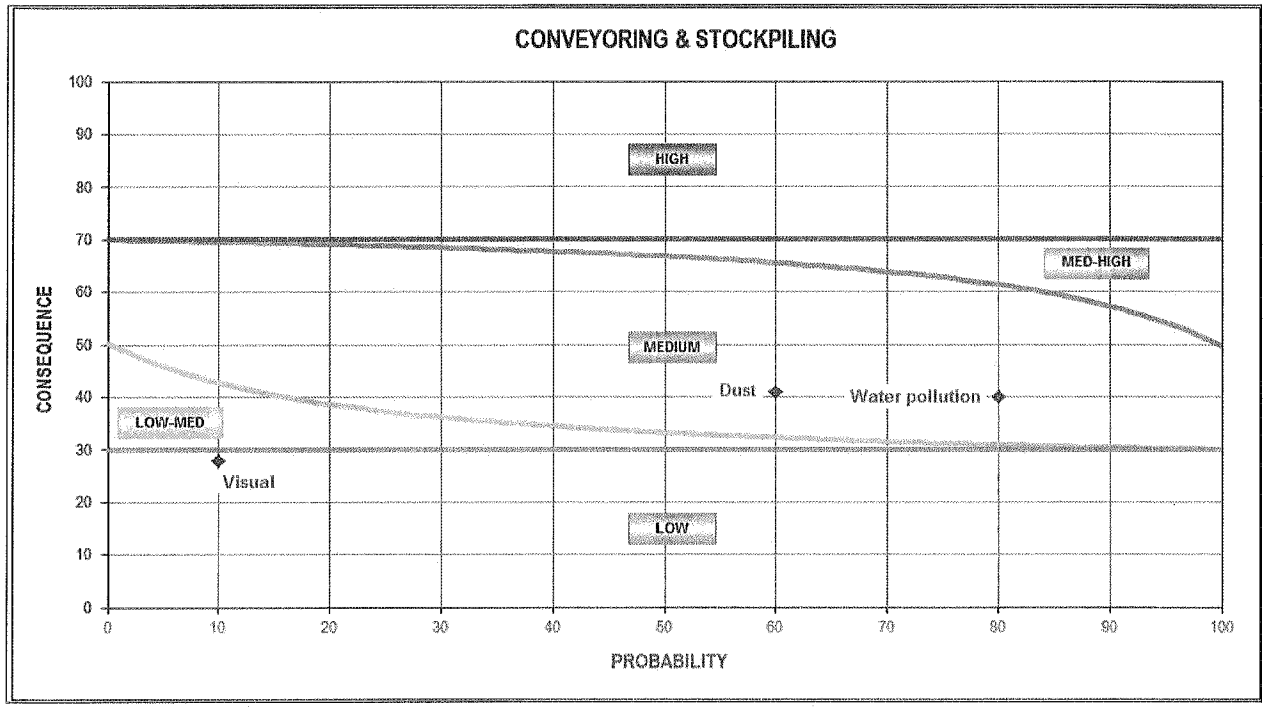
- Visual. Although the crushing and screening plant rise above the natural topography, due to the remote location of the mine the visual impact does not affect anyone.



6.1.7 Conveying and Stockpiling

Conveying and stockpiling will result in the following potential negative impacts;

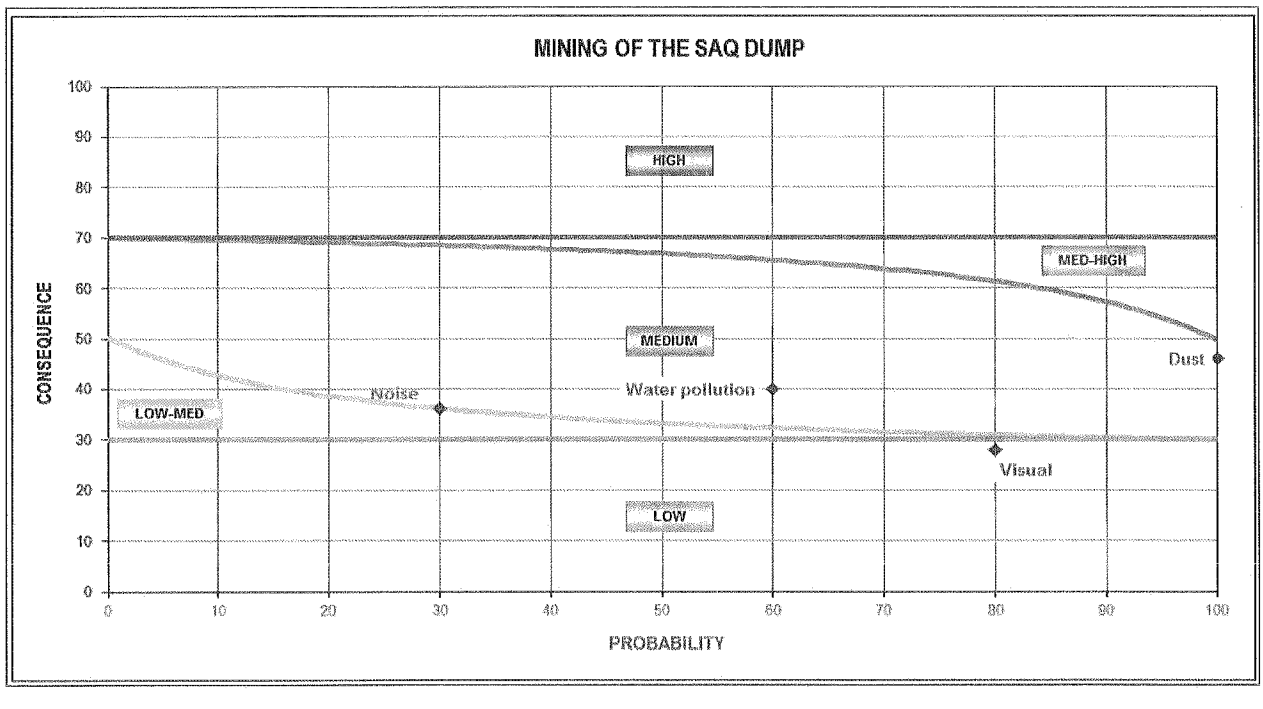
DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
✕ **Dust**	Medium significance	Dust will be created at the transfer points from the crushing operation to the stockpiled. The fact that the conveyor is covered reduces the likelihood of dust being generated.
✕ **Water pollution**	Medium significance	Should the stockpiles not be protected from storm water runoff potentially water with a high sediment load from the stockpile areas could impact on the runoff from the area.
✕ **Visual**	Low significance	Although the stockpiles rise above the natural topography, due to the remote location of the mine the visual impact does not affect anyone



6.1.8 Mining of the SAQ dump

The potential impacts associated with the mining operations at the SAQ dump are as follows:

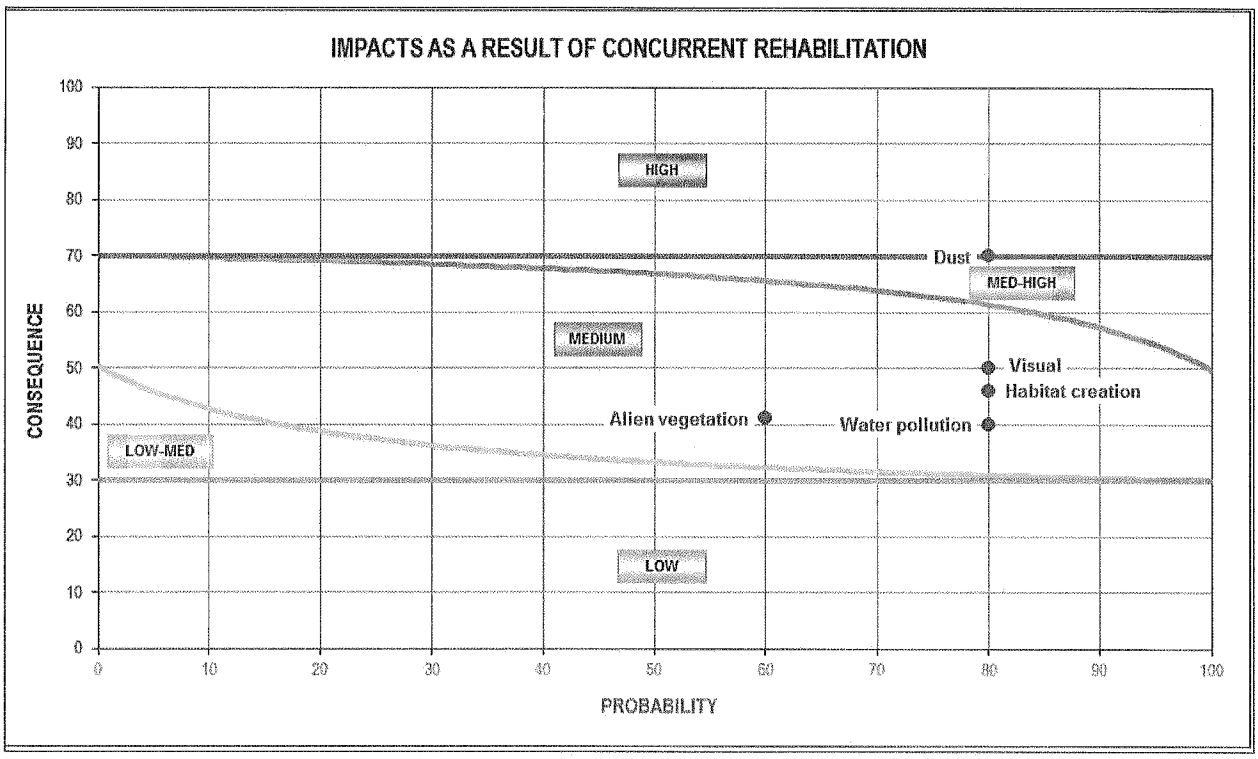
DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
✂ **Dust**	Medium significance	Dust is generated during screening and material handling activities.
✂ **Noise**		Noise is created as a result of screening and vehicle movement activities.
✂ **Water pollution**	Medium significance	Storm water runoff from the SAQ dump could be affected through oil spillages, diesel leaks and higher sediment loads in surface water runoff.
✂ **Visual**	Low significance	The positioning of the SAQ dump renders it to have a minimal visual impact on the surrounding areas.



6.1.9 Concurrent rehabilitation

The positive impacts associated with committing to concurrent rehabilitation are as follows

DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
✓ **Water pollution (reduced)**	Medium significance	Through the vegetation of disturbed area, there is less likely to be high sediment load runoff which could impair on the quality of storm water
✓ **Dust (reduced)**	Medium-high significance	Less exposed areas results in less dust generated from the site during the windy months.
✓ **Alien vegetation / bush encroacher removal**	Medium significance	The removal of alien vegetation / bush encroachers allows indigenous species to establish and eradicate the negative impacts associated with alien vegetation / bush encroachers.
✓ **Visual improvement**	Medium significance	A rehabilitated mine is more visually appealing.
✓ **Creation of habitats**	Medium significance	The recreation of a habitat will encourage the return of indigenous faunal species.



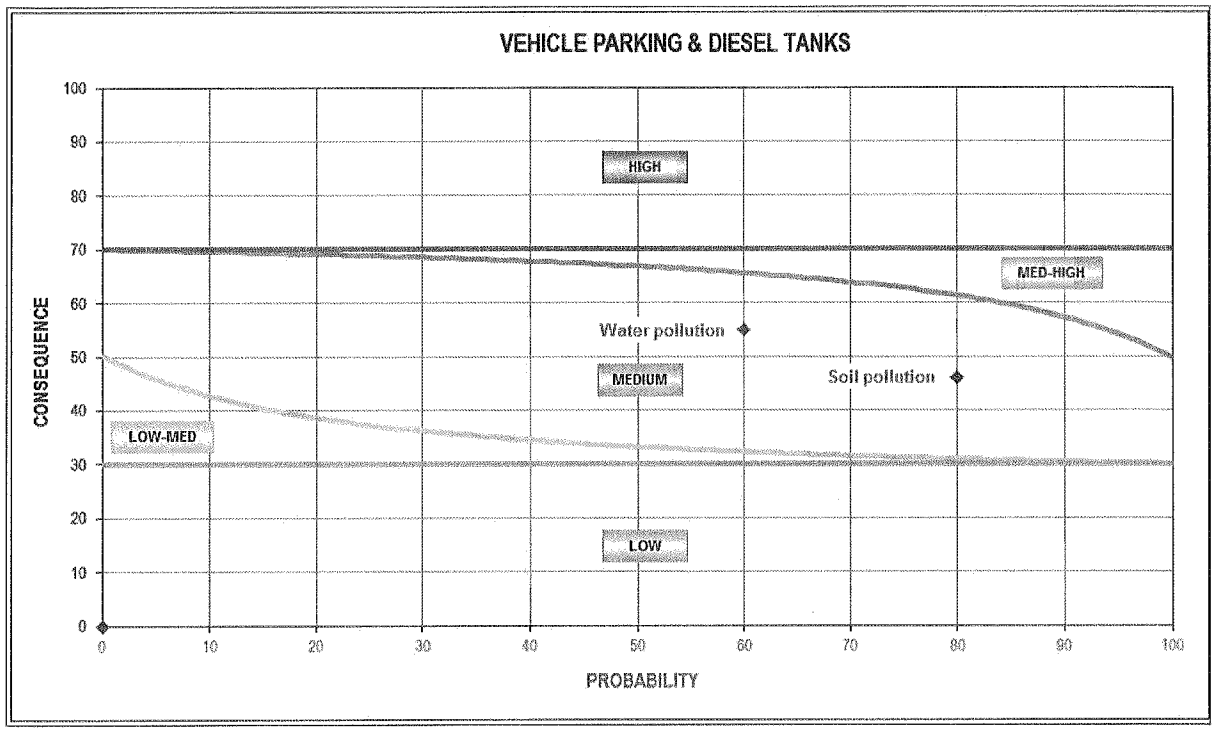
6.1.10 Mining supporting services

Fuel depot / Vehicle parking area

The day to day impacts associated with the diesel tanks, the refuelling of the vehicles and the vehicle parking area for the mine are listed below:

DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
✗ **Water quality**	Medium significance	Small spills and leaks of diesel from the refuelling process or from leaks on the vehicles could result in polluting storm water.
✗ **Soil pollution**	Medium significance	Continuous small spillages around the fuel dispensing area will result in localised sol contamination.

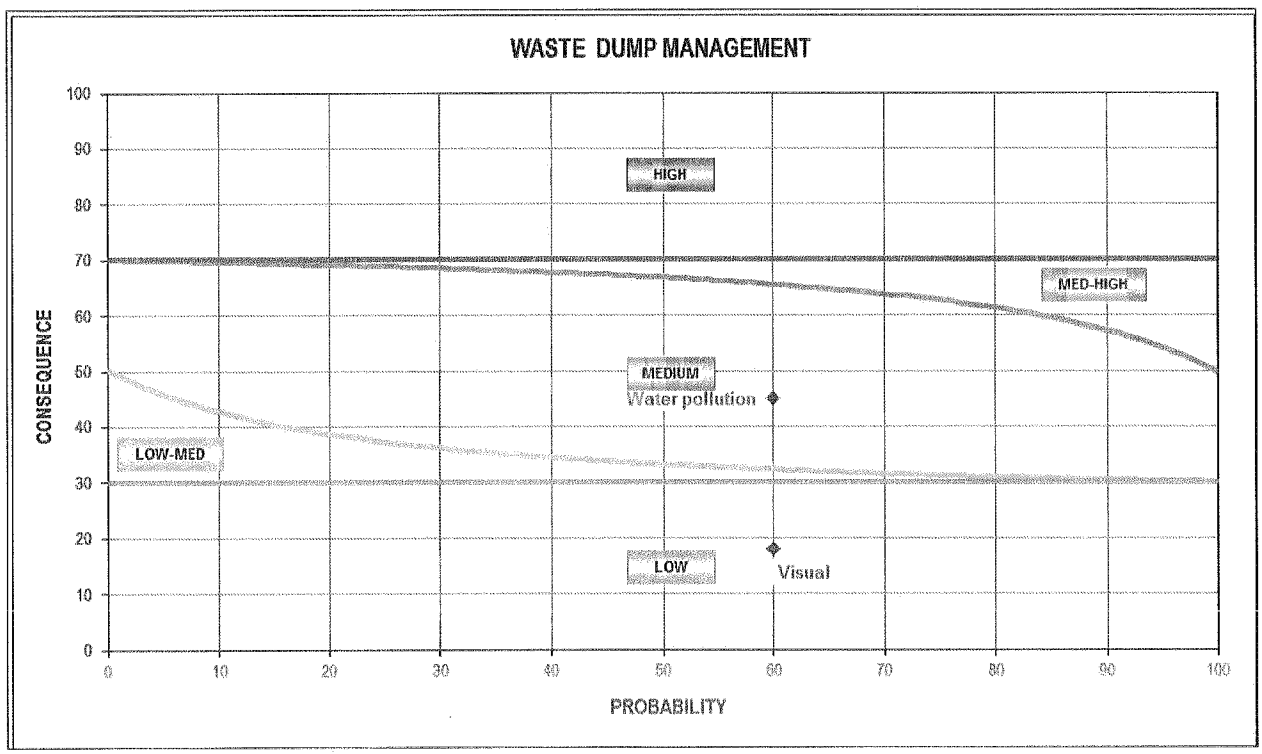
See impact assessment below for both of the above activities.



Waste dump site

The mining department are responsible for the management of the waste dump site. Should it not be managed effectively the following impacts could occur

DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
* **Water quality**	Medium significance	Should hazardous waste be dumped, then with the Infiltration of rain water there may be an impact on the quality of the ground water.
* **Visual impact**	Low significance	Poor management and access control of the waste dump could lead to uncontrolled dumping of waste which would then have a visual impact.



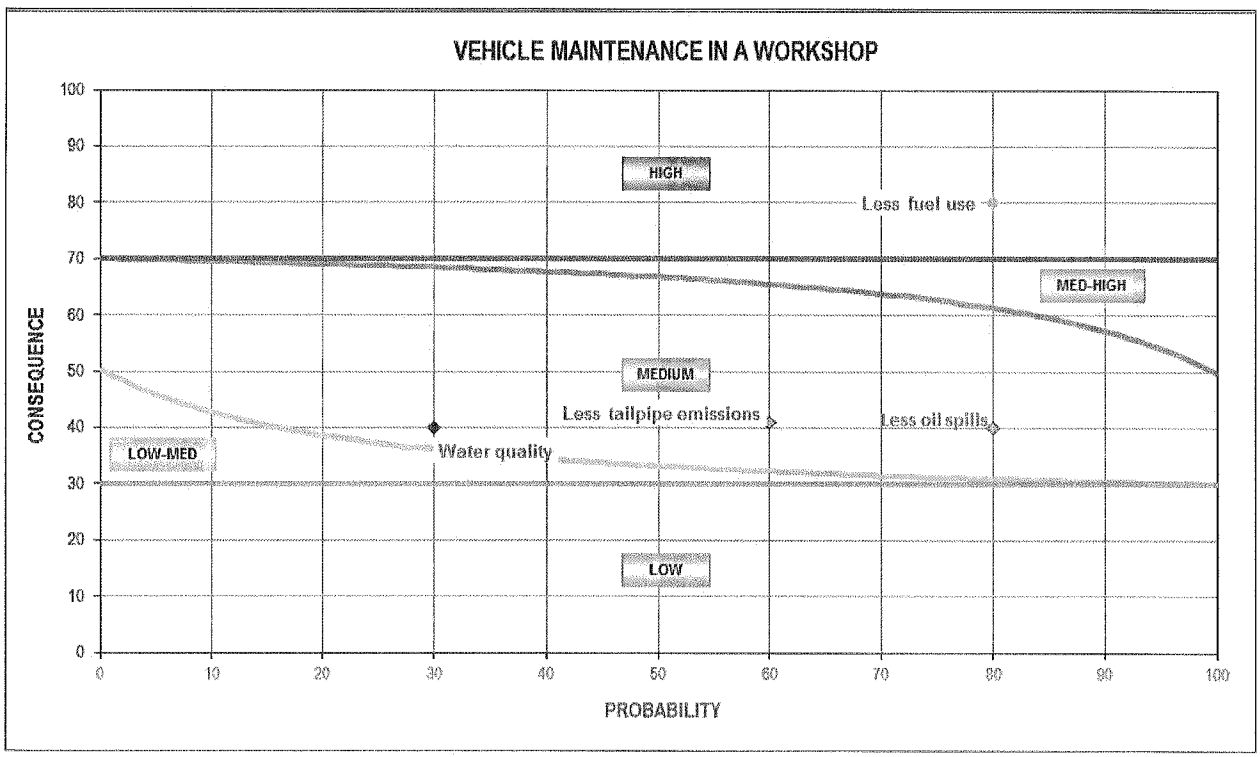
Administration

No negative environmental impacts associated with the mining administration facilities. The impacts associated with waste from this area are covered in the waste management section (**Section 6.9**).

Vehicle maintenance

The potential impacts associated with the vehicle maintenance are;

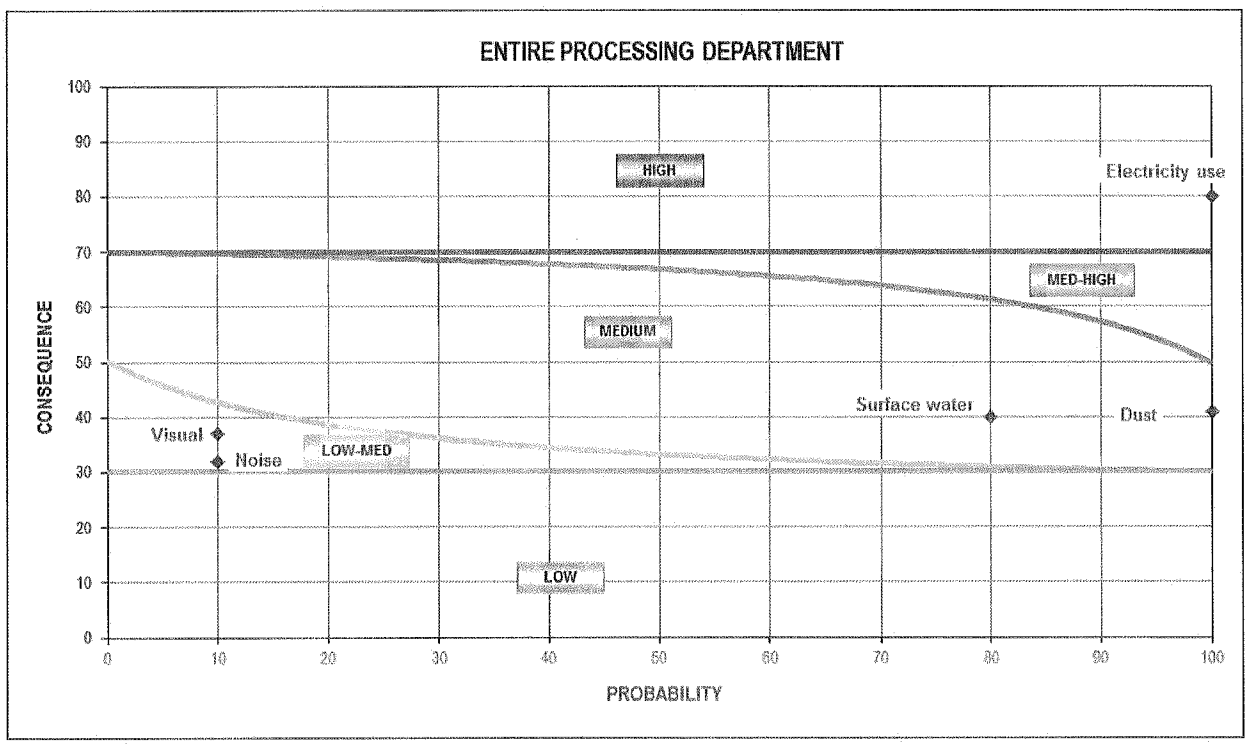
DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
✗ **Water / soil pollution**	**Medium significance**	Oil and diesel spillages at the workshop not being contained properly and running off concreted areas resulting in both potential soil and water pollution.
✓ **Reduce likelihood of a spillage**	**Medium significance**	Through implementing the maintenance activities, it is reducing the likelihood of a spillage or leak occurring during the use of the vehicle for its intended purposes.
✓ **Improve fuel efficiency**	**High significance**	Through implementing the maintenance activities, the fuel efficiency of the vehicle is maximised.
✓ **Reduce tailpipe emissions**	**Medium significance**	Through implementing the maintenance activities, the tailpipe emissions are controlled.



6.2 Environmental Impact Assessment – Process Department

The following section provides an indication of the impacts associated with the processing department. Initially the generic impacts associated with the whole of the Ulco plant is shown followed by the impacts of the activities described in **Section 3**. A generic impact is an impact that occurs from more than one activity within the Department. The generic negative impacts associated with the whole of the Processing Department can be described as:

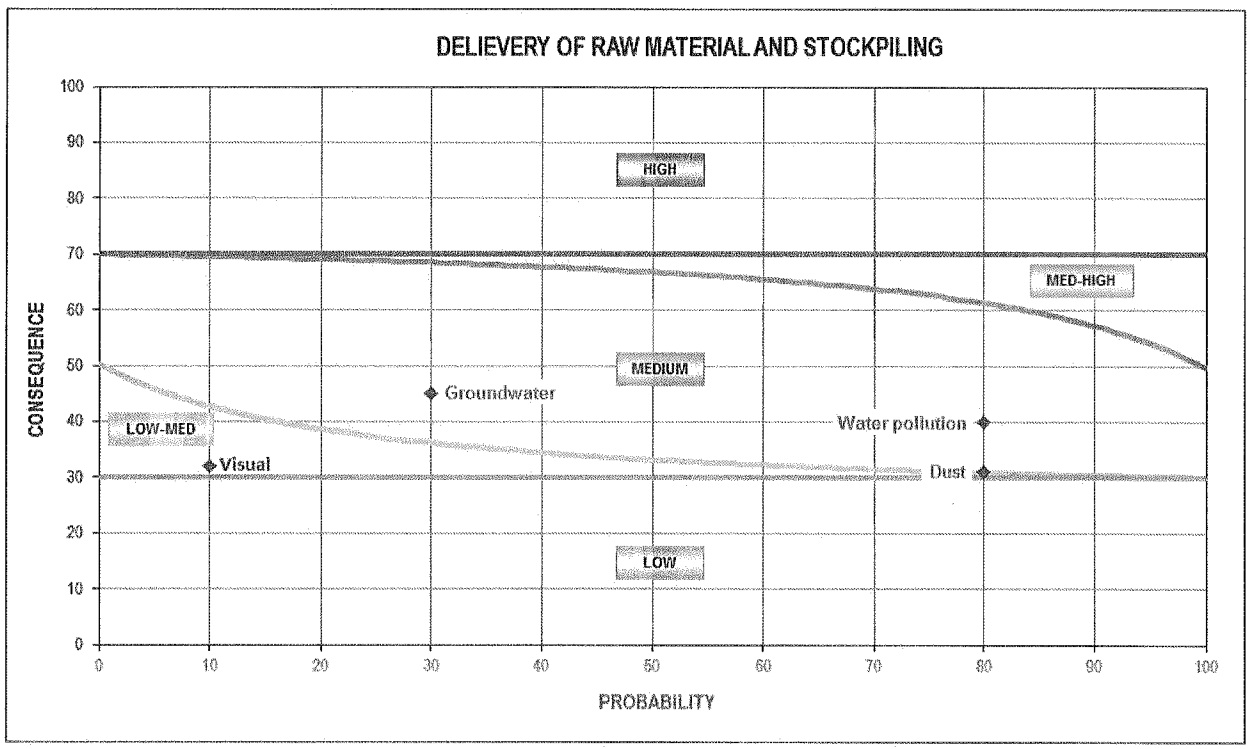
Description of the impact	Overall significance ranking	Explanation
* **Dust**	**Medium significance**	Dust is generated from the following point associated with the Process Department: • Raw material stockpiles • Product spillages on exposed surfaces • All conveyors and transfer points • The raw mills, coal mills & cement mills • Over pressure from the preheater • Kiln, clinker and cement silos • Open air clinker stockpile
* **Surface water pollution**	**Medium significance**	The dust created as a result of the processing of the material to produce clinker could result in fines been washed away in storm water. In addition pollution from industrial activities could impact on storm water
* **Visual impact**		The plant is visual from approximately 25km. However due to the remote location of the mine, this visual impact is not regarded as significant.
* **Noise**		Noise from the general running of the plant
* **Electrical usage**	**High significance**	High electrical needs through the running of the plant (specifically the mills and the kiln) results in significant offsite impacts associate with the generation of electricity



6.2.1 Raw materials delivery and storage

The potential negative impacts associated with the delivery and storage of the raw materials (iron ore / magnetite and carboneous SPL) are;

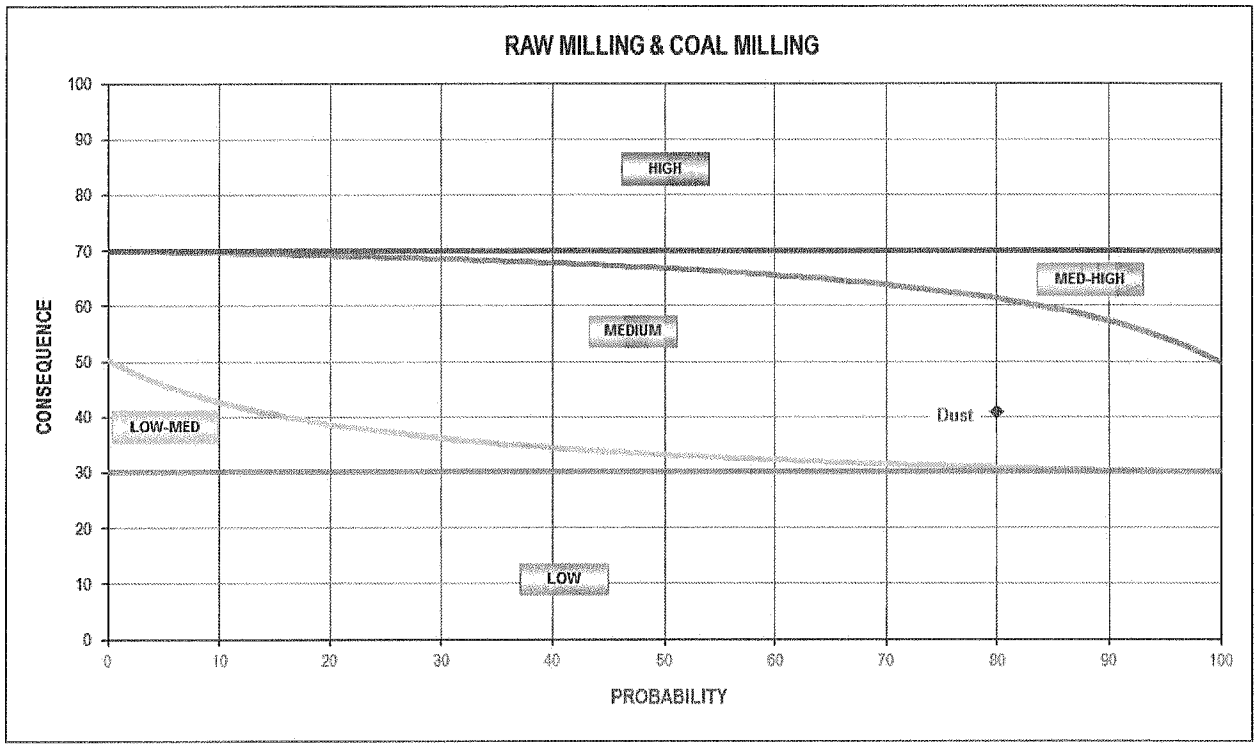
DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
* **Dust**		Small amounts of dust will be generated during the material handling of the raw materials.
* **Surface water pollution**	**Medium significance**	Surface water could be polluted from storm water runoff coming into contact with the respective stockpiles.
* **Ground water pollution**	**Medium significance**	If the material is not stored on a protected surface, then groundwater could potentially become polluted through infiltration of water through the stockpiles. This is particularly applicable for the SPL material and the coal stockpile area.
* **Visual Impact**		The raw material stockpiles are elevated and could represent a minimal visual impact



6.2.2 Recovery of raw material and raw milling

The potential negative impacts associated with the recovery of raw materials from their respective stockpiles, the conveying of the raw material to the proportioning plant and the milling of the raw material in the raw mill is;

DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
* **Dust**	**Medium significance**	Dust will be generated during the material handling operations.



Insignificant impacts include;

- Noise. Although the milling process is noisy and needs to be considered from an occupational health and safety point of view, the noise from the mill will not impact outside the boundaries of the mine.
- Surface water. The potential for fines to pollute surface water runoff is already covered in the generic section.

6.2.3 Coal milling

The potential negative impacts associated with the handling of the coal for coal milling purposes are;

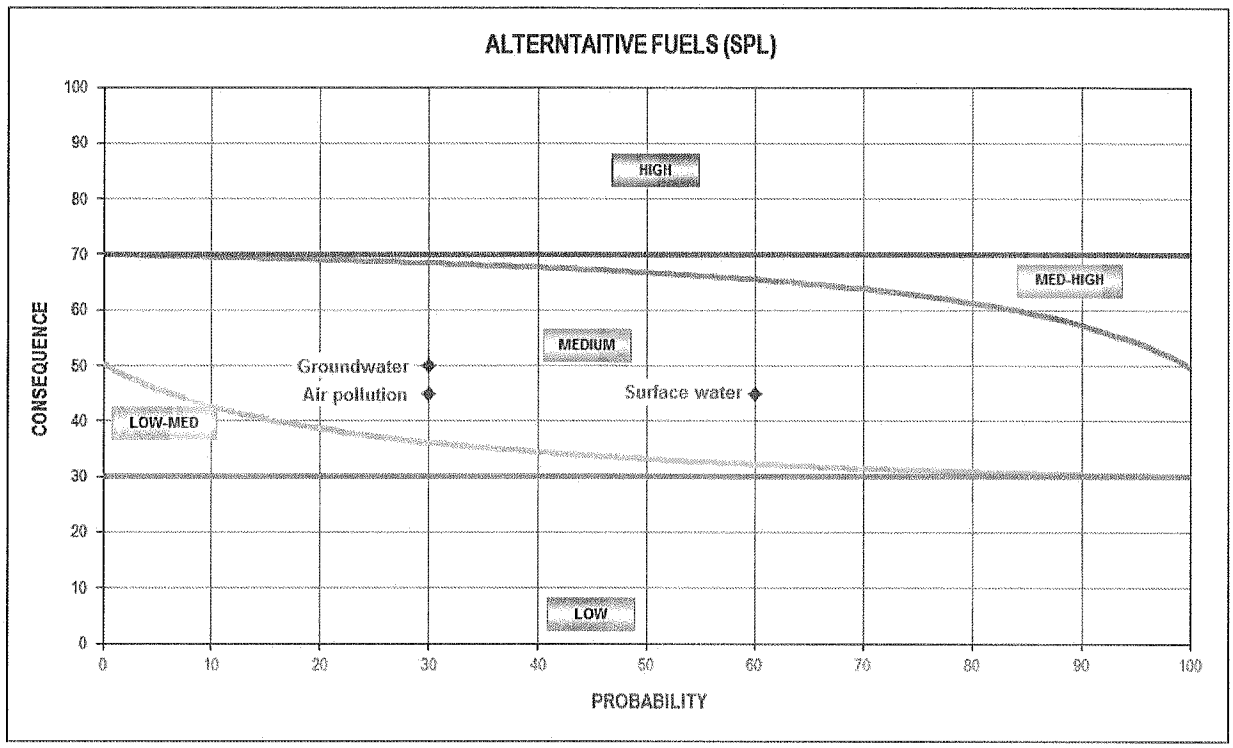
DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
✕ **Dust**	**Medium significance**	Dust will be generated during the material handling operations.

See impact assessment graph above.

6.2.4 Alternative fuel sources – SPL

The potential negative impacts associated with the delivery, storage and use of the carboneous SPL and other alternative fuels are;

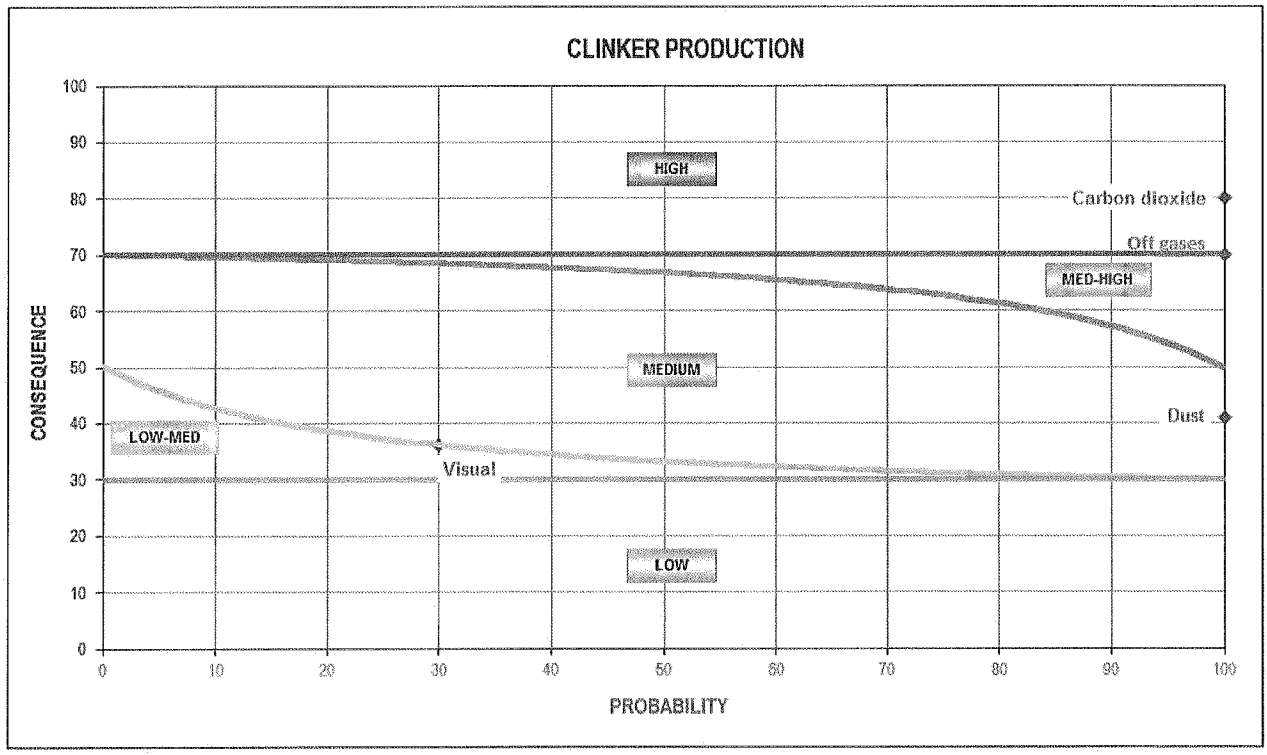
DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
✕ **Surface water pollution**	**Medium significance**	If the SPL or the other alternative fuel sources are not protected from surface water run off, then the material could potentially pollute the runoff from the site.
✕ **Groundwater pollution**	**Medium significance**	If there is infiltration of water which has come into contact with the SPL, then there could be an impact on the quality of the groundwater
✕ **Air pollution**	**Medium significance**	Should the quantities of either the SPL or other alternative fuels used within the kiln be above acceptable limited, then there could be an impact on the quality of the emissions from the kiln.



6.2.5 Clinker production

The potential negative impacts associated with the generation of clinker through the cement kiln at Ulco are;

DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
✕ **Carbon dioxide emissions**	**High significance**	Carbon dioxide is released during the calcination process. This carbon dioxide is released into the environment. Carbon dioxide is one of the main contributors to greenhouse gases and global warming.
✕ **Other off gaseous emissions**	**High significance**	Other gases such as Nox, Sox, dioxins and furans are release during the burning process. These gaseous emissions can potentially have a significant impact to the environment.
✕ **Dust and PM10**	**Medium significance**	In addition to gases, particulates (dust) are released during the process.
✕ **Visual**		The silo's, pre-heater towers, mill are all housed in buildings which rise considerably above the natural topography. These buildings are visual.



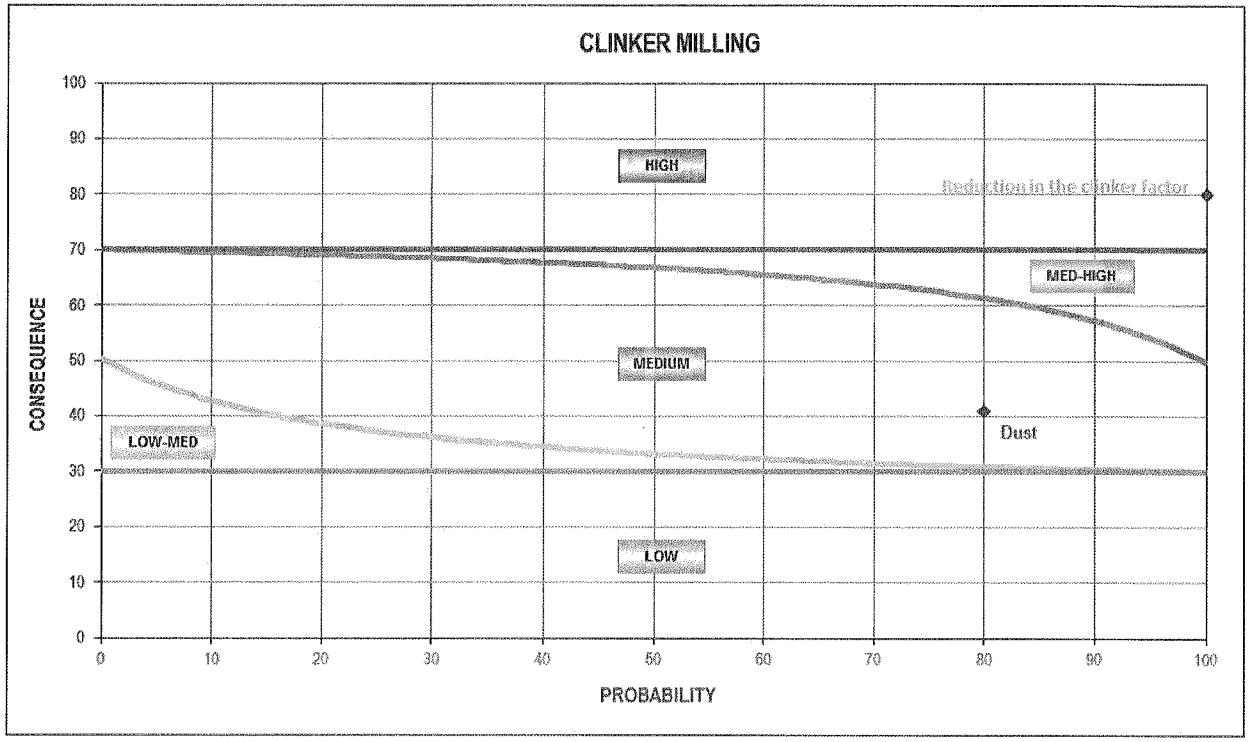
6.2.6 Clinker milling and cement storage

The potential impacts associated with the milling of the clinker in the cement mill are;

DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
× **Dust**	**Medium significance**	Dust will be generated during the milling process
✓ **Reduce the amount of CO2 per ton of cement**	**High significance**	If the amount of clinker required to generate a ton of cement is reduced through the addition of an extender, effectively the amount of CO_2 per ton of cement is reduced. This is referred to as reducing the clinker factor.

Insignificant impacts include;

- Noise. Although the milling process is noisy and needs to be considered from an occupational health and safety point of view, the noise from the mill will not impact outside the boundaries of the mine.
- Surface water. The potential for fines to pollute surface water runoff is already covered in the generic section.

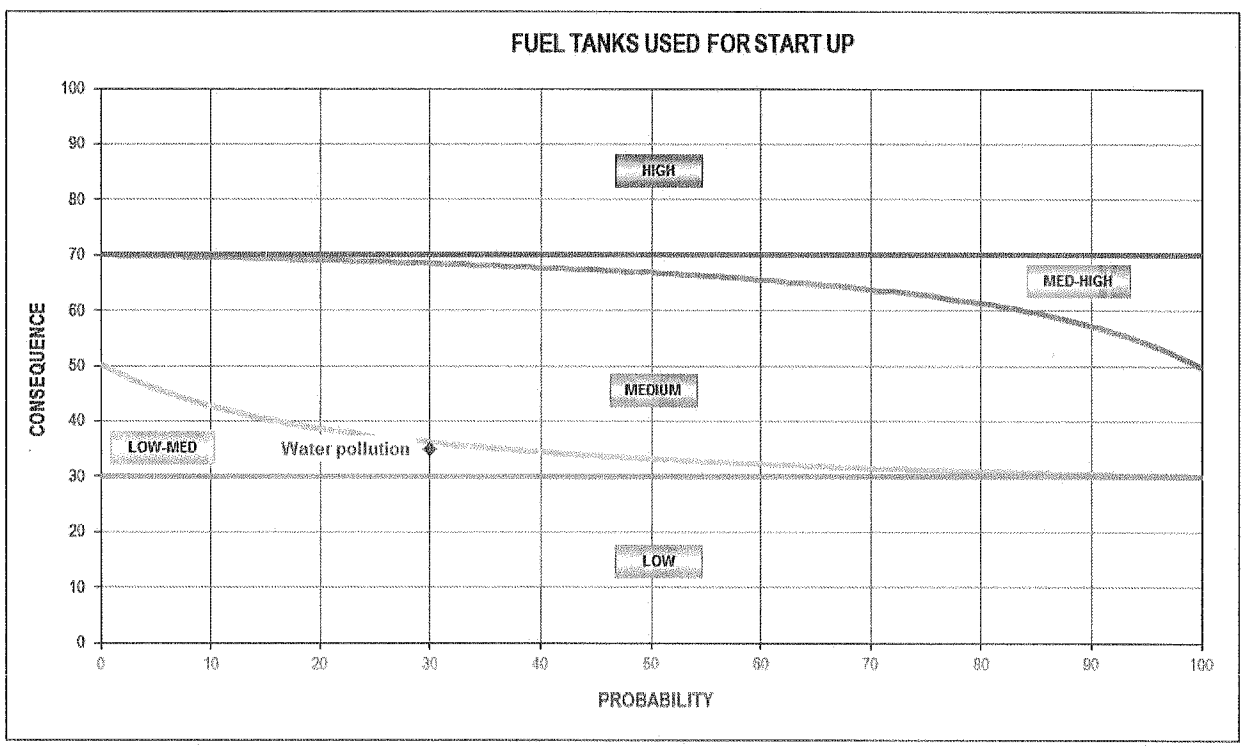


6.2.7 Process supporting services

Fuel tank

The potential negative impact associated with the fuel depot in the processing department is;

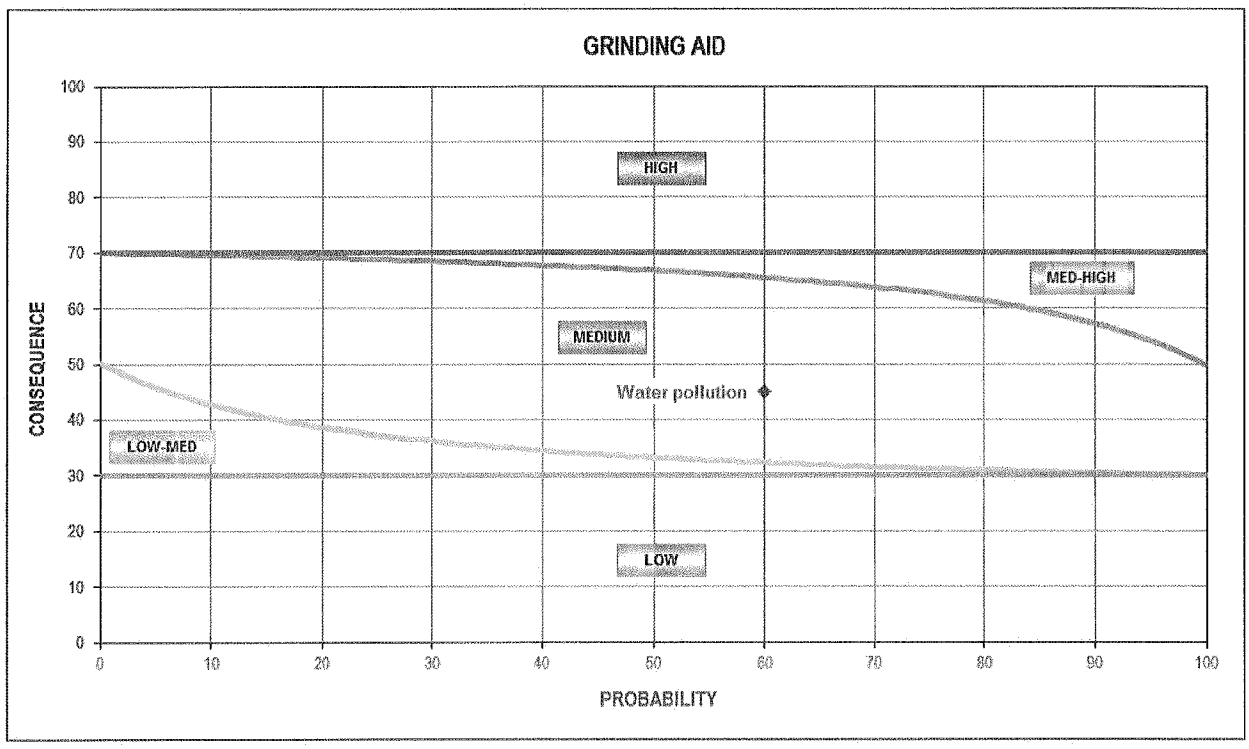
DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
✕ **Water and soil pollution**		The fuel tank is already contained within a bunded facility and hence the likelihood of a spill affecting the environment is extremely low.



Grinding Aid

The potential negative impact associated with the grinding aid in the processing department is;

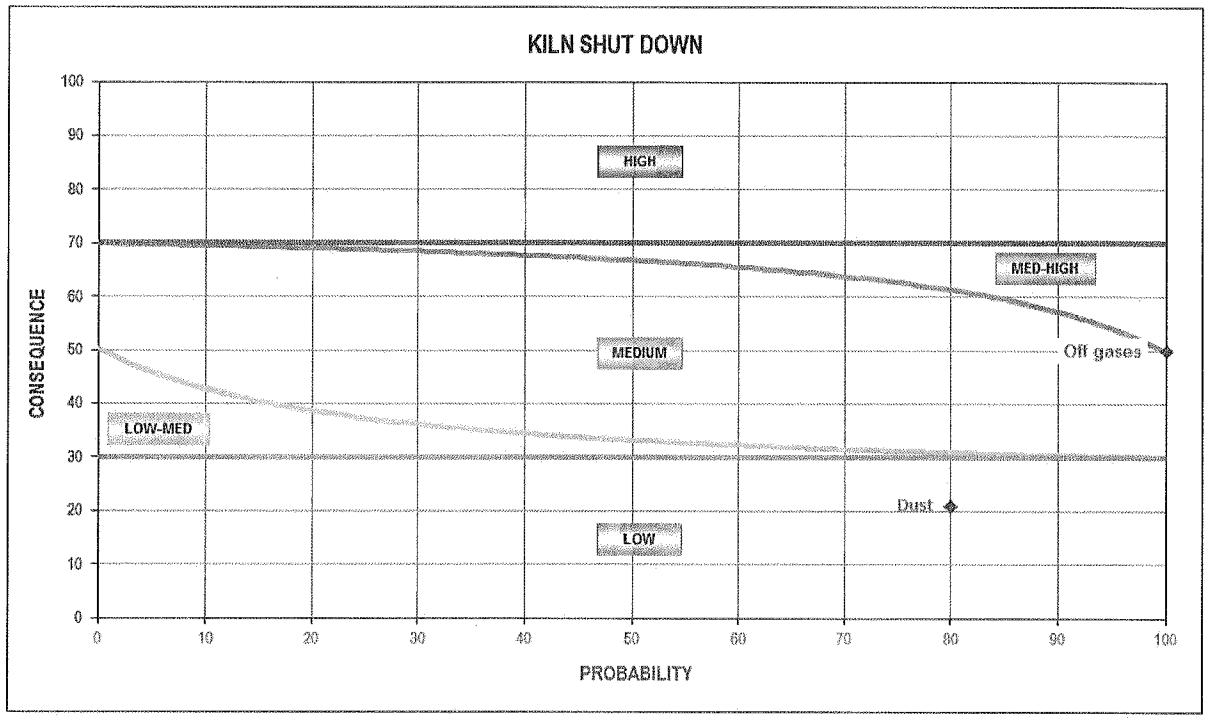
DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
* **Water pollution**	Medium significance	Should there be a spill of the grinding media used in the cement mills, this could result in pollution of the storm water leaving the site.



Kiln shutdown / maintenance

The impacts associated with the waste generated from the kiln shutdown process are covered under the waste management sections. The other negative impacts associated with the shutdown activities required for kiln maintenance are:

DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
* **Other off gaseous emissions**	Medium-high significance	Other gases such as Nox, Sox, dioxins and furans are released during the cooling down and heating up process. These gaseous emissions can potentially have a significant impact to the environment.
* **Dust and PM10**	Low significance	In addition to gases, particulates (dust) are released during the process.



Electricity usage

The recognition of the off-site impacts associated with the generation of electricity (coal mining / emissions from power plants) has been assessed in the overall processing impacts shown at the beginning of this section.

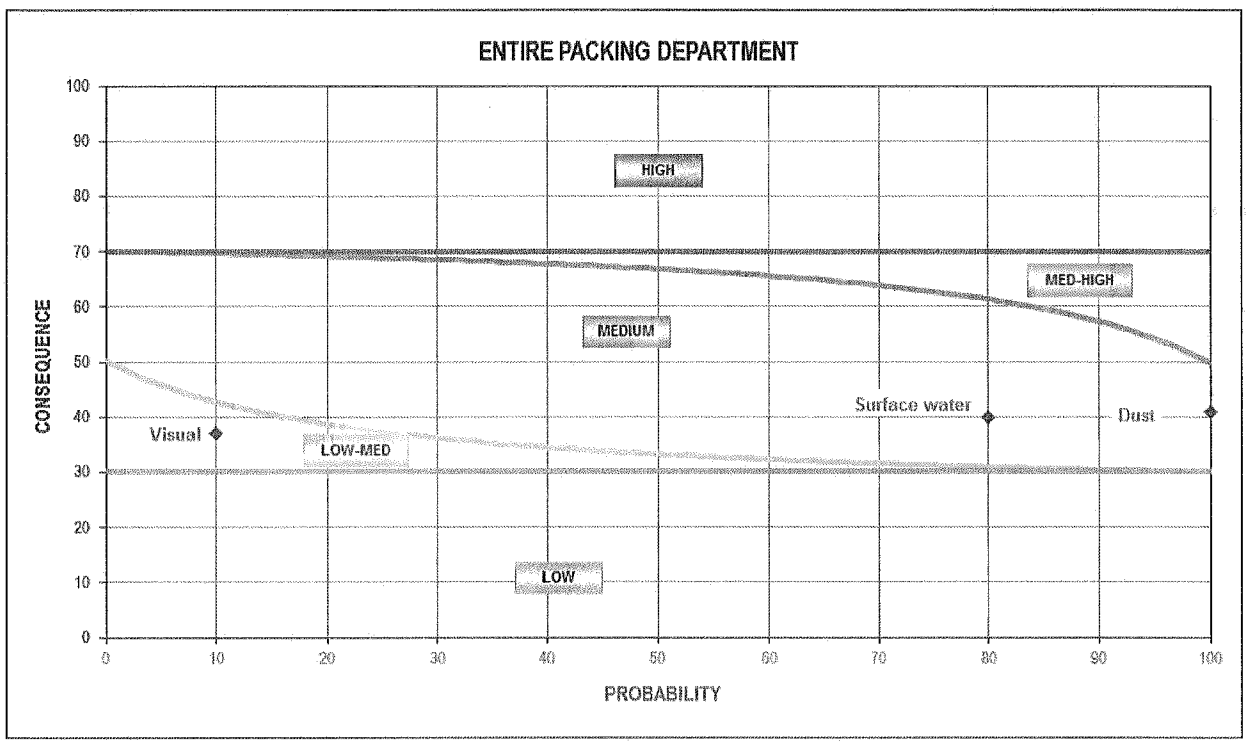
Water Reservoirs

There are no significant impacts associated with the small use of water for the cooling of equipment within the processing plant. The overall impact of water use is covered under a separate heading.

6.3 Environmental Impact Assessment – Packaging and Dispatch

The following section provides an indication of the impacts associated with the packaging and dispatch department. Initially the generic impacts associated with the whole of the department are shown followed by the impacts of the activities described in **Section 3**. A generic impact is an impact that occurs from more than one activity within the Department. The generic negative impacts associated with the whole of the packaging and dispatch Department can be described as:

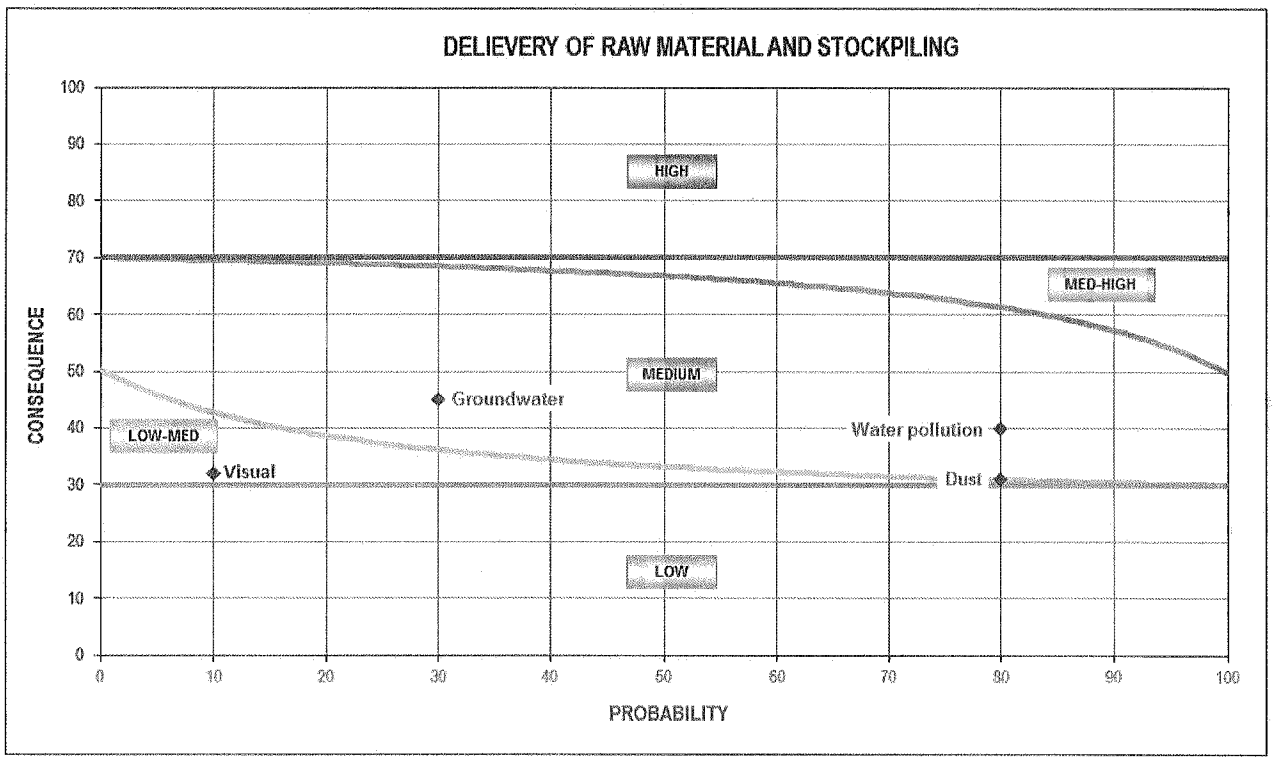
Description of the impact	Overall significance ranking	Explanation
✕ **Dust**	**Medium significance**	Dust is generated from the following point associated with the packaging and dispatch department: • Tippler and stockpiles • Cement loading activities • Packaging plant • Exposed surfaces • Product spillages on exposed surfaces • All conveyors and transfer points • Vehicle movement on internal roads
✕ **Surface water pollution**	**Medium significance**	The fine dust created as a result of the small cement spills could result in fines been washed away in rain water during storm events.
✕ **Visual impact**		The silos are visual from approximately 25km. However due to the remote location of the mine, this visual impact is not regarded as significant.



6.3.1 Receipt of coal and gypsum from the tippler

The potential negative impacts associated with receipt of both the coal, char and the gypsum from the tippler / trucks onto their respective stockpiles are;

DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
✕ **Dust**		Dust will be generated during the material handling operations and at the transfer points.
✕ **Visual**		The stockpiles are visible.
✕ **Water pollution**	**Medium significance**	If the stockpiles are not protected from surface water runoff, then the surface water could potentially become polluted from the coal / char stockpile.
✕ **Ground water**	**Medium significance**	If there is infiltration of water which has come into contact with the coal / char stockpiles, then there could be an impact on the quality of the groundwater



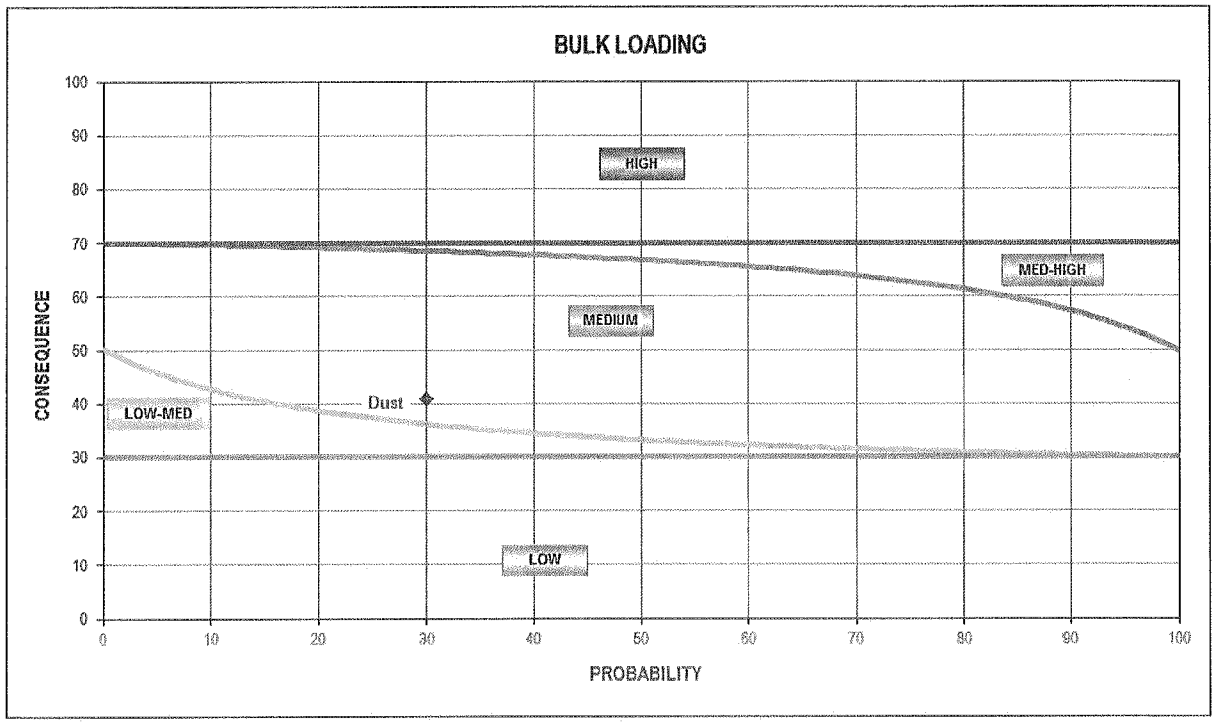
6.3.2 Bulk loading

The potential negative impact associated with bulk loading of cement is;

DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
✕ **Dust**	**Medium significance**	There is a chance of numerous small spillages during the bulk loading process resulting in fines acting as a source of dust.

Insignificant impacts include;

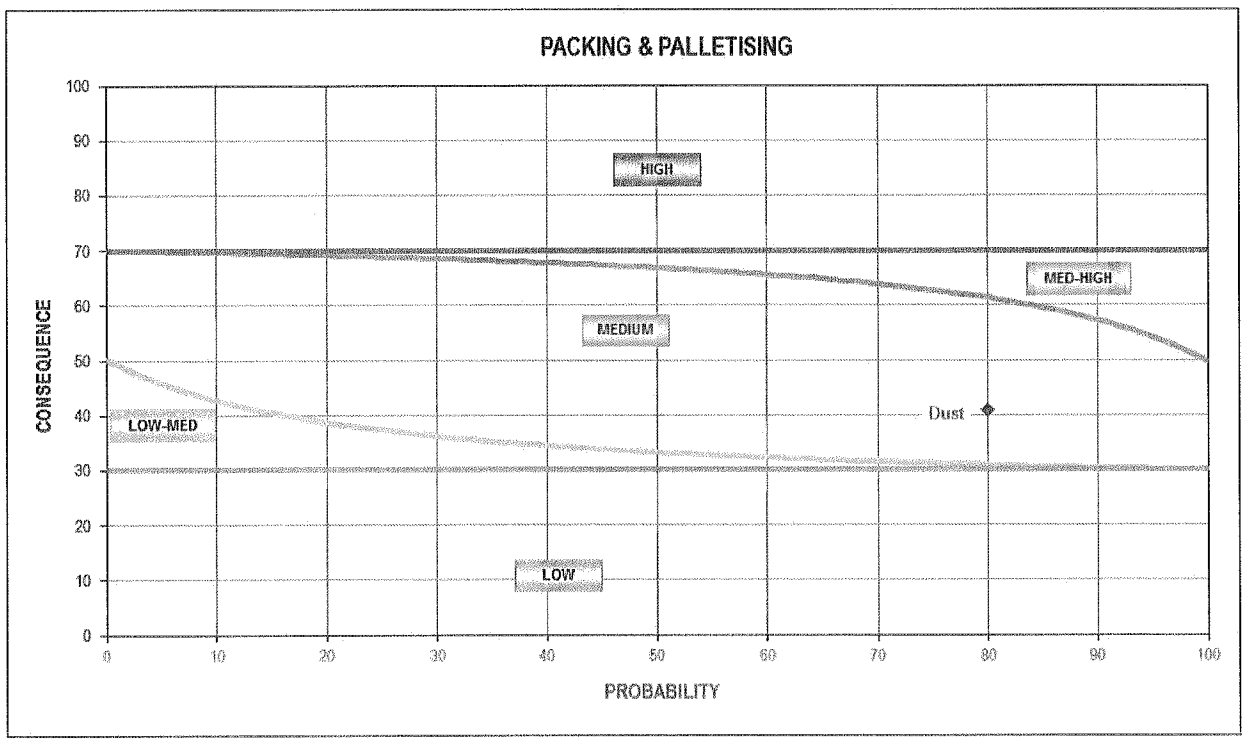
- Surface water. The potential for fines to pollute surface water runoff is already covered in the generic section.



6.3.3 Packaging and palletising

The potential negative impact associated with packaging and palletising is;

DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
× **Dust**	**Medium significance**	The packaging process results in dust emissions from cement spillages and broken bags.

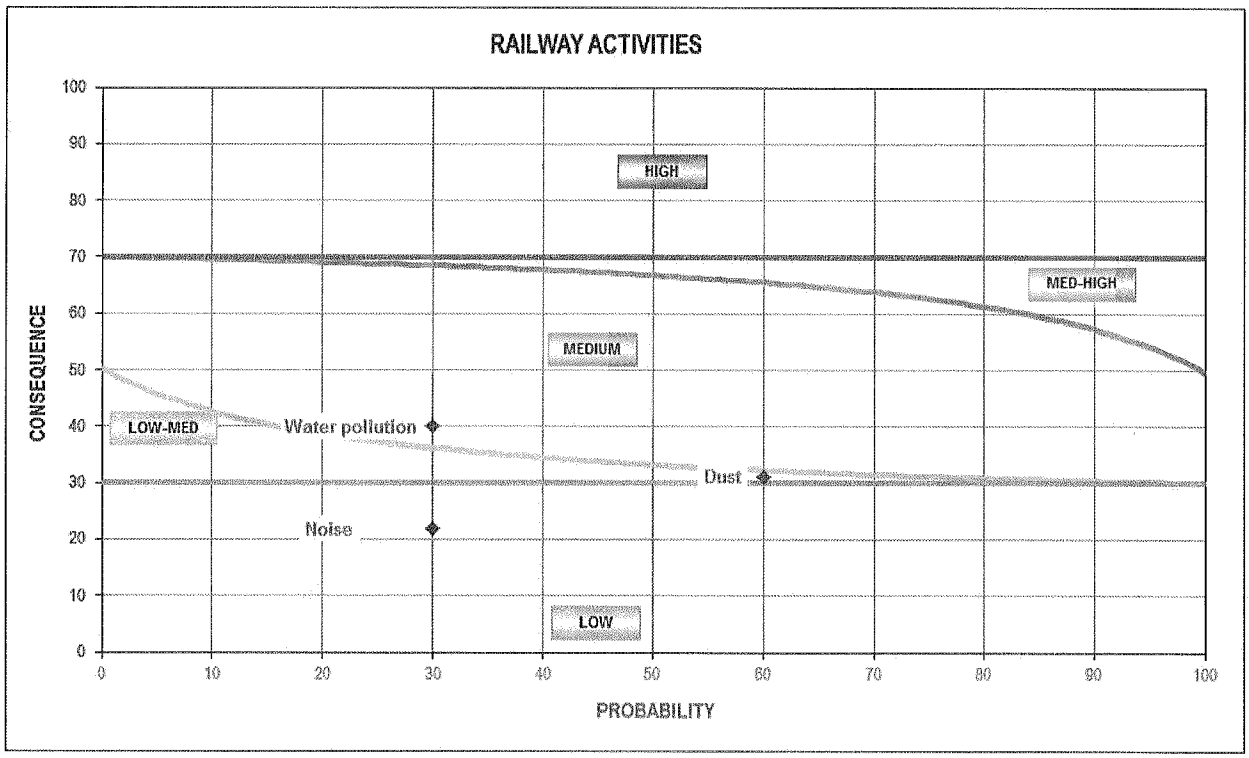


- Impacts associated with waste (broken bags, plastic, broken pallets) is dealt with in Section 6.9

6.3.4 Railway activities

The potential negative impacts associated with railway activities are:

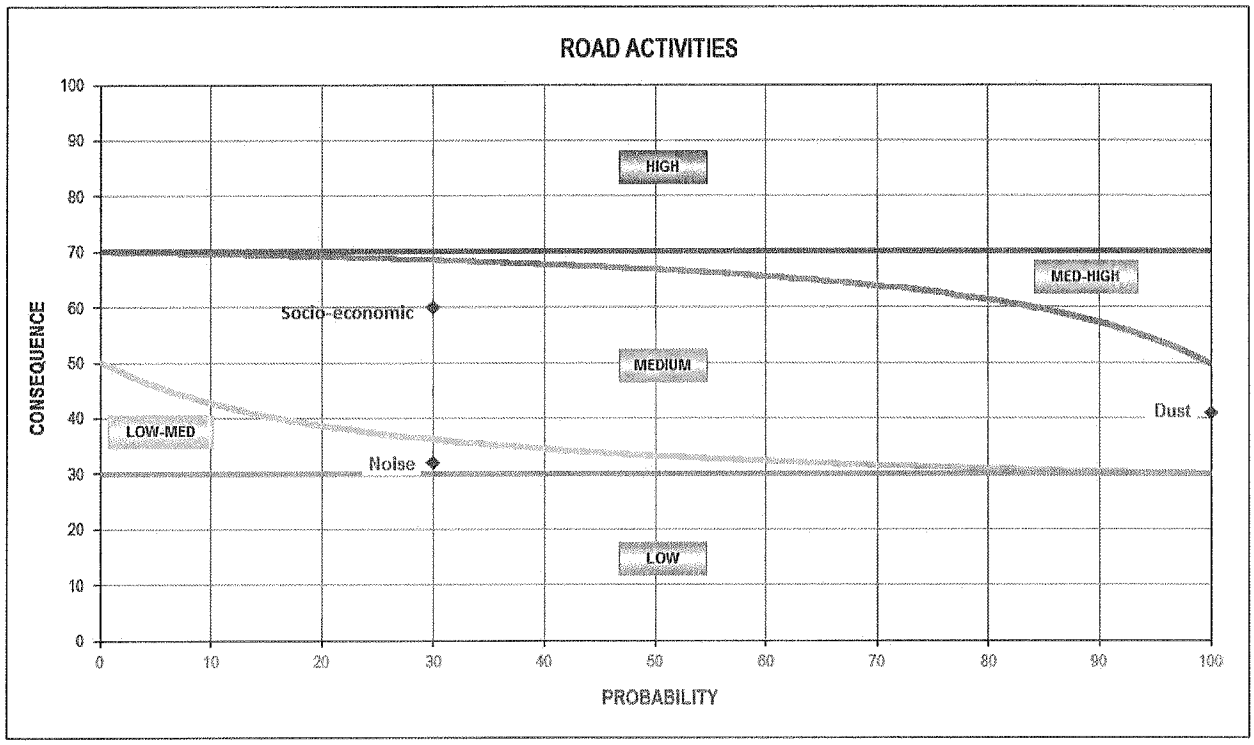
DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
× **Dust**		The process of both unloading from the tippler and loading rail wagons could result in dust emissions.
× **Noise**	Low significance	Shunting exercises of the rail wagons are noisy, however due to the remote location of the mine, the impact of this noise is limited.
× **Water pollution**	Medium significance	Hydrocarbon spillages from diesel locomotives on rail ballast can act as a source of pollution on storm water runoff.



6.3.5 Road activities

The potential negative impacts associated with road activities are;

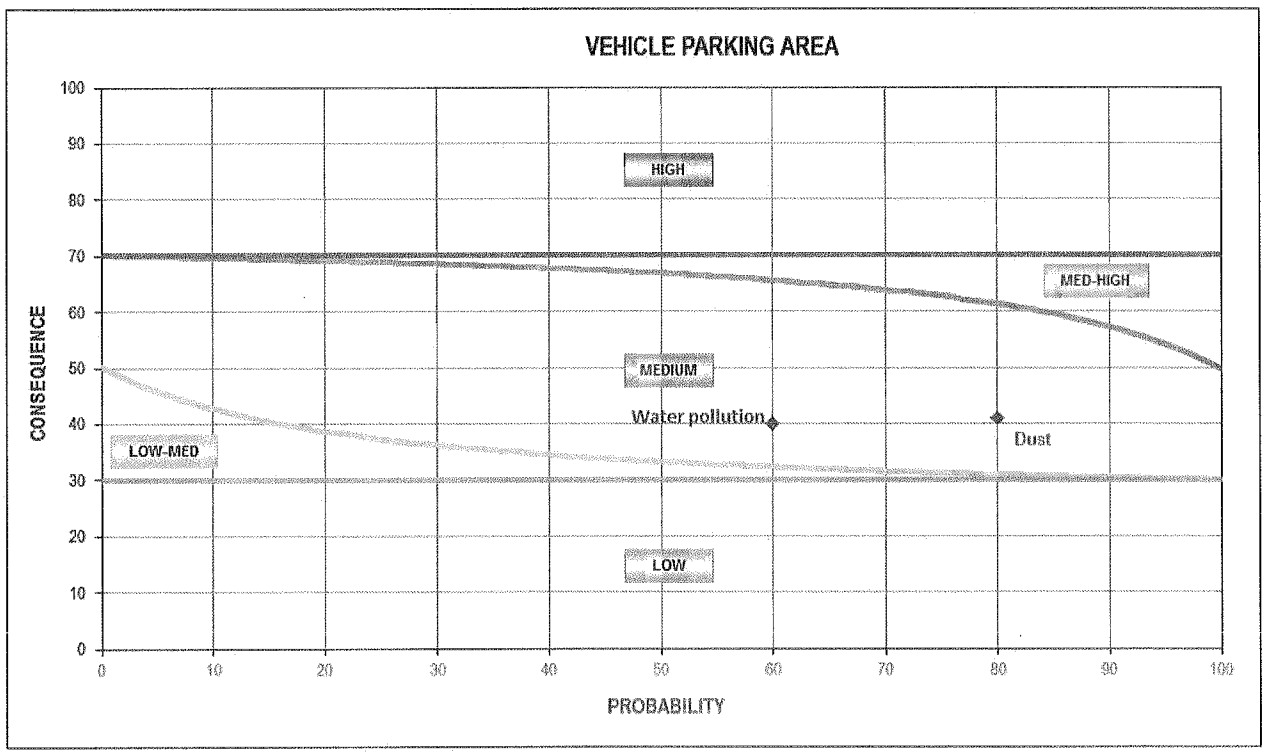
DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
× **Dust**	Medium significance	Dust can be created from fines blowing off a truck in transit and from vehicle movement on roads which have a build up of fines.
× **Noise**		Noise created from vehicle traffic.
× **Social impacts**	Medium significance	Deterioration of local roads due to traffic associated with the mine and speeding trucks representing a safety hazard.



6.3.6 Vehicle parking area

The potential negative impacts associated with the vehicle parking area are;

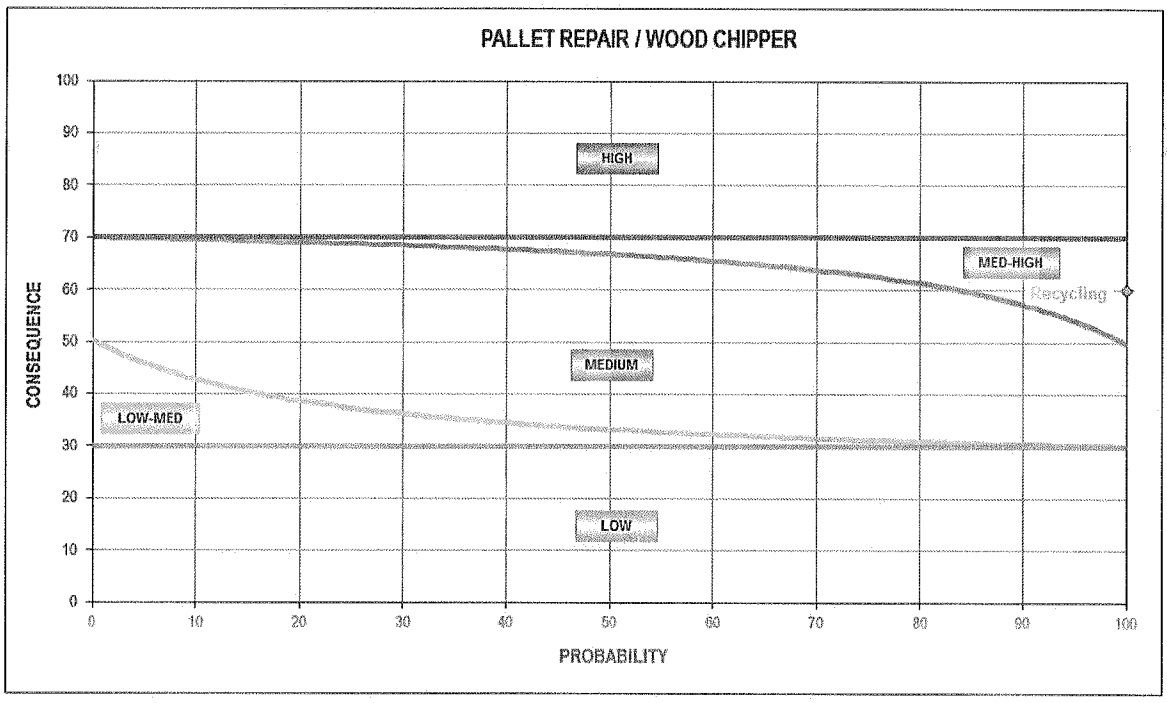
DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
× **Water pollution**	**Medium significance**	Water pollution can result from hydrocarbon spillages from poorly maintained vehicles and through vehicles disposing of waste.
× **Dust**	**Medium significance**	Dust created from vehicle movement on the exposed surfaces.



6.3.7 Packaging and dispatch supporting services

Pallet repair and wood chipper

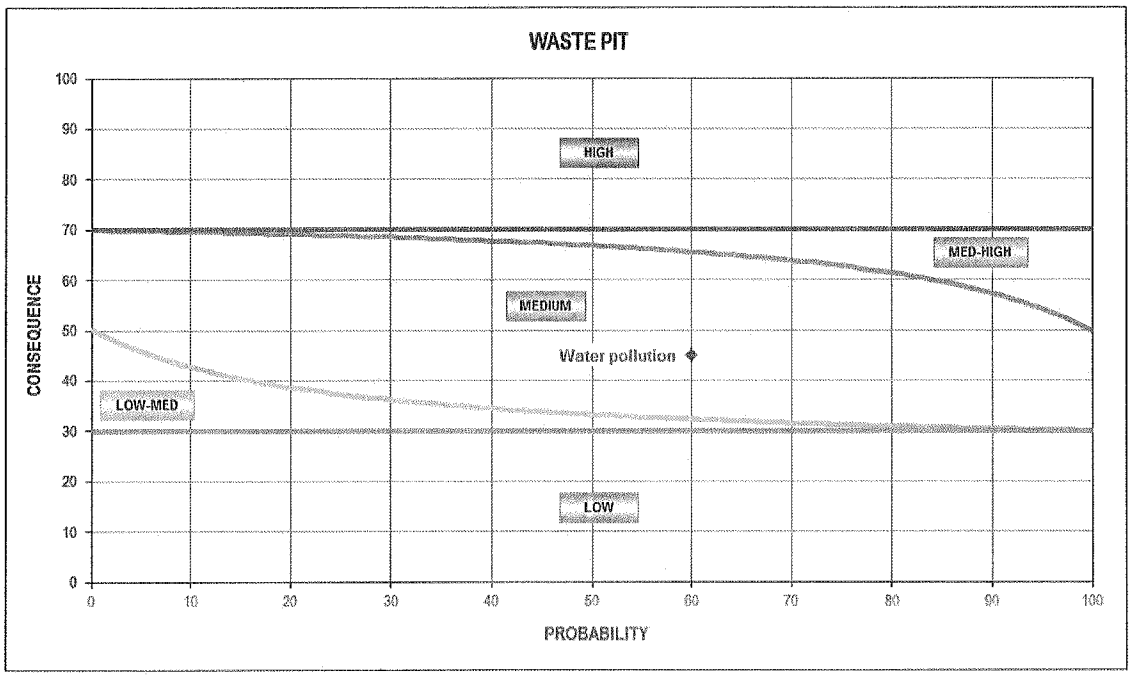
DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
✓ **Recycling**	Medium-high significance	The implication of undertaking pallet repair is a positive impacts based on the reuse of broken pallets. In addition, the wood chipper allows the pallets which cannot be recycled to act as a source of organic material for concurrent rehabilitation projects.



Waste pit

The potential negative impact associated with the waste pit area is;

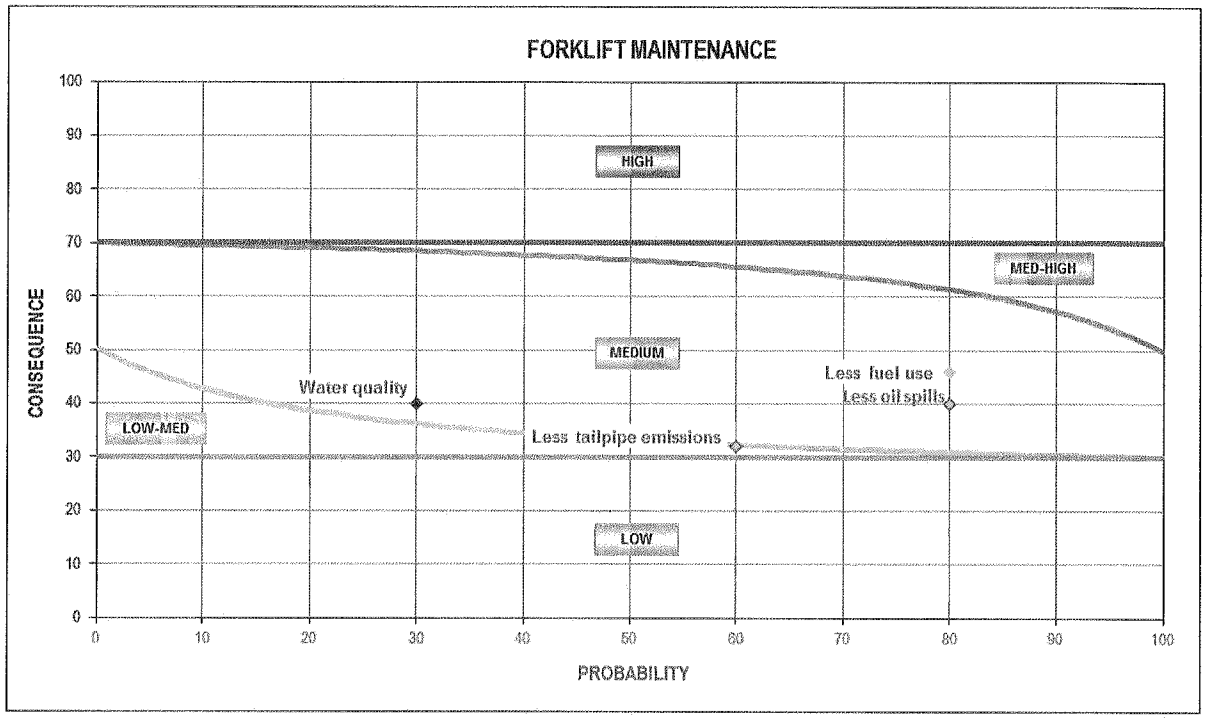
DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
✗ **Water pollution**	Medium significance	Water pollution can result from uncontrolled handling of the waste within the waste pit area.



Forklift maintenance

The potential negative impacts associated with the forklift maintenance are;

DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
✗ **Water / soil pollution**	**Medium significance**	Oil and diesel spillages at the forklift maintenance area not been contained properly and running off the concreted area resulting in both potential soil and water pollution.
✓ **Reduce likelihood of a spillage**	**Medium significance**	Through implementing the maintenance activities, it is reducing the likelihood of a spillage or leak occurring during the use of the forklift for its intended purposes.
✓ **Improve fuel efficiency**	**Medium significance**	Through implementing the maintenance activities, the fuel efficiency of the forklift is maximised.
✓ **Reduce tailpipe emissions**		Through implementing the maintenance activities, the tailpipe emissions are controlled.



Bag store

There are no negative impacts associated with the bag store.

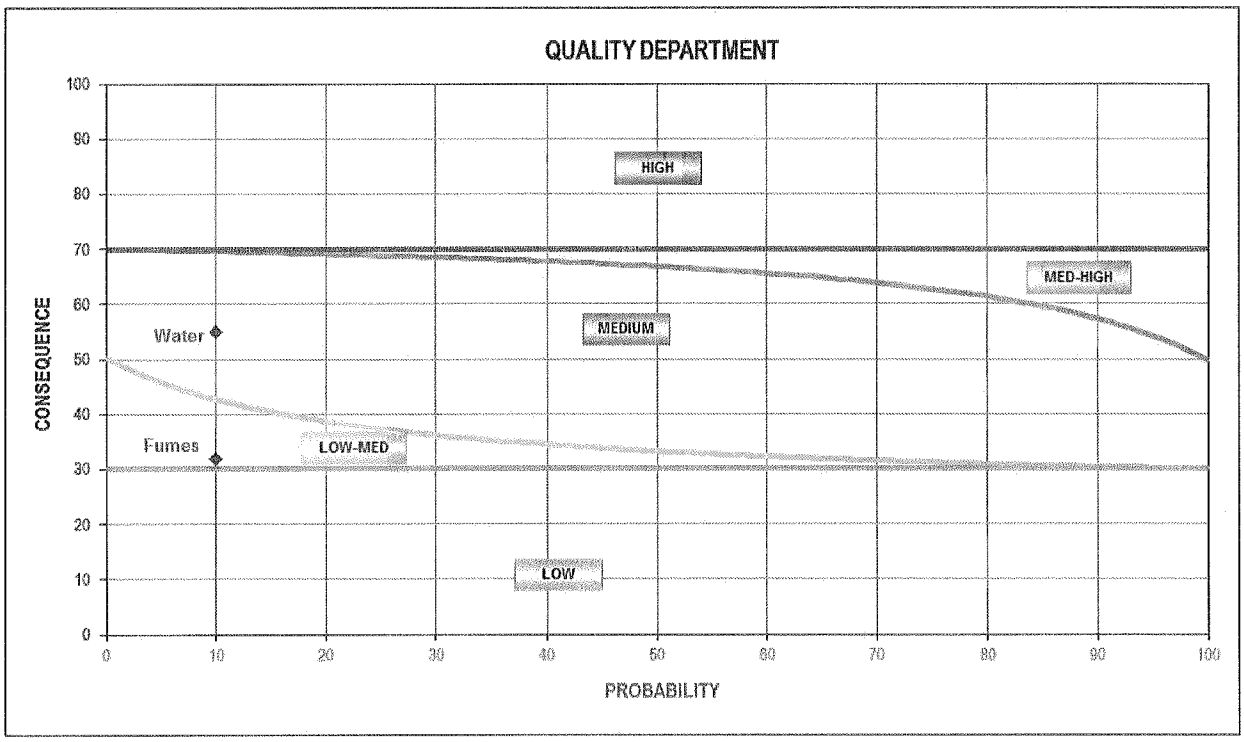
6.4 ENVIRONMENTAL IMPACT ASSESSMENT – QUALITY ASSURANCE

The negative impacts of quality assurance department are those impacts associated with the storage and disposal of the chemicals required for the various chemical tests performed.

The potential negative impacts associated with the Quality Assurance are;

DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
✕ **Fumes**		Small amounts of fumes are created during the quality assurance testing process.
✕ **Water pollution**	**Medium significance**	If chemicals disposed of down the sink are not diluted effectively, it may impact on the quality of water discharged from the sewage plant.

All identified impacts have an extremely low probability of occurring.



- Impacts associated with waste are dealt with in Section 6.9.4

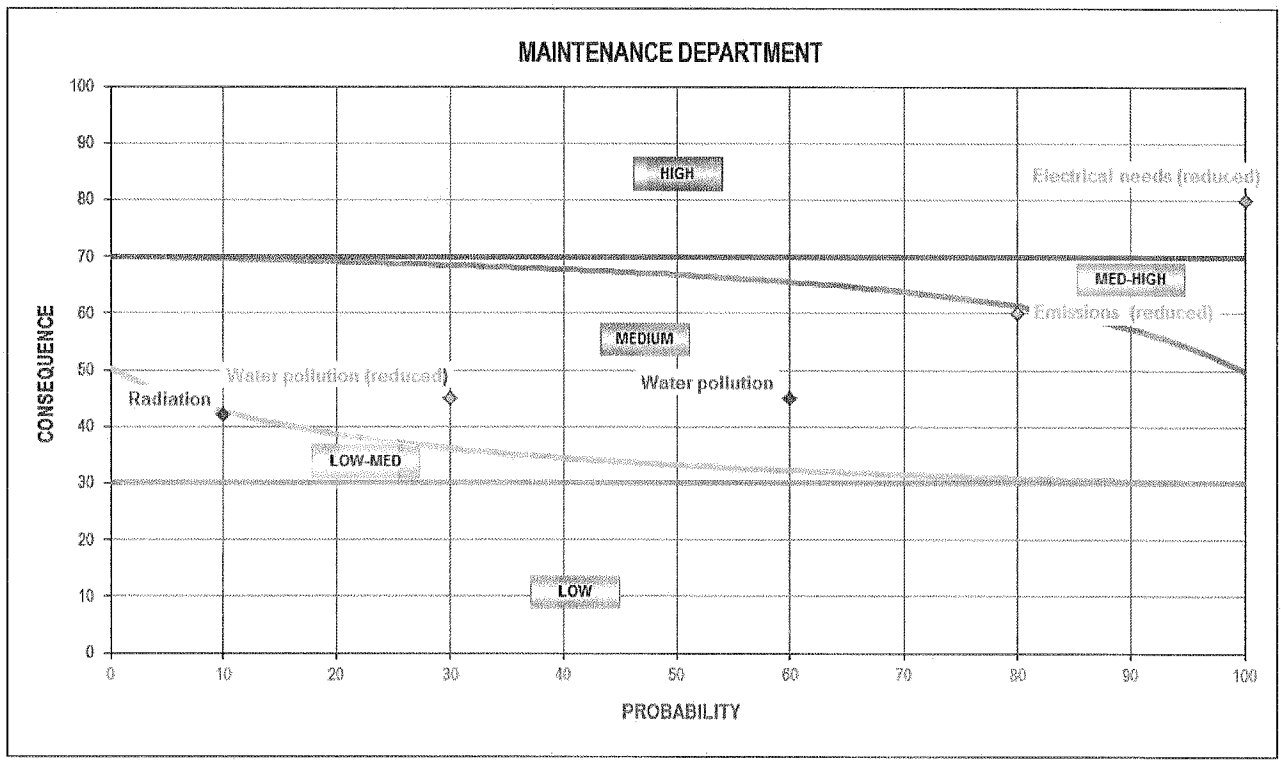
6.5 ENVIRONMENTAL IMPACT ASSESSMENT – ENGINEERING

The main negative impacts associated with the various Maintenance / Engineering departments are those associated with poor handling of waste generated from their activities. Impacts associated with waste are dealt with in **Section 6.9.4**. The activity of implementing preventative maintenance by the engineering department has the effect of reducing the likelihood of and number of the impacts associated with the operating of the mine and plant.

In addition the Maintenance / Engineering Department is responsible for a number of radioactive sources.

Other impacts (both negative and positive), in addition to those associated with waste are as follows:

DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
✗ **Water / soil pollution**	**Medium significance**	From hydrocarbon spillages when implementing maintenance activities
✗ **Radiation**		In the unlikely chance there is a radiation leak from the equipment maintained, it could cause radiation poisoning.
✓ **Reduce likelihood of hydrocarbon pollution**	**Medium significance**	Reducing the chance of water pollution through broken equipment by ensuring on-going effectiveness of equipment.
✓ **Improve dust management**	**Medium significance**	Reducing the chance of the dust control equipment not working and hence reducing the likelihood of excessive emissions.
✓ **Improve electrical efficiency**	**High significance**	Maintaining equipment to run at its optimal capacity ensures efficient use of all raw materials and electricity.



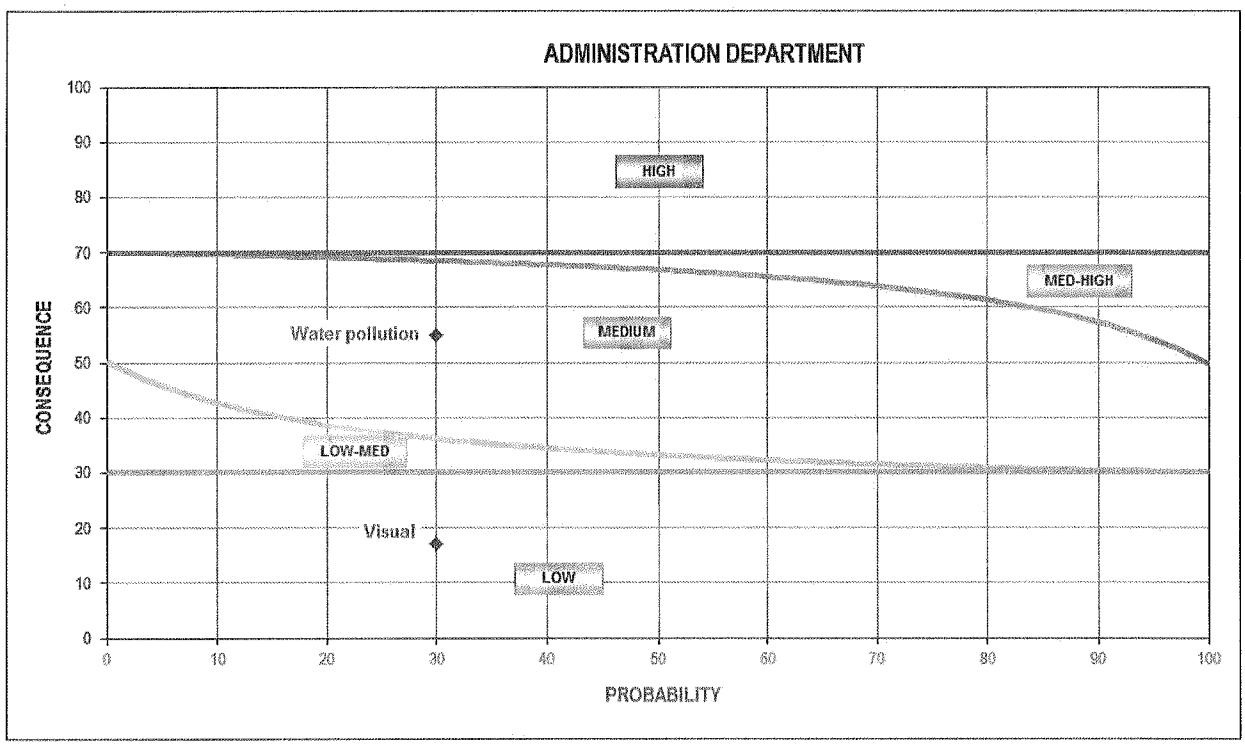
- Impacts associated with waste are dealt with in Section 6.9.4

6.6 ENVIRONMENTAL IMPACT ASSESSMENT – ADMINISTRATION / STORES

The environmental impacts associated with administration requirements are all linked to waste generation. The impact of waste is covered under **Section 6.9.4**.

The potential environmental impacts associated with the stores are those relating to the acceptance, handling and distribution of the stores required for the operation. If not received, stored and handled properly the environmental impacts associated with the activities implemented by the stores include:

DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
× **Water / soil pollution**	Medium significance	From hydrocarbon spillages / spillages of hazardous chemicals during the storage and distribution process.
× **Visual impact**	Low significance	Poor housekeeping through improper storage of chemicals



6.7 ENVIRONMENTAL IMPACT ASSESSMENT – HUMAN RESOURCES

All impacts associated with waste from this department are covered under **Section 6.9.4**.

6.7.1 Training

There are no negative impacts associated with training. If effective, training will have an impact of reducing the number of potential environmental non-conformances.

6.7.2 Socio-economic requirements

The socio-economic impacts associated with the operation of Ulco can be deemed positive in terms of employment creation, economic development of the region and support of local economic development initiatives. The detail concerning these social impacts is covered within the social and labour plan created for the mine for its mining right conversion.

6.7.3 Villages

The impacts associated with the village are impacts in relation to waste management. The impacts associated with waste management are covered under section 6.9.4.

6.8 Environmental Impact Assessment – Safety, Health and Environmental Department

Many of the activities implemented by the SHE Department have no significant environmental impacts. However, the function of the SHE department is vital for the implementation of effective environmental management at Ulco.

Without the implementation of the management measures which fall under the responsibility of the SHE Department numerous activities could result in unacceptable negative impacts.

6.8.1 Health and safety training & occupational health and safety monitoring

There are no negative environmental impacts associated with health and safety training. Often there is much overlap between implementing good health and safety practices and implementation good environmental practices. Hence some environmental management benefit such as reduce the number of environmental incidents, can be achieved from health and safety training.

There are no negative environmental impacts associated with the implementation of occupational health and safety monitoring. Sometimes there is overlap between occupational monitoring and environmental monitoring such as testing of water samples.

6.8.2 Risk Assessments

There are no negative environmental impacts associated with undertaking risk assessments. Often benefit can be achieved from the risk assessment in terms of also identifying potential environmental risks of activities when undertaking an assessment. Once a potential risk is identified, appropriate management measures can be implemented to reduce / mitigate the risk.

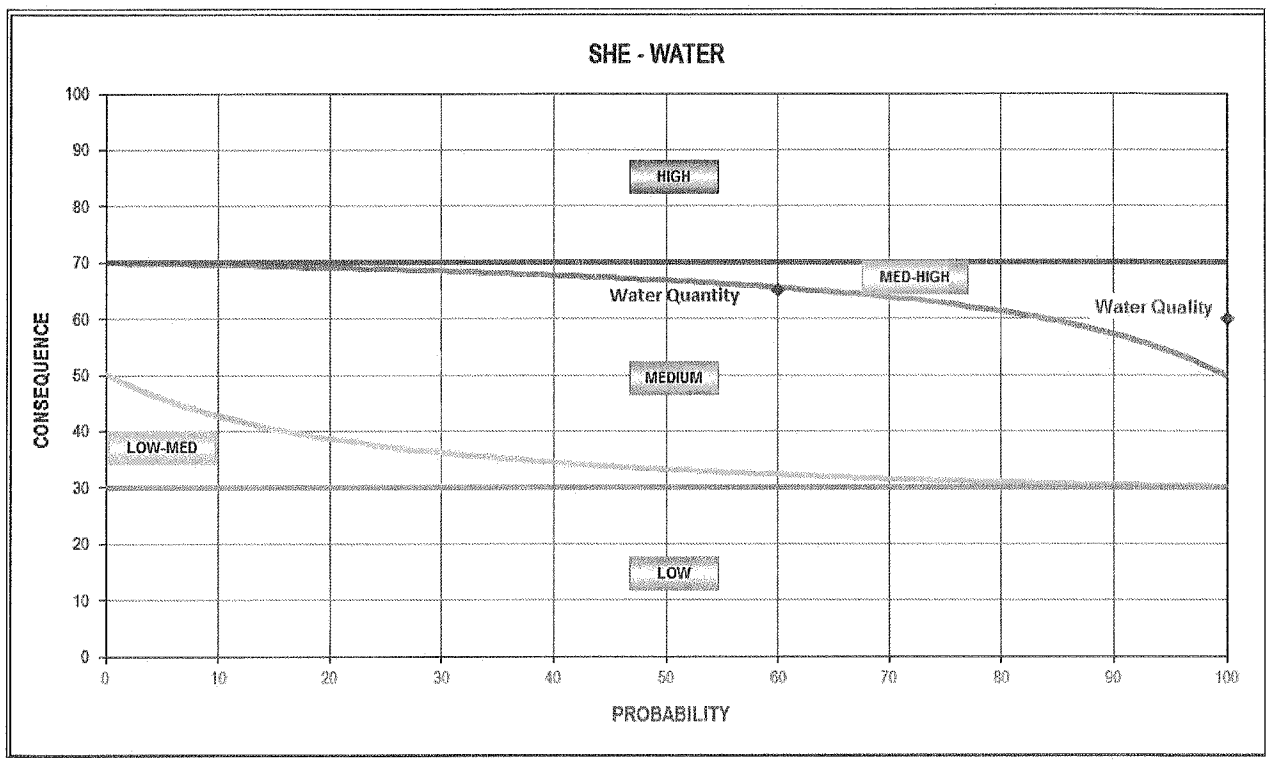
6.8.3 Documentation control / environmental legal compliance

There are no negative impacts associated with documentation control. However document control is essential to prove successful implementation of the environmental management measures on the mine and environmental legal compliance.

6.8.4 Water management

Through poor implementation of water management measures water resources (ground water / surface water / storm water) can be impacted as follows;

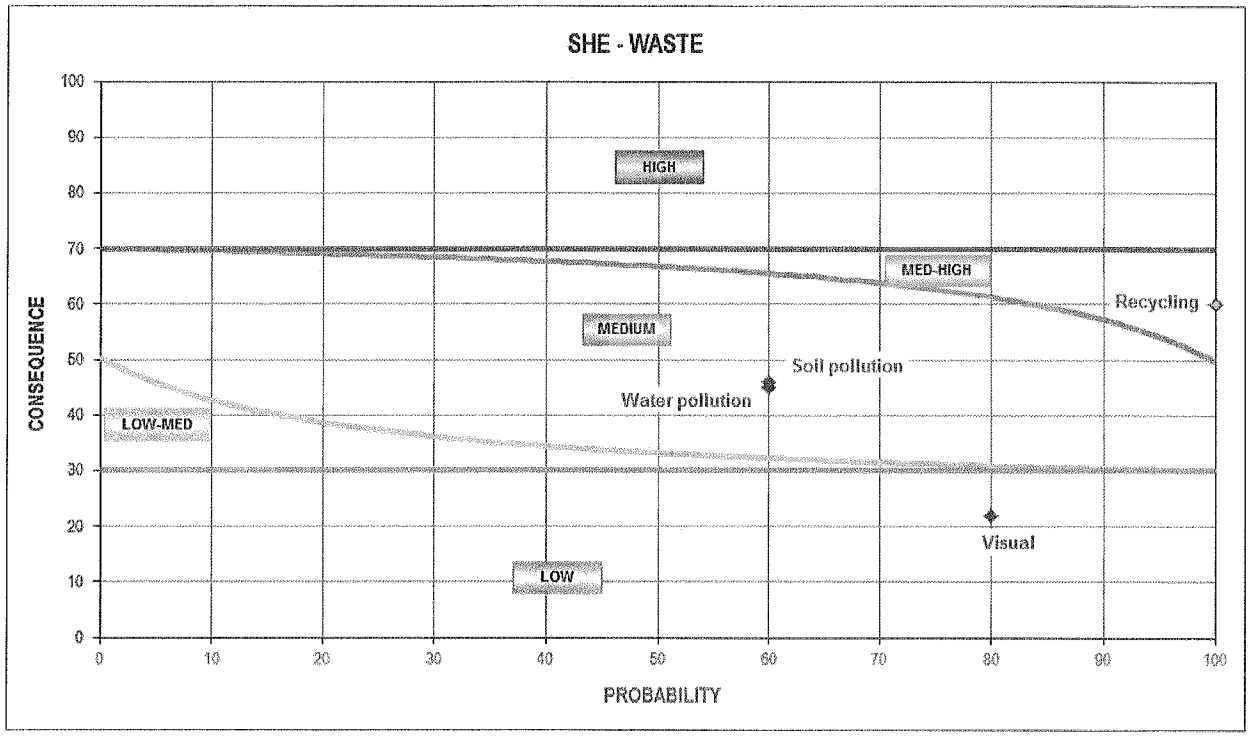
Description of the impact	Overall significance ranking	Explanation
* **Water quality**	Medium-high Significance	Water quality can be impaired through poor management practices such as: – Hydrocarbon spills – Ineffective oil traps – Ineffective sewage plant – Poor management of the storm water control structures resulting in poor separation of dirty and clean water streams. – Build-up of fines. – Poor waste management practices
* **Water quantity**	Medium significance	Water is a precious resource in South Africa, wasteful use of water can reduce the availability of the water for other users (both environmental and human): Water wastage can result from: – Leaks in pipes / supply – Excessive use for process purposes – Unnecessary dewatering from quarries – Draw down from the primary quarry – Excessive use for gardens – Altering of natural drainage channels



6.8.5 Waste management

There are no environmental impacts with implementing effective waste management. However there are significant negative impacts associated with the failing of implementation of effective waste management these include:

DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
✗ **Water pollution**	**Medium significance**	From hydrocarbon / other chemical spillages which are not cleaned and then pollute storm water runs off from the mine.
✗ **Soil pollution**	**Medium significance**	From hydrocarbon / other chemical spillages which are not cleaned
✗ **Visual**	**Low significance**	Poor waste management results in an aesthetical impact and creates a perception of poor housekeeping which in itself manifest as "not caring" about the environment by employees. Good waste management encourages good implementation of environmental management measures.
✓ **Reduce use of resources through recycling**	**Medium-high Significance**	Positive impacts associated with reduction in use of resources can be realised through the implementation of recycling and reuse of waste products and therefore must be encourage. Waste disposal should be treated as a last resort.



6.8.6 Environmental monitoring

There are no negative impacts associated with environmental monitoring however the result of the monitoring are **essential** to assess the success of the environmental management measures implemented by Ulco. The benefits of environmental monitoring include:

- ✓ Allows Ulco to prove compliance with both the environmental commitments made within this document and to the relevant environmental legislation.
- ✓ Allows Ulco to identify trends in environmental parameters which can be used to either identify potential problems or identify the success of specific management measures.
- ✓ Allows Ulco to set realistic targets in terms of reducing their impacts on the environment.

6.8.7 Environmental training

There are no negative impacts associated with environmental training. It is important to make the employees of Ulco aware of the potential environmental impacts associated with their roles and how they can be mitigated or minimised through the implementation of the correct management procedures. This training (if effective) can drastically **reduce** the potential of occurrence of environmental negative incidents.

6.8.8 Environmental forum

There are no negative impacts associated with the implementation of environmental forums. The benefits of meetings with interested and affected parties will result in ensuring that Ulco maintains a good relationship, with those people, it has an unavoidable impacts on.

6.8.9 Clinic

The only negative impact associated with the clinic is the implication of the disposal of medical waste. The impacts associated with waste management are provided in **Section 6.8.5**.

6.8.10 Security

There are no negative environmental impacts associated with security. However, the security section can be utilised to ensure that negative impacts such as hydrocarbon spillages from vehicles and poaching do not occur within the mining area.

6.8.11 Sub-contractors

In terms of the NEMA principle of cradle to grave, Ulco are responsible for the environmental management measures associated with the sub-contractors on site.

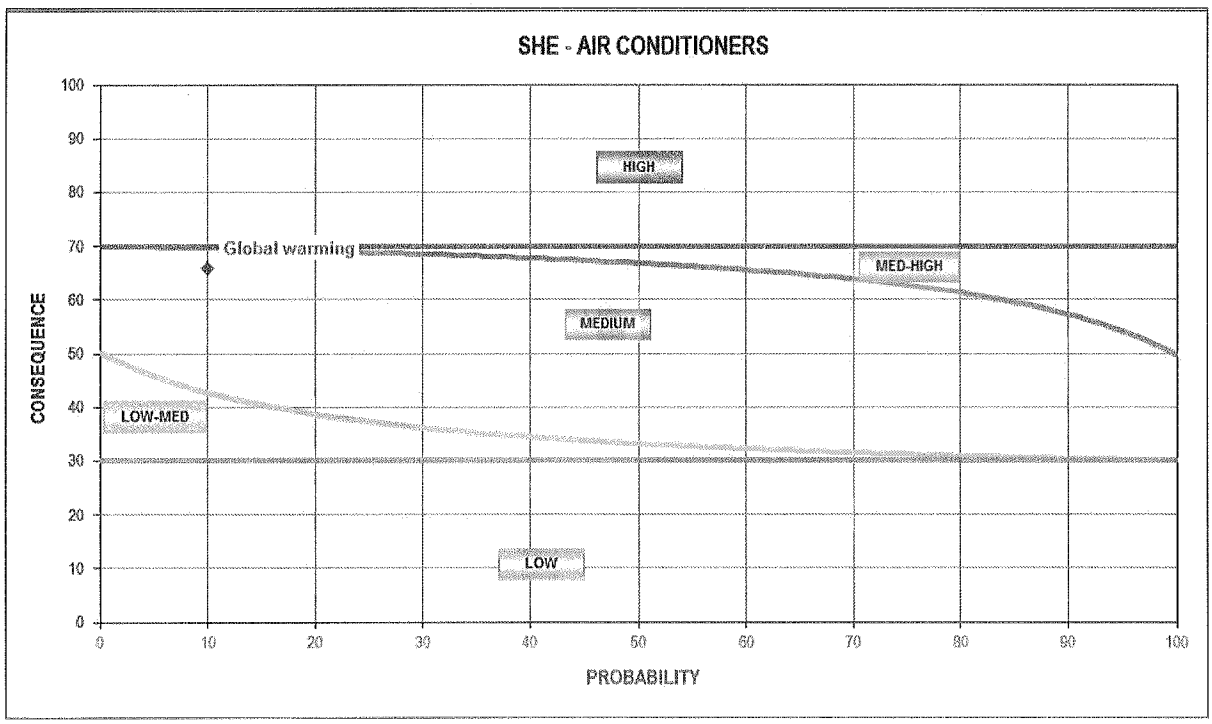
It is impossible to identify all the impacts associated with all the sub-contractors within this document. However Ulco must recognise that all the activities implemented by sub-contractors may result in an impact which must be managed.

The SHE manager for Ulco must perform an impact assessment on the individual sub-contractors to determine what impacts will result from their operations, then, appropriate management measures must be applied to the significant impacts.

6.8.12 Air conditioners

The mine makes use of air conditioners that have ozone depletion gases. The negative impact associated with ozone depletion gases includes:

DESCRIPTION OF THE IMPACT	OVERALL SIGNIFICANCE RANKING	EXPLANATION
✕ **Global warming**	**Medium significance**	Ozone depletion gases being potentially released and resulting in global warming.



6.8.13 Emergency incidents

Emergency environmental incidents / accidents can be defined as incidents / accidents having the following criteria:

- The Probable Frequency of these incidents / accidents occurring is considered to be very low or may never occur during the life of the Mine.
- The consequence of the environmental impacts associated with these incidents / accidents is potentially of **high significant**.

It is essential that the Mine personnel know how to respond in the event of an environmental emergency situation in order to avoid significant environmental degradation / impacts or injury to human health.

The emergency environmental incidents / accidents identified for Ulco are listed below.

- Excessive diesel / oil spillages
- Bursting or leaking diesel tanks
- Leaking transformer oil
- Excessive dust emissions
- Coal dust explosion from the coal mills
- Fire
- Flooding
- Run away chemical reactions.

7 ENVIRONMENTAL IMPACT STATEMENT

Legal Reference *MPRDA*:
NEMA of 1998: **Regulation 32(2)(n)**

It is important to note that the preceding impact assessment is based on mining activities taking place within the defined mining environment area and not the extended mining right area. Should mining in future need to extend beyond the current demarcated mining environment, then a reassessment of the potential environmental impacts will be required. The impact statement presented below is based on:

- The impact assessment undertaken in **Section 6**;

Impacts of the on-going Mining Operation

It is important to note that Ulco has been operating since 1936 and hence many of the initial impacts associated with the establishment of a mining operation have already occurred. It is the author's opinion that the following impacts as a result of the on-going mining activities require the greatest consideration when applying mitigating management measures.

The main on-going impacts associated with the mining operation which have either a **high** or **medium high** significance are:

- Impacts associated with the release of carbon dioxide during the clinker manufacturing process ultimately adding to the problems associated with global warming. Cement manufacturing industry is a large contributor to the release of carbon dioxide worldwide. Goals to reduce the clinker factor in cement manufacturing must be pursued.
- Impacts associated with the release of other gaseous emissions. In addition to carbon dioxide other gaseous emissions such as Nox and Sox are also released during the clinker manufacturing process and add to global warming.
- The offsite impacts associated with the generation of electricity as the equipment required for clinker and cement manufacturing consumes large amounts of electricity. The majority of electricity is generated in South Africa through the use of coal fired power stations. Both the mining of coal and the emissions associated with the generation of electricity have a serious environmental impact. By requiring large amounts of electricity, Ulco are adding to the demand for electricity.
- The offsite impacts associated with high fuel usage in the haul trucks required for the mining activities. Fuel is a non renewable resource.

Additional impacts which have a **medium significance** which are worth noting are:

- Atmospheric impacts associated with the generation of dust from both mining and processing activities.
- Impacts on water quality through oil spills, high sediment loads in water, storm water running through coal stockpile area and the SPL stockpile area.
- Impacts on water availability due to the dewatering from the quarries and the altering of natural runoff patterns.
- Impacts associated with the on-going disturbance of land (fauna, flora & heritage) through extending the disturbance associated with the mining area.

These impacts obtained the ranking due to the fact that they are an unavoidable by-product of the mining activities and will occur. The implementation of effective management measures will reduce the probability and / or the consequence of the negative impact(s).

Potential Positive Impacts:

The on-going operation of the mine will result in positive socio-economic impacts such as the generation of cement products required for development of the Southern Africa, adding to the local economy through its procurement needs, jobs (both directly and indirectly) and development through the implementation of its local economic development plan contained within its approved social and labour plan.

Continuation of the Mining Operation:

Ulco is an existing mining operation with a remaining life of over 30 years based on current production rates. The majority of impacts associated with transforming land to facilitate mining operations have already occurred. The main negative impacts associated with the on-going operation of the mine can be minimised / mitigated against through the implementation of effective management measures.

It is the author's opinion that there is no reason not to allow the continuation of the mine provided they adhere to relevant environmental legislation and implement the commitments within the EMP.

8 ALTERNATIVE LAND USE AND DEVELOPMENTS CONSIDERED – REGULATION 50(D)

Legal Reference *MPRDA*: **Regulation 50(d)**
NEMA of 1998: **Regulation 32(2)(f)** and **(h)**

This is an **existing mine** which has been in operation since 1936. Ulco has an approved mining right and an approved EMPR. This EIA / EMP has been compiled for the upgrade to the existing EMPR. As the intent of this section of the report is to determine if there are alternatives, for ***proposed*** operations, and not existing operation, it is **not applicable for Ulco**. Additional motivations of why alternatives to mining have not been considered are presented below.

Land-use / development:
This EIA has been developed for an existing mine, which will make use of existing infrastructure. To date over **2 billion** rand has been invested in the mine and associated cement manufacturing plant. The investment has created an economically profitable mining and cement production operation that generates cement required for infrastructural development in Southern Africa and over 200 direct employment opportunities and opportunities for contractors. No other land-use alternatives have been considered for this existing mine.

Mining Methods
The current mining method as described in **Section 3** has been developed over the last 30 years. No other mining method is being considered.

Processing Methods
The cement manufacturing process will remain the same for the remainder of the life of the plant. Currently Ulco are operating 1 kiln line. In future a new kiln line may be introduced to increase production.

In terms of the fuel resources, Ulco could implement the following alternatives:

Alternative Fuel Resources
Ulco currently make use of coal in order to generate the majority of heat required in the kiln for the clinker manufacturing process. Ulco are authorised to make use of spent pot liners (SPL) and a number of other waste products as an alternative fuel source.

AfriSam are undertaking a full environmental investigation to identify the viability of implementing a process whereby additional alternative fuels can be used to substitute some of the coal requirements needed to generate the heat required in the kiln. Alternative fuels are often waste / by-products of other industries. The implementation of alternative fuels will only be implemented upon the approval of a relevant EIA process.

Consequences of Not Continuing with the Mine
Should this existing mine and cement manufacturing plant stop the consequences would be:

- Loss of over 200 direct employment positions.
- Loss of indirect employment positions through the employment of sub-contractors.
- Loss of revenue for local goods and services.
- Loss of revenue for numerous suppliers.
- Loss of cement required for infrastructure development projects currently been undertaken throughout Southern Africa.
- Loss of community development projects that Ulco support.

9 KNOWLEDGE GAPS IDENTIFIED

Legal Reference	*MPRDA*:	**Regulation 50(g)**
	NEMA of 1998:	**Regulation 32(2)(l)** and **(m)**

Based on the information provided in the baseline section, the description of the activities taking place and of the potential impacts identified within the impact assessment the following current knowledge gaps have been identified for the existing mining environment area:

- The possible presence of red data faunal species

Appropriate management measures have been documented within Section 11 to address the knowledge gap listed above.

Should mining extend beyond the current mining environment area (north of the R31) then additional specialist studies will be required, to address additional knowledge gaps namely:

- Additional investigation into the presence of red data flora species
- Additional investigation into the presence of heritage resources
- Additional investigation into the impact of mining on the endoreric pan.
- Additional investigation into the impact of additional mining on surrounding water users

Legal Reference *MPRDA:* **Regulation 51(a)**
NEMA of 1998:

The overarching goals and objectives for Ulco are governed by the Environmental Policy for AfriSam (South Africa) (Pty) Ltd

AfriSam

Environmental Policy

Policy
AfriSam (South Africa) recognises the universal right of present and future generations to an environment that is not harmful to human well-being. Our commitment is to continuously improve our environmental performance and to provide a positive contribution to sustainable development. We therefore conduct our operations in such a way that we minimise any potential adverse effects of the cement, aggregate, readymix and slagment processes and products on the community, the environment and ourselves.

Environmental pillars and principles
There are four main pillars of our environmental policy for which we have assigned principles to guide our progress.

Management systems
We commit ourselves to environmental management systems that comply with the requirement of ISO 14001.
- Document, implement and maintain our ISO 14001 management systems.
- Achieve continuous improvement through the process of risk management, the execution of performance assessments, benchmarking and the implementation of improvement programmes.
- Management will review progress on environmental objectives, targets and programmes.
- A policy goal is legal compliance with applicable environmental legislation and defined requirements.
- Communicate this policy to employees and contractors.

Resource utilisation
We promote eco-efficiency, conservation of non-renewable resources and recycling of secondary materials.
- Pursue the optimal utilisation of resources, the reduction of waste and use of fossil fuels.

Environmental impacts
We measure our performance, continuously improve and promote best practice in our industry.
- We commit ourselves to the prevention of pollution.
- Management will provide the necessary resources to execute this policy.
- Continuously review environmental impacts in order to minimise environmental degradation.
- Use our emergency preparedness programme to identify and implement risk mitigation measures.
- Rehabilitate our mining sites to a self-sustainable or positively usable landform on final closure of operations.
- We will be active in promoting the conservation of species and ecosystems in the interests of protecting our countries' rich biodiversity.

Stakeholder relations
We engage our stakeholders and report to them on compliance, performance and progress.
- Participate in environmentally related dialogue with stakeholders, provide appropriate environmental training for all employees and contractors and publish a biennial report on Sustainable Development.

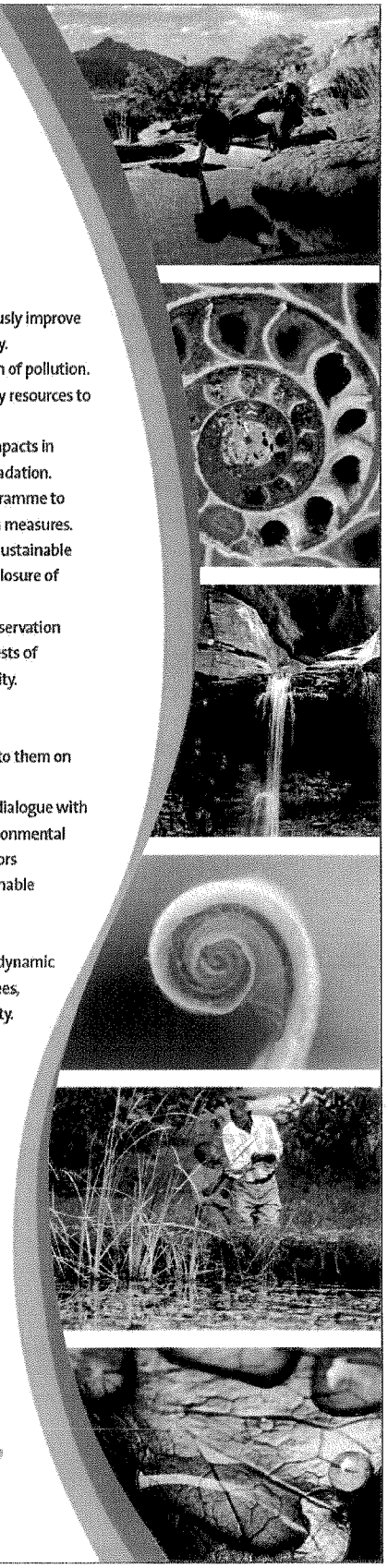
Our Environmental Policy is viewed as a dynamic document and is available to all employees, regulatory authorities and the community.

Stephan Olivier

Stephan Olivier
Acting Chief Operating Officer
AfriSam (South Africa) (Pty) Ltd

Claudene Moorgas
Environmental Manager
AfriSam (South Africa) (Pty) Ltd

Our actions today mould the future



AfriSam

AfriSam South Africa
Ulco Factory & Bloemfontein Depot
INTEGRATED MANAGEMENT POLICY

The vision of AfriSam South Africa is to be the choice of our customers, stakeholders and employees.

AfriSam Ulco and Bloemfontein are involved in mining and the manufacture and distribution of cementitious products in the domestic and export markets. This policy is applicable to both operations.

Under the banner of people, planet and performance AfriSam Ulco has implemented an Integrated Management System and commits the operations to:

- *Identify, manage and mitigate health and safety hazards and risks, environmental aspects and impacts, quality and customer service risks for activities and processes, both actual and planned, which have the potential to deplete resources, harm people and communities, pollute or degrade the environment or compromise product quality and customer service.*
- *Comply with applicable legislation, regulations and other requirements as a minimum requirement.*
- *Comply with the OHSAS 18001:2007, ISO 14001:2004, ISO 9001:2008 and NOSA standards for health, safety and environmental management.*
- *Comply with the SANS 458 and EN 197:2000 specifications for quantity and quality of products.*

The operation will:

- *Allocate resources and assign clear accountability at all relevant levels of employment and services. Nominated Managers and legal appointees are appointed to ensure the suitability, adequacy and effectiveness of management.*
- *Make use of efficient technology and carry out planned and controlled maintenance.*
- *Promote excellence of performance through appropriate training, awareness, empowerment programmes and agreed key performance indicators.*
- *Measure, monitor, review and audit performance and report thereon.*
- *Share achievements and performance challenges with employees, stakeholders and shareholders.*

This policy provides the framework for setting and reviewing objectives and targets for continual improvement, as identified through effective performance review, communication and engagement of employees, customers and other stakeholders.

The policy is reviewed periodically to ensure its relevance to realise the business goals of AfriSam South Africa.
The policy is available to any interested and affected parties.

General Manager:

Date: 30/09/2010

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Revision 05 / 2010-09-22

Legal Reference: **Regulation 51(a)(ii)**

10.1.1 Environmental Legislation

For the mining operation as a whole, the mine's **goal** is to comply *with all relevant environmental legislation*. Some specific legal considerations have been provided below.

National Environmental Management Act, Act 107 of 1998 (NEMA)

As the NEMA is the cornerstone of all environmental legislation, the management measures implemented by the mine will strive to adhere to the principles of NEMA. The specific principles which Ulco feels are most relevant to their environmental goals and objectives have been listed below (the reference numbers provided are the same as those in the legislation):

- Ulco will strive to mine in a sustainable manner.

(4)(a) Sustainable development requires the consideration of all relevant factors including the following:

i) That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
ii) that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
iii) that the disturbance of landscapes and sites that constitute the nations cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;
iv) that waste is avoided, or where it cannot be altogether avoided, minimised and reused or recycled where possible and otherwise disposed of in a responsible manner;
v) that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;
vi) that a risk averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and
vii) that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.

(b) Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.

(c) Environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons.

(d) Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination.

(e) Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.

(f) The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured.

(g) Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognising all forms of knowledge, including traditional and ordinary knowledge.

(h) Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.

(i) The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.

k) Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law.

(o) The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage.

(p) The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.

All of the above principles have been considered when developing the environmental management measures documented in Section 11.

Minerals and Petroleum Resources Development Act, Act No. 28 of 2002 (MPRDA)
In the spirit of the MPRDA, the mine's **objective** is to *change their attitude from one of compliance with environmental legislation to one of maximising the benefits of compliance.* This will not be an instantaneous change and will only be realised through the commitment of all staff members. It is hoped that over time, personnel will be able to take the environmental concepts learned in the work place to their place of residence and /or home.

National Water Act, Act No. 36 of 1998 (NWA)
Given that water is such a precious resource in South Africa, it is the mines **objective** to *comply with the purpose of the NWA*, which "is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways which take into account" a number of factors. Those applicable to activities at Ulco are listed below (the reference numbers provided are the same as those in the legislation):
(2)(g) protecting aquatic and associated ecosystems and their biological diversity;
(h) reducing and preventing pollution and degradation of water resources;

National Environmental Management: Air Quality Act, Act 39 of 2004 (NEM:AQA)
The mine supports the objectives of the NEM:AQA in that it will *control atmospheric emissions* arising from operational activities. The NEM:AQA objectives applicable to activities at Ulco are listed below (the reference numbers provided are the same as those in the legislation):

(2)(a) "protect the environment by providing reasonable measures for –
i) "the protection and enhancement of the quality of air in the Republic";
ii) The prevention of air pollution and degradation.

National Environmental Management: Waste Act, Act 59 of 2008 (NEM:WA)
Pollution is often associated with the incorrect handling and storage of waste. Therefore, it is the mines **objective** to *recognise and fulfil their duties in respect of waste management.* In order to achieve this, their **goals** will be to *take all reasonable measures to* (the reference numbers provided are the same as those in the legislation):
16(1)(a) avoid the generation of waste and where such generation can not be avoided , to minimise the toxicity and amount of wastes that are generated;
(b) reduce, re-use, recycle and recover waste;
(c) where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;
(d) manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour or visual impacts;
(e) prevent any employee or any person under his or her supervision from contravening this Act; and
(f) prevent any waste from being used for an unauthorised purpose.

Conservation of Agricultural Resources Act, Act No. 43 of 1983 (CARA)
Although many aspects of CARA are not applicable to mining operations, there is one aspect that is applicable for which goals and objectives has been established, viz.:
- Alien vegetation control:
  - It is the mine's **objective** to *prevent the spread of alien vegetation.*
  - In order to meet this objective, it is the mine's **goal** to *remove alien vegetation from the mining site and re-vegetate the cleared areas with indigenous vegetation.*

10.1.2 Specific Environmental Goals and Objectives

- **Implement Environmental Management Systems:**

Ulco has implemented ISO 9000 and ISO 14001 compatible management systems. Ulco will seek to effectively maintain their ISO 14001 certification and encourage continual improvements in environmental management.

- **Reduction of Carbon Dioxide (CO_2) emissions.**

Globally the cement industry is responsible for 5% of the industrial CO_2 emissions. In South Africa the value is approximately 1.7 % of industrial emissions. There are 4 main sources of CO_2 generation within the cement manufacturing process. The weighting of these sources is:

- 50% from the generation of clinker by breaking up of limestone
- 40% from the burning of fossil fuels for heat generation
- 5% from indirect emissions from the purchase of electrical power.
- 5% due to transport.

The goal at Ulco is to reduce CO_2 emissions to ***500 kg CO_2 / ton of cement***. This goal will be achieved by:

1. *Reduce the Clinker Factor to 73% while maintaining the quality of the product.*

The clinker factor is the percentage of clinker in cement. Substituting clinker with other materials (known as secondary cementitious materials) reduces the amount of raw materials required. Due to the strict quality standards set for cement, there is only a limited range of materials that can be used.

2. *Increase the thermal energy efficiency of the clinker making process*

The thermal energy efficiency of a plant is almost entirely the function of the technologies applied in the production process and continual maintenance of the plant.

3. *Increase the proportion of energy from alternative fuels:*

Substitution of fossil fuels by alternative waste derived fuels benefits by reducing fuel costs, reducing CO_2 emissions and provides a waste disposal service to society. Before alternative fuels can be used, detailed technical work must be conducted to ensure that there is no adverse effect on public health, the environment or product quality.

4. *Reduce the amount of kiln dust discards per amount of clinker produced*

The amount of cement kiln dust produced is an indicator of the eco-efficiency, as the more disposed, the less efficient the use of raw materials.

- **Monitoring on emissions with the goal to reduce emissions.**

Ulco will measure dust, SO_2, Nox and volatile organic carbon, hydrogen chloride, benzene, ammonia, Xylene and Tolene emissions continuously. There will be periodic measurement of other emissions including heavy metals, and dioxins / furans. The monitoring equipment will be calibrated once a year.

The goals of Ulco are to reduce emissions below the following values.

- Dust to be below 50mg/m3/Nday.
- N0x below 800mg/m3/Nday.
- S0x below 500 mg/m3/Nday.
- VOC (volatile organic carbon) below 100 mg/m3/Nday (calculated as carbon mgC/m3).
- Hydrogen Chloride (HCL) below 30 mg/m3/Nday.

- **Reporting on environmental standards**

AfriSam have initiated a "Plant Environmental Profile" (PEP) reporting system which is an annual self assessment tool that enables Ulco to evaluate their performance on all environmental issues.

- **Minimise wastage of natural resources**

All quarry's must optimise the use of raw materials with the assistance of quarry maps where by the chemical properties of the raw material is shown so that the required qualities can be extracted and homogenized into the correct proportions. Material extraction must be carried out in a shape that allows optimal rehabilitation.

Mining must be planned in a manner that haulage distances are kept to a minimum to reduce the impact of fuel consumption.

- **Fugitive Dust**

As dust has been identified as being one of the most significant impacts associated with Ulco, the mine's **objective** is to *reduce dust emissions from the operation through the implementation of management measures*. In order to ensure that the management measures being implemented are successful, the mine will monitor off-site dustfall levels. Using the results of this monitoring, the mine will be able to determine if they are meeting with their **goals** regarding dust fallout, viz.

- Onsite monitoring stations; <1,200 mg/m^2/day.
- Off site monitoring stations; <600 mg/m^2/day.

- **Water**

Use: In the spirit of the NWA, it is the mine's goal not to use river water for dust suppression purposes. The mine aims to achieve this by utilising captured storm water run-off within the mining area as dust suppression water. By striving towards the reduction of water consumption, the mine is also supporting the objectives of the NWA by conserving and managing their available water resource.

Pollution: Still in support of the spirit of the NWA, it is the mine's objective not to release polluted water from the property. In order to ensure that their goal is achieved appropriate storm water management features will be maintained and new storm water management structures designed and implemented where necessary.

- **Waste Management**

As indicated previously, incorrect handling and storage of waste will result in environmental impacts (i.e. pollution). Therefore, the mine's **objective** is to *avoid the generation of pollution associated with incorrect waste handling*. In order to achieve this, their **goals** will be to:

- *Minimise the generation of waste*
- *Re-use or recycle* where possible
- *Manage waste in accordance with the NEM:WA*.

- **Environmental Awareness Training:**

The mine recognises that there are potential environmental impacts associated with human ignorance. Therefore, it is the mine's **objective** to *educate their staff with regards to the impacts associated with their job*. The **goal** is then *to reduce the chance for environmental incidents as a result of human error* through implementing the site specific environmental awareness training.

- **Concurrent Rehabilitation**

Ulco commit to implement both concurrent rehabilitation on the active mining areas and historic rehabilitation of areas which have been historically disturbed. Five year rehabilitation plans will be developed and implemented by the mine.

- **I&AP**

The **objective** of the operation is to *ensure a good relationship with the neighbouring communities*, with a **goal** of *having no complaints* received from these communities. The mine intends to promote the relationship by:

- Implementing effective environmental management.
- Developing an understanding between the mine and surrounding I&AP's by have open communication channels.
- Maintaining the environmental forums implemented by the mine.

10.1.3 Mine Closure Goals and Objectives

Legal Reference: **Regulation 51(a)(i)**

It is important to appreciate that Ulco has a life of mine of approximately 30 years within its current mining environment. This life of mine can be extended through the implementation of mining activities to the north of the R31. Hence there could potentially be limestone reserves to sustain Ulco for over 100 years.

Due to the long life of mine remaining, no detailed closure planning has been completed.

Before mining took place, the land was suitable for low intensity grazing. Due to the rural location of the site, much of the surrounding land is undisturbed and represents what Ulco would have looked like if it were not for the mining operation.
Ulco will close the mine whereby all infrastructure and basic services that have been developed by the mine, which will continue to be of benefit to the local / provincial community after the mine has closed, will be left. All buildings / infrastructures that have been determined as having no socio-economic benefit after the life of the mine will be demolished and the rubble buried in old excavations within the mining area.

The aim for all disturbed land created as a result of the Ulco operations will be to rehabilitate the land back to a state to where it blends in with the surrounding land (grazing land) and is acceptable to all relevant interested and affected parties.

This overall closure of Ulco mining operation will be achieved by implementing the following general closure objectives:

- Removing all buildings that have no socio-economic use after the life of the mine. In 2010 this includes all buildings associated directly with mining and processing activities. During the life of the mine, all decommissioned mine buildings will be removed. Until they are removed, the cost of such removal will be catered for within the financial provisions, for the mine. Buildings will be stripped of salvageable material then demolished, and the rubble will be buried within depressions within the mining area, such as the old quarry and the subsided area. All concrete foundations will be broken up and buried under at least 500mm of overburden / topsoil.
- All buildings that have been identified as having socio-economic benefit will be left in accordance to Section 44 of the Minerals and Petroleum Resources Development Act. In 2010, this includes all the buildings and infrastructure which constitutes the Ulco village and all staff houses. The services which support the village will also be retained. This includes a sewage works, potable water purifying plant and reticulation system, roads, shops, schools, clinics, sports facilities, airstrip and electrical sub stations.
- Sloping of final benches within the quarries will first and fore mostly consider safety risks. After satisfying the safety risk, consideration will be given to a number of other factors which include:
  - Aesthetics & creating habitats for fauna and flora
  - Resembling the natural topography of the greater area giving specific consideration the Ghaap fault.
  - Indigenous grass and trees will be planted in all disturbed areas. A limiting factor of encouraging grass to grow over the disturbed area is the lack of topsoil. Recent experiments of the Harrison area have proved it possible to grow grass by contouring with foliage without any additional topsoil.
  - Erosion will be managed by establishing drainage channels.
  - All alien vegetation will be removed on site and a management plan will be implemented to ensure the continued eradication of alien vegetation.

The socio-economic impacts of mine closure will be dealt with in the social and labour plan for the mine. As the mine draws closer to closure, emphasis will be placed on the following socio-economic initiatives:

- Training & Multi-skilling workforce
- Where possible relocating employees to other AfriSam operations
- Working with local authorities to promote alternative job creation schemes
- Providing advice on alternative professions
- Setting up financial assistance for sustainable projects

10.2 Socio-economic Goals and Objectives

Legal Reference: **Regulation 51(a)(iii)**

Information presented in this section of the report includes the strategy and objectives as they are presented in the Social and Labour Plan. It must be noted that some of the strategies and objectives are Company based and not specific for Ulco. Where appropriate, this has been indicated.

Ulco is part of an innovative company AfriSam South Africa (Pty) Ltd who are committed to ensuring economic growth in South Africa, as well as within the municipality in which they operate.

Skills Development Plan

The Company's Skills Development Plan is aligned to the achievement of company **objectives**; "to ensure that it *attracts and retains the best people in the industry*, and most importantly *builds* the pipeline for *future leaders and managers to meet business targets* and identify new challenges" (SLP, 2007). This will be achieved by;

- having the skill capability available to achieve the required high standard of quarrying/mining activity;
- enabling employees to achieve a level of job competence that meets the required performance standards and that builds a foundation for personal development and career advancement;
- ensuring that the safety, health, and environmental standards are met;
- proactively managing the effective succession management process which highlights required skills and competencies of the talent pool
- having Employee Development Reviews to identify and monitor individual development and progress;
- having a process which facilitates discussion on employee performance improvement, the identification of key development areas, and the understanding of employees' career aspirations;
- developing individual training plans so that gaps between an employee's existing competencies and those required for a specified job category are identified, and action plans are put in place to eliminate the gaps; and
- providing employees with life and portable skills so that they are able to cope with socio-economic challenges.

Career Progression

The strategy of the Company with respect to human resource development is to build core competencies and capabilities within the framework of the nature of its business; and to develop its capacity to meet and exceed customer demand and expectations. The Company accepts that profitability is achieved through the existence of a well-skilled and competent workforce with an understanding of environmental and legislative requirements. The career development of employees has the following **objectives**:

- to develop the competencies necessary to fill key positions;
- to enable employees to achieve full potential; and
- to give opportunities to HDSAs and to progress towards Work Skills Plan and Employment Equity (EE) targets.

Mentorship Plan

It is the intention of the Company to implement both formal and informal mentorship programme to underpin the development initiatives. From a coaching aspect, the objectives of mentoring are to improve current job competence, and to give feedback and instruction to persons in a learning curve so that they may acquire specific job skills. However the overall mentoring **objective** is broader, *supporting the employee in all aspects which impact understanding and progress.* Their development will be accelerated to enable them to take on more responsible and complex roles.

Women's Participation in Mining

The strategy is to concentrate the recruitment and selection efforts on women in mining. Deliberate effort and attention will be focused on changing the attitudes of management in the current male dominated operations and helping them to understand the need for this change in the Company and the necessity to meet the mining charter objectives. The **objective** is to *identify suitable positions* where *women* can be *placed and developed* within the mining environment. The **goals** for Ulco are as follows:

- 11.9% (increased from 7%) women participation in mining by 2011 and maintaining that level.

HDSA Participation in Management

The Company has national and regional talent pools of employees who been earmarked to move into middle and senior level management roles. Ulco is therefore able to draw on this pool of resources as and when management-level vacancies arise.

Procurement Progression Plan

The Company is committed to support and grow Black Economic Empowerment (BEE) and Small, Micro and Medium Enterprises (SMMEs) in South Africa with emphasis being placed on procurement from HDSAs that are able to adhere to the Company's agreed quality and safety standards.

The Company implemented its new revised procurement policy on 1st September 2004. The policy is based on the values and norms expected across all operations and from all stakeholders within the Group. Ulco specific HDSA procurement targets are provided below:

% HDSA spend	2008	2009	2010	2011	2012
	35%	38%	40%	42%	43%

The **objectives** of the Company's HDSA/SMME procurement and development policies are as follows:

- to identify, accredit and approve HDSA suppliers for different commodities;
- to increase the levels of contracting with HDSAs;
- to increase business opportunities for HDSA suppliers and promote entrepreneurship in local business;
- to give preference to HDSA suppliers involved in local job creation,
- to encourage existing suppliers to form partnerships with HDSA enterprises; and
- to set targets for company spend with HDSA suppliers.

Housing Conditions of Employees

All permanent employees who wish to reside at Ulco, currently have housing. The type of housing provided to the employees is dependent on their position within the Company. All houses have at least two rooms, running water, electricity and a flush toilet.

Local Economic Development

The Company believes that it can play a constructive role in the development, upliftment and rebuilding of those communities surrounding Ulco. The improvement of economic and social conditions will result in improved opportunities for growth and development, and a pool of people better equipped for employment. The Company's visible involvement will also lead to a greater acceptance of Ulco in the surrounding community. Therefore the Company's mission in this regard is to make a meaningful contribution to the social and economic upliftment of the communities where the Company is a major stakeholder; or have a meaningful market presence and to improve the future prospects of the people, especially the youth, in those communities.

The mine's **objective** in this regard is to *uplift the community* through the selected (and approved) LED programme. The **goal** is to *support the identified project* as outlined in the SLP.

10.3 HISTORICAL AND CULTURAL GOALS AND OBJECTIVES

Legal Reference: **Regulation 51(a)(iv)**

Ulco recognise the importance of preserving historical and cultural sites. The Ghaap Escarpment is known for its archaeological finding. The goal at Ulco is to ensure that no important archaeological findings are destroyed by the mining operation.

- To date Ulco has set aside the 70 hectare piece of land at Grootkloof specifically to preserve bushman painting.

11 ENVIRONMENTAL MANAGEMENT AND MONITORING

Legal Reference	*MPRDA*:	**Section 39(3)(d), Regulation 50(e), (h) & Regulation 51(b)(i) – (iv)**
	NEMA of 1998:	**Regulation 32(2)(i)** and **(o)** and **Regulation 34(b)** and **(f)**

The potential impacts associated with the on-going mining operation have been outlined and evaluated in Section 6 of this report. This section (Section 11) of the report provides a description of the management measure to be implemented to prevent / minimise / mitigate / manage the identified impacts (taking cognisance of the principals of NEMA).

The sequence of presentation of the impact assessment in Section 6 has been determined based on the requirements of the MPRDA. In order to facilitate the review process and the implementation of the management programme, this section of the report has been set out in the same sequence as the Process Description in Section 3 and the Impact Assessment in Section 6, providing management measures for impacts ranked as having a MEDIUM to HIGH significance ranking. In some cases, management measures have also been proposed for impacts of LOW or LOW-MEDIUM significance, in order to ensure that the significance of these impacts do not increase with time.

In summary the management measures outlined in this section of the report are provided for:

- Mining Department (Section 11.1).
- Processing Department (Section 11.2).
- Packing and Dispatch Department (Section 11.3).
- Quality Assurance Department (Section 11.4)
- Maintenance / Engineering Department (Section 11.5).
- Stores Department (Section 11.6).
- Human Resources Department (Section 11.7).
- Safety, Health and Environment Department (Section 11.8)
- Monitoring and EMP Performance Assessment (Section 11.9).

The presentation of the management measures / the Management Programme has been set out providing the following information in order to meet the requirements of the NEMA and the MPRDA:

- The goals and objectives that may be applicable to that activity (if any).
- The significance ranking (**SIG**) of the impact as determined in Section 6. These are presented as an abbreviation where by the following is applicable; M-H – MEDIUM HIGH, **M** – **MEDIUM**, L-M – LOW MEDIUM, L – LOW
- The action plans / management measures that must be implemented.
- The time frames for implementation. For some management measures specific timeframes can not be highlighted however, they must be implemented for the "life of mine" and hence presented as LoM.

11.1 Environmental Management Measures for the Mining Department

The following management measures are to be implemented to prevent, minimise or mitigate impacts associated with the mining activities as described in **Section 3**. Initially generic environmental management measures have been described followed by the management measures for the individual activities which are undertaken by the mining department at Ulco.

Generic Mitigation & Management Measures	Timeframes
Good housekeeping:	
• In order to implement good house keeping the following will apply:	Daily
– **No waste** will be left lying around the mining area and that waste is disposed of in the correct manner (especially blasting waste). (See waste management **Section 11.8.5**).	
– Spillages of limestone or shale (at the crushers) will be recycled through the crusher onto the respective stockpiles.	
– Bins will be provided for both domestic and hazardous waste and regularly emptied. (See waste management **Section 11.8.5**).	
– Small amount of hydrocarbon chemicals at the quarry (such as oil drums) will be stored on a concreted area which is protected from surface water runoff.	
• Inspections of the mining areas will be undertaken to ensure compliance with the good house keeping commitment.	Weekly
Hydrocarbon / Oil spills:	
• The mining department will maintain a supply of suitable absorbent to soak up oil spills. The volume of absorbent will be determined by the volume of oils stored.	LOM
• Should a spill occur the following steps will be implemented:	As and when a spill occurs
– The source of the spill will be stopped.	
– The spill will be contained using suitable absorbent.	
– Once contained the spill and absorbent will be dug up and disposed of in a drum and temporarily moved to the hazardous waste store until disposed of in the kiln.	
Health and safety:	
• All noise zones will be advertised.	Daily
• The mine will issue employees working in noisy areas (as determined by the occupational health and safety monitoring) with the appropriate hearing protection.	LOM
• All employees will be issued with and instructed to wear the appropriated personal protective equipment (PPE).	LOM
• Health and safety training will form an integral part of employee training.	Training
• All employees will be subject to annual medicals.	Annual
Storm water management in the mining area:	
• Ulco will ensure that any "clean" storm water falling outside the mined areas (quarries) is directed away from the mining area. This will be achieved by;	LOM
– Maintaining trenches / berms (suitable to influence the natural flow of runoff) ahead of the mining faces (ahead of stripping of topsoil).	
• Ulco will ensure that storm water falling within the mining footprint is diverted away from potentially polluting areas by;	LOM
– Creating diversion bunds / berms to divert storm water away from potentially polluting areas such as the vehicle parking area, workshops, coal stockpile, plants, historic SPL storage area etc	
• Storm water falling within potentially polluting areas will be directed to an appropriate evaporation pond / catchment dam.	LOM
• Storm water accumulating within the mined area will be directed to sumps / settling ponds created in the mining area. From the sumps the water will either be:	LOM
– Used for dust suppression purposes. Or,	

– Allowed to evaporate. • All storm water channels will be inspected and if necessary cleaned and maintained. If alien vegetation is noted within the storm water channel it will be removed during the inspection. • Storm water management structures will be evaluated to determine its success. Findings from the evaluation will be used to continually improve storm water management at Ulco.	Annually Annually
Management of heritage resources. • Should any archaeological artefacts, graves or skeletal material be revealed during mining activities, mining in this area will be halted and a university or museum notified in order for an investigation and evaluation of the finds to take place. • Before mining commences into an area which has not been surveyed for heritage resources, a heritage specialist will be commissioned to undertake a survey. – Findings and recommendations from the survey will be implemented. • Buildings older than 60 years will not be destroyed without obtaining the relevant permit from the Heritage Resources Agency prior to destruction.	LOM Prior to mining in unsurvey areas LOM
Red data flora species: • Before mining commences into an area which has not been surveyed for red data species, a flora and fauna specialist will be commissioned to undertake a survey. – Findings and recommendations from the survey will be implemented. • All identified red data plants will be demarcated appropriately. • If the plants are in area which will be mined, Ulco will then apply for a permit to move / remove these plants. – Once a permit is obtained, ideally the mine will move these plants into areas being concurrently rehabilitated. – If this is not possible only then will the plant be destroyed.	Prior to mining areas not surveyed After survey As and when required
Fauna: • All employees will be informed that poaching is illegal and taught to recognise snares which are to be removed if and when found. • A full record of faunal species identified in the mining area should be kept (potentially to assist in future rehabilitation plans).	During awareness training LOM
Surface water: • No mining will take place within 100m of the endoeric pan north of the current mining area.	LOM
Knowledge Gaps: • A specialist faunal assessment should be completed to identify the possibility of red data fauna species. – Findings and recommendations from the survey will be implemented • Should mining proceed beyond the current demarcated area (goes to the north of the R31) where all historic surveys have been completed, Ulco will undertake the following specialist studies: – A fauna and flora investigation – A heritage impact assessment – A groundwater investigation – A surface water investigation • The Ulco EIA/EMP will be updated with the feedback from the specialist studies.	During 2011 2 years prior to planned mining north of the R 31.

11.1.1 Mine and Resource Planning

Although there are no negative impacts associated with resource planning the negative impacts of not implementing effective planning are significant.

Goals and objectives: To optimise utilisation of mineral resources within the mining right area and to mitigate the generation of mining waste.

SIGNIF.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
H +	**On-going prospecting:** • Ulco will continue with prospecting activities (drilling) of all future mining areas to determine the quality of the mineral deposits within the mining right area. • The results from the prospecting will be used in generating the long term mine plans, which will include; – The future mining of the existing quarries – The development of the new quarries. – The positioning of haul roads. • All prospecting sites will be concurrently rehabilitated after drilling activities at the site is completed.	LOM
	Day to day mining requirements: • Variable qualities of limestone and shale will be mined, blended and stockpiled homogenously to ensure that the limestone stockpiles are suitable for clinker production and to minimise geological waste. • The mine will use feedback from laboratory analysis on the quality of the limestone and shale to ensure that the correct quality of material is being fed to the stockpiles for clinker production.	Daily LOM
	Drill hole sampling: • If necessary, as determined by the Quarry manager, drill hole sampling is to be implemented which will include: – In the areas prepared for mining, a composite sample of the limestone fines from drill holes will be taken and analysed for chemical composition. – The results of the samples will be used to plan where mining should take place within the quarry to ensure the correct quality of limestone blend for clinker production.	As and when required
	Surveyor requirements: • Face advances will be surveyed regularly by the mine surveyor and the working plan updated by the mine planner.	On average Bi-annually
	Quarry planning meeting: • The mine will implement quarry planning meetings where the following will be discussed: – Planning for the next year's mining requirements based on the requirements for the kiln production through the creation of a short term mine plan. – Environmental issues to be discussed and address in the short term mine plans will include (but not limited to); – Storm water control. – Removal of Red Data flora species / heritage findings – Topsoil removal and use in concurrent rehabilitation. – Final side wall design at the end of each mining phase. – Historic / concurrent rehabilitation requirements (if any). – Fire break requirements. • Short term mine plans will be implemented by the Quarry manager. (See **Appendix 2** for the latest short term mine plan.)	Bi-annually
	Mine plans / Aerial photographs: • The mine will update and submit to the DMR the statutory mine plans using a surveyor. Future mine plans will (at least) show;	Annually

	– The amount of mining undertaken during the year. – The location of rehabilitated areas. – A **9m** buffer zone along the boundary of the mining right area – no mining will be allowed within 9m of the boundary of the mining right area. – The 100m buffer zone around the endoreric pan • Aerial photographs will be taken to provide proof of the concurrent rehabilitation that has been implemented.	Annually

11.1.2 Haul Road Construction / Maintenance

The following management measures will apply to the construction and maintenance of haul roads within the mine.

Goals and objectives: To position the route of haul roads to ensure that the limestone reserves are accessed in the shortest possible route (to save fuel) and not to go through sensitive environmental features. Upon completion of haul roads they will be maintained in an acceptable standard.

IMPACTS / SIGNIFICANCE	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Flora / habitats L Archaeology – M Red data plants - Topsoil – L Surface water runoff – M	**Haul road construction:** • All haul roads will be planned so as to take the shortest possible distance to access the required reserves, as determined by the mine plans, while avoiding sensitive environmental features such as: – Endoreric pans. – Areas that fall outside future mining areas. • See generic management measures for management of both heritage resources and red data plants (**Section 11.1**). • Topsoil will be removed ahead of the haul road development and either stockpiled or used in concurrent rehabilitation. • During haul road construction (as per appropriate work instruction) the following environmental parameters will be considered: – Free draining of rain water falling on the haul roads. – Allow natural drainage of surface water underneath the haul road, using culverts if necessary, to cater for a 1:5 year storm event. – Appropriate compaction to reduce the future generation of dust as and when in use by haulage trucks. – Raising of the haul road above the natural topography to ensure runoff does not flow over the haul road.	During haul road construction
	Haul road maintenance: • All haul roads in use by the mine will be monitored for; – Free draining of rain water falling on the haul roads. – Surface ponding adjacent to the haul road. – Potholes and corrugation on the surface of the haul road. – Build up of fines. • As and when any of the above are identified, maintenance of the haul road will be implemented, which could include: – Should ponding be discovered either on the road or adjacent to the road, the mine will create the appropriate diversion / culvert channel to stop future ponding. – All potholes will be fixed as and when identified. – As and when surfaces become uneven from use (as determined by the haulage drivers) they will be re-graded. – Build up of fines will be removed by the grading / compaction. • Culverts under haul roads will be inspected and if necessary cleared to ensure free flow of water.	Weekly As and when required Every 6 months

11.1.3 Stripping of Vegetation, Topsoil & Overburden

Goals and objectives: The goal is to only strip vegetation and topsoil as and when required (no more than 6 months prior to anticipated mining). Topsoil stripped ahead of the mining face should either be stockpiled or used for concurrent rehabilitation.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Generic	• To prevent pollution of soil through oil spillages from vehicles: – All vehicles used for stripping topsoil will be maintained as per the maintenance schedule (on average every 250 hours). – Vehicles will be inspected daily for signs of oil leaks prior to commencement of a shift. If leaks are discovered, they will be fixed prior to using the vehicle. • Refer to generic management measures for an indication on how oil spills are dealt with (**Section 11.1**).	As per maintenance schedule. Daily inspection
Red data plants – Heritage– M	**Red data species / Heritage resources:** • See generic management measures for both heritage and red data flora species requirements (**Section 11.1**).	
Surface water runoff – M	**Storm water management:** • See generic management measures for storm water control requirements in the mining area (**Section 11.1**).	
Vegetation / habitats – L	**Removal of vegetation:** • Vegetation will be bulldozed into piles ahead (up to **100m**) of the mine face prior to stripping of topsoil. • No other vegetation other than that required to be moved to facilitate mining will be destroyed. Vehicle movement will be restricted to the areas demarcated for mining and along demarcated haul roads. • Before clearing for the next section of mining face, the piles of vegetation will be moved into the concurrently rehabilitated areas to act as a seed bank and organic matter in concurrent rehabilitation.	LOM
Topsoil – M Fines in water – M Dust – L	**Generic topsoil management requirements:** • **No topsoil** will be removed from areas demarcated as a sensitive feature (unless appropriate authorisation has been obtained); – Endoeric pans (**100m**). • Topsoil will only be stripped a maximum of **6 months** prior to an area being mined. • Topsoil will be stripped a maximum of **100m** ahead of the working face. When stripped the topsoil will be; – immediately be transported to areas undergoing concurrent or historic rehabilitation. Or – transported to a topsoil stockpile. • After an area has been stripped of topsoil, it will be checked by a supervisor to ensure that all topsoil is removed. • No topsoil will be stripped during periods of heavy rain. • In the event that topsoil is required to be stockpiled, the following will be applicable: – Stockpiles will be restricted to a height of 2m. – Stockpiles will be protected from storm water runoff by appropriate profiling and placement of stockpiles. – Stockpiles will be monitored for erosion and if discovered, the erosion will be fixed. – Stockpiles will be monitored for establishment of alien vegetation, if discovered the vegetation will be removed. – A record of the amount of topsoil stockpiled will be maintained in a register. • At no time is topsoil to be contaminated with rubble or rubbish (any foreign material such as waste drums or blasting waste etc). This is applicable for both topsoil which has yet to be stripped, topsoil stockpiles and topsoil used in concurrent rehabilitation.	LOM LOM LOM LOM LOM If topsoil can not be used immediately Monthly monitoring LOM LOM

11.1.4 Drilling and blasting

The activity of drilling and blasting has both health and safety considerations as well as environmental impacts. The management measures below are in relation to the environmental impacts.

Goals and objectives: The environmental goal during drilling operations is to contain dust created as a result of drilling operations. The environmental goals and objectives of blasting operations are to maintain an insignificant impact on surrounding land owners as a result of the blast vibrations, air blast and noise while achieving the desired fragmentation of the rock.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Generic	• The mine must maintain the permits required to ensure the legality of all explosive magazines. • All carton boxes used as packaging for explosives will be burnt at the face as per legal requirements. • No other blasting waste to be left in the mining area. • The mine management of Ulco will implement a review of blasting methods and procedures to determine if and where improvements can be made. – The review will be documented.	LOM LOM LOM Annually
Dust – M Noise – L Pollution – M	**Drilling**: • All drilling to be conducted in accordance to a drill plan as approved by the Quarry manager (which complements the short term mine plans). • All drill rigs used on the mine will be fitted with the appropriate dust suppression equipment. • Drill rigs will be maintained as per a preventative maintenance schedule. • Large Oil spills (greater than 2m in diameter) created during drilling operations will be cleaned up as per the generic oil spill management measures (**Section 11.1**).	LOM
Dust – M Noise – L	**Blasting:** • All blasting activities must take place in accordance with a detailed blasting procedure (See **Appendix 3**) and be conducted by a person who holds a blasting certificate. – Blasts will only be performed under suitable climatic conditions as determined by the certified blaster. – Blasting activities will take place during the daylight. – The size / intensity of the blast will be suitably scaled to ensure that the blast will create the desired fragmentation while having an insignificant impact on surrounding structures.	For each blast
Lowering topography – visual impact M	• Blasting activities will loosen mineral resources to align to the requirements of the short term mine plan. • Concurrent rehabilitation will be implemented	LOM
Groundwater drawdown – M	• The impacts of lowering the topography on ground water will be monitored via recording the depth of the ground water in the mining area from existing boreholes. See **Section 11.9** Monitoring Requirements – Over time the seasonal variation in groundwater levels will be determined.	LOM
Water quality – M	• The impacts of mining on the quality of the water will be monitoring via water samples being taken from existing boreholes / sumps. See **Section 11.9** Monitoring Requirements – Over time the quality of the groundwater will be determined.	LOM

	– Future fluctuations in groundwater quality that could be linked to the mining activities will be investigated. – Feedback from the investigation will guide future management measures.	
Dust – L Noise – L	**Oversize material (secondary breaking):** • All fragmented material too big to process through the crusher will be stacked in a designated area for reduction by impact hammer or secondary blasting. Once reduced in size the material will be processed through the crusher.	As and when required.

11.1.5 Loading and Hauling

The environmental management measures for loading and hauling are presented below:

Goals and objectives: To minimise the amount of dust from vehicle entrainment along haul roads.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Generic	• The production team leaders will be responsible for determining if and when haul road maintenance is required. • During times of heavy downpours, haulage activities will be temporarily halted and the mine will make use of emergency stockpiles located adjacent to the crusher. • Illumination of loading and hauling areas at night will be achieved through the use of lights on the vehicles. • Prior to the commencement of a shift the vehicle operator will be responsible to undertake a check of his / her vehicle to ensure that the vehicle is in a good condition. This includes checks for oil leaks and excessive emissions. – If an oil spill is discovered it must be cleaned up and the vehicle serviced as soon as practically possible.	LOM During heavy rain events At night Prior to each shift
Dust – M	**Managing dust from vehicle movement**. • Speed limits will be maintained on the haul roads • The generation of dust from active haul roads will be reduced through wetting the roads in use. • Spot inspection of dust suppression measures both during the day and night will be undertaken. • Improvements to dust suppression techniques on haul roads will be discussed and if necessary investigated. – Economically feasible options will be implemented.	LOM If not raining Monthly Annually
Fuel usage – H	**Fuel consumption**: • Fuel consumption in all vehicles will be monitored. • Should the consumption of individual vehicles increase by more than 20% month on month (per hour travelled), an investigation to the cause of the increase will be implemented and action taken based on the outcome of the investigation. • AfriSam will continually research opportunities to ensure that its haulage fleet is fuel efficient. – Economically viable options will be implemented.	Daily As and when required. Annually
Noise –	**Upkeep of mine vehicles / Noise control**: • All vehicles used in loading and hauling will be maintained in a good condition as per a maintenance schedule. • All vehicles / equipment used in mining to be fitted with appropriate silencers which will be maintained to ensure continued	Per maintenance schedule. LOM

	effectiveness. • Through vehicle maintenance the mine must ensure that reverse hooters (required for safety reasons) are directional.	LOM
Road kills –	**Road kills:** • The mine will (where possible) document all road kills that occur on the haul roads in a register. – If possible the species of animal killed will be recorded. • Should the mine manger determine an increase in road kill compared to historic incidents, a specialist will be employed to identify the specific management measures which can be implemented to reduce the incidents of road kill.	LOM As and when required

11.1.6 Crushing and Screening

Goals and objectives: To reduce the noise and dust resulting from crushing and screening operations

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Dust – M Noise – M	**Dust and noise:** • Controlled at the crushing plants by: – Water sprays will be activated during initial tipping of material. – Crusher house will be kept enclosed. – Roofing / side panel on conveyor belts will be maintained. – Transfer points enclosed. – Dust extraction systems at discharge points of the crusher will be used and maintained.	LOM
Water quality – L	• Routine checks of the crusher to ensure that there are no oil / hydrocarbon leakages. – Any spill discovered to be cleaned up as per generic hydrocarbon spill management measure (**Section 11.1**). • Maintenance of crushing plant according to maintenance plan. • Cleaning around the crushers will be undertaken to ensure that the build up of fines is prevented.	Weekly As per plan When required

11.1.7 Conveying and Stockpiling

Goals and objectives: To reduce dust, to reduce the likelihood of contamination of storm water and to ensure stockpiling takes place in a manner that is ideal for clinker production.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Generic	• Have emergency stockpiles available for times when mining is not possible due to unfavourable weather conditions. • No mixing of various materials on one stockpile.	LOM
Dust – M	**Dust:** • Ensure all transfer points on the conveyor system are enclosed. • Ensure that the integrity of the conveyor system is complete at all times through monthly visual inspections. – If there is apparent abnormal dust from the conveyor system, the cause of the dust must be investigated and the appropriate mitigation measure to mitigate the cause of the dust emissions must be implemented. • Use of variable height stackers so that the stockpiling of limestone / shale is undertaken where the drop is limited, thereby reducing dust generation.	Ongoing Monthly Daily

Water quality –	**Storm water management around limestone stockpiles:** • All storm water will be directed away from the stockpile area by implementation of appropriate (trench and berm around the stockpile area) storm water management system. • Storm water management channels will be checked for build up of fines and if necessary cleaned. • See monitoring **Section 11.9** for indication of water monitoring requirements.	LOM Annually LOM

11.1.8 SAQ Dump

Goals and objectives: To reduce the noise and dust resulting from crushing operations

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Dust – M Noise –	**Dust and noise:** • Controlled at the crushing plants by: – Mining will take place in a manner that the crushing / screening plant is protected from wind by the remaining SAQ dump. – Mining activities will be temporarily halted in windy conditions.	LOM
Water quality – M	• Routine checks of the crusher / screen to ensure that there are no oil / hydrocarbon leakages. – Any spill discovered to be cleaned up as per generic hydrocarbon spill management measure. • Maintenance of crushing / screening plant according to maintenance plan. • Cleaning around the crusher / screening will be undertaken to ensure that the build up of fines is prevented.	Weekly As per plan Daily

11.1.9 Concurrent and Historic Rehabilitation and Ecological Management

The benefits of rehabilitation can be described as;

- Water pollution – M+
- Alien vegetation removal / control of bush encroachers – M+
- Habitat reconstruction – M+
- Reduce dust from exposed surfaces – MH+
- Improve visual impacts – M+

Goals and objectives: To make concurrent rehabilitation an integral part of day to day mining activities. To reduce the ecological impacts associated with the mine through the implementation of concurrent rehabilitation.

MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
• A five year **concurrent rehabilitation plan** will be developed and implemented. The purpose of the plan is to detail the concurrent rehabilitation requirements for the following 5 years. The current plan is included within **Appendix 4**. • This plan must be reviewed annually during quarry planning meetings • The following 5 year plan must be developed prior to the expiry of the current plan.	Reviewed annually and updated **every 5 years**
Fire management: • The mine will implement fire management which will include: – Burning of fire breaks in conjunction with neighbouring landowners. – Burning of fire blocks. • All fire sequence events will be recorded.	LOM
Grootkloof: • The Grootkloof area will be maintained as a protected area • Annual inspections will be undertaken to ensure the area remains pristine	LOM Annual

11.1.10 Mining Supporting Services

In order to successfully implement the mining activities described above, there are a number of supporting services dedicated to the mining department. The management measures for the supporting services are described below.

Fuel Depot

Goals and objectives: To ensure that no soil or ground water pollution emanates from fuel depot area in the quarry.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Generic	• The mine will compare the fuel reserves within the tanks versus the calculated fuel reserves based on how much fuel has been purchased and used. – Should there be a significant variance; the mine will initiate investigations to determine whether there is a leak in the fuel tanks. – Measures will be implemented based on the outcome of the investigations.	Monthly
Soil – M Water - M	• All employees refuelling vehicles will be trained on the procedure to follow to ensure that the risk of spills is minimal. • Suitable absorbent material will be available at the fuel depot to be used in the case of a spill. • Should a spill occur it will be cleaned up immediately as per hydrocarbon spill procedure and lodged as a non conformance. • The refuelling area will be visually checked and any spills and contaminated soils will be dug up and disposed as hazardous waste. • The mine will concrete and implement appropriate storm water management around the refuelling area.	Trained annually & implemented daily LOM LOM Weekly By 2012.

Vehicle Parking

Goals and objectives: To ensure that there is no potential for pollution of surface water runoff from hydrocarbon spills in the vehicle parking area.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Water - M	• The area used to park mine vehicles will be inspected for signs of hydrocarbon spills. • Vehicle operators to inspect under the vehicles at the parking area for signs of oil leaks. If discovered the oil spill must be cleaned up and the vehicle serviced. • Any spills discovered will be dug up, placed in a drum and moved to the temporary hazardous waste store for disposal into the kiln.	Weekly Daily As and when discovered

Mining Administration

Goals and objectives: To ensure that all waste is handled correctly.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Generic	• All administration waste generated will be handled in terms of the Ulco waste management plan detailed in **Section 11.8.5**. • A copy of all permits, permissions, mine plans, applicable environmental management programme reports, concurrent rehabilitation plans and bush encroachment removal plans will be maintained at the mine administration offices. • A copy of all monitoring results applicable to the mining department will be held in the mine administration offices.	LOM LOM LOM

Waste dump:

Goals and objectives: To reduce the chance of water pollution from the waste dump and to ensure that there is no visual impacts associated with the dump.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Water – M	• The conditions of the approval of the waste disposal site permit must be implemented	LOM
	• Only domestic inert waste will be allowed to be disposed of in the waste dump.	LOM
	• Access to the waste dump will be controlled by the mining department.	LOM
	• The waste dump site will be fenced.	LOM
	• The sides of the waste dump will be rehabilitated through the disposing of garden refuse over the sides.	LOM
	• The waste dump will be monitored for signs of water pollution which could be associated with the waste dump. See **Section 11.9**	See monitoring
Visual	• Waste cells will be dug for the disposal of the waste. • As and when a cell is full, it will be filled in and a new cell dug.	As and when required
Recycling	• Where possible materials will be recycled on the waste dump	LOM

Vehicle Maintenance in the Workshop:

Goals and objectives: To prevent pollution of surface water resources from the vehicle / plant servicing activities that take place in the workshop. To prevent pollution from the small servicing activities that take place at the quarry workshop.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Water / soil pollution – M Fuel efficiency - +M Spill reduction - +M Tailpipe emissions - +L	• All vehicles will be maintained as per the preventative maintenance schedule. A maintenance record will be kept for each vehicle.	On average every 250 hours
	• All vehicle maintenance will be conducted within the concreted workshop facility which has the correct storm water control measures and an oil trap in place.	LOM
	• Drip trays to be used to capture used oil which can be recycled.	LOM
	• If emergency maintenance is required and the vehicle cannot be brought to the workshop facilities, then drip trays must be used to capture oil leaks.	LOM
	• Workshop facilities will have spill kits available to clean up oil spills.	LOM
	• An oil separation system at the workshop will be maintained for continued effectiveness.	LOM
	– All water runoff from the workshop area is to be directed into the oil separator.	
	• Water discharged from the oil separator system will be tested to prove effectiveness.	Monthly
	– If the results indicate the system is not effective then applicable maintenance will be implemented.	
	• The channels / pipes directing dirty water from the workshop to the oil separator will be kept clean of build up of fines and blockages. Regular checks will be performed.	Quarterly
	• All old / used oil to be collected and recycled.	LOM
	• All used oil tanks will be kept in a bunded area which has 110% the capacity of the tank. Bunded area to be kept clean of debris.	LOM
	• All new oil / lubricants to be kept within a bunded area which has the capacity of 110% of the amount of oil stored.	LOM
	• Water accumulated in bunded area if clean must be drained, and if polluted must be contained within drums and removed as hazardous waste.	LOM

	• All oil spills must initially be contained and then cleaned up as described in generic management measures (**Section 11.1**). • Oil filters, oil contaminated rags, oil contaminated sweepings must be accumulated in drums and stored within the concreted area before being collected and disposed of in the kiln. • Batteries in the workshop to be stored on a concreted area. – All old batteries will be returned to the supplier for recycling. – Any spillages from a battery will be diluted with 10 parts water before disposal.	LOM LOM LOM

11.2 Management Measures – Production Process

The management measures for the Production Department are applicable for the existing cement production facility. The following generic management measures are applicable for the generic impacts identified as been associated with the Production Department, namely, dust (M), noise ( ), visual ( ) surface water (M), and high energy / electrical usage (H).

Mitigation & Management Measures	Time Frames
Good housekeeping / Visual impacts:	
• Housekeeping in the plant area will be maintained by implementing the following:	LOM
– Uncontaminated (by other raw products) spillages of raw materials must be returned to their respective stockpiles.	
– Spilt mixed raw material, to the extent where the material identity is unknown, is to be removed as waste (see **Section 11.5.4**).	
– Clinker spills to be recycled back to the clinker open area store.	
– Cement spillages to be recycled into the cement mills.	
– Waste management to be implemented as per **Section 11.5.4**	
– Bins to be provided around the processing department in order to implement waste management.	
– Bins to be emptied and waste to be removed as per waste management plan **Section 11.5.4**.	
– The area around the plant will be kept free of build up of fines through implementing general cleaning activities.	
• Cleaners to be trained to ensure that minimal mixing of raw material spills takes place when cleaning in an effort to encourage the recycling of the materials.	See training requirements
• The plant area will ensure the implementation of the greening of exposed areas in the plant.	LOM
– Targets will be set for the greening and planting of indigenous trees in and around the plant, with these targets being met during the following year.	Annual
Oil spills:	
• The Production Department will maintain a supply of absorbent to soak up oil spills.	LOM
• Should a spill occur the following steps will be implemented:	
– The source of the spill will be stopped.	As and when required
– The spill will be contained using suitable absorbent.	
– Once contained the spill and absorbent will be dug up and disposed of in a drum and temporarily moved to the hazardous waste store until disposed of in the kiln.	
Encourage efficiency of the plant:	
• Electrical efficiency of the plant will be encouraged through the implementation of a preventative maintenance schedule by the Engineering Department and optimisation of unit outputs.	Daily
Storm water:	
• A storm water management plan for the plant must be completed.	Completed by 2012
– The recommendations to ensure separation of clean and dirty water systems within the management plan must be implemented.	LOM implementation
– The recommendations to handle "dirty water" within the management plan must be implemented.	
• Storm water channels will be checked and if necessary cleaned.	Monthly
• Storm water will be diverted away from potentially polluting areas such as;	LOM
– the open air clinker store	
– Workshops	
– Stores	
– Fuel tanks & Oil stores	
– SPL handling areas	

Noise:	
• Noise will be reduced by ensuring that equipment is maintained to ensure that noise levels are not excessive.	LOM
• If the noise emissions from equipment are determined to be rising (determined either through normal hearing or through noise monitoring performed for occupational health and safety reasons), the equipment will be maintained.	LOM
Health and safety:	
• All noise zones will be advertised.	LOM
• The Production Department will issue employees working in noisy areas (as determined by the occupational health and safety monitoring) with the appropriate hearing protection.	LOM
• All employees will be issued with and instructed to wear the appropriated PPE.	LOM
• Employees handling the SPL will be provided and trained to handle the SPL and use the correct PPE.	LOM
Atmospheric emissions levels:	
• Ulco will maintain an **atmospheric emission inventory** which includes;	LOM
– List of all types of atmospheric emissions.	
– The point of emission.	
– The abatement device.	
• This inventory must be updated regularly or when there is a change to the process that impacts on emissions.	Monthly
• All gaseous emissions levels will be kept within the latest air pollution prevention permit (or equivalent) requirement.	LOM
• Ulco will comply with the requirements of the relevant air quality legislation. (Ulco will convert their APPA permit into an air emission license in terms of the National Environmental Management: Air Quality Act)	LOM
• Any non compliance to the emissions levels set within the permit will be recorded as a non conformance and applicable actions (including reporting to CAPCO) will be implemented to prevent future exceedance of emission levels.	When a non compliance is recorded.
• Ulco will investigate the implementation of additional / updated technology to reduce emission levels.	
– Economically viable technology will be implemented.	Annually
Atmospheric emissions reporting:	
• All legally required emissions reports will be compiled and submitted to the relevant authorities as and when required.	LOM
Dust control equipment:	
Dust control equipment includes, bag houses and ESP, enclosure of transfer points, water sprays at transfer points etc.	
• The equipment will be operated effectively by ensuring those employees responsible for the equipment are trained.	LOM
• Dust control equipment will be maintained in accordance with a preventative maintenance schedule.	Maintenance schedule.
• During times of maintenance or process disruptions, the effect of the equipment being off line will be reduced by adapting the process accordingly such as reducing the throughput of the kiln or stopping altogether.	When required
• If there is a failure of the dust control equipment, maintenance activities will be implemented immediately.	When required

11.2.1 Raw Materials Delivery and Storage

The following management measures are applicable to the delivery and storage of raw materials. These include carboneous SPL and iron ore / magnetite

Goals and objectives: Reduce dust generation when handling raw materials. Minimise loss of raw materials through correct handling procedures. All spills to be recycled.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Dust – L	The following management measures are specifically designed to reduce **dust generation** as a result of raw material delivery and storage: • Operators will be trained on best techniques to handle raw materials in a manner that reduces dust generation such as reducing drop heights. • Visual checks to ensure that all the various raw materials (including SPL) are stored within their designated areas. • Visual check to ensure that there is no build up of fines that could act as a source of dust at transfer points. Where there is a build up, it will be cleaned immediately.	During handling of raw materials. Training Weekly Monthly
Surface and Groundwater – M	• The following management measures are specifically designed to reduce the impact on **surface water / ground water** as a result of material handling. – All spills under transfer points will be cleaned up and moved to the respective stockpiles. – Maintenance of a storm water management system that directs surface water away from stockpile areas. – The effectiveness of storm water control will be checked during rain events. Any evidence of storm water running through a stockpile will be rectified. – SPL will be stored within a covered store with a concreted base which has the appropriate storm water controls in place. • Implementing of a surface water and groundwater monitoring programme to ensure that there are no significant impacts associated with the raw material stores. See **Section 11.9** – Monitoring	 Monthly Monthly During storm events. By 2012 Per monitoring
Visual -	• Implement good house keeping in and around transfer points and the stockpile area.	LOM

11.2.2 Recovery of Raw Material and Raw Milling

Goals and objectives: To ensure that 100% of the raw material is used to create raw meal.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Generic	**Production efficiency:** • Mix design into the raw mill to be controlled by accurate monitoring of the flow / weight of raw materials into the raw mill via the proportioning tower. • Sampling undertaken by the Quality Department will confirm all raw materials and raw meal is suitable for clinker production.	 Daily Daily
Dust - M	**Reduce dust:** • A variable height reclaimer will be used to reclaim limestone from its stockpile. • Conveyors will be partially covered to reduce wind blown dust generation. • Transfer points will be enclosed. • Implementation of good house keeping (see generic management measures – Section 11.2).	 LOM LOM LOM LOM

	• Emissions from the raw mill will be drawn through a dust extraction unit. • Any spillages of raw meal will be recycled through the limestone stockpiles. • The mine will investigate specific point source of dust created through the reclaiming of the raw material. – The purpose of the investigations will be to see if there is economically viable means of reducing dust levels during handling of material. A record of the discussions will be kept. – Viable solutions will be implemented.	LOM LOM Annually

11.2.3 Coal Milling

Goals and objectives: To ensure coal resources are not wasted and to reduce the likelihood of dust from coal milling.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Dust - M	The potential for dust will be reduced by: • Drawing the emissions from the coal mill through dust extraction equipment.	LOM
	The loss of coal resources will be reduced by: • All coal spillages will be recycled back onto the coal stockpile.	Daily

11.2.4 Alternative Fuels / Use of SPL

Goals and objectives: To ensure that the handling of the SPL or other alternative fuels do not result in any environmental impacts and to encourage the future use of additional alternative fuels.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Generic	• A concreted covered store with appropriate storm water controls in place specifically for SPL will be constructed. • The storage of other hazardous alternative fuels (oil polluted material) will be in a concreted, covered area with the appropriate storm water controls in place. • Detail records will be maintained of the amount of alternative fuels used within the process. At no time will the alternative fuel use exceed the permitted amount detailed on their air emissions license. • All employees working with the SPL will wear the appropriate PPE at all times. • Employees / contractors who handle SPL will be trained on operational and potential emergency procedures regarding SPL.	By 2012 By 2012 LOM Per training requirements. LOM
	• Ulco will investigate additional alternative fuel resources which can be used instead of coal for generating the heat in the kilns. – Any viable alternative fuel will be authorised through a separate environmental impact assessment process in terms of the National Environmental Management Act, Act 107 of 1998. – This will include undertaking the relevant air quality specialist studies. • The implementation of additional alternative fuel burning will only be commissioned upon the granting of all the relevant environmental authorisations. – Management measures documented within the environmental authorisation will be implemented by Ulco.	LOM

Soil / Surface water / Ground water - **M**	• SPL will be stored in a designated store which is covered and has a concrete floor. • This store will be protected from storm water flow. This will be confirmed during rain events. • The SPL area will be monitored to ensure that no SPL falls outside its designated location. • Any waste associated with SPL will be disposed of as hazardous waste.	LOM During rain events Daily LOM

11.2.5 Clinker Production

Goals and objectives: To ensure legal compliance of the atmospheric emissions resulting from clinker production.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Generic	**Kiln capacity:** • Kiln capacity per annum, as depicted on the current APPA permit (or equivalent) must not be exceeded.	LOM
Dust – **M**	**Reduce dust:** • Particulate emissions from the kilns will be drawn through dust extraction equipment. • All dust extraction equipment will be maintained as per the preventative maintenance schedule. • Preference will be given to using the clinker silo rather than the open air clinker store.	LOM
Visual -	• Implement good house keeping in and around the plant area.	LOM
Emissions – **H**	Measure **emissions:** • To ensure emissions levels are maintained within the set standards Ulco has installed an OPSIS monitoring system which measures the following emissions continuously: – SO_2, CO and NOx. • Particulate emissions are monitored at the following stacks: – Kiln – Cooler stack – Coal mill stack – Cement mill stack – Extraction point of the packing plant • All emissions measuring equipment is calibrated as required for each equipment. • Isokinetic monitoring will be implemented on all stacks (except the main stack)	LOM LOM LOM Every 6 months
	• Emission limit value is set and monitored in the control room for particulates, SO2 and NOx. • Limit settings must be activated in the control room to prompt a reaction to exceedances in emissions	LOM LOM
	• To ensure emission levels are maintained within the permitted levels Ulco will: – Ensure the quality of all raw products being used in the clinker / cement manufacturing process is ideal (See **Section 11.4**) – Should raw products not be within the required spec, they will be blended until within spec. – Reduce SOx emissions through the using of low sulphur coal.	LOM

	• If emission levels exceed permitted conditions Ulco will: – Reduce production to bring the emissions level into permitted levels and then rectify the problem causing the high emissions limits. – Record the exceeded incident as a non conformance immediately and report it to CAPCO in the quarterly report. • If necessary, Ulco will shut down production and implement maintenance activities.	As and when emissions are exceeded.
	• Unexpected problems associated with the kiln and production which may result in high emissions will be limited by: – Implementing a preventative maintenance programme for all parts associated with the plant.	LOM

11.2.6 Clinker Milling and Cement Storage

Goals and objectives: To produce cement within the specification of AfriSam standards while maintaining the lowest possible clinker factor and reducing potential impacts on water and the atmosphere.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Dust – M	**Reduce dust:** • Emissions from the cement mills will be drawn through dust extraction equipment. • Any spillages will be recycled through the cement mills.	LOM LOM
Reduce clinker factor – H+	• Reduce the clinker factor through the addition of extenders: – Ulco will reduce the amount of clinker to produce cement through the addition of extenders (such as secondary limestone). – Extenders will be added to the point where by the quality of the cement is not adversely affected as determined by the AfriSam standards. • On-going investigations by AfriSam will be implemented on ways to reduce the clinker factor while maintaining the quality of the cement. – Viable solutions will be implemented.	LOM LOM

11.2.7 Process Supporting Services

Fuel Tank

Goals and objectives: To ensure that no surface water pollution emanates from the fuel depot.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Water -	• The fuel tanks will be kept within a bunded area with a capacity of at least 110% of the capacity of the tank. • The valve on the bunded area will be kept locked unless needed in the case of a spill or heavy downpour of rain. • Bunded area to be kept clean of debris. • The integrity of the bunded area to be checked and if necessary reinforced. • The location of the outlet pipe of the fuel tank will be inspected for signs of pollution. If noted, plans must be implemented to clean up the pollution and prevent future pollution.	LOM LOM LOM Annually Annually
	• All employees using the fuel for the kiln start-up will be trained on the procedure to follow to minimise the risk of spills. • Suitable absorbent material will be available at the diesel tanks to be used in the case of a spill. • Should a spill occur it will be cleaned up as per the generic management measure and logged as a non conformance (Section 11.2).	Training LOM When required

Grinding aid:

Goals and objectives: To prevent any surface water pollution as a result of poor storage and handling of grinding aid.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Water – M	• Grinding aid / Strength enhancer: – Ulco will make use of a grinding aid / strength enhancer during the cement mill process. – The grinding aid will be contained within a bunded facility with 110% capacity. – On arrival of grinding aid to Ulco, it will be transferred immediately to its designated facility. • Any spillage of grinding aid must first be contained (prevented from entering into any storm water system) and then cleaned up as indicated on its MSDS.	LOM Upon arrival When required.

Kiln Shutdown Maintenance / Start Up

Goals and objectives: To ensure the efficiency of kiln through the implementation of preventative maintenance.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Dust – L Off gases – MH	• The kilns will be maintained during scheduled maintenance shutdowns. • Should it become necessary, due to equipment failure, additional shutdown events during the year can be planned. • As and when kiln bricks are replaced, the old bricks will either be sold or internalised.	As per schedule. When required When required
	• Ulco will ensure that the capacity of the stores is large enough to store the chemicals required for major scheduled maintenance activities.	LOM

Electricity Usage

The impacts associated with high energy use are all off site impacts associated with the generation of power.

Goals and objectives: To monitor electrical usage and encourage electrical efficiency.

MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
• Ulco will communicate with the relevant officials of Eskom with regards to load shedding requirements. Ulco will, if possible, work with Eskom on regulating energy requirements. This will include: – Ulco will implement and make use of cleaner technology to reduce electrical consumption as and when possible.	LOM
Encourage electrical efficiency: • The mills and kiln will be routinely maintained to ensure electrical efficiency. • When possible the mills and other high energy equipment will be run during periods of off-peak electrical demand. • Electrical use will be monitored and recorded as kW per ton of raw meal / clinker produced. – Large fluctuations in the mills electrical use will be investigated and recommendations to rectify the electrical use from the investigations will be implemented.	Per maintenance schedule LOM Ongoing If required
• Ulco will maintain a generator to keep essential equipment running during times of power failures.	LOM

Reduce energy consumption: • Ulco will investigate technology which will reduce energy consumption per ton of clinker produced. – Economically viable technology will be implemented. • The efficiency of the current energy saving technology will be maintained through the appropriate preventative maintenance.	LOM Per maintenance schedule

Water Reservoir / Cooling Water:

Goals and objectives: To ensure that the chemicals used in the cooling water is stored, handled and used in accordance with the MSD sheet.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Generic	• Only chemicals approved by the Quality Department will be used for cooling water. Chemicals will be stored, handled and used in accordance to its MSDS. • The MSDS for the chemicals used will be available at the place of storage of the chemicals.	LOM
	• The cooling water ponds and the storage area for the chemicals used to treat the water will be inspected. – Any problems / bad housekeeping identified during the inspections will be rectified as soon as possible.	Weekly

11.3 Management Measures – Packaging and Dispatch

The following management measures are to be implemented to prevent, minimise or mitigate impacts associated with the Packing and Dispatch Department. Generic impacts associated with more than one activity in this department are dust (M), pollution to water resources (M) and visual ( ). The following generic management measures are applicable for this Department.

Mitigation & Management Measures	Time Frames
Good housekeeping:	
• Housekeeping will be maintained by implementing the following:	Daily
– Raw material spills to be recycled back onto respective stockpiles.	
– Cement spills to be internalised and recycled.	
– Waste management to be implemented as per **Section 11.8.5**.	
– Bins to be provided to implement waste management.	
– Bins to be checked and if necessary emptied.	Weekly
– Open areas to be cleaned on a regular basis.	Daily
• The packing plant area will ensure the implementation of the greening of exposed areas.	LOM
– Targets will be set for the greening and planting of indigenous trees in and around the packing plant, with these targets being met during the following year.	Annual
Oil spills:	
• The department will maintain a supply of absorbent to soak up oil/diesel spills. The volume of absorbent stored must be related to the volume of oil being stored.	LOM
• Should a spill occur the following steps will be implemented:	
– The source of the spill will be stopped.	When required
– The spill will be contained using suitable absorbent.	
– Once contained the spill and absorbent will be dug up and disposed of in a drum and temporarily moved to the hazardous waste store until disposed of in the kiln.	
Storm water:	
• The storm water management plan must be completed.	Completed by 2012
– The recommendations to ensure separation of clean and dirty water systems within the management plan must be implemented.	
– The recommendations to handle "dirty water" within the management plan must be implemented.	
• Storm water channels will be checked and if necessary cleaned.	Monthly
Health and safety:	
• All noise zones will be advertised.	LOM
• The department will issue employees working in noisy areas (determined by the occupational health and safety monitoring) with the appropriate hearing protection.	
• All employees will be issued with and instructed to wear the appropriated PPE.	
Emissions:	
• All emissions from the packing plant will be drawn through dust extraction equipment.	LOM
• The dust extraction equipment will be maintained as per a planned maintenance schedule	
• Should emissions levels rise greater than the permitted amount, an alarm will sound in the control room.	
• If the alarm is sounded, maintenance activities will be implemented to resolve the cause of the excessive emissions.	
Calibration of weigh bridges / scales:	
• To ensure the correct weight of cement being sold, and to ensure that no overloading of vehicles takes place, scales will be calibrated. Internal calibration checks includes;	As per schedule
– The packers	
– All weigh bridges	

• External calibration of scales will be performed • Any vehicle determined to be overloaded will be prohibited from leaving the site until within acceptable weigh limits.	Annually When required
On-going improvements: • The departments will evaluate all sections to identify where improvements can be made to reduce dust generation. – Focus will be given to reduce the amount of handling of the cement spills e.g. using mobile skips to collect cement spills during operation and sweeping cement off the floor. – Viable options will be implemented.	Annually
Security: • Security check point will be used to monitor the standard of vehicles entering and exiting Ulco. If, through this monitoring, deficiencies are noted that could cause an environmental impact, vehicle operators will be informed so that the vehicle can be repaired appropriately.	LOM

11.3.1 Receipt of Raw Materials:

The packaging and dispatch department is responsible for the receipt and stockpiling of coal, char and gypsum delivered by rail and off loaded via the tippler onto their respective stockpiles.

Goals and objectives: Reduce dust emissions during the delivery of raw materials. Ensure that all raw materials are transferred to their respective stockpile. Ensure that the potential for water pollution is reduced through the appropriate management measures around the stockpiles.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Dust -	**Off loading of raw material / conveying to stockpiles:** • All raw materials delivered by rail will be offloaded at the tippler. • The weight of the material is measured prior to off loading. • The tippler will be adapted to be able to handle vehicle off loadings as well as off loading from train wagons. • Material will be conveyed from the tippler to its respective stockpile immediately after offloading. • After completion of offloading, the various transfer points will be cleaned up of any small spillages and material returned to the respective stockpile. – At no time will there be excessive spillages of any material at the transfer points.	During delivery of material During 2012 After offloading
Water - M	**Storm water management around coal stockpiles:** • The coal / char stockpile area should be managed as a separate catchment within the stockpile area. • All storm water falling outside the coal stockpile catchment will be directed away from the catchment area by implementation of appropriate (trench and berm around the stockpile area). • All storm water falling within the catchment area must be directed to a pollution control dam (PCD) – This PCD should have a volume to contain a 1:50 year rain event. – The PCD should be designed with energy dissipaters to encourage settling of coal dust and other solids. – The PCD should have a minimum freeboard of 0.8m. • Storm water management structures will be checked for build up of fines and if necessary cleaned. • Both surface and ground water from this area will be tested as part of the water monitoring campaign (**Section 11.9**). Should the results of the water monitoring campaign raise any concerns, appropriate management measures will be implemented to remedy the concern.	LOM LOM To be developed by 2012 Every 6 months See Monitoring

11.3.2 Bulk Loading

Goals and objectives:. To reduce the amount of spillages / dust as a result of bulk loading activities.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Dust – L	• Dust resulting from bulk loading activities is reduced through the following measures: – De-dusting systems are fitted and operated at the bottom of all bulk loading points. – Bulk loading takes place on a weighbridge and is automatically stopped based on weight (prevents overfilling). A sensor which determines when a bulk container is full acts as a back up. – When filling a tanker, visual inspections by the bulk loader operator will ensure that the seal between the bulk loading point and the tanker is effective and minimal cement escapes. – When a container is full it will be sealed by the operator. – Any clinker or cement spillages at the bulk loading points will be recycled immediately back into the system. • Good housekeeping around bulk loading transfer points will be implemented. • Regular maintenance of all dust suppression equipment, and the bulk loading process will be implemented by the engineering department.	LOM Daily Maintenance schedule

11.3.3 Packing / Palletising Plant – Loading of Bags

Goals and objectives:. Ensure the weight of bags is correct and to reduce dust levels at the packer.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Generic	• Bag weights will comply the requirements of SANS 1841. • Regular checks using mass-pieces calibrated in terms of SANS 1697 will be implemented. – If the result for the 50 kg weight is between 49.96kg and 50.04 kg, the scale can be used. – If the results are however outside of above ranges the scale must be removed from use to be calibrated. • The mass-pieces shall be calibrated and calibration certificates and records shall be obtained. • The scale shall be externally calibrated at least every 2 years or after repairs or service.	LOM Daily Every 6 months Every 2 years
	• Any bag below 49.50 kg will be shredded automatically (and regarded as a bag breakage) and the loose cement returned to the packer bin. • Targets for the packaging and logistic department: – To achieve less than 0.8% of under weight bags. • If the target is not achieved then investigations will be implemented. – Results of the investigations will be used to implement additional management measures.	LOM
	• All waste plastic will be removed from the packaging and dispatch area as per waste management protocol (**Section 11.8.5**).	LOM
Dust -	• Dust extraction equipment on the packers will be used to reduce dust levels. • Its effectiveness will be maintained through the implementation of	Daily Maintenance

	appropriate maintenance activities. • All spilt cement will be recycled back into the system.	LOM
	• All cement bag loads onto vehicles will be covered by tarpaulins to prevent dust during transportation. This mitigation is not necessary where pallets have been shrink wrapped.	LOM

11.3.4 Railway Activities

Goals and objectives: Reduce dust and noise emissions during the delivery of raw materials. To ensure that diesel spills from the locomotives do not result in unacceptable water pollution.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Dust - Noise - L	**Shunting / Tippler area:** • Keep tippler area clear of build up of material. • Ensure the integrity of the tippler is maintained • No fly shunting will be performed.	LOM
Water - M	**Rail activities:** • The maintenance and up keep of the rail activities will include; – Ensuring there are no excessive spills of diesel / oil from the diesel engines. – Diesel engines will be maintained as per maintenance schedule. – The location where diesel engines spend most time on site will be inspected. If regular spills are noted in one position, Ulco will implement measures in the area to catch future spills. – Polluted ballast must either be cleaned with a suitable environmentally friendly chemical or replaced. If removed, polluted ballast to be regarded and disposed of as hazardous waste. – Build up of fines along the railway lines will be kept to a minimum through appropriate cleaning. – Private railway lines will be kept clear of vegetation growth.	LOM Maintenance schedule Inspect biannually When necessary When necessary When necessary

11.3.5 Road Activities

Goals and objectives: To minimise the impacts of the vehicles leaving Ulco on the regional road network.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
General	• Ulco will ensure that the transport companies who collect and deliver material from Ulco make their drivers aware of the following: – Traffic laws and speeding restrictions areas. – Monitoring vehicle for leaks / spills. – Reporting status of the roads.	LOM
Road concerns – M	• All product transport vehicles leaving Ulco will be weighed prior to leaving the site. – Any product transport vehicle determined to be overloaded will be prohibited from leaving the site until within acceptable weigh limits.	Annually LOM
Dust – M	• All product transport vehicles will be covered with a tarpaulin to reduce the chance of dust escaping during the transportation of cement.	LOM
Noise -	• Ulco will prohibit any access to vehicles emitting excessive noise or fumes or leaking oil.	LOM

11.3.6 Vehicle Parking Area

Goals and objectives: To control dust from this area and to ensure that no potential hydrocarbon spillages could impair storm water.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Water - M	• The vehicle parking area will be inspected for signs of oil/fuel spills and product spills. – Any signs of oil/fuel spills will be cleaned with absorbents and removed as hazardous waste. – Any product spills will be cleaned up based on the nature of the product. – All general waste will be removed and disposed of in the Ulco waste management system.	Monthly When required
Dust – M	• During dry windy months dust from the vehicle parking area will be minimised through the use of water.	LOM

11.3.7 Supporting Services

The following additional management measures are applicable to supporting activities associated with Packing and Dispatch Department. Some of the generic management measures cover the requirements for supporting activities and hence have not been repeated.

Pallet Repair and wood chipper:

Goals and objectives: To reuse all pallets and where wood is deemed not usable, to chip it up to make it possible to use in concurrent rehabilitation.

MITIGATION & MANAGEMENT MEASURES	TIMEFRAMES
• Should pallets be damaged, they will be repaired for re-use.	Daily
• Where wood slats are beyond repair, the wood will be processed through a wood chipper. • The wood chips will be used to aid concurrent rehabilitation requirements	LOM

Waste pit:

Goals and objectives: To ensure that waste is controlled within the pit and disposed of appropriately.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Water - M	• All inert waste from the rail wagons will temporarily be stored in the waste pit. • Any waste from rail wagons of which the identity is unknown will not be cleaned from the rail wagon. • Storm water controls will be constructed to divert storm water from flowing into the pit. • As and when the capacity of the pit is full, the inert waste will be removed to the waste disposal site.	Monthly When required

Forklift Maintenance

Goals and objectives: To ensure that the forklifts are maintained in an acceptable standard that does not result in unnecessary pollution.

MITIGATION & MANAGEMENT MEASURES	TIMEFRAMES
• All forklift maintenance will be performed as per the maintenance plan. Waste will be handled as per **Section 11.8.5**. • Forklift maintenance will take place on a concreted protected area. • Any new or old oils will be stored within a bunded protected area. • All forklift operators will undertake a pre-shift inspection to ensure the forklift is in good working order prior to the shift.	As and when required Daily

11.4 MANAGEMENT MEASURES – QUALITY DEPARTMENT

The purpose of the Quality Department is to ensure overall quality of the clinker and cement produced at Ulco. In addition, the Department ensures that the quality of the raw materials used in the clinker and cement manufacturing process contributes to the reduction of emissions.

Samples will be taken and tested at various stages of the cement manufacturing process from the receipt of raw materials to the final cement product to ensure that the quality of all the raw materials and the cementitious products used and created at Ulco are of a standard that is acceptable for AfriSam and industrial standards. The impacts associated with the activities that take place in the laboratory include waste, impact on surface water (M) and impact on the atmosphere through fumes ( ).

Goals and objectives: To ensure that the quality of the cement is in line with EN specifications and to ensure that all chemicals are handled and disposed of in the correct manner.

IMPACTS / SIGNIFICANCE.	MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
Generic	• Draw up and implement **a sampling programme** from the raw materials to the final products to ensure that the quality of materials is within specifications.	LOM
	• Ulco have implemented and will **maintain ISO 9001:2000**, a quality management system to guarantee the quality of the cement produced.	LOM
	• Ulco will ensure correct calibration of all laboratory equipment. The following information is given for each equipment type requiring calibration checking, in a **calibration check register**: – Details of equipment type – Equipment register number – Location – Frequency of checks – Check method – Acceptance criteria – Persons authorised to check calibration – Action to be taken when the results are unsatisfactory • All inspections, measuring and test equipment that has been identified as requiring periodic calibration verification will bear a label indicating when the next calibration check is due i.e. the calibration status. • Keep proof of calibration	LOM
Surface water - M	The laboratory will reduce the chance of an impact on **surface water quality** by: • Ensuring that all chemicals disposed down the sink are diluted to a point where by there is no significant impact. • Periodic testing of the wastewater at the sewage plant will be undertaken to prove there is no impact on water quality from the laboratory activities. – Should the results of water testing indicate the water quality is of unacceptable quality compared to applicable guideline document then Ulco will implement amended management practices.	Daily See monitoring When required
	The likelihood of a **spillage will be reduced** through: • Ensuring chemicals are stored within a locked store room and only those trained in the use of the chemicals have access to the store room. The impacts associated with a spillage will be reduced by ensuring: • All personnel in the laboratory are trained on the procedures to implement clean ups, depending on the chemical that is spilled.	LOM Per training requirements.
Fumes - L	• All activity in the laboratory that results in noxious fumes will be performed within an operational fume cupboard.	Daily

11.5 MANAGEMENT MEASURES – ENGINEERING

The Engineering Department is responsible for the upkeep and maintenance of all plant and mining equipment. Maintenance scheduling is based on the risk of failure of the equipment and is captured on a computerised scheduled maintenance plan. Through implementing preventative maintenance, Ulco is essentially reducing the likelihood of potential negative impacts occurring. Namely, water pollution probability is reduced (M+), electrical needs are reduced (H+) and atmospheric emissions are reduced (M+).

GENERIC MITIGATION & MANAGEMENT MEASURES	TIMEFRAMES
Good housekeeping:	
• Housekeeping for the Engineering Department will be maintained by implementing the following:	LOM
– All waste metal / empty drums and shavings to be stored in the scrap yard.	
– All chemicals will be stored as per the requirements documented in the applicable MSD sheet.	
– Waste management to be implemented as per **Section 11.8.5**.	
– Bins will be provided around the engineering department for general waste.	
– Workshops will be cleaned and maintained in a neat state.	Daily
• Bins to be emptied and waste to be removed as per waste management plan.	
• Training on the handling, use and disposal of the chemicals used by the engineering department will be implemented.	Training matrix
Oil spills:	
• The Engineering Department will maintain a supply of suitable absorbent to soak up oil spills. The quantity of absorbent available will depend on the volume of oil stored.	LOM
• Should a spill occur the following steps will be implemented:	
– The source of the spill will be stopped.	When spills occur
– The spill will be contained using suitable absorbent.	
– Once contained the spill and absorbent will be dug up and disposed of in a drum and temporarily moved to the hazardous waste store until disposed of in the kiln.	
Health and safety:	
• All noise zones will be advertised.	LOM
• The Engineering Department will issue employees working in noisy areas (as determined by the occupational health and safety monitoring) with the appropriate hearing protection.	
• All employees will be issued with and instructed to wear the appropriated PPE.	
Redundant buildings:	
• The Engineering Department will evaluate all infrastructure associated with the mine.	Annually
– A plan will be drawn up and implemented for the removal / demolishing of any infrastructure that is deemed redundant with no future use either for the operating of the mine or benefit society at the end of life of mine.	
Calibration checks:	
• Inspection of maintenance equipment and the water flow meters will be performed as and when required.	LOM
• Details on the requirements for inspection of equipment / flow meters will be kept on the computerised maintenance management system.	LOM
• Equipment used to calibrate, will be labelled to indicate the next time it needs to be calibrated.	LOM

11.5.1 Planning

All maintenance is scheduled through detailed planning. The planning sub-department directs all the maintenance needs of the operation to the sub-sections within the Engineering Department.

The planners within the Engineering Department produce short term schedules for the implementation of on-going maintenance. Planning is based on;

- Pro-active maintenance to prevent negative impacts associated with the wear and tear of equipment occurring.
- Reactive non urgent maintenance in relation to the breakdown of equipment.
- Reactive urgent maintenance.

11.5.2 Support

The support department is responsible for:

GENERIC MITIGATION & MANAGEMENT MEASURES	TIMEFRAMES
Special projects: • The support sub-department will assess process re-engineering options, to improve both the efficiency of the plant and the overall environmental performance of the mine. The environmental impacts recognised as the most significant, and therefore receive most attention in terms of reducing impacts will included, but not limited to: – Emissions – Energy use (both coal and electricity) – Fuel usage – Dust generation – Water use / reuse – Minimising / recycling waste products • Economically viable options will be implemented. • If necessary, legal permits and permissions will be obtained prior to the implementation of a new process.	LOM

11.5.3 Maintenance Plant

The mechanical sub-department will implement the maintenance activities as indicated in the short term schedules for;

- Plant / boiler making activities
- Fitting activities
- Dust suppression equipment – the target for control equipment availabilities is that it is maintained at **95%** operational or more.

11.5.4 Electrical

The electrical sub-department will implement all maintenance associated with electrical equipment and radioactive sources. The following environmental management measures are applicable for the electrical sub-department.

MITIGATION & MANAGEMENT MEASURES	TIMEFRAMES
Transformers / PCB contaminated oils: • All transformers will be checked for PCB contamination. – If there is no contamination, the appropriate labelling will be shown. – If there is PCB contamination, then the contractor must remove the oil and replace it will clean oil. • When transformer oils are cleaned by a contractor it must be assured that the equipment used by the contractor is absolutely free of PCB's. Oil contaminated with PCB's will be drained and sealed in 210ℓ drums and to be stored in the temporary hazardous waste store. Safe disposal procedure for these PCB's to be followed.	Every 5 years As and when required

Energy savings: • Engineering will be responsible to measures energy consumption. • Discussion concerning possible energy saving measures that can be implemented in the different section of the mine will be held, recorded and filed. – Implement any viable energy saving measures resulting from the discussions. • Ulco will undertake an analysis of power demand and supply of all major energy consuming units.	LOM As and when required As and when required. Every 5 years
Radioactive sources: • Ulco will at all times have an appointed radiation protection officer whose duties will include: – Ensure that all persons who may work near the installation are fully aware of the associated radiation hazard and are familiar with correct work procedures. – Ensure that radioactive sources are appropriately sign posted. – The transfer of a radioactive measuring system from one place to another must take place under the guidance of the radiation protection officer. – When the radioactive source is removed from service, the radiation protection officer must ensure that it is immediately removed from site by an approved contractor. – No person is allowed to do maintenance work on a radioactive measuring system which directly involves the radioactive source (e.g. replacing defective sources). • Stock levels to be check and audited and stock forms submitted to the Department of Health	LOM Annually
• A source container in which a radioactive source has been installed must be tested for contamination. This is done by a leak test, which is performed by an accredited company who offers a leak testing service. – If the source is found to be "leaking", the Department of Health must be notified immediately.	At least biennially
• If a source has decayed to below its useful activity, it is not necessarily radioactive waste, but nevertheless it has to be disposed of in an orderly manner where by a disposal trail is documented and recorded. • The company shall not dispose of a sealed source, or a radioactive measuring system containing a sealed source without the written approval of the Department of Health. "Dispose" here includes the sale, lending, donation, exchange, as well as the return of the source to the supplier.	When required.

11.5.5 Maintenance Civil

The civil sub-department will implement the maintenance activities as indicated in the short term schedules for;

- Water reticulation systems
- Storm water management channels
- Infrastructure
- Air conditioners
- Village infrastructure.

11.6 Management Measures – Administration / Stores

The following management measures are applicable for the Administration / Stores Department. The potential negative impacts associated with the Administration / Stores includes an impact on soil / water through potential spillages of chemicals (M) and a visual impact through untidy storage of spares (L).

Generic Mitigation & Management Measures	Timeframes
Good housekeeping. • Housekeeping for the Administration / Stores Department will be maintained by implementing the following: – All chemicals will be stored as per the requirements documented in the applicable MSD sheet. – Appropriate storm water management measures to be in place around the storage of all hazardous chemicals. – Waste management to be implemented as per **Section 11.8.5** – Bins to be provided around the Department for general waste. – Bins to be emptied and waste to be removed as per waste management plan.	LOM
Oil spills: • The Department will maintain a supply of suitable absorbent to soak up oil spills. The quantity of absorbent available will depend on the volume of oil stored. • Should a spill occur the following steps will be implemented: – The source of the spill will be stopped. – The spill will be contained using suitable absorbent. – Once contained the spill and absorbent will be dug up and disposed of in a drum and temporarily moved to the hazardous waste store until disposed of in the kiln.	LOM
Health and safety: • All noise zones will be advertised. • The Administration / Stores Department will issue employees working in noisy areas (as determined by the occupational health and safety monitoring) with the appropriate hearing protection. • All employees will be issued with and instructed to wear the appropriated PPE.	LOM

Goals and objectives: Ulco will ensure that it has a copy of all applicable MSD sheets for all chemicals stored and used on site. The storage, handling and disposal specifications within the MSD sheets will be implemented.

Mitigation & Management Measures	Time Frames
Storage and distribution of chemicals:	
• All chemicals stored on site will be done so in line with the requirements documented in the MSD sheet.	LOM
• All hazardous chemicals will be stored within secure areas and only the responsible person who is aware of the correct handling procedures will have access to this area.	LOM
• Liquid hazardous chemicals will be stored within a bunded area (110% of capacity of liquid stored).	LOM
• The stores will have the capacity to handle the chemicals required for scheduled maintenance activities.	LOM
• No chemicals which could potentially react together will be stored together.	LOM
• Upon delivery of chemicals to be stored, they will be transported into the correct storage area immediately after delivery.	During delivery
• Forklift truck drivers who transport hazardous chemicals will be made aware of the potential dangers of spillages of the chemicals.	Per training matrix
• When a chemical is issued, the person receiving the chemical will sign confirmation that they have access to a copy of the relevant MSD sheet in the section where it is used.	On issuing a chemical
Material Safety Data Sheets: • The Stores Department shall be responsible for the acceptance of all chemicals on	

the site and no chemical can be brought onto the site without the appropriate MSDS being provided by the supplier. • A master copy of all MSD sheets will be kept by the Stores Department. • Copies of the applicable MSD sheets will be kept in all areas which use the applicable chemicals. • The Store Department in conjunction with the Quality Assurance Department is responsible to ensure that: – All chemicals are stored correctly (i.e. in bunded areas if necessary) – in accordance with the MSD sheets. – No potentially reactive chemicals are stored together. • All people who utilize the chemicals have a copy of the MSD sheet and are aware of its content in terms of PPE for use, storage requirements and the **acceptable disposal methods** of the chemicals.	LOM LOM LOM LOM LOM
• An audit on chemical acceptance, storage, use and disposal in accordance with the applicable MSD sheet will be completed. – Any deficiencies noted during the audit process will be rectified with the applicable training.	Annually
• All personnel who work with hazardous chemical substances shall be trained in the hazards associated with the use of all forms of hazardous chemical substances, and also the actions and reactions in the event of a mishap.	As per training matrix.
Fuel reconciliation: • The stores will be responsible to undertake a fuel reconciliation, to monitored for potential loss of fuel, of **all** diesel tanks at Ulco. – Should, through the monitoring of levels, it be identified that fuel is missing, Ulco will investigate the possibility of a leak in the tank. – Measures will be implemented based on the results of the investigation.	Weekly

11.7 Management Measures – Human Resource Management

The following management measures are applicable for the Human Resources Department.

11.7.1 Training

The following management measures are applicable to the training requirements of each employee:

Goals and objectives: To ensure each employee receives appropriate training.

Mitigation & Management Measures	Timeframes
• Each employee will have a training plan. • Training will be implemented based on the learning and development policy. Details concerning environmental awareness training are included in **Section 12**.	LOM LOM

11.7.2 Socio-economic Aspects

Goals and objectives: To maximise the socio-economic benefits to employees and the local communities through the on-going operation of the mine.

Mitigation & Management Measures	Timeframes
On-going Socio-economic commitments: • The Social and Labour Plan (SLP) developed in accordance with Regulation 46 of the MPRDA for the conversion of the old order mining licenses into new order mining rights will be implemented. This includes: – Human resource development programmes, namely; – Skills development plans including ABET training. – Career progression plans, Mentorship plans. – Internship and bursary plans. – Plans to achieve 10% women in mining and 40% HDSA in management. – Local economic development (LED) projects, namely; – Infrastructure and social development plans. – Procurement plans.	LOM

– Working with the Local Municipality with the development of the Integrated Development Plan for the Region. – Details pertaining to the management of downscaling and retrenchment. • Report on the compliance of the commitments made within the SLP.	Annually

11.7.3 Accommodation / Villages

The following management measures are applicable to the villages:

Goals and objectives: To ensure the upkeep of the villages.

MITIGATION & MANAGEMENT MEASURES	TIMEFRAMES
• All domestic waste in the village will be collected and removed with the waste generated at Ulco.	Daily
• All diesel tanks within the village will be bunded	LOM
• An area will be demarcated for vehicle maintenance which will have the appropriate storm water controls to prevent pollution from the area.	LOM
• All garden waste will be collected and removed to the waste dump site.	When required
• Watering gardens early in the morning / late in the afternoon and not during the heat of the day especially in the hot summer months.	When required
• Over time the replacement of alien vegetation with indigenous vegetation will be undertaken through the implementation of the alien vegetation removal programme.	When required
• Upkeep of infrastructure / housing within the villages.	
Gardens; • The engineering department will ensure the upkeep of the garden in and around the plant and the communal areas of the village. – Only indigenous trees will be planted during gardening activities. – Where possible the greening of the plant must be implemented in conjunction with the other departments. – Watering of the gardens should only take place outside the heat of the day to reduce the impact of evaporation. – Garden waste to be disposed of at the designated garden refuse site. – The manager of this site must ensure that only garden waste is accepted at this site.	LOM

11.8 Management Measures – Safety Health and Environment Management

The SHE Department resumes overall responsible for ensuring the implementation of all health, safety and environmental management measures on the mine. Some of the management measures presented in this section may be implemented by other Departments.

11.8.1 Health and Safety Training & Implementation of Occupational Health and Safety Monitoring

Ulco implements a comprehensive health and safety training programme for all employees. This EMP is not intended to cover the full spectrum of health and safety requirements for the mine. All the environmental training requirements for the mine have been presented as part of the environmental awareness plan in **Section 12**.

The SHE Department is responsible for implementing all the required occupational health and safety monitoring requirements. A summary of these monitoring programmes is presented below.

- Noise induced hearing loss
- Heat stress
- Personal dust monitoring
- Ventilation
- Illumination

11.8.2 Implementation of Risk Assessments

For any new activity or change of activity implemented at Ulco it is subjected to a risk assessment performed by the SHE Department.

Goals and objectives: Ensure that environmental risks (Aspects & Impacts) are considered in risk assessments.

Mitigation & Management Measures	Timeframes
• Each risk assessment will consider the following environmental parameters (in addition to the health and safety parameters). – The need for any environmental permit / legal permission. – The potential environmental impacts of the activity to all environmental parameters (Climate, geological features, topography, soil, surface water, ground water, atmospheric impacts, noise, heritage sites, flora, habitats (fauna), socio-economic impacts such as possible concerns from I&AP's) – The waste management requirements of the activity being assessed. – An assessment of the risk of an impact of on an environmental parameter and the potential significance of this risk. – If the risk is deemed significant, the SHE Department must develop appropriate management measure to mitigate the potential for the risk to materialise.	When required

11.8.3 Document Control / Environmental Legal Compliance

Documentation control is essential in the implementation of the environmental management systems and provides proof of environmental management taking place. Document control forms a vital requirement of successfully implementing ISO 14001.

Mitigation & Management Measures	Time Frames
• Any new activity or change of activity implemented at Ulco must be assessed for the significance of potential environmental impacts and the triggering of legal requirements. – Should through the assessment it be deemed that a significant impact could result from the activity, an environmental management plan for the activity will be drawn up and documented. • If legally required, any changes to the plant, such as implementing alternative fuels or the addition of an additional kiln line must be approved through the undertaking of the appropriate environmental legal authorisation process.	For any new activity or change to existing activity.

• All ISO 14001 procedures will be reviewed by the relevant departmental manager. • Any changes must be motivated and if accepted signed off by the general manager. • All ISO 14001 documentation will be kept digitally.	Annually
• The mine will confirm both the validity and the compliance of attached conditions, of all permits / registrations / licences. Such permits / registrations / licences include, but are not limited to: – Mining Right (formerly known as a Mining Licence). – Air Pollution Control Permits. – Authority to possess and use radioactive nuclides. – Water use license. – Waste licenses – Registration of Water Treatment Works & Sewage plant – Any other environmental authorisations • Any permits / registrations / licences which are due to expire during the following year will be renewed prior to the expiry date. • Any permit condition which has not been met will be regarded as a non conformance and plans to rectify the non conformance must be implemented. • Should there be any unrealistic permit conditions then Ulco must discuss the unrealistic conditions with the relevant authority and obtained an amended permit with altered conditions.	Annually

Management Measures – Record Keeping

MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
• The following records will be maintained: – Laboratory records concerning all quality control tests. – Inspection, testing and calibration records. – Training records. – Medical records. – Non conformances and complaints. – Permits such as blasting certificate, explosive magazine permits. – Waste disposal documents. – Environmental monitoring records. – Information on emergency preparedness and response. – Applicable environmental laws. – Any correspondence with interested and affected parties. – Contractor and supplier information.	All records to be kept for at least 10 years
• All original documents such as permits, certificates and correspondence with interested and affected parties will be maintained in a central file. • Records of all obsolete documents will be retained.	All records to be kept for at least 10 years

Management Measures – Legal Requirements

MITIGATION & MANAGEMENT MEASURES	TIME FRAMES
• Ulco will maintain an environmental legal compliance register which will be available on the network. • The legal register will be updated with changes or new legislation. • All legal requirements will be communicated to employees as and when required. • All legally required permits will be maintained indefinitely.	Update every 3 months
• An external legal compliance audit as required for ISO 14001 will be undertaken and action plans will be developed and implemented for all legal non conformances discovered.	Every 2 years