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12.1.4. Phase 4:

Duration: 5 Years

Active mining blocks: Block 7

Financial provision: R 402 628

Mining will be undertaken in block 7, block 6 and block 5.

Rehabilitation will be done on mined out areas in block 2 starting on the South Eastern side. The area will be rehabilitated as grass land only. The sides will be sloped with to create an angle of not more than 18°.

12.1.5. Phase 5:

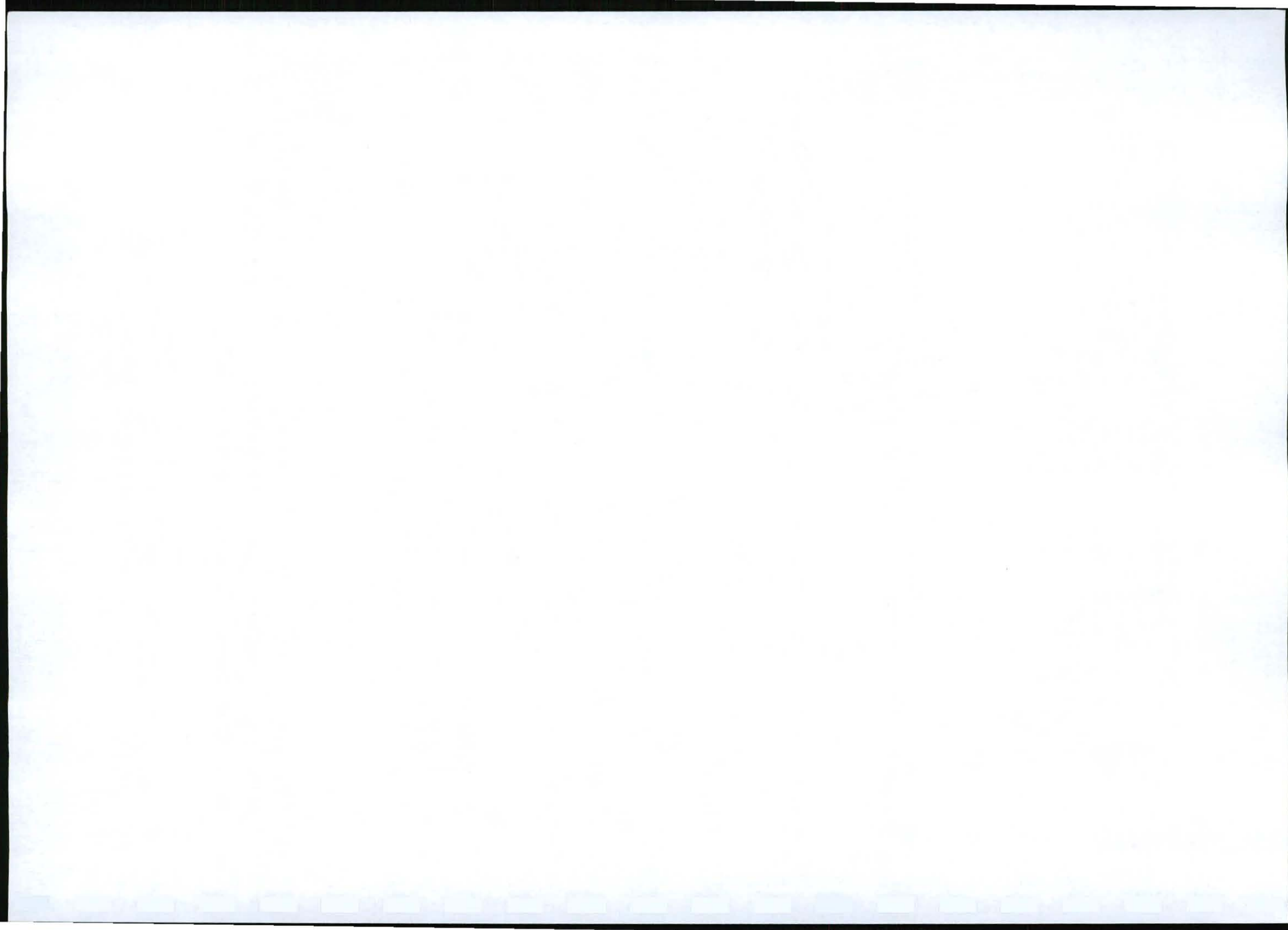
Duration: 7 Years

Active mining blocks: 8, 9, 10, 11 and 5

Financial provision: R 306 782

Mining will take place on the remaining sand reserves within the mining right depending on future environmental considerations as well as farming needs. These mining blocks are seen to be less than ideal for mining due to location but are retained for mining needs when all others are depleted.

Rehabilitation will be done on mined out areas in block 7 and 6. The area will be rehabilitated as grass land or wetland where water accumulates naturally. The sides will be sloped with to create an angle of not more than 18°.

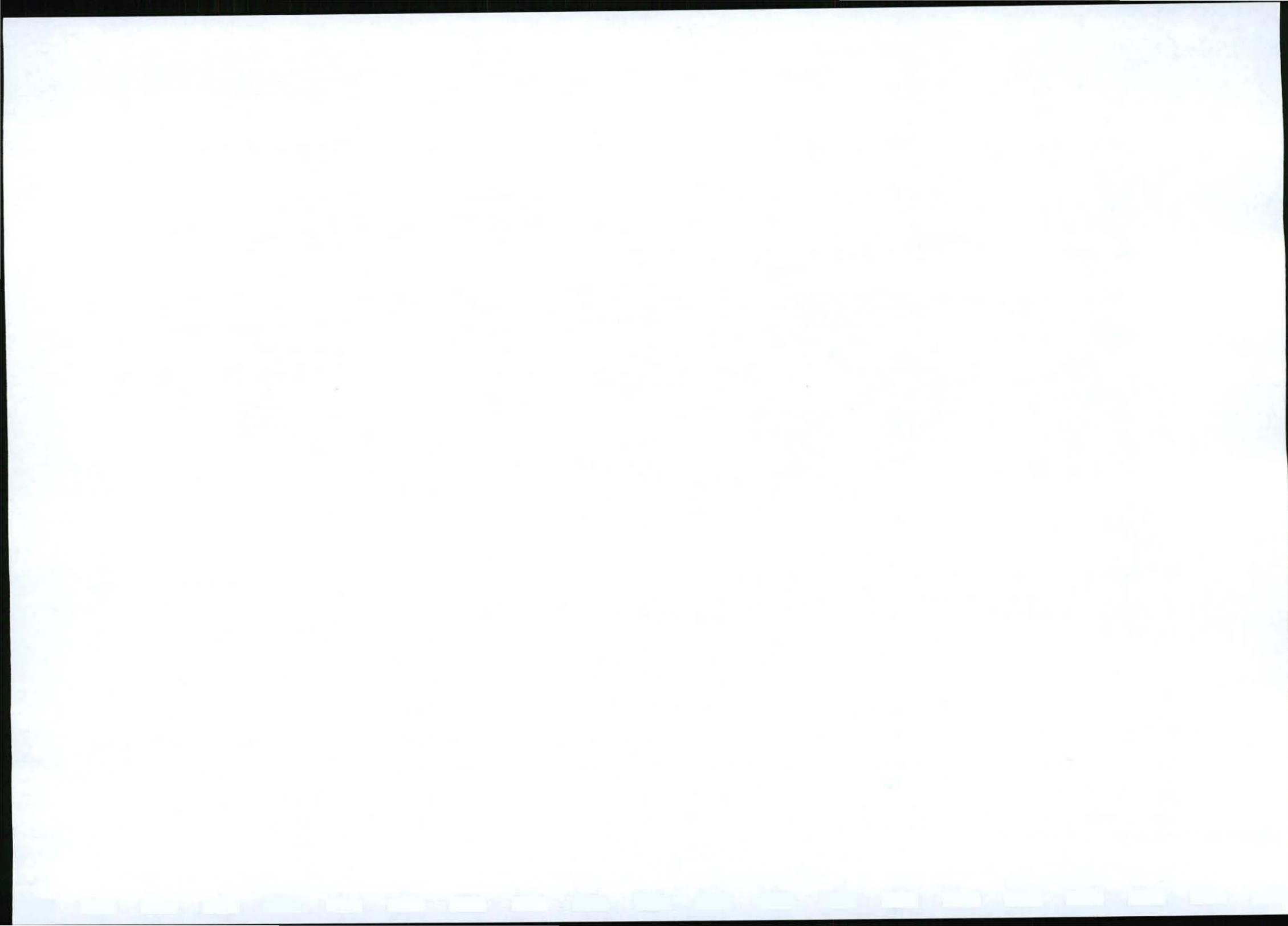


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The scheduling of the mining according to the calculations shown in Table 3 has been expanded to show the sequence of mining and which blocks will be mined over the years concurrently to ensure a consistent supply of sand and gravel to the plant. Note that the market dictates over time where mining will take place, some blocks have more sand or more stone than others. The scheduling below makes provision for concurrent mining of more than one block such as to enable the variety of products to be produced over time.

Table 4: Mining scheduling which has been created to ensure that sand and gravel are mined in a manner which ensures a consistent supply. Note that mining is not necessarily sequential but some areas are mined concurrently because of variation in geology and market requirements.

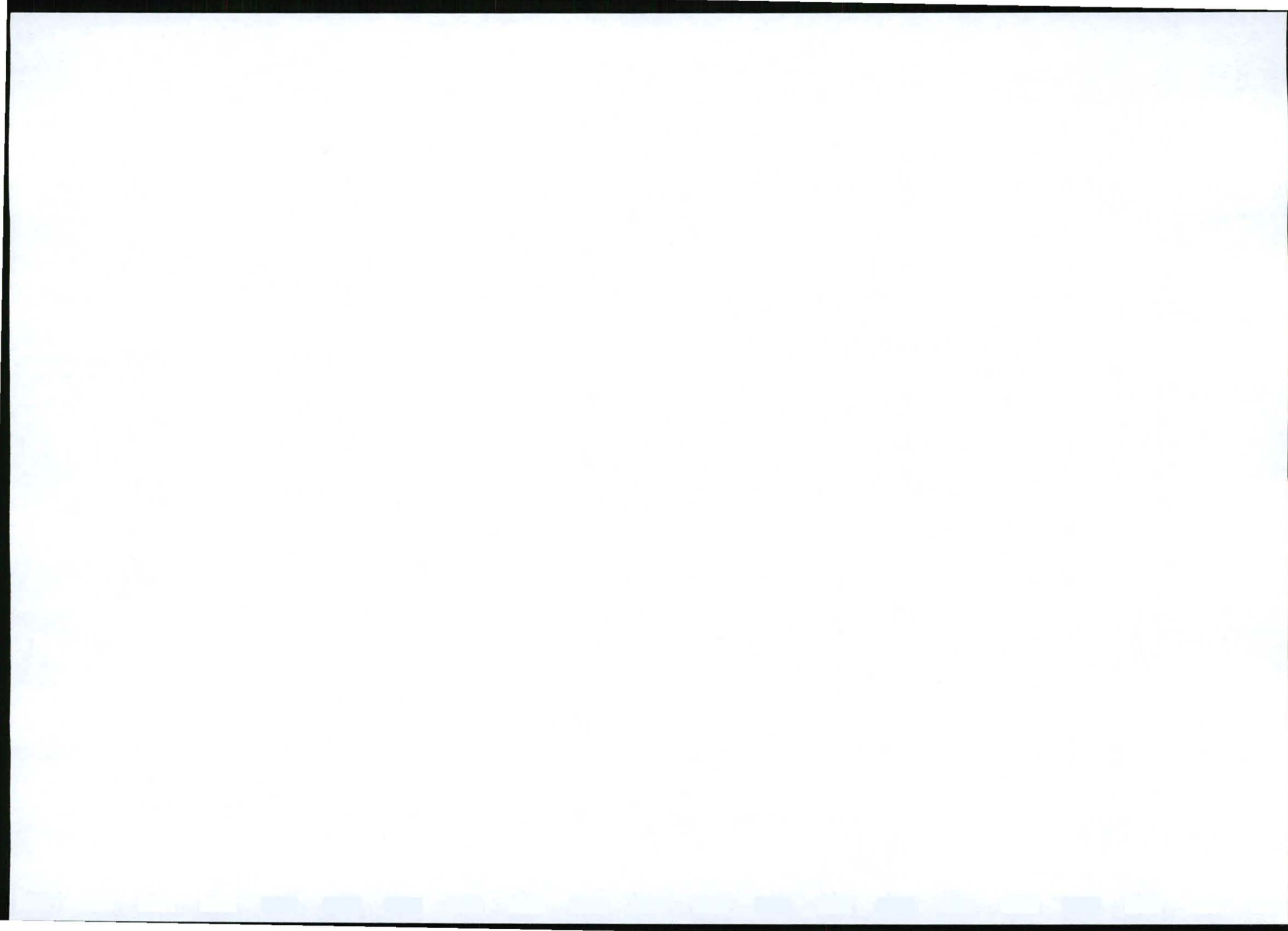
Scheduling of Sandman Quarries																																		
		Years																																
Block	Area in m2	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
		Phase 1												Phase 2				Phase 3			Phase 4				Phase 5									
Block 1a	55464																																	
Block 1b	85136																																	
Block 2	48169																																	
Block 3	72068																																	
Block 7	60437																																	
Block 8	38036																																	
Block 9	58575																																	
Block 10	57975																																	
Block 11	48297																																	
Block 4 stone	15249																																	
Block 5 stone	11235																																	
Block 6 stone	17935																																	
Block 6 plant	45240																																	
Number of areas mined	82089	2	4	4	4	4	4	4	4	5	5	5	5	5	5	3	3	3	3	3	4	4	4	4	4	4	4	3	3	3	4	3	3	2
Active mining																																		
Rehabilitated																																		
Pre-mining																																		



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12.2. Mineral Processing

Mineral processing will take place off-site, at the current Sandman Quarries processing plant. Mineral processing involved crushing, screening, washing and separation of sand and gravel to result in the various products as required by the markets.



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13. ENVIRONMENTAL IMPACT ASSESSMENT

See paragraph 23 : Annexure 1 : Environmental Impact Assessment for a detailed description of the environmental impact assessment as contemplated in regulation 50 of the MPRDA. In summary the following areas need to be focused upon:

Most significant impacts (impacts with the highest risk factors) :

- Soil
- Surface water
- Airborne dust
- Landscape

Impacts which can potentially affect neighbouring land owners :

- Surface water
- Airborne dust
- Noise
- Visual impacts

Impacts with insignificant risk :

- Noise
- Vegetation
- Terrestrial fauna
- Traffic
- Birds
- Herpetofauna
- Biodiversity
- Ground water

Impacts for which environmental programmes must be created :

- Soil
- Vegetation
- Surface water

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- Airborne dust
- Landscape

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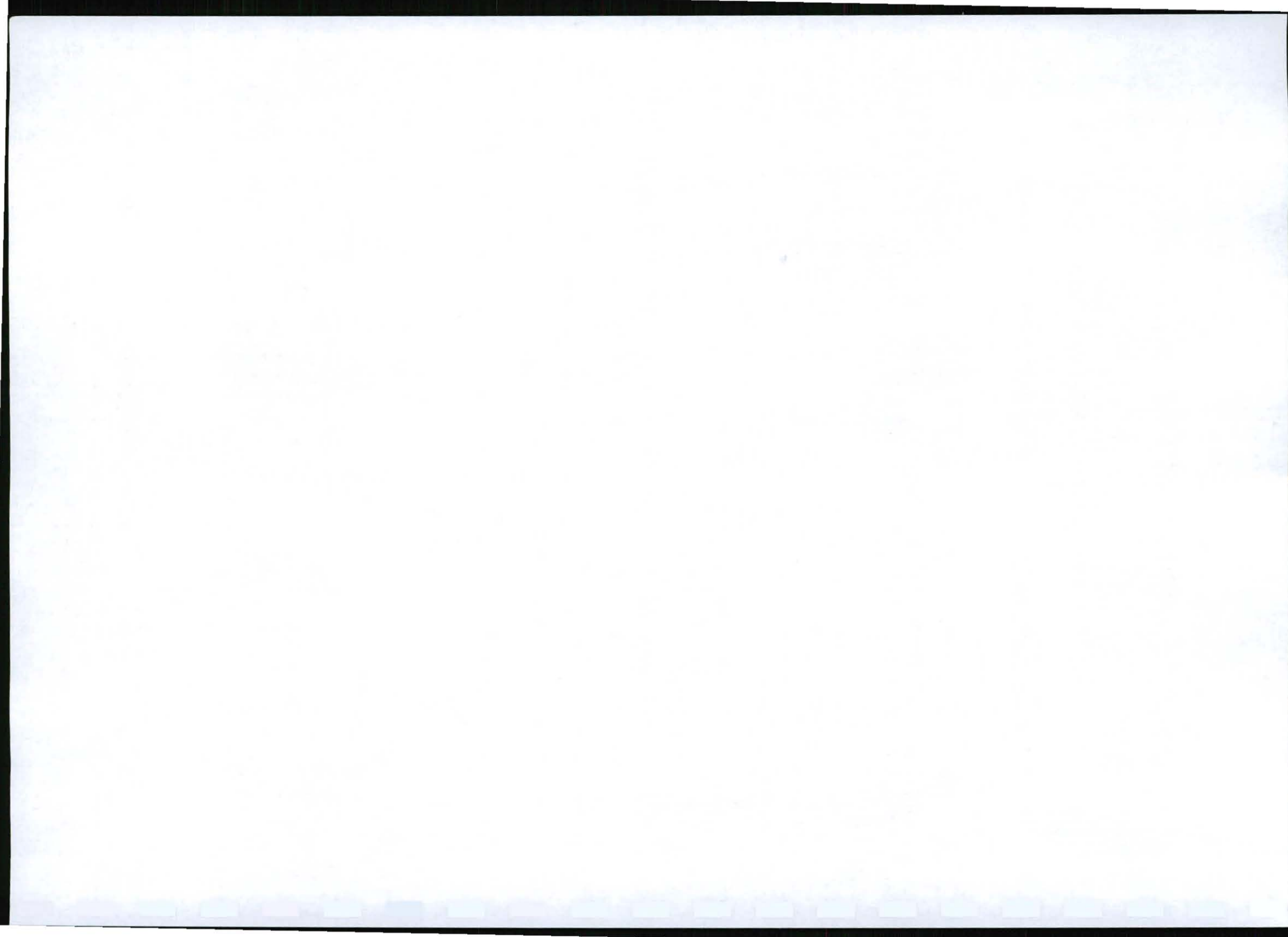
14. ENGAGEMENT OF INTERESTED & AFFECTED PARTIES

Below is the list of contacts for the scoping and environmental impact assessment process:

Contact list for public participation for Sandman Quarries :				
Mr. A. Greef	P.O. Box	61	Despatch	6219
Lafarge	P.O. Box	7123	Port Elizabeth	6055
New Era International	P.O. Box	427	Port Elizabeth	6000
Nelson Mandela Bay Municipality	P.O. Box	834	Port Elizabeth	6000
Mr. G.H.J. Olivier	P.O. Box	3090	Uitenhage	6230
Sharene Investments	P.O. Box	99	Swartkops	6210
Mr. L. Stander	P.O. Box	29	Despatch	6001
Mr. B. Turner	C/O	25 Amper Bo Street	Despatch	6219
Waagensdrift Property Trust	P.O. Box	313	Uitenhage	6230

The responses by the interested and affected parties are contained in Annexure 8 : Letters , comments and responses from Interested & Affected Parties.

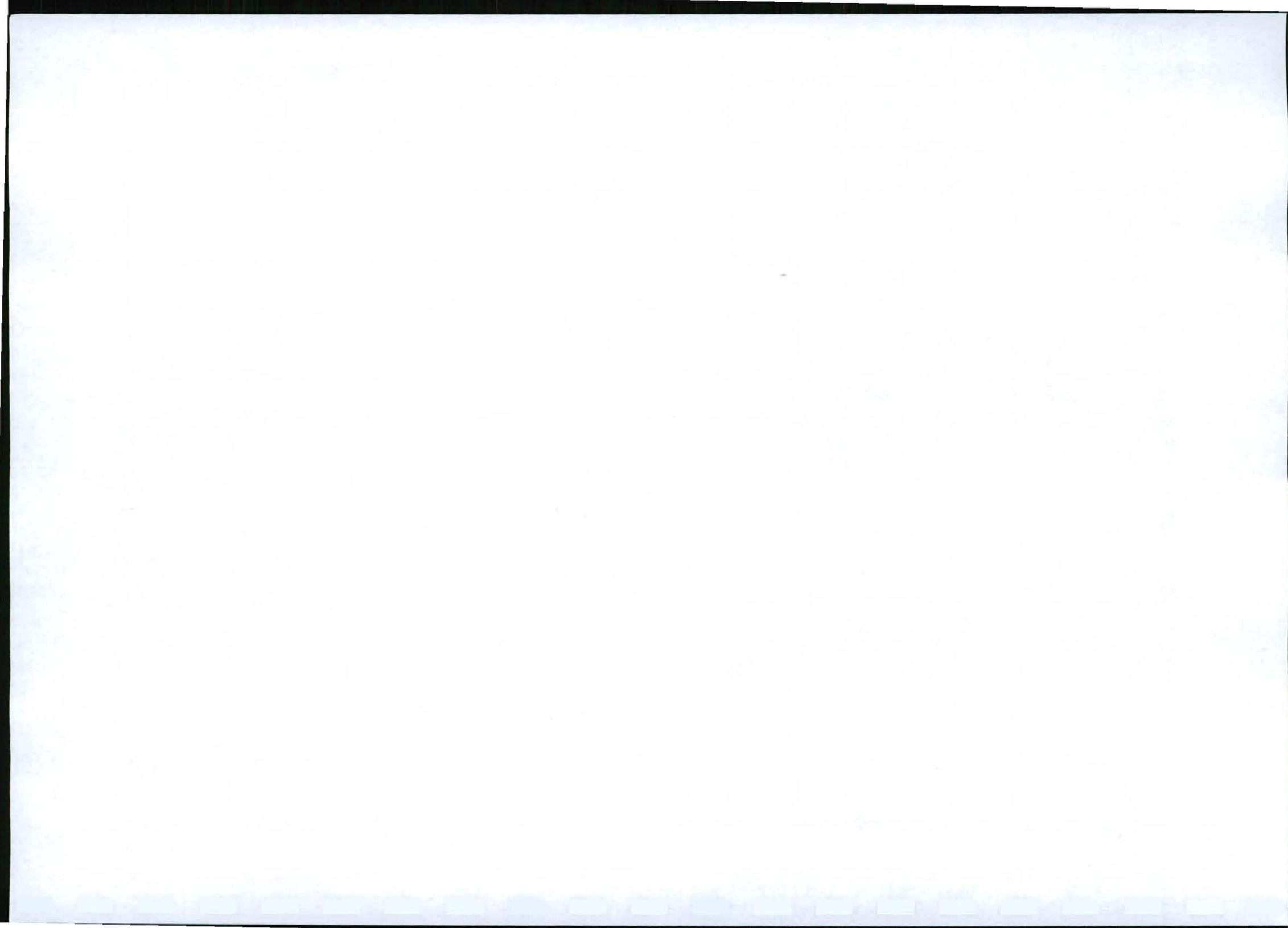
The details of the comments are summarised below as well as the proposed mechanisms to deal with these concerns:



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Table 5: Responses to concerns of interested and affected parties

Name of IAPS	Concerns raised	Response by Sandman Quarries
Mr. L Stander, Mr. Hattingh, Mr. Alberts	Disturbance relating to dust Chicken and pig farm sensitive to dust	Dust monitoring programme has been implemented adjacent to landowners property to assess dust currently as well as prevailing wind directions to enable risk assessment Note: That dust should not exceed levels currently produced by mine using current mitigation measures
Mr. L Stander, Mr. Hattingh, Mr. Alberts	Disturbance relating to noise Chicken and pig farm sensitive to dust	Perimeter noise monitoring has been undertaken to ambient levels of noise prior to commencement with mining Note: That noise should not exceed levels currently experienced as no more traffic will run on the road
Mr. L Stander, Mr. Hattingh, Mr. Alberts	Increase in traffic	No new traffic is planned to service the mining right in comparison with that currently undertaken with mining permit
Mr. L Stander, Mr. Hattingh, Mr. Alberts	Land value depreciation	No mining will take place in close proximity to houses for next 20 years. Should mining commence mining will stay 100m from the houses.
Mr. Meintjes	Temporary of landuse in accordance in LUPO	Agree to submit an application for temporary departure of land use with municipality NMBM in accordance with LUPO at time of submitting the EMP to the DME



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15. SUMMARY OF ENVIRONMENTAL IMPACTS

Most significant impacts (impacts with the highest primary risk factors)

- Soil
- Surface water
- Airborne dust
- Biodiversity
- Aquatic fauna

Impacts which can potentially affect neighbouring land owners

- Surface water
- Airborne dust
- Noise
- Visual impacts

Impacts with least primary risk

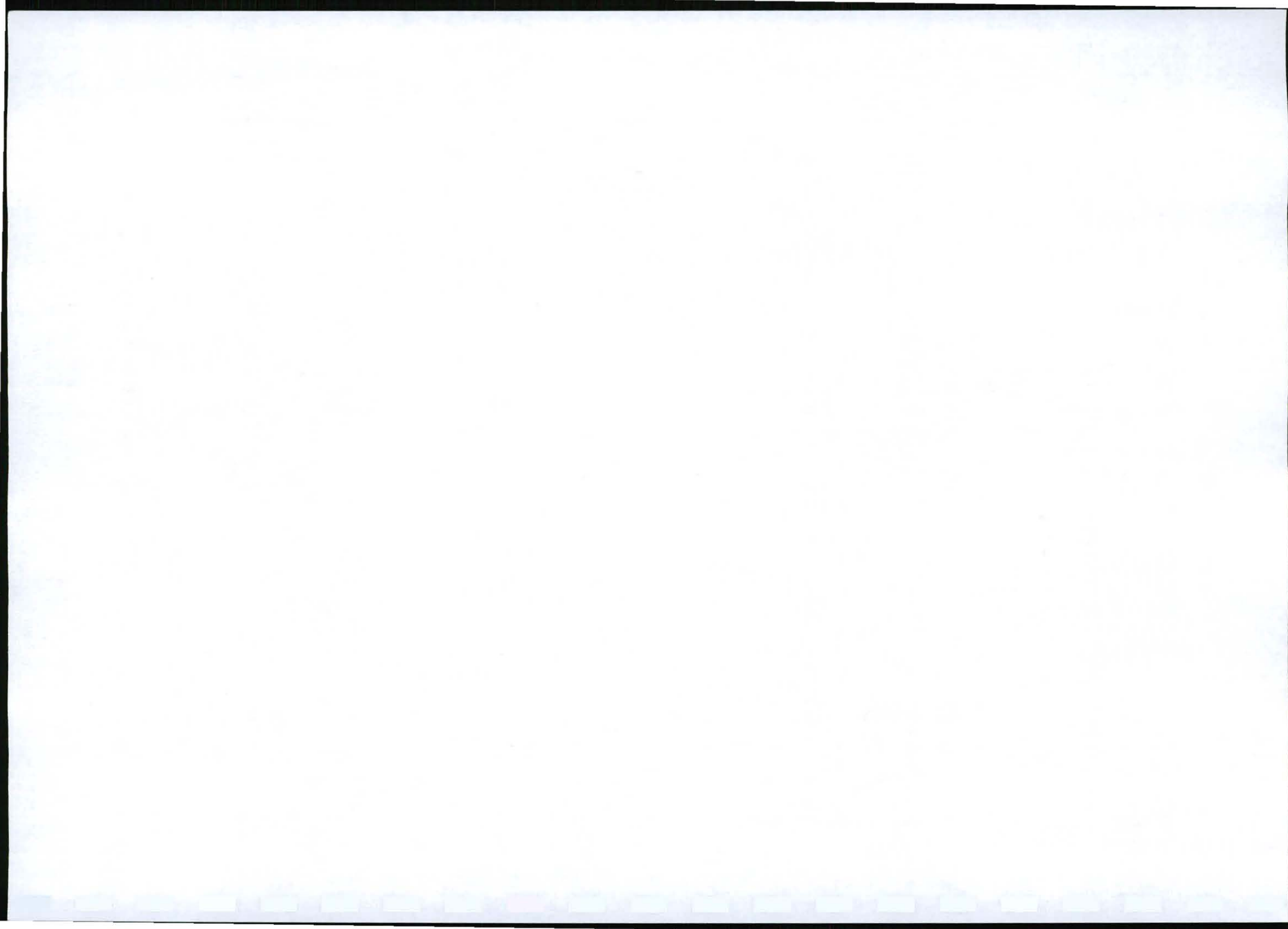
- Noise
- Ground water

Impacts which can be dealt with by creation of protected areas

- Biodiversity

Impacts for which environmental programmes must be created

- Soil
- Vegetation
- Surface water
- Airborne dust
- Aquatic fauna



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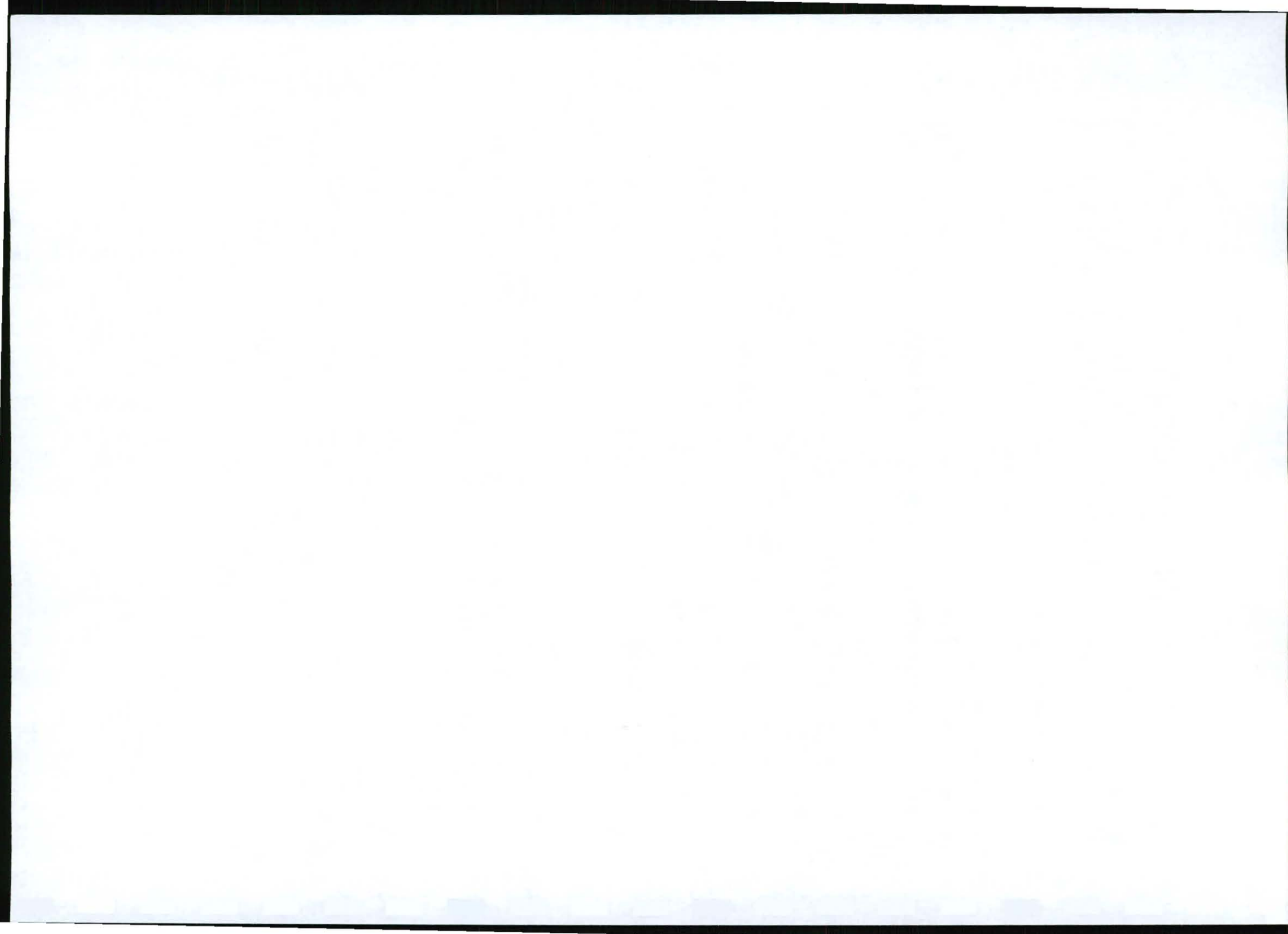
16. COMPARATIVE ASSESSMENT OF DIFFERENT LAND USE OPTIONS

For the purpose of comparative assessment, mining of sands and gravel is compared to the current land use, which is grazing of cattle. This is because cattle farming is the most likely land-use if mining does not take place. For each assessment criteria mining and cattle farming are rated either best or worst, where 1 is best option and 2 is worst option. The option with the lowest rating is the most suitable option for the site.

Table 6: Comparison between mining and cattle farming

Assessment criteria	Mining	Cattle farming
Socio-economic impacts	1	2
Environmental impacts	2	1
Visual impact	2	1
Positive impacts for local community	1	2
Job creation potential	1	2
Support for other industry	1	2
Sustainability	2	1
Business risk	2	1
Market	1	2
Financial viability	1	2
Overall rating	14	16

Mining has the lowest rating according to the comparison table above; obviously both options have their advantages and disadvantages. The same owner will apply to both options, unless he decides to sell the land. If mining does not take place in the short term, the resource will always be in demand in times of construction, and thus interest will always be there for construction sand.



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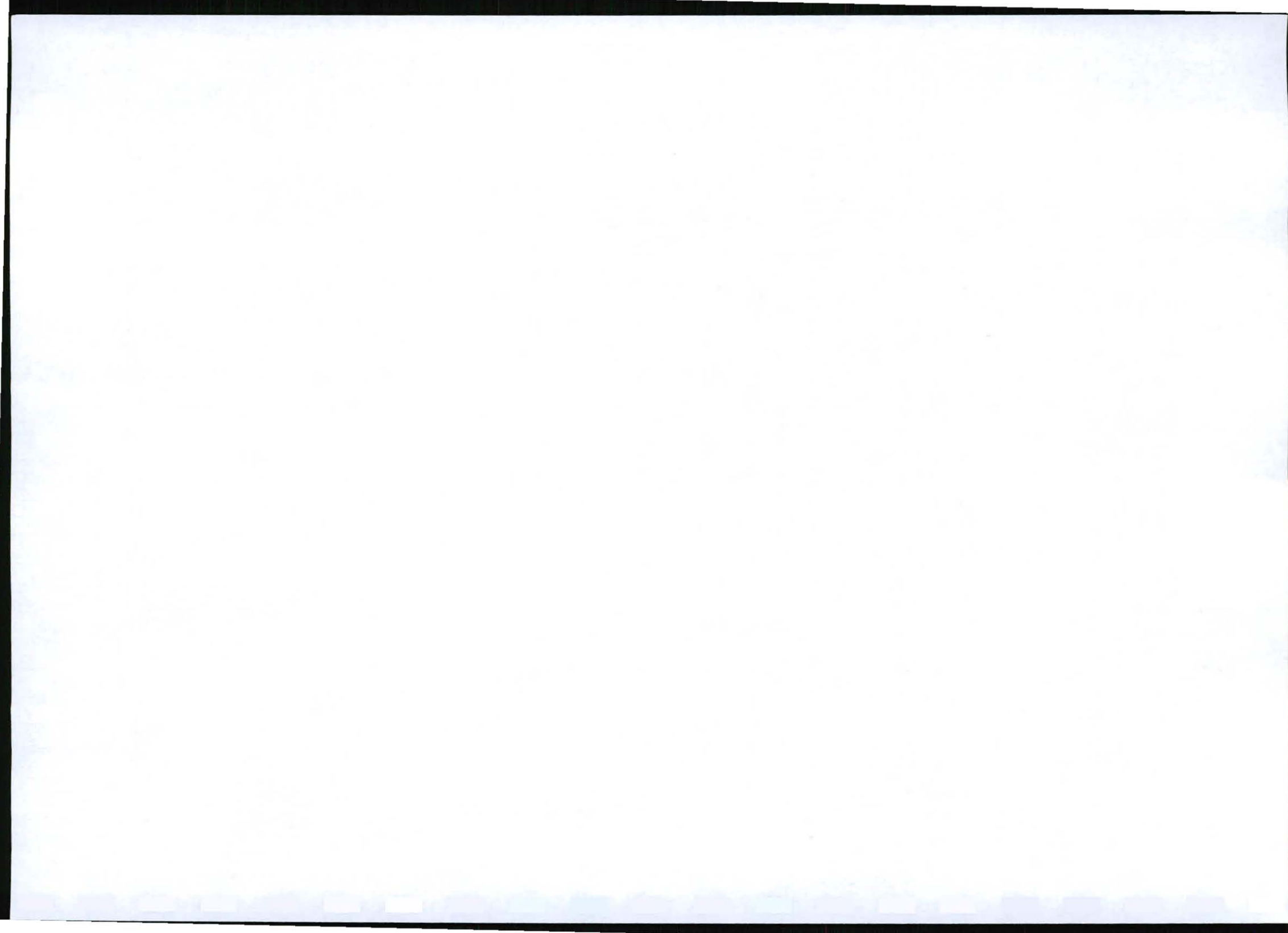
17. DESCRIPTION OF ENVIRONMENTAL OBJECTIVES

17.1.1. Mine Closure

The mine manager Mr. Hein Potgieter currently farms the proposed mining right area and wishes to continue farming the area long after the area is mined out. The land is sought for either creation of pastures for grazing of cattle or for centre pivot irrigation schemes. The ideal is for mining to be undertaken as deep as possible such that the least area is disturbed for an equivalent amount of material mined. This is in the interests of all IAPs as well as the owner, who wants to preserve land for farming. In some areas the mining will only consist of removing raised areas, to create level fields for farming, this is envisaged in block 7 and block 9. Noting that if enough material can be obtained from blocks 1, 6 and 7 no mining will be done in block 9.

The ideal picture at mine closure is pit with gentle slopes (1:3) (v:h), for which the base will be dressed with topsoil and vegetated either as a wetland or as pastures for cattle, depending whether the level of the area is above or below the water table. The area should be feasible for farming (grazing lands) or for wetland conservation (habitat for birds and aquatic species).

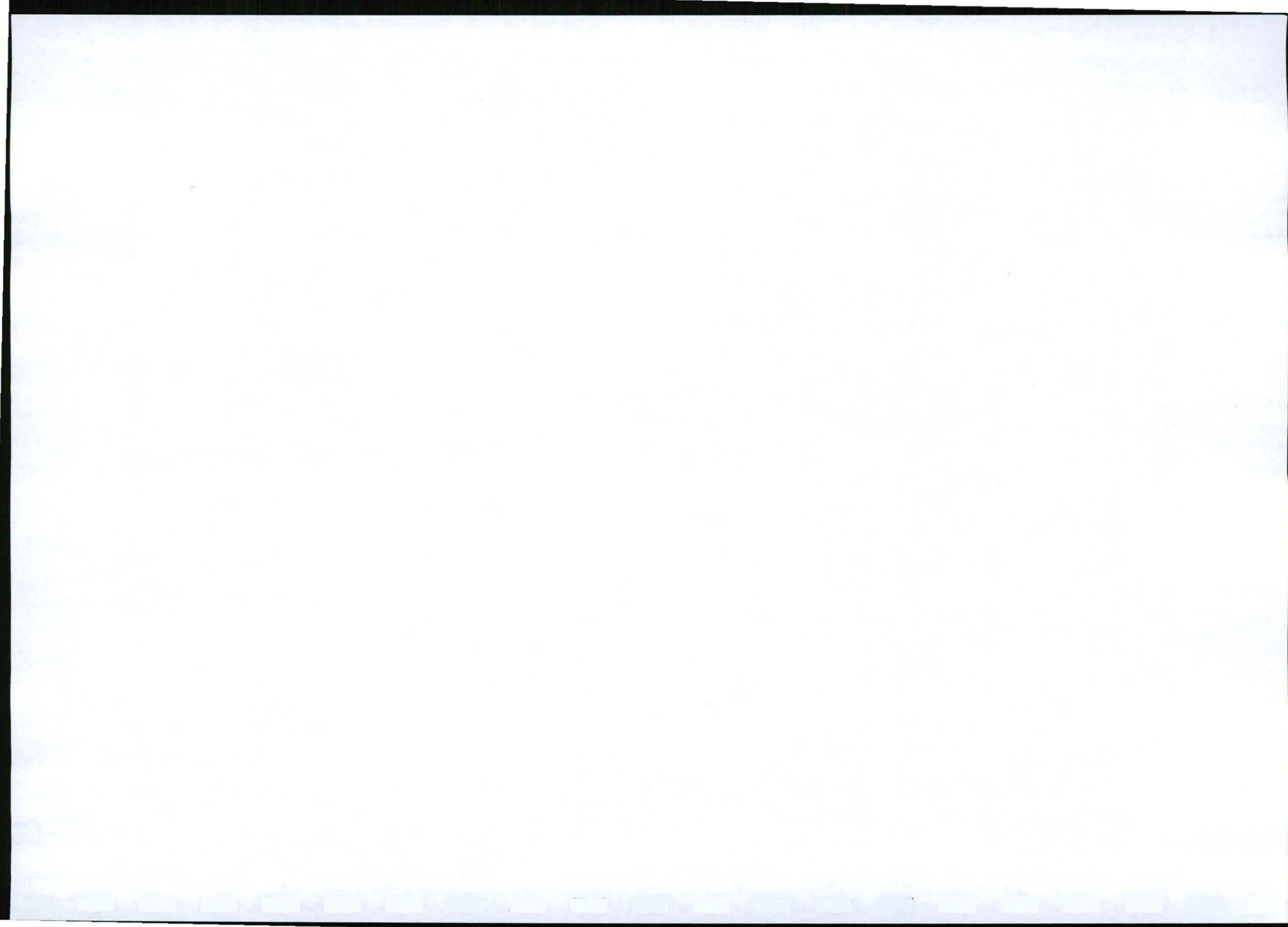
A mine closure image can be seen in Appendix 4: Annexure 4 : Mine closure plan



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17.1.2. Identified environmental objectives

Aspect	Objective	Target
Soil	Replace all stripped soil	All replaced soil must be fertile to allow for pasture establishment.
Removal of vegetation	Replace with indigenous pasture grasses	Creation of cattle pastures in mined out areas
Change in height of landscape	Minimise visual impacts	Landscaped area with slopes less than 1:3
Loss of threatened species	No mining in sensitive areas	Zero loss of Sunday's river thicket
Increase in alien invasive species	No alien species in mining right area	Reduce alien species to controllable level
Pollution of water resources	No pollution of Swartkops river	No disposal of dirty water into Swartkops
Airborne dust	Minimise dust outside of quarry area to below fall out limits	Zero dust reaching houses of local residents
Migratory fish species	Preserve and create secondary channels for migratory fish species	Minimum of one secondary channel between mining area and bankfull zone.



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18. IMPLEMENTATION PROGRAMME

18.1. Technical and Management Options chosen for Environmental Impacts

The management programmes for the significant environmental impacts are described in detail below:

18.1.1. Soil Conservation Programme

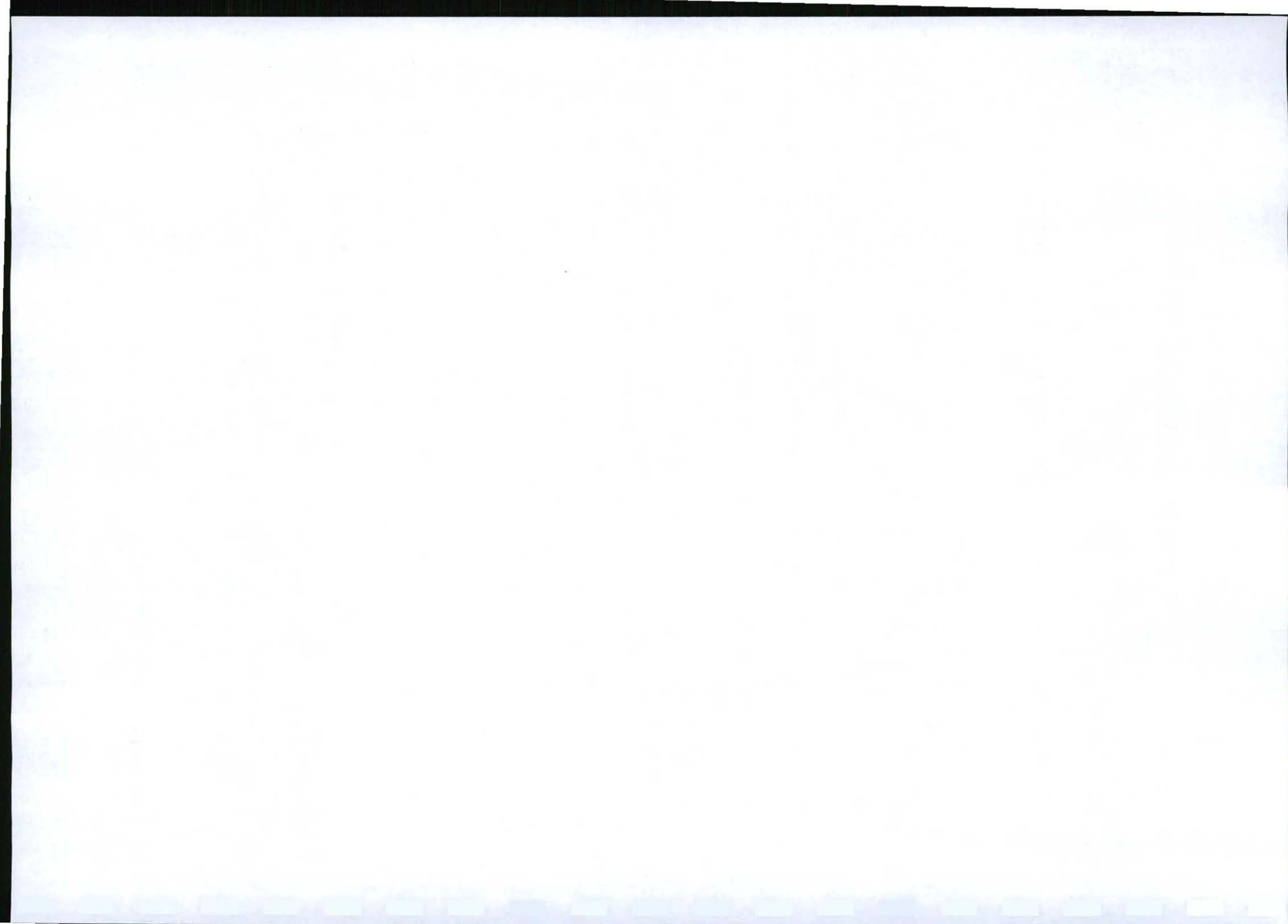
Soil will be conserved through the following management interventions:

1. All topsoil to an expected depth of more than 250mm will be removed prior to mining by excavator
2. Stripped topsoil will be placed in berms of not more than 1.5m in height
3. Once mining is completed then soil will be excavated and placed on the sites
4. Placed soil must be immediately seeded, preferably with a mix of indigenous grasses or vegetation and using hydro-seeding techniques.

18.1.2. Surface Water Protection

Surface water will be protected through the following management programme:

- A storm water berm must be created around the mining area to divert storm water away from the mining area.
- Water within the mining area must be channelled into a settling pond which in the case of this mining will take the form of part of the pit with the lowest elevation within each mining area.



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- As far as possible all water will be contained and allowed to seep through the sandy substrate, back into ground water and ultimately into the natural river systems. This is to ensure that a minimum of turbidity increases occur to natural waters.
- Where water within the mining area needs to be released it must be released via the settling pond which will release water into a shallow channel designed to create slow flow, such that suspended solids are deposited.
- Where channels are created or where channels lead to areas outside of upper flood terraces, these must be protected from scouring by flood waters through construction of revetment banks. As shown in the diagram below.
- After flooding any revetment that has been eroded must be replaced so that the bank is not scoured subsequently
- It is expected that in time the revetments will become stable banks which are not expected reasonably to erode after mining has ceased.

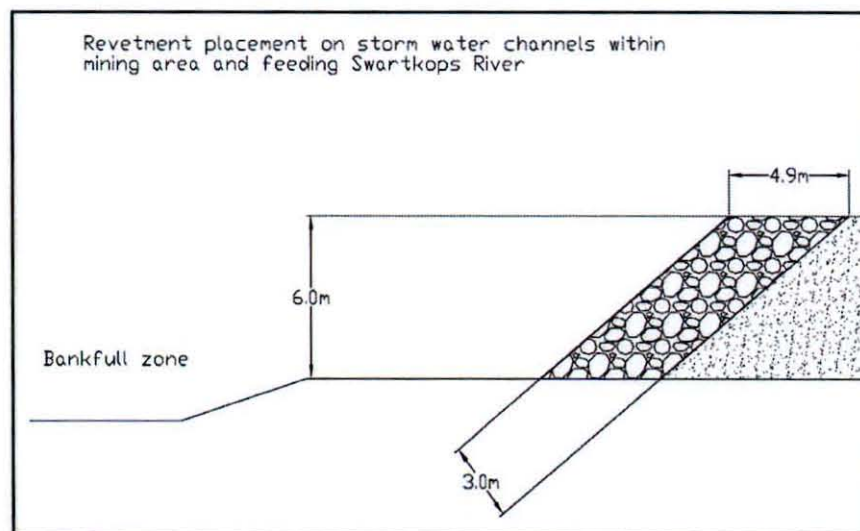
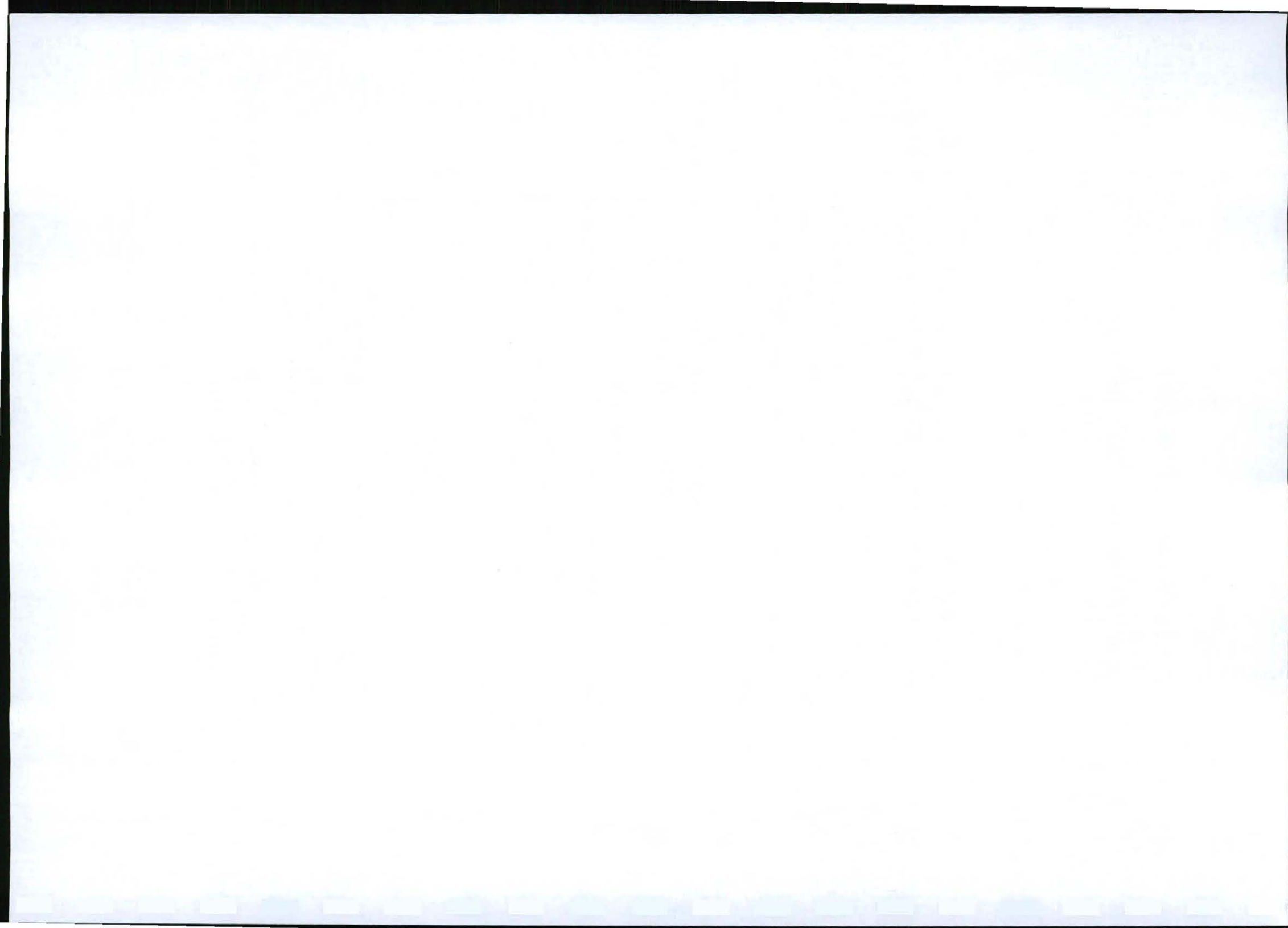


Figure 5: Specifications for revetments placed in areas where erosion of banks can damage infrastructure such as pipes and power lines



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18.1.3. Protected Areas

Indigenous vegetation will be preserved by the following management programme:

- Sensitive areas will not be mined in accordance with the mining right application because the occurrence of sensitive vegetation (Sunday's Thicket) is associated with the underlying soils and in this case, where areas are underlain by clayey soils, which are not listed as the targeted minerals in the mining right application.
- Irrigation of rehabilitated areas will take place for a short period after seeding to ensure successful growth
- All alien invasive species will be removed during mining and monitored during and after mining has ceased.

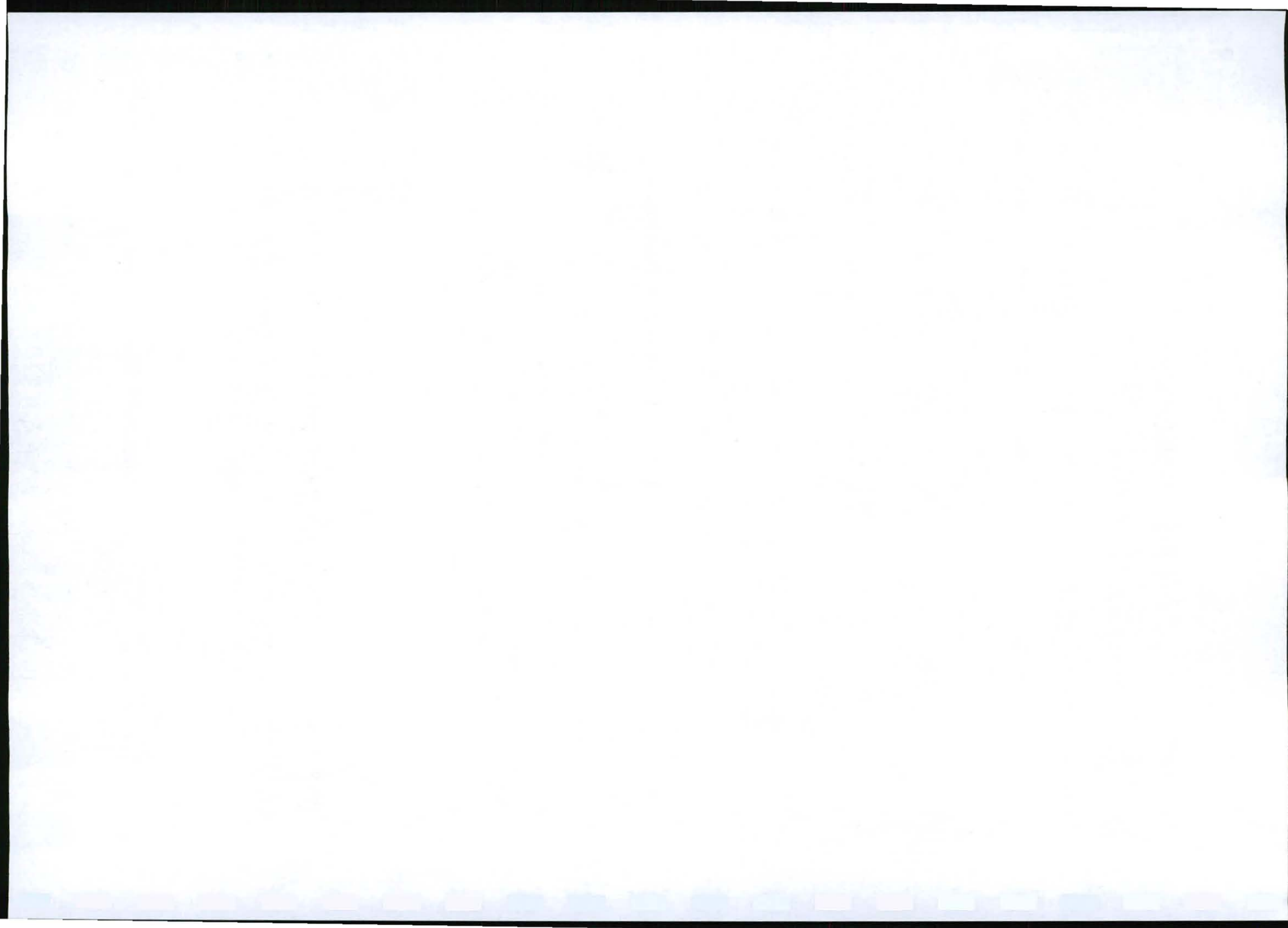
18.1.4. Alien vegetation control and monitoring programme

The mining creates an opportunity to remove alien vegetation such as Eucalyptus Species and Cactus species. Alien trees will be stripped off the area prior to mining and species such as jointed cactus will be bull dozed with soil prior to mining. Once mining is complete and mined out areas have been established as pastures or grazing areas, control of alien vegetation will be undertaken by spraying with weed killers and removal by hand of saplings were applicable.

18.1.5. Airborne Dust

Airborne dust will be controlled through the following management programme:

- Water spraying will be done on a constant basis to ensure that roadways and mining areas do not produce excessive dust



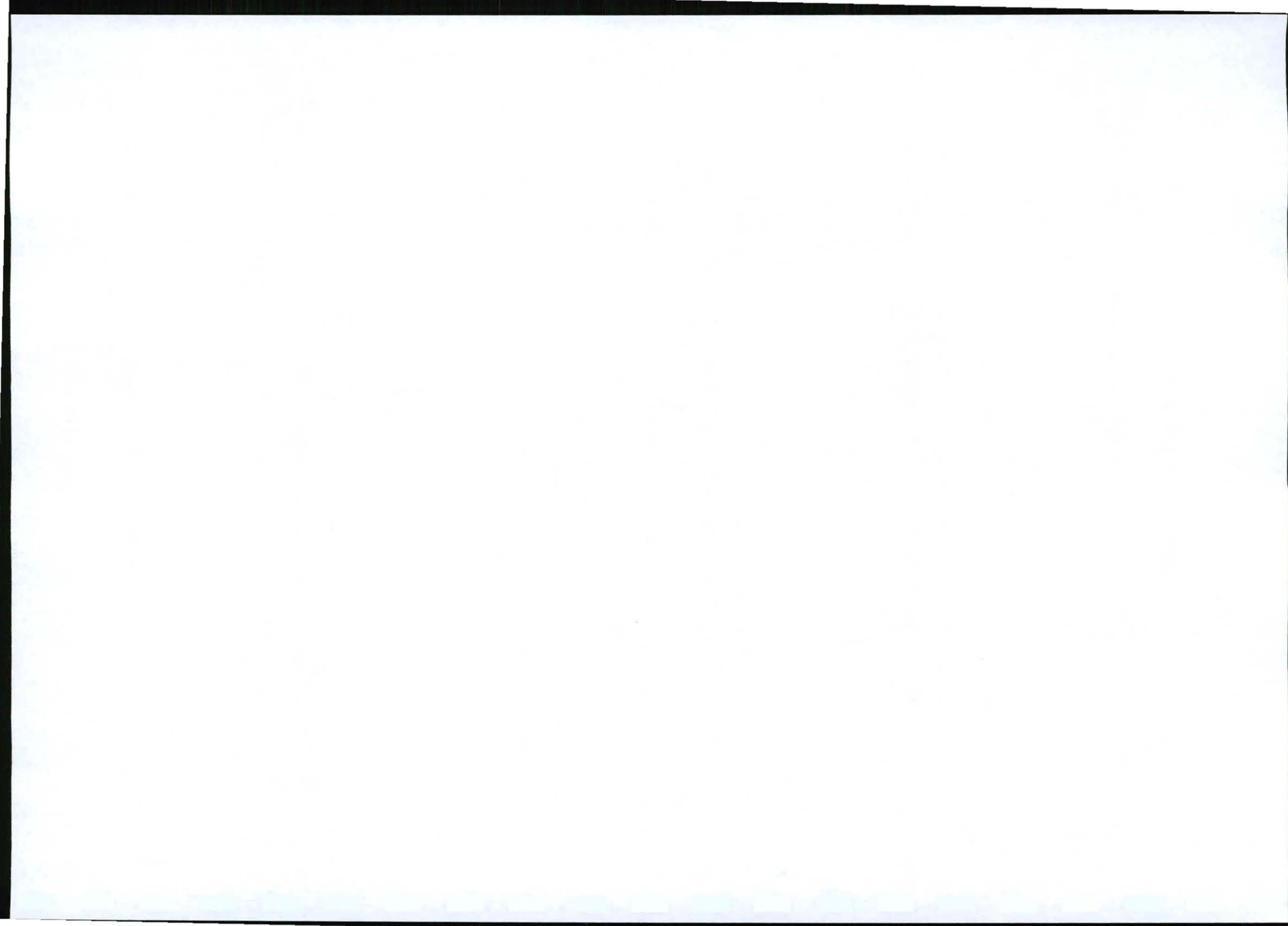
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- Work stoppage will take place on excessively windy days when neighbouring communities are at risk.
- Buffer zones of 100m will be maintained from any residential areas or houses
- Trees will be planted along particularly sensitive areas
- Ongoing fall out dust monitoring will be undertaken in sensitive areas, please refer to Annexure 6 : Dust monitoring results for dust monitoring programme description and results thus far.

18.2. Stormwater Management Plan

It should be noted that the mining conditions and the mineral being mined does not pose a chemical hazard to water resources. The ground water and surface water are readily exposed to the mineral under natural circumstances. The only hazards which poses a risk is that of increased turbidity by pollution with fine sediment and pollution by hydrocarbons from mining machinery, which must be prevented in terms of the MPRDA and NWA. Neither of these issues can be dealt with effectively by means of lined pollution control dams nor is this a fitting solution in the case of Sandman Quarries. The turbidity issue can be managed through the following means:

1. Minimising ingress from run-off into pits by diverting clean water system away from mining area
2. Retaining water which has entered the pits, in the pits and within sumps designed for this purpose, as long as possible to encourage:
 - a. Settling of fines
 - b. Evaporation of water
 - c. Natural seepage into ground water in sandy substrate
3. Ensuring the slow release of water back to the environment using wetlands or furrows



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18.3. Management of mining in the riparian environment

The mining of sand and gravels from a water course or estuary is regulated under the National Water Act, 1998.

When mining close to the Swartkops River "Bankfull zone", the following will be in place:

1. A berm at least 1m above the water level, which is excavated from material on the outer side of the berm position.
2. A buffer between berm and "Bankfull" zone of at least 3m which serves as a secondary channel conservation zone.
3. The pit must be mined from above and loaded from above allowing the pit to flood.
4. All machinery must be checked for leaking of oil, grease and fuel on a daily basis, any problems must be repaired off-site and all machines must be approved for use by the mine manager.

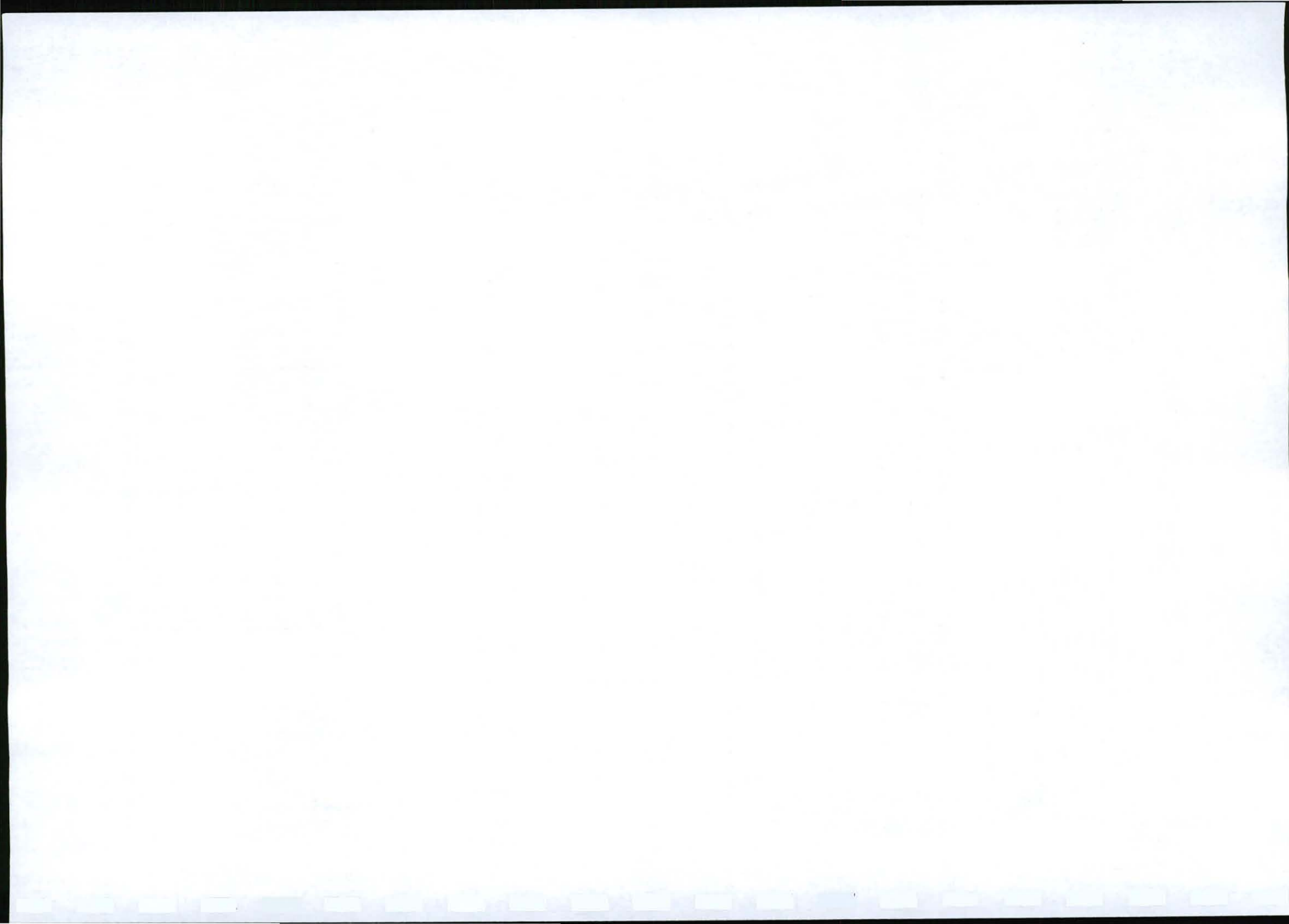
18.4. Environmental Emergency and Remediation

The environmental emergencies that have a significant potential occurrence are:

- Flooding of mining area
- Hydrocarbon spills

18.4.1. Flooding of Mining Area

The preventative measures to ensure that flooding of the mining area does not occur are described above in 18.1.2. The measures relate to the provision of berms to isolate the mining area from clean surface water systems. It is however likely that the mining area from time to time will be flooded, the impact on the river is expected to be minimal as the water will be severely polluted from other sources during these periods. As far



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as practical the water should be controlled in a manner which will allow it to seep into groundwater or to flow via natural channels back to the Swartkops River system.

18.4.2. Hydrocarbon Spills

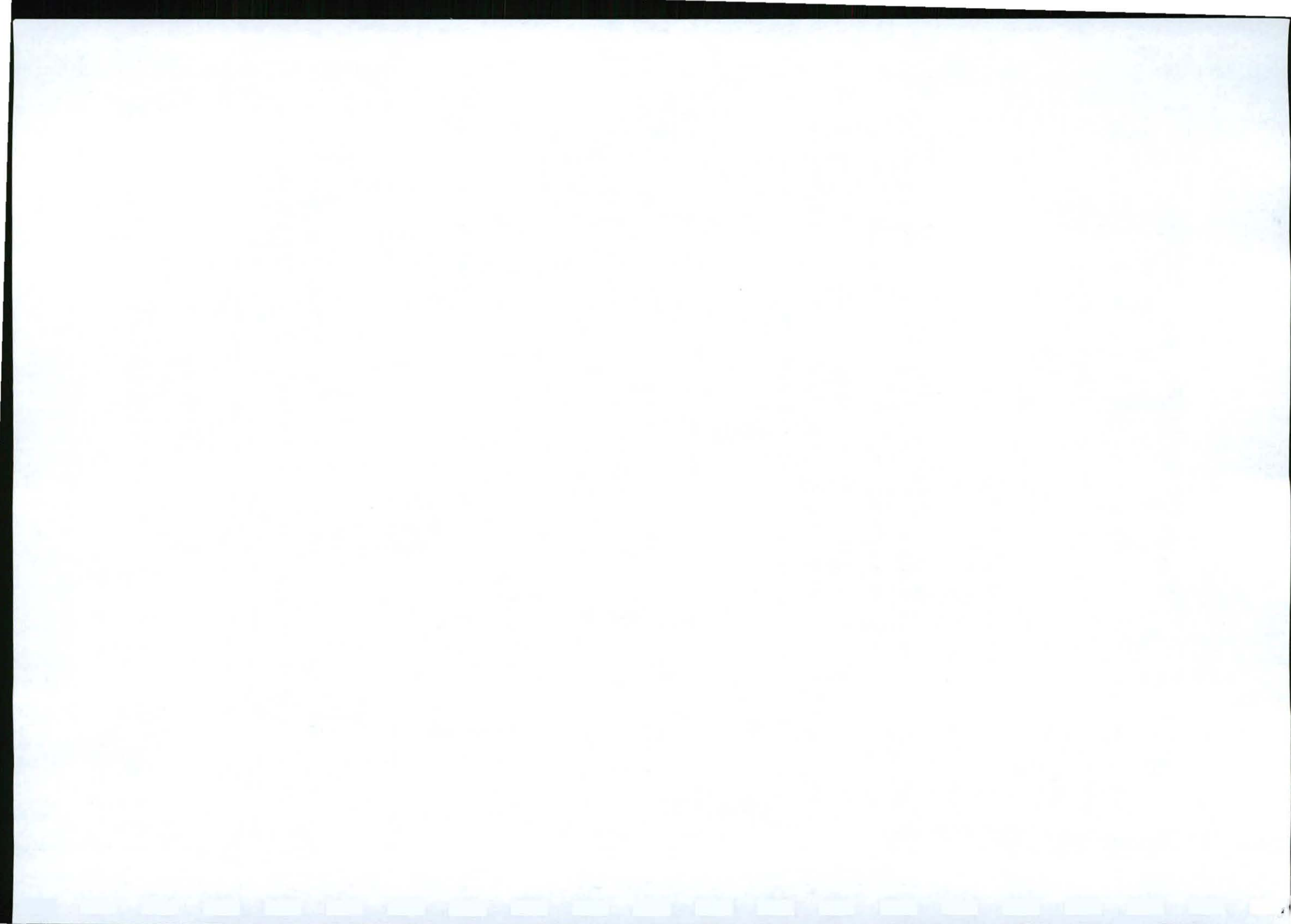
Spilling onto soil or sand

Should a significant amount of hydrocarbon be spilled in the mining area, the soil or sand or gravel onto which the hydrocarbon has spilled should be excavated and placed onto a high density poly urethane (HDPE) sheet, such that it can be treated in a composting manner, which encourages natural breakdown on oils. This soil should be turned on a weekly basis until all the hydrocarbon has been degraded from the contaminated soil.

Spilling onto Water Resources

If fresh water resources within the pits are significantly contaminated by an oil spill, this water should be dealt with in the following manner:

1. The water must be prevented from entering natural surface water features such as the Swartkops River
2. The water should be removed from sandy pits to prevent ground water penetration by hydrocarbons
3. Floating hydrocarbons can be skimmed off, if possible and disposed of in sealed containers or drums
4. Dirty water can be cleaned through a treatment facility such as a filter, biological treatment system or a facility such as the Despatch Sewage Treatment works

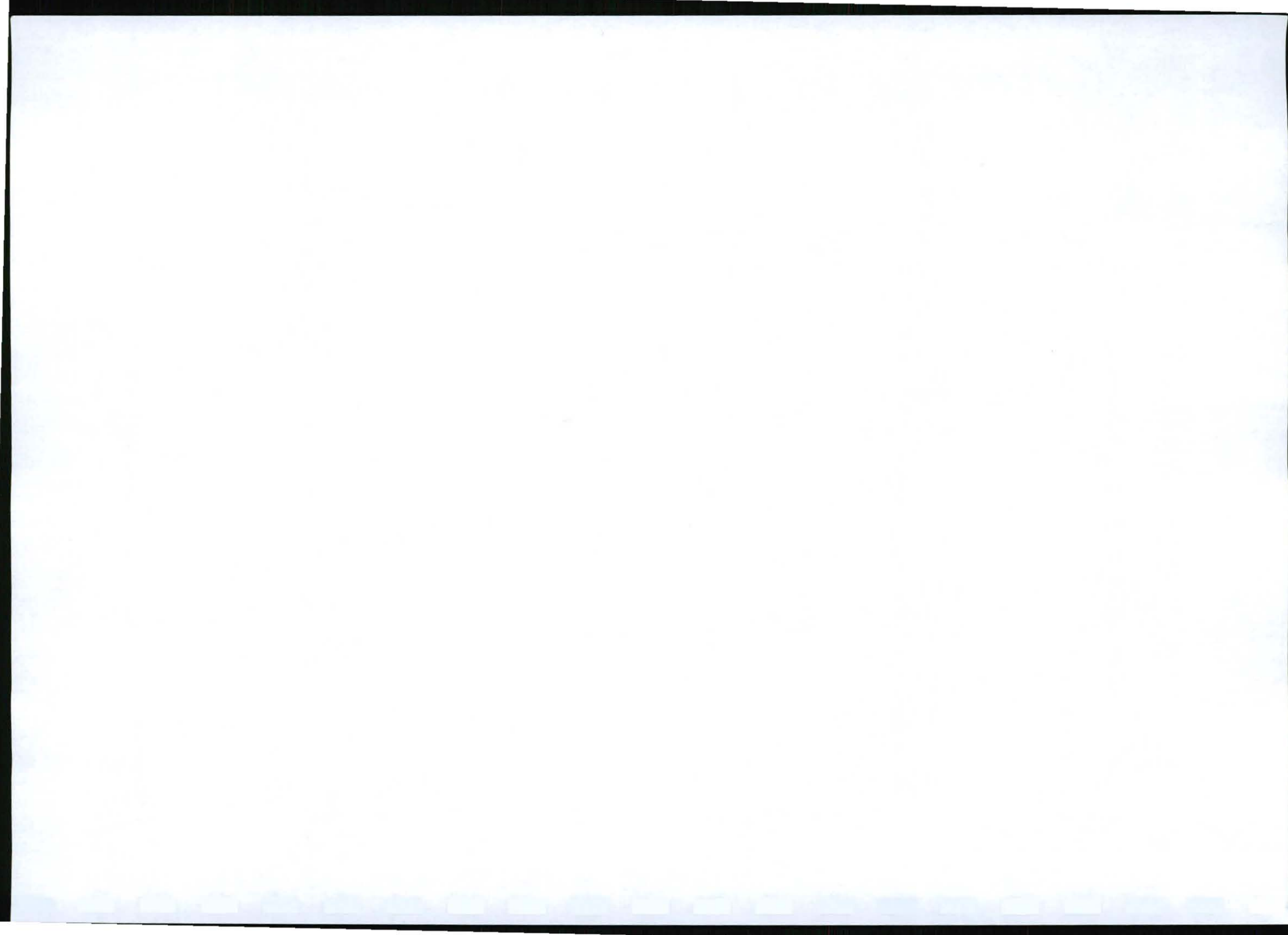


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18.5. Monitoring and Performance Assessment

Monitoring and performance assessment will be undertaken every two years by an independent consultant. This will include the following:

1. Mining progress
2. Progress on rehabilitation
3. State of rehabilitation
4. Analysis of fall out dust monitoring levels
5. Effectiveness of alien eradication programme
6. Species diversity
7. Revision of financial provision required
8. Recommendations on improving rehabilitation techniques



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19. FINANCIAL PROVISION

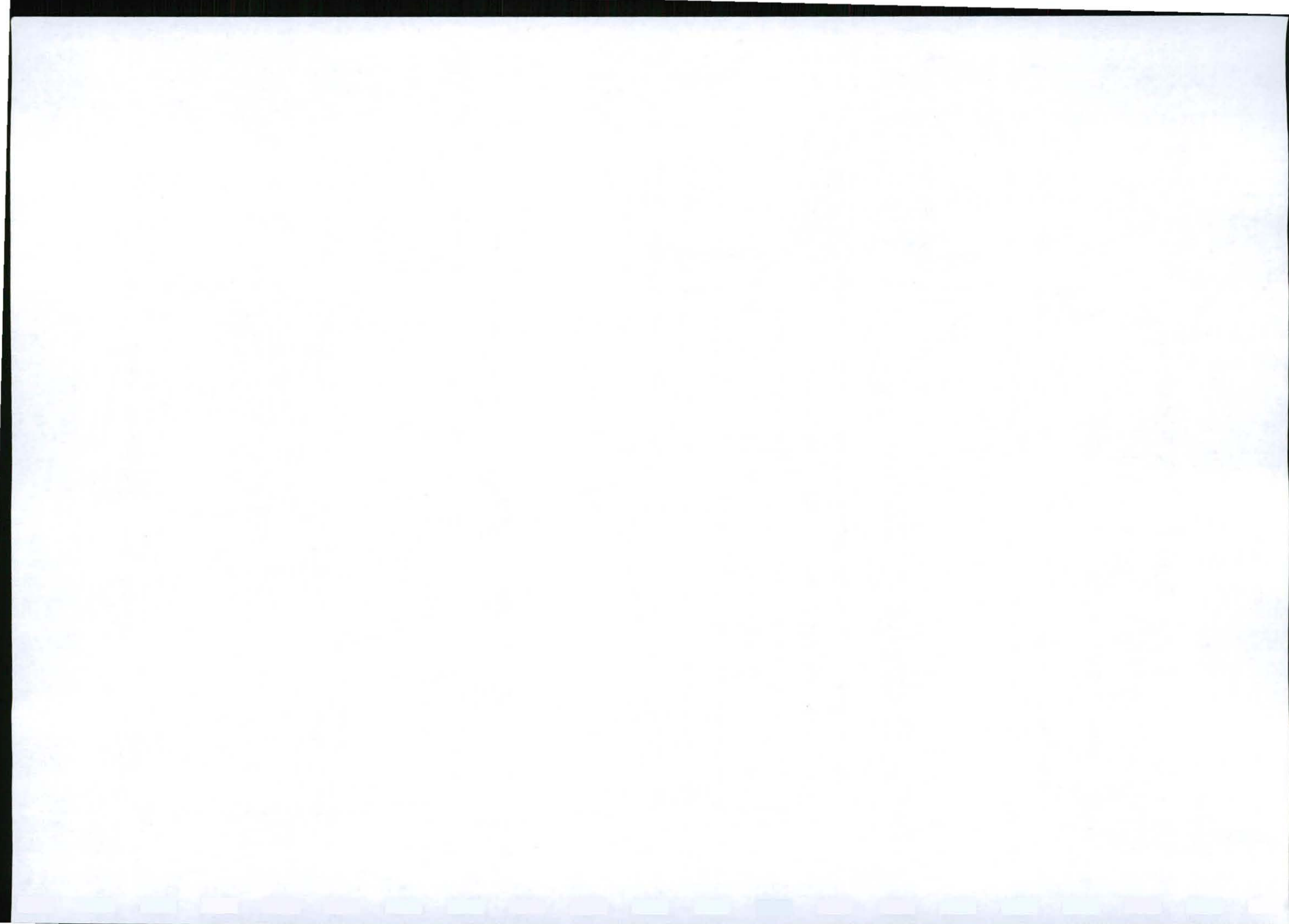
Financial provision was calculated using rules based approach detailed in DME Guidelines document "Guideline document for the evaluation of the quantum of closure-related financial provision provided by a mine".

19.1. Detailed Quantum of Financial Provision

Due to the nature of the mining operation, financial provision is based on the extent of the area mined and not yet rehabilitated at any point in the operation, which the mine manager must ensure is minimised. As mining progresses this figure will be revised based on compliance with the rehabilitation plan. If the rehabilitation lags behind, the figure will have to increased, and more funds must be provided. The rehabilitation has been calculated for the 2009 financial year and is based on the rehabilitation requirements for each mining phase. The area is regarded as having low environmental sensitivity and a low risk class as per the guidelines. The calculation of the financial quanta is shown in Annexure 7 : Financial quanta calculations.

19.2. Method of Financial Provision

Standard Bank South Africa will issue a bank guarantee of R 400,000 in favour of the Department of Minerals and Energy, to comply with regulation 53(b) of the MPRDA.

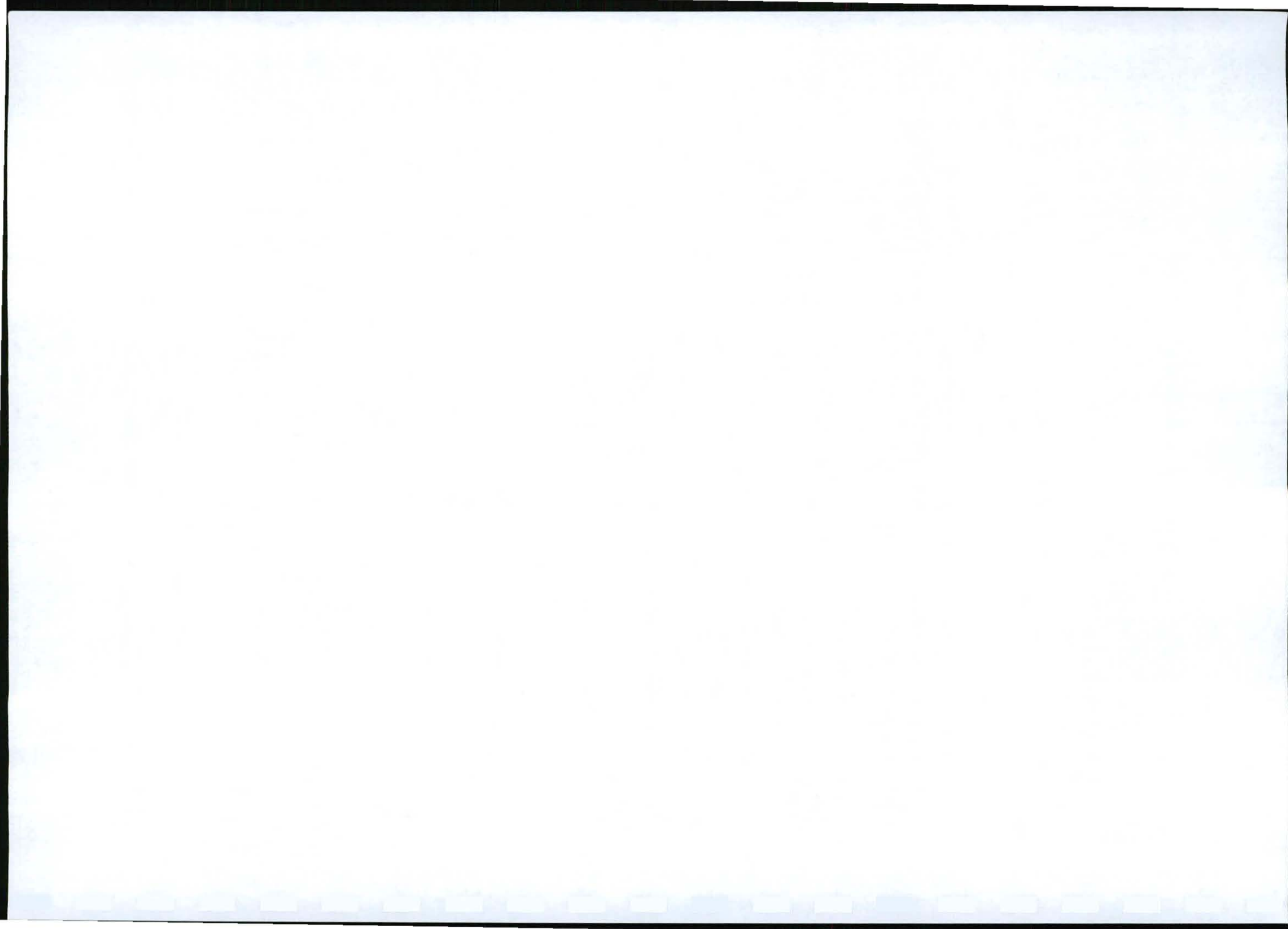


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20. ENVIRONMENTAL AWARENESS PLAN

Sandman Quarry's management will undertake to ensure that at all times there is an employee on the staff who has undertaken environmental awareness training. This training will be done in-house in accordance with a guideline developed by the quarry management. Management will ensure that adequate signs and posters are prominently placed around the quarry informing employees of the relevant environmental topics, these topics include:

- Waste disposal
 - Hydrocarbon management
 - Waste separation
 - Prohibitions against littering
- Water saving
- Energy saving
- Clearing of alien invasive species
- Identification of sensitive species
- Emergency procedures for:
 - Fuel or oil spills
 - Fires
 - Dangerous animal occurrences

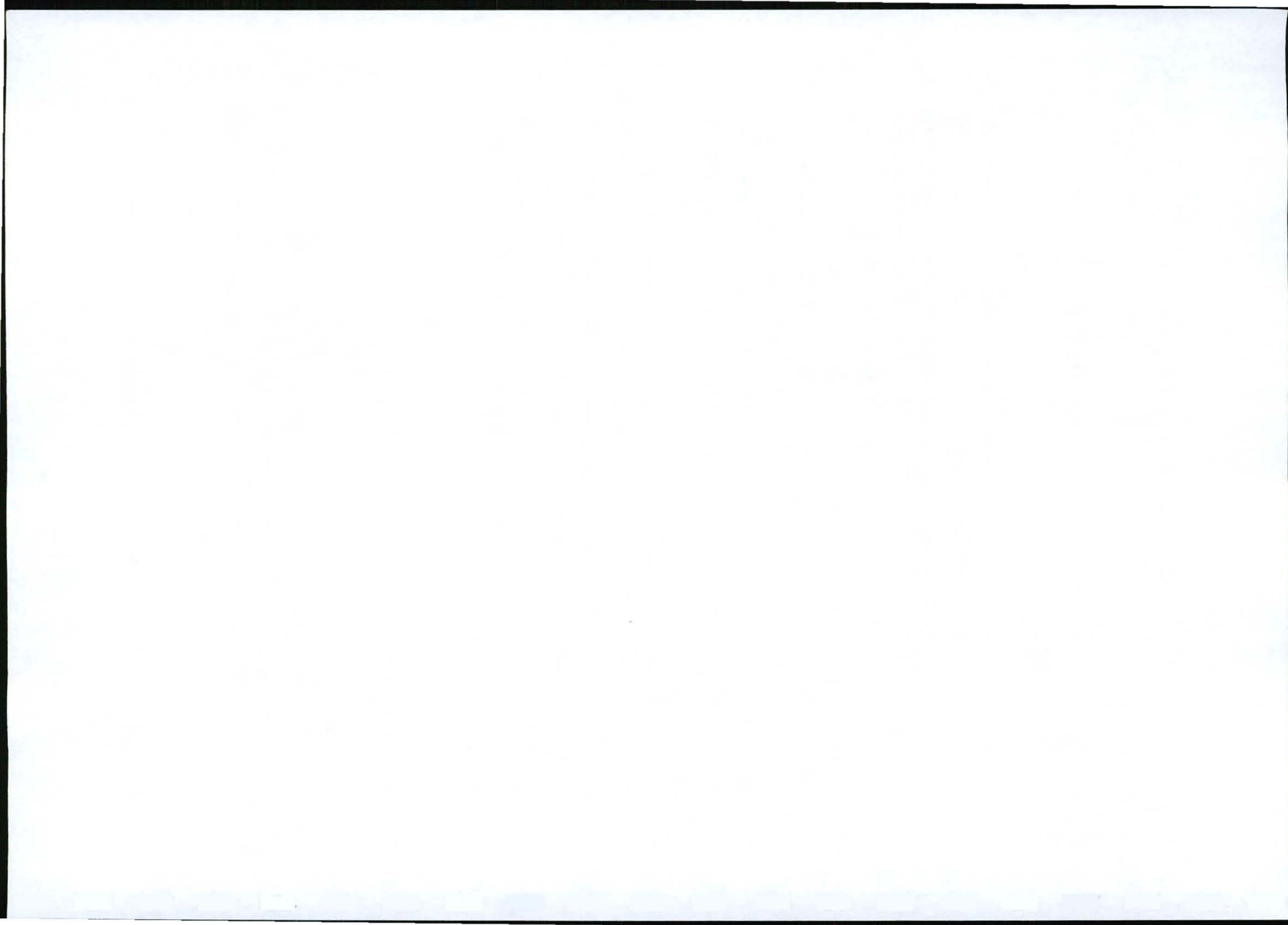


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21. COMMENTARY ON CURRENT ENVIRONMENTAL PRACTICES AT SANDMAN QUARRIES

Sandman Quarries operate an existing mining operation within the proposed mining right area. This mining is undertaken in two areas, each of which has a mining permit. The one area is adjacent to the river and the other is adjacent to an old pit mined out by other parties. The previous parties mined this area too close to the Eskom lines. Sandman has currently undertaken to undo the damage by previous parties by rehabilitating the slopes in such away as to protect the Eskom lines in the area. The areas mined out by Sandman have been sloped at an angle of less than 18° as has been proposed in Annexure 5 : Code of Practice on Safe mining within 100m from Eskom Power Lines. Sandman Quarries has also mined adjacent to the river in the "flood prone zone" as described in section 5.1.3 of this document. This area is currently largely mined out and the severity of the impact on the environment can now be seen. What is evident from the site visits undertaken is that the "bank full zone" has been left unaffected. Figure 6 shows the Swartkops River in the foreground and the mining permit area in the distance. What is further evident is the significant berm in between the mining area and the river, which has attracted riparian fauna and flora. Further down this berm becomes larger and has formed a wetland area which is overgrown with riparian vegetation. If mining is undertaken in this manner, the impact on the long term health of the river will be minimised. It must be noted that recovery of the mined out area in such a case happens naturally because of the following reasons:

- Frequent flooding eliminates the possibility of man-made ecological improvement of such an area as any soil placed or vegetation grown will be removed by flooding
- Deposition of sand and gravels in mined out areas frequently takes place due to flooding, which creates the natural environment for the riparian fauna and flora
- During minor flooding (annual high flows) seeds and vegetation are brought down from the higher reaches



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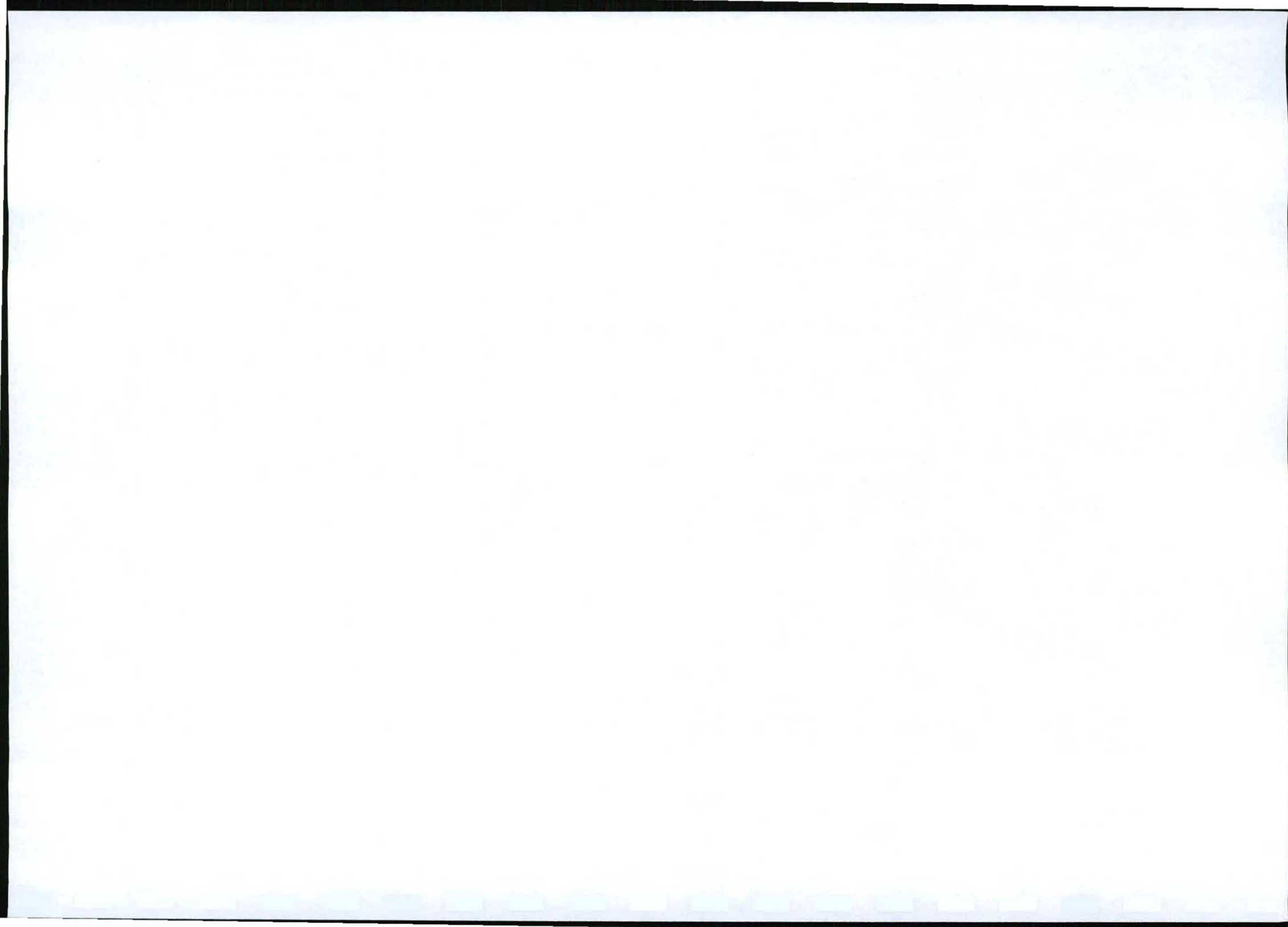


Figure 6: Sandman Quarries mining permit area adjacent to the Swartkops River channel. What can be seen from this photograph is that there is a significant berm left between the river and the mining area which has become habitat for riparian flora and fauna.

Prof. Eileen Campbell also commented on the rehabilitation undertaken by Sandman Quarries stating the following: *"The mining process had a significant impact on the integrity of the alluvial vegetation and water quality of the adjacent Swartkops River. However, Quarry management has undertaken significant rehabilitation of the River so that the water quality does not deteriorate during passage throughout the Sandman Quarry (Plate 5). These rehabilitation efforts are to be encouraged."*

She goes on to say later that: *"The National Water Act 26 of 1998 with the General Authorisations published on 26 March 2004 prohibits damaging areas within 500 m of any wetland or water course and prohibits altering the bed or banks of such a water course. However, rehabilitation efforts at Sandman Quarry are already showing improvement of the river banks. Management is to be complemented on their efforts in this regard."*

The issue of rehabilitation at the Sandman Quarries is an uncomplicated issue. The owner is a farmer and the family have farmed this area all his life. Having grown up in

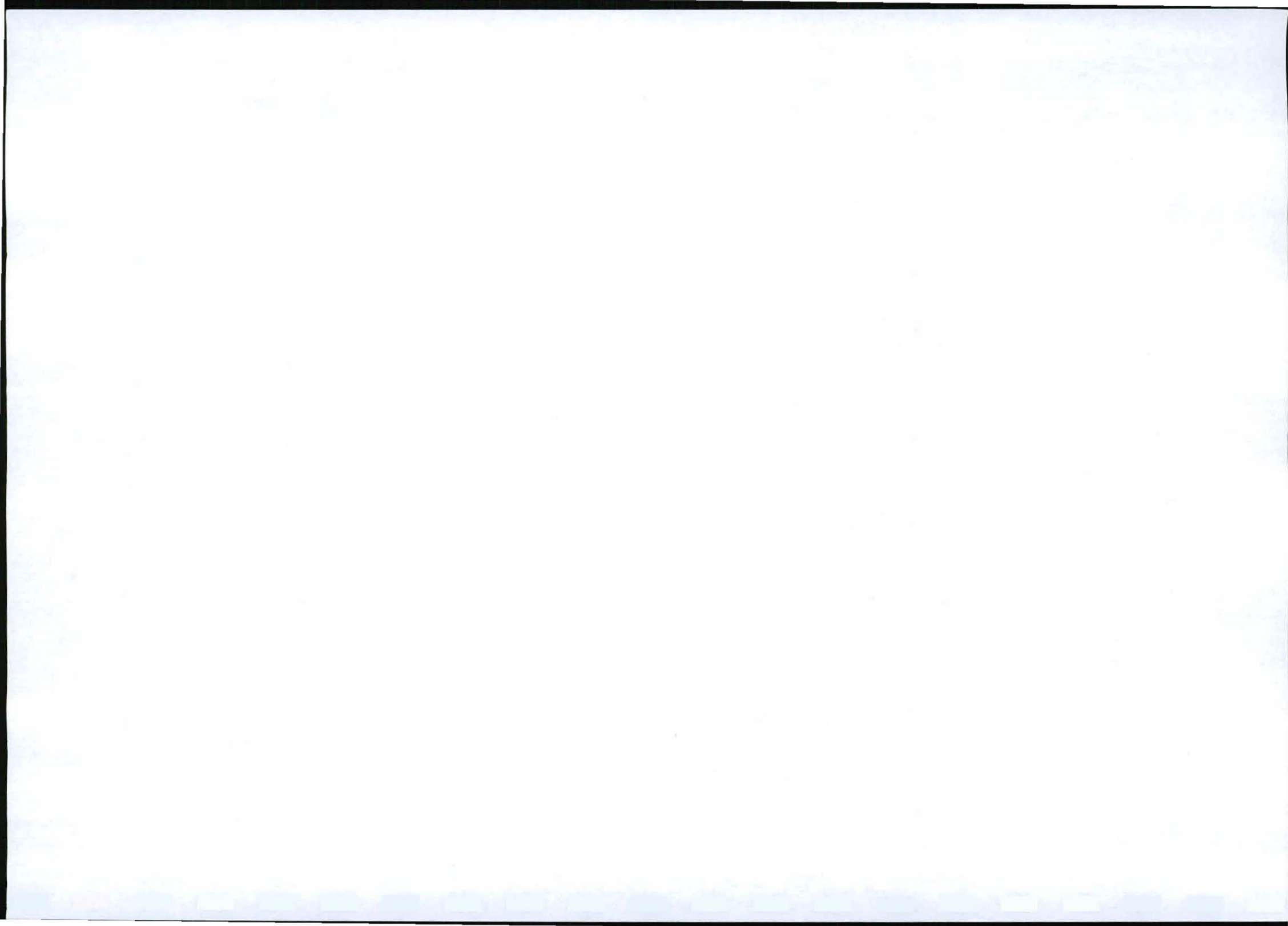


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the area the owner knows the behaviour of the river better than most professionals in the field. For that reason he has stated that he will not risk mining activities that could result in significantly alter the river system which may result in damage to infrastructure.

In addition, since the owner farms the land and intends to continue farming the land after mining of an area has ceased, the owner, more than anyone wants the land rehabilitated to a high standard. The owner intends to use the mined out areas for creation of grazing pastures for cattle and as such will undertake the rehabilitation speedily and in a manner best to his farming operation. He has good knowledge of the grass species in the area and pasture grasses that he intends to use for the rehabilitation.

In summary this essentially creates a win - win situation. The mining is done to fund the establishment of a robust farming operation and at the same time clears alien species and creates an opportunity for upgrading the agricultural value of the land, the "agricultural activities" then takes over the management of the land at closure and the mining operation benefits through inbuilt rehabilitation processed. This situation is unique in mining where the land owner benefits from the rehabilitation and does not do so primarily to satisfy a third party. For that reason it is the consultant's recommendation, from an environmental point of view, that the mining right be granted for the area in question.


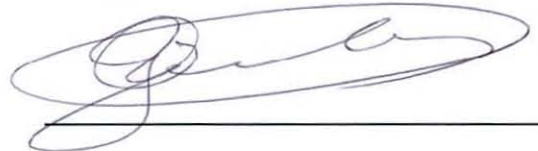


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**23. UNDERTAKING REGARDING THE EXECUTION OF THE
ENVIRONMENTAL MANAGEMENT PLAN**

I, Hein Potgieter, the undersigned and duly authorised thereto by Sandman Quarries cc undertake to adhere to the information, requirements, commitments and conditions as set out in this document.

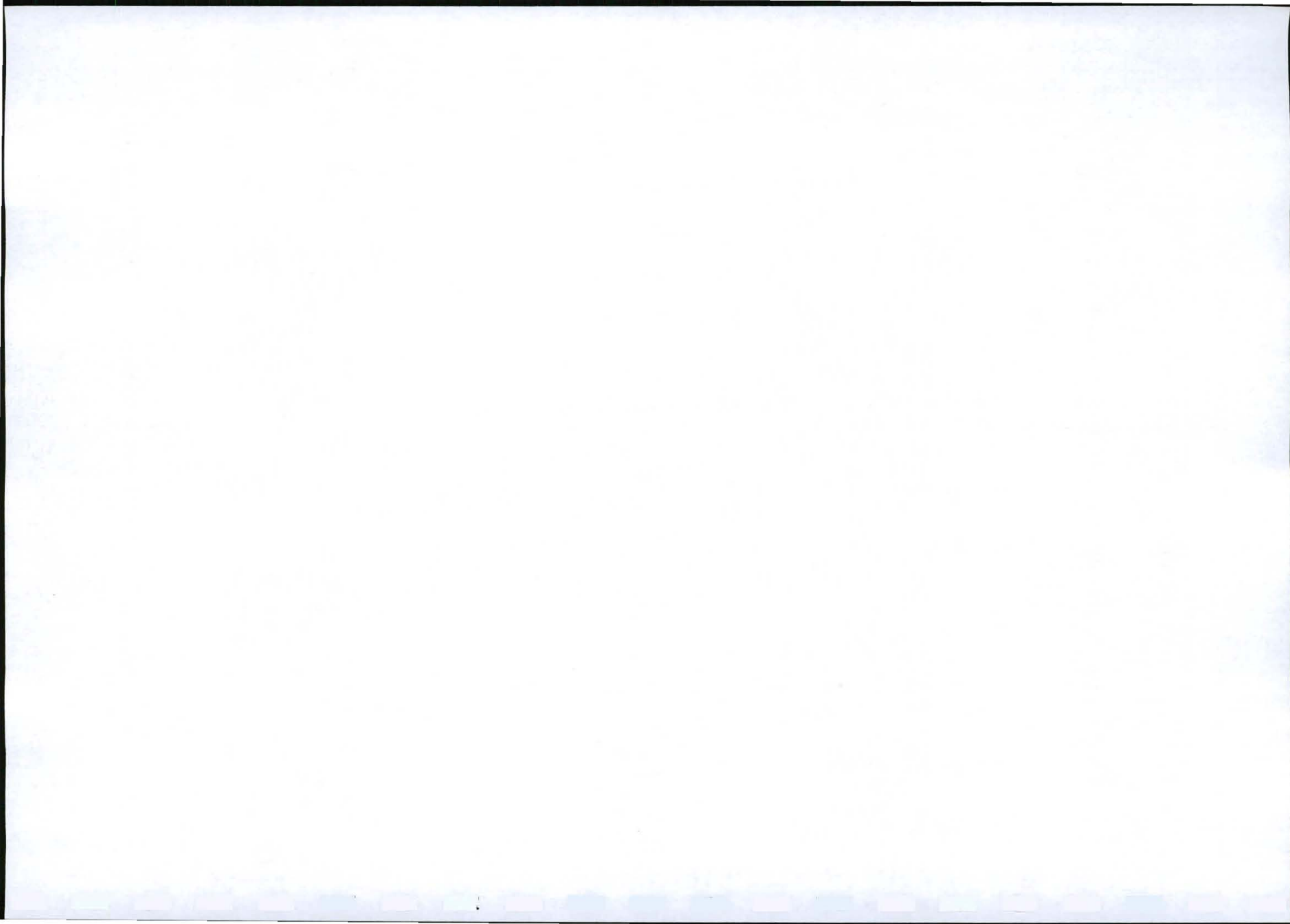
SIGNED AT Port Elizabeth ON THIS 18th DAY OF August 2009.


_____

Witness

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23. ANNEXURE 1 : ENVIRONMENTAL IMPACT ASSESSMENT



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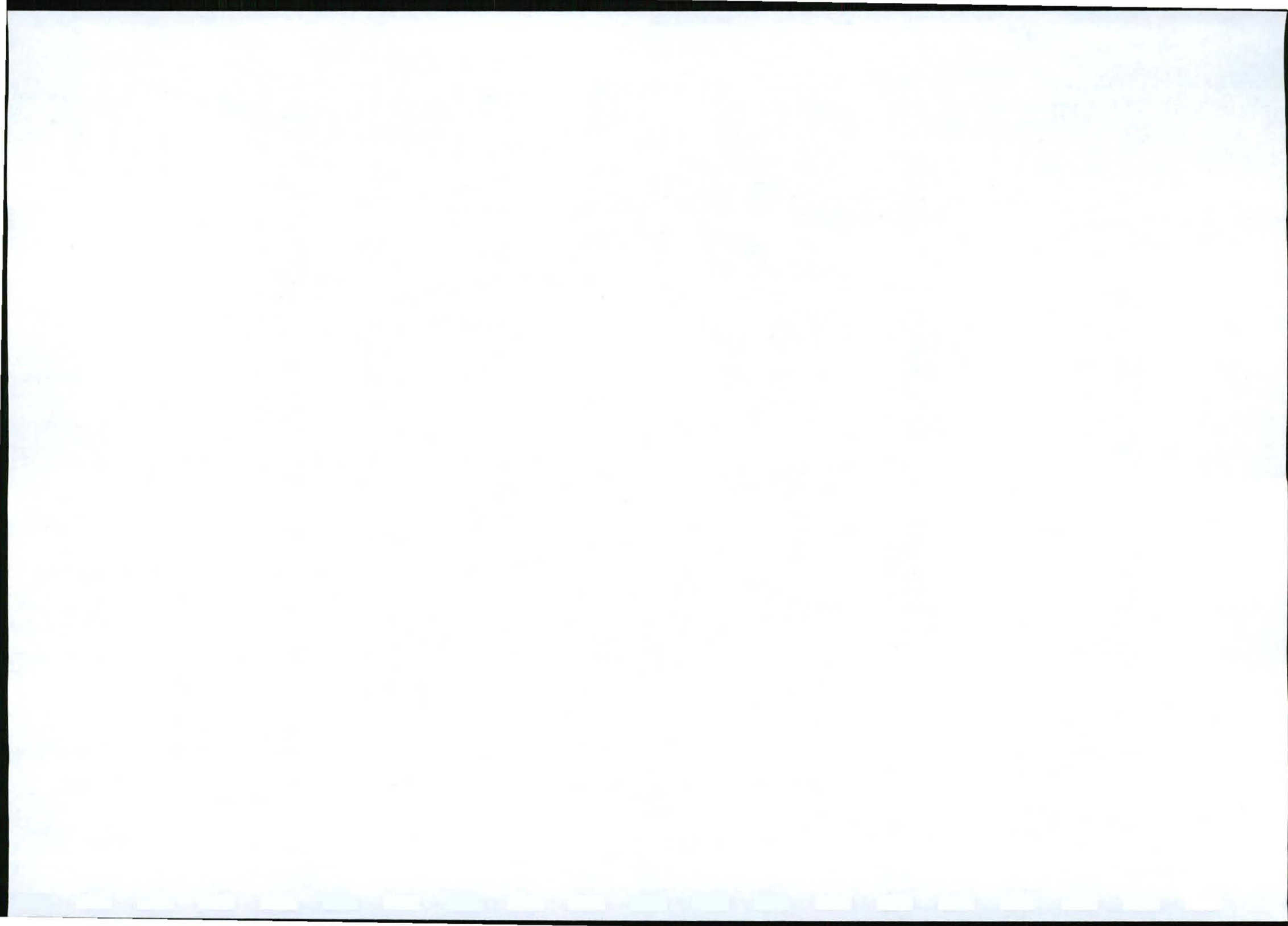
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ENVIRONMENTAL IMPACT ASSESSMENT

This Environmental Impact Assessment describes the possible impacts that mining activities from a proposed opencast mine, owned by Sandman Quarries, could have on the surrounding environment. This report is undertaken in compliance with Regulation 50 of the Minerals and Petroleum Resources Development Act, Act 28 of 2002.

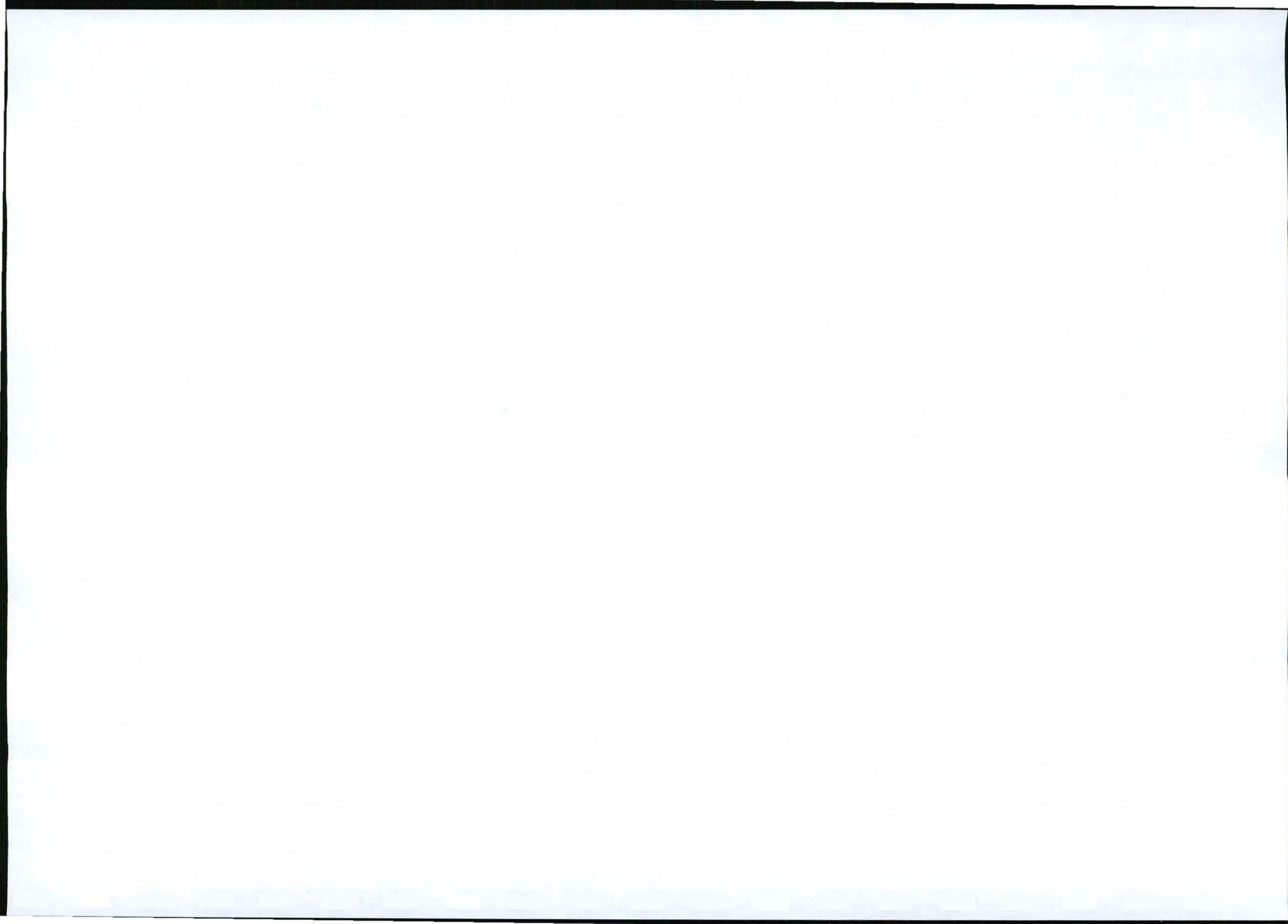
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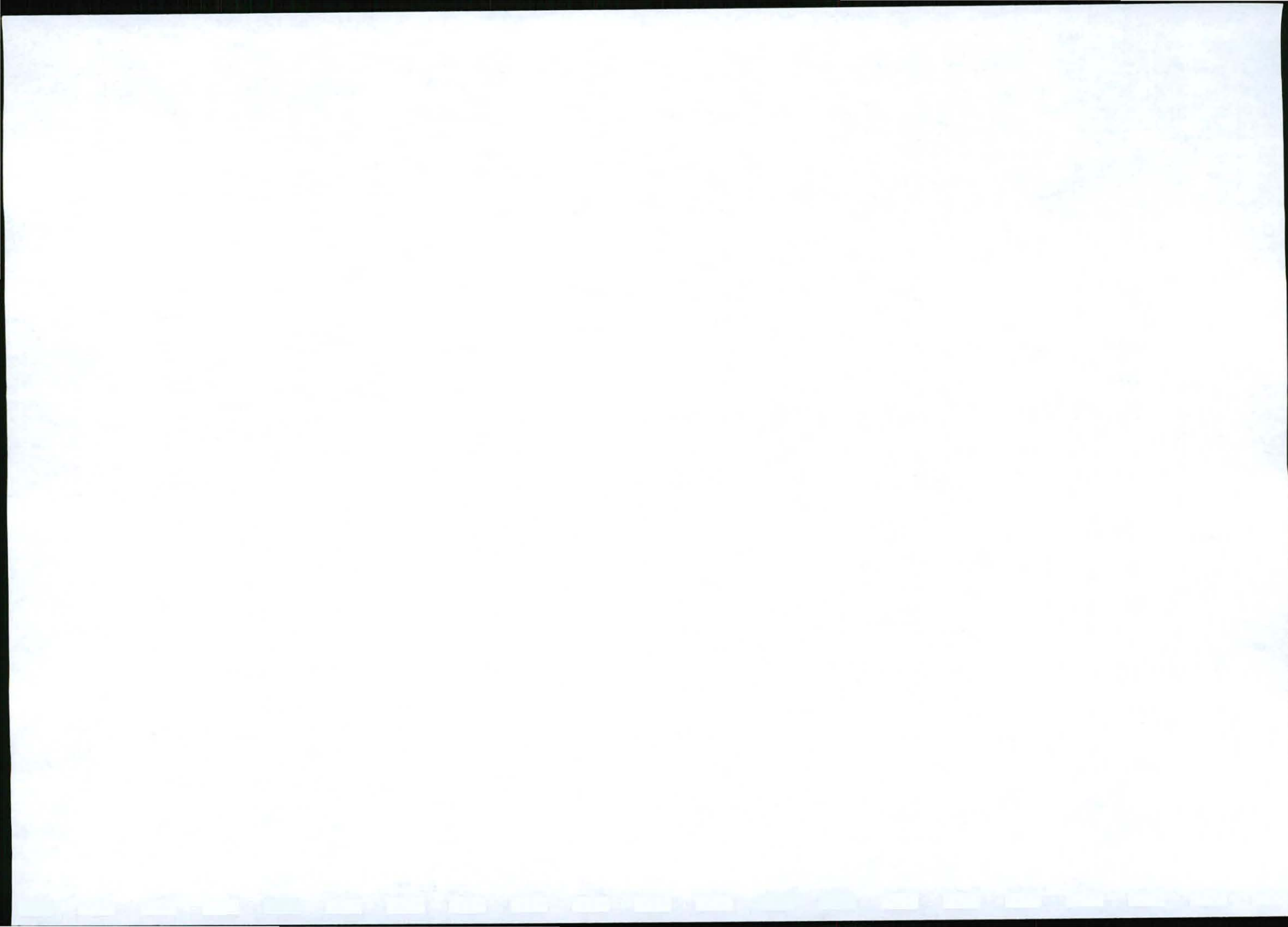


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1. INTRODUCTION

Sandman quarries has undertaken to apply for mining rights for the mining of gravel and sand on 32 portions of the farm Zwartkops River Waagens Drift no 567 in the division of Uitenhage. The total area sought after for mining right is 234ha, of which 84 ha will be targeted for mining. The land to be mined surrounds an area already mined by the owner of the land. Mining has taken place in this area over many years as it is underlain by shallow deposits of medium grained sand, much sought after in the civil construction industry.

1.1.Contact Details

Sandman quarries cc is represented by	Mr. Hein Potgieter.
Sandman Quarries Registration No.:	2002/063801/23
Postal address:	P.O. Box 313 Uitenhage 6230
Applicant telephone no.:	(041) 933 2792
Applicant Facsimile:	(041) 933 4959
Cell No.:	082 787 9975
Email:	sandmanquarries@telkomsa.net nwpotgieter@mweb.co.za

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2. PROJECT LOCALITY

The project is located to the East of Dispatch, north of the Swartkops River. Sandman quarries currently have an operation close to the R75 - bridge over the Swartkops River. This locality is further east opposite the Perseverance Quarry as well as the old wool pullery. The site is shown on a Google image in Figure 1.



Figure 1: Area for which mining right application is being lodged. Which consists 32 portions of farm 567 Zwartkops River Waagens Drift

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3. OWNERSHIP

Sandman quarries are an existing operation which is owned and managed by Mr. Hein Potgieter. The operation occurs on the farm of Mr. Potgieter, which is currently used for commercial agriculture. The land for which mining rights are being applied for fall onto 32 farm portions, 29 of which are owned by Potgieter Properties Trust (PPT) the other three are owned by:

1. Spade Reen Sending Internasionaal
2. New Era International Trust
3. Nelson Mandela Bay Metropolitan

Note that mining in the area owned by Spade Reen Sending Internasionaal has already taken place in the past and no extensions to this mining area are sought.

Of the 29 portions owned by PPT, 8 of the portions are targeted for mineral reserves; other portions are included with the purpose of retention for mining rights for potential mining. Most of the area targeted is currently used for grazing of cattle. The owner of Sandman Quarries holds a mining permit for a portion of the land. It is the intention of the owner to apply for larger mining right area to ensure sustainability of operations.

The title deed information is shown in Table 1.

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Table 1: Title deed numbers for all portions relevant to mining right application

List of farms owned by Potgieter trust as part of mining right area							
No.	Portion	Farm	Title deed no.	Owner	LPI code	District	Local Authority
1	23	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700023	Uitenhage	Despatch
2	24	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700024	Uitenhage	Despatch
3	25	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700025	Uitenhage	Despatch
4	26	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700026	Uitenhage	Despatch
5	27	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700027	Uitenhage	Despatch
6	28	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700028	Uitenhage	Despatch
7	29	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700029	Uitenhage	DIAS DC
8	30	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700030	Uitenhage	DIAS DC
9	31	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700031	Uitenhage	DIAS DC
10	32	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700032	Uitenhage	DIAS DC
11	33	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700033	Uitenhage	DIAS DC
12	34	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700034	Uitenhage	DIAS DC
13	35	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700035	Uitenhage	Despatch
14	36	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700036	Uitenhage	Despatch
15	37	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700037	Uitenhage	Despatch
16	38	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700038	Uitenhage	Despatch
17	39	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700039	Uitenhage	Despatch
18	40	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700040	Uitenhage	Despatch
19	7	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700007	Uitenhage	DIAS DC
20	8	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700008	Uitenhage	Despatch
21	9	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700009	Uitenhage	DIAS DC
22	79	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700079	Uitenhage	DIAS DC
23	80	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700080	Uitenhage	DIAS DC
24	114	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700114	Uitenhage	Despatch
25	111	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700111	Uitenhage	Despatch
26	96	567	T80192/2007	POTGIETER PROP TRUST	C0760000000056700096	Uitenhage	Despatch
27	59	567	T80194/2007	POTGIETER PROP TRUST	C0760000000056700059	Uitenhage	Despatch
28	68	567	T80192/2007	POTGIETER PROP TRUST	C0760000000056700068	Uitenhage	Despatch
29	71	567	T80193/2007	POTGIETER PROP TRUST	C0760000000056700071	Uitenhage	Despatch
30	70	567	T34894/1974	SPADE REEN SENDING INTERNASIONAAL	C0760000000056700070	Uitenhage	DIAS DC
31	74	567	T29956/1999	NEW ERA INTERNATIONAL TRUST	C0760000000056700074	Uitenhage	Despatch
32	82	567	T7821/1952	MUN NELSON MANDELA BAY METROPOLITAN	C0760000000056700082	Uitenhage	Despatch

The highlighted cells above show the Title deeds for farm portions which are not owned by Potgieter Property Trust.

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4. PRE-MINING ENVIRONMENT

The area which forms part of the mining rights application is used largely for farming purposes; the area is divided into two main land uses namely grazing lands and arable lands. The arable portion consists of approximately 8ha of land in the North West corner, currently part of an irrigation scheme using a centre pivot. The rest of the farming area is used for grazing cattle as it is not suitable for arable land due to sandy soils. This area is largely vegetated by Sundays Doringveld, which is discussed later.



Figure 2: View of fields used for grazing cattle showing Sunday Doring veld in the distance towards the Southern end of the land area

4.1. Biophysical Environment

The area falls between terrestrial thicket and riparian vegetation along the fringes of the Swartkops River system. Much of the area is invaded by alien species, such as Eucalyptus sp. and Jointed Cactus. From site investigations it is apparent that much of this area, particularly in the river channel, has been mined previously.

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4.1.1. Climate

The climate in the area has been described as moderate with rainfall between 400 and 440mm per year. The average surface run-off values for the area are between 50 and 100mm. The average maximum temperature is 28° C and the average winter is 17° C. The average minimum in summer is 22° C and the average minimum in winter is 6° C. The prevailing wind is from the west and south west but dominating east and south east during summer months. The mean annual evaporation is between 1500mm and 1600mm per annum.

A summary of the climatic conditions from the South African Weather Service for the area in terms of temperature and precipitation are presented in the table below:

Table 2: Summary of the weather experienced at Sandman Quarry.

Port Elizabeth Climate													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Highest recorded temperature (°C)	39	38	41	39	35	32	33	34	39	39	36	36	41
Average daily maximum temperature (°C)	25	25	25	23	22	20	20	20	20	21	22	24	22
Average daily minimum temperature (°C)	18	18	17	14	12	9	9	10	11	13	15	16	14
Lowest recorded temperature (°C)	10	11	8	4	2	-1	-1	2	2	3	6	9	-1
Average monthly precipitation (mm)	36	40	54	58	59	62	47	64	62	59	49	34	624
Average number of rain days (≥ 1 mm)	9	9	10	9	9	8	8	10	9	11	11	9	112

The strongest wind (>40km/hr) dominates from the West South Westerly, Westerly and Easterly directions with the most occurrences from the West South Westerly direction. Moderate winds of less than 25km/hr come from all directions.

4.1.2. Topography

The area is relatively flat, and forms part of the upper reaches of the Swartkops River floodplain. Very gentle south-easterly gradients (less than 1°) occur throughout. The



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study area drops from about 10m above sea level in the North and North West to about 3m above sea level in the South and South East. A river channel gradient of about 1:200 often prevails in these parts of the Swartkops River system.

4.1.3. Hydrological Environment

Surface water resources

The predominant surface water feature is the Swartkops River which runs along the Southern end of the area. The area relevant to the mining right application forms part of the upper terraces of the floodplain, and is noted in the Nelson Mandela Bay disaster management plan as being in a high risk area for flooding, as shown in Figure 3.

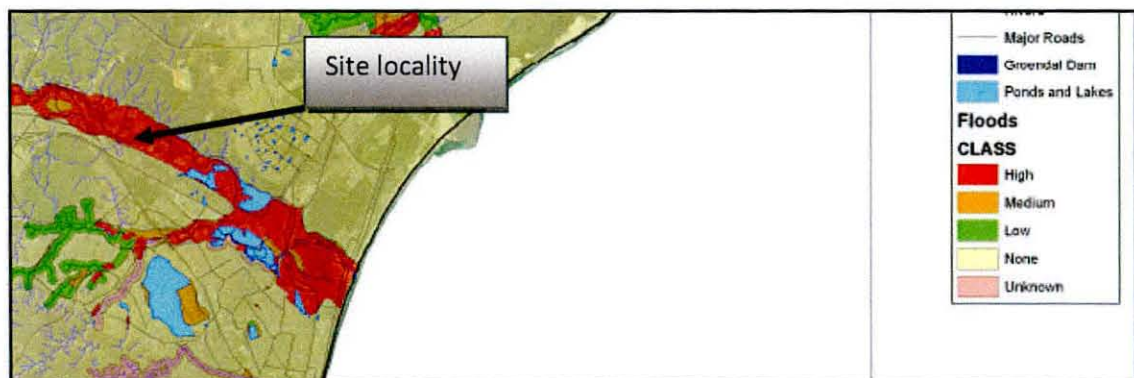
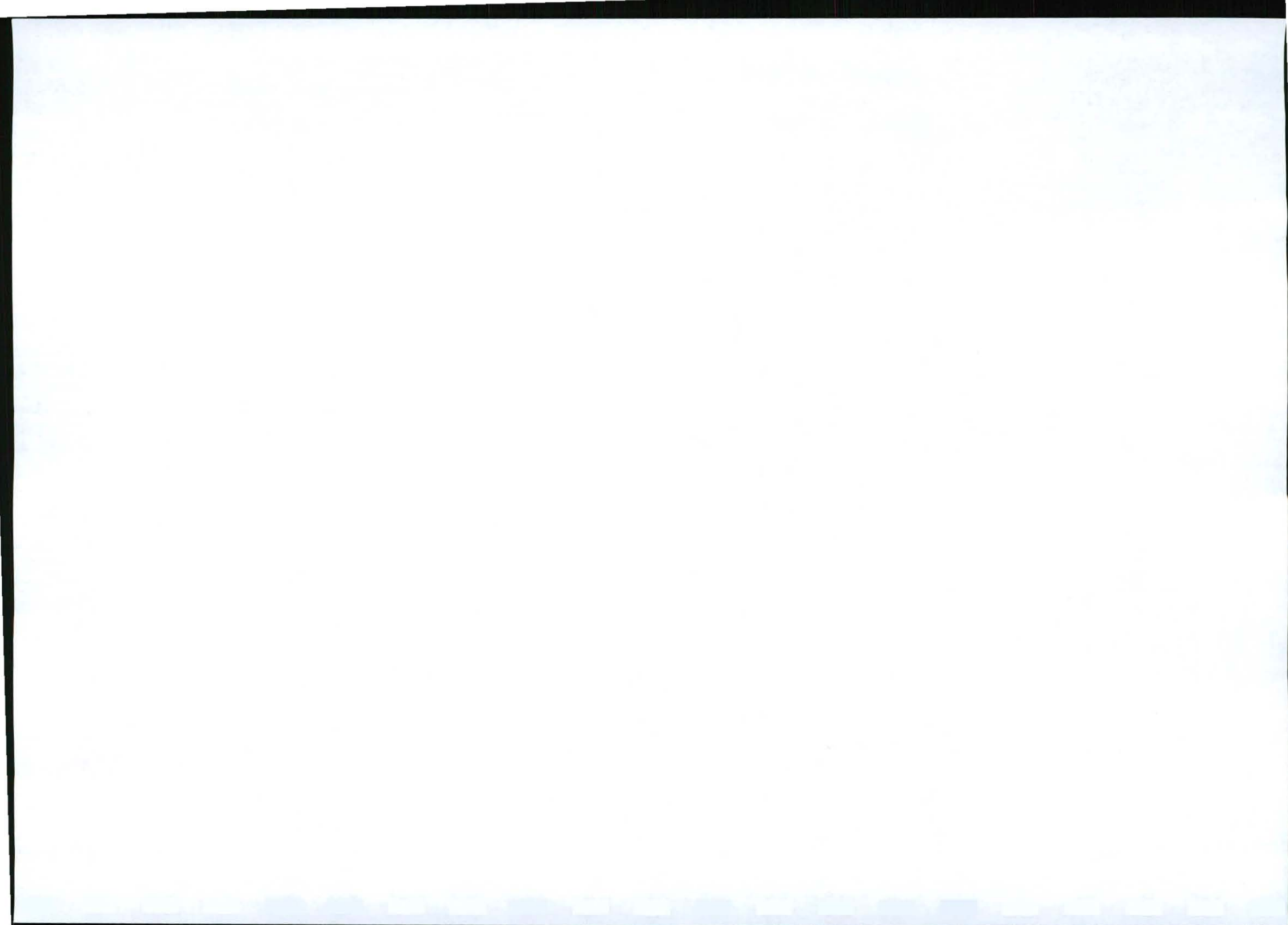


Figure 3: Flood risk data taken from Nelson Mandela Bay Disaster Management Plan

The site is formed from alluvial sand and gravel with lenses of secondary clay deposits from the Sundays River formation, which forms the high - lying areas to the North. Within these clayey areas and often on the boundary between the clay and the sand deposits there are often wetlands.



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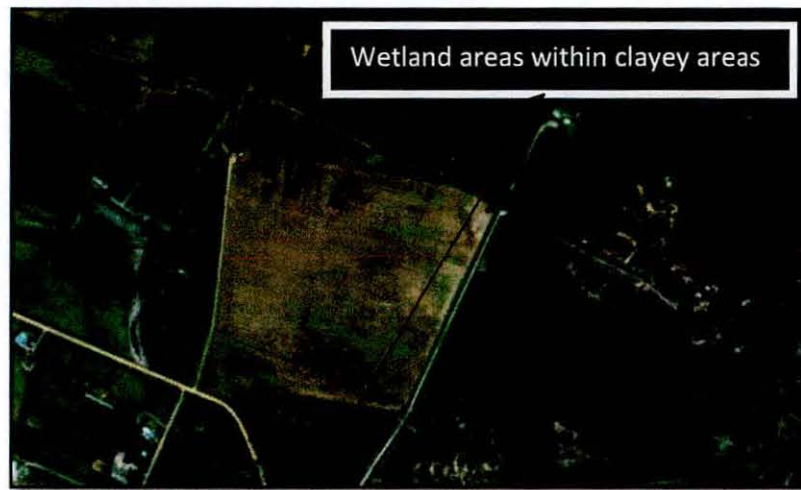


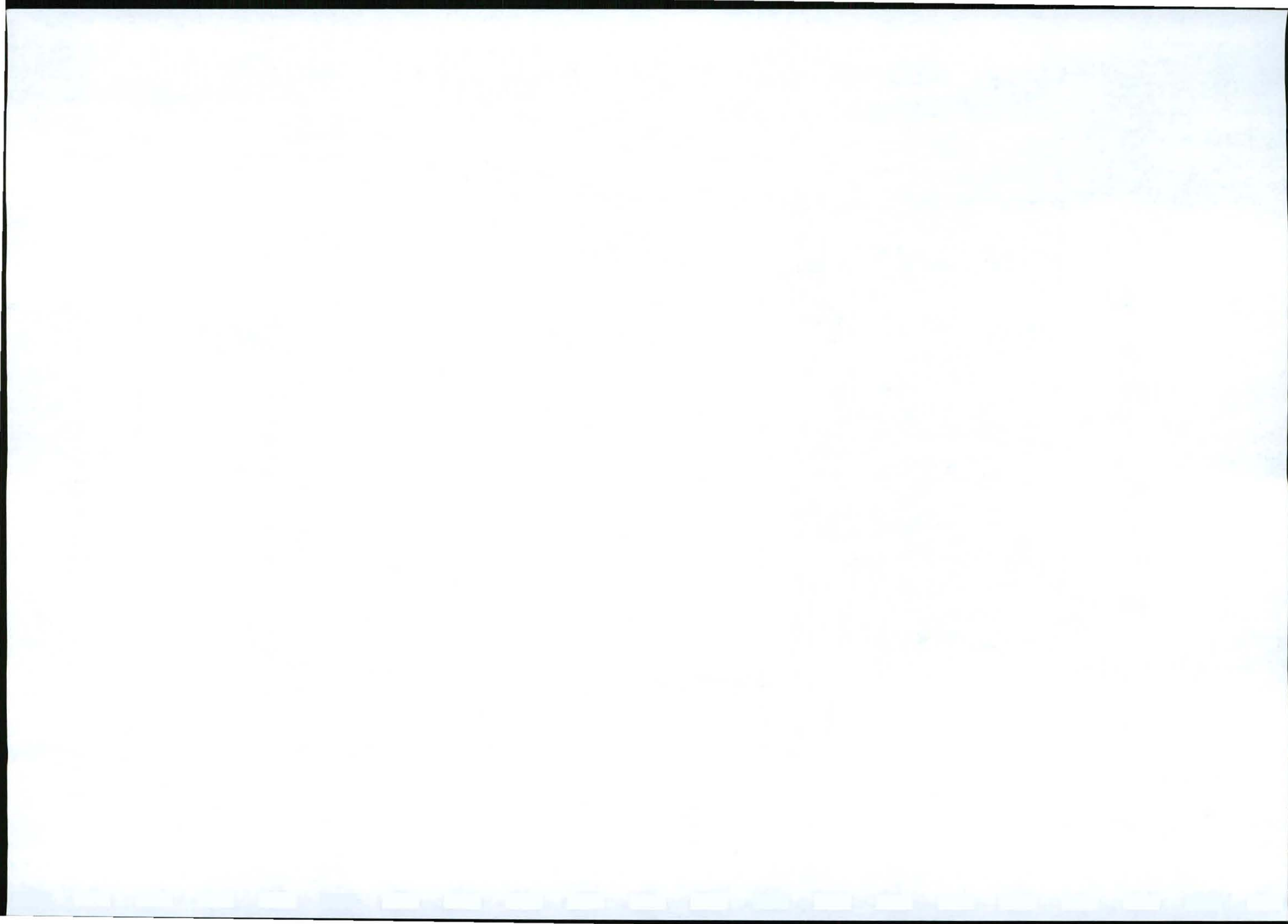
Figure 4: Showing seep zones and wetlands which form within clayey deposits within the floodplain.

Groundwater Resources

The mudstone underlying the Sundays River formation is not a good source of potable groundwater and generally reveals very poor reserves of brackish water due to its marine origin. The weathering of this mudstone creates an impervious layer below the mining and agricultural land uses, preventing any contamination of deeper groundwater. During the prospecting programme ground water was found at a level of about 2.5m in the clayey areas, whereas the sand and gravel deposits to the South, targeted for mining did not reveal ground water at 2.5m depth.

4.1.4. Vegetation

A vegetation assessment of the area including and surrounding the proposed mining right area was undertaken by Prof. Eileen Campbell of Nelson Mandela Metropolitan University, this report is included in section 17 : Specialist Vegetation Studies.



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4.1.5. Mammals

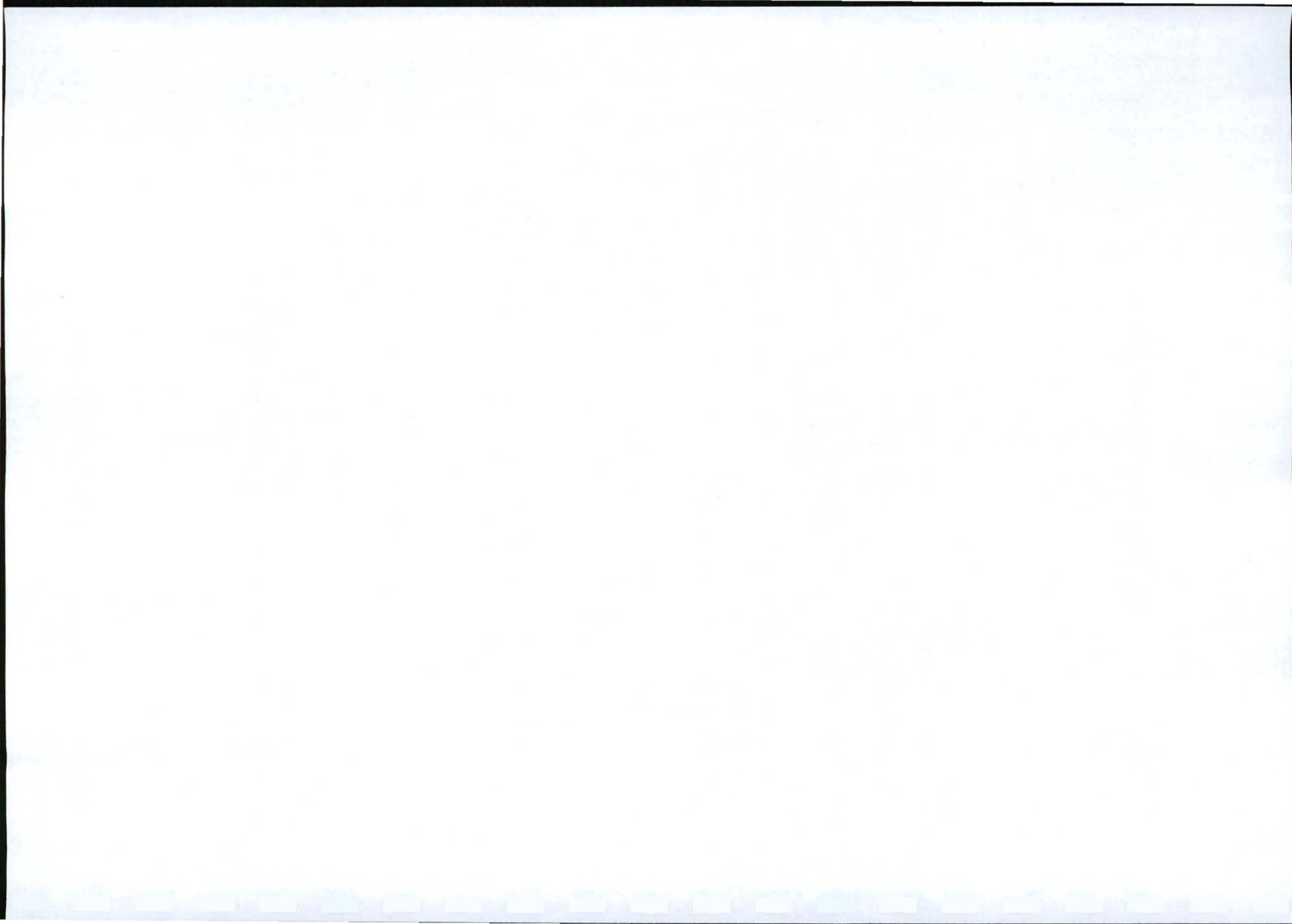
128 of the 292 terrestrial mammal species in Southern Africa occur in the Eastern Cape. The mammals which have documented ranges within the mining footprint are listed below:

Table 3: Mammals which could possibly occur in the mining right area

Common name	Scientific Name	Conservation status
Blue Duiker	<i>Philantomba monticola</i>	Vulnerable
Brown Hyena	<i>Hyaena brunnea</i>	Near threatened
Honey badger	<i>Mellivora capensis</i>	Near threatened
Lesser long fingered Bat	<i>Miniopterus fraterculus</i>	Near threatened
Schreibers Long-fingered Bat	<i>Miniopterus shreibersii</i>	Near threatened
Temminck's Hairy Bat	<i>Myotis tricolor</i>	Near threatened
Cape Horseshoe Bat	<i>Rhinolophus capensis</i>	Near threatened
Geoffrey's Horseshoe Bat	<i>Rhinolophus clivosus</i>	Near threatened
Hottentot's Golden Mole	<i>Crocidura cyanea</i>	Data deficient
Reddish-grey Musk Shrew	<i>Poecilogale albinucha</i>	Data deficient
Greater Musk Shrew	<i>Crocidura flavescens</i>	Data deficient
Forest Shrew	<i>Myosorex varius</i>	Data deficient
Least Dwarf Shrew	<i>Suncus infinitimus</i>	Data deficient
Woodland Mouse	<i>Grammomys dolichurus</i>	Data deficient

"Vulnerable" – refers to a species where the best available evidence indicates that it meets all the criteria for endangered animals and is therefore facing a very high risk of extinction in the wild.

"Near Threatened" – refers to species that have been evaluated against a criteria but do not qualify for critically endangered or vulnerable levels now but are close to qualifying for such a category in the near future.



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“Data deficient” – refers to species where there is inadequate information to make direct or indirect assessments of its risk to extinction based on present distribution or population status.

4.1.6. Reptiles and Amphibians

The herptefuna in the region include about 140 taxa of which 31 are restricted (endemic) to the Eastern Cape Province. No reptile or amphibians were noted during field investigations. Red Data Book species which occur in this area include only the Yellow-bellied House Snake (*Lamprophis fuscus*). This snake is associated with mountainous and grassland areas of the Eastern Cape Province. It is an olive pale colour with a light yellow belly. The snake is secretive and nocturnal occurring only in termitaria and beneath stones.

4.1.7. Birds

A rich avifaunal population exists in the Eastern Cape Province. Recent records indicate that about 500 bird species occur in the region, of which some 300 species breed. Twenty of these breeding species are listed as rare and endangered in South Africa. Of the 500 species in the area, only the European Starling (*Sturnus vulgaris*), House Sparrow (*Passer domesticus*) and Feral Pigeon (*Colomba livia*) occur as exotic species in the Uitenhage/Dispatch area. The major factor determining current bird distribution in the region is man's modification of the habitat.

Avifaunal adaptations to survive in built-up residential areas are frequently complicated by artificial predation such as domestic cats and dogs. Anthropogenic features such as clear window panes and overhead cables also have a negative impact on urban bird populations.

