

 Eskom	Strategy	Medupi Power Station Project
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1 INTRODUCTION

1.1 Background to Medupi Power Station Project

Electricity cannot be stored and must be used as it is generated. Therefore, electricity must be generated in accordance with supply-demand requirements. Eskom Holdings SOC Limited (Eskom) provides energy and related services, including the generation, transmission, distribution and supply of electricity. Eskom currently generates approximately 95% of the electricity used in South Africa. The reliable provision of electricity by Eskom is thus critical for industrial development, related employment and sustainable development in South Africa.

In order to be able to adequately provide for the growing electricity demand, Eskom have identified various technologies in different locations. As part of its capacity expansion programme, Eskom Holdings SOC Limited is constructing a 4800 MW coal-fired power station, named Medupi, in the Lephalale area in the vicinity of the existing Matimba Power Station.

The Medupi Power Station site was originally a 'greenfields' site, comprising of natural savanna vegetation. The construction phase, which included (inter alia) land clearance, removal of vegetation and wildlife and excavation of soils, represented the most significant direct and immediate impacts on the natural environment.

Environmental authorization was applied for prior to the start of construction of Medupi Power Station, and a positive Record of Decision (RoD) was received on the 21st of September 2006. One of the authorization conditions stipulates the re-instatement of vegetation and rehabilitation of the site after construction is completed.

2 SUPPORTING CLAUSES

2.1 Scope

The RSIP has the following scope:

- Clearly establishes the objectives of the Medupi Power Station Decommissioning plan and Rehabilitation activities;
- Proposes an end-use plan for the Construction of Medupi Power Station project area; and
- The extent of this RSIP includes areas directly impacted by Medupi Power Station Construction works and its associated infrastructure.

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2.1.1 Purpose

Condition 12 Annexure V of the Water Use License issued on the 13 February 2009 requires that the Licensee must prepare the Rehabilitation Strategy and Implementation Plan (RSIP) that must be submitted to the Chief Director: Limpopo for approval within 1 (one) year from the date of issuance of the license. Thereafter the RSIP must be updated and submitted to the Chief Director: Limpopo for approval annually.

The purpose of this document is to detail the Rehabilitation Strategy and Implementation Program (RSIP) that will describe the procedure that will be implemented by Eskom Holdings SOC Limited to meet the rehabilitation; decommissioning and environmental management objectives associated with construction of Medupi Power Station, situated in Lephalale, Limpopo South Africa.

2.1.2 Applicability

This document shall apply throughout Eskom Group Capital Medupi Power Station.

2.1.3 Effective date

The authorisation date shall be the effective date.

2.2 Normative/Informative References

2.2.1 Normative

Document Title	Document Number
Project Execution Plan	200 5919
Project Quality Plan	200 1679
Development and Change of Medupi QMS Documents	200 5665
Document and Control Management Procedure	200 1680
Unit Construction Procedure Manual	200-163680
ISO 14001, Environmental Management Systems, Requirements with guidance for use	ISO 14001
The Environmental Management Plan for the Medupi Coal-fired Power Station in the Lephalale Area, Limpopo Province – The Construction Phase	200-35208
Medupi Power Station Amended Water Use Licence(01/A42J/4055)	200-234039
Medupi Environmental Policy	200-73797
Medupi EMS Scope and Manual	200-73971
Procedure for Environmental Legal and Other Requirements	200-73977
Procedure for the Identification and Application of Environmental Operational Controls	200-73969

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2.2.2 Informative

Document Title	Document Number
TM Procedure for the Identification and Management of Alien and Invasive Species	200-85677
TM Stockpile Management Plan	200-53820
TM Land Management Plan	200-79130
Concept Design End-of-Phase Design Review Report for Medupi Landscaping Phase 1	200-167840
Medupi Power Station Landscaping Concept Design Report Phase 1	200-173130
Contractual Terms: ESKOM Holdings, Medupi Power Station, Section 4 – Employer Policies and Procedures, Part 9 – Safety, Health and Environmental Requirements Schedule	200-10609
Medupi Power Station Environmental Management Plan Revision 2, September 2010	200-35208
Medupi Power Station Ash Stack Facility Operation Manual, Ref Number JW057/10/B754, Revision C, October 2013.	-
Bohlweki Environmental, 2005. Scoping Report for Establishment of a New Coal-Fired Power Station in the Lephalale area, Limpopo.	-
Bohlweki Environmental, 2006. Environmental Impact Report for Establishment of a New Coal- Fired Power Station in the Lephalale area, Limpopo.	-
C & M Consulting Engineers, 2013. Waterberg Airshed Priority Air Quality Monitoring Network. Monthly Activity Report: April 2013. Department of Water Affairs	-
Mine Rehabilitation: www.industry.gov.au/resource/Documents/LPSDP/LPSDP Mine Rehabilitation Handbook	-
Mine Closure: www.industry.gov.au/resource/Documents/LPSDP/LPSDP Mine Closure Completion Handbook.	-
National Norms and Standards for the Remediation of Contaminated Land and Soil Quality, Notice 233 of 2012.	-
Framework for the Management of Contaminated Land, May 2010, Department of Environmental Affairs.	-

2.3 Definitions

Term	Definition
Contractor	An employer who performs construction work and includes principal contractors. Contracted companies are specifically viewed as employers in their own right, as per the OHSAct.
Rehabilitation	It is the process of reshaping and re-vegetating land to restore it to stable landform after some process such as construction has resulted in its disturbance or damage.
Progressive Rehabilitation	The process by which significantly disturbed areas are rehabilitated to their pre-disturbed land-use with same species and density of cover to that of surrounding undisturbed areas as soon as practicable following the completion of any construction or operational works.
Decommissioning	Planned shut-down or removal of an infrastructure such as building, equipment, plant, etc., from operation or usage.
Re-vegetation	The use of direct seeding to support an area achieving an acceptable measure of the pre-clearance indigenous vegetation or regional ecosystem status.

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2.4 Abbreviations

Abbreviation or Acronym	Description
RSIP	Rehabilitation Strategy and Implementation Plan
EA	Environmental Authorisation
NEMA	National Environmental Management Act
NWA	National Water Act
DEA	Department of Environmental Affairs
RoD	Record of decision
EMP	Environmental Management Plan
HCS	Hazardous Chemical Substance
CDD	Clean and Dirty Dam
Gx	Eskom Generation Division
TM	Team Medupi
GCD	Eskom Group Capital Division
ECO	Environmental Control Officer
Mm	millimetre
m ³	Cubic Metre
m ²	Square Metre
AIP	Alien and Invasive Species

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2.5 Roles and Responsibilities

Responsible

Responsible person perform or do the work to achieve the task. There is at least one role with a participation type of responsible, although others can be delegated to assist in the work required.

Accountable (also approver or final approving authority)

Accountable person is ultimately answerable for the correct and thorough completion of the deliverable or task, and delegates the work to those responsible. In other words, an accountable person must sign off (approve) work that responsible provides. There must be only one accountable specified for each task or deliverable.

Consulted (sometimes counsel)

Consulted person is the one whose opinion is sought, typically subject matter experts; and with whom there is two-way communication.

Informed

Informed person need to be kept up-to-date on progress, often only on completion of the task or deliverable; and with whom there is just one-way communication.

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Table 1 RACI Matrix

Process Step/Activity	TM Project Director	Medupi Power Station Manager	TM Environmental Manager	Medupi Environmental manager	TM Environmental Department	Medupi Environmental Team	TM Engineering	Medupi Engineering	ECO	Contractors	Rehabilitation Manager /Champion	Rehabilitation Team	Ecological specialist
Business unit	GCD	Gx	GCD	Gx	GCD	Gx	GCD	Gx	GCD	GCD	GCD	GCD	GCD
Overall accountability for rehabilitation and decommissioning of all areas associated with construction activities	A												
Overall accountability for rehabilitation and decommissioning of all areas associated with operational activities (e.g. Ash Dump)		A											
Setting and reviewing target dates related to this plan; Responsible for defining communicating and monitoring requirements of contracting third parties/ contractors operating under his control and influence (Construction phase)	A	I	R				C		I	I	C		
Setting and reviewing target dates related to this plan; Responsible for defining communicating and monitoring Requirements of contracting third parties/ contractors operating under her control and influence (Operational Activities)	A			R				C					C

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Process Step/Activity	TM Project Director	Medupi Power Station Manager	TM Environmental Manager	Medupi Environmental manager	TM Environmental Department	Medupi Environmental Team	TM Engineering	Medupi Engineering	ECO	Contractors	Rehabilitation Manager /Champion	Rehabilitation Team	Ecological specialist
Business unit	GCD	Gx	GCD	Gx	GCD	Gx	GCD	Gx	GCD	GCD	GCD	GCD	GCD
Setting and reviewing target dates related to this plan, Reviewing of the plan, monitoring rehabilitation progress and success, to monitor rehabilitated areas to determine if rehabilitation objectives are met	A				R		C		I				
Reviewing of the plan, monitoring rehabilitation progress and success, to monitor rehabilitated areas to determine if rehabilitation objectives are met	A					R							C
Landscaping design for phase 1I areas disturbed during Construction phase	A						R						
Landscaping design for different areas disturbed during Operational phase (e.g. Ash Dump)	A						R						
Review and acceptance of contractor's rehabilitation plan / method statement. Monitor implementation of rehabilitation plan. Report rehabilitation progress to authorities.	A				R				R				
To manage implementation of rehabilitation plan; Oversee rehabilitation process from beginning to end, Monitoring rehabilitation progress and success	A				R				R	R	R		
Carry out physical work of rehabilitation including site preparation, planting and maintenance	A									R		R	

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2.6 Related / Supporting Documents

- [1] Appendix A – Identified Rehabilitation Areas
- [2] Appendix B- Summary of Rehabilitation Method for Medupi Power Station
- [3] Appendix C- Location of Stockpiles within Medupi Power Station
- [4] Appendix D- Potential contaminated areas within Medupi Power Station
- [5] Appendix E- Landscape Concept Design Phase 1
- [6] Appendix F – Document Self-Assessment Checklist
- [7] Appendix G Medupi Power Station Rehabilitation Strategy and Implementation Program Action Plan

3 DOCUMENT CONTENT

3.1 REHABILITATION REQUIREMENTS

3.1.1 Statutory requirements

South Africa's legislation unambiguously places the responsibility of mitigating environmental damage as a result of a development on a developer. The liability exists throughout the life of development and beyond in terms of residual impacts. It includes commitments for remediation and/or rehabilitation.

The key legislation governing the requirements for rehabilitation is contained in the following acts:

- a) The constitution of the Republic of South Africa (Act 108 of 1996)

The constitution, whilst it does not contain specific provisions for rehabilitation, does enshrine the right of every citizen to an environment that is not harmful to health or wellbeing (Section 24). The inclusion of environmental rights as part of fundamental human rights ensures that environmental considerations are recognized and respected during administrative and legal processes implemented during the closure and rehabilitation of disturbed areas.

- b) The National Environmental Management Act 107 of 1998

The concept of rehabilitation has become an integral part of South African environmental law. Section 28 of NEMA imposes a duty of care to prevent or where authorised to minimise environmental degradation. It also provides steps that should be taken to prevent environmental degradation, including the provision for rehabilitation in section 28 (3) (f) which states that the measures may include measures to remedy the effects of pollution and degradation.

The principles of section 2 of NEMA that are particularly applicable to rehabilitation are:

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- ☐ The Precautionary Principle 2 (4) (a) (vii), which places the onus on the developer to take a risk averse and cautious approach during decision making, that recognises the limits of current knowledge about the consequences of decision and actions. Where uncertainty exists, action must be taken to limit the risk;
- ☐ The Cradle-to-Grave Principle 2 (4) (c) states that responsibility for environmental, health and safety consequences of a policy, program, project, product, process, service or activity exists throughout its life cycle;
- ☐ Polluter Pays Principle 2(4)(p) is generally regarded as an important guiding principle for environmental management; and
- ☐ The Project must comply with the requirements for sustainable development 2(4) (a). A holistic, integrated approach must be followed and best practicable environmental options, defined as being the option that provides the most benefit or causes least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as in the short term must be selected.

c) The National Water Act 36 of 1998

Section 19 of NWA which imposes a duty of care on the holder of authorisation in a similar way to section 28 of NEMA states that 'An owner of a land or a person in control of a land or a person who occupies or uses the land on which the activity or process is or was performed or undertaken; or any other situation exists, which causes, has caused or is likely to cause a pollution of water resource must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring'. This implies that before any development is opened or closed whether temporarily or permanently, all the necessary pollution control measures should be in place.

In addition to the above other legislation applicable to rehabilitation are the following:

- ☐ National Environmental Management Biodiversity Act 10 of 2004
- ☐ National Environmental Management Waste Act 59 of 2008
- ☐ National Environmental Management Air Quality Act 39 of 2004
- ☐ National Heritage Resources act 25 of 1999
- ☐ Occupational Health and safety Act of 1993
- ☐ National Forest Act 84 of 1998
- ☐ Hazardous substance Act 15 of 1973
- ☐ National Veld and Forest Fire Act 101 of 1998

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3.1.2 Site specific authorisations, licenses and permits

The construction of Medupi Power Station was approved by the Department of Environmental Affairs (DEA). The EA reference number 12/12/20/695 was the first to be issued on the 21 September 2006. All other EAs were issued after EA ref 12/12/20/695). A condition on re-instatement and rehabilitation of the site after construction has been set in different Environmental Authorisations issued to Medupi Power Station Project.

In summary, the overall statutory requirements are for Medupi Power Station Project to ensure that all significantly disturbed areas as a result of construction are returned to some degree to its former state.

Licence Name	Reference No	Date of first issue	Section and Requirements
Medupi Power Station	12/12/20/695	21 September 2006	Section 3.2.7.1, 3.2.7.2 and 3.7.7.3. Rehabilitation after construction
Medupi Ash Dump Licence	12/9/11/L50/6	28 October 2009	Section 12 Rehabilitation and Closure of Site
Excess Coal Stockyard RoD	14/12/16/3/3/1/531	09 July 2012	Condition 15 Site Closure and Decommissioning
Raw Water Line	12/12/20/1139	27 October 2008	Condition 1.15 Site Closure and Decommissioning
Raw Water Line	12/12/20/2069	03 March 2011	Condition 36 Site Closure and Decommissioning
Medupi EMP Rev 2	12/12/20/695	September 2010	Section 4.20 Site Clean-up and Rehabilitation
Water Use Licence	01/A42J/4055	18 December 2015	Condition 10.2 Annexure VI Rehabilitation & Condition 10.1 Annexure VI (Integrated Water and Waste Management)

Table 2 List of EA's and specific sections that stipulate rehabilitation requirements

The abovementioned legislation and environmental authorisations were utilised to compile this rehabilitation plan with the objective of providing feasible and achievable rehabilitation objectives that can be met and that are in line with the post closure requirements such as land use.

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3.1.3 Environmental Settings

3.1.3.1 Location

The Medupi Power Station Project is situated within Lephalale Local Municipality NP362, which forms part of the Waterberg District Municipality DC36 and is situated approximately 15km west of Lephalale and 6km south-west of the existing Matimba Power Station in the Limpopo Province (see Figure 1). It falls within the jurisdiction of the Lephalale Magisterial District. The project site is located on the farm Naauwontkome 599 LQ, Eenzaamheid 512 LQ, Kromdraai 513 LQ and Kuipersbult 511 LQ which has been bought from the previous owners by the site is located between the 23° and 24° of Longitude and between 27° and 28° of Latitude. The site was previously used for cattle and game farming as well as crop development such as peanuts.

The location of these farms is indicated in Table 4.

Farm Name	GPS Coordinates	
Naauwontkome	S23.70193°	E27.56574°
Eenzaamheid	S23.70941°	E27.52924°
Kuipersbult	S23.72414°	E27.56310°
Kromdraai	S23.73624°	E27.52594°

Table 3 GPS Location of farms

The Medupi Power Station falls within the Mokolo River Catchment within the catchment which drains into the Limpopo River to the north of the site (See Figure 1).

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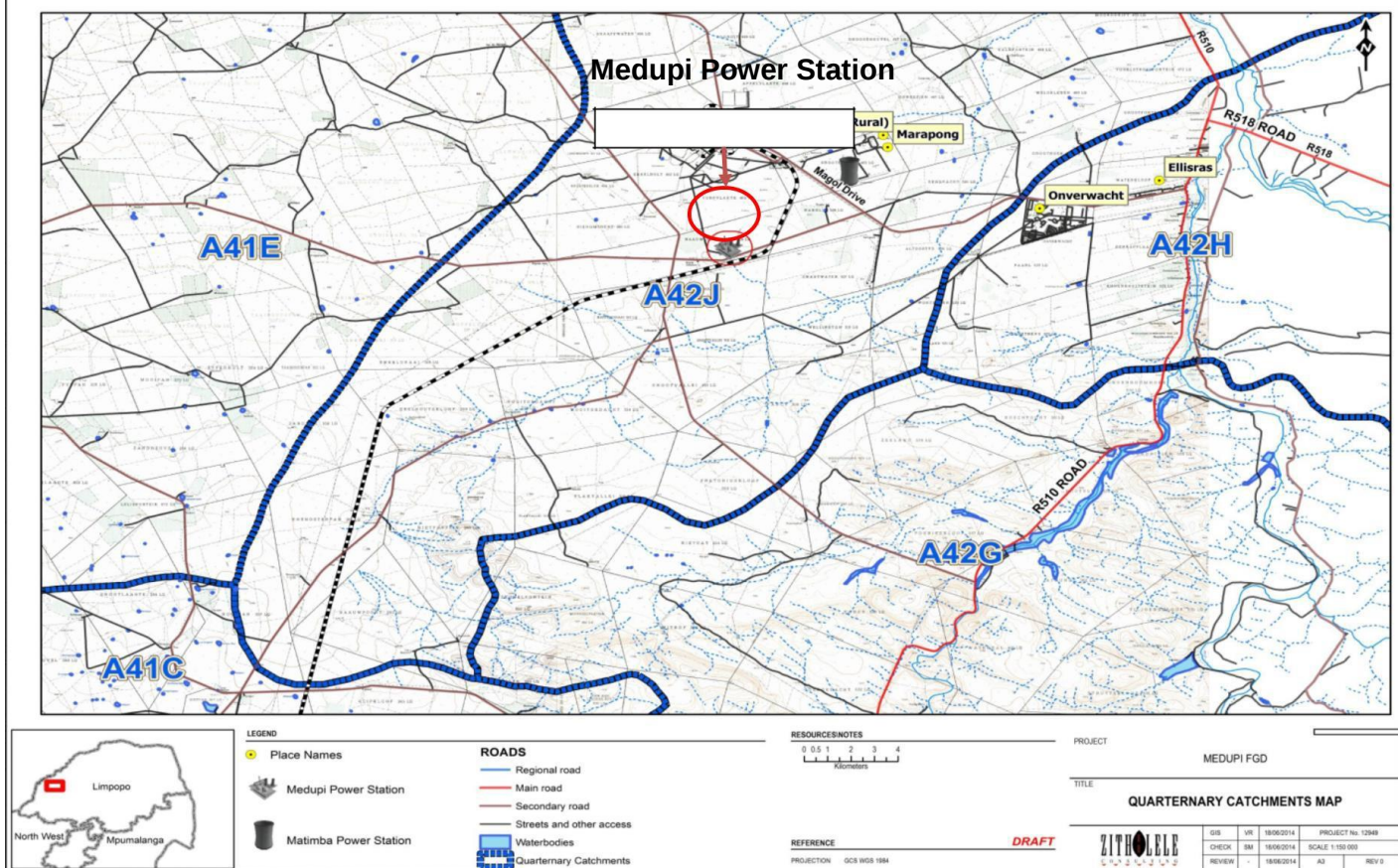


Figure 1 Locality Map (Medupi FGD EIA)

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3.1.3.2 Land Use and Tenure

The Principle of land use within the surrounding region identified during the original Medupi Power Station scoping Phase (Bohlweki, 2005).

- ☐ Natural savanna that were devoted mainly to game and cattle farming;
- ☐ Residential;
- ☐ Industrial;
- ☐ Grootegeeluk Mine;
- ☐ Matimba Power Station;
- ☐ Game farms and lodges;
- ☐ Isolated portions of agricultural activities on arable soils; and
- ☐ Sewage works on the farms Zongezien and Nelsonnskop.

3.1.3.3 Ecology

The Medupi Power Station footprint is spatially situated within the Savanna Biome. Vegetation types as discussed within the Medupi Power Station Scoping report (Bohlweki, 2006), include the following:

- ☐ Mixed Bushveld, the vegetation varies from dense bushveld to open tree savanna;
- ☐ Sweet Bushveld, vegetation is dominated by Acacia species that increase to dense thickets at the expense of the grass layer when under pressure; and
- ☐ Waterberg Moist Mountain Bushveld, the high proportion of unpalatable grasses within this vegetation type has resulted in the common term 'Sour Bushveld' (Mucina & Rutherford, 2006)

Six (6) protected tree species were recorded within the Medupi Power Station Project area (See Table 5). Transplantable tree species were transplanted to new locations within the project area whereas others were relocated to Matimba Power Station Nursery with the intention on planting them back on the Medupi site as part of rehabilitation objectives.

Botanical Name	Family	English Name	Afrikaans name
<i>Acacia erioloba</i>	<i>Mimosaceae</i>	Camel thorn	Kameeldoring
<i>Adansonia digitata</i>	<i>Malvaceae</i> <i>bombacaceae</i>	Baobab	Kremetart
<i>Boscia albitrunca</i>	<i>Capparaceae</i>	Shepherd's tree	Witgat
<i>Sclerocarya Birrea</i>	<i>Anacardiaceae</i>	Marula	Moroela
<i>Spirostachys</i> <i>Africana</i>	<i>Euphorbiaceae</i>	Tamboti	Tambotie
<i>Combretum imberbe</i>	<i>Combretaceae</i>	Leadwood	Hardekool

Table 4 Protected Trees within footprint of Medupi Power Station

3.1.3.4 Climate

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The climatic regime of Lephalale area is characterised by hot summers and mild winters. The long-term annual average rainfall is 485mm of which 420mm falls between October and March. The area experiences high temperatures especially in summer months where daily maximum of >40°C are common. The annual evaporation in the area is approximately 2 281mm. Frost is rare (Bohlweki Environmental, 2006). The predominant wind (as measured in April) is generally north-easterly with a wind speed ranging between 2 to 4m/s (C&M Consulting Engineers, 2013).

The climate within Lephalale Municipality and Limpopo Province causes in a negative climatic water balance with little water for industrial, mining, agricultural and domestic land use purposes.

3.1.3.5 Geology and Soil of the Area

The geological description was taken from the specialist geology assessment as discussed in section 8 of Medupi Scoping Report (Bohlweki, 2005) and the EIA Report (Bohlweki, 2006).

The Waterberg Coalfield comprises a graben structure with the Eenzaamheid fault forming the southern boundary and northern boundary being delineated by the Zoetfontein fault. Archean granite rocks outcrop to the North of the Zoetfontein fault and sediments of the Waterberg Group outcrop to the south of Eenzaamheid fault.

The area is further subdivided by the Daarby fault a major northeast then northwest trending fault. The Daarby fault has a down throw of 360m to north at an angle of 50° to 60°. The down throw of 360m to the north serves to bring the Grootgeluk Formation rocks to the south in contact with the younger Clarens Formation sandstone and Letaba Formation basalts in the north.

The site is underlain by Sandstone and conglomerates of the Mogalakwena Formation, Waterberg Group (Partridge, Maude and associates, 2007) To the North of the site, sediments comprise of mudstone and arkose of the Grootegeluk and Swartrand Formations, Karoo Super group.

Medupi Power Station comprises mostly sandy soil types Sandy soil (Environmental Impact Report for Medupi Power Station, 2005).

3.1.3.6 Surface Water

The description for the surface water was taken directly from Surface Water Specialist Study conducted for the Medupi Power Station Scoping Report (Bohlweki, 2005). The study area falls within the Mogol catchment which drains into the Limpopo River to the north. The Mokolo River Catchment covers an area of 8 387km². The catchment stretches from the Waterberg Mountains though the upper reaches of the Sand River and includes the Mokolo Dam and number of small tributaries that join the main Mokolo River up to its confluence with the Limpopo River. The topography of the area is flat varying between 900 and 922mams/1. The general topographical drainage system is poorly developed and drains in an easterly direction towards the Mokolo River (810mmsl).

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3.1.3.7 Ground Water

The ground water description was taken from ground water report undertaken for the Medupi Power Station Scoping Report (Bohlweki, 2005) and Medupi Power station EIR (Bohlweki, 2006).

The groundwater potential of the formations located in in the study area is limited in their pristine state due to low permeability, storage and transmissivity. No large-scale groundwater abstraction occurs in the study area even along the numerous faults.

Groundwater occurs within the joints, bedding planes, and along dolerite contacts within the Waterberg Group sediments.

3.1.4 Rehabilitation and Decommissioning Objectives

This section presents the rehabilitation and decommissioning objectives that the Medupi Power Station is committed to pursuing, the final land use concept plan and descriptions of the significance of limitations to successful rehabilitation (i.e. constraints) and how these limitations will be minimised.

3.1.4.1 Objectives

The objective of Rehabilitation and Decommissioning at Medupi Power Station is to:

- ☐ Restore disturbed land as far as reasonably practicable to its pre-clearance conditions;
- ☐ Make the site safe for humans and wildlife;
- ☐ Stabilise environmental conditions on the site;
- ☐ Make the site a non-polluting environment;
- ☐ Provide prescriptions for restoration of landforms and associated vegetation;
- ☐ Ensure that populations of any significant flora and vegetation communities are not compromised by the project;
- ☐ Adopt a controlled approach towards management of existing threatening processes such as weed control, fire and feral animals;
- ☐ Outline a program for monitoring landform reconstruction and re-vegetation, environmental impacts and compliance with the Medupi Power Station Rehabilitation and Decommissioning Plan.

The Medupi Power Station Project Rehabilitation and Decommissioning measures aim to:

- ☐ Eliminate health and safety risks to people;
- ☐ Restore the site to conditions acceptable to the land owner; and
- ☐ Remove infrastructure to leave a condition compatible with current and future usage.

3.1.5 Constraints to Successful Rehabilitation Outcomes and how they will be managed

3.1.5.1 Scale of land cleared

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The Medupi Power Station Project resulted in clearance of approximately 1500ha of natural savanna. Land clearing resulted in the removal of native vegetation (both protected and unprotected plant species) and habitat modification for different kinds of animal species. Of the total land cleared, approximately 690ha will ultimately require rehabilitation (See Appendix A).

3.1.5.2 Climatic unpredictability

The climatic regime of the study area is characterised by hot, moist summers and mild, dry winters. The long-term annual average rainfall is 485 mm, of which 420 mm (86.5%) falls between October and March. The area experiences high temperatures, particularly during the summer months, where daily maxima of >40°C are common. Average maximum temperatures range from 32°C in January to 23.2°C in July. On average there will be 13 days a year where the rainfall will exceed 10mm and the occurrence of hail storms on 2 to 3 days per annum. Severe drought conditions have existed in the region of 12% of all recorded years. The annual evaporation in the area is approximately 2 281 mm (Grooteegeluk weather Station 0674100 and Lephalale weather Station 0674311).

During time of minimal rainfall rehabilitation areas will be irrigated more frequently.

3.1.5.3 Wind

The wind pattern of the area is predominantly by east-north-easterly and north-easterly winds, as may be expected due to the continental high pressure. Winds are infrequently experienced from a westerly and south-easterly direction. East-north-easterly and north-easterly winds increase in frequency during summer months, and the percentage of north-easterly winds decreases in winter months.

Irrigation of the rehabilitation area shall be conducted in days when there is no strong wind. Trees shall be planted in such a way to withstand strong winds.

3.1.5.4 Diseases and pests

The Medupi Power Station Project site exhibit show visual evidence of being significantly impacted by disease or pests. Surrounding vegetation generally remains in good health.

3.1.5.5 Alien and Invasive species and Weeds

Several Alien and Invasive species were recorded during Alien and Invasive species survey that was conducted by the Specialist/ Botanist. The majority of alien and invasive species were recorded at locations that have been disturbed during construction activities (See table 6; Table 5 and Figure 2). Some AIP and weed species were recorded from topsoil stockpiles and within intact vegetation types in the immediate surrounds.

Weeds shall be managed as per Medupi Alien and Invasive Species Management Plan (Ref: 200-85677).

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Table 5 Weed Species identified within Medupi Power Station Footprint

Common Name	Species Name	Location
Spiny Sesbania	<i>Sesbania bispinosa</i> var. <i>bispinosa</i>	Dams and waterways, in recently disturbed areas, and open servitudes such as the security fence and along roads
Tall Khaki Weed	<i>Tagetes minuta</i>	
Smelter's Bush	<i>Flaveria bidentis</i>	
Brazilian Starbur	<i>Acanthospermum brasilum</i>	
Cotton Milkweed	<i>Gomphocarpus fruticosus</i> subsp. <i>decipiens</i>	
Wild Sunflower	<i>Verbesina encelioides</i>	
Wild Senna	<i>Senna didymobotrya</i>	
Lowveld Reed	<i>Phragmites mauritianus</i>	
Bulrush	<i>Typha capensis</i>	
Batchelor's Button	<i>Gomphrena celosioides</i>	
Redstar Zinnia	<i>Zinnia peruviana</i>	



Figure 2 Location of identified alien and invasive species within Medupi Power Station Footprint

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Type of Species (Alien, Invasive or weed)	Name of Species	Scientific name	Location	Category	No Observed on site	Control Measure
Invasive	Wild tobacco	<i>Nicotiana glauca</i>	Naauwontkomen Southern Boundary	1b	200	Mechanical/MSMA (10% solution)
Invasive	Large thorn apple	<i>Datura ferox</i>	Naauwontkomen (East & Southern Boundary)	1b	100	MSMA 720g/l (1.2% solution)
Invasive	Fountain Grass	<i>Pennisetum setaceum</i>	Naauwontkomen farm along roadsides, security fence and areas	1b	20	Mechanical
Invasive	Smelter's bush	<i>Flaveria bidentis</i>	Naauwontkomen farm and Eenzamheid farm especially in soil dump areas and along dirt roads and fences.	1b	50	Mechanical/Chemical
Invasive	Pest pear of Australia	<i>Opuntia stricta</i>	Specimens could be found on Naauwontkomen farm and Eenzamheid.	1b	1	MSMA 720g/l (50% solution)
Invasive	Chinese tamarisk	<i>Tamarix chinensis</i>	Naauwontkomen. The plants are localized but dense at the raw water dam overflow area.	1b	10	Mechanical
Invasive	Queen of the Night	<i>Cereus jamacuru</i>	Eenzaamheid East Boundary & Naauwontkomen Farm Southern Boundary	1b	3	MSMA (8-10% solution)
Invasive	Prickly Pear	<i>Opuntia ficus-indica</i>	Eenzaamheid East Boundary & Naauwontkomen Farm Southern Boundary	1b	4	MSMA (5-8% solution)
Invasive	Peanut Butter Cassia	<i>Senna didymobotrya</i>	Naauwontkomen Farm (Along Road side, security fence, Fill stockpile	3		5% Solution for Chopper

Table 6 Alien and Invasive Species at Medupi Power Station Site

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3.1.5.6 Indigenous seed availability

The availability of seed for indigenous species could be a constraint to rehabilitation efforts as no seed collection program was instituted prior to site clearing. However, during the recent rehabilitation of the raw water pipeline servitude, the reinstatement of topsoil and subsequent rains have resulted in activation of the in-situ seedbank resulting in >75% crown cover after the first rainy season. Where groundcover does not meet the 75% groundcover after the first rainy season, hydro seeding with local grass mixes, if available, will be utilised. Other indigenous plants will be sourced from local nurseries.

3.1.5.7 Topsoil and subsoil management

Topsoil along with the subsoil component is arguably the most important rehabilitation resource in the Project area. These two resources were recovered prior to commencement of any construction activity and will be utilised to reconstruct the upper soil profile in areas disturbed during construction.

Topsoil was sourced from areas which were cleared for construction activities. This was conserved and will be used judiciously in the rehabilitation of disturbed land.

The Contractor was required to strip topsoil together with grass from all areas where permanent or temporary structures are located, construction related activities occur, and access roads are to be constructed.

The soil stripping method implemented was determined by the earthworks contractor in liaison with the Contractor's Representative.

Topsoil and Subsoils are managed as per Medupi Power Station Stockpile Management Plan (200-53820).

3.1.5.8 Landform stability

The existing slope of landforms within rehabilitation areas is gentle to very gentle and the only steeply inclined on Stockpiles. Diversion drains shall be required to redirect surface runoff to minimise the potential for future erosion at these sites should they not be recovered after construction is complete.

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The Medupi Power Station Project Construction Environmental Management Plan Rev 2 of September 2010 has considered the management of surface water across the entire site, with particular attention on preventing erosion during construction and the early stages of rehabilitation. Minimising surface water run-off from any catchment areas occurring at the existing site, or created during the construction process, represent an important strategy particularly where these catchments occur at elevated points in the landscape.

Techniques that shall be incorporated into the rehabilitation program to minimise erosion during the early stages of re-vegetation development will include:

- ☐ Spreading a thin layer of cleared vegetation debris over re-contoured topsoil; and
- ☐ Shallow contour scarification of re-contoured rehabilitation surfaces.

3.1.5.9 Potential contaminated areas

Potentially contaminated areas were identified through use of aerial photographs, site inspections and internal and external audit and monitoring reports. Potential contaminants include hydrocarbons and/or heavy metals from coal and ash. These areas are monitored through the establishment of a groundwater monitoring network and testing and treatment will occur on an ongoing basis during rehabilitation and decommissioning.

3.1.5.10 Use of competent/ qualified Contractors

Only competent Contractors/ teams shall be used to undertake rehabilitation activities at Medupi Power Station. All workers to be involved in on-ground works must be aware of all factors influencing successful rehabilitation. Rehabilitation shall be made part of induction for employees who will be involved in rehabilitation of the Medupi Power Station.

3.1.5.11 Use of locally endemic, indigenous and suitable species for rehabilitation

Only indigenous and suitable species approved by the Environmental Manager and Environmental Control Officer shall be used for rehabilitation purposes at Medupi Power Station. Indigenous species are known to easily adapt to local climate and soil conditions.

3.1.5.12 Inadequate rehabilitation planning

Inadequate rehabilitation planning can hinder the success of rehabilitation. To prevent such to happen within the Medupi Power Station Project, a designated Rehabilitation Manager/ champion/ a competent person shall monitor/ oversee the whole rehabilitation process from planning to sign-off. This shall include rehabilitation by either a Contractor or Eskom.

3.1.5.13 Financial constrains

Inadequate financial assurance has been identified to have a significant impact on the success of rehabilitation. Depending on the contractual agreements, each contractor is expected to rehabilitate their areas as soon as areas for rehabilitation are available and no

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further disturbance is anticipated. In case of no man's land, and in instances where rehabilitation is not included as part of contractor's contract, Eskom Holdings SOC Limited shall take full responsibility in the rehabilitation of those areas.

3.1.6 Rehabilitation Strategy and Implementation Plan

The Medupi Power Station Project has adopted a two (2) fold rehabilitation strategy.

- a) A phased approach strategy, wherein areas identified for rehabilitation shall be rehabilitated in phases to native/ indigenous vegetation (Figure 3). This strategy shall be implemented around permanent infrastructures that will be landscaped and rehabilitated by Eskom Holdings SOC Limited; and
- b) A progressive approach strategy, wherein areas identified for rehabilitation shall be progressively rehabilitated as they become available to native/ indigenous vegetation. The strategy shall be implemented in all areas where rehabilitation forms part of Contractors working on those particular areas. Contractors shall submit rehabilitation method to be approved by Medupi Environmental Team and the ECO.

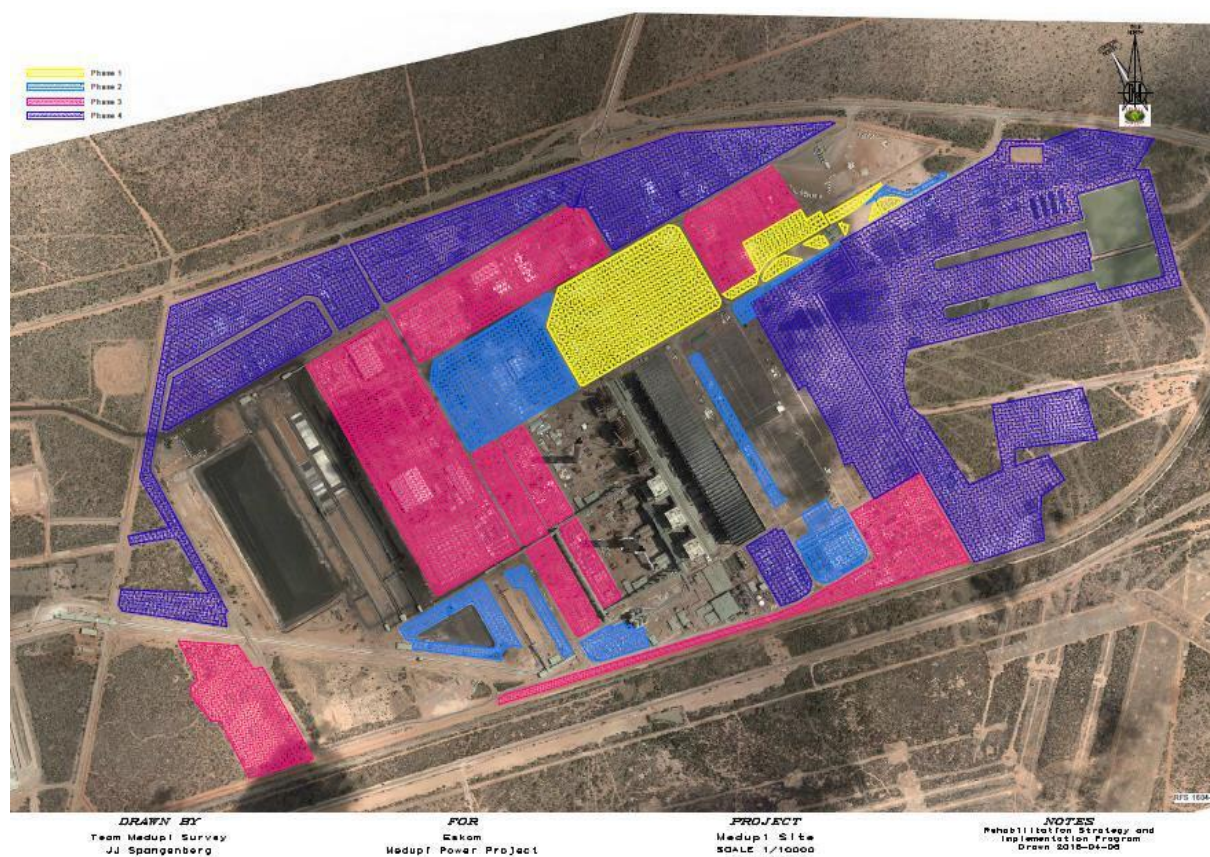


Figure 3 Identified Rehabilitation areas

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3.1.6.1 Rehabilitation Planning

Tasks during this period shall include (inter alia):

- ☐ Identification and delineation of Rehabilitation areas ;
- ☐ Development of a scope of work / specific rehabilitation method statement.
- ☐ Sourcing of suitable/ qualified service provider/ contractor to undertake rehabilitation;
- ☐ Field demarcation;
- ☐ Preparation of areas to be rehabilitated, , including contour sloping, topsoil replacement, soil preparation and enrichment, etc., this is initiated by completion of the De-establishment and Rehabilitation Inspection Checklist (200-234251) by contractors prior to leaving site and site handover to the client. This shall ensure that the contractors leave the area of work as they found it before the construction activities commenced.
- ☐ Procuring of indigenous plant species to be used during rehabilitation of disturbed areas; and
- ☐ Treatment of AIPs and common weed species within rehabilitation areas aimed at reducing the weed loading ahead of ground preparation as per Medupi Alien and Invasive Species Management Plan reference no 200-85677.

3.1.6.2 Identification of Rehabilitation Areas

Disturbed areas requiring rehabilitation will be identified through use of aerial photographs, site inspections and as part of internal and external audits. These areas were identified and mapped on aerial photographs (Appendix A).

3.1.6.3 Rehabilitation Schedule

The Construction of the Medupi Power Station started in 2007, and is expected to be completed in early 2020. Rehabilitation is expected to commence as soon as areas are available for rehabilitation and further use is no longer anticipated. Eskom Holdings SOC LTD shall develop an overall rehabilitation schedule whereas contractors shall develop a schedule that is specific to their areas of responsibility which must be approved by the Environmental Team and ECO within 6 months of this procedure being issued for existing contractors and immediately as part of site establishment for any new contractors. The schedule shall be updated regularly.

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3.1.6.4 Preparation of Rehabilitation Area

3.1.6.4.1 Removal of foreign material, ripping and scarification

All foreign and remaining construction materials within Rehabilitation areas shall be cleared and removed from site according to site-contractual and legal requirements. The surface soils shall be ripped and scarified as per Appendix B of Medupi EMP Rev 2. These preparation steps shall occur ahead of replacing a topsoil / subsoil resource to 75mm – 150mm depth and undertaking direct planting of indigenous plant species.

Prior to the application of topsoil, the uncompact ground surface shall be ripped or scarified with either a mechanical ripper or hand tilling, to a depth of approximately 150 mm as per Appendix B of Medupi EMP Rev 2. Compacted soil shall be ripped to a depth of greater than 250 mm where applicable.

The subsoil shall be thoroughly tilled to a depth of at least 100 mm by means of a plough, disc, harrow or any other approved method until the condition of the soil is acceptable.

Where tilling is difficult, the Contractor shall use rotary tillage machinery until no clods or lumps larger than 40 mm in size remain, and the mixing of soil is acceptable.

Stockpiles that remain after construction completion shall either be shaped or levelled to a gradual slope to reduce risk of erosion. Stockpiles shall be ripped where possible to aerate the soil. Stockpiles shall either be re-vegetated and re-grassed or allow for natural succession of grass and vegetation to achieve at least 75% coverage. Any areas of erosion picked up during inspections must be rectified immediately. Clearing of weeds and Alien and Invasive Plant species shall be undertaken within all Rehabilitation areas prior to the placement of topsoil as per the approved AIP Management Plan.

3.1.6.4.2 Management and application of topsoil and subsoil

Topsoil was stripped in initial stages of the development of Medupi Power Station Project in line with approved method statements and designs. The indigenous topsoil within the footprint of the Medupi Power Station Project was stripped to depth of 300mm to preserve the in situ indigenous seed resource and nutrient content.

Based on the size of area to be rehabilitated, it is estimated that approximately 667 954 m³ of topsoil will be required to complete remedial earthworks in the rehabilitation areas. Therefore, stockpiling of this important resource commenced during the initial stages to ensure required volumes are available. Topsoil was stockpiled to a maximum height of 2m as indicated in the EMP rev 2.

Subsoil shall be directly returned to prepared rehabilitation surfaces wherever possible to provide a planting medium. Replaced subsoil shall be re-contoured to blend with the surrounding vegetation in readiness for application of topsoil and then mulched vegetation and also simulate and facilitate natural drainage of the areas.

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Subsequent to the addition of the sub-soil, topsoil shall be spread evenly over the ripped or tilled surface to a depth of 75-150 mm on flat ground or to a minimum depth of 75 mm on slopes of 1:3 or steeper. However, a deeper profile may be reconstructed using topsoil where surplus volumes are available (in preference to using subsoil). The final prepared surface shall not be smooth but furrowed to follow the natural contours of the land, with scattered rocks of varying sizes according to the natural condition of the area.

Fertilisers or compost shall be added to increase organic matter and nutrients within the planting medium where required.

Where sodding is required, slight scarification shall be carried out to contain the sods. The soil shall be uniformly moist to a depth of 150 mm prior to planting or seeding. If this condition is not met by rainfall, the Contractor shall carry out irrigation.

3.1.6.4.3 Vegetation debris

The mulched vegetation removed during clearing of the Medupi Power Station footprint shall be spread onto prepared surfaces within Rehabilitation areas prior to surface scarification.

Surfaces shall be chipped and mulched to be used as compost in the rehabilitation area. Chipping and Mulching shall be the responsibility of the contractor that has undertaken vegetation clearing.

3.1.6.4.4 Contour scarification of prepared rehabilitation surfaces

Rehabilitation surfaces within Rehabilitation areas shall be contour scarified to reduce the potential for surface erosion and promote a seedbed for establishing plants. Contour scarification will be completed to a depth indicated in appendix B of Medupi EMP Rev 2 prior to direct planting of indigenous plant species.

3.1.6.4.5 Direct Seeding, Re-vegetation and Hydro seeding

After the rehabilitation area is prepared natural regrowth followed by either hydro seeding or planting of trees shall be undertaken. The choice and distribution of rehabilitation tree and grass species shall be done by a competent person.

3.1.6.4.5.1 Direct seeding

It is expected that initial establishment of indigenous vegetation shall be from the seed bank contained within the topsoil. If establishment is shown to be ineffective, trials of direct seeding the area with seed mix of indigenous vegetation shall be undertaken. Direct seeding shall be used to provide a fast-establishing vegetation cover within Rehabilitation areas.

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3.1.6.4.5.2 Planting of trees

Indigenous tree species shall be directly planted in the prepared area. The following method shall be followed when planting trees within rehabilitation area:

- ☐ Holes shall be excavated to a depth suitable for the size of the tree to be planted;
- ☐ The tree shall be carefully placed in the hole;
- ☐ Backfilling shall start while the tree is held in place either mechanically or manually;
- ☐ Liquid fertiliser, bone meal and/or chipped material shall be placed in the hole. This provides the trees with all the nutrients required to establish successfully at the new location;
- ☐ The soil shall be compacted as more soil and wood chips are added to stabilise the soil and to prevent the tree from falling over;
- ☐ Once the hole is backfilled, a soil berm shall be constructed around the tree. The berm shall act as a water retaining wall to prevent water runoff during watering;
- ☐ A water trucks or proper irrigation system shall be installed and used regularly to water the rehabilitated area; and
- ☐ Trees shall also receive fertilisers every month for up to 6 months.
- ☐ Weeds shall be cleaned around the trees and the soil berm around the tree shall be maintained to ensure water is retained.

3.1.6.4.5.3 Hydro- seeding

The hydro-seeding slurry shall be transported in a tank, either truck- or trailer-mounted or sprayed over prepared ground/ rehabilitation area. Hydro seeding shall be applied where necessary. Preferences shall be given to indigenous grass to naturally re-establish.

3.1.6.4.6 Reintroduction of Indigenous Fauna

The Medupi Power Station shall encourage indigenous fauna such as birds to return to the rehabilitated areas. Some of invertebrate species such as Termites, Ants, Earthworms and etc that are currently living in the topsoil shall be returned into the rehabilitation area together with the topsoil. The cleared vegetation shall be used to encourage the return of fauna by introducing log piles for shelter.

3.1.6.4.7 Erosion Control Measures

Slopes in rehabilitated areas shall be minimised to reduce the velocity of the down slope water flow. The final slopes shall be based on site-specific information and consider the surrounding topography. Slopes shall be less than 20° and length of the slope shall be minimised. Slopes should simulate the natural conditions of the site and facilitate run-off towards retaining areas, streams, dams, etc.

Erosion on the freshly placed topsoil within rehabilitated areas shall be reduced through application of the following measures:

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- ☐ The use of mulch over affected area;
- ☐ Spray environmental clogging agent over the area; and
- ☐ Construction of wind and/or water breaks.

Any of the following stabilization methods can be applied to stabilize rehabilitated area. Biodegradable netting/ matting, stabilization cylinders, logs and hard structures shall be used for erosion management and stabilization of the rehabilitated area.

3.1.6.4.8 Stabilisation cylinders

- ☐ Stabilisation cylinders shall consist of cylindrical capsules approximately 125 mm in diameter by 1.5 m in length;
- ☐ Stabilisation cylinders shall be manufactured from biodegradable material such as hessian or of extruded biodegradable plastic netting. The plastic material shall be sufficiently robust to last for a period of not less than 3 years and not more than 10 years before disintegrating under normal service conditions;
- ☐ Stabilisation cylinders shall be filled with shredded or partly compressed pine chips or similar material. Only material passing through a 31 mm sieve with round holes and retained on a 5 mm sieve with square holes shall be used. Wood chips shall be treated with Tanalith C wood preservative. Splinters and flat chips are not acceptable;
- ☐ An approved seed shall be included in the cylinders;
- ☐ Cylinders shall be anchored in position using biodegradable material; and
- ☐ Cylinders shall not be used to stabilise any rock faces.

3.1.6.4.9 Biodegradable netting / matting

- ☐ Biodegradable netting/matting shall be made from jute, sisal, coir or similar material;
- ☐ A 1 m² sample of the geofabric, geogrid or nylon (biodegradable) fabric shall be submitted to the Site Manager for approval prior to procurement;
- ☐ The netting/matting shall be sufficiently robust to last for a period of not less than 5 years under normal service conditions; and
- ☐ Holes in the netting/matting shall have a minimum size of 400 mm² and a maximum size of 900 mm² and be made from at least 4-6 mm thick cord.

3.1.6.4.10 Logs

- ☐ The Contractor shall ensure that for slopes of less than 1:3, the Site shall be stabilised by means of "geojute" and continuous rows of logs, secured to the slope with timber pegs, parallel to the contour. Logs shall be untreated pine (or gum) poles of not less than 150 mm with a taper of not more than 75 mm over its length. Timber pegs to be treated and not less than 400 mm in length. Timber pegs must be longer if thicker logs than the minimum are used;

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- ☐ The slope shall be covered with “geojute” prior to placing the logs. The Contractor shall install Kaytech Soil Saver 292 (or a similar product) as per the manufacturer’s specifications except for the pegging that is replaced by the log stabilization; and
- ☐ Logs shall be secured to the slope in such a manner that they will not become dislodged during construction and/ or planting. Logs to be secured to the slope by means of a minimum of two pegs driven into the soil not less than 250 mm deep. For logs longer than 3 m, additional pegs shall be required. Log ends to be butt-jointed and plugged with wood chips or similar to prevent water from washing through at the joint. Logs shall be placed at 2 m intervals with a bottom row parallel to the edge of the road. Logging of the slope to start at the top of the slope to prevent the stretching of the “geojute”.

3.1.6.4.11 Hard structures

All hard structures used for slope stabilisation shall have natural pebble face finishes. The responsible rehabilitation contractor shall provide slope stabilizer and / or anti-erosion materials.

3.1.6.4.12 Maintenance and monitoring of Rehabilitated area

Rehabilitated area shall be monitored and managed after initial rehabilitation. If areas are identified that are considered unsatisfactory, then maintenance shall include but not limited to:

- ☐ Replanting of failed or unsatisfactory area;
- ☐ Repairing any erosion problems;
- ☐ Fire management; and
- ☐ Pest and weed control.

3.1.6.4.13 Maintenance of trees and grasses planted

Planted trees and grasses shall be watered using either water trucks or irrigation system. Every tree shall receive enough water to keep the soil damp for several days. Watering frequency shall depend on the season and amount of rainfall received in that particular season. Watering frequency shall increase during dry and hot seasons depending on the plant’s needs.

Trees shall receive 50/50 mix of 2:3:2 and LAN fertiliser every month for up to twelve (12) months. Weeds shall be cleaned in and around the rehabilitated areas and soil berms around the trees shall be maintained to ensure water is retained until the tree has become established to survive normal climatic conditions

3.1.6.4.14 Weed and vermin Control

Introduced fauna have the potential to significantly impact on re-vegetation development within the relatively small rehabilitation area, by increasing and concentrating grazing pressure.

Potential management options for the Medupi Power Station Project are:

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- ☐ Baiting for rabbits/ mice in and around rehabilitation areas; and
- ☐ Feral cat control.

Weeds shall be controlled in accordance with the existing Alien and invasive plan (200-85677) and Land Management Plan (200-79130) for Medupi Power Station Project. The aim of the document is to provide a procedure and programme for eradicating weeds and alien and invasive species within Medupi Power Station Project. The plan was prepared to address Medupi Power Station Legislative objectives regarding management of weeds, alien and invasive species.

3.1.6.4.15 Fire management

Medupi Power Station Fire Management Plan (Ref: 200-112099) shall be used to manage risk of fire within rehabilitated areas.

3.1.6.4.16 Erosion management within rehabilitated area

Erosion shall constantly be monitored during the maintenance phase of the rehabilitation process. When signs of erosion start to develop, a contractor shall implement erosion control measures. If erosion is insignificant, the area shall be backfilled and vegetation encouraged to grow.

3.1.6.4.17 Success Criteria and Monitoring

A quarterly monitoring program designed to assess rehabilitation development success and the requirement for additional management strategies shall be undertaken for two (2) years following completion of rehabilitation. Monitoring shall continue until it has been proven that re-vegetation is self-sustaining and can be integrated with the surrounding undisturbed vegetation.

Monitoring shall use a series of plant biodiversity parameters such as species richness and diversity, plant density and percentage cover as indicators of ecosystem development and stability.

Parameters to be monitored during rehabilitation are the following:

- ☐ Vegetation coverage;
- ☐ Plant establishment and survival;
- ☐ Species diversity;
- ☐ Weed establishment; and
- ☐ Erosion problems.

3.1.6.4.18 Decommissioning

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All temporary infrastructure associated with the Construction of Medupi Power Station Project shall be removed and rehabilitated should no alternative use be found for the structures. An alternative use for removed material such as wood, steel and bricks must be sought and if no alternative use is found all material recovered from demolishing can either be transported to licenced Landfill site or sold as scrap or made available to local community as building materials provided they are in satisfactory condition following demolition. All removed material will be disposed of as per relevant legislations and available and applicable site management plans (e.g. Asset disposal plan, Waste management plan).

Foundations shall be removed completely. Where deemed necessary by the Eskom environmental team or the ECO, soil contamination assessment shall be undertaken, remediated, and vegetated.

Support infrastructure buried underground such as septic tanks, pipes shall be unearthed and removed from site.

Any roads that will no longer be used as part of normal infrastructure will be rehabilitated as follows:

- ☐ Culverts will be removed where they are no longer be required;
- ☐ The road surface, shoulders and embankments shall be graded to a slope suitable to prevent erosion;
- ☐ Cuttings shall be assessed and where necessary measures to improve safety and erosion stability shall be implemented;
- ☐ Electrical equipment and infrastructure such as temporary cables and DBs which are no longer required shall be demolished and removed from the site;
- ☐ The soils in the vicinity of transformers shall be assessed for contamination and appropriate decontamination measures shall be implemented; and
- ☐ All temporary reservoirs and pipes shall be removed and rehabilitated.

Infrastructure such as roads that are considered to be aligned to their post construction land use/ capability shall be retained.

The contractors responsible for the respective areas shall conduct decommissioning

3.1.6.4.19 Post Construction and Land use and Landform

Post construction land uses were determined. The main post construction land use for areas transformed by construction of Medupi Power Station Project is described as self-sustaining indigenous vegetation comprising appropriate grass species and indigenous trees and shrubs. The land use shall aim to complement the ecosystems identified as occurring in the surrounding area. The rehabilitation area shall form part of Medupi Power Station property.

3.1.6.5 Auditing and reporting

Audit shall be conducted as per requirements of Medupi Power Station Environmental Authorisation listed in section 1.5 of this document.

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Any emergency incident that may occur during rehabilitation activity shall be dealt with in accordance with section 28 and 30 of NEMA or Section 20 of NEMWA, whichever is applicable under the circumstances.

Site inspections shall be undertaken and rehabilitation progress report prepared and included in the Medupi Power Station Environmental performance submitted to Authorities on a regular basis. The report shall be qualitative and comprises a pictorial display of new rehabilitation areas and any significant rehabilitation events in older rehabilitation areas.

An annual rehabilitation report shall also be compiled. The report shall include the following:

- A summary description of visual monitoring for active erosion within the first 12 months after hydro-seeding, vegetating and after rainfall events;
- Pictures of new rehabilitation areas;
- A summary record of treatments used, including topsoil sources; and
- A summary of description of any failure and success of rehabilitation works and maintenance conducted.

3.1.6.6 Budget/Cost of Rehabilitation

Financial Provision shall be made available for Rehabilitation by Eskom SOC Holdings Limited and revisited regularly for any unforeseen changes in the project.

3.1.6.7 Site Handover and Takeover

Handover/Takeover shall occur at the conclusion of the mandatory Rehabilitation maintenance period of Two (2) years as per site requirements. Responsible Team Medupi Staff shall meet on-site with representatives of the Rehabilitation and Decommissioning contractor to inspect the site and assess the satisfaction of completion criteria. The form De-establishment and Rehabilitation inspection Checklist (200-234251) shall be completed to ensure all environmental items are addressed and corrected where applicable. If the team is satisfied that the criteria have been met and the Medupi Power Station agrees to assume management of the site, then handover certificate shall be signed by the ECO. If criteria have not been satisfied, the contractor shall be advised of works required to address shortcomings and render the site acceptable for the Medupi Power Station.

4 PROCESS FOR MONITORING

4.1 Key Performance Areas and Indicators

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The following Key Performance Areas / Indicators (KPA's / KPI's) shall be measured, analysed and reported by the Process Owner at the frequency documented as part of the QMS measurement, analysis and improvement initiative.

Key Performance Area	Key Performance Indicator	Measure Frequency	Responsibility	Records
Vegetation Establishment	Establishment of self-sustaining, low maintenance indigenous vegetation state	Monthly or as required	Environmental Practitioners	Audit and Inspection reports
Infrastructure	Removal of hazards that could make an	Monthly or as required	Contractors and Rehabilitation	Audit and Inspection

Table 7 KPA's/KPI's

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Key Performance Area	Key Performance Indicator	Measure Frequency	Responsibility	Records
	area unsafe for human and wild life		Team	reports
Weeds	Removal of weed, alien and invasive species, and feral animals	Monthly or as required	Contractors and Rehabilitation Team	Audit and Inspection reports
Rehabilitation Method Statement	Rehabilitation Method Statement Submitted	As Required	Contractors	Method Statement
Document control	Retain and store records generated as a result of this document as defined in the Procedure 200-1680 "Document and Control Management Procedure".	Annually or as required	EMS Co-ordinator	As generated by the procedure
Revision of Document	Revision requirements in line with Medupi Procedures 200-5665 "Development and Change of Medupi QMS Documents" and 200-1680 "Document and Control Management Procedure"	Annually	Environmental Manager	New revised document

4.2 Document Review and Self-Assessment

4.2.1 Document Self-Assessment

The "Process Owner" identified on the front page of this document along with departmental personnel and the project QMS Engineer shall undertake a "self-check" review of the process defined in this document at six monthly intervals, commencing from the effective date of this document, to check:

- the process / procedure operational integrity
- process efficiency
- the level of stakeholder knowledge and implementation.

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Participants and results of the “self-check” review shall be documented by the Process Owner in the “Self-Assessment Checklist” (***QMS Template No. QMS PTZ 200 - 75592***) included as an Appendix to this procedure which shall be issued to medupiga@eskom.co.za by the Process Owner once completed.

Process Owner shall proceed with any revision requirements in line with Medupi Procedures PPZ 200 5665 “Development and Change of Medupi QMS Documents” and PPZ 200 1680 “Document and Record Management”

The following quality records are utilised to record necessary process data required to verify process conformity:

- De-establishment and Rehabilitation Inspection Checklist
- Rehabilitation Inspection Report/ECO
- Rehabilitation Audit Report
- Rehabilitation Method statement

The revision status of Medupi project Quality Record templates is defined in the Medupi QMS Index 200–47329 maintained by Medupi Quality Dept.

Retention and storage of records generated as a result of this document shall follow the process defined in the Procedure 200-1680 “Document and Control Management Procedure”.

4.2.2 Revision Period

This document will undergo an Annual revision as per legal requirements

4.3 Training Requirements

Training shall be provided to all employees including contract workers working on rehabilitation activities.

The training program shall include the following:

- Precautionary measures that need to be taken during rehabilitation;
- Procedures that should be applied to their particular type of job;
- Appropriate use of Personal Protective Clothing (PPE);
- Risks of Hazardous Substances to their health which they are likely to be exposed to; and
- Overall hazard and risks associated with Rehabilitation activities.

5 ACCEPTANCE

This document has been seen and accepted by:

Name	Designation
Emile Marell	Environmental Manager
Brenda Mgidlana	Project Quality Manager
Thabisile Biyela	Senior Construction Manager

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Liyanda Mjingwana

Middle Manager Projects

6 REVISIONS

Date	Rev.	Compiler	Remarks
25/03/16	03	Mathews Sebonego	Annual Review
25/11/20	02	Mathews Sebonego	Annual Review
15/05/2019	01	E Marell	Annual review

7 DEVELOPMENT TEAM

The following people were involved in the development of this document:

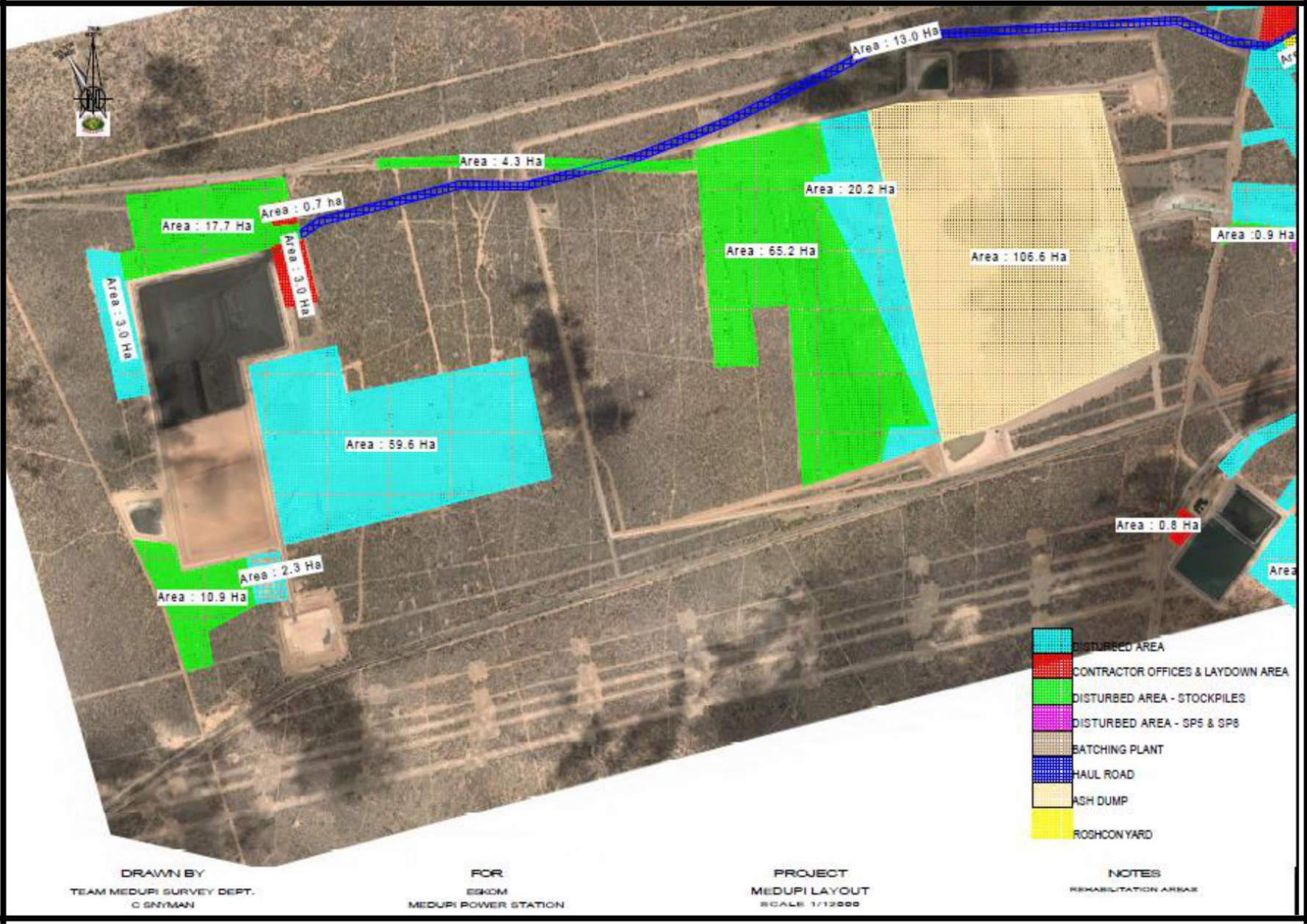
- Matthews Sebonego
- Dovhani Mudzielwana
- Sakutanya Mamabolo
- Emile Marell

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Appendix A – Identified Rehabilitation Areas



on the system.

Appendix B – Summary of Rehabilitation Method for Medupi Power Station

Area	Description	Potential Impacts	Rehabilitation Objective	Rehabilitation method	Responsibility	Status
Contractors Laydown and office areas; Working areas	Infrastructure) e.g. temporary office, Ablution blocks, tanks, pipes, electrical cables DB boxes and etc)	Unsafe area for	Make the site safe for humans and wildlife; Make a site non- polluting; Restore disturbed land as far as reasonably practicable to its pre- clearance conditions	Remove all temporary infrastructure and dispose material according to relevant legislation. Rip and scarify the area. Reinstate topsoil to depth of 75mm. Spread a thin layer of cleared vegetation debris over re-contoured soil; Re-grass and re- vegetate the area; Landscape the area as per design. Annually assess the habitat to monitor the sustainability of the diversions; Take action to rectify any negative impacts.	Contractors and Eskom	NYC
Ash Dump, Excess Coal Stockyard, Raw Water Dams and Pipeline and Main Medupi	Topsoil stockpiles	Loss of topsoil as a result of erosion	Make the site safe for humans and wildlife; Make a site non- polluting; Restore disturbed land as far as reasonably practicable to its pre-	Use Topsoil for rehabilitation. Leave excess topsoil material in place and allow it to naturally re- grass.	Contractors and Eskom Holdings SOC Limited	C

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Site			clearance conditions			
Clean and Dirty Water Dam	CDD embankment and roads	Erosion of soil into the dams thereby causing siltation; Loss of productive soil and grasses	Make the site safe for humans and wildlife;	Fix erosion around the dams as per design; Stabilize embankments as per design; Landscape the area as per design	Contractors and Eskom Holdings SOC Limited	NYC
East of HV Yard (Next to Roshcon ERI 37a)	Material Blending area	Soil and water pollution	Make a site safe for humans and wildlife; Make a site non-polluting;	Remove all imported material at Blending area; Rip, scarify and reinstate topsoil; Spread a thin layer of cleared vegetation debris over re-contoured soil;	Contractors and Eskom Holdings SOC Limited	C

NB: Alien, Invasive and Weed species must be removed prior to rehabilitation of specific areas

Areas to be landscaped as per designs

NYC-Not yet Commenced

C-Commenced

CP- Completed

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Appendix D – Potential Contaminated Areas within Medupi Power Station

Description	Potential Contaminants	Coordinates	
Roshcon Central Waste Storage Area	Hydrocarbons, HCS, Paints, Solvent, aerosols, pesticides and herbicides	Latitude -23.703421	Longitude 27.545978
Basil Read Hazardous Waste Storage facility	Hydrocarbons, HCS, Paints, Solvent, aerosols, pesticides and herbicides	Latitude -23.701071	Longitude 27.548980
Alstom P03 Central Waste Storage Area	Hydrocarbons, HCS, Paints, Solvent, aerosols, pesticides and herbicides	Latitude -23.695554	Longitude 27.562785
Kentz workshop and hazardous waste storage facility	Hydrocarbons, HCS, Paints, Solvent, aerosols, pesticides and herbicides	Latitude -23.694437	Longitude 27.564837
Sewage Treatment Facility	Heavy Metals, Hydrocarbons, Ecoli, Faecal Coliforms, Nitrates and phosphates,	Latitude -23.696353	Longitude 27.575338
MHP SA Waste Storage Facility	Hydrocarbons, HCS, Paints, Solvent, aerosols, pesticides and herbicides	Latitude -23.703053	Longitude 27.552745
MPSJV Waste Storage Facility	Hydrocarbons, HCS, Paints, Solvent, aerosols, pesticides and herbicides	Latitude -23.698764	Longitude 27.559504
MPSJV Plant Workshop		Latitude -23.699138	Longitude 27.558174
Ash Dump Workshop and Fuel Storage Facility	Hydrocarbons and HCS,	Latitude -23.711685	Longitude 27.531467
		Latitude -23.710435	Longitude 27.531282
Excess Coal Stockyard Workshop	Hydrocarbons and HCS,	Latitude -23.710946	Longitude 27.549133

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Bulk Fuel storage and offloading area	Hydrocarbons and HCS,	Latitude -23.709543 Latitude -23.709943	Longitude 27.564311 Longitude 27.563211
MHPSA Masana Bulk Fuel Storage	Hydrocarbons and HCS,	Latitude -23.704079	Longitude 27.557160
Eskom Filling Station	Hydrocarbons and HCS,	Latitude -23.700137	Longitude 27.559800
MPSJV Masana Bulk Fuel Storage and Washbay	Hydrocarbons and HCS,	Latitude -23.699811 Latitude -23.699319	Longitude 27.557005 Longitude 27.557600
Water Treatment Plant's Chemical Storage Area	Hydrocarbons and HCS,	Latitude -23.709295	Longitude 27,565985
Clean Water Dam, Dirty Water Dam and Spillway	Hydrocarbons, HCS, E.coli, Coliforms and heavy metals	Latitude -23.695439 Latitude -23.695405	Longitude 27.582153 Longitude 27.583505
Ash dump	Heavy metals	Latitude -23.710238	Longitude 27.538068
Coal Stockyard Pollution Control Dam	Hydrocarbons, HCS and heavy metals	Latitude -23.709656	Longitude 27.556624
Ash Dump Pollution Control Dam D1	Hydrocarbons, HCS and heavy metals	Latitude -23.705348	Longitude 27.541872
	Hydrocarbons, HCS and	Latitude -23.717991	Longitude 27.53515

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Ash Dump Pollution Control Dam D2	heavy metals		
Ash Dump Pollution Control Dam D2B	Hydrocarbons, HCS and heavy metals	Latitude -23.704645	Longitude 27.533621
Excess Coal Stockyard Pollution Control Dam D4	Hydrocarbons, HCS and heavy metals	Latitude -23.724615	Longitude 27.510028
10 000Tons Silt Trap	Heavy metals	Latitude -23.660169	Longitude 27.573242
MPSJV's Batch Plant Dam	Hydrocarbons, HCS and heavy metals	Latitude -23.700469	Longitude 27.554854
Strategic Coal Stockyard	Heavy metals	Latitude -23.706646	Longitude 27.55027
Seasonal Coal Stockyard (East and West)	Heavy metals	Latitude -23.705167 Latitude -23.706056	Longitude 27.553225 Longitude 27.551530
Live Coal Stockyard (East and West)	Heavy metals	Latitude -23.705484 Latitude -23.705748	Longitude 27.552628 Longitude 27.552136
Excess Coal Stockyard	Heavy metals	Latitude -23.713405	Longitude 27.505949

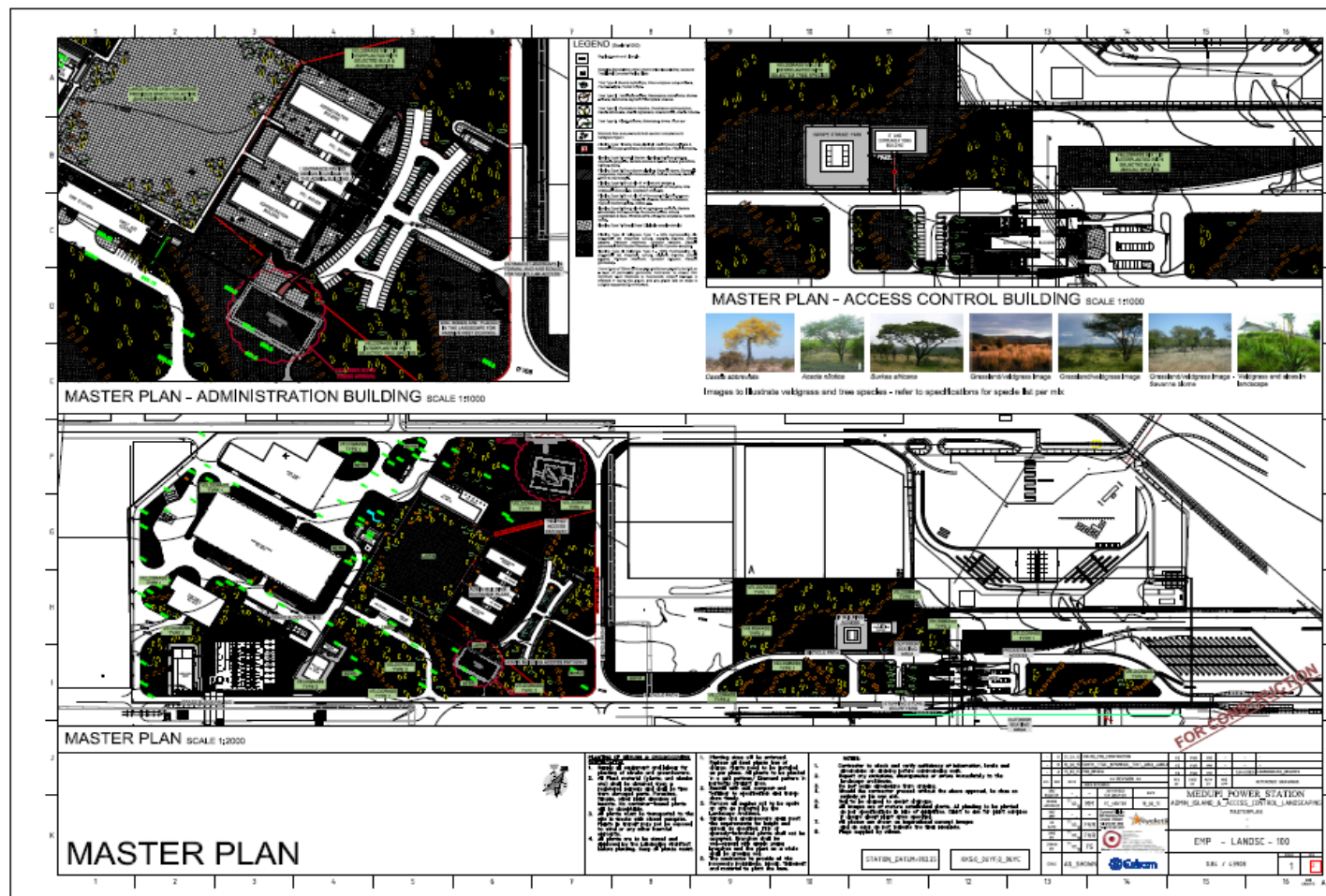
Appendix E – Landscape Concept Design Phase 1

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Appendix F – Process Self-Assessment Checklist

Discipline:		Applicable Document No.: PPZ 348 -				Self Assessment Date: / /	
Item No	Ref Section	Self-Assessment Question	Compliant			Comment	
			Yes	Part	No		
1	5.3.1	Is the Rehabilitation and Decommissioning objectives objectives?					
2	5.4.7	Is the volume of topsoil available estimated?					
3	5.4.10	Is the competent contractor used to undertake rehabilitation?					
4	5.4.11	Is only indegeous and suitable species approved by ECO and Environmental Manager used for Rehabilitation?					
5	5.6	Have contractors submitted Rehabilitation Method Statement?					
6	5.6.2	Are areas requiring rehabilitation identified?					
8	5.6.7	Is the rehabilitated area monitored regularly?					
9	5.6.7.1	Are the planted trees monitored regularly?					

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Comments:				
Self-Assessment by:	Name:	Position:	Revision Required?(Yes/No)	Planned Revision Date:
Attendees:				

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Appendix G: Medupi Power Station Rehabilitation Strategy and Implementation Program Action Plan

Action	Responsibility	Target Date	Status
Estimation amount of soil material available for Rehabilitation	Survey Department	Ongoing	Commenced
Appointment of Rehabilitation contractor (Package)	Medupi Management	TBC	
Investigate whether rehabilitation is included in existing Construction contracts	Contract Managers	31 March 2018	Completed
Monitoring of ground water quality	Environmental Practitioners through External Service Providers	Ongoing	Commenced
Landscaping designs for phase 1	Engineer	31 March 2018	Completed
Estimating number of tree species required for rehabilitation per area	To be included in rehab contract	31 December 2018	Completed for Phase 1
Selection of indigenous tree species required for rehabilitation	Competent Person/ Tree specialist/ To be included in rehab contract	31 December 2016	Completed for Phase 1
Procurement of tree species required for Rehabilitation	Contractors and Eskom	As required	Commenced

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Development of individual/ area specific rehabilitation and decommissioning plan/ method statement by existing contractors	Contractors	6 Month before the rehabilitation Contractor decommission	Commenced
Treatment of introduced (weed) species within rehabilitation areas aimed at reducing the weed loading ahead of ground preparation	Existing Contractors and Rehabilitation contractor	Ongoing	Commenced
Identification of Rehabilitation areas	Contractors and Eskom Holdings SOC Limited	Ongoing	Commenced
Preparation of areas to be rehabilitated by ripping and topsoil placing, identified areas: • Areas underneath the powerlines next to the HV yard. • Old ERI laydown areas next to the power lines. • Space next to the Generation Division admin building. • Old Hitachi laydown area next to the MPS batch plant. • All areas excluded from the FGD areas handed over by contractors as per figure 3.	Eskom Holdings SOC limited contractor	Ongoing	Commenced and Ongoing

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