10 WASTE MANAGEMENT LICENSE

10.1 Introduction

The intention of this chapter is to provide all the required information to the Department of Environmental Affairs to support the integrated waste licence application for Tutuka continuous ashing project. The information has been gathered by the various specialists in their relevant disciplines through desktop assessments, research, field work and other available means. An Ash classification assessment was performed according to the DEA's Waste Classification and Management Regulations – August 2013. Based upon this classification the liner type was identified as Type C and was incorporated into the Conceptual Design **(Appendix C).**

Although the DEA's Waste Classification and Management Regulations (August 2013), waste classification system is currently the official waste classification system, the ash sample was also classified in terms of the DWA Minimum Requirements as this was the applicable system at the time of the Ash Classification study. The classification in terms of the Minimum Requirements have been summarised and provided as background.

10.2 Legal Background

On the 6th of March 2009 the President assented to the National Environmental Management: Waste Act, 2008. This new Act came into effect on 1 July 2009.

Schedule 1 of the Act outlines waste management activities that are deemed to have or are likely to have a detrimental effect on the environment and for which a waste management license is required. This Schedule has subsequently been replaced by Government Notice 921, providing for three categories where, activities are equivalent to those either requiring a Basic Assessment (BA) or a full Environmental Impact Assessment (EIA) or performing the activities in Category C, compliance with Standards and Regulations are required.

Under the NEMWA, an applicant applies for a Waste Management License (WML) where the required basic assessment or full EIA process is followed in addition to any additional waste studies that may be requested by the Competent Authority (CA). This process is undertaken as a single integrated process whereby a single application is made to include activities triggered under the Waste Act as well as the NEMA listed activities.

The activities associated with the establishment of the continuous ash disposal facility and associated infrastructure at Tutuka Power Station pertain more specifically to Category B activities (requiring a full Environmental Impact Assessment).

10.3 Type of Application and Facility:

Type Of Activity	Mark
Recycling and/or recovery Facility	
Storage and/ or transfer Facility	**X**
Treatment facility	
Disposal facility	**X**

The proposed continuation of the existing Ash Disposal Facility involves Disposal whereas the proposed Emergency Dump is a Transfer/Storage facility.

10.4 Activities applied for in terms of the National Environmental Management: Waste Act

An application has been made for the following listed activities:

INDICATE THE NO. & DATE OF THE RELEVANT NOTICE:	**ACTIVITY NUMBERS (AS LISTED IN THE WASTE MANAGEMENT ACTIVITY LIST) :**	**DESCRIPTION OF EACH LISTED ACTIVITY (and not as per the wording of the relevant Government Notice):**
No. R. 921 November 2013 Category A	13	The expansion of a waste management activity (Ash Disposal) listed in Category A or B of the Schedule, which does not trigger an additional waste management activity in terms of the Schedule.
No. R. 921 November 2013 Category B	7	The disposal of any quantity of hazardous waste to land which includes the Ash as it has been classified as hazardous.
	10	The construction of facilities for activities listed in Category B of this schedule (the disposal of any quantity of hazardous waste to land)
No. GN 921 November 2013 Category C	2	The storage of hazardous waste at a facility that has the capacity to store in excess of 80m3 of hazardous waste. A hazardous waste storage facility will be located on top of the ADF.

10.5 Site Identification, Location and Land use

The following Surveyor-general Cadastral Code 21 digit site (erf/farm/portion) reference number is applicable to the recommended site **Alternative A** for the proposed continuous ash disposal facility at the Tutuka Power Station, **Table 10.1**:

Table 10.1: Affected portions for the recommended site for the proposed Continuous Ash Disposal facility.

SG_CODE	FARM_NO	PORTION	FARM NAME
T0IS00000000037400000	374	Rem	Pretorius Vley 374 IS Remainder
T0IS00000000037400002	374	2	Pretorius Vley 374 IS Portion 2
T0IS00000000037400004	374	4	Pretorius Vley 374 IS Portion 4
T0IS00000000037400010	374	10	Pretorius Vley 374 IS Portion 10
T0IS00000000037400011	374	11	Pretorius Vley 374 IS Portion 11
T0IS00000000037600000	376	Rem	Mooimeisjesfontein 376 IS Remainder
T0IS00000000037600002	376	2	Mooimeisjesfontein 376 IS Portion 2
T0IS00000000037600004	376	4	Mooimeisjesfontein 376 IS Portion 4
T0IS00000000034800000	348	Rem	Rouxland 348 IS Remainder
T0IS00000000034800001	348	1	Rouxland 348 IS Portions1,
T0IS00000000034800001	348	2	Rouxland 348 IS Portions2,
T0IS00000000034800025	348	25	Rouxland 348 IS Portion 25
T0IS00000000034800027	348	27	Rouxland 348 IS Portion 27
T0IS00000000034800028	348	28	Rouxland 348 IS Portion 28
T0IS00000000035000000	350	Rem	Dwars in de weg 350 IS Remainder
T0IS00000000035000002	350	2	Dwars in de weg 350 IS Portion 2
T0IS00000000035000005	350	5	Dwars in de weg 350 IS Portion 5
T0IS00000000035000006	350	6	Dwars in de weg 350 IS Portion 6
T0IS00000000035000008	350	8	Dwars in de weg 350 IS Portion 8)
T0IS00000000037500000	375	Rem	Spioen Kop 375 IS Remainder
T0IS00000000037500001	375	1	Spioen Kop 375 IS Portion 1
T0IS00000000037500002	375	2	Spioen Kop 375 IS Portions 2

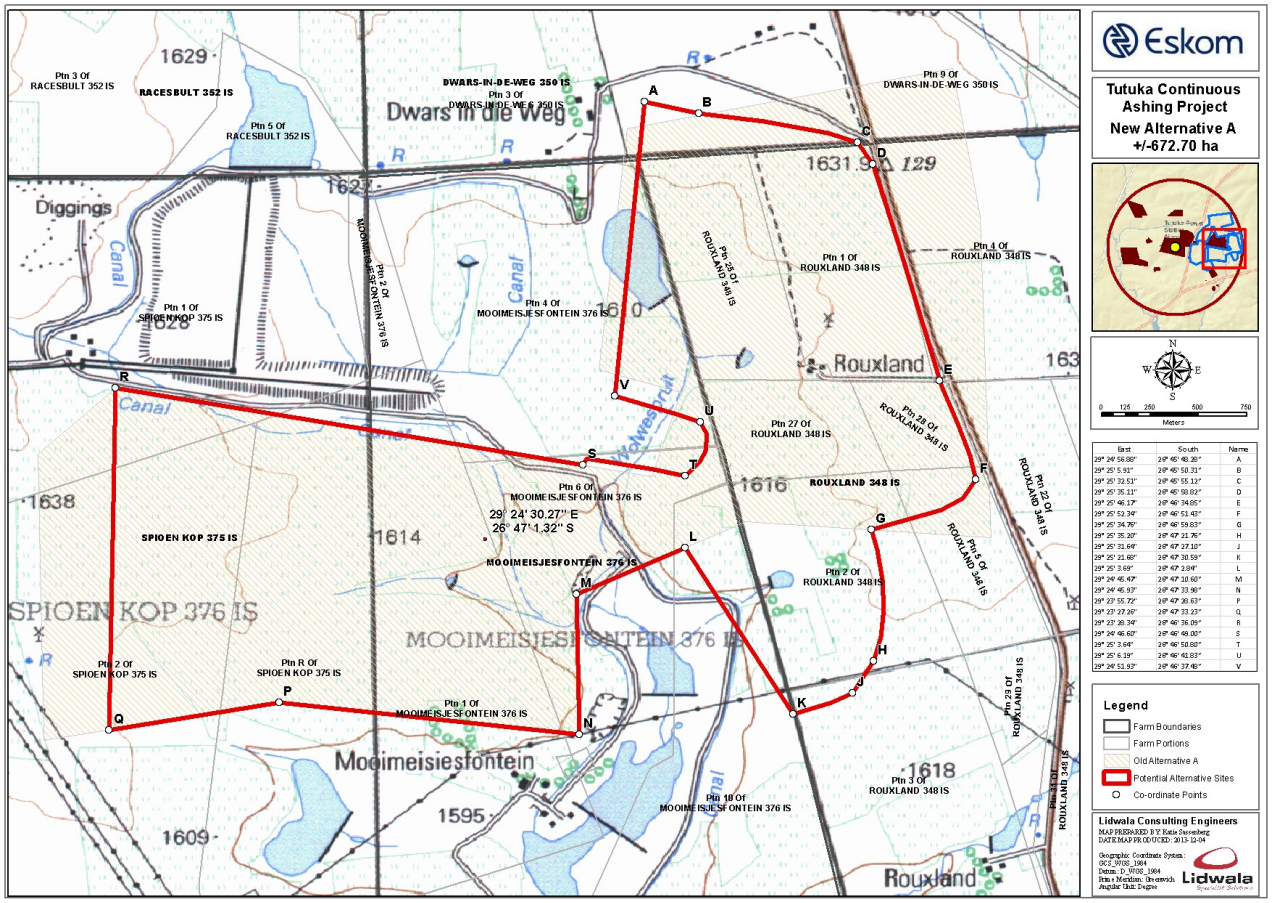

Figure 10.1: Affected portions for the recommended site for the proposed Tutuka ash disposal facility

Table 10.2 provides the co-ordinates of all the corner points of the recommended site Alternative. For further details on the specific design footprint please refer to the Conceptual Design **Appendix C**.

10.5.1 Size of Site and Classification

Size of facility for a waste management activity	Expansion ~ 800ha
Area where the waste management activity takes place	Tutuka Power Station
Classification of facility in terms of climatic water balance	Please refer to the Conceptual design report Appendix C for the details on the water balance.
Classification of Facility in terms of the type and the quantity of waste received (using Minimum Requirements)	Ash Disposal Facility (Dry) (H:H)
Classification of Facility in terms of the type and the quantity of waste received (using DEA 2013 Norms & Standards)	Class C Barrier System (Dry)

10.5.2 Current land-use where the site is situated:

Industrial	X	Recreation	
Agriculture	X	Commercial	
Residential		Mining & quarrying	
Forestry		Wilderness areas	
Wetlands	X	Nature area	X
Open spaces			

10.5.3 Geographical coordinates of all external corner points of the site:

Table 10.2: Co-ordinates of the corner points of the proposed site for the Continuous Ash Disposal facility (Site as reflected in Figure 10.1 above)

East	South	Name
29° 24' 56.88"	26° 45' 48.28"	A
29° 25' 5.91"	26° 45' 50.31"	B
29° 25' 32.51"	26° 45' 55.12"	C
29° 25' 35.11"	26° 45' 58.82"	D
29° 25' 46.17"	26° 46' 34.85"	E
29° 25' 52.34"	26° 46' 51.43"	F
29° 25' 34.76"	26° 46' 59.83"	G
29° 25' 35.20"	26° 47' 21.76"	H
29° 25' 31.64"	26° 47' 27.10"	J
29° 25' 21.68"	26° 47' 30.59"	K
29° 25' 3.69"	26° 47' 2.84"	L
29° 24' 45.47"	26° 47' 10.60"	M
29° 24' 45.93"	26° 47' 33.98"	N
29° 23' 55.72"	26° 47' 28.63"	P
29° 23' 27.26"	26° 47' 33.23"	Q
29° 23' 28.34"	26° 46' 36.09"	R
29° 24' 46.60"	26° 46' 49.00"	S
29° 25' 3.64"	26° 46' 50.80"	T
29° 25' 6.19"	26° 46' 41.83"	U
29° 24' 51.93"	26° 46' 37.48"	V

10.5.4 Operational times

Period	From	Until
Weekdays	Due to the fact that the facility supports the continuous station operations, it will be continuous.	
Saturdays		
Sunday		
Public holidays		

10.6 Process/Activity Description

The project involves the continuous ashing process at Tutuka Power Station in the Mpumalanga Province. Tutuka Power Station utilises a dry ashing disposal method.

The waste product is deposited onto the disposal site by means of a stacker machine, which handles 85% of the total ash whilst the remaining 15% is placed by a standby spreader system.

The ash handling system collects all the ash from the power station's six boilers, the ash conveyors transport this ash to the ash disposal site and the stacker and spreader systems stack this ash onto the main ash disposal facility. When there are challenges with the stacking system available on the ash disposal facility, then this ash is stored temporarily at the emergency offloading area (named TT02) (**please refer to section 10.6.1 for description of TT02**) inside the power station terrace. When the stacker system or spreader systems are restored then this ash from the emergency offloading area gets loaded onto the overland conveyor and transported to the ash disposal facility site. The ash from the emergency offloading ash can also be transported to the ash disposal facility by trucks.

The ash disposal facility structure consists of two layers of ash, the one layer is called the front stack and the second (top layer) is called the back stack.

- The first layer of ash which is called the front stack is stacked of about 45 m above the ground level.
- A final back stack layer is placed above the front stack.

The ash is disposed by one stacker system method through using the parallel front stacking method and the back stacking method. The second system is the rail mounted spreader system.

Existing standby spreader system

This standby existing rail mounted spreader can only stack ash in front of it and build one layer of ash by using the leap frog shifting operation. The width of this first layer of ash is about 100 meters and the height is about 45 meters.

As a rehabilitation strategy, a thick layer (300 mm) of topsoil will be placed on top of all completed ash dump top surfaces in the ash disposal facility and re-vegetated (planting of grass and trees) in line with the Environmental Management Programme.
As the ash disposal advances, the topsoil is stripped ahead of the activities and is taken by trucks and placed on top of the final disposal facility height, as a rehabilitation means. Grass is then planted in this top soil.

The proposed continuous development is an ash disposal facility with the following specifications:

- Capacity of airspace of ~158million m^3; and
- Ground footprint of ~800 Ha (Ash disposal facility & pollution control canals)

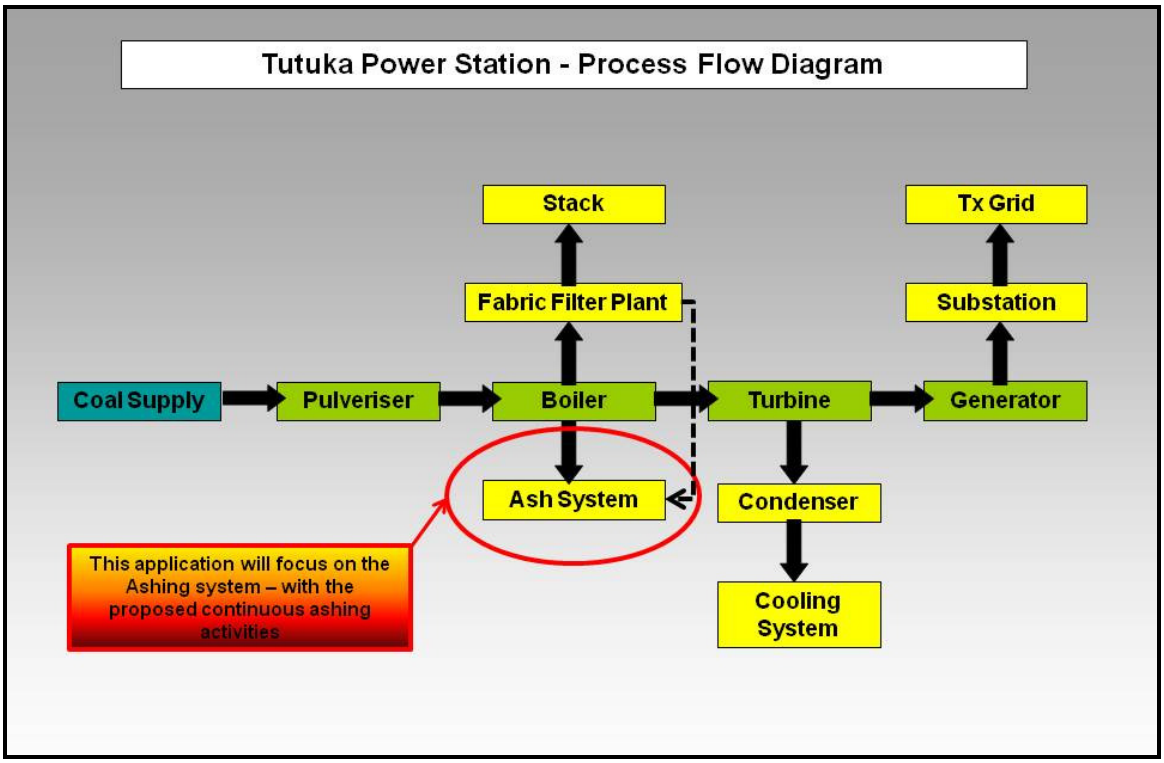

Figure 10.2: An overview of the activities on site and where this project fits within the process

10.6.1 Upgrade of Emergency Ashing Area (TT02)

During times where it is not possible to transport ash to the ash disposal facility or there is a breakdown on the Dust Handling Plant (DHP), Tutuka makes use of an emergency ashing area called TT02 (**Figure 10.3**). Possible reasons for not being able to transport

ash to the disposal facility include the loss of the ash conveyor system. Currently, the amount of ash that is off loaded during emergency offloading far exceeds the capacity of the existing footprint due to deterioration in quality of coal received by the station and also prolonged out of service ash conveying system due to plant break-downs.

Figure 10.3: The location of the current emergency ashing area (TT02) within Tutuka Power Station Terrace area.

- ***TT02 Operating Philosophy***

TT02 was designed to be a temporary storage facility for emergency ashing. Tutuka Power Station was designed to burn coal with an ash content of between 24 % to 28 %, over the years the station has been receiving coal of around 32 % to 40 %. The increased ash content percentage on the coal burnt has put strain on the Dust Handling Plant (DHP) and results in frequent DHP breakdown and also an increased amount of ash output. When the DHP experiences plant breakdowns, this means that the station does not have any means of removing ash from the system to the ash disposal facility. When this occurs, TT02 is used as an emergency ashing area.

Immediately after the ash has been disposed at TT02, trucks and front-end loaders are deployed to remove the ash to the ash disposal facility. The amount of ash at TT02 depends on two factors;

- The ash content on the coal burnt leading to more ash output being produced,
- The DHP break down (standing time).

In terms of the duration the ash storage at TT02 depends on the nature of the breakdown plus high ash content, therefore the station cannot predict when it will receive extremely poor coal with high ash content and when will the next breakdown take place and how long will it take the station to remove the ash at TT02. E.g. there can be a plant breakdown and the station will repair and after the plant has been put in service at the same time ash clean up process will be in place, while the ash is being removed from TT02, an unexpected plant breakdown might also occur. Having mentioned that, the station cannot indicate how many days will the ash be stored at TT02.

TT02 also has two sumps which are used to collect dirty water. The dirty water collects in the sumps with any run off ash. The ash settles and the water flows into a clean compartment via a series of drains. A pump in the clean water compartment pumps the water to stations drains , which ultimately is transported to the station Dirty Water Dam whereby the water is pumped back from the Dirty Water Dam to the cooling water system (re-used).

- ***Proposed TT02 operations and expansion***

The operations of TT02 have not changed, however, the area to be utilised will be increased.

- ***Scope of Work***

  - Design of the increased area required at TT02 such that there is sufficient space for front end loaders to manoeuvre comfortably around the site, with an increase from 1 880 m^2 to 20 785m^2;
  - All civil works related to increasing the size of TT02 from 1 880m^2 to 20 785m^2 (foundation works, installation of steel reinforcement, pouring of concrete slab, channels, silt traps etc.);
  - Provision of a 3 meter high bund / wall to prevent ash from spilling over from TT02 into the surrounding areas. The geotechnical properties of the ash must be considered so as to avoid a scenario where a 15m high ash heap fails. It is imperative that ash must not come into contact with or contaminate the surrounding areas;
  - Provision of drainage to channel any contaminated water to an additional silt trap;
  - Provision of a silt trap in order to collect the contaminated water and remove it to the station's dirty water drains and to remove settled ash
  - Locating of any above ground or sub terrain services (such as pipes, electrical cabling etc) so as not to damage them;
  - The existing pipes and power cables, above and below ground level should be rerouted to make sure that these services are not below the emergency ashing area.
  - Rerouting any of the identified services, as necessary; and the
  - Removal of any unnecessary old fencing on the south side of this site as well as the installation of new fencing as required;
  - Management of the facility, including dust suppression, will be done in line with the station's EMS systems and also EMPr.

10.7 Waste Quantities

The following estimated quantities of waste are expected to be managed daily at the proposed continuous ash disposal facility at Tutuka Power Station

Hazardous waste	Non-hazardous waste	Total waste handled (tonnes per day)
Ash	-	Approximately 13 600 tons per day (utilising a specific gravity for fly ash of 2.3 and the bulk density of 1 ton/m3)

10.7.1 Recovery, Reuse, Recycling, treatment and disposal quantities:

Types of Waste	Main Source (Name Of Company)	Quantities		On-Site Recovery Reuse Recycling Treatment Or Disposal	Offsite Recovery Reuse Recycling Treatment Or Disposal	Offsite Disposal
		Tons/ Month	M^3/Month	Method & Location	Method Location And Contractor Details	

10.8 Hazard Rating of the Tutuka Power Station Ash

10.8.1 Primary Hazard Rating

Based on the Minimum Requirements approach, a waste is first categorised based on the industry type. In this case the ash is from a power plant, where electricity is generated. The ash from the Tutuka Power Station was provisionally classified as hazardous. This is because the Minimum Requirements classifies the energy sector, specifically the production of electricity from coal, as an industrial sector which may generate hazardous waste (DWAF, 1998a).

10.8.2 Secondary Waste Classification or Hazard Rating

Based on the chemical analysis obtained from ARLP leach solution, the ash is classified as a Hazard Group 1 waste. This is due to chromium VI concentration in the ARLP solution being at a concentration higher than its ARL value of 0.020 mg/ℓ. None of the other elements and organic compounds tested for were detected in the leach solution at a concentration higher than their respective ARL values. Please refer to the Ash Classification specialist report for further details **Appendix K**.

10.8.3 Waste Disposal Risk Rating in Accordance with Government Gazette Notice 634 – 636 of 2013 – 23 August 2013 (Waste Classification and Management Regulations for Disposal)

Based on the analytical results obtained from the distilled water leach and total concentration analyses performed on the ash, the ash sample is classified as a **Type 3** waste requiring disposal on a waste disposal facility with a **Class C** barrier system provided there are no site specific risks that require a more conservative barrier system. Please see the Specialist Ash Classification report for further detail **Appendix K**.

The Type 3 waste classification was the result of the leachable concentration (LC) value of boron (B) and chromium VI concentrations exceeding their respective LC0 values, and the total concentration (TC) value of barium (Ba) and copper (Cu) exceeding their respective TC0 concentration values

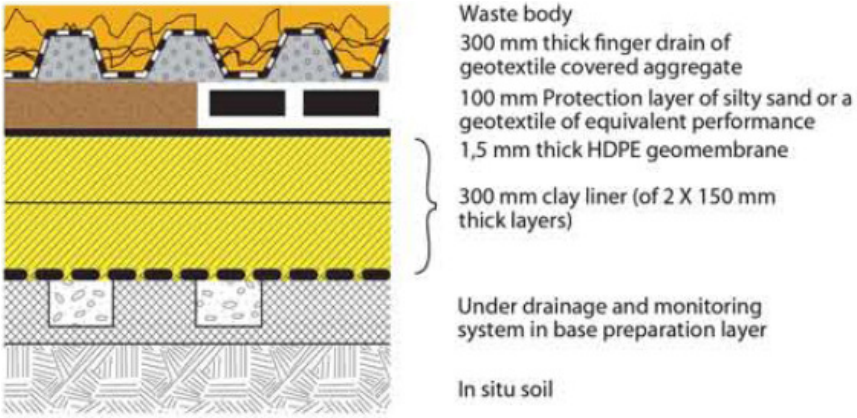

Figure 10.4: Class C Liner System

10.8.4 Carcinogenic, teratogenic and mutagenic characteristics of the ash

The DEA requires that a declaration be given with regard to the carcinogenic, mutagenic and teratogenic characteristics of the ash (DEA, 2009).

This assessment and declaration are based on a desktop study of available information and detailed source-pathway-receptor analysis and modelling was not undertaken. In addition, no testing of the ash sample was undertaken to establish the carcinogenic, mutagenic or teratogenic characteristics. The assessment is based on information obtained from reliable literature sources, such as the International Association for Research on Cancer (IARC), the World Health Organisation, US National Institute for Occupational Safety and Health (NIOSH), the US EPA and the Minimum Requirements.

The ash contains elements which fall into the Group 1, Group 2 and Group 3 carcinogens as identified by the IARC (See Ash Classification report for further details – **Appendix K**). The ash contains in the order of 17.44 % quartz (crystalline silica), based on the XRD analysis. Silica quartz has been classified as a Group 1 carcinogen by the IARC. In terms of the SANS 10234 rules, the ash would be classifiable as a Category 1 carcinogen, i.e., the ash contains more than 0.1 % of a Group 1 carcinogen (SABS, 2008).

However, despite the above, no medical evidence could be found that coal derived ash is actually classifiable as carcinogenic. From the literature study, it would appear that the respirable fractions of the silica are coated with amorphous alumina-silicate and thus

renders the silica significantly less hazardous (Y. Nathan et al, 2009). Therefore coal ash, including bottom (coarse) and fly-ash, is currently classified as a non-hazardous waste in the European Union, State of Maryland and Ireland, USA (EU, 2000 and Maryland Dept. of Health, 2007). The ash is therefore in this case also not classified as a carcinogen.
No evidence could be found that the ash is teratogenic or mutagenic.

10.8.5 Conclusion (Hazard Rating)

In the case of the DEA's Waste Classification and Management Regulations - 2013, different levels of protection are assigned for the different concentration levels. The higher the leachable concentration (or total concentration) of a pollutant, the higher the level of protection that must be provided, i.e., the more conservative the barrier systems become. This approach is in line with waste disposal practices elsewhere in the world.

In terms of the DEA's waste classification system, the ash is classified as a **Type 3** waste (low hazard waste), which requires disposal on a landfill with a **Class C barrier** system. This classification was the result of the leachable concentration of boron and the chromium VI, and the total concentrations of barium and copper in the ash. No further risk have been identified that would necessitate a more conservative liner. The conceptual design has therefor been drafted based on a Class C barrier system.

10.8.6 Transitional arrangements for Class C barrier system on ash disposal facility (Eskom motivation)

The current ash disposal facility grows in the eastern direction, where the main stacker system is shifted to the next position every 6 months. The last shift was in July 2014 and the next shift would be in January 2015. This process is repeated two times in a year. The main dump is growing by 80 meters every year, where the shift distance is 40 meters at a time. Through these shifting's Eskom covers the remaining landscape in front of the ash disposal facility at a rate of 80 meters per year. The face width of this main disposal facility face is about 1300 meters and the front face height is about 32 meters. The main disposal facility is in operation for about 85% of the time every year. The current main ash disposal facility would run out of space in 2025.

The standby ash disposal facility is also growing in the eastern direction at a rate of 240 meters and its face width is about 100 meters. The height of this face is about 35 meters. This standby ash disposal facility is covering the front landscape at a rate of 240 meters every year. The standby ash disposal facility is in operation for the remaining 15% of the time when the main ash disposal facility system is not available. The standby ash disposal

facility's remaining volume is much smaller than the main ash disposal facility and hence this standby ash disposal facility would run out of space in 2018.

The original SRK ash dump design (basically the same as the Demcotech design, within the EIA Alternative A), makes allowance for ash disposal facility Phase One area and also ash disposal Phase Two area. The station is currently using the Phase One area. With the higher ash production rate and the extension of the power station life, it would be required to explore the Phase Two area sooner and to have enough ash stacking space up to 2055. Tutuka has already covered about three quarters of the Phase One area. Due the small size of the remaining space in Phase One, Eskom submits that there is no material benefit to accrue by installing a **Class C** liner for the last remaining quarter remaining landscape area of Phase One (Existing Facility) please refer to **Figure 10.5**.

Eskom proposed to start using the **Class C** liner for the Phase Two area, which is the southern landscape (also called the phase two according to the original SRK design). This Phase Two area is new and no ash has been placed on this area.

In terms of timelines and milestones for installation of the Class C liner, the following is predicted:

- The ash disposal facility stability study and design should be complete by 28/02/2017;
- The scope of design work should be complete in 30/08/2017;
- The construction for the new ash disposal facility on the southern area should start at about 01/07/2019 after the tender process and the tender adjudication process; and
- The new ash dump should be in operation from December 2020.

As a result of the above engineering, administrative and construction processes that needs to be completed following the Authorisation, and the timeframes associated with these, Eskom would like to motivate for a transitional period to be granted as far as the implementation of the **Class C** barrier system is concerned, until 31 December 2020. Eskom would then use the current stacking process without a liner for the remaining area on the eastern side of the current ash disposal facility.

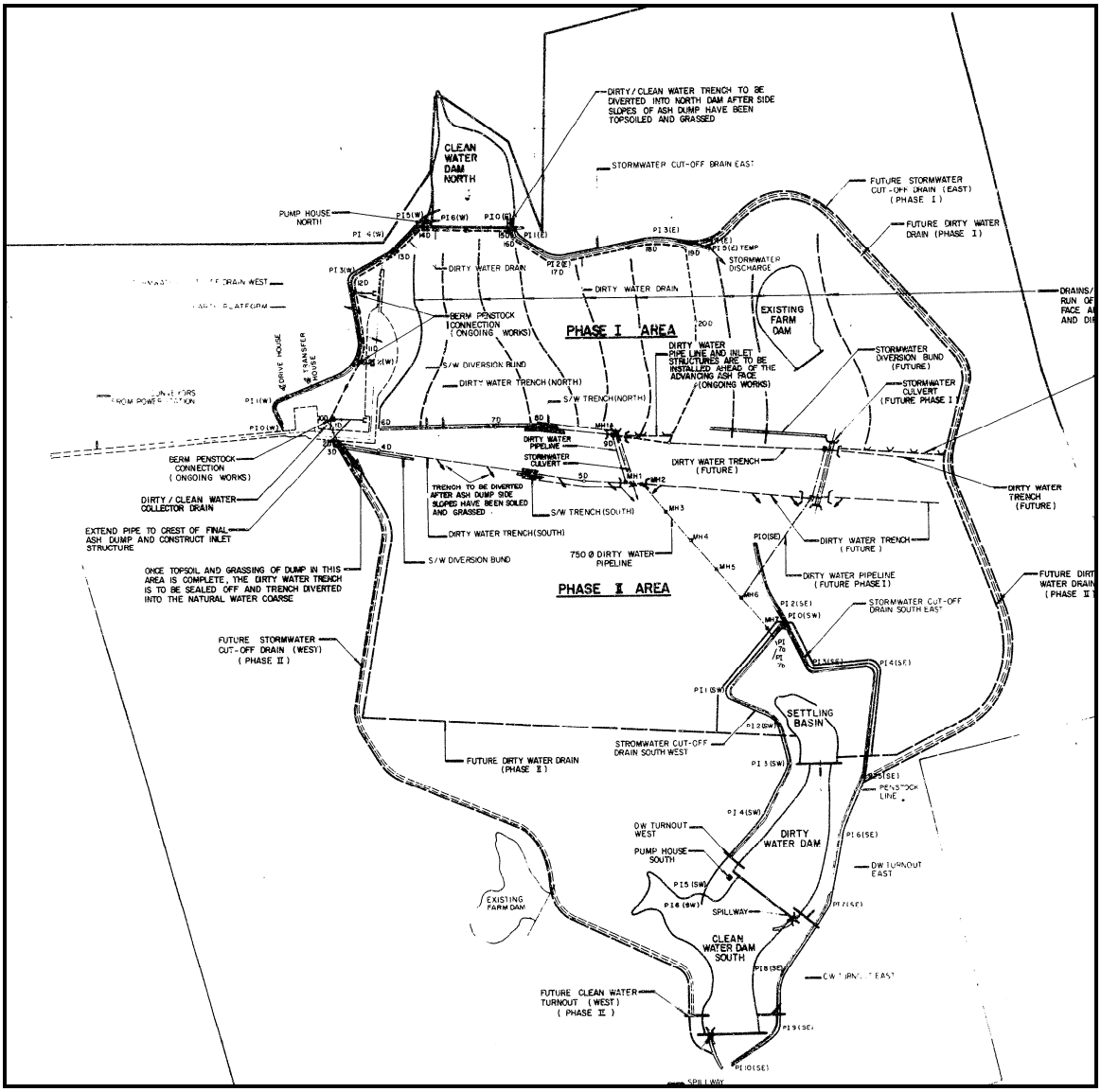

Figure 10.5 Indicating the phases of the proposed Facility

10.9 General

10.9.1 Prevailing wind direction

Figure 10.5 provides period wind roses for the Grootdraaidam Eskom monitoring station, with Figure 10.6 includes the seasonal wind roses for the same site. The predominant wind direction is east-south-easterly with a ~16% frequency of occurrence. Winds from the south-western sector are relatively infrequent occurring <4% of the total period. Calm conditions (wind speeds < 1 $m.s^{-1}$) occur for 9.9% of the time.

Winds from the north-western sector increases during day-time conditions. During the night-time an increase in east-southeast flow is observed with a decrease in westerly air flow.

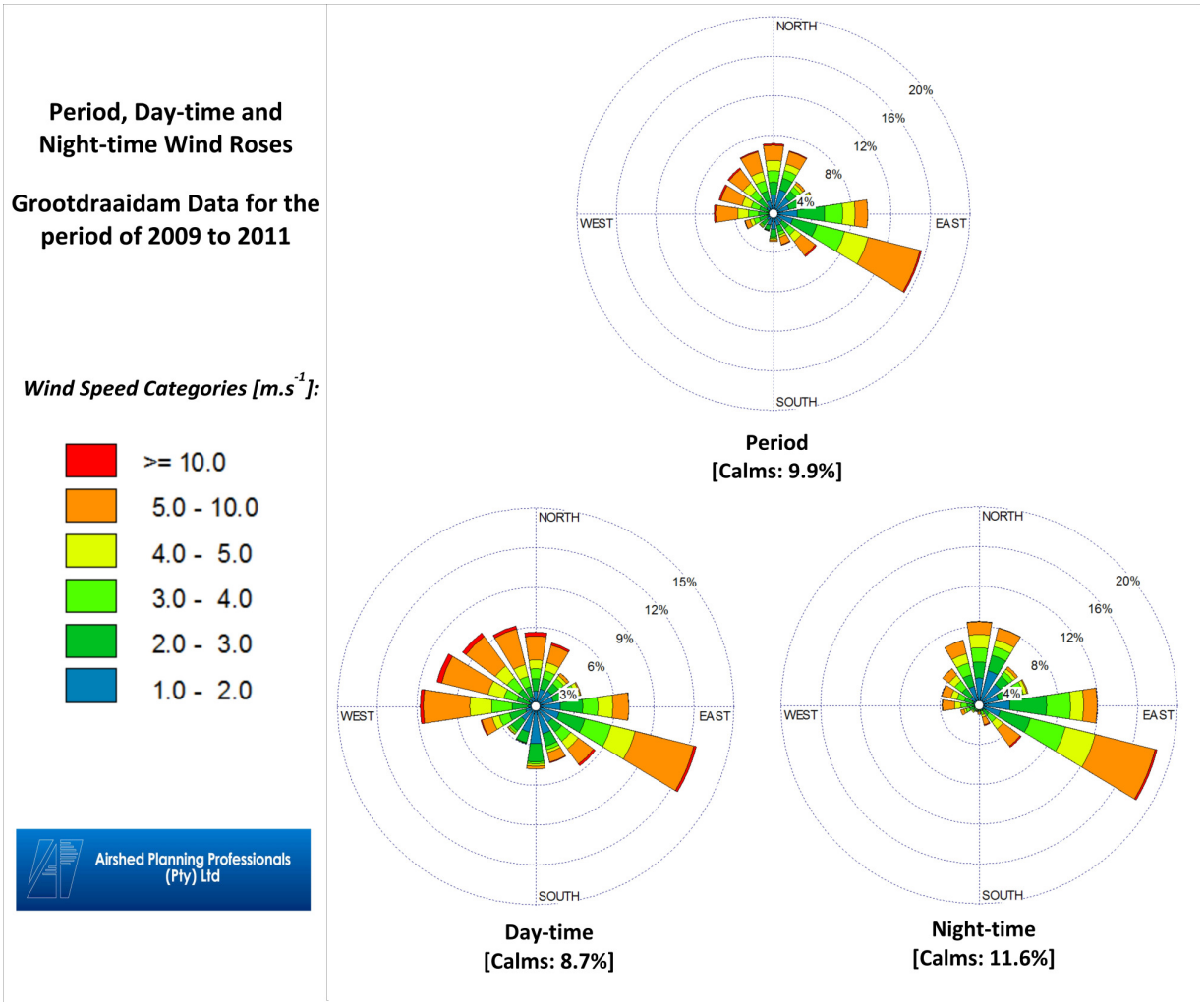

Figure 10.6: Period, day-time and night-time wind roses for Grootdraaidam (2009-2011)

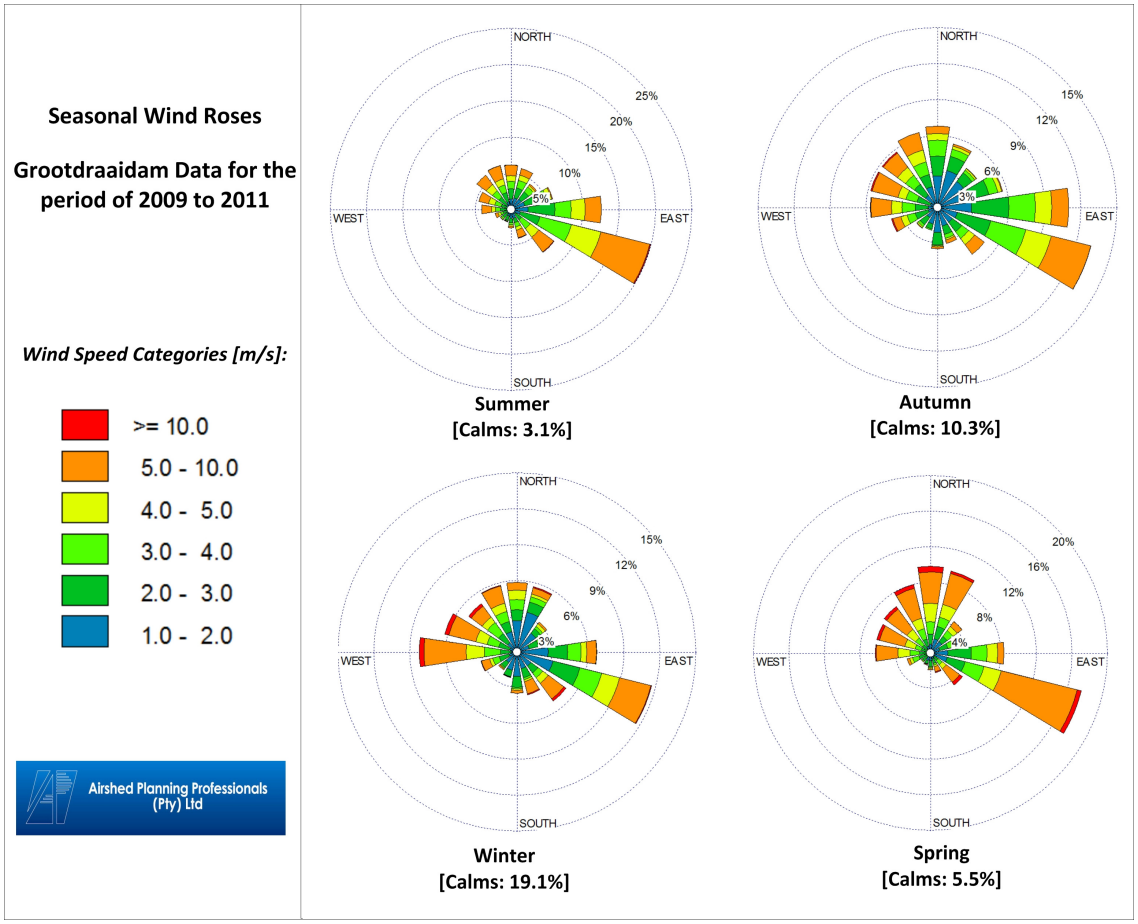

Figure 10.7: Seasonal wind roses for Grootdraaidam (2009-2011)

During summer months, winds from the east-southeast become more frequent, due to the strengthened influence of the tropical easterlies and the increasing frequency of occurrence of ridging anticyclones off the east coast. There is an increase in the frequency of calm periods (i.e. wind speeds <1 m/s) during the winter months of 19.1% with an increase in the westerly flow.

10.9.2 The size of population to be served by the facility

	Mark with "X"	Comment
0-499		The waste facilities proposed for ash disposal facility and storage facility for Tutuka power station's use, they therefore contribute to the National Grid and in doing so serve the population of South Africa.
500-9,999		
10,000-199,999		
200,000 upwards		

10.9.3 The geological formations underlying the site:

Granite		Quartzite	X
Shale	X	Dolomite	
Sandstone	X	Dolerite	X

10.10 Competence to Operate Site

It is imperative that the holder of the waste licence is a fit person in terms of section 59 of the NEMWA (59 of 2008).

10.10.1 Legal compliance

	YES/NO	DETAILS
Has the applicant ever been found guilty or issued with a non-compliance notice in terms of any national environmental management legislation?	**NO**	These details have specific reference to Tutuka Power Station
Has the applicant's licence in terms of the Waste Act 2008 ever been revoked?	**NO**	
Has the applicant ever been issued with a non-compliance notice or letter in terms of any South African Law?	**NO**	

10.10.2 Technical competence

What technical skills are required to operate the site?	The following skills are required: • An ash system Engineer (Mechanical) • A Civil Engineer • A quantity surveyor • Senior technician(Eskom) • Site supervisor (Roshcon) • Site manager(Roshcon) • Contracts manager (Eskom) • Maintenance personnel (Roshcon and Eskom) • Stacker operators • Environmental Official
How will the applicant ensure and maintain technical competency in the operation of the site?	Through Training, quality control and assurance as well as plant monitoring, ensuring that the operations of the ash disposal facility is as per the design. By ensuring that personnel have the necessary skills and knowledge in terms of the operation of the Ash Disposal facility. In line with ISO 14001 certification, which Tutuka holds, the station will ensure that appropriately competent resources are employed to operate the facility.

The details of Eskom's experience and qualifications along with that of relevant employees are summarised as shown in the table below:

NAME	POSITION	DUTIES AND RESPONSIBILITIES	QUALIFICATIONS AND EXPERIENCE
Please note these are the current names and are accurate as of August 2012, it should be noted that the specific people involved may change from time to time.			
Ryno Lacock	**PSM**	**Power Station Manager**	**B. Eng, B.Com, M.B.A. 22 years**
Johan Venter	**Civil Engineer (External)(Eskom)**	**Civil/Structural System Engineer**	**B.Tech Civil Engineering 12 yrs experience**
Jan Zwart	**Materials Handling Contracts Manager (Eskom)**	**Contracts Management**	**National N Diploma Mechanical 29 yrs experience**

Egard van Rensburg	**Mechanical Engineer (Eskom)**	**Ash Plant System Engineer**	**National Higher Diploma 18 yrs experience**
Marius van Wyk	**Senior Technician (Eskom)**	**Contract Supervision**	**N4 Certificate (Mechanical) Artisan, 24 yrs experience**
Blikkies Blignaut	**Site Supervisor (Roshcon)**	**Site Supervision/conveyors**	**Matric/N3 Mechanical Artisan 22 yrs experience**
Janavari Nkabinde	**Site Supervisor (Roschon)**	**Site Supervision/ash handling**	**St 6, 13 years**
Pearson Cameron	**Site Manager (Roshcon)**	**Site Management**	**Higher Teacher Degree 20 yrs experience**
Duduzile Lephoto	**Safety Officer (Roshcon)**	**Safety**	**National Diploma in safety 6 yrs experience**
Strauss Roux	**Contracts Manager (Roshcon)**	**Contract Management**	**National Diploma (Project Management) National Diploma (Coal handling) 22 years**

10.11 Landfill Parameters

10.11.1 The method of disposal of waste:

Land-building [X] Land-filling [ ] Both [ ]

10.11.2 The dimensions of the disposal site in metres

	At commencement	**After rehabilitation**
Height/Depth	Specific details are available in the Final Conceptual design Appendix C to this report	
Length		
Breadth		

10.11.3 The total volume available for the disposal of waste on the site:

Volume Available	Mark with "X"	Source of information (Determined by surveyor/ Estimated)
Up to 99		
100-34 999		
35 000- 3,5 million		
>3,5 million	**X**	Tutuka Power Station is anticipated to ash an additional 128 million m^3 until the end of its life span in 2055 (approximately 41 years)

10.11.4 The total volume already used for waste disposal:

(a) Will the waste body be covered daily		**NO**
(b) Is sufficient cover material available	**YES**	
(c) Will waste be compacted daily		**NO**

10.11.5 The Salvage method

At source	
Recycling installation	
Formal salvaging	
Contractor	
No salvaging planned	**X**

10.11.6 Fatal Flaws for the site:

Table 10.3 indicates which of the following apply to the facility for a waste management activity:

Table 10.3: Fatal Flaws for Alternative A

	YES	NO	Comment
Within a 3000m radius of the end of an airport landing strip		**X**	
Within the 1 in 50 year flood line of any watercourse	**X**		See Surface Water and Aquatic Specialist Study in **Appendix Q** for more information

Within an unstable area (fault zone, seismic zone, dolomitic area, sinkholes)		X	
Within the drainage area or within 5 km of water source	X		See Surface Water and Aquatic Specialist Study in **Appendix Q** for more information
Within an area with shallow and/or visible water table	X		
Within an area adjacent to or above an aquifer	X		See the Ash Classification and Ground Water Studies attached in **Appendices K and N** respectively
Within an area with shallow bedrock and limited available cover material		X	
Within 100 m of the source of surface water	X		See Surface Water and Aquatic Specialist Study in **Appendix Q** for more information
Within 1km from the wetland	X		
Indicate the distance to the boundary of the nearest residential area	Approximately 10km		
Indicate the distance to the boundary of the industrial area	4,7 km		

10.11.7 Rainfall

Monthly rainfall for the Tutuka ash disposal facility (January 2010 to November 2012) is given in Table 10.4. Average annual rainfall between 2007 and 2012 is 730 mm. The study area falls within a summer rainfall region, with over 80% of the annual rainfall occurring during the October to March period.

Table 10.4: Monthly rainfall at the Tutuka monitoring station 2011/2012

Month	Precipitation (mm)		
	2010	2011	2012
January	175	127	111
February	55	18	62
March	122	56	49
April	32	66	24
May	16	10	1
June	0	0	6
July	0	20	0
August	0	15	0
September	0	50	115

Month	Precipitation (mm)		
	2010	2011	2012
October	123	60	54
November	98	28	252
December	204	77	162

10.11.8 Location and depth of ground water monitoring boreholes:

Table 10.5: Tutuka Power Station – Groundwater Monitoring Boreholes

BH ID	Location	Water Level (mbgl)
AMB55	Within 100m from Ash Stack	8.47
AMB93	Within 100m from Ash Stack	1.89
AMB67	South of Ash Stack	1.98
AMB64	South of Ash Stack	2.11
AMB25S	In Ash Stack	10.69
AMB25D	In Ash Stack	12.19
AMB24S	In Ash Stack	25.42
AMB24D	In Ash Stack	27.14

10.12 Information needed when applying for scheduled activities listed under Category B:

Information Required	Comment
Scoping and Environmental Impact Assessment Report which should include:	
Description of the environment that may be affected by the proposed activity and the manner in which the geographical, physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity	See **Chapter 6** and **Chapter 8** of the EIA report
Description of significant environmental impacts, including cumulative impacts, that may occur as a result of the undertaking of the activity	See **Chapter 8** and **Chapter 9** of this report
Conducting public participation as outlined in EIA Regulations	See **Chapter 3** and the comments and responses report as part of the EIA report

Closure plan (report) / Rehabilitation	Due to the fact that the proposed facility is to be operated in the same way as the existing disposal facilities (except for the fact that it will be lined) at Tutuka power station, the existing Closure/Rehabilitation considerations are included in the existing operational plan included in **Appendix U**
Operational plan	Due to the fact that the proposed facility is to be operated in the same way as the existing disposal facilities (except for the fact that it will be lined) at Tutuka power station, the existing operational plan has been included in **Appendix U**
Waste disposal facility designs **(FINAL**	See **Appendix C**
A3 size layout plans (four hard copies for all applications) **(FINAL)**	See **Appendix C**
Landfill conceptual designs **(FINAL)**	See **Appendix C**
Geo-hydrological report (only apply to landfill sites, storage and treatment of waste)	See **Appendix N**
Consideration of alternatives	See **Chapter 7** of the EIR
Description of mitigation measures and risk assessment	See the EMPr in **Appendix D** as well as **Chapter 8** of the EIR.
Any inputs made by specialists to the extent that may be necessary	See **Appendices I to T**
Any specific information as may be required by the competent authority	Not Applicable as yet
Plan of study for environmental impact assessment which must among others include:	
Description of the tasks to be undertaken as part of the environmental impact assessment process, including specialist report or specialized processes, and a manner in which such tasks will be undertaken	The Plan of Study for EIA was submitted to the DEA on 7 January 2013

An indication of stages at which the competent authority will be consulted	and was approved and accepted on 20 March 2013 – See **Appendix A.**
Description of methods for assessing issues and alternatives, including the no-go alternative	
Particulars of participation process that will be conducted during the EIA process	
Draft environmental management plan	See **Appendix D**
Copies of any specialist reports and specialized processes	See **Appendices I to T**

The following is also included as supporting documentation.

Required Piece Of Information	Section In The Reports Where It Can Be Found	Comments (If Any)
Extremely clear Google Earth colour picture of the site	**Appendix V**	
1:50 000 topography /topo-cadastral map of the area showing o the site and 5km radius o Existing residential and industrial areas o Possible future development (indicate the type of development) o Other waste handling sites (existing or closed) in the area o Existing and possible future residential areas. o Sites which are listed as national monuments or archaeological, paleontological and cultural historical sites or objects worthy of conservation;	**Appendix W**	
The site plan drawn to scale showing the site's boundary showing: o Activities or development existing on all 4 directions of the site. o Waste receipt, storage and handling areas o Impermeable surfaces o Sealed drainage systems o Drainage system for the site including sumps and discharge points o Road names and access from all major roads in the area	**Appendix C**	

○ Land Owner's consent (letter with signature)	
Waste hierarchy implementation plan	Not Applicable

In addition to the above, the following has also been included.

Required Piece Of Information	Section In The Reports Where It Can Be Found	Comments (If Any)
Design for site roads	Not Applicable	
Laboratory facilities	Not Applicable	
Design and location of fuel storage areas	Not Applicable	
Design and location waste quarantine areas	Not Applicable	
Design and location of waste Inspection areas	Not Applicable	
Site's drainage system	**Appendix C**	
Liner specifications		
Gas generation and management	Not Applicable	
Air quality monitoring and management	See Air Quality Study in **Appendix I**, Environmental Management Programme in **Appendix D** as well as the Operational Plan in **Appendix U**	
Co-disposal ratio calculation	Not Applicable	
Daily and intermediate cover requirements	Not Applicable	
Temporary and permanent capping requirements	Not Applicable	