environmental affairs

Department:
Environmental Affairs
**REPUBLIC OF SOUTH AFRICA**

**DETAILS OF SPECIALIST AND DECLARATION OF INTEREST**

| | (For official use only) |
|---|---|
| File Reference Number: | 12/12/20/ or 12/9/11/L |
| NEAS Reference Number: | DEAT/EIA |
| Date Received: | |

Application for integrated environmental authorisation and waste management licence in terms of the-

(1) National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010; and

(2) National Environmental Management Act: Waste Act, 2008 (Act No. 59 of 2008) and Government Notice 718, 2009

**PROJECT TITLE**

Proposed 30-year Ash Disposal Facility at Kendal Power Station, Mpumalanga

| | | | |
|---|---|---|---|
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| | | | |
|---|---|---|---|
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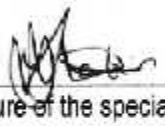
4.2 The specialist appointed in terms of the Regulations_

I, Yonanda Martin , declare that –

General declaration:

I act as the independent specialist in this application;
I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
I declare that there are no circumstances that may compromise my objectivity in performing such work;
I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
I will comply with the Act, Regulations and all other applicable legislation;
I have no, and will not engage in, conflicting interests in the undertaking of the activity;
I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
all the particulars furnished by me in this form are true and correct; and
I realise that a false declaration is an offence in terms of regulation 71 and is punishable in terms of section 24F of the Act.



Signature of the specialist:

Newtown Landscape Architects

Name of company (if applicable):

22 August 2016

Date:

Visual Impact Assessment Report

# Proposed Kendal 30 Year Ash Dump Facility, Mpumalanga Province

Mitha Cilliers (Pr LArch)

Newtown Landscape Architects

# PROPOSED KENDAL 30 YEAR ASH DUMP FACILITY PROJECT

# KENDAL, MPUMALANGA PROVINCE

Submitted to:

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| | |
|---|---|
| NLA Project No: | 1729/V |
| Report Revision No: | 0 |
| Date Issued: | 5 May 2015 |
| Prepared By: | Mitha Cilliers (Pr LArch) |
| Reference: | Kendal 30 Year Ash Project |

# Expertise of Specialists

| | |
|---|---|
| **Name:** | Graham A Young |
| **Qualification:** | Pr LArch |
| **Professional Registration:** | South African Council for the Landscape Architectural Profession (SACLAP)<br>Institute of Landscape Architects of South Africa (ILASA) |
| **Experience in Years:** | 30 years |
| **Experience** | Graham is a landscape architect with thirty yearsôexperience. He has worked in Southern Africa and Canada and has valuable expertise in the practice of landscape architecture, urban design and environmental planning. He is also a senior lecturer, teaching urban design and landscape architecture at post and under graduate levels at the University of Pretoria. He specializes in Visual Impact Assessments and has won an Institute of Landscape Architects Merit Award for his VIA work. |

| | |
|---|---|
| **Name** | Mitha Cilliers |
| **Qualification** | Pr LArch |
| **Professional Registration** | South African Council for the Landscape Architectural Profession (SACLAP) |
| **Experience in Years** | 10 years |
| **Experience** | Mitha is a landscape architect with nine years experience. She has worked as Landscape Architect in South Africa and Angola and has valuable expertise in the practice of landscape architecture and environmental planning. She has been working on visual impact assessments for Newtown Landscape Architects since 2008. She has experience in a wide range of visual impact assessments which include visual impacts for game lodges, transmission lines, solar parks and mines. |

# Acronyms, Abbreviations & Glossary

| Acronyms & Abbreviations | |
|---|---|
| **CSIR** | Council for Scientific and Industrial Research |
| **EIA** | Environmental Impact Assessment |
| **IFC** | International Finance Corporation |
| **SACLAP** | South African Council for the Landscape Architectural Profession |
| **VIA** | Visual Impact Assessment |

| Glossary | |
|---|---|
| **Aesthetic Value** | Aesthetic value is the emotional response derived from the experience of the environment with its particular natural and cultural attributes. The response can be either to visual or non-visual elements and can embrace sound, smell and any other factor having a strong impact on human thoughts, feelings and attitudes (Ramsay, 1993). Thus aesthetic value encompasses more than the seen view, visual quality or scenery, and includes atmosphere, landscape character and sense of place (Schapper, 1993). |
| **Aesthetically significant place** | A formally designated place visited by recreationists and others for the express purpose of enjoying its beauty. For example, tens of thousands of people visit Table Mountain on an annual basis. They come from around the country and even from around the world. By these measurements, one can make the case that Table Mountain (a designated National Park) is an aesthetic resource of national significance. Similarly, a resource that is visited by large numbers who come from across the region probably has regional significance. A place visited primarily by people whose place of origin is local is generally of local significance. Unvisited places either have no significance or are "no trespass" places. (after New York, Department of Environment 2000). |
| **Aesthetic impact** | Aesthetic impact occurs when there is a detrimental effect on the perceived beauty of a place or structure. Mere visibility, even startling visibility of a project proposal, should not be a threshold for decision making. Instead a project, by virtue of its visibility, must clearly interfere with or reduce (i.e. visual impact) the public's enjoyment and/or appreciation of the appearance of a valued resource e.g. cooling tower blocks a view from a National Park overlook (after New York, Department of Environment 2000). |

| | |
|---|---|
| **Cumulative Effects** | The summation of effects that result from changes caused by a development in conjunction with the other past, present or reasonably foreseeable actions. |
| **Landscape Character** | The individual elements that make up the landscape, including prominent or eye-catching features such as hills, valleys, woods, trees, water bodies, buildings and roads. They are generally quantifiable and can be easily described. |
| **Landscape Impact** | Landscape effects derive from changes in the physical landscape, which may give rise to changes in its character and how this is experienced (Institute of Environmental Assessment & The Landscape Institute, 1996). |
| **Study area** | For the purposes of this report the Kendal Ash Dump Project Study area refers to the proposed project footprint / project site as well as the ózone of potential influenceô(the area defined as the radius about the centre point of the project beyond which the visual impact of the most visible features will be insignificant) which is a 10km radius surrounding the proposed project footprint / site. |
| **Project Footprint / Site** | For the purposes of this report the Kendal Ash Dump Project *site* / *footprint* refers to the actual layout of the project. |
| **Sense of Place (genius loci)** | Sense of place is the unique value that is allocated to a specific place or area through the cognitive experience of the user or viewer. *Genius loci* literally means óspirit of the placeô |
| **Sensitive Receptors** | Sensitivity of visual receptors (viewers) to a proposed development. |
| **Viewshed analysis** | The two dimensional spatial pattern created by an analysis that defines areas, which contain all possible observation sites from which an object would be visible. The basic assumption for preparing a viewshed analysis is that the observer eye height is 1,8m above ground level. |
| **Visibility** | The area from which project components would potentially be visible. Visibility depends upon general topography, aspect, tree cover or other visual obstruction, elevation and distance. |
| **Visual Exposure** | Visibility and visual intrusion qualified with a distance rating to indicate the degree of intrusion and visual acuity, which is also influenced by weather and light conditions. |

| | |
|---|---|
| **Visual Impact** | Visual effects relate to the changes that arise in the composition of available views as a result of changes to the landscape, to peoples responses to the changes, and to the overall effects with respect to visual amenity. |
| **Visual Intrusion** | The nature of intrusion of an object on the visual quality of the environment resulting in its compatibility (absorbed into the landscape elements) or discord (contrasts with the landscape elements) with the landscape and surrounding land uses. |
| **Worst-case Scenario** | Principle applied where the environmental effects may vary, for example, seasonally to ensure the most severe potential effect is assessed. |
| **Zone of Potential Visual Influence** | By determining the zone of potential visual influence it is possible to identify the extent of potential visibility and views which could be affected by the proposed development. Its maximum extent is the radius around an object beyond which the visual impact of its most visible features will be insignificant primarily due to distance. |

# Executive Summary

Newtown Landscape Architects (NLA) was commissioned by Zitholele Consulting to carry out a Visual Impact Assessment (VIA) for the proposed Ash Disposal Project at Kendal Power Station, Mpumalanga Province (ñthe Projectò).

The current ash disposal facilities at Kendal Power Station are running out of capacity due to the high ash volumes being produced, in addition the life span of Kendal has also been extended to 2053. Two additional ash disposing strategies are currently being investigated. The first strategy will focus on the extension of the existing ashing facility towards the north on vacant land owned by Eskom. The second strategy is investigating a new facility with a capacity of 30 years to accommodate the remaining operational life of the power station until 2053. The effectiveness of the optimization of the first strategy will determine the required capacity for the additional new facility. This report will assess the impact of the new 30 year facility. Currently 3 alternative sites (B, C, F and H) were identified and will be investigated.

The study area has a gently to moderately undulating topography draped mainly with agricultural croplands with clusters of exotic shrubs and trees where the natural grassland has been disturbed. The study area has a mixed industrial ï pastoral sense of place. The visual character of the study area is largely cultivated land or natural grasslands disturbed by mining activities and with the Kendal Power Station and associated infrastructure competing to dominate the scene. The existing Ash Dump Facility forms part of the support infrastructure for the Kendal Power Station.

Sensitive viewers within the study area include farmsteads and residents within, visitors to and travellers through the study area. Residents and farmsteads had been rated with a high sensitivity and visitors to and travellers through with a moderate sensitivity. It should however be remembered that all viewers, sensitive or not, are already exposed to the existing mining and Kendal Power Station structures and support infrastructure.

The Project will introduce elements that are not uncharacteristic when set within the attributes of the receiving landscape and would therefore result in a partial alteration to the key features of the receiving landscape. However, the Project would in most instances be viewed against a backdrop including the existing ash dump as well as the Kendal Power Station and other mining activities.

Mitigation is possible and can easily be implemented effectively.

Construction phase will consist of installing the liner for the first section of the operations. The Initial Impact Risk had been calculated as a Class 3, Moderate Impact. The Additional impact as Low and the Residual impact as Moderate for this phase. The Operational phase will consist of installing liner progressively as required and dumping ash to the in consecutive sections until a maximum height for the section is achieved. This process will continue until full capacity of the ADF had been reached. Continuous rehabilitation of the ADF will take place. The Impact Risk had been calculated as a Class 3, Moderate Impact. Cumulative impacts would result from the implementation of the proposed ADF. The Initial, Additional and Residual

impacts had been rated as a Class 3 i.e. Moderate impact for the Operational phase. During closure the final exposed ash area will be capped / rehabilitated and the stackers and all other infrastructural equipment be removed. Even though rehabilitated, the ADF structure would remain. With the successful implementation of mitigation measures, the structure will soon after closure blend in with the natural environment. Cumulative impacts would result from the closure phase would be minimal as it would entail the removal of the stackers and the rehabilitation (capping and vegetation) of the remaining exposed ash areas. For the Closure Phase, the Initial impact had been rated as Moderate and both the Additional and Residual impacts as Low.

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# 1. INTRODUCTION

## 1.1 Project Overview and Background

Newtown Landscape Architects (NLA) was commissioned by Zitholele Consulting to carry out a Visual Impact Assessment (VIA) for the proposed Ash Disposal Project at Kendal Power Station, Mpumalanga Province (ñthe Projectò).

Kendal Power Station is a coal-fired power station, situated south-west of the town of Ogies and became operational in 1993. The power station has an indirect dry-cooling system that uses a cooling tower and water. Heat is conducted from the water by means of A-frame bundles of cooling elements arranged in concentric rings inside the tower. Cooling water (clean water) flowing through these elements, cools down as the cold air passes over them and returns to the condenser. This is referred to as a closed system as there is no loss of water due to evaporation and it uses significantly less water in its cooling processes than conventional wet cooled power stations. Kendal has six 686 megawatt (MW) units that generate 4 116MW of power. It is currently the largest coal-fired power station in the world and holds several Eskom performance records. The stationôs cooling towers are the largest structures in their kind in the world, with a height and base diameter of 165m.

The current ash disposal facilities at Kendal Power Station are running out of capacity due to the high ash volumes being produced, in addition the life span of Kendal has also been extended to 2053. Two additional ash disposing strategies are currently being investigated. The first strategy will focus on the extension of the existing ashing facility towards the north on vacant land owned by Eskom. The second strategy is investigating a new facility with a capacity of 30 years to accommodate the remaining operational life of the power station until 2053. The effectiveness of the optimization of the first strategy will determine the required capacity for the additional new facility. This report will assess the impact of the new 30 year facility.

## 1.2 Locality and Proposed Study Area

The three identified sites are all located within a 10km radius of the Kendal Power Station which is located approximately 11km south-west of the town of Ogies, Nkangala District Municipality in the Mpumalanga Province. The project site is located to the west of the Kendal Power Station, opposite the R555 and north of the existing ashing facility. Refer to Figure 1 for the project location and Figure 2 for the Layout.

## 1.3 Scope of Work

A specialist study is required to assess the visual impacts arising from the proposed Project. Based on the general requirements for a comprehensive VIA, the following scope of works was established:

- **Conduct a site visit** and scrutinize the receiving environment to the extent that it can be documented and adequately described.
- **Describe the landscape character** focusing on the nature of the land rather than the response of a viewer.
- **Describe and map the landscape quality** as a measurement of the union of ecological integrity (overall health of the landscape) and aesthetic appeal. Aesthetic appeal will be

described using contemporary research in perceptual psychology and the opinion of the specialist as the basis for determining its value.

- **Describe and map the sense of place** in terms of the uniqueness and distinctiveness of the landscape. The primary informant of these qualities will be the spatial form, character and the natural landscape together with the cultural transformations and traditions associated with the historic and current use of land.
- **Describe the visual resource** using landscape character, landscape quality and sense of place. These measures are intrinsic to the landscape and thus they enable a value to be placed on the landscape that is independent of the person doing the viewing.
- **Describe the visual characteristics** of the components of the project in terms of their physical characteristics.
- **Assess the project site** and **make recommendations** in terms of sensitivity.
- **Assess and rate the visual impact** of the proposed project on the receiving environment.

### 1.4 Assumption, Uncertainties and Limitations

For the significance rating it is assumed that all proposed mitigation measures would be implemented correctly and effectively.

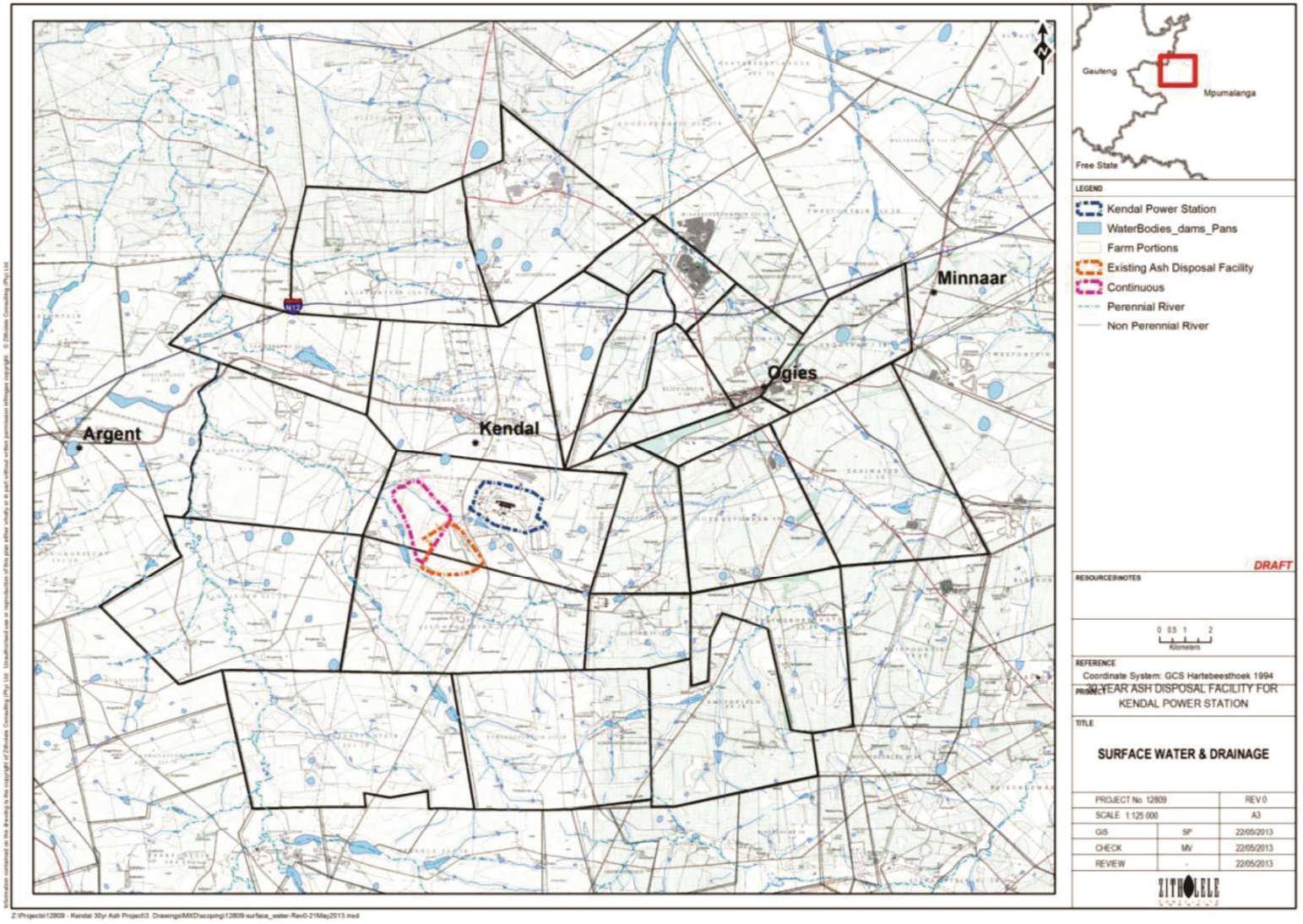


Image by Zitholele

# Figure 1: LOCALITY - Kendal 30 Year Ashing Project

April 2015

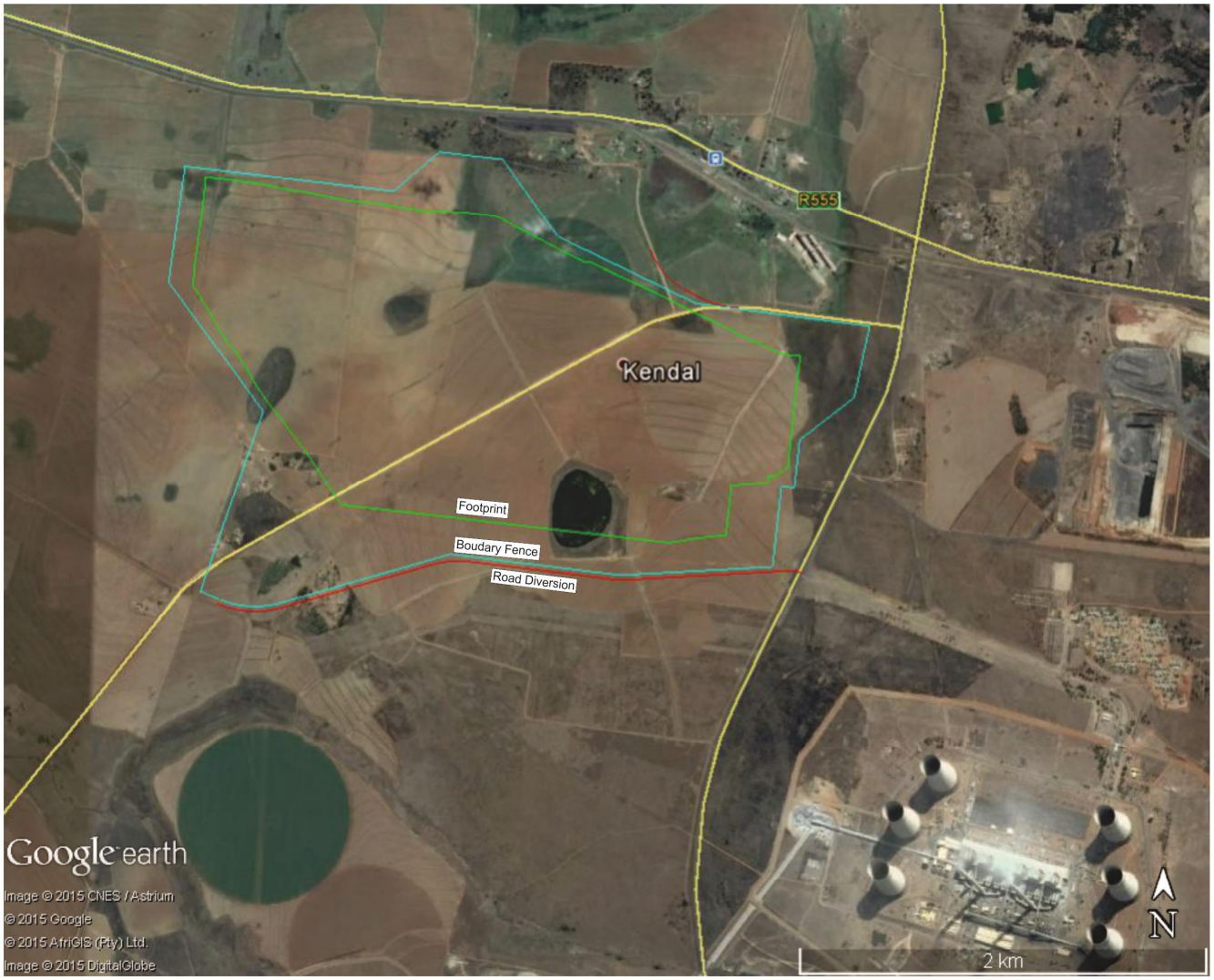


Figure 2: LAYOUT - Kendal 30 Year Ashing Project

April 2015

# 2. LEGAL REQUIREMENTS AND GUIDELINES

## 2.1 National Guidelines

National Environmental Management Act (Act 107 of 1998) EIA Regulations

The specialist report is in accordance to the specification on conducting specialist studies as per Government Gazette (GN) R 543 of the National Environmental Management Act (NEMA) Act 107 of 1998. The mitigation measures as stipulated in the specialist report can be used as part of the Environmental Management Plan (EMP) and will be in support of the Environmental Impact Assessment (EIA).

The NEMA Protected Areas Act (57 of 2003)

The main aim of the Act is to identify and protect natural landscapes.

The National Heritage Resources Act (25 of 1999)

The Act is applicable to the protection of heritage resources and includes the visual resources such as cultural landscapes, nature reserves, proclaimed scenic routes and urban conservation areas.

Western Cape Department of Environmental Affairs & Development Planning: Guideline for Involving Visual and Aesthetic Specialists in EIA Processes Edition 1 (CSIR, 2005)

Although the guidelines were specifically compiled for the Province of the Western Cape it provides guidance that will be appropriate for any EIA process. The Guideline document also seeks to clarify instances when a visual specialist should get involved in the EIA process.

## 2.2 International Guidelines

World Bank's IFC Standards

The World Bank's IFC Standards: Environmental, Health and Safety Guidelines for Mining refers to Visual Impact Assessments by stating that:

*"Mining operations, and in particular surface mining activities, may result in negative visual impacts to resources associated with other landscape uses such as recreation or tourism. Potential contributors to visual impacts include high walls, erosion, discoloured water, haul roads, waste dumps, slurry ponds, abandoned mining equipment and structures, garbage and refuse dumps, open pits, and deforestation. Mining operations should prevent and minimize negative visual impacts through consultation with local communities about potential post-closure land use, incorporating visual impact assessment into the mine reclamation process. Reclaimed lands should, to the extent feasible, conform to the visual aspects of the surrounding landscape. The reclamation design and procedures should take into consideration the proximity to public viewpoints and the visual impact within the context of the viewing distance. Mitigation measures may include strategic placement of screening materials including trees and use of appropriate plant species in the reclamation phase as well as modification in the placement of ancillary facilities and access roads."*

The specialists study is in accordance to the IFC Performance Standards (Performance Standard 1: Social and Environmental Assessment and Management Systems) for the undertaking of Environmental Assessments and contributes to the EIA for the proposed Project.

# 3. APPROACH AND METHODOLOGY

## 3.1 Approach

The assessment of likely effects on a landscape resource and on visual amenity is complex, since it is determined through a combination of quantitative and qualitative evaluations. (The Landscape Institute with the Institute of Environmental Management and Assessment, (2002)). When assessing visual impact the worst-case scenario is taken into account. Landscape and visual assessments are separate, although linked, procedures.

The landscape, its analysis and the assessment of impacts on the landscape all contribute to the baseline for visual impact assessment studies. The assessment of the potential impact on the landscape is carried out as an impact on an environmental resource, i.e. the physical landscape. Visual impacts, on the other hand, are assessed as one of the interrelated effects on people (i.e. the viewers and the impact of an introduced object into a particular view or scene).

### 3.1.1 The Visual Resource

Landscape character, landscape quality (Warnock, S. & Brown, N., 1998) and ñsense of placeò (Lynch, K., 1992) are used to evaluate the visual resource i.e. the receiving environment. A qualitative evaluation of the landscape is essentially a subjective matter. In this study the aesthetic evaluation of the study area is determined by the professional opinion of the author based on site observations and the results of contemporary research in perceptual psychology.

Aesthetic value is the emotional response derived from the experience of the environment with its particular natural and cultural attributes. The response is usually to both visual and non-visual elements and can embrace sound, smell and any other factor having a strong impact on human thoughts, feelings and attitudes (Ramsay, 1993). Thus aesthetic value is more than the combined factors of the seen view, visual quality or scenery. It includes atmosphere, landscape character and sense of place (Schapper, 1993). Refer also to Appendix B for further elaboration.

Studies for perceptual psychology have shown human preference for landscapes with higher visual complexity, for instance scenes with water or topographic interest. On the basis of contemporary research, landscape quality increases where:

- Topographic ruggedness and relative relief increase;
- Water forms are present;
- Diverse patterns of grassland and trees occur;
- Natural landscape increases and man-made landscape decreases;
- Where land use compatibility increases (Crawford, 1994).

Aesthetic appeal (value) is therefore considered high when the following are present (Ramsay, 1993):

- Abstract qualities: such as the presence of vivid, distinguished, uncommon or rare features or abstract attributes;

- Evocative responses: the ability of the landscape to evoke particularly strong responses in community members or visitors;
- Meanings: the existence of a long-standing special meaning to a particular group of people or the ability of the landscape to convey special meanings to viewers in general;
- Landmark quality: a particular feature that stands out and is recognized by the broader community.

And conversely, it would be low where:

- Limited patterns of grasslands and trees occur;
- Natural landscape decreases and man-made landscape increases;
- And where land use compatibility decreases (after Crawford, 1994).

In determining the quality of the visual resource, both the objective and the subjective or aesthetic factors associated with the landscape are considered. Many landscapes can be said to have a strong sense of place, regardless of whether they are considered to be scenically beautiful but where landscape quality, aesthetic value and a strong sense of place coincide - the visual resource or perceived value of the landscape is considered to be very high. The criteria given in Appendix B are used to assess landscape quality, sense of place and ultimately to determine the aesthetic value of the study area.

### 3.1.2 Sensitivity of Visual Resource

The sensitivity of a landscape or visual resource is the degree to which a particular landscape type or area can accommodate change arising from a particular development, without detrimental effects on its character. Its determination is based upon an evaluation of each key element or characteristic of the landscape likely to be affected. The evaluation will reflect such factors such as its quality, value, contribution to landscape character, and the degree to which the particular element or characteristic can be replaced or substituted (Institute of Environmental Assessment & The Landscape Institute, 1996:87).

### 3.1.3 Sense of Place

Central to the concept of sense of place is that the landscape requires uniqueness and distinctiveness. The primary informant of these qualities is the spatial form and character of the natural landscape taken together with the cultural transformations and traditions associated with the historic use and habitation of the area. According to Lynch (1992), sense of place ñis the extent to which a person can recognize or recall a place as being distinct from other places ï as having a vivid, unique, or at least particular, character of its ownò Sense of place is the unique value that is allocated to a specific place or area through the cognitive experience of the user or viewer. In some cases these values allocated to the place are similar for a wide spectrum of users or viewers, giving the place a universally recognized and therefore, strong sense of place.

Because the sense of place of the study area is derived from the emotional, aesthetic and visual response to the environment, it cannot be experienced in isolation. The landscape context must be considered. With this in mind, the combination of the natural landscape (mountains, streams and the vegetation) together with the manmade structures (residential areas, roads, mining activities and power lines) contribute to the sense of place for the study area. It is these land-uses, which define the area and establish its identity.

### 3.1.4 Sensitive Viewer Locations

The sensitivity of visual receptors and views are dependent on the location and context of the viewpoint, the expectations and occupation or activity of the receptor or the importance of the view. This may be determined with respect to its popularity or numbers of people affected, its appearance in guidebooks, on tourist maps, and in the facilities provided for its enjoyment and references to it in literature or art.

The most sensitive receptors may include:

- Users of all outdoor recreational facilities including public rights of way, whose intention or interest may be focused on the landscape;
- Communities where development results in changes in the landscape setting or valued views enjoyed by the community;
- Occupiers of residential properties with views affected by the development.

Other receptors include:

- People engaged in outdoor sport or recreation (other than appreciation of the landscape, as in landscapes of acknowledged importance or value);
- People traveling through or past the affected landscape in cars or other transport modes;
- People at their place of work.

Views from residences and tourist facilities / routes are typically more sensitive, since views from these are considered to be frequent and of long duration.

### 3.1.5 Landscape Impact

The landscape impact of a proposed development is measured as the change to the fabric, character and quality of the landscape caused by the physical presence of the proposed development. Identifying and describing the nature and intensity (severity) of change in the landscape brought about by the proposed new facility is based on the professional opinion of the author supported by photographic simulations. It is imperative to depict the change to the landscape in as realistic a manner as possible (Van Dortmont in Lange, 1994). In order to do this, photographic panoramas were taken from key viewpoints and altered using computer simulation techniques to illustrate the physical nature of the proposed project in its final form within the context of the landscape setting. The resultant change to the landscape is then observable and an assessment of the anticipated visual intrusion can be made.

### 3.1.6 Visual Impact

Visual impacts are a subset of landscape impacts. Visual impacts relate to the changes that arise in the composition of available views as a result of changes to the landscape, to peopleôs responses to the changes, and to the overall effect with respect to visual amenity. Visual impact is therefore measured as the change to the existing visual environment (i.e. views) caused by the intervention and the extent to which that change compromises (negative impact) or enhances (positive impact) or maintains the visual quality of the scene as perceived by people visiting, working or living in the area. This approach reflects the laymanôs concerns, which normally are:

- Will I be able to see the new development?
- What will it look like?
- Will the development affect views in the area and if so how?

Landscape and visual impacts do not necessarily coincide. Landscape impacts can occur with the absence of visual impacts, for instance where a development is wholly screened from available public views, but nonetheless results in a loss of landscape elements and landscape character within a localized area (the site and its immediate surrounds).

### 3.1.7 Severity of Visual Impact

The severity of visual impact is determined using visual intrusion, visibility and visual exposure criteria (Hull, R.B. and Bishop, I.E., 1988), qualified by the sensitivity of viewers (visual receptors) towards the proposed development. The severity of visual impact is therefore concerned with:

- The overall impact on the visual amenity, which can range from degradation through to enhancement;
- The direct impacts of the ash disposal facility upon views of the landscape through intrusion or obstruction;
- The reactions of viewers who may be affected.

For a detailed description of the methodology used in this study, refer to Appendix B, C and D. Image 1 below, graphically illustrates the visual impact process:

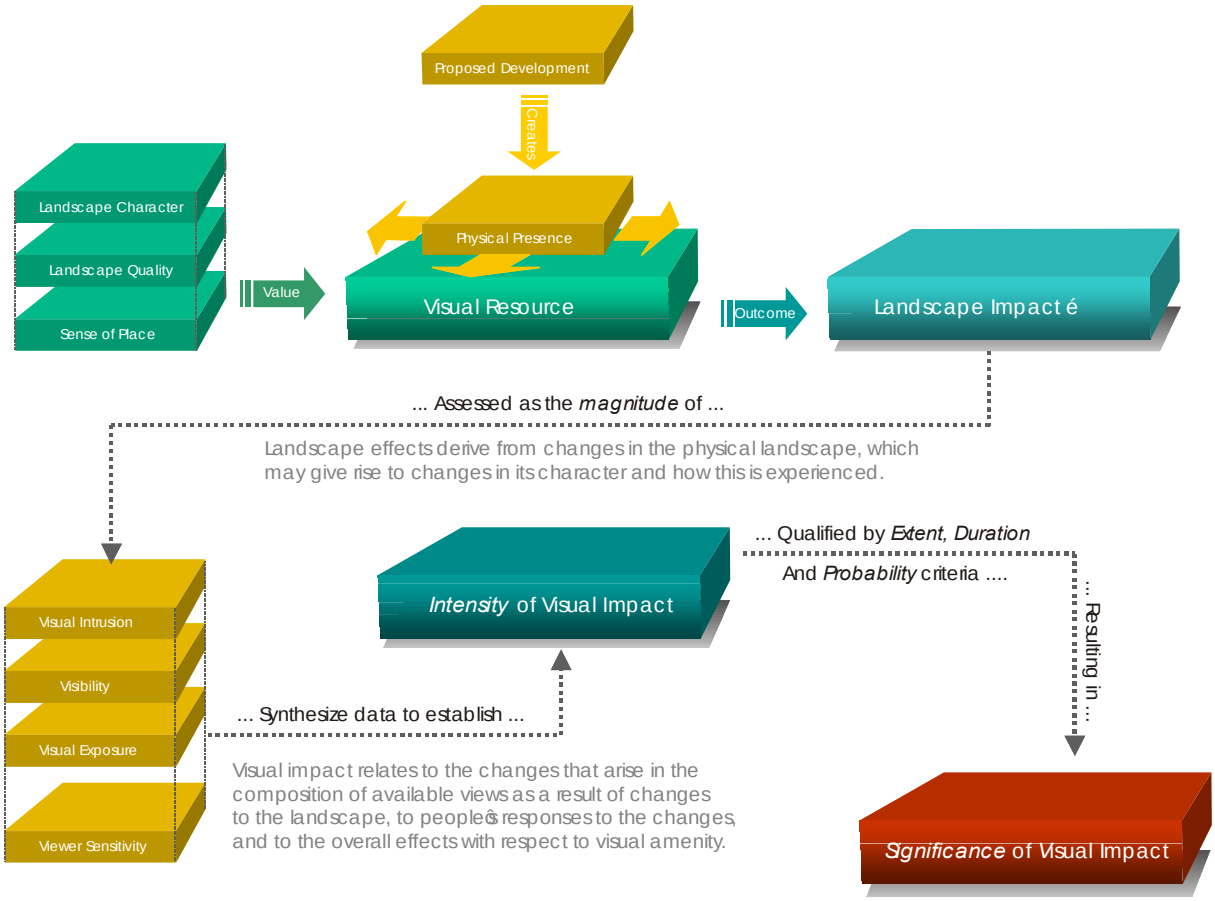


**Image 1: Visual Impact Process**

### 3.1.8 Significance of Visual Impact

A combined quantative and qualitative methodology, as supplied by the Environmental Practitioner, was used to describe the impacts for: significance, spatial scale, temporal scale, probability and degree of certainty. A summary of each of the qualitative descriptions along with the equivalent quantative rating scale is given in Annexure D.

## 3.2 Methodology

The following method was used:

- Site visit: A field survey was undertaken and the study area scrutinized to the extent that the receiving environment could be documented and adequately described;
- Project components: The physical characteristics of the project components were described and illustrated;
- General landscape characterization: The visual resource (i.e. receiving environment) was mapped using field survey and GIS mapping technology. The description of the landscape focused on the nature of the land rather than the response of a viewer (refer to Appendix B);
- The **landscape character** of the study area was described. The description of the landscape focused on the nature and character of the landscape rather than the response of a viewer;
- The **quality of the landscape** was described. Aesthetic appeal was described using recognized contemporary research in perceptual psychology as the basis;
- The **sense of place** of the study area was described as to the uniqueness and distinctiveness of the landscape. The primary informant of these qualities was the spatial form and character of the natural landscape together with the cultural transformations associated with the historic / current use of the land;
- Illustrations, in very basic **simulations**, of the proposed project were overlaid onto panoramas of the landscape, as seen from nearby sensitive viewing points to give the reviewer an idea of the scale and location of the proposed project within their landscape context;
- **Visual intrusion** (contrast) of the proposed project was determined by simulating its physical appearance from sensitive viewing areas;
- The **visibility** of the proposed project was determined;
- The **impact** on the visual environment and sense of place of the proposed project was rated based on a professional opinion and the method described below; and
- Measures that could mitigate the negative impacts of the proposed project were recommended.

## 4. DESCRIPTION OF THE PROJECT

The following associated infrastructure and activities are proposed for this project:

- A fixed conveyor will be constructed from the existing Emergency Dump (E-dump) at the power station and will cross under Road 545 to the other side of the road were a proposed new Emergency dump (E-dump) will be constructed;
- Fixed conveyors will extend from the proposed new E-dump towards the new proposed Ash Disposal Facility (ADF) on to which extendable and then shift-able conveyors will be fixed in order to dispose ash on the footprint of the proposed new ADF;
- Ashing on the proposed new ADF footprint will commence from the eastern side of the footprint towards the western end of the footprint;
- A 1:15 sloped ramp will be constructed on the eastern side of the proposed new ADF and will reach the maximum height of the proposed new ADF, 75 metres;
- The total air space volume required in Site H was calculated to be 176.2 Mm3;
- The proposed new ADF has a footprint area of 404.7 hectares;
- Several power lines will be diverted:
  - 400 kV: 2 No. off
  - 88 kV: 2 No. off
  - 22 kV: 2 No. off
  - 132 kV: 2 No. off
- The proposed new ADF is tapered on the south western corner due to parcels of land that have mining rights attached to them, situated on the western side of the site, and the need to avoid utilising these parcels of land;
- The proposed new ADF will have a ring access road constructed around its perimeter together with stormwater canals intercepting impacted runoff and directing to a pollution control dam;
- The Kusile Bulk Water line **will not** be relocated (for Scenario 1 only);
- The stormwater management system comprises of seven proposed new dams. Five Pollution Control Dams (PCD) and two clean water dams.;
- Road D1390 which runs through the proposed new ADF footprint will need to be diverted. The new diverted alignment of the road is on the southern side of the proposed new ADF and intersects with the access road leading to the Kendal Power Station main entrance;
- The new diverted Road D1390 will have a 40 metre road reserve;
- There will be three (3) access points to the proposed new ADF;
- For both the Maximum and Minimum Continuous Dump Options, a distance of 500 metres has been achieved between the existing silos, on the north eastern side of the proposed new ADF, and the perimeter of the proposed ADF;
- The liner construction will be constructed in stages, as per the disposal requirements. At any given point there will be 1 ï 2 years of available footprint of constructed liner;
- The starter ramp wall for the proposed new ADF will be constructed with bulldozers. The rest of the proposed new ADF will be constructed with the conveyor-stacker system;

The following vehicle, plant and personnel are envisaged to be used during start-up and operations of the facility.

- 6 ï 8 vans;
- 2 x Tractor Loader Backhoe (TLB); (77 - 103 dB per one TLB)
- 1 x 30 ton Excavator; (75 - 93 dB per one Excavator)
- 1 x Articulated Dump Truck (ADT); (100 - 110 dB per one ADT)
- 2 x Bulldozers; (95 - 105 dB per one Bulldozer)
- 2 x Skid Steers; (86 - 95 dB per one Skid Steer)
- 2 x Stacker Systems.

The project will commence with a starter platform for the extendible and shiftable conveyors. This will be built first and on the eastern side of the site. An ash ramp (1:15 average sloped) will then be constructed using parallel shifts (1:10 slope between shifts plus level shiftable conveyor platforms). The ramp will be constructued until it reaches an height of 75 metres, the maximum height of the ADF. The remainder of the ADF will be constructed with the conveyor-stacker system using parallel shifts and ending with radial shifts.

# 5. THE ENVIRONMENTAL SETTING

## 5.1 The Study Area

The study area is located within the Grassland biome according to The Vegetation of South Africa, Lesotho and Swaziland classification by Mucina and Rutherford, 2006. More specifically the study area falls within the Rand Highveld Grassland and Easter Highveld Grassland. The vegetation of these Grassland types is species rich and includes and alternates between sour grassland and low shrub-land on rocky slopes. The most common genera include *Themeda, Eragrostis, Heteropogon* and *Elionurus spp.* Herbs can also be found in high numbers with the dominant genus being *Asteraceae*. As stated above, shrubs and trees prevail in rocky areas with *Protea caffra, Acacia caffra, Celtis africana and Rhus spp.* dominating the vegetation pallet.

The nearest town is that of Ogies, a coal mining town established in 1928 on the farm Ogiesfontein, hence the townôs name ôOgiesô. The town of Ogies is located within the Cultural Heartland of Mpumalanga Province. It is also often referred to as the ñLanatusò country because of the endemic *Encephalartos lanatus* growing wild within the catchment of the Olifants River. Arum lilies transform the country side into a magical garden during summer months. Part of the tourism activities includes agricultural tours to working farms and industrial tours to the collieries and steel manufacturing plants. There is also a Boer War Route through the area hosting plenty of fascinating relics from that time.

## 5.2 Surrounding Land Use

### 5.2.1 Residential

The closest formal residential area is the Kendal settlement approximately 3.5km to the north of the Kendal Power Station. Kendal Agricultural Holdings is located approximately 4km to the north. The town of Ogies is located approximately 11km to the north-east. Phola community is located approximately 11.4km to the north-east. Other forms of residential units include farmsteads, scattered through the whole study area.

### 5.2.2 Agriculture

The larger part of the study area consists of intensive and specialized agricultural activities and include crop production as well as livestock farming. Cultivated lands are used mostly for intensive maize crops. Livestock farming includes cattle grazing, poultry farms for egg production as well as pig farming.

### 5.2.3 Infrastructure and mining

Infrastructure within the study area includes the existing Eskom Kendal Power Station with its associated infrastructure and including the existing Ash Disposal Facility, associated power lines and substations. Mining activities include Phola Coal, approximately 5.5km to the north-east; Vlakfontein Mine, approximately 9km to the north-east; Arbor Coal Mine, approximately 5.5km to the north-west; Stuart and Lakeside Collieries adjacent to the west; Leeuwfontein Steenkool Mine, approximately 3km to the south; as well as the Khutala Colliery, approximately 5km to the south-east. Other infrastructure includes the Kendal ï Kusile as well as Transnet Pipelines and grain silos.

### 5.2.4 Transportation systems

Main roads in the area include the N12, running east-west approximately 8km north of the project site and the R555 also running east-west approximately 5km north of the project site. Various other local tarred and dirt roads traverse the study area. A railway line follows the R555 alongside to the south of the road.

## 5.3 Landscape Character

Landscape character types are landscape units refined from the regional physiographic and cultural data derived from 1:50 000 topographical maps, aerial photographs and information gathered on the site visit. Dominant landform and land use features (e.g., hills, rolling plains, valleys and urban areas) of similar physiographic and visual characteristics, typically define landscape character types. Refer to the views in Figures 4 ï 7, which illustrate the nature and character of the study area. The viewpoint locations are indicated in Figure 3.

The study area has a gently to moderately undulating topography, typical of the Highveld plateau. Some small scattered wetlands and pans occur in the study area. Rocky outcrops and ridges also form part of the significant landscape features of the wider area. The main drainage feature within the study area is the Wilge River which drains northwards. Associated with the Wilge River is several tributaries situated to the west of the project site. Vegetation within the study area is mainly agricultural croplands with clusters of exotic shrubs and trees where the natural grassland has been disturbed.

The visual character of the study site is largely cultivated land or natural grasslands with the Kendal Power Station dominating the scene. The main residential components are the scattered farmsteads, Kendal Agricultural holdings and the town Kendal and Ogies. The farming activities and the residential components combination with the power infrastructure and mining structures and activities create a mixed pastoral / industrial landscape character theme.

Figure 7: Visual Resource, illustrates the spatial distribution of the various landscape character types and the section below will rate the relative value of these types.

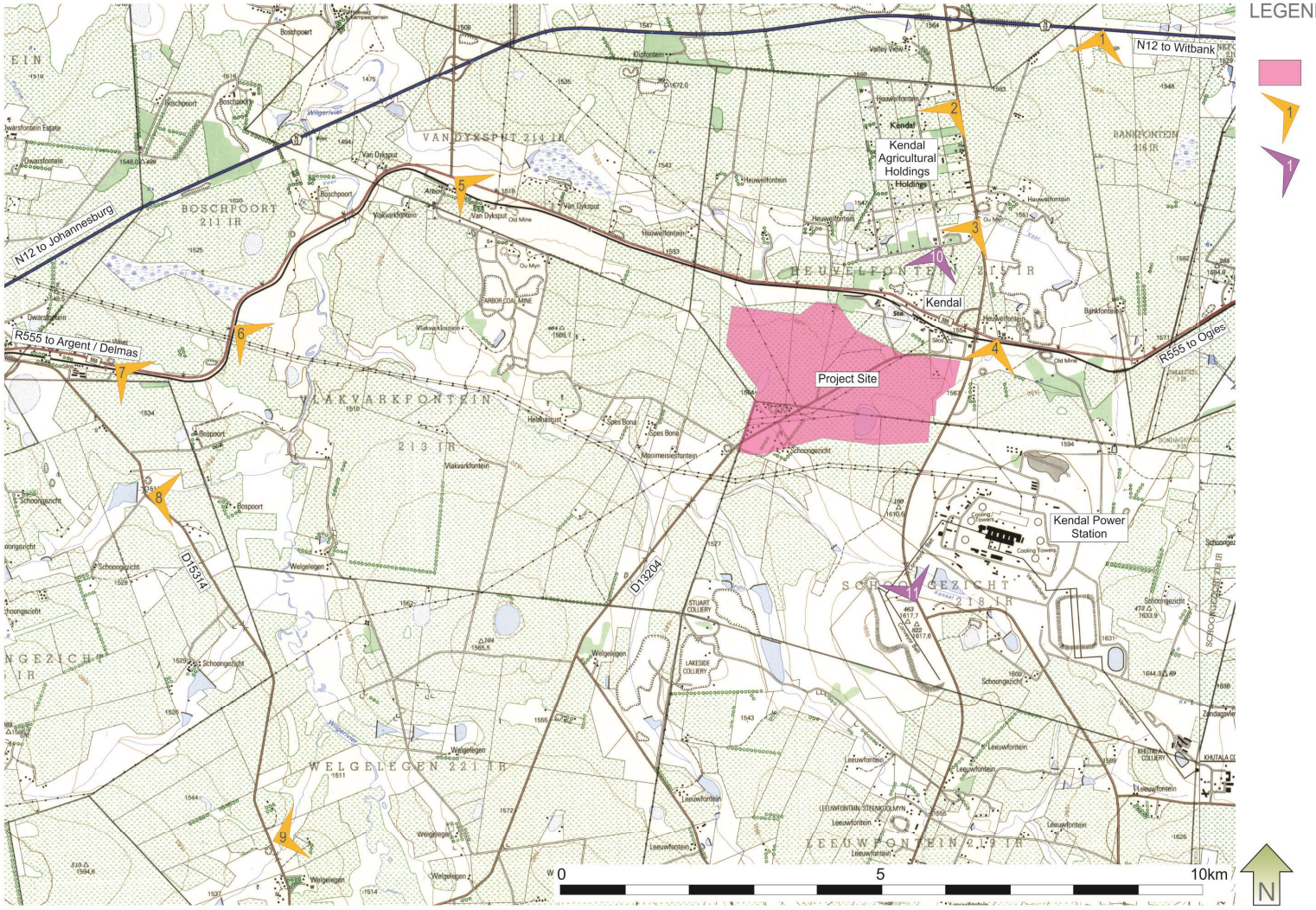


Figure 3: VIEWS - Kendal 30 Year Ashing Project

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View 1: along the N12, looking south across site F. Note the power station in the background and exiting mining activities to the right.

View 2: adjacent to Kendal Agricultural Holdings (KAH) from left to right: existing mining activities, Kendal power station, KAH. Site F to the left. Site B behind KAH

View 3: from left to right: existing minig activities on site F to the left, Kendal Power Station, Kendal silo's and community with some crop production in the foreground

Refer to Figure 3 for location of viewpoints

# Figure 4: LANDSCAPE CHARACTER - Kendal 30 Year Ashing Project

April 2015

View 4: along the R555, looking south across site H. Note existing mining activities on the far right, Kendal Power Station in the center, typical grassland vegetation in the fore- and middle ground, railway in the foreground, Kendal silo's to the far right, and power lines in the background


View 5: along R555, looking south-east towards site B. Note railway line and existing mining activities

View 6: along the R555, looking south-east. Site B located to the left of the power line and Site C to the right of the power line

Refer to Figure 3 for location of viewpoints

# Figure 5: LANDSCAPE CHARACTER - Kendal 30 Year Ashing Project

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View 7: along the R555 adjacent to Argent Railway Station, looking south-east. Note crop production, mining activities, Kendal Power Station and railway line

View 8: along D15314, looking east across site C. Note crop production and existing mining activities

View 9: along D15314, looking east towards site C. Note crop production, farmsteads, Kendal power station and existing mining activities

Refer to Figure 3 for location of viewpoints

# Figure 6: LANDSCAPE CHARACTER - Kendal 30 Year Ashing Project

April 2015

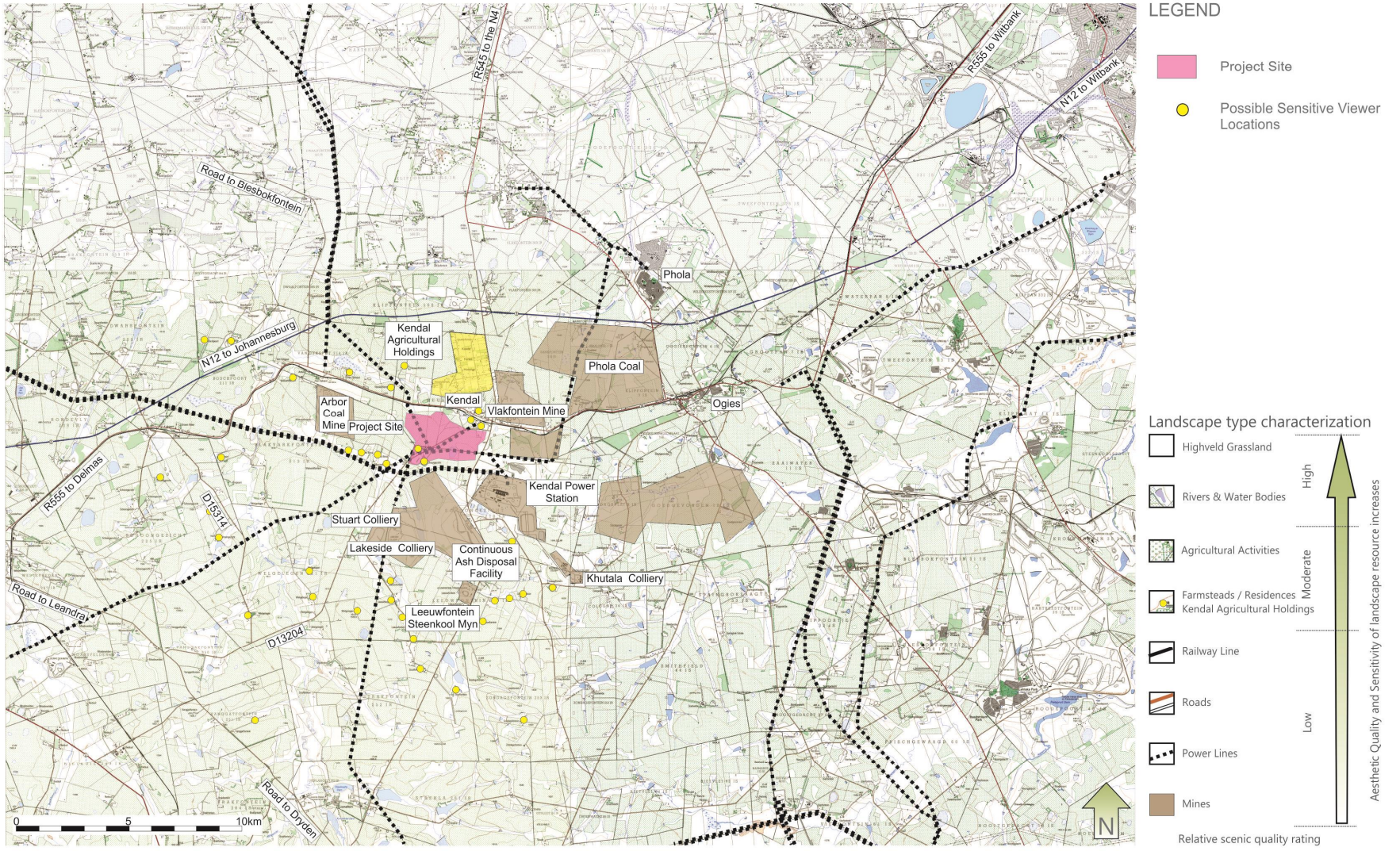



Figure 7: VISUAL RESOURCE - Kendal 30 Year Ashing Project

April 2015

# 6. VISUAL RESOURCE

## 6.1 Visual Resource Value / Scenic Quality

The spatial distribution of the landscape types discussed in 5.3 is illustrated in Figure 7: Visual Resource. The figure also rates the relative scenic quality of each type and its landscape sensitivity.

Scenic quality ratings (using the scenic quality rating criteria described in Appendix C) were assigned to each of the landscape types defined in Figure 7: Visual Resource. The *highest* value is assigned to the water bodies and water courses (small scattered wetlands and pans) as well as the grassland vegetation. The agricultural activities and agricultural holdings were rated as *moderate*. The landscape types with the *lowest* scenic quality were infrastructure which included the roads, railway lines, power lines, towns and built up areas as well as the power and mining infrastructure. These ratings result in the overall study area to be regarded as having a ***moderate*** visual resource value. Resultantly the study area is regarded to be moderately sensitive to change to the landscape. A summary of the visual resource values is tabulated in Table 1 below.

**Table 1: Value of the Visual Resource**
(After The Landscape Institute with the Institute of Environmental Management and Assessment (2002))

| **High**<br>wetlands, water courses & water bodies, grassland | **Moderate**<br>agricultural fields, Kendal Agricultural Holdings | **Low**<br>transportation infrastructure, power infrastructure, towns, mining activities |
|---|---|---|
| This landscape type is considered to have a *high* value because it is a:<br>Distinct landscape that exhibits a very positive character with valued features that combine to give the experience of unity, richness and harmony. It is a landscape that may be considered to be of particular importance to conserve and which has a strong sense of place.<br>Sensitivity:<br>It is sensitive to change in general and will be detrimentally affected if change is inappropriately dealt with. | This landscape type is considered to have a *moderate* value because it is a:<br>**Common landscape that exhibits some positive character but which has evidence of alteration / degradation / erosion of features resulting in areas of more mixed character.**<br><br>Sensitivity:<br>**It is potentially sensitive to change in general and change may be detrimental if inappropriately dealt with** | This landscape type is considered to have a *low* value because it is a:<br>Minimal landscape generally negative in character with few, if any, valued features. |

Sections highlighted in bold are applicable to the study area.

## 6.2 Sense of Place

The sense of place for the proposed study area derives from the combination of all landscape types and their impact on the senses. The natural environment with the grassland vegetation as well as agricultural fields and activities gives the area a pastoral sense of place. The scene is however dominated by the Kendal Power Station. Mining activities further contributes to the negative elements degrading the pastoral sense of place. The combination of the natural vegetation, agricultural elements and infrastructural elements gives the study area a mixed pastoral / industrial sense of place.

# 7. VISUAL RECEPTORS

## 7.1 Views

Typical views will be from the local roads, R555 and N12. These views are however temporary and regarded as ópublicô Views from farmsteads within the study area are permanent and regarded as óprivateô

### 7.1.1 Sensitive Viewers and Locations

Sensitive viewer locations would be those from the farmsteads and residences within the study area. Farmstead and residences were identified through a desktop study and site visits (4 April 2013 and 29 March 2015) are indicated on Figure 3 óVisual Resourceô Views from visitors to or travellers through the study area would also be regarded as sensitive, although only *moderately* sensitive.

**Table 2: Potential Sensitivity of Visual Receptors – the Project**

| **High**<br>Farmsteads and residences | **Moderate**<br>visitors to & travelers through the study area | **Low**<br>visitors & people working in mining and power supply industry |
|---|---|---|
| Visitors of Game Farms / Lodges and travelling along local routes, whose intention or interest may be focused on the landscape;<br><br>Communities where the development results in changes in the landscape setting or valued views enjoyed by the community;<br><br>**Occupiers of residential properties with views affected by the development.** | People engaged in outdoor sport or recreation (other than appreciation of the landscape, as in landscapes of acknowledged importance or value);<br><br>**People travelling through or past the affected landscape in cars, on trains or other transport routes.** | **Visitors and people working in mining / prospecting activities and travelling along local mining roads** whose attention may be focused on their work or activity and who therefore may be potentially less susceptible to changes in the view. |

Highlighted sections are applicable to the study area.

# 8. LANDSCAPE and VISUAL IMPACT

## 8.1 Landscape Impact

The *landscape impact* (i.e. the change to the fabric and character of the landscape caused by the physical presence of a development) of the proposed project will be ***high*** as the physical impact of the operation and closure of the mining activities will disturb a great percentage of the proposed project site. The main disturbance would be during the operational phase of the project.

However, as stated in the approach, the physical change to the landscape should be understood in visibility and aesthetic terms within the context of the study area. The following sections discuss the effect that the proposed project activities will have on the visual and aesthetic environment.

## 8.2 Severity of Visual Impact

The severity of visual impact is determined using visibility, visual intrusion, visual exposure and viewer sensitivity criteria. When the severity of impact is qualified with spatial, duration and probability criteria the significance of the impact can be predicted (refer to Appendix B).

### 8.2.1 Visual Intrusion

Visual intrusion deals with the notion of contextualism i.e. how well does a project component fit into the cultural aesthetic of the landscape as a whole? As discussed in Section 5.3, the study area is characterised by a moderately undulating topography with some small scattered wetlands and pans. Vegetation within the study area is mainly agricultural croplands with clusters of exotic shrubs and trees where the natural grassland has been disturbed. The residential component include farmsteads, the Kendal Agricultural Holdings, the towns of Kendal, Ogies and Phola. The industrial component include the Kendal Power Station with associated power lines and substations, transport infrastructure such as the roads and railways as well as the mining structures and activities.

The Project entails existing new ash dump facility with its associated infrastructure, the proposed project components are similar to those of the existing ash disposal facility. Thus the project would be in context with the surrounding land used and other land uses within the study area even though a large portion of the study area consists of agricultural activities.

During the site investigation it was evident that the existing ash dump is already being rehabilitated. Should the continuous ash dump not be mitigated the visual intrusion would be much worse as the contrast between the two projects would be clear and prominent.

The visual intrusion of the Project after sunset would form an extension of the existing activities and thus add cumulatively to the existing scenario.

Table 3 rates and summarises visual intrusion of the project components when the *worst case scenario (no mitigation)* is taken into account.

**Table 3: Visual Intrusion**

| **High** (if not rehabilitated successfully) | **Moderate** if rehabilitated successfully | **Low**<br>• operational and closure phases;<br>• after sunset | **Positive** |
|---|---|---|---|
| Because the proposed project:<br>- Has a substantial negative effect on the visual quality of the landscape; | Because the proposed project:<br>- Has a moderate negative effect on the visual quality of the landscape; | Because the proposed project: | The proposed project:<br>- Has a beneficial effect on the visual quality of the landscape; |
| - Contrasts dramatically with the patterns or elements that define the structure of the immediate landscape; | - Contrasts with the patterns or elements that define the structure of the landscape; | - **Contrasts minimally with the patterns or elements that define the structure of the landscape;** | - Enhances the patterns or elements that define the structure of the landscape; |
| - Contrasts with land use, settlement or enclosure patterns of the immediate environment; | - Is partially compatible with land use (utilities) patterns of the general area; | - **is mostly compatible with land use, (utility) patterns;** | - Is compatible with land use, settlement or enclosure patterns. |
| - Cannot be ôabsorbedô into the landscape from key viewing areas. | **- Is partially 'absorbed' into the landscape from key viewing areas.** | - is ôabsorbedôinto the landscape from key viewing areas. | |
| *Result*:<br>Notable change in landscape characteristics over an extensive area and/or intensive change over a localized area resulting in major changes to key views | *Result:*<br>Moderate change in landscape characteristics over localized area, resulting in a moderate change to key views | *Result*<br>Moderate change in landscape characteristics over localized area resulting in a minor change to a few key views. | *Result*<br>Positive change in key views. |

Sections that are placed in bold are applicable to the proposed Project.

In the light of the findings in Table 3 and the discussion above, the visual intrusion of the proposed Project will be ***moderate*** to ***low*** since the Project is mostly compatible with land use, (utility) patterns and would contrast minimally with the patterns or elements that define the structure of the landscape. The Project would however result in a moderatee change in landscape characteristics over an extensive area resulting in a moderate changes to key views. Due to the volume (mass and height) as well as the location of the Ashing Facility near a crest in the topography, it will only be partially absorbed into the landscape.

### 8.2.2 Visibility and Visual Exposure

In determining the visibility of the project the ôzone of potential influenceôwas established and is regarded to be 15km. Over 15km the impact of the proposed activities would have diminished due to the diminishing

effect of distance (the project recedes into the background) and atmospheric conditions (haze) on visibility. Also, at this distance the features would appear in the background of a view and thus begin to be áabsorbedô into the landscape setting.

Visual exposure of the project is determined by the proximity of the viewer to the proposed new project component. Refer to Figure 8 and Table 4 below. The impact of an object in the foreground (0 ï 1.5km) is greater than the impact of that same object in the middle ground (1.5km ï 5.0km) which, in turn is greater than the impact of the object in the background (greater than 5.0km) of a particular scene. Therefore the visibility and visual exposure for viewers within 1.5km of the proposed project will be high, for viewers between 1.5km and 5.0km it will be moderate and beyond 5.0km it will be low.

**Table 4: Visibility of the proposed Project**

| High | Moderate | Low |
|---|---|---|
| ***Visual Receptors*** | *Visual Receptors* | *Visual Receptors* |
| **If the project is visible from over half the zone of potential influence, and/or views are mostly unobstructed and / or the majority of viewers are affected.** | If the project is visible from less than half the zone of potential influence, and / or views are partially obstructed and or many viewers are affected | If the project is visible from less than a quarter of the zone of potential influence, and / or views are mostly obstructed and or few viewers are affected. |

Sections that are placed in bold are applicable to the proposed Project.

#### 8.2.2.1 Day Time

The proposed Project will be visible from over than half the Zone of Potential Influence. In the *high exposure* zone views would be screened by existing vegetation and buildings / built structures (the viewshed analysis only take topography into account and not vegetation and structures). In the middle to outer ranges of the *moderate exposure* zone, topography starts to screen views of the Ashing Facility. In the *low exposure* zone, the topography screens views of the facility for over half the area. The settlement of Kendal as well as a small section of the Kendal Agricultural Holdings, in the northeast, as well as a couple of farmsteads in the north and southwest fall within the *high exposure* zone. The remainder of the Kendal Agricultural Small Holdings as well as a couple of farmsteads in the north and southwest fall within the *moderate exposure* zone. Some more farmsteads as well as sections of the towns of Phola and Ogies fall within the *low exposure* zone. Table 4 below, summarizes the visual exposure of the Project.

During closure and rehabilitation the Project will remain visible as the ash dump will remain on site. The negative impact can however be reduced by implementing mitigating measures as described in Section 9 below.

#### 8.2.2.2 Night Time

The proposed Project will add cumulatively to the effect of the existing lights at night.

Visual exposure is summarized in Table 5.

**Table 5: Visual Exposure of the proposed Project**

| | High Exposure (significant contribution to visual impact) | Moderate Exposure (moderate contribution to visual impact) | Low Exposure (minimal influence on visual impact) | Insignificant Exposure (negligible influence on visual impact) |
|---|---|---|---|---|
| Farmsteads | **0 – 1.5 km** | **1.5 – 5.0 km** | **5.0 – 10.0 km** | **Over 10.0 km** |
| Kendal Agricultural Small Holdings | **0 – 1.5 km** | **1.5 – 5.0 km** | 5.0 ï 10.0 km | Over 10.0 km |
| Towns ï Phola & Ogies | 0 ï 1.5 km | 1.5 ï 5.0 km | **5.0 – 10.0 km** | Over 10.0 km |

Sections that are placed in bold are applicable to the proposed Project.

### 8.2.3 Sensitivity of Visual Receptors

When visual intrusion, visibility and visual exposure are incorporated, and qualified by sensitivity (visual receptors) criteria the intensity of the visual impact of the proposed project can be determined.

With reference to Table 6 below, residents within and visitors to the study area have a *high sensitivity*. Travellers passing through the study area have a *moderate sensitivity*. People at their place of work or whom are engaged in similar activities have a *low sensitivity*.

**Table 6: Sensitivity of Receptors for the proposed Project**

| High (residents) | Moderate residents | Low (travelers) workers |
|---|---|---|
| Users of all outdoor recreational facilities including public rights of way (tourist routes), whose intention or interest may be focused on the landscape;<br><br>Communities where the development results in changes in the landscape setting or valued views enjoyed by the community;<br><br>**Occupiers of residential properties with views affected by the development**. | People engaged in outdoor sport or recreation (other than appreciation of the landscape, as in landscapes of acknowledged importance or value);<br><br>**People travelling through or past the affected landscape in cars, on trains or other transport routes.** | The least sensitive receptors are likely to **be people at their place of work, or engaged in similar activities,** whose attention may be focused on their work or activity and who therefore may be potentially less susceptible to changes in the view (i.e. office and industrial areas).<br><br>**Roads going through urban and industrial areas.** |

Sections that are placed in bold are applicable to the proposed Project.

However, it should be remembered that all viewers will already be exposed to views of the existing ashing facility as well as other mining activities. Therefore their sensitivity rating would drop one category lower as indicated on the Table. I.e. residents and visitors will therefore have a *moderate* rating and travellers a *low* rating.

### 8.2.4 Severity of Visual Impact

In qualifying the criteria used to establish the severity of visual impact, a numerical or weighting system is

avoided. Attempting to attach a precise numerical value to qualitative resources is rarely successful, and should not be used as a substitute for reasoned professional judgement (Institute of Environmental Assessment & The Landscape Institute, 1996). These results are based on *worst-case scenarios* when the impact of all aspects is taken together and when viewed from the various sensitive viewing points as indicated in Table 7 below.

According to the results tabulated in Table 7 below the *severity* of visual impact will be ***moderate*** to ***low*** as the Project would introduce elements that are not uncharacteristic when set within the attributes of the receiving landscape and would result in a partial alteration to the key features of the receiving landscape. The Project would in most instances be viewed against a backdrop including the existing ash dump as well as the Kendal Power Station and other mining activities.

**Table 7: Severity of Impact of the proposed Project**

| High | Moderate | Low | Negligible |
|---|---|---|---|
| Total loss of or major alteration to key elements / features / characteristics of the baseline. | **Partial loss of or alteration to key elements / features / characteristics of the baseline**. | Minor loss of or alteration to key elements / features / characteristics of the baseline. | Very minor loss or alteration to key elements/features/characteristics of the baseline. |
| i.e. Pre-development landscape or view and / or introduction of elements considered to be totally uncharacteristic when set within the attributes of the receiving landscape. | i.e. Pre-development landscape or view and / or introduction of elements that may be prominent but may not necessarily be considered to be substantially uncharacteristic when set within the attributes of the receiving landscape. | i.e. **Pre-development landscape or view and / or introduction of elements that may not be uncharacteristic when set within the attributes of the receiving landscape.** | i.e. Pre-development landscape or view and / or introduction of elements that is not uncharacteristic with the surrounding landscape ï approximating the ómo changeôsituation. |
| High scenic quality impacts would result. | **Moderate scenic quality impacts would result** | **Low scenic quality impacts would result.** | Negligible scenic quality impacts would result. |

## 9. MITIGATING MEASURES

In considering mitigating measures there are three rules that were considered - the measures should be feasible (economically), effective (how long will it take to implement and what provision is made for management / maintenance) and acceptable (within the framework of the existing landscape and land use policies for the area). To address these, the following principles have been considered:

- Mitigation measures should be designed to suit the existing landscape character and needs of the locality. They should respect and build upon landscape distinctiveness.
- It should be recognized that many mitigation measures, especially the establishment of planted screens and rehabilitation, are not immediately effective.

The following mitigation measures are suggested.

### 9.1 Project Area Development

- It is proposed that as little vegetation as possible be removed during the construction phase.
- Ensure, wherever possible, all existing natural vegetation is retained and incorporated into the project site rehabilitation.

### 9.2 Earthworks

- Dust suppression techniques should be in place at all times during the construction, operational, the decommissioning and closure phases.
- Only the footprint and a small óconstruction buffer zoneôaround the proposed Project should be exposed. In all other areas, the natural vegetation should be retained.

### 9.3 Landscaping

- If at all possible the ash dump should be shaped in such a way that it blends with the contours of the surrounding landscape.
- The side slopes should be designed in such a way that they are articulated to form natural shaded areas.
- A registered Professional Landscape Architect could assist with the final design of the ash dump.
- A registered Professional Landscape Architect could be appointed to assist with the rehabilitation plan for the ash dump.
- Rehabilitate / restore exposed areas as soon as possible after construction activities are complete.
- Only indigenous vegetation should be used for rehabilitation / landscaping purposes.

### 9.4 Access and Haul Roads

During construction, operation, rehabilitation and closure of the Project, access and haul roads will require an effective dust suppression management programme, such as the use of non-polluting chemicals that will retain moisture in the road surface.

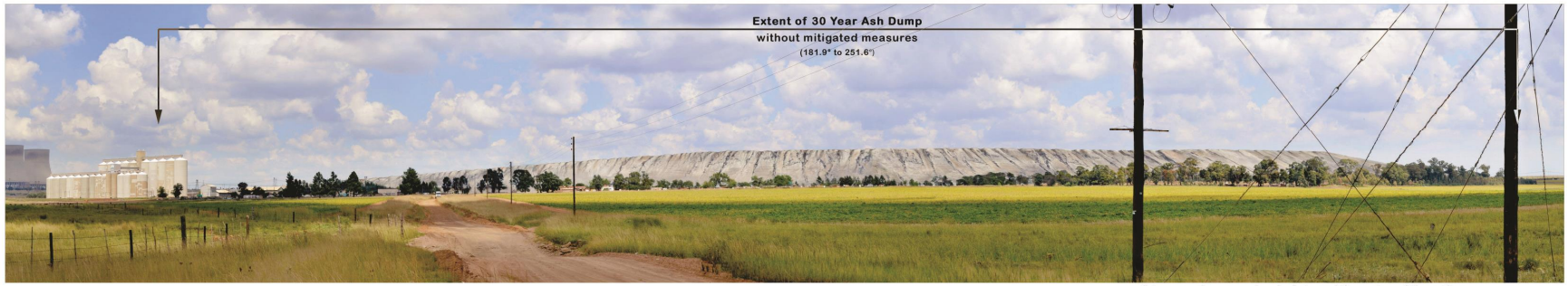
### 9.5 Lighting

Even though the area is already scattered with lights at night, light pollution should still be seriously and carefully considered and kept to a minimum. Security lighting should only be used where absolutely necessary and carefully directed.

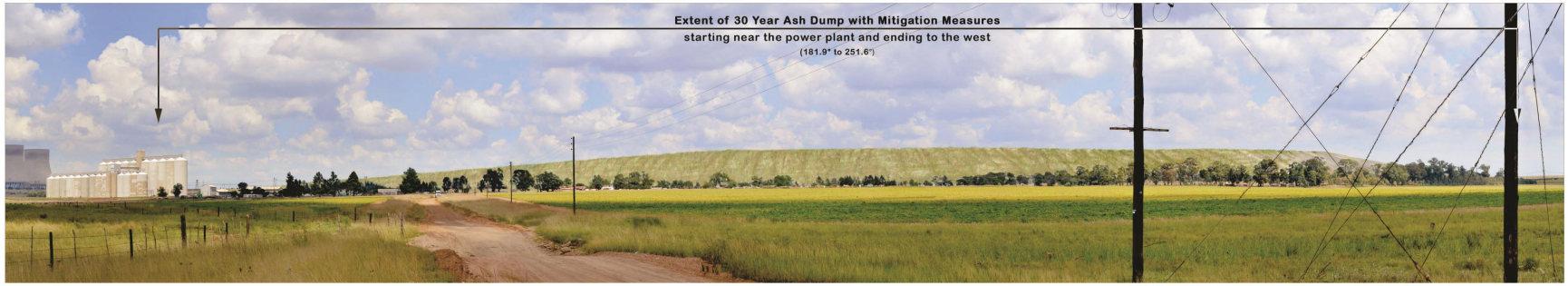
The negative impact of night lighting, glare and spotlight effects, can be mitigated using the following methods:

- Install light fixtures that provide precisely directed illumination to reduce light ñspillageò beyond the immediate surrounds of the substation.
- Light public movement areas (pathways and roads) with low level ôbollardô type lights and avoid post top lighting
- Avoid high pole top security lighting along the periphery of the substation site and use only lights that are activated on movement at illegal entry to the site.
- Use security lighting at the periphery of the site that is activated by movement and are not permanently switched on.

View 10: looking south, just south of Kendal Agricultural Small Holdings




At maximum height, without mitigation measures




With effectively implemented mitigation measures

Figure 9: SIMULATION (View 10) - Kendal 30 Year Ashing Project

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View 11: looking north, at the entrance to the existing Ashing Facility


At maximum height, without mitigation measures


With effectively implemented mitigation measures

Figure 10: SIMULATION (View 11) - Kendal 30 Year Ashing Project

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A combined quantitative and qualitative methodology, as supplied by the Environmental Practitioner, was used to describe the impacts for: significance, spatial scale, temporal scale, probability and degree of certainty. A summary of each of the qualitative descriptions along with the equivalent quantitative rating scale is given in Annexure C. Tables 8.1 to 10.2 below rates the Impact Risks for the Construction, Operational and Decommissioning phases of the proposed ADF.

**Table 8.1: Impact Risk for the Construction Phase of the Proposed Kendal 30 Year ADF Project**

| Impact Risk | Significance | Spatial Scale | Temporal Scale | Probability | Degree of Certainty | Rating |
|---|---|---|---|---|---|---|
| Visual Impact | MODERATE | *Local* | Short-term | *Very Likely* | **Probable** | Moderate Class 3 |
| | 3 | *3* | 2 | *4* | | 2.13 |

Construction phase will consist of installing the liner for the first section of the operations. The Impact Risk had been calculated as a Class 3, Moderate Impact.

**Table 8.2: Cumulative Impact for the Construction Phase of the Proposed Kendal 30 Year ADF Project**

| Impact | Significance | Spatial Scale | Temporal Scale | Probability | Degree of Certainty | Rating |
|---|---|---|---|---|---|---|
| Initial / Existing Impact | MODERATE | *Regional / Provincial* | Long term | *Very Likely* | **Probable** | Moderate Class 3 |
| | 3 | *4* | 4 | *4* | | 2.93 |
| Additional Impact | LOW | *Local* | Short-term | *Very Likely* | **Probable** | Low Class 2 |
| Cumulative Impact | 2 | *3* | 2 | *4* | | 1.867 |
| Residual Impact after mitigation | MODERATE | *Regional / Provincial* | Long term | *Very Likely* | **Probable** | Moderate Class 3 |
| | 3 | *4* | 4 | *4* | | 2.93 |

Cumulative impacts would result from the implementation of the proposed. The Initial impact has been rated as Moderate, the Additional impact as Low and the Residual impact as Moderate.

**Table 9.1: Impact Risk for the Operational Phase of the Proposed Kendal 30 Year Ashing Project**

| Impact Risk | Significance | Spatial Scale | Temporal Scale | Probability | Degree of Certainty | Rating |
|---|---|---|---|---|---|---|
| Visual Impact | MODERATE | *Regional / Provincial* | Long term | *Very Likely* | **Probable** | Moderate Class 3 |
| | 3 | *4* | 4 | *4* | | 2.93 |

The Operational phase will consist of installing liner progressively as required and dumping ash to the in consecutive sections until a maximum height for the section is achieved. This process will continue until full capacity of the ADF had been reached. Continuous rehabilitation of the ADF will take place. The Impact Risk had been calculated as a Class 3, Moderate Impact.

**Table 9.2: Cumulative Impact for the Operational Phase of the Proposed Kendal 30 Year Ashing Project**

| Impact | Significance | Spatial Scale | Temporal Scale | Probability | Degree of Certainty | Rating |
|---|---|---|---|---|---|---|
| Initial / Existing Impact | MODERATE | *Regional / Provincial* | Long term | *Very Likely* | **Probable** | Moderate Class 3 |
| | 3 | *4* | 4 | *4* | | 2.93 |
| Additional Impact | MODERATE | *Regional / Provincial* | Long term | *Very Likely* | **Probable** | Moderate Class 3 |
| Cumulative Impact | 3 | *4* | 4 | *4* | | 2.93 |
| Residual Impact after mitigation | MODERATE | *Regional / Provincial* | Long term | *Very Likely* | **Probable** | Moderate Class 3 |
| | 3 | *4* | 4 | *4* | | 2.93 |

Cumulative impacts would result from the implementation of the proposed ADF. The Initial, Additional and Residual impacts had been rated as a Class 3 i.e. Moderate impact.

**Table 10.1: Impact Risk for the Closure Phase of the Proposed Kendal 30 Year Ashing Project**

| Impact Risk | Significance | Spatial Scale | Temporal Scale | Probability | Degree of Certainty | Rating |
|---|---|---|---|---|---|---|
| Visual Impact | LOW | *Local* | Permanent | *Very Likely* | **Probable** | Moderate Class 3 |
| | 2 | *3* | 5 | *4* | | 2.67 |

During closure the final exposed ash area will be capped / rehabilitated and the stackers and all other infrastructural equipment be removed. Even though rehabilitated, the ADF structure would remain. With the successful implementation of mitigation measures, the structure will soon after closure blend in with the natural environment.

**Table 10.2: Cumulative Impact for the Closure Phase of the Proposed Kendal 30 Year Ashing Project**

| Impact | Significance | Spatial Scale | Temporal Scale | Probability | Degree of Certainty | Rating |
|---|---|---|---|---|---|---|
| Initial / Existing Impact | MODERATE | *Regional / Provincial* | Long term | *Very Likely* | **Probable** | Moderate Class 3 |
| | 3 | *4* | 4 | *4* | | 2.93 |
| Additional Impact | LOW | *Local* | Permanent | *Very Likely* | **Probable** | Moderate Class 3 |
| Cumulative Impact | 2 | *3* | 5 | *4* | | 2.67 |
| Residual Impact after mitigation | LOW | *Local* | Permanent | *Very Likely* | **Probable** | Moderate Class 3 |
| | 2 | *3* | 5 | *4* | | 2.67 |

Cumulative impacts would result from the closure phase would be minimal as it would entail the removal of the stackers and the rehabilitation (capping and vegetation) of the remaining exposed ash areas. The Initial impact had been rated as Moderate and both the Additional and Residual impacts as Low.

## 11. CONCLUSION

The study area has a gently to moderately undulating topography draped mainly with agricultural croplands with clusters of exotic shrubs and trees where the natural grassland has been disturbed. The study area has a mixed industrial ï pastoral sense of place. The visual character of the study area is largely cultivated land or natural grasslands disturbed by mining activities as well as the Kendal Power Station with its associated infrastructure dominating the scene. Sensitive viewer locations would be those from the farmsteads and residences within the study area.

The Project will introduce elements that are not uncharacteristic when set within the attributes of the receiving landscape and would therefore result in a partial alteration to the key features of the receiving landscape. However, the Project would in most instances be viewed against a backdrop including the existing ash dump as well as the Kendal Power Station and other mining activities.

Mitigation is possible and can easily be implemented effectively.

Construction phase will consist of installing the liner for the first section of the operations. The Initial Impact Risk had been calculated as a Class 3, Moderate Impact. The Additional impact as Low and the Residual impact as Moderate for this phase. The Operational phase will consist of installing liner progressively as required and dumping ash to the in consecutive sections until a maximum height for the section is achieved. This process will continue until full capacity of the ADF had been reached. Continuous rehabilitation of the ADF will take place. The Impact Risk had been calculated as a Class 3, Moderate Impact. Cumulative impacts would result from the implementation of the proposed ADF. The Initial, Additional and Residual impacts had been rated as a Class 3 i.e. Moderate impact for the Operational phase. During closure the final exposed ash area will be capped / rehabilitated and the stackers and all other infrastructural equipment be removed. Even though rehabilitated, the ADF structure would remain. With the successful implementation of mitigation measures, the structure will soon after closure blend in with the natural environment. Cumulative impacts would result from the closure phase would be minimal as it would entail the removal of the stackers and the rehabilitation (capping and vegetation) of the remaining exposed ash areas. For the Closure Phase, the Initial impact had been rated as Moderate and both the Additional and Residual impacts as Low.

***NLA***

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In order to reach an understanding of the effect of development on a landscape resource, it is necessary to consider the different aspects of the landscape as follows:

**Landscape Elements and Character**

The individual elements that make up the landscape, including prominent or eye-catching features such as hills, valleys, savannah, trees, water bodies, buildings and roads are generally quantifiable and can be easily described.

Landscape character is therefore the description of pattern, resulting from particular combinations of natural (physical and biological) and cultural (land use) factors and how people perceive these. The visual dimension of the landscape is a reflection of the way in which these factors create repetitive groupings and interact to create areas that have a specific visual identity. The process of landscape character assessment can increase appreciation of what makes the landscape distinctive and what is important about an area. The description of landscape character thus focuses on the nature of the land, rather than the response of a viewer.

**Landscape Value – all encompassing (Aesthetic Value)**

Aesthetic value is the emotional response derived from the experience of the environment with its particular natural and cultural attributes. The response can be either to visual or non-visual elements and can embrace sound, smell and any other factor having a strong impact on human thoughts, feelings and attitudes (Ramsay 1993). Thus aesthetic value encompasses more than the seen view, visual quality or scenery, and includes atmosphere, landscape character and sense of place (Schapper 1993).

Aesthetic appeal (value) is considered high when the following are present (Ramsay 1993):

- *Abstract qualities*: such as the presence of vivid, distinguished, uncommon or rare features or abstract attributes;
- *Evocative responses*: the ability of the landscape to evoke particularly strong responses in community members or visitors;
- *Meanings*: the existence of a long-standing special meaning to a particular group of people or the ability of the landscape to convey special meanings to viewers in general;
- *Landmark quality*: a particular feature that stands out and is recognised by the broader community.

**Sense of Place**

Central to the concept of a sense of place is that the place requires uniqueness and distinctiveness. The primary informant of these qualities is the spatial form and character of the natural landscape together with the cultural transformations and traditions associated with historic use and habitation. According to Lynch (1992) sense of place "is the extent to which a person can recognize or recall a place as being distinct from other places - as having a vivid, or unique, or at least particular, character of its own". Sense of place is the unique value that is allocated to a specific place or area through the cognitive experience of the user or

viewer. In some cases these values allocated to the place are similar for a wide spectrum of users or viewers, giving the place a universally recognized and therefore, strong sense of place.

**Scenic Quality**

Assigning values to visual resources is a subjective process. The phrase, ñbeauty is in the eye of the beholder,ò is often quoted to emphasize the subjectivity in determining scenic values. Yet, researchers have found consistent levels of agreement among individuals asked to evaluate visual quality.

Studies for perceptual psychology have shown human preference for landscapes with a higher visual complexity particularly in scenes with water, over homogeneous areas. On the basis of contemporary research landscape quality increases when:

Topographic ruggedness and relative relief increase;

Where water forms are present;

Where diverse patterns of grasslands and trees occur;

Where natural landscape increases and man-made landscape decreases;

And where land use compatibility increases and land use edge diversity decreases (Crawford 1994).

**Scenic Quality - Explanation of Rating Criteria:**

(After The Visual Resource Management System, Department of the Interior of the USA Government, Bureau of Land Management)

**Landform:** Topography becomes more interesting as it gets steeper or more massive, or more severely or universally sculptured. Outstanding landforms may be monumental, as the Fish River or Blyde River Canyon, the Drakensberg or other mountain ranges, or they may be exceedingly artistic and subtle as certain badlands, pinnacles, arches, and other extraordinary formations.

**Vegetation:** (Plant communities) Give primary consideration to the variety of patterns, forms, and textures created by plant life. Consider short-lived displays when they are known to be recurring or spectacular (wildflower displays in the Karoo regions). Consider also smaller scale vegetational features, which add striking and intriguing detail elements to the landscape (e.g., gnarled or wind beaten trees, and baobab trees).

**Water:** That ingredient which adds movement or serenity to a scene. The degree to which water dominates the scene is the primary consideration in selecting the rating score.

**Colour:** Consider the overall colour(s) of the basic components of the landscape (e.g., soil, rock, vegetation, etc.) as they appear during seasons or periods of high use. Key factors to use when rating "colour" are variety, contrast, and harmony.

**Adjacent Scenery:** Degree to which scenery outside the scenery unit being rated enhances the overall impression of the scenery within the rating unit. The distance which adjacent scenery will influence scenery within the rating unit will normally range from 0-8 kilometres, depending upon the characteristics of the topography, the vegetative cover, and other such factors. This factor is generally applied to units which

would normally rate very low in score, but the influence of the adjacent unit would enhance the visual quality and raise the score.

**Scarcity:** This factor provides an opportunity to give added importance to one or all of the scenic features that appear to be relatively unique or rare within one physiographic region. There may also be cases where a separate evaluation of each of the key factors does not give a true picture of the overall scenic quality of an area. Often it is a number of not so spectacular elements in the proper combination that produces the most pleasing and memorable scenery - the scarcity factor can be used to recognize this type of area and give it the added emphasis it needs.

**Cultural Modifications:** Cultural modifications in the landform / water, vegetation, and addition of structures should be considered and may detract from the scenery in the form of a negative intrusion or complement or improve the scenic quality of a unit.

**Scenic Quality Inventory and Evaluation Chart**

(After The Visual Resource Management System, Department of the Interior of the USA Government, Bureau of Land Management)

| Key factors | Rating Criteria and Score | . | . |
|---|---|---|---|
| Landform | High vertical relief as expressed in prominent cliffs, spires, or massive rock outcrops, or severe surface variation or highly eroded formations including major badlands or dune systems; or detail features dominant and exceptionally striking and intriguing such as glaciers. | Steep canyons, mesas, buttes, cinder cones, and drumlins; or interesting erosional patterns or variety in size and shape of landforms; or detail features which are interesting though not dominant or exceptional. | Low rolling hills, foothills, or flat valley bottoms; or few or no interesting landscape features. |
| | **5** | **3** | **1** |
| Vegetation and landcover | A variety of vegetative types as expressed in interesting forms, textures, and patterns. | Some variety of vegetation, but only one or two major types. | Little or no variety or contrast in vegetation. |
| | **5** | **3** | **1** |
| Water | Clear and clean appearing, still, or cascading white water, any of which are a dominant factor in the landscape. | Flowing, or still, but not dominant in the landscape. | Absent, or present, but not noticeable. |
| | **5** | **3** | **0** |
| Colour | Rich colour combinations, variety or vivid colour; or pleasing contrasts in the soil, rock, vegetation, water or snow fields. | Some intensity or variety in colours and contrast of the soil, rock and vegetation, but not a dominant scenic element. | Subtle colour variations, contrast, or interest; generally mute tones. |
| | **5** | **3** | **1** |

| | | | |
|---|---|---|---|
| Influence of adjacent scenery | Adjacent scenery greatly enhances visual quality.<br><br>**5** | Adjacent scenery moderately enhances overall visual quality.<br><br>**3** | Adjacent scenery has little or no influence on overall visual quality.<br><br>**0** |
| Scarcity | One of a kind; or unusually memorable, or very rare within region. Consistent chance for exceptional wildlife or wildflower viewing, etc. National and provincial parks and conservation areas<br><br>*** 5+** | Distinctive, though somewhat similar to others within the region.<br><br>**3** | Interesting within its setting, but fairly common within the region.<br><br>**1** |
| Cultural modifications | Modifications add favourably to visual variety while promoting visual harmony.<br><br>**2** | Modifications add little or no visual variety to the area, and introduce no discordant elements.<br><br>**0** | Modifications add variety but are very discordant and promote strong disharmony.<br><br>**-4** |

**Scenic Quality (i.e. value of the visual resource)**

In determining the quality of the visual resource both the objective and the subjective or aesthetic factors associated with the landscape are considered. Many landscapes can be said to have a strong sense of place, regardless of whether they are considered to be scenically beautiful but where landscape quality, aesthetic value and a strong sense of place coincide - the visual resource or perceived value of the landscape is considered to be very high.

When considering both objective and subjective factors associated with the landscape there is a balance between landscape character and individual landscape features and elements, which would result in the values as follows:

**Value of Visual Resource – expressed as Scenic Quality**

(After The Landscape Institute with the Institute of Environmental Management and Assessment (2002))

| High | Moderate | Low |
|---|---|---|
| Areas that exhibit a very positive character with valued features that combine to give the experience of unity, richness and harmony. These are landscapes that may be considered to be of particular importance to conserve and which may be sensitive change in general and which may be detrimental if change is inappropriately dealt with. | Areas that exhibit positive character but which may have evidence of alteration to /degradation/erosion of features resulting in areas of more mixed character. Potentially sensitive to change in general; again change may be detrimental if inappropriately dealt with but it may not require special or particular attention to detail. | Areas generally negative in character with few, if any, valued features. Scope for positive enhancement frequently occurs. |

A visual impact study analysis addresses the importance of the inherent aesthetics of the landscape, the public value of viewing the natural landscape, and the contrast or change in the landscape from the project.

For some topics, such as water or air quality, it is possible to use measurable, technical international or national guidelines or legislative standards, against which potential effects can be assessed. The assessment of likely effects on a landscape resource and on visual amenity is more complex, since it is determined through a combination of quantitative and qualitative evaluations. (The Landscape Institute with the Institute of Environmental Management and Assessment (2002).

Landscape impact assessment includes a combination of objective and subjective judgements, and it is therefore important that a structured and consistent approach is used. It is necessary to differentiate between judgements that involve a degree of subjective opinion (as in the assessment of landscape value) from those that are normally more objective and quantifiable (as in the determination of magnitude of change). Judgement should always be based on training and experience and be supported by clear evidence and reasoned argument. Accordingly, suitably qualified and experienced landscape professionals carry out landscape and visual impact assessments (The Landscape Institute with the Institute of Environmental Management and Assessment (2002),

Landscape and visual assessments are separate, although linked, procedures. The landscape baseline, its analysis and the assessment of landscape effects all contribute to the baseline for visual assessment studies. The assessment of the potential effect on the landscape is carried our as an effect on an environmental resource, i.e. the landscape. Visual effects are assessed as one of the interrelated effects on population.

**Landscape Impact**

Landscape impacts derive from changes in the physical landscape, which may give rise to changes in its character and from effects to the scenic values of the landscape. This may in turn affect the perceived value ascribed to the landscape. The description and analysis of effects on a landscape resource relies on the adoption of certain basic principles about the positive (or beneficial) and negative (or adverse) effects of change in the landscape. Due to the inherently dynamic nature of the landscape, change arising from a development may not necessarily be significant (Institute of Environmental Assessment & The Landscape Institute (2002)).

**Visual Impact**

Visual impacts relate to the changes that arise in the composition of available views as a result of changes to the landscape, to peopleôs responses to the changes, and to the overall effects with respect to visual amenity. Visual impact is therefore measured as the change to the existing visual environment (caused by the physical presence of a new development) and the extent to which that change compromises (negative impact) or enhances (positive impact) or maintains the visual quality of the area.

To assess the magnitude of visual impact four main factors are considered.

| | |
|---|---|
| **Visual Intrusion:** | The nature of intrusion or contrast (physical characteristics) of a project component on the visual quality of the surrounding environment and its compatibility/discord with the landscape and surrounding land use. |
| **Visibility:** | The area/points from which project components will be visible. |
| **Visual exposure:** | Visibility and visual intrusion qualified with a distance rating to indicate the degree of intrusion. |
| **Sensitivity:** | Sensitivity of visual receptors to the proposed development |

**Visual Intrusion / contrast**

Visual intrusion deals with the notion of contextualism i.e. how well does a project component fit into the ecological and cultural aesthetic of the landscape as a whole? Or conversely what is its contrast with the receiving environment. Combining landform / vegetation contrast with structure contrast derives overall visual intrusion/contrast levels of high, moderate, and low.

Landform / vegetation contrast is the change in vegetation cover and patterns that would result from construction activities. Landform contrast is the change in landforms, exposure of soils, potential for erosion scars, slumping, and other physical disturbances that would be noticed as uncharacteristic in the natural landscape. Structure contrast examines the compatibility of the proposed development with other structures in the landscape and the existing natural landscape. Structure contrast is typically strongest where there are no other structures (e.g., buildings, existing utilities) in the landscape setting.

Photographic panoramas from key viewpoints before and after development are presented to illustrate the nature and change (contrast) to the landscape created by the proposed development. A computer simulation technique is employed to superimpose a graphic of the development onto the panorama. The extent to which the component fits or contrasts with the landscape setting can then be assessed using the following criteria.

- Does the physical development concept have a negative, positive or neutral effect on the quality of the landscape?
- Does the development enhance or contrast with the patterns or elements that define the structure of the landscape?
- Does the design of the project enhance and promote cultural continuity or does it disrupt it?

The consequence of the intrusion / contrast can then be measured in terms of the sensitivity of the affected landscape and visual resource given the criteria listed below. For instance, within an industrial area, a new sewage treatment works may have an insignificant landscape and visual impact; whereas in a *valued* landscape it might be considered to be an intrusive element. (Institute of Environmental Assessment & The landscape Institute (1996)).

**Visual Intrusion**

| High | Moderate | Low | Positive |
|---|---|---|---|
| If the project:<br>- Has a substantial negative effect on the visual quality of the landscape;<br>- Contrasts dramatically with the patterns or elements that define the structure of the landscape;<br>- Contrasts dramatically with land use, settlement or enclosure patterns;<br>- Is unable to be ôabsorbedôinto the landscape. | If the project:<br>- Has a moderate negative effect on the visual quality of the landscape;<br>- Contrasts moderately with the patterns or elements that define the structure of the landscape;<br>- Is partially compatible with land use, settlement or enclosure patterns.<br>- Is partially ôabsorbedô into the landscape. | If the project:<br>- Has a minimal effect on the visual quality of the landscape;<br>- Contrasts minimally with the patterns or elements that define the structure of the landscape;<br>- Is mostly compatible with land use, settlement or enclosure patterns.<br>- Is ôabsorbedôinto the landscape. | If the project:<br>- Has a beneficial effect on the visual quality of the landscape;<br>- Enhances the patterns or elements that define the structure of the landscape;<br>- Is compatible with land use, settlement or enclosure patterns. |
| *Result*<br>Notable change in landscape characteristics over an extensive area and/or intensive change over a localized area resulting in major changes in key views. | *Result*<br>Moderate change in landscape characteristics over localized area resulting in a moderate change to key views. | *Result*<br>Imperceptible change resulting in a minor change to key views. | *Result*<br>Positive change in key views. |

Visual intrusion also diminishes with scenes of higher complexity, as distance increases, the object becomes less of a focal point (more visual distraction), and the observerôs attention is diverted by the complexity of the scene (Hull and Bishop (1988)).

**Visibility**

A viewshed analysis was carried out to define areas, which contain all possible observation sites from which the development would be visible. The basic assumption for preparing a viewshed analysis is that the observer eye height is 1.8m above ground level. Topographic data was captured for the site and its environs at 10 m contour intervals to create the Digital Terrain Model (DTM). The DTM includes features such as vegetation, rivers, roads and nearby urban areas. These features were ôdrapedôover the topographic data to complete the model used to generate the viewshed analysis. It should be noted that viewshed analyses are not absolute indicators of the level of significance (magnitude) of the impact in the view, but merely a statement of the fact of potential visibility. The visibility of a development and its contribution to visual impact is predicted using the criteria listed below:

## Visibility

| High | Moderate | Low |
|---|---|---|
| *Visual Receptors*<br><br>If the development is visible from over half the zone of potential influence, and/or views are mostly unobstructed and/or the majority of viewers are affected. | *Visual Receptors*<br><br>If the development is visible from less than half the zone of potential influence, and/or views are partially obstructed and or many viewers are affected | *Visual Receptors*<br><br>If the development is visible from less than a quarter of the zone of potential influence, and/or views are mostly obstructed and/or few viewers are affected. |

**Visual Exposure**

Visual exposure relates directly to the distance of the view. It is a criterion used to account for the limiting effect of increased distance on visual impact. The impact of an object in the foreground (0 ï 800m) is greater than the impact of that same object in the middle ground (800m ï 5.0 km) which, in turn is greater than the impact of the object in the background (greater than 5.0 km) of a particular scene.

Distance from a viewer to a viewed object or area of the landscape influences how visual changes are perceived in the landscape. Generally, changes in form, line, colour, and texture in the landscape become less perceptible with increasing distance.

Areas seen from 0 to 800m are considered foreground; foliage and fine textural details of vegetation are normally perceptible within this zone.

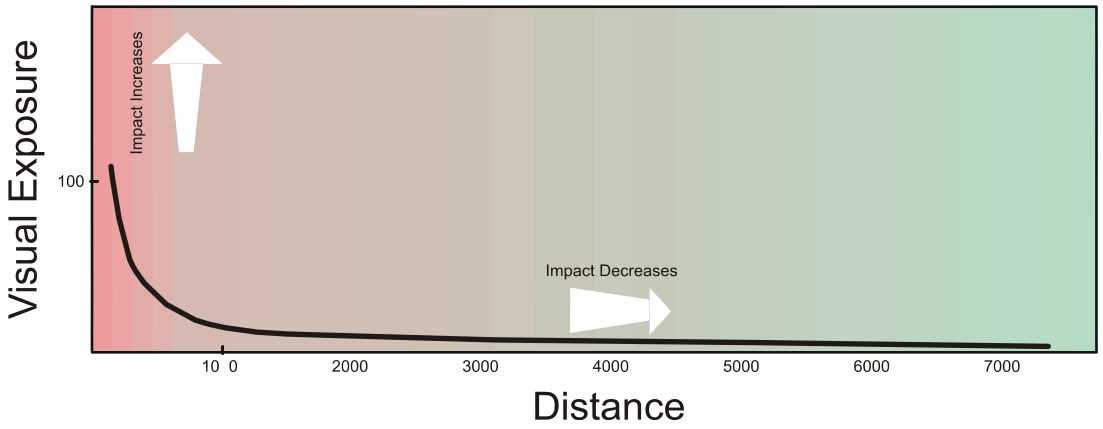
Areas seen from 800m to 3.0km are considered middle ground; vegetation appears as outlines or patterns. Depending on topography and vegetation, middle ground is sometimes considered to be up to 8.0km.

Areas seen from 5.0km to 8.0km and sometimes up to 16km and beyond are considered background. Landforms become the most dominant element at these distances.

Seldom seen areas are those portions of the landscape that, due to topographic relief or vegetation, are screened from the viewpoint or are beyond 16km from the viewpoint. Landforms become the most dominant element at these distances.

The impact of an object diminishes at an exponential rate as the distance between the observer and the object increases. Thus, the visual impact at 1000 m would be 25% of the impact as viewed from 500 m. At 2000 m it would be 10% of the impact at 500 m. The inverse relationship of distance and visual impact is well recognised in visual analysis literature (e.g.: Hull and Bishop (1988)) and is used as an important criteria for the study. This principle is illustrated in the Figure below.

**Effect of Distance on Visual Exposure**




**Sensitivity of Visual Receptors**

When visual intrusion, visibility and visual exposure are incorporated, and qualified by sensitivity criteria (visual receptors) the magnitude of the impact of the development can be determined.

The sensitivity of visual receptors and views will be depended on:

- The location and context of the viewpoint;
- The expectations and occupation or activity of the receptor;
- The importance of the view (which may be determined with respect to is popularity or numbers of people affected, its appearance in guidebooks, on tourist maps, and in the facilities provided for its enjoyment and references to it in literature or art).

The most sensitive receptors may include:

- Users of all outdoor recreational facilities including public rights of way, whose intention or interest may be focused on the landscape;
- Communities where the development results in changes in the landscape setting or valued views enjoyed by the community;
- Occupiers of residential properties with views affected by the development.
- These would all be high.

Other receptors include:

- People engaged in outdoor sport or recreation (other than appreciation of the landscape, as in landscapes of acknowledged importance or value);
- People travelling through or past the affected landscape in cars, on trains or other transport routes;
- People at their place of work.

The least sensitive receptors are likely to be people at their place of work, or engaged in similar activities, whose attention may be focused on their work or activity and who therefore may be potentially less susceptible to changes in the view.

In this process more weight is usually given to changes in the view or visual amenity which are greater in scale, and visible over a wide area. In assessing the effect on views, consideration should be given to the effectiveness of mitigation measures, particularly where planting is proposed for screening purposes (Institute of Environmental Assessment & The Landscape Institute (1996).

**Sensitivity of Visual Receptors**

| High | Moderate | Low |
|---|---|---|
| Users of all outdoor recreational facilities including public rights of way, whose intention or interest may be focused on the landscape; | People engaged in outdoor sport or recreation (other than appreciation of the landscape, as in landscapes of acknowledged importance or value); | The least sensitive receptors are likely to be people at their place of work, or engaged in similar activities, whose attention may be focused on their work or activity and who therefore may be potentially less susceptible to changes in the view (i.e. office and industrial areas). |
| Communities where the development results in changes in the landscape setting or valued views enjoyed by the community; | People travelling through or past the affected landscape in cars, on trains or other transport routes; | Roads going through urban and industrial areas |
| Occupiers of residential properties with views affected by the development. | | |

**Severity of the Visual Impact**

Potential visual impacts are determined by analysing how the physical change in the landscape, resulting from the introduction of a project, are viewed and perceived from sensitive viewpoints. Impacts to views are the highest when viewers are identified as being sensitive to change in the landscape, and their views are focused on and dominated by the change. Visual impacts occur when changes in the landscape are noticeable to viewers looking at the landscape from their homes or from parks, and conservation areas, highways and travel routes, and important cultural features and historic sites, especially in foreground views.

The magnitude of impact is assessed through a synthesis of visual intrusion, visibility, visual exposure and viewer sensitivity criteria. Once the magnitude of impact has been established this value is further qualified with spatial, duration and probability criteria to determine the *significance* of the visual impact.

For instance, the fact that visual intrusion and exposure diminishes significantly with distance does not necessarily imply that the relatively small impact that exists at greater distances is unimportant. The level of impact that people consider acceptable may be dependent upon the purpose they have in viewing the landscape. A particular development may be unacceptable to a hiker seeking a natural experience, or a household whose view is impaired, but may be barely noticed by a golfer concentrating on his game or a commuter trying to get to work on time (Ittleson *et al.,* 1974).

In synthesising these criteria a numerical or weighting system is avoided. Attempting to attach a precise numerical value to qualitative resources is rarely successful, and should not be used as a substitute for reasoned professional judgement. (Institute of Environmental Assessment and The landscape Institute (1996)).

**Magnitude (Intensity) of Visual Impact**

| High | Moderate | Low | Negligible |
|---|---|---|---|
| Total loss of or major alteration to key elements/features/characteristics of the baseline. | Partial loss of or alteration to key elements/features/characteristics of the baseline. | Minor loss of or alteration to key elements/features/characteristics of the baseline. | Very minor loss or alteration to key elements/features/characteristics of the baseline. |
| I.e. Pre-development landscape or view and/or introduction of elements considered to be totally uncharacteristic when set within the attributes of the receiving landscape. | I.e. Pre-development landscape or view and/or introduction of elements that may be prominent but may not necessarily be considered to be substantially uncharacteristic when set within the attributes of the receiving landscape. | I.e. Pre-development landscape or view an/or introduction of elements that may not be uncharacteristic when set within the attributes of the receiving landscape. | I.e. Pre-development landscape or view and/or introduction of elements that are not uncharacteristic with the surrounding landscape ï approximating the ónoô changeôsituation. |
| High scenic quality impacts would result. | Moderate scenic quality impacts would result | Low scenic quality impacts would result. | Negligible scenic quality impacts would result. |

**Cumulative effects**

Cumulative landscape and visual effects (impacts) result from additional changes to the landscape or visual amenity caused by the proposed development in conjunction with other developments (associated with or separate to it), or actions that occurred in the past, present or are likely to occur in the foreseeable future. They may also affect the way in which the landscape is experienced. Cumulative effects may be positive or negative. Where they comprise a range of benefits, they may be considered to form part of the mitigation measures.

Cumulative effects can also arise from the intervisibility (visibility) of a range of developments and /or the combined effects of individual components of the proposed development occurring in different locations or over a period of time. The separate effects of such individual components or developments may not be significant, but together they may create an unacceptable degree of adverse effect on visual receptors within their combined visual envelopes. Intervisibility depends upon general topography, aspect, tree cover or other visual obstruction, elevation and distance, as this affects visual acuity, which is also influenced by weather and light conditions. (Institute of Environmental Assessment and The landscape Institute (1996)).

- Colour;
- Shape or form;
- Scale;
- Texture; and
- Reflectivity.

## 9.3 IMPACT ASSESSMENT METHODOLOGY

The impacts will be ranked according to the methodology described below. Where possible, mitigation measures will be provided to manage impacts. In order to ensure uniformity, a standard impact assessment methodology will be utilised so that a wide range of impacts can be compared with each other. The impact assessment methodology makes provision for the assessment of impacts against the following criteria:

- Significance;
- Spatial scale;
- Temporal scale;
- Probability; and
- Degree of certainty.

A combined quantitative and qualitative methodology was used to describe impacts for each of the aforementioned assessment criteria. A summary of each of the qualitative descriptors along with the equivalent quantitative rating scale for each of the aforementioned criteria is given in **Table 9-1**.

**Table 9-1: Quantitative rating and equivalent descriptors for the impact assessment criteria**

| Rating | Significance | Extent Scale | Temporal Scale |
|---|---|---|---|
| 1 | VERY LOW | *Proposed site* | Incidental |
| 2 | LOW | *Study area* | Short-term |
| 3 | MODERATE | *Local* | Medium-term |
| 4 | HIGH | *Regional / Provincial* | Long-term |
| 5 | VERY HIGH | *Global / National* | Permanent |

A more detailed description of each of the assessment criteria is given in the following sections.

### 9.3.1 *Significance Assessment*

Significance rating (importance) of the associated impacts embraces the notion of extent and magnitude, but does not always clearly define these since their importance in the rating

scale is very relative. For example, the magnitude (i.e. the size) of area affected by atmospheric pollution may be extremely large (1 000 $km^2$) but the significance of this effect is dependent on the concentration or level of pollution. If the concentration is great, the significance of the impact would be HIGH or VERY HIGH, but if it is diluted it would be VERY LOW or LOW. Similarly, if 60 ha of a grassland type are destroyed the impact would be VERY HIGH if only 100 ha of that grassland type were known. The impact would be VERY LOW if the grassland type was common. A more detailed description of the impact significance rating scale is given in **Table 9-2** below.

**Table 9-2: Description of the significance rating scale**

| Rating | | Description |
|---|---|---|
| 5 | Very high | Of the highest order possible within the bounds of impacts which could occur. In the case of adverse impacts: there is no possible mitigation and/or remedial activity which could offset the impact. In the case of beneficial impacts, there is no real alternative to achieving this benefit. |
| 4 | High | Impact is of substantial order within the bounds of impacts, which could occur. In the case of adverse impacts: mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or some combination of these. In the case of beneficial impacts, other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or some combination of these. |
| 3 | Moderate | Impact is real but not substantial in relation to other impacts, which might take effect within the bounds of those which could occur. In the case of adverse impacts: mitigation and/or remedial activity are both feasible and fairly easily possible. In the case of beneficial impacts: other means of achieving this benefit are about equal in time, cost, effort, etc. |
| 2 | Low | Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts: mitigation and/or remedial activity is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means for achieving this benefit are likely to be easier, cheaper, more effective, less time consuming, or some combination of these. |
| 1 | Very low | Impact is negligible within the bounds of impacts which could occur. In the case of adverse impacts, almost no mitigation and/or remedial activity are needed, and any minor steps which might be needed are easy, cheap, and simple. In the case of beneficial impacts, alternative means are almost all likely to be better, in one or a number of ways, than this means of achieving the benefit. Three additional categories must also be used where relevant. They are in addition to the category represented on the scale, and if used, will replace the scale. |
| 0 | No impact | There is no impact at all - not even a very low impact on a party or system. |

### 9.3.2 *Spatial Scale*

The spatial scale refers to the extent of the impact i.e. will the impact be felt at the local, regional, or global scale. The spatial assessment scale is described in more detail in **Table 9-3.**

**Table 9-3: Description of the significance rating scale**

| Rating | | Description |
|---|---|---|
| 5 | Global/National | The maximum extent of any impact. |
| 4 | Regional/Provincial | The spatial scale is moderate within the bounds of impacts possible, and will be felt at a regional scale (District Municipality to Provincial Level). |
| 3 | Local | The impact will affect an area up to 10 km from the proposed site. |
| 2 | Study Site | The impact will affect an area not exceeding the Eskom property. |
| 1 | Proposed site | The impact will affect an area no bigger than the ash disposal site. |

### 9.3.3 *Duration Scale*

In order to accurately describe the impact it is necessary to understand the duration and persistence of an impact in the environment. The temporal scale is rated according to criteria set out in **Table 9-4**.

**Table 9-4: Description of the temporal rating scale**

| Rating | | Description |
|---|---|---|
| 1 | Incidental | The impact will be limited to isolated incidences that are expected to occur very sporadically. |
| 2 | Short-term | The environmental impact identified will operate for the duration of the construction phase or a period of less than 5 years, whichever is the greater. |
| 3 | Medium term | The environmental impact identified will operate for the duration of life of facility. |
| 4 | Long term | The environmental impact identified will operate beyond the life of operation. |
| 5 | Permanent | The environmental impact will be permanent. |

### 9.3.4 *Degree of Probability*

Probability or likelihood of an impact occurring will be described as shown in **Table 9-5** below.

**Table 9-5: Description of the degree of probability of an impact occurring**

| Rating | Description |
|---|---|
| 1 | Practically impossible |
| 2 | Unlikely |
| 3 | Could happen |
| 4 | Very Likely |
| 5 | It's going to happen / has occurred |

### 9.3.5 *Degree of Certainty*

As with all studies it is not possible to be 100% certain of all facts, and for this reason a standard "degree of certainty" scale is used as discussed in **Table 9-6**. The level of detail for specialist studies is determined according to the degree of certainty required for decision-making. The impacts are discussed in terms of affected parties or environmental components.

**Table 9-6: Description of the degree of certainty rating scale**

| Rating | Description |
|---|---|
| Definite | More than 90% sure of a particular fact. |
| Probable | Between 70 and 90% sure of a particular fact, or of the likelihood of that impact occurring. |
| Possible | Between 40 and 70% sure of a particular fact or of the likelihood of an impact occurring. |
| Unsure | Less than 40% sure of a particular fact or the likelihood of an impact occurring. |
| Can't know | The consultant believes an assessment is not possible even with additional research. |
| Don't know | The consultant cannot, or is unwilling, to make an assessment given available information. |

### 9.3.6 *Quantitative Description of Impacts*

To allow for impacts to be described in a quantitative manner in addition to the qualitative description given above, a rating scale of between 1 and 5 was used for each of the assessment criteria. Thus the total value of the impact is described as the function of significance, spatial and temporal scale as described below:

***Impact Risk*** = (SIGNIFICANCE **+** *Spatial* **+** Temporal) X Probability

**3** **5**

An example of how this rating scale is applied is shown below:

**Table 9-7: Example of Rating Scale**

| Impact | Significance | Spatial Scale | Temporal Scale | Probability | Rating |
|---|---|---|---|---|---|
| | LOW | *Local* | Medium-term | *Could Happen* | |
| Impact to air | **2** | ***3*** | **3** | **3** | **1.6** |

Note: The significance, spatial and temporal scales are added to give a total of 8, that is divided by 3 to give a criteria rating of 2,67. The probability (3) is divided by 5 to give a probability rating of 0,6. The criteria rating of 2,67 is then multiplied by the probability rating (0,6) to give the final rating of 1,6.

The impact risk is classified according to five classes as described in the **Table 9-8** below.

**Table 9-8: Impact Risk Classes**

| Rating | Impact Class | Description |
|---|---|---|
| 0.1 – 1.0 | **1** | **Very Low** |
| 1.1 – 2.0 | **2** | **Low** |
| 2.1 – 3.0 | **3** | **Moderate** |
| 3.1 – 4.0 | **4** | **High** |
| 4.1 – 5.0 | **5** | **Very High** |

Therefore with reference to the example used for air quality above, an impact rating of 1.6 will fall in the Impact Class 2, which will be considered to be a low impact.

### 9.3.7 *Cumulative Impacts*

It is a requirement that the impact assessments take cognisance of cumulative impacts. In fulfilment of this requirement the impact assessment will take cognisance of any existing impact sustained by the operations, any mitigation measures already in place, any additional impact to environment through continued and proposed future activities, and the residual impact after mitigation measures.

It is important to note that cumulative impacts at the national or provincial level will not be considered in this assessment, as the total quantification of external companies on resources is not possible at the project level due to the lack of information and research documenting the effects of existing activities. Such cumulative impacts that may occur across industry boundaries can also only be effectively addressed at Provincial and National Government levels.

Using the criteria as described above an example of how the cumulative impact assessment will be done is shown below:

**Table 9-9 - Example of cumulative impact assessment**

| Impact | Significance | Spatial Scale | Temporal Scale | Probability | Rating |
|---|---|---|---|---|---|
| Initial / Existing Impact (I-IA) | **2** | **2** | **2** | *1* | 0.4 |
| Additional Impact (A-IA) | **1** | ***2*** | **1** | *1* | 0.3 |
| Cumulative Impact (C-IA) | **3** | ***4*** | **2** | *1* | 0.6 |
| Residual Impact after mitigation (R-IA) | **2** | ***1*** | **2** | *1* | 0.3 |

As indicated in the example above the Additional Impact Assessment (A-IA) is the amount that the impact assessment for each criterion will increase. Thus if the initial impact will not increase, as shown for temporal scale in the example above the A-IA will be 0, however, where the impact will increase by two orders of magnitude from 2 to 4 as in the spatial scale

the A-IA is 2. The Cumulative Impact Assessment (C-IA) is thus the sum of the Initial Impact Assessment (I-IA) and the A-IA for each of the assessment criteria.

In both cases the I-IA and A-IA are assessed without taking into account any form of mitigation measures. As such the C-IA is also a worst case scenario assessment where no mitigation measures have been implemented. Thus a Residual Impact Assessment (R-IA) is also made which takes into account the C-IA with mitigation measures. The latter is the most probable case scenario, and for the purpose of this report is considered to be the final state Impact Assessment.

### 9.3.8 *Notation of Impacts*

In order to make the report easier to read the following notation format is used to highlight the various components of the assessment:

- Significance or magnitude- IN CAPITALS
- Temporal Scale – in underline
- Probability – in *italics and underlined*
- Degree of certainty - in **bold**
- Spatial Extent Scale – in *italics*

## 9.4 ENVIRONMENTAL IMPACT REPORT

Once the Scoping Report and the Plan of Study for the EIA is accepted by the DEA, Zitholele will begin the Environmental Impact Report.

The Environmental Impact Report will include the activity description; site / area and corridor assessments; public participation; a description of the issues and assessment of the site. The specialist studies results will be summarised and integrated into the Environmental Impact Report.

The WMLA Report will include all the technical information generated by the Design of the Facility, the Site Survey and the Operating Plan. In addition all the documents required by DEA for the waste license will also be included. These include the emergency and response plan, the closure and rehabilitation plan and the waste hierarchy implementation plan.

## 9.5 ENVIRONMENTAL MANAGEMENT PROGRAMME

An Environmental Management Programme (EMP), in the context of the Regulations, is a tool that takes a project from a high level consideration of issues down to detailed workable mitigation measures that can be implemented in a cohesive and controlled manner. The objectives of an EMP are to minimise disturbance to the environment, present mitigation

## APPENDIX D: CRITERIA FOR PHOTO / COMPUTER SIMULATION

To characterize the nature and magnitude of visual intrusion of the proposed project, a photographic simulation technique was used. This method was used according to Sheppard (in Lange 1994), where a visual simulation is good quality when the following five criteria are met.

| | |
|---|---|
| Representativeness: | A simulation should represent important and typical views of a project. |
| Accuracy: | The similarity between a simulation and the reality after the project has been realized. |
| Visual clarity: | Detail, parts and overall contents have to be clearly recognizable. |
| Interest: | A simulation should hold the attention of the viewer. |
| Legitimacy: | A simulation is defensible if it can be shown how it was produced and to what degree it is accurate. |

To comply with this standard it was decided to produce a stationary or static simulation (Van Dortmont in Lange, 1994), which shows the proposed development from a typical static observation points (Critical View Points).

Photographs are taken on site during a site visit with a manual focus, 50mm focal depth digital camera. All camera settings are recorded and the position of each panoramic view is recorded by means of a GPS. These positions, coordinates are then placed on the virtual landscape (see below).

A scale model of the proposal is built in virtual space, scale 1:1, based on CAD (vector) information as supplied by the architect / designers. This model is then placed on a virtual landscape, scale 1:1, as produced by means of GIS software. The accuracy of this depends on the contour intervals.

The camera views are placed on the points as recorded on the virtual landscape. The respective photographs are overlaid onto the camera views, and the orientation of the cameras adjusted accordingly. The light source is adjusted to suit the view. Each view is then rendered as per the process above.

## APPENDIX E: DECLERATION OF INDEPENDENCE

**Declaration of Independence**

I, Mitha Cilliers hereby declare that Newtown Landscape Architects cc, an independent consulting firm, has no interest or personal gains in this project whatsoever, except receiving fair payment for rendering an independent professional service.

Consultant name: Mitha Cilliers

Signature: 

Date: 27 April 2015

Since 1994

# Graham Young PrLArch

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*Graham is a landscape architect with thirty years' experience. He has worked in Southern Africa and Canada and has valuable expertise in the practice of landscape architecture, urban design and environmental planning. He is also a senior lecturer, teaching urban design and landscape architecture at post and under graduate levels at the University of Pretoria. He also specializes in Visual Impact Assessments.*

## EXPERIENCE: NEWTOWN LANDSCAPE ARCHITECTS cc. *Member*

Current — Responsible for project management, landscape design, urban design, and visual impact assessment.

*Senior Lecturer*: Department of Architecture, University of Pretoria.

1991 - 1994 — **GRAHAM A YOUNG LANDSCAPE ARCHITECT** - ***Sole proprietor***

1988 - 1989 — Designed major transit and CBD based urban design schemes; designed commercial and recreational landscapes and a regional urban park; participated in inter-disciplinary consulting teams that produced master plans for various beachfront areas in KwaZulu Natal and a mountain resort in the Drakensberg.

1989 - 1991 — **CANADA** - ***Free Lance***

Designed golf courses and carried out golf course feasibility studies (Robert Heaslip and Associates); developed landscape site plans and an end-use plan for an abandoned

mine (du Toit, Allsopp and Hillier); conducted a visual analysis of a proposed landfill site.
.

1980 - 1988 **KDM (FORMERLY DAMES AND MOORE)** - *Started as a Senior Landscape Architect and was appointed Partner in charge of Landscape Architecture and Environmental Planning in 1984*. Designed commercial, corporate and urban landscapes; completed landscape site plans; developed end-use master plans for urban parks, college and technikon sites; carried out ecological planning studies for factories, motorways and a railway line.

1978 - 1980 **DAYSON & DE VILLIERS - *Staff Landscape Architect***

Designed various caravan parks; designed a recreation complex for a public resort; conducted a visual analysis for the recreation planning of Pilgrims Rest; and designed and supervised the installation of various private gardens.

**EDUCATION:**

Bachelor of Landscape Architecture, 1978, (BLArch), University of Toronto, Canada;
Completing a masterôs degree in Landscape Architecture, University of Pretoria; Thesis: Visual Impact Assessment;
Senior Lecturer - Department of Architecture, University of Pretoria.

**PROFESSIONAL:**

Registered Landscape Architect ï South African Council for Landscape Architectural Profession (2001);
Board of Control for Landscape Architects of South Africa (1987) ï Vice Chairman 1988 to 1989;
Professional Member - Institute of Landscape Architects Southern Africa (1982) ï President 1986 - 1988;
Member Planning Professions Board 1987 to 1989;
Member International Association of Impact Assessment;

**AWARDS:**

Torsanlorenzo International Prize, Landscape design and protection 2nd Prize Section B: Urban Green Spaces, for Intermediate Phase Freedom Park (2009)
Phase 1 and Intermediate Phase Freedom Park: Special Mention World Architecture Festival, Nature Category (2008)
Moroka Park Precinct, Soweto: ILASA Merit Award for Design (2005) and Gold Medal United Nations Liveable Communities (LivCom) Award (2007)
Isivivane, Freedom Park: ILASA Presidential Award of Excellence Design (2005)
Information Kiosk, Freedom Park: ILASA Merit Award for Design (2005)
Moroka ï Mofola Open Space Framework, Soweto: ILASA Merit Award for Planning (2005)

Mpumalanga Provincial Government Complex: ILASA Presidential Award of Excellence (with KWP Landscape Architects for Design (2003)

Specialist Impact Report: Visual Environment, Sibaya Resort and Entertainment World: ILASA Merit Award for Environmental Planning (1999);

Gillooly's Farm, Bedfordview (with Dayson and DeVilliers): ILASA Merit Award for Design;

**COMPETITIONS:**

Pan African Parliament International Design competition ï with MMA architects (2007) Finalist

Leeuwpan Regional Wetland Park for the Ekurhuleni Metro Municipality (2004)

Landscape Architectural Consultant on Department of Trade and Industries Building (2002) ï Finalist

Landscape Architecture Consultant on Project Phoenix Architectural Competition, Pretoria (1999): Winner;

Mpumalanga Legislature Buildings (1998): Commissioned;

Toyota Fountain (1985): First Prize - commissioned;

Bedfordview Bike/Walkway System - Van Buuren Road (1982): First Prize - commissioned;

Portland Cement Institute Display Park (1982): Second Prize

**CONTRIBUTOR:**

Joubert, O, 10 Years + *100 Buildings – Architecture in a Democratic South Africa Bell-Roberts Gallery and Publishing*, South Africa (2009)

- Freedom Park Phase 1 and Intermediate Phase (NBGM), Pretoria, Gauteng

Galindo, M, *Collection Landscape Architecture*, Braun, Switzerland (2009)

- Freedom Park Phase Intermediate Phase (NBGM), Pretoria, Gauteng

In *1000 X Landscapes*, Verlagshaus Braun, Germany (2008)

- Freedom Park Phase 1 and Intermediate Phase (NBGM), Pretoria, Gauteng
- Riverside Government Complex (NLAKWP), Nelspruit, Mpumalanga;
- Moroka Dam Parks Precinct, Soweto, Gauteng.

In *Johannesburg: Emerging/Diverging Metropolis*, Mendrision Academy Press, Italy (2007)

- Moroka Dam Parks Precinct, Soweto, Gauteng.

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*Mitha is a landscape architect with nine years experience. She has worked as Landscape Architect in South Africa and Angola and has valuable expertise in the practice of landscape architecture and environmental planning. She is currently employed by Newtown Landscape Architects.*

**EXPERIENCE:**

Current *Landscape Architect:*

**NEWTOWN Landscape Architects cc.**

Visual Impact Assessments

Landscape Maintenance Auditing

Landscape Design

2008 to 2013 *Consultant*:

**NEWTOWN Landscape Architects cc.**

Visual Impact Assessments

**KWP Landscape Architects & Environmental Consultants**

Landscape Maintenance Auditing

Landscape Design and draughting

**REAL Landscapes**

Landscape Design

2005 ï 2007 *Landscape Architect:*

**KWP Landscape Architects & Environmental Consultants**

Landscape design for various types of projects ranging from residential garden design to industrial landscaping, including the landscape upgrade of the SASOL plant in Secunda.

General project administration and documentation including Bill of Quantities, Tender Evaluation and site inspections.

Landscape Maintenance Auditing at the Nelspruit Riverside Government Offices

Preparation of Environmental Impact Assessment Reports for proposed housing developments.

Environmental Control Officer on various residential housing developments.

2003 ï 2004 *Candidate Landscape Architect:*

**Sigma Gibb – part of the GIBB Africa Group**

Co-Landscape Architect on a residential housing estate in Luanda, Angola.

Design and draughting for various projects in Angola.

2003 *Candidate Landscape Architect:*

**NEWTOWN Landscape Architects cc.**

Design and draughting various projects ranging from private residential gardens to public parks.

Project administration including Bills of Quantities and Tender Evaluation and site inspections

**PROFESSIONAL:**

Registered Landscape Architect ï South African Council for Landscape Architectural Profession (2007)

Committee Member ï South African Council for Landscape Architectural Profession (2009 & 2011- - 2012)

**EDUCATION:**

Bachelor of Landscape Architecture, 2001, (BLArch), University of Pretoria.