VISUAL IMPACT ASSESSMENT FOR THE PROPOSED RETROFITTING OF THE EXISTING ELECTROSTATIC PRECIPITATORS WITH FABRIC FILTER PLANTS AND UPGRADING OF DUST HANDLING PLANT AT KRIEL POWER STATION, MPUMALANGA PROVINCE

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EXECUTIVE SUMMARY

I-scape was appointed by Wandima Environmental Services to provide a Visual Impact Assessment (VIA) report for the proposed retrofitting of the existing electrostatic precipitators (ESP) with fabric filter plants and upgrading of dust handling plant at the existing Kriel Power Station in the Emalahleni Local Municipality, Mpumalanga. New air quality legislation requires the Kriel Power Station to adhere to more stringent limits with regards to particle emissions, thus prompting the upgrade of the existing ESP. The client, ESKOM SOC, proposes to retrofit the existing ESP with more effective particle emission abatement technology, Fabric Filter Plants (FFP) and upgrade of the Dust Handling plant (DHP) at units 1-6 of the power station. The assessment forms part of a Basic Assessment (BA) as required by the National Environmental Management Act (No. 107 of 1998) (NEMA as amended, 2014 Regulations).

A VIA is a specialist study that assesses the potential visual changes/impacts to an existing baseline setting resulting from the implementation of a proposed project. The associated visual changes could potentially impact on the character and value of the landscape and affect the views and perceptions of observers in the study area. The purpose of the study is to determine the significance of the changes/impacts and to recommend mitigation measures where the impacts are considered unacceptably negative.

STUDY AREA

The study area can be described as the area affected by visual impact. It is defined by the limits of the project's visibility. The factors that most significantly influence the visibility are topographic variation and land use or land cover, which could potentially expose or screen the proposed project from sensitive viewpoints.

The study area is limited to the site within the boundaries of the Kriel Power Station and includes the immediate surroundings. The scale of the project is considered small, relative to the scale of the existing infrastructure such as the boilers, cooling towers and chimneys. It has been noticed during the site investigation that very few of the proposed project components are visible from views outside the power station site. All of the retrofitted equipment and additional structures will be located on the eastern and southern side of the power station. Many of the equipment and structures associated with the ESP, FFP and DHP will not be visible from surrounding views as it will be housed within the existing precipitator units. Alternative configurations of ash conveying air pipes will be required on top of the silo and a new conveying air compressor house and substation will be built next to chimney 2. Another major addition to the power station is the cleaning air equipment building on the southern side of chimney 2. The area between cooling tower 3 and the cleaning air equipment building will be used as the construction camp and laydown yard. .

PROJECT DESCRIPTION

The proposed project entails the retrofitting of a FFP to the existing ESP at the Kriel Power Station. The main purpose is to reduce particulate emissions to such a degree that the power station can comply to existing and future plant particulate matter limits as set out in the stations Atmospheric Emission Licence (AEL) by 2020. This requires an ongoing construction phase of approximately 4 years.

The Kriel Power Station has a design life expectancy of 50 years, ending 2030, but a possible 60-year operational life expectancy may be likely, ending of the last unit November 2040. This entails an operational phase for the FFP of 10-20 years. There are no siting alternatives to the additions and alternations due to the existing power station infrastructure location and process requirements.

The construction phase is ongoing to meet the AEL demands by 2020. For a period of approximately 4 years, the construction camp and laydown yards will be located between cooling tower 3 and boiler 6. This will presumably consist of temporary site offices, ablution facilities and an open laydown area. During the construction phase the following major alterations and additions will be made to the power station:

- A Pipe Rack for Ash Conveying Air pipes will be added;
- The Conveying pipe layout will be changed on top of the Silo;
- The DHP will be upgraded to accommodate new and larger pressure vessels to be installed beneath each of the FFP hoppers. The vessels will be installed on the existing concrete slab under the footprint of the FFP casing.
- New FFP that will be within the footprint of the currently installed ESPs. The FFP casing will be slightly higher than the existing ESP, increasing from 22.8m to 26.7m;
- New Conveying Air Compression House and Substation will be built between the silo and precipitators; and
- A new Cleaning Air Equipment building will be constructed next to boiler 6. It will be 61m x 17m x 13.7m(h) and will be a steel frame concrete building with corrugated iron roof.

During the construction phase a construction team will be present on site. It can be assumed that basic construction equipment will be utilised such as mobile cranes and earth moving vehicles. At most, a fixed crane may be installed for an indeterminate period. Most construction activity is expected to occur on ground-level with the exception of certain major structural alterations.

All the proposed project components and activities will occur within the existing footprint of the power station and will not alter the visual character of the power station in any significant way. New structural additions will be in a similar architectural style as to the existing buildings on the site. Relative to the scale of the cooling towers, boilers and chimneys, the project is considered a small-scale alteration and low intensity construction activity.

VISUAL IMPACT ASSESSMENT

VIA is a specialist study that assesses the potential visual changes/impacts to an existing baseline setting resulting from the implementation of a proposed project. This implies that, firstly, a baseline must be established and secondly, the visual change, resulting from the project, must be compared to the baseline. The essence of determining the significance of visual change for a particular project, centres on the severity of the potential impacts, and the sensitivity of the affected receptors. In simple terms, a low severity impact affecting receptors of low sensitivity, will result in a low significance. On the other end of the scale, a highly severe impact, affecting highly sensitive receptors, will result in a high significance. For a visual impact to occur, the visual change should be visible and severe enough as to impact on the receptors.

BASELINE ENVIRONMENT

The baseline environment comprises of an existing power station with a highly industrial character in a rural landscape setting. The study area is limited to the site and the immediate local environment

IMPACT SEVERITY

The parameters that are utilised to determine the impact severity are a function of:

- The nature of the impact;
- The probability of the impact occurring;
- The duration of the impact;
- The extent of the impact; and
- The magnitude of the impact.

RECEPTOR SENSTIVITY

Two observer groups can be identified in the immediate local environment of the study area namely employees of the power station and motorists passing the power station. The categorisation implies that the observers in that particular category will experience and appreciate the visual resource in a fairly similar fashion and will therefore have a similar sensitivity.

Both groups are rated to have **low** viewer sensitivity due to their brief or infrequent exposure to the potential visual impact. Their reasons for visiting the study area are focussed on objectives such as passing through and their work

IMPACT SIGNIFICANCE ASSESSMENT

Impact severity rating		
	Without mitigation	**With mitigation**
Construction phase		
Nature of impact: A construction team will be present on site for the duration of the construction phase. The construction camp will be located in the dedicated area between boiler 6 and cooling tower 3. Possible additional dust clouds may occur during the construction process. No major visual changes are expected and at most, the work on the silo and FFP will be visible from the immediate surroundings.		
Probability	Improbable (1)	Improbable (1)
Duration	Short term (2)	Short term (2)
Extent	Immediate area, less than 1 km (1)	Immediate area (1)
Magnitude	Insignificant (0)	Insignificant (0)
Severity[1]	Very low (3)	Very low (3)
Status (Positive/Negative)	Neutral	Neutral
Operational phase		
Nature of impact: The project remains similar to the baseline environment and no significant visual change is expected. No visual intrusion or change to the character of the power station will occur.		
Probability	None (0)	None (0)
Duration	None (0)	None (0)
Extent	None (0)	None (0)
Magnitude	None (0)	None (0)
Severity	None (0)	None (0)
Status (Positive/Negative)	Neutral	Neutral
Reversibility	N/A	N/A
Irreplaceable loss of resources?	None	None
Can impacts be mitigated?	No impacts are identified during the operational phase. During construction, the potential exist that additional dust clouds may occur due to the construction process. This can be mitigated very effectively.	
Mitigation: Mitigate the potential for additional dust clouds originating from ground works, by wetting the surface and to cover exposed soil areas, either by paving or rehabilitating it with planting as soon as possible.		
Cumulative impacts: No risk of cumulative impacts are identified		
Residual Risks: No residual risks are identified		

Sensitivity of receptors	Severity of Impact	Significance of Impact
Low	Insignificant	Insignificant

[1] Severity is calculated by using the following formula: Severity=(Extent+Duration+Magnitude)Probability

CONCLUSION

The Visual Impact Assessment report addresses potential direct, indirect, cumulative and residual visual impacts that can be expected from the proposed project's construction and operation. The project has been assessed to have no significant visual impacts due to the low sensitivity of observers in the study area, being exposed to an insignificant degree of visual change.

The project entails alterations and additions within the power station's perimeter and will not impact on any visual amenities or drastically change the character of the power station or its surroundings. The baseline environment will stay the same or at least, similar to its current scenario. An improbable risk occur that additional dust clouds may occur during the construction process, as certain ground works is required. This can be effectively mitigation.

The new technology will reduce the current output of dust particulate emissions from the power station. To what degree the emissions will be reduced is uncertain and whether it will be noticeable with the naked eye is also unknown. If it were to cause a drastic emission reduction, it could be argued that the impact during operation is positive.

No reason could be identified why the project should not be authorised based on the assessment of the visual impacts.

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LIST OF ABBREVIATIONS

BA	Basic Assessment
BAR	Basic Assessment Report
DEM	Digital Elevation Model
DHP	Dust Handling Plant
ESP	Electrostatic Precipitators
FFP	Fabric Filter Plants
GIS	Geographical Information System
I&AP	Interested and Affected Party
NEMA	National Environmental Management Act
SOC	State Owned Company
VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment
ZMVE	Zone of Maximum Visual Exposure
ZVI	Zone of Visual Influence

1 INTRODUCTION

I-scape was appointed by Wandima Environmental Services to provide a Visual Impact Assessment (VIA) report for the proposed retrofitting of the existing electrostatic precipitators (ESP) with fabric filter plants and upgrading of dust handling plant at the existing Kriel Power Station in the Emalahleni Local Municipality, Mpumalanga (Figure 1). New air quality legislation requires the Kriel Power Station to adhere to more stringent limits with regards to particle emissions, thus prompting the upgrade of the existing ESP. The client, ESKOM SOC, proposes to retrofit the existing ESP with more effective particle emission abatement technology, Fabric Filter Plants (FFP) and upgrade of the Dust Handling plant (DHP) at units 1-6 of the power station. The assessment forms part of a Basic Assessment (BA) as required by the National Environmental Management Act (No. 107 of 1998) (NEMA as amended, 2014 Regulations).

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The information sources that are used include the studying of aerial photographs, such as those available to the public in the form of web-based maps etc., web research and information gathered during a site investigation. The site investigation was done during the month of April 2016. Project information is provided by the client and/or lead consultant.

2 METHODOLOGY STATEMENT

According to a study by the Transportation Research Board of the National Academies (2013) a ten point criteria can be used to evaluate a VIA methodology. The ten points that define a good standard of reporting are described as being:

1. Objective – the procedure should be designed to eliminate individual bias;
2. Valid – the procedure should be defendable and legitimate within a legal framework;
3. Reliable – adequately trained professionals following the same procedure should reach similar results;
4. Precise – the data required by the procedure should be measured at a grain or scale sufficiently fine to validly measure or describe characteristics of substantive interest and sufficiently coarse to be pragmatically implemented;
5. Versatile – the procedure supports valid assessment of different types of proposed changes from the perspectives of different viewer groups interacting with different landscape settings;
6. Pragmatic – the procedure can be easily and efficiently implemented by a trained professional;
7. Easily understood– the procedure and assessment are accessible by the public and decision makers;
8. Useful – the procedure and assessments affect location, design or mitigation decisions.

9. Consistently implemented – the procedure can be applied consistently among different projects and individual assessments are consistent with the chosen procedure;
10. Legitimate – the procedure is supported by laws, regulations or other legal mechanisms, uses socially/culturally accepted standards and uses scientifically accepted standards.

These ten points are considered international benchmarks in the compilation of a Visual Impact Assessment and will dictate the VIA methodology and assessment strategy for this project.

2.1 VIA METHODOLOGY

1) **Site investigation:** Identify sensitive viewpoints and capture the character of the visual environment by establishing a photographic record;
2) **Define study area and level of assessment:** Establish limits to the study area and determine an appropriate level of assessment;
3) **Project description:** Describe the type, scale and visual characteristics of the proposed project;
4) **Describe the characteristics of the study area:** Understand the topography, land use, ecology and social environment;
5) **Visual Impact Assessment:** Determine the sensitivity of the receptors, the severity of the impacts and assess the significance of the potential visual impacts;
6) **Mitigation Measures:** Propose mitigation measures to avoid, reduce, or remediate the impacts or propose measures to compensate or enhance for the impacts; and
7) **Conclusion:** Provide closing statements.

3 DEFINING STUDY AREA AND LEVEL OF ASSESSMENT

3.1 DEFINING A STUDY AREA

As pointed out in number 4 of Section 2, part of developing an appropriate study methodology is to establish a suitable scale of assessment. Generally, the scale of assessment occurs on four levels namely; site, local area, region or larger region.

- **Site** is the smallest level of assessment and stipulates the extent of the activities related to the project activities and components. This is limited to the footprint of the project or the area of disturbance;
- The **local area** is limited to the immediate surroundings and is defined by the properties on which the project is located and could possibly include the surrounding properties as well;
- A **region** is described by area classifications such as municipalities/districts and cities/towns; and
- A **larger region** is measured by provincial, national or international borders being crossed or affected.

The proposed project will take place within the existing boundaries of the Kriel Power Station and will be integrated into the existing systems. All of the retrofitted equipment and additional structures will be located on the eastern and southern side of the power station. Many of the equipment and structures associated with the ESP, FFP and DHP will not be visible from surrounding views as it will be housed within the existing precipitator units. Alternative configurations of ash conveying air pipes will be required on top of the silo and a new conveying air compressor house and substation will be built next to chimney 2. Another major addition to the power station is the cleaning air equipment building on the southern side of chimney 2. The area between cooling tower 3 and the cleaning air equipment building will be used as the construction camp and laydown yard.

The scale of the study area can be limited to the site as all the project activities and components will occur within the boundaries of the existing power station. It is expected that some project components may be visible from points outside the site and therefore the local area will be the largest scale to assess.

3.2 LEVEL OF ASSESSMENT

The level of assessment is a function of the scale of the project, the nature of the study area and the sensitivity of the receptors. According to the National Environmental Management Act (No. 107 of 1998) (NEMA as amended, 2014 Regulations), a BA is required. The purpose of the Basic Assessment Report (BAR) is to identify any potential visual impacts and to elaborate on its significance.

4 LIMITATIONS AND ASSUMPTIONS

This section provides a clear understanding of the limitations and assumptions that influence the accuracy of the assessment and the confidence of the visual specialist in his professional judgement. The level of confidence is a function of the level of knowledge and information that is available with regards to the study area and the project.

- A Visual Impact Assessment is not a purely objective science and often integrates qualitative evaluations based on assumed human perceptions. It is the visual specialist's intention to utilise as much quantitative data and scientific research as possible to substantiate professional judgement and to motivate subjective opinions;
- No detail sketches were available on the physical appearance of the retrofitted components and additional infrastructure. From the technical descriptions it can be safely assumed that all new additions will be similar in appearance as the existing infrastructure;
- No detail information was available on the construction processes required to implement the new project. It is assumed to be a low intensity construction process considering the scale of the project; and
- It is uncertain to what degree the particulate emissions will be reduced and whether dust clouds emanating from the silo and chimneys will be any less visible than the current scenario. It is assumed that it will be less visible.

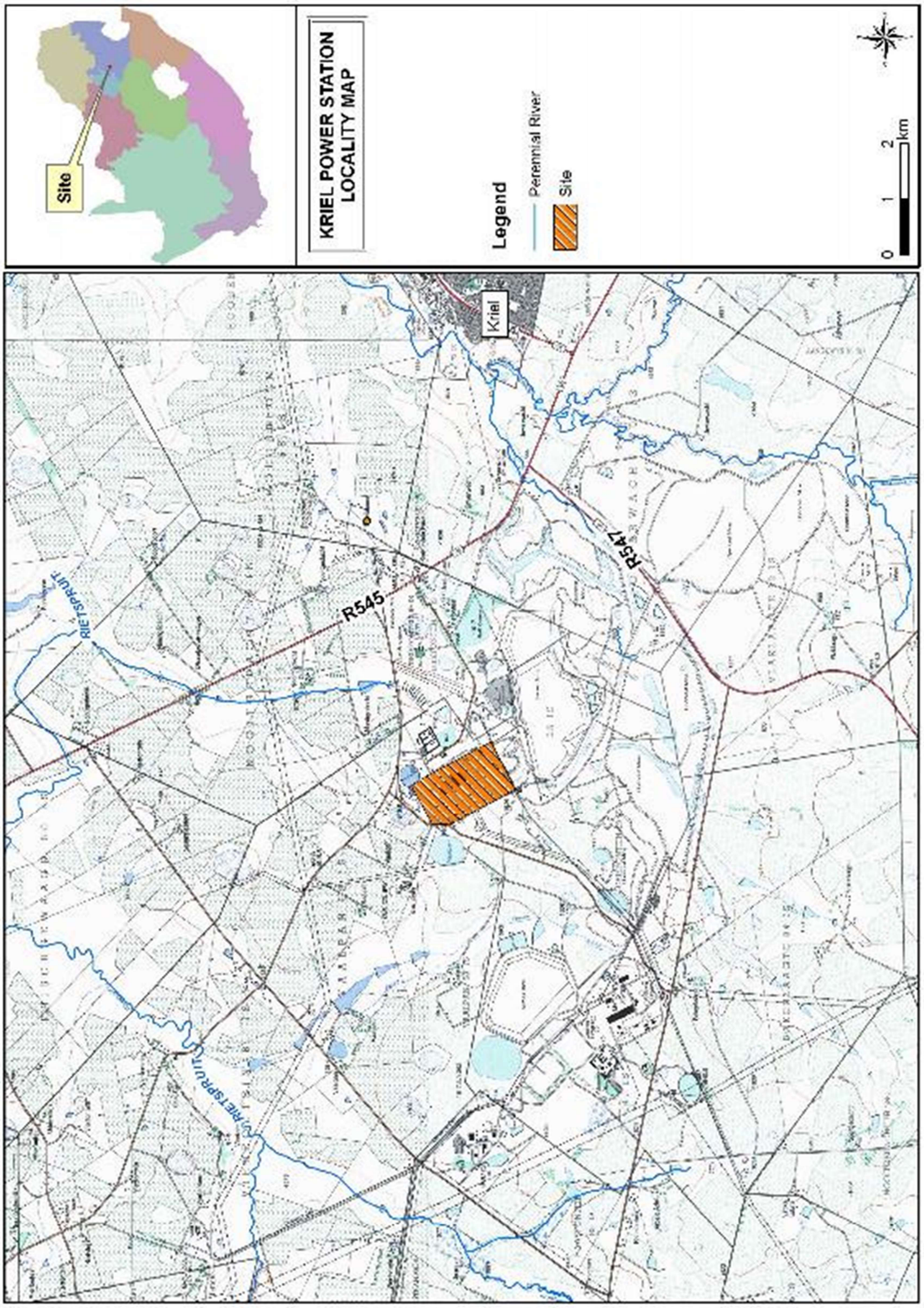

Figure 1: Locality map

5 PROJECT DESCRIPTION

The proposed project entails the retrofitting of a FFP to the existing ESP at the Kriel Power Station. The main purpose is to reduce particulate emissions to such a degree that the power station can comply to existing and future plant particulate matter limits as set out in the stations Atmospheric Emission Licence (AEL) by 2020. This requires an ongoing construction phase of approximately 4 years.

The Kriel Power Station has a design life expectancy of 50 years, ending 2030, but a possible 60-year operational life expectancy may be likely, ending of the last unit November 2040. This entails an operational phase for the FFP of 10-20 years. There are no siting alternatives to the additions and alternations due to the existing power station infrastructure location and process requirements.

The construction phase is ongoing to meet the AEL demands by 2020. For a period of approximately 4 years, the construction camp and laydown yards will be located between cooling tower 3 and boiler 6 (Figure 2). This will presumably consist of temporary site offices, ablution facilities and an open laydown area. During the construction phase the following major alterations and additions will be made to the power station:

- A Pipe Rack for Ash Conveying Air pipes will be added;
- The Conveying pipe layout will be changed on top of the Silo;
- The DHP will be upgraded to accommodate new and larger pressure vessels to be installed beneath each of the FFP hoppers. The vessels will be installed on the existing concrete slab under the footprint of the FFP casing.
- New FFP that will be within the footprint of the currently installed ESPs. The FFP casing will be slightly higher than the existing ESP, increasing from 22.8m to 26.7m;
- New Conveying Air Compression House and Substation will be built between the silo and precipitators; and
- A new Cleaning Air Equipment building will be constructed next to boiler 6. It will be 61m x 17m x 13.7m(h) and will be a steel frame concrete building with corrugated iron roof.

Other alterations may occur such as the demolishing of certain structures and moving of pipelines subject to certain conditions, but this is considered small project activities and components, relative to the scale of the project.

During the construction phase a construction team will be present on site. It can be assumed that basic construction equipment will be utilised such as mobile cranes and earth moving vehicles. At most, a fixed crane may be installed for an indeterminate period. Most construction activity is expected to occur on ground-level with the exception of certain major structural alterations.

All the proposed project components and activities will occur within the existing footprint of the power station and will not alter the visual character of the power station in any significant way. New structural additions will be in a similar architectural style as to the existing buildings on the site. Relative to the scale of the cooling towers, boilers and chimneys, the project is considered a small-scale alteration and low intensity construction activity.

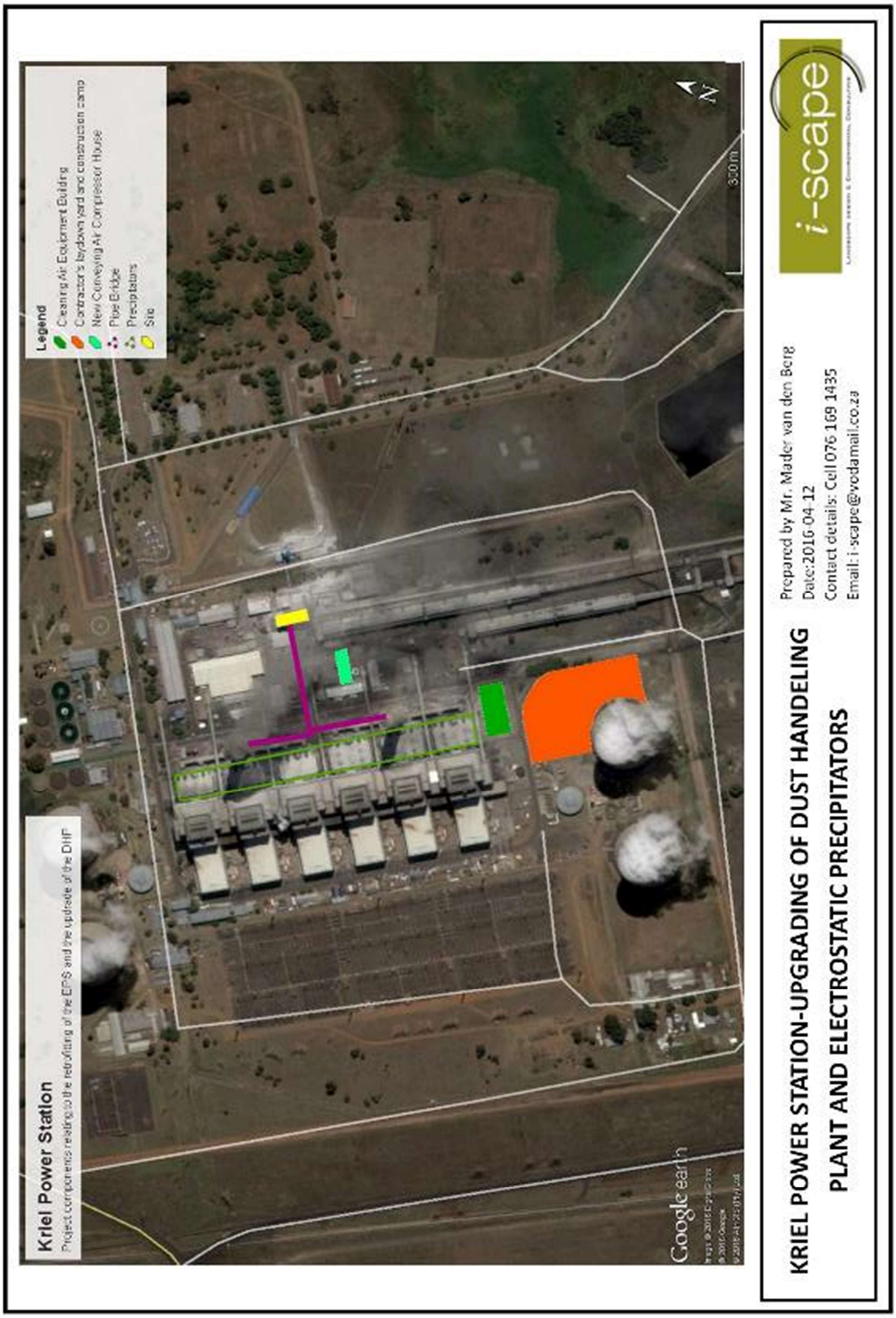

Figure 2: Aerial view of additions and alternations

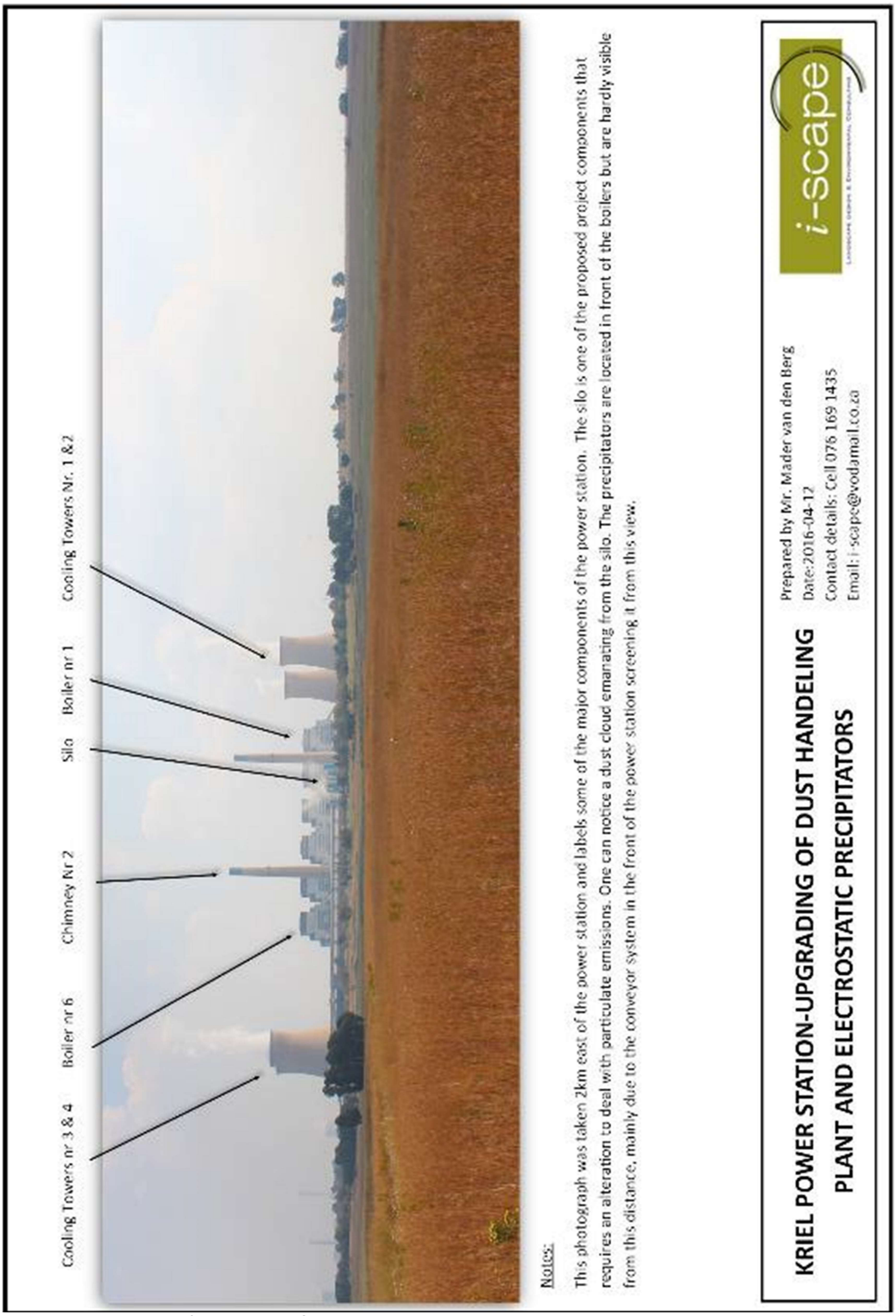

Figure 3: Distant view of Kriel Power Station

Figure 4: Close-up view of Kriel Power Station

6 STUDY AREA

The study area can be described as the area affected by visual impact. The factors that most significantly influence the visibility of the potential visual impacts are topographic variations in the landscape and the land use or land cover, which could potentially expose or screen the proposed project from sensitive viewpoints. These factors also contribute to the landscape character and is described in Table 1. Reference are made to the visibility of the project components and activities in order to justify the scale of the study area as mentioned in Section 3.1.

The study area is limited to the site of the new project which is within the boundaries of the Kriel Power Station. Figure 2 provides an indication of where the project will occur in relation to the existing footprint of the power station. The scale of the project is considered small, relative to the scale of the existing infrastructure such as the boilers, cooling towers and chimneys. It has been noticed during the site investigation that very few of the proposed project components are visible from views outside the power station site. Figure 3 & Figure 4 illustrates two views, one at about 2 km from the power station and one very near. The major project components such as the new FFP and the Cleaning Air Equipment Building are situated near the boilers and are behind the conveyor belt systems. The only components that will be visible outside of the site is the alterations to the pipe layout on top of the silo. This is a relatively small alteration and will only be visible to views near the power station therefore the immediate local area is considered as the largest study area.

Table 1: Study area character description

Topography	Generally, the natural topography is undulating with a general downwards slope towards the north east (Figure 5). Major topographic alterations occur to the south of the Kriel Power Station where the ash dumps and coal stockyards are located. This has elevated the natural ground level to heights of 10-20 m. Other topographic alterations occur around the water reservoirs to the north of the power station to contain processing water. The altered topography plays a major role in the screening of the Kriel Power Station and the proposed project components and activities. The only open views that were recorded of the power station, are from the east along roads such as the R545 and the eastern entrance road to the power station. Views from the R547 and R580 are completely or at least partially screened towards the power station and no visibility of the proposed project components or activities will be possible.
Vegetation	The study area is located in the Highveld region and is typically characterised by grassland vegetation and very few natural trees or shrubs (Figure 7). The greater region is transformed and large areas are actively cultivated. Maize production is one of the major agricultural activities, in addition to cattle ranching. Exotic trees have been planted along the roads entering Kriel Power Station and surrounding the developments that are located near the power station. The Kriel Golf Course and certain administration villages are situated east of the powers station and features an abundance of exotic trees. These trees conceal the base of the power station from views inside the golf course and administration villages. The natural vegetation and agricultural fields contribute minimally to the screening of the Kriel Power Station due to their generally low heights. The exotic trees that are present along the roads to the power station and the surrounding developments provide a significant degree of screening from specific locations. Complete to partial screening of the power station can be experienced from the entrance road to the Kriel Golf course. Views from roads such as the R545 and the northern by pass route are mostly open with limited vegetation screening.
Land use	The main regional land use is agriculture and is represented by cultivated maize fields or cattle farming that utilises the natural grassland for grazing Figure 6). Two power stations are located in close proximity to each other, namely the Kriel and Matla Power Stations (Figure 8). The power stations are impressive in scale and towers over the undulating landscape. Surrounding the power stations are coal stock yards and ash dumps that occupy very large areas. Other minor land uses can be identified east of the Kriel Power Station. Community centres, a school, administrative villages and the Kriel Golf Course are situated along the entrance road branching from the R545.
Degree of naturalness/ transformation	The site and the immediate surroundings are highly transformed and very little of the natural environment is present on or near the site. The site can be described as having an industrial character with the Kriel Power Station being the most prominent structure. Coal stock piles and ash dumps occupy the area east of the power station. The Matla Power Station is located a couple of kilometres west of Kriel Power Station. The entire area between the R545, R547 and R580 are dedicated to power generation with the exception of a couple of pans and fragmented grassland patches that is dwarfed by the massive scale of the power station and the ash dumps. The power station is located in a rural landscape that is mostly farmed.

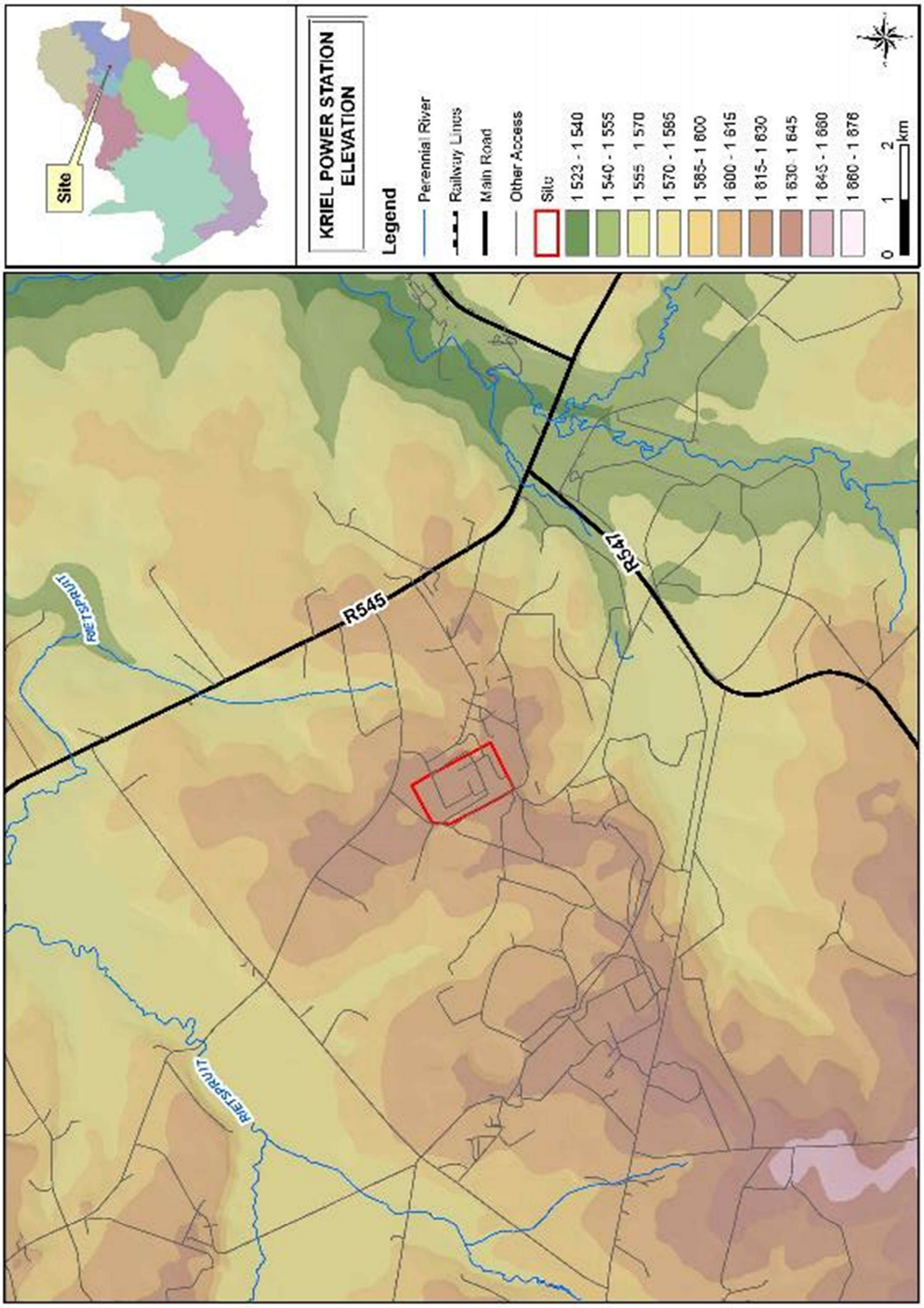

Figure 5: Elevation map

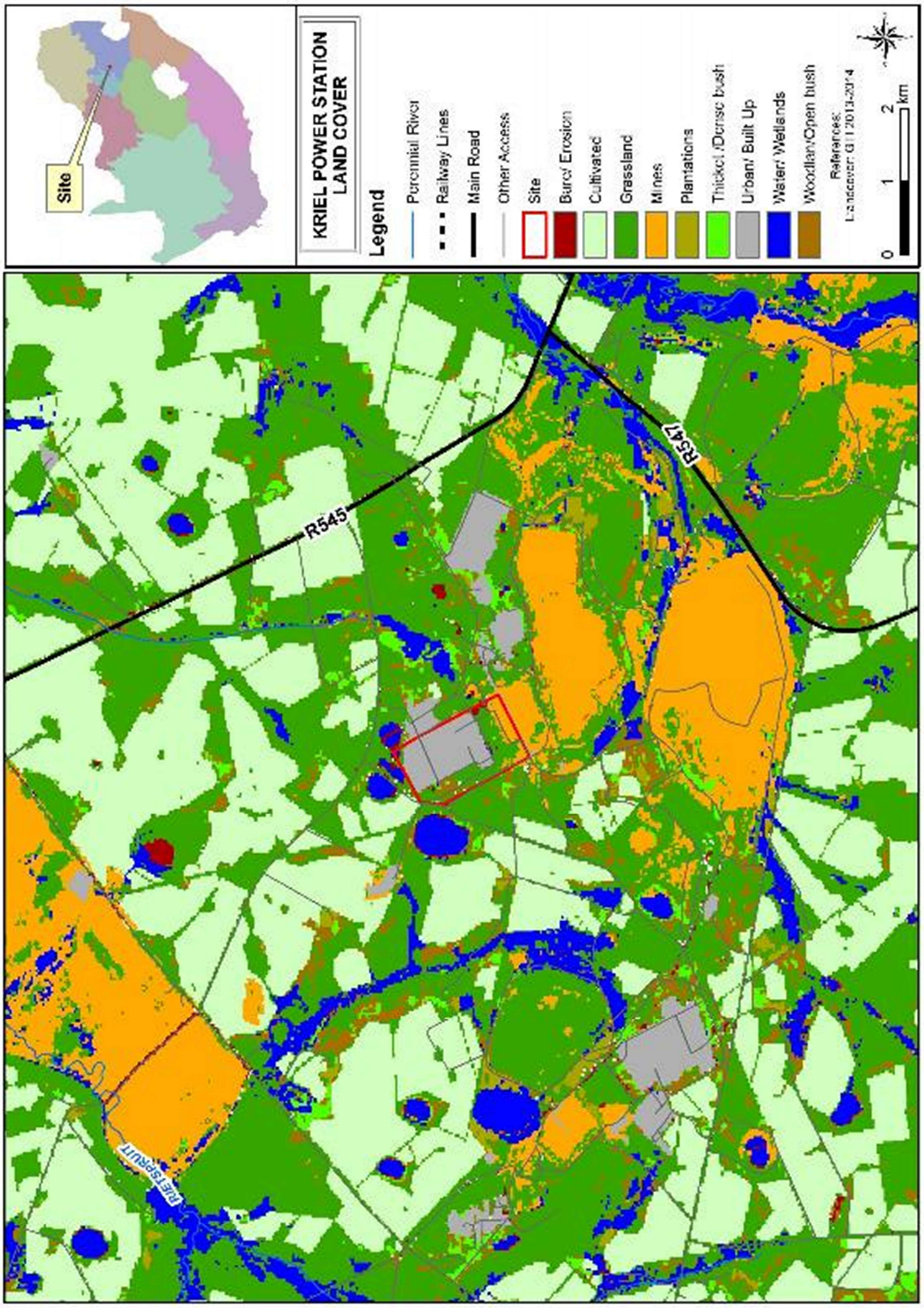

Figure 6: Land cover map

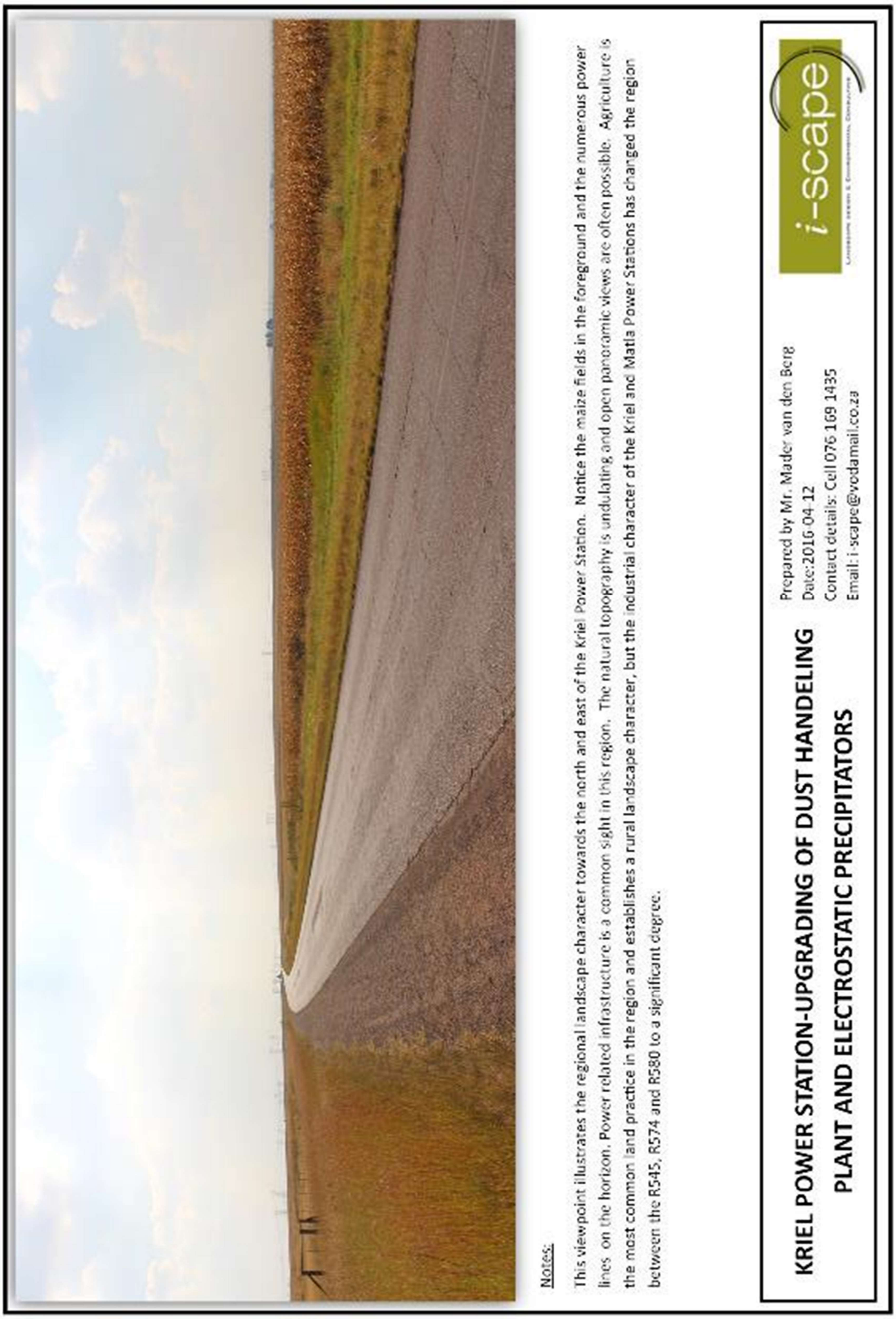

Figure 7: Regional Landscape Character

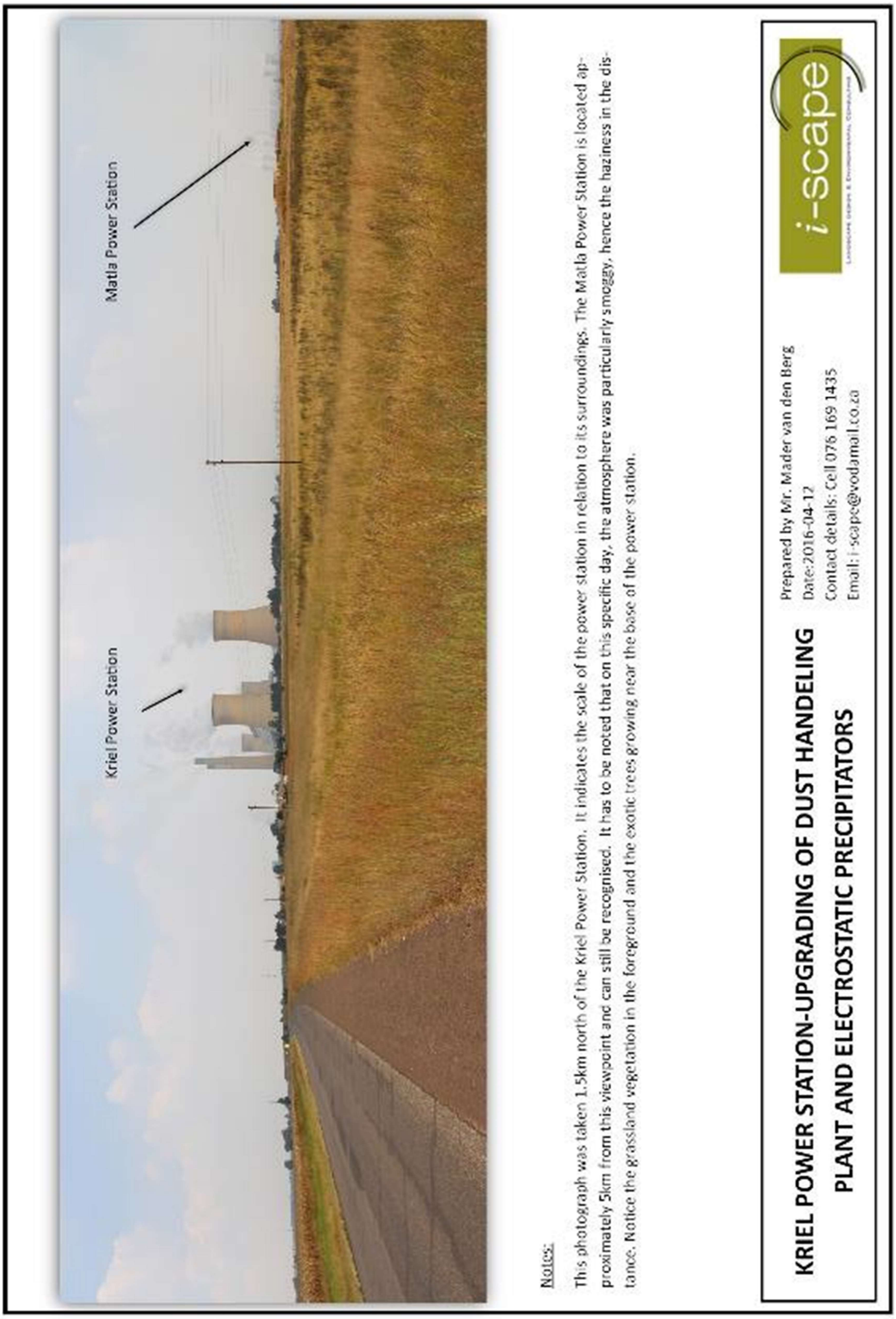

Figure 8: Kriel Power Station in its context

7 VISUAL IMPACT ASSESSMENT

As mentioned in Section 1, a VIA is a specialist study that assesses the potential visual changes/impacts to an existing baseline setting resulting from the implementation of a proposed project. This implies that, firstly, a baseline must be established and secondly, the visual change, resulting from the project, must be compared to the baseline. The quantification of the significance of the change is a further development in the assessment process and ultimately describes the degree of concern or the level of importance that relates to the visual change. For a visual impact to occur, the visual change should be firstly visible, and secondly it should be severe enough as to impact on the receptors.

The essence of determining the significance of visual impact for a particular project, centres on the severity of the potential impacts, and the sensitivity of the affected receptors. In simple terms, a low severity impact affecting receptors of low sensitivity, will result in a low significance. On the other end of the scale, a highly severe impact, affecting highly sensitive receptors, will result in a high significance. This is illustrated in Table 2.

Table 2: Impact significance matrix

		Impact severity				
		Very high	High	Medium	Low	Very low
Receptor sensitivity	Very high	Substantial	Major	Major/Moderate	Moderate	Moderate/Minor
	High	Major	Major/Moderate	Moderate	Moderate/Minor	Minor
	Medium	Major/Moderate	Moderate	Moderate/Minor	Minor	Minor/Negligible
	Low	Moderate	Moderate/Minor	Minor	Minor/Negligible	Negligible
	Very low	Moderate/Minor	Minor	Minor/Negligible	Negligible	Negligible/None

7.1 BASELINE ESTABLISHMENT

The baseline environment comprises of an existing power station with a highly industrial character in a rural landscape setting. The study area is limited to the site and the immediate local environment.

7.2 IMPACT SEVERITY

The parameters that are utilised to determine the impact severity are a function of:

- The nature of the impact;
- The probability of the impact occurring;
- The duration of the impact;
- The extent of the impact; and
- The magnitude of the impact.

7.3 RECEPTOR SENSITIVITY

Within the study area, specific observers experience different views of their environment and therefore value it differently. They may be affected by the proposed project when they are within the visibility zone and their visual environment is noticeably changed.

The sensitivity of an observer is related to the value an observer has for the particular visual resource being impacted. To determine viewer sensitivity a commonly used rating system is utilised (Table 3). This is a generic classification of observers and enables the Visual Specialist to establish a logical and consistent viewer sensitivity rating for viewers who are involved in different activities without engaging in extensive public surveys.

Table 3: Viewer Sensitivity

VIEWER SENSITIVITY	DEFINITION (BASED ON THE LANDSCAPE INSTITUTE, 2002 ED PP90-91)
Exceptional	Views from major tourist or recreational attractions or viewpoints promoted for or related to appreciation of the landscape, or from important landscape features.
High	Users of all outdoor recreational facilities including public and local roads or tourist routes whose attention or interest may be focussed on the landscape; Communities where the development results in changes in the landscape setting or valued views enjoyed by the community; Residents with views affected by the development; People generating an income from the visual resource or pristine quality of the environment.
Moderate	People engaged in outdoor sport or recreation (other than appreciation of the landscape); People commuting between work place and home or other destinations that do so at regular intervals.
Low	People at their place of work or focussed on other work or activity; Views from heavily industrialised or blighted areas. Motorists travelling at high speed with their focus placed on the road ahead.

Two observer groups can be identified in the immediate local environment of the study area namely employees of the power station and motorists passing the power station. The categorisation implies that the observers in that particular category will experience and appreciate the visual resource in a fairly similar fashion and will therefore have a similar sensitivity.

Both groups are rated to have **low** viewer sensitivity due to their brief or infrequent exposure to the potential visual impact. Their reasons for visiting the study area are focussed on objectives such as passing through and their work.

Visual exposure and human perceptions also contribute to the sensitivity of observers. **Visual exposure** is measured by the:

- Distance from the source of impact;
- Visibility of the project considering screening, visual contrast and the decrease in visibility over distance; and
- Duration i.e. sustained, temporary, intermittent, frequent, etc.

Human perceptions are for all practical reasons subjective, but are considered a valuable indication as to how observers respond to a proposed project. Often the general acceptance or non-acceptance of a project/development will come out in Public Participation events. No response was received from Interested and Affected Parties with regards to visual issues at the time this report was compiled. It can be argued that the proposed project could be deemed acceptable due to the fact that it is within the current footprint of the power station and that the project are associated with the function of the power station. No visual amenities will be removed or damaged and the visual character of the power station will remain the same. Very little visual changes are expected and therefore observers will experience a minimal change to their visual environment.

7.4 CRITICAL VIEWPOINTS

A number of viewpoints are assessed to illustrate the potential visual change during the implementation and operation of the project. Figure 3, Figure 4 and Figure 8 are viewpoints from various distances and locations around the power station. Figure 4 is the closest view that can be experienced from any publicly accessible area and shows the silo and ESP locations. The ESPs will be changed to accommodate the new FFP, which entails a slightly larger casing to be constructed. Pipe layouts will be changed on top of the silo and other minor alterations and additions could also be visible from this viewpoint. It is highly unlikely that any of the other project components or the construction camp will be visible from this viewpoint due to the conveyor system blocking the views.

Figure 3 and Figure 8 are views from 2km and 1.5km distances respectively. The only part of the project that can be visible in Figure 3 is the pipe layout configuration that will be changed on top of the silo. This will bring about an insignificant visual change that will hardly be noticeable from this point. In Figure 8 it is the dust emanating from the silo that is visible. If the new FFP is very effective, less dust will be released into the atmosphere and the dust cloud may be less visible. It is uncertain to what degree the new technology will reduce the dust.

It is therefore confirmed that the extent of the visual impact is limited to the site and the immediate local environment. Any views outside this location will experience an insignificant visual change. A summary of the impact severity during the construction and operational phases is provided in the following table.

Table 4: Impact severity

Impact severity rating		
	Without mitigation	**With mitigation**
Construction phase		
Nature of impact: A construction team will be present on site for the duration of the construction phase. The construction camp will be located in the dedicated area between boiler 6 and cooling tower 3. Possible additional dust clouds may occur during the construction process. No major visual changes are expected and at most, the work on the silo and FFP will be visible from the immediate surroundings.		
Probability	Improbable (1)	Improbable (1)
Duration	Short term (2)	Short term (2)
Extent	Immediate area, less than 1 km (1)	Immediate area (1)

Magnitude	Insignificant (0)	Insignificant (0)
Severity[2]	Very low (3)	Very low (3)
Status (Positive/Negative)	Neutral	Neutral
Operational phase		
Nature of impact: The project remains similar to the baseline environment and no significant visual change is expected. No visual intrusion or change to the character of the power station will occur.		
Probability	None (0)	None (0)
Duration	None (0)	None (0)
Extent	None (0)	None (0)
Magnitude	None (0)	None (0)
Severity	None (0)	None (0)
Status (Positive/Negative)	Neutral	Neutral
Reversibility	N/A	N/A
Irreplaceable loss of resources?	None	None
Can impacts be mitigated?	No impacts are identified during the operational phase. During construction, the potential exist that additional dust clouds may occur due to the construction process. This can be mitigated very effectively.	
Mitigation: Mitigate the potential for additional dust clouds originating from ground works, by wetting the surface and to cover exposed soil areas, either by paving or rehabilitating it with planting as soon as possible.		
Cumulative impacts: No risk of cumulative impacts are identified		
Residual Risks: No residual risks are identified		

7.5 IMPACT SIGNIFICANCE

Table 5: Impact significance

Sensitivity of receptors	Severity of Impact	Significance of Impact
Low	Insignificant	Insignificant

[2] Severity is calculated by using the following formula: Severity=(Extent+Duration+Magnitude)Probability

8 CONCLUSION AND RECOMMENDATIONS

The Visual Impact Assessment report addresses potential direct, indirect, cumulative and residual visual impacts that can be expected from the proposed project's construction and operation. The project has been assessed to have no significant visual impacts due to the low sensitivity of observers in the study area, being exposed to an insignificant degree of visual change.

The project entails alterations and additions within the power station's perimeter and will not impact on any visual amenities or drastically change the character of the power station or its surroundings. The baseline environment will stay the same or at least, similar to its current scenario. An improbable risk occur that additional dust clouds may occur during the construction process, as certain ground works is required. This can be effectively mitigation.

The new technology will reduce the current output of dust particulate emissions from the power station. To what degree the emissions will be reduced is uncertain and whether it will be noticeable with the naked eye is also unknown. If it were to cause a drastic emission reduction, it could be argued that the impact during operation is positive.

No reason could be identified why the project should not be authorised based on the assessment of the visual impacts.

9 REFERENCES

As a matter of best practice, this assessment is based on internationally accepted guidelines and standards with regards to VIA. The following sources are frequently referred to:

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