THE PROPOSED SOLAR POWER PLANT, NORTHERN CAPE

Specialist Study Report
VISUAL ENVIRONMENT – ASSESSMENT

Submitted to:
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1.0 INTRODUCTION

1.1 Project

In order to explore new generation options, find solutions that can contribute to meeting the growing electricity demand and in an effort to utilise renewable energy resources, the feasibility of constructing a Concentrated Solar Power (CSP) plant (the project) with a maximum capacity of 100 MW electrically in the Northern Cape, is being assessed. The intention of this effort is to develop solar resources to generate electricity and reduce the dependence on non-renewable fossil fuel resources. This proposed facility will utilise the sun as the fuel source. The project would include a Solar Field, Molten Salt Circuit, Power Block and Auxiliary Facilities and Infrastructure and is proposed to be located on Farm 469, Hay RD (Humansrus), approximately 4 km southeast of Groenwater and 30 km east of Postmasburg. SSI Engineers and Environmental Consultants (Pty) Ltd appointed Newtown Landscape Architects cc (NLA) to carry out a Visual Impact Assessment as part of the EIA process. This *Scoping Report* is the first phase of the process. An *Assessment Report* will follow in due course. Refer to the Figure 1 „Locality" for the location of the project site.

1.2 Terms of Reference

NLA"s terms of reference are as follows:

Compilation of a *scoping report* to include the following, but not limited to:

- An introduction to the study;
- An overview of the local and regional visual and landscape character;
- A description of the potential impacts (including cumulative impacts) on visual and landscape character, and sensitive receptors occurring within the general area of the study site to be further investigated during the EIA phase of the project;
- Any assumptions, limitations and / or constraints associated with the study;
- Recommendations on any further studies that may be required during or after the EIA process.

1.3 Assumption and Limitations

It is assumed that the farmsteads that fall within the visual study area could be occupied and therefore these viewing points have been identified as potentially being sensitive. This assumption will be verified during the assessment phase. The project description is as given to NLA by the environmental consultants and this stage the exact footprint within the project site is not known.

1.4 Aim of the Study

The main aim of the study is to ensure that the visual consequences of the proposed project are understood and adequately considered in the planning process. The objectives of the study are to:

- To define the visual resource and sense of place of the study area;
- To identify the sensitive receptors / lines of site;
- To determine and rate the visual impact;
- To simulating the key proposed infrastructure components against the visual baseline;
- To assess the cumulative visual impact; and
- To provide input, together with Beal and other specialists into visual management measures to minimize negative visual impacts.

2.0 APPROACH AND METHODOLOGY

A field survey was undertaken on 27 April 2011 and the project site visited and the study area scrutinized. Photographs of the general area were taken from public roads towards the proposed project site. The study area is defined as a 20 km radius about the proposed project site. Beyond this distance the proposed CSP project would be „absorbed" into its landscape setting or reduced in scale within in the viewing arc that its impact and visual exposure would be insignificant.

To evaluate the impacts of the project the inherent scenic value of the landscape (visual resource) first needs to be determined. Data collected during a site visit allowed for a comprehensive description and valuation of the receiving environment and also for issues to be identified that must be addressed in the impact assessment phase. The full visual impact process is indicated in Diagram 1 below. The following method was used for the scoping phase of the project.

- **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;
- **General landscape characterization** - landscape character types were mapped using field survey and physiographic data (from 1:50 000 maps). The description of the landscape focused on the nature of the land rather than the response of a viewer;
- **Scenic quality** - using the landscape character types, sense of place and studies for perceptual psychology, the aesthetic value of study area (scenic quality) was determined.
- **Project components** - the physical characteristics of the project components were described and illustrated by way of example.
- **Visual issues** - based on the baseline survey visual issues were identified that should be addressed in the impact assessment phase.

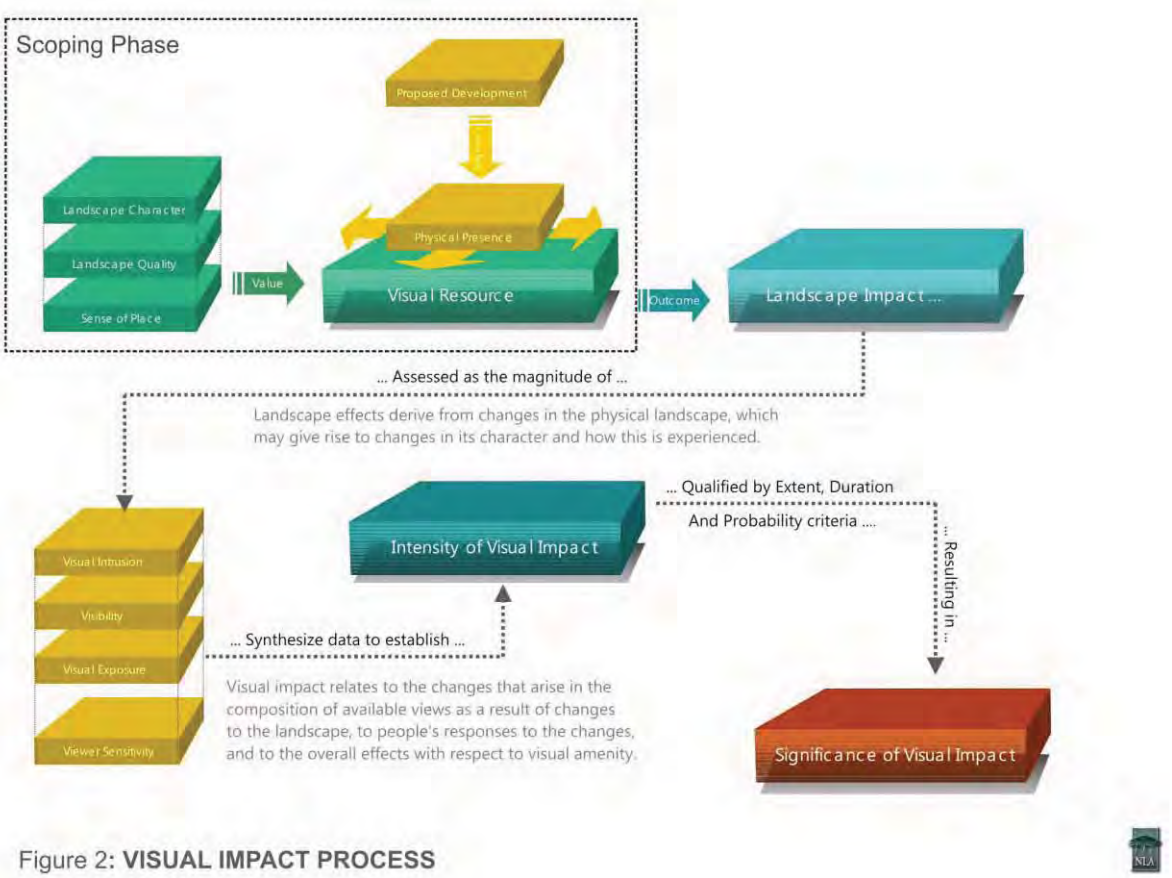

Figure 2: **VISUAL IMPACT PROCESS**

Diagram 1: Visual impact Process

3.0 DESCRIPTION OF THE PROJECT

The proposed project can be defined as a solar thermo-electric power plant that is embodied in the form of a Concentrated Solar Power (CSP) Plant. The key factor, however, is the amount of thermal storage required, as this determines the number of heliostats to be installed. The CSP Plant is proposed to be a molten salt-type, Central Receiver technology. This technology is based on the concept of thousands of large tracking mirrors (known as heliostats) which track the sun and reflect the beam radiation to a common focal point. This focal point (the central receiving tower) is located well above the heliostat field in order to prevent interference between the reflected radiation and the other heliostats. The tower is 200m from the ground up and each heliostat receiver (tracking mirror) is estimated to between 10 and 15 meters above ground level. The glare generated by the heliostat field is expected to be quite significant and this, along with the physical presents of project components, needs to be clearly understood in assessment phase of the project. The CSP plant requires approximately 3 square kilometres of terrain with little relief to satisfy construction needs and the pylons that would connect the CSP to the grid are also included in the description of the project. Construction is proposed to start in Jan 2013 for a 30 month construction period.

A variety of components make up the CSP plant. They are:

The Power Block

- Tower (to concrete deck): 163.98m;
- Steam Generating Building: 43,22m;
- Water Treatment Plant: 9,19m;
- Electric Building: 8,6m;
- Control Building: 5,67m;
- Fire Water Pump Building: 4,44m;

The Administrative Area

- Administration Building 8,25m;
- Warehouse 9,2m; and
- Guardhouse 3,9m.

A heliostat is a mirror mounted on an axis by which the sun is steadily reflected onto one spot. Heliostats are arranged in an elliptical formation around the focal point with the majority of the

reflective area weight to the more effective side of the heliostat field (refer to Figure 2 at the back of the report).

The central receiver is situated on the top of the central tower. This receiver is in essence a heat exchanger which absorbs the concentrated beam radiation, converts it to heat and transfers the heat to the working fluid (i.e. molten salt) which is in turn used to generate steam for conventional power generation.

Power is generated through a conventional Rankine cycle (steam turbine process). The working fluid is a salt mix of a 60:40 ratio of Sodium Nitrate ($NaNO_3$) and Potassium Nitrate (KNO_3). The cold salt is pumped up the central tower at approximate 300°C and flows through the central receiver where it is heated to approximately 550°C after which it can be stored for use in the conventional power generation process (maintaining 98% thermal efficiency).

At this stage the exact footprint within the project site is not known.

4.0 THE ENVIRONMENTAL SETTING

4.1 Landscape Character

The study area is situated in the Kalahari Mountain Bushveld (Low and Rebelo) savannah biome, which typical is found on rocky, shallow soils on the hills at an altitude of 450 to 1250m. It is an open savannah dominated by Camphor Tree (*Tarchonanthus camphoratus*) and Kanibus (*Rhus undulate*) and Broom Karee (*Rhus dregeana*) become the principal shrubs. The tree layer is poorly developed and individuals of Wild Olive (*Olea europaea* subsp. *africana*) and Black Thorn (*Acacia mellifera* subsp. *detinens*) are widely scattered. The grass layer is moderately developed depending on the rockiness of the area. The primary land-use is livestock farming of cattle, goats and sheep and it is a poorly conserved biome.

The project site comprises an open grassland valley between two small ridges to the west and east of it, which merge into a general ridgeline north of the site. These ridges are have a reasonably developed savannah cover of small shrubby material. This is especially evident in the northern sectors of the site. Refer to View 4 in Figure 5 and Views 5 and 6 in Figure 6. South of the project site the valley is split by a small rise in topography that extends to the south east and the Lime Acres mining complex and town. The „central" grassland areas of the project site are used mostly for livestock grazing.

The higher hills to the far north, west (refer to Views 1 and 2 in Figure 4) and east (refer to View 7 Figure 7) of the project site are also dominated by a reasonably established savannah cover but there is a dearth of tall trees and the tree layer is generally poorly developed. Most tall trees within the study area are Blue Gums associated with farmsteads or urban developments.

The areas to the south of the project site are generally flatter and more open and dominated by grasslands, used mostly for grazing (refer to Views 9 and 10 in Figures 8). The south western section of the project site also has this character and the topography tends to rise to a shallow ridgeline running from the R385 to the Lime Acres farm road (refer to View 11 Figure 9). Further to the south west toward Lime Acres the landscape is again of a „rolling" nature and the road and other infrastructure are contained within a shallow valley between two ridges (see View 8 Figure 7).

The grassland valley system extends north of the project site and north of the R385 and is eventually „embraced" by reasonably high hills that extend further north. Figure 9 View 12 from a small settlement north west of the project site and View 3 in Figure 5 illustrate the character of the grasslands in this area.

Throughout the study area railway, road and electricity infrastructure is evident and as the traveller nears Lime Acres, mining infrastructure and urban landscapes tend to dominate. Also, to the far north east of the project side beyond the hills, are the Owendale and Danielskuil mining activities (refer to Figure 10 which identifies these areas and infrastructure).

Generally, the landscape that embraces the site in the north, west and east (Figures 4, 5 and 6) is a more distinctive and varied and tends to be more interesting than the characteristics of the study area to the south of the site, which is less diverse and more open (Figures 8 and 9).

4.2 Sense of Place and Aesthetic Value

Landscapes with greater diversity or containing "distinctive" features are classified as having a higher scenic value than landscapes with low diversity, few distinctive features, or more “common" elements. Generally, the greater the diversity of form, line, texture, and colour in a landscape unit or area, the greater the potential for high scenic value. Scenic quality classifications and therefore categorised as:

- High - distinctive landscape often with a strong sense of place;
- Moderate - common landscape; And
- Low - minimal landscape often with a weak sense of place and the presence of man-made structures and infrastructure that discordant and promote strong disharmony.

The study area can be divided into a number of primary „landscape types“ each with its unique landscape characteristic, sense of place and aesthetic value. These are mapped in Figure 10 and include:

- Kalahari Mountain Bushland;
- Rolling grassland with drainage lines;
- Rural villages;
- Urban areas;
- Infrastructure and utilities; And
- Mining activities.

Using the criteria and values defined in Appendix A along with the discussion on landscape character in Section 4.1 above, the visual quality of the study area is rated across a range of values. Table 1 below summarises these findings.

Table 1: Value of the Visual Resource - Scenic Quality

High	Moderate	Low
Kalahari Mountain Bushveld	*Rolling open grasslands with drainage lines rural villages and towns*	*Urban, Mining and Power and Rail Infrastructure*
This landscape type is considered to have a *high* value because it is a:	These landscape types are considered to have a *moderate* value because they are:	These landscape types are considered to have a *low* value because they are:
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. It may be sensitive to change in general and may be detrimentally affected if change is inappropriately dealt with.	Common landscapes that exhibit some positive character but which have evidence of alteration /degradation/erosion of features resulting in areas of more mixed character. They are potentially sensitive to change in general and change may be detrimental if inappropriately dealt with but change may not require special or particular attention to detail.	Minimal landscapes generally negative in character with few, if any, valued features due to their inherent characteristics or due to major negative man-made impacts. Scope for positive enhancement could occur.

However, the value of the visual resource when the various landscape types are taken together (they are not perceived as one unit in the landscape as the eye is always roving and often embraces many of these landscape types in one view) and which are representative of the overall quality of the study area"s areas landscape, the rating is *moderate* within the context of the sub-region. This is primarily due to the „intrusion" of mining, urban and infrastructure projects, which reduce the positive effect that the hills have on the scenic beauty of the study area. The project site would also have *moderate* rating as its scenic value is compromised by the rail and power lines to the west of the site.

5.0 VIEWS AND SENSITIVE RECEPTORS

5.1 Viewing areas

The project site lies in a shallow valley between two ridgelines that mostly contain the visuals of the heliostats (orange viewshed footprint in Figure 11) to a band of approximately 5km to the east and west of the project site. Along the length of the valley north and south of the site, exposure is greater and would affect foreground and background views i.e. up to 10 km from the site.

The central receiving tower, which is 200m tall, would be visible from a far greater distance as in indicated in the viewshed in Figure 11. However, beyond 8km it would tend to recede into the background of views and at 16km it would be deemed as „infrequently" viewed as its scale relative to the viewing envelope would be very small and other features in the landscape would demand visual attention.

Public views (sensitive viewing areas) to the project site would be experienced by people living, working and passing through the study area. The closest of these viewing areas and the most exposed to the impact of the project, are the R385, which passes immediately to the north of the site and the Groenwater / Lime Acres farm road which passes immediately to the west of the site. There are a few farmsteads and residential properties (along Groenwater road immediately north west of the site) that occur near the site and the project would appear in the foreground of these views resulting in a potential high visual impact. The farmsteads (two) occur to the immediate north and south of the site. There are 3 farmsteads with potential middleground views of project activities. These are located immediately west (approximately 5km from the site) of the site and to the north east (5km) and south east (3km). Visual exposure at these greater distances is reduced but nevertheless could have an impact on these sensitive views.

The towns of Owendale, Lime Acres, Danielskuil at the settlement at Groenwater immediately north of the R385 and west of the site, would not see any components of the project as ridge lines block views towards the site.

At this stage it is not known if all the identified farmsteads are occupied. This would have to be verified in the assessment phase.

5.2 Sensitive receptors

Typically most sensitive receptors would include:

- Users of all outdoor recreational facilities including public rights of way, whose intention or interest may be focused on the landscape (scenic routes);

- 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.

Other less sensitive 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;

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.

Given these criteria, the sensitive receptors for the study area would be:

- Visitors and people who live in the farmsteads / residential units;

- People travelling through or past the affected landscape in cars and on trains;

During the site visit, no tourist facilities were identified in the immediate vicinity and nearby environs of the project site but this must be confirmed in the assessment phase of the project.

The focus of the impact analysis during the assessment phase will therefore be on these receptors and viewing areas. Refer to Figure 11, which identifies their location.

6.0 ISSUES TO BE ADDRESSED IN ASSESSMENT PHASE

To evaluate the impacts of the CSP project at Humansrus it is assumed that the landscape has some inherent scenic value and needs to be factored into the assessment of the impact on views and aesthetics of the project. The existing visual condition of the landscape potentially affected by the proposed CSP project has been described. Its scenic quality has been rated and highly sensitive viewing areas and receptors identified and mapped. The next phase, after the scoping phase, is to assess the impacts on the visual resource and the effects the project could have on sensitive views in area.

Visual resource impacts would result from the construction, operation, and maintenance of the proposed CSP project. Specifically, impacts would result from project components being seen from sensitive viewpoints and from effects to the scenic values of the landscape. Impacts to views would be the highest when viewers are identified as being sensitive to change in the landscape, and when their views are focused on and dominated by the change. Visual impacts would occur when changes in the landscape are noticeable to viewers observing the landscape from their homes or from tourism / conservation areas, travel routes, and important cultural features and historic sites, especially when the project occurs in foreground a middleground views. The visual impacts that could result from the project would most likely be direct, adverse, and long-term and must be addressed in the assessment phase of the project. The following issues will be considered in the assessment phase:

- Establish public concern for scenic quality of the study area and their perception of what constitutes a sensitive viewing site;
- Determine the visibility of the project components by conducting view shed analyses based on the final layout and designed heights of structures;
- Understand the „glare effect" of the heliostats on the visual environment;
- Determine visual intrusion (contrast) of the proposed CSP project by simulating its physical appearance from sensitive viewing areas;
- Rate the impact of the project on the views by sensitive receptors;
- Rate the impact on the scenic quality and sense of place of the study area;
- Establish management measures (mitigation) to reduce the impact of the power line where appropriate.

*** NLA ***

APPENDIX A: DETERMINING THE VALUE OF A VISUAL RESOURCE

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, woods, trees, water bodies, buildings and roads. They are generally quantifiable and can be easily described.

Landscape character is 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 Quality
(after Crawford 1994 and The Visual Resource Management System, Developed by The Bureau of Land Management (BLM) in the Department of the Interior of the USA Government).

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 - topography becomes more interesting as it gets steeper or more massive, or more severely or universally sculptured;
- Where water forms are present - The degree to which water dominates the scene is the primary consideration in selecting the rating score;
- 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 considering "colour" are variety, contrast, and harmony.
- Where diverse patterns of grasslands and trees occur - 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. Consider also smaller scale vegetational features which add striking and intriguing detail elements to the landscape (e.g. gnarled or wind beaten trees, and Quiver trees);
- 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.
- Where natural landscape increases and man-made landscape decreases;
- And where land use compatibility increases and land use edge diversity decreases - 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.

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). Refer also to Appendix A for further elaboration.

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 Beauty of Visual Resource

In determining the scenic 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

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

High (Distinct)	Moderate (Common)	Low (Minimal)
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.

Scenic Quality Inventory and Evaluation Chart

(Developed by: The Bureau of Land Management (BLM), In the Department of the Interior of the USA Government)

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. **5**	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. **3**	Low rolling hills, foothills, or flat valley bottoms; or few or no interesting landscape features. **1**
Vegetation	A variety of vegetative types as expressed in interesting forms, textures, and patterns. **5**	Some variety of vegetation, but only one or two major types. **3**	Little or no variety or contrast in vegetation. **1**
Water	Clear and clean appearing, still, or cascading white water, any of which are a dominant factor in the landscape. **5**	Flowing, or still, but not dominant in the landscape. **3**	Absent, or present, but not noticeable. **0**
Color	Rich color combinations, variety or vivid color; or pleasing contrasts in the soil, rock, vegetation, water or snow fields. **5**	Some intensity or variety in colors and contrast of the soil, rock and vegetation, but not a dominant scenic element. **3**	Subtle color variations, contrast, or interest; generally mute tones. **1**
Influence of adjacent scenery	Adjacent scenery greatly enhances visual quality. **5**	Adjacent scenery moderately enhances overall visual quality. **3**	Adjacent scenery has little or no influence on overall visual quality. **0**
Scarcity	One of a kind; or unusually memorable, or very rare within region. Consistent chance for	Distinctive, though somewhat similar to others within the region.	Interesting within its setting, but fairly common within the

	exceptional wildlife or wildflower viewing, etc. *** 5+**	**3**	region. **1**
Cultural modifications	Modifications add favorably to visual variety while promoting visual harmony. **2**	Modifications add little or no visual variety to the area, and introduce no discordant elements. **0**	Modifications add variety but are very discordant and promote strong disharmony. **-4**

APPENDIX B: DECLERATION OF INDEPENDENCE

Declaration of Independence

I, Graham A Young 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: Graham Young

Signature: 

Date: 2011 05 25

APPENDIX C: Curriculum Vitae - Graham A Young

Graham is a registered landscape architect with interest and experience in landscape architecture, urban design and environmental planning. He holds a degree in landscape architecture from the University of Toronto and has practiced in Canada and Africa, where he has spent most of his working life. During his 30 year career he has received numerous Institute of Landscape Architects of South Africa and other industry awards. He has published widely on landscape architectural issues and has had projects published both locally and internationally in design journals and books. In addition to being a founding member of Newtown Landscape Architects he is currently a senior lecturer, teaching landscape architecture and urban design at post and under graduate levels, at the University of Pretoria. He has been a visiting studio critic at the University of Witwatersrand and University of Cape Town. A 'niche' specialty of his is Visual Impact Assessments for which he was cited with an ILASA Merit Award in 1999.

EXPERIENCE:

NEWTOWN LANDSCAPE ARCHITECTS cc. ***Founding Member***

Current — Responsible for project management, landscape design, urban design, and visual impact assessment.
Senior Lecturer: Department of Architecture, University of Pretoria.

1991 - 1994 / 1988 - 1989 — **GRAHAM A YOUNG LANDSCAPE ARCHITECT** ***- Sole proprietor***
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.
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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;
Senior Lecturer - Department of Architecture, University of Pretoria.

PROFESSIONAL:

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

AWARDS:

Intermediate Phase(S'kumbuto, Moshate and Uitspanplek), Freedom Park: ILASA Merit Award (2009)

Corniche Bay Resort, Mauritius: ILASA Merit Award (2009)

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: Loerie Awards Gold Statue (2008)

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 – 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:

Johannesburg Inner City Park Design competition – with MMA architects (2009) Finalist and considered "the strongest concept" by the adjudication panel.

Pan African Parliament International Design competition – 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) – 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/AUTHOR:

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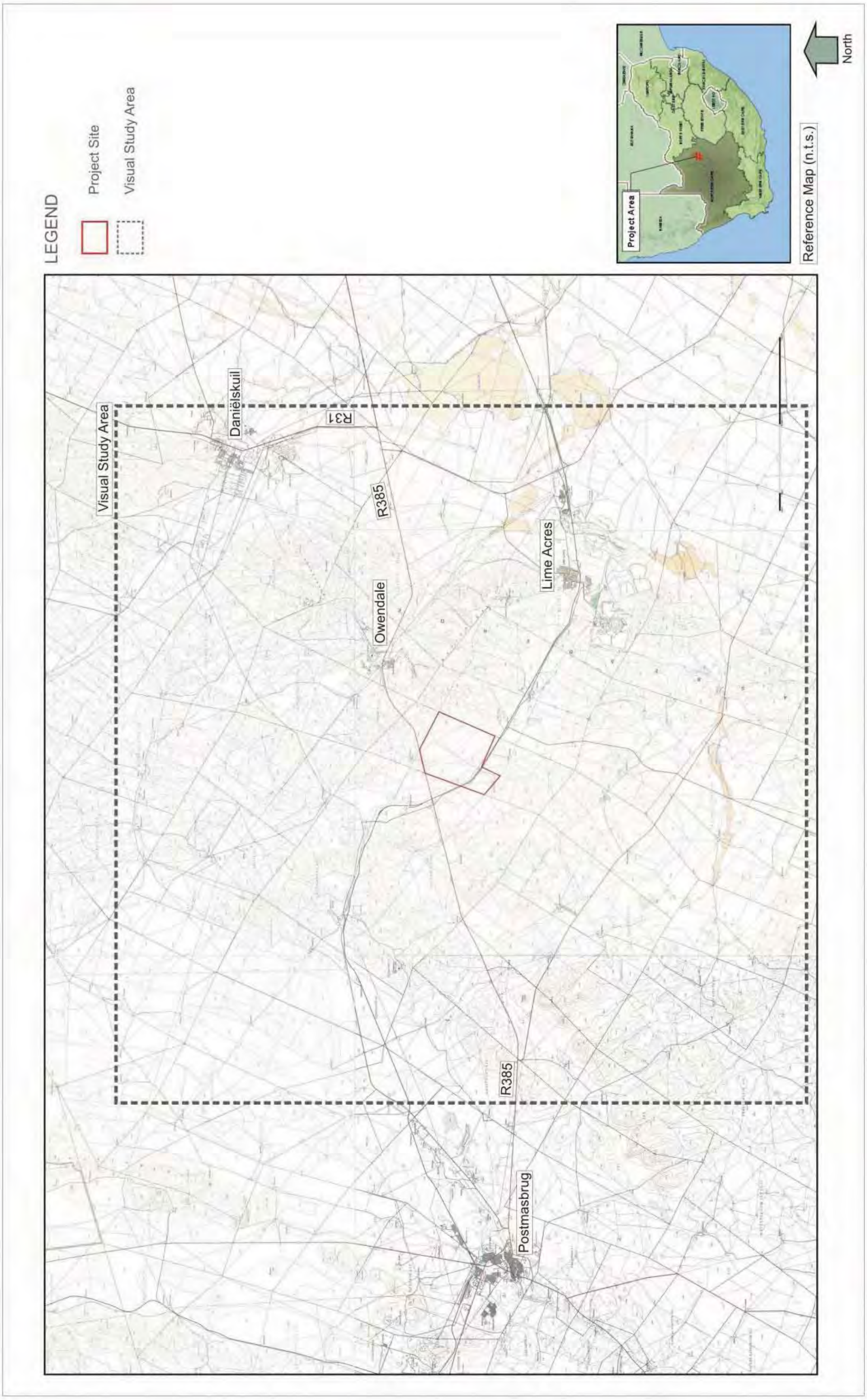

Figure 1: LOCALITY - Humansrus CSP

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LEGEND

Project Area

Existing Power Lines

An example of a power plant using central receiver technology - image courtesy NREL.

North

Figure 2: LAYOUT - Humansrus CSP

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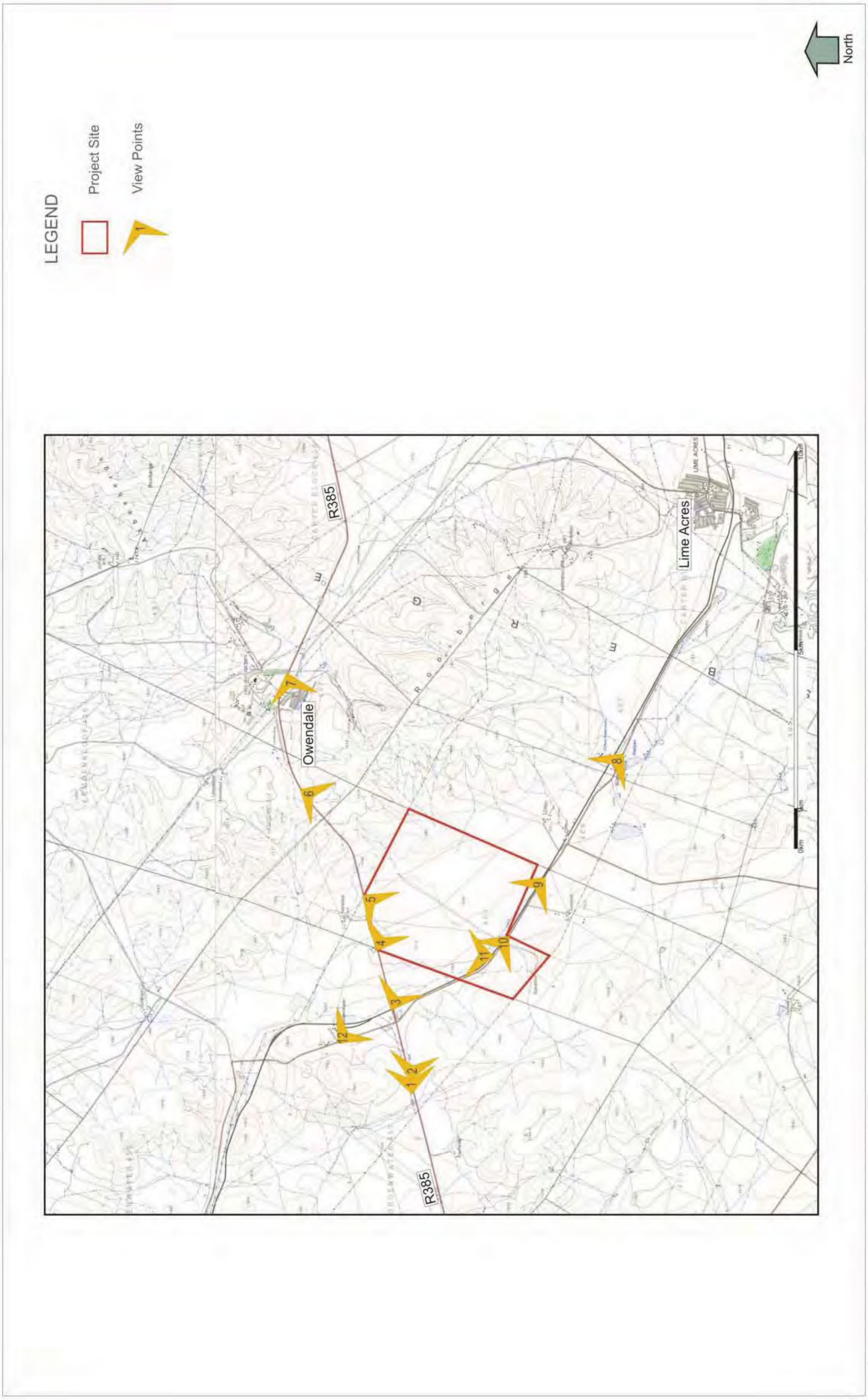
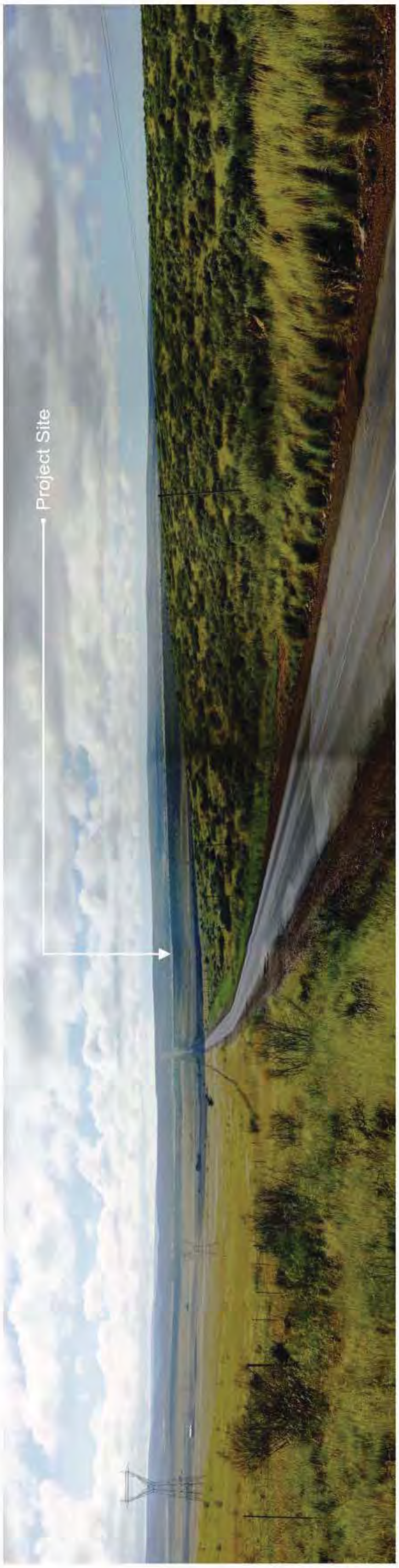


Figure 3: LOCATION OF VIEWPOINTS - Humansrus CSP

View 1: From the R385 looking east towards the project site



View 2: From the R385 looking east towards the project site

Refer to Figure 3 for location of views

Figure 4: LANDSCAPE CHARACTER (View 1 & 2) - Humansrus CSP

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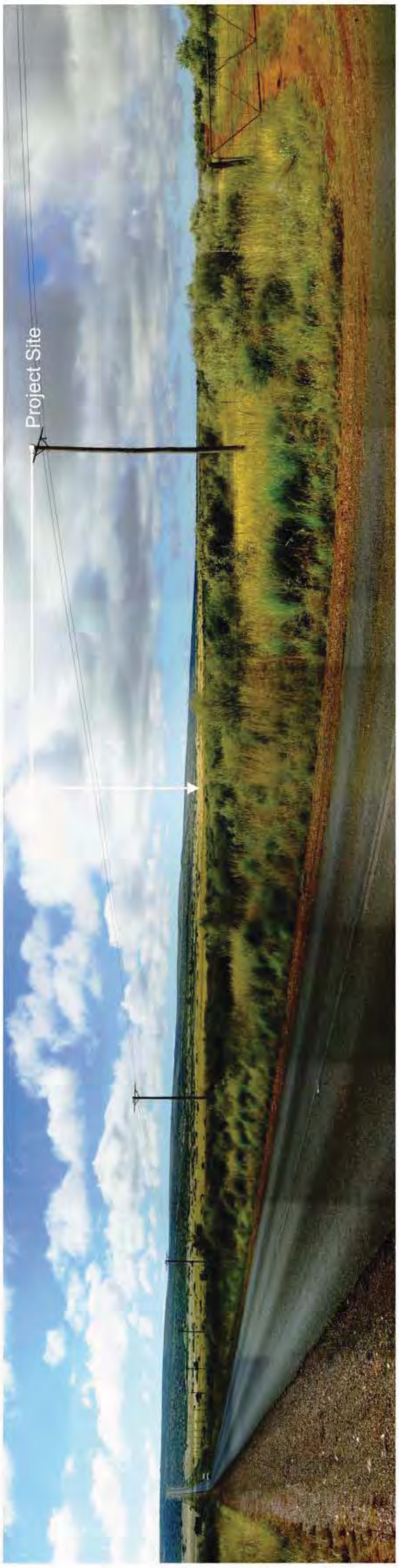
View 3: From the R385 looking east towards the project site



View 4: From the R385 looking east towards the project site at north western corner of the site

Refer to Figure 3 for location of views

Figure 5: LANDSCAPE CHARACTER (View 3 & 4) - Humansrus CSP

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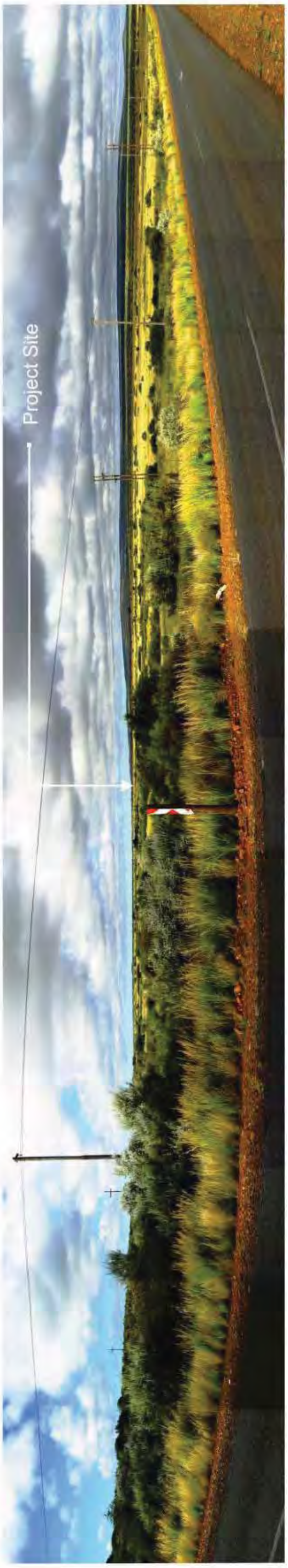
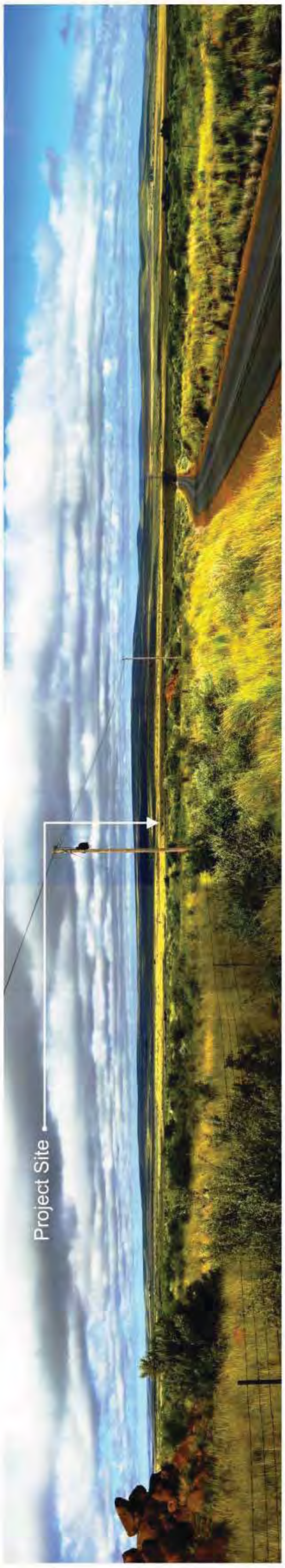


View 5: From the R385 looking east towards the project site at north eastern corner of the site



View 6: From the R385 looking east towards the project site

Refer to Figure 3 for location of views

Figure 6: LANDSCAPE CHARACTER (View 5 & 6) - Humansrus CSP

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View 7: From the R385 at Owendale looking south west towards the project site

View 8: From the Lime Acers road looking north west towards the project site

Refer to Figure 3 for location of views

Figure 7: LANDSCAPE CHARACTER (View 7 & 8) - Humansrus CSP

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View 9: From the Lime Acres road looking north west towards the project site at the south eastern corner of the site

View 10: From the Lime Acres road looking north west from adjacent the project site

Refer to Figure 3 for location of views

Figure 8: LANDSCAPE CHARACTER (View 9 & 10) - Humansrus CSP

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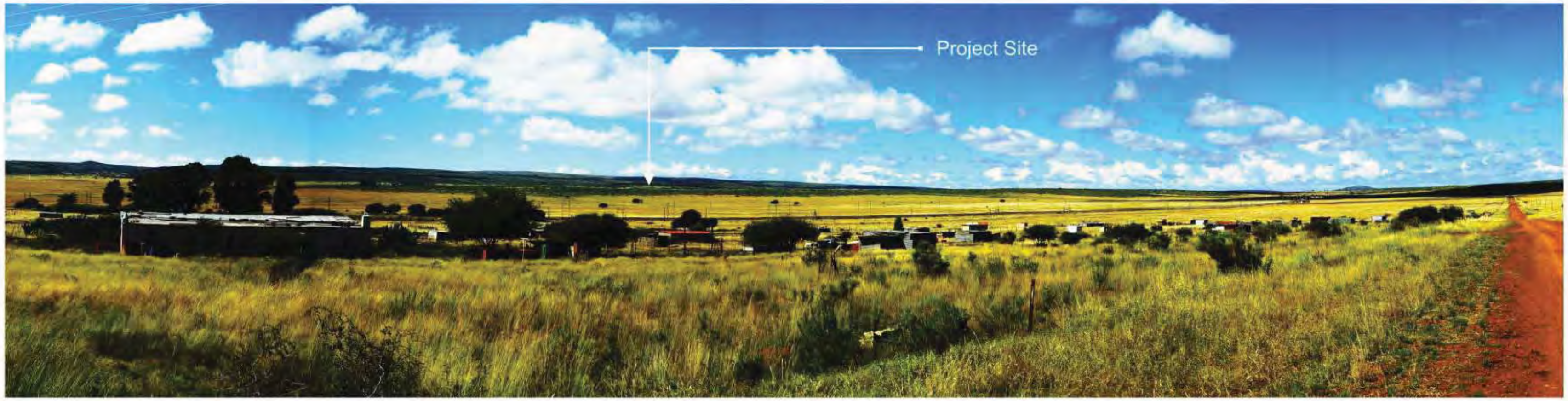
View 11: From the Lime Acres road looking north east across the project site



View 12: From a farm road north of the R385 looking south east towards the project site

Refer to Figure 3 for location of views

Figure 9: LANDSCAPE CHARACTER (View 11 & 12) - Humansrus CSP

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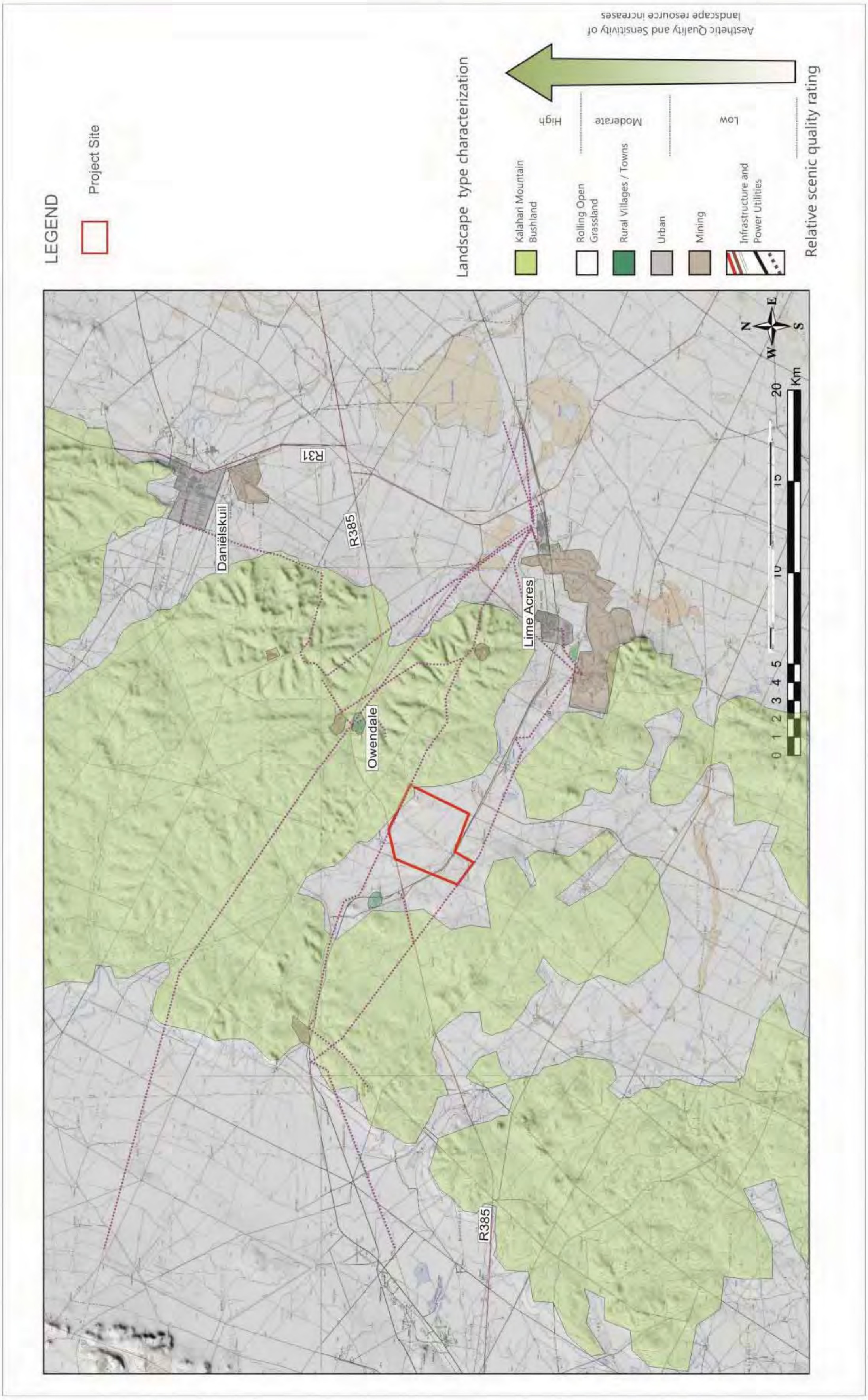

Figure 10: VISUAL RESOURCE - Humansrus CSP

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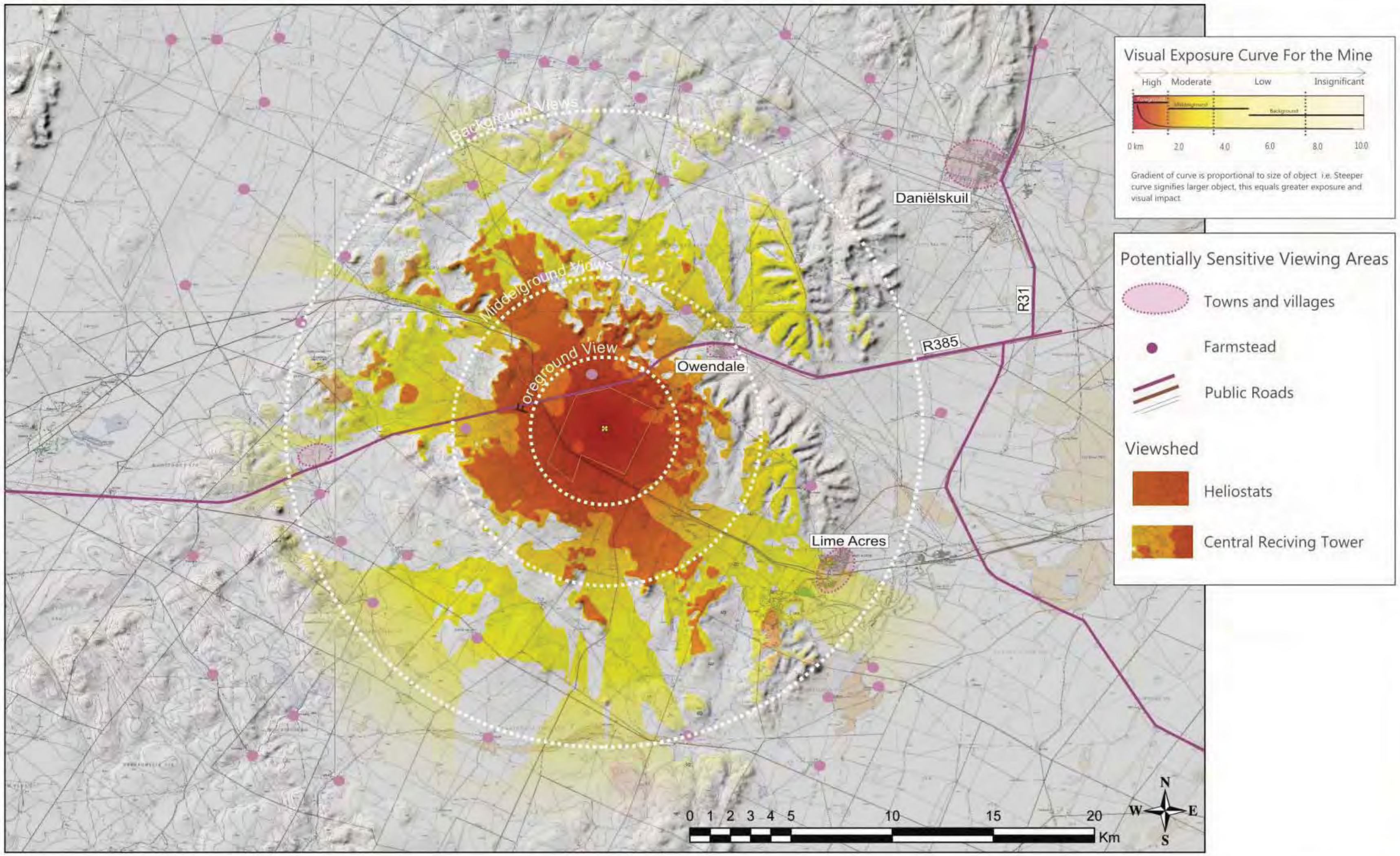

Figure 11: VIEWSHED AND SENSITIVE VIEWING AREAS - Humansrus CSP

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