APPENDIX E9 – Visual Resource Compliance Statement

SCIENTIFIC AQUATIC SERVICES

Visual Resource Compliance Statement

AS PART OF THE ENVIRONMENTAL AUTHORISATION PROCESS FOR THE PROPOSED MABASA 750MW COMBINED CYCLE GAS TURBINE (CCGT) POWER PLANT IN RICHARDS BAY, IN THE KWAZULU – NATAL PROVINCE.

Prepared for:	NEMAI Consulting (Pty) Ltd.
Report author:	S. Erwee
Report reviewers:	S. van Staden (Pr.Sci.Nat)
Report Reference:	SAS 24-1080
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Website: http://www.sasenvironmental.co.za

Image taken on site

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GLOSSARY OF TERMS

Best Practicable Environmental Option	This is the alternative/option that provides the most benefit or causes the least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as in the short term.
Characterisation	The process of identifying areas of similar landscape character, classifying and mapping them and describing their character.
Characteristics	An element, or combinations of elements, which make a contribution to landscape character.
Development	Any proposal that results in a change to the landscape and/ or visual environment.
Elements	Individual parts, which make up the landscape, for example trees and buildings.
Feature	Particularly prominent or eye-catching elements in the landscape such as tree clumps, church towers or wooded skylines.
Geographic Information System (GIS)	A system that captures, stores, analyses, manages and presents data linked to location. It links spatial information to a digital database.
Impact (Visual)	A description of the effect of an aspect of the development on a specified component of the visual, aesthetic or scenic environment within a defined time and space.
Key characteristics	Those combinations of elements which are particularly important to the current character of the landscape and help to give an area it particularly distinctive sense of place.
Land cover	The surface cover of the land, usually expressed in terms of vegetation cover or the lack of it. Related to but not the same as Land use.
Land use	What land is used for based on broad categories of functional land cover, such as urban and industrial use and the different types of agriculture and forestry.
Landform	The shape and form of the land surface which has resulted from combinations of geology, geomorphology, slope, elevation and physical processes.
Landscape	An area, as perceived by people, the character of which is the result of the action and interaction, of natural and/ or human factors.
Landscape Character Type	These are distinct types of landscape that are relatively homogeneous in character. They are generic in nature in that they may occur in different areas in different parts of the country, but wherever they occur, they share broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement pattern, and perceptual and aesthetic attributes.
Landscape integrity	The relative intactness of the existing landscape or townscape, whether natural, rural or urban, and with an absence of intrusions or discordant structures.
Landscape quality	A measure of the physical state of the landscape. It may include the extent to which typical landscape character is represented in individual areas, the intactness of the landscape and the condition of individual elements.
Landscape value	The relative value that is attached to different landscapes by society. A landscape may be valued by different stakeholders for a variety of reasons.
Receptors	Individuals, groups or communities who are subject to the visual influence of a particular project. Also referred to as viewers, or viewer groups.
Sense of place	The unique quality or character of a place, whether natural, rural or urban, allocated to a place or area through cognitive experience by the user. It relates to uniqueness, distinctiveness or strong identity and is sometimes referred to as genius loci meaning 'spirit of the place'.
Sky glow	Brightening of the night sky caused by outdoor lighting and natural atmospheric and celestial factors.
Skylining	Siting of a structure on or near a ridgeline so that it is silhouetted against the sky.
View catchment area	A geographic area, usually defined by the topography, within which a particular project or other feature would generally be visible.
Viewshed	The outer boundary defining a view catchment area, usually along crests and ridgelines.

Visibility	The area from which project components would potentially be visible. Visibility is a function of line of sight and forms the basis of the VIA as only visible structures will influence the visual character of the area. Visibility is determined by conducting a viewshed analysis which calculates the geographical locations from where the proposed power line might be visible.
Visual Absorption Capacity	The ability of an area to visually absorb development as a result of screening topography, vegetation or structures in the landscape.
Visual Character	The overall impression of a landscape created by the order of the patterns composing it; the visual elements of these patterns are the form, line, colour and texture of the landscape's components. Their interrelationships are described in terms of dominance, scale, diversity and continuity. This characteristic is also associated with land use.
Visual Exposure	The relative visibility of a project or feature in the landscape. Visual exposure is based on distance from the project to selected viewpoints. Visual exposure or visual impact tends to diminish exponentially with distance.
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.
Zone of visual influence	An area subject to the direct visual influence of a particular project.

*Definitions were derived from Oberholzer (2005) and the Institute of Environmental Management and Assessment (2013)

ACRONYMS

ARC	Agricultural Research Council
CCGT	Combined Cycle Gas Turbine
BLM	(United States) Bureau of Land Management
BPEO	Best Practicable Environmental Option
DEM	Digital Elevation Model
DTM	Digital Terrain Model
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
IEM	Integrated Environmental Management
GIS	Geographic Information System
GN	General Notice
GPS	Global Positioning Systems
IAPs	Interested and Affected Parties
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
KOP	Key Observation Point
LI IEMA	Institute of Environmental Management and Assessment
m.a.m.s.l.	Meters above mean sea level
NEMA	National Environmental Management Act (No. 108 of 1997)
RBIDZ	Richard's Bay Industrial Development Zone
SACAD	South African Conservation Area Database
SANBI	South African National Biodiversity Institute
SAPAD	South African Protected Area Database
SAS	Scientific Aquatic Services
UNESCO	United Nations Educational Scientific and Cultural Organization
VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment
VRM	Visual Resource Management
WHS	World Heritage Site

1 INTRODUCTION AND PROJECT BACKGROUND

Scientific Aquatic Services (SAS) was appointed to prepare a Visual Compliance Statement as part of the Environmental Authorisation (EA) and Water Use License (WUL) processes for the proposed 750MW Combined Cycle Gas Turbine (CCGT) power plant in the city of uMhlathuze Local Municipality and the King Cetshwayo District Municipality, KwaZulu-Natal Province. The project is located in the Richards Bay Industrial Development Zone (IDZ): Special Economic Zone Phase 1F, approximately 5 km east of the Nseleni Nature Reserve and 2 km north-west of Richards Bay central.

This infrastructure associated with the project is collectively referred to as the 'proposed Mabasa project' in the report and is located within the study area which is illustrated in Figure 1 – 3 in relation to the surrounding environment.

The study area is located immediately west of Richard's Bay Central, which is located within the uMhlathuze Local Municipality, an administrative area of the King Cetshwayo District Municipality. The study area is situated 3 km north of the R34 John Ross Highway and 0.5 km southwest of the R619 regional road. The study area is located within a largely developed area with the immediate surrounding areas comprising predominantly industrial zones, residential developments and various service industries (e.g., petrol stations). The section below was summarised from the technical document provided by the EAP.

The Combined Cycle Power Plant (the "Plant") will be designed to provide a highly reliable, efficient, and low cost means of generating electricity. Design features of the Plant will be carefully considered to provide the optimum balance between capital cost and operation and maintenance benefits, whilst considering environmental impacts associated with combustion of fuel and using the best available technologies.

The scope of supply for the Plant will be based on a "2+2+1 combination" comprising of two GE Frame gas turbines (the "Combustion Turbine") each with a dedicated Heat Recovery Steam Generator (the "HSRG") to generate and supply steam to a shared steam turbine (the Combustion Turbine, HRSG and steam turbine together known as the "Power Plant").

Generators attached to each of the Combustion Turbines and steam turbines will supply electrical power to a grid. The Combustion Turbines are capable of firing on a variety of fuels however most commonly natural gas or light distillate oil. Specific calculations will be made based on the fuel availability for a specific Project.

The Plant will comprise the following key equipment:

- Two (2) General Electric Frame 9 (model 9F.03) combustion turbines and generators;
- Two (2) triple pressure, 3 drum, natural circulation Heat Recovery Steam Generators (HRSG);
- One (1) condensing steam turbine and generator;
- One (1) de-aerating surface condenser;
- One (1) induced draft cooling tower;
- Balance of plant (BOP) equipment consisting of Pumps, Heat Exchangers, Transformers, Power Electrics, etc;
- One (1) integrated plant distribution control system; and
- 275 kV Switchyard comprising of three (3) x 15kV to 275kV step-up transformers and one (1) station auxiliary transformer (the rating to be defined during detailed design).

The Plant will be designed for base load operations at 500MW in Simple Cycle and 750MW in Combined Cycle on 24 hours a day, seven days a week basis.

The overall site and building arrangement has been developed to minimize space requirements while maintaining ample access for operation and maintenance activities. The land area required for the Project is 130,000m^2.

The plant arrangement is conceptual and should be finalized after i) a site visit, ii) completion of a geotechnical soil study, iii) location and direction of the transmission line / grid connection point, iv) the

location of the fuel gas pipeline on site, v) utilities on site, and vi) any environmental impact study considerations.

The electrical switchgear and associated auxiliary equipment will be located within constructed buildings. The steam turbines will also be located within a building construction (the “Steam Hall”). The Steam Hall will house an office for technical staff, locker / toilet facility a workshop, a laboratory and storage area.

All other major equipment will be designed for outdoor use.

Sufficient operations, administrative and support facilities are considered. A central control room provides a controlled environment to protect sensitive electrical equipment and for operators to monitor and control plant functions. A main office will accommodate Plant management and administrative staff, facilities including a, kitchenette facility, toilet, first aid room and a prayer room. All offices will have parking areas in front.

A demineralized water storage tank and system will provide boiler feed-water to the HRSG’s. The Plant will include one (1) induced draft cooling tower systems, with the source of the make-up water still to be defined.

The Plant will have a dedicated fire protection system; comprising of water storage, pumping system and pressurized ring main complete with fire hydrants positioned along the ring main, firefighting equipment, a sprinkler system for the offices, fire extinguishers and a deluge system for the switchyard.

Site access roads will permit normal operations and lay-down areas / access adjacent to major equipment to facilitate maintenance. Roads, including ducting and open drains and ditches crossing below a road, will be designed considering axel loads and tuning circles of large trucks and mobile cranes.

The Plant will have adequate drainage to remove surface water from the site. Oily water separators positioned around the site will collect any spillage and or wash from maintenance operations on key equipment. The oily water separators will be designed to discharge grey water into the drains treated to a satisfactory cleanliness level.

Fencing will be provided around the perimeter of the HV switchyard and the Plant perimeter. Appropriate lighting and security system will be provided.

The proposal assumes Potable water, telecommunications, power evacuation and sewage system raw water / sanitary waste will be available at the proposed Plant site boundary.

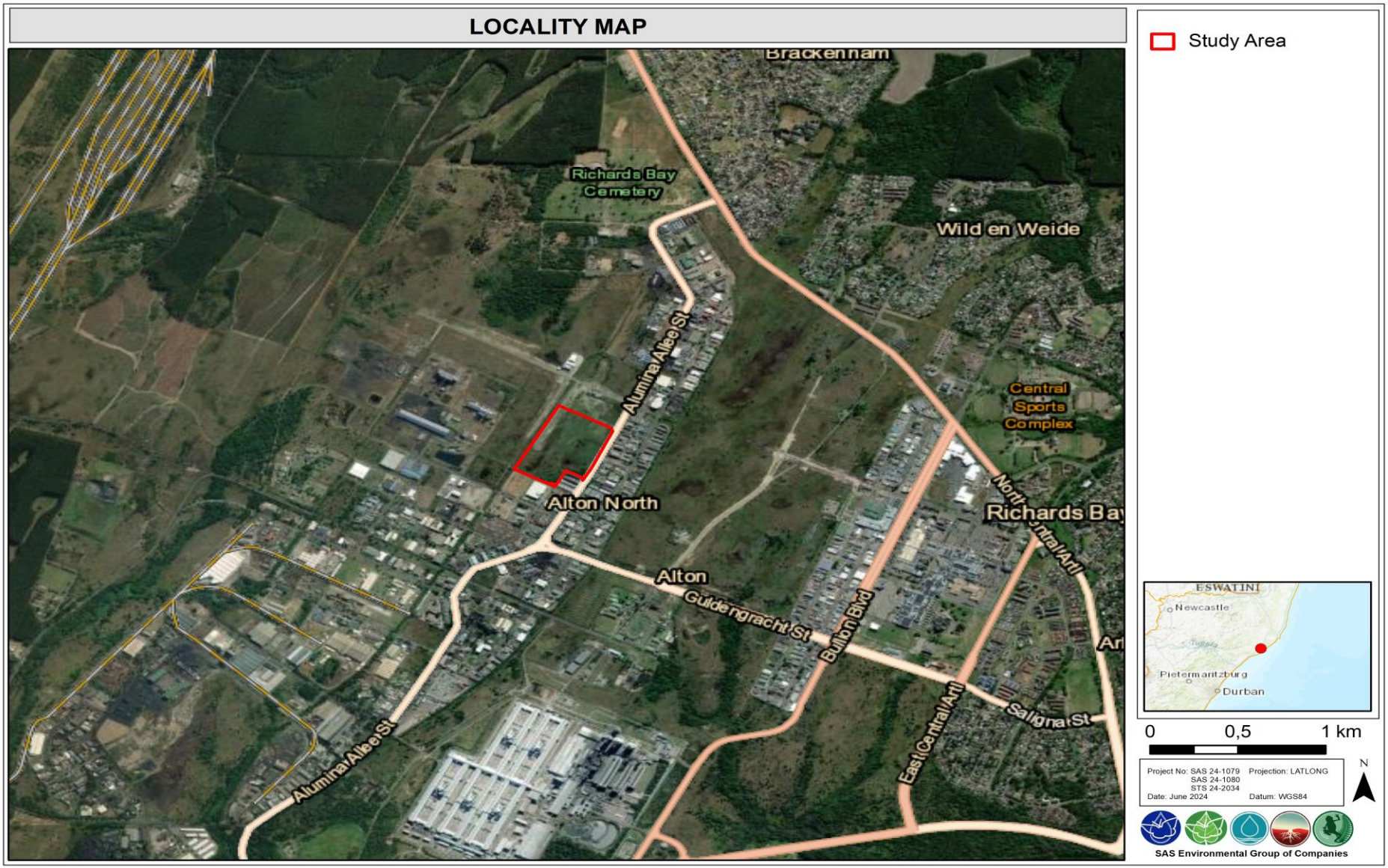

Figure 1: Digital Satellite image depicting the location of the study area in relation to surrounding areas.

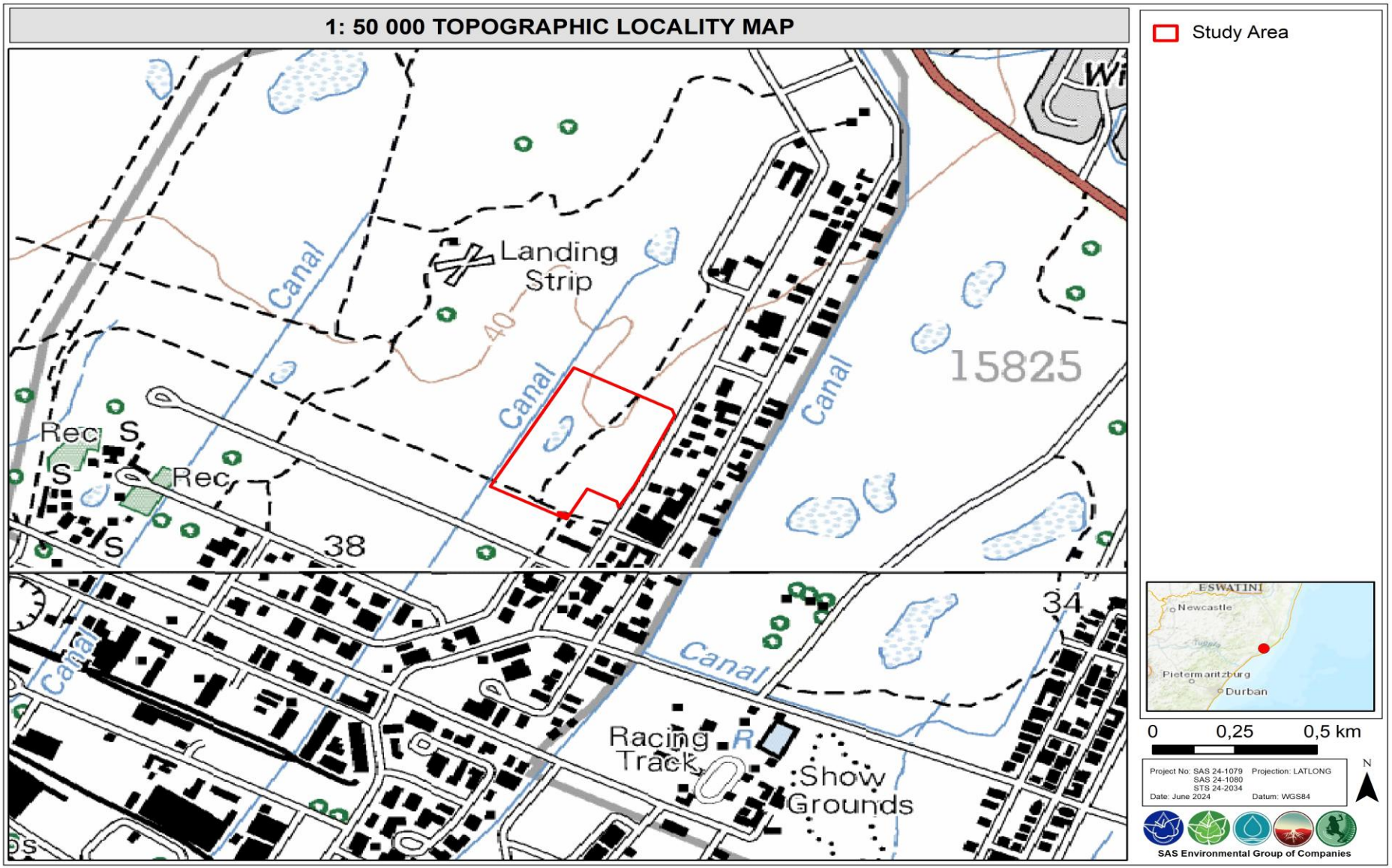

Figure 2: The study area depicted on a 1:50 000 topographical map in relation to its surrounding area.

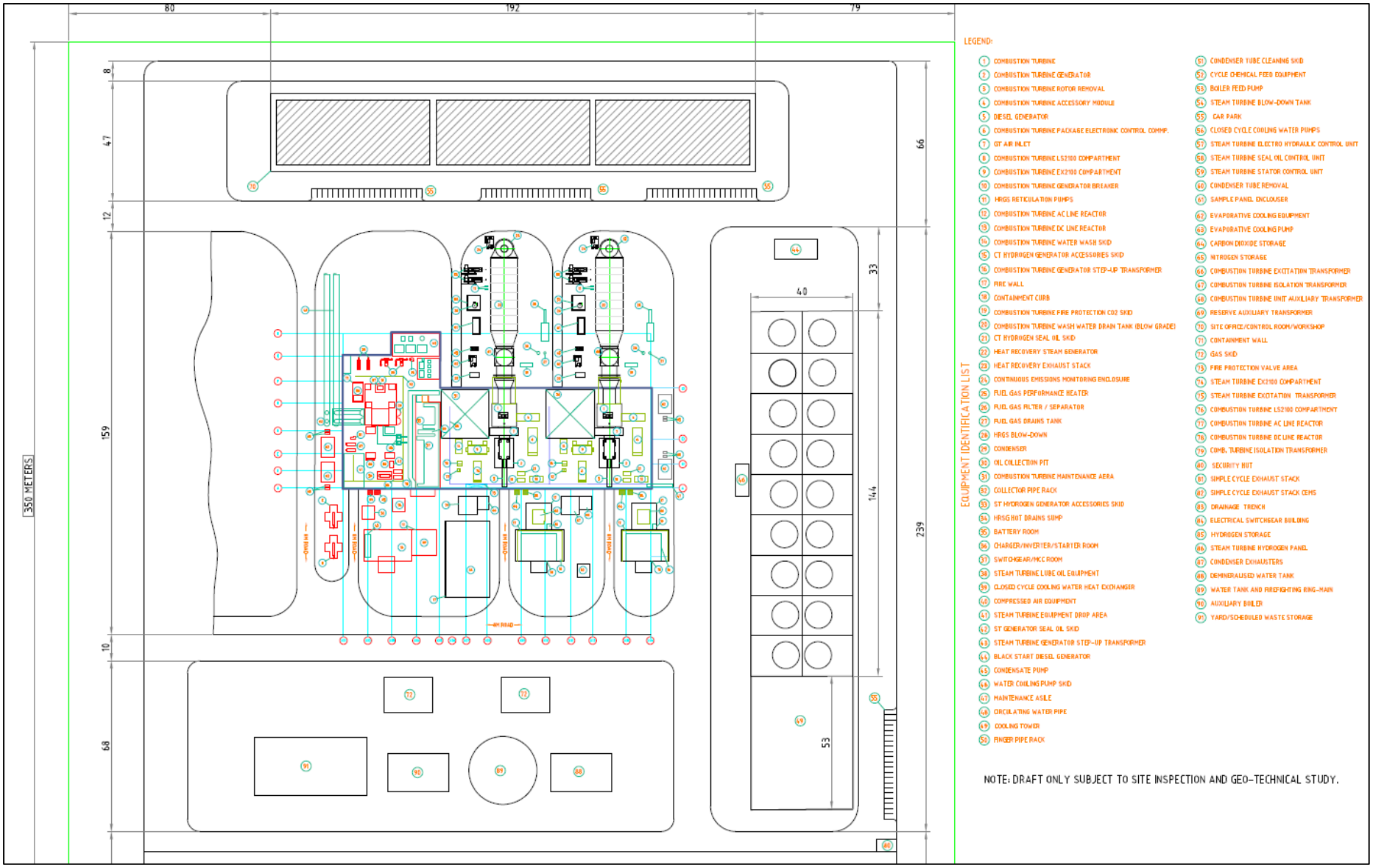

Figure 3: Conceptual layout of the proposed Combined Cycle Power Plant.

2 PURPOSE OF THIS REPORT

The Visual Compliance Statement entails a process of baseline data collection, spatial analysis, visualisation and interpretation to describe the quality of the landscape prior to development taking place and then identifying possible visual impacts after development. Assessing visual impacts can become complex as it is very subjective due to a person's perception being affected by more than only the immediate environmental factors (Oberholzer, 2005).

The site sensitivity verification aims to 1) Verify or dispute the outcome of the screening tool for Visual (Landscape) Theme and 2) should the "low" sensitivity be verified a compliance statement will be provided; however, should the "low" sensitivity be disputed a comprehensive visual impact assessment will have to be undertaken.

Prior to commencing with a specialist assessment, the current use of the land and the potential visual aesthetic sensitivity of the site under consideration as identified by the screening tool must be confirmed by undertaking a site sensitivity verification, which includes the steps as described in the figure below:

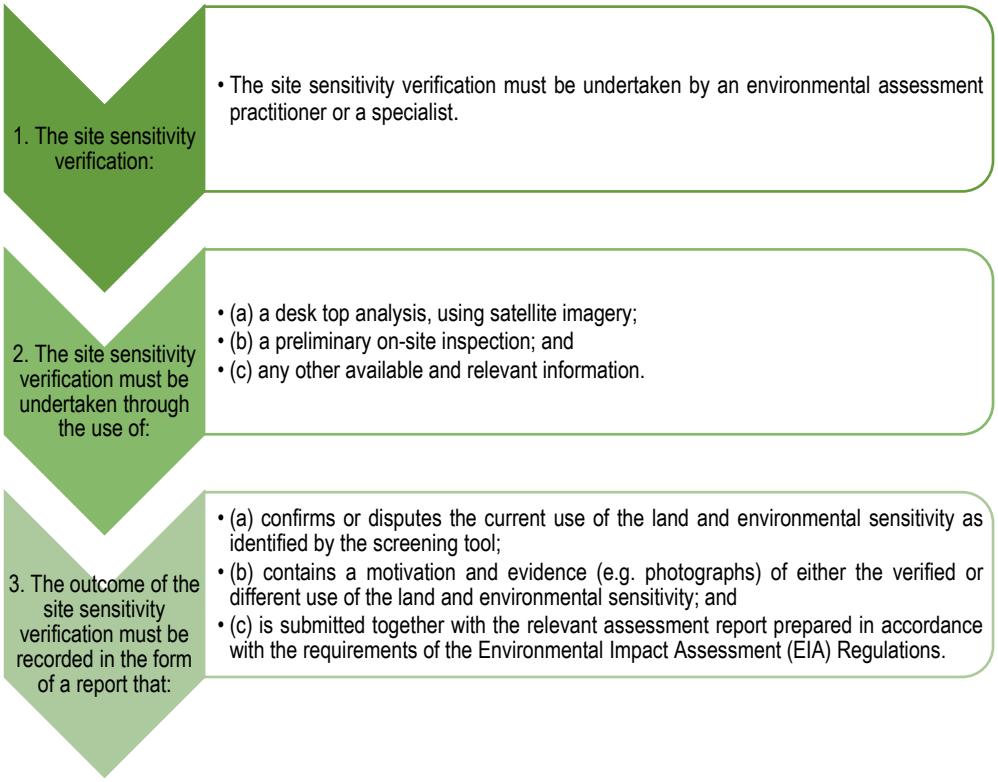

Figure 4: Site sensitivity verification process

3 LEGAL, POLICY AND PLANNING CONTEXT FOR VIA'S

According to the Provincial Government of the Western Cape Department of Environmental Affairs and Development Planning "Guideline for involving visual and aesthetic in EIA Processes" current South African environmental legislation governing the EIA process, which may include consideration of visual impacts if this is identified as a key issue of concern, is the National Environmental Management Act (NEMA) (Act 107 of 1998). This would include any regulations published under the NEMA, which are currently the 2014 NEMA Environmental Impact Assessment Regulations 2014 as amended (EIA Regulations) (published in General Notice (GN) No. R.982 as well as R 983 Listing Notice 1, R 984 Listing Notice 2, and R 985 Listing Notice 3) are also considered.

In addition, the following acts and guidelines are applicable:

National Environmental Management: Protected Areas Act (Act No. 57 of 2003)

This act was developed in 2003 for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes:

- Restricted activities involving national and protected parks:
- 48(1) Despite other legislation, no person may conduct commercial prospecting, mining, exploration, production, or related activities–
  (a) in a special nature reserve, national park, or nature reserve
  (b) in a protected environment without the written permission of the Minister and the Cabinet member responsible for minerals and energy affairs; or
  (c) in a protected area referred to in section 9(b), (c) or (d).

According to the South African Protected Areas Database (SAPAD, 2025, Q2), the study area is located within ± 5,2 km of the Enseleni Nature Reserve and 6,1 km of the Richards Bay Game Reserve. With the area dominated by wooded grassland vegetation, it limits the view of the observer to their immediate surroundings, and with the existing industrial structures in the landscape, visitors at the nature reserve will not observe the proposed industrial activities. This was confirmed during the field assessment as the Enseleni Nature Reserve was visited and no views of the existing industrial zone was present in the viewscape, due to the undulating terrain and wooded grassland vegetation and plantations in the landscape. The South African Conservation Areas Database (SACAD, 2024, Q1) database does not indicate any conservation areas within 10 km of the study area.

According to the National Protected Areas Expansion Strategy (NPAES, 2018) Database the study area is situated within a Priority Focus Area. Priority Focus Areas are geographic areas identified to be of highest priority for protected area expansion to meet the targets.

National Heritage Resources Act (Act No. 25 of 1999)

This provides legislative protection for listed or proclaimed sites, such as urban conservation areas, nature reserves and proclaimed scenic routes.

Municipal Systems Act (Act 32 of 2000)

In terms of the Municipal Systems Act (Act 32 of 2000), it is compulsory for all municipalities to initiate an Integrated Development Planning (IDP) process in order to prepare a five-year strategic development plan for the area under their control. The IDP process, specifically the spatial component is based in certain areas and provinces on a bioregional planning approach to achieve continuity in the landscape and to maintain important natural areas and ecological processes. The study area is situated within the City of uMhlathuze Local Municipality of which the IDP for 2022/2027 is available.

According to the IDP, the industrial facilities have been instrumental in the development of the area in the past and will definitely impact on the areas' future spatial development therefore there are future expansions needed, which is the purpose of this project.

Department of Forestry, Fisheries and the Environment (DFFE)'s National Environmental Screening Tool (2023).

According to the "Protocols for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes ("the Protocols") published in Government Gazette No. 43110 on 20 March 2020 and Government Gazette No. 43855 on 30 October 2020, the Environmental Assessment Practitioner (EAP) must verify the current use of the site in question and its environmental sensitivity as identified by the Screening Tool to determine the need for specialist inputs in relation to the themes included in the Protocols. The Protocols are allowed for in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA") as amended. The Protocols must be complied with for every new application for Environmental Authorisation that is submitted after 9 May 2020.

This document serves as the Visual (Landscape) Site Sensitivity Verification Report for the proposed Mabasa Project, within the KwaZulu Natal Province. The proposed Mabasa Project requires environmental authorisation in terms of the NEMA EIA Regulations, as amended and potentially a Water Use Licence (WUL).

According to the DFFE Screening Tool, there was no sensitivity rating for the Visual (Landscape) Theme, thus the landscape was deemed to have no sensitivity in terms of visual aesthetic impacts according to the screening tool.

Other

- Visual and aesthetic resources are indirectly protected by local authorities, where policies and by-laws relating to urban edge lines, scenic drives, special areas, signage, communication masts, et cetera have been formulated. these include the South Africa's national urban development policy – the IUDF and Spatial Development Frameworks; and
- Other decision-making authorities such as the Department of Mineral Resources and Energy (DMRE), or the local authorities, in terms of their particular legislative frameworks, may also require VIAs to support informed decision-making.

4 METHOD OF ASSESSMENT

4.1 Desktop Assessment

The method of assessment for this report is based on a spatial analysis of the study area and the surrounding areas, using Geographic Information Systems (GIS) such as Planet GIS, ArcGIS, Global Mapper as well as digital satellite imagery, photographs, various databases and all available data on the planned infrastructure. The desktop assessment served to guide the field assessment through identifying preliminary areas of importance in terms of potential visual impacts.

The desktop study included an assessment of the current state of the environment of the area including the climate of the area, topography, land uses and land cover with data obtained from the websites of the South African National Biodiversity Institute (SANBI) and the Agricultural Research Council (ARC). All databases used were published within the last 5 years and contain up to date and relevant information.

During the desktop assessment, which took place prior to and in preparation of the field assessment, the 1:50 000 topographical map, as well as high-definition aerial photographs from Google Earth Pro were used to identify the dominant landforms and landscape patterns. These resources together with digital elevation data were utilised to establish a parameter within which potential sensitive receptors were to be identified via Google Earth Pro. These parameters can henceforth be referred to as the "visual assessment zone". Based on the setting of the area and the existing infrastructure within the immediate vicinity, the visual assessment zone encompasses a 3 km radius of the study area. The potentially sensitive receptors identified within the visual assessment zone during the desktop assessment was verified during the field assessment.

4.2 Field Assessment

The field assessment was undertaken during the spring season on the 13th of June 2024 for the study area. The season within which the VIA takes place is irrelevant as the vegetation screening factor will remain similar across the seasons due to the sub-tropical nature of the vegetation. Some seasonal colour variation may, however, be evident between winter and summer.

The field assessment included a drive-around and on-foot survey of the study area and in the immediate vicinity thereof and a drive-around of the surrounds, to determine the visual context within which the proposed project is to be developed. Focus was placed on assessing the potentially sensitive receptors identified within the visual assessment zone, these included farmsteads and prominent roads within the area. Points from where the proposed infrastructure was determined to be visible were recorded (making use of Global Positioning Systems (GPS) to confirm these aesthetically sensitive viewpoints and potential sensitive visual receptors in relation to the proposed project.

4.3 Assumptions and Limitations

- No specific national legal requirements for VIAs currently exist in South Africa. However, the assessment of visual impacts is required by implication when the provisions of relevant acts governing environmental management are considered and when certain characteristics of

either the receiving environment or the proposed project indicate that visibility and aesthetics are likely to be significant issues and that visual input is required (Oberholzer, 2005);

- Distance and terrain play a critical role when assessing the visual impacts of an area. Due to the undulating terrain and dense vegetation of the area, it was deemed necessary to identify all potential sensitive receptors within a 3 km radius, on a desktop-level, which would then be verified during the field assessment. The 3 km radius can be considered the "visual assessment zone". It should be noted that the visibility of an object decreases exponentially the further away the observer is from the source of impact; and
- This scoping report was undertaken on a high-level therefore this report is considered to provide adequate information for informed decision making in the scoping phase of the EIA and to inform the plan of study for the EIA phase.

5 PRELIMINARY VISUAL RESULTS

The VIA was conducted to determine the potential impacts that the proposed development activities will have on the sense of place, landscape quality, and character of the receiving environment. The field assessment was conducted between the 13th of June 2024 and included a drive-around and on-foot survey of the study area, in order to determine the visual context within which the proposed project is to be developed. Focus was placed on assessing areas identified as being potentially important observation points, including residential areas which are inclusive of schools, churches, leisure facilities, and homes, and prominent roads within the area. Points from where the proposed development activities were determined to be highly visible were recorded (making use of Global Positioning Systems (GPS)) and high-resolution photographs were taken and serve as the basis from which representative visual simulations will be developed during the EIA Phase of the project, should it proceed.

Based on the field assessment the following was evident:

- According to Oberholzer (2005) the level of assessment will be a level 2 since limited direct visual impacts are expected to occur. Should the proposed facility utilise the stack flame, the indirect visual impacts is expected to occur.
- According to Mucina & Rutherford (2018) the study area is situated within the Indian Ocean Coastal Belt Biome, and the Maputaland Wooded Grassland Vegetation Type. See Appendix B for further detail regarding the climate, altitude topography and floral species associated with the Vegetation Type.
- The field assessment indicated that most of the study area is well vegetated characterised by grassland vegetation and two freshwater ecosystems, and one stretch of road. Figure 5 provides a visual representation of the environment of the study area. The dense wooded grassland vegetation confines the view of the observer to its immediate surroundings, thus reducing the viewscape of the proposed development activities to within the RBIDZ, therefore only people working within the RBIDZ is likely to have a view. As such the vegetative component of the surrounding environment is the most dominant contributing factor in the moderately high visual absorption capacity (VAC) of the environment.
- The study area is situated in relatively flat plains, adjacent to existing industrial activities within the RBIDZ, with the entire area to the east and south, developed with industrial facilities, with some industrial development to the west and north. With the study area situated within the RBIDZ, the proposed development will blend in with the industrial landscape. According to the uMhlathuze Local Municipality Integrated Development Plan (IDP) for 2022-2027 "The RBIDZ has been designated as special economic zone and is a national priority for stimulating growth in the manufacturing sector.
- The residential areas are situated to the north and east, with the closest residential area being 1,4 km north north east. As such there are no visual sensitive receptors situated within 1 km of the study area, rendering the proposed development activities outside the foreground of visual receptors. Residential areas are generally considered high sensitive visual receptors, however due to the distance, wooded grassland vegetation and existing industrial facilities screening the view toward the study area, the residential area may be considered low sensitive receptors.
- The main roads within the area are the N2 highway (approx. 7,7km north north west) R34 (approx. 2,5 km south) and R619 roadway (approx. 1,5 km north north east). Due to their momentary views and experience of the receiving environment motorists are generally classified as low sensitivity receptors. Based on the field work though motorists traveling along

these routes will not have a clear line of sight towards the study area due to the distance, vegetation and existing industrial facilities.

- According to the South African Protected Areas Database (SAPAD, 2025, Q12, the study area is located within ± 5,2 km of the Enseleni Nature Reserve and 6,1 km of the Richards Bay Game Reserve (Figure 6). With the area dominated by wooded grassland vegetation, it limits the view of the observer to their immediate surroundings, and with the existing industrial structures in the landscape, visitors at the nature reserve will not observe the proposed industrial activities. This was confirmed during the field assessment as the Enseleni Nature Reserve was visited and no views of the existing industrial zone was present in the viewscape, due to the undulating terrain and wooded grassland vegetation and plantations in the landscape. The South African Conservation Areas Database (SACAD, 2025, Q2) database does not indicate any conservation areas within 10 km of the study area.
- Due to the surrounding undulating terrain, dense wooded grassland vegetation, plantations, and existing industrial zone, the proposed industrial activities will have a low-level visual intrusion on the receiving environment, as the above factors provide good screening ability, partially obscuring or completely screening the view from the majority of the receptors.
- 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. It is created by the land use, character and quality of a landscape, as well as by the tangible and intangible value assigned thereto. The sense of place associated with the study area is related to the landscape character type, defined as industrial activities dominating the landscape, flat to undulating terrain. The proposed development activities will have a further effect on the sense of place of the immediate area, with the greater region not adversely affected.
- With the study area situated within the RBIDZ and the residential areas within the landscape, the area is considered to have significant sources of night time lighting. The lighting environment of the region is therefore considered urban with high district brightness (Zone E4) (Appendix J). According to Bortle's Scale (Appendix J) the study area falls within a Class 6 area (bright suburban) where there is light pollution to 35 degrees. Furthermore, it is evident that on a cloudy night the lights will be fairly bright and small objects that are close will be distinct. Development of the proposed industrial activities will be sources of light pollution during the construction and operational phases. Overall, the impact significance of potential night-time lighting is expected to be high and is likely to contribute to the effects of skyglow and light pollution.

Figure 5: Representative photographs of the study area, displaying dense but low vegetation cover, interspersed with tree clumps and surrounded by the existing industrial facilities.

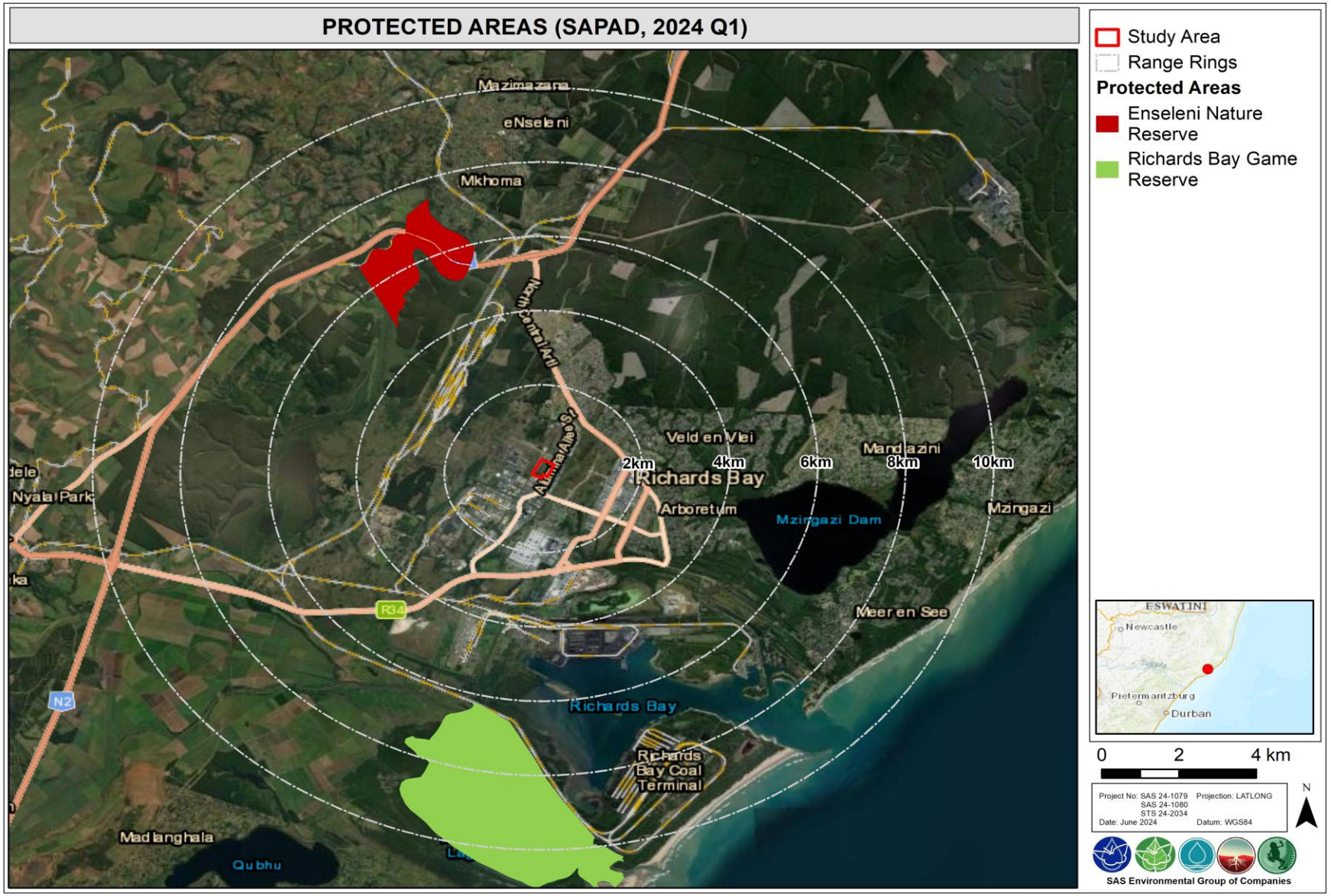

Figure 6: National protected areas associated with the study area (SACAD, 2024, Q1).

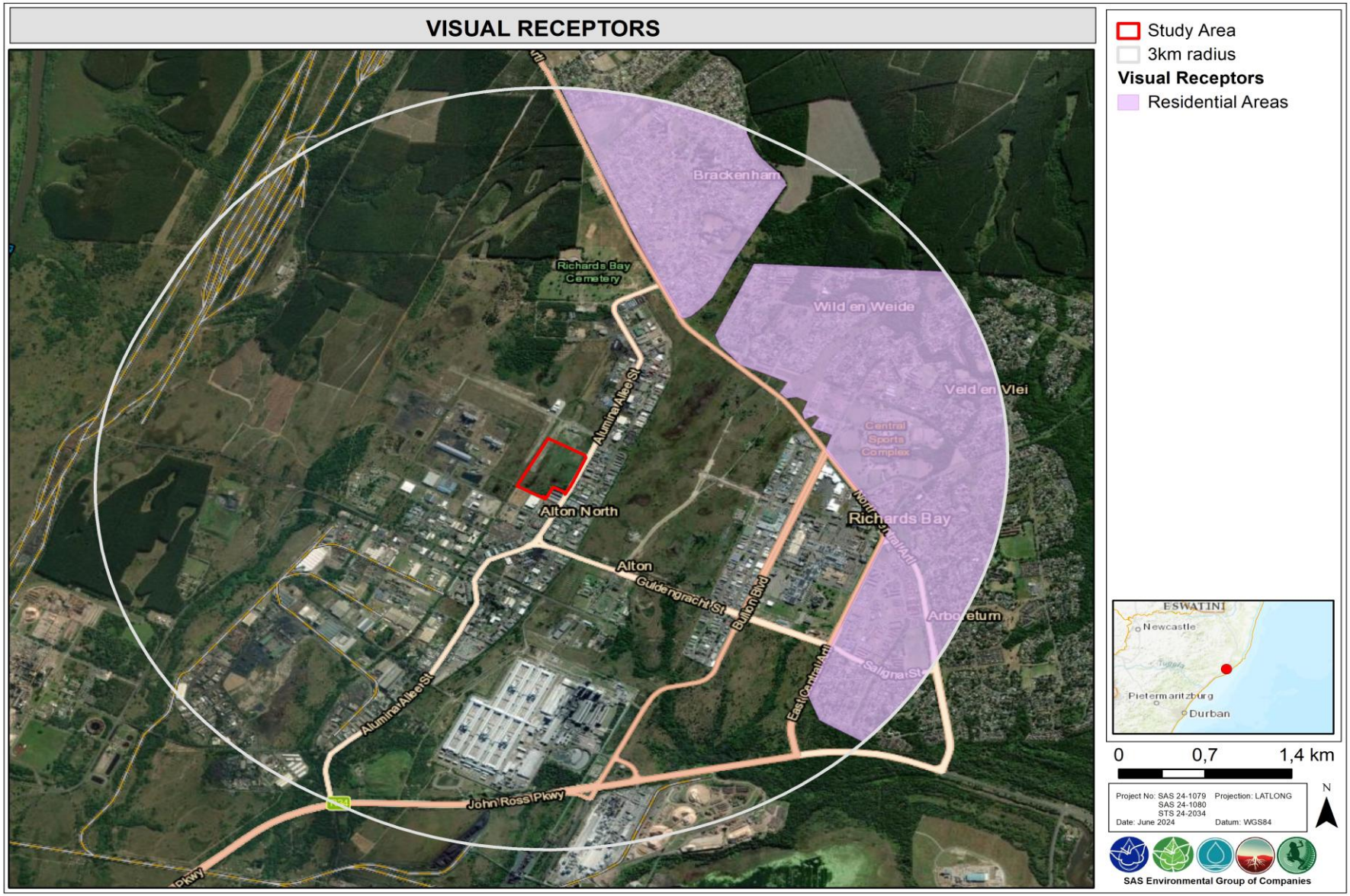

Figure 7: Map indicating the location of potential visual receptors within 3km of the study area.

6 PERCEIVED IMPACTS

Potential risks to the receiving environment that may occur as a result of the proposed industrial development project, have been identified and are presented below:

- The sense of place of the study area directly will be affected, however the larger region's sense of place will not be adversely affected, because of the bulk existing industrial activities present in the landscape.
- The proposed industrial development project is most likely to increase the bulk appearance of industrial structures in the landscape, therefore visual exposure and visibility may be impacted, which relates directly to the perception of sensitive visual receptors towards the project. Sensitive visual receptors have been determined to primarily comprise residents and road users, however due to the distance the receptors are considered to have a low sensitivity. Direct visual exposure will take place as a result of industrial infrastructure being present, as well as indirectly through fugitive dust generated by construction and operation related activities, such as construction vehicles driving on dirt roads, as well as earthwork activities and blasting.
- Lighting associated with the proposed project may be visible during both day and night but is more likely to have an adverse visual impact during the night time. Since the study area is situated within high district brightness area, there various light sources contributing to sky glow, thus the proposed industrial activities are likely to contribute to sky glow and further reduce night sky quality. It is important to note that should the proposed facility make use of a stack flame, the indirect lighting visual impact may be of increased significance.

7 CONCLUDING REMARKS

Based on the outcome of the desktop and field assessment the proposed project will most likely have a low visual impact on the receiving environment, due to the dense wooded grassland vegetation, plantations, existing industrial structures and undulating terrain partially obscuring and/ or completely screening the view from the visual receptors present within a 3 km radius.

From a visual impact perspective, there are no fatal flaws associated with the proposed industrial activities. It is therefore the opinion of the visual specialist that the proposed development be considered favorably from a visual impact perspective.

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APPENDIX A – Indemnity and Terms of Use of this Report

The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. The report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken and SAS (Pty) Ltd and its staff reserve the right, at their sole discretion, to modify aspects of the report including the recommendations if and when new information may become available from ongoing research or further work in this field or pertaining to this investigation.

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APPENDIX B – Vegetation Type

Maputaland Wooded Grassland (CB 2)

Figure B1: Maputaland Wooded Grassland: Wooded grassland in Maputaland (northern KwaZulu-Natal) with prominent (silvery leaves) undescribed species of geoxylic suffrutex (*Ozoroa* sp. Nov.) as depicted in Mucina and Rutherford (2006) page 577. Photo taken my W.S. Mathews.

Table B1: Characteristics of the Maputaland Wooded Grassland Vegetation Type (Mucina & Rutherford, 2006). Information taken from Mucina & Rutherford 2006, page 577.

Climate	Weak rainfall seasonality near the coast tending toward summer rainfall towards the interior. Relatively high precipitation attaining annual values up to 1 200 mm in coastal localities, decreasing rapidly to the interior.					
	Altitude (m)	**MAP* (mm)**	**MAT* (°C)**	**MFD* (Days)**	**MAPE* (mm)**	**MASMS* (%)**
	20 – 120	964	21	0	1902	68
Distribution	KwaZulu-Natal Province and southern Mozambique					
Conservation	**Endangered (EN).** Target 25%. About 17% statutorily conserved mainly in the Greater St Lucia Wetland Park. Some 46% transformed mostly for plantations and partly for cultivated land. The southern half of the area is not protected, and it is here that over 90% of the extent of the vegetation type has been transformed—mostly to pulpwood timber plantations, cane fields and informal settlements. Aliens include scattered populations of *Chromolaena odorata* and *Lantana camara*.					
Geology and Soils	Quaternary redistributed sand supporting yellowish redistributed sands of the Berea Formation (Maputaland Group). These are dystric regosols building dune crests, slopes, and relatively high-lying level plains. Water table found at depth 1.6–2.0 m below surface (and slightly deeper) in average rainfall years.					
Vegetation & landscape features	Generally flat landscape of the Maputaland coastal plain supporting coastal sandy grasslands rich in geoxylic suffrutices[1], dwarf shrubs, small trees, and very rich herbaceous flora. Excluded from this unit are the many interdune depression wetlands and hygrophilous grasslands neighbouring the wooded grasslands.					

[1] In South Africa, geoxylic suffrutices are considered 'underground trees' - i.e., a growth form that typically only attains a hundredth to a tenth the height of a normal tree.

Table B2: Dominant & typical floristic species of the Maputaland Wooded Grassland (Mucina & Rutherford, 2006). Information taken from Mucina & Rutherford 2006, page 577.

WOODY LAYER	
Small Trees & Tall Shrubs	*Acridocarpus natalitius* var. *linearifolius*, *Dichrostachys cinerea* subsp. *nyassana*, *Diospyros lycioides* subsp. *sericea*, *Hyphaene coriacea*, *Terminalia sericea, Grewia microthyrsa*[S].
Low Shrubs	*Helichrysum kraussii* (d), *Agathisanthemum bojeri*, *Crotalaria monteiroi* var. *monteiroi*.
Geoxylic Suffrutices	*Parinari curatellifolia* (d), *Salacia kraussii* (d), *Ancylobotrys petersiana*, *Diospyros galpinii*, *Eugenia capensis*[#], *Syzygium cordatum*[#], *Eugenia albanensis*[C], *Gymnosporia markwardii*[M].
Woody Climbers	*Albertisia delagoensis*[S], *Cissampelos hirta*[S].
FORB LAYER	
Herbs	*Chamaecrista plumosa, Helichrysopsis septentrionale*[M], *Oxygonum robustum*[M], *Tricliceras mossambicense*[M].
Geophytic Herb	*Cyrtanthus galpinii*.
GRASS LAYER	
Graminoids	*Diheteropogon amplectens* (d), *Themeda triandra* (d), *Aristida stipitata* subsp. *raciliflora*, *Bewsia biflora*, *Cyperus obtusiflorus*, *C. tenax*, *Digitaria natalensis*, *Eustachya paspaloides*, *Setaria sphacelata*, *Sporobolus fimbriatus*, *S. subulatus*, *Urelytrum agropyroides, Abildgaardia hygrophila*[C], *Cyperus natalensis*[C].
Biogeographically Important Taxon (Bushmanland endemic)	
Geoxylic Suffrutices	*Ochna* sp. nov.,[#], *Syzygium cordatum*[#].
Succulent Herb	*Aloe* sp. nov.
Geophytic Herb	*Brachystelma vahrmeijeri*

*(d) = dominant, [#] = Suffrutex Form, [C] = Coastal Belt Element, [M] = Maputaland Endemic, [S] = Southern distribution limit.

APPENDIX D – Visual Receptors

The number of observers and their perception of the proposed project will have an impact on the VIA and also on the perceived sensitivity of the landscape. The perception of viewers is difficult to determine as there are many variables to consider, such as cultural background, state of mind, reason for the sighting and how often the project is viewed within a set period. It is therefore necessary to identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the project. It is also necessary to generalise the viewer sensitivity to the proposed project to some degree (Oberholzer, 2005).

The IEMA (2002) identifies a number of potential sensitive receptors that may be affected by a proposed development, namely:

- Users of recreational landscapes/ public footpaths and bridleways, including tourists and visitors;
- Residents;
- Users of public sports grounds and amenity open space;
- Users of public roads and railways;
- Workers; and
- Views of or from within valued landscapes.

The sensitivity of visual receptors and views will depend on:

- The location and context of the viewpoint;
- The expectation and occupation or activity of the receptor; and
- The importance of the view.

The most sensitive receptors may include:

- Users of outdoor recreational facilities, including public rights of way, whose attention 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; and
- 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 landscape of acknowledges 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.

APPENDIX E – Night Time Lighting

In order to understand the potential visual impacts from night lighting, it is important to understand the existing lighting levels. The Institute of Lighting Engineers (ILP) (2011) identifies five environmental zones for exterior lighting control and with which to describe the existing lighting conditions within the landscape (Table J1). These environmental zones are supported by design guidance for the reduction of light pollution, which can then inform proposed mitigation measures and techniques. Where an area to be lit lies on the boundary of two zones the obtrusive light limitation values used should be those applicable to the most rigorous zone.

Table E1: Environmental zones for night-time lighting.

Environmental Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically Dark	National Parks, Areas of Outstanding Natural Beauty etc.
E2	Rural	Low District Brightness	Village or relatively dark outer suburban locations
E3	Suburban	Medium District Brightness	Small town centres or suburban locations
E4	Urban	High District Brightness	Town/city centres with high levels of night-time activity

Stationary lights facing upward are significant contributors to light pollution and causes sky glow and glare, while light facing in a horizontal direction can be visible for long distances, lead to light trespass (light falling outside the desired area of illumination) and be disturbing to viewers and vehicles. Sky glow refers to the night-time brightening of skies, caused by the scattering and redirecting of light in the atmosphere, by water droplets and dust in the air, back towards the ground. Such stray light mostly comes from poorly designed and improperly aimed light, and from light reflected from over-lit areas (ASSA, 2012). Lighting from vehicles within rural areas will generally be more intrusive than in urban settings and, therefore, will have a potentially greater impact due the general lack of existing ambient light within areas further away from the MRA.

The ILP (2011) recommends that, in order to maintain the night-time setting, lighting within the identified zone should have minimal illumination into the sky as well as to adjacent viewpoints.

Bortle Dark Sky Scale

The Bortle Dark Sky Scale was developed by John Bortle "based on nearly 50 years of observing experience," to describe the amount of light pollution in a night sky. It was first published in a 2001 Sky & Telescope article. The reality behind the use of the scale is the enormous amount of artificial light pushed into the sky by human habitation, as documented on this map below. To facilitate learning and using the scale, Bortle's indicators of sky brightness have been adapted as a table (below), including the colour codes used in available light pollution map.

For the amateur astronomer, the most robust and convenient relative measure of sky brightness is the naked eye or telescopic limiting magnitude. This is also a criterion that can be directly reported without recourse to the Bortle classification categories.

To calculate the sky darkness using these charts, simply canvas the entire area of the chart and mark as many stars as you can recognize that are near your averted vision threshold. Do not mark stars that you can identify with direct vision or that are easy with averted vision; try to select stars near your threshold. Identify in this way at least 10 faint stars. Later, tally the number of stars that fall within each magnitude bin shown in the key at bottom left, which identifies the half magnitude steps corresponding to the Bortle categories. The prevailing sky brightness is the average magnitude of the two faintest bins marked:

SB = (t1*m1 + t2*m2) / (t1+t2)
#t is a tally
*m is the fainter bracket magnitude that defines the magnitude interval bin.

For example, 7 stars of magnitude 5.0–5.49 and 9 stars of magnitude 5.5–5.99, so:

SB = (7*5.5+9*6.0)/(7+9) = (38.5+54)/16 = 5.78 = Bortle 5 (suburban)

The limit magnitude may differ from another observer's, but this difference in visual acuity will transfer to all other visual tasks. The Bortle scale inevitably combines differences in sky brightness and differences in individual detection capabilities.

Number Code	*Map Color Code*	*Label*	*Sky Mag.*	*Naked Eye Limit Mag.*	*320mm Limit Mag.*	*Triangulum Galaxy visible?*	*Andromeda Galaxy visible?*	*Central Galaxy visible?*	*Zodiacal light visible?*	*Light Pollution*	*Clouds*	*Ground Objects*
1		excellent dark sky	22.00–21.99	≥ 7.5	> 17	obvious	.	casts shadows	striking	airglow apparent	.	visible only as silhouettes
2		average dark sky	21.99–21.89	7.0–7.49	16.5	easy with direct vision	.	appears highly structured	bright, faint yellow color	airglow faint	dark everywhere	large near objects vague
3		rural sky	21.89–21.69	6.5–6.99	16.0	easy with averted vision	.	complex structure	obvious	LP on horizon	dark overhead	large distant objects vague
4		rural/suburban transition	21.69–20.49	6.0–6.49	15.5	difficult with averted vision	obvious	only large structures	halfway to zenith	low LP	lit in distance	distant large objects distinct
5		suburban	20.49–19.50	5.5–5.99	14.5–15.0	.	easy with direct vision	washed out	faint	encircling LP	brighter than sky	
6		bright suburban	19.50–18.94	5.0–5.49	14.0–14.5	.	easy with averted vision	visible only near zenith	.	LP to 35°	fairly bright	small close objects distinct
7		suburban/urban transition	18.94–18.38	4.5–4.99	14.0	.	difficult with averted vision	invisible	.	LP to zenith	brilliantly lit	.
8		city sky	< 18.38	4.0–4.49	13	.	.	.	.	bright to 35°	.	headlines legible
9		inner city sky	.	≤ 4.0		.	.	.	.	bright at zenith	.	.

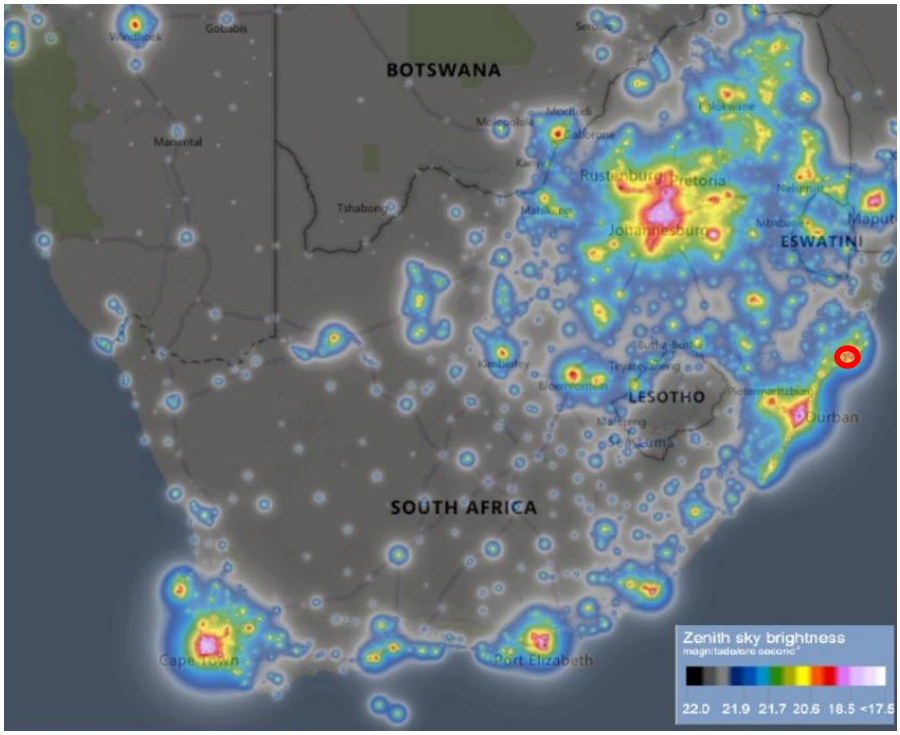

Figure E1: Light pollution map of South Africa (The World Atlas of the Artificial Night Sky Brightness) (the red dot is the location of the study area).

APPENDIX F – Specialist Information

Details of the specialist who prepared the report

Stephen van Staden	MSc Environmental Management (University of Johannesburg)
Sanja Erwee	BSc Zoology (University of Pretoria)

The expertise of that specialist to compile a specialist report including a curriculum vitae

Company of Specialist:	Scientific Aquatic Services		
Name / Contact person:	Stephen van Staden		
Postal address:	29 Arterial Road West, Oriel, Bedfordview		
Postal code:	2007	Cell:	083 465 2356
Telephone:	011 616 7893	Fax:	011 615 6240/ 086 724 3132
E-mail:	stephen@sasenvgroup.co.za		
Qualifications	MSc (Environmental Management) (University of Johannesburg) BSc (Hons) Zoology (Aquatic Ecology) (University of Johannesburg) BSc (Zoology, Geography and Environmental Management) (University of Johannesburg)		
Registration / Associations	Registered Professional Scientist at South African Council for Natural Scientific Professions (SACNASP) Accredited River Health practitioner by the South African River Health Program (RHP) Member of the South African Soil Surveyors Association (SASSO) Member of the Gauteng Wetland Forum		

Specialist Declaration

I, Stephen van Staden, declare that -

- I act as the **independent reviewer** in this assessment;
- 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 relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, 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

Signature of the Specialist

I, Sanja Erwee, declare that -

- I act as an **independent specialist** in this assessment;
- 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 relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, 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.

Signature of the Specialist

SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF STEPHEN VAN STADEN

PERSONAL DETAILS

Position in Company	Group CEO, Water Resource discipline lead, Managing member, Ecologist, Aquatic Ecologist
Joined SAS Environmental Group of Companies	2003 (year of establishment)

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Registered Professional Scientist at South African Council for Natural Scientific Professions (SACNASP)
Accredited River Health practitioner by the South African River Health Program (RHP)
Member of the South African Soil Surveyors Association (SASSO) Member of the Gauteng Wetland Forum
Member of the Gauteng Wetland Forum;
Member of International Association of Impact Assessors (IAIA) South Africa;
Member of the Land Rehabilitation Society of South Africa (LaRSSA)

EDUCATION

Qualifications

MSc Environmental Management (University of Johannesburg)	2003
BSc (Hons) Zoology (Aquatic Ecology) (University of Johannesburg)	2001
BSc (Zoology, Geography and Environmental Management) (University of Johannesburg)	2000
Tools for wetland assessment short course Rhodes University	2016
Legal liability training course (Legricon Pty Ltd)	2018
Hazard identification and risk assessment training course (Legricon Pty Ltd)	2013

Short Courses

Certificate – Department of Environmental Science in Legal context of Environmental Management, Compliance and Enforcement (UNISA)	2009
Introduction to Project Management - Online course by the University of Adelaide	2016
Integrated Water Resource Management, the National Water Act, and Water Use Authorisations, focusing on WULAs and IWWMPs	2017

AREAS OF WORK EXPERIENCE

South Africa – All Provinces
Southern Africa – Lesotho, Botswana, Mozambique, Zimbabwe Zambia
Eastern Africa – Tanzania Mauritius
West Africa – Ghana, Liberia, Angola, Guinea Bissau, Nigeria, Sierra Leona
Central Africa – Democratic Republic of the Congo

SELECTED PROJECT EXAMPLES OUT OF OVER 2000 PROJECTS WORKED ON

1 Mining: Coal, Chrome, PGM's, Mineral Sands, Gold, Phosphate, river sand, clay, fluorspar
2 Linear developments
3 Energy Transmission, telecommunication, pipelines, roads
4 Minerals beneficiation
5 Renewable energy (wind and solar)
6 Commercial development
7 Residential development
8 Agriculture
9 Industrial/chemical

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

- Floral Assessments
- Biodiversity Actions Plan (BAP)
- Biodiversity Management Plan (BMP)
- Alien and Invasive Control Plan (AICP)
- Ecological Scan
- Terrestrial Monitoring
- Protected Tree and Floral Marking and Reporting
- Biodiversity Offset Plan

Freshwater Assessments

- Desktop Freshwater Delineation
- Freshwater Verification Assessment
- Freshwater (wetland / riparian) Delineation and Assessment
- Freshwater Eco Service and Status Determination
- Rehabilitation Assessment / Planning
- Maintenance and Management Plans
- Plant species and Landscape Plan
- Freshwater Offset Plan
- Hydropedological Assessment
- Pit Closure Analysis

Aquatic Ecological Assessment and Water Quality Studies

- Habitat Assessment Indices (IHAS, HRC, IHIA & RHAM)
- Aquatic Macro-Invertebrates (SASS5 & MIRAI)
- Fish Assemblage Integrity Index (FRAI)
- Fish Health Assessments
- Riparian Vegetation Integrity (VEGRAI)
- Toxicological Analysis
- Water quality Monitoring
- Screening Test
- Riverine Rehabilitation Plans

Soil and Land Capability Assessment

- Soil and Land Capability Assessment
- Soil Monitoring
- Soil Mapping

Visual Impact Assessment

- Visual Baseline and Impact Assessments
- Visual Impact Peer Review Assessments
- View Shed Analyses
- Visual Modelling

Legislative Requirements, Processes and Assessments

- Water Use Applications (Water Use Licence Applications / General Authorisations)
- Environmental and Water Use Audits
- Freshwater Resource Management and Monitoring as part of EMPR and WUL conditions.

SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION CURRICULUM VITAE OF SANJA ERWEE

PERSONAL DETAILS

Position in Company	GIS Technician and Visual Specialist
Joined SAS Environmental Group of Companies	2014

EDUCATION

Qualifications

BSC Zoology (University of Pretoria)	2013

Short Courses

Global Mapper	2015
SANBI BGIS Course	2017
Global Mapper Lidar Course	2017
ESRI MOOC ARCGIS Cartography	2018

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, North West, Limpopo, KwaZulu-Natal, Northern Cape, Western Cape Free State

KEY SPECIALIST DISCIPLINES

Freshwater Assessments
- Desktop Freshwater Delineation
- Plant species and Landscape Plan

Visual Impact Assessment
- Visual Baseline and Impact Assessments
- Visual Impact Peer Review Assessments
- View Shed Analyses
- Visual Modelling

GIS
- Mapping and GIS for various sectors and various disciplines (biodiversity, freshwater, aquatic, soil and land capability).