

NABAS DIAMONDS PTY LTD

**PROPOSED GRASDRIFT ALLUVIAL DIAMOND MINE,
SOUTHERN BANK OF ORANGE RIVER, REMAINDER OF
FARM RICHTERSVELD NO. 11, AI AIS RICHTERSVELD
NATIONAL PARK
LANDSCAPE & VISUAL IMPACT SCOPING REPORT**

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1 INTRODUCTION

1.1 GENERAL

This Landscape and Visual Impact Scoping Report (LVISR) study forms part of the Scoping and Environmental Impact Assessment that is being undertaken for the proposed establishment the Grasdrift Diamond Mine by Naledzi Environmental Consultants (Pty) Ltd on behalf of Nabas Diamonds (PTY) Ltd.

This initial report has been prepared to inform the project Scoping Report.

1.2 PROJECT LOCATION

The proposed mining right area (MRA) is approximately 2692 ha in extent and located 140km east of Alexander Bay and 250km north of Springbok in the Richtersveld Local Municipality within the Namakwa District Municipality in the Northern Cape Province of South Africa. Access to the proposed mine right area is via an 80km secondary gravel road through the Richtersveld National Park and site across from Namibian town Aussenkehr.

Refer to the Site location Plan (**Map 1**).

1.3 BACKGROUND OF SPECIALIST

Jon Marshall qualified as a Landscape Architect in 1978. He has also had extensive experience working as an Environmental Assessment Practitioner. He has been involved in Visual Impact Assessment over a period of approximately 40 years. He has developed the necessary computer skills to prepare viewshed analysis and three dimensional modelling to illustrate impact assessments. He has undertaken visual impact assessments for major buildings, industrial developments, mining, renewable energy and infrastructure projects and has been involved in the preparation of visual guidelines for large scale developments.

A brief Curriculum Vitae outlining relevant projects is included as **Appendix I**.

1.4 THE NATURE OF VISUAL IMPACT

Visual impacts may relate to a general change in the character of an area or in the change in a specific view for a person or group of people.

Visual impacts can be positive or negative and a degree of subjectivity is required in deciding this point. The approach of any visual assessment should, as objectively as possible, describe a landscape and as far as is possible reflect the likely majority view regarding positive / negative aspect of an impact. This can be difficult particularly in South Africa due to different values and cultures associated with various sectors of the population. For example, poorer and particularly rural based sectors of the population are possibly more concerned with the productive nature of a landscape than its appearance, whereas the wealthier sectors might be more concerned with scenic value particularly as it is associated with property values. If possible the values and opinions of all impacted sectors of the community should be considered.

General change to a landscape might have greater or lesser significance subject to;

- a) Numbers of people that might use the landscape,
- b) The use of the landscape,
- c) The level of protection afforded to the landscape,
- d) The rarity of the landscape.

In terms of change to a specific view this might be defined as either visual intrusion or visual obstruction.

- a) Visual intrusion is a change in a view of a landscape that reduces the quality of the view. This can be a highly subjective judgement, subjectivity has been removed as far as is possible in this assessment by classifying the landscape character of each area and providing a description of the change in the landscape that will occur due to the proposed development.
- b) Visual obstruction is the blocking of views or foreshortening of views. This can generally be measured in terms of extent.

More often than not such an impact will be a combination of intrusion and obstruction. Obstruction can be measured in terms of the extent of an existing view that is screened by a development. However, judging intrusion requires a degree of subjectivity. It is however possible to relate this judgement to the manner in which proposed change would impact on the use or enjoyment of an area which again requires an understanding or local values.

1.5 BRIEF AND RELEVANT GUIDELINES

The brief is to assess the landscape and visual impact of the proposed project.

Work is to be undertaken in accordance with the following guideline documents:

- a. The Government of the Western Cape Guideline for Involving Visual and Aesthetic Specialists in EIA Processes (Western Cape Guideline), which is the only local relevant guideline, setting various levels of assessment subject to the nature of the proposed development and surrounding landscape; and
- b. The Landscape Institute and Institute of Environmental Management and Assessment (UK) Guidelines for Landscape and Visual Impact Assessment (LVIA) which provides detail of international best practice (UK Guidelines).

Comment [M1]: Add to scoping

Together these documents provide a basis for the level and approach of a Landscape and Visual Impact Assessment (LVIA) as well as the necessary tools for assessment and making an assessment legible to stakeholders.

The requirement for this investigation was highlighted in the DFFE Screening Tool Report which indicated that a Landscape and Visual Impact Assessment was required. This report indicates that a site sensitivity verification must be undertaken in accordance with Government Notice No. 320 included in Government Gazette 43110 of the 20th March 2020. This document fulfils these requirements.

In addition to the above, this document complies with Appendix 6 of the EIA Regulations which lists requirements of Specialist Reports, see schedule below.

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	Section of Report
1. (1) A specialist report prepared in terms of these Regulations must contain-	1
a) details of-	
i. the specialist who prepared the report; and	
ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Separate document.
c) an indication of the scope of, and the purpose for which, the report was prepared;	1
(cA) an indication of the quality and age of base data used for the specialist report;	1
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	4
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	1
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	1
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	3
g) an identification of any areas to be avoided, including buffers;	4
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Maps 5 and 6
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	1
j) a description of the findings and potential implications of such findings on the impact of the proposed activity, (including identified alternatives on the environment) or activities;	4
k) any mitigation measures for inclusion in the EMPr;	5
l) any conditions for inclusion in the environmental authorisation;	5
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	5
n) a reasoned opinion-	
i. whether the proposed activity, activities or portions thereof should be authorised;	
(iA) regarding the acceptability of the proposed activity or activities; and	
ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure	To be included in Final LVIA

plan;	
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	none
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	none
q) any other information requested by the competent authority.	none
2) Where a government notice <i>gazetted</i> by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	1

1.6 SCOPING OBJECTIVES

This LVIASR identifies and evaluates potential landscape and visual impacts associated with all aspects of the proposed Project. In terms of the EIA Regulations, feasible and reasonable alternatives should be assessed within the scoping study.

The characteristics of a scoping exercise are as follows:

- a) Feasible and reasonable alternatives are identified and selected for further assessment;
- b) Important characteristics of the affected environment are identified;
- c) Significant issues that are to be examined in the assessment procedure are identified; and
- d) It provides the basis for determining terms of reference for the assessment procedure.

1.7 LIMITATIONS AND ASSUMPTIONS

At the time of reporting, detailed layouts were not available. Assumptions as to height and nature of the development are indicated in section 2.2.

A site visit was undertaken over a two day period (18th and 19th November 2022) to verify the likely visibility of the proposed mine, the nature of the affected landscape and affected receptors.

The site visit was planned to ensure that weather conditions were clear ensuring reasonable visibility.

The timing of photography was planned to ensure that the sun was as far as possible behind the photographer. This was to ensure that as much detail as possible was recorded in the photographs.

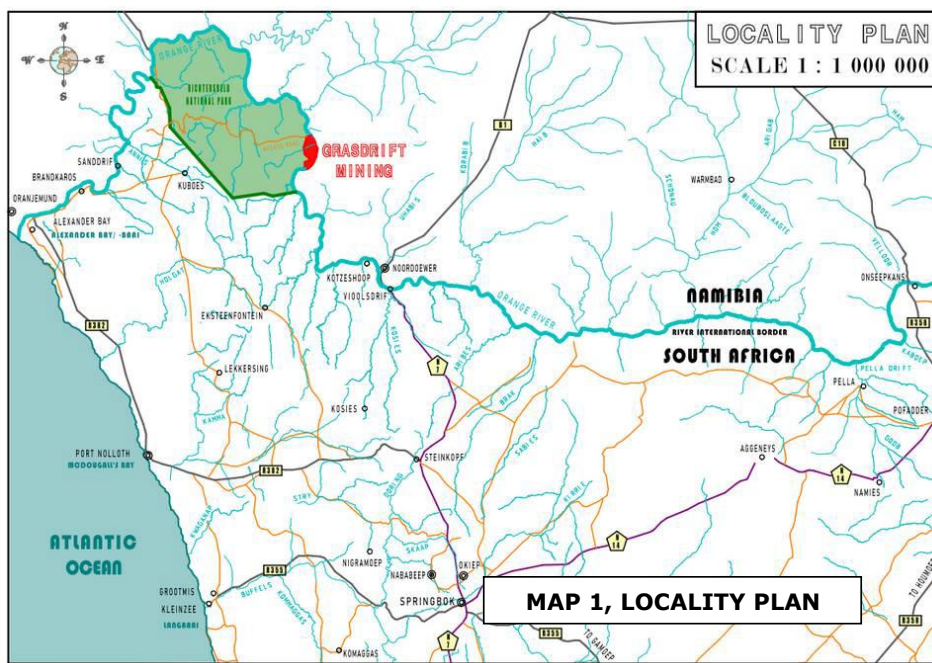
Visibility of the proposed facility has been assessed using the Global Mapper Viewshed tool.

The visibility assessment is based on terrain data that has been derived from satellite imagery. This data was originally prepared by NASA and is freely available on the CIAT-CCAFS website (<http://www.cgiar-csi.org>). This data has been ground truthed using a GPS as well as online mapping.

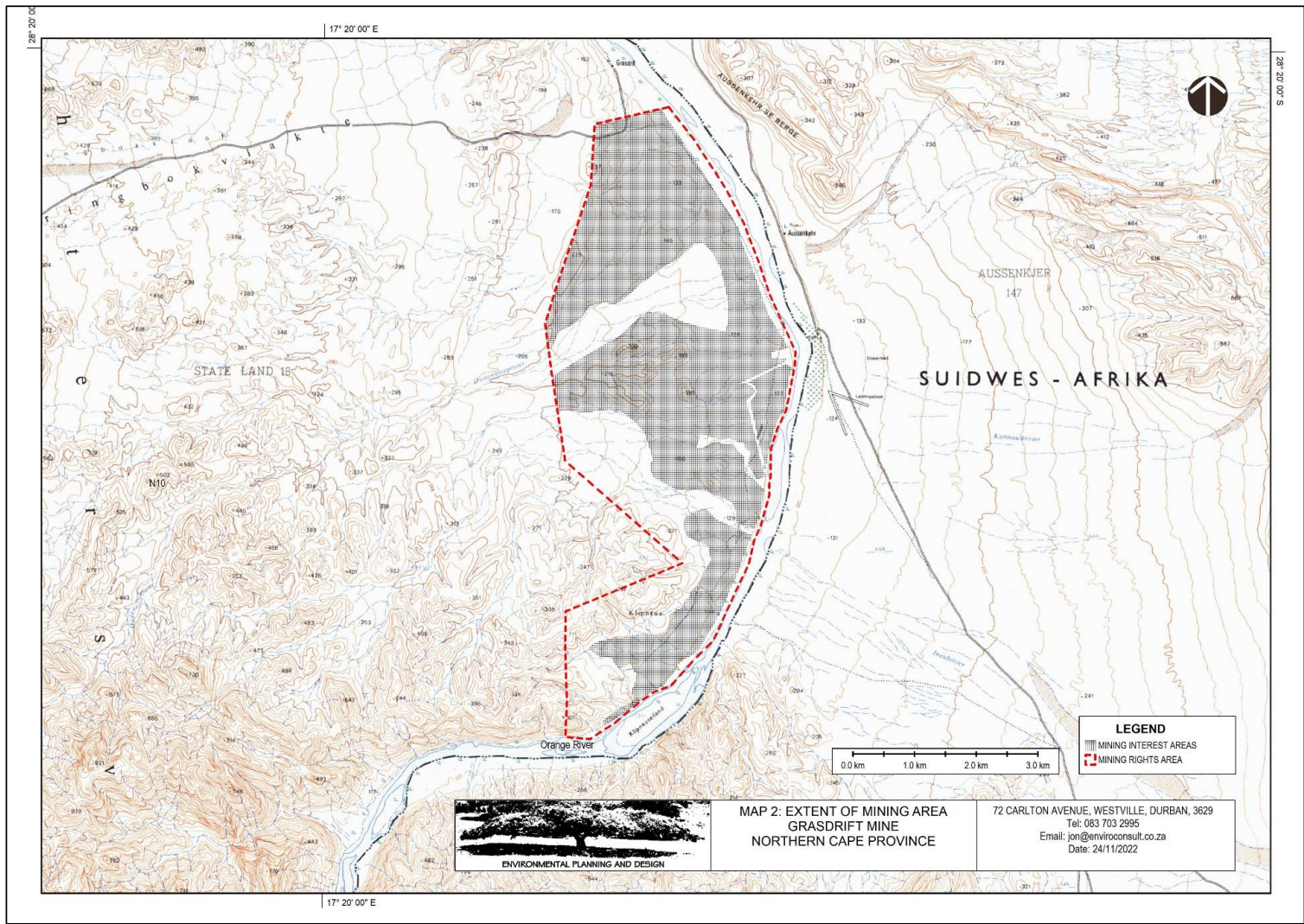
Calculation of visibility is based purely on the Digital Elevation Model and does not take into account the screening potential of vegetation or other development.

The following GIS data sets were used in undertaking and presenting the assessment:

DATA SET	SOURCE	YEAR
South Africa Protected Areas Database (SAPAD)	Department of Environmental Affairs	2021
SRTM Worldwide Elevation Data	CIAT-CCAFS	2018
World Imagery	ESRI	2009 (updated 2021)
SA NLC (National Land Cover)	Department of Environmental Affairs	2018
1:50,000 raster mapping	Chief Directorate National Geo-Spatial Information of South Africa	Unknown
South African rivers in drainage region ALL	Department of Water Affairs	2012
Update of vegm2009	South African National Biodiversity Institute	2015
South Africa /Lesotho Roads	Open Street Map	2014



Map prepared by Naledzi Environmental Consultants



2. PROJECT DESCRIPTION

2.1 PROJECT MOTIVATION

Drilling and bulk sampling conducted in 2019 under the prospecting right at Grasdrift indicates there is more than 250,000 carats of high-value diamonds present which can be mined over a 30 year period using conventional open cast mining methods i.e. loading, hauling and mineral processing by means of Standard Rotary Pan Plants.

The Mining Rights Area is located within a protected area (Richtersveld National Park) which is prohibited in terms of Section 48 of the National Environmental Management: Protected Area Act (57 of 2003)(NEM:PAA). However the mining rights were established prior to this Act. There are three other mining operations underway in the Park on the same basis.

2.2 PROJECT DESCRIPTION

The extent of the Mining Rights Area and within this the Interest Area which, from the best information available, is the area within which the diamond bearing material is located (**Refer to Map 2, Extent of Mining Area**).

The Grasdrift Mine will see open cast mining methods to extract the diamonds i.e. loading, hauling and mineral processing by means of Standard Rotary Pan Plants including final extraction through a Final Recovery Plant.

The mining process will involve mechanised removal of overburden i.e. removal of vegetation (>20ha), excavation of sand and boulders to expose the diamond-bearing gravel along the Orange River. The mined-out material will be loaded into excavators and Front End Loaders will load the minerals onto a dump truck and ADT's.

The Run of Mine (RoM) will be hauled to the processing plants for the diamond recovery and waste to overburden and waste stockpiles for later use in the rehabilitation of all disturbed areas.

Much of the plant and mining facilities that were established for the prospecting phase of the operation will be used and possibly expanded for the potentially 30 year mining phase.

Mining, processing and rehabilitation associated with prospecting were underway during the site visit. This provided a clear understanding of the nature of likely impacts.

Areas of work and likely timing of impacts was discussed during the site visit. From this discussion, the following is understood:

- Extraction of material may take place anywhere and at any time during the life of the mine subject to where the richest material is found;
- Other than physical issues, the only restriction that is in place appears to be that no mining shall take place below the 1:100year floodline of the Orange River;

- Possibly due to the depth of loose material, one such physical restriction is likely to be that only shallow excavation is likely to occur on the minor foot hills within the Mining Rights Area;
- Within flat areas beside the river the depth of excavation could be in the order of 20m;
- The Mining Rights Area will be divided into three areas (Areas 1 – 3). The southernmost area and central area, Areas 1 and 2 respectively are likely to be the first areas mined.
- Area 3 which is the northern most area is likely to be the last area mined;;
- Whilst Area 3 is likely to be the last area where mining is commenced, mining of all three areas is likely to happen in parallel throughout the life of the mine;
- Areas to be mined will be stripped of topsoil prior to mining commencing;
- Rehabilitation will take place sequentially meaning that as material from one trenched area is completed, extracted material and topsoil will be returned to each trench and grading undertaken to return the mined area to approximate original contours blending the landform into surrounding area. Therefore there should be no large pit areas open at any one time;
- As far as possible processing facilities, equipment access / haul roads and buildings developed and used during the prospecting phase will be maintained, repaired and possibly augmented for use during the mining phase;
- At the time of reporting, one processing plants had been established for use during the prospecting phase.
- Relatively small slimes dams will be required at each processing plant.
- Water will be abstracted from the Orange River for processing.

2.3 LIKELY SCALE OF DEVELOPMENT

The following description from the review of existing prospecting operations and through discussion with the Applicant.

The mining property will be divided into three (3) sections each with a static processing plant located in (**Refer to Plate 1**):

- The southern area in the current location of the existing processing plant - Section 1;
- In the central area of the MRA- Section 2; and
- In the northern section of the MRA - Section 3.

These static plants will service the mineral deposit areas around them. The average height of a static plant is in the order of 10m high as observed during a recent site visit (17 November 2022) to Grasdrift prospecting operations. The use of a mobile infield screen to minimise material handling at the plant is also proposed. The infield screen has an approximate height of 4m high. Visibility is likely to be exacerbated by dust rising from the handling and processing of material.¹

¹ The dust suppression measures to be put in place to minimise the dust rising from the plant areas in effect can and will minimise the visual impact i.e.

Abatement equipment under the mining right will include:

- Section 1 plant will be fitted with an extractor.
- Section 2 plant will have a scrubber (wet process) and will produce low to no dust.

Excavation of material will take place within the delineated mineral deposit areas of the MRA (i.e. Proto and Meso terraces). Two contractors will mine the MRA sections simultaneously starting with sections 1 and 2. Section 3 will only be mined later. It is likely that mining within section 1 and 2 will occur within the richest deposits first and then move on to the next richest. No mining sequence is followed. Excavation could occur anywhere within the delineated MRA mineral deposit areas (sections 1 and 2) at any time based on mineral recovery rate.

Stripping and stockpiling of topsoil will occur prior to excavation. The only relatively long term stockpiles will be topsoil that will remain in the area of each excavation until it is backfilled with processed material and oversized material.

Stockpiles are unlikely to exceed 8m high.

Removal of overburden (No blasting)² will be undertaken by excavator directly to dump trucks and transport as directly backfill to previously mined out areas.

Excavation of gravel from mineral deposit areas will then occur and gravels will be screened (+25mm, -4mm) directly in the pit, using an infield screen.

To minimise material handling waste rock (coarse tailings) stockpiled next to pit and used as direct backfill as part of concurrent rehabilitation.

Run of mine (-25mm, +4mm gravels) will be loaded onto dump trucks and hauled to processing plant for further screening and diamond recovery.

Waste rock generated at the plant (coarse or finer tailings) will be temporarily stockpiled at the plant and transported back to mined out areas for rehabilitation.

Fine tailings (porrel) from each plant will be pumped to the slimes dams to dry out.

Mining will remain above the 1: 100 year flood line of the Orange River or 100m away (whichever is greater) in line with GN 704 'Mine Water Regulations' of the NWA.

Rehabilitation will occur progressively as mining occurs. It will involve the backfilling of excavations with processed and over-sized material, spreading of topsoil and grading the land to mimic the surrounding landscape (i.e. terraces and coarse material surface cover), (**refer to plate 2**). From the site visit and discussions, one criticism is perhaps that previous rehabilitation has been too perfect (**Refer to plate 3**). The rehabilitated area appears different to the surrounding areas. This is because it has been finished on the surface with relatively fine gravel whereas surrounding areas have coarse gravel on the surface.

It is recommended that future rehabilitation takes cognisance of the surrounding surface material and ensures that sufficient coarse material is retained for surface finishing.

• Section 3 area to be mined does not have a lot of fine materials in the diamond-bearing gravels therefore much less dust is expected from this mining section and the abatement for this section will be confirmed by air quality specialist.

² No blasting required, excavation of boulders and sand)

Waste dumps and stockpiles will vary in height, however, they shouldn't exceed 10m.



Plate 1, Existing Processing Plant that was developed for the prospecting phase

This plant will be retained for the mining phase.



Plate 2, Mined trench being backfilled prior to spreading topsoil



Plate 3, Existing rehabilitated area



Plate 4: Example of Infield Screen tipping out coarse and fine tailings Photo taken at Reuning (Naledzi)



Plate 5: Excavator and dump truck used to extract gravels to load and haul to static processing plant



Waste dump
(overburden)

Plate 6: Dump truck in front of waste dump in background
The dump truck is 4.3m in height. The dump should be anything between 7-8m high. (Naledzi)

3. DESCRIPTION OF RECEIVING ENVIRONMENT AND RECEPTORS

3.1 EXTENT OF THE AFFECTED LANDSCAPE

The study area is comprised of the area over which the proposed development may be visible.

The Approximate Limit of Visibility (ALV) is dictated by height and visual mass of the proposed development, surrounding landscape and built features such as vegetation, ridgelines and buildings as well as the curvature of the earth.

A mathematical calculation has been used to indicate the Approximate Visual Horizon due to the earth's curvature as seen from the highest point of the proposed development. The formula used is a universally accepted formula that is used widely for navigation and is indicated in **Appendix II**. This indicates that in a flat landscape the proposed 35m high mast could be visible to the following distance;

DEVELOPMENT ELEMENT	APPROXIMATE LIMIT OF VISIBILITY/ LIMIT OF VISUAL EFFECT
10m high structure	11.3km (ALV)

In reality this distances will be reduced by:

- Landform, vegetation and other structures that may screen views;
- Weather conditions that limit visibility. This could include hazy conditions during fine weather as well as mist and rain;
- Scale and colour of individual elements making it difficult to differentiate structures from the background; and
- The fact that as the viewer gets further away, the apparent height of visible elements reduce. At the limit of visibility it will only be possible that the very tip of an object may be visible. This reducing scale means that an object will become increasingly more difficult to see as the distance from it increase.

It is acknowledged that the landscape within which the development is proposed is far from flat and that landform will play a major role in limiting visibility. However visibility will be limited within the ALV.

A distance of 11.3km has therefore been adopted as an initial indication of the necessary study area.

3.2 LANDSCAPE CHARACTER

Landscape character is defined as “a distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another”.

Landscape Character is a composite of influencing factors including;

- Landform and drainage
- Nature and density of development
- Vegetation patterns

3.2.1 Landform and Drainage

Refer to Map 4, Landform & Drainage.

The Orange River is the main drainage feature of the region. In the vicinity of the Mining Rights Area (MRA), the Orange River forms the boundary between the Republic of South Africa and Namibia.

Immediately to the north and the south of the MRA, the river flows through a steep gorge that is created by mountainous areas to the north and the south of the river. Mountains in these areas rise in the order of 400m above the river valley.

In the vicinity of the MRA the mountains are set back from the river approximately 6km on the South African side and approximately 11km on the Namibian side. The land slopes up towards the foot of the mountains in a relatively uniform flat approximate 1:50 slope.

The Orange River flows through a relatively wide river channel. Typically and under low flow conditions, the river has a wide sand / gravel floodplain on the edges of which slopes which in some areas are in the order of 10m high rise.



Plate 7, The broad floodplain of the Orange River



Plate 8, Wide gravel beds extend from above the Orange River Floodplain to the mountains

3.3.2 Vegetation Patterns

Vegetation types³ that occur within the vicinity of the proposed site include:

- Kwaggarug Mountain Desert which occurs on the higher land; and
- Richtersveld Sheet Wash Desert which occurs on the uniform slopes between the Orange River and the mountains

Vegetation within both of these types is sparse and generally will have little screening ability or influence on landscape character. At the time of the site visit, on the slopes above the River Channel were comprised of gravel surfaces. Vegetation Within the river channel however where water is more available riparian vegetation is relatively continuous and includes small trees.

It should be noted that in areas, natural riverine vegetation has been transformed by ornamental specials and grassing to allow river access.

3.3.3 Land Use

Refer to Map 5, Landcover.

To the north and south of the MRA where space between the Orange River and the foot of the mountains is limited, the only real land use is a road that runs beside the River on the Namibian (northern) side of the River.

Opposite the MRA again on the northern side of the River, where access along the C13 and irrigation from the Orange River is possible, the commercial production of grapes occurs in a band approximately 2.5km wide and largely between the River and the C13.

³ Muncia and Rutherford



Plate 9, Grape growing between the Orange River and the C13

The small, informal settlement of Assenkehr is located opposite the northern side of the MRA and there are two resort type developments Silverlands and Norotshama, located further to the south and adjacent to the River.



Plate 10, The settlement of Aussenkehr

The Silverlands Resort is associated with the Silverlands grape growing operation and has to be accessed through the growing area. It has a number of reed chalets

at its northern end and one house close to the southern end. The majority of the area is comprised of open, cut lawn. During the site visit there were no guests. It is understood that rafting expeditions along the river use this facility as a stop off.

The Norotshama Resort was relatively busy with numerous guests.



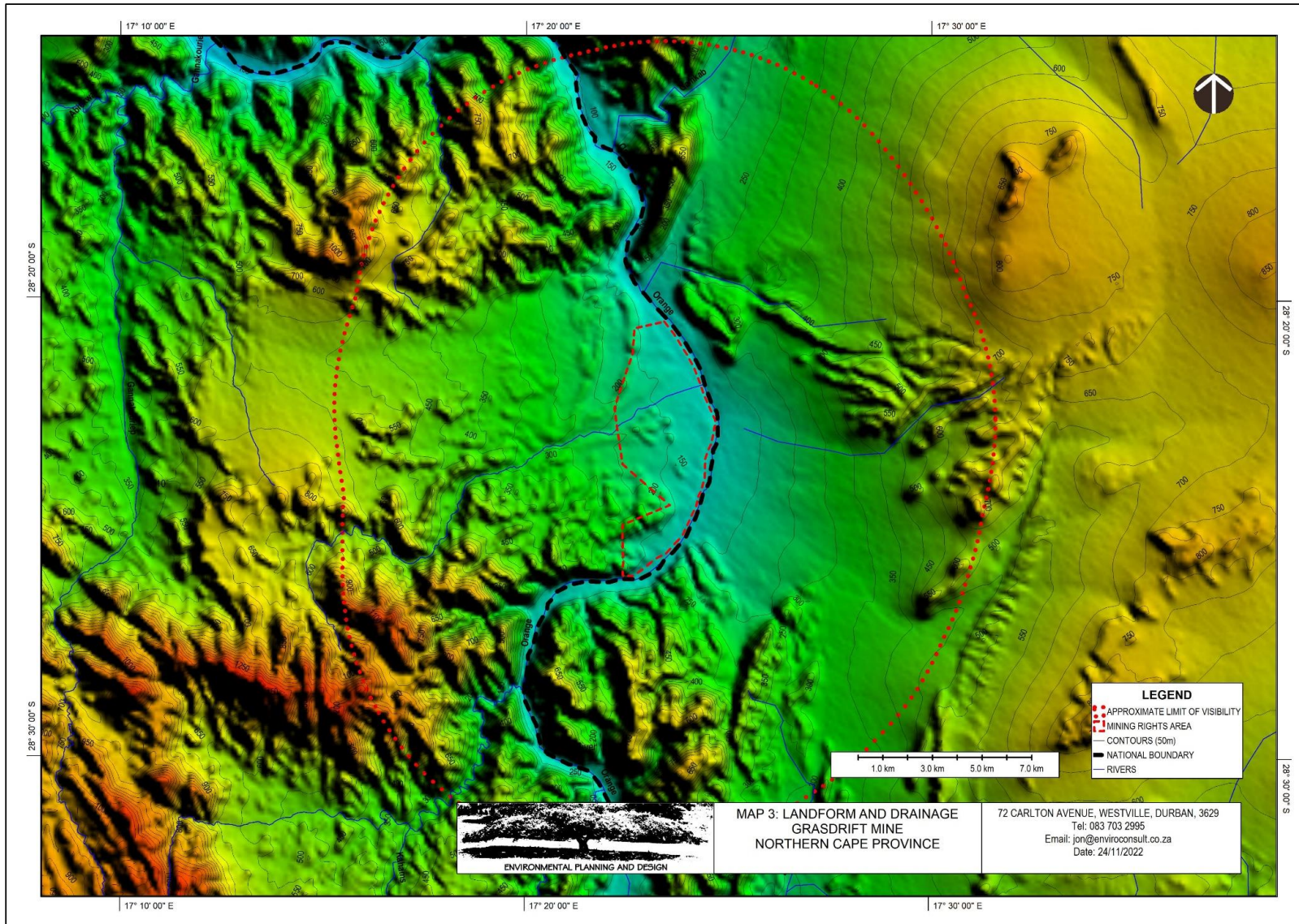
Plate 11, Reed chalets on the northern end of the Silverlands Resort
Irrigated grass and trees extend throughout.

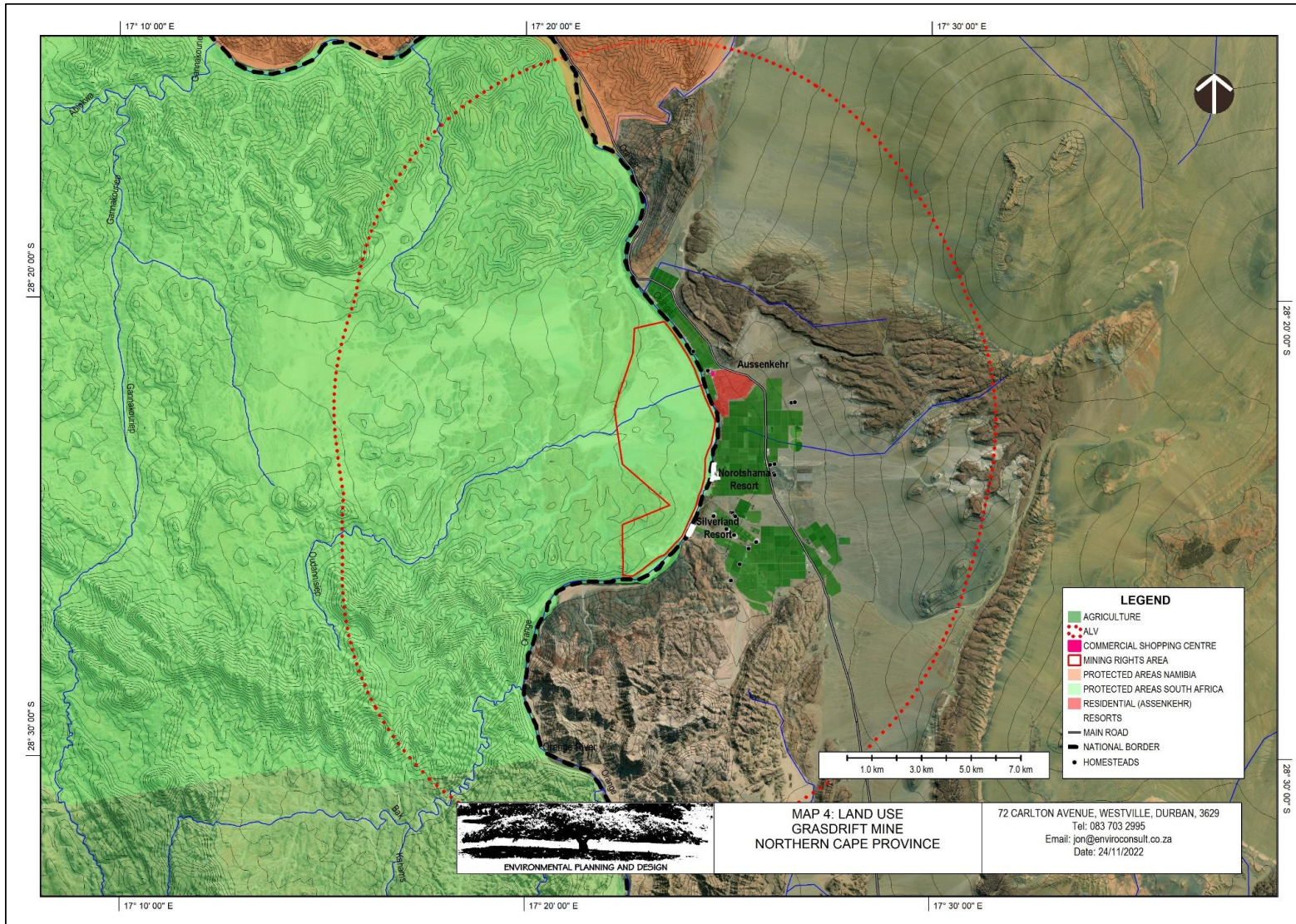


Plate 12, Private house on the southern end of the Silverlands Resort



Plate 13, The river frontage at the Norotshama Resort
Irrigated grass, shrubs and trees extend throughout.





MAP 4: LAND USE
GRASDRIFT MINE
NORTHERN CAPE PROVINCE

72 CARLTON AVENUE, WESTVILLE, DURBAN, 3629
Tel: 083 703 2995
Email: jon@enviroconsult.co.za
Date: 24/11/2022

3.4 LANDSCAPE CHARACTER AREAS

3.4.1 Landscape Character Area and Visual Absorption Capacity

Landscape Character Areas (LCAs) are defined as "single unique areas which are the discrete geographical areas of a particular landscape type"⁴.

Visual Absorption Capacity (VAC) is *defined* as the landscape's ability to absorb physical changes without transformation in its visual character and quality. Where elements that contrast with existing landscape character are proposed, VAC is dependent on elements such as landform, vegetation and other development to provide screening of a new element. The scale and texture of a landscape is also critical in providing VAC, for example; a new large scale industrial development located within a rural small scale field pattern is likely to be all the more obvious due to its scale.

The characteristics that have the greatest influence in the definition of landscape character are landform and landuse.

The analysis has helped to define the following Landscape Character Areas (LCAs):

Natural Upland LCA which is comprised of the rugged mountainous area on both sides of the Orange River. In terms of VAC, the topography is likely to help screen the proposed mine area from areas upstream and downstream on the Namibian side of the river, including the Ai-Ais National Park, and it will also provide screening from areas of the Richtersveld National Park that are accessible and used by the public on the South African side of the river.

Natural Lowland LCA which is comprised of the undeveloped gravel slopes between the foot of the mountains and the Orange River Corridor. The proposed mining area is located within the LCA. In terms of VAC, the topography and general lack of vegetation provide little ability for the various mining features to be screened. The general slope of the land towards the Orange River could also help to make mining more obvious to the Namibian side of the river. However, the relatively flat terrain is likely to help screen the majority of excavation work although the plant and trucks undertaking the excavation, moving and the excavated material are likely to be visible. This LCA is extensive and has a relatively uniform slope and visual texture. This should mean that the mining area is only visible when the viewer is within sections of the landscape which helps it read as a cohesive visual unit. Variations in this cohesive texture, perhaps due to small scale development seen at a distance, may be easily overlooked unless the viewer is focusing on them.

Developed Lowland LCA which is comprised of the grape growing area on the Namibian side of the Orange River. Amongst the plantations there are agricultural blocks, offices and homesteads largely of people working on the farms. Landscape aesthetics may be important to some people, however, they are likely to be in second place to the productivity of the landscape. In terms of VAC, the height and

⁴ UK Guidelines.

density of grapes blocks most views towards the river. However, views are possible in many places of the gravel slopes above the river channel on the opposite side of the river.

Orange River Corridor LCA which is comprised of the land within the river channel including the floodplain and, in areas, the steep slope on the edges of the floodplain. In addition to being the national border between Namibia and the Republic of South Africa, the river corridor is an important resource. In addition to water supply for people and crops, it is a recreational resource and is a visual resource that has attracted recreational and tourism development. In terms of VAC, when within the river channel the steep sided banks and riverine vegetation can provide a large degree of screening.

These LCAs are indicated on **Map 4, Landscape Character Areas and Visual Receptors**.

3.5 VISUAL RECEPTORS

Visual Receptors are defined as "individuals and / or defined groups of people who have the potential to be affected by the proposal"⁵.

3.5.1 Identified visual receptors

It is possible that an area might be sensitive due to an existing use. The nature of an outlook is generally more critical to areas that are associated with recreation, tourism and in areas where outlook is critical to land values.

This section highlights possible Receptors within the landscape which due to use could be sensitive to landscape change. They include Area Receptors, Linear Receptors and Point Receptors.

Area Receptors are areas within which it is not possible to be specific regarding viewpoints. They are important due to their use or designation. Within the study area the Richtersveld National Park within RSA, the Ai-Ais National Park within Namibia and the settlement of Aussenkehr, the Silverlands Resort and the Norotshama Resort are all area receptors.

Area receptors also include a section of the Orange River near the Aussenkehr School where access is possible for residents through a gate to the river. This appears to be the only section of the river where local people have ready access. It seems to be a popular area for children to bathe in the river.

⁵ UK Guidelines



Plate 14, Children playing in the Orange River close to the Aussenkehr School

Linear receptors are routes along which people travel. There is no set viewpoint as views change as the traveller moves along the route. They usually include roads but can include footpaths / hiking trails, railway lines and cable cars. Within the study area the C13 road on the Namibian side of the Orange River and the Orange River itself which is used for rafting trips are both linear receptors.

Point receptors are specific points in the landscape from which people are likely to view a proposed development from. They can include specific buildings, a mountain pass where people stop to admire a view, or a look out point on a trail. Within the study area point receptors include homesteads.

Visual receptors that include places and routes that may be sensitive to landscape change are indicated on **Map 6**.

3.5.2 Likely sensitivity of visual receptors and LCAs

The sensitivity of a landscape to change or a visual receptor to a change in view are likely to relate to use.

Uses such as tourism and recreation areas are likely to rely on the maintenance of an outlook for successfully attracting visitors and maximising their enjoyment. A route that is particularly important for tourism may also be dependent on outlook for the maintenance of a suitable experience for users.

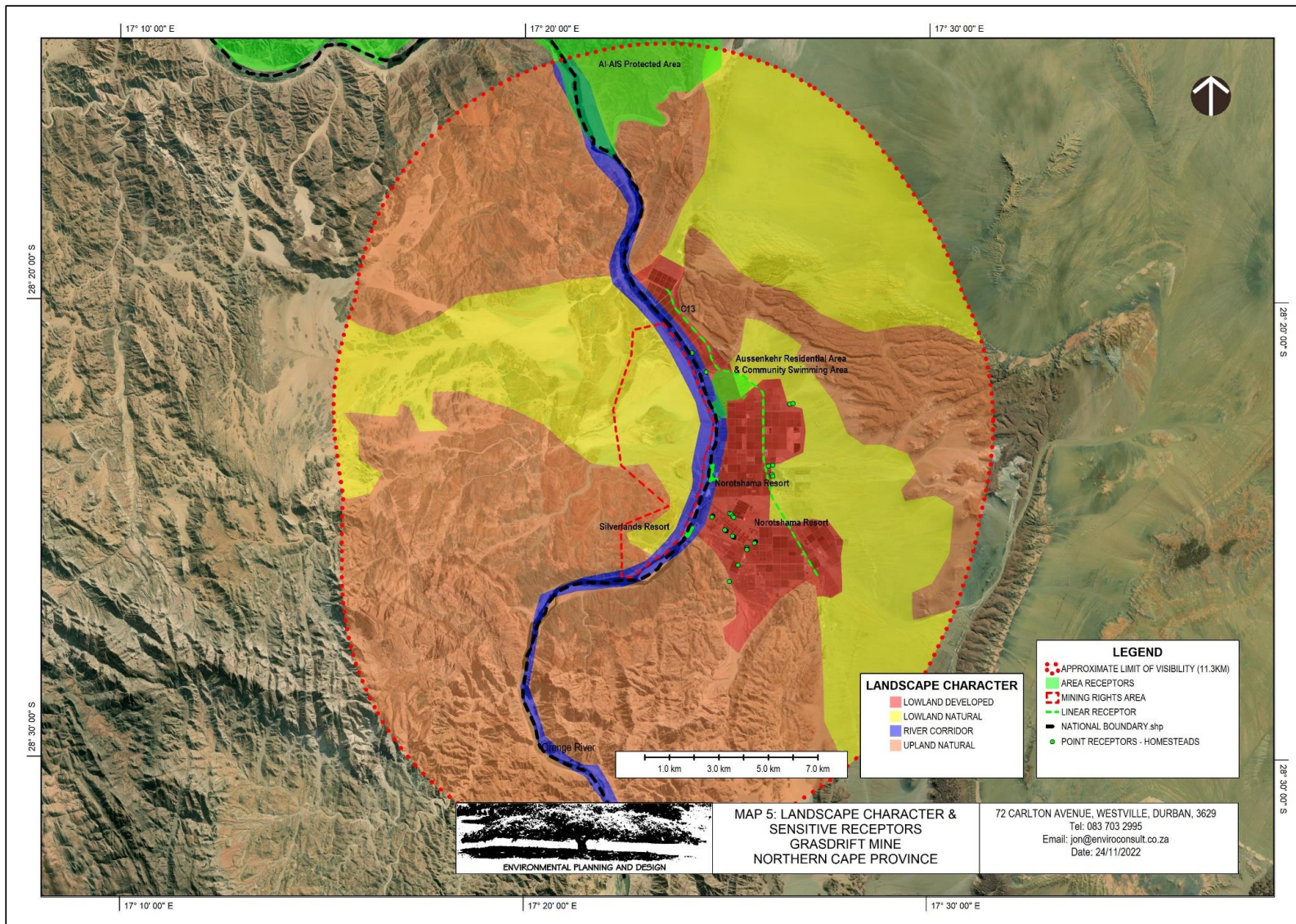
It is difficult to define hard and fast criteria for assessment of subjective issues however, in order to provide both consistency and transparency to the assessment

process, the table below defines the criteria that are proposed to guide the judgement as to the sensitivity of the various visual receptors in their interaction with the identified LCAs.

Landscape Sensitivity Criteria

SENSITIVITY	LCA	RECEPTORS
Low	<p>Landscape value is not recognised locally; the landscape is relatively intact, may have a distinctive character; and the landscape is very tolerant of change.</p> <p>These areas include:</p> <ul style="list-style-type: none"> • Developed Lowland LCA 	<p>Small number or low sensitivity of viewers assumed. Viewers' attention not focused on landscape. These include:</p> <ul style="list-style-type: none"> • Residents of the settlement of Aussenkehr; • Residents of homesteads within the grape growing areas. • River access area to the Orange River near Aussenkehr School, as long as the water is suitable for swimming and surrounding uses don't make it unpleasant, the people that use this area are unlikely to be concerned regarding the landscape setting.
Medium	<p>Landscape value is recognised locally, but is not protected; the landscape is relatively intact, with a distinctive character; and the landscape is reasonably tolerant of change.</p> <p>These areas include:</p> <ul style="list-style-type: none"> • Natural Lowland LCA Whilst This LCA falls within the Richtersveld National Park, due to the situation regarding historical mining rights taking precedent over the National Parks Act, this section of the Park is not protected. 	<p>Viewers' attention may be focused on landscape. These include:</p> <ul style="list-style-type: none"> • Users of the C13 some of these people may be tourists however, the majority are likely to be local people and business travellers.
High	<p>Landscape value recognised by existing or proposed national or regional designation. Sense of tranquillity or remoteness specifically noted in Landscape Character Assessment.</p> <p>High sensitivity to disturbance.</p> <p>The qualities for which the landscape is valued are in a good condition, with a clearly apparent distinctive character. This distinctive character is susceptible to relatively small changes.</p> <p>These areas include;</p> <ul style="list-style-type: none"> • The Natural Upland LCA which include the Richtersveld National Park and the Ai-Ais National Park; and • The River Corridor LCA, because the South African Boundary extends 	<p>Viewer's attention very likely to be focused on landscape. Enjoyment of the natural landscape and / or success of activities dependant on natural outlook.</p> <p>These include:</p> <ul style="list-style-type: none"> • Residents and visitors of the resorts that are located within / adjacent to the River Channel; and • Visitors to the Ricjtersveld National Park and the Ai-Ais National Park; and • People using the Orange River Corridor for recreation and tourism. This will include

	to the north bank of the Orange River, this LCA is within the Richtersveld National Park.	people taking part in river rafting as well as people taking part in other water sports from the resorts.
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4 LIKELY VISIBILITY OF MINING OPERATIONS

4.1 THE NATURE OF VISUAL IMPACTS

From the site visit, there are no overlooking viewpoints from within the Richtersveld National Park that are accessible.

From discussion with the Park Manager, the proposed mining area is not a popular area for visitors. The proposed mining area will be also be excluded from public access areas of the National Park.

This means that affected receptors are likely to be on the Namibian side of the Orange River or within the river corridor.

From this area the elements associated with the mine that are likely to be most visually obvious are those that can be seen in elevation. These elements will include:

- Processing Plants;
- Buildings including accommodation, offices and workshops;
- Plant that is moving across or working within the mining area; and
- Material stockpiles that could include topsoil, oversized material that is too large to be processed, material that has been processed and material waiting to be processed.

The main fixed impacts will result from processing plants, accommodation blocks, workshops and equipment storage. Impacts associated with these elements will be relatively predictable.

Impacts associated with the actual extraction process are more difficult to predict as from time to time the extraction operation will move. This means that impacts associated with extraction are likely to be transitory.

4.1.1 Processing Plant

Each proposed processing plant will appear as relatively small scale industrial operations similar in nature to the existing plant at the southern end of the Mining Rights Area.

In addition to the contrast between the form and colour of processing plants and the surrounding natural landscape making them visually obvious, from experience on site, the amount of dust rising from each plant could make them more obvious particularly from a distance.



Plate 15: Image of Grasdrift prospecting plant operations (section 1)

This illustrates the general appearance of mineral extraction and processing activities.



Plate 16, The same processing plant seen from within the mining area from a distance of approximately 400m



Plate 17, The same processing plant viewed from the opposite (eastern) bank of the river from a distance of approximately 1.7km

The plant is not highly visible however, the amount of dust rising makes it obvious.

4.1.2 Buildings

Existing brick buildings and steel structures owned by the mine (from prospecting operations) will be refurbished and reused as an office. These include accommodation blocks, offices and store facilities at each processing plant.

The accommodation blocks and office buildings are single storey structures that are located close to the Orange River. The brick accommodation blocks are painted a light sand colour possibly to help reduce heat gain. The colour also helps the structures to visually blend with desert like surroundings.



Plate 18, Existing accommodation block buildings that will be repaired and reused during the mining phase



Plate 19, Existing container offices that will be maintained during the mining phase



Plate 20, Existing container offices and accommodation block seen from the opposite (eastern) river bank from a distance of approximately 500m
Due to their rectangular form that creates geometric areas of shadow they are visually obvious from this distance. However, their colour helps.



Plate 21, Existing container offices and accommodation block seen from the opposite (eastern) river bank from a distance of approximately 2.2km

4.1.3 Excavations and Stockpiles

With the exception of excavation occurring on hillsides, excavations are unlikely to be highly obvious due to the fact that they will be below ground level and views will generally be from similar levels on the opposite river bank. However stockpiles and plant working beside trenches could be highly obvious. From the site visit, visibility of plant working beside or within excavations is likely to be exacerbated by dust rising from the working area.

Similar views are likely during rehabilitation and excavation of material.



Plate 22, Existing stockpiles close to the southern processing plant

The colour and texture of the excavated material makes it obvious when seen against the undisturbed hill slope.



Plate 23, Existing small topsoil stockpiles

The colour and texture of the excavated material makes it obvious when seen against the undisturbed area behind it.

The stockpiles are located immediately adjacent to an excavated trench form where the material was taken, however, the trench is not visually obvious.



Plate 24, The excavation plant that is likely to be more obvious than the excavation



Plate 25, Excavation plant is likely to be made more obvious by dust

4.1.4 Haul Roads

There will be a limited network of unsurfaced roads providing a link between the three mining areas and between the areas of excavation / rehabilitation and the three processing plants.

As with the excavations, the roads themselves are unlikely to be visually obvious to receptors. However, dust raised by trucks travelling along the roads is likely to make their location highly obvious.

4.1.5 Slimes Dams

Slimes dams will be required ranging in size at each plant i.e. 1ha, 1ha and 2.97ha. The minimum holding capacity requirement of each slimes dam is 110,000m³/month.

From observations during the site visit, slimes dams will be located relatively low in the landscape and are unlikely to be visually obvious unless viewed from above. They are therefore unlikely to be visually obvious to receptors within the River Corridor or on the east bank of the River.



Plate 26, An existing slimes dam within the Mining Rights Area

Dams are unlikely to be visible to receptors as they will be relatively small and located at low points in the landscape .

4.1.6 Water Abstraction

It is proposed that an average 80,000m³ to 100,000m³ of water is abstracted from the river each month for process and potable water.

Water will be piped from the abstraction point in the river to each processing plant.

Water is currently taken from the river for the existing processing plant. It is also abstracted to neighbouring properties largely for agricultural use.

The current mine abstraction plant is sufficient for current prospecting uses. When the mine is operating with three processing plant it is likely that the capacity will be increased and larger plant will be required.

Abstraction plant are relatively common on the affected section of the river bank due to the extent of agriculture. Water is also abstracted for potable use.



Plate 27, The existing water abstraction plant for the prospecting phase

This is a relatively small facility. It appears informal / temporary with a small float to hold the pump and a flexible hose feeding water up the river bank. Whilst it is visible from the immediate area it is unlikely to be highly obvious from 100m up and down the river .



Plate 28, An existing water abstraction facility on the opposite bank to the proposed mine

This is a relatively large facility associated with irrigation for a grape growing operation. With fixed steel pipes and a larger float that is likely to support a larger capacity pump, the system is significantly more visible from the river.

The wide section of cleared river bank either side of the facility and the large utilitarian building which houses a treatment plant exacerbate the visual impact.

4.1.7 Lighting

Lighting will be required at each processing plant and around offices, workshop and accommodation areas.

Any lighting is likely to be visible to receptors on the eastern side of the river.

It is likely that floodlighting may be required around the processing plants in order to enable night time operation.

Around offices, workshops and the accommodation block, relatively low level external lighting might be used sufficient to ensure safe use of the facilities. However, if lighting for security purposes is required around these buildings this too could be highly obvious to receptors.

4.2 ZONES OF THEORETICAL VISIBILITY

Zones of Theoretical Visibility (ZTV) are defined by the UK Guidelines as "a map usually digitally produced showing areas of land within which a development is theoretically visible".

An initial ZVT map has been prepared for the proposed development in order to highlight the areas that could be affected.

As site layouts have not been provided, it has been assumed that the various elements within the project could be up to 10m high.

The ZTV analysis has been undertaken using the Viewshed Tool in the Global Mapper GIS package. The assessment is based on terrain data that has been derived from satellite imagery. This data was originally prepared by NASA and is freely available on the CIAT-CCAFS website (<http://www.cgiar-csi.org>).

4.2.1 Likely Visibility of the proposed elements

Map 6 indicates the initial ZTV of the proposed project.

This indicates that visibility is likely to be constrained to the east and west by ridgelines associated with the valley sides and to the north and south by the mountains that converge on the Orange River Corridor creating the steep sided gorge.

4.3 LIKELY IMPLICATIONS FOR LANDSCAPE CHARACTER

Due to the limited time span for mining (30 years) and the likely success of rehabilitation, the visual influence of mining operations is likely to be temporary.

Proposed mining operations will introduce industrial elements into what is fundamentally a natural landscape.

Impact areas are likely to be relatively limited and focused around each activity.

The static elements being comprised of the processing plants, accommodation, workshops and offices will have a relatively long term impacts whereas the impacts

of extraction operations will be transitory and will move over time as the extraction area moves.

4.4 POSSIBLE IMPLICATIONS FOR VISUAL RECEPTORS

The mining operations are likely to be most obvious and have greatest impact on receptors that are relatively close.

4.4.1 Protected Areas

The ZTV indicates that the operations could be visible to the Ai-Ais protected area. However, they will be seen at a minimum distance of 9.5km and only from high points within the park. Considering the scale of the proposed operations and the distance, it is unlikely that the mining operations will be visually obvious. It is possible however that dust rising from the operations could be visible.

The area of the Richtersveld outside the MRA remains protected. From the site visit and with the exception of high areas that are likely to be inaccessible, the sign restricting access to the mining area was located close to the limit of visibility as indicated on the ZTV. Therefore, if visitors comply with signage it is unlikely that they will see the mining operations.

It needs to be understood that there are three other mining operations within the Park, one of which is close to the Sendelingsdrif Gate and Rest Camp. This operation runs 24 hours a day and has a major negative impact on visitor experience.

The mining operation is likely to have varying degrees of impact on the Orange River Corridor. Mining will be allowed to the 1:100 year floodline. At the time of the site visit the location of the floodline was not known.

In some areas where there is a steep embankment close to the river channel, it seemed likely that mining might occur through the embankment exposing extraction operations.

In other areas with a flatter embankment profile, it seemed likely that riverine vegetation might fall within the mining area.

This could be of visual concern as steep embankments and existing riverine vegetation could serve to limit visibility of mining operations to receptors in the river channel and on the Namibian side of the river.

4.4.2 Existing Resorts

Both the Silverlands Resort and the Norotshama Resort will be affected.

Correspondence has been received regarding the **Silverlands Resort (Appendix III)** which is located relatively close (approximately 1.8km) from the Area 1 (southern-most) processing plant that is operational for the prospecting phase. Concerns relate to issues other than visual impact including noise, dust and water quality. From reference to aerial photography estimate where the 1:100 year floodline may occur, it seems possible that excavation of material could occur within 400m of this resort. Whilst this is likely to cause a temporary impact, it is likely to significantly increase the concern.

There is little riverine vegetation on the Richtersveld side of the river opposite this resort. However there is some vegetation to the north and south. It is possible that this vegetation falls above the 1:100 year floodline. This vegetation could help to mitigate views of excavations. Mining of the area, however, could result in its loss.



Plate 29, View looking north west from the southern end of the Silverlands Resort towards the vegetated section of the western river bank

A discussion was held with the manager of the Norotshama Resort during the site visit during which he echoed the concerns raised by the Silverlands Resort. Immediately opposite the resort, on the Richtersveld side of the river, the river bank rises approximately 15-20m above the floodplain. There is concern that should mining be allowed to the 1:100 year flood line this could result in removal of the bank and the well-established vegetation that it supports. This would make mining more obvious than it would otherwise have been.



Plate 30, View looking across the Orange River from the Norotshama Resort

Note the steep 15-20m high bank that is well vegetated. It seems likely that the 1:100 flood line is located part way up the bank. The fact that mining may take place to the 1:100 year flood line could result in the bank and vegetation being removed and the mining operation being more obvious than it would have been should the bank and vegetation remain in place.

4.4.3 Roads

The only road that is likely to be affected is the C13. This road links the border crossing at Viooldrift to the border crossing at Sendelingsdrift and then northwards to Helmeringhausen. It is a relatively important regional road providing a link from South African border crossings to Luderitz and to Windhoek. It is therefore likely to carry a large proportion of tourist traffic.

At its closest the C13 is approximately 1km from the MRA. Along almost the entire section that could be affected by views of the proposed mining operations (approximately 16.5km) grape growing is likely to at least partly screen views of the proposed mining area. For approximately half this length the road will be in the order of 2km from the MRA.

At these distances it is likely that views of the mining will be visible to travellers along the road. It is also likely that dust rising from the mining operations will draw attention to these views. Without this views of mining may be possible but not highly obvious.



Plate 31, View looking towards the Orange River from the C13

Grape plantations at least partially screen views of the mining area from much of the potentially affected section of the road

4.4.4 Homesteads

Homesteads can be divided into two categories:

- Homesteads close to the Namibian river bank; and
- Homesteads that are associated with grape growing plantations.

There are three homesteads immediately adjacent to the Namibian bank of the Orange River. These homesteads are likely to have clear views over the mining area. One of these homesteads is located on the southern end of the Silverlands Resort. Views from this homestead will be similar in nature to those described for the resort.

The other two homesteads on the river bank are located towards the northern end of the MRA. One of the homesteads is located adjacent to the Aussenkehr Spar and is relatively high above the river. This homestead will have clear views over the adjacent mining area. The other northern homestead is located on the Frontier Fine Table Grapes plantation. Unfortunately the assessor was not able to gain access to this property. It is however significantly lower and closer to the river bank than the homestead adjacent to the Spar. It should also be noted that the river bank on the Richtersveld side of the river is relatively high and is covered with a band of well established riverine vegetation. It is likely that this could provide a high degree of screening for this homestead as long as mining operations are not permitted to either lower the bank or remove the vegetation.



Plate 32, View looking south from the garden of the homestead adjacent to the Aussenkehr Spar

Clear views over the mining area will be possible from this property.



Plate 33, View looking towards the homestead within the Frontier Fine Table Grapes plantation from close to the Aussenkehr Spar

The homestead is the closest structure. Views of the mining area should be largely screened by the steep river bank and riverine vegetation on the opposite river bank.

There are approximately twelve homesteads that are associated with grape growing plantations, they are generally located within or close to grape plantations to the degree that views towards the river are generally screened. Whilst partial views of the proposed mining area may be possible, views are generally screened.

4.4.5 Aussenkehr Settlement

It is likely that many residents of the Assenkehr settlement will have views over the proposed mining activities.

Residents who are located closest to the Orange River are likely to be screened from the mining area due to riverine vegetation. Residents further from the river and higher up the valley slope could have a panoramic view over the mining activities although neighbouring houses could provide screening.



Plate 34, View over Aussenkehr settlement looking towards the proposed mining area

Residents lower down the valley slope are likely to be screened from the mining area by riverine vegetation. Residents higher on the slope could have an overview of mining operations although neighbouring buildings could provide screening.

4.5 POSSIBLE MITIGATION

The most significant impacts are likely to affect receptors closest to the river. These include:

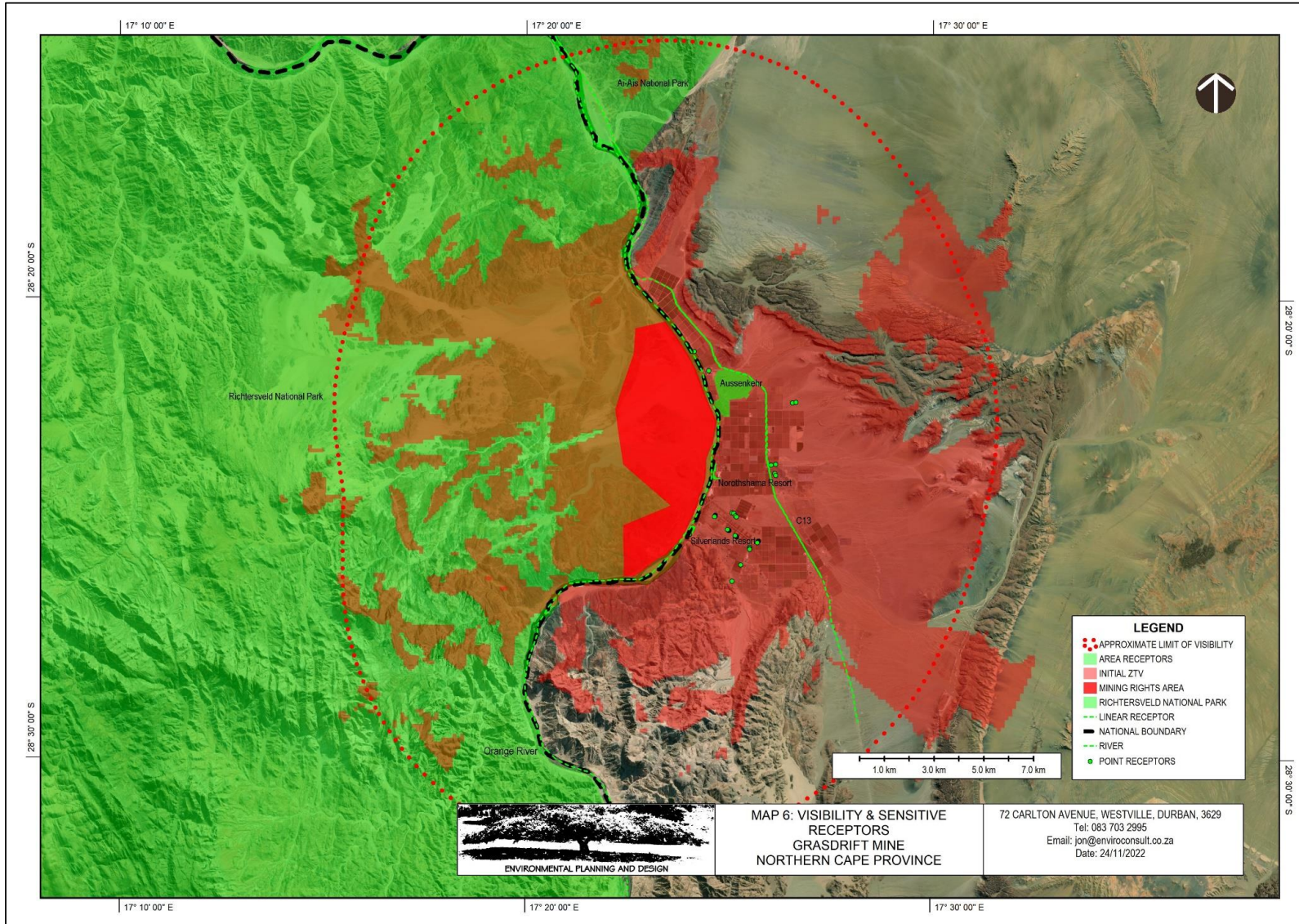
- Residents of homesteads on or close to the river bank;
- Guests in the Silverlands and Norotshama resorts;
- People participating in watersports on the river including rafting.

For these receptors the most effective mitigation measures are likely to include:

- Maintaining the river bank profile particularly in areas where an existing steep bank is likely to largely screen mining activities;
- Maintaining all existing riverine vegetation; and
- Where the above measures are not likely to be effective, maintaining a setback from the river.

For more distant receptors including the C13, residents of homesteads located away from the Orange River and residents of Aussenkehr, the following mitigation measures are could include:

- Avoiding bright colours and where possible painting structures a colour that blends with the landscape, a buff colour slightly darker than the colour of the existing accommodation block may be appropriate but this will need to be tested on site;
- Using stockpiles to help screen processing plants from receptors;
- Undertaking more effective dust suppression. In addition to the measures that will be undertaken listed in Section 4, this may include;
 - Damping down all haul roads using a water truck.
 - Damping down stockpiles as they are being deposited and as material is being extracted from them.
 - Damping down all areas where machinery is in motion extracting material from trenches and loading material into trucks.



5 RECOMMENDED ASSESSMENT METHODOLOGY

5.1 REQUIREMENTS IN ACCORDANCE WITH THE WESTERN CAPE GUIDELINES

The criteria recommended by the Western Cape Guidelines for justification of level of input for a VIA is the expected level of visual impact. This categorisation is derived from the following matrices;

Type of environment	Type of development (see Box 3) Low to high intensity				
	Category 1 development	Category 2 development	Category 3 development	Category 4 development	Category 5 development
Protected/wild areas of international, national, or regional significance	Moderate visual impact expected	High visual impact expected	High visual impact expected	Very high visual impact expected	Very high visual impact expected
Areas or routes of high scenic, cultural, historical significance	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	High visual impact expected	Very high visual impact expected
Areas or routes of medium scenic, cultural or historical significance	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	High visual impact expected
Areas or routes of low scenic, cultural, historical significance / disturbed	Little or no visual impact expected. Possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected
Disturbed or degraded sites / run-down urban areas / wasteland	Little or no visual impact expected. Possible benefits	Little or no visual impact expected. Possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected

The categorisation of development is indicated below;

<p>Category 1 development: e.g. nature reserves, nature-related recreation, camping, picnicking, trails and minimal visitor facilities.</p> <p>Category 2 development: e.g. low-key recreation / resort / residential type development, small-scale agriculture / nurseries, narrow roads and small-scale infrastructure.</p> <p>Category 3 development: e.g. low density resort / residential type development, golf or polo estates, low to medium-scale infrastructure.</p> <p>Category 4 development: e.g. medium density residential development, sports facilities, small-scale commercial facilities / office parks, one-stop petrol stations, light industry, medium-scale infrastructure.</p> <p>Category 5 development: e.g. high density township / residential development, retail and office complexes, industrial facilities, refineries, treatment plants, power stations, wind energy farms, power lines, freeways, toll roads, large-scale infrastructure generally. Large-scale development of agricultural land and commercial tree plantations. Quarrying and mining activities with related processing plants.</p>
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The affected landscape includes protected wild areas of international significance.

The proposed project is a Category 5 development.

According to the Western Cape Guidelines, a Level 4 Assessment is required.

A Level 4 Assessment requires the following input;

- Identification of issues raised in scoping phase, and site visit;
- Description of the receiving environment and the proposed project;
- Establishment of view catchment area, view corridors, viewpoints and receptors;
- Indication of potential visual impacts using established criteria;
- Inclusion of potential lighting impacts at night;
- Description of alternatives, mitigation measures and monitoring programmes;
- Complete 3D modelling and simulations, with and without mitigation; and
- Review by independent, experienced visual specialist (if required).

Confirmation of the need for a review by a second independent specialist is required from the Competent Authority.

5.2 LANDSCAPE AND VISUAL IMPACTS TO BE CONSIDERED

5.2.1 Possible Landscape and Visual Impacts

From the review of the proposed project, it is proposed that the following issues should be addressed during the assessment:

- a) The proposed development could contribute to a change in the character of the Rural LCAs which are important tourism resources;
- b) The proposed development could be visible from roads in the area some of which are important for tourism / recreation;
- c) The proposed development could impact on local homesteads many of which have secondary tourism uses;
- d) The proposed development could impact on local settlements;
- e) The proposed development could impact on protected areas;
- f) Glare impacts; and
- g) Lighting impacts could industrialise the night time landscape.

These issues will be considered in the context of the Landscape Character Areas, visual effects identified and possible cumulative influence of other possible infrastructure projects that are planned in the vicinity.

Possible mitigation measures will also need to be identified.

5.2.2 Initial Assessment of Possible Impacts

Impact			
a) Possible Landscape Change			
Initial Sensitivity Analysis of the Site:			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Industrialisation of the landscape	Affected areas could include: The Natural Lowland LCA; The Natural Upland LCA; and The River Corridor. Impacts will be temporary with	The infrastructure associated with the development could impact up to 11.3km from	At this early stage, no no-go areas are obvious from the initial review.

	the three processing plants being the most long term for the full length of the mining period (up to 30 years) and the extraction areas moving around the MRA over the same period and being likely to impact different areas over that period.	the site. However, at this distance it is unlikely to be visually discernible from the background.	
Description of expected significance of impact			
In that the project will impact negatively on a protected area of international importance, the impact will be significant.			
However, impacts will be temporary if long term.			
If riverine vegetation is protected, if rehabilitation of mined areas is undertaken on a progressive basis and to appropriate standards and if dust suppression measures are effective then impact areas will be minimised.			
Gaps in knowledge & recommendations for further study			
<ul style="list-style-type: none"> Location and detailed contents of processing plants. 			

Impact			
b) Visual impact on routes used by people travelling through the area (C13)			
Initial Sensitivity Analysis of the Site:			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Industrialisation of views of the natural landscape as seen from the C13	<p>The mining area will be visible intermittently from the road.</p> <p>Whilst mining will be visible, if mitigation is undertaken and is effective including progressive rehabilitation of mining area and dust suppression, due to distance, it is unlikely to be highly obvious.</p>	Approximately 16.5km	At this early stage, no no-go areas are obvious from the initial review.
Description of expected significance of impact			
If mitigation measures are undertaken and are effective, the impact significance is anticipated to be relatively low. This is due to: The distance of the road from the MRA; and The degree of screening provided by grape growing operations.			
Gaps in knowledge & recommendations for further study			
<ul style="list-style-type: none"> Location and details of processing plants. 			

Impact			
c) The proposed project could impact visually on local homesteads close to the banks of the Orange River.			
Initial Sensitivity Analysis of the Site:			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Industrialisation of views of the rural landscape	It is likely that a processing plant will be visually obvious and that from time to time	A limited number of homesteads	No no-go areas are obvious from the initial review.

<p>from homesteads close to the bank of the Orange River</p>	<p>extraction operations will be highly obvious.</p> <p>Mitigation measures may include:</p> <ul style="list-style-type: none"> • Retaining existing areas of riverine vegetation; • Retaining and providing a set back from steep river banks that could help to screen extraction operations; • Effective dust control; and • Using stockpiles to help screen processing plants. 	<p>will be impacted</p>	
<p>Description of expected significance of impact Without mitigation measures the significance is expected to be high particularly when extraction operations are being undertaken close to homesteads. With mitigation measures the significance of impacts is likely to be low for the majority of the time. Impacts will still increase when extraction is being undertaken in close proximity to homesteads.</p>			
<p>Gaps in knowledge & recommendations for further study</p> <ul style="list-style-type: none"> • Location and details of processing plants. 			

<p>Impact d) The proposed project could impact visually on local homesteads away from the Orange River and within grape plantations.</p>			
<p>Initial Sensitivity Analysis of the Site:</p>			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
<p>Industrialisation of views of the rural landscape from homesteads within the grape growing area.</p>	<p>Views are largely internal as the grape plantations will screen most views of the mining area from view.</p> <p>If occasional views of the mining area are possible, they will be seen at a distance and if mitigation measures are effective, mining is unlikely to be highly obvious.</p>	<p>A limited number of homesteads will be impacted</p>	<p>No no-go areas are obvious from the initial review.</p>
<p>Description of expected significance of impact The significance is expected to be low.</p>			
<p>Gaps in knowledge & recommendations for further study</p> <ul style="list-style-type: none"> • Location and details of processing plants. 			

<p>Impact e) The proposed project could impact visually on recreational activities within the Orange River Corridor.</p>
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Initial Sensitivity Analysis of the Site:			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Industrialisation of views of the from within the River Corridor.	<p>It is likely that from time to time when extraction operations are being undertaken close to the riverbank that impacts will have a high significance.</p> <p>Mitigation measures might reduce the extent of the Impact.</p> <p>Mitigation measures may include:</p> <ul style="list-style-type: none"> • Retaining existing areas of riverine vegetation; • Retaining and providing a set back from steep river banks that could help to screen extraction operations; • Effective dust control; and • Using stockpiles to help screen processing plants. 	<p>Without mitigation the entire length of the river adjacent to the MRA is likely to be impacted over the mining period.</p> <p>Mitigation measures will reduce the extent as well as the significance of impacts.</p>	No no-go areas are obvious from the initial review.
<p>Description of expected significance of impact The significance is expected to be high without mitigation. With mitigation the significance of the impact is likely to be reduced over a large proportion of the river bank.</p>			
<p>Gaps in knowledge & recommendations for further study</p> <ul style="list-style-type: none"> • Location and details of processing plants. 			

Impact			
f) Visual impact on local settlements (Aussenkehr).			
Initial Sensitivity Analysis of the Site:			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Industrialisation views over a natural landscape as seen from settlement areas	<p>Areas of the settlement closest to the Orange River and the MRA are unlikely to be affected due to the extent of riverine vegetation.</p> <p>Views of the mining operation are likely to be visible from areas further up the valley slopes however, the density of houses will have a modifying effect with structures providing a degree of screening from each other.</p> <p>Views will therefore only be</p>	Higher sections of the settlement	At this early stage, no no-go areas are obvious from the initial review.

	<p>possible from a distance.</p> <p>It is likely that the majority of residents will be more concerned about job opportunities than landscape aesthetics as long as the mining operations do not exacerbate existing living conditions.</p> <p>Views from within small towns and settlements of the surrounding landscape are generally screened or at least partially screened by surrounding buildings and street /garden vegetation. They are therefore largely inward facing. However views are likely to be possible from urban edges.</p>		
<p>Description of expected significance of impact Due to the likely low sensitivity of the settlement as well as the fact that only higher sections of the settlement are likely to be affected, impacts are likely to have a low significance.</p>			
<p>Gaps in knowledge & recommendations for further study</p> <ul style="list-style-type: none"> • Location and details of processing plants. 			

<p>Impact g) Visual impact on Protected Areas.</p>			
<p>Initial Sensitivity Analysis of the Site:</p>			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
<p>Industrialisation of a natural landscape</p>	<p>Only the Richtersveld National Park will be affected. Assuming that rehabilitation will be undertaken on a progressive basis and will be effective, the impact will be temporary, if long term.</p> <p>The impact will consist of ongoing disturbance of varying areas of the MRA as well as continuous disturbance of the three areas in which the processing plants are located. By way of mitigatory circumstances, the area of the park that will be affected is not popular with visitors, and</p>	<p>The entire MRA is likely to be affected on a temporary basis over the mining period (30 years)</p> <p>Visual impact on views from within Protected Areas is unlikely.</p>	<p>At this early stage, no no-go areas are obvious from the initial review.</p>

signage preventing access is located away from the MRA prior to the likelihood of mining activities being obvious,		
Description of expected significance of impact If mitigation is effective, the impact is likely to have a low significance.		
Gaps in knowledge & recommendations for further study		
<ul style="list-style-type: none"> Location and details of processing plants. 		

Impact			
h) Lighting associated with the proposed development could impact negatively on local receptors.			
Desktop Sensitivity Analysis of the Site:			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Industrialisation of a natural landscape	The working areas could be lit by floodlighting to enable night time working. This is likely to result in the mining operation being obvious at night from surrounding areas.	This is likely to be a local impact.	No no-go areas are obvious from the desk top review, however, a site visit is required to confirm this.
Description of expected significance of impact There is potential for lighting to make the project highly obvious at night over a wide area with glare making floodlighting more apparent. However, with appropriate mitigation, lighting levels might be controlled to an extent. Mitigation measures might include: Minimise lighting requirements to ensure that lighting is sufficient to allow areas to be worked safely with minimal light spill out of the working area; Ensuring that floodlighting is angled away from the Orange River. This is particularly important when extraction is being undertaken close to the Orange River; and Use bund between the processing plant and the Orange River in order to minimize lighting affecting receptors. Without mitigation, the impact significance could be high. With mitigation however, whilst lighting will still be visible, glare being obvious to receptors and the nuisance factor should be removed.			
Gaps in knowledge & recommendations for further study			
<ul style="list-style-type: none"> Location and details of processing plants. 			

5.3 DETAILED METHODOLOGY

The following methodology will be used in preparation of the LVIA report.

5.3.1 Identification of issues raised in scoping phase, and site visit

Likely issues have already been identified in this scoping analysis. These issues will be verified from a site visit as well as response from stakeholders to the scoping documentation.

5.3.2 Description of the receiving environment and the proposed project

The receiving environment has been described and categorised. This will be further verified through consultation.

5.3.3 Establishment of view catchment area, view corridors, viewpoints and receptors

Zones of theoretical visibility and visual receptors have been established from GIS analysis. These will be verified from a site visit.

Viewpoints will be identified from a site visit to represent views of visual receptors.

5.3.4 Indication of potential visual impacts using established criteria

Areas of likely visual impacts have been identified and described from this scoping exercise. These impacts will be further refined during the EIA phase.

The nature of likely impacts have been identified during the site visit. It is likely that these may be refined and expanded during Scoping.

5.3.5 Inclusion of potential lighting impacts at night

The impact of lighting at night will be included in the assessment. The nature of likely impacts has been identified. It is possible that this might be refined during Scoping.

5.3.6 Description of alternatives, mitigation measures and monitoring programmes.

The alternatives could include methodology alternatives as well as protection of key landscape assets such as existing riverine vegetation and river banks.

Mitigation and monitoring measures will be developed during the preparation of the LVIA report.

5.3.7 Review by independent, experienced visual specialist (if required).

Confirmation of this requirement is needed.

6 CONCLUSIONS

The affected landscape has been categorised as:

- Developed Lowland
- Natural Lowland LCA
- Natural Upland LCA
- River Corridor LCA

The natural landscape areas are largely comprised of protected areas including the Richtersveld National Park and the Ai-Ais National Park.

Due to the qualities of these natural landscape areas and the fact that they are important as a tourism and recreational resource, it is considered that it has high scenic and cultural significance.

Due to the scale of the proposed project and the nature of the affected landscape, a Level 4 Assessment in accordance with the Western Cape Guidelines is recommended.

The introduction of a major industrial element could change the character of the local landscape which could result in negative impact on surrounding sensitive land uses.

Possible visual receptors that have been identified are likely to include:

- i. Point receptors that are likely to include homesteads;
- ii. Linear receptors, local roads including the C13 and the Orange River Corridor;
- iii. Area receptors, Aussenkehr settlement, the protected areas of the Richtersveld National Park and the Ai-Ais National Park and two resorts on the north bank of the Orange River.

The initial assessment indicates that the proposed mining operation is unlikely to have a significant landscape or visual impact on protected areas because:

- Impacts are unlikely to be permanent;
- The Ai-Ais National Park on the Namibian side of the orange River is unlikely to be impacted;
- The affected section of the Richtersveld National Park is not popular with visitors and there are no overlooking viewpoints within the Park.

The most significant impacts are likely to be experienced within the Orange River Corridor. Receptors in this area include;

- Visitors undertaking recreational activities along the river including rafting;
- Visitors at the Silverlands Resort;
- Visitors at the Norotshama Resort; and
- Homesteads close to the river bank.

Mitigation measures might include;

- Additional dust suppression measures;

- Protection of river banks and riverine vegetation which might involve setbacks;
- Screening of processing plant possibly using material stockpiles.

If these measures are effective, receptors may still be affected on a temporary basis but the level and duration of impacts should be significantly reduced.

REFERENCES

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RikiTherivel, Oxford Brookes University, UCL Press, 2000.

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19), Mucina, L. & Rutherford, M.C. (eds.), 2006, South African National Biodiversity Institute, Pretoria.

**APPENDIX I
ASSESSOR'S BRIEF CURRICULUM VITAE**



ENVIRONMENTAL PLANNING AND DESIGN

Name	JONATHAN MARSHALL
Nationality	British
Year of Birth	1956
Specialisation	Landscape Architecture / Landscape & Visual Impact Assessment / Environmental Planning / Environmental Impact Assessment.
Qualifications	
<u>Education</u>	Diploma in Landscape Architecture, Gloucestershire College of Art and Design, UK (1979) Environmental Law, University of KZN (1997)
<u>Professional</u>	Registered Professional Landscape Architect (SACLAP) Chartered Member of the Landscape Institute (UK) Member of the International Association of Impact Assessment, South Africa
Languages	<u>English</u> - Speaking - Excellent - Reading - Excellent - Writing - Excellent
Contact Details	Post: 13 Askew Grove Glenwood Durban 4001 Cell: +27 83 7032995

General

Jon qualified as a Landscape Architect (Dip LA) at Cheltenham (UK) in 1979. He has been a chartered member of the Landscape Institute UK since 1986. He is also a Registered Landscape Architect and has had extensive experience as an Environmental Assessment Practitioner within South Africa.

During the early part of his career (1981 - 1990) He worked with Clouston (now RPS) in Hong Kong and Australia. During this period he was called on to undertake visual impact assessment (VIA) input to numerous environmental assessment processes for major infrastructure projects. This work was generally based on photography with line drawing superimposed to illustrate the extent of development visible.

He has worked in the United Kingdom (1990 - 1995) for major supermarket chains including Sainsbury's and prepared CAD based visual impact assessments for public enquiries for new store development. He also prepared the VIA input to the environmental statement for the Cardiff Bay Barrage for consideration by the UK Parliament in the passing of the Barrage Act (1993).

His more recent VIA work (1995 to present) includes a combination of CAD and GIS based work for a new international airport to the north of Durban, new heavy industrial operations, overhead electrical transmission lines, mining operations in West Africa and numerous commercial and residential developments.

VIA work undertaken during the last twelve months includes wind energy projects, numerous solar plant projects (CSP and PV) and electrical infrastructure.

Relevant Landscape & Visual Impact Assessment Projects

- **Coega Power Ship** – Landscape and Visual Impact Assessment for the proposed Coega Power Ship project in the Eastern Cape Province.
- **Saldanha Power Ship** - Landscape and Visual Impact Assessment for the proposed Saldanha Power Ship project in the Western Cape Province.
- **Richards Bay Power Ship** - Landscape and Visual Impact Assessment for the proposed Richards Bay Power Ship project in the KwaZulu Natal Province.
- **Modderfontein Wind Energy Facility** - Landscape and Visual Impact Assessment for a proposed amendment to the layout and wind turbine specification of a previously authorised project near Beaufort West.
- **Western Cape Wind Energy Facility** – Due diligence assessment for a proposed wind energy facility near Swellendam in the Western Cape Province.
- **Hyperion Thermal Generation Facility** - Landscape and Visual Impact Assessment for a proposed gas powered power generation plant near Kathu in the Northern Cape Province.
- **Makapanstad Agri- Hub** – Landscape and Visual Impact Assessment for proposed Agri-Hub development at Makapanstad in the North West Province for the Department of Rural Development and Land Reform.
- **Madikwe Sky Bubble** - Landscape and Visual Impact Assessment for proposed development of up-market accommodation at the Molori concession within the Madikwe Game Reserve.
- **Hartebeest Wind Energy Facility** – Landscape and Visual Impact Assessment Addendum Report for the proposed upgrading of turbine specifications for an authorised WEF near Mo0rreesburg in the Western Cape Province for a private client.
- **Selati Railway Bridge** - Landscape and Visual Impact Assessment for proposed development of up-market accommodation on a railway bridge at Skukuza in the Kruger Park.
- **Kangala Mine Extension** - Landscape and Visual Impact Assessment for a proposed extension to the Kangala Mine in Mpumalanga for Universal Coal.
- **Khunab Solar Developments** – Landscape and Visual Impact Assessment for four proposed solar PV projects near Upington in the Northern Cape Province for a private client.
- **Sirius Solar Developments** – Landscape and Visual Impact Assessment for four proposed solar PV projects near Upington in the Northern Cape Province for Sola Future Energy.
- **Aggeneys Solar Developments** – Landscape and Visual Impact Assessment for two proposed solar PV projects near Aggeneys in the Northern Cape Province for a private client.
- **Hyperion Solar Developments** – Landscape and Visual Impact Assessment for four proposed solar PV projects near Kathu in the Northern Cape Province for Building Energy South Africa.
- **Eskom Combined Cycle Power Plant** - Landscape and Visual Impact Assessment for proposed gas power plant in Richards Bay, KwaZulu Natal Province.
- **N2 Wild Coast Toll Road, Mineral Sources and Auxiliary Roads** – VIA for the Pondoland Section of this project for the South African National Roads Agency.
- **Mpushini Park Ashburton** – VIA for a proposed amendment to an authorised development plan which included residential, office park and light industrial uses to logistics and warehousing.
- **Moedeng PV Solar Project** - VIA for a solar project near Vrybury in the North West Province for a private client.
- **Establishment of Upmarket Tourism Accommodation on the Selati Bridge, Kruger National Park** – Assessment of visual implications of providing tourism accommodation in 12 railway carriages on an existing railway bridge at the Skukuza Rest Camp in the Kruger Park.

- **Jozini TX Transmission Tower** – Assessment of visual implications of a proposed MTN transmission tower on the Lebombo ridgeline overlooking the Pongolapoort Nature reserve and dam.
- **Bhangazi Lake Development** – Visual Impact Assessment for a proposed tourism development within the iSimangaliso Wetland Park World Heritage Site.
- **Palesa Power Station** - VIA for a new 600MW power station near Kwamhlanga in Mpumalanga for a private client.
- **Heuningklip PV Solar Project** – VIA for a solar project in the Western Cape Province for a private client.
- **Kruispad PV Solar Project** – VIA for a solar project in the Western Cape Province for a private client.
- **Doornfontein PV Solar Project** – VIA for a solar project in the Western Cape Province for a private client.
- **Olifantshoek Power Line and Substation** – VIA for a new 10MVA 132/11kV substation and 31km powerline, Northern Cape Province, for Eskom.
- **Noupoort Concentrating Solar Plants** - Scoping and Visual Impact Assessments for two proposed parabolic trough projects.
- **Drakensberg Cable Car** – Preliminary Visual Impact Assessment and draft terms of reference as part of the feasibility study.
- **Paulputs Concentrating Solar Plant (tower technology)** – Visual Impact Assessment for a new CSP project near Pofadder in the Northern Cape.
- **Ilanga Concentrating Solar Plants 1, 2, 3, 4 & 5** – Scoping and Visual Impact Assessments for the proposed extension of five authorised CSP projects including parabolic trough and tower technology within the Karoshhoek Solar Valley near Upington in the Northern Cape.
- **Ilanga Concentrating Solar Plants 1, 2, 3, 4 & 5 Shared Infrastructure** – Visual Impact Assessment for the necessary shared infrastructure including power lines, substation, water pipeline and roads for these projects.
- **Ilanga Concentrating Solar Plants 7, 8 & 9** - Scoping and Visual Impact Assessments for three new CSP projects including parabolic trough and tower technology within the Karoshhoek Solar Valley near Upington in the Northern Cape.
- **Sol Invictus Solar Plants** - Scoping and Visual Impact Assessments for three new Solar PV projects near Pofadder in the Northern Cape.
- **Gunstfontein Wind Energy Facility** – Scoping and Visual Impact Assessment for a proposed WEF near Sutherland in the Northern Cape.
- **Moorreesburg Wind Energy Facility** – Visual Impact Assessment for a proposed WEF near Moorreesburg in the Western Cape.
- **Semonkong Wind Energy Facility** - Visual Impact Assessment for a proposed WEF near Semonkong in Southern Lesotho.
- **Great Karoo Wind Energy Facility** – Addendum report to the Visual Impact Assessment Report for amendment to this authorised WEF that is located near Sutherland in the Northern Cape. Proposed amendments included layout as well as rotor diameter.
- **Perdekraal East Power Line** – Visual Impact Assessment for a proposed power line to evacuate power from a wind energy facility near Sutherland in the Northern Cape.
- **Tshivhaso Power Station** – Scoping and Visual Impact Assessment for a proposed new power station near Lephalale in Limpopo Province.
- **Saldanha Eskom Strengthening** – Scoping and Visual Impact Assessment for the upgrading of strategic Eskom infrastructure near Saldanha in the Western Cape.
- **Eskom Lethabo PV Installation** - Scoping and Visual Impact Assessment for the development of a solar PV plant within Eskom's Lethabo Power Station in the Free State.

- **Eskom Tuthuka PV Installation** - Scoping and Visual Impact Assessment for the development of a solar PV plant within Eskom's Thutuka Power Station in Mpumalanga.
- **Eskom Majuba PV Installation** - Scoping and Visual Impact Assessment for the development of a solar PV plant within Eskom's Majuba Power Station in Mpumalanga.
- **Golden Valley Power Line** - Visual Impact Assessment for a proposed power line to evacuate power from a wind energy facility near Cookhouse in the Eastern Cape.
- **Mpophomeni Shopping Centre** – Visual impact assessment for a proposed new shopping centre close to the southern shore of Midmar Dam in KwaZulu Natal.
- **Rheebokfontein Power Line** - Addendum report to the Visual Impact Assessment Report for amendment to this authorised power line alignment located near Darling in the Western Cape.
- **Woodhouse Solar Plants** – Scoping and Visual Impact Assessment for two proposed solar PV projects near Vryburg in the North West Province.
- **AngloGold Ashanti, Dokyiwa (Ghana)** – Visual Impact Assessment for proposed new Tailings Storage Facility at a mine site working with SGS as part of their EIA team.
- **Gateway Shopping Centre Extension (Durban)** – Visual Impact Assessment for a proposed shopping centre extension in Umhlanga, Durban.
- **Kouroussa Gold Mine (Guinea)** – Visual impact assessment for a proposed new mine in Guinea working with SGS as part of their EIA team.
- **Mampon Gold Mine (Ghana)** - Visual impact assessment for a proposed new mine in Ghana working with SGS as part of their EIA team.
- **Telkom Towers** – Visual impact assessments for numerous Telkom masts in KwaZulu Natal.
- **Eskom Isundu Substation** – Visual Impact Assessment for a proposed major new Eskom substation near Pietermaritzburg in KwaZulu Natal.
- **Eskom St Faiths Power Line and Substation** – Visual Impact Assessment for a major new substation and associated power lines near Port Shepstone in KwaZulu Natal.
- **Eskom Ficksburg Power Line** – Visual Impact Assessment for a proposed new power line between Ficksburg and Cocolan in the Free State.
- **Eskom Matubatuba to St Lucia Power Line** – Visual Impact Assessment for a proposed new power line between Mtubatuba and St Lucia in KwaZulu Natal.
- **Dube Trade Port, Durban International Airport** – Visual Impact Assessment
- **Sibaya Precinct Plan** – Visual Impact Assessment as part of Environmental Impact Assessment for a major new development area to the north of Durban.
- **Umdloti Housing** – Visual Impact Assessment as part of Environmental Impact Assessment for a residential development beside the Umdloti Lagoon to the north of Durban.
- **Tata Steel Ferrochrome Smelter** - Visual impact assessment of proposed new Ferrochrome Smelter in Richards Bay as part of EIA undertaken by the CSIR.
- **Durban Solid Waste Large Landfill Sites** – Visual Impact Assessment of proposed development sites to the North and South of the Durban Metropolitan Area. The project utilised 3d computer visualisation techniques.
- **Hillside Aluminium Smelter, Richards Bay** - Visual Impact Assessment of proposed extension of the existing smelter. The project utilised 3d computer visualisation techniques.
- **Estuaries of KwaZulu Natal Phase 1** – Visual character assessment and GIS mapping as part of a review of the condition and development capacity of eight estuary landscapes for the Town and Regional Planning Commission. The project was extended to include all estuaries in KwaZulu Natal.
- **Signage Assessments** – Numerous impact assessments for proposed signage developments for Blast Media.

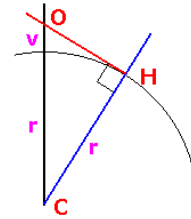
- **Signage Strategy** – Preparation of an environmental strategy report for a national advertising campaign on National Roads for Visual Image Placements.
- **Zeekoegatt, Durban** - Computer aided visual impact assessment. EDP acted as advisor to the Province of KwaZulu Natal in an appeal brought about by a developer to extend a light industrial development within a 60 metre building line from the National N3 Highway.
- **La Lucia Mall Extension** - Visual impact assessment using three dimensional computer modelling / photo realistic rendering and montage techniques for proposed extension to shopping mall for public consultation exercise.
- **Redhill Industrial Development** - Visual impact assessment using three dimensional computer modelling / photo realistic rendering and montage techniques for proposed new industrial area for public consultation exercise.
- **Avondale Reservoir** - Visual impact assessment using three dimensional computer modelling / photo realistic rendering and montage techniques for proposed hilltop reservoir as part of Environmental Impact Assessment for Umgeni Water.
- **Hammersdale Reservoir** - Visual impact assessment using three dimensional computer modelling / photo realistic rendering and montage techniques for proposed hilltop reservoir as part of Environmental Impact Assessment for Umgeni Water.
- **Southgate Industrial Park, Durban** - Computer Aided Visual Impact Assessment and Landscape Design for AECI.
- **Sainsbury's Bryn Rhos** - Computer Aided Visual Impact Assessment/ Planning Application for the development of a new store within the Green Wedge North of Swansea.
- **Ynyston Farm Access** - Computer Aided Impact Assessment of visual intrusion of access road to proposed development of Cardiff for the Land Authority for Wales.
- **Cardiff Bay Barrage** – Preparation of the Visual Impact Statement for inclusion in the Impact Statement for debate by parliament (UK) prior to the passing of the Cardiff Bay Barrage Bill.
- **A470, Cefn Coed to Pentrebach** - Preparation of landscape frameworks for the assessment of the impact of the proposed alignment on the landscape for The Welsh Office.
- **Sparkford to Ilchester Bye Pass** - The preparation of the landscape framework and the draft landscape plan for the Department of Transport.
- **Green Island Reclamation Study** - Visual Impact Assessment of building massing, Urban Design Guidelines and Masterplanning for a New Town extension to Hong Kong Island.
- **Route 3** - Visual Impact Assessment for alternative road alignments between Hong Kong Island and the Chinese Border.
- **China Border Link** - Visual Impact Assessment and initial Landscape Design for a new border crossing at Lok Ma Chau.
- **Route 81, Aberdeen Tunnel to Stanley** - Visual Impact Assessment for alternative highway alignments on the South side of Hong Kong Island.

**APPENDIX II
CALCULATION OF VISUAL HORIZON**

The Mathematics behind this Calculation

This calculation should be taken as a guide only as it assumes the earth is a perfect ball 6378137 metres radius. It also assumes the horizon you are looking at is at sea level. A triangle is formed with the centre of the earth (C) as one point, the horizon point (H) is a right angle and the observer (O) the third corner. Using Pythagoras's theorem we can calculate the distance from the observer to the horizon (OH) knowing CH is the earth's radius (r) and CO is the earth's radius (r) plus observer's height (v) above sea level.

Sitting in a hotel room 10m above sea level a boat on the horizon will be 11.3km away. The reverse is also true, whilst rowing across the Atlantic, the very top of a mountain range 400m high could be seen on your horizon at a distance of 71.4 km assuming the air was clear enough.



**APPENDIX III
CORRESPONDENCE**

11/7/22, 2:14 PM

Mail - Marissa Botha - Outlook

Proposed Grasdrift Mine (alluvial diamonds), Richtersveld (DMRE Ref. NC 30/5/1/2/2/10211 MR)

Kevin Liddle <kevin@silverlands.com>

Mon 11/7/2022 2:06 PM

To: Marissa Botha <botham@naledzi.co.za>

Cc: Willem Visser <wwisser@silverlands.com>

Hi Marissa,

One of my colleagues received the BID for the Proposed Grasdrift Mine.

We would like you to please register us as an Interested and Affected Party. We are land owners in Aussenkehr, Namibia. We have a common management team for two companies, Silverlands Vineyards Pty Ltd and Achill Island Investments Pty Ltd. Both companies are affected by this proposal.

We raise the following as matters that affect us:

- **Dust:** Grapes are exceptionally sensitive to dust and all farms in Aussenkehr have very significant mitigation measures. The dust created by the mine poses a significant threat to our ability to produce an export quality product. The current mining activities are already creating unwanted and damaging dust.
- **Noise and Light Pollution:** The mines activities are in direct line of sight of housing and a campsite used by tourists. The current view is of an unspoiled Richtersveld which is what people love and enjoy. A view of an opencast mine will obviously detract from the current experience. The current operations provide light disturbance with flashing lights from safety vehicles and strong floodlights.
- **Water Quality:** We are growing fruit (dates, grapes and blueberries) for export and the quality of the water can not be compromised. It is absolutely imperative that the river water is not polluted by the proposed mining operations in anyway.

We'd be happy to discuss and engage further on these matters.

Thanks

Kevin

*Kevin Liddle
Commercial Director*



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