Visual Impact Assessment for the Proposed Beeshoek Iron Ore Mine Optimisation Project

Project Number:

ENG014

Prepared for:

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DECLARATION OF INDEPENDENCE

I, Andy Pirie declare that:

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

Andy Pirie
Pr.Sci.Nat (reg no. 114988)

ACRONYMS AND ABBREVIATIONS

DEM	Digital Elevation Model
EIA	Environmental Impact Assessment
ELC	European Landscape Convention
EMPr	Environmental Management Programme
GIS	Geographical Information Systems
ha	Hectares
IFC	International Finance Corporation’
km	Kilometres
LoM	Life of Mine
m	Metres
m^2	Square metres
m^3	Cubic metres
mamsl	metres above mean sea level
mtpa	Million tons per annum
MPRDA	Mineral and Petroleum Resources Development Act 28 of 2002
MRA	Mining Right Area
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
ROM	Run of Mine
VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment
WRD	Waste Rock Dump
WUL	Water Use Licence
WULA	Water Use Licence Application

GLOSSARY OF TERMS

Zone of Potential Influence

The area defined as the radius about an object beyond which the visual impact of its most visible features will be insignificant.

Landscape Character

The individual elements that make up the landscape, including prominent or eye-catching features such as hills, valleys, woods, trees, water bodies, buildings and roads.

Sense of Place

Sense of place is the unique value that is allocated to a specific place or area through the cognitive experience of the user or viewer. According to Lynch (1992), sense of place "is the extent to which a person can recognise or recall a place as being distinct from other places – as having a vivid, unique, or at least particular, character of its own".

Aesthetic Value

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

Visibility

The area/points from which project components will be visible. The visibility is determined through a viewshed analysis.

Viewshed

The two dimensional spatial pattern created by an analysis that defines areas, which contain all possible observation sites from which an object would be visible.

Visual Intrusion

The nature of intrusion of an object on the visual quality of the environment resulting in its compatibility (absorbed into the landscape elements) or discord (contrasts with the landscape elements) with the landscape and surrounding land uses.

Visual Exposure

The visual exposure is the relative visibility of a development or feature in a landscape (Oberholzer, 2005). The visual exposure decreases as the distance between the development/feature and visual receptor increases.

Visual Absorption Capacity

The Visual Absorption Capacity (VAC) is the potential of the landscape to conceal the proposed development as a result of topography, vegetation or synthetic features (Oberholzer, 2005).

Visual receptor

A viewer or viewpoint from where the proposed development is visible.

EXECUTIVE SUMMARY

Hydrospatial (Pty) Ltd was appointed by EnviroGistics (Pty) Ltd (hereafter "EnviroGistics") to undertake a Visual Impact Assessment (VIA) for the proposed Beeshoek Iron Ore Mine (hereafter "Beeshoek" or the "Mine") Optimisation Project (hereafter the "project"). This report has been prepared for EnviroGistics, who are currently undertaking the Environmental Authorisation process for the proposed project.

Beeshoek is located approximately 7 kilometres (km) west of the town of Postmasburg in the Northern Cape. The Mine is divided into two areas that are separated by the R385 regional road that runs in a north-westerly direction between the towns of Postmasburg and Olifantshoek. The North Mine is located to the north of the R385, whilst the South Mine is located to the south.

Due to the flat topography and short shrubby vegetation of the region, the study area for this assessment was defined as a 10 km radius around the Mine dumps that are proposed to be raised. The main features within a 10 km radius of Beeshoek include the town of Postmasburg to the east, Kolomela Iron Ore Mine to the south, a number of smaller mines to the west and north, and scattered farmhouses.

Beeshoek are investigating opportunities for the continued and sustainable mining of iron ore reserves. The following projects and activities have been identified:

- Consolidation of ROM Stockpiles on South Mine;
- Increase in the height and footprint areas of the existing Waste Rock Dumps (WRDs);
- Increase in the open pit footprint areas and detrital mining;
- Low-grade beneficiation optimisation project; and
- Water management infrastructure.

The following were the main findings of the study:

- The proposed infrastructure will be located within the existing Beeshoek MRA;
- Mining activities, primarily from two large iron ore mines in the area, namely, Beeshoek and Kolomela Mine, largely characterise the landscape to the west and south-west of Postmasburg. Their large mine dumps have been constructed in a region that has flat topography, surrounded by short vegetation. Mining dominates the landscape of these areas, and the sense of place has been altered from a natural open landscape, to one associated with mine dumps and bare areas.
- Due to the general flat topography and short vegetation of the area, the proposed raised Mine dumps will be visible over a large area.
- The visual quality was determined to be medium in the flat natural areas away from the mining areas, and high in the natural mountainous areas particularly to the north-west of the study area. The town of Postmasburg has a medium scenic quality, whilst the immediate outer lying areas have a low scenic quality, due to the dusty nature and large amount of litter noted as well as informal settlements that characterise the area.

The mining areas, particularly to the centre and south of the study area were assigned a low scenic quality.

- The Visual Absorption Capacity (VAC) in general was determined to be low, particularly to the west of Beeshoek. The north – south ridge located to the east of Beeshoek, has a high VAC in concealing and blending the proposed increase in the mine dumps into the landscape. The trees and buildings within Postmasburg will have a high VAC in concealing any views of the dumps.
- The visual intrusion of the proposed project was determined to be low, due to mine dumps and mining activities already taking place at Beeshoek as well as in the surrounding area. The proposed Project is in line with the current land use of the area.
- Visual receptors include houses and farmsteads in the rural areas, residents of Postmasburg, motorists on the roads surrounding Beeshoek, and an aerodrome. The viewer sensitivity of the farmsteads and rural houses was determined to be moderate, and low for the remaining visual receptors due to the already existing mine infrastructure in the area.
- The impact assessment indicated that all impacts will have a medium significance pre-mitigation, with most achieving a low significance post-mitigation.

In conclusion, the natural landscape of the area has already been altered by mining activities. The proposed mine infrastructure is in line with the current land use and will add to the already altered landscape. It is not foreseen that the current visual quality of the area will be significantly altered by the proposed infrastructure. It is therefore the opinion of the specialist that the project can commence, provided that the recommendations and mitigation measures provided in Table 7-1 are implemented.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1 INTRODUCTION AND BACKGROUND

1.1 Terms of Reference

Hydrospatial (Pty) Ltd was appointed by EnviroGistics (Pty) Ltd (hereafter "EnviroGistics") to undertake a Visual Impact Assessment (VIA) for the proposed Beeshoek Iron Ore Mine (hereafter "Beeshoek" or the "Mine") Optimisation Project (hereafter the "project"). This report has been prepared for EnviroGistics, who are currently undertaking the Environmental Authorisation process for the proposed project.

1.2 Project Location and Study Area

Beeshoek is located approximately 7 kilometres (km) west of the town of Postmasburg in the Northern Cape (Figure 1-1). The Mine is divided into two areas that are separated by the R385 regional road that runs in a north-westerly direction between the towns of Postmasburg and Olifantshoek. The North Mine is located to the north of the R385, whilst the South Mine is located to the south.

Due to the flat topography and short shrubby vegetation of the region, the study area for this assessment was defined as a 10 km radius around the Mine dumps that are proposed to be raised. The main features within a 10 km radius of Beeshoek include the town of Postmasburg to the east, Kolomela Iron Ore Mine to the south, a number of smaller mines to the west and north, and scattered farmhouses.

1.3 Mining Operation Background

Assmang (Pty) Ltd is the holder of the new order rights in terms of the Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA) in respect of high-grade hematite iron ore deposits at Beeshoek. Mining was established in 1964 with a basic hand sorting operation. In 1975, a full washing and screening plant was installed. Because of increased production, Beeshoek South, a southern extension of the Mine, was commissioned in 1999. The mining method currently entails open pit mining, which consists of five (5) active open pits (Village Pit, HF Pit, BF Pit, East Pit, and BN Pit). The iron ore is exploited by means of conventional open pit mining techniques (drilling-blasting-load-haul). Backfilling of numerous existing pits is employed, where possible, in order to minimise both the final voids left at the end of mining as well as the size of waste dumps. Waste with a potential future use is stockpiled separately in order to be accessible and ready to be processed by the future user. Although other open pits at the Mine are dormant at this time, these are continuously assessed in terms of their economic value. The current resources of the Mine is approximately 97.17 million tonnes with a reserve of about 26.18 million tonnes.

Beeshoek can be broadly categorised as follows:

- Northern mining area (North Mine): This area comprises active as well as historical mining areas. A number of small quarries and Mine residue dumps of various categories are located within this area. The area also includes the existing iron ore beneficiation plant, tailings storage facility (slimes dam), as well as the North Opencast Pits;

- Main Offices, village (since demolished) and recreational area; and
- Southern mining area (South Mine): This area comprises large opencast pits and associated Waste Rock Dumps (WRDs). The Village Pit and associated WRD are the main activities in this area. This area also includes a crushing and screening area as pre-preparation of the Run of Mine (ROM) iron ore before being routed by overland conveyor to the Iron Ore Beneficiation Plant located at North Mine.

1.4 Proposed Projects and Activities

Beeshoek are investigating opportunities for the continued and sustainable mining of iron ore reserves. The following proposed projects and activities indicated on Figure 1-2 form part of the Environmental Authorisation process and are assessed in this study:

1.4.1 Consolidation of ROM Stockpiles on South Mine

Iron ore rich material removed from the Beeshoek open pits are stored on ROM Stockpiles (both on-grade and off-grade) on site. ROM stockpiles are processed through the plant. The on-grade and off-grade ROM are blended when required to meet the specific market requirements. The area between the stockpiles on the South Mine, namely, the ROM Stockpile, South Contaminated ROM 1, Contaminated Dump 2 and BIS Stockpile will be consolidated to allow for further stockpile capacity and operational management.

1.4.2 Increase in Height and Footprint Area of Existing WRDs

The Mine indicated the need to update the heights and designs of various WRDs on site to take into consideration rehabilitation requirements. The increase in the heights will also require an increase in the footprint areas to allow for the correct slope at closure. Table 1-1 indicates the approved/current and proposed heights and footprint areas of the WRDs.

1.4.3 Increase of Open Pit Footprint Areas and Detrital Mining

The Mine would like to increase the approved footprints of the active pits to include:

- BN Pit Expansion;
- Village North Pit Expansion;
- Village East Pit Expansion;
- Village South Pit Expansion;
- BF Pit Expansion; and
- Detrital Area.

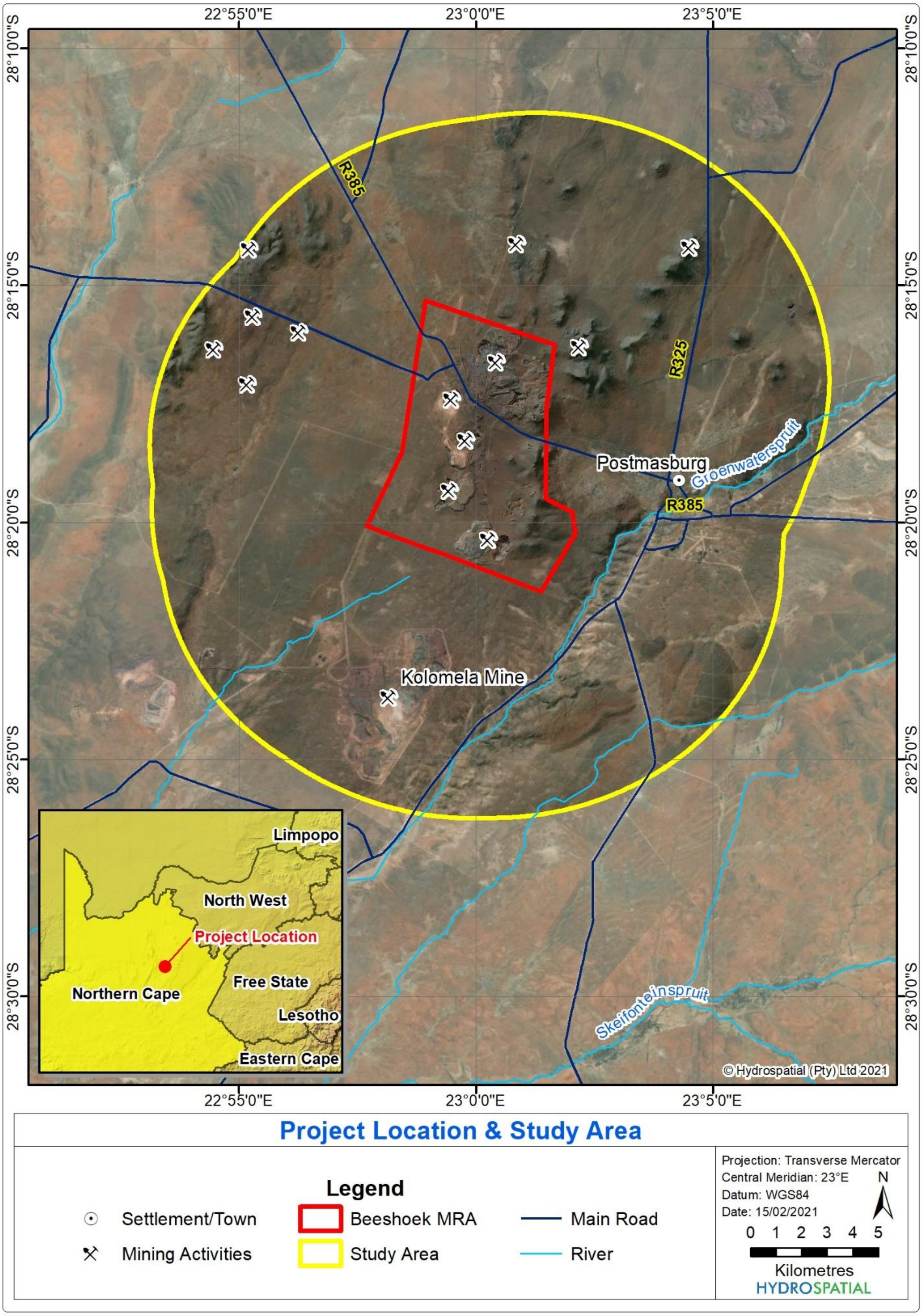

Figure 1-1: Location of the project and study area

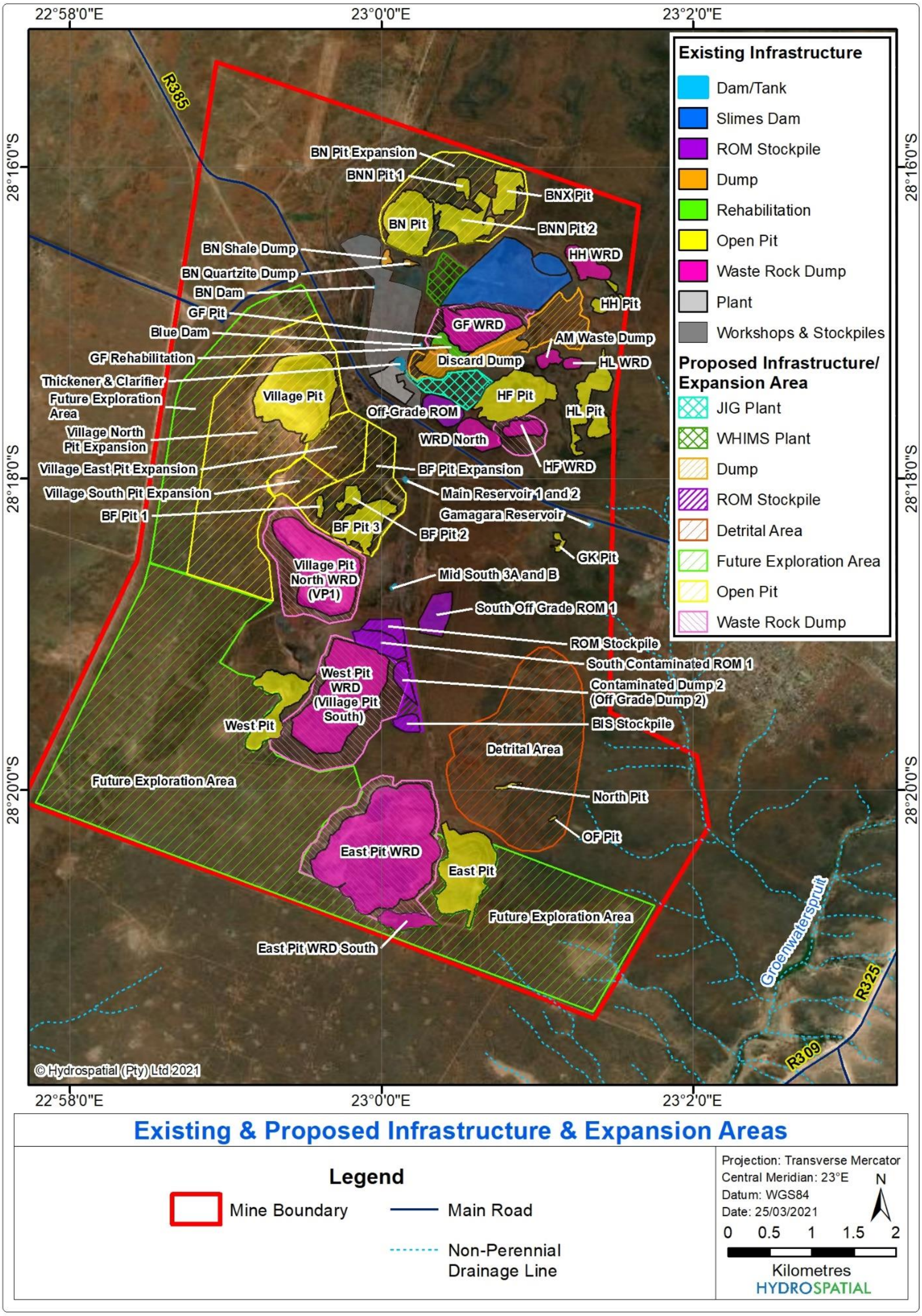

Figure 1-2: Existing and proposed infrastructure and expansion areas

Table 1-1: Approved/current and proposed dimensions of the WRDs

Facility	Approved/Current Dimensions	Proposed Dimensions	Comment
Village Pit North WRD (VP1)	Footprint: 70 ha Height: 93 m	Footprint: 96 ha Height: 111 m operational height but 112 m upon rehabilitation	Clearance of about 25 ha of vegetation
GF WRD	Footprint: 48 ha Height: 55 m	Footprint: 54 ha Height: 82 m operational height but 84 m upon rehabilitation	No clearance of vegetation foreseen
East Pit WRD	Footprint: 144 ha Height: 39 m	Footprint: 170 ha Height: 94 m for both operation and rehabilitation	Clearance in excess of 25 ha of vegetation
West Pit WRD (now referred to as the Village Pit South WRD)	Footprint: 80 ha Height: 0-1 m	Footprint: 135 ha Height: 98 m operational height but 106 m upon rehabilitation	Clearance of about 35 ha of vegetation
HF WRD	Footprint: 20 ha Height: 26 m	Footprint: Same footprint area Height: 39 m operational height but 63 m upon rehabilitation	No clearance of vegetation required
Discard Dump	Footprint: 28 ha Height: 29 m	Footprint: 60 ha Height: 60 m	No clearance of vegetation required

Detrital ore are shallow deposits that are scooped out of the ground for processing as opposed to employing more extensive open pit mining methods. The earlier approved Environmental Management Programmes (EMPr's) of the Mine did not demarcate the required detrital mining areas, or stipulated required management measures. For this reason, the dolomite karst areas will be explored and where possible mined. The depth can vary from 4 m to 25 m deep. The detrital mining strategy and the depth is only determined once excavation starts and the quality of iron ore is inspected within a karst deposition area.

One additional haul road of 1.1 km (approximately 3.3 ha) will be required between the current Village Pit and proposed Village South Pit Expansion.

The Mine will backfill the pits as far as practically possible as part of the ongoing development of the annual and long-term rehabilitation plans, but in some areas voids may remain where enviroberms will be established for safety purposes.

The areas to the west and south of the MRA have been earmarked for future exploration activities.

1.4.4 Low-Grade Beneficiation Optimisation Project

Beeshoek Mine has identified the opportunity to recover and economically beneficiate existing and arising low-grade resources. The intent being the construction, commissioning and bringing into production two additional beneficiation plants capable of producing approximately 1 million tons per annum (mtpa) of export quality sinter fines product.

The proposed Beeshoek Low-Grade Beneficiation Optimisation Project will allow Beeshoek Mine to optimise the mining process and reduce Mineral waste on site, by implementing two additional Beneficiation Projects, namely, a new WHIMS Plant to rework the existing slimes from the Slimes Dam, and a new Jig Plant to rework the existing low-grade Discard Dump.

The WHIMS Project will consist of the following:

- WHIMS Plant which will beneficiate slimes from the Slimes Dam and arising material from the existing Beeshoek Plant;
- WHIMS Construction Laydown Area of approximately 1.5 ha;
- Within the laydown area, a 2 500 m^2 Staging Stockpile comprising low grade feed material will be located. This will be a designed facility which will feed the WHIMS Plant. This material will be processed material (i.e. raw material) derived from the Slimes Dam. All waste (oversize from the Oversize Discard Bunker and slimes) will be disposed of onto the existing Slimes Dam and no new mine residue Stockpile will be developed;
- WHIMS Plant footprint, including an access road of 160 m, no wider than 30 m: approximately 4 ha in size;
- WHIMS Plant Central Process Water Dam: 0.4 ha, capacity planned at 5 000 m^3;
- WHIMS Plant Clarifier: tank diameter 56 m, capacity 9 700 m^3;
- WHIMS Plant Emergency Product Stockpile: 21 m^2 within WHIMS Plant footprint area;
- WHIMS 1 mm Product Stockpile: 300 m^2 within the WHIMS Plant footprint area;
- Tailings Pipeline HDPE: 315 mm diameter at 750 m^3/hr (208.3 l/s):
  - 1.1 km (new WHIMS Plant clarifier to northern perimeter of Slimes Dam;
  - 1.4 km (new WHIMS Plant clarifier to southern perimeter of Slimes Dam; and
  - Existing pipeline of 1.3 km to be rerouted from existing thickener directly to the new WHIMS Plant.
- Return Water Pipeline HDPE, 280 mm diameter at 400 m^3/hr (111 l/s): - 1.1 km (re-routing of existing pipeline from Slimes Dam to WHIMS Plant clarifier;

- Process Water Pipelines: 350 mm diameter - 1.3 km (replacement of existing pipeline with new pipeline from Central Water Dam to new Process Water Tank (2 000 m^3) adjacent to existing Clarifier);
- Water from Central Process Dam to Existing Beeshoek Plant: 200 mm mild steel – 1.3 km at 400 m^3/hr (111 l/s);
- New potable water pipeline 140 mm diameter - 1.6 km 100 m^3/hr (28l/s) from steel potable water tank (100 m^3) at the new Jigs Plant to combined steel potable water/fire water tank (approximately 1 000 m^3, still to be confirmed pending final designs) at WHIMS Plant;
- Process water tank (1000 m^3) adjacent to new WHIMS Plant Clarifier; and
- Overland Powerline: 22 kV powerline approximately 700 m in length.

The Jig Plant Project will comprise of the following:

- New Jig Plant footprint: approximately 2.6 ha;
- New Jig Plant Construction Laydown Area: 2 ha on existing Discard Stockpile footprint.
- Feed from the existing Discard Dump (low-grade material fed into a loading bin by means of front-end loaders and conveyed to the Washing and Screening Plant);
- Washing and Screening Plant;
- Crusher building containing a high-pressure grind roll (HPGR) crusher;
- Jig located in the Jig building;
- MCC and transformer bay;
- Re-routed existing water pipelines (buried, internal diameter 450 mm);
- Slurry from the new Jig Plant will be pumped to the existing Plant Thickener;
- New process water tank (located near existing Plant Thickener) – 2,000 m^3 (this forms part of project 5);
- Stockpiles [comprising of both material from the Discard Dump (also referred to as a Low Grade Stockpile] and arising low grade material from the existing Jig Beneficiation Plant). The stockpiles created from material reclaimed from the existing Low-Grade Stockpile (Discard Dump) and the stockpile created with the arising material (low grade) from the existing Jig Beneficiation Plant are intermediate stockpiles created within the footprint of the existing Discard Dump (the Low-Grade Intermediate Stockpile and the Arising Stockpile). Material from these intermediate stockpiles is transported to and fed into the new Jig Plant loading bin located south of the existing Low-Grade Stockpile. Low low-grade material from the new Jig Plant is then conveyed back to the Low Grade Stockpile footprint, deposited onto the ground and then moved back towards the existing Discard Dump. The three (3) stockpiles associated with the new Jig Plant includes the following:

   - Low Grade -32+1 mm Stockpile (Intermediate) (0.5 ha) located between the existing Low-Grade Stockpile (Discard Dump) and the new Jig Plant loading bin on the existing Low Grade Stockpile foot print. Low grade material transported to and from the intermediate stockpile by means of front-end loaders;
   - Arising -32+1mm Stockpile (Intermediate) (0.6ha) located between the to be constructed arisings conveyor discharge position and the new Jig Plant loading bin and within the existing Low Grade Stockpile footprint. Low grade material transported from the Arising -32+1mm Stockpile by means of front end loaders; and
   - Low low-grade material from the new Jig Plant will be conveyed by means of earth moving equipment to positions adjoining the existing Discard Dump within the existing footprint (i.e. waste from the new Jig Plant to return to the approved Discard Dump footprint). No new stockpiles will be constructed outside of the demarcated Discard Dump or other Type 3 Stockpile footprints, these will however be demarcated as part of the EMPr and WUL processes. The area of the Low low Grade Dump (stockpile) (115 m^2).
- New Jig Plant Conveyors:
   - Approximately 25 m conveyor from existing plant conveyor system to feed Jig Plant with low grade arising material; and
   - Approximately 330 m conveyer to feed the new Jig Plant from Discard Dump to feed Discard feed bin.
- New Jig Plant Roads, which are all connected:
   - Road 1: 240m with a width of 30 m;
   - New Jig Plant Road 2: 700 m with a width of 30 m;
   - Road 3: 280 m with a width of 30 m;
   - Road 4: 135 m with a width of about 30 m; and
   - Decommissioning of existing plant haul road: approximately 1000 m in length and 30 m wide.
- Overhead Powerline: 22 kV powerline of approximately 620 m; and
- Rerouting of underground electrical cable: 22 kV of approximately 380 m.

1.4.5 Water Management Infrastructure

The Mine will establish additional water storage tanks on site which will include:

- A new storage tank near the existing BN Tank of 500 m^3. The purpose is to provide sufficient storage space for water from the approved in-pit dewatering activities;
- 4 x 10 m^3 plastic tanks at the current Beneficiation Plant, to assist with day-to-day operational water transfer and use;

- 1 x 2000 m^3 process water tank adjacent to the existing Clarifier connected with a "balancing pipe". This will allow for the storage of water in the water balance system of the Mine to capacitate the plant process to start up without delay;
- Existing Dam: Steel Dam 250 m^3 capacity to store process water and allow for the storage of top-up water;
- Existing Dam: Zinc Dam: 90 m^3 capacity to store input water where required; and
- A new dewatering tank at the Village Pit.

1.4.6 Railway Line Link

Beeshoek propose to construct a 2.8 km railway line linking the existing Beeshoek siding to the existing Transnet Freight Rail (TFR) to transport iron ore to the Saldanha Port in the Western Cape for export. This project is unlikely to result any significant visual impact on the surrounding landscape, as it will be a short railway link connecting two existing railway lines, with no tall infrastructure proposed. This project was investigated as part of a Basic Assessment process and is therefore not assessed in this study.

1.5 Legislative Requirements and Guidelines

The following international and national legislative requirements and guidelines are relevant to the VIA study:

1.5.1 International

The European Landscape Convention (ELC) created by the Council of Europe, was the first international convention to focus exclusively on landscapes. The purpose of this convention is to promote effective management and planning of landscapes. It was signed by the United Kingdom government in 2006 and became binding from 2007. Public documents that explore the impacts of large scale developments, as defined in the ELC, on any landscape should take into account the effects of these developments. A landscape means "an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors" i.e. the natural, visual and subjectively perceived landscape, (Contesse, 2011; European Landscape Convention, 2007).

There is no regional or local scale legislation pertaining to mining activities and Visual Impact Assessments (VIAs) exclusively but VIAs are relevant to the International Finance Corporation's (IFC) Performance Standards and this will be treated as a best practice guideline.

IFC Performance Standard 3: Resource Efficiency and Pollution Prevention is applicable to the VIA. Performance Standard 3 recognises that increased economic activity and urbanisation often generate increased levels of pollution to air, water and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional and global levels. For the purposes of this Performance Standard, the term 'pollution' is used to refer to both hazardous and non-hazardous chemical pollutants in the solid, liquid, or gaseous phases, and includes other components such as pests, pathogens, thermal discharge to water, GHG emissions, nuisance odours, noise, vibration, radiation, electromagnetic energy and the creation of potential visual impacts including light (IFC, 2012).

The Environmental, Health and Safety Guidelines for Mining therefore need to be considered (World Bank, 2007):

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

1.5.2 National

At a national level, the following legislative documents potentially apply to the VIA:

- Regulations in Chapter 5 (Integrated Environmental Management) of the NEMA and the Act in its entirety. The Act states that "the State must respect, protect, promote and fulfil the social, economic and environmental right of everyone…" Landscape is both moulded by, and moulds, social and environmental features;
- Section 23(1)(d) of the MPRDA, where it is mentioned that a mining right will be granted if "the mining will not result in unacceptable pollution, ecological degradation or damage to the environment". Visual pollution is a form of environmental pollution and therefore needs to be considered under this section. Holders of rights granted in terms of the MPRDA must at all times give effect to the general objectives of integrated environmental management laid down in Chapter 5 of the NEMA. The Regulations promulgated in terms of the NEMA, with which holders of rights must comply, provide for the assessment and evaluation of potential impacts, and the setting of management plans to mitigate such impacts.
- The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) and related provincial regulations – in some instances there are policies or legislative documents that give rise to the protection of listed sites. The NHRA states that it aims to promote "good management of the national estate, and to enable and encourage communities to nurture and conserve their legacy so that it may be bequeathed for future generations". A holistic landscape whose character is a result of the action and interaction and/or human factors has strong cultural associations as societies and the landscape in which they live are affected by one another in many ways; and
- Section 17 of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEM: PAA) sets out the purposes of the declaration of areas as protected areas which includes the protection of natural landscapes. Landscapes are

defined by the natural, visual and subjectively perceived landscape; these aspects of a landscape are intertwined to form a holistic landscape context.

2 SCOPE OF WORK

The scope of work included the following:

- Provide a baseline (pre-construction and mining) description of the visual and aesthetic characteristics of the area;
- Provide a visual and aesthetic evaluation of the project; and
- Conduct an impact assessment to assess the visual impacts of the proposed project.

3 METHODOLOGY

3.1 Site Investigation

The areas associated with the proposed projects and activities for this study were assessed on the following dates:

- 4 July 2019;
- 27 October 2020; and
- 3 February 2021.

The purpose of the site visit was to investigate the visual and aesthetic characteristics of the landscape, sense of place of the study area, and to assess the visibility of the proposed project from viewpoints.

3.2 Baseline Visual and Aesthetic Environment

The purpose of the baseline is to provide a current and pre-mining description of the area in terms of the visual and aesthetic characteristics of the landscape. This was done by:

- Assessing aerial imagery of the area;
- Conducting a site visit;
- Assessing the topography of the study area by generating a Digital Elevation Model (DEM); and
- Reviewing literature on the project and general area.

3.3 Visual and Aesthetic Evaluation

The following criteria was used in the visual and aesthetic evaluation:

3.3.1 Visibility and Visual Exposure

The visibility of the Project was determined through a viewshed analysis. A viewshed indicates areas within the landscape from where the Project will and will not be visible. A DEM for the study area was generated from 0.5 m contours of the Beeshoek MRA in combination with a

30 m spatial resolution ALOS DEM for the remainder of the study area. The infrastructure heights from Table 1-1 together with the DEM and an average viewer height of 1.7 m, were input into the viewshed analysis tool in the ArcGIS 10.2 3D Analyst extension, in order to generate the viewsheds. Two viewsheds were generated as follows:

- **Current Infrastructure Viewshed:** A viewshed using the current heights of the dumps that are proposed to be raised was generated to establish the current visibility in the landscape; and
- **Proposed Infrastructure Viewshed:** The proposed maximum dump heights were used to generate a viewshed to establish the future visibility.

The purpose of generating two viewsheds was to determine whether there would be an increase in the current visibility of the Mine infrastructure, due to the raising of the mine dumps.

The visual exposure is the relative visibility of a development or feature in a landscape (Oberholzer, 2005). The visual exposure decreases as the distance between the development/feature and visual receptor increases. The visual exposure for the Project was determined to be:

- High – between 0 to 3 km;
- Medium – between 3 to 6 km; and
- Low – between 6 to 10 km.

3.3.2 Visual/Scenic Quality

The visual quality is determined to be high when:

- The landscape offers dramatic, rugged topography and/or visually appealing water forms are present;
- Pleasing, dramatic or vivid patterns and combinations of landscape features and vegetation are found;
- The landscape is without visually intrusive or polluting urban, agriculture or industrial development (i.e.it reveals a high degree of integrity); and/or
- Outstanding or evocative features and landmarks are present; and
- The landscape/townscape is able to convey meaning.

3.3.3 Visual Absorption Capacity

The Visual Absorption Capacity (VAC) is the potential of the landscape to conceal the proposed development as a result of topography, vegetation or synthetic features (Oberholzer, 2005). The criteria used to assess the VAC is indicated in Table 3-1.

Table 3-1: Visual absorption capacity criteria

High	Moderate	Low
The area is effectively able to screen visual impacts: • Undulating or mountainous topography and relief; • Good screening vegetation (high and dense); • Is highly urbanised in character; and • Existing development is of a scale and density to absorb the visual impact.	The area is partially able to screen visual impacts: • Moderately undulating topography and relief; • Some or partial screening vegetation; • A relatively urbanised character; and • Existing development is of a scale and density to absorb the visual impact to some extent.	The area is not able to screen the visual impacts: • A flat topography; • Low growing or sparse vegetation; • Is not urbanised; and • Existing development is not of a scale and density to absorb the visual impact to some extent.

3.3.4 Visual Intrusion

Visual intrusion is the level of compatibility or congruence of a project with the particular qualities of the area, or its 'sense of place' (Oberholzer, 2005). The criteria used to assess the visual intrusion is indicated in Table 3-2.

Table 3-2: Visual intrusion criteria

High	Moderate	Low
The development /activity results in a noticeable change or is discordant with the surroundings: • Is not consistent with the existing land use of the area; • Is not sensitive to the natural environment; • Is very different to the urban texture and layout; • The buildings and structures are not congruent / sensitive to the existing architecture / buildings; and • The scale and size of the activities are different to nearby existing activities.	The development/activity partially fits into the surroundings but is clearly noticeable: • Is moderately consistent with the existing land use of the area; • Is moderately sensitive to the natural environment; • Is moderately consistent with the urban texture and layout; • The buildings and structures are moderately congruent / sensitive to the existing architecture / buildings; and • The scale and size of the activities are moderately similar to nearby existing activities.	The development/activity results in a minimal change to the surroundings and blends in well: • Is consistent with the existing land use of the area; • Is highly sensitive to the natural environment; • Is consistent with the urban texture and layout; • The buildings and structures are congruent / sensitive to the existing architecture / buildings; and • The scale and size of the activities are similar to nearby existing activities.

3.3.5 Viewer Sensitivity

Visual receptors inform the viewer sensitivity. The criteria used to assess the viewer sensitivity is indicated in Table 3-3.

Table 3-3: Viewer sensitivity criteria

High	Moderate	Low
• Residential areas; • Lodges, resorts and hotels; • Nature reserves; and • Scenic routes / trails.	• Sporting and recreational areas; and • Places of work.	• Industrial areas; • Active mining areas; and • Severely degraded areas.

3.4 Impact Assessment

The impact assessment methodology used to rate the potential visual impacts pre- and post-mitigation is provided below. The evaluation of impacts is conducted in terms of the criteria detailed in Table 3-4 to Table 3-9. The various impacts of the project are discussed in terms of impact status, extent, duration, probability and intensity. Impact significance is the sum of the impact extent, duration, probability and intensity, and a numerical rating system is applied to evaluate impact significance. Therefore, an impact magnitude and significance rating is applied to rate each identified impact in terms of its overall magnitude and significance in Table 3-9. The various components of impact methodology are discussed below.

3.4.1 Impact Status

The nature or status of the impact is determined by the conditions of the environment prior to construction and operation. The nature of the impact can be described as negative, positive or neutral (Table 3-4).

Table 3-4: Impact status

Rating	Description	Quantitative Rating
Positive	A benefit to the receiving environment.	P
Neutral	No cost or benefit to the receiving environment.	-
Negative	A cost to the receiving environment.	N

3.4.2 Impact Extent

The extent of an impact is considered as to whether impacts are either limited in extent or affects a wide area. Impact extent can be site-specific (within the boundaries of the development area), local, regional or national and/or international (Table 3-5).

Table 3-5: Extent of the impact

Rating	Description	Quantitative Rating
Low	**Site-specific**; occurs within the site boundary.	1
Medium	**Local**; extends beyond the site boundary; affects the immediate surrounding environment (i.e. up to 5 km from the project site boundary).	2
High	**Regional**; extends far beyond the site boundary; widespread effect (i.e. 5 km and more from the project site boundary).	3
Very High	**National and/or international**; extends far beyond the site boundary; widespread effect.	4

3.4.3 Impact Duration

The duration of the impact refers to the time scale of the impact or benefit (Table 3-6).

Table 3-6: Duration of the impact

Rating	Description	Quantitative Rating
Low	**Short-term**; quickly reversible; less than the project lifespan; 0 – 5 years.	1
Medium	**Medium-term**; reversible over time; approximate lifespan of the project; 5 – 17 years.	2
High	**Long-term**; permanent; extends beyond the decommissioning phase; >17 years.	3

3.4.4 Impact Probability

The probability of the impact describes the likelihood of the impact actually occurring (Table 3-7).

Table 3-7: Probability of the impact

Rating	Description	Quantitative Rating
Improbable	Possibility of the impact materialising is negligible; chance of occurrence <10%.	1
Probable	Possibility that the impact will materialise is likely; chance of occurrence 10 – 49.9%.	2
Highly Probable	It is expected that the impact will occur; chance of occurrence 50 – 90%.	3
Definite	Impact will occur regardless of any prevention measures; chance of occurrence >90%.	4
Definite and Cumulative	Impact will occur regardless of any prevention measures; chance of occurrence >90% and is likely to result in in cumulative impacts.	5

3.4.5 Impact Intensity

The intensity of the impact is determined to quantify the magnitude of the impacts and benefits associated with the proposed project (Table 3-8).

Table 3-8: Intensity of the impact

Rating	Description	Quantitative Rating
Maximum Benefit	Where natural, cultural and / or social functions or processes are positively affected resulting in the maximum possible and permanent benefit.	+5
Significant Benefit	Where natural, cultural and / or social functions or processes are altered to the extent that it will result in temporary but significant benefit.	+4
Beneficial	Where the affected environment is altered but natural, cultural and / or social functions or processes continue, albeit in a modified, beneficial way.	+3
Minor Benefit	Where the impact affects the environment in such a way that natural, cultural and / or social functions or processes are only marginally benefited.	+2
Negligible Benefit	Where the impact affects the environment in such a way that natural, cultural and / or social functions or processes are negligibly benefited.	+1
Neutral	Where the impact affects the environment in such a way that natural, cultural and / or social functions or processes are not affected.	0
Negligible	Where the impact affects the environment in such a way that natural, cultural and / or social functions or processes are negligibly affected.	-1
Minor	Where the impact affects the environment in such a way that natural, cultural and / or social functions or processes are only marginally affected.	-2
Average	Where the affected environment is altered but natural, cultural and / or social functions or processes continue, albeit in a modified way.	-3
Severe	Where natural, cultural and / or social functions or processes are altered to the extent that it will temporarily cease.	-4
Very Severe	Where natural, cultural and / or social functions or processes are altered to the extent that it will permanently cease.	-5

3.4.6 Impact Significance

The impact magnitude and significance rating is utilised to rate each identified impact in terms of its overall magnitude and significance (Table 3-9).

Table 3-9: Impact magnitude and significance rating

Impact	Rating	Description	Quantitative Rating
Positive	**High**	Of the highest positive order possible within the bounds of impacts that could occur. +	+12 to -16
	Medium	Impact is real, but not substantial in relation to other impacts that might take effect within the bounds of those that could occur. Other means of achieving this benefit are approximately equal in time, cost and effort	+6 to -11
	Low	Impacts is of a low order and therefore likely to have a limited effect. Alternative means of achieving this benefit are likely to be easier, cheaper, more effective and less time-consuming	+1 to –5
No Impact	No Impact	Zero Impact	
Negative	**Low**	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts, mitigation is either easily achieved or little will be required, or both. Social, cultural, and economic activities of communities can continue unchanged.	-1 to -5
	Medium	Impact is real, but not substantial in relation to other impacts that might take effect within the bounds of those that could occur. In the case of adverse impacts, mitigation is both feasible and fairly possible. Social cultural and economic activities of communities are changed but can be continued (albeit in a different form). Modification of the project design or alternative action may be required	-6 to -11
	High	Of the highest order possible within the bounds of impacts that could occur. In the case of adverse impacts, there is no possible mitigation that could offset the impact, or mitigation is difficult, expensive, time-consuming or a combination of these. Social, cultural and economic activities of communities are disrupted to such an extent that these come to a halt.	-12 to -17

4 ASSUMPTION AND LIMITATIONS

The following are assumptions and limitations of the study:

- 0.5 m contours provided by the Mine was used to model the viewshed within the Beeshoek MRA, however, outside of the MRA, a fairly course scale 30 m spatial resolution ALOS DEM was used. The ALOS DEM was selected as it provided more detail than the 20 m 1:50 000 topographical contours for the area (5 m contours were not available for this area). Due to the course scale contours used, there could thus be areas that may or may not be visible, however, due to the flat topography of majority of the study area, this was not deemed to be a major limitation;
- It should be understood that VIAs can be subjective studies, based on the specialists visual and aesthetic experience of the study area;
- The average height of a viewer in the landscape was assumed to be 1.70 m; and
- The viewshed modelling only considered the topography of the terrain of the study area and not the vegetation, and can therefore be considered a worst-case visibility scenario.

5 BASELINE VISUAL AND AESTHETIC ENVIRONMENT

5.1 Topography

The topography of an area in which a project is located, plays an important role in the visibility of a project. For instance, in mountainous areas, a project may be concealed within a valley and not be visible to visual receptors. However, if a project is developed on top of a mountain, or in an open flat area, it may be visible to many visual receptors. Figure 5-1 demonstrates the role topography in the visibility of a project.

The general topography of the study area drops off gradually in a west to south-westerly direction, with the elevation varying from 1 496 metres above mean sea level (mamsl) along a series of koppies in the north-east, to 1 213 mamsl along a drainage line in the south-west (Figure 5-2). A ridge runs in a north to south direction along the eastern Mine boundary and reaches a maximum height of 1 480 mamsl in the north of the Mine. This ridge conceals the visibility of the current Beeshoek infrastructure from Postmasburg. Steep slopes in excess of 30 % occur along the sides of the koppies, ridges and mine dumps, however, the average slope of the study area is less than 3 %, indicating the general flat topography of the area.

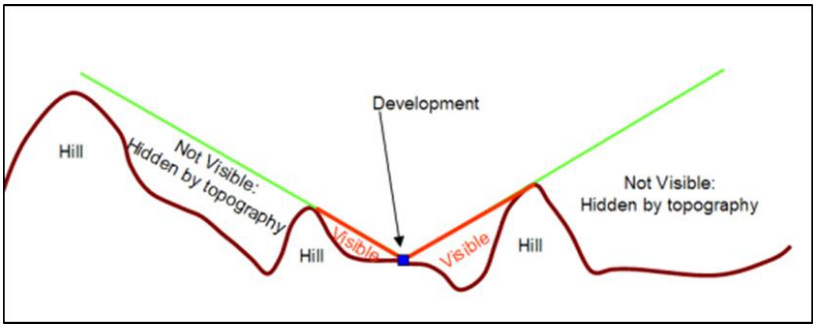

Figure 5-1: The role of topography in the visibility of a project

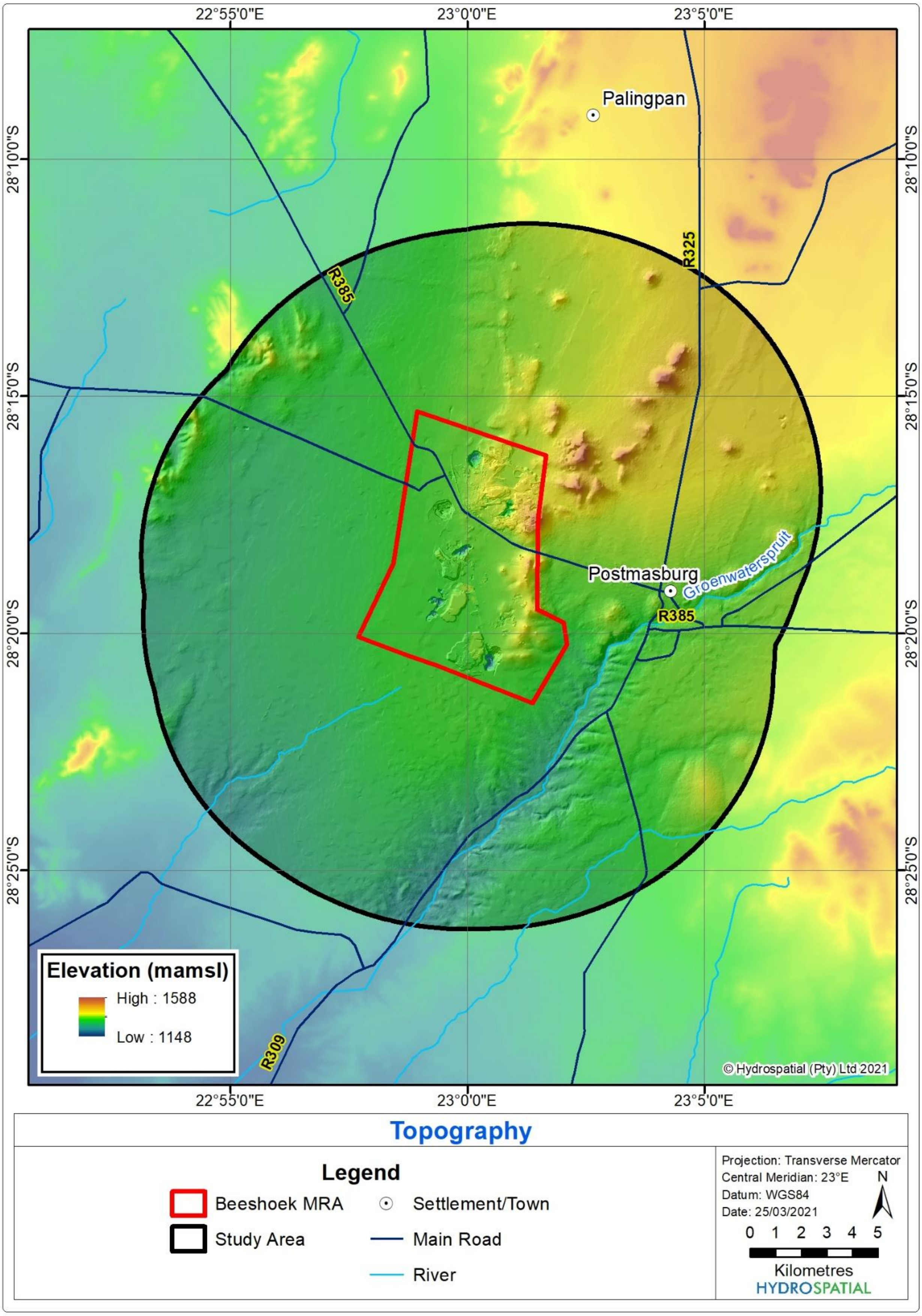

Figure 5-2: Topography of the study area

5.2 Land Cover/Use

Similar to topography, the land cover/use of an area plays an important role in the visibility of a project. Tall dense vegetation can conceal a project from visual receptors, while projects located in open areas consisting of grassland vegetation, are likely to be more visible to receptors.

According to the 2018 South African National Land Cover map (GeoTerraImage, 2019), the land cover of the study area consists mostly of grassland, shrubland and mining areas (Figure 5-4). The town of Postmasburg is located to the east of Beeshoek. The study area is dominated by three vegetation types, namely, Postmasburg Thornveld to the west, south and south-east, Kuruman Thornveld to the north-east, and Kuruman Mountain Bushveld along the elevated ridges and koppies (Mucina and Rutherford, 2006). These vegetation types are characterised by short shrubby and grassland vegetation (Figure 5-3).

Figure 5-3: Typical vegetation within the study area

5.3 Landscape Characterisation

The landscape of the study area can be broadly divided into three main categories:

- Natural areas – consisting of natural shrubland and grassland. These areas are used for livestock and game farming;
- Mining areas – consisting of mine dumps, bare areas, open pits and mine infrastructure; and
- Residential areas – Postmasburg and its immediate surrounding area, is the only town in the study area.

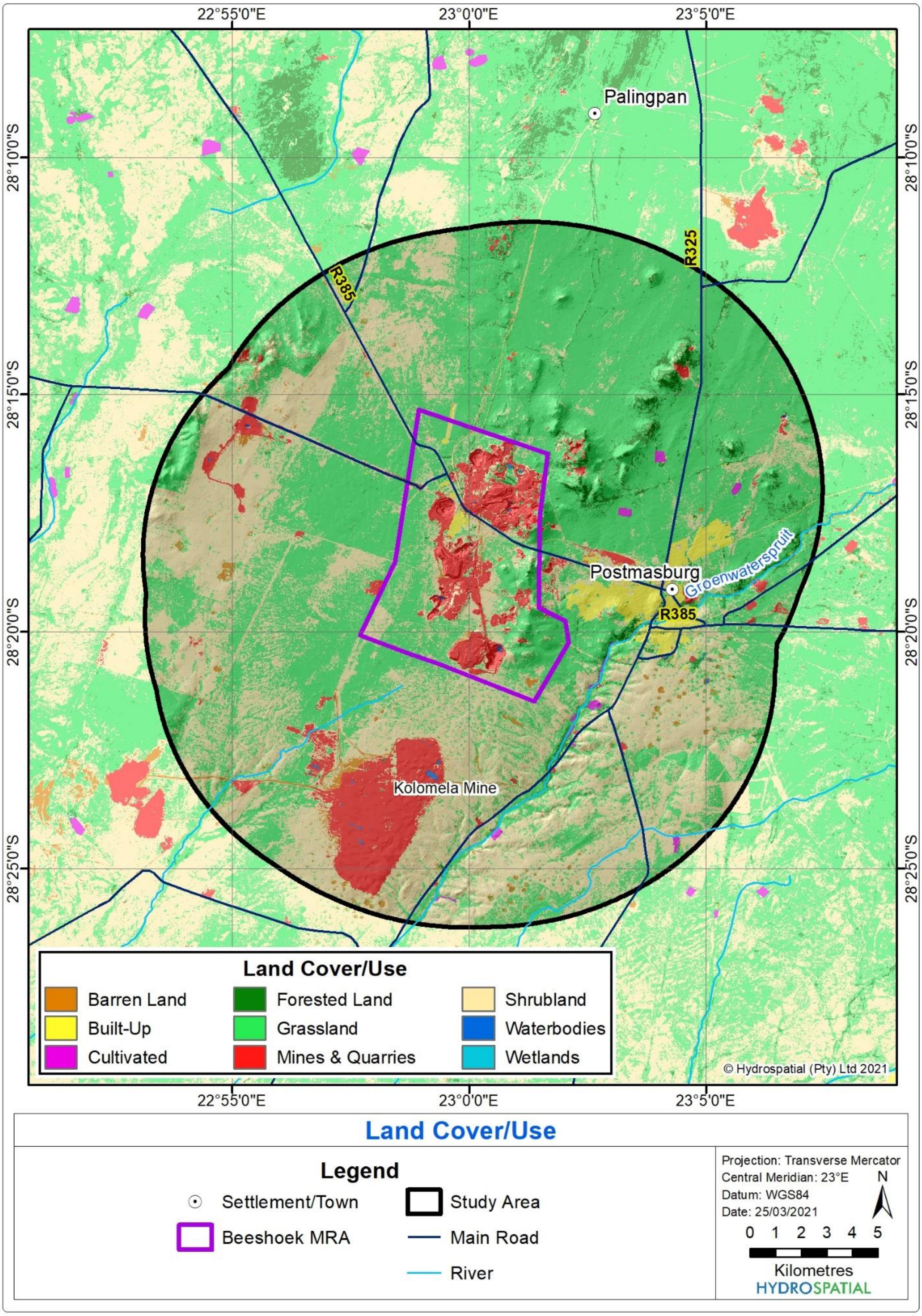

Figure 5-4: Land cover/use of the study area

5.4 Visual Receptors

The following visual receptors have been identified within the study area and are indicated on Figure 5-5:

- Houses and farmsteads;
- Residents of Postmasburg;
- Aerodrome; and
- Motorists travelling on roads within the study area.

5.5 Sense of Place

Sense of place is the unique value that is allocated to a specific place or area through the cognitive experience of the user or viewer. According to Lynch (1992), sense of place is "the extent to which a person can recognise or recall a place as being distinct from other places – as having a vivid, unique, or at least particular, character of its own".

Mining activities, primarily from two large iron ore mines in the study area, namely, Beeshoek and Kolomela Mine, largely characterise the landscape to the mid-west and south-west of Postmasburg. Their large mine dumps have been constructed in a region that has flat topography, surrounded by short vegetation. Mining dominates the landscape of these areas, and the sense of place has been altered from a natural open landscape, to one associated with mine dumps and bare areas.

Natural areas, particularly in the far-west, north-west, north and south-east of the study area, evoke a tranquil open bushveld sense of place.

The town of Postmasburg dominates the eastern part of the study area, and is largely dependent on the mining activities of the surrounding area. This is evident by the numerous number of people that were observed to be wearing mining attire within the town.

5.6 Protected Areas

No protected areas fall within the study area. Beeshoek, however, is located on the western edge of the Ghaap Plateau that has been identified by the Northern Cape Nature Conservation Services as a priority for conservation in the Northern Cape, and is regarded as an ecologically sensitive habitat. Endoreic pans occur on the Ghaap Plateau and are prevalent within the Sishen/Postmasburg area (EnviroGistics, 2021). Pans are present within the MRA.

5.7 Cultural and Heritage Landscape

According to HCAC (2021), evidence of Early (more than 400 000 years ago), Middle (30 000 to 300 000 years ago) and Late Stone Age (30 000 years ago) are evident in the greater area. In the area to the north of the study area, the Earlier Stone Age is represented by 11 known sites (Bruce, Kathu, Uitkoms, Sishen, Demaneng, Lylyveld and Mashwening); the Middle Stone Age by 5 sites (all in the vicinity of Kathu); and the Later Stone Age by 10 sites (one on King, one at Mashwening and eight at Kathu). Rock engravings have been identified from Sishen and Bruce, as well as Beeshoek, to the south.

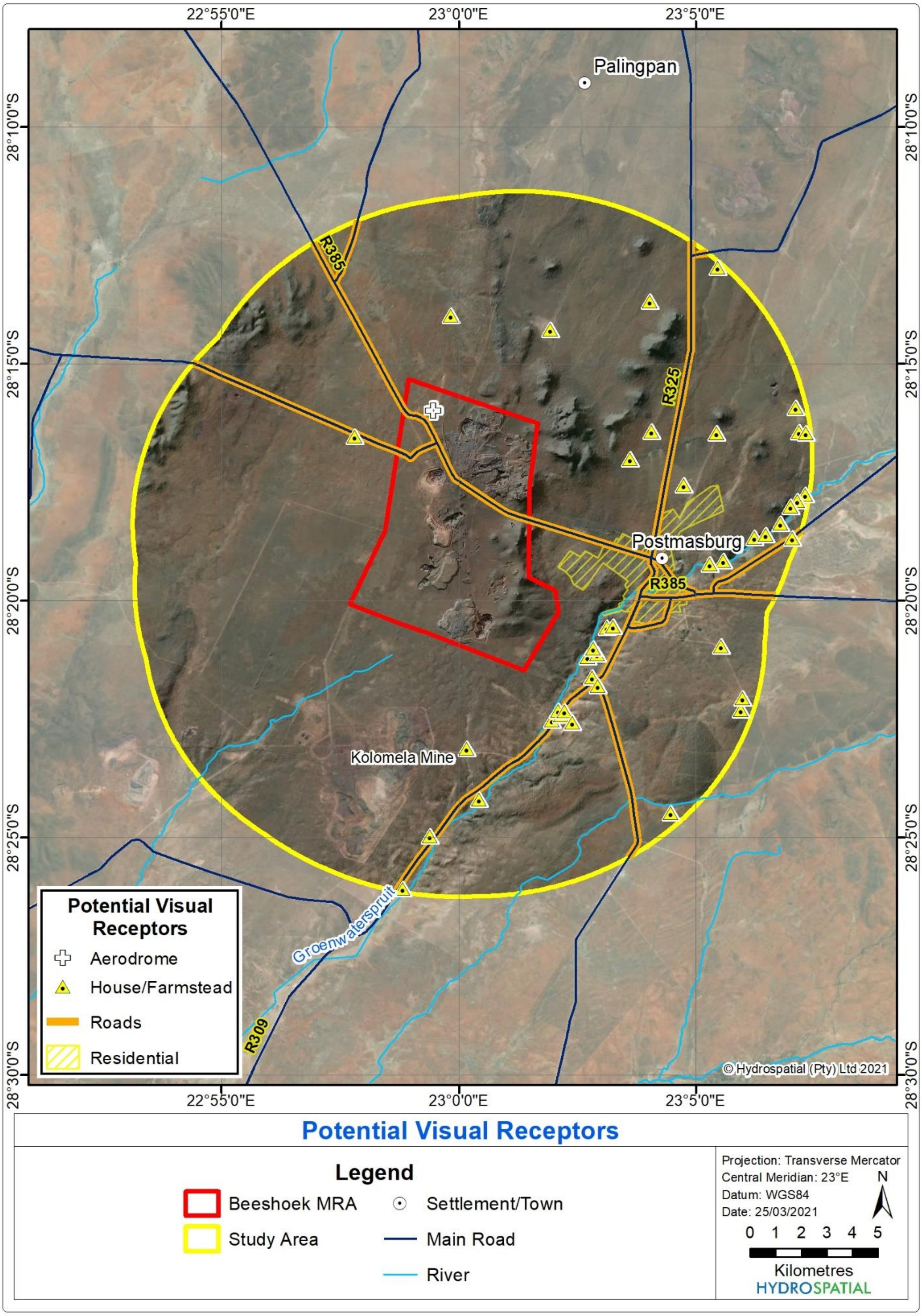

Figure 5-5: Potential visual receptors within the study area

The presence of the Iron Age in the greater area dates back to the 1600s, with a definite presence of the Tswana within the Postmasburg area around 1805 (HCAC, 2021).

According to HCAC (2021), rock paintings in the area serve as evidence that the hunter gatherer Bushmen had inhabited Griqualand West for centuries. In the 1770s, the Korana (people of Nama ancestry) moved into the Postmasburg area and disrupted the Bushmen's way of life. The Korana regularly visited a primitive mine in the Blinkklipkop, which today forms part of the town of Postmasburg, to exploit shimmering substances, namely hematite and specularite, which were mixed with fat and applied to the skin to give a sought-after shiny red appearance. With the later arrival of the Tswana, Korana, Griqua and Europeans the Bushmen gradually emigrated to the Kalahari, Botswana and Namibia.

In the late 1800s, Europeans began moving into the Postmasburg area with the establishment of a new Reformed Church. The manganese fields in the Postmasburg area were opened for prospecting in 1922, and this greatly boosted the development of the town and caused an influx of new residents (HCAC, 2021).

6 VISUAL AND AESTHETIC EVALUATION

6.1 Visibility and Visual Exposure

Viewshed analysis modelling was undertaken to determine the visibility of the project. Two viewsheds were generated as follows:

- **Current Infrastructure Viewshed:** A viewshed using the current heights of the dumps that are proposed to be raised was generated to establish their current visibility in the landscape; and
- **Proposed Infrastructure Viewshed:** The proposed maximum dump heights provided in Table 1-1 was used to generate a viewshed to establish the future visibility.

The purpose of generating two viewsheds was to determine whether there would be an increase in the current visibility of the Mine infrastructure, due to the raising of the mine dumps.

The visual exposure is the relative visibility of a development or feature in a landscape (Oberholzer, 2005). The visual exposure decreases as the distance between the development/feature and visual receptor increases. The visual exposure of the project was determined to be as follows:

- High – between 0 to 3 km;
- Medium – between 3 to 6 km; and
- Low – between 6 to 10 km.

6.1.1 Current Infrastructure

The current infrastructure viewshed is indicated on Figure 6-1, along with the affected visual receptors and visual exposure buffers. The viewshed indicated that the current Mine infrastructure is mostly visible from the western half of the study area, due to the flat regional topography that occurs in this area. The ridge which runs in a north to south direction along the eastern boundary of the Beeshoek MRA, largely shields the existing mine infrastructure from views from Postmasburg. Houses located in the south-eastern portion of the study area, fall within the visible area of the current infrastructure, due to the fairly close proximity to the East Pit WRD. Motorists travelling along the R385 through the Beeshoek MRA, will have close-up views, and therefore high visual exposure of the current existing Mine infrastructure. Motorists travelling along the north – south R325 road, may experience isolated views of medium to low visual exposure.

6.1.2 Proposed Infrastructure

The proposed infrastructure viewshed is indicated on Figure 6-2. The viewshed indicated that the raising of the mine dumps will result in a much larger visible area, particularly to the east of Beeshoek, with more receptors falling within the visible area. Table 6-1 indicates that the proposed raising of the Mine dumps will increase the visible area by 112 km^2, the number of houses and farmsteads in the rural areas will increase by 17, the length of road by 27 km, and the residential area within Postmasburg by 8 km^2. Figure 6-3 provides an illustration of the proposed dump heights from Postmasburg. It should be noted that the town of Postmasburg consists of buildings and houses, and is well wooded in certain areas, which will prevent the mine dumps from being visible. Furthermore, the visual exposure from Postmasburg is medium to low, and the mine dumps are likely to blend in with the ridge of koppies which run along the eastern boundary of Beeshoek. It should be further noted that the Kolomela Mine dumps, located to the south, is already impacting on the southern receptors as well as the R309 road.

Table 6-1: Total visible areas and visual receptors within the visible area of the viewsheds

Viewshed	Total Visible Area (km^2)	No. of Visual Receptors in the Visible Area	Length of Road in the Visible Area (km)	Area of Postmasburg in the Visible Area (km^2)
Current Infrastructure	339	18	45	1
Proposed Infrastructure	451	35	71	9

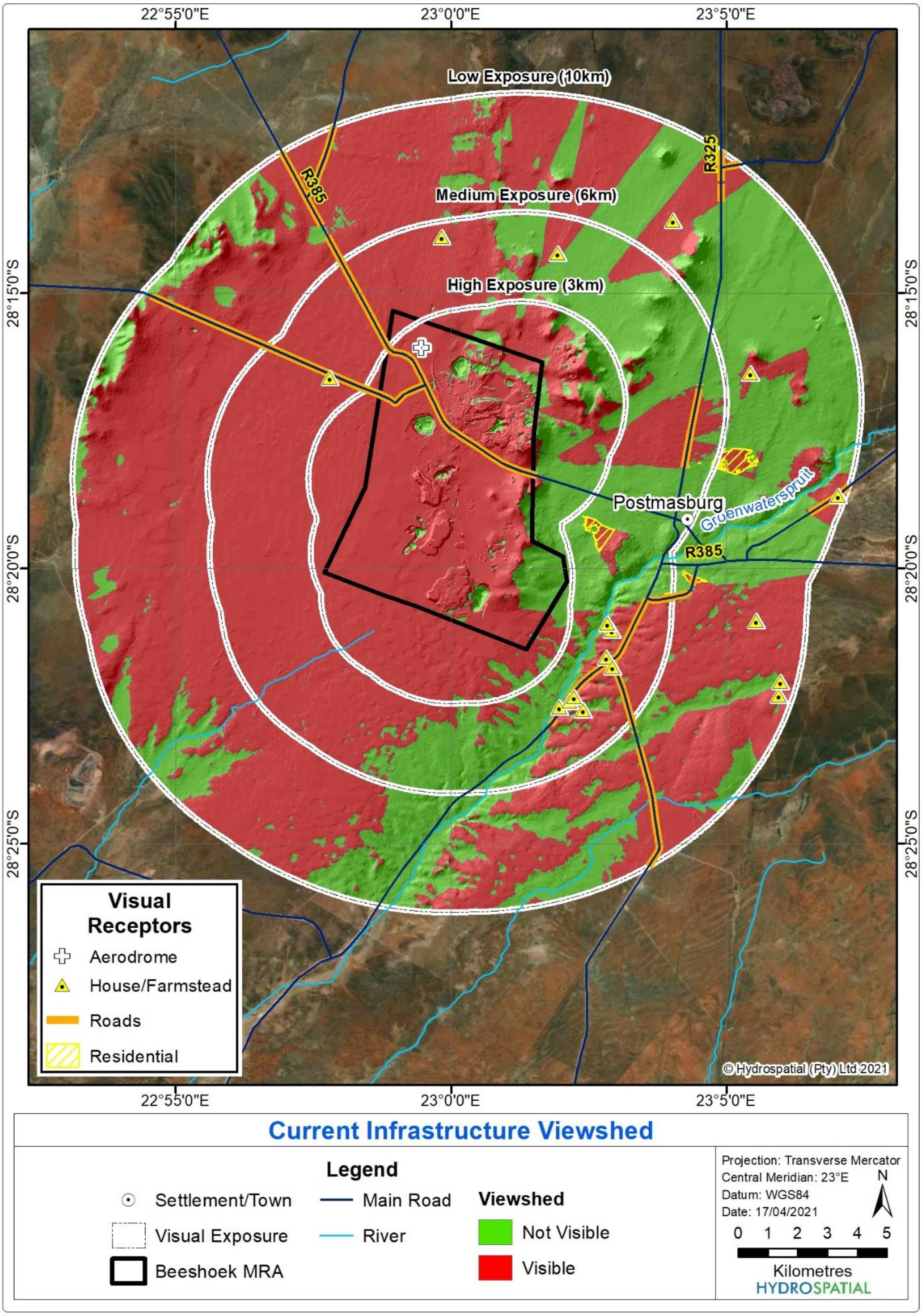

Figure 6-1: Current infrastructure viewshed

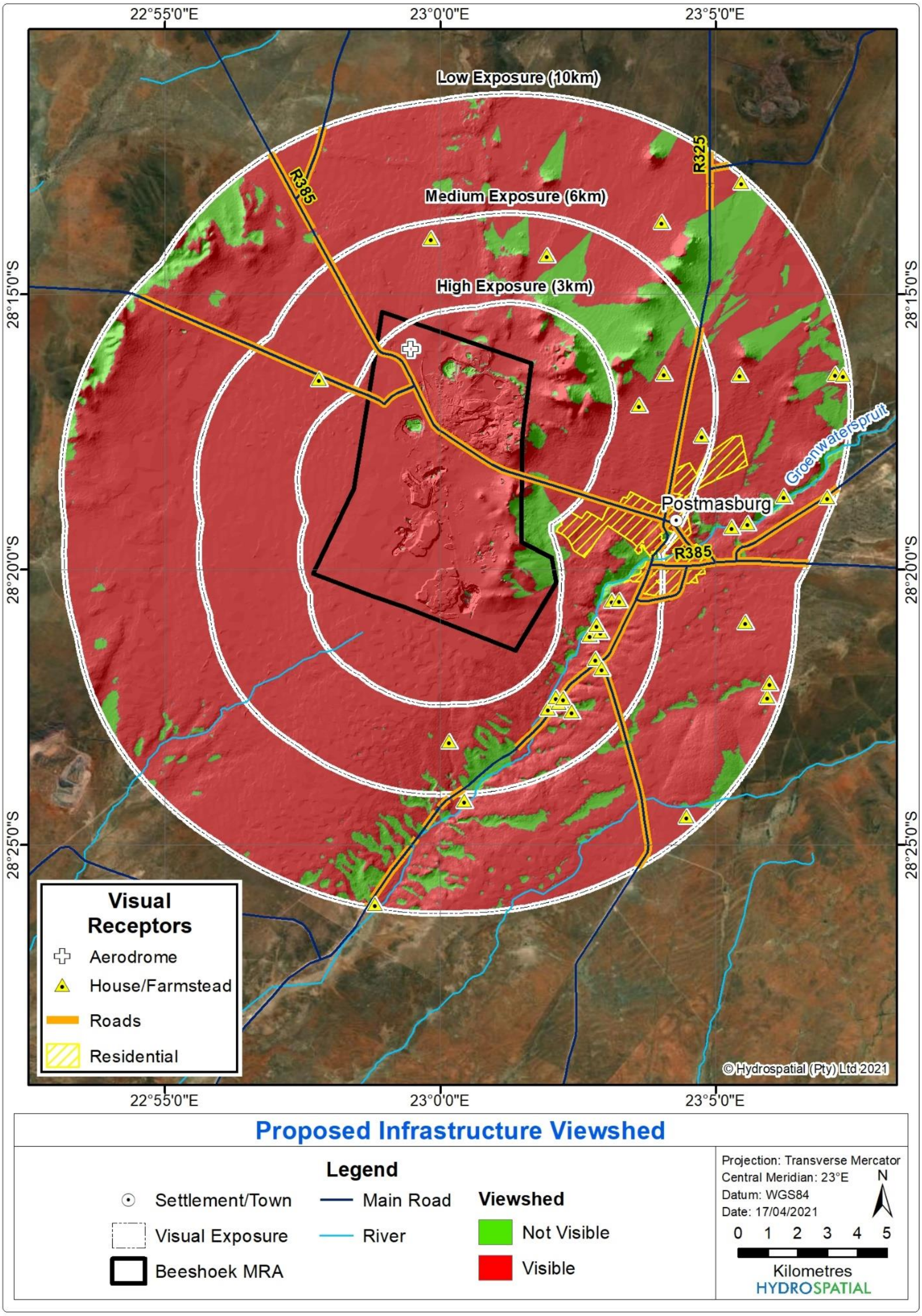

Figure 6-2: Proposed infrastructure viewshed

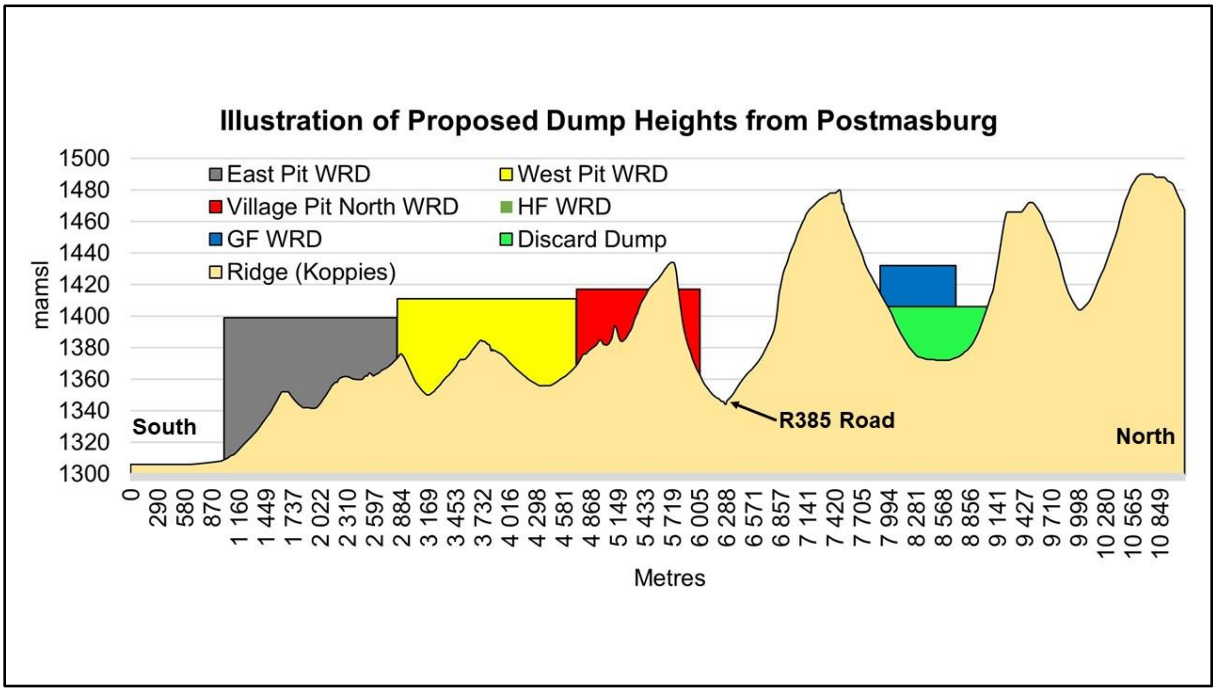

Figure 6-3: Illustration of the proposed dump heights from Postmasburg

6.2 Visual/Scenic Quality

Studies in perceptual psychology have shown that humans prefer landscapes with higher complexity and landscape quality and can be said to increase when:

- Natural landscape increases and man-made landscape decreases;
- Well-preserved, compatible man-made structures are present;
- Diverse or vivid patterns of grasslands and trees occur;
- Water forms are present;
- Topographic ruggedness and relative relief increases; and
- Where land use compatibility increases (Crawford, 1994, Arriaza, 2004).

Greater aesthetic value is also attached to places where:

- Rare, distinguished or uncommon features are present;
- The landscape/townscape evokes particularly strong responses in community members or visitors;
- The landscape/townscape has existing, long-standing meaning or significance to a particular group; and
- Landmark quality features are present (Ramsay, 1993).

The visual quality was determined to be medium in the flat natural areas away from the mining areas, and high in the natural mountainous areas particularly to the north-west of the study area. The town of Postmasburg was assigned a medium scenic quality, whilst the immediate outer lying areas were assigned a low scenic quality, due to the dusty nature and large amount of litter noted as well as informal settlements. The mining areas, particularly to the centre and south of the study area were assigned a low scenic quality.

6.3 Visual Absorption Capacity

The VAC is the potential of the landscape to conceal the proposed development as a result of topography, vegetation or synthetic features (Oberholzer, 2005). Due to the flat topography and short shrubby vegetation that characterises most of the study area, the VAC in general was determined to be low, particularly to the west. The north – south ridge located to the east of Beeshoek, has a high VAC in concealing and blending the proposed increase in the mine dumps into the landscape. The trees and buildings within Postmasburg will have a high VAC in concealing any views of the dumps.

6.4 Visual Intrusion

Visual intrusion is the level of compatibility or congruence of a project with the particular qualities of the area, or its 'sense of place' (Oberholzer, 2005). Due to mine dumps and mining activities already taking place at Beeshoek as well as in the surrounding area, the proposed Project is in line with the current land use of the area.

6.5 Viewer Sensitivity

The viewer sensitivity is summarised in Table 6-2.

Table 6-2: Summary of the viewer sensitivity of the Project

Visual Receptor	Comment	Rating
Houses and farmsteads	People living in the houses in the rural areas will be accustomed to mining in the area. However, views of mine dumps and mining activities is unlikely to be favourable.	Moderate
Residents of Postmasburg	The residents of Postmasburg are largely dependent on mining, with many of the residents working on the mines in the area, or indirectly benefiting from mining. The guesthouses and lodges are also largely dependent on mining.	Low
Motorists on roads	Views of mining activities are evident along the R325 between Postmasburg and	Low

Visual Receptor	Comment	Rating
	Kathu as well as to the south along the R309. The R385 through Beeshoek is already impacted by mining activities. By the time motorists reach Beeshoek, they would already be accustomed to mines	
Aerodrome	The aerodrome falls within the visible area of the existing mine infrastructure.	Low

7 IMPACT ASSESSMENT

7.1 Project Phase Description

The potential impacts during the different phases of the project are discussed below.

7.1.1 Construction Phase

During the construction phase, vegetation clearance and topsoil stripping will take place. The construction phase will result in areas being cleared, increased presence of heavy machinery and the generation of dust.

7.1.2 Operational Phase

During the operational phase, the open pits will be expanded and waste rock will be deposited on the mine dumps which will increase in size and height. The operational phase will result in the presence of heavy machinery and the generation of dust. Night-time lighting in the area will increase.

7.1.3 Decommissioning, Rehabilitation and Closure Phase

The decommissioning phase will result in Mine infrastructure being removed. The Mine dumps will be rehabilitated and vegetated. The decommissioning and rehabilitation phase will result in the generation of dust, however, once rehabilitation has been successfully completed, a general positive impact is expected in comparison to the operational phase.

7.2 Cumulative Impacts

Cumulative impacts result from the incremental impact of proposed activities on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

The proposed Project will cumulatively add to the historical and active mining in the area. Since landscape has already been transformed by mining activities, it is not foreseen that the visual quality of the area would be further significantly reduced. The visual quality, will however, be improved once rehabilitation has been successfully implemented.

7.3 Impact Assessment and Mitigation Measures

The pre- and post-mitigation impact assessment for the construction, operational and decommissioning and rehabilitation phases are provided in Table 7-1.

Table 7-1: Impact assessment

Phase	Activity	Impact Description	Pre-Mitigation					Mitigation/Management Measures & Recommendations	Post-Mitigation				
			Extent	Duration	Probability	Intensity	Significance		Extent	Duration	Probability	Intensity	Significance
Construction Phase	Removal of vegetation for the pits, WRDs and associated infrastructure. Stripping and stockpiling of topsoils.	Creation of a bare areas and the generation of dust.	Local (2)	Short-term (1)	Probable (2)	Minor (-2)	Medium (-6 to -11)	Vegetation clearance should be kept to an absolute minimum. Exposed areas should be vegetated as soon as possible. Dust suppression measures should be implemented to limit the generation of dust.	Site-specific (1)	Short-term (1)	Improbable (1)	Negligible (-1)	Low (-1 to -5)
Construction Phase	The presence and use of heavy machinery, trucks and vehicles for construction purposes.	The movement of vehicles and heavy machinery during the construction phase will create a visual presence and will generate dust.	Local (2)	Short-term (1)	Probable (2)	Minor (-2)	Medium (-6 to -11)	Machinery, trucks and vehicles are already present on the Mine site and are unlikely create any additional significant presence. Dust suppression measures should be implemented to limit the generation of dust.	Site-specific (1)	Short-term (1)	Improbable (1)	Negligible (-1)	Low (-1 to -5)
Operational Phase	Alteration in the current topography through the development of the pits and WRDs.	The pits will be expanded but are not expected to result in any significant visual impact. The WRDs will increase in size and height and will therefore be more visible. The generation of dust.	Regional (3)	Long-term (3)	Highly Probable (3)	Minor (-2)	Medium (-6 to -11)	The pits should be backfilled where possible. The WRDs should be vegetated as soon as practicably possible. Dust suppression measures should be implemented to limit the generation of dust.	Local (2)	Medium-term (2)	Improbable (1)	Negligible (-1)	Medium (-6 to -11)

Phase	Activity	Impact Description	Pre-Mitigation					Mitigation/Management Measures & Recommendations	Post-Mitigation				
			Extent	Duration	Probability	Intensity	Significance		Extent	Duration	Probability	Intensity	Significance
Operational Phase	The presence of additional Mine infrastructure such as the WHIMS and Jig Plants as well as the expansion of the pits and increase in the heights of the WRDs	Impact on the cultural and heritage landscape.	Regional (3)	Long-term (3)	Probable (2)	Minor (-2)	Medium (-6 to -11)	The natural landscape of the area has already been altered by mining. The proposed mine infrastructure is in line with the current land use and will add to the already altered landscape. It is not foreseen that the current visual quality of the area will be significantly altered by the proposed infrastructure. However, it is recommended that should the plant and other proposed infrastructure be painted, that earthy colours are used to blend in with the surrounding landscape. It is further recommended that the pits are backfilled where possible and that the WRDs are vegetated upon rehabilitation.	Local (2)	Medium-term (2)	Improbable (1)	Negligible (-1)	Medium (-6 to -11)
Operational Phase	The presence of additional Mine infrastructure such as the WHIMS and Jig Plants as well as the expansion of the pits and increase in the heights of the WRDs	Additional night lighting from proposed infrastructure.	Regional (3)	Long-term (3)	Probable (2)	Average (-3)	Medium (-6 to -11)	Down lighting and lighting shields should be used as far as possible.	Local (2)	Short-term (1)	Improbable (1)	Negligible (-1)	Low (-1 to -5)
Operational Phase	The presence and use of heavy machinery, trucks and vehicles during the operational phase.	The movement of vehicles and heavy machinery during the operational phase will create a visual presence and will generate dust.	Local (2)	Long-term (3)	Probable (2)	Minor (-2)	Medium (-6 to -11)	Machinery, trucks and vehicles are already present on the Mine site and are unlikely create any additional significant presence. Dust suppression measures should be implemented to limit the generation of dust.	Site-specific (1)	Short-term (1)	Probable (2)	Negligible (-1)	Low (-1 to -5)

Phase	Activity	Impact Description	Pre-Mitigation					Mitigation/Management Measures & Recommendations	Post-Mitigation				
			Extent	Duration	Probability	Intensity	Significance		Extent	Duration	Probability	Intensity	Significance
Closure, Decommissioning & Rehabilitation Phase	Removal of infrastructure and rehabilitation of disturbed areas and WRDs	The removal of infrastructure and the rehabilitation of disturbed areas and the WRDs will visually improve the area.	Regional (3)	Long-term (3)	Probable (2)	Minor (-2)	Medium (-6 to -11)	The removal of Mine infrastructure should be undertaken. The pits should be backfilled where possible. The WRDs should be vegetated.	Site-specific (1)	Medium-term (2)	Improbable (1)	Negligible (-1)	Low (-1 to -5)

8 CONCLUSIONS AND RECOMMENDATIONS

The following were the main findings of the study:

- The proposed infrastructure will be located within the existing Beeshoek MRA;
- Mining activities, primarily from two large iron ore mines in the area, namely, Beeshoek and Kolomela Mine, largely characterise the landscape to the west and south-west of Postmasburg. Their large mine dumps have been constructed in a region that has flat topography, surrounded by short vegetation. Mining dominates the landscape of these areas, and the sense of place has been altered from a natural open landscape, to one associated with mine dumps and bare areas.
- Due to the general flat topography and short vegetation of the area, the proposed raised Mine dumps will be visible over a large area.
- The visual quality was determined to be medium in the flat natural areas away from the mining areas, and high in the natural mountainous areas particularly to the north-west of the study area. The town of Postmasburg has a medium scenic quality, whilst the immediate outer lying areas have a low scenic quality, due to the dusty nature and large amount of litter noted as well as informal settlements that characterise the area. The mining areas, particularly to the centre and south of the study area were assigned a low scenic quality.
- The VAC in general was determined to be low, particularly to the west of Beeshoek. The north – south ridge located to the east of Beeshoek, has a high VAC in concealing and blending the proposed increase in the mine dumps into the landscape. The trees and buildings within Postmasburg will have a high VAC in concealing any views of the dumps.
- The visual intrusion of the proposed project was determined to be low, due to mine dumps and mining activities already taking place at Beeshoek as well as in the surrounding area. The proposed Project is in line with the current land use of the area.
- Visual receptors include houses and farmsteads in the rural areas, residents of Postmasburg, motorists on the roads surrounding Beeshoek, and an aerodrome. The viewer sensitivity of the farmsteads and rural houses was determined to be moderate, and low for the remaining visual receptors due to the already existing mine infrastructure in the area.
- The impact assessment indicated that all impacts will have a medium significance pre-mitigation, with most achieving a low significance post-mitigation.

In conclusion, the natural landscape of the area has already been altered by mining activities. The proposed mine infrastructure is in line with the current land use and will add to the already altered landscape. It is not foreseen that the current visual quality of the area will be significantly altered by the proposed infrastructure. It is therefore the opinion of the specialist that the project can commence, provided that the recommendations and mitigation measures provided in Table 7-1 are implemented.

9 REFERENCES

Arriaza, M. 2004. Assessing Visual Quality in Rural Landscapes. Landscape and Urban Planning, Vol. 69, Issue 1 pg 115-125, 15 July 2004.

Cornell, D.H., Thomas, R.J., Moen, H.F.G, Reid, D.L., Moore J.M. and Gibson, R.L. 2006. The Namaqua-Natal Province. In: Johnson, M.R., Anhaeusser, C.R.and Thomas, R.J. (Eds.), The Geology of South Africa. Geological Society of South Africa, Council for Geoscience, Pretoria, 325-380.

Crawford, D. 1994. Using remotely sensed data in landscape visual quality assessment, Landscape and Urban Planning. 30: 17-81.

EnviroGistics. 2021. Environmental Scoping Report in terms of National Environmental Management Act, 1998 and the National Environmental Management: Waste Act, 2008 for: Beeshoek Mine Optimisation Project.

GeoTerraImage. 2019. South African National Land-Cover 2018. Report & Accuracy Assessment. Version 004, 25-09-2019.

HCAC. 2021. Heritage Impact Assessment for the Proposed Beeshoek Optimisation Project, Postmasburg, Northern Cape Province.

Lynch, K. 1992. Good City Form, The MIT Press, London. p131

Oberholzer, B. 2005. Guideline for involving visual and aesthetic specialists in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 F. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.

Ramsay, J. 1993. Identification and assessment of aesthetic values in two Victorian forest regions. More than meets the eye: identifying and assessing aesthetic value. Report of the Aesthetic Value Workshop held at the University of Melbourne.