Visual Impact Assessment Report for The Proposed Maluti - A-Phofung Landfill Site On portion 110 Of the Farm Witsieshoek, 1903 At Phuthadithjaba (Qwaqwa), Free State Province

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LIST OF ABBREVIATIONS

BPEO	Best Practicable Environmental Option
DEA&DP	Department of Environmental Affairs and Development Planning
DEAT	Department of Environmental Affairs and Tourism
DWAF	Department of Water Affairs and Forestry
DTM	Digital Terrain Model
ECO	Environmental Control Officer
EIA	Environmental impact assessment
EMP	Environmental Management Plan
GIS	Geographic Information System
VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment
VRM	Visual Resource Management
ZVI	Zone Of Visual Influence

DEFINITIONS

ALTERNATIVES: A possible course of action, in place of another, that would meet the same purpose and need defined by the development proposal. Alternatives considered in the EIA process can include location and/or routing alternatives, layout alternatives, process and/or design alternatives, scheduling alternatives or input alternatives.

BEST PRACTICABLE ENVIRONMENTAL OPTION: This is the option that provides the most benefit or causes the least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as in the short term.

ENVIRONMENTAL IMPACT ASSESSMENT: A public process that is used to identify, predict and assess the potential positive and negative social, economic and biophysical impacts of a proposed development. EIA includes an evaluation of alternatives, appropriate management actions and monitoring programmes.

IMPACT (VISUAL): A description of the effect of an aspect of the development on a specified component of the visual, aesthetic or scenic environment within a defined time and space

ISSUE (VISUAL): Issues are concerns related to the proposed development, generally phrased as questions, taking the form.

KEY ISSUE: An issue raised during the scoping process that has not received an adequate response and which requires further investigation before it can be resolved.

LANDSCAPE INTEGRITY: The relative intactness of the existing landscape or townscape, whether natural, rural or urban, and with an absence of intrusions or discordant structures

MANAGEMENT ACTIONS: Actions that enhance benefits of a proposed development, or avoid, mitigate, restore or compensate for negative impacts.

MITIGATION MEASURES: Actions that can be employed to mitigate adverse effects.

PRE-APPLICATION PLANNING: The process of identifying environmental opportunities and constraints, potential fatal flaws and negative impacts, as well as alternatives and management actions in the early stage of the project design, prior to application for environmental authorization.

RECEPTORS: Individuals, groups or communities who are subject to the visual influence of a particular project.

SCENARIOS: A description of plausible future environmental states that could influence the nature, extent, duration, magnitude/intensity, probability and significance of the impact occurring.

SENSE OF PLACE: The unique quality or character of a place, whether natural, rural or urban.

SCENIC CORRIDOR: A linear geographic area that contains scenic resources, usually, but not necessarily, defined by a route. See also view corridor.

SCENIC ROUTE: A linear movement route, usually in the form of a scenic drive, but which could also be a railway, hiking trail, horse-riding trail or 4x4 trails.

SCOPING: The process of determining the key issues, and the space and time boundaries to be addressed in an environmental assessment.

GLOSSARY OF TERMS

GLARE: Glare is the uncomfortable brightness of a light source when viewed against a dark background (ILE, 2005).

HORIZON CONTOUR: A line that encircles a development site and that follows ridgelines where the sky forms the backdrop and no landform is visible as a background. This is essentially the skyline that when followed through the full 360-degree arc as viewed from a representative point on the site defines the visual envelope of the development. This defines the boundary outside which the development would not be visible.

LANDSCAPE AMENITY: Landscape amenities are those perceivable landscapes and/or landscape elements that greatly contribute to the prevailing landscape character and/or visual quality and –value of the study area. The notable features such as hills or mountains or distinctive vegetation cover such as forests and fields of colour that can be identified in the landscape and described. It also includes recognised views and viewpoints, vistas, areas of scenic beauty and areas that are protected in part for their visual value.

LANDSCAPE CHARACTERISATION/ CHARACTER: This covers the gathering of information during the desktop study and field survey work relating to the existing elements, features, and extent of the landscape (character). It includes the analysis and evaluation of the above and the supporting illustration and documentary evidence.

LANDSCAPE CONDITION: Refers to the state of the landscape of the area making up the site and that of the study area in general. Factors affecting the condition of the landscape can include the level maintenance and management of individual landscape elements such as buildings, woodlands etc and the degree of disturbance of landscape elements by non-characteristics elements such as invasive tree species in grassland or car wrecks in a field.

LANDSCAPE IMPACT: Changes to the physical landscape resulting from the development that include; the removal of existing landscape elements and features, the addition of new elements associated with the development and altering of existing landscape elements or features in such as way as to have a detrimental effect on the value of the landscape.

LANDSCAPE RECEPTOR: Landscape receptors are those defined visual recourses or landscape components that contribute to the prevailing landscape character and that will be affected by the proposed project.

LANDSCAPE RECEPTOR SENSITIVITY: Landscape receptor sensitivity is a measure of the magnitude of change the visual resource can accommodate without losing its inherent character. A landscape receptor with a high sensitivity would be one that is valued for its aesthetic attractiveness and/or have ecological, cultural or social importance.

LIGHT TRESPASS: Light trespass can be described as the effects of light or illuminance that strays from its intended purpose (Shaflik, 1997).

NIGHT GLOW: Night-glow (sky glow) is the brightening of the night sky above towns, cities and countryside (ILE, 2005).

SENSE OF PLACE: That distinctive quality that makes a particular place memorable to the visitor, which can be interpreted in terms of the visual character of the landscape. A more emotive sense of place is that of local identity and attachment for a place "which begins as undifferentiated space [and] becomes place as we get to know it better and endow it with value" (Tuan 1977) .

VIEWER EXPOSURE: The extent to which viewers are exposed to views of the landscape in which the proposed development will be located. Viewer exposure considers the visibility of the site, the viewing conditions, the viewing distance, the number of viewers affected the activity of the viewers (tourists or workers) and the duration of the views.

VIEWER SENSITIVITY: The assessment of the receptivity of viewer groups to the visible landscape elements and visual character and their perception of visual quality and value. The sensitivity of viewer groups depends on their activity and awareness within the affected landscape, their preferences, preconceptions and their opinions.

VISUAL ABSORPTION CAPACITY (VAC): Visual Absorption Capacity (VAC) signifies the ability of the landscape to accept additional human intervention without serious loss of character and visual quality or value. VAC is founded on the characteristics of the physical environment such as vegetative screening, diversity of colours and patterns and topographic variability. It also relates to the type of project in terms of its vertical and horizontal scale, colours and patterns. A high VAC rating implies a high ability to absorb visual impacts while a low VAC implies a low ability to absorb or conceal visual impacts.

VISUAL ACUITY: "Visual acuity refers to the clarity or clearness of one's vision, a measure of how well a person sees. The word "acuity" comes from the Latin acuitas, which means sharpness."

(http://www.tedmontgomery.com/the_eye/acuity.html [Accessed 17 Sep. 06])

VISUAL CHARACTER: Visual character is based on human perception and addresses the viewer's response to the landscape elements and the relationship between these elements that can be interpreted in terms of aesthetic characteristics such as pattern, scale, diversity, continuity and dominance.

VISUAL CONTOUR: The outer perimeter of the visual envelope determined from the site of the development. The two dimensional representation on plan of the horizon contour.

VISUAL CONTRAST: The degree to which the physical characteristics of the proposed development differ from that of the visual character of the visual resource. The characteristics affected typically include:

- Volumetric aspects such as size, form, outline and perceived density;
- Characteristics associated with balance and proportion such scale, diversity, dominance, continuity;
- Surface characteristics such as colour, texture, reflectivity; and
- Luminescence or lighting.

VISUAL ENVELOPE: The extent within which the development can be seen. The extent is often limited to a distance from the development within which views of the development are expected to be of concern.

VISUAL IMPACT: Changes to the visual character of available views resulting from the development that include: obstruction of existing views; removal of screening elements thereby exposing viewers to unsightly views; the introduction of new elements into the view shed experienced by visual receptors and intrusion of foreign elements into the view shed of landscape features thereby detracting from the visual amenity of the area.

VISUAL IMPACT ASSESSMENT: A specialist study to determine the visual effects of a proposed development on the surrounding environment. The primary goal of this specialist study is to identify potential risk sources resulting from the project that may impact on the visual environment of the study area, and to assess their significance. These impacts include landscape impacts and visual impacts.

VISUAL INTRUSION: Visual intrusion occurs when the viewer becomes aware, usually with negative associations, to a new element, or the removal of a familiar feature in a familiar view. The likelihood that a viewer will become aware of change is dependent on the compatibility of the element added, or the importance of the feature removed. This awareness is directly related to the perceived visual contrast between the existing and new scene, or between the new element and the existing landscape. In order to understand visual intrusion, the existing quality of views of the site must be compared to the views that will be experienced during the project phases.

VISUAL MAGNITUDE: Product of the vertical and horizontal angles of an object to describe quantitatively the visual dimension of an object. (Iverson, 1985). The visual magnitude is best described in terms of visual arcs with a one-minute arc usually considered as being the minimum resolution detectable by the human eye (equivalent to observing a 29mm ball at a distance of one hundred metres).

VISUAL QUALITY: An assessment of the aesthetic excellence of the visual resources of an area. This should not be confused with the value of these resources where an area of low visual quality may still be accorded a high value. Typical indicators used to assess visual quality are vividness, intactness and unity. For more descriptive assessments of visual quality attributes such as variety, coherence, uniqueness, harmony, and pattern can be referred to.

VISUAL RECEPTORS: Includes viewer groups such as the local community, residents, workers, the broader public and visitors to the area, as well as public or community areas from which the development is visible.

VISUAL RESOURCE: Visual resource is an encompassing term relating to the visible landscape and its recognisable elements which, through their co-existence, result in a particular landscape and visual character

ZONE OF VISUAL INFLUENCE: The extent of the area from which the most elevated structures of the proposed development could be seen and may be considered to be of interest (see visual envelope).

LIGHTING

SHIELDED: A fixture that is shielded in such a manner that light rays emitted by the fixture, either directly from the lamp or indirectly from the fixture, are projected within the property on which the light is mounted.

OUTDOOR LIGHTING FIXTURE: An outdoor artificial illuminating device, whether permanent or portable, used for illumination or advertisement, including searchlights, spotlights or floodlights, whether for architectural lighting, parking lot lighting, landscape lighting, security lighting, billboards or street lighting.

ZONE OF VISION: The central area that the eye can see clearly without moving and is surrounded by the peripheral vision.

INSTALLED LIGHTING: Attached, or fixed in place, whether or not connected to a power source.

FULLY-SHIELDED LIGHTS: (Also known as full cut-off lights) Outdoor light fixtures shielded or constructed so that no light rays are emitted by the installed fixture at angles above the horizontal plane as certified by a photometric test report.

LUMINAIRE: Means the complete lighting system, including the lamp and the fixture.

LUMEN: The unit used to measure the actual amount of light, which is produced by a lamp. Examples of lamp types of 4050 lumens and below are (the acceptability of a particular light is decided by its lumen output, not wattage; check manufacturer's specifications):

- 200 Watt Standard Incandescent;
- 150 Watt Tungsten-Halogen (quartz);
- 50 Watt High Pressure Sodium;
- 50 Watt Cool White Fluorescent; and
- 30 Watt Low Pressure Sodium.

WATT: The unit used to measure the electrical power consumption of a lamp.

FOOT-CANDLE: A unit of luminance amounting to one lumen per square foot. "Lux (lx) ".The SI unit of luminance. One lux is one lumen per square meter.

SKY GLOW: Is when light emitting from a luminaire shining into the sky and reflected by humidity and dust.

GLARE: Is caused by a harsh uncomfortably bright light emitting from a luminaire shining into the cone of vision causing reduced vision or momentary blindness when shining into one's cone of vision.

LIGHT TRESPASS: The shining of light, produced by a luminaire, not exceeding 0.5 foot-candle 1 meter beyond the property line on which it is located.

DIRECT LIGHT: Light emitted directly from the lamp, off the reflector or reflector diffuser, or through the refractor or diffuser lens, of a luminaire.

UP-LIGHT: Any light form a luminaire that shines above the horizontal at angles above the horizontal plane, causing illumination of the sky.

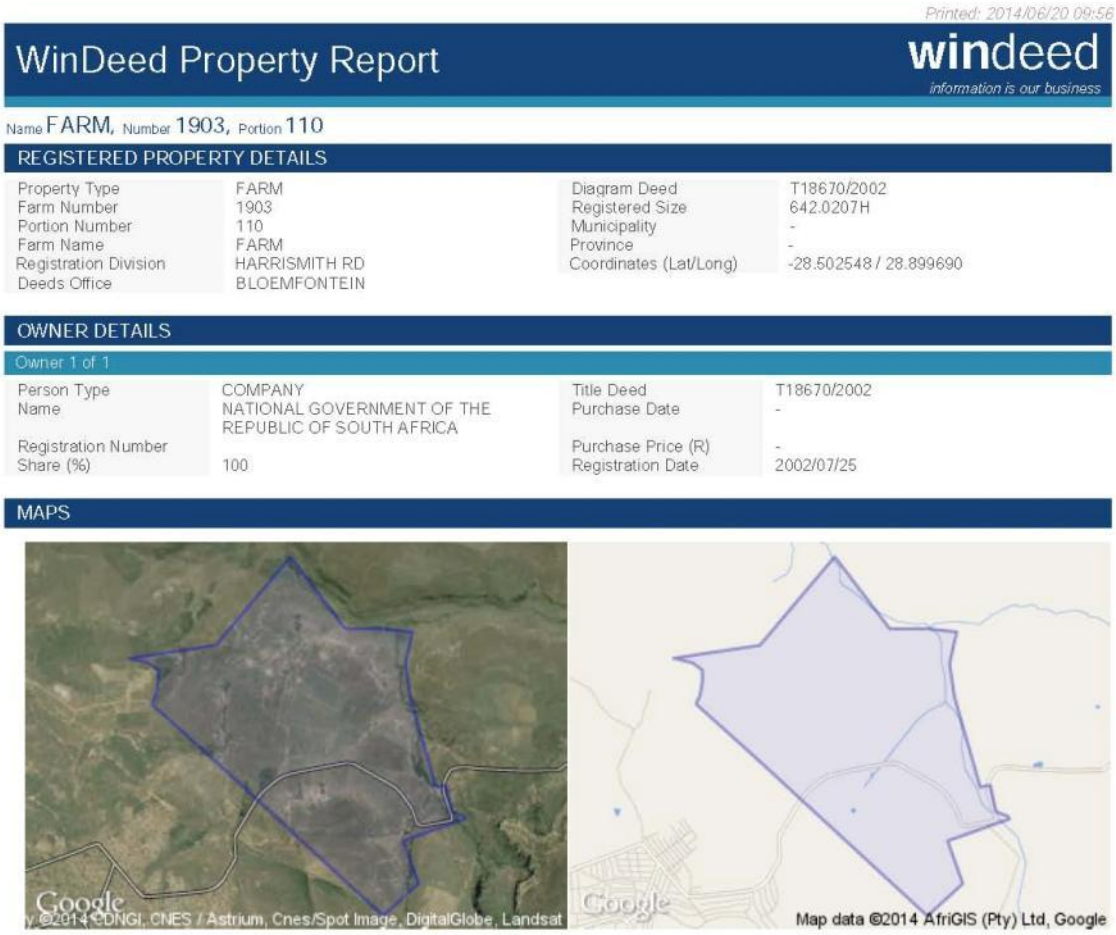
1. INTRODUCTION & BACKGROUND

Pregio Investment was appointed by Tholoana Consulting (TC), to undertake a Visual Impact Assessment (VIA) with regard to the construction of the Maluti-a-Phofung – Landfill Site, located in QwaQwa. Maluti-a-Phufong Local Municipality is an administrative area in the Thabo Mofutsanyane District of the Free State in South Africa.

Pregio Investment (PI) was appointed by Tholoana Consulting as a sub-consultant to complete a Visual Impact Assessment. This Visual Impact Assessment (VIA) is a specialist study that forms part of the Environmental Impact Assessment (EIA) to addresses the visual affects of the proposed Landfill Site under investigation.

The proposed development area sits on the following farm portion, Farm number 1903, portion 110 and the registered size is 642.0207 hectares.

Figure 1: WinDeed Property Information



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WinDeed Property Report — windeed — information is our business

Name FARM, Number 1903, Portion 110

REGISTERED PROPERTY DETAILS

Property Type	FARM	Diagram Deed	T18670/2002
Farm Number	1903	Registered Size	642.0207H
Portion Number	110	Municipality	-
Farm Name	FARM	Province	-
Registration Division	HARRISMITH RD	Coordinates (Lat/Long)	-28.502548 / 28.899690
Deeds Office	BLOEMFONTEIN		

OWNER DETAILS

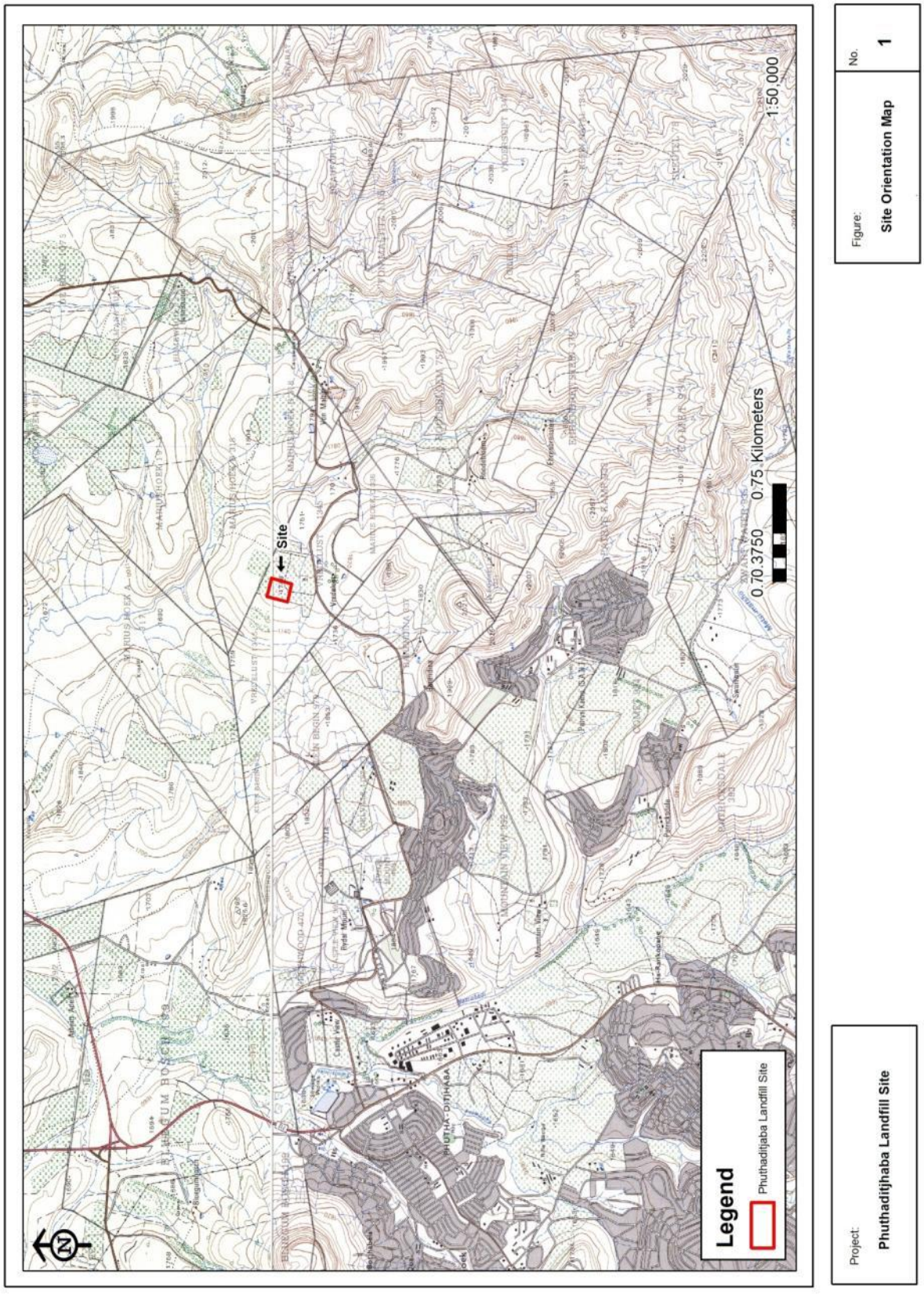
Owner 1 of 1

Person Type	COMPANY	Title Deed	T18670/2002
Name	NATIONAL GOVERNMENT OF THE REPUBLIC OF SOUTH AFRICA	Purchase Date	-
Registration Number		Purchase Price (R)	-
Share (%)	100	Registration Date	2002/07/25

MAPS

Figure 2: Context Locality Plan

Figure 3: Locality Plan



2. TRIGGERS AND KEY ISSUES

2.1. Project Category

Table 1: Categories of Development (DEA & DP)

CATEGORY	DEVELOPMENT TYPE
CATEGORY 1	Development: e.g. nature reserves, nature-related recreation, camping, picnicking, trails and minimal visitor facilities.
CATEGORY 2	Development: e.g. low-key recreation / resort / residential type development, small-scale agriculture / nurseries, narrow roads and small-scale infrastructure.
CATEGORY 3	Development: E.g., low-density resort / residential type development, golf or polo estates, low to medium-scale infrastructure.
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.
CATEGORY 5	Development: e.g. high density township / residential development, retail and office complexes, industrial facilities, refineries, treatment plants, Landfill Sites, wind energy farms, power lines, **dumping sites**, 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.

2.2. Environmental Category

Table 2: Categorisation of project and environment (DEA & DP)

Type Of Environment	TYPE OF DEVELOPMENT - LOW TO HIGH INTENSITY				
	CATEGORY 1 DEVELOPMENT	CATEGORY 2 DEVELOPMENT	CATEGORY 3 DEVELOPMENT	CATEGORY 4 DEVELOPMENT	CATEGORY 5 DEVELOPMENT
(A) 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
(B) 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
(C) 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
(D) 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
(E) 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**

Table 3: Categorization of approaches used for visual assessment (DEA & DP)

APPROACH	TYPE OF ISSUE				
	Little or no visual impact expected	**Minimal visual impact expected**	**Moderate visual impact expected**	**High visual impact expected**	**Very high visual impact expected**
Level of visual input recommended	**Level 1** visual input	**Level 2** visual input	**Level 3** visual assessment	**Level 4** visual assessment	

2.3. Public Participation Input

- General concern regarding unpaved nature of the roads to the dump site was raised;
    - During construction and operation dust can be raised from passing construction/ dumping trucks affecting neighbouring residential development of Gabisi and others in within (0-1km radius)
- Potential issues based on projects of a similar nature;
    - The general aesthetics of receptors' views will be negatively impacted by the construction and operational phases of the landfill site;
    - Light impacts associated with obtrusive night time lighting of the Landfill Site and associated infrastructure;
    - Visual impacts associated with the rubbish dumps;
    - The limited ability of the flat landscape to visually mitigate the proposed Landfill Sites and associated components;
    - The introduction of unsightly views to sensitive receptors within (0 -1km radius), in particular from the existing residential Gabisi residential properties;

2.4. Drafter Level of Confidence

The level of confidence assigned to the findings of this assessment is based on:

- The level of information available and/or understanding of the study area (rated 3a); and
- The information available and/or knowledge and experience of the project type (rated 2b).
- The findings in this VIA are rated with a confidence level of 6.

This rating indicates that the author's confidence in the accuracy of the findings is high (Table 4 below).

Table 4: Confidence level chart and description

CONFIDENCE LEVEL CHART				
	Information, knowledge and experience of the project			
Information, and knowledge of the study area		3b	**2b**	1b
	3a	9	**6**	3
	2a	6	4	2
	1a	3	2	1

3a – A high level of information is available of the study area in the form of recent aerial photographs, GIS data, documented background information and a thorough knowledge base could be established during site visits, surveys etc. The study area was readily accessible.

2a – A moderate level of information is available of the study area in the form of aerial photographs GIS data and documented background information and a moderate knowledge base could be established during site visits, surveys etc. Accessibility to the study area was acceptable for the level of assessment.

1a – Limited information is available of the study area and a poor knowledge base could be established during site visits and/or surveys, or no site visit and/or surveys were carried out.

3b – A high level of information and knowledge is available of the project in the form of up-to-date and detailed engineering/architectural drawings, site layout plans etc. and the visual impact assessor is well experienced in this type of project and level of assessment.

2b – A moderate level of information and knowledge is available of the project in the form of conceptual engineering/architectural drawings, site layout plans etc. and/or the visual impact assessor is moderately experienced in this type of project and level of assessment.

1b – Limited information and knowledge is available of the project in the form of conceptual engineering/architectural drawings, site layout plans etc. and/or the visual impact assessor has a low experience level in this type of project and level of assessment. (Adapted from Oberholzer B, 2005)

2.5. Methodology

Specialists are required to provide the reports in a specific layout and structure, so that a uniform specialist report volume can be produced. To ensure a direct comparison between various specialist studies, standard rating scales have been defined for assessing and quantifying the identified impacts. This is necessary since impacts have a number of parameters that need to be assessed.

Five factors need to be considered when assessing the significance of impacts, namely:

- **Relationship of the impact to temporal scales** - the temporal scale defines the significance of the impact at various time scales, as an indication of the duration of the impact.
- **Relationship of the impact to spatial scales** - the spatial scale defines the physical extent of the impact.
- **The severity of the impact** - the severity/beneficial scale is used in order to scientifically evaluate how severe negative impacts would be, or how beneficial positive impacts would be on a particular affected system (for ecological impacts) or a particular affected party.
- **With and without mitigation** - The severity of impacts can be evaluated with and without mitigation in order to demonstrate how serious the impact is when nothing is done about it. The word 'mitigation' means not just 'compensation', but also the ideas of containment and remedy. For beneficial impacts, optimization means anything that can enhance the benefits. However, mitigation or optimization must be practical, technically feasible and economically viable.

- **The likelihood of the impact occurring** - the likelihood of impacts taking place as a result of project actions differs between potential impacts. There is no doubt that some impacts would occur (e.g. loss of vegetation), but other impacts are not as likely to occur (e.g. vehicle accident), and may or may not result from the proposed development. Although some impacts may have a severe effect, the likelihood of them occurring may affect their overall significance.

Each criterion is ranked with scores assigned as presented in Table 5 to determine the overall significance of an activity. The criterion is then considered in two categories, viz. effect of the activity and the likelihood of the impact. The total scores recorded for the effect and likelihood are then read off the matrix presented in Table 5.1.a, to determine the overall significance of the impact. The overall significance is either negative or positive.

2.6. Assumptions and Limitations

This assessment was undertaken during the conceptual stage of the project and is based on information available at the time. The following assumptions and limitations are stated below:

- Only one site was identified for the proposed new landfill site, therefore there is no alternative site assessment;
- 5 meter contour intervals were used to generate the Digital Terrain Model (DTM);
- For visibility assessment map generation only the terrain is considered excluding vegetative for a worst case scenario;
- The following heights were considered for the visibility map;
    - Entrance Gate & Gate House 3m ;
    - Site Office -3 high ;
    - Ablution facilities 3m - ;
    - Weighbridge Hut 3m ;
    - Maintenance Shed & Storeroom -3m ; and
    - Sorting facility -3m.
    - Dump site cells – 5m

Table 5: Ranking Criteria

EFFECT	**Temporal scale**			**Score**
	Short term	Less than 5 years		**1**
	Medium term	Between 5 and 20 years		**2**
	Long term	Between 20 and 40 years (a generation) and from a human perspective almost permanent.		**3**
	Permanent	Over 40 years and resulting in a permanent and lasting change that will always be there		**4**
	Spatial Scale			
	Localised	At localised scale and a few hectares in extent		**1**
	Study area	The proposed site and its immediate environs		**2**
	Regional	District and Provincial level		**3**
	National	Country		**3**
	International	Internationally		**4**
	*	**Severity**	**Benefit**	
	Slight / Slight Beneficial	Slight impacts on the affected system(s) or party(ies).	Slightly beneficial to the affected system(s) or party(ies).	**1**
	Moderate / Moderate Beneficial	Moderate impacts on the affected system(s) or party (ies).	An impact of real benefit to the affected system(s) or party(ies).	**2**
	High / Beneficial	High impacts on the affected system(s) or party(ies).	A substantial benefit to the affected system(s) or party(ies).	**4**
	Very High / Very Beneficial	Very High change to the affected system(s) or party (ies).	A very substantial benefit to the affected system(s) or party(ies).	**8**
LIKELIHOOD	**Likelihood**			
	Unlikely	The likelihood of these impacts occurring is slight		**1**
	May Occur	The likelihood of these impacts occurring is possible		**2**
	Probable	The likelihood of these impacts occurring is probable		**3**
	Definite	The likelihood is that this impact will definitely occur		**4**

* In certain cases it may not be possible to determine the severity of an impact thus it may be determined: Don't know/can't know

Table 5-1a: Matrix used to determine the overall significance of the impact based on the likelihood and effect of the impact.

Likelihood		Effect													
		3	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
	1	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	2	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	3	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	4	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Table 5-1b: Description of Environmental Significance Ratings and associated range of scores

Significance Rate	Description	Score
Low	An acceptable impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in either positive or negative medium to short term effects on the social and/or natural environment.	4-7
Moderate	An important impact, which requires mitigation. The impact is insufficient by itself to prevent the implementation of the project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in either a positive or negative medium to long-term effect on the social and/or natural environment.	8-11
High	A serious impact, if not mitigated, may prevent the implementation of the project (if it is a negative impact). These impacts would be considered by society as constituting a major and usually a long-term change to the (natural &/or social) environment and result in severe effects or beneficial effects.	12-15
Very High	A very serious impact, which, if negative, may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are un-mitigable and usually result in very severe effects, or very beneficial effects.	16-20

The **environmental significance** scale is an attempt to evaluate the importance of a particular impact. This evaluation needs to be undertaken in the relevant context, as an impact can either be ecological or social, or both. The evaluation of the significance of an impact relies heavily on the values of the person making the judgment. For this reason, impacts of especially a social nature need to reflect the values of the affected society.

Cumulative Impacts

Cumulative Impacts affect the significance ranking of an impact because it considers the impact in terms of both on-site and off-site sources. For example, the noise generated by an activity (on-site) may result in a value, which is within the World Bank Noise Standards for residential areas. Activities in the surrounding area may also create noise, resulting in levels also within the World Bank Standards. If both on-site and off-site activities take place simultaneously, the total noise level at the specified receptor may exceed the World Bank Standards. For this reason it is important to consider impacts in terms of their cumulative nature.

Seasonality

Although seasonality is not considered in the ranking of the significance, if may influence the evaluation during various times of year. As seasonality will only influence certain impacts, it will only be considered for these, with management measures being imposed accordingly (i.e. dust suppression measures being implemented during the dry season).

Prioritising

The evaluation of the impacts, as described above is used to prioritise which impacts require mitigation measures.

Negative impacts that are ranked as being of "**VERY HIGH**" and "**HIGH**" significance will be investigated further to determine how the impact can be minimised or what alternative activities or mitigation measures can be implemented. These impacts may also assist decision makers i.e. lots of **HIGH** negative impacts may bring about a negative decision.

For impacts identified as having a negative impact of "**MODERATE**" significance, it is standard practice to investigate alternate activities and/or mitigation measures. The most effective and practical mitigations measures will then be proposed.

For impacts ranked as "**LOW**" significance, no investigations or alternatives will be considered. Possible management measures will be investigated to ensure that the impacts remain of low significance.

Adopted from - Coastal & Environment Services (Nov 2007)

3. PROJECT DESCRIPTION

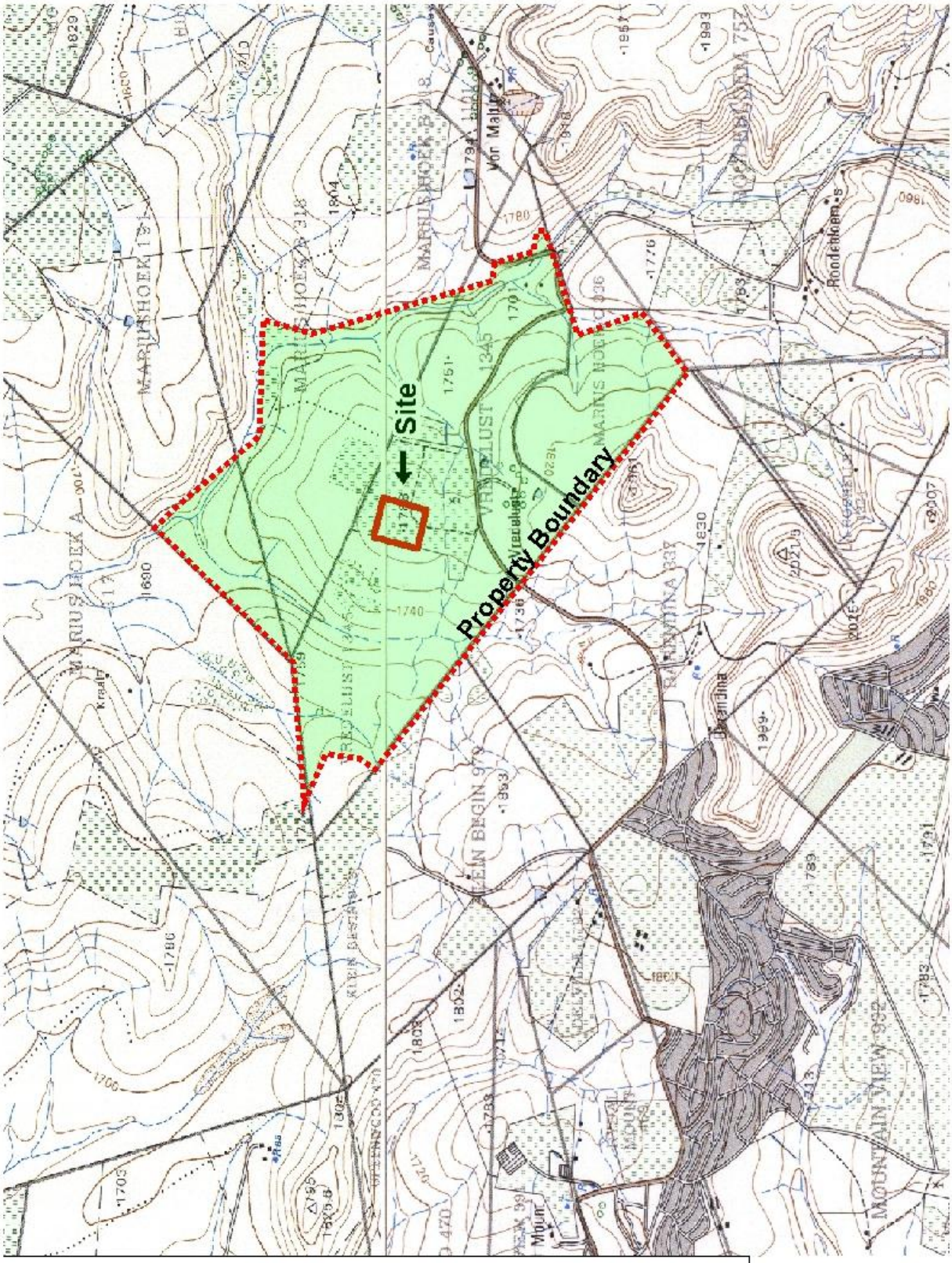
3.1. Overview of the Project

The proposed development involves the establishment of a landfill site at which will be located on Portion 110 of the Farm Witsieshoek, 1903 at Phuthadithjaba (QwaQwa), of which it is anticipated that the Landfill Site will be servicing the following three areas, Harrismith, Kestel and Phuthaditjhaba.

The proposed landfill site includes the following associated infrastructure and facilities;

- Perimeter fencing;
- General Lighting;
- Remote gate;
- Security guard house, and Administration block with Ablution facilities, Computers, and workshop
- Platform station;
- Recycling facilities & sorting facilities;
- Constructions of landfill cells and leachate management and
- Un-surfaced access road, ring road and storm-water drainage management system.

Figure 4: Erf boundary and Site Location



PROPERTY BOUNDARY LAYOUT

3.2. Project Components and Activities

The listed project components will have an effect on the visual and landscape character through the life of the project.

3.2.1. Construction Phase

During the construction of the project it is anticipated that there will be a construction camp. The following components of the construction camp will be discussed;

- Construction camp;

This phase deals with the provision of the infrastructure required for the main contractors to begin work; Land needs to be levelled, water and electrical services provided, roads constructed and construction offices established; and The terrain needs to be fenced off and security control and first aid facilities put in place.

- Materials storage yards;

Contractor's storage yard and office means a facility or area for the storage of materials, equipment, and commercial vehicles utilized by building and construction contractors, craftsmen and tradesmen, and may include accessory offices related to such activities.

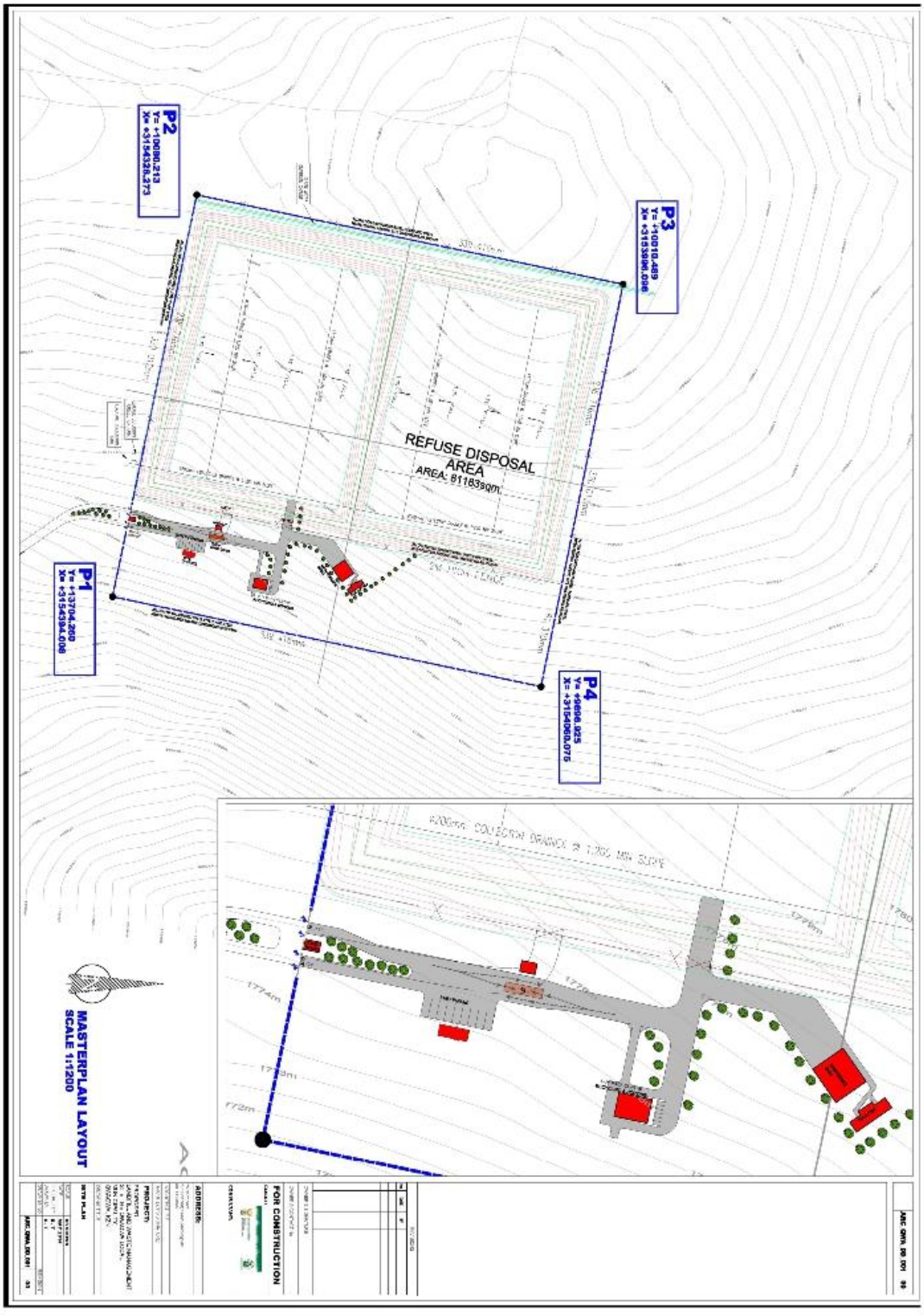
3.2.2. Operational Phase

It is proposed that the new Landfill site will have the following components once completed and these will be discussed:

- Recycling facility (thus a buy-back centre);
- Compost facility: and
- And an area allocated for inert waste disposal.

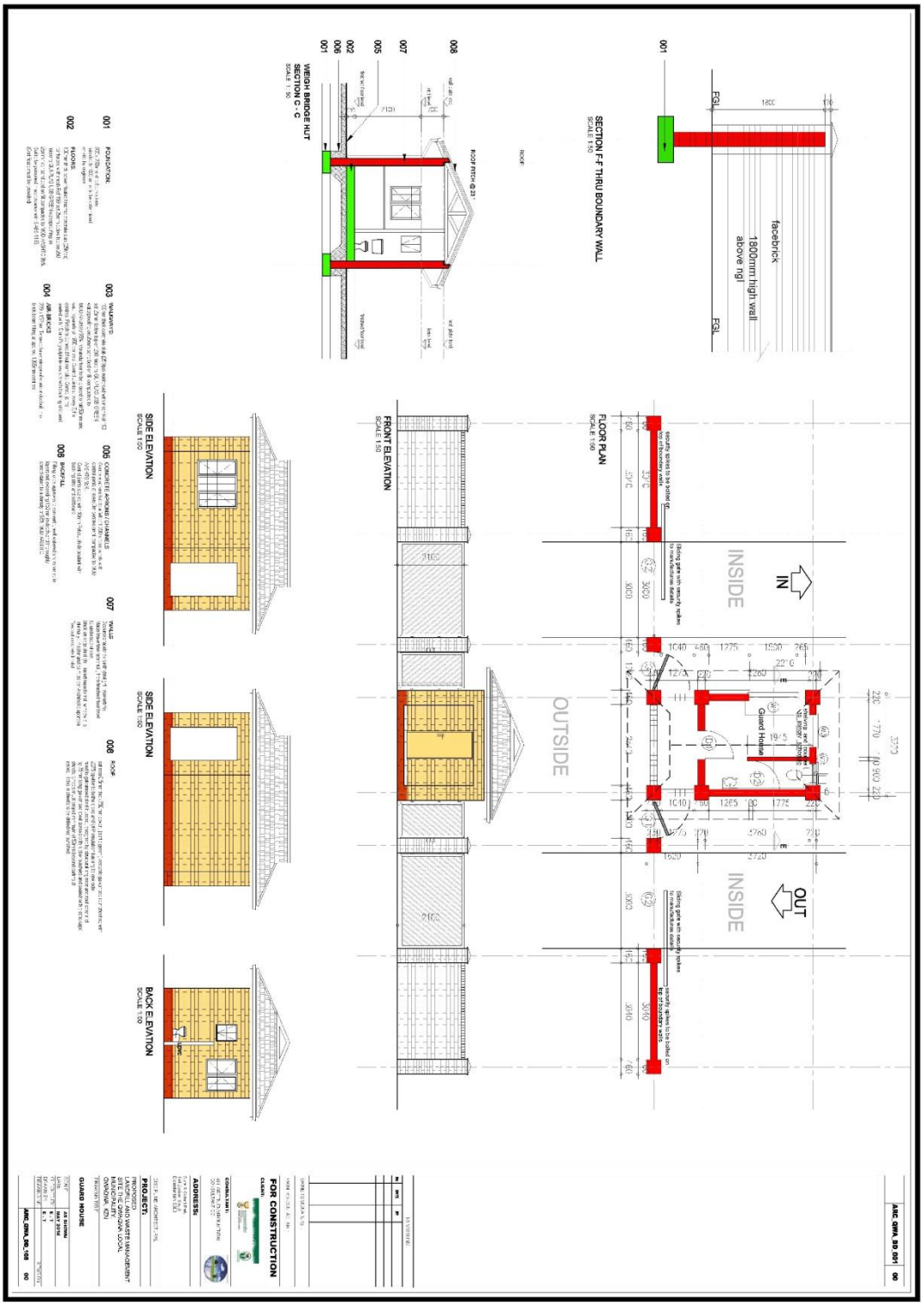
The footprint of the proposed Landfill site is approximately 20 hectares. The calculation of the expected tonnages with a life expectancy of 20 years for the proposed landfill site was done with an estimation of 550 tons of waste to be disposed per day.

Figure 5: Proposed Landfill Layout



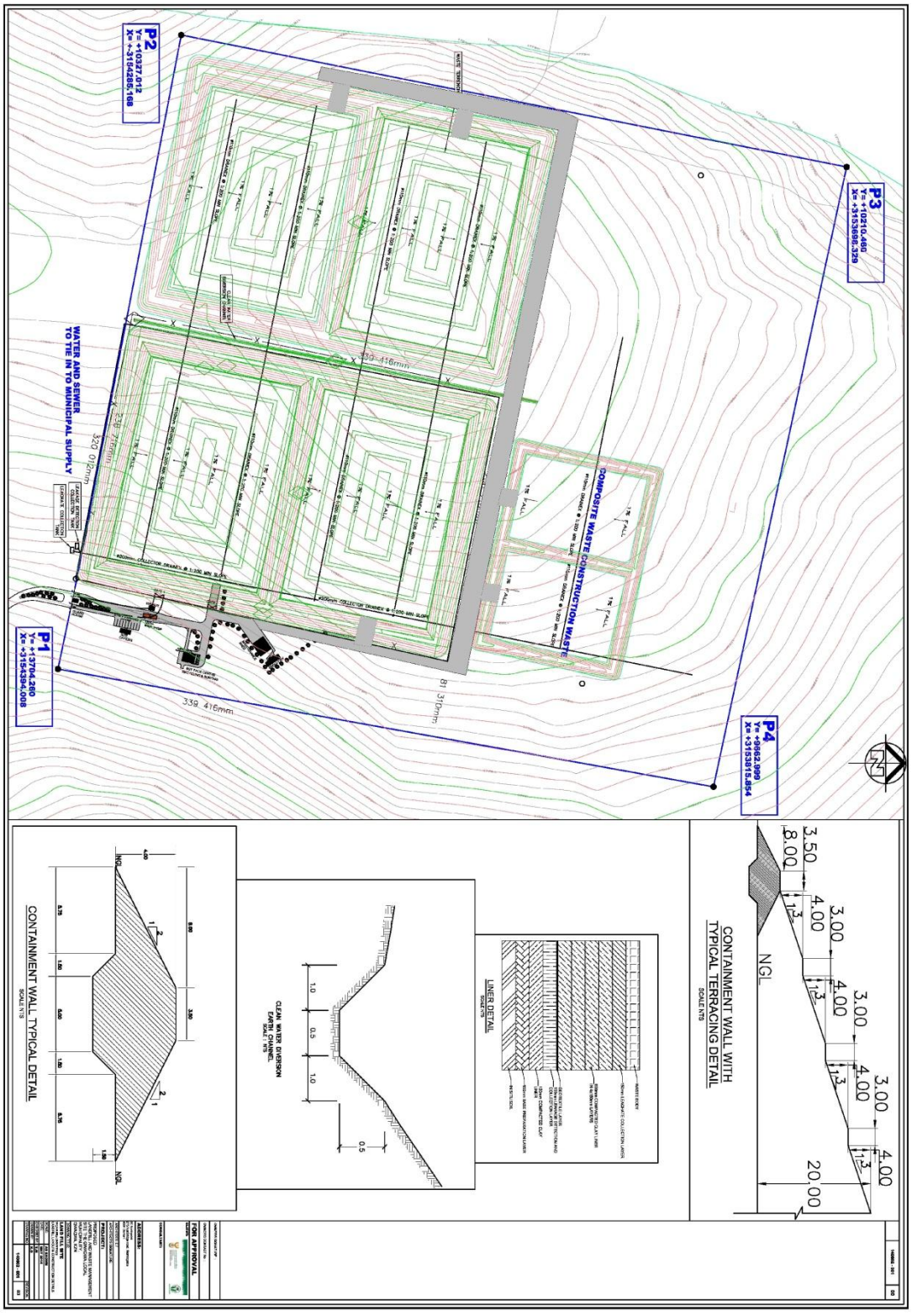
PROPOSED PROJECT LAYOUT

Figure 6: Proposed Architectural Style



PROPOSED PROJECT ARCHITECTURAL STYLE

Figure 7: Proposed – Landfill Dump Layout



PROPOSED PROJECT ARCHITECTURAL STYLE

4. DESCRIPTION OF THE ENVIRONMENT

Landscape and visual impacts may result from changes to the landscape. A distinction should be made between impacts on the visual resource and on the viewers (visual receptors). The former are impacts on the physical landscape that may result in changes to the landscape character while the latter are impacts on the viewers themselves and the views they experience.

4.1. Landscape Character

Landscape Character Assessment (LCA) is concerned primarily with the observable elements, components or features within a landscape that individually and collectively define the landscape characteristics through topography, vegetative cover and land use.

Landscape Character types are distinct types of landscape units that are relatively homogeneous in character. They usually have the following in common; geology, topography, drainage patterns, vegetation and historical land use (Swanwick, C. 2002).

4.2. Topography/ drainage patterns

The site is located on the crest of a hill that is bordered by streams along its western, northern and eastern sides. Typical to the area, the streams have formed eroded dongas over time which has been vegetated in some areas. Landscape features in the area include sandstone cliffs and low mountainous areas at the foothills.

4.3. Vegetative Cover

The site is underlain by sandstone and siltstone that consist mainly of silty sands and clayey silts on which the vegetation cover is a short grassy species, generally *Stoebe vulgaris,* now also known as *Seriphium plumosum* is a short grass which provides limited cover.

4.4. Land Use

The site used for grazing domestic animals and agricultural purposes in the past with evidence of ploughing still visible. The proposed site area has been cultivated previously with prominent contours constructed along the slopes of the ridge. There is also an old sand quarry on the northern edge of the site.

Figure 8: Landscape Character 1

LANDSCAPE CHARACTER

Figure 9: Landscape Character – 2

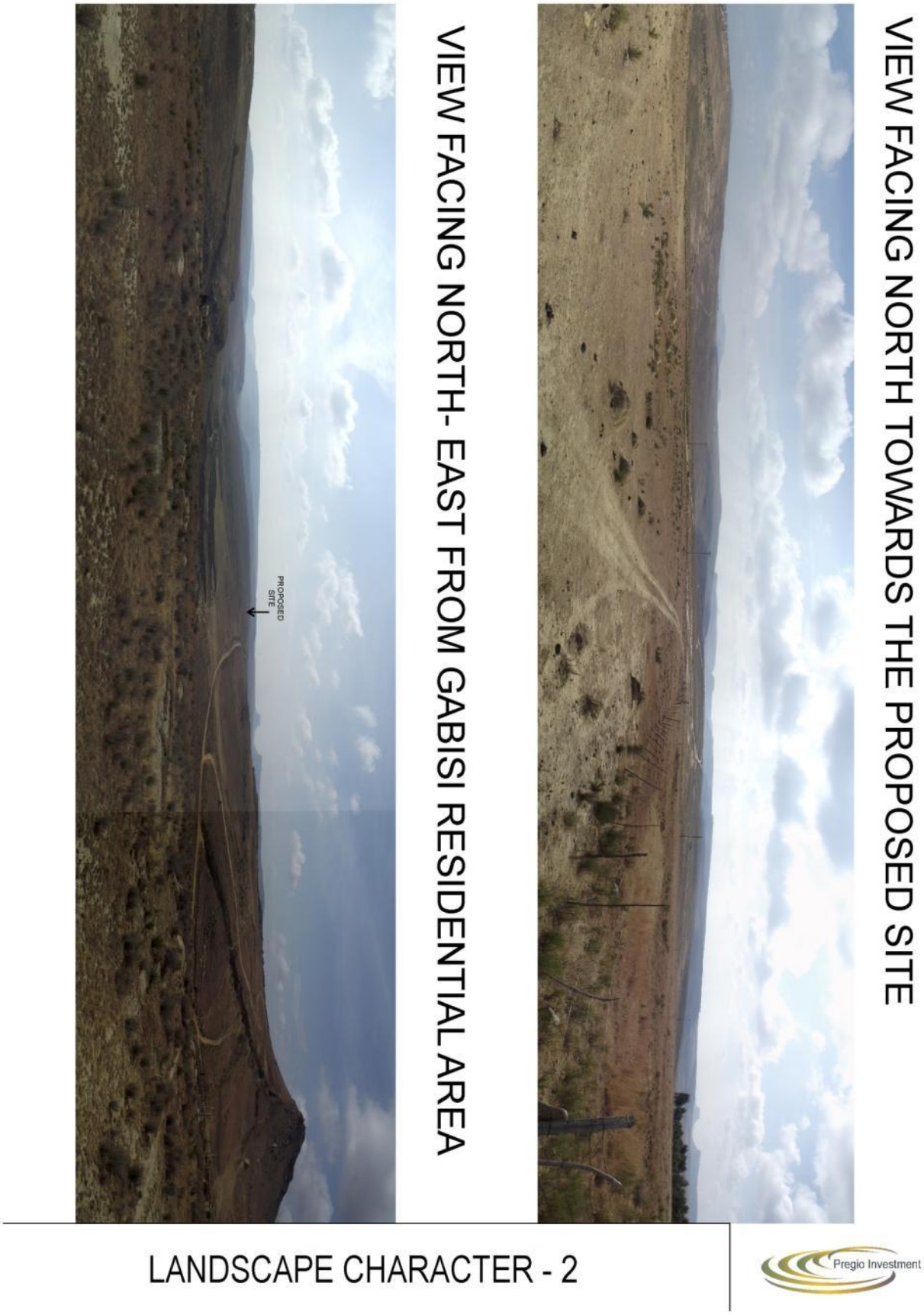


Figure 10: Landscape Character – 3

Figure 11: Landscape Character – 4

Figure 12: Land Use map

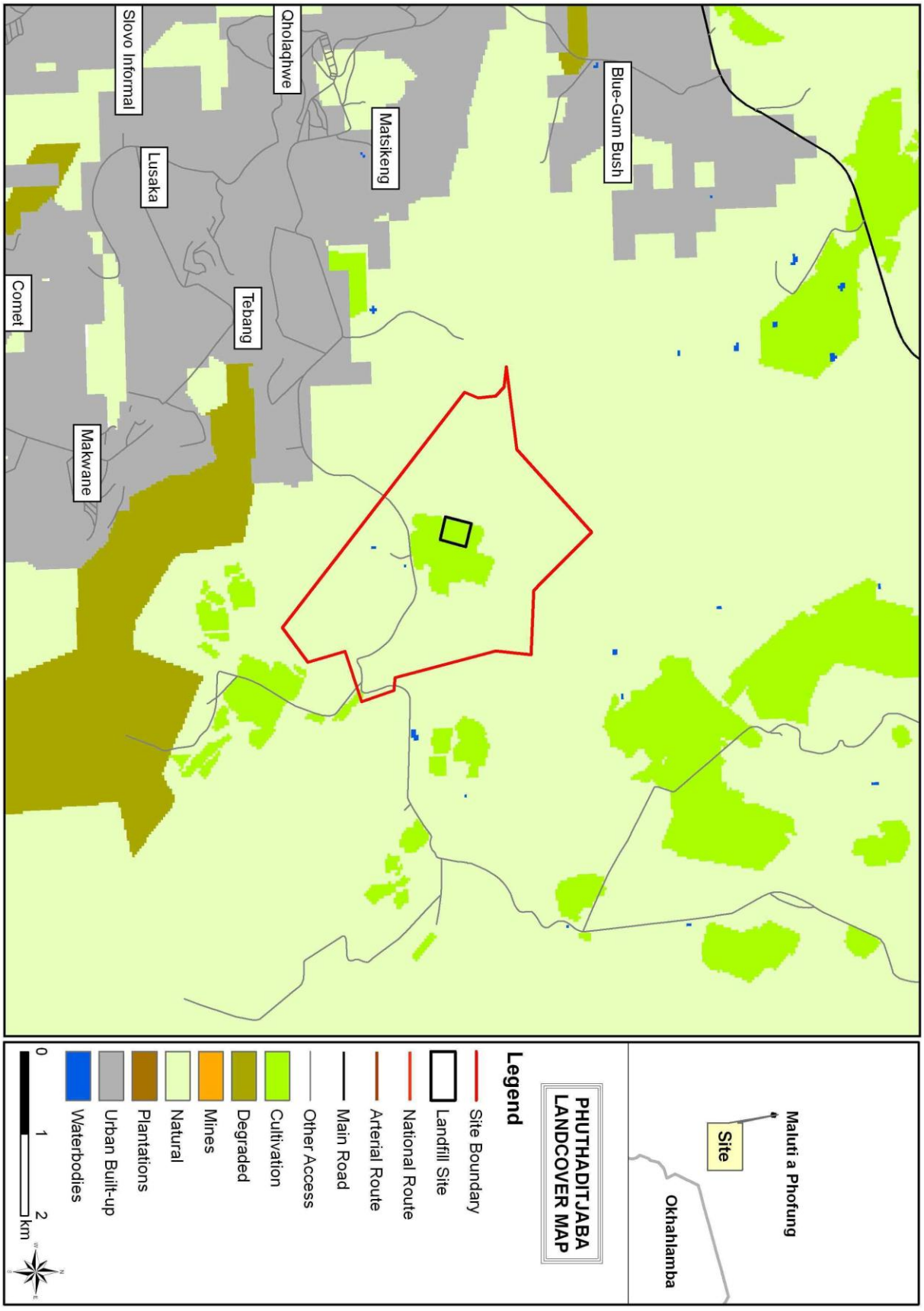
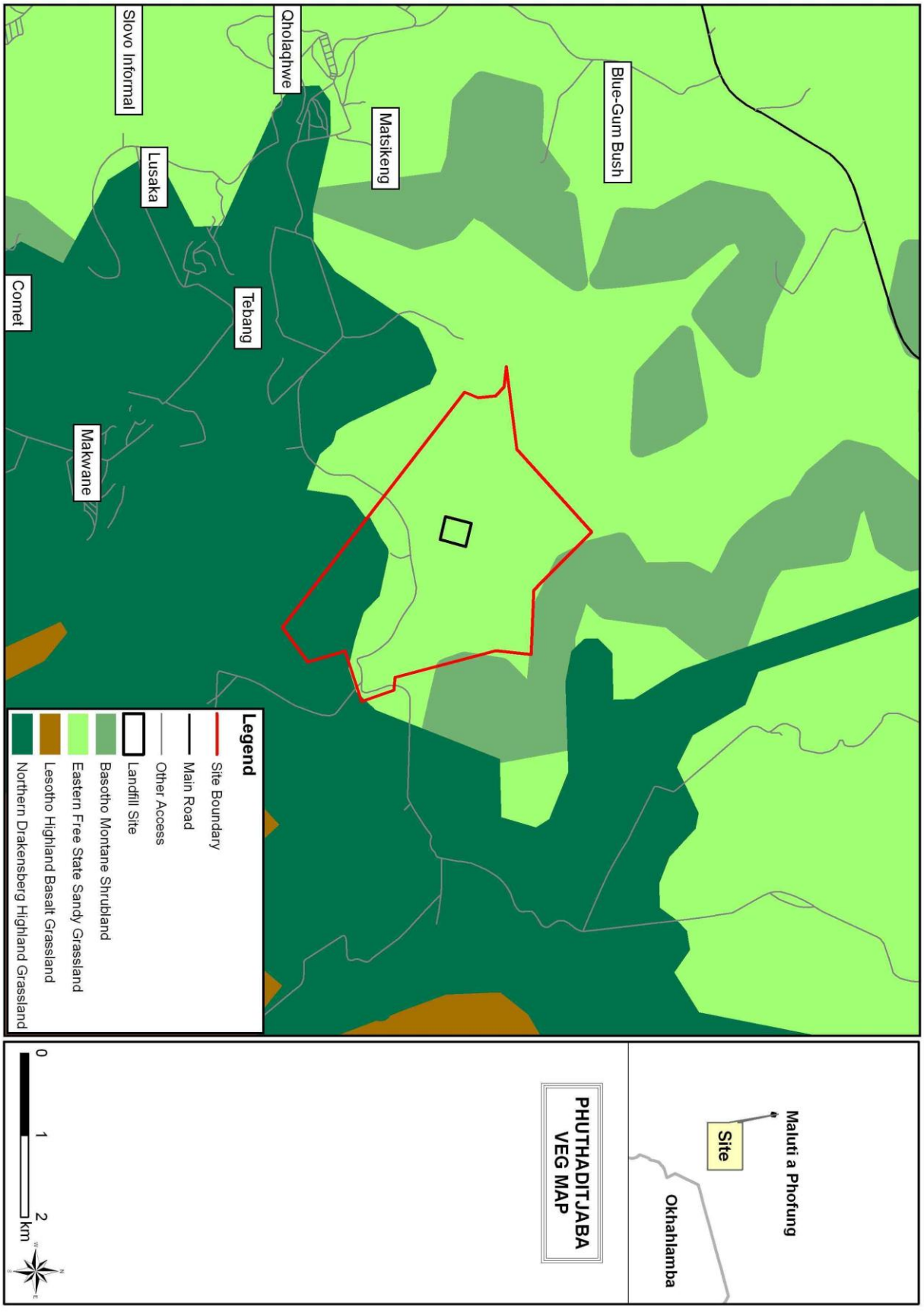


Figure 13: Vegetation map



5. VISUAL CHARACTER

Visual character is based on human perception and the observer's response to the relationships between and composition of the landscape, the land uses and identifiable elements in the landscape. The description of the visual character includes an assessment of the scenic attractiveness regarding those landscape attributes that have aesthetic value and contribute significantly to the visual quality of the views, vistas and/or viewpoints of the study area.

5.1. Assessment Tool

The following tools are used to assess the impacts of the proposed project on the study area's landscape character and visual receptors:

- Visual Quality;
- Landscape Character Sensitivity;
- Landscape Condition;
- Visual Absorption Capacity (VAC);

5.2. Visual Quality

Visual quality is a qualitative evaluation of the composition of landscape components and their influence on scenic attractiveness. Many factors contribute to the visual quality of the landscape and these are grouped under the following three main categories in Table 6 that are internationally accepted indicators of visual quality (FHWA, 1981).

Table 6: Criteria of Visual Quality (FHWA, 1981)

INDICATOR	CRITERIA
VIVIDNESS	The memorability of the visual impression received from contrasting landscape elements as they combine to form a striking and distinctive visual pattern.
INTACTNESS	The integrity of visual order in the natural and man-built landscape, and the extent to which the landscape is free from visual encroachment.
UNITY	The degree to which the visual resources of the landscape join to form a coherent, harmonious visual pattern. Unity refers to the compositional harmony of inter-compatibility between landscape elements.

The landscape is allocated a rating from an evaluation scale of 1 to 7 and divided by 3 to get an average.

The evaluation scale is as follows:
Very Low =1;
Low =2;
Moderately Low =3;
Moderate =4;
Moderately High =5;
High =6;
Very High =7.
The regional landscape visual quality is assessed against each indicator separately. All three indicators should be high to indicate high visual quality.

A higher visual quality can be attributed to areas with less human intervention and with significant natural features. In this case, the vegetation, pans and natural drainage lines qualify as high quality features, which contribute to both ecological importance and visual interest in the landscape. The introduction of dump site in the region together with the establishment of additional development to the area will reduce visual quality, to a moderate level. The evaluation is summarised in

Table **7**.

Table 7: Visual Quality of the Regional Landscape

VEGETATION TYPE	VIVIDNESS	INTACTNESS	UNITY	VISUAL QUALITY
Northern Drakensberg Highland Grassland	3	3	3	Moderately Low
Eastern Free state Sandy Grassland	3	3	3	Moderately Low

5.3. Landscape Character Sensitivity

The sensitivity of the landscape character is an indication of "…the degree to which a particular landscape can accommodate change from a particular development, without detrimental effects on its character" (GLVIA, 2002). A landscape with a high sensitivity would be one that is valued for its aesthetic attractiveness and/or has ecological, cultural or social importance through which it contributes to the inherent character of the visual resource.

Table 8: Criteria of Landscape Character (Swanwick C, 2002).

INDICATOR	CRITERIA
AESTHETICS	This includes the following aspects: ▪ Memories; Associations; Preferences; Sight; and Touch and feel.
NATURAL/ ECOLOGICAL	This includes the following aspects: ▪ Geology; Landform; Air, Soils; and Flora and Fauna.
CULTURAL/ SOCIAL	This includes the following aspects: ▪ Land use; Settlement; and Enclosure.

The landscape is allocated a rating from an evaluation scale of 1 to 7 and divided by 3 to get an average.

The evaluation scale is as follows:
Very Low =1;
Low =2;
Moderately Low =3;
Moderate =4;
Moderately High =5;

The regional landscape character is assessed against each indicator separately. All three indicators should be high to indicate high landscape character. The evaluation is summarised in Table 9 below.

Table 9: Summary - Landscape Character Sensitivity

ASPECT	Northern Drakensberg Highland Grassland	Eastern Free state Sandy Grassland
AESTHETICS	2 – No known scenic areas within 5km radius	2– No known scenic areas within 5km radius
NATURAL/ECOLOGICAL	2 – vegetation type associated with overgrazing	2 - vegetation type associated with overgrazing
CULTURAL/ SOCIAL	2 - vegetation type associated with overgrazing	2 - vegetation type associated with overgrazing
LANDSCAPE CHARACTER	Low	Low

5.4. Landscape Condition

Factors affecting the condition of the landscape can include the level of maintenance and management of individual landscape elements such as abandoned buildings and the degree of disturbance of natural landscape features by unfamiliar elements in a natural landscape such as road construction or borrow pits.

Table 10: Landscape Condition

VEGETATION TYPE	CONDITION
Northern Drakensberg Highland Grassland	Low
Eastern Free state Sandy Grassland	Low

5.5. Visual Absorption Capacity

Visual Absorption Capacity (VAC) signifies the ability of the landscape to accept additional human intervention without serious loss of character and visual quality or value. VAC is founded on the characteristics of the physical environment such as:

- **Degree of visual screening:** A degree of visual screening is provided by landforms, vegetation cover and/or structures such as buildings. For example, a high degree of visual screening is present in an area that is mountainous and is covered with a forest compared to limited screening in an undulating and homogenous grass cover,
- **Terrain variability:** Terrain variability reflects the magnitude of topographic elevation and diversity in slope variation. A highly variable terrain has great elevation differences and a diversity of slope variation creating talus slopes, cliffs and valleys. An undulating landscape with a gentle slope and repetitive landform will be an example of low terrain variability.
- **Land cover:** Land cover refers to the perceivable surface of the landscape and the diversity of patterns, colours and textures that are presented by the particular land cover (i.e. urbanised, cultivated, forested, etc.)

  A rating system is used to evaluate each landscape character type against the three VAC parameters. The values are relative and relate to the type of project that is proposed and how it may be absorbed in the landscape.

  A three-value range is used, three (3) being the highest potential to absorb an element in the landscape and one (1) being the lowest potential. The values are summed and categorised in a high, moderate or low VAC rating.

Table 11: Visual Absorption Capacity evaluation

VEGETATION TYPE	VISUAL SCREENING	TERRAIN VARIABILITY	LAND COVER	VAC - CAPACITY
Northern Drakensberg Highland Grassland	1	2	1	Very Low
Eastern Free state Sandy Grassland	1	2	1	Very Low

Table 12: Overall Visual Profile (Swanwick, 2002)

VEGETATION TYPE	VISUAL QUALITY SENSITIVITY	LCA SENSITIVITY	CONDITION SENSITIVITY	VAC - CAPACITY	OVERALL VISUAL SENSITIVITY
Northern Drakensberg Highland Grassland	Moderately Low (3)	Low (2)	Low (2)	Very Low (1)	**Low (2)**
Eastern Free state Sandy Grassland	Moderately Low (3)	Low (2)	Low (2)	Very Low (1)	**Low (2)**

6. SIGNIFICANCE OF POTENTIAL IMPACTS

The **significance of impacts** is a comparative function relating to the severity of the identified impacts on the respective receptors. The significance of an impact is considered high should a highly **sensitive receptor** be exposed to a highly **severe impact**

Table 13: Impact significance table

RECEPTOR SENSITIVITY	IMPACT SEVERITY		
	LOW	**MEDIUM**	**HIGH**
LOW	No significance	Low	Low
MEDIUM	Low	Medium	Medium
HIGH	Low	Medium	High

6.1. Severity of Potential Landscape Impacts

The severity of the landscape impact refers to the magnitude of change in the landscape character resulting from the proposed project on the receiving environment. The severity of the landscape impacts is based on the density, extent and scale of the proposed Landfill Site. Refer to the table above.

6.2. Impact Profile

This section is an important stage in the impact assessment process as it enables the estimation and identification of the probable nature of visual and landscape impacts on the receiving environment.

The severity of the impacts is compared to the sensitivity of receptors affected by the project to assess their significance.

This section is not meant to pre-empt the actual impact assessment but to identify the main issues or impacts associated with the project.

The severity of the landscape and visual impacts is examined by discussing the following factors:

- Degree of Change (Visual impact);
- Compatibility (Visual impact);
- Scale / Extent of Impacts (Visual & Landscape impact); and
- Cumulative impacts.

Table 14: Project Aspect & Impact profile

ASPECT	IMPACT SEVERITY		
DEGREE OF CHANGE (Visual Impact)	Will the project result in a noticeable change in the physical characteristics of the existing environment? (Consider all project components and construction impacts - both permanent and temporary, including landform changes, structures, noise barriers, vegetation removal, fencing, signage, and contractor activities).		
Construction Phase	High level of change (3)	**Moderate level of change (2)**	Low level of change (1)
Operational Phase	High level of change (3)	Moderate level of change (2)	**Low level of change (1)**
COMPATIBILITY (Visual Impact)	Will the project complement or contrast with the visual character desired by the community? (Evaluate the scale and extent of the project features compared to the surrounding scale of the community. Is the project likely to give an urban appearance to an existing rural or suburban community? Is the change viewed as positive or negative? Research planning documents, or talk with local planners and community representatives to get an idea of what type of visual environment local residents envision for their community).		
Construction Phase	**Highly incompatible (3)**	Somewhat incompatible (2)	Somewhat compatible (1)
Operational Phase	Highly incompatible (3)	**Somewhat incompatible (2)**	Somewhat compatible (1)
SCALE / EXTENT OF IMPACTS (Visual & Landscape Impact)	What types of project features and construction impacts are proposed? Are bridge structures, large excavations, sound barriers, or median planting removal proposed? (Certain project improvements can be of special local interest, causing a heightened level of public concern, and requiring a more focused visual analysis).		
Construction Phase	**High impact (3)**	Moderate concern (2)	Low concern (1)
Operational Phase	High concern (3)	**Moderate concern (2)**	Low concern (1)
CUMULATIVE IMPACTS (Additive & Synergistic)	Will this project, when seen collectively with other projects, result in an aggregate adverse change in overall visual quality or character? **Additive:** the simple sum of all the effects, (e.g. sprawl effect of houses along a scenic route); **Synergistic**: effects interact to produce a total effect greater than the sum of individual effects, (e.g. incremental urban development eventually results in total loss of rural or wilderness character of an area); *Source: Adapted from Cooper, 2004.*		
Construction Phase	Highly likely (3)	**Moderately likely (2)**	Unlikely (1)
Operational Phase	Highly likely (3)	**Moderately likely (2)**	Unlikely (1)

(Adopted from Standard Environmental Reference (SER) 2009) The findings are indicated by a shaded text box and bold text in the table above.

6.3. Severity of Potential Landscape Impacts

This approach builds an overview of the landscape impact across the site. Landscape impacts are predicted primarily on the basis of the order of change to baseline conditions prevalent at the time of assessment. Landscape impacts are assessed at three levels in terms of;

- the impact upon individual landscape features;
- the aggregate impact upon discrete areas of the site (Landscape Character Areas, LCAs); and'
- the overall impact of proposed dump sits on the study area.

6.3.1. Building and other built structures

Entrance Gate & Gate House;

- Site Office;
- Ablution facilities;
- Weighbridge Hut;
- Maintenance Shed & Storeroom; and
- Sorting facility.

Construction of structures will have a negative visual impact to the visual receptors within the study area as they observe construction activities from a distance, construction is anticipated to last for less than 5 years which is categorised as (short term), the impact's likelihood of happening is probable

The dumping site construction will cause permanent change to the landscape through the removal of vegetation and alteration of existing land use, which in turn will alter the existing landscape character.

In the operational phase, landscape impacts may occur for either maintenance or when additional infrastructure may be constructed, of which the probability of that occurring is lower than in the construction phase.

6.3.2. Earthworks/ Landfill Disposal Areas

- Containment areas
- Embankment walls
- Basin

High visual severity of construction with regards to earthmoving will be expected as clearing, construction of the containment embankments, importing of earth to create the dump site base, dust generated from construction vehicles, this is expected to last during the construction phase.

Large quantities of earthworks will be shifted and imported which will bring great change to the current landscape character

In the operational phase, the dump site is expected to become more visible in time as the dumping continues over the life of the dump site.

6.3.3. Linear construction items

- Access roads and internal road network
- Fencing/ boundary wall
- Water reticulation
- Bulk water services
- Drainage channels

The construction of these facilities will require major earthworks to excavate the linear trenches.

In the operational phase, the trenches and disturbed landscape will be rehabilitated. This phase will be characterised by a reduced disturbed footprint and the landscape impact is therefore reduced.

Bulk services including sewer and electricity will traverse over and above the proposed site, road upgrades will take longer than 5 years to upgrade, which will definitely affect sensitive viewers during this period

Table 15: Landscape impacts

Project components	Nature of Impact	Extent of Impact	Duration of Impact	Severity of Impact	Probability of Impact	Significance	
						WOM	WM
CONSTRUCTION PHASE							
Construction of Building and other built structures	**Negative** – Causing surface disturbance, removing elements common to the study area and replacing it with elements contrasting with the landscape character	Study Area (2)	Short term (1)	Moderate (2)	Probable (3)	Low (7)	Low (6)
		Localised (1)	Short term (1)	Moderate (2)	May occur (2)		
Construction of Earthworks/ Landfill Disposal Areas		Study Area (2)	Short term (1)	Severe (4)	Probable (3)	Moderate (10)	Low (6)
		Localised (1)	Short term (1)	Moderate (2)	May occur (2)		
Linear construction items	**Negative** – Causing a linear surface disturbance and introducing a foreign linear element in the landscape.	Study Area (2)	Medium term (2)	Moderate (2)	Definite (4)	Moderate (10)	Moderate (8)
		Study Area (2)	Medium term (2)	Low (1)	Probable (3)		
OPERATIONAL PHASE							
Operational of Building and other built structures	**Negative** - Altering the prevailing landscape character	Localised (1)	Permanent (4)	Low (1)	May occur (2)	Moderate (8)	Low (7)
		Localised (1)	Permanent (4)	Low (1)	May occur (2)		
Operational of Earthworks/ Landfill Disposal Areas	**Negative** – Encroachment from the growing dump site on the existing landscape character	Study Area (2)	Permanent (4)	Moderate (2)	Probable (3)	Moderate (10)	Moderate (8)
		Study Area (2)	Permanent (4)	Moderate (2)	May occur (2)		
Operation of the linear elements	**Negative** – Altering the prevailing landscape character by introduction of a linear object	Localised (1)	Permanent (4)	Low (1)	May occur (2)	Moderate (10)	Low (7)
		Localised (1)	Permanent (4)	Low (1)	Unlikely (1)		

Refer to **Error! Reference source not found.** (Impact Assessment Methodology)

6.3.4. Landscape Impact Assessment Overview

A relatively large footprint will be modified during the construction of the dump site precinct and its ancillary components. This will cause a localised change in land use, which is considered incompatible with the prevailing rural and stock grazing use of the study area.

Higher levels of impacts are anticipated in the construction phase as compared to the operational phase due to the increased footprint or extent of disturbance from the construction camps, access roads, stockyards, and construction traffic on site during the construction phase.

The severity of impact during the construction phase of the Landfill Site will be high, because of the scale and extent of the proposed project. The intensity of change over a relatively large area and the permanent nature of the project are responsible for a moderate to low impact on the landscape character.

In the operational phase, the landscape impacts will be reduced to only permanent structures built in the construction phase.

6.4. Severity of Potential Visual Impacts

The severity of visual impact refers to the magnitude of change to specific visual receptor's views. Severity of visual impact is influenced by the following factors:

The **viewer's exposure** to the project

- Distance of observers from the proposed project;
- The visibility of the proposed project;
- Number of affected viewers; and
- Duration of views to the proposed project.

Degree of **visual intrusion** created by the project.

6.4.1. Viewer Sensitivity

Viewers (visual receptors) within the study area visually experience the proposed sites in different ways. They will be affected because of alteration to their views and are therefore identified as part of the receiving and affected environment. The viewers are grouped according to their similarities in views and activity. The viewer groups included in this study are:

- Residents;
- Recreational users; and
- Motorists.

To determine viewer sensitivity a commonly used rating system, was utilised. This is a generic classification of viewers and enables the visual impact specialist to establish a logical and consistent viewer sensitivity rating for visual receptors who are involved in different activities without engaging in extensive public surveys.

Table 16: Visual receptor sensitivity

VISUAL RECEPTOR SENSITIVITY	DEFINITION (BASED ON THE GLVIA 2ND ED PP90-91)
EXCEPTIONAL	- Views from major tourist or recreational attractions or viewpoints promoted for or related to appreciation of the landscape, or from important landscape features.
HIGH	- Users of all outdoor recreational facilities including public and local roads or tourist routes whose attention or interest may be focussed on the landscape; - Communities where the development results in changes in the landscape setting or valued views enjoyed by the community; and - Residents with views affected by the development.
MODERATE	- People engaged in outdoor sport or recreation (other than appreciation of the landscape);
LOW	- People at their place of work or focussed on other work or activity; - Views from urbanised areas, commercial buildings or industrial zones; and - People travelling through or passing the affected landscape on transport routes.
NEGLIGIBLE (UNCOMMON)	- Views from heavily industrialised or blighted areas

Residents of the affected environment are classified as visual receptors of high sensitivity owing to their sustained visual exposure to the proposed landfill site as well as their attentive interest towards their living environment. It should be noted that only those residents located in the listed residential areas bellow will be considered as sensitive residents, this is based on the fact that all the residents' residing within a 5 kilometre radius of high visual exposure to the project components in the construction and operational phase.

The following visual receptors will experience a high degree of visual exposure; those residing within 5 km radius include the following settlements:

- Gabisi;
- Barendina;
- Delville;
- Matsikeng;
- Qholaqhwe;
- Slovo informal settlement;
- Lusaka;
- Portions of Blue-Gum Bush;
- Tebang; and
- Makwane.

Recreational users involved in outdoor recreational activities are classified as visual receptors of moderate sensitivity. They utilise the landscape for enjoyment purposes and are aware of the qualities of the landscape, which often include the visual quality that is associated with the landscape. These would

be located in the same locality with the local residents, because most residents in this area build chalets on their property.

Potential recreational viewers to the site would include:

- Sterkfontein Dam Nature Reserve, located about 7 kilometres away from the site;
- Golden Gate Highlands National Park, located approximately 12 kilometres; both accessible from the R 712; and
- Pocolan/ Robinson's Bush National Park.

Motorists are classified as visual receptors of low sensitivity due to their momentary view and experience of the proposed landfill site. As a road user's speed increases, the sharpness of lateral vision declines and the road user tends to focus on the line of travel (U.S.D.O.T, 1981). This adds weight to the assumption that under normal conditions motorist will show low levels of sensitivity as their attention is focused on the road.

- No significant road users driving along the S20 were identified as having visual exposure to the proposed project.

6.4.2. Visibility Maps

The GIS performs an analysis for a series of elevated observer points, which represents the height of the proposed structures in a Digital Elevation Model (DEM). This is reflected in a cumulative visibility map, with the degree of visibility illustrated through a range of colours.

The visibility map includes an area up to 5 km from the observer points. It considers the worst-case scenarios, using line-of-sight, based on topography alone. The screening capability of vegetation is not captured in the base model of the DEM and is therefore not considered in these results.

The shaded portions indicate the visual envelope of the landfill site; the colours of the view shade indicate areas of low to high visual exposure. The yellow portions indicate areas from which only the top sections of the landfill site will be visible whilst the deep red portions indicate areas where sections of the landfill site would be visible. Refer to the Visibility Maps bellow

Figure 14: GIS Visibility map

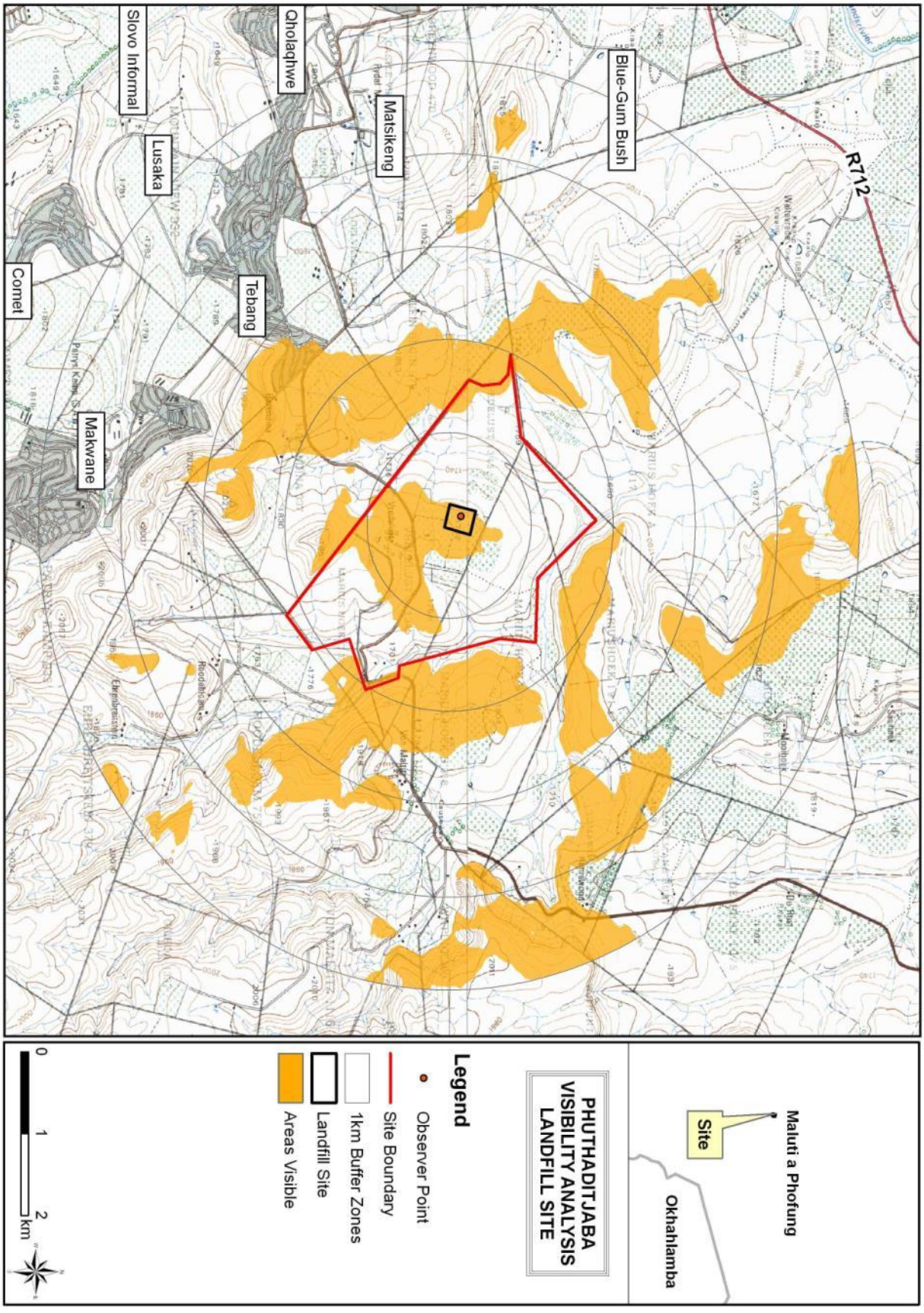


Figure 15: GIS Visibility map

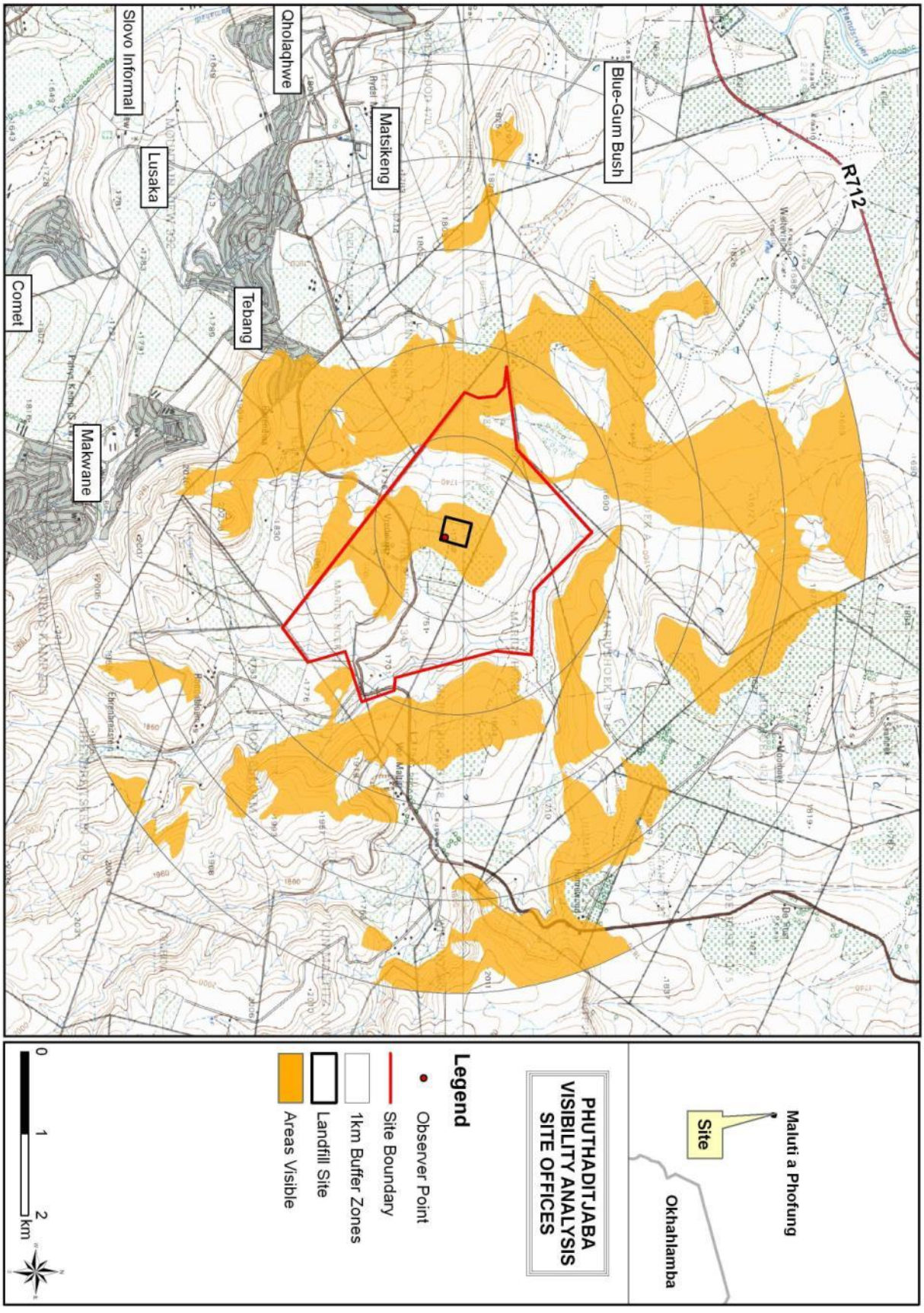
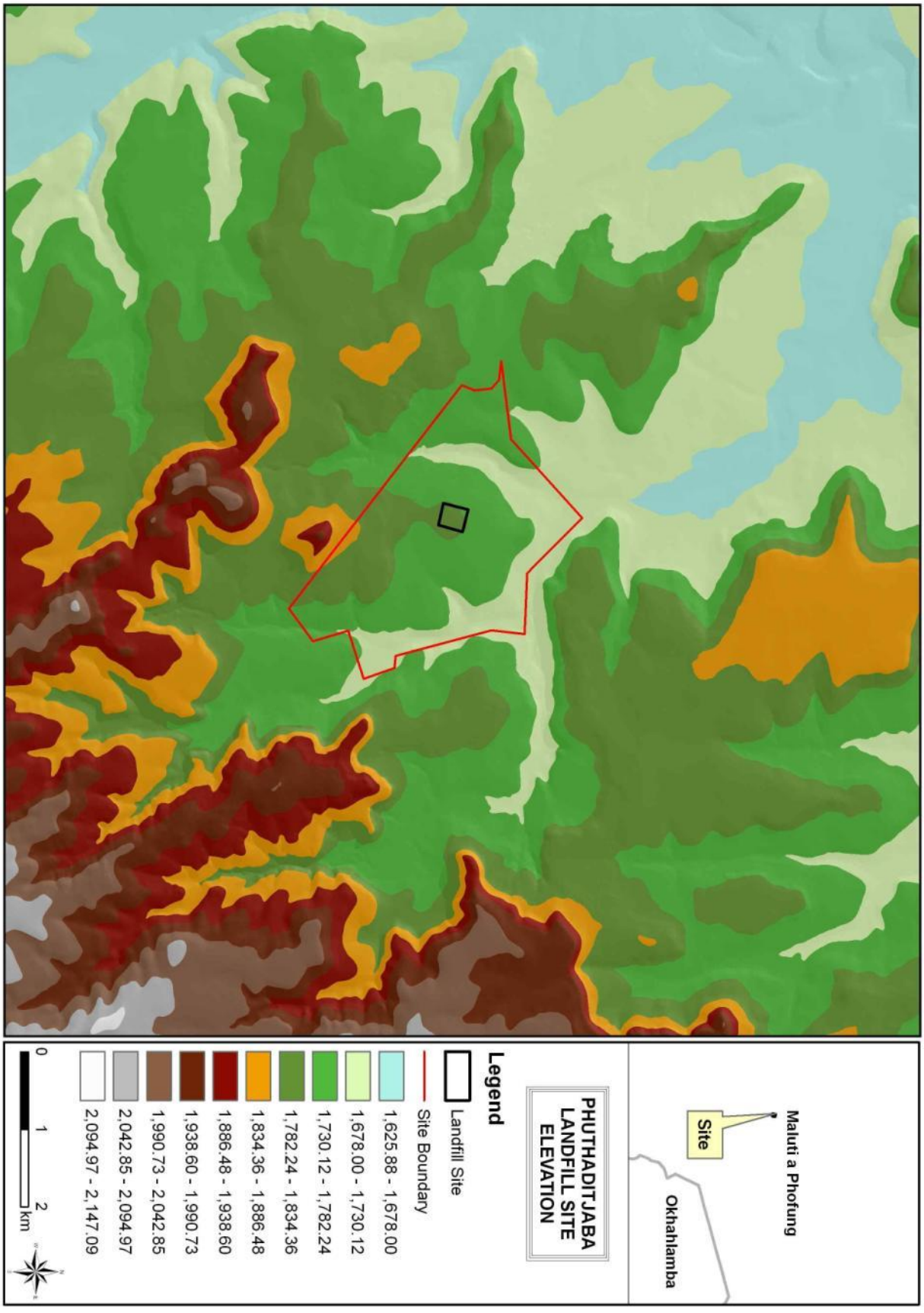


Figure 16: GIS Elevation map



6.5. Significance of Visual Impacts on Viewers

Table 17: Visual impact on residents and recreational users

Project components	Nature of Impact	Extent of Impact	Duration of Impact	Severity of Impact	Probability of Impact	Significance	
						WOM	WM
Construction phase							
Construction of Building and other built structures	**Negative** – Intruding on existing views of viewers	Regional (3)	Medium term (2)	High (4)	Definite (4)	High (13)	Moderate (9)
		Regional (3)	Medium term (2)	Moderate (2)	May occur (2)		
Construction of Earthworks/ Landfill Disposal Areas		Study Area (2)	Medium term (2)	Moderate (2)	Definite (4)	Moderate (10)	Low (7)
		Study Area (2)	Medium term (2)	Low (1)	May occur (2)		
Linear construction items		Study Area (2)	Medium term (2)	Moderate (2)	Definite (4)	Moderate (10)	Low (7)
		Study Area (2)	Medium term (2)	Low (1)	May occur (2)		
Operational phase							
Operation of the completed Building and other built structures	**Negative** – Causing major alterations or obstruction to existing views	Regional (3)	Permanent (4)	High (4)	Definite (4)	High (15)	High (12)
		Regional (3)	Permanent (4)	Moderate (2)	Probable (3)		
Operational of Earthworks/ Landfill Disposal Areas		Study Area (2)	Permanent (4)	High (4)	Definite (4)	High (14)	Moderate (10)
		Study Area (2)	Permanent (4)	Moderate (2)	May occur (2)		
Operation of the linear elements		Study Area (2)	Permanent (4)	Moderate (2)	Definite (4)	High (12)	Moderate (10)
		Study Area (2)	Permanent (4)	Moderate (2)	May occur (2)		

Refer to (Impact Assessment Methodology)

6.5.1. Building and other built structures

- Entrance Gate & Gate House;
- Site Office;
- Ablution facilities;
- Weighbridge Hut;
- Maintenance Shed & Storeroom; and
- Sorting facility.

Construction Phase

The completed structures of the dump site will create views that are not compatible with the inherent visual character of the area. The area is relatively undeveloped therefore the introduction of new building structures will have a permanent alteration to the rural like visual character. During the construction phase, visual exposure to the construction activity will initially be limited to local residents; they will experience views of the site preparation activities. As the structures increase in scale and height, the Zone of Visual Influence (ZVI) increases, resulting in a greater number of affected viewers and a subsequent increase in visual exposure.

The cleared site, construction camp and material storage yards will appear unsightly and out of character. Large-scale construction elements such as cranes will be highly visible and increase awareness of the construction activity over a considerable area. The visual intrusion caused during the construction phase will be high, although temporary in nature.

The top soil removed for the construction of the dump site components, this will grow progressively to a large heaps. This will cause unsightly views and dust to the surrounding areas through vehicles accessing the site via the dust road (S20).

Operational Phase

The completion of proposed dump site and associated infrastructure will be clearly visible to the adjacent residents of Gabisi, Tebang, Makwane, Matsikeng and smaller portions of Blue-Gum Bush, whom are situated within 4-5 kilometre radius. These residents are considered to be visual recipients with high sensitivity due to their proximity and permanency to the views from the completed dump site building structures. Although the landscape has limited vegetation, due to the elevated nature of the surrounding landscape, views of the proposed dump site will be limited to not more than a 5 kilometre radius.

6.5.2. Earthworks/ Landfill Disposal Areas

- Containment areas
- Embankment walls
- Basin

Construction phase

During the construction phase, visual exposure to the construction activity will initially be limited to local residents; they will experience views of the site preparation activities. As the dump site heap increase in scale and height, the ZVI increases, resulting in a greater number of affected viewers and a subsequent increase in visual exposure.

The top soil removed for the construction of the dump site containment cells will be used to create embankment walls that will help retain the ever growing dump heap. This will be characterised by earthmoving equipment that will place and compact the walls of rubbish dump.The growing dump heap may cause unsightly views of rubbish and potential dust to the surrounding areas.

Operational phase

The progressive growth of the dump site as it operates will further increase the visibility of the dump heap throughout the immediate areas.

Once the project is completed, it is considered as a permanent addition to the landscape as it is not anticipated to be decommissioned within the next 50 years. The duration of views experienced by the residents of the surrounding farming community is considered a permanent impact, which increases the severity of visual exposure.

In the event that the dumped rubbish is not well covered with soil the loose rubbish could be blown into the surrounding communities creating unsightly views. This scene can be characterised by the movement of dumping trucks over the growing dump heap as they spread out the rubbish over the heap in an effort to contain the potential dust and airborne loose rubbish. The additional presence of large machinery adds to the visual impact of the rubbish dumps due to their monumental structure.

6.5.3. Linear construction items

- Access roads and internal road network
- Fencing/ boundary wall
- Water reticulation
- Bulk water services
- Drainage channels

Construction phase

Due to the movement of material with construction vehicles to the site the construction phase will impact on the residents through generation of dust as they access the site to drop off construction material via the (S20) which currently not tar surfaced.

Additional but limited visual intrusion is anticipated from the trenching for bulk services to the site. The pipelines are expected to cause temporary visual impact during the construction phase when major earthworks are required to dig the trenches to house these services. The exposed soil from the trenches

will cause a significant colour contrast during the summer season when the prevailing colour is green. In dry seasons, there may be significant impact from dust.

The access roads and air strips will have a more localised impact than the dump sites. These elements are much smaller in vertical scale, but extend over a greater area.

Other potential visual receptors would be road users or recreational visitors to the surrounding Sterkfontein Dam Nature Reserve and Golden Gate Highlands National Park. This is less likely though as the two nature reserves are more accessible from the R712. Their visual exposure will be similar to the residents but their exposure will be temporary, therefore application of mitigation measures to the acceptable level to local residents will also apply to the recreational visitors.

Operational phase

The linear elements will have a more localised impact than the dump sites. These elements are much smaller in scale and elevation and are expected to present less visual intrusion.

Once the pipes have been installed, the visual impact will be significantly reduced through rehabilitation measures.

The visual impact is expected to be much less intrusive compared to the dump site precincts. The roads will have a low but permanent visual impact to the viewers.

The operational phase will potentially impact on users or recreational visitors to the surrounding Sterkfontein Dam Nature Reserve and Golden Gate Highlands National Park. This is less likely though as the two nature reserves are more accessible from the R712. Their visual exposure will be similar to the residents but their exposure will be temporary, therefore application of mitigation measures to the acceptable level to local residents will also apply to the recreational visitors.

7. CONCLUSION

It can be concluded that the severity of visual impact experienced by most residents from the immediate surroundings up to a 5-kilometre radius will be high, this includes:

- Gabisi;
- Barendina;
- Delville;
- Matsikeng;
- Qholaqhwe;
- Slovo informal settlement;
- Lusaka;
- Portions of Blue-Gum Bush;
- Tebang; and
- Makwane.

Only one site was assessed, no alternative sites were identified.

The landscape and visual impact will be permanent in nature resulting in a high impact to the above landscape and visual receptors.

The severity may diminish to a lesser degree when distance is considered, for those further than 5 kilometres. This is because of the reduction in visual severity over a 5 kilometre distance; therefore distant visual receptors will not be affected

8. RECOMMENDED MITIGATION MEASURES

8.1. Mitigation

The aim of mitigation is to reduce or alleviate the intrusive contrast between the proposed project components and activities, onto the receiving landscape to a point where it is acceptable to visual and landscape receptors. Mitigation should be implemented as an ongoing process, accompanying the design phase to mitigate predictable impacts before construction commences. This approach generates preventative measures that will influence design decisions instead of relying on cosmetic landscape remediation of a completed project.

8.1.1. Design Phase

- Treat building facades and roofs with a dull, non reflective paint that is similar to the prevailing colour of the landscape.
- Avoid the use of large facades of glass or shiny materials with a high reflectivity in the infrastructure to avoid glare and visual discomfort to nearby viewers. It is recommended that large roof overhangs should be used to minimise glare from windows in buildings. Dull finishes should be used on external facades to reduce reflection especially for the landfill site precinct elements;
- Fencing and water pipe trenching must follow existing linear elements were possible or lines in the study area such as roads and fence lines. Keep on the edge of the properties so as not to fragment large parcels of uniform land;
- As an additional mitigation measure the landfill can be recessed more to below ground level to screen it from sensitive visual receptors and to retain unobstructed views across the landscape;
- Spatially consolidate the associated structures as practically possible to reduce the visual and landscape footprint of the different project components. A grouped arrangement will result in a concentrated disturbance footprint and the potential exists for the individual elements to screen each other from sensitive viewpoints. The practicality of the re-arrangement would have to be determined and measured against other specialist inputs;
- Plan such that the project components are situated on lower laying areas of the site to reduce visibility f project components over large areas.
- Screen planting should be introduced along perimeter roads passing or adjacent the site, around dump site to screen views of the proposed project components. As a general good practice, screen planting should preferably be with indigenous trees. The use of exotic trees should however comply with the conditions in the Environmental Management Program (EMP);
- Strategically introduce screen planting around buildings and along the perimeter fence in order to reduce light trespass and glare on adjacent properties and motorists. Additionally, “full cut-off” luminaries should be installed to limit the amount of light trespass and spillage so as to control light output and restrict glare (Shaflik, 1997);
- To increase the effectiveness of screen planting, screening berms can be constructed and vegetated;
- When vertical structures or surfaces are lit such as building facades or signs, install a down light luminaire. If the only alternative is to up-light the element, the correct luminaire must be fitted to avoid light spillage; and

- Avoid over-illumination of outdoor spaces. Generally, low-pressure sodium lights are regarded as highly energy efficient and suitable for security lighting along the perimeter fence.

8.1.2. Construction Phase

- Locate construction camps and stockyards out of the visual field of highly sensitive visual receptors such as residents and farm communities. Choose sites that are close to existing clumps of trees. Utilise the existing screening capacity of the site and improve it by enclosing the construction site and stockyards with a dark green or khaki brown shade cloth as an additional screen;
- Retain the existing vegetation cover of the site through selective clearing. Where practical, protect existing vegetation clumps during the construction phase in order to facilitate screening during construction and operational phases;
- Keep the construction sites and camps neat, clean and organised in order to portray a general tidy appearance (Adhere to the minimum requirements of the Integrated Environmental Management Series – Environmental Best Practice Specifications: Construction);
- Remove rubble and other building litter off site as soon as possible or place it in a container in order to keep the construction site free from additional unsightly elements;
- If construction is necessary during night time, light sources should be directed away from residents and roads to prevent glare; and
- Pave roads where relatively high volumes of traffic are expected to minimise dust generation and potential unsightly discoloration of vegetation along roads. Alternatively, other dust suppression techniques should be implemented especially on windy days.

8.1.3. Operational Phase

- Refrain from permanently illuminating outdoor spaces where light is only required intermittently. Lighting can be switched on and off manually or through day and night switch, synchronised with the times light is required;
- Keep a small active face and progressively rehabilitate the dump site so as to avoid long periods of exposed refuse which creates unsightly views and dust;
- Manipulate the conventional dump site form and profile to resemble natural landform profiles in order to blend with the overall topographic setting. The interface between the dump site and the natural landscape is the connection point between two distinctly different slope angles and an abrupt, contrasting edge should be avoided. A natural S-shaped slope profile provides a sensitive solution. A convex curve from the crest converts to a concave curve that flattens out into the landscape. This gradual conversion between different slope angles reduces the conspicuous contrast in slope angles.
- The dump site's final slope configuration should avoid sharp angles and straight lines. The slope typically consists of benches and rises. The edges that will be created because of these changes in slope should be rounded to create an even light distribution over the edge and avoid distinct, straight shadow lines;

- Rehabilitation of the dump site should aim to establish a diverse and self-sustaining surface cover that is visually and ecologically representative of naturally occurring vegetation species. Visual synergy can be created by simulating vegetation patterns on the dump site that resemble vegetation patterns found on local occurring rocky outcrops or in drainage channels. This requires strategic groupings of associative locally occurring trees and shrubs on the side slopes that will create the perception of, for example a drainage line;
- Compile a plant palette consisting of a combination of indigenous vegetation species that occur locally. In order to establish a diverse range of species on the dump site the plant palette should include various grass, shrub and tree species;
- Access roads to the dumping site must be maintained to reduce dust especially in the light that no funds have been set aside to surface the road, watering trucks must be utilised to minimise dust regularly to reduce dust impacts to the nearby residents;
- To increase the life of the dump site the local Municipality must encourage the development of Buy Back Centres for recycling and sorting of waste before it gets to the dump site.
- Maintain a high level of landscaping around the landfill site so as to portray a neat appearance; and
- Maintenance of landfill site and associated infrastructure to avoid visual impact from degradation.

Figure 17: Proposed Dump Site Mitigation Measures (1)

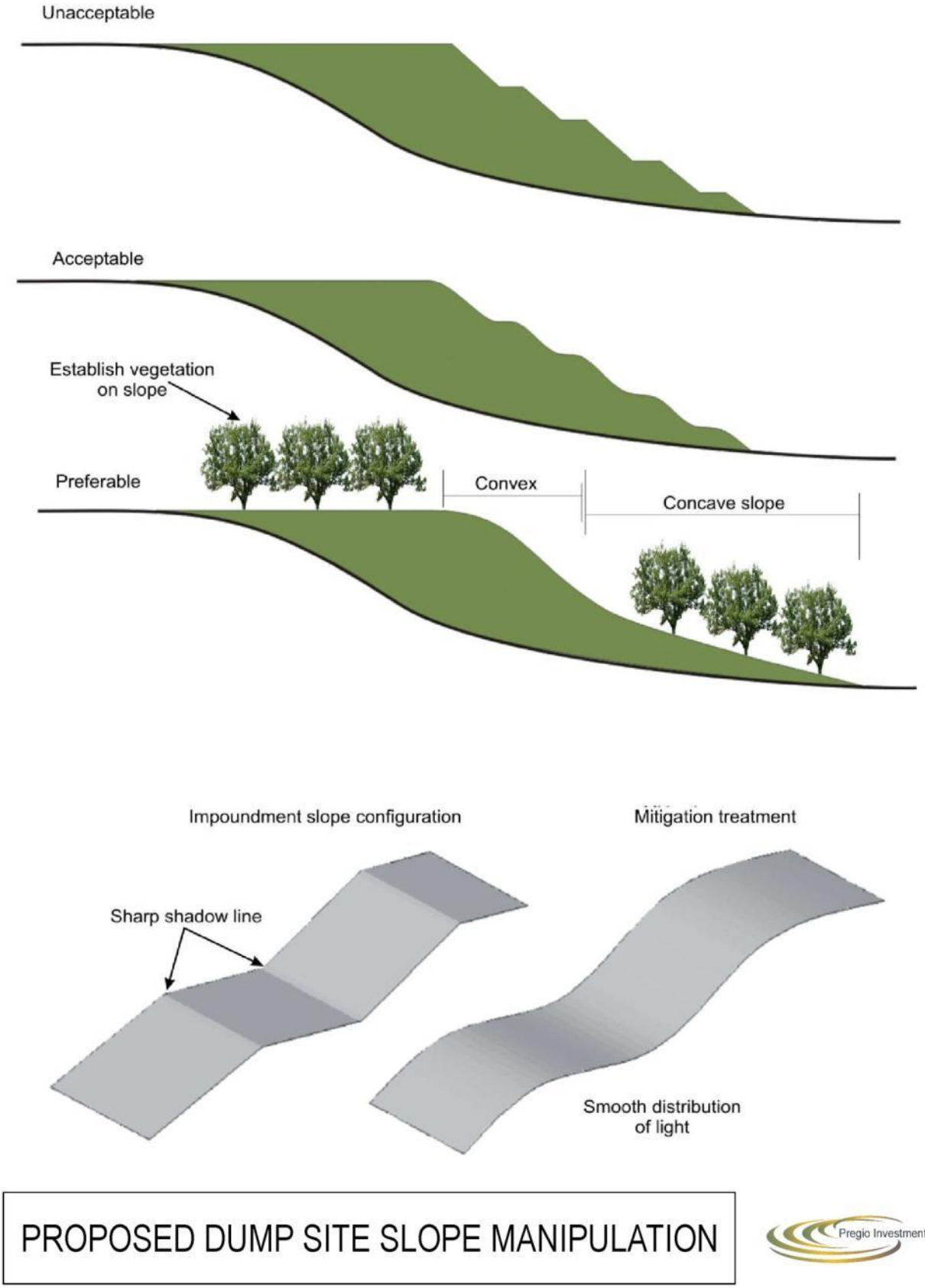
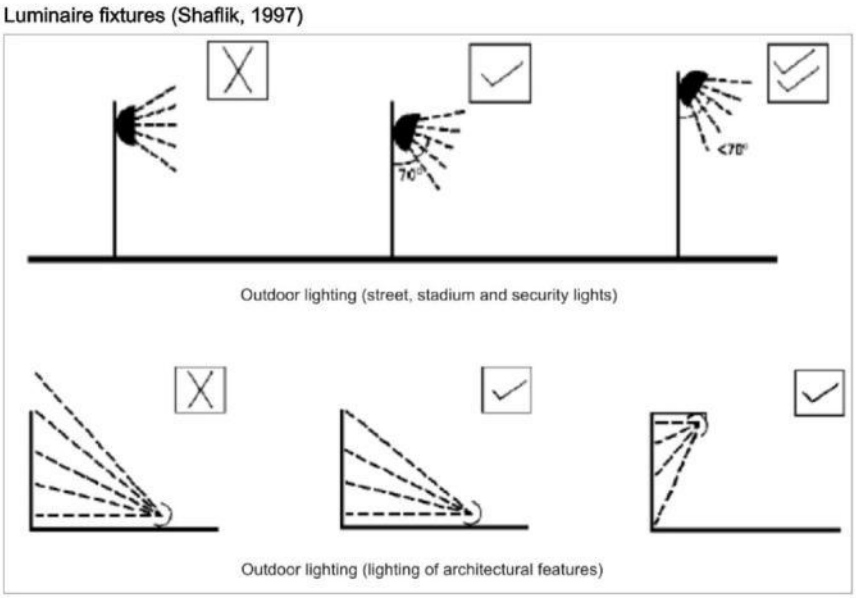
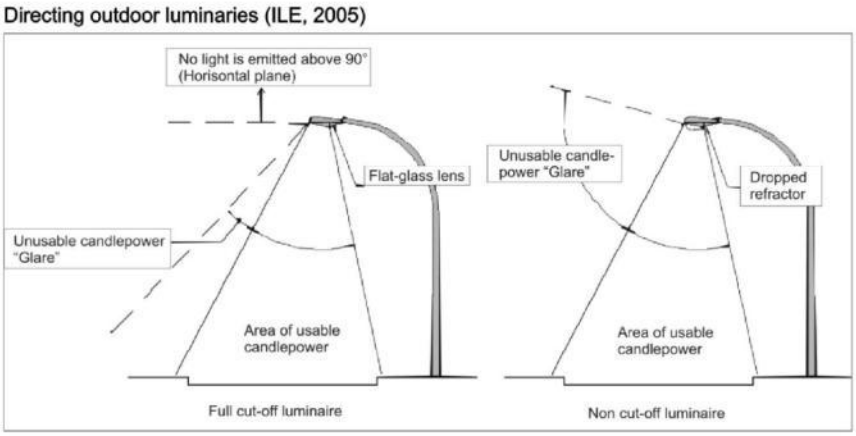
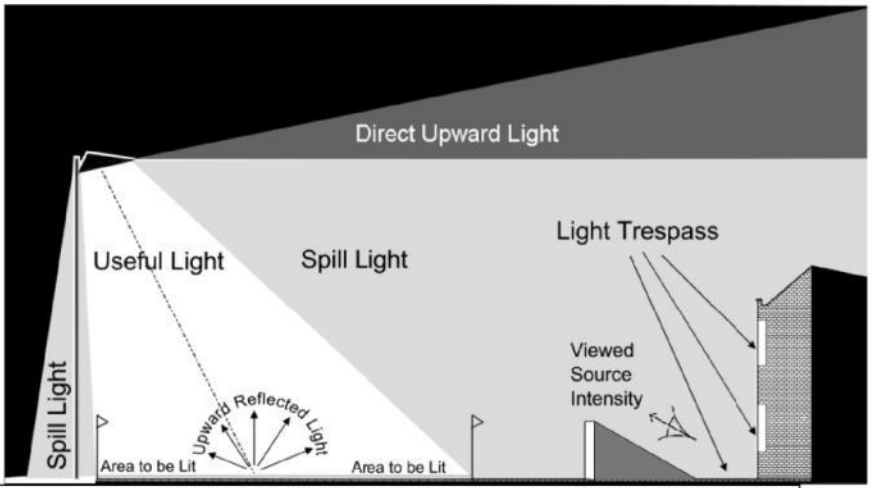


Figure 18: Proposed Light Mitigation Measures (2)

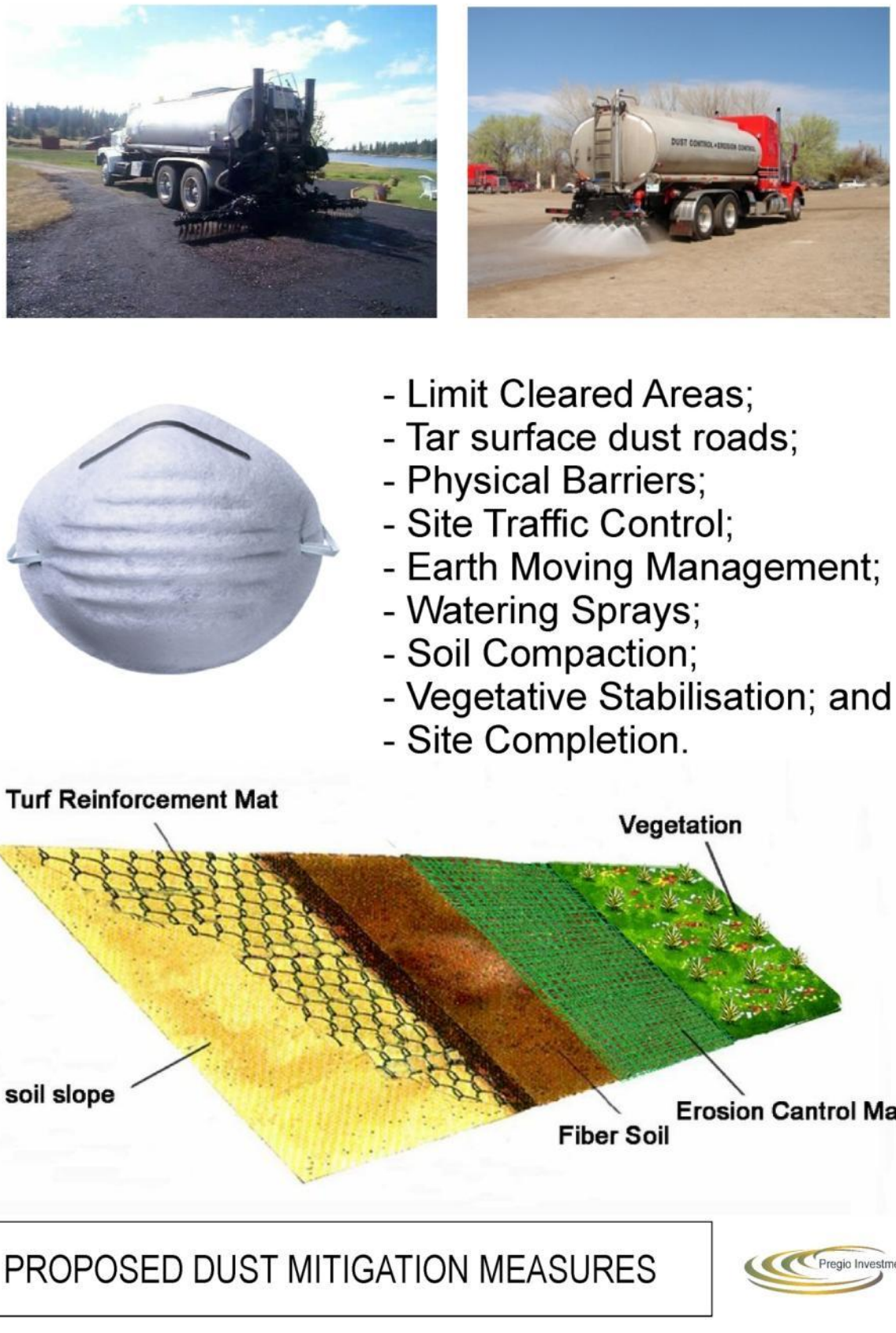






PROPOSED LIGHT MITIGATION MEASURES

Figure 19: Proposed Dust Mitigation Measures (3)



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