PROPOSED ALLDAYS PHOTOVOLTAIC/CONCENTRATED PHOTOVOLTAIC PLANT

The Farm Gotha No. 102 MS, Musina District, Limpopo Province

VISUAL IMPACT ASSESSMENT

Prepared as part of a Basic Assessment Process – Phase 1
and Environmental Impact Assessment Process – Phase 2

9 May 2012

PROJECT NO: VIA_160412.SA

Produced for:

BioTherm Energy (Pty) Ltd.

Energy

On behalf of:

Savannah Environmental (Pty) Ltd.

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1 INTRODUCTION

1.1 Background and Purpose of Report

BioTherm Energy (Pty) Ltd. proposes to establish a photovoltaic (PV)/concentrating (CPV) plant on the portions of the Farm Gotha No. 102 MS, in the Musina District of the Limpopo Province.

This Visual Impact Assessment (VIA) is undertaken as part of a Basic Assessment process and an Environmental Impact Assessment process being facilitated by Savannah Environmental (Pty) Ltd., in terms of the National Environmental Management Act 107 of 1998 (NEMA). The two processes will, respectively, make provision for a 20ha site to produce up to 20MW of electricity and a 500ha site which would be able to generate 75MW of electricity. This visual impact assessment aims to address visual impacts for both of these proposed developments.

As such, the purpose of this report is to assess the proposed activities in terms of the *Guidelines for Involving Visual and Aesthetic Specialists in the EIA Process* and the *NEMA EIA Regulations of 2010*.

1.2 Components of the Report

The aspects addressed in this report are as follows:

a) Description of the methodology adopted in preparing the report.
b) Description of the receiving environment.
c) Description of the view catchment area, view corridors, viewpoints and receptors.
d) Identification and evaluation of potential visual impacts associated with the proposed activity and the alternatives identified, by using the established criteria, including potential lighting impacts at night.
e) Description of the alternatives identified.
f) Identification in terms of best practical environmental option in terms of visual impact.
g) Addressing of additional issues such as:
    - Impact on skyline.
    - Negative visual impact.
    - Impact on aesthetic quality and character of place.
h) Assumptions made and uncertainties or gaps in knowledge.
i) Recommendations in respect of mitigation measures that should be considered by the applicant and competent authority.

1.3 Study Methodology

As stated previously, this VIA was undertaken in accordance with the *Guideline for Involving Visual and Aesthetic Specialists in EIA Processes*, as issued by the Western

Cape Government's Department of Environmental Affairs and Development Planning during 2005.

The VIA was undertaken in distinct steps, each of which informed the subsequent steps. The figure below summarises the methodology adopted for undertaking the assessment.

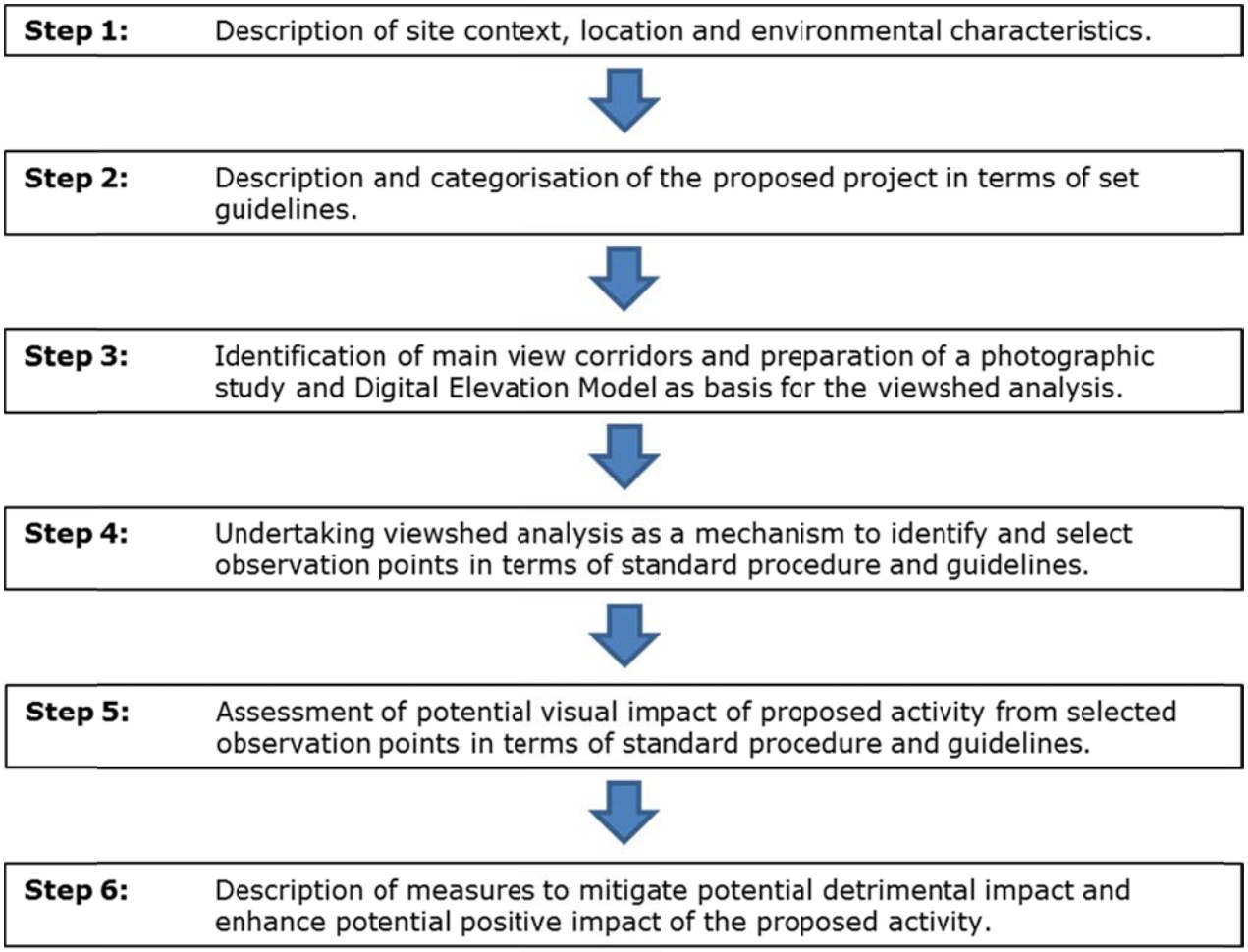

Figure 1: Methodology adopted for the VIA.

1.4 Supplementary Documentation

This report is to be read together with Annexure 1 (Selected Observation Point Viewsheds and Assessments), which provides an identification of the respective observation points and visual assessment of the proposed activity from each of these points.

1.5 Gaps in Knowledge, Assumptions and Limitations

This assessment was undertaken during the planning stage of the project and is based on the Background Information Document of April 2012, provided by Savannah Environmental (Pty) Ltd, for the mentioned project.

2 SITE DESCRIPTION

2.1 Locality

The project site is located in the Musina Local Municipality (LIM341) in the Limpopo Province and is some 75km due west of Musina. Being located in close proximity to the R521, which connects to the R572 north en-route to Zimbabwe, the site is readily accessible. The site does not fall within any designated urban edge.

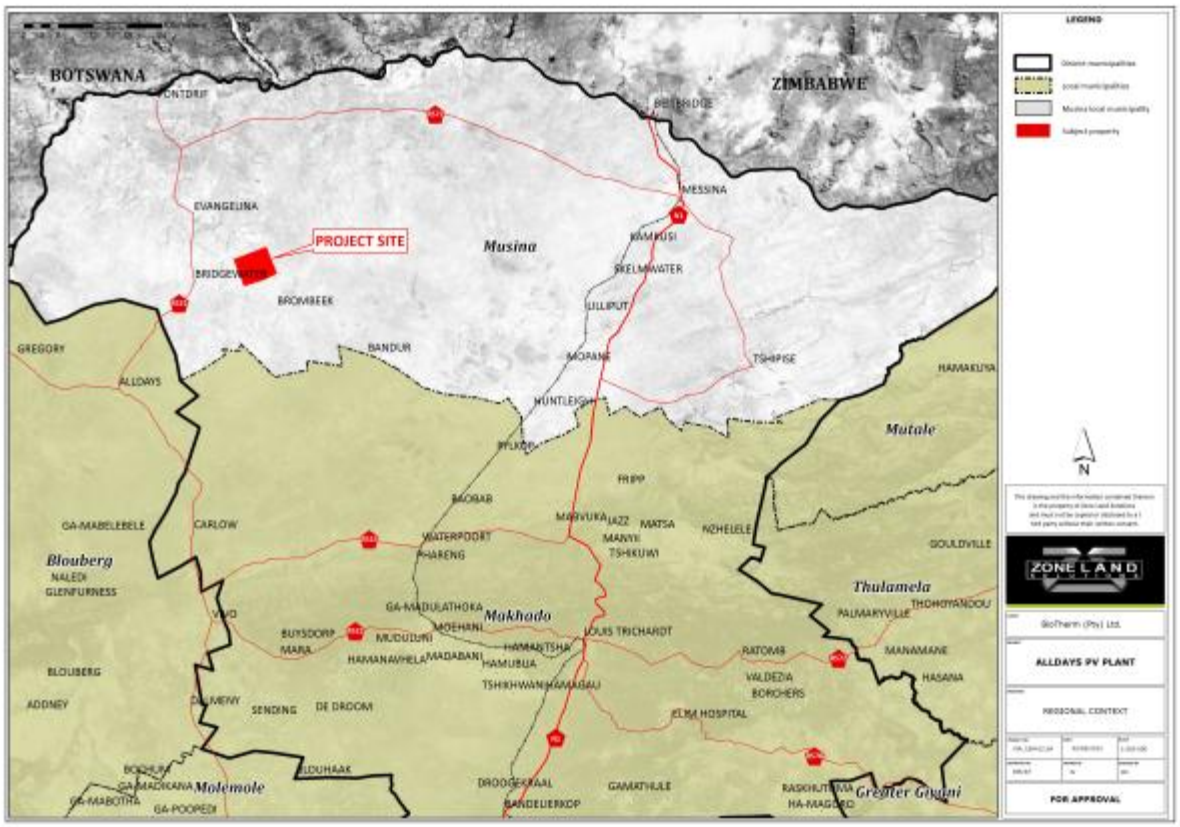

Figure 2: Regional context of the project site.

The subject property is located adjacent to the Venetia Diamond Mine and is South Africa's largest diamond producing mine (with an output of about 4Mct of diamond). The mine opened in 1992 and is De Beers Consolidated Mines' flagship operation.

Venetia operates a conventional open-pit mine with a remaining life expectancy, in its current form, of approximately 20 years. The typical mining infrastructure and buildings are present on the mine site which includes crushers, stockpiles and conveyors, treatment plants, processing plants, and a range of mobile equipment. Ancillary equipment includes Bell articulated water browsers, used for spraying, vehicle washing and fire fighting duties.

A local airstrip and an electrical substation, known as the Venetia 132.22kV Substation, have also been erected on the Venetia landholdings. The latter is in close proximity to the proposed photovoltaic/concentrated photovoltaic plant. The electricity generated from this facility would therefore easily be fed into the electrical grid via the Venetia Substation.

Even though the project site has a generally flat terrain, the terrain gently slopes downwards in an east-west direction. The height variations of the 20ha Basic Assessment site are between 705m above mean sea level and 720m. The larger 500ha site is located at an altitude between 694m 735mabove mean sea level.

The Musina Spatial Development Framework (2011) states that *agriculture is pivotal to local economic development. Apart from a few areas that can be irrigated, extensive agriculture and game farming are the primary focus of the agricultural sector.* The area in the vicinity of the proposed PV plan is also characterised by this type of land use.

2.1.1 Conservation Areas

The most prominent conservation area in the region is the Mapungubwe National Park, which is situated north of the R521 and the border between South Africa and Botswana/Zimbabwe. The nearest point of the national park to the project site is in the order of 30km and therefore not susceptible to a visual impact.

The Venetia Diamond Mine has however established the 36 000ha Venetia Limpopo Nature Reserve adjacent to the mine and moved a large number of animals from a new mine area to the reserve. This reserve also forms part of the Greater Mapungubwe Transfrontier Conservation Area (GMTFCA) as part of the trilateral agreement between the governments of South Africa, Botswana and Zimbabwe. The GMTFCA is aimed at effectively conserving the cultural and natural resources of the area transcending the international boundaries between the three countries.

2.2 Project Site Description

The subject property consists of the Farm Gotha No. 102 MS. In total the subject property covers 3161.4396ha. Being situated next to the Venetia access road, which links to the R521 in the west, the project site is readily accessible, but also subjects users of the Venetia access road to potential visual impacts from the proposed activity on the site.

During 1992, at the same time that a servitude area for an electrical substation on the adjacent Farm Venetia No. 103/1-MS was registered, an electrical power line servitude of 31.0m in total width was registered over the subject property. The electrical substation, *inter alia*, provides electricity to the Venetia mine.

The planned PV/CPV plant will connect to the grid via the Venetia substation and Eskom distribution network. The possibility exists to connect directly to the power line on-site or via a connection into the Venetia Substation. This would entail the construction of a new substation up to 132kV for the 20MW facility and up to 400kV for the 75MW facility on the project site.

The extent of the 20MW PV plant (white hatch) and the 75MW plan (red cross-hatch) is indicated on the figure below. Note also the position of the electrical substation on the neighbouring property and the electrical power line servitude (indicated in yellow).

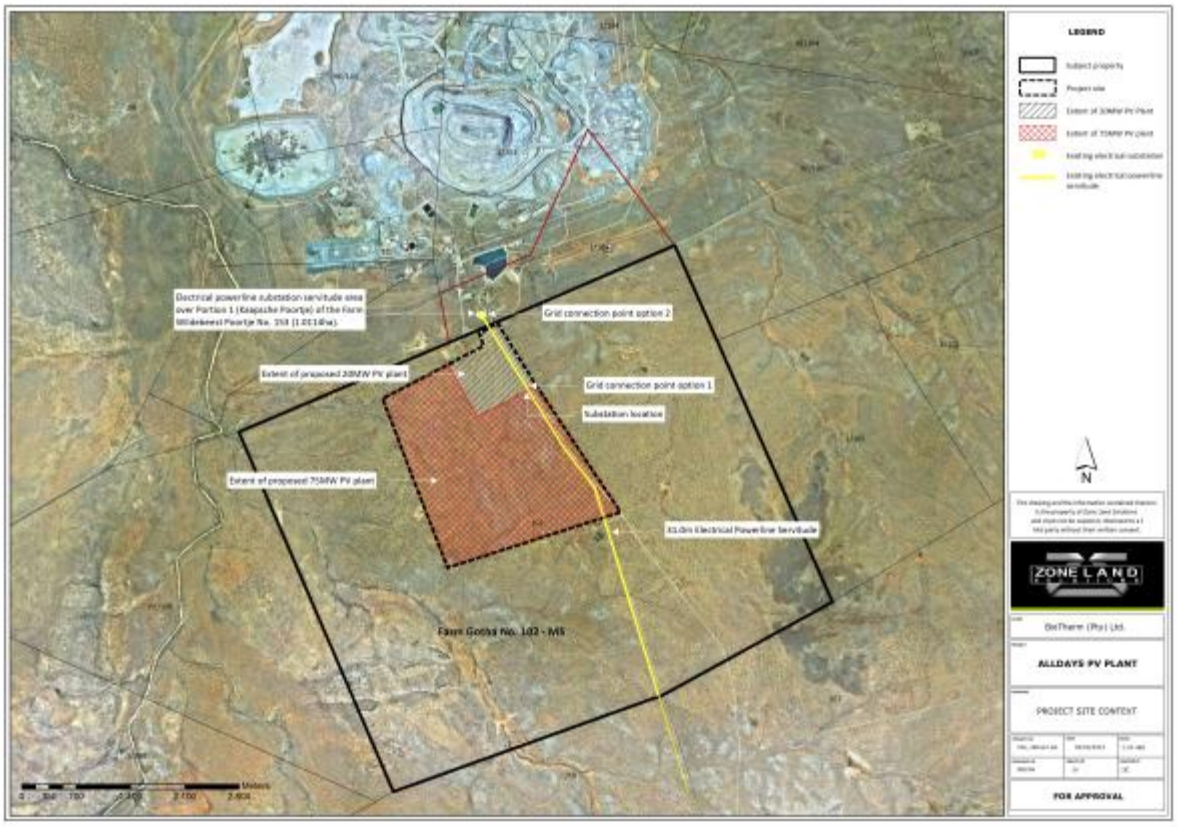

Figure 3: Extent of subject property and improvements.

Currently the Abend Ruhe Gotha guesthouse operates from a portion of the subject property, but not one which will be utilised by the project. The guesthouse complex consists of chalets and a lapa as well as facilities for caravans and campers.

2.2.1 Landscape Character

The landscape character of the region typifies a Bushveld landscape of great open plains with the occasional high hill or ridge. The area does not have a particular high rainfall figure and receives between 200 and 400mm of rain per year.

Musina forms part of the broader tropic bush and savannah in terms of Acock's (2006) broad classification. The specific veld type of the project site can be classified as Mopani veld. This vegetation type is characterised by a typically short fairly dense growth of shrubby *Colophospernum mopane*, generally associated with a number of other trees and shrubs and somewhat sparse and tufted grassveld. The most prominent trees in this community include *Acacia albida, A. Xanthophloea, Xanthocercis zambesiaca* and *Ficus sycomorus*.

The soil of the project site has been classified as a Class 5 *susceptibility to water erosion*. This is defined as land with a low to medium water or wind erosion hazard which generally comprise level to gently sloping land. The susceptibility of the erosion of the soils as a result of wind, is also classified as Class 5: *high susceptibility*. All construction activities will therefore have to be managed intensively to prevent dust pollution. A rigorous planting plan will also have to be put in place to cover bare soils.

Cattle and game farming dominates the agricultural practices in the region. As mentioned above, the occurrence of water along major streams and rivers, such as the Limpopo River to the north, make it possible to practice intensive agriculture in such locations.

Farmsteads and associated farm buildings are scattered throughout the landscape on the respective farms. Any new activity should take these structures into account.

3 PROJECT DESCRIPTION AND INSTALLATIONS

Photovoltaic systems use solar panels to convert sunlight into electricity. The system is made up of one or more solar panels, usually a controller or power converter, and the interconnections and mounting for the other components.

It is intended that a phased PV/CPV plant of up to 75MW be established on the project site. Individual ground-mounted PV panels (also referred to as free-field or stand-alone arrays) will be connected into a 'string' of panels of up to 20.0m in height. The 'string' can either be fixed tilt or tracking, either single axis or dual axis. Tracking increases the output, but also the installation and maintenance cost.

The 'string', which will cover up to 200ha of the project site (20ha for the 20MW facility and approximately 180ha for the 75MW facility), will feed the electricity generated directly into the electrical grid by means of the electrical substation directly north of the site or at a new 400kV substation to be developed along the existing powerline servitude on the project site.

The PV/CPV solar energy facilities proposed for the project site, would typically comprise the following infrastructure:

a) Photovoltaic (PV) or Concentrated Photovoltaic (CPV) panels with an installed capacity of up to 75MW (Venetia PV/CPV Plan Phase 1) and up to 20MW (Venetia PV/CPV Plant Phase 2).
b) A new on-site substation to evacuate the power from the facility into the Eskom grid via the Venetia Substation located adjacent to the project site.
c) Mounting structure to be either rammed steel pipes or piles with pre-manufactured concrete footings to support the PV/CPV panels.
d) Cabling between the project components, to be lain underground where practical.
e) Internal access roads and fencing.
f) Workshop area for maintenance, storage and offices.

3.1 Renewable Energy Technology Proposed

Various renewable energy technologies are available for electricity generation. Renewable energy technologies offer an alternative to fossil fuels, thereby reducing the amount of CO2 emissions into the atmosphere. There are two types of technology that are being considered for the proposed projects namely; Photovoltaic (PV) Technology and Concentrated Photovoltaic (CPV) Technology.

3.1.1 Photovoltaic Technology

Solar energy faculties, such as those using PV panels use the energy of the sun to generate electricity through a process known as Photovoltaic Effect. This effect refers to photons of light colliding with electrons, and therefore placing the electrons into a higher state of energy to create electricity. The Solar PV facility will comprise a Photovoltaic Cell, an Inverter and Support structure, as illustrated by the figure below.

Figure 4: Illustration of a photovoltaic solar facility.

3.1.2 Concentrating Photovoltaic Technology

Concentrating photovoltaic (CPV) technology uses optics such as lenses to concentrate a large amount of sunlight onto a small area of solar photovoltaic materials to generate electricity. Unlike traditional, more conventional flat panel systems, CPV systems are often much less expensive to produce, because the concentration allows for the productions of a much smaller area of solar cells.

Each panel will be approximately 22m wide and 12.5m high. As such, when the tracking panel is vertical, the structure will be a maximum height of approximately 20m.

Figure 5: Illustration of a concentrating photovoltaic solar facility.

3.2 Potential 'triggers' or Key Issues

A 'trigger' is a characteristic of either the receiving environment or the proposed project which indicates that visibility and aesthetics are likely to be key issues and may require further specialist involvement (DEA&DP, 2005).

The 'triggers', as it relates to the proposed project refer to the following:

Table 1: Potential triggers.

KEY ISSUE	FOCAL POINTS	DESCRIPTION
a) Nature of the receiving environment:	*Areas with protection status, such as national parks or nature reserves.*	The project site is not a proclaimed nature reserve. It is however located adjacent to the Venetia Limpopo Nature Reserve.
	Areas with proclaimed heritage or scenic routes.	The project site is not a proclaimed heritage site or part of a scenic route. However, it is located approximately 30km south of the Mapungubwe World Heritage Site.
	Areas lying outside a defined urban edge line.	The proposed activity is situated in a rural landscape next to an existing mine.
	Areas of important tourism or recreation value.	The project site is situated immediately south of expanded GMTFCA which is considered as a major tourism and conservation initiative in the region.
b) Nature of the project:	*A change in land use from the prevailing use.*	The prevailing use will change up to a total of 520ha though only approximately 180ha would have actual improvements upon them. If some of the proposed mitigation measures could be implemented, the prevailing use could be retained to a degree.
	Possible visual intrusion in the landscape.	The proposed activity will form an integral part of the future landscape character. The extent and significance of a possible visual impact is to be determined through this VIA.

3.3 Development Category

Based upon the 'triggers' and key issues and the environmental context summarised above, the proposed activity is categorised as a **Category 4 Development**.

This categorisation was based upon the *Guidelines for Involving Visual and Aesthetic Specialists in EIA Processes*, which lists the following categories of development:

Box 3: KEY TO CATEGORIES OF DEVELOPMENT

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 residential/resort type development, golf or polo estates, low to medium-scale infrastructure.

Category 4 Development: e.g. medium density residential development, sport facilities, small-scale commercial faculties/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, power stations, wind energy farms, power lines, freeways, toll roads, large-scale infrastructure generally. Large-scale development of agriculture land and commercial tree plantations. Quarrying and mining activities with related processing plants.

Based upon the above categorization and the assessment criteria provided in the *Guidelines for Involving Visual and Aesthetic Specialists in EIA Processes* it is expected that the visual impact of the proposed activity would be classified as **'high'** (refer to the table on the following page).

The objectives of the VIA described in this report is to:

g) determine whether such broad impact categorisation is appropriate and it not, to determine an appropriate category of impact;

h) formulate and implement measures or interventions that would mitigate any detrimental impacts to the extent that the activity will be acceptable.

Table 2: Categorization of expected visual impact (DEA&DP, 2005).

Type of environment	Type of development				
	Category 1	**Category 2**	**Category 3**	**Category 4**	**Category 5**
Protected/wild areas of international or regional significance	Moderate visual impact expected	High visual impact expected	High visual impact expected	Very high visual impact expected	Very high visual impact expected
Areas or routes of high scenic, cultural, historical significance	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	High visual impact expected	Very high visual impact expected
Areas or routes of medium scenic, cultural or historical significance	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	High visual impact expected

Areas or routes of low scenic, cultural or historical significance/disturbed	Little or no visual impact expected. Possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected
Disturbed or degraded sites / run-down urban areas / wasteland	Little or no visual impact expected. Possible benefits	Little or no visual impact expected. Possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected

4 VIEWSHED ANALYSIS

4.1 Dominant View Corridors

As a first step of this VIA, a survey was undertaken to determine the existence of significant view corridors associated with the project site. A view corridor is defined as *'a linear geographic area, usually along movement routes, that is visible to users of the route'* (DEA&DP, 2005). Accordingly, only one dominant *view corridor* was identified, namely:

a) **Venetia access road** One of the main distributors in the region and an important potential bus route (Musina SDF, 2011). The Venetia access road links the Venetia mine and the R521 in the west with Musina in the east.

4.2 Relevant Topographic and Physical Characteristics

A further key aspect affecting the potential visual impact of any proposed activity is the topography of the project site and the surrounding environment and the existence of prominent biophysical features from where the project site is visible. The topography and the major ridgelines of the area were subsequently determined and mapped by using a *Digital Elevation Model*[1].

[1] A Digital Elevation Model (DEM) is a geographic information system-based outcome generated from contours for a specific area. In this instance, 20m contour intervals for reference sheet nos. 2228bd, 2228db, 2229ac, 2229ad, 2229ca, 2229cb, 2229bc and 2229da were used to calculate the DEM for the region.

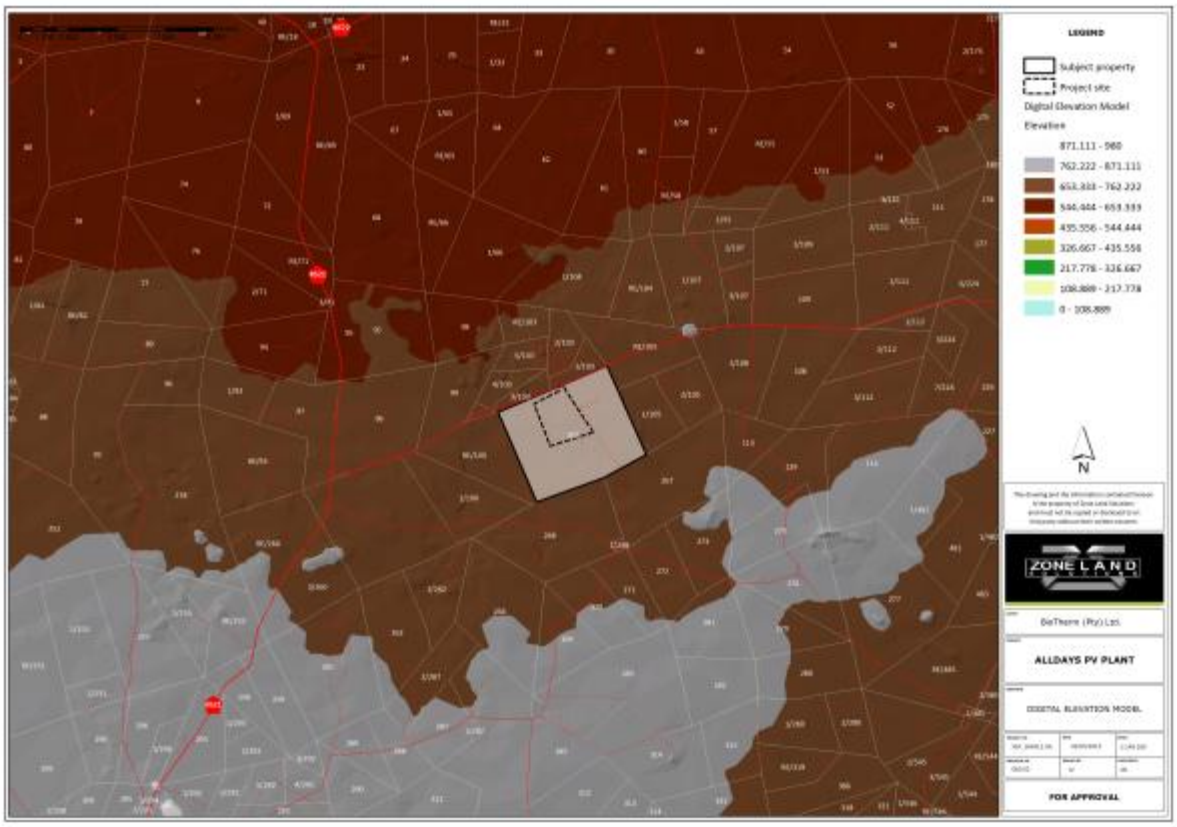

Figure 6: Digital Elevation Model illustrating major ridgelines and movement routes in the sub-region.

As illustrated by the DEM above, the project site is located at a mean elevation of approximately 715m above sea level on a slight westerly slope. The DEM shows that there are no prominent topographical manifestations in close proximity to the project site from which the proposed activity is particularly visually exposed.

Furthermore, the project site is located below any ridgeline. The proposed activity will therefore not impact on the skyline.

4.3 Photographic Study as Supplementary Component

In order to quantify and assess the visibility and potential impact of the proposed activity and to provide a basis for selecting appropriate observation points outside of the project site, a photographic study and analysis was undertaken from the project site. The analysis and ground-truthing identified several observation points with similar characteristics and assessments outcomes. A selection of Key Observation Points is therefore included under Annexure 1. The figure and photograph below illustrate the nature of the landscape in the vicinity of the project site.

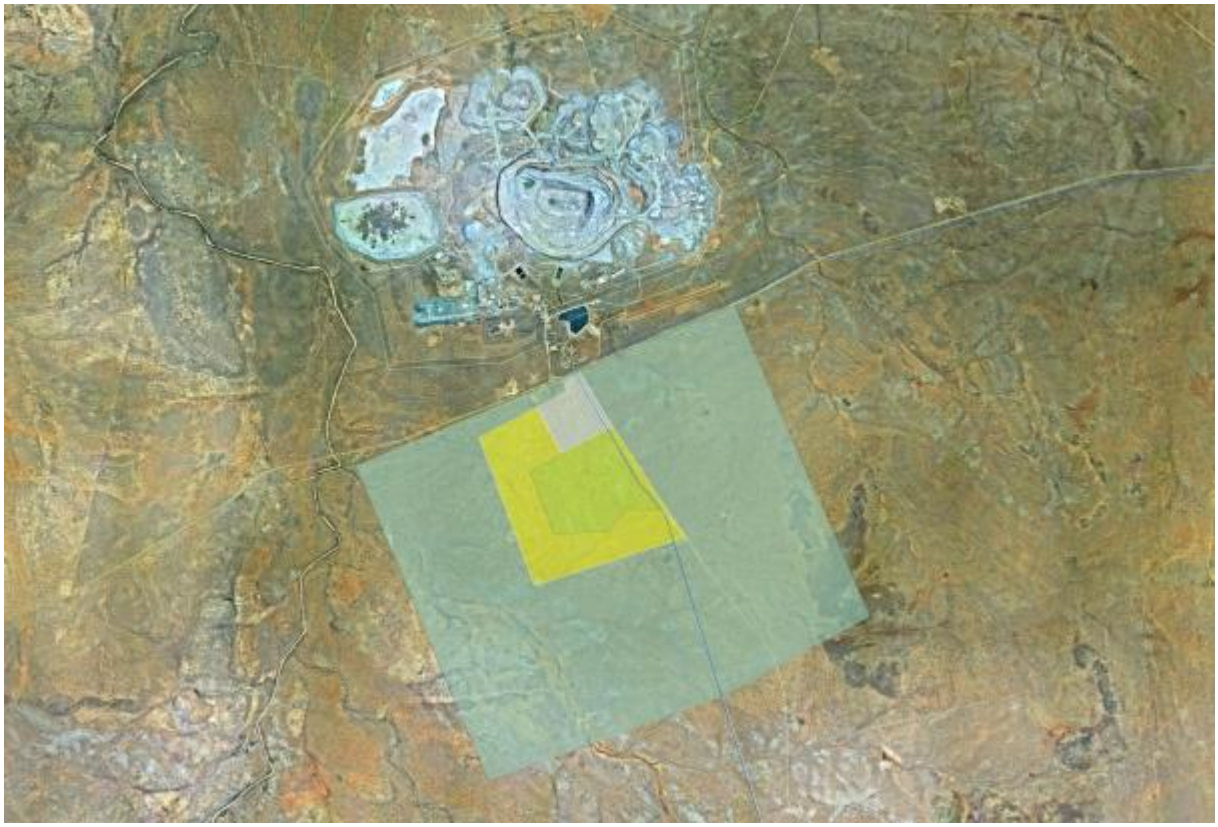

Figure 7: Aerial photograph illustrating the nature of the landscape of the project site. The white hatch illustrates the position of the 20MW PV/CPV plant while the yellow indicate the 75MW PV/CPV plant. The green portion polygon on the yellow portion indicated the proposed location of the PV/CPV plant

Photograph 1: The landscape character of the area in the vicinity of the project site (R521 approximately 12km to the west).

5 DIGITAL VIEWSHED ANALYSIS

The photographic study summarised above was supplemented with a digital viewshed analysis based upon the Digital Elevation Model (refer to Figure 6). As stated previously, the purpose of these two steps was to provide a basis for the identification and selection of appropriate observation points outside the project site for the VIA.

The viewshed[2] analysis was undertaken in accordance with the *Guideline Document for involving Visual Specialists in EIA Processes*. Geographic Information Systems (GIS) technology was used to analyse and map information in order to understand the relationships that exist between the observer and the observed view. Key aspects of the viewshed are as follows:

- It is based on a *single viewpoint* from the highest point of the combined 20MW and 75MW sites.
- It is calculated from 20m above natural ground level.
- It represents a '*broad-brush' designation*, which implies that the zone of visual influence may include portions that are located in a view of shadow and it is therefore not visible from the project site and vice versa. This may be as a result of landscape features such as vegetation, buildings and infrastructure not taken into consideration by the DEM.

As illustrated by the viewshed (refer to Figure 7 below), the primary *zone of visual influence*[3] is located in an easterly and north-easterly direction up to 30km from the project site. The GIS-generated viewshed illustrates a theoretical *zone of visual influence*. This does not mean that the proposed activity would be visible from all observation points in this area. The *zone of visual influence* is closely associated with the most prominent topographical features to the northeast.

5.1 Key Aspects of the Viewshed

The distance between the observer and the observed activity is an important determinant of the magnitude of the visual impact. This is due to the visual impact of an activity diminishing as the distance between the viewer and the activity increases. Viewsheds are categorised into three broad categories of significance, namely:

a) Foreground: The foreground is defined as the area within 1km from the observer within which details such as colour, texture, styles, forms and structure can be recognised. Objects in this zone are highly visible unless obscured by other landscape features, existing structures or vegetation.

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2 A viewshed is defined as *'the outer boundary defining a view catchment area, usually along crests and ridgelines. Similar to a watershed'*. A Viewshed Analysis is therefore the study into the extent to which a defined area is visible to its surroundings.

3 Zone of visual influence is defined as *'An area subject to the direct visual influence of a particular project'*.

b) Middle ground: The middle ground is the area between 1km and 3km from the observer where the type of detail which is clearly visible in the foreground becomes indistinguishable. Objects in the middle ground can be classified as visible to moderately visible, unless obscured by other elements within the landscape.

c) Background: the background stretches from approximately 3km onwards. Background views are only distinguishable by colour and lines, wile structures, textures, styles and forms are often not visible (SRK Consulting, 2007).

The distance radii indicating the various viewing distances from the subject property's boundary are illustrated by Figure 8 below.

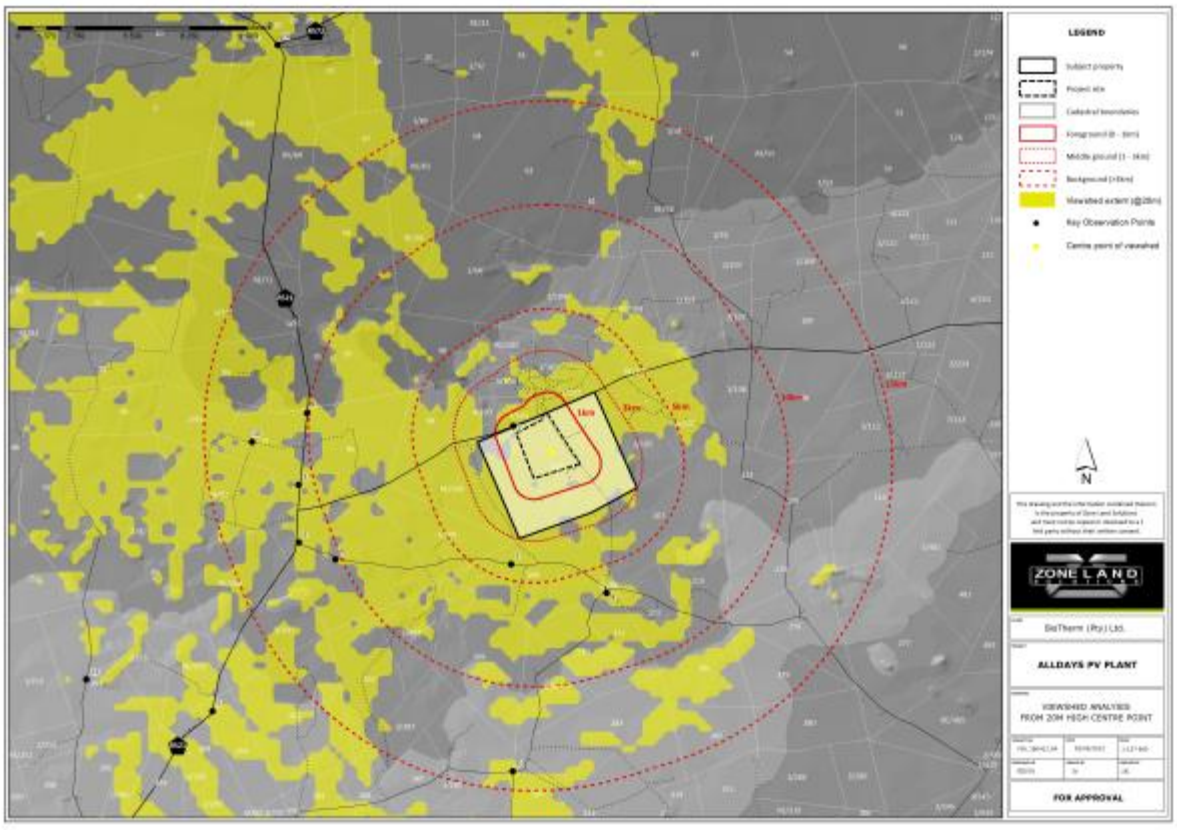

Figure 8: Viewshed generated from the project site.

As is illustrated by the figure above, no large settlement areas are within a 30km radius from the project site. The identified receptors are likely to be residents and farm workers on the farms in the region as well as the Venetia mine itself and residents of the Venetia mine settlement on a portion of the Farm Gotha 102-MS next to the Venetia access road. The latter is considered to be in the *foreground* while all other receptors are located in the *middle* to *background*.

However, the main view corridor, namely the Venetia access road falls within the *foreground*, *middle ground* and *background*, while the proposed activity will theoretically only be visible from the *middle* and *background*.

6 VISUAL IMPACT ASSESSMENT

6.1 Selection of Observation Points

A total of 15 Key Observation Points (KOPs) were provisionally identified and selected within the defined viewshed for the visual assessment in accordance with the selection criteria stipulated in the Visual Guidelines. As a result of the similarity in the assessment results of the KOPs, the description and assessment of only four KOPs are included in Annexure 1.

KOPs selected for the assessment are generally located at the intersection between the zone of visual influence and the defined view corridor (refer to Sections 4.1 and 5 above). The view corridors are those areas that are accessible to the general observer.

6.2 Assessment Process

The identified *observation points* were categorised and assessed as summarised in the table below.

Table 3: VIA methodology and process.

KEY	DESCRIPTION
NUMBER	Each observation point was allocated a reference number.
CO-ORDINATES	The co-ordinates of each of the observation points are provided.
ALTITUDE	The altitude of the observation point was provided in meters above sea level.
DESCRIPTION	A brief description where the observation point is located is provided.
TYPE	Each observation point is categorised according to its location and significance rating. These criteria include the following: • Tourist-related corridors, including linear geographical areas visible to users of a route or vantage points. • Residential areas (including farmsteads).
PHOTOGRAPH	A photograph was taken from each observation point in the direction of the project site to verify the digitally-generated viewshed.
PROPERTY LOCATION	The location of the property was described a *foreground*, *middle ground* or *background*.

PROXIMITY	The distance between the observation point and the project site was provided in kilometres.
VISUAL SENSITIVITY OF RECEPTORS	The visual impact considered acceptable is dependent on the type of receptors. A *high* (i.e. residential areas, nature reserves and scenic routes or trails), *moderate* (e.g. sporting or recreational areas, or places or work), or *low* sensitivity (e.g. industrial, mining or degraded areas) was awarded to each observation point.
VISUAL EXPOSURE	Exposure or visual impact tends to diminish exponentially with distance. A *high* (dominant or clearly visible), *moderate* (regocnizable to the viewer) or *low* exposure (not particularly visible to the viewer) rating was allocated to each observation point.
VISUAL ABSORPTION CAPACITY (VAC)	The potential of the landscape to conceal the proposed activity was assessed. A rating of *high* (effective screening by topography and vegetation), *moderate* (partial screening) and *low* (little screening) was allocated to each observation point.
VISUAL INTRUSION	The potential of the activity to fit into the surrounding environment was determined. The visual intrusion relates to the context of the proposed activity while maintaining the integrity of the landscape. A rating of *high* (noticeable change), *moderate* (partially fits into the surroundings) or *low* (blends in well with the surroundings) was allocated.
DURATION	With regard to roads, the distance (in kilometres) and duration (in seconds) for which the property will be visible to the road user, were calculated for each observation point.

6.3 Summary of Assessment

Based on the viewshed analysis and the preceding sections, the envisaged visual impact of the proposed activity was assessed in accordance with the criteria for visual impact assessments (DEA&DP, 2005). The findings of the assessment from selected observation points are included under Annexure 1.

6.3.1 Assessment Criteria

It is stated in the DEA&DPs Visual Guidelines that to aid decision-making, the assessment and reporting of possible impacts requires consistency in the interpretation of impact assessment criteria. The criteria that specifically relate to VIAs were therefore described in Table 3 and Annexure 1.

The potential visual impact of the proposed activity was assessed against these criteria, with reference to the summary of criteria in Box 12 of the Visual Guidelines. Table 4 provides a description of the summary criteria used to determine the impact significance.

Table 4: Summary of criteria used to assess the potential impacts of the proposed activity.

CRITERIA	DESCRIPTION
NATURE OF THE IMPACT	The nature of the impact refers to the visual effect the proposed activity would have on the receiving environment. The nature of the development proposals are described in the preceding sections.
EXTENT	This category deals with the spatial or geographic area of influence and refers to the following levels: • *Site-related* (extending only as far as the activity), • *Local* (limited to the immediate surroundings), • *Regional* (affecting a larger metropolitan or regional area), • *National* (affecting large parts of the country), • *International* (affecting areas across international boundaries). A value between 1 and 5 is assigned as appropriate (with 1 being low and 5 being high).
DURATION	Duration refers to the expected life-span of the visual impact. A rating of short term (during the construction phase) (assigned score of 1 or 2), *medium term* (duration for screening vegetation to mature) (assigned score of 3), *long term* (the lifespan of the project) (assigned score of 4), or *permanent* (were time will not mitigate the visual impact) (assigned score of 5) were applied.
MAGNITUDE	Magnitude refers to the magnitude of the impact on views, scenic or cultural resources. The following ratings were allocated to determine the intensity of the impact: • *No effect* (assigned score of 0), • *Low* (visual and scenic resources not affected) (score of 2), • *Minor* (will not result in impact on processes) (score of 4), • *Medium* (affected to a limited scale) (assigned score of 6), • *High* (scenic and cultural resources are significantly affected) (assigned score of 8), • *Very high* (result in complete destruction of patterns) (score of 10).
PROBABILITY	This category refers to the degree of possibility of the visual impact occurring. A rating of *very improbable* (probably will not happen) (assigned score of 1), *improbable* (very low possibility of the impact occurring) (assigned score of 2), *probable* (distinct possibility that the impact will occur) (assigned score of 3), *highly probable* (most likely) (assigned score of 4), or *definite* (impact will occur regardless of any preventative measures) (assigned score of 5) were applied.
STATUS	Status will be described as positive, *negative* or *neutral*.
REVERSIBILITY	Degree to which the activity can be reversed. The following rating were allocated:

	• Reversible (assigned score of 1), • Recoverable (assigned score of 3), or • Irreversible (assigned score of 5).
SIGNIFICANCE	The significance is calculated by combining the criteria in the following formula: S = (E+D+M)P S = Significance E = Extent D = Duration M = Magnitude P = Probability The significance ratings for each potential impact are as follows: • *Low* (where it will not have an influence on the decision) (<30 points), • *Medium* (where it should have an influence on the decision unless it is mitigated) (30-60 points), or • *High* (where it would influence the decision regardless of any possible mitigation) (>60 points).

6.3.2 Assessment of Impact on Sensitive Receptors in Fore- and Middle Ground

The sensitive receptors in the *foreground* and *middle ground* of the generated viewshed represents the Venetia access road, the Venetia mine and a secondary road south of the proposed project site. The latter road does not serve as a mobility route but only to provide access to adjacent farms. It is therefore not likely that many observers will travel along this route.

The Venetia mine is considered to be the major receptor in the area as the mine is situated on a slightly higher elevation than its surrounding. The sensitivity of the receptor is however to be questioned as the activity of mining is already in contrast to the majority of land uses in the area. The mine is also a private facility, only accessible to employees and workers on the premises.

The proposed activity will represent a change in land use and land form to what is currently the status quo on the project site. The introduction of foreign structures and forms in the bushveld landscape will have a potentially significant impact on sensitive receptors as described in the table below.

A photograph and viewshed from a defined KOP in the *middle ground* is appended under Annexure 1.

Table 5: Impact table summarising the significance of visual impact on sensitive receptors in the fore- and middle ground.

NATURE:	Potential visual impact on the sensitive receptors in the foreground and the middle ground.			
	Without Mitigation	**Score**	**With Mitigation**	**Score**
EXTENT	Local(**2**)		Local(**2**)	
DURATION	Long term(**4**)		Long term(**4**)	
MAGNITUDE	Medium(**6**)		Minor(**4**)	
PROBABILITY	Probable(**3**)		Probable(**3**)	
SIGNIFICANCE	Medium(**36**)		Medium(**30**)	
STATUS	Negative		Negative	
REVERSIBILITY	Recoverable(**3**)		Recoverable(**3**)	
IRRIPLACEABLE LOSS OF RESOURCE?	No		No	
CAN IMPACTS BE MITIGATED?	Yes			
MITIGATION:	• Keep disturbed areas to a minimum. • No clearing of land to take place outside the demarcated footprint. • Institute a rigorous planting regime along the boundaries of the site. Only indigenous plant species to be introduced. Attend especially to the northern boundary of the proposed activity. • Buildings and similar structures must be in keeping with regional planning policy documents, especially the principles of critical regionalism, namely sense of place, sense of history, sense of nature, sense of craft and sense of limits. • Consider establishing a private nature reserve on the remaining land (outside the development footprint).			
CUMULATIVE IMPACTS:	The Venetia mine, airfield, substation and associated industrial-type infrastructure already afford the area a sense of disturbance. The proposed activity will therefore add to the cumulative impact of the area in a negligible manner.			
RESIDUAL IMPACTS:	It is very possible that the status quo could be regained after decommissioning of the plant. Providing that the site is completely rehabilitated. The visual impact will therefore also be removed.			

6.3.3 Assessment of Impact on Sensitive Receptors in the Background

Visual receptors in the *background* represent a mix of farmsteads, game ranges and mobility routes.

The envisaged development components are constant and similar to the aspects described above, the likelihood of these structures being visible from a greater distance is however the only variable.

Various photographs taken from key observation points in the background illustrate the extent to which the site is visible from a greater distance (refer to Annexure 1).

Table 6: Impact table summarising the significance of visual impact on sensitive receptors in the background.

NATURE:	Potential visual impact on the sensitive receptors in the background.			
	Without Mitigation	**Score**	**With Mitigation**	**Score**
EXTENT	Local(**2**)		Local(**2**)	
DURATION	Long term(**4**)		Long term(**4**)	
MAGNITUDE	Low(**2**)		Low(**2**)	
PROBABILITY	Improbable(**2**)		Improbable(**2**)	
SIGNIFICANCE	Low(**16**)		Low(**16**)	
STATUS	Neutral		Neutral	
REVERSIBILITY	Recoverable(**3**)		Recoverable(**3**)	
IRRIPLACEABLE LOSS OF RESOURCE?	No		No	
CAN IMPACTS BE MITIGATED?	Yes			
MITIGATION:	• Keep disturbed areas to a minimum. • No clearing of land to take place outside the demarcated footprint. • Institute a rigorous planting regime along the boundaries of the site. Only indigenous plant species to be introduced. Attend especially to the northern boundary of the proposed activity. • Buildings and similar structures must be in keeping with regional planning policy documents, especially the principles of critical regionalism, namely sense of place, sense of history, sense of nature, sense of craft and sense of limits.			
CUMULATIVE IMPACTS:	It is near impossible to distinguish built forms and structures at distances greater than 5km. A tower structure of 20m in height might add to the cumulative impact although visual studies have confirmed that such as structure would not be visible at great distances (measured against the existing neighbouring mining structures).			
RESIDUAL IMPACTS:	It is very possible that the status quo could be regained after decommissioning of the plant. Providing that the site is completely rehabilitated. The visual impact will therefore also be removed.			

6.3.4 Assessment of Impact on Sense of Place

Sense of place refers to a unique experience of an environment by a user, based on his or her cognitive experience of the place. Visual criteria and specifically visual character of an area (informed by a combination of aspects, such as topography, level of development, vegetation, noteworthy features, cultural/historical features, etc.) play a significant role (MetroGIS, 2012).

A visual impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light (MetroGIS, 2012).

The sense of place of the wider region is very much one of Bushveld game farms. However, as the observer approach the project site, the increase in infrastructure becomes apparent and the character changes to an industrialised area. The project site has to a large degree lost much of its sense of place attributes due to the mining activities.

Table 7: Impact table summarising the significance of visual impact on the sense of place.

NATURE:	Potential visual impact on the sense of place of the Musina region.	
	Without Mitigation Score	**With Mitigation Score**
EXTENT	Local(**2**)	Site related (**1**)
DURATION	Long term(**4**)	Long term(**4**)
MAGNITUDE	Minor(**4**)	Low(**2**)
PROBABILITY	Probable(**3**)	Probable(**3**)
SIGNIFICANCE	Medium (**30**)	Low(**21**)
STATUS	Negative	Negative
REVERSIBILITY	Recoverable (3)	Recoverable(**3**)
IRRIPLACEABLE LOSS OF RESOURCE?	No	No
CAN IMPACTS BE MITIGATED?	Yes	
MITIGATION:	• Keep disturbed areas to a minimum. • No clearing of land to take place outside the demarcated footprint. • Institute a rigorous planting regime along the boundaries of the site. Only indigenous plant species to be introduced. Attend especially to the northern boundary of the proposed activity. • Buildings and similar structures must be in keeping with regional planning policy documents, especially the principles of critical regionalism, namely sense of place, sense of history, sense of nature, sense of craft and sense of limits. • Consider establishing a private nature reserve on the remaining land (outside the development footprint). • Encourage grasses to establish underneath the PV 'string' to provide a more natural character.	
CUMULATIVE IMPACTS:	It is near impossible to distinguish built forms and structures at distances greater than 5km. A tower structure of 20m in height might therefore only add to the cumulative impact of sense of place in the *foreground* and *middle ground*.	
RESIDUAL IMPACTS:	It is very possible that the status quo could be regained after decommissioning of the plant. Providing that the site is completely rehabilitated. The visual impact will therefore also be removed.	

6.3.5 Assessment of Impact during the Construction Period

Construction periods are often characterised by an increase in construction vehicles and personnel and their associated impacts such as dust clouds, noise, potential pollution, safety considerations, etc.

The visual impact of the construction period and the associated impacts on visual receptors are provided in the table below.

Table 8: Impact table summarising the significance of visual impact during the construction period.

NATURE:	Potential visual impact of the construction period on visual receptors.		
	Without Mitigation Score	**With Mitigation**	**Score**
EXTENT	Regional (**3**)	Local(**2**)	
DURATION	Very short term(**1**)	Very short term(**1**)	
MAGNITUDE	Medium(**6**)	Medium(**6**)	
PROBABILITY	Probable(**3**)	Improbable(**2**)	
SIGNIFICANCE	Medium(**30**)	Low(**18**)	
STATUS	Negative	Negative	
REVERSIBILITY	Recoverable(**3**)	Recoverable(**3**)	
IRRIPLACEABLE LOSS OF RESOURCE?	No	No	
CAN IMPACTS BE MITIGATED?	Yes		
MITIGATION:	• A *Construction Phase* and *Operational Phase* Environmental Management Programme must be prepared which would guide and control all aspects of the activity, including visual aspects. • An Environmental Control Officer (ECO) must be appointed to oversee the construction process and ensure compliance with conditions of approval. • An Environmental Management Specifications document (Specs) must be prepared to form part of the Basic Assessment Report and be adhered to. The document is to describe specifications for the pre-construction and construction phase of the project and include *inter alia* the following: o Details on aspects such as scope, interpretation, materials, the plant, tolerances, etc. o method statements for all identified aspects such as access routes, plant clearing, anchors, bunding, environmental awareness, fuel spills, rehabilitation, sensitive habitatis, traffic, etc. • Reduce and control dust through the use of approved dust suspension techniques as and when required (Venetia enforces a strict dust control policy which could be enforced on site). • Rehabilitate all disturbed areas (construction sites and roads) immediately after completion of construction works.		

CUMULATIVE IMPACTS:	None
RESIDUAL IMPACTS:	None

6.3.6 Assessment of Impact of Lighting during the Operational Phase

The project site has a very low incidence of light sources. A slight sky glow[4] effect is however visible at night at the Venetia mine. Direct, open light sources are also visible at night,

The PV 'string' of the proposed activity will not include lights of any kind, however, the associated ancillary buildings and infrastructure may include some degree of lighting.

Bar the tower structure, it is not expected that the proposed activity will contribute to the effects of sky glow or artificial lighting of the area. In order to ensure this, the proposed mitigation measures will have to be complied with.

Table 9: Impact table summarising the significance of visual impact of lighting during the operational phase.

NATURE:	Potential visual impact of artificial lighting as a result of the activity during operational phase.			
	Without Mitigation	**Score**	**With Mitigation**	**Score**
EXTENT	Regional (**3**)		Regional**(3)**	
DURATION	Long term (**4**)		Long term **(4)**	
MAGNITUDE	Minor (**4**)		Minor **(4)**	
PROBABILITY	Probable (**3**)		Probable **(3)**	
SIGNIFICANCE	Medium (**33**)		Medium**(33)**	
STATUS	Negative		Negative	
REVERSIBILITY	Recoverable (**3**)		Recoverable**(3)**	
IRRIPLACEABLE LOSS OF RESOURCE?	No		No	
CAN IMPACTS BE MITIGATED?	Yes			
MITIGATION:	• Outdoor lighting must be strictly controlled so as to prevent light pollution. • All lighting must be installed at downward angles. • Sources of light must as far as possible be shielded by physical barriers. • Consider the application of motion detectors to allow the application of lighting only where and when it is required.			
CUMULATIVE IMPACTS:	As mentioned above, the immediate surrounding area to the project site is already impacted by lighting. The proposed will contribute to the cumulative lighting effect although it is expected to be negligible in a regional context.			

[4]Sky glow refers to the illumination of the night sky or parts thereof. The most common cause of sky glow is artificial light that emits light pollution, which accumulates into a fast glow that can be seen from miles away.

RESIDUAL IMPACTS:	It is very possible that the status quo could be regained after decommissioning of the plant.

6.3.7 Assessment of Impact of Reflection of PV Panels

Photovoltaic solar panels are designed to absorb sunlight in order to convert it into electricity. The more sunlight that is absorbed, the more energy that can be produced. A monocrystalline silicon solar cell absorbs two-thirds of the sunlight reaching the panel's surface. This effectively means that only one-third of the sunlight reaching the surface of a solar panel has a chance to be reflected.

In addition, the PV panels have a reflectivity of around 30%, while surface materials such as dry sand has a reflectivity of around 45% and grass-type vegetation at 25%. Moreover, PV panels are installed at a fixed angle of around 30°.

Concentrated solar plants, on the other hand, are designed to reflect as much as possible light to a defined point. This type of plant, therefore, has the potential to impact on receptors, if not properly managed and maintained.

As the majority of receptors in the region are located at more or less the similar height of the project site (±40m variation), the solar panels will therefore not noticeably alter the site's current amount of reflected, indirect sunlight. Nor will a CPV reflect light into or in the direction of any receptors.

Table 10: Impact table summarising the significance of visual impact of reflection of the PV panels.

NATURE:	Potential visual impact of reflection of the PV Panels on the sensitive receptors.			
	Without Mitigation	**Score**	**With Mitigation**	**Score**
EXTENT	Regional (**3**)		Regional (**3**)	
DURATION	Long term(**4**)		Long term (4)	
MAGNITUDE	Medium (**6**)		Medium (**6**)	
PROBABILITY	Improbable (**2**)		Improbable (**2**)	
SIGNIFICANCE	Low (**26**)		Low (**26**)	
STATUS	Neutral		Neutral	
REVERSIBILITY	Recoverable (**3**)		Recoverable (**3**)	
IRRIPLACEABLE LOSS OF RESOURCE?	No		No	
CAN IMPACTS BE MITIGATED?	Yes			
MITIGATION:	• Consider installing anti-reflective coating or glass to reduce the sunlight that is reflected from PV panels and increase the amount of sunlight that is absorbed.			
CUMULATIVE IMPACTS:	The introduction of all kinds of solar panels, coupled with the existing substation on site and the adjacent industrial buildings, contribute to an increased cumulative visual impact.			

RESIDUAL IMPACTS:	The status quo could be regained after decommissioning of the plant, providing that the site is rehabilitated to its current state.

6.3.8 Assessment of Impact of Erosion on the Landscape

The specific soil type is prone to wind and water erosion. Coupled with the slight angle of the project site and the potential disturbance of the natural vegetation, torrential rains and severe winds have the potential to erode large, disturbed landscapes.

Great care therefore needs to be taken in the construction and operation of the plant to prevent erosion and scouring of the landscape.

Table 11: Impact table summarising the significance of visual impact of erosion.

NATURE:	Potential visual impact on the sensitive receptors in the foreground and the middle ground.	
	Without Mitigation	**With Mitigation**
EXTENT	Site related **(1)**	Site related(**1)**
DURATION	Permanent (**5)**	Long term(**4)**
MAGNITUDE	High(**8)**	Moderate(**6)**
PROBABILITY	Highly probable(**4)**	Probable (**3)**
SIGNIFICANCE	Medium(**56)**	Medium(**33)**
STATUS	Negative	Negative
REVERSIBILITY	Recoverable(**3)**	Recoverable (**3)**
IRRIPLACEABLE LOSS OF RESOURCE?	No	No
CAN IMPACTS BE MITIGATED?	Yes	
MITIGATION:	• Keep disturbed areas to a minimum. • No clearing of land to take place outside the demarcated footprint. • Institute a rigorous planting regime once construction has ceased. • Reintroduce suitable grass species beneath PV 'strings'. • Create stormwater channels alongside access roads and divert stormwater in the natural veld at regular intervals along the road. • Consider installing rainwater tanks to save all water from building roofs. Alternatively, install spreaders at the bottom of downpipes to prevent scouring of the land. • All contractors to adhere to the Environmental Specifications report.	
CUMULATIVE IMPACTS:	The construction of the proposed plant will increase the cumulative visual impact of erosion in the area if not properly managed and maintained. The proposed cumulative impact is considered to be negligible in a local context.	
RESIDUAL IMPACTS:	Should the proposed mitigation measured be introduced, it is possible that the sourcing of the landscape will be prevented altogether. Failing to implement these measures, the impact will remain.	

7 IMPACT STATEMENT

The on-site verification from the selected Key Observation Points and the viewsheds generated from the latter points indicated that the project site is not visible from any observation point, except from the adjacent mine and the Venetia access road, which are both located in the *foreground*.

To this end, the results of the viewshed analysis from the defined Key Observation Points, together with a photograph indicating the actual view have been included under Annexure 1. The assessment findings of the KOPs were categorised as follows:

7.1 Impact on the Middle and Background

A collation of the visual analysis and assessment undertaken from the KOPs situated in the *middle* and *background* zone of visual influence is as follows:

a)	**Visibility:**	Low
b)	**Visual exposure:**	Negligible
c)	**Visual absorption capacity:**	Very high
d)	**Visual sensitivity of receptors:**	Medium
e)	**Visual intrusion:**	Low
f)	**Significance of impact:**	Negligible

7.2 Impact on the Foreground

A collation of the visual impact analysis and assessment from the KOPs situated in the *foreground* is as follows:

a)	**Visibility:**	Low
b)	**Visual exposure:**	Medium
c)	**Visual absorption capacity:**	High
d)	**Visual sensitivity of receptors:**	Medium
e)	**Visual intrusion:**	Low
f)	**Significance of impact:**	Low

The findings of the Visual Impact Assessment for the proposed Venetia PV Plant (Phase 1 and 2) therefore found that the proposed activity will have a **negligible** impact from the *middle* and *background* and a **low** impact from the *foreground*(<1km).

In addition, it should be noted that users of the Venetia access road would not see the proposed 75MW plant directly from the road as the facility will be set back some 250m. A dense natural vegetated buffer is also in existence and will be maintained around the boundary of the site, especially the 20MW project site, as this facility will be located closer to the mentioned road.

The development of sustainable energy sources holds huge benefits for the country as a whole, and would have significant multipliers in the local economy. Not only do renewable energy projects contribute to clean development mechanism, but it would also establish an empowering environment in the region within which the facility is established. Sustainable energy projects should therefore be undertaken to provide the necessary infrastructure and associated amenities to accommodate the industry in an efficient manner. It is therefore crucial that Government would give preference to sustainable energy projects such as the proposed Alldays PV/CPV plan.

Based on the above and the documentation attached under Annexure 1, it is herewith recommended that the proposed activity be approved subject to the conditions described in section 6.3 above and the Environmental Management Programme described in section 8 below.

8 ENVIRONMENTAL MANAGEMENT PROGRAMME

The management plan tables aim to summarise the key findings of the visual impact report and to suggest possible management actions in order to mitigate the potential visual impacts.

Table 12: Environmental Management Programme – Construction Phase

OBJECTIVE: Mitigate the possible visual impact associated with the construction phase.		
Project component/s	Construction site	
Potential Impact	Visual impact of general construction activities and associated impacts.	
Activity/risk source	Potential impact on sensitive receptors within the *foreground*.	
Mitigation: Target/Objective	Minimal visual intrusion by construction activities and general acceptance and compliance with Environmental Specifications.	
Mitigation: Action/control	**Responsibility**	**Timeframe**
An Environmental Control Officer (ECO) must be appointed to oversee the construction process and ensure compliance with conditions of approval.	BioTherm	Pre-construction
Contractor to sign and undertake to comply with Environmental Specifications.	BioTherm	Pre-construction
Demarcate sensitive areas and no-go areas with danger tape to prevent disturbance during construction.	BioTherm / contractor	Pre-construction
Design buildings to reflect the local architecture and sense of place of the Bushveld.	BioTherm / contractor	Pre-construction
Keep disturbed areas to a minimum.	BioTherm / contractor	Throughout construction

Identify suitable areas within the construction site for fuel storage, temporary workshops, eating areas, ablution facilities and washing areas.	BioTherm / contractor	Throughout construction
Institute a solid waste management programme to minimise waste generated on the construction site, and recycle where possible.	BioTherm / contractor	Throughout construction
Reduce and control dust through the use of approved dust suspension techniques as and when required.	BioTherm / contractor	Throughout construction
Construction to occur only during daytime. Should the ECO authorize nightwork, low flux and frequency lighting shall be used.	BioTherm / contractor	Throughout construction
Rehabilitate all disturbed areas in accordance with the development plan.	BioTherm / contractor	Construction
Institute a rigorous planting regime in collaboration with the appointed botanical specialist.	BioTherm / contractor	Construction
Performance Indicator	Construction site is confined to the demarcated areas identified on the Development Plan. No transgression of the Environmental Specifications visible and natural processes occurring freely outside boundaries of the construction site.	
Monitoring	Monitoring to be undertaken by an appointed Environmental Control Officer who will enforce compliance with the Environmental Specifications.	

Table 13: Environmental Management Programme – Operational Phase

OBJECTIVE: Mitigate the possible visual impact associated with the operational phase.		
Project component/s	Photovoltaic 'string' of panels or CSP plant with tower structure and infrastructure such as a security building, workshop and offices.	
Potential Impact	Potential visual intrusion in the area and damage to the natural environment.	
Activity/risk source	Potential impact on sensitive receptors within the *foreground*.	
Mitigation: Target/Objective	A facility that fits in with the landscape, that is well maintained and managed.	
Mitigation: Action/control	**Responsibility**	**Timeframe**
Maintain the general appearance of the facility as a whole (i.e. the PV panels, buildings and associated infrastructure, roads and natural environment).	BioTherm / operator	Throughout operational phase
Maintain access roads to prevent scouring and erosion, especially after rains.	BioTherm / operator	Throughout operational phase

Performance Indicator	Well maintained facility that has a small footprint on the environment. Natural processes continuing to occur unhindered. All actions to be measured against the Operational Phase Environmental Management Plan.
Monitoring	ECO to undertake monitoring functions for a year after construction has been completed to ensure compliance with mitigation measures. Management thereafter to be undertaken by operator.

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ZONE LAND SOLUTIONS
9 MAY 2012

PROPOSED ALLDAYS PHOTOVOLTAIC / CONCENTRATED PHOTOVOLTAIC PLANT

The Farm Gotha No. 102 MS, Musina District, Limpopo Province

ANNEXURE 1

SELECTED OBSERVATION POINT VIEWSHEDS AND ASSESSMENTS

9 May 2012

PROJECT NO: VIA_160412.SA

Produced for:

BioTherm Energy (Pty) Ltd.

Energy

On behalf of:

Savannah Environmental (Pty) Ltd.

ENVIRONMENTAL (PTY) LTD

Produced by:

ZONE LAND SOLUTIONS

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PROPOSED VENITIA PHOTOVOLTAIC PLANT

The Farm Gotha No. 102 MS, Musina District, Limpopo Province

ANNEXURE 2

LIST OF PLANS

9 May 2012

PROJECT NO: VIA_160412.SA

Produced for:

BioTherm Energy (Pty) Ltd.

Produced by:

1 SELECTED OBSERVATION POINT ASSESSMENTS

The selected *observation points* were categorized and assessed in terms of the following assessment criteria.

KEY	DESCRIPTION
NUMBER	Each observation point was allocated a reference number.
CO-ORDINATES	The co-ordinates of each of the observation points are provided.
ALTITUDE	The altitude of the observation point was provided in meters above sea level.
DESCRIPTION	A brief description where the observation point is located is provided.
TYPE	Each observation point is categorized according to its location and significance rating. These criteria include the following: a) Tourist-related corridors, including linear geographical areas visible to users of a route or vantage points. b) Residential Areas.
PHOTOGRAPH	A photograph was taken from each observation point in the direction of the project site to verify the digitally generated view-shed.
PROPERTY LOCATION	The location of the property was described as *foreground*, *middle ground* or *background*.
PROXIMITY	The distance between the observation point and the project site was provided in kilometres.
VISUAL SENSITIVITY OF RECEPTORS	The visual impact considered acceptable is dependent on the type of receptors. A high (e.g. residential areas, nature reserves and scenic routes or trails), moderate (e.g. sporting or recreational areas, or places of work), or low sensitivity (e.g. industrial, mining or degraded areas) was awarded to each observation point.
VISUAL EXPOSURE	Exposure or visual impact tends to diminish exponentially with distance. A high (dominant or clearly visible), moderate (recognizable to the viewer) or low exposure (not particularly visible to the viewer) rating was allocated to each observation point.
VISUAL ABSORPTION CAPACITY (VAC)	The potential of the landscape to conceal the proposed development was assessed. A rating of high (effective screening by topography and vegetation), moderate (partial screening) and low (little screening) was allocated to each observation point.
VISUAL INTRUSION	The potential of the development to fit in with the surrounding environment was determined. The visual intrusion relates to the context of the proposed development while maintaining the integrity of the landscape. A rating of high (noticeable change), moderate (partially fits into the surroundings) or low (blends in well with the surroundings) was allocated.
DURATION	With regard to roads, the distance (in kilometres) and duration (in seconds) for which the property will be visible to the road user, were calculated for each observation point.

2 KEY OBSERVATION POINT 7

KOP7 is situated next to the project site along the Venetia access road as it follows a west-east direction from the R521. The observation point is some 12 km from the R521 and ±75km from the CBD of the town of Musina. The combination of the road orientation in relation to the site and the distance to the project site from the observation point, should, theoretically, offer a good vantage point over the site area. However, the lush natural Mopanie Veld (height 6m to 9m) on the project site and between the site and the observation point, results in general low visibility from this particular point. This creates very limited general visual sensitivity and potential intrusion of the proposed development in the landscape between the observation point and the project site. A portion of the 20m high panels would be visible from this KOP.

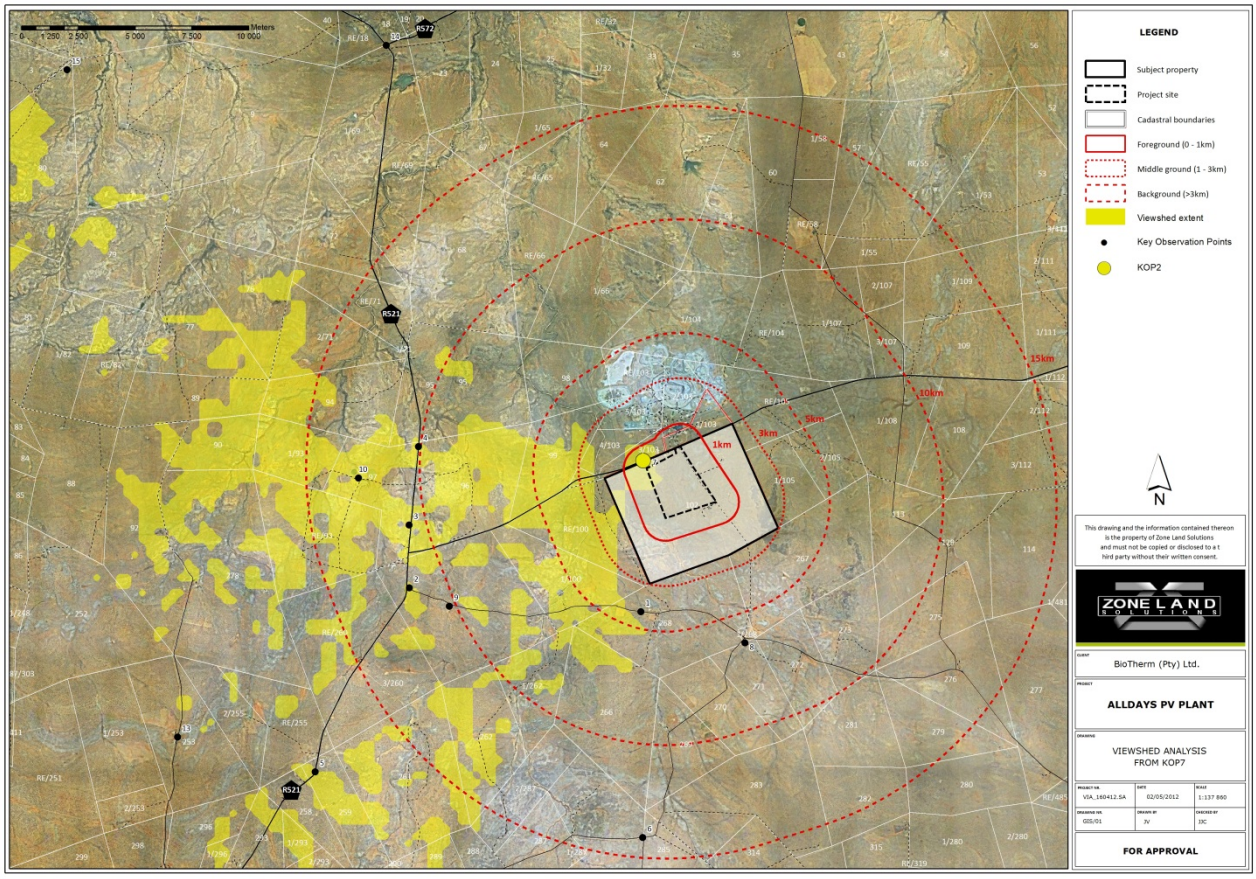


Figure 1: KOP7 Viewshed. Areas shaded yellow is theoretically visible from KOP7.

NUMBER:	KOP7	**CO-ORDINATES:**	**S**	**E**
ALTITUDE:	706 m		22°27'46.48"	29°18'51.00"
DESCRIPTION:	KOP7 is located along the Venetia access road between the Venetia mine and the project site, next to the Venetia mine settlement.			
TYPE:	Local distributor	**PHOTO:**	Photograph 1	
PROP. LOCATION:	Left foreground	**PROXIMITY:**	Adjacent to site	
VISUAL SENSITIVITY:	High			
VISUAL EXPOSURE:	Medium	**VAC:**	Medium	
VISUAL INTRUSION:	Medium	**DURATION:**	10km (intermittedly in east and west direction) 7.5 min @ 80km/h	

Photograph 1: View from KOP7 adjacent to the project site with the Venetia access roadto the right.

Photograph 2: View from the project site towards the Venetia Mine in the north.

3 KEY OBSERVATION POINT 3

KOP3 is situated ±12 km away the project site along the Venetia access road as it intersects with the R521.Despite having a 10 metre height advantage over the project site; the natural vegetation contributes to general low to no visibility from this particular observation point towards the proposed project site.

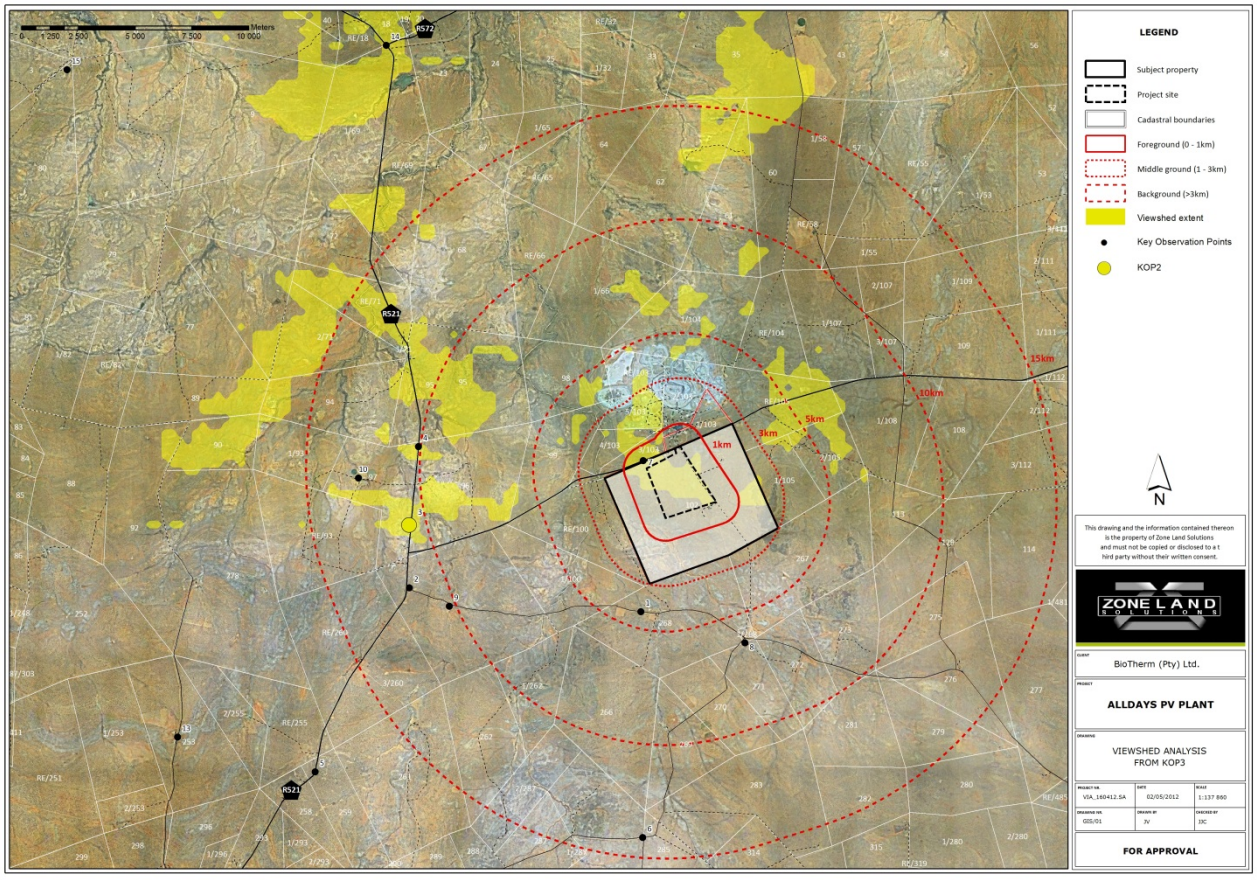


Figure 2: KOP3 Viewshed. Areas shaded yellow is theoretically visible from KOP3.

NUMBER:	KOP3	**CO-ORDINATES:**	**S**	**E**
ALTITUDE:	715 m		22°29'55.80"	29°12'31.50"
DESCRIPTION:	KOP3 is located along the R521 near the Venetia access road.			
TYPE:	Regional road	**PHOTO:**	Photograph 3	
PROP. LOCATION:	Right background	**PROXIMITY:**	±12 km	
VISUAL SENSITIVITY:	Low			
VISUAL EXPOSURE:	Low	**VAC:**	High	
VISUAL INTRUSION:	Low	**DURATION:**	5.3km (intermittedly) 3.18 min @ 100km/h	

Photograph 3: View from the R521 intersection with the Venetia access road towards the project site in the south-east.

4 KEY OBSERVATION POINT 4

KOP4 is situated ±11 km from the project site along the R521in a south-easterly direction towards the site. The silhouette of the upper structures of the Venetia mine is visible in the haze from this KOP. However, despite the topography rising towards KOP4, the natural vegetation again contributes to general low to no visibility from this Key Observation Point towards the proposed project site.

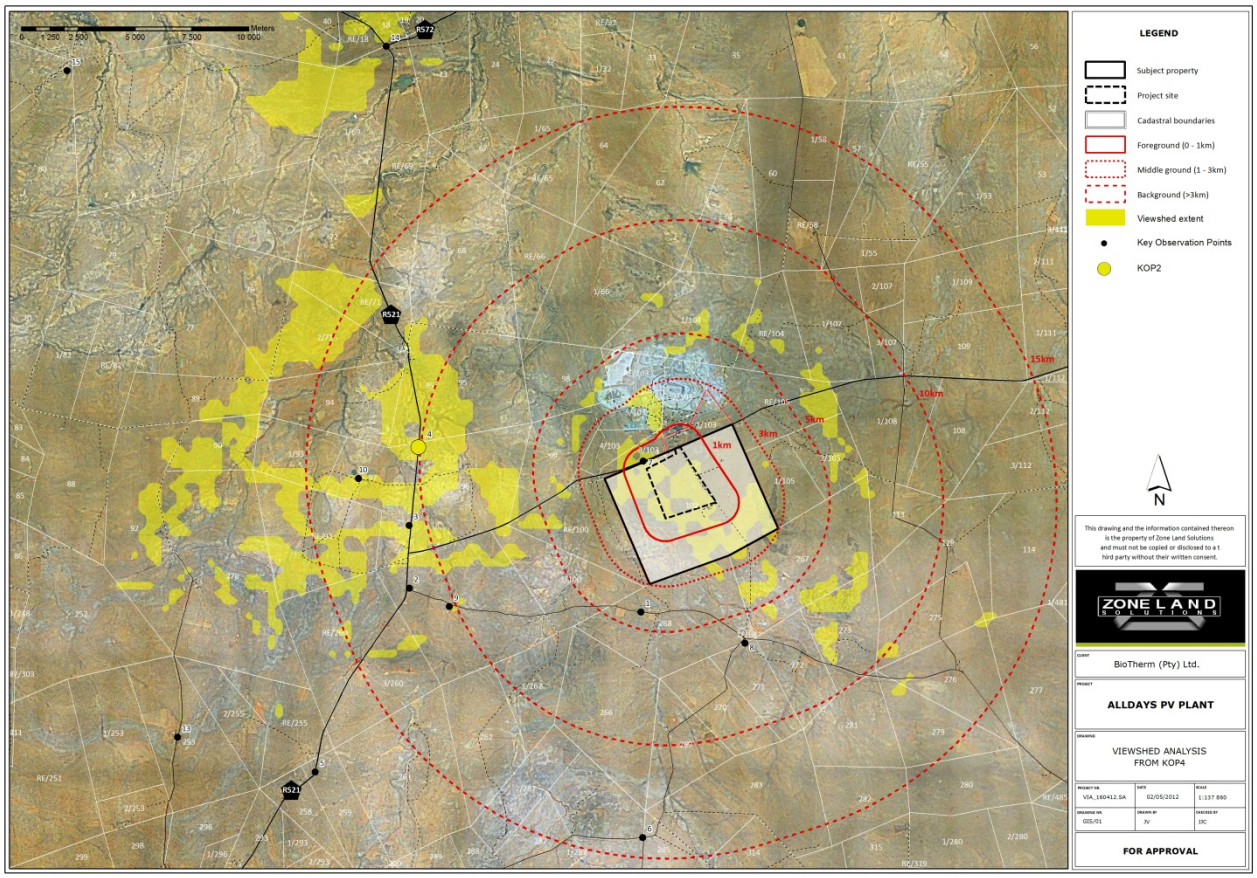


Figure 3: KOP4 Viewshed. Areas shaded yellow is theoretically visible from KOP4.

NUMBER:	KOP4	**CO-ORDINATES:**	**S**	**E**
ALTITUDE:	671 m		22°27'24.90	29°12'45.20
DESCRIPTION:	KOP4 is located along the R521. The photograph is taken eastwards towards the project site and the Venetia mine.			
TYPE:	R521	**PHOTO:**	Photograph 4	
PROP. LOCATION:	Distant background	**PROXIMITY:**	±11 km	
VISUAL SENSITIVITY:	Low			
VISUAL EXPOSURE:	Low	**VAC:**	High	
VISUAL INTRUSION:	Low	**DURATION:**	5.3km (intermittedly) 3.19 min @ 100km/h	

Photograph 4: View ±11km south-eastwards towards the subject site. Note the rise in elevation towards the subject site. The silhouette of the Venetia mine is visible towards the left.

5 KEY OBSERVATION POINT 2

KOP2 is situated ±10 km away from the project site along the R521 at approximately the same height as the project site. As a result of the distance and the vegetation, as described above, the project site is not visible from this KOP.

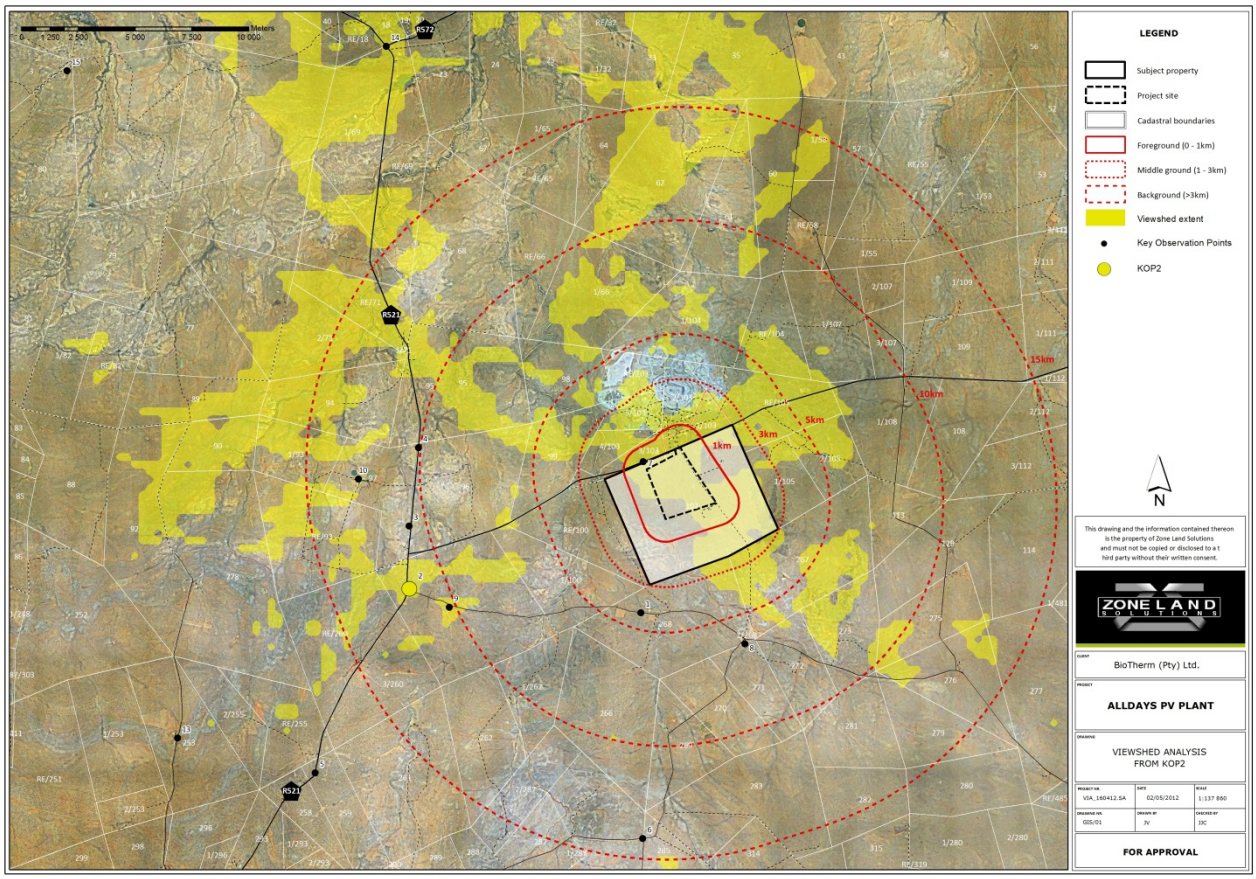
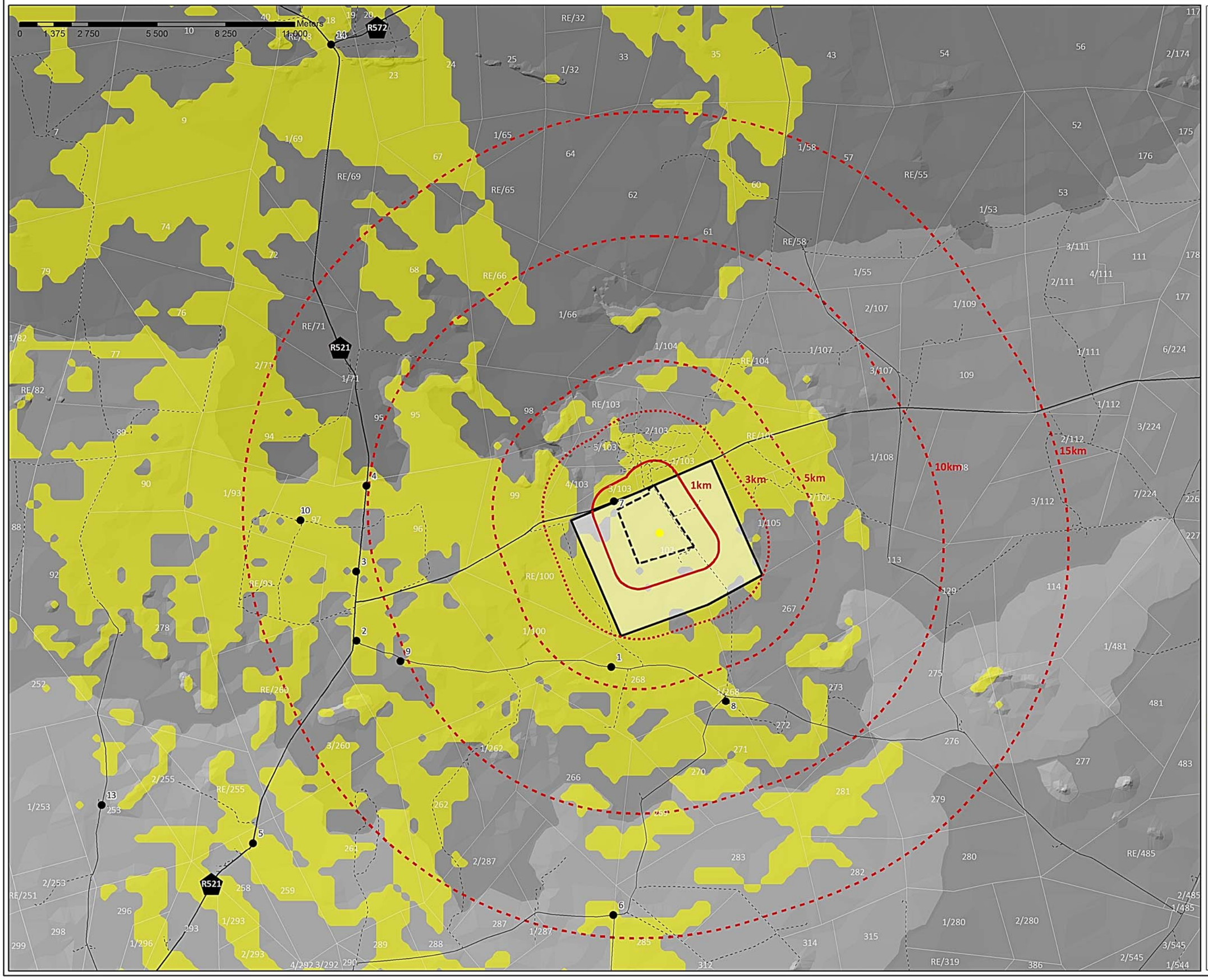


Figure 4: KOP2 Viewshed. Areas shaded yellow is theoretically visible from KOP2.

NUMBER:	KOP2	**CO-ORDINATES:**	**S**	**E**
ALTITUDE:	737m		22°30'47.30''	29°12'25.33''
DESCRIPTION:	KOP2 is located along the R521			
TYPE:	R521	**PHOTO:**	Photograph 5	
PROP. LOCATION:	Distant background	**PROXIMITY:**	±10 km	
VISUAL SENSITIVITY:	Low			
VISUAL EXPOSURE:	Low	**VAC:**	High	
VISUAL INTRUSION:	Low	**DURATION:**	1.2km 0.72sec @ 100km/h	

Photograph 5: View from KOP2 towards the project site.



LEGEND

- Subject property
- Project site
- Cadastral boundaries
- Foreground (0 - 1km)
- Middle ground (1 - 3km)
- Background (>3km)
- Viewshed extent (@20m)
- Key Observation Points
- Centre point of viewshed

N

ZONE LAND SOLUTIONS

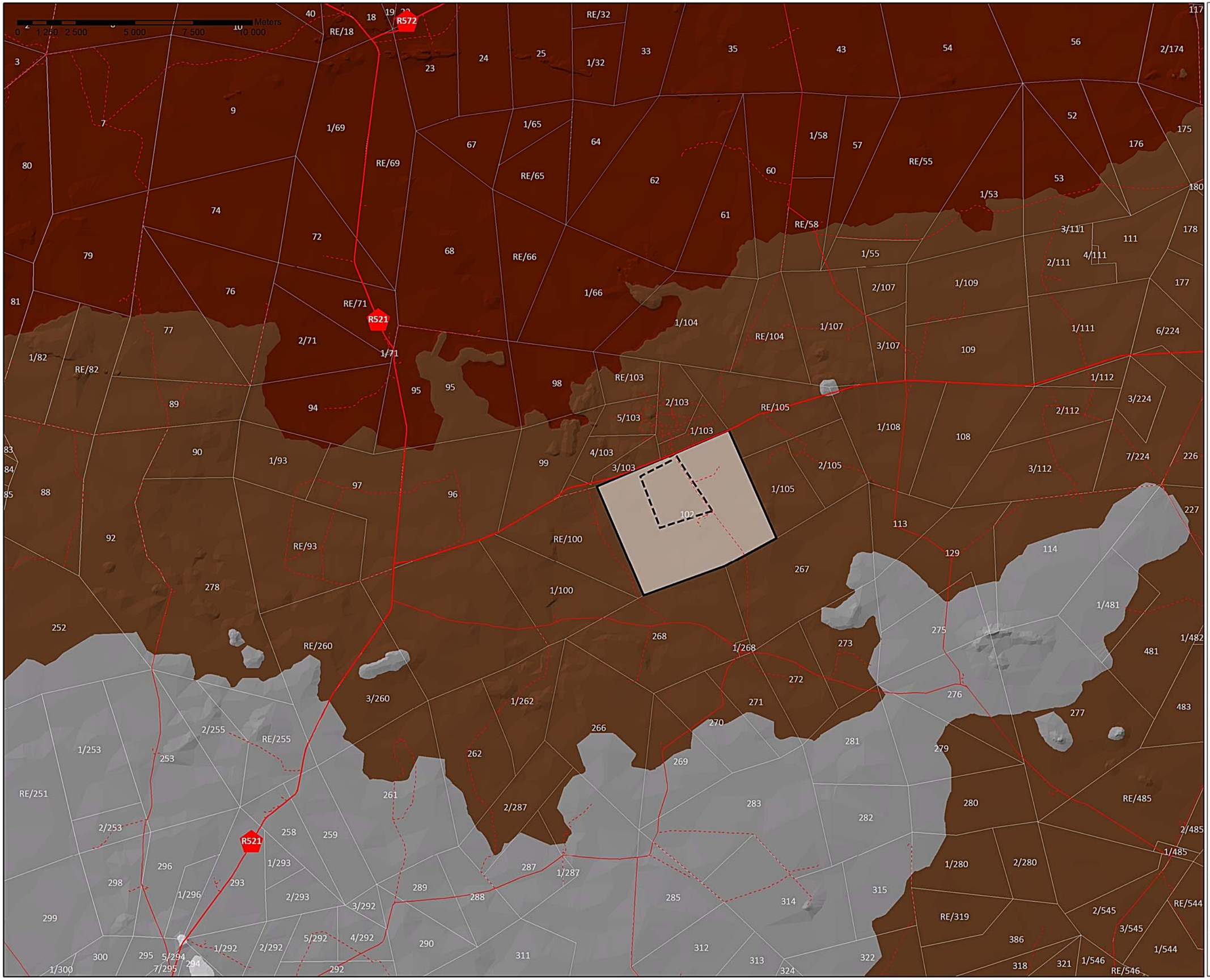
CLIENT
BioTherm (Pty) Ltd.

PROJECT
ALLDAYS PV PLANT

DRAWING
VIEWSHED ANALYSIS
FROM 20M HIGH CENTRE POINT

PROJECT NR.	DATE	SCALE
VIA_160412.SA	02/05/2012	1:137 860
DRAWING NR.	DRAWN BY	CHECKED BY
GIS/01	JV	JJC

FOR APPROVAL



LEGEND

- Subject property
- Project site

Digital Elevation Model

Elevation

- 871.111 - 980
- 762.222 - 871.111
- 653.333 - 762.222
- 544.444 - 653.333
- 435.556 - 544.444
- 326.667 - 435.556
- 217.778 - 326.667
- 108.889 - 217.778
- 0 - 108.889

N

ZONE LAND SOLUTIONS

CLIENT: BioTherm (Pty) Ltd.

PROJECT: **ALLDAYS PV PLANT**

DRAWING: DIGITAL ELEVATION MODEL

PROJECT NR.	DATE	SCALE
VIA_160412.SA	02/05/2012	1:148 265
DRAWING NR.	DRAWN BY	CHECKED BY
GIS/02	JV	JJC

FOR APPROVAL

0 1 250 2 500 5 000 7 500 10 000 Meters

15km
10km
5km
3km
1km

N

LEGEND

- Subject property
- Project site
- Cadastral boundaries
- Foreground (0 - 1km)
- Middle ground (1 - 3km)
- Background (>3km)
- Viewshed extent
- Key Observation Points
- KOP2

ZONE LAND SOLUTIONS

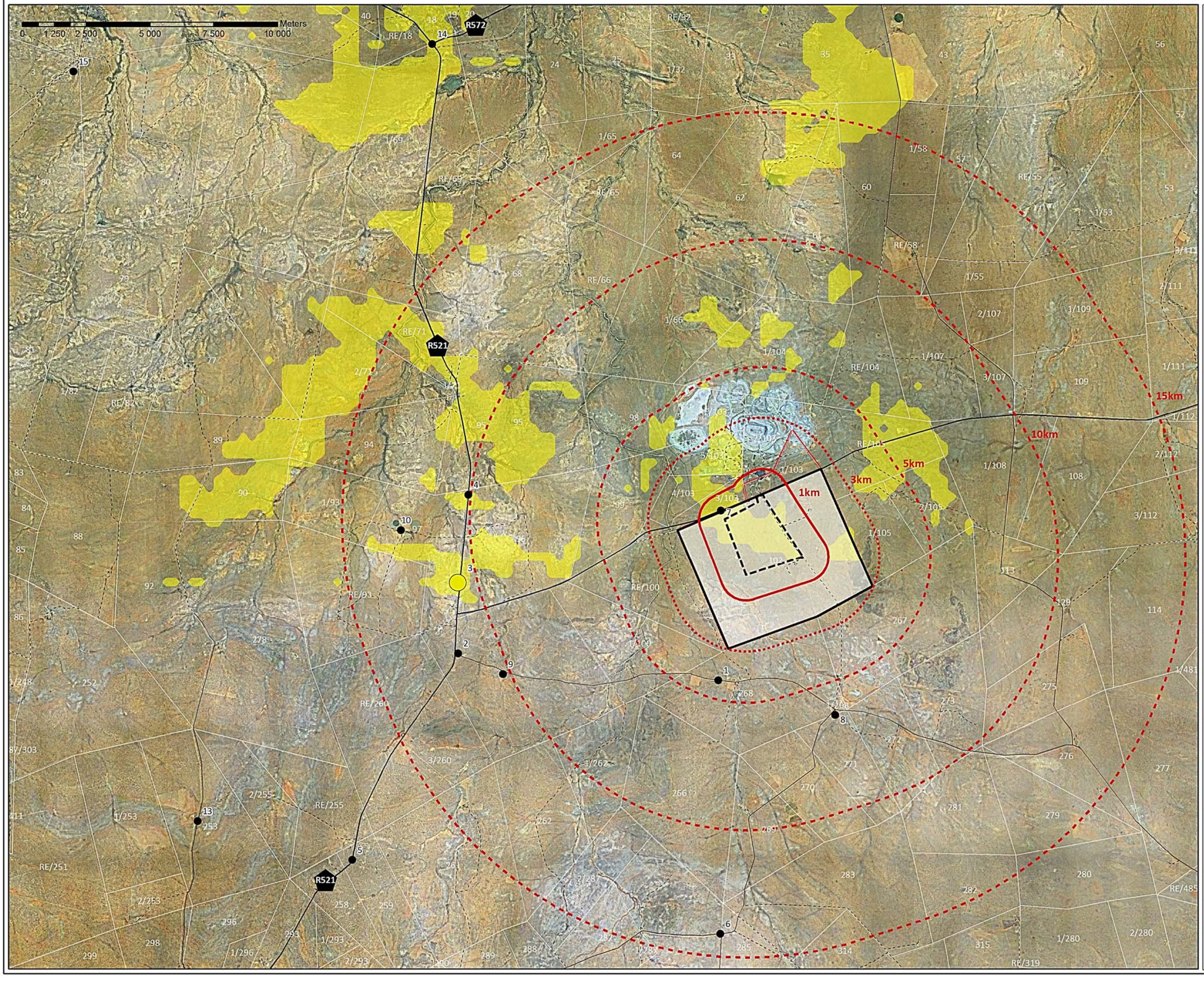
CLIENT
BioTherm (Pty) Ltd.

PROJECT
ALLDAYS PV PLANT

DRAWING
VIEWSHED ANALYSIS
FROM KOP2

PROJECT NR.	DATE	SCALE
VIA_160412.SA	02/05/2012	1:137 860
DRAWING NR.	DRAWN BY	CHECKED BY
GIS/01	JV	JJC

FOR APPROVAL



LEGEND

- Subject property
- Project site
- Cadastral boundaries
- Foreground (0 - 1km)
- Middle ground (1 - 3km)
- Background (>3km)
- Viewshed extent
- Key Observation Points
- KOP2

N

ZONE LAND SOLUTIONS

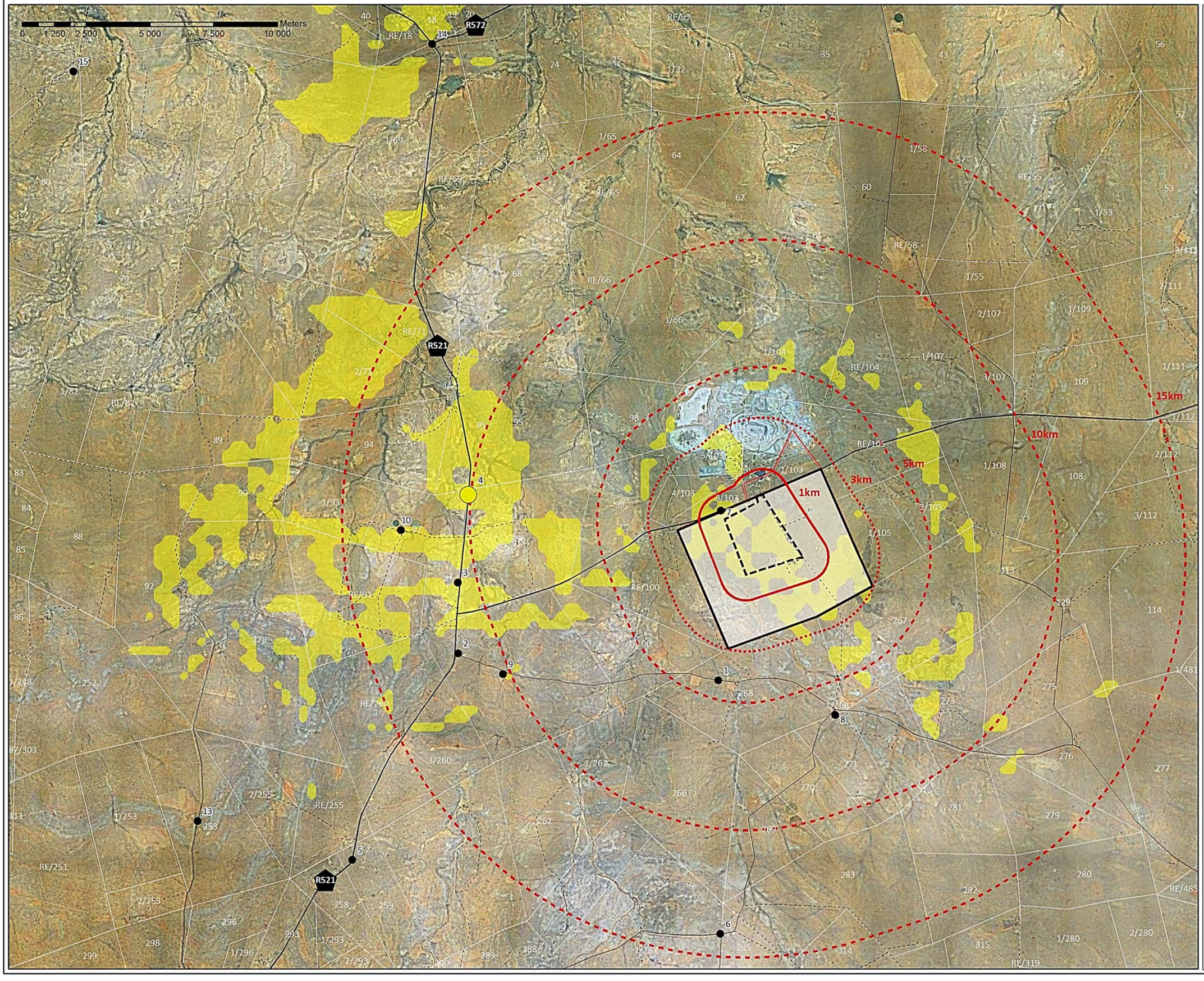
CLIENT
BioTherm (Pty) Ltd.

PROJECT
ALLDAYS PV PLANT

DRAWING
VIEWSHED ANALYSIS
FROM KOP3

PROJECT NR.	DATE	SCALE
VIA_160412.SA	02/05/2012	1:137 860
DRAWING NR.	DRAWN BY	CHECKED BY
GIS/01	JV	JJC

FOR APPROVAL



LEGEND

- Subject property
- Project site
- Cadastral boundaries
- Foreground (0 - 1km)
- Middle ground (1 - 3km)
- Background (>3km)
- Viewshed extent
- Key Observation Points
- KOP2

N

ZONE LAND SOLUTIONS

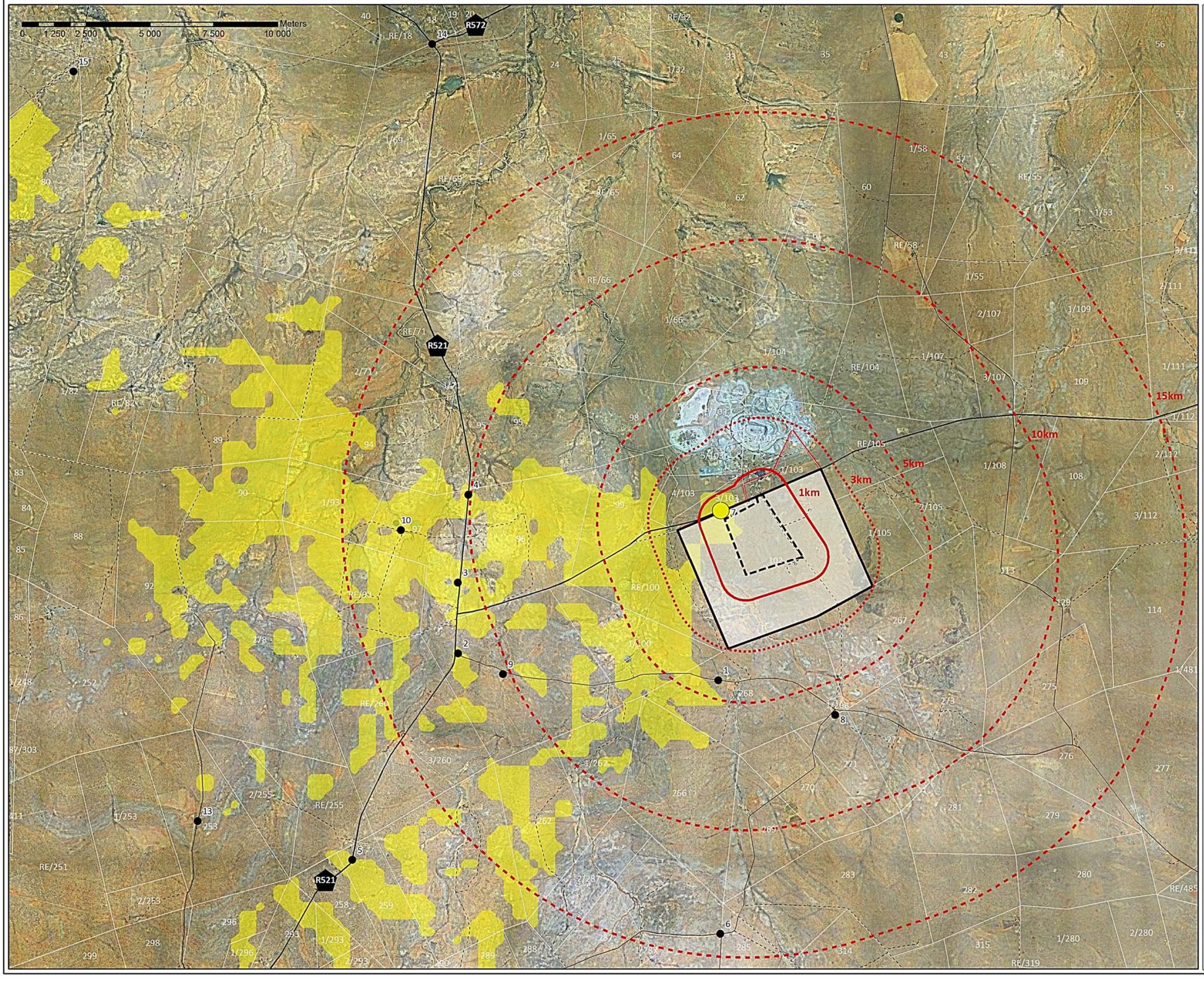
CLIENT
BioTherm (Pty) Ltd.

PROJECT
ALLDAYS PV PLANT

DRAWING
VIEWSHED ANALYSIS
FROM KOP4

PROJECT NR.	DATE	SCALE
VIA_160412.SA	02/05/2012	1:137 860
DRAWING NR.	DRAWN BY	CHECKED BY
GIS/01	JV	JJC

FOR APPROVAL



LEGEND

- Subject property
- Project site
- Cadastral boundaries
- Foreground (0 - 1km)
- Middle ground (1 - 3km)
- Background (>3km)
- Viewshed extent
- Key Observation Points
- KOP2

N

ZONE LAND SOLUTIONS

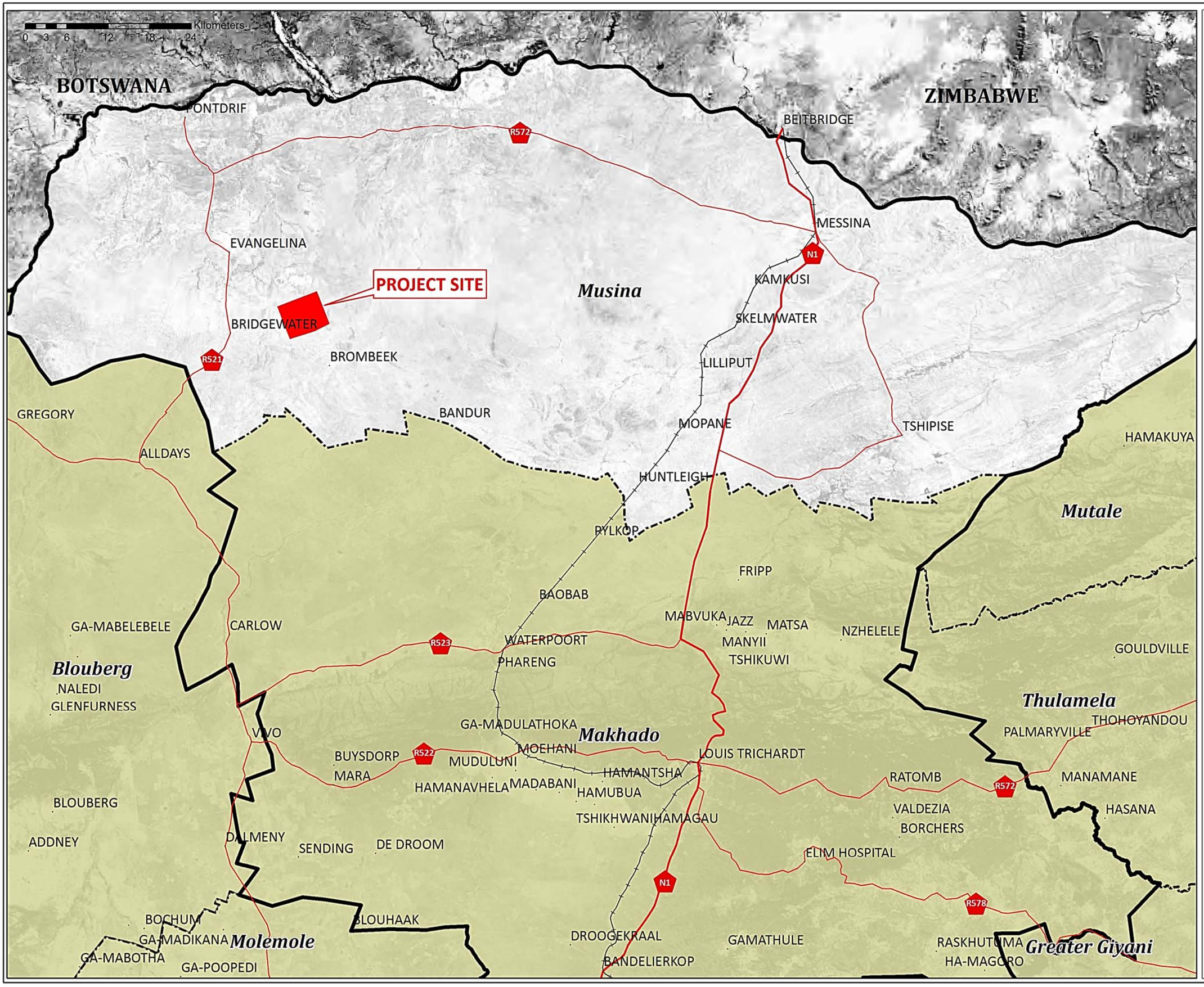
CLIENT: BioTherm (Pty) Ltd.

PROJECT: **ALLDAYS PV PLANT**

DRAWING: VIEWSHED ANALYSIS FROM KOP7

PROJECT NR.	DATE	SCALE
VIA_160412.SA	02/05/2012	1:137 860
DRAWING NR.	DRAWN BY	CHECKED BY
GIS/01	JV	JJC

FOR APPROVAL



LEGEND

- District municipalities
- Local municipalities
- Musina local municipality
- Subject property

N

ZONE LAND SOLUTIONS

CLIENT: BioTherm (Pty) Ltd.

PROJECT: **ALLDAYS PV PLANT**

DRAWING: REGIONAL CONTEXT

PROJECT NR.	DATE	SCALE
VIA_160412.SA	02/05/2012	1:500 000
DRAWING NR.	DRAWN BY	CHECKED BY
GIS/03	JV	JJC

FOR APPROVAL