Botanical Assessment for the Proposed Eskom 132/66 kV Powerline from Romansrivier Substation to Ceres Substation, Witzenberg Municipality, Western Cape

paulemmms
BOTANICAL SURVEYS

Prepared for SRK Consulting

September 2017

National Legislation and Regulations governing this report

This is a 'specialist report' and is compiled in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014.

Appointment of Specialist

Paul Emms was appointed by SRK Consulting (South Africa) (Pty) Ltd to provide specialist botanical consulting services for the proposed Eskom Powerline from Romansrivier substation to Ceres substation, Witzenberg Municipality, Western Cape.

Details of Specialist

Mr Paul Emms Pr. Sci. Nat.

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Expertise

- Qualifications: ND Horticulture, BSc. (Biodiversity & Conservation Biology), Hons. (Botany), MSc (Botany).
- Botanist with seven years' experience in the field of botanical surveys.
- Has conducted over 150 specialist botanical studies.
- Professional registration: South African Council for Natural Scientific Professions No. 400352/14.

THE SPECIALIST

I, Paul Ivor Emms, as the appointed specialist hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that I act as the independent specialist in this application;

- Will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- Declare that there are no circumstances that may compromise my objectivity in performing such work;
- Have expertise in conducting the specialist reports relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- Will comply with the Act, regulations and all other applicable legislation;
- Have no, and will not engage in, conflicting interests in the undertaking of the activity;
- Will undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- Realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist: PEmms

Date: 12 September 2017

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1. Introduction

Eskom Holdings SOC (Ltd) Western Cape Operating Unit (Eskom) currently supply electricity to customers via a network linked between the Romansrivier substation and Witzenberg substation. The existing electricity supply consists of a single circuit line from Romansrivier only. The supply line is fragile in the sense that any line breaks would result in over 3000 customers being without electricity for several months should a major fault occur. To address the fragility of the network and increase electrical supply to the region, Eskom is undertaking to construct a new double circuit powerline (132kV and 66kV) in two phases from the Romansrivier substation to the Witzenberg substation. The first phase includes the Romansrivier substation to Ceres substation; the focus of this study. The second phase will be implemented at a later stage between Ceres and Witzenberg substations, via a new substation in Prince Alfred's Hamlet.

Eskom has appointed SRK Consulting (South Africa) (Pty) Ltd (SRK) to undertake a Basic Assessment (BA) process as required in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the EIA Regulations, 2014. A key component in the Environmental Authorization (EA) process is to provide baseline information and impact assessment regarding the affected vegetation within the project area. Paul Emms was appointed by SRK to carry out the baseline botanical investigation and impact assessment.

2. Project description

Key aspects of the project include:

- Construction of a double circuit powerline (132kV and 66kV) between Romansrivier and Ceres substations (~20 km);
- Construction of new access roads and bridges; and
- Upgrading of various existing roads.

The study area encompasses a 300 m corridor (150 m each side of the currently proposed route), between the Ceres substation and Romansrivier substation, spanning 20 km in length. Access roads fall outside the corridor in places (indicated in Section 7.4).

3. Terms of Reference

3.1. General Terms of Reference

Botanical assessments must follow guidelines as set out in the following documents:

- Department of Environmental Affairs and Development Planning (DEA&DP) Guidelines for Involving Biodiversity Specialists in the EIA Process (Brownlie, 2005);
- Ecosystem Guidelines for Environmental Assessment in the Western Cape (Cadman *et al*., 2016);
- The requirements of CapeNature for providing comments on agricultural, environmental, mine planning and water-use related applications; and
- Appendix 6 of the Environmental Impact Assessment Regulations, 2014 (Government Gazette, 2014).

3.2. Specific Terms of Reference

- Describe the existing baseline characteristics of the study area and place this in a regional context. Include a description of biodiversity patterns at a community and ecosystem level (main vegetation type, plant communities in the vicinity and threatened/vulnerable ecosystems), at species level (threatened Red List species, protected species, presence of alien species) and in terms of significant landscape features;
- Describe the sensitivity of the site and its environs; and map these resources;
- Undertake a site walk-through with other specialists, SRK and Eskom to determine the final location of infrastructure based on ecological, visual and cultural (archaeological and palaeontological) sensitivity of the study area;
- Identify and assess potential impacts of the project and the alternatives, including impacts associated with the construction and operation phases, using SRK's prescribed impact rating methodology (Appendix 1);
- Indicate the acceptability of alternatives and recommend a preferred alternative;
- Identify and describe potential cumulative impacts of the proposed development in relation to proposed and existing developments in the surrounding area;
- Recommend mitigation measures to avoid and/or minimise impacts and/or optimise benefits associated with the proposed project; and
- Recommend and draft a monitoring campaign, if applicable.

4. The Study Area

4.1. Locality

The study area includes two components located as follows:

1. Powerline: a 20 km long x 300 m wide corridor orientated in a north-south direction between the Romansrivier and Ceres substations (Figures 1 and 2);
2. Access roads: various service roads found within, or in some instances outside, the 300 m corridor. These would consist of either temporary or permanent access roads and require either new access routes or upgrading of old roads.

A brief description of the 300 m corridor is provided below:

Romansrivier substation to White Bridge: a series of farms, traversing the upper hillslopes on the eastern side of the farms and west of the Witteberg Nature Reserve.

White Bridge to Ceres Substation: this section includes the Michell's Pass portion of the route. The route follows the valley in an easterly direction from White Bridge on the southern side of the Breede River before turning north and crossing the Dwarsrivier at several points. The section to the north of the Wittels River tributary falls within the Ceres Mountain Fynbos Reserve. At the northern end of Michell's Pass the route passes over a section of mountain to the Ceres Substation.

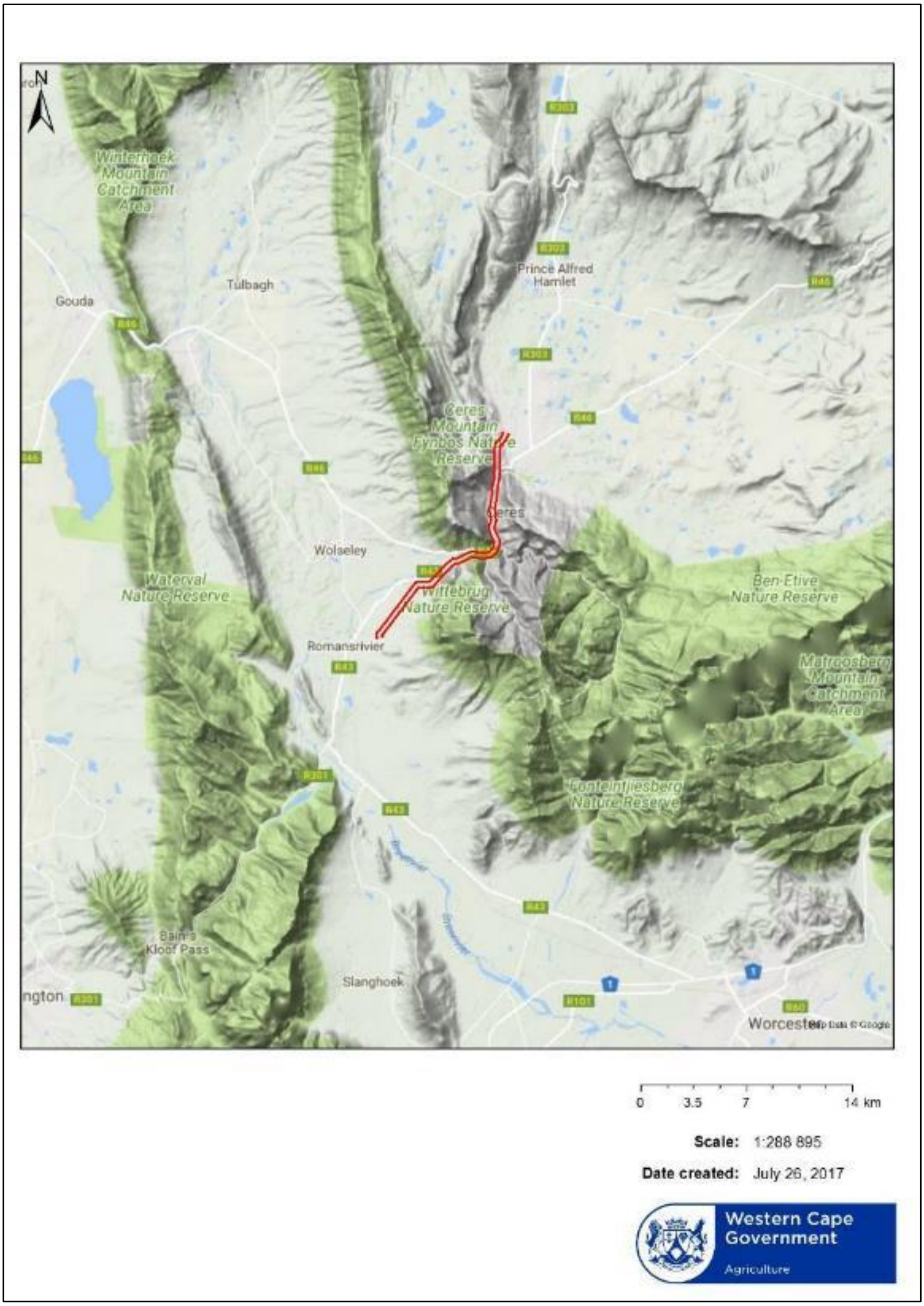

Figure 1. Locality map of the study area (red line) in relation to local towns and places, Western Cape (Chief Director, National Geo-spatial Information).

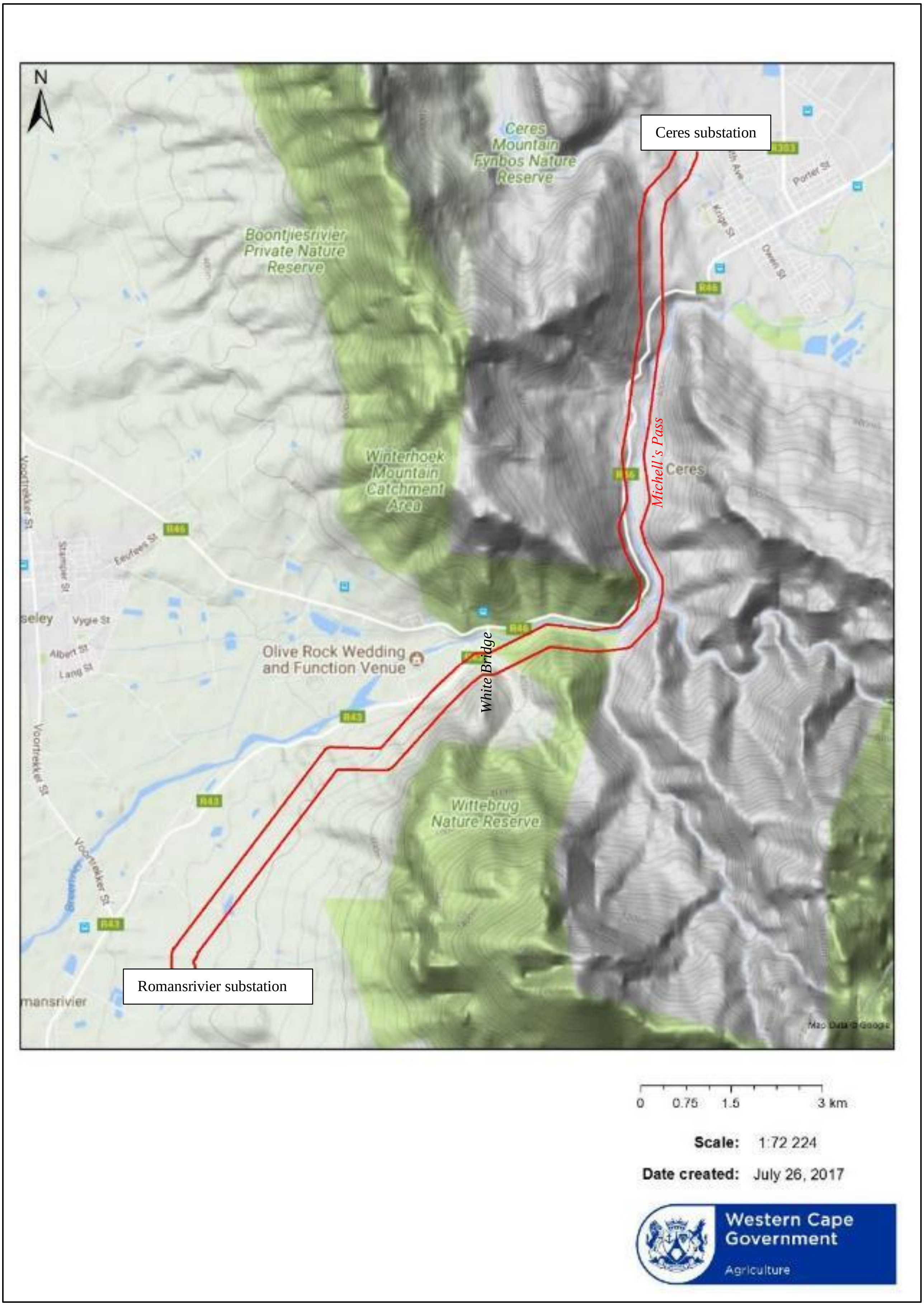

Figure 2. The study area (300 m corridor: red lines) in relation to Romansrivier and Ceres substations (Chief Director, National Geo-spatial Information).

4.2. Geology, topography and soils

The study area is characterised by a varying landscape with rugged mountains, flats, valleys and gently undulating hills. The soil types correspond to vegetation types that are indicated in Figure 4 as described by Rebelo *et al.* (2006 in Mucina & Rutherford, 2006):

North Hex Sandstone Fynbos/ Winterhoek Sandstone Fynbos: *"Acidic lithosol soil derived from Ordovician sandstone of the Table Mountain Group."*

Ceres Shale Renosterveld: *"Clays derived from shale and sandstone of the Ceres Group and to a lesser extent the Biedouw Subgroups of the Bokkeveld Group."*

Breede Shale Fynbos: *"Acidic, moist clay-loam, Glenrosa or Mispah forms derived from Bokkeveld Shale, underlain by rocks of the Malmesbury Group."*

Breede Alluvium Fynbos: *"Quaternary alluvial deposits consisting of round cobbles embedded in fine loamy sand over metasediments of the Malmesbury Group and Bokkeveld Group shales."*

Northern Inland Shale Band Vegetation: *"Clays derived from the Cederberg Formation."*

4.3. Climate

The study area falls within a Mediterranean climate; experiencing cool wet winters and warm dry summers. Mean annual precipitation (MAP) varies from 370—1350 mm (mean: 790 mm) with peak rainfall period from May to August (Rebelo *et al.* 2006 in Mucina & Rutherford, 2006) (Figure 3). Mean daily maximum and minimum temperatures are 26.7˚C and 3.1 ˚C for February and July respectively. Frost incidence is 10-30 days per year (Rebelo *et al.* 2006 in Mucina & Rutherford, 2006).

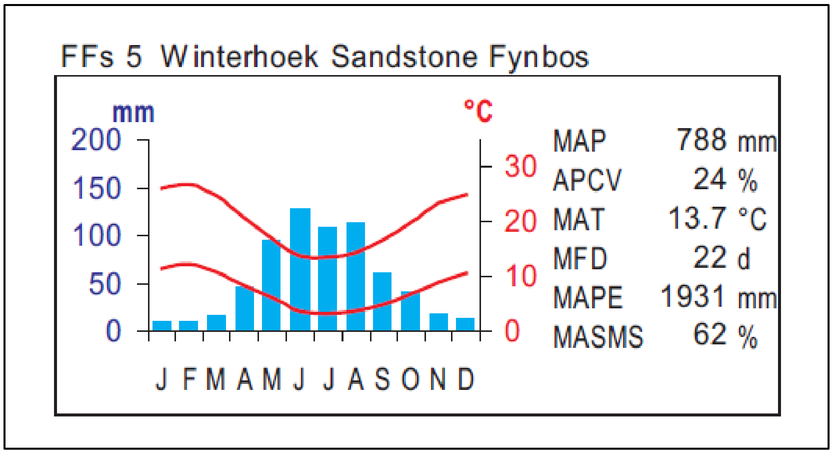

Figure 3. Climatic diagram of the Winterhoek Sandstone Fynbos ecosystem. Blue bars show the median monthly precipitation. The upper and lower red lines show the mean daily maximum and minimum temperature respectively. MAP: Mean Annual Precipitation; APCV: Annual Precipitation Coefficient of Variation; MAT: Mean Annual Temperature; MFD: Mean Frost Days (days when screen temperature was below 0˚C); MAPE: Mean Annual Potential Evaporation; MASMS: Mean Annual Soil Moisture Stress (% of days when evaporative demand was more than double the soil moisture supply) (Rebelo *et al.* 2006 in Mucina & Rutherford, 2006).

5. Evaluation Method

A site survey was carried out on 8, 9 and 10 May 2017 on foot and by vehicle. During this site visit baseline information was obtained. A second site visit was carried out on 23 and 24 May 2017 with the Eskom project team, SRK and the specialist team. Approximately eight hours were spent on site for each survey day. The purpose of the second site visit was to flag sensitive and No Go areas so that design changes could be made thereby having the lowest possible environmental impact given engineering constraints of the project. Sample waypoints were recorded to evaluate the ecological condition and to map each habitat type. Waypoints were logged with a Garmin GPSmap 64. Sample photographs were georeferenced. The vegetation cover was mapped using a combination of waypoints and GIS software. The sensitivity of the site was determined using the following criteria:

- *Ecological condition*: this is the actual condition of the various habitats, which considers (1) quality of the vegetation; (2) species composition; (3) disturbance regime; (4) degree of intactness; (5) the spatial connectivity of the site with adjoining habitats; (6) and non-botanical elements that form part of the broader biodiversity picture and that inform to what degree the botanical component supports biodiversity.

- *Ecosystem status:* informed by the List of Threatened Terrestrial Ecosystems (Government Gazette, 2011). The ecosystems are based on the vegetation types classified in *The Vegetation of South Africa, Lesotho and Swaziland* (Mucina & Rutherford, 2006).
- *Biodiversity planning*: the Western Cape Biodiversity Spatial Plan (WCBSP): Witzenberg Municipality (CapeNature 2017) is the most up to date biodiversity plan that indicates where Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs) have been assigned. The shapefiles of WCBSF were obtained from Biodiversity GIS (bgis.sanbi.org).
- *Important species*: the presence or absence of threatened (i.e. Red List), protected and ecologically important species informs the ecological condition and sensitivity of the site.
- *Botanical literature*: where identified areas of sensitivity may be of relevance in past botanical reports and/or literature.

6. Limitations, assumptions and information gaps

Aspects of the study that are limited by information gaps include the following:

Incomplete components of the project design: including finalization of access roads, which were not provided at the time of the initial site visits, and that were still in the process of designed during the walk-through. Since the construction of access roads was identified as having the highest impact (more than powerline and tower construction), it constitutes the main limitation and information gap. The access roads could not always be precisely assessed with the available information at the time of the site visits, however, since sampling was carried out within these habitat types for the proposed tower positions, impacts could be assessed with a sufficient degree of confidence.

Accessibility of the study area: access to a number of sections of the study area on private property was not possible in some areas since multiple properties needed to be accessed and landowners were not always available to grant access to their properties. Strategic sampling was required along with desktop analysis in inaccessible areas, which was deemed to be sufficient of the purposes of the study.

Seasonality: the time of the year that the survey was carried out was not conducive to identifying geophyte (bulb) species since these were mostly dormant at the time. Most geophytic species of the area flowers in spring (August to October). The assessment was based on gauging sensitivity from observable species and the vegetation condition but since geophytes were not visible it was not possible to map where these occur, which, in part, limits the accuracy of the study but not to the degree that impacts cannot be assessed sufficiently.

Fire timing: areas that were burnt within only a short time period prior to visiting portions of Michell's Pass did not contain any visible vegetation. In such instances assumptions and predictions were made based on sampling and knowledge of the vegetation cover nearby. This limits the study since ecologically important species and species of conservation concern would not have been visible at the time of the survey.

7. The Vegetation

7.1. General description

The study area encompasses six vegetation types when viewed in relation to *The Vegetation of South Africa, Lesotho and Swaziland* (VEGMAP) (Rebelo *et al*. 2006 in Mucina & Rutherford, 2006). These include (1) Winterhoek Sandstone Fynbos, (2) Ceres Shale Renosterveld, (3) North Hex Sandstone Fynbos, (4) Breede Shale Fynbos, (5) Breede Alluvium Fynbos, and (6) Northern Inland Shale Band Vegetation (Figure 4). According to the VEGMAP the dominant vegetation units, in terms of percentage cover, are Winterhoek Sandstone Fynbos, North Hex Sandstone Fynbos and Breede Shale Fynbos. A description of each of the vegetation types and associated landscape features, as described by Rebelo *et al* (2006 in Mucina & Rutherford, 2006), is provided below:

Winterhoek Sandstone Fynbos

"Moderately undulating high plain in the west, with rugged high peaks in the south and southeast, and two linear parallel north-south high mountains in the east, dissected by the Olifants River Valley. The eastern blocks are relatively flat, south- and north-sloping, dissected tablelands. Vegetation is mainly close restioland in deeper moister sands, with low, sparse shrubs that become denser and restios less dominant in the drier habitats. Proteoid and ericaceous fynbos are common on higher slopes while asteraceous fynbos is more common on lower slopes. Cape thicket is prominent on the lower slopes."

Ceres Shale Renosterveld

"Moderately undulating plains and lower mountain slopes supporting medium tall cuppressoid-leaved shrubland dominated by renosterbos. Heuweltjies are prominent in places."

North Hex Sandstone Fynbos

"North-facing steep and gentle slopes from foothills to high mountain peaks. The dominant restiolands often have a proteoid overstorey. Asteraceous fynbos found on lower slopes."

Breede Shale Fynbos

"Steep and upper slopes below mountains grading to slightly undulating plains, well dissected by rivers. Vegetation is a moderately tall and dense shrubland—mostly restioid, proteoid and asteraceous (mesotrophic) fynbos. A remarkably tall and dense post-fire component dominates early seral communities on wetter slopes."

Breede Alluvium Fynbos

"Slightly undulating plains in and adjacent high mountains, with numerous alluvial fans and streams. Open emergent tall proteoids in a moderately tall shrub matrix with a graminoid understorey. Asteraceous and proteoid fynbos are dominant. With localised restioid fynbos and ericaceous fynbos."

Northern Inland Shale band Vegetation

"Fynbos includes all structural types ; it is often quite grassy in character, and usually waboomveld occurs at lower altitudes."

7.2. Conservation status

The national List of Threatened Terrestrial Ecosystems in South Africa lists two of the vegetation types as threatened (Government Gazette, 2011). These are (a) Breede Alluvium Fynbos, listed as ENDANGERED due to irreversible loss of habitat (criterion A1), and (b) Ceres Shale Renosterveld, listed as VULNERABLE under the same criterion (Table 1). The remaining vegetation types are all Least Threatened.

Table 1. Ecosystem status with regard to transformation of habitat; level of protection (*Maree, 2014) and related species of special concern (^Government Gazette, 2011).

Vegetation type	^Ecosystem status	^Criterion	*Original extent of Ecosystem	*Remaining natural area of ecosystem	*Proportion of ecosystem target protected	~Known number of species of special concern	National conservation target
Winterhoek Sandstone Fynbos	Least Threatened	None	113 467 ha	94%	278%	Data deficient	29%
North Hex Sandstone Fynbos	Least Threatened	None	39 397 ha	94%	270%	Data deficient	29%
Breede Shale Fynbos	Least Threatened	None	31 806 ha	70%	104%	Data deficient	30%
Ceres Shale Renosterveld	Vulnerable	A1	49 162 ha	46%	2.7%	7 Red Listed plant species (EX, EW, CR, EN & VU) and 3 endemic plant species	27%
Breede Alluvium Fynbos	Endangered	A1	50 156 ha	40%	13%	52 Red Listed plant species (EX, EW, CR, EN & VU) and 21 endemic plant	30%
North Inland Shale Band Vegetation	Least Threatened	None	27 270 ha	95%	270%	Data deficient	29%

EX = Extinct, EW = Extinct in the wild, CR = Critically endangered, VU D2 = Vulnerable

National conservation target (Rouget *et al.* 2004).

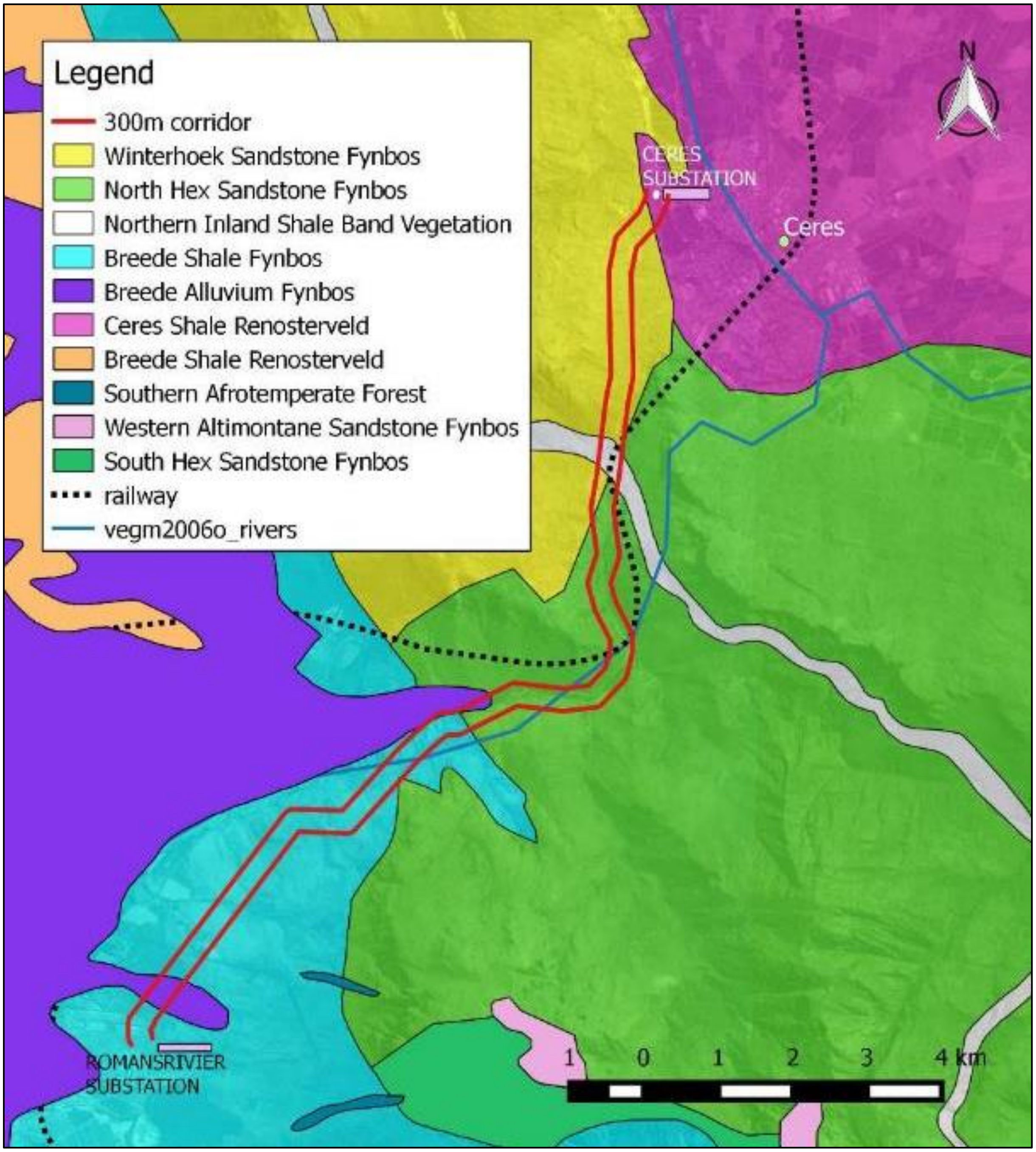

Figure 4. VEGETATION MAP: The study area superimposed on a map portion of *The Vegetation Map of South Africa, Lesotho and Swaziland* (SANBI, 2012) overlaid on a Google Earth ™ satelllite image.

7.3. Biodiversity plans

The Western Cape Biodiversity Spatial Plan 2017 (WCBSP) is a biodiversity planning assessment that delineates priority biodiversity and spatial (land) features such as Critical Biodiversity Areas

(CBAs) and Ecological Support Areas (ESAs) in order to safegaurd the *“continued existence and functioning of species and ecosystems, including the delivery of ecosystem services, across terrestrial and freshwater realms”* (CapeNature 2017). The purpose of the WCSBP is to inform sustainable development, including (a) development planning, (b) environmental assessemnt and regulation, (c) natural resource protection and management in the broader sense. The plan assigns four biodiversity planning categories when viewed in relation to the study area (Figures 5A, 5B and 5C show the entire study area and magnified maps for areas of high sensitivity). These include:

Protected Area: formally protected areas.
CBA 1 (Critcal Biodiversity Area 1): areas likely to be in a natural condition.
ESA 1 (Ecological Support Area 1): ecological support areas likely to be in a naturtal, near natural or moderalety degraded condition.
ESA 2 (Ecological Support Area 2): ecological support areas likely to be a in severely degraded condition or have no natural cover remaining and require restoration, where feasible.

Protected areas include the land between the Ceres substation and White Bridge (including Michell’s Pass). A substational proportion of the remaining land south of White Bridge (towards Romansrivier substation) comprises CBA 1 and ESA 1 sites.

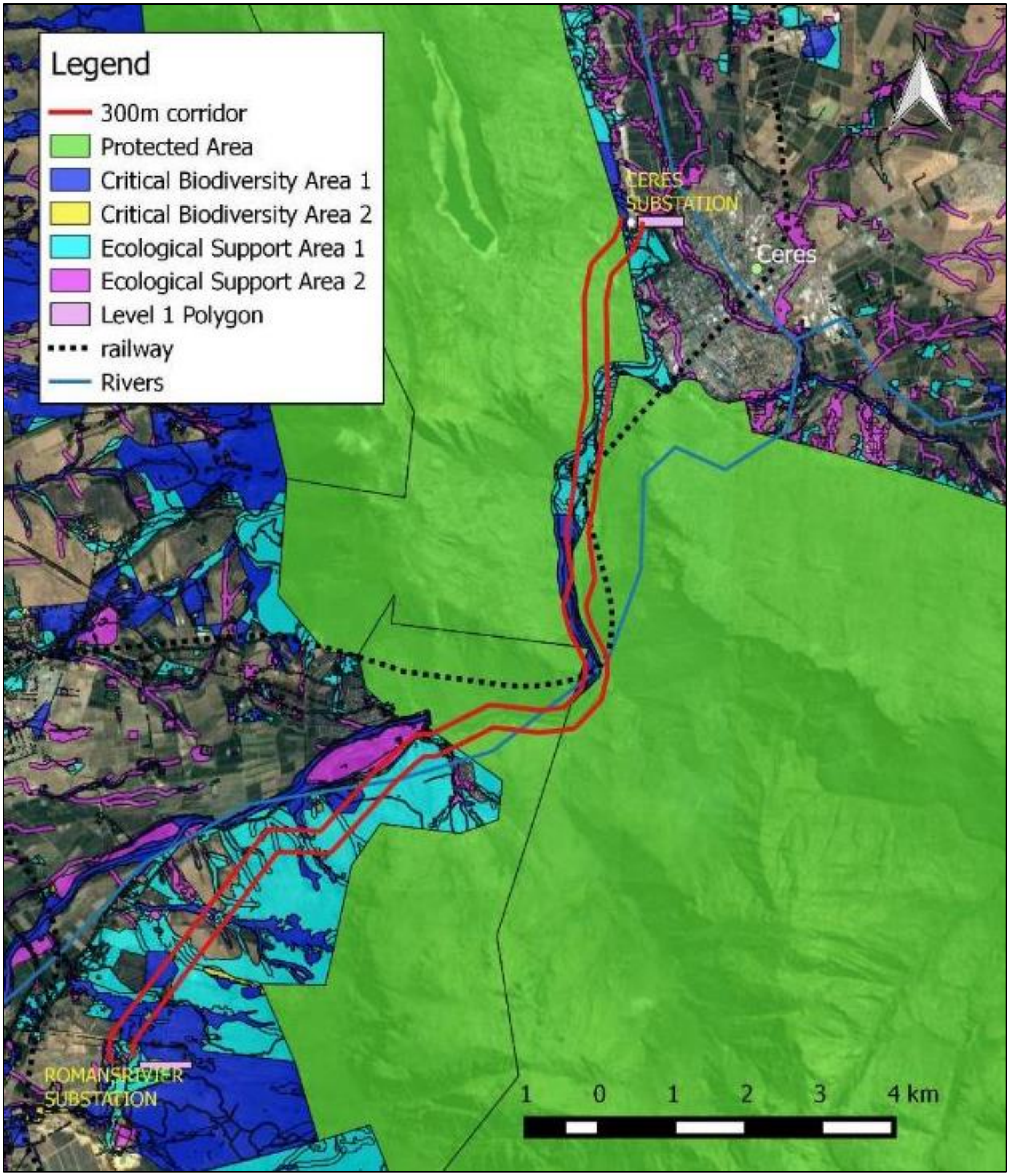

Figure 5. CONSERVATION PLANNING MAP: The study area in relation to the Western Cape Biodiversity Spatial Plan (CapeNature, 2017) overlaid on a Google Earth ™ satelllite image.

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7.4. The Vegetation and Sensitivity of the study area

A detailed description of the vegetation along the 300 m corridor is provided in tabular format below. The information is presented directionally from north to south (Ceres to Romansrivier substations) since this was deemed the most practical direction in which to survey the area.

The vegetation descriptions provide the basis for assigning a sensitivity rating. Sensitivity maps are presented in this section with the accompanying habitat maps. Sensitivity, as defined by SRK, refers to "*the capacity of an environment to tolerate disturbance (taking the environment's natural capacity to recover from disturbance as well as existing cumulative impacts into account).*" The sensitivity ratings include (a) very low, (b) low, (c) medium, (d) high, and (e) very high. Sensitivity is derived from the following:

1. Ecosystem status: based on the threat status of vegetation types (i. Least Threatened, Vulnerable, Endangered and Critically Endangered).
2. Ecological condition: based on ecological condition of the vegetation units shown in the habitat maps.
3. Conservation plans: presence or absence and ground-truthing of Critical Biodiversity Areas (CBA), Ecological Support Areas (ESA), and Protected Areas.
4. Degree of fragmentation likely to be imposed by the project: considers the overall effects at a local scale.
5. Presence of important species: ecologically important and/or threatened species, or species endemic to the area that may be affected.

Table 2. Description of sensitivity categories.

Sensitivity rating	Description
Very Low	Usually transformed habitats with no remaining natural vegetation and with no to very limited spatial ecological function.
Low	Usually degraded areas with compromised ecological integrity and low species diversity. Potentially important from a spatial ecological perspective.

Medium	Usually intact vegetation with functioning ecological processes in Least Threatened and sometimes threatened ecosystems.
High	Intact vegetation or special habitats (e.g. wetlands) with functioning ecological processes in ecosystems ranging from Least Threatened to Critically Endangered. May include ESAs, CBAs and Protected areas. Habitats are highly susceptible to loss of habitat and fragmentation and should only be impacted under certain conditions; assessed on a case by case basis.
Very High	Intact vegetation or very special habitats (e.g. wetlands, indigenous forests or species of conservation concern) with functioning ecological processes in ecosystems ranging from Least Threatened to Critically Endangered. May include ESAs, CBAs and Protected areas. Habitats are highly susceptible to loss of habitat and fragmentation and should never be impacted.

<table>
<tr><th>Illustrations</th><th>Affected area</th></tr>
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Figure 6.1.1. View of the proposed position of Tower 66. A rockwood tree (*Heeria argentea*) falls within the footprint.

Figure 6.1.2. Graminoid-dominated vegetation at waypoint 0121 (33°22'10.69"S; 19°17'23.84"E) with extensive wetlands.
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CERES SUBSTATION TO MICHELL'S PASS

The major part of the proposed powerline route between Ceres substation and Romansrivier substation traverses intact natural vegetation. The section between Tower 67 and waypoint 0011 (33°21'48.14"S; 19°17'40.57"E) traverses transformed wetland habitat. Thereafter, from waypoint 0011 southwards the routes continues through rugged mountainous terrain comprising dryland vegetation (Figure 6.1.1) intersected by numerous seeps and watercourses (Figure 6.1.2). [Note that a separate wetland study compiled by Day (pers. comm. 2017) address wetland impacts associated with this project.] The section between the Ceres substation and Michell's Pass differs to the Michell's Pass section by having almost no invasive alien plant species.

Dominant species: *Anthospermum aethiopicum, Cliffortia ruscifolia, Dodonaea viscosa, Erica* spp., *Ehrharta ramosa* subsp*. aphylla, Heeria argentea, Heterolepis aliena, Othonna parviflora, Rafnia angulata, Metalasia acuta*, *Stoebe plumosa*. Restioids are the dominant growth form. These include *Askidiosperma* sp*., Elegia filacea, Elegia stipularis, Restio capensis, Hypodiscus aristatus, Restio dispar, Restio* sp*.* and *Thamnochortus lucens.*
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Illustrations	Affected area
 **Figure 6.1.3.** Permanently wet seep located at waypoint 0201 (33°22'39.89"S; 19°17'24.42"E) with dense cover of *Elegia cuspidata* and invasive long-leaved wattle (*Acacia longifolia*).  **Figure 6.1.4.** Permanent wet seep above (north) Michell's Pass at waypoint 0251 (33°22'48.05"S; 19°17'23.57"E), dominated by *Leucadendron salicifolium,* with wild almond (*Brabejum stellatifolium*) occurring at the edges.	**CERES SUBSTATION TO MICHELL'S PASS** The permanent seeps and seasonal wetlands are distinctive habitats that support different plant communities (Figures 6.1.32 and 6.1.4). These are usually dominated by restioids but also contain shrubs and trees including *Leucadendron salicifolium, Brabejum stellatifolium, Metrosideros angustifolia* and *Cannamois virgat*a. Notable wet areas were found at the following localities: *Seasonally wet* • Waypoint 0101 (33°22'7.69"S; 19°17'24.14"E). *Permanently wet* • Waypoint 0201 (33°22'39.89"S; 19°17'24.42"E) (Figure 6.1.3). • Waypoint 0251 (33°22'48.05"S; 19°17'23.57"E) (Figure 6.1.4).

Illustrations	**Affected area**
 **Figure 6.1.5.** The proposed access road and site of the proposed suspension bridge crossing leading to Tower 64, showing restiolands punctuated with *Leucadendron salignum* (yellow shrubs) and *Protea laurifolia* (blue-green shrubs and trees) at waypoint 105 (33°21'56.29"S; 19°17'23.88"E).  **Figure 6.1.6.** The proposed access route (south view) to Tower 64 at waypoint 106 (33°21'59.61"S; 19°17'24.97"E).	**CERES SUBSTATION TO MICHELL'S PASS (Access road)** The proposed access road leading to Tower 64 and Tower 65 traverses restiolands with high cover of *Leucadendron salignum* (Figure 6.1.5). The proposed route traverses a stream that supports high numbers of Cape gum (*Metrosideros angustifolia*). The stream crossing would require a suspension bridge for vehicle access. The habitat south of waypoint 105 changes to almost pure restiolands with very low cover of *Leucadendron salignum* (Figure 6.1.6). The remaining towers (i.e. 63-59) leading to Michell's Pass, would not require access roads since tower construction would be helicopter assisted.

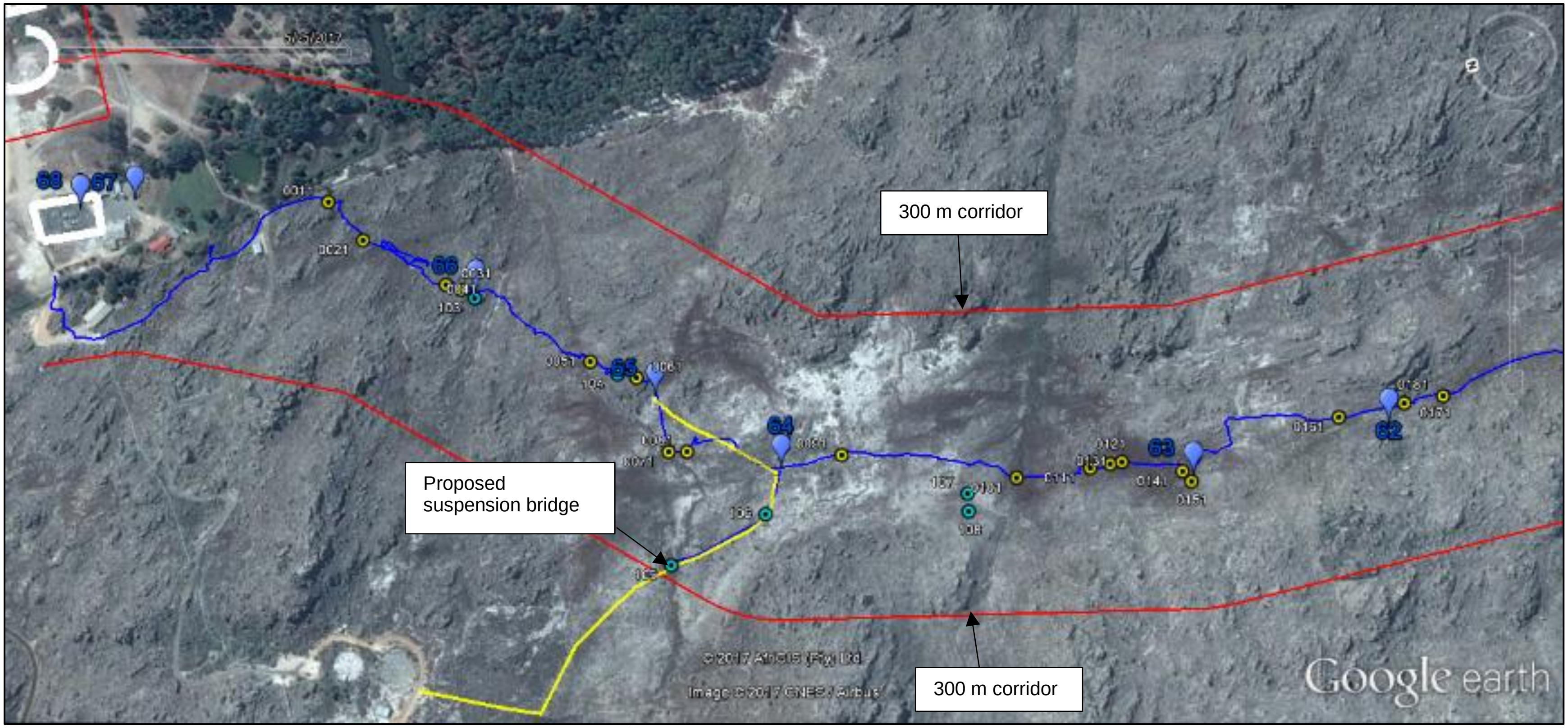


Figure 6.2.1. SURVEY MAP: Google Earth™ aerial image showing 300 m corridor (outer two parallel red lines) for the proposed 132/66kV powerline showing waypoints 0011 to 0171 (numbered yellow and turquoise circle icons), proposed tower locations (numbered blue balloon icons) and proposed access road (yellow line). The survey tracks are indicated by the blue lines. Note the position of the north arrow on the rotated image.

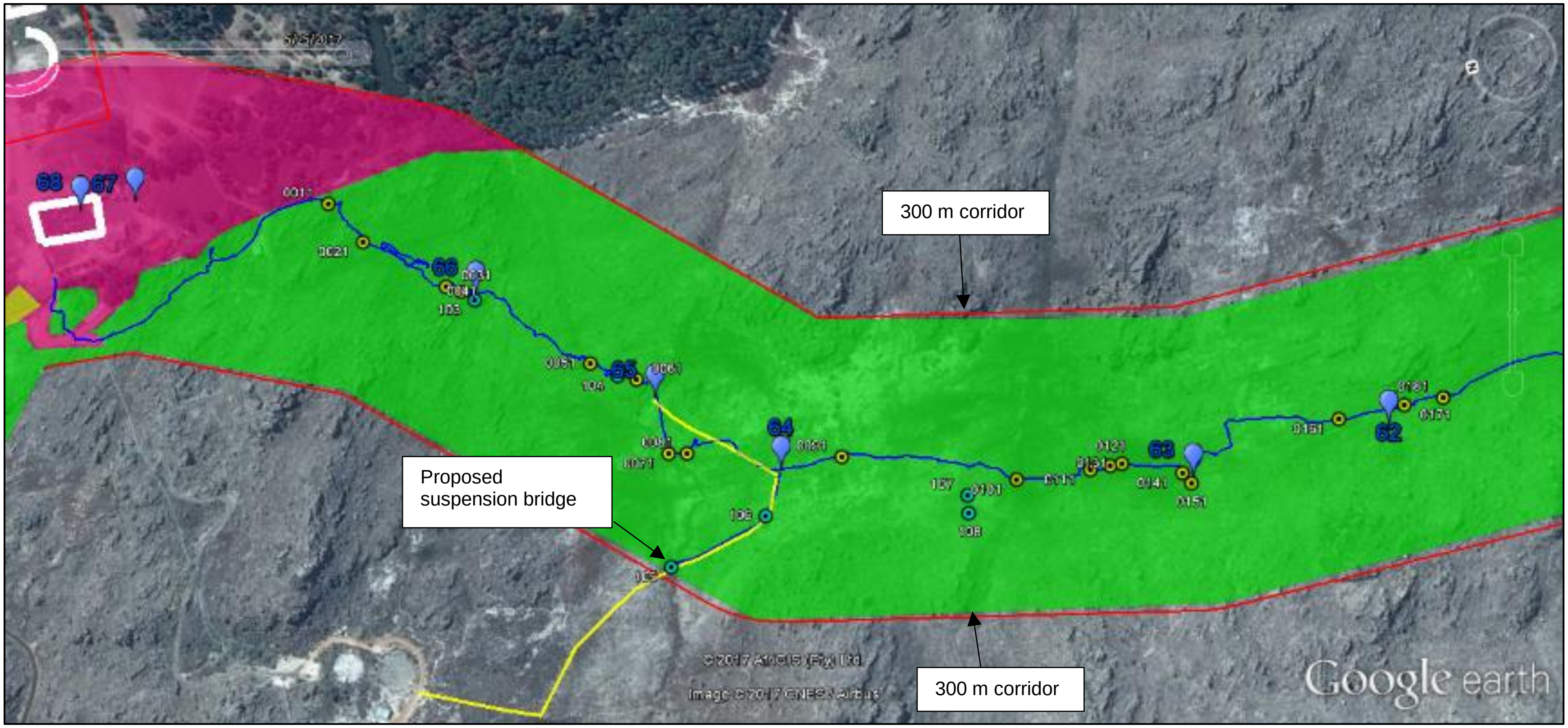


Figure 6.2.2. HABITAT MAP: Google Earth™ aerial image showing 300 m corridor (outer two parallel red lines) for the proposed 132/66kV powerline, showing the broad habitat types (green = intact vegetation; pink = transformed), waypoints 0011 to 0171 (numbered yellow and turquoise circle icons), proposed tower locations (numbered blue balloon icons) and proposed access road (yellow line). The survey tracks are indicated by the blue lines. Note the position of the north arrow on the rotated image.

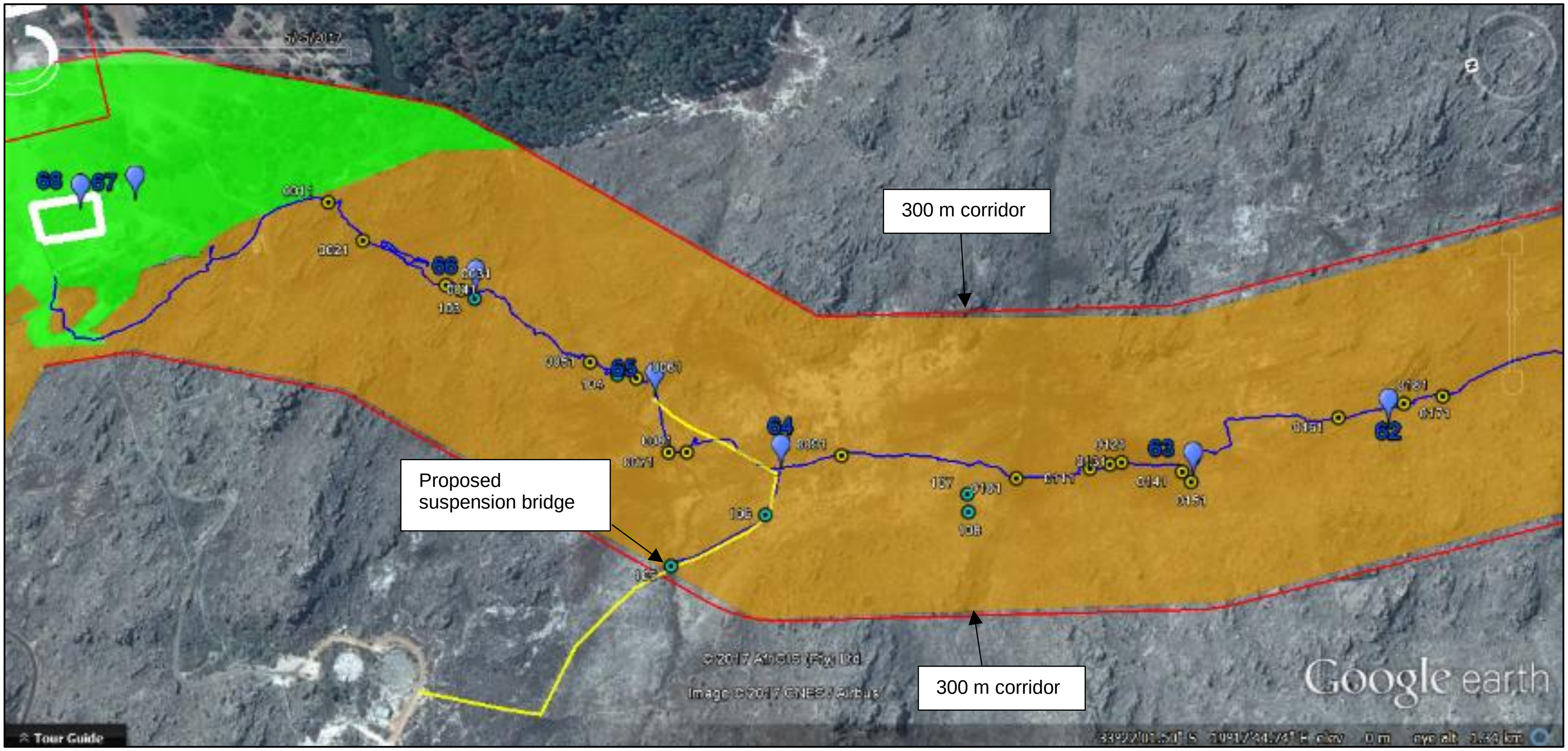


Figure 6.2.3. SENSITIVITY MAP: Google Earth™ aerial image showing 300 m corridor for the proposed 132/66kV powerline (outer two parallel red lines) showing the sensitivity (light orange = medium sensitivity; bright green = low sensitivity), waypoints 0011 to 0171 (numbered yellow and turquoise circle icons), proposed tower locations (numbered blue balloon icons) and proposed access road (yellow line). The survey tracks are indicated by the blue lines. Note the position of the north arrow on the rotated image.

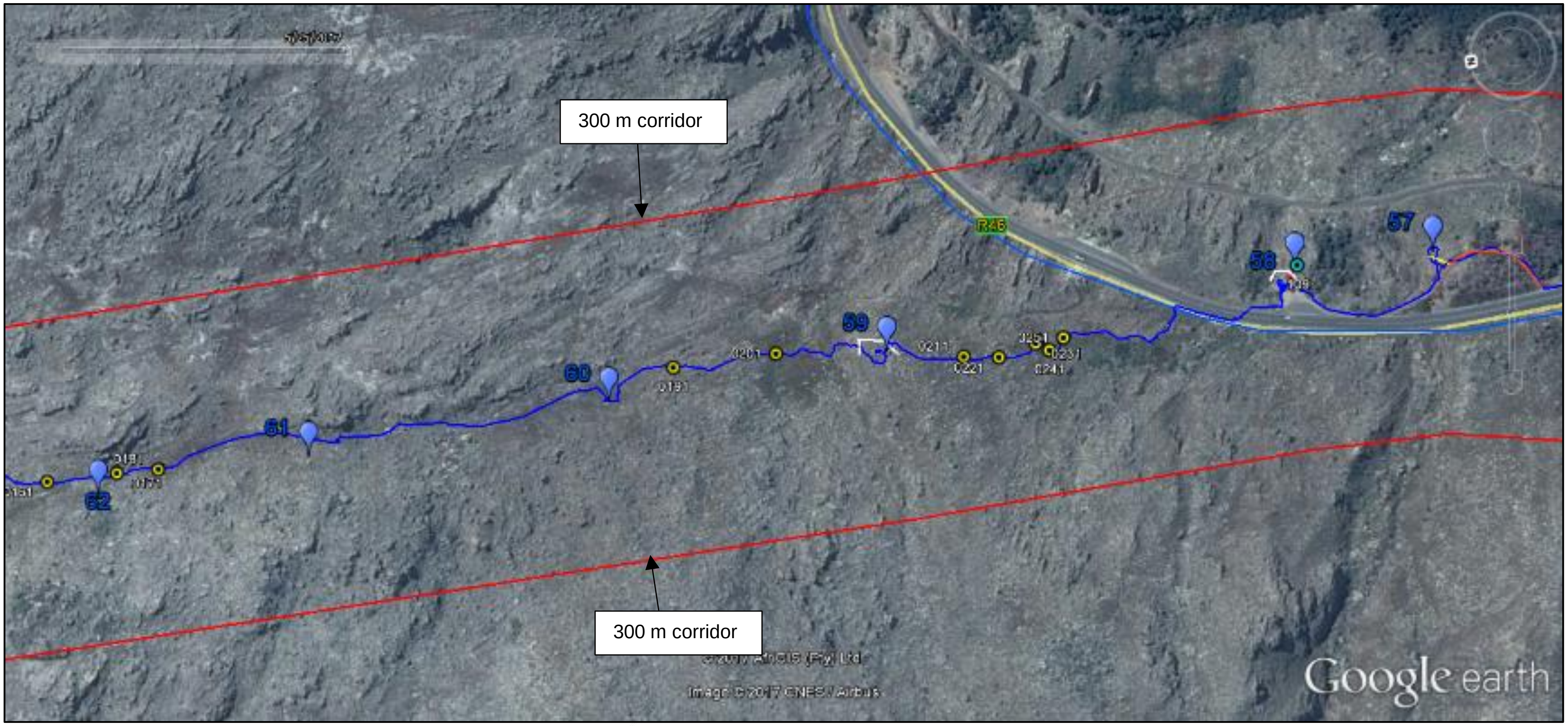


Figure 6.2.4. SURVEY MAP: Google Earth™ aerial image showing 300 m corridor (outer two parallel red lines) for the proposed 132/66kV powerline showing waypoints 0181 to 109 (numbered yellow and turquoise circle icons), proposed tower locations (numbered blue balloon icons) and existing access road (orange line at far right). The survey tracks are indicated by the blue lines. Note the position of the north arrow on the rotated image.

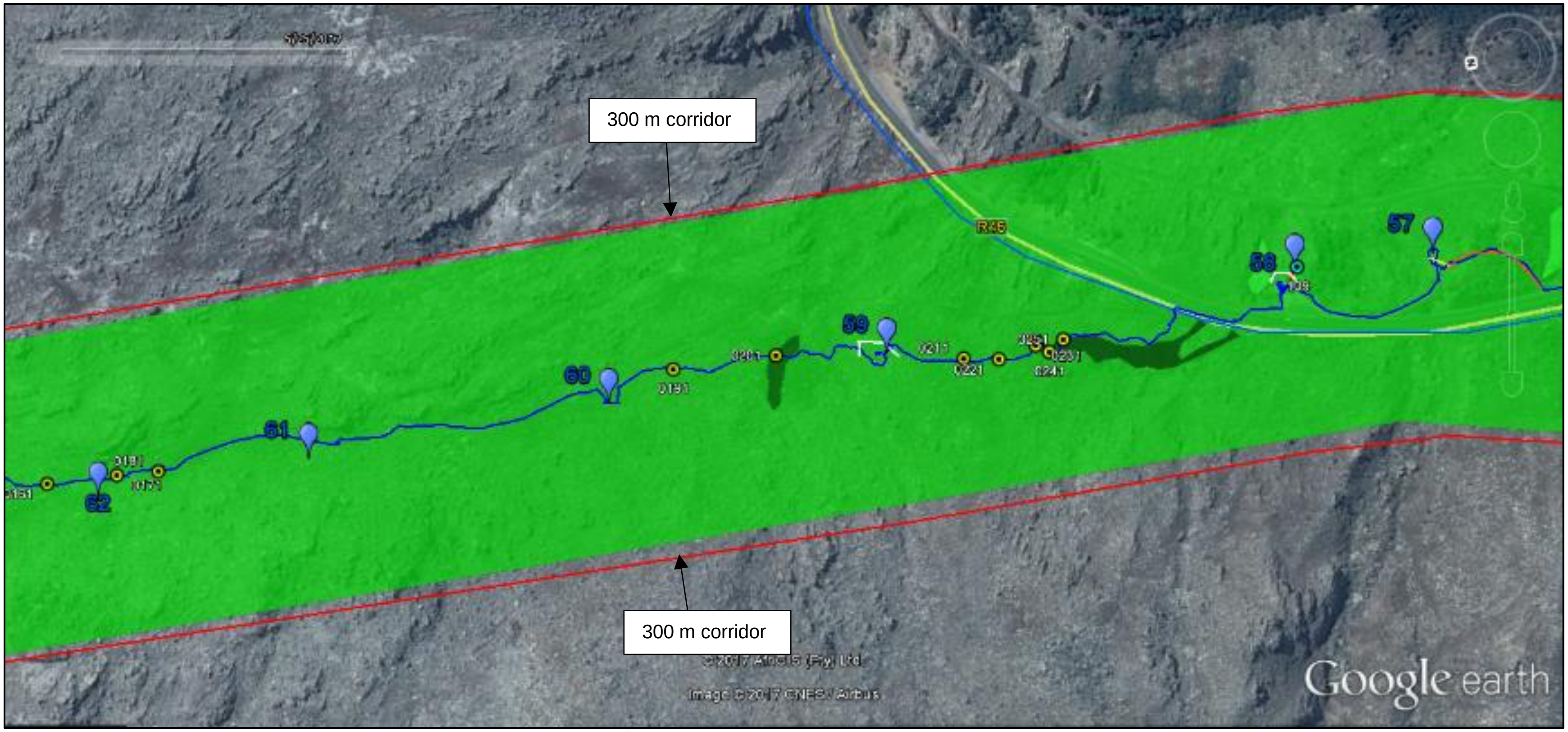


Figure 6.2.5. HABITAT MAP: Google Earth™ aerial image showing 300 m corridor (outer two parallel red lines) for the proposed 132/66kV powerline, showing the broad habitat types (bright green = intact vegetation; dark green = permanent wet seeps), waypoints 0181 to 109 (numbered yellow and turquoise circle icons), proposed tower locations (numbered blue balloon icons) and existing access road (orange line at far right). The survey tracks are indicated by the blue lines. Note the position of the north arrow on the rotated image.

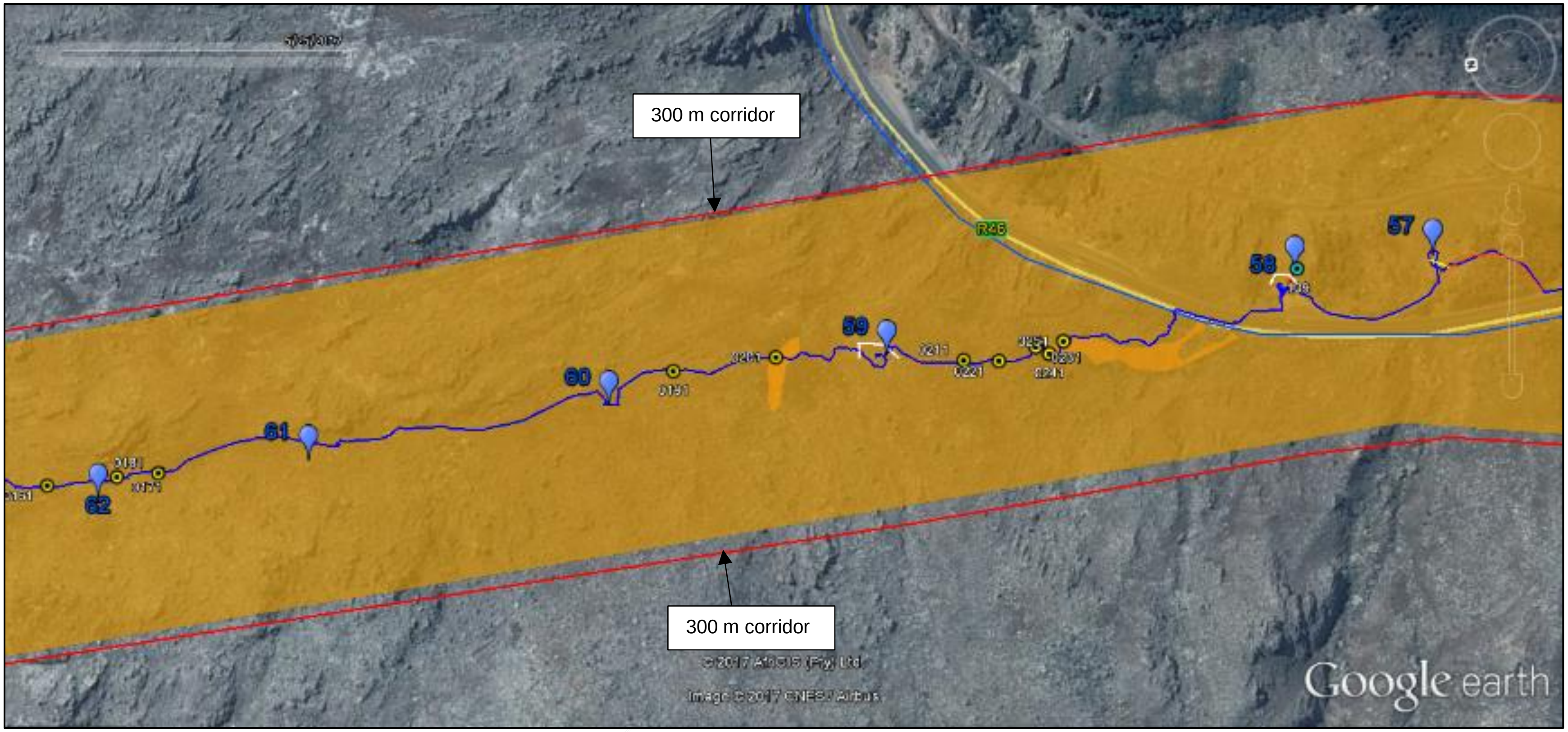


Figure 6.2.6. SENSITIVITY MAP: Google Earth™ aerial image showing 300 m corridor for the proposed 132/66kV powerline (outer two parallel red lines) showing the sensitivity (light orange = medium sensitivity; bright orange = high sensitivity), waypoints 0181 to 109 (numbered yellow and turquoise circle icons), proposed tower locations (numbered blue balloon icons) and existing access road (orange line at far right). The survey tracks are indicated by the blue lines. Note the position of the north arrow on the rotated image.

<table>
<tr><th>Illustrations</th><th>Affected area</th></tr>
<tr><td>

Figure 6.3.1. Tower 58.

Figure 6.3.2. Tower 57.

Figure 6.3.3. Tower 56.

Figure 6.3.4. Tower 55.

Figure 6.3.5. Tower 54.
</td><td>
MICHELL'S PASS

The proposed route continues south and crosses the R46 at Michell's Pass between proposed Tower 59 and Tower 58. Short descriptions of the tower positions and/or sections where these occur along, are provided below:
Tower 58: Disturbed area next to a picnic site on an eroded steep slope (Figure 6.3.1). On existing 66kV wood pole structure. A 16 m long access track would be required between the picnic site and tower location.
Tower 57: Disturbed area with dominants including Ehrharta ramosa, Pentameris sp., Diospyros glabra, Osyris compress and Searsia angustifolia (Figure 6.3.2). A 19 m long access track would be required from an existing track.
Tower 56: Previously disturbed (presumably during construction of the road) but intact vegetation dominated by Leucadendron rubrum, Protea laurifolia, Protea repens and Restio cf. capensis (Figure 6.3.3). A 96 m long access track would be required through the intact vegetation from the R46 up the moderate steep slope to the tower.
Tower 55: Disturbed area with cleared alien vegetation (Port Jackson willow and black wattle). A large English oak (Quercus robur) occurs at this point (Figure 6.3.4). A 209 m long access road would be required between Tower 55 and Tower 54. The road traverses same habitat described for Tower 54 below.
Tower 54: Disturbed area cleared of black wattle and gum with indigenous dominants including Anthospermum aethiopicum, Stoebe plumosa and Cliffortia sp. (Figure 6.3.5).
</td></tr>
</table>

Illustrations	**Affected area**
 **Figure 6.3.6.** Tower 53.  **Figure 6.3.7.** Tower 52.  **Figure 6.3.8.** Tower 51.  **Figure 6.3.9.** Tower 50.  **Figure 6.3.10.** Access road bridge crossing.	**MICHELL'S PASS** Tower 53: Heavily disturbed area with dumped material on an eroded slope. The area has been cleared of alien vegetation (Figure 6.3.6). An 85 m long access road would be required between Tower 53 and Tower 52. The roads traverses recently burnt vegetation as described for Tower 52 below. Tower 52: Disturbed area heavily infested with Port Jackson willow. Dominant indigenous species include *Diospyros glabra, Ehrharta ramosa, Senecio pubigerus* and resprouting (after fire) *Searsia angustifolia* shrubs (Figure 6.3.7). Tower 51: Recently burnt natural vegetation comprising a flat area between scattered rocks. Dominant species include, *Euryops* sp., *Ehrharta ramosa, Dodonaea viscosa, Leucadendron salignum* and *Restio sieberi* (Figure 6.3.8). A 150 m long access track is proposed through the habitat between an existing track to the north and Tower 51. Tower 50: Recently burnt area dominated by Port Jackson willow and black wattle. Indigenous species include *Ehrharta ramosa, Dodonaea viscosa, Othonna parviflora and Stoebe plumosa* (Figure 6.3.9). A 765 m long access road and bridge crossing of the Dwarsrivier would be required between Tower 51 and Tower 48. The vegetation west of the Dwarsrivier corresponds most closely with the habitat described for Tower 49. The area east of the Dwarsrivier contains no visible vegetation due to a recent burn. The Dwarsrivier and riparian vegetation is dominated by a mix of indigenous and exotic species. Exotic species include *Salix babylonica, Gleditsia triacanthos* and *Quercus palustris*. Dominant indigenous species

Figure 6.3.11. Tower 49.

Figure 6.3.12. Tower 48.

include *Salix mucronata* and to a lesser extent *Brabejum stellatifolium*.

Tower 49: Located along an old access road in burnt vegetation (Figure 6.3.11). The few visible species include *Ehrharta ramosa, Diospyros glabra, Osyris compressa* and *Searsia glauca*.

Tower 48: Burnt slopes on the east side of the Dwarsrivier. Very little vegetation was visible due to the recent fire. Burnt plants of *Protea laurifolia* and *Serruria* sp. were observed (Figure 6.3.12). <u>The same habitat type described for Tower 48 continues through to Tower 45.</u>

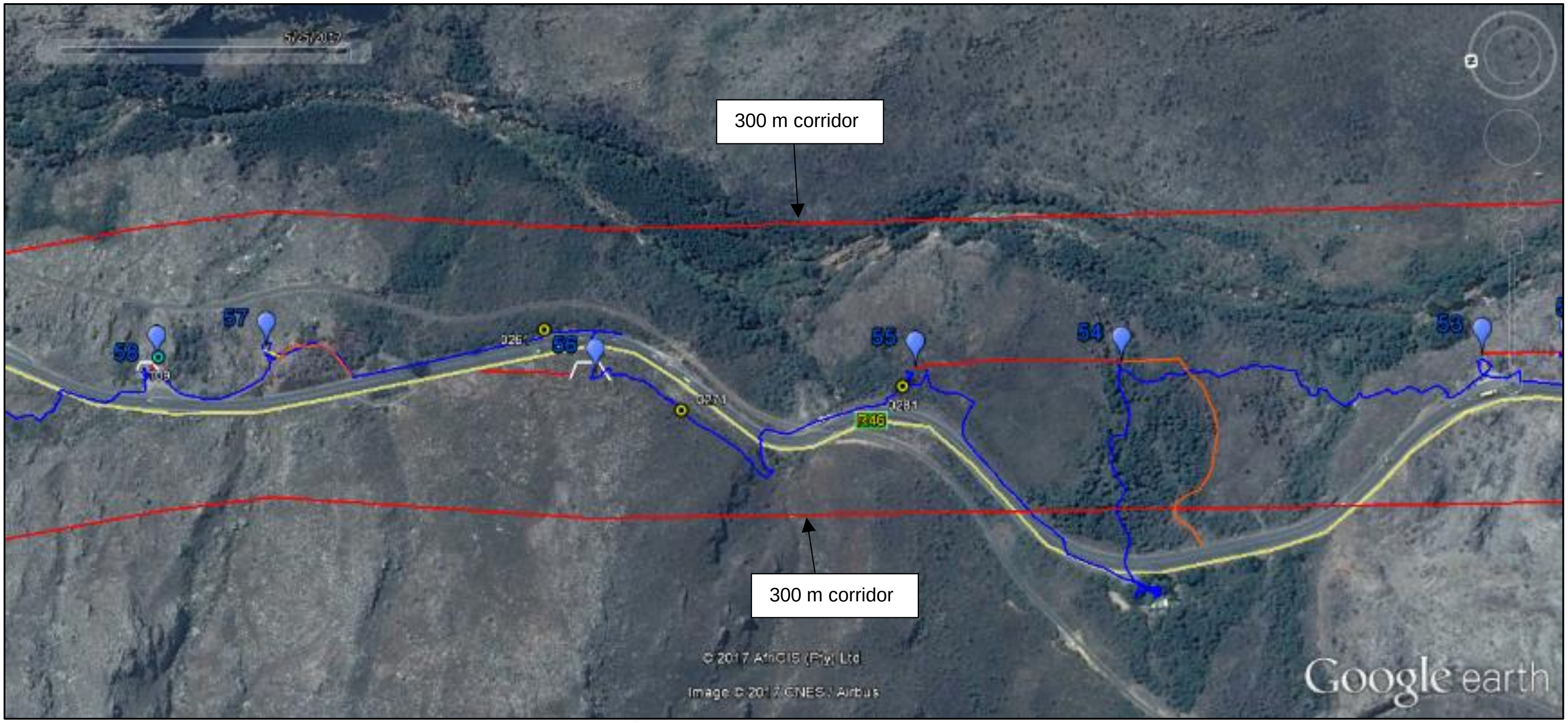


Figure 6.4.1. SURVEY MAP: Google Earth™ aerial image showing 300 m corridor (outer two parallel red lines) for the proposed 132/66kV powerline showing waypoints 0261 to 0281 (numbered yellow and turquoise circle icons), proposed tower locations 58 to 53 (numbered blue balloon icons) and proposed access roads (red lines = new roads; orange lines = existing roads). The survey tracks are indicated by the blue lines. Note the position of the north arrow on the rotated image.

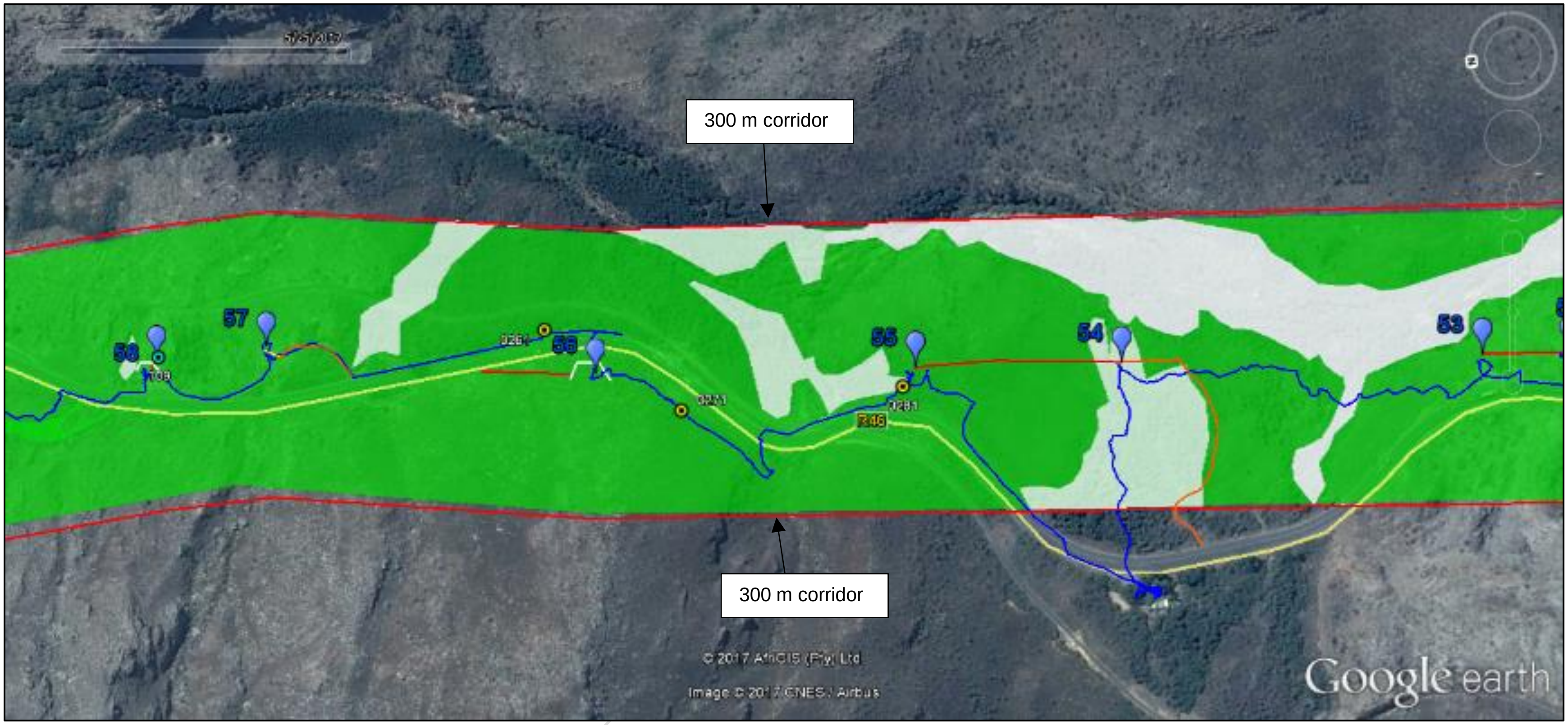


Figure 6.4.2. HABITAT MAP: Google Earth™ aerial image showing 300 m corridor (outer two parallel red lines) for the proposed 132/66kV powerline, showing the broad habitat types (bright green = intact vegetation; white = areas invaded with, or recently cleared invasive alien plants), waypoints 0261 to 0281 (numbered yellow and turquoise circle icons), proposed tower locations 58 to 53 (numbered blue balloon icons) and proposed access roads (red lines). The survey tracks are indicated by the blue lines. Note the position of the north arrow on the rotated image.

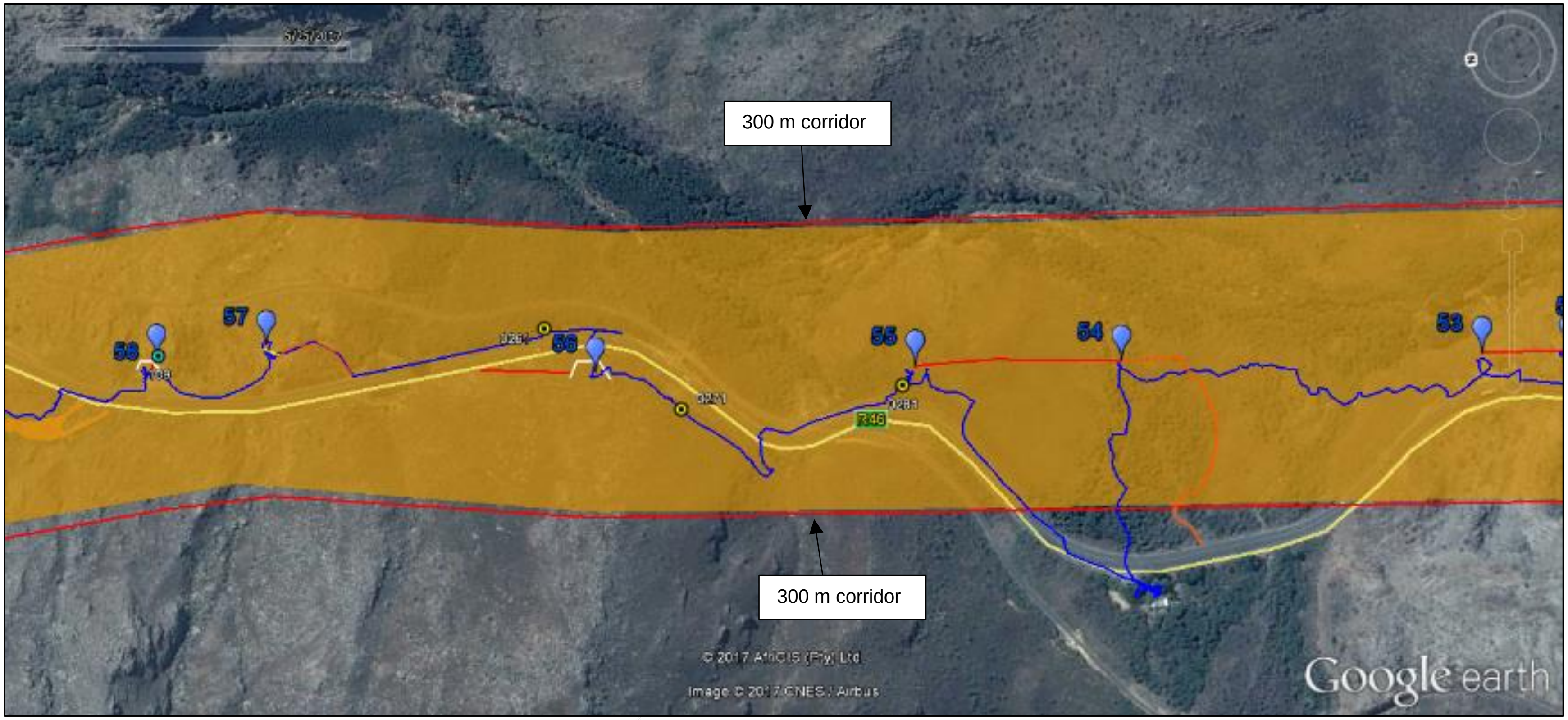


Figure 6.4.3. SENSITIVITY MAP: Google Earth™ aerial image showing 300 m corridor for the proposed 132/66kV powerline (outer two parallel red lines) showing the sensitivity (light orange = medium sensitivity; bright orange = high sensitivity), waypoints 0261 to 0281 (numbered yellow and turquoise circle icons), proposed tower locations 57 to 53 (numbered blue balloon icons) and proposed access roads (red lines). The survey tracks are indicated by the blue lines. Note the position of the north arrow on the rotated image.

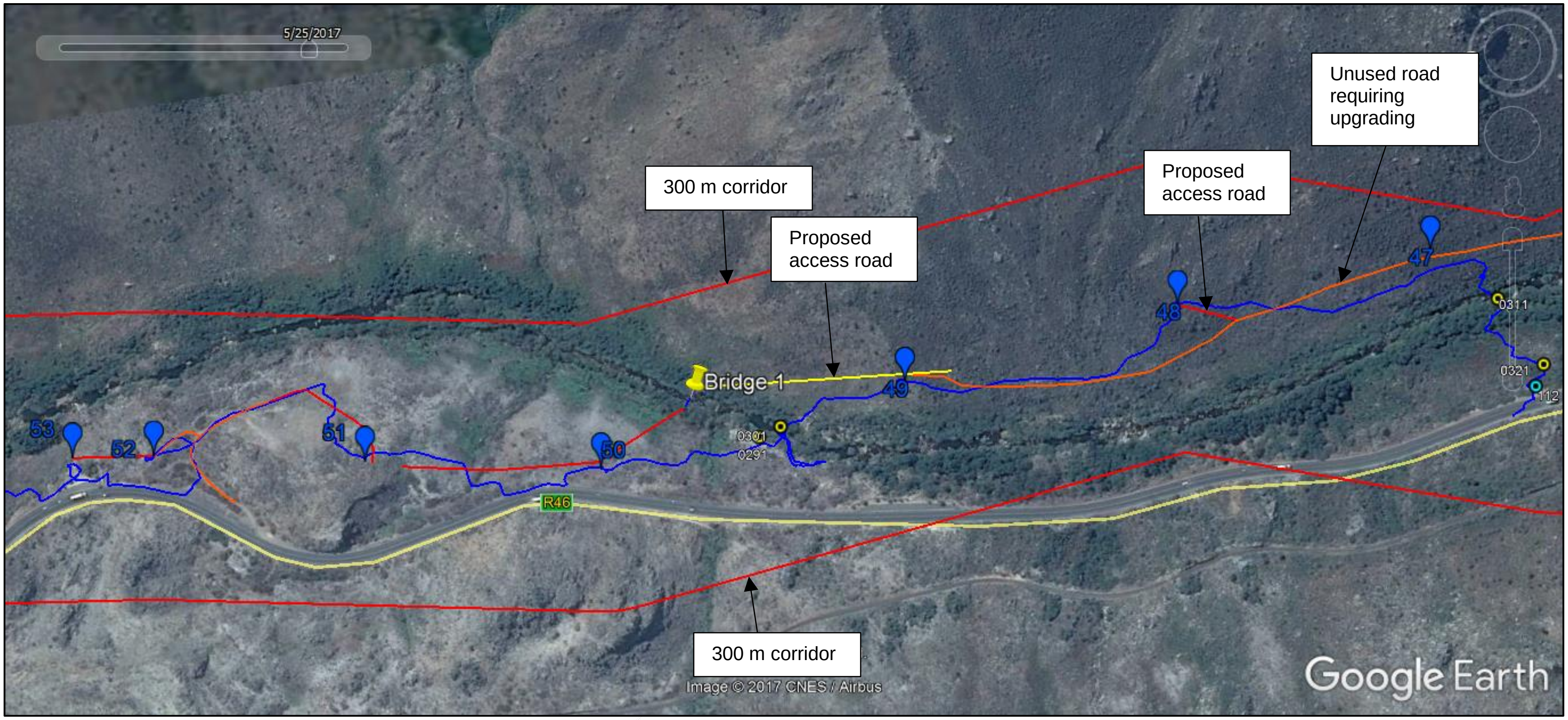


Figure 6.4.4. SURVEY MAP: Google Earth™ aerial image showing 300 m corridor (outer two parallel red lines) for the proposed 132/66kV powerline showing waypoints 0291 to 0301 (numbered yellow and turquoise circle icons), proposed tower locations 52 to 47 (numbered blue balloon icons) and proposed access road (red and bright yellow line = new roads; orange line = existing roads). The survey tracks are indicated by the blue lines. Note the position of the north arrow on the rotated image.

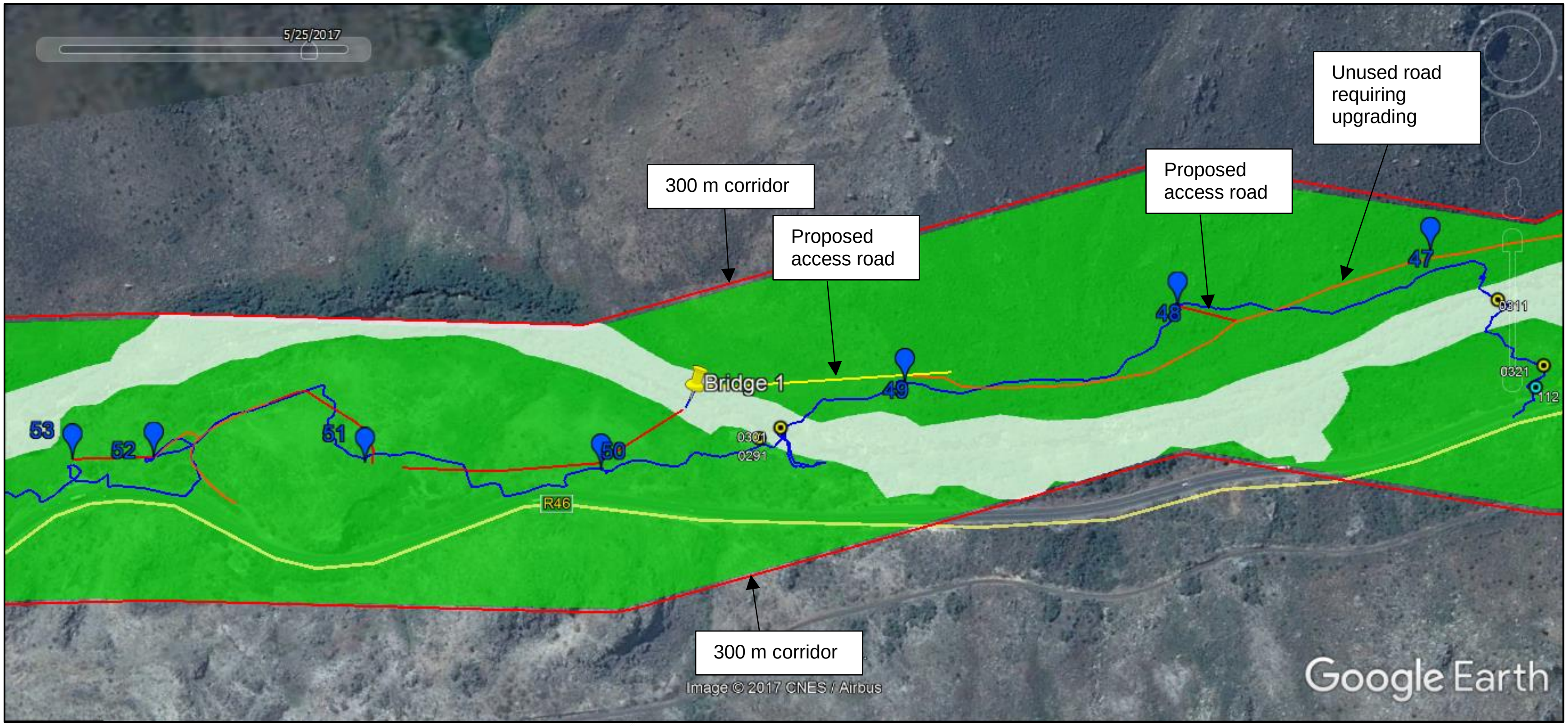


Figure 6.4.5. HABITAT MAP: Google Earth™ aerial image showing 300 m corridor (outer two parallel red lines) for the proposed 132/66kV powerline, showing the broad habitat types (bright green = intact vegetation; white = areas invaded with, or recently cleared invasive alien plants), waypoints 0291 to 0301 (numbered yellow and turquoise circle icons), proposed tower locations 52 to 47 (numbered blue balloon icons) and proposed access roads (red and bright yellow line). The survey tracks are indicated by the blue lines. Note the position of the north arrow on the rotated image.

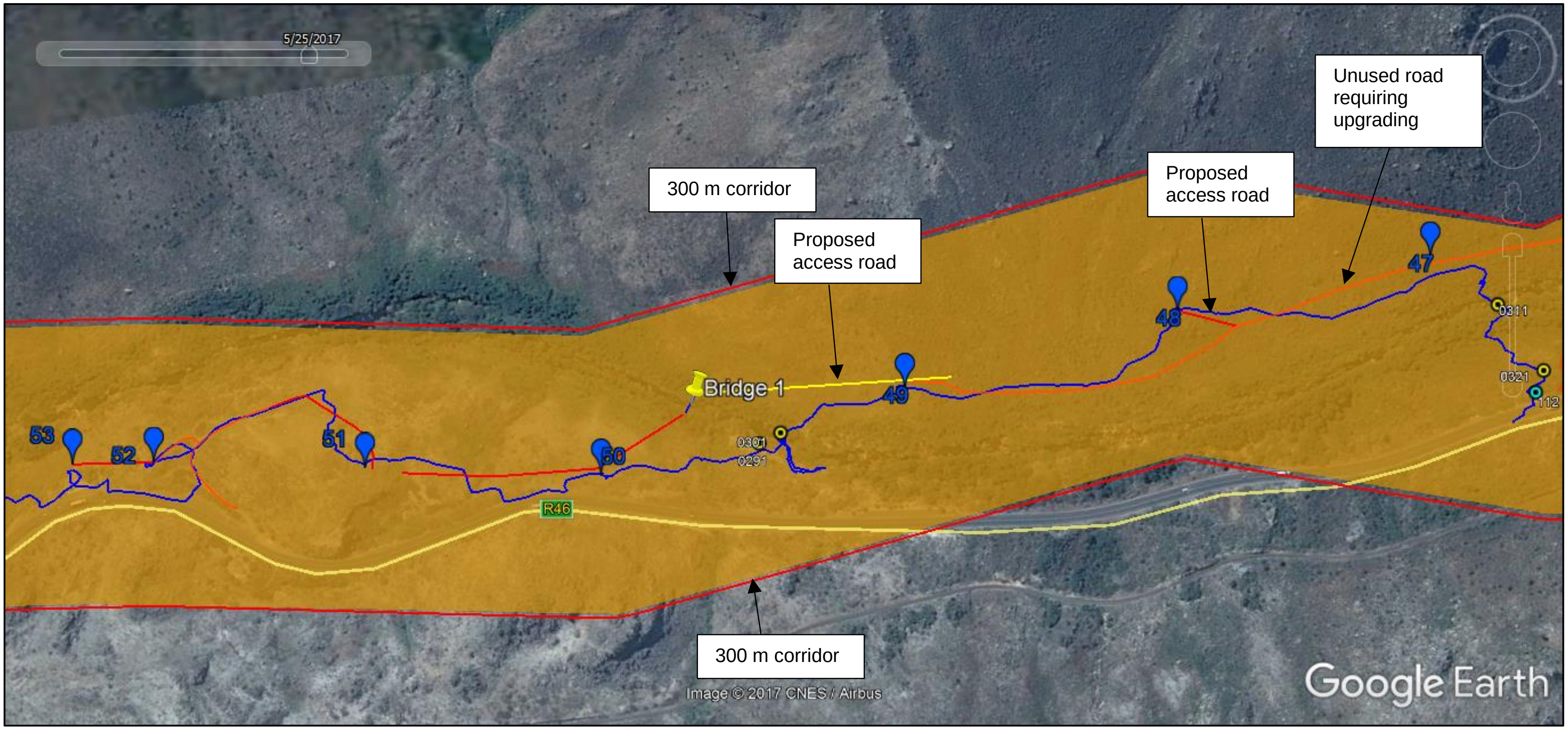


Figure 6.4.6. SENSITIVITY MAP: Google Earth™ aerial image showing 300 m corridor for the proposed 132/66kV powerline (outer two parallel red lines) showing the sensitivity (light orange = medium sensitivity), waypoints 0291 to 0301 (numbered yellow and turquoise circle icons), proposed tower locations 52 to 47 (numbered blue balloon icons) and proposed access road (bright yellow line). The survey tracks are indicated by the blue lines. Note the position of the north arrow on the rotated image.

Illustrations	Affected area
 **Figure 6.5.1.** Degraded recently burnt area at Tower 43. The forest located between Tower 43 and Tower 42 is indicated by the yellow oval.  **Figure 6.5.2.** View from beneath the canopy of the Breede River yellowwood forest at waypoint 0341 (33°25'4.82"S; 19°17'17.08"E). The area forest would not be impacted but is highlighted due to its high sensitivity.	**MICHELL'S PASS** Tower 43: Degraded burnt area with lots of scattered rubble. Very little vegetation cover was observable due to the recent fire (Figure 6.5.1). The area between Tower 43 and Tower 42 traverses the edge of a wild olive and Breede River yellowwood tree forest (*Podocarpus elongatus*) (Figures 6.5.1 and 6.5.2). This area of forest would not be impacted as tower positions were shifted after the second site visit with Eskom.

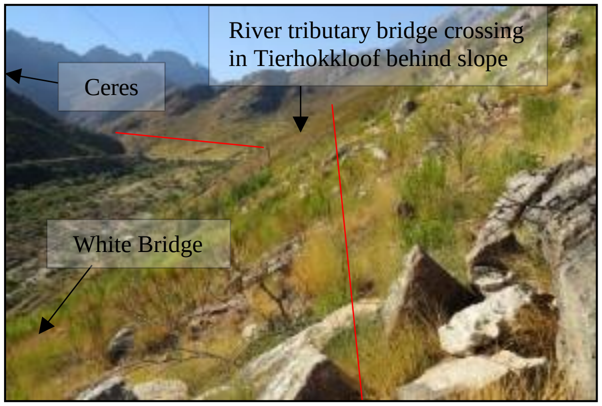
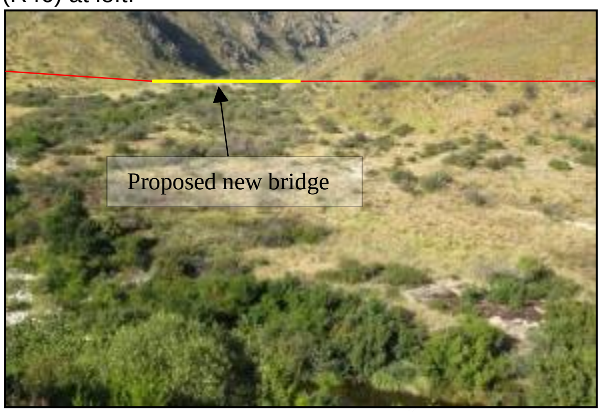
Illustrations	Affected area
 **Figure 6.5.3.** Intact grassy vegetation dominated by *Ehrharta ramosa* and sand olive (*Dodonaea viscosa)* showing the proposed powerline section and access roads (red lines) from Tower 37 viewed in an easterly direction with Michell's Pass (R46) at left.  **Figure 6.5.4.** Tierhokkloof showing the proposed new bridge crossing between Tower 40 and Tower 39 viewed from the R46.	**MICHELL'S PASS TO WHITE BRIDGE** The proposed powerline and an extensive network of access roads continues south from Tower 42 to Tower 35 along the northeast- and north-facing slopes on the east side of the Breede River (Figures 6.5.3). (Note that the Dwarsrivier changes to the Breede River at the southern end of Michell's Pass) <u>A bridge crossing would be required across the river tributary in the valley between Tower 40 and Tower 39 (Figure 6.5.4 and 6.6.4). About 860 m of both new and upgrading of an overgrown existing road/wagon track would be required on the east side of the tributary whereas 1.13 km of new access road may be required on the western side along the north-facing steep mountain slope (Figures 6.5.5 and 6.5.6).</u> The vegetation is homogenous, consisting of a mix of grasses and shrubs in approximately 2-year old vegetation (post burn). Occasional patches of black wattle and Port Jackson willow occur along this section. Dominant shrubs include *Dodonaea viscosa, Othonna parviflora* and *Rafnia angulata.* Dominant graminoids include *Ehrharta ramosa, Tetraria sp.* and *Willdenowia glomerata.* Patches of *Heeria argentea, Protea laurifolia, Maytenus oleoides, Searsia angustifolia* and *Osyris compressa* occur at the proposed bridge crossing at the valley bottom of Tierhokkloof. The vegetation becomes taller and thicket in the valley bottom (where the new bridge is proposed) and on the alluvial fan.

Figure 6.5.5. The proposed powerline section and access roads (red line) between Tower 39 and Tower 36 viewed in a southerly direction from the Michell's Pass (R46).

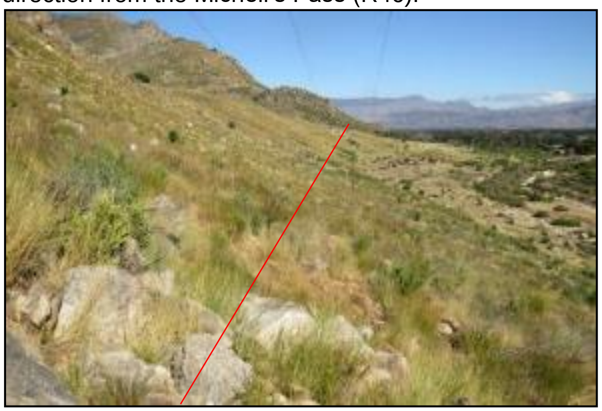


Figure 6.5.6. Continuation of powerline section and access roads (red line) at Tower 39 viewed towards Tower 38, 37 and 36 in a westerly direction.

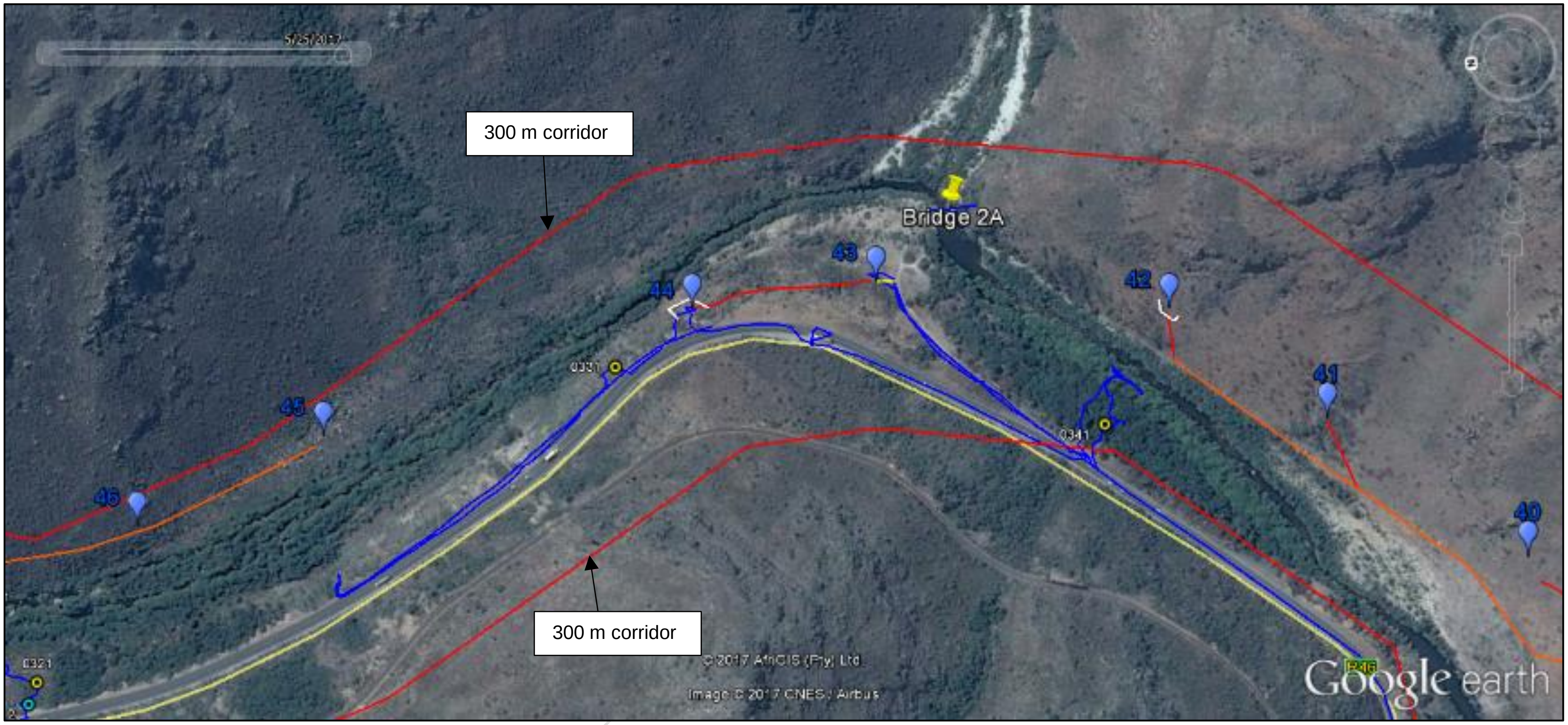


Figure 6.6.1. SURVEY MAP: Google Earth™ aerial image showing 300 m corridor (outer two parallel red lines) for the proposed 132/66kV powerline showing waypoints 0321 to 0341 (numbered yellow and turquoise circle icons), proposed tower locations 46 to 40 (numbered blue balloon icons) and proposed access road (red lines = new roads; orange line = existing roads requiring upgrading). The survey tracks are indicated by the blue lines. Note the position of the north arrow on the rotated image. Note that bridge 2A is not required.

Figure 6.6.2. HABITAT MAP: Google Earth™ aerial image showing 300 m corridor (outer two parallel red lines) for the proposed 132/66kV powerline, showing the broad habitat types (bright green = intact vegetation; white = areas invaded with, or recently cleared invasive alien plants; purple = Breede River yellowwood forest), waypoints 0321 to 0341 (numbered yellow and turquoise circle icons), proposed tower locations 46 to 40 (numbered blue balloon icons) and proposed access roads (red lines = new roads; orange lines = existing roads requiring upgrading). The survey tracks are indicated by the blue lines. Note the position of the north arrow on the rotated image.

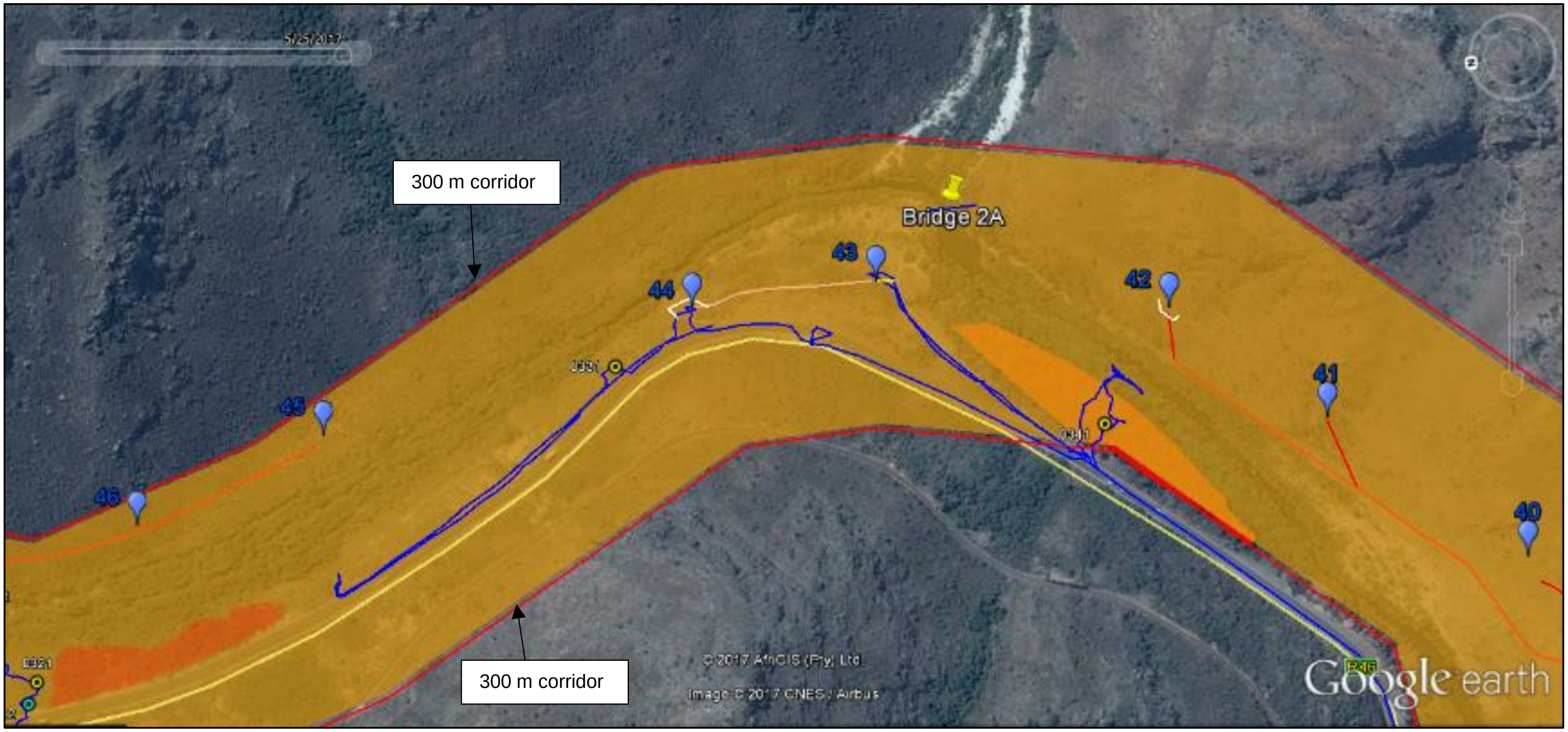


Figure 6.6.3. SENSITIVITY MAP: Google Earth™ aerial image showing 300 m corridor for the proposed 132/66kV powerline (outer two parallel red lines) showing the sensitivity (light orange = medium sensitivity; bright orange = high sensitivity), waypoints 0321 to 0341 (numbered yellow and turquoise circle icons), proposed tower locations 46 to 40 (numbered blue balloon icons) and proposed access roads (red lines = new roads; orange lines = existing roads requiring upgrading). The survey tracks are indicated by the blue lines. Note the position of the north arrow on the rotated image.

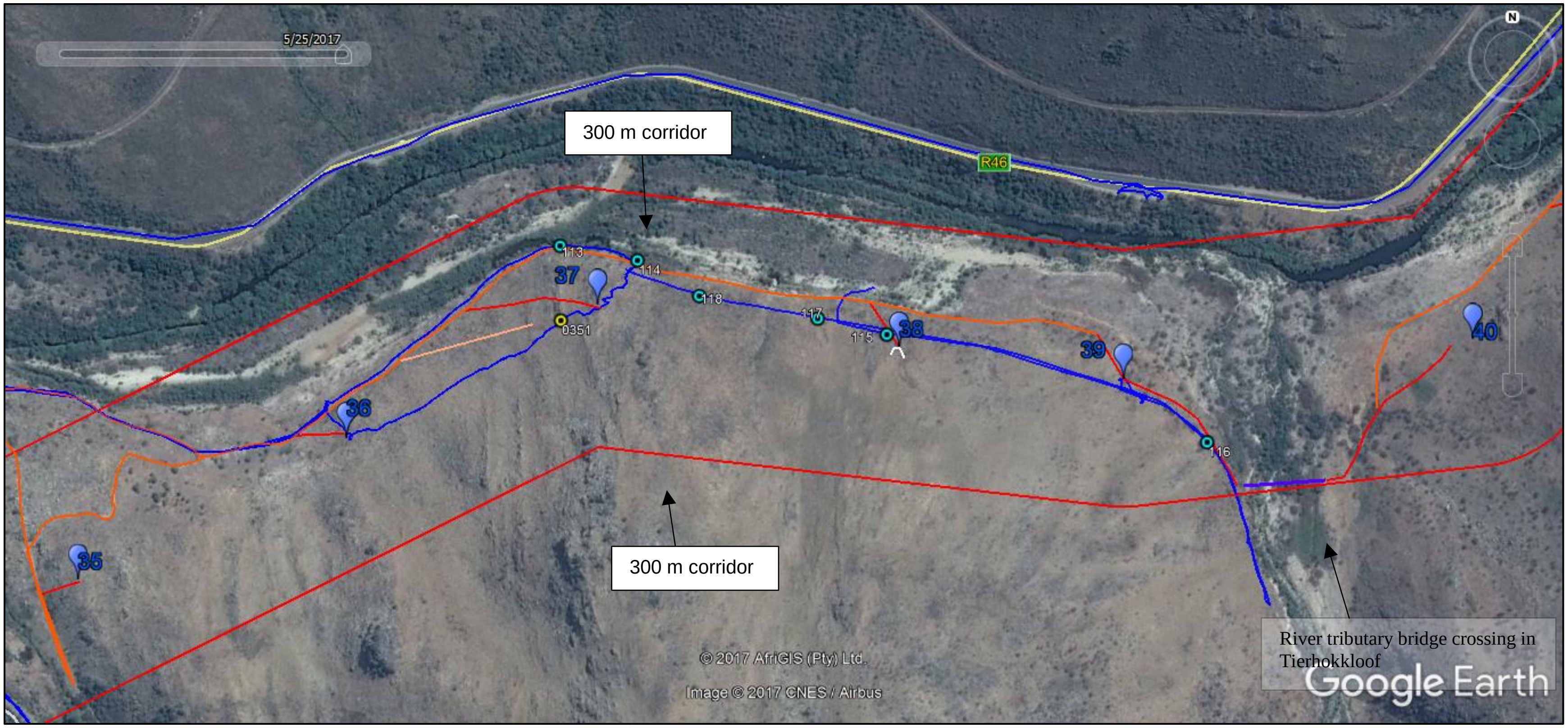


Figure 6.6.4. SURVEY MAP: Google Earth™ aerial image showing 300 m corridor (outer two parallel red lines) for the proposed 132/66kV powerline showing waypoints 116 to 0351 (numbered yellow and turquoise circle icons), proposed tower locations 40 to 35 (numbered blue balloon icons) and proposed access road (red lines = new roads; orange lines = old, existing and unused roads requiring upgrading). The survey tracks are indicated by the blue lines.

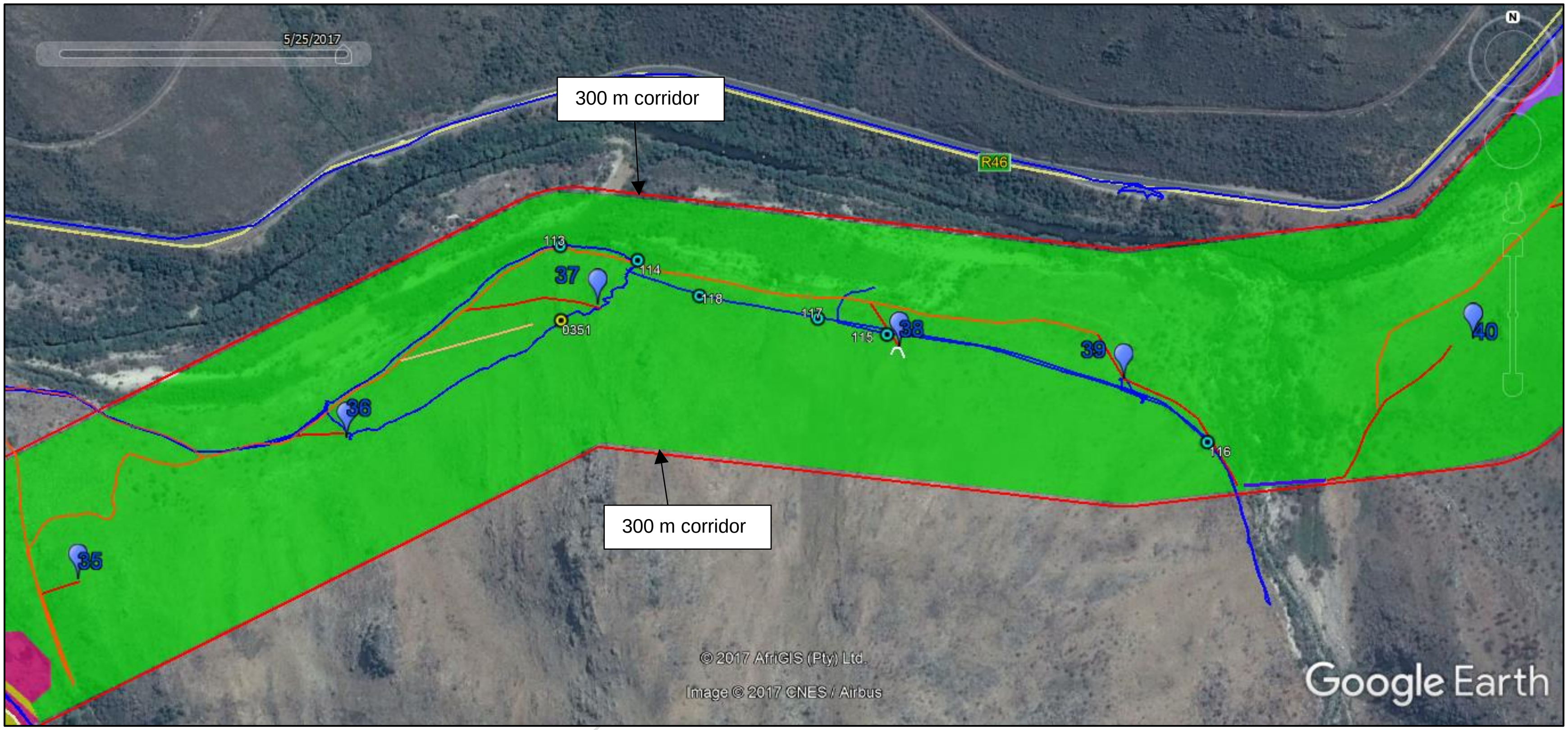


Figure 6.6.5. HABITAT MAP: Google Earth™ aerial image showing 300 m corridor (outer two parallel red lines) for the proposed 132/66kV powerline, showing the broad habitat types (green = intact vegetation), waypoints 116 to 0351 (numbered yellow and turquoise circle icons), proposed tower locations 40 to 35 (numbered blue balloon icons) and proposed access road (red lines = new roads; orange lines = old, existing and unused roads requiring upgrading). The survey tracks are indicated by the blue lines.

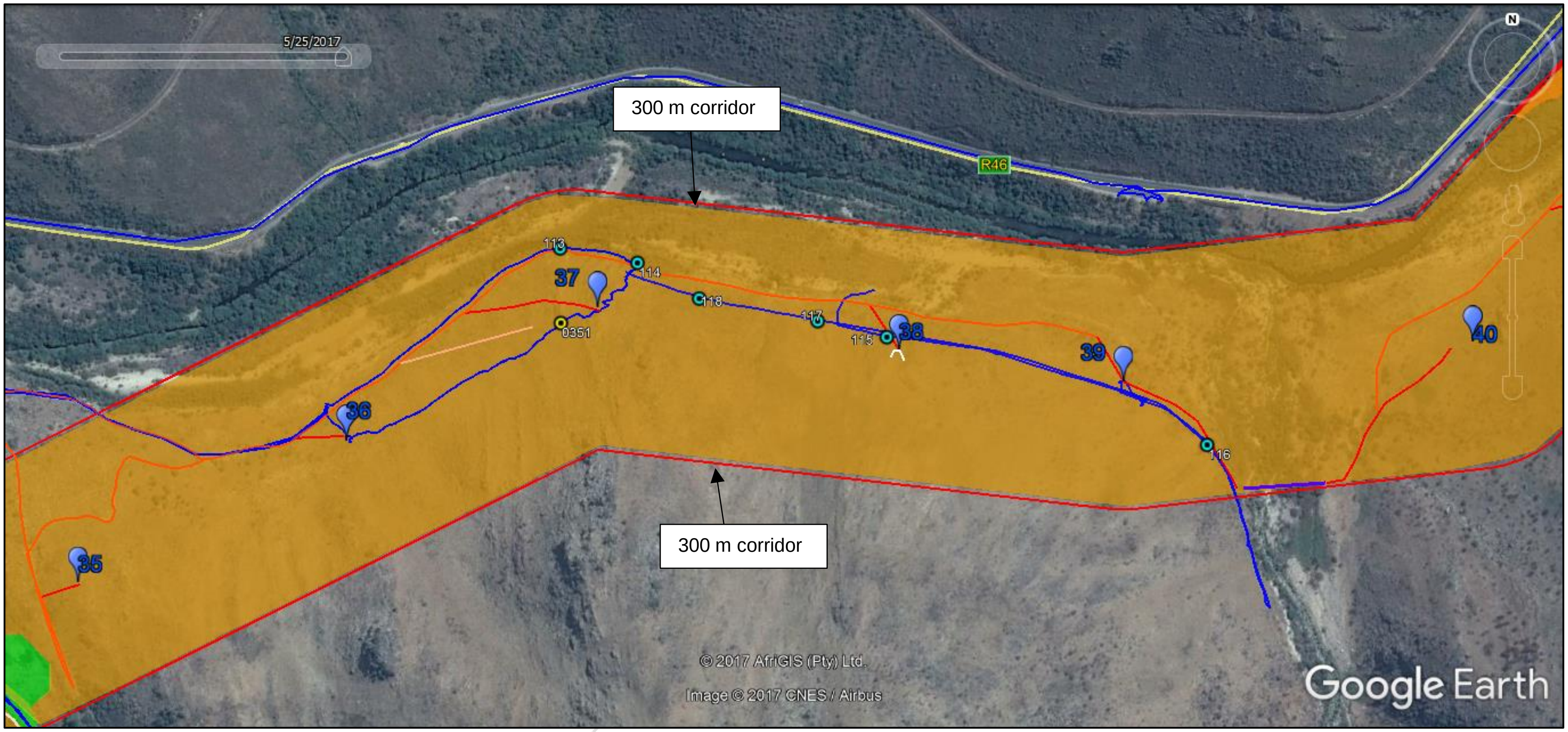


Figure 6.6.6. SENSITIVITY MAP: Google Earth™ aerial image showing 300 m corridor for the proposed 132/66kV powerline (outer two parallel red lines) showing the sensitivity (light orange = medium sensitivity), waypoints 116 to 0351 (numbered yellow and turquoise circle icons), proposed tower locations 40 to 35 (numbered blue balloon icons) and proposed access road (red lines = new roads; orange lines = old, existing and unused roads requiring upgrading). The survey tracks are indicated by the blue lines.

Illustrations	**Affected area**
 **Figure 6.7.1.** Intact vegetation with dominant shrub layer of sand olive (*Dodonaea viscosa)* and *Phylica* sp. at Tower 34.  **Figure 6.7.2.** Recently burnt medium condition vegetation on the upper slopes of farmland extends from this point at Tower 28 to Tower 16.	**WHITE BRIDGE TO ROMANSRIVIER SUBSTATION** At Tower 34 the vegetation is intact but partially disturbed due to cattle farming. The vegetation is dominated by tall layer of shrubs with *Dodonaea viscosa, Elytropappus rhinocerotis* and *Phylica* sp. (Figure 6.7.1). Several *Protea laurifolia* plants are present. Tall stands of long-leaved wattle (*Acacia longifolia*) occur in patches between Tower 34 and Tower 33. A 906 m long access road would be required between Tower 34 and Tower 30 (Figure 6.8.1). The route continues through homogenous plant communities from Tower 34 to Tower 28. The vegetation type along the remainder of the route between Tower 30 and the Romansrivier substation is Breede Shale Fynbos. The vegetation south of Tower 28 was recently burnt (Figure 6.4.2). The habitat type continues through the upper slopes across various farms until Tower 16. Patches of transformed land intersect this medium condition but intact vegetation is found between Tower 16 and the Romansrivier substation. Towers 15 and 14 are located in transformed farmland. The vegetation at Tower 12 is transformed.

<table>
<tr><th>Illustrations</th><th>Affected area</th></tr>
<tr><td>


Figure 6.7.3. Tower 16 showing burnt semi-intact natural vegetation.

Figure 6.7.4. Transitional habitat between dryland and wetland at Tower 9. Note the existing Romansrivier – Witzenberg 132kV tower in the background.
</td><td>
Since a new locality for Tower 11 was provided after visiting the site the exact species composition was not recorded. However, samples taken 100 m to the south suggest that the dominant species would be Dodonaea viscosa, Stoebe plumosa, Searsia angustifolia, Athanasia trifurcata and Senecio pubigerus.

The section between Tower 10 and the Romansrivier substation comprises a mix of dryland, wetland and transitional dryland/wetland habitats. The vegetation cover varies between renosterbos-dominated habitat (Elytropappus rhinocerotis) (Figure 6.7.4) and grass- and shrubland-dominated habitat. Dominant shrubs include Aspalathus spinosa, Dodonaea viscosa, Leucadendron salignum and Searsia angustifolia.
</td></tr>
</table>

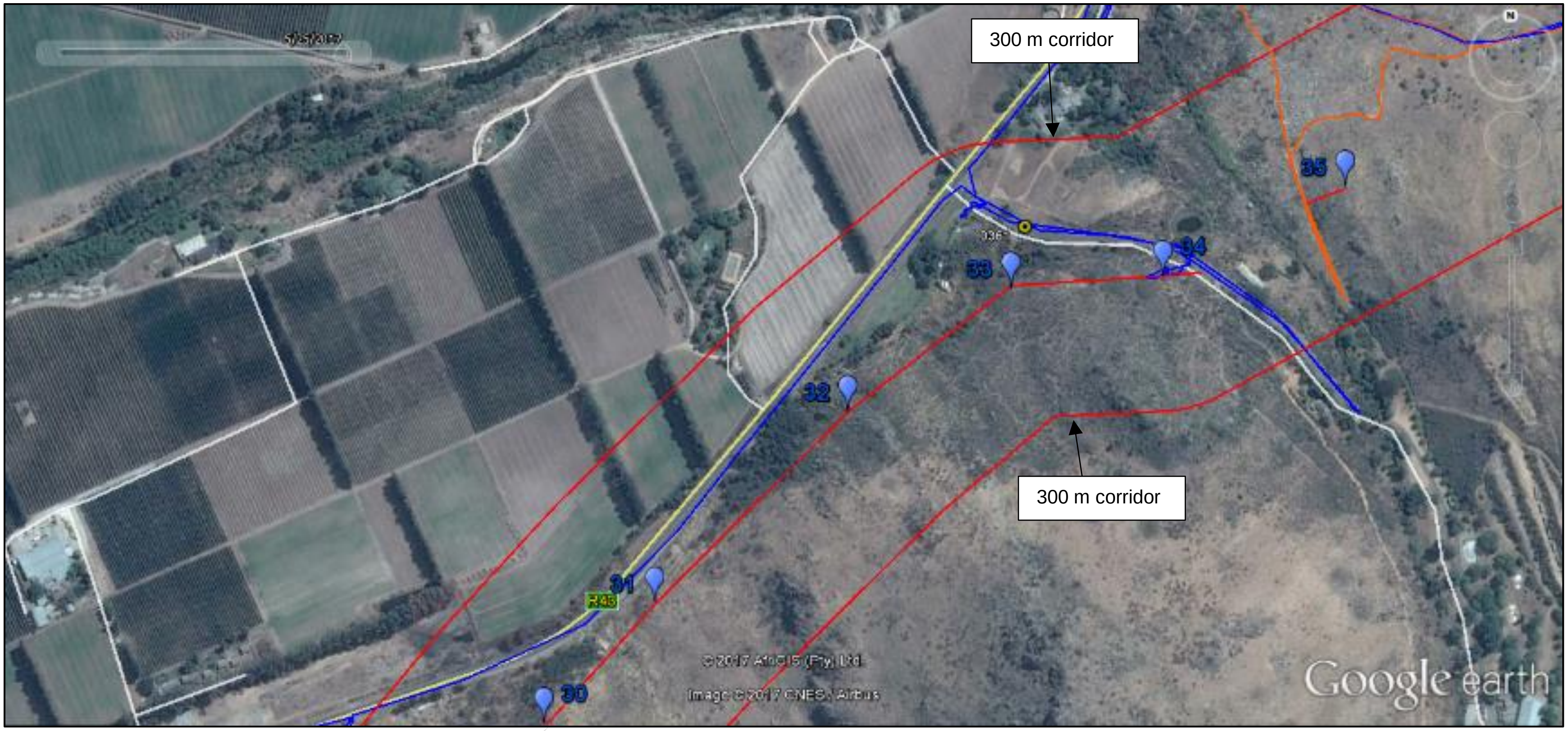


Figure 6.8.1. SURVEY MAP: Google Earth™ aerial image showing 300 m corridor (outer two parallel red lines) for the proposed 132/66kV powerline showing waypoint 0361 (numbered yellow circle icon), proposed tower locations 35 to 30 (numbered blue balloon icons) and proposed access road (red lines = new roads; orange line = old, existing roads requiring upgrading). The survey tracks are indicated by the blue lines.

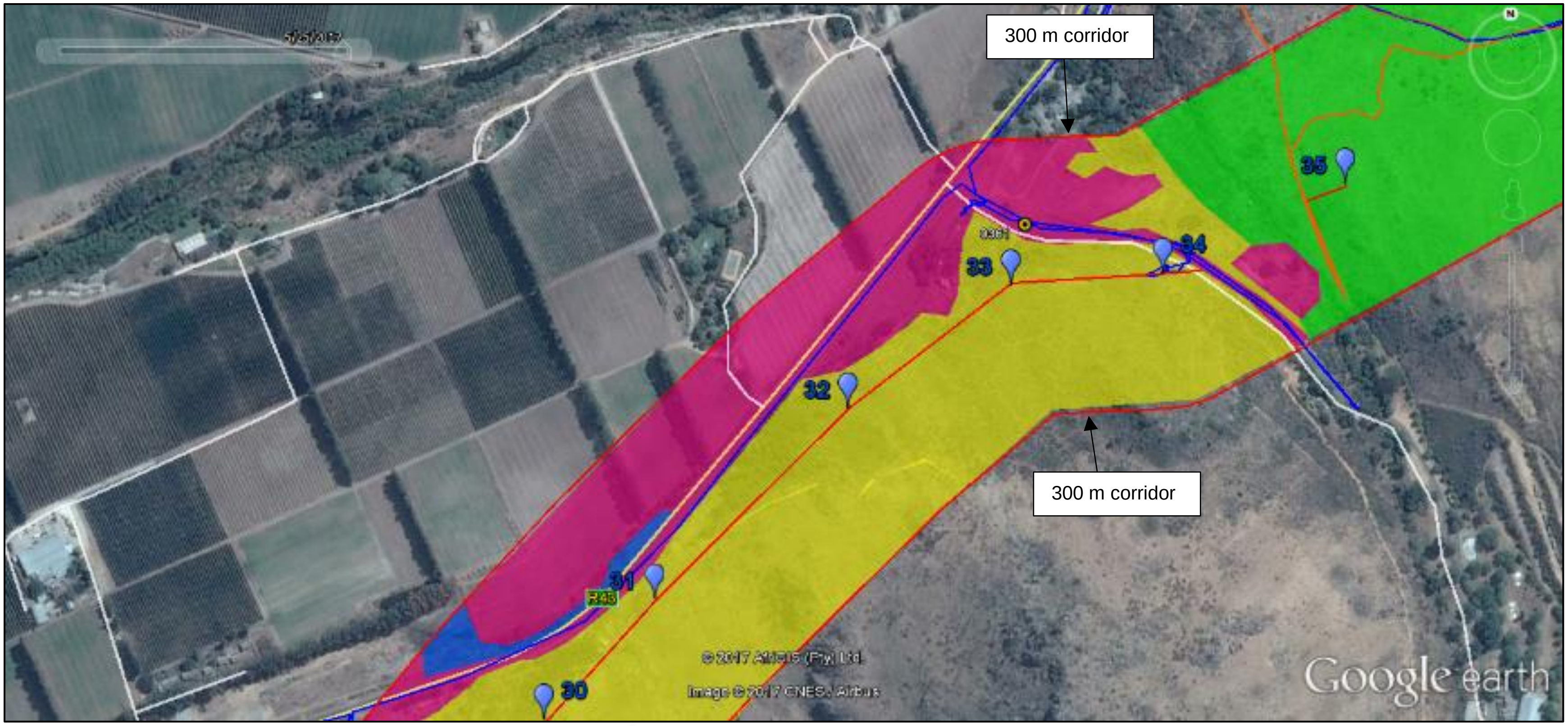


Figure 6.8.2. HABITAT MAP: Google Earth™ aerial image showing 300 m corridor (outer two parallel red lines) for the proposed 132/66kV powerline, showing the broad habitat types (bright green = intact vegetation; yellow = semi-intact vegetation; blue = degraded; pink = transformed), waypoint 0361 (numbered yellow circle icon), proposed tower locations 35 to 31 (numbered blue balloon icons) and proposed access roads (red lines = new roads; orange line = old, existing and unused roads requiring upgrading). The survey tracks are indicated by the blue lines.

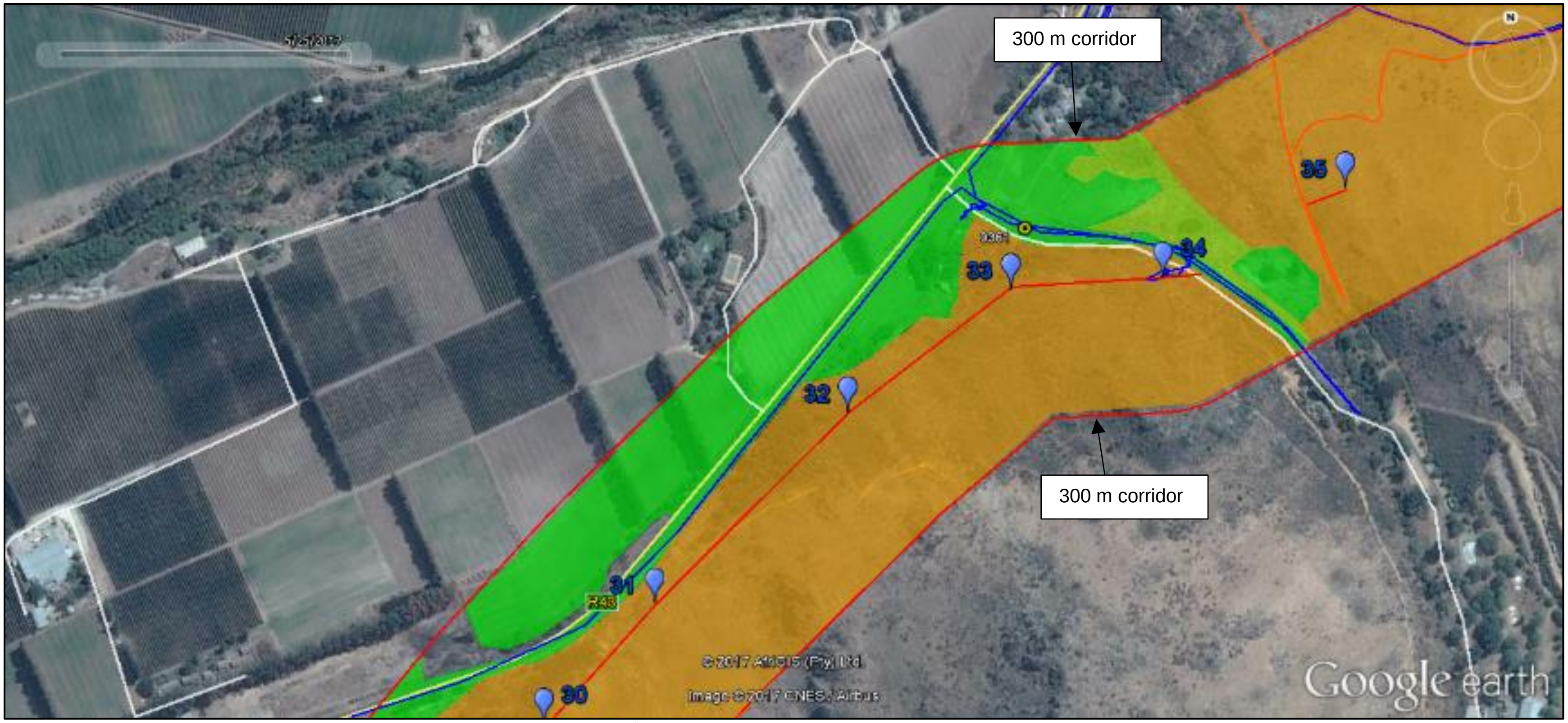


Figure 6.8.3. SENSITIVITY MAP: Google Earth™ aerial image showing 300 m corridor for the proposed 132/66kV powerline (outer two parallel red lines) showing the sensitivity (lime green = low sensitivity; bright green = very low sensitivity; light orange = medium sensitivity), waypoint 0361 (numbered yellow circle icon), proposed tower locations 35 to 30 (numbered blue balloon icons) and proposed access road (red lines = new roads; orange line = old, existing roads requiring upgrading). The survey tracks are indicated by the blue lines.

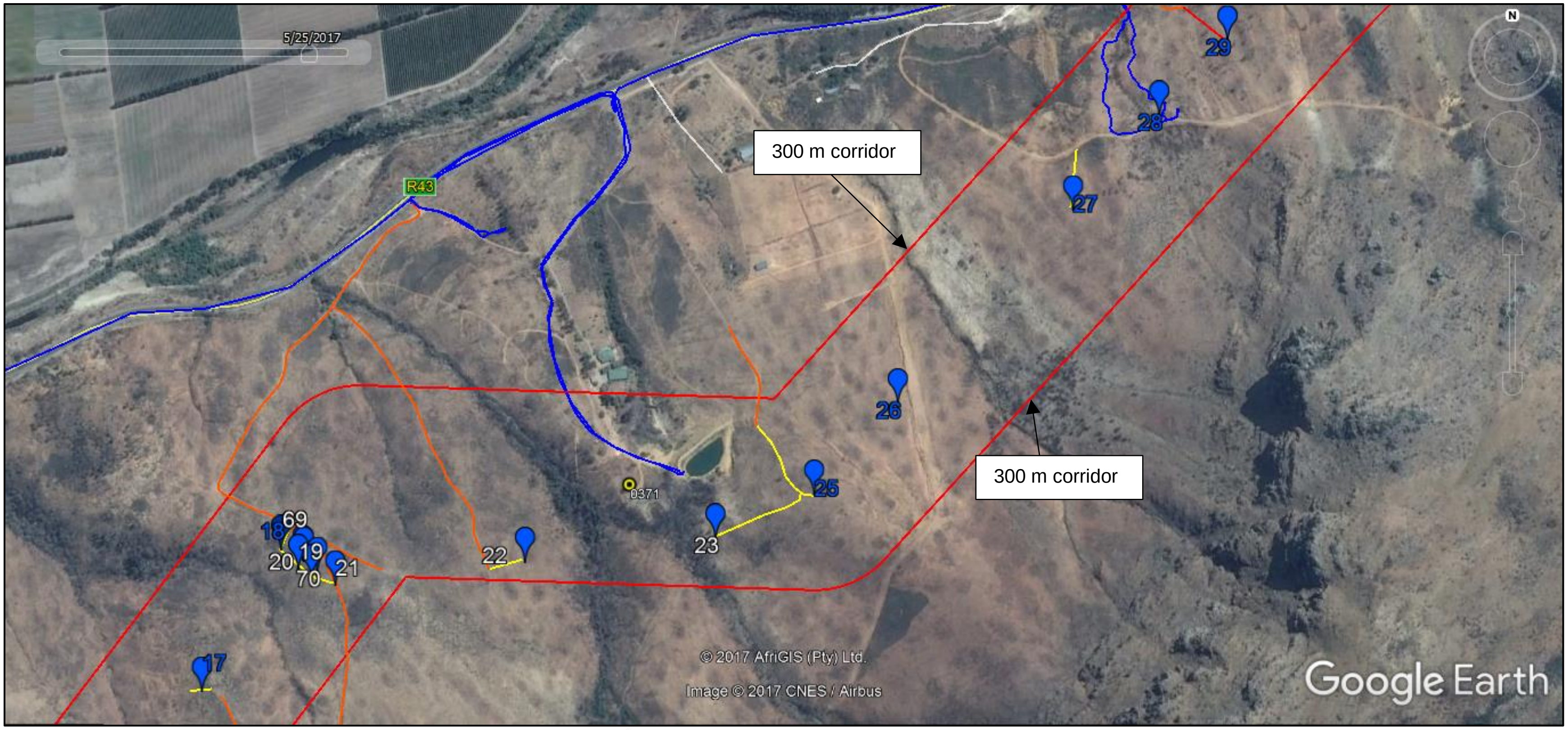


Figure 6.8.4. SURVEY MAP: Google Earth™ aerial image showing 300 m corridor (outer two parallel red lines) for the proposed 132/66kV powerline showing waypoint 0371 (numbered yellow circle icon), proposed tower locations 29 to 18, 69-70 (numbered blue balloon icons) and proposed access road (red and yellow lines = new roads; orange lines = existing roads). The survey tracks are indicated by the blue lines.

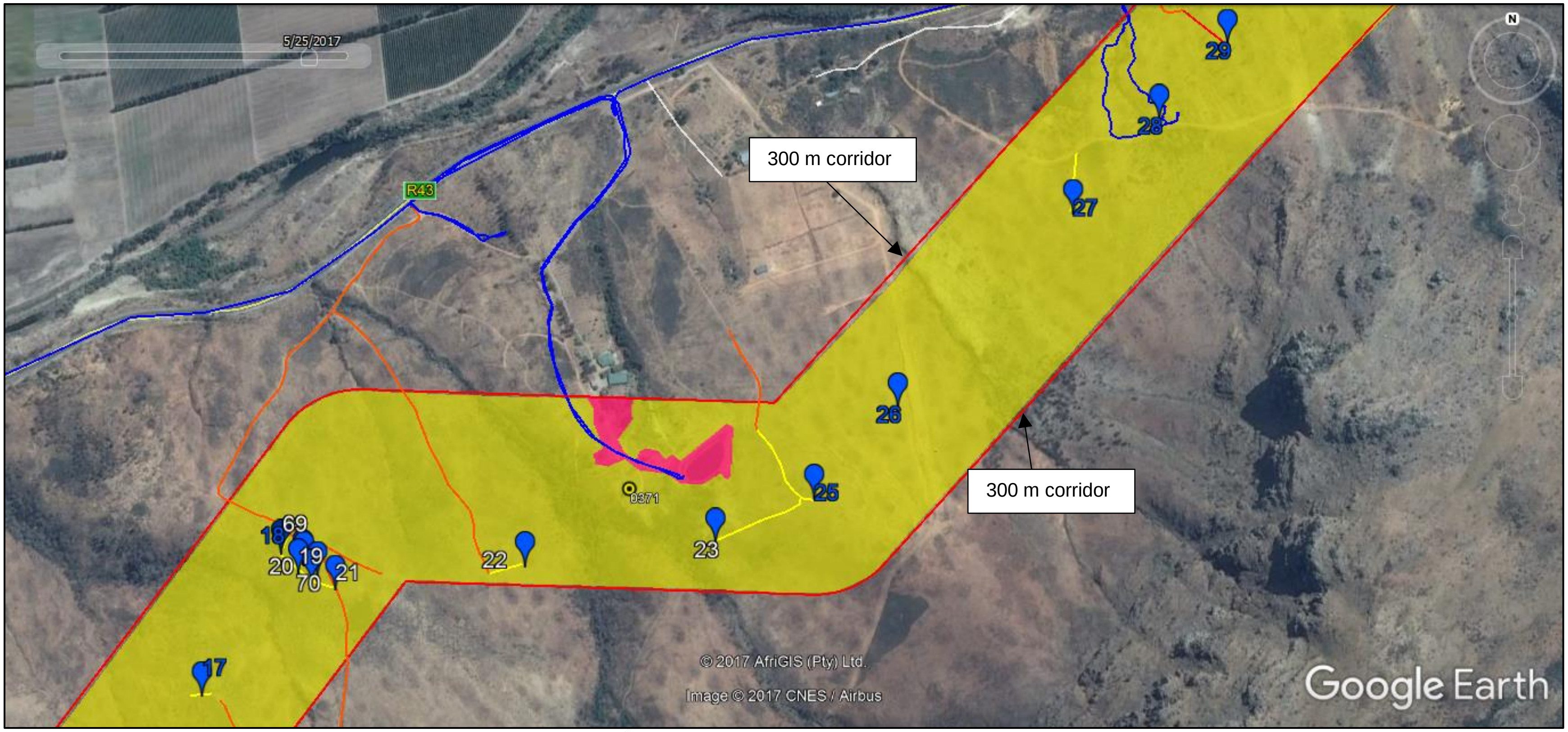


Figure 6.8.5. HABITAT MAP: Google Earth™ aerial image showing 300 m corridor (outer two parallel red lines) for the proposed 132kV powerline, showing the broad habitat types (pink = transformed; yellow = semi-intact vegetation), waypoint 0371 (numbered yellow circle icon), proposed tower locations 29 to 18, 69-70 (numbered blue balloon icons) and proposed access road (red lines = new roads; orange line = existing roads). The survey tracks are indicated by the blue lines.

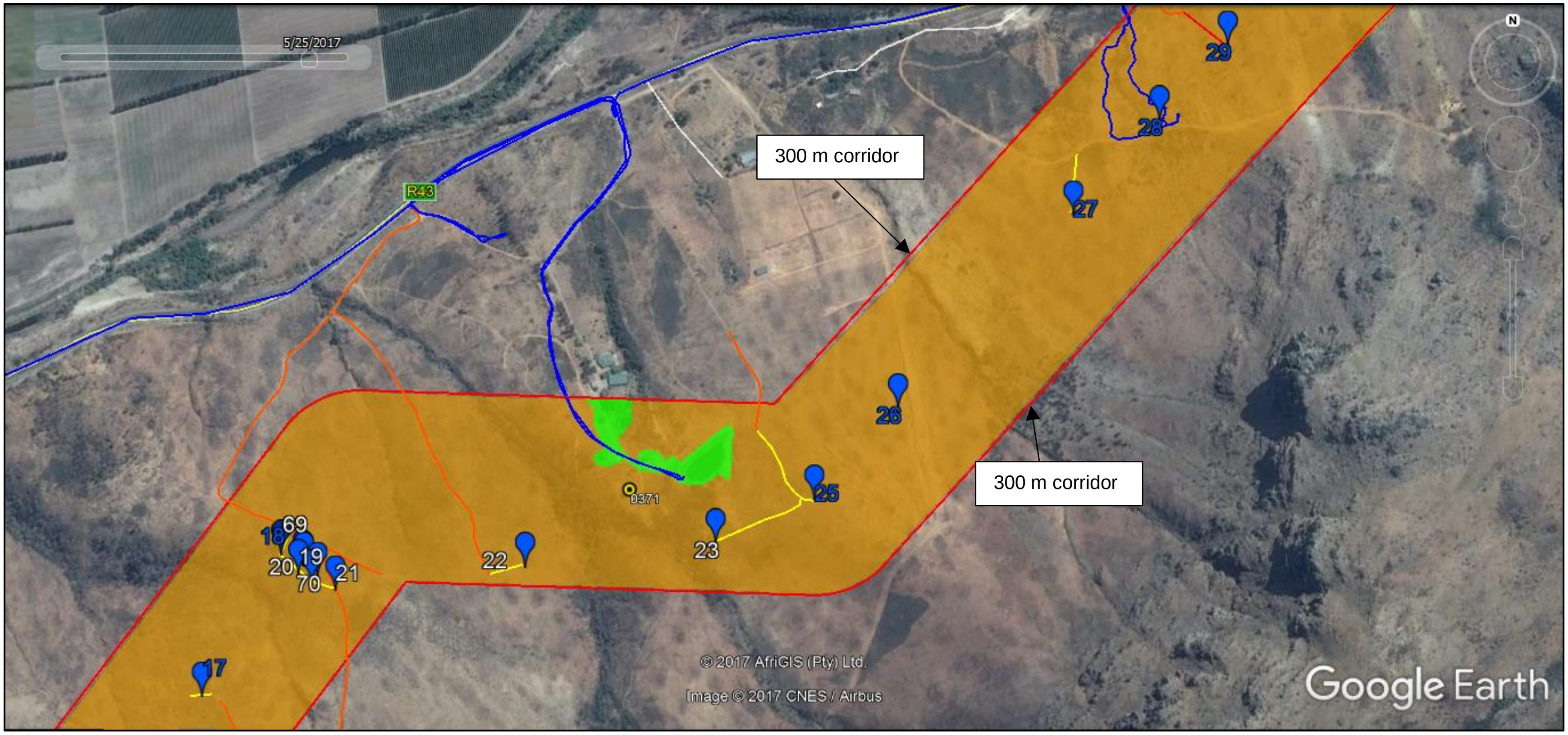


Figure 6.8.6. SENSITIVITY MAP: Google Earth™ aerial image showing 300 m corridor for the proposed 132kV powerline (outer two parallel red lines) showing the sensitivity (light orange = medium sensitivity; green = very low sensitivity), waypoint 0371 (numbered yellow circle icon), proposed tower locations 29 to 18, 69-70 (numbered blue balloon icons) and proposed access road (red and yellow lines = new roads; orange line = existing roads). The survey tracks are indicated by the blue lines.

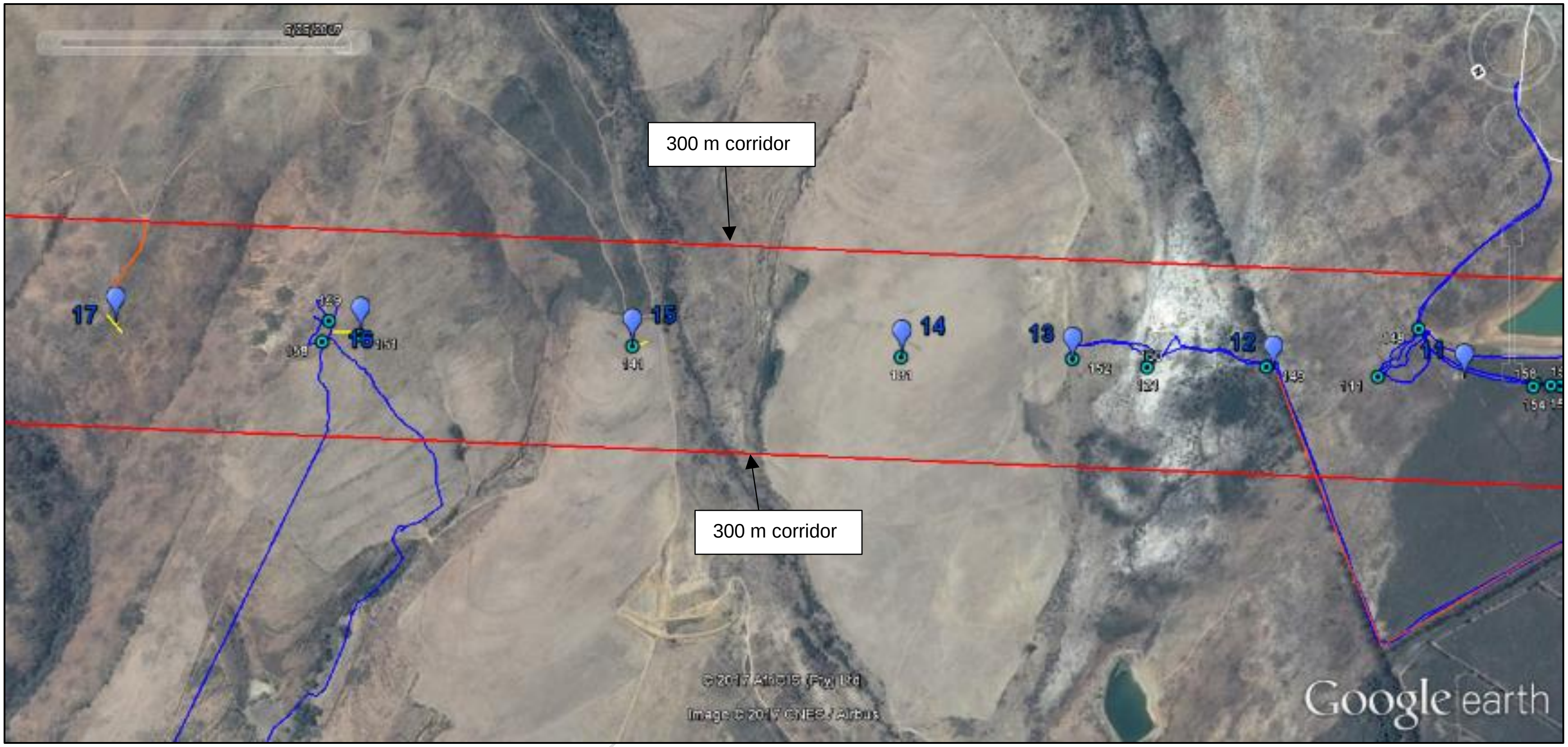


Figure 6.8.7. SURVEY MAP: Google Earth™ aerial image showing 300 m corridor (outer two parallel red lines) for the proposed 132kV powerline showing waypoint 154 to 158 (numbered yellow and turquoise circle icons), proposed tower locations 17 to 11 (numbered blue balloon icons) and proposed access road (red and yellow lines = new roads; orange lines = existing roads). The survey tracks are indicated by the blue lines.

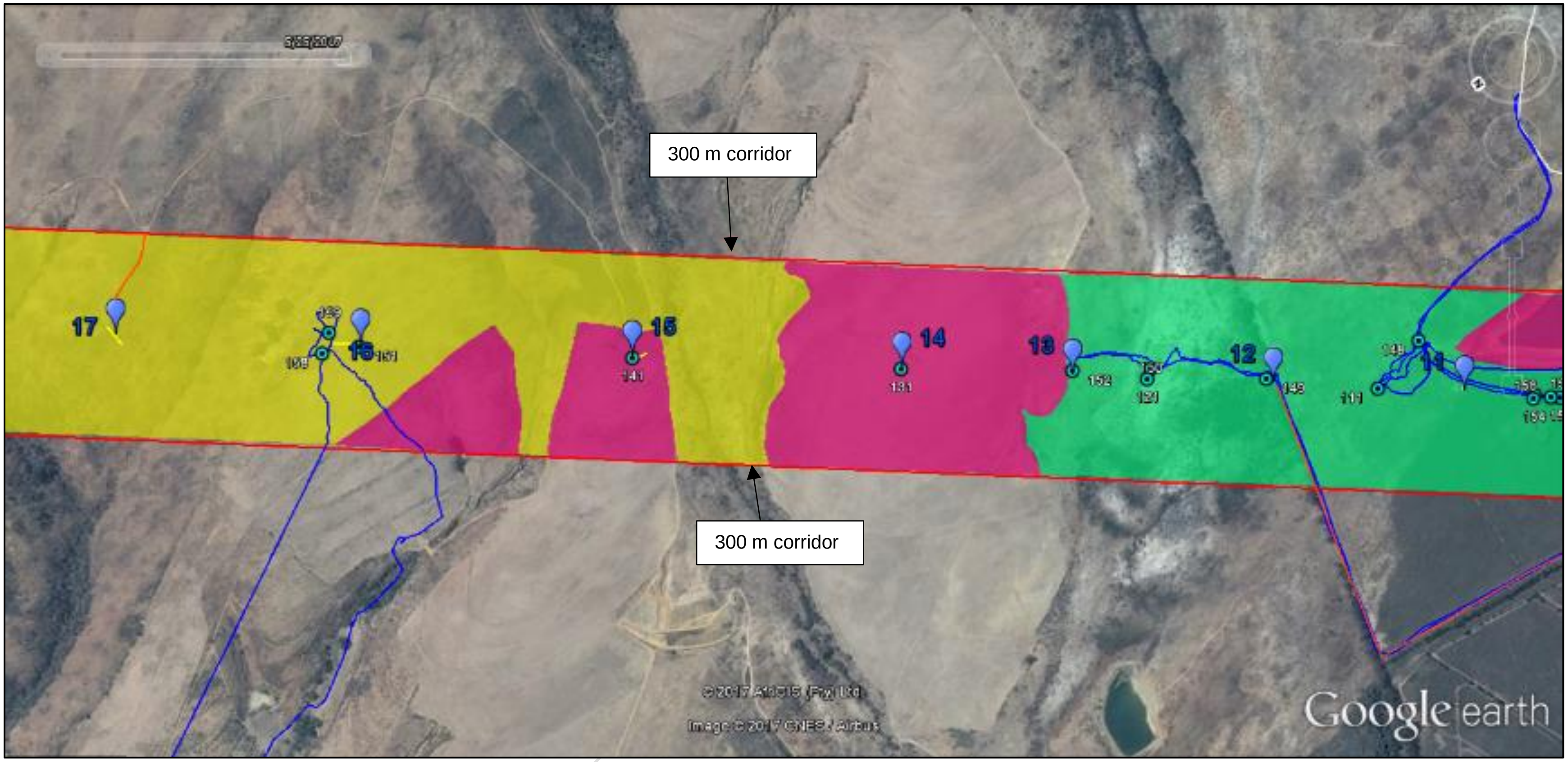


Figure 6.8.8. HABITAT MAP: Google Earth™ aerial image showing 300 m corridor (outer two parallel red lines) for the proposed 132kV powerline, showing the broad habitat types (pink = transformed; yellow = semi-intact vegetation; turquoise = intact medium condition vegetation), waypoints 154 to 158 (numbered yellow and turquoise circle icons), proposed tower locations 17 to 11 (numbered blue balloon icons) and proposed access road (red and red lines = new roads; orange line = existing roads requiring upgrading). The survey tracks are indicated by the blue lines.

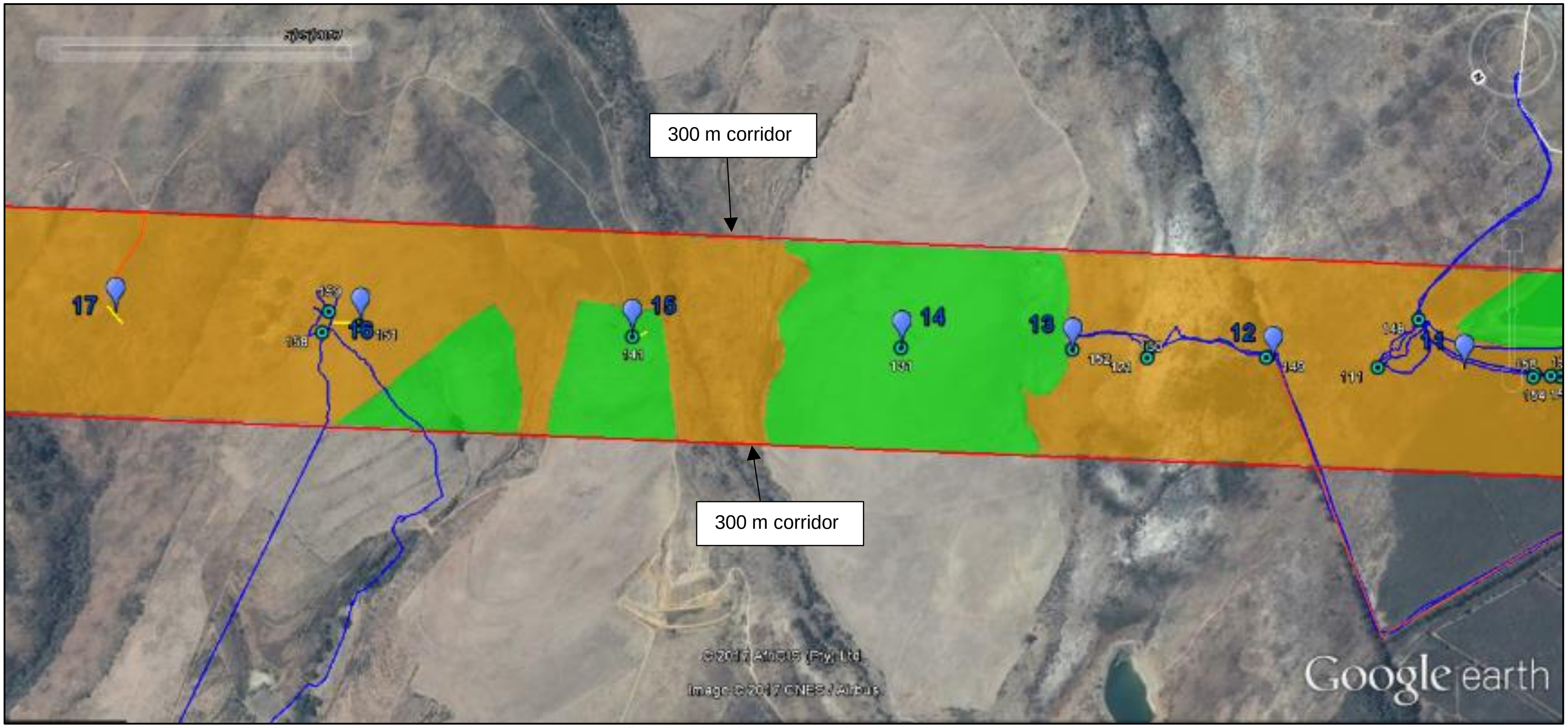


Figure 6.8.9. SENSITIVITY MAP: Google Earth™ aerial image showing 300 m corridor for the proposed 132kV powerline (outer two parallel red lines) showing the sensitivity (light orange = medium sensitivity; bright green = very low sensitivity), waypoints 154 to 158 (numbered yellow and turquoise circle icon), proposed tower locations 17 to 11 (numbered blue balloon icons) and proposed access road (red and yellow lines = new roads; orange line = existing roads requiring upgrading). The survey tracks are indicated by the blue lines.

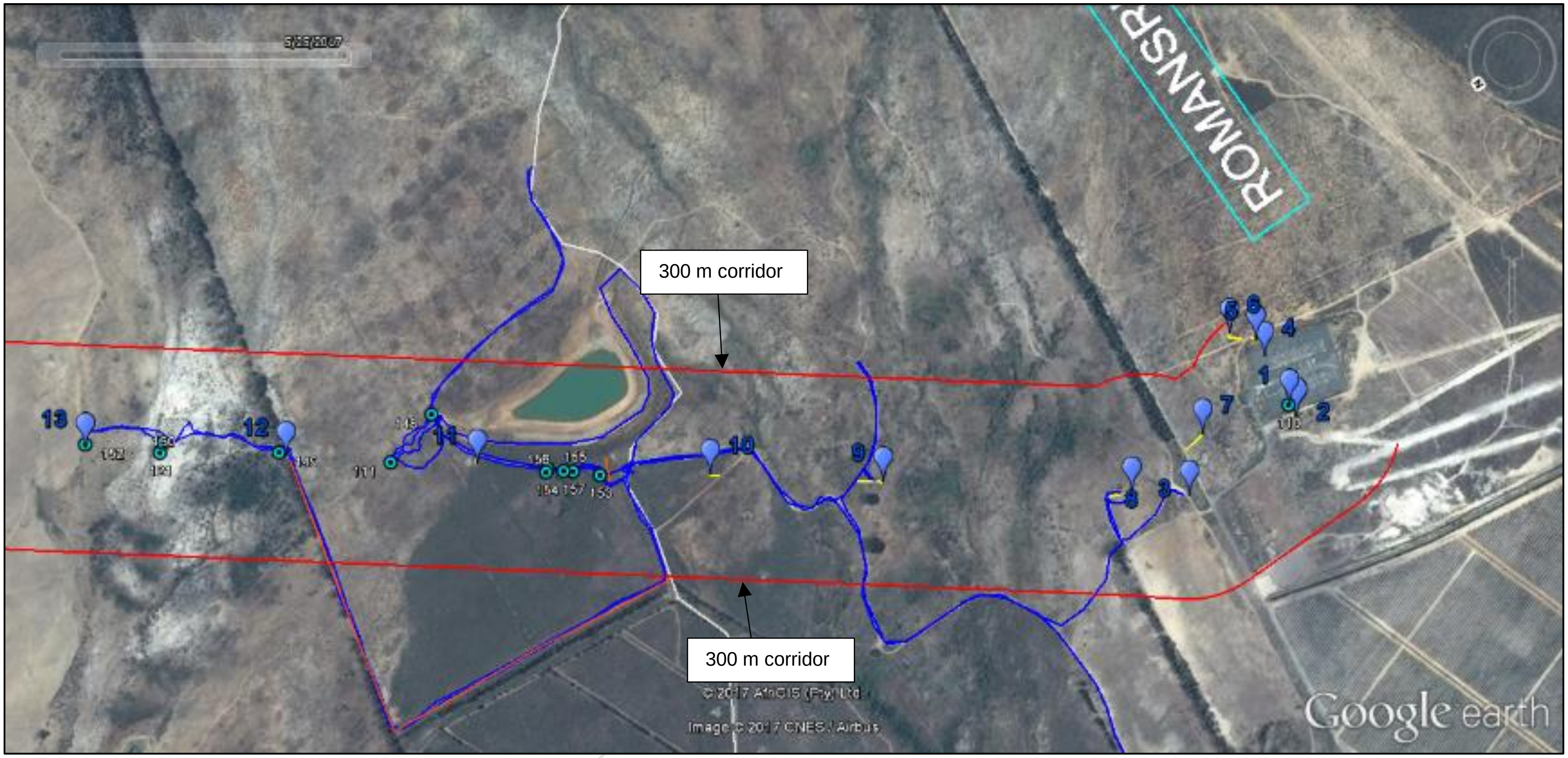


Figure 6.8.10. SURVEY MAP: Google Earth™ aerial image showing 300 m corridor (outer two parallel red lines) for the proposed 132kV powerline showing waypoint 152 to 110 (numbered yellow and turquoise circle icons), proposed tower locations 13 to 1 (numbered blue balloon icons) and proposed access road (orange and yellow lines = new roads; orange lines = existing roads requiring upgrading). The survey tracks are indicated by the blue lines.

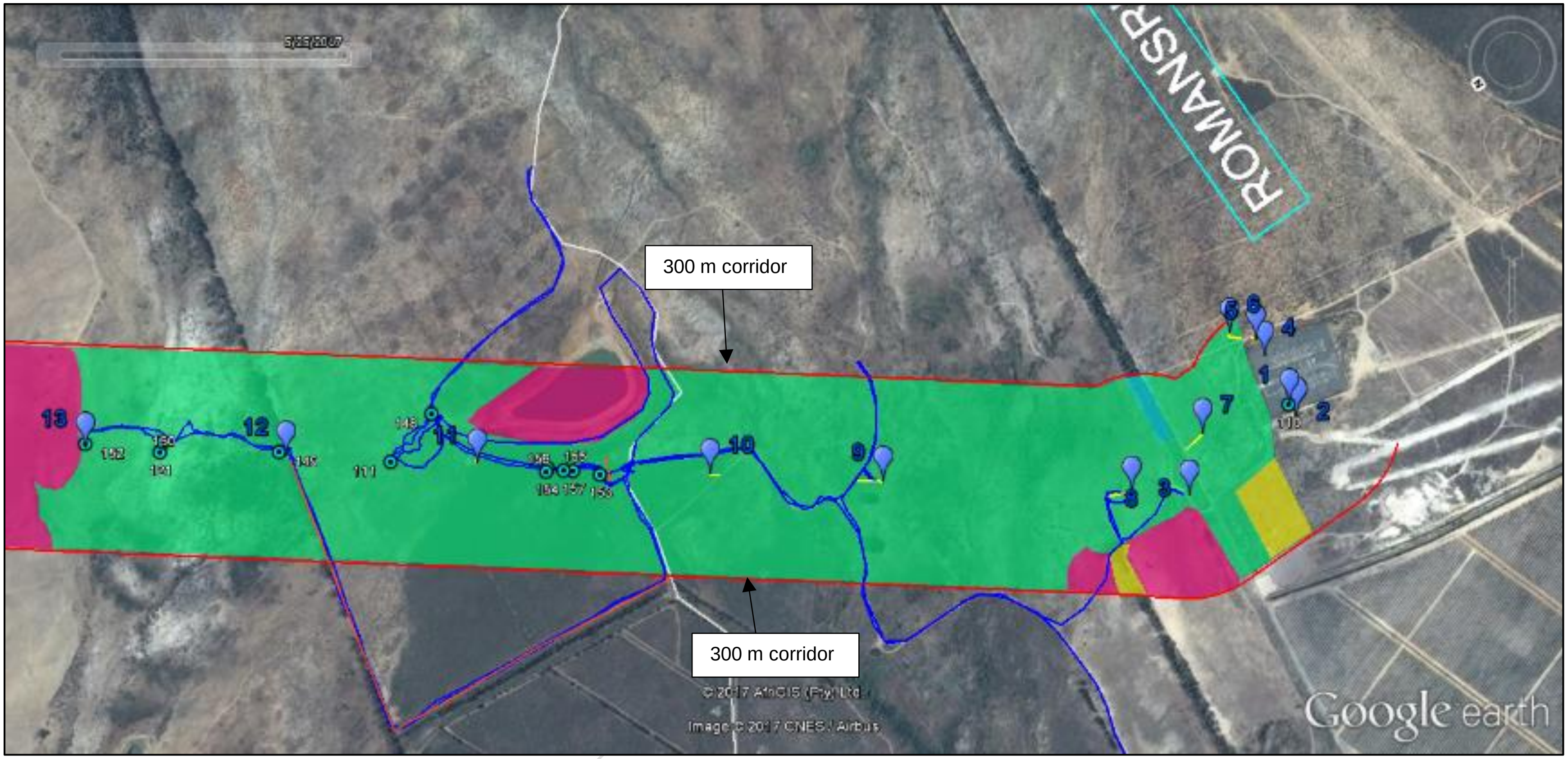


Figure 6.8.8. HABITAT MAP: Google Earth™ aerial image showing 300 m corridor (outer two parallel red lines) for the proposed 132kV powerline, showing the broad habitat types (pink = transformed; turquoise = semi-intact vegetation), waypoints 152 to 110 (numbered yellow and turquoise circle icons), proposed tower locations 13 to 1 (numbered blue balloon icons) and proposed access road (orange and yellow lines = new roads; orange line = existing roads requiring upgrading). The survey tracks are indicated by the blue lines.

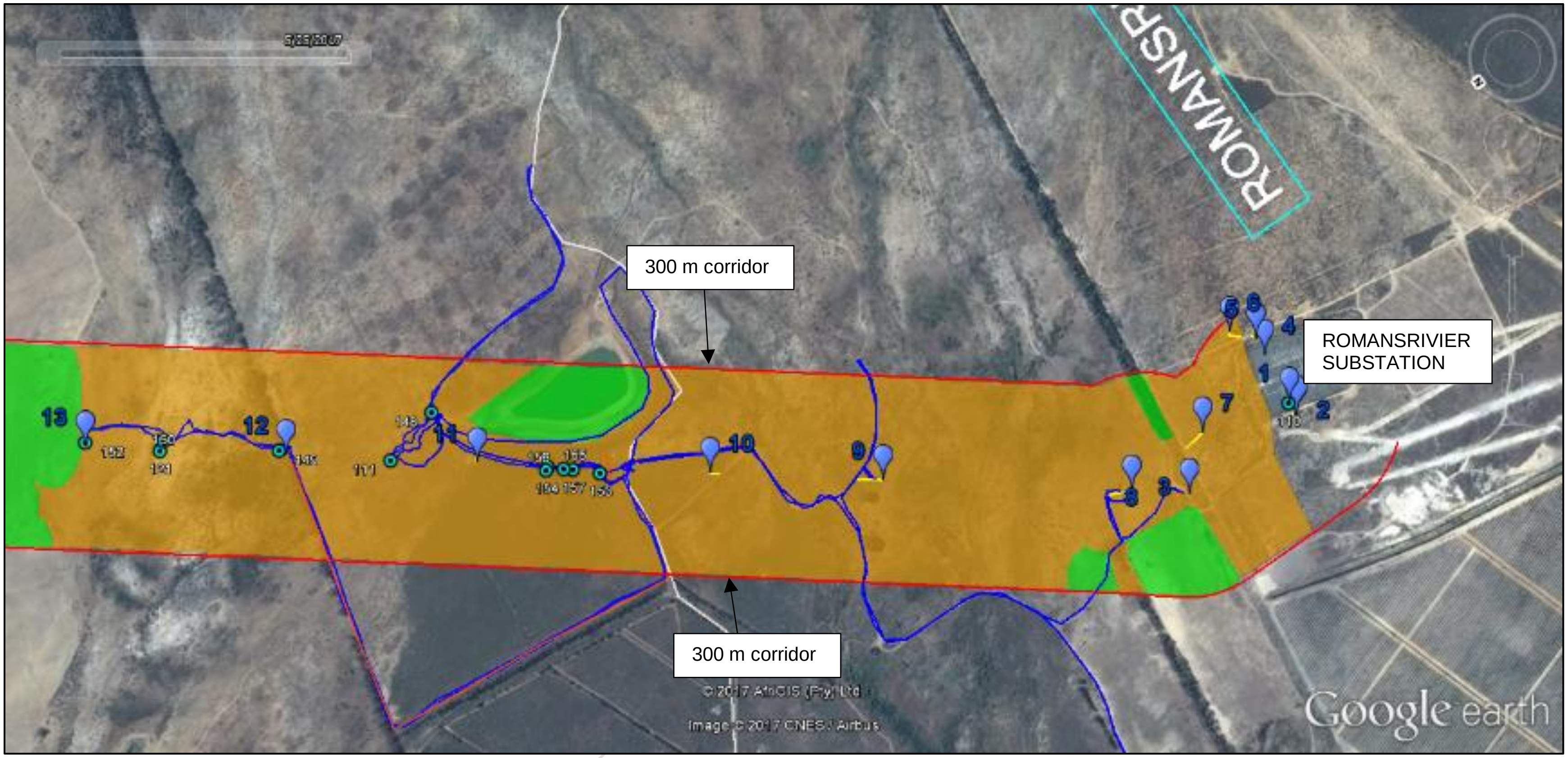


Figure 6.8.11. SENSITIVITY MAP: Google Earth™ aerial image showing 300 m corridor (outer two parallel red lines) for the proposed 132kV powerline, showing the sensitivity (light orange = medium sensitivity; bright green = very low sensitivity), waypoints 152 to 110 (numbered yellow and turquoise circle icons), proposed tower locations 13 to 1 (numbered blue balloon icons) and proposed access road (orange and yellow lines = new roads; orange line = existing roads requiring upgrading). The survey tracks are indicated by the blue lines.

8. Impact assessment

The impact assessment is a measure of the impacts likely to occur on the affected environment, specifically the vegetation, ecological processes, important plant species and habitats. They are assessed for (a) the 'No Go' scenario and (b) the direct, indirect and cumulative impacts. Impacts associated with the proposed project are based on (a) the layout plans provided (specific impacts linked to tower positions and access roads), and (b) the impacts associated with each habitat type (general impacts). Mitigation measures are those interventions required to either reduce the impact significance rating (essential mitigation) or to ensure that the project imposes the least possible strain on the affected environment (best practice/general mitigation).

8.1. The No Go Scenario

The 'No Go' or no development scenario takes into consideration the impact should development not occur. It is a prediction of the future state of the affected area in the event of no development taking place based on the current and/or anticipated future land use. If the proposed construction of the powerline does not occur it would not affect the *status quo* of the natural vegetation. The 'No Go' scenario would thus result in a **Neutral** impact since no natural vegetation would be lost or fragmented.

8.2. Direct impacts

Direct impacts are those that would occur as a direct result of the proposed construction and operational activities of the project. These would include the following:

- Loss of vegetation type, important species and ecological processes resulting from the construction of pylons.
- Loss of vegetation type, important species and ecological processes resulting from the construction of service roads.
- Loss of vegetation due to temporary access tracks (i.e. areas traversed by large trucks with possible brush-cutting of vegetation).
- Loss of vegetation within the servitude due to Eskom's vegetation management plan, as follows:
    - Brush-cutting of vegetation where the vegetation poses a safety clearance risk.

    - Brush-cutting or clearing of vegetation when access to the Eskom land is hindered.
    - Brush-cutting or pruning of vegetation where vegetation poses a fire risk.
    - To comply with legal imperatives.
- Introduction of weeds and invasive alien plants (IAP's) via disturbance and introduction of seed present in gravel and other introduced material, including seed transported in vehicles and by humans.
- Gradual spread of IAP's along new access roads.
- Spread of IAPs into Protected Areas and CBAs from new access roads. It is noted that new access roads may, however, assist alien clearing efforts and fire-fighting efforts. Thus impacts are likely to be both negative and positive in some instances.

Direct impacts are assessed in Table 3 to 8 according to the following interrelated components:

- ➢ Loss of vegetation type – including intact vegetation, ecologically important species and species of conservation concern.
- ➢ Loss of ecological processes – associated with fragmentation and loss of intact vegetation, and loss of ecologically important species and species of conservation concern.

Loss of vegetation was calculated for each vegetation type and habitat condition class (intact vegetation, semi-intact vegetation, degraded vegetation and transformed) for all construction activities, namely (a) tower construction and (b) access road construction (Table 2). These were assessed in terms of the extent (clearance of vegetation required) in relation to habitat sensitivity based on vegetation type, ecological processes, and important species (Tables 3 to 8). Note that when assessing impacts relating to tower construction and access road construction, the highest impact rating is applied in order to rate the overall impact significance. For example, if loss of vegetation is Low Negative for tower construction but Medium Negative for access road construction, the latter rating is applied since this allows for assessing the impacts significance for the powerline activities as an overall impact.

Loss of vegetation type and important species

Loss of vegetation type and important species is expected to result in the following impact significance <u>prior to mitigation</u>:

Tower construction

Ceres Shale Renosterveld: **Low Negative Impact.**

Winterhoek Sandstone Fynbos: **Low Negative Impact.**

Northern Inland Shale Band Vegetation: **Low Negative Impact.**

North Hex Sandstone Fynbos: **Low Negative Impact.**

Breede Shale Fynbos: **Low Negative Impact.**

Breede Alluvium Fynbos: **Low Negative Impact.**

Access road construction

Ceres Shale Renosterveld: **Low Negative Impact.**

Winterhoek Sandstone Fynbos: **High Negative Impact.**

Northern Inland Shale Band Vegetation: **Medium Negative Impact.**

North Hex Sandstone Fynbos: **Medium Negative Impact.**

Breede Shale Fynbos: **Low Negative Impact.**

Breede Alluvium Fynbos: **Low Negative Impact.**

Overall impacts

Ceres Shale Renosterveld: **Low Negative Impact.**

Winterhoek Sandstone Fynbos: **High Negative Impact.**

Northern Inland Shale Band Vegetation: **Medium Negative Impact.**

North Hex Sandstone Fynbos: **Medium Negative Impact.**

Breede Shale Fynbos: **Low Negative Impact.**

Breede Alluvium Fynbos: **Low Negative Impact.**

Note that no species of conservation concern were identified within the project footprint but that this may be strongly influenced by the season in which the survey was carried out and lack of vegetation cover in recently burnt areas. It is likely that a number of species of conservation importance would be identified during a spring survey. This limitation is dealt with in more detail in Section 8.3.2 (General mitigation section) below.

Loss of ecological processes

Loss of ecological processes associated with loss of vegetation type and important species is difficult to quantify, however, the main impacts are likely to result in habitat fragmentation and impeded flow of ecological process as a result of the construction of new access roads. These impacts are unlikely to have far reaching ecological impacts. Impacts due to loss of ecological processes was rated on the same order as loss of vegetation type and important species (i.e.

precautionary approach). These are expected to result in the following impact significance prior to mitigation:

Tower construction

Ceres Shale Renosterveld: **Low Negative Impact.**

Winterhoek Sandstone Fynbos: **Low Negative Impact.**

Northern Inland Shale Band Vegetation: **Low Negative Impact.**

North Hex Sandstone Fynbos: **Low Negative Impact.**

Breede Shale Fynbos: **Low Negative Impact.**

Breede Alluvium Fynbos: **Low Negative Impact.**

Access road construction

Ceres Shale Renosterveld: **Low Negative Impact.**

Winterhoek Sandstone Fynbos: **High Negative Impact.**

Northern Inland Shale Band Vegetation: **Low Negative Impact.**

North Hex Sandstone Fynbos: **Medium Negative Impact.**

Breede Shale Fynbos: **Low Negative Impact.**

Breede Alluvium Fynbos: **Low Negative Impact.**

Overall impacts

Ceres Shale Renosterveld: **Low Negative Impact.**

Winterhoek Sandstone Fynbos: **High Negative Impact.**

Northern Inland Shale Band Vegetation: **Low Negative Impact.**

North Hex Sandstone Fynbos: **Medium Negative Impact.**

Breede Shale Fynbos: **Low Negative Impact.**

Breede Alluvium Fynbos: **Low Negative Impact.**

Table 2. Loss of vegetation that would result from construction of tower and access road construction for each vegetation type and habitat condition class

Vegetation type	**Access roads: intact vegetation**	**Access roads: degraded vegetation**	**Access roads: transformed vegetation**	**Access roads: semi-intact vegetation**	**Pylons: intact vegetation**	**Pylons: degraded vegetation**	**Pylons: semi-intact vegetation**	**Pylons: transformed**
Ceres Shale Renosterveld	None				2 x 200m² =400m²			2 x 200m² =400m²
Subtotal					**400 m²**			**400 m²**
Winterhoek Sandstone Fynbos2 x 200 m2ion	616m x 4m = 2464m² 96m x 6m = 567m² 64m x 2m = 128m² 175m x 6m = 1050m²				11 x 200 m² = 2200m²			
Subtotal	**4 209 m²**				**2 200 m²**			
Northern Inland Shale Band Vegetation	88m x 6m = 528m² 85m x 6m = 510m²				3 x 200m²			
Subtotal	**1 030 m²**							
North Hex Sandstone Fynbos	150m x 6m = 900 m² 207m x 5m = 1035 m² 99m x 6m = 594 m² 263m x 4m = 1052 m² 288m x 4m = 1115 m² 1007m X 4m = 4028 m² 188m x 4m = 752 m² 554m x 6m = 3324 m² 49m x 6m = 294 m² 73m x 6m = 438 m² 97m bridge x 10m = 970 m² 224m x 6m = 1344 m² 190m x 6m = 1140 m² 715m x 6m = 4290 m²				16 x 200m² = 3200m²	1 x 200m² = 200m²		

	16m x 6m = 96 m^2 161m x 5m = 805 m^2 64m x 6m = 320m^2							
Subtotal	**22 497 m^2**				**3 200 m^2**	**200 m^2**		
Breede Alluvium Fynbos					2 x 200m^2 = 400m^2			
Subtotal					**400 m^2**			
Breede Shale Fynbos	7m x 5m = 35m^2 14m x 5m = 70m^2 33m x 5m = 165 m^2 35m x 5m = 175m^2 26m x 5m = 130m^2		22m x 5m = 110m^2	906m x 6m = 5434m^2 87m x 6m = 522m^2 93m x 5m = 465m^2 151 x 5m = 755m^2 157 x 5m = 785m^2 54 x 5m = 270m^2 137 x 5m = 685m^2 36m x 5m = 180m^2 39m x 5m = 195m^2	7 x 200 m^2 = 1400m^2		16 x 200 m^2 = 3200m^2	2 x 200m^2 = 400m^2
Subtotal	**575 m^2**		**110 m^2**	**9 291 m^2**	**1 400 m^2**		**3 200 m^2**	**400 m^2**

Road width calculated according to degree of cut and fill: 4 m = no cut and fill required; 5 m = 0.5 m cut and fill required; 6 m = 1 m cut and fill required.

Table 3A. Impact and Significance - Loss of vegetation type (Ceres Shale Renosterveld: VULNERABLE) and important species

CRITERIA	'NO GO' ALTERNATIVE		TOWERS (PYLONS)	
Nature of direct impact	**Neutral**		**-ve**	
Loss of vegetation type & important species	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION
Extent (A)	Local (1)	Local (1)	Local (1)	Local (1)
Intensity (B)	None (0)	None (0)	Low (1)	Low (1)
Duration (C)	None (0)	None (0)	Long-term (3)	Long-term (3)
Consequence score: (A + B + C)	1	1	5	5
Consequence rating	Not significant	Not significant	Low	Low
Probability of occurrence	Definite	Definite	Probable	Probable
Confidence	High	High	High	High
Significance	Not significant	Not significant	Low	Low
Proposed mitigation: None. Area is transformed between Ceres Substation and Tower 67. No access roads required. Note: Intensity considers impacts in relation to (a) the proportion of the ecosystem protected (2.7%) and (b) affected natural vegetation in relation to the remaining natural area of the ecosystem (0.004%).				
Nature of Cumulative impact: Note cumulative impacts are calculated in relation to the remaining natural or near-natural vegetation of each vegetation type or ecosystem (see section 8.4).	**Neutral**		**-ve**	
Cumulative impact prior to mitigation	No Impact	No Impact	Very Low	Very Low
Degree to which impact can be reversed	High	High	Irreversible	Irreversible
Degree to which impact may cause irreplaceable loss of resources	No Impact	No Impact	Very Low	Very Low
Degree to which impact can be mitigated	No Impact	No Impact	Very Low	Very Low
Proposed mitigation	None	None	None	None
Cumulative impact post mitigation	No Impact	No Impact	Very Low	Very Low
Significance of cumulative impact (broad scale) after mitigation	No Impact	No Impact	Very Low	Very Low

Table 3B. Impact and Significance - Loss of ecological processes associated with loss of Ceres Shale Renosterveld (VULNERABLE)

CRITERIA	'NO GO' ALTERNATIVE		TOWERS (PYLONS)	
Nature of direct impact	**Neutral**		**-ve**	
Loss of ecological processes				
	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION
Extent (A)	Local (1)	Local (1)	Local (1)	Local (1)
Intensity (B)	None (0)	None (0)	Low (1)	Low (1)
Duration (C)	None (0)	None (0)	Long-term (3)	Long-term (3)
Consequence score: (A + B + C)	1	1	5	5
Consequence rating	Not significant	Not significant	Low	Low
Probability of occurrence	Definite	Definite	Probable	Probable
Confidence	High	High	High	High
Significance	Not significant	Not significant	Low	Low
Proposed mitigation: None. Area is transformed between Ceres Substation and Tower 67. No access roads required.				

Table 4A. Impact and Significance - Loss of vegetation type (Winterhoek Sandstone Fynbos: Least Threatened) and important species

CRITERIA	**'NO GO' ALTERNATIVE**		**TOWERS (PYLONS)**		**ACCESS ROADS**	
Nature of direct impact	**Neutral**		**-ve**		**-ve**	
Loss of vegetation type & important species						
	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION
Extent (A)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)
Intensity (B)	None (0)	None (0)	Low (1)	Low (1)	High (3)	Medium (2)
Duration (C)	None (0)	None (0)	Long-term (3)	Long-term (3)	Long-term (3)	Long-term (3)
Consequence score: (A + B + C)	1	1	5	5	7	6
Consequence rating	Not significant	Not significant	Low	Low	High	Medium
Probability of occurrence	Definite	Definite	Probable	Probable	Probable	Probable
Confidence	High	High	High	High	High	High
Significance	Not significant	Not significant	Low	Low	High	Medium
Proposed mitigation: Helicopter-assisted construction for Towers 66, 63, 62, 61, 60 & 59 reduces potential impacts since no permanent access roads are required. Access road to Towers 64 & 65 (Ceres to Michell's Pass) and 56 & 55 (Michell's Pass) results in Medium (-ve) Impact. Note: Intensity is the magnitude of the impact in relation to the sensitivity of the receiving environment, taking into account the degree to which the impact may cause irreplaceable loss of resources. Intensity considers impacts in relation to (a) the proportion of the ecosystem protected (278%) and (b) affected natural vegetation in relation to the remaining natural area of the ecosystem (0.0006%). In this instance loss of botanically sensitive, special wetland habitats would be impacted and lead to High intensity without mitigation. However, with mitigation these habitats can be largely avoided, thus leading to Medium intensity. These resources are irreplaceable.						
Nature of Cumulative impact Note cumulative impacts are calculated in relation to the remaining natural or near-natural vegetation of each vegetation type or ecosystem (see section 8.4).	**Neutral**		**-ve**		**-ve**	
Cumulative impact prior to mitigation	No Impact	No Impact	Low	Low	Low	Low
Degree to which impact can be reversed	High	High	Irreversible	Irreversible	Irreversible	Irreversible
Degree to which impact may cause irreplaceable loss of resources	No Impact	No Impact	Low	Low	Low	Low
Degree to which impact can be mitigated	No Impact	No Impact	Medium	Medium	Medium	Medium

Proposed mitigation	None	None	See above	See above	See above	See above
Cumulative impact post mitigation	No Impact	No Impact	Very Low	Very Low	Very Low	Very Low
Significance of cumulative impact (broad scale) after mitigation	No Impact	No Impact	Very Low	Very Low	Very Low	Very Low

Table 4B. Impact and Significance - Loss of ecological processes associated with loss of Winterhoek Sandstone Fynbos

CRITERIA	**'NO GO' ALTERNATIVE**		**TOWERS (PYLONS)**		**ACCESS ROADS**	
Nature of direct impact	**Neutral**		**-ve**		**-ve**	
Loss of ecological processes						
	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION
Extent (A)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)
Intensity (B)	None (0)	None (0)	Low (1)	Low (1)	High (3)	Medium (2)
Duration (C)	None (0)	None (0)	Long-term (3)	Long-term (3)	Long-term (3)	Long-term (3)
Consequence score: (A + B + C)	1	1	5	5	7	6
Consequence rating	Not significant	Not significant	Low	Low	High	Medium
Probability of occurrence	Definite	Definite	Probable	Probable	Probable	Probable
Confidence	High	High	High	High	High	High
Significance	Not significant	Not significant	Low	Low	High	Medium
Mitigation: as for table 4A. Intensity and Significance is rated as for loss of vegetation (Table 4A) since loss of ecological processes is likely to be of the same order as loss of vegetation when considering that irreplaceable, special wetland habitats would potentially be impacted. Helicopter-assisted construction would substantially reduce (mitigates) these impacts.						

Table 5A. Impact and Significance - Loss of vegetation type (Northern Inland Shale Band Vegetation: Least Threatened) and important species

CRITERIA	'NO GO' ALTERNATIVE		TOWERS (PYLONS)		ACCESS ROADS	
Nature of direct impact	**Neutral**		**-ve**		**-ve**	
Loss of vegetation type and important species						
	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION
Extent (A)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)
Intensity (B)	None (0)	None (0)	Low (1)	Low (1)	Low (1)	Low (1)
Duration (C)	None (0)	None (0)	Long-term (3)	Long-term (3)	Long-term (3)	Long-term (3)
Consequence score: (A + B + C)	1	1	5	5	5	5
Consequence rating	Not significant	Not significant	Low	Low	Low	Low
Probability of occurrence	Definite	Definite	Probable	Probable	Probable	Probable
Confidence	High	High	High	High	High	High
Significance	Not significant	Not significant	Low	Low	Low	Low
Proposed mitigation: None. Note: Intensity is the magnitude of the impact in relation to the sensitivity of the receiving environment, taking into account the degree to which the impact may cause irreplaceable loss of resources. Note: Intensity considers impacts in relation to (a) the proportion of the ecosystem protected (270%) and (b) affected natural vegetation in relation to the remaining natural area of the ecosystem (0.0005%).						
Nature of Cumulative impact Note cumulative impacts are calculated in relation to the remaining natural or near-natural vegetation of each vegetation type or ecosystem (see section 8.4).	**Neutral**		**-ve**		**-ve**	
Cumulative impact prior to mitigation	No Impact	No Impact	Very Low	Very Low	Very Low	Very Low
Degree to which impact can be reversed	High	High	Irreversible	Irreversible	Irreversible	Irreversible

Degree to which impact may cause irreplaceable loss of resources	No Impact	No Impact	Low	Low	Low	Low
Degree to which impact can be mitigated	No Impact	No Impact	Medium	Medium	Medium	Medium
Proposed mitigation	None	None	None	None	None	None
Cumulative impact post mitigation	No Impact	No Impact	Very Low	Very Low	Very Low	Very Low
Significance of cumulative impact (broad scale) after mitigation	No Impact	No Impact	Very Low	Very Low	Very Low	Very Low

Table 5B. Impact and Significance - Loss of ecological processes associated with loss of Northern Inland Shale Band Vegetation

CRITERIA	'NO GO' ALTERNATIVE		TOWERS (PYLONS)		ACCESS ROADS	
Nature of direct impact	**Neutral**		**-ve**		**-ve**	
Loss of ecological processes						
	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION
Extent (A)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)
Intensity (B)	None (0)	None (0)	Low (1)	Low (1)	Low (1)	Low (1)
Duration (C)	None (0)	None (0)	Long-term (3)	Long-term (3)	Long-term (3)	Long-term (3)
Consequence score: (A + B + C)	1	1	5	5	5	5
Consequence rating	Not significant	Not significant	Low	Low	Low	Low
Probability of occurrence	Definite	Definite	Probable	Probable	Probable	Probable
Confidence	High	High	High	High	High	High
Significance	Not significant	Not significant	Low	Low	Low	Low

Table 6A. Impact and Significance - Loss of vegetation type (North Hex Sandstone Fynbos: Least Threatened) and important species

CRITERIA	'NO GO' ALTERNATIVE		TOWERS (PYLONS)		ACCESS ROADS	
Nature of direct impact	**Neutral**		**-ve**		**-ve**	
Loss of vegetation type and important species						
	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION
Extent (A)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)
Intensity (B)	None (0)	None (0)	Low (1)	Low (1)	Medium (2)	Medium (2)
Duration (C)	None (0)	None (0)	Long-term (3)	Long-term (3)	Long-term (3)	Long-term (3)
Consequence score: (A + B + C)	1	1	5	5	6	6
Consequence rating	Not significant	Not significant	Low	Low	Medium	Medium
Probability of occurrence	Definite	Definite	Probable	Probable	Probable	Probable
Confidence	High	High	High	High	High	High
Significance	Not significant	Not significant	Low	Low	Medium	Medium
Proposed mitigation: None. Impacts are not reduced by mitigation since mitigation option are highly limited. Access roads are a technical requirement according to Eskom and thus cannot be eliminated between Tower 51 and 48 in the Michell's Pass section. The extensive network of access roads, including a low level river crossing between 39 and 40 (Tierhokkloof River) leading to Towers 42 to 36 would require clearance of 22 497 m^2 of intact natural vegetation for both new/or upgrading of access roads and a further 3200m^2 for Tower construction. Note: Intensity is the magnitude of the impact in relation to the sensitivity of the receiving environment, taking into account the degree to which the impact may cause irreplaceable loss of resources. Note: Intensity considers impacts in relation to (a) the proportion of the ecosystem protected (270%) and (b) affected natural vegetation in relation to the remaining natural area of the ecosystem (0.0007%).						
Nature of Cumulative impact Note cumulative impacts are calculated in relation to the remaining natural or near-natural vegetation of each vegetation type or ecosystem (see section 8.4).	**Neutral**		**-ve**		**-ve**	

Cumulative impact prior to mitigation	No Impact	No Impact	Very Low	Very Low	Very Low	Very Low
Degree to which impact can be reversed	High	High	Irreversible	Irreversible	Irreversible	Irreversible
Degree to which impact may cause irreplaceable loss of resources	No Impact	No Impact	Low	Low	Low	Low
Degree to which impact can be mitigated	No Impact	No Impact	Medium	Medium	Medium	Medium
Proposed mitigation	None	None	None	None	None	None
Cumulative impact post mitigation	No Impact	No Impact	Very Low	Very Low	Very Low	Very Low
Significance of cumulative impact (broad scale) after mitigation	No Impact	No Impact	Very Low	Very Low	Very Low	Very Low

Table 6B. Impact and Significance - Loss of ecological processes associated with loss of North Hex Sandstone Fynbos

CRITERIA	'NO GO' ALTERNATIVE		TOWERS (PYLONS)		ACCESS ROADS	
Nature of direct impact	**Neutral**		**-ve**		**-ve**	
Loss of ecological processes						
	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION
Extent (A)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)
Intensity (B)	None (0)	None (0)	Low (1)	Low (1)	Medium (2)	Medium (2)
Duration (C)	None (0)	None (0)	Long-term (3)	Long-term (3)	Long-term (3)	Long-term (3)
Consequence score: (A + B + C)	1	1	5	5	6	6
Consequence rating	Not significant	Not significant	Low	Low	Medium	Medium
Probability of occurrence	Definite	Definite	Probable	Probable	Probable	Probable
Confidence	High	High	High	High	High	High
Significance	Not significant	Not significant	Low	Low	Medium	Medium
Proposed mitigation: None. Impacts are not reduced by mitigation since mitigation option are highly limited. Access roads are a technical requirement according to Eskom and thus cannot be eliminated between Tower 51 and 48 in the Michell's Pass section.						

Table 7A. Impact and Significance - Loss of vegetation type (Breede Shale Fynbos: Least Threatened) and important species

CRITERIA	'NO GO' ALTERNATIVE		TOWERS (PYLONS)		ACCESS ROADS	
Nature of direct impact	**Neutral**		**-ve**		**-ve**	
Loss of vegetation type and important species						
	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION
Extent (A)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)
Intensity (B)	None (0)	None (0)	Low (1)	Low (1)	Low (1)	Low (1)
Duration (C)	None (0)	None (0)	Long-term (3)	Long-term (3)	Long-term (3)	Long-term (3)
Consequence score: (A + B + C)	1	1	5	5	5	5
Consequence rating	Not significant	Not significant	Low	Low	Low	Low
Probability of occurrence	Definite	Definite	Probable	Probable	Probable	Probable
Confidence	High	High	High	High	High	High
Significance	Not significant	Not significant	Low	Low	Low	Low
Proposed mitigation: None. Access roads between Towers 34 and the Romansrivier substation traverse either low quality vegetation or are not extensive i.e. acceptable without mitigation. Note: Intensity is the magnitude of the impact in relation to the sensitivity of the receiving environment, taking into account the degree to which the impact may cause irreplaceable loss of resources. Note: Intensity considers impacts in relation to (a) the proportion of the ecosystem protected (104%) and (b) affected natural vegetation in relation to the remaining natural area of the ecosystem (0.002%).						
Nature of Cumulative impact Note cumulative impacts are calculated in relation to the remaining natural or near-natural vegetation of each vegetation type or ecosystem (see section 8.4).	**Neutral**		**-ve**		**-ve**	
Cumulative impact prior to mitigation	No Impact	No Impact	Very Low	Very Low	Very Low	Very Low
Degree to which impact can be reversed	High	High	Irreversible	Irreversible	Irreversible	Irreversible

Degree to which impact may cause irreplaceable loss of resources	No Impact	No Impact	Very Low	Very Low	Very Low	Very Low
Degree to which impact can be mitigated	No Impact	No Impact	Very Low	Very Low	Very Low	Very Low
Proposed mitigation	None	None	None	None	None	None
Cumulative impact post mitigation	No Impact	No Impact	Very Low	Very Low	Very Low	Very Low
Significance of cumulative impact (broad scale) after mitigation	No Impact	No Impact	Very Low	Very Low	Very Low	Very Low

Table 7B. Impact and Significance - Loss of ecological processes associated with loss of Breede Shale Fynbos

CRITERIA	'NO GO' ALTERNATIVE		TOWERS (PYLONS)		ACCESS ROADS	
Nature of direct impact	**Neutral**		**-ve**		**-ve**	
Loss of ecological processes						
	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION
Extent (A)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)
Intensity (B)	None (0)	None (0)	Low (1)	Low (1)	Low (1)	Low (1)
Duration (C)	None (0)	None (0)	Long-term (3)	Long-term (3)	Long-term (3)	Long-term (3)
Consequence score: (A + B + C)	1	1	5	5	5	5
Consequence rating	Not significant	Not significant	Low	Low	Low	Low
Probability of occurrence	Definite	Definite	Probable	Probable	Probable	Probable
Confidence	High	High	High	High	High	High
Significance	Not significant	Not significant	Low	Low	Low	Low
Proposed mitigation: None. Access roads between Towers 34 and the Romansrivier substation traverse either low quality vegetation or are not extensive i.e. acceptable without mitigation.						

Table 8A. Impact and Significance - Loss of vegetation type (Breede Alluvium Fynbos: ENDANGERED) and important species

CRITERIA	'NO GO' ALTERNATIVE		TOWERS (PYLONS)		ACCESS ROADS	
Nature of direct impact	**Neutral**		**-ve**		**-ve**	
Loss of vegetation type and important species						
	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION
Extent (A)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)
Intensity (B)	None (0)	None (0)	Low (1)	Low (1)	Low (1)	Low (1)
Duration (C)	None (0)	None (0)	Long-term (3)	Long-term (3)	Long-term (3)	Long-term (3)
Consequence score: (A + B + C)	1	1	5	5	5	5
Consequence rating	Not significant	Not significant	Low	Low	Low	Low
Probability of occurrence	Definite	Definite	Probable	Probable	Probable	Probable
Confidence	High	High	High	High	High	High
Significance	Not significant	Not significant	Low	Low	Low	Low
Proposed mitigation: None. Access leading to Towers 10 & 9 are 15m and 38m respectively, having Low Impact. Note: Intensity is the magnitude of the impact in relation to the sensitivity of the receiving environment, taking into account the degree to which the impact may cause irreplaceable loss of resources. Note: Intensity considers impacts in relation to (a) the proportion of the ecosystem protected (13%) and (b) affected natural vegetation in relation to the remaining natural area of the ecosystem (0.0001%).						
Nature of Cumulative impact Note cumulative impacts are calculated in relation to the remaining natural or near-natural vegetation of each vegetation type or ecosystem (see section 8.4).	**Neutral**		**-ve**		**-ve**	
Cumulative impact prior to mitigation	No Impact	No Impact	Very Low	Very Low	Very Low	Very Low
Degree to which impact can be reversed	High	High	Irreversible	Irreversible	Irreversible	Irreversible

Degree to which impact may cause irreplaceable loss of resources	No Impact	No Impact	Very Low	Very Low	Very Low	Very Low
Degree to which impact can be mitigated	No Impact	No Impact	Very Low	Very Low	Very Low	Very Low
Proposed mitigation	None	None	None	None	None	None
Cumulative impact post mitigation	No Impact	No Impact	Very Low	Very Low	Very Low	Very Low
Significance of cumulative impact (broad scale) after mitigation	No Impact	No Impact	Very Low	Very Low	Very Low	Very Low

Table 8B. Impact and Significance - Loss of ecological processes associated with loss of Breede Alluvium Fynbos (ENDANGERED)

CRITERIA	**'NO GO' ALTERNATIVE**		**TOWERS (PYLONS)**		**ACCESS ROADS**	
Nature of direct impact	**Neutral**		**-ve**		**-ve**	
Loss of ecological processes						
	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION
Extent (A)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)	Local (1)
Intensity (B)	None (0)	None (0)	Low (1)	Low (1)	Low (1)	Low (1)
Duration (C)	None (0)	None (0)	Long-term (3)	Long-term (3)	Long-term (3)	Long-term (3)
Consequence score: (A + B + C)	1	1	5	5	5	5
Consequence rating	Not significant	Not significant	Low	Low	Low	Low
Probability of occurrence	Definite	Definite	Probable	Probable	Probable	Probable
Confidence	High	High	High	High	High	High
Significance	Not significant	Not significant	Low	Low	Low	Low
Proposed mitigation: None. Access leading to Towers 10 & 9 are 15m and 38m respectively, having Low Impact.						

8.3 Mitigation

8.3.1. Site-specific mitigation

Loss of vegetation can be minimized in two ways. Firstly by reducing the extent, number and type of access roads and secondly by minimizing the construction area at towers by reducing unnecessary blasting and dumping of excavated rock. Excess material should be removed from each construction site since this smothers and kills the vegetation (Figure 7). In some instances the need for access roads could be eliminated by helicopter assisted access but due to Eskom's budgetary and technical constraints only a limited number of towers could be constructed in this manner. According to Eskom, the feasibility of the project becomes increasingly compromised as the number of constructed towers requiring helicopter assistance increases. It was therefore necessary to identify the most sensitive areas requiring helicopter assistance during the scoping and walk-through phases of the project. Mitigation is thus limited in many cases since loss of vegetation cannot be reduced by eliminating the need for access roads along all sections of the powerline route. The following site-specific mitigation measures were included:

Ceres substation to Michell's Pass

- Helicopter assistance for the construction of towers would be employed for Towers 66, 63, 62, 61, 60 & 59, thereby negating the need for permanent access roads. Permanent access roads to Towers 66, 63, 62, 61, 60 and 59 was identified as having High Negative Impact without helicopter assistance (i.e. without mitigation) due to the sensitivity of vegetation associated with multiple wetland systems. The introduction of helicopter assisted construction is expected to reduce these impacts to Low Negative.
- Impacts due to the access road to Towers 64 and 65 could not be mitigated by employing helicopter assistance.

Michell's Pass

- Access roads to Towers 56 and 55 would result in Medium (-ve) Impact both without and with mitigation.
- Access roads to Tower 51 and 48 are required but cannot be mitigated via helicopter assistance. Impacts are expected to be Medium (-ve) both without and with mitigation.

Michell's Pass to White Bridge

- The extensive network of access roads, including the low level river crossing (Tierhokkloof) leading to Towers 42 to 36 would require clearance of 22 497 m^2 of intact natural vegetation for access roads and a further 3200 m^2 for Tower construction***.*** The final clearance would potentially be lower since two options are available between Towers 36 and 39; these include an option to either upgrade the old access road or construct new access road directly beneath the towers. No essential mitigation was identified that would reduce these impacts. Impacts would be Medium Negative with and without mitigation. Note, however, that upgrading of the existing access track between Towers 36 and 39 would result in less severe impacts than the option to construct a new access track.

White Bridge to Romansrivier substation

- No site-specific mitigation is recommended since impacts are expected to be Low Negative for access roads and tower construction and traverse mostly semi-intact to degraded vegetation.

Figure 7. Piles of excavated rock smothering natural vegetation next to a pylon results in long-term loss of vegetation. Such events should be avoided by removing the material from the site.

8.3.2. General mitigation during the construction phase

General mitigation during the construction phase should include the following:

- **<u>If important geophytes occur along the access roads, these may require search and rescue. Given the urgency of the project it would be possible to carry out the search and rescue operation in September 2017. Important species and species of conservation concern could be collected and temporarily housed in a nursery until they can be planted after construction commences in May 2018. It is recommend that rescued plants are planted in April/May 2019.</u>**

- The construction phase should be monitored by the Environmental Control Officer (ECO) so that no damage occurs to adjacent vegetation falling outside the intended construction area.
- Permanent access roads could potentially be eliminated in areas where construction vehicles could access construction site as a 'once-off'. Access during emergency maintenance and repairs could potentially be via temporary access. However, the merits of eliminating the need for permanent access must be considered on a case by case basis. Eskom require that each structure be inspected at least annually. They motivate that by formalizing access tracks this prevents impacts spreading wider than the initial footprint.

8.3.3. General mitigation during the operational phase

General mitigation during the operational phase should include the following:

- Focused IAP eradication, management and monitoring along access roads where IAPs are likely to spread.
- A vegetation management plan should be compiled and incorporated into the Environmental Management Plan (EMP). Note that According the Department of Environmental Affairs and Development Planning (DEA&DP) Guideline for Environmental Management Plan (2005) an EMP can be defined as "*an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced". EMPs are therefore important tools for ensuring that the management actions arising from Environmental Impact Assessment (EIA) processes are clearly defined and implemented through all phases of the project life-cycle."* This management plan should be constantly refined and tailored for each veld type and veld age.

8.4. Cumulative impacts

Cumulative impacts are those impacts linked to increased loss of vegetation type or the ecosystems listed in the List of Threatened Terrestrial Ecosystems (Government Gazette, 2011) and calculated from CapeNature's ecosystem status of vegetation types (Maree, 2014). Cumulative impacts should measure loss of habitat in terms of the scale of the impacts:

- Impacts on a local scale;
- Impacts on a regional scale; and
- Impacts on a national scale.

Cumulative impacts were calculated in relation to the remaining natural or near-natural vegetation of each vegetation type or ecosystem (Table 9). Loss of vegetation type would not exceed 0.004% for any of the vegetation types. Cumulative impacts are expected to result in Very Low Negative Impact for (a) loss of each vegetation type and (b) overall loss of vegetation.

Table 9. Percentage of natural vegetation affected in relation to the remaining natural area for each vegetation type.

Vegetation Type	Total clearance of intact vegetation	Total vegetation clearance: semi-intact vegetation	Degraded intact vegetation	Remaining natural or near natural area of ecosystem in relation (ha)	Affected natural vegetation in relation to remaining natural area of ecosystem
Winterhoek Sandstone Fynbos	6 409 m^2 0.6409 ha			108 417 ha	0.0006%
North Hex Sandstone Fynbos	25 697 m^2 2.5697 ha		200 m^2 0.02 ha	37 200 ha	0.007%
Ceres Shale Renosterveld	400 m^2 0.04 ha			24 221 ha	0.0002%
Breede Shale Fynbos	9 514 m^2 0.9514 ha	12 491m^2 1.291 ha		21 881 ha	0.01%
Breede Alluvium Fynbos	400 m^2 0.04 ha			18 831 ha	0.0001%
Northern Inland Shale Band Vegetation	1 630 m^2 0.163 ha			25 942 ha	0.0005%
				Total loss of vegetation	
Total vegetation loss	4.405 ha	1.291 ha	0.02 ha	**5.716 ha**	

8.5. Indirect impacts

An indirect impact is an effect that is related to but removed from a proposed action by an intermediate step or process. It is usually qualitative and descriptive in terms of how the impact is assessed. Identified indirect impacts include the following:

- Change in drainage patterns and potential changes in plant communities resulting from altered moisture patterns. Reduction in moisture levels would potentially impact wetlands downslope from new access roads.

9. Conclusions and Recommendations

The proposed 132/66kV double-circuit powerline from Ceres Substation to Romansrivier substation would result in a number of impacts, of which the most severe include the construction of new access roads. Individual towers have a low impact owing to the small footprint area and ability of natural vegetation to recover in the long-term. Access roads with cut and fill are, however, permanent impacts that will result in greater loss of natural vegetation than tower construction. The scoping phase of the project was crucial in screening out 'No Go' areas where impacts where deemed unacceptable from a botanical, wetland, heritage and visual perspective, and has played an important role in reducing impacts of the project to acceptable levels. In some instances the need for access roads could be eliminated by helicopter assisted access but due to Eskom's budgetary and technical constraints only a limited number of towers could be selected for construction by helicopter assistance. According to Eskom, the feasibility of the project becomes increasingly compromised as the number of constructed towers requiring helicopter assistance increases. It was therefore necessary to identify the most sensitive areas requiring helicopter assistance during the scoping and walk-through phases of the project. Mitigation is thus limited in many cases since loss of vegetation cannot be reduced by eliminating the need for access roads.

The project components that contribute significantly to negative impact ratings include:

- The access road leading to Towers 65 and 64 between the Ceres substation and Michell's Pass.
- The access roads leading to Towers 56 and 55 along Michell's Pass section.
- The extensive network of access roads, including a low level river crossing between towers 39 and 40 (Tierhokkloof River) leading to Towers 42 to 36. These new roads represent the most extensive footprint. This section would require clearance of 22 497 m^2 of intact natural vegetation for new as well as upgrading of new access roads and a further 3 200 m^2 for Tower construction. As stated previously, the final clearance would potentially be lower since two options are available between Towers 36 and 39; these including an option to either upgrade the old access road or construct new access road directly beneath the towers.

Upgrading of the existing access roads is far more desirable with respect to botanical impacts than construction of new roads.

- The extensive access road network in the Michell's Pass section between Towers 51 and 48, which includes a bridge crossing and clearing of riparian vegetation along the Dwarsrivier.

Loss of vegetation type would not exceed 0.01% for any of the vegetation types. Cumulative impacts are thus expected to result in Very Low Negative Impact for (a) loss of each vegetation type and (b) overall loss of vegetation. Loss of vegetation for each vegetation type, important species and ecological processes would result in the following impacts after mitigation:

- Ceres Shale Renosterveld: **Low Negative Impact.**
- Winterhoek Sandstone Fynbos: **Medium Negative Impact.**
- Northern Inland Shale Band Vegetation: **Low Negative Impact.**
- North Hex Sandstone Fynbos: **Medium Negative Impact.**
- Breede Shale Fynbos: **Low Negative Impact.**
- Breede Alluvium Fynbos: **Low Negative Impact.**

Site- specific mitigation should include the following:

- Helicopter assistance for the construction of towers should be employed for Towers 66, 63, 62, 61, 60 & 59, thereby negating the need for permanent access roads. Permanent access roads to Towers 66, 63, 62, 61, 60 and 59 was identified as having High Negative Impact without helicopter assistance (i.e. without mitigation) due to the sensitivity of vegetation associated with multiple wetland systems. The introduction of helicopter assisted construction as agreed to by Eskom is expected to reduce impacts to the significances assessed in this report.

General mitigation should include the following:

- Focused IAP eradication, management and monitoring along access roads where IAP are likely to spread.
- If important geophytes occur along the access roads, these may require search and rescue.
- The construction phase should be monitored by the Environmental Control Officer (ECO) so that no damage occurs to adjacent vegetation falling outside the intended construction area.
- Permanent access roads could potentially be eliminated in areas where construction vehicles could access construction site as a 'once-off'. Access during emergency maintenance and repairs could potentially be via temporary access.

In addition to the above mitigation measures, a spring scan is needed in the event that important species/species of conservation require search and rescue. Given the urgency of the project and proposed date of construction commencement (May 2018) the most suitable time to carry out the search and rescue would be September 2017. Important areas to focus on are as follows:

- Between Tower 50 and 48.
- Between Tower 44 and 43.
- Between tower 42 and 30.
- Access road to Tower 29.
- Access road to Tower 27.
- Access road to Tower 25 and 23.
- Access Road to Tower 22.
- Access road between Tower 19 and 21.
- Access road to Tower 9, 8 and 7.

In terms of the updated National Environmental Management Act (Act 107 of 1998, as amended) 2014 EIA regulations, Appendix 3 Section 3(q), all specialist reports must include *"a reasoned opinion as to whether the proposed activity should or should not be authorized and if the opinion is that it should be authorized, any conditions that should be made in respect of that authorization".* It is worth mentioning that opinion statements are prone to bias and should be critically evaluated by the competent authority as well as interested and affected parties. My statements below must be considered in relation to the number of criteria, including (a) the impacts relating to loss of the vegetation type(s), (b) the development proposal in relation to approved developments (i.e. pending powerline proposals) at a local scale and the cumulative development effects, (c) need and desirability of the project, (d) locality of the powerline development in relation to Protected Areas, CBAs and ESAs, and (d) degree to which impacts could be mitigated (i.e. very low to very high).

It is my opinion that the proposed project should only be authorized if (a) all mitigation measures are met and (b) Eskom have shown that the permanent access roads are an absolute necessity (i.e. cannot be avoided via temporary access). Note also that it is not within the scope of a botanical assessment to address 'need and desirability'. Instead this must be weighed up against the overall botanical impacts imposed by the project. Mitigation measures should be included in the EMPr, with specific emphasis on Eskom's responsibility in implementing an IAP monitoring, control and eradication plan along the powerline route and access roads.

9. References

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Report submitted: 12 September 2017

Appendix 1: Criteria used for evaluating direct impacts (Source: SRK Consulting)

Impact Rating Methodology

The standard methodology used in EIA to assess and rate impacts based on the methodology and rating criteria is outlined in this section.

The significance of an impact is defined as a combination of the consequence of the impact occurring and the probability that the impact will occur.

The criteria used to determine impact consequence are presented in Table 5 below.

Table A1: Criteria used to determine the Consequence of the Impact

Rating	Definition of Rating	Score
A. Extent– the area over which the impact will be experienced		
None		0
Local	Confined to project or study area or part thereof (e.g. site)	1
Regional	The region, which may be defined in various ways, e.g. cadastral, catchment, topographic	2
(Inter) national	Nationally or beyond	3
B. Intensity– the magnitude of the impact in relation to the sensitivity of the receiving environment		
None		0
Low	Natural and/or social functions and processes are negligibly altered	1
Medium	Natural and/or social functions and processes continue albeit in a modified way	2

High	Natural and/or social functions or processes are severely altered	3
C. Duration– the time frame for which the impact will be experienced		
None		0
Short-term	Up to 2 years	1
Medium-term	2 to 15 years	2
Long-term	More than 15 years	3

The combined score of these three criteria corresponds to a Consequence Rating, as set out in Table 6:

Table A2: Method used to determine the Consequence Score

Combined Score (A+B+C)	0 – 2	3 – 4	5	6	7	8 – 9
Consequence Rating	Not significant	Very low	Low	Medium	High	Very high

Once the consequence is derived, the probability of the impact occurring will be considered, using the probability classifications presented in Table 7.

Table A3: Probability Classification

Probability of impact – the likelihood of the impact occurring	
Improbable	< 40% chance of occurring
Probable	40% - 70% chance of occurring
Highly probable	> 70% - 90% chance of occurring
Definite	> 90% chance of occurring

The overall significance of the individual impacts will be determined by considering consequence and probability using the rating system prescribed in Table 8.

Table A4: Impact Significance Ratings

Significance Rating	**Consequence**		**Probability**
Insignificant	Very Low	&	Improbable
	Very Low	&	Possible
Very Low	Very Low	&	Probable
	Very Low	&	Definite
	Low	&	Improbable
	Low	&	Possible
Low	Low	&	Probable
	Low	&	Definite
	Medium	&	Improbable
	Medium	&	Possible
Medium	Medium	&	Probable
	Medium	&	Definite
	High	&	Improbable
	High	&	Possible
High	High	&	Probable
	High	&	Definite
	Very High	&	Improbable
	Very High	&	Possible
Very High	Very High	&	Probable
	Very High	&	Definite

Finally, the impacts will also be considered in terms of their status (positive or negative impact) and the confidence in the ascribed impact significance rating. The prescribed system for considering impacts status and confidence (in assessment) is laid out in Table 9.

Table A5: Impact status and confidence classification

Status of impact	
	+ ve (positive – a ‘benefit’)
	– ve (negative – a ‘cost’)

Indication whether the impact is adverse (negative) or beneficial (positive).	Neutral
Confidence of assessment	
The degree of confidence in predictions based on available information, EAP's judgment and/or specialist knowledge.	Low
	Medium
	High

The impact significance rating should be considered by the authority in their decision-making process based on the implications of ratings described below:

- **Insignificant:** the potential impact is negligible and will not have an influence on the decision regarding the proposed activity/development.
- **Very Low:** the potential impact should not have any meaningful influence on the decision regarding the proposed activity/development.
- **Low:** the potential impact may not have any meaningful influence on the decision regarding the proposed activity/development.
- **Medium:** the potential impact should influence the decision regarding the proposed activity/development.
- **High:** the potential impact will affect the decision regarding the proposed activity/development.
- **Very High:** The proposed activity should only be approved under special circumstances.

In the EIA practicable mitigation measures will be recommended and impacts rated in the prescribed way both without and with the assumed effective implementation of mitigation measures.

Mitigation measures are either:

- Essential: must be implemented (as they minimise potentially significant negative impacts) and are non-negotiable; and

- Optional: “nice-to-have’s” as they do little to minimise a key potentially significant negative impacts and/or improve benefits.

Appendix 2: Botanical Assessment Content Requirements of Specialist Reports, as prescribed by Appendix 6 of GN R326

Regulation	Content as required by NEMA	Specialist Report Section/Annexure Reference
1 (1) (a)	Details of- (i) The specialist who prepared the report; and	Yes. Specialist declaration.
	(ii) The expertise of that specialist to compile a specialist report, including a CV	Yes. Appendix 3.
1 (1) (b)	A declaration that the specialist is independent in a form as may be specified by the competent authority	Yes. Specialist declaration.
1 (1) (c)	An indication of the scope of, and purpose for which, the report is prepared	Yes. Section 1.
1 (1)(cA)	An indication of the quality and age of base data used for the specialist report	Yes. Section 5.
1 (1)(cB)	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Yes. Section 8.
1 (1) (d)	The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Yes. Sections 5 & 6.
1 (1) (e)	A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Yes. Section 5.
1 (1) (f)	Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives	Yes. Section 7. Note that no site alternatives were provided. Only one layout plan was provided.

Regulation	Content as required by NEMA	Specialist Report Section/Annexure Reference
1 (1) (g)	An identification of any areas to be avoided, including buffers	Yes. During walk-through and baseline assessment and site meetings with Eskom, SRK and specialist team. For example, helicopter assistance construction activities results in avoidance of highly sensitive areas.
1 (1) (h)	A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers	Yes. Section 7.
1 (1) (i)	A description of any assumptions made and any uncertainties or gaps in knowledge	Yes. Section 6.
1 (1) (j)	A description of the findings and potential implications of such findings on the impact of the proposed activity or activities	Yes. Sections 8 and 9.
1 (1) (k)	Any mitigation measures for inclusion in the EMPr	Yes. Section 8.3.
1 (1) (l)	Any conditions for inclusion in the environmental authorisation	No.
1 (1) (m)	Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Yes. Section 9.
1 (1) (n)	A reasoned opinion- (i) whether the proposed activity, activities or portions thereof should be authorised; and	Yes. Section 9.
	(iA) regarding the acceptability of the proposed activity or activities; and	Yes. Section 9.
	(ii) If the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Yes. Section 9.
1 (1) (o)	A description of any consultation process that was undertaken during the course of preparing the specialist report	Yes. Section 5.
1 (1) (p)	A summary and copies of any comments received during any consultation process and where applicable, all responses thereto	No. Not applicable.

Regulation	Content as required by NEMA	Specialist Report Section/Annexure Reference
1 (1) (q)	Any other information requested by the competent authority	No. Not applicable at this stage of the EIA process.

Appendix 3: Curriculum Vitae: Paul Ivor Emms

EDUCATION

MSc (Botany) - University of the Western Cape (2014).

BSc: Hons (Botany) – University of the Western Cape (2005).

BSc: Biodiversity and Conservation Biology - University of the Western Cape (2002 – 2004).

National Diploma in Horticulture - Cape Peninsula University of Technology (1998 – 2000).

CAREER HISTORY

March 2011 - present – independent botanical specialist and associate at Bergwind Botanical Surveys & Tours CC.

March 2008 - March 2010 - field botanist and botanical specialist - Coastec (Coastal & Environmental Consultants).

January 2006 – December 2007 - Kirstenbosch Scholarship: horticultural research - South African National Biodiversity Institute.

ACCREDITATION

Registered Professional Natural Scientist with the South African Council for Natural Scientific Practitioners (SACNASP). Registration number 400352/14.

EXPERIENCE and SKILLS

Botanical specialist consultant

- Environmental Impact Assessment
- Ecological Constraints Analysis
- Invasive Alien Plant Management Plans
- Vegetation Rehabilitation Plans
- Remediation Plans
- Open Space Management Plans
- Plant Search and Rescue Plans
- Conservation Implementation Management Plans
- Over 150 botanical assessments

PERSONAL DETAILS

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- Date of birth – 31/08/1979
- Marital status - Married
- Dependents - 3