Terrestrial Biodiversity Compliance Statement Patrys Development Erf 3927, Still Bay West

CHEPRI (PTY) LTD

December 15, 2021

1 Summary

A residential development on Erf 3927, Still Bay West (Patrys Development) has been proposed (henceforth the proposed site). This document serves as a Terrestrial Biodiversity Compliance Statement for the proposed development. The Screening Report of the site and its surroundings delineate the proposed development area as of **very high relative terrestrial biodiversity importance**, which is in accordance with its location within the boundaries, albeit on the edge, of a vulnerable ecosystem, namely **Albertinia Sand Fynbos (VU)** [1]. Evidence is presented here of the current status quo and business as usual scenario of the proposed site within a terrestrial biodiversity context, as assessed using available data and a site investigation of 3 hour duration each of the site and surroundings on 18 June 2021 by Dr. Marius van der Vyver (SACNASP: Ecological Science, 118303).

The site is situated within an established residential area on its northern and western boundaries and is flanked by a main access road between the town of Still Bay and the coastal village of Vermaaklikheid to the West. The site is without any permanent structures at present, but located within a suburban residential area.

The proposed site is located on a Vulnerable ecosystem (**Albertinia Sand Fynbos**) according to the Western Cape Spatial Biodiversity Plan (WCSBP) [1], while the National Biodiversity Assessment (NBA) [2] and the associated National Vegetation Map [3] delineates the area as **Hartenbos Dune Thicket** (Southern portion of the site) **with a conservation status not assessed as yet**. The WCSBP [1] also designates most of the site as an 'Other Natural Area' (ONA) in terms of its biodiverity planning units (see Figure 3, Figure 4 and Figure 5). The proposed site was found to be relatively degraded through the regular clearance of herbaceous and shrub layers, leaving a stand of single mature trees dotted across the site. The trees are remnants from an initially sparse thicket element present on the site (Figure 8), likely established with the help of anthropogenic suppression of fire on the urban edge.

The site is located on the foot of a relatively gentle sloped dune. To the west, outside of the residential area it is imbedded in, the site landscape resembles a thicket-fynbos mosaic, although there are evidence of fire and grazing on the area directly adjacent to the site to the west, and bands of remnant thicket vegetation to the north and south. Although the site is designated as part of the Albertinia Sand Fynbos vegetation unit by the WCBSP it seems likely to have had some thicket elements already in 2003, at least since the 2003 . These thicket species seems to have persisted likely due to longer term fire suppression at the urban edge, which have grown into denser thicket vegetation over the years.

From a terrestrial bodiversity perspective, the site is largely disconnected from adjacent natural areas through the residential area to the north and west and the public road on its southern border. Although the site still provide some biodiversity value in terms of the remaining trees and associated dependent species, notably birds and invertebrates, it is not unique when considering the status and condition of the surrounding landscape. Little of the sand fynbos vegetation elements remain - the few species encountered are patches of regrowth from regular clearing activities on site and do not include any of the listed species of conservation concern.

Evidence of the current status quo and business as usual scenario with pressures on the local landscape in and around the proposed site is presented here to show its ecosystem function is currently diminished and limited:

i) Fragmentation of remaining natural vegetation on a landscape scale (i.e. loss of ecosystem function and pattern)
ii) Shrub and herbaceous layer is cleared regularly underneath remaining trees
iii) relatively high density of people, fences and roads with some road traffic surrounding the property hampering terrestrial fauna movement
vi) its disconnectivity from major current terrestrial biodiversity corridors linking with other intact adjacent areas
vii) an abundance of domestic predators in the landscape
/viii) high levels of anthropogenic degradation through clearing, suppression of fire and fencing.

Other influential factors considered, but for which no evidence is presented here include:
i) the suitablility and high cost of restoration action and intervention needed to re-establish much longer fire intervals, and to restore the surrounding ecosystem on a landscape scale to resume its ecological function,
ii) the highly improbable change to existing residential areas and main road surrounding the site to restore natural fire regimes and connectivity to the site.

The impact on current intact biodiversity features within the larger landscape by the proposed development is thus considered in the light of the above criteria to have a **Low** Impact, while the cumulative effects of the proposed development (a high density residential area) will likely also have a **Low to Medium** impact on the surrounding biodiversity value of the site and surrounding area. Very little of the original fynbos and thicket dynamics survive on the proposed site, apart from the established trees which should be left standing, and are incorporated as such in the design of the development.

2 Introduction

Still bay, like most of the coastal towns along the Garden Route, is under increasing pressure from urban development as a major driver of change. Vegetation clearing for agriculture is another important threat to the maintenance of current biodiversity within the region.

Vegetation types usually stand as proxies of biodiversity patterns in a landscape, which entails both fauna and flora components. Topography is often a key factor explaining variation in species assemblages (i.e. local vegetation patterns) on a landscape scale. Anthropogenic disturbance and transformation is another most common factor.

National Biodiversity Assessment tools such as the National Biodiversity Assessment (2018) [2], the national vegetation map [3] and the Western Cape Spatial Biodiversity Plan (WCSBP) [1] provide guidance on ecosystem types, extent and conservation status on which important decisions regarding ongoing development planning is to be based.

Based on satellite imagery (Google Earth, 2020) different patches of presumably homogenous vegetation were delineated and then ground-truthed with a field investigation of the proposed site and its surrounding landscape.

We present here a summary of these findings in relation to existing biodiversity spatial plans within the local area.

2.1 Study area

The proposed site is located on a Vulnerable ecosystem (**Albertinia Sand Fynbos**) according to the Western Cape Spatial Biodiversity Plan (WCSBP) [1], while the National Biodiversity Assessment (NBA) [2] and the associated National Vegetation Map [3] delineates the area as **Hartenbos Dune Thicket**. Hartenbos Dune Thicket has not yet been assessed in terms of its conservation status, according to the National Biodiversity Assessment .

The proposed site is enclosed within an existing residential area and borders on a main road leading from the town of Stilbaai to the adjacent coastal town and farmlands towards Jongensfontein and may experience a high seasonal peak in traffic with holiday makers over holiday season.

2.1.1 Western Cape Spatial Biodiversity Plan (WCSBP, 2017)

The WCSBP (2017) incorporates the spatial planning of the older Biodiversity Sector Plan (BSP) of the Hessequa and Mossel Bay municipalites [4].

1. Albertinia Sand fynbos (WCSBP, 2017)

   Albertinia Sand Fynbos is a Vulnerable ecosystem, one of four variations of Sandplain Fynbos and occurs on the Coastal Plain areas on deep sandy soils [4]. It supports species such as *Thamnochortus insignis*, *Leucadendron galpinii*, *Leucadendron muirii* and *Leucospermum praecox* and various commercial industries, such as the flowering industry [4]. Sandplain Fynbos is under severe pressure from overharvesting, poor fire management regimes, 'dragging' of vegetation to promote thatch but suppress other indigenous woody plants, infestation by invasive alien plants and groundwater abstraction.

   A common practice within this vegetation is clearing bush and shrubs to allow for the maintenance of a restioid fynbos and thereby suppressing proteiod fynbos from developing. This encourages the growth of desirable thatch harvesting species such as *Thamnochortus muirii* which is present within the landscape. Thicket vegetation is noted to occur within this vegetation type, often at the interface of limestone and sand fynbos, where soil is deeper than characteristic of limestone fynbos, and where there is a permanent water source or longer-term fire protection.

2. Hartenbos Dune Thicket (National Vegetation Map)

   The National Vegetation Map designates the area as Hartenbos Dune Thicket, which has not been assigned a conservation status to date. Hartenbos Dune Thicket consists mostly of thickets or bushclumps scattered across vegetation dominated by fynbos elements on relative deep sands and thus considered a mosaic vegetation type. A large number of succulents are included, and fire does not seem to the major important disturbance factor causing renewal, as much as large herbivores. Several important species reach their easternmost distribution limit in this vegetation type (*Euchaetis burchelli*, *Jordaaniella dubia*, *Orphium frutescens* and *Thamnochortus insignis*) [5] . An endemic or near endemic species to this unit is *Delosperma virens*. A large number of endangered plant species occurs within the unit. The thicket component extends into some of the river valleys, where it becomes more dense and continuous, with species such as *Sideroxylon inerme* (Milkwood) present.

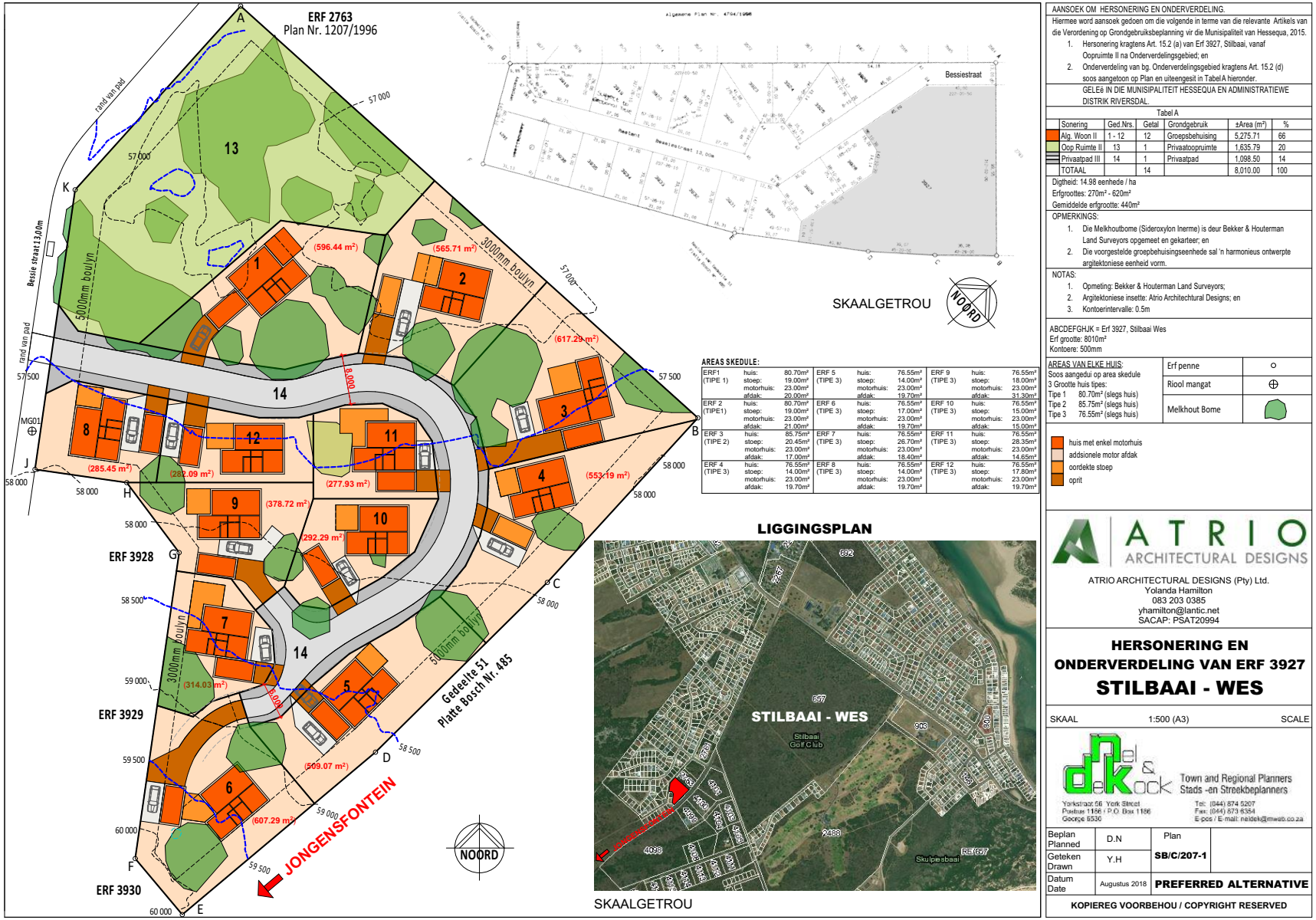


Figure 1: A layout plan of Patrys Development, Erf 3927, Stilbaai West.

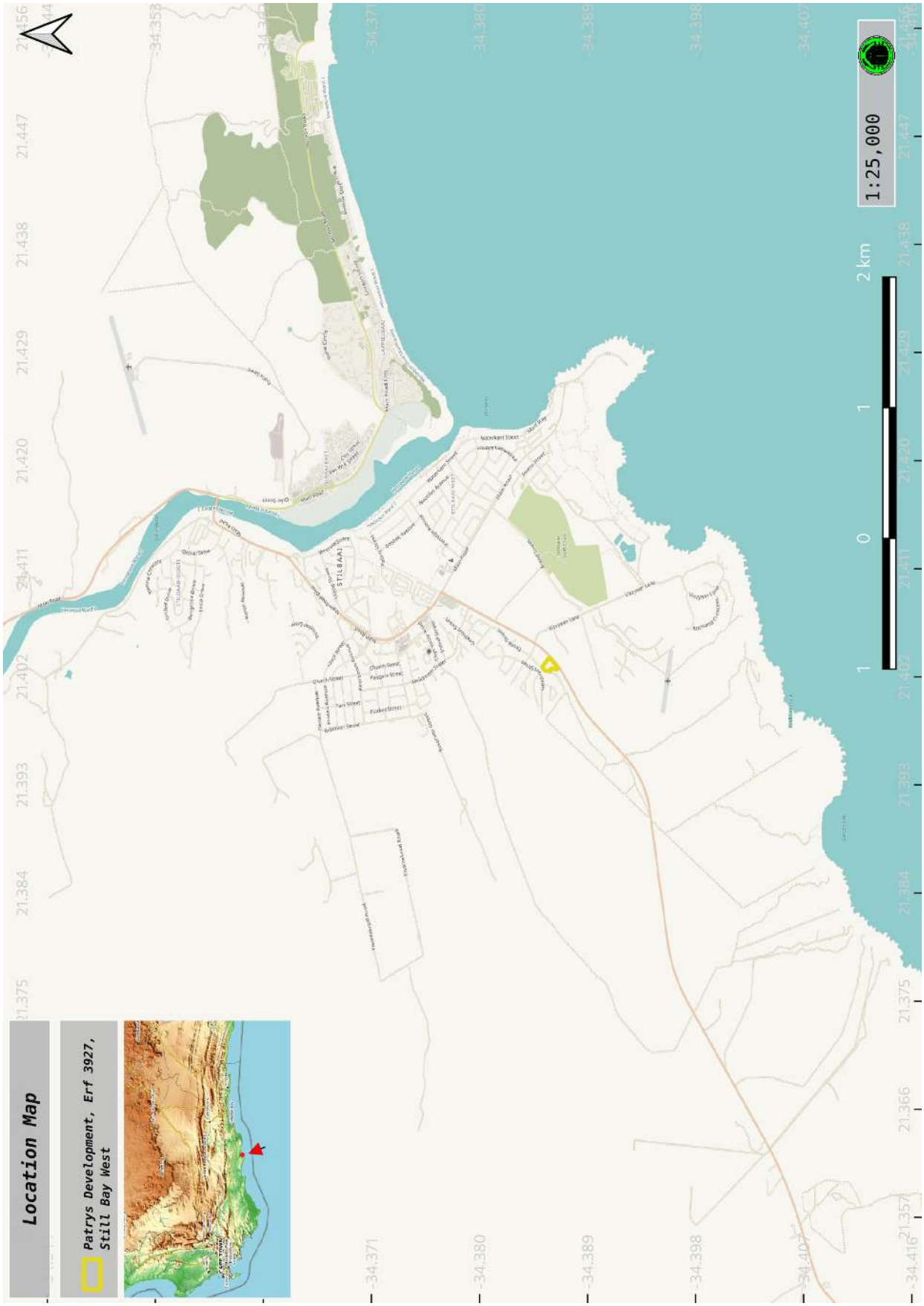


Figure 2: Location map of Portion 1 Farm 245, Mosselbay

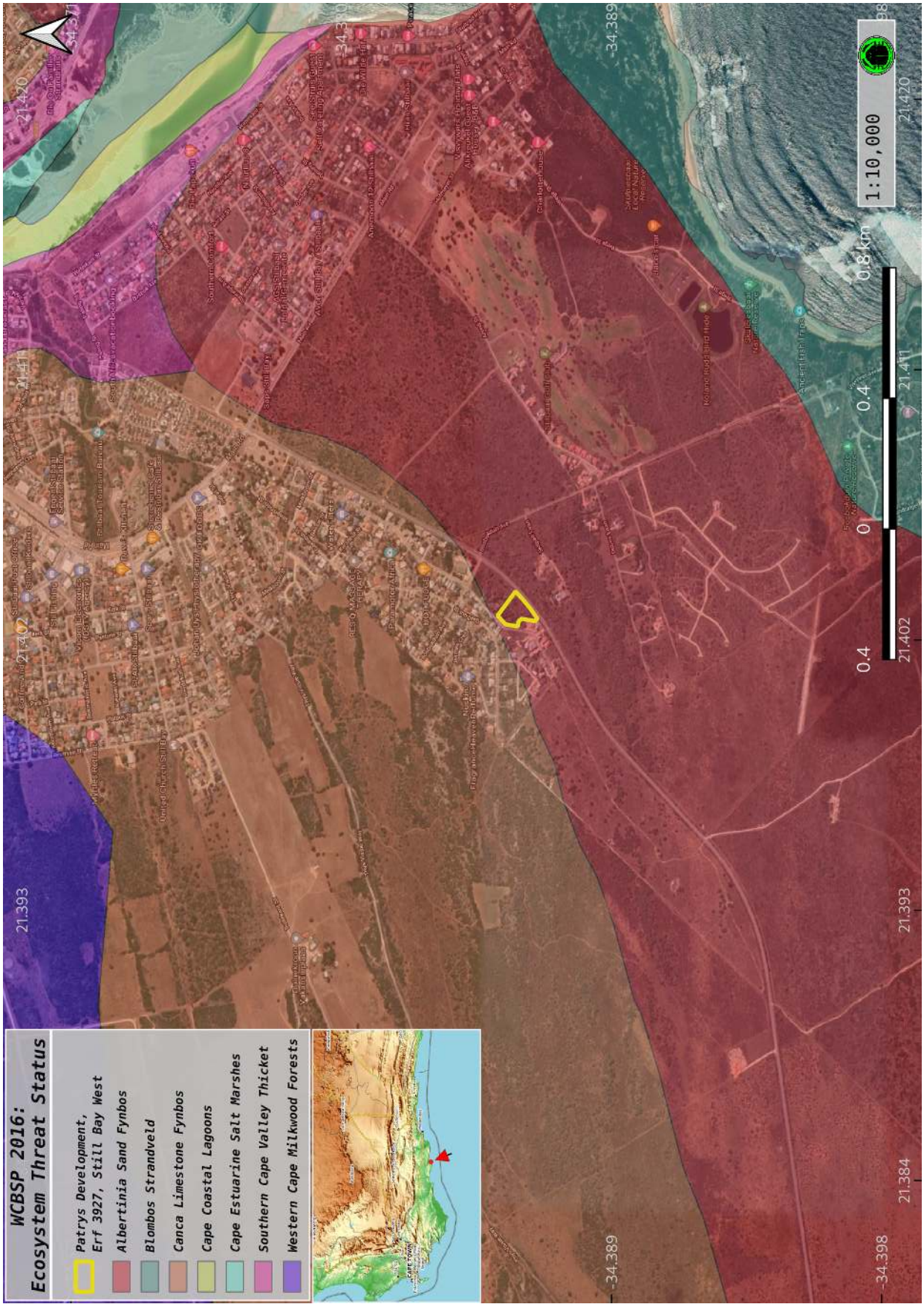

WCBSP 2016:
Ecosystem Threat Status
Patrys Development, Erf 3927, Still Bay West
Albertinia Sand Fynbos
Blombos Strandveld
Canca Limestone Fynbos
Cape Coastal Lagoons
Cape Estuarine Salt Marshes
Southern Cape Valley Thicket
Western Cape Milkwood Forests
1:10,000
0.8 km
0
0.4
0.4
21.393
21.384
21.402
21.411
21.420
-34.389
-34.398

Figure 3

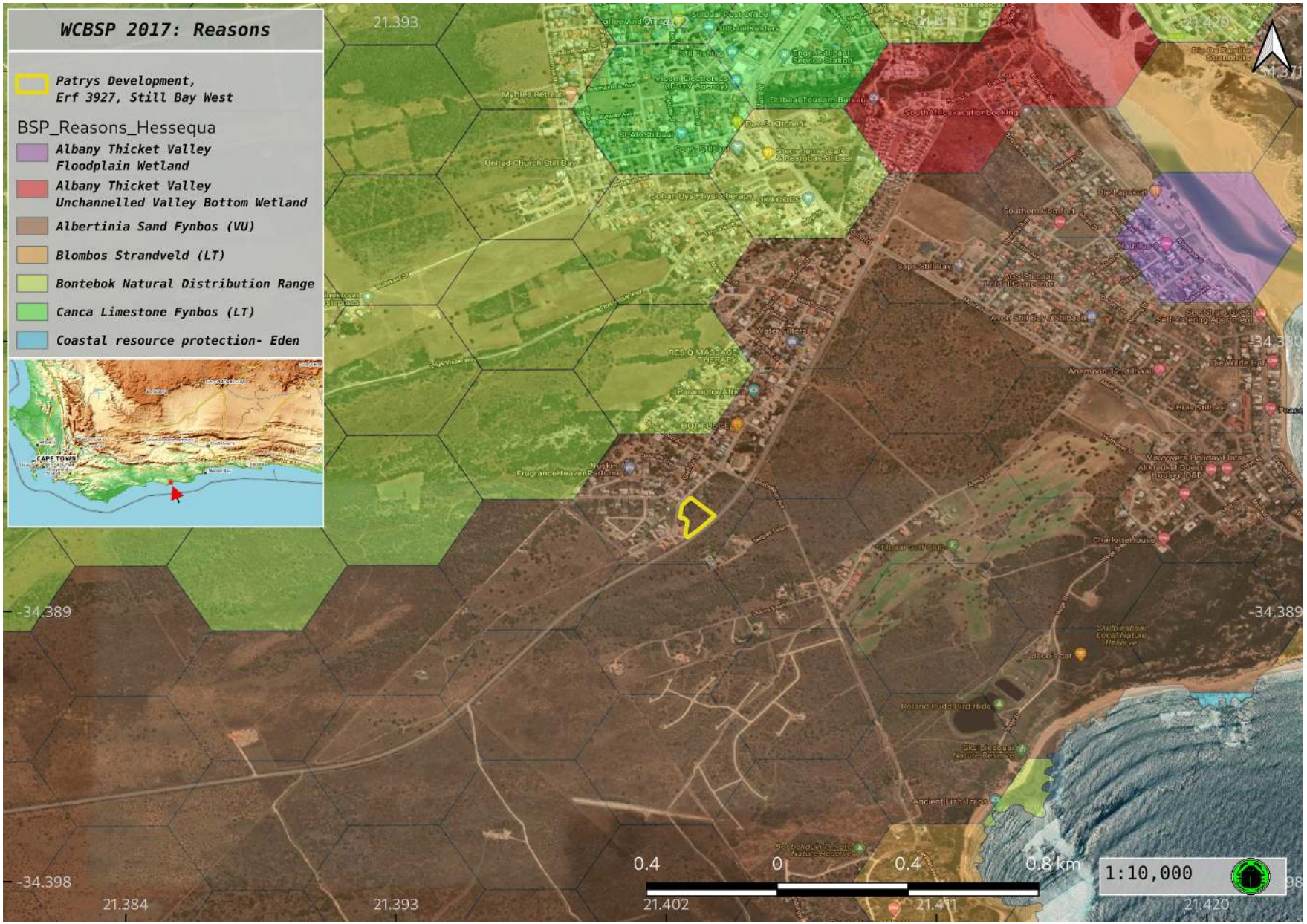


Figure 4: A Map of Conservation Planning Categories from the Western Cape Spatial Biodiversity Plan [1].

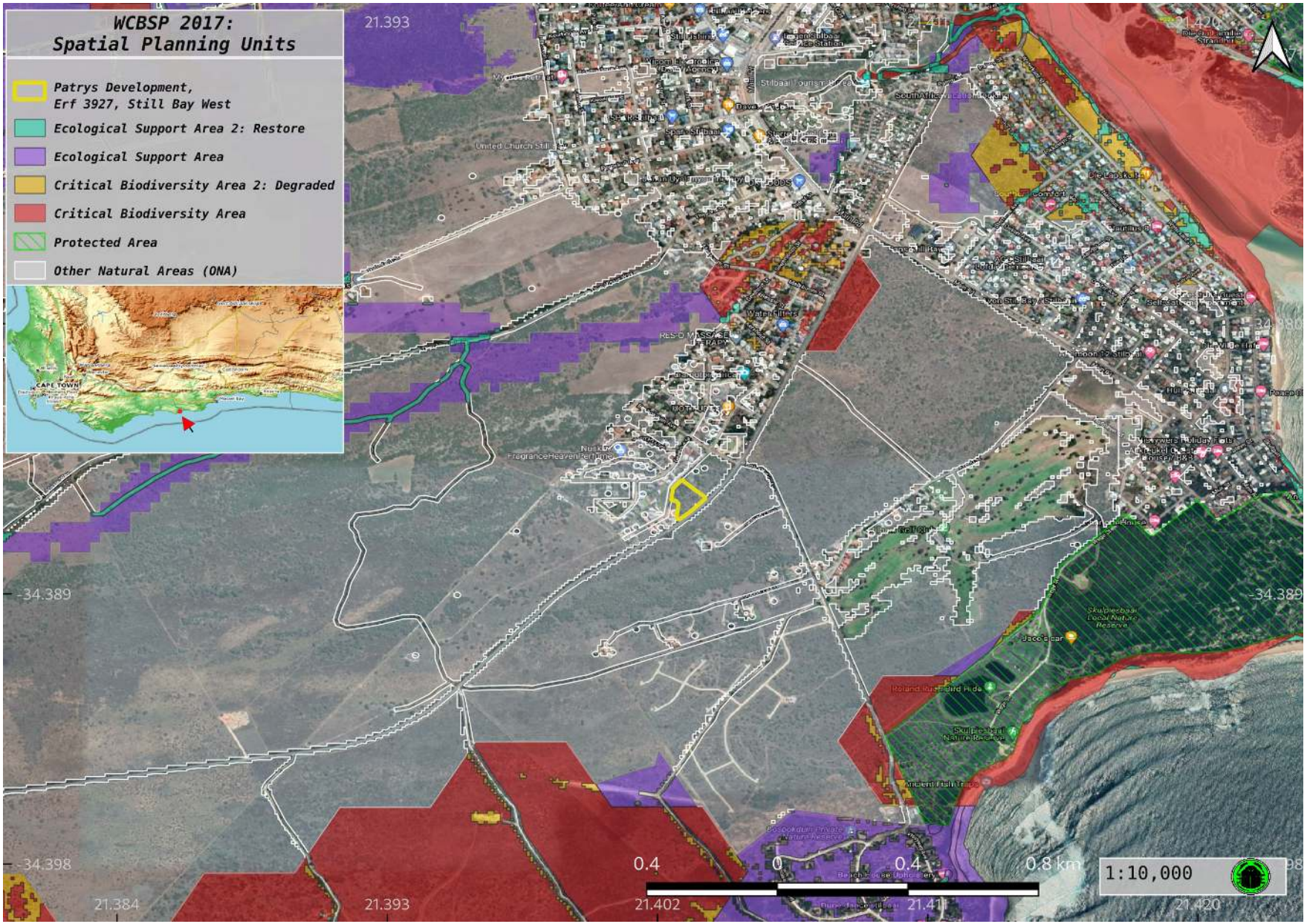


Figure 5: A Map of Conservation Planning Categories from the Western Cape Spatial Biodiversity Plan [1].

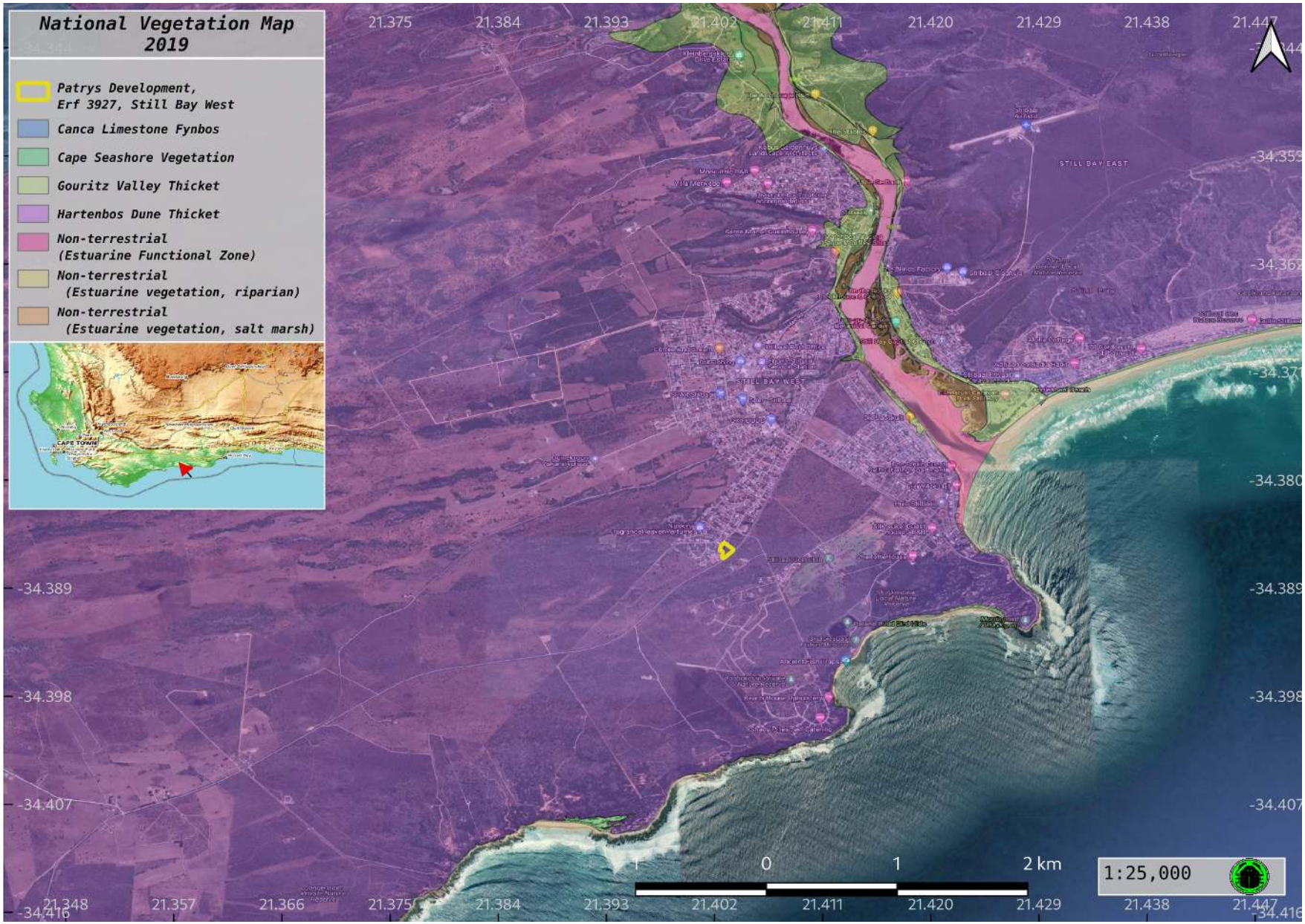


Figure 6: A Map at 1:50 000 scale showing the vegetation units as identified by the National Vegetation Map [3] overlain with endangered and critically endangered vegetation types delineated by the Western Cape biodiversity spatial plan [1] (in coloured outines).

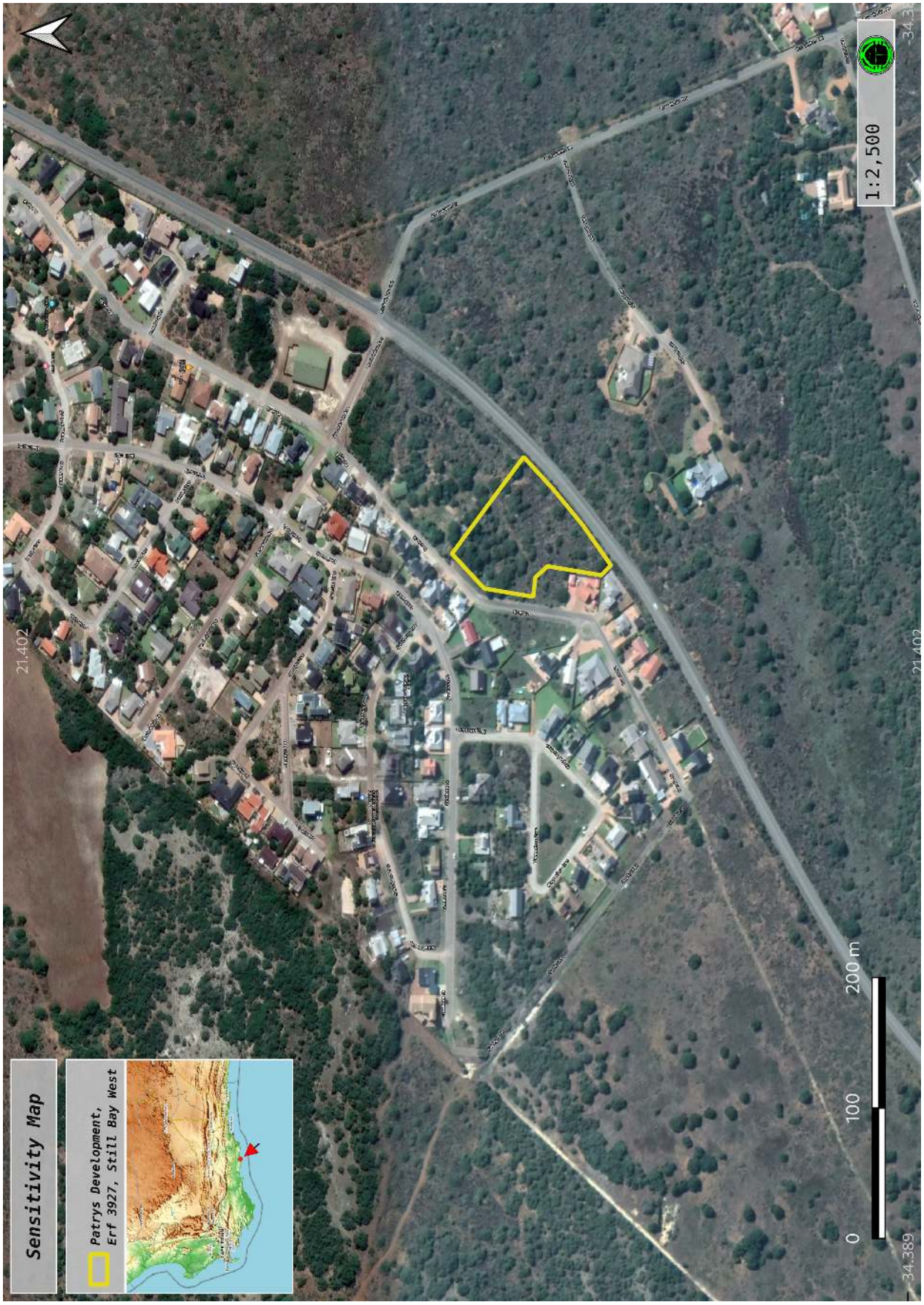


Figure 7: A Sensitivity map showing semi-natural vegetation within the project area that display some characteristics of a Critically Endangered Ecosystem (Cr) but designated as Medium Sensitivity due to high anthropogenic impact.

Figure 8: A historical image of the landscape dating to 2003, showing the proposed site within an already planned out residential area.

2.1.2 National Biodiversity Assessment (NBA, 2018) and National Vegetation Map (2019)

The National Vegetation Map (updated 2019), and by implication the NBA [2], delineates the area as Hartenbos Dune Thicket (see Figure 6), which is designated as *Least Threatened (LT)*. The Hessequa Municipal Biodiversity Spatial Plan (2017) (see Figure 3) delineates the area with slightly higher resolution, although with some significant overlap between identified units. Under this plan it is designated as Albertinia Sand Fynbos and assigned a *Vulnerable* status. The finer natural vegetation patterns of the area is not well studied historically and is quickly being fragmented.

The major threats and causes of transformation are mostly residential developments associated with the rapid expansion of coastal towns in the Garden Route, crop agriculture and the clearing of bush and restriction of fire recurrence frequence beyond that which is required for maintenance of healthy fynbos succession process and associated functions.

1. Western Cape Biodiversity Spatial Plan (WCSBP, 2017)

   The WCSBP (2017) designates the proposed development footprint area as an ONA (other natural area) (Figure 5). These are "areas that have not been identified as a priority in the current biodiversity spatial plan but retain most of their natural character and perform a range of biodiversity and ecological infrastructure functions. Although they have not been prioritised for meeting biodiversity targets, they are still an important part of the natural ecosystem. ONAs should be managed or utilised in a manner that minimises habitat and species loss and ensures ecosystem functionality through strategic landscape planning. These 'other natural areas' offer considerable flexibility in terms of management objectives and permissible land uses, but some authorisation may still be required for high impact land uses" [1].

3 Methods

The results of this report is derived from the findings of a desktop study and a three hour site visit on 17 December 2020 by a Botanical and Terrestrial Biodiversity Specialist, Dr. Marius van der Vyver (SACNASP: Ecological Science, 118303). The site was again visited on the 4th November during the mid morning for a period of two hours where the focus was on identifying potential lepidoptera species of conservation concern present on site. A more thorough site inspection and surrounding landscape was conducted in mid-July and for the purposes of a terrestrial biodiversity assessment in this specific area, the effect of seasonal variation on the results reported here is minimal.

Recent and historical Google Earth^{TM} imagery (dating up to 2003) were used to delineate the communities found on site and identify species of conservation concern (SOCC). The Western Cape Spatial Biodiversity Plan (2017) [1] as well as the National Vegetation Map [3] were extensively consulted, along with relevant field guides. Natural areas were identified from the Google Earth images and possible ecological corridors identified. All identified features were then ground-truthed during the site inspection. The proposed site area was investigated by walking in multiple transects and identifying all plant (and fauna) species and noting all observed disturbances that impact on the site. The surrounding landscape within a radius of 200m were delineated in terms of different landuse patterns from a recent Google Earth image and investigated where possible. Photographs were taken where relevant and a GPS device were used to mark SOCCs.

The identification of sensitive areas was primarily based on consideration of the current state of the proposed site. This state includes the extent to which the area can currently be considered to function as it is designated in terms of reigning conservation plans (WCSBP in this case) and its contribution to the functioning of the surrounding ecosystem. Highly fragmented, degraded and transformed areas are considered in terms of the capacity, cost and urgency for active restoration action to be applied to regain that biodiversity function. This methodology takes into account the mitigation hierarchy [1] as guideline (see Figure 9).

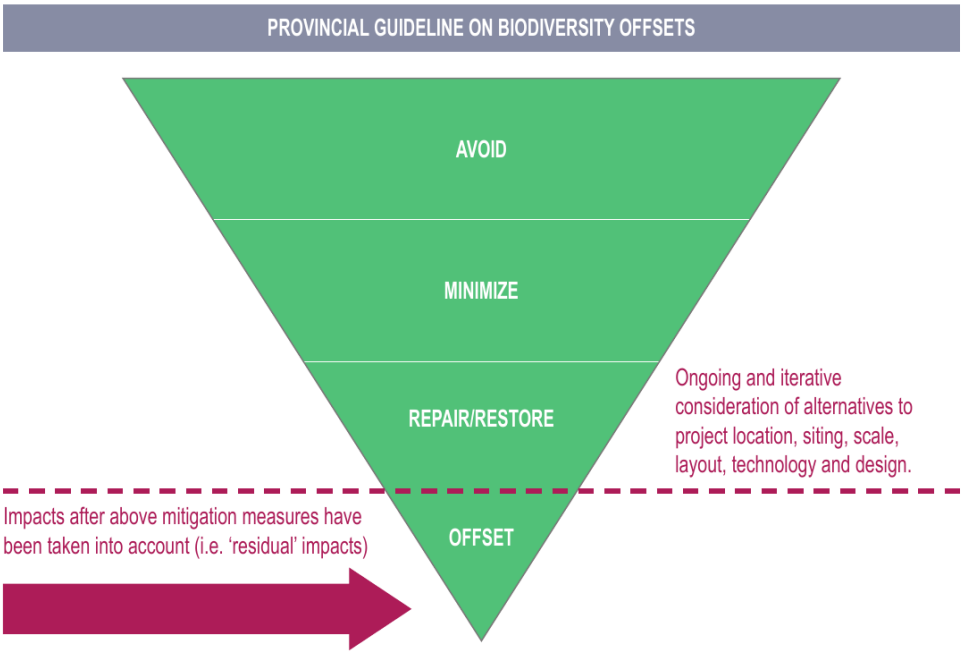


Figure 9: The Mitigation Hierarchy from WCSBP, 2017.

4 Results

4.1 Site description

The site is relatively low in plant biodiversity with a dense grass sward in patches. The original sand fynbos vegetation is regularly cleared, while the thicket tree species - Milkwood (*Sideroxylon inerme*) among them have thrived and established over time into mature trees, likely as a result of fire suppression over the long term, due to the site's proximity to the urban edge. There is some regrowth of some of the more resilient sand fynbos species observed, and some of the bulb species present within the wider area (see) is also still present on the site. Overall the key aspects of sand fynbos dynamics, namely a recurring fire regime of relative regularity and the plant species characteristic of Albertinia Sand Fynbos is absent from the site.

4.2 Site descriptions and sensitivity

The particular site does not harbour any of the plant species listed in the site screening report, and likely not any of the fauna species. Some of the endangered butterfly species has been observed in the past in close proximity to the site, but none of the documented plant species that serve as larva

Figure 10: Photos taken from various positions on the site. Note the remaining tree component and diminished shrub and sedge layer. Some bulbs remain, such as *Lachenalia bulbifera* (top, far left).

hosts are present, apart from an a few small isolated Bietou shrubs. The amount and density of these shrubs are very small in relation to that of the adjacent area directly adjacent to the residential area the site is enclosed in, where Bietou is found abundantly. The long-term regular disturbance regime in terms of vegetation clearing is likely to have interrupted any of the Lepidoptera species of concern to have established on the proposed site.

The relatively large amount of tree cover on the site may still provide habitat for many bird and invertebrate species, and the current layout plan of the proposed development () clearly shows the

consideration given to keeping existing trees intact on the site and incorporate it with the proposed development.

4.3 Findings and Recommendations

It is found that the original Albertina Sand Fynbos associated with the site is degraded and transformed to a parkland savannah type habitat where regular clearing keeps the shrub layer from developing later fire succession fynbos species. The thicket component likely took hold due to a long-term absence of fire within the urban edge area, as the site is part of an established residential area.

The site is tagged as an "Other Natural Area" in terms of the spatial planning within the WCBSP (2017), and not situated in any of the areas earmarked as necessary for ecological process and function flows.

4.3.1 Landuse planning based on results

The proposed site area is currently transformed and imbeddded within an existing residential development zone. Most of the biodiversity corridors is cut-off around it due to the main road on its one border and general residential area restrictions such as fences and domestic predators that abound and the suppression of fire. The site has been cleared of the shrub layer of natural fynbos vegetation on a regular basis and thus has been kept in a modified state.

There is no major impact on local and regional biodiversity patterns and process envisaged to result from the proposed development. Since the layout plan is already considerate of maintaining established trees, and natural fynbos vegetation where possible, the proposed development is in line with current land use planning of the proposed site as a residential area.

5 Recommendations

It is recommended that the proposed development be approved. This recommendation is founded on the relatively low impact the proposed development is envisaged to exert on intact plant biodiversity still remaining on the study area. It is further recommended that all NEMBA categorized alien invasive plants be controlled during the construction and post-construction phases. Post-construction landscaping should incorporate plant species from the site into the gardens if at all possible. Landscaping with common nursery garden or alien species is strongly discouraged, and only planting local indigneous plant species is recommended. Should any of the identified protected plants on the property be destroyed or pruned, it must be done only after obtaining a premit from the National Department of Environment, Forestry and Fisheries.

References

[1] R Pool-Stanvliet, A Duffell-Canham, G Pence, and R Smart. The western cape biodiversity spatial plan handbook. *Stellenbosch: CapeNature*, 2017.

[2] AL Skowno, DC Raimondo, CJ Poole, B Fizzotti, and JA Slingsby. South african national biodiversity assessment 2018 technical report volume 1: Terrestrial realm. south african national biodiversity institute, 2019.

[3] A Dayaram, LR Harris, BA Grobler, S Van der Merwe, AG Rebelo, LW Powrie, JHJ Vlok, PG Desmet, M Qabaqaba, KM Hlahane, et al. vegetation map of south africa, lesotho and swaziland 2018: a description of changes since 2006. bothalia, 49 (1), a2452, 1–11, 2019.

[4] KS Maree and DC Vromans. The biodiversity sector plan for the hessequa and mossel bay municipalities: Supporting land-use planning and decision-making in critical biodiversity areas and ecological support areas, 2010.

[5] J.H.J. Vlok and M.E. de Villiers. Vegetation map for the riversdale domain, 2007.

6 Declaration of Independence

I, Dr. Marius L van der Vyver, hereby declare 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 and that there are no circumstances that may compromise my objectivity in performing such work;

- Have expertise in conducting the specialist report 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;
- 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.

I further declare that all the particulars furnished by me in this form are true and correct; and acknowledge that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

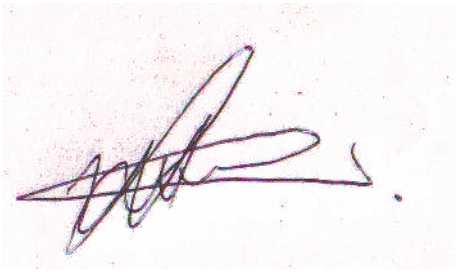
Name of Company

CHEPRI (PTY) LTD SCIENTIFIC SERVICES

Name of Specialist Consultant

DR. ML VAN DER VYVER

Signature of Specialist Consultant



Date

DECEMBER 15, 2021

7 Specialist details

Dr. Marius L. van der Vyver holds a PhD in Botany from Nelson Mandela University and has more than 15 years' experience as an ecologist and botanist. He is registered with the South African Council of Natural Scientific Professions (SACNASP) as an ecological scientist (reg.no. 118303) and a member of the South African Association of Botanists (SAAB).

Table 1: Project experience table: Dr. M.L. van der Vyver

Client	Name	Location	Description	Role	Year
Nelson Mandela University	Associate Researcher – NRM Restoration Research Group	Eastern and Western Cape	Research manager of a restoration team to investigate and promote spekboom restoration with funding from the Department of Environmental Affairs, Forestry and Fisheries' Natural Resoiuorce Management (NRM) division.	Project Scientist	2019
BMK consulting engineers	Rehabilitation Management Guidelines: Diepsloot Footbridge construction	Diepsloot, Johannesburg	Guidelines for rehabilitation after construction of a pedestrian footbridge over a wetland, Diepsloot, Gauteng	Restoration Ecologist	2019
Envirobalance (Pty) Ltd	Biodiversity Impact Assessment with specialist Vegetation and Mammal Studies for Calmera Estate, Cradel of Mankind.	Cradle of Mankind, Muldersdrift, Gauteng	Biodiversity Impact Study including a specialist Vegetation (botanical) and Mammal study for assessing the impacts of a low-impact residential development	Biodiversity Scientist	Ongoing
Wild Summit Group, Kamala Game Reserve	Ecological Risk Assessment for the introduction of Red Deer (Cervus elaphus) on Kamala Game Reserve.	Eastern Cape, South Africa	Determine the ecological risk involved with the introduction of a population of Red Deer on Kamala Game Reserve.	Ecological Scientist	2019
Integrated Data Management (IDM) (Pty.) Ltd.	Determining trends in Electricity usage from data provided by Maputo Hospital	Maputo, Mozambique	Statistical analyses of energy usage of electricity monitoring data	Statistical analyst	2018

Table 1: Project experience table: Dr. M.L. van der Vyver *(continued)*

Client	Name	Location	Description	Role	Year
IDM, Arcellor Mittal	Energy usage analysis from a steel factory, Arcellor Mittal	Port Elizabeth, South Africa	Statistical analyses of energy usage of electricity monitoring data	Statistical analyst	2018
Wild Summit Group, Kamala Game Reserve	Ecological Risk Assessment for the maintenance of an existing population of Barbary Sheep on Kamala Game Reserve.	Eastern Cape, South Africa	Determine the ecological risk involved with the maintenance of an existing population of Barbary sheep on Kamala Game Reserve.	Ecological Scientist	2018
Resilience Environmental Advice, Enviro-mining, Suralco LCC	Monitoring system for the Revegetation Index – Suralco LCC Mine Closure Project.	Surinam, South America	Develop a monitoring system for the rehabilitation and revegetation of ferro-bauxite mines, based on the inputs of various Biodiversity specialists.	Restoration ecologist, Statistical analyst	2018
CSIR	Biomass estimation of subtropical thicket vegetation in Addo Elephant National Park for calibration with LiDAR and radiometric sensor data.	Addo Elephant National Park, Eastern Cape.	Biomass estimation of aboveground vegetation across Addo Elephant National Park for calibration with LiDAR and radiometric sensor data	Botanical specialist, Statistical analyst	2018

Table 1: Project experience table: Dr. M.L. van der Vyver *(continued)*

Client	Name	Location	Description	Role	Year
African Centre of Coastal Paleosciences, NMU	Vegetation community identification and plant species list for phytolith research on specific extant vegetation types in the Garden Route and Klein Karoo area	Southern Cape including Garden Route and Little Karoo	Botanical input to a post-doc researching phytolith composition in relation to extant vegetation types.	Botanical specialist	2018
Bothalia (academic journal)	Peer-review of a research paper on restoration ecology for publication in the academic journal Bothalia	NA	Peer-review of a research paper on restoration ecology for publication in the academic journal Bothalia	Restoration ecologist	2018
Rhodes University	Develop allometric models for estimating Biomass of Honeybush tea plants	NA	Specialist assistance to develop allometric models from commercially planted and wild honeybush plants sampled	Statistical analyst	2017
C4ES (Pty) Ltd	Statistical analysis and R code development for applying boundary line analysis to various soil datasets	NA	Develop new and debug existing R code to implement the boundary line analysis method and quantile regression to various soil datasets	Statistical analyst	2017
Envirobalance (Pty) Ltd	Biodiversity Screening Report for a proposed township development, Dunottar, Gauteng	Dunnottar, Gauteng	Biodiversity impact screening report on a closed-down gold mine site.	Biodiversity scientist	2017

Table 1: Project experience table: Dr. M.L. van der Vyver *(continued)*

Client	Name	Location	Description	Role	Year
KDS Consortium (Pty) Ltd	Biodiversity Screening Report for a proposed township development, Tshivhazwaulu Extension 1	Makhado area, Limpopo	Biodiversity impact screening report for township development	Biodiversity scientist	2017
Envirobalance (Pty) Ltd	Wetland delineation for Calmera Estate, Cradle of Mankind.	Cradle of Mankind, Muldersdrift, Gauteng	Wetland delineation for a proposed Basic Assessment for a housing development	Wetland specialist	2017
Journal of Applied Ecology (academic journal)	Peer-review of a research paper on restoration ecology for publication in the academic Journal of Applied Ecology	NA	Peer-review of a research paper on restoration ecology for publication in the academic Journal of Applied Ecology	Restoration ecologist	2017
Arid Land Research and Management (academic journal)	Peer-review of a research paper on restoration ecology for publication in the academic Journal of Arid Land Research and Management	NA	Peer-review of a research paper on restoration ecology for publication in the academic Journal of Arid Land Research and Management	Restoration ecologist	2016

Table 1: Project experience table: Dr. M.L. van der Vyver *(continued)*

Client	Name	Location	Description	Role	Year
Sigwela and Associates (Pty) Ltd / DEA (National Resource Management Programmes)	Restoration of Forest Vegetation in Matiwane, near Port St. Johns, Eastern Cape	Port St. Johns area, Eastern Cape.	Monitoring of ongoing forest restoration project and establish research sites to ascertain the feasibility of different clearing protocols and treatments for the restoration of grassland habitat after alien plant clearing by WfW teams.	Restoration ecologist	2016
PeerJ (academic journal)	Peer-review of a research paper on restoration ecology for publication in the academic journal PeerJ	NA	Peer-review of a research paper on restoration ecology for publication in the academic journal PeerJ	Restoration ecologist	2015
Forests, Trees and Livelihoods (academic Journal)	Peer-review of a research paper on restoration ecology for publication in the academic journal Forests, Trees and Livelihoods	NA	Peer-review of a research paper on restoration ecology for publication in the academic journal Forests, Trees and Livelihoods	Botanical specialist	2014
Gamtoos Irrigation Board	Develop allometric models for biomass estimation of 5 major alien invasive plants in the Nelson Mandela Metropolitan area.	Port Elizabeth	Develop allometric models by destructively harvesting a number of prominent Invasive Alien Plant Species	Botanical specialist, Statistical analyst	2013-2014

Table 1: Project experience table: Dr. M.L. van der Vyver *(continued)*

Client	Name	Location	Description	Role	Year
USK Consulting (Pty) Ltd	Ecological Impact Assessment for the proposed Swartwater Solar Energy Facility, Northern Cape	Swartwater, Northern Cape	Botanical and Fauna specialist study	Biodiversity scientist	2013
USK Consulting (Pty) Ltd	Ecological Impact Assessment for the proposed Wesley Wind Energy Facility, Eastern Cape	Wesley, Eastern Cape	Biodiversity (Flora and Fauna) impact specialist study of a proposed Wind Energy Project	Biodiversity scientist	2012
Envirobalance (Pty) Ltd	Ecological Impact Assessment for the proposed Albert Luthuli (Badplaas) Landfill Site	Badplaas, Mpumulanga	Biodiversity (Flora and Fauna) impact specialist study for a proposed landfill site	Biodiversity scientist	2012
Envirobalance (Pty) Ltd	Ecological Screening Report – Kuruman Housing Development and Wastewater Treatment Works	Kuruman, Northern Cape	Biodiversity (Flora and Fauna) screening study for a proposed landfill site	Biodiversity scientist	2012
USK Consulting (Pty) Ltd	Air Quality monitoring at East London Port Harbour	East London, Eastern Cape	Procure, install maintain and manage air quality monitoring instruments and weather stations and analyse data	Environmental scientist	2010-2011

Table 1: Project experience table: Dr. M.L. van der Vyver *(continued)*

Client	Name	Location	Description	Role	Year
NMU Restoration Research Group	Active restoration of woody canopy dominants in degraded south african semi-arid thicket is neither ecologically nor economically feasible	Krompoort, Rhinosterhoek Eastern Cape	Experiment with planting nursery-grown propagules in spekboom restoration stands of diffent ages. Analysis and reporting on the ecological and economic implications of results. Publish results in Journal of Applied Vegetation Science.	Restoration ecologist	2011-2012
NMU Restoration Research Group, DEA	Spontaneous return of biodiversity in restored subtropical thicket: Portulacaria afra as an ecosystem engineer.	Krompoort, Rhinosterhoe Eastern Cape	Survey plant biodiversity and above and belowground carbon pools in different stands ranging from 0-50 years under spekboom restoration treatment and intact stands, and compare results to gauge restoration success in terms of biodiversity. Publish results in the journal Restoration Ecology.	Restoration ecologist	2011-2012
USK Consulting (Pty) Ltd / BCM	Water quality monitoring at Roundhill municipal landfill site in Buffalo City Municipality	East London, Eastern Cape	Water sampling from various locations around and inside the municipal landfill site and lab analysis interpretation and reporting against norms and allowable limits.	Environmental scientist	2010-2011

Table 1: Project experience table: Dr. M.L. van der Vyver *(continued)*

Client	Name	Location	Description	Role	Year
DEA (National Resource Management Programmes), NMU	Habitat and herbivory impact efficient ecological restoration of spekboom (Portulacaria afra)-rich subtropical thicket.	Various locations within the Southern and Eastern Cape	Assessment of local environmental and management factors affecting spekbooom restoration efficacy on 275 experimental restoration plots on a biome-wide scale (Thicket-wide Plot Experiment)	Restoration ecologist, Statistical analyst	2011-2017
DEA (National Resource Management Programmes), NMU	Plant larger truncheons deeper: more effective spekboom (Portulacaria afra) thicket restoration protocol.	Various locations within the Southern and Eastern Cape	Assessment of various propagule treatments and planting protocols affecting spekbooom restoration efficacy on 275 experimental restoration plots on a biome-wide scale (Thicket-wide Plot Experiment)	Restoration ecologist, Statistical analyst	2011-2017
DEA (National Resource Management Programmes), NMU	Contrasted aboveground carbon pool estimations of intact and degraded (Portulacaria afra)-rich subtropical thicket show terrestrial carbon offset potential.	Various locations within the Southern and Eastern Cape	I developed 40 different species-specific allometric models for estimating abovegroound biomass of subtropical thicket vegetation	Botanical specialist, Statistical analyst	2011-2017

Table 1: Project experience table: Dr. M.L. van der Vyver *(continued)*

Client	Name	Location	Description	Role	Year
C4ES (academic journal) / PrimaKlima (academic journal)	Monitoring of aboveground carbon pools on rehabilitated spekboomveld for three sites in the Eastern Cape.	Kaboega, Klipplaat, Jansenville and Uitenhage areas, Eastern Cape	Monitor and quantify aboveground carbon of spekboom restoration plots as terrestrial carbon offsets	Restoration ecologist	2011-2014
USK Consulting (Pty) Ltd	Strategic Environmental Assessment (SEA) for Mnquma Municipality, Eastern Cape.	Mnquma Municipality, Transkei, Eastern Cape	I was responible for the biodiversity (Fauna and Flora) component including extensive mapping and verification/ground-truthing of areas delineated by the Eastern Cape Biodiversity Plan. I managed the GIS component of the project.	Biodiversity scientist and GIS analyst	2011
Envirobalance (Pty) Ltd	Weltevreden Park Wetland Delineation Study, Centurion.	Weltevreden Park, Gauteng	Wetland delineation and map for a BA for proposed housing development	Wetland specialist	2011

Table 1: Project experience table: Dr. M.L. van der Vyver *(continued)*

Client	Name	Location	Description	Role	Year
USK Consulting (Pty) Ltd / Afrisam	Biodiversity Management Plan for Afrisam Dudfield Mine, Lichtenburg	Lichtenburg, North West	A biodiversity management plan including a vegetation map an alien plant control plan and an ecological management plan of a small protected area adjacent to the mining area with plant checklist, botanical baseline, veld condition assessment, game and stocking rate recommendation	Biodiversity scientist	2010
Envirobalance (Pty) Ltd	Vegetation Screening Report: Kuruman Housing development and Wastewater treatment works	Kuruman, Northern Cape	Botanical screening study for a proposed landfill site	Botanical specialist	2010
Envirobalance (Pty) Ltd	Ecological Impact Assessment: Ga-Oria to Tsate road – Sekhukhuneland, Limpopo	Steelpoort area, Mpumulanga	Biodiversity (Flora and Fauna) impact study for a proposed road.	Biodiversity scientist	2010
Envirobalance (Pty) Ltd	Karino Wetland Rehabilitation and Management Plan.	Nelspruit, Mpumulanga	Wetland delineation and rehabilitation plan	Wetland specialist	2010
USK Consulting (Pty) Ltd	Ecological Screening for Tsolo Junction Development, Eastern Cape	Tsolo, Transkei, Eastern Cape	Biodiversity (Flora and Fauna) screening study for a proposed road	Biodiversity specialist	2010

Table 1: Project experience table: Dr. M.L. van der Vyver *(continued)*

Client	Name	Location	Description	Role	Year
USK Consulting (Pty) Ltd	A number of Basic Assessments Reports	East London Area, Eastern Cape	Standard Basic Assessments and various inputs to EIA reports.	Environmental consultant	2009-2011
USK Consulting (Pty) Ltd	Ecological screening report - Riverland Orchard Farm 799/37 Gonubie	Gonubie, Eastern Cape	Biodiversity (Flora and Fauna) screening study for a proposed agricultural clearing	Botanical specialist	2008
Savannah Environmental (Pty) Ltd / Eskom	Scoping report: Ankerlig Power Station Conversion and transmission integration project, Western Cape.	Mossel Bay LM	I co-authored the scoping report and made two site visits and attended public meetings.	Environmental consultant	2008
Savannah Environmental (Pty) Ltd / Eskom	Environmental Management Plan for Ingula Transmission line	Ingula, Ladysmith area, KwaZulu Natal	I developed an environmental management plan for the construction of a large transmission line across sensitive ecologal communities in the KwaZulu Natal midlands.	Environmental scientist	2008
Savannah Environmental (Pty) Ltd / Eskom	Environmental Impact Assessment for building water infrastructure at Medupi Power Plant	Medupi, Limpopo Province	EIA and scoping for a proposed water infrastructure including extensive pipelines and reservoirs	Environmental consultant	2008

Table 1: Project experience table: Dr. M.L. van der Vyver *(continued)*

Client	Name	Location	Description	Role	Year
Savannah Environmental (Pty) Ltd / Eskom	Environmental Compliance Officer (ECO) for construction of pipeline for disposal of waste water and ash at Duvha Power Station, Witbank	Witbank, Mpumulanga	Environmental compliance project auditing the construction activities of a pipeline for the disposal of waste water and ash at Duvha Power Station, Witbank.	Environmental Compliance Officer	2008
Savannah Environmental (Pty) Ltd / DWAF	On-site ECO for construction of the De Hoop Dam and realignment of the provincial road	Steelpoort area, Mpumulanga	Independent Environmental Compliance Monitoring of a large dam construction project (DWAF) and an associated project involving the consequent realignment of the provincial road	Environmental Compliance Officer	2007-2008
Pidwa Conservation Projects (Pty) Ltd	Research and Monitoring support to Pidwa Reserve Management, part of the Greater Makalali Conservation Area, with paying volunteers.	Greater Makalali Conservation Area near Gravelotte, Limpopo	Research and monitoring within a large big-5 game reserve, specifically in terms of Elephant impacts on vegetation, leopard population and home range study, game monitoring and census, alien plant control, predation preferences of lions and management of international paying volunteers and post graduate students	Project and research manager	2006-2007

Table 1: Project experience table: Dr. M.L. van der Vyver *(continued)*

Client	Name	Location	Description	Role	Year
Siyafunda Conservation Projects (Pty) Ltd	Research and Monitoring support to Makalali Reserve Management, part of the Greater Makalali Conservation Area, with paying volunteers.	Greater Makalali Conservation Area near Hoedspruit, Limpopo	Research and monitoring within a large big-5 game reserve, specifically elephant group behaviour with regards to the reserve immuno-contraception program, predation preferences of predators on reserve, hyaena monitoring and home range calculations, elephant impacts on vegetation, leopard population and home range study, game monitoring and census, alien plant control and management of international paying volunteers and post graduate students	Volunteer facilitator, Monitoring officer	2004-2006
Tshwane University of Technology	Botanical surveys, vegetation condition assessments and game stocking recommendation on tribal lands in view of the potential establishment of a reserve.	Greater Giyani region, Limpopo	Botanical surveys, vegetation condition assessments and game stocking recommendation on tribal lands in view of the potential establishment of a reserve (3-month contract).	Botanical specialist	2004

Table 1: Project experience table: Dr. M.L. van der Vyver *(continued)*

Client	Name	Location	Description	Role	Year
Cambridge University, Kalahari Meerkat Project	International research station on small reserve focussed mostly on the behavioural ecology of Meerkats.	Kuruman River Reserve, Van Zylsrus, Northern Cape	Reserve management and research technician	Research technician, Reserve infrastructure manager.	2003-2004
SANParks	Field ranger	Kgalagadi Transfrontier Park	Reserve management duty, 4x4 trail guide, field guide	Field ranger, Field guide, 4x4 trail guide	2003