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Pri.Sci.Nat # 400045/08

BOTANICAL ASSESSMENT OF PROPOSED NEW N7 WEIGHBRIDGE, VISSERSHOK, CAPE TOWN.

Compiled for: Sharples Environmental Services, Milnerton

Client: Transport Management Branch – Department of Transport and Public Works.

29 May 2023

DECLARATION OF INDEPENDENCE

In terms of Chapter 5 of the National Environmental Management Act of 1998 specialists involved in Impact Assessment processes must declare their independence and include an abbreviated Curriculum Vitae.

I, N.A. Helme, do hereby declare that I am financially and otherwise independent of the client and their consultants, and that all opinions expressed in this document are substantially my own.

NA Helme

ABRIDGED CV:

Contact details as per letterhead.
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First names : NICHOLAS ALEXANDER
Date of birth : 29 January 1969
University of Cape Town, South Africa. BSc (Honours) – Botany (Ecology & Systematics), 1990.

Since 1997 I have been based in Cape Town, and have been working as a specialist botanical consultant, specialising in the diverse flora of the south-western Cape. Since the end of 2001 I have been the Sole Proprietor of Nick Helme Botanical Surveys, and have undertaken over 1700 site assessments in this period.

A selection of relevant previous botanical work is as follows:

- Botanical assessment of Zeekoevlei weir upgrades (Infinity Environmental 2022)
- Botanical assessment of proposed development on Ptn 29 of Farm 410 Caledon (PHS Consulting 2022)
- Botanical assessment of proposed development on Ptn 10 of Broken Hill 88, Heidelberg (Isikhova 2021)
- Botanical assessment of Ptns 3 & 6 of Farm 563 Kleinmond (Lornay Environmental 2021)
- Botanical assessment of Ptn 9 of Farm 429 Gabrielskloof, Caledon (Infinity Environmental 2021)

- Baseline ecological assessment of Karwyderskraal 584, Caledon (Terramanzi 2021)
- Botanical impact assessment of proposed development of Ptn 29 of Farm 410, Caledon (PHS Consulting 2021)
- Botanical assessment of proposed new cultivation on Welbedacht farm, Tra Tra Mountains (Footprint Environmental 2020)
- Biodiversity Compliance Statement - Philippi erf 1/1460 (Infinity Environmental 2020)
- Botanical assessment of Kleinmond WWTW expansion (Aurecon 2020)
- Botanical assessment of Mooreesburg WWTW expansion (Aurecon 2020)
- Botanical assessment of Struisbaai cemetery sites (Infinity Environmental 2020)
- Botanical assessment of MoPama development site, Swellendam (Landscape Dynamics 2020)
- Botanical assessment of Ptn of Rem of Erf 1 Caledon (Theewaterskloof Municipality 2019)
- Botanical assessment of proposed new cultivation on Portion of Wittewater 148, Piketberg (Cornerstone Environmental 2019)
- Botanical assessment of Droogerivier farm Leipoldtville (Footprint Environmental 2018)
- Botanical assessment of Sebulon farm, Redelinghuys (Natura Libra Environmental Services 2018)
- Botanical assessment of proposed new cultivation on Ptn 2 of farm Groenevalley 155, Piketberg (Cederberg Environmental Assessment Practise 2017)
- Botanical assessment of proposed new cultivation on farm Rosendal, Koue Bokkeveld (Cederberg Environmental Assessment Practise 2016)
- Botanical assessment of proposed cultivation on farm Kransvlei, Clanwilliam (Cederberg Environmental Assessment Practise 2016)
- Botanical assessment of proposed cultivation on farm Erfdeel, Bo-Swaarmoed, Ceres (Cederberg Environmental Assessment Practise 2016)
- Botanical constraints in a northern corridor across Ptns 2 and 3 of Farm Frankendale 152, Vissershok (Urban Dynamics 2014).

CONDITIONS RELATING TO THIS REPORT:

The methodology, findings, results, conclusions and recommendations in this report are based on the author's best scientific and professional knowledge, and on referenced material and available knowledge. Nick Helme Botanical Surveys and its staff reserve the right to modify aspects of the report, including the recommendations and conclusions, if and when additional relevant information becomes available.

This report may not be altered or added to without the prior written consent of the author, and this also applies to electronic copies of this report, which are supplied for purposes of inclusion in other reports, including in the report of EAPs. Any recommendations, statements or conclusions drawn from or based on this report must cite this report, and should not be taken out of context, and may not change, alter or distort the intended meaning of the original in any way. If these extracts or summaries form part of a main report relating to this study or investigation this report must be included in its entirety as an appendix or separate section to the main report.

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1. INTRODUCTION

This botanical assessment was requested to inform the environmental planning and authorisation process being followed for the potential development of a new weighbridge along the outbound side of the N7 in the Vissershok area of the City of Cape Town, Western Cape. Initially a single layout alternative was presented for assessment (Layout 1; see Figure 1), but based on initial botanical input after a site survey a further two layout alternatives were proposed (Layouts 2 & 3; see Figure 2).

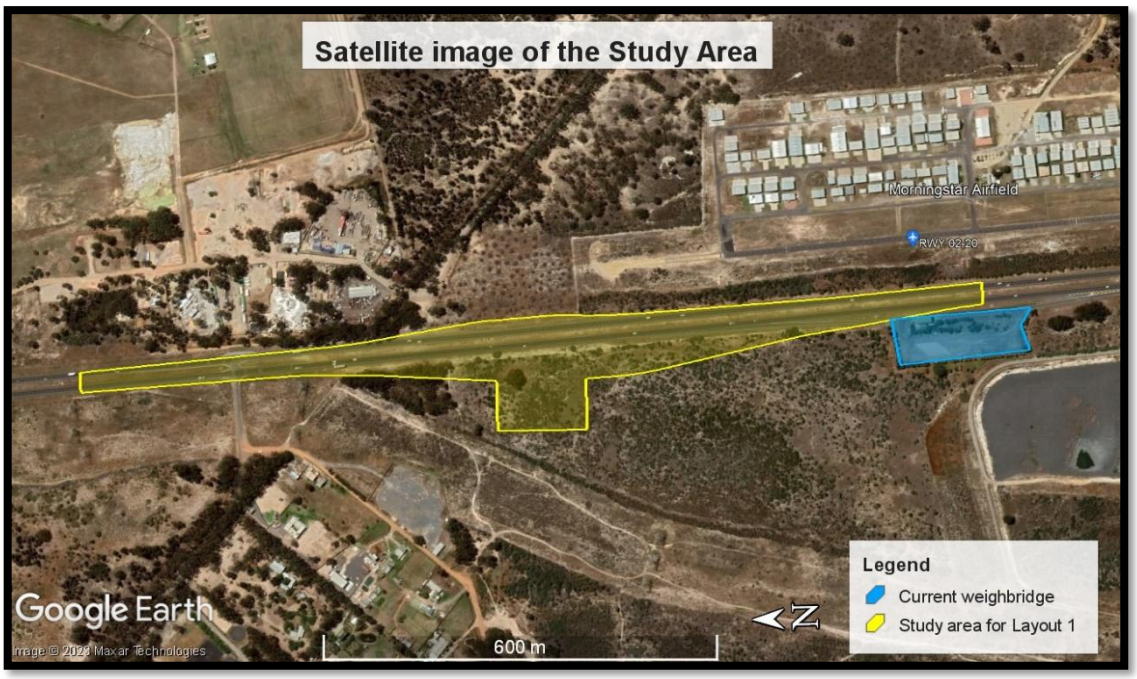

Figure 1: Satellite image showing the location of the study area, in relation to the existing N7 weighbridge. Layout 1 would be within the yellow polygon. Satellite image dated November 2022.

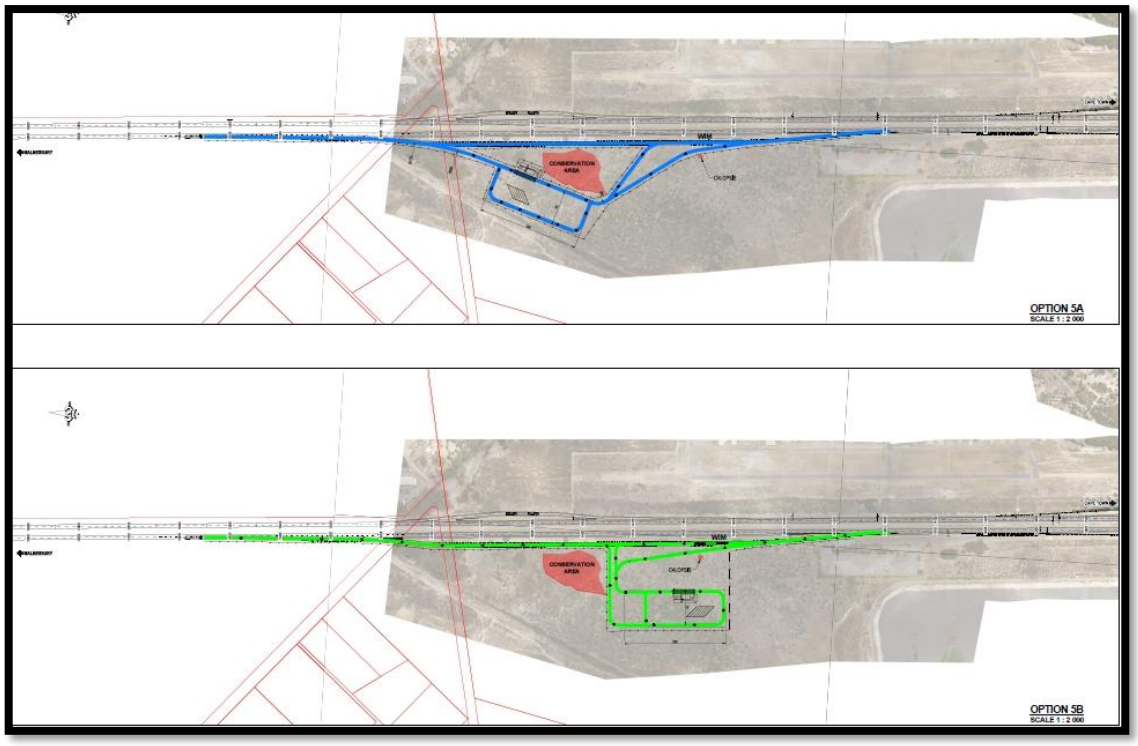

Figure 2: Layout 2 (Option 5a) and Layout 3 (Option 5b), superimposed on the identified area of high botanical sensitivity (red polygon, labelled Conservation Area).

2. TERMS OF REFERENCE

The terms of reference for this study were as follows:

- Undertake a site visit to assess the vegetation (terrestrial biodiversity) in the study area
- Identify and describe the vegetation in the study area and place it in a regional context, including its status in terms of the City of Cape Town Biodiversity Network (CBA/ESA/ONA, etc)
- Identify and locate any (likely) plant Species of Conservation Concern in the study area, based on observation, literature and iNaturalist website review
- Provide an overview and map of the botanical conservation significance (sensitivity) of the site
- Identify and assess (according to standard IA methodology) the potential impacts of the project including impacts associated with the construction and operational phases
- Indicate the acceptability of the project proposal from a botanical perspective

- Identify and describe the potential cumulative impacts of the proposed subdivision 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.
- Discuss the potential rehabilitation of the current site.

3. LIMITATIONS, ASSUMPTIONS AND METHODOLOGY

The site was visited on 19 May 2023. This was early in the optimal winter – spring flowering season in this mainly winter rainfall area, and most (but not all) of the likely geophytes were thus not yet flowering (and few were evident and identifiable), whilst all perennial plants were identifiable. There were thus some minor seasonal constraints on the accuracy of the botanical findings, but given the heavy dominance of perennials in this area – which in a Fynbos system can usually be used as indicators of habitat sensitivity - the confidence in the accuracy of the botanical findings is high. The author has undertaken extensive work within the region, which facilitates the making of local and regional comparisons and inferences of habitat quality and conservation value.

The study area was walked, and all plants on site were noted. Photographs of some of the key species were made using a Fuji mirrorless slr camera, and have been uploaded to the biodiversity website iNaturalist.org. Satellite imagery dated November 2022 (and earlier) was used to inform this assessment, and for mapping. It is assumed that development of any hard surfaces would result in the permanent loss of all natural or partly natural vegetation in that area.

The botanical sensitivity of a site is a product of plant species diversity, plant community composition, rarity of habitat, degree of habitat degradation, rarity of species, ecological viability and connectivity, restorability of habitat, vulnerability to impacts, and reversibility of threats.

The meaning of the No Go alternative in this case is assumed to mean no new development, but also minimal alien invasive vegetation management in the study area, and other potential future development.

4. REGIONAL CONTEXT OF THE VEGETATION

The study area is part of the Southwest Fynbos bioregion (Mucina & Rutherford 2006), and is part of the Fynbos biome, located within what is now known as the Core Region of the Greater Cape Floristic Region (GCFR; Manning & Goldblatt 2012). The GCFR is one of only six Floristic Regions in the world, and is the only one largely confined to a single country (the Succulent Karoo component extends into southern Namibia). It is also by far the smallest floristic region, occupying only 0.2% of the world's land surface, and supporting about 11500 plant species, over half of all the plant species in South Africa (on 12% of the land area). At least 70% of all the species in the Cape region do not occur elsewhere, and many have very small home ranges (these are known as narrow endemics). Many of the lowland habitats are under pressure from agriculture, urbanisation and alien plants, and thus many of the range restricted species are also under severe threat of extinction, as habitat is reduced to extremely small fragments. Data from the nationwide plant Red Listing project indicate that 67% of the threatened plant species in the country occur only in the southwestern Cape, and these total over 1800 species (Raimondo *et al* 2009). It should thus be clear that the southwestern Cape is a major national and global conservation priority, and is quite unlike anywhere else in the country in terms of the number of threatened plant species.

The Southwest Fynbos bioregion is characterised by relatively high winter rainfall, strong rainfall gradients, poor, sandy soils, high topographic diversity, and large urban areas and high levels of alien invasive vegetation. Due to this combination of factors the loss of natural vegetation in this bioregion has been severe (>60% of original extent lost within the region), and the bioregion has a very high number of threatened plant species (Raimondo *et al* 2009).

The City of Cape Town Biodiversity Network (see Figure 3) shows that CBA1d (poor condition) vegetation is mapped for most of the target area, but also with a higher priority CBA1b (fair condition) patch within the target area. The area including and immediately adjacent to the N7 is mapped as No Natural Vegetation. This map has fair congruence with the groundtruthed sensitivity map shown in Figure 4.

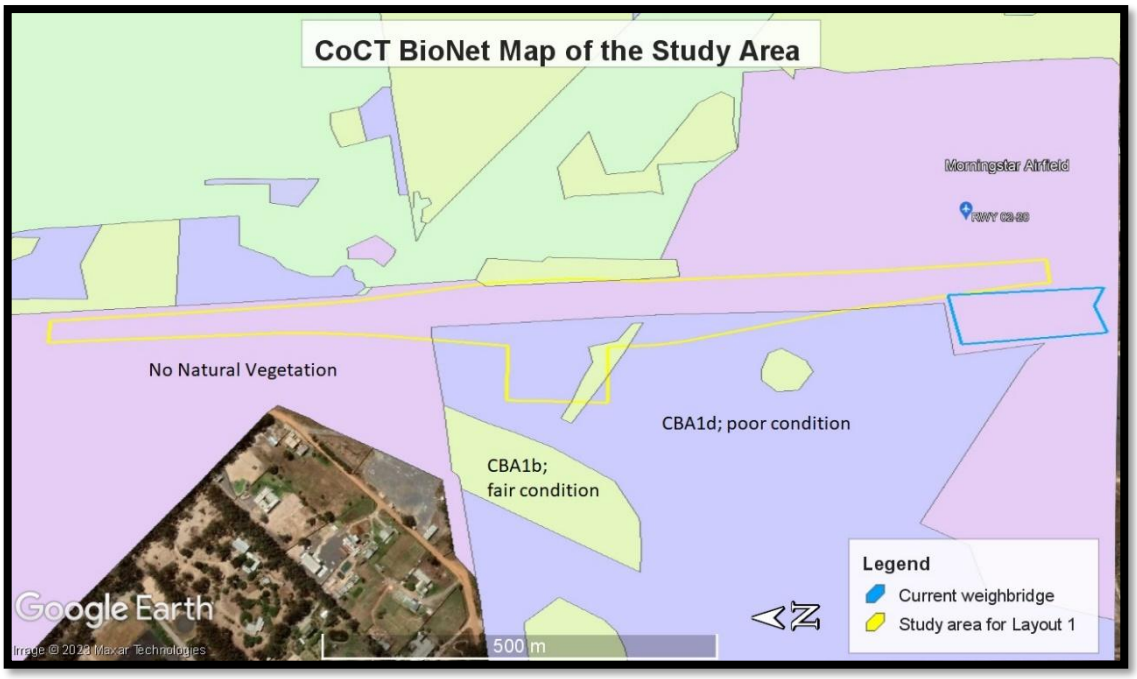

Figure 3: Extract of the City of Cape Town BioNet (2018) for the area, showing that CBA1d (poor condition) vegetation is mapped for most of the target area, but also with a higher priority CBA1b(fair condition) patch within the target area. This map has fair congruence with the groundtruthed sensitivity map shown in Figure 4.

5. THE VEGETATION AND ITS SENSITIVITY

According to the SA Vegetation Map the original natural vegetation in the study area is all Cape Flats Sand Fynbos (Mucina & Rutherford 2018). Based on my ground-truthing I agree with this, and no copy of the vegetation map is provided as it adds little value.

Atlantis Sand Fynbos is now gazetted as **Critically Endangered** on a national basis (Government of South Africa 2022), with less than 18% of its total original extent remaining intact, less than 1% conserved, and an unreachable national conservation target of 30% (Rouget *et al* 2004). The unit supports a very high number of threatened and endemic plant species, and occurs on deep, nutrient poor, sandstone derived, acid soils on in the area between Melkbos and Cape Point, and the vegetation type needs fire for optimal ecological functioning (Helme *et al* 2016).

The vegetation on site does not appear to have been burnt for at least twenty years. This means that the vegetation on site is now senescent (some species

dying of old age; diversity dropping), as this type of Fynbos should burn once every 10-14 years for optimal ecological functioning (Helme *et al* 2016).

Plate 1: View of Medium sensitivity vegetation in the southern part of the study area, with pypgras (*Ehrharta villosa*) dominant, and scattered indigenous shrubs. The large shrubs are invasive alien Port Jackson (*Acacia saligna*).

Plate 2: View of the High sensitivity patch of vegetation as mapped in Figure 4. The dominant plant is *Phylica cephalantha*, with *Thamnochortus punctatus* in the foreground. Indigenous shrubs cover about 80% of this area.

Plate 3: *Restio impolitus* is Redlisted as Vulnerable, and a single plant was found just west of the southern part of the study area.

Most of the study area has been relatively heavily disturbed in the past, most recently by dense stands of alien invasive trees, such as *Leptospermum laevigatum* (Australian myrtle), *Acacia saligna* (Port Jackson) and *Acacia cyclops* (rooikrans). Most of this alien vegetation was cleared and chipped about ten years ago, but has returned at a lower density since then, and now covers about 10-20% of the study area, and would be easy to eradicate. Rehabilitation potential is however only moderate in many areas, as the soil chemistry has been altered by the long period of alien plant invasion (changed soil from acid to neutral pH). The long-term absence of fire has also meant that the indigenous seedbank has not had optimal conditions to germinate for a long time (>20yrs).

The more disturbed and lower diversity areas are deemed to be of **Medium botanical sensitivity** at a regional scale (see Figure 4). Indigenous plant cover here is about 50%, with about 30-40% being open space. Indigenous plant species recorded in these areas include *Aspalathus ternata, A. hispida, Putterlickia pyracantha, Thamnochortus punctatus, T. obtusus, Dimorphotheca pluvialis, Athanasia trifurcata, Searsia laevigata, S. lucida, Seriphium plumosum, Phylica cephalantha, Metalasia densa, Asparagus capensis, Erica mammosa, Aristida diffusa, Dicerothamnus rhinocerotis, Staberoha cernua, Phylica stipularis, Ehrharta villosa, Restio sieberi, Ficinia secunda, F. indica, Ursinia anthemoides, Chrysocoma ciliata, Agathosma imbricata, Senecio pterophorus, Helichrysum cymosum, Tetragina fruticosa, Anthospermum spathulatum, Eriocephalus racemosus* and *Passerina corymbosa*. No succulents or bulbs were observed, which is probably largely an indication of the previously disturbed nature of the site.

The **High sensitivity** area (see Plate 2; also included in Figures 2 & 4)) includes all or most of the above species, plus *Senecio erosus, Diosma oppositifolia* and *Willdenowia teres*. The key distinguishing feature here is the much higher indigenous plant cover (about 80% versus about 15%), and the consequently much higher rehabilitation potential.

5.1 Plant Species of Conservation Concern (SoCC)

Two plant Species of Conservation Concern (SoCC) were recorded during the survey, and a few others may occur in these relatively degraded and senescent areas. None of them were actually recorded within the Layout 1 study area.

A couple of very old plants of *Aspalathus ternata* (Near Threatened) were found adjacent to and just north of the existing weighbridge, but their presence here is of low regional significance, as the population is very small, and this species is widespread and still relatively common (Vredendal to Cape Town).

*Restio impolitus (*Plate 3) is a rare and severely threatened graminoid found on the coastal sand plain, from Redelinghuys to Cape Town, and is Redlisted as Vulnerable. A single plant was found, just outside the southern part of the study area (see Figure 4), but I have also observed it about 700m to the northwest, so there seems to be a small local subpopulation here.

A single plant of *Otholobium uncinatum* (Near Threatened) has been recorded very close to the *Restio impolitus* (see inaturalist.org), but was not seen during the current site survey. The plotted location of the plant on iNaturalist can thus not be verified, but it is clearly more common east of the N7, on the Morningstar airfield property, where there are loamy soils, typically more to its liking, and I thus believe that the locality here may be an error.

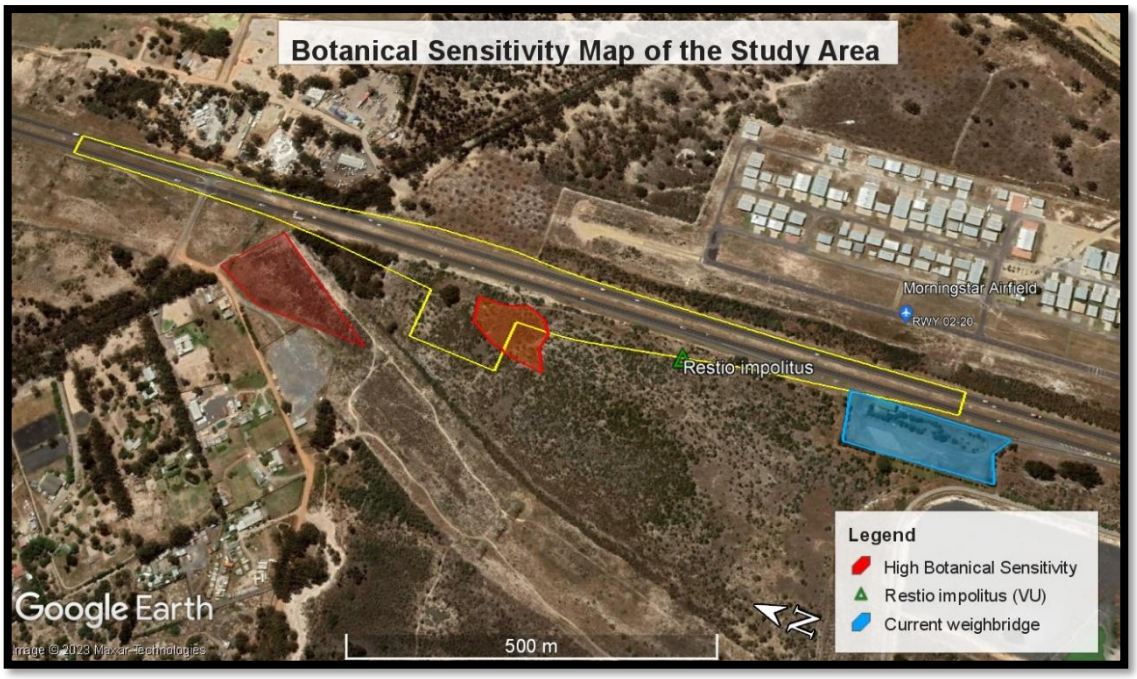

Figure 4: Botanical sensitivity map of the study area. All unshaded areas within the Layout 1 study area are of Medium sensitivity. An additional High sensitivity area within 50m of the northern part of the study area has been included for planning purposes.

6. IMPACT ASSESSMENT

6.1 Construction Phase (Direct) Botanical Impacts

It can safely be assumed that the primary construction phase botanical impact of the new weighbridge and associated roads would be permanent loss of all of the existing natural and partly natural vegetation in the development footprints (gazetted as a Critically Endangered vegetation type). No plant Species of Conservation Concern were recorded within the actual proposed footprints, although three were found in close proximity.

Vegetation that will be lost in Layout 1 is 20% High sensitivity and 80% Medium Sensitivity, whereas no High sensitivity vegetation ould be lost in Layouts 2 or 3.

Botanical significance of this vegetation loss (about 2.5ha) for Layout 1 is Medium – High negative before and after mitigation, whereas it is only Low – Medium negative for Layouts 2 and 3.

The No Go alternative would clearly have a lower direct (construction phase) botanical impact than the proposed development - presumably best rated as Neutral.

The extent of the impacts are deemed to be local and regional, but also national, in that the vegetation types and threatened species are also assessed at a national level.

Development Alternative	Extent of impact	Duration of impact	Intensity	Probability of impact	Irreplaceable loss of biodiversity	Significance before mitigation	Significance after mitigation
Layout 1	Mainly local	Permanent	High	Definite	Medium	Medium to High -ve	Medium to High -ve
Layout 2	Mainly local	Permanent	Medium	Definite	Low	Low to Medium -ve	Low to Medium -ve
Layout 3	Mainly local	Permanent	Medium	Definite	Low	Low to Medium -ve	Low to Medium –ve
No Go	Local	Unknown and variable	Neutral to low negative	Not likely	Low	Neutral	Neutral

Table A: Summary table for construction phase botanical impacts associated with the proposed layout alternatives. The primary construction phase impacts would be permanent loss of natural and partly natural vegetation (gazetted as a Critically Endangered vegetation type), in the development footprint (about 2.5ha)

6.2 Operational Phase Botanical Impacts

Operational phase impacts will take effect as soon as the natural vegetation on the site is lost or disturbed, and will persist in perpetuity, or as long as the area is not rehabilitated. Operational phase impacts include loss of current levels ecological connectivity across the site (essentially only N-S connectivity), and associated habitat fragmentation. The new development is likely to result in further fire suppression of the adjacent natural areas, with associated negative ecological impacts, and may result in (further?) alien Argentine ant introduction, with associated negative ecological impacts on seed dispersal.

Overall the operational phase botanical impacts of development here are likely to be **Low negative** at a local scale for layouts 1 and 3, but Medium negative for Layout 2, before and after mitigation. Layout 2 has a higher operational phase impact as the High sensitivity area, although technically not impacted during the construction phase, would then be surrounded by roads, and this would reduce

the ecological connectivity of this patch of vegetation. The low significance rating for Layouts 1 and 3 is mainly because the development is adjacent to an existing busy highway and does not intrude significantly into the larger patches of vegetation to the west, and the vegetation is already significantly degraded in many parts.

The No Go alternative would clearly have a slightly lower indirect (operational phase) botanical impact than the proposed development, although would not be without impact, due to ongoing alien invasive vegetation growth.

Positive ecological impacts could be realised at this stage if the applicant undertakes ongoing invasive alien vegetation management in the remaining areas of natural and partly natural vegetation.

Development Alternative	Extent of impact	Duration of impact	Intensity	Probability of impact	Irreplaceable loss of biodiversity	Significance before mitigation	Significance after mitigation
Layout 1	Mainly local	Permanent	Low	Definite	Low	Low to Medium -ve	Low to Medium -ve
Layout 2	Mainly local	Permanent	Medium	Definite	Low - Medium	Medium -ve	Medium -ve
Layout 3	Mainly local	Permanent	Low	Definite	Low	Low to Medium -ve	Low to Medium –ve
No Go	Local	Unknown and variable	Neutral to low negative	Likely	Low	Neutral to Low negative	Neutral to Low negative

Table B: Summary table for operational phase botanical impacts associated with the three layouts. The operational phase impacts would be loss of current ecological connectivity across the site and associated habitat fragmentation, as well as likely disruption of optimal fire regimes and of ant-based seed dispersal in the surrounding natural areas.

6.3 The No Go Alternative

The No Go alternative (continuation of the *status quo)* on this site would have clearly lower construction and operational phase botanical impacts (Neutral to Low negative) than the possible development, and would thus technically probably be the preferred alternative from a botanical perspective.

6.4 Cumulative Impacts

The cumulative ecological impacts are in many ways equivalent to the regional ecological impacts, in that the vegetation type/s likely to be impacted by the proposed development have been, and will continue to be, impacted by numerous developments and other factors (the cumulative impacts) within the region. The primary cumulative impacts in the region are loss of natural vegetation and threatened plant species to ongoing agriculture, urban development and alien plant invasion (Mucina & Rutherford 2012; Helme *et al* 2016).

The overall cumulative ecological impact of development of this site (Layout 3) at the regional scale is likely to be Very Low negative.

6.5 Positive Impacts

No significant positive ecological impacts of the proposed development are likely during either the construction or the operational phase, although if the applicant does undertake ongoing invasive alien plant removal on the land they manage this will have a small positive ecological impact. However, it would appear that relatively little natural vegetation will be included within the proposed fencing, so the impact may be limited.

7. REQUIRED MITIGATION

The following mitigation for Layout 3 is deemed feasible, reasonable and mandatory:

- The authorised hard surface footprints should be surveyed and pegged out on site prior to any site development.
- No areas of natural or partly natural vegetation should be disturbed outside the pegged out and authorised development footprints. No vehicular activity or dumping of material may take place outside the authorised development footprints.
- All woody alien invasive vegetation should be removed from within the fenced off project area, prior to the development of any authorised development footprints. This material should be removed from site and taken to an approved organic dump. Removal of the alien vegetation must be undertaken by a trained and licensed alien vegetation removal team, and must be undertaken using methodology outlined in the Best Practise Guidelines (see Martens *et al* 2021).

8. CONCLUSIONS AND RECOMMENDATIONS

- The study area supports moderately to fairly heavily degraded areas of Cape Flats Sand Fynbos, which is technically gazetted as a Critically Endangered vegetation type.
- Three plant Species of Conservation Concern have been recorded in the near vicinity of the study area, but none actually in the study area.
- An area of High botanical sensitivity was found within the primary development footprint for Layout 1, and subsequently two alternative layouts were generated for assessment.
- Layout 3 is the preferred development alternative from a botanical perspective, with an overall Low to Medium negative botanical impact.
- No special botanical mitigation would be necessary for the development of Layout 3, other than that outlined in Section 7.
- Rehabilitation of the current weighbridge area was mentioned, but I don't believe that it will add any ecological value, and the significant amount of money it would require should rather be spent on rehabilitation of other nearby areas that are not as heavily degraded and have a realistic chance of rehabilitation success (such as around the Morningstar airfield, or west of the current study area). The heavily degraded nature of the current weighbridge site means that rehabilitation will be expensive, difficult and time consuming, as Sand Fynbos is not easy to rehabilitate once the soil structure and chemistry has been altered. I would rather advocate that the rehabilitation budget be spent on ongoing removal of all woody alien invasive vegetation (using methodology as outlined in Martens *et al* 2021) in the area between the N7 and the Eskom servitude (some 300m west of the N7), which has a much higher chance of rehabilitation success, and is not as heavily degraded.

9. REFERENCES

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