



Aquatic & Terrestrial Biodiversity and Animal & Plant Species Compliance Statement:

Erf 3420, Sea Vista, St Francis Bay, Kouga Municipality, Eastern Cape

Report v. 1.2

14 November 2022



Report prepared by:

Dr B. Adriaan Grobler

9 Strandview Mansions, Summerstrand,
Gqeberha, Eastern Cape 6001

Mr Roy de Kock (SACNASP 400216/16)

38 Tulip Ave, Sunridge Park, Gqeberha,
Eastern Cape 6004

Report prepared for:

Eco Route Environmental Consulting

P.O. Box 1252, Sedgefield, Western Cape
6573



Contents

1. Introduction	2
2. Terms of Reference.....	2
3. Methodology.....	4
3.1 Desktop Study	4
3.2 Field Survey	5
3.3 Assumptions and Limitations.....	5
4. Results.....	6
4.1 Terrestrial Biodiversity.....	6
4.1.1 Regional Conservation Planning	6
4.1.2 Regional-Scale Vegetation Patterns.....	6
4.1.3 Local-Scale Vegetation Patterns	6
4.1.4 Site Sensitivity	7
4.2 Aquatic Biodiversity	8
4.2.1 Regional-Scale Aquatic Ecosystems	8
4.2.2 Local-Scale Aquatic Ecosystems.....	8
4.2.3 Site Sensitivity	8
4.3 Plant Species	9
4.3.1 Species of Conservation Concern.....	9
4.3.2 Protected Species.....	9
4.3.3 Declared Weeds and Invaders	9
4.3.4 Site Sensitivity	11
4.4 Animal Species	12
4.4.1 Species of Conservation Concern.....	12
4.4.2 Site Sensitivity	12
5. Proposed Impact Management Actions	14
6. Conclusion.....	14
7. References	15



1. Introduction

This Terrestrial Biodiversity and Plant Species Compliance Statement was commissioned to inform the Basic Assessment process being undertaken for the development of a residential apartment complex on Erf 3420 Sea Vista, St Francis Bay, Kouga Municipality, Eastern Cape (Figure 1). Erf 3420 covers an area of approximately 0.8 ha, all of which remains undeveloped. The proposed residential development will entail the construction of four apartment blocks consisting of four floors (including ground floor) each and with a total of 36 units, a reception area, 81 parking bays, and paved pathways leading to future extension plans of a clubhouse and pool area. To allow for this development to continue, the entire property must be levelled and graded. Access to the property is via an existing access road off Triton Avenue, while vehicle access for the proposed development will be continued on from this existing road. New service infrastructure will be required, including the necessary links to municipal bulk services, including water supply lines, sewerage mains, stormwater infrastructure and electricity supply lines.



2. Terms of Reference

The terms of reference for this study were as follows:

- A desktop study to identify:
 - The type and status of terrestrial and aquatic ecosystems on site in terms of applicable local and regional mapping and conservation-planning frameworks;
 - Any plant or animal species of conservation concern (SCC) that could occur on site.
- A field survey of the preferred development site to identify:
 - Terrestrial and aquatic biodiversity features (including fine-scale habitats) present;
 - Ecological condition of biodiversity features and sensitivity of the site;
 - Any plant or animal species of special concern (protected or SCC) present.
- A report providing the following information:
 - Baseline profile description of terrestrial and aquatic ecosystems and plant and animal SCC on site;
 - Description of methodology used to verify the sensitivities of the biodiversity features and SCC on the site;
 - Statement on the duration, date and season of the field survey and the relevance of the season to the outcome of the assessment;
 - Description of the assumptions made and any uncertainties or gaps in knowledge or data;
 - Proposed impact management outcomes or any monitoring requirements for inclusion in an environmental management programme;
 - Any conditions to which this statement is subjected.



Figure 1: Erf 3420 Sea Vista (red outline), the preferred site of a residential development in St Francis Bay, Kougga Municipality, Eastern Cape. The site occurs immediately south of Port St Francis and is located approximately 250 m from the Cape St Francis Nature Reserve (blue polygon). The path walked during the field survey is also indicated (yellow line).



3. Methodology

3.1 Desktop Study

To gain an understanding of broader vegetation patterns in the surrounding landscape, reference was made to the Vegetation Map of South Africa, Lesotho and Swaziland 2018 version (VEGMAP) (SANBI, 2006–2018, 2018a), which reflects important recent updates for the region under study (Dayaram *et al.*, 2019). Conservation status for vegetation types were identified from the National Biodiversity Assessment 2018 (SANBI, 2018b; Skowno *et al.*, 2019). Further information about vegetation patterns and the local flora in the area was drawn from the scientific literature (Cowling, 1983, 1984; Cowling *et al.* 2019; Grobler and Cowling, 2021) and botanical specialist reports (Grobler, 2019; Low, 2011). An understanding of regional conservation priority areas was informed by the 2017 National Protected Areas Expansion Strategy (NPAES; Government of South Africa, 2016) and the 2019 Eastern Cape Biodiversity Conservation Plan (EC BCP; Eastern Cape Department: Economic Development, Environmental Affairs and Tourism, 2020).

The 2011 National Freshwater Ecosystem Priority Areas database (NFEPA) (Nel *et al.*, 2011) and National Wetland Map version 5 (NWM5) (Van Deventer *et al.*, 2020) were consulted to gain an understanding of the extent and types of estuarine and inland aquatic ecosystems in the surrounding landscape.

Plant SCC are those species whose populations are naturally small or geographically confined, and those whose populations are declining due to human impacts (i.e., currently threatened with extinction or likely to become threatened). Plant SCC thus include any species with a conservation status of Rare, Critically Rare, Near Threatened, Vulnerable, Endangered, Critically Endangered or Critically Endangered Possibly Extinct (Raimondo *et al.*, 2009). A list of plant species of conservation concern (SCC) that could potentially occur at the site were identified from the following sources:

- The National Web-based Environmental Screening Tool (<https://screening.environment.gov.za>);
- The online Red List of South African Plants v. 2020 (SANBI, 2012–2020) (<http://redlist.sanbi.org>).
- The online Botanical Database of Southern Africa (SANBI, 2016) (<http://newposa.sanbi.org/>).
- The Custodians of Rare and Endangered Wildflowers (CREW) Eastern Cape database (V. Zikishe, pers. comm.);
- Observations submitted to the iNaturalist online biodiversity database (<https://www.inaturalist.org>).

Plant species that are protected under provincial or national legislation were identified from lists published in terms of the Cape Nature and Environmental Ordinance (Ordinance 19 of 1974), the National Environmental Management: Biodiversity Act (Act 10 of 2004) and the National Forest Act (Act 84 of 1998). Declared weeds and alien invasive plant species were identified from lists published in terms of the Conservation of Agricultural Resources Act (1983) and National Environmental Management: Biodiversity Act (2004).

A list of animal species of conservation concern (SCC) that could potentially occur at the site were identified from the following sources:

- The National Web-based Environmental Screening Tool (<https://screening.environment.gov.za>);
- Observations submitted to the iNaturalist online biodiversity database (<https://www.inaturalist.org>).

3.2 Field Survey

Fieldwork for this study was conducted on 30 November 2021 during early summer (Table 1). As the site falls in the coastal, temperate climate, year-round rainfall zone, seasonality is muted and thus the phenology of plants and vegetation is also muted in comparison with more seasonal regions (i.e., strongly winter- or summer-rainfall areas). The early-summer sampling period is considered appropriate as most plant species were identifiable. Early summer is also the optimal season for sampling in the local bioregion (SANBI, 2020).

A total of 2.5 hours was spent surveying the 0.8 ha of land at the site. Areas of suspected intact habitat, previously identified using Google Earth, were the focus of the survey as these areas were most likely to harbour SCC. However, care was taken to survey representative portions of all suspected habitats on site (Figure 2). During the survey, vegetation units and other habitat types were assessed for their ecological condition. Vegetation units were further surveyed for their dominant and typical component species. Any associations with specific soils, underlying geology, or landforms were noted.

Table 1: Site inspection details for Erf 3420 Sea Vista in St Francis Bay, Kouga Municipality, Eastern Cape.

Date:	30 November 2021
Duration:	2.5 hours
Season:	Summer
Season Relevance:	As the site falls in the coastal, temperate climate, year-round rainfall zone, seasonality is muted and thus the phenology of plants and vegetation is also muted in comparison with more seasonal regions. The early-summer sampling is considered appropriate as most plant species were identifiable. Early summer is also the optimal season for sampling in the local bioregion (SANBI, 2020).

3.3 Assumptions and Limitations

The following assumptions and limitations of the study must be considered in the interpretation of results presented in this report:

- It is assumed that all third-party information used (e.g., GIS data and satellite imagery) is correct at the time of generating this report.
- The field survey was restricted to a single season (summer), but due to the muted seasonality in the region, it is not considered necessary to perform additional seasonal surveys.



4. Results

4.1 Terrestrial Biodiversity

4.1.1 Regional Conservation Planning

While the EC BCP (Eastern Cape Department: Economic Development, Environmental Affairs and Tourism, 2020) and NPAES (Government of South Africa, 2016) identify areas of conservation importance in the landscape surrounding the site, these planning frameworks do not identify Erf 3420 as a priority for regional conservation efforts. Furthermore, as much of the surrounding landscape has already been developed (particularly the seaward margin adjacent to the site), the site does not play a major role in facilitating landscape connectivity.

4.1.2 Regional-Scale Vegetation Patterns

VEGMAP (SANBI, 2006–2018, 2018) identifies a single vegetation type occurring at the site, namely AT 57 St Francis Dune Thicket. This vegetation type is restricted to the Eastern Cape Province where it occurs on coastal dunes from near the Tsitsikamma River Mouth (west of Oyster Bay) eastward to the Sundays River Mouth (Grobler *et al.*, 2018). St Francis Dune Thicket comprises a mosaic of dune thicket – dominated by broad-leaved trees and shrubs – occurring in a matrix of asteraceous dune fynbos, dominated by fine-leaved, low-growing shrubs. The thicket clumps are best developed in fire-protected dune slacks, while the fynbos occurs on upper dune slopes and crests. This vegetation type, especially the fynbos component, is rich in regional and local endemic species (Cowling, 1983, 1984; Cowling *et al.*, 2019; Grobler, 2019; Low, 2011), most of which are restricted to coastal dunes of the Cape Floristic Region (Grobler and Cowling, 2021). St Francis Dune Thicket is threatened by sand mining, invasion by alien plants and urban sprawl (coastal development). While this vegetation type is poorly protected (Grobler *et al.*, 2018), it is currently listed as Least Concern in terms of conservation status (SANBI, 2018b; Skowno *et al.*, 2019).

4.1.3 Local-Scale Vegetation Patterns

Google Earth satellite imagery showed that most vegetation on Erf 3420 was cleared and subsequently subjected to topsoil disturbance around 2006 (Figure 2). During the 15 years since then, there appears to have been some rehabilitation of the site through grass planting followed by spontaneous establishment of some indigenous plant species. The field survey confirmed the above, with most of the site now transformed to an anthropogenic grassland (Table 3) and effectively no St Francis Dune Thicket remaining on Erf 3420. The extant grassland vegetation is dominated by a mix of alien-invasive (e.g., *Lagurus ovatus*, *Pennisetum clandestinum*) and indigenous (*Cynodon dactylon*, *Eragrostis curvula*, *Stenotaphrum secundatum*, *Sporobolus africanus*) grasses typical of disturbed areas (Fish *et al.*, 2015). Exotic weeds also occur in this grassland, especially the herbs *Medicago polymorpha* and *Plantago major*, but also the shrubs *Acacia cyclops*, *Acacia saligna*, *Foeniculum vulgare*, *Melilotus albus* and *Ricinus communis*, the latter two of which are declared invaders (Table 3). A few indigenous weedy herbs (e.g., *Aizoon rigidum*, *Arctotheca prostrata*, *Mesembryanthemum aitonis*) and shrubs (*Helichrysum teretifolium*, *Osteospermum moniliferum*, *Senecio ilicifolius*, *Solanum linnaeanum*) occur

sporadically throughout the grassland. Species typical of St Francis Dune Thicket are restricted to the southern boundary of Erf 3420 where a remnant strip of this vegetation approximately 1 m wide (but extending onto some adjacent properties) can be found (Table 3). The most common species here include the grass *Ehrharta villosa*, the restio *Restio eleocharis*, the herbs *Anchusa capensis*, *Hypoestes aristata*, *Pelargonium capitatum*, *Senecio elegans* and *Tetragonia decumbens*, the dwarf shrub *Hermannia althaeoides*, the tall shrubs *Cussonia thyrsoiflora*, *Grewia occidentalis*, *Osteospermum moniliferum*, *Salvia aurea*, *Searsia glauca* and *Searsia crenata*, and the climbers *Cynanchum obtusifolium*, *Rhoicissus digitata*, *Rhynchosia caribea* and *Secamone alpini*. Note that most of these species typically form part of the thicket component of St Francis Dune Thicket and that no species typical of the fynbos component were encountered on site.



Figure 2: Google Earth satellite imagery showing landcover of Erf 3420 (red outline) in (a) 2006 and (b) 2022. Note that most of the site was subjected to topsoil disturbance around 2006. Sites that are representative of plant habitats on site are indicated by black markers (S1–S4; see Table 3 for details).

4.1.4 Site Sensitivity

The findings of the desktop study and field survey are in accordance with the site sensitivity of **LOW** for the Terrestrial Biodiversity Theme identified by the National Web-based Environmental Screening Tool.

4.2 Aquatic Biodiversity

4.2.1 Regional-Scale Aquatic Ecosystems

No freshwater aquatic ecosystems as identified by the NFEPA or NWM5 occur within 500 m (i.e., the regulated zone of a watercourse as defined by the National Water Act (36 of 1998)) of Erf 3420 (Figure 3). The nearest aquatic ecosystems are depression wetlands that occur about 1.5 km east of the property, while the Krom Estuary lies about 4 km to the north.

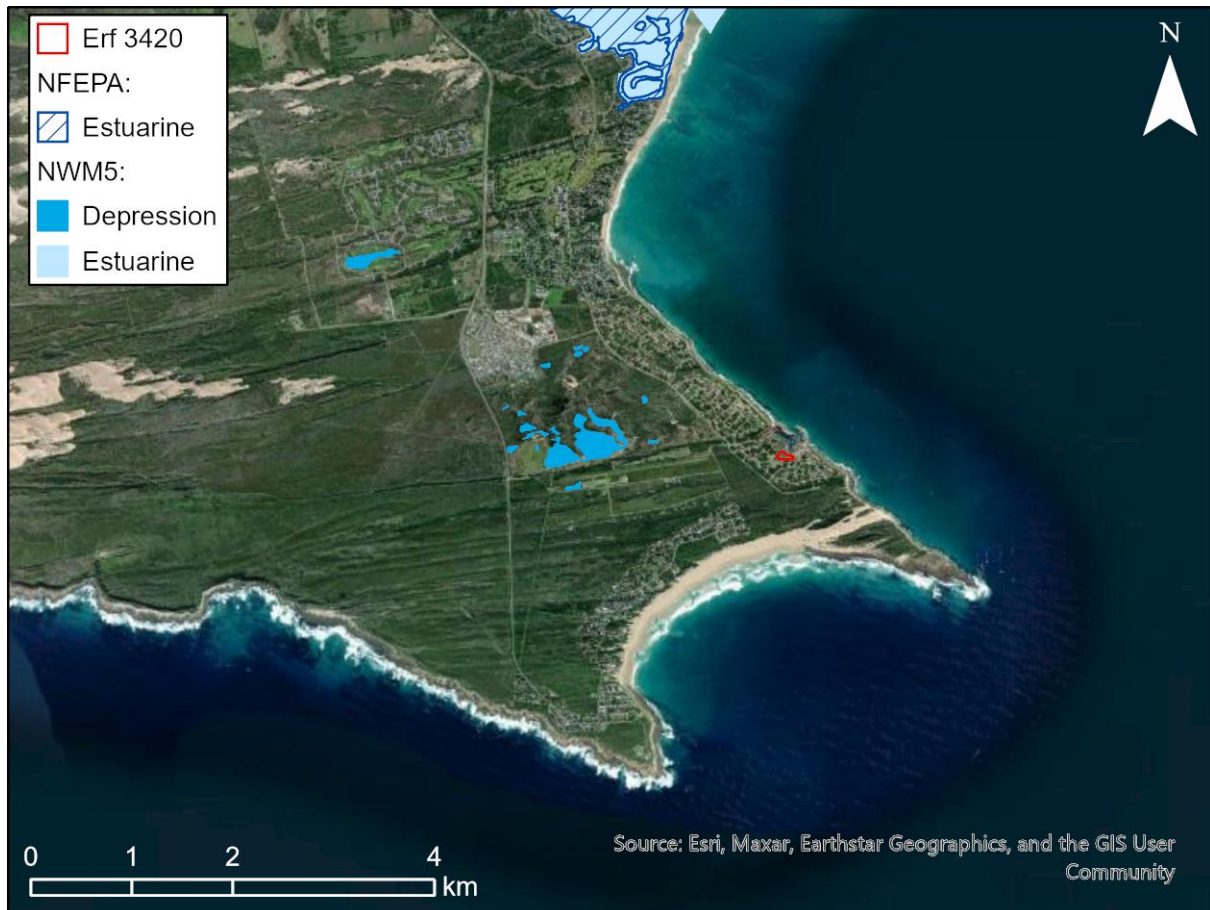


Figure 3: Aquatic biodiversity features in landscapes surrounding Erf 3420 Sea Vista according to the National Freshwater Ecosystem Priority Area database (NFEPA) and the National Wetland Map version 5 (NWM5).

4.2.2 Local-Scale Aquatic Ecosystems

The field survey confirmed that no freshwater aquatic ecosystems occur on Erf 3420 or in its immediate vicinity, with the site hosting exclusively terrestrial ecosystems, most of which occurs in a transformed state (Figure 2; Table 3).

4.2.3 Site Sensitivity

The findings of the desktop study and field survey are in accordance with the site sensitivity of **LOW** for the Aquatic Biodiversity theme identified by the National Web-based Environmental Screening Tool.

4.3 Plant Species

4.3.1 Species of Conservation Concern

The transformed nature of the site means that there is a low likelihood of plant SCC occurring on site (Table 2). No SCC were recorded during the field survey, and due to the high spatial resolution of the field sampling, it can be stated with high confidence that the site hosts no SCC populations.

Table 2: Plant species of conservation concern (SCC) that are associated with St Francis Dune Thicket in landscapes surrounding Erf 3240 as identified by the National Web-based Environmental Screening Tool (<https://screening.environment.gov.za>) and their likelihood of occurrence on site.

Species	Likelihood	Justification
<i>Agathosma stenopetala</i>	Low	No suitable habitat; high sampling effort without detection.
<i>Aspalathus recurvispina</i>	Low	No suitable habitat; high sampling effort without detection.
<i>Capeochloa cincta</i> subsp. <i>sericea</i>	Low	No suitable habitat; high sampling effort without detection.
<i>Centella tridentata</i> var. <i>hermanniifolia</i>	Low	No suitable habitat; high sampling effort without detection.
<i>Cotyledon adscendens</i>	Low	No suitable habitat; high sampling effort without detection.
<i>Erica chloroloma</i>	Low	No suitable habitat; high sampling effort without detection.
<i>Erica glandulosa</i> subsp. <i>fourcadei</i>	Low	No suitable habitat; high sampling effort without detection.
<i>Erica glumiflora</i>	Low	No suitable habitat; high sampling effort without detection.
<i>Hyobanche robusta</i>	Low	No suitable habitat; high sampling effort without detection.
<i>Rapanea gilliana</i>	Low	No suitable habitat; high sampling effort without detection.
Sensitive species 78	Low	No suitable habitat; high sampling effort without detection.
<i>Syncarpha sordescens</i>	Low	No suitable habitat; high sampling effort without detection.
Sensitive species 308	Low	No suitable habitat; high sampling effort without detection.
Sensitive species 448	Low	No suitable habitat; high sampling effort without detection.
Sensitive species 588	Low	No suitable habitat; high sampling effort without detection.
Sensitive species 657	Low	No suitable habitat; high sampling effort without detection.
Sensitive species 1032	Low	No suitable habitat; high sampling effort without detection.
Sensitive species 1192	Low	No suitable habitat; high sampling effort without detection.

4.3.2 Protected Species

While no plant SCC were recorded, two species protected under the Cape Environmental and Nature Conservation Ordinance (1974) occur on site: the climber *Cynanchum obtusifolium*, which occurs in the dune thicket along the southern boundary, and the annual succulent *Mesembryanthemum aitonis*, which occurs in the secondary shrubland in the southwestern portion of the site (Table 4; Figure 4). Both species are likely to be impacted by the proposed development (Figure 5).

4.3.3 Declared Weeds and Invaders

Three declared weeds and invaders, listed in terms of the Conservation of Agricultural Resources Act (1983) and National Environmental Management: Biodiversity Act (2004) were recorded on site: *Acacia cyclops*, *Acacia saligna* and *Ricinus communis* (Table 5).

Table 3: Descriptions of plant species habitats on Erf 3420 in Sea Vista and their likelihood of supporting species of conservation concern (SCC). See Figure 2 (b) for distribution of representative habitat sites where photos were taken.









Representative site	Habitat	Likelihood of SCC	Photos	
S1 -34.185613° 25.852023°	Low grassland, dominated by <i>Cynodon dactylon</i> – transformed, alien invasive plants present.	Low		
S2 -34.185297° 25.850971°	Tall grassland, dominated by <i>Pennisetum clandestinum</i> – transformed, alien invasive plants present.	Low		
S3 -34.185575° 25.850672°	Secondary shrubland, dominated by <i>Osteospermum moniliferum</i> and <i>Melilotus albus</i> – transformed, alien invasive plants present.	Low		
S4 -34.185312° 25.851036°	Dune thicket, dominated by <i>Searsia crenata</i> – degraded and fragmented, restricted to a small strip along the site's southern boundary.	Low		

Table 4: Protected plant species, listed in terms of the Cape Environmental and Nature Conservation Ordinance (1974), that were recorded on the site.

Species	Common name	ENCO category	Abundance
<i>Cynanchum obtusifolium</i>	Melktou	Schedule 4	Low
<i>Mesembryanthemum aitonis</i>	Sea spinach	Schedule 4	Low

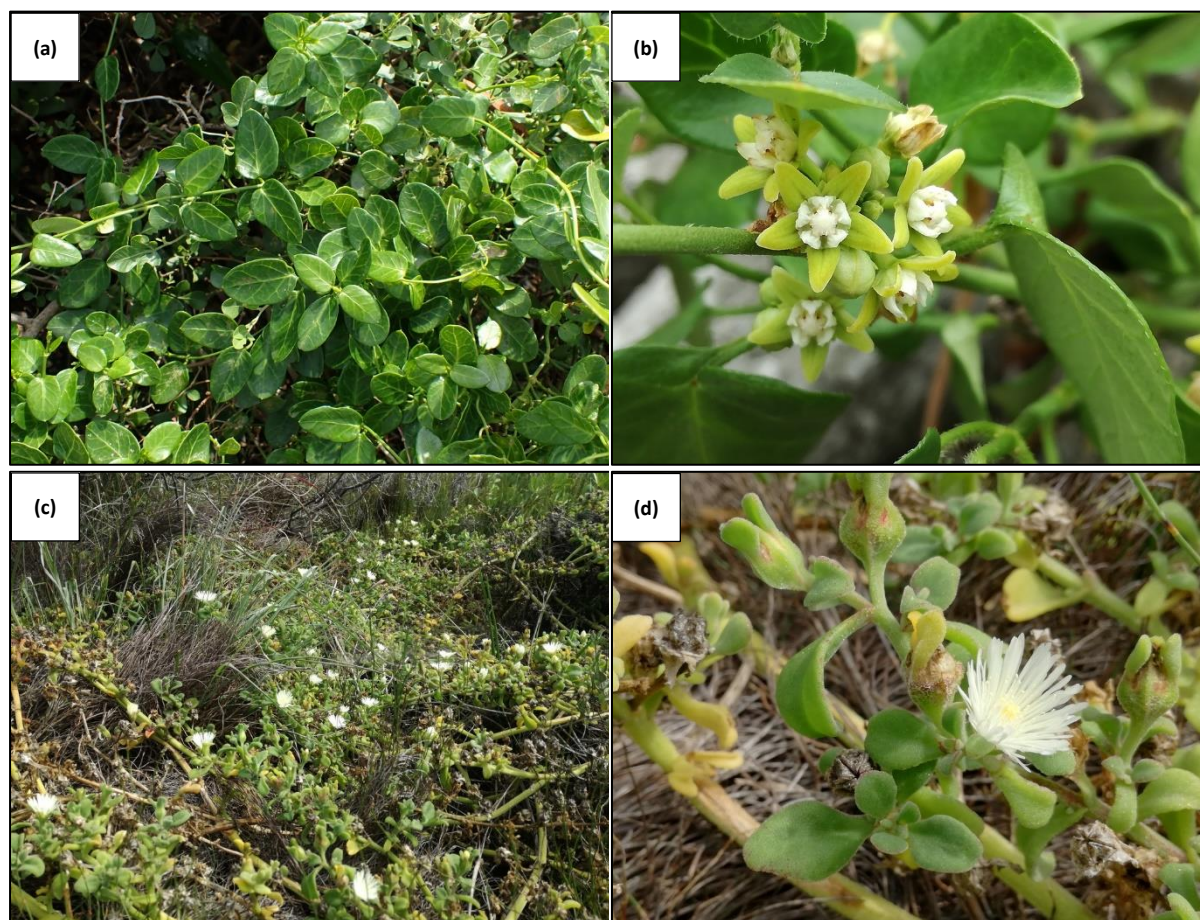


Figure 4: Protected plant species that were recorded on the site. (a, b) *Cynanchum obtusifolium*, a climber associated with dune thicket vegetation along the southern boundary of the site. (c, d) *Mesembryanthemum aitonis*, an annual succulent occurring in disturbed areas, especially the secondary shrubland, on site.

Table 5: Alien invasive plant species, listed in terms of the Conservation of Agricultural Resources Act (1983) and National Environmental Management: Biodiversity Act (2004), that were recorded on the site.

Species	Common name	CARA category	NEMBA category	Abundance
<i>Acacia cyclops</i>	Rooikrans	2	1b	Moderate
<i>Acacia saligna</i>	Port Jackson	2	1b	Moderate
<i>Ricinus communis</i>	Castor-oil plant	2	2	Moderate

4.3.4 Site Sensitivity

The findings of the desktop study and field survey contradict the site sensitivity of MEDIUM for the Plant Species Theme identified by the National Web-based Environmental Screening Tool. The transformed nature of the site, together with the absence of plant SCC (high confidence) translates to a **LOW** site sensitivity.

4.4 Animal Species

4.4.1 Species of Conservation Concern

The only SCC identified by the National Web-based Environmental Screening Tool as possibly occurring at the site was the Yellow-winged Agile Grasshopper (*Aneuryphymus montanus*) (VU) (Table 6). This species is associated with fynbos vegetation and has been recorded from predominantly inland localities in rocky foothills (i.e., montane fynbos) with an apparent preference for cool, south-facing slopes (Armstrong, 1999; Brown, 1960; Kinvig, 2005). Considering the site is in a developed area within a bioregion comprising coastal dune thicket, the transformed state of the site and the lack of suitable vegetation (habitat) available to support the species, it is unlikely that it will occur within the study area.

Table 6: Animal species of conservation concern (SCC) that potentially occur in landscapes surrounding Erf 3240 as identified by the National Web-based Environmental Screening Tool (<https://screening.environment.gov.za>) and their likelihood of occurrence on site.

Species	Likelihood	Justification
<i>Aneuryphymus montanus</i>	Low	No suitable habitat; high sampling effort without detection.

4.4.2 Site Sensitivity

The findings of the desktop study and field survey contradict the site sensitivity of MEDIUM for the Animal Species theme identified by the National Web-based Environmental Screening Tool. The transformed nature of the site, together with the likely absence of animal SCC (high confidence) translates to a **LOW** site sensitivity.

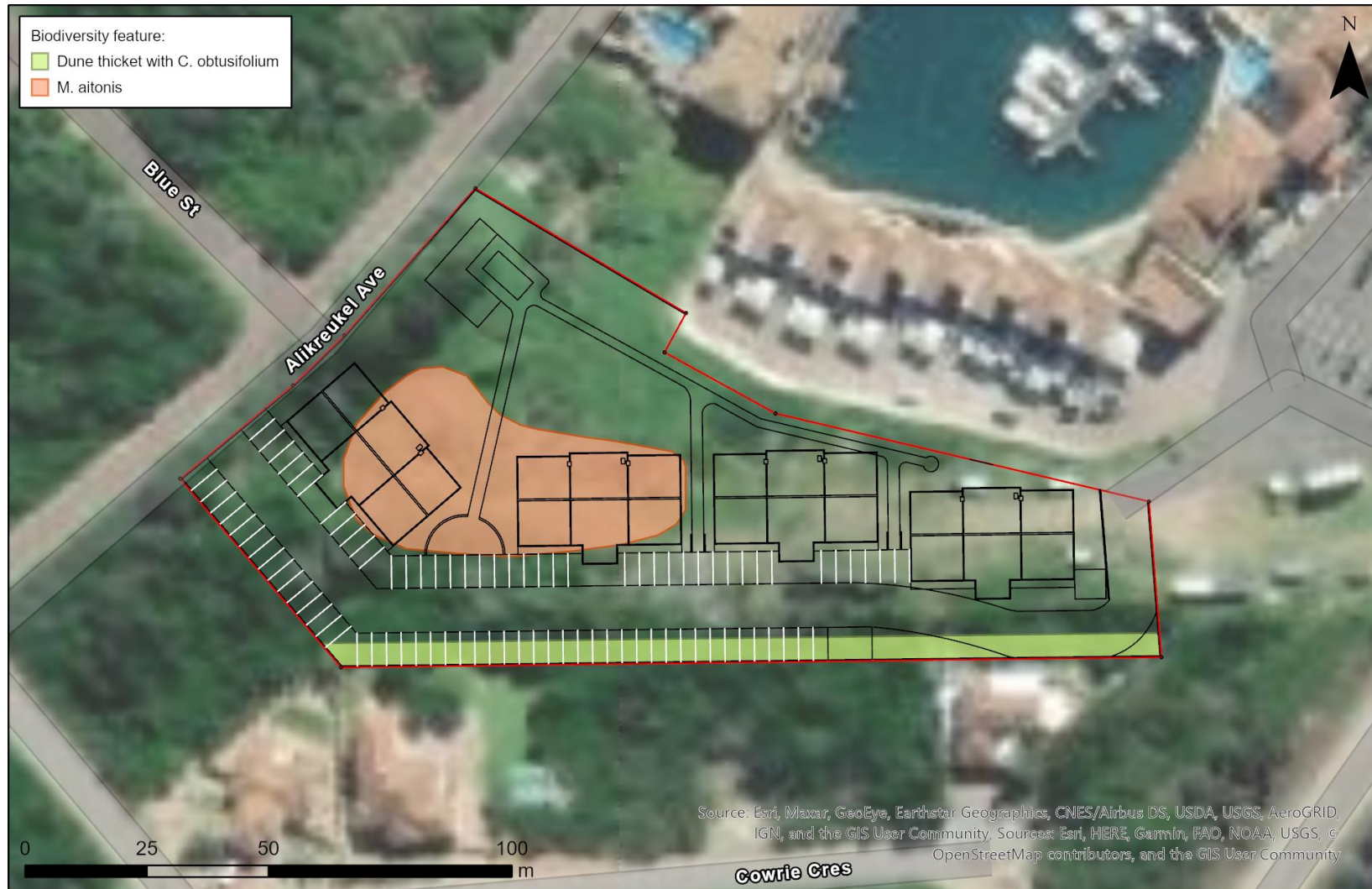


Figure 5: The location of terrestrial biodiversity features on ERF 3420 Sea Vista in relation to the proposed development layout. The development is likely to have an impact on both protected plant species identified on site (*Cynanchum obtusifolium* and *Mesembryanthemum aitonis*), as well as the strip of fragmented dune thicket along the southern boundary of the site.



5. Proposed Impact Management Actions

The following management actions are proposed to limit and mitigate ecological impacts of the development:

- In accordance with Schedule 4 of the Cape Environmental and Nature Conservation Ordinance (1974), a permit for the destruction of all protected plant species listed in Table 4 (*C. obtusifolium*, *M. aitonis*) must be procured from the Province of the Eastern Cape: Department of Economic Development, Environmental Affairs and Tourism before construction commences.
- In accordance with the National Environmental Management: Biodiversity Act (2004) (NEMBA), all Category 1b alien invasive plant species listed in Table 5 (*A. cyclops*, *A. saligna*) must be eradicated from the site and a plan for their ongoing control should be included in the environmental management plan of the development. NEMBA Category 2 weeds listed in Table 5 (*R. communis*) may be kept on site if a permit is obtained, but it is recommended that these invaders are also eradicated and controlled on site.
- During the construction phase of the proposed development, disturbance to patches of dune thicket along the southern boundary (on site and on adjacent properties) should be minimised where possible as this vegetation could provide a stepping-stone habitat for birds and small mammals within the broader landscape.



6. Conclusion

This compliance statement is applicable to the site as described in the Basic Assessment documentation and shown in Figures 1 and 2 of this report. Due to its transformed nature, the site is of **LOW** sensitivity for terrestrial and aquatic biodiversity and **LOW** sensitivity for plant and animal species (Table 7), and the proposed development will have **NO** impact on threatened terrestrial and aquatic biodiversity or plant and animal SCC. Furthermore, this compliance statement is not subjected to any conditions.

Table 7: Sensitivity of Erf 3240 Sea Vista based on findings of the site survey.

Theme	Low	Medium	High	Very High
Terrestrial Biodiversity	x			
Aquatic Biodiversity	x			
Plant Species	x			
Animal Species	x			



7. References

- Armstrong, H.J. 1999. Identification of priority regions for animal conservation in afforestable montane grasslands of the northern Eastern Cape Province, South Africa. *Biological Conservation* 87: 93–103.
- Brown, H.D. 1960. New grasshoppers (Acridoidea) from the Great Karroo and the south Eastern Cape. *Journal of the Entomological Society of South Africa* 23: 126–143.
- Cowling, R.M. 1983. Phytochorology and vegetation history in the south-eastern Cape, South Africa. *Journal of Biogeography* 10: 393–419.
- Cowling, R.M. 1984. A syntaxonomic and synecological study in the Humansdorp region of the fynbos biome. *Bothalia* 15: 175–228.
- Cowling, R.M., Logie, C., Brady, J., Middleton, M., Grobler, B.A. 2019. Taxonomic, biological and geographical traits of species in a coastal dune flora in the southeastern Cape Floristic Region: regional and global comparisons. *PeerJ* 7: e7336.
- Dayaram, A., Harris, L.R., Grobler, B.A., van der Merwe, S., Rebelo, A.G., Powrie, L.W., Vlok, J.H., Desmet, P.G., Qabaqaba, M., Hlahane, K.M. and Skowno, A.L., 2019. Vegetation Map of South Africa, Lesotho and Swaziland 2018: A description of changes since 2006. *Bothalia–African Biodiversity & Conservation* 49: 1–11.
- Eastern Cape Department: Economic Development, Environmental Affairs and Tourism. 2020. 2019 Eastern Cape Biodiversity Conservation Plan Terrestrial. Available online at <http://bgis.sanbi.org/SpatialDataset/Detail/4701>
- Fish, L., Mashau, A.C., Moeaha, M.J., Nembudani, M.T. 2015. Identification guide to the Southern African Grasses: an identification manual with keys, descriptions and distributions. South African National Biodiversity Institute, Pretoria.
- Government of South Africa. 2016. National protected area expansion strategy for South Africa 2017. Priorities for expanding the protected area network for ecological sustainability and climate change adaptation. The Government of South Africa, Pretoria.
- Grobler, B.A. 2019. Botanical Impact Assessment for the proposed residential development at Rocky Coast Farm (Portions 78 and 79 of the Farm Ongegund Vryheid No. 746), Cape St Francis, Kouga Municipality. Technical report prepared for Public Process Consultants.
- Grobler, B.A. and Cowling, R.M. 2021. The composition, geography, biology and assembly of the coastal flora of the Cape Floristic Region. *PeerJ* 9: e11916.
- Grobler, B.A., Vlok, J.H.J., Cowling, R.M., van der Merwe, S., Skowno, A.L. and Dayaram, A. 2018. Integration of the Subtropical Thicket Ecosystem Project (STEP) vegetation types into the VEGMAP national vegetation map 2018. Technical report. South African National Biodiversity Institute, Cape Town.
- Kinzig, R.G. 2005. Biotic indicators of grassland condition in Kwazulu-Natal, with management recommendations. University of KwaZulu-Natal.

- Low, A.B. 2011. Botanical and dune ecology impact assessment for the proposed nuclear 1, 2 and 3 sites at Koeberg (Duynefontein), Bantamsklip and Thyspunt. Coastal and Environmental Consultants, Cape Town.
- Nel, J.L., Murray, K.M., Maherry, A.M., Petersen, C.P., Roux, D.J., Driver, A., Hill, L., Van Deventer, H., Funke, N., Swartz, E.R. and Smith-Adao, L.B. 2011. Technical report for the national freshwater ecosystem priority areas project. Water Research Commission Report Report No. 1081.
- Raimondo, D., Von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A. and Manyama, P.A. (Eds). 2009. Red List of South African Plants. *Strelitzia* 25. South African National Biodiversity Institute, Pretoria.
- Skowno, A.L., Raimondo, D.C., Poole, C.J., Fizzotti, B. and Slingsby, J.A. (eds.). 2019. South African National Biodiversity Assessment 2018 Technical Report Volume 1: Terrestrial Realm. South African National Biodiversity Institute, Pretoria.
- South African National Biodiversity Institute. 2016. Botanical Database of Southern Africa (BODATSA). Available online at <http://newposa.sanbi.org/>
- South African National Biodiversity Institute (SANBI). 2006–2018. The Vegetation Map of South Africa, Lesotho and Swaziland, Version 2018. Mucina, L., Rutherford, M.C. and Powrie, L.W. (Editors). Available online at <http://bgis.sanbi.org/Projects/Detail/186>
- South African National Biodiversity Institute (SANBI). 2012–2020. Red List of South African Plants v. 2020. Available online at <http://redlist.sanbi.org/>
- South African National Biodiversity Institute (SANBI). 2018a. Final Vegetation Map of South Africa, Lesotho and Swaziland 2018 [spatial dataset]. Available online at <http://bgis.sanbi.org/SpatialDataset/Detail/1674>
- South African National Biodiversity Institute (SANBI). 2018b. Terrestrial ecosystem threat status and protection level – remaining extent 2018 [spatial dataset]. Available online at <http://bgis.sanbi.org/SpatialDataset/Detail/2676>
- South African National Biodiversity Institute (SANBI). 2020. Species Environmental Assessment Guideline: Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa. Version 1.2020. South African National Biodiversity Institute, Pretoria.
- Van Deventer, H., Van Niekerk, L., Adams, J., Dinala, M.K., Gangat, R., Lamberth, S.J., Lötter, M., Mbona, N., MacKay, F., Nel, J.L. and Ramjukadh, C.L. 2020. National Wetland Map 5: An improved spatial extent and representation of inland aquatic and estuarine ecosystems in South Africa. *Water SA* 46: 66–79.