

Strategic Biodiversity Offset Framework Plan Aalwyndal, Mossel Bay, Western Cape

REPORT 2: Calculated Size & Characteristics of the Offset



**Western Cape
Government**
Economic Development
and Tourism



confluent

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The plan was compiled by Confluent and Eco-Pulse in consultation with the Mossel Bay Municipality, Cape Nature, and the Department of Environmental Affairs and Development Planning.

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Report Series Information

This report (in bold) is one of a series of five reports produced for this framework plan which are listed below:

1. *Revision of the Aalwyndal Precinct Layout.*
2. ***Calculated Size and Characteristics of the Offset.***
3. *Costed Conservation Management Plan for the Onsite Biodiversity Offset.*
4. *Identification, Ground-truthing and Feasibility of Potential Offsite Offsets.*
5. *Management and Financial Arrangements for Biodiversity Offsets.*

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GLOSSARY

Biodiversity	The variability among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part and also includes diversity within species, between species, and of ecosystems.
Biodiversity Offset	The measurable outcome of compliance with a formal requirement contained in an environmental authorisation to implement an intervention that has the purpose of counterbalancing the residual negative impacts of an activity, or activities, on biodiversity, through increased protection and appropriate management, after every effort has been made to avoid and minimise impacts and rehabilitate affected areas.
Biodiversity Offset Implementation Agreement	Means a legally binding agreement that is entered into between the holder of an environmental authorisation and a third party, or third parties, for the implementation of a biodiversity offset.
Biodiversity Offset Management Plan	Means a plan setting out the management actions to be taken at a biodiversity offset site to achieve and maintain specific conservation outcomes in the long term.
Biodiversity Offset Receiving Area	Means an area identified in an official policy, plan or programme as an optimal area for locating biodiversity offsets.
Biodiversity Offset Report	Means a report prepared by a relevant specialist, or specialists, and submitted to a competent authority together with a basic assessment report, or environmental impact assessment report, setting out the findings of a biodiversity offset study.
Biodiversity Offset Site	Means a suitable area in the landscape which meets the offset requirements in an environmental authorisation and is secured for biodiversity conservation in the long term.
Biodiversity Priority Area	Means an area identified as a priority for biodiversity conservation in a spatial biodiversity plan, and includes Critical Biodiversity Areas, Ecological Support Areas, Freshwater Ecosystem Priority Areas and focus areas for protected area expansion.
Buffer	A strip of land surrounding a wetland or riparian area in which activities are controlled or restricted to reduce the impact of adjacent land uses on the wetland or riparian area. Buffers are land use specific and are calculated for the specific environmental context and proposed land use.
Candidate Biodiversity Offset Site	Means one of the potential biodiversity offset sites identified in a Biodiversity Offset Report.
Characteristics of a watercourse	Means the resource quality of watercourse within the extent of a watercourse.
Delineation of a wetland or riparian habitat	Means delineation of wetlands and riparian habitat according to the methodology as contained in the Department of Water Affairs and Forestry, 2008 publication: A Practical Field Procedure for Delineation of Wetlands and Riparian Areas or amended version.
CBA Map	Means a map of Critical Biodiversity Areas and Ecological Support Areas, based on a systematic biodiversity plan.
Conservation Area	Means an area with a conservation designation that is effective at achieving in-situ conservation of biodiversity outside of protected areas in the long term.
Conservation Authority	Means South African National Parks or the organ of state responsible for the conservation of biodiversity in a province.

Conservation Servitude	Means a servitude registered against the title deed of a property placing restrictions on the landowner and successors-in-title for the purposes of conservation of biodiversity on the relevant property.
Critical Biodiversity Area (CBA)	Means an area that must be maintained in a good ecological condition (natural or near-natural state) in order to meet Biodiversity Targets for ecosystem types as well as for species and ecological processes that depend on natural or near natural habitat, that have not already been met in the protected area network.
Ecosystem	Means an assemblage of living organisms, the interactions between them and their physical environment.
Ecological Condition	Means the extent to which the composition, structure and function of an area or biodiversity feature has been modified from a reference condition of "natural".
Ecosystem Extent	Means the proportion of an ecosystem type that remains intact (i.e. in a natural, near-natural or semi-natural condition) relative to its historical distribution.
Ecological Infrastructure	Means naturally functioning ecosystems that deliver valuable services to people, such as water and climate regulation, soil formation and disaster risk reduction.
Ecosystem Services	Means services and benefits to people and the economy provided by ecosystems, often classified into three broad categories: provisioning services, regulating services and cultural services.
Ecosystem Threat Status	Means the indicator of how threatened an ecosystem type is (in other words the degree to which it is still intact or alternatively losing vital aspects of its function, structure or composition) in which Ecosystem types are categorised as Critically Endangered, Endangered, Vulnerable or Not Threatened, based on the proportion of ecosystem type that remains in good ecological condition relative to a series of biodiversity thresholds.
Fatal Flaw	Means a major defect or deficiency in a project proposal that should result in environmental authorisation being refused, and from a biodiversity perspective, a residual negative impact that would have a Very High significance rating.
Irreplaceable Biodiversity	Means biodiversity identified through a systematic conservation assessment as being essential to meet a biodiversity target.
Regulated area of a watercourse	a) The outer edge of the 1 in 100-year flood line or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, dams and lakes. b) In the absence of a determined 1 in 100-year flood line or riparian area as contemplated in (a) above the area within 100m of distance from the edge of a watercourse where the edge of the watercourse (excluding floodplains) is the first identifiable annual bank fill flood bench. c) In respect of a wetland: a 500m radius around the delineated boundary (extent) of any wetland (including pans).
Rehabilitation	Means the process of reinstating natural ecological driving forces within part or whole of a degraded habitat to recover former or desired ecosystem structure, function, biotic composition, and associated ecosystem services.
Residual negative impacts	Means negative impacts that remain after the proponent has made all reasonable and practicable changes to the location, siting, scale, layout, technology and design of the proposed development, in consultation with the environmental assessment practitioner and specialists (including a

	biodiversity specialist), in order to avoid and minimise negative impacts, and/or rehabilitate any impacted areas within the prescribed timeframes specified for the completion of the rehabilitation in the EA.
Restoration	Means returning a disturbed, degraded or destroyed ecosystem to its natural condition, with the species present being representative of the ecosystem that occurred on the site prior to disturbance, and ecological processes supporting the long-term persistence of the ecosystem and species, and the associated ecosystem services, through active (with interventions) or passive (without interventions) means.
Spatial Biodiversity Plan	Means a spatial plan that identifies one or more categories of biodiversity priority area, using the principles and methods of systematic biodiversity planning.
Resource Quality	Of a watercourse means the quality of all the aspects of a water resource including: (a) The quantity, pattern, timing, water level and assurance of instream flow; (b) The water quality, including the physical, chemical and biological characteristics of the water; (c) The character and condition of the instream and riparian habitat, and; (d) The characteristics, condition and distribution of the aquatic biota.

ABBREVIATIONS

BA	Basic Assessment	FEPA	Freshwater Ecosystem Priority Area
BOCMA	Breede-Olifants Catchment Management Authority	I&AP	Interested and Affected Part
CA	Competent Authority	MEC	Member of the Executive Council for the environment (provincial)
CBA	Critical Biodiversity Area	MBM	Mossel Bay Municipality
CN	Cape Nature	NBA 2018	National Biodiversity Assessment
DFFE	Department of Forestry, Fisheries and Environment	NBF	National Biodiversity Framework
DEADP	Department of Environmental Affairs and Development Planning	NDP	National Development Plan
EA	Environmental Authorisation	NEMA	National Environmental Management Act (Act No. 107 of 1998)
EE	Ecosystem Extent	NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
EAP	Environmental Assessment Practitioner	NWA	National Water Act (Act No. 36 of 1998)
EIA	Environmental Impact Assessment	NGO	Non-government organisation
EMPr	Environmental Management Programme	NPO	Non-profit organisation
EPL	Ecosystem Protection Level	SCC	Species of Conservation Concern
ESA	Ecological Support Area	SEI	Site Ecological Importance

1. INTRODUCTION

This report is second in the series of reports produced for the development of a strategic biodiversity offset framework plan for Aalwyndal. The Aalwyndal precinct plan was revised and residual negative impacts assessed in the first report. While the proposed Core Area (V5) protects a total of 299.4 ha, the plan indicates that 164.08 ha (including remaining Very High, High and Medium sensitivity (SEI) units) of the developable area would trigger the requirement for an offset. The aim of this report is to determine the size and characteristics of the offset required if all offset trigger areas in the precinct were to be developed.

The proposed precinct plan presented an updated open space area referred to as the Core Area (V5). The Core Area is proposed as a conservation corridor within Aalwyndal to protect significant areas of Medium, High and Very High ecological importance. The corridor is considered an avoidance and minimisation step consistent with the impact mitigation hierarchy. An ever-improving understanding and confidence in the diversity of flora and fauna within the precinct has evolved. Building on this information, the detailed rating of Site Ecological Importance (SEI) undertaken for the precinct provided the basis for the proposed Core Area and is used to further inform the requirements of offsite offset sites.

This report applies the methods and principles provided in the National Biodiversity Offset Guideline (DFFE, 2023) to assess both the size and characteristics required for the offset site.

1.1 Terms of Reference

The terms of reference are guided by the original project scope provided by the Western Cape Government Department of Economic Development and Tourism. This report aims to calculate the total size and characteristics of the offset that would be required if all offset trigger areas in the Aalwyndal precinct were developed. This will be based on the revised precinct layout presented in Report 1 of this series.

2. TRIGGER FOR OFFSET OBLIGATIONS

The impact assessment process has re-iterated the significance of impacts of planned development to biodiversity. Based on the comparison of residual negative impacts between the Brownlie and the Confluent & Eco-Pulse precinct layouts, the latter was selected as the preferred development option. This was due to unacceptably high residual negative impacts in the Brownlie precinct layout (Brownlie and von Hase, 2021).

To address cumulative negative impacts, offset obligations will be triggered for any developments that transform habitat within areas defined as “Offset Required” as defined in the proposed “biodiversity offset overlay” for the Aalwyndal precinct (Figure 1). The Core Area corresponds with the designated open space area whilst areas requiring an offset have been defined as any areas outside of Core Area that are of Medium, High or Very High Site Ecological Importance (SEI).

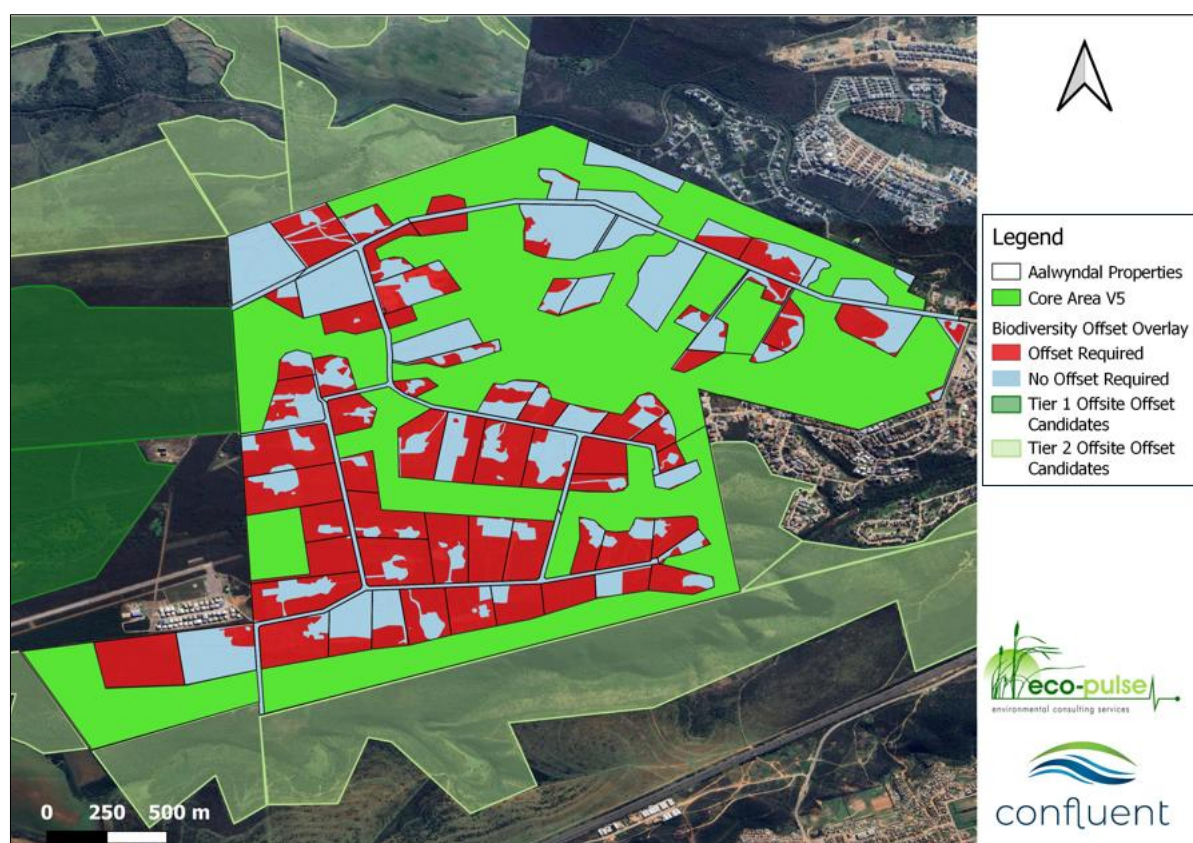


Figure 1. Proposed biodiversity offset overlay based on the Confluent & Eco-Pulse Precinct Plan.

3. SIZE OF THE BIODIVERSITY OFFSET

3.1 Quantification of the Residual Impacts

The assessment of potential impacts was undertaken as part of the revised precinct plan in Report 1, which included an evaluation of the impact significance of the Confluent & Eco-Pulse layout. A summary of the anticipated negative residual impacts to vegetation types associated with the expected long-term transformation of non-core areas in the precinct is indicated in Table 1 below. This excludes areas mapped as being of low to very low sensitivity, road reserves, existing servitudes and off-channel dams which have been excluded from the biodiversity offset overlay.

This effectively provides an indication of the worst-case scenario, that reflects full transformation of all areas not included in the open space network and would result in the transformation of 240 ha in the Confluent & Eco-Pulse plan (Table 1). By comparison, the Brownlie precinct plan resulted in potential transformation of 380 ha.

Table 1. Anticipated areas where biodiversity offsets would be triggered under a full development scenario. Figures are based on the revised precinct plan in Report 1.

Vegetation Type	SEI (ha)			TOTAL
	Medium	High	Very High	
Mossel Bay Shale Renosterveld	9.47	8.68	1.1	19.25
Swellendam Silcrete Fynbos ¹	57.12	87.00	0.00	144.12
Hartenbos Dune Thicket	0.49	0.09	0.14	0.71
Total				164.08

3.2 Determining Appropriate Offset Ratios

The next step for determining the size of a biodiversity offset is determining an applicable ecosystem-based biodiversity offset ratio. A biodiversity offset ratio provides the area-based size of a biodiversity offset relative to the area of the residual negative biodiversity impact and as such is the primary factor determining the size and costs associated with meeting offset obligations. The establishment of suitable ratios is informed by available national and provincial guidelines, but in some instances requires modification to cater for the local context.

3.2.1 National Biodiversity Offset Guidelines

A set of recommended offset ratios are outlined in the National Biodiversity Offset Guidelines. Here, the size requirement of a biodiversity offset is determined initially by factors such as thresholds of potential concern including remaining Ecosystem Extent (EE), Ecosystem Protection Level (EPL), and Ecosystem Threat Status (ETS). According to the NBOG (DFFE, 2023) ratios are informed by the following criteria:

1. Where the Ecosystem Extent is $\leq 30\%$ the precautionary principle demands that a 30:1 ratio must be applied.
2. Where the Ecosystem Extent is between 30% and 70% the ratios provided in the lookup table in the NBOG (DFFE, 2023) should be applied. The applicable ratios have already been calculated based on the EE and EPL.
3. The Ecosystem Threat Status must be considered, and the standard recommendation is to apply the following ratios for different ecosystem threat status levels:
 - a. Critically Endangered: 30:1
 - b. Endangered: 10:1
 - c. Vulnerable: 5:1

For each vegetation type, the highest of the two ratios described in 2. and 3. above should be selected as the starting ratio and are illustrated for vegetation types in the Aalwyndal precinct (Table 2).

¹ Note that this vegetation type is classified as North Langeberg Sandstone Fynbos (LC) in the 2018 National Vegetation map of South Africa but is treated as Swellendam Silcrete Fynbos (EN) for the purposes of this Strategic Biodiversity Offset Framework Plan. The rationale for this change is outlined in Report 1. Revision of the Aalwyndal Precinct Layout.

Table 2. Starting ratios for ecosystem types identified in the National Vegetation Map (SANBI, 2018) and provided in the National Biodiversity Offset Guideline (NBOG; DFFE, 2023).

Ecosystem Type	ETS	Ecosystem Extent	Starting Ratio
Mossel Bay Shale Renosterveld	Critically Endangered ^{B1(i)}	40.3%	30:1
North Langeberg Sandstone Fynbos	Least Concern	92.1%	0
Swellendam Silcrete Fynbos	Endangered ^{B1(i)}	48.1%	10:1 ²
Hartenbos Dune Thicket	Endangered ^{B1(iii)}	83.4%	10:1

B1(i): Ecosystem type is narrowly distributed with high rates of habitat loss in the past 28 years (1990-2018) placing the ecosystem type at risk of collapse.

B1(iii): Hartenbos Dune Thicket is narrowly distributed with evidence of ongoing biotic disruption from invasive species.

3.3 Approach to Determine Adjusted Offset Ratios

The NBOG (DFFE, 2023) emphasises that the standard approach to determining offset ratios described here is not binding but to be used as a guide based on relevant scientific information available for ecosystems. Additional factors that must be considered include:

- The size of the historical extent of the ecosystem measured against the extent of the residual negative impact. If a large percentage of the extent of the ecosystem would be impacted on, then a higher ratio would be justified.
- The cumulative residual negative impacts of development.
- Province-specific offset ratios to be determined by conservation authorities based on province-specific biodiversity targets which should be scientifically defensible.

The national guidelines do also provide some room for adjusting offset ratios within the urban context to make implementation more feasible. This sentiment is reflected below and is highly relevant to the Aalwyndal precinct.

“Consideration also needs to be given to how ratios are determined for development within the urban edges of cities and towns. It is more likely that there would be good reasons for adjusting biodiversity offset ratios down for activities within the urban edges of cities and towns given the relative scarcity of space and natural areas in those areas. In this regard, consideration should be given to approaches for determining biodiversity offset ratios for development within urban edges adopted by local authorities or provinces, when available.”

An important aspect that does need to be considered in adjusting offset ratios is the relevant CBA map, and in particular, whether any CBAs will be affected. In the case of CBA1's, a 30:1 ratio would typically be applied whilst in the case of CBA 2's, it is recommended that the basic biodiversity offset ratio should be adjusted by increasing it by a factor of 1.5 up to a maximum of 30:1. In this instance, most earmarked development areas will not affect mapped CBAs in the Western Cape Biodiversity Spatial Plan (Figure 2). Furthermore, the areas highlighted already fall within areas classified as Mossel Bay Shale Renosterveld which already triggers a 30:1 target.

² It is important to note that the implications of reclassifying certain areas from North Langeberg Sandstone Fynbos to Swellendam Silcrete Fynbos was assessed to determine if this would have any implications for the recommended offset ratios. In this instance, the areas involved are small and have no material effect on recommended offset ratios. This is principally due to the fact that the offset ratio for Swellendam Silcrete Fynbos is driven by the threat status rather than the ERR & EP ratio.

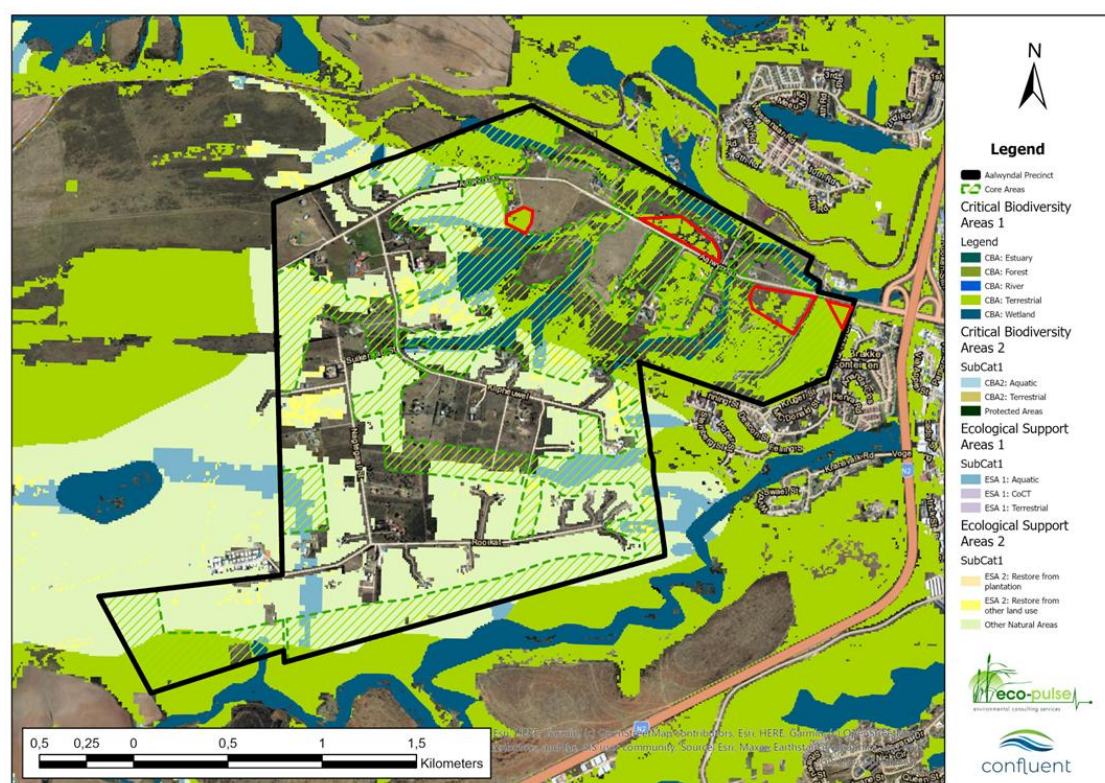


Figure 2. Map indicating the conservation value of areas as reflected in the Western Cape Biodiversity Spatial Plan (Cape Nature, 2023). Areas falling outside of the core areas that are classified as CBA2's are highlighted by way of red polygons.

3.3.1 Western Cape Offset Guidelines

The Western Cape Guideline on Biodiversity Offsets (DEA&DP, 2015) also specifies basic offset ratios for vegetation types for Endangered and Vulnerable terrestrial ecosystems in the Western Cape (Table 3). These ratios are however, based on outdated threat status assessments however, and guidance from representatives from DEA&DP was that the national guidelines should be applied in preference to the now outdated provincial guidelines. Even if the national guideline did not exist one would not be able to argue the starting ratios here since the threat status of both MBSR and SSF has changed, and based on the Western Cape Guideline the approach for Critically Endangered and Endangered ecosystems would now require a 30:1 and 10:1 starting ratio respectively.

Table 3. Basic ratios as defined in the Western Cape Offset Guidelines.

Ecosystem Type	ETS	Basic Ratio
Mossel Bay Shale Renosterveld	Endangered	10:1
North Langeberg Sandstone Fynbos	Least Concern	
Swellendam Silcrete Fynbos	Vulnerable	4:1
Hartenbos Dune Thicket	Not indicated	

It is however important to note that these guidelines give notable concessions to biodiversity offset obligations inside an urban edge. According to this guideline, requirements for the size of biodiversity offsets inside an urban edge are substantially lower than those required outside in rural contexts. **Offset ratios within or inside a recognised urban edge are given as 1:1 for Endangered ecosystems and 2:1 for Critically Endangered ecosystems** whilst

residual impacts on Vulnerable and Least Threatened ecosystems within the urban edge do not require an offset. This approach supports one of the main objectives of the Western Cape Provincial Spatial Development Framework (WCPSPDF) to contain development within urban edges.

3.4 Special Case Examples

Despite available national and provincial guidance, there have been notable exceptions to how ratios have been applied in practice, particularly within the urban edge of cities such as Cape Town and eThekweni in KwaZulu-Natal. This has relevance to this project given the lack of clear guidance on what offset ratios should be applied within an urban context. It is however important to note that these examples do pre-date the formalization of the NBOG and as such, need to be interpreted with some caution.

3.4.1 City of Cape Town

The application of offset ratios in the City of Cape Town has not been consistently aligned with national or provincial guidelines. Rather, strategic plans have been developed to address impacts to specific threatened ecosystems on a case-by-case basis. These include developments affecting the Critically Endangered Atlantis Sand Fynbos and Endangered Cape Flats Dune Strandveld.

The Department of Forestry, Fisheries and the Environment (DFFE) recently adopted a Generic Environmental Management Programme for Development Projects within the Atlantis Urban Area (City of Cape Town, 2022). This programme applies to developments planned within the Atlantis Special Economic Zone (SEZ), a key industrial node in the region that is planned in an area of high environmental sensitivity. Vegetation in this context is either classified as Endangered or Critically Endangered, for which offset ratios of 1:1 and 2:1 have been applied respectively. Development within the SEZ is facilitated through a dedicated team in the City of Cape Town (CCT) and the acquisition of a conservation land bank by the City to meet offset obligations. In this instance, the CCT covers both the acquisition and management costs of the land bank, thereby reducing the development costs linked to developments in the SEZ. This serves to demonstrate how proactive planning and engagement can lead to trade-offs in the urban context that can unlock development in areas where conflicts between high environmental sensitivities and development nodes otherwise prevail.

In the case of Cape Flats Dune Strandveld, a Conservation Implementation Plan (CIP) was developed by the City's Biodiversity Management Branch, with input from other key stakeholders (Oxtoby et al., 2019). The plan reflects a strategic trade-off between biodiversity and development aspirations in the area and effectively involved a reduction in conservation target for Cape Flats Dune Strandveld to 15% (from an initial 24%) to allow for additional development opportunities (Figure 3). Whilst this plan has not been formally gazetted, it has been used to inform offset planning in the region, with offset ratios ranging from 1:1 to 3:1 being applied in a suite of recent environmental authorizations. Subsequent discussions with key stakeholders resulted in the adoption of a refined set of ratios (ranging from 0:1 to 5:1) that account for the CIP category, vegetation condition and CBA category as reflected in the City of Cape Town Biodiversity Network (Figure 3). Whilst offset ratios are approved on a case-by case-by-case basis, these ratios have been used as the basis for defining offset ratios for a number of development projects.

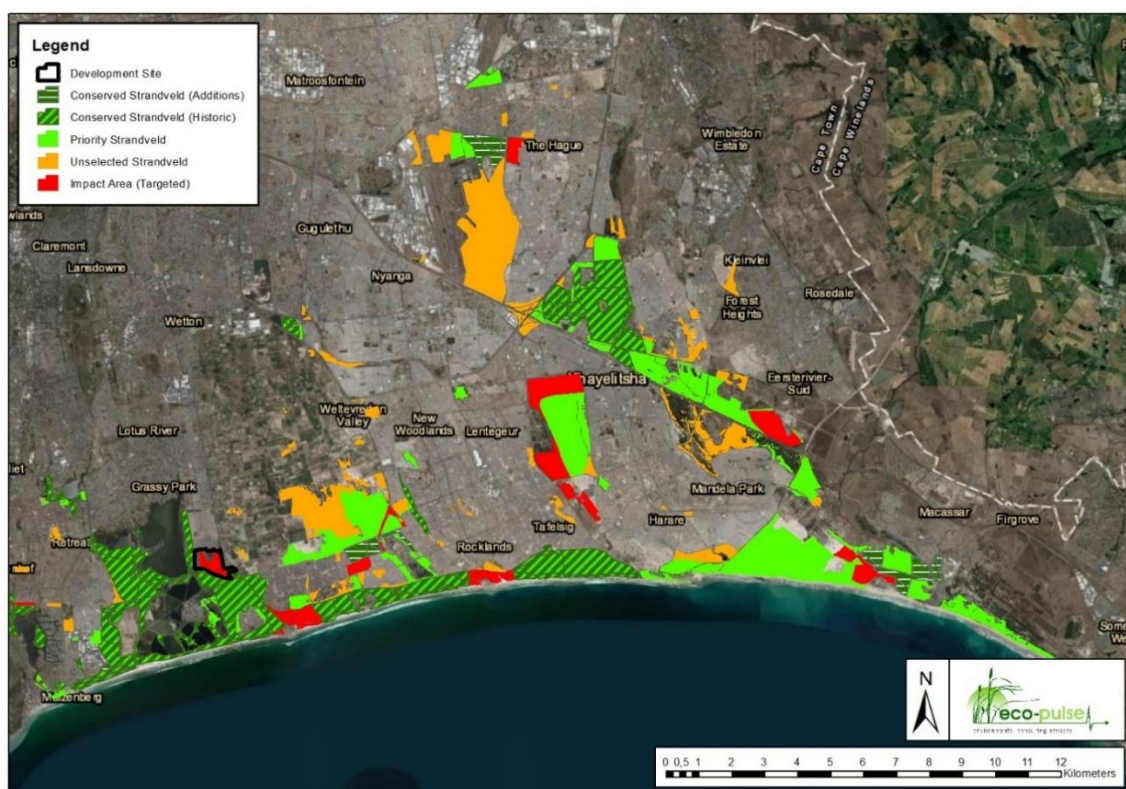


Figure 3. Overview of the Strandveld Conservation Implementation Plan (City of Cape Town, 2020).

3.4.2 eThekweni Municipality

The Cato Ridge Land Release and Development Project was recently approved in Cato Ridge, eThekweni Municipality (KZN Department of Economic Development, Tourism, and Environmental Affairs (EDTEA), 2023) and has relevance to the Aalwyndal case due to similarities in context which included the following:

- The development was strategic in nature and involved the development of an urban precinct aligned with eThekweni's dry port development project.
- The area had already been zoned for development despite the presence of large areas of critically endangered KwaZulu Natal Sandstone Sourveld (KZNSS) grasslands.
- There was notable conflict between biodiversity and development objectives, with a biodiversity offset being used to try and balance the trade-off between development and conservation.

The standard offset ratios previously applied to other smaller developments affecting KZNSS was 30:1 however a concession was given to lower the ratio to 10:1 to make it more feasible to meet offset obligations. This was informed by a detailed evaluation of the feasibility of meeting offset targets both within and outside the Municipality and the costs of achieving these targets. A further concession was given that allows the authorization holder to secure conservation-worthy vegetation or habitat types at a higher 15:1 ratio if it is meeting offset obligations cannot be reasonably and feasibly fulfilled. Any such concession would however need to be approved by the provincial conservation agency.

It is also important to note that the authorized layout was considerably smaller than initially proposed and was informed by a detailed sensitivity analysis. Through this process, most of

the important habitats were avoided and an ecological corridor of between 120m and 150m in width also had to be established to facilitate connectivity (Figure 1).

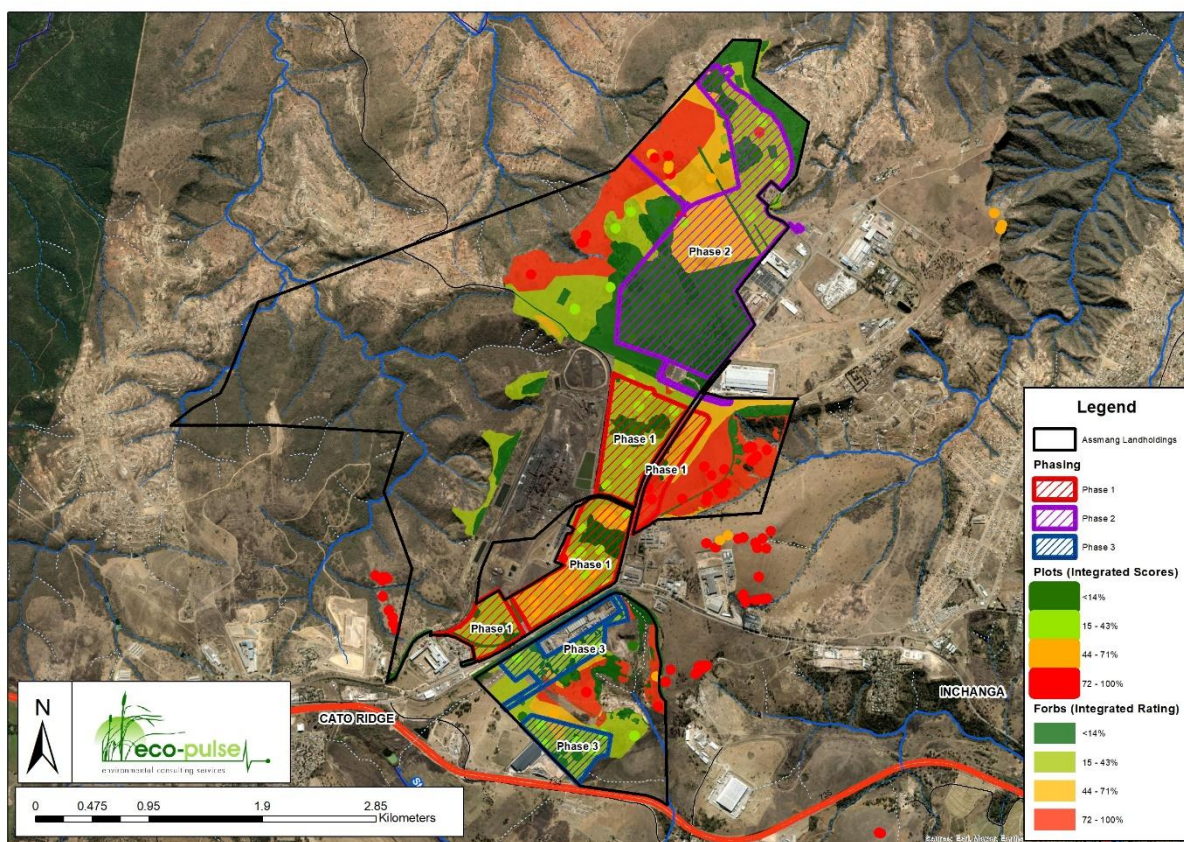


Figure 4. Map showing the approved development layout of the Cato Ridge Land Release and Development Project in relation to botanical sensitivities.

3.4.3 Mossel Bay Municipality

Whilst biodiversity offsets have not been widely applied in the Municipality, examples of developments have been authorized previously with on-site conservation obligations that have some relevance to the Aalwyndal case. Of particular interest is the Mossel Bay Municipality Sonskynvalley Extension development directly north of the Aalwyndal precinct which was authorized in 2015. This area was highlighted as one of the possible offset options in Brownlie and von Hase (2021).

As part of the EA, a large portion of land around the development, which included adjacent properties was required to be designated as open space with a conservation use and be managed appropriately (Figure 4). In this case, designated development zones cover approximately 26 Ha, whilst on-site conservation areas represent 35 Ha and off-site conservation areas, a further 174 Ha. This translates to a conservation: development ratio of 8:1. Whilst the conditions do not specifically require that the designated conservation areas be formally protected, the intent was clearly that these open space areas be set aside and managed for conservation by the Municipality.

The entire area is mapped as Mossel Bay Shale Renosterveld which is the same as the renosterveld vegetation type in Aalwyndal and at present would typically attract a 30:1 offset ratio outside of the urban area according to the NBOG. However, at the time the development

was approved, the Western Cape Guideline would have been applicable, and the ratio was 10:1 with an Endangered status (Table 3). The development area in this case is zoned within the Urban Edge, and therefore represents a similar case to Aalwyndal, albeit several years before the present NBOG was produced.

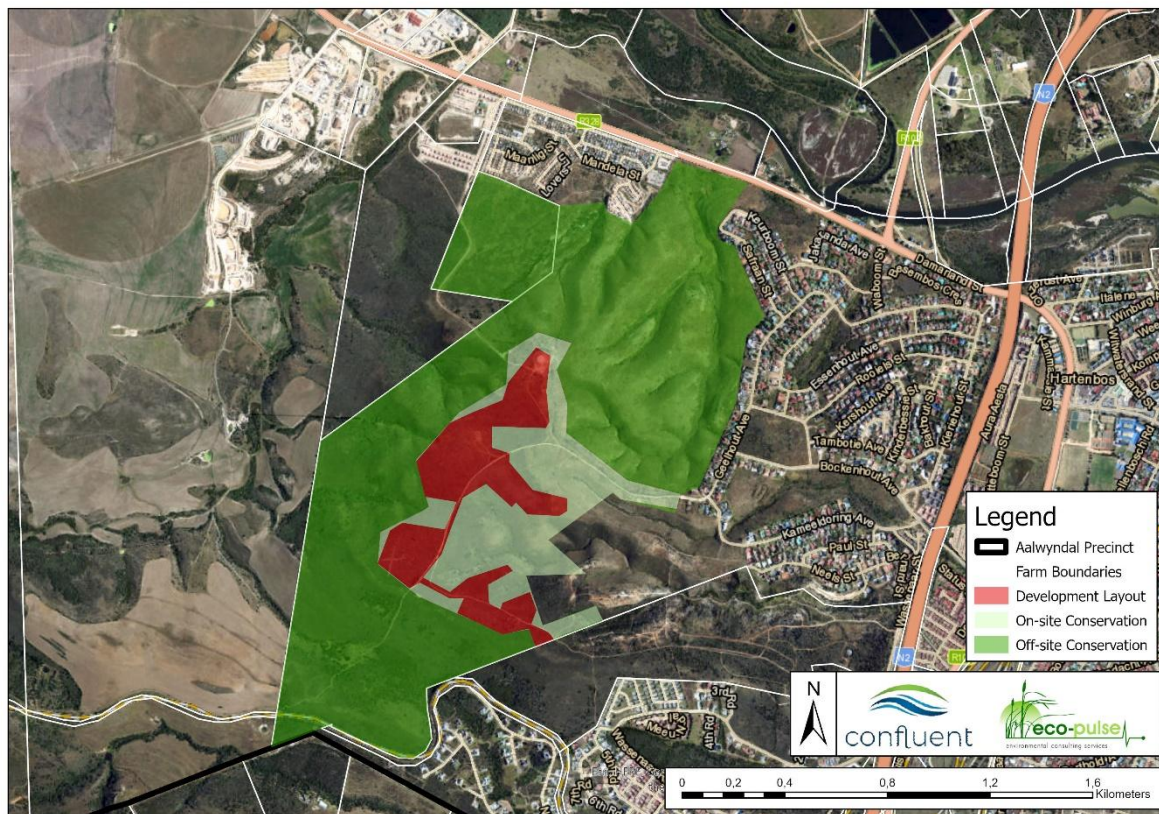


Figure 5. Map providing an indication of the Sonskynvalley development footprint and associated conservation areas³.

3.5 Recommended Offset Requirements

The location of the Aalwyndal precinct within the urban edge, means that available offset guidelines leave some flexibility for establishing locally relevant and defensible offset requirements. The required offset obligations should therefore seek to find a balance between conservation and development, recognizing the particulars of the site. Of relevance in this context, is that the precinct has been zoned Residential 1 and sub-divided previously for residential use and as such, property owners have a reasonable expectation of development whilst the Municipality are supporting the intensification of development in this area. The offset requirements would also need to be applied to a large number of properties and as such, standardization and simplification of the approach for application in this context is an important consideration.

3.5.1 Simplifying Offset Calculations

The precinct includes a range of vegetation types which includes a mix of fynbos, thicket and renosterveld elements. The two dominant mapped vegetation types are Mossel Bay Shale

³ Note that areas have been mapped based on visual interpretation of hard-copy maps. As such, they provide an approximate indication of the extent of features indicated.

Renosterveld to the north, and North Langeberg Sandstone Fynbos in the central, western, and southern areas. The Hartenbos Dune Thicket extends slightly into the precinct to the east and the southwest. In the case of fynbos elements, a strong case has been made to re-classify the vegetation type from North Langeberg Sandstone Fynbos, a Least Threatened vegetation type to Swellendam Silcrete Fynbos, which is Endangered (Refer to Report 1). This proposed change is reflected in Figure 6, below.

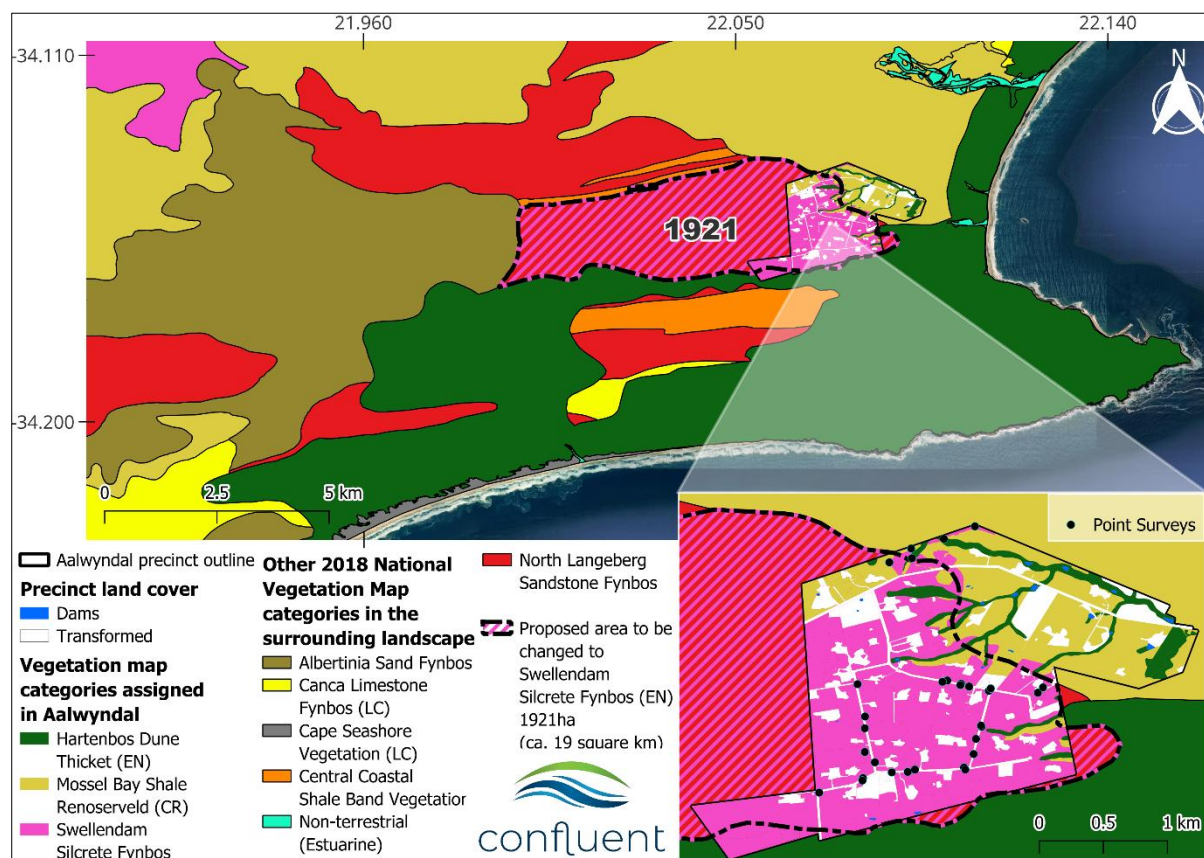


Figure 6. Current mapped vegetation types in the Aalwyndal Precinct, together with the proposed change to the national vegetation map, based on desktop assessments and field assessments, including point surveys of the dominant species observed, in the Aalwyndal precinct.

Given the mix of vegetation types that occur on the development site and the need to simplify the offset process, we recommend that a standard offset ratio be applied across all vegetation types rather than applying different ratios to sub-habitats within the precinct. The implications of applying this approach and using the starting ratios from the NBOG would result in a standardized offset ratio of 12.35:1 being applied across all properties in Aalwyndal (Table 4).

Table 4. Calculating a weighted ratio based on the relative extent of each vegetation type to be impacted by the proposed development.

Vegetation Type	"Offset Required" areas	% Residual Impact	NBOG Ratio
Mossel Bay Shale Renosterveld	19,25	11,73%	30
Swellendam Silcrete Fynbos	144,12	87,84%	10
Hartenbos Dune Thicket	0,71	0,44%	10
Total (ha)	164,08	Weighted Ratio	12,35

Another possible complexity that needs to be considered, is the Site Ecological Importance (SEI) of areas within designated “Offset Required” areas. The adoption of separate ratios for areas of different SEI classes would then leave the door open to refinement at a site level, which would lead to additional costs and create the potential for much contestation during implementation. As such, a standard offset ratio is recommended for all “Offset Required” areas.

There is also a need to clarify how offset gains are accounted for offset receiving areas. Whilst offset receiving areas should ideally include the impacted vegetation types, we recommend that there should again be flexibility in evaluating to what extent offset targets can be met by assessing cumulative gains across suitable vegetation types rather than dis-aggregating offset gains, as is typical of more detailed offset accounting practice. This would not apply to out-of-kind vegetation types, which would need to be considered on a case-by-case basis.

3.5.2 Taking Stock of the Costs of Applying Different Offset Ratios

When recommending a suitable offset ratio, it is also important to consider the costs of meeting offset obligations. This is particularly relevant in this context where land is located within the urban edge and has already been subdivided and zoned for development. The proposed approach to meeting offset obligations and detailed cost estimates for meeting offset obligations are outlined in detail in Report 5. An evaluation was however undertaken to determine the implications of applying different offset ratios on the costs of development. An extract of this analysis is included in Table 5, below which demonstrates that offset costs would more than double if the weighted NBOG ratio is applied relative to a more modest 4:1 ratio.

Table 5. Comparison of costs to meet offset obligations when applying two different conservation ratios.

Offset Ratio	Offset Target (Ha)	Conservation Levy	Biodiversity Offset Costs	Total Conservation Costs	Conservation Cost / Developable Area (R/Ha)	Conservation Cost / Opportunity (500m2)
12,35	2 026	R131 302 640	R276 236 696	R407 539 336	R1 297 983	R64 899
4:1	656	R131 302 640	R57 024 480	R188 327 120	R599 808	R29 990

3.5.3 Recommended Offset Ratios

Having reviewed the available biodiversity offset guidelines and approaches implemented in other Municipalities, and evaluating the cost implications for development, a sound argument can be made for reducing offset obligations for future development in the Aalwyndal precinct. Key reasons for reducing the offset ratio for this precinct include:

- The Municipality have identified Aalwyndal as a strategic densification area that is necessary to help meet the demands for development in the region;
- Densification within an urban core is preferred relative to diffuse development with potentially greater impacts to biodiversity;
- The Aalwyndal Precinct is located within the Urban Edge for which lower offset ratios have been applied in other contexts;

- Biodiversity information available at the time of preparing the precinct plan, and used to inform the precinct planning process did not accurately reflect the true sensitivity of the area;
- The precinct plan and associated land use zoning have already been approved and subdivisions have already been formalized;
- If biodiversity offset obligations are too onerous, this will stall future development in the precinct, impacting both on the aspirations of the municipality and existing landowners;
- The precinct plan has been amended to set aside the most sensitive biodiversity for conservation purposes in the Core Area.

For the purposes of this project, the following offset ratios are proposed, linked to the Biodiversity Offset Overlay Zone:

- **Offset Required: 4:1**
- **Core Area: 10:1**

It is important to note here that the Core Area is to be set aside for conservation purposes. As such, any development by private landowners in the Core Area should be prohibited. However, it may be necessary for the municipality to develop strategic essential services (e.g. sewer/water lines, roads, electrical transmission lines) to support development in the precinct. If all feasible alternatives have been considered and the only available option is to develop in the Core Area, then a punitive ratio of 10:1 is recommended. It is important to note that installation of services or expansion of existing roads within the road reserve will be exempt from offset obligations.

The proposed biodiversity offset ratios were presented to the Western Cape Biodiversity Offset Advisory Panel for their consideration. The conclusion of these engagements was that these ratios were reasonable given the specific context of this project and the justification provided. It will however be important for DEA&DP to formally adopt this biodiversity offset framework for these revised biodiversity offset ratios to be applied for future development applications in the precinct.

3.5.4 Contribution of On-site Conservation Areas

Notable consideration was given to maintaining the viability of conservation areas when developing the Core Area identified in the Confluent & Eco-Pulse plan. This included the integration of biodiversity corridors and ecological burns to maintain natural dynamics. Such areas should be protected and managed to ensure that biodiversity values are maintained in the long-term. A summary of the extent of different vegetation types associated with the Core Area is outlined in Table 6. Note that some existing servitudes for services such as electricity and water lines are included in the Core Area, and total 3.6 ha. These areas were not considered an offset contribution however, as they have, and will continue to undergo disturbance for maintenance and upgrades. The total area conserved with the Core Area is therefore 296.3 ha.

Table 6. Habitat included within designated Core Area in the Confluent & Eco-Pulse Precinct Plan.

Vegetation Type	Area (Ha)	Offset Contribution
Mossel Bay Shale Renosterveld	82,0	82,0
Swellendam Silcrete Fynbos	152,9	152,9
Hartenbos Dune Thicket	14,5	14,5
Other features (Watercourses, Dams, Transformed Areas)	47,0	47,0
Existing Servitudes (Regular disturbance expected)	3,6	N/A
Total (ha)	299,9	296,3

There are circumstances in-which the strategic identification, protection and management of such on-site set-aside areas can contribute towards meeting offset targets. It was for this reason that the feasibility of formally protecting and managing the Core Area has been specifically considered as part of this assessment.

Whilst protection and effective management of onsite conservation areas is aspirational and needs to be pursued, there are several challenges to achieving this in practice in Aalwyndal which are listed as follows:

- In comparison to offsite offset areas, the Core Area will be significantly more expensive to establish and manage given the high edge to area ratios and greater management burden for conservation areas within an urban area.
- The large number of sub-divisions (± 70) that comprise the Core Area which would require all landowners to work collectively to ensure the effective protection and management of these areas. This includes aspects such as the sub-division and rezoning of the Core Area.
- Fire management is a critical criterion for the maintenance of biodiversity (and fire risk management) within the Core Area. If ecological burns cannot be guaranteed, vegetation will inevitably degrade, and biodiversity loss will occur (See Report 3).

Fortunately, as this project progressed, it became evident that by allowing the Core Area to contribute towards offset obligations (as an onsite offset), the above issues could be resolved. These issues and others are discussed in detail in Report 5 which addresses the management and financial arrangements for biodiversity offsets.

3.5.5 Biodiversity Offset Targets

Biodiversity offset targets were calculated for planning purposes based on the final version of the Confluent & Eco-Pulse precinct layout plan presented in Report 1. These were based on the calculated residual impacts (164.08 ha) and proposed offset ratio (4:1). The potential offset obligations if all “offset required” areas are transformed translates to an offset target of 656.32 hectares (Table 7). It is worth noting however that it is unlikely that Aalwyndal will be entirely developed in the immediate future. This may take place over a period of 10-20 years, and some landowners may decide not to develop the full extent of sensitive areas on their properties, which would translate to lower offset targets.

Table 7. Indicative offset targets for the Aalwyndal precinct based on the Confluent & Eco-Pulse Precinct Plan.

Vegetation Type	"Offset Required" areas	Offset Ratio	Offset Target
Mossel Bay Shale Renosterveld	19,25	4	76,98
Swellendam Silcrete Fynbos	144,12	4	576,49
Hartenbos Dune Thicket	0,71	4	2,86
Total (ha)	164.08	4	656.32

In calculating these targets, it is understood that additional offset obligations may arise through additional impacts to earmarked core areas in the precinct. Such impacts should be avoided as far as possible, but it is understood that such impacts may be unavoidable in the case of strategic essential services (e.g. roads, electricity, water, sewerage) that must be developed by the Municipality. The ratio proposed for any transformation of habitat within the Core Area is higher, at 10:1, which aims to act as a deterrent but not completely block all options. It must also be highlighted that as with any proposed development, new development of essential services by the MBM still requires an environmental authorisation. The process for which will require that due consideration of development alternatives is provided.

Offset Ratios for both the offset-required areas within Aalwyndal and Core Area are applied as a standard ratio for all vegetation types and for impacts to areas of both Medium and High sensitivity as defined during this project. The latter means there would be no incentive for the degradation of habitat because the offset is applicable to both Medium and High sensitivity areas.

4. REFERENCES

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