



# DRAFT BASIC ASSESSMENT REPORT

## PROPOSED SALDANHA NAVAL BASE – REPLACEMENT OF AN EXISTING SECURITY FENCE

DRAFT REPORT  
REVISION 0

FEBRUARY 2013

PREPARED FOR:



public works

Department:  
Public Works  
REPUBLIC OF SOUTH AFRICA

Department of Public Works

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## DOCUMENT CONTROL

**TITLE:** DRAFT BASIC ASSESSMENT REPORT

**ELECTRONIC FILE:** P.12022 SALDANHA NAVAL BASE\_REPORTS\_DRAFT BAR\_Saldanha  
Naval Base\_Replacement of an Existing Security Fence

**REPORT STATUS:** Draft Report

**REVISION NUMBER:** 0

**CLIENT:** Department of Public Works  
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**CONSULTANT:** Delta Built Environment Consultants Pty Ltd  
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**DATE:** February 2013

**REFERENCE NUMBER:** P12022

**PROJECT TEAM:** Author: Deshni Naicker and Roelien du Plessis  
Reviewer: Roelien du Plessis

**COPIES ISSUED TO:** Heritage Western Cape

## **DRAFT BASIC ASSESSMENT REPORT FOR REVIEW**

The Department of Public works proposed to define the northern boundary of the Saldanha Military Area with concrete wall and wire mesh fencing. The fencing is proposed where the boundary is within 100m of the high water mark. New and upgraded existing gravel roadways are proposed on either side of the proposed wall. A gatehouse is proposed within the wall structure in the main entrance precinct.

The motivation for the boundary definitions and related infrastructure of service roads is to protect the military site from further vandalism and theft.

The proposed wall is a concrete structure of 3.2m high and 120mm wide. Gravel surface roads on either side of the proposed adjacent to the existing residential settlements wall are 2.5m wide. The purpose of the service roads are to delineate a no built zone between the wall and the existing settlement, allow the wall to be maintained and permit vehicular and pedestrian access to the existing residential development.

This Draft Basic Assessment Report has been prepared by Delta Built Environmental Consultants under the guidance of LIFE4ALL Environmental Consultancy in order to assess the potential environmental impacts associated with the construction of a wall along the Saldanha Naval Base. This process is being undertaken in support of an application for Environmental Authorisation in terms of the National Environmental Management Act (NEMA; Act 107 of 1998).



## environmental affairs

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA

(For official use only)

**File Reference Number:**

14/12/16/3/3/1/765

**Application Number:**

**Date Received:**

Basic assessment report in terms of the Environmental Impact Assessment Regulations, 2010, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

### Kindly note that:

1. This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2010 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.
2. This report format is current as of **1 September 2012**. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority
3. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
4. Where applicable **tick** the boxes that are applicable in the report.
5. An incomplete report may be returned to the applicant for revision.
6. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.
7. This report must be handed in at offices of the relevant competent authority as determined by each authority.
8. No faxed or e-mailed reports will be accepted.
9. The signature of the EAP on the report must be an original signature.
10. The report must be compiled by an independent environmental assessment practitioner.
11. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
12. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.
13. Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.
14. Two (2) colour hard copies and one (1) electronic copy of the report must be submitted to the competent authority.
15. Shape files (.shp) for maps must be included on the electronic copy of the report submitted to the competent authority.



## SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section?

YES

Details of specialist and declaration of interest for the specialist appointed is attached in **Appendix H**.

### 1. PROJECT DESCRIPTION

#### a) Describe the project associated with the listed activities applied for

**DELTA Built Environmental Consultants (DELTA BEC)** applied for environmental authorisation in January 2013 for the proposed **Saldanha Naval Base – Replacement of an Existing Security Fence, near Saldanha (NEAS Reference: DEA/EIA/0001569/2012) (DEA Reference: 14/12/16/3/3/1/765)**.

The proposed project entails the replacement of an existing security fence. Due to crime and vandalism in the area, the Saldanha Naval Base will require a 3,2m high concrete wall along the external boundary of the property. A service road of approximately 3m wide should run parallel (where possible) to the new security wall.

At appropriate locations and intervals security lighting will be installed along the wall inside the Naval Base. An entrance gate similar to the new police station's entrance gate is required.

#### b) Provide a detailed description of the listed activities associated with the project as applied for.

In terms of the Environmental Impact Assessment Regulations published in terms of Section 24(5) of the National Environmental Management Act (NEMA, Act No. 107 of 1998), authorisation is required from the National Department of Environmental Affairs (DEA), in consultation with the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP), for the construction of the proposed wall. In terms of sections 24 and 24D of NEMA, as read with the Environmental Impact Assessment Regulations of GNR543, GNR544, and GNR546, a Basic Assessment process is required for the proposed realignment. The following listed activities are applicable:

**Table 1.1:** Listed activities to the replacement of an existing security fence at the Saldanha Naval Base

Listed activity as described in GN R.544, 545 and 546	Description of project activity
<p><u>GN 544, 18 June 2010, activity 11</u>  <i>The construction of:</i>                      (xi) infrastructure or structures covering 50 m<sup>2</sup> or more                      Where such construction occurs within 32 meters of a water course, measured from the edge of a watercourse.</p>	<p>The project will entail the construction of a concrete wall and access road of 15 000m<sup>2</sup></p>
<p><u>GN 544, 18 June 2010, activity 40</u>  <i>The expansion of,</i>                      (iii) Buildings by more than 50 square meters within a watercourse/within 32 meters of a watercourse, measured from the edge of a watercourse, but excluding where such expansion will occur behind the development setback lines.</p>	<p>Construction of a 5.1km long concrete wall that will be 3.2m high, along the existing security fence; and                      A gravel service road that will be adjacent to the wall of approximately 15 000m<sup>2</sup>, and                      Security street lighting will be installed along the service road , and</p>

	<p>The replacement of an existing fence within the 100m high water mark buffer zone, and</p> <p>An entrance gate on an existing road.</p>
<p><u>GN 546, 18 June 2010, activity 4</u>  <i>The construction of a road wider than 4 meters with a reserve of less than 13.5 meters.</i>  <i>(ii) Outside urban areas, in</i>  <i>(cc) Sensitive areas as identified in the environmental management framework as contemplated in Chapter 5 of the act and as adopted by the competent authority.</i></p>	<p>Wall to be constructed outside of the Urban Edge.</p>
<p><u>GN 546, 18 June 2010, activity 12</u>  <i>The clearance of an area of 300 square meters or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation.</i>  <i>(a) Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004.</i></p>	<p>Vegetation of 41 854m<sup>2</sup> will be cleared to put up the new fence.</p>
<p><u>GN 546, 18 June 2010, activity 12</u>  <i>The clearance of an area of 300 square meters or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation.</i>  <i>(b) Within critical biodiversity areas identified in bioregional plans;</i></p>	<p>Critical Biodiversity areas have been identified within the bioregional plans</p>
<p><u>GN 546, 18 June 2010, activity 13</u>  <i>The clearance of an area of 1 hectare or more of vegetation where 75% or more of vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is require for:</i>  <i>(a) Critical biodiversity areas and ecological support areas as identified in systematic biodiversity plans adopted by the competent authority.</i></p>	<p>Wetlands have been identified within some sections of the proposed construction area.</p>
<p><u>GN 546, 18 June 2010, activity 13</u>  <i>(ii) Outside urban areas,</i>  <i>(cc) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act as adopted by the competent authority.</i></p>	<p>Wetlands have been identified within some sections of the proposed construction area.</p>
<p><u>GN 546, 18 June 2010, activity 13</u>  <i>(ii) Outside urban areas,</i>  <i>(gg) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined.</i></p>	<p>The construction of the new wall is 100m from the high water mark.</p>
<p><u>GN 546, 18 June 2010, activity 16</u>  <i>The construction of:</i></p>	<p>Some sections of the construction will be occurring with a watercourse.</p>

<p>(iv) Infrastructure covering 10 square meters or more where such construction occurs within a water course or within 32 meters of a water course, measured from the edge of a water course, excluding where such construction will occur behind the development setback line.</p> <p>(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.</p>	
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**2. FEASIBLE AND REASONABLE ALTERNATIVES**

“**alternatives**”, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

- (a) the property on which or location where it is proposed to undertake the activity;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

Describe alternatives that are considered in this application as required by Regulation 22(2)(h) of GN R.543. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity (NOT PROJECT) could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed.

The determination of whether site or activity (including different processes, etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the, competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

The identification of alternatives should be in line with the Integrated Environmental Assessment Guideline Series 11, published by the DEA in 2004. Should the alternatives include different locations and lay-outs, the co-ordinates of the different alternatives must be provided. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

**a) Site alternatives**

The Application is for a linear activity.

<b>Alternative 1 (preferred alternative)</b>		
Description	Lat (DDMMSS)	Long (DDMMSS)
<b>Alternative 2</b>		

Description	Lat (DDMMSS)	Long (DDMMSS)
<b>Alternative 3</b>		
Description	Lat (DDMMSS)	Long (DDMMSS)

In the case of linear activities:

**Alternative:**

**Latitude (S):**

**Longitude (E):**

Alternative S1 (preferred)

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

30° 01' 01.32"S	17° 56' 43.97"E
33° 00' 53.55"S	17° 56' 10.40"E
33° 01' 22.08"S	17° 55' 53.76"E

Alternative S2 (if any)

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity


Alternative S3 (if any)

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

30° 01' 01.32"S	17° 56' 43.97"E
33° 00' 53.55"S	17° 56' 10.40"E
33° 01' 22.08"S	17° 55' 53.76"E

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.

In the case of an area being under application, please provide the co-ordinates of the corners of the site as indicated on the lay-out map provided in Appendix A.

**b) Lay-out alternatives**

A proposed layout alternative will be assessed within the Basic Assessment.

<b>Alternative 1 (preferred alternative)</b>		
Description	Lat (DDMMSS)	Long (DDMMSS)
• A high wall (3.2 m in height)	30° 01' 01.32"S	17° 56' 43.97"E
• Concrete Wall	30° 01' 01.32"S	17° 56' 43.97"E
<b>Alternative 2</b>		
Description	Lat (DDMMSS)	Long (DDMMSS)
• A lower wall	30° 01' 01.32"S	17° 56' 43.97"E
• Alternative material (wall and palisade sections)	30° 01' 01.32"S	17° 56' 43.97"E
<b>Alternative 3</b>		
Description	Lat (DDMMSS)	Long (DDMMSS)
• A lower wall	30° 01' 01.32"S	17° 56' 43.97"E
• Alternative material (wall and palisade sections)	30° 01' 01.32"S	17° 56' 43.97"E

**c) Technology alternatives**

No feasible alternative technologies exist with regards to the construction of the proposed wall.

<b>Alternative 1 (preferred alternative)</b>
<b>Alternative 2</b>
<b>Alternative 3</b>

**d) Other alternatives (e.g. scheduling, demand, input, scale and design alternatives)**

The choice of construction materials to be used for the proposed wall will be determined in consultation with Saldanha Navy and does not significantly affect the environmental impact of the proposed development in any way.

<b>Alternative 1 (preferred alternative)</b>		
The wall will be of a concrete structure.		
<b>Alternative 2</b>		
Palisade Fencing		
<b>Alternative 3</b>		
Palisade Fencing		

**e) No-go alternative**

This is the option of not constructing the proposed wall on the boarder of the Saldanha Naval Base. This option is assessed as the 'no go alternative' in this Basic Assessment Report.

Paragraphs 3 – 13 below should be completed for each alternative.

**3. PHYSICAL SIZE OF THE ACTIVITY**

**a) Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):**

**Alternative:**

- Alternative A1<sup>1</sup> (preferred activity alternative)
- Alternative A2 (if any)
- Alternative A3 (if any)

**Size of the activity:**

m <sup>2</sup>
m <sup>2</sup>
m <sup>2</sup>

The application is for a linear activity:

**Alternative:**

- Alternative A1 (preferred activity alternative)

**Length of the activity:**

5 km
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<sup>1</sup> "Alternative A.." refer to activity, process, technology or other alternatives.

Alternative A2 (if any)  
Alternative A3 (if any)

	5km
	5km

**b) Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):**

**Alternative:**

Alternative A1 (preferred activity alternative)  
Alternative A2 (if any)  
Alternative A3 (if any)

**Size of the site/servitude:**

	15000m <sup>2</sup>
	15000m <sup>2</sup>
	15000m <sup>2</sup>

**4. SITE ACCESS**

Does ready access to the site exist?

YES	
	m

If NO, what is the distance over which a new access road will be built

Describe the type of access road planned:

Existing or previously authorised roads in the area will be utilised to access the site.

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

**5. LOCALITY MAP**

A locality map has been included as part of this report as **Appendix A**.

**6. LAYOUT/ROUTE PLAN**

A route plan has been included as part of this report as **Appendix A**.

**7. SENSITIVITY MAP**

A Sensitivity Map has been included as part of this report in **Appendix A**.

**8. SITE PHOTOGRAPHS**

Site photographs have been included as part of this report as **Appendix B**.

**9. FACILITY ILLUSTRATION**

A facility illustration has been included as part of this report as **Appendix C**.

## 10. ACTIVITY MOTIVATION

Motivate and explain the need and desirability of the activity (including demand for the activity):

<b>1. Is the activity permitted in terms of the property's existing land use rights?</b>	YES	<input type="checkbox"/>	Please explain
The wall will be constructed inside the properties that are owned by the Department of Public Works and are currently zoned as Authority according to the Zoning Scheme.			
<b>2. Will the activity be in line with the following?</b>			
<b>(a) Provincial Spatial Development Framework (PSDF)</b>	YES	<input type="checkbox"/>	Please explain
The PSDF for the Western Cape Province aims to promote socio-economic development, spatial restructuring and environmental sustainability. The wall will increase the environmental sustainability by protecting the relevant areas.			
<b>(b) Urban edge / Edge of Built environment for the area</b>		NO	Please explain
The proposed wall is outside of the urban edge and therefore will not impact on the urban edge in anyway.			
<b>(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).</b>		NO	Please explain
<p>The Saldanha IDP makes allowance for fencing to secure areas and therefore this is in line with the IDP Review 2011/12 - Saldanha Bay Municipality – April 2011. The wall will be constructed outside the urban edge on the Military property with a view to preserving ecological integrity, as per the planning principles of the Saldanha Bay SDF dated Dec 2010.</p> <p>The approval of this application would not compromise the integrity of the existing approved and credible municipal IDP and SDF. The project conforms to implement, monitor and manage the regulatory legal framework and SDF to achieve a balanced urban and natural environment.</p> <p>The project will also promote the conservation of the environment and facilitate responsible spatial development and use of resources.</p>			
<b>(d) Approved Structure Plan of the Municipality</b>	YES	<input type="checkbox"/>	Please explain
The municipality is aware of the proposed construction of the Saldanha Naval Base wall. The wall will not compromise the structure of the municipal plan.			

<p><b>(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)</b></p>		NO	Please explain
<p>The Saldanha EMF, commissioned by the Western Cape Department of Environmental Affairs &amp; Development Planning (DEA&amp;DP) is underway and is due for completion shortly. The purpose of the EMF is to provide a framework to facilitate the pursuit of a sustainable development path in the geographical area which it is concerned. The purpose of the EMF can therefore be captured in the concept of “wise use of land”.</p> <p>In accordance with this context, strategic goals which are pertinent for the proposed project arising from the EMF are:</p> <ul style="list-style-type: none"> <li>• To ensure that the integrity of the ecosystems is not undermined.</li> <li>• To optimize the use of resources and avoid wasteful and inefficient uses.</li> <li>• To improve the quality of relationships within human communities and between people and the ecological communities and between people and the ecological communities within which they exist.</li> <li>• To maintain valuable and irreplaceable cultural heritage.</li> </ul> <p>The overall strategic (management) objective to guide planning, development and decision- making that has been formulated in the EMF is as follows: “No negative change allowed to irreplaceable resources, positive change encourages.”</p>			
<p><b>(f) Any other Plans (e.g. Guide Plan)</b></p>		NO	Please explain
<p>The wall will be constructed within the Saldanha Naval based and will therefore not influence any of the planning strategies of the area.</p>			
<p><b>3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?</b></p>	YES		Please explain
<p>The Saldanha IDP makes allowance for fencing to secure areas and therefore this is in line with the IDP Review 2011/12 - Saldanha Bay Municipality – April 2011. The wall will be constructed outside the urban edge on the Military property with a view to preserving ecological integrity, as per the planning principles of the Saldanha Bay SDF dated Dec 2010.</p>			
<p><b>4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)</b></p>	YES		Please explain
<p>At present the consequent failure to restrict entrance into the Saldanha Naval Base property may therefore result in the encroachment of urban infrastructure into wetland areas. The proposed wall will ensure that no encroachment of urban infrastructure will occur into wetland areas.</p>			



<p><b>5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)</b></p>		NO	Please explain
<p>All the services needed for the project have been adequately provided for and should any need for other services arise the relevant authority will be communicated with.</p>			
<p><b>6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)</b></p>		NO	Please explain
<p>The proposed project is to be developed by the National Department of Public Works and not the municipality. It therefore does not fall within the infrastructure planning of the municipality. The project will not have any implications for the municipality.</p>			
<p><b>7. Is this project part of a national programme to address an issue of national concern or importance?</b></p>	YES		Please explain
<p>The proposed project is to restrict entrance into the Saldanha Naval Base property. The proposed wall will ensure that no encroachment of urban infrastructure will occur into wetland areas.</p>			
<p><b>8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)</b></p>	YES		Please explain
<p>The proposed project is to restrict entrance into the Saldanha Naval Base property. The proposed wall will ensure that no encroachment of urban infrastructure will occur into wetland areas.</p>			
<p><b>9. Is the development the best practicable environmental option for this land/site?</b></p>	YES		Please explain
<p>The proposed construction of the wall is bordered by urban infrastructure to the north and which includes the residential developments and roads to Diazville. The area to the south of the proposed construction of the wall is the property of the Saldanha Naval Base. This area is less transformed and includes naval base infrastructure and a few roads. The specialist studies that have been undertaken as part of this Basic Assessment conclude that the development of the proposed wall will have medium – low environmental impacts. The implementation of the proposed project is therefore the best practical environmental option.</p>			
<p><b>10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?</b></p>	YES		Please explain
<p>At present the consequent failure to restrict entrance into the Saldanha Naval Base property may therefore result in the encroachment of urban infrastructure into wetland areas. The proposed wall will ensure that no encroachment of urban infrastructure will occur into wetland areas.</p>			

<b>11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?</b>		NO	Please explain
The proposed wall will not differ from the infrastructure that is already present in the Saldanha Naval Base area.			
<b>12. Will any person's rights be negatively affected by the proposed activity/ies?</b>		NO	Please explain
No person's rights will be negatively affected by the proposed activity as the wall will be constructed within the Saldanha Naval Base.			
<b>13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?</b>		NO	Please explain
The project will not undermine the urban edge in any way as the proposed wall is located within the Saldanha Naval Base (i.e. outside of the urban edge).			
<b>14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?</b>	YES		Please explain
As the 17 Strategic Integrated Projects promote balanced economic development, unlock economic opportunities, promote mineral extraction and beneficiation, address socio-economic needs, promote job creation and help integrate human settlements and economic development. The proposed development will assist in promoting balanced economic development, economic opportunity, assisting in achieving socio-economic needs, promote jobs through job creation and assist with economic development. The construction of the proposed fence will give people living in the area opportunities to gain employment which would address the socio economic needs of individuals. This will therefore increase and balance the economic development, which in effect will address the socio-economic needs of the people in the area.			
<b>15. What will the benefits be to society in general and to the local communities?</b>	Please explain		
The main purpose of the fence is to ensure the safety and protection of the individuals within the Saldanha Naval Base due to the high criminal activity within the area. As the wall will need to be built and maintained this will create employment opportunities for members of the local community. The local community will benefit during the construction phase of the project as job opportunities will be created.			
<b>16. Any other need and desirability considerations related to the proposed activity?</b>	Please explain		
None			
<b>17. How does the project fit into the National Development Plan for 2030?</b>	Please explain		
By 2030 South Africa aims to reduce car carbon emissions, promote economic development and increase the GDP. To achieve this, the Province has aimed to improve Infrastructure and Basic Service; Socio – economic Development; Institutional transformation; Good Governance and Public Participation; Financial viability and Management. This proposed project will assist in facilitating the infrastructure growth in the area, through employment and also increasing infrastructure.			

**18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.**

The general objectives of Integrated Environmental management have taken into account for this Basic Assessment Report by means of identifying, predicting and evaluating the actual and potential impacts on the environment, socio-economic conditions and cultural heritage component.

The risks, consequences, alternatives as well as options for mitigation of activities have also been considered with a view to minimise negative impacts, maximise benefits, and promote compliance with the principles to environmental management.

**19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.**

The principles of NEMA have been considered in this assessment through compliance with the requirements of the relevant legislation in undertaking the assessment of potential impacts, as well as through the implementation of the principle of sustainable development where appropriate mitigation measures have been recommended for impacts which cannot be avoided. In addition, the successful implementation and appropriate management of this proposed project will aid in achieving the principle of minimisation of pollution and environmental degradation.

This process has been undertaken in a transparent manner and all effort has been made to involve interested and affected parties, stakeholders and relevant Organs of State such that an informed decision regarding the project can be made by the Regulating Authority.

**11. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES**

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable Refer to Table 1.4 below

Table 1.4:

<b>Title of legislation, policy or guideline</b>	<b>Applicability to the project</b>	<b>Administering authority</b>	<b>Date</b>
National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as amended	EIA Regulations have been promulgated in terms of Chapter 5. Activities which may not commence without and environmental authorisation are identified within these Regulations.  In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed and reported on to the competent authority (the decision – maker) charged by NEMA with granting of the	National Department of Environmental Affairs (DEA) – lead authority. Provincial Environmental Authority – commenting authority.	1998

	relevant environmental authorisation.		
National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)	Sections 18, 19 and 20 of the Act allow certain areas to be declared and managed as 'priority areas' in terms of air quality. Declaration of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with relevant emission standards. Section 34 makes provision for: (1) The Minister to prescribe essential national noise standards – (a) For the control of noise, either in general or specified places or areas; or (b) For determining – (i) A definition of noise (ii) The maximum levels of noise. (2) When controlling noise the provincial and local spheres of government are bound by any prescribed national standards	DEA	2004
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	Section 38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including: <ul style="list-style-type: none"> <li>• The construction of a road, power line, pipeline, canal or other similar linear development or barrier exceeding 300m in length;</li> <li>• Any development or other activity which will change the character of a site exceeding 5 000 m2 in extent</li> </ul>	Heritage Cape	Western 1999
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	The objective of the NEMBA is to manage and conserve biological diversity and resources in a sustainable	DEA	2004

	manner. The vegetation type found within the proposed area has been determined through an ecological impact assessment.		
National Water Act, 1998 (Act No. 36 of 1998)	In order to minimise the impact of the proposed development and to avoid sensitive environments, a wetland study has been conducted.	Department of Water Affairs and Forestry	1998
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	A full Heritage Impact Assessment (HIA) has been undertaken and submitted to the Western Cape Heritage Association	Western Cape – Heritage Association	1999
Promotion of Access to Information Act, 2000 (Act No. 2 of 2000)	All requests for access to information held by state or private body are provided for in the Act under S11	National Department of Environmental Affairs	2000
Promotion of Administrative Justice Act, 2000 (Act. No 3 of 2000)	In terms of Section 3 the government is required to act lawfully and take procedurally fair, reasons	National Department of Environmental Affairs	2000

## 12. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

### a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?

YES

If YES, what estimated quantity will be produced per month?

20 m<sup>3</sup>

Low quantities of solid waste would be created during the construction period. Excavated soil will be used mostly as backfill and as such minimal waste would be produced. Any excess would be disposed of, by the appointed contractor at a licensed facility at least once a week. There are no components that would require continuous recycling and there are no processes that would generate a significant amount of waste.

How will the construction solid waste be disposed of (describe)?

Construction solid waste will be dealt with in the Construction Environmental Management Programme (CEMP<sub>r</sub>) which will incorporate waste minimisation strategies including reduction, recycling, and re-use principles where viable. As mentioned above, there are no components that would require continuous recycling and there are no processes that would generate a significant amount of waste.

It is envisaged that the construction waste will be transported to and disposed of at a licensed waste disposal facility by a suitably qualified contractor. The contractor shall ensure that the waste generated at working areas are collected and disposed at a licensed facility at least once a week.

Where will the construction solid waste be disposed of (describe)?

The solid waste will be disposed of at the closest registered waste facility in the Saldanha Bay Municipality.

Will the activity produce solid waste during its operational phase?  YES  NO  
 If YES, what estimated quantity will be produced per month?  m<sup>3</sup>

How will the solid waste be disposed of (describe)?

If the solid waste will be disposed of into a municipal waste stream, indicate which registered landfill site will be used.

Where will the solid waste be disposed of if it does not feed into a municipal waste stream (describe)?

*If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.*

Can any part of the solid waste be classified as hazardous in terms of the NEM:WA?  YES  NO  
 If YES, inform the competent authority and request a change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

Is the activity that is being applied for a solid waste handling or treatment facility?  YES  NO  
 If YES, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

**b) Liquid effluent**

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?  YES  NO

If YES, what estimated quantity will be produced per month?  m<sup>3</sup>

Will the activity produce any effluent that will be treated and/or disposed of on site?  YES  NO  
*If YES, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.*

Will the activity produce effluent that will be treated and/or disposed of at another facility?  YES  NO

If YES, provide the particulars of the facility:

<b>Facility name:</b>	Temporary chemical toilets will be installed during the construction phase. These toilets will be service regularly and waste will be disposed of at the Saldanha Wastewater Treatment Works. Confirmation from the Saldanha Local Municipality will be obtained prior to the commencement of the construction phase.		
<b>Contact person:</b>	N/A		
<b>Postal address:</b>	N/A		
<b>Postal code:</b>	N/A		
<b>Telephone:</b>	N/A	<b>Cell:</b>	N/A

E-mail:

Fax:

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

Minimal water would be required for only the construction phase. The re-use and recycling thereof would not be financially viable based on the small quantities of water required.

**c) Emissions into the atmosphere**

Will the activity release emissions into the atmosphere other than exhaust emissions and dust associated with construction phase activities?  NO

If YES, is it controlled by any legislation of any sphere of government?  NO

If YES, the applicant must consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If NO, describe the emissions in terms of type and concentration:

Minor dust impacts may occur during the construction of the fence and any new access roads, but will not exceed acceptable limits.

**d) Waste permit**

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM:WA?  NO

If YES, please submit evidence that an application for a waste permit has been submitted to the competent authority

**e) Generation of noise**

Will the activity generate noise?  NO

If YES, is it controlled by any legislation of any sphere of government?  NO

If YES, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If NO, describe the noise in terms of type and level:

Noise may be generated by vehicle movement during construction, but would not exceed acceptable limits.

**13. WATER USE**

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

<input checked="" type="checkbox"/> Municipal	<input type="checkbox"/> Water board	<input type="checkbox"/> Groundwater	<input type="checkbox"/> River, stream, dam or lake	<input type="checkbox"/> Other	<input checked="" type="checkbox"/> The activity will not use water
---	--------------------------------------	--------------------------------------	---	--------------------------------	---

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:

Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs?

	NO
--	----

If YES, please provide proof that the application has been submitted to the Department of Water Affairs.

**14. ENERGY EFFICIENCY**

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

Not Applicable
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Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

Not Applicable
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## SECTION B: SITE/AREA/PROPERTY DESCRIPTION

### Important notes:

1. For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section B and indicate the area, which is covered by each copy No. on the Site Plan.

Section B Copy No. (e.g. A):

2. Paragraphs 1 - 6 below must be completed for each alternative.

3. Has a specialist been consulted to assist with the completion of this section?  YES  NO  
If YES, please complete the form entitled “**Details of specialist and declaration of interest**” for each specialist thus appointed and attach it in Appendix H. All specialist reports must be contained in Appendix D.

Property description/physical address:

<b>Province</b>	Western Cape Province
<b>District Municipality</b>	West Coast District Municipality
<b>Local Municipality</b>	Saldanha Local Municipality
<b>Ward Number(s)</b>	Ward 2 and Ward 3
<b>Farm name and number</b>	
<b>Portion number</b>	Please see attached in Appendix A
<b>SG Code</b>	Please see attached in Appendix A

Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.

Current land-use zoning as per local municipality IDP/records:

Authority
-----------

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Is a change of land-use or a consent use application required?  NO  YES

## 1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

### Alternative S1:

Flat	✓	1:50 1:20	-	1:20 – 1:15	1:15 – 1:10	1:10 1:7,5	-	1:7,5 – 1:5	Steeper than 1:5
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### Alternative S2 (if any):

Flat	✓	1:50 1:20	-	1:20 – 1:15	1:15 – 1:10	1:10 1:7,5	-	1:7,5 – 1:5	Steeper than 1:5
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### Alternative S3 (if any):

Flat	✓	1:50 1:20	-	1:20 – 1:15	1:15 – 1:10	1:10 1:7,5	-	1:7,5 – 1:5	Steeper than 1:5
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## 2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

2.1 Ridgeline	<input type="checkbox"/>	2.4 Closed valley	<input type="checkbox"/>	2.7 Undulating plain / low hills	<input type="checkbox"/>
2.2 Plateau	<input type="checkbox"/>	2.5 Open valley	<input type="checkbox"/>	2.8 Dune	<input type="checkbox"/>
2.3 Side slope of hill/mountain	<input type="checkbox"/>	2.6 Plain	<input checked="" type="checkbox"/>	2.9 Seafront	<input checked="" type="checkbox"/>

## 3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following?

	Alternative S1:	Alternative S2 (if any):	Alternative S3 (if any):
Shallow water table (less than 1.5m deep)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dolomite, sinkhole or doline areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Seasonally wet soils (often close to water bodies)	YES	YES	YES
Unstable rocky slopes or steep slopes with loose soil	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dispersive soils (soils that dissolve in water)	YES	YES	YES
Soils with high clay content (clay fraction more than 40%)	YES	YES	YES
Any other unstable soil or geological feature	YES	YES	YES
An area sensitive to erosion	YES	YES	YES

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted.

#### 4. GROUNDCOVER

Indicate the types of groundcover present on the site. The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - good condition <sup>E</sup>	✓ Natural veld with scattered aliens <sup>E</sup>	Natural veld with heavy alien infestation <sup>E</sup>	Veld dominated by alien species <sup>E</sup>	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an “E” is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn’t have the necessary expertise.

#### 5. SURFACE WATER

Indicate the surface water present on and or adjacent to the site and alternative sites?

Perennial River		NO	
Non-Perennial River		NO	
Permanent Wetland	YES		
Seasonal Wetland	YES		
Artificial Wetland	YES		
Estuarine / Lagoonal wetland		NO	

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

Refer to Wetland Report that is attached in (Appendix D)

#### 6. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

✓ Natural area	Dam or reservoir	Polo fields
Low density residential	Hospital/medical centre	Filling station <sup>H</sup>
✓ Medium density residential	School	Landfill or waste treatment site

High density residential	Tertiary education facility	Plantation
Informal residential <sup>A</sup>	Church	Agriculture
✓ Retail commercial & warehousing	Old age home	✓ River, stream or wetland
Light industrial	Sewage treatment plant <sup>A</sup>	Nature conservation area
Medium industrial <sup>AN</sup>	Train station or shunting yard <sup>N</sup>	Mountain, koppie or ridge
Heavy industrial <sup>AN</sup>	Railway line <sup>N</sup>	Museum
Power station	Major road (4 lanes or more) <sup>N</sup>	Historical building
Office/consulting room	Airport <sup>N</sup>	Protected Area
✓ Military or police base/station/compound	✓ Harbour	Graveyard
Spoil heap or slimes dam <sup>A</sup>	Sport facilities	✓ Archaeological site
Quarry, sand or borrow pit	Golf course	Other land uses (describe)

If any of the boxes marked with an "N" are ticked, how will this impact / be impacted upon by the proposed activity?

N/A

If any of the boxes marked with an "An" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

N/A

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

N/A

Does the proposed site (including any alternative sites) fall within any of the following:

Critical Biodiversity Area (as per provincial conservation plan)	YES	
Core area of a protected area?		NO
Buffer area of a protected area?		NO
Planned expansion area of an existing protected area?		NO
Existing offset area associated with a previous Environmental Authorisation?		NO
Buffer area of the SKA?		NO

If the answer to any of these questions was YES, a map indicating the affected area must be included in **Appendix A**.

## 7. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? If YES, explain:

YES

The site itself is identified as a heritage resource, the structures and the buildings from the WW1 and WW2.

The Archaeology Impact Assessment found severely damaged/destroyed shell midden deposits at steep slopes below the dune cordon on the beach at Tabakbaai, shell fish patches and fragments along Diaz road and within the military site, extensive shell midden deposits, including a few stone implements were documented on the soft vegetated sands, in a wide arc alongside the service road at Tabakbaai.

If uncertain, conduct a specialist investigation by a recognised specialist in the field (archaeology or palaeontology) to establish whether there is such a feature(s) present on or close to the site. Briefly explain the findings of the specialist:

N/A

Will any building or structure older than 60 years be affected in any way?

NO

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

NO

If YES, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.

## 8. SOCIO-ECONOMIC CHARACTER

### a) Local Municipality

Please provide details on the socio-economic character of the local municipality in which the proposed site(s) are situated.

Level of unemployment:

Although the Saldanha Bay Municipality is one of the biggest contributors to the economy of the West Coast District Municipality, unemployment rates are increasing due to the high population growth rate in the area.

The 2011 Census has revealed that the Saldanha Bay Municipality level of unemployment stands at 23.36% and has almost doubled in the Saldanha Bay area since 1996 when it was at 12.21%.

Economic profile of local municipality:

The 2011 Census has revealed that the Saldanha Bay Municipality has a total population of 99 193 persons that are living in the 28 811 households and this indicates a dramatic increase from 2001 when the total population was 70 261. This reflects a growth rate of 14% over the 10 year period.

The West Coast District Municipality has emerged as the fastest growing district in South Africa with a 39% increase from 2001 till 2011. 70.75% of our inhabitants speak Afrikaans as their home language, followed with Xhosa at 15.97% and English at 6.46%.

Of the inhabitants, the Coloured population makes up 55.80%, the Black / African population 24.49% and the White population 18.01%.

Level of education:

According to Quantec Standardised Regional Data 2012, it states that the majority of the adult population in the Saldanha Bay Local Municipality (63%) has reached some form of secondary education level and completed high school (Grade 12/Standard 10) which is more significant than the District and National Figures (54% and 61% respectively).

**b) Socio-economic value of the activity**

What is the expected capital value of the activity on completion?	R 51 million
What is the expected yearly income that will be generated by or as a result of the activity?	N/A
Will the activity contribute to service infrastructure?	YES
Is the activity a public amenity?	YES
How many new employment opportunities will be created in the development and construction phase of the activity/ies?	80 - 100
What is the expected value of the employment opportunities during the development and construction phase?	N/A
What percentage of this will accrue to previously disadvantaged individuals?	50%
How many permanent new employment opportunities will be created during the operational phase of the activity?	NIL
What is the expected current value of the employment opportunities during the first 10 years?	N/A
What percentage of this will accrue to previously disadvantaged individuals?	N/A

**9. BIODIVERSITY**

Please note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the identification of the biodiversity occurring on site and the ecosystem status consult <http://bgis.sanbi.org> or [BGIShelp@sanbi.org](mailto:BGIShelp@sanbi.org). Information is also available on compact disc (cd) from the Biodiversity-GIS Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/ EAP's responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) and must be provided as an overlay map to the property/site plan as Appendix D to this report.

**E) Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category)**

<b>Systematic Biodiversity Planning Category</b>	<b>If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan</b>
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✓ Critical Biodiversity Area (CBA)	✓ Ecological Support Area (ESA)	Other Natural Area (ONA)	No Natural Area Remaining (NNR)	CBA – The proposed development route is also indicated to pass a protected area as well as Terrestrial Critical Biodiversity Area (CBA)
				ESA – The proposed development falls within the Fynbos biome and is situated within the West Strandveld Bioregion.
				ESA – The proposed development route is adjacent to an “other ecological support area”. However, the support area is indicated where a wetland feature was delineated and it is deemed possible to reduce potential impact if mitigation measures as listed within the Wetland Assessment Report, are followed.

**b) Indicate and describe the habitat condition on site**

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes etc).
Natural	50%	According to the Vegetation Map as provided by the BGIS database the proposed development falls within four vegetation types, namely the Saldanha Flats Strandveld, Saldanha Granite Strandveld, Saldanha Limestone Strandveld and Langebaan Dune Strandveld.
Near Natural (includes areas with low to moderate level of alien invasive plants)	40%	Large sections of the project site indicate and abundance of alien and invasive species.
Degraded (includes areas heavily invaded by	%	

alien plants)		
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	10%	Houses and roads

**c) Complete the table to indicate:**

- (i) the type of vegetation, including its ecosystem status, present on the site; and
- (ii) whether an aquatic ecosystem is present on site.

Terrestrial Ecosystems		Aquatic Ecosystems				
<b>Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004)</b>		Wetland (including rivers, depressions, channelled and unchanneled wetlands, flats, seeps pans, and artificial wetlands)	Estuary		Coastline	
	Vulnerable		YES			NO



**d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)**

According to the Floral Specialist Report (Appendix D), the proposed development route falls within the Fynbos biome and is situated within the West Strandveld Bioregion (Mucina & Rutherford, 2006). The proposed development route falls within four vegetation types, namely Saldanha Flats Strandveld, Saldanha Granite Strandveld, Saldanha Limestone Strandveld and Langebaan Dune Strandveld (Mucina & Rutherford, 2006).

Species dominating the transformed habitat include invasive grass species such as *Avena fatua*, *Lolium multiflorum*, *Hordeum murinum* and *Bromus diandrus*. No plant species of concern were encountered within the area, and is highly unlikely that any such specimens will occur due to lack of suitable habitat and high levels of transformation. The ecological functionality and habitat integrity of the transformed habitat unit is therefore regarded as being extremely limited. The high diversity of alien plant species and severe vegetation transformation adds to this habitat unit having a low ecological sensitivity and little conservation value from an ecological perspective.

The proposed development route is located within one quaternary catchment namely G10M and falls within the South Western Coastal Belt ecoregion.

According to the Wetland Specialist Report (Appendix D) Site 1 – The natural wetland feature that is located to the south east of the proposed development route is classified as an unchannelled valley bottom wetland by the NFEPA database. Wetland indicators are present in the feature which is characterised by the presence of obligate wetland species such as *Sarcocornia sp.*, *Juncus acutus* and *Zantedeschia aethiopica*. Terrain units and the presence of hydromorphic soils and surface water further indicate the presence of wetland conditions in the area. Furthermore, frog and bird calls indicate importance in terms of the provision of amphibian and avifaunal habitat. This feature is therefore considered of increased importance in terms of overall wetland conservation in the area.

## SECTION C: PUBLIC PARTICIPATION

### 1. ADVERTISEMENT AND NOTICE

<b>Publication name</b>	Cape Times and The Weslander Community News Paper	
<b>Date published</b>	24 <sup>th</sup> January 2013	
<b>Site notice position</b> Saldanha Naval Base – Reception Area	<b>Latitude</b>	<b>Longitude</b>
	33°01'07.989"S	17°56'39.55"E
<b>Date placed</b>	23 January 2013	

The proof of the placement of the relevant advertisements and notices are attached in **Appendix E1**.

### 2. DETERMINATION OF APPROPRIATE MEASURES

Provide details of the measures taken to include all potential I&APs as required by Regulation 54(2) and 54(7) of GN R.543.

The public consultation process has included the publishing of notices regarding the proposed project as well as the distribution of notification letters to identified I&APs. A public meeting was held on the 31<sup>st</sup> of January 2013 to notify the adjacent community about the proposed project. A public meeting will be held within the study area during the review period of the draft Basic Assessment Report in order to provide feedback regarding the findings of the study. All identified I&APs will be invited to attend. In addition the meeting will be advertised in the local and regional press.

Key stakeholders (other than organs of state) identified in terms of Regulation 54(2)(b) of GN R.543:

<b>Title, Name and Surname</b>	<b>Affiliation/ key stakeholder status</b>	<b>Contact details (tel number or e-mail address)</b>
Mr L A Scheepers	Municipal Manager – Saldanha Municipality	022 701 7097 mun@saldanhabay.co.za
Mr Christo van Wyk	Saldanha Bay Forum	082 376 8529 metsal@imaginet.co.za
Mr Shane Cordom	Strategic Support Services – Saldanha Municipality	0227017146 shanec@saldanhabay.co.za
Ms Yulene Links	Civil Services – Saldanha Municipality	022 701 7094 yulenel@saldanhabay.co.za
Ms Siandra Brand	Town Planning – Saldanha Municipality	022 701 7114
Japie Julie	Environmental & Heritage – Saldanha Municipality	022 701 7114
Ms Philippa Huntly	WESSA	021 714 1963 philippa@wessa.co.za

Proof that the key stakeholder received written notification of the proposed activities is attached as **Appendix E2**. This proof may include any of the following:

- e-mail delivery reports;
- registered mail receipts;
- courier waybills;
- signed acknowledgements of receipt; and/or
- or any other proof as agreed upon by the competent authority.

### 3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

No comments have been received on the proposed project to date. All comments received during the review period of the draft Basic Assessment Report as well as responses provided will be captured and recorded within the Comments and Response Report attached as Appendix E in the final Basic Assessment Report

**Summary of main issues raised by I&APs**

**Summary of response from EAP**

### 4. COMMENTS AND RESPONSE REPORT

No comments have been received on the proposed project to date. All comments received during the review period of the draft Basic Assessment Report as well as responses provided will be captured and recorded within the Comments and Response Report attached as Appendix E in the final Basic Assessment Report.

### 5. AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders:

Authority/Organ of State	Contact person (Title, Name and Surname)	Tel No	Fax No	e-mail	Postal address
DEA: Integrated Coastal Management: Oceans and Coast Branch – EIA Department	Mr Lindelwani Madau	021-819 2432	021-819 2444	Lmadau2@environment.gov.za	No2 East Tier Building East Tier Road Waterfront
Department of Water Affairs	Ms Nelisa Ndobeni	021-941 6140		Ndobenin2@dwa.gov.za	52 Voortrekker Road, Spectrum

					Building, Bellville, 7530. Private Bag X16, Sanlamhof, 7532
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Proof that the Authorities and Organs of State received written notification of the proposed activities is attached as **Appendix E4**.

## 6. CONSULTATION WITH OTHER STAKEHOLDERS

A public consultation was conducted on the 31<sup>st</sup> of January 2013 at the Saldanha Naval Base – Cinema Hall. The purpose of the public meeting was to notify the public of the proposed development and for them to register as an I&APs on the database. A copy of the register and the minutes of the meeting is attached in **Appendix E5**.

A list of registered I&APs is included as **Appendix E5**.

## SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2010, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

### 1. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

Provide a summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed. This impact assessment must be applied to all the identified alternatives to the activities identified in Section A(2) of this report.

Activity	Impact summary	Significance	Proposed mitigation
<b>Alternative 1 (preferred alternative)</b>			
Impact on wetland habitat due to construction and development related activities	<b>Direct impacts:</b> The development of infrastructure may result in the loss of habitat within the natural wetland feature associated	Medi-m - High	The following mitigation should be proposed: <ul style="list-style-type: none"> <li>➤ All wetlands should be demarcated as sensitive zones and kept off limits during the construction phase of the development;</li> <li>➤ Limit the footprint area of the construction activity in order to minimise environmental damage.</li> </ul>
	<b>Indirect impacts:</b> None	N/A	None required
	<b>Cumulative impacts:</b> Development within the wetland zones may lead to alien vegetation encroachment and loss of species diversity. Development within wetland zones may result in change in hydrology that could result in drying of soils and loss of obligate/facultative wetland species.	High	<ul style="list-style-type: none"> <li>➤ Habitat loss must be kept to a minimum. The impact must be minimised;</li> <li>➤</li> </ul>
<b>Activity</b>	<b>Impact summary</b>	<b>Significance</b>	<b>Proposed mitigation</b>

<b>Activity</b>	<b>Impact summary</b>	<b>Significance</b>	<b>Proposed mitigation</b>
Loss of Wetland habitat due to ineffective rehabilitation	<b>Direct impacts:</b> Failure to develop a comprehensive rehabilitation plan to minimise environmental degradation. Failure to rehabilitate areas disturbed during construction within immediate surroundings of proposed development	Medium	➤ Recommended that a management plan be compiled prior to commencement of construction.
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> Some Impacts can still be expected during the development phase of the project	Low	Effective rehabilitation during phases of the development would result in the impact being of limited duration.
<b>Activity</b>	<b>Impact summary</b>	<b>Significance</b>	<b>Proposed mitigation</b>
Impact on Wetland Service and Function Provision	<b>Direct Impacts:</b> Development activities may impact on the service provision and function of the natural wetland feature associated with site 1.	L-w - Medium	➤ The natural wetland feature that is associated with site 1 should be regarded as sensitive and no development related activities should be allowed to encroach within the feature.
	<b>Indirect Impacts:</b> The area earmarked for the development as well as the surroundings should be kept free from alien and invasive floral species.	L-w - Medium	➤ Monitoring of alien and invasive floral species must be undertaken on a weekly basis during the construction phase of the project.
	<b>Cumulative Impacts:</b> Proliferation of alien vegetation could result in replacement of natural wetland species with alien/weed species with lower assimilation capacities.	L-w - Medium	➤ Some impact can still be expected during the development phase, regardless of implementation of mitigation measures, however effective rehabilitation during all phases of the development would result in the impact being of limited duration.
<b>Activity</b>	<b>Impact summary</b>	<b>Significance</b>	<b>Proposed mitigation</b>
Impact due to vehicles encroaching	<b>Direct impacts:</b> Construction vehicles entering wetland areas.	L-w - Medium	➤ No vehicles should be allowed to drive through wetland

<b>Activity</b>	<b>Impact summary</b>	<b>Significance</b>	<b>Proposed mitigation</b>
into wetland habitat			<p>zones, during either planning or construction phase of the development.</p> <ul style="list-style-type: none"> <li>➤ As far as possible, new roads developed within the boundary of the new wall should be developed within the footprint areas of existing roads.</li> </ul>
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> Vehicle related activities that would lead to impact on wetland resources associated with the proposed development route.	Low	<ul style="list-style-type: none"> <li>➤ Recommended that vehicles are restricted to designated roads and road development or upgrades kept to existing roads.</li> </ul>
<b>Activity</b>	<b>Impact summary</b>	<b>Significance</b>	<b>Proposed mitigation</b>
Impact due to indiscriminate fires.	<b>Direct impacts:</b> Indiscriminate fires within wetlands or the associated buffer zone due to increased activity during construction.	L-w - medium	All informal fires on the property should be prohibited specifically during the construction, operational and rehabilitation phases of the proposed development.
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> Change of floral composition within wetland zones in turn impacting the availability of faunal habitat.	Medi-m - High	<ul style="list-style-type: none"> <li>➤ No indiscriminate fires are to be allowed on the development site.</li> </ul>
<b>Activity</b>	<b>Impact summary</b>	<b>Significance</b>	<b>Proposed mitigation</b>
Impact due to sedimentation and erosion	<b>Direct impacts:</b> Sedimentation and erosion of wetland features due to the proposed development.	Medium	<ul style="list-style-type: none"> <li>➤ Energy breakers should be used at all storm water drains in order to dissipate the flow of storm water before it reached the natural wetland feature associated with site 1.</li> </ul>
	<b>Indirect impacts:</b> Vegetation clearing within areas near wetland features may result in sedimentation runoff from cleared areas.	Medi-m - High	<ul style="list-style-type: none"> <li>➤ Ensure that sedimentation runoff measures are in place before vegetation clearing takes place.</li> </ul>

<b>Activity</b>	<b>Impact summary</b>	<b>Significance</b>	<b>Proposed mitigation</b>
	Ineffective rehabilitation may result in areas where no vegetation establishes, prone to erosion. Construction of the proposed development route and associated infrastructure during the rainy season may result in dispersal of sediment and building material beyond the activity footprint that could result in sedimentation of wetland features.		➤ Vegetation should be re-established in cleared areas in order to reduce runoff and erosion from these areas.
	<b>Cumulative impacts:</b> Rehabilitation of areas.	High	➤ Rehabilitated areas should be monitored to determine if rehabilitation efforts are effective.
<b>Activity</b>	<b>Impact summary</b>	<b>Significance</b>	<b>Proposed mitigation</b>
Operational activities impacting on wetland habitat	<b>Direct impacts:</b> Indiscriminate driving through wetland zones may occur.	High	➤ No vehicles should be allowed to drive through surrounding wetland zones
	<b>Indirect impacts:</b> ➤ Indiscriminate driving through wetland sensitive areas.	High	➤ No driving should be allowed to drive through wetland sensitive areas.
	<b>Cumulative impacts:</b> Loss of sensitive wetland areas.	High	➤ Ensure that all operational activities take wetland boundaries and associated buffer zones within and near the proposed development route into account.
<b>Activity</b>	<b>Impact summary</b>	<b>Significance</b>	<b>Proposed mitigation</b>
Ineffective rehabilitation and monitoring	<b>Direct impacts:</b> Ineffective rehabilitation of areas disturbed during the operational phase as well as insufficient monitoring of areas disturbed during the construction phase.	High	➤ Proposed development route as well as surroundings should be kept free from alien and invasive floral species to ensure that they don't spread to rehabilitated areas.
	<b>Indirect impacts:</b> None	N/A	N/A



Activity	Impact summary	Significance	Proposed mitigation
	<p><b>Cumulative impacts:</b> Proliferation of alien and weed species in disturbed areas will lead to altered vegetation communities that will in turn impact the faunal community structure within the local area. Ineffective monitoring and maintenance of rehabilitation. Ineffective rehabilitation may lead to continued habitat transformation. Erosion and sedimentation of wetlands due to ineffective re-establishment of vegetation within disturbed areas.</p>	High	<ul style="list-style-type: none"> <li>➤ Alien and invasive species should be removed from the natural wetlands feature associated with site 1 as well as from artificial drainage features associated with sites 3, 4, 5 and 6 and the features should be maintained in a functioning state;</li> <li>➤ No vehicles should be allowed to drive through surrounding wetland areas during eradication of alien and weed species;</li> <li>➤ Ongoing monitoring should be undertaken within areas where alien vegetation was eradicated, to ensure methods were successful;</li> <li>➤ Care should be taken within wetland areas as well as surroundings with the choice of herbicide to ensure no additional impact due to the herbicide used occurs on the wetland features;</li> <li>➤ Rehabilitation areas should be monitored to determine if rehabilitation efforts are effective.</li> </ul>
Activity	Impact summary	Significance	Proposed mitigation
Cumulative Impacts	<p><b>Direct impacts:</b> Possibility that the proposed development route may result in an increase in the impacts already present within the Saldanha Bay Naval Base property such as alien vegetation encroachment, loss of wetland habitat and possible</p>	High	<ul style="list-style-type: none"> <li>➤ Limit the footprint area of the construction activity in order to minimise environmental damage.</li> </ul>

Activity	Impact summary	Significance	Proposed mitigation
	sedimentation of wetland features.		
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> Development of infrastructure or activities associated with the proposed development encroaching on wetland features or associated buffer zones may result in additional loss of wetland features within the study area. Development within wetland zones may lead to increased alien vegetation encroachment and loss of species diversity over time. Indiscriminate driving through wetland features during the operational phase may result in loss of wetland habitat and proliferation of alien vegetation species which will increase over time.	L-w medium	<ul style="list-style-type: none"> <li>➤ As far as possible vehicles should be restricted to existing roads, therefore limiting vehicles driving through wetland or associated buffer zones during the construction or operational phase of the development;</li> <li>➤ Eradication and monitoring of alien vegetation;</li> <li>➤ All development related activities are to be kept outside sensitive wetland zones.</li> </ul>
Activity	Impact summary	Significance	Proposed mitigation
Impact due to Alien Invasive Vegetation Encroachment / Proliferation	<b>Direct impacts:</b> Construction and introduction of foreign material. Pioneering alien species that are adapted to growth in bare soil areas may proliferate on exposed soils. Ineffective removal of alien invader species and exposed areas. Unmanaged alien plant invasions.	High	<ul style="list-style-type: none"> <li>➤ Ensure that alien invasive control measures are in place to eradicate alien plant invasions in to the proposed development areas.</li> </ul>
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> Construction of the wall and patrol road resulting in habitat disturbances and alien proliferation. Creation of access roads within the less disturbed strandveld habitat unit may result in proliferation of alien species and decrease in the natural floral diversity.	High	<ul style="list-style-type: none"> <li>➤ Eradication and on-going monitoring of areas disturbed during construction related activities;</li> <li>➤ After construction and rehabilitation activities the open strandveld next to the patrol road within the Naval Base should be strictly off</li> </ul>

<b>Activity</b>	<b>Impact summary</b>	<b>Significance</b>	<b>Proposed mitigation</b>
	<p>Vehicular movement will assist in spreading alien vegetation propagative material.</p> <p>Disturbance of soil during construction related activities will result in alien proliferation.</p> <p>Introduction of foreign material resulting in alien and invasive species encroachment.</p>		<p>limits to personnel as well as vehicles to prevent disturbance of floral habitat and promote re-establishment of natural fynbos community;</p> <p>➤ Impact can be largely reduced if mitigation measures as listed above are adhered to. However, ongoing monitoring will be necessary due to the wall being adjacent to a residential development that employs no eradication of alien species.</p>
<b>Activity</b>	<b>Impact summary</b>	<b>Significance</b>	<b>Proposed mitigation</b>
<p>Destruction of habitat may impact on floral biodiversity</p>	<p><b>Direct impacts:</b></p> <p>Construction related activities may lead to destruction of the habitat and overall loss of biodiversity. Impact within areas considered to be of higher ecological sensitivity (strandveld habitat unit) will be greater due to the possible presence of unique habitat for floral species.</p> <p>Construction and introduction of foreign material.</p>	<p>High</p>	<p>➤ Sensitivity map to be considered during the planning and construction phases of the proposed development activities to aid in conservation of ecology within the proposed development area;</p> <p>➤ All development footprint areas should remain as small as possible and should not encroach onto surrounding more sensitive areas.</p>
	<p><b>Indirect impacts:</b></p> <p>None</p>	<p>N/A</p>	<p>N/A</p>
	<p><b>Cumulative impacts:</b></p> <p>Removal of vegetation – strandveld habitat unit.</p> <p>Construction of wall and related activities will result in permanent loss of habitat within the wall and patrol road footprint areas.</p> <p>Disturbance of soil within areas adjacent to the wall and patrol</p>	<p>High</p>	<p>➤ All development footprint areas should remain as small as possible and should not encroach onto surrounding more sensitive areas;</p> <p>➤ Alien and invasive</p>

Activity	Impact summary	Significance	Proposed mitigation
	<p>road could result in loss of habitat. Creation of access roads through the strandveld and wetland habitat unit will result in permanent loss of floral habitat.</p> <p>Activities associated with pegging of wall route may encroach on surrounding areas that may result in loss of floral habitat.</p> <p>Alien and invasive species eradication activities may impact on floral habitat if not undertaken in an ecological sensitive manner. Lack of re-assessment and monitoring of the area to determine success of the action and any follow-up measures required</p> <p>Placement of infrastructure or other construction equipment in more sensitive areas making rehabilitation more costly.</p>		<p>species should be eradicated and controlled to prevent their spread beyond the site boundary;</p> <ul style="list-style-type: none"> <li>➤ All soils compacted due to construction activities falling outside the construction footprint areas should be ripped and profiled;</li> <li>➤ Upon completion of project, effective rehabilitation should be done to restore and improve the overall ecological status of the surrounding areas;</li> <li>➤ Areas to be re-vegetated in such a way as to ensure that alien vegetation will not dominate the community structure of the affected areas.</li> </ul>
Activity	Impact summary	Significance	Proposed mitigation
<p>Impacts on RDL and endemic species due to unplanned removal and habitat destruction.</p>	<p><b>Direct impacts:</b></p> <p>The strandveld and wetland habitat unit has remained largely undisturbed as result may offer habitat for RDL and endemic species such as <i>Babiana tubiflora</i> and <i>Felicia elongate</i>. Therefore unplanned removal and habitat destruction may result in loss of habitats.</p>	<p>High</p>	<ul style="list-style-type: none"> <li>➤ Permits need to be acquired in order to relocate, remove, destroy or transport RDL species.</li> </ul>
	<p><b>Indirect impacts:</b></p> <p>None</p>	<p>N/A</p>	<p>N/A</p>
	<p><b>Cumulative impacts:</b></p> <p>Removal of vegetation within the strandveld or wetland habitat units.</p> <p>Construction of wall and related activities within areas beyond the proposed wall and patrol road footprint.</p> <p>Disturbance of soil within areas adjacent to construction activities may result in the decrease in</p>	<p>High</p>	<ul style="list-style-type: none"> <li>➤ Construction personnel or vehicles should be restricted to construction footprint areas as well as predetermined roads;</li> <li>➤ Removal of vegetation may not exceed the proposed 7m to either side of the proposed</li> </ul>

Activity	Impact summary	Significance	Proposed mitigation
	<p>extent of habitat available for endemic or RDL species.</p> <p>Creation of access roads within the strandveld and wetland habitat unit may impact on habitat for endemic or RDL species.</p> <p>Indiscriminate driving within areas beyond the proposed construction footprint areas may result in loss of endemic or RDL individuals.</p>		<p>development route;</p> <ul style="list-style-type: none"> <li>➤ All areas near the proposed wall and patrol road, where construction related activities have resulted in compacted soils should be rehabilitated;</li> <li>➤ All rescue and relocation activities should be overseen by a suitably qualified ECO.</li> </ul>
Activity	Impact summary	Significance	Proposed mitigation
Impact on RDL and medicinal species due to collection	<p><b>Direct impacts:</b></p> <p>Potential collection of RDL species which will lead to increased impact on these populations.</p> <p>Increased potential for harvesting pressure on threatened medicinal plant species.</p>	High	<ul style="list-style-type: none"> <li>➤ No harvesting or collection of RDL species to occur on proposed development areas.</li> </ul>
	<p><b>Indirect impacts:</b></p> <p>Loss of medicinal plant species.</p>	High	<ul style="list-style-type: none"> <li>➤ No harvesting or collection of medicinal plant species to occur on proposed development site.</li> </ul>
	<p><b>Cumulative impacts:</b></p> <p>Increased human activity during construction may result in collection of RDL as well as medicinal species.</p>	High	<ul style="list-style-type: none"> <li>➤ Ensure open veld areas surrounding the proposed development route are off limits to construction vehicles and personnel.</li> </ul>
Activity	Impact summary	Significance	Proposed mitigation
Impact on overall floral biodiversity due to dust generation	<p><b>Direct impacts:</b></p> <p>Impact on the floral characteristics of the property. Vegetation along the roads is likely to become covered with dust, which could inhibit life-sustaining processes of plants.</p>	Low	<ul style="list-style-type: none"> <li>➤ Ensure that all roads and construction areas are regularly sprayed i.e. with water or a dust suppressant in order to curb dust generation.</li> </ul>
	<p><b>Indirect impacts:</b></p> <p>None</p>	N/A	N/A
	<p><b>Cumulative impacts:</b></p> <p>Dust generated during vegetation</p>	Low	<ul style="list-style-type: none"> <li>➤ Proposed that</li> </ul>

Activity	Impact summary	Significance	Proposed mitigation
	clearing. Disturbance of soil during construction activities. Increased vehicles assessing the site during construction. Continued exposure of soil.		predetermined roads, preferably already existing, should be used during the construction phase in order to minimise the construction of other additional or unplanned roads and dust generation within the local area; ➤ Ensure that all roads and construction areas are regularly sprayed with water or a dust suppressant in order to curb dust generation. This is particularly necessary during the dry season during periods with extreme wind when increased levels of dust generation can be expected.
Activity	Impact summary	Significance	Proposed mitigation
Impact on overall floral biodiversity due to uncontrolled fires	<b>Direct impacts:</b> Indiscriminate fires by construction personnel may lead to uncontrolled fires destroying plant communities and impacting on biodiversity. Fire related impacts may have an impact on the local area, for a significant duration.	High	➤ All informal fires on the property should be prohibited throughout all phases of project.
	<b>Indirect impacts:</b> Impact within highly sensitive areas is considered higher due to the potential loss of species diversity and abundance.	High	➤ Informal fires on the property should be prohibited throughout all phases of project.
	<b>Cumulative impacts:</b> Uncontrolled fires may damage Naval Base property and result in decline in unique habitat within the protected area. Frequent fires could result in a change in the floral community structure.	High	➤ Informal fires on the property should be prohibited throughout all phases of project; ➤ A natural burning regime should be implemented with cognisance of

Activity	Impact summary	Significance	Proposed mitigation
			<p>infrastructure within the Naval Base;</p> <ul style="list-style-type: none"> <li>➤ Adequate mitigation could lead to significant reduction in the probability as well as duration of impact.</li> </ul>
Activity	Impact summary	Significance	Proposed mitigation
Soil Contamination	<p><b>Direct impacts:</b> Soils may become contaminated by specific problem substances as well as spills by hydrocarbons from vehicles which could lead to changes in soil productivity, species composition, diversity dominance and abundance.</p>	Low – medium	<ul style="list-style-type: none"> <li>➤ Regular inspection of construction vehicles to be undertaken;</li> <li>➤ Re-fuelling must take place in a sealed surface area to prevent ingress of hydrocarbons into topsoil.</li> </ul>
	<p><b>Indirect impacts:</b> Contamination of topsoil.</p>	L–w medium -	<ul style="list-style-type: none"> <li>➤ Regular inspection of construction vehicles to be undertaken;</li> <li>➤ Re-fuelling must take place in a sealed surface area to prevent ingress of hydrocarbons into topsoil.</li> </ul>
	<p><b>Cumulative impacts:</b> Spillages from construction vehicles.</p>	L–w medium -	<ul style="list-style-type: none"> <li>➤ Regular inspection of construction vehicles to be undertaken;</li> <li>➤ Re-fuelling must take place in a sealed surface area to prevent ingress of hydrocarbons into topsoil.</li> </ul>
Activity	Impact summary	Significance	Proposed mitigation
Operational activities impacting on floral habitat	<p><b>Direct impacts:</b> After construction of the security wall the only expected activity will be from the use of the patrol road.</p>	Low	<ul style="list-style-type: none"> <li>➤ Ongoing eradication and monitoring of alien species along the proposed road and wall.</li> </ul>
	<p><b>Indirect impacts:</b> None</p>	N/A	N/A
	<p><b>Cumulative impacts:</b> Uncontrolled proliferation of alien</p>	Low	<ul style="list-style-type: none"> <li>➤ Ongoing eradication</li> </ul>

Activity	Impact summary	Significance	Proposed mitigation
	<p>and invasive species within immediate surroundings of the proposed road and wall.</p> <p>Ineffective rehabilitation may result in continued loss of floral habitat beyond the proposed wall and road footprint.</p> <p>Impact may result if vehicles are not restricted to the patrol road.</p> <p>Impact may result if areas in the vicinity of the wall and patrol road are not off limits to personnel that could potentially collect RDL and medicinal floral species.</p> <p>Dust generation due to the use of the patrol road is regarded insignificant.</p>		<p>and monitoring of alien species along the proposed road and wall;</p> <ul style="list-style-type: none"> <li>➤ Implementation of a rehabilitation plan with ongoing monitoring to ensure rehabilitation does result in re-establishment of a natural Strandveld floral community;</li> <li>➤ All vehicles should be strictly confined to existing roads;</li> <li>➤ Areas surrounding the proposed road and wall should be strictly off limits to personnel.</li> </ul>
Activity	Impact summary	Significance	Proposed mitigation
Ineffective rehabilitation and monitoring	<p><b>Direct impacts:</b></p> <p>Ineffective rehabilitation and monitoring of disturbed areas could lead to loss of species diversity.</p> <p>Impacts as a result of ineffective rehabilitation can impact on successful re-establishment of biodiversity resources if not effectively planned and implemented throughout all phases of the construction.</p>	Low	<ul style="list-style-type: none"> <li>➤ Planning of rehabilitation before commencement of construction activities to be undertaken;</li> <li>➤ Rehabilitation should be signed off by a suitably qualified ECO prior to contractor leaving site.</li> </ul>
	<p><b>Indirect impacts:</b></p> <p>None</p>	N/A	N/A
	<p><b>Cumulative impacts:</b></p> <p>Ineffective planning of rehabilitation plan from an ecological point of view could hamper the re-establishment of a natural floral diversity.</p> <p>Continued exposure of soil could result in compacted bare area not suitable for seed germination.</p> <p>Uncontrolled fires could impact on vegetation not yet established and could lead to dying of sensitive species and seedlings.</p> <p>Indiscriminate driving through rehabilitated areas could result in</p>	Low	<ul style="list-style-type: none"> <li>➤ Attention should be afforded to natural landscape characteristics, if disturbed areas need to be reprofiled;</li> <li>➤ Compacted soil should be ripped;</li> <li>➤ Alien vegetation control – with attention paid to the time of year alien species are eradicated;</li> <li>➤ Alien vegetation</li> </ul>



Activity	Impact summary	Significance	Proposed mitigation
	<p>soil disturbance</p> <p>Ineffective rehabilitation of any spill events could result in permanent soil contamination that could result in vegetation transformation.</p> <p>Failure to concurrently rehabilitate disturbed areas leading to increasing impact over time with special mention of eradication of alien vegetation</p> <p>Ensure that all disturbed and exposed areas are rehabilitated and covered with indigenous vegetation to prevent post construction dust generation.</p> <p>Lack of re-assessment and monitoring of the area to determine success of the action and any follow up measures required.</p>		<p>control – care should be taken with the removal of plants from site;</p> <ul style="list-style-type: none"> <li>➤ Alien vegetation control – plants removed should be taken to an area authorized for dumping of garden refuse.</li> <li>➤ Attention should be given to the type of herbicide used due to the areas being near wetland as well as protected areas.</li> <li>➤ Rehabilitation should be signed off by a suitably qualified ECO prior to contractor leaving the site;</li> <li>➤ Implementation of a fire regime applicable to the vegetation types found within the property;</li> <li>➤ Rehabilitated areas should be strictly off limits to vehicles and personnel with the exception of monitoring activities;</li> <li>➤ Monitoring and rehabilitated areas is deemed very important to establish if rehabilitation measures implemented are effective.</li> </ul>
Activity	Impact summary	Significance	Proposed mitigation
Impact on floral contamination	<p><b>Direct impacts:</b></p> <p>Proposed development route is situated along an already existing residential area.</p> <p>Building of the wall may result in further isolation from natural habitat.</p>	Low	<ul style="list-style-type: none"> <li>➤ Ensure rehabilitation of floral communities in the vicinity of the proposed development route is effective. To provide additional pollination corridors</li> </ul>

Activity	Impact summary	Significance	Proposed mitigation
			along the proposed development route.
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> Impact on the pollination of the floral community near the wall.	Low	<ul style="list-style-type: none"> <li>➤ Ensure rehabilitation of floral communities in the vicinity of the proposed development route is effective. To provide additional pollination corridors along the proposed development route.</li> </ul>
Activity	Impact summary	Significance	Proposed mitigation
Cumulative impact	<b>Direct impacts:</b> Construction of the wall would lead to permanent loss of approximately 10 100m <sup>2</sup> of vegetation types considered endangered. Disturbance of soil may result in proliferation of alien species already considered a significant problem within the study area and surroundings.	L-w - medium	<ul style="list-style-type: none"> <li>➤ Ongoing eradication and monitoring of alien species along the proposed road and wall;</li> <li>➤ Implementation of a rehabilitation plan with ongoing monitoring to ensure rehabilitation does result in re-establishment of a natural strandveld floral community</li> </ul>
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> No mitigation will prevent loss of habitat within the footprint of the proposed development route.	Low	<ul style="list-style-type: none"> <li>➤ All vehicles should be strictly confined to existing roads;</li> <li>➤ Areas surrounding the proposed road and wall should be strictly off limits to personnel.</li> </ul>
Activity	Impact summary	Significance	Proposed mitigation
Potential visual impact	<b>Direct impacts:</b> Potential visual impact on users of public road in close proximity to the proposed facility	Low	<ul style="list-style-type: none"> <li>➤ Suitable indigenous trees on the Diaz road reserve planted a minimum of 3 meters away from the proposed wall.</li> </ul>

Activity	Impact summary	Significance	Proposed mitigation
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b>		
	The construction of the wall is not regarded? a cumulative impact of structures as it is on the boundary of an urban development.	Low	<ul style="list-style-type: none"> <li>➤ Suitable indigenous trees on the Diaz road reserve planted a minimum of 3 meters away from the proposed wall.</li> </ul>
Activity	Impact summary	Significance	Proposed mitigation
	<b>Direct impacts:</b> Potential visual impact on residents of adjacent settlements in close proximity to the proposed facility	Medium	<ul style="list-style-type: none"> <li>➤ Suitable indigenous trees to be planted on the Diaz road reserve.</li> <li>➤ Trees are to be planted at a minimum of 5 m and to be positioned close to the roadway as to not be a potential security threat to the military site.</li> </ul>
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b>		
	The construction of the wall is not regarded a cumulative impact of structures as it is on the boundary of an urban development	Low	<ul style="list-style-type: none"> <li>➤ Suitable indigenous trees to be planted on the Diaz road reserve.</li> <li>➤ Trees are to be planted at a minimum of 5 m and to be positioned close to the roadway as to not be a potential security threat to the military site.</li> </ul>
Activity	Impact summary	Significance	Proposed mitigation
Potential visual impact on sensitive visual receptors (users of roads and homes) beyond 2km of	<b>Direct impacts:</b> Potential visual impact on sensitive visual receptors within the region	Low	<ul style="list-style-type: none"> <li>➤ No mitigation required for low visual impacts</li> </ul>

<b>Activity</b>	<b>Impact summary</b>	<b>Significance</b>	<b>Proposed mitigation</b>
the development			
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> The construction of the gatehouse and service roadways in the positions proposed, are assessed as minor cumulative impacts to the site and its context.	Low	➤ No mitigation required for low visual impacts
<b>Activity</b>	<b>Impact summary</b>	<b>Significance</b>	<b>Proposed mitigation</b>
Potential visual impact of lighting at night on observers and residents in close proximity to the proposed facility	<b>Direct impacts:</b> Potential visual impact of lighting at night on observers in close proximity to the proposed facility.	Low	➤ Planning: pro-active lighting design and planning and installation of motion detector type lighting installed at low levels and facing ground level.
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> The construction of light posts for the proposed development is assessed as cumulative impacts of increased lighting to the site and its immediate context. However given the nature of the site as a military base, the cumulative impacts are not assessed s serve	Low	➤ Planning: pro-active lighting design and planning and installation of motion detector type lighting installed at low levels and facing ground level.
<b>Activity</b>	<b>Impact summary</b>	<b>Significance</b>	<b>Proposed mitigation</b>
Potential visual impact of the construction phase activities on visual receptors in close proximity to the proposed facility	<b>Direct impacts:</b> Potential visual impact of construction activities on visual receptors in close proximity to the proposed facility	Medium	➤ Proper planning, management and rehabilitation of the construction site
	<b>Indirect impacts:</b> None	N/A	N/A

Activity	Impact summary	Significance	Proposed mitigation
	<b>Cumulative impacts:</b> None	N/A	N/A
Activity	Impact summary	Significance	Proposed mitigation
Potential visual impact of the proposed facility on the visual character and sense of place of the region	<b>Direct impacts:</b> Potential visual impact of the proposed facility on visual character and sense of place of the region	L-w - medium	<ul style="list-style-type: none"> <li>➤ The mitigation measures considered are the planting of indigenous trees in two places: <ul style="list-style-type: none"> <li>• Avenue Diaz Road reserve where the wall is proposed adjacent to the Diaz Road;</li> <li>• In planting precincts in the close proximity of the southern service road to replace the Eucalyptus trees that will be removed for the proposed project.</li> </ul> </li> </ul>
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> Minor as the proposed development is on the boundary of a site. The cumulative impact of larger scale is the fence perpendicular to the coastline	L-w - medium	<ul style="list-style-type: none"> <li>➤ The mitigation measures considered are the planting of indigenous trees in two places: <ul style="list-style-type: none"> <li>• Avenue Diaz Road reserve where the wall is proposed adjacent to the Diaz Road;</li> <li>• In planting precincts in the close proximity of the southern service road to replace the Eucalyptus trees that will be removed for the proposed project.</li> </ul> </li> </ul>
Activity	Impact summary	Significance	Proposed mitigation
Potential visual impact of the proposed facility on tourist routes and tourism	<b>Direct impacts:</b> Potential visual impact of the proposed facility on tourist routes, tourist destinations and tourist potential within the region.	Low	No mitigation recommended

Activity	Impact summary	Significance	Proposed mitigation
potential within the region			
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> None	N/A	N/A
<b>Alternative-2 -The Impacts will be the same as Alternative 1</b>			
<b>Alternative 3 - The impacts will be the same as Alternative 1</b>			
<b>No-go option</b>			
This is the option of not constructing the proposed wall within the proposed area. The option will result in limited or no impacts occurring on the biophysical environment (i.e. biodiversity, soils).			
Impact on wetland habitat due to construction and development related activities	<b>Direct impacts:</b> At present the boundary of the urban development lies in close proximity to the border of the natural wetland feature associated with site 1.	L-w medium -	➤ If encroachment of urban activities and infrastructures is not controlled it is doubtful that the impact can be fully mitigated.
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> Edge effects from surrounding urban activities may impact on wetland areas within the Saldanha Naval Base property Ongoing runoff from urban areas and erosion Encroachment of urban activities into wetland areas within the Saldanha Naval Base property. Urban infrastructure development near wetland features impacting on natural hydrology as well as resulting in loss of wetland habitat Earth moving activity as part of construction activities; Lack of alien vegetation control; Dumping of refuse within wetland areas.	L-w medium -	➤ If encroachment of urban activities and infrastructures is not controlled it is doubtful that the impact can be fully mitigated. ➤ Alien vegetation control could result in a decrease in impact significance. In terms of the amendments to the regulations under the conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998 landowners are legally responsible for the control of invasive alien plants on their properties.
Loss of wetland habitat due to ineffective rehabilitation	<b>Direct impacts:</b> No rehabilitation will be required which will result in no improvement of wetland characteristics of wetland	Low	➤ Mitigation will be limited if the development is not undertaken.

Activity	Impact summary	Significance	Proposed mitigation
	features.		➤ Alien vegetation control could result in a decrease in impact significance. In terms of the amendments to the regulations under the conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998 landowners are legally responsible for the control of invasive alien plants on their properties.
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> None	N/A	N/A
Loss of wetland habitat due to ineffective rehabilitation	<b>Direct impacts:</b> No rehabilitation will be required which will result in no improvement of wetland characteristics of wetland features	Low	➤ Alien vegetation control could result in a decrease in impact significance. In terms of the amendments to the regulations under the conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998 landowners are legally responsible for the control of invasive alien plants on their properties
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> None	N/A	N/A
Impact on wetland service and function provision	<b>Direct impacts:</b> With the encroachment of urban infrastructure and activities into wetland areas and a lack of rehabilitation the impact will be irreversible.	Medium	➤ Alien vegetation control could result in a decrease in impact significance.
	<b>Indirect impacts:</b>		

Activity	Impact summary	Significance	Proposed mitigation
	None	N/A	N/A
	<b>Cumulative impacts:</b> If the encroachment of urban activities and infrastructure is not controlled it is doubtful that the impact can be fully mitigated	Low	➤ Alien vegetation control could result in a decrease in impact significance
Impact due to vehicles encroaching into wetland habitat	<b>Direct impacts:</b> Privately owned vehicles may enter wetland areas within the Saldanha Bay Naval Base property.	Low – medium	➤ No mitigation – there is limited restriction of access to the wetland features.
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> None	N/A	N/A
Impact due to indiscriminate fires	<b>Direct impacts:</b> Indiscriminate fires within the wetland areas or associated buffer zones are likely to occur due to increased human activity.	High	➤ Without the development of the wall, it is not likely that the restriction of urban activities to the area outside of the Saldanha Naval base property will be possible. Residents of urban areas could create fires which may spread to more natural areas within the naval base.
	<b>Indirect impacts:</b> <b>None</b>	N/A	N/A
	<b>Cumulative impacts:</b> Indiscriminate fires may result in a change of floral composition within wetland zones in turn impacting the availability of faunal habitat	High	➤ Without the development of the wall, it is not likely that the restriction of urban activities to the area outside of the Saldanha Naval base property will be possible. Residents of urban areas could create fires which may spread to more natural areas within the naval base.
Impact due to sedimentation	<b>Direct impacts:</b> Site clearing as a result of	High	➤ No mitigation



<b>Activity</b>	<b>Impact summary</b>	<b>Significance</b>	<b>Proposed mitigation</b>
and erosion	unauthorised development within the Saldanha Bay Naval Base property may lead to sedimentation of wetland areas		measures will be undertaken
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> None	N/A	N/A
Operational activities impacting on wetland habitat	<b>Direct impacts:</b> At present the boundary of urban development lies in close proximity to the border of the natural wetland feature associated with site 1. Without the construction of the wall, urban sprawl and encroachment of urban activities into wetland areas within the Saldanha Bay Naval Base property is likely to occur and therefore may result in a decrease in the Present Ecological State of the natural feature associated with site 1	Low – medium	➤ Alien vegetation control could result in a decrease in impact significance. In terms of the amendments to the regulations under the conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998 landowners are legally responsible for the control of invasive alien plants on their properties
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> None	N/A	N/A
Ineffective rehabilitation and monitoring	<b>Direct impacts:</b> No rehabilitation will be required which will result in no improvement of wetland characteristics of wetland features	Medium	➤ Alien vegetation control could result in a decrease in impact significance. In terms of the amendments to the regulations under the conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998 landowners are legally responsible for the control of invasive alien plants on their properties
	<b>Indirect impacts:</b>		

Activity	Impact summary	Significance	Proposed mitigation
	None	N/A	N/A
	<p><b>Cumulative impacts:</b>            Alien and weed floral species presently within the proposed development route will proliferate and stands will increase in size with special mention of <i>Pennisetum clandestinum</i>.            Lack of ongoing rehabilitation, with special mention of alien vegetation control may result in loss of wetland species diversity and abundance.</p>	L-w medium -	<ul style="list-style-type: none"> <li>➤ Alien vegetation control could result in a decrease in impact significance. In terms of the amendments to the regulations under the conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998 landowners are legally responsible for the control of invasive alien plants on their properties</li> </ul>
Cumulative Impact	<p><b>Direct impacts:</b>            At present the boundary of urban development lies in close proximity to the border of the natural wetland feature associated with site 1. Without the construction of the wall, urban sprawl and encroachment of urban activities into wetland areas within the Saldanha Bay Naval Base property is likely to occur and therefore may result in a decrease in the Present Ecological State of the natural feature associated with site 1</p>	Medium	<ul style="list-style-type: none"> <li>➤ With the encroachment of urban infrastructure and activities into wetland areas and with a lack of a rehabilitation plan for the area the impacts cannot be mitigated.</li> </ul>
	<p><b>Indirect impacts:</b>            None</p>	N/A	N/A
	<p><b>Cumulative impacts:</b>            Without development of the wall, rehabilitation of the area will not take place. No development may also result in the encroachment of urban infrastructure and activities into wetland zones.</p>	L-w negative -	<ul style="list-style-type: none"> <li>➤ With the encroachment of urban infrastructure and activities into wetland areas and with a lack of a rehabilitation plan for the area the impacts cannot be mitigated.</li> </ul>
Impact due to alien invasive vegetation encroachment/proliferation	<p><b>Direct impacts:</b>            Significant vegetation transformation was noted during the time of the assessment in close vicinity to ongoing</p>	L-w medium -	<ul style="list-style-type: none"> <li>➤ As far as possible the Naval Base should eradicate and control alien species within their property.</li> </ul>

Activity	Impact summary	Significance	Proposed mitigation
	anthropogenic activity with special mention of the transformed habitat unit as well as stormwater channels. It is deemed highly likely that the species will spread within the protected area if not controlled. However, control of the species would prove difficult if access is not restricted.		
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> None	N/A	N/A
	<b>Direct impacts:</b> If the security wall is not built access to the Naval Base property will not be restricted. As a result, uncontrolled vehicle movement, pathways as well as dumping may result in habitat destruction. With no development of the security wall no vegetation clearing will be undertaken within the Strandveld habitat unit.	High	➤ Impact due to uncontrolled access will be difficult to reduce and it is deemed highly likely that the present floral habitat will be further degraded as anthropogenic activity increases in the vicinity of the Naval Base.
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> None	N/A	N/A
Impacts on RDL and endemic species due to unplanned removal and habitat destruction	<b>Direct impacts:</b> No development will result in no unplanned removal of habitat destruction along the proposed development route.	N/A	N/A
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> None	N/A	N/A
Impacts on RDL and medicinal species due to collection	<b>Direct impacts:</b> With no access control to less disturbed floral habitat, medicinal and RDL species are not protected from harvesting by the public.	Medium	➤ Without access control it is deemed highly unlikely that impact significance can be reduced.
	<b>Indirect impacts:</b>		

Activity	Impact summary	Significance	Proposed mitigation
	None	N/A	N/A
	<b>Cumulative impacts:</b> Ongoing collection of RDL and medicinal species could impact on the sensitive floral communities within the protected area.	Medium	➤ Ensure that access is restricted to sensitive floral communities within the protected area.
Impact on overall floral biodiversity due to dust generation	<b>Direct impacts:</b> No development will result in any dust generation during construction activities. There may be a slight increase in dust generation with the use of the existing gravel roads in the vicinity of the proposed development due to use by the public.	Low	➤ Possible mitigation will be limited without restricting access.
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> Dust generation due to the frequent use of gravel roads by the public may result in dying of vegetation within areas in the immediate vicinity of roads.	Low	➤ Possible mitigation will be limited without restricting access.
Impact on overall floral biodiversity due to uncontrolled fires	<b>Direct impacts:</b> The Naval Base property is accessible to the public and therefore fire related impacts are considered highly likely. If the fires are too frequent it is highly likely to result in a change of the floral community structure.	Highly	➤ Restricting unauthorised access, as far as possible ➤ Implementation of a fire control plan to reduce the extent of any informal fire within the Naval Base property.
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> Increased fire frequency and intensity due to increased human activity. Uncontrolled fires may damage Naval Base property and result in a decline in unique habitat within the protected area. Frequent fires could result in a change in the floral community structure.	Low	➤ Restricting unauthorised access, as far as possible ➤ Implementation of a fire control plan to reduce the extent of any informal fire within the Naval Base property.
Soil contamination	<b>Direct impacts:</b> Significant impact due to soil	N/A	N/A

Activity	Impact summary	Significance	Proposed mitigation
	contamination is considered highly unlikely if construction does not take place.		
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> N/A	N/A	N/A
Operational activities impacting on floral habitat	<b>Direct impacts:</b> With no development of the wall all impacts presently in the vicinity of the proposed development route will remain and may increase in extent	Medium	<ul style="list-style-type: none"> <li>➤ Naval base should control and eradicate and control alien species within their property.</li> <li>➤ Unauthorised access to be restricted.</li> <li>➤ Implementation of a fire control plan to reduce the extent and therefore impact significance of ant informal fire within the Naval Base Property.</li> </ul>
	<b>Indirect impacts:</b> <b>None</b>	N/A	N/A
	<b>Cumulative impacts:</b> None	N/A	N/A
Ineffective rehabilitation and monitoring	<b>Direct impacts:</b> Rehabilitation and monitoring will not take place if the construction of the wall is not undertaken.	N/A	N/A
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> None	N/A	N/A
	<b>Direct impacts:</b> If the wall is not constructed, no additional barriers will be created. Therefore, no additional impact on pollination of floral species is considered possible.	N/A	N/A
	<b>Indirect impacts:</b> None	N/A	N/A
	<b>Cumulative impacts:</b> None	N/A	N/A
Cumulative impacts	<b>Direct impacts:</b> Not building the wall could result in loss of habitat due to encroachment of anthropogenic	High	N/A

Activity	Impact summary	Significance	Proposed mitigation
	<p>activities within more intact areas as is presently the situation along the eastern portion of the proposed route.</p> <p>RDL and Medicinal species are under threat due to unauthorised collection; collection could continue and may result in a decline of individuals within the protected area.</p> <p>Without proper implementation of alien vegetation control, alien invasive species would keep spreading and the communities will increase in size.</p>		
	<p><b>Indirect impacts:</b> None</p>	N/A	N/A
	<p><b>Cumulative impacts:</b> Without the wall access cannot be restricted and therefore no feasible mitigation measures can be implemented to reduce cumulative impact on the floral community.</p>	High	N/A
Noise and Dust	<p><b>Direct Impacts:</b> Construction activities (e.g. construction vehicles, cement mixing etc.) would increase the noise levels around the site during construction.</p>	Low	<p>➤ The appointed contractor would be familiar with and adhere to, any local by-laws and regulations regarding the generation of noise and hours of operation. The Contractor would avoid construction activities outside of 'normal working hours'.</p>
	<p><b>Indirect Impacts:</b> None</p>	N/A	N/A
	<p><b>Cumulative Impacts:</b> None, short term impact</p>	Medium	No mitigation

## 2. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with

specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

#### **Alternative A (preferred alternative)**

The Department of Public Works proposed to define the northern boundary of the Saldanha Military Area, Saldanha with concrete walls and wire mesh fencing. The fencing is proposed where the boundary is within 100m of the high water mark. New and upgraded existing gravel roadways are proposed either side of the proposed wall. A gatehouse is proposed within the wall structure in the main entrance precinct.

The motivation for the boundary definitions and related infrastructure of service roads is to protect the military site from further vandalism and theft. Since 1994 the Department of Public Works has ceded portions of the Military site to the Saldanha Municipality for the construction of low income housing, such as the Reconstruction Development Programme (RDP) housing schemes. The result of positioning these low-income developments on the immediate boundaries of the Military site has been continual theft and vandalism to the military structures and assets, such as structures, goods) and the threatening of their military personnel.

Provided that all suggested mitigation is implemented, the proposed development should have an acceptable **LOW TO MEDIUM** impact on the surrounding heritage, the wetland and strandveld habitat units that is within the development area.

#### **Alternative B**

The Department of Public Works proposed to define the northern boundary of the Saldanha Military Area, Saldanha with concrete walls and wire mesh fencing. The fencing is proposed where the boundary is within 100m of the high water mark. New and upgraded existing gravel roadways are proposed either side of the proposed wall. A gatehouse is proposed within the wall structure in the main entrance precinct.

The motivation for the boundary definitions and related infrastructure of service roads is to protect the military site from further vandalism and theft. Since 1994 the Department of Public Works has ceded portions of the Military site to the Saldanha Municipality for the construction of low income housing, such as the Reconstruction Development Programme (RDP) housing schemes. The result of positioning these low-income developments on the immediate boundaries of the Military site has been continual theft and vandalism to the military structures and assets, such as structures, goods) and the threatening of their military personnel.

Provided that all suggested mitigation is implemented, the proposed development should have an acceptable **LOW TO MEDIUM** impact on the surrounding heritage, the wetland and strandveld habitat units that is within the development area.

#### **Alternative C**

The Department of Public Works proposed to define the northern boundary of the Saldanha Military Area, Saldanha with concrete walls and wire mesh fencing. The fencing is proposed where the boundary is within 100m of the high water mark. New and upgraded existing gravel roadways are proposed either side of the proposed wall. A gatehouse is proposed within the wall structure in the

main entrance precinct.

The motivation for the boundary definitions and related infrastructure of service roads is to protect the military site from further vandalism and theft. Since 1994 the Department of Public Works has ceded portions of the Military site to the Saldanha Municipality for the construction of low income housing, such as the Reconstruction Development Programme (RDP) housing schemes. The result of positioning these low-income developments on the immediate boundaries of the Military site has been continual theft and vandalism to the military structures and assets, such as structures, goods) and the threatening of their military personnel.

Provided that all suggested mitigation is implemented, the proposed development should have an acceptable **LOW TO MEDIUM** impact on the surrounding heritage, the wetland and strandveld habitat units that is within the development area.

**No-go alternative (compulsory)**

This is the option of not constructing the proposed wall on the boarder of the Saldanha Naval Base.



## SECTION E. RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?

YES

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment).

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application.

It is recommended that the project be managed in a proper way in order to protect the sensitive environment. Besides the conditions in the EA, should it be granted, it is recommended that the following documents also regulate the proposed development:

**The EMPr, the Heritage and Visual Impact Assessment, the Archaeological Impact Assessment, the Wetland Delineation Study and the Floral Ecological Assessment .**

Is an EMPr attached?

YES

The EMPr is attached as **Appendix F**.

The details of the EAP who compiled the BAR and the expertise of the EAP to perform the Basic Assessment process are included as **Appendix G**.

Specialist reports that were used during the compilation of this Draft BAR are attached in **Appendix D**. The declaration of interest for each specialist is attached in **Appendix H**.

Roelien du Plessis

\_\_\_\_\_  
NAME OF EAP

Roelien du Plessis

\_\_\_\_\_  
SIGNATURE OF EAP

\_\_\_\_\_  
DATE

## **SECTION F: APPENDIXES**

The following appendixes are attached:

Appendix A: Maps

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports (including terms of reference)

Appendix E: Public Participation

Appendix F: Environmental Management Programme (EMPr)

Appendix G: Details of EAP and expertise

Appendix H: Specialist's declaration of interest

## **APPENDIX A**

### **MAPS**



Figure 1: Locality Map

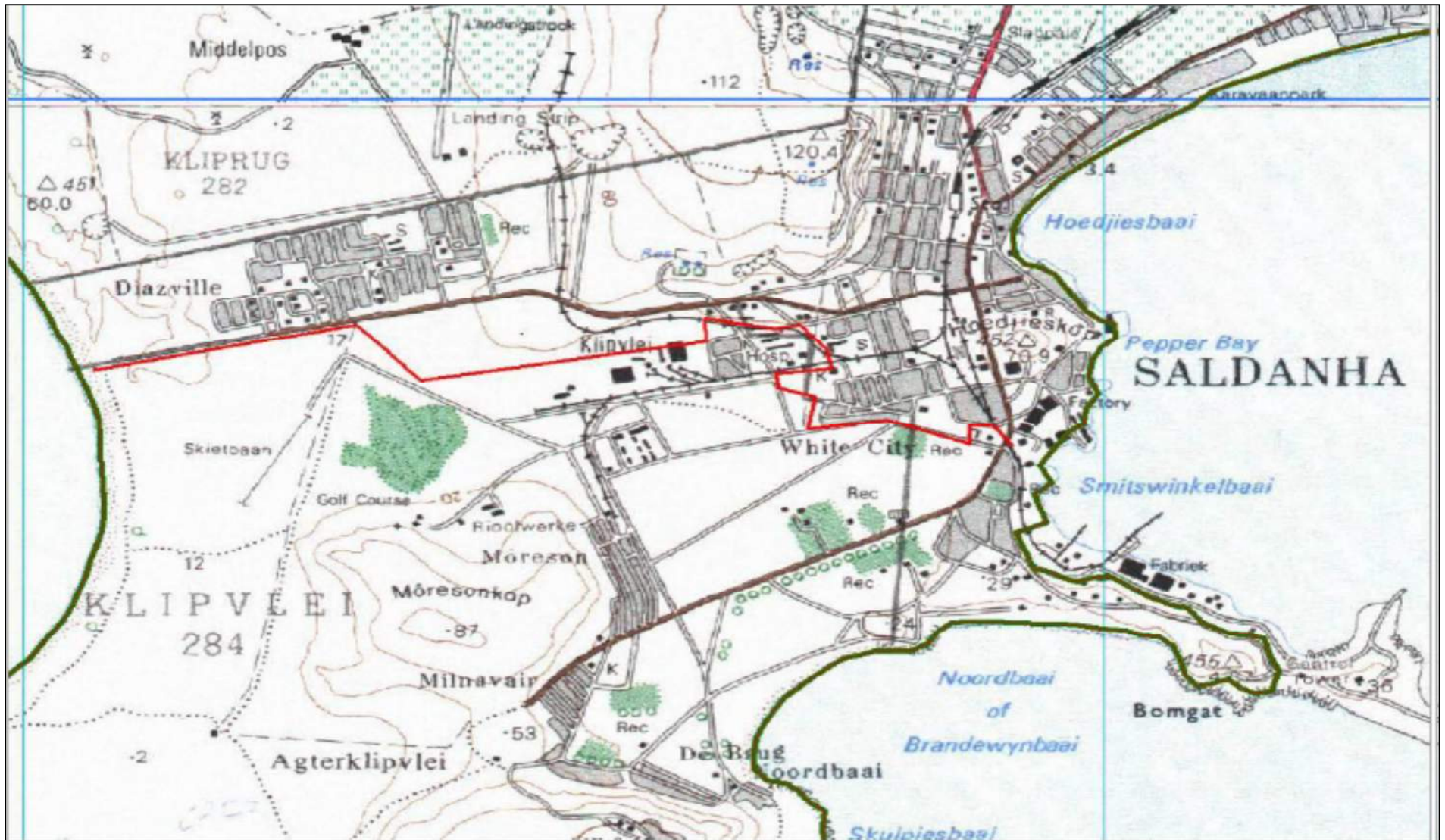


Figure 1: Location of the proposed development route in relation to the surrounding area.



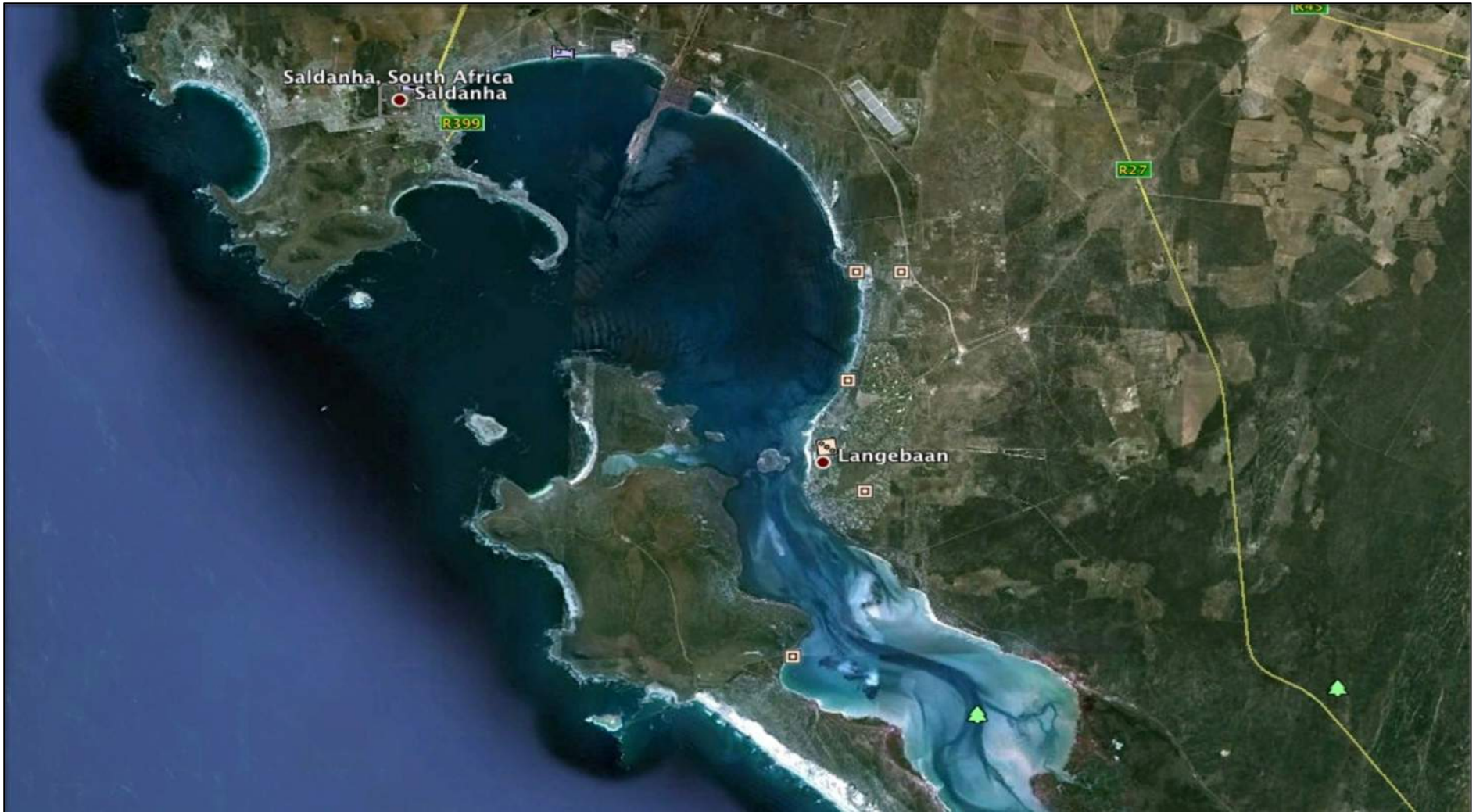


Figure 2: Context of SANDF Military site within Saldanha Bay









Figure 4: Sensitivity Map



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**APPENDIX B**

**SITE PHOTOGRAPHS**



Photograph 1: Existing wire mesh fence on coastal boundary.



Photograph 2: Existing fence boundary definition (right) opposite the municipal recreation centre.



Photograph 3: Existing vibracrete wall that has been vandalised and stolen.



Photograph 4: Existing vibracrete wall that defines the site and municipal land.



Photograph 5: Formal housing development that borders on the Saldanha Naval Base area.



Photograph 6: Existing railway track and electrical



Photograph 7: Existing gravel roadway between site and housing development.



Photograph 8: Existing railway line that is situated adjacent to RDP housing development that is located on the Saldanha Naval land.



Photograph 9: Coastal plains landscapes with ridges in backgrounds.





Photograph 10: Formal residential development adjacent to site on the Northern Boundary.



Photograph 11: Ecological support area that is located within the proposed development site.








Photograph 12: Natural wetland feature that is located within the proposed development site.

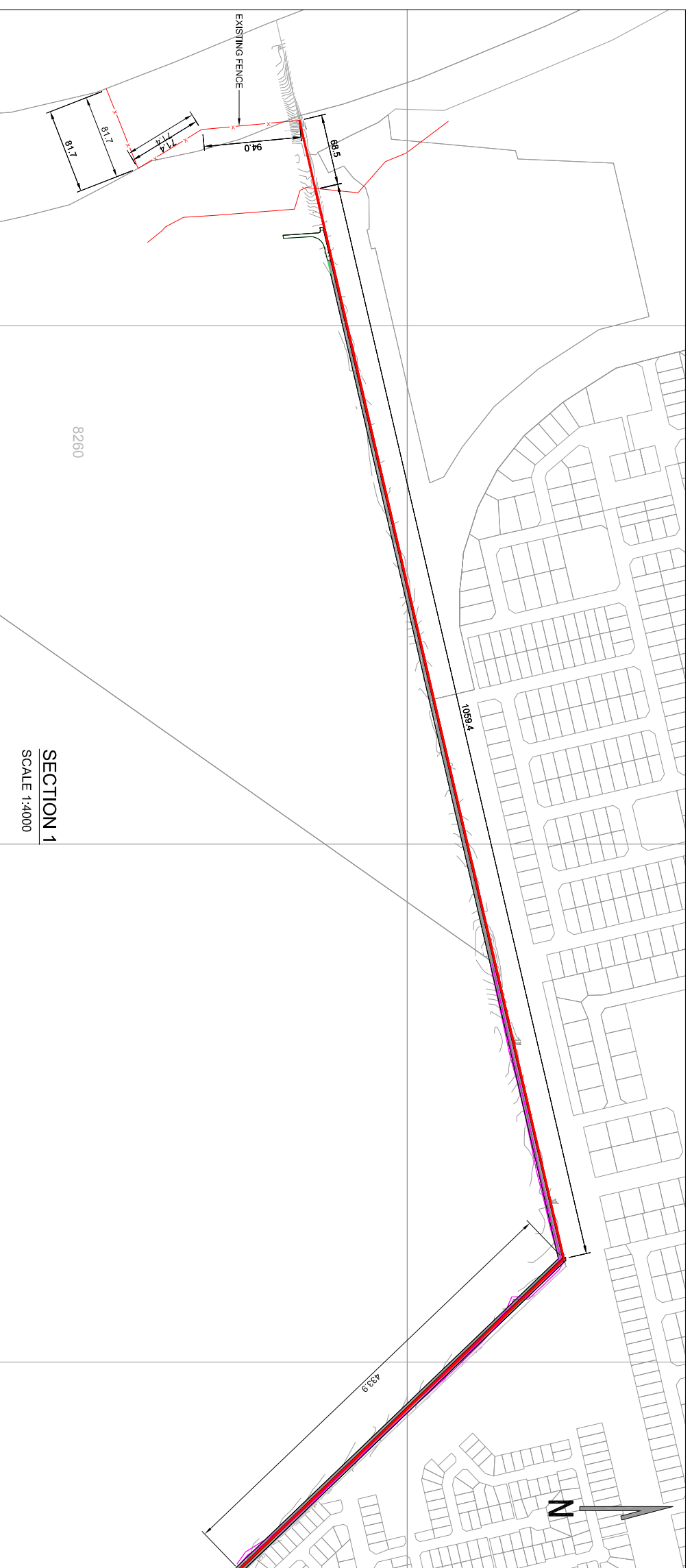
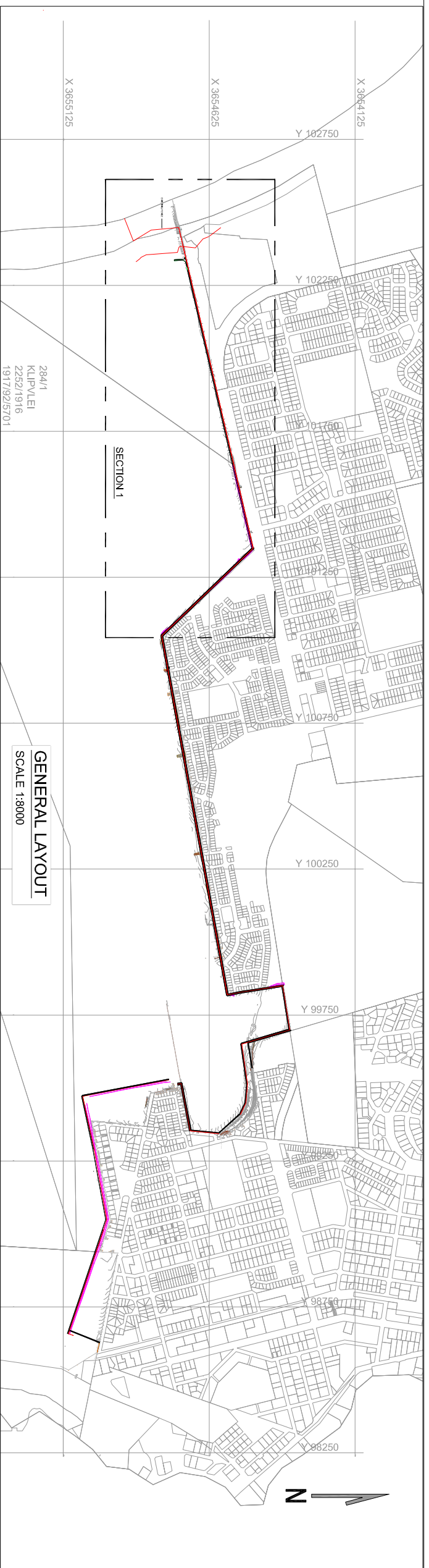
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**APPENDIX C**

**FACILITY ILLUSTRATION (S)**

**LEGEND:**

-  EXISTING FENCE
-  PROPOSED ROAD
-  EXISTING PAVED ROAD
-  PROPOSED CONCRETE WALL
-  EXISTING GRAVEL ROAD EDGE



**PRELIMINARY DESIGN**


Rev.	Date	Description of Changes	By
a	07-12-2012	ISSUE FOR APPROVAL	M.K

REVISIONS



**public works**  
Department:  
Public Works  
REPUBLIC OF SOUTH AFRICA

Consultant



**VIRTUAL**  
CONSULTING ENGINEERS

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VANS ROAD  
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7945  
TEL: (021) 671 2511  
FAX: (086) 605 6022

APPROVED  
REGISTERED CONSULTANTS  
BEARS THE ORIGINAL SIGNATURE OF APPROVAL

SIGNATURE: \_\_\_\_\_ NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

Project

**SALDANHA NAVAL BASE,  
WESTERN CAPE**

Project Description

**REPLACEMENT OF EXISTING  
SECURITY FENCE WITH  
CONCRETE WALL**

Drawing Title

**GENERAL LAYOUT  
SHEET 1 OF 3**


Drawing Units

METERS

Date	Scale	Designed By
DECEMBER 2012	AS SHOWN	M. KRISTEN

Checked By	Drawn By	Approved By
M. KRISTEN	E. HENDRICKS	R. LAQUIS

Drawing No. P12022-PD-001A

Rev  A



**LEGEND:**

- EXISTING FENCE
- PROPOSED ROAD
- EXISTING PAVED ROAD
- PROPOSED CONCRETE WALL
- EXISTING GRAVEL ROAD EDGE

**PRELIMINARY DESIGN**

Rev.	Date	Description of Changes	By
a	07-12-2012	ISSUE FOR APPROVAL	M.K
REVISIONS			



Consultant

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APPROVED  
REGISTERED AT VIRTUAL CONSULTING ENGINEERS  
BEARS THE ORIGINAL SIGNATURE OF APPROVAL

SIGNATURE: \_\_\_\_\_ NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

Project  
**SALDANHA NAVAL BASE,  
WESTERN CAPE**

Project Description  
**REPLACEMENT OF EXISTING  
SECURITY FENCE WITH  
CONCRETE WALL**

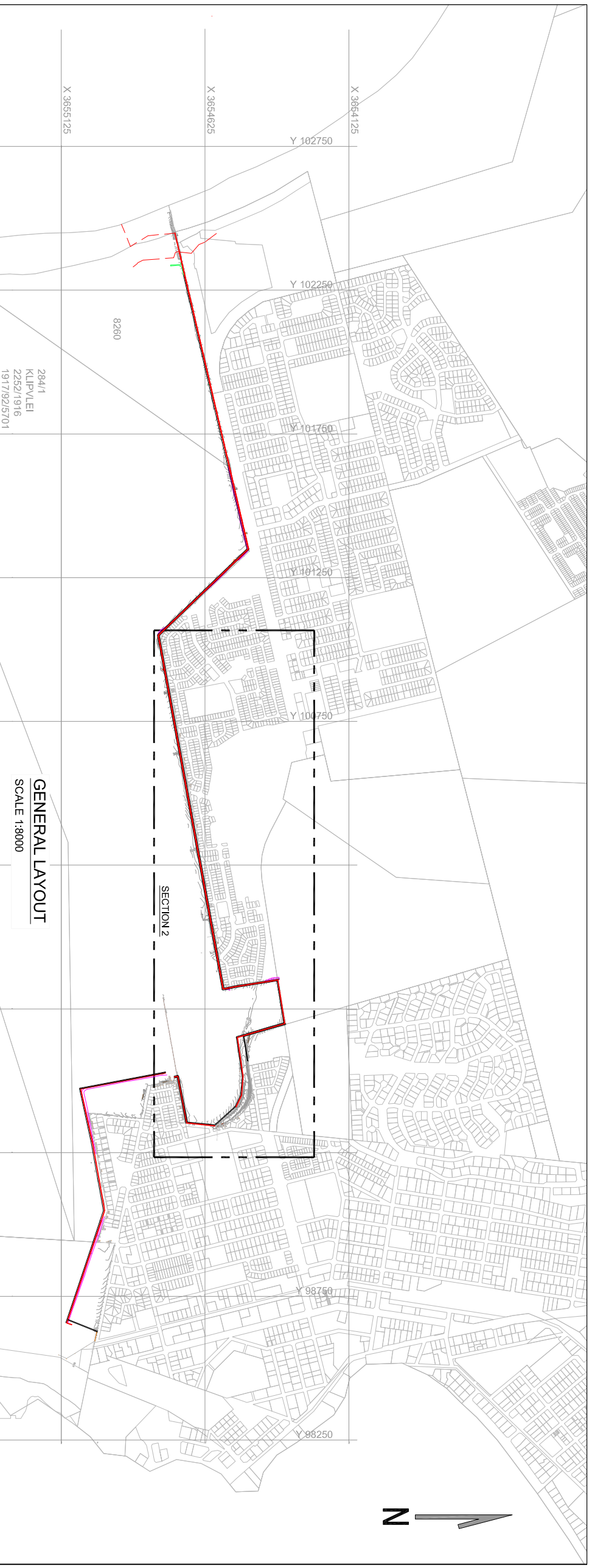
Drawing Title  
**GENERAL LAYOUT  
SHEET 2 OF 3**

Drawing Units  
METERS

Date	Scale	Designed By
DECEMBER 2012	AS SHOWN	M. KRISTEN
Checked By	Drawn By	Approved By
M. KRISTEN	E. HENDRICKS	R. LACLUS

Drawing No. **P12022-PD-001B**

Rev **A**





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**APPENDIX D**

**SPECIALIST REPORTS**

# HERITAGE IMPACT ASSESSMENT

## & VISUAL IMPACT ASSESSMENT

FINAL DRAFT

### SALDANHA

#### NAVAL TRAINING BASE & SOUTH AFRICAN MILITARY ACADEMY

Erven 8260, 284/1, 10990, 7858, 11189, 269 -286, 481 - 508, 703 – 727

SALDANHA MAGISTERIAL DISTRICT WESTERN CAPE

#### PROPOSED NORTHERN BOUNDARY WALLS & FENCES, SERVICE ROADS AND GATE HOUSE



*View of main entrance to Saldanha Military from Saldanha Main road, 2013 O'Donoghue*

Prepared for



**DELTA BUILT ENVIRONMENT CONSULTANTS**

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## EXECUTIVE SUMMARY

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The Department of Public Works proposes to define the northern boundary of the Saldanha Naval Training Base and SA Military Academy Military Area, Saldanha with reinforced concrete walls and fencing in addition to gravel service roads and a gatehouse.

The motivation for the boundary definitions and related infrastructure is to protect the military site from further vandalism and theft. Since 1994 the Department of Public Works has ceded portions of the Military site to the Saldanha Municipality for the construction of low income housing, such as the Reconstruction Development Programme (RDP) residential developments. The result of positioning these low-income developments on the immediate boundary of the Military site has been the continual theft and vandalism to the military structures and assets and the threatening of their military personnel.

The Military site consists of a variety of structures, training and recreational precincts. Permanent staff work and live on site and training is given to visiting military personnel. Structures on the site include administration, training, recreational, medical, residential, commercial buildings in addition to connecting roadways. Outdoor precincts include a disused golf course, active shooting range, military parade grounds, horse paddocks, and picnic sites.

The proposed wall is a concrete structure 3200mm high and 120mm wide. Gravel service roads proposed on either side of the proposed wall in certain section where it is adjacent to the existing residential settlements. The purpose of the service roads are to delineated a no built zone between the wall and the existing settlements, allow the wall to be maintained and permit vehicular and pedestrian access to the existing residential developments. The proposed fence is on the site coastal boundary and extends to a portion over the sandy beach perpendicular to the coastline.

The identified heritage resources are the site for its aesthetic and historic values, its historic military structures, natural and exotic landscape features in addition to its tangible heritage of significant military events. The immediate context of the site is not assessed of heritage value.

The potential negative impacts from the proposed development on archaeological resources, the historic military precinct and visual impacts on the scenic resources of Saldanha and the interface between the sea and the naval base are assessed in this report study. The HIA of the proposed walls, fence and related infrastructure is positive as the site's identified significant heritage resources are not impacted by the proposed development. The interface between the sea and the military site is altered on a minor section where the proposed fence is situated perpendicular to the coastline on the sandy beach. This fence is assessed as a minor heritage impact. The three mature Eucalyptus trees which require removal for the proposed service road is mitigated with the planting of additional trees. The site's proposed northern boundary walls and fencing will result in the improved maintenance of the site's heritage resources and facilities, as they will be secure the site from the present high degree of trespassing, theft and vandalism.

The Visual Impact Assessment assesses a high visual impact from sections of Diaz Road, residential areas of Diazville, White City and the elevated residential area north of Diaz Road in addition to SANDF buildings on the site's northern boundary precinct due to close proximity to the proposed walls. The VIA of the proposed walls from the historic military precinct and coastline are low due to the high visual absorption capacity of the adjacent urban development and the medium to far distance. The visually permeable fence on the site's western boundary and portion of Diaz Road has a low visual impact, as it is visually permeable. However the fence on the sandy beach is assessed to have a moderate visual impact due to its position on a sensitive coastal environment.

The Archaeology Impact Assessment found severely damaged/destroyed shell midden deposits the steep slopes below the dune cordon on the beach at Tabakbaai, shell fish patches and fragments along Diaz Road and within the Military site in addition to extensive shell midden deposits, including a few stone implements were documented on the soft vegetated sands, in a wide arc alongside the service road at Tabakbaai.

The predicted impacts of the proposed developments on archeological resources are a potential negative impact to the archaeological deposits on the existing gravel service road that will be widened and upgraded in addition to excavations for the new security wall might impact on potentially important sub-surface archaeological deposits. Unmarked human remains may be uncovered during excavations for the wall foundations.

The current conditions of the theft and vandalism are untenable to the SANDF and reflect a lack of respect from the perpetrators for the SANDF property and personnel in addition to the lack of will and capability of the SANDF in protecting their site. It is consistent with a military base of national importance that the boundaries are well defined and secured.

The HIA recommends to HWC IARCOM that the proposed development on the Saldanha Naval Training Base and the Military Academy given a positive comment to the Department of Environmental Affairs with the recommended landscaping on Diaz Road and the site.

## **SECTION 1 INTRODUCTION**

---

### **1.1 INTRODUCTION**

Delta Built Environment Consultants appointed Bridget O'Donoghue Heritage Consultant on behalf of their client, Department of Public Works for a Heritage Impact Assessment (HIA) Phase 1 and 2 and a Visual Impact Assessment (VIA) for the proposed boundary walls, fencing, service roads and gatehouse on the Saldanha Naval Training Base and the South African Military Academy Saldanha Western Cape. This report contains the HIA in addition to the VIA. Phase One HIA identifies and assesses the heritage resources on the site and provides heritage indicators for future development. Phase Two HIA assesses the proposed development on the identified heritage resources. The Visual Impact Assessment (VIA) identifies the degree of Visual Impact Assessment (VIA) of the proposed development. The Archaeological Impact Assessment (AIA) is included in Annexure 3 to the report with the finding included in Section 2.4.

### **1.2 LEGAL REQUIREMENT**

The Department of Public Works plans to construct a reinforced concrete wall of 3 200mm high and 120mm wide of approximately 5km on the site's northern boundary. A Notification for Intent to Develop (NID) was submitted to Heritage Western Cape (HWC) by Bridget O'Donoghue Heritage Consultant in terms of the National Heritage Resources Act No. 75 of 1999 (NHR Act) Section 38 (1). HWC, the Provincial Heritage Authority comment, dated 17 October 2012 was as follows:

*"Since there is reason to believe that heritage resources will be impacted upon, HWC requires an HIA in terms of S 38(3) of the NHRA (Act 25 of 1999) assessing the impacts to the archaeological resources, impacts to the historic military precinct and visual impacts of the development on the scenic resources of Saldanha and the interface between the sea and the naval base".*

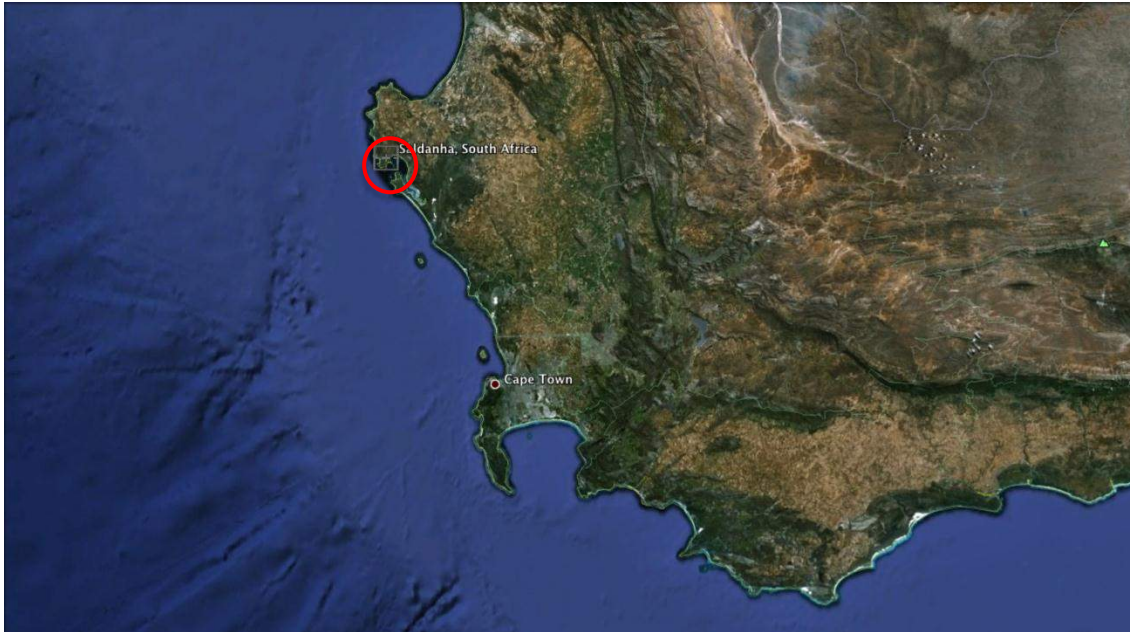
This HIA Phase 1 and 2 is a specialist study that forms part of an Environmental Impact Assessment Report required in terms of National Environmental Management Act of 1998. This HIA is done in terms of NHRA Section 38 (8) and HWC IARCOM is a commenting body to the Department of Environmental Affairs, not an approval body.

### **1.3 PROJECT LOCATION**

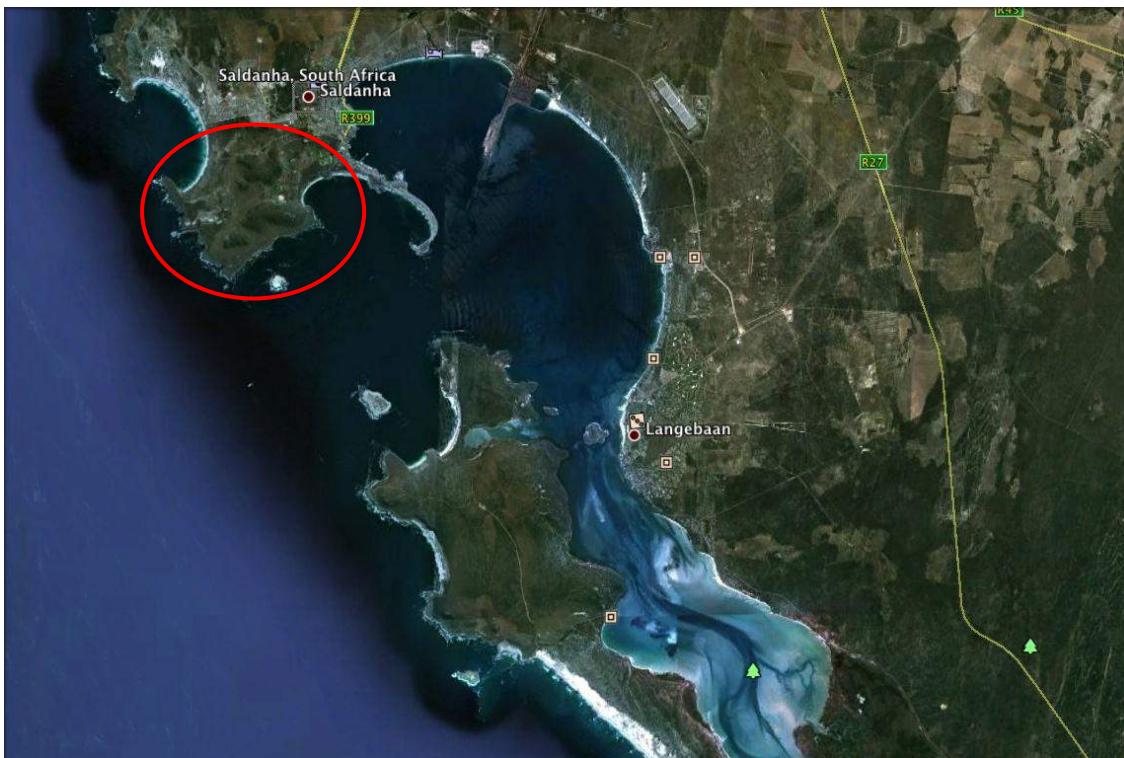
Saldanha is situated about 140km from Cape Town on the West Coast. The South African National Defence Force (SANDF) Saldanha Military site is situated on the peninsula of Saldanha south of the town (Refer to Aerial Photographs 1.1 – 1.4). Saldanha has the deepest and largest natural harbour in the southern hemisphere, and the safest harbour in South Africa. For centuries, geographic isolation and the lack of water prevented large-scale urban and industrial development and it only started developing once a pipeline for fresh water was built from the Berg River and commercial fishing established along the West Coast.

The Military site consists of various precincts such as administration, residential, training and storage precincts (refer Map 1.5). To the north of the site are high and low income residential areas, schools and shopping precincts. Access to the site is gained on the northeast boundary from Saldanha Main Road, or from the harbour on the site's eastern boundary.





**Aerial Photograph 1.1:** Context of SANDF Military site within Saldanha Bay (site indicated with a red circle), Google Earth 2012



**Aerial Photograph 1.2:** Context of SANDF Military site within Saldanha Bay (site indicated with a red circle), Google Earth 2012





**Aerial Photograph 1.3:** Context and extent of SANDF Saldanha Military site within Saldanha, Google Earth 2012



**Aerial Photograph 1.4:** Development area on SANDF Military site northern boundary (indicated with yellow outline), Google Earth 2012

## 1.4 PROJECT DESCRIPTION

Due to crime and vandalism on the SANDF Saldana Military site northern precinct, the Department of Public Works proposes a boundary definition on its northern boundary which is in immediate adjacent to low income residential areas (White City). The majority of the proposed boundary definition is a 3 200mm high security wall and the minor section in immediate context of the coastline is a wire mesh fence. The material proposed for the wall is concrete which will be strong enough to withstand vandalism and not be easily scalable. Internal service roads of 2.5m wide would be situated parallel to the new security wall when it is situated immediately adjacent to the residential precinct. When the wall runs along Diaz road for two sections, one service road is proposed. At regular intervals adequate lighting is proposed on light posts. An entrance gatehouse with basic accommodation is proposed on the eastern extremity of the wall. The design of the proposed boundary definition (wall and fence) is informed by the adjacent boundary conditions (residential precinct, coastline or roadway and the requirement for a robust and low maintenance structure that is deemed difficult to scale and damage.

## 1.5 PROJECT MOTIVATION

The proposed walls, fence and service roads are required due to the high degree of theft and vandalism that occurs to the military's structures, materials, formal landscaping, biodiversity areas and personnel. Since 1994 when the first democratic government of South Africa was elected, the South African National Defence Force (SANDF) ceded land to the Saldanha Municipality for low-income housing. A wire mesh fence was erected between the military site and the residential precincts. However these fences have been removed numerous times and the buildings on the northern precinct have been consistently damaged and vandalised. Doctors that work in the base's hospital require secure parking and protection when at the clinic in this precinct. Residents trespass on the site for their day and night recreational needs. The military has not been able to effectively deal with the theft, vandalism and trespassing. The northern service road between the existing residential precinct and the wall is designed to allow access to the residences for residents, and be maintained as a non-residential strip. Unless this road is achieved, informal and formal structures will be illegally constructed up against the wall these allowing easy mountable structures for access into the Military site.

## 1.6 TERMS OF REFERENCE (TOR)

The terms of reference for the Phase 1 and 2 Heritage Impact Assessment include:

- Research on the historical development of the site and Saldanha;
- Identify the site's heritage resources;
- Propose the cultural significance of the sites heritage resources;
- Identify the relevant heritage indicators;
- Assess the impact from the proposed development on the site's heritage resources;
- Recommend mitigation factors for the proposed development.

The terms of reference for the VIA include:

- Determination of the visibility of the proposed development area from significant routes and viewpoints;
- Delineation of the area from which the development will be visible i.e. the view catchment or the view shed;
- Identification of the scenic resources and visually sensitive environments;
- Identification of potential visual impacts of the proposed developments;
- Recommendations for possible mitigation measures to minimise the visual impacts of the proposed development.

## 1.7 PUBLIC CONSULTATION

The public consultation was achieved within the ambit of the NEMA Basic Assessment report. Issues that were raised at the Public Participation meeting that was held on the 31st January 2013 at the Military site's Cinema Hall include<sup>1</sup>:

- The issue regarding the storm water capacity – it was stated that when there is heavy rains the water then floods into the Wetland and when the wetland cannot take the capacity, it pushes the water back which then floods the nearby houses along the proposed developed areas. A request was made regarding the wetland – the municipality had approached Department of Water Affairs (DWAF) a few years back regarding to increase the dam structure on the naval base, as the wetland cannot contain or keep the water content or capacity and as an end result the area become flooded;
- Will there be an access road from White City;
- Houses that are built on the Military base site fence boundary;
- Questions of residents have access to the property. It was stated that the reason why the wall is going up is to restrict residents from entering the restricted areas on the Naval Base.
- The Commanding Officer – Mr V Pillay made a proposition to the Saldanha Bay Local Municipality that all property that is affected during the construction of the proposed wall will be replaced elsewhere within the Saldanha Naval Base area.
- The proposed fence will be a straight line – as originally planned.
- Mr du Plessis from the Saldanha Bay Local Municipality – requested if there was any alternative to the project –it was answered no and that the wall will run along the boundary of the Naval base.
- Mr du Plessis – Asked if there would be any problems from military regarding access road from community
- A comment was made regarding ‘to have another fence as a “buffer fence” for the new wall to prevent people from entering the naval base.
- Mr du Plessis – had stated that that a substation is present inside the base and on the boundary of the proposed wall – will it be a problem to access the substation. Mr Pillay had replied to the above comment stating that the Naval Base and the Municipality can come to some sort of agreement to access the substation.
- Mr du Plessis had asked who will maintain the wall once it is put up. Mr Pillay had commented that assurance will be made by the DPW for the wall to be maintained at all times
- Mr du Plessis had stated that a Maintenance Plan to be submitted to the Saldanha Local Municipality Building Department.
- Mr du Plessis had stated that all the sewer servitudes – fall within the boundary of the military – will the servitudes be moved
- Mr Pillay had stated that ‘the wall to be made more attractive for the community to see – in order to enhance the community – will make it a community project, to give the community a sense of belonging.
- Clarity regarding on where the wall meets the beach
- Ensure that the community benefits from the project

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<sup>1</sup> Issues raised and answers given in underline

## **1.8 ASSUMPTIONS AND LIMITATIONS**

### **1.8.1 Assumptions**

It is assumed that the data on the proposed project provided by Delta BEC is accurate and up to date at the time of writing this report.

### **1.8.2 Limitations**

The report has not examined in any detail social and economic issues that will be affected by the proposed development as this is outside the brief of the report.

## **1.9 APPROACH TO STUDY**

The proposed approach to the HIA study is based on the guidelines for Involving Heritage Specialists and Visual and Aesthetic Specialists in EIA processes: Edition 1 CSIR report No. ENV-S-C 2005 053 RSA, Provincial Government of the Western Cape, Department of Environmental Affairs and Planning, Cape Town (DEA&DP). These guidelines are based on accepted international best practice guidelines.

## **1.10 SPECIALIST TEAM AND DETAILS**

The Project Team consists of Bridget O'Donoghue and Jonathan Kaplan. Bridget is a registered Architect with the South African Council for the Architectural Profession and member of the Association of Professional Heritage Practitioners (APHP) and the International Association of Impact Assessors South Africa (IAIAsa). She is a specialist heritage practitioner with 13 years' experience in the field of heritage and environmental management in addition to 10 years' experience as a professional Architect. Jonathan Kaplan has worked extensively in the Saldanha area, for example Archaeological Impact Assessments on the Saldanha Steel project and the Saldanha Port access road, He is a registered Archaeologist with over 22 years' experience.

## **1.11 DECLARATION OF INDEPENDENCE**

This is to confirm that Bridget O'Donoghue and Jonathan Kaplan are responsible for undertaking the HIA, VIA and AIA assessments and are independent and have no vested or financial interest in the proposed development on the Saldanha Military site being either approved or rejected by the relevant authorities.

## **1.12 REPORT STRUCTURE**

The report is divided into 7 Sections, namely

- Section 1: Introduction
- Section 2: Description of Site
- Section 3: identified heritage resources and heritage design indicators for development
- Section 4: Design Proposals
- Section 5: Design Proposal Assessment and Recommended mitigation measures
- Section 6: Visual Impact Assessment
- Section 7: Recommendations

## SECTION 2 DESCRIPTION OF THE SITE

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### 2.1 INTRODUCTION

Section 2 provides an overview of the administration context of the site and the applicable statutory framework. Historical development for the site and its context are provided and a description of the site's current structures, landscape features and land uses.

### 2.2 ADMINISTRATIVE CONTEXT AND STATUTORY FRAMEWORK

#### 2.2.1 Introduction

The site is located within the Saldanha Bay Municipality, within the West Coast District Municipality, Western Cape. For the purposes of this study, the following relevant policy and planning documents were reviewed:

- National Heritage Resources Act No. 25 of 1999 (NHRA);
- Existing heritage studies.

#### 2.2.2 National Heritage Resources Act No. 25 of 1999 (NHRA)

The NHRA serves as the controlling legal framework for heritage conservation in South Africa. The Act lays down general principles for governing heritage resources management throughout the republic and provides for the identification, assessment and management of the heritage resources of the country. The Act only applied to "those heritage resources of South Africa, which are of cultural significance or other special value for the community and for future generations".

#### Definitions

- **Heritage Resources**

Heritage resources are places and objects of cultural significance. Heritage places are often described as either natural or cultural places. In reality, heritage places usually possess many different values, ranging from natural values at one end of the spectrum through to cultural values at the other. A heritage resource is described as "any place or object of cultural significance" (NHRA Section 26 [xvi]). Heritage resources significant enough to be considered part of the national "estate" in Section 3(2) of the NHRA may include *inter alia*:

- Places, buildings, structures and equipment of cultural significance;
- Places to which oral traditions are attached or which are associated with living heritage;
- Historical settlements and townscapes;
- Landscapes and natural features of cultural significance;
- Geological sites of scientific or cultural importance;
- Archaeological sites and objects;
- Graves and burial grounds;
- Sites of significance relating to the history of slavery in South Africa;

- Moveable objects including military objects, fine art, books records, documents, archaeological and paleontological objects and materials.

- **Heritage Place**

A heritage place is a specific area or site, perhaps a large area such as a whole region or landscape, or a small area such as a feature, furniture or building, which is valued by people for its natural and/or cultural heritage significance.

- **Cultural Landscape**

The International Council on Monuments and Sites (ICOMOS) states that Cultural Landscapes represent the "combined works of nature and of man". Cultural landscapes are illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal<sup>2</sup>.

The term "cultural landscape" embraces a diversity of manifestations of the interaction between humankind and its natural environment. Cultural landscapes often reflect specific techniques of sustainable land-use, considering the characteristics and limits of the natural environment they are established in, and a specific spiritual relation to nature.

- **Cultural Heritage Significance**

Cultural heritage significance means aesthetic, historical, scientific, architectural, scientific, spiritual, technological or social value or significance. Natural heritage significance means the importance of ecosystems and biological diversity for their existence value and/or for present or future generations of South Africans in terms of their scientific, social, aesthetic and life support value edge. The process of deciding why a place is of heritage significance is called heritage assessment. Assessment helps to work out exactly why a place or area is important and how parts or elements contribute to its significance. Understanding heritage significance is essential to making sound decisions about the future of a place, and is central to developing a conservation plan. It guides management actions, such as planning compatible uses, can inform the development of educational materials, helps to justify the allocation of resources and to explain to people why a place is important. The assessment of the heritage significance of a place or object is the essential departure point for any system of heritage management. The NHRA requires the heritage significance of any site or object be assessed so as to ensure the appropriate level of management of the country's heritage resources. (Refer Annexure 2 for further information on Heritage Assessments and grading of sites)

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<sup>2</sup> <http://whc.icomos.org/culturallandscape>

## Requirements of a Heritage Impact Assessment

The HIA requirements outlined in NHRA Section 38(3) a-c for a HIA include provision of information involving the following:

- Identification and mapping of heritage resources in the area affected;
- Assessment of the significance of such resources in terms of the NHRA heritage assessment criteria;
- Assessment of the impact of the development on such heritage resources.

The requirements of NHRA Section 38(3) are dealt with as follows:

- S 38 (3)(a): Mapping of heritage resources: refer to Section 3.3;
- S 38 (3)(b): Significance of heritage resources: refer to 3.3;
- S 38 (3)(c): Impact from proposed development on heritage resources: refer to Section 5;
- S 38 (3)(e): Public Participation: refer to Section 1.7;
- S 38 (3)(g): Mitigation measures for the proposed development: refer to Section 5 and 7;
- Sections 35(1) (3) and (4) (Archaeology): refer Section 2.4 and Annexure 3;
- Section 36 (3) (a) (burials): refer to Section 2.4 and Annexure 3.

### 2.2.3 Provincial Spatial Development Framework – Statutory Report

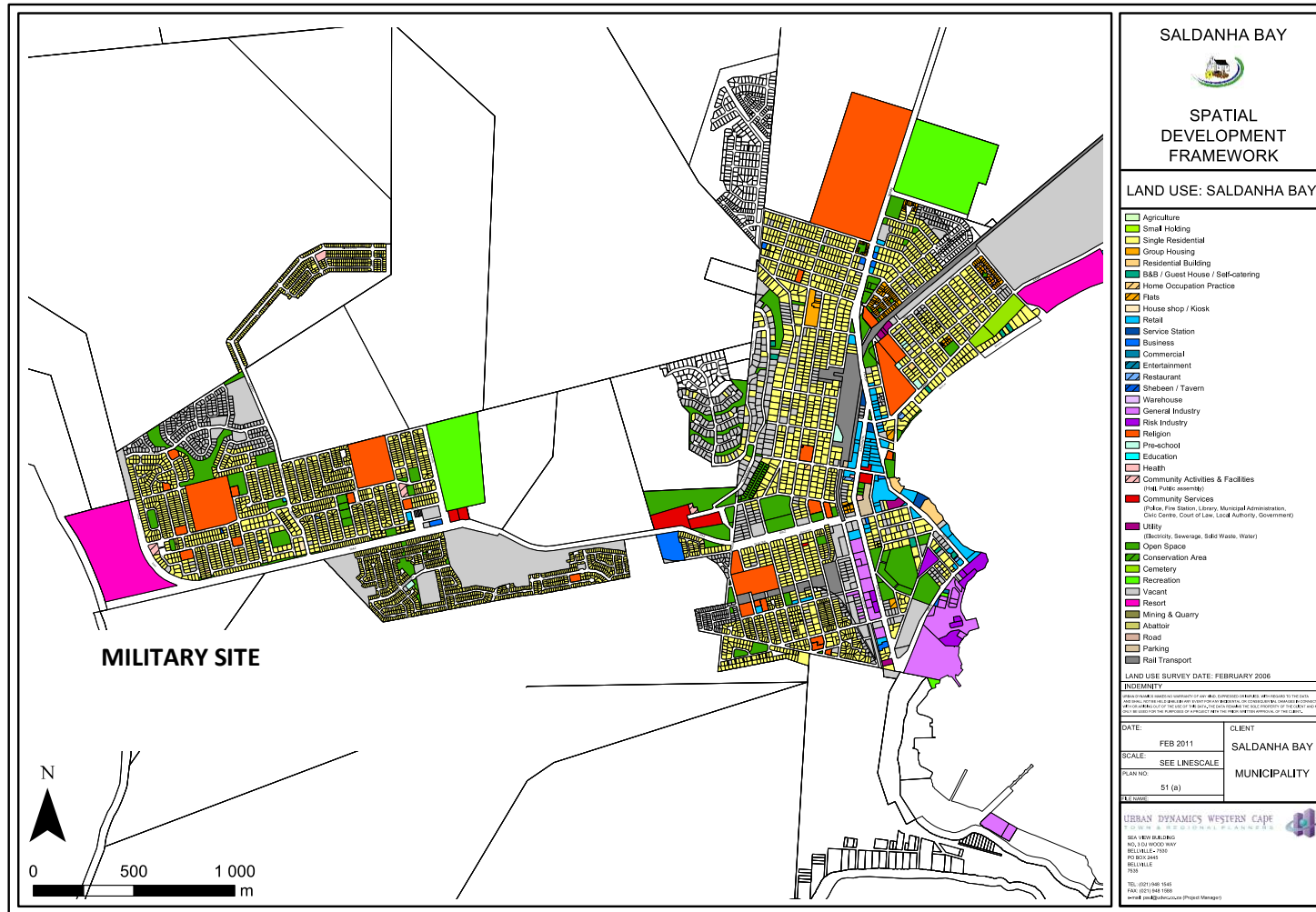
The Western Cape Provincial Spatial Development Framework (WCPSDF, commonly referred to as the PSDF) was initially published in November 2005. The PSDF is a policy document which is to be reviewed every five years. The next revision is due in 2014. As such it does not create or take away any existing land use rights. However, as a statutory policy document, any upgrading or changing of existing rights will have to comply with the PSDF. The Western Cape Urban Edge Guidelines are supplementary to the PSDF. The applicability of the Guidelines has not been superseded by either the drafting of the 2009 PSDF Statutory Report, or by the Rural Guidelines. The major purpose of the Guidelines was to provide policies for the consideration of land use applications inside, on or beyond the urban edge, or land use applications that entail leapfrog development in rural areas.

The Urban Edge line is on the site northern boundary where the proposed boundary definitions are proposed. The site is situated outside the Urban Edge line



## 2.2.4 Municipal Zoning Regulations

As the SANDF site is a strategic site for the defence of the country, the site zoning is indeterminate zoning. Adjacent to the site's northern boundary the zoning is single residential and resort site adjacent to the coastline.



Map 1: Zoning diagram portion Saldanha. Military site is at the bottom of the plan, Delta BEC 2013

### **2.3 Heritage Surveys**

The known heritage surveys have been completed on the cultural and built aspects of the Saldanha Military base. Archaeological Impact Assessments have been completed for previous proposed development on site<sup>3</sup>. The site is not a declared National or Provisional heritage site<sup>4</sup>.

### **2.4 Archaeology**

The archaeological study has been undertaken by Agency for Cultural Resource Management (refer Annexure 3). The aim of the study is to locate and map archaeological heritage sites/remains that may be negatively impacted by the planning, construction and implementation of the proposed project, to assess the significance of the potential impacts and to propose measures to mitigate against the impacts.

The results of the AIA are as follows:

- Severely damaged/destroyed shell midden deposits were encountered on the steep slopes below the dune cordon on the beach at Tabakbaai.
- Two small patches of shellfish were found alongside the existing diamond mesh fence in Diaz Road at Tabakbaai.
- Fragments of shellfish were encountered in the gravel service road inside the military base at Tabakbaai.
- Extensive shell midden deposits, including a few stone implements were documented on the soft vegetated sands, in a wide arc alongside the service road at Tabakbaai.
- Two World War II underground ammunition bunkers occur between 50-120m from the proposed boundary wall, inside the military base.

The predicted impacts of the proposed development are as follows:

- The gravel service road near Tabakbaai will be widened by about 0.5m, and proposed upgrading of the road will impact on archaeological deposits;
- Excavations for the new security wall might impact on potentially important sub-surface archaeological deposits;
- Unmarked human remains may be uncovered during excavations for the wall foundations.

With regard to the proposed construction of a new boundary wall at the Saldanha Bay Military Base, the AIA recommends:

1. Excavations for the wall foundations alongside Diaz Road/Tabakbaai must be monitored by a professional archaeologist. Should any sub-surface archaeological deposits be

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<sup>3</sup> Agency for Cultural Resource Management: Heritage Impact Assessment For The Proposed Construction Of A Sick Bay Facility On Farm 284/2 Saldanha Bay, December 2011

<sup>4</sup> Personal communication SAHRA 13 February 2013

encountered during monitoring, some sampling may be required.

2. Excavations must also be inspected for fossil content.
3. Upgrading, of the internal service road alongside Diaz Road on military property must not extend more than 0.5m south of the existing road.
4. If any unmarked human remains are exposed or uncovered during excavations, these must immediately be reported to the archaeologists (Jonathan Kaplan 082 321 0172), or Heritage Western Cape (Mr Troy Smuts 021 483 9685). Burials must not be disturbed or removed until inspected by the archaeologist.

## **2.5 Economic growth and development potential of Saldanha**

The development of Saldanha is linked to the sea and the provision of potable water. The area has grown from a small, quiet fishing village to a major centre on the West Coast. The Saldanha-Vredenburg settlement cluster has been identified as one of two “Regional Motors” within the Western Cape (Saldanha Bay Municipality, 2006). Although currently primarily used for fishing and iron-ore exports, the port is increasingly becoming an industrial base for a growing number of steel processing plants and other downstream, value-added activities. The oil and gas industry, mussel farming and sea grass harvesting have also been targeted for industrial development. According to its latest Integrated Development Plan (IDP) (Saldanha Bay Municipality, 2006), the municipality is planning to overhaul, upgrade and expand Saldanha harbour including additional residential and commercial waterfront developments and to extend transportation links to Atlantis and Cape Town. The region’s proximity to Cape Town and major transportation corridors linking road, rail and harbour is a further catalyst to economic growth and development. While Saldanha holds great potential for economic growth, the proposed major diversification away from a heavy dependence on agriculture and fishing toward a greater diversification into manufacturing and tourism restructuring may threaten social cohesion and increase social dislocation since locals do not have the required skill levels to be absorbed by these new sectors (Saldanha Bay Municipality, 2006). However, the fishing industry remains one of the key economic sectors<sup>5</sup>.

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<sup>5</sup> Environmental Evaluation Unit, University of Cape Town (Authors: Dr Hugo van Zyl, Tony Barbour, Dr Ralph Hamann, Mariam January, Ted Plettner and Samantha Williams): Assessment Of Socio-Economic Impacts Of Sea Harvest’s Operations On Saldanha Bay And The West Coast District, December 2007

## 2.6 SITE

### 2.6.1 Background to settlement in Saldanha<sup>6</sup>

Saldanha Bay was not discovered by Antonio de Saldanha, the man whose name it bears. Saldanha visited the Cape of Good Hope in 1503, and Table Bay was originally known as Saldanha Bay. Confusion followed when in 1601, a Dutch seafarer, Joris van Spilbergen, mistook the present Saldanha Bay for Table Bay and since then the name has remained while the original Aguada de Saldanha has become known as Table Bay.

Soon after his arrival at the Cape of Good Hope in 1652, Jan van Riebeeck made contact with the Khoikhoi, the Cochokwa of Saldanha and these people, whom he called Saldanhars, traded regularly their sheep and cattle for copper plate and tobacco at the Dutch fort in Table Bay. In September 1652, Van Riebeeck sent a boat to Saldanha to investigate the trade potential of the area and soon realised that the French were making extensive use of the bay as a halfway station to their Asian colonies.

Prior to the arrival of Van Riebeeck, most of the important bays and waters of South Africa, and particularly along the south and west coasts, were well-known to European navigators. Although the first fishing by the Dutch East India Company (VOC) and Free Burghers took place in Table Bay and the waters of the Salt River, soon the interest was up the southwest coast to Saldanha Bay, where fish were plentiful, and where the large bay affording good, safe anchorages and many landing places.

In 1658, a group of Free Burghers, known as the Saldanha seafarers, obtained rights from the VOC to fish the waters of Saldanha and ferry their catches to the Company's permanent trading post at Table Bay. The Saldanha seafarers had sole rights to the lucrative fishing until 1711, and established small huts for the storage of their nets. One fifth of the catch had to be delivered in salted or dried form: these dried fish was commonly known *bokkoms*.

The Dutch East India Company was anxious to prevent the establishment of a rival French trading post at Saldanha and in 1666 erected a rudimentary military post there. This was soon captured by the French and the guard ejected. In an effort to regain the upper hand, the Dutch removed the French markers in 1667 and in April 1669, established a post office and enlarged the military post to twelve men. France briefly retook the area in 1670, but from that year the Dutch retained full possession until 1795. The VOC's possession was formally confirmed when a visiting commissioner, Arnout van Overbeek, purchased the country from Hout Bay to Saldanha Bay from the Khoikhoi on 19 April 1672, for the sum of four thousand reals of eight.

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<sup>6</sup> <http://capeinfo.com/more/history/166-military-history-of-the-saldanha-bay-area> © Lt Col Ian van der Waag. Lt Col Is on the Editorial Advisory Board of the South African Journal of Military Studies Subject Group Military History Scientoa Militaria issn 1022-8136

<http://www.navy.mil.za/peoplesnavy/saldanha/history.htm>

<http://www.iss.co.za/pubs/asr/4no3/CreatingNewNavy.html>

During the Second Dutch-Khoikhoi war (1673-7), Saldanha Bay stood derelict. However the situation changed dramatically following the arrival of a new governor, Simon van der Stel, in 1679. The post at Saldanha Bay was re-occupied and Van der Stel set about the development of a chain of farms stretching from Table Bay to Saldanha Bay: the territory acquired by Commissioner van Overbeeck. Settlement was made easier after the Cochockwas were defeated in 1689 in an internal Khoikhoi war by a combined Charingurikwa-Namakwa force.

In 1711, the retired Governor Simon van der Stel obtained a five-year lease on the fishing and sealing rights at Saldanha Bay. Plans for development were soon halted by his death a year later. The 1713 smallpox epidemic, which wiped out the local Khoikhoi tribes, brought trade in the Saldanha area to a standstill. The bay, nonetheless, continued to be used as a safe and convenient harbour. Although the bay was surveyed by the Dutch in 1729 and 1738, the lack of an adequate water supply forced Saldanha to play a secondary role to Simon's Bay as the chief alternative to the exposed roadstead<sup>7</sup> at Table Bay.

Saldanha Bay was also not as safe as initially thought. The capture of five VOC merchantmen by the British in 1781 and the entrapment of the Dutch men-of-war under the British Admiral Engelbertus Lucas in 1796 proved that Saldanha Bay was useless to the Cape government unless it was adequately fortified.

Soon after the first British Occupation of the Cape (1795), the new governor, Lord Macartney considered turning Saldanha Bay into a naval fortress: a southern Gibraltar. However the lack of water and the return of the Cape to the Dutch in 1801 put an end to this idea, which was also not resuscitated after the Second British Occupation in 1806.

By 1818, the Cape government had very little ground left around Saldanha Bay, for most of the land had been organised into loan farms. Simon van der Stel's dream had materialized but this lack of Crown property was, in turn, to stunt the development of the area.

Throughout the nineteenth century, various harbour-development schemes failed to get off the ground and gradually Saldanha began to reassume its place as an outpost of the colony: close to Cape Town yet so far in terms of development. The transit of the Irish settlers through Saldanha en route for Clanwilliam in 1820, the guano rush of 1845 and the visit of the Confederate ship ALABAMA in 1863, briefly pulled Saldanha out of obscurity. However, for the last three decades of the 19<sup>th</sup> century, Saldanha assumed the lowliest of roles: that of a quarantine station for British ships infected with smallpox and bubonic plague. The 9th Regiment was quarantined at Saldanha in 1865, after leaving Gibraltar aboard the RENOWN. Saldanha was still such that communication with the rest of the colony could be easily prevented. In the words of McClintock, it was a tiny hamlet "situated in a barren and unproductive country" cut off from the nearest village by "an arid and rugged waste".

Saldanha had a number of superb geographical features, which were extolled by the Cape Attorney General, Sir Thomas Upington in London, at the 1887 Colonial Conference. Upington admonished

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<sup>7</sup> Place for vessels at anchorage

the British authorities for deciding to reduce the defense of the Cape Colony, after merely referring to maps in London and not acquainting themselves with the situation on the ground. While the conference stressed the importance of the Cape peninsula to British strategy, Saldanha did not weigh heavy in the discussions on the defense of the Peninsula despite the role the bay might have played in the occupation of the Cape by the British in 1806.

According to Upington, during war scares, the Cape government was "obliged to keep people on the look-out at Saldanha Bay who, by riding at full speed to the nearest telegraph station, would give us information of any ship or ships anchoring in Saldanha (sic) Bay, and making that a rendezvous and suddenly coming down upon us [at Cape Town]."

Although an ideal port, Saldanha Bay was an undefended port, being neither a military port nor a coaling station and as such had to the minds of the British naval authorities, no strategic value.

During the Second Anglo-Boer War (1899-1902), Table Bay harbour proved inadequate to deal with the sudden and sustained increase in the numbers of ships which were supplying the British Army in South Africa and attention once again turned to Saldanha Bay, which experienced a sudden and enormous increase in mercantile activity.

Increased attention inevitably led to speculation and the Saldanha Bay Harbour and Estate Company was floated under the chairmanship of L.F. Zietsman, a member of the Cape Legislative Assembly, to develop a port at the bay. The planned developments which included a railway line connecting Saldanha to the main-line system at Porterville, a pipeline for the supply of fresh water to what was essentially a 'waterless village', and a harbour works for the loading and unloading of vessels could only take place with the approval of the Cape government. Three private members' bills were subsequently introduced in the Cape parliament. The entire scheme rested on the success of the Saldanha Bay harbour, something that the inhabitants of Cape Town were afraid of. Consequently the Select Committee Votes against the scheme.

In view of this stalemate, the Saldanha Bay Company, in 1904, offered to donate some of its land at Hoedjes Bay to the British government on the condition that they establish a coaling station and docks at some future time. They did this in the hope of increasing the value of their remaining property. The British Commander-in-Chief at Simonstown, Rear Admiral A.W. Moore, nonetheless believed that Hoedjes Bay "would make a very good coaling station, but [was] of the opinion that the Government will do well, in view of probable future requirements, not to part with the best part of the available foreshore". Moore also pointed out that it was very undesirable to establish a coaling station at an undefended port. If commercial interests warranted the establishment of the coaling station, then some light defence was essential for protection against a raid by one or more enemy cruisers.

A fresh attempt was made to pass the bills in 1907 but again did not receive the support of the government. Five years later development at Saldanha received a further setback. The War Office intervened in 1912, when it appeared that the Union government was granting fishing and foreshore rights to private individuals. This the War Office believed would prejudice military and naval

interests and extracted an assurance from the newly formed Union government of South Africa that no development would take place without London's approval.

It was consequently not surprising that Saldanha Bay did not play an important role during the First World War and the area remained on the periphery of defense planning. The German presence in South West Africa (later Namibia) was perceived as the only major external threat to South Africa and all attention was focused on the defense of Kimberley and the far-northern Cape, and the coastal defense of Table and Simon's bays.

Towards the end of the WWI, the Union government began to recognise the strategic significance of Saldanha Bay and the small settlement of Hoedjes Bay, which received village status on 20 November 1916. In 1917, Sir Roland Bourne, South Africa's Secretary for Defence instructed Major J.G.W. Leipoldt to report on the possibility of an enemy raider berthing at Saldanha. Finding the bay practically undefended, Leipoldt reported the potential and very real use of Saldanha as a temporary sea base by an enemy of South Africa. The port officer at Saldanha, who was in telegraphic communication with the Admiralty in Simon's Town, was the area's only defence; and then it would still take five hours after his giving the alarm, before cruisers could be in Saldanha Bay. Leipoldt stated the water shortage at Hoedjes Bay would frustrate any enemy attempt to establish a base. Most of the water sources were at the southern end of the Langebaan lagoon, while the best landing places were further north, near Hoedjes Bay. Having secured a beachhead on the lagoon, an enemy would have to travel 18 miles to the east and establish an advance base on the Berg River. In view of these difficulties, Leipoldt believed an attack made directly on the bay, would be unlikely without the support from a landing somewhere else, such as St Helena Bay, twenty miles to the north. Leipoldt was convinced that Saldanha was only vital to an enemy as a sea base, enabling the landing of heavy stores, which could not be landed anywhere else.

The Leipoldt report on Saldanha remained a strategic working document within the Department of Defence, the Royal Naval establishment at Simon's Town and the South African Railways and Harbours Administration. This report led to the survey operations undertaken by HMSAS PROTEA from 1923.

In 1920, the Lords commissioners of the Admiralty finally granted an interview to representatives of the Saldanha Bay Harbour and Railway Company, who now suggested the development of a submarine and aerial base. Although not interested in acquiring another facility, the Admiralty had identified Saldanha as a port of fuelling and supply, and were no longer opposed to development.

In 1923, following the new line of the Company, the Hoedjes Bay Village Management Board approached Colonel Sir Pierre van Ryneveld, the Director Air Service, to consider Saldanha as a site for an airfield for the fledgling air arm of the Union Defence Force. Nothing materialised although the Union Defence Force in unison with the Admiralty, was re-evaluating its policy and re-aligning its position with regard to Saldanha. Both governments were now greatly interested in the bay, not as an air force base but as an anchorage for war and merchant vessels in time of war.

In 1924 Leipoldt was commissioned to make another survey of the Saldanha Bay area and he suggested the erection of a series of forts at Hoedjes Point, North Bay Point, Elands Point and South

Head Point, which would command the whole entrance to the bay. The PROTEA charted all the principal ports and landing sites along the west coast including Saldanha and St Helena bays. Naval activity began to pick up after the Royal Naval Intelligence Return for 1925 portrayed the Saldanha Bay area as the most likely landing place along the west coast, for an enemy invasion. HMS REPULSE visited the bay in that year and was followed by various combined Union Defence Force-Royal Naval exercises over the following decade: HMS WESTER, HMS MILFORD, HMS DAFFODIL, HMS NEPTUNE and HMS AMPHION all making regular visits.

However, unlike Simon's Town, Cape Town and Durban, Saldanha remained a low priority. The Union government, strapped for cash, hoped that the British would step in and fortify the bay. Fortification was expensive and was not affordable to the Union Defence Force which was not only experiencing enormous budgetary cuts, but was also committed to the fortification of Cape Town and Durban. However, Saldanha would assume considerable importance in time of war and could not be neglected. The Admiralty had earmarked Saldanha as one of two convoy assembly ports in the Union. In 1930, sites for the erection of a Port War Signal Station and Fire Commander's Post were approved. It was decided that these structures together with the gun emplacements would only be erected in the event of war.

In 1938 when the potential for another war in Europe was recognised by the Union Government, Oswald Pirow (Minister of Defence) and Pierre van Ryneveld (Chief of the General Staff), decided to improve coastal defenses with the approval of the estimates for the concrete bases of the fortifications at Durban, Cape Town and Saldanha. These bases would accommodate six-inch mark XIX mobile guns and defense electric lighting. The equipping of what was to become the Saldanha Sub-Fortress had begun.

Following the declaration of war on 6 September 1939, little other action was taken concerning Saldanha. It appeared that South Africa would not be seriously affected by the war in Europe and the Union Defence Force was unwilling to spend large sums erecting coastal defences, which would not be used. The Royal Navy posted an intelligence officer to the bay to monitor shipping. Nothing more was done. However, with the Fall of France in 1940, the situation changed dramatically. The Mediterranean Sea was no longer safe for Allied convoys destined for the Middle East and Far East and these convoys were now diverted around the Cape of Good Hope. This naturally caused congestion at Table Bay and in 1941 plans were prepared for a harbour at Saldanha Bay to relieve pressure at the Cape.

Prior to the attack on Pearl Harbor, the United States who wished to project her naval power by establishing a chain of bases and having already received long-term leases on naval facilities in Newfoundland, Bermuda and the Caribbean, wished to obtain the use of Saldanha Bay: a move that would project American power right across the Indian Ocean. The opposition National Party gained wind of the negotiations before anything could eventuate and the whole matter seemed to have been shelved, although the British later used Langebaan as a small fleet air-arm base (Catalinas of 262 Squadron RAF).

The entrance of Japan and the United States into the war at the end of 1941 and the Fall of Tobruk in 1942, resulted in Saldanha, now urgently required as a relief harbour. It became a defended port



in June 1942 and for the first time. The South African Seaward Defence Force and a Minesweeping flotilla was established in Saldanha in 1942 for seaward and harbour protection. On Baviaanskop, Elands Bay, Malgaskop and Hoedjiespunt, 6 inch and 12 inch guns were installed. Anti-submarine nets were laid in North Bay and eight lines of moored mines and a control centre on land protected the entrance of Saldanha Bay. Members of the South African Women's Auxiliary Naval Services, previously known as SWANS manned the controls and detection equipment.

Both flanks of the entrance to the bay were adequately protected against surface raiders. A good supply of fresh water was finally laid on by the South African Engineers Corps. Saldanha's largest problem, which for centuries had effectively diverted large-scale settlement and development to what became Cape Town, had been solved.

Between June 1942 and September 1943, nearly 450 ships had called in and dropped anchor in the bay. All the British living quarters became the property of the SA Navy on 14 June 1944. In 1948 the training establishment HMSAS Field Marshall Smuts moved from Saldanha to Salisbury Island in Durban. However, the base at Saldanha soon reverted to a training atmosphere in 1951 when the Naval Gymnasium was set up with 44 trainees reporting for a year's training.

Before the unit was christened *SAS Saldanha* on 1 March 1956, it was known as the "Naval and Marine Gymnasium" and "*SAS Drommedaris*." With the implementation of 12 months compulsory National Service, *SAS Saldanha* started training recruits from both the National Service and the Permanent Force. Two important dates in the unit's history are 20 March 1981 when the Freedom of Vredenburg/Saldanha was awarded to the unit, and 30 March 1990 when the Unit Colour was awarded to the unit.

In May 1989 *SAS Saldanha* became a Naval Base with the added responsibility to still function as a unit. This was maintained until 1990 when, due to rationalisation, it reverted back to a pure training unit. From these humble beginnings, emerged one of the cornerstones of the modern South African Navy, and one of the premier military training establishments on the continent.

The training that currently takes place at *SAS Saldanha* is divided into three parts, namely the NGP (MSD) Training, Military Training for Ratings Part 2 (MTR 2) and Military Training.

As part of the process of political and constitutional reform in South Africa, the new South African National Defence Force (SANDF) came into being on 27 April 1994. This new defence force consists of the statutory forces, the South African Defence Force (SADF), the four homeland armies and the non-statutory forces of the various political parties, such as Umkhonto we Sizwe (MK), the military wing of the African National Congress (ANC), the Azanian People's Liberation Army (APLA) of the Pan-Africanist Congress (PAC) and a few smaller paramilitary groupings.

The South African Navy attempted to meet the challenges accompanying the integration process. The first intake of former MK recruits occurred at the SA Navy's basic training base at South African Ship Saldanha (*SAS Saldanha*). While large-scale problems have been experienced in the integration process elsewhere in the SANDF, this study will attempt to determine why *SAS Saldanha* appears to have been successful in creating a new Navy.

Prior to 1991, SADF policy stipulated that the SA Navy was only allowed to recruit amongst 'White', 'Coloured' and Asian members of the South African population for its permanent force and national service contingents. Permission to recruit Black officers was obtained in 1991, resulting in the recruitment of eleven Black midshipmen.

It was, however, only with the demise of compulsory white military conscription in 1993 that Blacks entered the Navy in significant numbers, with the first major Black intake arriving at SAS Saldanha Naval Training base in September of that year. At that stage the Navy had very little experience in the training of Black sailors and expectations were based to a large extent on the experiences of the other arms of service and private sector organisations



**Aerial Photograph 2.1:** 1938 image of Saldanha with Military Base visible with little development on site other than the original farm settlement and associated cultivated fields (indicated in red circle) and no development on its boundaries, National Geo- Spatial Information, Rural Development Department, 2013



**Aerial Photograph 2.2:** 1960 image of Saldanha with Military Base visible with little development on its boundaries, National Geo- Spatial Information, Rural Development Department, 2013





**Aerial Photograph 2.3:** 1968 image of Saldanha with Military Base visible with the establishment of the Diazville and White City Townships and Diaz road on the northern boundaries of the Military Base, National Geo- Spatial Information, Rural Development Department, 2013



**Aerial Photograph 2.4:** 1980 image of Saldanha with Military Base visible with the increased in the development of Saldanha town, Diazville and White City Township with Diaz Road on the northern boundaries of the Military Base, National Geo- Spatial Information, Rural Development Department, 2013





**Aerial Photograph 2.5:** 2000 image of Saldanha with Military Base visible with the increased in the development of White City residential area within the former Military site, indicated with yellow dot, National Geo- Spatial Information, Rural Development Department, 2013





**Aerial Photograph 2.6:** 2010 image of Saldanha with Military Base visible with the increased in the development of White City residential area within the former Military site, indicated with yellow dot, National Geo- Spatial Information, Rural Development Department, 2013



## 2.6.2 Land Use

The Military site has a varied topography with its coastal conditions (sandy beaches, bay, cliffs), mountainous ridges and wetland areas (refer Photographs 2.1 -2.25 and Aerial Photograph 2.6). The site is formally used by the SANDF for administration, military training, residential and recreational purposes, and illegally by certain local residents. There are numerous administration, residential, storage, recreational and training structures and grounds, including the harbour. The majority of the SANDF personnel reside on the site while many senior personnel stay in the town.

## 2.6.3 Site Spatial Analysis

The **Vistas** of the site include the following:

- Open: –to the public residential areas, coast and horizon and the mountainous ridges;
- Semi closed: - coastal bays and the site’s varied precincts with views contained by site’s topography, vegetation and the ridges of the land forms;
- Distant: from certain site precincts views towards Pacific Ocean.

**Positive features** on the site include the vistas’ of and from the site and the context on the scenic peninsula. Views to the site from the public domain are predominately from the Diaz Road and the adjacent residential precincts. The elevated residential precincts enjoy vistas over part of the military site.

## Landscape Features

The site’s dominant landscape features are the large tracts of land between mountainous ridges, coastlines and the nodes of development precincts. These areas consist of military training grounds, sports fields and facilities, indigenous vegetated areas, horse paddocks and a disused golf course. Mature Eucalyptus trees are situated in the context of the developed nodes.

## 2.6.4 Character Features

The main **design patterns** of the site are follows:

- Cadastral boundaries;
- Defining infrastructure and urban development of buildings, structures and roadways;
- Indigenous vegetation;
- Few mature Eucalyptus trees associated with the site’s developed precincts;

## 2.6.5 SITE PHOTOGRAPHS



*Photograph 2.1: Saldanha Military Area: Coastal plains landscape with mountainous ridge in background, 2013 O'Donoghue*



*Photograph 2.2: Diazville residential area opposite the Saldanha Military site: 2013 O'Donoghue*



*Photograph 2.3: Saldanha Military site: Northern boundary conditions: Formal residential development adjacent to site (indicated with arrow), 2013 O'Donoghue*



*Photograph 2.4: Saldanha Military site: Military structures in isolated positions along the northern boundary precinct, 2013 O'Donoghue*

### **CURRENT BOUNDARY CONDITIONS**



*Photograph 2.5: Saldanha Military site: View from residential areas north of Military site, viewing south. Military structures in isolated positions along the northern boundary precinct (indicated with red circles, 2013 O'Donoghue)*





Photograph 2.6: Saldanha Military site: Existing wire mesh fence on coastal boundary (site to right) Municipal recreational centre and formal residential area in background (identified with arrows), 2013 O'Donoghue



Photograph 2.7: Saldanha Military site: Coastal conditions where a wire fence is proposed perpendicular to the coastline, 2013 O'Donoghue



Photograph 2.8: Saldanha Military site: existing fence boundary definition (right) at the site's north western corner opposite the municipal recreation centre (left), 2013 O'Donoghue



*Photograph 2.9: Saldanha Military site: existing vibracrete wall defining site and municipal land, position of proposed wall, 2013 O'Donoghue*



*Photograph 2.10: Saldanha Military site: existing vibracrete wall that is vandalised and stolen defining site and municipal land; position of proposed wall, 2013 O'Donoghue*



*Photograph 2.11: Saldanha Military site: existing vibracrete wall defining site and formal housing development, position of proposed wall on boundary of urban development, 2013 O'Donoghue*



*Photograph 2.12: Saldanha Military site: Diaz Road with site (right) and residential suburb Diazville (left). Proposed wall will be constructed on site boundary where existing damaged fence is located, 2013 O'Donoghue*



*Photograph 2.13: Saldanha Military site: Diaz Road with site on right opposite residential suburb Diazville. Proposed wall will be constructed on site boundary where no boundary definition remains, 2013 O'Donoghue*



*Photograph 2.14: Saldanha Military site: Boundary of site and formal residential area. Vibracrete wall is constantly damaged and residents dump waste on site, 2013 O'Donoghue*





*Photograph 2.15: Existing structure (hall) constantly damaged by local residents. Mrs Mkebi reportedly hosted a major event at this venue c 2007 when the building was in excellent condition, 2013 O'Donoghue*



*Photograph 2.16: Saldanha Military site: Proximity of formal residential development to military structures and ease of accessibility for trespassing, 2013 O'Donoghue*



*Photograph 2.17: Saldanha Military site: View of military structures situated adjacent to Diaz road. These buildings are constantly vandalised to the extent of non-functionality. Proposed wall will define site boundary adjacent to Diaz Roadway (foreground), 2013 O'Donoghue*



*Photograph 2.18: Saldanha Military site: Existing structure (residence) that has become inhabitable due to theft and vandalism, 2013 O'Donoghue*



*Photograph 2.19: Saldanha Military site: Example of historic building that is vandalised. Note mature Eucalyptus trees planted in context of buildings, 2013 O'Donoghue*

## **HOUSING**



*Photograph 2.20: Existing disused military infrastructure (railway line) situated adjacent to RDP housing development on former Saldanha military land, 2013 O'Donoghue*





*Photograph 2.21: Non-defined housing development on former Saldanha military land. Military structures (right of housing) are an electrical substation and a WW2 bunkers both under threat of constant vandalism from civilians, 2013 O'Donoghue*



*Photograph 2.22: Existing gravel roadway adjacent to non-and ill-defined boundary between site and housing development. Trees required to be removed due to proposed developed are circled, 2013 O'Donoghue*



*Photograph 2.23: Example of steel palisade fence erected around municipal substation to prevent theft and vandalism. Reportedly this palisade fencing is not considered to provide sufficient security, 2013 O'Donoghue*



*Photograph 2.24: Example of steel palisade fence erected around the clinic to give protection to staff, their vehicles and the building, 2013 O'Donoghue*



*Photograph 2.25: Saldanha Military Area: Example of residents from the adjacent residential area making use of the military base for leisure, 2013 O'Donoghue*



## SECTION 3 SITE IDENTIFIED HERITAGE RESOURCES & HERITAGE DESIGN INDICATORS

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### 3.1 INTRODUCTION

The spatial and historical analysis of the site informs the heritage informants and provides the basis for the heritage impact assessment. South Africa's heritage, shaped by nature and history, is an inheritance passed from one generation to the next. Heritage places have a range of values that communities recognise.

### 3.2 IDENTIFIED HERITAGE RESOURCES

The sites identifiable heritage resources are:

- Natural landscape features such as coastal plains, wetlands, mountainous ridges, coastal environment;
- Cultural landscape features such as mature Eucalyptus trees on the development precincts;
- Structures that relate to the World War 1 and World War 2;
- Military parade grounds and historic military precinct;
- Intangible heritage, for example the transformation of the SANDF Navy personnel with respect to race.

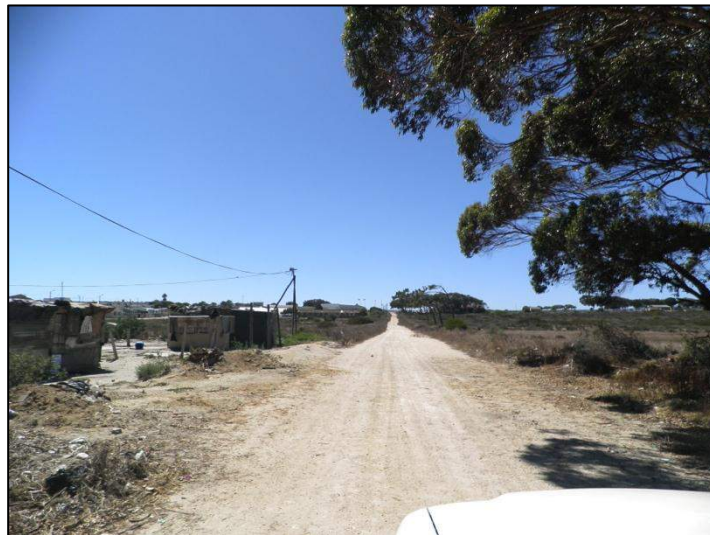
The heritage resources that are in context of the proposed development are the 3 mature Eucalyptus trees on the alignment of the existing gravel roadway and the WW2 underground ammunition bunkers that occur between 50-120m from the proposed boundary wall, and service roads inside the military base (refer to Photographs 3.1 – 3.3).



*Photograph 3.1: Saldanha Military site: one of two bunkers dating from WW2. The steel door to the entrance of the bunker has been stolen. The bunker is sued for vandalised (refer photo below) 2013 O'Donoghue*



*Photograph 3.2: Saldanha Military site: interior of one of two bunkers dating from WW2. The steel door to the entrance of the bunker has been stolen. The bunker is sued for vandalised (refer photo below) 2013 O'Donoghue*



*Photograph 3.3: Saldanha Military site: existing mature exotic Eucalyptus trees (right along existing gravel roadway) that will be removed for the proposed development, residential area White City (left), 2013 O'Donoghue*





**Diagram 3.1:** Saldanha Military site: proposed significant identified heritage resources: Entire site (natural and cultural landscape of significant historic, aesthetic intangible heritage resources), WW1 and WW2 defence structures and weaponry, historic military precinct and harbour.

### 3.3 PROVISIONAL STATEMENT OF CULTURAL SIGNIFICANCE

#### 3.3.1 Introduction

The following categories of significance of heritage resources are attributed in varying degrees to the site's cultural heritage significance: aesthetic significance, associational and historical significance.

#### 3.3.2 Contextual Significance

##### Description

The report considers the context of the site in terms of its historical and cultural significance. The Saldanha town was established as Hoedjiesbaai in the early 20<sup>th</sup> c and the development of a harbour

occurred in the early 20<sup>th</sup> c. The immediate context of the site is residential development and harbour infrastructure.

#### **Assessment**

The context of the site **is assessed** as significant in terms of the evolution of cultural landscapes and settlement patterns as stipulated in section 3 (3) of the NHRA.

#### **Grading**

The context is assessed to have contextual significance to meet the requirements of Grade IIIC in terms of Section 7 (1) of the NHRA.

### **3.3.3 Aesthetic Significance**

#### **Description**

#### **Assessment**

The site is of **high** aesthetic and spatial significance and does contribute to the high aesthetic value and significance of the Saldanha townscape. The site in its context is assessed to meet the following criteria stipulated in section 3 (3) of the NHRA:

- Importance to a community for its aesthetic characteristics value by the community;
- Importance to its contribution to the aesthetic value of the setting contributing to the identified aesthetic qualities of the cultural environs within which it is located.

#### **Grading**

Given the landscape qualities of the site, the site is assessed to have aesthetic qualities, which make it significant in terms of the local area. Given this significance, the site is considered to meet the requirements of Grade IIIA in terms of Section 7 (1) of the NHRA.

### **3.3.4 Architectural Significance**

#### **Description**

The historic WW1 and WW2 structures on the site are varied and numerous.

#### **Assessment**

The historic structures on the site are assessed to have architectural significance in terms of Section 3 (3) of the NHRA.

#### **Grading**

The Architectural significance is assessed to have significance to meet the requirements of Grade IIIA in terms of Section 7 (1) of the NHRA.

### **3.3.5 Historical Significance**

The site is of high historic significance linked to the early defence of the Cape and the involvement in the WW1 and WW2.

#### **Assessment**

The site is assessed to meet the following criteria stipulated in section 3 (3) of the NHRA:

- Importance in the evolution of cultural landscapes and settlement patterns;

#### **Grading**

The site is assessed to have special qualities, which make it historically significant in terms of the local area. Given this significance, the site is assessed to meet the requirements of Grade IIIA in terms of Section 7 (1) of the NHRA.

### 3.3.6 Scientific Significance

The degree of scientific significance of the site is assessed in relation to its involvement with its military historic is unknown and a proposed grading cannot be proposed.

### 3.3.7 Social Significance

#### Description

Prior to 1991, SANDF policy stipulated that the SA Navy was only allowed to recruit amongst 'White', 'Coloured' and Asian members of the South African population for its permanent force and national service contingents. Permission to recruit Black officers was obtained in 1991, resulting in the recruitment of eleven Black midshipmen. It was, however, only with the demise of compulsory white military conscription in 1993 that Blacks entered the Navy in significant numbers, with the first major Black intake arriving at SAS Saldanha Naval Training base in September of that year.

#### Assessment

The site is assessed to meet the following criteria stipulated in section 3 (3) of the NHRA:

- Importance in the community and pattern of South Africa's history;
- Its potential to yield information that will contribute to an understanding of SA cultural heritage;
- Its potential to yield information that will contribute to an understanding of SA natural heritage.

#### Grading

The site is assessed to have social significance to meet the requirements of Grade IIIA in terms of Section 7 (1) of the NHRA.

## 3.4 HERITAGE DESIGN INDICATORS

The heritage design indicators for the site are created in order to guide decisions on the any development proposals on site. The following section deals with the specific features on the site, namely landscape features, land use, and surrounding urban context.

### 3.4.1 Landscape Features

The site situated on the Saldanha peninsula has natural and aesthetic attributes, such as mountainous ridges, indigenous vegetation, coastal plains and wetlands. Few exotic trees are planted in association with the developed precincts on site.

#### Landscape Feature Indicators

The natural coastal landscape with the mountainous ridges are aesthetically and of value. The Exotic trees within the site's developed precinct are historical and to a less degree aesthetically significant than the surrounding topography. Development on site should consider the least disturbance of the natural vegetation and wetland. The retention of the historic trees within the development area should be considered. If the existing mature trees along the development area are to be removed, replacement trees should be proposed.

### 3.4.2 Land Use

The land use of the site is varied within the site and is separated into precincts. The linear area identified for proposed development has a circulation function with the existing access roads.

**Land Use Indicator**

The SANDF requirements and site's scale has resulted in various uses on site in a dispersed manner. Concentrate all new development within the main development precinct or within the northern boundary precinct prior to the site boundary on Diaz Road.

**3.4.3 Surrounding Urban Context**

The surrounding urban development ranges from the early 20<sup>th</sup> c until the 1990 and 2000 when low cost residential development, White City was constructed on the site's former northern precinct.

**Surrounding Context Indicator**

The site's surrounding northern urban context is not identified of heritage significance. Development on the northern boundary site will not impact negatively on its immediate neighbouring urban context. Development within the coastal precinct is sensitive and requires the appropriately sensitive response.

**3.4.4 Design and Use of Materials**

In the context of a variety of structures and buildings without any apparent domination of any, the design of proposed structures is required to be functional low maintenance.

The material should be robust and design detailing simple. Colour of new structures should be as muted tones.



## SECTION 4 DESIGN PROPOSALS

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### 4.1 DESIGN PROPOSALS

The DPW proposes to define the Saldanha Military base northern boundary in the following way:

- Reinforced concrete wall 3 200mm high and 120mm wide consisting of vertical posts at 6 600mm centres and 3 horizontal concrete slabs slotted between the vertical posts;
- Wire mesh fence 3000 mm high within the immediate context of the coastline;
- Gravel service roads of 2.5m wide adjacent to the proposed wall and fence – one existing road will be widened and upgraded;
- Gatehouse with bathroom, kitchenette, office (refer Images 4.1 & 4.2 and Drawing 4.1 and plans Annexure 4).

These boundary structures are required in order to protect the site's structures, goods and personnel from crime, theft and vandalism that are currently occurring.

The design of the proposed boundary walls and fencing is informed by:

- Adjacent boundary conditions (either residential precinct, coastline or roadway);
- Robust structure that is deemed difficult to scale and damage;
- Low maintenance materials that are difficult to damage and do not require regular maintenance procedures;
- Gatehouse close to the site's formal entry point and the adjacent South African Police Services Station.

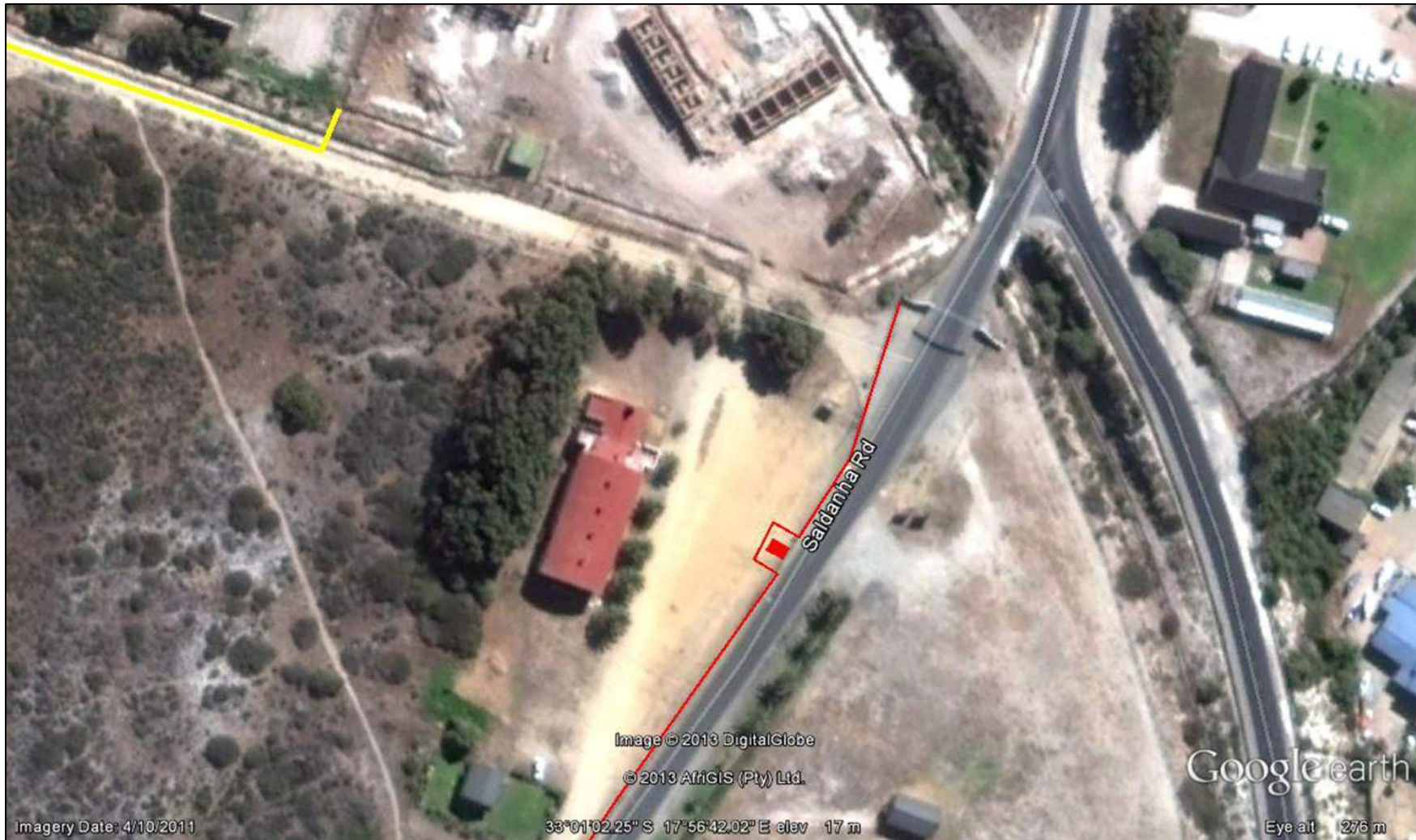
The wall material proposed is reinforced concrete which will be strong enough to withstand vandalism and not be easily scalable. Internal service roads would be situated parallel to the new security wall when situated immediately adjacent to the residential precinct. When the wall runs along Diaz Road for two sections, only a singular one service road is proposed.

The concrete wall is reinforced with a 152 x 152 x 23 kg/m steel H section. The wall will be partially constructed off site: the vertical posts at 6600mm centres will be constructed on the 1000 x 1000mm foundations on site. The reinforced concrete panels will be constructed off site and brought to site using the necessary equipment, slotted between the vertical posts. The panels will have one smoother side due to the construction methods of using shutterboards.

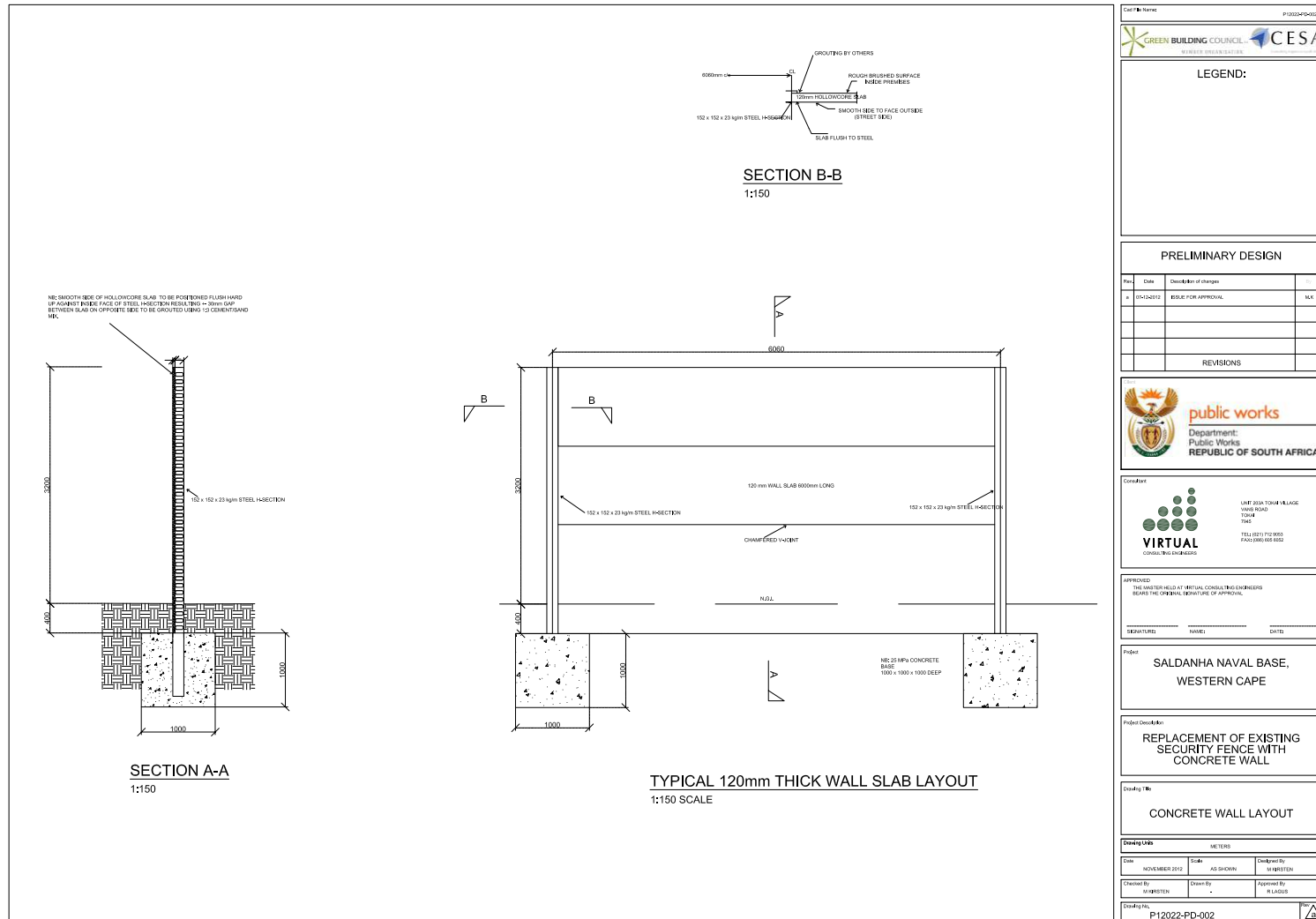
At regular intervals adequate lighting is proposed on light posts separate to the wall and fence structure. Lighting will be used to maintain a secure environment in the immediate context of the wall.







**Image 4.2:** Proposed wall (red) with gatehouse (red block) in the context of the site's formal entrance on the north eastern boundary, Delta BEC 2013



**Drawing 4.1:** Proposed concrete wall, section and elevation, Delta BEC 2013

## SECTION 5 ASSESSMENTS OF PROPOSALS

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### 5.1 INTRODUCTION

The development proposals are assessed on the potential impact on the identified significant heritage resources, namely the position and design and the proximity in relation to the site and context heritage resources.

### 5.2 ASSESSMENT OF PROPOSAL

#### 5.2.1 Position & Design of Walls and Fencing

##### Assessment of Position and Design

The position of the proposed wall and fence is determined by the site's boundary and the desire to place a service roadway the wall and the boundary which is situated adjacent to the existing low cost housing and Diaz Road. The proposed palisade fence is adjacent to the Diaz road for a short section, within 100m of the high coastal watermark. Although a few exotic trees of low significance will be impacted, new landscaping can mitigate their loss. The wall and fence will be constructed on natural ground levels.

The proposed position and design of the boundary walls and fencing is supported by the HIA. The majority of the wall is positioned adjacent to existing residential development of a similar scale. The fence positioned in the immediate context of the coastline is visually permeable and readily removable.

#### 5.2.3 Position & Design of service roadways

##### Assessment of Position and Design

The position of the proposed 2 500mm wide gravel surfaced service roadways on either side of the proposed wall are for security of the military base, maintenance of the walls, prevention of informal structures building adjacent to the walls and vehicular and pedestrian access for White City residents. Where the existing gravel roadways will be utilised if in the desired alignment otherwise new gravel roadways will be constructed. The design of the gravel service roadways is determined by cost and functionality.

The proposed position and design of the service roads is supported by the HIA. The gravel surface is consistent with the site's existing internal roads and will not negatively impact the locally significant site landscape and aesthetic qualities. Where it is unavoidable, the 3 mature Eucalyptus trees will need to be removed to allow for the development, but can be replaced. The service roads allow the proposed infrastructure to be maintained and will be utilized as an access road by the adjacent residents.

#### 5.2.4 Architectural Language of the proposed wall

The proposed architectural language of the proposed wall is based on functionality and securing. The reinforced concrete slabs and posts will be constructed in a natural concrete colour.

The proposed architectural language of the wall is supported by the HIA. The design of the wall is simple and the colour will fade and mottle over time.

### 5.2.5 Hard and Soft Landscaping

No Landscaping is proposed with the proposed boundary wall, fence, gatehouse and service roadways

**The no landscaping proposal is not supported by the HIA. The site formal landscaping on site is associated with development on site and although the climatic conditions are harsh, certain indigenous landscaping of stature can be implemented for the enhancement of the site.**

### 5.2.6 Assessment Summary for Proposals

The assessment of the design proposals for the Saldanha Military Base is evaluated using the following criteria:

- **Nature of the impact:** Do the proposals have a positive or negative impact of the identified heritage resources on the site? This impact is on the different values of the site i.e. the aesthetic, architectural, historical, scientific, social, technological, spiritual and/or linguistic.
- **Extent of the impact** (positive or negative); does the impact extend beyond the immediate site boundaries (the greater context, the town, the region or the national scale);
- **Duration of the impact:** What is the lifespan of the impact (short term, medium term, and long term); is the impact revisable?
- **Intensity of the impact:** Can the intensity of the impact be described (low, medium or high)?
- **Probability of the impact:** What is the likelihood of the impact occurring (high, medium, low)?
- **Confidence of the specialist** What is the confidence of the heritage specialist in determining the levels of impact (high, medium, low)?

The Impact significance is determined through a synthesis of the aspects mentioned above (low, medium, high, very high).

Table 5.1: Assessment of proposed development

DESIGN PROPOSAL	TYPE OF IMPACT						IMPACT SIGNIFICANCE
	Nature of impact	Extent of impact	Duration of impact	Intensity of impact	Probability of impact	Confidence of specialist	
<b>PLACEMENT OF WALL, FENCE, SERVICE ROADS AND SECURITY HOUSE</b>	Positive	Site & immediate Context	Long term	High	Highly Probable	High	Positive
<b>LANDSCAPING</b>	Neutral No landscaping	Site & Context	Medium term	High	High	High	Negative
<b>ARCHITECTURE</b>	Positive	Site & Context	Long term	High	Medium Probable	High	Positive

The HIA assesses the impacts to the historic military precinct and historic defence structures on the Saldanha Military Base and SA Training Academy from the proposed development to be minor.

## **SECTION 6 VISUAL IMPACT ASSESSMENT**

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### **6.1 INTRODUCTION**

The VIA sets out to identify and quantify the possible visual impacts related to the proposed development, including related infrastructure, as well as offer potential mitigation measures, where required.

### **6.2 DEFINITION OF VISUAL IMPACTS**

The word 'visual' is used in the report is taken from the broadest meaning to include visual, scenic, aesthetic and amenity values represented by the built and natural environment, which in totality can be described as a the area's sense of place.

### **6.3 METHODOLOGY**

The study was undertaken using Geographic Information Systems (GIS) software as a tool to generate view shed analyses and to apply relevant spatial criteria to the proposed facility. The approach utilised to identify issues related to the visual impact included the following activities:

- The creation of a detailed digital terrain model (DTM) of the potentially affected environment;
- A photographic survey of the site and the surrounding area including views from various routes and important viewpoints;
- The sourcing of relevant spatial data. This included cadastral features, vegetation types, land use activities, topographical features, site placement, etc.;
- The identification of sensitive environments upon which the proposed development could have a potential impact;
- Delineation of the view catchment area;
- Rating of potential visual impacts using qualitative criteria such as compatibility with the existing landscape;
- The creation of viewshed analyses from the proposed development area in order to determine the visual exposure and the topography's potential to absorb the potential visual impact. The viewshed analyses take into account the dimensions of the proposed structures;
- The creation of the site's slope analysis;
- Formulation of mitigation measures to minimise potential VIA of the proposed development.

### **6.4 CRITERIA USED IN THE ASSESSMENT OF VISUAL IMPACTS**

#### **6.4.1 View Points and View Corridors**

Viewpoints have been selected based on prominent viewing positions in the area, such as Diaz Road as it runs parallel to the site between Saldanha Main road and the coastline. View corridors are represented by this route in addition to those from the Military site and the local residential areas. Local topography, mountain ridges in the middle ground, vegetation, existing structures and road alignments determine the viewing experience of the viewers. The selected viewpoints and view

corridors are used as a basis for determining potential visual ability and visual impacts of the proposed development.

#### **6.4.2 Visual Exposure**

The visibility or visual exposure of any structure or activity is the point of departure for the visual impact assessment. It stands to reason that if the proposed walls, fencing, gatehouse and service roadways were not visible, no visual impact would occur. Visual exposure is determined by the viewshed or the view catchment being the area within which the proposed development will be visible. The viewshed boundary tends to follow ridgelines and highpoints and usually has view shadows' where development would be less visible. Although the viewshed tends to be defined by topography, features such as structures, trees would influence visual exposure at a more local scale.

#### **6.4.3 Determine Visual Distance / Observer Proximity to the facility**

In order to refine the visual exposure of the development of a linear structure on surrounding areas / receptors, the principle of reduced impact over distance is applied in order to determine the core area of visual influence for each type of structure. Proximity radii for the proposed development site are created in order to indicate the scale and viewing distance of the facility and to determine the prominence of the structures in relation to their environment. The visual distance theory and the observer's proximity to the facility are closely related, and especially relevant, when considered from areas with a high viewer incidence and a predominantly negative visual perception of the proposed facility.

#### **6.4.4 Determine Viewer Incidence / Viewer Perception**

The number of observers and their perception of a structure determine the concept of visual impact. If there are no observers, then there would be no visual impact. If the visual perception of the structure is favourable to all the observers, then the visual impact would be positive. It is therefore necessary to identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the proposed development and its related infrastructure. It would be impossible not to generalise the viewer incidence and sensitivity to some degree, as there are many variables when trying to determine the perception of the observer; regularity of sighting, cultural background, state of mind and purpose of sighting which would create a myriad of options.

#### **6.4.5 Visual Sensitivity**

Visual sensitivity can be determined by the number of factors in combination, such as prominent topographic or other scenic features, such as:

- High points ridges and spurs (visible from a greater distance and determines the horizon effects);
- Steep slopes (tends to be more prominent and visible from a distance);
- Axial vistas.

#### **6.4.6 Landscape Integrity**

Landscape integrity is visual qualities represented by the following qualities, which enhance the visual and aesthetic experience of the area:

- Intactness of the natural and cultural landscape;
- Lack of visual intrusions or incompatible structures;



- Presence of strong ‘sense of place’.

#### **6.4.7 Determine the Visual Absorption Capacity (VAC)**

The VAC is the capacity of the receiving environment to absorb the potential visual impact of the proposed facility. The VAC is influenced by the amount and scale of topography, vegetation and urban developments (scale, density and continuity). These have the capacity to ‘absorb’ visual impact. The digital terrain model utilised in the calculation of the visual exposure of the facility does not incorporate potential visual absorption capacity (VAC). It is therefore necessary to determine the VAC by means of the interpretation of the vegetation cover, topography and structures.

#### **6.4.8 Visual Sensitivity Synthesis**

A synthesis of the main visual sensitivity factors was created based on the following:

- View catchment areas (visual exposure);
- Visibility (relative distance from visually sensitive viewpoints or routes);
- Visual sensitivity (prominent topographical or scenic features);
- Landscape integrity (natural and cultural intact landscapes).

### **6.5 ASSESSMENT OF VISUAL IMPACTS OF PROPOSED DEVELOPMENT**

The potential visual impact of the proposed development can be determined by comparing the layout plan with the visual sensitivity synthesis.

The proposed walls, fencing, service roadways and gatehouse are located adjacent to existing infrastructure (residential areas and roadways). The proposed fence is located in the coastline section of the boundary and for a section on the beach. The visibility of the walls will only be on a section from Diaz Road (refer Map 4). The Diaz Road curve and local topography reduces and restricts views of the proposed wall from the major viewpoints. From within the site, the visibility is from the internal roadways, training and facilities and residential areas. Only a section of the permanent buildings on the base are situated within the close range of view (near distance 0 – 500m) (Refer Map 3). The proposed wall is situated on a low level terrain, so the visual impact is reduced as it blends in with the adjacent building and infrastructure.

#### **6.5.1 Potential Visual Exposure**

The result of the viewshed analysis for the proposed facility is shown on the Map 2. The viewshed analysis was undertaken at offsets of 3.2m above average ground level (i.e. the maximum height of the proposed wall). This was done in order to determine the general visual exposure of the area under investigation, simulating the proposed structures associated with the facility. This viewshed analysis indicates areas from which the proposed wall and fence would be visible.

It is clear from the viewshed analysis that the proposed wall is likely to be potentially visually exposed to varying degrees to an area within approximately 1.5km of the proposed structure. The majority of Diazville falls outside the viewshed due to topography and development. The existing urban development and topography on the site’s northern boundary restricts views onto the site from areas north of the site, such as the historic Saldanha settlement and majority of Diazville.

### 6.5.2 Visual distance / observer proximity to the facility

The proximity radii are based on the anticipated visual experience of the observer over varying distances. These proximity radii (calculated from the boundary lines of the farms) are shown on Map 3 and are as follows:

0 – 0.5km	Clearly noticeable within the observer’s view frame if no visual obstruction is present;
0.5 – 1km	Moderately visible, recognisable features within observer’s view frame;
1 – 1.5km	Marginally visible, not particularly noticeable within observers view frame;
1.5 – 4km	Hardly visible, practically not visible unless pointed out to observer;
4 km plus	Long distance view where the facility would become part of the visual environment, but could still be visible and recognisable. This zone constitutes a low/no prominence.

The residential development adjacent to the proposed service roadway does not have windows onto the Military site. Views therefore of the proposed wall are from between the gardens of the private house built on the boundary of the site. When the wall is proposed adjacent to Diaz Road, all users of the road and certain sections of Diazville will have high visibility of the proposed wall due to its immediate proximity to the site. The Military residential, administration and training facilities within the middle distance will have a moderate visibility of the wall.

### 6.5.3 Viewer incidence / viewer perception

Public viewer incidence of the proposed wall is calculated to be the highest along the portion of the proposed wall when it is erected adjacent to Diaz Road. This occurs in two sections: opposite a section of Diazville and a small section in the Military Clinic precinct.

Viewer incidence is calculated to be low and minimal when it is adjacent to the existing Saldanha settlement and White City residential settlement. Medium viewer incidence is from portion of the military administration base. Other military developments outside the 1km distance zone will have a marginal view as the proposed wall will be viewed as a component of the existing residential settlements. All views over 1,5km range will have a negligible view of the proposed wall due to the low topography and existing development adjacent to the proposed wall.

Pedestrians and motorists travelling on Diaz Road in the short and medium distance of the site are seen as possible sensitive visual receptors upon which the presence of the proposed wall and fence could have a negative visual impact. The entire wall is only visible at 1km distance from one vantage point, on the Military site, the top of the ridge above the Military training facilities. This distant view is assessed as a low impact view.

### 6.5.4 Visual Absorption Capacity

The existing structures, infrastructure adjacent to the entire length of the wall in addition to the rear view mountainous slopes on a section of the proposed wall are a high visual absorption capacity. The highest VAC is White City adjacent to the site. The fence on the site’s coastline boundary will not provide a visual impact as the fence is visually permeable. The proposed fence perpendicular to the coast along the sandy beach will provide a negative visual impact to beach and the recreational

centre's users, even though the fence is visually permeable. The visual impact is due to the obstruction to the setting of a natural landscape. As part of the proposed wall closest to site's core development has military structures restricting immediate views, in addition to a mountainous ridge backdrop, the viewer impact is significantly reduced by the VAC.

The Visual Absorption Capacity (VAC) of the receiving environment is deemed to be:

- Low by virtue of the low vegetation;
- Medium in terms of the existing infrastructure, such as on the site's boundaries and Diaz Road adjacent to the site;
- High in terms of existing built environment: on site and immediately adjacent to the site;
- Medium in terms of landform as existing topography limits views onto the site and context and provides a backdrop to the site.

## 6.6 VISUAL IMPACT ASSESSMENT: METHODOLOGY

The previous section identified specific areas where the potential visual impacts would occur and their magnitude. This section will attempt to quantify these potential visual impacts in their respective geographical locations and in terms of the identified issues related to the visual impact.

The methodology for the assessment of potential visual impacts states the **nature** of the potential visual impact (e.g. the visual impact on users of roads in the vicinity of the proposed development and includes a table quantifying the potential visual impact according to the following criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, where it will be indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. Scores are: site only (very high = 5), local (high = 4), regional (medium = 3), national (low = 2) or international (very low = 1).
- The **duration**, where it will be indicated whether:
  - \* the lifetime of the impact will be of a very short duration (0–1 years) assigned a score of 1;
  - \* the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - \* medium-term (5–15 years) – assigned a score of 3;
  - \* long term (> 15 years) - assigned a score of 4; or
  - \* permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  - \* 0 is small and will have no effect on the environment;
  - \* 2 is minor and will not result in an impact on processes;
  - \* 4 is low and will cause a slight impact on processes;
  - \* 6 is moderate and will result in processes continuing but in a modified way;
  - \* 8 is high (processes are altered to the extent that they temporarily cease); and
  - \* 10 is very high and results in complete destruction of patterns and permanent cessation of processes.

- The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale, and a score assigned:
  - \* Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
  - \* Assigned a score of 2 is improbable (some possibility, but low likelihood);
  - \* Assigned a score of 3 is probable (distinct possibility);
  - \* Assigned a score of 4 is highly probable (most likely); and
  - \* Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- the **significance**, which shall be determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high;
- the **status**, which will be described as positive, negative or neutral;
- **Reversibility** - reversible (= 1), recoverable (= 3) and irreversible (= 5).
  - the *degree* to which the impact can be *reversed*.
  - the *degree* to which the impact may cause *irreplaceable loss of resources*.
  - the *degree* to which the impact can be *mitigated*.

The **significance** is determined by combining the criteria in the following formula:

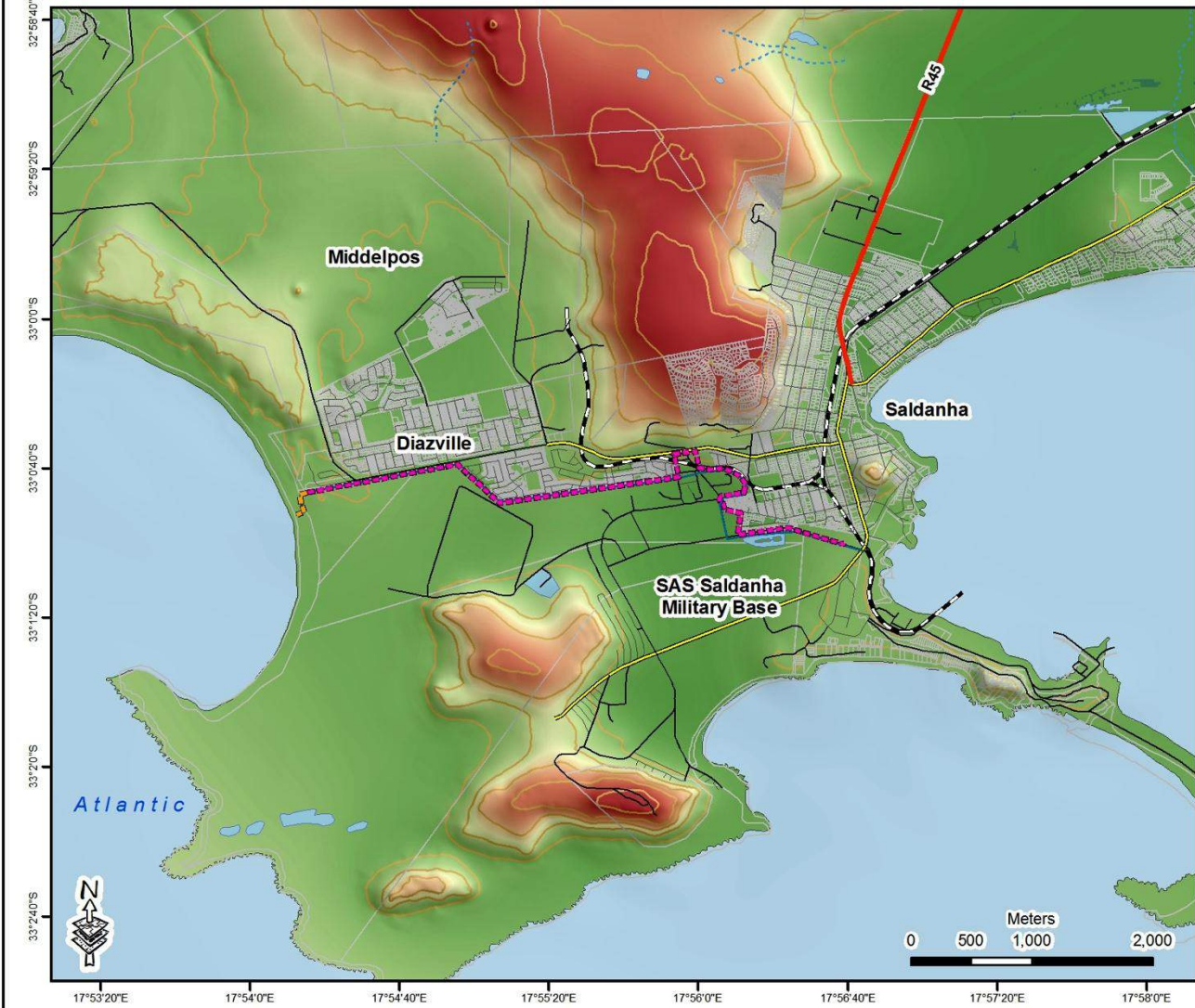
The **significance** of the potential visual impact is equal to the **consequence** multiplied by the **probability** of the impact occurring, where the consequence is determined by the sum of the individual scores for magnitude, duration and extent (i.e. **significance = consequence (magnitude + duration + extent) x probability**).

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

*Please note that due to the declining visual impact over distance, the **extent** (or spatial scale) rating is reversed (i.e. a localised visual impact has a higher value rating than a national or regional value rating). This implies that the visual impact is highly unlikely to have a national or international extent, but that the local or site-specific impact could be of high significance.*

# MAP 1: TOPOGRAPHICAL



WGS84 Geographic  
1:44,000 @ A4 paper size

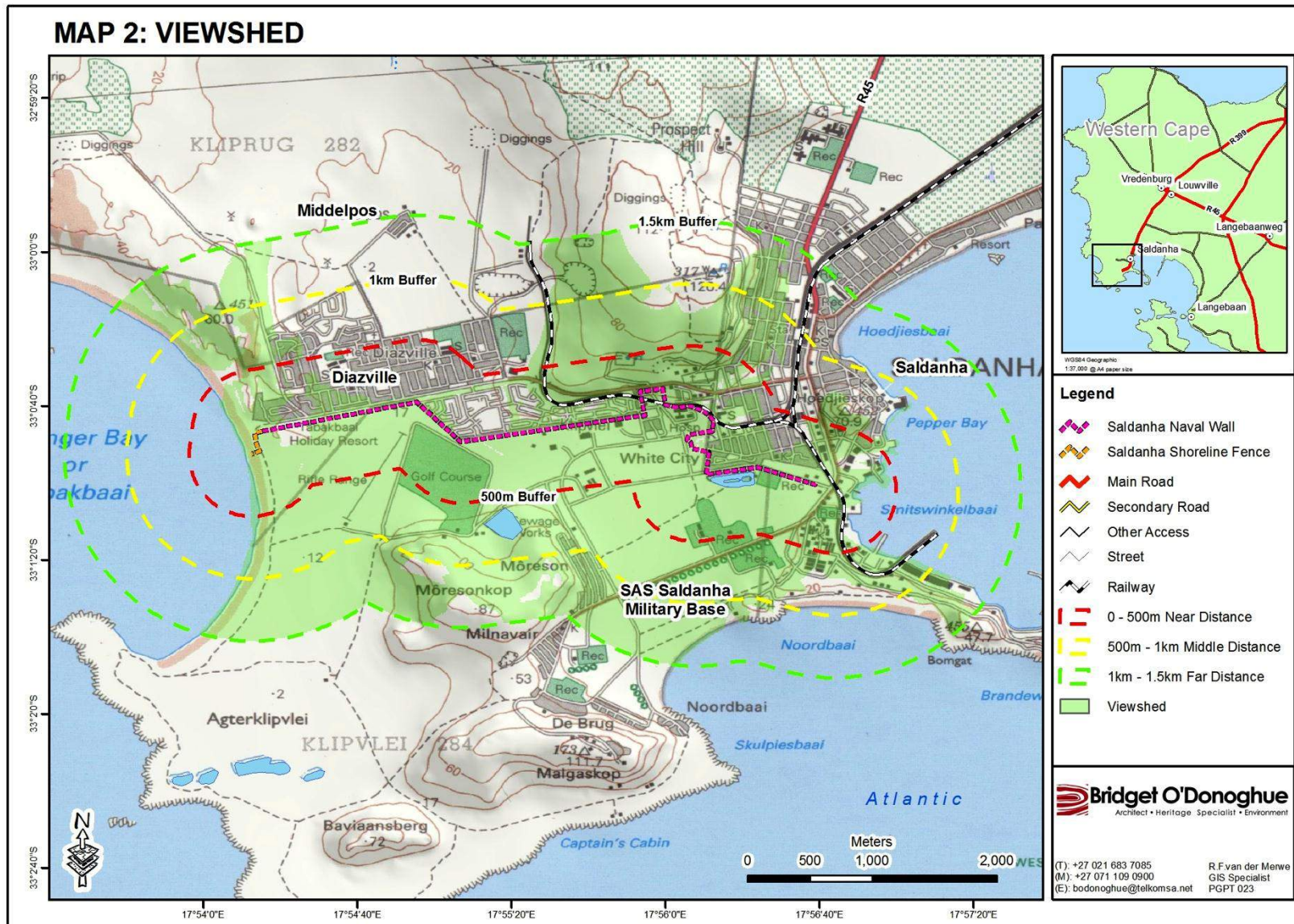
### Legend

- Saldanha Naval Wall
- Saldanha Shoreline Fence
- Cadastral
- Main Road
- Secondary Road
- Other Access
- Street
- Railway
- Non Perennial
- Perennial
- High : 122.459
- Low : 0

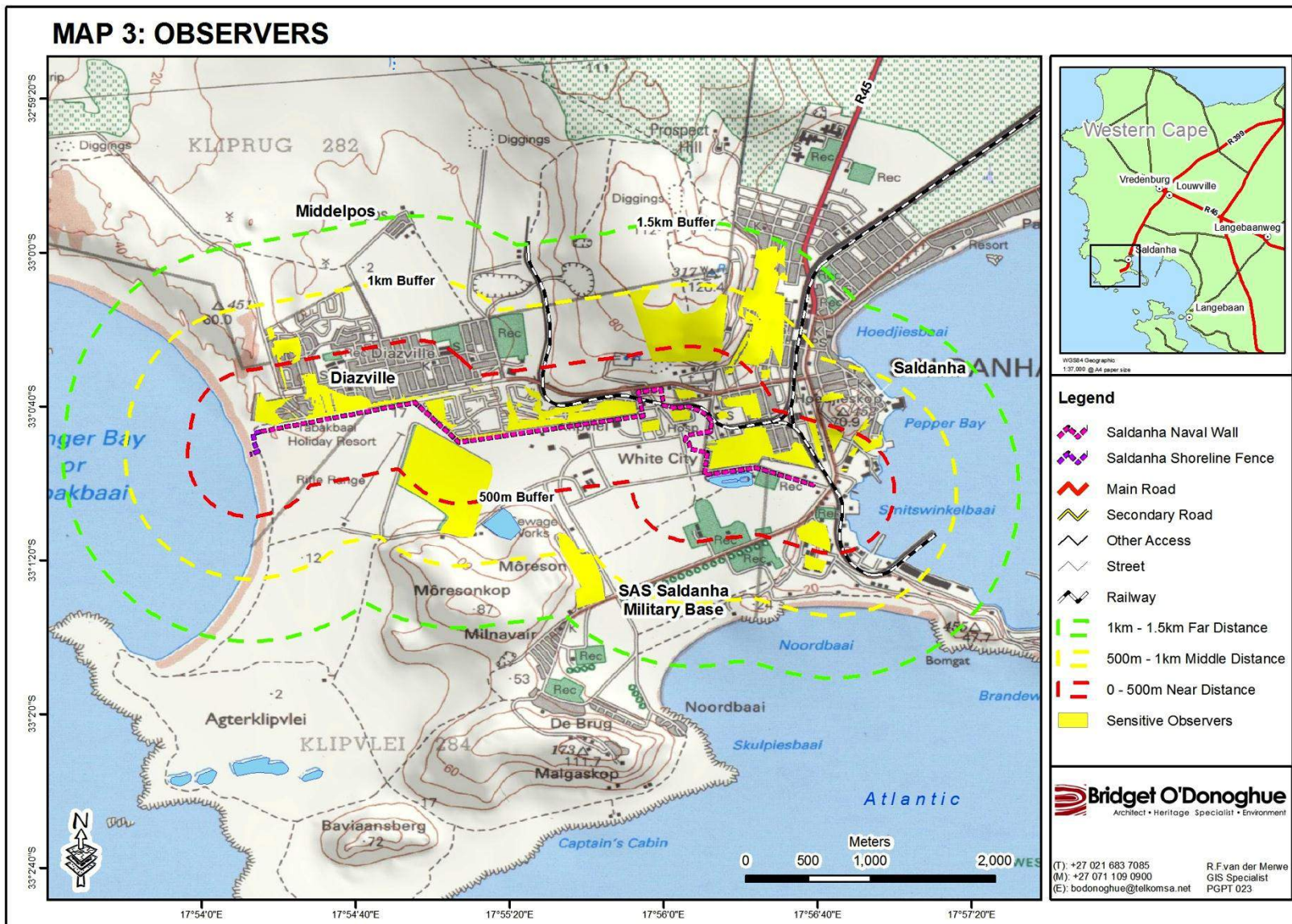
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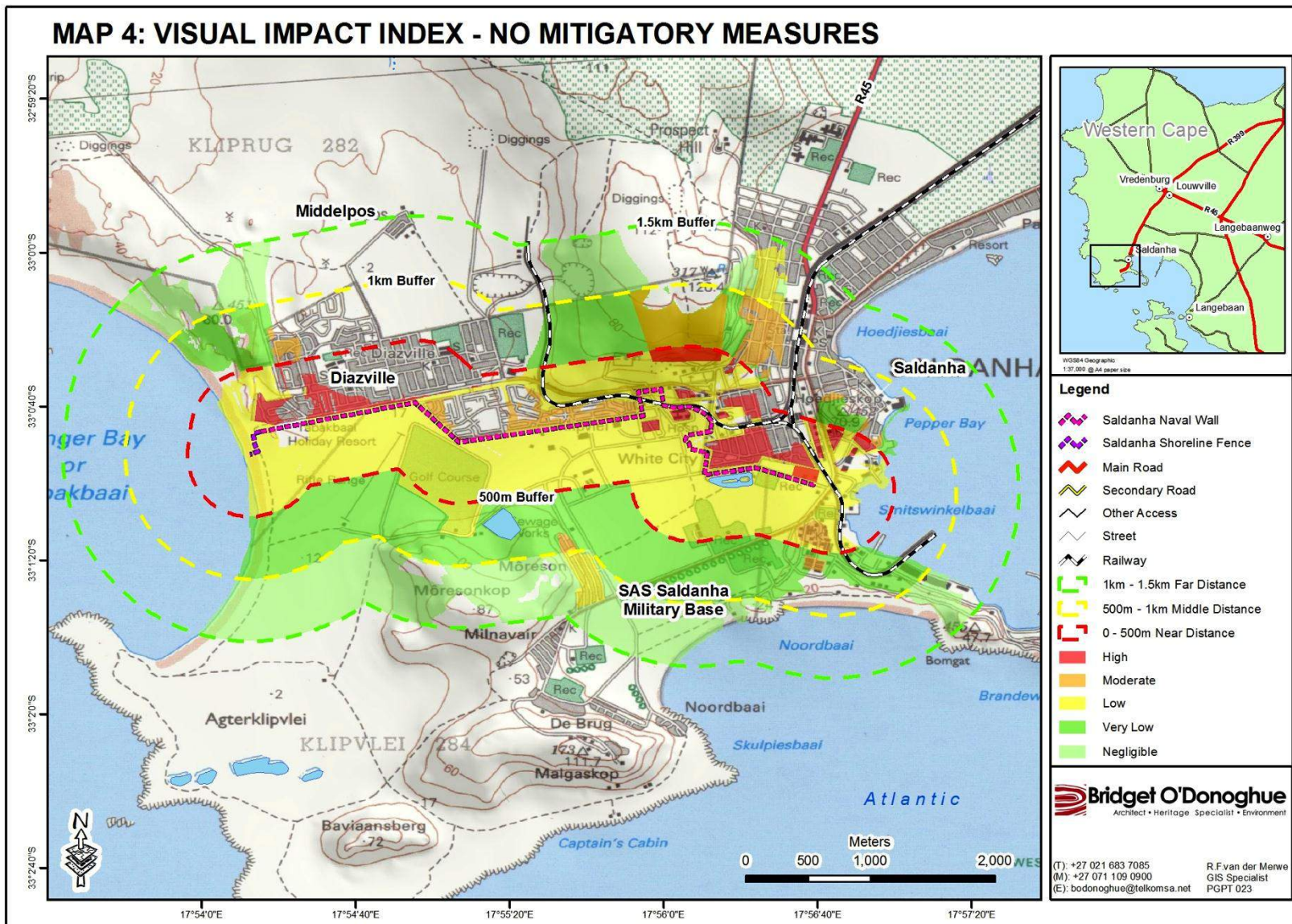














**Photomontage 6.1:** Diaz Road viewing east with Military base (right) and Diazville (left). Photomontage depicts proposed concrete wall on Military Site boundary, which is on Diaz Road for this section. Note topography limits view of Military site. Mitigatory recommendations for visual impact of wall for road users is the planting of trees along Diaz Road reserve, 2013





**Photomontage 6.2:** Internal existing gravel roadway which will remain as access to White City (left) and security and maintenance of proposed wall. Military site (right) beyond proposed boundary wall. Trees which will require to be removed to be replaced by suitable indigenous tree species, 2013

## 6.7 VISUAL IMPACT ASSESSMENT

The section outlines the visual impact assessment using the above outlined methodology and assesses the visual impact of the wall, fence, service roads and gatehouse on people that can view the site.

### 6.7.1 Potential visual impact of the wall, fence, service roads on users of public roads in close proximity to the proposed facility

Potential visual impact on users of the Diaz Road adjacent to the site on its northern boundary (within 500m) is expected to be **MEDIUM** significance, as indicated in the table below.

**Table 1:** *Impact table summarising the significance of visual impacts on users of Diaz road in close proximity to the proposed facility for a section of the site*

<b>Nature of Impact:</b> Potential visual impact on users of public road in close proximity to the proposed facility		
	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (4)	Local (4)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	Moderate (6)	Low (4)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	Medium (42)	Low Medium (36)
<b>Status (positive, neutral or negative)</b>	Negative	Positive
<b>Reversibility</b>	Reversible (1)	Reversible (1)
<b>Irreplaceable loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated</b>	Yes	Yes
<b>Mitigation:</b> Mitigation is the form of suitable indigenous trees on the Diaz road reserve planted a minimum of 3 metres away from the proposed wall. The trees are to be planted at minimum 5 m centres and be position close to the roadway as to not be a potential security threat to the military site i.e. the trees must be position as far away from the wall on the road reserve as possible.		
<b>Cumulative impacts:</b> The construction of the wall in not assessed a cumulative impact of structures as it is on the boundary of an urban development.		
<b>Residual impacts:</b> The residual impact is present until the wall is removed.		

### 6.7.2 Potential visual impact on residents of settlements in close proximity to the proposed facility

Potential visual impact on residents of settlement North of Diaz road (within 500m) is expected to be **MEDIUM** significance, as indicated in the Table 2 and Table 3 below. With mitigation measures proposed, the visual impacts are assessed as Low. Potential visual impact on residents of settlement south of Diaz road (within 500m) is expected to be **LOW** significance, as indicated in the table 2 below

**Table 2:** *Impact table summarising the significance of visual impacts on residents of settlements north of Diaz road in close proximity to the proposed wall*

<b>Nature of Impact:</b>		
Potential visual impact on residents of adjacent settlements in close proximity to the proposed facility		
	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (4)	Local (4)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	Moderate (4) Diazville north of Diaz road	Low (2)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	Medium (42)	Low (30)
<b>Status (positive, neutral or negative)</b>	Negative	Positive
<b>Reversibility</b>	Reversible (1)	Reversible (1)
<b>Irreplaceable loss of resources?</b>	No	-
<b>Can impacts be mitigated</b>	Yes	As described below
<b>Mitigation:</b> Mitigation is the form of suitable indigenous trees on the Diaz road reserve. The trees are to be planted at minimum 5 m centres and be position close to the roadway as to not be a potential security threat to the military site i.e. the trees must be position as far away from the wall on the road reserve as possible.		
<b>Cumulative impacts:</b> The construction of the wall in not assessed a cumulative impact of structures as it is on the boundary of an urban development.		
<b>Residual impacts:</b> The residual impact is present until the wall is removed.		



**Table 3:** Impact table summarising the significance of visual impacts on residents of settlements south of Diaz road in close proximity to the proposed wall

<b>Nature of Impact:</b> Potential visual impact on residents of adjacent settlements in close proximity to the proposed facility		
	<b>No mitigation</b>	<b>No Mitigation considered</b>
<b>Extent</b>	Local (4)	N/A
<b>Duration</b>	Long term (4)	N/A
<b>Magnitude</b>	Low (2) Diazville south of Diaz Road	N/A
<b>Probability</b>	probable (3)	N/A
<b>Significance</b>	Low Medium (30)	N/A
<b>Status (positive, neutral or negative)</b>	Negative	N/A
<b>Reversibility</b>	Reversible (1)	N/A
<b>Irreplaceable loss of resources?</b>	No	N/A
<b>Can impacts be mitigated</b>	No medium or high visual impacts to be mitigated	
<b>Mitigation:</b> No Mitigation proposed for low visual impact		
<b>Cumulative impacts:</b> The construction of the wall in not assessed a cumulative impact of structures as it is on the boundary of an urban development.		
<b>Residual impacts:</b> The residual impact is present until the wall is removed.		

### 6.7.3 Potential visual impact on sensitive visual receptors (users of roads and homes) beyond 1.5km of the development

The visual impact on users of major roads and on residents of farms, businesses and settlements within the region (i.e. beyond the 1.5km radius outside the site) is expected to be of **NO** Significance as the site is not visible from beyond 1.5km from roads, residences, commercial precincts outside the military base. The only section of the military base that will be able to view sections of the wall beyond the 1.5km range is the training facilities which are over 2.5km from the closest section of the proposed wall.

**Table 4:** *Impact table summarising the significance of visual impacts on the SANDF military facilities sensitive visual receptors within the region*

<b>Nature of Impact:</b> Potential visual impact on sensitive visual receptors within the region		
	<b>No mitigation</b>	<b>Mitigation considered - NONE</b>
<b>Extent</b>	Local <b>(4)</b>	N/a
<b>Duration</b>	Long term <b>(4)</b>	N/a
<b>Magnitude</b>	Small <b>(0)</b>	N/a
<b>Probability</b>	Probable from the military training facilities 2.5km from closest section of proposed wall <b>(3)</b>	N/a
<b>Significance</b>	<b>Low (24)</b>	N/a
<b>Status (positive or negative)</b>	Neutral	N/a
<b>Reversibility</b>	Reversible <b>(1)</b>	N/a
<b>Irreplaceable loss of resources?</b>	No	N/a
<b>Can impacts be mitigated during operational phase?</b>	No	N/a
<b>Mitigation:</b> Non required		
<b>Cumulative impacts:</b> The construction of the wall and service roads will increase the cumulative impact of infrastructure and structures on the site. However the nature and position of the proposed wall fence and gatehouse is assessed as a marginal cumulative impact.		
<b>Residual impacts:</b> The residual impact is present until the wall is removed.		

### 6.7.4 Potential visual impact of the ancillary infrastructure (gatehouse and service roads) on observers in close proximity to the proposed wall

The proposed service roadways will be positioned adjacent to the proposed wall. No mitigation measures are required as the visual impacts are assessed as **LOW**.

**Table 5:** Impact table summarising the significance of visual impact of the service roads and gate house

<b>Nature of Impact:</b> Potential visual impact of the service roads and gatehouse on observers in close proximity to the proposed facility		
	<b>No mitigation</b>	<b>NO Mitigation considered</b>
<b>Extent</b>	Local <b>(4)</b>	N/A
<b>Duration</b>	Long term <b>(4)</b>	
<b>Magnitude</b>	Small <b>(0)</b>	
<b>Probability</b>	Probable <b>(3)</b>	
<b>Significance</b>	<b>LOW (24)</b>	
<b>Status (positive or negative)</b>	Neutral	
<b>Reversibility</b>	Reversible <b>(1)</b>	
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impacts be mitigated during operational phase?</b>	Yes	
<b>Mitigation:</b> No mitigation required for low visual impacts		
<b>Cumulative impacts:</b> The construction of the gatehouse and service roadways in the positions proposed, are assessed as minor cumulative impacts to the site and its context.		
<b>Residual impacts:</b> The residual impact is present until the wall is removed.		

### 6.7.5 Potential visual impact of lighting at night on observers and residents in close proximity to the proposed facility

The lighting design, planning and specification for the proposed wall, fence, gatehouse and service roads are to be separate light poles and be at intervals that provide enough lighting for security of precinct but not security lighting that impacts on adjacent residents. The proposed lighting for the wall is on separate light poles, which will light the service roadways and be positioned for downward illumination. Street lighting exists on Diazville road and within the adjacent residential settlements. Light trespass and glare from the security and after-hours operational lighting for the walls and service roads could have negative visual impacts for residents in the immediate context. The correct specification and placement of lighting and light fixtures for the wall, fence and ancillary infrastructure will go far to contain rather than spread the light.

The Table below illustrates the assessment of this anticipated impact, which is likely to be of **LOW** significance.

**Table 6:** Impact table summarising the significance of visual impact of lighting at night on observers in close proximity to the proposed facility

<b>Nature of Impact:</b> Potential visual impact of lighting at night on observers in close proximity to the proposed facility.		
	<b>No mitigation</b>	<b>No Mitigation considered – sensitive lighting as proposed</b>
<b>Extent</b>	Local (4)	
<b>Duration</b>	Long term (4)	
<b>Magnitude</b>	<b>Low (4)</b> Lighting from the site’s adjoining residential settlements visible on site where the proposed wall, fence, gatehouse and service roadways are planned. The new lights will not significant increase the illumination at the site of development.	
<b>Probability</b>	probable (3)	
<b>Significance</b>	<b>Low Medium (36)</b>	
<b>Status (positive or negative)</b>	Negative	
<b>Reversibility</b>	Reversible (1)	
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impacts be mitigated during operational phase?</b>	Yes	
<b>Mitigation:</b> Planning: pro-active lighting design and planning and installation of motion detector type lighting installed at low levels and facing ground level.		
<b>Cumulative impacts:</b> The construction of light posts for the proposed development are assessed as cumulative impacts of increased lighting to the site and its immediate context. However given the nature of the site as a military base, the cumulative impacts are not assessed as a high negative visual impact.		
<b>Residual impacts:</b> The residual impact is present until the wall is removed.		

### 6.7.6 Potential visual impact of the construction phase activities on visual receptors in close proximity to the proposed facility

During the construction period, there will be an increase in heavy vehicles utilising the roads to the development site that may cause, at the very least, a visual nuisance to other road users and land owners in the area. In this environment, dust from construction work is also likely to represent a visual impact. Mitigation entails proper planning, management and rehabilitation of the construction site to forego visual impacts.

The table below illustrates the assessment of this anticipated impact, which is likely to be of **MEDIUM** significance, and may be mitigated to **LOW** significance.

**Table 7:** Impact table summarising the significance of visual impact of the construction activities on visual receptors in close proximity to the proposed facility

<b>Nature of Impact:</b> Potential visual impact of construction activities on visual receptors in close proximity to the proposed facility.		
	<b>No mitigation</b>	<b>Mitigation considered – Planning of construction phases</b>
<b>Extent</b>	Local <b>(4)</b>	Local <b>(4)</b>
<b>Duration</b>	Very short term <b>(1)</b>	Very short term <b>(1)</b>
<b>Magnitude</b>	Moderate <b>(6)</b>	Low <b>(2)</b>
<b>Probability</b>	High Probability <b>(4)</b>	Probable <b>(3)</b>
<b>Significance</b>	<b>Medium (44)</b>	<b>Low (21)</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	Reversible <b>(1)</b>	Reversible <b>(1)</b>
<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impacts be mitigated during operational phase?</b>	No	No
<b>Mitigation:</b> Construction: Proper planning, management and rehabilitation of the construction site		
<b>Cumulative impacts:</b> None.		
<b>Residual impacts:</b> The residual impact is present until the wall is removed.		

### 6.7.7 Potential visual impact of the proposed facility on the visual character and sense of place of the region

Sense of place refers to a unique experience of a natural and cultural environment by a user, based on their cognitive experience of the place. Visual criteria and specifically the visual character of an area (informed by a combination of aspects such as topography, level of development, vegetation, noteworthy features and cultural landscape play a significant role.

A visual impact on the sense of place is one that alters the cultural landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light. Specific aspects contributing to the sense of place of this region include the visual quality of the Military site and the beauty of the undeveloped land on the site and the coastline adjacent to the site. The anticipated visual impact of the proposed wall, fence service roads on the regional visual character, and by implication, on the sense of place, is expected to be **LOW MEDIUM** as indicated in Table 8 and reduced to Low with mitigation measures.

**Table 8:** Impact table summarising the significance of visual impacts on the visual character and sense of place of the region

<b>Nature of Impact:</b>		
Potential visual impact of the proposed facility on visual character and sense of place of the region		
	<b>No mitigation</b>	<b>Mitigation considered</b>
<b>Extent</b>	Local (4)	Local (4)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	Low(4)	Minor (2)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	<b>Low Medium (36)</b>	<b>Low (30)</b>
<b>Status (positive or negative)</b>	Positive	Positive
<b>Reversibility</b>	Reversible (1)	Reversible (1)
<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impacts be mitigated during operational phase?</b>	No	Yes
<b>Mitigation:</b> The mitigation measures considered are the planting of indigenous trees in two places: <ul style="list-style-type: none"> <li>• Diaz Road reserve where the wall is proposed adjacent to the Diaz Road;</li> <li>• Two planting precincts in the close proximity of the southern service road to replace the Eucalyptus trees that will be removed for the proposed project.</li> </ul>		
<b>Cumulative impacts:</b> Minor as the proposed development is on the boundary of a site. The cumulative impact of larger scale is the fence perpendicular to the coastline		
<b>Residual impacts:</b> The residual impact is present until the wall is removed.		



### 6.7.8 Potential visual impact of the proposed facility on tourist routes and tourism potential within the region

The tourism of Saldanha context is primarily located at Langebaan and Club Mikonos. The large industrial developments of the Saldanha harbour and Steel process plant resulted in an industrialised character to the Saldanha and its immediate context. Tourists visiting Saldanha primarily visit the original settlement (formally Hoedjiesbaai) and only specialist tourists visit the military structures on the site for the military history and the nature areas. The coastal areas are restricted areas for the general public. The anticipated visual impact of the proposed wall on existing tourist routes in Saldanha, as well as on the tourism potential of the local area, is expected to be of **LOW** significance, as illustrated in Table 9.

**Table 9:** Impact table summarising the significance of visual impacts on tourist routes, tourist destinations and tourist potential within the region

<b>Nature of Impact:</b> Potential visual impact of the proposed facility on tourist routes, tourist destinations and tourist potential within the region.		
	<b>No mitigation</b>	<b>No Mitigation considered</b>
<b>Extent</b>	Local (4)	N/a
<b>Duration</b>	Long term (4)	N/a
<b>Magnitude</b>	Low (2)	N/a
<b>Probability</b>	Probable (3)	N/a
<b>Significance</b>	Low (30)	N/a
<b>Status (positive or negative)</b>	neutral	N/a
<b>Reversibility</b>	Reversible (1)	N/a
<b>Irreplaceable loss of resources?</b>	No	N/a
<b>Can impacts be mitigated during operational phase?</b>	No	N/a
<b>Mitigation:</b> No mitigation recommended		
<b>Cumulative impacts:</b> No cumulative impacts assessed		
<b>Residual impacts:</b> The residual impact is present until the wall is removed.		

## 6.8 THE POTENTIAL TO MITIGATE VISUAL IMPACTS

The visual impact of a concrete wall is possible to mitigate in certain instances where necessary with the appropriate landscaping. The visual impact of the fence on the sandy beach is not possible to mitigate:

- Plant an avenue of indigenous trees at maximum 5m centres along the Diazville road reserve where the proposed wall on constructed on the site's road reserve boundary. Plan a 24-month maintenance period of watering for the trees by the appropriately qualified horticulturist service provider; the trees cannot be placed within 3 m of the proposed wall and fence for security reasons. The improvement of the streetscape will mitigate the removal of the view from Diaz Road and certain residents;
- Plant 2 clumps of indigenous trees suited to the ecology of the site to replace the removal of the mature Eucalyptus trees currently on line with the proposed southern service road. Install a 24 month maintenance period of watering trees by the appropriately qualified Horticulturist service provider;
- Investigate the sealing of the concrete wall for the removal of any possible graffiti on the northern wall facade;
- Mitigation of lighting impacts includes the pro-active design, planning and specification lighting for the facility by a lighting engineer. The correct specification and placement of lighting and light fixtures for the proposed service roadways and the ancillary infrastructure will go far to contain rather than spread the light. Additional measures include the following:
  - Limiting mounting heights of lighting fixtures by specifying foot-lights or bollard level lights only;
  - Making use of down-lighters, or shielded fixtures;
  - Making use of Low Pressure Sodium lighting or other types of low environmental impact lighting;
- Mitigation of visual impacts associated with the construction phase, albeit temporary, entails proper planning, management and rehabilitation of the construction site. Construction should be managed according to the following principles:
  - Reduce the construction period through careful planning and productive implementation of resources;
  - Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads;
  - Ensure that rubble, litter and disused construction materials are managed and removed regularly;
  - Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way;
  - Reduce and control construction dust through the use of approved dust suppression techniques.
  - Restrict construction activities to official working hours in order to negate or reduce the visual impacts associated with lighting.
  - Rehabilitate all disturbed and construction areas and road servitudes to acceptable visual standards.

## 6.9 VISUAL IMPACT INDEX RESULTS

The combined results of the visual exposure, viewer incidence/perception and visual distance of the proposed wall, fence and associated infrastructure are displayed on Map 4: Viewer Impact Index, which indicated high, moderate, low, very low and negligible visual impact. Values have been assigned for each potential visual impact per data category and merged in order to calculate the visual impact index. An area with short distance, high frequency of visual exposure to the proposed facility, a high viewer incidence and a predominantly negative perception would therefore have a higher value (greater impact) on the index. This focuses the attention to the critical areas of potential visual impact when evaluating the issues related to the visual impact. The visual impact index of the site indicates the following:

- Potential areas of **high visual impact** are on portions of Diazville, Diaz Road Recreational Centre, Diaz Road and portion of White City, lower portion of residential area below Diaz Road and individual buildings form within the Military site adjacent to the site boundary within 0.5km;
- Potential areas on **no visual impact** on section of Diazville, Diaz Road, White City due to the existing development, and topography;
- Potential areas of **moderate visual impact** are beyond the site's boundaries in the 0.5 - 1km range from the site on elevated land;
- Potential areas of **low visual impact** are within the 500m distance due to the high VAC, and the screening of the site by the local topography;
- Potential areas of **very low visual impact** are within the 500m – 1km distance due to the site due to the high VAC;
- Potential areas of **negligible visual impact** are beyond the site's boundaries beyond the 1km range.

## 6.10 VISUAL IMPACT STATEMENT

As the results and findings of the Visual Impact Assessment undertaken for the proposed wall, fence and service roadways is acknowledged that the visual landscape quality and views to the site from sections of the Diaz Road will be transformed by the wall which is considered to be permanent. The visual impact of the proposed fence is the section on the sandy beach.

The following is a summary of visual impacts without and then with mitigatory measures;

- The assessed visual impact of the proposed wall on identified residences in sections of Diazville, Diaz Road, Coastal Recreation Centre users, White City and residential area north of Diaz road will be **HIGH**. The existing urban developments and topography reduce visibility of the proposed wall from many residences. With mitigation measures recommended, such as the landscaping on Diaz Road reserve the visual impact for the Diaz Road users, Diazville and residential precinct north of Diaz Road will be reduced to **MODERATE**. The **HIGH** visual impact for White City is not assessed as a fatal flaw as this boundary wall gives definition to the military site and becomes a part of their urban development;
- The assessed visual impact on military personnel, residents and offices within the site in the 500m and 1km range to the proposed development will be of **LOW** significance, due to the

distance of the homes from the site, topography and the high visual absorption capacities identified; Except for the small section of the residential precinct north of Diaz Road which is assessed as moderate due to its elevated position, in the 500m – 1km middle distance which is assessed as a **MODERATE** visual impact, but a **LOW** impact in terms of VAC; The Military main administration and dormitory precinct is assessed as a **LOW** and **VERY LOW** visual impact, due to the high VAC of the area and topography.

- In terms of ancillary infrastructure, the assessed visual impact of the 2 service roadways, will be of **NEGLIGIBLE** significance due to the position and low level of topography at the proposed development area;
- Similarly, visual impacts related to lighting will be of **LOW MEDIUM** significance;
- The assessed visual impact of construction is also expected to be of **LOW** significance;
- The significance of the anticipated impact on the visual character and sense of place of the region will be of **LOW** significance, due to the position of the proposed wall and the urban development adjacent to its proposed position;
- The significance of the anticipated impact on tourist routes and tourism potential is not assessed to be of **LOW** impact as the site nor is its immediate context is not a well-used tourist route.

The anticipated visual impacts listed above (i.e. post mitigation impacts) are not considered to be fatal flaws from a visual perspective, considering the relatively contained area of potential visual exposure and the low occurrence of visual receptors. Furthermore, it is the opinion of the visual impact assessor that the anticipated moderate and low visual impacts assessed once mitigatory measures are implemented must be considered with the urgent requirement to secure the military site from the present theft and vandalism to the SANDF structures, goods and personnel. The proposed wall, fence, service roads and gate house will be highly unlikely to detract from the regional tourism appeal or the tourism potential of the area.

## 6.10 CONCLUSION

The construction and operation of the proposed boundary wall and fence and its associated infrastructure will have a low negative visual impact on portion of Diaz Road if the proposed landscaping is implemented. The moderating factors of the negative visual impact of the visual receptors in the close range are the following:

- The entire wall cannot be viewed at once due to the wall and roadway alignment and existing urban developments;
- The mountainous backdrop of the wall when viewed from Diaz Road;

The proposed development will have a visual minor impact on the scenic resources of Saldanha and the interface between the sea and the naval base. The proposed fence is assessed as neutral visual impact as it will be visually permeable. The small portion of the fence perpendicular to the coastline is assessed as a negative visual impact due to its position within a natural environment. It is not an impact that can be mitigated. However, due to the need to secure the site and the minor scale of this section of the fence, it is not a fatal flaw to the proposal. In light of the above-mentioned factors that reduce the impact of the facility, the visual impact is assessed as **low visual impact**.

The author is of the opinion that the definition of the military site through the construction of a boundary wall and fence with its associated infrastructure (service roads and gatehouse) is in keeping with the securement of a military precinct.

#### **6.11 RECOMMENDATIONS OF THE VIA**

The project is deemed to be feasible from a visual impact assessment perspective and the following recommendations are made for the proposed developments are implemented to reduce the visual impact of the facility:

- Proposed indigenous landscaping on the site as indicated on the Diaz Road reserve;
- Proposed indigenous landscaping on the military site in proximity to the internal site service roadway;
- Visually sensitive yet effective lighting design on the service roads;
- Good management practices during the construction phase recommendations

## SECTION 7

## RECOMMENDATIONS

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### 7.1 RECOMMENDATIONS

The proposed boundary wall, fence, security gatehouse and service roads are required to secure the Military base from the present state of continual vandalism and theft and danger to SANDF structures and personnel. The current conditions are untenable to the SANDF and reflect a lack of respect from the perpetrators for the SANDF property and personnel in addition to the lack of will and capability of the SANDF in protecting their site. It is consistent with a military base of national importance that the boundaries are well defined and secured. The HIA recommends to HWC IARCOM that the proposed development be given a positive comment to the DEA.

The recommendations by the HIA and VIA for the proposed wall, fence and associated infrastructure incorporate the recommended mitigation measures as follows:

- **Plant appropriate indigenous tree species** should be planted at a maximum of 5m intervals on the **Diaz road reserve** to reduce the visual impact of the wall and improve the streetscape. A service provider must properly water the new trees for a minimum of 24 months;
- Plant appropriate indigenous tree species in clumps in the context of the **site's service road boundary** to replace the 4 mature Eucalyptus trees that will be removed for the proposed project. A service provider must properly water the new trees for a minimum of 24 months;
- **Lighting** must be carefully designed. As the site is on the low grounds of its context viewed from above, the proposed lighting should be concentrated to the wall, fence, service roads and gatehouse. No tall industrial lighting should be used or high security lights fixed to the top of the wall and fencing;
- **No Advertising** on the wall on Diaz Road should be permitted unless approved by the local municipality;
- The proposed concrete wall should be sealed with the **appropriate sealer** so that any graffiti on the wall can be easily removed.

The recommendations for the AIA for the proposed wall, fence and associated infrastructure are as follows:

- Excavations for the wall foundations alongside Diaz Road/Tabakbaai must be monitored by a professional archaeologist. Should any sub-surface archaeological deposits be encountered during monitoring, some sampling may be required;
- Excavations must also be inspected for fossil content;



- Upgrading, of the gravel service road alongside Diaz Road on military property must not extend more than 0.5m south of the existing internal road;
- If any unmarked human remains are exposed or uncovered during excavations, these must immediately be reported to the archaeologists (Jonathan Kaplan 082 321 0172), or Heritage Western Cape (Mr Troy Smuts 021 483 9685). Burials must not be disturbed or removed until inspected by the archaeologist.

## 7.2 SOURCES

### Interviews and personal communication:

Chief Petty Officer Hammond (SANDF)

Consultant team:

- Mari Kristen
- Michael Langus Delta BEC
- Jonathan Kaplan, Archaeologist, Cultural Resources Management Agency;

### Printed material:

Cape Archives, Roeland street Cape Town

Department of Environmental Affairs and Development Planning: Western Cape Provincial Spatial Development Framework, 2009

Elphick, R & Giliomee, H: the Shaping of South African Society 1652 – 1820, 1982 Printpak (Cape) Ltd.

National Heritage Resources Act, no 25 of 1999

Electronic Media

<http://capeinfo.com/more/history/166-military-history-of-the-saldanha-bay-area> © Lt Col Ian van der Waag.

<http://www.navy.mil.za/peoplesnavy/saldanha/history.htm>

<http://www.iss.co.za/pubs/asr/4no3/CreatingNewNavy.html>

# ANNEXURE I

## Heritage Western Cape

### Comment on Notification of Intent to Develop

17 October 2013

**Our Ref:** HMIWEST COAST\SALDANHA BAY\SALDANHA BAY NAVAL BASE

**Enquiries:** Jenna Lavin  
**Tel:** 0214839685  
**Email:** [jenna.lavin@pgwc.gov.za](mailto:jenna.lavin@pgwc.gov.za)  
**Date:** 17 October 2012  
**Case No:** 121009JL15E  
**Auto IDs:** 2028 - 2166



**RESPONSE TO NOTIFICATION OF INTENT TO DEVELOP**  
**In terms of section 38(8) of the National Heritage Resources Act (Act 25 of 1999)**  
**and the Western Cape Provincial Gazette 6061, Notice 298 of 2003**

**Attention:** Ms Bridget O'Donoghue  
PO Box 1753  
Sun Valley  
7975  
Cape Town

**CASE NUMBER:** 121009JL15E  
**NID: PROPOSED SECURITY WALL, AN INTERNAL SERVICE ROAD AND ACCOMODATION FACILITIES AT THE SALDANHA BAY NAVAL BASE, SALDANHA BAY**

The matter above has reference.

Your NID received on 9 October 2012 was tabled and the following was discussed;

1. The application is for the proposed development of a 3.5m high security wall on the perimeter of the naval base site, an internal service road and an entrance gate building with accommodation consisting of 12 beds, ablution facilities and an office
2. The development may impact on subsurface archaeological material such as in the Saldanha Military Sick Bay application.
3. The site is not palaeontologically sensitive
4. The development has the potential to impact the historic military precinct.

**Decision**

Since there is reason to believe that heritage resources will be impacted upon, HWC requires an HIA in terms of S. 38(3) of the NHRA (Act 25 of 1999) assessing the impacts to the archaeological resources, impacts to the historic military precinct and visual impacts of the development on the scenic resources of Saldanha, and the interface between the sea and the naval base.

Appropriate alternatives must be provided.

**Terms and Conditions:**

Heritage Western Cape reserves the right to request additional information as required.

**Should you have any further queries, please contact the official above and quote the case number above.**

Yours faithfully

Andrew B Hall  
Chief Executive Officer  
Heritage Western Cape

# **ANNEXURE 2**

## **HERITAGE IMPACT ASSESSMENTS & GRADING OF HERITAGE SITES**

## **Heritage Assessment for Possible Inclusion in the National Estate and Assignment of Level of Management**

Assessment of the heritage value or significance of places and objects and ensuring adequate legal protection follows: a clear sequence of actions:

- Identification of places and objects that have apparent value in heritage terms;
- Identification of significant factors that make the place or object valuable in heritage terms. Assessment of significance using heritage assessment criteria;
- Determination of degree of significance of the place or object (grading);
- Assignment of the appropriate level of formal legal protection and management by the relative heritage authority.

### **Criteria for Assessing the Cultural Significance of an Identified Heritage Resource**

A culturally significant resource or site is considered part of the national estate if it has cultural significance or any other special value because of –

- Its importance in the community, or pattern of south Africa's history;
- Its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural history;
- Its potential to yield information that will contribute to an understanding of South Africa natural or cultural heritage;
- Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- Its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- Its strong association with a particular community or cultural group for social, cultural or spiritual reasons;
- Its strong and special association with the life or work of a person, group or organisation of importance in the history of south Africa;
- Sites of significance in relations to the history of slavery (Section 3[3] NHRA).

### **Formal Protections**

The Act provides formal protections for national and provincial heritage sites. Such sites are required to be declared by way of a notice in either the Government Gazette or Provincial Gazette. Provincial heritage resources authority must compile and maintain a heritage register listing the heritage resources in the province, which it considers conservation worthy.

### **General Protections**

The Act provides for the protection of heritage resources that have not been formally protected. Section 34 requires that "no person may alter or demolish any structure or part of a structure which

is older than 60 years without a permit issued by the relevant provincial heritage authority". Section 38 is intended to ensure that heritage resources that have not been formally identified and protected are not unknowingly damaged or destroyed during development or administration change to the site. It provides for certain classes of development requiring notification to the responsible heritage resources authority. If the responsible heritage resources authority decides that the heritage resources on the site could be affected by the proposed development or administration changes, it requires a heritage impact assessment (HIA).

### **Grading of Significance**

The South African Heritage Resources Authority (SAHRA) has in terms of Section 7 (1) of the NHRA, published regulations providing for Grading systems and heritage resources assessment criteria (Government Gazette No. 24893. Government Notice No. 694 dated 30 May 2003). The criteria to be applied in assessment the significance of heritage resources are as follows:

- **Grade 1**

Heritage resources with qualities so exceptional that they are of special national significance should be applied to any resources which is:

- Of outstanding significance in terms of one or more of the criteria set out in section 3(3) of the NHRA;
- Authentic in terms of design, material, workmanship or setting; and such universal value and symbolic importance that it can promote human understanding and contribute to national building and its loss would significantly diminish the national heritage.

- **Grade 2**

Heritage resources with special qualities with special qualities which make them significant in terms of the context of a province or region should be applied to any heritage resources which:

- Is of great significance in terms of one or more of the criteria set out in section 3(3) of the NHRA;
- Enriches understanding of cultural, historical, social and scientific development in the province or region in which it is situated but does not fulfil the criteria for Grade 1 status.

- **Grade 3**

Heritage resources worthy of conservation should be applied to a heritage resource which:

- Fulfils one or more of the criteria set out in section 3(3) of the NHRA;
- In the case of a site contributes to the environmental quality or cultural significance of a larger area, which fulfils one of the above criteria, but does not fulfil the criteria for a Grade 2 status.



# **ANNEXURE 3**

## **ARCHAEOLOGICAL IMPACT ASSESSMENT**

### **PROPOSED CONSTRUCTION OF A BOUNDARY WALL AROUND THE SALDANHA BAY MILITARY BASE SALDANHA BAY**

Prepared for:

**Delta Built Environmental Consultants**

On behalf of:

**NATIONAL DEPARTMENT OF PUBLIC WORKS**

By

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**FEBRUARY 2013**

**WETLAND DELINEATION, PES AND ECOSERVICES  
ASSESSMENT AS PART OF THE ENVIRONMENTAL  
ASSESSMENT AND AUTHORISATION PROCESS FOR THE  
PROPOSED CONSTRUCTION OF A WALL BORDERING  
THE SALDANHA BAY NAVAL BASE, WESTERN CAPE  
PROVINCE**

Prepared for

**Doug Jeffery Environmental Consultants**

2012

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**Declaration**

This report has been prepared according to the requirements of Section 33 (2) of the Environmental Impact Assessments Regulations, 2010 (GNR 543). We (the undersigned) declare the findings of this report free from influence or prejudice.

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## EXECUTIVE SUMMARY

Scientific Aquatic Services (SAS) was appointed to conduct a wetland assessment as part of the environmental assessment and authorisation process for the proposed construction of a wall bordering the Saldanha Bay Naval Base in the Western Cape, hereafter referred to as the “proposed development route”. The proposed development route is bordered by urban infrastructure to the north which includes the residential developments and roads of Diazville. The area to the south of the proposed development route is the property of the Saldanha Bay Naval Base. This area is less transformed and includes naval base infrastructure and a few roads.

The purpose of the report is to provide a summary of the wetland Ecological Importance and Sensitivity, Present Ecological State (PES) and function as part of the environmental assessment and authorisation process for the proposed construction activities associated with the proposed development route, and to allow informed decision making by the authorities, proponent and EAP consultants.

Specific outcomes required from this report include the following:

- Compile a desktop study with all relevant information as presented by the SANBI's Biodiversity GIS website (<http://bgis.sanbi.org>) as well as location of Freshwater Ecosystem Priority Areas (FEPAs) in relation to the study area;
- Delineation of the wetland features according to “DWAF, 2005: A practical Guideline Procedure for the Identification and Delineation of Wetlands and Riparian Zones”. Attention was also paid to wetland soil guidelines as given by Job (2009) for the Western Cape. A buffer zone was allocated to each wetland feature;
- Wetland functional units were defined based on observed characteristics. Functional units were mapped in the field and all assessments were made per functional unit;
- The wetland services provided by the resources on the proposed development route were assessed according to the Method of Kotze et al (2005) in which services to the ecology of the site were defined and services to the people of the area were defined;
- The wetland PES was assessed according to the resource directed measures guideline as advocated by DWAF 1999;

The following general conclusions were drawn upon completion of the wetland assessment:

- The proposed development route is located within quaternary catchment G10M and falls within the South Western Coastal Belt Aquatic Ecoregion;
- According to the ecological importance classification for the quaternary catchment, the systems in the area can be classified as moderate in terms of Ecological Importance And Sensitivity which, in their present state, can be considered Class C: Moderately modified based on the certainty of desktop methods (Kleynhans 1999);
- Two wetland features are indicated to fall in close proximity to the proposed development route by the National Wetland Inventory (2006). These features are indicated as unchannelled valley bottom wetlands;
- The Biodiversity GIS database ([www.bgis.sanbi.org](http://www.bgis.sanbi.org)), with special mention of the Freshwater Ecosystem Priority Areas (FEPAs), was consulted with regards to wetland features close to or crossing the proposed development route that may be of ecological importance. The following key conclusions were made:
  - The proposed development route falls within the Berg Water Management Area (WMA) and within the Lower Berg subWMA;
  - The NPAES database (National Protected Areas) indicates that a portion of the proposed development route is bordered by a formal land-based protected area (see figure below);
  - The Lower Berg subWMA is not listed as a fish Fresh Water Ecosystem Priority Area (fish FEPA);
  - The Lower Berg subWMA is not considered important in terms of fish sanctuaries and no importance is indicated in terms of migrational corridors, rehabilitation, translocation or relocation zones for fish;
  - The Lower Berg subWMA is however indicated as a Phase2 FEPA. The condition of these Phase 2 FEPAs should not be degraded further as they may in future be considered for rehabilitation;



- No river features are indicated to cross the proposed development route by the FEPA database;
  - The proposed development route is indicated to coincide with one wetland cluster area;
  - Wetland features are indicated to the south east of the proposed development route. These features fall in close proximity to the proposed development route and are considered natural features.
- After a drive through of the proposed development route and surrounding areas, seven areas that may potentially support wetland habitat were identified and investigated further;
  - The seven sites were assessed for the presence of any wetland indicators in line with the DWA 2005 wetland delineation methodology;
  - After further investigation, the two wetland features identified by FEPA maps to fall in close proximity to the proposed development route were determined to form part of a single valley bottom wetland feature which has been traversed by a gravel road. Of all the wetland areas investigated, only this valley bottom feature was determined to be natural. All remaining features traversing, or in close proximity to the proposed development route were identified to be artificial storm water canals or artificial impoundments;
  - The artificial feature associated with site 2 was not regarded to be of importance in terms of function and service provision due to the absence of any wetland indicators or characteristics and as a result was not included within further assessments;
  - The artificial feature associated with site 7 was characterised by the presence of *Zantedeschia aethiopica*. However, on further inspection the feature was determined to be a 'french drain' and was not regarded to be of importance in terms of function and service provision. This feature was therefore not included within further assessments;
  - The ecoservice provision and function of the natural wetland feature associated with site 1 was considered in a single assessment and the ecoservice provision and function of the artificial canals and impoundments associated with sites 3, 4, 5 and 6 were considered in a second assessment;
  - The natural wetland feature associated with site 1 indicated an intermediate importance in terms of overall function and service provision;
  - Although artificial, drainage canals located within the study area are considered to play some role in the provision of ecoservices and function and were therefore included in the assessment. The artificial drainage features associated with sites 3, 4, 5 and 6 indicated a moderately low importance in terms of overall function and service provision;
  - The Present Ecological State score calculated for the natural wetland feature associated with site 1 falls within Class B; largely natural with few modifications;
  - The PES scoring system is used to determine the transformation of natural wetland features and therefore was not applicable to artificial drainage features associated with sites 3, 4, 5 and 6;
  - The EMC class deemed appropriate to maintain the current ecology as well as functionality within the natural wetland feature associated with site 1 is class B (Largely natural with few modifications);
  - DWAF guidelines stipulate that a buffer zone of 32m be allocated to all wetland features. A buffer zone of 32m has been allocated to the natural valley bottom wetland feature associated with site 1. However, the drainage features associated with sites 3, 4, 5 and 6 are artificial features which are expected to play a limited role in the provision of ecoservices and function. Therefore, although indicated in the wetland delineation maps, it is the opinion of the specialist that the allocation of buffer zones for the drainage features is unnecessary.

The impact assessment was divided into three sections where impacts were determined for the construction phase, the operational phase as well as any possible cumulative impacts.

#### A summary of impact significance before and after mitigation

Impact	Alternative 1		No Go Alternative	
	Unmanaged	Managed	Unmanaged	Managed
IMPACT 1A: Impact on wetland habitat due to construction and development related activities	High negative significance	Low negative significance	Moderate negative significance	Low negative significance
IMPACT 1B: Loss of wetland habitat due to ineffective rehabilitation	High negative significance	Low negative significance	Moderate negative	Moderate negative



Impact	Alternative 1		No Go Alternative	
	Unmanaged	Managed	Unmanaged	Managed
			significance	significance
IMPACT 1C: Impact on wetland service and function provision	Moderate negative significance	Low negative significance	Moderate negative significance	Low negative significance
IMPACT 1D: Impact due to vehicles encroaching into wetland habitat	Moderate negative significance	Low negative significance.	Moderate negative significance	Moderate negative significance
IMPACT 1E:: Impact due to indiscriminate fires	Moderate negative significance	Low negative significance	Moderate negative significance	Moderate negative significance
IMPACT 1F: Impact due to sedimentation and erosion	Moderate negative significance	Low negative significance	Moderate negative significance	Moderate negative significance
Impact 2 A: Operational activities impacting on wetland habitat	Moderate negative significance	Low negative impact.	Moderate negative significance.	Moderate negative significance
Impact 2B: Ineffective rehabilitation and monitoring.	Moderate negative significance.	Low negative significance	Moderate negative significance	Moderate negative significance
Impact 3: Cumulative Impact	Moderate negative significance	Low negative significance	Moderate negative significance.	Moderate negative significance

From the results of the impact assessment it was observed that six major impacts are likely to impact the wetland features of the proposed development route during the construction phase and two major impacts are likely during the operational phase. However, it is deemed possible that the majority of the impacts can be mitigated or managed to a lower level of significance during both phases of the proposed development. At present the boundary of urban development lies in close proximity to the border of the natural wetland feature associated with site 1. The no-go alternative and consequent failure to restrict entrance into the Saldanha Naval Base property may therefore result in the encroachment of urban infrastructure into wetland areas. Edge effects from urban related activities as well as future activities within wetland zones may result in a decrease in the Present Ecological State of the natural feature associated with site 1.

After assessment, one natural wetland feature and six artificial features were found to fall in close proximity to, or to traverse the proposed development route. The significance of impacts on the drainage features associated with sites 3, 4, 5 and 6 will be low due to the artificial nature of the features and due to the limited service and function provided by the features. However, a lack of maintenance within these features could have a negative impact on natural wetland features down gradient of the systems. Although limited, the artificial drainage features are responsible for the trapping of sediment and for the assimilation of phosphates, nitrates and toxicants from runoff before water reaches down gradient areas. These features therefore play a role in the protection of the natural vegetation in the area and may play a role in the protection of the wetland feature associated with site 1. Impacts on the natural wetland feature associated with site 1 may be reduced by the construction of energy breakers at all storm water drains in order to dissipate the flow of storm water before it reaches the feature, by the removal of alien and invasive species from the artificial drainage features as well as erosion control within artificial drainage features, and by the ongoing monitoring of artificial features.

Although development of the wall will take place in the buffer zone of the natural wetland feature associated with site 1; where the wall passes through the buffer area it does so on an existing gravel road. Therefore, if the footprint area of the development is kept as small as possible and is limited to already disturbed gravel road areas falling outside wetland zones, then it is deemed likely that impacts as a result of development can be reduced to very low levels.

The wetland delineation map as depicted below is a summary of all aspects considered as part of the wetland assessment undertaken.







Figure a: Wetland delineation of eastern wetland features with allocated buffer zone.



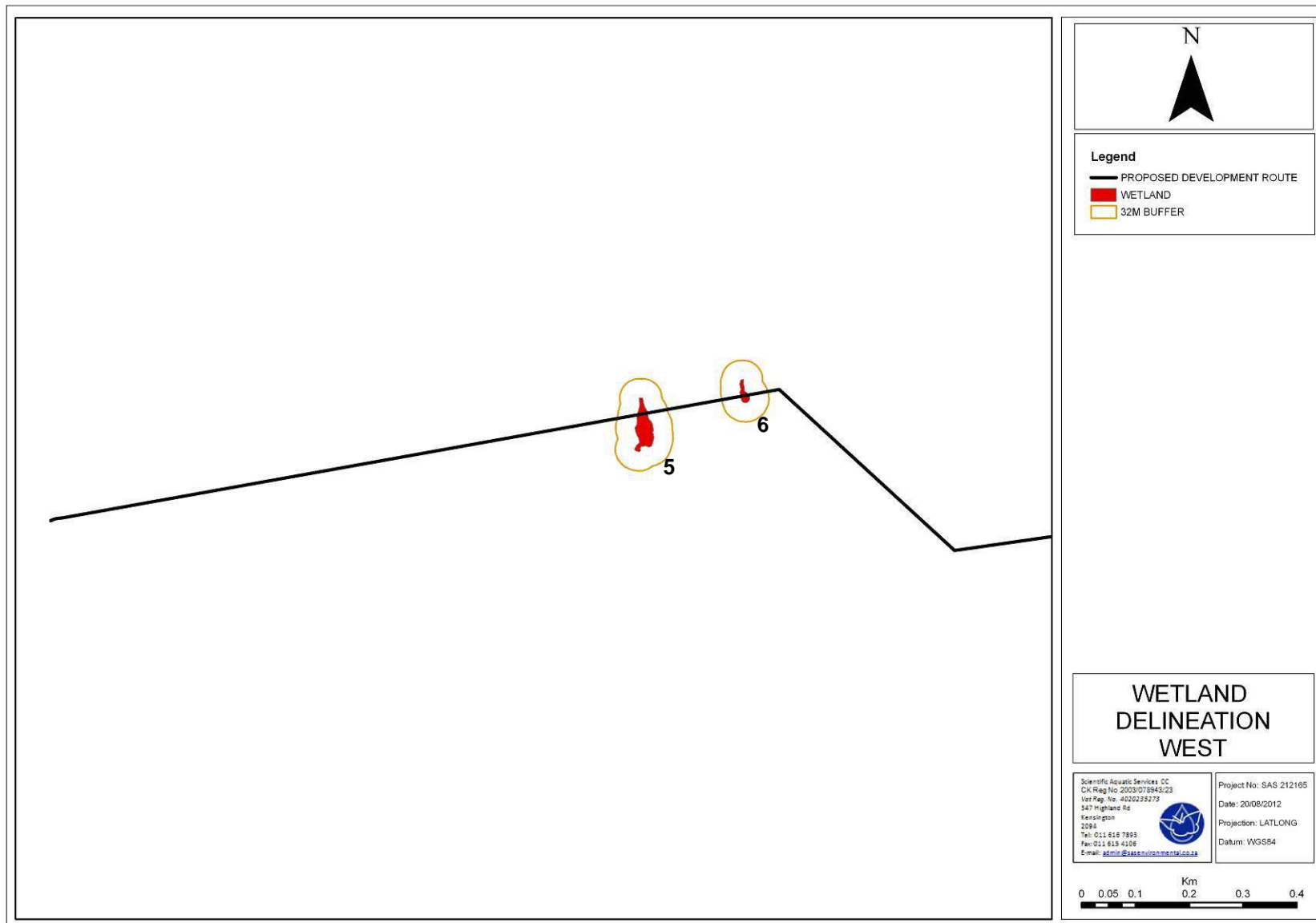


Figure b: Wetland delineation of western wetland features with allocated buffer zone.



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# 1 INTRODUCTION

Scientific Aquatic Services (SAS) was appointed to conduct a wetland assessment as part of the environmental assessment and authorisation process for the proposed construction of a wall bordering the Saldanha Bay Naval Base in the Western Cape, hereafter referred to as the “proposed development route” (depicted in the figure below). The proposed development route is bordered by urban infrastructure to the north which includes the residential developments and roads of Diazville. The area to the south of the proposed development route is the property of the Saldanha Bay Naval Base. This area is less transformed and includes naval base infrastructure and a few roads. It should be noted that the larger area that includes the proposed development route as well as immediate surroundings will be referred to as “study area” within this report.

The purpose of the report is to provide a summary of the wetland Ecological Importance and Sensitivity, Present Ecological State (PES) and function as part of the environmental assessment and authorisation process for the proposed construction activities associated with the proposed development route, and to allow informed decision making by the authorities, proponent and EAP consultants.





Figure 1: Location of the proposed development route depicted on an aerial photograph in relation to surrounding areas.





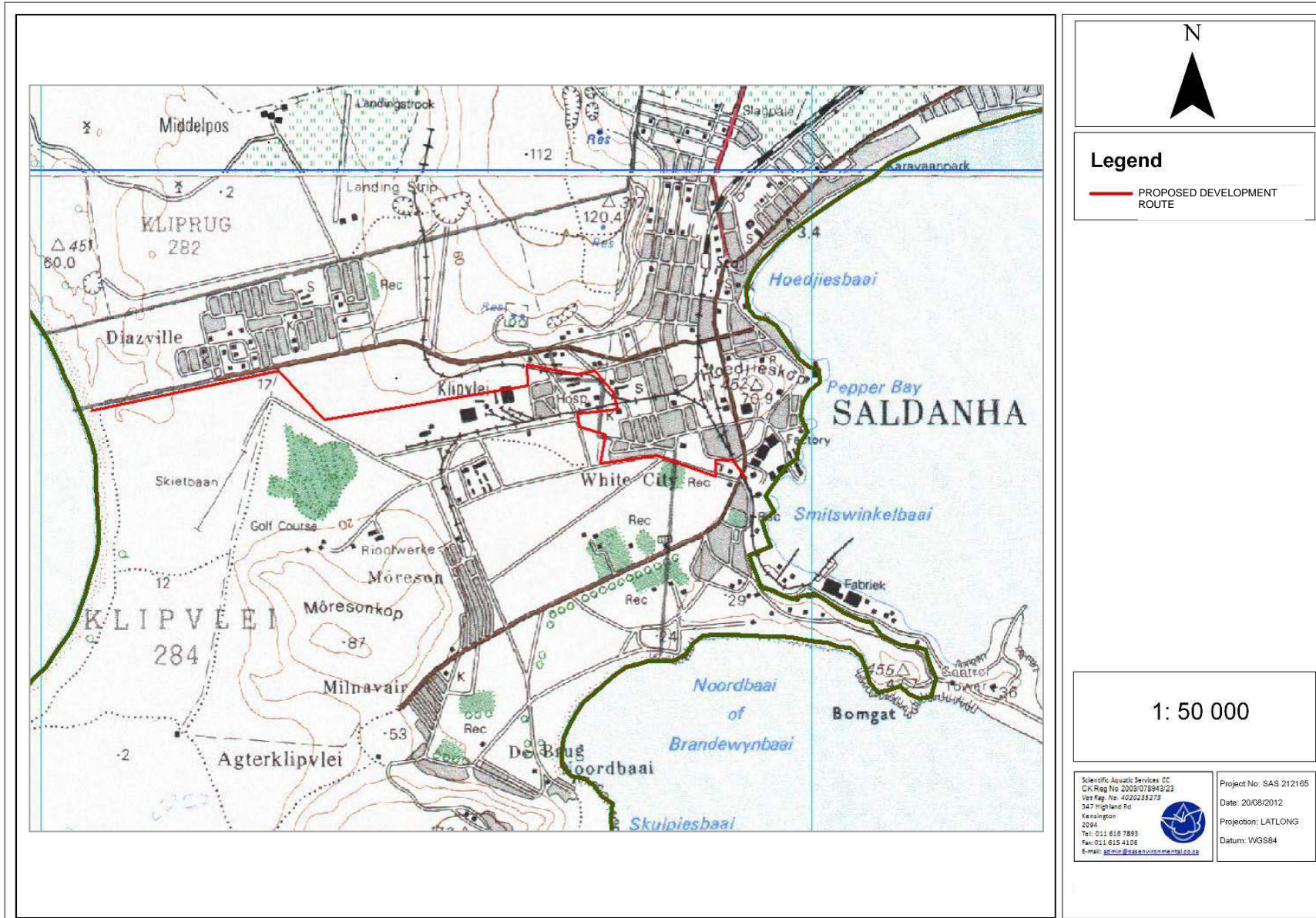


Figure 2: 1:50 000 topographic map depicting the location of the proposed development route in relation to surrounding areas.





## 2 METHODOLOGY

### 2.1 General site survey

Wetland features within the study area were initially delineated using desktop methods (FEPA wetland map, National Wetland Map, 1:50 000 topographic map and digital satellite imagery) after which a site assessment was undertaken on the 24<sup>th</sup> of August 2012. Firstly a drive through of the site was undertaken to identify the areas that may potentially sustain wetland habitat after which each of the areas identified were assessed for wetland indicators as advocated by DWA (2005). Special attention was also paid to wet soil indicators as defined by Job (2009). Wetland areas in close proximity to the proposed development route were verified and delineated in the field. Wetlands were grouped according to wetland characteristics (terrain units, vegetation structure and presence of surface water) encountered during the site visit, after which the Present Ecological State, functioning of each system and the environmental and socio-cultural services that the systems provide, were determined. According to the findings each wetland feature was advocated a Recommended Ecological Category (REC), consideration was also given to mitigation measures needed in order to reach the REC and to minimise any potential impact from the proposed development on the aquatic resources within the study area.

### 2.2 Desktop Study

A desktop study was compiled with all relevant information as presented by the SANBI's Biodiversity GIS website (<http://bgis.sanbi.org>). Wetland specific information resources taken into consideration during the desktop assessment of the proposed development route included:

- National Freshwater Ecosystem Priority Areas (NFEPAs), 2011
  - NFEPAs water management area (WMA)
  - NFEPAs wetlands/National wetlands map
  - Wetland and estuary FEPA
  - FEPA (sub)WMA % area
  - Sub water catchment area FEPAs
  - Water management area FEPAs
  - Fish sanctuaries
  - Wetland ecosystem types
- National Wetlands Inventory, 2006



Studies undertaken by the Institute for Water Quality Studies assessed all quaternary catchments as part of the Resource Directed Measures for Protection of Water Resources. In these assessments, the Ecological Importance and Sensitivity (EIS), Present Ecological Management Class (PEMC) and Desired Ecological Management Class (DEMC) were defined, and serve as a useful guideline in determining the importance and sensitivity of aquatic ecosystems.

Water resources are generally classified according to the degree of modification or level of impairment. The classes used by the South African River Health Program (RHP) are presented in the table below and will be used as the basis of classification of the systems of the proposed development route.

**Table 1: Classification of river health assessment classes in line with the RHP**

Class	Description
A	Unmodified, natural.
B	Largely natural, with few modifications.
C	Moderately modified.
D	Largely modified.
E	Extensively modified.
F	Critically modified.

### **2.3 South African Wetland Assessment Classification System**

All wetland and riparian features encountered within the study area were assessed using *the South African Wetland Classification System* as ascribed within the *Resource Directed Measures for Protection of Water Resources* (1999). This was done in order to achieve the Recommended Ecological Category (REC) of the wetland features. The methodology followed is illustrated in the figure below, followed by a detailed discussion of each section.



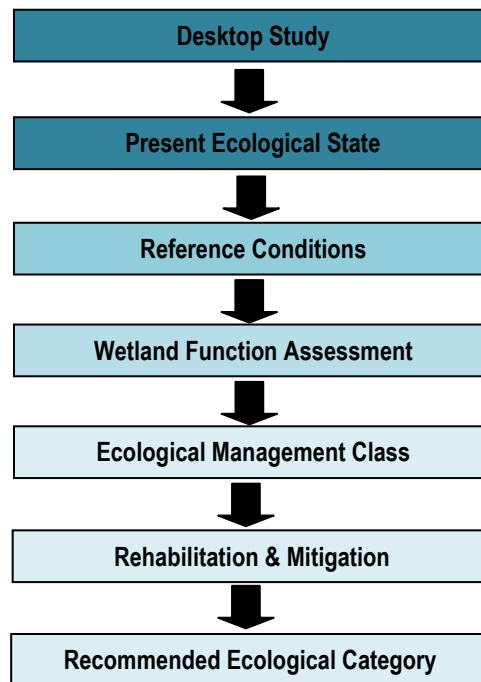


Figure 3: Wetland determination flow chart.

## 2.4 Present Ecological State

A site visit was undertaken in order to identify all natural characteristics of the wetland features within the study area, followed by characterisation of all wetland systems using the flow chart with definitions as stipulated below.



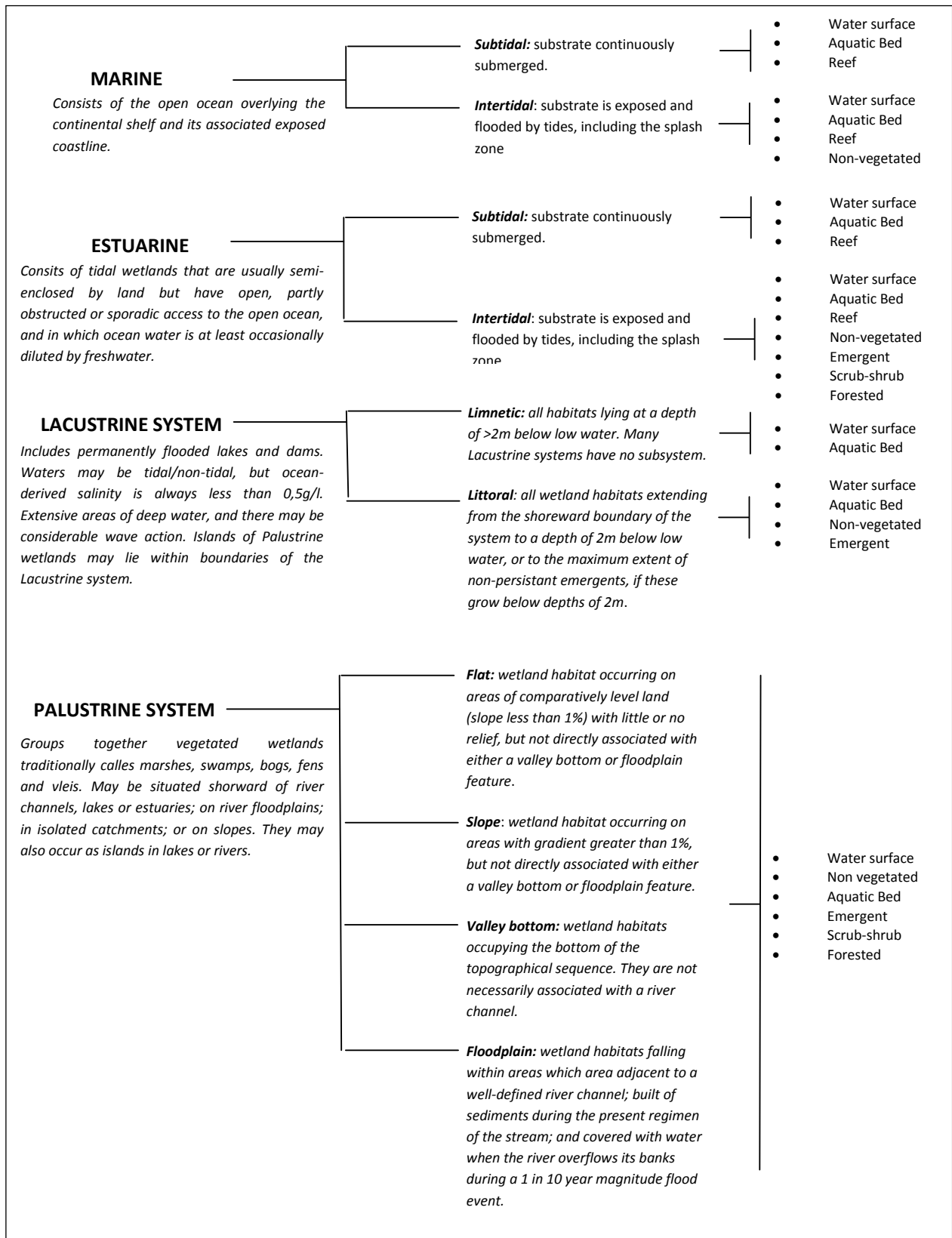
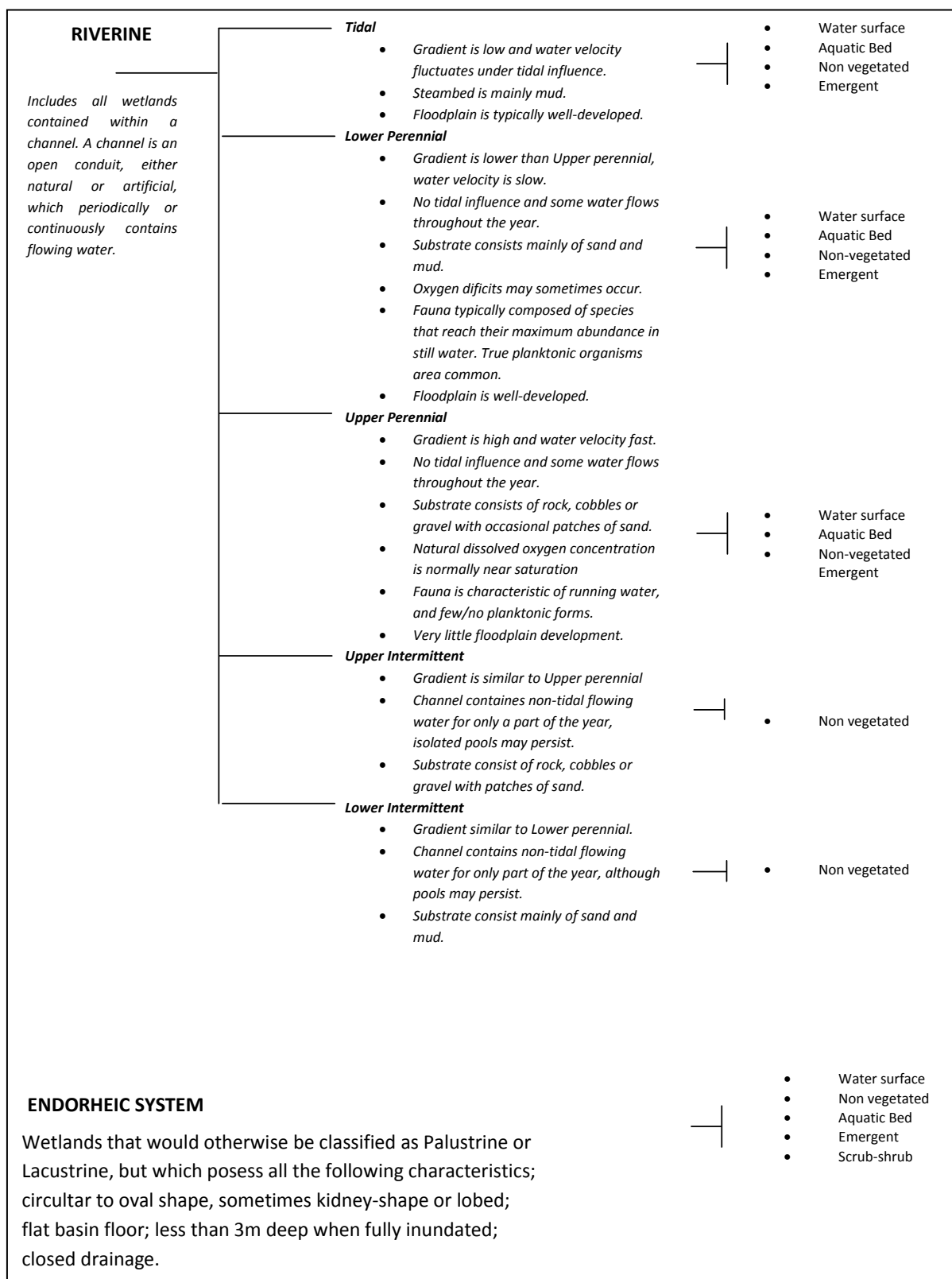


Figure 4: Wetland system characterisation.





**Figure 5: Wetland system characterisation<sup>1</sup> (continued).**

Department of Water Affairs and Forestry, South Africa Version 1.0 of Resource Directed Measures for Protection of Water Resources, 1999 [Appendix W1]<sup>1</sup>



After wetland systems have been classified according to the characteristics stipulated above it is important to determine any modifying aspects that may have altered the natural ecological state of the wetland system. *Resource Directed Measures (RDM)* (Dini, J; Cowan, G. & Goodman, P. First Draft: DWAF, *Version 1.0, 1999*) identifies three groups of modifiers: Water Regime Modifiers, Water Chemistry Modifiers, and Artificial Modifiers. A desktop study as well as the field assessment was used in order to determine any of these modifiers present at the proposed development route.

All the information gathered above as well as hydrology-, hydraulic/geomorphic-, biological criteria and water quality were then used to assign a Present Ecological Status (PES) for the wetland features. The table below lists the attributes as well as criteria assessed during the PES assessment.

**Table 2: Criteria and attributes assessed during the determination of the PES.**

Criteria and attributes	
<b>Hydrologic</b>	<b>Hydraulic/Geomorphic</b>
Flow modification	Canalisation
Permanent Inundation	Topographic Alteration
<b>Water Quality</b>	<b>Biota</b>
Water Quality Modification	Terrestrial Encroachment
Sediment load modification	Indigenous Vegetation Removal
	Invasive plant encroachment
	Alien fauna
	Overutilisation of biota

Each of the attributes were given a score according to ecological state observed during the site visit, as well as a confidence score to indicate areas of uncertainty (table below).

**Table 3: Scoring guidelines.**

Scoring guidelines		Relative confidence score	
Natural, unmodified	5	Very high	4
Largely natural	4	High	3
Moderately modified	3	Moderate	2
Largely modified	2	Low	1
Seriously modified	1		
Critically modified	0		

A mean score for all attributes were then calculated and the final score was then used in the Present Ecological Status category determination as indicated in the table below.





**Table 4: Present Ecological Status Category descriptions<sup>2</sup>**

Score	Class	Description
>4	A	Unmodified, natural
>3 and <4	B	Largely natural with few modifications
>2 and <3	C	Moderately modified
2	D	Largely modified
>0 and <2	E	Seriously modified
0	F	Critically modified

## 2.5 Wetland function assessment

“The importance of a water resource, in ecological social or economic terms, acts as a modifying or motivating determinant in the selection of the management class”.<sup>3</sup> The assessment of the ecosystem services supplied by the identified wetlands was conducted according to the guidelines as described by Kotze *et al* (2005). An assessment was undertaken that examines and rates the following services according to their degree of importance and the degree to which the service is provided:

- . Flood attenuation
- . Stream flow regulation
- . Sediment trapping
- . Phosphate trapping
- . Nitrate removal
- . Toxicant removal
- . Erosion control
- . Carbon storage
- . Maintenance of biodiversity
- . Water supply for human use
- . Natural resources
- . Cultivated foods
- . Cultural significance
- . Tourism and recreation
- . Education and research

<sup>2</sup> Department of Water Affairs and Forestry, South Africa *Version 1.0 of Resource Directed Measures for Protection of Water Resources, 1999* [Table G2].

<sup>3</sup> Department of Water Affairs and Forestry, South Africa *Version 1.0 of Resource Directed Measures for Protection of Water Resources, 1999*



The characteristics were used to quantitatively determine the value, and by extension sensitivity, of the wetlands. Each characteristic was scored to give the likelihood that the service is being provided. The scores for each service were then averaged to give an overall score to the wetland.

**Table 5: Classes for determining the likely extent to which a benefit is being supplied.**

Score	Rating of the likely extent to which the benefit is being supplied
<0.5	Low
0.5-1.2	Moderately low
1.3-2	Intermediate
2.1-3	Moderately high
>3	High

## 2.6 Ecological Management Class

“A high management class relates to the flow that will ensure a high degree of sustainability and a low risk of ecosystem failure. A low management class will ensure marginal maintenance of sustainability, but carries a higher risk of ecosystem failure.”<sup>4</sup>

The Ecological Management Class (EMC) was determined based on the results obtained from the PES, reference conditions and Ecological Importance and Sensitivity of the resource (sections above). Followed by realistic recommendations, mitigation, and rehabilitation measures to achieve the desired EMC.

A wetland may receive the same class for the PES, as the EMC if the wetland is deemed in good condition, and therefore must stay in good condition. Otherwise, an appropriate EMC should be assigned in order to prevent any further degradation as well as to enhance the PES of the wetland feature.

**Table 6: Description of EMC classes.**

Class	Description
A	Unmodified, natural
B	Largely natural with few modifications
C	Moderately modified
D	Largely modified

<sup>4</sup> Department of Water Affairs and Forestry, South Africa *Version 1.0 of Resource Directed Measures for Protection of Water Resources* 1999



## **2.7 Wetland delineation**

For the purposes of this investigation, a wetland habitat is defined in the National Water Act (1998) as including the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterized by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent areas.

The wetland zone delineation took place according to the method presented in the final draft of “A practical field procedure for identification and delineation of wetlands and riparian areas” published by the department of Water Affairs and Forestry in February 2005. Attention was also paid to wetland soil guidelines as defined by Job (2009) for the Western Cape. The foundation of the methods is based on the fact that wetlands and riparian zones have several distinguishing factors including the following:

- The presence of water at or near the ground surface;
- Distinctive hydromorphic soils;
- Vegetation adapted to saturated soils and
- The presence of alluvial soils in stream systems.

By observing the evidence of these features, in the form of indicators, wetlands and riparian zones can be delineated and identified. If the use of these indicators and the interpretation of the findings are applied correctly, then the resulting delineation can be considered accurate (DWA 2005).

Riparian and wetland zones can be divided into three zones (DWA 2005). The permanent zone of wetness is nearly always saturated. The seasonal zone is saturated for a significant part of the rainy season and the temporary zone surrounds the seasonal zone and is only saturated for a short period of the year, but is saturated for a sufficient period, under normal circumstances, to allow for the formation of hydromorphic soils and the growth of wetland vegetation. The object of this study was to identify the outer boundary of the temporary zone and then to identify a suitable buffer zone around the wetland area.



## **2.8 Impact Assessment**

The potential impacts and recommended mitigation measures was separated into:

- Pre-construction and Construction
- Operational phases

### **Nature of the impact**

This is an appraisal of the type of effect the construction, operation and maintenance a development would have on the affected environment. This description included what could be affected and how.

### **Extent of the impact**

Extent defines the physical extent or spatial scale of the impact. The impact could:

- Site specific: limited to the site.
- Local: limited to the site and the immediate surrounding area (1-10km)
- Regional: covers an area that includes an entire geographic region or extends beyond one region to another.
- National Scale: Across national boundaries and may have national implications.

### **Duration of the impact**

The lifespan of the impact is expected to be:

- Short term: 0-5 years.
- Medium term: 5-15 years.
- Long term: Beyond the operational phase, but not permanent.
- Permanent: Where mitigation either by natural processes or by human intervention will not occur in such a way or in such time span that the impact can be considered transient.

### **Intensity**

Intensity establishes whether the impact is destructive or benign and should be qualified as low, medium or high.

### **Probability of occurrence**

Probability describes the likelihood of the impact occurring. The likelihood can be described as:

- Improbable/unlikely: Low likelihood of the impact occurring



- Probable: Distinct possibility the impact will occur
- Highly probable: Most likely that the impact will occur
- Definite: Impact will occur regardless of any prevention measures.

### **Reversibility**

This refers to the degree to which an impact can be reversed.

- Fully reversible: Where the impact can be completely reversed.
- Partly reversible: Where the impact can be partially reversed.
- Irreversible: Where the impact is permanent.

### **Irreplaceable loss of resources**

Describes the degree to which resources will be irreplaceably lost due to the proposed activity.

- Fully replaceable: Resources can be fully replaced.
- Partly replaceable: Resources can be partially replaced.
- Irreplaceable: Resources cannot be replaced.

### **Degree to which an impact can be mitigated**

This indicates the degree to which an impact can be reduced. The impact can either be fully or partly mitigated or not mitigated at all.

### **Cumulative effect**

An effect which in itself may not be significant but may become significant if added to other existing or potential impacts that may result from activities associated with the proposed development.

### **Significance**

Based on a synthesis of the information contained in the above-described procedure, the potential impacts can be assessed in terms of the following significance criteria:

- **No significance:** the impacts do not influence the proposed development and/or environment in any way.
- **Low significance:** the impacts will have a minor influence on the proposed development and/or environment. These impacts require some attention to modification of the project design where possible, or alternative mitigation.



- **Moderate significance:** the impacts will have a moderate influence on the proposed development and/or environment. The impact can be ameliorated by a modification in the project design or implementation of effective mitigation measures.
- **High significance:** the impacts will have a major influence on the proposed development and/or environment.

### 3 ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations are applicable to this report:

- The wetland assessment is confined to the proposed development route as per Figure 1 and 2 and does not include the neighbouring and adjacent properties, which were only considered as part of the desktop assessment.
- Wetlands and terrestrial areas form transitional areas where an ecotone is formed as vegetation species change from terrestrial species to facultative and obligate wetland species. Within this transition zone some variation of opinion on the wetland boundary may occur, however if the DWAF 2005 method is followed, all assessors should get largely similar results.
- The wetland delineation as presented in this report is regarded as a best estimate of the wetland boundary based on the site conditions present at the time of assessment.

### 4 LEGAL FRAMEWORK

#### National Water Act

- The water act recognises that the entire ecosystem and not just the water itself in any given water resource constitutes the resource and as such needs to be conserved.
- No activity may therefore take place within a water course unless it is authorised by the Department of Water Affairs (DWA).
- Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from DWA in terms of Section 21 (c & i).

#### National Environmental Management Act

- The National Environmental Management Act (NEMA) (Act 107 of 1998) and the associated Regulations (No R. 544 and No R. 545) as amended in June 2010, states that prior to any development taking place within a wetland or riparian area, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment Report (BAR) process or the Environmental Impact Assessment (EIA) process depending on the scale of the impact.





## 5 RESULTS

### 5.1 Ecoregions

When assessing the ecology of any area (aquatic or terrestrial), it is important to know which ecoregion the study area is located within. This knowledge allows for improved interpretation of data to be made, since reference information and representative species lists are often available on this level of assessment, which aids in guiding the assessment.

The proposed development route is located within one quaternary catchment namely G10M and falls within the South Western Coastal Belt ecoregion; refer to the figure below. According to the ecological importance classification for the quaternary catchment, the systems in the area can be classified as moderate in terms of ecological importance and sensitivity which, in their present state, can be considered Class C: Moderately modified based on the certainty of desktop methods (Kleynhans 1999).

Studies undertaken by the Institute for Water Quality Studies assessed all quaternary catchments as part of the *Resource Directed Measures for Protection of Water Resources*. In these assessments, the Ecological Importance and Sensitivity (EIS), Present Ecological Management Class (PEMC) and Desired Ecological Management Class (DEMC) were defined, and serve as a useful guideline in determining the importance and sensitivity of aquatic ecosystems prior to assessment, or as part of a desktop assessment. This database was searched for the quaternary catchment of concern (G10M) in order to define the EIS, PEMC and DEMC, see table below. The findings are based on a study undertaken by Kleynhans (1999) as part of "A procedure for the determination of the ecological reserve for the purpose of the national water balance model for South African rivers".

**Table 7: Summary of ecoregion aspects applicable to the study area.**

Catchment	Resource	EIS	PEMC	DEMC
G10M	Verlorenvlei	Moderate	CLASS C	C: Moderately Sensitive Systems

The points below summarise the impacts on the aquatic resources within the quaternary catchment G10M (Kleynhans 1999):

- Bed modification within this quaternary catchment is considered to be at a moderate level.
- Moderate flow modifications have taken place within the catchment, due to the pumping of water from the system.



- 
- There has been a moderate impact in the catchment as a result of introduction of instream biota with special mention of *Cyprinus carpio*.
  - A marginal impact from inundation is present within the catchment.
  - Impact on river banks is considered to be at a moderate level.
  - Impact on water quality in the catchment is considered to be at a moderate level.

In terms of ecological functions, importance and sensitivity, the following points summarise the conditions in this catchment:

- The riverine systems in this catchment have a moderate diversity of habitat types.
- The catchment has a very high importance in terms of conservation areas and conservation of biodiversity and contains a proposed RAMSAR site.
- The riverine resources have a moderate level of intolerance to changes in flow and flow related water quality.
- The area has a high importance in terms of faunal migration with special mention of mullet species and bird species.
- The area is considered to be of very high importance in terms of rare and endangered species conservation with special mention of rare and endangered bird species.
- The area is regarded to be of moderate importance as source of refugia for aquatic species.
- The aquatic resources in this catchment can be considered moderately sensitive to changes in water quality and water flow.
- The catchment is considered to be of high importance with regards to species/taxon richness.
- The catchment is considered to be of moderate importance with regards to unique species with special mention of invertebrates associated with pan wetland features.



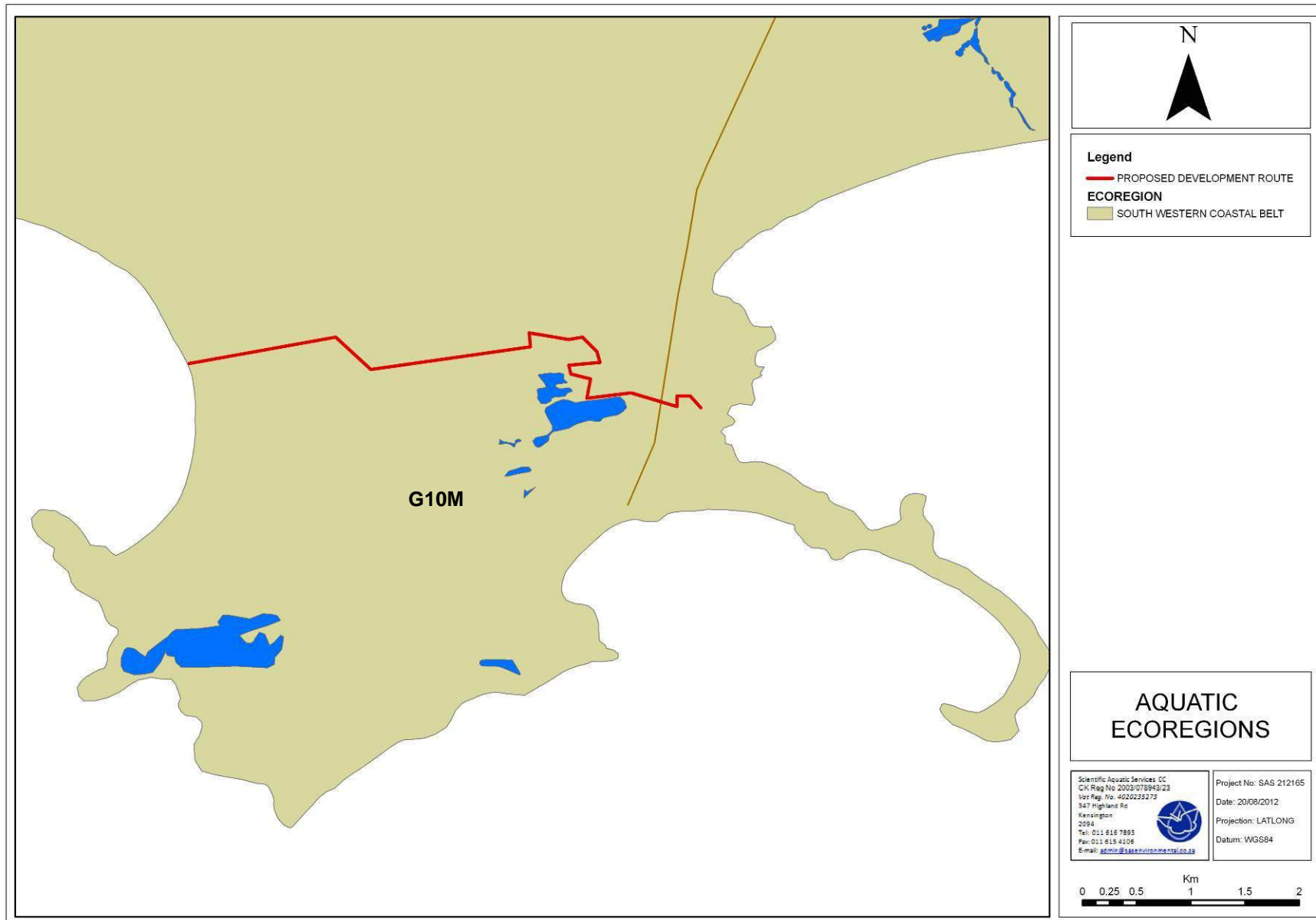


Figure 6: Aquatic ecoregion and quaternary catchments pertaining to the proposed development route and surroundings.



## ***5.2 General importance of the proposed development route with regards to wetland conservation***

### **5.2.1 National Wetlands Inventory (2006)**

Two wetland features are indicated to fall in close proximity to the proposed development route by the National Wetland Inventory (2006). These features are indicated as unchannelled valley bottom wetlands. It is considered important that if the proposed development route does prove viable, appropriate mitigation measures be implemented to ensure that these wetland features are not impacted upon. Where impact is unavoidable wetlands should be rehabilitated. Furthermore, it is deemed very important that if development takes place, it is done in an ecologically sensitive manor.



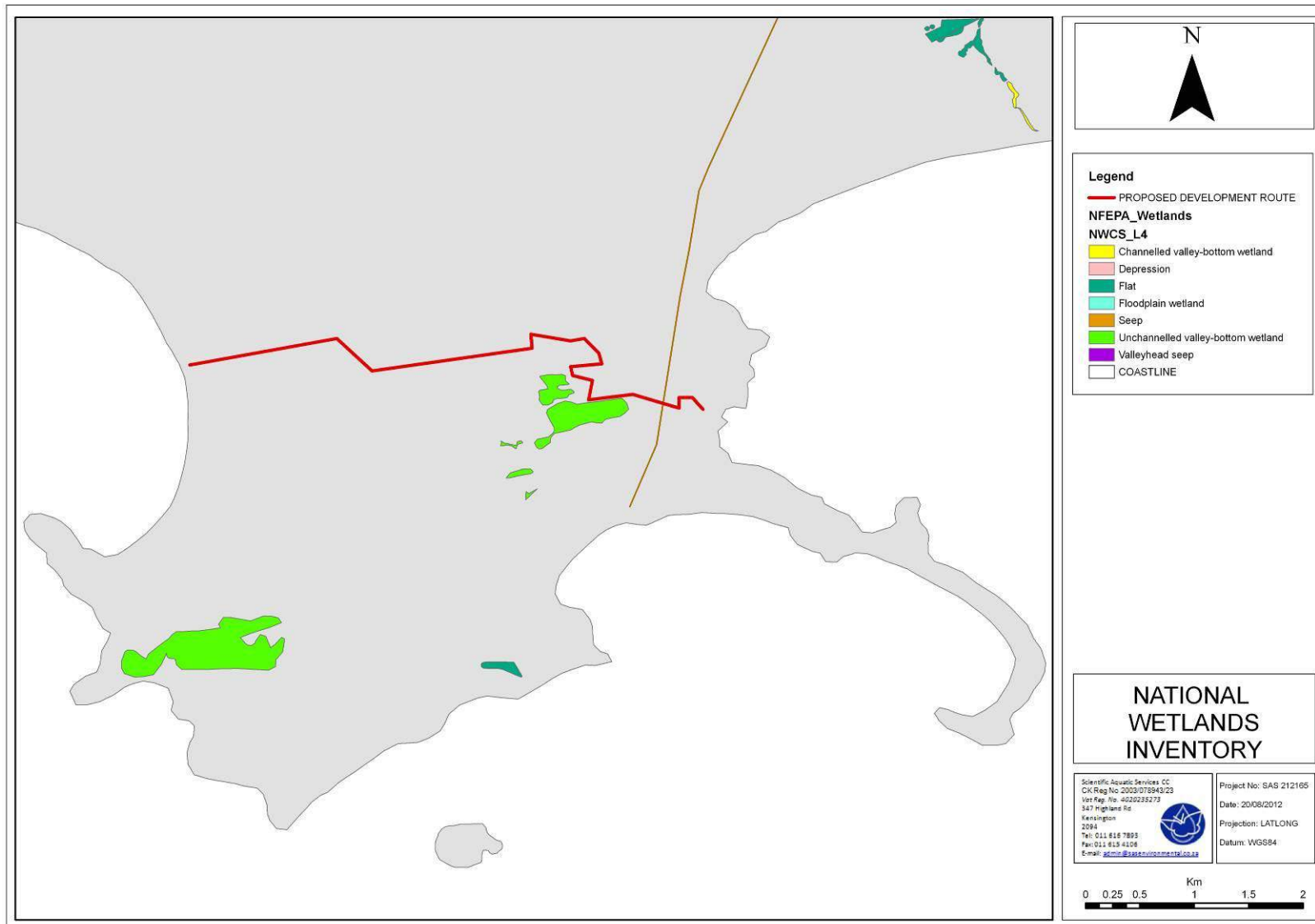


Figure 7: National Wetlands Inventory, 2006.



## 5.2.2 Freshwater Ecosystem Priority Areas

The Biodiversity GIS database ([www.bgis.sanbi.org](http://www.bgis.sanbi.org)), with special mention of the Freshwater Ecosystem Priority Areas (FEPAs), were consulted with regards to wetland features close to or crossing the proposed development route that may be of ecological importance. Although all available resources given by the BGIS were taken into consideration only the aspects applicable to the proposed development route and surroundings are discussed below and depicted in the figures that follow.

- The proposed development route falls within the Berg Water Management Area (WMA). Each Water Management Area is divided into several sub-Water Management Areas (subWMA), where catchment or watershed is defined as a topographically represented area which is drained by a stream or river network. The Sub-Water management unit indicated for the proposed development route is the Lower Berg subWMA;
- The NPAES database (National Protected Areas) indicates that a portion of proposed development route is bordered by a formal land-based protected area (figure 8);
- The Lower Berg subWMA is not listed as a fish Fresh Water Ecosystem Priority Area (fish FEPA);
- The Lower Berg subWMA is not considered important in terms of fish sanctuaries and no importance is indicated in terms of migrational corridors, rehabilitation, translocation or relocation zones for fish;
- The Lower Berg subWMA is however indicated as a Phase2 FEPA. The condition of these Phase 2 FEPAs should not be degraded further as they may in future be considered for rehabilitation;
- No river features are indicated to cross the proposed development route by the FEPA database;
- The proposed development route is indicated to coincide with one wetland cluster area (Figure 9);
- Wetland features are indicated to the south east of the proposed development route. These features fall in close proximity to the proposed development route and are considered natural features; see figure 10 below;



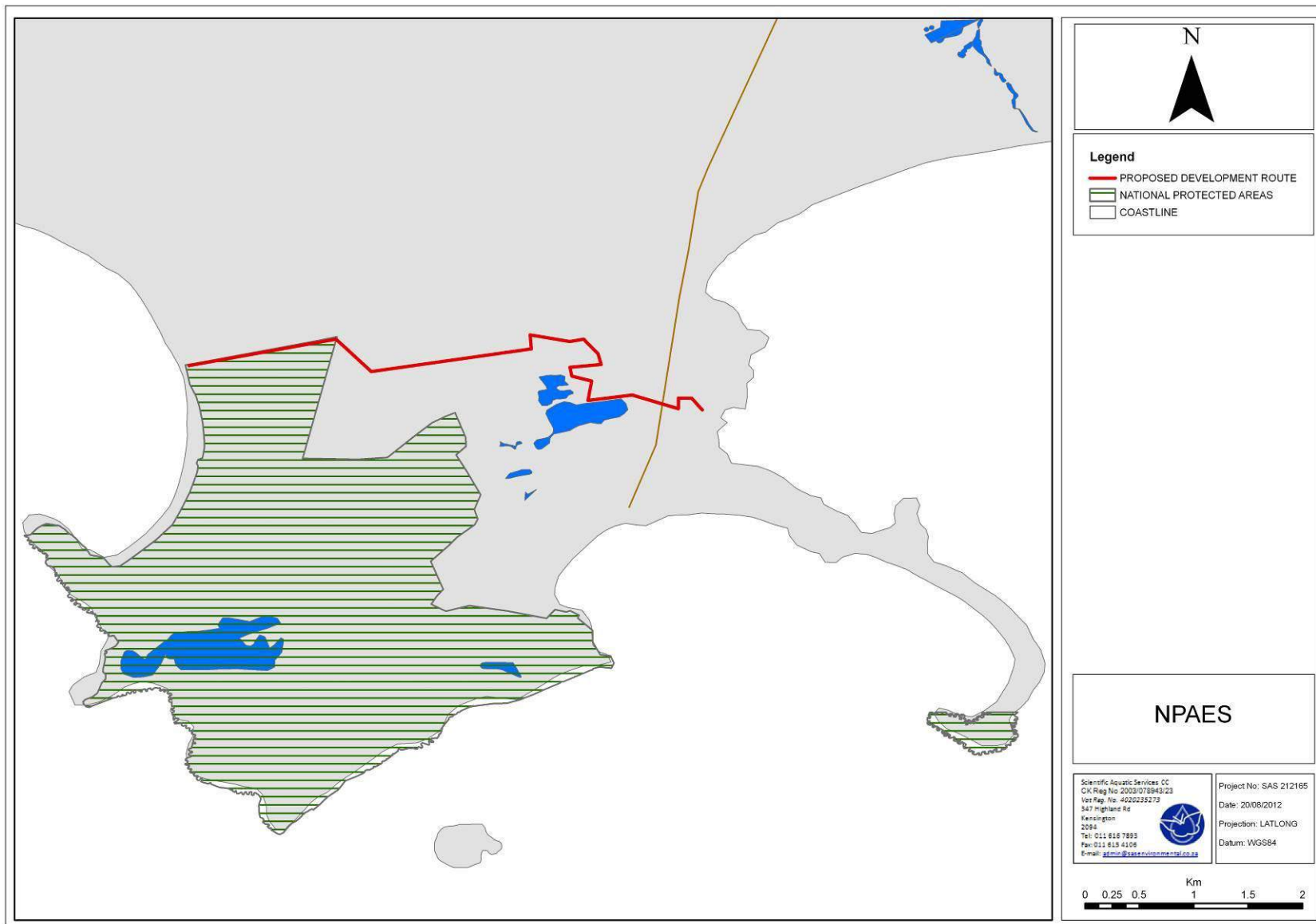


Figure 8: NPAES database (National Protected Areas).





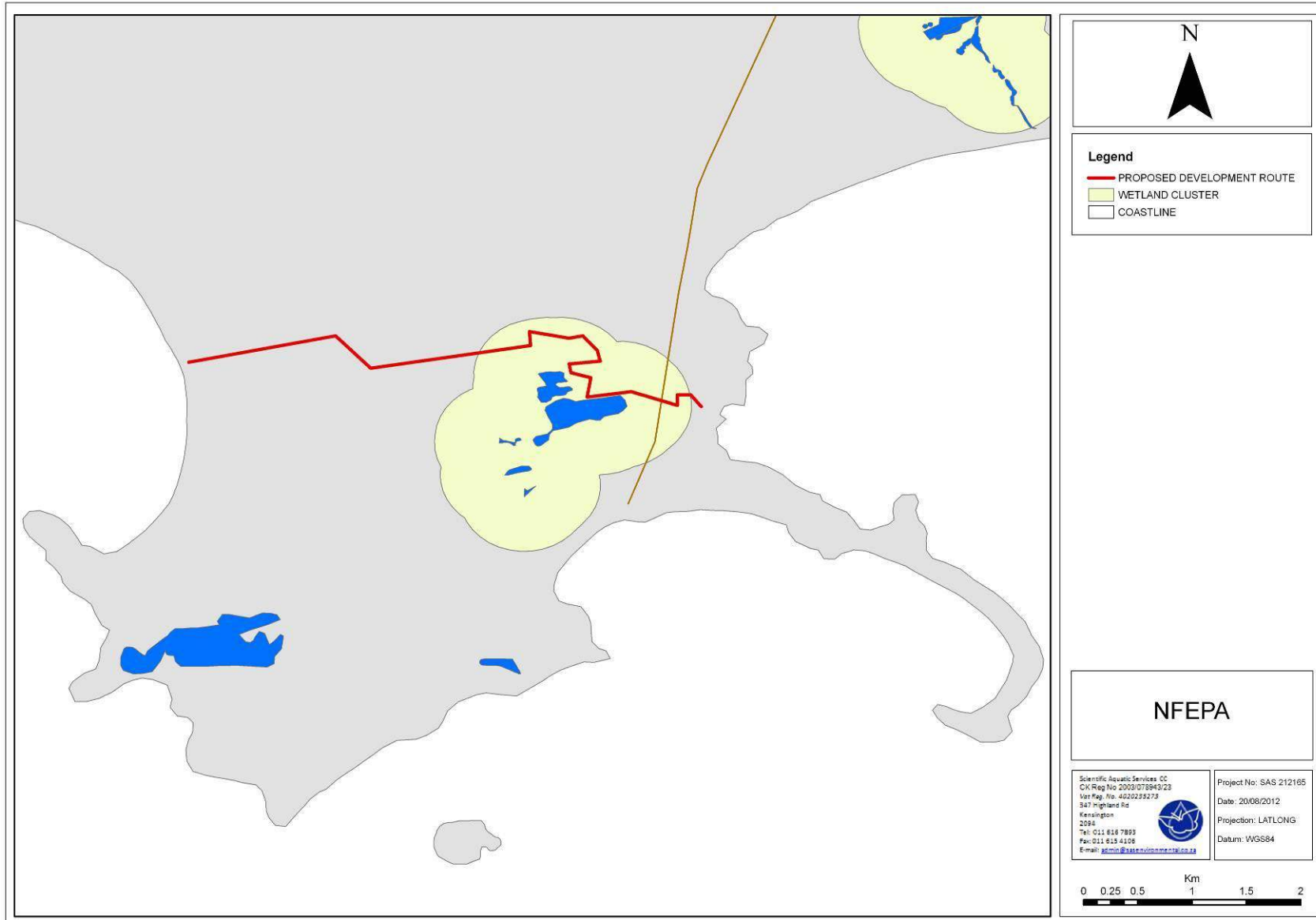


Figure 9: Wetland cluster indicated to coincide with the proposed development route.



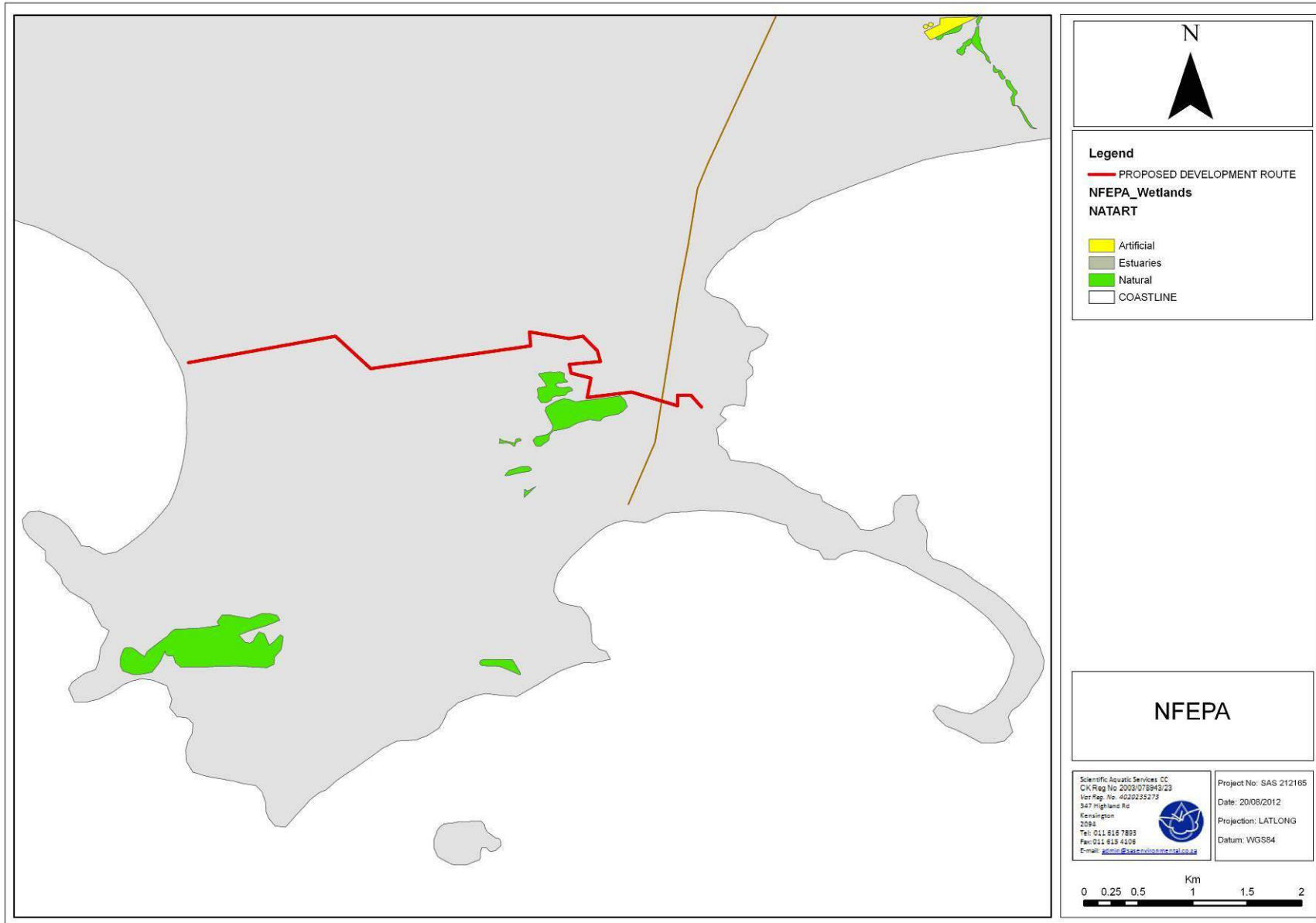


Figure 10: Location of wetlands features in relation to the proposed development route.



- Conditions of the wetlands near the proposed development route are depicted in the figure below and include:
  - Category C – Percentage natural land cover 25-75%



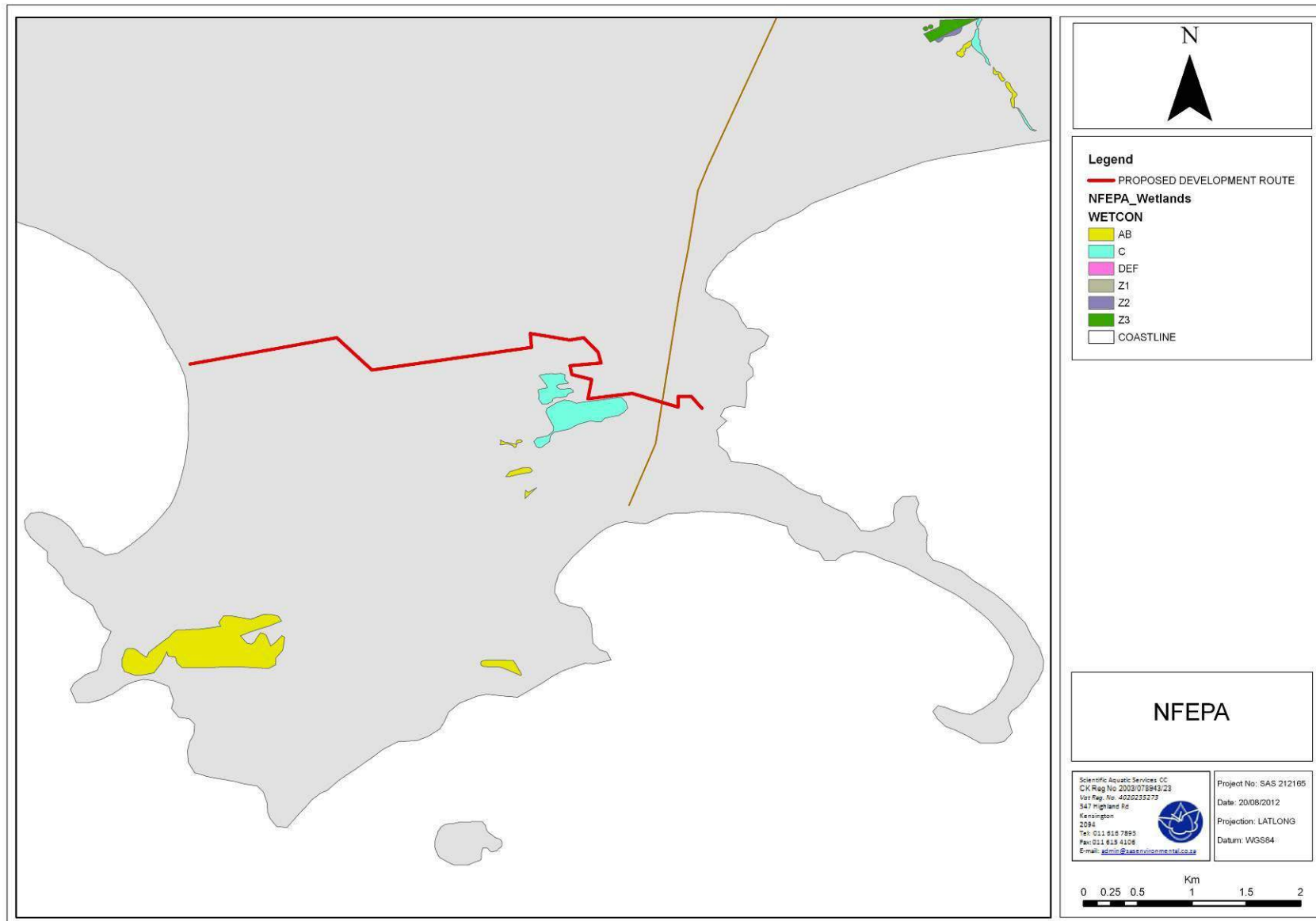


Figure 11: Specified conditions for wetlands near the proposed development route (C = natural land cover 25 -75%).



- All wetlands located within the vicinity of the proposed development route are indicated to have no importance with regard to biodiversity;
- No wetlands in the vicinity of the proposed development route are considered wetlands within 500m of a threatened waterbird point locality or of importance in terms of the conservation of cranes which are considered endangered (*Bugeranus carunculatus*, *Balearica regulorum* and *Anthopoides paradiseus*);
- No RAMSAR wetlands are located close to the proposed development route;
- No wetlands considered of importance in terms of frog conservation are located near the proposed development route;
- The wetland features located in close proximity to the proposed development route are ranked as 2, and are wetlands within a subquaternary catchment identified by experts at the regional review workshops as containing wetlands that are good, intact examples from which to choose.



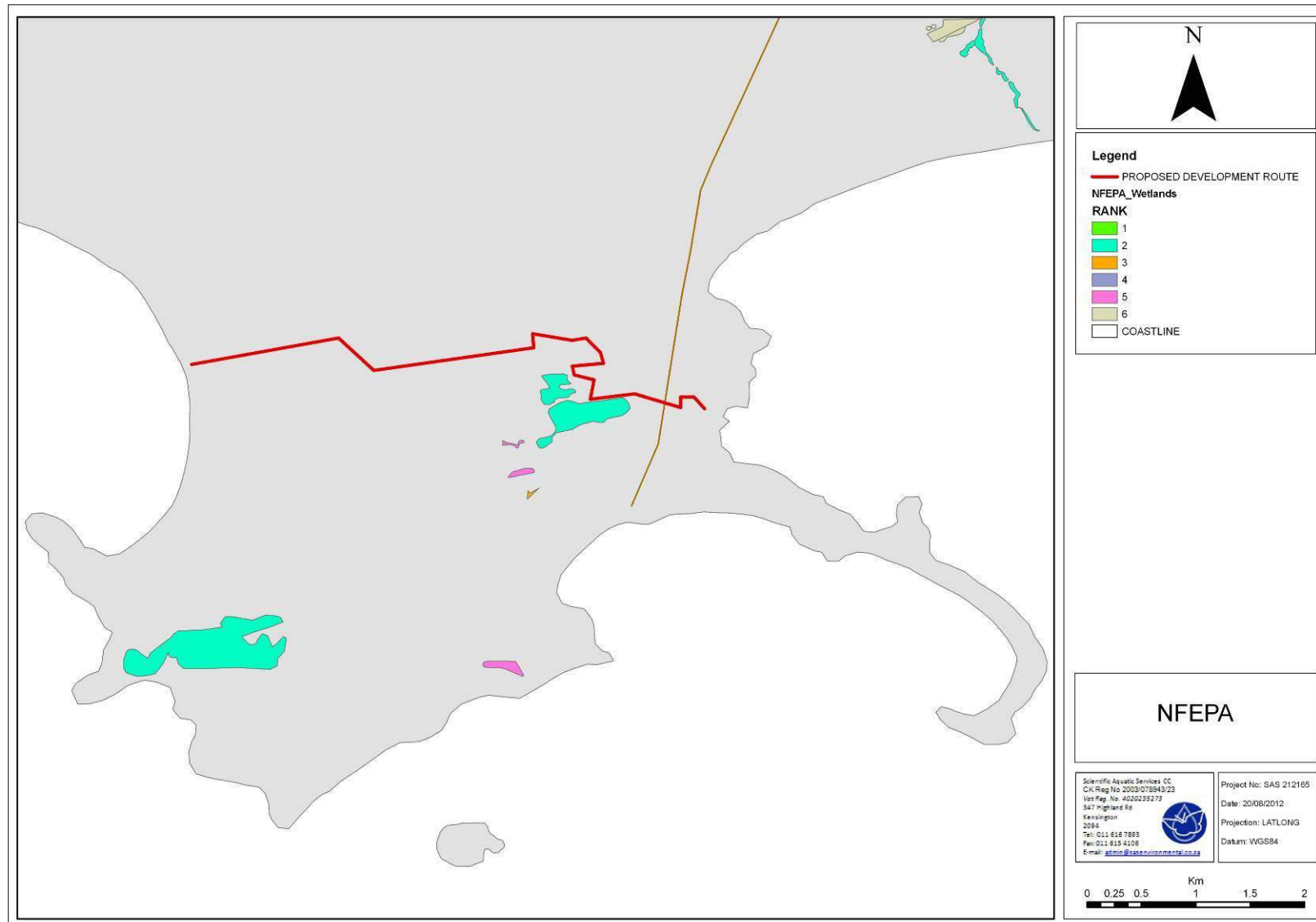


Figure 12: Ranks according to general importance (2 = wetlands within a subquaternary catchment identified by experts at the regional review workshops as containing wetlands that are good, intact examples from which to choose no importance).



The proposed development route is situated in close proximity to two wetland features and coincides with a wetland cluster area. The wetland features are considered natural features with a natural land cover of 25-75% and are wetlands within a subquaternary catchment identified by experts at the regional review workshops as containing wetlands that are good, intact examples from which to choose. Anthropogenic activity near these wetland features could result in impacts such as alien vegetation proliferation or sedimentation of wetland zones. It is therefore considered important that the proposed development route remain outside the allocated buffer areas as far as possible.

### **5.3 General Wetland Assessment Results**

After a drive through of the proposed development route and surrounding area, areas that may potentially support wetland habitat were identified and investigated further. These areas are depicted in the figure below. After further investigation, the two wetland features identified by FEPA maps to fall in close proximity to the proposed development route were determined to form part of a single valley bottom wetland feature which has been traversed by a gravel road along which the proposed development is to take place. Of all the wetland areas investigated, only this valley bottom feature was determined to be natural. All remaining features traversing, or in close proximity to the proposed development route were identified to be artificial storm water canals or artificial impoundments (See figure below for the location of wetland features).





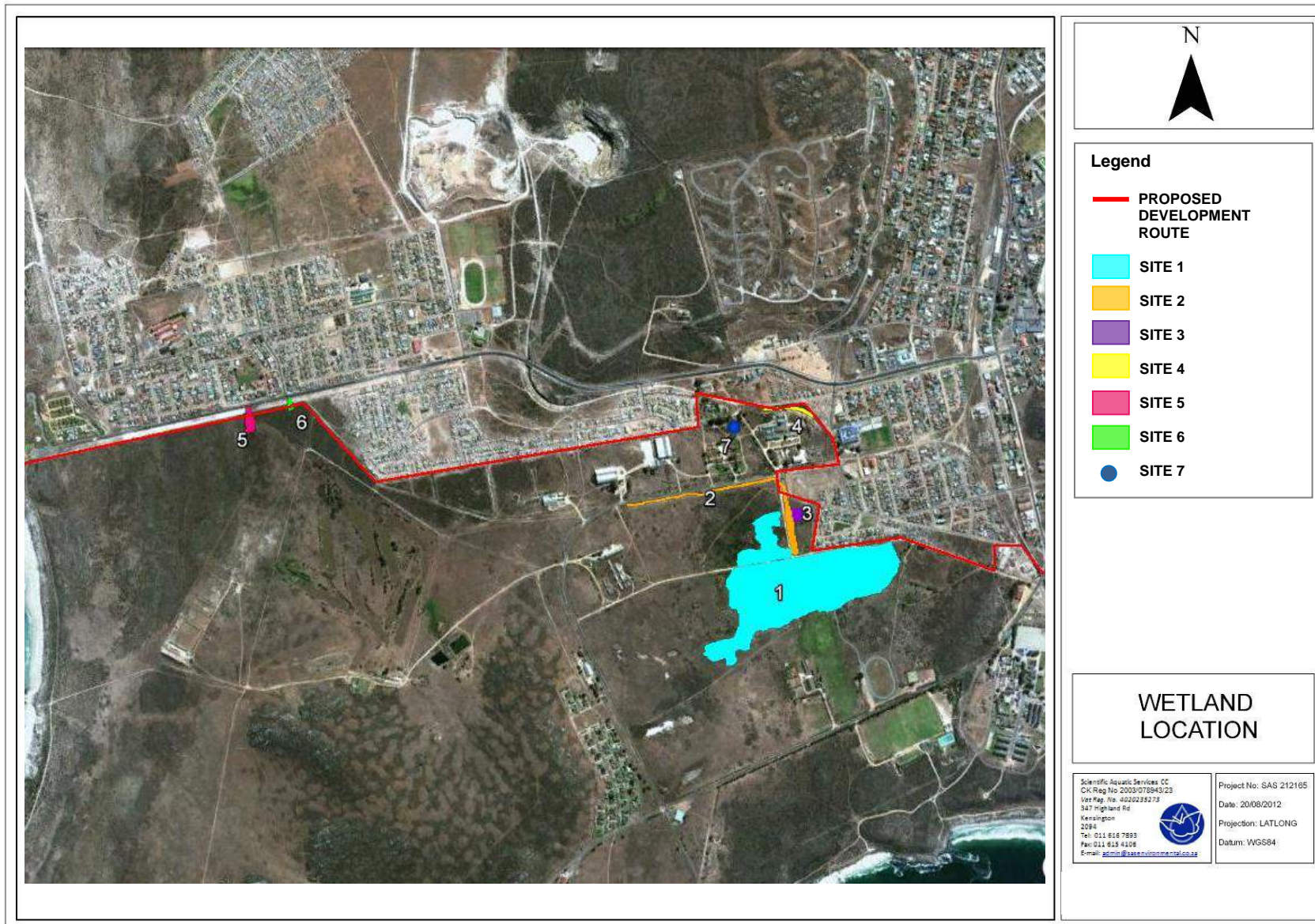


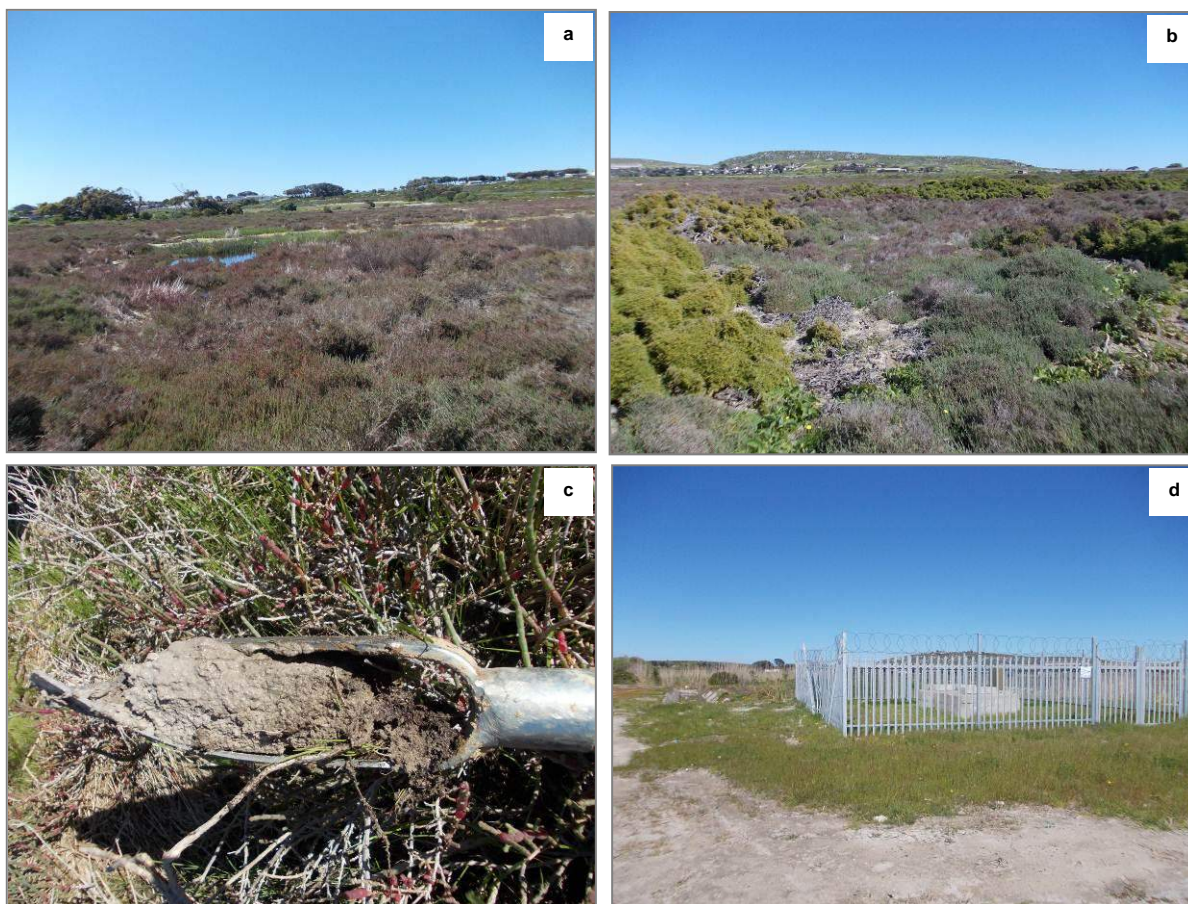
Figure 13: Areas within the study area investigated for the presence of wetland indicators.





The following can be concluded after the investigation of the areas:

### Site 1



**Figure 14: Site 1 (a and b), hydromorphic soils (c) and the pump system which removes water from the wetland (d).**

The natural wetland feature located to the south east of the proposed development route is classified as an unchannelled valley bottom wetland by the NFEPA database (Freshwater Ecosystem Priority Areas; FEPAs) (Site 1). A pump system has been installed within this wetland feature in order to remove water from the feature and to prevent the flooding of the area. This pump system may have affected the amount of water which naturally occurs in the wetland. However, wetland indicators are present in the feature which is characterised by the presence of obligate wetland species such as *Sarcocornia* sp., *Juncus acutus* and *Zantedeschia aethiopica*. Terrain units and the presence of hydromorphic soils and surface water further indicate the presence of wetland conditions in the area. Furthermore, frog and bird calls indicate importance in terms of the provision of amphibian and avifaunal habitat. This feature is therefore considered of increased importance in terms of overall wetland conservation in the area.

**Site 2**

**Figure 15: Site 2 (a), artificial berm and road to the west of the canal (b).**

Site 2 indicates the location of an artificial storm water drainage canal. No facultative or obligate wetland species were encountered within the area and neither surface water nor hydromorphic soils were present in the system. An artificial berm and gravel roads located to the west and south of the feature are thought to have isolated the canal from surrounding wetland areas. Due to the artificial nature of this feature as well as the lack of wetland indicators within the feature, it is deemed doubtful that the feature could be important in terms of function and service provision. As a result, the feature was not included within further assessments.

**Site 3**

**Figure 16: Site 3.**

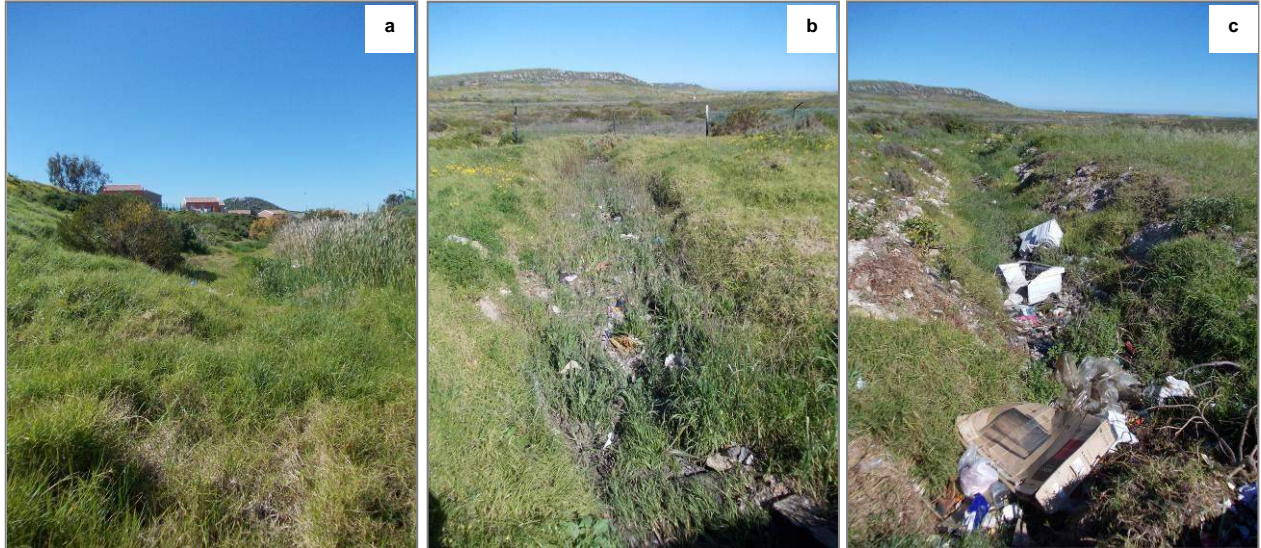
Site 3 indicates the location of an artificial impoundment. The collection of surface water runoff from surrounding roads and urban areas over an extended period of time is expected to have resulted in the formation of hydromorphic soils within the impoundment. However,





the feature is dominated by the alien invasive species *Pennisetum clandestinum* and is not expected to be of value in terms of overall wetland conservation.

#### Sites 4, 5 and 6



**Figure 17: Site 4 (a), site 5 (b) and site 6 (c).**

Three additional storm water drainage features run through the proposed development route (site 4, 5 and 6). All three features are considered artificial and are dominated by the alien invasive species *Pennisetum clandestinum*. These canals are expected to have been excavated to capture and convey surface runoff from surrounding roads and urban areas and, in their present state, it is doubtful that the features could be of significant importance in terms of wetland function and service provision.

**Site 7****Figure 18: Site 7.**

A 'french drain' was noted at site 7 and was characterised by the presence of the obligate wetland species *Zantedeschia aethiopica*. However, the feature is not regarded to be of importance in terms of function and service provision and as a result was not included within further assessments.

## 5.4 Wetland System Characterisation

The natural wetland feature associated with site 1 was categorised with the use of the *Wetland System Characterisation Methodology*. The results are illustrated in the figure below.

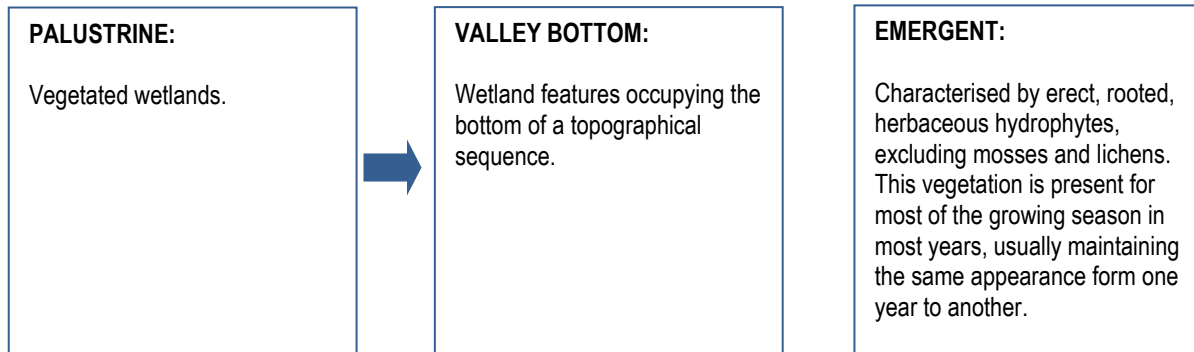


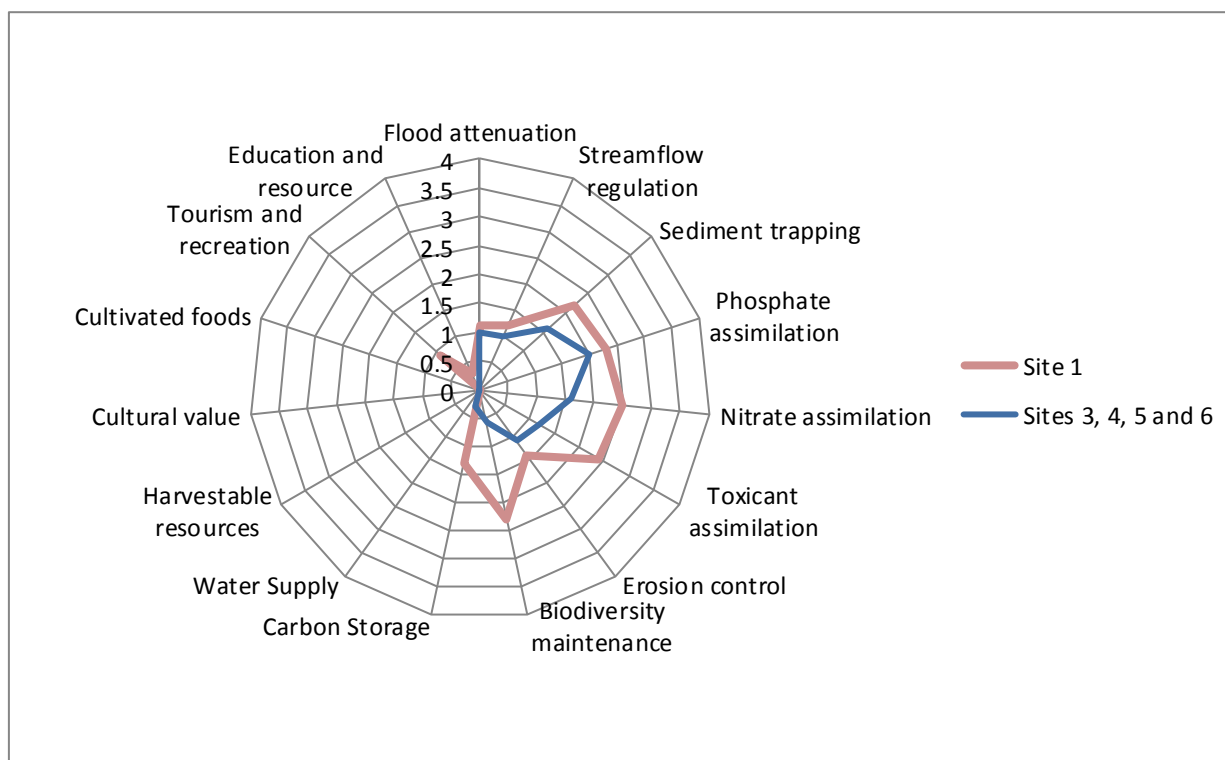
Figure 19: Wetland categorisation for the natural wetland feature associated with Site 1.

## 5.5 Wetland Function Assessment

For the purposes of the wetland function assessment, wetland features in close proximity to, or crossing the proposed development route were grouped according to the *Wetland System Characterisation Methodology* discussed in the previous section. The ecoservice provision and function of the natural wetland feature associated with site 1 were considered in a single assessment and the ecoservice provision and function of the artificial canals and impoundments associated with sites 3, 4, 5 and 6 were considered in a second assessment. Features associated with sites 2 and 7 are not expected to provide any ecoservices or to serve any function and so were not assessed.

**Table 8: Wetland function and service provision for features near the proposed development route.**

Ecosystem service	Wetland	
	Site 1	Sites 3, 4, 5 and 6
Flood attenuation	1.1	1
Streamflow regulation	1.2	1
Sediment trapping	2.2	1.6
Phosphate assimilation	2.3	2
Nitrate assimilation	2.5	1.6
Toxicant assimilation	2.4	1.2
Erosion control	1.4	1.1
Biodiversity maintenance	2.3	0.6
Carbon Storage	1.3	0.3
Water Supply	0	0
Harvestable resources	0	0
Cultural value	0	0
Cultivated foods	0	0
Tourism and recreation	0.9	0
Education and resource	0.3	0
<b>SUM</b>	<b>17.9</b>	<b>10.4</b>
<b>Average score</b>	<b>1.3</b>	<b>0.7</b>



**Figure 20: Radar plot of wetland services provided.**





It is evident from the results of the assessment that the natural wetland feature associated with site 1 has an intermediate level of ecological function and service provision. The diffuse nature of the system and the presence of wetland vegetation within the feature has resulted in a moderately high level of importance for the feature with regards to sediment trapping and the assimilation of phosphates, nitrates and toxicants which are expected to enter the system in the form of runoff from urban areas as well as from gravel and tarred roads. This feature also provides habitat for indigenous species in an area where the cumulative loss of the vegetation type is high, and is therefore regarded of moderately high importance in terms of the maintenance of biodiversity in the area

The artificial storm water drainage canals and impoundments associated with sites 3, 4, 5 and 6 were determined to have a moderately low level of ecological function and service provision. Although artificial in nature, these features may play some role in sediment trapping and the assimilation of phosphates and nitrates which are expected to enter the systems in runoff from roads and urban infrastructure.





Figure 21: Ecoservice provision of the eastern wetland features of the proposed development route.



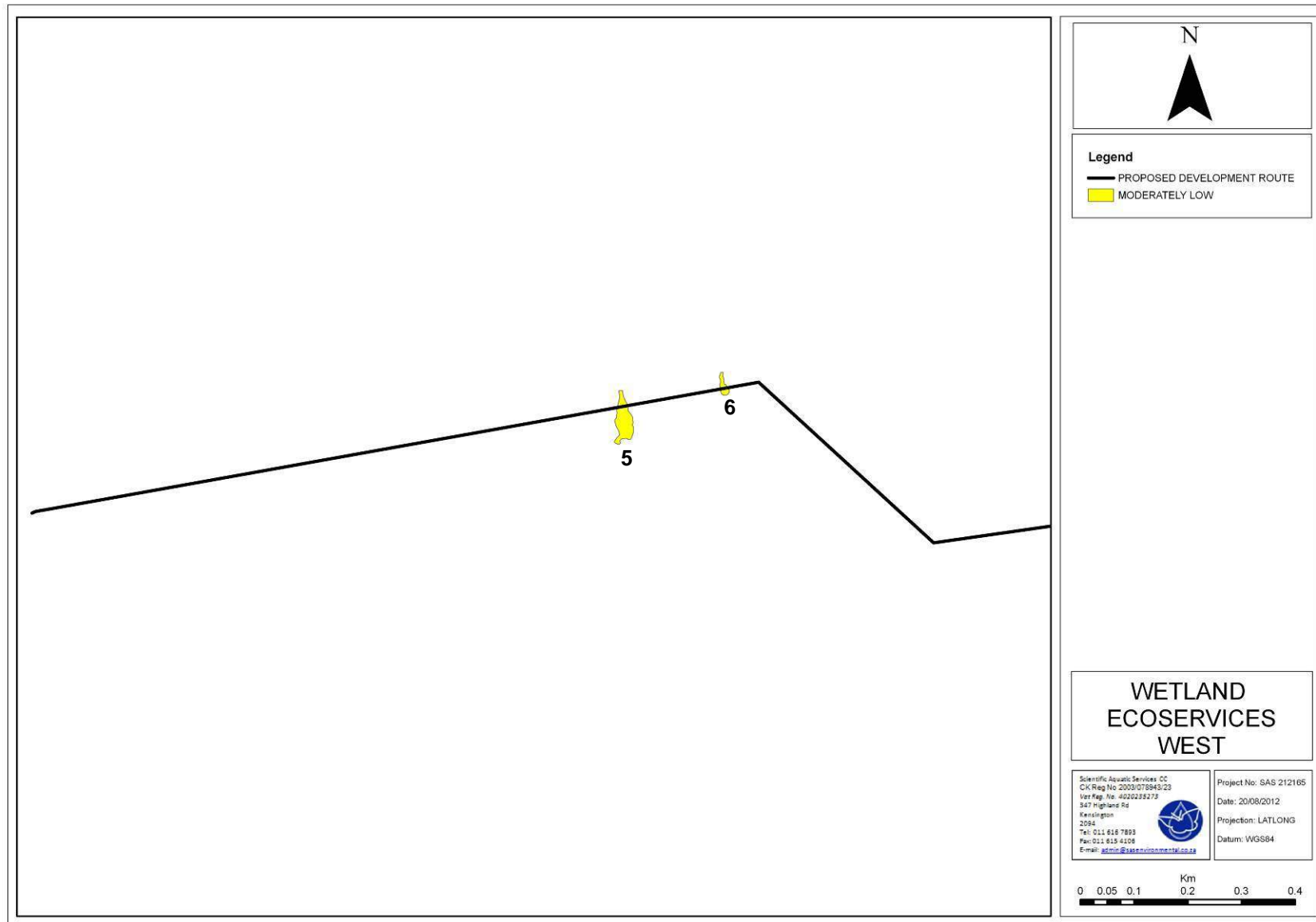


Figure 22: Ecoservice provision of the western wetland features of the proposed development route.



## 5.6 Present Ecological State

The PES scoring system is used to determine the transformation of natural wetland features and therefore is not applicable to artificial drainage features located within the study area (features associated with sites 3, 4, 5 and 6). The results for the criteria and attributes used for the calculation of the PES of the natural wetland feature associated with site 1 are however stipulated in the table below.

**Table 9: Criteria and Attributes used with the calculation of the PES.**

Criteria and Attributes	Site 1	
	Score	Confidence
<b>Hydrologic</b>		
Flow modification	1	4
Permanent Inundation	4	4
<b>Water quality</b>		
Water Quality Modification	3	4
Sediment load modification	3	4
<b>Geomorphic</b>		
Canalisation	4	4
Topographic Alteration	3	4
<b>Biota</b>		
Terrestrial Encroachment	3	4
Indigenous Vegetation Removal	4	4
Invasive plant encroachment	4	3
Alien fauna	4	2
Overutilization of biota	4	3
<b>Total</b>	<b>37</b>	
<b>Mean</b>	<b>3.4</b>	

The PES score calculated for the natural wetland feature associated with site 1 falls within Class B; largely natural with few modifications. The continuous removal of water from the feature by means of the pump system within the wetland area is expected to have resulted in the significant hydrological modification of the feature. Furthermore, runoff entering the feature from the urban area of Diazville and from gravel and tarred roads in close proximity to the feature is expected to have decreased the water quality of the feature. It is also possible that the sediment carried within this runoff has resulted in the modification of the sediment load of the system. However, geomorphic and biotic modifications are considered low and serve to increase the overall Present Ecological State of the system.





## **5.7 Ecological Management Class**

According to the resource directed measures for protection of water resources, a wetland may receive the same class for the PES, as the EMC, if the wetland is deemed in good condition, and therefore must stay in good condition. Otherwise, an appropriate EMC should be assigned in order to prevent any further degradation as well as to enhance the PES of the wetland feature. The natural wetland feature associated with site 1 was determined to have an intermediate level of ecological function and service provision and is considered to be in a largely natural state with few modifications. The EMC class deemed appropriate to maintain the current ecology as well as functionality within this natural wetland feature is class B (Largely natural with few modifications).

## **5.8 Impact Assessment**

The tables below serve to summarise the significance of perceived impacts on the wetland biodiversity of the proposed development route during the construction phase (impact assessment 1) and operational phase (impact assessment 2) followed by a table listing possible cumulative impacts (impact assessment 3) during both phases of the development. Due to the construction of the proposed development route on an existing gravel road, the pre-construction activities are not likely to cause a significant impact on wetland areas and so were not included in the assessment.





## Impact Assessment 1: Impacts during the construction phase.

### IMPACT 1A: Impact on wetland habitat due to construction and development related activities.

Potential impacts on the wetland aspects:	Alternative 1	No-Go Alternative
<b>Nature of impact:</b>	Although the majority of wetland features within 500 meters of the proposed development are artificial storm water drainage canals there is a possibility that the development of infrastructure may result in the loss of habitat within the natural wetland feature associated with site 1 which is of higher ecological importance.	At present the boundary of urban development lies in close proximity to the border of the natural wetland feature associated with site 1. Without the construction of the wall, urban sprawl and the encroachment of urban activities into wetland areas within the Saldanha Bay Naval Base property is likely to occur and therefore may result in a decrease in the Present Ecological State of the natural feature associated with site 1
<b>Extent and duration of impact:</b>	Local extent and will be long term.	Local extent and without mitigation most probably would be permanent.
<b>Probability of occurrence:</b>	Definite	Probable.
<b>Degree to which the impact can be reversed:</b>	Partly reversible.	Irreversible.
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	Irreplaceable.	Irreplaceable.
<b>Impact prior to mitigation:</b>	<ul style="list-style-type: none"> <li>• Development of infrastructure or activities associated with the proposed development encroaching on wetland features or associated buffer zones.</li> <li>• Development within wetland zones may lead to alien vegetation encroachment and loss of species diversity.</li> <li>• Indiscriminate driving through wetland zones during construction may lead to loss of wetland habitat.</li> <li>• Development within wetland zones may result in a change in hydrology that could result in drying of soils and loss of obligate/facultative wetland species.</li> <li>• Development of the wall foundation may result in a change in hydrology that could result in drying of soils and loss of obligate/facultative wetland species</li> <li>• An alteration of the wetland vegetation characteristics of the system may occur, mainly as a result of sedimentation during construction.</li> <li>• Mixing of concrete in wetland areas may result in loss of wetland habitat.</li> <li>• Erosion and incision of wetlands prior to re-establishment of vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>• Edge effects from surrounding urban activities may impact on wetland areas within the Saldanha Bay Naval Base property.</li> <li>• Ongoing runoff from urban areas and erosion.</li> <li>• Encroachment of urban activities into wetland areas within the Saldanha Naval Base property.</li> <li>• Urban infrastructure development near wetland features impacting on natural hydrology as well as resulting in loss of wetland habitat.</li> <li>• Earth moving activity as part of construction activities.</li> <li>• Lack of alien vegetation control.</li> <li>• Dumping of refuse within wetland areas</li> </ul>
<b>Significance rating of impact prior to</b>	High negative significance.	Moderate negative significance.



<p><b>mitigation</b> (Low, Medium, Medium-High, High, or Very-High)</p>		
<p><b>Degree to which the impact can be mitigated:</b></p>	<p>Partly mitigated.</p>	<p>If the encroachment of urban activities and infrastructure is not controlled it is doubtful that the impact can be fully mitigated.</p>
<p><b>Proposed mitigation:</b></p>	<ul style="list-style-type: none"> <li>• All wetland features should be demarcated as sensitive zones and kept off limits during the construction phase of the development.</li> <li>• Where development in wetland buffer areas is unavoidable, footprint areas should be kept as small as possible and should remain outside the wetland zone.</li> <li>• Ensure that development related waste and effluent do not affect the wetland boundaries and associated buffer zones. In this regard special mention is made of construction vehicles. All servicing and refuelling of construction vehicles should take place in a designated area away from any wetland areas or off site.</li> <li>• Limit the footprint area of the construction activity in order to minimise environmental damage.</li> <li>• Vehicles should not be allowed to drive through wetland zones.</li> <li>• As far as possible vehicles should be restricted to existing gravel roads.</li> <li>• As far as possible construction should be restricted to the drier summer months to avoid sedimentation of wetland features in the vicinity of the proposed development.</li> <li>• The area earmarked for the development as well as surroundings should be kept free from alien and invasive floral species to ensure these species do not spread to surrounding areas.</li> <li>• Alien and invasive species should be removed from the natural wetland feature associated with site 1 as well as from artificial drainage features associated with sites 3, 4, 5 and 6 and the features should be maintained in a functioning state.</li> <li>• No dumping of waste material should be allowed within wetland or associated buffer zone at any stage of the development. No temporary storage of building material should be allowed within wetland area or the associated buffer zone.</li> <li>• It is recommended that a management plan be compiled prior to commencement of construction with focus on ongoing rehabilitation.</li> <li>• Edge effects of activities, including erosion and alien/weed control need to be strictly managed in wetland areas as well as their</li> </ul>	<ul style="list-style-type: none"> <li>• Alien vegetation control could result in a decrease in impact significance. In terms of the amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998 landowners are legally responsible for the control of invasive alien plants on their properties.</li> </ul>



	<p>associated buffer zones.</p> <ul style="list-style-type: none"> <li>• Appropriate sanitation facilities must be provided for the duration of the proposed development and all waste removed to an appropriate facility. These facilities must be located outside of the wetland features and associated rehabilitated areas and must be regularly serviced.</li> </ul>	
<b>Impact post mitigation:</b>	<ul style="list-style-type: none"> <li>• All wetland features were delineated and buffer zones allocated to features regarded to be of higher ecological importance. Where development in buffer areas is unavoidable, the restriction of the footprint areas and the restriction of construction activities to areas outside of wetland features may decrease impact significances.</li> </ul>	<ul style="list-style-type: none"> <li>• Impacts as a result of the encroachment of urban infrastructure and activities into the Saldanha Bay Naval Base property will remain. However the removal of alien invasive species may reduce the impact slightly.</li> </ul>
<b>Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Low negative significance	Low negative significance



**IMPACT 1B: Loss of wetland habitat due to ineffective rehabilitation.**

Potential impacts on the wetland aspects:	Alternative 1	No-Go Alternative
<b>Nature of impact:</b>	Loss of wetland habitat due to ineffective rehabilitation.	No rehabilitation will be required which will result in no improvement of wetland characteristics of wetland features.
<b>Extent and duration of impact:</b>	Local extent and impact could be permanent.	Local extent and with no rehabilitation impact would be permanent.
<b>Probability of occurrence:</b>	Highly probable.	Definite.
<b>Degree to which the impact can be reversed:</b>	Partly reversible.	Irreversible.
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	Irreplaceable	Irreplaceable.
<b>Impact prior to mitigation:</b>	<ul style="list-style-type: none"> <li>• Failure to develop a comprehensive rehabilitation plan and ensure that sufficient rehabilitation and maintenance budgets are in place to minimise environmental degradation.</li> <li>• Failure to rehabilitate areas disturbed during construction with special mention of areas within immediate surroundings of proposed development route.</li> </ul>	<ul style="list-style-type: none"> <li>• Alien and weed floral species presently within the study area will proliferate and stands will increase in size with special mention of <i>Pennisetum clandestinum</i>.</li> </ul>
<b>Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	High negative significance.	Moderate negative significance
<b>Degree to which the impact can be mitigated:</b>	Fully mitigated.	Mitigation measures will be limited if the development is not undertaken.
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>• It is recommended that a management plan be compiled prior to commencement of construction with focus on ongoing rehabilitation in the vicinity of features considered of a higher ecological importance.</li> <li>• The area earmarked for the development as well as surroundings should be kept free from alien and invasive floral species to ensure these species do not spread to surrounding areas and ultimately hamper re-establishment of natural vegetation.</li> <li>• Alien and invasive species should be removed from the natural wetland feature associated with site 1 as well as from artificial drainage features associated with sites 3, 4, 5 and 6 and the features should be maintained in a functioning state.</li> <li>• No vehicles should be allowed to drive through wetlands or their immediate surrounding areas during eradication of alien and weed species.</li> <li>• Care should be taken within wetland areas as well as surroundings</li> </ul>	<ul style="list-style-type: none"> <li>• Alien vegetation control could result in a decrease in impact significance. In terms of the amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998 landowners are legally responsible for the control of invasive alien plants on their properties.</li> </ul>



	<p>with the choice of herbicide to ensure no additional impact due to the herbicide used occurs on wetland habitat.</p> <ul style="list-style-type: none"> <li>• All soils compacted as a result of construction activities falling outside the development footprint areas should be ripped, profiled and monitored to ensure establishment of natural vegetation.</li> <li>• Rehabilitated areas should be monitored to determine if rehabilitation efforts are effective.</li> <li>• Careful consideration should be taken with time of the year eradication methods are employed as to not result in further dispersal of seed as well as species known to proliferate after ineffective eradication methods.</li> <li>• Careful attention should be paid with the choice of wetland species used for rehabilitation; preference should be given to species known to occur within the region.</li> </ul>	
<p><b>Impact post mitigation:</b></p>	<ul style="list-style-type: none"> <li>• Some impact can still be expected during the development phase, regardless of implementation of mitigation measures, however effective rehabilitation during all phases of the development would result in the impact being of limited duration.</li> </ul>	<ul style="list-style-type: none"> <li>• Without eradication and future control of alien and weed species, these species will continue to proliferate and spread to surrounding areas resulting in loss of wetland habitat considered of importance for floral and faunal species.</li> </ul>
<p><b>Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)</b></p>	<p>Low negative significance</p>	<p>Moderate negative significance if no rehabilitation measures for urban related activities are implemented.</p>



**IMPACT 1C: Impact on wetland service and function provision.**

Potential impacts on the wetland aspects:	Alternative 1	No-Go Alternative
<b>Nature of impact:</b>	Proposed development activities may impact on the service provision and function of the natural wetland feature associated with site 1. This feature is expected to play an important role in sediment trapping and the assimilation of phosphates, nitrates and toxicants. The storm water drainage canals of the proposed development route are presently not considered of significant importance in terms of function and service provision due to their artificial nature. However, the features may still have some importance in terms of flood attenuation and the assimilation of phosphates and toxicants.	Without the development of the wall, dumping of refuse within wetland features and storm water canals within the Saldanha Bay Naval Base property, which presently provide some service and function, is likely to occur.
<b>Extent and duration of impact:</b>	Local extent and may be permanent if mitigation measures are not undertaken.	Local extent which will be permanent.
<b>Probability of occurrence:</b>	Definite	Probable
<b>Degree to which the impact can be reversed:</b>	Partly reversible.	With the encroachment of urban infrastructure and activities into wetland areas and a lack of rehabilitation the impact will be irreversible.
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	Irreplaceable.	Irreplaceable.
<b>Impact prior to mitigation:</b>	<ul style="list-style-type: none"> <li>• Removal of vegetation outside the proposed footprint area.</li> <li>• Construction of the wall in wetland areas.</li> <li>• Vehicles accessing site through wetland areas.</li> <li>• Proliferation of alien vegetation could result in replacement of natural wetland species with alien/weed species with lower assimilation capacities.</li> </ul>	<ul style="list-style-type: none"> <li>• Removal of natural vegetation within wetland areas.</li> <li>• Construction of urban infrastructure in close proximity to wetland areas.</li> <li>• Indiscriminate driving of vehicles through wetland areas.</li> <li>• Proliferation of alien vegetation could result in replacement of natural wetland species with alien/weed species with lower assimilation capacities.</li> </ul>
<b>Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Moderate negative significance.	Moderate negative significance.
<b>Degree to which the impact can be mitigated:</b>	Fully mitigated.	If the encroachment of urban activities and infrastructure is not controlled it is doubtful that the impact can be fully mitigated.
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>• The natural wetland feature associated with site 1 should be regarded as sensitive and no development related activities should be allowed to encroach within the feature.</li> <li>• Where development in wetland buffer areas is unavoidable, footprint areas should be kept as small as possible and should remain outside the wetland zone.</li> <li>• As far as possible construction should be restricted to the drier</li> </ul>	<ul style="list-style-type: none"> <li>• Alien vegetation control could result in a decrease in impact significance. In terms of the amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998 landowners are legally responsible for the control of invasive alien plants on their properties.</li> </ul>



	<p>summer months to avoid sedimentation of wetland features in the vicinity of the proposed development.</p> <ul style="list-style-type: none"> <li>• The area earmarked for the development as well as surroundings should be kept free from alien and invasive floral species.</li> <li>• Alien and invasive species should be removed from the natural wetland feature associated with site 1 as well as from artificial drainage features associated with sites 3, 4, 5 and 6 and the features should be maintained in a functioning state.</li> <li>• All soils compacted as a result of construction activities falling outside the development footprint areas should be ripped, profiled and monitored to ensure establishment of natural vegetation.</li> </ul>	
<p><b>Impact post mitigation:</b></p>	<ul style="list-style-type: none"> <li>• Majority of activities that would result in loss of ecological services can be mitigated,</li> </ul>	<ul style="list-style-type: none"> <li>• Impacts as a result of the encroachment of urban infrastructure and activities into the Saldanha Bay Naval Base property are likely to remain. However the removal of alien invasive species may reduce the impact slightly.</li> </ul>
<p><b>Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)</b></p>	<p>Low negative significance.</p>	<p>Low negative significance.</p>





**IMPACT 1D: Impact due to vehicles encroaching into wetland habitat.**

Potential impacts on the wetland aspects:	Alternative 1	No-Go Alternative
<b>Nature of impact:</b>	Construction vehicles entering wetland areas.	Privately owned vehicles may enter wetland areas within the Saldanha Bay Naval Base property.
<b>Extent and duration of impact:</b>	Site specific for less than 5 years.	Local extent and if uncontrolled may be permanent.
<b>Probability of occurrence:</b>	Distinct possibility the impact will occur.	Distinct possibility due to existing roads traversing the wetland feature associated with site 1.
<b>Degree to which the impact can be reversed:</b>	Partly reversible.	Partly reversible.
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	Partially replaceable.	Partly replaceable.
<b>Impact prior to mitigation:</b>	<ul style="list-style-type: none"> <li>• Vehicles may enter and pass through wetland areas during construction.</li> <li>• Construction vehicles not restricted to planned access routes and therefore resulting in indiscriminate driving through wetland habitat.</li> </ul>	<ul style="list-style-type: none"> <li>• Indiscriminate driving through wetland features.</li> </ul>
<b>Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Moderate negative significance.	Moderate negative significance.
<b>Degree to which the impact can be mitigated:</b>	Partly mitigated.	No mitigation.
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>• No vehicles should be allowed to indiscriminately drive through wetland zones during either the planning or construction phase of the development.</li> <li>• As far as possible, new roads developed within the boundary of the new wall should be developed within footprint areas of existing roads.</li> </ul>	<ul style="list-style-type: none"> <li>• No mitigation – there is limited restriction of access to the wetland features. Vehicles from surrounding urban areas are likely to enter wetland areas.</li> </ul>
<b>Impact post mitigation:</b>	<ul style="list-style-type: none"> <li>• Vehicle related activities that would lead to impact on wetland resources associated with the proposed development route can be largely reduced, to almost insignificant, if vehicles are restricted to designated roads and road development or upgrades kept to existing roads.</li> </ul>	<ul style="list-style-type: none"> <li>• Without development, possible impacts would most probably remain the same as pre mitigation.</li> </ul>
<b>Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Low negative significance.	Moderate negative significance



**IMPACT 1E: Impact due to indiscriminate fires.**

Potential impacts on the wetland aspects:	Alternative 1	No-Go Alternative
<b>Nature of impact:</b>	Indiscriminate fires within wetlands or the associated buffer zones due to increased human activity during construction.	Indiscriminate fires within wetland areas or associated buffer zones are likely to occur due to increased human activity as a result of the possible encroachment of urban infrastructure and activities into wetland areas within the Saldanha Bay Naval Base property.
<b>Extent and duration of impact:</b>	Local extent, however would remain for a relatively short period of time (0-5 years).	Local extent, however, if burning frequencies are increased and the natural fire regime interrupted, natural vegetation in the area could be lost and the impact would therefore be permanent
<b>Probability of occurrence:</b>	Highly probable.	Highly Probable.
<b>Degree to which the impact can be reversed:</b>	Partly reversible.	Partly reversible.
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	Irreplaceable.	Irreplaceable.
<b>Impact prior to mitigation:</b>	<ul style="list-style-type: none"> <li>Indiscriminate fires may result in a change of floral composition within wetland zones in turn impacting the availability of faunal habitat.</li> </ul>	<ul style="list-style-type: none"> <li>Indiscriminate fires may result in a change of floral composition within wetland zones in turn impacting the availability of faunal habitat.</li> </ul>
<b>Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Moderate negative significance.	Moderate negative significance.
<b>Degree to which the impact can be mitigated:</b>	Fully mitigated.	No mitigation.
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>All informal fires on the property should be prohibited specifically during the construction, operational and rehabilitation phases of the proposed development.</li> </ul>	<ul style="list-style-type: none"> <li>Without the development of the wall, it is not likely that the restriction of urban activities to the area outside of the Saldanha Bay Naval Base property will be possible. Residents of urban areas could create fires which may spread to more natural areas within the naval base.</li> </ul>
<b>Impact post mitigation:</b>	<ul style="list-style-type: none"> <li>None.</li> </ul>	<ul style="list-style-type: none"> <li>Without mitigation, indiscriminate fires may result in a change of floral composition within wetland zones within the Saldanha Bay Naval Base property, in turn impacting the availability of faunal habitat.</li> </ul>
<b>Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Low negative significance.	Moderate negative significance.



**IMPACT 1F: Impact due to sedimentation and erosion.**

Potential impacts on the wetland aspects:	Alternative 1	No-Go Alternative
<b>Nature of impact:</b>	Sedimentation and erosion of wetland features due to the proposed development.	Site clearing as a result of unauthorised development within the Saldanha Bay Naval Base property may lead to sedimentation of wetland areas.
<b>Extent and duration of impact:</b>	Local extent for a moderate period of time (5 – 15 years).	Local extent and, without development of the wall the impact would be permanent
<b>Probability of occurrence:</b>	Probable.	Highly probable.
<b>Degree to which the impact can be reversed:</b>	Partly reversible.	Irreversible.
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	Irreplaceable.	Irreplaceable.
<b>Impact prior to mitigation:</b>	<ul style="list-style-type: none"> <li>Vegetation clearing within areas near wetland features may result in sedimentation runoff from cleared areas.</li> <li>Ineffective rehabilitation may result in areas where no vegetation establishes, prone to erosion.</li> <li>Construction of the proposed development route and associated infrastructure during the rainy season may result in dispersal of sediment and building material beyond the activity footprint that could result in sedimentation of wetland features.</li> </ul>	<ul style="list-style-type: none"> <li>Vegetation clearing as a result of urban encroachment may result in erosion and sedimentation from cleared areas. This will not be restricted to the external edge of the proposed development route and may encroach into wetland areas within the Saldanha Bay Naval Base property.</li> <li>Sedimentation of wetland features as a result of a build up of sediment carried in runoff from urban areas.</li> <li>If the wall is developed, energy breakers may be used at all storm water drains in order to dissipate the flow of storm water before it reaches the natural wetland feature associated with site 1 thereby reducing the erosion caused as a result of the water. The no go alternative will result in the continuation of the erosion and sedimentation of the system as a result of storm water runoff.</li> </ul>
<b>Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Moderate negative significance.	Moderate negative significance.
<b>Degree to which the impact can be mitigated:</b>	Fully mitigated.	No mitigation
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>Energy breakers should be used at all storm water drains in order to dissipate the flow of storm water before it reaches the natural wetland feature associated with site 1 thereby reducing the erosive effects of the water..</li> <li>Vegetation should be re-established in cleared areas in order to</li> </ul>	<ul style="list-style-type: none"> <li>No mitigation measures will be undertaken.</li> </ul>



	<p>reduce runoff and erosion from these areas.</p> <ul style="list-style-type: none"> <li>Rehabilitated areas should be monitored to determine if rehabilitation efforts are effective.</li> </ul>	
<b>Impact post mitigation:</b>	<ul style="list-style-type: none"> <li>None.</li> </ul>	<ul style="list-style-type: none"> <li>Without mitigation impacts would most probably remain the same as pre mitigation</li> </ul>
<b>Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Low negative significance.	Moderate negative significance.



## Impact 2: Impacts during the operational phase.

### Impact 2 A: Operational activities impacting on wetland habitat.

Potential impacts on the wetland aspects:	Alternative 1	No-Go Alternative
<b>Nature of impact:</b>	Indiscriminate driving through wetland zones may occur.	At present the boundary of urban development lies in close proximity to the border of the natural wetland feature associated with site 1. Without the construction of the wall, urban sprawl and the encroachment of urban activities into wetland areas within the Saldanha Bay Naval Base property is likely to occur and therefore may result in a decrease in the Present Ecological State of the natural feature associated with site 1
<b>Extent and duration of impact:</b>	Local extent and permanent	Local extent and without mitigation most probably would be permanent.
<b>Probability of occurrence:</b>	Probable.	Probable.
<b>Degree to which the impact can be reversed:</b>	Partly reversible.	Irreversible.
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	Partly replaceable.	Partly replaceable.
<b>Impact prior to mitigation:</b>	<ul style="list-style-type: none"> <li>Indiscriminate driving through sensitive wetland areas</li> </ul>	<ul style="list-style-type: none"> <li>Edge effects from surrounding urban activities.</li> <li>Ongoing runoff from urban areas and erosion.</li> <li>Encroachment of urban activities into wetland areas.</li> <li>Urban infrastructure development near wetland features impacting on natural hydrology as well as resulting in loss of wetland habitat.</li> <li>Earth moving activity as part of construction activities.</li> <li>Lack of alien vegetation control.</li> <li>Dumping of refuse in wetland areas.</li> </ul>
<b>Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Moderate negative significance.	Moderate negative significance.
<b>Degree to which the impact can be mitigated:</b>	Fully mitigated.	If the encroachment of urban activities and infrastructure is not controlled it is doubtful that the impact can be fully mitigated.
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>It should be ensured that all operational related activities take wetland boundaries and associated buffer zones within and near the proposed development route into account.</li> <li>No vehicles should be allowed to drive through surrounding wetland zones;</li> </ul>	<ul style="list-style-type: none"> <li>Alien vegetation control could result in a decrease in impact significance. In terms of the amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998 landowners are legally responsible for the control</li> </ul>



		of invasive alien plants on their properties.
<b>Impact post mitigation:</b>	<ul style="list-style-type: none"> <li>• None.</li> </ul>	<ul style="list-style-type: none"> <li>• Impacts as a result of the encroachment of urban infrastructure and activities will remain. However the removal of alien invasive species may reduce the impact slightly.</li> </ul>
<b>Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Low negative significance.	Moderate negative significance



**Impact 2B: Ineffective rehabilitation and monitoring.**

Potential impacts on the cultural-historical aspects:	Alternative 1	No-Go Alternative
<b>Nature of impact:</b>	Ineffective rehabilitation of areas disturbed during the operational phase as well as insufficient monitoring of areas disturbed during the construction phase.	No rehabilitation will be required which will result in no improvement of wetland characteristics of wetland features.
<b>Extent and duration of impact:</b>	Local extent however could remain permanently.	Local extent however with no rehabilitation the present impact would be permanent.
<b>Probability of occurrence:</b>	Highly probable.	Definite.
<b>Degree to which the impact can be reversed:</b>	Partly reversible.	Irreversible.
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	Irreplaceable.	Irreplaceable
<b>Impact prior to mitigation:</b>	<ul style="list-style-type: none"> <li>• Proliferation of alien and weed species in disturbed areas will lead to altered vegetation communities that will in turn impact the faunal community structure within the local area.</li> <li>• Ineffective monitoring and maintenance of rehabilitation.</li> <li>• Ineffective rehabilitation may lead to continued habitat transformation.</li> <li>• Erosion and sedimentation of wetlands due to ineffective re-establishment of vegetation within disturbed areas.</li> </ul>	<ul style="list-style-type: none"> <li>• Alien and weed floral species presently within the proposed development route will proliferate and stands will increase in size with special mention of <i>Pennisetum clandestinum</i>.</li> <li>• Lack of ongoing rehabilitation, with special mention of alien vegetation control may result in loss of wetland species diversity and abundance.</li> </ul>
<b>Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Moderate negative significance.	Moderate negative significance
<b>Degree to which the impact can be mitigated:</b>	Partly mitigated.	If rehabilitation is not undertaken it is doubtful that the impact can be fully mitigated.
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>• The proposed development route as well as surroundings should be kept free from alien and invasive floral species to ensure these species do not spread to rehabilitated areas.</li> <li>• Alien and invasive species should be removed from the natural wetland feature associated with site 1 as well as from artificial drainage features associated with sites 3, 4, 5 and 6 and the features should be maintained in a functioning state.</li> <li>• No vehicles should be allowed to drive through surrounding wetland areas during eradication of alien and weed species.</li> <li>• Ongoing monitoring should be undertaken within areas where alien vegetation was eradicated, to ensure methods were successful.</li> <li>• Care should be taken within wetland areas as well as surroundings with the choice of herbicide to ensure no additional impact due to the herbicide used occurs on the wetland features;</li> <li>• Rehabilitated areas should be monitored to determine if rehabilitation</li> </ul>	<ul style="list-style-type: none"> <li>• Alien vegetation control could result in a decrease in impact significance. In terms of the amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998 landowners are legally responsible for the control of invasive alien plants on their properties.</li> </ul>





	efforts are effective.	
<b>Impact post mitigation:</b>	<ul style="list-style-type: none"> <li>It is deemed highly likely that impact related to ineffective rehabilitation and insufficient monitoring can be mitigated to a much lower degree of significance. However, until natural vegetation is established some impact can be expected due to alien vegetation and sedimentation.</li> </ul>	<ul style="list-style-type: none"> <li>Impacts as a result of the encroachment of urban infrastructure and activities will remain. However the removal of alien invasive species may reduce the impact slightly.</li> </ul>
<b>Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Low negative significance.	Moderate negative significance if no rehabilitation measures for urban related activities are implemented.



### Impact 3: Cumulative Impact.

Potential impacts on the wetland aspects:	Alternative 1	No-Go Alternative
<b>Nature of impact:</b>	There is a possibility that the proposed development route may result in an increase in the impacts already present within the Saldanha Bay Naval Base property such as alien vegetation encroachment, loss of wetland habitat and possible sedimentation of wetland features.	At present the boundary of urban development lies in close proximity to the border of the natural wetland feature associated with site 1. Without the construction of the wall, urban sprawl and the encroachment of urban activities into wetland areas within the Saldanha Bay Naval Base property is likely to occur and therefore may result in a decrease in the Present Ecological State of the natural feature associated with site 1.
<b>Extent and duration of impact:</b>	Local extent.	Local extent
<b>Probability of occurrence:</b>	Highly probable: Most likely that the impact will occur.	Highly probable: Most likely that the impact will occur.
<b>Degree to which the impact can be reversed:</b>	Partly reversible	Partly reversible
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	Irreplaceable	Irreplaceable
<b>Cumulative impact prior to mitigation:</b>	<ul style="list-style-type: none"> <li>• Development of infrastructure or activities associated with the proposed development encroaching on wetland features or associated buffer zones may result in additional loss of wetland features within the study area.</li> <li>• Development within wetland zones may lead to increased alien vegetation encroachment and loss of species diversity over time.</li> <li>• Indiscriminate driving through wetland features during the operational phase may result in loss of wetland habitat and proliferation of alien vegetation species which will increase over time.</li> </ul>	<p>Without development of the wall, rehabilitation of the area will not take place. No development may also result in the encroachment of urban infrastructure and activities into wetland zones. This may result in:</p> <ul style="list-style-type: none"> <li>• A loss of wetland habitat.</li> <li>• The clearing of natural vegetation from the areas and the proliferation of alien/weed species;</li> <li>• Indiscriminate driving through wetland features may result in loss of wetland habitat and proliferation of alien vegetation species which will increase over time.</li> <li>• Continued erosion and sedimentation of wetlands due to the lack of a suitable storm water management plan.</li> <li>• The loss of wetland service and function provision.</li> <li>• The loss of faunal habitat and migrational corridors.</li> </ul>
<b>Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Moderate negative significance.	Moderate negative significance.
<b>Degree to which the impact can be mitigated:</b>	Fully mitigated.	No mitigation.
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>• Limit the footprint area of the construction activity in order to minimise environmental damage.</li> </ul>	<ul style="list-style-type: none"> <li>• With the encroachment of urban infrastructure and activities into wetland areas and with a lack of a</li> </ul>



	<ul style="list-style-type: none"> <li>As far as possible vehicles should be restricted to existing roads, therefore limiting vehicles driving through wetland or associated buffer zones during the construction or operational phase of the development.</li> <li>Eradication and monitoring of alien vegetation.</li> </ul>	rehabilitation plan for the area the impacts cannot be mitigated.
<b>Impact post mitigation:</b>	<ul style="list-style-type: none"> <li>All wetland features were delineated and buffer zones allocated to features regarded to be of higher ecological importance. If all development related activities are kept outside sensitive wetland zones and if alien vegetation is eradicated and monitored, the possibility of impact can be largely mitigated.</li> </ul>	<ul style="list-style-type: none"> <li>Without the development of the wall possible impacts would most probably remain the same as pre mitigation</li> </ul>
<b>Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Low negative significance.	Moderate negative significance.



## 5.9 Wetland delineation

Due to the extent of the study area, use was made of aerial photographs, digital satellite imagery as well as provincial and national wetland databases to delineate wetland features. Areas of interest located in close proximity to the proposed development route were investigated further during the field survey and were delineated according to the guidelines advocated by DWA (2005) taking into consideration wetland soil characteristics as defined by Job 2009. It should be noted that the identification of the wetland temporary zone did prove difficult in some areas as a result of vegetation and landscape transformation. However, the wetland delineation as presented in this report is regarded as a best estimate of the wetland boundary based on the site conditions present at the time of assessment.

Wetland indicators used during the delineation of the natural wetland feature associated with site 1 are discussed below.

- The presence of obligate and facultative wetland floral species such as *Phragmites australis*, *Sarcocornia* sp. and *Juncus acutus* gave an indication of the wetland temporary, seasonal and permanent zones.
- For the soil form indicator, the presence of gleyed soils (most of the iron has been leached out of the soil leading to a greyish/greenish/bluish colour) and mottling (created by a fluctuating water table) were investigated and were used as an indicator of the of the temporary zone.
- Due to the assessment taking place in the peak rain season, surface water could be used as an indication of the wetland permanent zone.
- Due to the diffuse nature of the wetland feature, terrain units could be used to a degree.

Wetland indicators used during the delineation of the drainage channels associated with sites 3, 4, 5 and 6 are discussed below.

- Due to the artificial nature of the features and due to a lack of wetland vegetation in most features observed, terrain units were used as the primary indication of the wetland zones.
- The presence of gleyed soils (most of the iron has been leached out of the soil leading to a greyish/greenish/bluish colour) and mottling (created by a fluctuating water table) were also investigated and were used as a secondary indicator of the wetland the temporary zone.



Upon the assessment of the area, the various wetland vegetation components were assessed. Artificial drainage features were dominated by *Pennisetum clandestinum* and so vegetation components of the features were not assessed. The table below therefore refers to species observed in the natural wetland feature associated with site 1 and in surrounding terrestrial areas. Dominant species were characterised as either wetland or terrestrial species. The wetland species were then further categorised as temporary, seasonal and permanent zone species. This characterisation is presented in the table below, including the dominant terrestrial species identified within the study area.

**Table 10: Dominant terrestrial and wetland species noted during the field assessment.**

Terrestrial species	Temporary zone species	Seasonal zone	Permanent zone species
<i>Oncosiphon suffruticosum</i>	<i>Sarcocornia</i> sp	<i>Sarcocornia</i> sp	<i>Sarcocornia</i> sp.
<i>Pennisetum clandestinum</i>	<i>Lycium tetrandrum</i>		<i>Phragmites australis</i>
<i>Nemesia bicornis</i>	<i>Cotula turbinata</i>		<i>Juncus acutus</i>
<i>Asparagus rubicundus</i>	<i>Cynodon dactylon</i>		
<i>Carpobrotus quadrifidus</i>	<i>Osteospermum dentatum</i>		
<i>Ruschia macowanii</i>	<i>Oncosiphon suffruticosum</i>		
<i>Hermannia scabra</i>			
<i>Hermannia humifusa</i>			
<i>Osyris compressa</i>			
<i>Euphorbia burmannii</i>			
<i>Rhus glauca</i>			
<i>Oxalis pes-caprae</i>			
<i>Oxalis obtusa</i>			
<i>Roepera morgesana</i>			
<i>Salvia lanceolata</i>			
<i>Pelargonium fulgidum</i>			
<i>Dischisma ciliatum</i>			
<i>Arctotheca calendula</i>			
<i>Arctotis hirsuta</i>			
<i>Dimorphotheca pluvialis</i>			
<i>Osteospermum dentatum</i>			

DWA guidelines stipulate that a buffer zone of 32m be allocated to all wetland features. A buffer zone of 32m has been allocated to the natural valley bottom wetland feature associated with site 1. However, the drainage features associated with sites 3, 4, 5 and 6 are artificial features which are expected to play a limited role in the provision of ecoservices and function and are not regarded of importance towards the conservation of wetlands in the



area. Therefore, although indicated in the wetland delineation maps below, it is the opinion of the specialist that the allocation of buffer zones for the drainage features is unnecessary. In addition, with linear features by definition required to cross wetland features, the applicability of wetland buffers to linear developments is limited providing that measures to ensure migratory and hydrological continuity are in place.





Figure 24: Wetland delineation of eastern wetland features with allocated buffer zone.





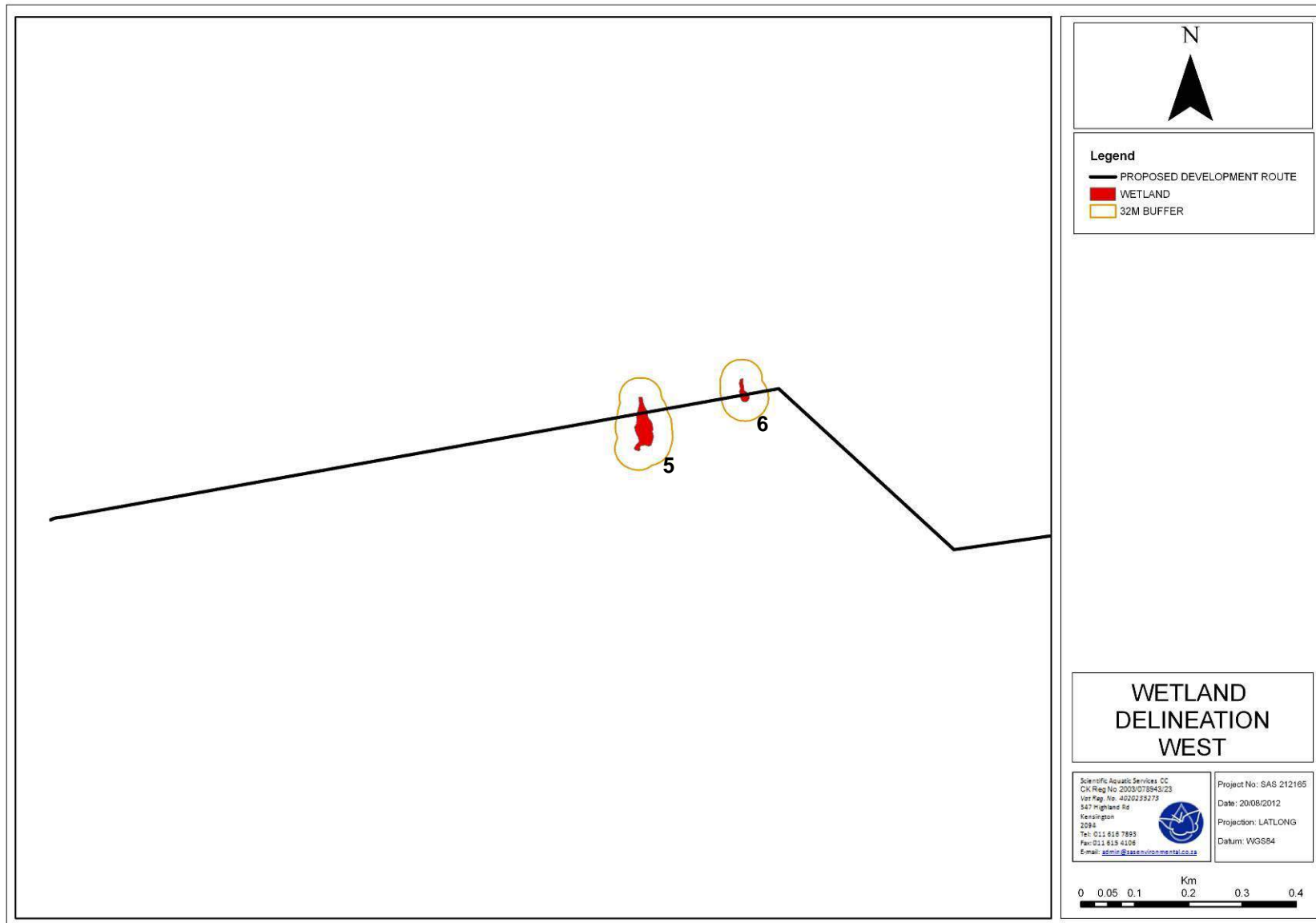


Figure 25: Wetland delineation of western wetland features with allocated buffer zone.



### **5.10 Wetland Sensitivity mapping**

The natural valley bottom wetland feature associated with site 1 plays an intermediate role in the provision of ecoservices and is considered to be moderately modified. However, this feature is expected to play an important role in the trapping of sediment as well as the assimilation of phosphates, nitrates and toxicants which enter the system in runoff from urban areas. The valley bottom feature also supports wetland species such as *Sarcocornia* sp., *Phragmites australis* and *Juncus acutus* which in turn may provide habitat for amphibian and bird species. With appropriate mitigation measures and rehabilitation plans, it is assumed that the overall present ecological state of the wetland feature can be increased, providing habitat for a more diverse wetland community. Therefore, this feature is considered to be of high sensitivity.

The storm water drainage canals associated with sites 3, 4, 5 and 6 are artificial features which are dominated by the invasive species *Pennisetum clandestinum*. These features have a limited level of service provision and function and are considered of low value regarding the conservation of wetlands in the area. The features are therefore considered to be of moderately low sensitivity.



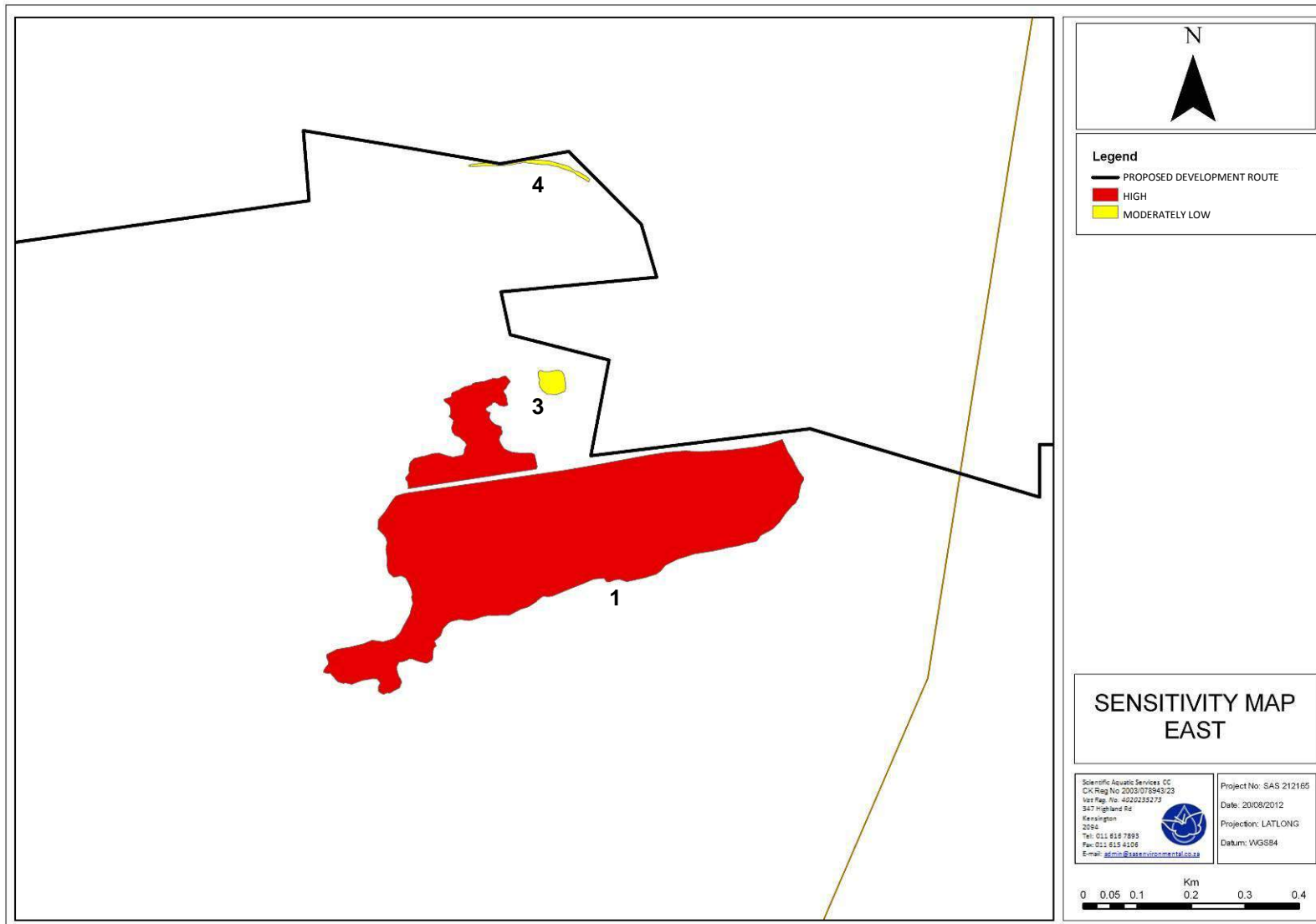


Figure 26: Wetland sensitivity of eastern wetland features.



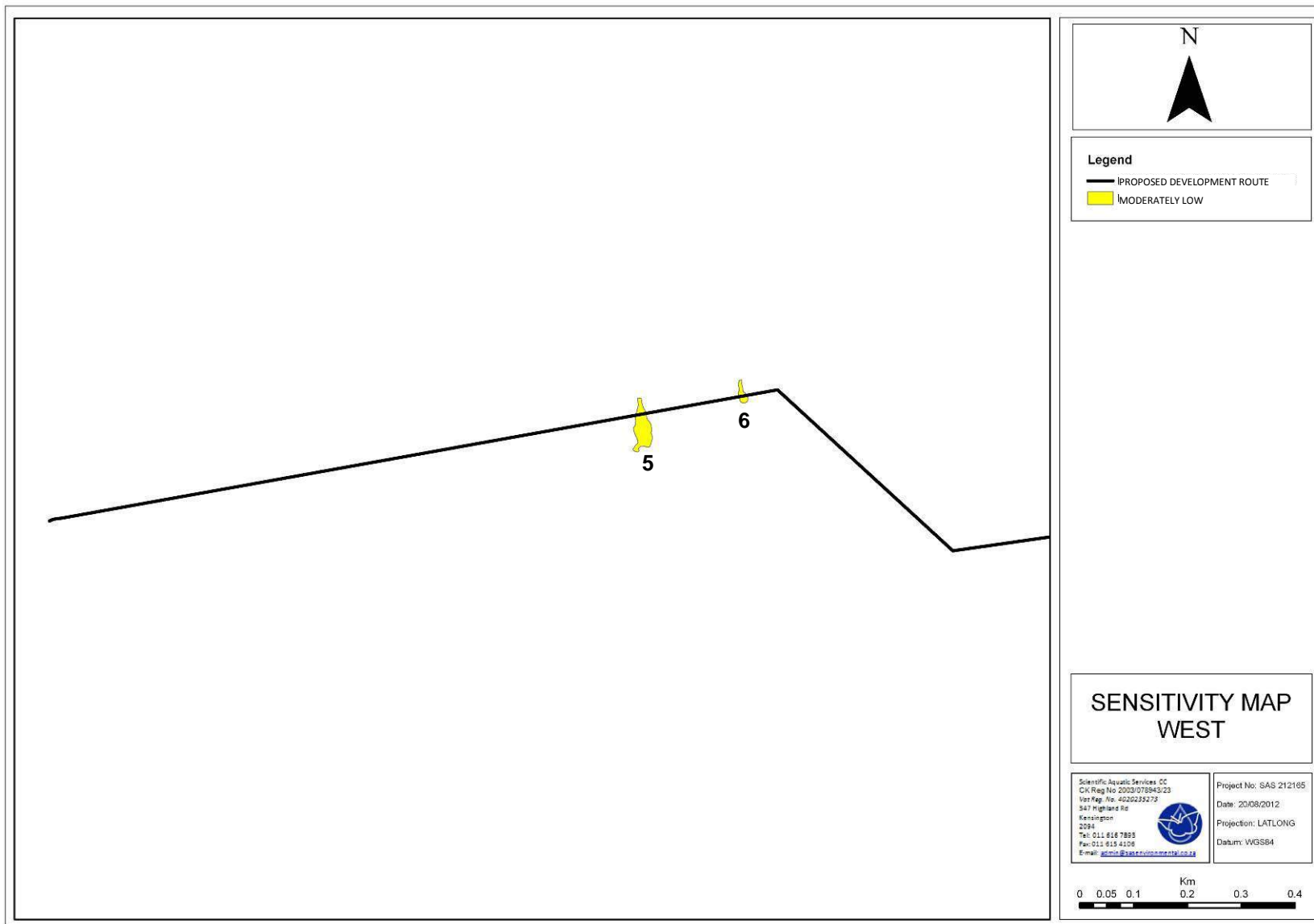


Figure 27: Wetland sensitivity of western wetland features.



## 6 CONCLUSION

The following general conclusions were drawn upon completion of the wetland assessment:

- The proposed development route is located within quaternary catchment G10M and falls within the South Western Coastal Belt Aquatic Ecoregion;
- According to the ecological importance classification for the quaternary catchment, the systems in the area can be classified as moderate in terms of Ecological Importance And Sensitivity which, in their present state, can be considered Class C: Moderately modified based on the certainty of desktop methods (Kleynhans 1999);
- Two wetland features are indicated to fall in close proximity to the proposed development route by the National Wetland Inventory (2006). These features are indicated as unchannelled valley bottom wetlands;
- The Biodiversity GIS database ([www.bgis.sanbi.org](http://www.bgis.sanbi.org)), with special mention of the Freshwater Ecosystem Priority Areas (FEPAs), was consulted with regards to wetland features close to or crossing the proposed development route that may be of ecological importance. The following key conclusions were made:
  - The proposed development route falls within the Berg Water Management Area (WMA) and within the Lower Berg subWMA;
  - The NPAES database (National Protected Areas) indicates that a portion of the proposed development route is bordered by a formal land-based protected area (see figure below);
  - The Lower Berg subWMA is not listed as a fish Fresh Water Ecosystem Priority Area (fish FEPA);
  - The Lower Berg subWMA is not considered important in terms of fish sanctuaries and no importance is indicated in terms of migrational corridors, rehabilitation, translocation or relocation zones for fish;
  - The Lower Berg subWMA is however indicated as a Phase2 FEPA. The condition of these Phase 2 FEPAs should not be degraded further as they may in future be considered for rehabilitation;
  - No river features are indicated to cross the proposed development route by the FEPA database;
  - The proposed development route is indicated to coincide with one wetland cluster area;
  - Wetland features are indicated to the south east of the proposed development route. These features fall in close proximity to the proposed development route and are considered natural features.



- After a drive through of the proposed development route and surrounding areas, seven areas that may potentially support wetland habitat were identified and investigated further;
- The seven sites were assessed for the presence of any wetland indicators in line with the DWA 2005 wetland delineation methodology;
- After further investigation, the two wetland features identified by FEPA maps to fall in close proximity to the proposed development route were determined to form part of a single valley bottom wetland feature which has been traversed by a gravel road. Of all the wetland areas investigated, only this valley bottom feature was determined to be natural. All remaining features traversing, or in close proximity to the proposed development route were identified to be artificial storm water canals or artificial impoundments;
- The artificial feature associated with site 2 was not regarded to be of importance in terms of function and service provision due to the absence of any wetland indicators or characteristics and as a result was not included within further assessments;
- The artificial feature associated with site 7 was characterised by the presence of *Zantedeschia aethiopica*. However, on further inspection the feature was determined to be a 'french drain' and was not regarded to be of importance in terms of function and service provision. This feature was therefore not included within further assessments;
- The ecoservice provision and function of the natural wetland feature associated with site 1 was considered in a single assessment and the ecoservice provision and function of the artificial canals and impoundments associated with sites 3, 4, 5 and 6 were considered in a second assessment;
- The natural wetland feature associated with site 1 indicated an intermediate importance in terms of overall function and service provision;
- Although artificial, drainage canals located within the study area are considered to play some role in the provision of ecoservices and function and were therefore included in the assessment. The artificial drainage features associated with sites 3, 4, 5 and 6 indicated a moderately low importance in terms of overall function and service provision;
- The Present Ecological State score calculated for the natural wetland feature associated with site 1 falls within Class B; largely natural with few modifications;
- The PES scoring system is used to determine the transformation of natural wetland features and therefore was not applicable to artificial drainage features associated with sites 3, 4, 5 and 6;



- 
- The EMC class deemed appropriate to maintain the current ecology as well as functionality within the natural wetland feature associated with site 1 is class B (Largely natural with few modifications);
  - DWAF guidelines stipulate that a buffer zone of 32m be allocated to all wetland features. A buffer zone of 32m has been allocated to the natural valley bottom wetland feature associated with site 1. However, the drainage features associated with sites 3, 4, 5 and 6 are artificial features which are expected to play a limited role in the provision of ecoservices and function. Therefore, although indicated in the wetland delineation maps, it is the opinion of the specialist that the allocation of buffer zones for the drainage features is unnecessary.

After assessment, one natural wetland feature and six artificial features were found to fall in close proximity to, or to traverse the proposed development route. The significance of impacts on the drainage features associated with sites 3, 4, 5 and 6 will be low due to the artificial nature of the features and due to the limited service and function provided by the features. However, a lack of maintenance within these features could have a negative impact on natural wetland features down gradient of the systems. Although limited, the artificial drainage features are responsible for the trapping of sediment and for the assimilation of phosphates, nitrates and toxicants from runoff before water reaches down gradient areas. These features therefore play a role in the protection of the natural vegetation in the area and may play a role in the protection of the wetland feature associated with site 1. Impacts on the natural wetland feature associated with site 1 may be reduced by the construction of energy breakers at all storm water drains in order to dissipate the flow of storm water before it reaches the feature, by the removal of alien and invasive species from the artificial drainage features as well as erosion control within artificial drainage features, and by the ongoing monitoring of artificial features.

Although development of the wall will take place in the buffer zone of the natural wetland feature associated with site 1; where the wall passes through the buffer area it does so on an existing gravel road. Therefore, if the footprint area of the development is kept as small as possible and is limited to already disturbed gravel road areas falling outside wetland zones, then it is deemed likely that impacts as a result of development can be reduced.





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**FLORAL ECOLOGICAL ASSESSMENT AS PART OF THE ENVIRONMENTAL ASSESSMENT AND AUTHORISATION PROCESS FOR THE DEVELOPMENT OF A WALL AT THE SALDANHA NAVAL BASE, WESTERN CAPE PROVINCE**

Prepared for

**Doug Jeffery Environmental Consultants**

2012

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<b>Report Reference:</b>	<b>SAS 212187</b>
<b>Date:</b>	<b>September 2012</b>

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## **Declaration**

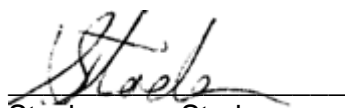
This report has been prepared according to the requirements of Section 33 (2) of the Environmental Impact Assessments Regulations, 2010 (GNR 543). We (the undersigned) declare the findings of this report free from influence or prejudice.

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## EXECUTIVE SUMMARY

Scientific Aquatic Services (SAS) was appointed to conduct a floral assessment as part of the environmental assessment and authorisation process for the construction of a security wall and associated patrol road on the northern border of the Saldanha Naval Base. The area earmarked for the wall and patrol road development will be referred to as “proposed development route” within this document.

Specific outcomes required from this report include the following:

- red data species assessment, including potential for species to occur on study area;
- provide floral inventories of species as encountered on site;
- determine and describe habitats, communities and Present Ecological State of the study area; and
- describe the spatial significance of the proposed development route with regards to surrounding natural areas.

In order to achieve the objectives of the report, the following assessment procedure/methodology was used:

- A desktop study to gain background information on the physical habitat, as well as generating potential floral biodiversity lists for the proposed development site and surrounding areas;
- Aerial photographs and digital satellite images were consulted prior to the field assessment and included an initial visual on-site assessment of the study area;
- A field assessment that identified the tree, grass, forb and exotic species that occur within each of the study areas;
- Description of the sensitivity of each site through vegetation community analyses;
- Data analyses and reporting of all findings.

The following general conclusions were drawn upon completion of the floral survey:

- This proposed development route falls within the *Fynbos biome* and is situated within the *West Strandveld Bioregion* (Mucina & Rutherford, 2006).
- The proposed development route falls within four vegetation types namely *Saldanha Flats Strandveld*, *Saldanha Granite Strandveld*, *Saldanha Limestone Strandveld* and *Langebaan Dune Strandveld* (Mucina & Rutherford, 2006).
- It should be noted that the Saldanha Naval Base property has remained largely undisturbed except for areas presently or historically utilised for Naval Base infrastructure and roads. As a result the property is considered a conservation area and is also indicated as a protected area ([www.environmental.gov.za](http://www.environmental.gov.za), 2000).
- The proposed development route of the wall is however located adjacent to the neighbouring Diazville residential development; consequently vegetation transformation along the route was noted with special mention of the eastern portion.
- Remnants of the Endangered *Saldanha Flats Strandveld* and Vulnerable *Saldanha Granite Strandveld* ecosystems are indicated to occur within the study area (National list of threatened terrestrial ecosystems for South Africa, 2011). It is considered important to safeguard these areas during the proposed wall development activities by adhering to the mitigation measures listed within the floral as well as wetland assessment report.
- According to the Vegetation Map as provided by the BGIS database ([www.bgis.sanbi.org](http://www.bgis.sanbi.org)) the proposed development route falls within four vegetation types. All the vegetation types are listed as being either “endangered” or “vulnerable”.
- At the time of the field assessment, the study area could be subdivided into three habitat units namely transformed habitats, wetland habitats and strandveld. The ecological condition and functioning of wetland and strandveld habitat units were considered to be significantly higher when compared to the transformed habitat unit. This was mainly a result of vegetation clearing for urban development and gravel roads resulting in a decrease in overall ecological condition and therefore functioning within transformed areas.
- The Vegetation Index Score was calculated separately for each habitat unit.
  - The transformed habitat unit calculated a very low score of -1.8 (Class F – modified completely). The low score was mainly as a result of edge effects caused by vegetation clearing for urban development and the construction of gravel roads.



- The wetland habitat unit calculated a moderate score of 16.2 (Class C – moderately modified). Edge effects of gravel road construction have resulted in the encroachment of invasive species into the wetland habitat unit; however, the unit is still dominated by the wetland species *Sarcocornia* sp.
- The strandveld habitat unit calculated a high score of 19 (Class B – largely natural with few modifications). The high score is a result of limited invasive species encroachment noted at the time of the assessment within the area and an increase in the diversity and abundance of indigenous floral species.
- The complete PRECIS (Pretoria Computer Information Systems) red data plant list for the grid reference (3317BB) was obtained from SANBI (South African National Biodiversity Institute) and habitat descriptions were sourced from Raimondo *et al.* 2009. After the field assessment, it was evident that portions of the study area that may potentially provide habitat for floral species of concern coincided with the strandveld habitat unit. Furthermore, two floral species of concern, *Babiana tubiflora* and *Felicia elongata* were identified within the habitat unit. Therefore, mitigation measures that will be listed as part of the impact assessment should be strictly adhered to, to ensure impact significance is reduced or avoided as far as possible.
- The species identified during the assessment were compared to the species listed within the Western Cape Nature Conservation Laws Amendment Act, 2000, Schedule 3 & 4: Endangered Flora (refer to appendix a). Representatives of three families considered of concern were identified namely IRIDACEAE (*Babiana tubiflora*, *Moraea flaccida*); MESEMBRYANTHEMACEAE (*Drosanthemum floribundum*, *Mesembryanthemum guerichianum*, *Carpobrotus edulis*, *Carpobrotus quadrifidus*, *Lampranthus* sp., *Rushia macowanii*, *Rushia* sp.) and RUTACEAE (*Agathosma imbricata*).
- The number and abundance of alien and invasive species found to the east of the proposed development route is considered an indication of the significant vegetation transformation that has resulted due to urban development and gravel road construction. As a result the transformed habitat unit is not considered of significant importance for floral species conservation.
- The majority of the medicinal plant species are located throughout the study area and are not restricted to specific habitats units. All medicinal floral species identified during the time of the assessment can be considered common for the region.



The impact assessment was divided into three sections where impacts were determined for the construction phase, the operational phase as well as any possible cumulative impacts.

**A summary of impact significance before and after mitigation**

Impact	Alternative 1		No Go Alternative	
	Unmanaged	Managed	Unmanaged	Managed
Impact 1a: Impact due to alien invasive vegetation encroachment/ proliferation.	High negative significance	Low negative significance	High negative significance	Moderate negative significance
Impact 1b: Destruction of habitat may impact on floral biodiversity.	High negative significance	Low negative significance	High negative significance	High negative significance
Impact 1c: Impacts on RDL and endemic species due to unplanned removal and habitat destruction.	High negative significance	Moderate negative significance	N/A	N/A
Impact 1d: Impacts on RDL and medicinal species due to collection.	Moderate negative significance	Low negative significance.	Moderate negative significance	Moderate negative significance
Impact 1e: Impact on overall floral biodiversity due to dust generation.	Low negative significance	Low negative significance	Low negative significance	Low negative significance
Impact 1f: Impact on overall floral biodiversity due to uncontrolled fires.	Moderate negative significance	Low negative significance	Moderate negative significance	Low negative significance
Impact 1g: Soil contamination.	Low negative significance	Low negative significance	N/A	N/A
Impact 2a: Operational activities impacting on floral habitat.	Moderate negative significance	Low negative impact.	Moderate negative significance.	Low negative significance
Impact 2b: Ineffective rehabilitation and monitoring.	Moderate negative significance.	Low negative significance	N/A	N/A
Impact 2c: Impact on pollination	Low negative significance	Low negative significance	N/A	N/A
Impact 3: Cumulative Impact	High negative significance	Moderate negative significance	High negative significance.	High negative significance

- From the results of the impact assessment it was observed that seven major impacts are likely to impact the floral biodiversity of the proposed development route during the construction phase and three major impacts are likely during the operational phase. However, it is deemed possible that the majority of the impacts can be mitigated or managed to a lower level of significance during both phases of the proposed development. At present the boundary of urban development lies in close proximity to the border of the natural strandveld habitat unit as well as the wetland habitat unit. The no-go alternative and consequent failure to restrict entrance into the Saldanha Naval Base property may therefore result in the encroachment of urban activities into more natural areas. Edge effects from urban activities as well as future activities within strandveld habitat and wetland zones may result in a decrease in the Present Ecological State of the vegetation within these less disturbed areas.
- After the assessment it is evident that floral species considered to be indicative of the applicable vegetation types were restricted to the strandveld and wetland habitat units and those areas to the east of the development route have been largely transformed. Therefore the strandveld habitat unit as well as wetland features with allocated buffer zones (refer to SAS Wetland Assessment, 2012) are considered as high ecological sensitivity areas and the remainder of the areas assessed are considered to be of low ecological sensitivity.
- It is therefore considered important, that if the project does prove feasible, all mitigation measures as listed be strictly adhered to in order to reduce impacts on the more sensitive vegetation communities noted within the strandveld and wetland habitat units.





The sensitivity map as depicted below is a summary of all aspects considered as part of the wetland as well as the floral assessment undertaken.



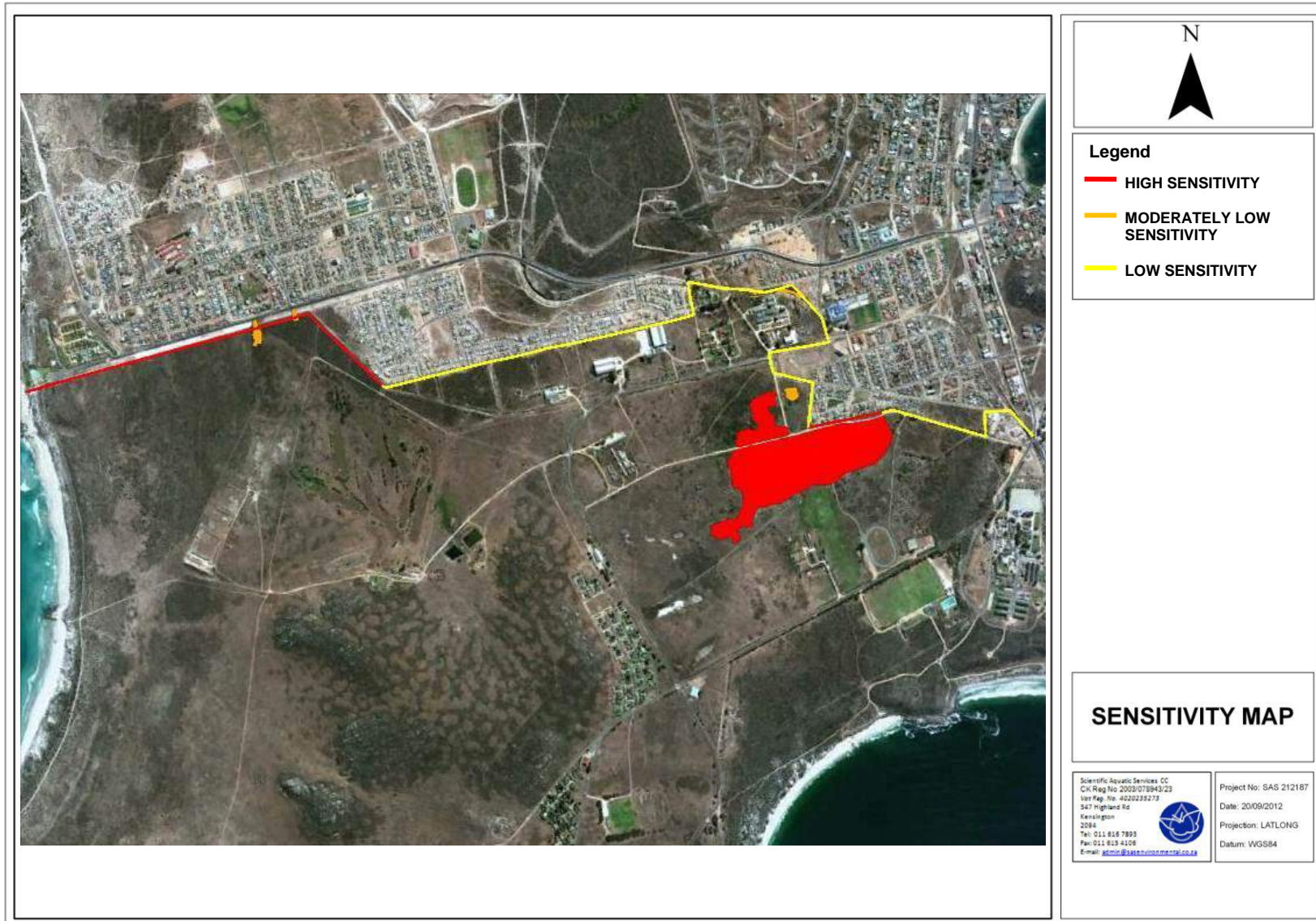


Figure 1: Sensitivity Map.



After the conclusion of the floral assessment, it is the opinion of the ecologists that the proposed development route be considered favourably provided that the recommendations below are adhered to:

- Eradication and ongoing monitoring of areas disturbed during construction related activities.
- After construction and rehabilitation activities the open strandveld next to the patrol road within the Naval Base should be strictly off limits to personnel as well as vehicles to prevent disturbance of floral habitat and promote re-establishment of a natural fynbos community.
- A sensitivity map has been developed for the study area, indicating areas which are considered to be of higher ecological importance. It is recommended that this sensitivity map be considered during the planning and construction phases of the proposed development activities to aid in the conservation of ecology within the proposed development area.
- All development footprint areas should remain as small as possible and should not encroach onto surrounding more sensitive areas.
- Proliferation of alien and invasive species is expected within disturbed areas. These species should be eradicated and controlled to prevent their spread beyond the site boundary. Alien plant seed dispersal within the top layers of the soil within footprint areas that will have an impact on rehabilitation in the future, have to be controlled.
- All soils compacted as a result of construction activities falling outside the construction footprint areas should be ripped and profiled. Special attention should be paid to alien and invasive control within these areas. Alien and invasive vegetation control should take place throughout all phases of the construction.
- Permits need to be acquired in order to relocate, remove, destroy or transport RDL species.
- Permits should be obtained from the relevant authorities for the relocation of *Felicia elongata* and *Babiana tubiflora* as well as species listed within the Western Cape Nature Conservation Laws Amendment Act, 2000, Schedule 3 & 4.
- As many of the species of concern should be rescued and relocated.
- All rescue and relocation activities should be overseen by a suitably qualified ECO.
- Construction personnel or vehicles should be restricted to construction footprint areas as well as predetermined roads.
- Removal of vegetation may not exceed the proposed 7m to either side of the proposed development route.
- Ensure open veld areas surrounding the proposed development route are off-limits to construction vehicles and personnel.
- It is proposed that predetermined roads, preferably already existing, should be used during the construction phase in order to minimise the construction of other additional or unplanned roads and dust generation within the local area.
- All informal fires on the property should be prohibited throughout all phases of the project.
- A natural burning regime should be implemented with cognisance of infrastructure within the Naval Base.
- Ensure that all hazardous storage containers comply with the relevant SABS standards to prevent leakage.
- Regularly inspect all construction vehicles for leaks.
- Re-fuelling must take place on a sealed surface area to prevent ingress of hydrocarbons into topsoil.



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## Glossary of Terms & Acronyms

- Alien vegetation* – Plants that do not occur naturally within the area but have been introduced either intentionally or unintentionally.
- Biome* – A broad ecological unit representing major life zones of large natural areas – defined mainly by vegetation structure and climate.
- °C – Degrees Celsius.
- Endangered* – Organisms in danger of extinction if causal factors continue to operate.
- Endemic species* – Species that are only found within a pre-defined area. There can therefore be sub-continental (e.g. Southern Africa), national (South Africa), provincial, regional or even within a particular mountain range.
- Exotic vegetation* – Vegetation species that originate from outside of the borders of the biome - usually international in origin.
- Ex situ conservation* – Where a plant (or community) cannot be allowed to remain in its original habitat and is removed and cultivated to allow for its ongoing survival.
- Extrinsic* – Factors that have their origin outside of the system.
- ha – Hectares.
- Indigenous vegetation* – Vegetation occurring naturally within a defined area.
- In situ conservation* – Where a plant (or community) is allowed to remain in its natural habitat with an allocated buffer zone to allow for its ongoing survival.
- m – Metres.
- mm – Millimetres.
- MAMSL – Metres above mean sea level.
- MAP – Mean annual precipitation.
- MAPE – Mean annual potential for evaporation.
- MASMS – Mean annual soil moisture stress.
- MAT – Mean annual temperature.
- PES – Present Ecological State.
- POC – Probability of occurrence.
- PRECIS – Pretoria Computer Information Systems.
- Pioneer species* – A plant species that is stimulated to grow after a disturbance has taken place. This is the first step in natural veld succession after a disturbance has taken place.
- QDS – Quarter degree square (1:50,000 topographical mapping references).
- Rare* – Organisms with small populations at present.
- RDL (Red Data listed) species* – Organisms that fall into the *Extinct in the Wild (EW)*, *critically endangered (CR)*, *Endangered (EN)*, *Vulnerable (VU)* categories of ecological status.
- RDSIS – Red Data Sensitivity Index Score.
- SANBI – South African National Biodiversity Institute.



# 1. INTRODUCTION

## 1.1 Background

Scientific Aquatic Services (SAS) was appointed to conduct a floral assessment as part of the environmental assessment and authorisation process for the construction of a security wall as well as an associated patrol road on the northern border of the Saldanha Naval Base. The area earmarked for the wall and patrol road development will be referred to as “proposed development route” within this document and is depicted in Figure 1 and Figure 2 below.

The proposed development would entail the following activities:

- Site preparation;
- Earthworks (excavations, etc.);
- Construction of the wall and road;
- Rehabilitation of the development site after construction.

This report, after consideration and description of the ecological integrity of the property, must guide the property owner, authorities and potential developers, by means of recommendations, as to viability of the proposed development.



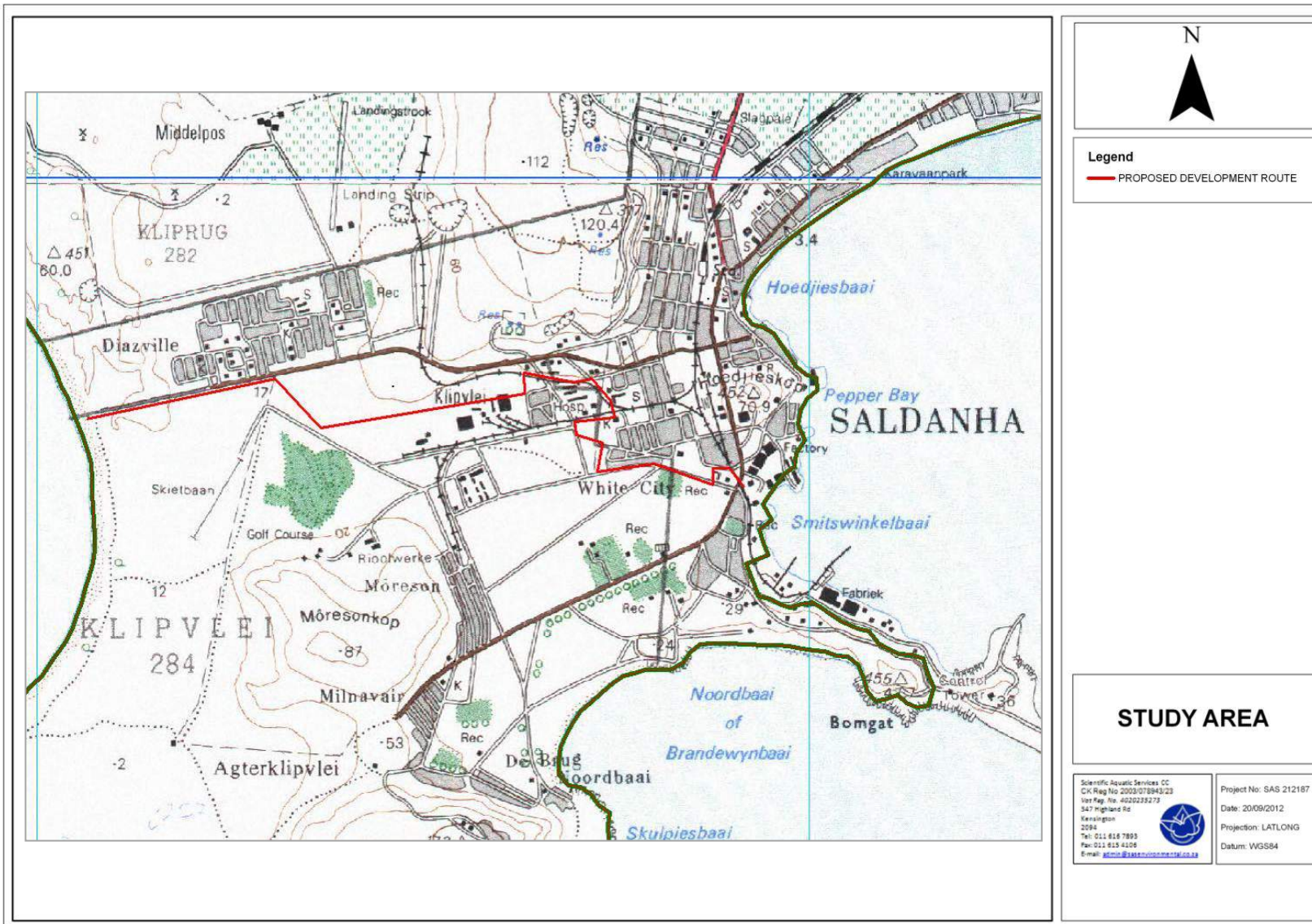


Figure 2: 1:50 000 Topographic map depicting the location of the proposed development route in relation to surrounding areas.





Figure 3: Aerial photograph depicting the proposed development route in relation to the surroundings.



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## **1.2 Scope**

Specific outcomes in terms of this study are as follows:

Floral Assessment:

- red data species assessment, including potential for species to occur on study area;
- provide floral inventories of species as encountered on site;
- determine and describe habitats, communities and Present Ecological State of the study area; and
- describe the spatial significance of the proposed development route with regards to surrounding natural areas.

## **1.3 Assumptions and Limitations**

The following assumptions and limitations are applicable to this report:

- With ecology being dynamic and complex, some aspects (some of which may be important) may have been overlooked. A more accurate assessment would require that assessments take place in all seasons of the year.
- The floral assessment is confined to the proposed development route and immediate surrounds and does not include the neighbouring and adjacent properties. These were however considered as part of the desktop assessment.
- Sampling by its nature, means that not all individuals are assessed and identified. Some species and taxa on the proposed development route may therefore have been missed during the assessment.

## **1.4 Legislation**

### **1.4.1 National Environmental Management Biodiversity Act, 2004**

- To provide for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998.

### **1.4.2 Conservation of Agricultural Resources Act, 1983**

- Legislation on weeds and invasive plants in South Africa.

### **1.4.3 National Water Act, 1998**

- The National Water Act (Act 36 of 1998) recognises that the entire ecosystem and not just the water itself in any given water resource constitutes the resource and as such needs to be conserved.
- No activity may therefore take place within a watercourse unless it is authorised by DWA.





---

## 2. METHODOLOGY

In order to accurately determine the Present Ecological State of the study area and capture comprehensive data with respect to floral taxa, the following methodology was used:

- Maps, aerial photographs and digital satellite images were consulted prior to the field assessment in order to determine broad habitats, vegetation types and potentially sensitive sites. An initial visual on-site assessment of the proposed development route was made in order to confirm the assumptions made during consultation of the maps.
- Literature review with respect to habitats, vegetation types and species distribution was conducted.
- Relevant data bases considered during the assessment of the study area included SANBI Threatened species programme (TSP) and PRECIS as well as SANBI Biodiversity GIS (BGIS) applicable to the Western Cape.

## 3. METHODS OF INVESTIGATION

### 3.1 Desktop Study

Initially a desktop study was undertaken to gather background information regarding the study area and its surrounding areas. All relevant authorities were consulted regarding conservational species lists, as well as all the latest available literature utilised to gain a thorough understanding of the area and its surrounding habitats. This information and further literature reviews were then used to determine the potential biodiversity lists for the proposed development site and surrounding areas. This information incorporated (amongst others) data on vegetation types, habitat suitability and biodiversity potential coupled to this information.

### 3.2 General site survey

Two site visits were undertaken on the 7<sup>th</sup> and 21<sup>st</sup> of September 2012 to determine the ecological status of the study area. A reconnaissance 'walkabout' was initially undertaken to determine the general habitat types found throughout the study area and, following this, specific study sites were chosen that were representative of the habitats found - special emphasis was placed on potential areas that may support *Red Data Listed* species. Sites were investigated on foot to identify the occurrence of the *dominant* plant species and habitat diversities.

### 3.3 Flora

All floral species encountered during the assessment were identified and medicinal importance of the species noted. These species lists were then also compared with the vegetation types



expected in the area, which provided an accurate indication of the ecological integrity and conservational value of the site where the proposed development is to be completed.

### 3.3.1 Vegetation Index Score

The Vegetation Index Score (VIS) was designed to determine the ecological state of each habitat unit defined within an assessment site. This enables an accurate and consistent description of the present ecological state (PES) concerning the proposed development route in question. The information gathered during these assessments also significantly contributes to sensitivity mapping, leading to a more truthful representation of ecological value and sensitive habitats.

Each defined management unit is assessed using separate data sheets (see Appendix A) and all the information gathered then contributes to the final VIS score. The VIS is derived using the following formulas:

$$\text{VIS} = [( \text{EVC} ) + (( \text{SI} \times \text{PVC} ) + ( \text{RIS} ))]$$

Where:

1. **EVC** is extent of vegetation cover;
2. **SI** is structural intactness;
3. **PVC** is percentage cover of indigenous species and
4. **RIS** is recruitment of indigenous species.

Each of these contributing factors is individually calculated as discussed below. All scores and tables indicated in blue are used in the final score calculation for each contributing factor.





**1.  $EVC = \frac{EVC1 + EVC2}{2}$**

**EVC 1 - Percentage natural vegetation cover:**

Vegetation cover %	0%	1-5%	6-25%	26-50%	51-75%	76-100%
Site score						
EVC 1 score	0	1	2	3	4	5

**EVC2 - Total site disturbance score:**

Disturbance score	0	Very Low	Low	Moderately	High	Very High
Site score						
EVC 2 score	5	4	3	2	1	0

**2.  $SI = \frac{SI1 + SI2 + SI3 + SI4}{4}$**

Score:	Trees (SI1)		Shrubs (SI2)		Forbs (SI3)		Grasses (SI4)	
	Present State	Perceived Reference State	Present State	Perceived Reference State	Present State	Perceived Reference State	Present State	Perceived Reference State
Continuous								
Clumped								
Scattered								
Sparse								

**Present State (P/S) = Currently applicable for each habitat unit**

**Perceived Reference State (PRS) = If in pristine condition**

Each SI score is determined with reference to the following scoring table of vegetation distribution for present state versus perceived reference state.

Perceived Reference state (PRS)	Present state (P/S)			
	Continuous	Clumped	Scattered	Sparse
Continuous	3	2	1	0
Clumped	2	3	2	1
Scattered	1	2	3	2
Sparse	0	1	2	3



**3. Percentage vegetation cover (exotic):**

	0%	1-5%	6-25%	26-50%	51-75%	76-100%
<b>Vegetation cover %</b>						
<b>PVC Score</b>	0	1	2	3	4	5

**Percentage vegetation cover (bare ground):**

	0%	1-5%	6-25%	26-50%	51-75%	76-100%
<b>Vegetation cover %</b>						
<b>PVC Score</b>	0	1	2	3	4	5

**4.  $PVC = [(EVC) - ((exotic \times 0.7) + (bare \ ground \times 0.3))]$**

**5. *RIS***

<b>Extent of indigenous species recruitment</b>	0	Very Low	Low	Moderate	High	Very High
<b>RIS</b>	0	1	2	3	4	5

The final VIS scores for each habitat unit are then categorised as follows:

Vegetation Index Score	Assessment Class	Description
22 to 25	A	Unmodified, natural
18 to 22	B	Largely natural with few modifications.
14 to 18	C	Moderately modified
10 to 14	D	Largely modified
5 to 10	E	The loss of natural habitat extensive
<5	F	Modified completely

**3.4 *Floral Community Assessment***

Vegetation surveys were undertaken by first identifying different habitat units and then analysing the floral species composition. This was done in order to determine the percentage composition of indigenous vegetation within each perceived habitat unit. Different transect lines were chosen within areas that were perceived to best represent the various plant communities. A walking stick was used that was placed every 1m and the plant species of biophysical feature falling closest to the point of the stick was identified. These points were done along a 50m transect line, making for 50 data points along a single transect. The data was then analysed and the percentage contribution of the various floral species for each transect line was calculated. These species lists were then compared with the vegetation expected to be found in the



*Saldanha Flats Strandveld, Saldanha Granite Strandveld, Sandanha Limestone Strandveld and Langebaan Dune Strandveld*, which provided an accurate indication of the ecological integrity and conservational value of each habitat unit. It should be noted that the assessment does not include exotic floral species and are solely aimed at determining the percentage indigenous vegetation.

### **3.5 Red Data Species Assessment**

#### **3.5.1 Flora**

Prior to the field visit, a record of Red Data List floral species and their habitat requirements was acquired from SANBI for the quarter degree grid 3317BB. Throughout the floral assessment special attention was paid with the identification of any of these RDL species as well as identification of suitable habitat that could potentially sustain these species.

### **3.6 Impact Assessment**

The potential impacts and recommended mitigation measures was separated into:

- Pre-construction and Construction
- Operational phases

#### **Nature of the impact**

This is an appraisal of the type of effect the construction, operation and maintenance a development would have on the affected environment. This description included what could be affected and how.

#### **Extent of the impact**

Extent defines the physical extent or spatial scale of the impact. The impact could:

- Site specific: limited to the site.
- Local: limited to the site and the immediate surrounding area (1-10km)
- Regional: covers an area that includes an entire geographic region or extends beyond one region to another.
- National Scale: Across national boundaries and may have national implications.

#### **Duration of the impact**

The lifespan of the impact is expected to be:

- Short term: 0-5 years.
- Medium term: 5-15 years.



- Long term: Beyond the operational phase, but not permanent.
- Permanent: Where mitigation either by natural processes or by human intervention will not occur in such a way or in such time span that the impact can be considered transient.

### **Intensity**

Intensity establishes whether the impact is destructive or benign and should be qualified as low, medium or high.

### **Probability of occurrence**

Probability describes the likelihood of the impact occurring. The likelihood can be described as:

- Improbable/unlikely: Low likelihood of the impact occurring
- Probable: Distinct possibility the impact will occur
- Highly probable: Most likely that the impact will occur
- Definite: Impact will occur regardless of any prevention measures.

### **Reversibility**

This refers to the degree to which an impact can be reversed.

- Fully reversible: Where the impact can be completely reversed.
- Partly reversible: Where the impact can be partially reversed.
- Irreversible: Where the impact is permanent.

### **Irreplaceable loss of resources**

Describes the degree to which resources will be irreplaceably lost due to the proposed activity.

- Fully replaceable: Resources can be fully replaced.
- Partly replaceable: Resources can be partially replaced.
- Irreplaceable: Resources cannot be replaced.

### **Degree to which an impact can be mitigated**

This indicates the degree to which an impact can be reduced. The impact can either be fully or partly mitigated or not mitigated at all.

### **Cumulative effect**

An effect which in itself may not be significant but may become significant if added to other existing or potential impacts that may result from activities associated with the proposed development.



**Significance**

Based on a synthesis of the information contained in the above-described procedure, the potential impacts can be assessed in terms of the following significance criteria:

- **No significance:** the impacts do not influence the proposed development and/or environment in any way.
- **Low significance:** the impacts will have a minor influence on the proposed development and/or environment. These impacts require some attention to modification of the project design where possible, or alternative mitigation.
- **Moderate significance:** the impacts will have a moderate influence on the proposed development and/or environment. The impact can be ameliorated by a modification in the project design or implementation of effective mitigation measures.
- **High significance:** the impacts will have a major influence on the proposed development and/or environment.



## 4 ECOLOGICAL DESCRIPTION OF THE PROPERTY

### ***4.1 Biome and bioregion***

Biomes are broad ecological units that represent major life zones extending over large natural areas (Rutherford 1997). This assessment site falls within the *Fynbos biome*. Biomes are further divided into bioregions, which are spatial terrestrial units possessing similar biotic and physical features, and processes at a regional scale. This assessment site is situated within the *West Strandveld Bioregion* (Mucina & Rutherford, 2006).



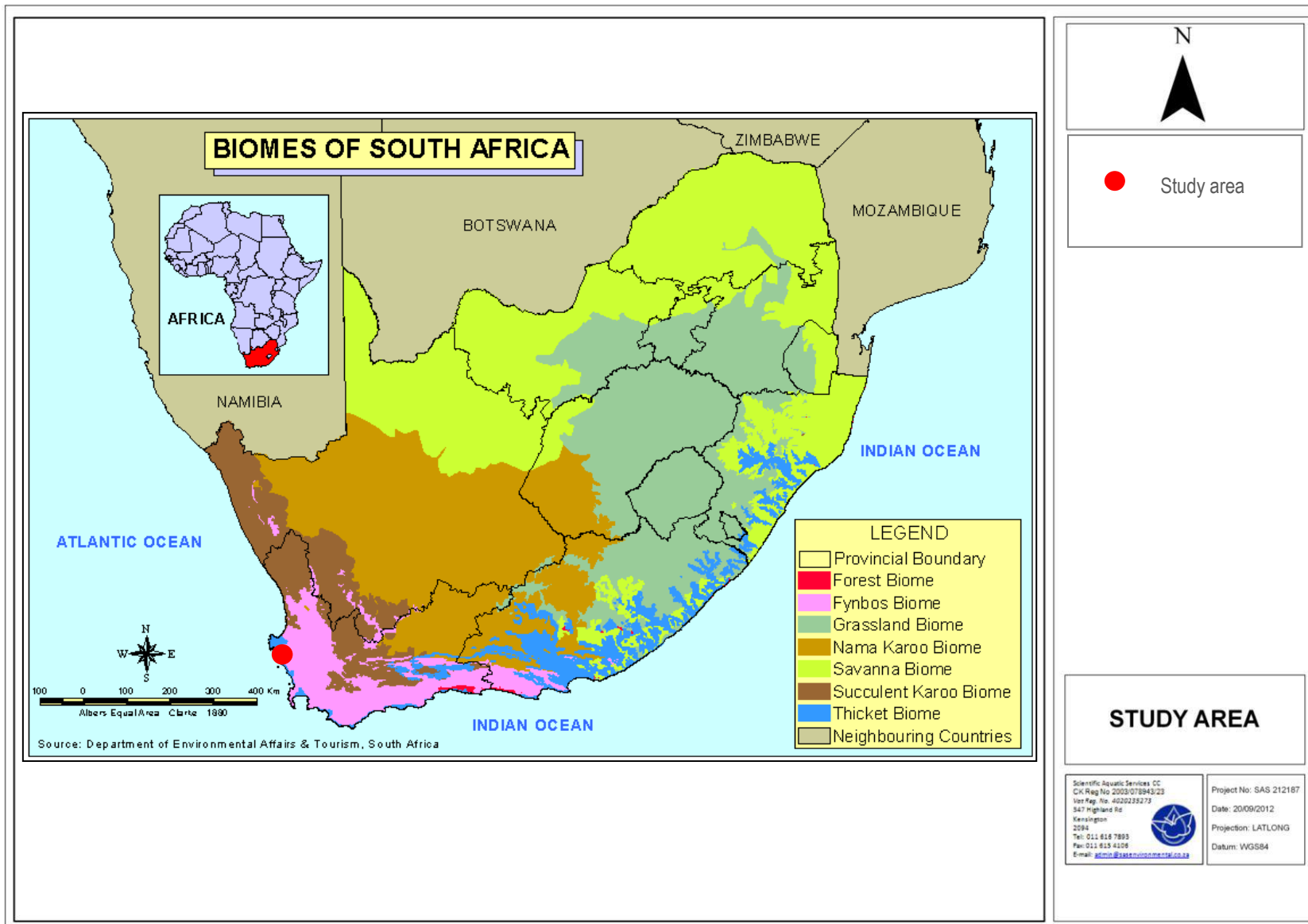


Figure 4: Biomes of South Africa.





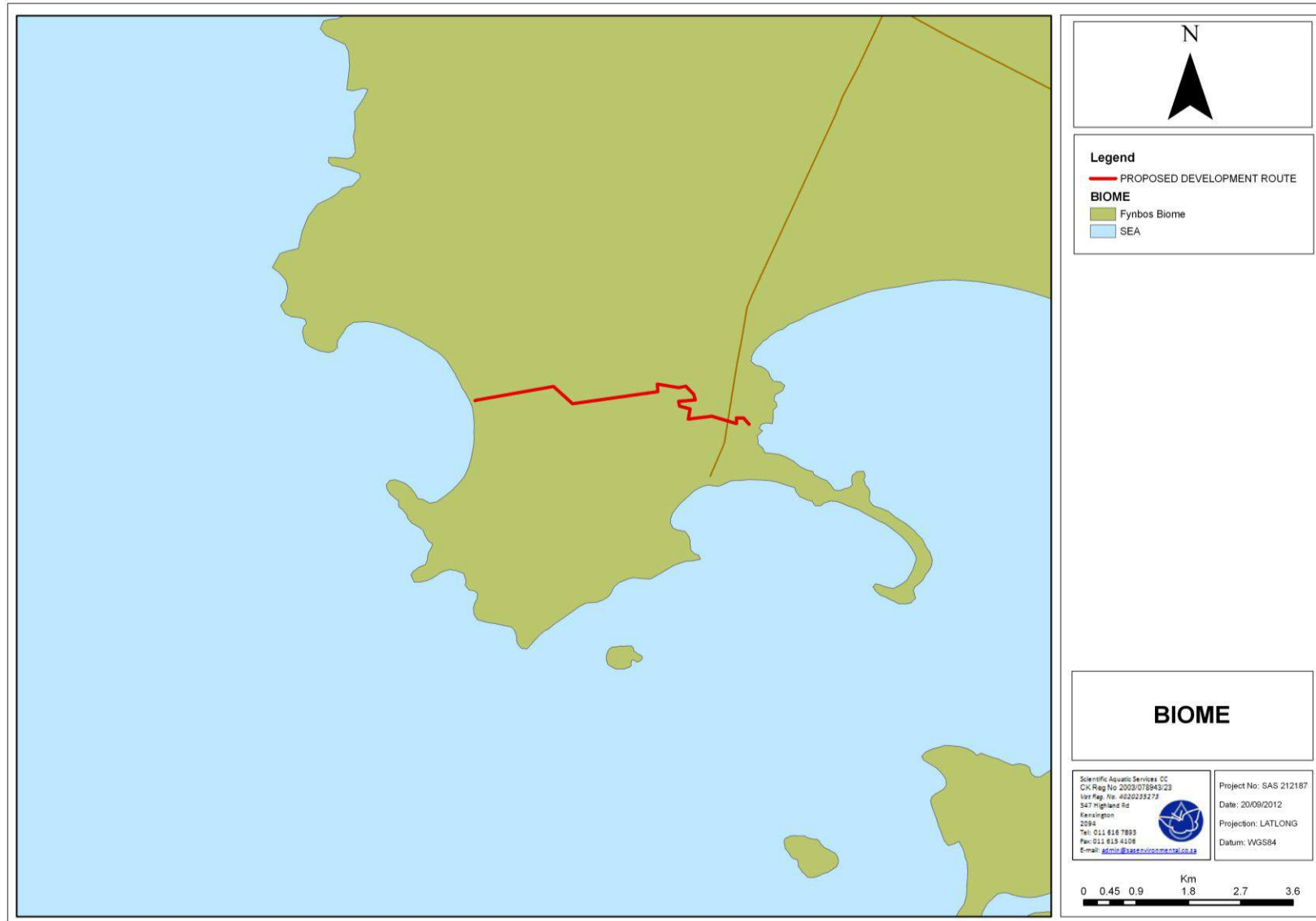


Figure 5: Biomes associated with the proposed development route (Mucina & Rutherford, 2006).





Figure 6: Bioregions associated with the proposed development route (Mucina & Rutherford, 2006).



## **4.2 Vegetation type and Landscape Characteristics**

While biomes and bioregions are valuable as they describe broad ecological patterns, they provide limited information on the actual species that are expected to be found in an area. Knowing which vegetation type an area belongs to provides an indication of the floral composition that would be found if the assessment site was in a pristine condition, which can then be compared to the observed floral list and so give an accurate and timely description of the ecological integrity of the assessment site. When the boundary of the assessment site is superimposed on the vegetation and veld types of the surrounding area (Figures below), it is evident that the proposed development route falls within one veld type namely the *Strandveld of the West Coast* (Acock's, 1953) and within four vegetation types namely *Saldanha Flats Strandveld*, *Saldanha Granite Strandveld*, *Saldanha Limestone Strandveld* and *Langebaan Dune Strandveld* (Mucina & Rutherford, 2006).



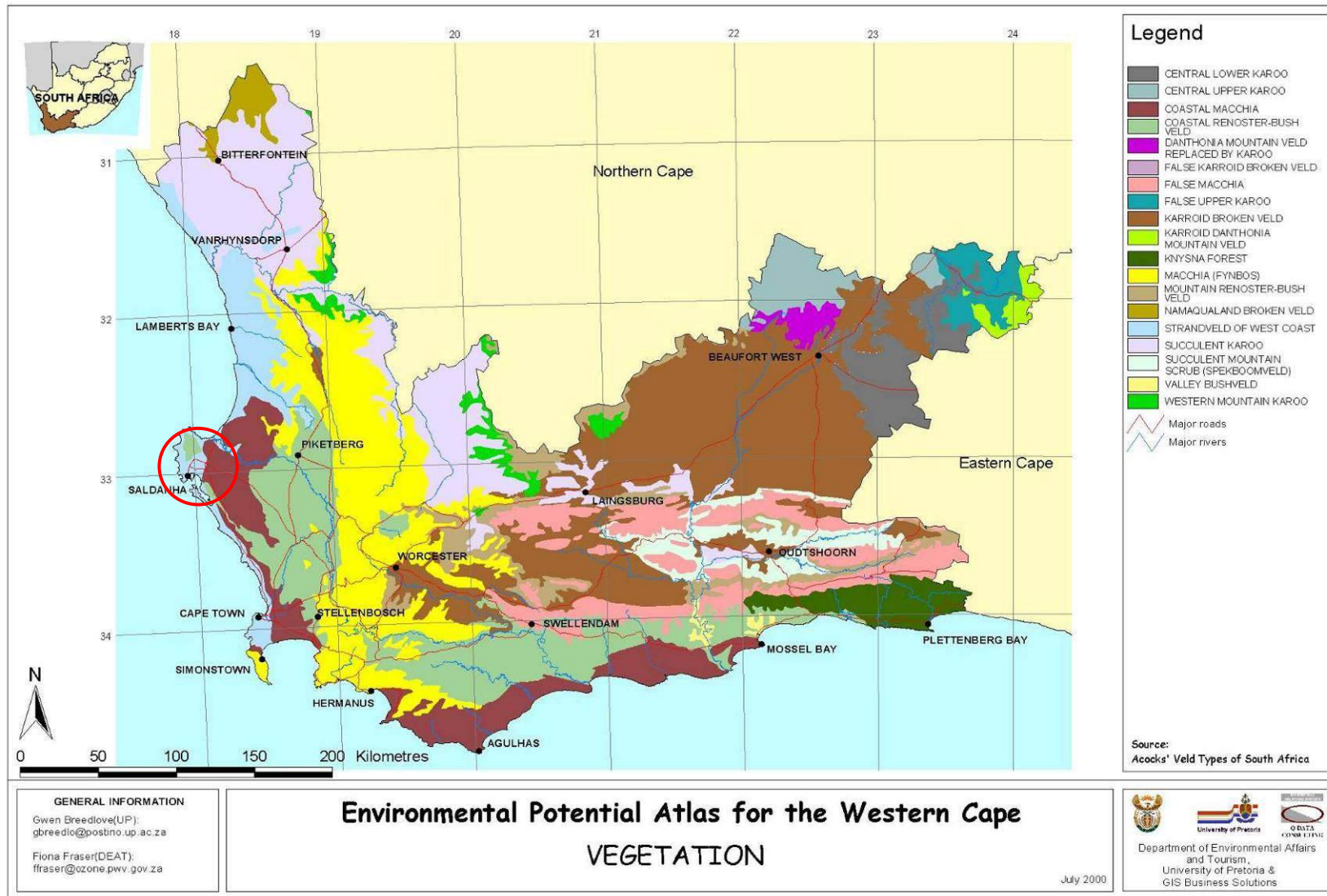


Figure 7: Acocks' Veld types of the Western Cape Province ([www.environment.gov.za](http://www.environment.gov.za)) the general location of the proposed route is indicated in red.



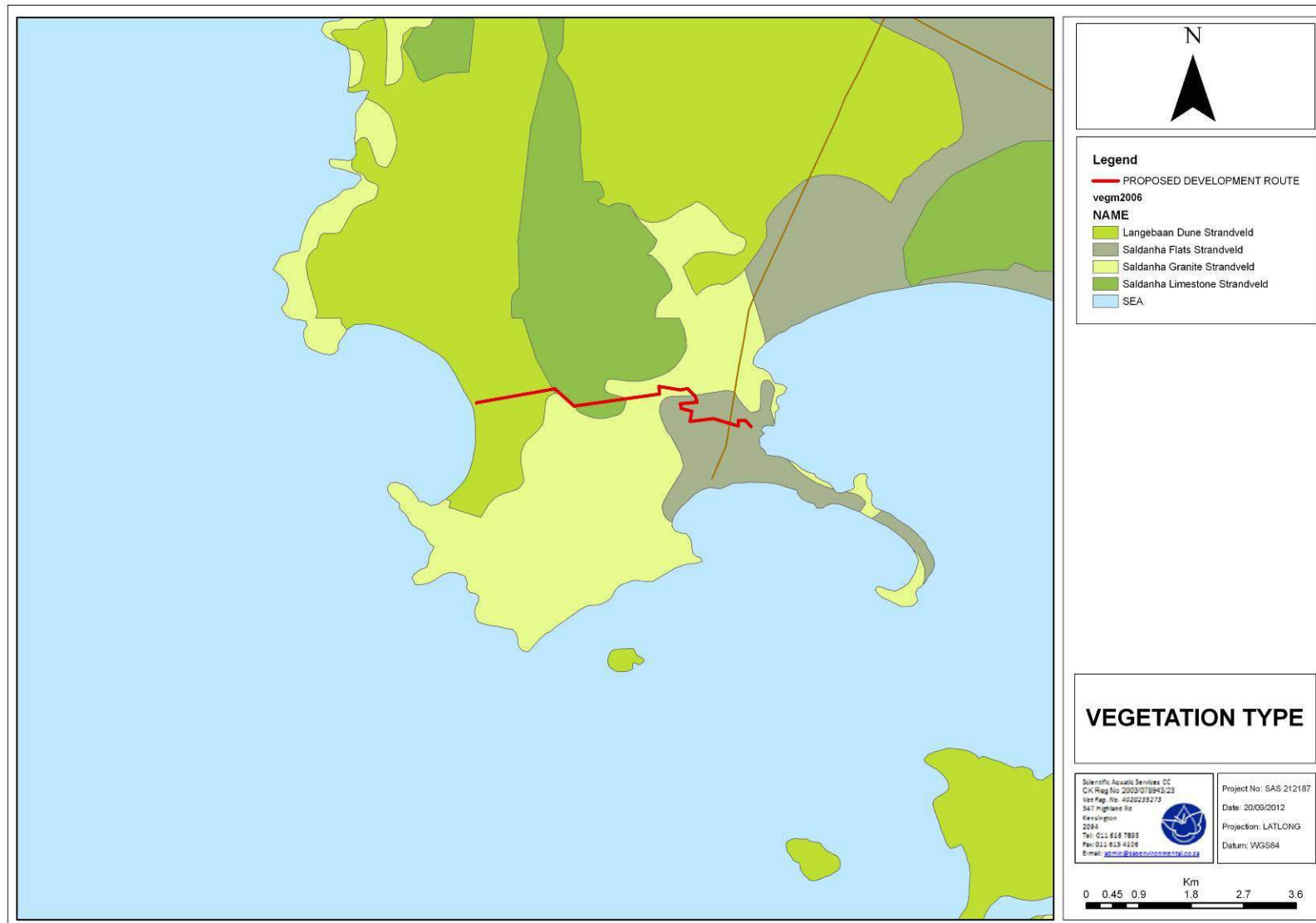


Figure 8: Vegetation type associated with the proposed development route (Mucina & Rutherford, 2006).



## 4.3 Saldanha Granite Strandveld

### 4.3.1 Distribution

The *Saldanha Granite Strandveld* vegetation type is located within the Western Cape Province. On the West Coast, granite domes from Vredenburg to St Helena bay and many points along the coast including Paternoster and Saldanha's North Head; also around Langebaan town and at Postberg on the Langebaan Peninsula. Altitude ranges from 0 to 180 meter (Mucina & Rutherford, 2006).

### 4.3.2 Vegetation & Landscape Features

Rounded forms of granite sheets and smooth forms at their feet dominate the landscapes of this vegetation unit with low to medium shrubland, containing some succulent elements, alternates with grassy and herb-rich spots supporting a rich geophyte flora (Mucina & Rutherford, 2006).

### 4.3.3 Geology and soils

Deep, coarse sandy to loamy soils derived from the Vredenburg Batholith in the north and the Saldanha Batholith in the south (both of the Cape Granite Suite). Dominant land type Ab, followed by Fc (Mucina & Rutherford, 2006).

### 4.3.4 Climate

Mainly cyclonic annual rainfall varying from approximately 250mm in the north to 350mm in the south, almost exclusively in winter. Mean daily maximum and minimum temperatures 25.4°C and 7.9°C for February and July, respectively. Advective sea fog and dew contribute significantly to the moisture in summer and autumn. Frost rare. Winds tend to be strong northwesterly in winter and southerly in summer.

**Table 1: General climatic information for *Saldanha Granite Strandveld* (Mucina & Rutherford, 2006).**

Bioregion	Vegetation types	Altitude (m)	MAP* (mm)	MAT* (°C)	MAPE* (mm)	MASMS* (%)
Fynbos Biome	<i>Saldanha Granite Strandveld</i>	0-180	283	16.0	2,166	35

\*MAP – Mean annual precipitation; MAT – Mean annual temperature; MAPE – Mean annual potential evaporation; MASMS – Mean annual soil moisture stress (% of days when evaporative demand was more than double the soil moisture supply).



### 4.3.5 Conservation Status

This vegetation type is considered Endangered with a conservation target of 24%. Almost 10% is statutorily conserved in the West Coast National Park, SAS Saldanha and Columbine Nature Reserves, and a small portion in private reserves such as West Point, Groot Paternoster and Swartriet. About 70% is transformed for cultivation or by urban development. This vegetation type is regularly utilised for grazing and Australian *Acacia saligna*, *A. cyclops* and *A. baileyana* are causing serious infestations in many places. Coastal development is a further threat to this vegetation type. Erosion is considered low and very low (Mucina & Rutherford, 2006).

### 4.3.6 Important Taxa

The Dominant (\*d) and typical floristic species of the Saldanha Granite Strandveld (Mucina & Rutherford, 2006) are Tall Shrubs: *Euclea racemosa* subsp. *racemosa*, *Passerina corymbosa*, *Rhus glauca*. Low Shrubs: *Pteronia divaricate* (d), *Agathosma bifida*, *Eriocephalus africanus* var. *africanus*, *Exomis microphylla*, *Otholobium hirtum*, *Polygala myrtifolia*, *Pterocelastrus tricuspidatus*, *Putterlickia pyracantha*. Succulent Shrubs: *Aloe perfoliata*, *Drosanthemum floribundum*, *Euphorbia mauritanica*, *Lycium tetrandrum*, *Othonna floribunda*, *Tetragonia fruticosa*, *T. spicata*, *Tylecodon paniculatus*, *Zygophyllum morgsana*. Woody Climber: *Cissampelos capensis*. Semiparasitic Shrub: *Osyris compressa*. Herb: *Dimorphotheca pluvialis* (d), *Oncosiphon suffruticosum* (d), *Adenogramma glomerata*, *Nemesia versicolor*, *Senecio arenarius*, *Ursinia anthemoides* subsp. *anthemoides*. Geophytic Herbs: *Amaryllis belladonna*, *Chasmanthe floribunda*, *Freesia viridis*, *Geissorhiza monanthos*, *Lachenalia pustulata*, *Melasphaerula ramosa*, *Romulea hirsuta*. Succulent Herb: *Dorotheanthus bellidiformis* (d). Graminoids: *Chaetobromus involucratus* subsp. *dregeanus*, *C. involucratus* subsp. *involucratus*, *Cynodon dactylon*, *Ehrharta calycina*, *E. villosa* var. *villosa*, *Festuca scabra*, *Tribolium echinatum*, *Wildenowia incurvata*.

## 4.4 Saldanha Flats Strandveld

### 4.4.1 Distribution

The *Saldanha Flats Strandveld* vegetation type is located within the Western Cape Province. Extensive coastal flats from St Helena Bay and the southern banks of the Great Berg River near its mouth in the north to Saldanha and Langebaan in the





south, with the southernmost extension at the coast near Yzerfontein and Rietduin. Altitude ranges from 0 to 120m (Mucina & Rutherford, 2006).

#### 4.4.2 Vegetation & Landscape Features

Sclerophyllous shrublands built of a sparse emergent and moderately tall shrub layer, with an open succulent shrub layer forming the undergrowth; with conspicuous displays of geophytes and annual herbaceous flora in spring (Mucina & Rutherford, 2006).

#### 4.4.3 Geology and soils

The main geology is shallow calcareous sand over a fossiliferous Pleistocene limestone hardpan layer along an old marine terrace. The hardpan of the Sandveld Group is exposed in places while farmers often rip the hardpan and accumulate rock piles in cultivated fields. The Sandveld Group overlies the Cape Granites as well as the Malmesbury Group metasediments into which the granites intruded. Dominant land type Hb (almost 50%), followed by Db and Ha (Mucina & Rutherford, 2006).

#### 4.4.4 Climate

Mainly cyclonic rainfall varying from approximately 250mm in the north to 380mm in the south (overall MAP: 300mm), almost exclusively in winter. Mean daily maximum and minimum temperatures 26.6°C and 7.9°C for February and July, respectively. Mean monthly maximum and minimum temperatures for Langebaanweg 36.5°C and 2.2°C for January/February and July/August, respectively. Advective sea fog and dew contribute to the moisture balance in summer and autumn. Frost infrequent. Strong southeasterly winds typical of the summer period, northerly winds more frequent in the winter months, especially between May and August.

**Table 2: General climatic information for *Saldanha Flats Strandveld* (Mucina & Rutherford, 2006).**

Bioregion	Vegetation types	Altitude (m)	MAP* (mm)	MAT* (°C)	MAPE* (mm)	MASMS* (%)
Fynbos Biome	<i>Saldanha Flats Strandveld</i>	0-120	299	16.4	2,215	75

\*MAP – Mean annual precipitation; MAT – Mean annual temperature; MAPE – Mean annual potential evaporation; MASMS – Mean annual soil moisture stress (% of days when evaporative demand was more than double the soil moisture supply).



#### 4.4.5 Conservation Status

The vegetation type is considered Endangered with a conservation target of 24%. Some 11% is statutorily conserved in the West Coast National Park and Yzerfontein Nature Reserve and a very small portion also in private conservation areas such as Jakkalsfontein and West Point. More than a half has already been transformed for cultivation, road building or by urban development. Serious alien infestation is caused by trees such as *Acacia cyclops* and *A. saligna* and herbs including *Bromus diandrus* and *Medicago hispida*. Erosion generally very low (Mucina & Rutherford, 2006).

#### 4.4.6 Important Taxa

The Dominant (\*d)) and typical floristic species of the Saldanha Flats Strandveld (Mucina & Rutherford, 2006) are Tall Shrubs: *Euclea racemosa* subsp. *racemosa* (d), *Nylandtia spinosa*, *Rhus glauca*. Low Shrubs: *Aspalathus lotooides* subsp. *lagopus*, *Clutia daphnoides*, *Euryops linifolius*, *Exomis microphylla*, *Hermannia pinnata*, *Lebeckia sericea*, *Leysera gnaphalodes*, *Nenax hirta* subsp. *calciphila*, *Pterocelastrus tricuspidatus*, *Pteronia divaricate*, *P. ovalifolia*, *P. uncinata*. Succulent Shrubs: *Euphorbia mauritanica*, *Ruschia macowanii*, *Tetragonia decumbens*, *T. fruticosa*, *Zygophyllum cordifolium*, *Zygophyllum morgsana*. Herb: *Dimorphotheca pluvialis* (d), *Oncosiphon suffruticosum* (d), *Arctotheca calendula*, *Foveolina tenella*, *Hebenstretia repens*, *Helichrysum litorale*, *Nemesia versicolor*, *Senecio arenarius*, *Ursinia anthemoides* subsp. *anthemoides*. Geophytic Herbs: *Trachyandra ciliate*, *T. divaricate*. Succulent Herb: *Dorotheanthus bellidiformis* (d), *Conicosia pugioniformis* subsp. *pugioniformis*, *Mesembryanthemum guerichianum*, *Senecio littoreus*. Graminoids: *Bromus pectinatus* (d), *Ehrharta calycina*, *E. villosa* var. *villosa*, *Festuca scabra*, *Schismus barbatus*, *Tribolium echinatum*.

### 4.5 Saldanha Limestone Strandveld

#### 4.5.1 Distribution

The *Saldanha Limestone Strandveld* is located within the Western Cape Province. Very limited area with a larger patch on the Kliprug ridge between Saldanha and Paternoster, with several smaller outliers including those between Saldanha and north of Club Mykonos on the Langebaan Lagoon. Unmapped are small outcrops at



Yzerfontein and on the tip of Langebaan Peninsula. Altitude ranges from 20 to 120 meter (Mucina & Rutherford, 2006).

#### 4.5.2 Vegetation & Landscape Features

Slightly undulating ridges and steeper coastal slopes supporting low shrublands built of low succulent-stemmed and deciduous, fleshy leaved shrubs in deeper soils. Patches of prostrate, succulent-leaved dwarf shrubs and annual or geophytic herbs occupy cracks or shallow depressions in the exposed limestone (Mucina & Rutherford, 2006).

#### 4.5.3 Geology and soils

Shallow sandy soil on hardpan Tertiary limestone of the Sandveld Group. Dominant land types Fc and Hb (Mucina & Rutherford, 2006).

#### 4.5.4 Climate

Mainly cyclonic rainfall varying from approximately 250mm in the north to 350mm in the south (overall MAP: 300mm), almost exclusively in winter. Mean daily maximum and minimum temperatures 25.3°C and 8.0°C for February and July/August, respectively.

**Table 3: General climatic information for *Saldanha Limestone Strandveld* (Mucina & Rutherford, 2006).**

Bioregion	Vegetation types	Altitude (m)	MAP* (mm)	MAT* (°C)	MAPE* (mm)	MASMS* (%)
Fynbos Biome	<i>Saldanha Limestone Strandveld</i>	20-120	303	16.0	2,155	76

\*MAP – Mean annual precipitation; MAT – Mean annual temperature; MAPE – Mean annual potential evaporation; MASMS – Mean annual soil moisture stress (% of days when evaporative demand was more than double the soil moisture supply).

#### 4.5.5 Conservation Status

The vegetation type is considered Endangered with a conservation target of 24%. None conserved in statutory conservation areas and only a small fraction protected in the Swartriet Private Nature Reserve. About 40% has been transformed for cultivation or by development of coastal settlements. Some portions are under heavy grazing pressure and aliens *Acacia cyclops* and *A. saligna* can become a problem in



places. Erosion is generally considered very low. This vegetation unit is rich in Red Data plants (at least 20 species, some of them restricted to this unit.) (Mucina & Rutherford, 2006).

#### 4.5.6 Important Taxa

The Dominant (\*d)) and typical floristic species of the Saldanha Limestone Strandveld (Mucina & Rutherford, 2006) are Tall Shrubs: *Euclea racemosa* subsp. *racemosa* (d), *Nylandtia spinosa*, *Rhus glauca*. Low Shrubs: *Chrysanthemoides monilifera* (d), *Exomis microphylla*, *Pteronia divaricate*. Succulent Shrubs: *Aleo perfoliata*, *Cheiridopsis rostrata*, *Euphorbia mauritanica*, *Jordaaniella dubia*, *Lycium tetrandrum*, *Othonna cylindrical*, *O. floribunda*, *Ruschia tumidula*, *Zygophyllum cordifolium*, *Zygophyllum morgsana*. Semiparasitic Shrub: *Thesium spinosum*. Herb: *Dimorphotheca pluvialis* (d), *Arctotis hirsuta*, *Lyperia tristis*, *Oncosiphon suffruticosum* (d), *Nemesia versicolor*, *Senecio arenarius*, *Ursinia anthemoides* subsp. *anthemoides*, *Zaluzianskya villosa*. Geophytic Herbs: *Babiana tubulosa* var. *tubiflora*, *Oxalis compressa*, *O. obtusa*. Succulent Herb: *Dorotheanthus bellidiformis* (d), *Mesembryanthemum guerichianum*. Graminoids: *Ehrharta calycina*, *E. villosa* var. *villosa*, *Festuca scabra*, *Ficinia lateralis*, *Ischyrolepis eleocharis*.

### 4.6 Langebaan Dune Strandveld

#### 4.6.1 Distribution

The *Langebaan Dune Strandveld* vegetation type is located within the Western Cape Province. This strandveld occurs in three large disconnected patches; one is a narrow coastal strip from Elands Bay to the mouth of the Great Berg River at Velddrif, the second one covers parts from Britannia Bay past Paternoster to Danger Bay near Saldanha Bay, while the last one surrounds Langebaan Lagoon from the north on the Langebaan Peninsula at Donkergat west of the lagoon and Langebaan, east of the lagoon, via Geelbek to Yzerfontein continuing as a very narrow strip along the West Coast seaboard as far south as Silverstroomstrand at Bokbaai (west of Atlantis). Altitude ranges from 0 to 100 meter (Mucina & Rutherford, 2006).

#### 4.6.2 Vegetation & Landscape Features

Flat to slightly undulating old coastal dune systems and stabilised inland duneveld supporting closed, evergreen, up to 2m tall, sclerophyllous shrubland with prominent



annual herbaceous flora occurring in gaps (and forming spectacular displays, especially after good rain in late winter) (Mucina & Rutherford, 2006).

### 4.6.3 Geology and soils

Deep Tertiary to Recent sands and calcrete of marine origin. Dominant land types Hb (slightly prevailing), Fc and Ha (Mucina & Rutherford, 2006).

### 4.6.4 Climate

Mainly cyclonic rainfall varying from approximately 230mm in the north to 355mm in the south almost exclusively in winter and accompanied by frequent and strong northwesterly winds and cooler temperatures. Mean daily maximum and minimum temperatures 26.1°C and 7.8°C for February and July, respectively. Mean monthly maximum and minimum temperatures for Cape Columbine 29.8°C and 6.1°C for March and July, respectively. Southeasterly winds prevail in summer. Fog and dew contribute to the moisture in summer and autumn (especially in the northern part of the unit). Frost an infrequent phenomenon.

**Table 4: General climatic information for *Langebaan Dune Strandveld* (Mucina & Rutherford, 2006).**

Bioregion	Vegetation types	Altitude (m)	MAP* (mm)	MAT* (°C)	MAPE* (mm)	MASMS* (%)
Fynbos Biome	<i>Langebaan Dune Strandveld</i>	0-100	303	16.0	2,155	76

\*MAP – Mean annual precipitation; MAT – Mean annual temperature; MAPE – Mean annual potential evaporation; MASMS – Mean annual soil moisture stress (% of days when evaporative demand was more than double the soil moisture supply).

### 4.6.5 Conservation Status

The vegetation type is considered vulnerable with a conservation target of 24%. Almost 30% conserved in the West Coast National Park and Rocherpan, SAS Saldanha, Columbine and Yzerfontein Nature Reserves. An additional 1% is protected in private reserves such as Groot Paternoster, Jakkalsfontein, Swarriet and Grotto Bay. Some 35% already transformed for cultivation and by urban sprawl. Alien *Acacia Cyclops* and *A. saligna* have infested broad stretches of this vegetation unit. Erosion considered generally very low (Mucina & Rutherford, 2006).



#### 4.6.6 Important Taxa

The Dominant (\*d) and typical floristic species of the Langebaan Dune Strandveld (Mucina & Rutherford, 2006) are Tall Shrubs: *Euclea racemosa* subsp. *racemosa* (d), *Metalasia muricata*, *Morella cordifolia*, *Olea exasperata*, *Rhus glauca*, *R. laevigata*. Low Shrubs: *Chrysanthemoides monilifera* (d), *Pteronia divaricata*, *Salvia africana-lutea* (d), *Ballota africana*, *Chironia baccifera*, *Chrysanthemoides incana*, *Clutia daphnoides*, *Eriocephalus africanus* var. *africanus*, *E. racemosus*, *Helichrysum niveum*, *Lebeckia multiflora*, *Maytenus lucida*, *Pterocelastrus tricuspidatus*, *Putterlickia pyracantha*. Woody Climber: *Cissampelos capensis*. Semiparasitic Shrub: *Osyris compressa*, *Thesium spinosum*. Herb: *Oncosiphon suffruticosum* (d), *Helichrysum litorale*. Geophytic Herbs: *Babiana tubulosa* var. *tubiflora*, *Trachyandra divaricata*. Succulent Herbs: *Carpobrotus acinaciformis* (d), *Dorotheanthus bellidiformis* (d), *Carpobrotus edulis*, *Conicosia pugioniformis* subsp. *pugioniformis*, *Crassula ammophila*, *Mesembryanthemum guerichianum*, Herbaceous Climbers: *Didymodoxa capensis*, *Kedrostis nana*. Graminoids: *Ehrharta villosa* var. *villosa* (d), *Willdenowia incurvata* (d), *Chaetobromus involucratus* subsp. *dregeanus*, *C. involucratus* subsp. *involucratus*, *Festuca scabra*, *Ficinia secunda*, *Ischyrolepis eleocharis*, *Stipa dregeana*, *Thamnochortus erectus*.



## 5 GENERAL IMPORTANCE OF PROPOSED DEVELOPMENT ROUTE

### *5.1 Department of Environmental Affairs and Tourism*

It should be noted that the Saldanha Naval Base property has remained largely undisturbed except for areas presently or historically utilised for Naval Base infrastructure and roads. As a result the property is considered a sensitive area and also indicated as a protected area in Figure 9, Figure 10 and Figure 11 ([www.environment.gov.za](http://www.environment.gov.za), 2000). The proposed development route of the wall is however located adjacent to the neighbouring Diazville residential development; consequently vegetation transformation along the route was noted with special mention of the eastern portion. It is considered highly likely that the building of the wall may prevent edge effects that could result from the neighbouring developments into the conservation area around the naval base.





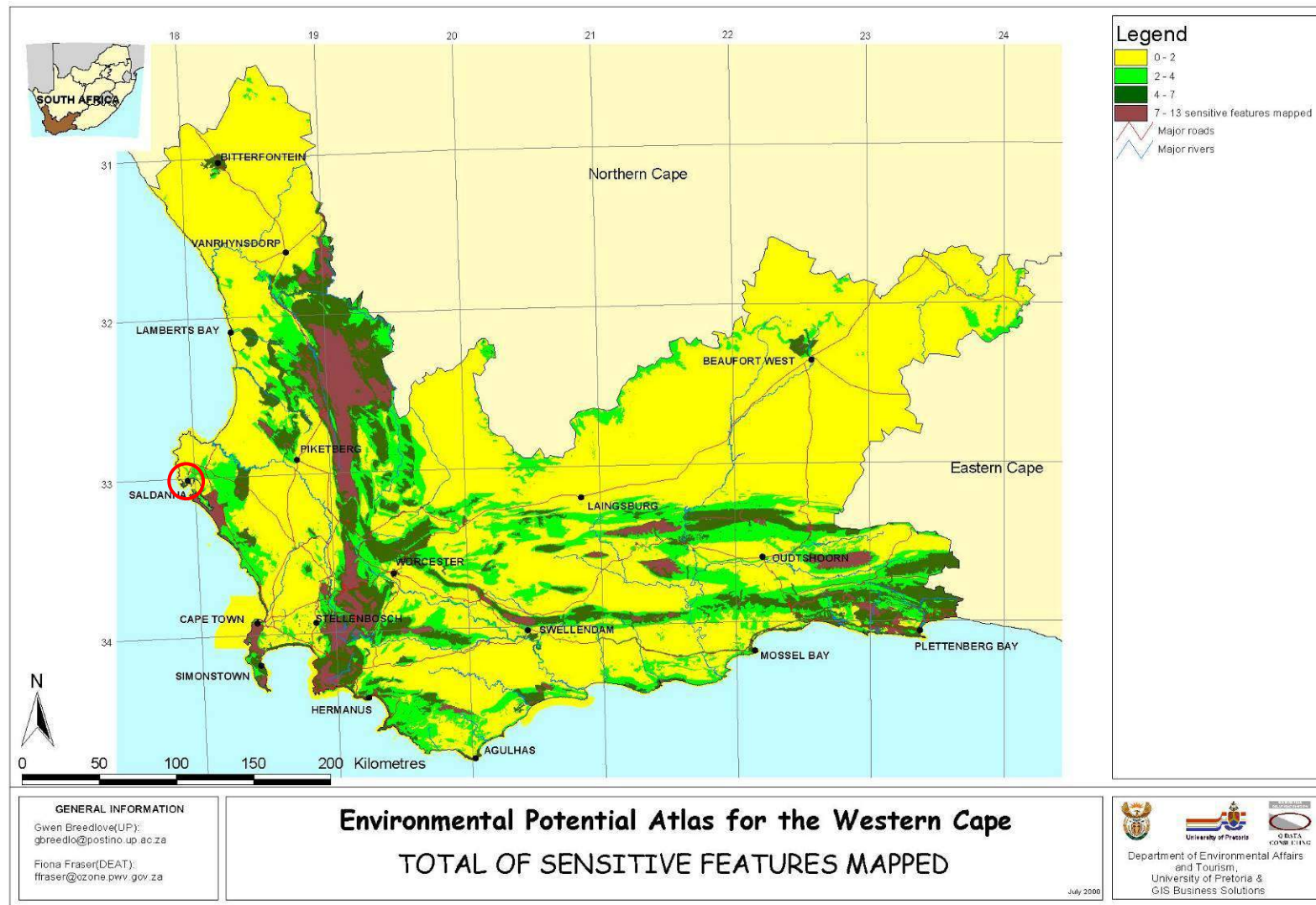


Figure 9: Map of sensitive areas as indicated by [www.environment.gov.za](http://www.environment.gov.za); study area and surroundings are indicated with a red circle.



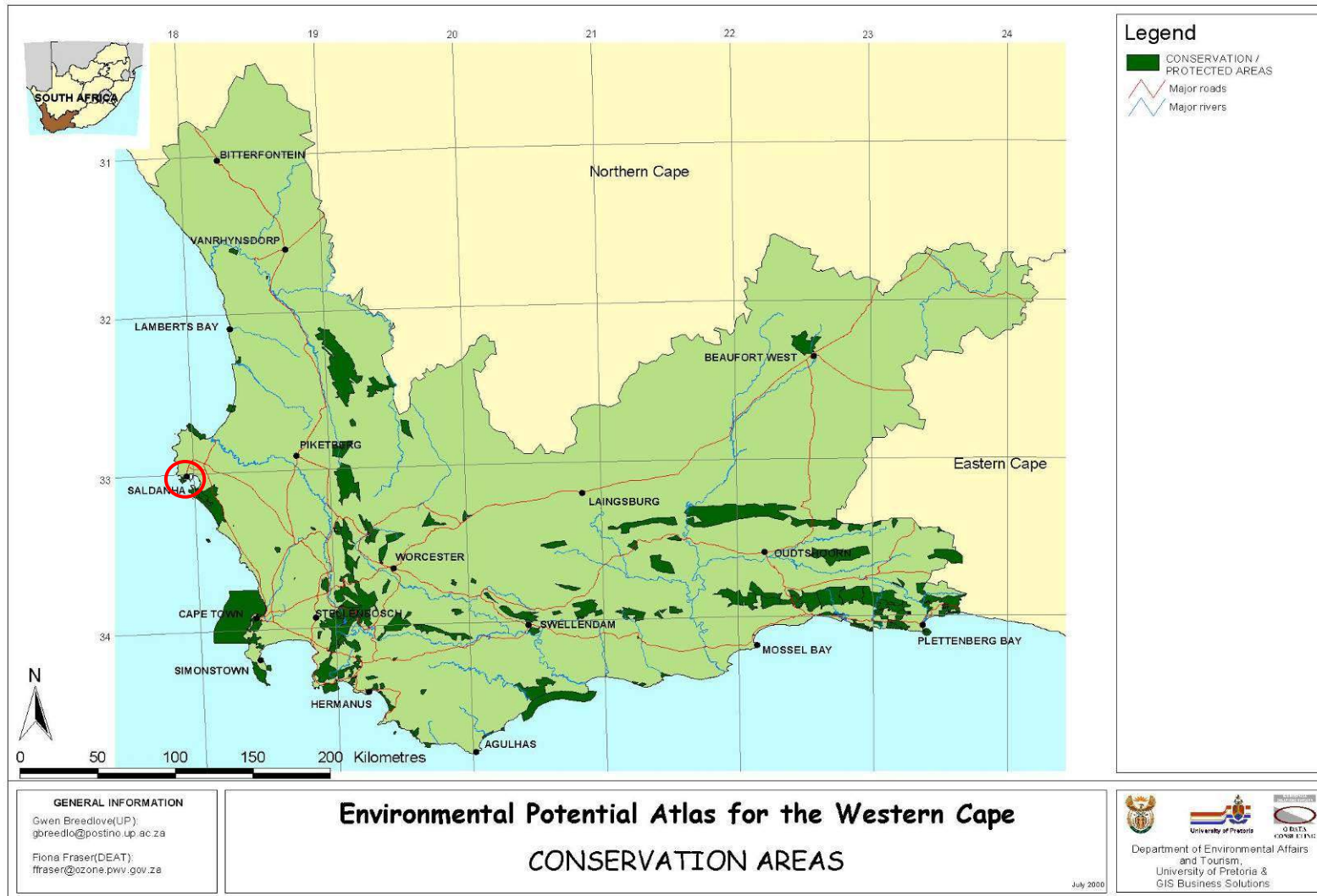


Figure 10: Map of areas with conservation value as indicated by [www.environment.gov.za](http://www.environment.gov.za); study area with surroundings is indicated with a red circle.



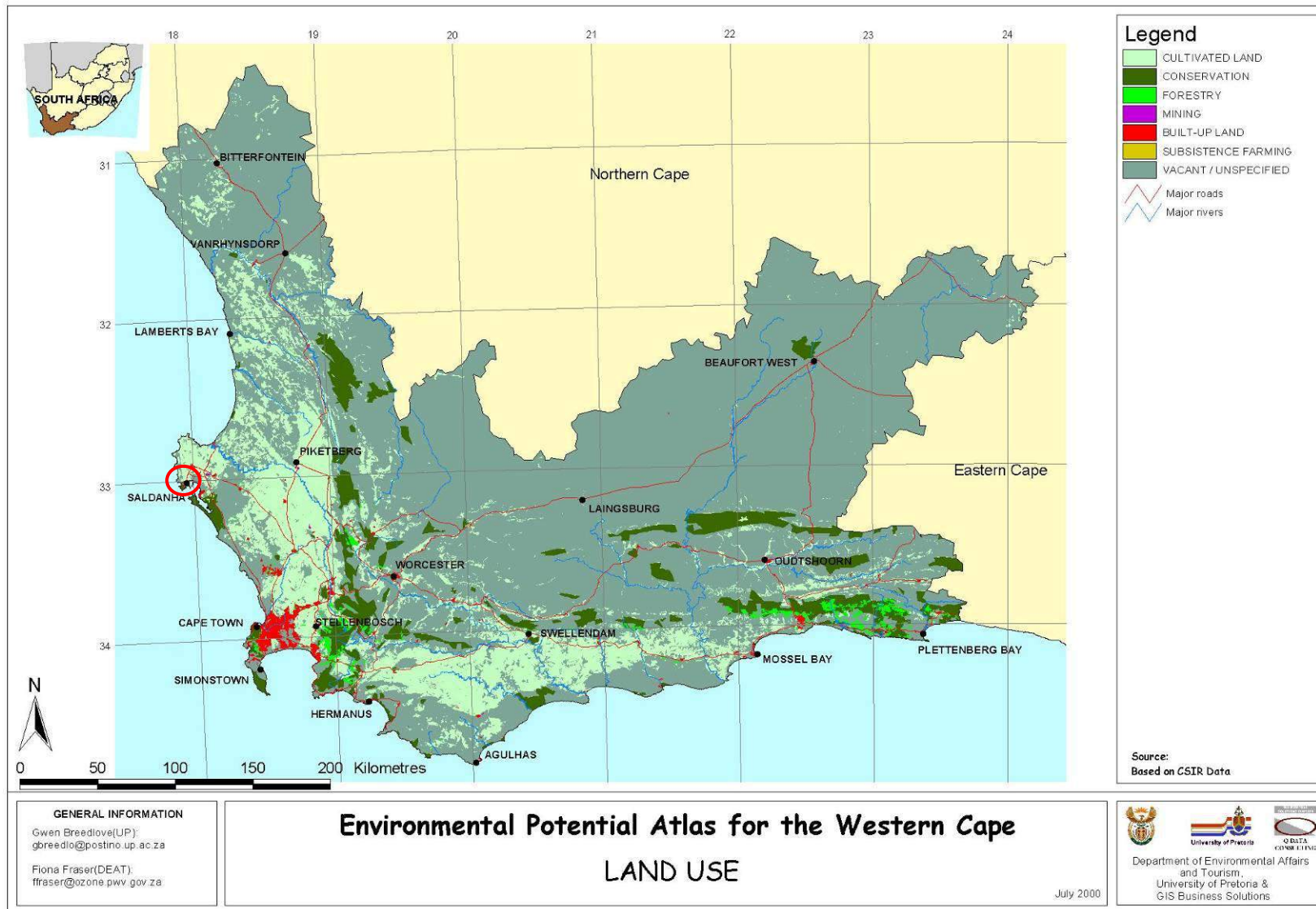


Figure 11: Dominant land use; the study area with surroundings is indicated with a red circle ([www.environment.gov.za](http://www.environment.gov.za)).



## 5.2 Biodiversity GIS (BGIS)

Although all available resources presented by the BGIS ([www.bgis.sanbi.org](http://www.bgis.sanbi.org)) were taken into consideration, only the aspects applicable to the proposed development route and surroundings are discussed below.

### 5.2.1 National list of threatened terrestrial ecosystems for South Africa (2011)

The Biodiversity Act (Act 10 of 2004) provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The purpose of listing threatened ecosystems is primarily to reduce the rate of ecosystem and species extinction. This includes preventing further degradation and loss of structure, function and composition of threatened ecosystems. The purpose of listing protected ecosystems is primarily to preserve witness sites of exceptionally high conservation value. The listed protected ecosystems<sup>1</sup> were searched, for the four vegetation types applicable to the proposed development route. Only the *Saldanha Flats Strandveld* and *Saldanha Granite Strandveld* are listed, see table below for results.

**Table 5: Vegetation types listed as threatened ecosystems.**

Vegetation type	Threat status	Remaining natural area of ecosystem (%)	Proportion of ecosystem protected	Known number of species of special concern
<i>Saldanha Flats Strandveld</i>	Vulnerable	48%	11% of original area (76 000 ha)	26 Red Data plant species and 2 endemic plant species
<i>Saldanha Granite Strandveld</i>	Endangered	37%	10% of original area (23 000 ha)	45 Red Data plant species and 15 endemic plant species

Remnants of endangered ecosystems are indicated to occur within the study area (see figure below). Endangered ecosystems have lost significant amounts of their natural habitat and this has a negative effect on ecosystem function. Therefore, it is considered important to safeguard these areas during the proposed wall development activities by adhering to the mitigation measures listed within the floral and wetland assessment reports.

<sup>1</sup> Threatened Ecosystems in South Africa. Draft 2009 South African National Biodiversity Institute & Department of Environmental Affairs and Tourism





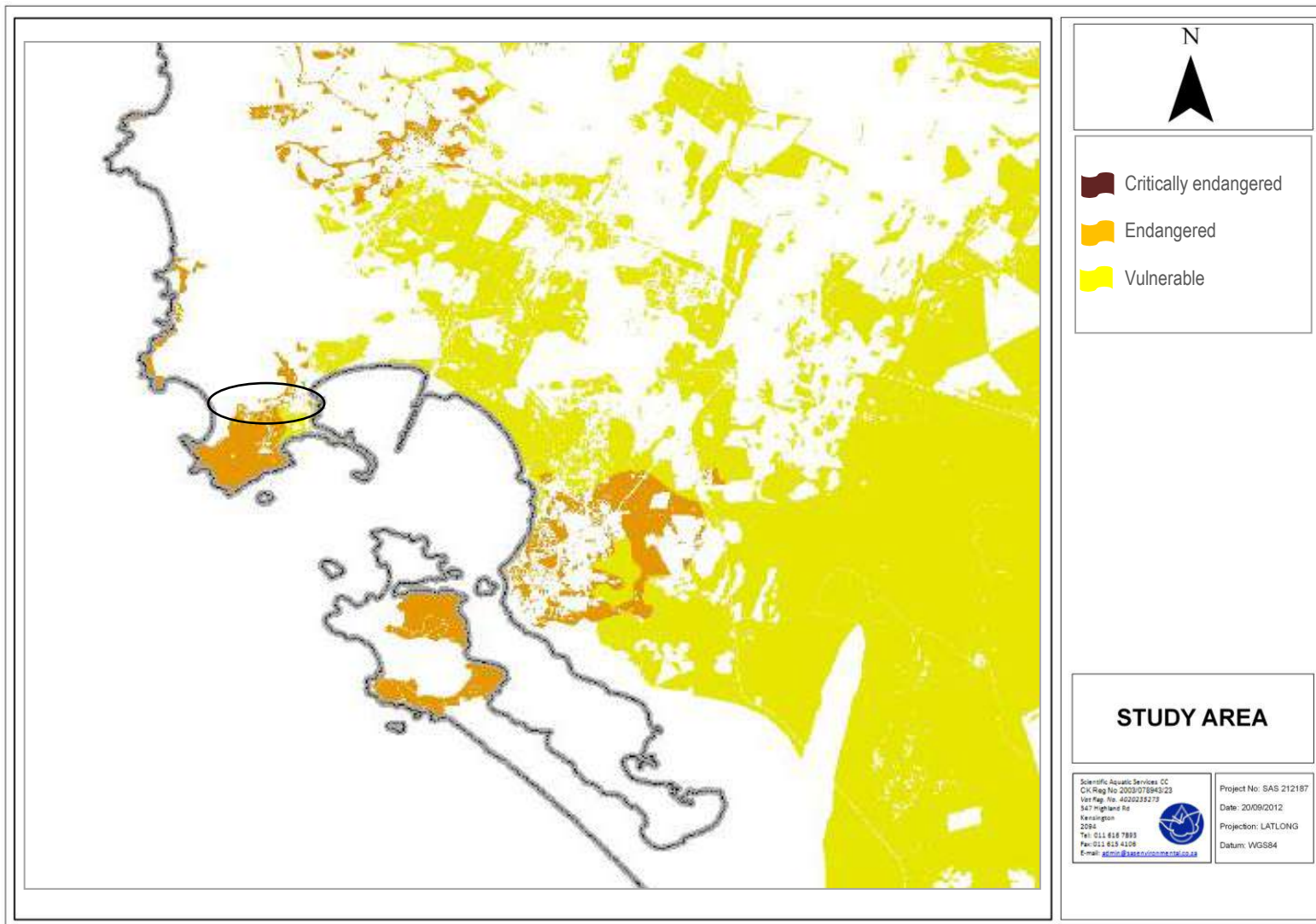


Figure 12: National List of Threatened Ecosystems; study area indicated with a black circle.



### **5.2.2 Vegetation Map of South Africa, Lesotho and Swaziland (2006)**

According to the Vegetation Map as provided by the BGIS database the proposed development route fall within four vegetation types namely the *Saldanha Flats Strandveld*, *Saldanha Granite Strandveld*, *Saldanha Limestone Strandveld* and *Langebaan Dune Strandveld*. All the vegetation types are listed as being either “endangered” or “vulnerable”.



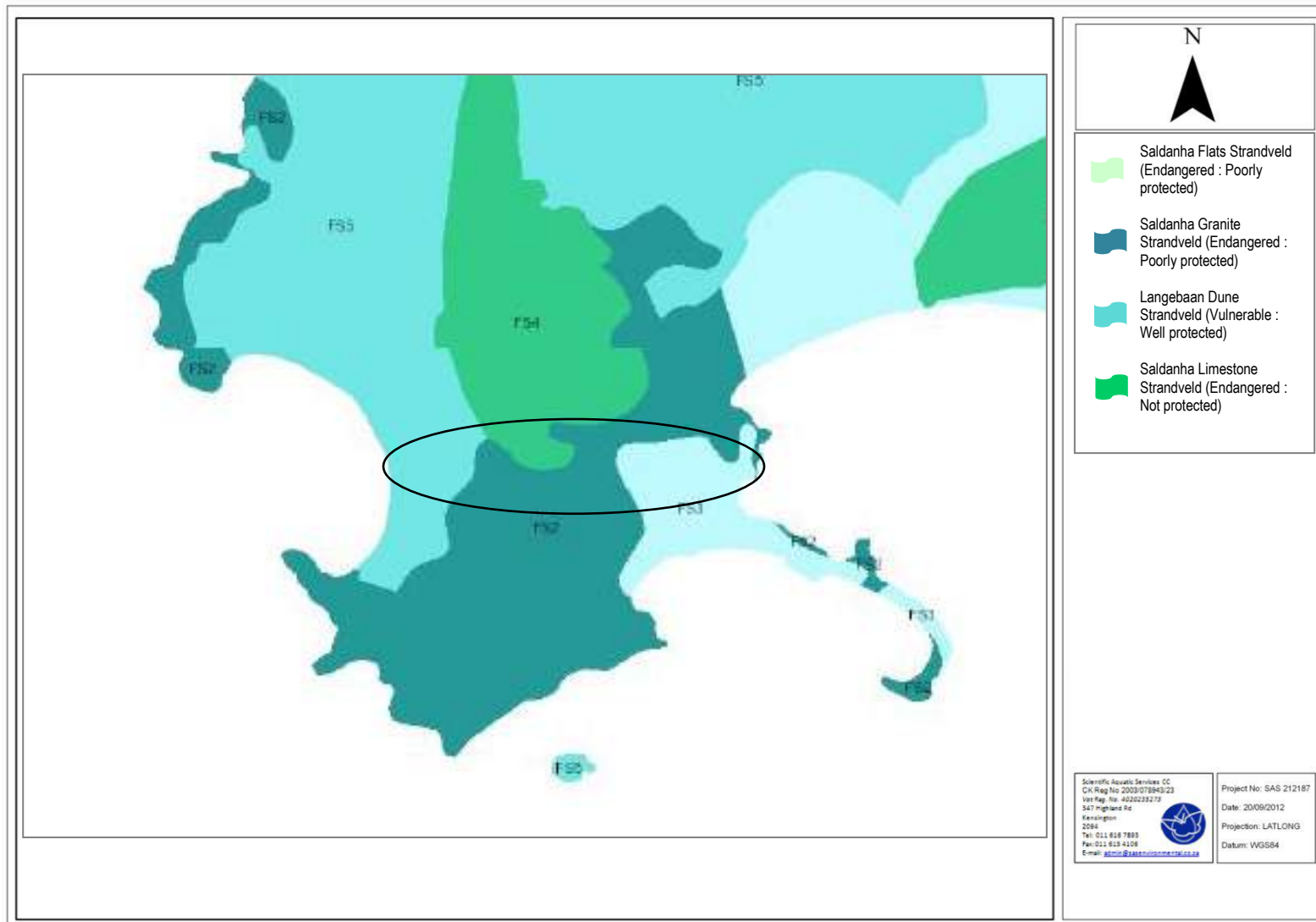


Figure 13: Vegetation Map of South Africa, Lesotho and Swaziland (2006); study area indicated with black circle.





### 5.2.3 Saldanha Bay Municipality Fine Scale Plans

Aspects of importance as indicated by the Saldanha Bay Municipality Fine Scale Plans are listed below and with reference to the figure that follows:

- The proposed development route does not cross any Aquatic Critical Biodiversity Area (CBAs).
- The proposed development route is adjacent to an “other ecological support area”. However, the support area is indicated where a wetland feature was delineated (see SAS Wetland Assessment Report, 2012) and it is deemed possible to reduce potential impact if mitigation measures as listed within the wetland assessment report, are followed.
- The proposed development route is also indicated to pass a “protected area” as well as Terrestrial Critical Biodiversity Area (CBA).

The proposed route for the wall is located near areas considered to be of higher ecological importance. It is therefore considered important, that if the project does prove feasible, all mitigation measures as listed be strictly adhered too.



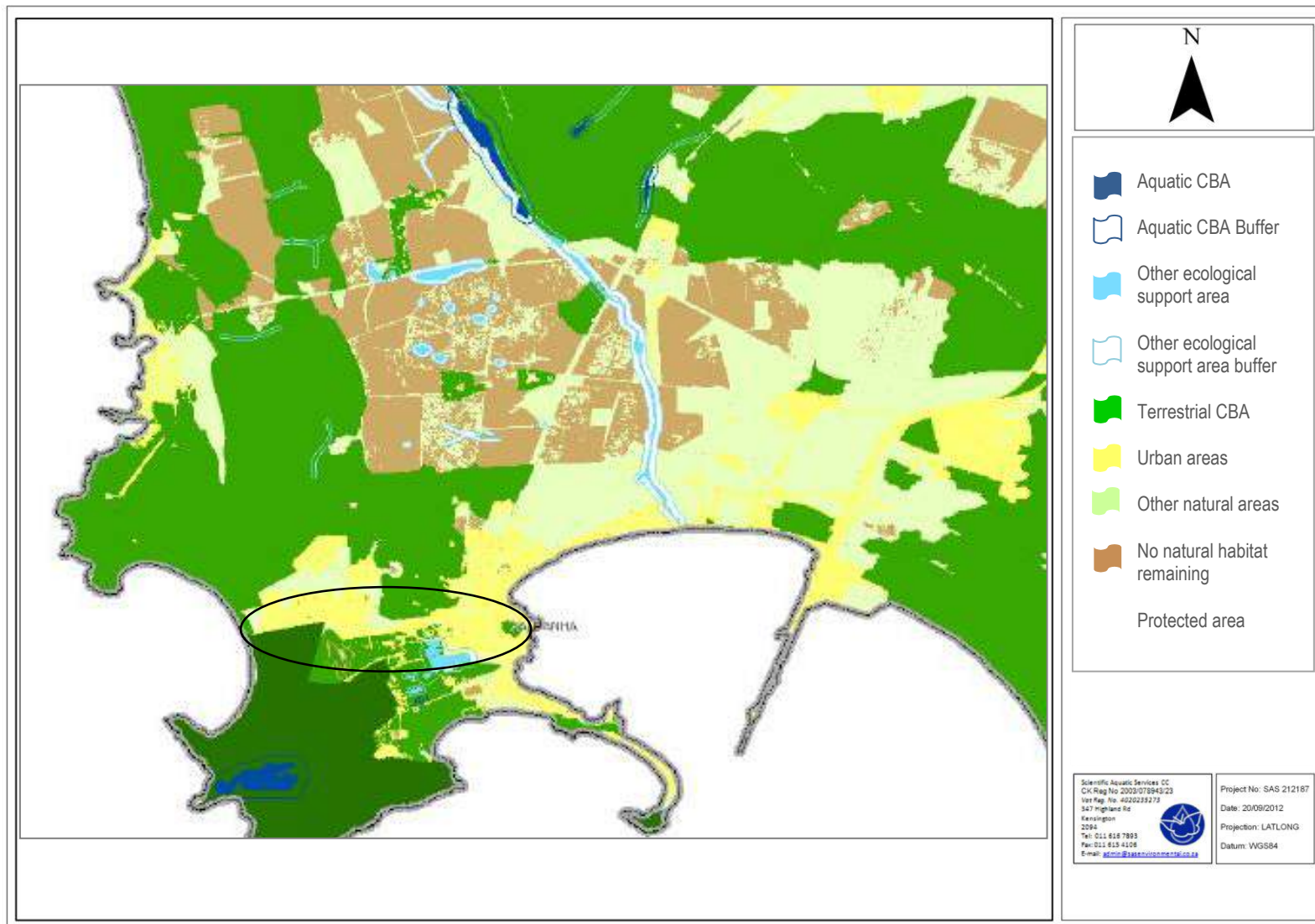


Figure 14: Saldanha Municipality Fine Scale Plans; study area indicated with a black circle.



## 6 RESULTS OF INVESTIGATION

### 6.1 *Surrounding Properties/Land Uses*

The proposed development route is bordered by urban infrastructure to the north which includes the residential developments and roads of Diazville. The area to the south of the proposed development route is the property of the Saldanha Bay Naval Base. This area is less transformed and includes naval base infrastructure and isolated gravel roads.

### 6.2 *Ecological condition and functioning*

At the time of the assessment, the study area could be subdivided into three habitat units, namely a transformed habitat unit, a wetland habitat unit and a strandveld habitat unit. The ecological condition and functioning of strandveld and wetland habitat units were considered significantly higher when compared to the transformed habitat unit. This was mainly a result of vegetation transformation due to disturbance caused by construction of gravel roads and urban development within transformed areas.

### 6.3 *Transformed habitat unit*



**Figure 15: Transformed vegetation located to the east of the proposed development route**

Activities such as the construction of gravel roads, the construction of naval base infrastructure and urban development have led to high levels of transformation in the area to the east of the proposed development route. Thus, almost no indigenous climax vegetation is left within these areas and the community structure can largely be considered transformed. Species dominating the transformed habitat unit include invasive grass species such as *Avena fatua*, *Lolium multiflorum*, *Hordeum murinum*

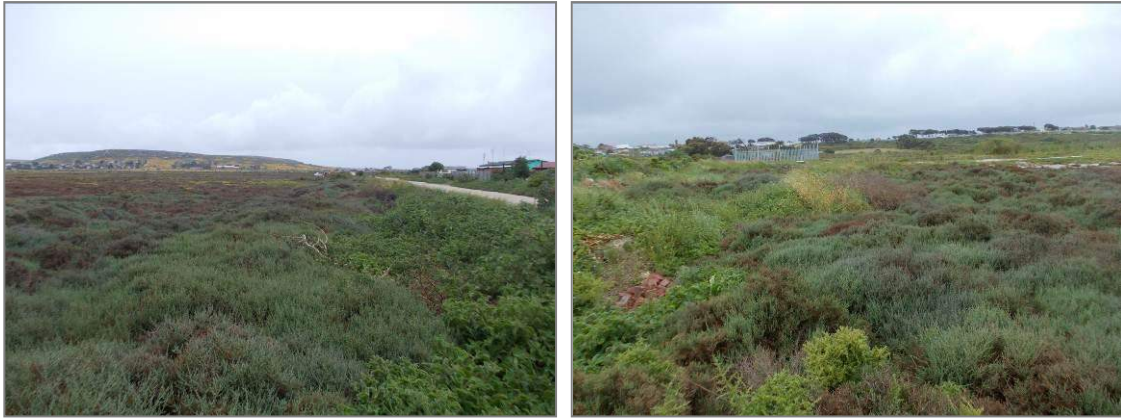
and *Bromus diandrus*. Annuals characteristic of previously disturbed areas such as *Dimorphotheca pluvialis*, *Arctotheca calendula*, *Osteospermum dentatum* and *Oncosiphon suffruticosum* were also found to occur in high numbers. No plant species of concern were encountered within this habitat unit, and it is highly unlikely that any such specimens will occur due to the lack of suitable habitat and high levels of transformation. The ecological functionality and habitat integrity of the transformed habitat unit is therefore regarded as being extremely limited. The high diversity of alien plant species and severe vegetation transformation adds to this habitat unit having a low ecological sensitivity and little conservation value from an ecological perspective.

**Table 6: Dominant species encountered in the Transformed Habitat Unit. Alien species are indicated with an asterisk.**

Grass/sedge/reed species	Forb species	Tree/Shrub Species
<i>Avena fatua</i> *	<i>Arctotheca calendula</i> *	<i>Acacia saligna</i> *
<i>Bromus diandrus</i> *	<i>Berkheya rigida</i> *	<i>Eucalyptus camaldulensis</i> *
<i>Hordium marinum</i> *	<i>Cotula turbinata</i> *	<i>Carissa bispinosa</i>
<i>Lolium multiflorum</i> *	<i>Cysticapnos vesicarius</i>	<i>Lavatera arborea</i> *
<i>Pennisetum clandestinum</i> *	<i>Dimorphotheca pluvialis</i>	<i>Lycium tetrandrum</i>
<i>Tribolium echinatum</i>	<i>Dischisma ciliatum</i>	<i>Myoporum tenuifolium</i> subsp.
	<i>Erodium moschatum</i> *	<i>montanum</i> *
	<i>Euphorbia helioscopia</i> *	<i>Searsia laevigata</i>
	<i>Exomis microphylla</i>	
	<i>Fumaria muralis</i> *	
	<i>Lobelia coronopifolia</i>	
	<i>Mesembryanthemum guerichianum</i>	
	<i>Oncosiphon suffruticosum</i>	
	<i>Ornithogalum cooperi</i>	
	<i>Osteospermum dentatum</i>	
	<i>Oxalis pes-capre</i> *	
	<i>Raphanus raphanistrum</i> *	
	<i>Rumex acetosella</i> subsp.	
	<i>angiocarpus</i> *	
	<i>Ruschia macowanii</i>	
	<i>Sonchus oleraceus</i> *	
	<i>Tetragonia fruticosa</i>	
	<i>Zantedeschia aethiopica</i>	



## 6.4 Wetland habitat unit



**Figure 16: Wetland habitat unit dominated by *Sarcocornia* sp. but with some invasive species present**

A large valley bottom wetland feature is located to the east of the proposed development route. A gravel road has been constructed through the valley bottom wetland and a pump system has been installed within the wetland feature in order to remove water from the feature and to prevent the flooding of the area. Edge effects of gravel road and pump construction have resulted in the disturbance of wetland vegetation within some areas and the encroachment of invasive species such as *Avena fatua*, *Bromus diandrus*, *Lolium multiflorum*, *Cotula turbinata* and *Lavatera arborea*. However, wetland species such as *Sarcocornia* sp. and *Juncus acutus* presently still dominate the wetland habitat unit. Furthermore, the unit may provide ecosystem services such as flood attenuation and sediment control which increase the ecological importance and sensitivity of this habitat unit. The wetland habitat unit therefore warrants conservation and impacts from the proposed development should be prevented or suitably mitigated.

At the time of the assessment it was difficult to determine the species of *Sarcocornia* found. However, two species of the genus *Sarcocornia* are listed for the 3317QDS and both species are considered least concern.

**Table 7: Dominant species encountered in the Wetland Habitat Unit. Alien species are indicated with an asterisk.**

Grass/sedge/reed species	Forb species	Tree/Shrub Species
<i>Avena fatua</i> *	<i>Cotula turbinata</i> *	<i>Lavatera arborea</i> *
<i>Bromus diandrus</i> *	<i>Mesembryanthemum</i>	<i>Lycium tetrandrum</i>
<i>Hordium marinum</i> *	<i>guerichianum</i>	<i>Myoporum tenuifolium</i> subsp.
<i>Lolium multiflorum</i> *	<i>Oncosiphon suffruticosum</i>	<i>montanum</i> *
<i>Pennisetum clandestinum</i> *	<i>Osteospermum dentatum</i>	
<i>Phragmites australis</i>	<i>Oxalis pes-capre</i> *	
<i>Tribolium echinatum</i>	<i>Zantedeschia aethiopica</i>	





## 6.5 Strandveld habitat unit



**Figure 17: Intact, indigenous vegetation occurring within the strandveld habitat unit**

The western portion of the proposed development route lies within more intact strandveld vegetation. The clearance of the road reserve to the north of the proposed development route has resulted in the encroachment of alien invasive species into this area, however, the vegetation to the south of the proposed development route is considered to be in a higher Present Ecological State. The strandveld habitat unit is characterised by the presence of indigenous shrub and succulent species such as *Searsia glauca*, *Othonna cylindrica*, *Salvia africana-lutea*, *Zygophyllum morgsana*, *Euphorbia burmannii*, *Chrysanthemoides monilifera*, *Ruschia macowannii* and *Lycium tetrandrum*. Diversity of forb and geophyte species are also considered high and include species such as *Felicia tenella*, *Lobelia coronopifolia*, *Nemesia affinis*, *Dischisma ciliatum*, *Morea flaccida* and *Ornithogalum cooperi*. Both *Babiana tubiflora* and *Felicia elongata* were found scattered throughout the strandveld habitat unit. *Babiana tubiflora* is listed in the IUCN Red Data Species list as 'Declining' and *Felicia elongata* is listed in the IUCN Red Data Species List as 'Vulnerable'. It is therefore recommended that the rescue and relocation of these species takes place if they are to be disturbed during the proposed development activities and that the process be overseen by a suitably qualified Environmental Control Officer.

Due to lower levels of disturbance in the area there is an increase in the ecological functionality and habitat integrity of the vegetation within the strandveld habitat unit. The high diversity of indigenous species, the presence of RDL species and the more intact nature of the vegetation add to this habitat unit having a higher ecological sensitivity and conservation value from an ecological perspective.

**Table 8: Dominant species encountered in the Strandveld Habitat Unit. Alien species are indicated with an asterisk.**

Grass/sedge/reed species	Forb species	Tree/Shrub Species
<i>Avena fatua</i> *	<i>Babiana tubiflora</i>	<i>Agathosma imbricata</i>
<i>Bromus diandrus</i> *	<i>Cotula turbinata</i>	<i>Asparagus capensis</i>
<i>Ehrharta calycena</i>	<i>Crassula capitella</i>	<i>Asparagus rubicunus</i>
<i>Hordium marinum</i> *	<i>Cysticapnos vesicarius</i>	<i>Asparagus lignosus</i>
<i>Lolium multiflorum</i> *	<i>Dischisma ciliatum</i>	<i>Asparagus aethiopicus</i>
<i>Tribolium echinatum</i>	<i>Drosanthemum floribundum</i>	<i>Ballota Africana</i>
	<i>Felicia elongata</i>	<i>Carpobrotus edulis</i>
	<i>Felicia tenella</i>	<i>Carpobrotus quadrifidus</i>
	<i>Hemimeris sabulosa</i>	<i>Chrysanthemoides monilifera</i>
	<i>Lobelia coronopifolia</i>	<i>Euphorbia caput-medusae</i>
	<i>Mesembryanthemum guerichianum</i>	<i>Euphorbia burmannii</i>
	<i>Moraea flaccida</i>	<i>Euphorbia mauritanica</i>
	<i>Nemesia affinis</i>	<i>Exomis microphylla</i>
	<i>Ornithogalum cooperi</i>	<i>Foeniculum vulgare</i>
	<i>Ornithogalum flaccidum</i>	<i>Helichrysum revolutum</i>
	<i>Osteospermum dentatum</i>	<i>Lampranthus sp.</i>
	<i>Oxalis pes-capre</i>	<i>Lycium tetrandrum</i>
	<i>Rumex lativalvis</i>	<i>Othonna cylindrical</i>
	<i>Sebaea exacoides</i>	<i>Pelargonium fulgidum</i>
	<i>Senecio arenarius</i>	<i>Pteronia divaricate</i>
	<i>Senecio burchellii</i>	<i>Putterlickia pyracantha</i>
		<i>Rushia macowanii</i>
		<i>Rushia sp.</i>
		<i>Salvia africana-lutea</i>
		<i>Senecio aloides</i>
		<i>Septulina glauca</i>
		<i>Searsia glauca</i>
		<i>Searsia laevigata</i>
		<i>Tetragonia fruticosa</i>
		<i>Thesium capitatum</i>
		<i>Zygophyllum morgsana</i>







Figure 18: Areas assessed along the proposed development route.



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## 7 FLORAL ASSESSMENT

### 7.1 *Vegetation Index Score*

The information gathered during the assessment of the proposed development route was used to determine the Vegetation Index Score (VIS) - see appendix B. The proposed development route consisted of three habitat units and therefore the three units were assessed separately. The transformed habitat unit calculated a very low score of -1.8 (Class F – modified completely). The low score was mainly as a result of edge effects caused by vegetation clearing for urban development and the construction of gravel roads. The wetland habitat unit calculated a moderate score of 16.2 (Class C – moderately modified). Edge effects of gravel road construction have resulted in the encroachment of invasive species into the wetland habitat unit. However, the unit is still dominated by the wetland species *Sarcocornia* sp. The strandveld habitat unit calculated a high score of 19 (Class B – largely natural with few modifications). The high score is a result of a decrease in invasive species encroachment in the area and an increase in abundance and diversity of indigenous floral species. All scores are considered representative of the Present Ecological State of each of the habitat units assessed. To prevent any additional impact on wetland features as well as the strandveld habitat unit, it is recommended that all mitigation measures as listed be strictly adhered to. By so doing the majority remnants of natural vegetation will be safeguarded by reducing the extent of the impacts. It should be noted that the VIS score calculated is solely aimed at determining the degree of vegetation transformation, a detailed wetland assessment was done during the SAS Wetland Assessment (2012).

### 7.2 *Floral Community Assessment*

A floral community assessment was done in order to determine the percentage composition of indigenous vegetation within each habitat unit. This was done by comparing the floral species identified during each floral community assessment with vegetation expected to be found in the *Saldanha Flats Strandveld*, *Saldanha Granite Strandveld*, *Saldanha Limestone Strandveld* and *Langebaan Dune Strandveld*. It should however be noted that due to the close proximity of the four vegetation types to each other it is considered highly likely that floral species won't necessarily be restricted to specific areas except where species are habitat specialists such as *Sarcocornia* sp. and *Juncus acutus* known only to occur in wetlands. Therefore species identified were compared to all species listed for the vegetation types and



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not only to the vegetation type applicable to the specific area where the floral community assessment was undertaken. The locations of the community assessments are depicted in the figure below and results are illustrated in the pie charts that follow.



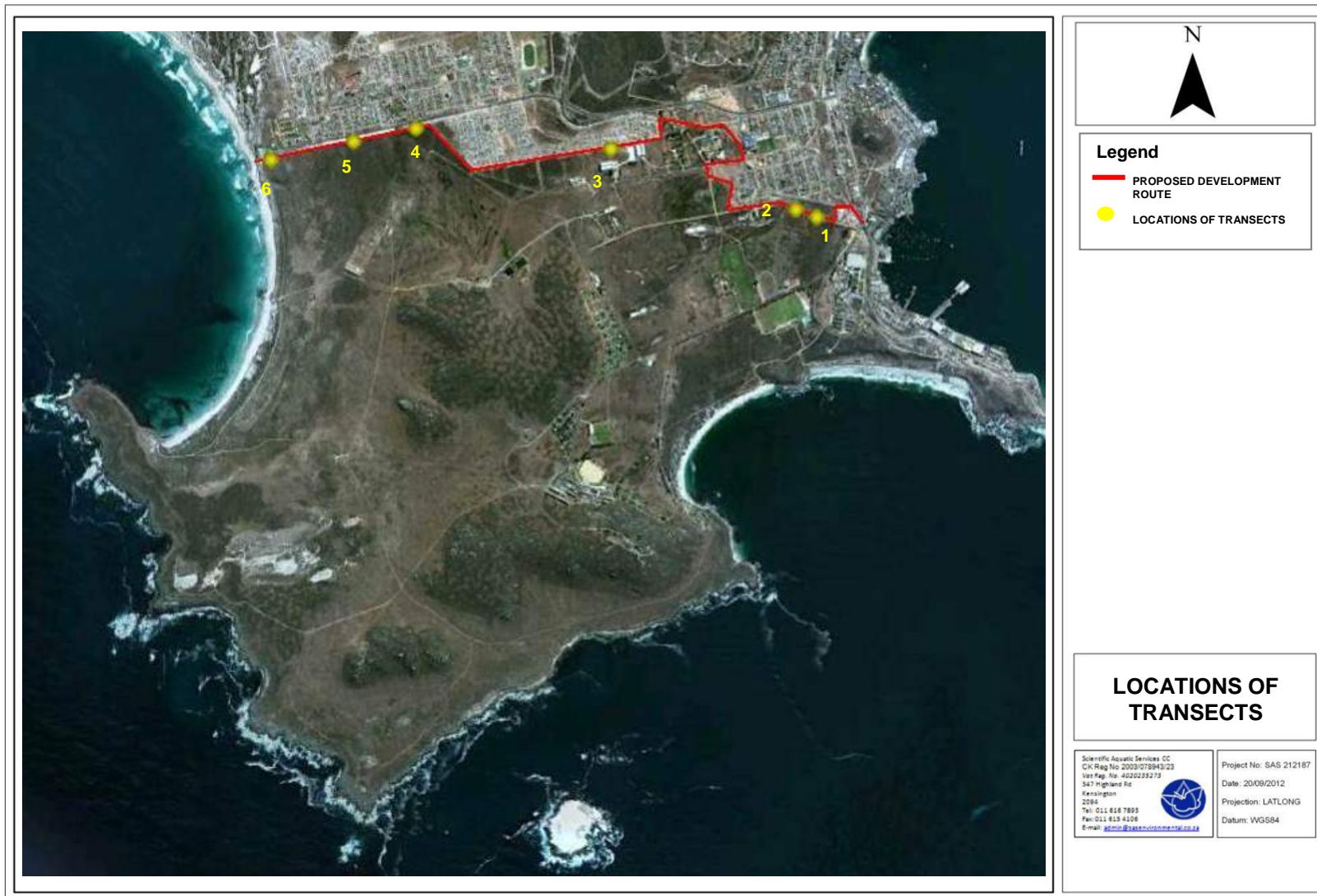
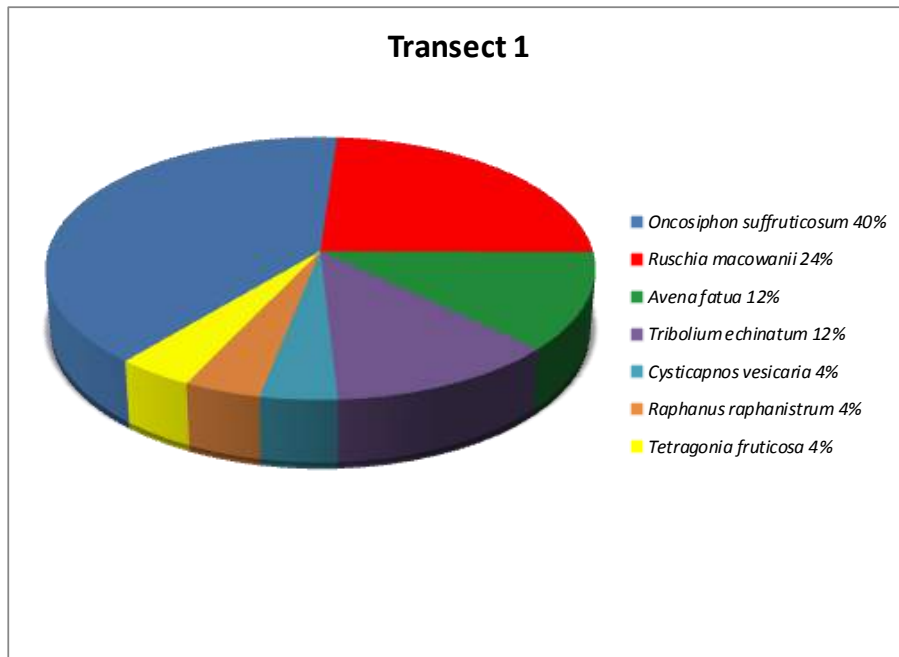


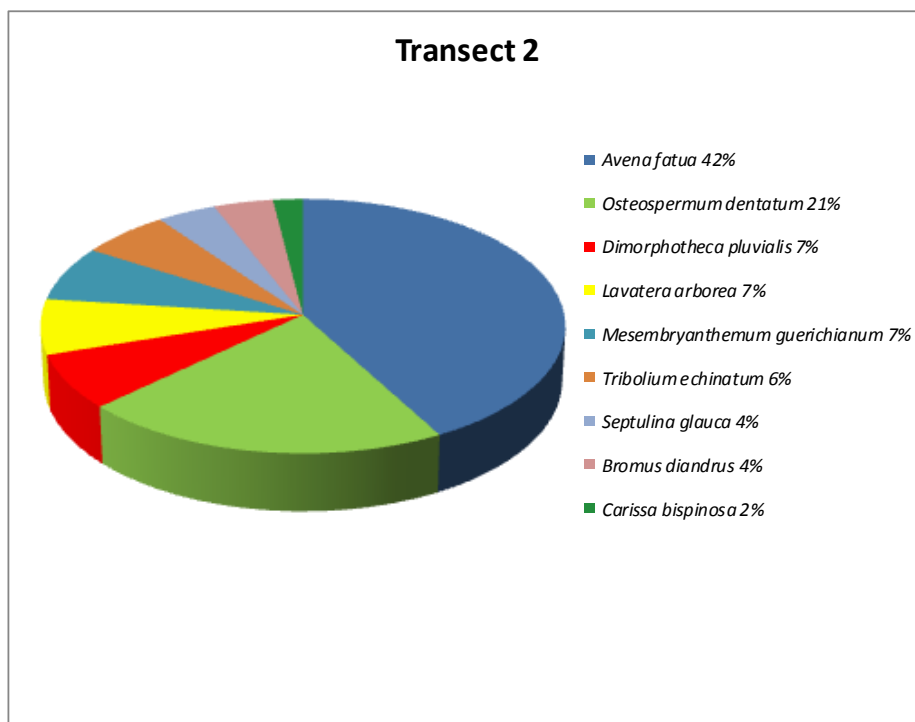
Figure 19: Locations of areas where floral community assessments were undertaken.





**Figure 20: Transformed habitat unit transect 1.**

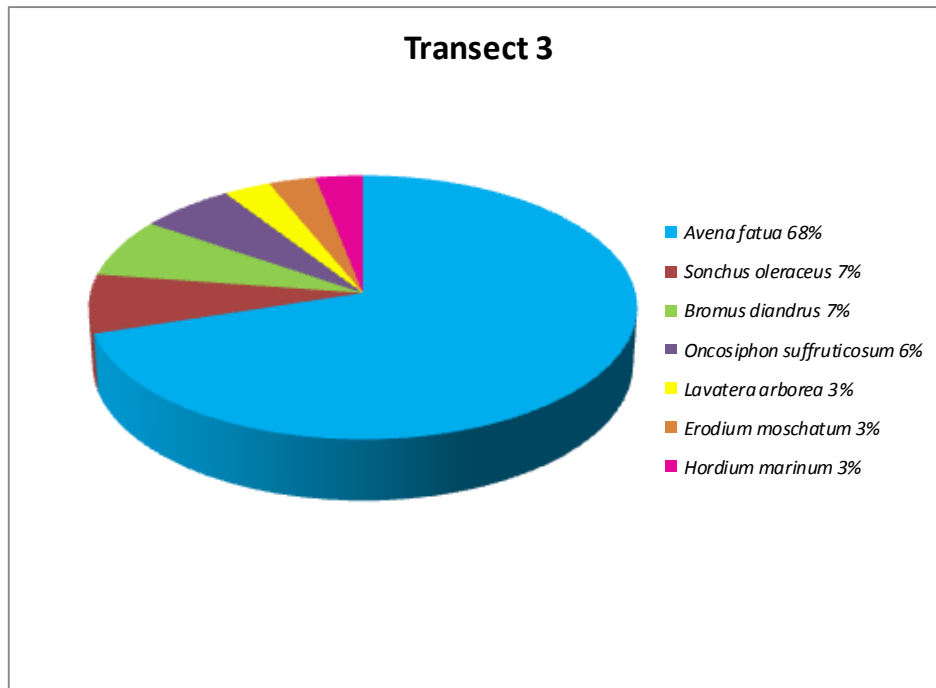
Transect 1 (transformed habitat unit) was dominated by *Oncosiphon suffruticosum*. Although *O. suffruticosum* is indicated as a species commonly occurring in the vegetation types of the area, its dominance of the vegetation is an indication of disturbance. The presence of the alien invasive species *Avena fatua* and *Raphanus raphanistrum* along the transect line is a further indication of the disturbed nature of the site.



**Figure 21: Transformed habitat unit transect 2.**



Transect 2 (transformed habitat unit) was dominated by the alien invasive grass species *Avena fatua* (42%) as well as the herb *Osteospermum dentatum* (21%). *O. dentatum* is a species indigenous to the area, however, the dominance of *A. fatua* and *O. dentatum* along the transect line, as well as the presence of other invasive species including *Lavatera arborea* and *Bromus diandrus* is an indication of the vegetation transformation within the area where transect 2 were conducted.

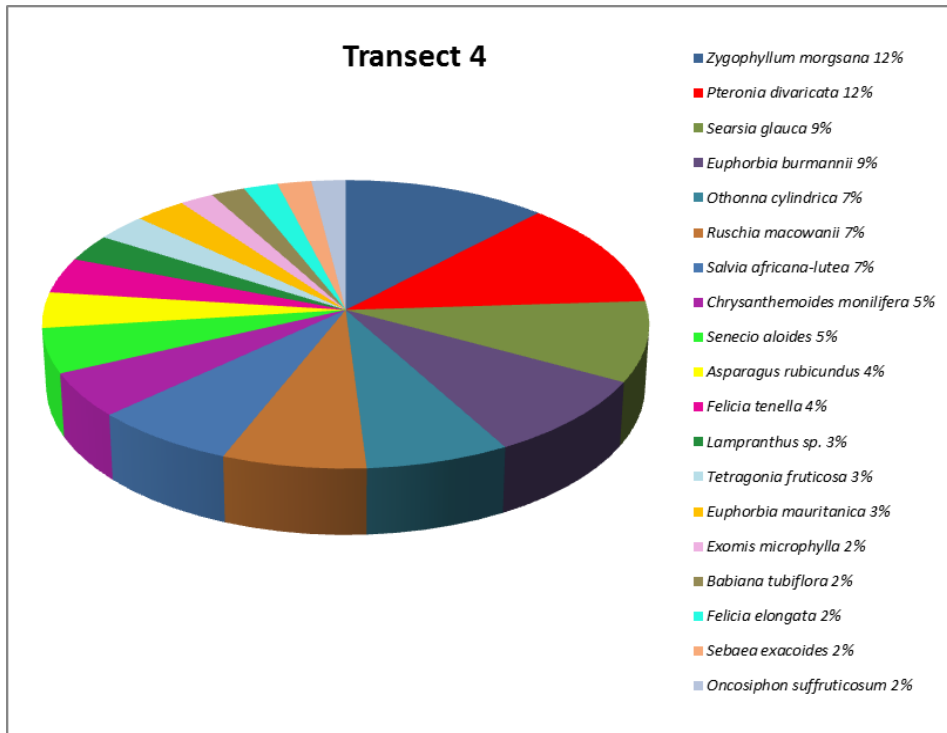


**Figure 22: Transformed habitat unit transect 3.**

Transect 3 (transformed habitat unit) was characterised by the dominance of the invasive grass species *Avena fatua* (68%). All other species identified along the transect line, excluding *Oncosiphon suffruticosum*, are invasive species which are characteristic of disturbed areas.





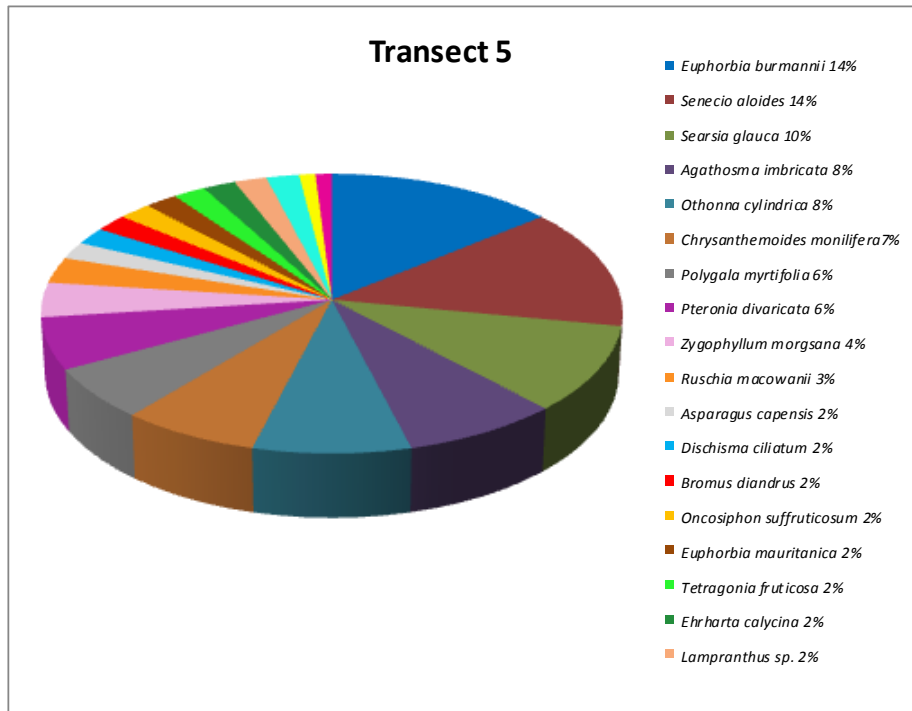


**Figure 23: Strandveld habitat unit transect 4.**

An increase in species diversity was noted throughout the strandveld habitat unit. Transect 4 (strandveld habitat unit) was dominated by *Zygodphyllum morgsana*, *Pteronia divaricata*, *Searsia glauca* and *Euphorbia burmannii*. All four species are indigenous to the area and are listed as indicators of the vegetation types of the area. Other species listed as indicators within the vegetation types include: *Othonna cylindrical*, *Ruschia macowanii*, *Salvia africana-lutea*, *Chrysanthemoides monilifera*, *Tetragonia fruticosa*, *Euphorbia mauritanica*, *Exomis microphylla* and *Babiana tubiflora*. Although remaining species are not indicated as important within the vegetation types, they are listed for the quarter degree square and so are considered indigenous to the area.



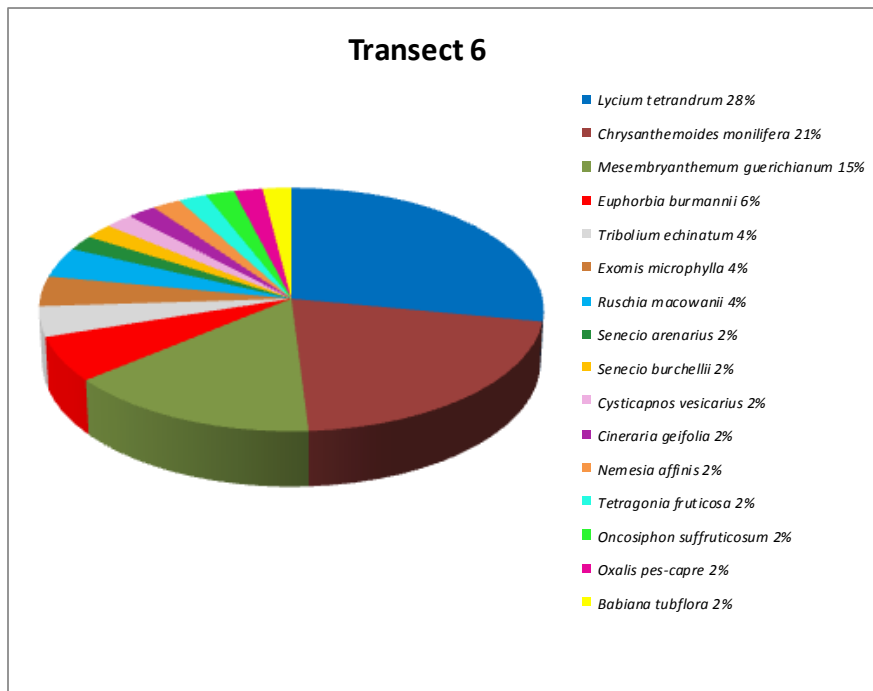




**Figure 24: Strandveld habitat unit transect 5.**

Transect 5 (strandveld habitat unit) was dominated by *Euphorbia burmannii*, *Senecio aloides*, *Searsia glauca*, *Agathosma imbricata* and *Othonna cylindrica*. *Euphorbia burmannii*, *Searsia glauca* and *Othonna cylindrica* are listed as indicator species for the vegetation types of the area. Although *Agathosma cylindrica* is not indicated as an indicator for the vegetation types, it is listed for the quarter degree square and so is considered indigenous to the area. Of the remaining species, *Chrysanthemoides monilifera*, *Polygala myrtifolia*, *Pteronia divaricata*, *Zygophyllum margsana*, *Ruschia macowanii*, *Oncosiphon suffruticosum*, *Euphorbia mauritanica*, *Tetragonia fruticosa* and *Ehrharta calycina* are listed as indicator species within the vegetation types. The diversity and abundance of floral species within the area where the assessment took place is an indicator of less vegetation transformation and a higher overall Present Ecological State.





**Figure 25: Strandveld habitat unit transect 6.**

Transect 6 (strandveld habitat unit) was dominated by *Lycium tetrandrum*, *Chrysanthemoides monilifera* and *Mesembryanthemum guerichianum*. All three species are indigenous to the area and are listed as indicators for the vegetation types of the area. Other species listed as indicators within the vegetation types include: *Euphorbia burmannii*, *Tribolium echinatum*, *Exomis microphylla*, *Ruschia macowanii*, *Senecio arenarius*, *Tetragonia fruticosa*, *Oncosiphon suffruticosum* and *Babiana tubiflora*. Floral diversity remains high and therefore the western portion of the proposed transmission line route can still be considered in a high Present Ecological State.

If the results obtained from the floral community assessments are considered the increase in indigenous vegetation within the strandveld habitat unit is evident, with a significant increase in alien and invasive floral species towards the east.

### **7.3 RDL Floral Status Assessments**

An assessment considering the presence of any RDL plant species, as well as suitable habitat to support any such species, was undertaken. The complete PRECIS (Pretoria Computer Information Systems) red data plant list for the grid references (3317BB) was obtained from SANBI (South African National Biodiversity Institute) and habitat descriptions were sourced from Raimondo *et al.* 2009. All floral species



as listed within the Western Cape Nature Conservation Laws Amendment Act, 2000, Schedule 3 and Schedule 4 are listed within Appendix A.

**Table 9: IUCN Red Data List Categories – Version 3.1 as supplied by SANBI**

Category	Definition
EX	Extinct
EW	Extinct in the wild
CR	Critically endangered
EN	Endangered
VU	Vulnerable
NT	Near threatened
LC	Least concern
DD	Data deficient
NE	Not evaluated

**Table 10: PRECIS RDL plant list for the QDS 3317BB (Raimondo *et al.*, 2009; SANBI, [www.sanbi.org](http://www.sanbi.org)).**

Family	Species	Threat status	Growth forms
AMARYLLIDACEAE	<i>Gethyllis ciliaris</i> (Thunb.) Thunb. <i>subsp. ciliaris</i>	NT	Geophyte
ASTERACEAE	<i>Cotula duckittiae</i> (L.Bolus) K.Bremer & Humphries	VU	Herb
ASTERACEAE	<i>Felicia elongata</i> (Thunb.) O.Hoffm. <i>Helichrysum tricostatum</i> (Thunb.) Less.	VU	Herb, shrub
ASTERACEAE	<i>Less.</i>	NT	Shrub
ASTERACEAE	<i>Steirodiscus tagetes</i> (L.) Schltr.	VU	Herb
CYTINACEAE	<i>Cytinus capensis</i> Marloth	CR PE	Herb, parasite, succulent
FABACEAE	<i>Argyrolobium velutinum</i> Eckl. & Zeyh.	EN	Dwarf shrub
FABACEAE	<i>Indigofera psoraloides</i> (L.) L. <i>Podalyria sericea</i> (Andrews) R.Br. ex Aiton f.	VU	Herb
FABACEAE	<i>Psoralea repens</i> L.	NT	Shrub
FABACEAE	<i>Psoralea repens</i> L. <i>Daubenya zeyheri</i> (Kunth)	NT	Dwarf shrub
HYACINTHACEAE	<i>J.C.Manning &amp; A.M.van der Merwe</i>	EN	Geophyte
HYACINTHACEAE	<i>Lachenalia longibracteata</i> E.Phillips	Declining	Geophyte
HYACINTHACEAE	<i>Lachenalia pustulata</i> Jacq.	NT	Geophyte
HYACINTHACEAE	<i>Lachenalia viridiflora</i> W.F.Barker <i>Empodium veratrifolium</i> (Willd.) M.F.Thomps.	CR	Geophyte
HYPOXIDACEAE	<i>M.F.Thomps.</i> <i>Babiana nana</i> (Andrews) Spreng.	EN	Geophyte
IRIDACEAE	<i>subsp. nana</i>	EN	[No lifeform defined]
IRIDACEAE	<i>Babiana tubiflora</i> (L.f.) Ker Gawl.	Declining	Geophyte, herb
IRIDACEAE	<i>Babiana tubulosa</i> (Burm.f.) Ker Gawl. <i>Gladiolus caeruleus</i> Goldblatt & J.C.Manning	VU	[No lifeform defined]
IRIDACEAE	<i>J.C.Manning</i>	NT	Geophyte, herb



Family	Species	Threat status	Growth forms
IRIDACEAE	<i>Hesperanthes erecta</i> (Baker) Benth. ex Baker	NT	Geophyte, herb
IRIDACEAE	<i>Ixia purpureo rosea</i> G.J.Lewis	EN	Geophyte, herb
IRIDACEAE	<i>Moraea calcicola</i> Goldblatt	EN	Geophyte, herb
IRIDACEAE	<i>Romulea saldanhensis</i> M.P.de Vos	EN	Geophyte, herb
IRIDACEAE	<i>Watsonia hysterontha</i> J.W.Mathews & L.Bolus	NT	Geophyte, herb
MALVACEAE	<i>Hermannia procumbens</i> Cav. subsp. <i>myrrhifolia</i> (Thunb.) De Winter	EN	Herb
MESEMBRYANTHEMACEAE	<i>Antimima limbata</i> (N.E.Br.) H.E.K.Hartmann	EN	Succulent
MESEMBRYANTHEMACEAE	<i>Cephalophyllum rostellum</i> (L.Bolus) H.E.K.Hartmann	EN	Succulent
MESEMBRYANTHEMACEAE	<i>Cheiridopsis rostrata</i> (L.) N.E.Br.	VU	Succulent
MESEMBRYANTHEMACEAE	<i>Drosanthemum hispidifolium</i> (Haw.) Schwantes	VU	Succulent
MESEMBRYANTHEMACEAE	<i>Lampranthus amoenus</i> (Salm-Dyck ex DC.) N.E.Br.	EN	Succulent Shrub,
MESEMBRYANTHEMACEAE	<i>Ruschia geminiflora</i> (Haw.) Schwantes	VU	succulent
PLUMBAGINACEAE	<i>Limonium acuminatum</i> L.Bolus	VU	Dwarf shrub Dwarf shrub,
POLYGALACEAE	<i>Muraltia macropetala</i> Harv.	VU	shrub
PROTEACEAE	<i>Leucadendron thymifolium</i> (Salisb. ex Knight) I.Williams	CR	Shrub
RHAMNACEAE	<i>Phyllica greyii</i> Pillans	EN	Dwarf shrub
RUBIACEAE	<i>Nenax hirta</i> (Cruse) T.M.Salter subsp. <i>calciphila</i> Puff	NT	Shrub
RUTACEAE	<i>Diosma guthriei</i> P.E.Glover	VU	Dwarf shrub
RUTACEAE	<i>Diosma haelkraalensis</i> I.Williams	EN	Dwarf shrub
SCROPHULARIACEAE	<i>Phyllopodium capillare</i> (L.f.) Hilliard	NT	Herb
SCROPHULARIACEAE	<i>Zaluzianskya parviflora</i> Hilliard	NT	Herb

**Table 11: Number of species of concern listed for the QDS**

QDS	RDL Category
3317BB	Near threatened - 11 Vulnerable - 11 Endangered - 13 Declining - 2 Critically endangered - 3

Limited information regarding red data species habitat was available, however, from the more intact nature of the vegetation within the strandveld habitat unit and from the presence of two red data list species, *Babiana tubiflora* and *Felicia elongata*, it can be deduced that the habitat requirements of further red data species are likely to be met in these areas. Therefore, the presence of further red data species within the strandveld habitat unit should be anticipated.



The species identified during the assessment were compared to the species listed within the Western Cape Nature Conservation Laws Amendment Act, 2000, Schedule 3 & 4: Endangered Flora (refer to appendix a). Representatives of three families considered of concern were identified namely IRIDACEAE (*Babiana tubiflora*, *Moraea flaccida*); MESEMBRYANTHEMACEAE (*Drosanthemum floribundum*, *Mesembryanthemum guerichianum*, *Carpobrotus edulis*, *Carpobrotus quadrifidus*, *Lampranthus sp.*, *Rushia macowanii*, *Rushia sp.*) and RUTACEAE (*Agathosma imbricata*).

As a result it is deemed important that the proposed construction footprint be kept as small as possible and all mitigation measures listed strictly adhered to. It should be noted that although the strandveld habitat unit is considered of higher ecological importance the proposed wall development is highly likely to decrease the possibility of future impacts on sensitive floral communities within the Naval Base property with special mention of edge effects as well as collection.

#### **7.4 Exotic and Invader Species**

Alien invaders are plants that are of exotic origin and are invading previously pristine areas or ecological niches (Bromilow, 2001). Not all weeds are exotic in origin, but as these exotic plant species have very limited natural “check” mechanisms within the natural environment, they are often the most opportunistic and aggressively-growing species within the ecosystem. Therefore, they are often the most dominant and noticeable within an area. Disturbances of the ground through trampling, excavations or landscaping often leads to the dominance of exotic pioneer species that rapidly dominate the area. Under natural conditions, these pioneer species are overtaken by sub-climax and climax species through natural veld succession. This process, however, takes many years to occur, with the natural vegetation never reaching the balanced, pristine species composition prior to the disturbance. There are many species of indigenous pioneer plants, but very few indigenous species can out-compete their more aggressively-growing exotic counterparts.

Alien vegetation invasion causes degradation of the ecological integrity of an area, causing (Bromilow, 2001):

- a decline in species diversity;
- local extinction of indigenous species;
- ecological imbalance;



- decreased productivity of grazing pastures; and
- increased agricultural input costs.

Floral species listed by Mucina and Rutherford (2006) as potential invaders in the *Saldanha Flats Strandveld*, *Saldanha Granite Strandveld*, *Saldanha Limestone Strandveld* and the *Langebaan Dune Strandveld* include *Acacia saligna*, *A. cyclops*, *A. baileyana* as well as *Bromus diandrus* and *Medicago hispida*. Of these invasive species listed *Acacia saligna*, *Avena fatua* and *Bromus diandrus* were identified along the proposed development route. *Avena fatua* and *Bromus diandrus* were found throughout the development route with special mention of transformed areas and disturbed roadsides. The number and abundance of alien and invasive species found within the transformed habitat unit is considered an indication of the significant vegetation transformation that has resulted due to urban development and gravel road construction.

Listed below are the weeds and aliens identified within the study area (Bromilow, 2010). It is deemed highly likely that with the earth moving activities that would take place during the construction of the proposed wall and patrol road, these alien and invasive species would proliferate and further encroach into areas presently still providing habitat for species expected to occur within the *Saldanha Flats Strandveld*, *Saldanha Granite Strandveld*, *Saldanha Limestone Strandveld* and the *Langebaan Dune Strandveld*. It is therefore recommended that species listed in the table below, be eradicated along the proposed development route, with special attention paid to recommendations provided for alien vegetation control within the impact assessment.

**Table 12: Dominant exotic vegetation species identified during the general area assessment.**

Species	Common name	Type or Origin	Present Category*	Recommended Category**
<b>Forbs</b>				
<i>Ricinus communis</i> var <i>communis</i>	Caster oil plant	Native to Africa	N/A	N/A
<i>Arctotheca calendula</i>	Cape marigold	Weed	N/A	N/A
<i>Berkheya rigida</i>	Disseldoring	Weed	N/A	N/A
<i>Fumaria muralis</i>	Fumitory	Native to Europe	N/A	N/A
<i>Foeniculum vulgare</i>	Wild fennel	Native to Europe	N/A	N/A
<i>Erodium moschatum</i>	Musk heron's bill	Native to Europe	N/A	N/A
<i>Rumex acetosella</i> subsp. <i>angiocarpus</i>	Sheep sorrel	Native to Europe	N/A	N/A
<i>Cotula turbinata</i>	Goose daisy	Native to Australia	N/A	N/A
<i>Oxalis pes-caprae</i>	Yellow sorrel	Weed	N/A	N/A



Species	Common name	Type or Origin	Present Category*	Recommended Category**
<i>Raphanus raphanistrum</i>	Wild radish	Native to Europe	N/A	N/A
<i>Euphorbia helioscopia</i>	Umbrella milkweed	Native to Europe	N/A	N/A
<i>Sonchus oleraceus</i>	Sowthistle	Native to Europe	N/A	N/A
Trees				
<i>Eucalyptus camaldulensis</i>	Red river gum	Native to Australia	2	1b/2
<i>Acacia saligna</i>	Port Jackson willow	Native to Australia	2	N/A
<i>Lavatera arborea</i>	Tree mallow	Native to Europe	N/A	N/A
<i>Myoporum tenuifolium subsp. montanum</i>	Manitoka	Native to Australia	3	N/A
Grass				
<i>Avena fatua</i>	Common wild oats	Native to Europe	N/A	N/A
<i>Pennisetum clandestinum</i>	Kikuyu	Native to East-Africa	X2	N/A
<i>Lolium multiflorum</i>	Italian ryegrass	Native to Europe	X2	N/A
<i>Hordeum murinum subsp. murinum</i>	Wild barley	Native to Europe	N/A	N/A
<i>Cynodon dactylon</i>	Couch grass	Native to Europe	X2	N/A
<i>Bromus diandrus</i>	Ripgut brome	Native to the Medditeranean	N/A	N/A

\*Present Category

Recommended Present Category indicated with X

**Category 1** – Declared weeds. Prohibited plants, which must be controlled or eradicated.

**Category 2** – Declared invader plants with a value. "Invaders" with certain useful qualities (i.e. commercial). Only allowed in controlled, demarcated areas.

**Category 3** – Mostly ornamental plants. Alien plants presently growing in, or having escaped from, areas such as gardens, but are proven invaders. No further planting or trade in propagative material is allowed.

\*\*Recommended Category

**Category 1a** – Species considered of high priority that is spreading quickly and the need for control is considered important.

**Category 1b** – Common invaders.

**Category 2** – Invader species controlled within certain areas. Propagation allowed within allocated areas however a permit application is necessary.

**Category 3** - Mostly ornamental plants. Alien plants presently growing in, or having escaped from, areas such as gardens, but are proven invaders. No further planting or trade in propagative material is allowed (Bromilow, 2001)

## 7.5 Medicinal plants

The majority of the medicinal plant species are located throughout the study area and are not restricted to specific habitats. The table below presents a list of plant species with traditional medicinal value, plant parts traditionally used and their main applications, which were identified during the field assessment. All species considered of medicinal importance are regarded as common and widespread species. The proposed development will therefore have no significant impact on medicinal plant populations

**Table 13: Traditional medicinal plants identified during the field assessment. Medicinal applications and application methods are also presented (van Wyk, Oudtshoorn, Gericke, 2009; Nzue, A.P.M.M, 2009).**





Species	Name	Plant parts used	Medicinal uses
<i>Asparagus aethiopicus</i>	Wild asparagus	Rhizomes and fleshy roots	Asparagus species are traditionally used in southern Africa as a treatment for tuberculosis, kidney ailments and rheumatism.
<i>Carpobrotus edulis</i>	Sour fig	Leaf juice or leaf pulp	Leaf juice is gargled to treat infections of the mouth and throat. Taken orally for dysentery, digestive troubles, tuberculosis and as a diuretic and styptic. Juice is applied to treat eczema, wounds and burns and is said to be effective against tooth ache, earache and oral and vaginal thrush.
<i>Foeniculum vulgare</i>	Wild fennel	Small dry fruits	Treats flatulence and reduces griping effects of laxatives. Syrup made from the juice has been used for chronic coughs. Numerous uses have been recorded for the Western Cape, mainly for the treatment of poor appetite and indigestion.
<i>Oncosiphon suffruticosum</i>	Stinkruid	The whole plant	Part of the Khoi San healing tradition. Infusions taken orally as digestive tonics and to treat stomach pains, colds and influenza, intestinal worms, infantile convulsions, typhoid fever, rheumatic fever, asthma and pneumonia. A poultice of the leaves is applied to treat scorpion stings and inflammation.
<i>Ricinus communis</i>	Caster oil plant	The oil, which is extracted from the seeds, leaves and roots.	Castor oil is a well-known purgative medicine, commonly referred to in South Africa as "blue bottle" because of the characteristic blue bottle in which it was traditionally packed and sold. Leaf infusions, administered orally or as enemas, are used for stomach ache. Root and leaf poultices are widely applied to wounds, sores and boils.
<i>Salvia africana-lutea</i>	Young stems and leaves	Beach salvia	Decoctions are used in the Cape to treat coughs, colds, chest troubles, convulsions, stomach pain flatulence, colic, women's ailments and diarrhoea.
<i>Zantedeschia aethiopica</i>	Arum lily	Leaves	Leaves have been widely used in South Africa to treat wounds, sores and boils. It was also applied to parts affected by rheumatism and gout. Boiled rhizomes were sometimes mixed with honey or syrup and taken for bronchitis, asthma, heartburn and rheumatism or gargled for a sore throat. Pounded rhizome used as a poultice, is an old Cape treatment for inflamed wounds.

## 8 SENSITIVITY MAPPING

After the assessment it is evident that floral species considered to be indicative of the vegetation types were restricted to the strandveld and wetland habitat units and that the eastern portion of the proposed development route has been largely transformed. Therefore, the strandveld habitat unit as well as wetland features with allocated buffer zones (refer to SAS Wetland Assessment, 2012) are considered as high ecological sensitivity areas and the remainder of the areas assessed considered of low ecological sensitivity.



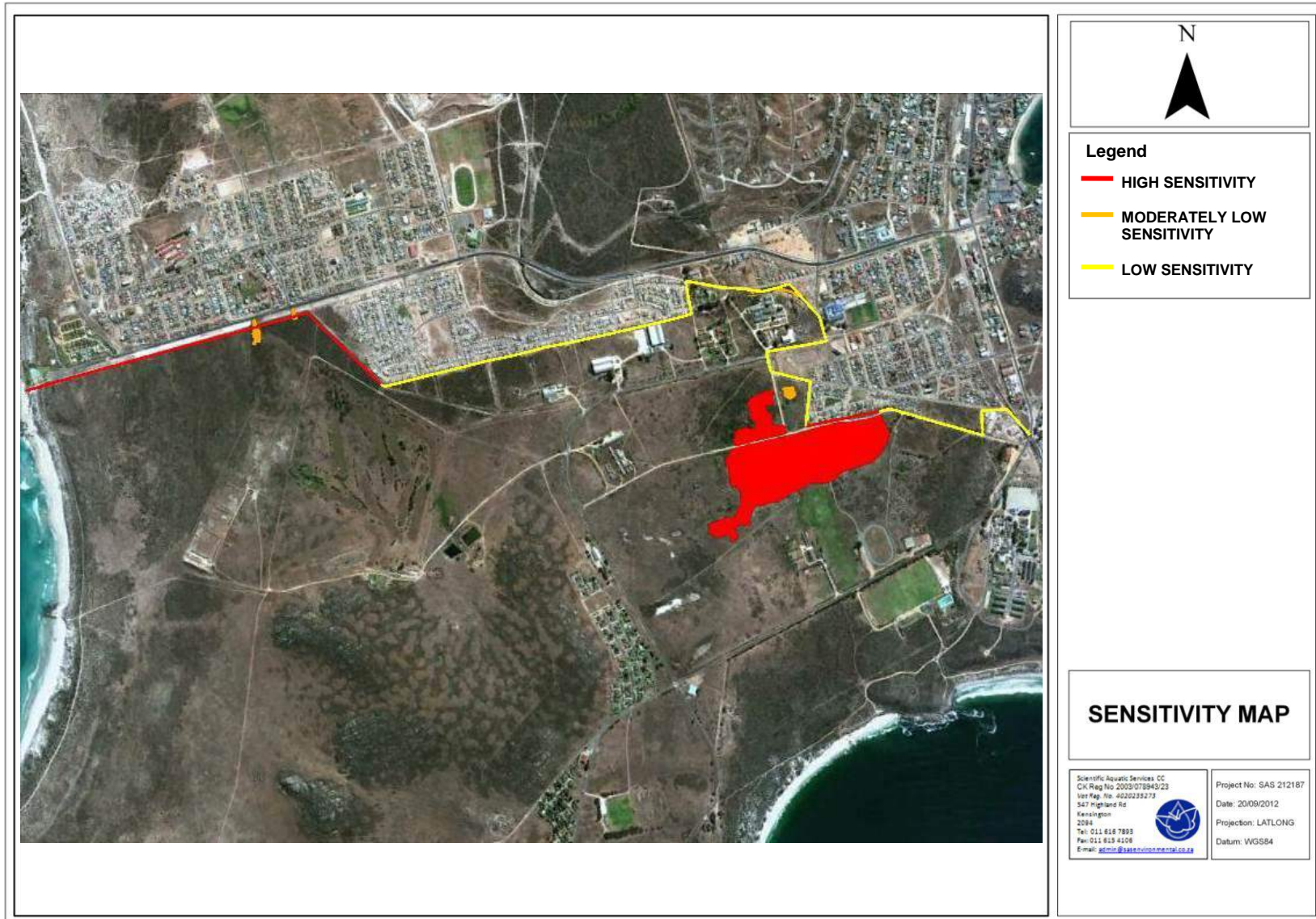


Figure 26: Floral sensitivity map for the proposed development route.



## 9 IMPACT ASSESSMENT

The tables below serve to summarise the significance of perceived impacts on the floral biodiversity of the proposed development route during the construction phase (impact assessment 1) and operational phase (impact assessment 2) followed by a table listing possible cumulative impacts (impact assessment 3) during both phases of the development. Due to the construction of the wall on an existing gravel road or fence, the pre-construction activities are not likely to cause a significant impact on floral areas and so were not included in the assessment.



## Impact Assessment 1: Impacts during the construction phase.

### IMPACT 1A: IMPACT DUE TO ALIEN INVASIVE VEGETATION ENCROACHMENT / PROLIFERATION

Potential impacts on the floral aspects:	Alternative 1	No-Go Alternative
<b>Nature of impact:</b>	<ul style="list-style-type: none"> <li>Construction and introduction of foreign material e.g. soils may lead to the introduction of alien invader species or proliferation of alien and invader species already along the proposed development route, impacting on the floral characteristics of areas near the proposed wall.</li> <li>Pioneering alien species that are adapted to growth in bare soil areas may proliferate on exposed soils not rehabilitated after construction.</li> <li>Ineffective removal of alien invader species and exposed areas could lead to re-establishment of invasive species, impacting on floral community rehabilitation efforts.</li> <li>Unmanaged alien plant invasions have the capacity to change the structure and dynamics of vegetation communities and out-compete indigenous species, thus lowering species diversity.</li> </ul>	<ul style="list-style-type: none"> <li>Significant vegetation transformation was noted during the time of the assessment in close vicinity to ongoing anthropogenic activity with special mention of the transformed habitat unit as well as stormwater channels. It is deemed highly likely that the species will spread within the protected area if not controlled. However, control of the species would prove difficult if access is not restricted.</li> </ul>
<b>Extent and duration of impact:</b>	Local and long term	Local and long term
<b>Probability of occurrence:</b>	Definite	Definite
<b>Degree to which the impact can be reversed:</b>	Fully reversible	Partly reversible
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	Partly replaceable	Partly replaceable
<b>Impact prior to mitigation:</b>	<ul style="list-style-type: none"> <li>Construction of the wall and patrol road resulting in habitat disturbance and alien proliferation.</li> <li>Creation of access roads within the less disturbed strandveld habitat unit may result in proliferation of alien species and decrease in the natural floral diversity.</li> <li>Vehicular movement will assist in spreading alien vegetation propagative material.</li> <li>Disturbance of the soil during construction related activities will result in alien proliferation.</li> <li>Introduction of foreign material resulting in alien and invasive species encroachment.</li> </ul>	<ul style="list-style-type: none"> <li>Proliferation and spread of alien vegetation communities within the less disturbed strandveld habitat unit.</li> <li>Spread of alien vegetation species during heavy rain effects from stormwater channel's to more intact wetland habitat due to lack of eradication and management.</li> <li>Without sufficient control in combination with ongoing anthropogenic activity it is deemed highly likely that over time the extent of the alien floral community could increase significantly and result in a decrease in floral species diversity and abundance within an area listed as protected.</li> </ul>
<b>Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	High negative significance	High negative significance
<b>Degree to which the impact can be mitigated:</b>	Fully mitigated	Partly mitigated
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>Eradication and ongoing monitoring of areas disturbed during construction related activities.</li> <li>After construction and rehabilitation activities the open strandveld next to the patrol road within the Naval Base should be strictly off limits to personnel as well as vehicles to prevent disturbance of floral habitat and</li> </ul>	<ul style="list-style-type: none"> <li>As far as possible the Naval Base should eradicate and control alien species within their property.</li> </ul>



	promote re-establishment of a natural fynbos community.	
<b>Impact post mitigation:</b>	<ul style="list-style-type: none"> <li>Impact can be largely reduced if mitigation measures as listed above are adhered to. However, ongoing monitoring will be necessary due to the wall being adjacent to a residential development that employs no eradication of alien species.</li> </ul>	<ul style="list-style-type: none"> <li>Impact due to alien vegetation will be ongoing although the footprint of alien vegetation communities could be reduced with effective control within the Naval Base property.</li> </ul>
<b>Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Low negative significance	Moderate negative significance



**IMPACT 1B: DESTRUCTION OF HABITAT MAY IMPACT ON FLORAL BIODIVERSITY**

Potential impacts on the floral aspects:	Alternative 1	No-Go Alternative
<b>Nature of impact:</b>	<ul style="list-style-type: none"> <li>Construction related activities may lead to the destruction of habitat and overall loss of biodiversity, while disturbance of soils within areas adjacent to the patrol road may lead to the proliferation of alien vegetation which in turn may lead to a decrease in natural floral species diversity.</li> <li>Impact within areas considered to be of higher ecological sensitivity (strandveld habitat unit) will be greater due to the possible presence of unique habitat for floral species.</li> <li>Construction and introduction of foreign material e.g. soils may lead to the further introduction of alien invader species, impacting on the floral characteristics of the affected construction area.</li> </ul>	<ul style="list-style-type: none"> <li>If the security wall is not built access to the Naval Base property will not be restricted. As a result, uncontrolled vehicle movement, pathways as well as dumping may result in habitat destruction.</li> <li>With no development of the security wall no vegetation clearing will be undertaken within the strandveld habitat unit.</li> </ul>
<b>Extent and duration of impact:</b>	Local and long term	Local and long term
<b>Probability of occurrence:</b>	Highly probable	Highly probable
<b>Degree to which the impact can be reversed:</b>	Irreversible	Irreversible
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	Irreplaceable	Irreplaceable
<b>Impact prior to mitigation:</b>	<ul style="list-style-type: none"> <li>Removal of vegetation, with special mention of the strandveld habitat unit.</li> <li>Construction of wall and related activities will result in permanent loss of habitat within the wall and patrol road footprint areas.</li> <li>Disturbance of the soil within areas adjacent to the wall and patrol road could result in loss of floral habitat.</li> <li>Creation of access roads through the strandveld and wetland habitat unit will result in permanent loss of floral habitat. Access roads through wetland habitat may impact on hydrology that may result in impact beyond the road footprint area.</li> <li>Activities associated with the pegging of wall route may encroach on surrounding areas that may result in loss of floral habitat.</li> <li>Alien and invasive species eradication activities may impact on floral habitat if not undertaken in an ecological sensitive manner.</li> <li>Lack of re-assessment and monitoring of the area to determine success of the action and any follow-up measures required.</li> <li>Placement of infrastructure or other construction equipment in more sensitive areas making rehabilitation more costly.</li> </ul>	<ul style="list-style-type: none"> <li>If the security wall is not built access to the Naval Base property will not be restricted. As a result, uncontrolled vehicle movement, pathways as well as dumping may result in habitat destruction.</li> </ul>
<b>Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	High negative significance	High negative significance
<b>Degree to which the impact can be mitigated:</b>	Partly mitigated	Not mitigated



<p><b>Proposed mitigation:</b></p>	<ul style="list-style-type: none"> <li>• A sensitivity map has been developed for the study area, indicating areas which are considered to be of higher ecological importance. It is recommended that this sensitivity map be considered during the planning and construction phases of the proposed development activities to aid in the conservation of ecology within the proposed development area.</li> <li>• All development footprint areas should remain as small as possible and should not encroach onto surrounding more sensitive areas.</li> <li>• Proliferation of alien and invasive species is expected within disturbed areas. These species should be eradicated and controlled to prevent their spread beyond the site boundary. Alien plant seed dispersal within the top layers of the soil within footprint areas that will have an impact on rehabilitation in the future, have to be controlled.</li> <li>• All soils compacted as a result of construction activities falling outside the construction footprint areas should be ripped and profiled. Special attention should be paid to alien and invasive control within these areas. Alien and invasive vegetation control should take place throughout all phases of the construction.</li> <li>• Upon completion of the project, effective rehabilitation should be done to restore and improve the overall ecological status of the surrounding area. Specific mention is made of the need to re-vegetate areas in such a way as to ensure that alien vegetation will not dominate the community structure of the affected areas.</li> </ul>	<ul style="list-style-type: none"> <li>• Impact due to un-controlled access will be difficult to reduce and it is deemed highly likely that the present floral habitat will be further degraded as anthropogenic activity increases in the vicinity of the Naval Base.</li> </ul>
<p><b>Impact post mitigation:</b></p>	<ul style="list-style-type: none"> <li>• Although loss of habitat within the proposed wall and patrol road footprint will be permanent, loss of habitat within surrounding areas can largely be prevented or re-established if mitigation measures are adhered to.</li> </ul>	<ul style="list-style-type: none"> <li>• It is doubtful that access could be efficiently controlled without the security wall, therefore the impact on habitat due to ongoing anthropogenic activity is deemed highly likely to remain if not increase in significance.</li> </ul>
<p><b>Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)</b></p>	<p>Low negative significance</p>	<p>High negative significance</p>





### IMPACT 1C: IMPACTS ON RDL AND ENDEMIC SPECIES DUE TO UNPLANNED REMOVAL AND HABITAT DESTRUCTION

Potential impacts on the floral aspects:	Alternative 1	No-Go Alternative
<b>Nature of impact:</b>	The strandveld and wetland habitat unit has remained largely undisturbed as a result may offer habitat for RDL and endemic species such as <i>Babiana tubiflora</i> and <i>Felicia elongata</i> . Therefore unplanned removal and habitat destruction may result in loss of individuals.	No development will result in no unplanned removal or habitat destruction along the proposed development route.
<b>Extent and duration of impact:</b>	Site specific and permanent	N/A
<b>Probability of occurrence:</b>	Definite	N/A
<b>Degree to which the impact can be reversed:</b>	Irreversible	N/A
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	Irreplaceable	N/A
<b>Impact prior to mitigation:</b>	<ul style="list-style-type: none"> <li>Removal of vegetation within the strandveld or wetland habitat units.</li> <li>Construction of wall and related activities within areas beyond the proposed wall and patrol road footprint.</li> <li>Disturbance of the soil within areas adjacent to construction activities may result in the decrease in extent of habitat available for endemic or RDL species.</li> <li>Creation of access roads within the strandveld and wetland habitat unit may impact on habitat for endemic or RDL species.</li> <li>Indiscriminate driving within areas beyond the proposed construction footprint areas may result in loss of endemic or RDL individuals.</li> </ul>	N/A
<b>Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	High negative significance	N/A
<b>Degree to which the impact can be mitigated:</b>	Partly mitigated	N/A
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>Permits need to be acquired in order to relocate, remove, destroy or transport RDL species.</li> <li>Permits should be obtained from the relevant authorities for the relocation of <i>Felicia elongata</i> and <i>Babiana tubiflora</i>.</li> <li>Construction personnel or vehicles should be restricted to construction footprint areas as well as predetermined roads.</li> <li>Removal of vegetation may not exceed the proposed 7m to either side of the proposed development route.</li> <li>All areas near the proposed wall and patrol road, where construction related activities have resulted in compacted soil should be rehabilitated.</li> <li>All rescue and relocation activities should be overseen by a suitably qualified ECO.</li> </ul>	N/A
<b>Impact post mitigation:</b>	<ul style="list-style-type: none"> <li>RDL species including <i>Felicia elongata</i> and <i>Babiana tubiflora</i> will be removed from the development footprint area, however if relocated to</li> </ul>	N/A



	<p>similar habitat within the protected area the impact can be mitigated to a lower significance.</p> <ul style="list-style-type: none"> <li>Habitat for floral species of concern will be permanently destroyed along the proposed development route. However, with building the wall all habitat within the protected area will be safeguarded in future.</li> </ul>	
<p><b>Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)</b></p>	<p>Moderate negative significance.</p>	<p>N/A</p>



**IMPACT 1D: IMPACTS ON RDL AND MEDICINAL SPECIES DUE TO COLLECTION**

Potential impacts on the floral aspects:	Alternative 1	No-Go Alternative
<b>Nature of impact:</b>	<ul style="list-style-type: none"> <li>There is the potential for collection of RDL species which will lead to increased impact on these populations.</li> <li>Increased potential for harvesting pressure on threatened medicinal plant species.</li> </ul>	<ul style="list-style-type: none"> <li>With no access control to less disturbed floral habitat, medicinal and RDL species are not protected from harvesting by the public.</li> </ul>
<b>Extent and duration of impact:</b>	Site specific and short term	Site specific and permanent
<b>Probability of occurrence:</b>	Probable	Highly probable
<b>Degree to which the impact can be reversed:</b>	Fully reversible	Irreversible
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	Irreplaceable	Irreplaceable
<b>Impact prior to mitigation:</b>	<ul style="list-style-type: none"> <li>Increased human activity during construction may result in collection of RDL as well as medicinal species.</li> </ul>	<ul style="list-style-type: none"> <li>Ongoing collection of RDL and medicinal species could impact on the sensitive floral communities within the protected area.</li> </ul>
<b>Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Moderate negative significance	Moderate negative significance
<b>Degree to which the impact can be mitigated:</b>	Fully mitigated	Not mitigated
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>Ensure open veld areas surrounding the proposed development route are off-limits to construction vehicles and personnel.</li> </ul>	<ul style="list-style-type: none"> <li>Without access control it is deemed highly unlikely that impact significance can be reduced.</li> </ul>
<b>Impact post mitigation:</b>	<ul style="list-style-type: none"> <li>The removal of RDL floral species within the areas considered to be of higher ecological value and surroundings may have an impact on the RDL community within the region. However, impact due to removal can be easily mitigated if no employees are allowed to collect floral species for the duration of construction activities.</li> </ul>	<ul style="list-style-type: none"> <li>Degree of impact would remain the same as pre mitigation. However, there is a potential of the impact increasing if the public became aware of rare species within the protected area.</li> </ul>
<b>Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Low negative significance	Moderate negative significance



**IMPACT 1E: IMPACT ON OVERALL FLORAL BIODIVERSITY DUE TO DUST GENERATION.**

Potential impacts on the floral aspects:	Alternative 1	No-Go Alternative
<b>Nature of impact:</b>	<ul style="list-style-type: none"> <li>Dust generated by construction activities may impact on the floral characteristics of the property. Vegetation along roads is likely to become covered with dust, which could inhibit life-sustaining processes of plants. However, the proposed construction activities will be of a limited duration and therefore impact due to dust that could occur is considered minimal.</li> <li>Furthermore with the wall development the frequency of use of the proposed road will be reduced due to access control. Presently roads in the vicinity of the proposed wall development are used by the public.</li> </ul>	<ul style="list-style-type: none"> <li>No development will result in no dust generation during construction activities.</li> <li>There may be a slight increase in dust generation with the use of the existing gravel roads in the vicinity of the proposed development due to use by the public.</li> </ul>
<b>Extent and duration of impact:</b>	Site specific and short term	Site specific and long term
<b>Probability of occurrence:</b>	Probable	Probable
<b>Degree to which the impact can be reversed:</b>	Fully reversible	Irreversible
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	Partly replaceable	Partly replaceable
<b>Impact prior to mitigation:</b>	<ul style="list-style-type: none"> <li>Dust generated during vegetation clearing.</li> <li>Disturbance of the soil during construction activities.</li> <li>Increased vehicles accessing the site during construction.</li> <li>Continued exposure of soil.</li> </ul>	<ul style="list-style-type: none"> <li>Dust generation due to the frequent use of gravel roads by the public may result in dying of vegetation within areas in the immediate vicinity of the roads.</li> </ul>
<b>Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Low negative significance	Low negative significance
<b>Degree to which the impact can be mitigated:</b>	Fully mitigated	Not mitigated
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>It is proposed that predetermined roads, preferably already existing, should be used during the construction phase in order to minimise the construction of other additional or unplanned roads and dust generation within the local area.</li> <li>Ensure that all roads and construction areas are regularly sprayed (where applicable) with water or a dust suppressant in order to curb dust generation. This is particularly necessary during the dry season during periods with extreme wind when increased levels of dust generation can be expected.</li> </ul>	<ul style="list-style-type: none"> <li>Possible mitigation will be limited without restricting public access.</li> </ul>
<b>Impact post mitigation:</b>	<ul style="list-style-type: none"> <li>Impact prior to mitigation is not considered significant, therefore if mitigation is implemented when an increase in dust generation is noted the impact can be reduced to almost insignificant levels.</li> </ul>	<ul style="list-style-type: none"> <li>Impact significance would largely remain at the same level as pre mitigation.</li> </ul>
<b>Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Low negative significance	Low negative significance



**IMPACT 1F: IMPACT ON OVERALL FLORAL BIODIVERSITY DUE TO UNCONTROLLED FIRES**

Potential impacts on the floral aspects:	Alternative 1	No-Go Alternative
<b>Nature of impact:</b>	<ul style="list-style-type: none"> <li>Indiscriminate fires by construction personnel may lead to uncontrolled fires destroying plant communities and impacting on biodiversity.</li> <li>Fire related impacts may have an impact on the local area, for a significant duration. Severity of impact within the high sensitivity areas (strandveld and wetland habitat units) are considered higher due to the potential loss of species diversity and abundance.</li> </ul>	<ul style="list-style-type: none"> <li>The Naval Base property is accessible to the public and therefore fire related impacts are considered highly likely. If the fires are too frequent it is highly likely to result in a change of the floral community structure.</li> </ul>
<b>Extent and duration of impact:</b>	Local extent for a short period of time	Local extent, however, if burning frequencies are increased and the natural fire regime interrupted, natural vegetation in the area could be lost and the impact would therefore be permanent
<b>Probability of occurrence:</b>	Highly probable	Highly probable
<b>Degree to which the impact can be reversed:</b>	Partly reversible	Partly reversible
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	Irreplaceable	Irreplaceable
<b>Impact prior to mitigation:</b>	<ul style="list-style-type: none"> <li>Uncontrolled fires may damage Naval Base property and result in a decline in unique habitat within the protected area.</li> <li>Frequent fires could result in a change in the floral community structure.</li> </ul>	<ul style="list-style-type: none"> <li>Increased fire frequency and intensity due to increased human activity.</li> <li>Uncontrolled fires may damage Naval Base property and result in a decline in unique habitat within the protected area.</li> <li>Frequent fires could result in a change in the floral community structure.</li> </ul>
<b>Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Moderate negative significance	Moderate negative significance
<b>Degree to which the impact can be mitigated:</b>	Fully mitigated	Partly mitigation
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>All informal fires on the property should be prohibited throughout all phases of the project.</li> <li>A natural burning regime should be implemented with cognisance of infrastructure within the Naval Base.</li> </ul>	<ul style="list-style-type: none"> <li>Restricting unauthorised access, as far as possible.</li> <li>Implementation of a fire control plan to reduce the extent of any informal fire within the Naval Base property.</li> </ul>
<b>Impact post mitigation:</b>	<ul style="list-style-type: none"> <li>Adequate mitigation could lead to significant reduction in the probability as well as duration of impact.</li> </ul>	<ul style="list-style-type: none"> <li>Fire related impact is directly related to the efficient management and control of informal fires. As a result impact can be reduced if mitigation measures mentioned above can be effectively implemented.</li> </ul>
<b>Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Low negative significance	Low negative significance



**IMPACT 1G: SOIL CONTAMINATION**

Potential impacts on the floral aspects:	Alternative 1	No-Go Alternative
<b>Nature of impact:</b>	Soils may become contaminated by specific problem substances as well as spills of hydrocarbons from vehicles which could lead to changes in soil productivity, species composition, diversity dominance and abundance.	Significant impact due to soil contamination is considered highly unlikely if construction does not take place.
<b>Extent and duration of impact:</b>	Site specific and for a short period of time	N/A
<b>Probability of occurrence:</b>	Probable	N/A
<b>Degree to which the impact can be reversed:</b>	Fully reversible	N/A
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	Partly replaceable	N/A
<b>Impact prior to mitigation:</b>	<ul style="list-style-type: none"> <li>• Spillages from construction vehicles.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Low negative significance	N/A
<b>Degree to which the impact can be mitigated:</b>	Fully mitigated	N/A
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>• Ensure that all hazardous storage containers comply with the relevant SABS standards to prevent leakage.</li> <li>• Regularly inspect all construction vehicles for leaks.</li> <li>• Re-fuelling must take place on a sealed surface area to prevent ingress of hydrocarbons into topsoil.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Impact post mitigation:</b>	<ul style="list-style-type: none"> <li>• Soil contamination, due to construction related spillages and contaminating events, is likely, if unmanaged and could remain for up to a year within the moderate and high ecological sensitive areas. If correctly mitigated, the significance of the impact can be reduced to a very low level through a reduction in probability, severity, duration as well as spatial scale.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Low negative significance	N/A



## Impact 2: Impacts during the operational phase.

### IMPACT 2A: OPERATIONAL ACTIVITIES IMPACTING ON FLORAL HABITAT.

Potential impacts on the floral aspects:	Alternative 1	No-Go Alternative
<b>Nature of impact:</b>	After construction of the security wall the only expected activity will be from the use of the patrol road, with proper mitigation any impact that could potentially arise can be avoided or significantly reduced.	With no development of the wall all impacts presently in the vicinity of the proposed development route will remain and may increase in extent.
<b>Extent and duration of impact:</b>	Site specific and for a short period of time	Local extent and permanent
<b>Probability of occurrence:</b>	Probable	Highly probable
<b>Degree to which the impact can be reversed:</b>	Fully reversible	Partly reversible
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	Partly replaceable	Irreplaceable
<b>Impact prior to mitigation:</b>	<ul style="list-style-type: none"> <li>Uncontrolled proliferation of alien and invasive species within immediate surroundings of the proposed road and wall.</li> <li>Ineffective rehabilitation may result in continued loss of floral habitat beyond the proposed wall and road footprint.</li> <li>Impact may result if vehicles are not restricted to the patrol road.</li> <li>Impact may result if areas in the vicinity of the wall and patrol road are not off limits to personnel that could potentially collect RDL and medicinal floral species.</li> <li>Dust generation due to the use of the patrol road is regarded insignificant.</li> </ul>	<ul style="list-style-type: none"> <li>Alien and invasive species proliferation and spread within the protected areas.</li> <li>Collection of RDL and medicinal species</li> <li>Destruction of floral habitat due to indiscriminate driving, footpaths and dumping due to limited access control.</li> <li>Fire related impacts.</li> </ul>
<b>Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Moderate negative significance	Moderate negative significance
<b>Degree to which the impact can be mitigated:</b>	Fully mitigated	Partly mitigated
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>Ongoing eradication and monitoring of alien species along the proposed road and wall.</li> <li>Implementation of a rehabilitation plan with ongoing monitoring to ensure rehabilitation does result in re-establishment of a natural Strandveld floral community.</li> <li>All vehicles should be strictly confined to existing roads.</li> <li>Areas surrounding the proposed road and wall should be strictly off limits to personnel.</li> </ul>	<ul style="list-style-type: none"> <li>As far as possible the Naval Base should eradicate and control alien species within their property.</li> <li>Restricting unauthorised access, as far as possible.</li> <li>Implementation of a fire control plan to reduce the extent and therefore impact significance of any informal fire within the Naval Base property.</li> </ul>
<b>Impact post mitigation:</b>	<ul style="list-style-type: none"> <li>With proper mitigation any impact that could potentially arise can be avoided or significantly reduced</li> </ul>	<ul style="list-style-type: none"> <li>Without the development of the wall, impacts cannot be fully mitigated.</li> </ul>
<b>Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Low negative significance	Low negative significance





**IMPACT 2B: INEFFECTIVE REHABILITATION AND MONITORING.**

Potential impacts on the floral aspects:	Alternative 1	No-Go Alternative
<b>Nature of impact:</b>	<ul style="list-style-type: none"> <li>• Ineffective rehabilitation and monitoring of disturbed areas could lead to loss of species diversity. Such impacts may continue after rehabilitation.</li> <li>• Impacts as a result of ineffective rehabilitation can impact on the successful re-establishment of biodiversity resources if not effectively planned and implemented throughout all phases of the construction.</li> </ul>	<ul style="list-style-type: none"> <li>• Rehabilitation and monitoring will not take place if the construction of the wall is not undertaken.</li> </ul>
<b>Extent and duration of impact:</b>	Local extent and long term	N/A
<b>Probability of occurrence:</b>	Probable	N/A
<b>Degree to which the impact can be reversed:</b>	Fully reversible	N/A
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	Irreplaceable	N/A
<b>Impact prior to mitigation:</b>	<ul style="list-style-type: none"> <li>• Ineffective planning of rehabilitation plan from an ecological point of view could hamper the re-establishment of a natural floral diversity.</li> <li>• Continued exposure of soil could result in compacted bare area not suitable for seed germination.</li> <li>• Uncontrolled fires could impact on vegetation not yet established and could lead to the dying of sensitive species and seedlings.</li> <li>• Indiscriminate driving through rehabilitated areas could result in soil disturbance.</li> <li>• Ineffective rehabilitation of any spill events could result in permanent soil contamination that could result in vegetation transformation.</li> <li>• Failure to concurrently rehabilitate disturbed areas leading to increasing impact over time with special mention of eradication of alien vegetation.</li> <li>• Ensure that all disturbed and exposed areas are rehabilitated and covered with indigenous vegetation to prevent post-construction dust generation.</li> <li>• Lack of re-assessment and monitoring of the area to determine success of the action and any follow-up measures required.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<b>Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Moderate negative significance	N/A
<b>Degree to which the impact can be mitigated:</b>	Fully mitigated	N/A
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>• Planning of rehabilitation before commencement of construction activities:                             <ul style="list-style-type: none"> <li>○ Attention should be afforded to natural landscape characteristics, if disturbed, areas need to be reprofiled.</li> <li>○ Compacted soil should be ripped.</li> <li>○ Alien vegetation control – species listed as dominant should be eradicated.</li> <li>○ Alien vegetation control - with attention paid to the time of year alien species are eradicated. If done during the seeding period removal</li> </ul> </li> </ul>	N/A



	<p>may result in further spread of these species.</p> <ul style="list-style-type: none"> <li>○ Alien vegetation control – care should be taken with the removal of plants from site. Using an open vehicle could result in seed being blown from the vehicle.</li> <li>○ Alien vegetation control - Plants removed should be taken to an area authorized for the dumping of garden refuse. No dumping of plant material should be allowed during any stage of the development.</li> <li>○ Alien vegetation control – attention should be afforded to the type of herbicides used due to the areas being near wetland as well as protected areas.</li> <li>● Rehabilitation should be signed off by a suitably qualified ECO prior to the contractor leaving site.</li> <li>● Implementation of a fire regime applicable to the vegetation types found within the property.</li> <li>● Rehabilitated areas should be strictly off limits to vehicles and personnel with the exception of monitoring activities.</li> <li>● Monitoring of rehabilitated areas is deemed very important to establish if rehabilitation measures implemented are effective.</li> </ul>	
<p><b>Impact post mitigation:</b></p>	<ul style="list-style-type: none"> <li>● If a rehabilitation plan is developed and correctly implemented, the probability of all impacts listed above occurring can be reduced as well as the duration of the impact.</li> </ul>	<ul style="list-style-type: none"> <li>● N/A</li> </ul>
<p><b>Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)</b></p>	<p>Low negative significance</p>	



**IMPACT 2C: IMPACT ON FLORAL POLLINATION.**

Potential impacts on the floral aspects:	Alternative 1	No-Go Alternative
<b>Nature of impact:</b>	<ul style="list-style-type: none"> <li>The proposed development route is situated along an already existing residential area. As a result, pollination corridors may already be hampered to some degree.</li> <li>The building of the wall may result in further isolation from natural habitat. However, the impact will be largely directed towards wind pollination of floral communities near the wall. Insects as well as birds will still be able to fly over the proposed wall.</li> </ul>	<ul style="list-style-type: none"> <li>If the wall is not constructed no additional barriers will be created. Therefore, no additional impact on pollination of floral species is considered possible.</li> </ul>
<b>Extent and duration of impact:</b>	Site specific, however will be permanent.	N/A
<b>Probability of occurrence:</b>	Probable.	N/A
<b>Degree to which the impact can be reversed:</b>	Irreversible.	N/A
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	Fully replaceable.	N/A
<b>Impact prior to mitigation:</b>	<ul style="list-style-type: none"> <li>Impact on the pollination of the floral community near the wall.</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Low negative significance.	N/A
<b>Degree to which the impact can be mitigated:</b>	Partially.	N/A
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>Ensure rehabilitation of floral communities in the vicinity of the proposed development route is effective. To provide additional pollination corridors along the proposed development route.</li> </ul>	N/A
<b>Impact post mitigation:</b>	<ul style="list-style-type: none"> <li>Some impact on pollination may still be present.</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Low negative significance.	N/A



### Impact 3: Cumulative Impact.

Potential impacts on the floral aspects:	Alternative 1	No-Go Alternative
<b>Nature of impact:</b>	<ul style="list-style-type: none"> <li>The construction of the wall would lead to permanent loss of approximately 10 100m<sup>2</sup> of vegetation types considered endangered.</li> <li>Disturbance of soil may result in proliferation of alien species already considered a significant problem within the study area and surroundings.</li> </ul>	<ul style="list-style-type: none"> <li>Not building the wall could result in loss of habitat due to encroachment of anthropogenic activities within more intact areas as is presently the situation along the eastern portion of the proposed route.</li> <li>RDL and Medicinal species are under threat due to unauthorised collection; collection could continue and may result in a decline of individuals within the protected area.</li> <li>Without proper implementation of alien vegetation control, alien invasive species would keep spreading and the communities will increase in size.</li> </ul>
<b>Extent and duration of impact:</b>	Local extent and permanent	Local extent and permanent
<b>Probability of occurrence:</b>	Definite	Definite
<b>Degree to which the impact can be reversed:</b>	Irreversible	Irreversible
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	Irreplaceable	Irreplaceable
<b>Cumulative impact prior to mitigation:</b>	<ul style="list-style-type: none"> <li>No mitigation will prevent loss of habitat within the footprint of the proposed development route. However, implementation of an effective rehabilitation plan could result in a very low impact significance within surrounding areas.</li> </ul>	<ul style="list-style-type: none"> <li>Without the wall access cannot be restricted and therefore no feasible mitigation measures can be implemented to reduce cumulative impact on the floral community.</li> </ul>
<b>Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	High negative significance	High negative significance
<b>Degree to which the impact can be mitigated:</b>	Partly mitigated	No mitigation
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>Ongoing eradication and monitoring of alien species along the proposed road and wall.</li> <li>Implementation of a rehabilitation plan with ongoing monitoring to ensure rehabilitation does result in re-establishment of a natural Strandveld floral community.</li> <li>All vehicles should be strictly confined to existing roads.</li> <li>Areas surrounding the proposed road and wall should be strictly off limits to personnel.</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>
<b>Impact post mitigation:</b>	<ul style="list-style-type: none"> <li>Permanent loss of 10 100m<sup>2</sup> of endangered vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>Impact significance would remain at the same level as prior to mitigation.</li> </ul>
<b>Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)</b>	Moderate negative significance	High negative significance



## 10 CONCLUSIONS AND RECOMMENDATIONS

Scientific Aquatic Services (SAS) was appointed to conduct a floral assessment as part of the environmental assessment and authorisation process for the construction of a security wall and associated patrol road on the northern border of the Saldanha Naval Base.

The following general conclusions were drawn on completion of the floral survey:

- This proposed development route falls within the *Fynbos biome* and is situated within the *West Strandveld Bioregion* (Mucina & Rutherford, 2006).
- The proposed development route falls within four vegetation types namely *Saldanha Flats Strandveld*, *Saldanha Granite Strandveld*, *Saldanha Limestone Strandveld* and *Langebaan Dune Strandveld* (Mucina & Rutherford, 2006).
- It should be noted that the Saldanha Naval Base property has remained largely undisturbed except for areas presently or historically utilised for Naval Base infrastructure and roads. As a result the property is considered a conservation area and is also indicated as a protected area ([www.environmental.gov.za](http://www.environmental.gov.za), 2000).
- The proposed development route of the wall is however located adjacent to the neighbouring Diazville residential development; consequently vegetation transformation along the route was noted with special mention of the eastern portion.
- Remnants of the Endangered *Saldanha Flats Strandveld* and Vulnerable *Saldanha Granite Strandveld* ecosystems are indicated to occur within the study area (National list of threatened terrestrial ecosystems for South Africa, 2011). It is considered important to safeguard these areas during the proposed wall development activities by adhering to the mitigation measures listed within the floral as well as wetland assessment report.
- According to the Vegetation Map as provided by the BGIS database ([www.bgis.sanbi.org](http://www.bgis.sanbi.org)) the proposed development route falls within four vegetation types. All the vegetation types are listed as being either “endangered” or “vulnerable”.
- At the time of the field assessment, the study area could be subdivided into three habitat units, namely transformed habitats, wetland habitats and strandveld. The ecological condition and functioning of wetland and



strandveld habitat units were considered to be significantly higher when compared to the transformed habitat unit. This was mainly a result of vegetation clearing for urban development and gravel roads resulting in a decrease in overall ecological condition and therefore functioning within transformed areas.

- The Vegetation Index Score was calculated separately for each habitat unit.
  - The transformed habitat unit calculated a very low score of -1.8 (Class F – modified completely). The low score was mainly as a result of edge effects caused by vegetation clearing for urban development and the construction of gravel roads.
  - The wetland habitat unit calculated a moderate score of 16.2 (Class C – moderately modified). Edge effects of gravel road construction have resulted in the encroachment of invasive species into the wetland habitat unit; however, the unit is still dominated by the wetland species *Sarcocornia* sp.
  - The strandveld habitat unit calculated a high score of 19 (Class B – largely natural with few modifications). The high score is a result of limited invasive species encroachment noted at the time of the assessment within the area and an increase in the diversity and abundance of indigenous floral species.
- The complete PRECIS (Pretoria Computer Information Systems) red data plant list for the grid reference (3317BB) was obtained from SANBI (South African National Biodiversity Institute) and habitat descriptions were sourced from Raimondo *et al.* 2009. After the field assessment, it was evident that portions of the study area that may potentially provide habitat for floral species of concern coincided with the strandveld habitat unit. Furthermore, two floral species of concern, *Babiana tubiflora* and *Felicia elongata* were identified within the habitat unit. Therefore, mitigation measures that will be listed as part of the impact assessment should be strictly adhered to, to ensure impact significance is reduced or avoided as far as possible.
- The species identified during the assessment were compared to the species listed within the Western Cape Nature Conservation Laws Amendment Act, 2000, Schedule 3 & 4: Endangered Flora (refer to appendix a). Representatives of three families considered of concern were identified namely IRIDACEAE (*Babiana tubiflora*, *Moraea flaccida*); MESEMBRYANTHEMACEAE (*Drosanthemum floribundum*,



*Mesembryanthemum guerichianum*, *Carpobrotus edulis*, *Carpobrotus quadrifidus*, *Lampranthus sp.*, *Rushia macowanii*, *Rushia sp.*) and RUTACEAE (*Agathosma imbricata*).

- The number and abundance of alien and invasive species found to the east of the proposed development route is considered an indication of the significant vegetation transformation that has resulted due to urban development and gravel road construction. As a result the transformed habitat unit is not considered of significant importance for floral species conservation.
- The majority of the medicinal plant species are located throughout the study area and are not restricted to specific habitats units. All medicinal floral species identified during the time of the assessment can be considered common for the region.
- The impact assessment was divided into three sections where impacts were determined for the construction phase, the operational phase as well as any possible cumulative impacts.

**A summary of impact significance before and after mitigation**

Impact	Alternative 1		No Go Alternative	
	Unmanaged	Managed	Unmanaged	Managed
Impact 1a: Impact due to alien invasive vegetation encroachment/ proliferation.	High negative significance	Low negative significance	High negative significance	Moderate negative significance
Impact 1b: Destruction of habitat may impact on floral biodiversity.	High negative significance	Low negative significance	High negative significance	High negative significance
Impact 1c: Impacts on RDL and endemic species due to unplanned removal and habitat destruction.	High negative significance	Moderate negative significance	N/A	N/A
Impact 1d: Impacts on RDL and medicinal species due to collection.	Moderate negative significance	Low negative significance.	Moderate negative significance	Moderate negative significance
Impact 1e: Impact on overall floral biodiversity due to dust generation.	Low negative significance	Low negative significance	Low negative significance	Low negative significance
Impact 1f: Impact on overall floral biodiversity due to uncontrolled fires.	Moderate negative significance	Low negative significance	Moderate negative significance	Low negative significance
Impact 1g: Soil contamination.	Low negative significance	Low negative significance	N/A	N/A
Impact 2a: Operational activities impacting on floral habitat.	Moderate negative significance	Low negative impact.	Moderate negative significance.	Low negative significance
Impact 2b: Ineffective rehabilitation and monitoring.	Moderate negative significance.	Low negative significance	N/A	N/A
Impact 2c: Impact on pollination	Low negative significance	Low negative significance	N/A	N/A
Impact 3: Cumulative Impact	High negative significance	Moderate negative significance	High negative significance.	High negative significance





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- From the results of the impact assessment it was observed that seven major impacts are likely to impact the floral biodiversity of the proposed development route during the construction phase and three major impacts are likely during the operational phase. However, it is deemed possible that the majority of the impacts can be mitigated or managed to a lower level of significance during both phases of the proposed development. At present the boundary of urban development lies in close proximity to the border of the natural strandveld habitat unit as well as the wetland habitat unit. The no-go alternative and consequent failure to restrict entrance into the Saldanha Naval Base property may therefore result in the encroachment of urban activities into more natural areas. Edge effects from urban activities as well as future activities within strandveld habitat and wetland zones may result in a decrease in the Present Ecological State of the vegetation within these less disturbed areas.
  - After the assessment it is evident that floral species considered to be indicative of the applicable vegetation types were restricted to the strandveld and wetland habitat units and that areas to the east of the development route have been largely transformed. Therefore the strandveld habitat unit as well as wetland features with allocated buffer zones (refer to SAS Wetland Assessment, 2012) are considered as high ecological sensitivity areas and the remainder of the areas assessed are considered to be of low ecological sensitivity.
  - It is therefore considered important, that if the project does prove feasible, all mitigation measures as listed be strictly adhered to in order to reduce impacts on the more sensitive vegetation communities noted within the strandveld and wetland habitat units.

After the conclusion of the floral assessment, it is the opinion of the ecologists that the proposed development route be considered favourably provided that the recommendations below are adhered to:

- Eradication and ongoing monitoring of areas disturbed during construction related activities.
- After construction and rehabilitation activities the open strandveld next to the patrol road within the Naval Base should be strictly off limits to personnel as well as vehicles to prevent disturbance of floral habitat and promote re-establishment of a natural fynbos community.



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- A sensitivity map has been developed for the study area, indicating areas which are considered to be of higher ecological importance. It is recommended that this sensitivity map be considered during the planning and construction phases of the proposed development activities to aid in the conservation of ecology within the proposed development area.
  - All development footprint areas should remain as small as possible and should not encroach onto surrounding more sensitive areas.
  - Proliferation of alien and invasive species is expected within disturbed areas. These species should be eradicated and controlled to prevent their spread beyond the site boundary. Alien plant seed dispersal within the top layers of the soil within footprint areas that will have an impact on rehabilitation in the future, have to be controlled.
  - All soils compacted as a result of construction activities falling outside the construction footprint areas should be ripped and profiled. Special attention should be paid to alien and invasive control within these areas. Alien and invasive vegetation control should take place throughout all phases of the construction.
  - Permits need to be acquired in order to relocate, remove, destroy or transport RDL species.
  - Permits should be obtained from the relevant authorities for the relocation of *Felicia elongata* and *Babiana tubiflora* as well as species listed within the Western Cape Nature Conservation Laws Amendment Act, 2000, Schedule 3 & 4.
  - As many of the species of concern should be rescued and relocated.
  - All rescue and relocation activities should be overseen by a suitably qualified ECO.
  - Construction personnel or vehicles should be restricted to construction footprint areas as well as predetermined roads.
  - Removal of vegetation may not exceed the proposed 7m to either side of the proposed development route.
  - Ensure open veld areas surrounding the proposed development route are off-limits to construction vehicles and personnel.
  - It is proposed that predetermined roads, preferably already existing, should be used during the construction phase in order to minimise the construction of other additional or unplanned roads and dust generation within the local area.



- All informal fires on the property should be prohibited throughout all phases of the project.
- A natural burning regime should be implemented with cognisance of infrastructure within the Naval Base.
- Ensure that all hazardous storage containers comply with the relevant SABS standards to prevent leakage.
- Regularly inspect all construction vehicles for leaks.
- Re-fuelling must take place on a sealed surface area to prevent ingress of hydrocarbons into topsoil.



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**The South African National Biodiversity Institute is thanked for the use of data from the National Herbarium, Pretoria (PRE) Computerised Information System (PRECIS) – quarter degree grids 3317BB**



# **APPENDIX A**

## ***Species lists***



**Table 14: Western Cape Nature Conservation Laws Amendment Act, 2000, Schedule 3 & 4: Endangered Flora.****Schedule 3**

<b>Family</b>		APOCYNACEAE
	Halfmens	<i>Pachypodium namaquanum</i>
<b>Family</b>		GESNERIACEAE
	Cape Gloxinia	<i>Charadrophila capensis</i>
<b>Family</b>		LILIACEAE
		<i>Aloe pillansii</i>
		<i>Aloe buhrii</i>
		<i>Aloe erinacea</i>
<b>Family</b>		PROTEACEAE
		<i>Mimetes capitulatus</i>
		<i>Mimetes hottentoticus</i>
		<i>Mimetes stokoei</i>
	Mountain Rose	<i>Orothamnus zeyheri</i>
		<i>Protea odorata</i>
<b>Family</b>		STANGERIACEAE
	Bobbejaankos	<i>Stangeria eriopus</i>
<b>Family</b>		ZAMIACEAE
	Cycad Broodboom	<i>Encephalartos</i> spp.

**Schedule 4**

<b>Family</b>		AMARYLLIDACEAE
	All species	
<b>Family</b>		APOCYNACEAE
	All species except <i>Pachypodium</i> spp. specified in Schedule 3.	
<b>Family</b>		AQUIFOLIACEAE
	Cape Holly	<i>Ilex mitis</i>
<b>Family</b>		ARACEAE
	Yellow Arum Lily	<i>Zantedeschia elliotiana</i>
<b>Family</b>		ASCLEPIADACEAE
	All species/Alle spesies	
<b>Family</b>		BORAGINACEAE
		<i>Echiostachys spicatus</i>
<b>Family</b>		BRUNIACEAE
	All species/Alle spesies	
<b>Family</b>		COMPOSITAE
		<i>Senecio coleophyllus</i>
		<i>Cotula duckitteae</i>
<b>Family</b>		CRASSULACEAE
	Koesnaatjie	<i>Crassula columnaris</i>
	Red Crassula	<i>Crassula falcata</i> ( <i>Rochea coccineaas</i> )
	Pointed-leaf Crassula	<i>Crassula perfoliata</i>
		<i>Crassula pyramidalis</i>
		<i>Kalanchoe thyrsiflora</i>
<b>Family</b>		CUNONIACEAE
	Rooi-els	<i>Cunonia capensis</i>
		<i>Platylophus trifoliatus</i>
<b>Family</b>		DIOSCOREACEAE
	Elephant's Foot	<i>Testudinaria sylvatica</i>
	Olifantsvoet	<i>Testudinaria elephantipes</i>
<b>Family</b>		ERICACEAE
	All species	
<b>Family</b>		EUPHORBIACEAE
		<i>Euphorbia bupleurtfolia</i>
		<i>Euphorbia fasciculata</i>
		<i>Euphorbia globosa</i>
		<i>Euphorbia horrida</i>
	Eselkos of Pol	<i>Euphorbia meloformis</i>
	Vetmenseie	<i>Euphorbia obesa</i>





		<i>Euphorbia schoenlandii</i>
	Vetmensie	<i>Euphorbia symmetrica</i>
		<i>Euphorbia valida</i>
<b>Family</b>		GEISSOLOMACEAE
	All species	
<b>Family</b>		GESNERIACEAE
	All species of the genus <i>Streptocarpus</i>	
<b>Family</b>		GRAMINEAE
	Mountain Bamboo	<i>Arundinaria tessellata</i>
	Wild Rye Grass	<i>Secale africanum</i>
<b>Family</b>		GRUBBIACEAE
	All species	
<b>Family</b>		IRIDACEAE
	All species	
<b>Family</b>		LEGUMINOSAE
	Tambookie Thorn	<i>Erythrina acanthocarpa</i>
		<i>Erythrina humeana</i>
	Klipblom	<i>Liparia comantha</i>
	Orange Nodding Head	<i>Liparia sphaerica</i>
		<i>Liparia splendens</i>
	Wild Sweet Pea	<i>Podalyria calyptata</i>
		<i>Priestleya vestita</i>
	Silver Pea	<i>Priestleya tomentosa</i>
<b>Family</b>		LILIACEAE
	All species of the genus ALOE except those specified in Schedule 3 and the species <i>Aloe ferox</i>	
		<i>Gasteria beckeri</i>
	Gloriosa Lily	<i>Gloriosa superba</i>
	All species of the genus <i>Haworthia</i>	
	All species of the genus <i>Kniphofia</i>	
	All species of the genus <i>Lachenalia</i>	
	Climbing Bells	<i>Littonia modesta</i>
	Christmas Bells	<i>Sandersonia aurantiaca</i>
	All species of the genus <i>Veltheimia</i>	
		<i>Agapanthus walshii</i>
		<i>Daubenya aurea</i>
	Chinese Lantern	<i>Nymanya capensis</i>
<b>Family</b>		MESEMBRYANTHEMACEAE
	All species	
<b>Family</b>		MUSACEAE
	All species of the genus <i>Strelitzia</i>	
<b>Family:</b>		NYMPHAEACEAE
	Blue Water-lily	<i>Nymphaea capensis</i>
<b>Family</b>		ORCHIDACEAE
	All species	
<b>Family:</b>		OXALIDACEAE
	Watersuring	<i>Oxalis nutans</i>
<b>Family:</b>		PEDALIACEAE
	Klondoring	<i>Harpagophytum procumbens</i>
<b>Family:</b>		PENAEACEAE
	All species	
<b>Family:</b>		POLYGALACEAE
		<i>Muraltia minuta</i>
<b>Family:</b>		POLYPODIACEAE
	All species of the genus <i>Adiantum</i>	
	Tree Ferns	<i>Hemitelia capensis</i>
	Seven Weeks Fern	<i>Polystichum adiantiforme</i>
<b>Family:</b>		PORTULACACEAE
	All species of the genus <i>Anacampseros</i>	
<b>Family:</b>		PROTEACEAE
	All species except those specified in Schedule 3	
<b>Family:</b>		RANUNCULACEAE



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Anemone	<i>Anemone capensis</i>
<b>Family:</b>	RESTIONACEAE
All species of the genus <i>Chondropetalum</i>	
	<i>Acockii pillans</i>
	<i>Elegia fenestrata</i>
	<i>Restio acockii</i>
	<i>Restio micans</i>
	<i>Restio sabulosus</i>
<b>Family:</b>	RETZIACEAE
	<i>Retzia capensis</i>
<b>Family</b>	RHAMNACEAE
	<i>Phyllica pubescens</i>
<b>Family:</b>	RORIDULACEAE
All species	
<b>Family:</b>	RUTACEAE
All species	
<b>Family:</b>	SCROPHULARIACEAE
All species of the genus <i>Diascia</i>	
All species of the genus <i>Harveya</i>	
Nemesia	<i>Nemesia strumosa</i>
All species of the genus <i>Haller</i>	
<b>Family:</b>	THYMELAEACEAE
	<i>Lachnaea aurea</i>



**Table 15: Expected floral species list for the quarter degree grid 3317BB supplied by Sanbi Precis Database.**

Family	Species	Threat status	Lifecycle	Growth forms
AIZOACEAE	<i>Aizoon paniculatum</i> L.	LC	Perennial	Herb, succulent
AIZOACEAE	<i>Galenia crystallina</i> (Eckl. & Zeyh.) Fenzl var. <i>crystallina</i>	LC	Perennial	Dwarf shrub Dwarf shrub, succulent
AIZOACEAE	<i>Tetragonia fruticosa</i> L.	LC	Perennial	succulent
ALLIACEAE	<i>Tulbaghia capensis</i> L.	LC	Perennial	Herb
AMARYLLIDACEAE	<i>Ammocharis longifolia</i> (L.) M.Roem.	LC	Perennial	Geophyte
AMARYLLIDACEAE	<i>Boophone haemanthoides</i> F.M.Leight.	LC	Perennial	Geophyte
AMARYLLIDACEAE	<i>Brunsvigia orientalis</i> (L.) Aiton ex Eckl. <i>Gethyllis ciliaris</i> (Thunb.) Thunb. subsp. <i>ciliaris</i>	LC	Perennial	Geophyte
AMARYLLIDACEAE	<i>Gethyllis lanuginosa</i> Marloth	NT	Perennial	Geophyte
AMARYLLIDACEAE	<i>Haemanthus coccineus</i> L.	LC	Perennial	Geophyte
AMARYLLIDACEAE	<i>Haemanthus pubescens</i> L.f. subsp. <i>pubescens</i>	LC	Perennial	Geophyte
ANTHERICACEAE	<i>Chlorophytum undulatum</i> (Jacq.) Oberm.	LC	Perennial	Herb
APIACEAE	<i>Annesorhiza grandiflora</i> (Thunb.) M.Hiroe	LC	Perennial	Herb
APIACEAE	<i>Cynorhiza typica</i> Eckl. & Zeyh.	DDT	Perennial	Herb
APIACEAE	<i>Torilis arvensis</i> (Huds.) Link	NE	Annual	Herb
APOCYNACEAE	<i>Cynanchum africanum</i> (L.) Hoffmanns.	LC	Perennial	Climber
APOCYNACEAE	<i>Microlooma sagittatum</i> (L.) R.Br.	LC	Perennial	Climber
ASPARAGACEAE	<i>Asparagus capensis</i> L. var. <i>capensis</i>	LC	Perennial	Shrub
ASPARAGACEAE	<i>Asparagus declinatus</i> L.	LC	Perennial	Scrambler
ASPARAGACEAE	<i>Asparagus fasciculatus</i> Thunb.	LC	Perennial	Climber
ASPARAGACEAE	<i>Asparagus ovatus</i> T.M.Salter	LC	Perennial	Climber Dwarf shrub, shrub, succulent
ASPHODELACEAE	<i>Aloe perfoliata</i> L.	LC	Perennial	shrub, succulent
ASPHODELACEAE	<i>Bulbinella cauda-felis</i> (L.f.) T.Durand & Schinz	LC	Perennial	Geophyte, herb Geophyte, succulent
ASPHODELACEAE	<i>Trachyandra ciliata</i> (L.f.) Kunth	LC	Perennial	Geophyte, succulent
ASPHODELACEAE	<i>Trachyandra falcata</i> (L.f.) Kunth	LC	Perennial	Geophyte, succulent
ASPHODELACEAE	<i>Trachyandra hispida</i> (L.) Kunth	LC	Perennial	Geophyte, succulent
ASTERACEAE	<i>Amellus tenuifolius</i> Burm.	LC	Perennial	Herb
ASTERACEAE	<i>Arctotis candida</i> Thunb.	LC	Perennial	Herb, suffrutex
ASTERACEAE	<i>Arctotis hirsuta</i> (Harv.) Beauverd	LC	Annual	Herb
ASTERACEAE	<i>Arctotis revoluta</i> Jacq.	LC	Perennial	Suffrutex
ASTERACEAE	<i>Cineraria geifolia</i> (L.) L.	LC	Perennial	Herb, suffrutex
ASTERACEAE	<i>Cotula duckittiae</i> (L.Bolus) K.Bremer & Humphries	VU	Annual	Herb
ASTERACEAE	<i>Cotula turbinata</i> L.	LC	Annual	Herb Dwarf shrub, succulent
ASTERACEAE	<i>Didelta carnosus</i> (L.f.) Aiton var. <i>carnosus</i>	LC	Perennial	Herb, succulent, suffrutex
ASTERACEAE	<i>Dimorphotheca fruticosa</i> (L.) Less.	LC	Perennial	suffrutex
ASTERACEAE	<i>Dimorphotheca pluvialis</i> (L.) Moench	LC	Annual	Herb
ASTERACEAE	<i>Dimorphotheca tragus</i> (Aiton) B.Nord. <i>Eriocephalus racemosus</i> L. var. <i>affinis</i> (DC.) Harv.	LC	Perennial	Herb
ASTERACEAE	<i>Felicia dubia</i> Cass.	LC	Perennial	Shrub
ASTERACEAE	<i>Felicia dubia</i> Cass.	LC	Annual	Herb



ASTERACEAE	<i>Felicia elongata</i> (Thunb.) O.Hoffm.	VU	Perennial	Herb, shrub
ASTERACEAE	<i>Foveolina tenella</i> (DC.) K?llersj?	LC	Annual	Herb
ASTERACEAE	<i>Helichrysum indicum</i> (L.) Grierson	LC	Annual	Herb
ASTERACEAE	<i>Helichrysum niveum</i> (L.) Less.	LC	Perennial	Dwarf shrub
ASTERACEAE	<i>Helichrysum tricostatum</i> (Thunb.) Less.	NT	Perennial	Shrub Dwarf shrub, shrub
ASTERACEAE	<i>Leysera gnaphalodes</i> (L.) L.	LC	Perennial	shrub
ASTERACEAE	<i>Monoculus monstrosus</i> (Burm.f.) B.Nord.	LC	Annual	Herb, succulent
ASTERACEAE	<i>Oncosiphon suffruticosum</i> (L.) K?llersj?	LC	Annual	Herb
ASTERACEAE	<i>Othonna coronopifolia</i> L.	LC	Perennial	Shrub, succulent
ASTERACEAE	<i>Othonna cylindrica</i> (Lam.) DC.	LC	Perennial	Shrub, succulent
ASTERACEAE	<i>Othonna floribunda</i> Schltr.	LC	Perennial	Shrub, succulent
ASTERACEAE	<i>Pteronia divaricata</i> (P.J.Bergius) Less.	LC	Perennial	Shrub
ASTERACEAE	<i>Pteronia leptospermoides</i> DC.	LC	Perennial	Shrub
ASTERACEAE	<i>Pteronia onobromoides</i> DC.	LC	Perennial	Shrub
ASTERACEAE	<i>Pteronia ovalifolia</i> DC.	LC	Perennial	Shrub
ASTERACEAE	<i>Pteronia uncinata</i> DC.	LC	Perennial	Shrub
ASTERACEAE	<i>Rhynchopsidium sessiliflorum</i> (L.f.) DC.	LC	Annual	Herb
ASTERACEAE	<i>Senecio glutinarius</i> DC.	DDT	Annual	Herb
ASTERACEAE	<i>Senecio littoreus</i> Thunb. var. <i>littoreus</i>	LC	Annual	Herb
ASTERACEAE	<i>Senecio maritimus</i> L.	LC	Annual	Herb, succulent Dwarf shrub, shrub, succulent
ASTERACEAE	<i>Senecio sarcoides</i> C.Jeffrey	LC	Perennial	shrub, succulent
ASTERACEAE	<i>Senecio scapiflorus</i> (L'H?r.) C.A.Sm.	LC	Perennial	Herb
ASTERACEAE	<i>Steirodiscus tagetes</i> (L.) Schltr.	VU	Annual	Herb Dwarf shrub, shrub
ASTERACEAE	<i>Stoebe capitata</i> P.J.Bergius	LC	Perennial	shrub
BRASSICACEAE	<i>Chamira circaeoides</i> (L.f.) Zahlbr.	LC	Annual	Herb
BRASSICACEAE	<i>Heliophila africana</i> (L.) Marais	LC	Annual	Herb
BRASSICACEAE	<i>Heliophila amplexicaulis</i> L.f.	LC	Annual	Herb
CARYOPHYLLACEAE	<i>Silene ornata</i> Aiton	DDT	Perennial	Herb
CHENOPODIACEAE	<i>Atriplex vestita</i> (Thunb.) Aellen var. <i>appendiculata</i> Aellen	LC	Perennial	Shrub Dwarf shrub, succulent
CHENOPODIACEAE	<i>Salicornia meyeriana</i> Moss	LC	Annual	succulent
CHENOPODIACEAE	<i>Sarcocornia littorea</i> (Moss) A.J.Scott	LC	Perennial	Shrub, succulent
CHENOPODIACEAE	<i>Sarcocornia pillansii</i> (Moss) A.J.Scott var. <i>pillansii</i>	LC	Perennial	Dwarf shrub, succulent
CRASSULACEAE	<i>Tylecodon paniculatus</i> (L.f.) Toelken	LC	Perennial	Shrub, succulent
CYPERACEAE	<i>Ficinia trichodes</i> (Schrad.) Benth. & Hook.f.	LC	Perennial	Cyperoid, herb, mesophyte Cyperoid, emergent hydrophyte,
CYPERACEAE	<i>Schoenoplectus triqueter</i> (L.) Palla	NE	Perennial	helophyte, herb Herb, parasite, succulent
CYTINACEAE	<i>Cytinus capensis</i> Marloth	CR PE	Perennial	succulent
EUPHORBIACEAE	<i>Adenocline violifolia</i> (Kuntze) Prain	LC	Annual	Herb Dwarf shrub, succulent
EUPHORBIACEAE	<i>Euphorbia burmannii</i> E.Mey. ex Boiss.	LC	Perennial	succulent
EUPHORBIACEAE	<i>Euphorbia hamata</i> (Haw.) Sweet	LC	Perennial	Shrub, succulent
EUPHORBIACEAE	<i>Euphorbia mauritanica</i> L. var. <i>mauritanica</i>	LC	Perennial	Shrub, succulent
FABACEAE	<i>Argyrolobium velutinum</i> Eckl. & Zeyh.	EN	Perennial	Dwarf shrub Dwarf shrub, shrub
FABACEAE	<i>Calobota angustifolia</i> (E.Mey.) Boatwr. & B.-E.van Wyk		Perennial	shrub



FABACEAE	<i>Calobota sericea</i> (Thunb.) Boatwr. & B.-E.van Wyk		Perennial	Dwarf shrub, shrub
FABACEAE	<i>Dipogon lignosus</i> (L.) Verdc.	LC	Perennial	Climber, herb
FABACEAE	<i>Indigofera heterophylla</i> Thunb.	LC	Perennial	Dwarf shrub, herb
FABACEAE	<i>Indigofera meyeriana</i> Eckl. & Zeyh.	LC	Perennial	Dwarf shrub, shrub
FABACEAE	<i>Indigofera procumbens</i> L.	LC	Perennial	Climber, herb
FABACEAE	<i>Indigofera psoraloides</i> (L.) L.	VU	Perennial	Herb
FABACEAE	<i>Lessertia capitata</i> E.Mey.	LC	Perennial Annual (occ.)	Herb
FABACEAE	<i>Lessertia herbacea</i> (L.) Druce	LC	perennial)	Herb
FABACEAE	<i>Lessertia stenoloba</i> E.Mey.	LC	Perennial	Herb
FABACEAE	<i>Lessertia tomentosa</i> DC.	LC	Perennial	Herb
FABACEAE	<i>Melolobium adenodes</i> Eckl. & Zeyh.	LC	Perennial	Dwarf shrub
FABACEAE	<i>Melolobium exudans</i> Harv.	LC	Perennial	Dwarf shrub, herb
FABACEAE	<i>Podalyria sericea</i> (Andrews) R.Br. ex Aiton f.	NT	Perennial	Shrub
FABACEAE	<i>Psoralea repens</i> L.	NT	Perennial	Dwarf shrub
FABACEAE	<i>Rhynchosia pinnata</i> Harv.	LC	Perennial	Dwarf shrub Dwarf shrub, shrub
FABACEAE	<i>Sutherlandia frutescens</i> (L.) R.Br.	LC	Perennial Annual (occ.)	shrub
FABACEAE	<i>Vicia benghalensis</i> L.	NE	perennial)	Climber, herb
FRANKENIACEAE	<i>Frankenia repens</i> (P.J.Bergius) Fourc.	LC	Perennial	Dwarf shrub Dwarf shrub, herb, suffrutex
GENTIANACEAE	<i>Chironia baccifera</i> L.	LC	Perennial	herb, suffrutex
GENTIANACEAE	<i>Sebaea exacoides</i> (L.) Schinz <i>Pelargonium carnosum</i> (L.) L'H?r. subsp. <i>carnosum</i>	LC	Annual	Herb
GERANIACEAE	<i>Pelargonium fulgidum</i> (L.) L'H?r. <i>Daubinya zeyheri</i> (Kunth) J.C.Manning & A.M.van der Merwe	LC	Perennial	Shrub, succulent Dwarf shrub, scambler, succulent
GERANIACEAE	<i>Pelargonium fulgidum</i> (L.) L'H?r. <i>Daubinya zeyheri</i> (Kunth) J.C.Manning & A.M.van der Merwe	LC	Perennial	Shrub, succulent Dwarf shrub, scambler, succulent
HYACINTHACEAE	<i>Drimia exuviata</i> (Jacq.) Jessop	EN	Perennial	Geophyte
HYACINTHACEAE	<i>Drimia exuviata</i> (Jacq.) Jessop	LC	Perennial	Geophyte
HYACINTHACEAE	<i>Drimia fragrans</i> (Jacq.) J.C.Manning & Goldblatt	LC	Perennial	Geophyte
HYACINTHACEAE	<i>Lachenalia bulbifera</i> (Cirillo) Engl.	LC	Perennial	Geophyte
HYACINTHACEAE	<i>Lachenalia longibracteata</i> E.Phillips	Declining	Perennial	Geophyte
HYACINTHACEAE	<i>Lachenalia pustulata</i> Jacq.	NT	Perennial	Geophyte
HYACINTHACEAE	<i>Lachenalia rubida</i> Jacq. var. <i>rubida</i>	LC	Perennial	Geophyte
HYACINTHACEAE	<i>Lachenalia viridiflora</i> W.F.Barker	CR	Perennial	Geophyte
HYACINTHACEAE	<i>Veltheimia capensis</i> (L.) DC. <i>Empodium veratrifolium</i> (Willd.) M.F.Thomps.	LC	Perennial	Geophyte
HYPOXIDACEAE	<i>Babiana nana</i> (Andrews) Spreng. subsp. <i>nana</i>	EN	Perennial	Geophyte [No lifeform defined]
IRIDACEAE	<i>Babiana tubiflora</i> (L.f.) Ker Gawl.	EN	Perennial	Geophyte, herb
IRIDACEAE	<i>Babiana tubiflora</i> (L.f.) Ker Gawl.	Declining	Perennial [No lifecycle defined]	Geophyte, herb [No lifeform defined]
IRIDACEAE	<i>Babiana tubulosa</i> (Burm.f.) Ker Gawl. <i>Gladiolus caeruleus</i> Goldblatt & J.C.Manning	VU	Perennial	Geophyte, herb
IRIDACEAE	<i>Babiana tubulosa</i> (Burm.f.) Ker Gawl. <i>Gladiolus caeruleus</i> Goldblatt & J.C.Manning	VU	Perennial	Geophyte, herb
IRIDACEAE	<i>Hesperantha erecta</i> (Baker) Benth. ex Baker	NT	Perennial	Geophyte, herb
IRIDACEAE	<i>Hesperantha erecta</i> (Baker) Benth. ex Baker	NT	Perennial [No lifecycle defined]	Geophyte, herb [No lifeform defined]
IRIDACEAE	<i>Ixia calendulacea</i> Goldblatt & J.C.Manning		Perennial [No lifecycle defined]	Geophyte



IRIDACEAE	<i>Ixia purpureorosea</i> G.J.Lewis	EN	Perennial	Geophyte, herb
IRIDACEAE	<i>Melasphaerula ramosa</i> (L.) N.E.Br.	LC	Perennial	Geophyte, herb
IRIDACEAE	<i>Moraea calcicola</i> Goldblatt	EN	Perennial	Geophyte, herb
IRIDACEAE	<i>Moraea macrocarpa</i> Goldblatt	LC	Perennial	Geophyte, herb
IRIDACEAE	<i>Romulea flava</i> (Lam.) M.P.de Vos var. <i>flava</i>	LC	Perennial	Geophyte, herb
IRIDACEAE	<i>Romulea hirsuta</i> (Steud. ex Klatt) Baker var. <i>hirsuta</i>	LC	Perennial	Geophyte, herb
IRIDACEAE	<i>Romulea obscura</i> Klatt var. <i>blanda</i> M.P.de Vos	LC	Perennial	Geophyte, herb
IRIDACEAE	<i>Romulea saldanhensis</i> M.P.de Vos	EN	Perennial	Geophyte, herb
IRIDACEAE	<i>Watsonia hysterantha</i> J.W.Mathews & L.Bolus	NT	Perennial	Geophyte, herb
JUNCAGINACEAE	<i>Triglochin bulbosa</i> L.	LC	Perennial	Helophyte, herb
LAMIACEAE	<i>Ballota africana</i> (L.) Benth.	LC	Perennial	Dwarf shrub, herb
LAMIACEAE	<i>Salvia africana-lutea</i> L.	LC	Perennial	Shrub
LAMIACEAE	<i>Stachys aethiopica</i> L.	LC	Perennial	Herb
LAMIACEAE	<i>Stachys bolusii</i> Skan	LC	Perennial	Herb
LORANTHACEAE	<i>Septulina glauca</i> (Thunb.) Tiegh.	LC	Perennial	Parasite, shrub, succulent Dwarf shrub, shrub
MALVACEAE	<i>Anisodontea scabrosa</i> (L.) Bates	LC	Perennial	Shrub
MALVACEAE	<i>Hermannia prismatocarpa</i> E.Mey. ex Harv.	LC	Perennial	Dwarf shrub
MALVACEAE	<i>Hermannia procumbens</i> Cav. subsp. <i>myrrhifolia</i> (Thunb.) De Winter	EN	Perennial	Herb
MALVACEAE	<i>Lavatera arborea</i> L.	NE	Perennial	Shrub
MELIANTHACEAE	<i>Melianthus elongatus</i> Wijnands	LC	Perennial	Shrub
MESEMBRYANTHEMACEAE	<i>Antimima limbata</i> (N.E.Br.) H.E.K.Hartmann	EN	Perennial	Succulent
MESEMBRYANTHEMACEAE	<i>Carpobrotus acinaciformis</i> (L.) L.Bolus	LC	Perennial	Succulent
MESEMBRYANTHEMACEAE	<i>Cephalophyllum rostellum</i> (L.Bolus) H.E.K.Hartmann	EN	Perennial	Succulent
MESEMBRYANTHEMACEAE	<i>Cheiridopsis rostrata</i> (L.) N.E.Br.	VU	Perennial	Succulent
MESEMBRYANTHEMACEAE	<i>Conicosia pugioniformis</i> (L.) N.E.Br. subsp. <i>pugioniformis</i>	LC	Perennial	Succulent
MESEMBRYANTHEMACEAE	<i>Disphyma crassifolium</i> (L.) L.Bolus	LC	Perennial	Succulent
MESEMBRYANTHEMACEAE	<i>Dorotheanthus bellidiformis</i> (Burm.f.) N.E.Br. subsp. <i>bellidiformis</i>	LC	Annual	Succulent
MESEMBRYANTHEMACEAE	<i>Drosantheum hispidifolium</i> (Haw.) Schwantes	VU	Perennial	Succulent
MESEMBRYANTHEMACEAE	<i>Lampranthus amoenus</i> (Salm-Dyck ex DC.) N.E.Br.	EN	Perennial	Succulent Geophyte, succulent
MESEMBRYANTHEMACEAE	<i>Phyllobolus canaliculatus</i> (Haw.) Bittrich	LC	Perennial	Succulent
MESEMBRYANTHEMACEAE	<i>Ruschia geminiflora</i> (Haw.) Schwantes	VU	Perennial	Shrub, succulent
MESEMBRYANTHEMACEAE	<i>Ruschia klipbergensis</i> L.Bolus	DDD	Perennial	Succulent
MESEMBRYANTHEMACEAE	<i>Ruschia macowanii</i> (L.Bolus) Schwantes	LC	Perennial	Shrub, succulent
MOLLUGINACEAE	<i>Limeum africanum</i> L. subsp. <i>africanum</i>	LC	Perennial	Dwarf shrub, herb
MOLLUGINACEAE	<i>Pharnaceum confertum</i> (DC.) Eckl. & Zeyh. var. <i>confertum</i>	LC	Perennial	Dwarf shrub
ORCHIDACEAE	<i>Corycium orobanchoides</i> (L.f.) Sw.	LC	Perennial	Geophyte, herb
ORCHIDACEAE	<i>Pterygodium volucris</i> (L.f.) Sw.	LC	Perennial	Geophyte, herb
ORCHIDACEAE	<i>Satyrium odorum</i> Sond.	LC	Perennial Annual (occ.)	Geophyte, herb
OROBANCHACEAE	<i>Harveya squamosa</i> (Thunb.) Steud.	LC	perennial)	Herb, parasite
OROBANCHACEAE	<i>Hyobanche sanguinea</i> L.	LC	Annual	Herb, parasite
OXALIDACEAE	<i>Oxalis pusilla</i> Jacq.	LC	Perennial	Geophyte



PAPAVERACEAE	<i>Papaver rhoeas</i> L.	NE	Annual (occ. perennial)	Herb
PLUMBAGINACEAE	<i>Limonium acuminatum</i> L. Bolus	VU	Perennial	Dwarf shrub
PLUMBAGINACEAE	<i>Limonium capense</i> (L. Bolus) L. Bolus		Perennial	Dwarf shrub Dwarf shrub, shrub
PLUMBAGINACEAE	<i>Limonium peregrinum</i> (P. J. Bergius) R. A. Dyer		Perennial	shrub
POACEAE	<i>Avena barbata</i> Pott ex Link	NE	Annual	Graminoid
POACEAE	<i>Briza minor</i> L.	NE	Annual	Graminoid
POACEAE	<i>Bromus diandrus</i> Roth	NE	Annual	Graminoid
POACEAE	<i>Bromus pectinatus</i> Thunb.	LC	Annual	Graminoid
POACEAE	<i>Chaetobromus involucratus</i> (Schrad.) Nees subsp. <i>involucratus</i>	LC	Perennial Perennial (occ.)	Graminoid
POACEAE	<i>Ehrharta calycina</i> Sm.	LC	annual)	Graminoid
POACEAE	<i>Ehrharta longiflora</i> Sm.	LC	Annual	Graminoid
POACEAE	<i>Hordeum geniculatum</i> All.	NE	Annual	Graminoid
POACEAE	<i>Lophochloa cristata</i> (L.) Hyl.	NE	Annual	Graminoid
POACEAE	<i>Lophochloa pumila</i> (Desf.) Bor	NE	Annual	Graminoid
POACEAE	<i>Phalaris canariensis</i> L.	NE	Annual	Graminoid
POACEAE	<i>Phalaris minor</i> Retz.	NE	Annual	Graminoid
POACEAE	<i>Tribolium echinatum</i> (Thunb.) Renvoize	LC	Annual	Graminoid
POACEAE	<i>Tribolium hispidum</i> (Thunb.) Desv.	LC	Perennial	Graminoid
POACEAE	<i>Vulpia muralis</i> (Kunth) Nees	NE	Perennial	Graminoid Dwarf shrub, shrub
POLYGALACEAE	<i>Muraltia macropetala</i> Harv.	VU	Perennial	shrub
POLYGALACEAE	<i>Polygala myrtifolia</i> L. var. <i>myrtifolia</i>	LC	Perennial	Shrub
POTTIACEAE	<i>Pseudocrossidium crinitum</i> (Schultz) R. H. Zander <i>Leucadendron thymifolium</i> (Salisb. ex Knight) I. Williams	CR	Perennial	Bryophyte
PROTEACEAE				
RESTIONACEAE	<i>Restio bifurcus</i> Nees ex Mast.	LC	Perennial	Shrub Dwarf shrub, restioid
RHAMNACEAE	<i>Phylica greyii</i> Pillans <i>Nenax hirta</i> (Cruse) T. M. Salter subsp. <i>calcipbila</i> Puff	EN	Perennial	Dwarf shrub
RUBIACEAE	<i>Agathosma bisulca</i> (Thunb.) Bartl. & H. L. Wendl.	NT	Perennial	Shrub Dwarf shrub, shrub
RUTACEAE	<i>Agathosma imbricata</i> (L.) Willd.	LC	Perennial	shrub
RUTACEAE	<i>Agathosma peglerae</i> Dummer	LC	Perennial	Dwarf shrub
RUTACEAE	<i>Diosma guthriei</i> P. E. Glover	VU	Perennial	Dwarf shrub
RUTACEAE	<i>Diosma haelkraalensis</i> I. Williams	EN	Perennial	Dwarf shrub Dwarf shrub, parasite, shrub
SANTALACEAE	<i>Thesium spinosum</i> L. f.	LC	Perennial	parasite, shrub
SCROPHULARIACEAE	<i>Chaenostoma uncinatum</i> (Desr.) Kornhall	LC	Perennial	Dwarf shrub, herb
SCROPHULARIACEAE	<i>Diascia capensis</i> (L.) Britten	LC	Annual	Herb
SCROPHULARIACEAE	<i>Diascia diffusa</i> Benth.	LC	Annual	Herb
SCROPHULARIACEAE	<i>Diascia sacculata</i> Benth.	LC	Annual	Herb
SCROPHULARIACEAE	<i>Dischisma spicatum</i> (Thunb.) Choisy	LC	Annual	Herb
SCROPHULARIACEAE	<i>Hemimeris racemosa</i> (Houtt.) Merr.	LC	Annual	Herb
SCROPHULARIACEAE	<i>Hemimeris sabulosa</i> L. f.	LC	Annual	Herb
SCROPHULARIACEAE	<i>Manulea rubra</i> (P. J. Bergius) L. f.	LC	Perennial	Herb
SCROPHULARIACEAE	<i>Nemesia grandiflora</i> Diels <i>Nemesia versicolor</i> E. Mey. ex Benth. var. <i>versicolor</i>	DDT	Annual	Herb
SCROPHULARIACEAE		LC	Annual	Herb





SCROPHULARIACEAE	<i>Oftia africana</i> (L.) Bocq.	LC	Perennial	Dwarf shrub, shrub
SCROPHULARIACEAE	<i>Oftia revoluta</i> (E.Mey.) Bocq.	LC	Perennial	Dwarf shrub, shrub
SCROPHULARIACEAE	<i>Phyllopodium capillare</i> (L.f.) Hilliard	NT	Annual	Herb
SCROPHULARIACEAE	<i>Zaluzianskya parviflora</i> Hilliard	NT	Annual [No lifecycle defined]	Herb
TELOSCHISTACEAE	<i>Xanthodactylon flammea</i> (L.f.) C.W.Dodge			Lichen
THYMELAEACEAE	<i>Struthiola leptantha</i> Bolus	LC	Perennial	Dwarf shrub, shrub
URTICACEAE	<i>Didymodoxa capensis</i> (L.f.) Friis & <i>Wilmot-Dear</i> var. <i>capensis</i>	LC	Annual	Herb
URTICACEAE	<i>Didymodoxa capensis</i> (L.f.) Friis & <i>Wilmot-Dear</i> var. <i>integrifolia</i> (Wedd.) Friis & <i>Wilmot-Dear</i>	LC	Annual	Herb
ZOSTERACEAE	<i>Zostera capensis</i> Setch.	LC	Perennial	Herb, hydrophyte
ZYGOPHYLLACEAE	<i>Zygophyllum cordifolium</i> L.f.	LC	Perennial	Dwarf shrub, shrub, succulent
ZYGOPHYLLACEAE	<i>Zygophyllum flexuosum</i> Eckl. & Zeyh.	LC	Perennial	Dwarf shrub, shrub, succulent



**APPENDIX B**  
***Vegetation Index Score***



### Vegetation Index Score – Transformed habitat unit

**1.  $EVC = \frac{EVC1 + EVC2}{2}$**

**EVC 1 - Percentage natural vegetation cover:**

Vegetation cover %	0%	1-5%	6-25%	26-50%	51-75%	76-100%
Site score		X				
<b>EVC 1 score</b>	0	1	2	3	4	5

**EVC2 - Total site disturbance score:**

Disturbance score	0	Very Low	Low	Moderately	High	Very High
Site score						X
<b>EVC 2 score</b>	5	4	3	2	1	0

**2.  $SI = \frac{SI1 + SI2 + SI3 + SI4}{4}$**

Score:	Trees (SI1)		Shrubs (SI2)		Forbs (SI3)		Grasses (SI4)	
	Present State	Perceived Reference State	Present State	Perceived Reference State	Present State	Perceived Reference State	Present State	Perceived Reference State
Continuous				X			X	
Clumped						X		
Scattered		X			X			
Sparse	X		X					X

Present State (P/S) = Currently applicable for each habitat unit

Perceived Reference State (PRS) = If in pristine condition

Each SI score is determined with reference to the following scoring table of vegetation distribution for present state versus perceived reference state.

Perceived Reference state (PRS)	Present state (P/S)			
	Continuous	Clumped	Scattered	Sparse
Continuous	3	2	1	0
Clumped	2	3	2	1
Scattered	1	2	3	2
Sparse	0	1	2	3



$$3. \quad PVC = [(EVC) - ((exotic \times 0.7) + (bare \text{ ground} \times 0.3))] = -3.3$$

**Percentage vegetation cover (exotic):**

Vegetation cover %	0%	1-5%	6-25%	26-50%	51-75%	76-100%
						X
<b>PVC Score</b>	0	1	2	3	4	5

**Percentage vegetation cover (bare ground):**

Vegetation cover %	0%	1-5%	6-25%	26-50%	51-75%	76-100%
		X				
<b>PVC Score</b>	0	1	2	3	4	5

**4. RIS**

Extent of indigenous species recruitment	0	Very Low	Low	Moderate	High	Very High
		X				
<b>RIS</b>	0	1	2	3	4	5

$$VIS = [(EVC) + ((5 \times PVC) + (RIS))] = -1.8$$

The final VIS scores for each habitat unit are then categorised as follows:

Vegetation Index Score	Assessment Class	Description
22 to 25	A	Unmodified, natural
18 to 22	B	Largely natural with few modifications.
14 to 18	C	Moderately modified
10 to 14	D	Largely modified
5 to 10	E	The loss of natural habitat extensive
<5	F	Modified completely



### Vegetation Index Score Wetland habitat unit

**1.  $EVC = \frac{EVC1 + EVC2}{2}$**

**EVC 1 - Percentage natural vegetation cover:**

Vegetation cover %	0%	1-5%	6-25%	26-50%	51-75%	76-100%
Site score						X
<b>EVC 1 score</b>	0	1	2	3	4	5

**EVC2 - Total site disturbance score:**

Disturbance score	0	Very Low	Low	Moderately	High	Very High
Site score				X		
<b>EVC 2 score</b>	5	4	3	2	1	0

**2.  $SI = \frac{SI1 + SI2 + SI3 + SI4}{4}$**

Score:	Trees (SI1)		Shrubs (SI2)		Forbs (SI3)		Grasses (SI4)	
	Present State	Perceived Reference State	Present State	Perceived Reference State	Present State	Perceived Reference State	Present State	Perceived Reference State
Continuous					X	X		
Clumped								
Scattered							X	
Sparse	X	X	X	X				X

Present State (P/S) = Currently applicable for each habitat unit

Perceived Reference State (PRS) = If in pristine condition

Each SI score is determined with reference to the following scoring table of vegetation distribution for present state versus perceived reference state.

Perceived Reference state (PRS)	Present state (P/S)			
	Continuous	Clumped	Scattered	Sparse
Continuous	3	2	1	0
Clumped	2	3	2	1
Scattered	1	2	3	2
Sparse	0	1	2	3



$$3. \quad PVC = [(EVC) - ((exotic \times 0.7) + (bare \text{ ground} \times 0.3))] = 2.8$$

**Percentage vegetation cover (exotic):**

Vegetation cover %	0%	1-5%	6-25%	26-50%	51-75%	76-100%
		X				
<b>PVC Score</b>	0	1	2	3	4	5

**Percentage vegetation cover (bare ground):**

Vegetation cover %	0%	1-5%	6-25%	26-50%	51-75%	76-100%
		X				
<b>PVC Score</b>	0	1	2	3	4	5

**4. RIS**

Extent of indigenous species recruitment	0	Very Low	Low	Moderate	High	Very High
						X
<b>RIS</b>	0	1	2	3	4	5

$$VIS = [(EVC) + ((6 \times PVC) + (RIS))] = 16.2$$

The final VIS scores for each habitat unit are then categorised as follows:

Vegetation Index Score	Assessment Class	Description
22 to 25	A	Unmodified, natural
18 to 22	B	Largely natural with few modifications.
14 to 18	C	Moderately modified
10 to 14	D	Largely modified
5 to 10	E	The loss of natural habitat extensive
<5	F	Modified completely



### Vegetation Index Score: Strandveld habitat unit

**5.  $EVC = \frac{EVC1 + EVC2}{2}$**

**EVC 1 - Percentage natural vegetation cover:**

Vegetation cover %	0%	1-5%	6-25%	26-50%	51-75%	76-100%
Site score						X
<b>EVC 1 score</b>	0	1	2	3	4	5

**EVC2 - Total site disturbance score:**

Disturbance score	0	Very Low	Low	Moderately	High	Very High
Site score		X				
<b>EVC 2 score</b>	5	4	3	2	1	0

**6.  $SI = \frac{SI1 + SI2 + SI3 + SI4}{4}$**

Score:	Trees (SI1)		Shrubs (SI2)		Forbs (SI3)		Grasses (SI4)	
	Present State	Perceived Reference State	Present State	Perceived Reference State	Present State	Perceived Reference State	Present State	Perceived Reference State
Continuous			X	X				
Clumped					X	X		
Scattered	X	X					X	
Sparse								X

Present State (P/S) = Currently applicable for each habitat unit

Perceived Reference State (PRS) = If in pristine condition

Each SI score is determined with reference to the following scoring table of vegetation distribution for present state versus perceived reference state.

Perceived Reference state (PRS)	Present state (P/S)			
	Continuous	Clumped	Scattered	Sparse
Continuous	3	2	1	0
Clumped	2	3	2	1
Scattered	1	2	3	2
Sparse	0	1	2	3

**7.  $PVC = \frac{EVC - (exotic \times 0.7) + (bare \ ground \times 0.3)}{2}$**





## 8. RIS

### Percentage vegetation cover (exotic):

	0%	1-5%	6-25%	26-50%	51-75%	76-100%
Vegetation cover %		X				
<b>PVC Score</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

### Percentage vegetation cover (bare ground):

	0%	1-5%	6-25%	26-50%	51-75%	76-100%
Vegetation cover %		X				
<b>PVC Score</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Extent of indigenous species recruitment</b>	<b>0</b>	<b>Very Low</b>	<b>Low</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>
						X
<b>RIS</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

$$\text{VIS} = [( \text{EVC} ) + ( ( \text{SixPVC} ) + ( \text{RIS} ) )] = 19$$

The final VIS scores for each habitat unit are then categorised as follows:

Vegetation Index Score	Assessment Class	Description
22 to 25	<b>A</b>	Unmodified, natural
18 to 22	<b>B</b>	Largely natural with few modifications.
14 to 18	<b>C</b>	Moderately modified
10 to 14	<b>D</b>	Largely modified
5 to 10	<b>E</b>	The loss of natural habitat extensive
<5	<b>F</b>	Modified completely



# **ARCHAEOLOGICAL IMPACT ASSESSMENT**

## **PROPOSED CONSTRUCTION OF A BOUNDARY WALL AROUND THE SALDANHA BAY MILITARY BASE SALDANHA BAY**

Prepared for:

**Delta Built Environmental Consultants**

On behalf of:

**NATIONAL DEPARTMENT OF PUBLIC WORKS**

By

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**FEBRUARY  
2013**

## **Executive summary**

### **Introduction**

ACRM was appointed to conduct an Archaeological Impact Assessment (AIA) for the proposed construction of a 3m high security wall around the northern boundary of the Saldanha Bay Military Base in Saldanha Bay in the Western Cape.

The length of the proposed new wall is about 5 kms long, while excavations for the wall foundations will be 1.5m deep. A gravel service road at Tabakbaai will also be upgraded. Office space and ablutions for security staff near the entrance to the base will be provided.

The new wall is intended to replace the existing diamond mesh fence, which has been vandalized. The diamond mesh fence along the dune cordon at Tabakbaai will be replaced.

The aim of the study is to locate and map archaeological sites/remains that may be impacted by the proposed development, to assess the significance of the potential impacts and to propose measures to mitigate any impacts.

### **Results of the study**

- Severely damaged/destroyed shell midden deposits were encountered on the steep slopes below the dune cordon on the beach at Tabakbaai.
- Two small patches of shellfish were found alongside the existing diamond mesh fence in Diaz Road at Tabakbaai.
- Fragments of shellfish were encountered in the gravel service road inside the military base at Tabakbaai.
- Extensive shell midden deposits, including a few stone implements were documented on the soft vegetated sands, in a wide arc alongside the service road at Tabakbaai.
- Two World War II underground ammunition bunkers occur between 50-120m from the proposed boundary wall, inside the military base.

### **Predicted impacts**

The gravel service road near Tabakbaai will be widened by about 0.5m, and proposed upgrading of the road will impact on archaeological deposits.

Excavations for the new security wall might impact on potentially important sub-surface archaeological deposits.

Unmarked human remains may be uncovered during excavations for the wall foundations.

## Archaeological study, Saldanha Bay Security Wall

It is noted that the Later Stone Age site known as Diaz Street Midden (or DSM) is located about 2.5 kms north east of Tabakbaai, alongside Diaz Road. This important archaeological site was almost destroyed during construction of the Saldanha Bay Police Station in 2007. Six Khoisan skeletons were recovered from the site.

Ancient raised shell beach deposits and important vertebrate fossils may be exposed in underlying sand and limestone deposits during excavations for the wall foundations.

With regard to the proposed construction of a new boundary wall at the Saldanha Bay Military Base, the following recommendations are made:

1. Excavations for the wall foundations alongside Diaz Road/Tabakbaai must be monitored by a professional archaeologist. Should any sub-surface archaeological deposits be encountered during monitoring, some sampling may be required.

Excavations must also be inspected for fossil content.

2. Upgrading, of the internal service road alongside Diaz Road on military property must not extend more than 0.5m south of the existing road.

3. If any unmarked human remains are exposed or uncovered during excavations, these must immediately be reported to the archaeologists (Jonathan Kaplan 082 321 0172), or Heritage Western Cape (Mr Troy Smuts 021 483 9685). Burials must not be disturbed or removed until inspected by the archaeologist.

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## **1. INTRODUCTION**

### **1.1 Background and brief**

ACRM was appointed by Delta BEC to conduct an Archaeological Impact Assessment (AIA) for the proposed construction of a 3m high concrete security wall around the northern boundary of the Saldanha Bay Military Base, in Saldanha Bay in the Western Cape (Figures 1 & 2). The applicant is the National Department of Public Works.

The length of the proposed new wall is about 5 kms long, while excavations for the wall foundations will be 1.5m deep. Office space and ablutions for security staff near the entrance to the base will also be provided. A gravel service road inside the military base at Tabakbaai will be upgraded. Upgrading will entail widening the road 0.5m to the south.

The new wall is intended to replace the existing diamond mesh fence, which has been vandalized. The concrete wall will stop 50m short of the High Water Mark at Tabakbaai.

The broken mesh fence along the dune cordon on the beach in Tabakbaai will also be replaced.

A Notification of Intent to Develop (NID) was completed by Bridget O'Donoghue Heritage Consultants and submitted to Heritage Western Cape (HWC). HWC requested that a HIA, assessing the impacts of the development on archaeological resources, as well as a visual impact, and scenic resource study, must be done.

The HIA forms part of the Environmental Impact Assessment (EIA) process that is being undertaken by Doug Jeffery Environmental Consultants.

## **2. LEGAL FRAMEWORK**

Section 38 (1) (a) of the National Heritage Resources Act (No 25 of 1999) indicates that any person constructing a powerline, pipeline or road, or similar linear development or barrier exceeding 300m in length is required to notify the responsible heritage resources authority, who will in turn advise whether an impact assessment report is needed

## **3. TERMS OF REFERENCE**

The Terms of Reference for the archaeological study were to:

- Determine whether there are likely to be any important archaeological heritage that may potentially be impacted by the proposed development;
- Indicate any constraints that would need to be taken into account in considering the development proposal;
- Identify potentially sensitive archaeological areas, and
- Recommend any further mitigation action.

# Archaeological study, Saldanha Bay Security Wall



Figure 1. Locality map



Figure 2. Google Earth photograph indicating the position of the proposed boundary wall. All the landholdings south of the yellow line are administered by the SANDF. DSM is the location site of the Diaz Street Midden.



#### 4. DESCRIPTION OF THE RECEIVING ENVIRONMENT

The Saldanha Bay Military Base is located in the west coast town of Saldanha Bay. Access to the property is through the security gate at the harbour entrance (refer to Figure 2). All of the landholdings south of the proposed boundary wall (in yellow) are administered by the South African National Defence Force (SANDF).

At Tabakbaai, the broken diamond wire mesh fence at the beach and on the dune cordon will be replaced (Figures 3 & 4), while the wire mesh fence alongside Diaz Road (Figures 5-9) and the northern boundary of the base will be replaced with a new 3m high concrete wall (Figures 10-18).



Figure 3. The beach at Tabakbaai



Figure 4. The dune cordon at Tabakbaai.



Figure 5. View from Tabakbaai looking east. The gravel service road is to right of the fence.



Figure 6. Service road and fence alongside Diaz Road



Figure 7. Service road & fence alongside Diaz Road



Figure 9. View looking back toward Tabakbaai



Figure 8. Service road and fence alongside Diaz Road



Figure 10. View along vibracrete wall facing south



Figure 11. View along vibracrete wall facing east



Figure 12. View along vibracrete wall facing east





Figure 13. View along vibracrete wall facing east



Figure 15. View facing south



Figure 14. View along vibracrete wall facing east



Figure 16. View facing south



Figure 17. View facing east



Figure 18. View facing east.

## **5 STUDY APPROACH**

### **5.1 Method**

A site visit and assessment took place on the 21 January, 2013. The beach and frontal dunes at Tabakbaai, and the length of the proposed new wall, from high water mark till the vibracrete wall ( $\pm 1.1$  km) were searched for archaeological remains. A track path of the survey was created (refer to Figure 26 in Appendix I). The remainder of the route was driven by vehicle and intermittently searched along the way. Archaeological remains were recorded using a hand held GPS device set on the map datum WGS 84 (refer to Figure 26). A desk top study was also done.

### **5.2 Constraints and limitations**

There were no constraints or limitations associated with the study. Archaeological visibility is high alongside the gravel service road at Tabakbaai. However, there are large volumes of domestic debris and litter all along the vibracrete wall that abuts the township housing, but this area is not expected to yield any surface pre-colonial archaeological heritage.

### **5.3 Identification of potential risks**

- Shell midden deposits and human burials may be exposed or uncovered during excavations for the wall foundations. Shell midden deposits at Lentjiesklip (Hart 1997, 2001; Parkington *et al* 1988) on the eastern shore of the Langebaan Lagoon, for example, have been found buried up to three meters below the sand body.
- Ancient shell beach deposits and vertebrate fossils may be exposed in underlying sand and limestone deposits during excavations for the wall foundations.

### **5.4 Results of the desk top study**

Since the mid-1990s, numerous AIAs have been conducted in Saldanha Bay, north of the port terminal (Kaplan 1994, 1996, 1997a, 2007a), where archaeological remains assigned mainly to the Early and Middle Stone Age have mostly been documented. Later Stone Age sites have also been recorded on and nearer to the coast south of the town (Kaplan 1997b, 1998, 2006, 2007b) where the remains typically comprise dispersed scatters of shellfish, a few stone artefacts, ostrich eggshell and pottery. None of these sites has been dated. There are also shell middens with stone artefacts dating to the Middle Stone Age (MSA) in Saldanha Bay. The evidence from Sea Harvest and Hoedjiespunt, for example, has provided some of the earliest evidence we have in the world for the human exploitation of coastal resources, more than 100 000 years ago. Beside evidence of well preserved bone, ostrich eggshell, ochre and stone implements, the Sea Harvest and Hoedjiespunt sediments also contains evidence of early modern human about 125 000 years ago (Grine & Klein 1993; Volman 1978; Berger & Parkington 1995).

Bateman (1946) also documented LSA middens in the vicinity of the Saldanha military base, as well as a few MSA occurrences, and Kaplan (2012) documented LSA middens at the site of the proposed new Saldanha Bay military sick bay, as well as along the shoreline inside the base. Rudner (1968) also recorded a cave with shell midden

deposits at Noordbaaikop inside the military base. Archaeological excavations at the planned new sick bay revealed substantial sub-surface LSA deposits, including shellfish, large volumes of marine fauna, stone artefacts, and ostrich eggshell (Smith 2013, 2012). A sample of bone taken from the excavation was dated to 2 500 years BP, while the presence of pottery also indicates that the site was visited after 2000 years ago. Shell middens have also been reported from Tabakbaai and further north toward Jacobsbaai (Kaplan 1993).

But it is the recent salvage excavations and recovery of six LSA Khoisan skeletons from the Diaz Street Midden (DSM) (Orton 2009; Dewar 2009), more than 2kms inland from the shoreline, that has focussed attention on the important LSA industry in Saldanha Bay. More than 4000 stone artefacts were recovered from the small excavation (the site of the new Saldanha Bay Police Station), where sadly a large portion of the archaeological deposits had already been destroyed during construction work. While all of the recent upper deposits (probably dating to the last 2000-3000 years) were destroyed during initial earthworks, some of the underlying deposits were still intact by the time the archaeologists were notified, when the first of the burials were uncovered. These deposits were later dated to between 5000 and 6000 years ago, and comprised thousands of stone artefacts (including many retouched tools such as scrapers and backed artefacts). Ostrich eggshell (OES) beads, decorated fragments of OES and some worked bone were also found, as well as subsistence remains including shellfish, crayfish and marine fauna.

## 6. RESULTS

As anticipated, most of the archaeological heritage located during the study is confined to the immediate shoreline and the inland area within 300m of the High Water Mark (Kaplan 1993).

A severely damaged midden (SBMW1) was encountered immediately below the frontal dunes on which the mesh wire fence has been built, at Tabakbaai (Figure 19). Most of the shellfish has spilled down the very steep slopes and is a mix of both modern and pre-colonial shell. No shell lenses, or any dispersed shellfish was noted in the steep dunes where pedestrian traffic is extensive and where the dunes are severely degraded. There is much plastic, glass, rusted metal and domestic debris lying around. There is no shellfish visible on, or behind the dune cordon, or along the fence line.

The ex-situ shellfish below the dunes are dominated by limpets (mainly Scutellastra argenvillei), with smaller amounts of Black Mussel (Choromytilus meridionalis) occurring. A few small fragments of Perlemoen (Haliotis) were also recorded.

With regard to archaeological finds, only one small piece of weathered ostrich eggshell, one rough quartzite stone flake and a few pieces of weathered bone including tortoise and bird were found. It is unclear whether the bone is modern or is in an archaeological context. The site is severely degraded.

A small patch of very fragmented and weathered shellfish (SBMW2), dominated by limpets occurs on soft sand directly alongside the wire mesh fence (Figure 20), while fragments of shellfish, including one or two whole S. argenvillei, were also noted in gravel service road (Figure 21). No cultural remains were found.



An extensive scatter of shellfish (SBMW3) was encountered immediately south of the gravel service road, on the flat vegetated dunes. The shellfish occurs in a wide arc, and the extent of the site is more or less defined by the track path in Figure 25. The scatter of shellfish is fairly diffuse however, as is usually the case for sites of this nature, but several denser patches of shellfish occurs on the soft loose sands in the surrounding area (Figures 22 & 23).

The shellfish is dominated by limpets S. argenvillei and Cymbula granatina, with some Black Mussel also occurring. Bits of loose calcrete were also noted lying about. Dune mole rat activity is fairly extensive and some shellfish was recorded among the sand dumps, suggesting that sub-surface archaeological deposits do exist. One quartzite flake, and six silcrete flakes and chunks, including three utilized flakes were found. A small pecked shale beach cobble, and a tiny piece of red ochre, was also found. No pottery was found suggesting that the site may be older than 2000 years. While a few pieces of glass and rusted metal were noted, the archaeological site is undisturbed.

A few pieces of weathered shellfish (SBMW4) - including S. argenvillei and C. granatina were encountered on the northern side of the wire mesh fence, on soft sands and among pieces of loose calcrete alongside Diaz Road. No cultural remains were found. This side of the fence is severely degraded.

Two World War II (WWII) ammunition bunkers (SBMW5) were pointed out the archaeologist by Chief Petty Officer Hammond of the SANDF (Figure 24 & refer to Figure 26). The bunkers are situated between 50 and 120m south of the proposed boundary wall, and will not be impacted by the construction of the new security wall. The bunkers are protected features under the National Heritage Resource Act (No. 25 of 1999)



Figure 19. SMMW1 on the beach at Tabakbaai



Figure 20. SBMW2



Figure 21. SBMW2. Arrow indicates shellfish



Figure 23. SBMW3. Note the distance to the fence



Figure 22. SBMW3.



Figure 24. SBMW5. One of two WWII ammunition bunkers

### 6.1 Significance of the archaeological remains

Given the DSM experience where important sub-surface archaeological deposits were lost during the construction of the Saldanha Bay Police Station; the archaeological remains (i. e. SBMW3) encountered alongside the gravel service road at Tabakbaai have been provisionally rated as having medium-high (Grade 3B) significance.

SBMW1, SBMW2 and SBMW4 have been rated as having low (Grade 3C) significance.





Figure 25. The extent of SBMW3 is illustrated by the green hatched line. The coastal platform is a sensitive archaeological zone.

### 6.1 Significance of the archaeological remains

Given the DSM experience where important sub-surface archaeological deposits were lost during the construction of the Saldanha Bay Police Station; the archaeological remains (i. e. SBMW3) encountered alongside the gravel service road at Tabakbaai have been provisionally rated as having medium-high (Grade 3B) significance.

SBMW1, SBMW2 and SBMW4 have been rated as having low (Grade 3C) significance.

### 7. PREDICTED IMPACTS

The proposed construction of a concrete boundary wall alongside Diaz Road in Saldanha Bay is not likely to impact negatively on any significant surface archaeological heritage, but excavations for the 1.5 m deep foundations may expose potentially important sub-surface deposits.

Unmarked pre-colonial human remains/burials may also be uncovered during excavations for the wall foundations.

Upgrading (i. e. widening) of the internal service road by 0.5m will intrude into and impact on surface archaeological deposits south of the road, but these impacts are expected to be limited.

Fossil remains and MSA archaeological occurrences may possibly be intersected or exposed should excavations for the wall foundations penetrate underlying limestone

deposits. According to palaeontologist Dr John Pether (2007), excavations greater than 1 m deep into the subsurface of the coastal plain around Saldanha Bay for example often encounter fossils in underlying strata. The fossils could be shelly beds or more sporadic occurrences such as bones.

## **8. RECOMMENDATIONS**

With regard to the proposed construction of a new 3m high security wall around the northern boundary of the Saldanha Bay Military Base in Saldanha bay, the following recommendations are made:

1. Excavations for the wall foundations alongside Diaz Road/Tabakbaai must be monitored by a professional archaeologist. Should any sub-surface archaeological deposits be encountered during monitoring, some sampling may be required.

Excavations must also be inspected for fossil content.

2. Upgrading, of the gravel service road alongside Diaz Road on military property must not extend more than 0.5m south of the existing internal road.

3. If any unmarked human remains are exposed or uncovered during excavations, these must immediately be reported to the archaeologists (Jonathan Kaplan 082 321 0172), or Heritage Western Cape (Mr Troy Smuts 021 483 9685). Burials must not be disturbed or removed until inspected by the archaeologist.

## 9. REFERENCES

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Appendix I





Figure 26. GPS track path and illustration of waypoints.

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## **APPENDIX E**

### **PUBLIC PARTICIPATION**

- **Appendix E1 – Newspaper advertisements and notices**
- **Appendix E2 – Stakeholder notification**
- **Appendix E3 – Authorities Notification**
- **Appendix E4 – List of I&APs**
- **Appendix E5 – Minutes of Public Participation Meeting**



**STARTS FRIDAY 25 JANUARY 2013**  
**DOORS OPEN 08H30**

• WOMENSWEAR • MENSWEAR • SHOES • LINGERIE  
 • SWIMMING COSTUMES • SURFWEAR • BEDDING

**A.P. JONES**  
 SINCE 1930

**MAIN ROAD 011 781 6111 FISH HOEK**

**NOTICE OF MEETING**

**BASIC ASSESSMENT FOR THE PROPOSED SALMANHA NAVAL BASE REPLACEMENT OF AN EXISTING SECURITY FENCE**

STATE REFERENCE: DE/EA/160/1997/2012  
 DEIA REFERENCE: SA/12/16/2/1/1/765

Notice is hereby given of a public participation process in terms of the NEMA Environmental Impact Assessment Act (Act 107 of 1994).

Description: The proposed project entails the replacement of an existing security fence, due to erosion and vandalism in the area. The Salhanha Naval Base will require a high concrete wall along the entire boundary of the property. A security wall of approximately 7.5m will be erected (where possible) to the new security wall. At appropriate locations and intervals security lighting will be installed along the wall inside the Naval Base. An entrance gate similar to the one at the existing entrance gate is required. This gate should provide sufficient space and visibility for security monitoring vehicles.

Location: Salhanha Naval Base, Stellenbosch.

Applicant: National Department of Public Works.

Environmental Assessment Practitioner: DELTA Earth Environmental Consultants (DEEA PTA).

Application for Environmental Authorisation to undertake the following listed activities:  
 18 (terms of Environmental Notice No. 8544 of 18 June 2012), 13 (03) & 40 (06)  
 in terms of Government Notice No. 8546 of 19 June 2012, 4 (10), 12 (01B), 13 (2) (01) (01) (02) & 10 (02).

DEEA South Environmental Consultants (DEES) have been appointed as independent basic Assessment process. An Application Form was submitted to the Department of Environmental Affairs and accepted in January 2013 (DEES reference no. P/EA/160/1997/2012 & DEIA reference no. 12/16/2/1/1/765).

A Public Participation Meeting will be held to inform interested and affected Parties (I&AEP) about the proposed project and provide I&AEPs with an opportunity to comment and/or raise any issues.

Date and Time of Meeting: 31st of January 2013 at 10:30am  
 Venue: Cassius Hall in the Salhanha Naval Base.

For more information contact:

**DELTA**  
 Earth Environmental Consultants

Mrs. Deshae Mooler  
 Email: Deshae.mooler@deltaec.com  
 Tel: (021) 712 2093  
 Fax: (021) 685 6067

Date of advertisement: 24th January 2013

Cape Times Newspaper 24/01/2013

the high reality of a fast-shrinking budget, deep budget cuts and little US interest in another costly war in a distant land.

But urged by the needs of British citizens and a hostage crisis in a remote region, the British government has ordered for a global response to protect the state in north Africa.

In the United States, where there is no such crisis, the Obama administration has ordered for a global response to protect the state in north Africa.

France, whose navy is second to none in the world, is in an early stage of its own military intervention in the region. The French navy is in the region since September 2011, but the intervention is still in the early stages of planning and execution.

France's intervention in Libya is part of a broader strategy to reassert its global influence and to protect its interests in the region.

The intervention in Libya is part of a broader strategy to reassert its global influence and to protect its interests in the region.

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**MOTIF: Military uniforms displayed for the media after Islamist militants who took hostages at a gas plant in Algeria, were killed.**

now in terms of an existential threat is warning the British public," said the military spokesman, who was not authorized to speak publicly.

"But to be honest, until someone with an Algerian or Malian or Nigerian pedigree comes and puts a bomb in London or a bus in the Tube, we are going to take any action. The popular opinion will be it's not our problem."

France's intervention in Libya is part of a broader strategy to reassert its global influence and to protect its interests in the region.

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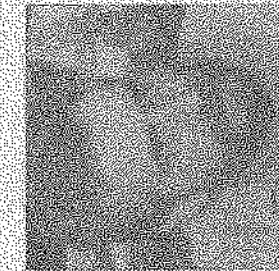
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## Mozambique to free man who murdered journalist



**CARLOS CARDOSO**

MAPUTO (Mozambique) will free one of the men convicted of killing celebrated journalist Carlos Cardoso in 2002, in a move that local media reported yesterday.

A judge signed an early release order for Venancio Rabinava on the grounds of good behaviour, his lawyer told Radio Mozambique.

"At the moment we are waiting for the court's decision to be reached," Avial Qui told the radio.

The actual release date has not been finalized.

Rabinava was jailed in 2002, along with five others - for Cardoso's murder. He has served only 10 years of a 20-year sentence.

The parole decision has generated controversy in Mozambique, especially since none of the convicted have paid the half million dollars compensation to Cardoso's family as the trial judges ordered, the state-controlled Mozambican News Agency (ANSA) reported.

Cardoso, one of Africa's most famous and respected journalists, was gunned down in a kidnapping-style attack after exposing the theft of \$14 million from state bank BCPM on the

## Egypt opposition leader aims to break Islamist dominance

CAIRO A coalition of Egyptian opposition groups is forming a coalition to contest the upcoming presidential election, a move that could challenge the dominance of Islamist groups.

The coalition, led by Mohamed El-Baradei, aims to break the dominance of the Muslim Brotherhood and other Islamist groups in Egyptian politics.

El-Baradei, a former nuclear inspector and Nobel laureate, has been a prominent opposition leader since the 2011 revolution. He has been a vocal critic of the military and the Islamist groups that have taken power.

The coalition is expected to include several other opposition groups, including the Egyptian Social Liberal Party and the Egyptian Renaissance Party.

The coalition's formation is seen as a significant development in Egyptian politics, as it represents a united front against the Islamist groups that have dominated the country since the 2011 revolution.

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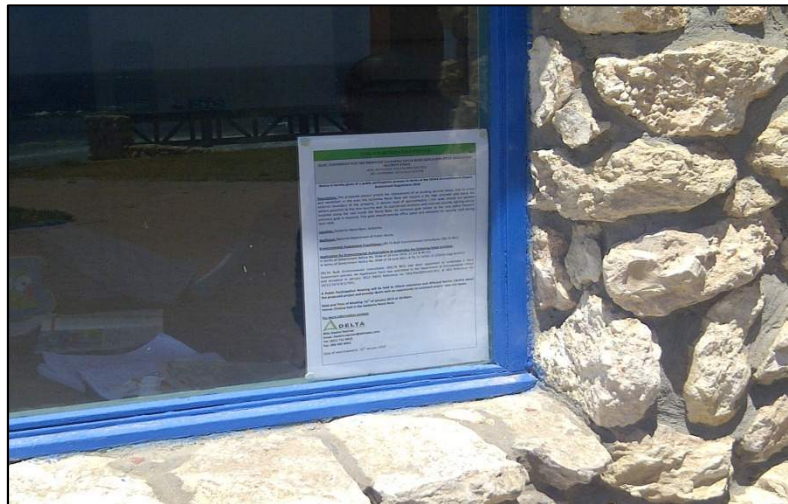








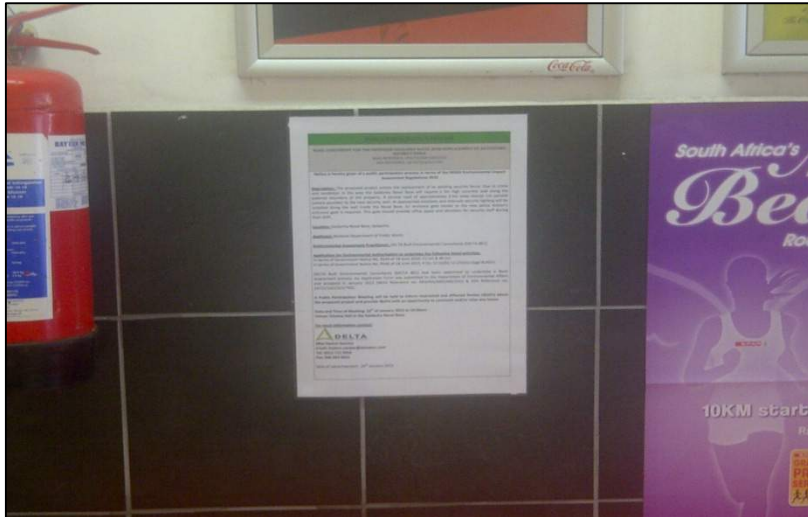
Site Notice 1: Outside the Saldanha Municipality Clinic



Site Notice 2: Camping Site Office next to pool (near the Saldanha Naval Base Boundary fence)



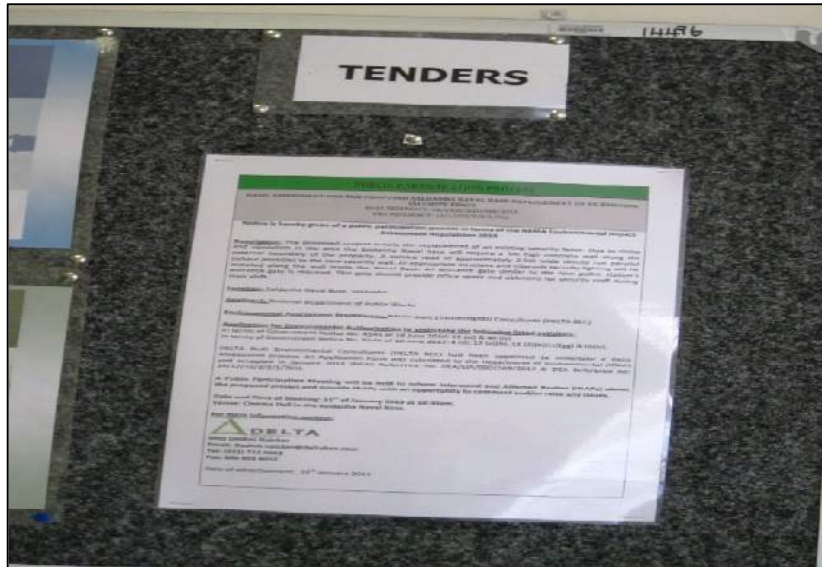
Site Notice 3: Saldanha Post Office



Site Notice 4: Saldanha SPAR



Site Notice 5: Saldanha Naval Base – Reception Area



Site Notice 6: Saldanha Bay Local Municipality

## Deshni Naicker

---

**From:** Gaffley, Lindsey  
**Sent:** 30 January 2013 07:43 AM  
**To:** deshni.naicker@vceza.com; Scheepers, Louis; Oberholster, Andre; Du Plessis, Morne; Meiring, Marius; Jarvis, Jeremy; Links, Yulene  
**Cc:** Mun  
**Subject:** FW: INVITATION TO A PUBLIC PARTICIPATION MEETING  
**Attachments:** PUBLIC PARTICIPATION PROCESS - Saldanha Naval Base - Advertisement - PP meeting - Poster Adverts.pdf

**Importance:** High

Thank you Deshni, I'll forward it to other related officials in our municipality,

Regards

---

**From:** Deshni Naicker [<mailto:deshni.naicker@vceza.com>]  
**Sent:** 29 January 2013 09:24 AM  
**To:** Gaffley, Lindsey  
**Subject:** RE: INVITATION TO A PUBLIC PARTICIPATION MEETING  
**Importance:** High

Good Morning,

My colleague has tried to contact you on Friday the 25<sup>th</sup> of January 2013 and this morning. The reason being was to drop off an invite to a Public Participation Meeting on the 31<sup>st</sup> of January 2013.

Please find attached a copy of the document detailing the Public Participation Meeting.

Should you have any enquiries, please do not hesitate to contact me.

Thanks, and

Kind Regards



**Deshni Naicker**  
Senior Environmental  
Analyst  
[www.deltabec.com](http://www.deltabec.com)

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PO Box 1438  
Umhlanga Rocks  
4320

☎ (031) 539 7442  
☎ (031) 502 7731

Email Disclaimer: "All views or opinions expressed in this electronic message and its attachments are the view of the sender and do not necessarily reflect the views and opinions of the Saldanha Bay Municipality (SBM). No employee of the SBM is

entitled to conclude a binding contract on behalf of the SBM unless he/she is the accounting officer of the SBM, or his or her authorised representative. The information contained in this message and its attachments may be confidential or privileged and is for the use of the named recipient only, except where

the sender specifically states otherwise. If you are not the intended recipient you may not copy or deliver this message to anyone." "Serve, Grow & Succeed Together."



## Deshni Naicker

---

**From:** Deshni Naicker  
**Sent:** 29 January 2013 09:51 AM  
**To:** 'ryan.don@sbm.gov.za'  
**Subject:** RE: INVITE FOR PUBLIC PARTICIPATION MEETING - SALDANHA NAVAL BASE - 31 JANUARY 2013  
**Attachments:** PUBLIC PARTICIPATION PROCESS - Saldanha Naval Base - Invite - PP meeting.pdf  
**Importance:** High

Good Morning Mr Don,

As discussed during our telephonic conversation this morning. Please find attached an invite to the Public Participation to be held on the 31<sup>st</sup> of January 2013.

Should you have any enquiries, please do not hesitate to contact me.

Thanks, and

Kind Regards



**Deshni Naicker**  
Senior Environmental  
Analyst  
[www.deltabec.com](http://www.deltabec.com)

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**LEVEL 2**  
Certified by:  
BEE Verification Agency CC (BVA/014)  
Certificate no: BVT 4374

## Deshni Naicker

---

**From:** Deshni Naicker  
**Sent:** 22 February 2013 11:57 AM  
**To:** 'philippa@wessa.co.za'  
**Subject:** RE: REGISTRATION AS AN I&AP  
**Attachments:** P12022\_REPORTS\_DESIGN REPORTS\_BAR\_IAP Registration Form\_Draft\_DN\_REV O.pdf; INTERESTED AND AFFECTED PARTY REGISTRATION FORM - P12022.docx

**Importance:** High

Hi Philippa,

Please find attached a BID document regarding a **BASIC ASSESSMENT FOR THE PROPOSED SALDANHA NAVAL BASE – REPLACEMENT OF AN EXISTING SECURITY FENCE NEAR SALDANHA.**

Should you have any enquiries, please do not hesitate to contact me.

Thanks, and

Kind Regards



**Deshni Naicker**  
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Analyst  
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4320

☎ (031) 539 7442  
☎ (031) 502 7731



**LEVEL 2**

Certified by:  
BEE Verification Agency (CC: BVA-014)  
Certificate no: 881 4370

## Deshni Naicker

---

**From:** Thilivhali Meregí  
**Sent:** 26 February 2013 11:13 AM  
**To:** deshni.naicker@vceza.com  
**Cc:** Lindelani Mudau; Potlako Khati; Razeena Omar  
**Subject:** RE: INVITATION TO A PUBLIC PARTICIPATION MEETING

**Importance:** High

Good day Deshni

Following the telephonic conversation, the Department confirm having received the background information document (BID) for the Proposed Saldanha Naval base Replacement of an existing security fence near Saldanha and the Registration form for the interested and affected parties(I&AP s).

The Department apologies for the late respond, please note that the Registration form will be forwarded to you in due course.

Regards,

Ms. Thilivhali Meregí

Environmental Officer: EIA Administration

Tel: 021 819 2494

email: [tmeregí@environment.gov.za](mailto:tmeregí@environment.gov.za)

>>> Razeena Omar 2/25/2013 11:03 AM >>>

Hi Deshni and Lindelani

Deshni- thank you for your follow-up comminique. For sure- we would appreciate to be kept informed on the project. Lindelani, can you provide an update on the bid document?

Many thanks

Regards

Razeena

>>>On 22/02/2013 at 11:10 AM, <[deshni.naicker@vceza.com](mailto:deshni.naicker@vceza.com)> wrote:

> Good day Dr Omar,

>

>

>

> As stated on the telephone a BID document was sent out to Mr L. Madau. I am

> just contacting all stakeholders to confirm if they would like to be

> registered on to our project database.

>

>

>

> Should you have any enquiries please do not hesitate to contact me.



>  
> My colleague has tried to contact you on Friday the 25th of January 2013  
> and this morning. The reason being was to drop off an invite to a Public  
> Participation Meeting on the 31st of January 2013.

>  
>  
>  
> Please find attached a copy of the document detailing the Public  
> Participation Meeting.

>  
>  
>  
> Should you have any enquiries, please do not hesitate to contact me.

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>  
> Thanks, and

>  
>  
>  
> Kind Regards

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>  
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> [image: cid:image002.png@01CDC183.00AAEA10]

>  
> \*Deshni Naicker\*  
>  
> Senior Environmental Analyst

>  
> [www.deltabec.com](http://www.deltabec.com)  
>  
> [deshni.naicker@deltabec.com](mailto:deshni.naicker@deltabec.com)

>  
> PO Box 1438  
>  
> Umhlanga Rocks

>  
> 4320  
>  
> \*A\*\* \*(031) 539 7442\*

>  
> \*E\*\* \*(031) 502 7731\*

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>  
> \*[image: cid:image004.png@01CDC183.00AAEA10!\*

==  
Dr Razeena Omar  
Chief Director: Integrated Coastal Management  
Department of Environmental Affairs  
Physical Address:  
2 East Pier Shed

East Pier Road  
V&A Waterfront  
Cape Town  
8002

Postal address:

PO Box 52126  
Victoria and Alfred Waterfront  
Cape Town  
8002

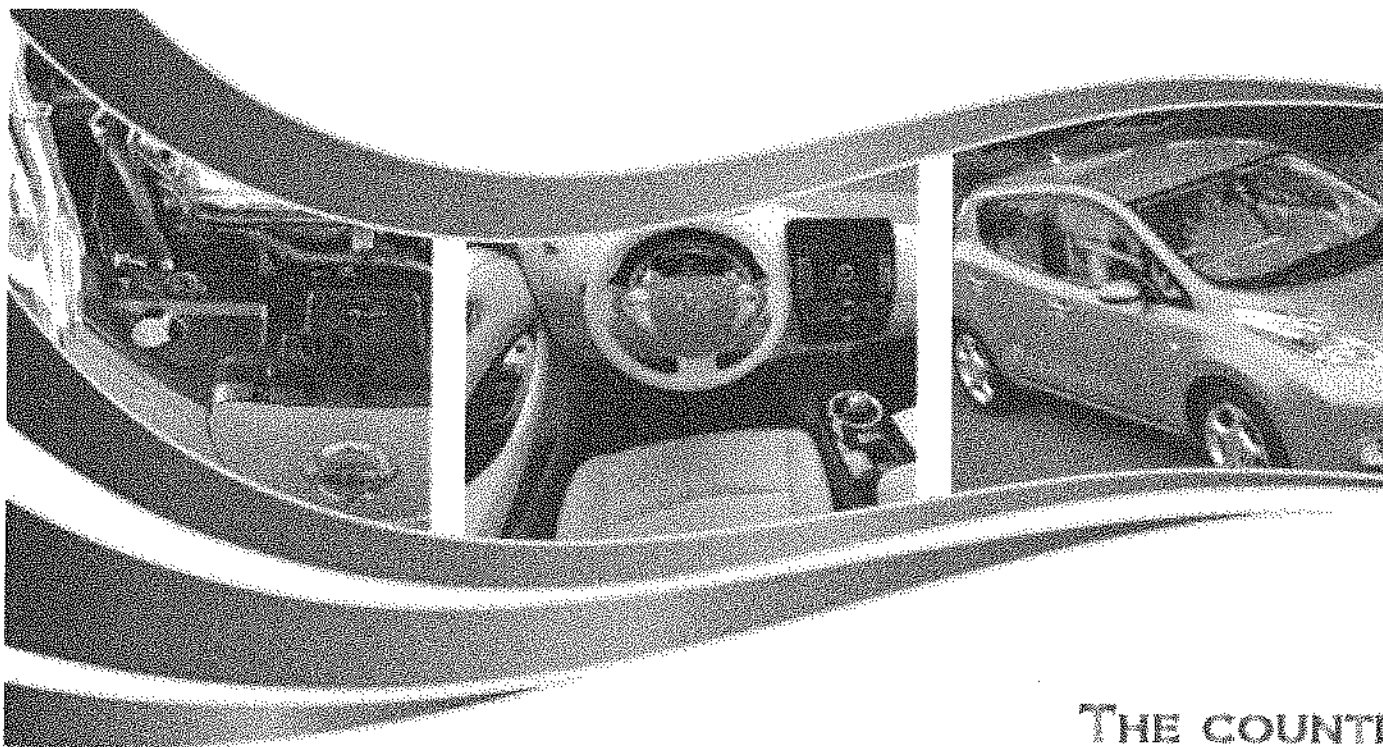
Tel: +27 21 819 2432

Fax: +27 21 819 2431

Mobile: +27827707079

Romar@environment.gov.za

Website: [www.environment.gov.za/](http://www.environment.gov.za/)



## THE COUNTY ZERO EMISSION VEHICLE ANNOUNCEMENT



environmental affairs

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA

# NISSAN

## Deshni Naicker

---

**From:** Ndobeni Nelisa (BVL)  
**Sent:** 25 February 2013 08:52 AM  
**To:** Deshni Naicker  
**Subject:** RE: RE: INVITATION TO A PUBLIC PARTICIPATION MEETING  
**Attachments:** INTERESTED AND AFFECTED PARTY REGISTRATION FORM - P12022.doc

Hi Deshni,

Attached is the completed registration form.

Regards,

Nelisa

---

**From:** Deshni Naicker [<mailto:deshni.naicker@vceza.com>]  
**Sent:** 22 February 2013 01:40 PM  
**To:** Ndobeni Nelisa (BVL)  
**Subject:** FW: RE: INVITATION TO A PUBLIC PARTICIPATION MEETING  
**Importance:** High

Hi Nelisa,

Please see attached documents:

Thanks, and

Kind Regards



**Deshni Naicker**  
Senior Environmental  
Analyst  
[www.deltabec.com](http://www.deltabec.com)

[deshni.naicker@deltabec.com](mailto:deshni.naicker@deltabec.com) : (031) 539 7442  
PO Box 1438 : (031) 502 7731  
Umhlanga Rocks  
4320

---

**From:** Deshni Naicker  
[<mailto:deshni.naicker@vceza.com>]  
**Sent:** 22 February 2013  
12:26 PM  
**To:** 'ndobenin@dwa.gov.za'  
**Subject:** FW: RE:  
INVITATION TO A PUBLIC  
PARTICIPATION MEETING  
**Importance:** High



**LEVEL 2**  
Certified by:  
BEE Verification Agency (CC (BVA-014))  
Certificate no: BE1 4272

Good day Ms Ndobeni,

This email is just a follow up regarding registration as an I&AP onto our project database.

Should you have any enquiries, please do not hesitate to contact me.

Thanks, and

Kind Regards





**Deshni Naicker**  
Senior Environmental  
Analyst  
[www.deltabec.com](http://www.deltabec.com)

[deshni.naicker@deltabec.com](mailto:deshni.naicker@deltabec.com)  
PO Box 1438  
Umhlanga Rocks  
4320

T (031) 539 7442  
F (031) 502 7731

**From:** Deshni Naicker  
[<mailto:deshni.naicker@vceza.com>]  
**Sent:** 29 January 2013  
09:27 AM  
**To:** [ndobenin@dwa.gov.za](mailto:ndobenin@dwa.gov.za)  
**Subject:** RE: INVITATION  
TO A PUBLIC  
PARTICIPATION MEETING  
**Importance:** High



**LEVEL 2**  
Certified by:  
BES Verification Agency (CC) (BVA-014)  
Certificate no. BE1 4373

Good Morning,

Please find attached a copy of the Background Information Document (BID) and an I&APs Registration Form.

Should you have any enquiries, please do not hesitate to contact me.

Thanks, and

Kind Regards



**Deshni Naicker**  
Senior Environmental  
Analyst  
[www.deltabec.com](http://www.deltabec.com)

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F (031) 502 7731

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notify the system  
manager/sender. Any  
unauthorized use,

alteration or dissemination is prohibited. The Department of Water Affairs further accepts no liability whatsoever for any loss, whether it be direct, indirect or consequential, arising from this e-mail, nor for any consequence of its use or storage.

<b>CLIENT</b>	DEPARTMENT OF PUBLIC WORKS	<b>PROJECT</b>	P12022 – PROPOSED REPLACEMENT OF AN EXISTING SECURITY FENCE AT THE SALDANHA NAVAL BASE
---------------	----------------------------	----------------	--

NAME AND SURNAME	COMPANY/ ORGANISATION NAME	CONTACT INFORMATION			ADDRESS
		TEL/ FAX	CELL	EMAIL	
Mr Lindsey Gaffley	Saldanha Bay Municipality – Town Planner	022 701 7051 (T) 022 715 1518 (F)	N/A	lindseyg@saldanhabay.co.za	Private Bag X12 Vredenburg 7380
Mr Noel van Stade	Saldanha Bay Municipality – Municipal Manager	022 701 7097 (T) 022 715 1518 (F)	N/A	wmb@saldanhabay.co.za	Private Bag X12 Vredenburg 7380
Ms Yulene Links	Saldanha Bay Municipality – Civil Services	022 701 7094 (T)	N/A	yulene@saldanhabay.co.za	Private Bag X12 Vredenburg 7380
Mr Shane Cordom	Saldanha Bay Municipality – Strategic Support Services	022 701 7146 (T)	N/A	shanec@saldanhabay.co.za	Private Bag X12 Vredenburg 7380
Ms Siandra Brand	Saldanha Bay Municipality – Town Planning	022 701 7114	N/A	siandrab@saldanhabay.co.za	Private Bag X12 Vredenburg 7380
Japie Julie	Saldanha Bay Municipality – Environmental	022 701 7114	N/A	japiej@saldanhabay.co.za	Private Bag X12 Vredenburg 7380

	and Heritage				
Ms Philippa Huntly	WESSA	021 701 1397(T) 021 701 1399(F)	N/A	philippa@wessa.co.za	31 The Sanctuary, Off Pollsmoor Road, Kirstenhof, 7945
Mr Jimmy Walsh	Saldanha Bay Water Quality Trust	N/A	073 327 0075	hilltopcottage@telkomsa.net	35 Heuningbos Slot Myburgh Park Langebaan 7357
Dr Razeena Omar	DEA: Integrated Coastal Management: Ocean and Coast Branch	021 819 2432 (T) 021 819 2444 (F)	N/A	romar@environment.gov.za	No 2 East Tier Building East Tier Road Waterfront
Mr Lindelwani Madau	DEA: EIA Department	021 819 2444 (F)	N/A	Lmadau2@environment.gov.za	No 2 East Tier Building East Tier Road Waterfront
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I&APs DATABASE

## **Issues that were raised at the Public Participation Meeting that was held on the 31st January 2013 at the Saldanha naval Base – Cinema Hall**

The following issues were raised during the Public Participation Meeting by representatives of the Saldanha Bay Local Municipality:

- The issue regarding the storm water capacity – it was stated that when there is heavy rains the water then floods into the Wetland and when the wetland cannot take the capacity, it pushes the water back which then floods the nearby houses along the proposed area.
- Will there be an access road from White City.
- It was stated that there are houses that are built on the boundary of the fence.
- Will residents have access to the property, it was stated that the reason why the wall is going up is to restrict residents from entering the restricted areas on the Naval Base.
- A request was made regarding the wetland – the municipality had approached DWAF a few years back regarding to increase the dam structure on the naval base, as the wetland cannot contain or keep the water content or capacity and as an end result the area become flooded.
- The Commanding Officer – Mr V Pillay made a proposition to the Saldanha Bay Local Municipality that all property that is affected during the construction of the proposed wall will be replaced elsewhere within the Saldanha Naval Base area.
- The proposed fence will be a straight line – as originally planned.
- Mr du Plessis from the Saldanha Bay Local Municipality – requested if there was any alternative to the project –Mr Pillay and Mr Michael Lagus - answered no and that the wall will run along the boundary of the Naval base.
- Mr du Plessis – Asked if there would be any problems from military regarding access road from community
- A comment was made regarding ‘to have another fence as a “buffer fence” for the new wall to prevent people from entering the naval base.
- Mr du Plessis – had stated that that a substation is present inside the base and on the boundary of the proposed wall – will it be a problem to access the substation.
- Mr Pillay had replied to the above comment stating that the Naval Base and the Municipality can come to some sort of agreement to access the substation.
- Mr du Plessis had asked who will maintain the wall once it is put up
- Mr Pillay had commented that assurance will be made by the DPW for the wall to be maintained at all times
- Mr du Plessis had stated that a Maintenance Plan to be submitted to the Saldanha Local Municipality Building Department.
- Mr du Plessis had stated that all the sewer servitudes – fall within the boundary of the military – will the servitudes be moved
- Mr Pillay had stated that ‘the wall to be made more attractive for the community to see – in order to enhance the community – will make it a community project, to give the community a sense of belonging.

- Clarity regarding on where the wall meets the beach
- Ensure that the community benefits from the project



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## **APPENDIX F**

### **DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)**



# P.12022 SALDANHA NAVAL BASE

## CONSTRUCTION ENVIRONMENTAL MANAGEMENT PROGRAMME

### DRAFT REPORT

### REVISION 0

### FEBRUARY 2013

**PREPARED FOR:**



**public works**

Department:  
Public Works  
REPUBLIC OF SOUTH AFRICA

**DEPARTMENT OF PUBLIC WORKS**

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## DOCUMENT CONTROL

**TITLE:** CONSTRUCTION ENVIRONMENTAL MANAGEMENT PROGRAMME

**ELECTRONIC FILE:** P.12022 SALDANHA NAVAL BASE\_REPORTS\_CEMPr\_Saldanha Naval Base Construction Environmental Management Programme

**REPORT STATUS:** Draft Report

**REVISION NUMBER:** 0

**CLIENT:** Department of Public Works  
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**DATE:** February 2013

**REFERENCE NUMBER:** P12022 / R 1278

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# 1 INTRODUCTION

## 1.1 BACKGROUND

The Department of Public Works (DPW) intends to construct a new security wall alongside the Naval Base located in Saldanha in the Western Cape Province. This Construction Environmental Management Programme (CEMPr) has been compiled for the construction activities to take place for the new boundary wall.

An appointed Contractor will carry out the construction of the new security wall, and this CEMPr will form part of the contractual obligations of the Contractor while carrying out the construction activities required for the effective completion of the project.

## 1.2 PURPOSE OF PROGRAMME

The purpose of this CEMPr is to minimise the extent of negative impacts on the environment, during the construction phase of the new security wall for the Saldanha Naval Base Project. This Programme is also aimed at preventing long-term or permanent damage to the environment, enhancing any positive impacts associated with the project and ensuring appropriate restoration of areas affected by construction.

It is anticipated that this document will guide the appointed Contractor regarding mitigation measures and environmental specifications as well as on organisational authority structures to ensure the effective implementation of the CEMPr.

The CEMPr also sets out minimum requirements specified in relevant environmental legislation and general good environmental practices. The CEMPr may be amended from time to time to ensure that any additional environmental requirements identified by key stakeholders are adequately covered. These amendments must be approved by the Department of Environmental Affairs (DEA).

## 1.3 STRUCTURE OF PROGRAMME

This CEMPr comprises the following sections:

- Section 1: Introduction
- **Section 2:** Project Overview;
- **Section 3:** Implementation of CEMPr;
- **Section 4:** Construction Site Facilities;
- **Section 5:** Construction Activities;
- **Section 6:** Incident Management;
- **Appendix A:** Construction Programme;
- **Appendix B:** Environmental Authorisation;
- **Appendix E:** Environmental Manager Appointment Letter;
- **Appendix D:** Letter of Acceptance of CEMPr;



- **Appendix E:** Training Record;
- **Appendix F:** List of Contacts;
- **Appendix G:** Complaints Register;
- **Appendix H:** Incident Register; and
- **Appendix I:** Method Statements.

## 1.4 TERMS AND DEFINITIONS

Table 1 Terms and Definitions

TERM	DEFINITION
Broadleaf Weed	One of the easiest types of weeds to identify – with broad and flat leaves e.g. dandelions, wild garlic, wild violet, morning glory, thistle, clover, etc.
CEMP <sub>r</sub>	Construction Environmental Management Programme
DEA	Department of Environmental Affairs
DMR	Department of Mineral Resources
DWA	Department of Water Affairs
ECO	Environmental Control Officer
SABS	South African Bureau of Standards
SAHRA	South African Heritage Resources Agency
HWC	Heritage Western Cape
Spoil Material	Excavated subsoil
Topsoil	Top layer of soil, a depth of between 50mm to 200mm.

---

## 2 PROJECT OVERVIEW

The site description and facilities, construction activities, possible environmental impacts and environmental legislation are important considerations for the preparation of this CEMPr. An overview of these aspects is presented under the following headings:

- Project Description;
- Description of Receiving Environment;
- Project Activities and Possible Environmental Impacts;
- Legislation; and
- Labour Recruitment.

### 2.1 PROJECT DESCRIPTION

Due to crime and vandalism in the area, a 3m high concrete wall will be constructed along the external boundary of the Saldanha Naval Base. An internal service road of approximately 2,5m wide will also run parallel to the new security wall situated immediately adjacent to the residential precinct. One service road is proposed when the wall runs along Diaz Road for two sections. At regular intervals (approximately 500m intervals) adequate lighting is proposed on light posts. An entrance gate, situated on the eastern extremity of the wall, will also be constructed, in order to act as a bunker with 12 beds, an ablution facility and a small office.

The works that form part of the Saldanha Naval Base Project include, but is not limited, to the following:

- Clearing and grubbing of the building site;
- Earthworks and excavations;
- Construction of the security wall and road; and
- Rehabilitation of the development site after construction.

The construction of the new security wall will follow the route as illustrated in the Figure 1 below.



Figure 1 Development Route of the Security Wall (Source: Scientific Aquatic Services CC)

## 2.2 DESCRIPTION OF RECEIVING ENVIRONMENT

The natural environment that falls within the property of the Saldanha Naval Base is predominantly undisturbed except for some areas utilised for Naval Base infrastructure and roads. The subject property is therefore considered as a conservation area and is also identified as a protected area.

From the results of the impact assessment and the specialist studies conducted, which comprise of a wetland, floral and heritage impact assessment, the following was concluded.

The floral species situated on the site are restricted to the strandveld and wetland habitat units. The strandveld habitat units comprise of the following:

- Saldanha Flats Strandveld – Endangered;
- Saldanha Granite Strandveld – Endangered;
- Langebaan Dune Strandveld – Vulnerable; and
- Saldanha Limestone Strandveld – Endangered.

The wetland unit is classified as an unchannelled valley bottom wetland feature, located to the east of the development route.

The strandveld habitats, as well as the wetland features on the site (allocated with buffer zones) are considered as high ecological sensitivity areas, as illustrated in Figure 2 below. The remaining areas that were assessed are considered to be of low ecological sensitivity.



Figure 2 Floral Sensitivity Map (Source: Scientific Aquatic Services CC)

### 2.3 PROJECT ACTIVITIES AND POSSIBLE ENVIRONMENTAL IMPACTS

The activities that are to take place during the construction phase of the Saldanha Naval Base Project are an important aspect of the development of a CEMPr as these activities affect the environment on the site and in the surrounding areas.

The following construction activities and associated impacts have been identified:

Table 2 Possible Construction Activities and Associated Impacts

ACTIVITY	IMPACT
Clearing & Grubbing and Bulldozing	Disruption of natural ecology and loss of biodiversity
	Spreading of alien or invasive vegetation
	Damage / removal of indigenous vegetation
	Loss of topsoil
	Erosion on steep slopes
	Disturbance of shallow soils may cause or accelerate existing erosion issues
Concrete Work	Contamination to ground water through improper practices or accidental spillage
Construction and Use of Temporary Roads	Soil compaction and loss of topsoil
	Loss of indigenous vegetation and increased spreading of alien or invasive species
	Dust and noise pollution

ACTIVITY	IMPACT
Construction Employment	Employment creation
	Skills development
Generation of Solid Waste (general and hazardous)	Impacts associated with improper waste management practices (e.g. burning of waste)
	Contamination of groundwater due to poor storage methods
Earthworks: Excavation	Impacts associated with the risk of damaging existing servitude infrastructure
	Possible damage to undiscovered heritage resources
Lighting / Night Work	Light pollution
	Effects of bright lights on traffic in the nearby residential area
Topsoil Stripping and Storage	Loss of topsoil functionality due to improper management and storage methods
	Erosion
	Loss of indigenous vegetation
Provision of Sanitary Facilities	Contamination to ground water through improper practices or accidental spillage
Refuelling of Vehicles / Machinery	Contamination to ground water through improper practices, leaks or accidental spillage
Site Camp Establishment	Construction activities will cause and increase dust along access roads
	Impacts associated with the noise emanating from construction activities
	Contamination of the environment due to improper storage of material
	Impacts associated with the siting of the camp such as vegetation clearing, security, affecting wetland functionality etc.
Transportation of Materials	Transportation will cause and increase dust and noise levels along access roads
Trenching	Open trenches pose a safety risk to people, animals, equipment, machinery and vehicles
	Impacts associated with trench collapse
	Increased erosion
Washing of Vehicles / Machinery	Contamination of groundwater through the lack of oil water separators or waste water collection system

## 2.4 LEGISLATION

According to Section 2 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), hereafter referred to as NEMA, all organs of state are required to apply certain principles that are set out in NEMA, while making decisions that could affect the environment. The legislation that is relevant to the Saldanha Naval Base Project is listed in the table below:

**Table 3 Applicable Legislation**

<b>General Environmental Legislation</b>	The Constitution of South Africa, 1996 (Act No.108 of 1996)
	National Environmental Management Act, 1998 (Act No.107 of 1998)
	Environmental Conservation Act, 1989 (Act No.73 of 1989)
	Environmental Impact Assessment Regulations, 2010
	The White Paper on Environmental Management Policy for South Africa
<b>Land, Soil and Plants Legislation</b>	The Conservation of Agricultural Resources Act, 1983 (Act No.43 of 1983)
	White Paper on Agriculture (Department of Agriculture, 1995)
	National Forests Act, 1998 (Act No.84 of 1998)
	National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004)
	National Veld and Forest Fire Act, 1998 (Act No.101 of 1998)
<b>Protected Areas Legislation</b>	Protected Areas Act, 2003 (Act No.57 of 2003)
	The Protected Areas Amendment Act, 2004 (Act No.31 of 2004)
<b>Inland Water Resources Legislation</b>	National Water Act, 1998 (Act No.36 of 1998)
	Water Services Act, 1997 (Act No.108 of 1997)
<b>Cultural Resources Legislation</b>	Natural Heritage Resources Act, 1999 (Act No.25 of 1999)
	World Heritage Convention Act, 1999 (Act No.49 of 1999)
<b>Animals and Wildlife Legislation</b>	Animals Protection Act, 1962 (Act No.71 of 1962)
	Game Theft Act, 1991 (Act No.105 of 1991)
	Agricultural Pests Act, 1983 (Act No.36 of 1983)
<b>Pollution Control and Waste Management Legislation</b>	National Environmental Management: Waste Act, 2008 (Act No.59 of 2008)
	White Paper on Integrated Pollution and Waste Management for South Africa, 2004
	Minimal requirements for Waste Disposal by Landfill, 2005
<b>Air Pollution Legislation</b>	National Environmental Management: Air Quality Act, 2004 (Act No.39 of 2004)

	Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965)
<b>Hazardous and Toxic Substances Legislation</b>	Hazardous Substances Act, 1973 (Act No.15 of 1973)
	Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No.36 of 1947)
	Minimum requirements for the handling, classification and disposal of hazardous waste (Department of Water Affairs)
<b>Minerals, Energy and Mining Legislation</b>	Mineral and Petroleum Resources Development Act, 2002 (Act No.28 of 2002)
	Minerals Act, 1991 (Act No.50 of 1991)
	Electricity Act, 1987 (Act No.41 of 1987)
	National Energy Regulator Act, 2004 (Act No.40 of 2004)
	White Paper on a Minerals and Mining Policy for South Africa (October, 1998)
	White Paper on the Renewable Energy Policy of the Republic of South Africa (November, 2003)
<b>Noise Legislation</b>	Noise Control Regulations GN R154 in Government Gazette No.13717 of 10 January 1992
	Aviation Act, 1962 (Act No.74 of 1962)
	Road Traffic Act, 1989 (Act No.29 of 1989)
	Explosives Act, 2003 (Act No.15 of 2003)
	Advertising on Roads and Ribbon Development Act, 1940 (Act No.21 of 1940)

## 2.5 LABOUR RECRUITMENT

Labour will be sourced from the local communities.



### 3 IMPLEMENTATION OF CEMPR

This section of the report will present the method and structure to be used during the implementation of this CEMPr and is presented under the following headings:

- Implementation Structure and Management;
- Roles and Responsibilities;
- Environmental Awareness and Training;
- Record Keeping; and
- Non-Compliance with CEMPr.

#### 3.1 IMPLEMENTATION STRUCTURE AND MANAGEMENT

The CEMPr must be implemented in such a way that it is effectively carried out. It is therefore recommended that dedicated environmental personnel fulfil certain roles to implement the programme and to ensure that it is adhered to. The required personnel include, but are not limited to, and Environmental Manager and an Environmental Control Officer.

The personnel structure is illustrated in the figure below:

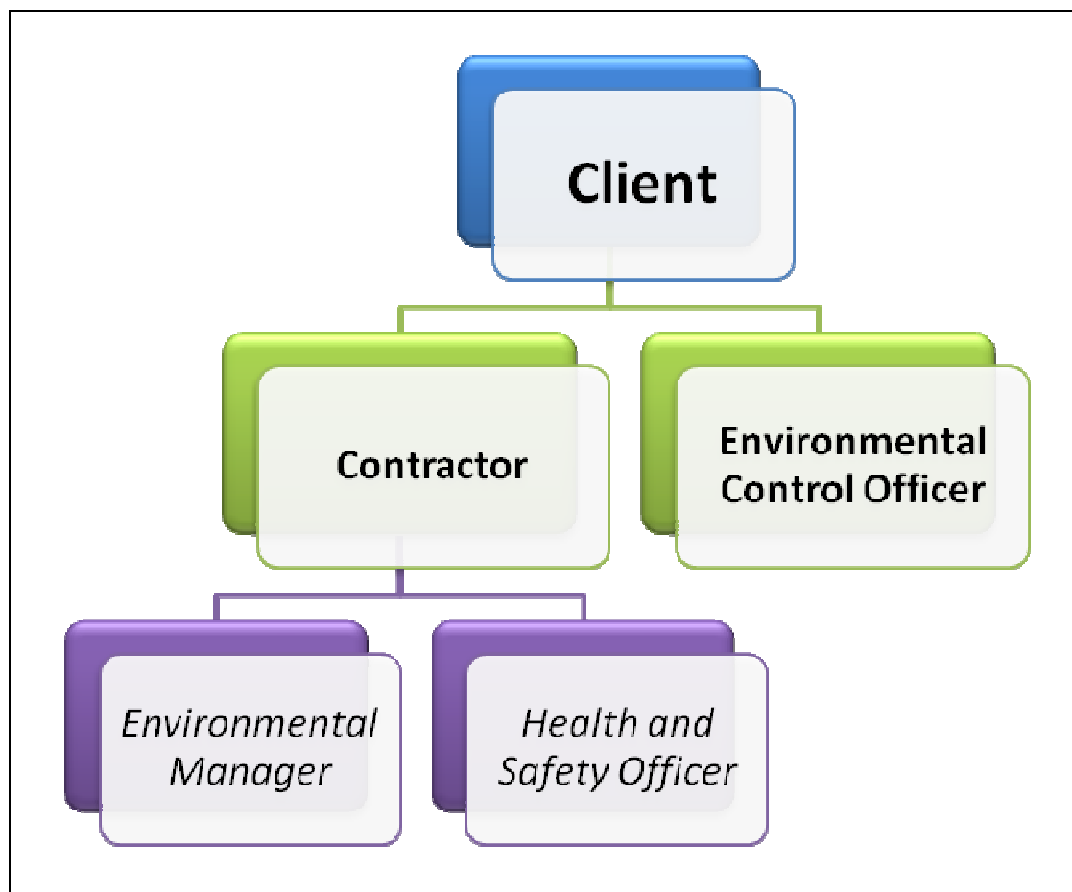


Figure 3 Personnel Structure

---

## 3.2 ROLES AND RESPONSIBILITIES

The environmental personnel appointed to manage the environmental aspects of the construction phase will monitor and measure activities to guarantee that the desired outcomes of the CEMPr are reached. Once the activities are monitored and measured, corrective action must be taken where necessary.

Various sections of this CEMPr may be revised if necessary. Once revisions have been made, the relevant personnel must be informed and provide recommendations of various mitigation measures that should be altered or improved. Revisions of the CEMPr must be approved by the Environmental Control Officer who will then obtain approval from the Client and the DEA.

The roles of the individuals, relevant to the construction phase of the Saldanha Naval Base Project, are briefly discussed under the following headings:

- Client;
- Contractor;
- Environmental Manager; and
- Environmental Control Officer.

### 3.2.1 CLIENT

The Client will be responsible for the monitoring and implementation of the CEMPr. A Contractor will be appointed to carry out the construction activities for the project and hence will be appointed to implement the proposed mitigation measures as well as to monitor and control the CEMPr.

The Client will appoint an Environmental Control Officer (ECO) to undertake regular monthly environmental audits for the duration of the construction period.

### 3.2.2 CONTRACTOR

The Contractor will appoint an Environmental Manager to be responsible for the overall implementation of the CEMPr. The Contractor will ensure that any sub-contractors, appointed to carry out all or part of the obligations under their contract, comply with the requirements of this CEMPr.

### 3.2.3 ENVIRONMENTAL MANAGER

The Environmental Manager will be appointed by the Contractor to oversee the construction phase of the project to ensure that all environmental specifications and CEMPr requirements are met at all times.

The Environmental Manager will primarily be responsible for monitoring, reviewing and verifying the Contractor's compliance with the CEMPr.

The Environmental Manager's duties, to ensure effective monitoring and verification of the Contractor's compliance with the CEMPr include, amongst others, the following:

- Monitoring and verifying that environmental impacts are avoided or kept to a minimum;
- Reviewing and approving method statements, with input from the ECO and Resident Engineer;
- Assisting the Contractor in finding suitable solutions to environmental issues;
- Keeping records relating to the implementation of this CEMPr;
- Provide training and awareness, such as environmental induction and toolbox talks on a regular basis;
- Presenting regular reports on the progress of implementation of the CEMPr, compliance to the requirements of the CEMPr and any environmental issues that need to be addressed;
- Keeping a register of complaints and recording comments and issues made, and the actions taken in response to complaints;

The Environmental Manager must be fully conversant with this document and environmental legislation. He/she must be well versed in environmental studies and construction processes.

#### **3.2.4 ENVIRONMENTAL CONTROL OFFICER**

The Environmental Control Officer (ECO) will be appointed by the Client to undertake regular compliance monitoring and environmental auditing for the duration of the construction phase of the project and will also act as the quality control officer regarding environmental aspects.

The ECO may be fulfilled by any person, well versed in environmental studies and construction processes, and who is able to make meaningful and workable recommendations as required.

The ECO will carry out regular compliance monitoring and environmental audits and will regularly submit an audit report to the Client and Contractor. All reasonable mitigation measures proposed by the ECO must be considered and if feasible, implemented.

The ECO may be required to attend regular monthly site meetings to provide mitigation measures for problems that have become evident. The ECO will also advise on possible environmental issues that may arise.

Decisions regarding environmental procedures, specifications and requirements which have a cost implication (i.e. those that are deemed to be a variation, not allowed for in the CEMPr) must be endorsed by the Project Manager and Client.

### **3.3 ENVIRONMENTAL AWARENESS AND TRAINING**

The Environmental Manager will be required to ensure that awareness posters and relevant contact details are visibly displayed on the site.

Regular toolbox talks and training must take place to ensure that environmental awareness is raised amongst all staff members.

Other environmental awareness methods may also be implemented, e.g. presentations, demonstrations, etc.

### 3.4 RECORD KEEPING

It is important that certain documentation is kept, by the Environmental Manager, on the site premises. These documents include the following:

- Method Statements; and
- General Environmental Documentation.

#### 3.4.1 METHOD STATEMENTS

Method statements will be required to be prepared by the Contractor and approved, in consultation with the ECO, by the Environmental Manager for the following work, prior to the commencement of the specific activity:

- Camp Establishment;
- Access Roads;
- Cement and Concrete Batching;
- Dust Control;
- Bunding;
- Fuels and Fuel Spills;
- Fire, Hazardous and Poisonous Substances;
- Solid and Liquid Waste Management;
- Stormwater Controls;
- Source of Materials;
- Emergency Response;
- Vegetation Clearing;
- Erosion Control;
- Wash Areas;
- Exposed Aggregate Finishes; and
- Water Abstraction.

The Method Statements should be stored on file at the construction site (*see Appendix I*). The Method Statements should be updated as and when required. Each of the method statements must contain information on the following basic aspects:

- *Specifications* – referencing the CEMPr, general environmental principals, legislation, etc.;
- *Drawings* – where relevant;
- *Major Equipment* – listing the major equipment that will be involved in the specific construction activity;
- *Activity Description* – a brief description of the specific activity;

- *Programme* – identifying when the activity is expected to take place;
- *Construction Sequence and Method* – detailing the activity process that must be followed;
- *Resources* – resources that will be required for the activity; and
- *Environmental* – information regarding awareness, training, precautions, etc.

### **3.4.2 GENERAL ENVIRONMENTAL DOCUMENTATION**

The following general environmental documentation will be filed and stored on site at all times.

#### **3.4.2.1 Environmental Authorisation**

A copy of the Environmental Authorisation must be stored on file on the construction site at all times. *(See Appendix B)*

#### **3.4.2.2 Environmental Manager Appointment Letter**

An appointment letter for the Environmental Manager must be kept on record. This appointment letter must be signed by the Contractor and the Environmental Manager. A list of general responsibilities that are expected to be undertaken by the Environmental Manager should be included in the appointment letter. *(See Appendix C)*

#### **3.4.2.3 Training Record**

Training and awareness will be carried out to ensure that all employees working on the construction site understand and adhere to the CEMPr as well as the legal requirements. A training record must be kept on site *(See Appendix E)*

#### **3.4.2.4 List of Contacts**

A list of contacts must be printed and made clearly visible on the site. These contacts will include the environmental personnel, municipality and emergency contacts. This list must be updated as and when required. *(See Appendix F)*

#### **3.4.2.5 Complaints Register**

A complaints register must be kept on site and updated regularly. The complaints register must contain the contact details of the complainant as well as the details of the complaint. Complaints must be dealt with in the correct manner by the appropriate personnel. *(See Appendix G)*

#### **3.4.2.6 Incident Register**

An incident register must be kept on site to record any incidents that may occur during the construction activities. *(See Appendix H)*

### **3.5 NON-COMPLIANCE WITH CEMPR**

During the construction phase of Saldanha Naval Base Project, regular monitoring will take place and audit reports will be presented to the Client, Contractor and Competent Authority on a regular basis. The outcomes of these reports should be discussed in order to identify solutions to any identified issues.

Any non-compliances with the CEMPr will be treated as serious. The liability for non-compliance with the CEMPr rests with the Contractor.

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## 4 CONSTRUCTION SITE FACILITIES

This section of the CEMPr describes the measures that must be undertaken to effectively manage the site facilities, particularly regarding access, establishment of the site and routing of services as well as the camp site, and is presented under the following headings:

- Site Establishment and Demarcation;
- Construction Facilities / Camps; and
- Routing of Services.

### 4.1 SITE ESTABLISHMENT AND DEMARCATION

When establishing the site (including the site camp and all areas of operation), the environmental objective is to minimise the footprint of disturbance, retain quality of topsoil and minimise loss of vegetation and prevent pollution.

If the construction activities are to affect the aesthetic quality of the surrounding area, practical mitigation measures should be implemented.

Any permanent demarcation of natural features is prohibited during the construction period. If any demarcation is required, it shall be carried out through the use of pegs, rope, beacons, etc.

The site layout should take cognisance of access for deliveries and services, and any future works. Likely disturbance to neighbouring areas as well as security implications should be considered.

The construction site will be clearly demarcated for the duration of the construction phase of the project. This includes the demarcation of relevant internal areas (e.g. stockpiling, parking spaces, etc.) with fencing, poles, hazard tape or other relevant markers to prevent sprawl. If there are no specific demarcated areas, the ECO should approve positions prior to any works being done.

### 4.2 CONSTRUCTION FACILITIES / CAMPS

The construction camp shall be located at an easily accessible point within an area of low environmental sensitivity. The location shall be identified in consultation with the Client.

None of the Contractor's facilities will be allowed within 200m of a drainage channel or water body unless otherwise approved by the Environmental Manager.

Any maintenance of plant or machinery that will take place at the Contractor's facilities will be carried out in workshops. The Contractor must ensure that there is no contamination of the soil or vegetation around the workshops or any plant maintenance facilities.



If on-site washing of vehicles or machinery is required, this shall be done in designated areas. Oil-water separators must be installed in these areas and all washing, oil services and oil storage areas are to be bunded.

Each of the locations for the site offices shall also include an adequate area for the storage of solid waste materials. If necessary, gravel parking, to accommodate vehicles, should also be provided at the Contractor's facilities / camp.

### **4.3 ROUTING OF SERVICES**

Details regarding the services that will be required for the contractor is presented under the following headings:

- Power;
- Water;
- Sanitation; and
- "No Go" Areas.

#### **4.3.1 POWER**

The Contractor will connect to existing power supply. The electricity usage for the construction site should be monitored and reduced where possible. If feasible, an alternative power supply should be made available by the Contractor in case of a power outage.

#### **4.3.2 WATER**

The Contractor will connect to existing water supply. The use of water for the construction site should be monitored and reduced where possible. If abstraction from a natural water resource is required, the Contractor must apply for a Water Use License from the Department of Water Affairs (DWA).

#### **4.3.3 SANITATION**

The Contractor has an option on what type of sanitation method to be used, such as the use of chemical toilets and/or mobile toilets. These toilets shall be placed at the site offices and at the construction sites, if necessary. Sanitation facilities must be serviced regularly by a contracted service provider.

Toilets should be located no closer than 50m from any water body or stormwater inlets. Proof of safe disposal of sewerage should be kept on site by the Contractor.

#### **4.3.4 "No Go" AREAS**

Where necessary, certain areas will be demarcated as "no go" areas, such as the identified wetland, and demarcation will be visible and understood by all employees on site. All natural elements (flora or fauna and topsoil stockpiles) will be considered "no go" areas. All private property outside of the construction areas shall also be considered "no go" areas.

All “no go” areas must be appropriately fenced and demarcated and no unauthorised entry, stockpiling, dumping or storage will be allowed in these areas. The ECO must ensure that all “no go” areas are demarcated prior to construction. If an area, that is not included in this CEMPr, is identified as environmentally sensitive during construction, the Environmental Manager must demarcate the area and notify the ECO. The Environmental Manager must ensure that all employees are aware of these areas.

## 5 CONSTRUCTION ACTIVITIES

This section of the programme describes the measures that must be undertaken during the construction phase of the project, and is presented under the following headings:

- Traffic and Access to Site;
- Plant, Machinery and Tools;
- Materials Handling, Use and Storage;
- Waste Materials;
- Cement and Concrete Batching;
- Clearing and Grubbing;
- Earthworks (Excavation);
- Blasting;
- Demolition;
- Pumping and Sumping;
- Air Quality;
- Water Management;
- Erosion and Sedimentation Control;
- Retaining Walls and Gabions;
- Protection of Cultural / Heritage Features;
- Protection of Paleontological and Archaeological Features;
- Protection of Flora Species;
- Protection of Fauna Species;
- Noise; and
- Lights.

### 5.1 TRAFFIC AND ACCESS TO SITE:

The Contractor shall ensure that access to site is restricted and that entry by the general public is prohibited. Any personnel or visitor permitted access to the site shall undergo an adequate induction process prior to admittance. Any personnel or visitor will receive a permit (day permit for visitors) to allow access to the site.

Existing roads and/or tracks should be used, where possible, for access to the Construction Site, Construction Camp and works areas. Adequate vehicle turning areas should be allowed for along the routes. Vehicles may not be permitted to leave the designated routes into any natural areas – turnaround areas will be limited to specific, designated sites.

Speed limits should be enforced for all public and access roads, at all times. Dust suppression measures shall be implemented (such as watering carts) and no unnecessary hooting or loud noises from the vehicles will be permitted.

Routes should not cross slopes that have a gradient of more than 8%. If this is unavoidable, the surface of the route must be stabilised.

Access routes should be adequately maintained to avoid erosion and surface damage. Adequate stormwater controls should be implemented.

Routes in or through wetlands must be avoided. Routes through drainage lines and riparian zones must also be avoided; however, where this is unavoidable, only one route will be allowed and it may not follow drainage lines within the floodplain – routes should be perpendicular to the drainage lines.

In sensitive areas, access routes should be no wider than 3m with passing bays to allow for two-way traffic (if required).

## **5.2 PLANT, MACHINERY AND TOOLS**

The Contractor will be required to implement preventative measures, where necessary, for plant, machinery and tools and should be directed by the Environmental Manager. These preventative measures include:

- Mufflers;
- Screening;
- Dust control;
- Fire prevention;
- Timing; and
- Pre-notification of affected individuals.

This shall be done to minimise complaints associated with noise, dust and vibration.

## **5.3 MATERIALS HANDLING, USE AND STORAGE**

This subsection will consider the handling, use and storage of construction materials, hazardous materials and stockpiles.

### **5.3.1 CONSTRUCTION MATERIALS**

Storage areas for materials required for construction should be roofed with impermeable materials and the ingress of wind-blown rain should be avoided through the provision of adequate roof overhang or aides of adequate height.

### **5.3.2 HAZARDOUS MATERIALS**

The Contractor shall be responsible for the management and monitoring of the storage and disposal of all hazardous chemicals or materials used or generated on the Construction Site. The storage, use and disposal of hazardous chemicals must be regularly checked by the Environmental Manager.

Materials Safety Data Sheets (MSDS's) must be filed for all hazardous materials kept on site. These documents must be checked regularly. The MSDS's must contain the relevant information required for any emergency situation that may arise, which includes the following:

- Product and company identification;
- Composition / information on ingredients;
- Hazards identification;
- First aid and fire fighting measures;
- Handling and storage;
- Exposure control / personal protection;
- Physical and chemical properties;
- Stability and reactivity;
- Toxicological information;
- Ecological information;
- Disposal considerations;
- Transport information;
- Regulatory information; and
- Other necessary information.

The Contractor will be required to comply with the requirements stipulated in the MSDS's. If insufficient information is provided on the MSDS's, the following must be adhered to:

- All hazardous materials (poisons, corrosives, flammables, etc.) shall be stored in a secured, bunded area that is fenced off and has restricted entry. The bunded area must be able to hold a minimum of 110% of the total amount of liquid stored in the area. The bunded areas must have smooth, impermeable surfaces and the floor of the bunded area should slope towards oil traps. Storage of hazardous materials shall only take place using suitable containers approved by the Environmental Manager.
- All receipts of hazardous waste disposal must be kept on record. Only a licensed waste collection company will be permitted to collect and dispose of hazardous materials. Certificates of safe disposal should be obtained from the waste collection company every time hazardous waste is sent for disposal.

Hazard signs indicating the nature of the stored materials shall be placed on the storage facility / containment structure. Safety signs must be displayed and clearly visible to illustrate safety precautions, such as "no smoking", "danger", "no unauthorised access", etc. at the area where hazardous materials are stored. Fire extinguishers must also be provided within a close proximity to the hazardous storage area and must be easily accessible.

It should be noted that the costs associated with the management and disposal of hazardous waste will be at the expense of the Contractor.

### **5.3.3 STOCKPILES**

The requirements surrounding topsoil and spoil stockpiles are discussed in the paragraphs below.

### 5.3.3.1 Topsoil Stockpiles

The areas that result in the topsoil being impacted upon by the construction activities will require the topsoil to be stripped and stockpiled for later use in rehabilitation, after the areas have been cleared of vegetation. Herbaceous vegetation (excluding alien and invasive species), overlying grass and other fine organic material must not be removed from the stripped topsoil.

Topsoil is to be treated with care and must not be buried or in any other way rendered unsuitable for further use. Adequate precautions must be taken to avoid unnecessary handling and compaction of the topsoil material. No vehicles may drive over topsoil stockpiles. Topsoil from different soil types must be stockpiled separately and replaced in the same areas from which they were stripped.

It is vital that topsoil is handled only twice. Once when the topsoil is stripped and stockpiled, and again when it is replaced and levelled for rehabilitation purposes. In the absence of recognisable topsoil, the top 300mm layer of soil should be stripped. Topsoil should not be stripped when it is wet. The Contractor may not store topsoil stockpiles in heaps that exceed 2000mm in height. See **Error! Reference source not found.** below.

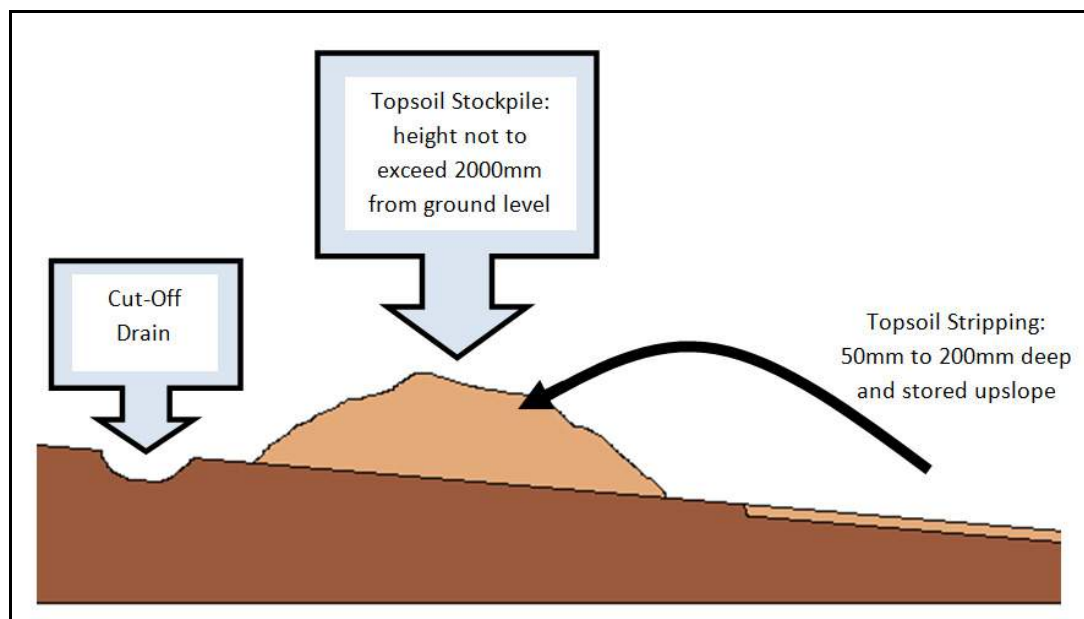


Figure 4 Section of a Typical Topsoil Stripping and Stockpiling Activity

Topsoil stockpiles should be positioned on the higher side of a disturbed area and above a 1:50 year floodline, wherever possible. Topsoil stock-piles may not be stored in drainage lines. The Contractor shall ensure that the topsoil stockpiles are stored in such a way and in a location that will not cause damming up of water, erosion gullies, or wash away completely. Topsoil stockpiles should be protected from erosion.

If invasive or exotic plant species or broadleaf weeds emerge on the topsoil stockpiles, the Contractor must arrange for the removal thereof. If topsoil stock-

piles are to be stored for long periods of time (especially during wet seasons), the Environmental Manager may recommend one or more of the following:

- The re-vegetation of topsoil stockpiles with indigenous grasses; and/or
- The covering of topsoil stockpiles with protective materials e.g. hessian mats.

The Contractor must ensure that topsoil is at no point during the Construction Phase, including rehabilitation, mixed with spoil material, rubble, building material, etc. The Contractor must also ensure that the topsoil is not compacted or contaminated by vehicles or machinery.

The Contractor will be held responsible for the replacement of any topsoil that is rendered unsuitable for rehabilitation for reasons due to mismanagement or negligence.

Excess topsoil shall be used for rehabilitation and landscaping purposes before the completion date of the contract.

### 5.3.3.2 Spoil Stockpiles

The Contractor may not store spoil stockpiles in heaps that exceed 2000mm in height nor with slopes steeper than 1(V):3(V). Spoil stockpiles should be positioned on the higher side of a disturbed area and above a 1:50 year floodline wherever possible. Spoil stock-piles may not be stored in drainage lines. The Contractor shall ensure that the spoil stockpiles are stored in such a way and in a location that will not cause damming up of water, erosion gullies, or wash away completely.

The courser material in the spoil stockpile must be buried beneath the finer materials. Permanent spoil stockpiles should be covered with a 200mm thick layer of topsoil.

Once the spoil material has been removed, the spoil sites must be immediately rehabilitated as soon as work in the area is complete.

## 5.4 WASTE MATERIALS

Waste materials and the management methods and measures that should be implemented during the Construction Phase of the (name of project) Project, are discussed under the following headings:

- Solid Waste; and
- Liquid Waste.

### 5.4.1 SOLID WASTE

Descriptions of the types of waste that will originate from the different construction activities are as follows (this must be verified i.e. check with project



team or with the Environmental Impact Assessment / Basic Assessment Report / Environmental Authorisation):

- **Earthworks Waste (if Earthworks are to be done):**
  - It is anticipated that earth from the construction platforms will be used in the rehabilitation of the site and earth that will not be used will be stored at the spoil sites.
- **Construction Waste:**
  - Due to the high cost of materials used, it is anticipated that there will be very little waste; and
  - Other waste could include small volumes of concrete and concrete aggregate.
- **Infrastructure Waste:**
  - Small amounts of concrete and asphalt will result from the construction of roads, parking areas, stormwater drainage measures etc.; and
  - It should be noted that there will be small amounts of waste that cannot be recycled and must be stored and disposed of accordingly.
- **Building Waste:**
  - Waste will include bricks, glass, sand, concrete and general construction waste. Waste volumes will be minimised to keep the cost of the building materials to a minimum.

It will be the responsibility of each contractor to ensure the waste materials generated from construction are transported to their on-site waste storage areas. These materials must be stored in areas specified and demarcated by the Environmental Manager; however it should be noted that waste storage areas must be positioned away from buildings.

Building and Construction Waste (as described above) will be stored in skips at the construction camp site and will be covered to avoid any ingress of wind-blown rain. These skips will be provided by the contractors themselves. General solid waste and rubbish will be stored in appropriate containers in a separate area that is covered and has a lid on.

All solid waste materials must be collected regularly (at least weekly) and disposed of at approved landfill sites. The disposal of materials must be monitored and recorded by the Environmental Manager. The burning and on-site disposal of waste is prohibited. A licensed waste management company must be appointed (either by the client or by the contractor – depending on the requirements of the client (check with project manager)) to collect solid waste materials on a regular basis. Any vehicle transporting waste, either to the storage area or from the storage area to the landfill site, must be covered with tarpaulins.

Litter will be disposed of in scavenger proof and weather proof bins and disposed of with the general solid waste and rubbish or recycled (if possible). Every person on site will utilise these bins and no litter or refuse must be left on the ground. The contractors will ensure that appropriate rubbish bins are placed on the

construction site for refuse and wheelie bins will be placed inside the refuse area for waste generated from the site camp (offices). Litter from the site camp and working areas will be cleaned by the contractor regularly to ensure that the camp site is kept neat and clean at all times.

Each contractor must ensure that recyclables are stored separately on their site camps and recycled (if feasible). The materials that can be recycled include: paper, cardboard, plastic, glass, metals, concrete, etc.

#### **5.4.2 LIQUID WASTE**

Washing facilities will be provided for construction staff. Chemical toilets will be provided and serviced by a reputable service provider at the cost of the contractor. Drinking water and washing areas (must be connected to a sewerage system to accommodate the waste water) shall be located at convenient areas. All staff will adhere to regulations stipulated and controlled by the Environmental Manager, e.g. areas to be kept clean and no wasting of water will be permitted.

The Environmental Manager will decide on the location of the toilet facilities within each of the site office areas; however it must be noted that the chemical toilets, washing areas, etc. may not be located within 10m of the site Security. Sanitation facilities will be located within 100m of any working point, but no closer than 200m to any water body.

All temporary / portable toilets shall be secured to the ground to the satisfaction of the Environmental Manager to prevent them toppling over due to wind or any other cause.

The facilities will be maintained in a hygienic condition and serviced regularly. Sufficient toilet paper will be provided. Any discharge of waste from the facilities is strictly prohibited.

#### **5.5 CEMENT AND CONCRETE BATCHING**

Concrete shall not be mixed directly on the ground. The batching activity shall be located in an area of low environmental sensitivity to be identified and approved by the Environmental Manager. Batching plants should be positioned on the basis of convenient location to the work sites as well as environmental limitations and opportunities. Batching plants may not be located within a riparian vegetation zone or the 1:100 year floodline, or within a horizontal distance of 100m (whichever is greater) of a watercourse, drainage line or identified wetland.

It is recommended that the permitted location of the batching plant (including the location of the cement stores and sand and aggregate stockpiles) shall be indicated on the site layout plan and approved by the Environmental Manager.

The batching plant area should be protected on the up-slope side by an earth berm or sandbags to deflect clean surface runoff away from the plant. The batching plant should be contained on the down-slope side by a trench and earth

berm or sandbags to control contaminated runoff and construction water emanating from within the area.

Waste concrete and cement sludge must be scraped off the side of the batching plant on a regular basis, and disposed of in the appropriate manner.

## **5.6 CLEARING AND GRUBBING**

Only stipulated methods of clearing vegetation will be allowed. It should be noted that burning of any vegetation is prohibited and the burying of vegetation or use as part of backfill or landscape shaping is prohibited unless permission is granted by the Environmental Manager.

Upgrading, of the gravel service road alongside Diaz Road on military property must not extend more than 0.5m south of the existing internal road.

Refer to 5.3.3.1 for specifications regarding the clearing of Topsoil.

## **5.7 EARTHWORKS (EXCAVATION)**

General excavation activities must be conducted in such a way as to minimise the extent of any environmental impacts caused. The excavations of any material will be done in accordance with SABS 1200 D or DB and PSD or PSDB as applicable. No equipment shall be allowed outside the designated areas of operation unless permitted by the ECO.

Other considerations with regards to the environmental impacts of excavation activities are discussed under the following headings:

- Prospective Boreholes and Test Pits;
- Excavations and Trenches;
- Cut and Fill; and
- Shaping and Trimming.

### **5.7.1 PROSPECTIVE BOREHOLES AND TEST PITS**

The Environmental Manager will be required to walk the route in order to identify any features or areas to be avoided. The Environmental Manager must then mark the route to be used and only the necessary vehicles shall be permitted to use the route.

The drill rig must only travel the route once in and once out and the access route may remain open as long as testing or borrowing from the site takes place. After this is complete, the route must be closed and rehabilitated.

All pits and holes must be backfilled, stabilised and made safe once testing is complete.

## 5.7.2 EXCAVATIONS AND TRENCHES

Appropriate drainage practices will be implemented when excavation activities take place and backfill will be excavated in a progressive basis.

If wetlands are present on the site, the disturbance of wetland soils will be minimised during trenching activities. Topsoil and subsoil will be kept separate and the alteration of the hydrological function must be minimised. These activities will be monitoring by the Environmental Manager.

Trenching for services shall be undertaken according to SABS 1200DB specifications with the following environmental extensions where applicable:

- The number of trenches must be kept to a minimum through the use of one single trench for multiple services;
- The Environmental Manager should be consulted when planning and selecting trench routes. Cognisance should be given to minimising the potential for soil erosion;
- The trench routes and associated working areas must be clearly demarcated before excavation takes place;
- Trench lengths shall be kept as short as practically possible before backfilling and compacting. No trench longer than 1000m may be exposed at any one time and excavations are not allowed to stand open for longer than two days where possible. It is preferable that excavations are opened and closed on the same day;
- Trenches should be re-filled to the same level as, or slightly higher (to allow for settlement) than the surrounding surface to minimise erosion. Excess material must be stockpiled.
- After trenches are refilled, the trenches and associated working areas must be planted with suitable indigenous vegetation and regularly watered.
- If the area is prone to erosion a biodegradable fabric such as Geojute should be used in addition to planting.

The method used for excavation and re-filling of trenches should be the roll-over method. This method involves the following:

1. Soil from the first trench length is stockpiled;
2. Soil from the next trench length is excavated and used as backfill material for the trench behind it, once the services have been laid;
3. The final trench length shall be re-filled using the soil that was stockpiled from the first trench length.

Excavations for the wall foundations alongside Diaz Road / Tabakbaai must be monitored by a professional archaeologist. Should any sub-surface archaeological deposits be encountered during monitoring, some sampling may be required. Excavations must also be inspected for fossil content.

### 5.7.3 CUT AND FILL

It is possible to cut and fill earthworks operations will be necessary to level areas at the locations of some of the proposed structures. The possible impacts from the cut and fill activities include sedimentation from construction activities and invasion of exotic or invasive plant species.

The vegetation will be cut to ground level (where possible) to ensure that root systems remain and therefore ensuring rapid re-colonisation of vegetation.

Cut slopes steeper than 1(V):3(H) will not be permitted. Any slopes steeper will be stabilised according to the recommendations of the Environmental Manager. No concrete rubble is permitted within the top 1.5m of any embankments.

### 5.7.4 SHAPING AND TRIMMING

Bulk (shaping) and fine (trimming) earthworks will be accomplished according to design. Areas will be shaped to correct contours within 300mm and areas will be trimmed to within a tolerance of 50mm.

All stones (diameter larger than 50mm) will be removed from areas to be mown by machines and disposed of in the appropriate manner.

Trimmed surfaces will be kept slightly rough to ensure natural establishment of vegetation.

Where trimming by the use of machinery is not viable, trimming will be carried out by the use of hand tools.

## 5.8 PUMPING AND SUMPING

Spill / dip trays must be placed under pumps to prevent fuels and leaks entering the ground and possibly the ground water. The discharge of contaminated water into existing watercourses is prohibited. Silt-laden water will be cleaned up using the appropriate methods. These methods include the following:

- Using a perforated 200ℓ drum containing sand and stone, separated by geotextiles fabric with a central delivery water pipe;
- Ensuring the overland flow of water disperses widely through vegetation; and
- By tying geotextiles stock on the delivery pipe of the pump. Other filtration methods, such as hay bales and flocculation, may be used if approved by the Environmental Manager.

## 5.9 AIR QUALITY

General considerations regarding air quality are described in the paragraphs presented under the following headings:

- Emissions; and

- Dust.

### 5.9.1 EMISSIONS

All vehicles and equipment shall be kept in good working condition to maximise efficiency and minimise pollution.

The quickest, less congested routes should be taken when making deliveries or travelling to and from the construction site.

### 5.9.2 DUST

To minimise the dust emitted on the construction site, the Contractor shall implement dust suppression measures, e.g. covering of material stockpiles, shade cloth erected on fencing, etc. if and when required.

Vehicles will be required to adhere to speed limits of 20km/hr to 40km/hr.

Materials must be appropriately covered during transportation and the extent of disturbed area must be minimised and protected against wind erosion.

Excavation, transportation and handling of various materials should be avoided in conditions when wind is high. When the occurrence of dust is unavoidable, mitigation measures must be implemented.

The compliant register can be used to monitor the effects of dust due to construction. Dust buckets, to monitor the occurrence of dust, should also be placed at strategic locations identified by the ECO.

## 5.10 WATER MANAGEMENT

The management strategies to be implemented with regards to water resources are presented under the following headings:

- Water Abstraction from Stream and Ground Water;
- Waste Water Management; and
- Contaminated Water.

### 5.10.1 WATER ABSTRACTION FROM STREAM AND GROUND WATER

If the amount of water, to be abstracted from streams or ground water, exceeds the permissible levels (maximum capacity determined by DWA in the General Provisions) a relevant license / permit from the DWA must be obtained.

All abstractions of water must be monitored and controlled.

Natural water sources may not be used for any of the following:

- Personal washing;
- Washing of machinery;
- Washing of clothes; or

- Drinking.

### **5.10.2 WASTE WATER MANAGEMENT**

The Contractor must take reasonable precautions to prevent the pollution of surface and ground water resources on the site as a result of the construction activities.

A surface water management plan should be prepared and approved before construction commences and should take the following into consideration:

- Cut-off drains to separate potentially contaminated flows from the open drainage system;
- Containment of polluted flows; and
- Settling ponds / sludge dams / evaporation ponds for water with high suspension solids.

The Contractor must immediately notify the ECO of any pollution incidents on site.

### **5.10.3 CONTAMINATED WATER**

All watercourses shall be protected from erosion and direct or sewer or indirect spills of pollutants e.g. oils, fuels, chemicals, wastewater, etc.

No spills may be allowed to be hosed down into a stormwater drain or sewer or into the natural environment. All contaminated soil, for example from leaking machines, must be excavated to the depth of contaminant penetration, placed in appropriate drums and removed to an approved landfill site.

Runoff from fuel depots, workshops, washing areas, etc. must be directed into oil water separators and disposed of at a site approved by the Environmental Manager.

The Contractor shall not work within river flood lines and watercourses without written approval from the ECO.

## **5.11 EROSION AND SEDIMENTATION CONTROL**

Aspects relating to erosion and sedimentation control are presented under the following headings:

- Sedimentation and Erosion; and
- Stormwater Controls.

The erosion control measures that are implemented must be monitored weekly by the Environmental Manager to ensure that the measures are maintained.



### 5.11.1 SEDIMENTATION AND EROSION

The contractor shall, as an on-going exercise, implement erosion and sedimentation control measures to the satisfaction of the ECO.

During construction, the contractor shall protect all areas susceptible to erosion by installing necessary temporary and permanent drainable works as soon as possible and by taking any other measures necessary to prevent stormwater from scouring slopes, banks, etc.

The use of water on the site (especially at concrete batching plants and where large water bowsers are used) must be carefully monitored to ensure that erosion on slopes does not take place.

Any erosion channels developed during the construction period shall be backfilled and compacted and the areas restored to a proper condition. The necessary compaction of the replaced sand/soil over trenches must be undertaken. Brushwood removed from excavations should be replaced over the disturbed area to prevent wind and water erosion and facilitate the rehabilitation process.

Stabilisation of cleared areas to prevent and control erosion and/or sedimentation shall be actively managed. The method of stabilisation shall be determined in consultation with the ECO. Consideration and provision shall be made for the following methods, or a combination thereof:

- Brushcut packing;
- Straw stabilising;
- Mulch or chip cover;
- Planting / sodding;
- Soil binders and anti-erosion compounds;
- Watering;
- Mechanical cover;
- Hand or hydro seeding;
- Hessian Cover;
- Gabions and reno mattresses;
- Retaining walls;
- Pole fencing;
- Geofabric;
- Etc.

Anti-erosion compound must consist of an organic or inorganic material such that soil particles are bound together and such that dust and erosion are suppressed. The material used must be able to ensure that grass and seeds germinate and thus enable growth.

Traffic and movement over stabilised areas should be restricted and controlled, and damage to stabilised areas shall be immediately repaired and maintained to the satisfaction of the ECO.

In areas where construction activities have been completed and where no further disturbance would take place, rehabilitation and re-vegetation should commence as soon as possible.

### **5.11.2 STORMWATER CONTROLS**

The contractor shall take reasonable measures to control the erosive effects of stormwater runoff. A runoff control plan should be implemented to regulate the loss of soil and soil potential and to ensure safe discharge and handling of surface runoff.

Detention areas should be used to manage the stormwater runoff from disturbed areas if and when possible.

Silt screens should be used to prevent overland flowing water from causing erosion. Straw bales and geotextiles should be used as erosion protection measures where necessary.

Point source discharge of stormwater must be prevented on slopes as this will lead to erosion of unstable slopes with loss of vegetation and resultant deep donga erosion.

The use of straw / korog bales as filters, which are placed across the flow of overland stormwater flows, shall be used as an erosion protection measure. The ploughing in of straw offers limited protection against stormwater runoff-induced erosion and should be used as an erosion protection measure. The contractor shall be liable for any damage to downstream property cause by the diversion of overland stormwater flows.

## **5.12 PROTECTION OF CULTURAL / HERITAGE FEATURES**

If any cultural or heritage features such as gravesites, ancient stone walls or other structures older than 60 years are present on site, they will be demarcated as “no go” areas and demarcation will be visible and understood by all employees on site.

It is important to note that no structures older than 60 years or parts thereof are allowed to be demolished altered or extended without a permit from SAHRA; all the recommendations of the Heritage Impact Study must be adhered to.

## **5.13 PROTECTION OF PALEONTOLOGICAL AND ARCHAEOLOGICAL FEATURES**

If any archaeological or paleontological remains i.e. unmarked human remains, artefacts, etc. are discovered during excavations, the ECO, the archaeologists (Jonathan Kaplan - 082 321 0172), or Heritage Western Cape (Mr Troy Smuts - 021 483 9685) must be informed immediately to ensure that no damage or destruction to these remains or artefacts occurs. Burials must not be disturbed or removed until inspected by the archaeologist.

All construction activities, as well as operational activities, occurring on the site will then have to immediately cease until further notice.

The following process must be taken in the event of a discovery of any archaeological or paleontological remains during construction:

- Construction is to cease immediately and the ECO informed;
- The finding must be reported to the local police station; and
- South African Heritage Resources Agency (SAHRA) must be notified and must then investigate the finding.

#### **5.14 PROTECTION OF FLORA SPECIES**

Each construction zone should be clearly demarcated prior to the commencement of construction activities to ensure that activities do not unduly disturb sensitive areas outside of the construction area. Areas to be cleared of vegetation will need to be demarcated. The demarcation of any natural element (trees, rocks, etc.) must not be permanent or unnecessary.

Where possible, the vegetation must be cut to ground level, rather than removing completely, leaving root systems in tact to encourage rapid re-colonisation. All alien plant species must be removed and should be replaced with indigenous vegetation.

Should the removal of any vegetation be required the following will be obligatory:

- Identifying endangered / protected plant species (with the aid of an ecologist or other suitable professional);
- Permission from the ECO prior to any vegetation being cleared for development;
- Appropriate rehabilitation measures to be in place and implemented; and
- Exposed areas to be re-vegetated as soon as possible.

Invasion of alien plants through soil disturbance, erosion and sedimentation of the disturbed areas will be monitored by the Environmental Manager.

The contractor shall be responsible for informing all employees about the need to prevent any harmful effects on natural vegetation on or around the construction sites as a result of their activities.

All conservation, sensitive or “no go” areas must be clearly demarcated or cordoned off with temporary structures / markings prior to machinery moving onto site. Machinery operators and contractors should be briefed regarding the constraints before commencing work on site.

The use of herbicides must be approved by the ECO.

Protected trees need to be identified and demarcated. These trees should be avoided where possible. If it is absolutely necessary to remove protected trees, a tree removal license must be applied for prior to the removal of these trees.

Appropriate indigenous tree species should be planted in clumps in the context of the site's service road boundary to replace the four mature Eucalyptus trees that will be removed for the proposed project. A service provider must properly water the new trees for a minimum of 24 months.

All trees that are to be retained must be clearly demarcated with the use of danger tape, strapping or pegs. Demarcation must remain in place for the duration of the construction period.

The use of fires shall be strictly controlled and approved emergency procedures to manage fires must be put in place prior to construction.

### **5.15 PROTECTION OF FAUNA SPECIES**

The contractor shall ensure that no hunting, trapping, shooting, poisoning etc. of any animals take place.

The feeding of any wild animals is prohibited. No food or food products (including waste) may be stored in such a way as to attract scavengers.

The use of pesticides is prohibited unless approved by the ECO.

No domestic pets are permitted on site.

Structures (e.g. gutters, drains, sumps, ditches) must be designed, as far as possible, so that they do not act as pitfall traps for small creatures, i.e. they should either have gently sloping edges or be adequately covered to prevent creatures from falling into them.

### **5.16 NOISE**

The Contractor must take reasonable steps to ensure that noise generating activities are kept to a minimum. Construction processes and machinery / vehicles with the lowest noise emission values available should be used and machinery must undergo regular maintenance.

The Contractor should provide and use effective silencers / mufflers on equipment, machinery and vehicles when working close to residential areas.

Adjacent landowners are to be notified if any after-hours construction work is to take place. If any complaints regarding noise are received, they must be dealt with in a practical and timely manner.

No sound amplification equipment (hooters, loud music, speakers, sirens etc.) is to be used, unless in the case of an emergency.

Excessively noisy plant or machinery requiring repairs are to be removed from site.

## **5.17 LIGHTS**

Where night work has been authorised by the Environmental Manager, low flux and low frequency lighting will be used due to entomological concerns and this will only be in the case of an emergency.

The Contractor will ensure that any lighting installed on the site for the construction activities does not interfere with air traffic or cause a reasonably avoidance disturbance to the surrounding community or other users of the area.

## 6 INCIDENT MANAGEMENT

This section of the report will describe certain incidents that could occur during the construction phase, as well as certain response procedures that should be undertaken. This section is therefore presented under the following headings:

- Types of Incidents; and
- Incident / Emergency Response.

### 6.1 TYPES OF INCIDENTS

There are two types of incidents. The first type is a reportable incident which is an incident that is defined according to the National Environmental Management Act (NEMA) Section 30, as an

*“unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution or detriment to the environment, whether immediate or delayed”*

A reportable incident is also defined, according to the National Water Act Section 20 as

*“any incident or accident in which a substance*  
*(a) pollutes or has the potential to pollute a water resource; or*  
*(b) has, or is likely to have, a detrimental effect on a water resource.”*

The second type of incident is a general incident and it is defined as a minor incident or non-conformance to this CEMPr that is confined to the construction area and/or has minimal impacts on the environment with no long-term effects.

If a reportable incident occurs on the site, an incident report must be completed by the Contractor and/or the Environmental Manager and checked by the ECO. The Contractor must ensure that the incident report is submitted to the relevant government department.

### 6.2 INCIDENT / EMERGENCY RESPONSE

The aims of the Emergency Response Plan (ERP) are to ensure the effective response to emergency incidents; to attempt to control emergency situations; to record incidents; and to ensure (where possible) that all measures are taken to prevent the recurrence of incidents.

The two major environmental incidents that are common during construction activities are:

- Spill Response; and
- Fire Control and Response.

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### 6.2.1 SPILL RESPONSE

Spillage treatment methods must be stipulated and adhered to in the case of an accidental leak or spill. In the event of an accidental leak or spill, it must be reported to the Contractor / Environmental Manager who will be responsible for reporting the spill to the ECO. The ECO must ensure that all site personnel are made aware of the spill response procedures during training and toolbox talks. If the spill results in contamination or if the spill falls within the definition of an emergency incident, the ECO must report the incident to the relevant authorities.

The spill response should adhere to the following procedures:

1. Identify the nature and size of the spill (e.g. diesel, 20ℓ). Consult the Materials Safety Data Sheets (MSDS) for safety precautions.
2. Protect exposed stormwater drains; prevent entry of substance to stormwater drains, drainage lines and water sources.
3. For small spills (less than 1 litre), locate spill kit and contain spill according to the training from the spill kit suppliers.
4. For large spills (unable to deal with on site), contact external spill control contractors.
5. Determine appropriate method for disposal of material based on information provided in MSDS.
6. Determine if any contamination has occurred, i.e. entry into stormwater, soil contamination, etc.
7. If contamination has occurred, consult with authorities on need for on-going monitoring and/or rehabilitation requirements. Determine medium- and long-term effects. Stormwater incidents must be reported to the Department of Water Affairs (DWA).
8. If no contamination has occurred, determine if the spill falls under a definition of an “incident” and if so, report to relevant authorities.
9. Record the incident in the incident register. The ECO must review all spill reports.
10. Adjustments should be made, if necessary, to the construction and emergency procedures to prevent further occurrences.



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## 6.2.2 FIRE CONTROL AND RESPONSE

In the event of a fire, the Health and Safety Officer appointed to the site must be contacted. The contractor must then report the incident to the relevant authorities if the fire falls within the definition of an emergency incident. The Environmental Manager must ensure that all site personnel are aware of the fire response procedures during training and toolbox talks.

The following fire response procedures should be followed:

1. Identify the source and nature of the fire.
2. In the event of a small fire, it must be extinguished with material appropriate to the nature of the fire.
3. Immediately contact the fire marshal appointed for the site and in the event of a large fire contact the Fire Department.
4. Exposed stormwater drains must be sealed to ensure the fire does not cause any external contamination.
5. Once the fire has been extinguished, determine whether any contamination has occurred.
6. If contamination has occurred, the authorities must be contacted to determine the appropriate rehabilitation and monitoring.
7. Record incident in the incident register and record incident in the non-compliance register if applicable.
8. The ECO should review all fire reports.
9. Adjustments should be made, if necessary, to the operational and emergency procedures to prevent further occurrences.

## Appendix A – Construction Programme

*To be finalised and inserted*

## Appendix B – Environmental Authorisation

*To be finalised and inserted*

## Appendix C – Environmental Manager Appointment Letter

*To be finalised and inserted*

## Appendix D – Letter of Acceptance of CEMPr

The following letter is to be signed by each Contractor and other relevant persons (on the relevant letterhead), printed and stored on site.

**RE: Acceptance of the Saldanha Naval Base Construction Environmental Management Programme**

Dear Sir / Madam,

This is to state that the undersigned have received a copy of the Construction Environmental Management Programme (CEMPr) developed for the construction phase of the Saldanha Naval Base Project, by Delta Built Environmental Consultants (DELTA BEC), dated (date of final revision). The undersigned do hereby agree to abide by the strictures of the CEMPr. Any contravention of the CEMPr shall be recorded and corrective action shall be carried out.

Any changes to the CEMPr shall be approved by the relevant Competent Authority. Such changes shall be made in writing and a record of all changes will be maintained.

As agreed on this day \_\_\_\_\_ of \_\_\_\_\_ (Month) \_\_\_\_\_ (Year)

Environmental Control Officer

Full Name: \_\_\_\_\_

Signed: \_\_\_\_\_

Contractor

Full Name: \_\_\_\_\_

Signed: \_\_\_\_\_

Resident Engineer

Full Name: \_\_\_\_\_

Signed: \_\_\_\_\_



## Appendix F – List of Contacts

The following List of Contacts must be updated and displayed in a prominent location on the construction site.

NAME & SURNAME	ORGANISATION	DESIGNATION	CONTACT NUMBER
	Contractor (Name of Company)	Environmental Manager	
	Contractor (Name of Company)	Health and Safety Officer	
		Environmental Control Officer	
		Resident Engineer	
		<i>(Other Relevant Construction Staff)</i>	
	Name of Competent Authority		
	Department of Water Affairs		
	Name of Municipality		
	Water		
	Electricity		
	Fire Department		
	Emergency Response		
	Police		
	Emergency Spill Response		
	<i>(Other Relevant Contacts)</i>		



## Appendix G – Complaints Register

The following Complaints Register must be completed if and when complaints have been received.

<b>Complaint Number:</b>	
<b>Date of Complaint:</b>	
<b>Complainant's Name &amp; Surname:</b>	
<b>Complainant's Contact Number:</b>	
<b>Nature of Complaint:</b>	
<b>Corrective Action Taken:</b>	
<b>Date of Completion of Action:</b>	
<b>Monitored By:</b>	



## Appendix I – Method Statements

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## **APPENDIX G**

### **DETAILS OF EAP AND EXPERTISE**



## environmental affairs

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA


### DETAILS OF EAP AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	14/12/16/3/3/1/765
NEAS Reference Number:	DEAT/EIA/0001569/2012
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010

### PROJECT TITLE

Proposed Saldanha Naval Base – Replacement of an Existing Security Fence
--

Environmental Assessment Practitioner (EAP): <sup>1</sup>	Life4all Environmental Consultancy cc		
Contact person:	Roelien du Plessis		
Postal address:	P O BOX 39600, Moreleta Park		
Postal code:	0044	Cell:	084 584 4707
Telephone:	0845844707	Fax:	086 236 7477
E-mail:	life4all@telkomsa.net		
Professional affiliation(s) (if any)	IAIAsa, SSAG IWMSA, WISA		

Project Consultant:	Delta Built Environmental Consultants		
Contact person:	Michael Lagus/ Deshni Naicker		
Postal address:	Unit 203A, Tokai Village, Vans Road, Tokai		
Postal code:	7945	Cell:	
Telephone:	021 712 9053	Fax:	086 605 6052
E-mail:			

#### 4.2 The Environmental Assessment Practitioner

I, Roelien du Plessis, declare that –

General declaration:

I act as the independent environmental practitioner in this application

I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant

I declare that there are no circumstances that may compromise my objectivity in performing such work;

I have expertise in conducting environmental impact assessments, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;

I will comply with the Act, regulations and all other applicable legislation;

I will take into account, to the extent possible, the matters listed in regulation 8 of the regulations when preparing the application and any report relating to the application;

I have no, and will not engage in, conflicting interests in the undertaking of the activity;

I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;

I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;

I will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report;

I will keep a register of all interested and affected parties that participated in a public participation process; and

I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not

all the particulars furnished by me in this form are true and correct;

will perform all other obligations as expected from an environmental assessment practitioner in terms of the Regulations; and

I realise that a false declaration is an offence in terms of regulation 71 and is punishable in terms of section 24F of the Act.

**Disclosure of Vested Interest (delete whichever is not applicable)**

I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2010;

~~— I have a vested interest in the proposed activity proceeding, such vested interest being:~~

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Signature of the environmental assessment practitioner:

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Name of company: LIFE4ALL Environmental Consultancy cc

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Date: 27/2/2013

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**APPENDIX H**

**SPECIALIST DECLARATION OF INTEREST**





## environmental affairs

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA


### DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	14/12/16/3/3/1/765
NEAS Reference Number:	DEA/EIA/0001569/2012
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010

### PROJECT TITLE

PROPOSED SALDANHA NAVAL BASE – REPLACEMENT OF AN EXISTING SECURITY FENCE

Specialist:	Agency for Cultural Resource Management		
Contact person:	Jonathan Kaplan		
Postal address:	5 Stuart Rd, Rondebosch		
Postal code:	7700	Cell:	082 321 0172
Telephone:	021 685 7589	Fax:	
E-mail:	acrm@waccess.co.za		
Professional affiliation(s) (if any)	Association of Southern African Prof. Archaeologists Association of professional Heritage Practitioners		
Project Consultant:	Delta Built Environmental Consultants		
Contact person:	Michael Lagus/ Deshni Naicker		
Postal address:	Unit 203A, Tokai Village, Vans Road, Tokai		
Postal code:	7945	Cell:	
Telephone:	021 712 9053	Fax:	086 605 6052
E-mail:	Michael.lagus@deltabec.com / Deshni.naicker@deltabec.com		

4.2 The specialist appointed in terms of the Regulations\_

I, Jonathan Kaplan, declare that --

General declaration:

I act as the independent specialist in this application

I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant

I declare that there are no circumstances that may compromise my objectivity in performing such work;

I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;

I will comply with the Act, regulations and all other applicable legislation;

I have no, and will not engage in, conflicting interests in the undertaking of the activity;

I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;

all the particulars furnished by me in this form are true and correct; and

I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of section 24F of the Act.

  
Signature of the specialist:

Agency for Cultural Resource Management  
Name of company (if applicable):

22-02-2013  
Date:



## environmental affairs

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA


### DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	14/12/16/3/3/1/765
NEAS Reference Number:	DEA/EIA/0001569/2012
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010

### PROJECT TITLE

PROPOSED SALDANHA NAVAL BASE – REPLACEMENT OF AN EXISTING SECURITY FENCE

Specialist:	Bridget O'Donoghue Architect, Heritage Specialist, Environment		
Contact person:	Bridget O'Donoghue		
Postal address:	P O Box 1753 Sun Valley		
Postal code:	7985	Cell:	071 109 0900
Telephone:	021 683 7085	Fax:	086 511 0389
E-mail:	bodonoghue@telkomsa.net		
Professional affiliation(s) (if any)	Association of Professional Heritage Practitioners (APHP) International Association of Impact Assessment South Africa		

Project Consultant:	Delta Built Environmental Consultants		
Contact person:	Michael Lagus/ Deshni Naicker		
Postal address:	Unit 203A, Tokai Village, Vans Road, Tokai		
Postal code:	7945	Cell:	
Telephone:	021 712 9053	Fax:	086 605 6052
E-mail:	Michael.lagus@deltabec.com / Deshni.naicker@deltabec.com		

4.2 The specialist appointed in terms of the Regulations\_  
**Bridget O'Donoghue**

I, \_\_\_\_\_, declare that --

General declaration:

I act as the independent specialist in this application

I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant

I declare that there are no circumstances that may compromise my objectivity in performing such work;

I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;

I will comply with the Act, regulations and all other applicable legislation;

I have no, and will not engage in, conflicting interests in the undertaking of the activity;

I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;

all the particulars furnished by me in this form are true and correct; and

I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of section 24F of the Act.

*Bridget O'Donoghue*

Signature of the specialist:

Bridget O'Donoghue Architect, Heritage Specialist, Environment

Name of company (if applicable):

21 / 02 / 2013

Date:



## environmental affairs

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA


### DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	14/12/16/3/3/1/765
NEAS Reference Number:	DEA/EIA/0001569/2012
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010

### PROJECT TITLE

PROPOSED SALDANHA NAVAL BASE – REPLACEMENT OF AN EXISTING SECURITY FENCE
--

Specialist:	Louise Zdanow		
Contact person:	Louise Zdanow		
Postal address:	22 Leiden Crescent Uitzicht Estate		
Postal code:	7550	Cell:	076 7255657
Telephone:	/	Fax:	/
E-mail:	louise@sasenvironmental.c		
Professional affiliation(s) (if any)			

Project Consultant:	Delta Built Environmental Consultants		
Contact person:	Michael Lagus/ Deshni Naicker		
Postal address:	Unit 203A, Tokai Village, Vans Road, Tokai		
Postal code:	7945	Cell:	
Telephone:	021 712 9053	Fax:	086 605 6052
E-mail:	Michael.lagus@deltabec.com / Deshni.naicker@deltabec.com		

4.2 The specialist appointed in terms of the Regulations

I, LOUISE ZDANOW, declare that --

General declaration:

I act as the independent specialist in this application  
I will perform the work relating to the application in an objective manner, even if this results in  
views and findings that are not favourable to the applicant  
I declare that there are no circumstances that may compromise my objectivity in performing such  
work;  
I have expertise in conducting the specialist report relevant to this application, including knowledge  
of the Act, regulations and any guidelines that have relevance to the proposed activity;  
I will comply with the Act, regulations and all other applicable legislation;  
I have no, and will not engage in, conflicting interests in the undertaking of the activity;  
I undertake to disclose to the applicant and the competent authority all material information in my  
possession that reasonably has or may have the potential of influencing - any decision to be taken  
with respect to the application by the competent authority; and - the objectivity of any report, plan  
or document to be prepared by myself for submission to the competent authority;  
all the particulars furnished by me in this form are true and correct; and  
I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms  
of section 24F of the Act.

Signature of the specialist:



SAS ENVIRONMENTAL

Name of company (if applicable):

25/02/2013  
Date: