

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

PREPARED IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998), ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS OF 2014, AS AMENDED

PROJECT

PROPOSED UPGRADE OF THE EXISTING PINNACLE POINT
WASTEWATER TREATMENT WORKS (WWTW) FROM 2.15
ML/DAY TO 6.9 ML/DAY TREATMENT CAPACITY ON THE
REMAINDER OF ERF NO. 15390, MOSSEL BAY
REGISTRATION DIVISION, MOSSEL BAY

DEA&DP Ref. No. 16/3/3/6/1/D6/29/0223/21

APPLICANT



PREPARED BY



JUNE 2023

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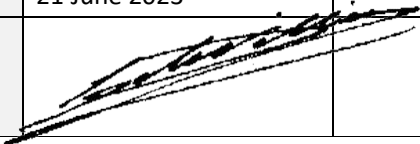
	Issue 1	Revision 1	Revision 2
Issue/Revision Name	Construction EMPr: Pinnacle Point WWTW Upgrade, Mossel Bay Municipality		
Report prepared/revised by:	Pieter de Villiers, Cornerstone Environmental Consultants (Pty) Ltd.		
Revision notes:	-		
Date:	21 June 2023		
Signature:			

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List of Acronyms and Abbreviations

BAR	Basic Assessment Report
DEA&DP	Department of Environmental Affairs and Development Planning
DHSWS	Department of Human Settlement, Water and Sanitation
DWS	Department of Water and Sanitation (now DHSWS)
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
I&APs	Interested and Affected Parties
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended
NFEPA	National Freshwater Ecosystems Priority Assessment
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
SDP	Site Development Plan

Definitions

“Activity” is the relevant action(s) that will take place on the site, e.g. undertaking maintenance of machinery at the Farm Shed.;

“Alien species” means—

- a) a species that is not an indigenous species; or
- b) an indigenous species translocated or intended to be translocated to a place outside its natural distribution range in nature, but not an indigenous species that has extended its natural distribution range by natural means of migration or dispersal without human intervention.

“Ecological Infrastructure” refers to naturally functioning ecosystems that deliver valuable services to people, such as water and climate regulation, soil formation and disaster risk reduction.

“Environmental aspect” is a feature or characteristic of an activity that affects or can affect the environment.

“Environmental impact” is a change to the environment. Such change can be positive or negative. Environmental impacts are caused by environmental aspects;

“Environmental Objective” is the specific environmental goal; and

“Environmental Target” is a detailed performance requirement. Environmental targets are derived from environmental objectives and are used to achieve these objectives. Targets should be measurable where possible.

“General Authorisation” in this document refers to the General Authorisation in terms of section 39 of the National Water Act, 1998 (Act No. 36 of 1998) for Water Uses as defined in Section 21(c) or Section 21(i) (GN. 509 of 26 August 2016).

“Indigenous vegetation” refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.

“Invasive species” means any species whose establishment and spread outside of its natural distribution range—

- a) threaten ecosystems, habitats or other species or have demonstrable potential to threaten ecosystems, habitats or other species; and
- b) may result in economic or environmental harm or harm to human health.

“Listed Activity” means an activity identified in any notice published by the Minister or MEC in terms of section 24D(1)(a) of the Act as a listed activity or specified activity. Activity in this document refers to the activities as listed in Listing Notice 1, 2 and 3 of the Environmental Impact Assessment Regulations, 2014 (as amended).

“Maintenance” means actions performed to keep a structure or system functioning or in service on the same location, capacity and footprint.

1 Introduction

This Environmental Management Programme (EMPr) describes, amongst others, mitigation measures and identifies the specific people/entities that will be responsible for implementation of the identified mitigation measures in order to ensure that impacts on the environment are minimised during the construction and operational phases of the expanded Pinnacle Point Wastewater Treatment Works (WWTW) on the Remainder of Erf No. 15390, Mossel Bay Registration Division, Mossel Bay, Western Cape Province. Please refer to **Figure 1** for a locality map.

In the event of appointing external contractors, the EMPr must form part of the contractual agreement between the relevant contractor(s) and the Mossel Bay Municipality.

1.1 EIA Regulations, 2014 - EMPr Content Requirements

Appendix 4 of the Environmental Impact Assessment (EIA) Regulations of 2014, as amended, provides the content requirements for an EMPr. An EMPr must also comply with section 24N (2) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The table below lists the relevant requirements, indicates whether the relevant information is included in this report or not, and provides cross-references as to where the relevant information can be found in this report.

Table 1: EMPr requirements in terms of Appendix 4 of the EIA Regulations of 2014, as amended

Appendix 4 of the EIA Regulations of 2014		Included (Yes, No or N/A)	EMPr Section Reference
1. An EMPr must comply with section 24N of the Act (NEMA) and include -			
(a)	details of -		
	(i) the EAP who prepared the EMPr; and	Yes	Chapter 2
	(ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Yes	Chapter 2
(b)	a detailed description of the aspects of the activity that are covered by the draft EMPr as identified by the project description;	Yes	Chapter 9
(c)	a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Yes	Figures 1, 2 and 3
(d)	a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including- (i) planning and design; (ii) pre-construction and activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; (v) where relevant, operation activities;	Yes	Chapter 8
(e)	a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);	Yes	Chapter 9
(f)	a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to -	Yes	Chapter 9

Appendix 4 of the EIA Regulations of 2014		Included (Yes, No or N/A)	EMPr Section Reference
	(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;		
	(ii) comply with any prescribed environmental management standards or practices;		
	(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and		
	(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;		
(g)	the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Yes	Chapters 6 and 9
(h)	the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Yes	Chapters 6 and 9
(i)	an indication of the persons who will be responsible for the implementation of the impact management actions;	Yes	Chapters 6 and 9
(j)	the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Yes (project phases)	Chapters 6 and 9
(k)	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Yes	Chapters 6 and 9
(l)	a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Yes	Chapters 6 and 9
(m)	an environmental awareness plan describing the manner in which-	Yes	Chapter 7
	(i) the Applicant intends to inform his or her employees of any environmental risk which may result from their work; and		
	(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and		
(n)	any specific information that may be required by the competent authority.	-	-
2. Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.			

2 Environmental Assessment Practitioner

This EMPr was prepared by Pieter de Villiers, Director of Cornerstone Environmental Consultants (Pty) Ltd., who undertook the Environmental Impact Assessment process for the proposed upgrade and expansion of the Pinnacle Point WWTW. The sections below provide the details of the EAP and explains the EAP's expertise to prepare this EMPr.

2.1 Details and Expertise of the EAP

Pieter de Villiers has more than 19 years' experience in the environmental management field and holds a Baccalaureus Technologiae (B. Tech) Degree in Environmental Sciences from the Tshwane University of Technology. He is a member of the Environmental Assessment Practitioners' Association of South Africa (EAPASA), EAPASA Registered (2019/1372) and member of the International Association for Impact Assessors, South African Affiliate (IAIASa). He is a registered Professional Natural Scientist with the South African Council for Natural Scientific Professions (registration number 400210/15). He has also successfully completed Aspects International's, ISO 14001:1996 Lead Auditors Training course (IEMA's Approved Auditors' Course), amongst others.

See **Appendix A** for Pieter de Villiers' abbreviated Curriculum Vitae.

3 Project Description and Listed Activities Covered by this EMPr

3.1 Brief Project Description

The Mossel Bay Municipality proposes to upgrade the existing WWTW by installation of new infrastructure on the existing footprint as well as expanding the footprint by $\pm 6\,000\text{m}^2$, towards the north-west (the site), to accommodate new infrastructure, to provide an increased treatment capacity of 6,9 Mega Litres per day (ML/day).

The following scope is recommended by the engineers to increase the capacity of the WWTW to 6,9 ML/day:

- construction of a new inlet works with mechanical screening, vortex-type grit chambers and washing of grit and screenings;
- construction of a new flow distribution structure between the old and new plants;
- upgrading of the existing office building to facilitate the new MCC, further to this the refurbishment of the existing chlorination building to have the required safety structures (refer to the Technical Report's Annexure K);
- construction of a new secondary treatment chain with a new biological reactor and secondary settling tank;
- supply and installation of a new mechanical dewatering facility including the construction of a new dewatered sludge hopper;
- rehabilitation of the existing access road;
- extension of the site area towards the north-west with a footprint of $\pm 6\,000\text{ m}^2$;
- extension of fencing around the total footprint.

There is an existing access road to the WWTW that will be used.

Refer to **Figure 2** for the project's Site Development Plan.

3.2 Project Phases

The following two main project phases are relevant to this project:

- Construction Phase of the WWTW will include the planning, design, pre-construction and construction activities for the upgrade of the existing works and the expansion into the new $\pm 6\,000\text{m}^2$ area; and
- Operational Phase of the WWTW.

This Draft EMPr does not address the decommissioning and closure phases of the WWTW, since it is not foreseen that any of the infrastructure will be decommissioned.

3.3 NEMA Listed Activities Triggered

The NEMA EIA Listed Activities, as per the NEMA EIA Regulations Listing Notices 1, 2 and 3 of 2014 as amended, that will be triggered by the proposed project are listed below.

Table 2: NEMA Listed Activities applicable to this application

GN No. R. 327 Activity No(s): (Listing Notice 1 of 2014, as amended)	Describe the portion of the development as per the project description that relates to the applicable listed activity.
None	
GN No. R. 325 Activity No(s): (Listing Notice 2 of 2014, as amended)	Describe the portion of the development as per the project description that relates to the applicable listed activity.
None	
GN No. R. 324 Activity No(s): (Listing Notice 3 of 2014, as amended)	Describe the portion of the development as per the project description that relates to the applicable listed activity.
Listed Activity 12 The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. i. Western Cape i. 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; ii. Within critical biodiversity areas identified in bioregional plans; or iii. Within the littoral active zone or 100 m inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas, or iv. <u>On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or</u> v. On land designated for protection or conservation purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister.	The area has not been disturbed during the preceding 10 years, contains indigenous vegetation, and thus will trigger this listed activity because the land is zoned Open Space III.
Listed Activity 15 The transformation of land bigger than 1000 square metres in size, to residential, retail, commercial, industrial or institutional use, where, such land was zoned open space, conservation or had an equivalent zoning, on or after 02 August 2010. (f) Western Cape: i) Outside urban areas.	Transformation of $\pm 6\,000\text{m}^2$ of undeveloped land that is zoned open space to a WWTW. This listed activity will be triggered.

It is of the utmost importance to prevent the triggering of further listed activities that may need to be authorised. If uncertain during the undertaking of any activities, contact an Environmental Assessment Practitioner to ascertain if the proposed development does not trigger any Listed Activities.

4 Receiving Environment Summary

The site is located on the edge of the elevated coastal platform (130-140 masl) between Dana Bay and Mossel Bay (**Figure 1**). Being located at the foot of an old sand mine directly north-west of the Pinnacle Point WWTW,

it is highly modified and predominantly covered by kikuyu (*Cenchrus clandestinus*) and other invasive species. The area directly to the east (east of the access road) is relatively undisturbed and covered by fynbos. The area to the north and west has been modified by past sand mining activities. The closest residential area is Pinnacle Point Golf Estate, located about 800 m away to the southeast.

The proposed expansion of the WWTW will be situated on the already disturbed footprint of the old sand mine area to the north-west of the WWTW.

4.1 Climate

The mean annual rainfall for the property in which the site is located, is 444 mm (as per Cape Farm Mapper climatic data for 1950 to 2000). The peak rainfall periods are the months of March (autumn) and October (spring), while the driest periods are the winter and summer months, i.e. bimodal rainfall regime. The study area lies in the transition zone between the winter and summer rainfall regions. Mean monthly maximum and minimum temperatures are 24.2°C and 9.9°C for January/February and July/August, respectively (as per Cape Farm Mapper data). The Köppen-Geiger climate classification for the Mossel Bay area is BSk (arid, steppe, cold).

4.2 Geology

According to the 3422 AA Mossel Bay 1:50 000 geological map, the main geological formation underlying the site is identified as non-shelly sand. Lower down on the steeper sea-facing slopes (below the WWTW) it changes into a mixture of non-shelly sand, calcrete and calcified dune sand (Wankoe Formation) (Figure 4-3). The Wankoe Formation belongs to the Bredasdorp Group. All these deposits are of Tertiary to Quaternary age. In the past, non-shelly sand has been targeted for sand mining. Lightgrey quartzitic sandstone (Skurweberg Formation of The Table Mountain Group) is found at the base of the coastal platform (well below the WWTW). The latter is well exposed along the coast west of Cape St Blaize.

4.3 Freshwater Features

According to the National Freshwater Ecosystem Priority Atlas (NFEPA; Nel et al., 2011) the sub-quaternary reach (SQR 9292) is classified as a Freshwater Ecosystem Priority Area (FEPA). FEPAs must remain in a good condition to manage and conserve freshwater ecosystems, and to protect water resources for human use. This does not mean these areas should be fenced off from humans, rather that they be supported by good planning, decision-making and management to ensure they are not degraded. The recommended condition for all FEPAs is an ecological category of A or B (Nel et al., 2011).

There are no definable watercourses within the footprint of the expanded area proposed for the WWTW.

While the Sub-quaternary reach in which the site falls is a FEPA, the site falls well outside the catchment area of the river reach for which the FEPA status was determined. The wetland seep mapped on the National Wetland Map 5 is actually an area of dumped rubble and soil overgrown by kikuyu grass. This may have been a wetland once many decades ago, but it no longer functions in any way like a wetland.

The mapped wetland area is located upslope from the proposed expansion of the WWTW so even if sensitive wetland habitat were present, it could not be impacted by construction works.

4.4 Cultural and Heritage Aspects

Dr. Nilssen provided a Brief Preliminary Heritage Resources Status Statement on 20 June 2023, as follows:

“Based on the disturbed nature of the affected portion of Rem Erf 15390 and previous archaeological / heritage work conducted in the area by this author and consulting palaeontologist, John Pether, the heritage process is likely to be completed during the NID application phase.

With supporting information, it will be motivated in the HWC NID application that on archaeological / heritage and palaeontological grounds the study area is of LOW sensitivity and that there is no reason to believe that significant heritage resources will be impacted by the proposed upgrade of the Pinnacle Point WWTW. Consequently, it will be motivated that further heritage-related studies are not required and that an integrated Heritage Impact Assessment is not warranted in this instance”.

5 Responsible Parties and Communication

5.1 Responsible Parties

Responsibility for the implementation of the EMPr lies with the Applicant (or the Applicant’s representative). This responsibility shall be delegated to contractors for practical purposes, but the Applicant shall remain legally responsible for the implementation of the EMPr.

It is therefore the responsibility of the following individuals or groups to implement the EMPr and its management conditions.

The impact and mitigation tables provided below includes a “Responsible Person / Party” column that indicates which team member(s) are responsible for implementation of the identified mitigation measures.

5.1.1 Applicant/Proponent

Has the responsibility of implementing the conditions of this EMPr as well as those contained in the Environmental Authorisation, until the liability is carried over to a new “holder of the Environmental Authorisation”.

5.1.2 Proponent’s Representative

This is the person responsible for managing the WWTW on behalf of the Proponent.

Responsibilities include:

- The day-to-day running and maintenance of various activities and facilities at the WWTW;
- Appointment and management of relevant third parties as described below and/or management of internal employees conducting work related to management, maintenance, or rehabilitation projects at the WWTW; and
- Overseeing the implementation of the EMPr during general operational activities.

5.1.3 Project Engineer

The project engineer represents the Proponent.

5.1.4 Construction contractor(s)

Will include the construction manager and whose responsibilities include:

- to have the EMPr, Environmental Authorisation and Water Use Licence available on site at all times;
- If required by the Engineer / Applicant, provide “Method Statements” that will indicate the procedures that will be applied in order to meet the requirements of any aspect of the EMPr (see **Appendix C** to this EMPr for a template of a method statement); and
- ensure that all problems identified during environmental inspections, are addressed and rectified as soon as reasonably possible.

5.2 Communication

The following sections describe the site communication measures that will need to be implemented.

5.2.1 Consultation with Interested and Affected Parties

The Proponent or representative should establish a complaints register to record / register all complaints relating to the construction activities. The project team should develop a protocol relating to the steps that would be followed once a complaint has been received. The protocol should cover at least the following steps: registration, investigation, and reporting, follow-up action and close out.

5.2.2 Site Instructions

The Engineer should maintain a Site Instruction book that should be used for the recording of general site instructions as they relate to the works on site.

5.2.3 Method Statements

A method statement is a written submission by the construction contractor that contains information on how work in sensitive environments will take place. It must describe the scope of the intended work, step-by-step, in order for the Applicant and/or Engineer to understand the construction contractor's intentions with its activities, and to be able to assess whether or not the construction contractor's work proposal is in accordance with the Scope of Work and/or will produce results in accordance with the EMPr.

The construction contractor must submit the method statements **seven (7) working days before any particular construction activity is due to start**. Work may not commence until the method statement has been approved by the Applicant or by the Project Engineer. Method Statements from the construction contractor could be required for specific actions on request by the authorities or the Applicant or by the Project Engineer.

Approved Method Statements should be available on site and should be communicated to all relevant personnel. The proponent or his construction contractor shall carry out the construction activities in accordance with the approved Method Statement. Approval of the Method Statement shall not absolve the construction contractor from any of his obligations or responsibilities in terms of his contract or the requirements of the approved EMPr.

Method Statements shall consider all environmental hazards and risks identified in the EMPr and should clearly indicate the following:

- **WHAT WORK IS TO BE UNDERTAKEN** – give a brief description of the works to be undertaken;
- **WHERE THE WORKS ARE TO BE UNDERTAKEN** – provide a description of the extension of the works and an annotated plan of the locality of work;
- **HOW THE WORKS ARE TO BE UNDERTAKEN** - a detailed description of the process of work, methods and materials to be used in the works; and
- **WHEN WILL THE WORKS TAKE PLACE** - the sequencing of actions with due commencement dates and completion date estimates.

Refer to **Appendix C** for an example template for the method statements.

The following method statements, as per the EMPr specifications, may be required:

- **MS1: Site demarcation.**
- **MS2: Site and camp layout and establishment.**
- **MS3: Stormwater Runoff and Erosion control.**

- **Earthworks and spoil management.**

5.2.4 Record Keeping

The complaints register, site instruction book, method statements, and all other records related to the implementation of this EMPr must be kept together in a file at the site office or at least on the property for the duration of the construction contract period.

5.2.5 Penalties and Fines

Fines / penalties will be issued for the transgressions listed below, in addition to any remedial costs incurred as a result of non-compliance with this CEMPr. The ECO will inform the Project Manager / Consulting Engineer of the contravention. The Project Manager / Consulting Engineer will then issue the amount of the fine to the Contractor and will deduct the amount from monies due under the Contract.

Table 3: Fines / penalties to be imposed for non-compliances with this EMPr.

A	Any vehicle being driven, and equipment or materials being parked or stored outside the demarcated boundaries of the site or indicated laydown area.	R 5 000.00
B	Persons walking outside the demarcated boundaries of the site.	R 500.00
C	Persistent and un-repaired oil leaks from machinery. The use of inappropriate methods of refuelling such as the use of a funnel rather than a pump.	R 3 000.00
D	Persistent littering on site or adjacent the site.	R 1 000.00
E	Deliberate lighting of illegal fires on site.	R 10 000.00
F	Individual not making use of the site ablution facilities.	R 1 000.00
G	Any person, vehicle, item of plant, or anything related to the Contractors operations causing a public nuisance.	R 2 000.00
H	Other CEMPr contraventions not listed above (use discretion).	R 2 000.00

For each subsequent similar offence, the fine may, at the discretion of the Consulting Engineer/ECO, be doubled in value to a maximum value of R100 000.00.

6 Monitoring, Performance Assessment and Reporting on EMPr Compliance

6.1 Monitoring

Several monitoring actions are proposed, which would be implemented by various project role players. These role players are identified in the "Monitoring" column in the EMPr tables below (Chapter 9). Also refer to **Section 9** for the "Monitoring Action", "Responsible Person/Party", and "Monitoring Frequency" associated with the identified mitigation measures.

6.2 Performance Assessment and Reporting on EMPr Compliance

6.2.1 Environmental Control Officer

The ECO is an independent appointment to objectively monitor implementation of this CEMPr. The ECO must be on site prior to any site establishment and must form an integral part of the project team. The mitigation measures as described in the EMPr, as well as the conditions of authorisation as described in the Environmental Authorisation, should be monitored by the ECO.

The ECO must be suitably experienced with the relevant environmental management qualifications. He/she must be proactive and have access to specialist expertise as and when required.

The ECO's duties should include, amongst others:

- Knowing the background to the project and monitoring the implementation of the EMPr.
- Acting as a guide, advisor and consultant to the project manager and contractors on environmental issues **during construction**.
- Monitor the **demarcation of areas** to be avoided **before construction activities commence**.
- Present an **environmental site induction session** to all Contractors and Sub-Contractors; the first of which shall be held before the commencement of any activities on site. Subsequent induction shall be presented as and when required when new contractors commence on site.
- Undertake **monthly site visits** during the **construction phase of the WWTW**.
- Report on compliance by means of submitting **monthly ECO Checklists** to the Mossel Bay Municipality, the Project Manager, and the Contractor(s).
- **Identify non-compliances** and problem areas timeously to avoid costly stoppages and / or further environmental damage.
- Ensure that **open communication lines** exist for the reporting of any significant environmental incidents to DEA&DP and to attend to any problems or complaints from the public rapidly.
- Propose changes (for approval) to the EMPr as necessary. Advise that the EMPr be updated if required.
- After completion of the construction activities, a **final site inspection and report** should be undertaken by the ECO, before commencement of the operational phase, in order to determine compliance with the EMPr and the Environmental Authorisation. The final report should be submitted to the competent authority.

In an event where there is a transgression or non-compliance with any condition contained in the EMPr which may result in a significant threat to, or impact on the environment, the ECO, Engineer (and obviously the Applicant) has the authority to stop works. Reasons should be provided for the work stoppage.

If the contractor or his employee(s) do not show adequate consideration for the environmental aspects of the construction activities, the contractor's representative or any employee(s) may be suspended by the ECO, Engineer / Applicant until the matter is resolved.

The ECO will not be held liable in any manner for any contravention, by the Applicant or contractors, of any conditions of the EMPr.

6.2.2 ECO Checklists

The ECO checklists (also called "ECO site inspection reports") will report on the compliance of the construction phase activities to the mitigation measures contained in the EMPr, as well as the conditions of approval described in the Environmental Authorisation.

The checklist should be submitted to the Applicant, within five (5) working days of the ECO site inspection and should also be made available to the construction contractor and competent authority.

The checklist must be read by the construction contractor and copies of the ECO Checklist must be kept on site. Any non-compliances noted by the ECO should be rectified and "closed out" by the contractors, as stipulated in the ECO Checklist.

6.2.3 Environmental Monitoring and Auditing of the Operational Phase

It will be incumbent for the Proponent to undertake periodic **internal audits** of the activities on site to ascertain compliance with the mitigation measures in the abovementioned tables of the EMPr. These audits should also be supplemented by an **external audit**, the frequency of which will be indicated in the Conditions of the EA, to establish compliance of the development with the EMPr, the EA and any other management plans, permits and/or licences in place (if applicable).

The objectives of the environmental audit report, as per Regulation 34 and Appendix 7 of the EIA Regulations, 2014, is to:

- a) *report on-*
 - (i) *the level of compliance with the conditions of the environmental authorisation and the EMPr, and where applicable, the closure plan; and*
 - (ii) *the extent to which the avoidance, management and mitigation measures provided for in the EMPr, and where applicable, the closure plan achieves the objectives and outcomes of the EMPr, and closure plan.*
- b) *identify and assess any new impacts and risks as a result of undertaking the activity;*
- c) *evaluate the effectiveness of the EMPr, and where applicable, the closure plan;*
- d) *identify shortcomings in the EMPr, and where applicable, the closure plan; and*
- e) *identify the need for any changes to the avoidance, management and mitigation measures provided for in the EMPr, and where applicable, the closure plan.*

6.2.4 Photographic Record

It is recommended that the Proponent and ECO take photographs of the site prior to, during and immediately after construction as a visual record. It is also recommended that the ECO take photographs to supplement the monthly ECO Inspection Checklists.

7 Environmental Awareness Education

7.1 Environmental Awareness and Environmental Risk Induction

The ECO must induct the Proponent and Construction Manager, to convey the importance and implications of the EMPr, and to familiarise them with the environmental aspects of the contract.

The contractors must have a copy of the Environmental Authorisation, Water Use Licence and this EMPr on site at all times and the **Construction Manager must induct all construction staff** to convey the importance and implications of the EMPr, and to familiarise them with the environmental aspects of the contract. Staff must fill in an attendance register after attending an environmental induction session.

As part of the induction programme, all staff shall be educated as to the need to refrain from destruction of animals and plants, as well as from indiscriminate defecation, waste disposal and/or pollution of local soil and water resources, from trespassing on surrounding private property and from poaching and/or theft of crops and animals from surrounding private property. Immediate and decisive action should be taken should this occur.

Inductions shall be run during normal working hours at a suitable venue provided by the Applicant. All attendees shall remain for the duration of the induction and sign an attendance register that clearly indicates participants' names on completion, a copy of which shall be handed to the Applicant. The Contractor shall allow for sufficient sessions to induct all personnel. Subsequent sessions shall be run for any new personnel coming onto Site.

Notwithstanding the specific provisions of this clause, it is incumbent upon the Applicant to convey the spirit of the EMPr to all personnel involved with the works.

Where possible, the presentation needs to be conducted in the language of the employees / contractors. The environmental induction training should, as a minimum, include the following:

- Sensitive and/or no-go areas on site.
- The importance of conformance with the EMPr.
- The significant environmental impacts, actual or potential, of their work activities.
- The environmental benefits of improved personal performance.
- Their roles and responsibilities in achieving conformance with the EMPr, including emergency preparedness and response requirements.
- The potential consequences of departure from specified operating procedures.
- The mitigation measures required to be implemented when carrying out their work activities.

8 Impact Assessment Summary and Recommendations

The project (proposed WWTW expansion) should not result in any significant negative ecological, socio-economic and / or heritage or cultural impacts during the construction or operational phases. In fact, the impact is expected to be of a prevailing positive nature due to the upgraded treatment capacity and socio-economic benefits. Any potential negative impacts during construction and operation can be mitigated by adhering to the EMPr.

Refer to the Draft BAR Section H(4) for the impact assessment summary tables and Section I(1) for a summary of the Findings and Recommendations (mitigation measures) by the specialists. These mitigation measures are also included in the table in Section 9.2.2, *Specific Management during the Construction Phase* and Section 9.3.2, *Specific Management during the Operational Phase*, for implementation.

9 Management and Mitigation Measures

A number of potential environmental impacts that may arise during the project have been identified. These are outlined in the table below, and mitigation measures are provided.

The Applicant and delegated persons must familiarise themselves with the requirements of the EMPr, keeping in mind that other site-specific requirements as outlined in the Environmental Authorisation must also be complied with.

9.1 Glossary of Terms for Impact Table

- **“Activity”** is the relevant action that will take place on the site, e.g. site clearance, etc.
- An **“environmental aspect”** is a feature or characteristic of an activity that affects or can affect the environment.
- An **“environmental impact”** is a change to the environment. Such change can be positive or negative. Environmental impacts are **caused by environmental aspects**.
- An environmental **“Objective”** is the specific environmental goal.
- An environmental **“Target”** is a detailed performance requirement. Environmental targets are derived from environmental objectives and are used to achieve these objectives. Targets should be measurable where possible.

9.2 Construction Phase Environmental Management Programmes

9.2.1 General Management during the Construction Phase

CONSTRUCTION PHASE – GENERAL MANAGEMENT

NO	PROJECT ACTIVITY (Environmental Aspect)	POTENTIAL IMPACT	OBJECTIVE AND TARGET	MITIGATION / MANAGEMENT MEASURES	RESPONSIBLE PARTY/PERSON (to implement mitigation measures)	MONITORING: RESPONSIBLE PERSON/ PARTY AND FREQUENCY	For ECO Monitoring Purposes only (Successfully Implemented / Corrective action required)
1	Environmental awareness training	Environmental degradation	Objective: To prevent environmental impacts resulting from misconduct by the Contractor(s) and/or staff. Target: All Contractor(s) and/or staff should be well familiar with the CEMPr and their responsibilities in terms of preventing environmental impacts.	1.1. All the Contractors and Sub-Contractors must attend an Environmental Awareness Training/induction course presented by the ECO, the first of which shall be held before the commencement date. Subsequent courses shall be held as and when required. 1.2. The Contractors must induct their staff during toolbox talks, using the material provided in Appendix D.	ECO/Contractor	Responsible Person/Party: ECO Monitoring Frequency: As required	
2	Site establishment	Depletion of natural resources	Objective: Prevent unnecessary habitat destruction.	2.1 The specific location for the establishment of a construction site, temporary construction camp for the storage of materials, containers, ablution facilities, vehicle turning area, etc. shall be identified in consultation with the ECO, and shall be clearly	Construction Contractor(s)	Responsible Person/Party: ECO	

CONSTRUCTION PHASE – GENERAL MANAGEMENT							
NO	PROJECT ACTIVITY (Environmental Aspect)	POTENTIAL IMPACT	OBJECTIVE AND TARGET	MITIGATION / MANAGEMENT MEASURES	RESPONSIBLE PARTY/PERSON (to implement mitigation measures)	MONITORING: RESPONSIBLE PERSON/ PARTY AND FREQUENCY	For ECO Monitoring Purposes only (Successfully Implemented / Corrective action required)
			<u>Target:</u> All areas not demarcated for construction activities should remain vegetated.	demarcated, as and where appropriate. 2.2 Stockpiling of both natural and manufactured materials shall be restricted to the permanent and temporary stockpile areas identified by the Project Manager / Consulting Engineer and the ECO. 2.3 Activities shall be undertaken on previously cleared areas where possible. Vegetation removal shall be kept to the minimum and as indicated. 2.5 Vegetation and other material cleared from the construction site shall be disposed of at an appropriately licensed waste disposal facility. 2.6 Disturbance to topsoil shall be minimized so that the need for active rehabilitation is minimized (i.e. planting). 2.7 No flora shall be removed, damaged or disturbed outside of designated working areas. 2.8 No herbicides or other poisonous substances may be used for clearing purposes. 2.9 The trapping, poisoning and shooting of animals is strictly forbidden. 2.10 No natural feature may be defaced, painted, damaged or marked (e.g. rock formations). 2.11 The construction camp shall be kept neat and tidy at all times.		<u>Monitoring Frequency:</u> As required	

CONSTRUCTION PHASE – GENERAL MANAGEMENT							
NO	PROJECT ACTIVITY (Environmental Aspect)	POTENTIAL IMPACT	OBJECTIVE AND TARGET	MITIGATION / MANAGEMENT MEASURES	RESPONSIBLE PARTY/PERSON (to implement mitigation measures)	MONITORING: RESPONSIBLE PERSON/ PARTY AND FREQUENCY	For ECO Monitoring Purposes only (Successfully Implemented / Corrective action required)
3	Access and traffic control	Depletion of natural resources	Objective: Prevent unnecessary habitat destruction. Target: Limited clearing of additional access routes, and minimal disturbance to traffic flow.	3.1 Existing roads and tracks shall be used. 3.2 Traffic safety measures, to the satisfaction of the Project Manager/Consulting Engineer and/or the Health and Safety Representative, shall be considered in determining entry/exit onto public roads. 3.3 Attention shall be paid to minimising disruption of the flow of traffic and reducing the danger to other road users and pedestrians. 3.4 All traffic accommodation measures are to conform to the latest edition of the South African Road Signs Manual.	Construction Contractor(s)	Responsible Person/Party: H&S Rep. and ECO Monitoring Frequency: As required	
4	Contaminated water control	Depletion of water resource and pollution of water resources	Objective: Prevent pollution due to improper control of contaminated water. Targets: No contaminated water may come into contact with the environment.	4.1 No effluent or contaminated water, including that from construction activities, shall be discharged into the environment. Any contaminated water shall be disposed of in an appropriate disposal facility.	Construction Contractor(s)	Responsible Person/Party: ECO Monitoring Frequency: As required	

CONSTRUCTION PHASE – GENERAL MANAGEMENT							
NO	PROJECT ACTIVITY (Environmental Aspect)	POTENTIAL IMPACT	OBJECTIVE AND TARGET	MITIGATION / MANAGEMENT MEASURES	RESPONSIBLE PARTY/PERSON (to implement mitigation measures)	MONITORING: RESPONSIBLE PERSON/ PARTY AND FREQUENCY	For ECO Monitoring Purposes only (Successfully Implemented / Corrective action required)
5	Site and waste management	Water pollution, air pollution, soil pollution etc.	Objective: Prevent pollution due to improper materials handling. Target: No waste may come into contact with the environment.	5.1 All asbestos cement pipelines that may need to be removed, if applicable, shall be removed by an appropriately certified contractor and shall be disposed of (by the certified contractor) at an appropriately licensed facility. Proof of such disposal shall be kept on file on site. 5.2 Storage areas for potentially contaminating materials shall be roofed with impervious material (or double bagged in a skip until removed). 5.3 Waste bins/skips must be used for all waste and litter. Waste bins must have lids to prevent content from blowing away or accumulating rainwater. Skips should be covered with netting. 5.4 All waste material shall be stored in a way to avoid stormwater run-off or ground contamination due to rain. 5.5 The Contractor shall ensure that the construction site, working and eating areas are maintained in a clean, hygienic and orderly state. 5.6 The excavation and use of rubbish pits on site is forbidden. 5.7 The burning of waste is forbidden. 5.8 Contaminated soil (resulting from oil spills, etc.), used cement bags and water used for washing concrete equipment are regarded as hazardous waste and shall be disposed at a permitted hazardous waste landfill site. 5.9 Gas welding cylinders and LPG cylinders shall be stored in a secure, well-ventilated area.	Construction Contractor(s)	Responsible Person/Party: ECO Monitoring Frequency: As required	

CONSTRUCTION PHASE – GENERAL MANAGEMENT							
NO	PROJECT ACTIVITY (Environmental Aspect)	POTENTIAL IMPACT	OBJECTIVE AND TARGET	MITIGATION / MANAGEMENT MEASURES	RESPONSIBLE PARTY/PERSON (to implement mitigation measures)	<u>MONITORING:</u> RESPONSIBLE PERSON/ PARTY AND FREQUENCY	For ECO Monitoring Purposes only (Successfully Implemented / Corrective action required)
				5.10 No staff member may make use of any natural water sources (e.g. springs, streams, rivers, dams, etc.) for the purposes of swimming, personal washing or washing of vehicles, machinery and clothes. 5.11 At least one chemical toilet must be made available on site for every 15 workers. All workers will be required to use the chemical toilet(s). 5.12 The exact location of the toilets shall be approved by the ECO prior to establishment. All temporary / portable toilets shall be secured to the ground to the satisfaction of the ECO to prevent them from toppling due to wind or any other cause and situated at least 40 m from the nearest watercourse or wetland. 5.13 The chemical toilets shall be properly maintained and cleaned out on a regular basis (at least once a week). Sewage from the chemical toilets shall be disposed of at a suitably licensed sewage disposal facility. Disposal slips must be kept on file.			
6	Hydrocarbon Management	Soil and water pollution	Objective: To ensure that hydrocarbons and other hazardous materials are managed during the construction phase.	6.1 Proper facilities, placed on an impermeable surface, shall be provided for the storage of oils, grease, fuels, chemicals and other hazardous materials to be used. Fuel shall be stored in a secure area in a steel tank supplied and maintained by the fuel suppliers. Leakage of fuel shall be avoided. An adequate bund wall, 110% of the fuel tank volume, shall be provided for fuel and diesel areas to accommodate any spillage or overflow from these substances. The area inside	Construction Contractor(s)	Responsible Person/Party: ECO Monitoring Frequency: As required	

CONSTRUCTION PHASE – GENERAL MANAGEMENT							
NO	PROJECT ACTIVITY (Environmental Aspect)	POTENTIAL IMPACT	OBJECTIVE AND TARGET	MITIGATION / MANAGEMENT MEASURES	RESPONSIBLE PARTY/PERSON (to implement mitigation measures)	MONITORING: RESPONSIBLE PERSON/ PARTY AND FREQUENCY	For ECO Monitoring Purposes only (Successfully Implemented / Corrective action required)
			Target: Prevent potential impacts from hydrocarbon spills.	the bund wall shall be lined with an impervious lining to prevent infiltration of the fuel into the soil. 6.2 All hydrocarbons, including fuel, oil, tar or bitumen and its associated contaminated soil or wastewater, shall be disposed of at a licensed hazardous waste site and disposal certificates obtained. 6.3 Drip trays shall be placed under construction trucks (when parked overnight) and all equipment that uses hydrocarbons. 6.4 Drip trays shall be inspected and emptied daily and serviced when necessary. Drip trays shall be closely monitored during rain events to ensure that they do not overflow. The contractor shall maintain a used oil storage container that will be within an appropriately bunded area. 6.5 All hydrocarbon spills are to be addressed immediately to prevent seeping into the ground. Effective environmentally friendly hydrocarbon absorption agents shall be stored close to the bund in the event of a spill. Examples of agents selling absorption material are: Sunisorb, tel. 084 293 4191, http://www.sunisorb.com or Drizit, tel. 0800 202 202, http://www.drizit.com). Also check that the source causing the spillage has ceased, and that the affected area is isolated to prevent spreading of the hazardous substance, where after it shall be rehabilitated.			

CONSTRUCTION PHASE – GENERAL MANAGEMENT							
NO	PROJECT ACTIVITY (Environmental Aspect)	POTENTIAL IMPACT	OBJECTIVE AND TARGET	MITIGATION / MANAGEMENT MEASURES	RESPONSIBLE PARTY/PERSON (to implement mitigation measures)	MONITORING: RESPONSIBLE PERSON/ PARTY AND FREQUENCY	For ECO Monitoring Purposes only (Successfully Implemented / Corrective action required)
7	Fire prevention and control	Depletion of natural resources or harm to humans and infrastructure	Objective: Prevent damage to vegetation and built structures due to uncontrolled fires. Target: No fires on site.	7.1 No hot work (e.g. welding or grinding) is allowed on days when the Fire Danger Index (FDI) is orange or red. 7.2 The Municipal Fire Chief must be informed and consulted in terms of the relevant Fire Regulations 7.3 Any welding or other sources of heating of materials shall be done in a controlled environment and under appropriate supervision, in such a manner as to minimise the risk of fires and/or injury to staff. 7.4 Ensure that a working fire extinguisher is immediately at hand if any "HOT WORK" is undertaken e.g. welding, grinding, gas cutting etc. 7.5 The contractor shall ensure that fire-fighting equipment is available on site, where flammable substances are being stored or used. 7.6 Open fires for heating and cooking shall not be permitted. 7.7 No smoking will be allowed on site, in particular in areas within or adjacent to natural vegetation, except in designated smoking points. 7.8 The disposal of any matter by burning is prohibited. 7.9 The outbreak of an uncontrolled fire shall be reported to the ECO after immediately taking the necessary steps to control and extinguish the fire.	Construction Contractor(s)	Responsible Person/Party: ECO Monitoring Frequency: As required	

CONSTRUCTION PHASE – GENERAL MANAGEMENT							
NO	PROJECT ACTIVITY (Environmental Aspect)	POTENTIAL IMPACT	OBJECTIVE AND TARGET	MITIGATION / MANAGEMENT MEASURES	RESPONSIBLE PARTY/PERSON (to implement mitigation measures)	<u>MONITORING:</u> RESPONSIBLE PERSON/ PARTY AND FREQUENCY	For ECO Monitoring Purposes only (Successfully Implemented / Corrective action required)
				7.10 All fire requirements shall be carried out as contained in the National Building Regulations SABS 0400 and the safety code of the National Fire Protection Association of the South Africa (NFPA). 7.11 The contractor shall be held responsible for any damage caused as a result of fires caused by their employees or sub-contractors.			
8	Noise control	Noise pollution	Objective: Prevent noise pollution Target: Keep noise levels below the limits.	8.1 Construction activities shall be approved by the Engineer. 8.2 Activities generating output of 85dB or more, shall be limited to normal working hours and not allowed during weekends to limit the impact of noise of neighbours. 8.3 Should the contractor need to work outside normal working hours (including Sundays from 07h00 to 17h00), any affected individuals shall be informed prior to the work taking place. 8.4 The Contractor shall limit noise levels (e.g. install and maintain silencers on machinery). The provisions of SANS 1200A Sub clause 4.1 regarding "built-up" area shall apply to all areas within audible distance of residents whether in urban, peri-urban or rural areas. 8.5 The Contractor shall adhere to the local by-laws and regulations regarding the noise and associated hours of operations. 8.6 All vehicles and machinery used on site shall be kept in good repair to prevent unnecessary noise. 8.7 No amplified music shall be allowed on site.	Construction Contractor(s)	Responsible Person/Party: ECO Monitoring Frequency: As required	

CONSTRUCTION PHASE – GENERAL MANAGEMENT							
NO	PROJECT ACTIVITY (Environmental Aspect)	POTENTIAL IMPACT	OBJECTIVE AND TARGET	MITIGATION / MANAGEMENT MEASURES	RESPONSIBLE PARTY/PERSON (to implement mitigation measures)	MONITORING: RESPONSIBLE PERSON/ PARTY AND FREQUENCY	For ECO Monitoring Purposes only (Successfully Implemented / Corrective action required)
9	Dust control	Air pollution	Objective: Prevent air pollution. Target: Keep dust levels below the limits.	9.1 The contractor shall take all reasonable measures to minimise the generation of dust as a result of construction activities to the satisfaction of the ECO. 9.2 The contractor shall be responsible for the control of dust arising from the operations and for any costs against the employer for damages resulting from the dust.	Construction Contractor(s)	Responsible Person/Party: ECO Monitoring Frequency: As required	
10	Heritage	Depletion of heritage resources/ artefacts	Objective: Prevent impacts on heritage resources/ artefacts. Target:	10.1 If any human remains or archaeological remains (e.g. fossils, bones, artefacts etc.) are exposed or uncovered during work on site, the contractor shall stop work immediately and inform the ECO who must contact Heritage Western Cape (HWC) for information on the appropriate course of action to be taken. HWC contact detail: 021 483 5959.	Construction Contractor(s)	Responsible Person/Party: ECO Monitoring Frequency:	

CONSTRUCTION PHASE – GENERAL MANAGEMENT							
NO	PROJECT ACTIVITY (Environmental Aspect)	POTENTIAL IMPACT	OBJECTIVE AND TARGET	MITIGATION / MANAGEMENT MEASURES	RESPONSIBLE PARTY/PERSON (to implement mitigation measures)	MONITORING: RESPONSIBLE PERSON/ PARTY AND FREQUENCY	For ECO Monitoring Purposes only (Successfully Implemented / Corrective action required)
			No impacts on heritage resources/ artefacts.	10.2 The Contractor shall not recommence work in that area until he has received written permission from the CE/ECO to continue. 10.3 Note that the Contractor may not, without a permit issued by HWC; destroy, damage, excavate, alter, deface or otherwise disturb any archaeological site or archaeological material. The latter is a criminal offence under the Heritage Resources Act.		As required	
11	Lights	Light pollution/ nuisance.	Objective: Prevent light nuisance. Target: No light nuisance.	11.1 No high mast, spot-light or up-lighting security lighting will be allowed. Down-lighting to be used.	Construction Contractor(s)	Responsible Person/Party: ECO Monitoring Frequency: As required	
12	Concrete management	Surface and groundwater management	Objective: Prevent surface and groundwater. Target: No light nuisance.	12.1 Ready-mix concrete should preferably be used. 12.2 Cement and other potential environmental pollutants shall be stored in a dry lockable container. 12.3 Mixing of mortar and concrete must take place on an impermeable substratum. 12.4 Lined, concrete effluent catchpits must be created where on-site mixing takes place.	Construction Contractor(s)	Responsible Person/Party: ECO Monitoring Frequency:	

CONSTRUCTION PHASE – GENERAL MANAGEMENT							
NO	PROJECT ACTIVITY (Environmental Aspect)	POTENTIAL IMPACT	OBJECTIVE AND TARGET	MITIGATION / MANAGEMENT MEASURES	RESPONSIBLE PARTY/PERSON (to implement mitigation measures)	MONITORING: RESPONSIBLE PERSON/ PARTY AND FREQUENCY	For ECO Monitoring Purposes only (Successfully Implemented / Corrective action required)
						As required	
13	Site closure	Impact on natural environment	Objective: Rehabilitate natural areas. Target: Remove all used infrastructure within 4 weeks.	13.1 All equipment and temporary facilities shall be removed from the site within one week after completion of construction activities. 13.2 The contractor must remove all oil, cement spills and waste within one week after completion of construction on a site. 13.3 The contractor must repair disturbed areas (e.g. deep tracks left by construction vehicles) within one week after completing construction on a site. 13.4 Areas compacted by vehicles during construction shall be scarified or ripped, if necessary, to allow penetration of plant roots and the re-growth of natural vegetation if outside the boundaries of the site footprint. 13.5 Locally indigenous plant species shall be used for rehabilitation. 13.6 Vegetative cover shall be encouraged to take place in as short a time as possible.	Construction Contractor(s) / Mossel Bay Municipality	Responsible Person/Party: ECO Monitoring Frequency: As required	

CONSTRUCTION PHASE – GENERAL MANAGEMENT							
NO	PROJECT ACTIVITY (Environmental Aspect)	POTENTIAL IMPACT	OBJECTIVE AND TARGET	MITIGATION / MANAGEMENT MEASURES	RESPONSIBLE PARTY/PERSON (to implement mitigation measures)	MONITORING: RESPONSIBLE PERSON/ PARTY AND FREQUENCY	For ECO Monitoring Purposes only (Successfully Implemented / Corrective action required)
14	Emergency issues, incidents and complaints	Emergencies	Objective: Comply with the CEMPr measures. Target: No non-compliances to be received.	14.1 The Contractor shall have a Complaints Register and an Environmental Incident Log (Appendix C) on site and shall ensure that it is always kept up to date. 14.2 Telephone numbers of emergency services, including the local firefighting service, shall be placed in visible area(s) on site. 14.3 Any emergency incident, originating at the proposed facility, which falls within the definition of Section 30(l)(a) of the NEMA must be dealt with by the facility in accordance with Section 30 of NEMA. In the event of any incident, the facility must ensure containment of the spill or hazard, by the responsible person, and notify the Pollution Information and Chemicals Management Section of the Department at 021 483 2760 / 4099 immediately after the situation is under control. 14.4 Adopt standard emergency reporting procedures. 14.5 Ensure that all personnel are aware of emergency reporting procedures and their responsibilities.	Construction Contractor(s)	Responsible Person/Party: ECO Monitoring Frequency: As required	

9.2.2 Specific Management during the Construction Phase

CONSTRUCTION PHASE – SPECIFIC MANAGEMENT							
NO	PROJECT ACTIVITY (Environmental Aspect)	POTENTIAL IMPACT	OBJECTIVE AND TARGET	MITIGATION / MANAGEMENT MEASURES	RESPONSIBLE PARTY/PERSON (to implement mitigation measures)	MONITORING: RESPONSIBLE PERSON/ PARTY AND FREQUENCY	For ECO Monitoring Purposes only (Successfully Implemented / Corrective action required)
15	Natural Vegetation and Alien Clearing	Loss of Indigenous Vegetation	Objective: Comply with the CEMPr measures. Target: No non-compliances to be received.	The botanist stated that the surrounding fynbos on the eastern side (east of the access road) and south-western side of the site and WWTW is highly sensitive and suggested that these areas must not be disturbed. 15.1 During the construction phase, demarcate/fence off the development footprint. Restrict all construction activities, such as stockpiling and parking, to already disturbed areas away from natural vegetation. The contractor(s) must be made aware of the sensitive surroundings. The fynbos outside the footprint must be declared a 'no-go' area and not be disturbed in any way. 15.2 Remove topsoil and/or seedbearing plant material from the fynbos areas to be disturbed for use in the rehabilitation of disturbed areas after construction. 15.3 Rehabilitate/revegetate all the disturbed surfaces, especially the newly created slopes directly behind the WWTW. Erosion prevention measures will be needed on the steep slopes, such as silt fences, logs or netting, to slow down runoff and potential erosion. Mulching and seeding with indigenous grass seed may also be needed. 15.4 Engage in alien clearing, focussing on invasive species such as prickly pear, thorn apple, Australian myrtle, rooikrans, port jackson and lantana. These species	Mossel Bay Municipality	Responsible Person/Party: ECO Monitoring Frequency: As required	

CONSTRUCTION PHASE – SPECIFIC MANAGEMENT							
NO	PROJECT ACTIVITY (Environmental Aspect)	POTENTIAL IMPACT	OBJECTIVE AND TARGET	MITIGATION / MANAGEMENT MEASURES	RESPONSIBLE PARTY/PERSON (to implement mitigation measures)	MONITORING: RESPONSIBLE PERSON/ PARTY AND FREQUENCY	For ECO Monitoring Purposes only (Successfully Implemented / Corrective action required)
				are category 1b invaders that require compulsory control as part of an invasive species control programme. This will become a long-term maintenance requirement. 15.5 It is recommended that the fenced off area, as well as a 5 m wide strip (buffer) around the site be kept clear of the woody aliens. See Figure 3. 15.6 Allow at least 24 months for the monitoring of rehabilitation success and alien infestation post construction. 15.7 During the staking out of the construction site take cognisance of the presence of Species of Conservation Concern (SCC) (especially <i>Leucospermum praecox</i>) and milkwoods (<i>Sideroxylon inerme</i>). Try and avoid these as far as practically possible. Removal of Milkwoods require a permit from the Department of Forestry. 15.8 Topsoil, cuttings and seedbearing plant material should be salvaged from the fynbos areas to be disturbed for replanting in the adjacent areas or rehab of disturbed areas after construction, especially cuttings from <i>Carpobrotus</i> and <i>Pelargonium</i> species. <i>Carpobrotus</i> species are useful soil binders. Bulbs should be removed along with some soil, placed in gel, bagged and then taken to a nursery for temporary storage or transplanted directly in the receiving area. Search and rescue			

CONSTRUCTION PHASE – SPECIFIC MANAGEMENT							
NO	PROJECT ACTIVITY (Environmental Aspect)	POTENTIAL IMPACT	OBJECTIVE AND TARGET	MITIGATION / MANAGEMENT MEASURES	RESPONSIBLE PARTY/PERSON (to implement mitigation measures)	<u>MONITORING:</u> RESPONSIBLE PERSON/ PARTY AND FREQUENCY	For ECO Monitoring Purposes only (Successfully Implemented / Corrective action required)
				should be done at an appropriate time of the year, preferably when the soil is wet during the raining season.			

9.2.3 Environmental Auditing of the Construction Phase

A final site audit should be undertaken by the ECO at the end of the construction phase to ascertain compliance with the mitigation/management measures in the abovementioned tables. The final checklist produced by the ECO must be submitted to the DEA&DP, and Applicant for their records.

Note that this is not the external environmental audit.

9.3 Operational Phase Environmental Management Programme

The intention of providing an EMPr for the operational phase is to provide guidelines for management of infrastructure and facilities to safeguard the environment against negative environmental impacts.

Monitoring is the sole responsibility of the Mossel Bay Municipality, or their appointed representatives, i.e., operators, contractors etc.

9.3.1 General Management during the Operational Phase

OPERATIONAL PHASE MANAGEMENT							
NO	PROJECT ACTIVITY (Environmental Aspect)	POTENTIAL IMPACT	OBJECTIVE AND TARGET	MITIGATION / MANAGEMENT MEASURES	RESPONSIBLE PARTY/PERSON (to implement mitigation measures)	MONITORING: RESPONSIBLE PERSON/ PARTY AND FREQUENCY	For Monitoring Purposes only (Successfully Implemented / Corrective action required)
1	Natural Vegetation and Alien Clearing	Loss of Indigenous Vegetation	Objective: Preserve the Indigenous Vegetation. Target: No loss of Indigenous Vegetation.	The botanist stated that the surrounding fynbos on the eastern side (east of the access road) and south-western side of the site and WWTW is highly sensitive and suggested that these areas must not be disturbed. 1.1 It is recommended that the fenced off area, as well as a 5 m wide strip (buffer) around the site be kept clear of the woody aliens. See Figure 3. 1.2 Allow at least 24 months for the monitoring of rehabilitation success and alien infestation post construction. 1.3 Continuous control of the existing seed banks is essential by removing alien seedlings annually. 1.4 Alien seedlings should preferably be pulled by hand as soon as possible. If left to grow, removal of these plants becomes more difficult and costly. Seedlings must not be allowed to grow to a size that requires mechanical or chemical means of removal. 1.5 Seedling removal is most effective after the rainy season (October to November) when seeds have	Mossel Bay Municipality	Responsible Person/Party: Municipality Monitoring Frequency: Initial clearing: immediately; Maintenance: annually at end of October	

OPERATIONAL PHASE MANAGEMENT							
NO	PROJECT ACTIVITY (Environmental Aspect)	POTENTIAL IMPACT	OBJECTIVE AND TARGET	MITIGATION / MANAGEMENT MEASURES	RESPONSIBLE PARTY/PERSON (to implement mitigation measures)	MONITORING: RESPONSIBLE PERSON/ PARTY AND FREQUENCY	For Monitoring Purposes only (Successfully Implemented / Corrective action required)
				germinated. One-year old seedlings can be hand-pulled, preferably when soil is wet after a rainfall. 1.6 Large alien plants should be cut as close to ground level as possible to prevent resprouting. Where required, stumps will need to be treated with herbicides to prevent resprouting. Herbicide is to be painted rather than sprayed onto stumps, to prevent adjacent areas from being affected. As an added precaution, stumps may be split with an axe. 1.7 If physical removal is not practical, regrowth of alien vegetation is to be chemically controlled, only if appropriate to the species, and under strictly monitored application techniques (consult a specialist). 1.8 When spraying herbicides, use nozzle cones to limit areas affected by the herbicide. Harmful herbicides, such as Garlon, may not be used in depressions or drainage courses. Keep a strict record of herbicides used, date and method of application, and area treated. Also record climatic conditions. 1.9 All alien plant material removed from site is to be disposed of at a licensed waste disposal site. Burning of this material as a means of disposal is not allowed on site. Alternatively, alien plant material could be used for stabilising cleared areas to prevent erosion. 1.10 Alien plant control is to be undertaken by a suitably trained and experienced contractor, especially with the handling of herbicides.			

OPERATIONAL PHASE MANAGEMENT							
NO	PROJECT ACTIVITY (Environmental Aspect)	POTENTIAL IMPACT	OBJECTIVE AND TARGET	MITIGATION / MANAGEMENT MEASURES	RESPONSIBLE PARTY/PERSON (to implement mitigation measures)	MONITORING: RESPONSIBLE PERSON/ PARTY AND FREQUENCY	For Monitoring Purposes only (Successfully Implemented / Corrective action required)
				1.11 Develop a monitoring protocol to assess the success of alien plant control. Make adjustments to the clearing programme, if required.			
2	Manage and maintain the Pinnacle Point WWTW and associated infrastructure, i.e., pipelines	Degradation of archaeological, botanical and groundwater resources	Objective: Comply with the EMPr measures. Target: No non-compliances to be received.	2.1 Rehabilitation and erosion control are satisfactory. 2.2 Alien vegetation is being successfully controlled. 2.3 The WWTW is adequately protected from wildfires. 2.4 Quality of treated wastewater is acceptable and conforms to national standards. 2.5 Emergency repair work is undertaken expediently, and repair/maintenance work is not harmful to the environment.	Mossel Bay Municipality	Responsible Person/Party: Municipality Monitoring Frequency: As required	
3	Rehabilitation and Protection	Disturbance of unstable areas around the WWTW	Objective: Erosion control. Target: No erosion should take place.	3.1 All previously disturbed and alien-infested areas will be rehabilitated. Where considered practical, hydroseed disturbed areas with an indigenous seed mixture. Only locally indigenous species and suitable grasses may be used for rehabilitation. 3.2 All areas where erosion is likely to occur are to be monitored, particularly after heavy rainfall events. 3.3 Implement erosion control measures when and where needed. All areas susceptible to erosion, including all stormwater outlets, are to be protected by installing the necessary drainage or retaining works (e.g. silt traps, retaining fences, rock walls, gabions and mattresses) to prevent the surface water from being concentrated in streams and from scouring the slopes. Suggested methods for soil stabilisation are listed in table below.	Mossel Bay Municipality	Responsible Person/Party: Municipality Monitoring Frequency: As required	

OPERATIONAL PHASE MANAGEMENT							
NO	PROJECT ACTIVITY (Environmental Aspect)	POTENTIAL IMPACT	OBJECTIVE AND TARGET	MITIGATION / MANAGEMENT MEASURES	RESPONSIBLE PARTY/PERSON (to implement mitigation measures)	MONITORING: RESPONSIBLE PERSON/ PARTY AND FREQUENCY	For Monitoring Purposes only (Successfully Implemented / Corrective action required)
4	Fire Protection	Damage to infrastructure	Objective: To protect the WWTW from wildfires. Target: No veldfires to be as a result of negligence from the personnel at the WWTW.	4.1 All unplanned, accidental fires must be extinguished speedily with all the necessary resources. All unplanned fires starting at the WWTW are regarded as a potential hazard to the facility as well as surrounding properties. 4.2 Promote awareness among staff at the facility of the potential risks of unplanned fires. Diagrams showing the position of hydrants and firefighting equipment are to be displayed at strategic positions. Council is to provide staff with instructions of procedures to follow in the case of a fire, including emergency contact details. A Fire Response Plan need to be drawn up for this purpose. 4.3 Council is responsible for ensuring that firefighting equipment is regularly inspected and appropriately maintained. 4.4 No person will be allowed to make outdoor fires or burn any materials anywhere on the site. Council is to act against anyone for any contravention in this regard. 4.5 A firebreak of adequate width (5m to correlate with buffer area) is to be cleared and maintained (along security fence) around the facility. Vegetation must be cleared by hand or brush-cut and removed from the firebreak. Bush-cutters must not be allowed off the firebreak. The firebreak is to be cleared annually at the beginning of the summer season (end of October).	Mossel Bay Municipality	Responsible Person/Party: Municipality Monitoring Frequency: Ongoing Clear firebreak at the end of October	

OPERATIONAL PHASE MANAGEMENT							
NO	PROJECT ACTIVITY (Environmental Aspect)	POTENTIAL IMPACT	OBJECTIVE AND TARGET	MITIGATION / MANAGEMENT MEASURES	RESPONSIBLE PARTY/PERSON (to implement mitigation measures)	MONITORING: RESPONSIBLE PERSON/ PARTY AND FREQUENCY	For Monitoring Purposes only (Successfully Implemented / Corrective action required)
				4.6 Comply with the relevant regulations promulgated under the National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998).			
5	Protection of groundwater resources	Pollution of groundwater	Objective: Protection of groundwater resources. Target: No pollution of groundwater resources.	5.1 Take monthly water samples from the maturation dam outlet and submit to an accredited laboratory for chemical analysis. A suitably experienced/qualified person from Council, or a company appointed by Council, is to take water samples. 5.2 Final treated effluent water is required to conform to the General Limits for wastewater as specified by the National Water Act. 5.3 Monitor the maturation dam for potential leakage - initially through an evaporation pan test, followed by regular checks for seepage from subsoil underneath the dam. 5.4 Keep a strict record of monitoring data for auditing purposes. 5.5 Monitoring must take place in compliance to the Water Use Authorisation for the facility.	Mossel Bay Municipality	Responsible Person/Party: Municipality Monitoring Frequency: Ongoing	
6	Emergency repairs and maintenance of infrastructure	Environmental Pollution	Objective: To be approachable by the public for emergencies and to undertake emergency repairs expediently and	6.1 All infrastructure is to be maintained to an acceptable standard. 6.2 Prescribe environmental conditions for works in sensitive areas. Consult with a botanist or the Municipality's Environmental Manager. 6.3 Remove any unused or derelict structures resulting from repair or maintenance work and dispose of it at a licensed waste-disposal site.	Mossel Bay Municipality	Responsible Person/Party: Municipality Monitoring Frequency: As required	

OPERATIONAL PHASE MANAGEMENT							
NO	PROJECT ACTIVITY (Environmental Aspect)	POTENTIAL IMPACT	OBJECTIVE AND TARGET	MITIGATION / MANAGEMENT MEASURES	RESPONSIBLE PARTY/PERSON (to implement mitigation measures)	MONITORING: RESPONSIBLE PERSON/ PARTY AND FREQUENCY	For Monitoring Purposes only (Successfully Implemented / Corrective action required)
			prevent or minimise the impact on botanical or archaeological resources during repair/maintenance work. Target: Continual maintenance must be undertaken.	6.4 Stormwater facilities are to remain functional and clean. Conduct regular clearing of excessive silt, vegetation and litter in stormwater facilities. Manholes shall be opened and inspected. Siltation deeper than 10 cm within pipes and 15 cm within the culverts shall be cleaned before the onset of winter rains. 6.5 Follow the prescribed Emergency Repairs and Maintenance Schedule provided by the Engineers.			
7	Health Risks to Employees	Exposure of employees to hazardous substances (e.g. solid waste screen material) may lead to health risks and infections.	Objective: Reduce contact with solid waste. Target: No infections.	7.1 Employees must undergo training in Health and Safety of a WWTW to minimise the likelihood and severity of health risks and infection.	Mossel Bay Municipality	Responsible Person/Party: Municipality Monitoring Frequency: As required	

9.4 Decommissioning Phase Environmental Management Programme

No decommissioning phase for the WWTW is foreseen. The Construction Phase management tables may be used to guide the activities, should decommissioning activities ever take place.

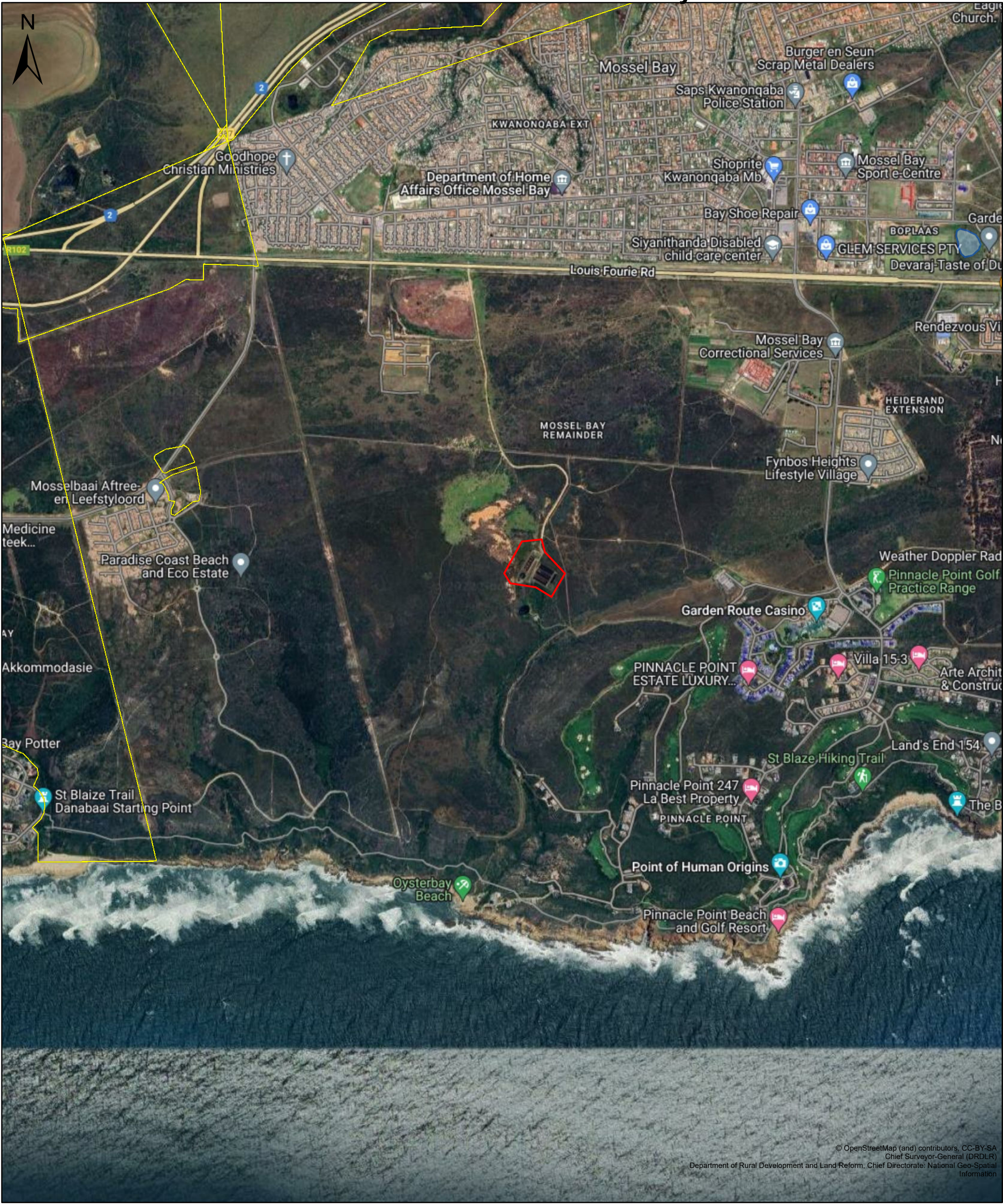
10 References

Berry, M.G. 2023. Botanical assessment: proposed expansion of the Pinnacle Point WWTW, Mossel Bay. Mark Berry Botanical Consulting, Somerset West.

FIGURE 1

LOCALITY MAP

Pinnacle Point WWTW - Locality



Legend

- Farm Portions
- Dams

0 0.25 0.5 1 km

Map Center: Lon: 22°4'37.9"E
Lat: 34°11'42.1"S

Scale: 1:18 056

Date created: August 5, 2022

FIGURE 2

SITE DEVELOPMENT PLAN



NOTES

LEGEND

- PHASE 1
- NEW FENCE LINE
- EXISTING FENCE LINE
- NEW PAVED ROADS

DRAWING APPROVAL

AMENDMENTS

NO.	DATE	INITIALS	DESCRIPTION

REVISION	TENDER PHASE	00
----------	--------------	----

CLIENT



PROJECT

CAPACITY INCREASE OF
PINNACLE POINT WWTW

DRAWING TITLE

PROPOSED SITE LAYOUT



UNIT 24 DEWERPARK
ROKEWOOD ROAD
DIE BOORD
STELLENBOSCH
7600
PO BOX 12861
DIE BOORD
7613
TEL: 021 886 6895
EMAIL: STELLENBOSCH@WEC-CONSULT.CO.ZA

DESIGNED BY	FH	DRAWN BY	FH
DESIGNED CHECKED	CvR	DRAWING CHECKED	CvR

APPROVED BY

F HARRIS - PYTECH ENG - 2021300946 DATUM/DATE

CONTRACT NO.
TDR383/2022/2023

FILE NO.
21-MOS-021/DRW/TENDER

SCALE
1:50

DATE
DECEMBER 2022

DRAWING NO.
21-MOS-021/SUR101/00

FIGURE 3

ENVIRONMENTAL SENSITIVITIES OF THE PREFERRED SITE AND NO-GO AREAS

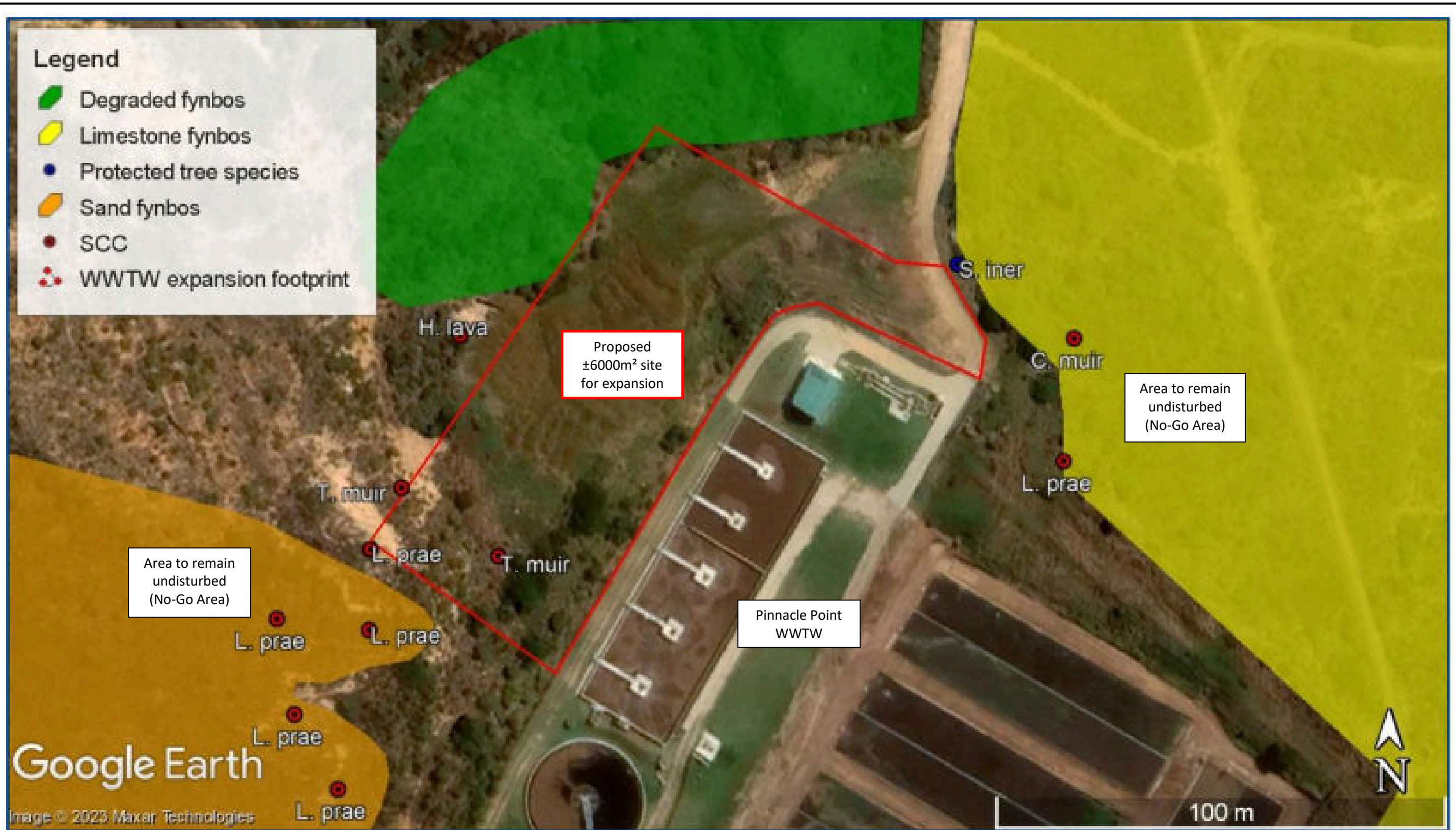


Figure 5-1: Botanical attributes of the site. The untuned areas represent significantly transformed areas.

APPENDIX B2: Pinnacle Point WWTW

Environmental Sensitivities of the Preferred Site and No-Go Areas.

Note: Refer to Appendix B1 for the Site Development Plan and infrastructure to be placed within the demarcated footprint.

The botanist stated that the surrounding fynbos on the eastern side (east of the access road indicated as Limestone Fynbos and shaded yellow) and south-western side of the site and WWTW, indicated as Sand Fynbos and shaded orange, is highly sensitive and suggested that these areas must not be disturbed.

Scale: As per Google Image

Appendix A: Pieter de Villiers' Curriculum Vitae

Curriculum Vitae

(Abbreviated Version)

Pieter de Villiers



Personal Information

Full names: Petrus Johannes de Villiers (Pieter)

Nationality: South African

Languages: Afrikaans and English

Profession: Registered Environmental Assessment Practitioner, registration number 2019/1372 and registered as Professional Natural Scientist (Pr.Sci.Nat 400210/15)

Position: Director

Specialisation: Environmental Services (Impact Assessment and Environmental Control Officer)

Office Address: Die Boord, Stellenbosch

Cell number: 083 243 0994

Tel: 021 887 9099

Email address: info@cornerstoneenviro.co.za

Website: www.cornerstoneenviro.co.za

Profile Summary

Pieter de Villiers is the founder of Cornerstone Environmental Consultants (Pty) Ltd.

Pieter has more than 18 years' experience in the environmental management field and is a registered Environmental Assessment Practitioner (EAP) and is a registered Professional Natural Scientist with the South African Council for Natural Scientific Professions. He holds a Baccalaureus Technologiae (B. Tech) Degree in Environmental Sciences from the Tshwane University of Technology and has successfully completed the Management Development Programme at the University of Stellenbosch Business School. He has also successfully completed Aspects International's ISO 14001:1996 Lead Auditors Training course (IEMA's¹ Approved Auditors' Course), amongst others.

He gained experience as part of the environmental team at Golder Associates Africa (hereafter "Golder Associates"), an international consultancy firm, where he was mostly involved with projects in the heavy industrial and mining sectors as part of multi-disciplinary teams. Whilst at Golder Associates, he gained invaluable auditing experience in the mining sector, mostly conducting Environmental Management Systems and Compliance Audits in African countries outside the borders of South Africa.

Pieter also worked for a small, yet dynamic consultancy company, Withers Environmental Consultants in Stellenbosch, where his focus shifted to managing Environmental Impact Assessment processes in the residential, land development, telecommunication, renewable energy and Municipal bulk services sectors. He prepared Environmental Scoping Reports, Environmental Impact Reports, Environmental Management Programmes, Environmental Due Diligence Reports, Project Cost Estimates and Quotations, amongst others. He also acted as an Environmental Control Officer on construction projects ranging from housing developments to optic fibre duct installation projects. Pieter furthermore also managed and assisted junior staff in the office.

Pieter then joined Enviroworks, an environmental consultancy based in Bloemfontein, Free State Province, with a branch in Strand, Western Cape Province, as their General Manager. He provided leadership to all staff members in overseeing the company's projects and services and acted as project reviewer. He furthermore functioned as a Senior Environmental Consultant and maintained projects of his own. Project related experience and responsibilities were to conduct and coordinate Environmental Impact Assessments and its associated public participation processes in several disciplines e.g., renewable energy projects, housing developments, industrial development, optic fibre duct installations and Section 24G rectification applications. His review work included review of Environmental Scoping Reports, Environmental Impact Reports, Environmental Management Programmes, Environmental Due Diligence Reports, Project Cost Estimates and Quotations, etc. He also acted as an Environmental Control Officer on construction projects.

¹ Institute of Environmental Management and Assessment

Tertiary Education

Year:	2005
Qualification:	B. Tech Environmental Sciences
Institution:	Tshwane University of Technology (previously Technikon Pretoria)
Subjects:	Project: Environmental Technology IV, Environmental Resources IV, Environmental Rehabilitation IV, Environmental Social Science III, Water Quality Management IV, and Integrated Catchment Management IV.
Year:	2002 - 2004
Qualification:	N. Dip. Environmental Sciences
Institution:	Tshwane University of Technology
Subjects:	Environmental Management I, II & III, Environmental Resources I, II & III, Environmental Law, Communication skills, Chemistry IA, Geology I, Mathematics I, Entrepreneurial skills, Computer Skills, Applied Geology I & II, Environmental Geology II, Environmental Geohydrology III, Microbiology I, Geotechnology I, II & III, Environmental Chemistry II, Environmental Economy, Environmental Biotechnology II, Environmental Management Systems, Industrial Processes III, and Industrial Environmental Practice III.

Courses Attended

2014	Sharpening the tool: New techniques and methods in environmental impact assessment. Presented by SE Solutions
2010	Management Development Programme at the University of Stellenbosch Business School
2009	Golder Associates Africa Technical Writing Course
2007	Aspects International, ISO 14001:1996 Lead Auditors Training course, IEMA Approved Auditors Course
2006	St John Ambulance, First Aid Training Course Level 1
2006	International Association for Public Participation, IAP2 Certificate in Public Participation
2006	Golder Associates Africa, Project Sustainability Management

2006 National Occupational Safety and Health Consultancy: Health and Safety Representative Training Course

2006 Golder Associates Africa, Project Management Course

Work Experience

May 2014 to current **Cornerstone Environmental Consultants** Stellenbosch, South Africa

Independent Environmental Assessment Practitioner

Functions and experience: In mid-May 2014, Pieter, with 10 years' experience in the Environmental Management field, founded Cornerstone Environmental Consultants (Pty) Ltd. He has a well-established network with environmental specialists and is supported by Mari de Villiers, also a registered Environmental Assessment Practitioner, with more than 19 years relevant experience. Mari acts as peer reviewer on all projects the company pursue. The company's focus is on natural resource management and environmental impact assessment.

September 2013 to May 2014 **Envioworks Environmental Consultants** Bloemfontein and Strand, South Africa

General Manager and Senior Environmental Consultant

Functions and experience: Pieter was appointed as Envioworks' General Manager for Envioworks' two branches, the head office in Bloemfontein, Free State and the Western Cape office situated in Strand. Pieter provided leadership to staff in overseeing all company projects and services and acted as project reviewer. He also functioned as a Senior Environmental Consultant and maintained projects of his own. Project related experience and responsibilities were to conduct and coordinate Environmental Impact Assessments and its associated public participation processes in several disciplines e.g. renewable energy projects, housing developments, industrial development, optic fibre duct installations and Section 24G rectification applications. His review work included review of Environmental Scoping Reports, Environmental Impact Reports, Environmental Management Programmes, Environmental Due Diligence Reports, Project Cost Estimates and Quotations, etc. He also acted as an Environmental Control Officer on construction projects.

October 2009 to August 2013 **Withers Environmental Consultants** Stellenbosch, South Africa

Senior Environmental Consultant and Environmental Control Officer

Functions and experience: Responsible for conducting and coordinating Environmental Impact Assessments and its associated public participation process in several disciplines e.g. housing developments, industrial development, optic fibre duct installations and alternative energy projects. Compilation of Environmental Scoping Reports, Environmental Impact Reports, Environmental Management Programmes, Environmental Due Diligence Reports, Project Cost Estimates and Quotations, etc. Managing of junior staff in the office. Act as Environmental Control Officer on construction projects ranging from housing developments to optic fibre duct installation projects.

August 2004 to
September 2009

Golder Associates Africa

Johannesburg, South Africa

Environmental Scientist and Auditor (April 2006 to September 2009)

Functions and experience: Responsible for conducting and coordinating Environmental Impact Assessments in the industrial and mining sectors. Compilation of Environmental Scoping Reports, Environmental Impact Assessment Reports, Environmental Management Plans, Project Cost Estimates and Quotations, etc.

Audit-related experience in Environmental Management Systems, Compliance Audits, Due Diligence, Environmental Control Officer work and Phase 1 Environmental Site Assessments. Divisional Health and Safety representative.

Surveillance Technician (August 2004 to March 2006)

Functions and experience: Tailings storage facility surveillance, Resource Management and Information Systems (REMIS) implementation and updating of the database, compiling quarterly environmental baseline monitoring reports and co-ordinating key performance indicators within the Surveillance Division. Divisional Health and Safety representative.

A full CV and Company Profile will be forwarded upon request. Also view www.cornerstoneenviro.co.za.

PROTECTION OF THE ENVIRONMENT IS YOUR RESPONSIBILITY
BESKERMING VAN DIE OMGEWING IS JOU VERANTWOORDELIKHEID

REMAIN WITHIN WORKING AREAS BLY BINNE WERKGEBIEDE	PROTECT ANIMALS ON THE SITE BESKERM DIERE OP DIE KONSTRUKSIETERREIN	DO NOT HARM OR DAMAGE PLANTS AND ANIMALS. MOENIE PLANTE EN DIERE BESKADIG NIE.	USE RUBBISH BINS GEBRUIK ASBLIKKE	DO NOT LIGHT ANY FIRES WITHOUT PERMISSION MOENIE SONDER TOESTEMMING ENIGE VURE MAAK NIE	SMOKE CAUTIOUSLY ROOK VERSIGTIG
PREVENT OIL POLLUTION. USE DRIP TRAYS VOORKOM OLIE-BESOEDELING	USE TOILETS GEBRUIK DIE TOILETTE	DON'T SPEED/ SECURE LOADS RY STADIG/ MAAK VRAGTE VAS	CONTROL DUST BEHEER STOF	FINES OF BETWEEN R1000- R10000 BOETES TUSSEN R1000 - R10000	ONLY EAT IN DEMARCATED AREAS EET SLEGS IN GEMERKTE GEBIEDE
			EMERGENCY NUMBERS NETCARE 082 911 DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING 044 814 2013 CAPENATURE 087 087 3060 HERITAGE WESTERN CAPE 021 483 5959		
LIMIT NOISE VERMINDER GERAAS	ASK QUESTIONS VRA VRAE	KNOW THE EMERGENCY NUMBERS KEN DIE NOODNOMMERS			

Appendix C: Method Statement

Project:.....

Method Statement for:

Method Statement compiled by:.....

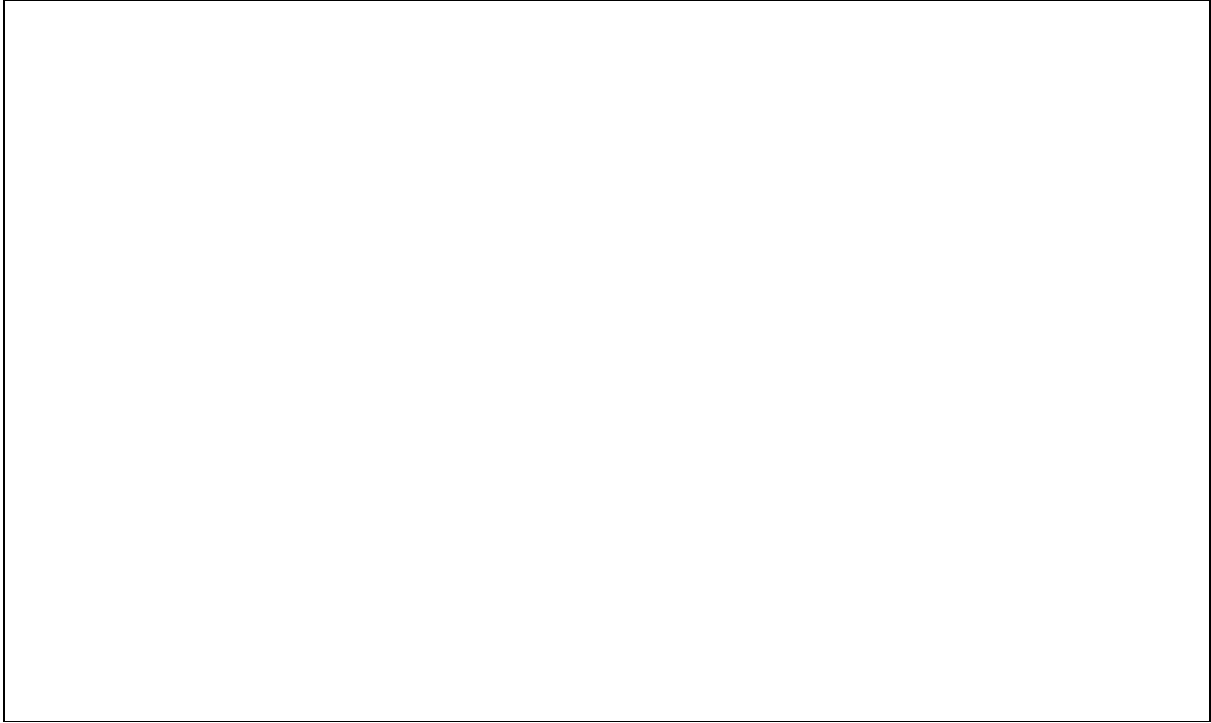
Start Date of Works:..... End Date of Works:

Note: The Contractor must submit the method statement to the Applicant / Engineer before any particular construction activity is due to start. Work may not commence until the method statement has been approved by the Applicant / Engineer.

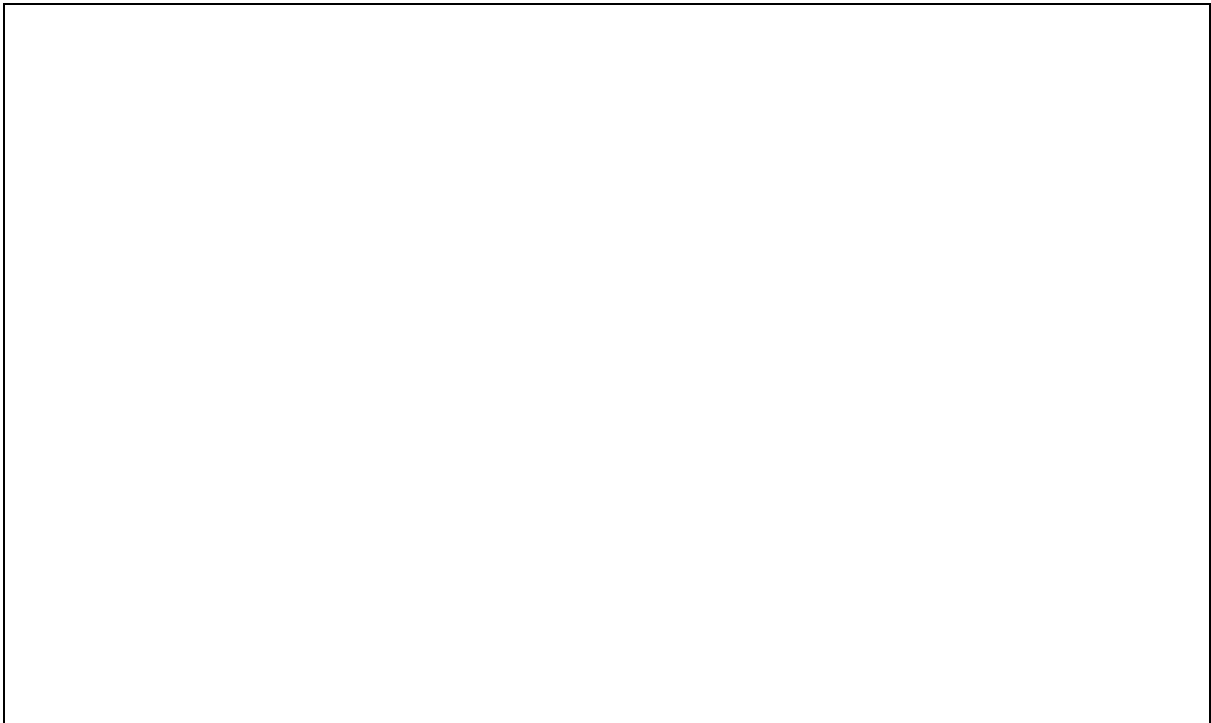
WHAT WORK IS TO BE UNDERTAKEN – give a brief description of the works to be undertaken.

WHERE THE WORKS ARE TO BE UNDERTAKEN – provide a description of the extension of the works and an annotated plan of the locality of work

HOW THE WORKS ARE TO BE UNDERTAKEN - a detailed description of the process of work, methods and materials to be used in the works.

A large, empty rectangular box with a thin black border, intended for a detailed description of the work process, methods, and materials to be used in the works.

WHEN WILL THE WORKS TAKE PLACE - the sequencing of actions with due commencement dates and completion date estimates

A large, empty rectangular box with a thin black border, intended for the sequencing of actions with due commencement dates and completion date estimates.

Declarations

1) APPLICANT/FARM MANAGER

The work described in this Method Statement, if carried out according to the methodology described, appears to be satisfactorily mitigated to prevent avoidable environmental impacts:

(signed)

(print name)

Dated: _____

2) CONTRACTOR

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to other signatories and that the Engineer's Representative/Environmental Control Officer will audit my compliance with the contents of this Method Statement. I understand that this method statement does not absolve me from any of my obligations or responsibilities in terms of the Contract of Construction.

(signed)

(print name)

Dated: _____

3) ENGINEER'S REPRESENTATIVE

The works described in this Method Statement are approved.

(signed)

(print name)

(designation)

Dated: _____

Appendix D: Incident Register - Example Template

INCIDENT REGISTER: [Add project name here]					
PERSON REPORTING THE INCIDENT (NAME AND CONTACT DETAILS)	SHORT DESCRIPTION OF INCIDENT	DATE INCIDENT OCCURRED	DATE INCIDENT WAS REPORTED	MANNER IN WHICH INCIDENT WAS ADDRESSED AND DATE INCIDENT WAS RECTIFIED	PERSON RESPONSIBLE FOR RECTIFICATION

Appendix E

Fossil Chance Find Protocol

8. Chance Find Protocol

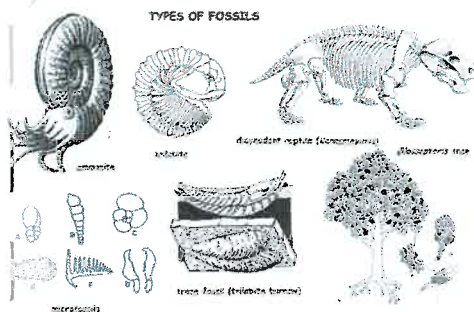
Monitoring Programme for Palaeontology – to commence once the excavations begin.

1. The following procedure is only required if fossils are seen on the surface and when excavations commence.
2. When drilling or excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, wood, bone, coal) should be put aside in a suitably protected place. This way the prospecting activities will not be interrupted.
3. Photographs of similar fossil plants must be provided to the developer to assist in recognizing the fossil plants in the shales and mudstones (for example see Figure 5, 6). This information will be built into the EMP's training and awareness plan and procedures.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
5. If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
7. If no good fossil material is recovered then the site inspections by the palaeontologist will not be necessary.
8. If no fossils are found and the excavations have finished then no further monitoring is required.

Palaeontology: what is a fossil?

Fossils are the traces of ancient life (animal, plant or microbial) preserved within rocks and come in two forms:

- Body fossils preserve parts, casts or impressions of the original tissues of an organism (e.g. bones, teeth, wood, pollen grains); and
- Trace fossils such as trackways and burrows record ancient animal behaviour.



How to report chance fossil finds: What should I do if I find a fossil during construction/mining?

If you think you have identified a fossil:

Immediately inform the ECO or Site Agent.
He/she will then contact HWC and write a report
and if necessary operations will stop in that
specific area until the fossil is recovered

Heritage Western Cape
ceoheritage@westerncape.gov.za

021 483 5959

www.hwc.org.za

Types of palaeontological finding - What does a fossil look like?

Fossils vary in size, from fossilised tree trunks and dinosaur bones down to very small animals or plants. Finds can be **individual fossils** (one isolated wood log or bone) or **clusters and beds** (several bones, teeth, animal or plant remains, trace fossils in close proximity or bones resembling part of a skeleton). A bed of fossils is a layer with many fossil remains.

Below there is a list of few examples of fossils which may be identified during excavations in the Western Cape.

Image	Description	Image	Description
	Leaves		Snail shells and other shells
	Fossil wood		Bones of larger animals
	The remains of fish and marine life (e.g. teeth, scales, starfish)		Large burrows made by moles and other animals
	Stromatolites		Traces made by burrowing insects (ants, wasps, dung-beetles etc.).
	Animal footprints		

Images provided by Dr John Almond

Text by HWC's Archaeology, Palaeontology & Microliths Committee June 2016



HWC PROCEDURE: CHANCE FINDS OF PALAEONTOLOGICAL MATERIAL

June 2016

Introduction

This document is aimed to inform workmen and foremen working on a construction and/or mining site. It describes the procedure to follow in instances of accidental discovery of palaeontological material (please see attached poster with descriptions of palaeontological material) during construction/mining activities. This protocol does not apply to resources already identified under an assessment undertaken under s. 38 of the National Heritage Resources Act (no 25 of 1999).

Fossils are rare and irreplaceable. Fossils tell us about the environmental conditions that existed in a specific geographical area millions of years ago. As heritage resources that inform us of the history of a place, fossils are public property that the State is required to manage and conserve on behalf of all the citizens of South Africa. Fossils are therefore protected by the National Heritage Resources Act and are the property of the State. Ideally, a qualified person should be responsible for the recovery of fossils noticed during construction/mining to ensure that all relevant contextual information is recorded.

Heritage Authorities often rely on workmen and foremen to report finds, and thereby contribute to our knowledge of South Africa's past and contribute to its conservation for future generations.

Training

Workmen and foremen need to be trained in the procedure to follow in instances of accidental discovery of fossil material, in a similar way to the Health and Safety protocol. A brief introduction to the process to follow in the event of possible accidental discovery of fossils should be conducted by the designated Environmental Control Officer (ECO) for the project, or the foreman or site agent in the absence of the ECO

It is recommended that copies of the attached poster and procedure are printed out and displayed at the site office so that workmen may familiarise themselves with them and are thereby prepared in the event that accidental discovery of fossil material takes place.

Actions to be taken

One person in the staff must be identified and appointed as responsible for the implementation of the attached protocol in instances of accidental fossil discovery and must report to the ECO or site agent. If the ECO or site agent is not present on site, then the responsible person on site should follow the protocol correctly in order to not jeopardize the conservation and well-being of the fossil material.

Once a workman notices possible fossil material, he/she should report this to the ECO or site agent.

Procedure to follow if it is likely that the material identified is a fossil:

- i. The ECO or site agent must ensure that all **work ceases** immediately in the vicinity of the area where the fossil or fossils have been found;
- ii. The ECO or site agent must **inform HWC of the find immediately**. This information must include photographs of the findings and GPS co-ordinates;
- iii. The ECO or site agent must compile a **Preliminary Report and fill in the Fossil Discoveries: HWC Preliminary Record Form** within 24 hours without removing the fossil from its original position. The **Preliminary Report** records basic information about the find including:
 - The date
 - A description of the discovery
 - A description of the fossil and its context (e.g. position and depth of find)
 - Where and how the find has been stored
 - Photographs to accompany the preliminary report (the more the better):
 - A scale must be used
 - Photos of location from several angles
 - Photos of vertical section should be provided
 - Digital images of hole showing vertical section (side);
 - Digital images of fossil or fossils.

Upon receipt of this **Preliminary Report**, HWC will inform the ECO or site agent whether or not a rescue excavation or rescue collection by a palaeontologist is necessary.

- v. **Exposed finds must be stabilised where they are unstable and the site capped, e.g. with a plastic sheet or sand bags.** This protection should allow for the later excavation of the finds with due scientific care and diligence. HWC can advise on the most appropriate method for stabilisation.
- vi. If the find cannot be stabilised, **the fossil may be collect with extreme care** by the ECO or the site agent and put aside and protected until HWC advises on further action. Finds collected in this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove the all fossil material and any breakage of fossil material must be avoided at all costs.

No work may continue in the vicinity of the find until HWC has indicated, in writing, that it is appropriate to proceed.

FOSSIL DISCOVERIES: HWC PRELIMINARY RECORDING FORM

Name of project:		
Name of fossil location:		
Date of discovery:		
Description of situation in which the fossil was found:		
Description of context in which the fossil was found:		
Description and condition of fossil identified:		
GPS coordinates:	Lat:	Long:
If no co-ordinates available then please describe the location:		
Time of discovery:		
Depth of find in hole		
Photographs (tick as appropriate and indicate number of the photograph)	Digital image of vertical section (side)	
	Fossil from different angles	
	Wider context of the find	
Temporary storage (where it is located and how it is conserved)		
Person identifying the fossil	Name: Contact:	
Recorder	Name: Contact:	
Photographer	Name: Contact:	