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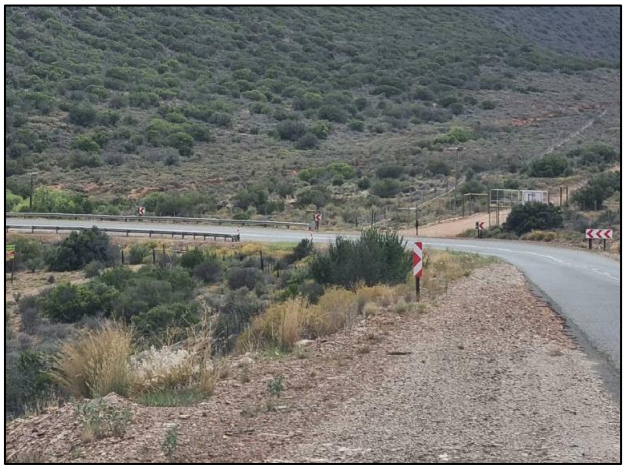
PRE-CONSTRUCTION, CONSTRUCTION AND POST-CONSTRUCTION PHASE

DRAFT

ENVIRONMENTAL MANAGEMENT PROGRAMME

FOR THE

PROPOSED STRENGTHENING OF A PORTION OF THE ROAD TR75/1 (TRUNK ROAD 75/ NATIONAL HIGHWAY 12) NEAR OUDTSHOORN, OUDTSHOORN LOCAL MUNICIPALITY, WESTERN CAPE.



APPLICANT:	WESTERN CAPE GOVERNMENT: DEPARTMENT OF INFRASTRUCTURE: TRANSPORT INFRASTRUCTURE BRANCH
ENVIRONMENTAL ASSESSMENT PRACTITIONER:	SHARPLES ENVIRONMENTAL SERVICES CC AUTHOR: MADELEINE KNOETZE (EAPASA #3230) CO-AUTHOR: JOHN GEARY REVIEWER: BETSY DITCHAM (EAPASA #1480)
DEA & DP PROJECT REFERENCE:	16/3/3/6/7/1/D7/10/0125/23
SES REFERENCE NUMBER:	CT20/POST-APP/EMPR/11/23
DATE:	10 November 2023

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APPENDIX 4 OF THE EIA REGULATIONS 2014 (AS AMENDED 2017).

This Environmental Management Programme has been drafted in accordance with Appendix 4 of the Environmental Impact Assessment Regulations 2014 (as amended 2017). The table below shows how the requirements of Appendix 4 have been included within this Environmental Management Programme.

(1) An EMPr must comply with section 24N of the Act and include— (a)details of– (i)the EAP who prepared the EMPr; and (ii)the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Appendix A
(b)a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 5
(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;	Appendix B
(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 activities; (iii)construction activities; (iv)rehabilitation of the environment after construction and where applicable post closure; and (v)where relevant, operation activities;	Section 9 - 12
(f)a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to — (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 provision for rehabilitation, where applicable;	

(g)the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 13
(h)the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 13 Appendix E
(i)an indication of the persons who will be responsible for the implementation of the impact management actions;	Section 9 - 12
(j)the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 7 Section 9 - 12
(k)the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 13 Appendix E
(l)a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	
(m)an environmental awareness plan describing the manner in which— (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	Section 15 - 16 Appendix E and N
(n)any specific information that may be required by the competent authority.	N/A

1. DOCUMENT DETAILS

Project Ref. No:	CT20
Conditions of Use:	This report is the property of the sponsor, *Sharples Environmental Services cc* (*SES*), who may make allowance to publish it, in whole provided that: a. Approval for copy is obtained from *SES*. b. *SES* is acknowledged in the publication. c. *SES* is indemnified against and claim for damages that may result from publication of specifications, recommendations or statements that is not administered or controlled by *SES*. d. That approval is obtained from *SES* if this report is to be used for the purposes of sale, publicity or advertisement. *SES* accepts no responsibility for failure to follow the recommended program.

2. ABOUT THIS EMPR

This document is intended to serve as a guideline to be used by the *Proponent* during the pre-construction, construction, post-construction rehabilitation and operational (maintenance) phases of the proposed development. This document provides measures that must be implemented to ensure that any environmental degradation that may be associated with the development is avoided, or where such impacts cannot be avoided entirely, are minimised and mitigated appropriately.

This EMPr has been prepared in accordance with the requirements of an Environmental Management Programme (EMPr) as specified in the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (Government Notice Regulation (GNR) 326 of 2017) and Section 24N of the National Environmental Management Act, 1998 (Act No. 107 of 1998), and with reference to the "Guidelines for Environmental Management Programmes" published by the Department of Environmental Affairs and Development Planning (DEA&DP, 2005).

In line with the mitigation hierarchy (see Figure 1), the overarching goal of this EMPr is to anticipate and provide measures that must be implemented to ensure that any environmental impact that may be associated with the development is avoided, or where such impacts cannot be avoided entirely, are minimised and mitigated appropriately. The mitigation hierarchy was considered during the Basic Assessment Report (BAR) planning process, to appropriately manage environmental impacts.

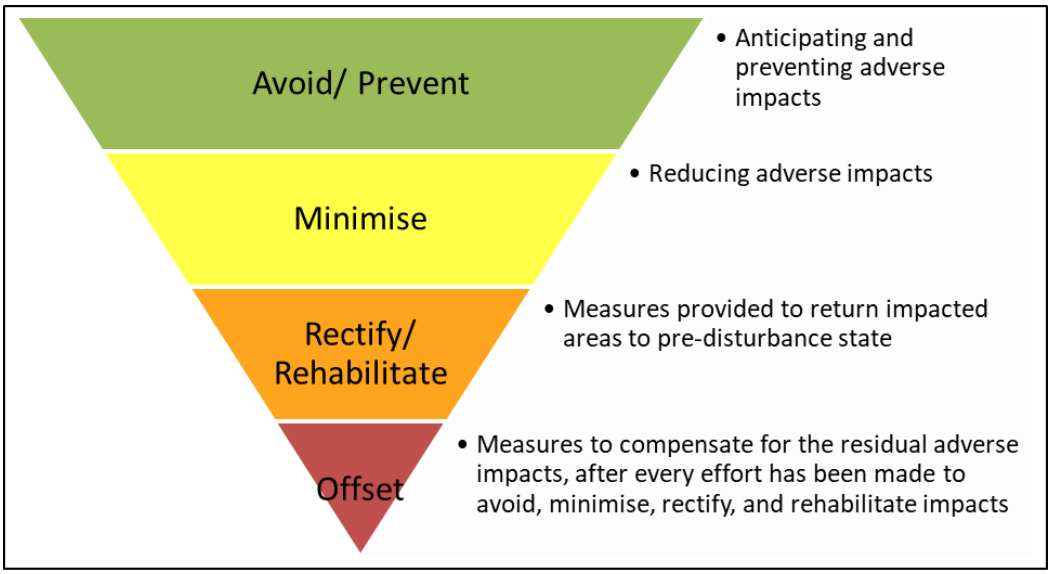

Figure 1. Mitigation hierarchy

It is important to note that not only is the EMPr designed to manage the physical establishment of the development *per se*, but also as a tool which can be used to manage the environmental impacts of the development.

The rehabilitation, mitigation, management and monitoring measures prescribed in this EMPr must be seen as binding to the *Proponent*, and any person acting on its behalf, including but not limited to agents, contractors, employees, associates, guests or any person rendering a service to the development site.

1.1. Important caveat to the report

In the past, some developments have had a devastating impact on the environment even though they have had Environmental Management Programmes in place, while other developments have had a low impact even though no management plans have been compiled.

The Implementing Agent and the attitude of the construction team play an integral role in determining the impact that the development will have on the environment. The Environmental Control Officer (ECO) needs to ensure that all role-players are aware of the constraints that the EMPr places on the development and construction team and are prepared to be actively involved in implementing these constraints. The end result relies on co-operation, mutual respect and understanding of all parties involved.

3. HOW TO USE THIS DOCUMENT

It is essential that this EMPr be carefully studied, understood, implemented and adhered to as far as reasonably possible, throughout all phases of the proposed development. The *Proponent* must retain a copy of this EMPr, and an additional copy must be kept on site at all times during the pre-construction, construction and post-construction rehabilitation phases of the development.

This EMPr must be included in all contracts compiled for contractors and subcontractors employed by the *Proponent*, as this EMPr identifies and specifies the procedures to be followed by engineers and

other contractors to ensure that the adverse impacts of construction and maintenance activities are either avoided or reduced. Appointed contractors must make adequate financial provision to implement the environmental management measures specified in this document.

This EMPr must be seen as a working document, which may be amended as and when needed, in order to accommodate changing circumstances on site or in the surrounding environment, or in order to accommodate requests/ conditions issued by the Competent Authority, the Department of Environmental Affairs & Development Planning (DEADP). Amendments to this EMPr must first be approved by the Competent Authority, in writing, before being implemented.

4. DETAILS OF THE EAP & TECHNICAL/SPECIALIST INPUT

This EMPr and the associated environmental assessment was undertaken by Sharples Environmental Services cc. Sharples Environmental Services (SES) was established in 1998 and has been actively engaged in the fields of environmental planning, assessment and management. SES advises on private, corporate and public enterprises on a variety of differing land use applications ranging from large-scale residential estates and resorts to golf courses, municipal service infrastructure installations and the planning of major arterials. Our consultants have over 20+ years of combined experience and we operate in the Southern, Eastern and Western Cape regions.

A brief description of the Environmental Assessment Practitioners (EAP) has been included below, as per Table 1, and a detailed Curriculum Vitae has been included in Appendix A.

Table 1: EAP Details.

Role:	Name:	E-Mail Address:	Qualifications:	Registration/ Memberships	YEARS OF EXPERIENCE
Author	M Knoetze	madeleine@sescc.net	• Bachelor of Science Degree specialising in Environmental Sciences	• IAIA (SA) • EAPASA (2021/3230)	• 8+ yrs
Co-author	J Geary	jgeary@sescc.net	• B.Sc. Tourism, Botany & Zoology (NWU)	• SACNASP (Cand.Sci.Nat: 600011/15)	• 5+ yrs
Reviewer	B Ditcham	betsy@sescc.net	• B.Sc. Honours (Wildlife Management) (UP) • B.Sc (Zoology and Ecology (UCT)	• IAIA (SA) • EAPASA (Reg Nr. : 1480)	• 14+ yrs

5. DESCRIPTION OF THE ACTIVITY

The proposed development is an initiative of the Western Cape Government's Department of Infrastructure: Transport Infrastructure Branch (also referred to as the *Proponent*). The proposed site is located within the Oudtshoorn Local Municipality and is accessible via the TR75/1 (N12-Highway) south-bound from Oudtshoorn or north-bound from George. The proposed project is approximately 14.9 km in length. The project entails the strengthening of the main route between the two before-mentioned towns. This will include relayering and where required widening of portions of the road, as well as widening of the existing stormwater infrastructure where required.

The extent of the expansion footprint will be approximately 481 493 m² (48.1 ha) which will be stretched over 14.9 kilometres. Please note that the extent was calculated based on the fenced boundaries which provided an indication of the servitude width along the proposed route.

For background purposes, the proposed project pertains to the strengthening of the road, TR75/1 (Trunk Road 75/N12 Highway). According to a map obtained from the Department of Transport's website (as accessed in January 2023), the construction of the portion of the road works, under consideration for the current application, concluded prior to 1959.

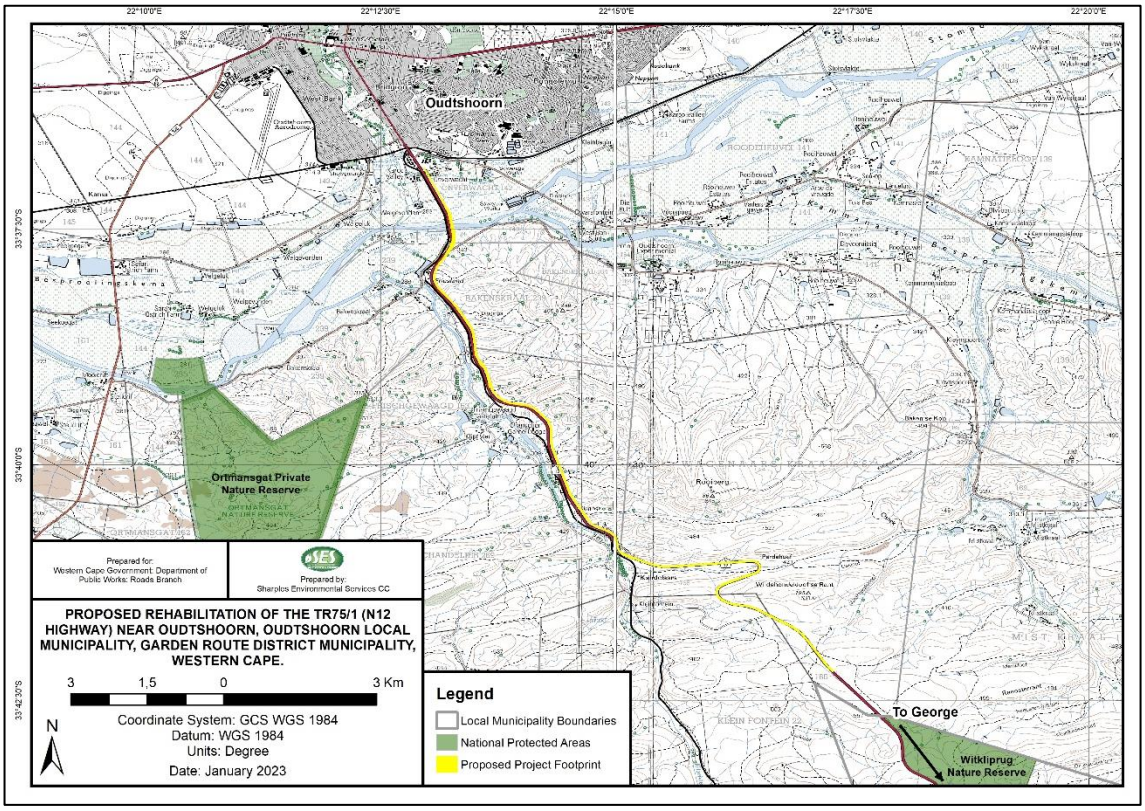

Figure 1: Proposed site locality (DRDLR, 2016)

The proposed project will stretch over the following properties:

- Portion 5 of the Farm Wagenaars 166
- Remainder of the Farm Wagenaars 166
- Remainder of portion 31 of the Farm Klein Fontein 22
- Farm Wagenaars Kraal 251
- Remainder of the Farm Wagenaars Kraal Railway Reserve 167
- Portion 15 of the Farm Frischgewaagd 163
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- Portion 68 of the Farm Frischgewaagd 163
- Portion 69 of the Farm Frischgewaagd 163
- Portion 70 of the Farm Frischgewaagd 163
- Remainder of the Farm Bakenskraal 239
- Portion 4 of the Farm Bakenskraal 239
- Portion 8 of the Farm Bakens Kraal 164
- Portion 9 of the Farm Bakens Kraal 164
- Remainder of the Farm Onverwag B 241
- Portion 10 of the Farm Onverwag 143
- Portion 29 of the Farm Onverwag 143
- Portion 53 of the Farm Onverwag 143
- Portion 62 of the Farm Onverwag 143
- Portion 90 of the Farm Onverwag 143
- Portion 92 of the Farm Onverwag 143
- Portion 94 of the Farm Onverwag 143
- Portion 106 of the Farm Onverwag 143
- Portion 127 of the Farm Onverwag 143
- Portion 207 of the Farm Onverwag 143

The proposed works will entail:

1. General
    a. The establishment on site of the Contractor's campsite and offices for the Engineer and his site staff.
    b. The supply of plant, labour, tools, equipment and materials necessary to complete the works.
    c. Setting out the working areas taking cognisance of all the sensitivities as identified by the appointed specialist.
    d. Accommodation of traffic during the construction phase of the proposed project.
2. Road works
    a. Rehabilitation of the existing road cross-section to include surfaced shoulders:
        i. Widening of existing cut and fill slopes,
        ii. In-situ reconstruction of the existing pavement layers as the upper selected layer,
        iii. Construction of new subbase and base layers, and
        iv. Construction of a new surfacing seal.
    b. Construction of auxiliary (passing and climbing) lanes at selected locations.
    c. Rehabilitation of selected accesses to main or minor farm access standards as applicable.
    d. Extension of existing minor culverts.
    e. Maintenance of existing minor culvert inlet and outlet structures.

3. Structures
    a. Widening or raising head and wing walls at major culverts if required due to cross-section strengthening or introduction of auxiliary lanes.
    b. Maintenance to major culverts including:
        i. Concrete crack repair.
        ii. Scour repair

c. Maintenance to B4691 over the Olifants River including:
    i. Replacement of bridge joints.
    ii. Repair of rebar corrosion and concrete spalling.

4. Appurtenant works
    a. Construction of concrete lined drains
    b. Installation of road signs
    c. Painting of road marking
    d. Installation of guardrails
    e. Installation of fencing, including clearing the fenceline.

The images below show the overall works proposed as part of this project. In addition to the works indicated below, it is proposed that the refurbishment of the road be done where required. This will form part of the general maintenance procedures of the road.

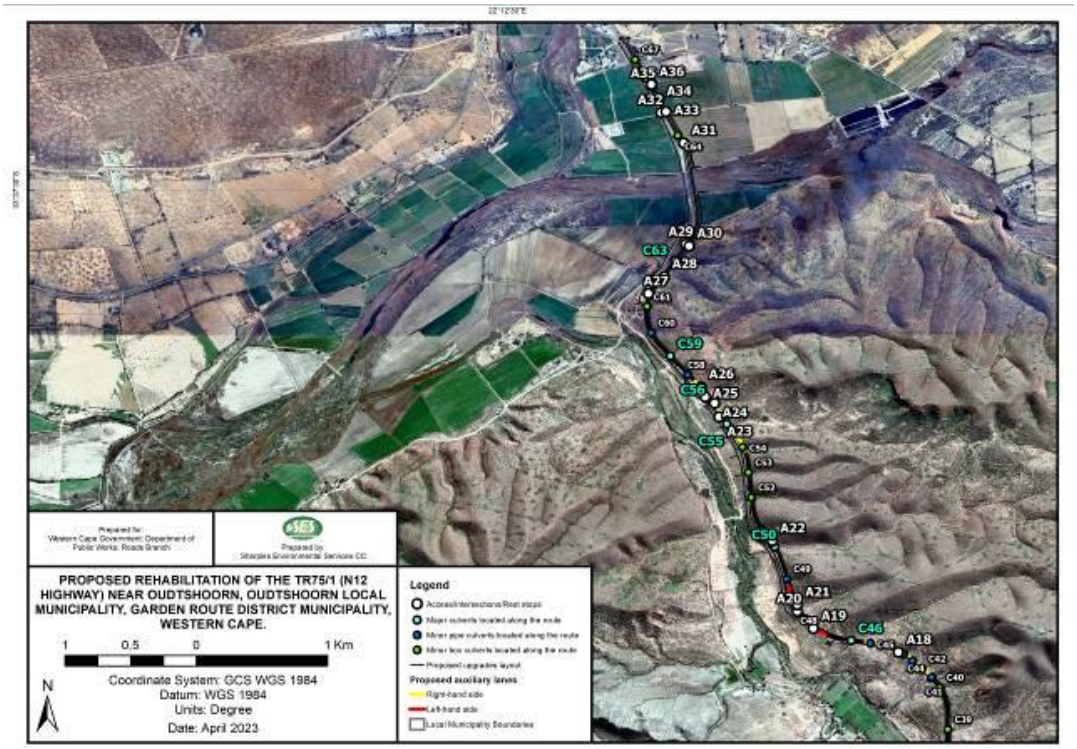


Figure 2. Location of proposed works as detailed in the specifications (North).

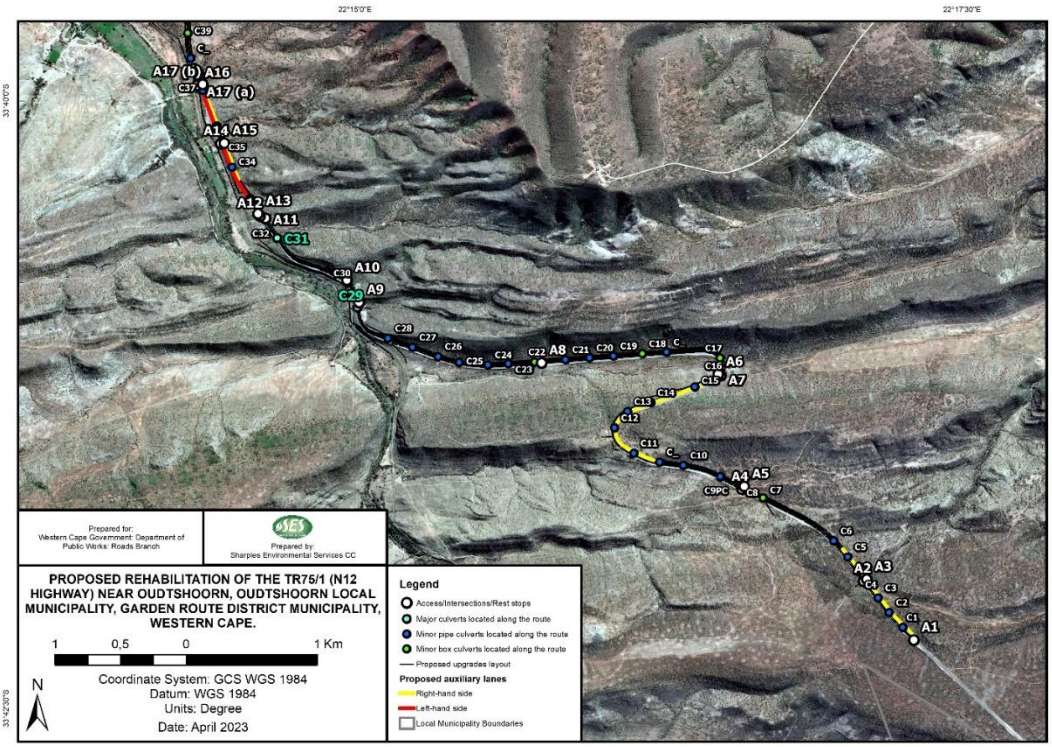


Figure 3. Location of proposed works as detailed in the specifications (South).

The proposed development has the following coordinates:

		Degrees	Minutes	Seconds
Start	**Latitude (S)**	33°	36'	51.20"
	Longitude (E)	22°	12'	57.39"
Mid	**Latitude (S)**	33°	40'	23.13"
	Longitude (E)	22°	14'	33.50"
End	**Latitude (S)**	33°	42'	11.55"
	Longitude (E)	22°	17'	17.43"

6. RECEIVING ENVIRONMENT

The following specialist assessments were undertaken:

- Terrestrial Biodiversity and plant impact assessment;
- Aquatic Biodiversity impact assessment;
- Animal species compliance statement;
- Agricultural compliance statement; and
- Heritage and palaeontological impact assessment.

Please see the summary of the abovementioned assessments below:

Table 2. Summary of the specialist assessments.

Specialist Company	Specialist Details	Sensitivity of receptors	Summary of findings
HERITAGE AND PALAEONTOLOGICAL OBSERVATIONS			
ASHA Consulting (Pty) Ltd	Jayson Orton (Heritage Consultant) Elize Butler (Palaeontological Consultant	Low	From a cultural heritage and landscape perspective, based on the nature of the proposed project (with the proposed project entailing the strengthening of an existing road), the proposed project will have very little to no impacts on the heritage resources in the area. A number of features were identified along the road, however many of them were purely for out of interest rather than heritage reasons. They do however assist with understanding the history of the study area. **No heritage resources of significance were identified within the road reserve.**
		Very High	The N12 Road strengthening works near Oudtshoorn in the Western Cape is underlain by the Devonian Ceres and Bidouw Subgroups of the Bokkeveld Group. The Bokkeveld Group is known for its marine invertebrate fossils, while plant fragments and trace fossils are common. Vertebrate fish fossils have also been identified from this Group. Recently, upgrades to roads have **exposed exceptionally well-preserved fossils** in road cuttings. Some of these fossil-finds were of great scientific value and numerous new species have been described. The proposed development site was inspected on the weekend of 1 April 2023 and five (5) occurrences of fossil finds were recorded by the appointed specialist. These included well-preserved bivalve, trace fossils with possible trilobites. The fossils observed within the study area have a scientific grading value of IIIB.
AQUATIC BIODIVERSITY ASSESSMENT			
Confluent Consulting (Pty) Ltd	James Dabrowski	Very High	The **proposed project intersects twenty-nine (29) watercourses which can be described as non-perennial rivers**, with clearly discernible bed and banks that are characterised by a highly intermittent hydriperiod (i.ie. flowing for a short period – hours to a few days – only after heavy rainfall events in the catchment area). The size of these watercourses varies from minor, first order drainage lines to broader second to third order streams. All watercourses cross the TR75/1 road via formalised culverts and ultimately flow into the Klip River. The Klip River is a large fifth order perennial river which eventually becomes a floodplain wetland prior to its confluence with the Olifants River. The section of the TR75/1 that will be strengthened also **crosses the Olifants River, which is a large floodplain wetland system**. The Present Ecological Status (PES) of the non-perennial rivers has been identified as B (Largely Natural) and the Ecological Importance and Sensitivity (EIS) of these watercourses have been identified as Low. The PES of the Olifants River floodplain wetland was identified as D (Largely Modified) and the EIS of this watercourse is considered to be High.
TERRESTRIAL BIODIVERSITY AND PLANT SPECIES ASSESSMENT			
Mark Berry Environmental Consulting.	Mark Berry	Medium to High	Apart from a few patches of reed (*Phragmites australis*) and a few shrubs/trees, the Olifantsrivier floodplain in the vicinity of the road is highly transformed by agriculture and roadworks. Sections of the road through the hills are still flanked by **good quality vegetation (Eastern Little Karoo**), albeit modified in places. Some of it is regarded as highly sensitive where SCC were recorded. The untoned sections of the road reserve are of low sensitivity due to a high degree of modification and lack of (or very little) biodiversity. This does not mean that these areas should be treated as such during the construction phase. The vegetation

Specialist Company	Specialist Details	Sensitivity of receptors	Summary of findings
			inside the road 'reserve' (fenced-off area) is often highly modified due to past roadworks. Disturbances noted include cut-to-fill (along the steeper sections), infilling of watercourse crossings, road cuttings, lay-by's, farm entrances and stormwater trenches. **Good (medium) quality vegetation** is found along the length of the route from where the hills start just south of the Olifantsrivier floodplain. It includes areas slightly modified, as well as areas highly modified, but still covered with fair quality vegetation (secondary growth). Alien infestation is minimal, with only a few scattered invaders encountered, such as *Opuntia ficus-indica* and *Prosopis glandulosa*. Emergent species, such as *Euclea undulata, Portulacaria afra* and *Dodonaea viscosa*, are also prominent.
		High	A fairly high number of indigenous shrub species were recorded during the site visit conducted by the appointed specialist. Of the species recorded, only **three (3) Species of conservation concern (SCC)** were identified. These include *Antimima piscodora* (DDD), *Glottiphyllum linguiforme* (VU) and *Euphorbia colliculina* (EN). In addition to these, *Berkheya cuneata*, *Hereroa muirii*, *Cerochlamys pachyphylla*, Pleiospilos compactus ssp. compactus, *Tylecodon cacalioides, Astroloba spiralis* and *Polygala myrtifolia* var. *pinifolia* are regional endemics. As far as the author can detect (from iNaturalist records), *Syringodea derustensis* is the only other listed SCC recorded within 5 km from the road. However, there is a good chance that others, such as sensitive species 54 and 842, may also occur in the area. **No protected tree species were recorded or are expected to occur in the area.**
AGRICULTURAL COMPLIANCE STATEMENT			
Johann Lanz	Johann Lanz	Low-Negligible	An agricultural impact is a change to the future agricultural production potential of land. The significance of the agricultural impact is directly proportional to the extent of the change in production potential. Due to the status of the land as a road reserve, it has no agricultural production potential and the development will not therefore result in any change to that potential. **There is therefore zero agricultural impact**. Even if the road works are required to extend beyond the existing road reserve in places, its proposed footprint would only impinge on the very edge of agricultural land and would therefore have negligible impact.
ANIMAL SPECIES COMPLIANCE STATEMENT			
Cossypha Ecological	Robyn Phillips	Low	Faunal activity on the site was generally low with only common and generalist birds and small / medium mammals recorded, usually around the riparian areas and drainage lines. Some of the bird species recorded in the study area included Cape Turtle-Dove (*Streptopelia capicola*), Cape Bulbul (*Pycnonotus capensis*), Karoo Prinia (*Prinia maculosa*), Southern Double-collared Sunbird (*Cinnyris chalybeus*), Chestnut-vented Tit-Babber (*Curruca subcoerulea*), and Bokmakierie (*Telophorus zeylonus*). A few common mammal species observed during the field surveys including Scrub Hare (*Lepus saxatilis*), Cape Grey Mongoose (*Galerella pulverulenta*), and Chacma Baboon (*Papio ursinus*). **No faunal SCC were recorded during the site surveys.** The habitat along the route is largely disturbed and exists in a narrow strip that is somewhat fragmented due to the proximity to the roadway. It is unlikely that the available habitat would support any individuals or populations of faunal SCC, and such species are more likely to utilise the better-quality habitat that exists in the adjacent natural areas in far larger and more viable quantities.

7. IMPLEMENTATION PLAN FOR THE PROPOSED DEVELOPMENT

In order to fulfil the requirements of Section 24N of the NEMA, 1998 (Act 107 of 1998) and Appendix 4 of the EIA Regulations of 2014, as amended, it is required that an implementation plan be provided for a proposed development as part of the EMPr.

For the purpose of the proposed infrastructure development, a validity period of the Environmental Authorisation was requested for a period of 7 years.

The table below stipulates the anticipated implementation timeframes based on anticipated activities of the proposed development. Should the timeframes below change (where activities will only commence at a later stage), or extensions of the valid approvals be required, these changes will be requested in line with the requirements of the EIA Regulations applicable at that time.

Table 3. Implementation plan for the proposed infrastructure development.

Activities	Approximate Duration of Works	Dates
Site Clearance and Site Camp Establishment	1 week	TBC
Construction works*	2 Years (Conservative)	TBC
Post-construction monitoring	1 year	TBC

* Please note that the workplan will be finalised prior to commencement of the construction activities.

8. GENERAL ENVIRONMENTAL MANAGEMENT

The following general management measures are intended to protect environmental resources from pollution and degradation during all phases of the project life cycle. These measures must be implemented as and where applicable, reasonable and practicable during the pre-construction, construction and post-construction rehabilitation and operational (maintenance) phases of the proposed development.

8.1 Code of Conduct

The purpose of the Code of Conduct (CoC) is to minimise the impact of the activities associated with the construction phase on the environment. The rules and regulations prescribed in this CoC are intended to ensure that the impacts on the environment are not prejudiced by the construction activities. Failure to adhere to or any breach of this CoC will result in a fine being levied against the offending or defaulting party / individual.

Labourers during the construction phase must conserve the natural environment, endorsing the principles of sustainable use and minimum impact. They must also be sensitive to the impact of their operation on the environment within which they work and minimise any adverse impacts.

This EMPr forms an integral part of the activities during the construction phase and as such, is legally enforceable. In addition to the restrictions and controls provided for in this EMPr, the environmental controls comprise of the following:

- **Engineers**
  - Unless otherwise stated by the holder, only a registered engineer must be appointed for the construction phase of the development.
  - The engineer must provide work or services of a quality and scope, and to a level, which are commensurate with accepted standards and practices.
  - The engineer must be impartial in decision-making, provision of advice and judgement.

- **Contractors and sub-contractors**
  - Unless otherwise determined, only appropriately registered contractors must be appointed.
  - It shall be the responsibility of the holder / engineer to ensure that the contractors abide by and comply with the rules and regulations of the Code of Conduct.
  - Contractors shall at all times be responsible for their sub-contractors and employees whilst they are on the development property.

8.2 Rules and Regulations

It is of vital importance that engineers, and contractors understand and acknowledge that they are working on a site that has undergone an environmental assessment and if authorised will require compliance with all relevant permits/licenses and this EMPr. The role players should agree to conform to all environmental controls specified in this EMPr, and any additional environmental permits/licenses, as well as any additional input by the ECO.

In addition to the EMPr, the environmental controls comprise of the following:

- **Plan Controls**
  - A copy of the approved and signed project plans must be available on site during the construction phase of the development.
  - Variations of the building plans must be approved by the engineer / holder prior to being implemented.
- **Site Tidiness**
  - The contractor must keep the appearance of the site neat and tidy at all times. Building rubble must be removed from site at regular intervals, and litter must be removed from the site on a daily basis (if not in appropriate receptacles). Refuse drums must be available on site which waste can be placed in. The drums must be emptied on a regular basis and the waste taken to a licenced local waste disposal facility.
- **Safety**
  - The contractor must comply with the Health and Safety Act (Act No. 85 of 1993), as amended (OSHA), together with such regulations promulgated thereunder.

8.3 Site Access and Traffic Management

All construction vehicles need to adhere to traffic laws and regulations, drivers must be sensitised to the fact that they are working in an area with a potentially high volume of foot and vehicle traffic. The speed of construction vehicles and other heavy vehicles must be strictly controlled to avoid dangerous conditions for other road users. As far as possible, care must be taken to ensure that the local traffic flow pattern is not significantly disrupted, and vehicle operators therefore need to be educated in terms of "best-practice" operation in order to minimise unnecessary traffic congestion or dangers. These practices include, but are not limited to, not unnecessarily obstructing the access point or traffic lanes used to access the site; considering the load carrying capacity of road surfaces and adhering to all other prescriptive regulations regarding the use of public roads by construction vehicles.

Adequate signage that is both informative and cautionary to passing traffic must be erected to warn other road users (motorists and pedestrians) about the presence of construction vehicles, particularly at the point where construction vehicles enter/ exit the site warning them of the construction. Signage would need to be clearly visible and include, amongst others, the following:

- Identifying working area as a construction site;

- Cautioning against relevant construction activities;
- Prohibiting access to construction site;
- Clearly specifying possible detour routes and / or delay periods;
- Possible indications of time frames attached to the construction activities, and;
- Listings of which contractors are working on the site.

Other mitigation measures include:

- No construction to take place over or during the construction closure period in December – January without prior permission from the relevant authorities.
- Construction vehicles must adhere to the load carrying capacity of road surfaces and adhere to all other prescriptive regulations regarding the use of public roads by construction vehicles.
- ECO to do awareness training with the contractor and labourers and to highlight the traffic related risks before construction commences.
- Where possible, construction traffic that may obstruct traffic flow on the surrounding roads must be scheduled for outside of peak traffic times.
- Ensure appropriate behaviour of operators of construction vehicles.
- If needed, appropriate traffic management measures and/ or points men (traffic marshals) must be utilised to assist vehicles entering/ exiting the site, particularly where vehicles must cross the path of oncoming traffic.

8.4 Site Demarcation

The working areas should be clearly demarcated on site during the pre-construction or construction phases of the development, as appropriate.

8.4.1. Construction Working Area

The Search and Rescue Plan, once approved by DEA&DP and appended to this EMPr, must be implemented by a suitably qualified/knowledgeable specialist before any pre-construction clearance activities occur. Prior to the commencement of any land-clearing or construction activities, the Specialist and ECO must be advised of the intended to be developed (considering the construction is phased). All areas intended to be utilised at that point in time (ie: for permanent structures, hardened surfaces, and temporary site camp), must be checked by the specialist, search and rescue conducted (if necessary), and thereafter signed off (written proof or instruction) by the specialist as confirmation that the search and rescue has concluded for the area in question. This proof must be communicated to the Contractor and project team to commence with demarcation and construction activities.

Prior to the commencement of any land-clearing or construction activities, the outer boundary of the development area must be surveyed and pegged. This demarcation boundary is to ensure that land clearing and construction activities are restricted to only that area strictly required for the proposed development, and to prevent unnecessary disturbance of soil surfaces and vegetation outside of the development footprint.

The outer boundary of the working area should be enclosed with, at least, shade netting, droppers & wire, or similar measures – as is feasible and practical. Access point should be temporarily gated. The fencing should be retained and maintained for the duration of the construction period or up until the conclusion of the rehabilitation phase. If changes to changes are required, such changes can only be applied once the approval of the appointed ECO and Site Engineer has been acquired. Areas to be cleared must be demarcated before any clearing and grubbing commences.

8.4.2. No-Go Areas

Areas beyond the approved working corridor and access corridors must be considered "no-go" areas, to avoid disturbance from expanding beyond the approved footprint. All areas which have not been searched and rescued (by an appropriately registered specialist/ECO), must be considered temporary no-go areas, until this activity is completed to the satisfaction of the individual responsible therefor.

In order to limit the impacts of the construction phase, only the area to be developed must be cleared to ensure there are no unmanaged no open areas subject to alien invasive encroachment, or wind and water erosion.

Prior to the commencement of any land-clearing or construction activities, all sensitive areas (as identified by the ECO), must be demarcated and must not be disturbed during the construction phase. It is recommended that the No-Go Areas or access to the No-Go Areas, be demarcated with a suitable material that can be easily identified and noticed. Danger tape flagging (pieces of danger tape tied to twine or rope) may be utilised; however the use of only danger tape is not recommended for long-term demarcation as this will easily become untidy and blown away by the wind resulting in pollution.

No-go areas could include areas with slopes of 1:4 and steeper, greenbelt / corridor areas, public open spaces, drainage lines, demarcated/barricaded trees, streams and/or other wetlands outside of the approved development area and all areas beyond the proposed site footprint. No-go areas outside the approved development area must be off-limits to all construction workers, vehicles and machinery during all phases of the development. No vegetation may be cleared from within the no-go areas (unless in accordance with an approved alien invasive management plan and under the supervision of the ECO), and no dumping of any material (waste, topsoil, subsoil etc.) may occur in these areas. Construction workers must be informed of the no-go areas, and if necessary appropriate signage can be used to enforce the demarcation. Any interaction with No-Go Areas should be consulted between the Contractor and ECO prior to any actions.

In accordance with this proposal, the No-Go Area should be considered any area beyond the proposed development footprint (10m wide working corridor) and its associated servitude.

8.4.3. Demarcation of the Site Camp

The area chosen for the site camp and associated facilities must be the minimum area reasonably required to accommodate the site camp facilities, and which will involve the least disturbance to the environment. It is recommended that easily accessible, transformed areas must be used for the site camp. Site selection must be done in consultation with the ECO.

8.5. Site Camp and Associated Facilities

The set up and organisation of the site camp is paramount to ensuring compliance. An environmental file is to be created by the contractor and be situated within the site camp throughout the construction phase and with the applicant thereafter. The environmental file is to include the following;

- A copy of the Environmental Authorisation.
- A copy of the General Authorisation or any other relative permits.
- A copy of the approved EMPr.
- Updated waste slips.
- Disposal slips or cleaning slips (ablution cleaning).
- All EMR's (Environmental Monitoring Reports) and ECO instructions.
- Copies of Environmental induction register/s.
- The Protocol for Chance Palaeontological Findings.

- A Complaints Register.
- Updated method statements.
- Any and all emergency procedure/s applicable to site activities.
- An Incident Register.

The following general management measures pertaining to the set-up, operation and closure of a site camp must be applied where appropriate, reasonable and practicable:

8.5.1. Fencing & Security

The site camp area must be secured to prevent any unauthorised individuals from entering the site camp and possibly getting injured or posing a safety and/or security risk. Adequate signage must be displayed, designating the site office / camp as a restricted area to non-personnel. If required, the site camp and associated areas may be fenced off along the demarcated boundaries of these areas, preferably with 2m high fence and shade netting or similar. A site register is recommended to record any daily visitors and activities, for record keeping purposes.

8.5.2. Fire Fighting Equipment

No less than 2 fire extinguishers must be present in the site camp. The extinguishers must be in a working condition and within their service period. A fire extinguisher must always be present wherever any "hot works" (e.g. welding, grinding etc.) are taking place. It is recommended that all construction workers receive basic training in fire prevention and basic fire-fighting techniques and are informed of the emergency procedure to follow in the event of accidental fires. Open fires and smoking should be prohibited on site. However, it is noted that despite this, incidents may arise where fires are created after hours by security, and labour may attempt to smoke on site. In these cases, measures should be taken to ensure that activities are managed appropriately. Therefore, should a fire be created on site after hours, the following procedure must be followed:

- Ensure that the security is aware that creating fires within the site is prohibited.
- Should they choose to create one beyond the demarcated area, they are solely responsible for the management.
- He/she should ensure that:
    - Utilise a metal barrel and contain the fire within, outside of the proposed site.
    - It may not be positioned close to any vegetation, no-go area, natural areas or flammable material.
    - Do not leave fire unattended.
    - Monitor and extinguish any embers that may escape.

Should the contractor choose to, he/she may designate a smoking area within the site camp, of which the contractor is solely responsible for the management of this activity on site, and any incidents that may occur. It must contain the following features:

- Appropriate signage.
- A barrel/bucket filled to 50% capacity with sand, for disposal of used cigarettes.
- An appropriately weighted lid, that cannot be easily displaced by volatile weather conditions.
- The bin and designated area must be positioned in such a manner that it is not directly affected by heavy winds.
- This bin must be emptied as is necessary and must not be allowed to reach 75% capacity.

In the case of accidental fires, the contractor must (if required/significant) alert the Local Authority's Fire Department as soon as a fire starts prior to the fire becoming uncontrollable.

8.5.3. Waste Storage Area

Sufficient bins for the temporary storage of construction related waste must be provided inside the site camp and/or at the working area and must be located in such a way that they will present as little visual impact to surrounding residents and road users as possible. Sufficient signage and awareness must be created to ensure that these bins are properly used.

8.5.4. Hazardous Substances Storage Area

Fuels, chemicals, lubricants and other hazardous substances must be stored in a demarcated, secured, bunded and clearly sign-posted area within the site camp away from the watercourses on site. Sufficient signage and awareness must be created to ensure that these bins are properly used. It must be ensured that all hazardous storage containers and storage areas comply with the relevant SABS standards to prevent leakage. Ensure that when substances are transferred, this is done on an impermeable and/or bunded surface, to contain any spillage. Spillage, should it occur, must be disposed of appropriately.

Any accidental release of a hazardous substance during the construction and operational phase of the proposed development, must be reported to the relevant authorities, including the Department of Environmental Affairs and Development Planning's Directorate: Pollution and Chemicals Management, in terms of Section 30(3) of the NEMA.

8.5.5. Potable Water

An adequate supply of potable water must be provided to construction workers at the site camp. It is the Contractors duty to ensure that the labour has adequate access to potable water throughout construction phase, and to monitor weather conditions, to ensure that labour has enough drinking water on hotter days, or construction activity must cease, until conditions are safe to continue. To conserve water, it is recommended that buckets of water are used to clean tools and machinery, rather than running water.

8.5.6. Ablution Facilities

Chemical toilets must be kept at the site camp, on a level surface and secured from blowing over and located in such a way that the toilets will not cause any form of pollution. As per the SANS 10400 (SANS 10400 – Part P; Section 4.11 – Table 5) requirement, one ablution facility for every 8 male workers and 2 ablution facilities for every 8 female workers will be provided.

The ablution facilities must not be linked to the river system/drainage lines in any way. Toilets must be serviced regularly and kept in an orderly state. The contractor must ensure that no spillage occurs when the toilets are cleaned, serviced or moved. The toilet facilities should be emptied on a weekly basis, by an appropriately registered service provider. Proof of this weekly servicing must be obtained and filed in the Environmental File on site. Performing ablutions outside of the provided toilet facilities is strictly prohibited and the ECO would need to regularly inspect the state of the chemical toilets to ensure compliance.

8.5.7. Eating Area & Rest Area

A dedicated area within which construction workers can rest and eat during breaks must be provided within the site camp. Seating, shaded areas and waste bins must be provided.

8.5.8. Vehicle & Equipment Maintenance Yard

All vehicles must be regularly inspected for leaks. Re-fuelling must take place on a sealed surface area (impermeable surface or underlain by a drip tray) to prevent ingress of hydrocarbons into the soil. Where possible, construction vehicles and equipment that require repair must be removed from site

and taken to a workshop for servicing. If emergency repairs and/or basic maintenance of construction vehicles or equipment are necessary on site, such repair work must be undertaken within the designated maintenance yard area away from any watercourses. Repairs must be conducted on an impermeable surface, and/or a tarpaulin and/or drip trays must be laid down prior to emergency repairs taking place, in order to prevent any fuel, oil, lubricant or other spillages from contaminating the surrounding environment. All spills should they occur, should be immediately cleaned up and treated accordingly.

8.5.9. House-Keeping

The site camp and related site camp facilities must be kept neat and orderly at all times, in order to prevent potential safety risks and to reduce the visual impact of the site during construction.

8.6. Protection of Fauna

Construction workers are to be sensitised to the fact that they may encounter fauna during the construction period. This must be included in the environmental awareness training completed with all site personnel before any construction commences. Environmental Awareness Training must educate labour on conduct in terms of faunal management throughout construction phase, including but not limited to:

- No person/s may harm, kill, capture or keep any fauna.
- Appropriate access control must be put in place to reduce the risk of animal species gaining access to the development area.
- Where possible, avoid interactions, particularly with fauna that can inflict harm, if such fauna is identified on site contact local SPCA other animal protection and removal services.
- No domestic animals are permitted on the sites.
- Maintain good housekeeping, so that fauna cannot hide amongst waste and material.

If any fauna is encountered by construction workers, the ECO is to be notified. If the ECO is not on site, the site manager is to be informed. Rescued fauna must be released into a nearby area of similar habitat away from any construction. Contact details for animal rescue services and/or snake wrangler, from the local area, should be available on site, in case of an emergency.

Use shade cloth over existing fence line (boundary of working area), to stop animals from wandering onto site.

8.7. Indigenous Vegetation Clearing and Protection.

The Search and Rescue Plan, once approved by DEA&DP, must be implemented where necessary by a suitably qualified specialist before clearance activities occur within the proposed phase. Should vegetation remain after the implementation of the Search and Rescue activities, the following measures must be implemented:

- As the construction will be phased, areas which have not been searched and rescued (as confirmed by the specialist/ECO), must be considered temporary no-go areas, until this activity is completed.
- The appointed specialist responsible for conducting the search and rescue activities is to guide and educate the labour on vegetation management and clearance techniques, especially related to alien invasives in line with the Alien Invasive Management Programme and Search and Rescue Plan.
- It is important that clearing activities are kept to the minimum and take place in a phased manner. This allows animal species to move into safe areas and prevents alien invasive encroachment, and wind and water erosion of the cleared areas. Blanket clearing of

vegetation must be limited to the approved development footprint, and the area to be cleared must be demarcated before any clearing commences, and ONLY AFTER search and rescue is done for that portion.

- Any alien vegetation that is cleared must be disposed of in accordance with the Alien Invasive Management Programme and in consultation with the ECO. Chipping of alien invasives must occur immediately and must not be stored on site for more than 90-days.
- Workers are NOT allowed to collect any flora species. All flora remains the property of the landowner and must not be disturbed, upset or used without their expressed consent.
- A monitoring programme shall be in place, not only to ensure compliance with this EMPr throughout the construction phase, but also to monitor any post-construction environmental issues and impacts such as increased surface runoff. The monitoring must be regular and additional visits must be taken when there is potential risk to the aquatic habitat.

Where indigenous vegetation must be cleared for the development, the following measures must be implemented:

- An Independent Environmental Control Officer will oversee compliance with all the prescribed environmental requirements and mitigation measures listed here and will be on site regularly.
- Only the areas required to accommodate the construction and access to the construction site must be cleared/trimmed of vegetation, as long as the vegetation has not been identified as an SCC.
- Vegetation outside of the construction footprint and within any no-go areas must not be cleared, unless permitted in accordance with the alien invasive management plan, and under the supervision of the ECO.
- Land clearing and earthmoving activities should not be undertaken during strong winds or heavy rainfall events, where possible.
- Trees and shrubs that are directly affected by the operations may be felled or cleared but only by the expressed written permission of the ECO, and under the applicable permits obtained in terms of the Nature Conservation Ordinance (19 of 1974, amended 2000) and/or the National Forests Act (Act 84 of 1998, amended 2009).
- Stripped vegetation should be temporarily stored during operations and to be used later to stabilise slopes/soils. This excludes alien invasive species.
- Ensure any open spaces/bare areas are kept clear of alien plant species through the adoption of an Alien Invasive Management plan.
- No unpermitted/uncontrolled fires are permitted on site.
- Rehabilitation of vegetation of the site must be done as described in the Rehabilitation Plans.
- To limit adverse impacts to the surrounding environment, the contractor and labourers must take great care if cement is to be mixed on site. Cement is to be mixed on thick plastic sheets or in large buckets that are bunded. Any spillage must be cleaned up immediately. Cement water is also to be contained in the above manner and allowed to dry out and then removed from site. Cement water, which is highly alkaline, poses a definite threat to the soil and seed banks, should the water disperse into surrounding areas.

8.8. Alien Invasive Species Control

Several exotic invasive and other weed species were noted on the site, ranging from a few scattered individuals to dense infestations. The existing infestations and any further spread of these tree species pose a significant negative risk to the environment by causing direct habitat destruction, increasing the risk and intensity of wildfires, and reducing surface and sub-surface water. Alien Invasive Plants require removal according to the Conservation of Agricultural Resources Act 43 of 1983 (CARA) and

the National Environmental Management: Biodiversity Act (10 of 2004; NEMBA): Alien and Invasive Species Lists (GN R598 and GN R599 of 2014).

Removal of species should take place throughout the construction, operational, and maintenance phases.

8.9. Topsoil and Subsoil Management

In accordance with the Search and Rescue Programme and the Rehabilitation Programme, and under the guidance of the appointed appropriately registered specialist, topsoil must be removed from any area where physical disturbance of the surface will occur, including within the footprint of the development site (working area) and possibly within the site camp, ablution area, vehicle maintenance yard, refuelling area and temporary waste storage area. Topsoil removal and stockpiling must be undertaken only after consultation with the ECO. The following soil management measures must be implemented:

- Topsoil & subsoil that has been excavated must be stockpiled separately, along & adjacent to the excavation pits and must be covered with a suitable cover crop or tarpaulin.
- Excavated topsoil and subsoil must be stockpiled for the duration of the active construction period and utilised for the final landscaping and rehabilitation of disturbed areas on site.
- Excavated subsoil must be stockpiled separately from topsoil.
- The topsoil & subsoil storage area must be located on a level area outside of any surface drainage channels outside the riparian zone, and at a location where it can be protected from disturbance and river flow/floods during construction and where it will not interfere with construction activities.
- Topsoil and subsoil stockpiles must be adequately protected from being blown away or eroded by storm water. If necessary, shade cloth or other suitable measures must be used to stabilise and protect the stockpile from wind/water erosion. Topsoil stockpiles must not be covered with tarpaulin, as this may smother and decrease the virility of topsoil. Stockpiles may not exceed 2 m in height.
- Handling of topsoil must be minimised as much as possible, and the location of the topsoil berm must be chosen carefully to avoid needing to relocate the topsoil berm at a later date.
- Ideally, topsoil is to be handled twice only, once to strip and stockpile, and once to replace, level, shape and scarify.
- No stockpiling of topsoil is to take place within close proximity to any watercourse; in other words, stockpiles must be located outside the 1:50 year flood level of any watercourse.
- Topsoil shall be kept separate from overburden and shall not be used for building or maintenance of roads.
- Topsoil stockpiles must not exceed 1.5 m in height and must not be compacted.
- If soil stockpiles will be stored for an extended period of time, the stockpiles must be kept clear of weeds and alien vegetation growth by regular weeding, (or application of herbicides if agreed with the ECO).
- Soil material that will not be re-utilised on site may be removed from site and taken to an appropriate site for re-use or disposal.
- Note that the topsoil must be the final layer applied to a rehabilitated/ re-landscaped site, after subsoil/ spoil material has been placed and shaped on the site.

8.10. Integrated Waste Management Approach

It is recommended that an integrated waste management system is adopted on site. The system must be based on waste minimisation and must incorporate reduction, recycling, re-use and disposal where appropriate. Separate waste bins/skips that are weather and animal proof must be provided for recyclable waste, general waste and hazardous waste. Recovered builder's rubble & green waste may be stockpiled on the ground within the site camp, or in separate skips until removal. These bins/skips must be emptied, and the waste taken to a registered recycling facility. The receipts from the facility must be kept on file and must be available on request.

The non-recyclable and non-reusable waste (e.g. builder's rubble, etc.) generated on site must be disposed of at a landfill site licensed in terms of the applicable legislation. The receipts from the facility must be kept on file and must be available on request.

Chemical toilets present a risk to the surrounding environment and must be managed accordingly. Chemical toilets must be kept within the site camp (not be linked to the storm water drainage system), on a level surface and secured from blowing over. Chemical toilets must be regularly emptied, by a registered cleaning company and the waste disposed of at an appropriate wastewater disposal/ treatment site. Care must be taken to prevent spillages when moving or servicing chemical toilets.

Hazardous substances such as diesel, oil and detergents will be present on site throughout the construction phase of the proposed development. Hazardous substances pose a greater risk to the surrounding environment than general substances and therefore need to be managed accordingly. A designated storage area within the site camp that is clearly demarcated must be set aside for the storage of hazardous substances and is to be treated as a no-go zone to unauthorised personnel. Appropriate signage, Material Safety Data Sheets (MSDSs), recently serviced fire extinguishers and spill kits should accompany the hazardous substances. Appropriate storage of hazardous substances is important while drip trays should always be utilised when decanting of hazardous substances and when refilling chemical/ fuel storage tanks. If any spills do occur, the solid must be excavated and disposed of as hazardous waste.

Cement and concrete batching will be permitted on site, but may only take place on designated impermeable, bunded surfaces, as agreed with the ECO. Used cement bags should be disposed of as hazardous waste on site.

8.11. Erosion Control and Stormwater Management

Stormwater must be managed in accordance with the Municipal Stormwater Management By-law and based on Sustainable Drainage Systems (SUDS). The SUDS systems attempt to maintain or mimic the natural flow systems as well as prevent the wash-off of urban pollutants to receiving waters. Further to this, the EA holder or appointed contractor must ensure that:

- Where necessary, Stormwater Management Plans must be developed for the site and should include the following:
    - The management of stormwater during construction.
    - The installation of stormwater and erosion control infrastructure.
    - The management of infrastructure after completion of construction.
- Temporary drainage works are implemented, where/when required, to prevent sediment-laden surface water from draining into river systems in proximity to the site. Stormwater must be prevented from entering or running off site.

- Sheet runoff from access roads and the walkways is slowed down by the strategic placement of berms.
- As far as possible, all construction activities in close proximity to watercourses should occur in the low flow season, during the drier winter months.
- Diversion channels should be constructed ahead of the open cuts, and above emplacement areas and stockpiles to intercept clean runoff and divert it around disturbed areas into the natural drainage system downstream of the site.
- As much indigenous vegetation should be maintained and encouraged to minimise erosion;
- All soil compacted because of construction activities as well as ongoing operational activities falling outside of project footprint areas should be ripped and profiled; and
- To ensure that site is not subjected to excessive erosion and capable of drainage runoff with minimum risk of scour, their slopes should be profiled at a maximum 1:3 gradient.
- Rehabilitation is necessary to control erosion and sedimentation of all eroded areas (where works took place).
- It is importation that the rehabilitation of site is planned and completed in such a way that the runoff water will not cause erosion.
- A monitoring plan for the development and the immediate zone of influence should be implemented to prevent erosion and incision.

The scale and nature of the erosion and stormwater control measures implemented on site must be appropriate to the conditions on site, and sufficient to achieve the desired outcomes (soil preservation, prevention of flooding, stormwater control) to the satisfaction of the ECO and consulting engineer.

The prevention of soil erosion can be initiated by designating specific areas for stockpiling of raw materials with consultation of the ECO. No stockpiling is to occur on or near slopes or water resources and all stockpiling areas must be approved by the ECO before stockpiling occurs.

Stockpiles need to be effectively managed and maintained as they have the potential to contribute to runoff and erosion. To prevent this, the following management measures must be implemented.

- Stockpiles of topsoil & spoil material must be protected from wind & water erosion.
- Stockpiles of earth material may not be located within any storm-water drainage pathways and must be outside of the reach of potential flood waters.
- Any erosion runnels/ gulleys/ channels that form on site must be infilled with appropriate material, compacted, rehabilitated as needed and appropriate erosion control measures put in place to prevent recurrent erosion at that site. Rehabilitation of erosion channels should be ongoing during the construction phase and not left until the end of the construction period.
- Stockpiles must not be located within 50 metres of the edge of any wetland habitat.

It may be necessary to implement small-scale erosion protection measures at the construction site, to prevent soil erosion. Such measures may include the use of shade netting, geo-fabric, brush-packing or similar barriers in areas susceptible to erosion and along exposed slopes. The storm water management plan should adhere to the principles of sound storm water management as well as the Municipal Stormwater Management By-law and based on Sustainable Drainage Systems (SUDS). The storm water management system must be implemented on site and must be properly maintained to ensure that contaminated run-off from the construction site is prevented from flowing into the watercourse.

Cleared areas and any other area susceptible to erosion should be provided with a suitable cover and stabilised as soon as possible via the implementation of appropriate erosion control measures. This may

include use of cut-off drains, temporary/permanent drainage channels, brush-packing, mulching, planting or sodding, use of environmentally benign soil binders, use of geo-textile or other coverings. The appropriate measures should be selected by the contractor in consultation with the Engineer & ECO.

8.12. Excavations and Earthworks

Any major earthworks with bulldozers and heavy machinery must be under constant supervision and operators are to be aware of all the environmental obligations, as there is always the potential to inflict damage to the sensitive areas. Any unnecessary or excessive heavy machinery movement must be kept to a minimum i.e. only what is absolutely necessary. Areas to be excavated must be clearly demarcated. Areas, which have already been excavated and entail fairly significant earthworks, must be similarly demarcated to avoid the spreading of construction activities into more sensitive areas.

All excavated material must be stored on a flat surface away from any drainage line, sloped areas or area susceptible to erosion. The location must be decided in consultation with the ECO. Stored material must be protected from wind and water erosion, and this may entail covering the material with suitable shade cloth material or similar (if and when necessary). The shade cloth may need to be weighed down in such a manner that any stream flow is directed away from the stockpile, reducing the risk of erosion.

Whenever any excavation is undertaken, the following procedures shall be adhered to:

- Topsoil shall be handled as described in this EMPr.
- Excavations shall take place only within the approved demarcated site.
- Excavations must follow the contour lines where possible.
- Excavations shall be temporarily fenced shade cloth or barrier fencing to obstruct visual impacts and to prevent the harm to animals or unauthorised persons that may fall into excavations.
- The construction site will not be left in any way to deteriorate into an unacceptable state.
- Once excavations have been filled with overburden and coarse natural materials and profiled with acceptable contours (including erosion control measures), the previous stored topsoil shall be returned to its original depth over the area.
- Rehabilitation of the site shall take place according to the Rehabilitation Programme.

In the event that any heritage resources, including evidence of graves, human remains, archaeological material and paleontological material, are uncovered during construction activities; these must be immediately reported to Heritage Western Cape. Burials must not be disturbed or removed until inspected by a professional archaeologist. In case of the unexpected uncovering of fossil bones in the surficial cover-sands and soil, or buried archaeological material, or unmarked graves, the Fossil Finds Procedure (FFP) must be followed.

8.13. Visual Impact.

The proposed development has the potential to cause a visual impact during the construction and operational periods. To minimise the potential visual impact, all working areas, storage facilities, stockpiles, waste bins, elevated tanks and the site camp should be located in such a way that they will present as little visual impact to surrounding residents and road users as possible. Waste must be managed according to this EMPr. Good housekeeping practices on site must be maintained to ensure the site is kept neat and tidy. The site camp may require visual screening via shade cloth or other suitable material. The use of reflective materials and excessive lighting should be avoided, and construction vehicles must enter and leave the site during working hours, where possible (07:30-17:30).

8.14. Noise Management.

Additional noise is expected during the construction period due to construction activities. It is important that noise complaints register should be opened and that all excavations and earth-moving activities must be restricted to normal construction working hours (7:30 – 17:30) as far as possible. Work on site must be well-planned and should proceed efficiently so as to limit the duration of the disturbance. This is to be done by ensuring that all equipment is in good working condition and fitted with mufflers/exhaust silencers in necessary. Noise levels must comply with the relevant health & safety regulations and SANS codes and should be monitored by the Health & Safety Officer as necessary and appropriate, and all affected parties must be informed of the excessive noise factors. In addition to the beforementioned measures the following must be implemented:

- All construction vehicles must be equipped with muffled reverse sirens (which are to the standard of the Occupational Health & Safety Act (Act 85 of 1993).
- No constructions activities are permitted between 17:00 and 7:00 unless previously agreed upon between the Contacting team and the Municipality.
- Construction workers are to remain within the designated site boundary at all time.
- Eating areas are to be located away from any residential units/homesteads and tourists' attractions within proximity to the current working areas.

8.15. Dust Management.

Although the generation of dust is synonymous with construction sites, care needs to be taken to prevent excessive dust from impacting the surrounding environment and community. Majority of the dust causing activities will take place during the construction period. Exposed surfaces, such as stockpiles and cleared areas should be provided with a suitable cover as soon as possible or wetted down. Construction vehicles should maintain low speeds of 20-40km/h and must ensure that tarpaulins are used to cover any loads transported. Dust levels specified in the National Dust Control Regulations (GN 827 of November 2013) may not be exceeded. i.e. dust fall in residential areas may not exceed 600mg/m^2/day, and dust fall rates in non-residential areas may not exceed 1200 600mg/m^2/day, measured using reference method ASTM D1739.

A Complaints Register must be available at the site office for inspection by the ECO, in case of complaints, such as those related to dust. This should form a part of your Environmental File.

8.16. Heritage Resources

In the unlikely event that any heritage resources, including evidence of graves, human remains, archaeological material and paleontological material, are uncovered during construction activities, these must be immediately reported to Heritage Western Cape. Burials must not be disturbed or removed until inspected by a professional archaeologist. The following mitigation measures were proposed by the heritage and palaeontological specialists appointed for the proposed development:

- Fossils will be required to be extracted.
- A realistic monitoring programme for the palaeontologically sensitive areas of the road works must be compiled by a professional palaeontologist.
- The beforementioned specialist will require an HWC-approved Workplan for the collection of palaeontological materials and must conform to international best practice for palaeontological fieldwork and the study (e.g., data collecting, collecting of fossil as well as report writing) should meet the minimum standards for Phase 2 palaeontological studies suggested by HWC.
- Feedback from Heritage Western Cape must be received regarding this aspect.

- A Chance of Find protocol must be implemented on site throughout the construction phase of the proposed project.
- A search and rescue of fossils is required prior to site establishment.
- A suitably qualified palaeontological specialist must be appointed to oversee the search and rescue activities.

8.17. Site Closure and Rehabilitation

Upon completion of the construction phase, and after each maintenance event, all disturbed areas, including the working area (disturbance corridor), temporary access road, and all areas utilised for the site camp and associated site camp facilities, if applicable, may require rehabilitation as follows:

- On completion of the construction operations, the site camp area must be cleared of all site camp facilities, ablution facilities, fencing, signage, waste and surplus material.
- All areas within the working area and site camp that have become devoid of vegetation or where soils have been compacted due to construction activities must be scarified or ripped to improve filtration and reduce run-off.
- All demarcation fencing, including all droppers, wires, netting and barrier tape must be removed from site and taken to an appropriate site for re-use or disposal.
- Surfaces are to be checked for waste products from activities such as concreting or asphalting and cleared in a manner approved by the ECO. Any soil contaminated with hydrocarbons (oil, fuel, etc) or other hazardous substance must be collected and disposed of as hazardous waste to a licenced disposal facility.
- All construction waste is to be removed from the site and disposed of at an appropriate facility. Burying or burning of waste or rubble on site is strictly prohibited.
- Topsoil that was removed and stockpiled before construction, must be replaced by spreading it evenly over the areas from which it was removed. This topsoil (and the seedbank it contains) will facilitate the re-vegetation of the site.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the activity, be corrected and the area be seeded with a vegetation seed mix to his or her satisfaction. This *must* be done in consultation with the ECO.
- Disturbed areas, especially areas where excavations have taken place, must be shaped as appropriate (original topography must be restored where possible), and covered with a layer of stockpiled topsoil as soon as possible.
- Any topsoil, subsoil or other excavated material that cannot be utilised during site rehabilitation must be removed from the site and disposed of at an appropriate disposal site.
- The disturbed, newly rehabilitated surfaces (particularly steeper slopes and areas recently covered with topsoil) must be protected from wind & water erosion using mulch, brush packing or other appropriate erosion protection measures. Brush-packing/ mulching is done by covering the exposed surface with organic plant material such as branches, plant cuttings and leafy material. Ideally the vegetation removed from site at the start of the construction must be utilised. Brush-packing/ mulching plays a valuable role in erosion control, while also promoting re-vegetation of the site by retaining moisture in the soil, introducing seeds and/or trapping wind-blown seeds and providing organic material (compost) to promote new plant growth.
- Final landscaping and rehabilitation of the site must be done to the satisfaction of the ECO and must adhere to all conditions/ requirements of the Environmental Authorisation.

9. ENVIRONMENTAL IMPACT MANAGEMENT: PLANNING AND DESIGN PHASE

No direct environmental impacts are associated with the planning and design phase. However, poor planning or inappropriate design decisions in this phase may result in environmental impacts arising during subsequent phases of the project.

Planning and design activities must therefore take into account the environmental constraints and opportunities identified during the Environmental Impact Assessment process, in order to avoid or minimise the potential future impacts of the development. Proper planning is also essential to ensure that adequate provision is made to implement the environmental requirements of this EMPr, and to ensure that the development is compliant with additional conditions which may be included in the Environmental Authorisation.

The impact management outcome (goals) during this phase are to:

- Appoint an Independent Environmental Control Officer.
- Complete the detailed design of the structures and detailed site layout plan.
- Compile and adopt a suitable and acceptable Stormwater Management Plan.
- Update the EMPr (if necessary).

These environmental management objectives, as well as the management actions that must be implemented in order to achieve the desired objective and avoid/minimise potential impacts are discussed in more detail below.

9.1. Outcome 1: Appointment of an Environmental Control Officer and Environmental Auditor, and a search and rescue specialist

Impact Management Objective: ***To appoint a suitably qualified and experienced environmental control officer, environmental auditor, and a specialist to plan and conduct search and rescue activities.***		
Potential impact to avoid	• Failure to appoint an ECO and Environmental Auditor will result in non-compliance with the requirements of the EMPr. • Failure to appoint a specialist to plan and conduct search and rescue operations before any pre-construction clearance activities commence will result in non-compliance with the requirements of this EMPr.	
Impact Management Outcome	The requirements of the EMPr are implemented and monitored during all phases of the development, which will promote sound environmental management on site.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
Environmental Auditor & Control Officer • A suitably qualified and experienced Environmental Auditor must be appointed before any activities commence on site. • A suitably qualified and experienced Environmental Control Officer (ECO) must be appointed before any activities commence on site. • The appointed ECO must adhere to the requirements stated in Section 11 of this EMPr. • The appointed ECO must be advised of the construction start date, at least two weeks in advance, prior to the commencement of any construction activities on site, so that the ECO can perform a pre-commencement inspection, ensure any pre-construction conditions of the environmental authorisation are completed, and plan for environmental awareness training of construction workers (see Section 14 for Environmental Awareness Plan and Appendix N for Environmental Awareness Training Booklet). Search and Rescue Specialist • A suitably qualified specialist is to be appointed to compile and implement a search and rescue based on the viability of indigenous, salvageable, good quality vegetation at the time of rescue. The specialist must ensure the following is completed prior to commencement of clearance activities on site:	Western Cape Government's Department of Infrastructure	During design phase

○ Compile a Search and Rescue Plan prior to clearance activities, this must include the following as a minimum; ▪ Details on the salvageable plant material, including the species names and approximate quantities that can be salvaged, ▪ Detailed methodology for safe removal, transportation, and delivery if applicable. ○ The proviso should be that the receiving area (holding area) comprises of the same substrate and vegetation type as that of the site in question, and that it will be actively protected. ○ The stripping and re-establishment of topsoil containing indigenous seed banks should form part of the search and rescue programme. Topsoil and seed salvaging must be avoided from previously heavy alien infested areas. Seed-bearing plant material can also be collected for placement on previously disturbed areas to be rehabilitated. <u>Palaeontological Specialist:</u> • A suitably qualified palaeontological specialist must be appointed to oversee the search and rescue activities at least 6 months ahead of construction. • A realistic monitoring programme for the palaeontologically sensitive areas of the road works must be compiled by a professional palaeontologist. • The beforementioned specialist will require a HWC-approved Workplan for the collection of palaeontological materials and must conform to international best practice for palaeontological fieldwork and the study (e.g., data collecting, collecting of fossil as well as report writing) should meet the minimum standards for Phase 2 palaeontological studies suggested by HWC.		
Performance Indicator	• A qualified ECO and Environmental Auditor is appointed prior to the commencement of any construction activities (including pre-construction set-up activities) on site. • A qualified Search and Rescue specialist is appointed to plan and conduct search and rescue activities on site before pre-construction clearance activities commence.	

9.2. Outcome 2: Detailed Design, Site Layout Plan and Search and Rescue Plan

Impact Management Objective: ***To compile a detailed design and site layout plan that adheres to the recommendations of the BAR Report and any additional conditions which may be included in the Environmental Authorisation.***			
Potential impact to avoid	Substantial deviation from the conceptual layout plan may result in: • Non-compliance with the Environmental Authorisation during construction. • Triggering of additional listed activities not authorised in the Environmental Authorisation. • An increase in the severity of the impacts identified and assessed in the BAR or may result in new impacts not previously assessed and not provided for in the EMPr, resulting in environmental degradation. • Visual disturbance. Poor stormwater management as a result of poor planning, can exacerbate impacts and result in additional non-compliances.		
Impact Management Outcome	Development is compliant with recommendations of the BAR and the EMPr.		
IMPACT MANAGEMENT ACTIONS			
Mitigation measure		Responsible party	Time period
General: • The final detailed design & layout must adhere to the conceptual layout assessed in the BAR process. • The final detailed design & layout must adhere to any conditions of the Environmental Authorisation (EA). • If the final detailed design differs significantly from that assessed during the BAR, the revised layout must be assessed by an ECO and escalated to the Environmental Auditor, who should liaise with the CA regarding an amendment, prior to proceeding. <u>Search and Rescue Plan:</u> The following flora relocation plan is recommended: • Once the final layout has been determined the botanist will be consulted in order to finalise the plant relocation and vegetation clearing (search and rescue) plan. • Respective permits to be obtained. • Flora search and rescue is to be conducted before vegetation clearing takes place. • Areas should only be stripped of vegetation as and when required and once species of special concern have been relocated for that area.		Western Cape Government's Department of Infrastructure & Appointed Specialist (Search and Rescue)	During design phase

• Once site clearing is to commence, the area to be cleared of vegetation will be surveyed by the vegetation and plant search and rescue team clearing under the supervision of the botanist to identify and remove species suitable for rescue and commence removal of plants. • These species are to be replanted immediately in a suitable area of similar vegetation, where future development is unlikely to occur, or within a protected area. This plan must be issued to DEA&DP for approval and, once approved, it must be appended to this EMPr for implementation.		
Performance Indicator	Detailed designs and site layout plans are approved, and a Search and Rescue Plan is approved that adheres to the conditions of the EA and EMPr, prior to the commencement of construction.	

9.3. Outcome 3: Legislative compliance

***Impact Management Objective:* Legislative compliance**		
Potential impact to avoid	Commencement of activities without all relevant permits/permissions/licences/approvals including registered servitudes, permits to remove specific vegetation, etc. as well as commencing without implementation of specialist recommendations, including search and rescue, and compliance with EMPr pre-construction activities, can result in penalties, time delays and excessive costs. All stemming from poor planning.	
Impact Management Outcome	All permits, permissions, licences, approvals, and specialist input are acquired, and the proposed development is compliant with the respective conditions.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
<u>General</u> • Ensure programme of works is planned accordingly and includes recommended measures where necessary, such as implementing search and rescue activities. • Ensure financial allowances are made for the recommended measures, such as search and rescue plans, rehabilitation, etc. • Ensure all relevant permits/licenses/approvals are in place and are valid prior to commencing with works. These include: o Environmental Authorisation	Western Cape Government's Department of Infrastructure	During design phase

○ Servitudes registrations ○ District Municipality approval for DRE road crossings ○ Permission from Municipal Roads and Stormwater Department for the temporary closure of municipal roads ○ Permission from private landowners for the closure of private access roads during road crossings ○ A Water Use Licence ○ A permit obtained from CapeNature in terms of the Nature Conservation Ordinance (19 of 1974, amended 2000) for the search and rescue (removal) of endangered or protected plant species listed in Schedules 3 or 4. ○ A licence from Forestry Western Cape in terms of the National Forests Act (Act 84 of 1998, amended 2009) should any trees in natural forests be required to be cut, disturbed or uprooted. • Ensure that the Contractor has accepted the approved EMPr and Environmental Authorisation (and any other relevant permits/licenses, etc), as a part of their Tender Document, to ensure that they are fully aware of their responsibilities in terms of the implementation of these documents. • Ensure that the Contractor provides method statements for activities intended to be undertaken, and these are checked and approved by the ECO as well as the Engineer. • Inform ECO of planned works ahead, so as to ensure inductions are undertaken timeously. • Involve ECO in selection of site camp location. Programme of Works: Ensure that the construction programme is pre-planned, and all affected landowners are notified of the estimated date, extent and conclusion of works on their property or affecting their access. The removal of trees should only be done in cooler months of the year, when there is less heat- and water stress on the trees. <u>Unplanned/Planned Shutdown:</u> • Should site need to be closed, ensure the following is undertaken: - All waste is removed from site.		

- All stockpiled soils, etc. is removed from site or is bunded efficiently and covered with tarp, to minimise dispersion. - Ensure all excavations are backfilled, and recommended rehabilitation is commenced at the very least. - Ensure heavy machinery is stored safely. - Contact the ECO to undertake an inspection and advise on any appropriate measures that need to be undertaken. • It is important to note that the Environmental Authorisation and approved EMPr is a legal and binding document, therefore regardless of reason for shutdown compliance with these conditions must be met, or the Competent Authority must be informed of the reason and estimated duration of shutdown.		
Performance Indicator	The project does not incur delays, excessive costs and penalties due to unobtained permits and non-compliance with required permits, permissions, licences, and approvals.	

10. ENVIRONMENTAL IMPACT MANAGEMENT: PRE-CONSTRUCTION PHASE

Proper set-up during the pre-construction phase can set the foundation for good environmental management during the active construction phase to follow and can avoid potential impacts from arising at a later date.

The Impact Management Outcome for this phase of the project relate to:

- Implement Search and Rescue Plan
- Identification and Demarcation of no-go areas and working areas.
- Establishment of site camp and associated site facilities.
- Pre-construction ECO visit.

10.1. Outcome 1: Implement search and rescue plan, and identify & demarcate No-Go and working areas

Impact Management Objective: ***Implement search and rescue plan and identify & demarcate No-Go and working areas.***		
Potential impact to avoid	• Clearance before the Search and Rescue plan is established and implemented resulting in irrecoverable loss of biological material. • Insensitive location of working areas and site facilities may result in environmental impacts during the construction phase. • Failure to accurately demarcate working areas may result in works exceeding the approved assessed footprint, resulting in non-compliance and potential penalties and delays	
Impact Management Outcome	Future construction activities will be restricted to within the designated areas & all areas indicated as no-go areas, will be protected from disturbance, i.e., beyond the development footprint or areas not assessed in terms of search and rescue, as of yet.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
<u>General</u> • Inform ECO of planned works ahead, so as to ensure inductions are undertaken timeously. • Involve ECO in selection of site camp location. • Ensure all labour and sub-contractors undergo environmental inductions. • Ensure flora permits are in place timeously (PNCO only) – allow at least 1 or 2 months before commencement. • Environmental Awareness and Training (EAT) – Ensure all labour are informed and plant operators are aware of risks, issues, dos and don'ts and no-go areas.	Specialist (Search and Rescue Mitigation) and Contractor (General)	Pre-construction phase (prior to arrival of construction equipment, machinery, or workers on site)

• Ensure permits/licenses applicable, are obtained prior to commencement of construction works on site. <u>Search and Rescue Plan Implementation</u> • The removal of trees should only be done in cooler months of the year, when there is less heat- and water stress on the trees. • The Search and Rescue Plan (as required by Appendix L of this EMPr), once approved by DEA&DP and appended to this EMPr, must be implemented by a suitably qualified specialist before any pre-construction clearance activities. • Prior to the commencement of any land-clearing or construction activities, the following steps must be taken by the appointed specialist (as a bare minimum): o A site visit is to be taken prior to clearance (by the ECO and Specialist), this is to confirm the quantity and type of vegetation to be removed and record this information (for the intended phase). This must take into account all areas intended to be utilised at that point in time (ie: for permanent structures, hardened surfaces, and temporary site camp, etc.) o Prior to the implementation of the Search and Rescue Plan for the specific phase, the specialist must identify whether any of the indigenous plant species identified to be salvaged are listed as endangered or protected species in Schedule 3 or Schedule 4 of the Nature Conservation Ordinance (19 of 1974, as amended 2000). o Where necessary, the specialist must compile permit applications in terms of Section 62 and 71 of the Nature Conservation Ordinance (19 of 1974, as amended 2000), (and any other relevant permits), and issue these applications to CapeNature for approval, prior to the implementation of the Search and Rescue Plan. o Identify area to transplant and maintain salvaged plant species on. o The appointed specialist is to confirm that conditions are ideal for removal of plant material (ie. soil is moist, etc.) and inform the contractor of when this activity will be undertaken. o If the appointed specialist intends to utilise the contractors labour to remove the plant material, the specialist is to ensure that they are made aware of what vegetation is intended to be removed, and what the recommended and correct methodology is to be followed for removal. o The appointed specialist is to conduct the search and rescue and monitor the labour during implementation. o **<u>Written confirmation from the Specialist/ECO must be issued to the Contractor and construction team (ie. engineers and applicant), notifying them that all search and rescue for the intended</u>**		

phase has been fulfilled. Therefore, the Contractor may proceed with demarcation and construction activities.
 	
• No clearance may occur until the Search and Rescue Plan is implemented and removal activities have concluded, for the relevant construction phase. Areas which have not been searched and rescued (as confirmed by the specialist/ECO), must be considered temporary no-go areas, until this activity is completed.
 	
Working Corridor
 	
• Ensure the relevant ECO is present and consulted for demarcation.
• A maximum working corridor of 20 m is to be maintained in non-sensitive areas
• In Aquatic areas a maximum working corridor of 10 m must be maintained
• In Forest areas a maximum working corridor of 3 m must be maintained.
  o See Appendix C: Vegetation Sensitivity for coordinates of very sensitive areas.
  o Specialist appointed to undertake Search and Rescue should assess the 3 m corridor and identify/tag any mature trees to avoid.
  o Engineer needs to confirm the route after on-site specialist input.
  o Specialist/ECO must undertake an application to Forestry Western Cape for the removal of identified tree species (if necessary).
• Where possible, and especially in sensitive areas (ie. forest areas and watercourses/riparian areas), utilise the smallest possible working corridor which is in all cases below the specified maximums provided above.
• Demarcate/fence off the working corridor with temporary fencing (e.g. poles and shade cloth) to:
  o contain potential overflow into the surrounding sites;
  o obstruct visual impacts;
  o Prevent harm to fauna that may fall into open excavations, therefore ensure all excavations are covered or closed overnight.
• The temporary fencing must be retained and maintained on a daily basis for the duration of the construction period.
• Contain disturbance to the demarcated construction area.
• Areas outside the working corridor must be considered no-go areas.
 	
Landowners;		

• Notify landowners of the construction programme to ensure that they are aware that construction activity may bring about delays/obstructions as well as ensuring that they are aware of any risks. • Ensure clear signage is erected on the access road. • The planning & construction phases of the project must not restrict the day-to-day agricultural activities nor negatively impact the existing cultivars of the productive farm portions that the project will intersect with. Ensure that landowners are notified before private access roads are crossed and this is done in a timeous and practical manner in order to ensure access is always available. <u>Heritage and Palaeontological Sensitivity:</u> • A realistic monitoring programme for the palaeontologically sensitive areas of the road works must be compiled by a professional palaeontologist. Schedule to be decided with construction manager. • The beforementioned specialist will require a HWC-approved Workplan for the collection of palaeontological materials and must conform to international best practice for palaeontological fieldwork and the study (e.g., data collecting, collecting of fossil as well as report writing) should meet the minimum standards for Phase 2 palaeontological studies suggested by HWC. • Report any fossils discovered during excavations. Implement Chance Finds Procedure (as included as Appendix F).		
Performance Indicator	Search and Rescue of identified indigenous plant material is implemented before initial site establishment or clearance commences. No-go areas, working areas and areas for site camp facilities have been identified and appropriately demarcated to the satisfaction of the ECO, before construction activities commences on site.	

10.2. Outcome 2: Establish Environmentally Sensitive Site Camp & Site Facilities

***Impact Management Outcome:* To set up and equip the site camp and associated site facilities in a manner that will promote good environmental management.**			
Potential impact to avoid	• Failure to properly demarcate and set up site facilities may result in disorganised construction activities and unnecessary disturbance to the site. • Failure to provide the necessary site facilities and/or failure to equip these facilities with the necessary equipment/materials may impede good environmental management & compromise ability to respond to emergencies.		
Impact Management Outcome	Site camp facilities do not impact significantly on environment. The equipment required to implement the provisions of the EMPr are provided on site.		
IMPACT MANAGEMENT ACTIONS			
Mitigation measure		Responsible party	Time period
General • The site camp and associated site facilities must be set-up and managed in accordance with the general environmental management measures specified in Section 6 of this EMPr. • The site camp must be strategically set up in a manner that will promote good environmental management during construction/ demolition, and to respond to potential emergencies (including fires, spillage of hazardous substances etc.) that may arise. • The site camp, storage facilities, stockpiles, waste bins, and any other temporary structures on site must be located in such a way that they will present as little visual impact to surrounding residents and road users as possible. • Frequent stormwater outlets must be maintained (if necessary), to prevent erosion at discharge points. Site Camp Establishment If in an area that contains vegetation, utilise disturbed areas only, and: • Ensure site selected is inspected and approved by ECO. • Utilise disturbed or transformed areas for site camp establishment. • Site camp facilities must be the minimum area reasonably required to accommodate the site camp facilities and must not be allowed to impact areas not within the designated footprint. • Ensure the site camp is positioned on a levelled area and is easily accessible. • Ensure site camp is fenced off with appropriate fencing and shade cloth, to block out activities within.		Contractor / Department of Infrastructure	Pre-construction phase (prior to start of construction activities)

• Ensure access to site is at one point, unless to existing points of entry/exit are identified.
• Ensure access onto site is controlled.
• Ensure there is 24hr security.
• Designate specific areas for specific purpose, including storage areas, machinery storage areas, parking areas, waste disposal areas, etc.
• Infographics must be available on site in public areas, including information on safety measures, potential harmful fauna (ie. snakes common to the areas, and emergency contact information, including, but not limited to: Snake catchers, Ambulance; Fire Department; the closest hospital, veterinarian (ie: for anti-venom, etc).
• Must contain a spill-kit.
• Clean portable water must be available to workers on site during construction.
• Potable chemical toilets:
  o Plan positioning of Potable Toilets for labour working along the route.
  o Consider designating a vehicle for the transportation of labourers to toilets. The vehicle can be equipped with a spill-kit.
  o Ensure chemical toilets are positioned on levelled areas and are protected from wind and rain that could result in them blowing over and spilling waste contents.
  o Ensure toilets are positioned at least 32m's from any watercourse.
  o Ensure toilets are rented from a registered company, with whom arrangements should be made for cleaning of these toilets on a weekly basis.
  o Disposal slips/cleaning slips from this company must be obtained following every cleaning and must be filed in the Environmental File.
  o Ensure an adequate quantity of toilets are provided at each working area.
• Hazardous substances including oil/fuel etc. should be:
  o Stored in bunded areas, on hardened/impermeable surfaces, where the barrels/drums/containers are protected from the natural elements.
  o Hazardous substances storage area must be treated as a no-go zone to unauthorised personnel.
  o Appropriate signage indicating what kind hazardous/flammable materials are stored.
  o Material Safety Data Sheet (MSDSs) must be available.
  o A fire extinguisher and contact details for the fire department and other emergency numbers must be positioned in close proximity.
  o A spill kit must be positioned inside the hazardous substances storage area.		

o May only be decanted/filled on the aforementioned surface or with the use of drip trays. o If any spills do occur, the solid must be excavated and disposed of as hazardous waste at an appropriately registered facility. <u>Waste Management:</u> • Designate areas for temporary waste storage, this area should be: o Protected from wind/rain displacement. o Should be on a levelled surface. • An appropriate number of skips/bins must be made available on site, to accommodate for waste separation of the various types of waste generated. • Waste bins/skips must be weather and animal proof. Ensure weighted covers are positioned on skips/bins, to ensure that animals cannot get into the bins as well as to avoid waste dispersion. • Label bins appropriately. • No waste/excavated soil/ etc. intended to be removed from site may remain on site for more than 90-days. • Ensure that disposal is undertaken when waste has reached 75% capacity of the bin/skip. • The waste must be disposed of at a registered waste disposal facility. The disposal receipts from the facility must be kept in the Environmental File. • Ensure waste receptacles are available where works are being undertaken, this can take the form of black bin bags, etc. however it must: • Be sufficient hold the waste without tearing/spilling. • It must be removed from site on a daily basis and re-established at the start of every day, when works occurs in that area. • Request that the foreman responsible for the labour team in a specific area, is responsible for ensuring that this waste receptacle is utilised, removed and established daily. • Waste containers for general waste and hazardous waste must be disposed in appropriate and clearly marked containers and kept in a designated area/s. <u>Environmental File</u> • An environmental file is to be created by the contractor and be situated within the site camp throughout the construction phase and with the applicant thereafter. The environmental file is to include the following:		

○ Copies of all approvals, including: Environmental Authorisation, Water Use Licence and any other license/permit/approval. ○ A copy of the approved EMPr ○ Copies of waste disposal slips ○ Copies of chemical toilet cleaning/servicing slips ○ Disposal slips or cleaning slips (ablution cleaning) ○ All EMR's (Environmental Monitoring Reports) and ECO instructions ○ Copies of Environmental Induction Register/S ○ A Complaints Register ○ Updated method statements ○ Material Safety Data Sheets for all hazardous substances utilised on site. ○ Copies of audit reports ○ Risk Management, Prevention and Emergency Preparedness Plan ○ An Incident Register ○ Copy of induction registers. ○ Copies of purchase orders for rehabilitation material etc.		
Performance Indicator	Appropriate, well organised, and properly equipped site facilities are available on site prior to commencement of construction activities. The location and set up of the facilities don't impact on the natural resources.	

10.3. Outcome 3: Pre-Construction ECO and Environmental Site Officer (ESO) Inspection and Due Diligence

It is essential that the appointed ECO and ESO be advised of the intended construction start date before construction activities commence on site, in order for the ECO to conduct an initial site inspection to assess the pre-commencement condition of the site. The ECO can also advise on the appropriate siting and demarcation of the site facilities, and the identification and demarcation of the no-go areas. The ECO may also conduct the first round of environmental awareness training at this stage, if any construction workers/sub-contractors are present on site.

Impact Management Outcome: ***Environmental Control Officer and Environmental Site Officer to conduct an inspection prior to the commencement of construction activities on site.***		
Potential impact to avoid	• Failure to appoint ECO or to notify ECO of commencement prior to commencement may result in non-compliance with the EA. • If a pre-commencement ECO inspection is not performed, the Construction Contractor may be held liable for environmental degradation that took place prior to the Contractor commencing work on site.	
Impact Management Outcome	• Good environmental management is promoted and enforced by the ECO during the full pre-construction and construction phases. • Site facilities are appropriately located on site. • Construction workers receive environmental awareness training before commencing work on site.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• The appointed ECO must be advised of the construction start date, before any activities commence on site so that the ECO can perform a pre-commencement inspection and plan for environmental awareness training (see Section 14 and Appendix I), of construction workers. • The ECO must ensure all relevant items are in place in terms of Section 7 and 8 of this EMPr, where necessary, and all relevant pre-construction requirements have been complied with in terms of the EA. • Ensure the project timeframe has taken the relevant requirements of the EA and EMPr, into account. • The ECO is to take photographs of the site prior to the establishment of ALL facilities (including the site camp), for record purposes. • The ECO is to ensure that the Environmental File is in place on site, with all the relevant content, and emergency numbers for the relevant authorities are available. • The ECO is to consult with the Contractor regarding relevant dates for environmental inductions (with regard to new labour). • If it is recommended that an ESO is appointed, as per the EA, this must be undertaken.	Contractor	Start of construction phase

Performance Indicator	A pre-commencement site inspection is conducted by the appointed ECO before construction activities commence on site.

11. ENVIRONMENTAL IMPACT MANAGEMENT: CONSTRUCTION PHASE

A number of potential environmental impacts may arise during the construction phase of the development. These impacts have been identified and assessed during the Environmental Impact Assessment process. Environmental Management objectives and actions that will prevent the identified potential impacts from arising – or where avoidance is not possible, that will minimise and mitigate the impacts – are provided in this section.

The environmental management actions and mitigation measures prescribed in this section must be implemented throughout the construction phase and must be implemented in conjunction with the general management measures specified in Section 6 of this EMPr, as well as any other conditions which may be stated in the Environmental Authorisation. The Environmental Control Officer must monitor and enforce the implementation of the relevant environmental management measures and may provide guidance on the implementation of these environmental management measures as and when required.

The impact management outcome (goals) for the Construction phase are:

- Erosion, Earthworks and Land clearance
- Loss of vegetation and disruption to ecological processes
- Disturbance and displacement of faunal habitat, and faunal & floral species of conservation concern
- Aquatic Impacts
- Visual Impacts
- Maintain sense of place (Reduce the visual impact)
- Creation of multiple job opportunities & capital expenditure
- Maintain traffic access and safety

The environmental management actions that must be implemented in order to achieve the desired objectives and avoid/minimise potential impacts are discussed in more detail in the sections below.

11.1. Outcome 1: Erosion, Earthworks and Land Clearance

***Impact Management Outcome:* To prevent soil loss on site and prevent increased sediment load exiting the site caused by earthworks.**			
Potential impact(s) to avoid	Susceptibility of some areas to erosion because of construction related disturbances due to of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion, during heavy rainfall events, after completion of the activity. Stockpiled soils and materials can be displaced in heavy rainfall and windy conditions, resulting in sediment dispersal.		
Impact Management Outcome	Stormwater systems are not impacted significantly.		
IMPACT MANAGEMENT ACTIONS			
Mitigation measure		Responsible party	Time period
General: • Ensure working corridor is demarcated appropriately. • Construction activities may not exceed the footprint required for the proposed works. • Take into account sloped areas and areas where rockfalls/rock slides may be more prominent. • Be mindful of rainfall events, and plan construction works during dry season. • Ensure programme of works includes rehabilitation after each section has been backfilled, to avoid bare surfaces remaining exposed for extended periods of time. • Ensure ALL works on site, remain within the working corridor (this includes stockpiling, if necessary, on site). • Undertake search and rescue of area demarcated for excavations as per the search and rescue plans. • The planning & construction phases of the project must not restrict the day-to-day agricultural activities nor negatively impact the existing cultivars of the productive farm portions that the project will intersect with. Notify all affected landowners before disrupting their access or entering their properties. • Keep landowners updated on progress on their properties so as to avoid people trespassing. Stockpiling: • Ensure stockpiles do not exceed 2m's in height. • Prohibit stockpiling of material close to slopes.		Contractor	Construction phase

• Ensure stockpiles are bunded, and if necessary, cover with shade cloth to avoid loss of material. • Separate topsoil and subsoils during excavations. • When backfilling, ensure subsoils are backfilled first, and top-soil thereafter. • If topsoil is of poor-quality purchase new topsoil to ensure rehabilitation will be successful. • Remove alien invasives/weeds established on stockpiled soils prior to re-instatement. • Continue with weed management throughout construction, in line with the EMPr. • Stockpiles of materials and soil must all be covered by a geotextile or plastic covering, which must also be bunded (e.g., sandbags) when the piles are not in use on the site. This will prevent the material from washing away and contaminating the substrate of the site which likely still contains useful seeds and soil organisms. <u>Excavations:</u> • Topsoil & subsoil that has been excavated for the roadworks must be stockpiled separately, along & adjacent to the excavation pits and must be covered with a suitable cover crop or tarpaulin. • Ensure excavations are undertaken as per specifications. • Ensure that excavations are not left open overnight. If it is necessary to do so, the working corridor demarcation must be checked by the safety officer to ensure that ether is no potential for encroachment by fauna or people. The excavation may need to be covered using metal sheeting or other somewhat rigid cover. • No excavations may be left open overnight if rain is predicted. • Integrate shoring measures if pit walls are collapsing. <u>Exposed surfaces:</u> • Implement weed management measures as detailed in the EMPr. • After backfilling an area, immediately commence with rehabilitation, as detailed in the EMPr, and continue with weed management. • Ensure dust creation is controlled, as detailed in the EMPr. • No surface should be left exposed for extended periods of time. <u>Alien invasive management:</u> • Ensure that alien invasive species are identified, and measures are taken to consistently remove alien invasive species from within the development footprint – implement weed management plan/alien invasive management plan as per EMPr.		

- Stockpiled alien invasive species cleared from site, should be contained and removed from site as soon as possible, so as to not allow dispersal.
- Indigenous vegetation must be utilised where possible.
- Implement rehabilitation plan.

<u>Erosion Management</u>

- Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed.
- Topsoil must be stripped and stockpiled separately and replaced on completion.
- If natural vegetation re-establishment does not occur, a suitable grass must be applied.
- Be mindful of weather conditions that may cause runoff.
- Utilise silt fences, if necessary, at demarcated working corridor fence line, to capture runoff.
- Alternatively, filled sandbags must be used to reduce the intensity of water flow over the site in strategic areas where water flow is anticipated to be altered during construction.

<u>Soil Contamination</u>

- Ensure all machinery utilises drip trays.
- Ensure all machinery is maintained prior to allowing them to be utilised on site.
- Utilise spill-kit for contaminated soil and dispose of at a registered site.
- If cement is to be mixed, ensure this is done on a bunded impermeable surface, and transferred so that there is no interaction with natural ground.
- Concrete and cement mixing is not to occur near muddy areas.
- No contaminated soil may be utilised during backfilling.

<u>Waste Management</u>

- Utilise waste receptacles on site.
- Do not litter on site.
- Remove waste receptacles positioned outside of site camp, at the end of every day.
- Do not allow food wrappers or food items to build up in any waste receptacles as this will attract scavenging fauna, and other pests.

<u>Specialist recommendations:</u>

- Following the completion of construction, disturbed areas must be:

○ Cleared of construction debris and any blockages. ○ Cleared of alien invasive vegetation. ○ Reshaped to free-draining and non-erosive contours where possible. ○ Re-vegetated with indigenous vegetation suitable to the area. <u>Heritage Specialist recommendations:</u> • Ensure disturbance is kept to a minimum and does not exceed project requirements. Rehabilitate areas not needed during operation. • Report any fossils discovered during excavations. Implement Chance Finds Procedure (see Appendix F of this EMPr). • If any archaeological material, fossils, or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist or palaeontologist. Such heritage is the property of the state and may require excavation and curation in an approved institution. • Palaeontological monitoring must also take place during expansion of the road cuttings. A schedule for inspections (compiled in collaboration with the palaeontological specialist and the heritage consultant has been included as APPENDIX F of the EMPr.		
Performance Indicator	The terrestrial and aquatic environment is not significantly impacted as a result of soil erosion.	

11.2. Outcome 2: Loss of vegetation and disruption to ecological processes

<u>Impact Management Outcome:</u> Reduce the impacts caused by land disturbance and impacts on surrounding indigenous vegetation.	
Potential impact(s) to avoid	• Permanent loss of indigenous vegetation cover due to construction activities. • Increased susceptibility to erosion caused by construction activities.
Impact Management Outcome	The disturbance of indigenous vegetation and faunal species is minimised.

IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
<u>General:</u> • The removal of trees should only be done in cooler months of the year, when there is less heat- and water stress on the trees. <u>Specialist recommendation:</u> • Implement a flora search and rescue before commencement. • Respective permits to be obtained beforehand. <u>Clearance of vegetation:</u> • Blanket clearing of vegetation must be limited to the development footprint, and the area to be cleared must be demarcated before any clearing commences. • No clearing outside of footprint to take place. • Should the proposed roadworks require the clearance of indigenous succulent vegetation and/or plant SCCs, respective permits will be required beforehand AND measures must be implemented to minimise such clearing. • Such measures include a survey of the route before commencement in order to microsite the route to avoid large or important trees and may require hand excavation in certain areas to reduce the footprint so as not to significantly disturb the canopy. • Topsoil must be striped and stockpiled separately during site preparation and replaced on completion where revegetation will take place. • Any site camps and laydown areas requiring clearing must be located within already disturbed areas away from watercourses. • Avoid intact forest vegetation pockets where possible. • During the construction phase of the proposed project, a minimum working area is to be adopted, specifically working within the moderate and highly sensitive vegetation areas.	Contractor	Construction phase

Flora search and Rescue • Once the final layout has been determined the botanist will be consulted in order to finalise the plant relocation and vegetation clearing plan. • Respective permits to be obtained. • Flora search and rescue is to be conducted before vegetation clearing takes place. • Areas should only be stripped of vegetation as and when required and once species of special concern have been relocated for that area. • Once site clearing is to commence, the area to be cleared of vegetation will be surveyed by the vegetation and plant search and rescue team clearing under the supervision of the botanist to identify and remove species suitable for rescue and commence removal of plants. • These species are to be replanted immediately and maintained until re-establishment. Alien Invasive Vegetation: • Alien species must be removed from the site as per the National Environmental Management: Biodiversity Act (No. 10 of 2004) requirements. • A suitable weed management strategy must be implemented in the construction phase and carried through the operational phase. • Weeds and alien species must be cleared by hand before the rehabilitation phase of the areas. Removal of alien plants are to be done according to the Working for Water Guidelines. • Construction and rehabilitation of the watercourse banks must occur successively. • The Contractor is responsible for the removal of alien species within all areas disturbed during construction activities. Disturbed areas include (but are not limited to) access roads, construction camps, site areas and temporary storage areas. • In consultation with relevant authorities, the Engineer may order the removal of alien plants (when necessary). Areas within the confines of the site are to be included. • All alien plant material (including brushwood and seeds) should be removed from site and disposed of at a registered waste disposal site. Should brushwood be utilised for soil stabilisation or mulching, it must be seed free. • After clearing is completed, an appropriate cover crop may be required, should natural re-establishment of grasses not take place in a timely manner. Fires		

• The Contractor must ensure that an emergency preparedness plan is in place in order to fight accidental fires or veld fires, should they occur. The adjacent landowners/users/managers should also be informed or otherwise involved. • Enclosed areas for food preparation should be provided and the Contractor must strictly prohibit the use of open fires for cooking and heating purposes. • The use of branches of trees and shrubs for fire-making must be strictly prohibited. • The Contractor should take all reasonable and active steps to avoid increasing the risk of fire through their activities on-site. No fires may be lit except at places approved by the ECO. • The Contractor must ensure that the basic fire-fighting equipment is to the satisfaction of the Local Emergency Services. • The Contractor must supply all living quarters, site offices, kitchen areas, workshop areas, materials, stores and any other relevant areas with tested and approved fire-fighting equipment. • Fires and "hot work" must be restricted to demarcated areas. • The Contractor must take precautions when working with welding or grinding equipment near potential sources of combustion. Such precautions include having a suitable, tested and approved fire extinguisher immediately at hand and the use of welding curtains. <u>Soil Aspects</u> • Sufficient topsoil must be stored for later use during decommissioning, particularly from outcrop areas. • Topsoil shall be removed from all areas where physical disturbance of the surface will occur. • All available topsoil shall be removed after consultation with the botanist and horticulturalist prior to commencement of any operations. • The removed topsoil shall be stored on high ground within the site footprint outside the 1:50 flood level within demarcated areas. • Topsoil shall be kept separate from overburden and shall not be used for building or maintenance of roads. • The stockpiled topsoil shall be protected from being blown away or being eroded. The application of a suitable grass seed/runner mix will facilitate this and reduce the minimise weeds. <u>Dust</u> • To manage complaints relation to impacts on the nearby communities, a dust register will be developed.		

• Dust suppression methods, such as non-potable water spraying must be used during the construction phase of the proposed refurbishment project. • Vehicular speed must be controlled at all time with no indiscriminatory driving permitted by any construction vehicles, or the general public. • No over-watering of the site or road surfaces. • Wind screens should be used to reduce wind and dust in open areas.		
Performance Indicator	Construction team limit disturbance to the surrounding vegetation.	

11.3. Outcome 3: Disturbance and displacement of faunal and floral species of conservation concern

<u>Impact Management Outcome:</u> Reduce the impacts caused by land disturbance and impacts on the faunal habitat and faunal species of conservation concern		
Potential impact(s) to avoid	• Permanent loss of faunal habitat cover due to construction activities. • Increased susceptibility to erosion caused by construction activities. • Disturbance and displacement of faunal species, their processes. • Permanent loss of plant species of conservation concern.	
Impact Management Outcome	The disturbance of faunal habitat, faunal and floral species is minimised.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
<u>General</u>: • During the construction phase of the proposed project, a minimum working area is to be adopted, specifically working within the moderate and highly sensitive vegetation areas. • For the purpose of conserving the vegetation resources, a botanical specialist must be appointed prior to the commencement of the works in order to clearly demarcate the plant SCCs identified by the botanical specialist. As per the current designs, the plant SCCs will be avoided (please refer to Appendix B2 and Section I below). • The demarcation of the plant SCCs must be done well in advance (2-3 months prior) of the commencement of the construction phase. Should the layout designs change and these SCCs	Contractor	Construction phase

be impacted upon, a permit from CapeNature must be obtained prior to work commencing in those areas. • A Vegetation rehabilitation and monitoring plan must be compiled for the proposed development. • The Rehabilitation plan must be implemented concurrently with construction works of the proposed project (as construction in a specific area concludes, the rehabilitation procedures must be implemented). <u>Plant Specialist Recommendations:</u> • During the staking out of the construction area take cognisance of the highly sensitive and medium sensitive areas next to the road. Try and avoid or minimise disturbance of these areas as far as practically possible. • Search and rescue succulents and bulbs from the construction area for replanting in the disturbed or rehabilitation areas after construction. Topsoil, cuttings and seedbearing plant material can also be salvaged for this purpose, especially cuttings from succulents and Pelargonium species. 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 should be done at an appropriate time of the year, preferably when the soil is wet during the raining season. Ideally, bulbs should be salvaged during leaf fall, but before or after flowering. Please note that a CapeNature permit is needed for the removal/relocation of indigenous plant species. A Search & Rescue and Rehabilitation Plan will be needed. <u>Animal Specialist Recommendations:</u> • An experienced, independent Environmental Control Officer (ECO) must be appointed to oversee the construction activities and compliance with the EMPr. • Sensitive areas such as riparian areas, drainage lines, rocky ledges, and pockets of indigenous vegetation that comprise Aloe sp. and succulent plants, must be disturbed as little as possible. (Refer to the botanical report for any specific mitigation measures for succulent plants and Aloe sp.) • The natural vegetation in the surrounding areas must be designated no-go areas for construction camps and crews. Construction camps must be placed within the footprint or within disturbed areas that are already modified.		

• During construction, no wild animal may under any circumstance be handled, removed, or be interfered with by construction workers. No wild animal may under any circumstance be hunted, snared, captured, injured, or killed. This includes animals perceived to be vermin. • Alien plant eradication and control must be undertaken throughout the construction phase and the operational phase.		
Performance Indicator	Construction team limit disturbance to the surrounding vegetation.	

11.4. Outcome 4: Aquatic Impacts

<u>Impact Management Outcome:</u> Reduce the impacts caused by construction activities on aquatic features.		
Potential impact(s) to avoid	• Loss of watercourse vegetation, associated habitat and ecosystem services, associated with the trench footprint areas and associated construction area; • Transportation of construction materials can result in disturbances to soils, and increased risk of sedimentation/erosion; • Soil and stormwater contamination from oils and hydrocarbons originating from construction vehicles. • Earthworks could be potential sources of sediment, which may be transported as runoff into the downstream watercourse areas; • Proliferation of alien and/or invasive vegetation as a result of disturbances. • Increased sedimentation of the watercourses, leading to smothering of vegetation associated with the watercourses; • Exposure of soils, leading to increased runoff, and erosion, and thus increased sedimentation of the watercourses; • Altered watercourse habitat; • Altered runoff patterns, leading to increased erosion and sedimentation of the watercourses.	
Impact Management Outcome	The disturbance of surrounding aquatic features is minimised.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
<u>General mitigation</u>	Contractor	Construction phase

• All construction vehicles must be equipped with a drip tray. This drip tray must be placed beneath the vehicles once stationary. • Mixing of dangerous/hazardous substances may not take place on the bare soil surface. • Mixing of dangerous/hazardous substances must take place on a level area, on top of an impermeable surface and where possible inside of a bunded area (fixed or mobile). • Storage of dangerous/hazardous substances must take place within a designated area within the site camp. This storage area must be lined by an impermeable surface and must subsequently be bunded in order to prevent runoff from contaminating groundwater resources. • Spill kits must be available on site at all times. • Where fuelling does occur on site, a drip tray must be used to contain any spilled fuel. • All construction vehicles must be equipped with drip trays at all times. • No maintenance activities may occur on site for the duration of the construction phase. • Where emergency maintenance is required, such maintenance must be communicated with the independent Environmental Control Officer appointed to oversee the alignment of the construction works with the applicable environmental legislation. • All construction buffers, as requested by the aquatic specialist, must be adhered to. The construction site camp must also adhere to the construction limits (30m away from the edge of any identified watercourses). <u>Site preparation prior to construction activities:</u> • It is imperative that all construction works be undertaken during the dry summer months during low flows when flow diversion is not necessary; • Due to the accessibility of the sites, no unnecessary crossing of the watercourses may be permitted and all existing roads must be utilised to limit edge effects, erosion and sedimentation of the watercourses during the construction phase; • Construction vehicles that are not in use must be parked outside of watercourses and be equipped with drip trays to avoid potential spillage into adjacent watercourses; • The removed vegetation must be stockpiled outside of the delineated boundary of the watercourses. The footprint areas of these stockpiles should be kept to a minimum. Should the		

vegetation not be suitable for reinstatement after the construction phase or be alien/invasive vegetation species, all material must be disposed of at a registered garden refuse site and may not be burned or mulched on site. <u>Limiting impact on instream habitats (materials):</u> • Construction camps, equipment and material lay down areas must be located at least 30 m from any watercourse. • Concrete, cement and bitumen mixing may not be permitted at or in the vicinity of the watercourse. • Cement and bitumen mixing cannot take place on bare ground. An impermeable or bunded area must be established in a way that cement slurry will not run off into the surrounding environment. • Any soil or material stockpiles must be covered with a geotextile or plastic and bunded (e.g. with sand bags) to prevent erosion of the material down slopes into the watercourse. • Excess cement or other materials must be left to dry out before being removed and disposed of at an appropriate facility. • Construction should be planned to avoid seasonal rainfall peaks. <u>Limiting impact on instream habitats (vehicular movement):</u> • Vehicle access roads to construction areas must not cross watercourses. Vehicles must be diverted back to the existing road at these points (i.e. watercourses must not become traffic thoroughfares). • Access to the watercourse can only be for work specifically being conducted to enlarge the crossings and culvert areas. In these areas, access must be limited to essential equipment only. • Fuel storage and vehicle refuelling areas must be located at least 50 m from any watercourse. • Discontinue construction during periods of high rainfall. • Vehicles and machinery must be inspected for leaking fuel before accessing the site, and leaking vehicles must not be permitted to work at the site. <u>Increased persons (labourers) impact of instream habitats:</u> • Provide bins or waste bags for waste and place them in an area designated for break-time. Ensure bins are cleaned out on a regular basis.		

• Provide portable chemical toilets on-site (1 toilet per 10 workers). Waste from toilets is to be disposed of regularly, at least weekly, in a responsible manner by a registered waste contractor. Toilets must be located more than 30 m away from watercourses. • All workers must be briefed that no waste is to be disposed of in the environment. • All workers must be briefed that no access to watercourses is permitted for the duration of construction works unless this is related to maintenance or construction of road infrastructure.		
Performance Indicator	Construction team limit disturbance to the surrounding aquatic features.	

11.5. Outcome 5: Visual Impacts (sense of place)

<u>Impact Management Outcome:</u> To prevent the site from presenting an unnecessary visual impact to the surrounding public.		
Potential impact(s) to avoid	Temporary loss of the visual aesthetics (sense of place) due to construction disturbance, poor housekeeping practices, negligent stockpiling, as well as failure to pursue rehabilitation timeously.	
Impact Management Outcome	The impact on the sense of place caused by the construction of the proposed development is significantly reduced and no notable impacts occur.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
<u>General:</u> • The site camp, toilets, storage facilities, stockpiles, waste bins, and any other temporary structures on site, should be located in such a way that they will present as little visual impact to surrounding residents and road users as possible. • Utilise shade cloth, or other suitable material, along the fence perimeter of the site camp and construction working corridor. • Waste must be managed according to this EMPr and the mitigation measures listed above in terms of waste management. Good housekeeping practices on site must be maintained to ensure the site is kept neat and tidy and free of litter at all times.	Contractor	Construction phase

- Work on site must be well-planned and well-managed so that work proceeds quickly and efficiently, thus minimising the disturbance time.
- The site camp, storage facilities, stockpiles, waste bins, elevated tanks and any other temporary structures on site must be located in such a way that they will present as little visual impact to surrounding residents and road users as possible.
- Special attention must be given to the screening of highly reflective material.
- Use of lighting (if required) must take into account surrounding residents and land users and must present little or no nuisance. Downward facing, spill-off type lighting is recommended.
- A clean site policy must be adopted at all times during the construction phase.
- Where possible, storage and disposal of waste must take place in a sustainable manner, where clearly marked recycle bins must be provided to workers at the site camp.

<u>Vegetation Clearance</u>

- Ensure working corridor fence is established before proceeding.
- Ensure search and rescue is undertaken by specialist.
- Rehabilitate immediately after backfilling, and monitor the area as recommended the Rehabilitation Programme (Appendix M).

<u>Heavy Machinery</u>

- Heavy machinery must remain within fenced areas.
- Do not undertake maintenance of heavy machinery on site or on permeable surfaces.

<u>Stockpiling</u>

- Separate subsoils and topsoils.
- The topsoil must be stored separately and should not be contaminated.
- The soil layers should be replaced in the same order and the topsoil returned last.
- Topsoil stockpiles must be less than 1.5 m in height and have adequate signage to illustrate which are topsoil and subsoil for rehabilitation purpose.
- Clear litter/waste/weeds from topsoil prior to backfilling.
- Import topsoil if topsoil is found to be inadequate to support rehabilitation.
- Do not allow stockpiled materials to exceed 2 m in height, and do not position stockpiles along slopes or outside of the working corridor/site camp.

<u>Stormwater measures</u>

• Utilise temporary stormwater structures, e.g. silt fences, to capture runoff before it creates erosion down slopes. <u>Light</u> • Lights must be positioned in such a way so as to not shine directly ahead onto the road during nighttime hours (i.e. must be positioned facing downward. • Where practically possible, low intensity lighting must be used for areas which requires to be illuminated. <u>Rockslides:</u> • The maintenance system put in place to contain rockfall along the road must be maintained throughout the construction phase of the project. • The system must be cleared often as needed in order to prevent failure of the netting system. • Prior to removal of the nets for maintenance purposes, signage notifying the public of potential rock falls must be erected on site. • The netting system must be checked at regular intervals in order to determine whether there are any weaknesses in the netting structures.		

Performance Indicator	• Good "housekeeping" is evident on site. • The site does not pose a visual impact to surrounding community.

11.6. Outcome 6: Creation of Multiple Job opportunities and Capital Expenditure

<u>Impact Management Outcome:</u> To create employment opportunities with potential for skills transfer, for members of the local community.	
Potential impact(s) to be promoted.	• A number of temporary job opportunities for skilled and unskilled labour will be created during the construction phase of the development. • Potential transfer of skills from more experienced workers to less experienced workers. • Increase in business for local businesses within the construction industry.
Impact Management Outcome	Social benefits from the employment opportunities created during the construction phase.

IMPACT MANAGEMENT ACTIONS		
Promotion measure	Responsible party	Time period
• Positive, therefore no mitigation necessary. • It should be noted that this impact will benefit the local community and address the issue of unemployment within the Western Cape, and South Africa, particularly for unskilled labourers, although temporary. • The applicant is recommended to source local labour, contractors and sub-contractors, as well as utilise local materials and suppliers.	Department of Infrastructure / Contractor	Construction phase
Performance Indicator	A substantial proportion of the construction team is from the local community, with preference given to historically disadvantaged individuals and, where appropriate, unskilled labourers. Skills transfer from experienced to less experienced workers is actively encouraged on site.	

11.7. Outcome 7: Traffic and Access

Impact Management Outcome: ***To ensure continued functioning of road network and road safety during construction.***	
Potential impact(s) to avoid	• Some congestion along Trunk Road 75 (N12 highway). • Accidents may occur due to impatient or negligent drivers. • Congestion and delays may be caused.
Impact Management Outcome	The functioning of the surrounding road network remains efficient and the state of the infrastructure is not hampered.

IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
General • Plan deliveries ahead of time, such as abnormal loads, to occur outside of peak traffic periods. • All construction vehicles need to adhere to traffic laws. The speed of construction vehicles and other heavy vehicles must be strictly controlled to avoid dangerous conditions for other road users. As far	Contractor	Construction phase

as possible care should be taken to ensure that the local traffic flow pattern is not significantly disrupted. • All vehicle operators need to be educated in terms of "best-practice" operations to minimise unnecessary traffic congestion or dangers. Construction vehicles should therefore, not unnecessarily obstruct the access point or traffic lanes used to access the site. • Adequate signage, that is both informative and cautionary to passing traffic (motorists and pedestrians), warning them of the construction activities must be suitably located in the area where the construction is occurring and must be easily visible by all road users. Signage needs to be clearly visible and needs to include, among others, the following: o Identifying working area as a construction site; o Cautioning against relevant construction activities; o Prohibiting access to construction site; o Clearly specifying possible detour routes and/or delay periods; o Possible indications of time frames attached to the construction activities, and; o Details of responsible contractors and engineers are working on the site. • In addition to the abovementioned means of notification, a notice must be erected in Oudtshoorn and at the intersection of the N12 with Heimersriver Road and all minor road intersections leading onto the road to be constructed. • Speed of construction vehicles and other heavy vehicles must be strictly controlled to avoid dangerous conditions for other road users. • If needed, appropriate traffic management measures and/ or points men (traffic marshals) must be utilised to assist vehicles entering/ exiting the site, particularly where vehicles must cross the path of oncoming traffic. • Construction activities may not be planned over the December/January high-season (i.e. between 15 December and 6 January) or over the Easter break. • The procedures outlined in the Communication Plan of the Department of Infrastructure (the Applicant) must be implemented for the proposed project. <u>Landowners;</u> • Notify landowners of the construction programme to ensure that they are aware that construction activity may bring about delays/obstructions as well as ensuring that they are aware of any risks. • Ensure clear signage is erected on the access road.		

• Where access roads to private property is obstructed, notice must be given to affected landowners and/or occupiers, and such obstruction must endure for the minimum duration possible. • Where possible, road crossings of private access roads must be undertaken in piecemeal fashion, only excavating half the access road at a time and allowing for private vehicles to pass safely on the remaining half. • Excavations across private access roads, must not be left unattended or left open overnight under any circumstances.		
Performance Indicator	• The surrounding road networks infrastructure remains in its current state. • Limited congestion and traffic.	

11.8. Outcome 8: Combatting Security concerns and Vandalism

Impact Management Outcome: ***To prevent the site from presenting an unnecessary visual impact to the surrounding public.***		
Potential impact(s) to avoid	• Materials positioned on site overnight may attract people with nefarious intentions. • Opportunities for criminal activities. • Damage to or loss of resources.	
Impact Management Outcome	The development remains unvandalized and safe.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
General • Ensure access to site is controlled and restricted. • A register must be kept of all vehicles and personnel entering the site. • At night, ensure that materials are covered/obstructed from view. Fire safety • Ensure that gas or any flammable substances are stored according to industry standards, the National Veld and Forest Fire Act (Act 101 of 1998), and as advised by the Municipal Fire Department.	Contractor	Construction phase

• Maintain fire hoses and extinguishers in working order. • Erect fire safety signage, and warning signage to alert people that flammable items are stored in a certain area, etc. and to indicate where fire safety equipment (e.g. fire extinguishers) are located.		
Performance Indicator	• Good "housekeeping" is evident on site. • The site does not pose a safety impact to surrounding community.	

11.9. Outcome 6: Climate change impacts

***Impact Management Outcome:* Ensure all adaption and mitigation measures are integrated and are in good order.**		
Potential impact(s) to be avoided.	• Strain on services, as temperatures increase. • Strain on water resources. • The need to capture and store rainwater during periods of rainfall, will become a priority. • Will impact negatively on groundwater capacity and availability. • Fires can be started by negligent labour activity. Which in turn can affect private properties, homes, and livelihoods (farms), etc. • Based on the variety of vegetation intended to be traversed by this proposal, drier periods may see fire hazards occurring beyond the control of the contractor or farmers, which can put lives and infrastructure at risk. • Potential for the storm event to damage infrastructure, at water crossings. • Potential for storm events to impact on electricity supply, which will strain the functioning of pumps and other electrical devices, designed to ensure that the treatment and supply of water is undertaken correctly.	
Impact Management Outcome	Low climate impact as a result of the construction activities	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
General: • Implement all adaption and mitigation measures found to be feasible and reasonable. • Monitor efficiency of all adaption and mitigation measures, during operational phase.	Contractor	Operational phase
Performance Indicator	Local climate remains unchanged as a result of development – no occurrence of field fires, no additional strain on water resources.	

12. ENVIRONMENTAL IMPACT MANAGEMENT: POST CONSTRUCTION REHABILITATION PHASE & OPERATIONAL PHASE

After all construction activities have ceased, the sites must be cleared of all construction related equipment, materials, facilities and waste. In addition, all disturbed surfaces – including disturbed areas around the structures and all areas utilised for site facilities – must be stabilised, rehabilitated and provided with a suitable cover. All temporary access roads constructed must be rehabilitated and access must be restricted from the public.

The impact management outcomes (goals) for this phase are:

- Aquatic impacts: Erosion of the beds and banks of the watercourses
- Alien invasive species clearance and rehabilitation
- Loss of terrestrial biodiversity corridor
- Provision of improved services and infrastructure

12.1. Outcome 1: Erosion of the beds and banks of the watercourses

Impact Management Outcome: ***To rehabilitate all areas disturbed by construction activities, if not already transformed, in an environmentally compliant manner.***		
Potential impact(s) to avoid	• Decreased stability of the watercourse beds and banks.	
Impact Management Outcome	• Limited occurrences of erosion of the banks and beds of the watercourses.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
Specialist Recommendation: • Inspect road crossings following rainfall events to ensure there is no erosion or sediment deposition along watercourses associated with the culverts. • Where erosion has occurred determine an appropriate method of rehabilitation such as revegetation with indigenous plants to stabilise soil or silt fences on slopes. Identify areas of channelled flow or high flow velocities. Methods to spread water and reduce flows should be investigated. • Ensure pipes and culverts under roads are free of debris following rainfall events.	Contractor / Department of Infrastructure	Construction phase – Post-Construction
Performance Indicator	• All construction-related materials, equipment, facilities, waste and contaminated soils have been removed from the site.	

	• All planned works have been implemented and any areas not planned that were impacted upon, have been rehabilitated.

12.2. Outcome 2: Alien invasive species clearance and rehabilitation

***Impact Management Outcome:* Alien invasive species clearance and rehabilitation**		
Potential impact(s) to be promoted.	• Reoccurrence of alien invasive species	
Impact Management Outcome	• Limited infestation and establishment of alien invasive species population.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
Specialist Recommendation: • Inspect culverts bi-annually to ensure that road crossings following rainfall events to ensure there is no erosion or sediment deposition along watercourses associated with the culverts. o Bi-annual inspections should be sufficient to allow invasive plants to be removed by hand-pulling. Alternatively, plants must be controlled using the cut-stump method: ▪ The trees must be felled as close to the ground as possible; ▪ The freshly cut stump must be painted with a herbicide registered for the control of the plant species in question; and The herbicide must be mixed with a dye to identify stumps that have already been treated.	Developer / Department of Infrastructure	Operational phase
Performance Indicator	• No alien invasive species present within the road reserve.	

12.3. Outcome 3: Loss of terrestrial biodiversity corridor

***Impact Management Outcome:* Boosting local revenue and local economy**	
Potential impact(s)	Negative impact • Vegetation loss mostly modified (secondary) Eastern Little Karoo. Sections have been identified as highly sensitive. • Slight impact on biodiversity network. • Increased alien infestation. • Erosion due to poor rehabilitation efforts.
Impact Management Outcome	Businesses, especially those in the tourism sector are more efficiently supported, as this essential service is upgraded.

IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
Specialist recommendations: • Rehabilitate/revegetate all the disturbed surfaces, especially the newly created slopes directly above and below the road. Erosion prevention measures may 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. • As a long-term maintenance requirement, engage in alien clearing, focussing on invasive species such as castor-oil plant, honey mesquite, prickly pear and wild tobacco. These species are category 1b and 2 invaders that require compulsory control as part of an invasive species control programme. • Allow at least 24 months for the monitoring of rehabilitation success and alien infestation post construction. o For the first 12-months, the onus must rest on the construction team appointed to complete the proposed works; o Thereafter, the onus must rest on the maintenance team appointed to service to road.	Developer / Department of Infrastructure	Operational phase
Performance Indicator	Local economic growth, due to reliability of essential services.	

12.4. Outcome 4: Provision of safer roadway

***Impact Management Outcome:* Provision of upgraded services and infrastructure**		
Potential impact(s) to be avoid.	• Road accidents as a result of narrow roads and poor road quality conditions.	
Impact Management Outcome	• Supporting existing communities and proposed future development in the area. • Utilizing existing infrastructure.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
Positive. No mitigation proposed - The proposed development represents an enhancement measure on its own.	Developer / Department of Infrastructure	Operational phase
Performance Indicator	• Development compliments the sense of place as it aligns with other land uses, and does not pose nuisances.	

13. MONITORING COMPLIANCE

This EMPr, once approved by the competent authority (DEA&DP), must be seen as binding to the Holder, and any person acting on the Holder's behalf, including but not limited to agents, employees, associates, contractors and service providers.

The Holder and all other persons who may be directly involved in the development are also bound by their general Duty of Care, as stated in Section 28 of the National Environmental Management Act, 1998:

> ***Duty of Care:***
> *"Every person who causes, has caused, or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm cannot reasonably be avoided or stopped, to minimize and rectify such pollution or degradation of the environment"*

13.1. Environmental Authorisation (EA) Holder / Proponent

It is the EA Holders responsibility to ensure that all agents/contractors/subconsultants appointed to provide services to establish the proposed development, are fully aware of the EMPr, Environmental Authorisation and any other relevant licenses/permits, which must be considered prior to actioning any activity on site. The EA Holder may choose to hold the Contractor responsible for any fines incurred as a result of non-compliant activities during implementation, however this must be done through the agent and by legal procedure. The EA Holder must ensure that:

- Financial allowances are incorporated into the Bill of Quantities, to accommodate for the requirements of the licenses and EMPr.
- An appropriately experienced/qualified Environmental Control Officer (ECO) is appointed to monitor compliance, prior to commencement of site establishment activities.
- An appropriately experienced/qualified Environmental Auditor is appointed to audit compliance, prior to commencement of site establishment activities.

13.2. Contractor

It is the Contractors responsibility to be aware of the requirements of the EMPr, Environmental Authorisation and any other relevant permits/licences and ensure that all labour, appointed sub-contractors/consultants are also made aware of these documents. The Contractor is required to ensure that as per EMPr, EA conditions, and other permits or licences:

- Time allowances/considerations are given to accommodate all relevant activities, when compiling the project programme of works.
- Financial allowances are made to meet all relevant requirements.
- All activities are implemented in an environmentally conscience manner, in line with the EMPr.
- Produce method statements for approval by the ECO and Site Engineer, prior to implementing activities.

13.2.1. Construction Phase Record Keeping

A copy of the approved EMPr, the Environmental Authorisation and any relevant construction method statements must be kept on site at all times during pre-construction, construction and rehabilitation activities. The ECO Reports must be retained by the Holder for a period of at least 5 years, and must be provided to the Competent Authority upon request.

The set up and organisation of the site camp is paramount to ensuring compliance. An environmental file is to be created by the contractor and be situated within the site camp throughout the construction phase and with the applicant thereafter. The environmental file is to include the following;

- A copy of the Environmental Authorisation
- A copy of General Authorisation or any other relative permits
- A copy of the approved EMPr
- Updated Waste slips
- Disposal slips or cleaning slips (ablution cleaning)
- All EMR's (Environmental Monitoring Reports) and ECO instructions
- Copies of Environmental induction register/s
- The Protocol for chance Palaeontological Findings
- A complaints register
- Updated method statements
- Any and all emergency procedure/s applicable to site activities
- An Incident Register

13.2.2. Method Statements

The Competent Authority and/or the ECO may require the Holder or Construction Contractor to submit Method Statements for one or more construction-related activity, or any aspect of the management of the site, before the activity is undertaken or during the performance of the activity, if the activity is causing or may cause significant environmental damage, or pose a health and safety risk.

Method Statements need not be complex and lengthy, but must clearly state **how**, **when** and **where** the activity concerned will be undertaken, and must specify **who** will be responsible for undertaking each component of that activity. Method Statements must be prepared by the Construction Contractor and submitted to the ECO for approval before undertaking the activity concerned.

The ECO and / or Competent Authority have the authority to request method statements for activities, including but not limited to:

- Establishment of site camp and stockpile area.
- Cement/ concrete batching, disposal and emergency contingencies.
- Topsoil and sub-soil storage/ stockpiling.
- Storage of fuels and hazardous chemicals and emergency contingencies.
- Waste management system.
- Storm water management and control.
- Alien invasive plant species management.
- Fire Control & Fire Emergency Plan.
- Emergency preparedness plan / emergency response procedure.
- Post-construction rehabilitation.

The ECO has the authority to prevent activities from being undertaken until such time as a satisfactory Method Statement has been submitted to the ECO and approved by the ECO.

13.3. ECO Monitoring

The appointed ECO is responsible for undertaking regular site visits to monitor and report on the implementation of the EMPr and adherence to the conditions of the Environmental Authorisation during the pre-construction, construction and post-construction rehabilitation phases. The ECO is not required to monitor the site during the operational (maintenance) phase of the development.

- Frequency of ECO visits

- The ECO must conduct **weekly** site visits during the construction phase, in addition to the start-up and closure inspections.
- Further monitoring must continue on a monthly basis following the practical completion of the proposed works, so as to ensure the success of all rehabilitation measures implemented.
- The ECO has the discretion to undertake additional visits if he / she feels this is justified due to the actions of the contractors, and to make *ad hoc* visits in order to ensure compliance.

- Monitoring Reports:
  - Must be produced monthly and submitted to the Competent Authority, Engineer, Proponent and Contractor.

- **ECO Inspections–- Photographic Records**

The condition of the surrounding natural environment must be monitored regularly in order to ensure that construction and management activities are not impacting negatively on the condition of the landscape and any sensitive ecosystems. The most effective way to achieve this is by means of a detailed photographic record. In this way, a record of any shift in ecosystem condition can be maintained and potential impacts be detected at an early stage. It is thus recommended that fixed-point photo-monitoring sites could be set up, and photographs must be taken at these sites during each ECO inspection. Where necessary, the entire working area must be well documented and photographed.

- **ECO Inspections–- Written Records**

The following record-keeping during the pre-construction, construction and rehabilitation phases of the development is recommended:

- The ECO must complete an ECO Checklist after each ECO site visit.
- The ECO must compile an ECO monitoring report and submit this to the Holder, the Contractor and the Competent Authority (the latter only if required by the Competent Authority). The monthly reports must be a summary of the ECO inspections from the preceding month, and must highlight the key concerns/ issues on site, instances of non-compliance with the EA and EMPr, all instructions issued to the contractor, actions taken and aspects that still require attention.
- All ECO reports and ECO instructions must be retained on file at least for the duration of the construction period (retaining reports for a period of at least 5 years is recommended, in the event that the Competent Authority must request information).
- A record (minutes) of construction site meetings, liaison site meetings between the ECO and resident engineer or contractor, monitoring reports, ECO instructions and ECO observations must be clearly documented and filed on a master file off-site for safe keeping.
- It is recommended that a site register (incident register) be kept on site at the site office for the recording of any environmental incidents (e.g. fires, spills etc.), observations which are contrary to the stipulations within the EMPr and any other contravention deemed necessary for the attention of the resident engineer. Actions taken to remedy the incidents must also be recorded.
- A complaints register must be kept on site in which complaints by any member of the public must be logged.
- The ECO must compile a final post-construction audit report, within 6 months of completion of each construction phase. The audit report must detail the rehabilitation measures undertaken, describe all major incidents or issues of non-compliance and any issues or aspects that require attention or follow-up.

13.4. ESO Monitoring

Due to the nature of this development, an Environmental Site Officer (ESO) must be appointed. The site officer will be responsible for implementing and monitoring the site activities daily. This individual must be appointed by the Main Contractor. The ESO will be responsible for actively managing activities on-site. The ESO must:

- Have a site diary wherein they report all environmental incidents daily;
- Ensure that all environmental filing relevant to the project is up to date;
- Keep proper Incident reports on record of all incidents, including all remediation action-documents. These reports and documents must be made available to the ECO, Site Contractor, Site Engineer and the DEA&DP when required;
- Be present and give report on all incidents at all site meetings for the project.

13.5. Auditing by Environmental Auditor

An environmental auditor is to be appointed by the applicant. As per Section 34 of the EIA Regulations (GN R326 of 2017), the duty of an Environmental Auditor is to be in dependent and is responsible for:

- Ensuring compliance with the conditions of the environmental authorisation and the EMPr; and
- Submit an environmental audit report to the relevant competent authority, which provides verifiable findings, in a structured and systematic manner, as per Appendix 7 of GN R326.
- Any amendments to the EMPr, which must be recorded in Appendix J.

The Environmental auditor must undertake an audit as per Appendix 7 of GN R326 at the following stages;

- Every 6 months following the commencement date of the construction works.
- At practical completion of the construction period.
- Quarterly, for a period of 12 months following the practical completion of the construction period.
- Once a year, for the following the initial 12 months after practical completion of the construction period.
- Or according to the frequency specified in the Environmental Authorisation.

14. PENALTIES, CLAIMS AND DAMAGES

The contractor will be responsible for all costs incurred in the rehabilitation of the site and for ensuring that all procedures required to rehabilitate the site are implemented. If third parties are called to the site to perform clean up and rehabilitation procedures, the contractor will be responsible for all costs. The competent authority may impose penalties on the Holder or any of the contractors if conditions contained in this EMPr are contravened. This would be based on an agreement or contract between the Holder and the contractor.

Penalties could be imposed in terms of Chapter 11 of the Western Cape Bill on Planning and Development as published in the Extraordinary Provincial Gazette No 5183, 3 October 1997, and would be applicable for any action which leads to damage to the natural environment. Please note that the payment of any fines in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.

In cases where severe environmental damage occurs, the competent authority law enforcement division may take legal action against the responsible parties. The reasons for this could include, among others:

- Not implementing the conditions of the EMPr;
- Spillage that result in environmental damage;
- Incorrect handling and storage of construction materials and chemicals;
- Sensitive areas that are not clearly demarcated;
- Performing ablutions in areas other than facilities provided for such actions; and
- Occurrence of unattended and out of control fire.

The Contractor shall comply with the environmental specifications and requirements on an ongoing basis and any failure on his part to do so will entitle the ECO to issue the contractor with penalty / fine as described in the following section.

The following offences, level of severity and value of the financial fines have been drafted according to the sensitivities on the proposed site, the mitigation measures proposed, and the construction methods proposed. It must be noted that the level of severity is at the discretion of the ECO and any offences or fines will be recorded in the ECO's monitoring report. The fineable offences are not limited to the table below, additional offences may be applied by the ECO with prior agreement with the EA holder.

The following fine structure shall apply:

Table 4: Fines and offences

Finable Transgression	Min Fine	Max Fine
Failure to notify the ECO of the commencement of construction or pre-construction activities, prior to the commencement of such activities.	R1 000	R2 000
Failure to comply with the provisions relating to the demarcation of the working area, site camp and associated facilities, and the maintenance of the demarcated boundaries.	R1 000	R5 000
Failure to comply with the provisions relating to the demarcation of all "no-go" areas, and the maintenance of the demarcated boundaries.	R2 000	R5 000
Failure to provide secured ablution facilities (1:30 ratio) on site.	R500	R15 000
Failure to comply with the provisions relating to the clearance of vegetation on site.	R2 000	R5 000
Clearance of indigenous vegetation (regardless of the density of alien vegetation present) outside of the demarcated boundaries of the working area and site camp.	R2 500	R15 000
Failure to apply herbicide to alien vegetation when required to do so.	R500	R2 000
Failure to adhere to designated access routes and/or the driving of vehicles through undeveloped vegetation outside of the demarcated working area or site camp.	R1 000	R5 000
Movement of vehicles and/or construction workers in no-go areas;	R1 000	R10 000
Parking or storage of vehicles, machinery, tools and other materials or equipment related to the Contractors operations, within designated "no-go" areas.	R1 000	R10 000
Parking or storage of vehicles, machinery, tools and other materials or equipment related to the Contractors operations, outside of the areas demarcated for such parking/storage.	R500	R5 000
Failure to comply with the provisions relating to the management of topsoil and subsoil.	R1 000	R5 000
Excessive excavation of material in areas not depicted for such purpose / activity on the approved design plans.	R2 500	R10 000
Failure to comply with the provisions relating to waste management on site i.e. recycling of wastes.	R500	R5 000
Failure to comply with the provisions relating to the storage, use and management of hazardous substances and fuels on site and/or the spillage of hydrocarbons or hazardous substances on site leading to environmental damage.	R1 000	R10 000

Mixing cement or concrete on bare ground and/or failure to comply with any other provision regarding cement/ concrete batching.	R1 000	R5 000
Failure to provide adequate fire-fighting equipment (in working order) on site at all times and/or failure to comply with the provisions relating to fire prevention and/or the occurrence of unattended or out of control fires.	R500	R5 000
Refueling of vehicles, machinery or equipment outside of the designated refueling area.	R500	R2 000
Maintenance of vehicles, machinery or equipment outside of the designated maintenance yard, except in emergencies.	R500	R2 000
Failure to undertake refueling or repairs over a drip tray or other impermeable bunded surface to collect spilled hydrocarbons (fuels, lubricants, oils etc.) and other hazardous substances; failure to provide drip trays under fuel burning equipment (including pumps and generators) where there is a risk of hydrocarbon leakage.	R500	R2 000
Failure to produce a required method statement/s to the engineer's and ECO's satisfaction prior to undertaking the activity concerned and/or failure to adhere to an approved method statement.	R1 000	R5 000

The above does not absolve the transgressor from being prosecuted in terms of the ***National Environmental Management Act (Act 107 of 1998)*** which may result in further penalties and other actions by State Departments.

15. EMERGENCY PREPAREDNESS

15.1. Emergency response procedures

The potential environmental risks that may arise as a result of construction activities, or during the maintenance of the structures must be identified, and appropriate emergency response procedures must be compiled for each emergency scenario. Potential environmental emergencies that require an emergency response include, but are not limited to, unplanned fires, sewage spills, spills of hazardous chemicals, snake bites etc.

- The construction contractor is responsible for identifying potential significant environmental risks that may arise as a result of pre-construction, construction and rehabilitation activities, and the contractor must formulate emergency response procedures for these potential incidents.
- The ECO, the contractor and the EA Holder are responsible for ensuring that all construction workers are aware of the emergency procedures and are properly trained on how to identify and respond to an emergency incident during construction.
- An emergency procedure must clearly indicate who will take charge during an emergency, and the roles and responsibilities of workers and authorities during an emergency.
- The construction contractor is responsible for ensuring that the requirements of the Occupational Health & Safety Act (Act 85 of 1993) (OHS Act) are adhered to during the construction phase. The Holder is responsible for ensuring compliance with the OHS Act during the undertaking of operational and maintenance activities.
- All workers on site during the construction and operational phase must be properly educated about possible emergency incidents that may arise, how to avoid such incidents and how to respond in the event of an incident. "Refresher" training sessions on emergency procedures must be held if needed.
- All workers must ideally be given basic fire-awareness training, as well as be advised on basic firefighting and safety techniques. Fire-fighting equipment must be available on-site during construction and operational activities.

- All workers must be trained on how to respond in the event of a spill of a hazardous substance (fuel, chemicals etc.), if hazardous substances are to be used on site.
- A spill kit for containing and/or neutralising spills of hazardous substances (e.g. hydrocarbons) must be available on site at all times, when hazardous substances are present.
- Any incidents of pollution or spillage of hazardous materials during construction must be reported to the ECO as soon as possible. The ECO must then (depending on the nature of the spill) notify the relevant authorities, if needed. During the operational phase of the development, the EA Holder is responsible for notifying the relevant authorities of any pollution incidents that arise.
- A first aid kit must be available on site at all times.
- Emergency contact numbers (including the fire department, police and ambulance) must be prominently displayed on site at all times and regularly updated.
- All emergency incidents must be recorded in a site incident log. The cause of the incident, the measures taken in response to the incident and the efficacy of those measures must also be recorded. This information must be used to inform future emergency preparedness planning, and to avoid prevent similar incidents from arising again.

15.2. Emergency preparedness

The following measures must be implemented, as appropriate, to ensure effective responses to emergencies:

- All workers on site during the construction and operational phase must be properly educated about possible emergency incidents that may arise, how to avoid such incidents and how to respond in the event of an incident. "Refresher" training sessions on emergency procedures must be held if needed.
- All workers must ideally be given basic fire-awareness training, as well as be advised on basic firefighting and safety techniques. Fire-fighting equipment must be available on-site during construction and maintenance activities.
- All workers must be trained on how to respond in the event of a spill of a hazardous substance (fuel, chemicals etc.), if hazardous substances are to be used on site.
- A spill kit for containing and/or neutralising spills of hazardous substances (e.g. hydrocarbons) must be available on site at all times, when hazardous substances are present.
- Any incidents of pollution or spillage of hazardous materials during construction must be reported to the ECO as soon as possible. The ECO must then (depending on the nature of the spill) notify the relevant authorities, if needed. During the operational phase of the development, the Holder is responsible for notifying the relevant authorities of any pollution incidents that arise as a result of maintenance activities.
- A first aid kit must be available on site at all times.
- Emergency contact numbers (including the fire department, police and ambulance) must be prominently displayed on site at all times and regularly updated.
- All emergency incidents must be recorded in a site incident log. The cause of the incident, the measures taken in response to the incident and the efficacy of those measures must also be recorded. This information must be used to inform future emergency preparedness planning, and to avoid prevent similar incidents from arising again.

16. ENVIRONMENTAL AWARENESS PLAN

Environmental Awareness Training must be conducted prior to the commencement of construction activities. It is the Holder's responsibility to familiarise himself/herself with the content and requirements

of this EMPr. The Holder is also responsible to ensure that the contractor and all labourers working on site during the construction phase are familiar with the content of this EMPr.

The following actions must be taken to ensure that all relevant parties are aware of their environmental role and duties:

1. This EMPr must be kept on site at all times.
2. The provisions of this EMPr and the conditions of the Environmental Authorisation must be explained in detail to all staff during Awareness Training.
3. Training booklets will be handed out to all labourers and must be explained to them.
4. Daily checks to be done by the Holder's environmental representative who must be on site at all times.
5. The ECO to conduct frequent site visits.
6. Monthly monitoring reports to be compiled by the ECO. These reports will be circulated to all parties involved (including the Holder, contractor and the competent authority where required).

The Construction Contractor must make allowance for all construction site staff, including all subcontractors that will be working at the site, to attend environmental awareness training sessions (undertaken by the ECO) before commencing any work on site. During this training, the ECO will explain the EMPr and the conditions contained therein. Attention will be given to the construction process and how the EMPr fits into this process. Other items relating to sound environmental management which must be discussed and explained during the environmental awareness training sessions include:

- The demarcated "No-Go" areas;
- General do's and don'ts of the site;
- Making of fires;
- Waste management, use of waste receptacles and littering;
- Use of the toilets provided;
- Use and control of construction materials and equipment etc.;
- Control, maintenance and refuelling of vehicles;
- Methods for cleaning up any spillage;
- Access and road safety;
- Emergency procedures (e.g. in case of fire, spillage etc.)
- General "best practice" principles, with regards to the protection of environmental resources.

Environmental awareness training and education must be ongoing throughout the construction phase and must be undertaken regularly if deemed necessary (especially if it becomes apparent that there are repeat contraventions of the conditions of the EMPr), or as new workers come to site. Translators must be utilised where needed.

APPENDIX A – CURRICULUM VITAES OF EAPS

CURRICULUM VITAE

BETSY-JANE DITCHAM

PERSONAL

Profession: Director & Environmental Assessment Practitioner

Nationality: South African

Languages: English (read, write and speak) & Afrikaans (read, write and speak)

Drivers License: Code B

EAPASA Registration: No. 1480

Betsy has a Bachelor of Science Honours Degree in Wildlife Management from the University of Pretoria and a Bachelor of Science Degree (Zoology and Ecology) obtained from the University of Cape Town in 2005. She has 11 years' experience in the environmental field, including environmental assessments, legal compliance, on-site compliance monitoring, cleaner production and business greening and sustainability (carbon and environmental footprinting). In her time as a consultant, she has compiled a number of environment assessments and management plans for both private and governmental clients. Betsy is a co-owner of SES and is Registered with EAPASA (**Reg No. 1480**).

WORK EXPERIENCE

March 2020 – Present: Sharples Environmental Services cc, Cape Town, WC

Co-Owner and Cape Town Office Manager: Principal Environmental Assessment Practitioner

- Project Management / Client Liaison
- Environmental Authorisation
- Environmental Management Programmes
- Public Participation
- Legal Compliance
- On-site compliance auditing

2018 – Feb 2020: Sharples Environmental Services cc, Cape Town, WC

Cape Town Office Manager: Principal Environmental Assessment Practitioner

- Environmental Authorisation
- Environmental Management Programmes
- Public Participation
- Legal Compliance
- On-site compliance auditing

August 2017 – December 2017: WSP, Cape Town, WC

Assistant Consultant

- Environmental Authorisation
- Legal compliance

- Air quality monitoring
- Public participation

October 2009 to October 2015: Jeffares & Green Engineering & Environmental Consultants, Pinelands, WC

Environmental Scientist

- On-site compliance auditing
- Environmental footprinting (carbon, water, waste)
- Business greening & sustainability
- Environmental authorisations
- In-house newsletter

July 2009 to September 2009: Freelance, Cape Town, WC

Environmental Control Officer

- Environmental auditing of construction related projects.

TERTIARY EDUCATION

2005 University of Cape Town

- Bachelor of Science Degree specialising in Zoology and Ecology

2006 University of Pretoria

- Bachelor of Science Honours Degree in Wildlife Management

KEY PROJECTS

- BAR: Upgrade of Trunk Road 11/1 (N7) from Potsdam to the Melkbos Interchange.
- EIA: Proposed University Precinct Development at the Garden Route Dam and Associated Infrastructure on a Portion of Remainder Farm 464, George, Western Cape.
- EA Amendment: Bulk Water Pipeline along Baden Powell Drive, Khayelitsha, WC.

CURRICULUM VITAE

MADELEINE KNOETZE

PERSONAL

Profession: Environmental Assessment Practitioner, Sharples Environmental Services cc, Cape Town.

Nationality: South African

Date of Birth: 18 May 1992

Languages: English & Afrikaans

Marital Status: Single

Drivers' License: Code B

WORK EXPERIENCE

October 2022 – Present: Sharples Environmental Services cc, Cape Town, WC
Environmental Assessment Practitioner

- Basic Assessments Reports;
- Environmental Impact Assessments;
- Environmental Management Programmes;
- Legislative documentation;
- Administration.

February 2015 – September 2022: Exigent Engineering Consultants CC: Environmental Assessment Practitioner and GIS Specialist

- Management and compilation of GIS database;
- Layout/map creation;
- Basic Assessment Applications
- Water Use License Applications
- Environmental Monitoring/Auditing
- Stakeholder Engagement
- Reporting
- Environmental Management Plans
- Public /Contractor Awareness Training
- Biodiversity Offset Plans
- Rehabilitation and Protected Areas
- Project Management
- Ecological Impact Assessments
- Wetland Impact Assessments
- Rehabilitation and Monitoring Plans
- Alien invasive Management Plans
- Administration

TERTIARY EDUCATION

2014: Nelson Mandela Metropolitan Municipality

- Bachelor of Science Degree specialising in Environmental Sciences.

KEY PROJECTS

- BAR: Proposed Development of a Sewer Line for the Proposed Sammy Marks Township, City of Tshwane.
- EIA: The proposed truck stop and associated infrastructure on Erf 56 and 57, Mossdustria.
- BAR: Proposed rural roads upgrade in Mandlazini – Phase 2, Richards Bay.

CURRICULUM VITAE

JOHN GEARY

PERSONAL

Profession: Environmental Consultant, Sharples Environmental Services cc, Cape Town.

Nationality: South African

Date of Birth: 25 December 1991

Languages: English and Afrikaans

Marital Status: Unmarried

Drivers License: Code B

WORK EXPERIENCE

March 2023 – Present: Sharples Environmental Services cc
Environmental Consultant

- Site Sensitivity Verification Reports
- ECO
- PPP plans
- NOIs
- EMPr's
- Basic Assessments Reports
- Marketing and social media
- Tender search.

September 2021 – June 2022: Pear Environmental (Pty) Ltd, Pretoria, GP
Environmental Manager

- Environmental Management
- Rehabilitation
- Environmental Monitoring
- Water Use License Applications.

June 2013– March 2020: Jaco-K Consulting (Pty) Ltd (Zyntha)
Junior Environmental Specialist

- EMPr & BAR Applications
- Water Use License Applications
- Environmental Monitoring.

TERTIARY EDUCATION

2014: North-West University (NWU): Potchefstroom

B.Sc. Tourism, Botany & Zoology

APPENDIX B – MAPBOOK OF ENVIRONMENTAL SENSITIVITIES AND LAYOUT PLAN

APPENDIX C - SCREENING TOOL

APPENDIX D - LEGISLATIVE COMPLIANCE

LEGAL FRAMEWORK

The NEMA, Act No 107 of 1998, as Amended, and the EIA Regulations (2014) (as amended 2017)

The National Environmental Management Act, 1998 (Act No. 107 of 1998) as per EIA Regulations, 2014 (as amended 2017), gives effect to the Constitution of the Republic of South Africa by providing a framework for co-operative environmental governance and environmental principles that enable and facilitate decision-making on matters affecting the environment. NEMA requires that an environmental authorisation be issued by a competent authority (CA) before the commencement of an activity listed in the Environmental Impact Assessment Regulations, 2014 (as amended 2017), in terms of the Listing Notices G.N. 324, 325, 326 & 327 published on the 7th April 2017.

Due to the fact that this development proposal consists of activities listed in the EIA Regulations, Listing Notice 1 and 3, a Basic Assessment Process was required, and the respective reports (Basic Assessment Report and Appendices) were submitted to the Department of Environmental Affairs and Development Planning (DEA&DP) for Environmental Authorisation.

The following table indicates the relevant triggered activities as per the development proposal:

Table 1: Listed Activities in terms of the NEMA Environmental Impact Assessment Regulations (2014), as amended, that are proposed to be triggered and therefore require an Environmental Authorisation.

Activity No(s):	Provide the relevant **Basic Assessment Activity(ies)** as set out in **Listing Notice 1**	Describe the portion of the proposed development to which the applicable listed activity relates.
19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; ~~but excluding where such infilling, depositing, dredging, excavation, removal or moving—~~ ~~(a) will occur behind a development setback;~~ ~~(b) is for maintenance purposes undertaken in accordance with a maintenance management plan; [or]~~ ~~(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;~~ ~~(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or~~ ~~(e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.~~	The proposed project will intercept the Olifantsriver and a number of non-ephemeral drainage lines. Additionally, the proposed project will require the rehabilitation of culvert infrastructure (located within identified watercourses) in select locations along the road TR75/1 near Oudtshoorn.
56	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre – ~~(i) Where the exiting reserve is wider than 13,5 meters; or~~ (ii) Where no reserve exists, where the existing road is wider than 8 metres. ~~Excluding where widening or lengthening occurs inside urban areas.~~	According to the scope of works, the road will be widened and auxiliary lanes will be installed in select locations, where the width of the widening will be between 4 and 6 m in width (excluding the infilled areas).
Activity No(s):	Provide the relevant **Basic Assessment Activity(ies)** as set out in **Listing Notice 3**	Describe the portion of the proposed development to which the applicable listed activity relates.
12	*The clearance of an area of 300 square metres or more of indigenous vegetation is required for maintenance purposes undertaken in accordance with a management plan.* ***i. Western Cape*** *i. Within any critically endangered or 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*	The Muscadel Riviere Ecosystem and the Eastern Little Karoo Vegetation Types have been identified as endangered ecosystems under the Revised List of Ecosystems in terms of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA) (GN 2747 of 2022). According to the Western Cape Biodiversity Spatial Plan (2016), the Muscadel Riviere Ecosystem type has a threat status of Critically Endangered whereas the Eastern Little Karoo has an Ecosystem threat status of Vulnerable. The proposed project will intercept various Critically Biodiversity and Ecological Support Areas. The project will see to the clearance of more than 300 square metres.

	been identified as critically endangered in the National Spatial Biodiversity Assessment 2004. *ii. Within critical biodiversity areas identified in bioregional plans.*	
18	*The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.* ***ii. <u>Western Cape</u>*** *ii. Outside Urban Areas:* *aa) Areas containing indigenous vegetation*	According to the scope of works, the road will be widened and auxiliary lanes will be installed in select locations, where the width of the widening will be between approximately 2.1 m (throughout a portion of the section of proposed road works) and up to approximately 8.9 m in areas where auxiliary lanes are required (this excludes the footprint of the construction works). According to the Botanical assessment done for the proposed development, numerous indigenous species were located within the road reserve (the fenced area of the N12). Additionally, sections of the road through the hills are still flanked by good quality vegetation (Eastern Little Karoo).
23	*The expansion of (ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more, where such expansion occurs:* *(a) Within a watercourse;* *~~(b) In front of a development setback adopted in the prescribed manner; or~~* *(c) If no development setback has been adopted, within 32 metres of a watercourse measured from the edge of the a watercourse.* *~~Excluding the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.~~* *i. Western Cape* *i. Outside urban areas:* *(dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority.*	The proposed project will see to the expansion of several culverts where the widening of the road will be required. It is expected that the widening activities will be larger than 10 square metres collectively. Although no environmental management framework has been adopted by the Local municipality. The area associated with the Olifantsrivier has been identified as a sensitive area as part of the Municipalty's Spatial Development Framework.
Activity No(s):	Provide the relevant **Scoping and EIR Activity(ies)** as set out in **Listing Notice 2**	Describe the portion of the proposed development to which the applicable listed activity relates.
None	None	None

Therefore, in summary, the following activities will be applied for:

- Listing Notice 1: Activity No: 19 and 56;
- Listing Notice 2: None; and
- Listing Notice 3: Activity No: 12, 18 and 23.

Other Applicable Legislation

The *Proponent* is responsible for ensuring that all contractors, labourers and any other appointed person/entity acting on their behalf, remain compliant with the conditions of the received authorisations, as well as the provisions of all other applicable legislation, including *inter alia*:

- National Environmental Management Act (NEMA) (Act No 107 of 1998, as amended);
- National Environmental Management Biodiversity Act (Act 10 of 2004);
- National Environmental Management: Waste Act (Act 59 of 2008);
- National Water Act (Act 36 of 1998)
  - The National Water Act (Act 36 of 1998) provides the framework for the sustainable management of South Africa's water resources. It aims to protect, use, develop, conserve, manage and control water resources as a whole, promoting integrated water resource management that involves participation of all stakeholders. The Act declares the national government to be the public trustee of the nation's water. The Act is administered by the national Department of Water Affairs (DWA) via regional offices.
    The proposed development activities **will trigger a General Authorisation** (in terms of Section 21(c) and (i) water uses).
- National Heritage Resources Act (Act No 25 of 1999);
- Occupational Health and Safety Act (Act 85 of 1993);
- National Veld and Forest Fire Act (Act No. 101 of 1998).

The above listed legislation has general applicability to most development applications, and it is the responsibility of the *Proponent* to ensure that all contractors and employees are aware of their obligations in terms of these Acts. This EMPr does not detract from any other legal requirements.

APPENDIX E - ROLES & RESPONSIBILITIES

ROLES & RESPONSIBILITIES

Duties and Responsibilities of the Holder

The Holder is ultimately responsible for ensuring that the environmental management measures specified in this EMPr, as well as any other conditions specified by the competent authority, are implemented and adhered to during the construction and operational phase (maintenance activities) of the proposed development.

The Holder or delegated party is responsible for monitoring and maintenance during the operational phase. The Holder must ensure that all appointed service providers, contractors and maintenance workers are capable of complying with all statutory requirements of this EMPr and the conditions of the Environmental Authorisation. The Holder is responsible for ensuring that this EMPr and the conditions of the Environmental Authorisation are implemented and adhered to during construction.

The Holder or appointed consultant is responsible for identifying emergency situations that may arise during operational and maintenance activities and must formulate appropriate emergency response procedures for these emergency scenarios.

Duties and Responsibilities of the Contractor

The "Construction Contractor" is the entity responsible for undertaking the physical construction of the residential development. The construction contractor is responsible for ensuring that all environmental management measures specified in this EMPr and in the EA are implemented during the pre-construction, construction and post-construction rehabilitation phases, unless agreed otherwise with the Holder. The contractor will be responsible for all costs incurred, in relation to any non-compliances which may occur during implementation of construction activities/rehabilitation activities. The contractor must therefore make adequate financial provision for the implementation of all prescribed measures, in accordance with the Bill of Quantities and the EMPr.

It is strongly recommended that the Construction Contractor appoint an Environmental Site Officer (ESO), who will act as the Contractor's representative to enforce compliance with the conditions of this EMPr, throughout all phases of construction.

In addition to the above, the Construction Contractor is responsible for the following:

- Identify emergency situations that may arise as a result of construction activities and formulate appropriate emergency response procedures.
- Ensure that all construction workers, including sub-consultants and service providers, undergo environmental awareness training prior to commencing work on site, or as soon as possible thereafter.
- Compile the required method statements, which must be to the satisfaction of the ECO, before commencing with the activity to be governed by the method statement.
- Respond to concerns or issues identified by the ECO, as relates to environmental management, and implement the appropriate management or remediation measures, at the Contractor's own expense (unless agreed otherwise).
- Any damage to the surrounding environment (site camp location and outskirts of working corridor) must be noted by the contractor with photo evidence. Any damage identified throughout the operational phase of the proposed extension will be the contractor's responsibility to repair.
- Should third parties be called to the site to perform clean up and rehabilitation procedures, the Construction Contractor will be responsible for all associated costs.

Note that failure to comply with the requirements and conditions of this EMPr and the Environmental Authorisation may result in fines or other penalties being levied against the Construction Contractor by the Competent Authority.

Duties And Responsibilities of the ECO

The appointed ECO is responsible for undertaking regular site visits to monitor and report on the implementation of the EMPr and adherence to the conditions of the Environmental Authorisation during the pre-construction, construction and post-construction rehabilitation phases. The ECO is not required to monitor the site during the operational (maintenance) phase of the development.

- Competency of the ECO

The ECO must be independent of the Environmental Auditor, Holder, Engineer, Construction Contractor and their service providers. The appointed ECO must be suitably qualified and experienced and must be able to demonstrate that he / she is of sufficient competency to undertake the required task. The ECO must preferably be a resident in close proximity to the development area to ensure quick response if required. The ECO must work in close co-operation with the Construction Contractor, resident engineer or EO (where applicable) and all contractors in order to identify potential problems before they occur, and provide suitable guidance as to how the identified problems (environmental impacts) can be avoided.

- Duties of the ECO

The duties of the ECO include, but are not limited to:

- Conduct a pre-construction site inspection to ascertain the pre-commencement condition of the site (i.e. the status quo);
- Conduct environmental awareness training, which must include;
  - A brief description of the surrounding environment
  - Importance of the EMPr
  - Roles and responsibilities
  - Identified environmental risks
  - Mitigation measures to be implemented
  - No-go areas
  - Emergency procedures (Hydrocarbon spill)
- Undertake regular site visits to monitor compliance with all mitigation, monitoring and management measures contained in the EMPr and the Environmental Authorisation, during the pre-construction, construction and rehabilitation phases of the development;
- Evaluate the achievement of the performance indicators associated with each impact management objective specified in this EMPr;
- Liaise with site contractors, engineers and other members of the development team with regard to the requirements of the EMPr;
- Provide guidance as and when required regarding the implementation of the environmental management measures contained in the EMPr and EA, so as to assist the Holder and contractor in remaining compliant with these measures;
- Assist in finding environmentally acceptable solutions to construction problems;
- Ensure that the working areas, site camp facilities, access roads and no-go areas are properly demarcated;
- Ensure that proper topsoil management practices are adhered to on site;
- Ensure that proper waste management & pollution prevention strategies are practised on site;
- Examine method statements, where required;
- Recommend additional environmental protection measures, should this be necessary;

- Furnish contractors with verbal warnings in case of contravention of the EMPr;
- Recommend that the competent authority furnish errant contractors with predetermined fines, when verbal and / or written warnings are ignored;
- Ensure satisfactory rehabilitation of disturbed areas on site, after construction is complete;
- Keep detailed records of all site activities that may pertain to the environment, and produce **monthly** compliance-monitoring reports (ECO Reports) for submission to the Holder, and the Competent Authority at regular intervals during the construction phase;
- Submit a final post-construction inspection report, within 6 months of completion of the construction phase. The audit report must detail the rehabilitation measures undertaken, describe all major incidents or issues of non-compliance and any issues or aspects that require attention or follow-up.
- All ECO Reports and Inspection Reports must be submitted to the Holder and Competent Authority.

- Frequency of ECO visits

The ECO must conduct **weekly** site visits during the construction phase, in addition to the start-up and closure inspections.

The ECO must conduct quarterly site visits for a period of 24 months following the completion of the construction phase of the proposed project, so as to ensure all implemented rehabilitation works are successful.

The ECO has the discretion to undertake additional visits if he / she feels this is justified due to the actions of the contractors, and to make *ad hoc* visits in order to ensure compliance.

- Authority of the ECO

The ECO has the authority to recommend to the decision-making authorities that they suspend all works (or part thereof) occurring on site, should any action being undertaken on site not comply with the environmental requirements, and where such actions pose a serious threat to any element of the surrounding environment.

The ECO has the authority to issue instructions to the Construction Contractor and/or Holder, regarding measures that must be implemented on site in order to ensure compliance with the EMPr and Environmental Authorisation, and/or to prevent environmental degradation or pollution from occurring.

The ECO has the authority to issue verbal and written warnings to contractors. Should verbal and written instructions and/or warnings be ignored, the ECO has the authority to request the Competent Authority to issue pre-determined fines or other penalties.

The ECO has the authority to report incidents of non-compliance to the Competent Authority at any time.

Duties and Responsibilities of the Environmental Auditor

In accordance with the requirements of the Environmental Impact Assessment Regulations, 2014 (as amended), the Holder of the Environmental Authorisation must, for the period that the Environmental Authorisation is valid, appoint a suitably qualified independent person to conduct an environmental audit to audit compliance with the conditions of the Environmental Authorisation and the EMPr.

The Holder is responsible for appointing, managing and remunerating the appointed auditor. The auditor may **not** be the appointed ECO.

The appointed auditor is to be provided with the completed EMR's and Checklists, as well as any other crucial information that may be relevant or requested (incident report, waybills etc) in order to effectively report on the level of compliance with the conditions of the environmental authorisation and the EMPr. The appointed auditor must undertake environmental audits at the following stages;

- Every 6 months following the commencement date of the construction works.
- At practical completion of the construction period.
- Quarterly, for a period of 12 months following the practical completion of the construction period.
- Once a year, for the following 2 years after practical completion of the construction period.
- Or according to the frequency specified in the Environmental Authorisation.

Following each audit, the environmental auditor must submit an audit report to the Competent Authority (in this instance the DEA&DP).

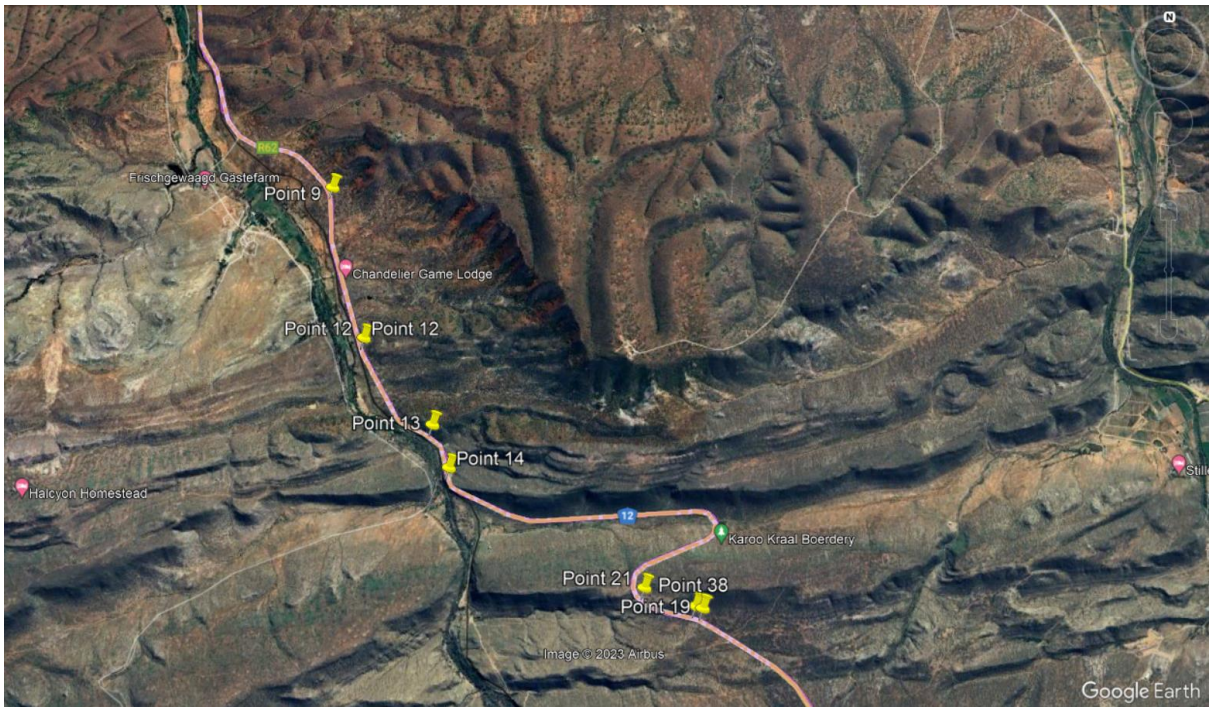
- Environmental auditing and environmental audit reports must adhere to the requirements of the amended 2014 Environmental Impact Assessment Regulations, in particular Section 34 (*Auditing of Compliance with Environmental Authorisation, Environmental Management Programme*) and Appendix 7 (*Objective and Content of Environmental Audit Report*)
- The audit report must provide verifiable findings on the level of compliance with the provisions/ conditions of the Environmental Authorisation and the EMPr and must also comment on the ability of the measures contained in this EMPr to sufficiently avoid, manage and mitigate environmental impacts.
- Where the findings of the audit report indicate that the impact management measures stated in the EMPr are insufficient to adequately address environmental impacts, recommendations as to how the EMPr must be amended so as to address the identified shortcomings must be made and submitted to the competent authority together with the audit report.

APPENDIX F – PALAEONTOLOGICAL SCHEDULE

Palaeontological Monitoring Schedule

This document has been prepared in collaboration with the Elize Butler (the appointed Palaeontological Specialist) and Jayson Orton (the appointed Heritage Specialist) for the purpose of inclusion into the Environmental Management Programme submitted as part of the Environmental Authorisation process.

During the site visit conducted by the Palaeontological specialist, a number of fossils were identified within the proposed project area. As per the image below, five (5) fossil specimens were found.



Following the conclusion of the Section 38 process in terms of the National Heritage Resources Act (Act 25 of 1999), Heritage Western Cape (HWC) provided their final comments on the proposed project. As part of the final comments provided, the following was requested:

"*Palaeontological monitoring must also take place during expansion of the road cuttings. A suitableschedule for inspections must be agreed upon between the palaeontologist and contractor*"

For the purpose of relieving the future planning constraints, the schedule has been compiled and included as part of the Environmental Management Programme compiled for the proposed development. This allows the Contractor to provide a quotation accurately reflecting the requirements of the required schedule.

This appendix aims to provide detailed breakdown of the palaeontological schedule requirements of the proposed project and has been subdivided into three (3) phases:

1. Workplan acquisition
2. Pre-construction site inspection and fossil recovery
3. Construction related monitoring

A Palaeontological specialist must be appointed to oversee <u>all</u> phases of this schedule.

Phase 1: Workplan approval
In terms of Section 35(4)(b) of the NHRA (Act 25 of 1999), *No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite.* As this project is under Section 38 of the NHRA, no permit is required from Heritage Western Cape but an approved Workplan for the retrieval of the fossiliferous material located within the proposed project footprint must be in place before work commences.

A Workplan Application is to be submitted to the HWC for approval in terms of activities listed in Section 34 of the NHRA (Act 25 of 1999). Approximately 20 days are required for the processing of the Workplan application with Heritage Western Cape. As part of the application process, a suitable natural history museum / University must be identified and the capability of the establishment to accept additional specimens must be confirmed. During this confirmation, the findings of the Palaeontological Impact Assessment (PIA) must be communicated to the establishment.

Phase 2: Pre-construction site inspection and fossil recovery
Once the workplan application has been processed and the approval has been granted by the relevant authority, the following fossil retrieval proceedings must be implemented prior to the commencement of the construction phase of the proposed project.

a) The initial fossil retrieval exercise must be conducted prior to the commencement of the construction activities.
b) Pre-Construction fossil retrieval may be done under either one of the following conditions, as agreed upon between the appointed specialist and the Contractor:
    i. Phased – This approach sees that the fossil removal procedure occurs in a phased manner based on the progress of the taskforce along the construction area.
    ii. Once-off – This approach sees that all fossils that have been identified in the PIA are collected and delivered to the pre-identified museum / university simultaneously. This would be the preferred method.
c) The Contractor's Environmental Site Officer (ESO) and the appointed Environmental Control Officer (ECO) must be present and trained in identifying fossils on site.
d) All collected fossils must be accessioned at the pre-identified museum / university.

Phase 3: Construction related monitoring
When working in the areas where there is a high likelihood of fossil finds (the areas where fossils have already been identified as indicated in the figure above), the following procedures must be followed:

a) The Palaeontological specialist must be contacted in advance and informed of the pending work schedule in the sensitive areas.
b) No work earthwork (ground moving activities, blasting [if necessary], or cut) activities may be executed without the supervision of the ESO on site.
    i. Prior to the commencement of earthworks in a particular sensitive area, the ESO is to survey the terrain in order to confirm the absence of fossils, and extract fossils if observed. All procedures/work methodologies followed to extract the uncovered fossils must done in accordance with the training received from the specialist and all steps of the extraction process must be recorded (either by photographic images, indicating time stamps, or through video evidence for review by the specialist);
    ii. Upon completion of an initial cut, spot checks must be done in accordance with point (e) below (Therefore, the outcrop and the spoil material must be inspected).
    iii. Should fossiliferous materials be observed, extraction of the observed fossils must be completed, and all cuts must be inspected as required, with the ESO present on site until the monitoring frequency can be decreased.

iv. The ESO is to report to the ECO and the appointed palaeontological specialist should any fossils be observed on site and reporting is to be completed in accordance with the monitoring report requirements stipulated below.
v. The Palaeontological specialist must do bi-monthly site visits to verify the finds of the ESO, collect and distribute the fossils to the pre-identified institution.

c) The earth-work monitoring may be reduced at the discretion of the palaeontological specialist based on the site conditions.
d) During the earthmoving activities the ESO must observe and inspect the following:
   i. Any temporarily exposed outcrops; and
   ii. Spoil heaps (stockpiles of raw excavated materials).
e) Should a fossil be uncovered during earthmoving activities, earth-moving activities in the area are to cease, the specialist is to collect the material and lodge it at the pre-identified museum / university. Based on the type of fossils observed during the PIA, it is anticipated that that the fossil recovery process will be quick and should not cause significant project delays. Avoiding or minimizing project delays can be achieved by diverting earthwork operations to other areas of the project while fossil recovery work is under way.

During the construction phase of the project, the Chance of Fossil Find Protocol as presented in the EMPr and in the PIA must be implemented. Upon discovery of a fossil at any time during the construction phase construction works in that particular area must halt until such a time that the specimen has been removed.

Additional notes:

a) Safety related concerns

- Safety procedures to be followed by the palaeontological specialist / ESO must include the following:
  - Wearing appropriate Personal Protective Equipment (e.g., high-visibility safety vests, hard hats, steel-toed boots).
  - Large handheld orange flags mounted on poles must be visible for above ground personnel at all times while surveying an excavation.
  - Securing equipment operators' attention before entering an active cut.
  - Notifying grading personnel before beginning a salvage excavation.
  - Marking fossil discovery sites with surveyor's flagging.
  - The palaeontologist must be accompanied by either the foreperson or the site's safety manager at all times.

b) After retrieval fossil care (prior to museum/university donation)

- Once the fossils have been collected by the palaeontological specialist, the fossils are to be transferred to the pre-identified institution, where they will be prepared and curated.
- Fossil preparation may be conducted at the laboratory of the appointed specialist or the pre-identified museum/university and must be done according to the standards of the recipient of the fossiliferous materials.

c) Monitoring report requirements

- Following the conclusion of the activities of the construction phase, the palaeontological specialist is to compile a monitoring report to be submitted as an Appendix of the Close Out Site Report of the Environmental Control Officer and is to be submitted to Heritage Western Cape and to the Department of Environmental Affairs and Planning Development.
- This report is to contain the following information:
  - The credentials of the palaeontological specialist appointed to oversee the project.

  - The credentials of the Natural History Museum/University identified as the Receiver of the fossils.
  - The methodology followed during the fossil retrievals.
  - The locations, and date of the fossil retrievals, including a photograph and the species name of the specimens.
- The monitoring reports are not to be made public in any circumstances, if there is a necessity thereof, the co-ordinates of the finds must be redacted.

APPENDIX G - PROTOCOL FOR CHANCE FOSSIL FINDS

PROTOCOL FOR CHANCE FOSSIL FINDS

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

<table>
<tr><td>Province & region:</td><td>George, Western Cape</td></tr>
<tr><td>Responsible Heritage Resources Agency</td><td>HERITAGE WESTERN CAPE (Contact details: Protea Assurance Building, Green Market Square, Cape Town 8000. Private Bag X9067, Cape Town 8001. Tel: 086-142 142. Fax: 021-483 9842. Email: hwc@pgwc.gov.za)</td></tr>
<tr><td>ECO protocol</td><td>1. Once alerted to fossil occurrence(s): alert site foreman, stop work in area immediately (N.B. safety first!), safeguard site with security tape / fence / sand bags if necessary.</td></tr>
<tr><td colspan="2">2. Record key data while fossil remains are still in situ:
Accurate geographic location – describe and mark on site map / 1: 50 000 map / satellite image / aerial photo
Context – describe position of fossils within stratigraphy (rock layering), depth below surface
Photograph fossil(s) in situ with scale, from different angles, including images showing context (e.g. rock layering)</td></tr>
<tr><td>3. If feasible to leave fossils in situ:
Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation
Ensure fossil site remains safeguarded until clearance is given by the Heritage Resources Agency for work to resume</td><td>3. If not feasible to leave fossils in situ (emergency procedure only):
Carefully remove fossils, as far as possible still enclosed within the original sedimentary matrix (e.g. entire block of fossiliferous rock)
Photograph fossils against a plain, level background, with scale
Carefully wrap fossils in several layers of newspaper / tissue paper / plastic bags
Safeguard fossils together with locality and collection data (including collector and date) in a box in a safe place for examination by a palaeontologist
Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation</td></tr>
<tr><td colspan="2">4. If required by Heritage Resources Agency, ensure that a suitably-qualified specialist palaeontologist is appointed as soon as possible by the developer.</td></tr>
</table>

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.

iv 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 stabilized 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 stabilization.

vi If the find cannot be stabilized, **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.

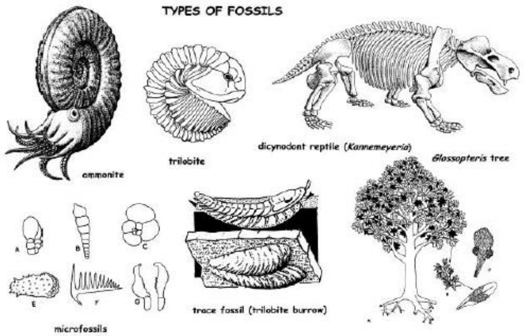
No work may continue in the vicinity of the find until HWC has indicated, in writing, that it is appropriate to proceed.

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:	

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 & Meteorites Committee June 2016

APPENDIX H - EMPR REVIEW AND AMENDMENT REGISTER

EMPR REVIEW AND AMENDMENT REGISTER

Review Date	Description of Review and/or Amendment	Signature

APPENDIX I - ALIEN INVASIVE MANAGEMENT PROGRAMME

ALIEN INVASIVE MANAGEMENT PROGRAMME

Invasive alien plants have a significant negative impact on the environment by causing direct habitat destruction, increasing the risk and intensity of wildfires, and reducing surface and sub-surface water. Landowners are under legal obligation to control alien plants occurring on their properties. Alien Invasive Plants require removal according to the Conservation of Agricultural Resources Act 43 of 1983 (CARA) and the National Environmental Management: Biodiversity Act (10 of 2004; NEMBA): Alien and Invasive Species Lists (GN R598 and GN R599 of 2014).

Category 1a and 1b listed invasive species must be controlled and eradicated. Category 2 plants may only be grown if a permit is obtained, and the property owner ensures that the invasive species do not spread beyond his or her property. The growing of Category 3 species is subject to various exemptions and prohibitions. Some invasive plants are categorised differently in different provinces. For example: the Spanish Broom plant is categorised as a category 1b (harmful) invasive plant in Eastern Cape and Western Cape, but it is a category 3 (less harmful) invasive plant in the other seven provinces.

Alien control programmes are long-term management projects and a clearing plan, which includes follow up actions for rehabilitation of the cleared area, is essential. This will save time, money and significant effort. Collective management and planning with neighbours allow for more cost-effective clearing and maintenance considering aliens seeds as easily dispersed across boundaries by wind or water courses. All clearing actions should be monitored and documented to keep track of which areas are due for follow-up clearing. A general rule of thumb is to first target lightly infested areas before tackling densely invaded areas and prioritize sensitive areas such as riverbanks and wetlands. Alien grasses are among the worst invaders in lowland ecosystems adjacent to farms but are often the most difficult to detect and control.

Several exotic invasive and other weed species were noted within the site, ranging from a few scattered individuals to dense infestations, in particular Black Wattle, Blackwood & Port Jackson Willow trees are common and abundant. The dense localised infestations of these tree species have a noticeable and definite impact to the habitat present and are a significant source of degradation. A weed management programme, as part of the construction contract including an after-care period will be required, until such time as natural vegetation has become adequately re-established. A two year after-care period is recommended.

Alien species recorded include:

- *Ricinus communis* (castor-oil plant, NEMBA category 2)
- *Prosopis glandulosa* (honey mesquite, NEMBA category 1b)
- *Schinus molle* (pepper tree)
- *Opuntia ficus-indica* (prickly pear, NEMBA 1b)
- *Trichocereus cf spachianus* (torch cactus); and
- *Nicotiana glauca* (wild tobacco, NEMBA Category 1b).

As indicated above, four of these are Category 1b and 2 invaders. In terms of the National Environmental Management: Biodiversity Act (NEMBA) (Act 10 of 2004) Alien and Invasive Species List (2016), category 1b invasive species require compulsory control as part of an invasive species control programme. Also, the harbouring of category 2 species, such as *Ricinus communis*, is prohibited without a permit. The presence of these species is not problematic yet but requires attention to curb future problems.

Invasive alien and weed species within the demarcated working corridor must be removed in accordance with the regulations contained in the National Environmental Management: Biodiversity

Act (NEM:BA, Act 10 of 2004), the Invasive Species Regulations (October 2014), the Conservation of Agricultural Resources Act (CARA, Act 43 of 1983) and the Duty of Care principle contained in NEMA, Section 28. Removal of species should take place throughout the construction, operational, and maintenance phases, in accordance with the following:

- In consultation with the ECO, the Contractor must control the establishment of alien invasive species along the working corridor on an ongoing basis during construction and follow-up clearance to be conducted for a 2-year period.
- The Contractor is responsible for the removal of alien species within all areas disturbed during construction activities. Disturbed areas include (but are not limited to) access roads, construction camps, site areas and temporary storage areas.
- In consultation with relevant authorities, the Engineer may order the removal of alien plants (when necessary) within the confines of the site are to be included.
- In consultation with the ECO, any alien vegetation (including brushwood and seed-bearing material) that is cleared must be disposed of at an appropriately registered waste disposal facility.
- Removal of alien vegetation are to be done according to the Working for Water Guidelines.
- The following control measures may be used to ensure that the introduction and spread of alien invasive vegetation is minimised:
    - Seedlings and saplings can be removed through hand pulling and hoeing, treated with herbicide through a foliar spray or basal stem treatments.
    - Mature trees can be felled or ring barked or treated with herbicide by means of frilling or cut stump treatment.
    - Herbicide should not be applied in wet or windy conditions.
- Care should be taken with the choice of herbicide to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicide used;
- Footprint areas should be kept as small as possible when removing alien plant species; and
- No vehicles should be allowed to drive through designated sensitive watercourse areas during the eradication of alien and weed species.
- After clearing is completed, an appropriate cover crop may be applied as provided in Rehabilitation Programme, should natural re-establishment of indigenous vegetation not take place in a timely manner.

APPENDIX J - GENERAL SEARCH AND RESCUE PROGRAMME

SEARCH AND RESCUE PROGRAMME

The Search and Rescue Programme must be undertaken by an appropriately qualified specialist (e.g. botanist). The appointed specialist, in consultation with the ECO, must develop a detailed search and rescue plan during the design phase of the proposed development. This plan must be implemented prior to the commencement of any pre-construction clearance and site establishment activities.

This Section of the EMPr provides guidance for the Search and Rescue Plan which is to be compiled by the appointed specialist for search and rescue, in consultation with the ECO. On completion of the Search and Rescue Plan, it must be appended to this EMPr.

9. Objective of Search and Rescue

The overall objective of Search and Rescue programmes is to identify, remove, and where possible, rescue or relocate indigenous flora species of concern (threatened, protected or conservation worthy) to mitigate the development's impact on terrestrial biodiversity.

According to the findings of the Terrestrial Biodiversity and plant species specialist three plant species of conservation concern (SCCs) was identified on site. The following species were identified on site:

- *Euphorbia colliculina*
- *Antimima piscodora*
- *Glottiphyllum linguiforme*

Should impact on these plant species not be able to be avoided, as a result of the construction activities, the appropriate permitting (in terms of CapeNature' Requirements, and search and rescue operation must be undertaken.

10. Compilation of the Search and Rescue Plan

A suitably qualified specialist is to be appointed to compile the Search and Rescue Plan based on the viability of indigenous, salvageable, good quality vegetation at the time of rescue. The specialist must ensure that the Search and Rescue Plan include the following as a minimum:

- Details on the salvageable plant material, including the species names and approximate quantities that can be salvaged,
- Detailed methodology for safe removal, transportation, and delivery of each species, if applicable.
- Confirm the location of the temporary storage of transplanted material, to be maintained, until the re-establishment on site.
- Details of maintenance activities.
- The stripping and stockpiling of topsoil containing indigenous seed banks should form part of the Search and Rescue operations and should lay the groundwork for rehabilitation activities as provided in the Rehabilitation Programme (Appendix M of this EMPr).
    - Topsoil and seed salvaging must be avoided from previously heavy alien infested areas.
    - Seed-bearing plant material can also be collected for placement on previously disturbed areas to be rehabilitated.
- Where necessary, the specialist must compile permit applications in terms of Section 62 and 71 of the Nature Conservation Ordinance (19 of 1974, as amended 2000), for the search and rescue (removal) of protected plant species listed in Schedules 3 or 4, and issue these applications to CapeNature for approval, prior to the implementation of the Search and Rescue Plan.
- This plan must be issued to DEA&DP for approval and once approved, it must be appended to this EMPr for implementation on site.

11. Implementation of Search and Rescue

No clearance of vegetation may occur until the Search and Rescue Plan, as approved by DEA&DP and appended to this EMPr, is implemented and removal activities have concluded, for the relevant construction phase. Areas which have not been searched and rescued (as confirmed by the specialist/ECO), must be considered temporary no-go areas, until this activity is completed. Prior to the commencement of any land-clearing or construction activities, the following steps must be taken by the appointed specialist (as a bare minimum):

- The area to be cleared of vegetation is to be surveyed prior to search and rescue (by the ECO and Specialist), this is to confirm the quantity and type of vegetation to be removed and record this information (for the intended phase). This must take into account all areas intended to be utilized at that point in time (ie: for permanent structures, hardened surfaces, and temporary site camp, etc.)
- Prior to the implementation of the Search and Rescue Plan for the specific phase, the specialist must identify whether any of the indigenous plant species identified to be salvaged are listed as endangered or protected species in Schedule 3 or Schedule 4 of the Nature Conservation Ordinance (19 of 1974, as amended 2000).
- Transplant rescued plant material into temporary storage area and maintain until re-establishment is necessary.
- The appointed specialist is to confirm that conditions are ideal for removal of plant material (ie. soil is moist, etc.) and inform the contractor of when this activity will be undertaken.
- If the appointed specialist intends to utilise the contractors labour to remove the plant material, the specialist is to ensure that they are made aware of what vegetation is intended to be removed, and what the recommended and correct methodology is to be followed for removal.
- The appointed specialist is to conduct the search and rescue and monitor the labour during implementation.
- **Written confirmation from the Specialist/ECO must be issued to the Contractor and construction team (ie. engineers and applicant), notifying them that all search and rescue for the intended phase has been fulfilled. Therefore, the Contractor may proceed with demarcation and construction activities.**

APPENDIX K - REHABILITATION PROGRAMME

REHABILITATION PROGRAMME

1. Rehabilitation Objective

The overall objective of the rehabilitation plan is to minimize adverse environmental impacts associated with the activity whilst maximizing the future utilization of the site. Significant aspects to be borne in mind in this regard is, revegetation of undeveloped footprint and stability and environmental risk. The depression and immediate area of the working area must also be free of alien vegetation. Additional broad rehabilitation strategies / objectives include the following:

- Rehabilitating the worked-out areas to take place concurrently within prescribed framework established in the EMPr.
- All infrastructure, equipment, plant and other items used during the construction period will be removed from the site.
- Waste material of any description, including scrap, rubble and tyres, will be removed entirely from the site and disposed of at a recognised landfill facility. It will not be permitted to be buried or burned on site.
- Final rehabilitation shall be completed within a period specified by the Regional Manager.
- Final landscaping and rehabilitation of the site must be done to the satisfaction of the ECO and must adhere to all conditions/ requirements of the Environmental Authorisation.

2. Topsoil and Subsoil Replacement

Topsoil and subsoil will be stripped and stockpiled separately and only used in rehabilitation work towards the end of the operation. This is in contract to the gravel activity where rehabilitation and topsoil replacement was earmarked at the completion of each phase.

Stripped overburden will be backfilled into the worked-out areas where needed. Stripped topsoil will be spread over the re-profiled areas to an adequate depth to encourage plant regrowth. The vegetative cover will be stripped with the thin topsoil layer to provide organic matter to the relayed material and to ensure that the seed store contained in the topsoil is not diminished. Reseeding may be required should the stockpiles stand for too long and be considered barren from a seed bank point of view. Stockpiles should ideally be stored for no longer than a year.

The topsoil and overburden will be keyed into the reprofiled surfaces to ensure that they are not eroded or washed away. The topsoiled surface will be left fairly rough to enhance seedling establishment, reduce water runoff and increase infiltration.

3. Revegetation

All prepared surfaces will be seeded with suitable grass species to provide an initial ground cover and stabilize the soil surface. The following grass seed that is commonly available and suitable.

The overall revegetation plan will, therefore, be as follows:

- Ameliorate the aesthetic impact of the site
- Stabilise disturbed soil and rock faces
- Minimize surface erosion and consequent siltation of natural water course located on site
- Control wind-blown dust problems
- Enhance the physical properties of the soil
- Re-establish nutrient cycling
- Re-establish a stable ecological system

- Control alien and invasive vegetation

Every effort must be made to avoid unnecessary disturbance of the natural vegetation during operations.

4. Visual Impacts Amelioration

The overall visual impact of the proposed activities will be minimised by the following mitigating measures:

- Confining the footprint to an area as small as possible.
- Re-topsoiling and vegetating all disturbed areas.

5. Monitoring and Reporting

Adequate management, maintenance and monitoring of rehabilitation success will be carried out annually for at least 2 years by the EA Holder to ensure successful rehabilitation of the property until a closure certificate is obtained.

To minimise adverse environmental impacts associated with operations it is intended to adopt a progressive rehabilitation programme, which will entail carrying out the proposed rehabilitation procedures concurrently with activity.

APPENDIX N: ENVIRONMENTAL AWARENESS BOOKLET