Proposed Coega Gas-to-Power: Gas Infrastructure

Final Environmental Management Programme

Report Prepared for

Coega Development Corporation

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April 2021

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Profile and Expertise of EAPs

SRK Consulting (South Africa) Pty Ltd (SRK) has been appointed by Coega Development Corporation (CDC) to undertake the Environmental Impact Assessment (EIA) process required in terms of the National Environmental Management Act 107 of 1998 (NEMA).

SRK Consulting was established in 1974 and comprises over 1 400 professional staff worldwide, offering wide-ranging expertise in the natural resources and environmental sectors. SRK's Port Elizabeth environmental department has a proven track record of managing large, complex environmental and engineering projects in the Eastern Cape, Africa and internationally. SRK has rigorous quality assurance standards and is ISO 9001 certified.

As required by NEMA, the qualifications and experience of the key independent Environmental Assessment Practitioners (EAPs) undertaking the EIA are detailed below and Curriculum Vitae provided in Appendix A.

Project Reviewer: Christopher Dalgliesh, BBusSc (Hons); MPhil (EnvSci)
Registered EAP No. 2019/413
Chris Dalgliesh is a Director and head of SRK's Environmental Department in Cape Town. He has more than 33 years environmental consulting experience covering a broad range of projects, including EIA and ESIA (EMPR), environmental and social due diligence, socio-economic impact assessments, stakeholder engagement, strategic environment assessments and management plans, state of environment reporting, environmental management frameworks, site safety reports for the nuclear industry, natural resource management and waste management

Project Manager: Nicola Rump, MSc, EAPSA
Nicola Rump is a Principal Environmental Scientist in SRK's Port Elizabeth office and has been involved in environmental management for the past 12 years working on South African and international projects including EIAs and ISO 14001 auditing for a variety of activities. Her experience includes Basic Assessments, Environmental Impact Assessments, Environmental Management Plans, Environmental Auditing and Stakeholder Engagement. Nicola is the Environmental Assessment Practitioner for this Environmental Impact Assessment process.

Project Consultant: Abby van Nierop, BSc Hons
Abby van Nierop is an Environmental Scientist in the Port Elizabeth office. Abby has been involved in environmental management for the past 7 years. Her expertise includes assistance with Environmental Impact Assessments (EIAs), Basic Assessments, Environmental Management Programmes (EMPrs), Water Use Applications (WUAs), environmental compliance auditing compliance auditing and as a Public Participation Co-ordinator.

Statement of SRK Independence

Neither SRK nor any of the authors of this Report have any material present or contingent interest in the outcome of this Report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of SRK.

SRK has no beneficial interest in the outcome of the assessment which is capable of affecting its independence.

Disclaimer

The opinions expressed in this report have been based on the information supplied to SRK by CDC. SRK has exercised all due care in reviewing the supplied information, but conclusions from the review are reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

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Acronyms and Abbreviations

CCGT	Combined Cycle Gas Turbine
CDC	Coega Development Corporation
DEA	Department of Environmental Affairs (National) (now DEFF)
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism
DEFF	Department of Environment, Forestry and Fisheries (National) (formerly DEA)
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
GHG	Greenhouse Gas Emissions
GN	Government Notice
LNG	Liquid Natural Gas
MW	Megawatt
NMBM	Nelson Mandela Bay Municipality
RMIPPPP	Risk Mitigation Independent Power Producer Procurement Programme
SAHRA	South African National Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANS	South African National Standards
SCC	Species of Conservation Concern
SEZ	Special Economic Zone
WML	Waste Management Licence
WUA	Water Use Authorisation

Glossary

Auto – refrigeration	The process in which LNG is kept at its boiling point, so that any added heat is countered by energy lost from boil off.
Base Load Power Plant	A power plant that provides a continuous supply of electricity and is only turned off during maintenance.
Baseline	Information gathered at the beginning of a study which describes the environment prior to development of a project and against which predicted changes (impacts) are measured.
Berth	Designated location in port/harbour for the mooring of vessels
Biodiversity	The diversity, or variety, of plants, animals and other living things in a particular area or region. It encompasses habitat diversity, species diversity and genetic diversity
Breakwater	Structures constructed on coasts as part of coastal defence or to protect an anchorage from the effects of both weather and longshore drift
Construction Phase	The stage of project development comprising site preparation as well as all construction activities associated with the development.
Cumulative Impacts	Direct and indirect impacts that act together with current or future potential impacts of other activities or proposed activities in the area/region that affect the same resources and/or receptors.
Environment	The external circumstances, conditions and objects that affect the existence and development of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.
Environmental Authorisation	Permission granted by the competent authority for the applicant to undertake listed activities in terms of the NEMA EIA Regulations, 2014.
Environmental Impact Assessment	A process of evaluating the environmental and socio-economic consequences of a proposed course of action or project.
Environmental Impact Assessment Report	The report produced to relay the information gathered and assessments undertaken during the Environmental Impact Assessment.
Environmental Management Programme	A description of the means (the environmental specification) to achieve environmental objectives and targets during all stages of a specific proposed activity.
Fauna	The collective animals of a given region.
Floating Storage Regasification Unit	Floating vessel that receives liquefied natural gas and converts this to its gaseous form on board.
Flora	The collective plants of a particular region, habitat or geological period.
Fossil	Rare objects that are preserved due to unusual circumstances.
Heritage Resources	Refers to something, e.g. a building, an area, a ritual, etc. that forms part of a community's cultural legacy or tradition and is passed down from preceding generations.
Hydrology	(The study of) surface water flow.
Impact	A change to the existing environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.
Integrated Environmental Management	The practice of incorporating environmental management into all stages of a project's life cycle, namely planning, design, implementation, management and review.
Jetty	A structure that projects from the land out into the water
Liquefaction	The process by which natural gas is converted into liquid natural gas
Liquid Natural Gas	Natural gas that has been converted to liquid form.

Mitigation measures	Design or management measures that are intended to avoid and / or minimise or enhance an impact, depending on the desired effect. These measures are ideally incorporated into a design at an early stage.
Natural Gas	A hydrocarbon gas that is usually obtained from underground sources, often in association with petroleum and coal deposits. Natural gas generally contains a high percentage of methane and inert gases.
Operational Phase	The stage of the works following the Construction Phase, during which the development will function or be used as anticipated in the Environmental Authorisation.
Particulate matter	Broad term used for fine particles found in the ambient atmosphere, including soil dust, dirt, soot, smoke, pollen, ashes, aerosols and liquid droplets.
Port	A location on a coast or shore containing one or more harbours where ships can dock and transfer people or cargo to or from land
Quay	A structure on the shore of a harbour where ships may dock to load and unload cargo. Includes one or more berths and may include piers, warehouses or other facilities necessary for handling the ships.
Regasification	The process by which LNG is heated, converting it into its gaseous state.
Sustainable development	Sustainable development is generally defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. NEMA defines sustainable development as the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.
Terminal	The set of facilities at a port where loading and unloading of cargo/container takes place. Terminals are named on the basis of the type of cargo that can be handled by them. Some of the most common types of terminals are container terminal, bulk cargo terminal, LNG terminal
Ullage	The empty space in large tanks used to store liquids.
Waterbody	A body of water forming a physiographical feature, for example the sea.
Watercourse	A natural freshwater feature, including pans.

1 Introduction

1.1 Background

The Coega Development Corporation (CDC) proposes to develop a gas to power project, including three power plants and associated infrastructure, within the Coega Special Economic Zone (SEZ) (see Figure 1-1 and Figure 1-3) and have appointed SRK Consulting (South Africa) (Pty) Ltd (SRK) to conduct an Environmental Impact Assessment (EIA) in terms of the National Environmental Management Act (NEMA).

The overall project would broadly involve the following components:

- A Liquefied Natural Gas (LNG) terminal, consisting of a berth with off-loading arms within the Port of Ngqura, cryogenic pipelines, storage and handling facilities and re-gasification modules;
- Three Gas to Power plants, each with up to 1000 MW generation capacity (specific generation technologies may vary);
- Gas pipelines for the transmission, distribution and reticulation of natural gas within the Coega SEZ and Port of Ngqura; and
- Electricity transmission lines to evacuate electricity to the previously approved 400 kV lines in the SEZ, or via new 132 kV power lines to Dedisa substation.

The overall/ultimate proposed project will comprise of three power plants with power generation capacities of up to 1000 MW each. A total power generation capacity of up to 3000 MW will therefore be available once the full extent of the project has been developed (which may be spread over a number of phases in a modular fashion), the timing of which is unknown at this stage and is dependent on the CDC securing successful clients for the development of each component.

This Final Environmental Management Programme (EMPr) deals with the gas infrastructure components of the project, facilitating the supply of gas to the power plants, and gas and LNG to third party off-takers.

NEMA requires that an Environmental Management Programme (EMPr) be submitted along with the EIA Report to demonstrate how environmental management and mitigation measures will be implemented. The mitigation measures, which were identified during the Scoping and Environmental Impact Reporting process, apply to the following phases of the development process:

- The Design Phase: These measures relate to the detailed layout, planning and design of the gas infrastructure and will largely be implemented by the planning and development team prior to the commencement of any physical on site activities. These mitigation measures are presented in Section 2.
- The Construction Phase: These mitigation measures are applicable during site preparation and construction of the gas infrastructure and must be implemented by the relevant contractors and sub-contractors. These mitigation measures are presented in Section 3.
- The Operational Phase: These mitigation measures are applicable during the long-term operation of the gas infrastructure. These mitigation measures are presented in Section 4.
- The Decommissioning Phase: It should be noted that the Gas infrastructure would be decommissioned at the end of the contract period for provision of power. Decommissioning will also occur in stages and would trigger the need for separate Environmental Authorisations and a separate EMPr and are not explicitly addressed in this EMPr.

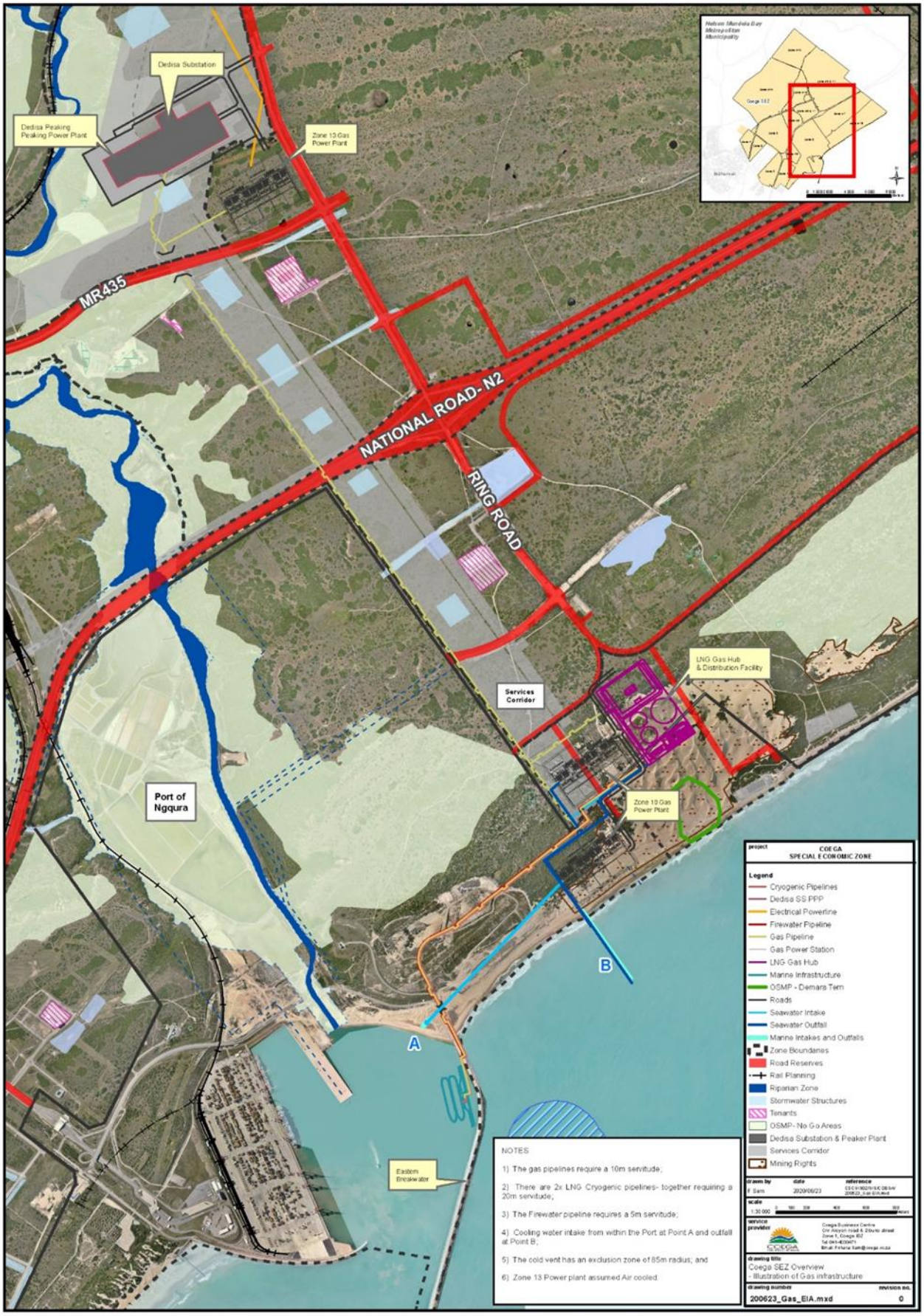


Figure 1-1: Map of the Coega SEZ showing the CDC gas to power project

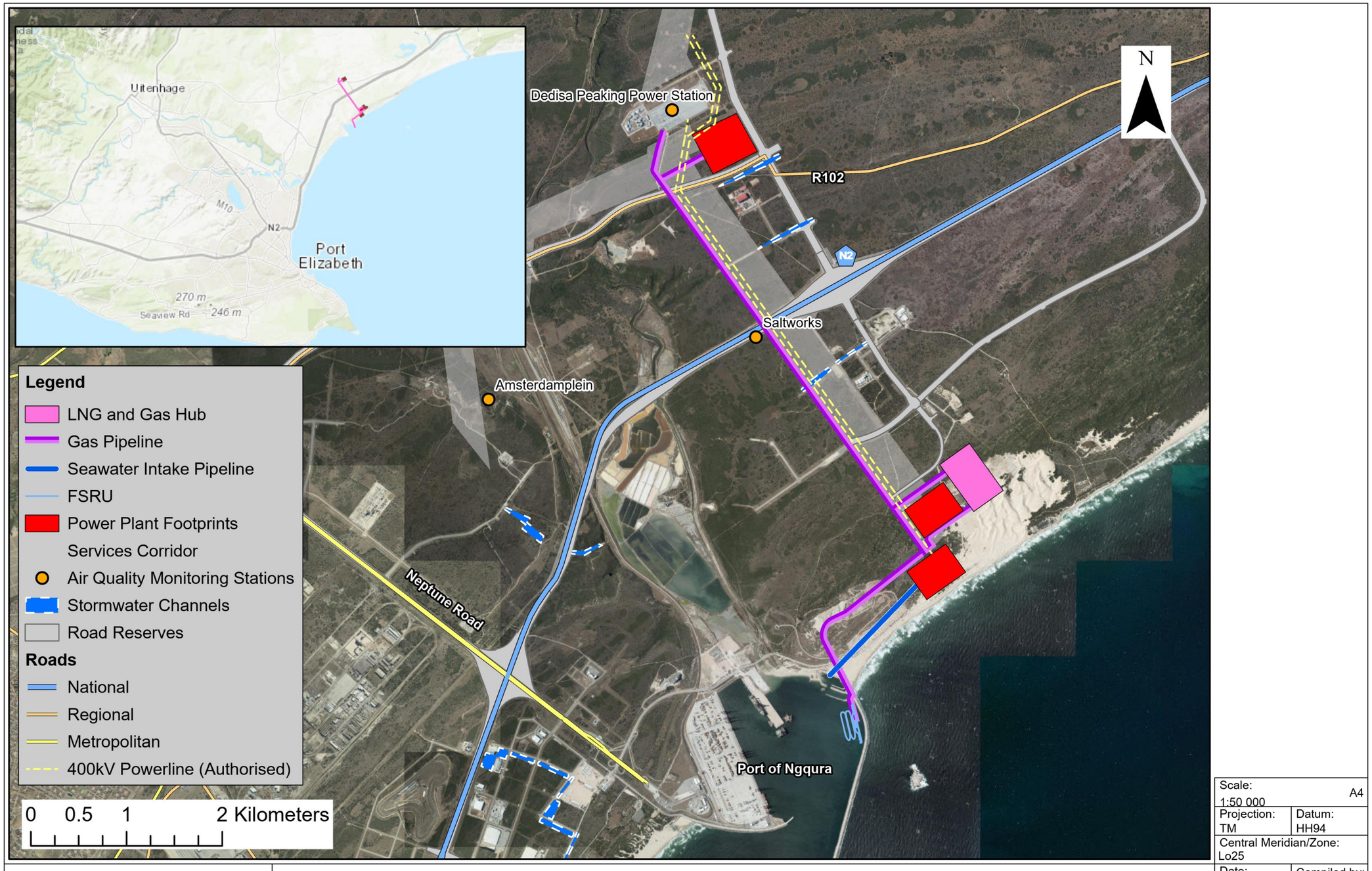
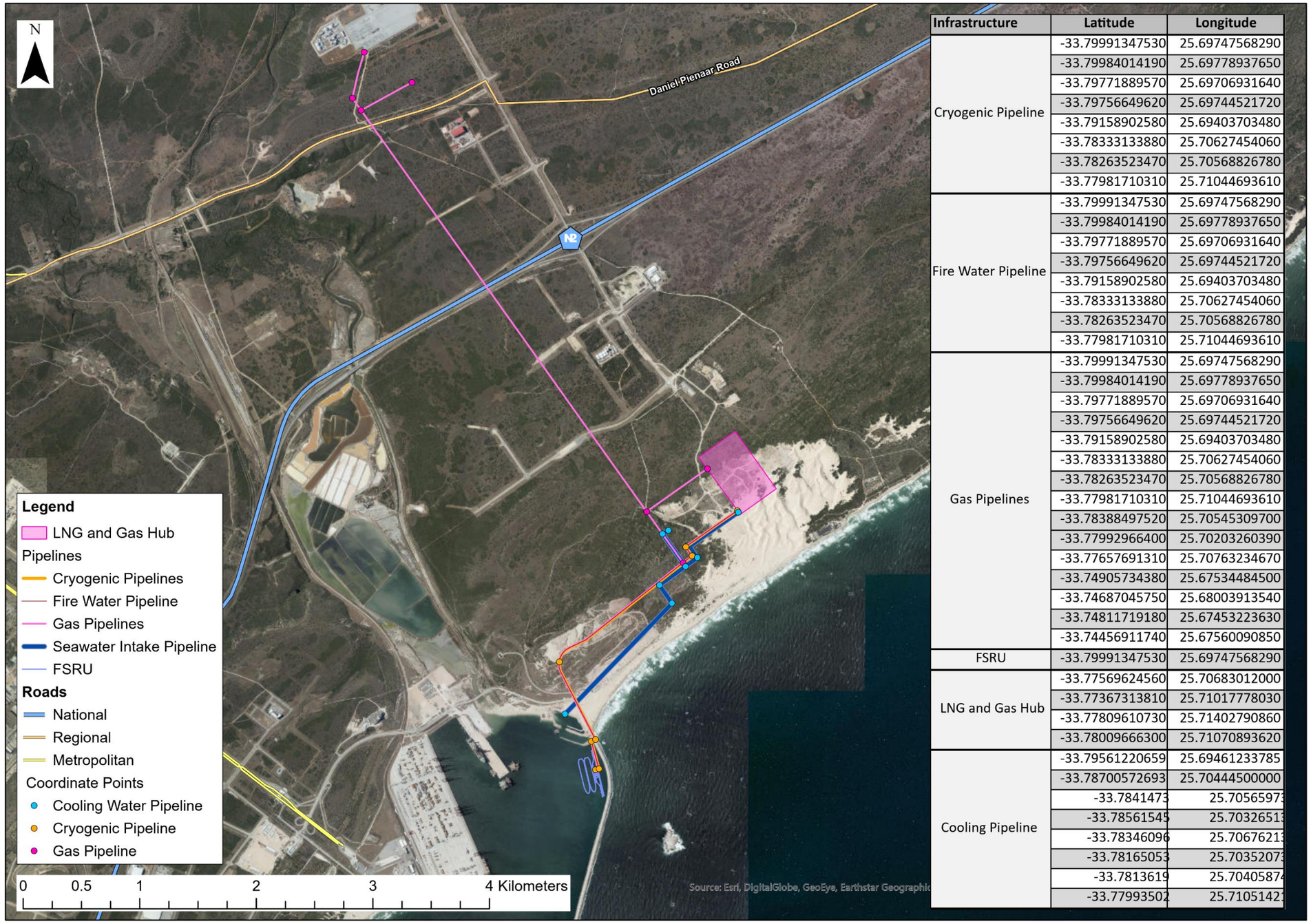


Figure 1-2: Map of the Coega SEZ showing the overall CDC Gas to Power Project



Infrastructure	Latitude	Longitude
Cryogenic Pipeline	-33.79991347530	25.69747568290
	-33.79984014190	25.69778937650
	-33.79771889570	25.69706931640
	-33.79756649620	25.69744521720
	-33.79158902580	25.69403703480
	-33.78333133880	25.70627454060
	-33.78263523470	25.70568826780
	-33.77981710310	25.71044693610
Fire Water Pipeline	-33.79991347530	25.69747568290
	-33.79984014190	25.69778937650
	-33.79771889570	25.69706931640
	-33.79756649620	25.69744521720
	-33.79158902580	25.69403703480
	-33.78333133880	25.70627454060
	-33.78263523470	25.70568826780
	-33.77981710310	25.71044693610
Gas Pipelines	-33.79991347530	25.69747568290
	-33.79984014190	25.69778937650
	-33.79771889570	25.69706931640
	-33.79756649620	25.69744521720
	-33.79158902580	25.69403703480
	-33.78333133880	25.70627454060
	-33.78263523470	25.70568826780
	-33.77981710310	25.71044693610
	-33.78388497520	25.70545309700
	-33.77992966400	25.70203260390
	-33.77657691310	25.70763234670
	-33.74905734380	25.67534484500
	-33.74687045750	25.68003913540
	-33.74811719180	25.67453223630
	-33.74456911740	25.67560090850
FSRU	-33.79991347530	25.69747568290
LNG and Gas Hub	-33.77569624560	25.70683012000
	-33.77367313810	25.71017778030
	-33.77809610730	25.71402790860
	-33.78009666300	25.71070893620
Cooling Pipeline	-33.79561220659	25.69461233785
	-33.78700572693	25.70444500000
	-33.7841473	25.7056597
	-33.78561545	25.7032651
	-33.78346096	25.7067621
	-33.78165053	25.7035207
	-33.7813619	25.7040587
	-33.77993502	25.7105142

srk consulting

CDC Gas to Power Plant - Gas Infrastructure

Locality Plan

Scale:	A3
Projection: TM	Datum: HH94
Central Meridian/Zone: Lo25	
Date: 22/04/2021	Compiled by: STRL
Project No: 553652	Fig No: I_009

Path: G:\Projects\Current\553652 CDC Gas To Power EIA_RUMP\8GIS\GISPROJ\APR\553652_CDC Gas to Power_Overview_1.aprx

Revision: A Date: 00 00 2016

Figure 1-3: Site locality map for Gas Infrastructure

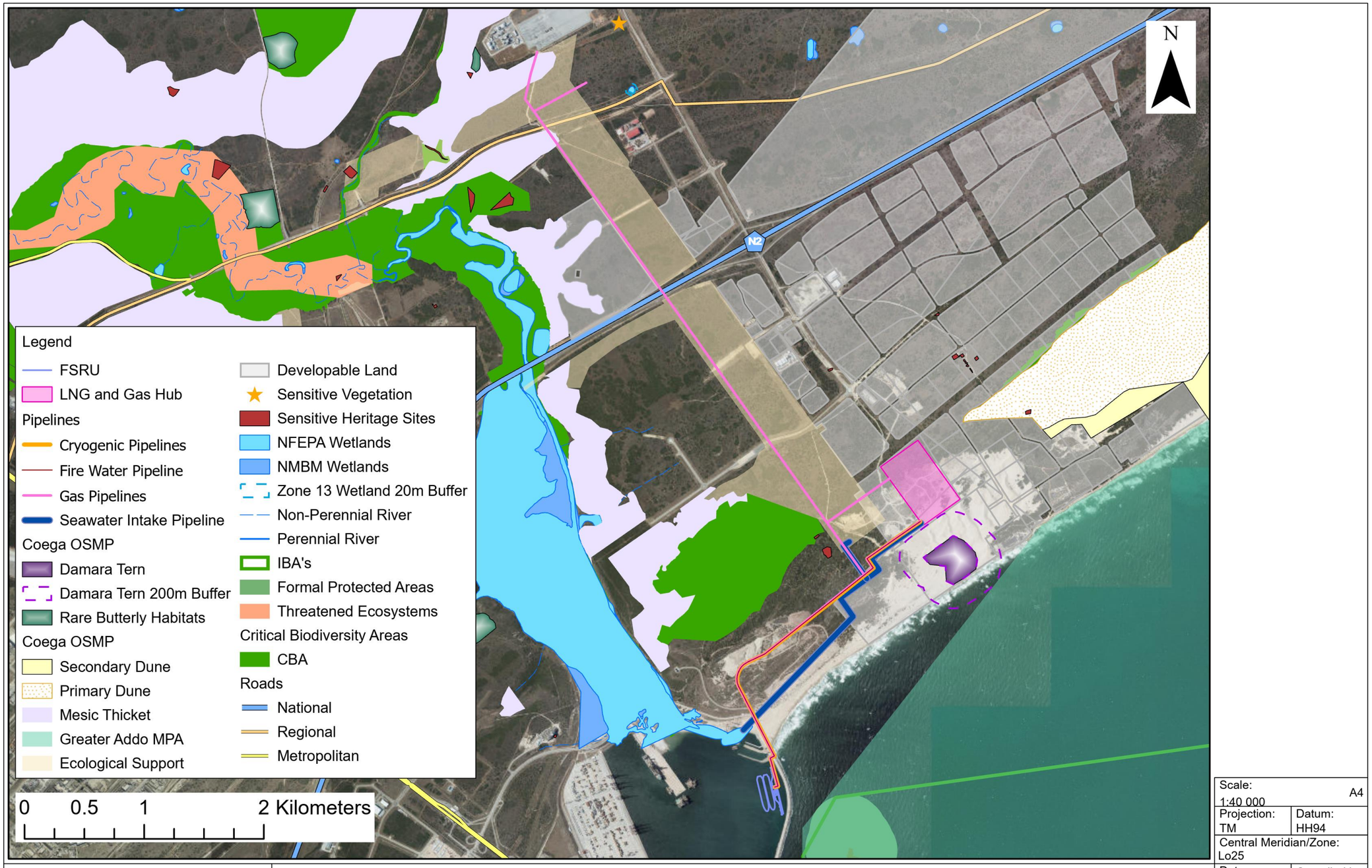


Figure 1-4: Terrestrial environmental sensitivities including identified buffer areas

1.2 Contents of the EMPr

Appendix 4 of the 2014 EIA Regulations, as amended in 2017 (Government Notice (GN) 326 of 07 April 2017) prescribes the required content in an EMPr. These requirements, and the sections of this EMPr in which they are addressed, are summarised in Table 1-1.

Table 1-1: Contents of the EMPr as per Appendix 4 of the 2014 EIA regulations (as amended in 2017)

GN326, Appendix 4	Item	Section Reference
1.(1)(a)(i)	Details of the EAP who prepared the EMPr	Page ii
1.(1)(a)(ii)	the expertise of that EAP to prepare an EMPr, including a curriculum vitae	Page ii
1.(1)(b)	A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 1.3
1.(1)(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	Figure 1-4
1.(1)(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—	-
1.(1)(d)(i)	• planning and design	Section 0 & Table 3-1
1.(1)(d)(ii)	• pre-construction activities	Section 0 & Table 3-1
1.(1)(d)(iii)	• construction activities	Section 4 & Table 4-2
1.(1)(d)(iv)	• rehabilitation of the environment after construction and where applicable post closure; and	Section 4 & Table 4-2
1.(1)(d)(v)	• where relevant, operation activities	Section 5 & Table 5-1
1.(1)(e)	- (removed in the 2017 amendment)	-
1.(1)(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 —	
1.(1)(f)(i)	• avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	Table 3-1, Table 4-2, Table 5-1
1.(1)(f)(i)	• comply with any prescribed environmental management standards or practices	Table 3-1, Table 4-2, Table 5-1
1.(1)(f)(i)	• comply with any applicable provisions of the Act regarding closure, where applicable; and	Not applicable
1.(1)(f)(i)	• comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;	Not applicable
1.(1)(g)	the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 4.2

GN326, Appendix 4	Item	Section Reference
1.(1)(h)	the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 4.2.2
1.(1)(i)	an indication of the persons who will be responsible for the implementation of the impact management actions;	Sections 3.1, 4.1, and 5.1
1.(1)(j)	the time periods within which the impact management actions contemplated in paragraph (f) must be implemented	Table 3-1, Table 4-2, Table 5-1
1.(1)(k)	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Table 3-1, Table 4-2, Table 5-1
1.(1)(l)	a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations	Section 4.2.2
1.(1)(m)	an environmental awareness plan describing the manner in which	-
1.(1)(m)(i)	• the applicant intends to inform his or her employees of any environmental risk which may result from their work	Table 4-2
1.(1)(m)(ii)	• risks must be dealt with in order to avoid pollution or the degradation of the environment	Table 4-2
1.(1)(n)	any specific information that may be required by the competent authority	Not applicable
2.	Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply	Not applicable

1.3 Project Description

This chapter describes the key characteristics of the proposed gas infrastructure within the Coega SEZ. The project design information in this chapter reflects the information available at the time of the compilation of the EIA Report. It is expected that the project description will evolve and be refined during detailed design.

At the outset, it is important to note that this description is deliberately non-specific in terms of the proprietary technologies that would be required for the overall site development. As the specific technology providers have not yet been selected, the approach in this report is to describe each of the components of the development using typical/standard Gas to Power plant design information.

A generic process flow diagram showing the two phases of gas infrastructure establishment (initially, with off-shore storage and regasification of LNG in a Floating Storage and Regasification Unit (FSRU) (phase 1) followed by development of an onshore storage and regasification facility at the LNG & gas hub (phase 2), is provided in Figure 1-5.

1.3.1 LNG Terminal

An LNG terminal will need to be constructed at the Port of Ngqura to accommodate the LNG transport/storage vessels and offloading operations. The proposed site for the LNG terminal is located within and at the base of the eastern breakwater, seaward of the Admin Craft Basin (ACB) in the port.

LNG terminals are predominantly constructed as piled structures. This standard design was used as a baseline for the development of the proposed terminal. Piled jetty structure design has been identified as the most (technically) feasible consisting of (Figure 1-6):

- An access trestle with road and provision for pipelines and services: approximately 283 m long by 5 m wide deck on piled access trestle;
- A platform with provision for distribution of natural gas and future conversion to distribution of cryogenic LNG; and
- Mooring and berthing dolphins, to protect the berth infrastructure from impact.

A separate platform area will be required when converting the FSRU terminal to a Liquified Natural Gas Carrier (LNGC) terminal, as the manifold positions on FSRU and LNGC vessels differ. A platform area of 20 m by 30 m was allocated for the distribution of gas and was based on the space requirements for the plant and equipment.

A large amount of plant and equipment will be needed for the distribution of cryogenic LNG and will require a substantial area of platform space. A separate platform of 40 m by 30 m, constructed for the distribution of gas, was allocated for typical plant and equipment required on the LNG platform.

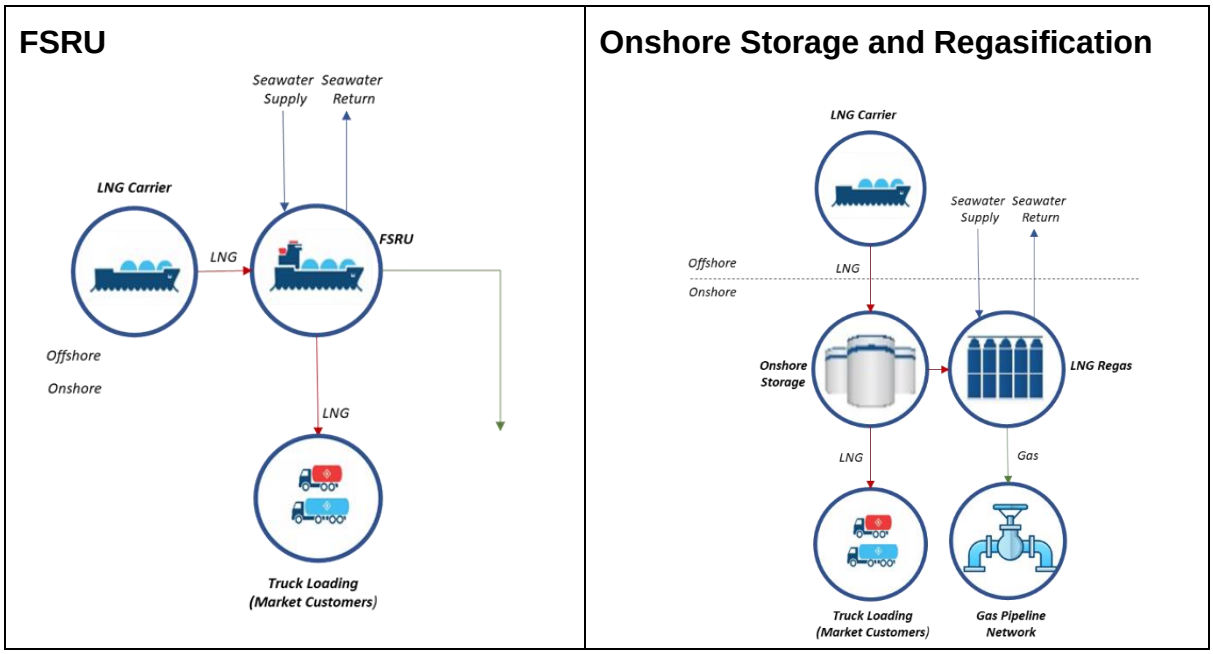


Figure 1-5: Example Process Flow Diagram of onshore and Regasification

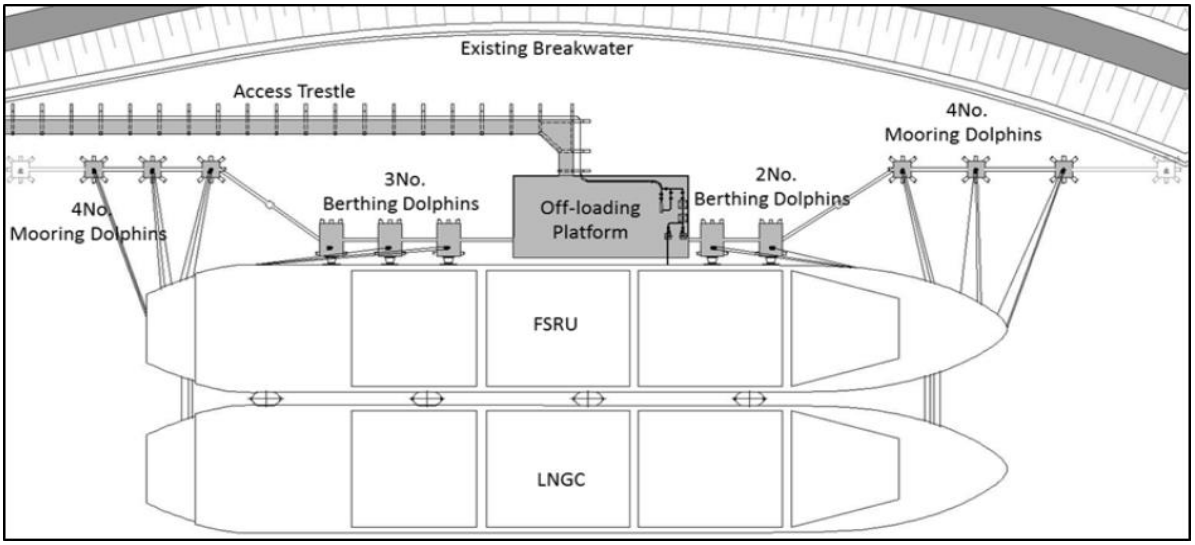


Figure 1-6: Layout 1 –Piled jetty structure

The technical feasibility study found that Firewater Pump Packages would be required at the Jetty, mounted in dedicated Firewater Pump Rooms designed to be fully self-sufficient in terms of power, control and cooling. The pumps will draw seawater from the harbour.

Dredging is expected to involve loading of dredged material directly into a series of sailing hopper barges, which transport the material to the disposal area. Dedicated disposal locations within the site will need to be confirmed, with an attempt to locate a dump site as close as possible to the dredging works. Environmental monitoring of turbidity and water quality would be required at dredging areas and dump sites. It is anticipated that dredging activities will take approximately 22 weeks to complete. Preliminary calculations of anticipated dredge volumes as presented in Table 1-2 indicate that there is sufficient capacity for the anticipated volume of dredge spoil from terminal excavations to be spoiled at the spoil location.

Table 1-2: Calculated dredged volumes for the two LNG terminal layouts considered

Soil type	Layout 1 – Eastern Breakwater dredging volume (m^3)	Layout 2 – Dig-out option dredging volume (m^3)
Fill material and marine deposits	48,500	67,000
Gravel Lag Deposits (Cobbles and Gravels)	16,200	67,000
Soft Rock (Mudstone: 0 to 12.5 MPa)	-	903,000
Medium to Hard Rock (Mudstone: 12.5 to 30 MPa)	3,300	370,000
Hard Rock (Siltstone: 30 to 50 MPa)	-	74,000
TOTAL	**68,000**	**1,480,000**

1.3.2 LNG Carrier (LNGC)

LNG will be delivered to the Port of Ngqura via LNGC vessels. The LNGC would berth alongside the moored FSRU and transfer the LNG across to the FSRU storage tanks. It is expected that LNG will initially be offloaded via a short cryogenic pipeline from the LNGC to the FSRU. However, once land-based storage is constructed, and the FSRU departs, LNG will then be pumped from the LNGC to onshore storage tanks via cryogenic LNG unloading arms and a cryogenic pipeline. The unloading process takes approximately 12 to 24 hours.

Boil off Gas is expected from the storage and transportation of LNG and measures to contain, capture, re-use and recover BOG are incorporated in the design of the LNGC and cryogenic pipelines. During the unloading of an LNGC, BOG reports back to the LNG tanker's cargo system by a separate vapour return line(s) to ensure that the pressure in both the FSRU or land-based storage tanks and the LNGC storage tanks is maintained within their design operating parameters.

1.3.3 Floating Storage and Regasification Unit (FSRU)

The main components of an FSRU include:

- LNG transfer system (offloading system),
- Storage tanks (in ship);
- Boil-Off Gas handling system,
- LNG pumping system,
- Vaporisation equipment, and
- Heat source (in this case seawater)

It is envisaged that up to two FSRU's, each with a storage capacity of 170,000 m^3 (i.e. a total storage capacity of 340,000 m^3) would be required for the project, although land-based storage is likely to be

implemented before the second FSRU becomes a requirement. The FSRU, and potentially the second FSRU, will be berthed permanently at the FSRU terminal.

The FSRU houses onboard LNG regasification facilities for the re-warming of the liquefied gas back to natural gas at ambient air temperature via vaporisers. Various re-warming options are available however the most likely option will be the extraction of relatively warm seawater and the subsequent discharge of the cooled seawater once it has heated the LNG. The estimated maximum quantity of seawater needed for heating LNG is at 20,840 m³/hour; discharged seawater would be 8ºC cooler than the intake water.

1.3.4 Gas Transmission pipelines

Two types of gas pipelines are required to transmit both LNG and natural gas from the LNG terminal to the three power plants and the boundary of the Dedisa peaking power plant (if required) and LNG and gas hub in Zone 10. All gas transmission pipelines will be installed underground and will require servitude widths of 20 m for the double cryogenic pipeline (for LNG) and 10 m for the gas pipeline (for natural gas).

The pipelines will be approximately 1 km long and will run from the FSRU, supported by a trestle structure running on the inside of the eastern breakwater until it reaches the landward end of the breakwater near the ACB, and subsequently further onshore to a turning / intersection point where they will be routed north and run along the coast to the Zone 10 power plants and LNG and gas hub (Appendix B).

During the period when the FSRU is in operation, a pipeline will transfer natural gas from the Port to the power plants in Zones 10 and 13. A single natural gas pipeline approximately 6 km long will then run in the services corridor from there to the Zone 13 power plant and boundary of the Dedisa power station site.

LNG cryogenic pipelines will be installed to distribute LNG to third party offtakers (via the truck distribution centre located in the LNG and gas hub in zone 10). The pipeline will convey the LNG from the FSRU via the trestle and along the coastline, following the alignment of the gas pipeline, to the proposed LNG & gas hub, and will include a return pipeline (i.e. a double cryogenic pipeline, with a combined servitude of 20 m is proposed).

Further expansion of the proposed LNG terminal development will entail onshore storage and regasification. This will include cryogenic pipelines to feed LNG from the LNG carrier to the land-based storage and regasification terminal located at the LNG and gas hub in Zone 10. The cryogenic pipelines will be routed underground on the landward side of the main breakwater as there is insufficient space between the ACB and breakwater to accommodate the above-ground cryogenic pipelines. Following this they will be routed parallel to the coast in a north easterly direction towards the LNG and gas hub and power stations.

1.3.5 LNG and Gas Hub

The LNG and gas hub will be located adjacent to the Zone 10 North power plant and will include facilities for land-based LNG storage and regasification, as well as the truck distribution centre (for third party supply of LNG and gas). The hub will occupy a footprint of up to 23.1 ha, and will be fenced, with an access controlled entrance point. Facilities within the storage and regasification area include admin offices, a utility station and control room, maintenance and repairs workshop and store, a cold vent system, metering package and pig launcher. The truck distribution centre will include a weighbridge, control cabin and loading facilities. The hub will be connected to fire water pipelines (running from the LNG terminal in the port), gas and LNG transmission pipelines.

1.3.6 LNG storage

It is proposed that at a certain point in the expansion of the gas infrastructure development, the FSRU will no longer be the most feasible option and land-based storage and regasification will become economically more feasible. The cryogenic pipelines will feed LNG directly from the LNG terminal to a new land-based storage and regasification terminal, at the LNG and gas hub. The Boil Off gas (BOG) is captured and recondensed to be sent to the vaporiser with LNG or compressed and sent via the return cryogenic pipeline back to the storage and regasification unit.

It is estimated that up to a maximum of two FSRUs of 170 000 m³ LNG storage capacity each would be required, and should increased capacity beyond this be required, up to two tanks of 160,000 m³ each will be constructed for onshore storage regasification (i.e. total LNG storage of 320,000 m³ to 340,000 m³) will be required. No storage of natural gas is proposed.

The LNG storage facility will require a venting system as protection against the risk of overpressure due to “roll-over” in the LNG tank. LNG “rollover” refers to the rapid release of LNG vapours from a storage tank, resulting from stratification.

1.3.7 LNG Regasification

The main component in the regasification process is the vaporiser, i.e. heat exchangers used to return the LNG to its regular vapour phase. Due to the proximity of the sea it is expected that the technically preferred vaporisers would be Open Rack Vaporisers (ORV). ORVs take seawater and stream it over the vertical tubes of the vaporisers in order to warm up the LNG. This is the most common type and generally is the preferred choice where warm seawater is available. The estimated maximum quantity of seawater needed for heating LNG is 20,840 m³/hour for a typical seawater with a change in temperature 8º C across the vaporiser. Infrastructure for the intake and discharge of seawater for heating purposes is excluded from the scope of this EMPr.

1.3.8 Cold vent system

The regasification and storage facility (both onshore and offshore) will have its own independent overpressure protection and venting systems and fire and gas and depressurisation regimes. The design of the project is expected to be in accordance with a philosophy of minimum venting in order to protect the environment without compromising safety. During normal operation, there will be no flow of vapour from the facilities into the vent system.

Relief and vent streams from the FSRU are expected to be handled by the FSRU. Operational and minor upsets in the LNG Truck Loading Facility are also assumed to return to the FSRU (or onshore regasification unit once this is operational) through the cryogenic recirculation pipeline.

The vent system will need to be sized to handle vapour resulting from depressurisation of the gas pipeline between the jetty and the Emergency Shut Down Valve at the gas distribution facility, and any other coincident relief scenarios.

It is anticipated that there will be a requirement to depressurise the above ground section of the gas pipeline between the FSRU and the underground section of pipeline. It is not anticipated that it will be necessary to blowdown the underground section of gas pipeline.

An emergency Cold Vent system will be required to provide safe release of gas and depressurisation of the gas containing facilities up to the Emergency Shut Down Valve at the Gas Distribution Facility, in the event of an emergency upset or start-up/run-down conditions. The Cold Vent System is expected to terminate in a pipe vent supported by a structural steel stack of a height and location designed to ensure suitable dispersion of the gas. The Cold Vent System is expected to be provided with a Snuffing Package for manual use in the event of ignition.

1.3.9 Gas Distribution

The gas exported from the regasification unit will be transported to a gas distribution centre at the LNG and gas hub. The facility will have its own access point with a gate and will include facilities for gas chromatography as well as pig handling and receiving.

Facilities for online operational pigging are included at each end to allow for pipeline inspection and integrity management. The receiving facilities at the distribution centre include a gas filter to allow any impurities in the pipeline after construction to be removed prior to export to clients. Long term use of the gas filter may not be required, depending on the pipeline and upstream facility cleanliness.

In addition to the above-mentioned items, the gas distribution facilities typically include:

- Emergency shutdown valves to automatically isolate the pipeline on the activation of a shutdown event;
- Valves on each customer stream to allow for the isolation of the particular stream for performance of maintenance on any of the equipment;
- Control room for local operation of the system;
- A cold vent to allow for de-pressurisation of any part of the facility as required in an emergency or during routine maintenance;
- Gas conditioning, which typically includes a gas mixing vessel and LPG and / or Nitrogen supply; and
- Firefighting facilities for emergency response in the event of fire.

1.3.10 Truck loading facility

A Truck Loading Facility will be provided within the LNG and gas hub for third party offtake. This will be complete with recirculation systems for BOG and LNG. The Truck Loading Facility will typically comprise a weighbridge and associated loading arms. Initially it is assumed that parallel loading of two road tankers should be provided for. The estimated offtake of LNG is approximately of 787 tpd, providing offtake by 40 x 20 ton LNG trucks per day.

1.3.11 Waste generation and management

During construction, waste types typically associated with large infrastructure will be generated. During operation, the following waste streams are expected:

- Used generator and turbine lubricant oil, which will be collected on site and removed in drums by a specialist contractor for appropriate disposal;
- Small volumes of oily sludge recovered from on-site surface water treatment;
- Spent gas turbine fabric air filter and lube oil filter cartridges;
- Dried powder / sludge and spent resins from on-site effluent treatment / demineralisation;
- Solid domestic waste (office consumables etc.);
- Scrap metals, plastic and packaging, which will be recycled where possible;
- Waste solvents and grease from cleaning of workshop equipment; and
- Spent laboratory chemicals from water testing and treatment.

2 Environmental Objectives

This section specifies the impact management objectives and outcomes used to determine the extent of management action(s) required to mitigate the impacts identified during the impact assessment process. A summary of the potential impacts of the proposed development identified and assessed in the EIA Report is presented in Table 2-1. Additional details on the nature of these impacts are provided in the Final EIA Report (SRK Report No: 553652/ Infrastructure /4, April 2021).

2.1 Visual Impacts

Altered sense of place and visual intrusion may be caused by earthworks and the operational LNG and Gas Hub. The FSRU(s) and mooring infrastructure will be in keeping with the existing port infrastructure and the other components of the gas infrastructure project (pipelines etc) will largely run within existing services corridors. These components are there not expected to result in significant visual impacts. The project is located in an industrial zone (Coega SEZ) in areas allocated to bulk services, energy and aquaculture development. While the LNG and Gas Hub site is sheltered to an extent from sensitive receptors along the N2 and inland, opportunities for visual screening may be limited for receptors along the coast and for offshore viewers (such as visitors to the MPA). To manage impacts during construction, activities will need to be managed so that negative visual impacts (including those resulting from dust) are minimised

The management objectives for this impact are:

- Prevent short term visual impacts during construction, e.g. dust, litter, etc;
- Promote consistency the surrounding land uses, through compliance with the CDC's architectural guidelines.

2.2 Impacts relating to Waste Management

With the exception of effluent and air emissions, no large scale systematic waste by-products would be generated as part of the process. Wastes similar to other industrial or manufacturing concerns would naturally be generated and are expected to be moderate in quantity. Lack of adequate waste management during both construction and operation could result in spread of litter, illegal dumping, contamination soil, water resources and the marine environment, and increased prevalence of scavengers at the site.

During construction, the waste generated will largely be construction waste (rubble, cement waste, packaging, small amounts of hazardous materials), with small amounts of domestic waste from workers on-site. It is anticipated that on-site chemical toilets will be used for sanitation during construction, and it must be ensured that the contents thereof are properly disposed of. During operation, waste generated by the LNG and Gas Hub, FSRU and associated facilities could result in the impacts mentioned above if not adequately managed. Waste entering the stormwater system may also result in blockages and downstream contamination.

The management objectives for this impact are:

- Prevent waste pollution of surrounding habitats; and
- Legally compliant management of solid waste.

Table 2-1: Summary of potential impacts and their significance following mitigation

Impact group	Impact Description	During Construction		During Operation	
		without mitigation	with mitigation	without mitigation	with mitigation
Visual	V1: Change in visual character and sense of place	Very low	Insignificant	Low	Low
Waste Management	WM1: Poor Waste Management resulting in pollution of surroundings	Medium	Insignificant	Low	Very low
Soil, Stormwater & Erosion	WE1: Pollution of Soil and Stormwater, and increase in Erosion	Very low	Insignificant	Medium	Low
Terrestrial Ecology	TE1: Loss and disturbance of vegetation	Low	Very low	Medium	Low
Terrestrial Ecology	TE2: Impact on Damara Terns due to Disturbance	Medium	Medium	High	High
Heritage Resources	HR1: Damage or destruction of concentrations of Heritage Resources	Low	Very low	-	-
Traffic	TI1: Increased traffic volumes affecting traffic flow	Very low	Very low	Very low	Very low
Traffic	TI2: Additional axle loading resulting in deterioration of road condition	Very low	Very low	-	-
Traffic	TI3: Traffic safety impact due to additional / high-speed traffic	Very low	Very low	Very low	Very low
Dust	CA1: Dust impacts	Low	Very low	-	-
Infrastructure	CA2: Damage to other infrastructure	Insignificant	Insignificant	-	-
Fire	CA3: Veld fires and fire management	Very low	Insignificant	-	-
Climate Change	CC1: Impact on climate change by way of GHG emissions resulting from the project			Very high	Very high
Climate Change	CC2: Climate change risk and vulnerability of the project to climate change			Low	Very low
Noise	N1: Noise affecting nearby receptors	Very low	Insignificant	Very low	Very low
Socio-economic	SE1: Direct and Indirect employment opportunities	Low (positive)	Low (positive)	Medium (positive)	Medium (positive)
Socio-economic	SE2: Growth of the local, regional and provincial economies	Low (positive)	Low (positive)	Medium (positive)	Medium (positive)
Socio-economic	SE3: Contribution to increased energy security	-	-	High	-
Air Quality	AQ1: Impact on ambient SO_2 , NO_2 and PM_{10} concentrations	-	-	Insignificant	Insignificant
Air Quality	AQ2: Impact on CO	-	-	Insignificant	Insignificant
Safety Risks	QR1: Loss of containment of LNG (FSRU)			Medium	Medium
Safety Risks	QR2: Loss of containment of LNG (Onshore storage & regasification)			Medium	Low
Safety Risks	QR3: Loss of containment of LNG due to pipeline failure			Medium	Very Low

Impact group	Impact Description	During Construction		During Operation	
		without mitigation	with mitigation	without mitigation	with mitigation
Marine Ecology	ME1: Benthic communities through disturbance and loss of substratum	Very low	Very low	-	-
Marine Ecology	ME2: Impact of increased suspended sediment concentrations or turbidity	Very low	Very low		
Marine Ecology	ME3: Toxic effects of remobilised contaminants and nutrients	Insignificant	Insignificant	-	-
Marine Ecology	ME4: Disturbance, behavioural changes and avoidance due to underwater noise generated by dredging and general construction	Very low	Very low		
Marine Ecology	ME5: Disturbance, behavioural changes and avoidance due to underwater noise generated by from the LNGCs and FSRU	-	-	Very low	Very low
Marine Ecology	ME6: Disturbance, behavioural changes and avoidance due to underwater noise due to pile driving, underwater drilling and hydraulic rock breaking	Medium	Very low	-	-
Marine Ecology	ME7: Creation of artificial hard strata	Very low (positive)	Very low (positive)	-	-
Marine Ecology	ME8: Intake of large volumes of seawater from the port	-	-	Medium	Low
Marine Ecology	ME9: Introduction and spread of alien invasive species	Medium	Low	-	-
Marine Ecology	ME10: Discharge of high volumes of water with depressed or elevated temperatures	-	-	Very low	Very low
Marine Ecology	ME11: Discharge of co-pollutants (biocide, metals, and salinity)	-	-	Very low	Very low
Marine Ecology	ME12: Increase in ambient lighting	-	-	Very low	Very low
Marine Ecology	ME13: Waste Discharges to Sea	-	-	Low	Low
Marine Ecology	ME14: Accidental Spills of LNG	-	-	Insignificant	Insignificant
Marine Ecology	ME15: Accidental Spills of Hypochlorite	-	-	Insignificant	Insignificant
Marine Ecology	ME16: Faunal strikes with LNGCs and Dredgers	-	-	Insignificant	Insignificant
Marine Ecology	ME17: Release of diesel to sea during bunkering or due to vessel accident	-	-	High	Insignificant

Colour Coding

Negative status of impact					Positive status of impact				
High	Medium	Low	Very Low	Insignificant	Insignificant	Very Low	Low	Medium	High

2.3 Impact on Soil, Stormwater and Erosion

Vegetation clearing and disturbance of soils during construction will leave the ground vulnerable to erosion by water and wind. This could lead to increased sediment load in stormwater runoff, potentially clogging the receiving stormwater infrastructure. Loss of topsoil and erosion will also limit the potential for vegetation growth in these areas, leading to further erosion. There is a risk of downstream erosion and sedimentation if undeveloped cleared areas are not properly rehabilitated during and after the construction phase**.**

An increase in the extent of hardened surfaces from the development will increase the impermeable surface area and lead to reduced ground absorption of stormwater and increased surface water runoff. This will result in an increase in the quantity and velocity of stormwater leaving the site and could result in soil erosion and downstream sedimentation impacts if there is improper storm water management design.

Runoff also has the potential to transport potential contaminants (generated from project point sources as well as roads) away from the site into downstream natural environments, including the sea and littoral active zone. Spills or leaks of liquids such as chemicals, hydrocarbons, paints, or water contaminated with paints, solvents, cement of other construction related materials may infiltrate into the soil and thereby enter groundwater resources, by means of ground or surface water runoff. Similarly, during operation, spills or leaks of materials and fuels stored on site may occur during storage or handling, potentially polluting surface and groundwater resources, or the marine environment.

No wetlands or other surface water features have been identified on or within 32 m of the proposed Gas Infrastructure.

The management objectives for this impact are:

- Prevent contamination of surface water, soil, and groundwater
- Prevent erosion, sedimentation of surface water, and loss of topsoil.

2.4 Impacts on Terrestrial Ecology

Loss and disturbance of vegetation will occur through the clearing of areas for the construction of the power plant units (including associated infrastructure) and the spread of invasive alien vegetation may be promoted through the disturbance to land. Faunal species could be lost and habitats fragmented through vegetation clearing for the development, displacing these animals to adjacent areas.

During operation, noise and other anthropogenic impacts of the development will also disturb and displace fauna in the surrounding habitat. Most species will be able to migrate to other areas of the SEZ further from the site, provided suitable habitat is available.

Clearing of vegetation, has previously been authorised through the “Rezoning of the remainder of the Coega SEZ” impact assessment process, and impacts associated with this are currently managed through the approved Coega Open Space Management Plan (OSMP).

The LNG and Gas Hub proposed for Zone 10 lies approximately 200-300 m of the Damara Tern breeding area.

The impact management objective for this impact is:

- Minimise disturbance to vegetation;
- Minimise impacts to Species of Special Concern;
- Minimise the spread of alien invasive plants;

- Prevent disturbance to the Damara Tern colony; and
- Prevent erosion by appropriate rehabilitation of disturbed areas.

2.5 Impacts on Heritage Resources

Damage or destruction to heritage resources on the site may occur due to earthworks and excavations during construction or during maintenance activities. As heritage studies have previously been compiled by specialists for the Coega SEZ and no sensitive areas/material was identified within the proposed development area. Zone 10, being close to the coast, was noted as a sensitive area in general from a heritage perspective, and for this reason additional mitigation measures were recommended by the specialist.

Excavation activities might uncover heritage resources and the impact management objective for this impact is to prevent destruction of possible archaeological and / or paleontological material should such resources be uncovered.

According to the South African Heritage Resources Association (SAHRA), during the development of the port (2004), the wreck of the County of Pembroke was uncovered. Despite the discovery of a shipwreck during construction of the port, subsequent further development and dredging of the area means that the Maritime and Underwater Cultural Heritage (MUCH) unit at SAHRA considers the possibility of any impact on maritime heritage resources to be low.

2.6 Impacts on Air Quality

The process of liquefaction involves extracting most of the impurities in raw natural gas. The remaining natural gas is primarily methane with only small amounts of other hydrocarbons and consequently is widely considered a clean fossil fuel. The quantity and nature of emissions to the atmosphere from LNG combustion depends on the quality of the fuel, fuel consumption, the combustion device, and the air pollution control devices. The combustion of LNG results in gaseous emissions of sulphur dioxide (SO_2), oxides of nitrogen ($NO + NO_2 = NO_X$), carbon monoxide (CO), and some particulate matter (PM). Carbon dioxide (CO_2) is the main Greenhouse Gases resulting from LNG combustion.

SO_2 is produced from the combustion of sulphur in the LNG. NO_X is produced from thermal fixation of atmospheric nitrogen in the combustion flame and from oxidation of nitrogen bound in the LNG. The quantity of NOx produced is directly proportional to the temperature of the flame. The non-combustible portion of the fuel remains as solid waste and emitted as particulates. Back-up fuels stored on-site can generate VOCs such as benzene, toluene, ethyl benzene and xylene from storage and transportation losses.

For the Gas Infrastructure, the main sources of point source emissions include the Heater Stack, the generators via a combined stack, and the four stacks on a typical LNG carrier. Emissions from LNG handling and storage during start-up are considered to be negligible.

Storage and loading of LNG or NG from the Land-based LNG Terminal and Infrastructure Project generates negligible emissions as the fuel is kept at extremely low temperatures. Any gas that may escape will be returned to the storage unit.

The Air Quality Assessment found that the main sources of fugitive emissions include:

- The LNG resupply vessels during their transit from the eastern breakwater to the berthing area; and
- The LNG Truck Loading Facility and associated road infrastructure.

The National Ambient Air Quality Standard (NAAQS) consists of a ‘limit’ value and a permitted frequency of exceedance. The limit value is the fixed concentration level aimed at reducing the harmful

effects of a pollutant. The permitted frequency of exceedance represents the acceptable number of exceedances of the limit value expressed as the 99th percentile. Compliance with the ambient standard implies that the frequency of exceedance of the limit value does not exceed the permitted tolerance. Being a health-based standard, ambient concentrations below the standard imply that air quality poses an acceptable risk to human health, while exposure to ambient concentrations above the standard implies that there is an unacceptable risk to human health.

Air quality management interventions to reduce emissions are deemed to be unnecessary considering the low impact of the project on air quality.

2.7 Safety Risks resulting from Catastrophic Events

Accidental leaks of LNG could occur and result in a vapour cloud. The vapour cloud is quickly vaporised, however if an ignition source is present this can cause a fire which burns back to the source. The storage and handling of LNG (and other hazardous substances) may be considered to be a Major Hazard Installation (MHI) in terms of the Occupational Health & Safety Act.

The main hazards that would occur with a loss of containment of hazardous components at the proposed project include exposure to:

- Thermal radiation from fires;
- Overpressure from explosions.

Hazardous materials stored on the site and taken into account in the QRA are as follows:

- LNG and Natural Gas (predominantly methane), at the FSRU(s) and onshore storage

Leaks or spills of natural gas or LNG from pipelines conveying it may result in fires and explosions, which may have fatal consequences.

Safety risks are managed in terms of the Occupational Health and Safety Act which would that engineering designs adequately address safety requirements according to industry standards. No specific management objectives therefore are included in this EMPr.

2.8 Impacts on the Marine Environment

The elimination of marine benthic communities in the structural footprint of the LNG berth is an unavoidable consequence of the proposed development, and no direct mitigation measures, other than the no-project alternative, are possible. In the case of the cooling water discharges from the LNGC and FSRU, structural adaptations can be implemented to the vessels outlets thereby avoiding impacts to the sediments below the vessels. The initial negative impacts are deemed of low intensity within the immediate vicinity of the LNG berth. Furthermore, the negative impacts persist over the short-term only recolonisation of unconsolidated sediments will be rapid and as the new structures and rock armouring will offer a new settling ground for hard bottom species and will be rapidly colonised.

Elevated suspended sediment concentrations and increased turbidity in the Port due to dredging and construction activities, and in the vicinity of the dredge disposal site during dredge spoil disposal is deemed of low intensity within the immediate vicinity of the dredging and construction sites, with impacts persisting over the short-term only. As dredging and construction activities relating to the offloading facilities will be confined to within the Port area, impacts on the adjacent Addo Elephant MPA and Algoa to Amathole EBSA are unlikely. Suspended sediment plumes generated during dumping of dredge spoil and installation of the gas and cryogenic pipelines would, however, overlap with the MPA and EBSA, but as impacts would be highly localised and ephemeral, the impact is assessed to be of very low significance both without and with mitigation. Similarly, regular movement

of maritime traffic already occurs along the existing approach channel to, and within the Port of Ngqura. Although additional sediment resuspension by turbulence generated propeller wash from LNGCs can be considered a cumulative effect, the impact can be considered insignificant. Although elevated suspended sediment concentrations are an unavoidable consequence of dredging and construction activities, impacts can be kept to a minimum through responsible dredging and construction practices.

As the proposed LNG terminal is located within a port, the shipping noise component of the ambient noise environment is expected to be significant within and around the construction site. Given the significant local shipping traffic and relatively strong metocean conditions specific to the area, ambient noise levels are expected to be 90–120 dB re 1 µPa for the frequency range 10 Hz – 10 kHz. The underwater noise from the LNGC and FSRU, the truck carrier vessel and general construction activities may induce localised behavioural changes or masking of biologically relevant sounds in some marine fauna, but there is no evidence of significant behavioural changes that may impact on the wider ecosystem.

Resuspension of sediments during dredging and dumping of dredge spoil, as well as construction of piles for the access trestle along the breakwater, may result in the release of contaminants, increased nutrient concentrations and potential alteration of dissolved oxygen levels in the water column. This may affect biological organisms in a variety of ways.

Dredging, dumping of dredge spoil, deposition of rocks onto the seabed and pile driving, drilling, etc. during construction of the port infrastructure, as well as pumping of heating and cooling water by the LNGC and FSRU, and regasification of LNG will generate noise and vibrations that may be transmitted underwater and impact on marine organisms.

Deposition of rock material onto the seabed and installation of piles during construction of the port infrastructure will result in creation of artificial hard surfaces for colonization by marine organisms, replacing some of the natural habitat lost due to construction and resulting in a positive impact.

The operation of the FSRU is estimated to require a seawater flow rate of 45 000 – 600 000 m³/day for the vaporisers, cooling water and onboard desalination, which will be taken in directly from the port. The LNGCs will also require water for engine cooling and to protect the vessel from damage during LNG transfer and regasification, and both vessels would have a ballast control system to maintain vessel stability during cargo transfer. Cumulatively the volumes of seawater circulated through the vessels could be substantial and could potentially result in entrainment or injury of marine organisms, especially larvae and eggs.

The operation of the ballast control system in the FSRU and LNGC, as well as bio-fouling organisms on the hulls of LNGCs from outside South African waters may result in introduction of species not naturally found in the area. These may be in the form of larvae, eggs, cysts, or adult organisms, using the vessel hull as substrate.

Changes in water temperature resulting from thermal water discharges from the LNGC and FSRU during operation can have a substantial impact on aquatic organisms and ecosystems, in terms of physiology oof biota, localised changes in behaviour, or influences on ecosystem functioning.

Disinfection of the pipe and plant system with hypochlorite to prevent fouling of the heat-exchange system of the FSRU, as well as operation of the on-board desalination plant on the LNGC and FSRU, may result in release of heated seawater to the port.

The strong operational lighting used to illuminate the LNGC and FSRU vessels and the truck carrier at night may disturb and disorientate pelagic seabirds feeding in the area or attract turtles, marine mammals and fish. Although some species may change their feeding habits, the impacts on marine species are generally expected to be minor as the LNG terminal will be located in a port where artificial

lighting will be of comparatively high intensity. It is expected, therefore, that seabirds and marine mammals in the area would become accustomed to the presence of the vessels within a few days.

Dredging and construction activities, as well as operation of the LNGC and FSRU at the LNG terminal will result in a reduction of water quality from routine discharges to the sea from vessels.

Unplanned events, such as diesel spills, LNG spills, and faunal strikes with the LNGC and truck carrier, are also possible.

The management objectives for this impact are:

- Reduce disturbance to substratum that might arise from water discharges from the FSRU;
- Minimise elevated suspected sediment during construction;
- Reduce marine (sub-surface) noise, especially during construction;
- Ensure that ballast water management plans are developed and implemented;
- Reduce the zone of influence of thermal discharges;
- Minimise the potential for discharge of co-pollutants (e.g. chlorine, aluminium, and copper);
- Minimise impact of night-time lighting
- Ensure that a waste management plan is developed and implemented;
- Operate vessels in a manner that minimises the potential for faunal strikes; and
- Ensure that emergency preparedness and response plans are developed and implemented for diesel spills and LNG spill.

2.9 Noise Impacts

Noise impacts could originate from construction equipment and vehicle noise and noise from the operation of the Gas infrastructure and auxiliary infrastructure. Impacts could be experienced by local residents outside the study area, tenants within the SEZ, and the Port of Ngqura. Various ecological receptors have also been identified, including the Damara Tern colony in Zone 10, and rare butterfly habitats. The noise from the power plant will include audible, low frequency and infra sound.

Noise sensitive areas (NSA's) were identified in the vicinity of the Gas infrastructure. The most sensitive areas from a noise perspective will be Jahleel Island and the Damara Tern Colony. Dues to the attenuation of noise by distance, the other sensitive areas identified are too far away from the noise source to be of concern.

The management objectives for this impact are:

- Minimise noise impacts; and
- Legal compliance with regard to noise generation.

2.10 Impacts on Traffic

The following potential traffic related impacts relating to the proposed Gas Infrastructure have been identified. Note that the impacts will occur both in the short-term (i.e. during the construction phase) and medium to long-term once the plant is completed (operational phase):

- Road Capacity - Additional vehicle trips generated by the proposed development (up to 323 and 34 additional trips during the AM and PM peak hours for the construction and operational scenarios respectively) will have minimal impact in terms of road capacity given the current

low hourly volumes along the road links and at the affected intersections, and low trips generated by the proposed power plant.

- Road Pavement - The Coega IDZ Demand Modelling Report indicates that all Class 2 roads would likely need to accommodate 7.5 million E80s per lane over a 20-year period. Given that the Ring Road is a class 2 road it has likely been designed for these volumes. As such the number of E80s generated by the Power Plant traffic relative to the maximum expected loading over the 20-year period is minimal. Similarly, the cumulative impact of all other known power plants will not impact significantly on the road pavements as their design has taken such volumes into account.
- Traffic Safety - Safety issues may initially be a concern given low traffic volumes as traffic is likely to operate at high speeds in low traffic environments.

The management objectives for this impact are:

- Prevent damage to road infrastructure; and
- Minimise traffic safety risks.

2.11 Impacts on the socio-economic environment

The proposed Gas Infrastructure development may result in the direct creation of approximately 2000 temporary job opportunities (over a construction period of 3 years), of which 30% would be unskilled labour. Indirect job opportunities (industries that provide construction materials and services for the project) may also benefit as a result of the construction of the proposed development. It is estimated that during the operational phase, approximately 200 long-term skilled and unskilled personnel will be required which will in turn create employment opportunities for local labour.

During construction, income to the government is expected to be marginally increased by taxes (VAT) paid by CDC/ the developer on locally procured goods and services. Investment in locally procured goods and services will also have a very limited indirect and induced effect on economic performance.

Local investment (e.g. the purchase of construction material) leads to (direct) new business sales. The suppliers of these goods and services spend their additional income, further adding to the circulation of money. This secondary expenditure, or demand, results in indirect and induced new business sales, i.e. the multiplier effect. Total new business sales are determined by the addition of direct, indirect and induced sales in the economy.

The management objective for this impact is to maximise the positive impact on the local (NMBM) economy, including the use of local and unskilled labour.

2.12 General construction impacts

Dust generated by construction activities has the potential to impact on off-site access roads by creating a dust nuisance to other tenants in the SEZ and impairing visibility on the roads thereby affecting traffic safety and visual impacts. Excess dust can also draw undue attention to the site by increasing the visibility of construction activities. The impact of dust is more of a nuisance nature and does not typically pose a health risk due to the its typically coarse size of the dust particles.

While the project layout is intended to fit into the existing or yet to be developed services infrastructure in the SEZ, there is a potential remains for damage to existing services infrastructure (both underground and above ground) during excavation and other construction related activities. This may result in temporary disruptions to these services, affecting other tenants in the SEZ.

Much of the Zone 10 and surrounding vegetation is largely made up of dune thicket invaded by woody aliens, which is susceptible to burning, and therefore the risk of bush fires spreading to the proposed

Gas infrastructure must be considered. There is a risk however of fires originating from within the development due to construction activities or general anthropogenic impacts.

The management objective for this impact is to minimise dust, fire, and damage to existing infrastructure.

2.13 Climate change impacts

A high-level GHG inventory was developed for the proposed Gas distribution infrastructure, to quantify its impacts on climate change. This GHG inventory estimated the emissions associated with the operation and value chain (both upstream and downstream) of the proposed project. The GHG inventory was assessed in comparison to a calculated South African carbon budget, which, in turn, informed the impact assessment conducted in this CCIA.

The Scope 1 and Scope 2 emissions were summarised into the following categories: Tanker Berthing and Deberthing and LNG Regasification. With an assumed project life span of 30 years[1], this amounts to 26 million tCO_2e throughout the lifespan of the Gas Distribution Infrastructure project. These emissions are related to a total annual throughput of 16.9 million m3 of LNG per year. The Scope 1 and Scope 2 emissions equate to 0.56% of South Africa's carbon budget.

The upstream Scope 3 emissions (from natural gas extraction, transport, processing and liquefication) amount to a total of 8.0 million tCO_2e per annum. The most significant portion of Scope 3 emissions, and of the entire project, is the downstream Scope 3 emissions which are 19.6 million tCO_2e per annum, which are related to the combustion of the imported LNG for various processes, including, but not limited to, the combustion emissions arising from the three proposed CDC gas-to-power stations.

The total annual emissions (Scope 1, 2 and 3) are 28.5 million tCO_2e per annum and the total GHG Inventory across the lifetime of the Gas Distribution Infrastructure is 855 million tCO_2e.

An assessment of the climate change risk and vulnerability of the Gas Distribution Infrastructure, considering the core operations, value chain, and social and natural environments, was conducted to inform the resilience of the project to climate change. Several climate change impacts could affect the core operations of the power plant. These impacts mostly affect the structural integrity of the equipment and installations. The health and safety of employees as well as their performance could also be significantly impacted, mostly due to increasing average temperatures and reducing water security. The climate change impacts that are likely to have severe impacts are associated with the increased frequency and severity of severe weather events, such as severe storms and severe rainfall events.

The management objectives for this impact are to:

- Reduce Scope 1 GHG emissions where possible; and
- Improve the resilience of the Gas infrastructure in the design of the facility.

[1] Power Generation Technology Data for Integrated Resource Plan of South Africa. (2017) Department of Energy

3 Measures Applicable to the Detailed Design Phase

3.1 Roles and Responsibilities

The key role players during the design phase of the project are:

- The holder of the Environmental Authorisation (the CDC or any developer it cedes the EA to); and
- The engineering consultants responsible for the design of the power plant and any associated activities

3.1.1 The Proponent (the CDC or developer rights are ceded to)

The Proponent is responsible for ensuring that the measures in this EMPr are complied with and must:

- Ensure that the engineering consultant team is aware of and takes into consideration all relevant measures in the EMPr; and
- Confirm that all relevant environmental management measures in the EMPr have been incorporated into the project design on completion of the Design Phase.

3.1.2 Engineering Consultants:

The engineering consultants must:

- Take cognisance of all relevant measures in the EMPr and ensure integration thereof in the detailed design; and
- Reference the environmental management measures applicable to the construction (Section 4) and operational (Section 5) phases of the project in all documents that will be applicable to future phases of the Project (e.g. tender documents).

3.2 Environmental Management Measures

The environmental management and mitigation measures that must be implemented during the design phase, as well as responsibilities and timelines for the implementation of these measures and monitoring thereof, are laid out in Table 3-1 below.

Table 3-1: Environmental management and mitigation measures that must be implemented during the Design Phase

Design Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsibility**	**Timeframe / Frequency**	**Monitoring Methods1**	**Performance Indicators**
Authorisations	1	Ensure that all required licences and permits have been obtained before the start of construction. These include, but may not be limited to: • Water Use Authorisations; and • Permits for the disturbance or removal of protected plant species.	• The Proponent	• Before construction commences	• Keep record of all permits, licences, and authorisations	• Required licences/permits on file
	2	Ensure that all conditions stated in required licences and permits are integrated into the project design and management. These include, but may not be limited to: • Water Use Authorisations; and • Permits for the disturbance or removal of protected plant species.				
	3	Review the detailed design of the gas infrastructure to determine whether the environmental impact falls within the envelope of inputs and outputs assessed in the Environmental Impact Report for the following: • A greater water demand; • A greater level of air emissions (CO_2, NO_2, PM_{10}, etc); • More intense noise emissions.		• During detailed design	• Technical review	• Confirmation from technical tams and/or DEFF
	4	Review the detailed design of each component of the full 1000 MW (including the initial 200 MW) facility to determine whether there are significant deviations from the authorised project description and obtain confirmation from DEFF regarding the need, or not, to apply for an amendment to the authorisation in cases such as, but not limited to, the following: Substantial changes to the layout, • Stack height and parameters; • Changes in on site storage of dangerous goods;		• During detailed design	• Technical review	• Confirmation from technical tams and/or DEFF

Design Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsibility**	**Timeframe / Frequency**	**Monitoring Methods1**	**Performance Indicators**
		• Changes in fuel type, or changes in the use of backup fuels; or • A change in the height of the stacks for exhaust gases				
Preparation of Construction Phase	5	Include the EMPr in all tender documents to ensure that sufficient resources are allocated to environmental management by the Contractor.	• Consultant team	• Prior to call for tenders	• Check tender documents and contract	• Incorporated in tender documents
	6	Plan and make adequate financial provision for rehabilitation and restoration activities and clearly allocate timing and responsibility for environmental rehabilitation.	• The Proponent	• Before construction commences	• Review rehabilitation plan and financial provisions	• Rehabilitation plan and financial provisions
	7	Appoint a botanist to implement an initial search and rescue and collect key plant species for growing in a nursey and reintroduction to the area / use during rehabilitation.	• Consultant team	• Before construction commences	• Appointment letter	• Initial search and rescue undertaken and plants moved to nursery
	8	Obtain a permit from Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) SCC and protected species are removed from the construction footprint.	• The Proponent / botanist	• Before removal of SCC	• Application lodged	• Permit obtained
Visual Impacts	9	Design of buildings, lighting, and grounds according to the CDCs architectural guidelines	• The proponent	• In preparation for building plan approval	• Approved building plans	• Approved building plans
Pollution of Soil and Stormwater	10	Implementation of a site specific stormwater management plan, in accordance with the CDC's overarching stormwater management strategy for the SEZ, to ensure stormwater exiting the site meets the requirements in terms of quality and volume	• The Proponent	• Prior to construction	• Building plan approval	• Approved building plans
Pollution of Soil and Stormwater	11	Provide suitable traffic accommodation measures as part of construction contract to inform other road users of presence of construction related traffic	• The Proponent s)	• Before appointing a contractor	• Annual compliance audits	• Traffic accommodation measures included in contracts

Design Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsibility**	**Timeframe / Frequency**	**Monitoring Methods1**	**Performance Indicators**
Increased traffic	12	The design of storage & handling facilities is governed by well-established South African National Standards which are aimed at pollution prevention	• Design engineer	• In preparation for building plan approval	• Approved building plans	• Approved building plans
Stormwater management	13	The stormwater management plan for the site must be implemented to ensure that any impacts of stormwater from the site are mitigated as far as possible within the site (measures such as the use of permeable surfaces, re-use of runoff from built areas such as roofs as well as the use of measures such as swales) to minimise the stormwater impacts on the watercourse	• Design engineer	• In preparation for building plan approval	• Approved building plans	• Approved building plans
Stormwater management	14	If necessary, pre-treatment areas such as oil, sediment and litter traps should be included in the stormwater management design.	• Design engineer	• In preparation for building plan approval	• Approved building plans	• Approved building plans
Air quality mitigation not included	15	Design to include installation of instrumentation, including detection and emergency shut down for chlorine and ammonia.	• Design engineer	• In preparation for building plan approval	• Approved building plans	• Approved building plans
Safety management	16	Design to include installation of instrumentation, including detection and emergency shut down for natural gas leaks in the gas pipelines	• Design engineer	• In preparation for building plan approval	• Approved building plans	• Approved building plans
Safety management	17	Design to include installation of instrumentation, including detection and emergency shut down for diesel leaks in above ground storage tanks.	• Design engineer	• In preparation for building plan approval	• Approved building plans	• Approved building plans
FSRU Design	18	Design intakes to minimise entrainment or impingement by reducing the average intake velocity to about 0.1 to 0.15 m/s. This is comparable to background currents in the oceans and will allow mobile organisms to swim away from the intake under these flow conditions (UNEP 2008).	• FSRU Operator	• Design phase	• Annual compliance audit	• Monitoring records
FSRU Design	19	Consider water conservation opportunities for LNG facility cooling systems (e.g. air cooled heat exchangers in place of water cooled heat exchangers)	• FSRU Operator	• Design phase	• Annual compliance audit	• Specifications
FSRU Design	20	Design the discharge of cooling water to surface waters in a manner that will allow maximum mixing and dilution of the thermal plume to ensure that the temperature is within 3°C of	• FSRU Operator	• Design phase	• Annual compliance audit	• Specifications

Design Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsibility**	**Timeframe / Frequency**	**Monitoring Methods1**	**Performance Indicators**
		ambient temperature at the edge of the mixing zone or within 100 m of the discharge point				• Modelling / monitoring records
FSRU Design	21	Fit deflector plates to discharges directed vertically downwards to modify the discharge to 45°	• FSRU Operator	• Design phase	• Annual compliance audit	• Specifications
FSRU Design	22	Consider water conservation opportunities for LNG facility cooling systems (e.g. air cooled heat exchangers in place of water cooled heat exchangers).	• FSRU Operator	• Design phase	• Annual compliance audit	• Specifications
FSRU Design	23	Design the FSRU in a manner that enables neutralising of NaOCl with SMBS prior to discharge to ensure that the most conservative international guideline value (<<2 µg/L) for residual chlorine at the point of discharge is met.	• FSRU Operator	• Design phase	• Annual compliance audit	• Specifications
FSRU Design	24	The hypochlorite generation unit must be suitably bunded to prevent and spills from the plant entering the marine environment	• FSRU Operator	• Design phase	• Annual compliance audit	• Specifications
FSRU Design	25	Design the FSRU in a manner that enables blending brine from the onboard desalination plant with cooling water prior to release	• FSRU Operator	• Design phase	• Annual compliance audit	• Specifications
FSRU Design	26	Prepare an emergency response plan covering recommended measures to prevent and respond to LNG spills.	• FSRU Operator	• Design phase	• Annual compliance audit	• Presence of plan

4 Measures Applicable to the Construction Phase

4.1 Roles and Responsibilities

The key role players during the construction phase of the project are anticipated as follows:

- The Proponent, i.e. The holder of the Environmental Authorisation (the CDC or any developer it cedes the EA to);
- Resident Engineer (RE), who will oversee the activities of the contractors on site;
- Contractors responsible for the construction of the project;
- Any sub-contractors hired by the contractor; and
- Environmental Control Officer (ECO).

The anticipated construction phase organogram is presented in Figure 4-1 below and shows the proposed lines of communication during this phase. All instructions relating to the EMPr will be given to the contractor via the RE. In an emergency situation, the ECO may give an instruction directly to the Contractor/ sub-contractors. Both the Contractor and ECO will report issues of concern to the RE, who in turn will report on progress to the proponent. The Proponent will retain responsibility for ensuring that the Contractor fully implements the provisions of the EMPr.

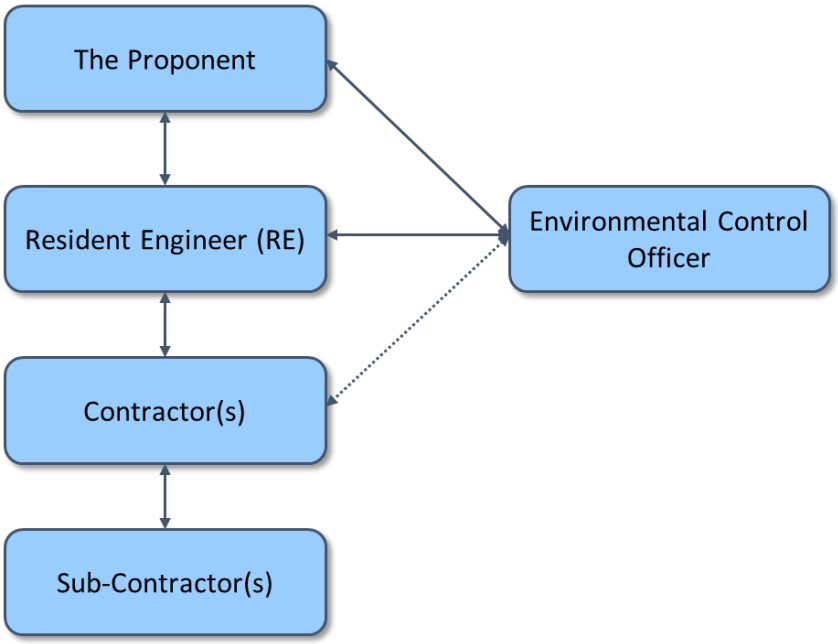


Figure 4-1: Construction phase reporting structure

Key roles and responsibilities during the construction phase with respect to the implementation of the EMPr are outlined below.

4.1.1 The Proponent (the CDC or developer rights are ceded to)

The Proponent has the overall responsibility for management of the project. In terms of environmental management, the proponent must:

- Appoint suitably experienced Engineers who will be responsible for the overall management of activities on site during the Construction Phase;
- Appoint an independent and suitably qualified ECO to monitor compliance with the EMPr for the duration of the Construction Phase;

- Ensure that the Engineers are aware of the requirements of the EMPr, implement the EMPr and monitor the Contractor's activities on site;
- Ensure that the Contractor is aware of and contractually bound to the provisions of this EMPr by including the relevant environmental management requirements in the tender and contract documents, as appropriate;
- Ensure that the Contractor remedies environmental problems timeously and to the satisfaction of the ECO and authorities (when necessary); and
- Notify the authorities should problems not be remedied timeously.

4.1.2 The Resident Engineer

The Proponent will appoint suitably qualified Engineering company who will in turn designate a suitable Resident Engineer (RE) who will be responsible for overseeing activities of the Contractor during the Construction Phase. The RE must:

- Ensure that the Contractor is duly informed of the EMPr and associated responsibilities and implications of this EMPr prior to commencement of construction;
- Monitor the Contractor's activities (together with the ECO) with regard to the requirements outlined in the EMPr;
- Relay all instructions from the ECO to the Contractor and ensure that these are fully understood and implemented;
- Report any environmental emergencies/concerns to the ECO immediately;
- Act as a point of contact for local residents and community members; and
- Ensure that non-compliance is remedied timeously and to the satisfaction of the Proponent, ECO, and where applicable, the relevant authorities.

4.1.3 The Contractor

The Contractor will be required to appoint or designate a Contractor's Environmental Representative (CR) who will assume responsibility for the Contractor's environmental management requirements on site and be the point of contact between the Contractor and the ECO. The CR must:

- Ensure that all activities on site are undertaken in accordance with the EMPr;
- Monitor the Contractor's activities with regard to the requirements outlined in the EMPr;
- Ensure that all employees and sub-contractors comply with the EMPr;
- Immediately notify the ECO of any non-compliance with the EMPr, or any other issues of environmental concern; and
- Ensure that non-compliance is remedied timeously and to the satisfaction of the ECO.

The Contractor has a duty to demonstrate respect and care for the environment. The Contractor will be responsible for the cost of rehabilitation of any environmental damage that may result from non-compliance with the EMPr, environmental regulations, and relevant legislation.

4.1.4 Sub-contractors:

All Sub-contractors will be required to:

- Ensure that all employees are duly informed of the EMPr and associated responsibilities and implications of this EMPr prior to commencement of construction;
- Ensure that all activities on site are undertaken in accordance with the EMPr;
- Monitor employees' activities with regard to the requirements outlined in the EMPr;
- Immediately notify the ECO of any non-compliance with the EMPr, or any other issues of environmental concern; and
- Ensure that non-compliance is remedied timeously and to the satisfaction of the ECO.

The Sub-contractor has a duty to demonstrate respect and care for the environment. The Sub-contractor will be responsible for the cost of rehabilitation of any environmental damage that may result from non-compliance with the EMPr, environmental regulations and relevant legislation, resulting from their presence on site.

4.1.5 The Environmental Control Officer (ECO)

The ECO must be a suitably qualified/experienced environmental professional, appointed by the proponent, for the duration of the Construction Phase of the Project. The ECO must:

- Request Method Statements from the Contractor prior to the start of relevant construction activities, where required, and approve these (as appropriate) without causing undue delay;
- Monitor, review and verify compliance with the EMPr by the main Contractor, as well as any sub-contractors and specialist contractors;
- Undertake site inspections at least once a month to determine compliance with the EMPr;
- Identify areas of non-compliance and recommend corrective actions (measures) to rectify them in consultation with the Proponent, the RE, and the Contractor, as required;
- Compile a checklist highlighting areas of non-compliance following each ECO inspection;
- Ensure follow-up and resolution of all non-compliances;
- Provide feedback for continual improvement in environmental performance;
- Respond to changes in project implementation or unanticipated site activities which are not addressed in the EMPr, and which could potentially have environmental impacts, and advise the Proponent, the RE, and Contractor as required; and
- Undertake a site closure inspection, which may result in recommendations for additional clean-up and rehabilitation measures.

4.2 Compliance and Monitoring

4.2.1 Method Statements

A Method Statement is a document setting out specific details regarding the plant, materials, labour, and the method the Contractor proposes using to carry out certain activities, usually activities that may have a detrimental effect on the environment. It is submitted by the Contractor to the ECO.

The purpose of a Method Statement is for the Contractor to provide additional details regarding the proposed methodology for certain activities, and for the ECO to confirm that these meet the requirements of the EMPr and acceptable environmental practice. This allows the EMPr to be less prescriptive and affords the Contractor a certain amount of flexibility or to respond to stipulations in the EMPr. It also provides a reference point to detect deviations from the agreed approach to an activity.

Each Method Statement will address environmental management aspects relevant to the activity and will typically provide detailed descriptions of items including, but not necessarily limited to:

- Nature, timing and location of activities;
- Procedural requirements and steps;
- Management responsibilities;
- Material and equipment requirements;
- Transportation of equipment to and from site;
- Method for moving equipment/material while on site;

- How and where material will be stored;
- Emergency response approaches, particularly related to spill containment and clean-up; and
- Response to compliance/non-conformance with the requirements of the EMPr.

The following list provides examples of Method Statements that may be requested from the Contractor:

- Environmental awareness course preparation;
- Material and equipment storage and delivery;
- Fuel storage, dispensing and fuel spills;
- Waste management;
- Management of contaminated water;
- Erosion and stormwater control; and
- Cement batching.

The Method Statements will be submitted by the Contractor to the ECO not less than 14 days prior to the intended date of commencement of an activity. The ECO shall approve / reject the Method Statement within two days of receipt of the method statement. An activity for which a Method Statement has been requested shall not commence until the ECO has approved such method and, once approved, the Contractor shall abide by the relevant Method Statement. A suitable Method Statement format can be agreed between the ECO and Contractor.

4.2.2 Environmental Records and Reports

Environmental records and reports required during the Construction Phase are listed in Table 4-1.

Table 4-1: Reports required during Construction

Report	Frequency	From	To
Environmental Checklist	Weekly	CR	ECO
Environmental Compliance Report	Monthly	ECO	Proponent and RE
Site Closure Audit	End of Contract	ECO	Proponent and RE

Environmental Checklist

The CR will undertake weekly site inspections to check on the implementation of the EMPr by the Contractor and complete a brief report/checklist after the inspection. The completed checklists shall be submitted to the ECO at the end of each inspection. This checklist should be discussed between the CR and the ECO during the initial site inspection, and agreement reached on the preferred format and content.

Environmental Compliance Report

The ECO will prepare monthly Environmental Compliance Reports, detailing any environmental issues, non-compliances, and actions to be implemented. These reports will be based on the ECO's observations and the weekly Environmental Checklists. Environmental Compliance Reports will be submitted to the Proponent and a full record will be kept by the ECO, for submission to DEFF on request.

When more frequent site visits are undertaken by the ECO, the frequency of reports will increase accordingly to allow for timeous reporting of environmental issues and actions required.

Photographic Records

If the ECO identifies any areas of concern, the ECO will request photographic records, which must be submitted by the Contractor for record purposes. Photographic records will typically be recorded in the monthly compliance reports.

Construction Site Closure Audit

The ECO will undertake a final site closure audit on completion of the Construction Phase. The purpose of this is to confirm compliance with all site closure requirements identified by the ECO, and that the site has been left in an environmentally suitable condition. If outstanding environmental requirements are observed during this inspection, a further inspection must be carried out to confirm compliance. The Site closure Audit report will be submitted to the Proponent for record purposes, and to DEFF if requested.

4.2.3 Corrective Action

Corrective action is a critical component of the plan-do-check-act cycle and it is through corrective action that continuous improvement can be achieved. Where repeated non-compliance is recorded, procedures may need to be altered accordingly to avoid further corrective actions.

If environmental compliance monitoring by the CR and ECO indicates non-compliance with the EMPr or approved Method Statements, the RE will formally notify the Contractor through a Corrective Action Request. The Corrective Action Request documents:

- The nature of the non-conformance/environmental damage;
- The actions or outcomes required to correct the situation; and
- The date by which each corrective or preventive action must be completed.

Upon receipt of the Corrective Action Request, the Contractor will be required to produce a Corrective Action Plan (or similar plan), which will detail how the required actions will be implemented. The Corrective Action Plan must be submitted to the ECO for approval prior to implementation. Once it has been approved, the corrective action must be carried out within the time limits stipulated in the Corrective Action Request. Additional monitoring by the CR and ECO will then be required to confirm the success or failure of the corrective action.

4.3 Environmental Management Measures

The environmental management and mitigation measures that must be implemented during the construction phase, as well as responsibilities and timelines for the implementation of these measures and monitoring thereof, are laid out in Table 4-2 below.

Table 4-2: Environmental management and mitigation measures that must be implemented during the Construction Phase

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Initial appointments and preparations	1	Appoint an independent ECO to oversee construction activities.	• Proponent	• Before construction commences • Once the final construction footprint has been pegged	• Review appointment documentation	• Appointment documents
	2	Appoint a suitably qualified botanist / specialist to mark SCC and protected species within the construction footprint and to oversee the removal, rescue and relocation of the SCC.				
	3	The following management plans must be compiled prior to construction, implemented, and made available to the authorities on request: • Alien invasive plant management plan; • Plant rescue and protection plan; • Revegetation, maintenance and habitat rehabilitation plan; • Erosion management plan;	• Proponent	• Before construction commences	• Compliance audit • ECO audit	• Availability of plans
	4	Obtain a permit from DEDEAT for SCC and protected species that are to be removed from the construction footprint.	• Proponent / botanist	• Before removal of SCC	• Application lodged	• Permit obtained
	5	Implement a search and rescue along the entire footprint immediately prior to construction to move any fauna that are directly threatened by the construction activities and unlikely to move out by themselves. No wildlife may be removed from the site or surrounding areas unless approved by the ECO in consultation with the appropriate permits obtainable from relevant competent authorities	• Herpetologist	• Before construction starts	• Visual inspection • Record of relocations	• Records of relocations

[2] Unless otherwise indicated, monitoring will be undertaken by the ECO, supported by the authorities where the requirement is specifically stipulated in a licence or permit.

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Clearing	6	Conduct a site walkthrough by a suitably experienced faunal specialist prior to clearing of the site for search and rescue of faunal species of special concern that may occur in the vicinity	• Proponent/ specialist	• Before clearing	• ECO Audit	• Monitoring records
Clearing	7	Conduct the botanical search & rescue of SSC in accordance with the permit obtained from DEDEAT.	• Proponent/ specialist	• Before clearing	• ECO Audit	• Monitoring records
Clearing	8	Clearing must take place in a phased manner (i.e. the entire area to be developed should not be cleared all at once)	• Contractor(s)	• Start of construction	• Visual inspection by CR and ECO	• Monitor extent of clearing
Clearing	9	Limit the footprint area of the construction activity to what is absolutely essential.	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Clearing	10	Ensure that no vegetation is removed or disturbed outside the delineated construction site boundary.	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Clearing and earthmoving	11	Construction within or immediately adjacent to the watercourse should preferably take place during the drier months of the year.	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Visible impacts on nearby wetland

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Clearing and earthworks	12	Areas to be cleared of vegetation or topsoil shall be cleared only when required, and shall be rehabilitated immediately on completion of the construction activity in that area	• Contractor	• Start of construction	• Visual inspection	• Size of disturbed areas
Clearing and stockpiles	13	When necessary, appropriate dust control measures (such as wetting of soil and covering of stockpiles) shall be implemented	• Contractor(s)	• Throughout construction	• ECO audits	• No visible dust plumes, especially during string winds
Complaints register / grievance mechanism	14	Maintain and disclose a complaint register. The register must record: • Complainant name and contact details; • Date complaint was lodged; • Person who recorded the complaint; • Nature of the complaint; • Actions taken to investigate the complaint and outcome of the investigation; • Action taken to remedy the situation; and • Date on which feedback was provided to complainant.	• Contractor(s)	• Duration of construction activities	• Monthly ECO Audits	• Register on site • Complaints followed up and closed out
Concrete / cement work	15	Where possible, ready-mix cement must be used.	• Contractor(s)	• Throughout construction	• ECO audits	• Visual inspection
Concrete / cement work	16	No mixing of cement within 50 m of the wetland, or any other watercourse and mixing must be conducted on an impermeable surface and all cement contaminated wastewater must be collected for evaporation and disposal	• Contractor(s)	• Throughout construction	• ECO audits	• Visual inspection
Concrete / cement work	17	Use Ready-Mix concrete rather than batching where possible.	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Number of incidents of batching outside works footprint; • Contamination of water and soil; and • Visible litter / waste on site.

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Concrete / cement work	18	Ensure that no cement truck delivery chutes are cleaned on site. Cleaning operations are to take place off site at a location where wastewater can be disposed of in the correct manner. If this is not possible a suitable washing facility is to be developed on site in consultation with the ECO.	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Inspection of incident records
Concrete / cement work	19	Batch cement in a bunded area within the boundaries of the development footprint only (where unavoidable).	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Number of incidents of batching outside works footprint; • Contamination of water and soil; and • Visible litter / waste on site.
Concrete / cement work	20	Ensure that cement is mixed on mortar boards and not directly on the ground (where possible).	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Inspection of incident records
Concrete / cement work	21	Place cement bags in bins and dispose of bags as waste to a licensed waste disposal facility.	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Number of incidents of batching outside works footprint; • Contamination of water and soil; and • Visible litter / waste on site.
Construction layout	22	Access roads should be kept to a minimum and their length and width should be minimised to reduce the surface area from which dust can be generated	• Contractor	• Start of construction	• Visual inspection	• Visibility of dust coming off construction site • Number of registered complaints

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Construction traffic	23	When transporting fine materials, dust tarps should be installed on vehicles	• Contractor	• Duration of construction	• Visual inspection	• Visibility of dust coming off vehicles • Number of registered complaints
Construction traffic	24	Limit speeds on access and internal roads to 40kmph	• Contractor	• Duration of construction	• Visual inspection	• Visibility of dust coming off construction site
Demarcate working area	25	Construction should be limited to the development footprint and the wetland should be demarcated as a no-go area with a buffer of 20 m between the delineated wetland and the development footprint being maintained.	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Visible impacts on nearby wetland
Demarcation of working area	26	Demarcate construction site boundaries upon establishment. Control security and access to the site. Fence off site boundaries to the satisfaction of the ECO and ensure that plant, labour, and materials remain within site boundaries.	• Contractor(s)	• Start of construction	•	•
Demarcation of working area	27	No-Go/ open space areas (including the sensitive vegetation patch north of the site) must be clearly demarcated/ clearly marked (i.e. with danger tape) before any construction activities commence on site and appropriate measures implemented to ensure compliance	• Contractor(s)	• Start of construction	• Visual inspection by CR and ECO	• No disturbance to no-go areas
Dust management	28	Avoid clearing of vegetation until absolutely necessary (i.e. just before earthworks).	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Size of disturbed areas
Dust management	29	Regularly evaluate the effectiveness of all dust management measures. Amend how or which measures are used if necessary.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of registered complaints

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Dust management	30	Stabilise exposed surfaces as soon as is practically possible.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of days that dust plumes are visible • Number of registered complaints
Dust management	31	Avoid excavation and handling and transport of materials which may generate dust under high wind conditions or when a visible dust plume is present.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of days that dust plumes are visible
Dust management	32	If required, place wind barriers at right angles to prevailing wind currents as close to the work areas as possible. Vertical barriers should be at least 2 m high and screening material must have a porosity of 50% or less. For larger surfaces place barriers at intervals of approximately 10 times the barrier height, if feasible	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of days that dust plumes are visible • Number of registered complaints

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Dust management	33	Minimise dust generated off stockpiles: • Locate piles in sheltered areas where possible; • Minimise the slope of the stockpile; • Limit stockpile sizes; and • Cover stockpiles when not in active use for some time and / or use an environmentally friendly chemical spray to bind soil.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Dust mitigation measures in place • Number of days that dust plumes are visible • Number of registered complaints
Dust management	34	Cover trucks transporting loose material to or from site with tarpaulins, plastic, or canvas.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Dust mitigation measures in place • Number of registered complaints
Dust management	35	Ensure that any material spilled from trucks on public roads during transport to or from the site is cleaned up.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Number of registered complaints
Dust management	36	Limit construction vehicle speeds to 40 km/hr on gravel roads.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of registered complaints

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Dust management	37	Limit the number of vehicles allowed on-site and restrict the movement of these vehicles over unsurfaced or unvegetated areas once they are on site to reduce dust problems.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of days that dust plumes are visible • Number of registered complaints
Employment	38	Recruit local labour as far as feasible to increase the benefits to the local households	• Contractor(s)	• Throughout construction	• Annual compliance audits	• Employment records (to include whether local or non-local)
Employment	39	Employ labour intensive methods in construction where feasible	• Contractor	• Throughout construction	• Annual compliance audits	• Employment numbers
Employment	40	Sub-contract to local construction companies where possible	• Contractor	• Throughout construction	• Annual compliance audits	• Employment records (to include whether local or non-local)
Employment	41	Use local suppliers where feasible and arrange with local SMMEs and BBBEE compliant enterprises to provide transport, catering and other services to the construction crews	• Contractor	• Throughout construction	• Annual compliance audits	• Employment records (to include whether local or non-local)
Employment	42	Set targets for the use of local labour based on the availability of existing skills and people that are willing to undergo training	• Proponent • Contractor(s)	• Throughout construction	• Keep record of how targets were determined • Keep record of staff by origin • Keep record of training provided	• Percentage of local staff • Percentage of BEE staff

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Employment	43	Maximise opportunities for the training of unskilled and skilled workers from local communities and use local Sub-Contractors where possible.	• Proponent • Contractor(s)	• Throughout construction	• Keep record of how targets were determined • Keep record of staff by origin • Keep record of training provided	• Percentage of local staff • Percentage of BEE staff
Employment	44	Meet empowerment targets relevant to the construction sector.	• Proponent • Contractor(s)	• Throughout construction	• Keep record of how targets were determined • Keep record of staff by origin • Keep record of training provided	• Percentage of local staff • Percentage of BEE staff
Employment	45	Consider implementing labour-intensive rather than capital-intensive work methods where feasible.	• Proponent • Contractor(s)	• Throughout construction	• Keep record of how targets were determined • Keep record of staff by origin • Keep record of training provided	• Percentage of local staff • Percentage of BEE staff
Employment	46	Consider purchasing resources from local sources where possible.	• Proponent • Contractor(s)	• Throughout construction	• Keep record of how targets were determined • Keep record of staff by origin • Keep record of training provided	• Percentage of local staff • Percentage of BEE staff

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Environmental awareness training	47	Provide environmental awareness training to all personnel on site at the start of their employment. Training should include discussion of: • Potential impact of construction waste and activities on the environment; • Suitable disposal of construction waste and litter; • Key measures in the EMPr relevant to worker's activities; • How incidents and suggestions for improvement can be reported. Ensure that all attendees remain for the duration of the training and on completion sign an attendance register that clearly indicates participants' names	• Contractor(s)	• Before workers start working on-site • Before new activities are undertaken	• Check training attendance register • Observe whether activities are executed in line with EMPr requirements	• Proportion of workers that completed environmental training • Compliance of workers with EMPr
Existing infrastructure	48	Existing infrastructure and services within or close to the construction footprint are to be located (via GPR if necessary) and demarcated prior to construction activities commencing	• Contractor(s)	• Start of construction	• ECO Audits	• Inspection of site drawings
Existing infrastructure	49	Relevant authority agencies and/or Department of the service supplied are to be notified should existing infrastructure be damaged by construction related activities	• Contractor(s)	• Throughout construction	• ECO Audits	• Inspection of incident records
Existing infrastructure	50	Other users are to be notified of any planned disruptions to services ahead of time	• Contractor(s)	• Throughout construction	• ECO Audits	• Inspection of incident records
Fire management	51	Ensure that no fires are permitted on or adjacent to site.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Number of fire incidents
Fire management	52	Smoking is not to be permitted on site except in designated areas	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Visual evidence
Fire management	53	Ensure that sufficient fire-fighting equipment is available on site.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits.	• Certified extinguishers in appropriate locations.
Fire management	54	Any fire incidents or accidents must be recorded, and a record thereof must be kept on site	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Number of fire incidents

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Fire management	55	Equip all fuel stores and waste storage areas with fire extinguishers.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Certified extinguishers in appropriate locations.
Fire management	56	Ensure that all personnel on site are aware of the location of firefighting equipment on the site and how the equipment is operated.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits.	• Training records
Fire management	57	Suitably maintain firefighting equipment.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Certified extinguishers in appropriate locations.
Hazardous materials	58	Design and construct hazardous material storage facilities, including fuel storage, with suitable impermeable materials and a minimum bund containment capacity equal to 110% of the largest container.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Compliance with specification
Hazardous materials	59	Locate hazardous material storage facilities, especially fuel storage, as far as practically possible from the nearby wetland	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Compliance with specification
Hazardous materials	60	Ensure that contaminants are not placed directly on the ground.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Compliance with specification
Hazardous materials	61	Develop (or adapt and implement) procedures for the safe transport, handling and storage of potential pollutants.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Number of spills of hazardous materials, including waste materials; • Evidence of contamination and leaks.

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Hazardous materials	62	Avoid unnecessary use and transport of hazardous substances.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Number of spills of hazardous materials, including waste materials; • Evidence of contamination and leaks.
Hazardous materials	63	Keep Material Safety Data Sheets for all hazardous materials on site and ensure that they are available for reference by staff responsible for handling and storage of materials.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Availability of MSDSs
Hazardous substance handling	64	The proper storage and handling of hazardous substances (hydrocarbons and chemicals) needs to be administered to prevent leaks and spills. Drip trays must be used during pouring of liquids and secondary containment must be in place during storage	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Use of drip trays • Secondary containment for stored hazardous materials
Hazardous substance handling	65	Spillages should be cleaned up immediately and any contaminated soil from the construction site must be removed and disposed of at a permitted waste disposal facility	• Contractor(s)	• Throughout construction	• ECO audits	• Incident records • Waste disposal records
Heritage resources	66	An archaeologist must be present on site during vegetation clearing of selected strips of vegetation (to be identified by the archaeologist). Clearing must be by small machinery, or the least invasive method of clearing.	• Contractor(s) • Archaeologist	• Prior to vegetation clearing and earthworks commencing	• Visual inspection	• Audit Reports • Site inspection reports
Heritage resources	67	Monitoring by an archaeologist must take place during all earthmoving activities, including, but not limited, to trenching and piling.	• Contractor(s) • Archaeologist	• Throughout construction	• Visual inspection	• Audit Reports • Site inspection reports
Heritage resources	68	If any concentrations of heritage material / fossils are exposed during construction, all work in that area must cease and it be reported immediately to the Albany museum so that the required investigations can be undertaken. This could entail Phase 2 mitigation (to be determined by the Albany Museum).	• Contractor(s) • Archaeologist	• Throughout construction	• Visual inspection	• Sampling or destruction permits

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Heritage resources	69	After vegetation clearing a report must be sent to SAHRA for review and guidance on the way forward.	• Contractor(s) • Archaeologist	• Throughout construction	• Annual compliance audit	• Report to Albany Museum
Heritage resources	70	Any excavations in the Salnova formation must be examined and sampled by a professional palaeontologist WHILE fresh bedrock is still exposed. The presence of a palaeontologist is required on site soon after exposure.	• Contractor(s) • Palaeontologist	• In the event that artefacts are found.	• Annual compliance audit	• Report to Albany Museum
Heritage resources	71	Should historic remains be uncovered during construction of the port infrastructure , all works must cease until SAHRA has been contacted to advise the way forward.	• Contractor(s) • Archaeologist	• Throughout construction	• Annual compliance audit	• Report to SAHRA
Increased traffic	72	Traffic accommodation measures to be provided in terms of Chapter 13 of the South African Road Traffic Signs Manual	• Contractor(s)	• Throughout construction	• H&S Audits	• Audit Reports
Increased traffic	73	Measures to be provided subject to approval by the Engineer	• Contractor(s)	• Throughout construction	• H&S Audits	• Audit Reports
Increased traffic	74	Ensure construction traffic is confined to site area	• Contractor(s)	• Throughout construction	• H&S Audits	• Audit Reports
Increased Traffic	75	Minimise need for continuous construction traffic on Ring Road by confining construction traffic to the site	• The Proponent	• Throughout construction	• Keep record of vehicles entering the site and time they enter • Keep record of incidences and complaints	• Number of incidents / complaints
Increased Traffic	76	Ensure that vehicle loads are within legislated limits, i.e. maximum Gross vehicle mass of 56 000kg	• The Proponent	• Throughout construction	• Visually inspect vehicles for any obvious faults or overloading	• Inspection records
Increased Traffic	77	Source relevant permits from the Eastern Cape Department of Transport should abnormal loads be required for transport of components	• The Proponent	• Throughout construction	• Annual compliance audit	• Permits
Layout	78	The construction site camp should be located further than 50 m from the wetland, or any other watercourse and preferably further away if possible	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Visible impacts on nearby wetland

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Layout	79	No storage of machinery within 50 m of the wetland, or any other watercourse and only emergency maintenance may be performed on site	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Use of drip trays • Secondary containment for stored hazardous materials
Layout	80	No stockpiles of excavated or spoil material or topsoil to be within 50 m of the wetland, or any other watercourse.	• Contractor(s)	• Throughout construction	• ECO audits	• Visual inspection
Layout	81	Submit a method statement for site camp location and establishment for approval by the ECO at least two weeks prior to establishment of the camp.	• Contractor(s)	• At least 2 weeks prior to establishment of site camp	• Visual inspections • Method statement	• Approved method statement
Layout	82	Establish a suitably fenced site camp at the start of the contract, which will allow for site offices, vehicle, equipment, material and waste storage areas to be consolidated as much as possible. Locate the site camp at a position approved by the ECO. Provide water and / or ablution facilities at the site camp for personnel.	• Contractor(s)	• Start of construction	•	• Site boundaries demarcated • Signage in place
Noise management	83	All construction operations should only occur during daylight hours if possible. Limit noisy construction activities to normal working hours as per the requirements of the noise control regulations.	• All contractors operating machinery	• Throughout construction	• Random noise measurements	• Results of random noise measurements • Absence of noise complaints
Noise management	84	Maintain all generators, vehicles, and other equipment in good working order to minimise exhaust fumes and excess noise.	• All contractors operating machinery	• Throughout construction	• Random noise measurements	• Results of random noise measurements • Absence of noise complaints
Noise management	85	No construction piling should occur at night where possible. Piling should only occur during the day to take advantage of unstable atmospheric conditions (which lessen the effects of project related noise).	• Contractor(s)	• Throughout construction	• ECO audits	• Absence of noise complaints

Construction Phase Measures						
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Noise management	86	Construction staff should receive "noise sensitivity" training such as switching off vehicles when not in use, location of Noise sensitive areas, etc.	• Contractor(s)	• Start of construction • Throughout construction	• ECO audits	• Training records
Noise management	87	An ambient noise survey should be conducted at the noise sensitive receptors during the construction phase	• Proponent	• Start of construction • Throughout construction	• Noise survey	• Survey report
Protection of animals	88	Do not harm, catch or kill animals by any means, including poisoning, trapping, shooting or setting of snares.	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Protection of animals	89	Safely remove and relocate any fauna that may be physically harmed by construction activities.	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches

Construction Phase Measures						
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Protection of animals	90	Backfill trenches as soon as possible. Inspect open trenches daily for animals which may have fallen or become trapped	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Record keeping	91	Maintain a register of complaints, e.g. for monitoring levels of nuisance experienced by neighbours. Respond to complaints by increasing the frequency and/or intensity management measures, e.g. dust suppression	• Contractor(s)	• Throughout construction	• ECO audits	• Register
Safety and security	92	Ensure that emergency procedures (in relation to fire, spills, contamination of the ground, accidents to employees, use of hazardous substances, etc.) are established prior to commencing construction.	• Contractor(s)	• Throughout construction	• Approval by CR and ECO.	• Compliance with specification.
Safety and security	93	Make all emergency procedures available, including responsible personnel, contact details of emergency services, etc. to all the relevant personnel. Clearly demarcate emergency procedures at the relevant locations around the site.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Compliance with specification.
Safety and security	94	Secure the site camp, particularly to restrict access unauthorised to fuels and any other hazardous substances.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Controlled access
Safety and security	95	Store all construction material and equipment in locked containers within the site camp. Employ 24 hour security for the Site Camp.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Controlled access
Safety and security	96	Provide suitable emergency and safety signage on site, and demarcate any areas which may pose a safety risk (including hazardous substances, deep excavations etc.).	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Signage .
Safety and security	97	Advise the ECO of any emergencies on site, together with a record of action taken	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Incidents register

Construction Phase Measures						
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Site Camp management	98	Provide appropriate sanitation facilities for the duration of the proposed construction activities and remove all waste to an appropriate facility.	• Contractor(s)	• Throughout construction	•	•
Site Camp management	99	Do not leave any food out in the open to avoid attracting animals.	• Contractor(s)	• Throughout construction	•	•
Stockpiles	100	Dust control measures such as wetting and covering of stockpiles to be implemented when necessary	• Contractor(s)	• Throughout construction	• Visual inspection by ECO	• Absence of dust generation
Stormwater / run-off management	101	Ensure suitable control of run-off during the construction phase to prevent erosion of topsoil on stockpiles and adjacent land and undeveloped portions of the site	• Contractor(s)	• Throughout Construction	• Visual inspection of downstream areas and topsoil stockpiles	• No erosion
Stormwater / run-off management	102	Prevent discharge of any pollutants, such as cements, concrete, lime, chemicals, and other contaminated wastewater and fuels into any water sources and the stormwater system.	• Contractor(s)	• When cleaning existing plant and removing old equipment	• Monitor activity against method statement	• Implementation of preventative actions • Visibility of water pollution
Stormwater / run-off management	103	Collect stormwater from bunded areas in a suitable container and remove from the site for appropriate disposal.	• Contractor(s)	• Throughout construction	• Visual inspection	• Incidents of stormwater contamination
Stormwater / run-off management	104	Direct runoff or pump water from construction sites away from freshwater features, so that it is first captured in detention ponds for settlement. Ensure that flows are dissipated to prevent scour and initially collected in a tank or similar containment that allows coarse sediment to settle.	• Contractor(s)	• Throughout construction	• Visual inspection	• Visible leaks/water wastage • Visible surface erosion
Stormwater / run-off management	105	Incorporate adequate erosion and stormwater management measures during construction to prevent erosion and the associated sedimentation of freshwater features. Management measures may include berms, silt fences, hessian curtains and stormwater diversion away from areas susceptible to erosion. Avoid additional disturbance during the implementation of these measures.	• Contractor(s)	• Throughout construction	• Visual inspection	• Visible leaks/water wastage • Visible surface erosion

Construction Phase Measures						
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Stormwater / run-off management	106	An erosion control plan must be compiled by a suitably experienced specialist, outlining specific recommendations for stabilisation of dunes that are cleared or disturbed during construction. This must be compiled in consultation with a revegetation plan by a suitably experienced specialist in coastal vegetation.	• Contractor(s)	• Throughout construction	• Visual inspection	• Visible leaks/water wastage • Visible surface erosion
Stormwater management	107	The stormwater management plan for the site should ensure that any impacts of stormwater from the site are mitigated as far as possible within the site (measures such as the use of permeable surfaces, re-use of runoff from built areas such as roofs as well as the use of measures such as swales) to minimise the stormwater impacts on the watercourse	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Visible impacts on nearby wetland
Stormwater management	108	If necessary, pre-treatment areas such as oil, sediment and litter traps should be included in the stormwater management design	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Visible impacts on nearby wetland
Topsoil storage	109	Designate and demarcate areas to be used for topsoil stockpiling.	• Contractor(s)	• Before construction commences	• Visual inspection •	• Incidence of erosion; and • Incidences of incorrect storage of topsoil.
Topsoil storage	110	Stockpile topsoil prior to the commencement of construction activities (stockpile no higher than 2 m) and conserve topsoil for landscaping and rehabilitation	• Contractor(s)	• Before construction commences	• Visual inspection •	• Incidence of erosion; and • Incidences of incorrect storage of topsoil.
Topsoil storage	111	Locate topsoil stockpiles in an area protected from the wind and agreed with the ECO.	• Contractor(s)	• Before construction commences	• Visual inspection •	• Incidence of erosion; and • Incidences of incorrect storage of topsoil.
Transportation and refuelling	112	Undertake regular maintenance of vehicles and machinery to identify and repair minor leaks and prevent equipment failures.	• Contractor(s)	• Throughout construction	• Visual inspection	• Maintenance records

Construction Phase Measures						
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Transportation and refuelling	113	Undertake any on-site refuelling and maintenance of vehicles/machinery in designated areas and at least 50 m from the nearby wetland. Line these areas with an impermeable surface and install oil traps.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Visual inspection
Transportation and refuelling	114	Use appropriately sized drip trays for all refuelling and/or repairs done on machinery – ensure these are strategically placed to capture any spillage of fuel, oil, etc.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Visual inspection
Vegetation clearing	115	Disturbance to the natural vegetation to be kept to the minimum	• Contractor(s)	• At the commencement of construction	• Visual inspection by ECO	• Absence of dust generation • Intact natural vegetation adjacent, and in close proximity, to the development footprint.
Waste Management	116	Implement effective waste management	• Contractor(s)	• Throughout construction	• Visual inspection by ECO	• Absence of litter in and around the site
Waste Management	117	Waste management plan to address classification of waste streams, segregation at source, control of waste on site before disposal, removal of wastes from site, and record keeping	• Contractor(s) • ECO	• Prior to construction commencing	• Approval of the waste management plan(s) by the ECO	• Approved waste management plan(s)
Waste Management	118	Identify and separate materials that can be reused or recycled to minimise waste, e.g. metals, packaging and plastics, and provide separate marked bins/ skips for these items. These wastes must then be sent for recycling and records kept of recycling;	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	119	No disposal of wastes, other than at registered landfill sites	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	120	No waste may be burned	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports

Construction Phase Measures						
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Waste Management	121	Sufficient portable on-site weather & vermin proof bins with lids need to be provided and appropriately placed and emptied regularly (contents to be disposed of at a licensed landfill site, and proof of disposal retained for auditing purposes)	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	122	Ensure that construction materials (e.g. bags of cement) are suitably stored and protected to avoid wastage	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports •
Waste Management	123	Excess excavated material that cannot be used for backfill should not be allowed to accumulate on site and should be disposed of at a formal landfill site or suitable spoil site identified in consultation with the ECO.	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	124	Vehicles and/ or plant and personnel shall only be permitted within the demarcated construction areas, or on existing roads and/ or access tracks between demarcated areas.	• Contractor(s)	• Throughout construction	• Visual inspection	• No evidence of driving outside demarcated areas (ECO audit reports)
Waste Management	125	No clearing of vegetation, abstraction, storage, disposal or mixing of any substance (e.g. water, cement, petroleum etc.) may take place outside the demarcated construction area without prior approval of the ECO	• Contractor(s)	• Throughout construction	• Visual inspection	• No evidence of disturbance demarcated areas (ECO audit reports)
Waste Management	126	Limit all activities to within the construction footprint area, which must be demarcated prior to commencement of clearing;	• Contractor(s)	• Throughout construction	• Visual inspection	• No evidence of disturbance demarcated areas (ECO audit reports)
Waste Management	127	No hunting, poaching or otherwise harming of wildlife on and around the site	• Contractor(s)	• Throughout construction	• ECO audits	• Reported incidents, complaints, or other evidence
Waste Management	128	Environmental awareness programme to include protection of all fauna on site.	• Contractor(s)	• Throughout construction	• ECO audits	• Training records
Waste Management	129	Appropriate scavenger-proof solid waste management facilities with lids must be provided on-site during construction and must be regularly emptied	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Absence of windblown litter

Construction Phase Measures						
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Waste management	130	Aim to minimise waste through reducing and re-using (packaging) material.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas • Visual inspection of construction areas (litter) • Check waste disposal slips	• Availability of rubbish bins and skips for different recyclable wastes
Waste management	131	Collect recyclables separately and deliver these to suitable facilities or arrange for collection.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas	• Presence of litter • Availability of rubbish bins and skips
Waste management	132	Collect all waste in bins and/or skips at the construction site.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas	• Presence of litter • Availability of rubbish bins and skips
Waste management	133	Do not stockpile construction material or waste within 30 m of the nearby wetland or where it is likely to wash or blow into the wetland.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas	• Correct location of stockpiles
Waste management	134	Prevent littering by construction staff at work sites by providing bins or waste bags in sufficient locations.	• Contractor(s)	• Throughout construction	• Visual inspection of construction areas (litter)	• Absence of litter
Waste management	135	Dispose of waste appropriately and obtain certificates.	• Contractor(s)	• Throughout construction	• Check waste disposal slips	• Waste disposal certificates
Waste management	136	Do not allow any burning or burying of waste on site.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas	• Availability of rubbish bins and skips • Waste storage capacity

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Water Management	137	No polluted water from washing of mechanical plant or equipment to be discharged to the ground. This must be collected in a tank for evaporation and disposal	• Contractor(s)	• Throughout construction	• ECO audits	• Incident records • Waste disposal records
Site rehabilitation	138	Ensure that slopes are immediately stabilised to prevent erosion, using geofabric or other appropriate erosion stabilisation techniques.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	139	Remove all construction equipment, vehicles, equipment, waste and surplus materials, including site offices, temporary fencing and other facilities, from the site.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	140	Clean up and remove any spills and contaminated soil in the appropriate manner.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	141	Ensure that no discarded materials are buried on site or on any other land not designated for this purpose.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Construction sites fully rehabilitated within two years
Site rehabilitation	142	Ensure that affected areas are rehabilitated following construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	143	Rehabilitate areas adjacent to the site (if disturbance is unavoidable) to at least the same condition as was present prior to construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	144	Use harvested topsoil for rehabilitation and landscaping following construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	145	Rehabilitate project areas with locally indigenous species, including those removed from the site prior to construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	146	Rehabilitate any disturbed areas as soon as construction in the area is complete.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Construction sites fully rehabilitated within two years

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Site rehabilitation	147	An alien invasive vegetation monitoring and control programme must be implemented throughout the construction and defects notification period, to clear alien invasive vegetation from all areas affected by construction activities and prevent its regrowth	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Construction sites fully rehabilitated within two years
Site rehabilitation	148	Appoint a specialist contractor to remove alien and weed species in areas disturbed as a result of construction activities to comply with existing legislation (amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998).	• The Proponent	• After Construction	• Annual compliance audits	• Ongoing absence of alien vegetation
Site rehabilitation	149	Dispose of alien vegetation at the municipal waste dump (and do not dump this waste on or off site).	• The Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Waste disposal slips
Monitoring	150	Appoint a qualified person to monitor rehabilitation success.	• The Proponent	• Once rehabilitation has been completed in the first section	• Contract documentation	• Appointment
Monitoring	151	Monitor rehabilitation success every three months in the first year, and every six months thereafter until acceptable species densities and cover are achieved. Monitor by means of 3 m x 3 m fixed plots in which species presence and cover is assessed, as well as fixed point photography.	• Contractor(s)	• Once rehabilitation has been completed in the first section	• Updates after each monitoring	• Regular monitoring • Rehabilitation success
Damara Terns	152	CDC to establish a Damara Tern Management Program within the CDC OSMP mechanisms, which incorporates: • specialist monitoring of the Damara tern population to determine the extent of their habitat, by an expert with previous experience monitoring this species, • An annual report on the status of the SEZ Damara tern population, and approval of the annual report / management plan by the EMC. • Continued monitoring of the Damara Tern population must be implemented	• CDC	• Prior to Construction	• Annual compliance Audit	• Presence of plan

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Damara Terns	153	Maintain a No-Go buffer area to ensure no access or activities within 200 m of Damara Tern habitat as indicated on the environmental sensitivity map (Figure 1-4).	• Contractor	• Throughout construction	• ECO Audits	• Visual inspection
Damara Terns	154	No-Go buffer areas around the tern breeding area must be demarcated and pedestrian and other access must be prevented both during operation, particularly during the Damara Tern breeding season (early October to late February)	• Contractor	• Throughout construction	• ECO Audits	• Visual inspection
Damara Tern	155	Environmental awareness / toolbox talks to include awareness of the Damara tern population	• Contractor	• Throughout construction	• ECO Audits	• Training records
Damara Tern	156	Measures must be taken to minimise noise from machinery etc.	• Contractor	• Throughout construction	• ECO Audits	• Monitoring records
Damara Tern	157	Drivers of vehicles authorised to drive on the beach must be made aware of the presence of Damara Terns during the breeding season (October to March) and must keep below the high-water mark	• Contractor	• Throughout construction	• ECO Audits	• Training records
Damara Tern	158	Management actions such as litter picking must be carefully planned to minimise disturbance to breeding pairs.	• Contractor	• Throughout construction	• ECO Audits	• Visual inspection
LNG Terminal	159	All dredging activities and associated environmental monitoring must be conducted in accordance with the conditions stipulated under the port expansion authorisation.	• Contractor(s)	• Plan prior to dredging	• ECO Audits	• Monitoring records
LNG Terminal	160	Consider the use of silt curtains to manage suspended sediment plumes generated during construction of the LNG Terminal.	• Proponent • Contractor(s)	• Throughout construction	• ECO Audits	• Monitoring records
LNG Terminal	161	Restrict construction noise and vibration-generating activities to the absolute minimum required	• Contractor(s)	• Throughout construction	• ECO Audits	• Monitoring records
LNG Terminal	162	Have good house-keeping practices in place during construction	• Contractor(s)	• Throughout construction	• ECO Audits	• Visual inspection
LNG Terminal	163	Ensure that all pile driving is undertaken in accordance with international protocols (e.g. JNCC 2010; DPTI 2012)	• Contractor(s)	• Throughout construction	• ECO Audits	• Monitoring records • Visual inspection

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
LNG Terminal	164	Consider the use of a bubble curtain. As the noise from pile driving is transmitted through the sediment into the water, bubble screens do not eliminate all behavioural responses to the piling noise but reported noise reductions range from 3 to 20 dB	• Contractor(s)	• Throughout construction	• ECO Audits	• Construction records
LNG Terminal	165	Demonstrate that the BATNEEC (Best Available Technique Not Entailing Excessive Cost) approach has been applied to proposed pile driving operations	• Contractor(s)	• Throughout construction	• ECO Audits	• Construction records / method statements
LNG Terminal	166	Avoid pile driving in the early morning and evening when penguins and gannets are leaving for offshore feeding areas, or returning to their nesting sites	• Contractor(s)	• Throughout construction	• ECO Audits	• Construction records
LNG Terminal	167	Consider the use of Acoustic Deterrent Devices in conjunction with visual and/or acoustic monitoring to exclude animals from the piling area	• Contractor(s)	• Throughout construction	• ECO Audits	• Construction records / method statements
LNG Terminal	168	To improve the confidence rating in the assessment of significance, consider engaging an acoustic consultant to undertake a site specific underwater noise assessment before the start of construction of the dolphin berths. At a minimum this should address: • Determine the existing ambient noise environment based on measurements. • Establish the likely hearing sensitivity and bandwidth for the considered sensitive marine mammal species and determine noise exposure criteria for behavioural and physiological impacts. • Determine the expected source levels for the piling/construction activity, and predict received levels versus distance from the piling activity using a suitable noise propagation modelling method • Estimate the size of the zone of audibility, responsiveness, and hearing injury based on the above information, and determine suitable sizes for the safety zones.	• Contractor(s)	• Prior to construction commencing • Throughout construction	• ECO Audits	• Construction records / method statements

5 Measures Applicable to the Operational Phase

5.1 Roles and Responsibilities

The key role players during the operation phase of the project are:

- The Proponent, i.e. The holder of the Environmental Authorisation (the CDC or any developer it cedes the EA to).

5.1.1 The Proponent

The Proponent has overall responsibility for the operation of the power plant. In terms of environmental management, the proponent must:

- Ensure that all personnel (employees and employees of contractors) are aware of, and contractually bound to, the provisions of this EMPr by including the relevant environmental management requirements into key performance areas and/or contracts.
- Notify the authorities should problems not be remedied timeously

5.1.2 Personnel, including employees and contractors

Personnel employed by the Proponent, either directly or contractors must:

- Comply with the applicable environmental commitments, procedures, restrictions, and guidance specified in the EMPr;
- Co-operate fully in implementing applicable environmental procedures;
- Ensure that copies of the EMPr are available at its offices and on site;
- Ensure that all its personnel on site, (including any sub-contractors and their staff) are familiar with and understand the requirements of the EMPr, that are relevant to their activities; and
- Ensure that any problems and non-conformances are remedied in a timely manner, to the satisfaction of the Proponent.

Personnel employed directly by the Proponent, Contractors, and their sub-contractors, have a duty to demonstrate respect and care for the environment and may be held liable in their individual capacity for not complying with commitments, procedures, restrictions, and guidance specified in the EMPr.

5.2 Environmental Management Measures

The environmental management and mitigation measures that must be implemented during the operational phase, as well as responsibilities and timelines for the implementation of these measures, and monitoring thereof, are laid out in Table 5-1.

Table 5-1: Environmental management and mitigation measures that must be implemented during the Operational Phase

Operational Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
Visual	1	Effective waste management	• The Proponent	• Throughout the operational life	• Visual inspection by CDC ECO	• Absence of litter, and/or accumulated waste
	2	Maintain gas infrastructure and services				• Visually well maintained structures and grounds
Climate Change	3	The procurement policy for LNG must specify or encourage less emission-intensive extraction methods of natural gas, to minimise the upstream extraction emissions and potential fugitive emissions associated with the use of LNG. It is suggested that an emission factor of 0.0253 tCO_2e/GJ is applied to LNG being procured	• The Proponent	• Throughout the operational life	• Annual compliance audit	• Carbon footprint calculations
Climate Change	4	Source LNG from nearby suppliers such as northern Mozambique, to reduce upstream transport emissions	• The Proponent	• Throughout the operational life	• Annual compliance audit	• Carbon footprint calculations
Climate Change	5	Source LNG from responsible suppliers, reducing emissions associated with extraction and upstream processing of the LNG	• The Proponent	• Throughout the operational life	• Annual compliance audit	• Carbon footprint calculations
Climate Change	6	Use good quality equipment to reduce the amount of natural gas that escapes as fugitive emissions and reducing the need for flaring	• The Proponent	• Throughout the operational life	• Annual compliance audit	• Carbon footprint calculations
Waste Management	7	Separate materials that can be reused or recycled to minimise waste e.g. metals, packaging and plastics, and provide separate marked bins/ skips for these items. These wastes must then be sent for recycling and records kept of recycling	• The Proponent	• Throughout the operational life	• Visual inspection by CDC ECO	• Absence of litter, • Waste disposal records
	8	No dumping within the surrounding area shall be permitted, and no waste may be buried or burned on site	• The Proponent	• Throughout the operational life	• Visual inspection by CDC ECO	• Absence of accumulated waste

Operational Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
						• Waste disposal records
	9	Sufficient portable on-site weather & vermin proof bins with lids need to be provided and appropriately placed and emptied regularly (contents to be disposed of at a licensed landfill site, and proof of disposal retained for auditing purposes);	• The Proponent	• Throughout the operational life	• Visual inspection by CDC ECO	• Absence of litter, • Waste disposal records
	10	Cleared alien vegetation should be disposed of so that it does not re-establish on site	• The Proponent	• Throughout the operational life	• Visual inspection by CDC ECO	• Absence of alien vegetation, • Waste disposal records
	11	Regular (weekly) waste collection service to be provided	• The Proponent	• Throughout the operational life	• Visual inspection by CDC ECO	• Waste disposal records (weekly)
	12	All staff shall be trained on correct waste management	• The Proponent	• Throughout the operational life	• Internal auditing	• Training records (weekly)
Pollution of Soil and Stormwater	13	Implementation of a site specific stormwater management plan, in accordance with the CDC's overarching stormwater management strategy for the SEZ, to ensure stormwater exiting the site meets the requirements in terms of quality and volume	• The Proponent	• Prior to construction and throughout the operational life	• Building plan approval	• Approved building plans • Compliance audits
	14	Harvesting of rainwater and stormwater where possible for use on site	• The Proponent	• Throughout the operational life	• Annual compliance auditing	• Water harvesting records and infrastructure
	15	Separation of clean and dirty stormwater on site and treatment of dirty stormwater prior to discharge	• The Proponent	• Throughout the operational life	• Annual compliance auditing	• Water monitoring records and infrastructure
	16	Ensure all storage and handling of hazardous liquids takes place over an impermeable surface to capture any leaks or spills for disposal or further treatment	• The Proponent	• Throughout the operational life	• Annual compliance auditing	• Visual inspection of infrastructure
	17	Include bunding to at least 110% of storage capacity around all fuel and chemical storage vessels where appropriate to do so, to capture any spills / leaks	• The Proponent	• Throughout the operational life	• Annual compliance auditing	• Building plans

Operational Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
Edge effects of operation	18	Monitor the surrounding area for signs of dumping of waste, harvesting of indigenous vegetation, destruction of natural forest, and invasion of additional informal residences, and take action to prevent these activities	• The Proponent	• Throughout the operational life	• Annual compliance audit	• No encroachment or unplanned loss of natural vegetation
Increased Traffic	19	Ensure that vehicle loads are within legislated limits, i.e. Gross vehicle mass of 56 000kg	• The Proponent	• Throughout the operational life	• Visual inspection for obvious signs of overloading	• Inspection records
	20	Ensure that vehicles are registered to transport hazardous goods and comply with SANS 1518 or other prescribed specifications	• The Proponent	• Throughout the operational life	• Annual compliance audit	• Compliance audits report
Noise management	21	An ambient noise survey should be conducted at the noise sensitive receptors to ensure that the impact is within the legal limit	• Proponent	• Throughout the operational life	• Noise survey	• Survey report
Noise management	22	An avifauna specialist should be consulted to determine the effects that an increase in noise levels will have on the Damara Tern Colony	• Proponent	• During operation	• Annual compliance audit	• Specialist report
LNG Truck carrier & LNGC	23	Undertake an entrainment study to more accurately determine the potential impacts of impingement and entrainment on communities within the Port of Ngqura.	• Vessel operators	• During operation	• Compliance audit	• Availability of study results.
FSRU	24	Optimise operating modes in the open-loop system as far as possible to reduce impacts, or use closed-loop systems whenever practicable	• FSRU operator	• Throughout the operational life	• Annual compliance audit	• Maintenance records
FSRU	25	Use multi-port discharges and adjust discharge rate to facilitate enhanced mixing with the receiving water body	• FSRU operator	• Throughout the operational life	• Annual compliance audit	• Maintenance records
FSRU	26	Ports should discharge horizontally or within -45° of horizontal to maximise dilution and avoid erosion of the sediments where the jet hits the seabed.	• FSRU operator	• Throughout the operational life	• Annual compliance audit	• Maintenance records
FSRU	27	Discharge cooling water to surface waters in a manner that will allow maximum mixing and dilution of the thermal plume to ensure that the temperature is within 3°C of ambient temperature at the edge of the mixing zone or within 100 m of the discharge point	• FSRU operator	• Throughout the operational life	• Annual compliance audit	• Monitoring records

Operational Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
FSRU	28	Implement the principle of mechanical cleaning of the entire system as part of regular annual maintenance of the FSRU in preference to the use of a biocide	• FSRU operator	• Throughout the operational life	• Annual compliance audit	• Maintenance records
FSRU	29	Reduce lighting in non-essential areas	• FSRU operator	• Throughout the operational life	• Annual compliance audit	• Visual inspection
FSRU	30	Use of guards to direct lights to areas requiring lighting	• FSRU operator	• Throughout the operational life	• Annual compliance audit	• Visual inspection
FSRU	31	Avoid direct light in water, except during safety inspection	• FSRU operator	• Throughout the operational life	• Annual compliance audit	• Visual inspection
FSRU	32	Low light mounting where possible	• FSRU operator	• Throughout the operational life	• Annual compliance audit	• Visual inspection
FSRU	33	Use of long wavelength lights that are less intense for nocturnal animals	• FSRU operator	• Throughout the operational life	• Annual compliance audit	• Visual inspection
FSRU	34	Compile a lighting plan that identifies specific measures that could be implemented to minimise or avoid impacts associated with operational night time lighting on avian species, fish species, and marine mammals	• FSRU operator	• Throughout the operational life	• Annual compliance audit	• Visual inspection
FSRU	35	Implement a waste management system that addresses all wastes generated at the various sites, shore-based and marine. This should include: • Separation of wastes at source; • Recycling and re-use of wastes where possible; • Treatment of wastes at source (maceration of food wastes, compaction, incineration, treatment of sewage and oily water separation).	• FSRU operator	• Throughout the operational life	• Annual compliance audit	• Visual inspection
FSRU	36	Implement leak detection and repair programmes for valves, flanges, fittings, seals, etc.	• FSRU operator	• Throughout the operational life	• Annual compliance audit	• Maintenance records
FSRU	37	Use a low-toxicity biodegradable detergent for the cleaning of all deck spillages.	• FSRU operator	• Throughout the operational life	• Annual compliance audit	• Maintenance records

Operational Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
FSRU	38	Maintain an emergency response plan covering recommended measures to prevent and respond to LNG spills.	• FSRU operator	• Throughout the operational life	• Annual compliance audit	• Presence of plan
LNG Truck carrier & LNGC	39	Ensure that vessel speed is kept below 10 knots when underway in Algoa Bay.	• LNG Truck carrier & LNGC operators	• Throughout the operational life	• Annual compliance audit	• Visual inspection
LNG Truck carrier & LNGC	40	The vessel operators should keep a constant watch for slow-swimming large pelagic fish, marine mammals, and turtles in the path of the vessel.	• LNG Truck carrier & LNGC operators	• Throughout the operational life	• Annual compliance audit	• Visual inspection
FSRU, LNG Truck carrier & LNGC	41	Ensure that all project-associated vessels have an oil spill contingency plan in place.	• Vessel operators	• Throughout the operational life	• Annual compliance audit	• Visual inspection
FSRU, LNG Truck carrier & LNGC	42	As far as possible, and whenever the sea state permits, attempt to control and contain the spill at sea with suitable recovery techniques to reduce the spatial and temporal impact of the spill.	• Vessel operators	• Throughout the operational life	• Annual compliance audit	• Incident reports
FSRU, LNG Truck carrier & LNGC	43	Ensure adequate resources are provided to collect and transport oiled birds to a cleaning station.	• Vessel operators	• Throughout the operational life	• Annual compliance audit	• Visual inspection • Incident reports
FSRU, LNG Truck carrier & LNGC	44	Refuelling is to take place only under controlled conditions within the port.	• Vessel operators	• Throughout the operational life	• Annual compliance audit	• Visual inspection
LNG Supply	45	The LNGCs must have a Ballast Water Management Plan in place	• LNGC Operator	• Throughout the operational life	• Annual compliance audit	• Presence of plan
LNG Supply	46	Ballast water exchange must be done at least 200 nautical miles from the nearest land in waters of at least 200 m deep; the absolute minimum being 50 nautical miles from the nearest land	• LNGC Operator	• Throughout the operational life	• Annual compliance audit	• Operational records
LNG Supply	47	Ensure that routine cleaning of ballast tanks to remove sediments is carried out, where practicable, in mid-ocean or under controlled arrangements in port or dry dock, in accordance with the provisions of the ship's Ballast Water Management Plan	• LNGC Operator	• Throughout the operational life	• Annual compliance audit	• Maintenance records
LNG Supply	48	Use filtration procedures during loading of ballast in order to avoid the uptake of potentially harmful aquatic organisms, pathogens and sediment that may contain such organisms.	• LNGC Operator	• Throughout the operational life	• Annual compliance audit	• Maintenance records

Operational Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
LNG Supply	49	Ensure that hulls are regularly cleaned in controlled environments at ports certified to undertake such operations	• LNGC Operator	• Throughout the operational life	• Annual compliance audit	• Maintenance records
Employment	50	Recruit local labour as far as feasible to increase the benefits to the local households	• Proponent	• Throughout the operational life	• Annual compliance audit	• Employment records
	51	Sub-contract to local maintenance companies where possible	• Proponent	• Throughout the operational life	• Annual compliance audit	• Employment records
	52	Use local suppliers where feasible and arrange with local SMMEs and BBBEE compliant enterprises to provide transport, catering and other services to the maintenance crews	• Proponent	• Throughout the operational life	• Annual compliance audit	• Employment records
Traffic Management	53	Suitable warning traffic signage be provided to ensure safe operation along Ring Road	• NMBM	• Throughout the operational life	• Visual inspection	• Visual inspection
	54	Ongoing enforcement along access roads	• NMBM	• Throughout the operational life	• Visual inspection	• Traffic statistics

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Nicola Rump MSc
Principal Environmental Scientist

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Chris Dalgliesh EAPASA
Partner, Principal Environmental Scientist

Appendices

Appendix A: CV's of Key Professionals

Nicola Rump

Principal Environmental Scientist

Profession:	Principal Environmental Consultant / Scientist
Nationality:	South African (dual UK & SA passports)
Qualifications:	MSc (Eco Physiology), Wits, 2005 BSc (Hons) (Zoology), UPE, 2002 BSc (Zoology, Biochemistry), UPE, 2001
Registrations:	Certified Environmental Assessment Practitioner (EAP(SA)), Member of IAIASA
Awards:	University of Port Elizabeth Dean's Scholarship

Specialisation:	Environmental Management Plans, permitting and compliance monitoring; Environmental Impact and Basic Assessments (to SA and IFC standards); Renewable energy, infrastructure, industrial and mining related projects; ecology
Additional relevant courses / training:	International Finance Corporation (IFC) Environmental and Social Risk Management (ESRM) training for consultants, consisting of 5 days of intensive training followed by four practical workshops (2-3 days each), running from January to October 2018. This training was provided by the IFC to qualifying consultants, and covered a wide range of topics aimed at assisting financial organisations in identifying, assessing, mitigating and monitoring the risks posed by potential investments.

Professional Interests: Risk management, international best practice, mining, renewable energy developments, conservation and restoration ecology, ecosystem services, impact assessment, environmental management, environmental compliance and due diligence audits.

I have been involved in EIAs and environmental management for the past 12 years, both in South Africa and internationally. My experience includes 11 months in SRK's UK office (Cardiff) during 2011-2012, during which time (and subsequently, back in SRK's SA office), I gained experience on working on large mining projects and meeting the requirements of international funders (such as the IFC). I have also completed the IFC's Environmental and Social Risk Management training programme for consultants (in 2018). My expertise includes:

- Project management and co-ordination;
- Environmental impact assessments (BA / EIA / ESIA, both to South African standards and those of international funding organisations);
- Environmental management plans (including ESAP, ESMP, EMPr, ESMS);
- Environmental compliance auditing;
- Management of specialist studies;
- Environmental licensing / permitting;
- Stakeholder engagement;
- Due diligence / environmental legal compliance reviews;
- Provision of environmental input for a wide range of report types.

My core competencies include:

- Proficiency in using the various commonly used PC software e.g. MS Word, Excel, Powerpoint, Outlook and Project;
- Excellent report writing, review and compilation skills;
- Excellent presentation and communication skills (both verbal and written);
- Project management, including management of a large and diverse project team and budgets;
- Appointment and management of specialists / sub-consultants;
- Mentoring and management of junior staff;
- Identifying and pursuing new work opportunities, including budgeting and proposal writing

Employment Record:

2012- present	**SRK Consulting (SA)**, Port Elizabeth. Principal Environmental Scientist
2011 - 2012	**SRK Consulting (UK)**, Cardiff. Environmental Scientist
2008 – 2011	**SRK Consulting (SA)**, Port Elizabeth. Environmental Scientist.
2007 – 2008	**Sigwela and Associates**, Port Elizabeth. Environmental Control Officer.
2006-2007	**Integrated Management Systems**, Port Elizabeth. Personal assistant and trainee Management System consultant.
2006	**Valmac Printers & Stationers**, Port Elizabeth. General assistant to management; print consultant.
2005	**NMMU,** Port Elizabeth. Research Assistant – Botany Department.

Languages:	**Speak**	**Read**	**Write**
English	Excellent	Excellent	Excellent
Afrikaans	Good	Good	Fair
Spanish	Basic	Fair	Fair

PROJECT EXPERIENCE

Key Experience:	**IFC-ALIGNED LENDER RELATED WORK**
Location:	Selous, Zimbabwe
Project duration & year:	April – June 2016
Client:	Zimplats
Name of Project:	Proposed Smelter expansion Project at Selous Metallurgical Complex (SMC) Environmental & Social Risk Assessment
Project Description:	ESRA for the expansion of existing smelter facilities at Zimplats' platinum processing plant, to inform further actions required with regard to environmental best practice management.
Job Title and Duties:	Project co-ordinator - liaison with client, project team and specialists; compilation of ESRA report; management of specialists.
Value of Project:	~ R 150,000

Location:	Ethiopia (two mine sites)
Project duration & year:	October 2015
Client:	National Mining Corporation plc (NMiC)
Name of Project:	Okote Gold & Werri Gold & Base Metal Project, Ethiopia
Project Description:	Environmental and Social Impact Assessments (for local permitting requirements, as well as to lay the ground work for upgrading to international standards), for two gold mines in Ethiopia
Job Title and Duties:	Environmental Assessment Practitioner - provision of ad-hoc assistance to project team relating to report writing.
Value of Project:	~ USD 1,000,000

Location:	Bas Congo Province, Democratic Republic of Congo
Project duration & year:	May 2013 – October 2015
Client:	Nyumba Ya Akiba sarl. (NYA)
Name of Project:	NYA cement project ESIA update, addendum and implementation support
Project Description:	ESIA update and associated management plans (including RAP), as well as completion of further work required, in response to gaps in a previous ESIA (by another consultancy) identified through a due diligence undertaken on behalf of the IFC for the development of a cement plant, limestone quarry and associated infrastructure in DRC.
Job Title and Duties:	Project co-ordinator - liaison with client and Project team, specialists and relevant lender and reviewer organisations; updating of project description and provision of input regarding project design and layout; identification, assessment and rating of impacts; writing and compilation of ESIA reports; management of specialists and project team; review of specialist inputs; ongoing co-ordination of environmental study requirements for implementation; compilation of environmental monitoring report for lenders.
Value of Project:	~ USD 1,000,000

Location:	Lunsar, Sierra Leone
Project duration/date:	November 2010 – October 2012
Client:	Marampa Iron Ore Limited (subsidiary of Cape Lambert)
Name of Project:	Marampa Iron Ore ESIA
Project Description:	EIA for the development of an iron ore mine and associated infrastructure around the town of Lunsar, Sierra Leone.
Job Title and Duties:	Project manager – Management of project team and specialists; liaison with client, stakeholders and authorities; project co-ordination; compilation of EIA report and Environmental Management Programme for local authorisation and to meet future IFC-aligned lender requirements.
Value of Project:	~ R8,500,000

Key Experience:	**ENVIRONMENTAL IMPACT ASSESSMENTS**
Location:	Molteno, Eastern Cape, South Africa
Project duration & year:	September 2018 - current
Client:	Engie Southern Africa
Name of Project:	Molteno Wind Energy Project
Project Description:	Screening study and Basic Assessments for development of two wind energy facilities near Molteno.
Job Title and Duties:	Environmental Assessment Practitioner, project coordinator/manager
Value of Project:	~R 400,000

Location:	Coega Industrial Development Zone, Port Elizabeth, South Africa
Project duration & year:	December 2015 - current
Client:	Coega Development Corporation
Name of Project:	Coega Gas to Power Project
Project Description:	Environmental Impact Assessment and Air Emission License application for 4500 MW Combined Cycle Gas Turbine Project, including regasification unit.
Job Title and Duties:	Environmental Assessment Practitioner, project coordinator/manager
Value of Project:	~R 800,000

Location:	Groot Winterhoek Mountains, Kirkwood, Eastern Cape, South Africa
Project duration & year:	2014 – 2017
Client:	Vulisango Holdings (Pty) Ltd
Name of Project:	Inyanda – Roodeplaat 187 MW Wind Energy Facility
Project Description:	Environmental Impact assessment for wind farm
Job Title and Duties:	Environmental Assessment Practitioner / Project Manager - Management of project team and specialists; liaison with client, stakeholders and authorities; public participation; compilation of EIA report and Environmental Management Programme
Value of Project:	~ R 2,600,000

Location:	Hopetown, Northern Cape, South Africa
Project duration & year:	April 2015 – June 2017
Client:	Afri-Coast Energy (Pty) Ltd
Name of Project:	Kloofsig 225 MW photovoltaic solar energy facility
Project Description:	Environmental Impact Assessment for solar energy facility (in 3 phases, each requiring a separate EIA process)
Job Title and Duties:	Environmental Assessment Practitioner / Project Manager - Management of project team and specialists; liaison with client, stakeholders and authorities; public participation; compilation of EIA report and Environmental Management Programme
Value of Project:	~R 1,300,000

Location:	Coega Industrial Development Zone, Port Elizabeth, South Africa
Project duration & year:	3 months, 2018
Client:	Confidential
Name of Project:	Wind to Water feasibility study
Project Description:	Environmental Feasibility Study for an integrated 150 ML/day desalination plant and wind energy project in the Coega industrial development zone

Job Title and Duties:	Report author
Value of Project:	Confidential

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	March 2014 – September 2019
Client:	Nelson Mandela Bay Municipality
Name of Project:	Walmer Gqebera housing EIA, erf 11305
Project Description:	Environmental Impact Assessment for low cost housing development
Job Title and Duties:	Project manager and EAP– Management of project team and specialists; liaison with client, stakeholders and authorities; project co-ordination and supervision of public participation; compilation of EIA report and Environmental Management Programme
Value of Project:	~R 1,900 000

Location:	Harare, Zimbabwe
Project duration & year:	September 2013 - March 2014
Client:	PPC
Name of Project:	PPC Zimbabwe Harare cement grinding plant EIA
Project Description:	Supervision and review of an EIA for Zimbabwean environmental authorisation (with a subsequent potential update to meet lender requirements) for a cement grinding facility and associated infrastructure in Harare.
Job Title and Duties:	Project co-ordinator - liaison with client, local EIA consultant, specialists and Project team; supervision of local Zimbabwean consultant team and review of reports and specialist studies to ensure they are of adequate quality for Zimbabwean environmental authorisation and that PPC's risk is adequately managed with regard to authorisation commitments and community expectations.
Value of Project:	~ ZAR 1,600 000

Location:	Humansdorp, Eastern Cape, South Africa
Project duration & year:	March 2013 – September 2014
Client:	Woodlands Dairy
Name of Project:	Woodlands Dairy EIA & Waste License
Project Description:	EIA for the installation of an effluent treatment plant at a milk processing facility and the associated waste license application.
Job Title and Duties:	Project manager – Management of project team and specialists; liaison with client, stakeholders and authorities; project co-ordination and supervision of public participation; compilation of EIA report and Environmental Management Programme.
Value of Project:	~ R400,000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	November 2010 – April 2019
Client:	Nelson Mandela Bay Municipality
Name of Project:	Seaview housing EIA
Project Description:	Site suitability screening and EIA for the development of a low cost housing development and associated infrastructure, including on-site sanitation.
Job Title and Duties:	Project manager – Management of project team and specialists; liaison with client, stakeholders and authorities; project co-ordination and supervision of public participation; compilation of EIA report and Environmental Management Programme.
Value of Project:	~ R1,500,000

Location:	Selous, Zimbabwe
Project duration/date:	February 2012 – July 2012
Client:	Zimplats
Name of Project:	Proposed Sulfur Dioxide (SO_2) Abatement Installation Project at Selous Metallurgical Complex (SMC) EIA Amendment
Project Description:	EIA amendment for the installation of a scrubber and associated facilities for SO_2 abatement at an existing platinum processing plant at Zimplats's SMC facility.
Job Title and Duties:	Project co-ordinator - liaison with client, project team and specialists; compilation of EIA amendment report; management of specialists.
Value of Project:	~ R750,000

Location:	Selous, Zimbabwe
Project duration/date:	August 2012 – February 2013
Client:	Zimplats
Name of Project:	Zimplats Phase 3 expansion consolidated EIA and EMP
Project Description:	Consolidated report summarising the project description and findings of various EIAs that have been conducted for Zimplats current operations and Phase 3 expansion, and compilation of an Environmental Management Plan for management of current and future environmental impacts.
Job Title and Duties:	Project co-ordinator - liaison with client, project team and specialists; compilation of Consolidated EIA and EMP report; management of specialists.
Value of Project:	~ R3,000,000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	February 2009 – September 2010
Client:	Nelson Mandela Bay Municipality
Name of Project:	NMBM Wind Farm EIA
Project Description:	EIA for a 20 MW wind farm (including comparative site suitability assessment)
Job Title and Duties:	Project co-ordinator - liaison with client, Interested and Affected Parties, specialists and relevant authorities; compilation of scoping and EIA reports; management of specialists; facilitation of public participation process
Value of Project:	~ R2,000,000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	2008 - 2010
Client:	Nelson Mandela Bay Municipality
Name of Project:	Khayamnandi Extension Housing Project EIA
Project Description:	Environmental Impact Assessment
Job Title and Duties:	Project co-ordinator - liaison with client, Interested and Affected Parties, specialists and relevant authorities; compilation of scoping and EIA reports; management of specialists and review of specialist reports; facilitation of public participation process
Value of Project:	~R 530,000

Location:	Graaff-Reinet, Eastern Cape, South Africa
Project duration/date:	April 2008 – March 2010
Client:	Camdeboo Municipality
Name of Project:	Graaff-Reinet Waste Landfill Site EIA and Waste License Application
Project Description:	EIA for the selection of a suitable location for a new waste landfill site, and licensing thereof
Job Title and Duties:	Project co-ordinator - liaison with client, Interested and Affected Parties, specialists and relevant authorities; compilation of scoping and EIA reports; management of specialists; facilitation of public participation process
Value of Project:	~R350 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	July 2008 – September 2010
Client:	Nelson Mandela Bay Municipality
Name of Project:	NMBM Walmer Gqebera Housing EIA

Project Description:	Application for exemption from EIA for low-cost housing development in Gqebera Township
Job Title and Duties:	Project co-ordinator - liaison with client and environmental authorities; compilation of exemption application and supporting information
Value of Project:	~R200 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	July 2006 - 2008
Client:	Jacques du Plessis
Name of Project:	Ferreira Farm residential development EIA
Project Description:	EIA for residential development
Job Title and Duties:	Project co-ordinator - liaison with client and environmental authorities; facilitation of public participation; compilation of EIA Report
Value of Project:	~R240 000

Key Experience:

BASIC ASSESSMENTS

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	March 2019 - current
Client:	ACSA
Name of Project:	ACSA PE airport stormwater upgrade
Project Description:	Updated Basic Assessment for upgrades to stormwater infrastructure at the Port Elizabeth airport and Environmental Control Officer for construction
Job Title and Duties:	Environmental Assessment Practitioner, project coordinator/manager
Value of Project:	~R 240,000

Location:	Coega IDZ, Eastern Cape, South Africa
Project duration & year:	December 2018 - current
Client:	BAIC South Africa
Name of Project:	BAIC paintshop BA
Project Description:	Basic Assessment and MHI permit application for development of paintshop and associated facilities for the construction of a new automobile plant at Coega IDZ
Job Title and Duties:	Environmental Assessment Practitioner, project coordinator/manager
Value of Project:	~R 300,000

Location:	Molteno, Eastern Cape, South Africa
Project duration & year:	September 2018 - current
Client:	Engie Southern Africa
Name of Project:	Molteno Wind Energy Project
Project Description:	Screening study and Basic Assessments for development of two wind energy facilities near Molteno.
Job Title and Duties:	Environmental Assessment Practitioner, project coordinator/manager
Value of Project:	~R 400,000

Location:	Kouga municipal area, Eastern Cape, South Africa
Project duration/date:	August 2018 - ongoing
Client:	Kouga Municipality
Name of Project:	Kouga cemeteries BA
Project Description:	Screening study and Basic Assessment for development of four cemeteries at various locations in the Kouga municipal area, including Water Use Authorisation Applications
Job Title and Duties:	Project manager – management of project team; liaison with client and project team; project co-ordination and supervision; compilation of Basic Assessment reports and Environmental Management Programme
Value of Project:	~ R450 000

Location:	Middelburg, Queenstown and Van Stadens, Eastern Cape, South Africa
Project duration/date:	February - September 2016
Client:	Department of Transport (EC)

Name of Project:	DoT Traffic Control Centres BA
Project Description:	Basic Assessments and Concept layouts (x 3) for development of traffic control centres at 3 locations
Job Title and Duties:	Project manager – management of project team; liaison with client and landowners; project co-ordination and supervision; compilation of Basic Assessment reports and Environmental Management Programme (draft stage only – project terminated early by client)
Value of Project:	~ R200 000

Location:	Baviaanskloof, Eastern Cape, South Africa
Project duration/date:	July 2015 – July 2016
Client:	Another Way Trust
Name of Project:	Baviaanskloof Leopard Trail BA
Project Description:	Basic Assessment for development of hiking trail facilities
Job Title and Duties:	Project manager – management of project team; liaison with client and authorities; project co-ordination and supervision of public participation; compilation of Basic Assessment reports and Environmental Management Programme
Value of Project:	~ R100 000

Location:	Hopewell conservation area, Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	March 2015 – June 2015 (project terminated early)
Client:	AfriCoast Energy
Name of Project:	Hopewell Solar PV BA
Project Description:	Basic Assessment for 9 MW solar PV facility
Job Title and Duties:	Project manager – management of project team; liaison with client and authorities; project co-ordination and supervision of public participation; compilation of Basic Assessment reports and Environmental Management Programme
Value of Project:	~ R100 000

Location:	Alexandria area, Eastern Cape, South Africa
Project duration/date:	November 2014 – August 2019
Client:	Wycombevale Broers Boerdery
Name of Project:	Wycombevale Vegetation Clearing BA and subsequent amendment
Project Description:	Basic Assessment for clearing of agricultural land for pastures
Job Title and Duties:	Project manager – management of project team; liaison with client and authorities; project co-ordination and supervision of public participation; compilation of Basic Assessment reports and Environmental Management Programme, appeal against conditions of authorisation (successful), application for amendment of authorisation
Value of Project:	~ R200 000

Location:	Cookhouse, Eastern Cape, South Africa
Project duration/date:	March 2014 – September 2015
Client:	Blue Crane Route Municipality
Name of Project:	Cookhouse WWTW Upgrade BA and WULAs
Project Description:	Basic Assessment and Section 21 c, i, f & g WULAs for upgrade of existing wastewater treatment works
Job Title and Duties:	Project manager – management of project team; liaison with client and authorities; project co-ordination and supervision of public participation; compilation of Basic Assessment reports and Environmental Management Programme; advice on associated licensing requirements
Value of Project:	~ R150 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	March 2014 – June 2017
Client:	Nelson Mandela Bay Municipality
Name of Project:	Walmer Gqebera housing BA, erf 1948, and subsequent amendment and implementation support (license applications, etc.)
Project Description:	Site suitability screening and Basic Assessment for transitional and permanent low cost housing development

Job Title and Duties:	Project manager - Liaison with client and environmental authorities; project co-ordination and supervision of public participation; compilation of Basic Assessment Report and Environmental Management Programme; amendment application; support with meeting EA commitments.
Value of Project:	~ R400 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	April 2013 - March 2014
Client:	Airports Company of South Africa (ACSA)
Name of Project:	PE airport stormwater upgrade BA and WULA
Project Description:	Basic Assessment and water use licensing for stormwater upgrade at PE airport
Job Title and Duties:	Project manager - Liaison with client and environmental authorities; assisting with project co-ordination and facilitation of public participation; co-ordination water use license applications; distribution of Basic Assessment Report; compilation of Environmental Management Plan
Value of Project:	~R135 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	April 2007 – August 2008
Client:	Nelson Mandela Bay Municipality
Name of Project:	MSA Gonubie upgrade BA
Project Description:	Basic Assessment for Gonubie roads upgrade
Job Title and Duties:	Liaison with client and environmental authorities; assisting with project co-ordination and facilitation of public participation; co-ordination water use license applications; distribution of Basic Assessment Report; compilation of Environmental Management Plan
Value of Project:	~R135 000

Location:	East London, Eastern Cape, South Africa
Project duration/date:	April 2007 – August 2008
Client:	Eastern Cape Department of Roads & Transport
Name of Project:	MSA Gonubie upgrade BA
Project Description:	Basic Assessment for Gonubie roads upgrade
Job Title and Duties:	Liaison with client and environmental authorities; assisting with project co-ordination and facilitation of public participation; co-ordination water use license applications; distribution of Basic Assessment Report; compilation of Environmental Management Plan
Value of Project:	R135 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	January 2009 – July 2009
Client:	Makhetha Development Consultants (on behalf of NMBM)
Name of Project:	MDC Markman wastewater BA
Project Description:	Basic Assessment for construction of wastewater storage ponds
Job Title and Duties:	Project co-ordination - liaison with client and environmental authorities; facilitation of public participation; compilation of BA Report.
Value of Project:	~R70 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	September 2008 – February 2009
Client:	Jacques du Plessis
Name of Project:	JDP Wells Estate Industrial Park BA
Project Description:	Basic Assessment for light industrial park
Job Title and Duties:	Liaison with client and authorities; project co-ordination and facilitation of public participation; compilation of Basic Assessment Report
Value of Project:	~R65 000

Location:	Upington, Northern Cape, South Africa
Project duration/date:	November 2009 – December 2010

Client:	Fluopro Investments (Pty) Ltd
Name of Project:	Upington 5 MW Solar Energy Plant
Project Description:	BA for the construction of a 5 MW solar energy facility
Job Title and Duties:	Project co-ordination - liaison with client, Interested and Affected Parties, specialists and relevant authorities; compilation of Basic Assessment report; management of specialists and review of specialist reports; facilitation of public participation process
Value of Project:	~R120 000

Location:	Jansenville, Eastern Cape, South Africa
Project duration/date:	July 2010 - November 2010
Client:	Eonian Development (Pty) Ltd
Name of Project:	Eonian 10 MW Solar Energy Plant, Jansenville
Project Description:	BA for the construction of a 10 MW solar energy facility
Job Title and Duties:	Project co-ordination - liaison with client, Interested and Affected Parties, specialists and relevant authorities; compilation of Basic Assessment report; management of specialists and review of specialist reports; facilitation of public participation process
Value of Project:	~R55 000

Location:	Graaff-Reinet, Eastern Cape, South Africa
Project duration/date:	October 2010 – March 2011
Client:	Camdeboo Municipality
Name of Project:	Graaff-Reinet waste landfill closure BA and Licensing
Project Description:	BA for the decommissioning & rehabilitation of an existing waste landfill facility, and application for closure license.
Job Title and Duties:	Project co-ordination - liaison with client, Interested and Affected Parties, specialists and relevant authorities; compilation of Basic Assessment report; management of specialists and review of specialist reports; facilitation of public participation process; completion of closure license application.
Value of Project:	~ R230 000

Key Experience:	**ENVIRONMENTAL MANAGEMENT PLANS, LICENSING, AUDITING & OTHER REPORT TYPES**
Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	September 2017- current
Client:	Nelson Mandela Bay Municipality
Name of Project:	NMBM Emergency Drought Relief Services
Project Description:	Environmental support to facilitate implementation of various drought relief projects (potentially including groundwater, desalination, effluent return schemes, and construction, expansion and repairs to supporting infrastructure). Services include EMPs, ECO, license applications (e.g. WULAs), Section 30A application in support of exemption from environmental authorisation processes due to emergency conditions, and fulfilling the associated reporting requirements.
Job Title and Duties:	Liaison with client; review of project information; compilation of report in support of appeal.
Value of Project:	~R3,700 000

Location:	East London, Eastern Cape, South Africa
Project duration/date:	April 2018 – August 2018
Client:	Express Petroleum
Name of Project:	Express Petroleum fuel tanks 24G
Project Description:	Section 24G application for construction of fuel storage tanks with a combined capacity of approximately 800 m^3
Job Title and Duties:	Liaison with client and authorities; review of project information; compilation of 24G application form.
Value of Project:	~R70 000

Location:	Kouga, Koukamma and Ndlambe municipalities, Eastern Cape, South Africa
Project duration/date:	April 2017- June 2019
Client:	MSBA (on behalf of the EC DRPW)
Name of Project:	MSBA Causeways ECO & water quality sampling
Project Description:	Environmental Control Officer and post-authorisation submissions to authorities for repairs to river crossings on the Kap, Kromme, Sand and Kariega rivers.
Job Title and Duties:	Project manager - Liaison with client and project team; review of project information and reports; supervision of ECO work and water sampling to meet requirements of WUAs.
Value of Project:	~R600 000

Location:	Graaff Reinet, Eastern Cape, South Africa
Project duration/date:	June 2017- current
Client:	Richardt van Rensburg Inc.
Name of Project:	Irhafu Sand Mining Appeal
Project Description:	Review in support of appeal against authorisation for sand mining in the Sundays River floodplain
Job Title and Duties:	Liaison with client; review of project information; compilation of report in support of appeal.
Value of Project:	~R50 000

Location:	Humansdorp, Eastern Cape, South Africa
Project duration/date:	June 2015- September 2019
Client:	Lex Gutsche Investment Trust
Name of Project:	RNA Aerodrome 24G Application
Project Description:	24G process for construction of an airstrip and associated infrastructure
Job Title and Duties:	Project manager – management of project team; liaison with client and authorities; project co-ordination and supervision of public participation; compilation of Environmental Assessment reports and Environmental Management Programme in support of 24G application.
Value of Project:	~R130 000

Location:	Motherwell canal, Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	June - October 2015 (Phase 1) & 2016 (Phase 2)
Client:	Nelson Mandela Bay Municipality
Name of Project:	Motherwell constructed wetland maintenance ECO (Phase 1 & 2)
Project Description:	ECO function for maintenance and repairs to constructed wetland as part of a water quality improvement project at the Mother stormwater canal
Job Title and Duties:	Compilation of Environmental Management Plan; Environmental Control Officer duties, provision of ad-hoc advice and reporting to the project team on compliance.
Value of Project:	~R50 000

Location:	Deal Party, Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	May 2008
Client:	Reclamation Group
Name of Project:	Reclamation Group Phase 1 Environmental Due-diligence
Project Description:	Phase 1 environmental due diligence of recycling facilities
Job Title and Duties:	Site audit and reporting on environmental aspects.
Value of Project:	~R30 000

Location:	Transnet facilities in Port Elizabeth and Uitenhage, Eastern Cape, South Africa
Project duration/date:	February – March 2014
Client:	KPMG
Name of Project:	KPMG Transnet absorbent mat due diligence audit
Project Description:	Audit of the effectiveness and adherence to SOPs at various Transnet Engineering facilities
Job Title and Duties:	Site audit and reporting on environmental aspects.
Value of Project:	~R30 000

Location:	Kuyga township, Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	March 2014- January 2016
Client:	Aecom (on behalf of NMBM)
Name of Project:	Aecom Kuyga sewers ECO
Project Description:	ECO function for construction of the upgrade of sewers and construction of a pumpstation in Kuyga township
Job Title and Duties:	Project manager - Environmental Control Officer duties, provision of ad-hoc advice and reporting to the project team on compliance.
Value of Project:	~R60 000

Location:	Graaff Reinet area, Eastern Cape, South Africa
Project duration/date:	April 2013 – March 2014
Client:	Department of Roads and Public Works (Eastern Cape)
Name of Project:	Camdeboo Borrow Pits licensing and EMP
Project Description:	License application for re-development of seven existing borrow pits in the Camdeboo district municipal area.
Job Title and Duties:	Project manager – liaison with client, project team, authorities and landowners; management of project team; overseeing compilation of license application.
Value of Project:	~R500 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	January 2012 – June 2014
Client:	MSBA (on behalf of DRPW)
Name of Project:	R102 maintenance vegetation clearing
Project Description:	EMP and ECO function for the clearing and management of vegetation in the road reserve, including relevant permits, for a road maintenance contract
Job Title and Duties:	Project manager - Environmental Control Officer duties, provision of ad-hoc advice and ensuring relevant permits are in place.
Value of Project:	~R250 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	July 2014 – May 2015
Client:	Engen / Orion Engineered Carbons
Name of Project:	Orion PE Harbour Black Oil pipeline EMP
Project Description:	EMP and ECO function for TNPA approval for Black Oil pipeline replacement
Job Title and Duties:	Environmental Control Officer duties and reporting to TNPA for replacement of black oil pipeline within the PE harbour facility.
Value of Project:	~R35 000

Location:	Tsolo, Eastern Cape, South Africa
Project duration/date:	2013 – 2014
Client:	Uhambiso Consult
Name of Project:	Tsolo WWTW Water Use License Application
Project Description:	Water quality management report and water use license application for the Tsolo waste water treatment works.
Job Title and Duties:	Compilation of reports, liaison with project team and authorities, submission of WULA and supporting information.
Value of Project:	~R45 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	November 2013 – February 2014
Client:	Engen / Orion Engineered Carbons
Name of Project:	Orion PE Harbour pipeline EMP
Project Description:	EMP and ECO function for TNPA approval for HFO pipeline refurbishment
Job Title and Duties:	Environmental Control Officer duties and reporting to TNPA for refurbishment of HFO pipeline within the PE harbour facility.
Value of Project:	~R30 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	May – October 2013
Client:	Shell (Pty) Ltd
Name of Project:	Shell PE harbour trenches
Project Description:	Provision of environmental advice and compilation of EMP for TNPA approval for installation of product recovery trenches at Shell's lease area the PE harbour.
Job Title and Duties:	Project co-ordinator – liaison with project team and TNPA; compilation of EMP.
Value of Project:	~R30,000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	March 2012 – 2016
Client:	Nelson Mandela Bay Municipality
Name of Project:	Nooitgedacht / Coega Low Level Water Supply Scheme
Project Description:	ECO for construction of a bulk water supply pipeline and associated infrastructure (including reservoirs and water treatment works)
Job Title and Duties:	Environmental compliance auditing and reporting to authorities and project team, and provision of ad-hoc advice on environmental management.
Value of Project:	~R2,300 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	July 2012 – January 2016
Client:	Metrowind
Name of Project:	Metrowind van Stadens wind farm
Project Description:	ECO for construction of a 27 MW wind farm and associated infrastructure.
Job Title and Duties:	Environmental compliance auditing and reporting to authorities and project team, and provision of ad-hoc advice on environmental management.
Value of Project:	~R1,590 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	August 2009 – March 2011
Client:	Nelson Mandela Bay Municipality
Name of Project:	Churchill Pipeline Upgrade
Project Description:	ECO for upgrade of Churchill pipeline and construction of booster pump station
Job Title and Duties:	Environmental compliance auditing and reporting to authorities and project team, and provision of ad-hoc advice on environmental management.
Value of Project:	~R200 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	April 2008 – September 2008
Client:	Nelson Mandela Bay Municipality
Name of Project:	NMBM Moffett Dam
Project Description:	EMP and ECO for repairs to dam wall
Job Title and Duties:	Compilation of Environmental Management Plan and Environmental Control Officer duties for geotechnical drilling operations.
Value of Project:	~R300 000

Location:	Herbertsdale, Western Cape, South Africa
Project duration/date:	May 2008 – September 2009
Client:	KFD Wilkinson Engineers (on behalf of DRPW)
Name of Project:	KFDW Herbertsdale culverts ECO
Project Description:	ECO overseeing repairs to damaged river crossings and culverts resulting from previous floods
Job Title and Duties:	Environmental Control Officer - compilation of environmental management plan, performing ECO duties, including environmental compliance audits, supervision of contractor's environmental officer, and providing ad-hoc advice.
Value of Project:	~R145 000

Location:	King Williams Town, Eastern Cape, South Africa
Project duration/date:	August 2008
Client:	Chevron South Africa
Name of Project:	Chevron King Williams Town EMP
Project Description:	Environmental Management Plan for re-opening of service station
Job Title and Duties:	Compilation of Environmental Management Plan (for approval by DME)
Value of Project:	~R12 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	November 2010 – December 2010
Client:	Nelson Mandela Bay Municipality
Name of Project:	Heugh Road Upgrade EMP
Project Description:	EMP for widening and upgrading of Heugh Road.
Job Title and Duties:	Review and assistance with compilation of Environmental Management Plan, including responding to IAP comments and identification of environmentally sensitive areas and vegetation.
Value of Project:	~R67 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	October 2010 – December 2010
Client:	Eris Property Group
Name of Project:	Construction of First National Bank Newton Park Building
Project Description:	EMP and ECO for construction
Job Title and Duties:	Review and assistance with compilation of Environmental Management Plan, including responding to client's comments.
Value of Project:	~R11 000

Certification:	
I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe me, my qualifications, and my experience.	
SRK Consulting - Certified Electronic Signature srk consulting /43564/Other 2980-5375-6652-RUMP This signature has been printed digitally. The Author has given permissi use for this document. The details are stored in the SRK Signature Data	Date: 28/10/2019
Full name of staff member:	**Nicola Rump**

Coega Gas to Power Project – Gas Infrastructure DSR: EAP Affirmation

Section 16 (1) (b) (iv), Appendix 1 Section 3 (1) (r), Appendix 2 Sections 2 (i) and (j) and Appendix 3 Section 3 (s) of the Environmental Impact Assessment (EIA) Regulations, 2014 (promulgated in terms of the National Environmental Management Act 107 of 1998 (NEMA), require an undertaking under oath or affirmation by the Environmental Assessment Practitioner (EAP) in relation to:

- The correctness of the information provided in the report;
- The inclusion of comments and inputs from stakeholders and interested and affected parties;
- Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties; and
- The level of agreement between the EAP and interested and affected parties on the Plan of Study for undertaking the environmental impact assessment.

SRK and the EAPs managing this project hereby affirm that:

- To the best of our knowledge the information provided in the report is correct, and no attempt has been made to manipulate information to achieve a particular outcome. Some information, especially pertaining to the project description, was provided by the applicant and/or their sub-contractors. In this respect, SRK's standard disclaimer (inserted in this report) pertaining to information provided by third parties applies.
- To the best of our knowledge all comments and inputs from stakeholders and interested and affected parties have been captured in the report and no attempt has been made to manipulate such comment or input to achieve a particular outcome. Written submissions are appended to the report while other comments are recorded within the report. For the sake of brevity, not all comments are recorded verbatim and are mostly captured as issues, and in instances where many stakeholders have similar issues, they are grouped together, with a clear listing of who raised which issue(s).
- If applicable, information and responses provided by the EAP to interested and affected parties are clearly presented in the report. Where responses are provided by the applicant (not the EAP), these are clearly indicated.
- With respect to EIA Reports, SRK will take account of interested and affected parties' comments on the Plan of Study and, insofar as comments are relevant and practicable, accommodate these during the Impact Assessment Phase of the EIA process.

Nicola Rump

Name

Signature

Chris Dalgliesh

Principal Consultant

Profession	Environmental Practitioner
Education	MPhil (EnvSci) with Distinction, Cape Town, 1994 BBusSc (Hons), Cape Town, 1985
Registrations/ Affiliations	Registered Environmental Assessment Practitioner (South Africa) Member International Association of Impact Assessment Director SRK South Africa 2018 - Director SRK Australia 2019 - Director SRK Investments 2011 - Director SRK Global 2013 - 2017 SRK Cape Town Managing Partner 2007 - 2015
Awards	None

Specialisation

Environmental management consulting.

Expertise

Chris Dalgliesh has been involved in management and environmental projects for the past 33 years. His expertise includes:

- EIA and ESIA (EMPR);
- Environmental and social due diligence;
- Socio-economic impact assessments;
- Stakeholder engagement;
- Strategic environment assessments and management plans;
- State of environment reporting;
- Environmental management frameworks;
- Site safety reports for the nuclear industry;
- Natural resource management;
- Waste management.

Employment

2000 – Present	SRK Consulting (Pty) Ltd, Director, Partner and Principal Environmental Consultant
1999 – 2000	Arcus Gibb (Pty) Ltd, Associate, Cape Town, South Africa
1996 – 1998	African Environmental Solutions (Pty) Ltd, Senior Environmental Consultant
1994 – 1996	Environmental Evaluation Unit, Environmental Consultant, UCT
1991 – 1993	Novello Music Publishers, Marketing Manager, London, UK
1988 – 1990	JR Phillips, Product Manager, Wokingham, UK
1986 – 1988	Unilever, Trade and Brand Manager, Durban, South Africa

Publications

I have been interviewed and quoted in numerous environmental and sustainability articles published in the press and journals.

Languages

English – read, write, speak
Afrikaans – read, write, speak
Dutch - read

Chris Dalgliesh
Principal Consultant

Publications

I have been interviewed and quoted in numerous environmental and sustainability articles published in the press and sector specific journals.

1. Angola's hydropower projects pose potential environmental risks. *African Mining Brief*. October 2016
2. Environmental Risks to Angola's Hydropower Revolution. *Alternative Energy Africa*. October 2016
3. Five facts about Angola's hydropower projects. *African Business Review.* October 2016
4. Environmental Risks to Angola's Hydropower Revolution. *Electricity and Control.* November 2016, p. 48
5. Incorporating visual impact assessments into projects. Position IT. June 2014, p54
6. Measuring the costs projects ignore. Construction World. April 2011, 6.
7. Measuring the costs projects ignore. Mining World. Published online 25 Feb 2011

Conferences/Workshops

I have attended and presented at a number of conferences/workshops.

Chris Dalgliesh

Principal Consultant

Key Experience: Environmental and social impact assessment (ESIA)

Location:	Aggeneys
Project duration & year:	2019 – ongoing
Client:	Vedanta - Black Mountain Mining (Pty) Ltd
Name of Project:	EMPr Performance Assessment, BMM and Gamsberg
Project Description:	EMPr Performance Assessment, BMM and Gamsberg
Job Title and Duties:	Project Director
Value of Project:	R115 000

Location:	Brand se Baai
Project duration & year:	2019 – ongoing
Client:	Tronox Mineral Sands
Name of Project:	Tronox EOFS Residue Facility
Project Description:	EIA for Namakwa Sands East Mine In-Pit Residue Storage Facility
Job Title and Duties:	Project Director
Value of Project:	R900 000

Location:	Suriname
Project duration & year:	2019 - ongoing
Client:	N.V. Energiebedrijven Suriname
Name of Project:	Tout lui Faut Kanaalweg Power Plant ESIA
Project Description:	ESIA for the 36 MW power plant in the Wanica District, Suriname
Job Title and Duties:	Project Director
Value of Project:	US$115 000

Location:	Western Cape
Project duration & year:	2019 - 2020
Client:	Eskom
Name of Project:	Kappa – Sterrekus Powerline
Project Description:	EIA for 765kV Kappa – Sterrekus Powerline
Job Title and Duties:	Project Director
Value of Project:	R3 000 000

Location:	Suriname
Project duration & year:	August 2019 – ongoing
Client:	Staatsolie Maatschappij Suriname
Name of Project:	Saramacca Cyclic Steam Stimulation EMMP
Project Description:	EIA for the Cyclic Steam Stimulation Enhanced Oil Recovery, Suriname
Job Title and Duties:	Project Director
Value of Project:	US$50 000

Location:	Suriname
Project duration & year:	May 2019 – ongoing
Client:	Staatsolie Maatschappij Suriname
Name of Project:	Saramacca Polymer Flood EMMP
Project Description:	EIA for Polymer Flood Enhanced Oil Recovery, Suriname
Job Title and Duties:	Project Director
Value of Project:	US$85 000

Location:	Suriname
Project duration & year:	January 2019 – ongoing
Client:	Maritieme Autoriteit Suriname
Name of Project:	Suriname River Dredging Project ESIA
Project Description:	ESIA for the dredging of the Suriname River, Suriname
Job Title and Duties:	Project Director

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Value of Project:	US$185 000
Location:	Suriname
Project duration & year:	July 2018 – 2019
Client:	Staatsolie Maatschappij Suriname
Name of Project:	Saramacca Power Plant ESIA
Project Description:	ESIA for the 36 MW power plant in the Saramacca District, Suriname
Job Title and Duties:	Project Director
Value of Project:	US$125 000
Location:	Brand se Baai
Project duration & year:	2018 – ongoing
Client:	Tronox Mineral Sands
Name of Project:	Tronox Coastal Setback
Project Description:	EIA for prospecting in the “coastal setback” at Namakwa Sands Mine
Job Title and Duties:	Project Director
Value of Project:	R800 000
Location:	Luanda, Angola
Project duration & year:	2018 – 2019
Client:	Motaengil Africa
Name of Project:	Patriota Hospital
Project Description:	IFC compliant EIA for Private Hospital
Job Title and Duties:	Project Director
Value of Project:	R640 000
Location:	South Africa
Project duration & year:	2018 - ongoing
Client:	Rheinmetall Denel
Name of Project:	Multi Purpose Nitration Plant
Project Description:	EIA for Multi Purpose Nitration Plant
Job Title and Duties:	Project Director
Value of Project:	R650 000
Location:	South Africa
Project duration & year:	June 2018 – 2019
Client:	Sezigyn
Name of Project:	Orange Deep West Exploration Right EIA
Project Description:	EIA for Exploration Right Application, Offshore Block Orange Deep West, West Coast
Job Title and Duties:	Project Director
Value of Project:	R150 000
Location:	South Africa
Project duration & year:	March 2018 – 2019
Client:	Ricocure
Name of Project:	Block 3B Exploration Right EIA
Project Description:	EIA for Exploration Right Application, Offshore Block 3B, West Coast
Job Title and Duties:	Project Director
Value of Project:	R150 000
Location:	South Africa
Project duration & year:	March 2018 – 2019
Client:	Sezigyn
Name of Project:	Mid-Orange Basin Exploration Right EIA
Project Description:	EIA for Exploration Right Application, Offshore Mid-Orange Basin, West Coast

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Job Title and Duties:	Project Director
Value of Project:	R150 000
Location:	South Africa
Project duration & year:	2017
Client:	Impact Oil and Gas
Name of Project:	Orange Deep Basin Seismic Survey
Project Description:	EIA for 2D and/or 3D Seismic Survey in Orange Deep Basin
Job Title and Duties:	Project Director
Value of Project:	R600 000
Location:	Bengo, Angola
Project duration & year:	2017 - ongoing
Client:	AES
Name of Project:	Landfill ESIA
Project Description:	ESIA of landfill
Job Title and Duties:	Project Director
Value of Project:	US$80 000
Location:	Soyo, Angola
Project duration & year:	2017
Client:	AES
Name of Project:	Landfill ESIA Amendment
Project Description:	ESIA of landfill
Job Title and Duties:	Project Director
Value of Project:	US$15 000
Location:	Pletmos Basin, Offshore Southern Cape, South Africa
Project duration & year:	2016 – 2017
Client:	Sungu Sungu Oil (Pty) Ltd
Name of Project:	Pletmos Basin Seismic Survey EIA
Project Description:	EIA
Job Title and Duties:	Project Director
Value of Project:	R 525 000
Location:	Western Cape Province, South Africa
Project duration & year:	2016 – 2017
Client:	City Of Cape Town
Name of Project:	Vissershok North Landfill Waste Management Licence
Project Description:	EIA
Job Title and Duties:	Project Director
Value of Project:	R 675 000
Location:	Lutzville, Western Cape, South Africa
Project duration & year:	September 2016 – ongoing
Client:	Mineral Sand Resources
Name of Project:	Tormin Mine EIA
Project Description:	EIA for the Tormin Mine Expansion
Job Title and Duties:	Project Director
Value of Project:	R1 500 000
Location:	Saldanha Bay, Western Cape
Project duration & year:	April 2016 – ongoing
Client:	Department of Agriculture, Forestry and Fisheries
Name of Project:	Saldanha Bay Aquaculture Development Zone EIA

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Project Description:	Project Definition and Basic Assessment for a proposed Aquaculture Development Zone in Saldanha Bay as part of Operation Phakisa
Job Title and Duties:	Project director
Value of Project:	R1 000 000
Location:	Mossel Bay, Western Cape
Project duration & year:	2016
Client:	Easigas
Name of Project:	LNG EIA
Project Description:	Environmental Impact Assessment (EIA) for LNG facility
Job Title and Duties:	Project director
Value of Project:	R 600 000
Location:	Vanrhynsdorp, Western Cape
Project duration & year:	2016
Client:	Gyproc St Gobain
Name of Project:	Maskam Mine EMPR
Project Description:	Environmental Management Programme for Maskam gypsum mine
Job Title and Duties:	Project director
Value of Project:	R 100 000
Location:	Ceres, Western Cape
Project duration & year:	2016
Client:	Eskom
Name of Project:	Bon Chretien – Merino Powerline
Project Description:	Basic Assessment for the construction of a powerline between the existing Bon Chretien substation in Ceres and the new Merino substation
Job Title and Duties:	Project director
Value of Project:	R 400 000
Location:	Brand se Baai
Project duration & year:	2015 – Ongoing
Client:	Tronox Mineral Sands (Pty) Ltd
Name of Project:	West Mine Slimes Dam 6
Project Description:	Environmental Impact Assessment (EIA) for new slimes dam
Job Title and Duties:	Project director
Value of Project:	R900 000
Location:	Observatory, Western Cape
Project duration & year:	2015 – ongoing
Client:	The River Club
Name of Project:	Redevelopment of the River Club Property
Project Description:	EIA for redevelopment
Job Title and Duties:	Project director
Value of Project:	R1 050 000
Location:	Western Cape, South Africa
Project duration & year:	2015 - ongoing
Client:	Eskom
Name of Project:	Transient Interim Storage Facility Project
Project Description:	Environmental impact assessment
Job Title and Duties:	Project director
Value of Project:	R900 000
Location:	Liberia
Project duration & year:	2015 - ongoing

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Client:	SIMO Petroleum Ltd
Name of Project:	Fuel Supply Project Liberia EIA
Project Description:	Environmental impact assessment
Job Title and Duties:	Project director
Value of Project:	US$ 200 000
Location:	Guinea
Project duration & year:	2015 - ongoing
Client:	SIMO Petroleum Ltd
Name of Project:	Fuel Supply Project Guinea ESIA
Project Description:	Environment and social impact assessment
Job Title and Duties:	Project director
Value of Project:	US$ 200 000
Location:	Liberia
Project duration & year:	2014
Client:	Sable Mining Africa Ltd
Name of Project:	Nimba Iron Ore Export Project EIA
Project Description:	Environment and social impact assessment
Job Title and Duties:	Project director
Value of Project:	US$ 450 000
Location:	Western, Northern and Eastern Cape, South Africa
Project duration & year:	2014 - 2015
Client:	Falcon Oil & Gas
Name of Project:	South Karoo Basin Shale Gas Exploration
Project Description:	Environment management programme update and engagement
Job Title and Duties:	Project director
Value of Project:	USD 90 000
Location:	Western Cape, South Africa
Project duration/date:	2014 - 2015
Client:	Department of Environmental Affairs (DEA)
Name of Project:	Licensing of Unlicensed Municipal Waste Disposal Sites
Project Description:	Waste Management License applications and Basic Assessment processes for 20 unlicensed waste disposal facilities in the W Cape.
Job Title and Duties:	Project Director
Value of Project:	R 2 600 000
Location:	St. Helena Bay, Western Cape
Project duration & year:	January 2015 – ongoing
Client:	Lucky Star
Name of Project:	Section 24G Application
Project Description:	Section 24G Application and Environmental Impact Assessment to apply for rectification of an unlawful activity
Job Title and Duties:	Project Director
Value of Project:	R 110 000
Location:	Guinea
Project duration & year:	May 2014 – on hold
Client:	Sable Mining / West Africa Explorations (WAE)
Name of Project:	Nimba Mine Project CIA
Project Description:	Cumulative Impact Assessment for WAE’s Nimba iron ore mine
Job Title and Duties:	Project Director
Value of Project:	US$90 000

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Location:	Kimberley, Northern Cape
Project duration & year:	2014-
Client:	De Beers Kimberley Mines
Name of Project:	De Beers Buffalo Camp
Project Description:	Basic Assessment and EMPR Amendment
Job Title and Duties:	Project Director
Value of Project:	R 260 000

Location:	Kraaifontein, Western Cape
Project duration & year:	2014-
Client:	Eskom
Name of Project:	Eskom Double Circuit 132kV Powerline and Denova 132/11kV Substation
Project Description:	Basic Assessment and Water Use Licence Application
Job Title and Duties:	Project Director
Value of Project:	R 300 000

Location:	Saldanha Bay, Western Cape Province, South Africa
Project duration & year:	2014 - 2015
Client:	Tronox Namakwa Sands
Name of Project:	Smelter Expansion EIA
Project Description:	EIA for additional furnace at Smelter
Job Title and Duties:	Project director
Value of Project:	ZAR1 250 000

Location:	Hermanus, Western Cape Province, South Africa
Project duration & year:	2014 - 2017
Client:	EFG Engineers
Name of Project:	Hermanus Bypass EIA
Project Description:	Environmental impact assessment
Job Title and Duties:	Project review
Value of Project:	ZAR 1 200 000

Location:	Turkey
Project duration & year:	2014
Client:	SRK Turkey
Name of Project:	Copler Gold Mine Expansion Cumulative CIA
Project Description:	Cumulative impact assessment
Job Title and Duties:	Project review
Value of Project:	US$30 000

Location:	Liberia
Project duration & year:	2014
Client:	Sable Mining Africa Ltd
Name of Project:	Nimba Iron Ore Export Project EIA
Project Description:	Environment and social impact assessment
Job Title and Duties:	Project director
Value of Project:	US$450 000

Location:	Brand se Baai, Western Cape Province, South Africa
Project duration & year:	2014 - ongoing
Client:	Tronox Namakwa Sands
Name of Project:	Abalone Farm EIA
Project Description:	EIA for abalone farm
Job Title and Duties:	Project director
Value of Project:	ZAR1 050 000

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Location:	Doringbaai, Western Cape Province, South Africa
Project duration & year:	2014 - ongoing
Client:	Matzikamma Municipality
Name of Project:	Abalone Farm EIAs
Project Description:	EIAs for three abalone farms
Job Title and Duties:	Project director
Value of Project:	ZAR1 100 000

Location:	Liberia
Project duration & year:	2014
Client:	Sable Mining Africa Ltd
Name of Project:	Nimba Iron Ore Export Project EIA : Phase 1
Project Description:	Environment and social impact assessment
Job Title and Duties:	Project director
Value of Project:	US$30 000

Location:	Kimberley, South Africa
Project duration & year:	2013
Client:	De Beers
Name of Project:	EMPr Amendment
Project Description:	EMPr amendment to incorporate extension of fine residue pond for submission to Department of Mineral Resources
Job Title and Duties:	Project director
Value of Project:	R120 000

Location:	Soyo, Angola
Project duration & year:	2013
Client:	AES
Name of Project:	Landfill ESIA
Project Description:	ESIA of landfill
Job Title and Duties:	Project director
Value of Project:	US$70 000

Location:	Angola
Project duration & year:	2013
Client:	Western Geco
Name of Project:	Western Geco Ultra Deep EIA
Project Description:	Environment and social impact assessment
Job Title and Duties:	Project director
Value of Project:	US$ 35 000

Location:	Southern Cape, South Africa
Project duration & year:	2013 - ongoing
Client:	PetroSA
Name of Project:	Offshore EIA and EMP
Project Description:	EIA of offshore gasfield
Job Title and Duties:	Project director
Value of Project:	R500 000

Location:	Suriname
Project duration & year:	2013
Client:	EnergieBedrijven Suriname
Name of Project:	EBS Power Plant ESIA
Project Description:	ESIA of new power plant
Job Title and Duties:	Project director
Value of Project:	US$135 000

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Location:	Soyo, Angola
Project duration & year:	2013
Client:	AES
Name of Project:	TDU ESIA
Project Description:	ESIA of Thermal Desorption Unit
Job Title and Duties:	Project director
Value of Project:	US$65 000

Location:	Suriname
Project duration & year:	September 2012 – ongoing
Client:	Staatsolie Maatschappij Suriname
Name of Project:	SPCS Power Plant Expansion Rapid EA
Project Description:	Rapid EA of power plant expansion
Job Title and Duties:	Project director
Value of Project:	US$100 000

Location:	Angola
Project duration & year:	2012
Client:	BP
Name of Project:	BP Blocks 18 & 31 Drilling and Seismic Survey
Project Description:	Environment and social impact assessment
Job Title and Duties:	Project director
Value of Project:	US$ 40 000

Location:	Abraham Villiers Bay, Northern Cape, South Africa
Project duration & year:	August 2012 – ongoing
Client:	Frontier
Name of Project:	Desalination Plant EIA
Project Description:	EIA for proposed desalination plant and water pipeline
Job Title and Duties:	Project director
Value of Project:	R1 250 000

Location:	Lucap, Lunda Norte, Angola
Project duration & year:	2012
Client:	Tecmad
Name of Project:	Confidential
Project Description:	Retrospective EIA for existing open pit and alluvial diamond mining operation
Job Title and Duties:	Project director
Value of Project:	R275 000

Location:	Namakwaland, Western Cape Province, South Africa
Project duration & year:	2012 - ongoing
Client:	Tronox Namakwa Sands
Name of Project:	Namakwa Sands EIA/EMPr
Project Description:	EIA /EMPr for two mining application areas
Job Title and Duties:	Project director
Value of Project:	ZAR1 250 000

Location:	Vanrhynsdorp, Western Cape, South Africa
Project duration & year:	2012
Client:	Viaquin Investments (Pty) Ltd
Name of Project:	EMPlan for Rare Earth Elements Prospecting ner Vanrhynsdorp
Project Description:	EMPlan for submission to Department of Mineral Resources
Job Title and Duties:	Project director
Value of Project:	R80 000

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Location:	Vanrhynsdorp, Western Cape, South Africa
Project duration & year:	2012
Client:	Viaquin Investments (Pty) Ltd
Name of Project:	EMPlan for Rare Earth Elements Prospecting ner Vanrhynsdorp
Project Description:	EMPlan for submission to Department of Mineral Resources
Job Title and Duties:	Project director
Value of Project:	R80 000

Location:	Cape Town, South Africa
Project duration/date:	2012 - ongoing
Client:	Airports Company South Africa
Name of Project:	CTIA Runway Realignment EIA
Project Description:	EIA of realignment of runway
Job Title and Duties:	Project director
Value of SRK Project:	R1 675 000

Location:	Matzikama Municipality, South Africa
Project duration/date:	2012 - ongoing
Client:	Exxaro Namakwa Sands
Name of Project:	Exxaro Namakwa Sands EIA and EMPr
Project Description:	EIA and EMPr for two new mining areas at the Exxaro Namakwa Sands mining operations at Brand-se-Baai.
Job Title and Duties:	Project director
Value of SRK Project:	R1 250 000

Location:	Maputo, Mozambique
Project duration/date:	2012
Client:	Grindrod Mauritius
Name of Project:	ESIA of Matola Coal Terminal Phase 4 Expansion
Project Description:	EIA of Matola Coal Terminal Phase 4 Expansion in Maputo
Job Title and Duties:	Project director
Value of SRK Project:	USD 425 000

Location:	Angola
Project duration & year:	2010 - 2011
Client:	Maersk
Name of Project:	Maersk Blocks 16 Seismic Survey
Project Description:	Environment and social impact assessment
Job Title and Duties:	USD 25 000 m
Value of Project:	Project director

Location:	Suriname
Project duration & year:	October 2011 – ongoing
Client:	Staatsolie Maatschappij Suriname
Name of Project:	Staatsolie Pipeline EIA
Project Description:	EIA for proposed construction of diesel, gasoline and LGP pipelines
Job Title and Duties:	Project director
Value of Project:	US$120 000

Location:	Saldanha Bay, South Africa
Project duration & year:	May 2011 – ongoing
Client:	Premier Fishing
Name of Project:	Saldanha Fish Meal Plant
Project Description:	EIA for proposed re-establishment of fish meal plant in Saldanha Bay
Job Title and Duties:	Project director
Value of Project:	R1 200 000

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Location:	Matzikama Municipality, South Africa
Project duration/date:	2011
Client:	Exxaro Namakwa Sands
Name of Project:	Exxaro Namakwa Sands Socio-economic Impact Assessment
Project Description:	Socio-economic Impact Assessment of the Exxaro Namakwa Sands mining operation on the local communities in the Matzikama Municipality.
Job Title and Duties:	Project director
Value of SRK Project:	R80 000

Location:	Angola
Project duration/date:	2011 (ongoing)
Client:	Eni Angola BV
Name of Project:	Block 15/06 West Hub Development
Project Description:	Environmental Social and Health Impact Assessment (ESHIA) of the proposed development of the Block 15/06 West Hub oil fields, in conjunction with Angola Resources Consultants (ARC).
Job Title and Duties:	Project director
Value of SRK Project:	USD110 000

Location:	Angola
Project duration & year:	2010 - 2011
Client:	Maersk
Name of Project:	Maersk Blocks 16 Seismic Survey
Project Description:	Environment and social impact assessment
Job Title and Duties:	Project director
Value of Project:	USD 25 000Project director

Location:	Western, Northern and Eastern Cape, South Africa
Project duration & year:	2010 - 2011
Client:	Falcon Oil & Gas
Name of Project:	South Karoo Basin Shale Gas Exploration
Project Description:	Environment management programme
Job Title and Duties:	Project director
Value of Project:	USD 100 000

Location:	Nampula Province, Mozambique
Project duration & year:	2010 - ongoing
Client:	Vale
Name of Project:	Evate Phosphate Processing Plant, Mozambique
Project Description:	Environmental scoping study
Job Title and Duties:	Project review
Value of Project:	USD 30 000

Location:	Vanrhynsdorp, Western Cape, South Africa
Project duration & year:	2010 – ongoing
Client:	Great Western Minerals Group
Name of Project:	Steenkampskraal Rare Earth Elements Mine
Project Description:	Environment impact assessment and EMPr
Job Title and Duties:	Project director
Value of Project:	R1 760 000

Location:	Northern Cape, South Africa
Project duration & year:	2010 – ongoing
Client:	Ranor Karoo Farm Holdings
Name of Project:	Schanskraal Residential Estate
Project Description:	Environment impact assessment
Job Title and Duties:	Project director

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Value of Project:	R560 000
Location:	Eastern Senegal
Project duration & year:	July – September 2010
Client:	Oromin Joint Venture Group
Name of Project:	Oromin Sabodala Gold Mine
Project Description:	Visual impact assessment
Job Title and Duties:	Project consultant
Value of Project:	USD 27 000
Location:	Brazil
Project duration & year:	May 2010
Client:	SRK UK
Name of Project:	MBAC Phosphate and Potash Mine
Project Description:	Environmental due diligence review
Job Title and Duties:	Project review
Value of Project:	USD 2 000
Location:	Nampula Province, Mozambique
Project duration & year:	2010 - ongoing
Client:	Vale
Name of Project:	Evate Phosphate Mine, Mozambique
Project Description:	Environmental and social impact assessment
Job Title and Duties:	Project review
Value of Project:	USD 630 000
Location:	Luanda, Malange and Lubango, Angola
Project duration & year:	March – November 2010
Client:	Sonangol Lda
Name of Project:	Sonangol Bulk Storage Depots
Project Description:	Environment impact assessment (x6)
Job Title and Duties:	Project review
Value of Project:	USD 280 000
Location:	Sofala Province, Mozambique
Project duration & year:	2009 – 2010
Client:	Empresa Moçambicana de hidrocarbonetos and Buzi Hydrocarbons Pty Ltd
Name of Project:	Seismic Surveys and Exploration Drilling in Buzi Block
Project Description:	Environment and social impact assessment
Job Title and Duties:	Project reviewer
Value of Project:	USD 200 000
Location:	Paramaribo, South America
Project duration & year:	2009 – 2010
Client:	Staatsolie
Name of Project:	Staatsolie Refinery Expansion
Project Description:	Environment and social impact assessment
Job Title and Duties:	Project director
Value of Project:	USD 400 000
Location:	Angola
Project duration & year:	2008 - 2010
Client:	Petrobras
Name of Project:	Petrobras Blocks 6, 18 and 26 Prospect Well Drilling
Project Description:	Environment and social impact assessments (x3)
Job Title and Duties:	USD 123 000

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Value of Project:	Project director
Location:	Moamba, Mozambique
Project duration & year:	2009 – 2010
Client:	Sasol Technology
Name of Project:	Sasol Moamba Pipeline
Project Description:	EIA for proposed new gas pipeline from Ressano Garcia to Moamba, Mozambique
Job Title and Duties:	Project director
Value of Project:	R 1 000 000
Location:	Aggeneys, South Africa
Project duration & year:	2008 – 2010
Client:	Anglo American
Name of Project:	Gamsberg Zinc Mine
Project Description:	State of Environment Report, Strategic Environment Assessment, and Environmental, Social and Health Impact Assessment
Job Title and Duties:	Project partner: strategy and review
Value of Project:	R13 m
Location:	Botswana and Namibia
Project duration & year:	2008 – present
Client:	CIC Energy
Name of Project:	Trans Kalahari Railroad and Port Screening Study
Project Description:	Environmental screening and fatal flaw assessment
Job Title and Duties:	Strategy and review
Value of Project:	R1 300 000
Location:	Mossel Bay, South Africa
Project duration & year:	2008 – 2009
Client:	Anglo American
Name of Project:	Anglo American Mossel Bay Power Plant
Project Description:	Environmental impact assessment
Job Title and Duties:	Project director
Value of Project:	R840 000
Location:	Suriname
Project duration & year:	2007 – 2008
Client:	BHP Billiton
Name of Project:	Corantijn River Dredging ESIA
Project Description:	Environmental and social impact assessment
Job Title and Duties:	Project director
Value of Project:	USD 750 000
Location:	Chrysallis Landfill
Project duration & year:	2006 – 2007
Client:	PlanTrust
Name of Project:	Bottelary, Western Cape Province, South Africa
Project Description:	EIA for proposed landfill
Job Title and Duties:	Project director
Value of Project:	R700 000
Location:	Suriname
Project duration & year:	2006 – 2008
Client:	BHP Billiton
Name of Project:	Bakhuis Transport ESIA

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Project Description:	Environmental and social impact assessment
Job Title and Duties:	Project director
Value of Project:	USD 1.6 million
Location:	Worcester, Western Cape Province, South Africa
Project duration & year:	2006 – 2010
Client:	Altona Developments
Name of Project:	EIA for Altona Development
Project Description:	Environmental impact assessment
Job Title and Duties:	Project director
Value of Project:	R750 000
Location:	Nassau, Suriname
Project duration & year:	2006
Client:	BHP Billiton
Name of Project:	Nassau Exploration
Project Description:	Initial environmental review
Job Title and Duties:	Project director
Value of Project:	USD 15 000
Location:	Bakhuis, Suriname
Project duration & year:	2005 – 2008
Client:	BHP Billiton
Name of Project:	Bakhuis Bauxite Mining ESIA
Project Description:	Environmental and social impact assessment
Job Title and Duties:	Project director
Value of Project:	USD 3.2m
Location:	Suider-Paarl, Western Cape Province, South Africa
Project duration & year:	2005 – 2008
Client:	Levendal Developments (Pty) Ltd
Name of Project:	Levendal Development EIA
Project Description:	Environmental impact assessment
Job Title and Duties:	Project director
Value of Project:	ZAR 450 000
Location:	Somerset West, Western Cape Province, South Africa
Project duration & year:	2005 – 2006
Client:	Ninham Shand (Pty) Ltd
Name of Project:	Somerset West Road Upgrade TR2 and MR 108 road upgrades
Project Description:	2 x Scoping studies
Job Title and Duties:	Project director
Value of Project:	ZAR 250 000
Location:	Coermotibo, Suriname
Project duration & year:	2005
Client:	BHP Billiton
Name of Project:	Coermotibo Three Hills Bauxite deposits
Project Description:	Environmental and social impact assessment
Job Title and Duties:	Project director
Value of Project:	USD 65 000
Location:	Luanda, Angola
Project duration & year:	2005
Client:	Best Angola Metal
Name of Project:	Angola metals recycling - EIA

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Project Description:	Environmental impact assessment
Job Title and Duties:	Project director
Value of Project:	USD 60 000
Location:	Viana, Angola
Project duration & year:	2005 -2010
Client:	Bevcan, Angola
Name of Project:	Bevcan canning facility - EIA
Project Description:	Environmental impact assessment
Job Title and Duties:	Project director
Value of Project:	USD 75 000
Location:	Cabinda, Angola
Project duration & year:	2004 – 2005
Client:	Chevron Texaco
Name of Project:	Malongo base hazardous landfill - EIA
Project Description:	Environmental impact assessment
Job Title and Duties:	Project director
Value of Project:	USD 90 000
Location:	Rive Gauche residential development
Project duration & year:	Power Cape Developments (Pty) Ltd
Client:	Blackheath, Western Cape Province, South Africa
Name of Project:	Environmental impact assessment
Project Description:	2004 – 2005
Job Title and Duties:	Project director
Value of Project:	ZAR 300 000
Location:	Groenkloof, Western Cape Province, South Africa
Project duration & year:	2004
Client:	Brandwacht Land Development (Pty) Ltd
Name of Project:	Brandwacht Rezoning - EIA
Project Description:	Scoping study
Job Title and Duties:	Project director
Value of Project:	ZAR 100 000
Location:	Mossel Bay, Western Cape Province, South Africa
Project duration & year:	2004
Client:	Joao Da Nova
Name of Project:	Hartenbos Heuwels EIA, Rezoning of land to residential
Project Description:	Scoping study and rezoning of land to residential
Job Title and Duties:	Project director
Value of Project:	ZAR 75 000
Location:	Mossel Bay, Western Cape Province, South Africa
Project duration & year:	2004
Client:	Joao Da Nova
Name of Project:	Kwanonqaba EIA, Rezoning of land to light industry
Project Description:	Scoping study and rezoning of land to light industrial
Job Title and Duties:	Project director
Value of Project:	ZAR 75 000
Location:	Mossel Bay, Western Cape Province, South Africa
Project duration & year:	2004
Client:	Attpower Developments (Pty) Ltd
Name of Project:	Mossel Bay beachfront redevelopment and walkway - EIA

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Project Description:	Environmental impact assessment
Job Title and Duties:	Project director
Value of Project:	ZAR 600 000
Location:	Cacuaco, Angola
Project duration & year:	2004
Client:	Intels Services Luanda
Name of Project:	Intels hazardous landfill - Intels Landfill Operating Manual
Project Description:	Environmental impact assessment
Job Title and Duties:	Project director
Value of Project:	USD 65 000
Location:	Cape Peninsula National Park, Western Cape Province, South Africa
Project duration & year:	2003 – 2005
Client:	Halcyon Africa
Name of Project:	Halcyon Koeel Bay Lodge, investigation of Groundwater Use/Resources
Project Description:	Environmental impact assessment
Job Title and Duties:	Project director
Value of Project:	ZAR 300 000
Location:	Gansbaai, Western Cape Province, South Africa
Project duration & year:	2003 – 2005
Client:	Kwezi V3
Name of Project:	Gansbaai Waste Water Treatment Works
Project Description:	Environmental impact assessment
Job Title and Duties:	Project director
Value of Project:	ZAR 350 000
Location:	Pearly beach, Western Cape Province, South Africa
Project duration & year:	2003 – 2004
Client:	Overstrand Municipality
Name of Project:	Pearly Beach waste water treatment works
Project Description:	Environmental impact assessment
Job Title and Duties:	Project director
Value of Project:	ZAR 200 000
Location:	Bordjieskrif Cape Peninsula National Park, Western Cape Province, South Africa
Project duration & year:	2003 – 2004
Client:	Cape Peninsula National Park
Name of Project:	Bordjieskrif Experimental Centre
Project Description:	Environmental impact assessment
Job Title and Duties:	Project director
Value of Project:	ZAR 240 000
Location:	Cape Town, Western Cape Province, South Africa
Project duration & year:	2003 – 2004
Client:	City of Cape Town
Name of Project:	Fisantekraal waste water treatment works, EIA : Fisantekraal
Project Description:	Environmental impact assessment
Job Title and Duties:	Project director
Value of Project:	ZAR 450 000
Location:	Luanda, Angola
Project duration & year:	2003
Client:	Intels Services Luanda

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Name of Project:	Intels total waste management facility
Project Description:	Environmental impact assessment
Job Title and Duties:	Project director
Value of Project:	USD 60 000
Location:	Somerset West, Western Cape Province, South Africa
Project duration & year:	2002 – 2003
Client:	Heartland Properties (Pty) Ltd
Name of Project:	Zeconi Fibre Optic Plant
Project Description:	Environmental impact assessment
Job Title and Duties:	Project director
Value of Project:	ZAR 250 000
Location:	Eastern Cape Province, South Africa
Project duration & year:	2002 – 2003
Client:	St Francis Bay Municipality
Name of Project:	St Francis Bay, beach remediation
Project Description:	Environmental impact assessment
Job Title and Duties:	Project director
Value of Project:	ZAR 300 000
Location:	Western Cape Province, South Africa
Project duration & year:	2001 – 2004
Client:	Breede River Winelands Municipality
Name of Project:	Breede River Winelands Municipality Landfill
Project Description:	Environmental impact assessment
Job Title and Duties:	Project manager
Value of Project:	ZAR 400 000
Location:	Western Cape Province, South Africa
Project duration & year:	2001 – 2004
Client:	City Of Cape Town
Name of Project:	Vissershoek EICR North landfill extension
Project Description:	Environmental impact assessment
Job Title and Duties:	Project director
Value of Project:	ZAR 175 000
Location:	Plettenberg Bay, Eastern Cape Province, South Africa
Project duration & year:	2001 – 2002
Client:	Sanderlings Coastal Estates
Name of Project:	Sanderlings Estate Development - EIA
Project Description:	Scoping study
Job Title and Duties:	Project manager
Value of Project:	ZAR 150 000
Location:	Capricorn Park, Western Cape Province, South Africa
Project duration & year:	2001 – 2002
Client:	Heartland Properties (Pty) Ltd
Name of Project:	Zeconi fibre optic plant
Project Description:	Supplementary environment impact assessment
Job Title and Duties:	Project director
Value of Project:	ZAR 180 000
Location:	Worcester, Western Cape Province, South Africa
Project duration & year:	2000 – 2004
Client:	KWV

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Name of Project:	Effluent disposal site and pipeline
Project Description:	Environmental impact assessment
Job Title and Duties:	Project director
Value of Project:	ZAR 250 000
Location:	Saldanha, Western Cape Province, South Africa
Project duration & year:	2000 – 2002
Client:	SA Port Operations
Name of Project:	Portnet Saldanha iron ore terminal expansion – EIA
Project Description:	Environmental impact study
Job Title and Duties:	Project director
Value of Project:	ZAR 600 000
Location:	Robertson, Western Cape Province, South Africa
Project duration & year:	2000 – 2001
Client:	Breed River Winelands Municipality
Name of Project:	Robertson landfill
Project Description:	Scoping study
Job Title and Duties:	Project manager
Value of Project:	ZAR 75 000
Location:	Durbanville, Western Cape Province, South Africa
Project duration & year:	2000 – 2001
Client:	Omnicron Eiendomsmakelaars Trust
Name of Project:	Kanonberg Lifestyle Estate, Road Amendment
Project Description:	Scoping study
Job Title and Duties:	Project manager
Value of Project:	ZAR 130 000
Location:	2000
Project duration & year:	Nigeria
Client:	Entech
Name of Project:	Bar Beach Waterfront - EIA
Project Description:	Reclamation and redevelopment feasibility study
Job Title and Duties:	Project manager
Value of Project:	USD 10 000
Location:	2000
Project duration & year:	Meerlust, Western Cape Province, South Africa
Client:	Ninham Shand
Name of Project:	Meerlust Bosbou social housing project
Project Description:	Scoping study
Job Title and Duties:	Project manager
Value of Project:	ZAR 75 000
Location:	Airport Industria, Cape Town, Western Cape Province, South Africa
Project duration & year:	1999 – 2000
Client:	NGK
Name of Project:	NGK ceramics shuttle kiln
Project Description:	Scoping study
Job Title and Duties:	Project manager
Value of Project:	ZAR 150 000
Location:	Zandvliet/Macassar, Western Cape Province, South Africa
Project duration & year:	1999 – 2000
Client:	City of Cape Town

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Name of Project:	Zandvliet/Macassar waste water treatment works
Project Description:	Environmental impact assessment
Job Title and Duties:	Project manager
Value of Project:	ZAR 300 000
Location:	Eastern Cape Province, South Africa
Project duration & year:	1999
Client:	Coega Development Corporation
Name of Project:	Coega development zone
Project Description:	Rezoning environmental impact assessment
Job Title and Duties:	Project coordinator
Value of Project:	ZAR 85 000
Location:	Atlantis, Western Cape Province, South Africa
Project duration & year:	1999
Client:	FibreCore
Name of Project:	IDC optical glass facility
Project Description:	Scoping report
Job Title and Duties:	Project manager
Value of Project:	ZAR 50 000
Location:	Port Elizabeth, Eastern Cape Province, South Africa
Project duration & year:	1999
Client:	Umtha Welanga
Name of Project:	Umtha Welanga Casino
Project Description:	Environmental impact assessment and EMP
Job Title and Duties:	Project manager
Value of Project:	ZAR 220 000
Location:	Richards Bay, KwaZulu-Natal Province, South Africa
Project duration & year:	1999
Client:	BHP Billiton
Name of Project:	Proposed Alusaf Hillside smelter
Project Description:	Environmental impact assessment – scoping only
Job Title and Duties:	Project manager
Value of Project:	ZAR 150 000
Location:	Eastern Cape Province, South Africa
Project duration & year:	1997 – 1998
Client:	Coega Development Corporation
Name of Project:	Environmental assessment
Project Description:	Coega Quarry Haul Road
Job Title and Duties:	Project manager
Value of Project:	ZAR 30 000
Location:	Port Elizabeth, Eastern Cape Province, South Africa
Project duration & year:	1995 – 1998
Client:	Gencor
Name of Project:	Gencor Zinc refinery and Kynoch phosphoric plant
Project Description:	Environmental impact assessment
Job Title and Duties:	Project manager
Value of Project:	ZAR 800 000
Location:	Saldanha, Western Cape Province, South Africa
Project duration & year:	1997
Client:	Duferco

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Name of Project:	DSP steel rolling mini-mill
Project Description:	Environmental impact assessment
Job Title and Duties:	Project manager
Value of Project:	ZAR 90 000
Location:	Durban, KwaZulu-Natal Province, South Africa
Project duration & year:	1993 – 1994
Client:	Hoechst
Name of Project:	Hoescht SA polymer extension
Project Description:	Initial EIA
Job Title and Duties:	Joint project manager
Value of Project:	ZAR 280 000

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Key Experience: Environmental planning and natural resource management

Location:	Saldanha Bay, Western Cape
Project duration & year:	2018
Client:	Transnet
Name of Project:	Review of Operational EMP for Port of Saldanha
Project Description:	Operational EMP
Job Title and Duties:	Project Director
Value of Project:	R170 000

Location:	Duynefontyn and Thyspunt, South Africa
Project duration & year:	2017 – ongoing
Client:	Eskom
Name of Project:	Nuclear Site Safety Reports Update
Project Description:	Ecological Reports
Job Title and Duties:	Report compilation and review
Value of Project:	ZAR 800 0000

Location:	Western Cape Province, South Africa
Project duration & year:	2016 – 2017
Client:	Western Cape State of Environmental Report Update
Name of Project:	Provincial Government Western Cape
Project Description:	Environmental report
Job Title and Duties:	Project director
Value of Project:	ZAR 1.7 million

Location:	Brand-se-Baai, Western Cape
Project duration & year:	2015-ongoing
Client:	Tronox
Name of Project:	Assessment of the rehabilitation potential of the Namakwa Sands Mine
Project Description:	Development of Closure Commitments and Rehabilitation Monitoring Plan
Job Title and Duties:	Project director
Value of Project:	R 600 000

Location:	Cape Town Harbour, Western Cape
Project duration & year:	2015-
Client:	Chevron South Africa (Pty) Ltd
Name of Project:	Chevron CWDP Application
Project Description:	Coastal Waters Discharge Permit Application for the Upgrade of Tank 25-D1 at Cape Town Harbour
Job Title and Duties:	Project director
Value of Project:	R 120 000

Location:	West Coast, South Africa
Project duration & year:	2012 - 2013
Client:	West Coast District Municipality
Name of Project:	WCDM ICMP
Project Description:	Integrated Coastal Management Plan
Job Title and Duties:	Project director
Value of Project:	ZAR 700 0000

Location:	Cape Town, Western Cape Province, South Africa
Project duration & year:	2008 - 2009
Client:	City of Cape Town

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Name of Project:	City of Cape Town Environmental Management Framework Districts A, D, G, H
Project Description:	Environmental Management Framework and control zones
Job Title and Duties:	Project director
Value of Project:	ZAR 600 0000
Location:	Koeberg, Bantamsklip and Thyspunt, South Africa
Project duration & year:	2008 – 2013
Client:	Eskom
Name of Project:	Nuclear I Site Safety Reports
Project Description:	Ecological Reports
Job Title and Duties:	Report compilation and review
Value of Project:	ZAR 900 0000
Location:	Cape Town, Western Cape Province, South Africa
Project duration & year:	2008
Client:	City of Cape Town
Name of Project:	City of Cape Town Environmental Management Framework Districts B, C & E
Project Description:	Environmental Management Framework and control zones
Job Title and Duties:	Project director
Value of Project:	ZAR 500 0000
Location:	Western Cape Province, South Africa
Project duration & year:	2004 – 2005
Client:	Knysna Municipality
Name of Project:	Knysna State of Environment Report
Project Description:	Environmental report framework and state of environment report
Job Title and Duties:	Project director
Value of Project:	ZAR 130 000
Location:	Western Cape Province, South Africa
Project duration & year:	2004 – 2005
Client:	Western Cape State of Environmental Report
Name of Project:	Provincial Government Western Cape
Project Description:	Environmental report
Job Title and Duties:	Project director
Value of Project:	ZAR 1.4 million
Location:	Cape Town, Western Cape Province, South Africa
Project duration & year:	2002 – 2003
Client:	Planning Partners
Name of Project:	Culemborg DFP
Project Description:	Strategic environmental opportunities and constraints study
Job Title and Duties:	Project director
Value of Project:	ZAR 80 000
Location:	Western Cape Province, South Africa
Project duration & year:	2001 – 2003
Client:	Table Mountain National Park
Name of Project:	Cape Peninsula National Park infrastructure
Project Description:	Environmental management manual (2001 and 2003 review)
Job Title and Duties:	Project director
Value of Project:	ZAR 130 000
Location:	Outeniqua, Western Cape Province, South Africa

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Project duration & year:	2000 – 2001
Client:	Planning Partners
Name of Project:	Outeniqua spatial development framework
Project Description:	Strategic EMP
Job Title and Duties:	Project director
Value of Project:	ZAR 240 000

Location:	Sout River, Western Cape Province, South Africa
Project duration & year:	2000
Client:	City of Cape Town
Name of Project:	Sout River catchment
Project Description:	Catchment management plan
Job Title and Duties:	Project director
Value of Project:	ZAR 80 000

Location:	Capricorn Park, Western Cape Province, South Africa
Project duration & year:	1998
Client:	FibreCore
Name of Project:	IDC optical glass facility
Project Description:	Technical report
Job Title and Duties:	Project manager
Value of Project:	ZAR 20 000

Location:	Eastern Cape Province, South Africa
Project duration & year:	1998
Client:	Coega Development Corporation
Name of Project:	Coega development zone
Project Description:	Open space management plan
Job Title and Duties:	Project coordinator
Value of Project:	ZAR 40 000

Location:	Eastern Cape Province, South Africa
Project duration & year:	1998
Client:	Coega Development Corporation
Name of Project:	Algoa Bay (Coega development zone)
Project Description:	Management plan
Job Title and Duties:	Project coordinator
Value of Project:	ZAR 40 000

Location:	Eastern Cape Province, South Africa
Project duration & year:	1998
Client:	Coega Development Corporation
Name of Project:	Coega Marine (Coega development zone)
Project Description:	Risk assessment
Job Title and Duties:	Project coordinator
Value of Project:	ZAR 50 000

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Key Experience: Environmental management consulting

Location:	Beaufort West, Western Cape Province, South Africa
Project duration & year:	2016 - 2017
Client:	Tasman Pacific Minerals
Name of Project:	Rystkuil and Quaggasfontein Uranium Mine Advisory
Project Description:	Enai Environmental Advisory for EIAs
Job Title and Duties:	Project director
Value of Project:	ZAR 250 000

Location:	Paramaribo, Suriname
Project duration & year:	2014
Client:	NIMOS
Name of Project:	EIA Training
Project Description:	EIA training course for entry level environmental practitioners
Job Title and Duties:	Course director and presenter
Value of Project:	USD 30 000

Location:	Namakwaland, Western Cape Province, South Africa
Project duration & year:	2012 - ongoing
Client:	Tronox Namakwa Sands
Name of Project:	Traffic Management
Project Description:	Traffic and consultation study for increased haul truck traffic
Job Title and Duties:	Project director
Value of Project:	ZAR150 000

Location:	Suriname
Project duration & year:	2005 - 2006
Client:	BMS
Name of Project:	BHP Billiton Next Generation Mines Concept Study
Project Description:	Concept study: environment and community
Job Title and Duties:	Project director
Value of Project:	USD 25 000 and USD 15 000

Location:	Hout Bay, St Helena Bay and Lamberts Bay, Western Cape Province
Project duration & year:	2002 – 2004
Client:	Oceana Operations
Name of Project:	Oceana Ltd
Project Description:	Public participation and emissions permitting
Job Title and Duties:	Project director
Value of Project:	ZAR 200 000

Location:	Cape Metropolitan Area, Western Cape Province, South Africa
Project duration & year:	2001
Client:	City of Cape Town
Name of Project:	Outdoor advertising
Project Description:	EIA guidelines
Job Title and Duties:	Project director
Value of Project:	ZAR 65 000

Location:	Cape Metropolitan Area, Western Cape Province
Project duration & year:	1999 – 2000
Client:	Ericsson
Name of Project:	Acquisition
Project Description:	Ericsson cellular sites

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Job Title and Duties:	Project manager
Value of Project:	ZAR 230 000
Location:	Worldwide
Project duration & year:	1999
Client:	BHP Billiton
Name of Project:	Billiton companies
Project Description:	Environmental reporting guidelines
Job Title and Duties:	Project manager
Value of Project:	ZAR 60 000
Location:	Eastern Cape Province, South Africa
Project duration & year:	1999
Client:	Coega Development Corporation
Name of Project:	Coega IDZ and Harbour
Project Description:	Environmental management framework
Job Title and Duties:	Project manager
Value of Project:	ZAR 250 000
Location:	Eastern Cape Province, South Africa
Project duration & year:	1999
Client:	Coega Development Corporation
Name of Project:	Coega IDZ and Harbour
Project Description:	Environmental management framework
Job Title and Duties:	Project manager
Value of Project:	ZAR 250 000
Location:	Eastern Cape Province, South Africa
Project duration & year:	1998
Client:	Coega Development Corporation
Name of Project:	Coega development zone
Project Description:	Environmental design manual
Job Title and Duties:	Project manager
Value of Project:	ZAR 30 000
Location:	Eastern Cape Province, South Africa
Project duration & year:	1998
Client:	Coega Development Corporation
Name of Project:	Coega Development Zone
Project Description:	Open space environmental review
Job Title and Duties:	Project manager
Value of Project:	ZAR 25 000
Location:	Swaziland
Project duration & year:	1997
Client:	Swaziland Electricity Board
Name of Project:	Swaziland Electricity Board
Project Description:	EIA training course
Job Title and Duties:	Project manager
Value of Project:	ZAR 75 000

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Key Experience: Environmental review and due diligence

Location:	Alexander Bay, South Africa
Project duration & year:	2020
Client:	Eramet Comilog Manganese
Name of Project:	Environmental Regulatory Due Diligence of Heavy Minerals Mine
Project Description:	Limited Environmental Regulatory Due Diligence of Heavy Minerals Mine
Job Title and Duties:	Project director
Value of Project:	€ 11 000

Location:	Ghorashal, Bangladesh
Project duration & year:	2020- 2032
Client:	HSBC Hong Kong
Name of Project:	Caculo Cabaca Dam ESDD
Project Description:	Environmental and Social Compliance Monitoring of Fertilizer Plant and Railway Line
Job Title and Duties:	Project director
Value of Project:	$ 670 000

Location:	Caculo Cabaca, Angola
Project duration & year:	2020
Client:	Euler Hermes / UniCredit / Voith
Name of Project:	Caculo Cabaca Dam ESDD
Project Description:	Environmental and Social Due Diligence and Action Plan
Job Title and Duties:	Project director
Value of Project:	€ 30 000

Location:	Caculo Cabaca, Angola
Project duration & year:	2020
Client:	Euler Hermes / UniCredit / Voith
Name of Project:	Caculo Cabaca Dam ESDD
Project Description:	Environmental and Social Due Diligence and Action Plan
Job Title and Duties:	Project director
Value of Project:	€ 30 000

Location:	Langebaan, South Africa
Project duration & year:	2020
Client:	BNP Paribas
Name of Project:	Elandsfontein Expansion ES Due Diligence
Project Description:	Environmental and Social Compliance Monitoring
Job Title and Duties:	Lead auditor; Environment
Value of Project:	R115 000

Location:	Saldanha Bay, Western Cape
Project duration & year:	2018
Client:	Easigas
Name of Project:	Easigas LPG Depot
Project Description:	ESDD of Avedia LPG terminal
Job Title and Duties:	Project Director
Value of Project:	R90 000

Location:	Caculo Cabaca, Angola
Project duration & year:	2017
Client:	Standard Bank South Africa Limited
Name of Project:	Caculo Cabaca ESDD
Project Description:	Environmental and Social Due Diligence and Action Plan

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Job Title and Duties:	Lead auditor
Value of Project:	$ 23 000
Location:	Luanda, Angola
Project duration & year:	2017
Client:	AES
Name of Project:	Cacuaco Landfill Compliance Review
Project Description:	Compliance Audit
Job Title and Duties:	Project Director
Value of Project:	US$17 500
Location:	Langebaan, South Africa
Project duration & year:	2016 - 2017
Client:	BNP Paribas
Name of Project:	Elandsfontein ES Compliance
Project Description:	Environmental and Social Compliance Monitoring
Job Title and Duties:	Lead auditor; Environment
Value of Project:	R275 000
Location:	Port Elizabeth, South Africa
Project duration & year:	2016 – ongoing
Client:	Rubicept
Name of Project:	Metrowind Compliance Review
Project Description:	Environmental and Social Compliance Monitoring
Job Title and Duties:	Project Director
Value of Project:	R275 000
Location:	Caculo Cabaca, Angola
Project duration & year:	2016 - 2017
Client:	Industrial and Commercial Bank of China
Name of Project:	Caculo Cabaca ESDD
Project Description:	Environmental and Social Due Diligence and Action Plan and Annual Compliance Audits
Job Title and Duties:	Lead auditor
Value of Project:	$ 31 000
Location:	Israel
Project duration & year:	2016
Client:	Deutsche Bank
Name of Project:	Beer Tuvia ESDD
Project Description:	Environmental and Social Due Diligence of Combined Cycle Gas Turbine and five annual audits, in the Beer Tuvia Industrial Zone
Job Title and Duties:	Project director and lead auditor
Value of Project:	€ 145 000
Location:	Caculo Cabaca, Angola
Project duration & year:	2016
Client:	Confidential
Name of Project:	Caculo Cabaca Dam Gap Analysis
Project Description:	Gap Analysis
Job Title and Duties:	Project director
Value of Project:	€ 20 000
Location:	Langebaan, South Africa
Project duration & year:	2015
Client:	BNP Paribas

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Name of Project:	Elandsfontein ESDD
Project Description:	Environmental and Social Due Diligence
Job Title and Duties:	Lead auditor; Environment
Value of Project:	R110 000
Location:	West Coast, Western Cape
Project duration & year:	2014 and 2015
Client:	Tronox Namakwa Sands
Name of Project:	Water Use Licence Audit
Project Description:	Assessment of Namakwa Sands' performance against commitments in licences for the Mine, MSP and Smelter
Job Title and Duties:	Project Director
Value of Project:	R160 000/year
Location:	Namakwaland, Western Cape Province, South Africa
Project duration & year:	2014
Client:	Tronox Namakwa Sands
Name of Project:	EMPr Performance Assessment
Project Description:	EMPr Performance Assessment
Job Title and Duties:	Project director
Value of Project:	ZAR 175 000
Location:	Lauca, Angola
Project duration & year:	2014 - 2018
Client:	Deutsche Bank
Name of Project:	Lauca Dam ESDD
Project Description:	Environmental and Social Due Diligence and Annual Review
Job Title and Duties:	Project director and lead auditor
Value of Project:	€ 300 000
Location:	Guinea
Project duration & year:	2014
Client:	West Africa Exploration Ltd
Name of Project:	Nimba Iron Ore EIA gap analysis
Project Description:	Environment and social gap analysis
Job Title and Duties:	Project director
Value of Project:	US$ 80 000
Location:	Cambambe, Angola
Project duration & year:	2013 - 2017
Client:	HSBC
Name of Project:	Cambambe Dam ESDD
Project Description:	Environmental and Social Due Diligence and Annual Review
Job Title and Duties:	Project director and lead auditor
Value of Project:	€ 255 000
Location:	Namakwaland, Western Cape Province, South Africa
Project duration & year:	2012 - ongoing
Client:	Tronox Namakwa Sands
Name of Project:	EMPr Performance Assessment
Project Description:	EMPr Performance Assessment
Job Title and Duties:	Project director
Value of Project:	ZAR 150 000
Location:	Brazil
Project duration & year:	2010

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Client:	SRK UK
Name of Project:	MBAC Fertilizer Project
Project Description:	Environmental Due Diligence
Job Title and Duties:	Author and reviewer
Value of Project:	USD 15 000
Location:	Namakwaland, Western Cape Province, South Africa
Project duration & year:	2012 - ongoing
Client:	Exxaro Namakwa Sands
Name of Project:	EMPr Performance Assessment
Project Description:	EMPr Performance Assessment
Job Title and Duties:	Project director
Value of Project:	ZAR 85 000
Project duration & year:	2009
Client:	SRK Russia
Name of Project:	Rossing South Uranium Mine
Project Description:	Environmental Due Diligence
Job Title and Duties:	Author and reviewer
Value of Project:	USD 12 000
Location:	Cape Town
Project duration & year:	2007 – 2008
Client:	City of Cape Town
Name of Project:	Cape Town Regional Landfill EIA Review
Project Description:	Environmental Impact Assessment external review
Job Title and Duties:	Reviewer
Value of Project:	ZAR 120 000
Location:	Cape Town
Project duration & year:	2007 – present
Client:	Edward Nathan Sonnenbergs
Name of Project:	Sea Point EIA Review
Project Description:	Environmental Impact Assessment external review
Job Title and Duties:	Reviewer
Value of Project:	ZAR 30 000
Location:	Soyo, Angola
Project duration & year:	2006
Client:	SonaGas
Name of Project:	Sonagas LNG plant
Project Description:	Environmental Impact Assessment external review
Job Title and Duties:	Reviewer
Value of Project:	USD 50 000
Location:	Saldanha Bay, Western Cape Province, South Africa
Project duration & year:	2005 – present
Client:	Transnet
Name of Project:	Transnet iron ore upgrade
Project Description:	Environmental Impact Assessment and consultation: internal review
Job Title and Duties:	Reviewer
Value of Project:	ZAR 4 million
Location:	Luanda, Angola
Project duration & year:	2004
Client:	Sonils Luanda

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Name of Project:	Sonils expansion, Sonils Gi Marine
Project Description:	Environmental Impact Assessment external review
Job Title and Duties:	Reviewer
Value of Project:	USD2 000
Location:	Suriname
Project duration & year:	2004
Client:	BMS
Name of Project:	BHP Billiton Suriname Successor Mines projects
Project Description:	Environmental Impact Assessment review
Job Title and Duties:	Reviewer
Value of Project:	USD5 000
Location:	Cape Town, Western Cape Province, South Africa
Project duration & year:	2003
Client:	Department of Environmental Affairs & Tourism
Name of Project:	Potsdam waste water treatment works, Potsdam EIA Review
Project Description:	Environmental Impact Assessment external review
Job Title and Duties:	Review consultant
Value of Project:	ZAR 15 000
Location:	Maputo, Mozambique
Project duration & year:	2002
Client:	Netherlands Commission for EIA
Name of Project:	Mavoco hazardous landfill
Project Description:	External EIA review for Netherlands Commission for EIA
Job Title and Duties:	Reviewer
Value of Project:	ZAR 30 000
Location:	Wynberg CBD
Project duration & year:	2000
Client:	City of Cape Town
Name of Project:	Wynberg, Western Cape Province, South Africa
Project Description:	Integrated study external review
Job Title and Duties:	Review consultant
Value of Project:	ZAR 25 000
Location:	East London, Eastern Cape Province, South Africa
Project duration & year:	1998
Client:	East London IDZ
Name of Project:	Industrial development zone on West Bank strategic environmental assessment (SEA)
Project Description:	Strategic environmental assessment review
Job Title and Duties:	Review consultant
Value of Project:	ZAR 40 000
Location:	Cape Town, Western Cape Province, South Africa
Project duration & year:	1994
Client:	Wastetech
Name of Project:	Vissershoek waste disposal site
Project Description:	Consolidated review of scoping and social impacts
Job Title and Duties:	Joint project manager
Value of Project:	ZAR 40 000

Chris Dalgliesh

Principal Consultant

Key Experience: Environmental management programmes and plans

Location:	Gamsberg, Northern Cape
Project duration & year:	2018-ongoing
Client:	Black Mountain Mining (Pty) Ltd
Name of Project:	Gamsberg Mine IWWMP Update
Project Description:	IWWMP Update
Job Title and Duties:	Project Director
Value of Project:	R185 000

Location:	Lutzville, Western Cape, South Africa
Project duration & year:	September 2017
Client:	Tiger Brands
Name of Project:	Tomato Plant IWWMPr
Project Description:	Integrated Water and Waste Management Plan for Tomato Plant
Job Title and Duties:	Project Director
Value of Project:	R125 000

Location:	Guinea
Project duration & year:	2014
Client:	West Africa Exploration Ltd
Name of Project:	Nimba Iron Ore SEP
Project Description:	Stakeholder Engagement Plan
Job Title and Duties:	Project director
Value of Project:	US$ 15 000

Location:	Guinea
Project duration & year:	2014
Client:	West Africa Exploration Ltd
Name of Project:	Nimba Iron Ore BAP
Project Description:	Biodiversity Action Plan
Job Title and Duties:	Project director
Value of Project:	US$ 20 000

Location:	Namakwaland, Western Cape Province, South Africa
Project duration & year:	2013 - ongoing
Client:	Tronox Namakwa Sands
Name of Project:	Namakwa Sands IWWMPr
Project Description:	Integrated Water and Waste Management Plan for Namakwa Sands mine
Job Title and Duties:	Project director
Value of Project:	ZAR125 000

Location:	Saldanha Bay, Western Cape Province, South Africa
Project duration & year:	2013
Client:	Tronox Namakwa Sands
Name of Project:	Smelter IWWMPr
Project Description:	Integrated Water and Waste Management Plan for Namakwa Sands Smelter
Job Title and Duties:	Project director
Value of Project:	ZAR110 000

Location:	Paramaribo, Suriname
Project duration & year:	2009 – 2010
Client:	Staatsolie
Name of Project:	Staatsolie Refinery Expansion
Project Description:	Environmental Management and Monitoring Plan

Chris Dalgliesh
Principal Consultant

Job Title and Duties:	Project director
Value of Project:	USD 35 000
Location:	Suriname
Project duration & year:	2007 – present
Client:	BHP Billiton
Name of Project:	Bakhuis Project
Project Description:	Conceptual Closure and Rehabilitation Plan
Job Title and Duties:	Project director
Value of Project:	USD 210 000
Location:	Suriname
Project duration & year:	2007 – present
Client:	BHP Billiton
Name of Project:	Bakhuis Project
Project Description:	Environmental Management and Monitoring Plan
Job Title and Duties:	Project director
Value of Project:	USD 190 000
Location:	Suriname
Project duration & year:	2006
Client:	BMS
Name of Project:	BHP Billiton Coermotibo Three Hills Bauxite Deposits
Project Description:	Environmental management and monitoring plan
Job Title and Duties:	Project director
Value of Project:	USD 25 000
Location:	Du Toits Kloof, Western Cape Province, South Africa
Project duration & year:	2005 – 2006
Client:	Private client
Name of Project:	Rainbow's End
Project Description:	Environmental assessment and rehabilitation plan
Job Title and Duties:	Project director
Value of Project:	USD 200 000
Location:	Western Cape Province, South Africa
Project duration & year:	2005 – 2006
Client:	City of Cape Town
Name of Project:	Vissershoek landfill extension
Project Description:	Environmental impact control report
Job Title and Duties:	Project director
Value of Project:	ZAR 95 000
Location:	Diaz beach, Western Cape Province, South Africa
Project duration & year:	2004
Client:	Greenfields (Pty) Ltd
Name of Project:	Diaz beach dunes
Project Description:	Rehabilitation plan
Job Title and Duties:	Project director
Value of Project:	ZAR 75 000
Location:	Philippi, Western Cape Province, South Africa
Project duration & year:	2004
Client:	Consol
Name of Project:	Consol glass sand mining
Project Description:	Environmental management plan report

Chris Dalgliesh
Principal Consultant

Job Title and Duties:	Project director
Value of Project:	ZAR 20 000
Location:	Namakwaland, Northern Cape Province, South Africa
Project duration & year:	2003
Client:	Namakwa Sands
Name of Project:	Namakwa Sands
Project Description:	Closure plan
Job Title and Duties:	Project manager
Value of Project:	ZAR 170 000
Location:	Namakwaland, Northern Cape Province, South Africa
Project duration & year:	2003
Client:	Namakwa Sands
Name of Project:	Namakwa Sands
Project Description:	Closure plan
Job Title and Duties:	Project manager
Value of Project:	ZAR 170 000
Location:	Namakwaland, Northern Cape Province, South Africa
Project duration & year:	2003
Client:	Namakwa Sands
Name of Project:	Namakwa Sands
Project Description:	Closure plan
Job Title and Duties:	Project manager
Value of Project:	ZAR 170 000
Location:	Vredendal district, Western Cape Province, South Africa
Project duration & year:	2001 – 2003
Client:	NDC
Name of Project:	NDC diamond mining
Project Description:	Environmental management programme report
Job Title and Duties:	Project director
Value of Project:	ZAR 800 000
Location:	Cape Town, Western Cape Province, South Africa
Project duration & year:	2000
Client:	NGK
Name of Project:	NGK Kiln, Airport industria
Project Description:	Environmental management plan
Job Title and Duties:	Project manager
Value of Project:	ZAR 20 000
Location:	Klein Slangkop, Kommetjie, Western Cape Province, South Africa
Project duration & year:	1999 – 2000
Client:	Private client
Name of Project:	Klein Slangkop EMP
Project Description:	Environmental management plan and homeowners EMP
Job Title and Duties:	Project manager
Value of Project:	ZAR 50 000
Location:	Western Cape Province, South Africa
Project duration & year:	1998
Client:	Capricorn
Name of Project:	Capricorn Technology and Industrial Park
Project Description:	Environmental management plan

Chris Dalgliesh
Principal Consultant

Job Title and Duties:	Project manager
Value of Project:	ZAR 50 000
Location:	Saldanha, Western Cape Province, South Africa
Project duration & year:	1997
Client:	Duferco
Name of Project:	DSP steel rolling mini-mill
Project Description:	Environmental management plan
Job Title and Duties:	Project manager
Value of Project:	ZAR 50 000

Chris Dalgliesh

Principal Consultant

Key Experience: Environmental management systems

Location:	Port Elizabeth, Eastern Cape Province, South Africa
Project duration & year:	2003
Client:	Nelson Mandela Metropolitan Municipality
Name of Project:	Nelson Mandela Metropolitan Municipality EMS
Project Description:	Sustainable development framework and environmental management system
Job Title and Duties:	Team member
Value of Project:	ZAR 1 million

Location:	Cato Ridge, KwaZulu-Natal Province, South Africa
Project duration & year:	2002 – 2003
Client:	Ferro Alloys
Name of Project:	FerroAlloys (ISO 14001)
Project Description:	Environmental management system
Job Title and Duties:	Project director
Value of Project:	ZAR 300 000

Location:	Cape Town, Western Cape Province, South Africa
Project duration & year:	1999 – 2000
Client:	NGK
Name of Project:	NGK Kiln, Airport Industria
Project Description:	Environmental management system
Job Title and Duties:	Project manager
Value of Project:	ZAR 180 000

Chris Dalgliesh

Principal Consultant

Key Experience: Environmental audits

Location:	Cape Town, Western Cape Province, South Africa
Project duration & year:	2012
Client:	Biovac
Name of Project:	Pharmaceutical Plant, Pinelands
Project Description:	Environmental due diligence audit
Job Title and Duties:	Lead auditor
Value of Project:	ZAR 100 000

Location:	Cape Town, Western Cape Province, South Africa
Project duration & year:	2004
Client:	Confidential
Name of Project:	Confidential Pharmaceutical Plant, Epping Industria
Project Description:	Environmental due diligence audit
Job Title and Duties:	Lead auditor
Value of Project:	ZAR 80 000

Location:	Luanda, Angola
Project duration & year:	2002 – 2004
Client:	BP
Name of Project:	BP Waste Audits
Project Description:	Subcontractor waste management audits
Job Title and Duties:	Project director
Value of Project:	USD 20 000 p.a.

Location:	Western Cape Province, South Africa
Project duration & year:	2002
Client:	City of Cape Town
Name of Project:	Water Treatment Works Audits
Project Description:	Water treatment works audits
Job Title and Duties:	Auditor
Value of Project:	ZAR 140 000

Location:	Saldanha Bay, Western Cape Province, South Africa
Project duration & year:	2001
Client:	Dufero Steel Products
Name of Project:	Compliance Audit
Project Description:	Compliance audit
Job Title and Duties:	Auditor
Value of Project:	ZAR 30 000

Location:	Cape Town, Western Cape Province, South Africa
Project duration & year:	2000
Client:	NGK
Name of Project:	NGK Ceramics facility environmental management, Airport Industria
Project Description:	Compliance audit
Job Title and Duties:	Lead auditor
Value of Project:	ZAR15 000

Location:	Western Cape Province, South Africa
Project duration & year:	1999
Client:	Saldanha Steel
Name of Project:	Saldanha Steel environmental management plan
Project Description:	Compliance audit

Chris Dalgliesh

Principal Consultant

Job Title and Duties:	Auditor
Value of Project:	ZAR 35 000

Chris Dalgliesh

Principal Consultant

Key Experience: Socio economic impact assessments

Location:	Uganda and Tanzania
Project duration & year:	February 2016 – ongoing
Client:	RSK
Name of Project:	EACOP pipeline
Project Description:	Economic specialist component of three socio-economic impact assessments for the East African Crude Oil Pipeline (EACOP)
Job Title and Duties:	Reviewer
Value of Project:	$40 000

Location:	Republic of Congo
Project duration & year:	2012
Client:	SRK UK
Name of Project:	Sintoukola Potash Mine
Project Description:	Economic impact assessment of potash mine north of Pointe Noire
Job Title and Duties:	Project director
Value of Project:	USD 30 000

Location:	Suriname
Project duration & year:	October 2011 – ongoing
Client:	Staatsolie Maatschappij Suriname
Name of Project:	Staatsolie Pipeline Community Relations Plan
Project Description:	Engagement plan for refinery expansion project
Job Title and Duties:	Project manager
Value of Project:	US$120 000

Location:	Balochistan, Pakistan
Project duration & year:	2010
Client:	SRK UK
Name of Project:	Reko Diq Phosphate Mine
Project Description:	Review of Economic Impact Assessment
Job Title and Duties:	Reviewer
Value of Project:	USD 7 500

Location:	Western Cape Province, South Africa
Project duration & year:	2004
Client:	DEADP
Name of Project:	Western Cape State of the Environment Report
Project Description:	Economic overview
Job Title and Duties:	Specialist consultant
Value of Project:	ZAR 40 000

Location:	Durbanville, Cape Town, Western Cape Province, South Africa
Project duration & year:	2003
Client:	Withers Environmental Consultants
Name of Project:	Fisantekraal waste water treatment works
Project Description:	Socio economic assessment
Job Title and Duties:	Specialist consultant
Value of Project:	ZAR 30 000

Location:	Eastern Cape Province, South Africa
Project duration & year:	2002
Client:	St Francis Bay Municipality
Name of Project:	St Francis Bay beach remediation
Project Description:	Socio economic assessment

Chris Dalgliesh

Principal Consultant

Job Title and Duties:	Specialist consultant
Value of Project:	ZAR 25 000

Abby van Nierop

Environmental Consultant

Profession	Environmental Scientist
Education	BSc (Hons), Water Resource Management, Rhodes University, 2011 BSc, Environmental Science, Geography, Rhodes University, 2010
Registrations/ Affiliations	Member, International Association of Impact Assessors, South Africa (IAIAsa)

Specialisation

Environmental Impact and Basic Assessments, developing Environmental Specifications and Management Plans, Section 24G Applications, permitting and compliance monitoring (Environmental Control Officer).

Expertise

Abby has developed his skills and expertise over the years as she has been involved in many different types National Environmental Management Act (NEMA) and National Environmental Management Waste Act (NEM:WA) Application processes for both private and governmental developments. Her Duties and responsibilities include:

- Environmental Assessments (Basic Assessment Reports and assistance with Scoping and Environmental Impact Reports);
- Environmental Management Plans;
- Environmental Auditing;
- Public Participation Co-ordinator;
- Mining Permit Applications;
- Water Use Licence Applications;
- Forestry Applications; and
- Public Participation Process.

Employment

2019 - present	SRK Consulting (Pty) Ltd, Environmental Consultant, Port Elizabeth.
2013 - 2019	Terreco Environmental cc, East London, Environmental Consultant.
2011	Rhodes University, Grahamstown, Earth Science 101 Tutor – Geography Department.

Key Experience: Basic Assessments and Environmental Management Programmes

Location:	Matatiele Ward 4, South Africa
Project duration & year:	2018 – 2019 (19 months)
Client:	Alfred Nzo District Municipality
Name of Project:	Proposed construction of the Matatiele Ward 4 Bulk Water Supply Scheme, Alfred Nzo District Municipality, Eastern Cape
Project Description:	Basic Assessment for the construction of a bulk water supply pipeline and associated infrastructure (including reservoirs, boreholes and pump stations)
Job Title and Duties:	Project co-ordinator - Liaison with client and environmental authorities, conducting site visits, appointment and management of specialists, facilitation of public participation process, and author of Basic Assessment Report and EMPr.

Abby van Nierop

Environmental Consultant

Key Experience:	**Basic Assessments and Environmental Management Programmes**
Location:	Mthatha, South Africa
Project duration & year:	2013 – 204 (10 months)
Client:	Alfred Nzo District Municipality
Name of Project:	Proposed King Sabata Dalindyebo Bulk Water Presidential Intervention Project – Construction of the Mthatha Central & Airport Bulk Water Supply Corridor Section, Mthatha, Eastern Cape
Project Description:	Basic Assessment for the construction of a bulk water supply pipeline and associated infrastructure (including reservoirs, boreholes and pump stations)
Job Title and Duties:	Project co-ordinator - Liaison with client and environmental authorities, conducting site visits, appointment and management of specialists, facilitation of public participation process, and author of Basic Assessment Report and EMPr.
Location:	East London, Eastern Cape, South Africa
Project duration & year:	July 2018 (12 months) – Client cancelled project prior to submissions to DEDEAT due to financial issues.
Client:	Eastern Cape Department of Public Works
Name of Project:	Proposed Khayalethu Special Needs School, Dorchester Heights, East London.
Project Description:	Basic Assessment for the construction of a new school for children with special needs and/or disabilities.
Job Title and Duties:	Project co-ordinator - Liaison with client and environmental authorities, conducting site visits, appointment and management of specialists, facilitation of public participation process, and author of Draft Basic Assessment Report and EMPr.
Location:	Queenstown to Lady Frere, Eastern Cape, South Africa
Project duration & year:	2014 – 2015 (16 months)
Client:	Department of Roads and Public Works
Name of Project:	Proposed Upgrading of the MR00661 Road and Bridge between Lady Frere and Queenstown, Eastern Cape.
Project Description:	Basic Assessment for the rehabilitation and upgrade of the MR00661 road and associated road infrastructure.
Job Title and Duties:	Project co-ordinator - Liaison with client and environmental authorities, conducting site visits, appointment and management of specialists, facilitation of public participation process, and author of Basic Assessment Report and EMPr.
Location:	Mkambati Nature Reserve, Eastern Cape, South Africa
Project duration & year:	2013 – 2014 (13 months)
Client:	Mkambati Matters
Name of Project:	Proposed Construction of a Tourist Resort at the Mkambati Nature Reserve, Eastern Cape.
Project Description:	Basic Assessment for the construction of a private tourist resort proposed for the Mkambati Nature Reserve.
Job Title and Duties:	Assisting Environmental Assessment Practitioner - conducting site visits; facilitation of public participation process; and assistance with Draft and Final Basic Assessment Reports and EMPr.

Abby van Nierop
Environmental Consultant

Key Experience:	**Basic Assessments and Environmental Management Programmes**
Location:	Matatiele Ward 5 and 7, South Africa
Project duration & year:	2014 (10 Months)
Client:	Alfred Nzo District Municipality
Name of Project:	Construction of the Matatiele Ward 5 and 7 Bulk Water Supply Scheme, Alfred Nzo District Municipality, Eastern Cape.
Project Description:	Basic Assessment for the construction of a bulk water supply pipeline and associated infrastructure (including reservoirs, boreholes and pump stations)
Job Title and Duties:	Assisting Environmental Assessment Practitioner - Liaison with client and environmental authorities, conducting site visits, appointment and management of specialists, facilitation of public participation process, and author of Basic Assessment Report and EMPr.

Key Experience:	**Environmental Control Officer (ECO)**
Location:	Port Saint Johns, Eastern Cape, South Africa
Project duration & year:	2018 – 2019 (11 months)
Client:	SANRAL
Name of Project:	Replacement of the Mngazi (Dumasi) River Bridge, PSJ, Eastern Cape
Project Description:	Environmental auditing of the construction of the new Mngazi River Bridge.
Job Title and Duties:	Monthly environmental auditing, attendance of progress meetings, monitoring and advising on compliance with authorisations as well as liaising with competent authorities.
Location:	Ward 5, Matatiele, Eastern Cape, South Africa
Project duration & year:	2019 (11 months)
Client:	Alfred Nzo District Municipality
Name of Project:	Construction of a Matatiele Ward 5 Bulk Water Scheme, Alfred Nzo District Municipality, Eastern Cape.
Project Description:	Environmental auditing of the construction of a bulk water supply pipeline and associated infrastructure (including reservoirs, boreholes and pump stations)
Job Title and Duties:	Monthly environmental auditing, attendance of progress meetings, monitoring and advising on compliance with authorisations as well as liaising with competent authorities.
Location:	Port Alfred, Eastern Cape, South Africa
Project duration & year:	2015 -2019 (4 years)
Client:	SANRAL
Name of Project:	The Upgrade of the R72 Road between Port Alfred and the Fish River, Eastern Cape.
Project Description:	Environmental auditing of the construction of regional road and associated road infrastructure
Job Title and Duties:	Monthly environmental auditing, attendance of progress meetings, monitoring and advising on compliance with authorisations as well as liaising with competent authorities.
Location:	Port Saint Johns, Eastern Cape, South Africa
Project duration & year:	2019 (11 months)
Client:	Port Snt Johns Local Municipality
Name of Project:	The upgrading of Port St Johns Residential Streets: Marine Drive & Marine Drive Link 1 Roads, Port Saint Johns, Eastern Cape
Project Description:	Environmental auditing of the upgrading of residential roads and associated road infrastructure.
Job Title and Duties:	Monthly environmental auditing, attendance of progress meetings, monitoring and advising on compliance with authorisations as well as liaising with competent authorities.

Abby van Nierop
Environmental Consultant

Key Experience: Environmental Control Officer (ECO)

Location:	Sipetu, Eastern Cape, South Africa
Project duration & year:	24 months,
Client:	SANRAL
Name of Project:	The Upgrade of the DR08125 Road and DR08447 Road from the N2 National Road to Sipetu Hospital, Eastern Cape.
Project Description:	Environmental auditing of the upgrading of provincial roads and associated road infrastructure.
Job Title and Duties:	Monthly environmental auditing, attendance of progress meetings, monitoring and advising on compliance with authorisations as well as liaising with competent authorities.
Location:	Middelburg, Eastern Cape, South Africa
Project duration & year:	2015 – 2016 (17 months)
Client:	SANRAL
Name of Project:	The Upgrade of the N9, Section 7 from Middelburg to Carlton Heights, Eastern Cape.
Project Description:	Environmental auditing of the upgrading of a national road and associated road infrastructure.
Job Title and Duties:	Monthly environmental auditing, attendance of progress meetings, monitoring and advising on compliance with authorisations as well as liaising with competent authorities.
Location:	Libode, Eastern Cape, South Africa
Project duration & year:	2017 – 2019 (30 months)
Client:	SANRAL
Name of Project:	The Construction of Bridges, Intersection Widenings and Livestock Underpasses on the R61: Section 8 from Libode East (Km28, 1), Eastern Cape.
Project Description:	Environmental auditing of the construction of a upgrading of provincial roads and associated road infrastructure.
Job Title and Duties:	Monthly environmental auditing, attendance of progress meetings, monitoring and advising on compliance with authorisations as well as liaising with competent authorities.
Location:	Luchaba Nature Reserve, Mthatha, Eastern Cape
Project duration & year:	2014 – 2015 (11 months)
Client:	SANRAL
Name of Project:	The Construction of the Mthatha Dam Tourism Development in the Luchaba Nature Reserve: Phase III, Eastern Cape.
Project Description:	Environmental auditing of the construction of a 300 Ml reservoir.
Job Title and Duties:	Monthly environmental auditing, attendance of progress meetings, monitoring and advising on compliance with authorisations as well as liaising with competent authorities.
Location:	Idutywa, Eastern Cape
Project duration & year:	2013 (10month)
Client:	SANRAL
Name of Project:	The Expansion and Rehabilitation of Two Idutywa Dams, Eastern Cape.
Project Description:	Environmental auditing for proposed expansion and rehabilitation work for a dam.
Job Title and Duties:	Monthly environmental auditing, attendance of progress meetings, monitoring and advising on compliance with authorisations as well as liaising with competent authorities.

Abby van Nierop
Environmental Consultant

Key Experience:	**Environmental Control Officer (ECO)**
Location:	Lusikisiki, Eastern Cape
Project duration & year:	2016 – 2017 (13 months)
Client:	Department of Public Works
Name of Project:	The Construction of a New SAPS Police Station and Package Treatment Plant, Lusikisiki, Eastern Cape.
Project Description:	Environmental auditing of the construction a new police atation and package treatment plant
Job Title and Duties:	Monthly environmental auditing, attendance of progress meetings, monitoring and advising on compliance with authorisations as well as liaising with competent authorities.
Location:	Gonubie, Eastern Cape
Project duration & year:	2013 – 2014 (14 months)
Client:	Buffalo City Metropolitan Municipality
Name of Project:	The Upgrade Gonubie WWTW, East London, Eastern Cape.
Project Description:	Environmental auditing of the construction-related activities involved in the upgrading of a WWTW.
Job Title and Duties:	Monthly environmental auditing, attendance of progress meetings, monitoring and advising on compliance with authorisations as well as liaising with competent authorities.
Location:	Port Edward, Kwazulu-Natal
Project duration & year:	2015 – 2017 (20 months)
Client:	SANRAL
Name of Project:	The upgrade of DR08005 from Magusheni to Mzamba (R61) + 80 Km: Phase 1 and Phase 2, Eastern Cape.
Project Description:	Environmental auditing of the upgrading of provincial roads and associated road infrastructure.
Job Title and Duties:	Monthly environmental auditing, attendance of progress meetings, monitoring and advising on compliance with authorisations as well as liaising with competent authorities.
Location:	Elliotdale, Eastern Cape
Project duration & year:	2013 – 2016 (48 months)
Client:	SANRAL
Name of Project:	The upgrade of DR180033 for Elliotdale to DR08327: Phase 1 and Phase 2, Eastern Cape.
Project Description:	Environmental auditing of the upgrading of provincial roads and associated road infrastructure.
Job Title and Duties:	Monthly environmental auditing, attendance of progress meetings, monitoring and advising on compliance with authorisations as well as liaising with competent authorities.
Location:	Bizana, Eastern Cape, South Africa
Project duration & year:	2016 – 2017 (7 months)
Client:	SANRAL
Name of Project:	The rehabilitation and regraveling of DR080116, DR08020, DR080121 and DR080144, Bizana, Eastern Cape
Project Description:	Environmental auditing of the upgrading of provincial roads and associated road infrastructure.
Job Title and Duties:	Monthly environmental auditing, attendance of progress meetings, monitoring and advising on compliance with authorisations as well as liaising with competent authorities.

Abby van Nierop
Environmental Consultant

Key Experience:	**Environmental Control Officer (ECO)**
Location:	Pietermaritzburg, Kwazulu-Natal
Project duration & year:	2015 – 2016 (21 months)
Client:	SANRAL
Name of Project:	The Special Maintenance the National Route from Sanctuary Road l/C (15 15.1) to Cedara l/C (KM 1.6), Pietermaritzburg, Kwazulu-Natal.
Project Description:	Environmental auditing of the upgrading of a national road and associated road infrastructure.
Job Title and Duties:	Monthly environmental auditing, attendance of progress meetings, monitoring and advising on compliance with authorisations as well as liaising with competent authorities.
Location:	Coffee Bay, Eastern Cape
Project duration & year:	2016 (10 months)
Client:	Department of Roads and Public Works
Name of Project:	The construction of the new Coffee Bay Bridge, Eastern Cape.
Project Description:	Environmental auditing of the construction of a new bridge.
Job Title and Duties:	Monthly environmental auditing, attendance of progress meetings, monitoring and advising on compliance with authorisations as well as liaising with competent authorities.
Location:	Mhlontlo, Eastern Cape
Project duration & year:	2019 (4 months)
Client:	Elundini Local Municipality
Name of Project:	The repairs to the Mhlontlo Causeway, Elundini Local Municipality
Project Description:	Upgrading of an existing causeway together with the construction of gabions.
Job Title and Duties:	Monthly environmental auditing, attendance of progress meetings, monitoring and advising on compliance with authorisations as well as liaising with competent authorities.
Location:	Pitseng, Eastern Cape
Project duration & year:	2019 (5 months)
Client:	Elundini Local Municipality
Name of Project:	The repairs to the Pitseng Causeway, Elundini Local Municipality
Project Description:	Upgrading of an existing causeway together with the construction of gabions ..
Job Title and Duties:	Monthly environmental auditing, attendance of progress meetings, monitoring and advising on compliance with authorisations as well as liaising with competent authorities.
Location:	Hamburg, Eastern Cape
Project duration & year:	2013 – 2014 (13 months)
Client:	Ngqushwa Local Municipality
Name of Project:	Urban Regeneration Programme, Hamburg, Eastern Cape.
Project Description:	The construction of a multidisciplinary centre.
Job Title and Duties:	Monthly environmental auditing, attendance of progress meetings, monitoring and advising on compliance with authorisations as well as liaising with competent authorities.
Location:	Gonubie, Eastern Cape
Project duration & year:	2015 – 2016 (14 months)
Client:	Buffalo City Metropolitan Municipality
Name of Project:	Upgrading of Gulls Way Road, Gonubie, Eastern Cape
Project Description:	Environmental auditing of the upgrading of a residential road and associated road infrastructure.
Job Title and Duties:	Monthly environmental auditing, attendance of progress meetings, monitoring and advising on compliance with authorisations as well as liaising with competent authorities.

Abby van Nierop

Environmental Consultant

Key Experience:	**Environmental Control Officer (ECO)**
Location:	Gonubie, Eastern Cape
Project duration & year:	2016 (6 months)
Client:	Buffalo City Metropolitan Municipality
Name of Project:	Upgrading of Gonubie Main Road / East Gulls Way Intersection, Gonubie, Eastern Cape
Project Description:	Environmental auditing of the upgrading of a main residential road and associated road infrastructure
Job Title and Duties:	Monthly environmental auditing, attendance of progress meetings, monitoring and advising on compliance with authorisations as well as liaising with competent authorities.
Location:	Queenstown, Eastern Cape
Project duration & year:	2019 (7 months)
Client:	Enoch Mgijima Local Municipality
Name of Project:	Ward 30 Regravelling Project, Enoch Mgijima Local Municipality, Eastern Cape
Project Description:	Environmental auditing of the upgrading of rural roads and associated road infrastructure.
Job Title and Duties:	Monthly environmental auditing, attendance of progress meetings, monitoring and advising on compliance with authorisations as well as liaising with competent authorities.

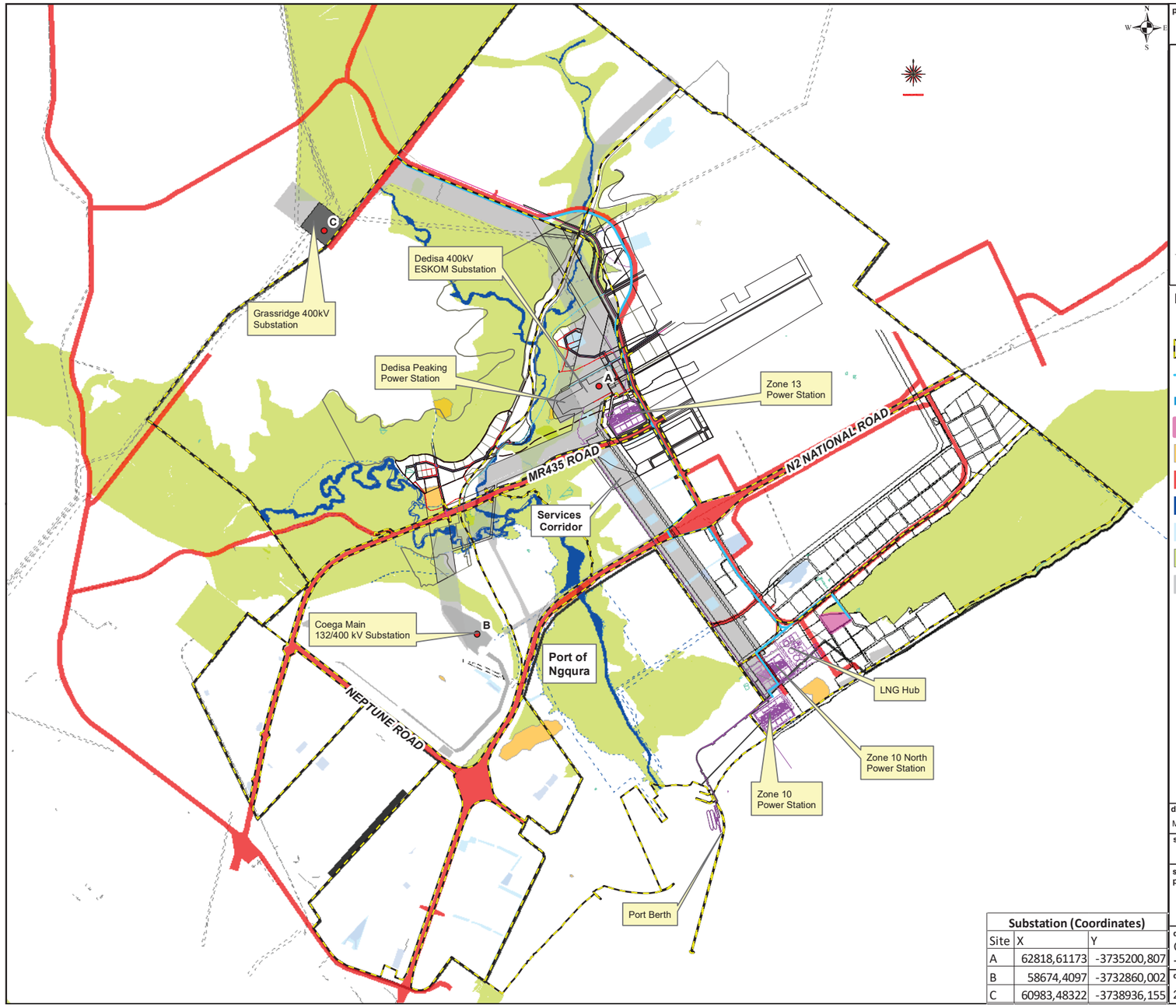
Abby van Nierop
Environmental Consultant

Key Experience: Onsite Designated Environmental Officer (DEO)

Location	Noupoort, Northern Cape
Project duration & year:	2015 - 2016 (17 months)
Client:	Mainstream Renewable Power
Name of Project:	Proposed construction of an 80 MW Wind Energy Farm in Noupoort, Northern Cape.
Project Description:	Onsite DEO for the construction period of a 35 wind turbine Wind Energy Farm.
Job Title and Duties:	Duties and responsibilities included:

- Ensuring that the specific construction contract is undertaken in accordance with the relevant environmental requirements of the Environmental Management Programme, specialist reports as well as Authorization/Permits from competent authorities.
- Interaction with subcontractors to ascertain environmental compliance.
- Conduct environmental incident investigations with corrective actions and generating reports.
- Act as emergency coordinator in case of hazardous material spills.
- Advise and coordinates spill response activity.
- Assistance in compiling Environmental Risk Assessments.
- Attend weekly progress meetings with the Client.
- Represent the contractor at environmental monitoring meetings undertaken by competent authority (DWS, DMR and DEDEAT).
- Compiling environmental Method Statements.
- Oversee the implementation of environmental requirements of all Method Statements
- Conduct environmental awareness training to all levels of staff on site.
- Compiling Toolbox Talks.
- Undertaking daily environmental compliance inspections
- Compiling weekly and monthly environmental reports.
- Maintain and update permits for compliance with all applicable regulations.
- Manage waste management, spill management, sanitary waste management.
- Monitoring of water use, energy consumption, weather conditions and erosion.
- Managing rehabilitation and hydro seeding program.
- Managing Water quality monitoring.
- Facilitating the actions of the flora and Fauna Search and Rescue team.
- Facilitating the catch and relocation of fauna.
- Advise and direct staff on environmental regulations and compliance issues.
- Compile and maintain a legal register.
- Manage used oil collection and separation from contaminated water and soil
- Lead management of actions to control alien invasive vegetation and rehabilitation.

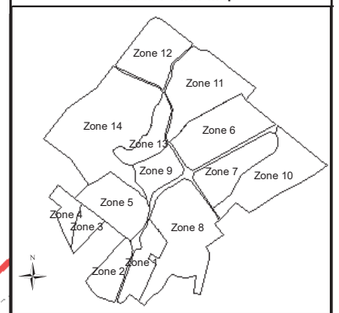
Appendix B: Layout drawings



Substation (Coordinates)		
Site	X	Y
A	62818,61173	-3735200,807
B	58674,4097	-3732860,002
C	60983,48322	-3738936,155

project

Coega SEZ
Gas to Power Map



Legend

- Substation Centroid
- Zone Boundaries
- Potable Water
- Port of Ngqura Boundary
- Desal
- Species of Special Concern
- Road Reserves
- Riparian Zone
- Stormwater Structures
- OSMP- No Go Areas
- Services Corridor

drawn by	checked by	date	reference
M Gcukumana		2020/11/20	CDCGIS02/GIS/COEGA/201119_Gas-EIA.mxd

scale: 1:50 742 (0 320 640 1 280 1 920 2 560 Meters)

service provider

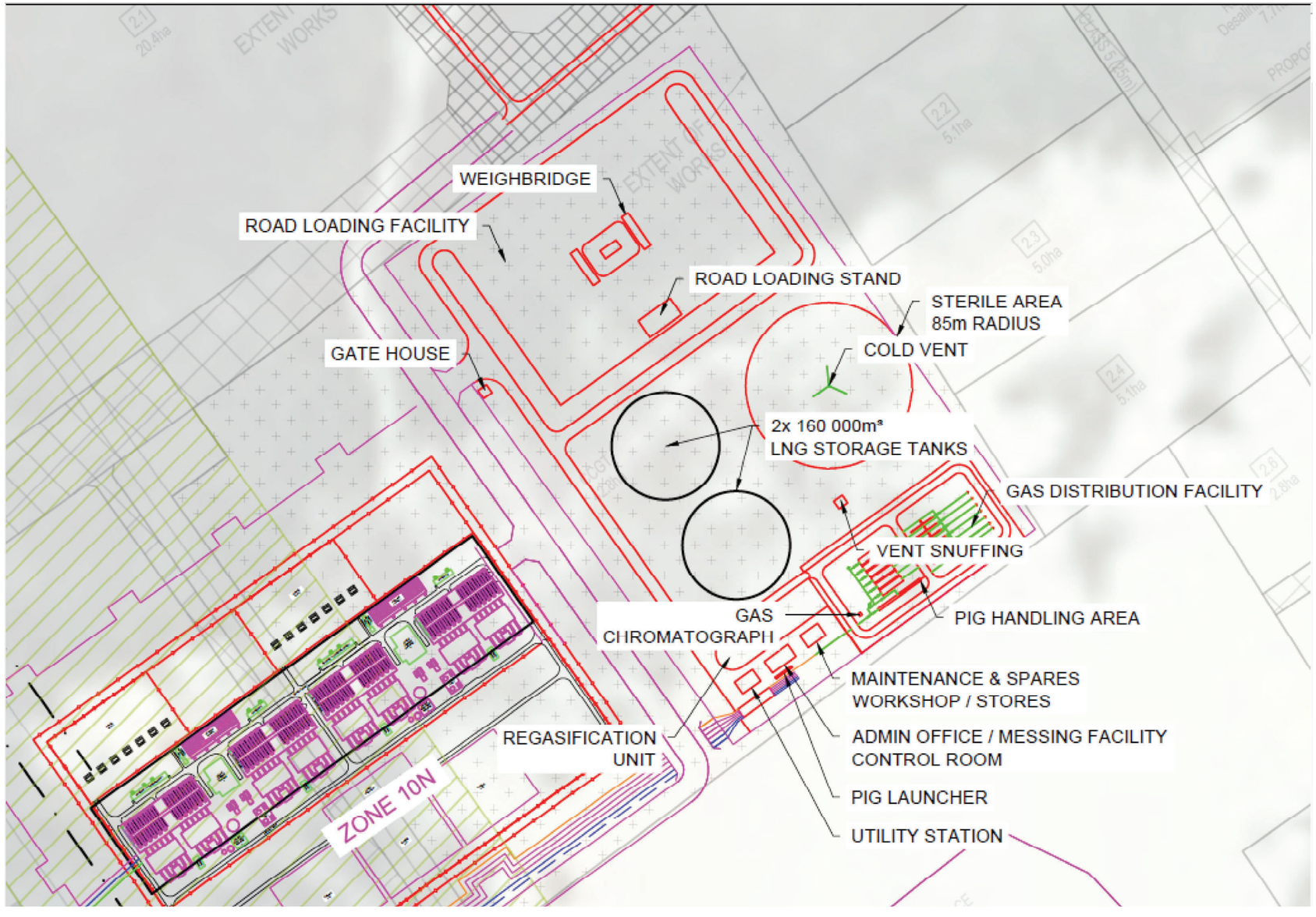
Coega Business Centre
Cnr Alcyon road & Zibuko street
Zone 1, Coega IDZ
Port Elizabeth, 6100

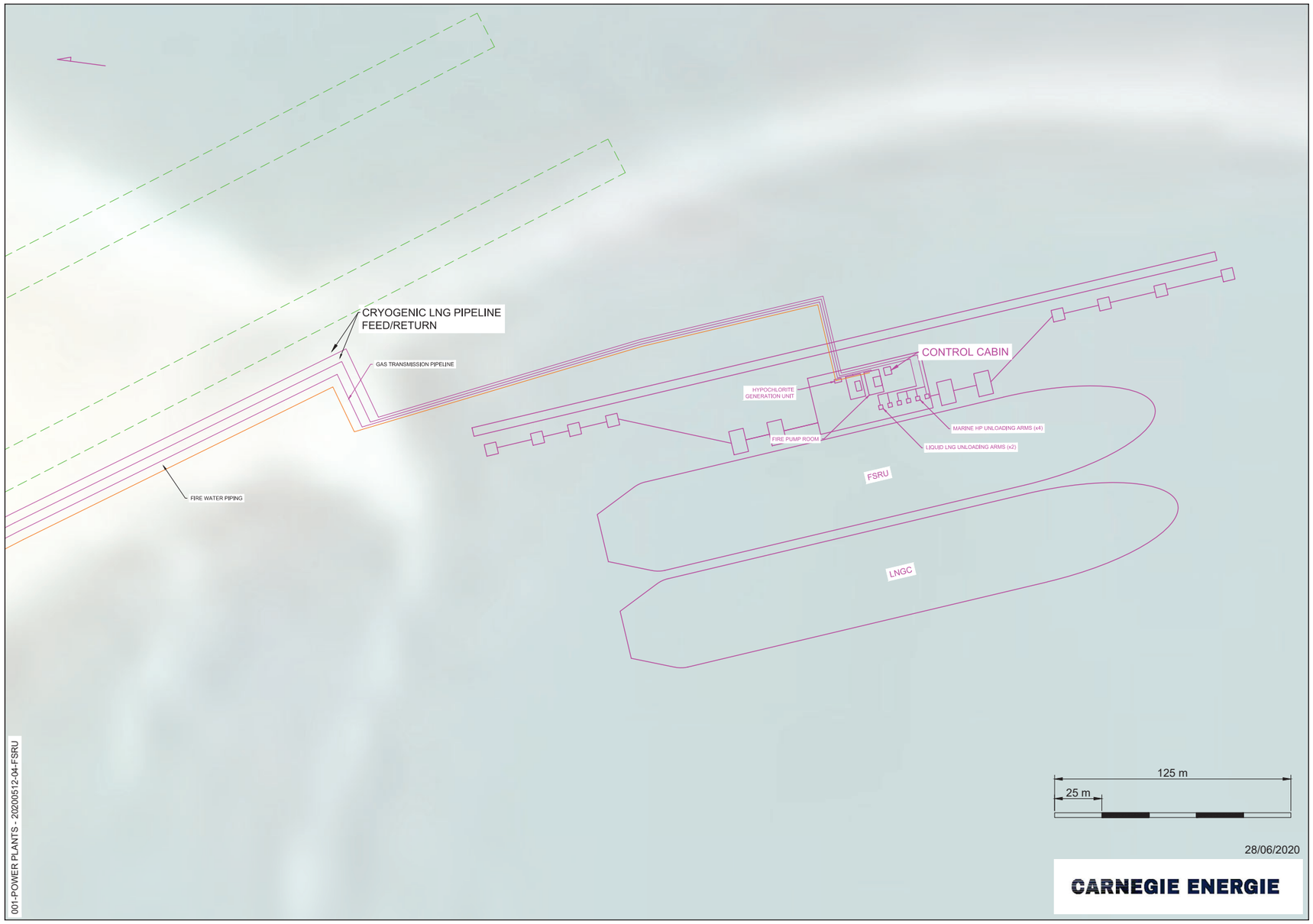
Tel: 041-4030471
Email: Firhana.Sam@coega.co.za

drawing title: Coega SEZ - Gas to Power Overview Map

drawing number: 201120_Gas-EIA.mxd

revision no.: 1


WEIGHBRIDGE
ROAD LOADING FACILITY
ROAD LOADING STAND
STERILE AREA
85m RADIUS
GATE HOUSE
COLD VENT
2x 160 000m³
LNG STORAGE TANKS
GAS DISTRIBUTION FACILITY
VENT SNUFFING
GAS
CHROMATOGRAPH
PIG HANDLING AREA
MAINTENANCE & SPARES
WORKSHOP / STORES
REGASIFICATION
UNIT
ADMIN OFFICE / MESSING FACILITY
CONTROL ROOM
PIG LAUNCHER
UTILITY STATION
ZONE 10N


CRYOGENIC LNG PIPELINE
FEED/RETURN
GAS TRANSMISSION PIPELINE
FIRE WATER PIPING
CONTROL CABIN
HYPOCHLORITE
GENERATION UNIT
FIRE PUMP ROOM
MARINE HP UNLOADING ARMS (x4)
LIQUID LNG UNLOADING ARMS (x2)
FSRU
LNGC
125 m
25 m
28/06/2020
CARNEGIE ENERGIE
001-POWER PLANTS - 20200512-04-FSRU