Department of Environmental Affairs and Development Planning (DEA&DP) Western Cape:
DEA&DP EIA Reference number: 16/3/1/2/F4/17/3009/13

Environmental Impact Assessment (EIA) for the proposed construction, operation and decommissioning of the Saldanha Regional Marine Outfall Project of Frontier Saldanha Utilities (Pty) Ltd. at Danger Bay in the Saldanha Bay region

FINAL EIA REPORT

SECTION B

EMP

CONTENTS

TABLES

FIGURES

1 INTRODUCTION

Frontier Saldanha Utilities (Pty) Ltd (Frontier Utilities) is proposing the construction and operation of a pipeline transfer system with associated infrastructure to discharge 8-9 Mℓ per day of treated effluent generated by:

- The Rare Earth Element (REE) Separation Plant proposed by Frontier Separation (Pty) Ltd (Frontier Separation), referred to as the Saldanha Separation Plant (SSP), which will refine REE feedstock mined at the Zandkopsdrift Mine in southern Namaqualand by Sedex Minerals (Pty) Ltd (EIA undertaken by AGES, Environmental Decision pending; Application Ref No. 16/3/1/2/F4/17/3004/13).
- The associated Chlor-Alkali Production Facility (CAPF) proposed by Chlor-Alkali Holdings (Pty) Ltd (CAH), a supplier of reagents situated adjacent to the SSP (EIA in progress, undertaken by MEGA, Application Ref No. 16/3/1/2/F4/17/3053/12).
- A regional Waste Water Treatment Works (WWTW) proposed by the Saldanha Bay Municipality (SBM) (EIA not yet commissioned).

The effluent will be discharged into Danger Bay near Saldanha Bay in the Western Cape.

It is currently planned that the effluent will be discharged via the brine disposal infrastructure from the proposed West Coast District Municipality (WCDM) seawater reverse osmosis desalination plant, to be located at Danger Bay (EIA was undertaken by CSIR; Application Ref No. E12/2/4/2-F4/16-3037/11; Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) granted Environmental Authorisation on 13 August 2013).

However, the possibility exists that the planned construction of the WCDM desalination plant might be delayed. Consequently, the EIA for the proposed Saldanha Regional Marine Outfall (SRMO) pipeline transfer system will investigate an alternative interim sea disposal option (Scenario 1) until the WCDM desalination plant is commissioned (Scenario 2). Once the desalination plant has been commissioned, a single shared outfall will be utilised, and the interim sea disposal option will be decommissioned. **It is thus envisaged that there will only be one outfall into Danger Bay at any stage of the project.**

Prior to the construction of the plant in terms of the NEMA (107 of 1998), an Environmental Management Plan (EMP) with specialist input has been prepared. The specialist team involved in the preparation of the EMP is listed below:

Table 1: Specialist team for the EIA and EMP

Team Member and Affiliation	Role in this EIA	Relevant experience
Dr Andrea Pulfrich Pisces Environmental Services (Pty) Ltd	Marine Ecology	Ph.D. Fisheries Biology. She is a member of the South African Council for Natural Scientific Professions. She has 26 years of experience in marine ecology and has been party to a number of specialist studies including desalination plants (e.g. the WCDM desalination plant in Danger Bay and NamWater and Areva, Namibia).
Nick Helme Nick Helme Botanical Surveys	Terrestrial Ecology	B.Sc. Botany and registered with the South African Council for Natural Scientific Professions. Nick has undertaken over 30 different botanical assessments within the West Coast District Municipality and the Saldanha Bay region in the last eight years. This includes the Terrestrial Ecological assessment of the proposed WCDM desalination plant EIA.
John Pether University of Cape Town	Palaeontology	M.Sc. Earth Science. John is registered with the South African Council for Natural Scientific Professions. He has extensive experience with working on the west coast of South Africa. This includes the Palaeontological assessment of the proposed WCDM desalination plant EIA.
Dr Jayson Orton ASHA	Archaeology	D.Phil. Archaeology (Oxon). ASAPA professional accreditation. Jayson has been actively involved in a wide range projects spanning the west coast region. This includes the Archaeological assessment of the proposed WCDM desalination plant EIA.
Dr Hugo van Zyl Independent Economic Researchers	Socio-Economic and Planning	Ph.D. Economics. Hugo has been involved in over 50 appraisals of infrastructure projects, industrial developments, land use changes, conservation projects and eco-tourism initiatives throughout Southern Africa. He has undertaken the Economics specialist study of the proposed WCDM desalination plant EIA.
Henry Holland MapThis (Pty) Ltd	Visual	M.Sc. Geology. Henry is a visual specialist who has done visual studies for several industrial developments, utilising GIS and computer simulation skills in his work. Mr Holland has undertaken the visual impact assessment for the proposed WCDM desalination plant EIA.
Luanita van der Walt CSIR	Freshwater Ecology	M.Sc. Environmental Sciences. Her M.Sc focussed on the biogeochemical landscape functionality, plant species diversity, and plant functional diversity of fragmented grasslands. Luanita is currently an EAP intern at CSIR. She is assisting the EMS Group with compiling EIA reports and preparing GIS maps. Luanita revised the Freshwater Ecological study that was prepared by Dr Liz Day of "*The Freshwater Group"* for the proposed WCDM desalination plant EIA for the purposes of the SRMO Project EIA (Day 2014).
Francois Smit WorleyParsons RSA **WSP Group Africa (Pty) Ltd (Independent Review)**	Marine Modelling/ Hydrodynamics	MEng (Civil), University of Stellenbosch, 1991. Francois Smit is a Coastal Engineer with twenty years' experience in coastal engineering, including three with WorleyParsons. Experience includes coastal zone management, coastal monitoring, coastal processes modelling and waterfront and coastal structures design. Specific expertise includes coastal measurement and monitoring, including ADCP, coastal imaging (video) and laser (LIDAR) technologies; wave climate and design condition assessments; harbour/marina/waterfront planning and design;

Team Member and Affiliation	Role in this EIA	Relevant experience
		shoreline stability assessment; coastal asset condition surveys; temporary and/or innovative coastal protection methods, including artificial surf reefs and geo-containers; computational and physical modelling of coastal processes, including surf zone turbulence and suspended sediment transport, wave and wind-induced hydrodynamics, coastal response and marine water quality. The Hydrodynamic Modelling study was independently reviewed by WSP.

2 PROJECT DESCRIPTION

Section 2 provides a Project Description of the proposed SRMO Project. The proposed pipeline will be designed with a potential lifespan of approximately 30 years; however, it is envisaged the WCDM desalination plant will be commissioned well within this period and that the marine component of the SRMO will be decommissioned and rehabilitated (i.e. there will be a shared outfall facility utilised by the WCDM desalination plant and the effluent emanating from the SRMO).

The section below provides a summary of what the project will comprise of:

- A terrestrial pipeline corridor (see Figure 2.1). This corridor will be approximately 27 km long from the proposed SSP proposed by Frontier Separation to the outfall in Danger Bay. The pipeline will have a diameter of approximately 900 mm and will be constructed from high density polyethylene (HDPE) or will be a glass reinforced plastic (GRP) pipe;
- Electrical corridors connecting to the pump stations. Either Medium Voltage (MV) cabling — which will be buried depending on the width of the pipeline servitude — will be utilised or Medium Voltage Overhead Lines (OHL) in traditional Delta A-Frame positions (wooden poles), at a height of 12 m, will be used;
- Five pump stations including brine transfer tanks, mechanical pumps, electrical distribution networks and standby generator located within the servitude located at positions A, B, C, D and E (refer to Figure 2.2);
- Gravel service and access roads to the pumps stations; and
- A marine outfall with diffuser system in Danger Bay.

2.1 Marine & Terrestrial Pipeline

The proposed pipeline will have a diameter of approximately 900 mm which will ensure there is sufficient capacity to allow additional industries to connect to it in future (these will conform to additional environmental authorisations not investigated as part of this EIA).

The terrestrial pipeline will be approximately 27 km long from the SSP to the outfall in Danger Bay. The pipe will most likely be constructed from High density polyethylene (HDPE) or will be

a glass reinforced plastic (GRP) pipe. The proposed terrestrial pipeline will be buried to minimize the risk of theft, vandalism and veld fire damage.

The marine outfall will be low pressure mains and constructed in accordance with SABS 1200. The pipeline will be either be laid on the seabed, weighted down by suitable weight collars or concrete coatings, or buried (depending on geotechnical conditions). The pipeline to the outfall will be buried through the surf and beach areas. Some excavation of underlying rock may be required for the burial of the pipeline through the beach, surf and offshore areas, which may necessitate the use of blasting methods.

Figure 1: Laying of Glass Reinforced Plastic (GRP) pipe across the sea-shore

2.2 Marine Outfall

The proposed SRMO pipeline transfer system will initially transfer treated industrial effluent from the proposed SSP, the CAPF and the WWTW. Subsequently, the effluent will be co-discharged with the effluent discharge system of the proposed WCDM desalination plant; however, at this stage the date of construction for the desalination plant is not known.

The treated industrial effluents will be transferred from the respective plants via a terrestrial pipeline route to Danger Bay. The current proposal is to locate the outfall -10 m below Mean Sea Level to allow adequate dispersion of the effluent. The discharge design parameters of the

marine outfall will influence the mixing behaviour of the effluent in the near-field region, which extends up to a few hundred metres away from the outfall location. It is assumed that a diffuser system installed at the seaward end of the outfall pipeline will be implemented to provide the mixing necessary to prevent the heavy saline discharge from accumulating on the seabed in the immediate vicinity of the discharge.

Table 2: Discharge characteristics

Constituent	SSP*	CAPF	WWTW	WCDM DP
Discharge (Mℓ /d)	3.36	0.188	5.00	38.40
Salinity (psu)	104.35	63.1		60.5
pH	5-8.5	6-8	5.5-9.5	7.3-8.2
Temperature (°C)	18-25	20		ΔT 1 - 1.5
TSS (mg/ℓ)		130	25	<10
Heavy Metals				
Al (mg/ℓ)	2.4			
As (mg/ℓ)	0.012		0.02	
Cd (mg/ℓ)	0.06		0.005	
Co (mg/ℓ)	0.06			
Cr (mg/ℓ)	0.12		0.05	??
Cu (mg/ℓ)	0.024		0.01	
Mn (mg/ℓ)	2.4		0.1	
Mo (mg/ℓ)				??
Ni (mg/ℓ)	0.12			??
Pb (mg/ℓ)	0.06		0.01	??
Sr (mg/ℓ)	0.6			
Th (mg/ℓ)	0.06			
U (mg/ℓ)	0.02			
V (mg/ℓ)	0.006			
Zn (mg/ℓ)	0.6			
Ba (mg/ℓ)	0.12			
Bi (mg/ℓ)	0.012			
Ca (mg/ℓ)	1.2	591		
Fe (mg/ℓ)	2.4		0.3	
Mg (mg/ℓ)	0.6	31		
Si (mg/ℓ)	0.6			
Ti (mg/ℓ)	1.2			
Na (mg/ℓ)	60 000	24 553		
P (mg/ℓ)	0.6		10	
Cl (mg/ℓ)	72 000 (as Cl^{-1})	25 165	0.25 (as free chlorine)	<0.002
K (mg/ℓ)	0.12			
Rare Earth Elements				
Y (mg/ℓ)	23.436			
La (mg/ℓ)	165.44			

Constituent	SSP*	CAPF	WWTW	WCDM DP
Ce (mg/ℓ)	278.08			
Pr (mg/ℓ)	29.23			
Nd (mg/ℓ)	98.85			
Sm (mg/ℓ)	13.67			
Eu (mg/ℓ)	3.53			
Gd (mg/ℓ)	8.25			
Tb (mg/ℓ)	0.95			
Dy (mg/ℓ)	4.41			
Ho (mg/ℓ)	0.76			
Er (mg/ℓ)	1.764			
Tm (mg/ℓ)	0.252			
Yb (mg/ℓ)	1.26			
Lu (mg/ℓ)	0.189			
Other co-discharges				
SO_4^{-2} (mg/ℓ) (sulphate)	0.6	11 782		
CO_3 (mg/ℓ) 9carbonate)		65		
NO_3 (mg/ℓ) (nitrate)		11		15
Cyanide (mg/ℓ)			0.02	
Soap, oil, grease (mg/ℓ)	2.625		2.5	
$H_2C_2O_4$ (Oxalic acid)	420			
Naphthenic acid, P_5O_7, Kerosene	50			
Faecal coliforms (per 100 mℓ)			1 000	
Antiscalant (mg/ℓ)				4.0 – 5.0
Spent CIP solutions (mg/ℓ)				<10
Coagulant ($FeCl_3$) (mg/ℓ)				<1.0
Ammonia (as Nitrogen) (mg/ℓ)			6	
Nitrate/Nitrite as Nitrogen (mg/ℓ)			15	

* Absolute maximum short term concentrations only.

Note: ?? Denotes where values are expected but not known.

2.3 Pump stations

Five pump stations with associated transfer tanks are proposed along the pipeline corridor (marked A to E in Figure 2.1). These structures will not be taller than 5 m. The dimensions of the pump stations will vary depending on the final design of the pipeline and associated infrastructure.

The following design parameters apply to the pump stations:

- the transfer pump stations will be located within (or as close as possible) to the servitude or it will be located on a separate site that may require rezoning;
- access to the pump stations will be via existing accesses off the R85 road. The access roads will be gravel roads. The access roads will be designed to

accommodate surface water run-off for a 1:5 year flood. The exact location of the access roads will be determined within the scope of the EIA;

- the access roads will be 5 m wide with turning radii of to allow maintenance vehicles entry and exit;
- the pump stations will be fenced off with double swing gates for access control;
- security measures (e.g. burglar proofing) will be installed to secure the pump station and a concrete roof will be constructed; and
- a bunded storage facility will be provided and designed to accommodate the industrial effluent requirements (since separate EIAs will have to be performed each time a new industry utilises the facility, the EIA requirement may prescribe to update the Engineering Design during which time the size of the bunded area may change).

2.4 Pump station transfer tanks

The pump station transfer tanks (comprising a volume of 15 m^3 each) will have a bunded wall to contain the maximum volume of storage during an emergency. The floor of the bunded area will be impermeable and will slope towards a sump, located in the bunded area, to allow for the emptying of the bunded area in case of an emergency. An emergency overflow will also be constructed above the maximum water level in the transfer tank to provide for additional storage during emergencies.

Instrumentation will be installed on each individual pipe, feeding the pump station transfer tanks from each participating industry, to measure certain key constituents as determined during the EIA. The final position and type of instrumentation to be used will be determined during the detailed design stage of the project.

Pressure transmitters will be installed in the main suction and delivery lines of the pump station. A pressure transmitter will have a stainless steel body, with a diaphragm type element.

The pressure transmitters will also act as a protective measure for the pump sets. When the pressure in the pipeline reduces excessively, the pump sets will be automatically tripped by the PLC.

A generator with a fuel tank (diesel; capacity of 600 litres) will be installed at each pump station. The generator will be installed in a dedicated standby generator room, inside the pump station building. The generator will be installed within a bunded area to ensure fuel is contained in the event of spillage. The bunded wall will be designed to contain 110 % of the maximum fuel that can be stored in the fuel tank of the generator.

2.5 Electrical Infrastructure

This section describes the electrical supply and requirements of the pump stations associated with the SRMO Project. It is estimated that each transfer pump station will require 315 kVA.

Due to the different transfer pump stations locations, electricity will be supplied by either Eskom or the SBM. A miniature substation (mini-sub) will be provided.

Eskom will provide electricity to the pump station at Position A and B. The SBM will provide electricity to the other three pump stations, i.e. at Positions C, D and E (see Figure 2.2).

There are two options to supply electricity to the pump stations, i.e. via Medium Voltage (MV) underground cabling or MV Overhead lines (OHL). These options require further investigation to voltage regulation that will be performed and will be discussed later in the EIA process. All designs and installations need to comply with the specifications of the relevant electricity provider.

2.6 Civil Works

The main civil works are:

- Extensive terrain leveling at the Danger Bay site and the formation of dunes with excess material;
- Existing roads/tracks will be used were possible On the same principle, road design will be determined within detailed engineering in accordance with SABS standards and South African road regulation requirements (e.g. compacted road layer works and crushed stone surfacing);
- Terrestrial pipeline servitudes will be approximately 10 m in width depending on existing road infrastructure and will be trenched to a depth of 1.4 m. A safety firebreak band and roadway will be constructed around the pipeline. The servitudes will consist of roads, pipelines and electrical infrastructure;
- Trenching through the surf zone. The pipeline construction is typically done by digging a trench through the surf zone before laying the pipeline. Trench dimensions are expected to be 3 m deep, 5 m wide and 200 m long. The trench is kept open by two sheet pile rows (one on each side of the trench) for a period of several weeks. A temporary jetty will also likely be built for aiding in the pipeline laying operations; and
- Blasting through rock should it be required.

SRMO - COORDINATE POINTS ON PIPELINE						
Point	Lat			Long		
	D	mm	ss.ss	D	mm	ss.ss
1	32	57	25.93	18	3	18.73
2	32	57	28.83	18	3	36.55
3	32	57	18.60	18	4	11.04
4	32	58	10.67	18	3	5.86
4a	32	57	11.96	18	4	6.93
5	32	58	9.29	18	1	54.20
6	32	58	11.75	18	1	7.05
7	32	58	6.01	18	0	46.12
8	32	58	16.34	18	0	9.81
9	32	57	50.96	17	59	18.05
10	32	57	6.19	17	57	52.48
11	32	57	1.77	17	57	33.04
12	32	57	6.11	17	56	27.49
13	32	57	27.04	17	54	35.78
14	32	57	28.01	17	54	29.98
15	32	57	37.59	17	53	41.97
16	32	57	49.33	17	53	28.70
17	32	58	1.81	17	53	31.32
18	32	58	30.22	17	53	26.81
19	32	58	50.55	17	53	28.31
20	32	59	35.17	17	52	53.82
21	32	59	48.00	17	52	57.77
22	32	59	53.52	17	52	59.46

SRMO - COORD POINTS ON ALTERNATIVE ROUTES						
Point	Lat			Long		
	D	mm	ss.ss	D	mm	ss.ss
23	32	57	54.49	17	53	49.68
24	32	58	24.32	17	53	49.93
25	32	59	23.67	17	53	56.77
26	32	59	51.56	17	53	51.72
27	32	59	36.50	17	53	24.04
28	32	57	11.96	18	4	6.93
29	32	57	16.12	18	3	56.03
30	32	58	25.95	18	4	23.36

PUMP STATIONS - COORDINATE POINTS						
PS	Lat			Long		
	D	mm	ss.ss	D	mm	ss.ss
A	32	57	14.81	18	4	8.57
B	32	58	30.49	18	4	25.78
C	32	58	8.92	17	59	48.31
D	32	57	26.52	17	54	35.01
E	32	59	53.93	17	52	59.86

OUTFALL PIPELINE OPTIONS - END COORDINATES						
Option	Lat			Long		
	D	mm	ss.ss	D	mm	ss.ss
1	33	0	18.43	1	6	49.65
2	33	0	23.98	1	6	25.60
3	33	0	9.59	1	7	28.25
Desal	33	0	20.34	1	6	41.37

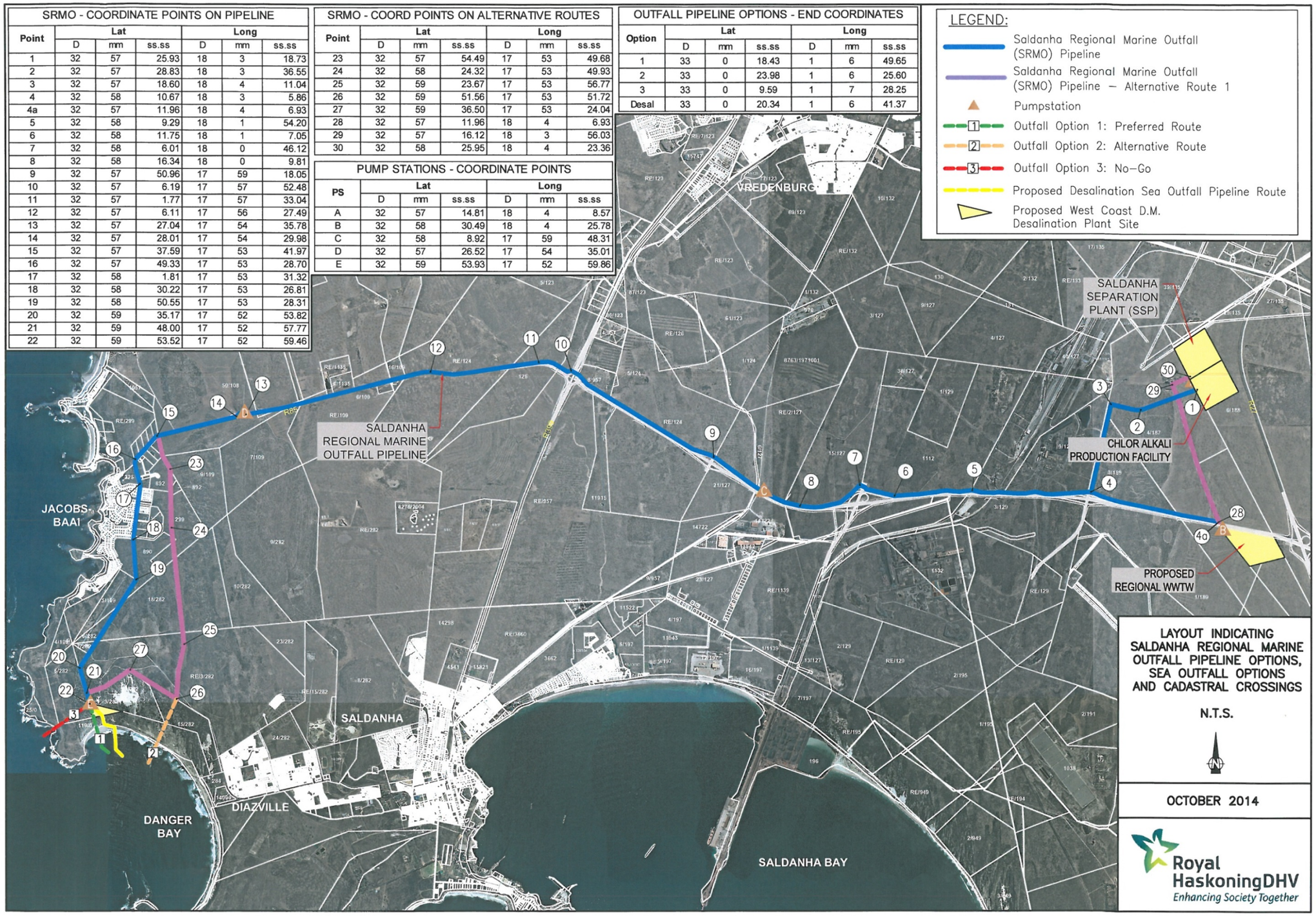

Figure 2: Locality map showing the alternative terrestrial routings and marine outfall positions and associated infrastructure considered as part of the EIA (please note the blue corridor (Jacobsbaai Western Corridor) was selected as the preferred pipeline routing alternative and Outfall Option 1 was selected as the preferred marine outfall)

3 SITE LOCATION AND ALTERNATIVES

3.1 Permit Requirements

The environmental scope of the SRMO EIA is broad as there are a number of diverse development components such as sea pipeline, terrestrial pipeline, marine outfall, electrical infrastructure and others. This creates a complex legal environment where a number of legal permissions, licenses, permits and authorisations are required from a number of different Provincial and National governmental departments. At this stage it is the understanding of the EAP that the following environmental authorisations will be required.

Table 3: Environmental Authorisations and permits required for the proposed Saldanha Regional Marine Outfall Project

TYPE OF AUTHORISATION REQUIRED	COMPETENT AUTHORITY	REASON FOR AUTHORISATION
The National Environmental Management Act (No. 108 of 2008). General Environmental Authorisation	Western Cape Department of Environmental Affairs and Development Planning (DEA&DP): Land Management	The proposed SRMO Project includes listed activities triggered under the 2010 NEMA EIA Regulations. The SRMO Project contains listed activities that require full Scoping and Environmental Impact Reporting (S&EIR) GN.R545, and listed activities which require a Basic Assessment in terms of GN.R544 and GN.R546. These activities are included in Table 1.4 of Chapter 1. Listed activities are also triggered under the 2014 NEMA EIA Regulations which subsequently came into effect on 4 December 2014. These activities are included in Table 1.5 of Chapter 1.
Integrated Coastal Management Act (No. 24 of 2008). Coastal Waters Discharge Permit	Department of Environmental Affairs Oceans and Coasts (DEA:O&C): Coastal Pollution Management	A concentrated brine solution with additional chemical constituents will be discharged into the sea.
The Sea-Shore Act (No. 21 of 1935). A lease for the portion of the sea-shore below the high water mark will need to be obtained	DEA&DP and/or CapeNature	Sea pipeline intake and discharge facilities will traverse the sea-shore below the high water mark. A maximum of a 20 year lease with the potential for renewal will be applied for.
Servitudes for pipelines that traverse state owned land above the high water mark need to be applied for by Frontier Utilities.	Department of Public Works	Terrestrial pipelines will traverse state owned land above the high water mark and authorisation for this will need to be obtained from the National Department of Public Works to register the servitude within this region of the coast.
National Environmental Management Act (No. 107 of 1998) GN. Regulation 1399: Regulations for the control of Vehicles in the Coastal Zone. Permission required	DEA&DP: Coastal Management Unit	The development of the pipeline traversing the sea shore will require an Off Road Vehicle licence in accordance with Regulation 1399.
A Permit to remove rare plant species if present.	CapeNature	Rare and endangered plant species may need to be relocated for the routing of the pipeline. Authorisation to undertake this activity will need to be obtained from the competent authority.

TYPE OF AUTHORISATION REQUIRED	COMPETENT AUTHORITY	REASON FOR AUTHORISATION
The National Heritage Resources Act (NHRA No. 25 of 1999)	Heritage Western Cape	The construction of the terrestrial pipeline may have the potential to excavate, alter of remove archaeological, palaeontological and historical material or objects. This should not be done without a permit issued by Heritage Western Cape.
National Water Act (No. 36 of 1998) Water Use License Application (WULA).	Department of Water Affairs and Sanitation: Western Cape	There is the potential that the terrestrial pipeline may traverse areas within 500 m of wetlands. A Water Use License Application for Section 21(c) (impeding or diverting the flow of water in a watercourse) and 21(i) (altering the bed, banks, course or characteristics of a watercourse) will be required before constructing the pipeline. AGES Gauteng has prepared the WULA and will submit it to DWS for approval.

4 APPROACH TO THE EMP

A typical EMP takes the planning and design, construction, operational and decommissioning phases of a project into account. The EMP is compiled as part of the EIA process and is an annexure to the project report (Section B of Volume I of the Final EIA Report (FEIAR).

The EMP is based largely on the findings and recommendations of the EIA process. However, the EMP is considered a 'live' document and must be updated with additional information or actions during the design, construction and operational phases.

The EMP follows an approach of identifying an over-arching goal and objectives, accompanied by management actions that are aimed at achieving these objectives. The management actions are presented in a table format in order to show the links between the goal and associated objectives, actions, responsibilities, monitoring requirements and targets. The management plans for the design, construction, operation and decommissioning phases consist of the following components:

- Identification of project aspects (activities);
- Management objectives associated with that project aspect (based on findings of EIA);
- Management actions to achieve the stated objectives;
- The responsible party; and
- Monitoring frequency.

4.1 Roles and Responsibilities

For the purposes of the EMP, the generic roles that need to be defined are those of the:

- Project Proponent: Frontier Saldanha Utilities (Pty) Ltd (Frontier Utilities);
- The appointed Consulting Engineers;
- The appointed Environmental Control Officer (ECO);
- The appointed Lead Contractor ; and
- The appointed Operations Manager.

Note: The specific titles for these functions will vary from project to project. The intent of this section is to give a generic outline of what these roles typically require.

4.1.1 Project Proponent

The Project Proponent (i.e. Frontier Saldanha Utilities (Pty) Ltd; here-after referred to as Frontier Utilities) is the 'owner' of the project and as such is responsible for ensuring that the conditions of the Environmental Authorisation (EA) issued in terms of NEMA (should the project receive such EA) are fully satisfied, as well as ensuring that any other necessary permits or licences are obtained and complied with. It is expected that the Project Proponent will appoint the Environmental Control Officer (ECO), Construction Manager and the Operations Manager.

4.1.2 Environmental Control Officer (ECO)

The ECO will be responsible for overseeing the implementation of the EMP during the construction and operations phases, and for monitoring environmental impacts, record-keeping and updating of the EMP as and when necessary.

During *construction*, the ECO will be responsible for the following:

- Meeting on site with the Construction Manager prior to the commencement of construction activities to confirm the construction procedure and designated activity zones;
- Weekly or bi-weekly (i.e. every two weeks) monitoring of site activities during construction (or as required) to ensure adherence to the specifications contained in the EMP, using a monitoring checklist that is to be prepared by the ECO at the start of the construction phase;
- Preparation of the monitoring report based on the weekly or bi-weekly site visit; and
- Conducting an environmental inspection on completion of the construction period and 'signing off' the construction process with the Construction Manager.

During *operation*, the ECO will be responsible for:

- Overseeing the implementation of the EMP for the operation phase;
- Ensure that the necessary environmental monitoring takes place as specified in the EMP; and
- Update the EMP and ensure that records are kept of all monitoring activities and results.

During *decommissioning*, the ECO will be responsible for:

- Overseeing the implementation of the EMP for the decommissioning phase; and
- Conducting an environmental inspection on completion of decommissioning and 'signing off' the site rehabilitation process.

At the time of preparing this draft EMP, the ECO appointment is still to be made by the proponent. The appointment is dependent upon the project receiving EA and proceeding to the construction phase.

4.1.3 Lead Contractor

The lead contractor will be responsible for the following:

- Overall construction programme, project delivery and quality control for the construction for the SRMO Project;
- Overseeing compliance with the Health, Safety and Environmental Responsibilities specific to the project management related to project construction;
- Promoting total job safety and environmental awareness by employees, contractors and sub-contractors and stress to all employees and contractors and sub-contractors the importance that the project proponent attaches to safety and the environment.
- Ensuring that each subcontractor employ an ECO to monitor and report on the daily activities on-site during the construction phase;
- Ensuring that safe, environmentally acceptable working methods and best practices are implemented and that sufficient plant and equipment is made available, properly operated and maintained, to facilitate proper access and enable any operation to be carried out safely;
- Meeting on site with the ECO prior to the commencement of construction activities to confirm the construction procedure and designated activity zones;
- Ensuring that all appointed contractors and sub-contractors are aware of this EMP and their responsibilities in relation to the plan; and
- Ensuring that all appointed contractors and sub-contractors repair, at their own cost, any environmental damage as a result of a contravention of specifications contained in the EMP, to the satisfaction of the ECO.

At the time of preparing this draft EMP, the appointment of a lead contractor has not been made and will depend upon the project receiving EA and proceeding to the construction phase.

4.1.4 Operations Manager

It is envisaged that an "Operations Manager" will be responsible for:

- Operation of the facility;
- Required maintenance; and
- Ensuring that the specified environmental monitoring programmes during operations are undertaken effectively and that the findings are analysed and applied.

Table 4: Roles and Responsibilities of key players

Lead players	Contact names	Contact details
Frontier Saldanha Utilities (Pty) Ltd	Derick de Wit	Frontier Rare Earths SA (Pty) Ltd Sound Mining House. 2A Fifth Avenue, Rivonia, 2128 Tel: +27 11 234 6216 Fax: +27 21 446 6050
	Drikus Janse van Rensburg	Frontier Rare Earths SA (Pty) Ltd Sound Mining House. 2A Fifth Avenue, Rivonia, 2128 Tel: +27 11 234 6216 Fax: +27 21 446 6050

4.2 Communication

Frontier Utilities shall establish and maintain information (in paper and electronic form) to describe the ***core elements*** of the EMP. Reference must also be provided to related documentation, for example, to monitoring relevant to the EMP that is undertaken by independent bodies.

The core elements are the key areas of an EMP that need to be documented. As a minimum, these should include the following:

- Company environmental policy;
- Roles and responsibilities of key players responsible for implementation and monitoring of the EMP;
- Management objectives;
- Detailed Management Plans;
- Operational, reporting and communication procedures;
- Site Inspection Forms, monthly environmental reports and audit reports; and
- Any other relevant environmental information (e.g. description of possible environmental accidents and training activities provided).

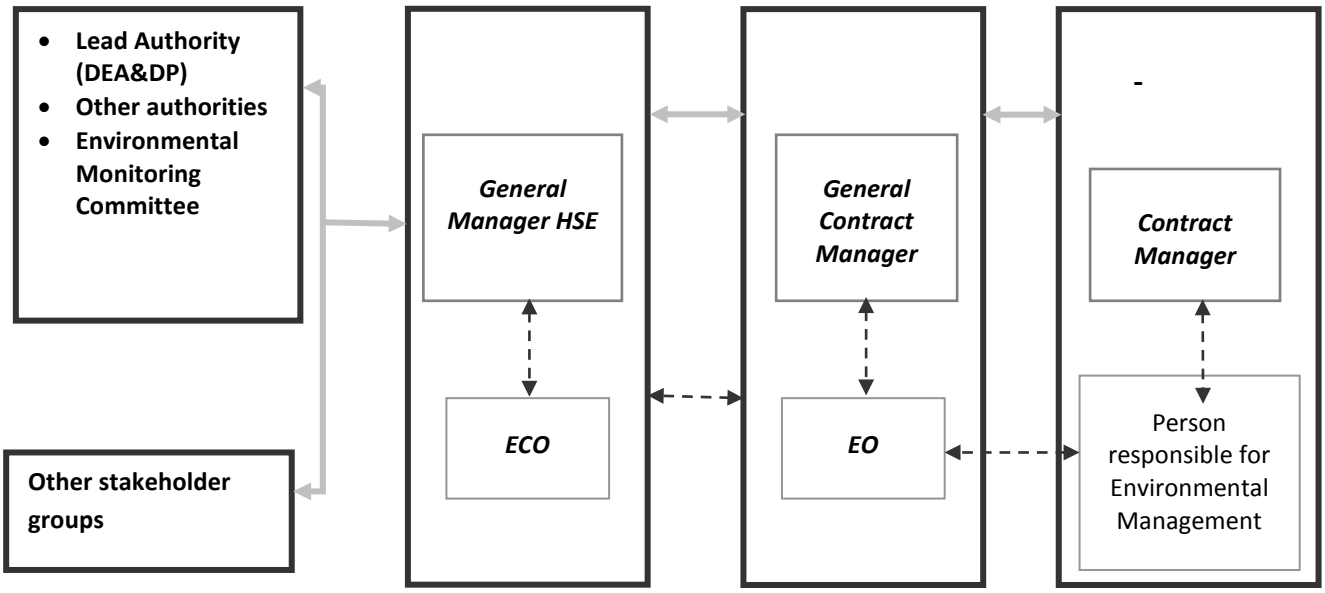

Figure 3: Communication and information-keeping

5 SPECIFIC MARINE MONITORING

Monitoring plays a key role in ensuring that plants function as intended with minimal environmental impacts. Monitoring includes validation, operational monitoring, verification and surveillance. Validation is the process of obtaining evidence that control measures are capable of operating as required, in other words it should confirm that specific pieces of equipment achieve accepted performance standards. Operational monitoring is the planned series of observations or measurements undertaken to assess the ongoing performance of individual control measures in preventing, eliminating or reducing hazards. Operational monitoring will normally be based on simple and rapid procedures such as measurement of turbidity and chlorine residuals or inspection of the system integrity. Verification provides assurance that a system as a whole is providing safe products while surveillance reviews compliance with identified guidelines, standards and regulations and permit conditions.

5.1 Recommendations for Validation

A thorough characterisation of the receiving water at the proposed discharge site in Danger Bay should include an evaluation of physical, microbial and chemical characteristics, meteorological and oceanographic data, and aquatic biology. Seasonal variations should also be taken into account. The study should consider water temperature, total dissolved solids (TDS), total suspended solids (TSS), scaling compounds (calcium, silica, magnesium, barium, etc.) and total organic carbon (TOC).

Once the outfall is in full operation, a monitoring programme should be implemented to ensure that the diffuser is performing to the expected specifications and that the required level of dilution (as predicted by the numerical modelling) is in fact achieved. Typical effluent and thermal footprints need to be confirmed by sampling with a conductivity-temperature-depth (CTD) probe after an initial period of operation of the discharge both to confirm the performance of the discharge system and the numerical model predictions. This should be done for a suitably representative range of "conservative" environmental conditions, i.e. conditions for which dispersion of the effluent is likely to be the most limited. It is envisaged that two to three field surveys of one to two days duration would be adequate to confirm the performance of the discharge system and the accuracy of model predictions. It is likely, that most of these measurements would in any case be needed to be included in the monitoring programmes developed to study the impact of the brine on potentially affected communities, particularly the subtidal benthic communities. If field observations and monitoring fail to mirror predicted results, the predicted impacts will need to be re-assessed.

5.2 Recommendations for Operational Monitoring

To quantify the full impact of the effluent on the marine environment, all affected habitats and/or communities should be monitored before and during the discharge. However, prior research has indicated that this is impractical, impossible or simply unnecessary. Monitoring should rather focus on what are likely to be the most sensitive, significantly affected and/or representative species, communities or resources. The proposed discharge area includes two principal kinds of habitat - subtidal unconsolidated sediments and reefs, and intertidal sandy beaches. In both cases a suite of standard, and widely accepted techniques have been developed for the monitoring of invertebrate communities associated with these habitats. Very little information is available on the intertidal sandy substrate communities in Danger Bay. It is strongly recommended that a well-designed monitoring plan be developed as part of the regional marine outfalls environmental requirements. This would involve establishing a baseline of intertidal and shallow subtidal invertebrate macrofaunal communities before any construction commences, followed by regular monitoring thereafter to assess recovery of the impacted communities following construction, as well as responses of the communities to a continuous hypersaline discharge.

Continuous monitoring of the effluent for residual contaminants and dissolved oxygen levels is essential. Should residual chlorine be detected in the brine, sodium bisulphite (SBS) dosing should immediately be increased. This may in turn lead to reduced oxygen levels in the effluent requiring aeration of the brine before discharge. Furthermore, bacterial re-growth

should be periodically assessed (every 6 months) and if high bacterial numbers are encountered in the brine, shock-dosing with SBS should be undertaken. Continuous monitoring of oxygen levels would then indicate whether aeration of the effluent is necessary.

To ensure complete confidence in the controls of the effluent streams and that the consequent residual co-pollutants are being managed to concentrations that (together with possible synergistic effects of other co-discharges) will not have significant environmental impacts, it will be necessary to undertake toxicity testing of the discharge for a full range of operational scenarios. Such sampling and Whole Effluent Toxicity (WET) testing need only be undertaken for the duration and extent necessary to determine an effluent profile under all operational scenarios. This will enable more reliable assessment of the impacts of any co-discharged constituents and to calculate the required dilution rate.

The effluent may contain low amounts of heavy metals from corrosive processes, which tend to enrich in suspended material and finally in the marine sediments. It is recommended that the effluent be monitored regularly (every 6-12 months) for heavy metals until a profile of the discharge in terms of heavy metal concentrations is determined. These heavy metal concentrations in the brine effluent would then need to be assessed based on existing guidelines (DWAF 1995; ANZECC 2000). An inspection programme at similar intervals (6-12 months) to check corrosion levels of plant constituent parts and the physical integrity of the outfall pipe and diffuser should be implemented and components replaced or modified if excessive corrosion is identified or specific maintenance is required.

5.3 Recommendations for Surveillance Reviews

Independent of which site is ultimately chosen, an environmental monitoring programme should be developed to study the effects of the discharged brine on the receiving water body and potentially affected subtidal benthic communities. This recommendation is reinforced by the National Guideline for the Discharge of Effluent from Land-based Sources into the Coastal Environment (DWAF 2014), in which it is stated that it is essential that the effects of an effluent discharged into the coastal zone be monitored according to an accepted monitoring programme. This monitoring programme would build on the programme designed to assess diffuser performance and validate numerical modelling results (see above). As a minimum, this monitoring should include measurement of the main water quality parameters such as temperature, salinity and dissolved oxygen as a minimum. It is further recommended that every effort be made to keep a journal/report of the results and to include it in annual company reports that includes triple bottom line reporting.

This information should be used to develop a contingency plan that examines the risk of contamination, and considers procedures that must be implemented to mitigate any unanticipated impacts (e.g. mixing zone larger than expected under certain conditions).

6 MANAGEMENT ACTIONS FOR DETAILED PLANNING & DESIGN PHASE

The aim of managing tasks associated with the planning and design phase of the pipeline and associated infrastructure is to ensure that potential environmental impacts identified during the EIA process are effectively used to inform project design. This promotes the use of pre-emptive measures that serve to minimise the potential environmental impacts that may otherwise require mitigation at a later stage in the process.

Table 5: Management Actions PLANNING & DESIGN phase

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
PLANNING AND DESIGN OF THE PIPELINE AND ASSOCIATED INFRASTRUCTURE	Servitude corridors (pipeline, roads & power lines)	Avoid development on high sensitivity vegetation	• Reroute the pipeline to north of Jacobsbaai road between Pump Stations C and D along the Jacobbaai western corridor in order to avoid the two sensitive areas south of this road. • For the section pipeline of approximately 2 000 m traversing through an area with endangered vegetation (within and to the south of Jacobsbaai), the pipeline construction disturbance footprint should be entirely within the road reserve west of the main road, to reduce impacts on sensitive vegetation along the pipeline corridor. • For the section pipeline of approximately 2 000 m traversing through an area with endangered vegetation (within and to the south of Jacobsbaai) the proposed pipeline must be buried on the western (seaward) side of the road as this side is more disturbed and hence less sensitive than the eastern side.	**Project Proponent:** Restricted to the Planning and Design phase of the activity
		Contribute to the conservation and management of sensitive vegetation in the Vredenburg/Saldanha area	• Frontier Saldanha Utilities must enter into a shared agreement with CapeNature (or another appropriate institution) regarding the nature and value of the financial contribution to a suitable offset programme in the Vredenburg/Saldanha area.	**Project Proponent:** Restricted to the Planning and Design phase of the activity
		Avoid wetlands along the Jacobsbaai Road of high conservation priority	• The Jacobsbaai Road infrastructure corridor would cross through portions of Wetland 1. The servitude corridor must be designed so that it runs along the northern section of the road and does not traverse this wetland.	**Project Proponent:** Restricted to the Planning and Design phase of the activity
		Avoid palaeontological heritage along the proposed corridor	• Heritage inspection of pipeline routes through the Prospect Hill and Velddrif formations prior to construction must be undertaken.	**Project Proponent:** Restricted to the Planning and Design phase of the

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
			• Refinements may be made to the route alignment to avoid sensitive heritage sites such as Site DB022. • The road alignment must make use of existing official and unofficial dirt-roads as much as possible to avoid the creation of new roads.	activity
		Design the pipeline, power line and pump station to mitigate visual intrusion at Danger Bay	• Locate structures such that they are screened by dunes, using non-reflective paints on structures to reduce contrast and using paint colours for structures and buildings so that they blend in with the natural background (e.g. RAL-9010, RAL-9016, RAL-9003 or RAL-9001). • The dunes are quite high in this area and careful placing of structures and buildings, as well as appropriate colour schemes for buildings can lower their visibility. Wooden power line pylons will maintain a rural feel to the landscape. • Keep building and structure heights as low as possible in order to reduce structure visibility. • Pylons should be similar to existing pylons. • Night lighting of the pump station E should not exceed, in number of lights and brightness, the minimum required for safety and security.	**Project Proponent:** Restricted to the Planning and Design phase of the activity
		Conservation of Marine Ecology	A marine chemist may be appointed to undertake a chemical study during the detailed design to confirm acceptability of to investigate potential synergistic and antagonistic effects of the effluents prior to commissioning of the project. The study can be undertaken as part of a Risk Assessment in the post EIA phase as the proposed contributing industries have not been designed in detail nor commissioned. This will be confirmed with the Department of Environmental Affairs: Oceans and Coasts (DEA:O&C)	**Project Proponent:** Restricted to the Planning and Design phase of the activity **Marine chemist** to be appointed in post EIA phase

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
			during the Coastal Waters Discharge Application	
	Marine and pump station infrastructure	Design the outfall to facilitate rapid dispersion of brine in the marine environment and to minimise corrosion	• The effluent must be discharged through a multi-port diffuser positioned in an area of relatively high wave conditions where regular mixing of the water column can be expected. • The outfall pipeline must be designed as a single pipeline fitted with a suitable diffuser system along the second half of the length of the pipeline and located at 10 m depth below MSL. • Ensure dead spots and threaded connections are eliminated when designing the outfall pipeline. • Establish a pre-construction marine ecology baseline against which long-term monitoring results can be compared.	**Project Proponent:** Restricted to the Planning and Design phase of the activity The baseline should comprise at least a winter and a summer sample from both impact and suitable reference sites for a year prior to construction. In this case it is proposed to sample the beach at the pipeline position (and a suitable control), as well as subtidal macrofauna in unconsolidated sediments around the pipeline position.
		Effective pipeline design to ensure erosion protection and protection against coastal processes.	• Each pump station should be investigated to ensure optimal design with minimal visual impact to the environment and to be enclosed to buffer exposure to coastal processes. • Ensure that all the pump stations have back-up electricity supply. • The pipeline design must consider the pipeline stability and required erosion protection under incident and extreme wave and current conditions.	**Project Proponent:** Restricted to the Planning and Design phase of the activity

7 MANAGEMENT PLAN FOR THE CONSTRUCTION PHASE

The overall goal for the construction phase is to undertake all relevant construction activities in a way that ensures proper management of environmental aspects and impacts; and to minimise disruption to other landuse activities in the area and traffic. The potential impacts resulting from development of the 'preferred' pipeline route at Danger Bay during the construction phase of the activity are provided below.

General Recommendation:

A detailed Construction Environmental Management Programme (CEMP) should be compiled and implemented, such that it clearly addresses *inter alia* the activities during the construction phase as well as appropriate locations for construction camps, vehicle storage and parking areas, ablution facilities and waste management, such that these do not impact on sensitive or otherwise important terrestrial or wetland areas. It is recommended that the CEMP takes into consideration the requirements set out by the DEA&DP in the following draft document: *Generic Environmental Management Programme for Saldanha Bay*.

Table 6: Management plan for the CONSTRUCTION phase

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
CONSTRUCTION OF THE PIPELINE AND ASSOCIATED INFRASTRUCTURE	Servitude corridors (pipeline, roads, powerlines)	Contractors will avoid development on high sensitivity vegetation	a) The approved development footprint within areas of natural vegetation shall be surveyed and fenced/cordoned off with coloured rope and danger tape. There will be no disturbance of natural vegetation outside these demarcated areas. Penalties for violation of areas outside those demarcated for construction purposes shall be incorporated into the contracts of all contractors and sub-contractors. b) The removal or collecting of any plants or shrubs outside the demarcated development area is prohibited and this must be communicated to all construction staff. c) Contractors and construction workers must be clearly informed of the no-go areas and held accountable for any infringements that may occur. No access to the demarcated areas should be permitted during the construction phase. d) An ecologist should be contracted to conduct preconstruction surveys within the final development footprint to demarcate setback distances from sensitive areas such as wetlands that may be present as well as locate and translocate any protected species present. Individuals located should be transplanted to a safe area within a similar environment at the site.	**Project Proponent, Appointed ECO and lead contractor:** Initially on establishment of the site camp and prior to site clearing, with subsequent daily monitoring during construction. The S&R Programme to be undertaken as a once-off measure with the consultation of lead botanist:

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
			e) Prior to any construction a plant Search and Rescue programme (S&R) should be undertaken within all development footprint that occur within areas of natural vegetation. S&R shall involve translocation of selected succulents, shrubs and bulbs occurring in the pipeline footprint, with emphasis on any Species of Conservation Concern (SCC). The timing of the S&R operation is critical - it cannot be done during the dry summer months, for example. All such development footprints must be surveyed and pegged out as soon as possible after project commencement, and then a local horticulturist with S&R experience (such a person could be recommended by the botanist) should be appointed to undertake the S&R, just after flowering has been completed. The horticulturist must liaise with the botanist. All rescued species should be bagged (and cuttings taken where appropriate) and kept in the horticulturist's nursery, and should be returned to site once all construction is completed and rehabilitation of disturbed areas is required. Replanting should only occur in autumn or early winter (April – May), once the first rains have fallen, in order to facilitate establishment. The consultant botanist must confirm in writing that this process has been completed successfully. f) It is recommended that for the section pipeline of approximately 2 000 m traversing through an area with endangered vegetation (within and to	

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
			the south of Jacobsbaai), the pipeline construction disturbance footprint should be entirely within the road reserve west of the main road, to reduce impacts on sensitive vegetation along the pipeline corridor. Most of the SCC are located east of the main road, or outside of the road reserve. g) It is recommended that for the section pipeline of approximately 2 000 m traversing through an area with endangered vegetation (within and to the south of Jacobsbaai) the proposed pipeline must be buried on the western (seaward) side of the road as this side is more disturbed and hence less sensitive than the eastern side. h) The Jacobsbaai Western Corridor must be rerouted to run north of the Jacobsbaai road between Pump stations C and D, in order to avoid the two sensitive wetland areas south of this road. i) Active rehabilitation following construction activities. Only suitable locally indigenous Langebaan Dune Strandveld and Saldanha Flats Strandveld plant species should be used for rehabilitation or planting anywhere on site. This means that no exotic or invasive species should be used for rehabilitation, and this includes the commonly used but highly invasive grass species such as ryegrass (*Lolium spp*.). j) An ECO must visit the area at least twice a week for the duration of the construction phase, or	

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
			more often as required. k) The ECO must ensure that no laydown or material storage areas are located within areas of natural vegetation. l) Disturbance must be minimised during construction in the Very High Sensitivity areas through Jacobsbaai, and in this regard all heavy machinery and soil piles should be kept within the current road shoulder edge. In other words, no disturbance may take place west of the actual trench to be dug – no vehicular activity, and no pipe or soil storage. m) Topsoil (top 30cm) must be replaced last when infilling the trenches, and compacted only by hand once replaced. n) No dumping or temporary storage of any materials may take place outside designated and demarcated laydown areas. Laydown areas may not be located within areas of natural vegetation. o) Some of the unneeded fill from excavated trenches should ideally be used as a surfacing for the adjacent service roads, in order to minimise the development footprint. p) All new roads must be kerbless.	
		Conservation and management of botanical sensitive areas	The applicant must engage with CapeNature (or another appropriate conservation body) and an experienced biodiversity offset advisor prior to the project being executed, in order to formalise the form and quantum of a biodiversity offset, as an important element of mitigation for	**Project Proponent** Prior to construction commences

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
			degradation of Limestone Strandveld habitat in the Jacobsbaai area.	
		Prevention of disturbance to fauna	a) All open trenches must be fenced off at ground level on the open side (the side opposite the side where the excavated soil is stacked) in order to prevent small animals like frogs, snakes and tortoises falling in and becoming trapped. Shadecloth of 30 cm high should be used, and fastened to fence droppers hammered in every 5 m, with the bottom staked down at ground level, leaving no gaps. b) No sections of pipeline trenches more than 50 m long may be left open for more than a week, and they should preferably be closed up within a day, using the carefully stockpiled soil that came out of the trench. c) If trenches are left open for more than a day the ECO must inspect all such sections every morning and evening and remove any animals that may have fallen into the trench. If the ECO is not on site the contractor must designate a team member to do this checking and removal twice a day. d) Blasting should not be undertaken, except where no other feasible alternative exists. e) If blasting is required blast curtains must be used to limit damage caused by flying rock. f) If blasting is required all feasible terrestrial faunal species (notably lizards, tortoises and snakes) within the blast area, plus within a	**Appointed ECO and lead contractor:** ECO to monitor (visual inspections) open sections of trench every morning and evening and remove any animals

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
			buffer of at least 20m, must be removed beforehand and translocated to adjacent areas of natural habitat that will not be impacted by blasting. This must be undertaken by someone familiar with capture of such species. g) Conservation of Black girdled lizard (*Cordylus niger)*: No mitigation required in areas with no rocks, or further than 500 m from the coast. And no other mitigation really possible other than avoiding rocky habitats in rocky areas close to sea.	
		Reduce the impact of corridor construction on wetlands on the Jacobsbaai Road corridor	a) Implement measures to prevent contamination of wetlands with construction material and minimise disturbance footprint. b) Time construction within wetland areas for outside of the wet season. c) Rehabilitate disturbed areas north of the road such that pre-construction levels are retained along the pipeline corridor and wetlands are not thus infilled. d) The Jacobsbaai Western Corridor must be rerouted to run north of the Jacobsbaai Road between Pump stations C and D, in order to avoid the two sensitive wetland areas south of this road.	**Appointed ECO and lead contractor:** Once a week
		Prevention of disturbance to avifauna	a) Minimise noise and extent of construction period; schedule construction around any key avian activities, determined in pre-construction walk-through. b) Minimise construction footprint, particularly	**Appointed ECO and lead contractor:** Once a week

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
			in areas with intact Strandveld vegetation c) Minimise noise and extent of construction period; schedule construction around any key avian activities, determined in pre-construction walk-through. d) Use only bird-friendly power infrastructure hardware, mark the entire length of new power line with industry standard bird diverters or flappers.	
		Maintenance of important heritage features	a) A pre-construction palaeontological survey of chosen alignment should take place where the Velddrif and Prospect Hill Formations will be crossed. b) Monitoring and site inspection by the ECO and periodic site inspections by a palaeontologist in above formations during construction. c) Archaeological test excavation must take place at JB001 and along the route within about 200 m of Danger Bay. d) In situ recording of full excavation must take place at DB022 depending on the outcome of the test excavation, e) any graves intersected should be immediately protected and reported to an archaeologist or to HWC. f) Construction workers must be informed about the possibility of finding fossils, shell middens and human remains during excavation and must be instructed to protect and report these finds immediately and cease	**Project Proponent, ECO. lead archaeologist and palaeontologist:** Test excavation should take place at site JB001, at site DB022 if the later could not be avoided and along the pipeline route within about 200 m of Danger Bay

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
			work until they have been assessed.	
		Minimise visual impact of the servitude corridors	a) Erosion risks should be assessed and minimised as erosion scarring can create areas of strong contrast which is often visible far beyond that of the power line or pipeline servitude. b) Construction duration should be kept as short as is practical in order to reduce the visual impact of the construction phase on visual receptors. c) Laydown areas and stockyards should be located in low visibility areas (e.g. between high dunes) and limited night lighting, and existing vegetation should be used to screen them from views where possible. d) Night lighting of the construction sites should be minimised within requirements of safety and efficiency. e) Best practice measures will be implemented during the construction phase of the power lines. f) The design of the proposed power line should be the same as the current power line installed in Jacobsbaai, i.e. a single pole carrying three conductors.	**Appointed ECO and lead contractor:** Once a week
		Maintain best practice during construction of the powerline	(a) The design of the proposed power line should be the same as the current power line installed in Jacobsbaai, i.e. a single pole carrying three conductors.	**Project Proponent, Appointed ECO and lead contractor:** During construction

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
			(b) Cognisance should be taken of the MHI risk assessment for the Chlorine Caustic Soda and Hydrochloric Acid Facility with respect to the possible overhead power lines.	
	Marine infrastructure	Prevent excessive disturbance to sensitive sub-tidal, rocky-reef, benthic & surf-zone communities	a) Adhere to all measures specified in the planning and design phase. b) Restrict traffic on upper beach to minimum required. Keep heavy vehicle traffic associated with pipeline or breakwater construction on the beach to a minimum. c) Restrict vehicles to clearly demarcated access routes and construction areas only; d) All construction activities in the coastal zone must be managed according to a strictly enforced Environmental Management Programme (EMP). e) Install a pipeline leak detection system. f) Active rehabilitation following completion of construction activities (i.e. remove all artificial constructions or beach. modifications created during construction from above and within the intertidal zone). No accumulations of excavated beach sediments should be left above the high water mark, and any substantial sediment accumulations below the high water mark should be levelled. Furthermore, an adjacent portion of undisturbed beach should be allocated where populations of macrofaunal species can survive and supplement recolonisation in impacted	**Project Proponent, Appointed ECO, lead contractor and marine ecologist:** Conduct Whole Effluent Toxicity (WET) testing of the brine for a full range of operational scenarios (i.e. shock-dosing, etc.). Such sampling WET testing need only be undertaken for the duration and extent necessary to determine an effluent profile under all operational scenarios.

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
			areas. g) Restrict disturbance of the sea bottom to the smallest area possible. h) Lay pipeline in such a way that required rock blasting is kept to a minimum. i) Active rehabilitation of sandy subtidal substrate is not required as sediment redistribution will be fast in the turbulent surf zone. j) Rehabilitation of rocky reefs is not possible but exposed pipeline will serve as new hard-bottom substrate. k) Restrict vibration-generating activities to the absolute minimum required. l) Restrict blasting to the absolute minimum required (one blast per day) (i.e. a single series of small ripple blasts), preferably in the middle of the day when African Penguins are foraging far out to sea. m) Use blasting methods which minimise the environmental effects of shock waves through the use of smaller, quick succession blasts directed into the rock using a time-delay detonation. n) Avoid onshore blasting during the breeding season of shore-birds. o) Visual observation limiting blasting to periods when there are no marine mammals, turtles or flocks of diving or swimming birds present in the immediate vicinity (approximately 2-km radius). The blasting	

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
			programme should be scheduled to allow seals to have left the area before the next blasting event.	
		Minimise the impact on shoreline dynamics in Danger Bay	a) Minimise operational area during construction. b) Minimize the construction period as much as possible. c) Sand dredged from trench during construction period must be fed to adjacent downdrift area. (Trench should ideally be backfilled after pipe-laying is completed to reduce risk/impact. Trench backfilling through the surf zone can be undertaken via the temporary jetty and sand pumping. Natural fill up with sediments from longshore drift is possible, however the filling period could be relatively long). d) The pipeline must be excavated to the adequate depth and across the beach so that it does not interfere with coastal processes. e) A dune restoration programme must be implemented after construction is finalised. f) Continual monitoring of the beach changes during and after construction must be implemented.	**Appointed ECO and lead contractor:** Once a month

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
		Minimise coastal erosion	a) Minimize the construction period as much as possible, including removing the temporary sheet-piles and jetty (maximum of 2 - 4 months after the start of trench excavation). b) Keep construction activities to the smallest area possible. c) Undertake a dune restoration process after construction is finalized. The dune restoration process will include the use of indigenous vegetation and a suitably qualified ecologist or specialist will be appointed to oversee the restoration process. d) Monitoring the beach changes during and after construction.	**Appointed ECO and lead contractor:** Once a month **Appointed dune specialist, or suitably qualified ecologist or specialist** After construction has been completed.
	General construction activities	Contractors will ensure that the construction site (i.e. site camp and laydown areas) is properly controlled and security is always maintained	a) Once the site camp has been established, fencing will need to be erected and security guards employed to ensure that access to the construction site is controlled. b) Adequate provision should be made for the supply of toilets to the site and for the treatment of issues such as construction-associated litter. c) All temporary fencing (or coloured rope) and danger tape should be removed once the construction phase has been completed.	**The lead contractor and appointed ECO:** Check on a daily basis
		Contractors will ensure that all fauna and flora disturbance is kept to an absolute minimum	a) Hunting and trapping of fauna is prohibited. b) No dogs may be allowed on site. c) The collection or harvesting of any plants on the site or within the surrounding area is prohibited. d) No fuelwood collection is allowed on-site.	**Appointed ECO:** Initially on establishment of the site camp and prior to site clearing, with subsequent **daily monitoring during**

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
			e) Any fauna directly threatened by the construction activities should be removed to a safe location by the ECO. f) Any active burrow systems of larger mammals within or near the development footprint should be clearly demarcated as no-go areas including a buffer of at least 30 m.	**construction**
		Prevention of soil contamination	a) Have good house-keeping practices in place. b) For equipment maintained in the field, oils & lubricants to be contained & correctly disposed of off-site. c) Maintain vehicles and equipment to ensure that no oils, diesel, fuel or other contaminant fluids are spilled. d) No vehicle maintenance or refuelling on beach. e) No concrete mixing on beach. f) All hazardous materials must be stored in a bunded area that can be locked when not in use. g) Vehicles used for the construction activity should have a spill kit (peatsorb/ drip trays) onboard in the event of a spill. h) Spill kits must be kept at designated points within the developments area. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up immediately, in the appropriate manner as related to the nature of the spill. Details of the spill must be communicated within 2	**Appointed ECO and lead contractor:** Once a week

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
			hours of the occurrence to the Resident Engineer.	
		Prevention of soil compaction and erosion	a) All construction vehicles must remain on demarcated roads so that compaction is limited to the development area only. b) Traffic should be prevented on wet soil. c) Topsoil must be stripped from all the areas that are to be utilised during the construction period and stockpiles must be well managed with a view to using the topsoil for effective rehabilitation programmes.	**Appointed ECO and lead contractor:** Once every two weeks
		Prevention of temporary loss of air quality through dust and other emissions	a) Speed of construction vehicles must be restricted, as defined by the Lead Contractor and ECO. b) Vehicles and equipment used for construction activities must be maintained in good working condition to prevent unnecessary emissions. c) Dust emissions to be limited by: • Minimising the presence of construction vehicles in and around the site • Using soil stabilizing agents or water for dust control purposes. • Keeping construction period to the minimum.	**Appointed ECO:** Daily monitoring during construction required

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
		Minimise the occurrence of fires and the associated impacts	a) Appropriate fire safety training should also be provided to staff that are to be on the site for the duration of the construction phase. b) Firefighting equipment must be made available at various appropriate locations on the construction site.	**Appointed ECO:** Once a week
		Minimise noise disturbance during construction	a) Restricted work hours (day time) will ensure that impact is reduced. Noise levels during construction must adhere to the relevant SANS standards.	**Appointed ECO and lead contractor:** Daily
		Proper management of stockpiles	a) Stockpiled material must be managed in a way that prevents the spread of materials. b) Stockpiles must be stabilised if there are signs of erosion. c) No plant, workforce or any construction related activities may be allowed on the topsoil stockpile.	**Appointed ECO and lead contractor:** Once a week
		General and hazardous waste management	a) Waste must be separated into recyclable and non-recyclable waste. b) Sufficient closed containers must be located around the site to manage builder's waste generated on-site. c) All solid and chemical wastes must be disposed of at a licensed waste disposal site. d) Materials such as fuel, oil, paint and others used during construction works must be sealed and stored in bermed areas. e) Sufficient care must be taken when handling these materials to prevent pollution. f) Material Safety data Sheets (MSD) must be prepared for all hazardous substances on site	**Appointed ECO and lead contractor:** Once a week

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
			and supplied by the contractors.	
		Reduce the potential for traffic impacts in the region	a) Impacts associated with the higher traffic volumes can be accommodated by proper site management, e.g. controlling the size of orders that would be transported to the site at any given time, and by notifying the public through local and regional media centres when large freight-carrying vehicles will be on the roads. b) The contractor must ensure that damage caused to roads by the construction related activities, including heavy vehicles, is repaired before the completion of the construction phase. The costs associated with the repair must be borne by the contractor. c) Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers. d) All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.	**Project Proponent, Appointed ECO and lead contractor:** Once a week

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
		Maximise positive financial impacts of the development	a) Set targets for use of local labour and maximise opportunities for the training of unskilled and skilled workers. b) Use local sub-contractors where possible.	**Project proponent and lead contractor:** To be discussed in construction progress reports to the client
		Reduce unwanted impacts on social networks	a) Where possible, the project proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs. b) The project proponent should consider the establishment of a Monitoring Forum (MF) for the construction phase which should be established before the construction phase commences and should include key stakeholders, including representatives from the local community, local councillors, farmers, and the contractor. The role of the MF would be to monitor the construction phase and the implementation of the recommended mitigation measures in terms of social impact. c) The project proponent and the contractor should, in consultation with representatives from the MF, develop a Code of conduct for the construction phase. The code should identify what types of behaviour and activities by construction workers are not permitted. Construction workers that breach	**Project proponent and lead contractor:** To be discussed in construction progress reports to the client

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
			the code of good conduct should be dismissed. All dismissals must comply with the South African labour legislation. d) The construction workers will need to adhere to rules and requirements specified in their Environmental Health and Safety Plans. e) The proponent and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase. f) The movement of construction workers on and off the site should be closely managed and monitored by the contractors. In this regard the contractors should be responsible for making the necessary arrangements for transporting workers to and from site on a daily basis. g) The contractor should make the necessary arrangements for allowing workers from outside the area to return home over weekends and or on a regular basis during the construction phase. h) It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay overnight on the site.	
		Enhance employment beneficiation	a) Where reasonable and practical, the project proponent should appoint local contractors and implement a 'locals first' policy. b) Where feasible, efforts should be made to employ local contactors that are compliant	**Project proponent and lead contractor:** To be discussed in construction progress reports to the client

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
			with Broad Based Black Economic Empowerment (BBBEE) criteria. c) Before the construction phase commences the project proponent should meet with representatives from the local municipality to establish the existence of a skills database for the area. If such as database exists it should be made available to the contractors appointed for the construction phase and where possible local labour should be used. d) Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase. e) The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.	

8 MANAGEMENT PLAN FOR THE OPERATIONAL PHASE

The objective for managing the operational phase of the ancillary infrastructures (pipeline AND associated powerlines, roads) associated with the SMRO plant is to ensure that the daily operations do not have unforeseen impacts on the environment; to ensure that all potential impacts are monitored and that the necessary corrective actions are undertaken in a timeous manner.

Table 7: Management plan for the OPERATIONAL phase

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
OPERATION OF THE PIPELINE AND ASSOCIATED INFRASTRUCTURE	Servitude corridors (pipeline, roads & power lines)	Avoid disturbance to high sensitivity vegetation	a) There must be no disturbance of natural vegetation outside the demarcated areas of the servitude corridors b) Access to the pump stations, e.g. for regular maintenance should be via the existing roads or paths constructed for this purpose. No new roads or paths to be constructed which are not approved by the relevant authorities. c) Penalties for violation of areas outside those demarcated for construction purposes shall be incorporated into the contracts of all contractors and sub-contractors for the operational lifespan of the project	**The lead contractor and appointed ECO:** Monthly monitoring, with annual reporting during the operational lifetime of the project (or timeframes as deemed appropriate during the operational phase of the project)
		Rehabilitation of disturbed areas after construction	a) Rehabilitation of disturbed areas should be undertaken; b) Only suitable locally indigenous Strandveld plant species should be used for rehabilitation or planting anywhere on site. This means that no exotic or invasive species should be used for rehabilitation, and this includes the commonly used but highly invasive grass species such as ryegrass (*Lolium* spp). c) All rescued plant species should be returned to site once all construction is completed and rehabilitation of disturbed areas is required. Replanting should only occur in autumn or early winter (April – May), once the first rains have fallen, in order to facilitate establishment.	**The lead contractor and appointed ECO**: Monthly monitoring, with annual reporting during the operational lifetime of the project (or timeframes as deemed appropriate during the operational phase of the project). The botanist must confirm in writing that the rescued plants have been successfully

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
				returned to site in terms of the S&R being done.
		Conservation and management of botanical sensitive areas	The applicant must engage with CapeNature (or another appropriate conservation body) and an experienced biodiversity offset advisor prior to the project being executed, in order to formalise the form and quantum of a biodiversity offset, as an important element of mitigation for degradation of Limestone Strandveld habitat in the Jacobsbaai area.	**Project Proponent** Prior to construction commences
		Contractors will ensure that alien invasive plants are effectively managed	a) Regular monitoring must be undertaken to ensure that alien plants are not increasing as a result of the entire disturbance that has taken place b) A long-term alien management plan must be designed and implemented in conjunction with a suitably qualified expert including the DWA methodology; cut stems and paint immediately with suitable herbicide; no herbicide spraying in areas with >10% natural vegetation. c) Ongoing alien plant monitoring and removal must be undertaken in all areas of natural vegetation within the project area on an annual basis (in October or November) for a minimum of five years after completion, within 50m of any infrastructure	**The lead contractor and appointed ECO:** Ongoing monitoring programme in October or November for a minimum of 5 years. Alien vegetation contractor to undertake work; independent botanist to audit two years after construction completed

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
			associated with this project. DWA approved methods should be employed for all alien clearing operations. No earthmoving machinery should be used for this purpose, as this disturbs the soil and creates ideal conditions for re-invasion. For woody plants all stems must be cut as close to ground level as possible, using loppers or chainsaws (depending on size), and stumps must be immediately hand painted with a suitable Triclopyr herbicide (e.g. Garlon, Timbrel, with colour dye) to prevent resprouting. If this is not done within five minutes of being cut some stems may resprout, wasting the original effort. All cut branches should be stacked into pyramids (cut ends up) and left to dry – where rodents will eat the available seed under the pile, reducing seed germination. Annual follow ups are required in all areas that have been previously cleared. Small seedlings may be hand pulled, and grasses and herbs should either be hand pulled or sprayed with suitable herbicide if cover is greater than 60% per m^2 and indigenous plant cover is less than 10%. An independent botanist should monitor and audit this process two years after completion of the project construction.	
		Prevention of soil compaction and erosion (incl. stormwater management)	a) Regular visual monitoring for erosion is required to ensure that no erosion problems are occurring as a result of the pipeline route, roads and other infrastructure. If erosion occurs, the necessary changes to the system must be noted. All erosion problems observed should be rectified as soon as possible.	**The lead contractor and appointed ECO:** Monthly monitoring, with annual reporting during the operational lifetime of the project

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
			b) A detailed stormwater management plan would need to be designed, and implemented at an early phase of construction. c) The internal stormwater management system should include the creation of sediment traps, designed to prevent the large-scale passage of sediment into downstream systems. d) Efforts should be made to re-establish vegetation across the facility following construction to reduce erosion at the level of the site. e) The storm water management plan will include measures to reduce coastal erosion. All storm water runoff from "clean" areas is allowed to percolate into the ground. It is expected that the contractor will provide grading around the site to allow for channelling of storm water during the detailed design process. Although it can be argued that "clean" storm water can be collected and re-used, due to the low rainfall in the area, this may not be a practical option. To ease water requirements for irrigation, and if economically feasible, collection of rain water into tanks connected to roof gutters could be considered.	

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
		Maintain as lower visual impact in the area as possible	a) Use non-reflective paint for buildings and structures in a colour that blends in as well as possible with the background (e.g. RAL-9010, RAL-9016, RAL-9003 or RAL-9001). b) A plant maintenance programme and schedule should include maintenance of exterior facades since the plant is likely to be highly exposed to the elements. c) Lighting of the facility should not exceed, in number of lights and brightness, the minimum required for safety and security. Night lighting pollution should be avoided. Night lighting of the construction sites should be minimised within requirements of safety and efficiency. d) Uplighting and glare (bright light) should be minimised using appropriate light screening features on all external lights. e) Low-pressure sodium light sources should be used to reduce light pollution. f) Light fixtures should not spill light beyond the project boundary (light trespass). g) Lights should be switched off when not in use whenever it is in line with safety and security	**The lead contractor and appointed ECO:** Monthly monitoring, with annual reporting during the operational lifetime of the project

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
		Manage power lines to consider the impacts of avifauna	a) Use only bird-friendly power line infrastructure hardware, mark the entire length of new power line. with industry standard bird diverters or flappers. b) Ensure that any maintenance on the transmission infrastructures retains the bird-friendly design features. c) Any electrocution and collision events that occur should be recorded, including the species affected and the date. If repeated collisions occur within the same area, then further mitigation and avoidance measures may need to be implemented.	**The lead contractor and appointed ECO:** Monthly monitoring, with annual reporting during the operational lifetime of the project
	Marine infrastructure	Prevent excessive disturbance to sensitive sub-tidal, rocky-reef, benthic & surf-zone communities	a) Implement an operational monitoring programme as prescribed by and to the satisfaction of the Department of Environmental Affairs: Oceans and Coasts (DEA:O&C) as part of the Coastal Waters Discharge Permit Application. The monitoring protocol should reflect or build on those implemented by the SBWQFT for the Saldanha Bay and Langebaan area. b) Regular monitoring of the water and sediment quality in the bay would be undertaken over the long-term to ensure that potential cumulative effects remain within acceptable levels. c) Undertake intermittent chlorination to prevent bacterial re-growth in the brine. d) Ensure that residual chlorine is suitably neutralised with sodium bisulfite (SBS); residual chlorine in the brine discharge must be below No Observed Effect Concentration (NOEC) and/or the relevant water	**The lead contractor, Project Proponent, appointed ECO and marine ecologist:** Continuous monitoring of the effluent for residual chlorine and dissolved oxygen levels is essential. Monitor effluent regularly (every 6-12 months) for heavy metals until a profile of the discharge in terms of heavy metal concentrations is determined.

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
			quality target values. e) Monitor the brine for dissolved oxygen levels potentially caused by overdosing of SBS, and aerate if necessary. f) As far as possible, use only biocides, chemicals and additives with low toxicity to aquatic invertebrate and fish species. g) Avoid the use of nutrient-enriching antiscalants (i.e. polyphosphate antiscalant), and use antiscalants with low toxicity to aquatic invertebrate and fish species. h) Backwash sludge should be appropriately treated in the sludge handling facility and solids removed as far as practical and disposed of at an accredited landfill site or recycled. i) All acidic cleaning solutions must be neutralized before discharge and treated together with the backwash sludge in the sludge handling facility. j) Once the desalination plant contributes to the waste stream from the SRMO, aeration of the effluent prior to discharge is recommended, either with a permanent aeration system, or using intermittent aeration when monitoring results detect unacceptably low dissolved oxygen levels in the effluent k) Should concentrations of heavy metals and Rare Earth Elements in the effluent generated during normal operation of the separation plant not fall within the guidelines (DWAF 1995; ANZECC 2000 or others that may be applicable), polishing of the brine by metals precipitation should be undertaken.	Implement an inspection programme (6-12 months) to check the corrosion levels of pipeline infrastructure. Test for heavy metals (every 6 months) Assess bacterial re-growth periodically (every 6 months). Assess the performance of the diffuser (salinity and temperature footprints (every 6 months). Surveillance monitoring programme performed at 6-monthly intervals over a period of approximately 4 years. Monitoring of the quality of effluent discharges from the plant for the lifetime

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
			l) Heavy metal levels should be checked in water and sediment and in mussels (also subject to requirements of the DEA:O&C as part of the Coastal Waters Discharge Permit Application).	of the plant (a laboratory may need to be established at the plant)
		Limit increased salinity to mixing zone	a) Ensure sufficient mixing of the effluent with the receiving water body by adjusting the discharge configuration appropriately. b) Limit increased salinity to mixing zone.	**The lead contractor, appointed ECO and marine ecologist:** Continuous monitoring of the effluent for residual chlorine and dissolved oxygen levels is essential. Monitor effluent regularly (every 6-12 months)
		Limit increased temperature to mixing zone.	a) Ensure sufficient mixing of the discharged effluent with the receiving water body by adjusting the discharge configuration appropriately. b) Limit increased temperature to mixing zone.	
		Prevent reduction in dissolved oxygen concentrations of the receiving water as a result of dechlorination with sodium bisulphite (overdosing), and elevated nutrients from the WWTW	a) Aeration of the effluent prior to discharge b) Effective screening of organic matter in the WWTW	

9 MANAGEMENT PLAN FOR THE DECOMMISSIONING PHASE

The SRMO pipeline and associated infrastructure can, with on-going maintenance, last up to 30 years. Equipment will only be decommissioned once it has reached the end of its economic life. It is anticipated that the obsolete equipment will be re-used, recycled or discarded as appropriate.

Table 8: Management plan for the DECOMMISSIONING phase

Aspects	Infrastructure components	Management objectives	Management actions	Responsible party and monitoring frequency
DECOMMISSIONING OF THE PIPELINE AND ASSOCIATED INFRASTRUCTURES	All infrastructure	Minimise the generation of solid waste	a) Suitable receptacles must be provided for the temporary storage of various waste types such as scrap metal and concrete, until it is removed to the nearest licensed landfill. Waste separation is encouraged and therefore receptacles should be labelled to reflect the different waste types b) Additionally, other structures from the SRMO facility will need to be removed and disposed of. The applicant must ensure that the final disposal site can accept the waste and the anticipated volumes thereof c) Any hazardous waste must be disposed of at a hazardous waste disposal site	**The lead contractor and appointed ECO:** Daily monitoring, with weekly reporting during the decommissioning
		Avoid disturbance or use of no-go areas	a) All areas identified as no-go areas with reference to ecological, soil and land use, visual, heritage and freshwater features within the site should not be disturbed or used for the stockpiling/temporary storage of disassembled structures or other materials.	**The lead contractor and appointed ECO:** Daily monitoring, with weekly reporting during the decommissioning
		Minimise traffic impacts	a) Impacts associated with the higher traffic volumes can be accommodated by proper site management, e.g. controlling the quantity of materials that would be transported to the landfill, and by notifying the public through local and regional media centres when large waste-carrying vehicles will be on the roads.	**The lead contractor and appointed ECO:** Daily monitoring, with weekly reporting during the decommissioning

10 SITE REHABILITATION

It may be necessary to completely remove all infrastructure associated with the SRMO Project. The marine pipeline may act as an artificial reef and there is a possibility that this may be left intact. However, this will be discussed with all the relevant authorities. Once this is achieved, rehabilitation of the site will be required. It is recommended that the developer takes into account and adhere to the appropriate rehabilitation measures as required. Consultation with the local authority or any appropriate institution or authority is encouraged as the rehabilitation should meet the requirements set out by the local authorities or any appropriate institution or authority and be in accordance with any relevant legislation at the time. All rehabilitation of vegetation and dunes should be undertaken with the consultation of the necessary botanists, specialists and/or landscapes architects.

11 CONCLUSION

It is anticipated that if the proposed pipeline and associated infrastructure is constructed, operated and decommissioned in accordance with the recommendations made herein, the project is unlikely to have unacceptable environmental impacts.