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Environmental Management Services**

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10 September 2014

Department of Environmental Affairs: Oceans and Coasts
Director: Coastal Pollution Management
2nd Floor, East Pier Building, East Pier Road,
V&A Waterfront,
Cape Town
8002

Attention: Ms N. Baijnath-Pillay
Tel: +27 (0)21 819 2409
Email: nbpillay@environment.gov.za

Dear Ms Baijnath-Pillay,

**APPLICATION FOR A COASTAL WATERS DISCHARGE PERMIT FOR THE SALDANHA
REGIONAL MARINE OUTFALL PROJECT IN DANGER BAY FOR FRONTIER SALDANHA
UTILITIES (PTY) LTD IN TERMS OF SECTION 69 OF THE INTEGRATED COASTAL
MANAGEMENT ACT (ACT NO. 24 of 2008)**

Please find attached the above-mentioned application form submitted on behalf of Frontier Saldanha Utilities (Pty) Ltd.

The following reports are attached to the application form:

1. APPENDIX 1: Saldanha Regional Marine Outfall: Concept options trade-off assessment- Prepared by WorleyParsons
2. APPENDIX 2: Saldanha Regional Marine Outfall: Effluent Disposal Alternatives study- Prepared by Process Projects
3. APPENDIX 3: Saldanha Regional Marine Outfall: Marine Modelling studies in support of EIA combined effluent dispersion modelling-Prepared by WorleyParsons

Please contact me should you have any queries.

Yours sincerely,

Minnelise Levendal
CSIR EIA Project Manager
Tel: 021 888 2495
Email: mlevendal@csir.co.za



**GENERIC APPLICATION FORM FOR A COASTAL WATERS DISCHARGE PERMIT
IN TERMS OF SECTION 69 OF THE INTEGRATED COASTAL MANAGEMENT (ICM) ACT,
(ACT NO. 24 OF 2008) effective from 01 January 2014**

GENERAL INSTRUCTIONS

- i. All relevant sections of this Application Form **must** be completed in full.
- ii. If an item is "not applicable", please indicate "N/A". The use of "not applicable" in the Application Form must be done with circumspection.
- iii. Failure to fully complete all required parts of this application form or pay necessary Application Fees (if required) will result in the application being returned.
- iv. This Application Form **must** be completed and signed by the applicant. If the application is completed by a third party (such as a consultant or legal representative), the third party's details must further be included.
- v. All details of previous approved licenses such as the reference number (s) and the dates of issue as well as expiration dates must be provided.
- vi. This Application Form is current as of 1 January 2014. It is the responsibility of the Applicant to ascertain whether subsequent versions of the Application Form have been published or produced by the Department. Note that this Application Form replaces all the previous versions. This updated Application Form must be used.
- vii. One hard copy and one electronic copy (CD/DVD/ via E-mail) of this form must be submitted.
- viii. The required information must be typed within the spaces provided. The sizes of the spaces provided are not necessarily indicative of the amount of information to be provided. The space provided extend as each space is filled with typing. A legible font type and size must be used when completing the form. The font size should not be smaller than 10pt (e.g. Arial Narrow). A digital copy of the Application Form is available on request.
- ix. **No faxed or e-mailed applications will be accepted.**
- x. Unless protected by law, all information contained in and attached to this Application Form will become public information on receipt by the Department. Upon request, any Interested and

Affected Party should be provided with the information contained in and attached to this Application Form.

- xi. This Application Form must be submitted to the Department at the postal or physical address given below. Unnecessary delays will be incurred should the application and attached information not be submitted to the correct address.
- xii. This Application Form, with all applicable documents **must** be addressed and sent to the Department of Environmental Affairs: Branch Oceans and Coasts to the **Director: Coastal Pollution Management** to:

2nd Floor, East Pier Building, East Pier Road, V & A Waterfront, Cape Town or
P.O. Box 52126, V & A Waterfront, 8002

Electronic submissions may also be sent to: cwdp@environment.gov.za

- xiii. The proof of payment of the application fee must be attached to this application.
- xiv. A copy of this application must be kept for the applicant's record.
- xv. The Department's "Draft Generic Assessment Criteria" must be consulted for guidance on how the generic assessment criteria will be used to evaluate your application.
- xvi. The Department's ***"Guideline on public participation requirements for Coastal Waters Discharge Permit Application under section 69 of the National Environmental Management Act: Integrated Coastal Management Act 2008 (Act no.24 of 2008)"*** must be consulted for guidance when conducting public participation for a CWDP.
- xvii. For information or enquiries, please contact the following officials:
Mr M. Tshikotshi on 021 819 2455 or via E-mail mtshikot@environment.gov.za
Ms N. Baijnath-Pillay on 021 819 2409 or via E-mail nbpillay@environment.gov.za

SPECIFIC INSTRUCTIONS

Who must apply for a Coastal Waters Discharge Permit (CWDP)?

Anyone who discharges or intends to discharge land-derived effluent into the coastal waters of South Africa must apply for a CWDP.

Section 69 (1) of the ICM Act states:

"No person may discharge effluent that originates from a source on land into coastal waters except in terms of a general authorisation ... or a coastal waters discharge permit ..."

Under the ICM Act, **"effluent"** is defined as:

- (a) Any liquid discharged into the coastal environment as waste, and includes any substance dissolved or suspended in the liquid; or*
- (b) Liquid which is a different temperature from the body of water into which it is being discharged.*

“Waste” is similarly defined in the ICM Act as:

“... any substance, whether or not that substance can be re-used, recycled or recovered –

- (i) that is surplus, unwanted, rejected, discharged, abandoned or disposed of;*
- (ii) that the generator has no further use of, for the purposes of production, reprocessing or consumption;*
- and*
- (iii) that is discharged or deposited in a manner that may detrimentally impact on the environment.”*

Sections A, B, and C

- | |
|---|
| <p>I. Section A: To be completed by a private entity.</p> <p>II. Section B: To be completed by a consultant and acting on behalf of the applicant.</p> <p>III. Section C: To be completed by organ of state or operating as a parastatal.</p> |
|---|

- Complete all relevant fields.
- If you are a private individual and have been contracted as a service provider for the purposes of environmental authorisations and monitoring, please complete sections A and B respectively.
- If you are representing an organ of state/government/parastatal and have contracted a service provider for the purposes of environmental authorisations and monitoring, please complete sections B and C respectively.

Application Information

- i. Existing discharge: ☐ New Application: ☒ Renewal Application: ☐
Revision/Amendment of Existing CWDP Permit: ☐
- ii. Discharge into which of the following receiving environments:
Offshore: ☒ Surf Zone: ☐ Estuary: ☐

(For estuary discharges, applications will be processed in consultation with the relevant Department of Water Affairs Office)

SECTION A APPLICANT INFORMATION (PRIVATE)

Company trading name (if any):	Frontier Saldanha Utilities (Pty) Ltd		
Registration no:	2013/029091/07		
Contact person:	Mr Cyril V Thomas		
Physical address:	9 th Floor Metropolitan Life Centre; 7 Walter Sisulu Avenue, Cape Town, 8001		
Postal address:	PO Box 8399 Foreshore Cape Town		
Postal code:	8012	Cell:	083 626 1318
Telephone:	021-446 6040	Fax:	021-446 6050
E-mail:	cthomas@frontierrareearths.co.za		
Website:	http://www.frontierrareearths.com		

If the applicant is an individual please provide South African identification number or alternatively provide a valid Passport Number: N/A

Pipeline owner:	N/A		
Contact person:	N/A		
Postal address:	N/A		
Postal code:	N/A		
Telephone:	N/A	Cell:	N/A
E-mail:	N/A	Fax:	N/A

NB: If another company also discharges via this outfall, kindly attach a list of details as requested in all sections of this application form for any such company.

SECTION B APPLICANT INFORMATION (CONSULTANT)

Consultancy	Council for Scientific and Industrial Research (CSIR)		
Trading Name:	N/A (CSIR is a Research Council)		
Registration no:	Minnelise Levendal		
Consultant's name:	Senior Environmental Researcher		
Designation:	CSIR, 11 Jan Celliers Street, Stellenbosch		
Physical address:	7599		
Postal code:	021-888-2495/2661	Cell:	083 309 8159
Telephone:		Fax:	021-888 2693
E-mail:	mlevendal@csir.co.za		
Website:	www.csir.co.za/ems		

SECTION C**APPLICANT INFORMATION (ORGAN OF STATE OR PARASTAL)**

1. Name of District or Local Authority:

N/A

2. Department:

N/A

3. Directorate/Section:

N/A

4. Primary Contact Official:

Name & Surname:	N/A		
Designation/Rank:	N/A		
Physical address:	N/A		
Postal code:	N/A		
Telephone:	N/A	Cell:	N/A
E-mail:	N/A	Fax:	N/A
Website:	N/A		

5. Secondary Contact official:

Name & Surname:	N/A		
Designation/Rank:	N/A		
Physical address:	N/A		
Postal code:	N/A		
Telephone:	N/A	Cell:	N/A
E-mail:	N/A	Fax:	N/A
Website:	N/A		

1. Provide a brief description of the effluent discharge process that results in the effluent being generated, together with the products, by-products and other waste per month. Attach an effluent flow chart.

Frontier Saldanha Utilities (Pty) Ltd (Frontier Utilities) is proposing the construction and operation of a marine outfall pipeline and associated infrastructure in Danger Bay in the Saldanha Bay region. The Council for Scientific and Industrial Research (CSIR) has been appointed by as the independent Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment (EIA). The proposed pipeline transfer system [referred to as the Saldanha Regional Marine Outfall (SRMO) Project] will discharge approximately 8 - 9 Mega litres per day (Ml/day) of treated industrial effluent generated from the following three sources into Danger Bay:

- a Rare Earth Element (REE) Separation Plant [referred to as the Saldanha Separation Plant (SSP)] proposed by Frontier Separation Pty (Ltd) (EIA in progress undertaken by AGES, Application Ref No. 16/3/1/2/F4/17/3004/13);
- a Chlor-Alkali Production Facility (CAPF) proposed by Chlor-Alkali Holdings Pty (Ltd) (CAH) (EIA in progress undertaken by MEGA, Application Ref No. 16/3/1/2/F4/17/3053/12); and
- a regional Waste Water Treatment Works (WWTW) proposed by the Saldanha Bay Municipality (SBM) (EIA not yet commissioned).

The liquid effluent produced at the proposed facilities (SSP, CAPF and WWTW) will predominantly be brine i.e. a solution of sodium chloride (NaCl) in water, with trace levels of other elements. At the SSP, sodium hydroxide (NaOH) and hydrochloric acid (HCl) will be used for the separation of mixed rare earth elements into individual rare earth elements. These chemicals (HCl and NaOH) will be produced in an adjacent CAPF owned and operated by CAH. Figure 1 illustrates the flow of effluent of the SRMOP.

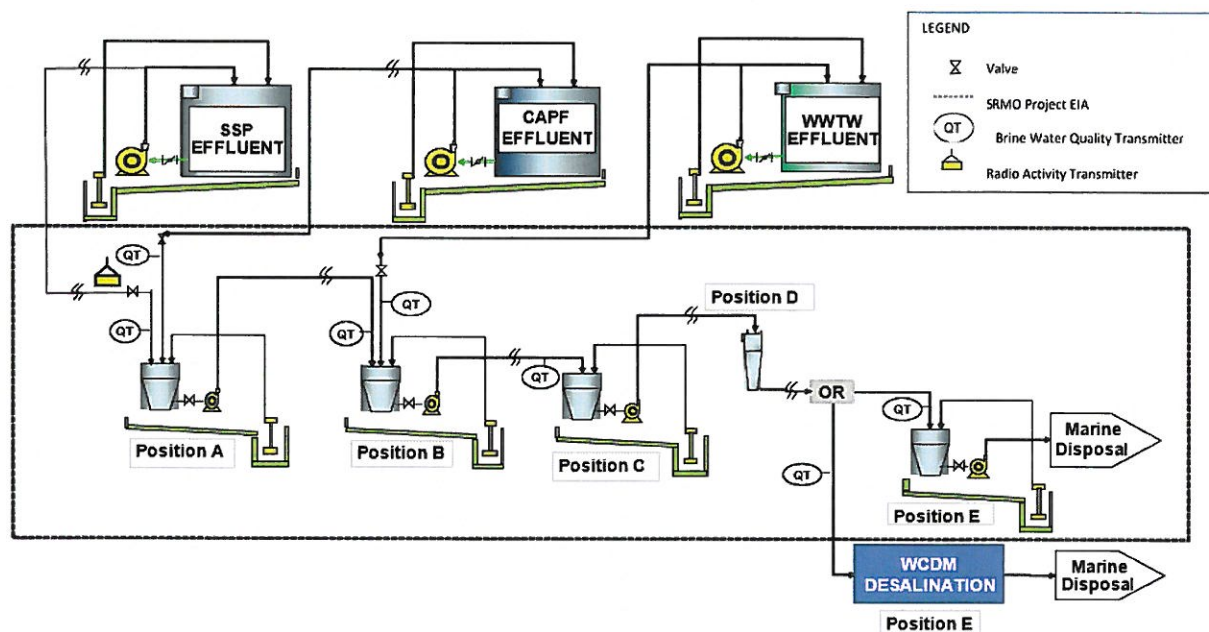


Figure 1 Effluent Flow Diagram

2. Describe the location of the waste generation points as within the facility, the route to the coast, the discharge point and the structures associated with the activity en route to the discharge point.

For the SRMO Project a comprehensive screening study was undertaken by WorleyParsons South Africa (Pty) Ltd (WorleyParsons) and CSIR to identify suitable marine pipeline routing alternatives and associated marine discharge points at Danger Bay. The study is appended as Appendix 1 and aimed to identify specific environmental, technical and financial constraints associated with the alternative pipeline routings and associated marine discharge positions. Three potential marine outfall routing alternatives were identified i.e. Options 1, 2 and 3 (refer to Figure 2). The study concluded that Option 3 is not feasible. Option 1 (Preferred) and Option 2 (Alternative) were therefore considered and assessed in the EIA (Figure 3).

It is proposed that the SRMO transfer pipeline will follow to a large extent the same terrestrial corridor as that proposed in the EIA for the proposed WCDM desalination plant potable water pipeline leading to the Besaanskop reservoir. The proposed SRMO transfer system will consist of a pipeline with transfer pump stations located along the pipeline route. The pipeline routing and the positions of the transfer pump stations are shown in Figure 4.

The pump stations will mainly consist of a brine transfer tank, mechanical pumps (duty and standby) located in a bunded area, an electrical distribution and control centre and a diesel standby generator to supply power to the system during electrical power outages (approximately 4 hours). Approximately 600 l of diesel will be stored at the pump stations for the standby electrical generators. The pump stations and pipeline route will be accessible via existing or new gravel service roads; where access will be limited to monitoring and maintenance functions (all gravel roads will follow existing dirt roads and tracks). The pump stations will be remotely monitored and controlled via a centralized off site control room.

The project will thus consist of the following infrastructure:

- A terrestrial pipeline corridor. This corridor will be approximately 27 km long from the SSP to the outfall in Danger Bay. The 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 the SRMOP EIA). The pipe will be constructed out of 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 1 on Page 15);
- Gravel service roads to the pumps stations along existing dirt roads and tracks; and
- A marine outfall and with diffuser design system in Danger Bay.

The pipe will be low pressure mains and constructed in accordance with SABS 1200. The marine outfall 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. The marine pipe will have a minimum cover depth of soil or sand of 1.5 m.

In order to further assess the application, please indicate the type of sector generating the effluent. (Make an X in the appropriate box)

a. Aquaculture	<input type="checkbox"/>
b. Industrial	<input checked="" type="checkbox"/>
c. Brine or brackish water	<input checked="" type="checkbox"/>
d. Cooling water	<input type="checkbox"/>
e. Fish processing effluent	<input type="checkbox"/>
f. Municipal Effluent	<input type="checkbox"/>
g. Other (please specify below)	<input type="checkbox"/>

NB: For municipal effluent proposed for coastal discharge, an evaluation in terms of the Water Services Development Plan, in terms of the Water Services Act (Act No. 108 of 1997), must be submitted with regard to water management for the Municipality

1. Do alternatives exist other than to discharge the effluent into the coastal environment?

YES

NO

2. If alternatives to discharge exist, please provide details:

No Alternatives to discharge currently exist. Frontier Utilities appointed an independent third party consultant (Process Projects) to conduct an effluent disposal study attached as Appendix 2 and found that there is no other alternative than disposing of the treated brine effluent via a marine outfall.

3. If not, provide a strong motivation for the need and desirability of the effluent discharge into the coastal environment, noting the need to consider the best practicable environmental option for the site:

As noted above a number of different technological alternatives were assessed before identifying that disposal of effluent to sea would be the only option for this project. In this regard, Frontier Utilities appointed independent engineering consultants, Process Projects, to investigate a number of alternatives for the disposal of brine produced by the proposed SSP and the proposed CAPF¹. Process Projects subsequently completed a desktop trade-off study, dated July 2013, in which the following brine effluent disposal options were investigated:

- a) disposal of brine effluent to the Saldanha or Vredenburg existing local Waste Water Treatment Works;
- b) the construction of evaporation ponds to generate salt for disposal at a licensed disposal facility;
- c) evaporating and crystallising processes to generate waste salt for disposal at a licensed disposal facility or to be re-used by the CAPF;
- d) evaporating and crystallising processes to generate salt to be re-used as feed by the CAPF; and
- e) marine disposal (*i.e.* disposal to sea) of the effluent.

The criteria used to identify the preferred disposal option are mainly technical and financial, but some environmental criteria were also considered, e.g. visual impacts, ground water contamination, land sterilisation, air emission impacts etc. This led to the marine disposal alternative being selected as the only option considered feasible at this point.

The following conclusions and recommendations are made in the desktop trade-off study:

- disposal via any of the existing WWTWs is not possible due to the high salt concentration of the brine being detrimental to the WWTW's bacterial breakdown process;
- evaporation ponds will require 45 hectares (ha) of ponds though 60 ha of land will have to be purchased for this option. The size and extent of the ponds will have a high visual impact on the area and ground water contamination will be a concern. Both the evaporation ponds and crystalliser options will produce 57 000 tons/year of waste salt (Phase 1 of the SSP);
- Chlor- Alkali Holdings have indicated that they would accept moist salt provided that the heavy metal ions were reduced to <0.05 mg/l. This can be produced, however, it will also produce a salt precipitate requiring licensed disposal which has not been identified; due to Vissershok (the nearest licensed disposal site to Saldanha), not being

¹ Process Projects, (August, 2013). Desktop Trade Off Study: Saldanha Separation Plant: Effluent Brine Disposal Options Study. Process Projects Document No: PC5155. Prepared for Frontier Separation.

willing to accept the waste salt, the evaporation pond and both crystalliser options are not realistically feasible options;

- disposal by pipeline to a sea outfall is the lowest capital, lowest operating cost and least environmental impact at this stage of the study;
- effluent brine can be processed to precipitate metals to reduce the non-NaCl load on the effluent going to sea provided the precipitated salts can be disposed of in a licenced facility. However, such a facility has not yet been identified;
- it was thus determined that the most cost effective solution is to dispose of the brine to sea; and
- in the event that there are objections to the composition of the effluent brine, polishing of the brine by metals precipitation should be pursued provided that the precipitated sludge can be disposed of to a licensed disposal facility. Use of lime as the alkali seems possible and should be further investigated.

4. Has any of the activities in the Listing Notices of the Environmental Impact Assessment Regulations (2010), in terms of Chapter 5 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), been triggered that will result in the discharge to the coastal environment?

YES

No

5. If YES, has the abovementioned assessment been conducted?

YES

No

An EIA is currently being undertaken, but has not been completed yet. The Scoping phase of the EIA has been completed. The EIA is currently in the impact assessment stage. The Draft Environmental Impact Assessment Report will be submitted to the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) in October 2014. It will also be submitted simultaneously to Interested and Affected Parties for a 40-day commenting period.

NOTE: that a public participation process is required before a CWDP may be authorised. If the answer to question 6 is "NO," please be informed that the CWDP Reference Number as well as the associated documentation pertaining to this application may be used in the public participation process for an Environmental Authorisation to avoid duplication of such a process.

6. Environmental Authorisation Reference Number (if YES):

N/A-The EIA is being conducted. The Environmental Decision has not been issued yet.

The EIA reference number is: 16/3/1/2/F4/17/3009/13.

(Attach approved Environmental Authorisation)

7. Date of commencement of pipeline operation

2019

8. Is an Environmental Authorisation in progress?

YES

No

See response to no 5 above.

NOTE: No Public Participation may commence without a CWDP reference number issued by the Department, where clarity will be given on the extent of the public participation required.

NOTE: The Applicant must take into account the Department's "**Guideline on public participation requirements for Coastal Waters Discharge Permit Application under section 69 of the National Environmental Management Act: Integrated Coastal Management Act 2008 (Act no.24 of 2008)**" when conducting public participation for a CWDP.

The CWDP application, the reference number that will be issued by DEA and relevant information will be distributed to all Interested & Affected Parties (I&APs) registered on the I&AP database created for the public participation process of the application for environmental authorisation by DEA&DP (EIA Ref: 16/3/1/2/F4/17/3009/13).

I&APs will be invited to comment on the CWDP application. Comments will also be requested from the relevant State Departments, i.e. DEA&DP, Department of Water Affairs, the SBM and the WCDM.

1. It is required by the applicant to attach to this application:

1.1. A detailed site map and aerial photograph indicating the following:

i. Point(s) of discharge

See Figures 2 & 3- Either Option 1 (Preferred) or Option 2 (Alternative) will be utilised

ii. Location where effluent is generated on land

See Figure 4. Position of SSP, CAPF and the WWTW

iii. Effluent monitoring points

See Figure 1 & 4 effluent quality monitoring will be completed at each of the pump stations along the route, i.e. pump Stations A, B, C, D, and E. Pump station positions indicated on Figure 4.

iv. An indication of whether any diffusers have been connected to the pipeline.

Either Option 1 (Position 12) or Option 2 (Position 21) will be utilised -see Figure 3. A diffuser will be installed at the end of the pipeline and will be designed during the projects detail engineering design phase in order to facilitate dispersion of the brine and to minimise impacts on the marine ecology.

1.2. The total length of the pipeline (from the high water mark to the point of discharge):

For Option 1 (Preferred) =458 m

For Option 2 (Alternative) =365 m

1.3. The shortest straight line distance from the high water mark to the discharge point:

For Option 1(Preferred) =440 m

For Option 2 (Alternative) =365 m

1.4. The depth of the discharge point (i.e. the depth at the end of the pipeline):

10 m below MSL

1.5. The Erf No: ____

KLIPRUG RE/3/282 for Option 1 and KLIPRUG 13/282

(Attach relevant supporting documents to this application form)

2. Complete the following mandatory fields:

(Use either Decimal Degrees or Degrees Minutes and Seconds)

2.1. Co-ordinates for point/s of discharge (end of pipeline in coastal environment):

Point 12 Option 1 Figure 3	33° 0' 18.425" S; 17° 53' 10.348" E
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Point 21 Option 2 Figure 3	33° 0' 23.983" S; 17° 53' 34.399" E
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2.2. The GPS co-ordinates of the point where the coastal outfall pipeline crosses the high water mark:

Point 12 Option 1 Figure 3	33° 0' 5.587" S; 17° 53' 2.901" E
Point 21 Option 2 Figure 3	33° 0' 13.187" S; 17° 53' 40.218" E

2.3. Co-ordinates for plant/generator of land derived effluent (terrestrial):

SSP	32°56'59.66"S, 18° 4'9.94"E
CAPF	32°57'15.48"S, 18° 4'20.91"E
WWTW	32°58'34.47"S, 18° 4'38.00"E

SECTION H**EFFLUENT CHARACTERISATION**

1. Complete the following information (refer to the Annex for guidance on completing this section):

Table 1: Summary table of project effluent contributors

DESCRIPTION		FLOW	UNITS	PSU	TEMP
1	SSP	3.36	MI/day	104.35	20°C
2	CAPF	0.19	MI/day	63.11	20°C
3	WWTW	5.00	MI/day	0.06	20°C
Total Flow		8.55	MI/day		

The effluent constituents for:

- the proposed SSP are provided in Table 2 below;
- the proposed CAPF are provided in Table 3 below; and
- the proposed WWTW are provided in Table 4 below.

Table 2: Composition of the Effluent Generated by the Proposed Saldanha Separation Plant (SSP).
Note: SPP Constituents: The absolute total monthly and total annual amounts of all the individual elements, will not be more than 6 000 kg and 18 000 kg respectively, except for Sodium and Chloride.

Constituent	Absolute Maximum Concentration (Short Term)	Unit	Maximum Load (kg)	
			Monthly	Annual
Magnesium (Mg)	0.6	mg/l	20	180
Aluminium (Al)	2.4	mg/l	80	500
Silicon (Si)	0.6	mg/l	20	150
Calcium (Ca)	1.2	mg/l	40	300
Titanium (Ti)	1.2	mg/l	40	300
Vanadium (V)	0.06	mg/l	<10	30
Chromium (Cr)	0.12	mg/l	<10	30
Manganese (Mn)	2.4	mg/l	80	500
Iron (Fe)	2.4	mg/l	80	500
Thorium (Th)	0.06	mg/l	<10	16
Uranium (U)	0.02	mg/l	<2	10
Cobalt (Co)	0.06	mg/l	<10	30
Nickel (Ni)	0.12	mg/l	<10	35
Copper (Cu)	0.024	mg/l	<10	30
Lanthanum (La)	165.44	mg/l	3 000	5 000
Cerium (Ce)	278.08	mg/l	3 000	5 000
Praseodymium (Pr)	29.23	mg/l	900	5 000
Neodymium (Nd)	98.85	mg/l	3 000	5 000
Samarium (Sm)	13.67	mg/l	420	2 000
Europium (Eu)	3.53	mg/l	110	750
Gadolinium (Gd)	8.25	mg/l	250	1 800
Terbium (Tb)	0.95	mg/l	30	200
Dysprosium (Dy)	4.41	mg/l	140	800
Holmium (Ho)	0.76	mg/l	20	180
Zinc (Zn)	0.6	mg/l	20	150
Lead (Pb)	0.06	mg/l	<10	20
Cadmium (Cd)	0.06	mg/l	<10	20
Arsenic (As)	0.012	mg/l	<5	<10
Bismuth (Bi)	0.012	mg/l	<5	<10
Strontium (Sr)	0.6	mg/l	20	150
Barium (Ba)	0.12	mg/l	<10	35
Sodium (Na)	60	g/l	2 000	16 000
Phosphorus (P)	0.6	mg/l	20	160
Sulfate Ion (SO ₄ ⁻²)	0.6	mg/l	20	160
Potassium (K)	0.12	mg/l	<10	30
Soap, oil & grease	2.625	mg/l	100	700
Erbium (Er)	1.764	mg/l	80	360
Thulium (Tm)	0.252	mg/l	<10	50
Ytterbium (Yb)	1.26	mg/l	50	290
Lutetium (Lu)	0.189	mg/l	<10	45
Yttrium (Y)	23.436	mg/l	750	3 000
Chloride Ion (Cl ⁻¹)	72	g/l	2 200	14 800
Oxalic Acid (H ₂ C ₂ O ₄)	420	mg/l	5 000	10 000
Naphthenic acid	50	mg/l	<10 000	20 000
P ₅ O ₇				
Kerosene				
Temperature	20°C			
pH	5-8.5			

Table 3: Composition of the Effluent Generated by the Proposed Chor-Alkali Production Facility

Effluent Stream Composition (mg/l)	Absolute Maximum Concentration (Short Term)	Unit	Maximum Load (kg)	
			Monthly	Annual
pH	6 to 8			
Temperature	20	°C		
Total dissolved solids	63108.14	mg/l	109127	1309519
Total suspended solids	129.97	mg/l	225	2697
Sodium (Na)	24552.8	mg/l	42457	509480
Calcium (Ca)	591.48	mg/l	1023	12273
Magnesium (Mg)	30.73	mg/l	53	638
Sulphate Ion (SO ₄ ⁻²)	11782.25	mg/l	20374	244486
Chloride Ion (Cl ⁻¹)	25165.14	mg/l	43516	522187
Carbonate (CO ₃)	64.50	mg/l	112	1338
Hydroxide Ion (OH ⁻¹)	0	mg/l	0	0
Nitrate Ion (NO ₃ ⁻¹)	11.45038	mg/l	20	238
Chlorate Ion ClO ₃	0	mg/l	0	0

Table 4: Composition of the Effluent Generated by the Proposed Regional Waste Water Treatment Works of the Saldanha Bay Municipality

SUBSTANCE/PARAMETER		WWTW GENERAL LIMIT
Faecal Coliforms	per 100ml	1 000
Chemical Oxygen Demand	mg/l	75 (i)
pH	-	5,5-9,5
Ammonia (ionized and unionised) as Nitrogen	mg/l	6
Nitrate/Nitrite as Nitrogen	mg/l	15
Chlorine as Free Chlorine	mg/l	0.25
Suspended Solids	mg/l	25
Electrical Conductivity	mS/m	70mS/m above intake to a max of 150mS/m
Ortho-Phosphate as Phosphorus	mg/l	10
Fluoride	mg/l	1
Soap, Oil & Grease	mg/l	2.5
Dissolved Arsenic	mg/l	0.02
Dissolved Cadmium	mg/l	0.005
Dissolved Chromium (VI)	mg/l	0.05
Dissolved Copper	mg/l	0.01
Dissolved Cyanide	mg/l	0.02
Dissolved Iron	mg/l	0.3
Dissolved Lead	mg/l	0.01
Dissolved Manganese	mg/l	0.1

To ensure that environmental quality objectives are practical and effective management tools, they need to be set in terms of measurable target values, or ranges for specific water column and sediment parameters, or in terms of the abundance and diversity of biotic components. The South African Water Quality Guidelines for Coastal Marine Waters (DWAF, 1995) provide recommended target values (as opposed to standards) for a range of substances.

Quality Variable and unit of measurement	Average Discharge Concentration per month	Maximum Anticipated Discharge Concentration per month
Coliforms (Colony Forming Units/ml)	N/A	N/A
Enteric pathogens e.g. E.coli (Colony Forming Units/ml)	N/A	N/A
pH (pH units)	See Above	See Above
Temperature (°C)	See Above	See Above
Acidity (mg/l)	See Above	See Above
Alkalinity (mg/l)	See Above	See Above
Aluminium (mg/l)	See Above	See Above
Ammonia (mg/l)	See Above	See Above
Arsenic (mg/l)	See Above	See Above
Barium (mg/l)	See Above	See Above
Boron (mg/l)	See Above	See Above
Bromide (mg/l)	See Above	See Above
Cadmium (mg/l)	See Above	See Above
Calcium (mg/l)	See Above	See Above
Chemical oxygen demand (mg/l)	See Above	See Above
Chloride (mg/l)	See Above	See Above
Chromium (mg/l)	See Above	See Above
Chromium(vi) (mg/l)	See Above	See Above
Cobalt (mg/l)	See Above	See Above

Quality Variable and unit of measurement	Average Discharge Concentration/month	Maximum Anticipated Discharge Concentration/month
Copper (mg/l)	See Above	See Above
Cyanide (mg/l)	See Above	See Above
Fluoride (mg/l)	See Above	See Above
Iron (mg/l)	See Above	See Above
Lead (mg/l)	See Above	See Above
Lithium (mg/l)	See Above	See Above
Manganese (mg/l)	See Above	See Above
Mercury (mg/l)	See Above	See Above
Molybdenum (mg/l)	See Above	See Above
Nickel (mg/l)	See Above	See Above
Phenol (mg/l)	See Above	See Above
Potassium (mg/l)	See Above	See Above
Radionuclides (mg/l)	See Above	See Above
Salinity	See Above	See Above
Soap, oil or grease (mg/l)	See Above	See Above
Sodium (mg/l)	See Above	See Above
Sulphate (mg/l)	See Above	See Above
Tin (mg/l)	See Above	See Above
Total dissolved solids (mg/l)	See Above	See Above
Total Suspended solids (mg/l)	See Above	See Above
Total nitrogen (mg/l)	See Above	See Above
Quality Variable and unit of measurement	Average Discharge Concentration/month	Maximum Anticipated Discharge Concentration/month
Total phosphorus (mg/l)	See Above	See Above
Uranium (mg/l)	See Above	See Above
Vanadium (mg/l)	See Above	See Above
Zinc (mg/l)	See Above	See Above

2. Complete the following Monthly discharge pattern (in volume) below and indicate the unit of measurement thereof:

Month	Average	Maximum
January	265007	291508
February	239361	291508
March	265007	291508
April	256458	291508
May	265007	291508
June	256458	291508
July	265007	291508
August	265007	291508
September	256458	291508
October	265007	291508
November	256458	291508
December	265007	291508
Total/annum	3120242	3432266

In cubic meters

☒

OR

% of total

☐

OR

Another unit of measurement (please specify)

☐

3. Provide a description of any treatment processes applied to the effluent, where applicable.

There is no treatment of the various effluent streams as received from the effluent contributors (SSP, CAPF and WWTW) planned to be disposed of via the SRMO project.

1. Provide a description of all monitoring points along the effluent stream.

For reference please read the following section in conjuncture with the flow diagram as noted in Figure 1.

An effluent storage tank will be located at the sites of the SSP, CAPF and WWTW's facilities. The size of the storage tank will depend on the volume of the effluent to be disposed and the duration of the storage required. It is proposed that all effluent contributors (SSP, CAPF and WWTW) allow for a minimum storage period of four hours on their respective sites.

The effluent storage tanks may require Environmental Authorisation from the relevant competent authority, i.e. the DEA&DP. This EIA will not require Environmental Authorisation for the storage tanks. Each party that intends to use the proposed SRMO pipeline (i.e. SSP, CAPF, WWTW and possibly other industries in future) will have to apply for a separate Environmental Authorisation for the storage tanks on their respective sites.

Effluent will be transferred from each independent facility to the SRMO pipeline infrastructure via pumps (see Figures 1 & 4). Online quality control instruments will be used to continuously monitor the quality of each facility's effluent and although no radioactive materials will be processed at the SSP, a continuous radio activity detector would be installed on the SSP effluent feed lines to the SRMO system as a final precautionary measure. If the effluent of a particular facility/ies does not meet the required quality standards and requirements an automated valve will close to prevent the effluent from entering the SRMO transfer tank (15 m³) (see Figure 1). Effluent that does not comply with the relevant standards will therefore not be pumped and disposed of at Danger Bay. It is therefore crucial that each facility that intends to use the SRMO pipeline must have its own effluent storage tank on site to ensure that it will be able to store effluent that is non-compliant.

In addition to continuous monitoring, samplers will be set to collect liquid samples automatically at regular timed intervals to produce a daily composite for off-site laboratory analysis to ensure compliance of specified marine disposal requirements.

The effluent quality will be continuously monitored online for constituents that the EIA study determines detrimental to the environment including:

- pH
- Conductivity
- Turbidity
- Oxidation reduction potential (as a surrogate for oxidising biocides)
- Temperature

In addition and with regards to how radio activity will be measured and controlled for at the SSP the following mitigation measures will be implemented.

Thorium (Th) and Uranium (U) are naturally occurring elements and are present in the Zandkopsdrift REE deposit near Garies. These elements will not be allowed to be transported to the SSP and will be precipitated out at the Zandkopsdrift Mine site near Garies.

In order to monitor radioactivity in the REE salts produced at Zandkopsdrift minerals processing plant, three separate monitoring systems are planned:

- Firstly, real time online radioactive monitoring will be conducted to ensure that REE salts produced at the mine, prior to shipment to the SSP, are within legislative and acceptable limits determined during the EIA. Should the online monitoring system determine that radio activity levels are not within specification, the REE salts produced will automatically be rejected at the Zandkopsdrift minerals processing plant and not be allowed to move to the packing and transport facility.
- Secondly, manual samples will be taken of the REE salts produced at the mine during each operating shift, at predetermined intervals, and tested at a laboratory (to be determined) to confirm the results of the real time monitoring instrumentation.
- Thirdly, REE salt samples will be tested for radioactivity at the National Nuclear Regulator (NNR).

The frequency of the different radioactive assessments (real time monitoring, manual sampling and NNR assessment) will be determined during the EIA.

On receipt of a REE Salt shipment at the SSP, additional radioactive tests will be completed to confirm that the product is within the required pre-determined specification limits:

- Firstly, real-time radioactive monitoring will be installed on the materials offloading system at the SSP. Any material found not to meet the specifications will automatically be diverted for return to the Zandkopsdrift Processing Facility, thereby not being processed any further at the SSP.
- Secondly, manual samples will be taken at the SSP of the REE salts received during each operating shift, at predetermined intervals, and tested at a laboratory (to be determined) to confirm the results of the real time monitoring instrumentation.

In summary it is not expected that radioactive material will be received by the SSP and if any does it will be returned to the Zandkopsdrift minerals processing plant.

The final radioactive monitoring will be performed by real time monitoring on the brine effluent stream from the SSP to the SRMO brine transfer tank to ensure that the brine effluent entering the SRMO system is within the prescribed limits of the Environmental Authorisation of the EIA. Should the limits be breached the system will automatically prevent the brine from entering the SRMO system.

Thus the risk of any accidental discharge is obsolete due to the number of control systems at both the supply and receive portions of the projects. In addition it is expected that any radioactive elements that may be present will not report to the brine produces but rather the REE oxide product that will affect the quality of the SSP's production. Thus any radioactive material will depreciate the quality of REE produced which would lead to revenue losses and thus is not beneficial to Frontier Separation to allow any radioactive material into the SSP and thus the reason for the monitoring of radio activity in the feed to the SSP.

2. Provide the frequency of monitoring of the above mentioned monitoring point(s).

As Noted Above point 1, Continuous online monitoring via instrumentation will be implemented and manual effluent samples will be taken for analysis as required and determined by the EIA.

3. Provide a detailed description of the type of monitoring, management strategies and maintenance plans implemented for effluent quantity and quality, the receiving environment as well as structural integrity of the pipeline.

In addition to the monitoring programs mentioned in items 1 and 2 above, as part of the current EIA application an EMP (Environmental Management Plan) will be drafted and will include the monitoring systems, strategies pertaining to the effective monitoring of effluent quality pertaining to the proposed marine Outfall.

4. Provide the historic data on monitoring and compliance for the coastal outfall pipeline. Attach your information to this application form.

Hydrographic, geophysical and shore topographic surveys as well as on site measurements of metocean conditions (currents, waves, water temperature and turbidity) in Danger Bay were undertaken during winter 2012 and summer 2012/13 for base line control data as well as to develop the marine dispersion software model. In addition collection of additional autumn metocean measurements were completed during May and June 2014.

WorleyParsons undertook a number of additional studies, which included:

- Cross-shore beach profile storm erosion assessment;
- Pipe line stability assessment;
- Onshore geotechnical investigation; and
- Jet probe survey.

Frontier Saldanha Utilities, and Chlor Alkali Holdings are currently members of the Saldanha Water Quality Forum Trust (SWQFT). Via this forum, independent water quality monitoring is currently being conducted for the Saldanha bay harbour. It is proposed that the current water quality monitoring program, in future be extended to Danger bay. During April 2014 the 1st water quality assessment was completed on Danger bay via the SWQFT and it is Frontier Utilities intention to continue with this assessment prior to the project being commissioned and during operation.

5. Provide a detailed description of maintenance plans in place for recording/monitoring devices, if any.

Online quality control and measurement instrumentation will be maintained and calibrated as per the supplier's recommendations.

6. Provide a detailed description of maintenance plans in place for treatment facilities, if any.

As stated above no treatment facility of the combined effluent generated by the contributors (SSP, CAPF and WWTW) is currently foreseen.

7. Provide a copy of any prior authorisation issued for the coastal discharge by the Department of Water Affairs, including a record of compliance for the last 12 (twelve) months to such an authorisation. Attach your information.

No prior authorisation issued as the current application is for a new coastal outfall pipeline.

8. For existing outfalls, do you have a lease agreement issued in terms of the Sea Shore Act, 1935 (Act No. 21 of 1935) for the pipeline below the high water mark or proof of submission of an application for such a lease agreement to the relevant authority?

Application is for a new marine outfall pipeline.

N/A

9. If YES, attach the proof thereof.

N/A

10. Provide details of the mandatory reporting regime as contained in Annexure 1 (Reporting).

N/A. No details of reporting regime provided as current application is for a new coastal outfall pipeline.

SECTION J**CONTINGENCY AND DECOMMISSIONING PLANNING**

1. **Provide information on pipeline incidences, continuous improvement plans, contingency plans for effluent discharge and decommissioning plans implemented at or adopted by the facility for the past 12 (twelve) months, if available.**

The application is for a new marine outfall pipeline. No information on pipeline incidences, continuous improvement plans, contingency plans for effluent discharge and decommissioning plans implemented at or adopted by the facility for the past 12 (twelve) months is available, however as part of the detail design that will be initiated best practice engineering design procedures and guidelines will be followed.

SECTION K**SPECIALIST TECHNICAL AND ENGINEERING REQUIREMENTS**

1. **Provide a detailed report on the following specialist technical and engineering requirements (refer to Annex for more on the generic requirements) if applicable:**
 - 1.1 **Scope of study area and features**
 - 1.2 **Biogeochemical processes (water column and sediment)**
 - 1.3 **Marine ecology**
 - 1.4 **Microbiological Factors**
 - 1.5 **Hydraulic design**
 - 1.6 **Achievable dilution**
 - 1.7 **Sedimentation/re-suspension of solid phase particles**
 - 1.8 **Pipeline construction considerations and structural design (including decommissioning)**

Specialist studies were completed as part of the EIA for the Construction, Operation and Decommissioning of the Saldanha Regional Marine Outfall Project near Danger Bay with EIA Reference 16/3/1/2/F4/17/3009/13. The following specialist and technical reports were included in the EIA phase of assessment:

- Description of the Affected Environment
- Terrestrial Biodiversity
- Marine Ecology
- Brine Dispersion Modelling Study
- Heritage (including Archaeology and Palaeontology)
- Visual
- Economic study

As they are pertinent to this application, the Marine Ecology and Brine Dispersion Modelling Study have been attached to this application.

- 2. Describe any gaps in the above knowledge, any underlying assumptions made and any uncertainties when conducting the above specialist study (ies) in the above mentioned detailed report.**


The limitations and assumptions for each specialist technical report have been described within the specialist reports. The Marine Ecological study and the summary of the Brine dispersion modelling study are attached to this application as it is more relevant to this application. The other specialist studies are available on request should DEA wish to view it as well.

DECLARATION

I **Cyril V Thomas**, in my personal capacity or duly authorised as
..... **Director** (state your capacity) by
..... **Frontier Saldanha Utilities Pty (Ltd)** thereto hereby declare that I:

- regard the information contained in this application form and associated documentation submitted to be true and correct, and
- am fully aware of my responsibilities in terms of **Section 69 of the Integrated Coastal Management Act, 2008 (Act No. 24 of 2008)**;
- have provided access to all information at my disposal that is relevant to the application;
- will be responsible for the costs incurred in complying with the environmental legislation including but not limited to –
 - costs incurred in connection with the appointment of a specialist/ consultant ;
 - costs incurred in respect of the undertaking of any process required in terms of this application;
 - costs in respect of any fee prescribed by the Minister in respect of this application and the discharge; and
 - the provision of security to ensure compliance with the applicable management and mitigation measures;
- am responsible for complying with the conditions that might be attached to any decision(s) issued by the Department;
- have the ability to implement the applicable management, mitigation and monitoring measures; and
- hereby indemnify, the government of the Republic, the Department of Environmental Affairs and all its officers, agents and employees, from any liability arising out of, inter alia, the content of any report, any procedure or any action for which the applicant or environmental assessment practitioner is responsible.

Please Note: If acting in a representative capacity, a certified copy of the resolution or power of attorney must be attached.

.....  (Signature) **Cape Town** (Place)
(yyyy/mm/dd) **2014/09/08** (Date) **Director** (Designation/capacity)
Frontier Saldanha Utilities Pty (Ltd) (Name of company/municipality/organisation)

	Name and Surname	Address	Signature
Witness 1	Fezeka Sesotho	16 Langley Way Parklands 7441	
Witness 2	Ricardo Brand	16 STELLENBERG STR BEAUFORT CAPE TOWN	

FINAL Check list (tick the box were applicable)

- | | | |
|-----|--|------------------------------|
| 1. | Paid prescribed application fee..... | <input type="checkbox"/> N/A |
| 2. | Motivation for the discharge as a BPEO..... | <input type="checkbox"/> |
| 3. | Specialist technical and engineering requirements for assessment (Annexure 1)..... | <input type="checkbox"/> |
| 4. | Environmental Authorisation and details, if applicable..... | <input type="checkbox"/> |
| 5. | Lease agreement issued in terms of the Sea Shore Act, 1935 (Act No. 21 of 1935) for the pipeline below the high water mark or proof of submission of such an application, if applicable..... | <input type="checkbox"/> N/A |
| 6. | A copy of the baseline marine impact assessment for the receiving environment surrounding the coastal outfall pipeline..... | <input type="checkbox"/> |
| 7. | A report outlining the impact of the effluent on the coastal receiving environment..... | <input type="checkbox"/> |
| 8. | Information on any public forum established for the coastal outfall pipeline, including minutes of such meetings if applicable..... | <input type="checkbox"/> |
| 9. | A copy of all comments and responses received and made during the public participation period | <input type="checkbox"/> |
| 10. | A copy of any prior authorisation issued for the coastal discharge by the Department of Water Affairs..... | <input type="checkbox"/> N/A |
| 11. | Record of compliance for the last 12 (twelve) to the authorisation mentioned above..... | <input type="checkbox"/> N/A |

- Annexure 1: Specialist Technical and Engineering Design
- Annexure 2: Detailed Monitoring and Maintenance Plan: This will be developed as part of the EMP of the EIA.
- Annexure 3: Brine Dispersion Modelling Study
- Annexure 4: EIA Executive Summary
- Annexure 5: Marine Ecology Impact Assessment Report
- Annexure 6: I&AP Comments and Responses Report
- Annexure 7: Environmental Management Plan from EIA Process
- Annexure 8: Proof of Environmental Authorisation for SRMOP: CSIR to provide once the Environmental Authorisation has been issued.

APPENDIX 1:

SALDANHA REGIONAL MARINE OUTFALL: CONCEPT OPTIONS TRADE-OFF ASSESSMENT

PREPARED BY: WORLEY PARSONS SA

APPENDIX 2:

SALDANHA REGIONAL MARINE OUTFALL: EFFLUENT DISPOSAL ALTERNATIVES STUDY

PREPARED BY: PROCESS PROJECTS

APPENDIX 3:

**SALDANHA REGIONAL MARINE
OUTFALL: MARINE MODELLING
STUDIES IN SUPPORT OF EIA
COMBINED EFFLUENT DISPERSION
MODELLING.**

PREPARED BY: WORLEY PARSONS SA



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