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

CHAPTER 9:

CONCLUSIONS

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9 CONCLUSIONS

9.1 INTRODUCTION

It was initially intended that the effluent from the Saldanha Regional Marine Outfall (SRMO) Project will be discharged via the brine disposal infrastructure from the proposed desalination plant of the West Coast District Municipality (WCDM), to be located at Danger Bay. Environmental Authorisation (EA) for this desalination plant was granted by the Department of Environmental Affairs and Development Planning (DEA&DP) on 13 August 2013 (Application Ref No. E12/2/4/2-F4/16-3037/11).

However, the possibility exists that the planned construction of the WCDM desalination plant might be delayed.

Consequently, the EIA for the proposed SRMO pipeline transfer system investigated an alternative interim sea disposal option (Scenario 1) until the WCDM desalination plant is commissioned (Scenario 2). It is the intention that once the desalination plant has been commissioned, a single shared outfall will be utilised, and the interim sea disposal option (Scenario 1) will be decommissioned. It is therefore the assumption that following successful commissioning, there will be only one outfall into Danger Bay at any stage. It is important to emphasise that EA is sought for Scenario 1 only.

The conclusions chapter will briefly discuss the assumptions and limitations of each of the specialist components of this report; provide a summary of the negative, positive and cumulative impacts associated with the proposed development; provide a discussion on further licence and permit requirements; an assessment of the project alternatives and provide the final EAP impact statement and recommendations.

9.2 ASSUMPTIONS AND LIMITATIONS

The assumptions and limitations for each specialist study contained in Appendices A-F of Volume II of the Final EIA Report (FEIAR) are listed below:

9.2.1 Marine ecology

The Marine Ecology specialist study is based on the project description made available to the specialists at the time of the commencement of the studies (plant capacities, discharge locations, constituents, volumes, etc.). The assessment is restricted to only those effluent characteristics specified for the proposed Saldanha Separation Plant (SSP), the proposed Chlor-Alkali Production Facility (CAPF) and the regional Waste Water Treatment Works (WWTW) proposed by the Saldanha Bay Municipality (SBM). The characteristics modelled by WorleyParsons were brine density, an elevation in temperature and the achievable dilutions of a co-discharged pollutant.

The three-dimensional modelling study undertaken in support of the EIA by WorleyParsons comprises a far-field model and does not resolve detailed near-field features of the

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discharge plumes. For this reason it has been assumed that the resolution in the modelling is inadequate to provide detail within an approximate 50 m radius of the discharge point. Consequently it was assumed that the water quality guidelines may regularly be exceeded within a 50 m radius of the discharge point, despite the fact that this will not necessarily be the case, particularly if a diffuser is installed at the end of the pipeline. This constitutes a conservative approach.

The ecological assessment of the Marine Ecology report was **limited to a 'desktop' approach** and thus relied on existing information only. No new data or measurements (physical or biological) have been obtained as part of this study. Some important conclusions and associated assessments and recommendations made in this study are based on results from the numerical modelling study done by WorleyParsons. **The predictions of these models need to be validated by field observations and subsequent monitoring**. If field observations and monitoring fail to mirror predicted results, the forecasted impacts will need to be re-assessed.

Potential changes in the marine environment such as **sea level rise and/or increases in the severity and frequency of storms related to climate change are not considered here**. Such scenarios are difficult to assess due to the uncertainties surrounding climate change. Should evidence or more certain predictions of such changes become available, the development and management plans should be reassessed to include the impacts of these anticipated macroscale changes. However, it is not expected that these climate changes will affect the effluent plume behaviour to the extent that the conclusions of this study will be altered. (These changes may however significantly affect the existing beneficial or designated uses in the bay.)

9.2.2 Terrestrial ecology

For the Terrestrial Ecology specialist study, no specific site visit was undertaken, as the route largely follows an alignment assessed by the author in 2012 (see Helme 2012), for which fieldwork was undertaken. Significant additional fieldwork has been undertaken in most of the study area over the last ten years, and this, in combination with the available Google Earth imagery (the most recent being April 2011, which is of a high resolution and is easily interpreted) and a habitat based approach, means that the confidence in the botanical findings is high. A range of references noted in this report were consulted.

In the report, conservation value and sensitivity (terms which are often used interchangeably in ecological assessments) of habitats are a product of species diversity, plant community composition, rarity of habitat, degree of habitat degradation, rarity of species, ecological viability and connectivity, vulnerability to impacts, and reversibility of threats (which in this case generally refers to the rehabilitation potential of the habitat; high sensitivity habitats having low rehabilitation potential).

In the report, reference was made to the GIS-based database of rare plant localities maintained by CREW (Custodians of Rare and Endangered Wildflowers, based at Kirstenbosch), to the Red List of South African plants (Raimondo *et al* 2009), to the Fine Scale Vegetation map of the Saldanha Municipality (Helme & Koopman 2007), and to CapeNature's Fine Scale Conservation Plan for the Saldanha Municipality (Pence 2008).

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It was assumed that the installation of the pipeline will result in disturbance of a corridor up to 12 m wide (including an adjacent access track (at least for construction, where not close enough to any existing road), trenches and temporary piling of fill). It was also assumed that the pipeline would run either within or just outside the existing or new proposed road reserves (in the case where roads are proposed for upgrade).

The positions of the proposed Pump Stations as assessed is shown in Figures 2 & 3 of the Terrestrial Ecological report (Appendix B of Volume II or are shown in Figures 2.1 in Chapter 2 of this report). The electrical infrastructure associated with these is assumed to follow the pipelines, and is not specifically assessed as it is likely to have negligible additional botanical impact.

9.2.3 Wetlands

The Wetland Assessment Report focused on the wetlands / watercourses identified by CSIR (2012) in the Final Scoping Report of the proposed SRMO Project. Thus although sections of the proposed infrastructure alignments were driven during the site assessment, no effort was made to drive the entire routes. However, CSIR (2012) drew its aquatic ecosystem information largely from the CAPE Finescale Planning Project outcomes, and since mapping in terms of this project included substantial ground-truthing of the overall area (Job *et al*. 2008), fairly high confidence should be attached to its outcomes.

Input by Freshwater Consulting Group into this project did not allow for the collection, identification or detailed description of wetland flora or fauna along the route - it is assumed that the botanical study identified areas in which important red data plant species occur.

No water quality or other raw data were collected during this study – allusions to water quality in site descriptions is thus based on existing reports or visual observations only. Wetlands delineated as part of this study were spatially plotted using data from a hand-held Garmin GPS only, and the plotted edges may thus be somewhat inaccurate. They were however checked against aerial photography and are assumed to be accurate enough for the purposes required in this study.

Of these approaches, the first two are based on the presence of *inter alia*, rare species, biodiversity, bird migration route nodes and sensitivity to water quality changes. One of the limitations of such an approach is that fairly detailed information is required on the character, flora and fauna, as well as seasonal variability and water quality of the system, to fulfill the requirements of the assessment. Moreover, the EIS assessment protocol was developed specifically for floodplain wetlands, and does not apply to other wetland types, omitting key functions of other wetland types such as groundwater recharge and focusing entirely on floodplain function.

Partly because of the problem of applying a floodplain wetland protocol to a different wetland type, and partly because not all of the data needed to make the Ecological Importance and Sensitivity (EIS) assessments are available for all of the systems in the present study area (e.g. limited data for wetlands in general in the Western Cape make interpretations of endemism in wetland faunal communities difficult), Ewart-Smith and

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Ractliffe's (2003) approach was used in this study, to provide a general overview of wetland importance and function.

It should be noted with regard to the importance criteria used in this study that they primarily allow a reflection of relative importance between wetlands. An importance assignment of "Low" does not however imply that conservation of the wetland in question is unnecessary – it rather reflects the importance of the system in relation to other wetlands.

9.2.4 Visual

For the Visual assessment a 10 km distance around proposed corridors and sites was used as the study area for the structures proposed for the marine outfall development. Spatial data used for visibility analysis originate from various sources and scales. Inaccuracy and errors were therefore inevitable. Where relevant these were highlighted in the report. Every effort was made to minimize their effect. The marine outfall pipeline will not be visible after construction and the effluent streams will be colourless and will not cause discolouration of the sea water at the outlet points.

Calculation of the viewsheds did not take into account the potential screening effect of vegetation and buildings. Viewsheds were calculated using Digital Elevation Model (DEM) which is derived from 1:50000 scale contour lines with a 20 m vertical distance between contours. The DEM has a pixel resolution of 20 m x 20 m and covers a 70 km x 30 km area.
Mitigation measures in this report assumed that construction activities will be managed and performed in such a way as to minimise its impact on the receiving environment. The following assumptions, in particular, applied since they are relevant to minimising visual impact during the construction phase:

- The contractor(s) will maintain good housekeeping on site to avoid litter and minimise waste;
- Project developers will demarcate construction boundaries and minimise areas of surface disturbance;
- Vegetation and ground disturbance will be minimised and take advantage of existing clearings;
- Construction of new roads will be minimised and existing roads will be used where possible;
- Topsoil from the site will be stripped, stockpiled, and stabilised before excavating earth for the construction of the facility;
- Vegetation matter from vegetation removal will be mulched and spread over fresh soil disturbances to aid in rehabilitation process;
- Plans will be in place to control and minimise erosion risks;
- Plans will be in place to minimise fire hazards and dust generation;
- Plans will be in place to rehabilitate cleared areas as soon as possible; and
- It is also assumed that construction of overhead power lines will proceed according to specifications set out by Eskom (Eskom 2001) where applicable.

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9.2.5 Archaeology

The Archaeological Assessment comprised a surface survey only and hence any completely buried archaeological sites will not be readily located. In the far eastern part of the study area there was very dense indigenous vegetation but this is unlikely to have completely hidden any archaeological sites that might have been present. In the west some areas were under wheat cultivation and these areas could not be searched for archaeological material. Previous surveys have shown that archaeological remains tend not to be located on the flat lands with white aeolian sands often underlain by calcrete. Although this was taken as an assumption, one area was still walked to be certain. Otherwise, it was assumed that archaeological resources would be far more numerous closer to the coastline.

9.2.6 Palaeontology

For the Palaeontological Assessment the assumption was that the fossil potential of the formations underlying the site (Langebaan and Springfontein formations) will be typical of that found in the region and more specifically, similar to that already discovered nearer to the site. Scientifically important fossil bone material was expected to be sparsely scattered in these deposits and much depends on spotting this material as it is uncovered during digging *i.e.* by monitoring excavations.

A limitation on predictive capacity existed in that it is not possible to predict the buried fossil content of an area or formation other than in very general terms. Certain processes/agents can produce significant concentrations of fossil bones, but the possibility of these specific buried palaeoenvironments being present may be only evident once the formation is exposed in excavations.

9.2.7 Economics

For the Economics Assessment all technical, financial (i.e. market surveys, business plans and costs) and other information provided by the applicant, the applicant's project team, other official sources and other specialists involved in the EIA was assumed to be correct unless there is a clear reason to suspect incorrect information. The quantification of economic impacts in order to inform the assessment of the significance of impacts was not possible, nor considered necessary, for all impacts. Where possible, quantification focused on impacts considered to be most important in the overall assessment. Assessments of impact significance made without quantification (and based on a consideration of the likely magnitudes of impacts and/or expert judgements) were, however, considered adequate unless otherwise specified.

All impacts were assessed individually and then as a whole to the degree possible and appropriate. An overall assessment and discussion of net impacts (i.e. whether overall benefits exceed costs) was undertaken to the degree thought appropriate and justifiable combining quantifiable and unquantifiable impacts. Given uncertainties and the potentially subjective nature of comparisons between impact categories, the emphasis in the report was on presenting assessments of impact categories with less emphasis on trying to reconcile them in an overall assessment of net effects. To a large degree this role of

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comparing and weighing up different (and hard to reconcile) impacts is the ambit of the relevant decision-making authorities.

The findings of the Economics assessment reflected the best professional assessment of the author drawing on relevant and available information within the constraints of time and resources thought appropriate and made available for the assessment.

9.3 SUMMARY OF NEGATIVE ENVIRONMENTAL IMPACTS

9.3.1 Marine ecology

- Altered flows at the discharge resulting in ecological impacts (e.g. flow distortion/changes and effects on natural sediment dynamics);
- Potential for habitat health impacts/losses resulting from elevated salinity in the vicinity of the discharge;
- The effect of the discharged effluent potentially having a higher temperature than the receiving environment;
- Potential toxicity to marine organisms of constituents in the waste-water streams from the SSP, CAPF, and the WWTW;
- The effect of elevated organic inputs and nutrient levels on marine biota in the effluent stream from the WWTW;
- Biocidal action of residual chlorine (or other alternative biocides) in the effluent stream from the WWTW;
- Direct changes in dissolved oxygen content due to the difference between the ambient dissolved oxygen concentrations and those in the discharged effluent, and indirect changes in dissolved oxygen content of the water column and sediments as a result of nutrient inputs;
- Disturbance and destruction of intertidal beach macrofauna during pipeline construction as a result of vehicular traffic, jetty construction and excavations;
- Accidental spillage or leakage of fuel, chemicals, or lubricants that may cause water or sediment contamination and/or disturbance to beach and subtidal biota;
- Disturbance and destruction of subtidal sandy and rocky reef biota during laying of the discharge pipeline, jetty construction, surf-zone excavation and rock blasting;
- Effects of blasting, if required, on macrophytes, invertebrates and fish communities;
- Effects of blasting, if required, on marine communities, particularly turtles and marine mammals;
- Discharge of high density saline brine may cause sinking of the plume, seafloor spreading and increases in porewater salinity;
- Increased salinity in the mixing zone affects biota;
- Reduction in dissolved oxygen concentrations of the receiving water as a result of dechlorination or elevated nutrients from the WWTW;
- Heavy metals may affect dissolved metal concentrations in the receiving water;
- Effects of REEs on marine communities in the mixing zone;

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- Effects of discharged co-pollutants; and
- Avoidance behaviour by fish, marine mammals and/or turtles of the discharge area.

9.3.2 Terrestrial ecology (Fauna and Flora)

- Direct, permanent loss of natural vegetation and associated plant and faunal SCC within the development footprint at the construction phase (the loss of Very High sensitivity vegetation in the Jacobsbaai area being the primary concern);
- Temporary to long term direct loss and degradation of natural vegetation and faunal habitat at the construction phase (laydown and soil storage areas; work areas); and
- Indirect ecological impacts at the operational phase (introduction of invasive alien plants; fragmentation of natural habitat and ecological corridors; fragmentation and reduction of sub-populations of rare/threatened plant species).

9.3.3 Impacts on wetlands

- Disturbance of wetland habitat along the disturbed area;
- Compaction of the surface over the pipeline footprint, potentially making re-establishment of wetland plants difficult; and
- Effective infilling of wetland habitat, if infilling of the pipeline trench resulted in a final surface that was raised above pre-construction levels – not only would this result in loss of wetland habitat and the creation of a disturbed terrestrial corridor, prone to alien and weedy plant invasion, but it would potentially contribute to localised habitat fragmentation and changes in flow in channelled portions of the wetland.

9.3.4 Visual impacts

- Intrusion of construction activity on views of sensitive visual receptors at Danger Bay;
- Intrusion of construction activity along power line and pipeline corridors on views of sensitive visual receptors;
- Visual intrusion of a pump station and associated structures at Danger Bay on the views of sensitive visual receptors;
- Visual intrusion of 11 kV overhead power lines from Pump Station E to Jacobsbaai on views of sensitive visual receptors; and
- Impact of night lighting of Pump Station E at Danger Bay on the nightscape.

9.3.5 Heritage impacts

- Loss of Archaeological resources;
- Loss of Palaeontological resources;
- Impact on scenic routes; and
- Impact on unmarked graves.

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9.3.6 Socio-economic Impacts

- Impact on mariculture and fishing; and
- Impact on tourism and recreation.

Additional impacts associated with the Construction phase

- Soil erosion impacts on dune ecosystems;
- Soil compaction and disturbance;
- Soil contamination through spillage;
- Uncontrolled access to the site camp and security concerns;
- Presence and operation of construction vehicles on-site;
- Negligence by construction workers;
- Temporary decrease in air quality from dust;
- Noise disturbance during construction;
- Generation of grey water and sewage;
- Generation of solid waste;
- Traffic impacts on the residents of Jacobsbaai; and
- Potential impacts on family structures and social networks associated with the presence of construction workers e.g. impact on Diazville residents.

The table below lists all the key negative impacts of High significance before mitigation and Medium significance after mitigation.

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Table 9.1 Most important negative environmental impacts and mitigation measures associated with the SRMO Project

KEY IMPACTS	MANAGEMENT ACTIONS
MARINE ECOLOGY	
The key issues identified relevant to the operational phase: **Two negative impacts of high significance (before mitigation)** associated with the **operational phase** of the SRMO Project (Scenario 1 and Scenario 2) were identified:	
1. Effects of biocide plume on marine communities in the mixing zone.	1.1 Dechlorinate effluent with sodium bisulphite (SBS) prior to discharge.
	1.2 Pigging of discharge pipeline should be undertaken as it can reduce the need for and costs of biocides.
2. Potential synergistic and antagonistic effects of a combined effluent.	2.1 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. Investigate the use of lime as the alkali.
	2.2 Commission a specialist study to investigate potential synergistic and antagonistic effects of the effluents.
Seven negative impacts of medium significance (before mitigation) associated with the **operational phase** of the SRMO (Scenario 1 and Scenario 2) were identified:	
1. Discharge of high density saline brine may cause sinking of the plume, seafloor spreading and increases in porewater salinity.	1.1. Ensure sufficient mixing of the effluent with the receiving water body by adjusting the discharge configuration appropriately.
	1.2. Limit increased salinity to mixing zone.
2. Increased salinity in the mixing zone affects biota.	2.1 Ensure sufficient mixing of the effluent with the receiving water body by adjusting the discharge configuration appropriately.
	2.2 Limit increased salinity to mixing zone.
3. Reduction in dissolved oxygen concentrations of the receiving water as a result of dechlorination or elevated nutrients from the WWTW.	3.1 Aeration of the effluent prior to discharge.
	3.2 Effective screening of organic matter in the WWTW.
4. Heavy metals may affect dissolved metal concentrations in the receiving water.	4.1 Design outfall properly, e.g. by eliminating dead spots and threaded connections, to reduce corrosion to a minimum.
	4.2 Corrosion resistance is considered good when the corrosion rate is <0.1 mm/a (UNEP 2008).
	4.3 Monitor corrosion rate in the various plants.
	4.4 Monitor effluents for metal concentrations.
5. Effects of REEs on marine communities in the mixing zone.	5.1 Monitor effluents from SSP regularly for REE concentrations.
6. Effects of discharged co-pollutants.	6.1 Treat backwash from brine purification filters in slurry tank, neutralize, and remove solids for alternative disposal on land.

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KEY IMPACTS	MANAGEMENT ACTIONS
	6.2 Monitor effluents from all plants regularly for the presence of toxic constituents.
	6.3 Wherever possible, select constituents and chemicals that have relevant eco-toxicological testing.
	6.4 Regularly conduct Whole Effluent Toxicity (WET) testing of the effluent.
7. Avoidance behaviour by fish, marine mammals and/or turtles of the discharge area.	7.1 Ensure sufficient mixing of the discharged brine with the receiving water body by adjusting the discharge configuration appropriately.
	7.2 Limit the size of the mixing zone to a minimum.
<u>The management actions and mitigation measures recommended for Marine Ecology (Scenario 1 and Scenario 2) will reduce the negative impacts of 'high', 'medium to high' and of 'medium' significance to 'low' significance</u>. If the recommended mitigation measures are applied effectively, no negative residual impacts of high significance are predicted.	
TERRESTRIAL ECOLOGY (FAUNA AND FLORA)	
1. Pump Station E is likely to have a **<u>Medium negative</u>** botanical impact, **before and after mitigation (Low – Medium negative faunal impact)**.	1.1. None required
2. Both proposed pipeline routes (Jacobsbaai Western and Eastern Corridors) will have some negative botanical and faunal impacts which cannot be avoided or mitigated. Without mitigation the Jacobsbaai Western corridor will have a **High negative botanical impact (Medium negative faunal impact), which could be reduced to Medium negative with mitigation (reroute portion of pipeline or Low – Medium negative with financial contribution to a biodiversity offset; (Low negative for faunal impact).**	2.1 Reroute a portion of the pipeline route to the northern side of the Jacobsbaai Road between Pump Stations C and D thereby avoiding sensitive wetland areas on the southern side of the Jacobsbaai Road.
	2.2 Search and Rescue of all bulbs and succulents in footprint.
	2.3 Search & Rescue of all animals that fall into open trenches; catchfences along all open trenches.
	2.4 Construct the disturbance footprint entirely within the road reserve west of the main road (for approximately 2 000 m section traversing through an area with endangered vegetation (within and to the south of Jacobsbaai)
	2.5 Bury pipeline on the western (seaward) side of the road as this side is more disturbed and hence less sensitive than the eastern side (for approximately 2 000 m section traversing through an area with endangered vegetation (within and to the south of Jacobsbaai)
	2.6 Determine an appropriate financial contribution to a biodiversity offset.
3. The Jacobsbaai Eastern Corridor will have a Medium **negative botanical impact, both before and after mitigation. Faunal impact is likely to be Medium negative before mitigation, and Low negative after**	3.1. Search & Rescue of rare plant species.
	3.2 Rehabilitation

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KEY IMPACTS	MANAGEMENT ACTIONS
mitigation.	3.3 Search & Rescue of all animals that fall into open trenches; catchfences along all open trenches.
Thus if rerouting of a portion of the Jacobsbaai Western Corridor is undertaken, and all mitigation is put in place then there is no strongly preferred routing alternative from a botanical perspective.	
WETLAND IMPACTS	
1. Wetland 1: Disturbance, compaction and infilling- **High Negative (before Mitigation) and Negative Low (after Mitigation)**	1.1 Avoidance of wetland 1 by routing pipeline along northern side of road.
	1.2 Implement measures to prevent contamination of wetlands with construction material and minimise disturbance footprint, as per Construction phase EMP.
	1.3 Time construction within wetland areas for outside of the wet season.
	1.4 Rehabilitate disturbed areas north of the road such that pre-construction levels are retained along the pipeline corridor and wetlands are not thus infilled.
VISUAL IMPACTS	
1. Intrusion of construction activity along power line and pipeline corridors on views of sensitive visual receptors **(Medium Negative before and after mitigation).**	1.1. Construction duration should be kept as short as is practical in order to reduce the visual impact of the construction phase on visual receptors.
	1.2. Temporary laydown areas should be located in low visibility areas and existing vegetation should be used to screen these where possible.
2. Visual intrusion of 11 kV overhead power lines from Pump Station E to Jacobsbaai on views of sensitive visual receptors **(Medium Negative before and after mitigation).**	2.1 Use existing dunes to conceal as much development as possible.
	2.2 Keep building and structure heights as low as possible in order to reduce structure visibility.
	2.3 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).
	2.4 The maintenance plan should include regular maintenance of exterior facades since the pump station and associated structures are likely to be highly exposed to the elements.
HERITAGE IMPACTS	
1. Impact on unmarked graves **(High and Negative before Mitigation; Negative and Low after Mitigation)**	1.1 During construction, any graves intersected should be immediately protected and reported to an Archaeologist or to HWC. Exhumation by an archaeologist will be required.

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9.4 SUMMARY OF POSITIVE ENVIRONMENTAL IMPACTS

The overall aim of the proposed SRMO Project is to dispose of effluent from the proposed SSP and from other industries such as the proposed CAPF and the regional WWTW proposed by the SBM.

The proposed SRMO Project would be a pre-requisite for the development of the SSP as the latter would only be technically feasible if process effluent can be legally disposed of. The benefits associated with the SSP can therefore be viewed as indirect or facilitated benefits of the SRMO Project.

From a municipal service provision perspective, the SRMO Project would facilitate wastewater service provision by the SBM. Frontier Utilities would take the primary financial risks associated with the construction of the project to the ultimate benefit of the SBM. The option of using the facility will then be open to the SBM once the mooted new WWTW proceeds. This would support efforts by the SBM to keep future wastewater services provision costs (and therefore service charges to users) as low as possible.

The plant would have a positive impact on economic activity in the local area and region given the size of the new spending injections associated with it. An estimated R113 million expenditure on the project is anticipated. Approximately 164 temporary construction jobs of 12 to 18 months are expected. The majority of these would be medium and low skilled positions in keeping with the nature of the construction required. A total direct labour income of R20 million would be associated with the construction phase. The annual operational expenditures would be approximately R2.6 million per year. Approximately eight permanent jobs will be associated with the operation phase of the plant resulting in a total operational labour local salary bill of approximately R1.2 million per year. In addition to the above direct employment and associated income opportunities, a number of temporary indirect opportunities would be associated with the project.

The project will have a positive impact on economic activity in the area. The impact will be **positive with a medium significance** rating with mitigation during construction. The impact during the operational phases will be **positive with a low significance** rating given jobs and income effects.

In summary, the positive impacts identified are:

- Impacts associated with project investment / expenditure (Low to Medium before mitigation; **Medium after Mitigation**);
- Impacts on industrial development opportunities (**High before and after mitigation);**
- Impacts on municipal services provision (**Medium before and after mitigation**);
- Impacts associated with project investment / expenditure (**Low before and after mitigation**); and
- Impact on municipal services provision and costs (**Medium before and after mitigation**).

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Two additional positive impacts have also been identified:

- Discovery of new fossils and new information on the local geology (**Positive, Medium significance after mitigation**).
- The construction of the breakwater and submerged pipeline during operation may act as artificial reefs (**Positive, Medium significance after mitigation**).

Indirect positive impact for Ecology

No potentially positive benefits of this project have been identified in terms of vegetation or fauna. However, if a suitable financial contribution to a biodiversity offset is implemented then certain positive impacts could be realized, notably by providing funding for ecological management of valuable land parcels as identified by CapeNature or another authority or institution. It should be noted that the magnitude and hence significance of the positive impact is related to the scale of the offset.

9.5 CUMULATIVE IMPACTS

Anthropogenic activities in the coastal zone can result in complex immediate and indirect effects on the natural environment. Effects from disparate activities can combine and interact with each other in time and space to cause incremental or cumulative effects. Cumulative effects can also be defined as the total impact that a series of developments, either present, past or future, will have on the environment within a specific region over a particular period of time (DEAT IEM Guideline 7, Cumulative effects assessment, 2004). To define the level of cumulative impact in the intertidal and subtidal environment, it is therefore necessary to look beyond the environmental impacts of the current project and consider also the influence of other past or future developments in the area. The cumulative impacts identified in the specialist studies that were undertaken for this EIA are indicated below.

9.5.1 Marine ecology

Danger Bay is largely undeveloped at present and to the best of our knowledge there are currently no other discharges into the bay other than rainwater runoff. Without knowledge of proposed future developments in the immediate vicinity of the bay, the cumulative impacts over the long term associated with the proposed regional marine outfall itself are difficult to predict. If the various effluent streams contributing to the outfall are regularly checked and stringently controlled to ensure compliance with water quality guidelines, and the state of the receiving environment is monitored, potential cumulative impacts should be avoidable. If any additional effluents from future developments are proposed for the outfall, this should be thoroughly investigated to ensure that the quality of the water and sediments within the bay remain within acceptable limits.

Should construction of the WCDM desalination plant (Scenario 2) go ahead at some time in the future, the same impacts may be expected during the construction of that discharge pipeline. Depending on the time between construction periods, cumulative impacts on

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intertidal and shallow subtidal beach and rocky reef communities may need to be considered for the construction of the second pipeline.

9.5.2 Terrestrial ecology

To some extent a cumulative impact is a regional impact, rather than the local site scale impact, i.e. if something has a regional impact it also has a cumulative impact. The remaining vegetation and faunal habitat in the SBM is under heavy development pressure (pers. obs.), and thus all new developments in the region have a cumulative impact, especially on the three vegetation types largely restricted to the region, and on the 60 or so regionally endemic plant species (Helme & Koopman 2007). No faunal species covered in this report are known to be restricted to the Saldanha Municipality.

The impacts of the proposed development will be significantly less than for various past, recent and proposed agricultural, mining, industrial and urban developments in the region (which are based on large scale habitat transformation). Cumulative impacts are thus important, but may be seen as potentially relatively low when compared with certain other development related impacts. However, further loss of rare or threatened species, many of which have lost large parts of their original populations, could be seen as a severe cumulative impact, and thus ones perspective in fact determines how the cumulative impact is seen.

Frontier Saldanha Utilities is willing to enter into an agreement with CapeNature or another relevant authority or institution (e.g. WWF) to provide an offset in the form of a financial contribution for the conservation and management of valuable land parcels as identified by CapeNature or another authority or institution suitable biodiversity offset is implemented then certain positive impacts could be realized, notably by providing funding for ecological management of identified but as yet unformalised nearby conservation areas.

There is unlikely to be a significant difference in terms of cumulative impacts between the Jacobsbaai Western and Eastern Corridors, provided that the Western corridor is rerouted north of the Jacobsbaai road between Pump station C and D. If not rerouted, the Jacobsbaai Western corridor alternative could have a greater negative cumulative impact than the Jacobsbaai Eastern Corridor.

It is recommended that for the section pipeline of approximately 2 000 m traversing through an area with endangered vegetation, the pipeline footprint should be entirely within the road reserve west of the road to reduce impacts on sensitive vegetation along the pipeline corridor. This has been accepted by Frontier Saldanha Utilities. It is further recommended that a plant rehabilitation programme, including a Search & Rescue Programme (S&R), should be undertaken by Frontier Saldanha Utilities. Thus significant cumulative impacts on sensitive vegetation associated with the Western Pipeline Corridor should be avoided provided that all the measures in the EMP are implemented during the construction phase.

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9.5.3 Wetlands

It is proposed that the SRMO corridor will be constructed on the northern side of the Jacobsbaai Road and will thus bypass important, high sensitivity wetland habitat on the southern boundary of the road. Thus significant cumulative impacts associated with the corridor should be avoided provided that all the measures in the EMP are implemented during the construction phase.

9.5.4 Visual

The WCDM has proposed a desalination plant for the Danger Bay area in close proximity to Pump Station E of the SRMO project. The desalination plant development has received environmental authorisation from the DEA&DP. If the desalination plant is built in the Danger Bay area as proposed then the landscape there will be altered considerably. A large industrial element will be introduced to the region and its rural nature is unlikely to remain.

High voltage (66 kV) power lines will be installed for the desalination plant along the same route as that proposed for the SRMO Project, from the desalination plant (or Pump Station E) to Jacobsbaai along the gravel road. If the desalination plant is built then the SRMO pipeline will connect directly to the disposal infrastructure of the desalination plant and a separate pump station will not be necessary.

The cumulative visual impact will be **low** since the desalination plant will predominate views in the area, and since Pump Station E will not be necessary the 11 kV power line to Jacobsbaai will also not be required.

The SRMO pipeline will be buried and will therefore only have a visual impact on sensitive visual receptors during the construction phase. The servitude for the pipeline for the most part will be adjacent to the road, except if the Jacobsbaai Eastern Corridor is used.

The only pump station that will potentially cause significant visual intrusion is Pump Station E in Danger Bay but careful siting among the dunes can reduce the impact since the structures are no larger than existing buildings in the area. The other proposed Pump Stations are located in areas where they will not seem out of place in the landscape since they are similar in size and form to farm buildings and structures.

9.5.5 Heritage (Archaeology and Palaeontology)

Cumulative impacts on archaeological resources are of relatively low significance because large numbers of archaeological sites do remain on the Vredenburg Peninsula. However, it should be remembered that such resources are irreplaceable and unique. Cumulative impacts on palaeontological resources are of relatively low significance, since the overall area to be impacted is quite small. In certain geological formations, that have a more limited spatial extent, such as the Prospect Hill Formation, cumulative impacts could be slightly greater.

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9.5.6 Economics

Cumulative impacts are defined as the impact on the environment, which result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (CEQ, 1997).

Impact assessment including significance ratings in previous sections has encompassed all impacts including those of a cumulative nature providing comment specifically on their cumulative nature where relevant. This section provides further consolidated discussion of these impacts in order to provide greater clarity. Bear in mind also that the distinction between cumulative and other impacts is often difficult to make. The assessment of cumulative impacts is also generally more difficult primarily as they often require more onerous assumptions regarding the likely actions of others.

The key sources of potential negative cumulative impacts identified in this assessment are those associated with impacts on mariculture and fishing along with those on tourism and recreation. Risks to mariculture and fishing would flow from cumulative impacts on the marine environment which are assessed in the marine ecology specialist study (Appendix A of Volume II). This study notes a high level of uncertainty associated with predicting cumulative impacts without knowledge of proposed future developments in the immediate vicinity of Danger Bay. It concludes that, "If the various effluent streams contributing to the outfall are regularly checked and stringently controlled to ensure compliance with water quality guidelines, and the state of the receiving environment is monitored, potential cumulative impacts should be avoidable. If any additional effluents from future developments are proposed for the outfall, this should be thoroughly investigated to ensure that the quality of the water and sediments within the bay remain within acceptable limits" (Appendix A of Volume II). Cumulative risks to mariculture and fishing should therefore remain **low with mitigation**. Cumulative risks to tourism and recreation are equally difficult to predict, but should remain at a **low to medium level of significance.**

Positive cumulative impacts are also likely as the project should set a positive precedent for further investment in the wider area. The project would represent a commitment to investment in infrastructure and service development that facilitates the development of other industries and creates a partnership with the local municipality. It would thus be a strong 'vote of confidence' in the local economy. This has the potential to influence other investors to also act with similar confidence thereby resulting in cumulative impacts on overall investment levels and the 'crowding in' of further investment. Its **positive cumulative impacts** in this regard have therefore been given a **high significance rating**.

9.6 PERMITS AND LICENSE REQUIREMENTS

In terms of the Integrated Coastal Management Act (No. 24 of 2008) a Coastal Waters Discharge Permit (CWDP) will be required from the Department of Environmental Affairs Oceans and Coasts: Coastal Pollution Management (DEA:O&C). This permit will regulate the disposal of brine into the marine environment. An application for this permit dated 10 September 2014 was submitted to DEA:O&C. DEA:O&C has issued the reference number:

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"2014/016/Frontier Saldanha" to the SRMO Project. The Application and proof of submission are attached as Annexure 4 in Volume III of this report.

In line with the National Environmental Management Act (No. 107 of 1998) Regulation 1399 regarding control of Vehicles in the Coastal Zone the applicant must apply for permission to DEA&DP to operate a vehicle on the beach before commencing with any construction activities.

In terms of the National Water Act (No. 36 of 1998), a Water Use License Application (WULA) must be submitted to the Department of Water Affairs and Sanitation (DWS): Western Cape if any watercourses or wetlands are impacted upon by the proposed development. It is envisaged that there may be the potential that the terrestrial pipeline may traverse wetlands along the Jacobsbaai Road corridor (in this regard, Appendix C in Volume II provides a full account of wetland resources). Should the wetlands described in this study be disturbed or altered: a WULA 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 will submit a WULA on behalf of Frontier Utilities to DWS for approval.

The National Heritage Resources Act (NHRA No. 25 of 1999) protects archaeological and palaeontological sites and materials, as well as graves/cemeteries, battlefield sites and buildings, structures and features over 60 years old. The South African Heritage Resources Agency (SAHRA) administers this legislation nationally, with Heritage Resources Agencies acting at provincial level. The relevant agency in the Western Cape is Heritage Western Cape (HWC).

According to section 35 of this Act, it is an offence to destroy, damage, excavate, alter of remove from its original place, or collect, any archaeological, palaeontological and historical material or object, without a permit from the relevant Heritage Authority, viz. HWC.

A Notification of Intent to Develop (NID) dated 1 August 2014 was submitted to HWC. A reference number was assigned to the project, i.e. 14070705AS0707E. Heritage Western Cape responded to the NID and requested the undertaking of a Heritage Impact Assessment (HIA) that includes specialist studies of archaeological and palaeontological resources (letter from HWC dated 13 August 2014). A HIA was undertaken by ASHA Consulting which includes an Archaeological and a Palaeontological Assessment (Appendix E of Volume II of this FEIAR) and was submitted to HWC for approval. Heritage Western Cape provided their response in a letter dated 10 December 2014. It states that the SRMO Project was tabled at the meeting of the Impact Assessment Committee of 17 November 2014 and that the Committee supports the recommendations of the consultant (see letter in Appendix G of Volume I which includes the specific recommendations).

Additional permits may be required further into the development process should, for example: should any rare plant species be encountered onsite. Planning permits pertaining to the Sea Shore Act (Act 21 of 1935) for shore crossing and other servitude registration permits will also be required by the applicant.

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9.7 DEVELOPMENT SCENARIOS

As mentioned in the Introduction section of this chapter, it is currently planned that the effluent will be disposed via the brine return disposal infrastructure of the proposed WCDM seawater reverse osmosis desalination plant, planned to be located at Danger Bay.

However, the possibility exists that the planned construction of the WCDM desalination plant might be delayed. Consequently, this EIA for the proposed SRMO pipeline transfer system will investigate an alternative interim sea disposal option (Scenario 1) until the WCDM desalination plant is commissioned (Scenario 2).

SCENARIOS TO BE CONSIDERED IN THE SRMO EIA

Scenario 1: *Considers no WCDM desalination plant, with the SRMO effluent to be disposed of at a suitable location identified during the scoping and impact assessment phase of the EIA at/or adjacent to Danger Bay; and*

Scenario 2: *Considers the completed construction of the WCDM desalination plant, with the SRMO effluent to be disposed of in combination with the brine return from the proposed WCDM desalination plant as per the Environmental Authorisation issued by DEA&DP on 13 August 2013. In this event, an application for an Amendment to the existing WCDM Environmental Authorisation and CWDP will be made to the DEA&DP and DEA: O&C respectively to accommodate the additional SRMO effluent. However, within the scope of this EIA, the hydrodynamic modelling included and excluded the proposed effluent and brine discharge of the WCDM desalination and the SRMO Project. The Modelling study therefore considered both Scenario 1 and Scenario 2.*

Assuming that the effluent would comprise the combined waste streams from the SSP, the CAPF and the WWTW (*i.e*. Scenario 1 – Frontier Utilities SRMO), three alternatives were assessed in the Marine Ecological study, namely:

- **Scenario 1 (via Outfall Option 1)**: Discharge into Danger Bay through pipeline Option 1 (sandy beach west end of Danger Bay); discharge of the SRMO effluent only;
- **Scenario 1 (via Outfall Option 2)**: Discharge into Danger Bay through pipeline Option 2 (sandy beach in centre of Danger Bay); discharge of the SRMO effluent only; and
- **Scenario 2 (via WCDM brine return pipeline)**: Co-discharge with a hypersaline brine from the proposed WCDM desalination plant.

Note that the impacts of a hypersaline discharge from the desalination plant on the marine ecology of Danger Bay have been assessed as part of the EIA for the proposed WCDM desalination plant.

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9.8 ASSESSMENT OF PROJECT ALTERNATIVES

9.8.1 Marine Outfall Alternatives

A comprehensive environmental and technical screening study was undertaken by WorleyParsons and CSIR to identify suitable marine pipeline routing alternatives and associated marine discharge points for Scenario 1 i.e. assuming no WCDM desalination plant (Annexure 1 of Volume III). The study 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 9.1). It includes Option 1 (pipeline through sandy shoreline in the west of Danger Bay), Option 2 (pipeline through sandy shoreline in the centre of Danger Bay) and Option 3 (pipeline through rocky shoreline on the headland immediately west of Danger Bay (refer to Figure 1.2). Options 1 (preferred) and 2 (alternative) were deemed to be the most feasible options during the Scoping Phase, and were therefore assessed in the Marine Ecological Study (Annexure A in Volume II of this report). Marine outfall Option 3 was not deemed feasible, as the pipeline would need to cross a rocky coast, cobble terrace just above the high water mark and exposed granite east of this. The area has a very high sensitivity for both fauna and flora with low rehabilitation potential. The pipeline would traverse highly sensitive Saldanha Granite Strandveld. The marine outfall Option 3 was thus considered as a "no go" option and therefore not further assessed as part of this study. This option would also have required extensive blasting for the laying of the pipeline over the rocky coast.

The Marine specialist concluded that in terms of local marine biota, there are no noteworthy reasons for preferring one marine outfall option/alternative over another, i.e. the two proposed Frontier Utilities marine outfall options 1 and 2 that were assessed in this EIA. The hydrodynamic modelling results, however, indicate that the plume footprints are generally smaller for the marine outfall option 2 through the sandy shoreline closer to the centre of Danger Bay, but the differences are not considered significant from an ecological perspective.

9.8.2 Pipeline Corridor Routing Alternatives

A full description of the pipeline routing alternatives and the discussion on offsets is provided in Section 1.4.2 of Chapter 1. The section below provides a summary of Section 1.4.2.

BACKGROUND TO THE WEST COAST DISTRICT MUNICIPALITY DESALINATION PLANT APPLICATION

In the FEIAR of the WCDM desalination plant, the 'Jacobsbaai Road Eastern Corridor[1]' alternative was the preferred electrical and pipeline corridor for the development as it

[1] Please note in the EIA reports of the WCDM Desalination Plant the pipeline corridors are referred to as the 'Jacobsbaai **Road** Eastern- and Western Corridors'. In the EIA Reports of the SRMO Project the pipeline corridors are referred to as the Jacobsbaai Eastern- and Western Corridors.

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followed a sandy, disturbed trench (previously used for agriculture) that would circumnavigate sensitive limestone strandveld mosaics. This corridor was also included as the preferred pipeline routing option in the Draft Scoping Report of this SRMO EIA.

In the WCDM desalination plant EIA the 'Jacobsbaai Road Western Corridor' was determined to be a no-go area by the botanical specialist Nick Helme due to its botanical sensitivity, as it traverses a surface limestone area which is known to support at least 12 threatened plant species.

Subsequent to the EA being issued for the WCDM desalination plant in August 2013, it was determined that certain land owners along the 'Jacobsbaai Road Eastern Corridor' were not amiable to negotiate the potential for registering a servitude over their properties.

Currently the 'Jacobsbaai Road Eastern Corridor' is the authorised corridor for the WCDM desalination plant. The CSIR lodged an application for an EA Amendment on 15 August 2014 with DEA&DP on behalf of WCDM for the proposed desalination pipeline. In this Amendment application, the 'Jacobsbaai Road Western Corridor' was re-evaluated and was put forward as the preferred pipeline routing alternative as the 'Jacobsbaai Road Eastern Corridor' has proven to be unfeasible.

FURTHER NEGOTIATIONS ON ERF 299

Subsequent to lodging the Application for an EA Amendment for the WCDM Desalination Plant, Frontier Saldanha Utilities started negotiating with land owners along the Jacobsbaai Eastern Corridor to register a servitude. Frontier Saldanha Utilities issued a letter dated 25 February 2015 to Mr Smit to formally request Forellendam to indicate whether they would be amenable towards negotiations with regard to the registering of a proposed servitude over Erf 299 (see Appendix B2 (i)). Mr Smit issued a letter of objection dated 18 March 2015 in response (see Appendix B2(ii)). Attached to the letter from Mr Smit is a letter from the SBM granting development rights for erven 299, 892 and 889, which also includes a layout plan (dated April 1994).

Following this interaction, the Jacobsbaai Eastern Corridor was identified as not being a viable alternative, and Frontier has reconsidered routing alternatives including the 'Afrisam' and 'Jacobsbaai Road Western' Corridors which were previously considered by the CSIR EIA project team during the WCDM desalination plant EIA.

Discussions between representatives of Frontier Saldanha Utilities and Afrisam revealed that Afrisam object to the pipeline crossing their property. Afrisam issued a letter of objection dated 9 February 2015 (see Appendix B3).

The Jacobsbaai Western Corridor was thus included as the preferred pipeline routing alternative in the Final Scoping Report and was assessed in the EIA phase of the SRMO Project (see Figure 1.1). The Jacobsbaai Western Corridor was assessed in the Terrestrial Ecological specialist study undertaken by Nick Helme for the SRMO Project (Appendix B of Volume II of this report). The study concluded that the Jacobsbaai Western Corridor will have a HIGH negative botanical impact without mitigation, which could be reduced to **MEDIUM negative with mitigation**. The required mitigation includes rerouting a portion of

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the route (from Pump station C to D) to the northern side of the Jacobsbaai Road, thereby avoiding sensitive wetland areas on the southern side of the Jacobsbaai Road. The HIGH negative botanical impact without mitigation could be reduced to **LOW to MEDIUM with a financial contribution to a biodiversity offset**. The Jacobsbaai Eastern Corridor will have a MEDIUM negative botanical impact, both before and after mitigation. Thus if rerouting of a portion of the Jacobsbaai Western Corridor is undertaken as mentioned above, and all mitigation is sufficiently implemented and executed, then there is no clear routing preference from a botanical perspective evident to the EAP.

The Jacobsbaai Western Corridor is the preferred alternative from a visual perspective since the pipeline will follow the existing road and will not open up a new corridor in the landscape.

DISCUSSIONS AROUND BOTANICAL OFFSETS

Frontier Saldanha Utilities is willing to enter into an agreement with CapeNature or another relevant authority or institution (e.g. WWF) to provide an offset in the form of a financial contribution for the conservation and management of valuable land parcels as identified by CapeNature or another authority or institution. This option was discussed at the meeting which was held at the offices of DEA&DP in Cape Town on 12 March 2015 with representatives of Frontier, DEA&DP, CapeNature, CSIR and the ecological specialist, Mr Nick Helme (see meeting notes and the attendance register included in Appendix I1). The purpose of the meeting was to discuss the challenges associated with the Jacobsbaai Eastern Corridor and to provide motivation why the Jacobsbaai Western Corridor has become the only viable corridor alternative.

It is the opinion of the EAP that the offset in the form of a financial contribution is appropriate considering the nature and the scale of the proposed development. It is recommended that it is not necessary for Frontier Saldanha Utilites to conduct a separate botanical offset study. Motivation to this effect is provided in Section 1.4.2 of Chapter 1.

9.8.3 Alignment of pipeline route

During the EIA, the proponent investigated the options to construct the pipeline along the northern or southern side of the Jacobsbaai Road. The Wetland Assessment and the Terrestrial Ecological Assessment indicated that should the pipeline be constructed along the southern side of the Jacobsbaai Road, impacts would be considered highly undesirable in the case of the delineated wetland 1 on the southern side of the Jacobsbaai Road. The impacts are likely to be permanent and of Medium intensity, and although taking place within only a small portion of the wetland, would be considered as taking place at a regional scale, given the conservation importance of Wetland 1. The overall significance of the above impacts in this area would be considered High. It is recommended that all wetlands south of the road are treated as no go areas – including the wetland margins in the southern road reserve. In the case of the Jacobsbaai Road Corridor, avoidance of Wetland 1 is considered crucial.

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It is further recommended that for the section pipeline of approximately 2 000 m traversing through an area with endangered vegetation, the pipeline footprint should be entirely within the road reserve west of the road to reduce impacts on sensitive vegetation along the pipeline corridor. This has been accepted by Frontier Saldanha Utilities.

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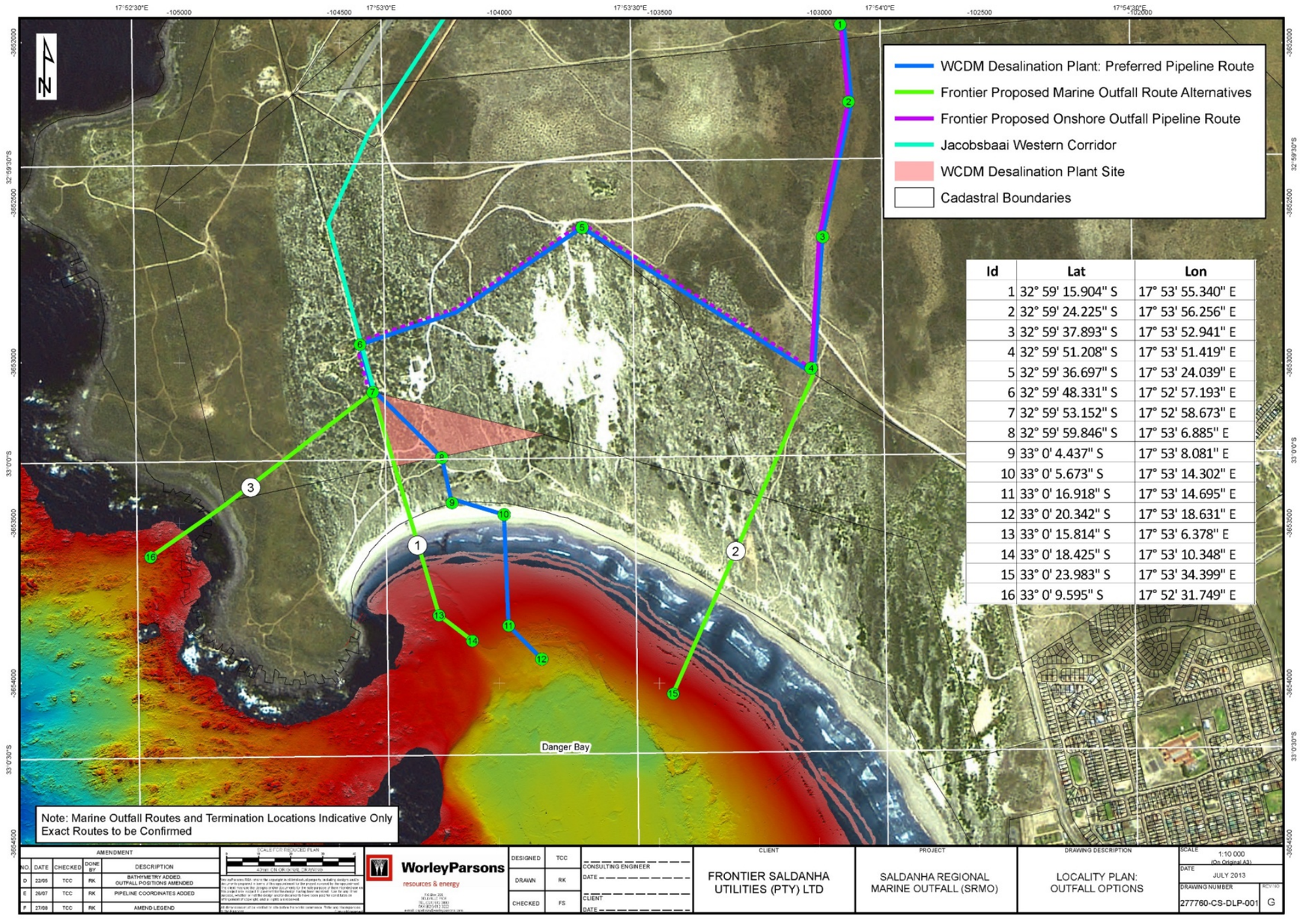

Id	Lat	Lon
1	32° 59' 15.904" S	17° 53' 55.340" E
2	32° 59' 24.225" S	17° 53' 56.256" E
3	32° 59' 37.893" S	17° 53' 52.941" E
4	32° 59' 51.208" S	17° 53' 51.419" E
5	32° 59' 36.697" S	17° 53' 24.039" E
6	32° 59' 48.331" S	17° 52' 57.193" E
7	32° 59' 53.152" S	17° 52' 58.673" E
8	32° 59' 59.846" S	17° 53' 6.885" E
9	33° 0' 4.437" S	17° 53' 8.081" E
10	33° 0' 5.673" S	17° 53' 14.302" E
11	33° 0' 16.918" S	17° 53' 14.695" E
12	33° 0' 20.342" S	17° 53' 18.631" E
13	33° 0' 15.814" S	17° 53' 6.378" E
14	33° 0' 18.425" S	17° 53' 10.348" E
15	33° 0' 23.983" S	17° 53' 34.399" E
16	33° 0' 9.595" S	17° 52' 31.749" E

Figure 9.1 Frontier Utilities proposed marine outfall route alternatives

Note: Option 3 was not deemed feasible and was not assessed in the EIA process.

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9.8.4 No-development alternative

The 'No-Development' alternative assumes that the project as proposed does not go ahead. This alternative provides the baseline against which other alternatives are compared and was considered throughout the report. The implications of the "no-go" alternative will be:

- No impact on marine ecology;
- No disturbance and elimination of beach and shallow subtidal macrofauna, through pipeline installation;
- No brine effluent (and associated co-discharges) will be released into the marine environment;
- No risks associated with such discharge;
- No impact on marine biota;
- No risks to mariculture and fishing;
- No impact on terrestrial fauna and flora (including sensitive vegetation);
- No loss of land of conservation importance;
- No change in the landscape;
- No visual intrusion of pipeline and pump station near Jacobsbaai and Danger Bay;
- No visual impacts from associated infrastructure such as powerlines;
- No impact on wetlands;
- No impact on archaeological and palaeontological resources;
- No additional electricity will be abstracted from the grid;
- No impact on tourism and recreational activities;
- No impact on mariculture;
- No positive socio-economic impacts including the creation of employment (temporary employment during construction and permanent employment during the operational phase);
- No positive investment in the local economy;
- From a municipal service provision perspective, the provision of a wastewater service by the SBM will not be facilitated as the SBM will not be able to use the pipeline for the proposed new WWTW;
- No contribution to the development of the Greater Saldanha industrial and commercial areas; and
- No contribution to economic growth for Saldanha Bay and the surrounding area.

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9.9 FINAL PROJECT LAYOUT MAP

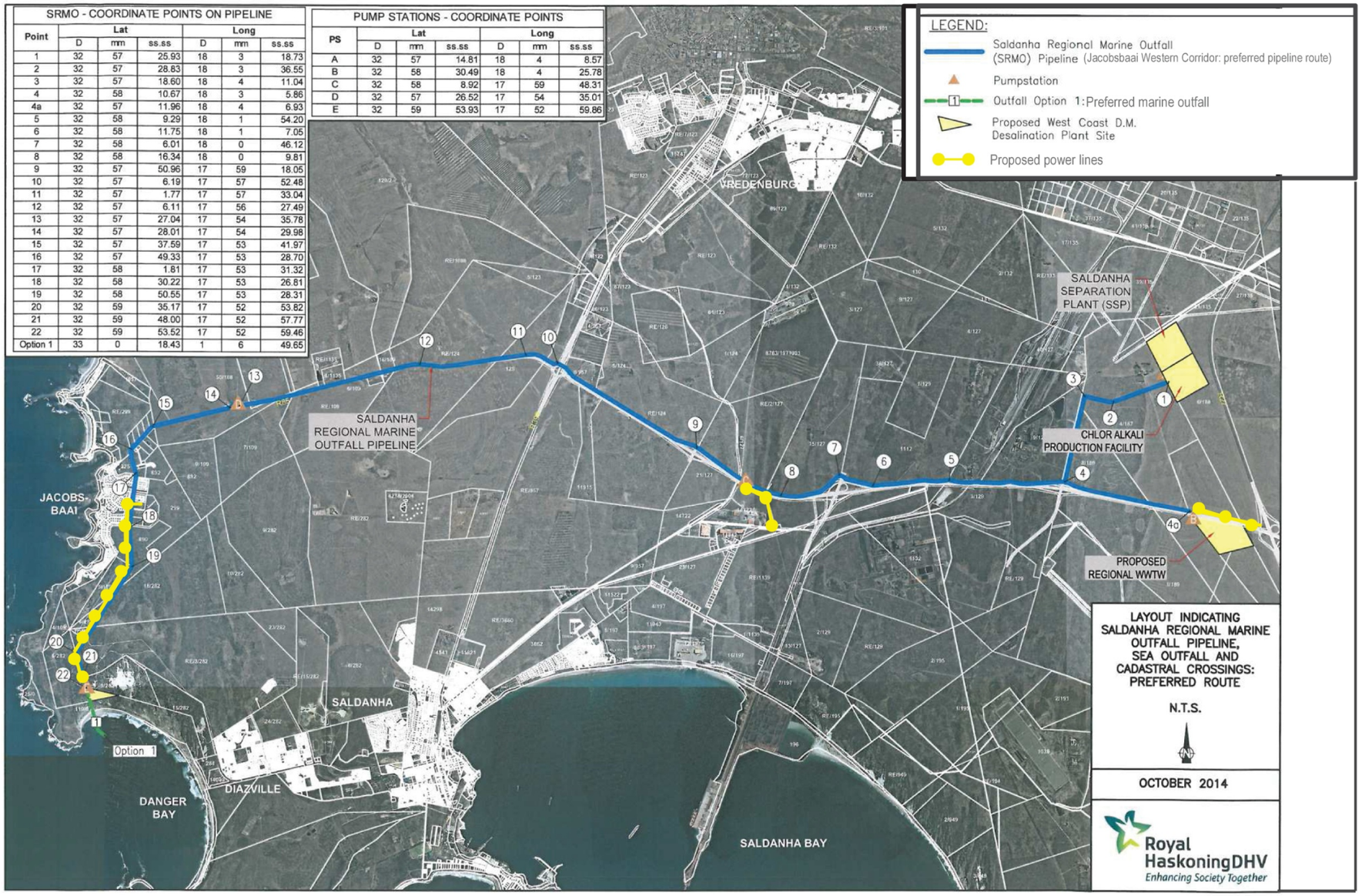

Figure 9.2 Layout map indicating the preferred pipeline routing alternative (Jacobsbaai Western Corridor) and the preferred marine outfall option (option 1)

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9.10 EAP IMPACT STATEMENT AND RECOMMENDATIONS

No negative impacts have been identified that, in the opinion of the Environmental Assessment Practitioner (EAP), should be considered "fatal flaws" from an environmental perspective, and thereby necessitate substantial re-design or termination of the project.

Through the course of the EIA process, the project layout went through several iterations after consultation with the specialists on the project team as well as after consultation with affected landowners. This indicates how the EIA process has actively and effectively informed the project planning.

Residual impacts are those that are expected to remain high once appropriate mitigation has been implemented. No negative residual impacts were identified for the proposed SRMO Project. The specialists indicated that the Negative impacts of High significance before mitigation could be changed to Medium and Low significance provided the appropriate mitigation measures are put in place.

Taking into consideration the findings of the EIA process for the proposed SRMO Project, it is the opinion of the EAP that the negative impacts can be successfully mitigated and that overall impacts are not of such a nature to reject the project.

Provided that the specified mitigation measures are applied effectively, it is proposed that the project receives an Environmental Authorisation (EA) in terms of the 2010 EIA Regulations promulgated under the National Environmental Management Act (NEMA) provided that the following recommendations are attached to the EA.

- In the event that the WCDM Desalination Plant is constructed and the associated marine outfall pipeline becomes operational, Frontier Utilities will co-dispose the SRMO effluent via the marine outfall pipeline of the WCDM desalination plant in line with the Heads of Agreement (HOA) signed between Frontier and the WCDM on 01 November, 2013 (see Appendix B1). This will be subject to an Amendment to the EA issued for the WCDM desalination plant dated 13 August 2013. The Amendment to the EA for the actual desalination plant must be undertaken by the project applicant (the WCDM) in collaboration with Frontier Utilities and in line with the broad principles and commercial terms as established in the HOA;
- The EA should be for Scenario 1 as explained in section 9.7 above. Scenario 1 considers no WCDM desalination plant, with the SRMO effluent to be disposed of *via* an alternative sea disposal option;
- The WCDM desalination plant and its associated infrastructure received EA from the DEA&DP on 13 August 2013. Scenario 2 assumes the completed construction of the WCDM desalination plant, with the SRMO effluent to be disposed of in combination with the brine return from the proposed WCDM desalination plant. Should Scenario 2 be implemented first, an Application for an Amendment to the existing WCDM CWDP (should this have been issued at the time) will need to be made to the DEA&DP and DEA: O&C respectively to accommodate the additional SRMO effluent;
- The power line corridors shown in Figure 9.2 of Chapter 9 must be approved;

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- The submission of the FEIAR to DEA&DP, and the comments received on the FEIAR from CapeNature should be used by DEA&DP to guide the conditions of the EA (if applicable). Should an EA be granted, DEA&DP must include a condition wherein 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;
- Should an EA be granted, DEA&DP must include a condition wherein Frontier Saldanha Utilities must undertake a plant rehabilitation programme (including a Search and Rescue Programme) as specified by the botanical specialist, Mr Nick Helme in the Ecological study (Appendix B of Volume II) and the EMP of the SRMO Project (Section B of Volume I of the FEIAR);
- 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 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 Species of Special Concern are located east of the main road, or outside of the road reserve. This recommendation has been accepted by Frontier Saldanha Utilities;
- 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; and
- The layout and preferred alternatives contained in Figure 9.2 should be approved:
    - The Jacobsbaai Western Corridor is the preferred pipeline routing alternative;
    - The marine outfall option 1 in Danger Bay is the preferred outfall alternative; and
    - The pipeline must be constructed on the northern side of the Jacobsbaai Road between the proposed Pump Stations C and D thereby avoiding sensitive wetland areas on the southern side of the Jacobsbaai Road.

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