TRANSNET

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

SCOPING & ENVIRONMENTAL IMPACT ASSESSMENT (S&EIA) FOR THE PROPOSED 2 MEGALITRES PER DAY (MLD) SOLAR POWERED SEAWATER DESALINATION PLANT IN THE PORT OF EAST LONDON, BUFFALO CITY METROPOLITAN MUNICIPALITY, EASTERN CAPE PROVINCE, BY TRANSNET NATIONAL PORTS AUTHORITY

DFFE Pre-Application Reference Number: 2026-04-0038

July 2026

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Cover photo: Tahlia Henry

REPORT DETAILS

DFFE Pre-Application Ref No:	2026-04-0038
Project Title:	Scoping & Environmental Impact Assessment (S&EIA) for the Proposed 2 MLD Solar Powered Seawater Desalination Plant in the Port of East London, Buffalo City Metropolitan Municipality, Eastern Cape Province, by Transnet National Ports Authority
S&EIA Process Status:	Environmental Impact Assessment Phase
Report Status:	Revised Draft Environmental Impact Assessment Report (part of the resubmission of application for Environmental Authorisation)
Physical Location:	Erven 63584, 38530 and 63586; Harbour; 5201; Port of East London; East London; Buffalo City Metropolitan Municipality; Eastern Cape Province; South Africa.
Report prepared for Client:	Transnet SOC Limited—Division Transnet National Ports Authority (TNPA)—East London Port; Hely Hutchinson Rd, Quigney, East London, 5211
Report Prepared by:	Anchor Environmental Consultants (Pty) Ltd— 8 Steenberg House, Silverwood Close, Tokai, South Africa.
Authors:	Cheruscha Swart (Professional EAP) Michael Armitage (Candidate EAP)

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PREFACE

Transnet SOC Ltd, through its division Transnet National Ports Authority (TNPA), is in the process of resubmitting an application for Environmental Authorisation for the construction and operation of a reverse osmosis (RO) desalination plant within the Port of East London, located in the Buffalo City Metropolitan Municipality, Eastern Cape Province.

An application for Environmental Authorisation was initially submitted to the Department of Forestry, Fisheries and the Environment (DFFE) on 27 February 2025. The Draft Scoping Report was circulated as part of the Scoping Phase public participation process conducted from 11 March to 10 April 2025. Following incorporation of comments, the Final Scoping Report was submitted to the DFFE and accepted on 30 May 2025. A Draft Environmental Impact Assessment Report (EIAr) was subsequently compiled and made available for public review and comment from 2 to 31 October 2025.

However, due to delays in finalising the project layout, the Final EIAr could not be completed and submitted within the prescribed timeframe, and the application therefore lapsed.

The project layout has since been finalised, enabling the applicant to proceed with the application for Environmental Authorisation. As the approved Scoping Report remains valid, and the project meets the requirements of Regulation 21(2)(a) to (d) of the EIA Regulations, 2014 (as amended), it is not necessary to repeat the Scoping Phase. The process will therefore resume from the Environmental Impact Assessment (EIA) phase following resubmission of the application.

This document constitutes the revised Draft EIAr, which forms part of the resubmission of the application for Environmental Authorisation. The report has been updated to incorporate all comments received during the previous public participation process (2 to 31 October 2025).

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DETAILS AND EXPERTISE OF THE EAP

Ms Cheruscha Swart: Environmental Assessment Practitioner (EAP)

- MSc (Cum Laude) Zoology; BSc (Hons) & BSc Biodiversity and Ecology
- EAPASA (Reg EAP no. 2021/3298)
- SACNASP Pr.Sci.Nat. Reg: 155305 (Environmental Science; Zoological Science)

Cheruscha holds a Master of Science (MSc) in Zoology and a Bachelor of Science (BSc) Honours degree in Biodiversity and Ecology from Stellenbosch University. She is a Registered Environmental Assessment Practitioner (EAP) with 14 years of research and consulting experience. Cheruscha is the Team Lead and Head EAP of the Environmental Management Department at Anchor Environmental Consultants, where she leads and manages a wide range of environmental projects. Her expertise includes Environmental Impact Assessments (EIAs), applications for prospecting rights, management plan development, auditing, environmental compliance monitoring, baseline and monitoring surveys, and specialist impact assessments, all undertaken across marine, coastal, and terrestrial environments. In addition, she has specialist expertise in marine invertebrate taxonomy and rocky shore surveys. Her project portfolio spans a wide range of sectors, including land-based and offshore prospecting, offshore mining, agriculture, land- and sea-based aquaculture, solar desalination, residential and commercial developments, conservation surveys for protected areas, and long-term monitoring of bays and ports along the South African coast. Cheruscha is the author of three peer-reviewed scientific publications and numerous scientific reports, with additional projects and publications currently in preparation.

Mr Michael Armitage: Candidate EAP

- MSc Environmental and Geographical Science (EGS; with distinction); BSc (Hons) EGS (with distinction); and BSc EGS & Archaeology
- EAPASA (Candidate EAP no. 2024/7978)

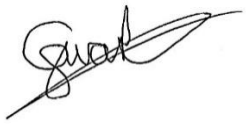
Michael holds MSc and BSc (Hons) degrees in Environmental and Geographical Science (EGS), as well as a BSc in EGS and Archaeology, all from the University of Cape Town. His expertise lies in integrated environmental and water resources management—with a focus on coastal, estuarine, and freshwater systems, as well as nature-based management solutions. He thrives on unpacking the complexities of dynamic systems to develop integrated, practical, and effective management solutions. Michael works as an Environmental Assessment Practitioner (EAP) and Environmental Management Specialist, undertaking Environmental Impact Assessments (EIAs) and preparing a range of environmental management plans. He also has experience in estuarine studies, sediment quality assessment, and GIS mapping. He is a registered Candidate EAP (EAPASA 2024/7978) and a member of the International Association for Impact Assessment South Africa.

Full professional CVs have been appended to this Report, as Appendix 1.

DECLARATIONS BY CONSULTANTS

We, Cheruscha Swart and Michael Armitage declare that we:

i. Act as the independent specialists in this application;
ii. Have performed the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
iii. Declare that there are no circumstances that may compromise our objectivity in performing such work;
iv. Have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
v. Will comply with the Act, Regulations and all other applicable legislation;
vi. Have not, and will not engage in, conflicting interests in the undertaking of the activity;
vii. Undertake to disclose to the applicant and the competent authority all material information in our possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority and the objectivity of any report, plan or document to be prepared by ourselves for submission to the competent authority;
viii. The particulars furnished in this form are true and correct; and
ix. Realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the NEMA.



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Cheruscha Swart; Date: 13 July 2026

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Michael Armitage; Date: 13 July 2026

Other Declarations, Undertaking of Oats and Affirmations have been included in Appendix 2.

CONTENT OF THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Section 23(3) of the EIA Regulations requires the preparation of an Environmental Impact Assessment Report (EIAr) in accordance with Appendix 3 of the Regulations. The content of this EIAr has been compiled to meet the objectives of the environmental impact assessment process. Table 1 lists the prescribed requirements for an EIAr and identifies the relevant section or Appendix where each item is addressed. This table serves as both a directory to assist readers in navigating the report and a checklist demonstrating compliance with the EIA Regulations.

Note that this report draws extensively on information from the various specialist studies, and in some cases content has been directly quoted or summarised to ensure that key details are not lost. Large portions of Section 8 (Affected Environment), Section 9 (Specialist Study Findings) and Section 10 (Impact Assessment) in particular include direct excerpts from the specialist reports. Information and assessments were sourced from the following studies: Marine and Estuarine (Bovim et al. 2026), Terrestrial (Hawley & Balmer 2026), Socio-economic (Armitage et al. 2026), Heritage (Gribble 2026), Palaeontology (Bamford 2026), Agriculture (Lanz and Lakey 2026), and Geotechnical/Engineering (Busakwe & de Jager 2025).

Table 1. Legally required content of an Environmental Impact Assessment Report, as per Appendix 3 of the EIA Regulations (published in GN R982 of 2014).

Content of the Environmental Impact Assessment Report	Section/ Page Numbers
(1) An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include -	
(a) details of-	
(i) the EAP who prepared the report; and	Page 1 and vii
(ii) the expertise of the EAP, including a curriculum vitae;	Page vii and Appendix 1
(b) the location of the activity, including-	
(i) the 21-digit Surveyor General code of each cadastral land parcel;	Section 1 and Appendix 3
(ii) where available, the physical address and farm name;	Section 1
(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	N/A
(c) a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is-	Section 1
(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or	Section 1 and Appendix 3
(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	N/A
(d) a description of the scope of the proposed activity, including-	
(i) all listed and specified activities triggered;	Section 3
(ii) a description of the activities to be undertaken, including associated structures and infrastructure;	Section 1
(e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;	Section 7
(f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Section 6
(g) a motivation for the preferred development footprint within the approved site;	Section 5
(h) a full description of the process followed to reach the proposed development footprint within the approved site, including:-	
(i) details of the development footprint alternatives considered;	Section 5

Content of the Environmental Impact Assessment Report	Section/ Page Numbers
(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs	Section 4
(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Section 4.5 and Appendix 4
(iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 8
(v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts - (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; (vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks; (vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (viii) the possible mitigation measures that could be applied and level of residual risk;	Section 10
(ix) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	N/A. Alternatives were assessed as part of the scoping phase. See Section 5.
(x) a concluding statement indicating the preferred alternative development location within the approved site;	Section 5.4
(i) a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity, including -	Section 10 and Appendix 14
(i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Section 10
(j) an assessment of each identified potentially significant impact and risk, including -	
(i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be mitigated;	Section 10
(k) where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;	Section 9 and Section 10
(l) an environmental impact statement which contains -	Section 11
(i) a summary of the key findings of the environmental impact assessment:	
(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and	
(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	
(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the Environmental Management Programme (EMPr) as well as for inclusion as conditions of authorisation;	Section 9; Section 10; Section 11.4; Section 11.5
(n) the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;	Section 1; Section 11

Content of the Environmental Impact Assessment Report	Section/ Page Numbers
(o) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation	Section 11.4
(p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 12
(q) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Section 11.4
(r) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;	N/A as the development includes an operational aspect. See Section 1.6.
(s) an undertaking under oath or affirmation by the EAP in relation to- (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	Page ix and Appendix 2
(t) where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	N/A
(u) an indication of any deviation from the approved scoping report, including the plan of study, including -	
(i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and (ii) a motivation for the deviation;	Section 5 and specifically Section 5.5
(v) any specific information required by the competent authority; and	N/A
(w) any other matter required in terms of section 24(4)(a) and (b) of the Act.	
Section 24(4)(a) and (b) of NEMA states that: *24(4) Procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment-* *(a) must ensure, with respect to every application for an environmental authorisation-* *(i) coordination and cooperation between organs of state in the consideration of assessments where an activity falls under the jurisdiction of more than one organ of state;*	N/A
(ii) that the findings and recommendations flowing from an investigation, the general objectives of integrated environmental management laid down in this Act and the principles of environmental management set out in section 2 are taken into account in any decision made by an organ of state in relation to any proposed policy, programme, process, plan or project;	N/A. Competent Authority responsibility
(iii) that a description of the environment likely to be significantly affected by the proposed activity is contained in such application;	Section 8
(iv) investigation of the potential consequences for or impacts on the environment of the activity and assessment of the significance of those potential consequences or impacts; and	Section 10
(v) public information and participation procedures which provide all interested and affected parties, including all organs of state in all spheres of government that may have jurisdiction over any aspect of the activity, with a reasonable opportunity to participate in those information and participation procedures; and	Section 4
(b) must include, with respect to every application for an environmental authorisation and where applicable- *(i) investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity;*	Section 5 and Section 10
(ii) investigation of mitigation measures to keep adverse consequences or impacts to a minimum;	Section 10 and Section 11.3
(iii) investigation, assessment and evaluation of the impact of any proposed listed or specified activity on any national estate referred to in section 3 (2) of the National Heritage Resources Act, 1999 (Act 25 of 1999), excluding the national estate contemplated in section 3 (2) (i) (vi) and (vii) of that Act;	Section 9.1.4, Section 10.2.4, Section 10.3.4, Section 10.6.3
(iv) reporting on gaps in knowledge, the adequacy of predictive methods and underlying assumptions, and uncertainties encountered in compiling the required information;	Section 12
(v) investigation and formulation of arrangements for the monitoring and management of consequences for or impacts on the environment, and the assessment of the effectiveness of such arrangements after their implementation;	Section 1.6 and Annexure 1
(vi) consideration of environmental attributes identified in the compilation of information and maps contemplated in subsection (3); and	Section 8
(vii) provision for the adherence to requirements that are prescribed in a specific environmental management Act relevant to the listed or specified activity in question.	Section 7

EXECUTIVE SUMMARY

Project Background and Location

Transnet SOC Ltd (through its division Transnet National Ports Authority (TNPA)) is applying for Environmental Authorisation (EA) for the construction and operation of a reverse osmosis (RO) desalination plant with the purpose of producing fresh potable water from saltwater, which has been abstracted from the estuarine/ marine environment. The proposed development will be situated within the Port of East London, in the Buffalo City Metropolitan Municipality, Eastern Cape Province (Figure 1).

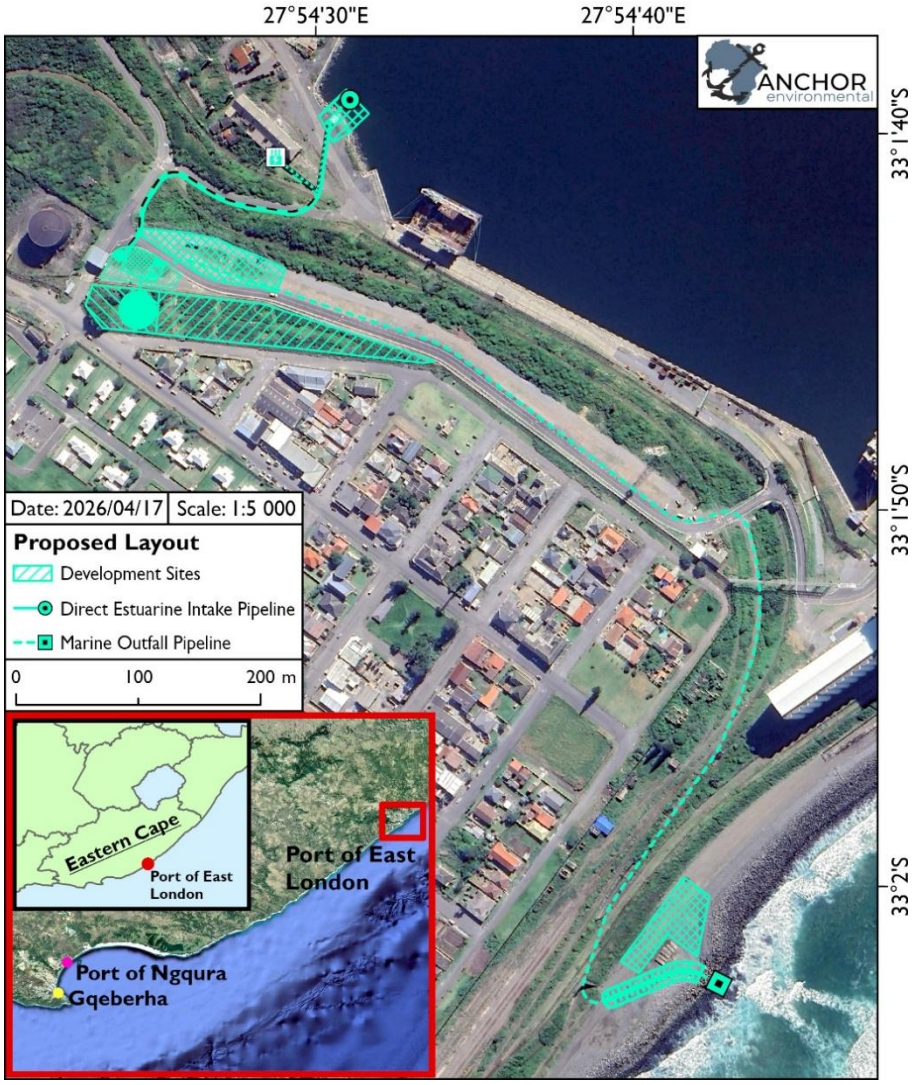

Figure 1. Location of the proposed development in the Port of East London, Eastern Cape Coastline, South Africa.

At full capacity, the plant will produce 2 000 cubic metres (2 MLD / two million litres) and will be powered by a hybrid system that uses both solar (sun) energy and backup municipal grid electricity. Since the facility will discharge brine into the marine environment, a Coastal Waters Discharge Permit (CWDP) is also required. The proposed development will span erven 63584, 38530 and 63586, all owned by the applicant.

TNPA appointed Sunwater East London Joint Venture (Pty) Ltd. (Sunwater) to lead the engineering feasibility, implementation and operation of the project. Anchor Environmental Consultants (Pty) Ltd. (Anchor) was appointed to provide independent Environmental Assessment Practitioner (EAP) services to undertake the Scoping and Environmental Impact Assessment (S&EIA) process required prior to construction and commissioning of this development and the application for the CWDP.

Project Layout and Description

The preferred and final layout was determined through detailed engineering feasibility studies, supported by specialist investigations and input from the EAP. Several potential sites and configurations within the Port of East London were assessed during this process, most of which were screened out due to unfavourable engineering results or environmental sensitivities. The final layout, shown below, represents the most viable option, forms the basis of this Environmental Impact Assessment (EIA), and is the layout to which the recommended impact management, avoidance, and mitigation measures is applicable (Figure 2).

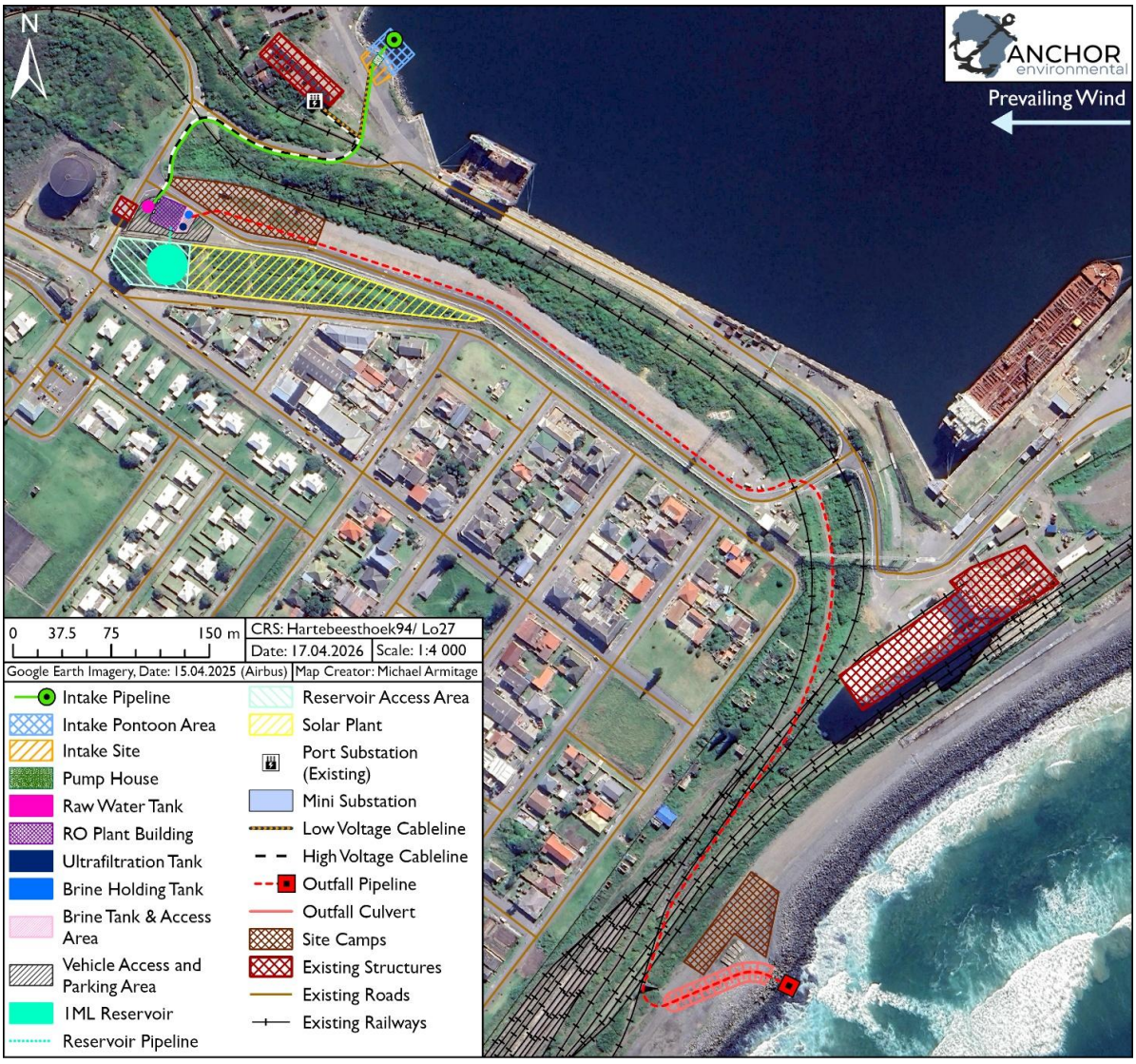

Figure 2. Preferred development layout for the Solar & RO Desalination Plant and Intake and Outfall Pipelines and associated Infrastructure/ Structures.

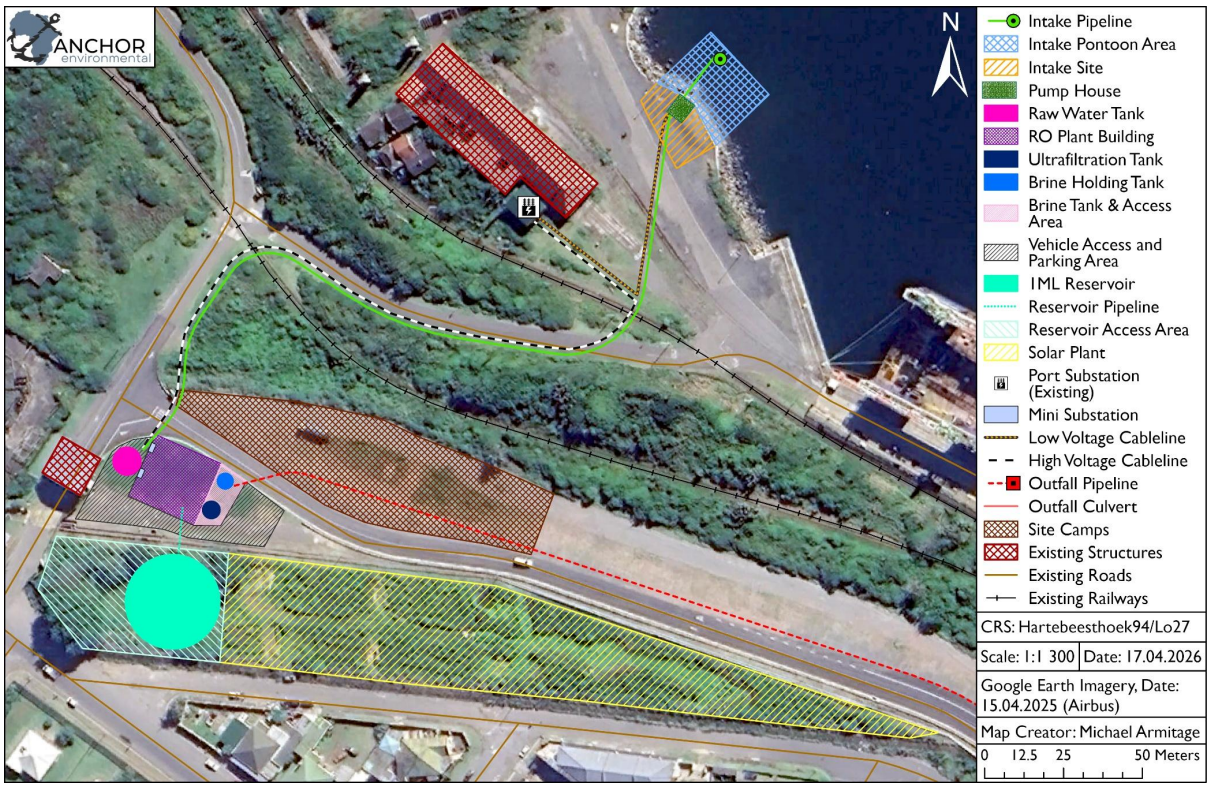

Figure 3. The proposed intake, RO Plant, Solar Plant, and all supporting infrastructure.

Saline water will be abstracted daily from the Buffalo River Estuary and treated at a reverse osmosis (RO) desalination plant to produce potable water (freshwater), that complies with the requirements of SANS 241. During the initial phase of the project, approximately 1 375 m^3 of saline water will be abstracted per day. As the project expands, abstraction volumes will increase to approximately 5 500 m^3/day when the plant reaches its full design capacity. Freshwater production will initially be approximately 500 m^3/day (0.5 Megalitres/ day (MLD)) and will increase progressively as the project advances. At full capacity, the plant will produce approximately 2 000 m^3/day (2 MLD or two million litres per day). The treated water will be stored in a 1 000 m^3 (1 ML) freshwater reservoir before being used to support port operations and reduce reliance on municipal water supplies.

The desalination plant will be powered by a hybrid system that uses both solar energy and municipal grid electricity with the former being primary. If more electricity is generated than needed, batteries might be used in the future to store excess electricity in containers housed at the RO plant site. Brine, a by-product of desalination with elevated salt concentrations, will be discharged via a pipeline to a marine outfall where rapid dilution with ocean water is expected. It should be noted that brine is classified as effluent and may contain traces of chemicals used during the desalination process (such as cleaning agents and anti-scalants), but at highly periodic and very dilute concentrations.

The total development disturbance footprint is estimated at approximately 25 162 m^2 and includes buffer corridors for linear infrastructure. For the purposes of this estimate, the footprint of the intake pipeline and electrical cables assumes a corridor width of 4 m to accommodate trenching and associated disturbance, while the outfall pipeline assumes a corridor width of 8 m. However, the permanent operational footprint following construction will be smaller.

The main project components are outlined below, with their locations depicted in Figure 2 and Figure 3. The spatial extent of each component, or lengths in the case of linear infrastructure such as pipelines and electrical cable lines, is provided in Table 1.

The main project components are as follows:

- **<u>Water Intake Site/ associated structures and buildings:</u>**
  - Direct intake and pipeline:
    - For water abstraction from the Buffalo River Estuary: Stretches from intake point in estuary to raw water holding tank at the RO plant site.
    - Intake point in the estuary: Approximately ~13–18 m from the edge of existing wall and 1 m below surface
    - Pipe made from High-Density Polyethylene (HDPE); Diameter: 315 mm.
    - Intake head will include a strainer barrier to prevent fish and other organisms from being drawn into the pipe.
  - Pontoon system linked to the pump house and extends to the estuary intake: A floating platform that supports the pipeline and accommodates the intake structure within the estuary (refer to the design in Section 1.3).
  - Parking area.
  - Pump house building and foundation.
- **<u>Desalination Plant Site:</u>**
  - RO Desalination plant building which includes (list not extensive):
    - General storage room;
    - Restrooms;
    - Control/operations room with switchboard and computers;
    - Feed pumps and pre-treatment filters;
    - A chemical storage room/container for Clean-in-place (CIP) and pre-treatment chemicals;
    - Battery storage container (batteries only potentially required to store excess electricity, if generated by the solar plant).
    - Reverse osmosis pumps and energy recovery devices; and
    - Two trains of RO membranes.
  - A 60 m^3 brine holding/storage tank (brine "treatment" tank).
  - A 80 m^3 ultrafiltration tank.
  - A 200 m^3 raw water holding tank.
  - Permeate pipeline: Pipeline that transports desalinated freshwater from the RO plant to reservoir.
  - Vehicle Access and Parking area
  - Mini substation/ Transformer: Situated next to RO plant building close to Motor Control Centre housed inside. Connected to proposed 11kV cable line, which connects to the existing substation near the intake.
  - Freshwater production will gradually be scaled up as project progresses:
    - Initial phase: The plant will produce 500 m^3 (0.5MLD) of freshwater per day.
    - Full Capacity: The plant will produce 2 000 m^3 of freshwater per day (2MLD).
- **<u>Solar Plant Site:</u>**
  - 1000 m^3 (1 ML) freshwater reservoir and booster pumps.
  - Solar panels and foundations. Estimated output of 525 kWp (kilowatt peak), generating direct current (DC) at up to 1 kV supplied directly to RO plant.

- **<u>Marine Outfall Site/ Infrastructure:</u>**
    - Brine discharge pipeline passing over breakwater
    - Internal Diameter: 200 mm; Outlet diameter: 150 mm
- **<u>Municipal Grid Connection:</u>**
    - New low-voltage cable line from existing substation to intake pump house. Will power the pumphouse with electricity from the grid (will distribute 230-400V)
    - New 11 kV underground cable line line: Will run from existing substation to RO plant to supply power for specific low-voltage components and to supply backup electricity when needed (will distribute 11kV). Connects to newly installed mini substation/ transformer next to RO plant building. Will be installed instead of the previously proposed overhead electrical transmission line.
- **Site Camps:**
    - Across the road from the desalination plant on a disturbed parking/ gravel area.
    - Close to the marine outfall next to the port breakwater.

Table 1. Technical details and dimensions of the main project components for the proposed development. For linear infrastructure, the footprint of the intake pipeline and electrical cables assumes a corridor width of 4 m to accommodate trenching and associated disturbance, while the outfall pipeline footprint assumes a corridor width of 8 m.

Component	Description/ Dimensions
Location of the site	See Table 1.1 above. Ward 19 Buffalo City Metropolitan Municipality East London Harbour Port of East London
Urban Edge	Entire development in the urban edge, except for section of outfall pipeline extending beyond high-water mark into marine environment (Figure 1.2).
Coastal Public Property	Not situated in delineated CPP
Total disturbance footprint	**Footprint: ~**25 162 m^2
Water abstraction	**Maximum abstraction:** 5 500 cubic metres
Water Discharge (via marine outfall)	**Maximum discharge:** 3300 cubic metres a day (at full capacity of 2 000 m^3/day freshwater production) **Initial Discharge:** 815 cubic metres per day (at initial phase of ±500 m^3/day freshwater production)
Freshwater Production	**Maximum Production: 2000 cubic meters**
Type of renewable energy	Solar PV
Maximum generation capacity for solar plant	Estimated output of 525 kWp (kilowatt peak), generating direct current (DC) at up to 1 kV supplied directly to RO plant.
Water Intake Site/ associated structures/ buildings and intake pipeline	**Total Footprint: 1 391m^2 (land-based section only)**
<u>Intake Site (on land)</u>	• **Footprint:** ~340 m^2

Component	Description/ Dimensions
• Intake site minus pumphouse	• **Footprint:** ~298 m^2
• Pumphouse building (including surrounding concrete foundation)	• **Footprint:** 42 m^2 • **Dimensions**: 6 x 7 m
Pipeline from estuary intake point to RO Plant (land portion only)	• **Pipe material:** HDPE • **Water:** Transports saline water from estuary • **Footprint (m^2—minus intake site portions):** ~1 051 m^2 • **Footprint from RO plant to Pumphouse Building (m^2):** 1111 m^2 • **Lenth (m):** ~290m total (of which ~13–18 m will be between the intake and existing wall) • **Diameter:** 315 mm • **Peak Throughput:** Approximately. 63 l/s • **Intake velocity:** Will not exceed 0.15 m/s along the entire intake strainer area (to comply with best practice).

Estuary Intake Area and pontoon system (not included in total footprint calculation)	• **Estuary Intake area in which pontoon will float:**
	  ○ **Footprint (m^2):** ~576 m^2
	• **Pontoon System:**
	  ○ **Footprint (m^2):** ~91 m^2 (note this is not a solid structure and floats on water)
	  ○ **Dimensions (m):** 4.9m x 18.5m

Desalinisation plant site	**Total Footprint: ~1 442 m^2**
RO Desalination Plant Building Dimensions (including foundation and stone walkway surrounding building)	• **Footprint:** 528 m^2 • **Dimensions:** 24 x 22m
• Chemical storage room: CIP and pre-treatment chemicals	• **Capacity:** 85 m^3
• Battery storage container (future consideration)	• **Capacity:** 32.6 m^3
• Mini substation/ Transformer:	• **Footprint:** 4.5 m^2 • **Dimensions**: 1.5 x 3 m
Vehicle Access and Parking Area	• **Footprint:** 756 m^2
• Raw Water Holding Tank	• **Footprint:** ~63.6 m^2 • **Diameter:** 9 m • **Capacity:** 200 m^3
Brine and UF Tank and Access Area	• **Footprint:** 159 m^2
• Brine storage/ treatment Tank	• **Footprint:** ~19.6 m^2 • **Diameter:** 5 m • **Capacity:** 60 m^3
• Ultrafiltration (UF) Tank	• **Footprint:** ~28.3 m^2 • **Diameter:** 6 m • **Capacity:** 80 m^3
Solar Plant Site	**Site Footprint: ~5 505 m^2**
Reservoir Site	**Site Footprint: ~1 883 m^2**
Freshwater Reservoir	• **Footprint:** ~707 m^2 • **Diameter:** 30 m • **Capacity:** 1 ML (1 million litres)
Reservoir Access Area	• **Footprint:** ~1176 m^2

Component	Description/ Dimensions
Permeate Pipeline: transports desalinated freshwater from the RO plant to reservoir	• **Pipe material:** HDPE • **Water:** Desalinated potable water • **Footprint (m^2): ~**61.6 m^2 (of which 8.3 m^2 falls within Reservoir Site) • **Lenth (m):** ~15.4 m (of which 2.1 m falls within Reservoir Site).
Marine Outfall Pipeline and associated structures	**Total Footprint: ~10 240 m^2** **Total Pipeline Length: ~1 093 m**
Pipeline from brine storage tank to outfall culvert	• **Pipe material:** HDPE material • **Footprint (m^2): ~**7 881 m^2 • **Lenth (m):** ~995 m • **Internal Diameter:** 200 mm • **Outlet diameter:** 150 mm • **Peak Throughput:** Maximum approximately 38 l/s
Culvert + Outfall Revetment Section	• **Culvert Material:** Predominantly Concrete • **Footprint (m^2):** ~2 359 m^2 • **Length:** ~98.5 m
Municipal Grid Connection:	**Total footprint: 1 251 m^2**
New low-voltage cable line: from existing substation to intake pump house.	**Length:** 102 m **Footprint (m^2): ~**408 m^2 (**note**: there is considerable overlap between this footprint and that of the Medium Voltage Cable Line, as well as the intake pipeline) **Volts to be distributed:** 230-400 V
New medium-voltage underground cable line: From existing substation to newly installed mini substation next to RO plant building.	**Length:** 253 m **Footprint (m^2):** 1011m^2 (**note**: there is considerable overlap between this footprint and that of the low-voltage underground cable line, as well as the intake pipeline). **Kilovolts to be distributed:** 11 kV **For supplying grid electricity to the RO plant:** Certain low-voltage components at the RO plant, such as lights, will rely exclusively on grid electricity. In addition, if solar power is not enough, electricity will be drawn from the municipal grid at up to 400 V.
Site Camps	**Total Footprint: 5 265 m^2**
Site Camp A: RO and Desal plant	**Site Footprint:** 2 859m^2
Site Camp B: Marine outfall	**Site Footprint:** 2 406 m^2

Routine Inspection, Maintenance and Cleaning

Routine inspection and cleaning of intake strainers

A visual inspection of the intake will be performed daily. Should the intake strainers need to be cleaned due to blockage, either of the following approaches will be followed:

i. If the component is removable, the component will be removed and mechanically (scrubbing and or pressure hosing) cleaned on land.

ii. Non removable components will be cleaned mechanically (scrubbing and/or pressure hosing) either by trained personnel on the pontoon, or by a team of divers.

iii. The removed debris will be disposed of as appropriate for the type of waste.

Routine inspection and maintenance of the intake pipelines

The intake system has a chlorine dosing system which helps to minimise marine growth within the intake pipeline. Further mechanical cleaning of the intake pipeline will be performed either by pipeline pigging, or the removal of discrete pipeline segments to be replaced or cleaned in a suitable workshop or area.

Routine inspection and maintenance of the outfall pipelines

Mechanical cleaning of the outfall pipeline will be performed either by pipeline pigging, or the removal of discrete pipeline segments to be replaced or cleaned in a suitable workshop or area.

Other equipment and components

Other equipment and components such as storage tanks and electrical equipment, amongst others, should regularly be inspected for any weaknesses/damage. These will be repaired/ replaced as and when needed.

Waste management from filter backwash and chemical cleaning processes

Backwash and the periodic CIP flush (occurring once every 3–6 months), is first collected in a sump within the desalination building. Hereafter it goes to the brine tank for mixing with brine (allowing dilution), natural aeration and finally gets discharged into the ocean with the brine.

Effluent Discharge Management and Compliance with Coastal Waters Discharge Permit

Effluent discharged must meet the end-of-pipe concentrations modelled in the Marine Specialist Study and comply with all conditions of the CWDP. In addition, and in assisting with achieving this, the following requirements must be complied with:

a) Ensuring aeration of the effluent prior to discharge when oxygen scavengers (such as sodium metabisulphite) are used.

b) Ensuring the neutralisation of extremely alkaline or acidic solutions and the treatment of additional cleaning agents prior to discharge.

c) Ensuring the continual release of small volumes of chemicals used during the CIP process with the brine stream to allow for maximum dilution before entering the environment.

d) Ensuring adequate hydraulic mixing and dilution of brine.

The above can be met using a brine holding tank, which would act as an effective treatment and conditioning system. Within the tank, natural aeration, hydraulic mixing, dilution, neutralisation and pH equalisation would occur as part of normal operation. If the tank is installed, no additional chemical dosing or mechanical aeration is required unless indicated by monitoring results. Dosing levels must be adjusted if adverse effects are detected through the monitoring programme.

During operation, ongoing environmental monitoring is required to ensure that the desalination plant's brine discharge (end-of-pipe concentrations) complies with the conditions of the CWDP and to detect and manage any potential environmental impacts over the life of the plant.

Monitoring requirements, including the frequency of monitoring and the specific parameters to be measured, will be set out in the CWDP. These requirements are expected to apply for the full operational life of the plant.

Typically, this will involve both point source measurements (for example Conductivity, Temperature and Depth (CTD) profiling of the water in line with ongoing environmental monitoring requirements) and continuous water quality monitoring through deployment of a suitable instrument, which measures specific parameters, at the edge of the Recommended Mixing Zone (RMZ) to measure compliance with permitted discharge limits and parameters.

It also includes collecting sediment and biotic samples at the edge of the RMZ to assess sediment characteristics and benthic macrofaunal communities. Monitoring data will be compared to the baseline data collected as part of the Marine Specialist Assessment to determine impact over time. The results will provide an ongoing assessment of the influence of the outfall structure and brine discharge on biodiversity and ecosystem health.

Development Phases and Life Span

Environmental Authorisation is required for a period of at least 10 years.

Construction of the proposed development is anticipated to be completed within approximately 12 months with the anticipated construction dates being as follows:

- Start: March 2027
- Finish: March 2028

Once completed, the plant will commence operation. The current Contractor's "Operations and Monitoring" contract period is currently as follows:

- Start: March 2028
- Finish: March 2032

However, the operational phase is expected to continue indefinitely, with no decommissioning planned in the foreseeable future because of the long-term need for a reliable, independent water supply to support the Port of East London. TNPA will therefore continue to operate the desalination plant beyond the current contractor's operational contract. Therefore, the Environmental Authorisation is required for at least 10 years to cover the tentative operational period of the plant.

During operation, environmental monitoring for effluent discharge will be undertaken as described in Section 1.5 above. Routine maintenance activities, such as equipment servicing, infrastructure inspections, and repairs, are expected to occur throughout the operational life of the project to ensure ongoing efficiency, safety, and environmental compliance. Any major upgrades or refurbishments will be undertaken as required to maintain optimal performance and extend the facility's lifespan.

Permitting and Reporting Requirements

Under the EIA Regulations, 2014, certain Listed Activities (published under Listing Notices 1, 2 and 3) that may have environmental, social, economic or heritage impacts require Environmental

Authorisation (EA) from the Competent Authority (in this case the National Department of Forestry, Fisheries and the Environment (DFFE)) before a project can proceed. This project triggers activities under all three Notices, including Listing Notice 2, and therefore requires Environmental Authorisation through a S&EIA process. The S&EIA comprises a Scoping Phase and an EIA Phase. Scoping defines the project context, identifies potential impacts, and determines the specialist studies needed for the EIA. The EIA then assesses these impacts in detail, proposes mitigation measures, and is informed by specialist input and the independent EAP evaluation. Findings are presented in an Environmental Impact Assessment Report (EIAr) and an accompanying Environmental Management Programme (EMPr), which sets out actions, monitoring, and responsibilities to minimise and manage impacts. The draft EIAr and EMPr are then circulated for public comment before final submission to the Competent Authority for consideration in the granting of EA.

The Environmental Authorisation Application was lodged on 27 February 2025. The Scoping Phase was completed, and the Final Scoping Report submitted to the Competent Authority on 14 April 2025, and was accepted on 30 May 2025. A Draft EIAr was subsequently compiled and made available for public review and comment from 2 to 31 October 2025. However, due to delays in finalising the project layout, the Final EIAr could not be completed and submitted within the prescribed timeframe, and the application therefore lapsed. The project layout has since been finalised, enabling the applicant to proceed with the application for Environmental Authorisation. As the approved Scoping Report remains valid, and the project meets the requirements of Regulation 21(2)(a) to (d) of the EIA Regulations, 2014 (as amended), it was not necessary to repeat the Scoping Phase. The process has therefore resumed from the Environmental Impact Assessment (EIA) phase. This document is therefore the Draft EIAr for this resubmission process.

Listed Activities Triggered by the Development

The proposed development will trigger activities under Listing Notice 1 (Activities 14, 16, 17, 19A, 25, 27 and 30), Listing Notice 2 (Activities 6 and 14), and Listing Notice (Activities 2 and 12). The list below identifies each Listed Activity along with the relevant project components causing it to be applicable.

Listing Notice 1

- **Activity 14:** The project will involve on-site storage of desalination chemicals considered dangerous goods in a storage room with a capacity exceeding the 80 cubic metre threshold. Should batteries be used, these will also be stored on site.
- **Activity 16:** The RO desalination plant will produce 2 000 cubic metres of freshwater per day, exceeding the 100 cubic metre threshold.
- **Activity 17:** The marine outfall pipelines will extend into the ocean and the littoral active zone, outside the urban edge.
- **Activity 19A:** The direct intake and marine outfall pipelines will require the removal, movement, or deposition of more than 5 cubic metres of material within the sea, seashore, and estuary.
- **Activity 25:** The desalination plant will produces and treat approximately 3 300 cubic metres of brine effluent per day, exceeding the 2 000 cubic metre threshold.
- **Activity 27:** Approximately 1 hectare of indigenous vegetation will be removed to accommodate the proposed infrastructure.

Listing Notice 2

- **Activity 6**: The project will require a CWDP for the daily discharge of brine into the marine environment under the ICMA.
- **Activity 14:** Both the marine outfall pipelines and the direct intake pipelines will involve the construction of structures on the seabed. While the intake pipelines extend into the estuarine environment, it is considered part of the seabed due to being a marine-dominated area.

Listing Notice 3

- **Activity 2**: The proposed reservoir will have a capacity of 1 ML, exceeding the 250 m^3 threshold, and falls within a CBA 1 and critically endangered Umtiza Forest Thicket vegetation type, designated for conservation use in the Buffalo City Municipal Spatial Development Framework (MSDF).
- **Activity 12:** More than 300 square metres of indigenous vegetation within a CBA1 will be removed.
- **Activity 4:** The intake and outfall pipelines may result in the formation of informal roads through repeated vehicle use during construction and maintenance. These occur within an area designated for conservation use in the Buffalo City MSDF, as it is mapped as a CBA 1 and Critically Endangered Umtiza Forest Thicket vegetation.

Public Participation Process

Invitation to Comment on the Proposed Project

Interested and Affected Parties (I&APs) are invited to review the draft EIAr and draft EMPr and to submit comments, questions, or concerns on the project, including the proposed brine discharge and associated CWDP.

- **Comment Period:**
  - 18 July 2026 – 18 August 2026 (closing 23:59)
- **Where to Access the draft EIAr and draft EMPr:**
  - **Digitally:** https://anchorenvironmental.co.za/public-documents
  - **Hardcopies:**
    - West Bank Library: Hood St, West Bank Village, East London
- **Contact for Comments & Registration as an I&AP:**
  - Mr Steve Septpmber – Anchor Environmental Consultants (Pty) Ltd
  - Tel: 021 701 3420 | Email: steve@anchorenvironmental.co.za

Public Participation Process and Requirements

The process is being undertaken in accordance with the EIA Regulations (promulgated under the National Environmental Management Act (NEMA; Act 107 of 1998)) and ensures that stakeholders, I&APs, and authorities are informed of the project and its potential impacts and are given the opportunity to review and comment before finalisation. Notifications of the project and opportunities to comment are provided in English and some in isiXhosa through email, site notices, flyers, and newspaper advertisements (Go!&Express and Daily Dispatch) in the week of 13 – 17 July 2026. The draft EIAr and draft EMPr is available for a 30-day public review period from 18 July 2026 – 18 August 2026. During this time, I&APs can access the reports online or at two

designated public venues (as indicated above) and submit comments by email, post, phone, or at the public meeting. All comments received will be recorded in a Comments and Responses Report (CRR) and addressed in the final EIAr and EMPr.

Previous Public Participation Processes

The process was undertaken in accordance with the EIA Regulations and ensured that stakeholders, I&APs, and authorities were informed of the project and its potential impacts and were given the opportunity to review and comment before finalisation. Notifications of the project and opportunities to comment were provided in English and some in isiXhosa through email, site notices, flyers, and newspaper advertisements (Go!&Express and Daily Dispatch) between 22 and 25 September 2025. The draft EIAr and draft EMPr was made available for a 30-day public review period from 2 to 31 October 2025. During this time, I&APs could access the reports online or at two designated public venues (as indicated above) and submit comments by email, post, phone, or at the public meeting. A public meeting was held on 14 October 2025 at the West Bank Golf Club, although no participants or I&APs were in attendance. All comments received has been recorded in the Comments and Responses (C&R) Table and addressed in this final EIAr and EMPr.

Summary of Comments Received to Date

To date, several comments have been received from national, provincial, and municipal authorities, heritage agencies, and other stakeholders. Key issues raised included:

- **Department Forestry, Fisheries and Environment, Directorate: Integrated Environmental Authorisations**
    - Provide accurate coordinates for all activities and infrastructure, development footprints, specifications, and a clear summary of the full project scope, supported by final layout and sensitivity maps.
    - Submit a Site Sensitivity Verification Report, ensure all required specialist studies comply with gazetted protocols, include SACNASP registrations and declarations, and provide clear no-go areas, limitations, and practical mitigation measures.
    - Confirm all applicable listed activities, update the application if activities differ, ensure technical details are included, provide feasible alternatives, obtain landowner consent, and comply with all EIA Regulations, timeframes, and public participation requirements.
    - Obtain and submit comments from mandated authorities including DFFE Biodiversity, DFFE Oceans and Coasts, EC DEDEA, Buffalo City Metropolitan Municipality (BCMM) and Eastern Cape Provincial Heritage Resources Agency (ECPHRA), with a complete CRR including all correspondence and proof of notification.
    - Strengthen the EMPr with detailed operational management measures (intake cleaning, brine compliance monitoring, pipeline maintenance, waste management), ensure EMPr compliance with Appendix 4, and submit the generic EMPr where relevant.
    - Provide a clear cumulative impact assessment that quantifies impacts where possible, integrates specialist inputs, and states whether the project should proceed.
    - Note that an ORV permit may be required in the coastal zone and engage the Sub-Directorate for coastal-zone machinery use.

- **Department Forestry, Fisheries and Environment, Directorate: Protected Areas**
    - Requested that Outfall Alternative 3 be diverted away from the Potters Pass Nature Reserve/ excluded to avoid any degradation in the protected area. After reviewing the draft EIAr the Directorate noted that Alternative 3 (Outfall) had been removed to avoid potential impacts on the Potters Pass Nature Reserve and indicated that it had no further comments.
- **Department Forestry, Fisheries and Environment, Directorate: Oceans and Coasts**
    - No delineated Coastal Public Property exists within the port, which excludes Activities 15 and 52 of Listing Notice 1 from the project.
    - Oceans and Coasts requested detailed intake and outfall design information, including pipeline length, materials, anchoring, placement (above or below ground), installation alternatives, and intake screening requirements to protect estuarine fauna.
    - Clarify whether brine will be treated or released through a diffuser, provide operational details, and ensure continuous monitoring to verify dilution models and compliance with CWDP conditions and water quality guidelines.
    - Address recreational fishing around the outfall, confirm that vehicle use within the modified harbour area is permissible, and ensure all NEMA Duty of Care obligations and operational mitigation measures are implemented.
    - Based on the site inspection and submitted reports, Oceans and Coasts has no objection to the proposed development, provided the above issues are addressed and no activities commence before Environmental Authorisation is granted.
- **Department Forestry, Fisheries and Environment, Directorate: Biodiversity Conservation**
    - Acknowledged receipt, requested development footprint shapefiles, and directed all biodiversity queries to their designated contact.
    - No objections to the Draft Scoping Report or Plan of Study, with the reminder that the EIA must comply with NEMA assessment and reporting requirements.
    - The development falls within a highly sensitive terrestrial area (CBA 1 and portions of Critically Endangered Umtiza Forest Thicket) and a vulnerable marine environment. However, much of the site is historically transformed, degraded, and ecologically disconnected due to surrounding urban and industrial land uses.
    - Measures should be implemented to maintain ecological functioning and connectivity and to protect marine and estuarine ecosystems through appropriate EMPr actions including stormwater management, spill prevention, invasive alien control, rehabilitation, and compliance with NEMBA and ICMA.
    - Clarification that no delineated Coastal Public Property exists within the port.
- **Department of Water and Sanitation: Water Use Authorisation**
    - Confirmed that a WUL would not be required for the development, as the estuary is not classified as a water source under the National Water Act (NWA, Act 36 of 1998).
    - Specific concerns/ queries included: the quality of intake water and potential risks from sewage, harbour pollution, and oil spills, brine disposal in a sheltered area up-current of the Buffalo River Estuary, the quality of intake water and potential risks from sewage, harbour pollution, and oil spills, brine disposal in a sheltered area up-current of the Buffalo River Estuary, the processes of remineralisation or blending; and the processes of remineralisation or blending; and the potential for the project to be upscaled to serve the city.
- **Eastern Cape Provincial Heritage Resources Agency (ECPHRA)**
    - Submission of a Notice of Intent to Develop and a Phase 1 HIA (archaeological, cultural, maritime and palaeontological components) undertaken by qualified

specialists. A waiver for a palaeontological field assessment was issued by ECPHRA.
    - Accepted the Phase 1 Archaeological and Maritime Assessment and the desktop Palaeontological Assessment. The development may proceed subject to full compliance with specialist and ECPHRA recommendations.
    - Notify ECPHRA of project commencement, submit a detailed Chance Finds Procedure for approval, conduct heritage induction for the ECO and construction team, have a palaeontologist monitor excavations, and report any shipwreck or heritage material to South African Heritage Resource Agency (SAHRA) and ECPHRA.
    - Undertake pre-installation surveys for shipwrecks, establish and map no-go exclusion zones, stop work and notify authorities if any heritage resources or human remains are uncovered, and implement the palaeontological Chance Finds Protocol.
    - Submit a final heritage compliance report to ECPHRA.
- **South African Heritage Resources Agency (SAHRA)**
    - Interim Comment: The SAHRA Development Applications Unit (DAU) Requested the MUCHIA, PIA, and draft EIA before providing comments. Further comments would be issued upon receipt of the above reports.
    - Final Comment: DAU has no objections to the proposed development.
    - Heritage specialist recommendations are supported and must be followed.
    - Any uncovered shipwrecks or related artefacts must be reported to a maritime archaeologist, and a report submitted to SAHRA.
    - Fossil Chance Finds Procedure must be included in the EMPr.
    - Any archaeological evidence (structures, ceramics, bones, artefacts, etc.) must be reported to SAHRA; non-compliance is an offence.
    - Unmarked human burials must be reported immediately to SAHRA; non-compliance is an offence.
    - Professional archaeologists or palaeontologists must be contracted if heritage resources are uncovered, with a Phase 2 rescue operation if needed and permitted by SAHRA.
    - Submission and record: Final BAR and EMPr must be submitted to SAHRA for record purposes. The Environmental Authorisation decision must be communicated to SAHRA and uploaded to the South African Heritage Resources Information Systems (SAHRIS) website.
- **Other Comments:** General queries on access to project information and requests for project KMZ files.

Assessment of Alternatives and Proposed Development Footprint

During the Scoping Phase, multiple alternative sites and configurations for the RO and solar plant, seawater intake, and brine outfall were assessed to identifying the final layout (Figure 3). A multi-step process was used to screen out alternatives and select the preferred development layout and final site footprint that is being assessed in this EIA. The first step involved an initial site screening using a Site Selection Matrix, which considered parameters such as seawater intake, brine discharge, site elevation, land shape and area, solar shading, proximity to sensitive sites, hydraulic network access, flood risk, and site safety. Hereafter, detailed investigations were conducted on the preferred or most viable options and included geotechnical and hydraulic engineering feasibility studies (borehole drilling and testing of beach wells, water quality testing, land surveying, etc) and specialist studies and impact assessments to confirm environmental acceptability.

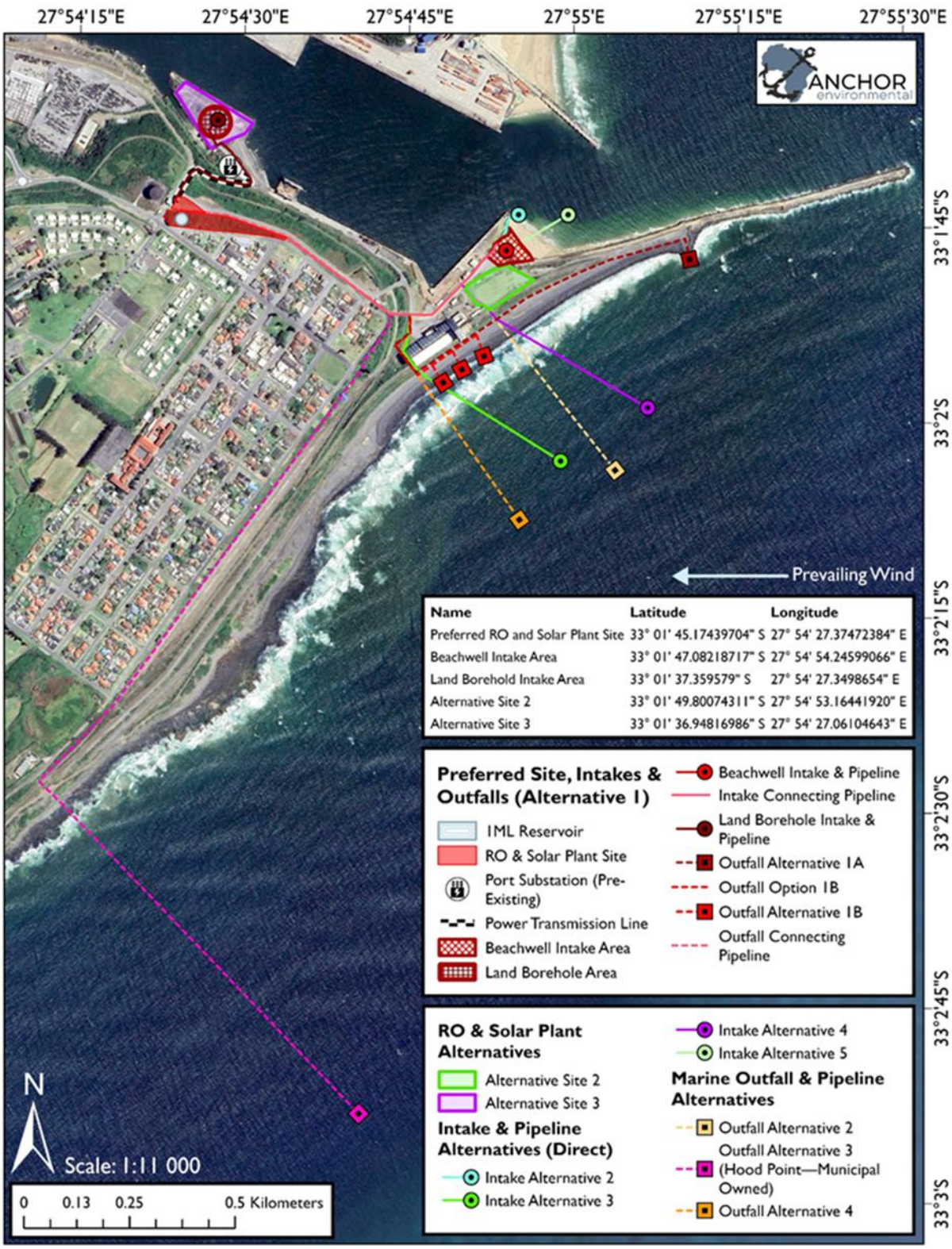

Figure 3. Alternatives Development Layouts considered during the Scoping Phase.

Alternative Site 2 achieved the highest suitability score but was unavailable due to a planned future development, resulting in Site 1 being selected. Beach wells and land boreholes were initially preferred for seawater abstraction due to their natural pre-filtration benefits. However, test drilling confirmed that this option was not viable because of low groundwater yield and poor water quality. A direct estuarine intake located closest to the preferred plant site was therefore selected following the screening of other marine and estuarine intake alternatives. Reverse

osmosis (RO) was selected as the preferred desalination technology due to its lower energy requirements, compact footprint, and high water quality. A hybrid power supply comprising solar PV and municipal grid electricity was selected to maximise energy security while reducing operating costs and greenhouse gas emissions. Monocrystalline PV panels were selected based on their high efficiency and reduced footprint. Marine discharge via a direct outfall was identified as the only practical and feasible brine disposal method, with the final outfall location and design refined through engineering assessments and brine dispersion modelling to minimise environmental impacts. A single-pipeline outfall with a single-point outlet was selected as the preferred design.

Deviation of Project Layout from the Approved Scoping Report

The final EIAr project layout differs slightly from that presented in the Final Scoping Report, primarily due to refinements to the intake and outfall locations following detailed engineering investigations. Beach wells and land boreholes were initially preferred for seawater abstraction, but test drilling revealed low yield and poor water quality, necessitating a change to a direct estuarine intake. The marine and estuarine intake alternatives assessed during the Scoping Phase were subsequently screened out due to operational, spatial, and technical constraints, resulting in the identification of a new preferred estuarine intake. Similarly, the outfall alignment was refined to optimise engineering feasibility while reducing marine disturbance. Specialists assessed the updated layout and confirmed that these refinements do not affect the scope, findings, or impact assessments. The Scoping Phase therefore remains valid, and the DFFE confirmed that it does not need to be repeated.

Need And Desirability of the Development

South Africa faces severe water scarcity, with growing demand for high-quality freshwater exceeding available supply and causing over-exploitation of rivers, dams, and aquifers. Climate change is expected to exacerbate this situation, increasing rainfall variability and the frequency of extreme events, further stressing water resources. In East London, recent severe droughts in the Amatola Water Area have caused water shortages and restrictions. Municipal supply is therefore constrained, placing port operations at risk of interruption and potentially affecting local industry, trade, and employment that rely on the port. This creates an urgent need for a secure and sustainable supply of high-quality water for port operations, including both potable and industrial uses, while relieving pressure on existing municipal systems. Desalination provides a viable solution by generating freshwater from saline water without increasing demand on existing water resources. RO desalination requires a stable electricity supply, and given South Africa's largely coal-based and unreliable grid, powering the process with renewable energy is critical to ensure reliability, reduce greenhouse gas emissions, and support sustainable water and energy management. The proposed solar-powered desalination plant will provide an independent, reliable water source for the Port of East London, easing pressure on stressed freshwater systems. Solar power ensures consistent operation, reduces dependence on the municipal grid, lowers greenhouse gas emissions, and aligns with national sustainability objectives, supporting resilience to climate variability and South Africa's transition to a low-carbon economy.

Legislative and Policy Context

- **Relevant International Agreements, and Obligations**
    - World Heritage Convention, 1972
    - Convention on International Trade in Endangered Species of Wild Fauna and Flora, 1973
    - Bonn Convention, 1979
    - Abidjan Convention, 1981
    - United Nations Convention on Biological Diversity, 1992;
    - United Nations Framework Convention on Climate Change, 1992;
    - Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, 1995
    - Agenda 21, 1992
    - The Sustainable Development Summit, 2015
    - Ramsar Convention: Convention on Wetlands of International Importance, 1971
    - United Nations Educational, Scientific and Cultural Organization (UNESCO)

- **Relevant National Legislation, Policy, and Guidelines**
    - The Constitution of the Republic of South Africa, 1996
    - National Environmental Management Act (Act 107 of 1998)
        - Environmental Impact Assessment Regulations, 2014
    - National Environmental Management: Protected Areas Act (NEMPAA; Act 57 Of 2003)
    - The National Environmental Management: Biodiversity Act (NEMBA; Act 10 Of 2004).
        - National Biodiversity Assessment (NBA)
        - Threatened or Protected Species Regulations, 2015
        - Alien and Invasive Species Regulations, 2020
    - National Environmental Management: Integrated Coastal Management Act (ICMA; Act 24 Of 2008)
        - Coastal Waters Discharge Permit and Water Quality Guidelines
    - National Environmental Management: Waste Act (NEMWA; Act 59 Of 2008)
    - The Marine Living Resources Act (MLRA; Act 18 of 1998)
    - Marine Spatial Planning Act (MSPA; Act 16 of 2018)
        - Draft Maritime and Underwater Cultural Heritage Sector Plan
    - Sea Birds And Seals Protection Act (Act 46 of 1973)
    - The National Water Act (NWA; Act 36 Of 1998)
    - Water Services Act (Act 108 of 1997)
    - South African National Water Resources Infrastructure Agency SOC Limited Act (Act 34 OF 2024)
    - Animals Protection Act (Act 71 of 1962)
    - World Heritage Convention Act (WHCA; Act 49 Of 1999)
    - National Heritage Resources Act (NHRA; Act 25 Of 1999)
    - Maritime Zones Act (No 15 of 1994)
    - Spatial Planning and Land Use Management Act (SPLUMA; Act 16 Of 2013)
    - Carbon Tax Act (Act 15 of 2019)
    - The Climate Change Act (Act 22 of 2024)
    - Infrastructure Development Act (Act 23 of 2014)
    - Local Government: Municipal Systems Act (Act 32 of 2000)
    - Promotion of Access to Information Act (PAIA; Act 2 of 2000)
    - The Occupational Health and Safety (OHSA; Act 85 of 1993)

- **Relevant Provincial Law, Guidelines, and Policies**
    - Draft Eastern Cape Environmental Management Act (2024)
    - Eastern Cape Biodiversity Conservation Plan
    - Eastern Cape Coastal Management Programme (2014)

- **Relevant Local Law, Guidelines, and Policies**
    - Buffalo City Integrated Development Plan (2024/2025)
    - Buffalo City Municipality: Municipal Spatial Development Framework (2019-2024)
    - Canon Rocks Environmental Management Framework (EMF, 2010)
    - Buffalo City Municipality: Zoning Scheme Regulations (2007)
    - Buffalo City Metropolitan Municipality: Integrated Waste Management By-Law (2022)
    - Buffalo City Municipality: Roads and Streets By-Law (2011)
    - Buffalo City Noise By-Law (2010)
    - Buffalo City Draft Noise Control By-Law (2024)
    - Buffalo City Coastal Management Programme (2024)
    - Draft Buffalo River Estuarine Management Plan (2016)

Description of Affected Environment and Specialist Study Findings

Several specialist studies were conducted as part of the S&EIA to describe the status of the current environment and assess potential impacts of the development on environmental, heritage, and socio-economic receptors. Impacts were assessed in terms of the Construction Phase (impacts resulting from the construction of the development) and Operational Phase (impacts resulting from operational activities, e.g., brine discharge), as well as any Cumulative (combined) impacts arising from this development—in combination with other existing, currently-or approved, developments. Finally, potential impacts associated with the "No-Go" (do nothing) approach were also assessed. Decommissioning impacts were excluded as they are not anticipated in the foreseeable future. These assessments also identified mitigation measures to minimise negative impacts; optimisation measures to maximise positive impacts/benefits; as well prescribing other management and monitoring requirements for inclusion in the EMPr.

Marine and Estuarine Environment

The marine and estuarine environment surrounding the development includes both natural and heavily modified habitats. The nearshore marine environment comprises exposed rocky shores and subtidal reefs interspersed with sandy patches.

The marine environment is classified as Vulnerable, due to the area's susceptibility to degradation of ecological structure, function, or composition as a result of human activities. The area further lies within a marine Ecologically or Biologically Significant Area (EBSA) and is partly associated with an Ecological Support Area (ESA), due to the regions' ecological importance. However, the southern section of the Port breakwater (marine side), onto which the outfall pipeline will extend is for example already artificial and heavily modified comprising of an artificially constructed "rocky beach." The construction and presence of the outfall is therefore not expected to have significant impacts on the marine environment.

The DFFE Environmental Screening Tool found one Species of Conservation Concern (SCC) that may occur within the project area: the rocky kurper fish *Sandelia bainsii*, which is listed as Endangered on the International Union for the Conservation of Nature (IUCN) Red List. However,

this species only occurs in freshwater habitats, and as such is highly unlikely to be present in the estuarine or marine habitats within which the project area falls.

Rocky shores include outcrops, boulders, low rocky platforms, and artificial dolosse near the port, creating heterogeneous habitats that support diverse intertidal communities. Key organisms include barnacles, limpets, mussels, grazers, seaweeds, sea urchins, starfish, crabs, and intertidal fish. The marine outfall area comprises mainly artificial dolosse, originally installed to protect the harbour walls. The shallow subtidal near the East London outfall comprises a mix of patchy reefs, boulders, pebbles, and sandy areas, with algae-dominated communities similar to the intertidal. Key species include seaweeds (e.g., *Gelidium*), mussels, oysters, ascidians, abalone, octopus, and spiny lobsters. These habitats also support a diverse array of finfish and serve as important feeding and nursery grounds, while reef structures influence the distribution of organisms in adjacent sandy areas. Soft subtidal habitats at the proposed desalination outfall comprise unconsolidated sediments (sand, gravel, mud) supporting benthic macrofauna communities dominated by invertebrates. This environment was sampled during the survey in July 2024.

A total of 23 benthic macrofaunal taxa were identified, spanning five phyla, three classes, nine orders, 17 families, 14 genera, and 11 species. Benthic macrofauna serve as indicators of sediment quality and environmental health due to their close association with sediments and ability to bioaccumulate pollutants. The community was dominated by Arthropoda (12 taxa), Annelida (4), and Mollusca (3). Overall, the community is depauperate, with low abundance and biomass, reflecting the high-energy, sand-dominated environment with low organic content. Comparison between control and impact sites showed no significant differences (PRIMER, ANOSIM, $R = -0.035$, $p = 0.629$), confirming that control sites are appropriate for future monitoring. Annual sediment and macrofauna sampling is recommended to maintain consistent baseline data. Sediment samples were predominantly sandy with minimal mud content (<3%), resulting in low total organic content. No trace metal concentrations exceeded ERL thresholds. This composition reflects a high-energy environment with strong currents and large waves, limiting the accumulation of organic matter and contaminants, which are typically associated with finer sediments. The low organic content and lack of elevated trace metals indicate that sediments are unlikely to concentrate pollutants from brine discharge, supporting a low potential impact on the soft subtidal environment.

The pelagic environment offshore of the South Coast supports an estimated 21 cetacean species (whales and dolphins), based on historic sightings, strandings, and habitat projections. Dolphins have been observed near the Buffalo River estuary mouth. The area also hosts a resident pinniped species, the Cape fur seal (*Arctocephalus pusillus pusillus*). The transformed estuary mouth provides a sheltered habitat for mammals, including bottlenose dolphins (*Tursiops* sp.) and humpback dolphins (*Sousa* sp.).

The Buffalo River Estuary forms the estuarine component of the study area and is classified as a warm temperate, predominantly open system. The Estuarine Functional Zone (EFZ) extends approximately 7.5 km from the mouth, with the lower 2 km encompassing the Port, where natural intertidal habitats such as mudflats, sandflats, and salt marshes are largely absent due to infrastructure and repeated dredging. The estuary provides important nursery and sheltering functions for juvenile fish and other estuarine organisms, though its current condition has been rated as “heavily modified” and Vulnerable, due to historical habitat loss, hydrological alteration, and chronic water quality pressures from upstream pollution and nutrient inputs. Benthic macrofauna are moderately to highly disturbed, estuarine plants are largely absent in the lower system, and avifauna are limited to species capable of utilising the modified estuary margins.

Despite these pressures, the system retains ecological function and any new developments must ensure that current conditions are not further degraded.

Overall, the broader marine environment supports a diverse assemblage of species, while the estuary, although degraded, continues to provide nursery and refuge functions. The marine and estuarine ecosystems in the vicinity of the proposed development could therefore be sensitive to disturbance, pollution, and habitat modification, particularly in the estuary, where anthropogenic pressures have already heavily altered the environment. With appropriate management and mitigation, impacts on these systems can be minimised while maintaining the ecological integrity of both systems and ensuring that activities are compatible with conservation objectives of Critical Biodiversity Areas (CBAs), ESAs and the EBSA.

Dispersion Modelling:
The potential effects of the discharge of brine to the marine environment was assessed using a Cornell Mixing Zone expert system (CorMIX) modelling study. Model set up was informed by existing literature as well as in situ data collected during the field survey.

Dispersion modelling estimates 1) effluent and associated contaminants' dilution rates and 2) the footprint of the plume after effluent discharge. These outputs inform the assessment of potential environmental impacts and compliance with permit conditions. For a facility to receive a CWDP for effluent discharge, it must be able to demonstrate that the effluent will sufficiently dilute by the time it reaches a set distance from the outfall/ discharge point, known as "the recommended mixing zone" (RMZ). The RMZ is a defined portion or volume of the receiving water where the discharged effluent is permitted to mix and dilute before Water Quality Guidelines (WQG) must be achieved. In practice, it may occur within the near field or far field of a hydrodynamic mixing process and therefore depends on source, ambient, and regulatory constraints. The following recommendations have been proposed for South Africa: 300 m in an offshore environment, 100 m in a nearshore open coast environment, 30 m in sheltered coastal environments and special management areas, 0 m for outfalls in estuaries. A conservative 30 m RMZ was applied in this study. Calculated Concentrations: Cross-shore dilution calculations (dilution into the surf zone) show salinity exceeds WQG at 60 m only when the swell height is 1-1.5 m under extremely small surf zone widths (10 m) but were compliant across all other conditions. It is rare for the surf zone width to be > 10 m wide, and it is likely that this noncompliance will be temporary and limited to the immediate discharge area. These calculations do not differentiate between initial and full discharge volumes but indicate any exceedance would be temporary and limited to the immediate discharge area. Modelled Concentrations: Numerical modelling was performed using the Cornell Mixing Zone expert system (CORMIX) to predict the geometry and dilution characteristics of the discharge and to determine the outfall design/effluent quality requirements to achieve compliance with these WQGs. Results were based on the worst-case concentration of effluent exiting the pipe end. The model results suggest that compliance with WQG is achieved at the Zone of Initial Dilution (ZID) for salinity, total suspended solids (TSS), and sodium hypochlorite (NaOCl), which provides high confidence of compliance at the 30 m RMZ.

Impacts
The construction of the proposed desalination plant and associated infrastructure could result in temporary, localised disturbances to subtidal marine and estuarine habitats, as well as mortality of macrofaunal and floral communities. Pelagic habitats may also be briefly disturbed, though mobile species are expected to move to adjacent areas. Seabird colonies are also not expected to be disturbed as no sensitive seabird colonies occur nearby. Additional potential impacts include litter generation, hazardous substance spills, and minor sediment disturbance, which could affect marine and estuarine organisms if not properly managed. However,

construction within the EFZ will be limited to already modified areas, with no removal of existing vegetation anticipated. Moreover, the construction of the outfall pipeline are not expected to cause significant marine impacts, given the already artificial and heavily modified nature of the southern breakwater, which comprises an artificially constructed "rocky beach." Overall, the development footprint is confined to disturbed areas, and any potential effects on surrounding natural habitats are expected to be minimal. Impacts are therefore small in spatial extent, reversible, and will not result in a net loss of habitat. General mitigation measures for the construction phase include restricting activities to the approved footprint, careful handling of materials, rehabilitation of disturbed areas, responsible waste management, and prevention or rapid response to spills. In addition, the intake must be installed to ensure that water is not drawn from the upper or the bottom one meter of the water column and to ensure the horizontal intake of water. The intake head must further include a strainer barrier to prevent fish and other organisms from being drawn into the pipe. Overall, construction-phase impacts are rated from "Medium" to "Very Low" before mitigation and are reduced to "Low" to "Insignificant" after mitigation.

During the operational phase, impacts are primarily associated with seawater intake and brine discharge. Seawater abstraction may cause entrainment or impingement of marine organisms, but careful intake design, including low intake velocities and positioning away from sensitive habitats, limits these effects. Brine discharge increases local salinity, potentially affecting organism physiology, distribution, and productivity, but dilution in the receiving environment and strategic discharge placement mitigate these impacts. Other operational impacts include minor reductions in dissolved oxygen or changes in pH from treatment chemicals, as well as the release of co-pollutants such as biocides and anti-scalants. General mitigation measures include adequate brine dilution, neutralisation of chemicals, effluent monitoring, and avoidance of sensitive habitats. In addition, the intake must be designed to ensure intake velocities remain below 0.15 m/s to reduce the risk of debris entrainment and marine life impingement (to ensure that fish and other mobile organisms can escape the intake current), as per international best practise.

Overall, operational-phase impacts are rated "Low" to "Very Low" before mitigation and "Very Low" after mitigation, with all effects expected to be reversible upon decommissioning.

Furthermore, the area of proposed discharge is typically subject to significant wave action, as evidenced by the presence of extensive sea defence structures (dolosse) in the area. This wave action results in significant energy and associated mixing. The dispersion modelling results did indeed indicate that there is sufficient mixing within the first few meters after discharge to meet water quality guideline limits for salinity and other components of the effluent that may be of concern. It should also be noted that there is little to no risk that brine effluent will be entrained into the nearby estuary at concentrations that may result in environmental harm.

During operation, ongoing environmental monitoring is required to ensure that the desalination plant's brine discharge (end-of-pipe concentrations) complies with the conditions of the CWDP and to detect and manage any potential environmental impacts over the life of the plant. Monitoring requirements, including the frequency of monitoring and the specific parameters to be measured, will be set out in the CWDP. These requirements are expected to apply for the full operational life of the plant. Typically, this will involve both point source measurements (for example CTD profiling of the water in line with ongoing environmental monitoring requirements) and continuous water quality monitoring through deployment of a suitable instrument, which measures specific parameters, at the edge of the RMZ to measure compliance with permitted discharge limits and parameters.

It also includes collecting sediment and biotic samples at the edge of the RMZ to assess sediment characteristics and benthic macrofaunal communities. Monitoring data will be compared to the baseline data collected as part of the Marine Specialist Assessment to determine impact over time. The results will provide an ongoing assessment of the influence of the outfall structure and brine discharge on biodiversity and ecosystem health.

The dispersion modelling confirmed that brine will dilute rapidly and meet water quality standards within the RMZ. During operation, ongoing monitoring must be conducted to ensure brine discharge complies with the CWDP, meets water quality guidelines, and that any impacts are promptly detected and managed for the life of the plant. The specialist recommended that the development be granted Environmental Authorisation and a CWDP, on the condition that all stipulated mitigation measures be implemented.

Socio-economic, Visual and Noise Receptors

East London serves as an administrative and economic hub for the region, with the city and its port playing a central role in governance and trade. With unemployment increasing, the trade sector, particularly the port, remains a key source of employment and economic support. The coastal and estuarine environment provides opportunities for recreational activities such as surfing, kayaking, SCUBA diving, sailing, and birdwatching, while commercial, traditional line fishing and small-scale or recreational fisheries also operate in the area. The proposed desalination plant is expected to support port operations, indirectly contributing to economic stability and trade-related employment across the Buffalo City Metropolitan Municipality (BCMM).

During construction, the proposed development may cause both negative, and positive, socio-economic impacts. Potential negative impacts include visual and noise disturbance, air pollution due to dust and emissions, and health and safety risks. Negative impacts range from "Medium" to "Insignificant" before mitigation and can all be reduced to a significance of "Very Low" to "Insignificant" after mitigation through measures such as dust suppression, stockpile management, careful handling of materials, noise control in line with relevant legislation (BCMM Noise By-Law (2010) and the Draft Noise Control By-Law (2024)), and robust health and safety protocols including worker training, inductions, use of personal protective equipment, and first aid provision. Construction activities may also have minor negative effects on fisheries, however, given the highly disturbed nature of the port environment and minimal overlap with recreational fishing, these are expected to be negligible. Potential positive impacts resulting from construction are economic in nature, and relating to the stimulation of East London's economy. This impact is assessed to of "Very Low" positive significance without optimisation, yet this can be increased to "Low" positive with the implementation of recommended optimisation measures, such as sourcing necessary construction materials, materials, goods, and services locally.

During operation, negative visual and noise impacts are expected to be minor, owing to the already noisy, visually altered, port/industrial-type setting; the use of low-noise equipment; and the plant not being located close to private properties. Fisheries and recreational fishing are unlikely to be affected by the brine discharge as rapid dispersion and dilution is expected. Negative operational impacts are all rated as either "Low" or "Insignificant" before mitigation, and can all be reduced to either "Very Low" or "Insignificant" after mitigation. Positive operational impacts stem from providing a reliable water supply for port operations, which should enhance port efficiency and capacity, and stimulate the East London's economy. These economic benefits are expected to largely be indirect (knock-on) in nature—stemming from provision of the new water supply to the Port of East London. While direct job creation relating to

the plant during operation will likely to be limited—due to the specialised nature of operational roles—indirect employment opportunities may arise, both within TNPA and more broadly within East London, through improved port performance and increased economic activity. This impact was assessed as "Low" positive without recommended/best practice optimisations measures, and "Medium" positive, with employment of these measures.

The negative socio-economic, visual, and noise impacts of the proposed development are expected to be minor with mitigation and are outweighed by the potential benefits. Developing within the already highly-disturbed port environment is preferable to less developed or sensitive areas. The development is therefore recommended for approval.

Terrestrial Biodiversity, Plants and Animals

According to the South African Vegetation Map (Mucina & Rutherford 2006, SANBI 2018, South African National Biodiversity Institute (SANBI) 2024), the project area includes portions of Umtiza Forest Thicket, classified as Critically Endangered by the South African National Biodiversity Institute (SANBI). However, the site has been historically transformed, isolated from natural areas, and affected by urban, residential, and industrial edge effects, with natural ecological processes largely absent, limiting its value for species movement or connectivity. Although it falls within a Terrestrial CBA1 in the Eastern Cape Biodiversity Conservation Plan (2019), historical land use indicates it does not meet CBA criteria, and associated guidelines are not applicable. Nearby protected areas, including Potters Pass Nature Reserve (1.3 km away) and a Protected Area Expansion Strategy site (2.6 km upstream), are unlikely to be affected. The Site Ecological Importance was assessed as "Very Low" for most of the area, with a small portion rated "Low" due to remaining natural vegetation that may support mobile threatened species such as birds. Only nine indigenous plant species were recorded, none of which are Species of Conservation Concern (SCC) or protected. The vegetation is dominated by alien and invasive plants (over 80% cover), which should be removed. No threatened or protected plant species are expected due to historical modification and degradation of the sites. Only bird species and SCC were observed during the site survey. No amphibian, reptile or mammal species or SCC were noted. While a number of invertebrates species were noted, there is no suitable habitat in the development sites for the threatened invertebrate SCC. Several threatened avifaunal species potentially occur within the project area and wider landscape. Of these, 11 species have a moderate likelihood and three a high likelihood of occurrence. Three of these were directly observed (Cape Cormorant *Phalacrocorax capensis* (Endangered), Caspian Tern *Hydroprogne caspia* (Vulnerable) and African Darter *Anhinga rufa* (Near threatened)). Most species are waterbirds associated with coastal, estuarine, or freshwater habitats and are unlikely to be affected by land-based development in the Port. Four terrestrial species may occur in the wider landscape (Crowned Eagle *Stephanoaetus coronatus*, Forest Buzzard *Buteo trizonatus*, Black-winged Kite *Elanus caeruleus*, and Knysna Warbler *Bradypterus sylvaticus*), but only Crowned Eagles have been recorded roosting near the port, and the remaining species are unlikely to use the site frequently, given its transformed nature and disturbance levels. The port environment is highly modified and subject to ongoing disturbance from industrial and shipping activities. Bird populations that do occur within the area are considered to have adapted to these conditions and to the urban settlement. Existing rooftop solar installations indicate that the proposed development does not introduce novel disturbance. Given the already highly modified nature of the Port, the proposed desalination plant is unlikely to result in significant impacts on bird populations. **The assessments indicated no significant ecological sensitivity within the area and the proposed development is not expected to result in significant impacts. It is the opinion of the specialists that the development may be authorised with the recommended mitigation measures incorporated into the EMPr.**

Archaeology, Cultural Heritage and Palaeontology

Palaeontology: The southern portion of the site lies on the Nanaga Formation, which is rated as very highly sensitive on SAHRA's palaeo-sensitivity map. However, the specialist assessment found fossil occurrences here to be rare and often highly weathered, recommending a "Low" palaeo-sensitivity rating and no mitigation unless significant fossils are uncovered during excavation. The northern portion is underlain by the Permian Middelton Formation, also mapped as highly sensitive, but this rating applies mainly to the central Karoo Basin. No records of Permian vertebrates or plants exist for the project area. The significance of impacts is expected to be "Very Low" and negative before mitigation. With the implementation of mitigation measures, the impact is anticipated to shift to a positive outcome, still rated as "Very Low" in significance. Mitigation measures include monitoring construction activities for heritage discoveries, immediate reporting to SAHRA, and engaging qualified specialists if resources are found.

Maritime Archaeology: Historical records indicate about 90 potential shipwrecks within 1 km of the proposed intake and outfall pipelines, but their exact locations are uncertain. The widened Buffalo River has a man-made riverbed, making wrecks near the intake unlikely. While several maritime casualties were reported near the former Castle Point at the river mouth, their positions are vague. Any wrecks near the marine outfall would likely be buried beneath the rocky beach and revetment or lie exposed on the rocky seabed, where impacts would only occur if the pipelines intersect their locations. Potential impacts on maritime archaeological resources are, therefore, expected to be localised and of low intensity, with any damage being permanent due to the non-renewable nature of these resources. However, because the locations of known wrecks are imprecise and the marine outfall infrastructure has a small footprint, impacts are considered unlikely. Overall, impacts significance is assessed as "Very Low" negative before mitigation, and and improves to "Very Low" positive with mitigation measures.

Terrestrial Archaeology: The East London area contains no Early Stone Age archaeological material, but has scattered Middle Stone Age artefacts, mostly in secondary contexts and of low archaeological significance and sensitivity. A notable Middle Stone Age find is the 124 000-year-old human, bird, and mammal footprints preserved in sandstone at Nahoon Point, north of the Buffalo River. Later Stone Age material is widely recorded in the area and mainly consists of coastal shell middens often with bone and other remains, occurs as more defined sites and is generally of moderate to high local significance. impacts on terrestrial and submerged prehistoric resources are not anticipated. Impacts on terrestrial archaeology is not anticipated.

The archaeological survey reported no pre-colonial archaeological sites or material within the Port of East London desalination project footprint, and aside from the foundations of the now demolished 20th century harbour houses, there is also no indication on the ground or on the historical mapping consulted, of historical archaeological remains in the project footprint. This, and the disturbed nature of the receiving environment for the project, suggests that the survival of significant in situ pre-colonial and historical archaeological sites and material, within the footprint of the proposed desalination project and it associated infrastructure, is unlikely and these receptors **were therefore scoped out of the specialist assessment**. However, if pre-colonial or historical archaeological material or human remains are discovered during construction, all work in the affected area must stop immediately. The site must be secured and the material left undisturbed, while a qualified archaeologist assesses the find and the relevant heritage authorities, including SAHRA and ECPHRA, are notified.

Submerged Prehistory: The nearshore seabed is mostly exposed rock with little sediment, making the survival of in situ submerged archaeological deposits highly unlikely. While isolated deposits

may exist in ancient incised valleys on the continental shelf, the surf zone where the marine outfall will be installed is heavily erosive and reinforced by a rock revetment and boulder beach, further reducing the likelihood of preserved material. The estuarine bed on which the intake pipeline will lie is also heavily altered by over a century of dredging, making submerged prehistoric remains improbable. Negative impacts on submerged prehistoric are not anticipated, and thus were **scoped out** of the specialist assessment.

In conclusion, there is some limited potential for palaeontological material such as fossils, and maritime archaeological sites such as shipwrecks. Terrestrial and submerged prehistoric archaeological sites and materials are not expected. As heritage resources are non-renewable, avoidance is the preferred form of mitigation. This is feasible for shipwrecks, but not for palaeontological material, as its presence and extent cannot be predicted. Mitigation measures have therefore been recommended for inclusion in the EMPr for implementation during the life of the project, but particularly during the construction phase as no impacts are expected during the operational phase.

The draft HIA has already been subject to review and comment by SAHRA and the ECPHRA, in September 2025, with the following comments being received:

- **ECPHRA:** In a final comment dated 22 October 2025, the ECPHRA indicated that "there are no objections to the proposed development. It may proceed as planned provided that the recommendations by specialists and ECPHRA, are adhered to". Included within their letter of comment were a suite of additional measures that have been included within both this document, and the EMPr.
- **SAHRA:** In its Final Comment issued on 28 November 2025, SAHRA stated that "The SAHRA Development Application Unit (DAU) has no objections to the proposed development"; and that "The recommendations provided by the heritage specialists are supported and must be adhered to". Included within their letter of comment were a suite of additional measures that have been included within both this document, and the EMPr.

Consequently, if heritage resources are discovered and properly managed in terms of the requirements of the specialists, ECPHRA, and SAHRA, the outcome is expected to be positive—since the preservation and documentation of these resources could provide valuable records for research, education, and heritage conservation. Provided the recommendations to mitigate and offset any potential impacts are implemented under the EMPr, the proposed development can be considered to be archaeologically and paleontologically acceptable and can be authorised.

Agriculture

Despite potentially suitable climate and terrain, the site is entirely surrounded by urban development, isolating it from other farmland and making any agricultural activity impractical. Consequently, the site has no realistic potential for agricultural production. Importantly, an agricultural impact is defined as a change to future agricultural production potential. Since the site has no agricultural production potential, development will not alter its agricultural value. Overall, the proposed development will result in zero loss of future agricultural production potential. **The agricultural assessment concludes that the development is acceptable and recommends approval, with no conditions required.**

Geotechnical Assessment

A Geotechnical Assessment confirmed that the proposed development is feasible and can proceed if engineering specifications are followed. Test pit analyses guided the placement of infrastructure to avoid unstable or sensitive areas, ensuring suitable foundations and minimising environmental disturbance. No additional management or mitigation measures specific to environmental impacts were identified, other than that the recommendations of the geotechnical report should be implemented in full to ensure that construction is aligned with the identified feasibility constraints. **The proposed development is feasible and can proceed, subject to adherence to the engineering specifications.**

Hydrology Assessment

A Hydrology Assessment tested beachwell and borehole intake options but found them unviable due to low yield and poor water quality. The intake method was therefore revised to a direct intake, which does not require further hydrological assessment.

Summary of Impact Assessment

The potential impacts of the proposed development on various environmental, heritage and socio-economic receptors have been outlined in the specialist study findings above. This section summarises all identified positive and negative impacts associated with the construction and operation of the project on these receptors, consequences of the No-Go alternative (not proceeding with the development) and cumulative impacts. Cumulative impacts arise when individual activities interact over time and space, producing combined effects that may not be evident when assessed separately. Decommissioning impacts are not assessed as they are not anticipated in the foreseeable future. Potential impacts arising from the triggering of Listed Activities have been addressed through the EIA process and the supporting specialist studies. All impacts were evaluated for their significance both before and after the implementation of mitigation (for negative impacts) or recommended/best practice optimisation measures (for positive impacts). The tables below further present each impact, before and after mitigation/optimisation, for the Construction Phase (Table 2), Operational Phase (Table 3) and Cumulative Impacts (Table 4). Overall, the assessment found that, before mitigation/optimisation, construction of the development could result in 12 negative impacts, and one positive impact—which shifts to 10 negative, 3 positive, with mitigation/optimisation. In addition, during operation, the development could lead to eight potential negative impacts and one positive impact (both pre-and-post mitigation/optimisation). As the development will only have a slight overlap with other disturbances, and will impact already transformed land/habitats, it is therefore not expected to generate significant negative cumulative effects—with the nature and significance of negative cumulative impacts being similar to those identified for individual activities. Furthermore, the spatially appropriate nature of the development, coupled with the existing (and anticipated) economic contributions of surrounding developments, is anticipated to result in positive cumulative socio-economic impacts that greatly outweigh the negatives.

Negative Impacts

Negative impacts relate primarily to disturbance, habitat alteration, the release of pollutants or other substances into the surrounding marine and estuarine environment, changes to water quality, as well as disturbance to people from noise, visual changes, destruction to heritage resources and worker-related risks. No significant terrestrial impacts are anticipated, as the development footprint is located within a highly modified port environment with limited natural habitat. The most significant potential impacts are the spillage of hazardous substances affecting marine biota as well as health and safety risks to workers. These were both rated as

"Medium" before mitigation. With the recommended mitigation measures, these and all other impacts can be reduced to "Low", "Very Low", or "Insignificant" levels. None of the identified impacts are considered a fatal flaw to the development or a constraint to authorisation.

Positive Impacts/Benefits

The plant will provide a reliable freshwater supply, enhancing port efficiency and resilience while supporting regional economic activity.

Potential positive impacts resulting from construction are economic in nature, and relating to the stimulation of East London's economy. This impact is assessed to of "Very Low" positive significance without optimisation, yet this can be increased to "Low" positive with the implementation of recommended optimisation measures, such as sourcing necessary construction materials, materials, goods, and services locally.

Positive operational impacts stem from providing a reliable water supply for port operations, which should enhance port efficiency and capacity, and stimulate the East London's economy. These economic benefits are expected to largely be indirect (knock-on) in nature—stemming from provision of the new water supply to the Port of East London. While direct job creation relating to the plant during operation will likely to be limited—due to the specialised nature of operational roles—indirect employment opportunities may arise, both within TNPA and more broadly within East London, through improved port performance and increased economic activity. This impact was assessed as "Low" positive without recommended/best practice optimisations measures, and "Medium" positive, with employment of these measures.

Summary of Construction Phase Impacts

Table 2. Summary of potential impacts of the proposed development on various receptors/ resources during the construction phase, along with their impact ratings before and after mitigation/recommended optimisation measures have been implemented.

CONSTRUCTION PHASE					
Impact identified	**Consequence**	**Probability**	**Significance**	**Status**	**Confidence**
Potential Impacts on the Marine and Estuarine Environment					
Impact 1: Disturbance of intertidal and subtidal marine habitat					
Without mitigation	Very Low	Probable	**VERY LOW**	-ve	High
With mitigation	Very Low	Possible	**INSIGNIFICANT**	-ve	High
Impact 2: Disturbance of pelagic open water habitat					
Without mitigation	Very Low	Possible	**INSIGNIFICANT**	-ve	High
Impact 3: Disturbance and loss of estuarine habitat					
Without mitigation	Very Low	Probable	**VERY LOW**	-ve	High
With mitigation	Very Low	Possible	**INSIGNIFICANT**	-ve	High
Impact 4: Pollution due to waste generation and incorrect disposal and littering					
Without mitigation	Low	Probable	**LOW**	-ve	High
With mitigation	Low	Possible	**VERY LOW**	-ve	High
Impact 5: The effect of spillage of hazardous substances on marine biota					
Without mitigation	Medium	Probable	**MEDIUM**	-ve	Medium
With mitigation	Medium	Improbable	**LOW**	-ve	Medium
Potential Impacts on Terrestrial Biodiversity, Plants and Animals: (Scoped Out)					
Potential Impacts on Agricultural Resources (Scoped Out)					
Potential Impacts on the Heritage Resources					
Impact 6: Direct impact (disturbance and/ or destruction) of palaeontological resources (fossils)					
Without mitigation	Low	Improbable	**VERY LOW**	-ve	Medium
With mitigation	Low	Improbable	**VERY LOW**	**+ve**	Medium
Disturbance and / or destruction of terrestrial pre-colonial & historical archaeology (Scoped Out)					
Disturbance and / or destruction of submerged prehistory (Scoped Out)					
Impact 7: Disturbance and / or destruction of maritime archaeology					
Without mitigation	Low	Improbable	**VERY LOW**	-ve	Medium
With mitigation	Low	Improbable	**VERY LOW**	**+ve**	Medium
Potential Impacts on Social, Visual, Noise and Economic Receptors/ Resources					
Impact 8: Generation of noise and potential impacts on people					
Without mitigation	Low	Probable	**LOW**	-ve	High
With mitigation	Very Low	Probable	**VERY LOW**	-ve	High
Impact 9: Potential impacts on the visual character of the area					
Without mitigation	Very Low	Probable	**VERY LOW**	-ve	High
Impact 10: Impact of reduced air quality due to release of dust and suspension of dust on people					
Without mitigation	Low	Probable	**LOW**	-ve	High
With mitigation	Very Low	Possible	**INSIGNIFICANT**	-ve	High
Impact 11: Potential health and safety concerns of workers					
Without mitigation	High	Possible	**MEDIUM**	-ve	High
With mitigation	Low	Possible	**VERY LOW**	-ve	High
Impact 12: Potential impacts on fisheries					
Without mitigation	Very Low	Improbable	**INSIGNIFICANT**	-ve	High
Impact 13: Potential economic benefits					
Without optimisation	Very Low	Probable	**VERY LOW**	**+ve**	Medium
With optimisation	Low	Probable	**LOW**	**+ve**	Medium

Summary of Operational Phase Impacts

Table 3. Summary of potential impacts, of the proposed development on various receptors/ resources during the operational phase, along with their impact ratings before and after mitigation/recommended optimisation measures have been implemented.

OPERATIONAL PHASE					
Impact identified	**Consequence**	**Probability**	**Significance**	**Status**	**Confidence**
Potential Impacts on the Marine and Estuarine Environment					
Impact 1: Disturbance and/or mortality of marine life due to the intake of seawater					
Without mitigation	Low	Probable	**LOW**	-ve	High
With mitigation	Very Low	Probable	**VERY LOW**	-ve	High
Impact 2: Effects of increased salinity on system function and biota					
Without mitigation	Low	Possible	**VERY LOW**	-ve	High
With mitigation	Low	Possible	**VERY LOW**	-ve	High
Impact 3: Reduced physiological functioning of system and biota due to decreased dissolved oxygen					
Without mitigation	Low	Probable	**LOW**	-ve	High
With mitigation	Low	Possible	**VERY LOW**	-ve	High
Impact 4: Reduced physiological functioning of system and biota due changes in water pH					
Without mitigation	Low	Possible	**LOW**	-ve	High
With mitigation	Low	Possible	**VERY LOW**	-ve	High
Impact 5: The effect of discharged co-pollutants on marine biota					
Without mitigation	Medium	Possible	**LOW**	-ve	Medium
With mitigation	Low	Possible	**VERY LOW**	-ve	High
Potential Impacts on Terrestrial Biodiversity, Plants and Animals (Scoped Out)					
Potential Impacts on Agricultural Resources (Scoped Out)					
Potential Impacts on the Heritage Resources (Scoped Out)					
Potential Impacts on Social, Visual, Noise and Economic Receptors/ Resources					
Impact 6: Generation of noise and potential impacts on people					
Without mitigation	Very Low	Improbable	**INSIGNIFICANT**	-ve	High
Impact 7: Potential impacts on the visual character of the area					
Without mitigation	Low	Probable	**LOW**	-ve	High
With mitigation	Low	Possible	**VERY LOW**	-ve	High
Impact 8: Potential impacts on fisheries					
Without mitigation	Very Low	Improbable	**INSIGNIFICANT**	-ve	High
Impact 9: Potential economic benefits due to increased and reliable water supply in port					
Without optimisation	Medium	Possible	**LOW**	+ve	Medium
With optimisation	Medium	Probable	**MEDIUM**	+ve	Medium

Decommissioning Phase Impacts

Decommissioning is not anticipated in the near future. If it occurs, impacts are expected to be minor, confined to already disturbed areas, and similar to construction activities. Construction-phase mitigation measures would apply as needed.

No-Go Alternative

The No-Go Alternative would avoid minor negative impacts but would also prevent the creation of jobs, local economic opportunities, and improved port efficiency, resulting in the loss of significant socio-economic benefits and making it the less favourable option.

Summary of Cumulative impacts

Table 4. Summary of potential cumulative impacts of the proposed development on various receptors/ resources.

CUMULATIVE IMPACTS					
Impact identified	**Consequence**	**Probability**	**Significance**	**Status**	**Confidence**
Potential Impacts on the Marine and Estuarine Environment					
Without mitigation	Very Low	Probable	**VERY LOW**	-ve	High
Potential Impacts on Terrestrial Biodiversity, Plants and Animals					
Without mitigation	Very Low	Probable	**VERY LOW**	-ve	High
Potential Impacts on Heritage Resources					
Palaeontological resources					
Without mitigation	**LOW NEGATIVE**				
Terrestrial archaeology					
Without mitigation	**LOW NEGATIVE**				
Submerged prehistory					
Without mitigation	**LOW NEGATIVE**				
Maritime Archaeology					
Without mitigation	**VERY LOW NEGATIVE**				
Potential Socio-Economic Benefits					
Without mitigation or enhancement	High	Possible	**MEDIUM**	+ve	Low

Summary of Mitigation/ Enhancement Measures

Mitigation / impact management measures to reduce negative impacts were classified as either:

- **Essential: Mandatory:** Measures that must be implemented and are non-negotiable. These measures are assumed to be implemented in the "with mitigation" impact scenario and are therefore incorporated into the post mitigation impact assessment significance rating; or
- **Best Practice / Recommended:** Non-mandatory measures that should be implemented where feasible and appropriate. Alternative measures or approaches may be adopted, provided that the required environmental outcome is still achieved and a clear and defensible motivation is provided for not implementing the recommended measure. These do not affect the overall impact rating if not implemented.

Optimisation measures aimed at enhancing potential benefits are generally considered Best Practice / Recommended and are non-mandatory.

Mitigation and optimisation measures prescribed to reduce the negative impacts and enhance positive outcomes of the development, are listed below:

Construction Phase

<u>Marine and Estuarine Environment</u>

Essential Mitigation Measures:

- Rehabilitate the disturbed area in the intertidal area immediately following construction by removing all artificial materials not related to the permanent fixture of the pipeline
- Construction activities within the coastal zone should be planned and undertaken as efficiently as practicable to avoid unnecessary delays and prolonged disturbance

- Constrain spatial extent of impacts to the minimum required.
- Rehabilitate the disturbed area in the estuarine area immediately following construction by removing all artificial materials not related to the permanent fixture of the pipeline
- Ensure suitable stormwater management is in place to minimize run-off to the estuarine system.
- Suitable handling and disposal protocols must be clearly explained, and sign boarded.
- A "reduce, reuse, recycle" approach must be followed.
- Provide suitable containers for the disposal of all waste, including recycling.
- Regular litter sweeps should be carried out around the construction site.
- Intentional disposal of any litter into the environment is strictly prohibited, while accidental spillage must be prevented, contained and reported to the responsible Environmental Officer, Environmental Control Officer or other relevant party immediately.
- Inform and train all staff about sensitive estuarine species and the responsible disposal of construction waste. This training must be integrated into toolbox talks or onsite awareness sessions to ensure that waste management practices are understood and followed diligently. Additionally, contractors must prepare a method statement outlining specific waste management procedures, which must be approved by the resident engineer before construction activities commence.
- Waste disposal at licensed landfill sites by qualified contractors is mandatory, with proof of disposal submitted to the appointed Environmental Officer. Waste management certification must be obtained, and detailed records of all stored and disposed waste, including quantity, nature, and fate, must be maintained for auditing purposes.
- Adequate sanitary facilities and ablutions must be provided for all personnel throughout the project area. Enforcement of facility usage and cleanliness is crucial.
- Implementation of a rigorous environmental management and control plan (including procedures for remediation).
- All fuel and oil is to be stored with adequate spill protection.
- No leaking vehicles are permitted on site.
- All hazardous substances must be accompanied by a permit, a hazard report sheet, and may only be handled by suitably trained operators.
- Implement leak detection and maintenance programmes for valves, flanges, fittings, seals, hydraulic systems, hoses, etc. All hydraulic systems should be adequately maintained, and hydraulic hoses should be frequently inspected. All process areas should be bunded to ensure drainage water flows into the closed drainage system. Drip trays should be used to collect run-off from equipment that is not contained within bunded areas and the contents routed to the closed drainage system.
- Low-toxicity biodegradable detergents should be used in the cleaning of all spillages.
- Intentional disposal of any substance into the environment is strictly prohibited, while accidental spillage must be prevented, contained and reported to the responsible Environmental Officer, Environmental Control Officer or other relevant party immediately.

<u>Terrestrial biodiversity, Plants and Animals</u>

Essential Mitigation Measures:

- Conduct a search and rescue prior to clearing to ensure that nests, small reptiles and mammals are moved out of the area.
- Rehabilitate/revegetate construction areas with indigenous plant species.
- During construction and for 6 months post-construction, monitor and eradicate AIPs from the construction site.

Heritage, Archaeological, and Palaeontological Resources

Essential Mitigation Measures:

Palaeontological Resources

- Monitoring of earthworks by the Environmental Compliance Officer (ECO), Environmental Officer (EO) or another designated responsible person.
- Implementation of a Palaeontological Fossil Chance Find Protocol by the ECO/ EO to ensure the identification, recovery, curation and reporting to SAHRA/ECPHRA of any fossil finds. If fossils are found by the EO/ ECO, or other responsible person once excavations for foundations have commenced, these should be rescued and SAHRA and ECPHRA notified to determine whether a palaeontologist should be called to assess and collect a representative sample. Any recovered fossils or artefacts are the property of the State will need to be deposited in a suitable curatorial institution. Information on the sources or contexts of the collected items must accompany them, as far as can be determined.

Maritime Archaeological Resources

- Shipwrecks/ shipwreck remains are generally large and visible on the seabed and therefore measures can be taken in advance of installation activities to avoid the site or material
- Any wreck or related artefacts identified during any pre-construction ground-truthing of the marine outfall site must be flagged and the information shared with a suitably qualified maritime archaeologist and SAHRA.
- A suitably defined construction exclusion zone may be required around any such site or material to ensure that it is not impacted by the installation of the marine outfall. The project maritime archaeologist's advice must be sought on the appropriate size and extent of any such exclusion zone. Any such exclusion zones must be marked on all project mapping as No-Go areas for construction contractors.
- If seabed debris or a previously unknown wreck are encountered during the installation of the marine outfall, the project maritime archaeologist and SAHRA must be notified immediately and work must cease in the immediate vicinity until the maritime archaeologist and SAHRA have assessed the significance of the site and a decision has been taken as to how to deal with it.

Terrestrial Pre-Colonial & Historical Archaeological Resources

- Should pre-colonial or historical archaeological material, or human remains be encountered during the construction of project, work must immediately cease in that area. The area must be cordoned off and the material made safe but left in situ. A suitably qualified archaeologist must be called to site to assess the significance of the find and SAHRA and the ECPHRA must be notified of the find.

Additional Essential Measures Prescribed by ECPHRA (Essential Mitigation)

Pre-Construction

- The project proponent/representative must notify ECPHRA of the date of commencement of the project or share the project schedule and (EA).
- The project proponent/representative must submit a detailed heritage chance finds procedure for ECPHRA to approve before development starts.
- Heritage induction and training for ground crew (including the ECO) must be conducted, in identifying heritage resources.
- SAHRA and ECPHRA must be notified of any shipwreck finds.
- A palaeontologist must be on site, to monitor, during excavations
- Heritage monitoring and reports to be shared with ECPHRA.

Post-Construction

- Upon completion of the project, a final heritage compliance report must be submitted to ECPHRA.

Additional Measures Prescribed by SAHRA (Essential Mitigation)

- If any shipwrecks and/or artefacts related to shipwrecks in the region are uncovered, the findings must be reported to a maritime archaeologist appointed to inspect potential finds. A report on this inspection must be submitted to SAHRA for further recommendations.
- The Fossil Chance Finds Procedure must be included in the EMPr;
- 38(4)c(i) – If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA DAU (Nokukhanya Khumalo/Natasha Higgitt 021 202 8660) must be alerted as per section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offence in terms of section 51(1)e of the NHRA and item 5 of the Schedule;
- 38(4)c(ii) – If unmarked human burials are uncovered, the SAHRA DAU (Nokukhanya Khumalo/Natasha Higgitt 021 202 8660), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offence in terms of section 51(1)e of the NHRA and item 5 of the Schedule;
- 38(4)d – See section 51(1) of the NHRA;
- 38(4)e – The following conditions apply with regards to the appointment of specialists:
- If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA;
- The Final BAR and EMPr must be submitted to SAHRA for record purposes;
- The decision regarding the EA Application must be communicated to SAHRA and uploaded to the SAHRIS Case application".
- In addition to any other identified Interested and Affected Parties (I&APs), this final HIA must be submitted to SAHRA, the ECPHRA and the Buffalo City Metropolitan Municipality for comment as part of this public participation process for the Final BAR.

<u>Socio-Economic</u>

Essential Mitigation Measures:

- Efforts must be made to limit noise during the construction phase (including all unnecessary noise production).
- Construction phase noise must comply with any relevant noise legislation, including the BCMM Noise By-Law and Draft BCMM Noise By-Law.
- Implement dust suppression techniques such as covering stockpiles with shade netting/ geotextile, should they be left exposed for prolonged periods of time.
- Where possible, construction using large volumes of sand should occur during clear weather, and loose sand should be cleared or covered during breaks in construction.
- If dispersal of dust/ soil during vehicle transit is unavoidable, then water spraying trucks must be deployed in tandem, in order to keep this dust out of the atmosphere.
- Erosion control measures, such as silt fences, should be employed in areas at risk of erosion/runoff.
- Monitor air quality and implementing measures to minimize soil disturbance.

- Workers must be provided with all appropriate Personal Protective Equipment (PPE), such as correctly rated masks, when working in/ around areas where dust pollution/ emissions are unavoidable
- Implementation of a rigorous environmental management and control plan (including procedures for remediation).
- Only vehicles and equipment that are suitably maintained and compliant with emission regulations may be allowed on site.
- Vehicles must be subject to a daily Environmental Health and Safety checklist.
- An ECO must monitor the site for vehicle fumes and dust suspension. Additionally, the ECO must monitor all vehicles and equipment transiting the site, in order to identify obviously non-compliant vehicles.
- Monitor construction areas post rainfall events and repair any erosion damage that may have occurred.
- Construction activities must be conducted in accordance with the Occupational Health and Safety Act, and TNPA's own health and safety protocols.

Recommended/Best Practice Optimisation Measures

- While the construction phase is not expected to result in many new job opportunities (as workforce requirements are small, and much of the specialised work will be undertaken by existing contractors and personnel—some potentially from outside East London), should new job opportunities arise, then a local labour procurement policy should be employed (where feasible). This can be demonstrated through employment, payroll, procurement, and supplier records.
- Source construction materials, goods and services from local suppliers wherever practical, as demonstrated through procurement documentation and supplier databases. Engage with local authorities and business associations to source construction materials, goods, and services from local suppliers wherever practical.

Operational Phase

Marine and Estuarine Environment

Essential Mitigation Measures:

- Intake velocities should be kept below 0.15 m/s to ensure that fish and other mobile organisms can escape the intake current.
- Intake structures should ensure the horizontal intake of water. This can be achieved through use of footer valves.
- Intake structures should be positioned away from sensitive environments or areas with high species diversity or abundance, like rocky reefs, and should not draw in water from the upper meter of the water column.
- Effluent discharged must meet modelled end of pipe concentrations.
- Monitoring of end of pipe concentrations must be conducted and dosing levels should be adjusted should adverse effects be detected by the monitoring program.
- Effluent discharged must meet end of pipe concentrations modelled here (Section 5.3.2).
- Aeration of the effluent prior to discharge must be undertaken if oxygen scavengers (such as sodium metabisulphite) are utilised.
- Aeration of the effluent prior to discharge must be undertaken if oxygen scavengers (such as sodium metabisulphite) are utilised.
- Neutralization of extremely alkaline or acidic solutions and treatment of additional cleaning agents is required prior to discharge.
- Corrosion resistant materials should be used.

- Strong acidic and alkaline solutions must be neutralised prior to discharge.
- There must be continual release of small volumes of chemicals used during the Clean-in-Place (CIP) process with the brine discharge to allow for maximum dilution before release into the environment.

Terrestrial biodiversity, Plants and Animals

Essential Mitigation Measures:

- During construction and for 6 months post-construction, monitor and eradicate AIPs from the construction site.

Socio-Economic

Essential Mitigation Measures:

- Non-reflecting (matt)/ scattering solar panels must be used, in order to reduce the potential harm or disturbance associated with sunlight reflecting off the panels.
- Buildings must be painted a neutral colour (dark green/ grey), so as not to overly reflect sunlight and cause disturbance/ harm to observers. This will also help to preserve the overall character and sense of place of the area.

Recommended/Best Practice Optimisation Measures

- While plant operation will not result in the direct creation of any new job opportunities (all plant operations will be conducted by the existing appointed specialists), it is possible that indirect employment opportunities may be created within the port, due to improved port functioning/capacity. Should TNPA utilise a "Local-First" employment policy (if and where possible) for general port hiring processes, then the potential local socio-economic benefits realised through the creation of these indirect employment opportunities would increase.
- Water Resource Management: TNPA to utilise the new water supply provided by the desalination plant strategically, to strengthen the port's resilience against fluctuations or interruptions in municipal water and electricity services. This includes optimising storage, scheduling use during peak demand or supply constraints, and ensuring efficient distribution to reduce reliance on external utilities.

Conclusion and Environmental Impact Statement

The proposed solar-powered RO desalination plant by TNPA within the Port of East London, Buffalo City Metropolitan Municipality, has been assessed through a S&EIA process. Several specialist studies informed the assessment of potential impacts and benefits on the environment, surrounding community, port operations, heritage and palaeontological resources, and the broader economic context. Various alternative layouts were considered and assessed during the Scoping Phase while the final development layout was assessed as part of the EIA phase. The final development layout, to which the recommended impact management, avoidance, and mitigation measures as identified during the EIA is applicable, is shown in Figure 2 above. Overall, the project may cause several negative impacts during construction and operation, mainly related to disturbance, habitat alteration, the release of pollutants or other substances into the surrounding environment, changes to water quality, destruction to heritage resources, as well as disturbance to people from noise, visual changes, and worker-related risks. However, all impacts are manageable, and none pose a fatal flaw. With mitigation, the significance of impacts will be reduced to "Low", "Very Low" and "Insignificant". Key benefits include a reliable freshwater supply for the port, stimulation of the local economy, and potential

heritage discoveries of scientific value. Mitigation will focus on limiting construction disturbance, preventing pollution, protecting marine life and heritage resources, and ensuring worker safety. Mitigation measures for negative impacts include careful site management, rehabilitation of disturbed areas, strict control of emissions and waste, and ongoing monitoring of water quality and ecological conditions—while operational safeguards will ensure the desalination plant functions efficiently with minimal environmental impact. Recommended/best practice optimisation measures applicable to positive impacts include sourcing goods, services, and construction materials locally during construction, and ensuring that the available water resource will be utilised optimally to enhance economic benefits. The No-Go Alternative (not proceeding with the development) would avoid minor negative impacts but would also prevent job creation, local economic opportunities, and improved port efficiency, making it the less favourable option. Decommissioning impacts were not assessed as they are not anticipated in the foreseeable future.

In summary, the proposed development is expected to provide significant water security and operational resilience (and thus economic) benefits for the Port of East London, which outweigh the potential negative impacts, all of which can be effectively managed through appropriate mitigation.

Based on the findings of the specialist studies and the EIA process, it is the EAP's reasoned opinion that the proposed development is acceptable from an environmental, social, economic, and heritage perspective. No significant adverse impacts are anticipated, while meaningful positive benefits are expected to be realised. It is therefore recommended that Environmental Authorisation and the CWDP be granted. This recommendation is subject to the condition that all mitigation, monitoring, and management measures outlined in the EMPr, as well as any additional conditions imposed by the competent authority, are fully implemented to ensure that potential impacts are avoided, minimised, or managed to acceptable levels. Furthermore, the plant may not operate without a valid CWDP, and all conditions of the CWDP must be adhered to.

GLOSSARY

Aeolianites: A calcareous dune sand or rock that has been formed by sediment deposited by wind. Also known as dune limestone.

Alga: Seaweeds.

Alien species: Species that occur outside their natural range and dispersal potential. Alien species are spread by human activity, intended or unintended, to new areas. May or may not become an invasive species.

Ambient temperature: The average temperature of an environment

Anthropogenic: Relating to or resulting from the influence of human beings on nature.

Anti-scalant: A pre-treatment injected into the feedwater that flows through the Reverse Osmosis membrane, preventing it from scaling. Scaling occurs when particles accumulate on a membrane, causing the membrane's pores to plug.

Aquifer: Underground layer of water-bearing permeable rock, rock fractures or unconsolidated materials (gravel, sand, or silt) from which groundwater can be extracted using a water well.

Baseline: Information gathered at the beginning of a study which describes the environment prior to development of a project, and against which predicted changes (impacts) are measured.

Beach Wells: A small seawater intake facility usually located on the seashore. The seawater they draw up is slowly filtered as it passes through the subsurface sand.

Benthic: The benthic zone is the ecological region at the lowest level of a body of water such as an ocean or a lake, including the sediment surface and some sub-surface layers. Organisms living in this zone are collectively referred to as the "benthos", e.g. the benthic invertebrate community, including crustaceans and polychaetes.

Biodiversity: The variability among living organisms from all terrestrial, marine, and other aquatic ecosystems, and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems.

Biogeography: The study of the distribution of species and ecosystems in geographic space and through geological time. Organisms and biological communities often vary in a regular fashion along geographic gradients of latitude, elevation, isolation and habitat area. Also see Ecoregion and Ecozone.

Biomass: The mass of living biological organisms in a given area or ecosystem.

Bioregion: A region defined by characteristics of the natural environment rather than by man-made divisions.

Biota: The animal and plant life of a particular region, habitat, or geological period.

Brine: The highly saline water which is "left behind" after desalination.

Community structure: Taxonomic and quantitative attributes of a community of plants and animals inhabiting a particular habitat, including species richness and relative abundance structurally and functionally.

Community: In ecology, a community is a group or association of populations of two or more different species occupying the same geographical area and in a particular time.

Competent Authority: Any person or organisation that has the legally delegated or invested authority, capacity, or power to perform a designated function.

Construction phase: The stage of project development comprising site preparation as well as all construction activities associated with the development.

Coquinite: A sedimentary rock composed of the transported, abraded, and mechanically sorted fragments of mollusks, trilobites, brachiopods, or other invertebrates.

Coralline algae: This is an encrusting red alga in the order Corallinales. They are characterised by a thallus that is hard because of calcareous deposits contained within the cell walls. This alga is typically pink, or reddish. Some species can be purple, yellow, blue, white, or grey-green.

Corticated (foliose) seaweeds: An alga consisting of multiple cell layers, most regularly an outer pigmented layer and an inner unpigmented layer.

Coulomb: The Standard International unit of electric charge, equal to the quantity of electricity conveyed in one second by a current of one ampere (10−6 coulombs).

Critical Biodiversity Area (CBA): An area in a natural condition that is required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure. The management objectives for these areas require that they are to remain in a natural or near-natural state, with no further loss of natural habitat.

Crustacean: A large diverse group of largely aquatic invertebrate animals within the arthropod group.

Cumulative impacts: Direct and indirect impacts that act together with current or future potential impacts of other activities or proposed activities in the area/region that affect the same resources and/or receptors.

Cyanobacteria: Also known as blue-green algae, are a group of photosynthetic bacteria that obtain their energy through photosynthesis.

Densities of species: The abundance or number of individuals of a particular species within a given area or habitat.

Desalination: The process of removing salts or other minerals and contaminants from seawater, brackish water, and wastewater effluent and it is an increasingly common solution to obtain fresh water for human consumption and for domestic/industrial utilization.

Diversity: the number of different species present in an ecosystem and relative abundance of each of those species." Diversity is greatest when all the species present are equally abundant in the area.

Ecological function: The potential of an ecosystem to deliver a service that is itself dependent on ecological processes and structures.

Ecological Support Area (ESA): An area that is not essential for meeting biodiversity targets but does play an important role in supporting the functioning of Protected Areas or CBAs and are often vital for delivering ecosystem services.

Ecologically or Biologically Significant Marine Areas (EBSAs): Defined by the Convention on Biological Diversity (CBD) as "geographically or oceanographically discrete areas that provide important services to one or more species/populations of an ecosystem or to the ecosystem as a whole, compared to other surrounding areas or areas of similar ecological characteristics, or otherwise meet the [EBSA] criteria".

Ecology: The relations of organisms to one another and to their physical surroundings.

Ecoregion: A geographically distinct area characterised by its unique assemblage of ecosystems, species, and environmental conditions. It is defined based on ecological similarities, including factors such as climate, geology, topography, and species composition. Also see Biogeography and Ecozone.

Ecosystem engineers: Species that play a crucial role in structuring the community and influencing the abundance, diversity and distribution of other organisms through their role as dominant grazers, prey items, predators or competitors.

Ecosystem Threat Status: Developed by SANBI (2018) is an indicator of how threatened ecosystems are, specifically the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function, or composition (SANBI 2019). See National Biodiversity Assessment.

Ecosystem: A biological community of interacting organisms and their physical environment – a complex network or interconnected system.

Ecozone: The 2011 National Biodiversity Assessment used the terms 'ecoregions' and 'ecozones' to replace the similar, but revised 'bioregions' and 'biozones' used previously and to avoid confusion between the different map layers from previous assessments. Also see Biogeography and Ecoregion.

Effluent: Wastewater from sewers or industrial outfalls that flows directly into surface waters either untreated or after being treated at a facility.

End of pipe effluent limits: The specific regulatory or permitted limits set for the quality of wastewater or pollutants that are discharged from a facility or process at the final stage of treatment, typically at the point where it is released into the environment, such as a water body or a sewer system. These limits ensure that the discharged effluent meets certain environmental and health standards to minimise its impact on the receiving environment.

Environment: The external circumstances, conditions and objects that affect the existence of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.

Environmental Authorisation (EA): Permission granted by the competent authority for the applicant to undertake listed activities in terms of the NEMA EIA Regulations, 2014.

Environmental Impact Assessment (EIA): A process of evaluating the environmental and socio-economic consequences of a proposed course of action or project.

Estuarine Functional Zone (EFZ): Delineated by a 5 m above mean sea level (MSL) contour as proxy indicator, the area in and around an estuary which includes the open water area, estuarine habitat (such as sand and mudflats, rock and plant communities) and the surrounding floodplain area.

Euphotic depth: Euphotic zone depth, z1%, reflects the depth where photosynthetic available radiation (PAR) is 1% of its surface value. The value of z1% is a measure of water clarity, which is an important parameter regarding ecosystems.

Family: A taxonomic rank that groups together related organisms. It is a higher rank than genus and species but lower than order. Members of the same family share certain common characteristics and are more closely related to each other than to organisms in different families.

Fauna: General term for all the animals found in a particular location.

Flora: General term for all the plant life found in a particular location.

Genus (plural – genera): A taxonomic rank that is higher than species but lower than family. It refers to a group of closely related species that share common ancestry and exhibit similar characteristics. Organisms within the same genus have more similarities than those in different genera but are still distinct species.

Global carbon budget: The amount of carbon dioxide (CO2) emissions that can be released into the atmosphere by anthropogenic activities, balanced by storage in carbon reservoirs on land or in the ocean, without exceeding a set threshold of global warming.

Government Gazette (GG): An official Government publication used to publish acts and bills, regulations and notices in terms of acts, changes of names, company registrations and deregistrations, financial statements, land restitution notices, liquor licence applications and transport permits.

Government Notice (GN): A Notice published in a Government Gazette.

Government Notice Regulation (GNR): Regulations published as a Government Notice in a Government Gazette.

Impact: A change to the existing environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.

Indigenous: Species within the limits of their native range (Synonyms: native).

Invasive species: Alien species that have self-replacing populations over several generations and that have spread from their point of introduction.

Invertebrate: An animal without a backbone (e.g. a starfish, crab, or worm).

Macrobenthos/macrofauna: Those animals retained by a 1.0-mm-mesh sieve. Macrobenthic invertebrates are defined as organisms that live on or inside the deposit at the bottom of a water body.

Macrophyte: A macroscopic alga (seaweed).

Megalitre: One million litres or 1000 cubic meters m^3

Meiobenthos: Small benthic invertebrates that live in marine or freshwater environments and can pass through a 500-µm sieve, but are retained on a 40-µm sieve.

Microalgae: Microalgae, also known as microscopic algae or phytoplankton, are a diverse group of photosynthetic microorganisms that are primarily aquatic. It includes diatoms and spores.

Midden: An ancient landfill containing various remnants from past human habitation, including animal bones, human waste, plant matter, mollusc shells, pottery fragments, stone tools, and other archaeological artifacts and organic remains.

Mitigation measures: Design or management measures that are intended to minimise or enhance an impact, depending on the desired effect. These measures are ideally incorporated into a design at an early stage.

National Biodiversity Assessment (NBA): The threat status and sensitivity of different habitat types based on biodiversity (richness, uniqueness, spatial extent of the habitat type) and exposure levels to natural disturbance or environmental perturbations. Ecosystem types are categorised as “Critically Endangered”, “Endangered”, “Vulnerable”, “Near Threatened” or “Least Concern”, based on the proportion of the original extent of each ecosystem type that remains in good ecological condition relative to a series of biodiversity thresholds. See Ecosystem Threat Status.

Nearshore: The area encompassing the transition from subtidal marine habitats to associated terrestrial systems.

Operational phase: The stage of the works following the Construction Phase, during which the development will function or be used as anticipated in the Environmental Authorisation.

Outfall: The point where effluent is discharged from a facility into a water body, typically an endpoint of a pipeline.

Pelagic: The water column of the open ocean and can be further divided into regions by depth.

Percentile (e.g. 20th, 90th, 95th percentile etc): The position of a measurement/ count within a dataset, in relation to other measurements, and expressed as a percentage. If the data was arranged from high to low, where in this distribution does the measurement in question lie. If it is in the 20th percentile, this measurement is the same as or greater than 20% of the other measurements in the dataset.

pH: Potential hydrogen. A measure of the acidity or alkalinity of a solution equal to the common logarithm of the reciprocal of the concentration of hydrogen ions in moles per cubic decimetre of solution. Pure water has a pH of 7, acid solutions have a pH less than 7, and alkaline solutions a pH greater than 7.

RAMSAR site: A wetland site designated to be of international importance under the Ramsar Convention, also known as "The Convention on Wetlands of International Importance ". This is an international environmental treaty signed on 2 February 1971 in Ramsar, Iran, under the auspices of UNESCO (See abbreviations). South Africa is a signatory to the Ramsar Convention.

Reverse Osmosis (RO): A method of desalination and involves forcing water through a semi-permeable membrane under high pressure, leaving the dissolved salts and other solutes behind on the surface of the membrane.

Spawning: The process by which organisms release their eggs and sperm (gametes) into the environment for reproduction.

Specialist study: A study into a particular aspect of the environment, undertaken by an expert in that discipline.

Species diversity: The number of different species and relative abundance of each of those species present in an ecosystem.

Species richness: The number of different species represented in an ecological community. It is simply a count of species and does not take into account the abundance of species.

Species: A category of biological classification ranking immediately below the genus, grouping related organisms. A species is identified by a two-part name; the name of the genus followed by a Latin or Latinised un-capitalised noun.

Swell: A series of mechanical waves that propagate along the interface between water and air under the predominating influence of gravity

Taxon (plural – taxa): Refers to any unit used in the science of biological classification, or taxonomy.

Tides: The rise and fall of sea level, usually twice a day, due to gravitational forces by the moon. Spring tides have higher high tides and lower low tides, whereas neap tides have lower high tides and higher low tides. Spring and neap tides each occur twice a month, the former occurring just after every full and new moon, when the sun, moon and earth are in line. During a spring low tide, the water level drops lower than during an average low tide.

Turbidity: The measure of relative clarity of a liquid.

UNESCO: The United Nations Educational, Scientific and Cultural Organization is a specialized agency of the United Nations aimed at promoting world peace and security through international cooperation in education, arts, sciences and culture.

Upwelling: The wind-driven motion of dense, cooler, and usually nutrient-rich water from deep water towards the ocean surface. It replaces the warmer and usually nutrient-depleted surface water.

ABBREVIATIONS AND ACRONYMS

ADCP	Acoustic Doppler Current Profiler
AIA	Archaeological and Cultural Heritage Impact Assessment
Anchor	Anchor Environmental Consultants (Pty) Ltd.
APM	Archaeology, Palaeontology and Meteorites Committee
BA	Basic Assessment
BCMM	Buffalo City Metropolitan Municipality
BSP	Biodiversity Spatial Plan
C&R	Comments and Responses
CA	Competent Authority
CBA	Critical Biodiversity Area
CBD	Convention on Biological Diversity
GHG	Greenhouse Gases
CIP	Clean-in-place
CML	Coastal Management Line
CMP	Coastal Management Programme
CO_2	Carbon Dioxide
CORMIX	Cornell Mixing Zone Expert System
CPP	Coastal Public Property
CSIR	Council for Scientific and Industrial Research
CSL	Coastal Setback Line
CSP	Concentrated Solar Power
CWDP	Coastal Waters Discharge Permit
DC	Direct Current
DEA	Department of Environmental Affairs (former name)
DEA: O&C	Department of Environmental Affairs: Oceans and Coasts (former name)
DFFE	Department of Forestry, Fisheries and the Environment (formerly DEFF, DAFF and DEA)
DFFE:O&C	Department of Forestry, Fisheries and the Environment: Oceans and Coasts (new name)
DO	Dissolved Oxygen
DWAF	Department of Water Affairs and Forestry (former name, now DWS)
DWS	Department of Water and Sanitation (formerly DWAF)
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EBSA	Ecologically or Biologically Significant Marine Area
EC:EMA	Draft Eastern Cape Environmental Management Act (2024)
ECBSP	Eastern Cape Biodiversity Spatial Plan
ECCMP	Eastern Cape Coastal Management Plan
ECPHRA	Eastern Cape Provincial Heritage Resources Agency
ECO	Environmental Control Officer
EEZ	Exclusive Economic Zone
EFZ	Estuarine Functional Zone
EIA	Environmental Impact Assessment
EIAr	Environmental Impact Assessment Report
EHI	Estuarine Health Index
EHS	Environmental Health and Safety
EL	East London
EMF	Environmental Management Framework

EMP	Estuarine Management Plan
EMPr	Environmental Management Programme Report
EN	Endangered
ERF	Erven
ESA	Early Stone Age
ESA	Ecological Support Area
GA	General Authorisation
GDA	General Discharge Authorisation
GDP	Gross Domestic Product
GG	Government Gazette
GIS	Geographic Information System
GN	Government Notice
GNR	Government Notice Regulation
GVA	Gross Value Added
H&S	Health and Safety
HA	Hectare
HIA	Heritage Impact Assessment
HWM	High Water Mark
I&APs	Interested and Affected Parties
ICMA	National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008)
IDP	Integrated Development Plan
IUCN	International Union for the Conservation of Nature
KBA	Key Biodiversity Area
KMZ	Keyhole Markup Language Zipped
KV	Kilovolt
KWP	Kilowatt Peak
LAT	Lowest Astronomical Tide
LN	Listing Notice
LSA	Later Stone Age
MARISMA	Marine Spatial Management and Governance Programme
MHWM	Mean High Water Mark
MIS	Marine Isotope Stage
ML	Megalitre
MLD	Megalitres per day
MLRA	Marine Living Resources Act 18 of 1998
MPA	Marine Protected Area
MSA	Middle Stone Age
MSA	Municipal Systems Act (Act 32 of 2000)
MSDF	Metropolitan Spatial Development Framework
MSL	Mean Sea Level
MSP	Marine Sector Plan
MSPA	Marine Spatial Planning Act
MUCH	Maritime and Underwater Cultural Heritage
NaOCl	Sodium Hypochlorite
NBA	National Biodiversity Assessment
NBMM	Nelson Mandela Bay Metropolitan Municipality
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NEMPAA	National Environmental Management: Protected Areas Act (Act No. 57 of 2003)

NEMWA	National Environmental Management: Waste Act (Act 59 of 2008)
NHRA	National Heritage Resources Act (Act 25 of 1999)
NID	Notice of Intent to Develop
NT	Near Threatened
NTCSA	National Transmission Company South Africa SOC Ltd.
NWA	National Water Act (Act 36 of 1998)
OHSA	Occupational Health and Safety Act (Act 85 of 1993)
ONA	Other Natural Area
ORV	Offroad Vehicle
PA	Protected Area
PAH	Polycyclic Aromatic Hydrocarbons
PAN	Protected Area Network
PES	Present Ecological State
PIA	Palaeontological Impact Assessment
PPE	Personal Protective Equipment (PPE)
PPP	Public Participation Process
PSU	Practical Salinity Units
PTY LTD.	Proprietary Limited
PV	Photovoltaic
REC	Recommended Ecological Category
RMZ	Recommended Mixing Zone
RO	Reverse Osmosis
S&EIA	Scoping and Environmental Impact Assessment
SA	South African
SAHRA	South African Heritage Resource Agency
SAHRIS	South African Heritage Resources Information Systems
SANBI	South African National Biodiversity Institute
SANPARKS	South African National Parks
SANS	South African National Standards
SCC	Species of Conservation Concern
SCUBA	Self-Contained Underwater Breathing Apparatus
SDF	Spatial Development Framework
SDG	Sustainable Development Goal
SEI	Site Ecological Importance
SG21	Surveyor General 21
SPLUMA	Spatial Planning and Land Use Management Act (Act No. 16 of 2013)
SSV	Site Sensitivity Verification
Sunwater	Sunwater East London Joint Venture (Pty) Ltd
TNPA	Transnet National Ports Authority
TOPS	Threatened or Protected Species
TSS	Total Suspended Solids
UNESCO	The United Nations Educational, Scientific and Cultural Organization
VIP	Ventilated Improved Pit Latrines
VU	Vulnerable
WHCA	World Heritage Convention Act (Act 49 of 1999)
WQG	Water Quality Guidelines
WUL	Water Use Licence
ZID	Zone of Initial Dilution

1 PROJECT BACKGROUND, LOCATION AND DESCRIPTION

1.1 PROJECT BACKGROUND AND LOCATION

Transnet National Ports Authority (TNPA) is applying for Environmental Authorisation (EA) for the construction and operation of a reverse osmosis (RO) desalination plant with the purpose of producing fresh potable water from saltwater, which has been abstracted from the estuarine/ marine environment. The proposed development will be situated within the Port of East London, in the Buffalo City Metropolitan Municipality, Eastern Cape Province (Figure 1.1).

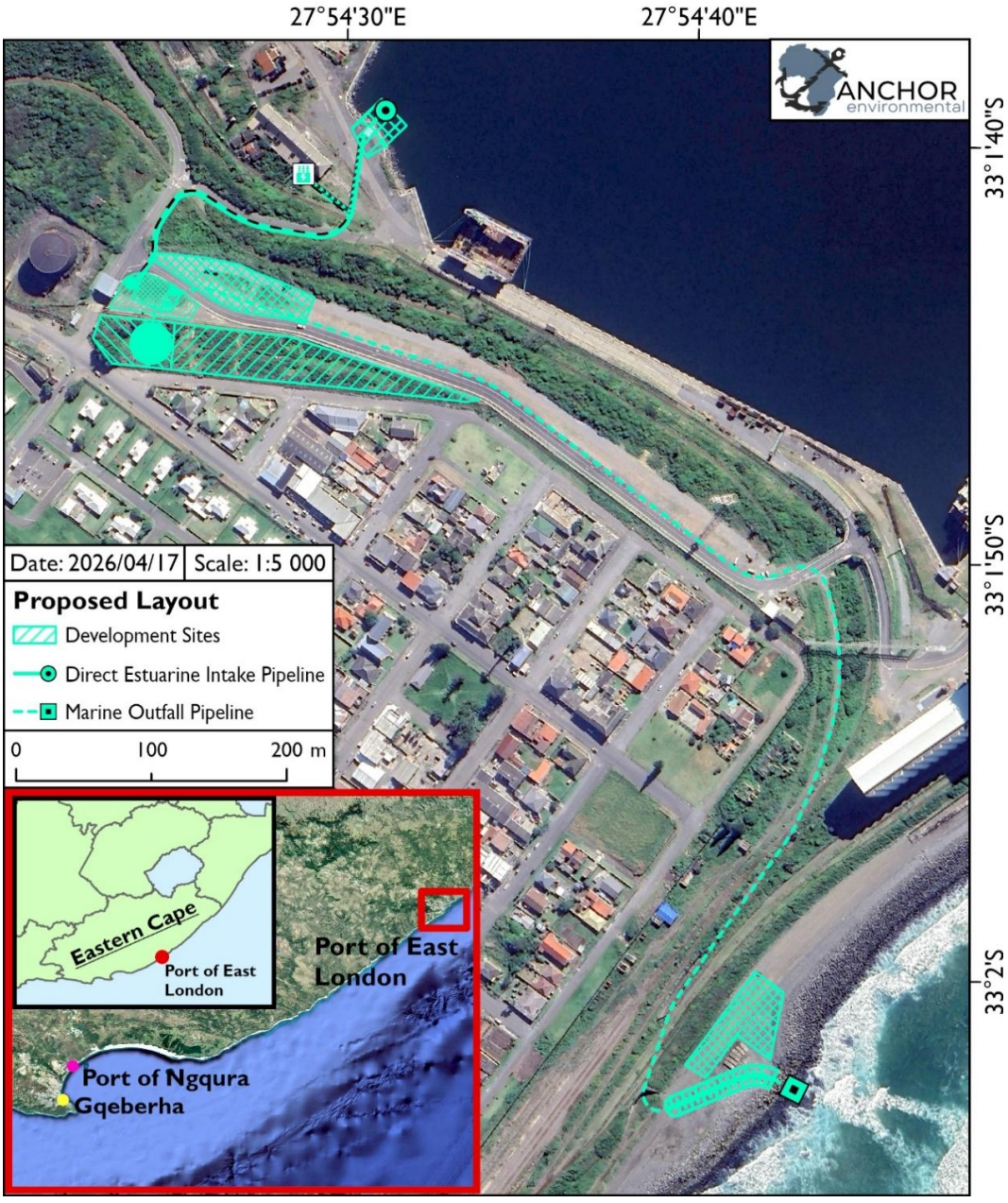

Figure 1.1. Location of the proposed development within the Port of East London, Eastern Cape Coastline, South Africa.

Since the facility will discharge brine into the marine environment, a Coastal Waters Discharge Permit (CWDP) is also required. The proposed development will span multiple erven, all owned by the applicant (Table 1.1 and Figure 1.2). See Appendix 3 for coordinates of each component of the proposed development.

The entire development is located within the urban edge, except for the section of the outfall pipeline that extends beyond the high-water mark into the marine environment (Figure 1.2). Note that the area is not situated within a delineated Coastal Public Property (CPP) as no CPP boundary exists within ports as confirmed by the Department of Forestry, Fisheries and the Environment (DFFE): Oceans and Coasts.

TNPA appointed Sunwater East London Joint Venture (Pty) Ltd (Sunwater) to lead the engineering feasibility, implementation and operation of the project. Anchor Environmental Consultants (Pty) Ltd (Anchor) was appointed to provide independent Environmental Assessment Practitioner (EAP) services to undertake the Scoping and Environmental Impact Assessment (S&EIA) process required prior to construction and commissioning of this development and the application of the CWDP.

The preferred and final development layout was determined primarily through detailed engineering feasibility studies, supported by specialist investigations and input from the EAP. A wide range of factors were considered, including the suitability of seawater intake and brine discharge sites, landform and geotechnical conditions, water quality and yield, site elevation, topography, safety, and the availability of space for both the solar and process plant. These technical considerations were supplemented by environmental inputs to ensure that the layout is both feasible and responsible. Several potential sites and configurations within the Port of East London were assessed during this process, with some being screened out due to unfavourable engineering results or environmental sensitivities. The final preferred layout, presented below, represents the most viable option, forms the basis of this EIA and responds to the impact management measures, avoidance, and mitigation measures identified through the assessment. A summary of the alternatives considered is provided in Section 5.

Table 1.1 General site information: Erven (Erf) numbers, Surveyor General 21 (SG21) codes and physical location of the proposed development.

PHYSICAL LOCATION	
Province	Eastern Cape Province
Municipality	Buffalo City Metropolitan Municipality
City/ Town	East London
Area/ suburb	Harbour, Port of East London
Postal Code	5201
Ward Number:	Ward 19
Zoning	**Transport Zone 1**
ERVEN	**SG21 ID**
63584	C02300040006358400000
38530	C02300040003853000000
63586	C02300040006358600000

Figure 1.2. The development falls within Erven 63584, 38530 and 63586 on the South Bank of the Port of East London. Also shown is the Buffalo City Urban Development Edge.

1.2 Brief project Overview and Layout

Saline water will be abstracted daily from the Buffalo River Estuary and treated at a reverse osmosis (RO) desalination plant to produce potable water (freshwater), that complies with the requirements of SANS 241.

During the initial phase of the project, approximately 1 375 m^3 of saline water will be abstracted per day. As the project expands, abstraction volumes will increase to approximately 5 500 m^3/day when the plant reaches its full design capacity.

Freshwater production will initially be approximately 500 m^3/day (0.5 Megalitres/ day (MLD)) and will increase progressively as the project advances. At full capacity, the plant will produce approximately 2 000 m^3/day (2 MLD or two million litres per day). The treated water will be stored in a 1 000 m^3 (1 ML) freshwater reservoir before being used to support port operations and reduce reliance on municipal water supplies.

The desalination plant will be powered by a hybrid system that uses both solar energy and municipal grid electricity with the former being primary. If more electricity is generated than needed, batteries might be used in the future to store excess electricity in containers housed at the RO plant site. Brine, a by-product of desalination with elevated salt concentrations, will be discharged via a pipeline to a marine outfall where rapid dilution with ocean water is expected. It should be noted that brine is classified as effluent and may contain traces of chemicals used during the desalination process (such as cleaning agents and anti-scalants), but at highly periodic and very dilute concentrations.

The total development disturbance footprint is estimated at approximately 25 162 m^2 and includes buffer corridors for linear infrastructure. For the purposes of this estimate, the footprint of the intake pipeline and electrical cables assumes a corridor width of 4 m to accommodate trenching and associated disturbance, while the outfall pipeline assumes a corridor width of 8 m. However, the permanent operational footprint following construction will be smaller.

The main project components are outlined below, with their locations depicted in Figure 1.3 and Figure 1.4. The spatial extent of each component, or lengths in the case of linear infrastructure such as pipelines and electrical cable lines, is provided in Table 1.2.

The main project components are as follows:

- **<u>Water Intake Site/ associated structures and buildings:</u>**
  - Direct intake and pipeline:
    - For water abstraction from the Buffalo River Estuary: Stretches from intake point in estuary to raw water holding tank at the RO plant site.
    - Intake point in the estuary: Approximately ~13–18 m from the edge of existing wall and 1 m below surface
    - Pipe made from High-Density Polyethylene (HDPE); Diameter: 315 mm.
    - Intake head will include a strainer barrier to prevent fish and other organisms from being drawn into the pipe.
  - Pontoon system linked to the pump house and extends to the estuary intake: A floating platform that supports the pipeline and accommodates the intake structure within the estuary (refer to the design in Section 1.3).
  - Parking area.
  - Pump house building and foundation.
- **<u>Desalination Plant Site:</u>**
  - RO Desalination plant building which includes (list not extensive):
    - General storage room;
    - Restrooms;
    - Control/operations room with switchboard and computers;
    - Feed pumps and pre-treatment filters;
    - A chemical storage room/container for Clean-in-place (CIP) and pre-treatment chemicals;
    - Battery storage container (batteries only potentially required to store excess electricity, if generated by the solar plant).
    - Reverse osmosis pumps and energy recovery devices; and
    - Two trains of RO membranes.
  - A 60 m^3 brine holding/storage tank (brine “treatment” tank).
  - A 80 m^3 ultrafiltration tank.
  - A 200 m^3 raw water holding tank.
  - Permeate pipeline: Pipeline that transports desalinated freshwater from the RO plant to reservoir.
  - Vehicle Access and Parking area
  - Mini substation/ Transformer: Situated next to RO plant building close to Motor Control Centre housed inside. Connected to proposed 11kV cable line, which connects to the existing substation near the intake.
  - Freshwater production will gradually be scaled up as project progresses:
    - Initial phase: The plant will produce 500 m^3 (0.5MLD) of freshwater per day.
    - Full Capacity: The plant will produce 2 000 m^3 of freshwater per day (2MLD).
- **<u>Solar Plant Site:</u>**
  - 1000 m^3 (1 ML) freshwater reservoir and booster pumps.

- Solar panels and foundations. Estimated output of 525 kWp (kilowatt peak), generating direct current (DC) at up to 1 kV supplied directly to RO plant.

- **Marine Outfall Site/ Infrastructure:**
  - Brine discharge pipeline passing over breakwater
  - Internal Diameter: 200 mm; Outlet diameter: 150 mm
- **Municipal Grid Connection:**
  - New low-voltage cable line from existing substation to intake pump house. Will power the pumphouse with electricity from the grid (will distribute 230-400V)
  - New 11 kV underground cable line line: Will run from existing substation to RO plant to supply power for specific low-voltage components and to supply backup electricity when needed (will distribute 11kV). Connects to newly installed mini substation/ transformer next to RO plant building. Will be installed instead of the previously proposed overhead electrical transmission line.
- **Site Camps:**
  - Across the road from the desalination plant on a disturbed parking/ gravel area.
  - Close to the marine outfall next to the port breakwater.

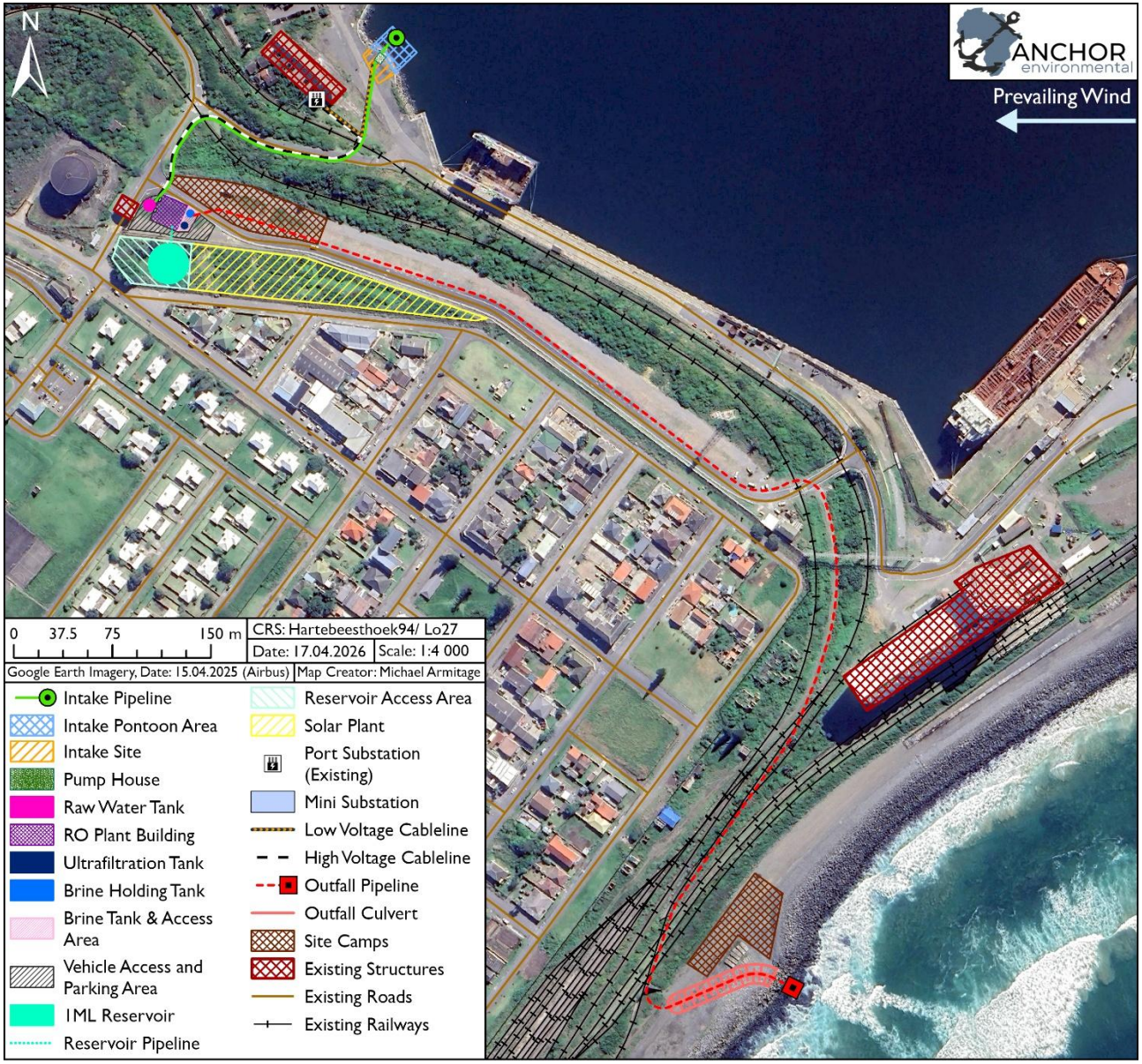

Figure 1.3. Preferred development layout for the Solar & RO Desalination Plant and Intake and Outfall Pipelines and associated Infrastructure/ Structures.

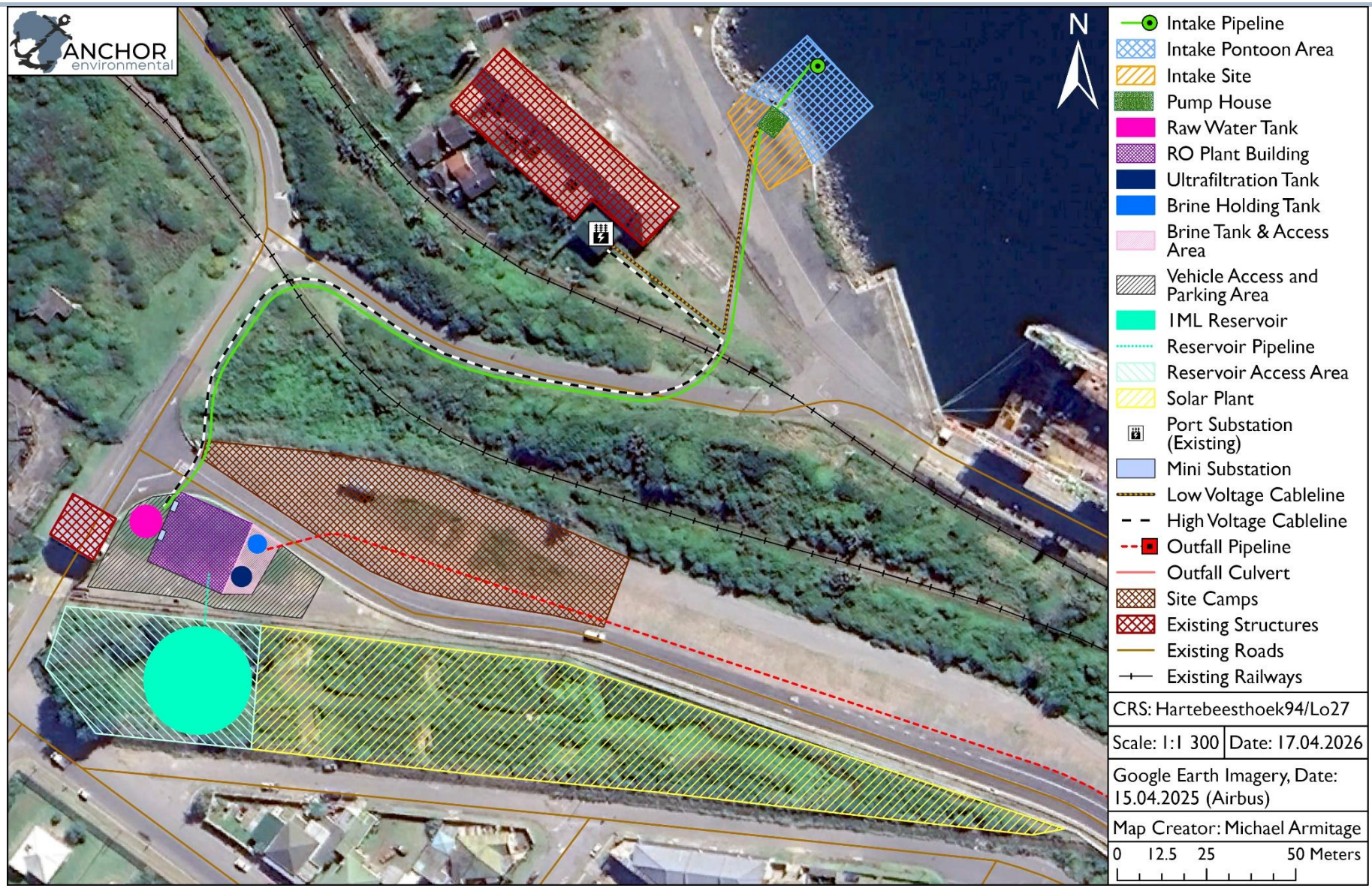

Figure 1.4. The proposed intake, RO Plant, Solar Plant, and all supporting infrastructure.

Table 1.2. Technical details and dimensions of the main project components for the proposed development. For linear infrastructure, the footprint of the intake pipeline and electrical cables assumes a corridor width of 4 m to accommodate trenching and associated disturbance, while the outfall pipeline footprint assumes a corridor width of 8 m.

Component	Description/ Dimensions
Location of the site	See Table 1.1 above. Ward 19 Buffalo City Metropolitan Municipality East London Harbour Port of East London
Urban Edge	Entire development in the urban edge, except for section of outfall pipeline extending beyond high-water mark into marine environment (Figure 1.2).
Coastal Public Property	Not situated in delineated CPP
Total disturbance footprint	**Footprint: ~**25 162 m^2
Water abstraction	**Maximum abstraction:** 5 500 cubic metres
Water Discharge (via marine outfall)	**Maximum discharge:** 3300 cubic metres a day (at full capacity of 2 000 m^3/day freshwater production) **Initial Discharge:** 815 cubic metres per day (at initial phase of ±500 m^3/day freshwater production)
Freshwater Production	**Maximum Production: 2000 cubic meters**
Type of renewable energy	Solar PV
Maximum generation capacity for solar plant	Estimated output of 525 kWp (kilowatt peak), generating direct current (DC) at up to 1 kV supplied directly to RO plant.
Water Intake Site/ associated structures/ buildings and intake pipeline	**Total Footprint: 1 391m^2 (land-based section only)**
Intake Site (on land)	• **Footprint:** ~340 m^2
• Intake site minus pumphouse	• **Footprint:** ~298 m^2
• Pumphouse building (including surrounding concrete foundation)	• **Footprint:** 42 m^2 • **Dimensions**: 6 x 7 m
Pipeline from estuary intake point to RO Plant (land portion only)	• **Pipe material:** HDPE • **Water:** Transports saline water from estuary • **Footprint (m^2—minus intake site portions): ~**1 051 m^2 • **Footprint from RO plant to Pumphouse Building (m^2):** 1111 m^2 • **Lenth (m):** ~290m total (of which ~13–18 m will be between the intake and existing wall) • **Diameter:** 315 mm • **Peak Throughput:** Approximately. 63 l/s • **Intake velocity:** Will not exceed 0.15 m/s along the entire intake strainer area (to comply with best practice).

Component	Description/ Dimensions

Estuary Intake Area and pontoon system (not included in total footprint calculation)	• **Estuary Intake area in which pontoon will float:**
	  ○ **Footprint (m²):** ~576 m²
	• **Pontoon System:**
	  ○ **Footprint (m²):** ~91 m² (note this is not a solid structure and floats on water)
	  ○ **Dimensions (m):** 4.9m x 18.5m

Desalinisation plant site	**Total Footprint: ~1 442 m²**
RO Desalination Plant Building Dimensions (including foundation and stone walkway surrounding building)	• **Footprint:** 528 m² • **Dimensions:** 24 x 22m
• Chemical storage room: CIP and pre-treatment chemicals	• **Capacity:** 85 m³
• Battery storage container (future consideration)	• **Capacity:** 32.6 m³
• Mini substation/ Transformer:	• **Footprint:** 4.5 m² • **Dimensions**: 1.5 x 3 m
Vehicle Access and Parking Area	• **Footprint:** 756 m²
• Raw Water Holding Tank	• **Footprint:** ~63.6 m² • **Diameter:** 9 m • **Capacity:** 200 m³
Brine and UF Tank and Access Area	• **Footprint:** 159 m²
• Brine storage/ treatment Tank	• **Footprint:** ~19.6 m² • **Diameter:** 5 m • **Capacity:** 60 m³
• Ultrafiltration (UF) Tank	• **Footprint:** ~28.3 m² • **Diameter:** 6 m • **Capacity:** 80 m³
Solar Plant Site	**Site Footprint: ~5 505 m²**
Reservoir Site	**Site Footprint: ~1 883 m²**
Freshwater Reservoir	• **Footprint:** ~707 m² • **Diameter:** 30 m • **Capacity:** 1 ML (1 million litres)
Reservoir Access Area	• **Footprint:** ~1176 m²
Permeate Pipeline: transports desalinated freshwater from the RO plant to reservoir	• **Pipe material:** HDPE • **Water:** Desalinated potable water • **Footprint (m²):** ~61.6 m² (of which 8.3 m² falls within Reservoir Site) • **Lenth (m):** ~15.4 m (of which 2.1 m falls within Reservoir Site).
Marine Outfall Pipeline and associated structures	**Total Footprint: ~10 240 m²** **Total Pipeline Length: ~1 093 m**
Pipeline from brine storage tank to outfall culvert	• **Pipe material:** HDPE material • **Footprint (m²):** ~7 881 m² • **Lenth (m):** ~995 m • **Internal Diameter:** 200 mm • **Outlet diameter:** 150 mm

Component	Description/ Dimensions
	• **Peak Throughput:** Maximum approximately 38 l/s
Culvert + Outfall Revetment Section	• **Culvert Material:** Predominantly Concrete • **Footprint (m²):** ~2 359 m² • **Length:** ~98.5 m
Municipal Grid Connection:	**Total footprint: 1 251 m²**
New low-voltage cable line: from existing substation to intake pump house.	**Length:** 102 m **Footprint (m²): ~**408 m² (**note**: there is considerable overlap between this footprint and that of the Medium Voltage Cable Line, as well as the intake pipeline) **Volts to be distributed:** 230-400 V
New medium-voltage underground cable line: From existing substation to newly installed mini substation next to RO plant building.	**Length:** 253 m **Footprint (m²):** 1011m² (**note**: there is considerable overlap between this footprint and that of the low-voltage underground cable line, as well as the intake pipeline). **Kilovolts to be distributed:** 11 kV **For supplying grid electricity to the RO plant:** Certain low-voltage components at the RO plant, such as lights, will rely exclusively on grid electricity. In addition, if solar power is not enough, electricity will be drawn from the municipal grid at up to 400 V.
Site Camps	**Total Footprint: 5 265 m²**
Site Camp A: RO and Desal plant	**Site Footprint:** 2 859m ²
Site Camp B: Marine outfall	**Site Footprint:** 2 406 m²

1.3 Detailed Project Description

WATER INTAKE: SITE AND STRUCTURES

Approximately 5 500 cubic meters (5.5 ML) of saline water will be abstracted daily from the Buffalo River Estuary via an intake pipe (Figure 1.3).

Intake Pipeline Specifications

- The intake pipeline from the estuary to the RO Plant will be approximately 290 m in length (of which ~13–18 m will be between the intake and existing wall), with an estimated land-based construction footprint of ~1111 m² from the RO plant to the pumphouse building. While the trench will be fairly narrow (~0.6 m), a pipeline corridor of 4m has been considered to account for vegetation clearing and vehicle access.
- Peak throughput be approximately. 63 l/s.
- The pipeline will be manufactured from High-Density Polyethylene (HDPE), not from steel or corrosive materials. HDPE is a high-strength, durable, chemical-resistant thermoplastic with low moisture absorption.
- The pipe diameter will be 315 mm.
- The pipeline will be buried wherever feasible. A few short sections may remain exposed where burial is impractical, such as at certain servitude crossings. Final details will be confirmed during detailed design.

- The intake point will be located approximately 13–18 m from the edge of the existing wharf.
    - This distance is based on the requirement that the intake be positioned 0.5 m below the lowest water level (LAT), approximately roughly –2 m MSL, allowing for some tolerances. Survey data indicate that the –2 m MSL contour lies 13–18 m from the wharf edge at this site.
    - The intake will be installed to avoid drawing water from the upper or lower one metre of the water column.
    - The intake will draw water horizontally.
    - Intake velocities will be kept below 0.15 m/s to minimise debris entrainment and marine life impingement (to ensure that fish and other mobile organisms can escape the intake current), in line with international best practice and the marine specialist study recommendations (Fedorenko 1991).
    - A strainer barrier will be fitted onto the intake head to prevent fish and other organisms from being drawn into the pipe.

Current preferred intake design: floating pipeline/pontoon system

- The pontoon will be attached to the pump house and extend approximately 19 m into the estuary from the existing concrete wharf (Figure 1.3, Figure 1.5, Figure 1.6).
- Pontoon footprint: ~91 m^2 (floating, not a solid structure). The area in which the pontoon will be located will be ~576 m^2.
- In this design, the pipeline will run from the RO plant to the pump house and then onto the pontoon, passing through an opening before extending into the estuary.
- A key advantage of this floating design is the ease of access for maintenance. Strainers require frequent cleaning, which is significantly easier on a pontoon-based system.

Intake Site Footprint

Adjacent land will be converted to accommodate the intake infrastructure. The total site footprint is approximately 340 m^2. The site will support the pump house building, which will include a concrete foundation and have a total footprint of approximately 42 m^2 (Figure 1.5). The remaining area will be landscaped for ease of access and used primarily for parking.

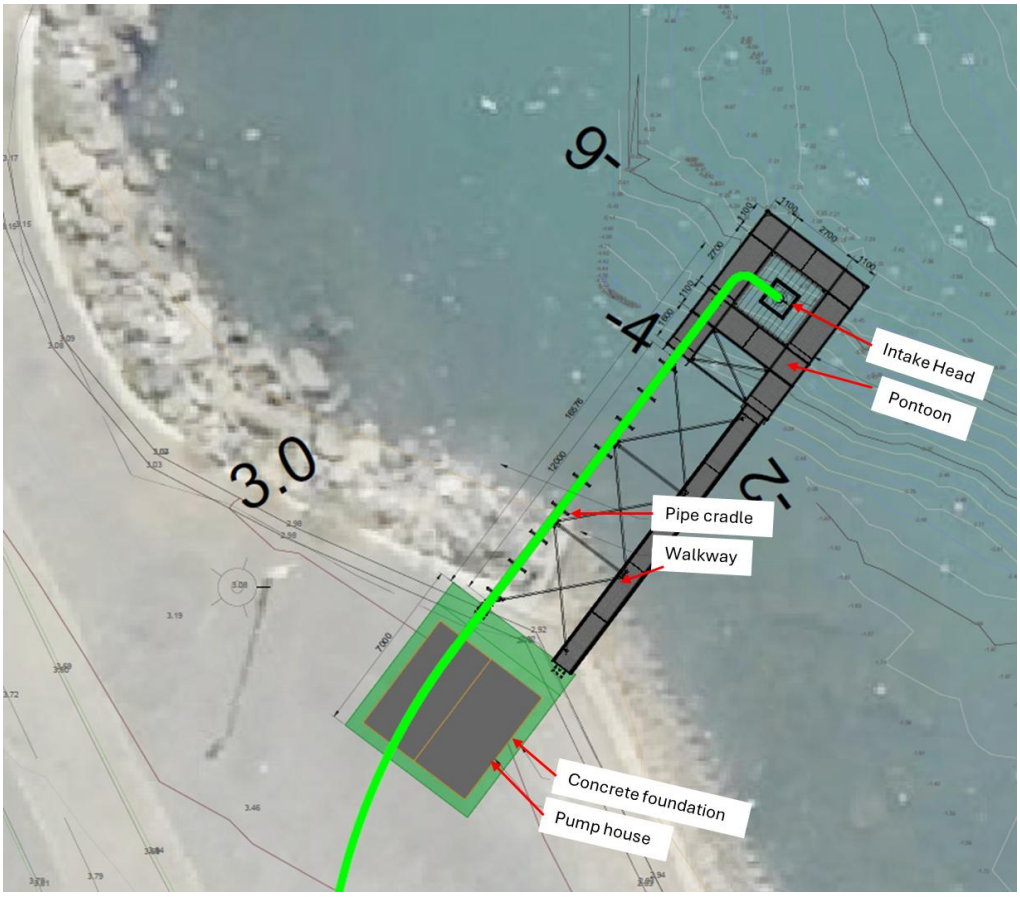

Figure 1.5 Draft pontoon system, pump house on concrete foundation and intake pipeline (bright green).

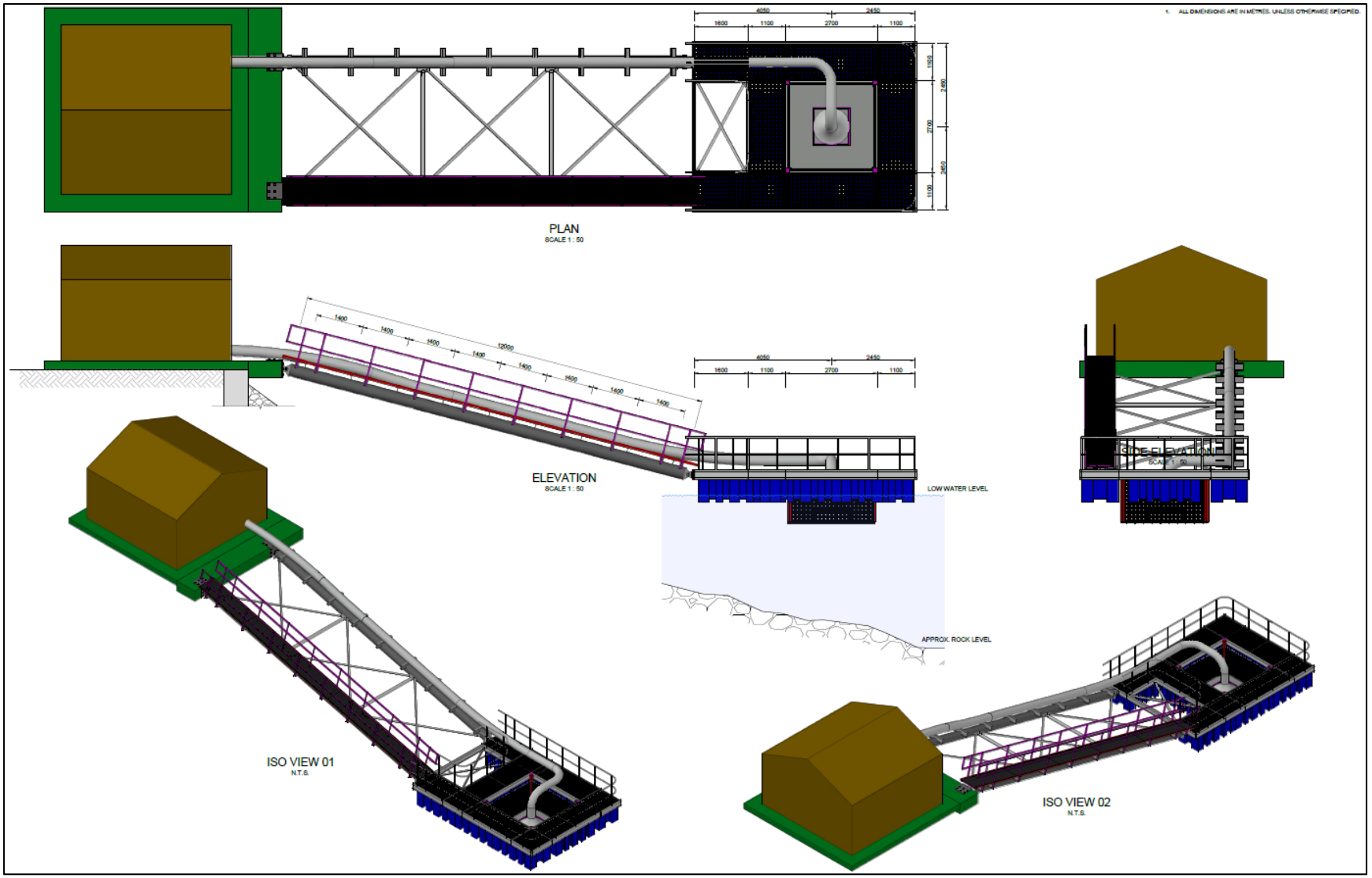

Figure 1.6 Draft pontoon system design.

Water Quality of Intake Water

The current water quality of the estuary, which includes sewage contamination (elevated *E. coli* and coliform levels) as well as organic matter and suspended solids, has been fully considered in the process design. The intake system will include a large intake strainer as the first barrier, followed by a three-stage pre-filtration process consisting of:

- a 300-400 micron screen filter
- a 80-120 micron self-cleaning pre-filter
- an Ultrafiltration step

Chlorine will be dosed at the appropriate filtration stage for disinfection, along with the addition of a coagulant. Prior to entering the reverse osmosis system, the chlorine will be neutralised using sodium metabisulphite to protect the RO membranes. The intake is positioned deep enough below the water surface that the risk of oil contamination is reduced, since oil spills typically remain concentrated at the surface.

DESALINATION PLANT: SITE AND STRUCTURES

Desalination will take place at the RO plant. The site will require extensive ground improvements or deep foundations depending on load-bearing requirements and will therefore be fully transformed to support the necessary infrastructure. Structures and infrastructure on this site will include:

- RO Desalination plant building and surrounding foundations and 1.5 m stone walkway (total footprint of 528m^2; Dimensions: 24 x 22 m). The building will house the following structures/ component (list not extensive):
    - General storage room;
    - Restrooms;
    - Control/operations room with switchboard and computers
    - Feed pumps and pre-treatment filters;
    - A chemical storage room/container (85 m^3 capacity) for CIP and pre-treatment chemicals;
    - Battery storage container of 32.6 m^3 (batteries only potentially required in future to store excess electricity, if generated by the solar plant).
    - Reverse osmosis pumps and energy recovery devices; and
    - Two trains of RO membranes.
- A 60 m^3 brine holding tank (brine "treatment" tank) (5 m diameter and ~19.6 m^2 footprint).
- An 80 m^3 Ultrafiltration Tanks (6 m diameter and ~28.3 m^2 footprint). Acts as a buffer tank between the ultrafiltration pre-treatment and the main reverse osmosis treatment.
- A vehicle access and parking area (~756 m^2 footprint).
- A 200 m^3 raw water holding tank (9 m diameter and ~63.6 m^2 footprint).
- Mini substation/ Transformer: Situated next to RO plant building close to Motor Control Centre housed inside. Connected to proposed 11kV cable line, which connects to the existing substation near the intake. Note that only one transformer will be used, although it will be in one of two positions as indicated in Figure 1.4. This will be confirmed during design and planning.

Reverse Osmosis Process

In the early stages of the project, freshwater production will be approximately 500 cubic metres per day. This capacity will gradually be scaled up to 2 000 cubic metres per day as the project progresses. Freshwater will be stored in a 1000 cubic metre (1 ML) reservoir, to be constructed on the solar plant site, before being distributed via TNPAs existing hydraulic network.

Reverse Osmosis desalination is a process that turns seawater into freshwater by forcing it through special membranes that block salts and other impurities (Figure 1.7). In simple terms, the membranes act like a very fine sieve that lets only clean water through, while leaving the salt behind in a concentrated brine solution. The proposed plant will use a series of these membrane units, powered by pumps, to produce freshwater. On average, about 40 to 45% of the seawater that enters the plant becomes freshwater, with the remainder discharged as brine. While this technology is energy intensive, it is widely used around the world and is proven to reliably produce safe drinking water.

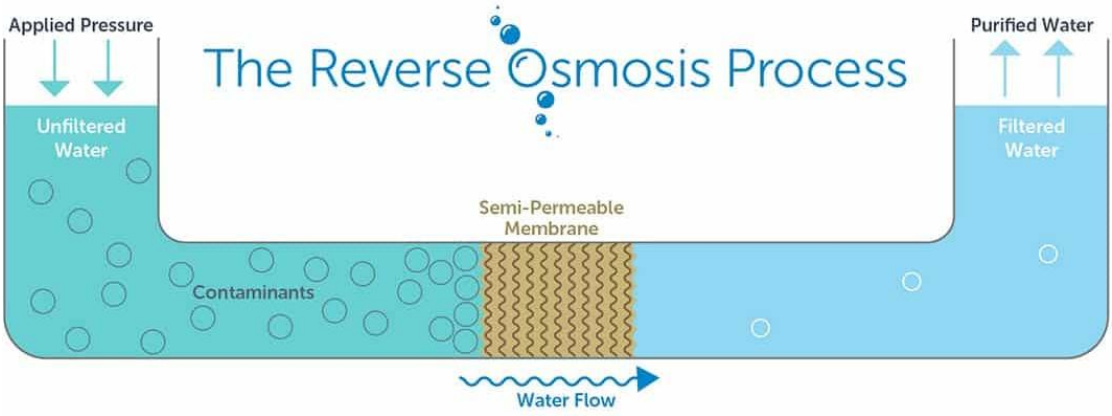

Figure 1.7. Simple diagram showing the Reverse Osmosis process (Image source: (RelianceHomeComfort.com 2025).

Re-mineralisation / blending:

The freshwater produced by the desalination process will undergo the following post-treatment process, before the water enters a new holding reservoir prior to injection into port hydraulic network:

1. **Remineralization: Calcite filters with Sulfuric acid Injection**
   The produced drinking water will be sent to a remineralization station through filters to achieve calcium-carbonate equilibrium. The produced drinking water will be sent to a calcite remineralization filter (CaCO3). This filtering media has self-limiting property and slowly dissolves calcium carbonate. This solution requires dosing of H2SO4 upstream neutralizing filters to achieve carbonate equilibrium. The remineralization station will consist of remineralization columns placed in parallel.

2. **pH adjustment: Injection of sodium hydroxide.**
   The pH correction by Sodium hydroxide injection will allow the adjustment of the pH according to the desired pH range.

3. **Chlorination: Injection of sodium hypochlorite.**
   Chlorination will ensure water potability in the water distribution network.

RESERVOIR SITE

The freshwater (permeate) produced by the RO plant will be stored on a site to the south. This area has a footprint of 1 883 m^2, and will comprise a Reservoir (~707 m^2), surrounded by a "Reservoir Access Area" (1 176 m^2). The reservoir will have a 1 ML capacity and a diameter of 30 m. Booster pumps will also be constructed on the site, to support gravity-fed supply into the port's water network. A permeate pipeline will convey desalinated freshwater from the RO plant to the reservoir.

SOLAR PLANT SITE

The desalination plant will be powered by a hybrid system that uses both solar energy and municipal grid electricity. The RO plant will be powered primarily by the solar installation. The solar array will have an estimated output of 525 kWp (kilowatt peak), generating direct current (DC) at up to 1 000 V (1 kV), which will be supplied directly to the RO plant. The final system size will be confirmed during process design optimisation. Only if solar generation is insufficient, will additional electricity be drawn from the municipal grid (at up to 400 V) via the existing substation near the intake. This power will be transported through the proposed 11 kV underground cable line connecting the substation to the RO plant. Certain low-voltage components at the RO plant (e.g. lights) will rely exclusively on municipal grid electricity supplied through this 11 kV cable, rather than on solar power.

The area designated for the solar installation is located east of (and adjacent to) the Reservoir Site, and has a footprint of approximately ~5 505 $m^{2/}$ ~0.6 hectares.

A photovoltaic (PV) array system will be installed and utilised for this development. The solar array will:

- Use monocrystalline panels, known for their high-power efficiency (converting a large amount of the sun's energy into electricity) and minimal light reflection (generally between 0.2–0.4%, and less than 1.5%).
- Be coated with anti-reflective or light-scattering coatings to minimise reflection and visual impact.
- Most likely be installed in an east–west configuration (depending on coastal wind loads), or alternatively in a north-facing configuration.
- Be tilted at an angle of approximately 30 degrees and have an estimated height of around 2 m from ground level to the highest point of the panels (to be confirmed and dependant on the above configuration).

PV systems consist of flat panels made up of many small solar cells that generate electricity when exposed to sunlight (Figure 1.8).

Figure 1.8. Example of a Monocrystalline Photovoltaic (PV) Solar panels (Image source: http://www.chintglobal.com).

They are oriented such that they receive the largest possible amount of sunlight. Each solar panel on its own produces only a small amount of power, but when combined into larger groups called solar arrays, they can generate enough electricity to meet high demands such as running a desalination plant. While there are different types of solar panels, monocrystalline panels will be used (Figure 1.8). These panels are made from a single piece of silicon, which makes them more efficient, durable, and longer-lasting than other types (polycrystalline or thin-film panels). They also produce more electricity per square metre, meaning fewer panels are needed.

MARINE OUTFALL AND BRINE DISCHARGE

Brine produced by the desalination process will be stored in the brine holding tank and released into the sea through a marine outfall pipeline. The water will flow to the ocean by gravity. The discharge volumes will increase as freshwater production increases:

- In the initial phase (±500 m^3/day freshwater production), brine discharge will be approximately 815 m^3/day.
- At full capacity (2 000 m^3/day freshwater production), brine discharge will increase to approximately 3 300 m^3/day.

The outfall pipeline design and discharge location must ensure that effluent meets the end-of-pipe concentrations modelled in the Marine Specialist Study and complies with all requirements of the CWDP. These requirements have been incorporated into the preferred design, as described below.

The proposed Marine Outfall Pipeline will extend from the RO Plant, running adjacent to the internal road in a south-easterly direction towards the existing silo storage tank. From there, it will continue in a southerly direction along the railway line until reaching the railway underpass, where it will bend and proceed in an easterly direction, crossing the service road towards the breakwater and ocean (Figure 1.3). The pipeline will traverse the breakwater, which comprises rock and dolosse, and will terminate at the seaward edge of the breakwater (i.e. the outer edge of the dolosse), discharging into the ocean.

From the RO Plant to the breakwater, the pipeline will cross several roads and railway lines. It will be buried wherever feasible, with short sections remaining exposed where burial is not practical. The last section of the pipeline will be secured by a concrete encasing within the existing rock revetment as per Figure 1.9 below.

A portion of the pipeline, located just after the railway underpass and prior to the breakwater (i.e. where it crosses the service road), will be encased within a precast portal culvert to allow for continued access by port staff and security. The pipeline route largely follows existing roads and railway lines within already disturbed and modified areas.

Outfall design and disposal method:

- The outfall pipeline from the RO plant to the discharge point will be approximately 1093 m long. While the pipeline trench will be fairly narrow (~0.6 m), a pipeline corridor of 8 m has been considered to account for vegetation clearing and vehicle access. Consequently, the total outfall pipeline will have a footprint of approximately 10 240 m^2.
    - A section of the final portion of the pipeline (~101 m in length) will be encased in a culvert structure, before passing through the existing revetment infrastructure. An 8 m buffer has been allocated surrounding this structure, to facilitate vehicle access/necessary disturbances, this resulting in a footprint of 2 359 m^2.
    - The pipeline will have a diameter of 200 mm, reducing to 150 mm at the outlet to comply with the dispersion modelling requirements. The reduced outlet diameter increases the exit velocity to ensure sufficient dispersion energy.
- Maximum peak throughput will be approximately 38 l/s.
- Brine will be discharged through a single-point outlet rather than multi-nozzle diffusers.

Brine Treatment

The desalination plant should be designed to ensure aeration of effluent when oxygen scavengers are used, neutralisation of highly alkaline or acidic solutions, and appropriate treatment and controlled release of cleaning agents and CIP chemicals prior to discharge to allow maximum dilution in the receiving environment. The above effluent requirements can be achieved through the installation of a brine holding tank, which would act as an effective treatment and conditioning system. Within the tank, natural aeration, hydraulic mixing, dilution, neutralisation and pH equalisation would occur as part of normal operation. The desalination plant operates with two parallel RO trains, and only one undergoes cleaning process (CIP) at a time (CIP process occurs once every 3–6 months depending on incoming water quality and current state of RO process). This means that when one train is in CIP mode, the other remains operational, continuously feeding brine into the tank. This incoming brine dilutes any residual CIP chemicals and assists with pH equalisation. Any temporary pH fluctuations from CIP are therefore buffered and stabilised within the holding tank before brine is released to the outfall. The brine tank provides an effective and complete form of treatment before discharge. Should the tank be installed, no additional chemical dosing or mechanical aeration is required, unless monitoring indicates otherwise.

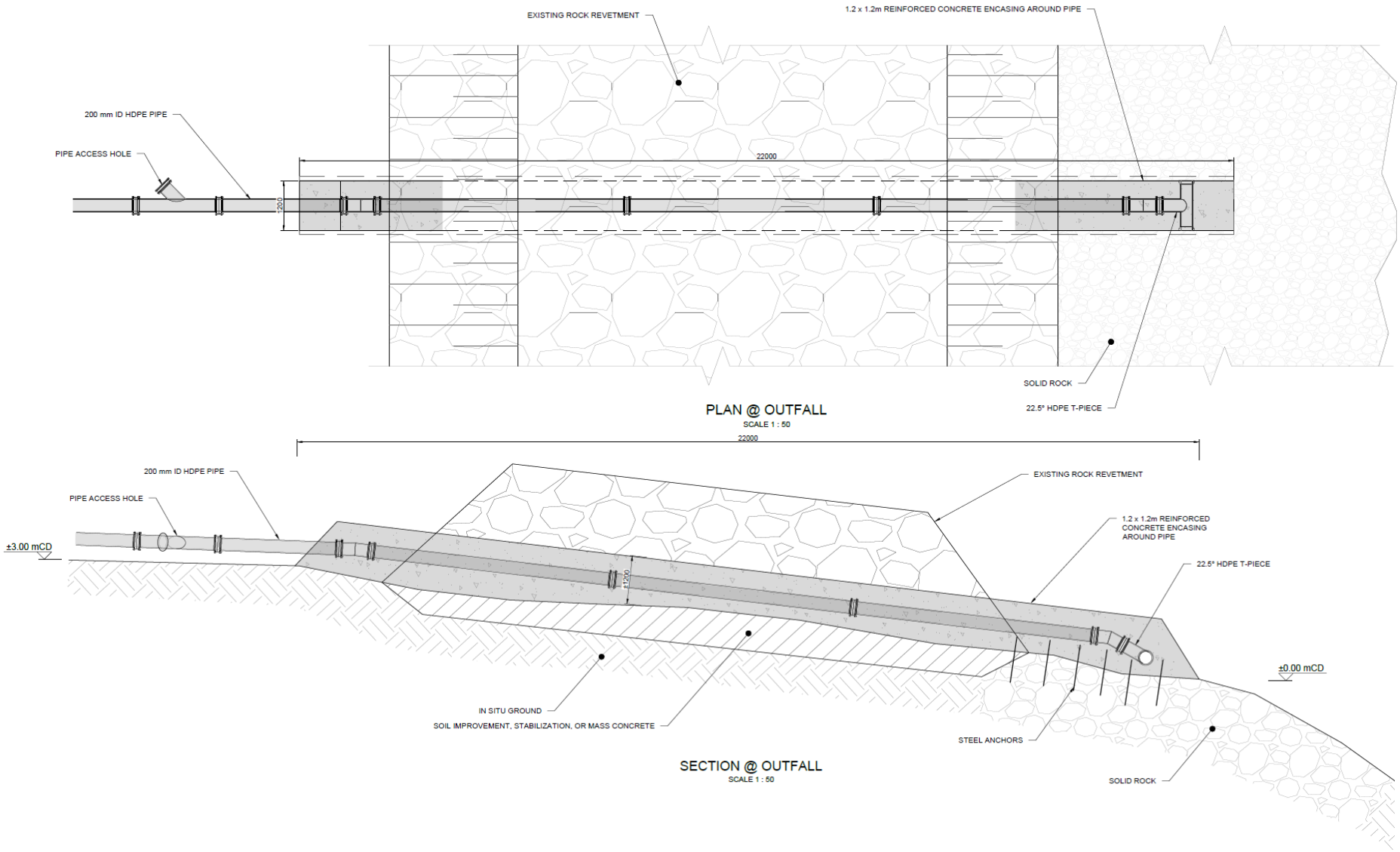

Figure 1.9. Schematic illustrating the final section of the pipeline secured within a concrete encasement embedded in the existing rock revetment.

MUNICIPAL GRID CONNECTION:

A new low-voltage cable (102 m in length) will be installed from the existing substation to the intake pump house to provide grid power at 230–400 V. The cable will be routed on a cable rack that follows the alignment of the intake pipeline. It will have a total footprint of 408 m^2, although most of this footprint will overlap with the Medium Voltage Cable Line and / or intake pipeline). **Note**: this is area is based on a corridor width of 4 m.

In addition, a new 11 kV Medium Voltage underground cable (253 m in length) will be installed from the existing substation to the RO plant. This cable is required because certain low-voltage components at the RO plant will rely solely on municipal grid electricity supplied through the 11 kV line, rather than on solar power. Only if solar generation is insufficient, will additional electricity also be drawn from the municipal grid (at up to 400 V) via the existing substation and transmitted along the proposed 11 kV underground cable to the RO plant. It will have a total footprint of approximately 1011 m^2, although most of this footprint will overlap with the Low Voltage Cable Line and / or intake pipeline). **Note**: this is area is also based on a corridor width of 4 m.

From the existing port substation to the intake pipeline, the 11 kV cable will be installed underground on the same footprint as the Low Voltage Cable Line. From the intake pipeline connection point, it will continue along the same route and share a trench with the intake pipeline to the RO plant, where it will connect to the mini substation/ transformer, located adjacent to the RO plant building near the Motor Control Centre.

SITE CAMPS

Two site camps will be established. The first will be located across the road from the desalination plant, within an existing disturbed parking/gravel area that was previously used as a site camp for an earlier development. The footprint of this camp will be approximately 2 859 m^2. The second site camp will be established near the marine outfall, adjacent to the port breakwater, and have a footprint of 2 406 m^2.

1.4 Routine Inspection, Maintenance and Cleaning

Routine inspection and cleaning of intake strainers

A visual inspection of the intake will be performed daily. Should the intake strainers need to be cleaned due to blockage, either of the following approaches will be followed:

iv. If the component is removable, the component will be removed and mechanically (scrubbing and or pressure hosing) cleaned on land.

v. Non removable components will be cleaned mechanically (scrubbing and/or pressure hosing) either by trained personnel on the pontoon, or by a team of divers.

vi. The removed debris will be disposed of as appropriate for the type of waste.

Routine inspection and maintenance of the intake pipelines

The intake system has a chlorine dosing system which helps to minimise marine growth within the intake pipeline. Further mechanical cleaning of the intake pipeline will be performed either by pipeline pigging, or the removal of discrete pipeline segments to be replaced or cleaned in a suitable workshop or area.

Routine inspection and maintenance of the outfall pipelines

Mechanical cleaning of the outfall pipeline will be performed either by pipeline pigging, or the removal of discrete pipeline segments to be replaced or cleaned in a suitable workshop or area.

Other equipment and components

Other equipment and components such as storage tanks and electrical equipment, amongst others, should regularly be inspected for any weaknesses/damage. These will be repaired/ replaced as and when needed.

Waste management from filter backwash and chemical cleaning processes

Backwash and the periodic CIP flush (occurring once every 3–6 months), is first collected in a sump within the desalination building. Hereafter it goes to the brine tank for mixing with brine (allowing dilution), natural aeration and finally gets discharged into the ocean with the brine.

1.5 Effluent Discharge Management and Compliance with Coastal Waters Discharge Permit

Effluent discharged must meet the end-of-pipe concentrations modelled in the Marine Specialist Study and comply with all conditions of the CWDP. In addition, and in assisting with achieving this, the following requirements must be complied with:

e) Ensuring aeration of the effluent prior to discharge when oxygen scavengers (such as sodium metabisulphite) are used.

f) Ensuring the neutralisation of extremely alkaline or acidic solutions and the treatment of additional cleaning agents prior to discharge.

g) Ensuring the continual release of small volumes of chemicals used during the CIP process with the brine stream to allow for maximum dilution before entering the environment.

h) Ensuring adequate hydraulic mixing and dilution of brine.

The above can be met using a brine holding tank, which would act as an effective treatment and conditioning system. Within the tank, natural aeration, hydraulic mixing, dilution, neutralisation and pH equalisation would occur as part of normal operation. If the tank is installed, no additional chemical dosing or mechanical aeration is required unless indicated by monitoring results. Dosing levels must be adjusted if adverse effects are detected through the monitoring programme.

During operation, ongoing environmental monitoring is required to ensure that the desalination plant's brine discharge (end-of-pipe concentrations) complies with the conditions of the CWDP and to detect and manage any potential environmental impacts over the life of the plant.

Monitoring requirements, including the frequency of monitoring and the specific parameters to be measured, will be set out in the CWDP. These requirements are expected to apply for the full operational life of the plant.

Typically, this will involve both point source measurements (for example Conductivity, Temperature and Depth (CTD) profiling of the water in line with ongoing environmental monitoring requirements) and continuous water quality monitoring through deployment of a suitable instrument, which measures specific parameters, at the edge of the Recommended Mixing Zone (RMZ) to measure compliance with permitted discharge limits and parameters.

It also includes collecting sediment and biotic samples at the edge of the RMZ to assess sediment characteristics and benthic macrofaunal communities. Monitoring data will be compared to the baseline data collected as part of the Marine Specialist Assessment to determine impact over time. The results will provide an ongoing assessment of the influence of the outfall structure and brine discharge on biodiversity and ecosystem health.

1.6 Development Phases, Life Span and Environmental Authorisation Validity Period

Environmental Authorisation is required for a period of at least 10 years.

Construction of the proposed development is anticipated to be completed within approximately 12 months with the anticipated construction dates being as follows:

- Start: March 2027
- Finish: March 2028

Once completed, the plant will commence operation. The current Contractor's "Operations and Monitoring" contract period is currently as follows:

- Start: March 2028
- Finish: March 2032

However, the operational phase is expected to continue indefinitely, with no decommissioning planned in the foreseeable future because of the long-term need for a reliable, independent water supply to support the Port of East London. TNPA will therefore continue to operate the desalination plant beyond the current contractor's operational contract. Therefore, the Environmental Authorisation is required for at least 10 years to cover the tentative operational period of the plant. During operation, environmental monitoring for effluent discharge will be undertaken as described in Section 1.5 above. Routine maintenance activities, such as equipment servicing, infrastructure inspections, and repairs, are expected to occur throughout the operational life of the project to ensure ongoing efficiency, safety, and environmental compliance. Any major upgrades or refurbishments will be undertaken as required to maintain optimal performance and extend the facility's lifespan.

2 PERMITTING AND REPORTING REQUIREMENTS

2.1 SCOPING AND ENVIRONMENTAL IMPACT ASSESSMENT PROCESS, COASTAL WATERS DISCHARGE PERMIT AND REPORTING

In terms of the Environmental Impact Assessment (EIA) Regulations, 2014 (Government Notice (GN) R982, promulgated under the National Environmental Management Act (NEMA; Act 107 of 1998)), certain Listed Activities (published under Listing Notices (LN) 1, 2 and 3 (GN R983, GN R984 and GN R985 of 2014)) may have environmental, social, economic, or heritage impacts and requires Environmental Authorisation (EA) from the Competent Authority (CA; in this instance the National Department of Forestry, Fisheries and the Environment (DFFE)) before the project may commence. Activities in LN 1 and LN 3 are typically smaller in scale and assessed through a Basic Assessment (BA), while activities in LN 2 generally involve larger-scale developments and require a full Scoping and Environmental Impact Assessment (S&EIA) process. These processes are undertaken by a registered EAP.

The current project will trigger activities across all three Notices (refer to Section 3) and therefore requires EA, which must be applied for by means of a S&EIA process. The S&EIA process comprises two phases, Scoping and EIA. The Scoping Phase defines the development context, identifies potential impacts, and determines the specialist studies required for the EIA Phase. This Phase involves a detailed assessment of potential impacts on the environmental, social, economic, and heritage conditions of the area, as well as the identification of mitigation measures to avoid or minimise impacts. The assessment is informed by specialist studies and the independent Environmental Assessment Practitioner (EAPs) own evaluation, and the findings are presented in an Environmental Impact Assessment Report (EIAr). The results of the EIA are used to develop an Environmental Management Programme (EMPr), a legally required management tool under NEMA that sets out specific actions to prevent or minimise negative impacts and enhance positive outcomes throughout the project's life cycle. It is based on the EIA findings and outlines mitigation measures, monitoring requirements, and the responsibilities of the Developer and Contractors to ensure effective environmental management. The draft EIAr and EMPr are circulated to the public and Interested and Affected Parties (I&APs) for comment during a public participation process, after which the reports are updated and submitted to the Competent Authority for consideration in the granting of EA.

An application for EA was initially lodged on 27 February 2025. The Final Scoping Report was accepted by the DFFE on 30 May 2025, and the Draft EIAr was made available for public review and comment from 2 to 31 October 2025. However, due to delays in finalising the project layout, the Final EIAr could not be submitted within the prescribed timeframe and the application lapsed. The project layout has since been finalised, allowing the application to proceed. In accordance with Regulation 21(2) of the EIA Regulations, the application will be resubmitted in July 2026, with the EIA process recommencing from the EIA phase. Accordingly, the Draft EIAr and EMPr are again being made available for public review and comment as part of the required public participation process.

Since the facility will discharge brine into the marine environment, a Coastal Waters Discharge Permit (CWDP) is required under the Integrated Coastal Management Act (ICMA; Act 24 of 2008). The CWDP application will be lodged shortly after the public participation process has ended. The CWDP application is supported by a Marine Specialist Impact Assessment and numerical dispersion modelling to assess effluent dilution, dispersion, and related environmental impacts, all of which have been addressed in this EIA.

3 LISTED ACTIVITIES TRIGGERED

3.1 SUMMARY OF LISTED ACTIVITIES TRIGGERED BY THIS DEVELOPMENT

The proposed development will trigger activities under Listing Notice (LN) 1 (Activities 14, 16, 17, 19A, 25, and 27), LN 2 (Activities 6 and 14), and LN 3 (Activities 2, 4 and 12). The table below summarises the applicable listed activities and the associated project components triggering each activity.

Since submission of the Scoping Report (2025), several alternatives have been screened out, resulting in some previously identified listed activities no longer being applicable. The list below therefore reflects only those activities relevant to the final project layout. The new Application Form (submitted in June 2026) is aligned with this list.

3.2 LISTING NOTICE 1

Table 3.1. List of Potential Listing Notice 1 (GN R983 of 2014) activities triggered by the proposed development. Applicable portions have been bolded and underlined. Exclusion not applicable have been crossed out.

Activity No.	Activity Description, as per GN R983	Related Project Component
14	**The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.**	**Reverse Osmosis (RO) and Solar Plant Site** Desalination pre-treatment and clean-in-place (CIP) chemicals will be stored on-site within a dedicated chemical storage room inside the desalination building, housed in respective drums or jerry cans. The storage room will have a storage capacity exceeding 80 cubic meters. Should batteries be used to store excess electricity, they will be stored on-site in containers with a capacity of 32.6 cubic meters each. One or more containers may be used. The total capacity of the chemical storage room and battery storage container will exceed the 80 cubic metres threshold for storage of a dangerous good, thereby triggering this activity.
16	**The development and related operation of facilities for the desalination of water with a design capacity to produce more than 100 cubic metres of treated water per day.**	**RO Plant Site** The RO plant will be constructed and produce 2000 cubic meters (2 megalitres, ML) of fresh water per day.
17	**Development-** • **(i) in the sea;** • (ii) in an estuary; • **(iii) within the littoral active zone;** • (iv) in front of a development setback; • **(v) or if no development setback exists, within a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever is the greater;**	**Marine Outfall Pipelines** This activity applies and will be triggered by portions of the marine outfall pipeline that extend onto undisturbed sections of the sea and littoral active zone outside the urban edge (i.e., increasing port development footprint), in respect of rock revetments or stabilising structures. *Activity not applicable to estuarine environment and estuarine intake as the estuary falls within the urban edge according to the Buffalo City Municipality's Urban Edge*

Activity No.	Activity Description, as per GN R983	Related Project Component
	in respect of- **(a) fixed or floating jetties and slipways;** (b) tidal pools; (c) embankments; (d) rock revetments or stabilising structures including stabilising walls; or **(e) infrastructure or structures with a development footprint of 50 square metres or more** but excluding- • ~~(aa) the development of infrastructure and structures within existing ports or harbours that will not increase the development footprint of the port or harbour;~~ • ~~(bb) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;~~ • ~~(cc) the development of temporary infrastructure or structures where such structures will be removed within 6 weeks of the commencement of development and where coral or indigenous vegetation will not be cleared; or~~ • ~~(dd) where such development occurs within an urban area.~~	*(as per the Metropolitan Spatial Development Framework, MSDF).* No development setback has been delineated in this area to date. No exclusions apply.
19A	**The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from –** **(i) the seashore;** **(ii) the littoral active zone, an estuary or a distance of 100 metres inland of the high - water mark of the sea or an estuary, whichever distance is the greater; or** **(iii) the sea; -** ~~but excluding where such infilling, depositing, dredging, excavation, removal or moving –~~ ~~(f) [sic] will occur behind a development setback;~~ ~~(g) [sic] is for maintenance purposes undertaken in accordance with a maintenance management plan;~~ ~~(h) [sic] falls within the ambit of activity 21 in this Notice, in which case that activity applies;~~ ~~(i) [sic] occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.~~	**Construction/ Installation of Direct Intake & Pipelines** Construction will occur next to the estuary and within 100m of the estuary. This activity applies and will be triggered by the removal or moving of more than 5 m^3 of material from an area within a distance of 100 metres inland of the estuary, on undisturbed land (i.e., increasing port development footprint). **Construction/ Installation of Marine Outfalls & Pipelines** This activity applies and will be triggered by the construction of the marine outfall pipelines and associated structures, which will result in the removal, moving, and or depositing of more than 5 m^3 of material onto/ from the seashore; the littoral active zone; the sea and/ or an area within a distance of 100 metres inland of the high - water mark of the sea. Although the entire development falls within the boundaries of the port, some areas are undisturbed and certain portions of the development could therefore increase the port development footprint No exclusions apply.
25	**The development and related operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of more than 2 000 cubic metres but less than 15 000 cubic metres.**	**RO Plant Site** The Desalination Plant will produce and treat approx. 3300 cubic meters of brine ("effluent") per day, exceeding the 2000 cubic metres threshold, thereby tiggering this listed activity.
27	**The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation,** ~~except where such clearance of indigenous vegetation~~	**RO and Solar Plant Site** The removal of indigenous vegetation is required to make space for the project infrastructure. The construction activities could result in the removal of approx. 1 hectare

Activity No.	Activity Description, as per GN R983	Related Project Component
	~~is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.~~	of indigenous vegetation on the solar and desal site, thereby tiggering this listed activity.

3.3 LISTING NOTICE 2

Table 3.2. List of Potential Listing Notice 2 (GN R984 of 2014) Activities triggered by the proposed development. Applicable portions have been underlined. Exclusion not applicable have been crossed out.

Activity No.	Activity Description, as per GN R984	Related Project Component
6	**<u>The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent,</u>** ~~excluding- (i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; (iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, wastewater or sewage where such facilities have a daily throughput capacity of 2 000 cubic metres or less; or (iv) where the development is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will not exceed 50 cubic metres per day.~~	**Brine Discharge** A Coastal Waters Discharge Permit (CWDP) is required for the discharge of brine via an outfall pipeline into the marine environment, under the Integrated Coastal Management Act, therefore triggering this activity. Maximum discharge capacity will be 3300 cubic metres a day, meaning it will exceed a throughput capacity of 2 000 cubic metres. No exclusions apply
14	**<u>The development and related operation of</u>** • (i)… • **<u>(ii) an anchored platform; or</u>** • **<u>(iii) any other structure or infrastructure on, below or along the sea bed;</u>** ~~excluding- (a) development of facilities, infrastructure or structures for aquaculture purposes; or (b) the development of temporary structures or infrastructure where such structures will be removed within 6 weeks of the commencement of development and where coral or indigenous vegetation will not be cleared.~~	**Construction/ Installation of Marine Outfalls & Pipelines** The last section of the outfall pipeline (where it terminates), should it extend below the high-water mark, would be considered “on the seabed”, and would therefor trigger this activity.

3.4 LISTING NOTICE 3

Table 3.3. List of Potential Listing Notice 3 (GN R985 of 2014) Activities triggered by the proposed development. Applicable portions have been underlined. Exclusion not applicable have been crossed out.

Activity No.	Activity Description, as per GN R985	Related Project Component
2	**The development of reservoirs, excluding dams, with a capacity of more than 250 cubic metres.** **(a) Eastern Cape** (ii) In a protected area identified in terms of NEMPAA, excluding conservancies; (ii) Outside urban areas, in: • (aa) National Protected Area Expansion Strategy Focus areas; • (bb) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority; • (cc) Sites or areas identified in terms of an international convention; • (dd) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; • (ee) Core areas in biosphere reserves; • (ff) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve; • (gg) In an estuarine functional zone, excluding areas falling behind the development setback line; • (hh) Areas seawards of the development setback line or within 1 kilometre from the highwater mark of the sea if no such development setback line is determined; or **(iii) Inside urban areas:** • ~~(aa) Areas zoned for use as public open space;~~ • **(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, or zoned for a conservation purpose**; or • ~~(cc) Areas seawards of the development setback line or within urban protected areas.~~	**Construction of a Reservoir** The proposed reservoir will have a total capacity of 1 ML (1 000 m^3), which exceeds the 250 m^3 threshold. The site is located within an urban area (inside the urban edge) and falls within "*an area designated for conservation use in an adopted Spatial Development Framework*", as it is mapped as a Critical Biodiversity Area 1 (CBA 1) under the Eastern Cape Biodiversity Conservation Plan (2019), which is further recognised for conservation use within the Buffalo City Metropolitan Municipality Spatial Development Framework (2019–2024). The area further overlaps with an area mapped to support Critically Endangered Umtiza Forest Thicket vegetation as identified in the 2018 National Biodiversity Assessment (NBA). Accordingly, the activity is triggered under condition (a)(iii)(bb). Important note: The specialist confirmed that the site does not meet the criteria for a CBA in terms of the Technical Guidelines for CBA Mapping (SANBI, 2017), and that the associated land use recommendations of the ECBCP (2019) are therefore not applicable at a site-specific level. The ECBCP mapping is informed in part by the National Land Cover dataset (2014), and its scale and resolution do not always reflect fine-scale conditions on the ground, necessitating site verification. In this instance, historical aerial imagery dating back to 1966 indicates that the proposed development area within the Port of East London has been previously modified. The site is therefore not considered to represent a functional or intact CBA, despite its mapped classification. Notwithstanding the above, a conservative approach has been adopted, and the activity considered triggered and included due to the mapped CBA and Critically Endangered designation and SDF classification.
4	**The development of a road wider than 4 metres with a reserve less than 13.5 metres.** **(a) Eastern Cape** (i) Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding disturbed areas; (bb) National Protected Area Expansion Strategy Focus areas; (cc) Sensitive areas as identified in an environmental management framework as	**Intake and Outfall Pipelines** While the intake and outfall pipelines will largely follow existing roads, railway lines, and already disturbed areas, it is acknowledged that repeated vehicle access along these routes during construction and maintenance may, in some instances, result in the formation of informal access tracks. As advised by the competent authority, such repeated disturbance could potentially be interpreted as the development of a road. The intake and outfall infrastructure is located within an urban area (inside the urban edge), while most of the

Activity No.	Activity Description, as per GN R985	Related Project Component
	contemplated in Chapter 5 of the Act and as adopted by the competent authority; (dd) Sites or areas identified in terms of an international convention; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (ff) C ore areas in Biosphere reserves; (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas; (hh) Areas seawards of the development setback line or within 1 kilometre from the highwater mark of the sea if no such development setback line is determined; or (ii) In an estuarine functional zone, excluding areas falling behind the development setback line; or **(ii) Inside urban areas:** (aa) Areas zoned for use as public open space; **(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose;** or (cc) Seawards of the Development setback line or within urban protected areas.	footprint overlaps with "*an area designated for conservation use in an adopted Spatial Development Framework*", as it is mapped as a Critical Biodiversity Area 1 (CBA 1) under the Eastern Cape Biodiversity Conservation Plan (2019), which is further recognised for conservation use within the Buffalo City Metropolitan Municipality Spatial Development Framework (2019–2024). Most of the intake and outfall infrastructure footprint also overlaps with an area mapped to support Critically Endangered Umtiza Forest Thicket vegetation as identified in the 2018 NBA. On this basis, the activity is triggered due to condition (a)(ii)(bb). *Note: As discussed above, the area does not meet the criteria for a CBA in terms of the Technical Guidelines for CBA Mapping (SANBI, 2017), and the associated ECBCP (2019) land use recommendations are not applicable at a site-specific level due to the already transformed nature of the area.* Notwithstanding the above, a conservative approach has been adopted, and the activity considered triggered and included due to the mapped CBA designation and SDF classification.
12	**The clearance of an area of 300 square metres or more of indigenous vegetation** ~~except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.~~ **(a) Eastern Cape** **•(i) Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;** **•(ii) Within critical biodiversity areas identified in bioregional plans;** •(iii) Within the littoral active zone or 100 metres inland from the high water mark of the sea, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas; •(iv) Outside urban areas, within 100 metres inland from an estuarine functional zone; or • (v) On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	**RO and Solar Plant Site, Intake and Outfall pipelines** Construction of the proposed development will result in the clearance of more than 300 m^2 of vegetation within areas mapped as CBA1 in the ECBCP (2019), and Critically Endangered Umtiza Forest Thicket vegetation, as per the 2018 NBA. On this basis, the activity is triggered due to condition (a)(i) and (ii), as it involves vegetation clearance within both a critically endangered ecosystem and a mapped CBA. *Note: As discussed above, the area does not meet the criteria for a CBA in terms of the Technical Guidelines for CBA Mapping (SANBI, 2017), and the associated ECBCP (2019) land use recommendations are not applicable at a site-specific level due to the already transformed nature of the area. Furthermore, the vegetation present is highly degraded and characterised by a high level of alien infestation.* Notwithstanding the above, a conservative approach has been adopted, and the activity considered triggered and included due to the mapped CBA designation and the classification of the vegetation type as Critically Endangered.

4 PUBLIC PARTICIPATION PROCESS

4.1 INVITATION TO COMMENT ON THE PROPOSED PROJECT

All Interested and Affected parties (I&APs) are invited to review the draft Environmental Impact Assessment Report (EIAr; this document) and draft Environmental Management Programme (EMPr; Annexure 1) and to submit comments, questions, or concerns regarding the project, including the proposed brine discharge and associated Coastal Waters Discharge Permit (CWDP) during the public participation process (PPP). Comments must be submitted to Mr Steve September (contact details below). To remain informed and receive future updates, please ensure you are registered as an I&AP.

The public participation and commenting period are open from:

18 July 2026 – 18 August 2026 (closing 23:59)

The draft EIAr and EMPr is available for review during this 30-day period at the following locations:

- **Digitally:** https://anchorenvironmental.co.za/public-documents
- **Hardcopies:**
  - West Bank Library: Hood St, West Bank Village, East London

To submit comments/ questions/ concerns, to register as an I&AP, contact:

Mr Steve September
Anchor Environmental Consultants (Pty) Ltd
Tel: 021 701 3420
Email: steve@anchorenvironmental.co.za

4.2 OVERVIEW OF INITIAL PUBLIC PARTICIPATION PROCESS

A public participation process (PPP) was undertaken from 2 to 31 October 2025 as part of the initial EIA process and circulation of the Draft EIAr. I&APs were notified between 22 and 25 September 2025 through site notices, newspaper advertisements, email notifications, posters, and distribution of flyers. The Draft EIAr was made available for public review for a 30-day period via Anchor Environmental Consultants (Pty) Ltd. (Anchor's) website and at designated public locations. A public meeting was held at the West Bank Golf Club in East London on 14 October 2025, although no I&APs attended. All comments received during the process were captured in a Comments and Responses Report (CRR).

4.3 PUBLIC PARTICIPATION PROCESS AND REQUIREMENTS

The current PPP will be conducted in line with Chapter 6 (Sections 39 to 44) of the National Environmental Management Act (NEMA, Act 107 of 1998) EIA Regulations. Its purpose is to ensure that all stakeholders, including potential I&APs, state departments, organs of state, and the Competent Authority (CA), have access to clear and accurate

information about the project and its potential environmental impacts. It further provides an opportunity for stakeholders/ I&APs to review and comment on the project before it is finalised. A brief overview of the process followed for this project is provided below.

4.3.1 Stakeholder Identification, registration and the creation of database

A stakeholder (I&AP) database was established during the Scoping Phase and further updated during the initial EIA and PPP undertaken in 2025. The database includes all I&APs identified in terms of Sections 40(2), 42, and 43 of the EIA Regulations, as well as other key and potential stakeholders. For the current EIA process, all registered I&APs on the database will be notified of the project via email, while additional potential I&APs will be informed through A2 and A4 site notices, flyers, and newspaper advertisements. Interested persons and organisations will be invited to register as I&APs and added to the database upon request. Any person or organisation submitting comments will also be registered. The database will continue to be updated throughout the EIA process.

4.3.2 Methods of Notification and Availability of Documents

Notices were distributed in the week of 13 – 17 July 2026 to inform I&APs about the proposed project and their opportunity to provide comments. These notices are available in English, with some also translated into isiXhosa, and include:

- A summary of the proposed activities;
- Information about the PPP, including the timeline and how to access the EIAr and EMPr;
- Instructions on how, by when, and to whom comments must be submitted; and
- An invitation to attend the public meeting.

The following methods have been used for notification:

- **Site Notices:** Two A2-sized notice boards have been displayed in visible locations near the project site:
    - One in front of the Transnet National Ports Authority (TNPA) West Bank Main Entrance on the Corner of Dr Zahn Rd and Ross Street.
    - The other opposite East London Ski Boat Club: Pontoon Rd, Harbour, East London.
- **Newspaper Advertisement:** Two newspaper advertisements have been published, one in Go!&Express, a local newspaper circulated free of charge to all households in East London, and one in the Daily Dispatch, a National newspaper circulated in the eastern half of the Eastern Cape.
- **Email Notifications and Official Correspondence:** Written notifications have been sent via email to all relevant I&APs with email addresses, including:
    - Relevant National and Provincial government departments;
    - Relevant environmental and land use departments within the Buffalo City Metropolitan Municipality;
    - The Ward Councillor for Ward 19 of the Buffalo City Metropolitan Municipality, Ms Shandre Marilyn Hoffman;
    - Relevant adjacent landowners with email addresses; and
    - Any other potential and / or registered I&APs currently listed on database.

- **Other hardcopy notices**:
    - A4 notices/ posters have been placed at various shops/ other public locations north and south of the development site.
    - Flyers have been distributed/ hand delivered to adjacent landowners directly south of the development.

4.3.3 Circulation of draft EIAr & Comment Period

The Draft EIAr is available for a 30-day public review and comment period from 18 July to 23:59 on 18 August 2026. Notification of the availability of the report is included in the notices and advertisements outlined above. In addition, an email containing a link to the Draft EIAr and EMPr on Anchor's website has been distributed to registered and potential I&APs, as well as relevant organs of state. During this period, the documents are accessible electronically on Anchor's website and as a hardcopy at the West Bank Library. Potential and registered I&APs may submit comments via email, post, telephone, or verbally during the public meeting.

4.3.4 Public Meeting

No public meeting has been scheduled as part of the current public participation process, as no stakeholders attended the public meeting held during the previous EIA process. However, should any Interested and Affected Party request a public meeting during this process, one will be arranged accordingly.

4.3.5 Comments and Responses Report

All comments received during the PPP will be documented in the Comments and Responses Report (CRR). The CRR also includes records of all notifications, correspondence, and proof of the PPP, and will be submitted as part of the final EIAr. These comments will be used to update/ inform the final EIAr and EMPr where relevant.

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4.4 Compliance with Regulation 39, 40, 41, 42, 43 and 44 of the EIA Regulations, 2014

GN 982	Content	How Requirement Was / Will Be Fulfilled
CHAPTER 6- PUBLIC PARTICIPATION		
39 Activity on land owned by person other than proponent		
39(1)	If the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an environmental authorisation in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land.	N/A. TNPA is the owner and person in control of the land.
39 (2)	(2) Subregulation (1) does not apply in respect of- (a) linear activities; and (b) ..... (c) strategic integrated projects as contemplated in the Infrastructure Development Act, 2014.	N/A
40 Purpose of public participation		
40 (1)	The public participation process to which the (a) basic assessment report and EMPr, and the closure plan in the case of a closure activity, submitted in terms of regulation 19; and (b) Scoping report submitted in terms of regulation 21, the environmental impact assessment report, EMPr, and the closure plan in the case of a closure activity, submitted in terms of regulation 23; was subjected to must give all potential or registered interested and affected parties, including the competent authority, a period of at least 30 days to submit comments on each of the basic assessment report, EMPr, scoping report and environmental impact assessment report, and the closure plan in the case of a closure activity, as well as the report contemplated in regulation 32, if such reports or plans are submitted at different times.	Two separate 30-day public participation processes will be undertaken: **1. Scoping Phase:** A 30-day comment period was provided for review of the Draft Scoping Report. **2. Draft EIAr:** A second 30-day comment period is being provided from 18 July to 18 August 2026 during the EIA phase, to allow I&APs and the CA an opportunity to review and comment on the Draft EIAr and EMPr.
40(2)	The public participation process contemplated in this regulation must provide access to all information that reasonably has or may have the potential to influence any decision with regard to an application unless access to that information is protected by law and must include consultation with (a) the competent authority; (b) Every State department that administers a law relating to a matter affecting the environment relevant to an application for an environmental authorisation; (c) All organs of state which have jurisdiction in respect of the activity to which the application relates; and (d) All potential, or, where relevant, registered interested and affected parties.	Documents containing all relevant information that could influence decision-making was made publicly accessible throughout the public participation process. A hardcopy is available at the West Bank Library in East London and digital versions accessible on Anchor Environmental's website. All potential I&APs listed in the compiled database were directly notified of the availability of the reports and invited to participate. These included relevant authorities such as the competent authority, State departments responsible for environmental matters, and organs of state with jurisdiction over aspects of the proposed development. In addition, broader notification was achieved through a

GN 982	Content	How Requirement Was / Will Be Fulfilled
		newspaper advertisement and the placement of A2 site notices to ensure that any additional potential I&APs are informed and given an opportunity to register and comment.
40(3)	Potential or registered interested and affected parties, including the competent authority, may be provided with an opportunity to comment on reports and plans contemplated in subregulation (1) prior to submission of an application but must be provided with an opportunity to comment on such reports once an application has been submitted to the competent authority	No pre-app PPP was conducted, only an official 30-day PPP.
41 Public participation process		
41 (2) (a)	Fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of —	
	(i) the site where the activity to which the application or proposed application relates is or is to be undertaken; and	An A2 notice board was placed on TNPAs West Bank Entrance on Dr Zahn Road, near the boundary of the site.
	(ii) any alternative site;	An A2 notice was placed at the East London Ski Boat Club entrance on Pontoon Road.
41 (2) (b)	Giving written notice, in any of the manners provided for in section 47D of the Act, to—	***Section 47D of NEMA: Delivery of documents*** *(1) A notice or other document in terms of this Act or a specific environmental management Act may be issued to a person* *-(a) by delivering it by hand;* *-(b) by sending it by registered mail* *(i) to that person's business or residential address; or* *(ii) in the case of a juristic person, to its registered address or principal place of business;* *-(bA) by faxing a copy of the notice or other document to the person, if the person has a fax number;* *-(bB) by e-mailing a copy of the notice or other document to the person, if the person has an e-mail address; or* *-(bC) by posting a copy of the notice or other document to the person by ordinary mail, if the person has a postal address;* *-(c) where an address is unknown despite reasonable enquiry, by publishing it once in the Gazette and once in a local newspaper circulating in the area of that person's last known residential or business address.* *(2) A notice or other document issued in terms of subsection (1) (b), (bA), (bB), (bC) or (c) must be regarded as having come to the notice of the person, unless the contrary is proved.*
(i)	the occupiers of the site and, if the applicant is not the owner or person in control of the site on which the activity is to be undertaken,	The site proposed for development is unoccupied and the site currently not utilised for any specific purpose. There are no residential, commercial, or

GN 982	Content	How Requirement Was / Will Be Fulfilled
	the owner or person in control of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;	informal occupiers who may be directly affected by the activity on the site itself. Furthermore, TNPA is both the applicant and the legal owner and custodian of the site, meaning there is no separate party in control of the land. In the absence of any third-party land occupiers and given that the owner is already fully informed and actively involved in the application, there is no reasonable or practical basis to issue further notice in terms of this requirement. The purpose of this provision, to ensure that parties directly impacted by activities on a site are made aware of the application, has therefore been inherently met.
(ii)	owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken	The site is bordered on three sides by land that is either owned by TNPA or by the marine/ estuarine environment. The southern section borders the residential area of West Bank. To notify the residents: • Written notifications have been sent via email to relevant adjacent landowners with email addresses; • A4 notices/ posters have been placed at various shops/ other public locations north and south of the development site. • Flyers have been distributed/ hand delivered to adjacent landowners directly south of the development. • Two newspaper advertisements have been published, one in Go!&Express, and one in the Daily Dispatch.
(iii)	the municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area;	Email notifications were sent to the municipal councillor for Ward 19 of the Buffalo City Metropolitan Municipality, Ms Shandre Marilyn Hoffman, in accordance with Section 47D(1)(bB) of the NEMA. No active ratepayers' associations operating within the project area have been identified.
(iv)	the municipality which has jurisdiction in the area;	Email notifications were sent to several environmental and land use branches within the Municipality. This notification was issued in accordance with Section 47D(1)(bB) of NEMA.
(v)	any organ of state having jurisdiction in respect of any aspect of the activity; and	Written notice was provided via email (in accordance with Section 47D(1)(bB) of NEMA) to all relevant organs of state that have jurisdiction over aspects of the proposed activity.
(vi)	any other party as required by the competent authority;	Email notifications were sent to Departments required by the competent authority and included: • DFFE: Directorate Biodiversity and Conservation • DFFE: Directorate Protected Areas • DFFE: Directorate Oceans & Coasts • DFFE Sub-Directorate: Coastal Protection and Development—ORV Permitting:

GN 982	Content	How Requirement Was / Will Be Fulfilled
41 (2) (c)	Placing an advertisement in	
	i. one local newspaper; or **ii.** (ii) Any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;	A notice was placed in Go!&Express, a local newspaper circulated free of charge to all households in East London.
41 (2) (d)	Placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii); and	A notice was placed the Daily Dispatch, a National newspaper circulated in the eastern half of the Eastern Cape.
41 (2) (e)	using reasonable alternative methods, as agreed to by the Department, in those instances where a person is desirous of but unable to participate in the process due to— (i) illiteracy; (ii) disability; or (iii) any other disadvantage.	This requirement is not applicable at this stage, but will be complied with should it become relevant.
41 (3) (a)	A notice, notice board or advertisement referred to in subregulation (2) must give details of the application or proposed application which is subjected to public participation; and	This requirement was complied with.
41 (3) (b)	State (i) whether basic assessment or S&EIR procedures are being applied to the application; (ii) The nature and location of the activity to which the application relates; (iii) Where further information on the application or proposed application can be obtained; and (iv) The manner in which and the person to whom representations in respect of the application or proposed application may be made.	These requirements were complied with.
41 (4)	A notice board referred to in subregulation (2) must **(a)** be of a size of at least 60 cm by 42 cm; and **(b)** Display the required information in lettering and in a format as may be determined by the competent authority.	These requirements were complied with. A2 notice boards were used.
41 (5)	Where public participation is conducted in terms of this regulation for an application or proposed application, subregulation (2)(a), (b), (c) and (d) need not be complied with again during the additional public participation process contemplated in regulations 19(1)(b) or 23(1)(b) or the public participation process contemplated in regulation 21(2)(d), on condition that **(a)** such process has been preceded by a public participation process which included compliance with subregulation (2)(a), (b), (c) and (d); and	This condition was noted.

GN 982	Content	How Requirement Was / Will Be Fulfilled
	(b) Written notice is given to registered interested and affected parties regarding where the **i.** Revised documents as contemplated in regulation 19(1)(b); **ii.** Revised documents as contemplated in regulation 23(1)(b); or **iii.** environmental impact assessment report and documents as contemplated in regulation 21(2)(d); may be obtained, the manner in which and the person to whom representations on these reports or plans may be made and the date on which such representations are due.	
41 (6)	When complying with this regulation, the person conducting the public participation process must ensure that **(a)** information containing all relevant facts in respect of the application or proposed application is made available to potential interested and affected parties; and **(b)** participation by potential or registered interested and affected parties is facilitated in such a manner that all potential or registered interested and affected parties are provided with a reasonable opportunity to comment on the application or proposed application.	These requirements were complied with. Two public participation processes were undertaken, one during the Scoping Phase and one during the application phase (EIA Phase), each allowing for a 30-day comment period. This ensures that all potential and registered I&APs have reasonable and repeated opportunities to access relevant information and provide input. During these periods, the draft reports were made available in both hard copy and digital formats. I&APs were able to submit comments via email, post, by handing in written comments, telephonically, or verbally during the public meeting.
41 (7)	Where an environmental authorisation is required in terms of these Regulations and an authorisation, permit or licence is required in terms of a specific environmental management Act, the public participation process contemplated in this Chapter may be combined with any public participation processes prescribed in terms of a specific environmental management Act, on condition that all relevant authorities agree to such combination of processes	The commenting period for the CWDP is being combined with that of the Scoping and Environmental Impact Assessment (S&EIA).
42 Register of interested and affected parties		
42 (2)	A proponent or applicant must ensure the opening and maintenance of a register of interested and affected parties and submit such a register to the competent authority, which register must contain the names, contact details and addresses of (a) all persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP; (b) All persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and	This requirement was complied with. Please refer to Appendix 16 for the I&AP database.

GN 982	Content	How Requirement Was / Will Be Fulfilled
	(c) All organs of state which have jurisdiction in respect of the activity to which the application relates.	
43 Registered interested and affected parties entitled to comment on reports and plans		
43(1)	A registered interested and affected party is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process contemplated in these Regulations and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.	Comments were received although no issues of significance or objections were received.
43 (2)	In order to give effect to section 24O of the Act, any State department that administers a law relating to a matter affecting the environment must be requested, subject to regulation 7(2), to comment within 30 days.	All relevant State departments have were contacted for comment.
44 Comments of interested and affected parties to be recorded in reports and plans		
44 (1)	The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations.	A CRR has been compiled and will be submitted as an Appendix (Appendix 4) with the final EIAr.
44 (2)	Where a person desires but is unable to access written comments as contemplated in subregulation (1) due to (a) A lack of skills to read or write; (b) Disability; or (c) Any other disadvantage, reasonable alternative methods of recording comments must be provided for.	This requirement is not applicable at this stage, but will be complied with should it become relevant.

4.5 SUMMARY OF COMMENTS RECEIVED BY I&APS

A comprehensive record of all comments received from stakeholders during the public participation processes for the Scoping Phase (11 March to 10 April 2025) and EIA Phase (2 to 31 October 2025) has been compiled into a table within the Comments and Responses Report (Appendix 4). This report also includes all historical comments submitted in connection with the development prior to the official commenting periods.

The report presents the Environmental Assessment Practitioners' (EAPs) responses to each comment and indicates how these issues have been addressed in the final Scoping Report and the final EIAr. Copies of all written correspondence from I&APs and stakeholders are provided in Appendix 5.

A summary of comments received from the various stakeholders and I&APs is provided below (listed in no particular order):

- **Department of Forestry, Fisheries and the Environment (DFFE): Priority Infrastructure Projects— Integrated Environmental Authorisations — Competent Authority (CA)**
    - Provide coordinates for each activity and associated infrastructure, including corner points for all sites and start, middle and end points for linear infrastructure. Also provide the specific development footprints (in hectares or square metres) and the specifications for each development component and associated infrastructure.
    - Provide concise, but complete, summary and bullet list of the project description, development components and associated infrastructure (or project scope).
    - Provide a Site Verification Report addressing the site sensitivity verification requirements and all specialist assessments identified in the screening tool report. The report must confirm or dispute the sensitivity ratings for each theme and include a motivation for any specialist studies identified by the screening tool that were not undertaken. Compliance Statements (where applicable) as required by the relevant themes must also be included.
    - Comments must be obtained from specific department including:
        - DFFE: Directorate Biodiversity and Conservation
        - DFFE: Directorate Oceans and Coast.
        - Eastern Cape Department of Economic Development and Environmental Affairs
        - Buffalo City Metropolitan Municipality
        - Eastern Cape Provincial Heritage Resources Agency (ECPHRA).
    - A powerline is mentioned with no further details is provided. Elaborate on the use of a powerline.
    - The operational phase indicated in the EMPr is insufficiently detailed. It must include management actions for:
        - Routine inspection and cleaning of intake strainers.
        - Verification of brine dispersion and salinity compliance at the Recommended Mixing Zone (RMZ).
        - Periodic maintenance of the outfall and intake pipelines.

        - Waste management from filter backwash and chemical cleaning processes.
    - Ensure that all relevant listed activities are correctly applied for, clearly linked to the project, with impacts and mitigation measures assessed for each activity.
    - Should Listed Activities applied for in the application form differ from those mentioned in the final EIAr, an amended application form must be submitted.
    - Relevant authorities must be engaged throughout the EIA process, with written comments obtained and submitted, and a graphical representation of the development within the respective geographical areas for the relevant GN R. 985 activities provided.
    - The EIAr must include the final preferred site layout map showing all project components and associated infrastructure and neighbouring and existing infrastructure and also incorporating all available biodiversity information and specialist recommendations wherever possible.
    - Provide an environmental sensitivity map indicating sensitive environmental features on site, Buffer areas; and "no-go" area with the layout map superimposed.
    - Ensure all specialist studies are final, comply with the required protocols and TOR expectations, including detailed methods, clear footprint descriptions, full disclosure of limitations (excluding seasonality), correct and consistent definitions of no-go areas, final and practical mitigation recommendations, and clear justification where specialist recommendations differ.
    - Ensure all specialist assessment are conducted in accordance with the relevant gazetted protocols (GN 320 and GN 1150). Specialists must be SACNASP-registered where applicable, with certificates attached to their reports. Original signed Specialist Declaration of Interest forms, using the Department's template, must be submitted with the final EIAr and include each specialist's organisation registration, membership number, and status.
    - The cumulative impact assessment must clearly define and, where possible, quantify cumulative impacts, demonstrate how similar developments and specialist recommendations informed the assessment, and ensure that cumulative impact significance guides the need and desirability of the project. It must also include a clear cumulative impact environmental statement on whether the development should proceed.
    - The final EIAr must include an undertaking under oath or affirmation by the EAP, administered by a Commissioner of Oaths, and provide the EAP's details and expertise, including a curriculum vitae, to comply with Appendix 3 of the NEMA EIA Regulations, 2014.
    - The Public Participation Process must be conducted in terms of the relevant Regulation.
    - Submit all stakeholder comments and proof of correspondence with the EIAr, and ensure all issues raised by I&APs and organs of state are fully addressed in a separate CRR that uses the required table format and includes verbatim comments with clear individual responses.

- Include all original comments, minutes, attendance registers, and evidence of attempts to obtain comments, as well as written notices of the EIAr's availability.
- The EMPr must comply with Appendix 4 of the EIA Regulations, 2014.
- For substations and overhead electricity transmission/distribution infrastructure triggering listed activities, the generic EMPr must be submitted alongside the facility-specific EMPr with the final report.
- The EIAr must include technical details of the proposed facility in a table format, showing descriptions and dimensions.
- The final EIAr must state the period for which Environmental Authorisation is required and the anticipated completion date of the activity.
- Should there be significant changes or new information that has been added to the EIAr or EMPr which changes or information was not contained in the reports or plans consulted on during the initial public participation process, you are required to comply with Regulation 23(1)(b) of the NEMA EIA Regulations, 2014.
- Ensure compliance with the relevant Regulations related to timeframes as failure to meet the required regulatory timeframes may result in the application lapsing.
- No activities may commence before Environmental Authorisation is granted as per Section 24F of NEMA.
- Provide a description of feasible and reasonable alternatives, including their environmental and community impacts, or submit proof and justification if no alternatives exist.
- Submit landowner consent for all affected properties.
- Confirmation was provided that an Off-Road Vehicle (ORV) Permit may be required for machinery operating within the coastal zone and details for engaging the Sub-Directorate: Coastal Protection and Development were supplied.
- The following specialist assessments have been proposed and will be undertaken: Marine and Estuarine, Avifauna, Socio-Economic, Terrestrial Biodiversity, Plant and Animal Species, and Archaeological, Cultural Heritage and Palaeontology. In addition, Compliance Statements will be undertaken for Agriculture, Landscape and Visual, Civil Aviation, Relative Defence, Noise, Radio Frequency Interference, Hydrology and Geotechnical aspects.

- **Department Forestry, Fisheries and Environment: National Infrastructure Projects, Integrated Environmental Authorisations**
  - Advised that the national Screening Tool must be run twice (for two categories Solar and Desalination), with both reports submitted alongside an Site Sensitivity Verification (SSV) for all identified environmental themes, to confirm or dispute the Screening Tool's sensitivity ratings and guide the need for specialist studies in line with the relevant assessment protocols.

- **Department of Forestry, Fisheries and the Environment: Oceans and Coasts—Coastal Development & Protection**
  - The Directorate confirmed that no delineated Coastal Public Property (CPP) boundary exists within ports, and as a result, Activities 15 and 52 of Listing

Notice 1 have been excluded from the proposed development's listed activities.

- **Department of Forestry, Fisheries and the Environment: Oceans and Coasts—Coastal Development & Coordination**
    - During site visit, requested detail on the intake and outfall engineering design, such as length of pipeline into estuary, material to be used, anchorage to estuarine/ seabed, whether pipeline will be laid above or below ground, etc.
    - Based on the submitted Draft Environmental Impact Report with associated reports and the site inspection conducted on the 28th of October 2025, the Branch has no objections to the proposed development and presents the comments stipulated below for consideration.
    - Include possible installation alternatives and distances for the submerged intake pipe; minimal additional alteration to the already modified estuarine banks is expected.
    - Intake structures should avoid sensitive areas and high biodiversity zones; clarification needed on whether an intake screen or low intake velocity will adequately protect larvae and juvenile fish.
    - The intake pipe should have a strainer barrier as a mitigation measure to prevent organisms from being drawn in.
    - Clarify whether brine will be treated or discharged via a diffuser system, including design and operational details to assess environmental impacts.
    - Effluent concentration, volume, and timing will be regulated through the CWDP and no comments have therefore been provided on these aspects.
    - Consider how recreational fishing activities around the outfall area will be accommodated during operations.
    - Ground-truthing is needed to verify brine dilution models; continuous monitoring should be maintained as outlined in the EIA.
    - Operational monitoring must ensure brine discharge complies with the CWDP, meets water quality guidelines, and promptly addresses any impacts.
    - Vehicle use in the modified coastal public property within the harbour is permitted without a separate permit.
    - The applicant must adhere to NEMA Section 28(1) Duty of Care to prevent, minimize, and remediate environmental damage.
    - No activities outside the scope of the application may commence before Environmental Authorisation is granted under Section 24F of NEMA.

- **Department Forestry, Fisheries and Environment, Directorate: Protected Areas**
    - The Directorate requested that Outfall Alternative 3 be diverted away from the Potters Pass Nature Reserve/ excluded to avoid any degradation in the protected area.
    - The EAP must further consult the management authority of the Potters Pass Nature Reserve and the Amathole Marine Protected Area.
    - The directorate has no further comments subject to availability of new information.

- The applicant must strictly adhere to the mitigation measures and recommendations from other stakeholders, interested and affected parties
- After reviewing the draft EIAr the Directorate noted that Alternative 3 (Outfall) had been removed to avoid potential impacts on the Potters Pass Nature Reserve and indicated that it had no further comments.

- **Department of Forestry, Fisheries and the Environment: Biodiversity Conservation**
  - The Directorate acknowledged receipt of the invitation, allocated the project to Mrs M Rabothata and Ms Lindiwe Dlamini, and requested the shapefiles of the development footprint.
  - They raised no objections to the Draft Scoping Report and Plan of Study, but noted that the EIA report must comply with assessment procedures and reporting requirements under NEMA.
  - All Biodiversity EIA documents and queries must be directed to Mr Seoka Lekota at BCAdmin@dffe.gov.za.
  - After reviewing the draft EIAr the Directorate noted that the proposed development is situated within a highly sensitive terrestrial environment (Critical Biodiversity Area 1), including portions of the Critically Endangered Umtiza Forest Thicket. Despite this, the site has undergone significant historical transformation and is largely isolated from surrounding natural habitats due to urban, residential, and industrial impacts, leading to a loss of ecological connectivity and functions. The area is further degraded by invasive alien vegetation, while the adjacent port is highly modified and subject to ongoing industrial and shipping disturbances, though indigenous plant species sensitivity is very low. The site also falls within a vulnerable marine environment, influenced by the endangered Buffalo River Estuary and a vulnerable section of coastline, but is not part of a Strategic Water Source Area. The Directorate recommends that measures be implemented to maintain ecological functioning and connectivity.
  - Implement an EMPr to protect marine and estuarine ecosystems by minimizing topsoil runoff, preventing pollution and spills, managing stormwater, establishing buffer zones, rehabilitating disturbed areas, controlling invasive alien plants, maintaining ecological flows, and complying with NEMBA and the Integrated Coastal Management Act.

- **Department of Water and Sanitation: Water Use Authorisation**
  - Confirmed that a WUL would not be required for the development, as the estuary is not classified as a water source under the National Water Act (NWA, Act 36 of 1998).

- **Department of Water and Sanitation: Eastern Cape (Regulation, Compliance & Enforcement)—Water Use Authorisation**
  - Specific concerns/ queries included:
    - The quality of intake water and potential risks from sewage, harbour pollution, and oil spills;
    - Brine disposal in a sheltered area up-current of the Buffalo River Estuary;
    - The processes of remineralisation or blending; and

        - The potential for the project to be upscaled to serve the city.
- **The Sarah Baartman District Municipality and the Nelson Mandela Bay Metropolitan Municipality**
    - The Municipality noted that they do not cover the district in which the project falls and therefore forwarded the notice to the relevant DFFE representatives within the appropriate district municipality.

- **Amathole District Municipality: Environmental Affairs**
    - They acknowledged receipt of the Draft Scoping Report and indicated they would review and provide comments within the stipulated timeframe. However, no further comments were received.

- **National Transmission Company South Africa SOC Ltd (NTCSA); Grid Planning: Land and Rights**
    - Had a general query in which they requested a Keyhole Markup Language Zipped (KMZ) to view the project area.

- **Eastern Cape Provincial Heritage Resources Agency (ECPHRA)**
    - Noted that the project would be discussed at the ECPHRA Archaeology, Palaeontology and Meteorites Committee (APM) committee meeting on 18 March, and that a heritage comment will follow.
    - ECPHRA shared the project with the South African Heritage Resources Agency's (SAHRA's) Marine Underwater Unit.
    - Official comment: ECPHRA requests a completed Notice of Intent to Develop (NID) form, proof of payment, and a Phase 1 HIA (including archaeological, palaeontological, and maritime desktop and field assessments) compiled by qualified specialists to SAHRA standards.
    - SAHRA requires a separate South African Heritage Resources Information Systems (SAHRIS) application and will issue an official comment with their requirements once reviewed.
    - In an interim comment dated 25 April 2025, SAHRA responded to the Scoping Report by requesting the submission of this Heritage Impact Assessment (HIA) and the draft EIAr, before providing further comments on the proposed development.
    - The ECPHRA, in its response dated 4 April 2025, also requested a HIA to cover all aspects of development and comprising:
        - A Phase 1 AIA (Archaeological and Cultural Heritage Impact Assessment), including a desktop/pre-feasibility and field assessment.
        - A Phase 1 PIA (Paleontological Impact Assessment) including a desktop/pre-feasibility and field assessment.
        - A desktop maritime and underwater cultural heritage assessment.
    - Waiver from the requirement to conduct a palaeontological field assessment as part of the HIA was granted by ECPHRA on 26 June 2025 (response to a request lodged by the heritage specialist with the ECPHRA on 20 May).
    - After reviewing the draft EIAr, the following has been noted: The Phase 1 Archaeological Impact Assessment (including maritime and cultural components) and the desktop Paleontological Impact Assessment were reviewed and accepted by ECPHRA in 2025. The development may

proceed, subject to adherence to specialist and ECPHRA recommendations.

- General Pre/Construction Phase Requirements
  - Notify ECPHRA of project commencement or share schedule and Environmental Authorisation.
  - Submit a detailed heritage Chance Finds Procedure (CFP) for ECPHRA approval before construction.
  - Conduct heritage induction and training for ground crew, including the ECO.
  - Notify SAHRA and ECPHRA of any shipwreck finds.
  - Have a palaeontologist on-site to monitor excavations.
  - Share heritage monitoring reports with ECPHRA.
- Post-Construction Phase Requirements
  - Submit a final heritage compliance report to ECPHRA.
- Specialist Guidance
  - Palaeontology
    - ❖ Small chance of fossils in the Nanaga Formation aeolianites and Middleton Formation bedrock. Implement a palaeontological Chance Find Protocol in the EMPr.
    - ❖ Any fossils discovered must be rescued, reported to SAHRA and ECPHRA, and deposited in a suitable curatorial institution with contextual information.
  - Maritime Archaeology
    - ❖ Shipwrecks are generally large and visible; pre-installation surveys should identify any material. Implement construction exclusion zones around wrecks, marked as no-go areas on project mapping.
    - ❖ If unknown wrecks or debris are found during installation, cease work and notify the maritime archaeologist and SAHRA for assessment.
  - Terrestrial Archaeology
    - ❖ If pre-colonial or historical sites/material are encountered, cease work, cordon off the area, and call a qualified archaeologist and notify SAHRA and ECPHRA; human remains require immediate cessation of activities and secure the site until assessed.

- **South African Heritage Resources Agency (SAHRA)**
  - Interim Comment: The SAHRA Development Applications Unit (DAU) noted that a Maritime and Underwater Cultural Heritage Impact Assessment (MUCHIA) and PIA had already been commissioned and carried out, but that they require the submission of said reports along with the draft EIA report before providing further comments on the proposed development. Further comments would be issued upon receipt of the above reports.
  - Final Comment: SAHRA requested the MUCHIA, PIA, and draft EIA before providing comments, and the reports were submitted in October 2025. The heritage assessment found a low likelihood of significant archaeological finds, as the desalination plant and pipelines are located on highly modified or disturbed areas, though historical records note some shipwrecks

nearby. Any newly identified wrecks must be avoided, reported, and included in the EMPr with chance finds procedures. The palaeontological assessment indicated low sensitivity for the Nanaga and Middleton Formations on site. Overall, potential impacts on heritage and palaeontology are considered low, with chance finds procedures recommended.
    - DAU has no objections to the proposed development.
    - Heritage specialist recommendations are supported and must be followed.
    - Any uncovered shipwrecks or related artefacts must be reported to a maritime archaeologist, and a report submitted to SAHRA.
    - Fossil Chance Finds Procedure must be included in the EMPr.
    - Any archaeological evidence (structures, ceramics, bones, artefacts, etc.) must be reported to SAHRA; non-compliance is an offence.
    - Unmarked human burials must be reported immediately to SAHRA; non-compliance is an offence.
    - Professional archaeologists or palaeontologists must be contracted if heritage resources are uncovered, with a Phase 2 rescue operation if needed and permitted by SAHRA.
    - Submission and record: Final BAR and EMPr must be submitted to SAHRA for record purposes.
    - The Environmental Authorisation decision must be communicated to SAHRA and uploaded to SAHRIS.

- **Protea Pipeline Services**
    - Submitted a general query regarding interest in the project.

5 ASSESSMENT OF ALTERNATIVES AND PROPOSED DEVELOPMENT FOOTPRINT

This section outlines the process followed to reach the preferred alternative and the proposed development footprint within the approved site, provides the motivation for this choice, and includes a concluding statement indicating the preferred location. It discusses site, layout, water supply, power supply, technology and design alternatives. It also highlights any deviations from the approved scoping report and provides a motivation for such deviation. For a detailed discussion of all the alternatives considered, please refer to the Final Scoping Report.

5.1 DEVELOPMENT SITE AND LAYOUT ALTERNATIVES

During the Scoping Phase, several alternative sites and configurations for the Reverse Osmosis (RO) and solar plant, as well as for the seawater intake and brine outfall infrastructure, were assessed within the Port of East London (Figure 5.1).

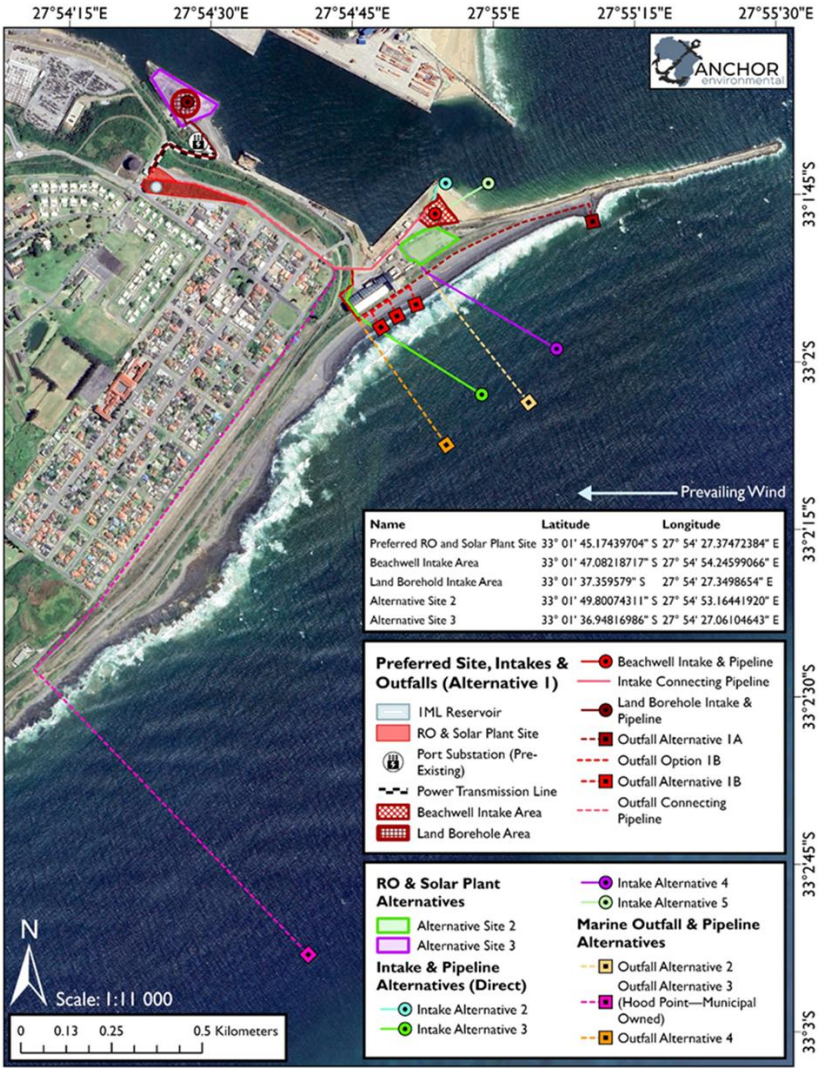

Figure 5.1. Alternatives Development Layouts considered during the Scoping Phase.

Figure 5.1 illustrates all alternatives previously considered during the Scoping Phase, including the initially preferred layout (shown in red) and other alternatives indicated in different colours. A multi-step process was used to screen out alternatives and select the preferred development layout and final site footprint. The screening relied mainly on engineering feasibility studies and environmental sensitivity assessments, with specialist input used to confirm or refine the preferred option.

During the initial 2025 EIA process, the originally preferred intake and outfall configurations were once again revised following engineering design refinements and layout optimisation. The resulting final preferred layout has been carried forward and forms the basis of assessment for the current 2026 Environmental Impact Assessment (EIA) process (Figure 5.2 and Figure 5.3).

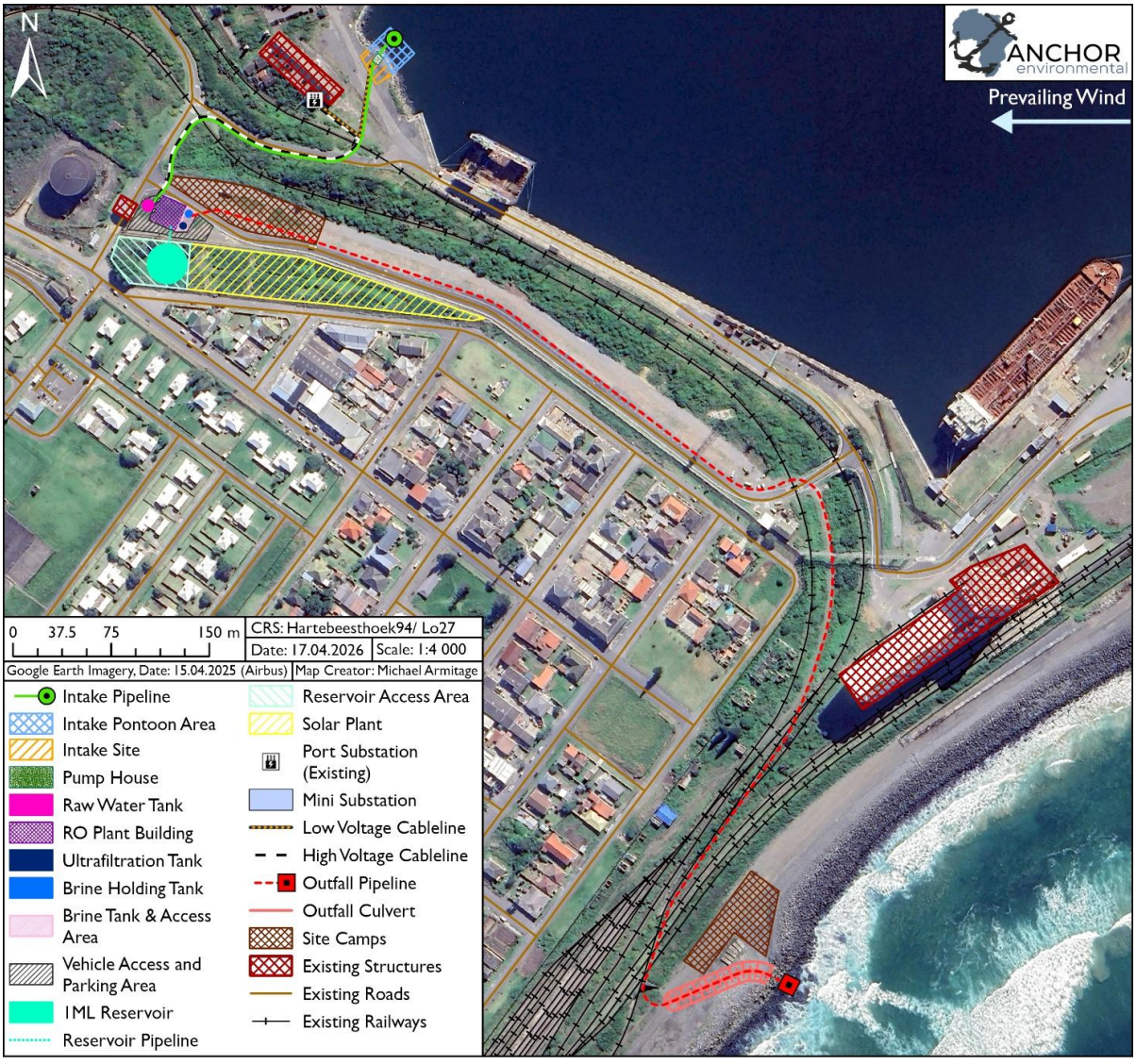

Figure 5.2. Preferred development layout for the Solar & RO Desalination Plant and Intake and Outfall Pipelines and associated Infrastructure/ Structures.

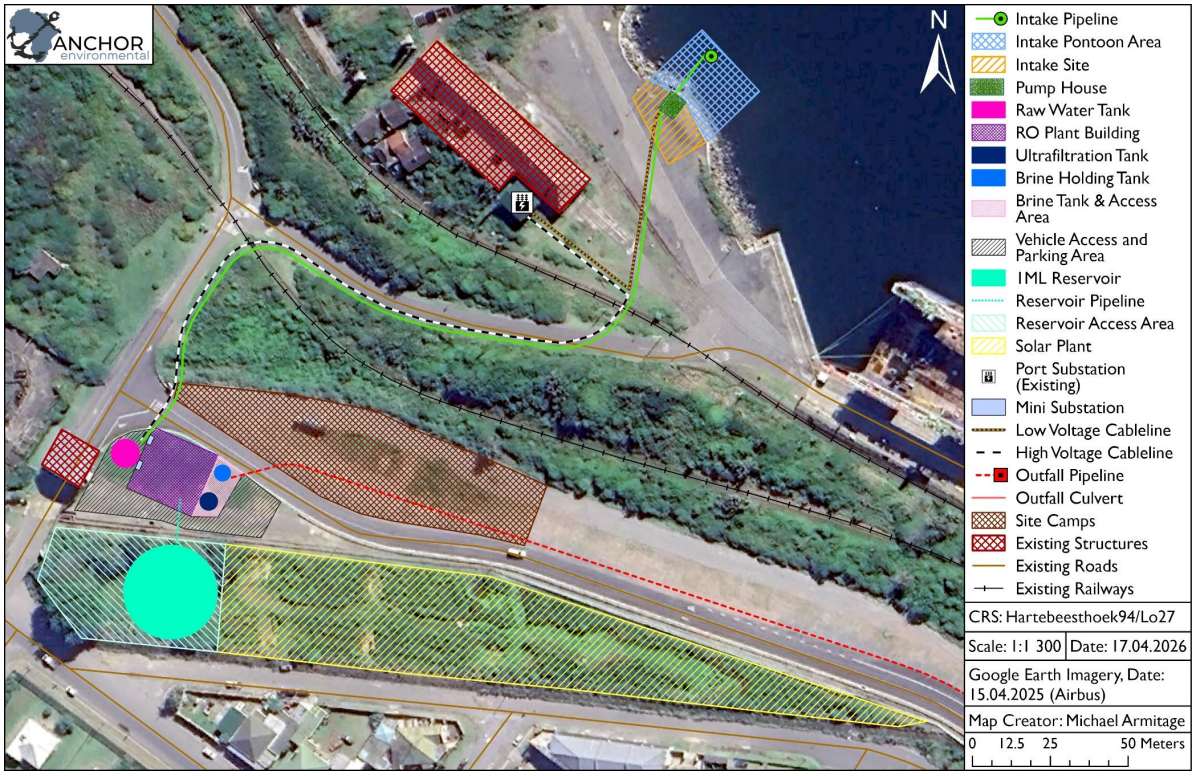

Figure 5.3. The proposed intake, RO Plant, Solar Plant, and all supporting infrastructure.

5.1.1 Methodology to Assess Development Layout Alternative

The approach to identifying and refining the final layout involved the following steps:

- Initial site screening using a Site Selection Matrix, informed by the engineers and the Environmental Assessment Practitioner (EAP) during the Site Sensitivity Verification (SSV).
- Detailed on-site engineering feasibility studies.
- Environmental sampling and surveys.
- Specialist studies and impact assessments.
- Description of the affected environment.
- Input from the Scoping Phase Public Participation Process (PPP).

The site screening process included the identification and evaluation of the potential intake, brine discharge and desalination/solar plant sites. For the solar/RO plant, the Site Selection Matrix considered a set of parameters with weighted importance (Table 5.1). Each site was scored from 1 to 5, with lower scores indicating less preferred options. This process was undertaken jointly by the engineering team and the EAP as part of the SSV (Appendix 6). Note that this SSV has been updated since the Scoping Phase to reflect specialist input and findings.

Table 5.1 Parameters considered in the screening exercise, and their percentage contribution to the final score (weight % Importance).

Screening Criteria/ Parameter	Description	Weight %
Seawater Intake	Distance and accessibility of the site from preferred intake. Preference for shorter, linear pipelines without infrastructural obstacles and minimal road crossings.	100
Brine Discharge	Distance and accessibility of the site from preferred discharge area. Preference for shorter, linear pipelines without infrastructural obstacles and minimal road crossings.	100
Site Elevation (relative to Discharge Zone)	Elevation of the site in relation to the proposed brine discharge area (higher elevation, less pumping requirement for highly saline brine due to natural static head). 50% weight importance as can be counteracted with larger pumps.	50
Land Shape and Topography	Considers shape and topography of the site, especially land gradient - preference for regular shapes and near-flat topography for ease of process flow and plant and pipe construction. 75% weight importance as plant configuration can be adapted to a degree.	75
Land Area Availability for both Solar & Process Plant	Considers the site area and whether sufficient for the solar photovoltaic (PV) plant next to the desalination plant to reduce transmission losses and additional electrical work. Site area requirement is at least 0.7 hectares based on initial calculations.	100
Solar Plant Shading Potential	Considers the shading potential on solar panels due to infrastructure and land topography. The recommended maximum shading loss percentage for a solar plant is typically up to 3-5%. This threshold ensures that the efficiency and overall energy yield of the solar power system remain high. Shading can significantly reduce the performance of a solar PV system, as even minor shading can impact the entire array's output due to the interconnected nature of the cells and modules.	100
Land Readiness	Considers the current physical state of the site and its readiness to be utilised for a desalination plant development. Aspects such as vegetation, ground condition and existing structures were considered.	50
Proximity to Environmentally Sensitive Sites	Considers the distance of the site to environmentally sensitive sites as screened and analysed by the appointed environmental consultants (using the Department of Forestry, Fisheries and the Environment's (DFFEs) Legislated Screening Tool), which includes a desktop study and site visit and resulting in a high-level environmental score (Site Sensitivity Verification).	100
Proximity to Hydraulic Network	Considers the distance of the site to the hydraulic network within the port for injection purposes (to be modelled by the appointed Hydraulic Modelling Consultant). 75% weight importance as can inject at another point if need be.	75
Flood Risk	Considers the future flood risk of the site based on screening by appointed environmental consultants. 50% weight importance as it is a long-term climate change concern.	50
Site Safety	Considers the location of the site in terms of safety, especially with regards to solar panel theft and future operational safety. 25% weight importance as measures can be put in place to counteract.	25

The most suitable intake, outfall and plant site options were then carried forward for more detailed feasibility investigations, which included:

Seawater Intake Site(s)

- Hydrogeological Study, including borehole drilling & testing
    - Water Yield & Quality Testing (Beach well Intake Evaluation)
- Land Surveying
- Two- to three-month in-situ water quality monitoring (direct intake evaluation).

Brine Discharge Area(s)

- Two- to three-month in-situ Acoustic Doppler Current Profiling (ADCP).
- Water quality and biotic monitoring at multiple offshore sites
- Sediment and macrofauna sampling at multiple offshore sites

Identification & Evaluation of suitable Process Plant Site(s)

- Land Surveying
- Hydraulic Modelling
- Geotechnical Study
- Detailed Infrastructural Survey
- Process Design & Layout

In parallel, a suite of specialist studies (e.g., terrestrial ecology, avifauna, marine ecology, heritage) was undertaken as part of the EIA to confirm the feasibility and environmental acceptability of the proposed layout and to identify buffers or areas to avoid. A summary of these studies, including impact assessments and mitigation measures, is provided in Section 9, with full reports in Appendix 7 – Appendix 13. The description of the affected environment in Section 8 also informed the layout refinement. In addition, public input obtained during the Scoping Phase PPP contributed to identifying and evaluating alternatives (see Final Scoping Report available at https://anchorenvironmental.co.za/public-documents). The EIA PPP will provide further opportunity for stakeholders to comment on the proposed layout and footprint (refer to Section 4).

5.1.2 Outcomes and Motivation for the Preferred Development Layout

RO & SOLAR PLANT SITE

The assessment indicated that Alternative Site 2, followed by Alternative Site 1, achieved the highest scores for site suitability (Table 5.2). The lowest-ranked site was screened out early and not taken forward into the Scoping Process. Although Site 2 achieved the highest ranking, it has been earmarked for another development. Due to uncertainty about its availability, Site 1 was selected as the preferred site.

Table 5.2. Outcome of Site Screening: Site Evaluation Screening Scorecard. Scores are as follows: 1 (red)= least preferred (lowest score); 5 (green) = more preferred (higher score). The sites have been ranked in terms of their suitability, based on the final scores, as indicated in the last line.

	Alternative 1 (Preferred) (Entrance Adjacent)	Alternative Site 2 (Silo Adjacent)	Alternative Site 3 (Old Shipyard)	Additional Site Screened out Railway Adjacent)
Seawater Intake (Distance & Accessibility)	1	4	1	1
Brine Discharge (Distance & Accessibility)	2	4	1	1
Site Elevation	5	1	1	1
Land Shape & Topography	3	5	5	2
Land Readiness	3	3	1	3
Land Area Availability for both Solar and Process Plant	3	4	5	1
Site Safety	4	5	4	4
Solar Plant Shading Potential	5	5	5	5
Environmental Sensitivity	4	4	1.33	2.67
Flood Risk	5	4	4	4
Proximity to Hydraulic Network (For Injection)	5	5	5	5
SCORE	28.5	33.75	24.83	20.92
MAX POSSIBLE SCORE	46.25	46.25	46.25	46.25
PERCENTAGE SCORE	61.6%	73.0%	53.7%	45.2%
Ranking for Site Suitability for further On-site Studies	2	1	3	4

PREFERRED INTAKE METHOD

Initially, beach wells and land boreholes were identified as the preferred intake method. This option offered natural pre-filtration, which could reduce filtration requirements, equipment needs, chemical use, and energy costs. Desktop studies suggested that this intake method would be feasible in terms of yield, water quality, and pre-filtration performance. To confirm technical parameters and finalise the design (including borehole locations, depths, and pipeline lengths), test boreholes were drilled as part of the geotechnical and geohydrology studies. However, test drilling showed that the borehole intake was not viable due to low yield and poor water quality. This outcome required a change in approach to a direct intake. All previously considered direct marine (Alternatives 3 and 4 in Figure 5.1) and estuarine intakes (Alternatives 2 and 5 in Figure 5.1) were screened out due to operational, spatial, and technical constraints within the Port. These included the long pipeline distances between the preferred plant site and the intake points, the need to cross multiple roads and railways, and the added pumping requirements and costs of moving water up to the RO plant. Most of the direct marine intake options were identified based on Site 2 being the initially preferred location. A new direct estuarine intake, located nearest to the selected plant site, was identified and has been assessed by specialists; it is also being considered as part of this EIA (Figure 5.3). A discussion on the deviation from the Scoping Report is provided in Section 5.2.

MARINE OUTFALL

Desalination plants typically discharge brine through marine outfalls rather than land-based methods such as disposal sites or evaporation ponds. This is due to technical, environmental, and operational considerations. Brine volumes are large, making up roughly 55% of the total seawater volume processed, and is highly saline, which makes land disposal and evaporation ponds impractical. In addition, these options can negatively affect soil, groundwater, and local ecosystems, while evaporation ponds would require very large land areas, making them costly and unsuitable. Because

seawater is naturally saline, and the ocean provides opportunities for rapid dilution and dispersion, direct marine discharge is generally the most practical and cost-effective method, especially in coastal locations. For the East London desalination project, no other feasible or sustainable alternatives for brine disposal exist. As a result, only direct marine outfall options were considered.

The key factor influencing the marine disposal of brine from the RO process is dispersion. Without adequate dispersion, brine discharges can have unacceptable impacts on the marine environment. For this reason, the siting and design of a brine outfall has been carefully planned and supported by mathematical dispersion modelling, to ensure that the outlet location and design will not cause significant impacts.

However, alternatives involving seafloor pipelines would result in greater disturbance to marine habitats during construction compared to pipelines located above the rocks of the artificial "rocky beach" within the coastal zone, as proposed for Alternatives 1A and 1B. From an engineering perspective, these alternatives are also more practical and cost-effective, as they require shorter pipeline lengths and avoid construction on the seabed.

Although all outfall alternatives considered during the Scoping Phase were screened out, a revised option within the same vicinity as Alternatives 1B, and following the same concept (i.e. positioned above the dolosse), was subsequently identified, refined, and selected for assessment by specialists. This option is also carried forward in the current EIA process (Figure 5.3). A discussion of the deviation from the Scoping Report is provided in Section 5.2. Furthermore, based on advice from the DFFE Protected Areas Directorate, Outfall Alternative 3 was excluded due to its proximity to Potter's Pass Nature Reserve.

5.1.3 Summary of Screening Process Outcomes

Table 5.3. Summary of Screening Process Outcomes

Project Component & Alternative	Outcome
RO and Solar Plant Sites	
Preferred Alternative (Site 1)	***Selected as the final preferred option. Carried forward to the EIA. Ranked second-best in the Site Selection Matrix.***
Alternative Site 2	Screened out. Earmarked for another potential development.
Alternative Site 3	Screened out. Contains vegetation (including possible Critically Endangered Umtiza Forest Thicket) and several old buildings with heritage value. Would require the most site preparation (vegetation clearance, levelling, demolition).
Water Intake & Pipelines	
Land Boreholes and Beach Wells (original preferred)	Screened out. Test drilling showed low yield and poor water quality, making the option unviable.
Estuarine Direct Intakes (Alternatives 2 & 5)	Screened out due to long pipeline distances, need to cross multiple roads/railways, and added pumping costs. Originally linked to Site 2 as preferred.
Marine Direct Intakes (Alternatives 3 & 4)	Screened out due to long pipeline distances, need to cross multiple roads/railways, and added pumping costs. Originally linked to Site 2 as preferred.
Preferred Direct Estuarine Intake (newly identified)	***Selected as the final preferred option. Carried forward to the EIA. Located closest to the preferred RO and solar plant site.***

Project Component & Alternative	Outcome
Marine Outfalls and Pipelines	
Preferred Marine Outfall (newly identified)	***Selected as the final preferred option and carried forward into the EIA. Most feasible from an engineering and cost perspective, following an optimised route that avoids major physical constraints along the alignment. Avoids construction on the seabed. Placement on the dolosse provides optimal stability, constructability, and maintenance access.***
Outfall 1A (single pipeline, single point)	Screened out. No need to extend that far up the pier from an engineering or cost perspective.
Outfall 1B (branched pipeline, multiple points)	Screened out. A more feasible option ahs been selected.
Outfall 2 (north of grain silo, 500 m offshore)	Screened out. More costly than Alternative 1 and would cause greater habitat disturbance.
Outfall 3 (existing Hood Point municipal outfall, 1.5 km southwest, >1 km offshore)	Screened out. Would require a connecting pipeline from the RO plant. Not practical from an engineering perspective. Excluded based on DFFE advice due to proximity to Potter's Pass Nature Reserve.
Outfall 4 (south of grain silo, 500 m offshore)	Screened out. More costly and environmentally disturbing than Alternative 1.

5.2 Technology, Design and Infrastructure Alternatives

5.2.1 Water Supply Alternatives

Given South Africa's status as a water-scarce country, freshwater resources are increasingly under pressure from competing domestic, industrial and ecological demands. Continued reliance on surface water abstraction and groundwater exploitation has contributed to the overutilisation of available catchments and aquifer systems, resulting in altered hydrological regimes and associated environmental impacts. These pressures are further exacerbated by climate variability and the anticipated increase in the frequency and severity of drought conditions, which are expected to reduce the reliability of rainfall and surface water availability in many parts of the country, including the Eastern Cape.

Within this context, several potential water supply alternatives were considered for the Port of East London, including continued reliance on municipal supply, abstraction of groundwater, and the development of a dedicated desalination facility.

Continued reliance on municipal water supply was not considered a secure long-term option, as existing supply systems in the region are already constrained and subject to periodic shortages and restrictions. Increased reliance on this supply would further strain already stressed water resources and expose port operations to potential interruptions during drought or system failure events.

Groundwater abstraction was also considered. However, available investigations indicate that local groundwater resources are of low yield and variable quality. In addition, any groundwater abstracted for potable or industrial use would still require treatment or desalination to meet applicable water quality standards. Groundwater

resources are therefore not considered a reliable or sufficient standalone supply for the scale and consistency of demand required by port operations.

Desalination was identified as a viable alternative that can provide a reliable, independent water source without placing additional pressure on existing freshwater systems. Seawater is readily available adjacent to the Port of East London, and desalination provides a controlled and scalable process to produce high-quality water suitable for both potable and industrial use. Desalination shifts abstraction away from stressed terrestrial freshwater systems to a more predictable marine source, subject to appropriate environmental management and permitting.

Accordingly, desalination was selected as the preferred water supply option, as it provides a secure and climate-resilient source of water for port operations, reduces reliance on constrained municipal systems, and supports long-term operational continuity and economic stability.

5.2.2 Desalination Technology Alternatives

For desalination, thermal and RO processes were assessed. Thermal desalination involves boiling seawater to produce steam, while RO forces seawater through membranes under high pressure. RO was selected as the preferred technology due to its lower energy requirements, compact design, and higher quality of water produced.

5.2.3 Power supply Alternatives

GRID ELECTRICITY VS RENEWABLE ENERGY

Different power supply options were considered, including reliance solely on municipal grid electricity and reliance solely on renewable energy. Renewable energy refers to energy generated from naturally replenishing resources that are not depleted through use and produce little or no greenhouse gas emissions during operation. Examples include solar, wind, and hydroelectric power. These energy sources provide an opportunity to reduce dependence on the national electricity grid while improving energy security and reducing greenhouse gas emissions.

Reliance solely on municipal grid electricity was not considered the preferred option, as desalination requires a reliable and continuous power supply to operate efficiently. South Africa's electricity network has historically experienced supply constraints and interruptions, which could affect the reliability and resilience of the desalination plant. Furthermore, the national grid remains largely dependent on coal-fired power generation, resulting in a relatively high carbon footprint. Reliance solely on renewable energy, such as solar power, was also not considered feasible, as electricity generation is dependent on weather conditions and daylight hours. Periods of low solar generation, particularly during overcast conditions or at night, could affect the continuous operation of the desalination plant unless significant energy storage infrastructure is provided.

A hybrid power supply option was therefore selected for the desalination plant, incorporating both solar energy and municipal grid electricity.

The RO plant will be primarily powered by the on-site solar PV installation, although certain low-voltage components at the RO plant will rely solely on municipal grid

electricity rather than solar power. During periods when solar generation is insufficient, additional electricity will be drawn from the municipal grid via the existing nearby substation to power the RO plant. The pump station will be powered exclusively by grid electricity.

The hybrid approach reduces reliance on the municipal electricity supply, lowers the carbon footprint associated with the development, improves energy resilience, and reduces operational costs while ensuring a reliable power supply for the facility.

TYPE OF RENEWABLE ENERGY

Several renewable energy technologies were considered, including solar, wind and hydroelectric power. Solar PV was selected as the preferred renewable energy source due to the good solar energy potential (high levels of sunlight) in East London, the relatively small footprint and infrastructure requirements, ease of operation and maintenance, and compatibility with the available development footprint. Solar PV is also a well-established and widely implemented technology, with readily available infrastructure and supply chains, which contributes to overall cost-effectiveness and implementation feasibility. In contrast, wind energy would require larger infrastructure, including turbine installations and associated access and servicing infrastructure, and may be constrained by site-specific engineering and operational considerations within a port environment. Wind energy developments may also trigger additional environmental considerations and assessments, including avifaunal sensitivity and visual impact considerations, which can increase the complexity of project planning and assessment. Hydroelectric power was not considered feasible due to the need for extensive supporting infrastructure and hydraulic conditions, which would be disproportionate to the scale of the proposed development and the available footprint within the port environment.

Solar PV was therefore identified as the most practical, reliable and cost-effective renewable energy option for the proposed development.

SOLAR TECHNOLOGY AND PANEL TYPES

In terms of solar technology, Concentrated Solar Power (CSP) and photovoltaic (PV) systems were considered. CSP typically requires large land areas and significant water for cooling, which is not practical within the constrained port environment at East London. In contrast, PV systems are more cost-effective, scalable, and have minimal water requirements. PV technology was therefore selected as the preferred option.

With regard to panel types, monocrystalline, polycrystalline and thin-film technologies were considered. Monocrystalline panels were selected despite their higher cost, as they offer higher efficiency, greater durability, and higher power output per unit area, resulting in a reduced spatial footprint and fewer panels required for the same energy generation capacity.

5.2.4 INTAKE METHOD AND DESIGN

As discussed previously, beachwells were also considered as an intake method. However, drilling results showed that the borehole intake was not viable due to low yield and poor water quality, and the intake method was subsequently revised to a direct

intake. For the direct intake design, an intake located on the seabed was previously considered, in which the pipeline would have been laid along the estuarine bed and supported at intervals by mass concrete anchor blocks, particularly at the intake point. This option has since been replaced by a pontoon intake system, which is now the preferred alternative (Figure 1.5). This alternative consists of an above-ground pipeline extending from the pump house to the estuary, crossing the existing concrete wharf before sloping down onto the artificial rock layer and entering the estuary, and does not involve any construction on the seabed.

5.2.5 Brine Disposal Method and Design

Desalination produces a concentrated saline by-product (brine) that requires disposal. Alternative brine disposal methods exist in South Africa, some of which include discharge to the marine environment, disposal via municipal wastewater treatment infrastructure or evaporation ponds.

Disposal to municipal wastewater infrastructure was not considered feasible due to the potential operational impacts associated with introducing highly saline water into wastewater treatment systems, and the additional authorisations and approvals that would likely be required from the relevant authorities and infrastructure operators. Evaporation ponds were also not considered feasible due to the large land area required, ongoing maintenance requirements and costs and visual impacts. Given the coastal location of the proposed desalination plant immediately adjacent to a suitable marine receiving environment, discharge via a marine outfall was identified as the most practical and feasible brine disposal option. The marine environment provides a large receiving water body with significant assimilative capacity, allowing rapid dilution and dispersion of the brine.

A detailed marine specialist assessment and brine dispersion modelling were therefore undertaken to evaluate the suitability of marine discharge. The modelling demonstrated that the discharged brine would dilute rapidly within the receiving environment and that salinity levels would return to near-background concentrations within a relatively short distance from the discharge point. The assessment further confirmed that, with the implementation of the proposed mitigation measures and compliance with the conditions of the Coastal Waters Discharge Permit (CWDP), significant impacts on the marine environment can be kept minimal.

Marine discharge via an authorised outfall was therefore selected as the preferred brine disposal option, as it represents the most practical and cost-effective solution for the proposed development and is considered environmentally acceptable, provided that the required mitigation measures, monitoring requirements, and CWDP conditions are implemented.

Several outfall configurations were considered during the design process, including a branched outfall system and a single-pipeline outfall. Alternative outlet configurations, including multi-nozzle diffusers and a single-point outlet, were also considered. The branched outfall option would require additional infrastructure, a larger development footprint, increased construction disturbance, and higher capital and maintenance costs. Based on engineering assessments and the relatively small volume of brine to be discharged, a single-pipeline outfall was considered sufficient to achieve the required discharge objectives. The simpler design also reduces infrastructure requirements and

improves constructability and maintenance. Similarly, multi-nozzle diffusers were considered as an alternative to a single-point outlet. However, brine dispersion modelling demonstrated that the proposed discharge can achieve the required dilution and dispersion performance without the need for diffuser nozzles. As such, a single-pipeline outfall terminating in a single-point outlet was consequently selected as the preferred option.

5.3 Assessment of the No-go Alternative

The No-Go Alternative refers to the potential impacts associated with not pursuing the proposed development, or "doing nothing". It therefore considers the implications of not proceeding with the proposed desalination plant at the Port of East London. Under this scenario, the project area would remain in its current state, with only natural environmental processes and the current port operations continuing to influence the site.

While this alternative would avoid the "Low", "Very Low", or "Insignificant" negative impacts associated with construction and operation (as identified and assessed in the EIA), it would also result in the loss of the associated positive outcomes of the project. These include limited but nonetheless meaningful short-term socio-economic benefits such as temporary employment opportunities, local procurement, and support for existing contractors and service providers in the East London area, even where many of these benefits are assessed as "Low" to "Very Low" in significance.

More importantly, the No-Go Alternative would not address the underlying need and desirability of the project, namely the provision of a reliable and independent freshwater supply to support efficient and uninterrupted port operations. The absence of such a supply would maintain continued reliance on constrained municipal systems, leaving port operations vulnerable to supply interruptions and water restrictions.

The primary consequence of the No-Go Alternative would therefore be the forfeiture of both the limited socio-economic benefits associated with construction and operation, and, more significantly, the strategic benefit of securing a reliable water source for the Port of East London and its tenants.

In addition, the absence of the project would exclude potential cumulative benefits associated with improved port efficiency and resilience, including synergies with other planned infrastructure upgrades such as the Proposed Replacement of Quay Wall 3 and 4. This would, in turn, limit the port's broader contribution to economic activity and growth within East London and the Buffalo City Metropolitan Municipality.

Overall, while the No-Go Alternative would avoid the identified minor environmental impacts, it would also prevent the realisation of both direct and strategic benefits associated with improved water security and port functionality, and is therefore considered the less preferable option.

5.4 Concluding Statement Indicating the Preferred Alternatives and Location

In conclusion, the preferred development layout and final site footprint has been identified through a multi-step assessment process. The final layout is presented in Figure 5.2. This process was guided primarily by detailed engineering feasibility studies, supported by specialist assessments, environmental input from the EAP, and outcomes of the Scoping Phase alternatives assessment. Key considerations included the suitability of seawater intake and brine discharge sites relative to the estuarine and marine environment, geotechnical conditions, water quality and yield, site elevation and topography, operational safety, infrastructure integration within the Port environment and spatial requirements for both the solar and process plant component.

Technology, design, and infrastructure alternatives were also considered throughout, including water supply alternatives (desalination, municipal supply or abstraction), desalination technology options (RO vs thermal processes), renewable energy options (solar or wind), intake methodologies (abstraction vs intake from marine environment), and brine disposal configurations, to ensure that the final design represents a technically feasible and environmentally acceptable solution.

Environmental sensitivities were integrated throughout the process to ensure that the layout is both technically viable and environmentally responsible. Broader water supply alternatives were considered, including continued reliance on municipal supply and groundwater abstraction. However, these were found to be constrained by existing supply limitations, variability, and insufficient yield or quality, reinforcing desalination as the most reliable long-term solution for port operations.

Several site and configuration options within the Port of East London were assessed, with less suitable alternatives screened out based on engineering constraints, environmental considerations, operational feasibility, and permitting requirements. The final preferred option reflects a balanced outcome between technical practicality, environmental acceptability, and long-term operational resilience.

Overall, the preferred development footprint represents the most feasible and sustainable option for the proposed desalination facility within the Port of East London.

5.5 Deviation of Project Layout from the Approved Scoping Report

There is a minor deviation in the project layout presented in the current Draft Environmental Impact Assessment Report (EIAr) compared to that included in the Final Scoping Report (Figure 5.4). While the preferred site alternative identified during Scoping has been retained and forms the basis of this EIA, the intake and outfall locations have been refined and updated.

Initially, beach wells and land boreholes were identified as the preferred intake method (blue areas in top image in Figure 5.4). Desktop studies suggested this approach would be feasible in terms of yield, water quality, and pre-filtration performance. Test boreholes were drilled as part of geotechnical and geohydrology studies to confirm technical parameters and finalise the design, including borehole locations, depths, and pipeline lengths. However, test drilling revealed that the borehole intake was not viable due to low yield and poor water quality, necessitating a change to a direct intake. This outcome was unexpected and required a change in approach to a direct intake.

All previously considered direct marine and estuarine intake options were initially based on Alternative Site 2, which represented the preferred intake location at the time but was later screened out due to allocation for another project. These intake alternatives were subsequently excluded due to operational, spatial, and technical constraints within the Port, including excessive pipeline lengths between the revised plant site and intake locations, multiple crossings of roads and rail infrastructure, and increased pumping requirements and associated costs. A new direct estuarine intake, located closest to the selected plant site, was therefore identified (green line in the bottom image in Figure 5.4). This is the intake option considered in the current EIA.

In terms of the outfall, all alternatives considered during the Scoping Phase were initially screened out. However, a revised option within the same vicinity as Alternative 1B, and following the same concept (i.e. positioned above the dolosse), was subsequently identified (Figure 5.4). It represents the most feasible solution from an engineering and cost perspective, following an optimised route that avoids major physical constraints along the alignment. It also avoids construction on the seabed, thereby reducing potential marine disturbance. The placement on the dolosse further provides optimal stability, constructability, and long-term maintenance access. This is the outfall option considered in the current EIA.

Based on the EAPs assessment and input from specialists, it was not necessary to repeat the scoping phase. All relevant specialists (Heritage, Palaeontology, Terrestrial Biodiversity; Birds, Plants, and Animals; Marine; and Socio-economic) have been informed of the updated layout and conducted their assessments accordingly. These changes have not affected the scope, findings, or outcomes of their studies, nor the identification or assessment of impacts. The initial Scoping Phase considered the broader Transnet National Ports Authority (TNPA) port area, assessing all likely impacts not just for the potential layout alternatives, but across the entire site. As such, the change to this direct intake and the outfall location did not introduce new potential impacts or extend the scope beyond what was originally assessed including that of the project footprint. Confirmation was also obtained from the DFFE on 15 July 2025 that the Scoping Phase does not need to be repeated.

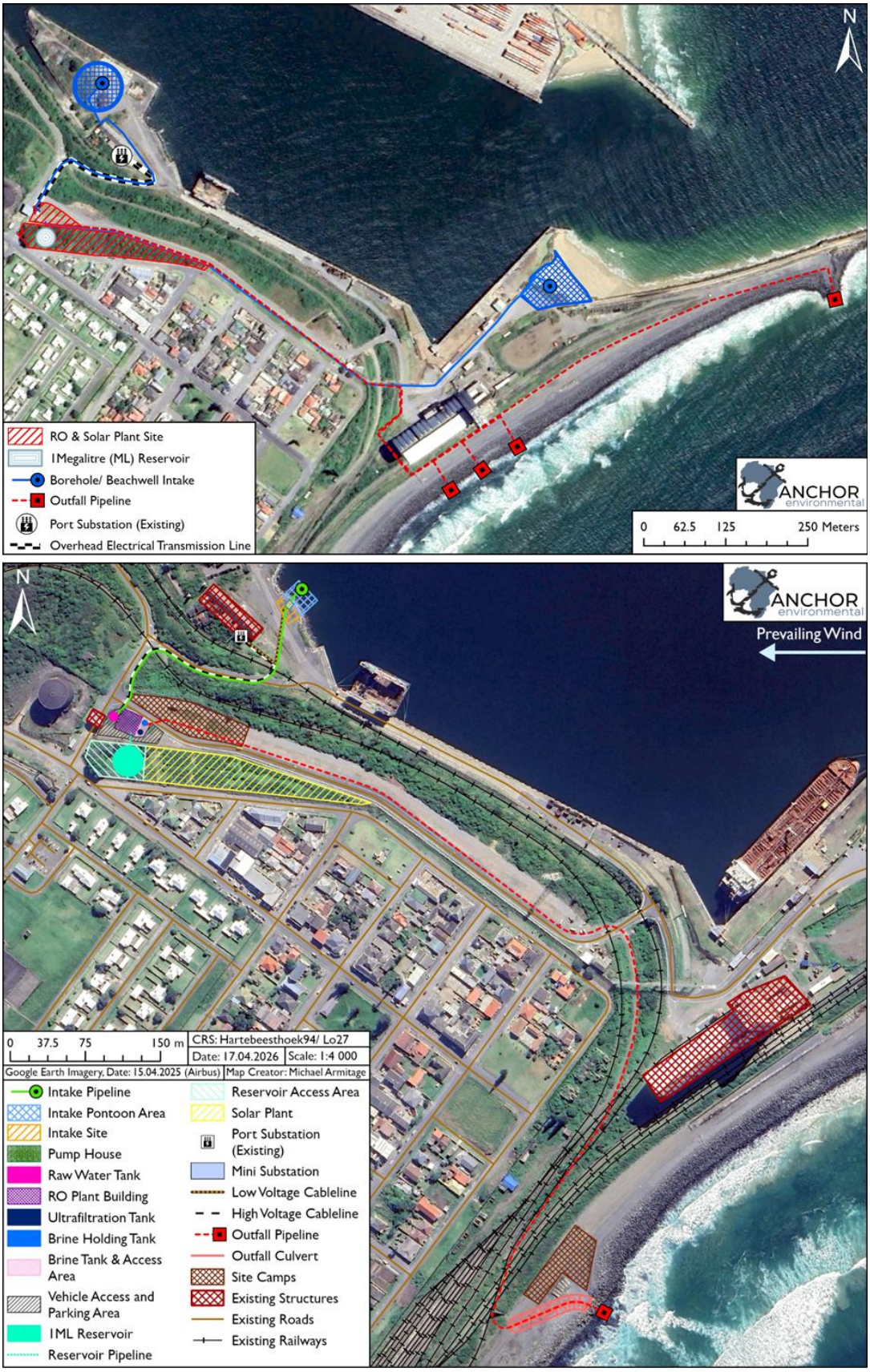

Figure 5.4. Preferred project layout considered in Scoping phase (top) vs the current preferred project layout assessed as part of the EIA (bottom).

6 NEED AND DESIRABILITY OF THE DEVELOPMENT

6.1 DESALINATION IN RELATION TO SOUTH AFRICA'S WATER AND ELECTRICITY SUPPLY

Given that South Africa is considered a water-scarce country, with social, industrial, and ecological users all competing for the same limited fresh water supply, the current and projected demand for high-quality fresh water is rapidly exceeding the available supply throughout many areas of the country. Consequently, over-exploitation of current freshwater resources commonly occurs. Addressing these concerns is predominantly done through the damming and abstraction of surface waters derived from the country's many catchments, as well as the abstraction of ground water within aquifer systems. Unfortunately, such overexploitation frequently leads to alterations in surface flow regimes and groundwater characteristics, which can both have harmful environmental and ecological effects. Beyond the harm induced upon environmental and ecological receptors, humanities' propensity to alter and exploit freshwater system also has the potential to place human lives, properties, and settlements at risk due to the loss of natural ecosystem functions, processes, and ecosystem services. Furthermore, as the 21st century proceeds, it is anticipated that the effects of global climate change will be felt to ever-greater degrees, with predictions and models indicating that rainfall regimes are likely to shift, and for climatic events (such as freak floods and prolonged droughts) to become more extreme and frequent. South Africa is predicted to experience a more erratic climate and see a reduction in average rainfall, yet this is expected to vary between the countries varying rainfall zones. A reduction in the predictability and reliability of rainfall, coupled with the already stressed nature of many of our sensitive water resources, is therefore concerning for both current and future economic growth, and the continued existence of our sensitive and unique natural systems.

One potentially viable solution to address this problem is the development of new water sources that do not place additional pressure on existing supplies. Desalination is one such option. It is a treatment process in which salts are removed from saline (salty) water, typically seawater, to produce freshwater. This allows a new water supply to be generated from water that would otherwise be unsuitable for human consumption, industry, or agriculture. Desalination can also be adapted to different needs and applications, including producing potable water for households, providing freshwater for industrial and chemical processes such as the production of Green Hydrogen gas, which has the potential to drive economic growth in South Africa, as well as supporting a range of other uses.

Beyond alleviating pressure on already-strained water resources, securing an independent water source is particularly valuable for businesses and industries. It reduces reliance on external service providers, such as municipalities, which may only supply water intermittently or volumes insufficient for the optimisation of chemical/ industrial processes. This, in turn, has knock-on effects to profitability and economic growth.

The most widely used desalination technology is Reverse Osmosis, as discussed in Section 1 above. A challenge associated with desalination is that it requires a continuous and reliable supply of electricity to operate efficiently. In South Africa, electricity supply has historically been affected by generation and distribution constraints, resulting in periodic power interruptions. As a result, many industries have invested in independent or supplementary power supplies to improve operational reliability. Similarly, desalination plants may require a dedicated or alternative power source to ensure uninterrupted operation and a consistent supply of freshwater.

The source of electricity used to power a desalination plant is an important consideration when assessing its overall sustainability. Although desalination provides a reliable source of freshwater, it is an energy-intensive process. Where this electricity is generated from fossil fuels, particularly coal, the environmental benefits associated with improving water security are offset by increased greenhouse gas (GHG) emissions. In South Africa, where the national electricity grid remains predominantly coal-based, the carbon footprint associated with conventional grid-powered desalination is comparatively high. Consequently, reducing reliance on fossil fuel-derived electricity through the incorporation of renewable energy is an important consideration in improving the long-term environmental sustainability of desalination projects.

Renewable energy refers to energy generated from naturally replenishing resources that are not depleted through use and produce little or no greenhouse gas emissions during operation. Examples include solar, wind, and hydroelectric power. These energy sources provide an opportunity to reduce dependence on the national electricity grid while improving energy security and reducing greenhouse gas emissions. Their integration therefore not only enhances the reliability of desalination systems but also supports South Africa's transition towards a lower-carbon and more sustainable energy future.

6.2 The Context of East London

East London is a coastal city within the Eastern Cape Province of South Africa. The city is divided in its centre by the Buffalo River Estuary, which originates in the Amatole Mountains (Department of Environmental Affairs, 2018). The Buffalo River flows for 125 km and passes through King Williams Town, Zwelitsha and Mdantsane, before reaching its estuary in East London and ultimately discharging into the Indian Ocean.

The Buffalo River has been greatly altered from its natural condition, primarily due to flow modifications related to damming and freshwater abstraction (Van Niekerk et al., 2019a). Despite not being the sole freshwater source in East London, the Buffalo River and its tributaries feed several major dams within the Amatola Water Area, including the Rooikrans Dam, Laing Dam, and Bridle Drift Dam, which contribute towards East London’s water supply (Figure 6.1). Unfortunately, the Amatola Water Area has been struck by severe droughts in the years preceding this application, which has led to water shortages and the adoption of water restrictions.

Figure 6.1. Amatola Water Area Map (Amatola Water 2024).

6.3 Motivation for the Proposed Development

There is a need to establish a secure and sustainable supply of clean, high-quality water for port operations, including both potable (drinking) and industrial use, while alleviating pressure on existing municipal systems. Municipal supply in East London is already constrained due to overexploitation of catchments and prolonged droughts. Reliance on this supply places port operations at risk of interruption, which could negatively impact local industry, trade, and employment that depend on the functioning of the port. To address these constraints and ensure reliable water provision for both current and future port activities, the development of a solar-powered desalination plant within the Port of East London has been proposed. This approach directly responds to national and regional priorities relating to water security, economic resilience, and sustainable infrastructure development. By generating an independent water source, the project supports the continued viability of the port, which is a critical economic hub for the Eastern Cape and South Africa. Powering the plant with solar energy further enhances its desirability. East London receives high levels of solar radiation due to its geographic location, making solar generation both feasible and cost-effective. In addition, a dedicated solar supply will minimise risks of operational downtime caused by load-shedding, while reducing greenhouse gas emissions associated with reliance on coal-based municipal electricity. South Africa also has a well-established solar industry, which ensures the availability of expertise, equipment, and services for efficient installation and long-term maintenance. The proposed desalination plant secures the Port of East London's water needs while reducing pressure on already strained freshwater systems. It also supports sustainability objectives by improving resilience to climate variability and adopting renewable energy in line with South Africa's transition to a low-carbon economy.

In summary: The proposed desalination plant will primarily enhance the operational resilience of the Port of East London and port-dependent industries, such as MBSA, by

reducing reliance on municipal bulk water supply. While not intended to replace municipal supply at scale, the plant will act as a reliable local backup during water shortages or restrictions, ensuring continuity of critical services. By securing water for port operations and tenants, the project will help prevent production stoppages, export delays, and associated economic losses for the Buffalo City Metropolitan Municipality. The use of solar power, including battery or hybrid renewable systems, will lower energy costs for TNPA and reduce pressure on the municipal electricity grid. In addition, the project will generate short-term employment, support local procurement, and build technical capacity for small-scale desalination in the region.

7 LEGISLATIVE AND POLICY CONTEXT

7.1 Relevant International Agreements, and Obligations

- World Heritage Convention, 1972: Convention Concerning the Protection of the World Cultural and Natural Heritage.
- Convention on International Trade in Endangered Species of Wild Fauna and Flora, 1973
- Bonn Convention, 1979: Convention of Migratory Species of Wild Animals (1979)
- Abidjan Convention, 1981: The Convention for the Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region
- United Nations Convention on Biological Diversity (CBD), 1992;
- United Nations Framework Convention on Climate Change, 1992;
- Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, 1995
- Agenda 21, 1992—Confirmed at the United Nations World Summit on Sustainable Development, Johannesburg Summit, 2002
- The Sustainable Development Summit, 2015
- Ramsar Convention: Convention on Wetlands of International Importance, 1971
- United Nations Educational, Scientific and Cultural Organization (UNESCO)

7.2 Relevant National Legislation, Policy, and Guidelines

7.2.1 The Constitution of the Republic of South Africa, 1996

The Constitution of the Republic of South Africa, 1996 (Constitution), serves as the highest legal authority and upholds the right of all South Africans to an environment free from harm to health and well-being. It obligates the protection of this right for the well-being of both present and future generations, achieved through appropriate legislative and other actions. As such, the Constitution forms the fundamental legal basis for environmental management in South Africa, with various laws at the national, provincial, and local levels aligning with its legal principles.

7.2.2 National Environmental Management Act (NEMA; Act 107 Of 1998)

NEMA provides for cooperative environmental governance by establishes principles for decision-making on matters affecting the environment. It requires identification, assessment, and authorisation of activities that may affect the environment, socio-economic conditions, or cultural heritage. There are several key provisions under NEMA, four of these include:

- **Environmental Impact Assessment (EIA) Regulations:** Procedures for identifying, assessing, and authorising listed activities with potential environmental impacts. *This current Scoping and Environmental Impact Assessment (S&EIA) process is conducted in terms of the EIA Regulations. The Listed Activities triggered by the proposed Solar Reverse Osmosis (RO) Development are discussed in Section 3.*

- **Specialist Protocols:** Requirements for assessing sensitive environments, heritage, and socio-economic aspects. *Specialist Assessment were conducted in line with these protocols. Refer to Section 9 and Appendix 7 to Appendix 13.*
- **Public Participation:** Ensures stakeholder engagement in environmental decision-making. *Public Participation is being conducted as part of this process. Refer to Section 2.*
- **Environmental Management Frameworks (EMFs):** Spatial tools guiding sustainable development in environmentally sensitive areas. *The development must adhere to the Canon Rocks Environmental Management Framework (EMF, 2010)*

7.2.3 National Environmental Management: Protected Areas Act (NEMPAA; Act 57 of 2003)

NEMPAA provides for the formal declaration and management of protected areas in South Africa. It aims to conserve biodiversity, protect natural and cultural resources, and maintain ecological integrity. Key provisions include allowing the declaration of protected areas (e.g. Nature Reserves, Marine Protected Areas, etc), each with specific objectives and activity restrictions; requiring management plans for all protected areas to guide conservation and land-use decisions; and assigning management responsibility to designated authorities (e.g. South African National Parks (SANParks) for National Parks).

The Potter's Pass Nature Reserve is situated southwest of the development, although there is no spatial overlap. This reserve was taken into account when determining the development layout and when assessing potential impacts of the project.

7.2.4 The National Environmental Management: Biodiversity Act (NEMBA; Act 10 of 2004).

Provides for the legal protection and management of South Africa's biodiversity within the framework of NEMA. It aims to safeguard species and ecosystems of national importance, promote the sustainable use of indigenous biological resources, and ensure fair and equitable sharing of benefits derived from such resources. It gives effect to international agreements (e.g., the CBD, 1992), supports planning tools such as bioregional and Biodiversity Management Plans, regulates alien and invasive species, provides for the protection of threatened species and ecosystems and establishes the South African National Biodiversity Institute (SANBI) for research and monitoring. The Act also mandates biodiversity assessments like the National Biodiversity Assessment (NBA), which informs conservation and planning.

- **National Biodiversity Assessment (NBA):** Evaluates ecosystem condition and sensitivity using International Union for the Conservation of Nature (IUCN) Red List frameworks to guide conservation, spatial planning, and policy. *The most recent NBA data (2018) was used to describe the environment and biodiversity and assess potential impacts of the development on these (see Section 8).*

- **Threatened or Protected Species Regulations, 2015** (TOPS; Notice 255 in Government Gazette (GG) 38600): Safeguards threatened and protected species by prohibiting restricted activities. *The proposed project may require permits should certain species be disturbed or removed within the development area.*

- **Alien and Invasive Species Regulations, 2020** (Notice R1020 of GG 43735): Prevents unauthorised introduction and spread of alien and invasive species and guides their management. Requires the development of Alien and Invasive Species Management Plans to remove existing invasives, prevent establishment, and monitor management effectiveness. *The proposed project will require the development of an Alien and Invasive Species Management Plan.*

7.2.5 National Environmental Management: Integrated Coastal Management Act (ICMA; Act 24 of 2008)

The ICMA provides the framework for integrated coastal and estuarine management to promote conservation and ensure that coastal development is socially, economically, and ecologically sustainable. It defines rights and duties, regulates activities that may harm the coastal environment, and gives effect to South Africa's international coastal obligations. The Act defines and delineates the coastal zone, including the coastal protection zone, which may overlap with areas designated as sensitive coastal areas under the National Heritage Resources Act (NHRA, Act 25 of 1999). It also provides for the establishment of a Coastal Management Line (CML) or Coastal Setback Line (CSL) to protect the coastal protection zone. Any future development seawards of a CML or CSL is automatically subject to a S&EIA and must be compatible with the objectives of the applicable Coastal Management Programme, which provides the framework for implementing integrated coastal management at national and provincial levels.

The current project is being assessed through a full S&EIA and has also been assessed in terms of the NHRA. The current project must further align with the National, Provincial and relevant municipal Coastal Management Programme (CMP) for the area. Refer to Section 7.3.3 for the Eastern Cape Coastal Management Programme (2014) and See Section 7.4 for the Buffalo City Coastal Management Programme (2024).

ICMA further requires coastal district and local municipalities to prepare Coastal Management Plans that are consistent with both the National and Provincial Coastal Management Plans. National and Provincial CMPs address strategic coastal planning and implementation, while Municipal CMPs focus on operational and site-level issues.

Finally, the ICMA regulates discharges of land-derived effluent into coastal waters. Such discharges may only occur under:

- General Discharge Authorisations (GDAs): with "Very Low" to "Insignificant" impacts, provided that prescribed water quality and volume limits are met. Is an alternative to a full Coastal Waters Discharge Permits (CWDP). Applies only to specific areas in certain Ports.
- Coastal Waters Discharge Permits (CWDPs): For significant discharges with potential environmental impacts. Requires detailed assessment and specific permit conditions.

Coastal Waters Discharge Permit and Water Quality Guidelines

Any operator intending to discharge effluent into coastal waters must obtain a CWDP and comply with the Water Quality Guidelines (WQGs) for Coastal Marine Waters)(DFFE 2022). These guidelines specify thresholds for 29 parameters and are used to assess compliance and potential impacts of discharges. Applications must include contaminant data and dilution/dispersion modelling that simulates worst-case

scenarios and demonstrates compliance at the edge of the Recommended Mixing Zone (RMZ). The radius of the RMZ was determined according to the "Assessment Framework for Effluent Discharged from Land Based Sources" (Anchor 2015). An RMZ of 100 m was used for the nearshore open coast environment (<10 m water depth or <500 m from shore, whichever the most conservative). When reviewing applications, the Minister considers both direct and cumulative impacts, with discharges required to comply with standards under the ICMA and the National Water Act. Section 58(1) of the ICMA further reinforces the NEMA duty of care by holding parties accountable for harm to the coastal environment. The 2019 CWDP Regulations provide the administrative framework, including timeframes, renewal procedures, fees, and information requirements.

As this project involves the discharge of brine into the marine environment, a CWDP is required. A Marine Specialist Impact Assessment and numerical dispersion modelling study have been completed to assess dilution and potential impacts, with results summarised in Section 9. The CWDP application is underway and will be submitted following the public participation process, which concludes on 31 October 2025.

7.2.6 National Environmental Management: Waste Act (NEMWA; Act 59 of 2008)

NEMWA establishes a framework to promote sustainable waste management practices that protect human health and the environment. The Act focuses on minimising resource consumption and waste generation, maximising waste reuse and recycling, and ensuring safe treatment and disposal of waste. To achieve these objectives, it requires the adoption and enforcement of national norms and standards for waste management and services; licences for waste management activities, including transport, storage, and disposal; Identifying, remediating, and rehabilitating contaminated land; regulating the generation, handling, and disposal of hazardous waste; and integrated waste management planning and reporting by local authorities.

The current project must ensure that it adopts a waste management strategy that aligns with this Act.

7.2.7 The Marine Living Resources (MLRA; Act 18 of 1998

The objectives and principles of this Act is the management of marine living resources, the need to protect whole ecosystems, preserve marine biodiversity and minimise marine pollution, as well as to comply with international law and agreements.

As the development and brine discharge will occur in an area with active fishing, this Act is relevant, and provisions outlined in it should be complied with.

7.2.8 Marine Spatial Planning Act (MSPA; Act 16 of 2018)

The Act establishes a national system for Marine Spatial Planning to manage ocean use across all sectors, promote responsible and sustainable development, conserve marine ecosystems, and resolve conflicts between competing uses through a precautionary, ecosystem-based approach.

The development is compatible with requirements outlined in this Act.

DRAFT MARITIME AND UNDERWATER CULTURAL HERITAGE SECTOR PLAN

Under the MSPA, a series of draft Marine Sector Plans (MSPs) were published for public comment in March 2023. These MSPs support the development of Marine Area Plans as part of the Marine Spatial Planning process and specify the overall development objectives and priorities of various marine sectors for the coming two decades. The draft Maritime and Underwater Cultural Heritage (MUCH) Sector Plan identified several sector development objectives to guide the future development of the sector as part of and through marine spatial planning. These include the need to:

- Protect maritime heritage resources in compliance with the relevant legislation and international standards, including through improved cooperative governance.
- Improve and enable appropriate and sustainable public access to maritime heritage resources.
- Enable and advance maritime heritage research and the dissemination of this information.
- Utilise and strengthen synergies with other sectors and stakeholders, particularly with biodiversity conservation and tourism development.

Based on these objectives, the draft MSP proposes a number of sector development guidelines of which the following are relevant to this Heritage Impact Assessment (HIA):

- *Sustainable Development Goal (SDG)1: Marine planners and decision-makers must consider and adhere to the requirements of Section 38 of the National Heritage Resources Act (NHRA, Act 25 of 1999) when contemplating developments in the marine space. The aim must be to minimise the potential impacts on maritime heritage assets, taking as a starting point that priority must be given to the in situ preservation of maritime heritage resources.*
- *SDG2: Marine planners and decision-makers should consider the potential impacts of seabed development on, the potential value of and the need to protect heritage resources which are not yet designated or protected by the NHRA.*

Marine planners and decision-makers must also be aware of the potential for new discoveries of historical or archaeological interest during seabed development, and that this may require the introduction of new restrictions on the proposed development and will require reporting to SAHRA without delay.

- *SDG3: Proposals for activities that may affect maritime heritage resources must provide up to date assessments of the presence and significance of these resources within the area to be affected, and of the potential for new discoveries to arise, in accordance with statutory regulations. Proposals must demonstrate how any adverse impacts will be avoided, or, if this is not possible, minimised and mitigated.*

The draft MUCH MSP does not propose any dedicated maritime heritage zones but refers instead to the imposition of a standard 200 m exclusion or buffer zone around identified wreck sites within any proposed development area as a basis for inclusion of maritime heritage interests in the Marine Area Plans. The draft MSP notes that these exclusion zones should be defined on a case-by-case basis and may be increased for large wrecks, wrecks with imprecise coordinates, and highly significant wrecks.

This HIA has considered and meets the requirements of the relevant sector development guidelines in the draft MUCH MSP. No exclusion zones as envisaged by the draft MSP are required as there are no identified wrecks or other maritime heritage resources within the Port of East London desalination plant project footprint.

7.2.9 Sea Birds And Seals Protection Act (Act 46 of 1973)

Prohibits the harassment, disturbance, killing, or capture of seabirds and seals. It is supported by the South African Policy on the Management of Seals, Seabirds, and Shorebirds, 2007.

Protection of these animal forms part of the Animal and the Marine Specialist Assessment mitigation measures.

7.2.10 The National Water Act (NWA; Act 36 Of 1998)

The NWA provides the framework for the protection, use, development, conservation, and management of South Africa's water resources. Under Section 21, certain activities are classified as water uses and require a Water Use Licence (WUL) from the Department of Water and Sanitation (DWS). These include abstracting water, altering the flow of water, and discharging waste or water containing waste into rivers, groundwater, estuaries, or the sea via outfalls. In some cases, a General Authorisation (GA) can be applied, exempting users from obtaining a WUL, provided discharges remain within prescribed limits and conditions. These limits, set out in the General and Special Limits for the Discharge of Waste or Water Containing Waste into a Water Resource (GN 36820 of 6 September 2013), establish national water quality standards for parameters such as nutrients, salts, heavy metals, organic compounds, and microbiological indicators. Compliance with these standards is legally required for both licensed and authorised discharges.

The DWS was consulted to determine whether a WUL would be required for this project and confirmed that neither a WUL nor a GA is necessary (Appendix 4 and Appendix 5). Nevertheless, the applicant remains obliged to comply with the NWA and ensure that no water use is triggered.

7.2.11 Water Services Act (Act 108 of 1997)

This act regulates the provision of water services, including water supply and sanitation, and establishes the framework for the rights and duties of water services authorities and providers. While some water sector laws have changed over time, this Act continues to serve as a fundamental legal framework for regulating water services.

This Act is of general relevance and should be noted by the Applicant.

7.2.12 South African National Water Resources Infrastructure Agency SOC Limited Act (Act 34 of 2024)

This new Act commenced on 7 February 2025 (GG 51163). It establishes a state-owned company to manage national water resource infrastructure, with functions transferred from the Trans-Caledon Tunnel Authority).

This Act is of general relevance and should be noted by the Applicant.

7.2.13 ANIMALS PROTECTION ACT (ACT 71 OF 1962)

Consolidates and amends laws relating to the prevention of cruelty to animals.

The protection of animal forms part of the Animal and the Marine Specialist Assessment mitigation measures.

7.2.14 WORLD HERITAGE CONVENTION ACT (WHCA; ACT 49 OF 1999)

This legislation enables the integration of the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Convention (WHC) into the legal framework of South Africa, as well as its enforcement and execution within the country. It ensures that World Heritage Sites are formally protected and that appropriate management plans are developed and implemented.

As the project may impact on cultural heritage in the environment, the Heritage Impact Assessment as taken this Act into consideration in the drafting of mitigation measures.

7.2.15 NATIONAL HERITAGE RESOURCES ACT (NHRA; ACT 25 OF 1999)

Provides the legal framework for the management and protection of heritage resources, which includes cultural, archaeological (including shipwrecks), and palaeontological resources, in South Africa. It establishes SAHRA and provincial heritage authorities to provide oversight. In terms of Section 38 of the Act, it is required that a heritage assessment be undertaken by a Heritage Specialist before any development or other activity commences which will change the character of a site. This Act further protects the coastal protection zone.

The NHRA reflects the tripartite (national/provincial/local) nature of public administration under the South African Constitution and makes provision for the devolution of cultural heritage management to the appropriate, competent level of government. Because national government is responsible for the management of the seabed below the mean high water mark (MHWM), however, the management of maritime and underwater cultural heritage resources under the NHRA does not devolve to provincial or local heritage resources authorities but remains the responsibility of the national agency, SAHRA. The NHRA gives legal definition to the range and extent of what are considered to be South Africa's heritage resources. According to Section 2(xvi) of the Act a heritage resource is "any place or object of cultural significance". This means that the object or place has aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

In terms of the definitions provided in Section 2 of the NHRA, maritime and underwater cultural heritage can include the following sites and/or material relevant to this assessment:

- *Material remains of human activity which are in a state of disuse and are in or on land [which includes land under water] and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures (Section 2(ii));*
- *Wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the Republic, as defined respectively in sections 3, 4 and*

6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation (Section 2(ii)); and

- *Any movable property of cultural significance which may be protected in terms of any provisions of the NHRA, including any archaeological artefact or palaeontological specimen (Section 2(xxix)).*

Of the heritage resource types protected by the NHRA, the development of the Port of East London desalination plant has the potential to impact the following:

- *Palaeontological features and material, which are defined by the NHRA as the fossilised remains or fossil trace of animals or plants which lived in the geological past.*
- *Submerged pre-colonial archaeological sites and materials.*
- *Terrestrial pre-colonial and historical archaeological sites and artefacts.*
- *Maritime and underwater cultural heritage sites and material, which are principally historical shipwrecks.*

As per the definitions provided above, these cultural heritage resources are protected by the NHRA and a permit from SAHRA is required to destroy, damage, excavate, alter, deface or otherwise disturb any such site or material.

It is also important to be aware that in terms of Section 35(2) of the NHRA, all archaeological objects and palaeontological material is the property of the State and must, where recovered from a site, be lodged with an appropriate museum or other suitable public institution.

As the project may impact on cultural heritage in the environment, a Heritage and Palaeontological Impact Assessment has been undertaken.

7.2.16 Maritime Zones Act (No 15 of 1994)

South Africa's Maritime Zones Act of 1994 is the national legislative embodiment of the international maritime zones set out in the United Nations Convention on the Law of the Sea (UNCLOS). The Act defines the extent of the South Africa's territorial waters, contiguous zone, exclusive economic zone (EEZ) and continental shelf, which together comprises of some 4.34 million square kilometres of seabed and sets out South Africa's rights and responsibilities in respect of these various maritime zones. Under the terms of Sections 4(2) and 6(2) of the Maritime Zones Act respectively, "any law in force in the Republic, including the common law, shall also apply in its territorial waters" and "subject to any other law the Republic shall have, in respect of objects of an archaeological or historical nature found in the maritime cultural zone, the same rights and powers as it has in respect of its territorial waters". The NHRA applies, therefore, within South Africa's territorial waters (12 nautical miles seaward of the baseline) and to the outer limit of the maritime cultural or contiguous zone (24 nautical miles seaward of the baseline).

The proposed outfall pipelines for the Port of East London desalination plant all lie within South African territorial waters and the NHRA therefore applies to any offshore activities related to their construction that have the potential to disturb or damage cultural heritage resources located in or on the seabed within the project areas. This means the

involvement of SAHRA, as a) a commenting body in respect of the NEMA environmental impact assessment process (see below) and b) as permitting authority where impacts to sites or material cannot be avoided and damage or destruction will occur.

7.2.17 Spatial Planning And Land Use Management Act (SPLUMA; Act 16 Of 2013)

Provides a national framework for spatial planning and land use decisions to ensure coordinated, sustainable, and equitable development. It guides zoning, aligns planning with other legislation, and empowers municipalities to prepare Spatial Development Framework (SDFs) and land use systems that integrate environmental, social, and economic objectives.

This Act guides the development of the Metropolitan Spatial Development Framework (MSDF) with which the development must align.

7.2.18 Carbon Tax Act (Act 15 of 2019)

Imposes a tax on the CO_2 equivalent of greenhouse gas emissions to encourage emission reductions, with supporting regulations on tax rates, reporting, and allowances, and amendments to align with evolving climate policies.

This project is not expected to trigger obligations under the Act due to its relatively small scale and reliance on solar energy, which minimises carbon emissions. However, it should still be noted by the Applicant.

7.2.19 The Climate Change Act (Act 22 of 2024)

Facilitates an effective climate change response and support a long-term, just transition toward a low-carbon, climate-resilient economy and society in South Africa, aligned with principles of sustainable development. This Act was recently assented to on 23 July 2024 (GN 5050 in GG 50966) and partially commenced on 17 March 2025, with some provisions still pending.

The project aligns with the objectives of the Climate Change Act by supporting climate-resilient water supply through renewable energy–powered desalination, thereby contributing to both adaptation to water scarcity and mitigation of greenhouse gas emissions.

7.2.20 Infrastructure Development Act (Act 23 of 2014)

Facilitates and coordinates priority public infrastructure projects of economic or social importance, promoting state development goals and improving management across all phases from planning to operation.

This Act is of general relevance and should be noted by the Applicant.

7.2.21 Local Government: Municipal Systems Act (Act 32 of 2000)

Provides the framework for developmental local government, promoting social and economic upliftment, universal access to affordable services, community participation, effective municipal administration, and coordinated planning, performance management, and service delivery. Requires every municipality to prepare an Integrated

Development Plan (IDP) as the principal strategic planning instrument. IDPs must guide all planning, budgeting, management, and decision-making in a municipality.

The Buffalo City Municipality has its own IDP with which the development will align.

7.2.22 Promotion of Access to Information Act (PAIA; Act 2 of 2000)

Gives effect to the constitutional right of access to information held by the state or by another person when required to exercise or protect rights and assigns related powers and duties to the Information Regulator.

This Act is of general relevance and should be noted by the Applicant.

7.2.23 The Occupational Health and Safety (OHSA; Act 85 of 1993)

Intends to provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety; and to provide for matters connected therewith.

The Applicant must ensure the health and safety of all workers and the public during the construction and operation of the plant and its associated infrastructure.

7.3 Relevant Provincial Law, Guidelines, and Policies

Whilst operating under the mantle of the national legislation described above, individual provinces are able to draft and gazette their own laws, by-laws, guidelines, and policies, in order to manage the province in a more targeted manner. Relevant documentation specific to the Eastern Cape Province, is as follows:

7.3.1 Draft Eastern Cape Environmental Management Act (2024)

The purpose of the draft Eastern Cape Environmental Management Act (EC: EMA, 2024), is to "*To rationalize, consolidate and reform the law regulating environmental management and to provide for the harmonisation of provincial legislation with national legislation regulating protected areas and biodiversity; and to provide for matters connected therewith*." If gazetted for implementation, this act will optimise environmental management within the Eastern Cape Province, and will be subordinate to NEMA, NEMBA, ICMA and NEMPAA.

Should it be promulgated, it will guide future environmental management in the Eastern Cape, and the project proponent should remain aware of its potential implications.

7.3.2 Eastern Cape Biodiversity Conservation Plan

The Eastern Cape Biodiversity Conservation Plan (ECBCP 2019) is a tool that aims to guide land and natural resource use, which may impact on biodiversity, in planning and decision-making across all sectors within the province. It is aligned with the principles and methods gazetted in NEMBA and uses a systematic biodiversity approach to identify priority areas for conservation known as Critical Biodiversity Areas (CBAs) and Ecological

Support Areas (ESAs). The ECBCP primarily aims to facilitate the conservation of these important biodiversity areas, which are outside of the Protected Area Network (PAN), to prevent the loss of ecosystem functioning and degradation of critical habitats. It does this by outlining land-use guidelines which may stipulate the need for environmental assessments and authorisations to be conducted and granted in order for development to occur within these areas.

The proposed development site is mapped as a Terrestrial Critical Biodiversity Area 1 (CBA1) in the ECBCP, which is normally intended to remain in a natural state to meet biodiversity targets. However, because CBA mapping is based on broad-scale land cover data, it requires ground verification. Historical aerial imagery shows that the Port of East London sites were already modified, meaning the area no longer meets the criteria for a CBA. Consequently, the ECBCP (2019) land use guidelines for CBA1 areas do not apply to this site. This does not mean the ECBCP is irrelevant, only that its specific land use guidelines are not applicable. Refer to Section 8 for further detail. Note: the ECBCP does not apply to the marine environment.

7.3.3 Eastern Cape Coastal Management Programme (ECCMP; 2014)

The Eastern Cape Coastal Management Programme is a strategic framework designed to manage the sustainable development and utilisation of coastal resources (Breetzke et al. 2013). It aims to guide socio-economic development while protecting of the diverse ecosystems found along the Eastern Cape coast. The framework is a holistic approach aimed at balancing the needs of communities and industries as well as the ecosystem services provided by the environment. The ECCMP focuses on protecting sensitive coastal ecosystems, such as coral reefs, estuaries and dunes which in turn provide ecosystems services such as coastal protection against extreme weather events, safeguarding human settlements, or act as fish nurseries which feed into the fish stocks which form the bases of commercial or subsistence fishing. The ECCMP is made up of several priority areas which integrate into the overall framework of ensuring sustainable management of the Eastern Cape diverse coastline. Within each priority area, there are a series of goals which outline the strategy to achieving each objective. Goals specific to the development of the desalination plant are listed and explained below.

"**Goal 2A**: To promote the diversity, vitality and long-term viability of coastal economies and activities, giving preference to those that are distinct coastal or dependent on a coastal location taking the upliftment of coastal communities into account."

As the desalination plant requires access to the ocean to abstract water and release brine, it meets the requirement of being dependent on a coastal location. It further is essential for the functioning of other industries within the coastal zone, thereby promoting economic development.

"**Goal 3A**: To plan and manage coastal development so as to avoid increasing the incidence and severity of natural hazards and to avoid exposure people, property and economic activities to significant risk from dynamic coastal processes."

Although the desalination plant is located within the coastal zone and the Buffalo Estuarine Functional Zone (EFZ), which could be exposed to natural hazards such as extreme storm conditions and flooding, these risks were considered by the project engineers during site selection. The chosen location lies within the East London Harbour

limits, where existing port infrastructure provide additional protection and reduce the likelihood of significant risk from dynamic coastal processes.

"**Goal 4A**: To implement pollution control and waste management measures in order to prevent, minimise and strictly control harmful discharges in coastal ecosystems."

The desalination plant will release brine into the ocean near the Harbour, this should not impact the local marine conditions and therefore on local species. A CWDP which assesses these impacts will need to be granted before discharging into the ocean is allowed.

"**Goal 5A**: To manage and protect estuarine resources."

A marine and estuarine specialist assessment was undertaken as part of the S&EIA process to evaluate potential impacts of the development on these environments. Appropriate mitigation measures were identified and incorporated into the Environmental Management Programme (EMPr) to avoid, reduce, or manage any potential impacts.

"**Goal 8A**: To promote compliance with coastal and other relevant regulations."

All relevant legislation has been considered by the EAP and specialists during the S&EIA process to guide the engineers and applicant to ensure compliance.

"**Goal 9A**: To maintain the diversity, health, and productivity of coastal processes and ecosystems."

As this development occurs within the coastal zone and discharges at sea, it is critical that it does not negatively impact the surrounding environment and thereby risk the health and well-being of communities dependent on coastal resources.

7.4 Relevant Local Law, Guidelines, and Policies

At the local level, municipalities, develop their own policies and by-laws to regulate land use, zoning, environmental management, and infrastructure, which align with broader provincial and national objectives. Local legislation/ documentation focuses on specific issues such as spatial development, zoning schemes, land occupancy, biodiversity conservation, pollution control and management (air, water and land), potable water supply systems, sanitation, solid waste, noise, and stormwater management. These ensure the alignment of projects with spatial planning objectives in addition to adherence to environmental standards, thereby positively contributing to a municipality's development, while safeguarding its ecological integrity. Municipalities are required to prepare spatial plans and frameworks, guided by national and provincial legislation and informed by higher-level spatial and biodiversity data such as the 2018 NBA. Examples of key legislation and instruments prepared and applied by municipalities include:

- Zoning Scheme and Planning By-Laws: Regulates land use rights, zoning and consent use applications.
- By-Laws: Regulates management of stormwater, water use, air quality, and waste.
- IDPs: A primary strategic plan which guides municipal development priorities, including budgeting, development, service delivery, safety, socio-economic growth, and environmental sustainability. Ensures alignment with national and provincial legislation and plans.

- Municipal SDFs: Provides spatial direction for municipal growth and development while safeguarding sensitive environments.
- Municipal Environmental Management Frameworks (EMFs): Identifies environmental sensitivities, defines compatible and incompatible activities, and provides guidance to prevent environmental degradation.

Relevant documentation specific to the Buffalo City Metropolitan Municipality, are as follows:

7.4.1 Buffalo City Integrated Development Plan (2024/2025)

The current Buffalo City Metropolitan Municipal (BCMM) Council's 2021-2026 IDP was adopted on 31 May 2021, in accordance with the Municipal Systems Act (MSA; Act 32 of 2000). An IDP is a strategic framework in which local municipalities outline their development objectives and strategies. It is a holistic approach which aims to integrate economic, social and environmental aspects into a comprehensive, mutually compatible development plan.

Within the IDP, Strategic Outcome 2: A Green City is of particular relevance as it speaks to promoting ecologically sustainable development that does not negatively impact on the environment. The use of solar power to run the desalination plant aligns to the goals of this Strategic Outcome as it uses an environmentally friendly alternative to coal-powered electricity thereby reducing greenhouse gas production.

Strategic Outcome 2 also address the need for environmental compliance to be observed by state institutions and individuals, specifically the need for Environmental Impact Assessments (EIAs) to be conducted for new developments where required. EIAs identify potential risks to sensitive environments and can guide developments to minimize their impact, thereby preserving critical habitat and preventing loss of ecosystem functioning. As the development takes place within the Buffalo EFZ and along the coast, which are both environmentally sensitive areas, the desalination plant construction and operation should not have any detrimental effects on the environment. The development does however take place within the East London Harbour which may encourage such development if it allows opportunity for economic development.

7.4.2 Buffalo City Municipality: Municipal Spatial Development Framework (2019-2024)

Each municipality in South Africa is required to put together a SDF which outlines the goals of the municipality in terms of future spatial development. It identifies zones for residential, industrial and commercial development while accounting for factors such as transportation, social equity and environmental concerns. The Framework is guided by SPLUMA and aims to allow for sustainable and equitable growth. BCMM aims to ensure that the biophysical environment is protected and wisely managed (Foster & Naidoo 2020). This is done by protecting sensitive habitats and critical ecosystem services by potentially restricting development in areas which contribute to the health and well-being of residents. Sensitive habitats include the Buffalo EFZ and development along the coast.

For this project, Marine and Estuarine Specialist Assessments have been undertaken as part of the S&EIA, with mitigation measures recommended to ensure the desalination plant aligns with the City's development goals and minimises potential impacts on sensitive habitats.

7.4.3 CANON ROCKS ENVIRONMENTAL MANAGEMENT FRAMEWORK (EMF, 2010)

The primary objective of the Canon Rocks EMF is to facilitate the conservation of critical natural resources, such as biodiversity, ecosystem services and fertile agricultural land, given the increasing land-use pressures along the coastal zone situated between the Great Kei River and Cannon Rocks (SRK Consulting 2010). This is done with respect to Chapter 8 of the NEMA EIA regulations. Within the Buffalo City Municipality, estuaries, rivers and their banks, were identified as key natural resources to be safe guarded (SRK Consulting 2010). Therefore, any development within the EFZ is very carefully considered for risks to the environment by the local Competent Authority before any work can be undertaken in these areas.

For this project, Marine and Estuarine Specialist Assessments have been undertaken as part of the S&EIA, with mitigation measures recommended to ensure the desalination plant aligns with the EMF.

7.4.4 BUFFALO CITY MUNICIPALITY: ZONING SCHEME REGULATIONS (2007)

These regulations guide land use and development to promote coordinated, sustainable, and safe urban growth. The Zoning Scheme is also in line with new national legislation, such as the Development Facilitation Act 67 of 1995 which encourages more compact cities, mixed land uses and support for sustainable cities.

The development aligns with the Zoning Scheme and these regulations and supports the municipality's objectives for integrated, well-planned, and sustainable city development.

7.4.5 BUFFALO CITY METROPOLITAN MUNICIPALITY: INTEGRATED WASTE MANAGEMENT BY-LAW (2022)

The BCMM Integrated Waste Management By-law aligns with NEMWA and the National Waste Management Strategy to promote sustainable waste management practices. It regulates waste generation, storage, collection, transportation, recycling, treatment and disposal. This includes the responsible management of waste generated from construction.

As the desalination plant is within an environmentally sensitive area, it is crucial that waste generated during construction is handled responsibly and not allowed to disperse into the estuary or ocean. The current project must ensure that it adopts a waste management strategy that aligns with this by law and NEMWA.

7.4.6 BUFFALO CITY MUNICIPALITY: ROADS AND STREETS BY-LAW

Regulate the management of roads and streets in the Buffalo City Municipality, as well as the development, operation and maintenance of activities within the road reserve.

Project infrastructure within road reserves must avoid obstructing traffic or stormwater systems, and construction will require 4 m-wide access for vehicles.

7.4.7 BUFFALO CITY NOISE BY-LAW

The control of noise within the BCMM is managed in terms of the Buffalo City Municipality's Noise By-Law (2010) and Draft Noise Control By-Law (2024). The By-law sets legal sound level limits of noise pollution for different zones, such as residential and

commercial areas, during various times of the day. Given the higher detail and likelihood of the implementation of the 2024 Draft By-Law by the time the proposed development will begin, the 2024 By-Law should be considered.

The developer must ensure that all construction activities comply with the Noise By-law. During the operational phase, noise levels are expected to remain within the prescribed limits.

7.4.8 Buffalo City Coastal Management Programme (2024)

The BCMM CMP is a strategic framework for managing the city's coastal resources (Gxaba et al. 2024) and aligns with ICMAs objectives to preserve biodiversity and ecosystem functioning while supporting communities dependent on coastal resources. The CMP highlights issues such as pollution, development pressure, habitat loss, estuary protection, and coastal vulnerability. Rising coastal development increases habitat degradation, reduces ecosystem services, and threatens species, while estuaries provide essential functions like supporting fisheries, filtering contaminants, and protecting settlements from storm surges. Developments in coastal and estuarine zones should therefore minimise environmental impacts. Although coastal setback lines have not yet been declared, infrastructure must consider risks from sea level rise, floods, and storms, and sustainable development should adhere to national Coastal Management Lines.

The development is situated both within the coastal zone and within the EFZ of the Buffalo River Estuary which are both highlighted as sensitive environments. Marine and Estuarine Specialist Assessments have been undertaken as part of the S&EIA, with mitigation measures recommended to ensure the desalination plant aligns with the EMF. A CWDP is being applied for.

7.4.9 Buffalo River Estuarine Management Plan

South African policy and law relating to estuaries are comprehensively outlined in (Van Niekerk & Taljaard 2007). The key legislation guiding estuarine management is the NWA and the ICMA. Responsibility is shared between two national departments: the DWS, which oversees water resources and supply, and the DFFE, which manages land use, biodiversity, and living resources within estuaries. The ICMA requires the development of an Estuarine Management Protocol, which provides the framework for preparing Estuarine Management Plans (EMPs). These plans aim to balance ecological processes with human activities, ensuring sustainable use of estuarine resources. The national vision for estuarine management is that "the estuaries of South Africa are managed in a sustainable way that benefits the current and future generations."

Marine and estuarine specialist assessments undertaken as part of the S&EIA have incorporated mitigation measures aligned with the Buffalo River Estuarine Management Plan and other relevant management frameworks and plans (Department of Environmental Affairs 2018).

8 AFFECTED ENVIRONMENT

This section describes the affected environment in the proximity to the development for all relevant receptors including the marine, coastal, estuarine and terrestrial environments, as well as the local socio-economic, heritage and palaeontological contexts.

8.1 DESCRIPTION OF AREA AND CURRENT LAND USES

8.1.1 RO & SOLAR PLANT SITE

The preferred site lies 100–200 m from the Buffalo River Estuary. The site is divided into two main areas by a tarred road (Figure 8.1).

Figure 8.1. Google Streetview image of the proposed RO Plant site (grassed area between the tar roads to the left of screen).

Figure 8.2. The proposed RO Plant site (grassed area) with the TNPA West Bank security entrance in the distance.

The RO plant and supporting infrastructure are proposed for the northern portion of the site (the green patch of grass to the left of the road near the white security house in Figure 8.1 and as shown in Figure 8.2), while the solar farm and reservoir will be located on the long strip to the south (the green area to the right in Figure 8.1, and as shown in Figure 8.3). Despite both portions of the site being largely devoid of concrete, tar, or other non-permeable surfaces, the site is clearly disturbed and modified. The southern portion is densely vegetated with a combination of grasses, short shrubs, and trees. Over 80% of this area was estimated to be covered with alien plant species, according to the Terrestrial Ecology Specialist (Hawley & Balmer 2026). Additionally, evidence of recent alien clearing was observed during an April 2024 site visit. Conversely, the northern portion of the site is entirely covered with a managed grass lawn, with no indigenous vegetation present. In addition, remnants of former buildings were observed in the southern portion of the site. These structures are now reduced to ruins and largely flattened.

Figure 8.3. Photographs of the preferred site as taken during April 2024. Top: The eastern portion of the Solar Plant and Reservoir site, as viewed from the centre looking east. Bottom: View of the Solar Plant and Reservoir site, as viewed from the centre looking west-northwest.

8.1.2 Estuarine Intake Pipeline and Structures

Saltwater for the desalination process will be abstracted from the Buffalo River Estuary via a direct intake pipeline. The associated pump house and infrastructure will be located on land adjacent to the intake point within an unvegetated area of compacted ground and concrete surfacing (Figure 8.4). The preferred intake design is a floating pontoon system attached to the pump house and extending approximately 19 m into the estuary from the existing concrete wharf. The pipeline will run from the pump house onto the pontoon and extend into the estuary through the pontoon structure. No seabed construction is required.

Figure 8.4. Views of the proposed estuarine intake and pump house site. Top and bottom: The proposed intake pipeline will protrude into the estuarine waters. Middel: The proposed pump house would be situated on the compacted dirt concrete surface.

8.1.3 Outfall Pipeline and Structures

The proposed Marine Outfall Pipeline will extend from the RO Plant, running adjacent to the internal road in a south-easterly direction towards the existing silo storage tank. From there, it will continue in a southerly direction along the railway line until reaching the railway underpass, where it will bend and proceed in an easterly direction, crossing the service road towards the breakwater and ocean (Figure 8.5). The pipeline will traverse the breakwater, which comprises rock and dolosse, and will terminate at the seaward edge of the breakwater (i.e. the outer edge of the dolosse), discharging into the ocean.

Figure 8.5. Site photographs captured in 2025. Top: View looking east towards the ocean, showing the service road, rocky shoreline, and dolosse at the water's edge. Bottom: Closer view of the breakwater comprising rock armour and dolosse, across which the pipeline will be routed and at which it will terminate.

From the RO Plant to the breakwater, the pipeline will cross several roads and railway lines. It will be buried wherever feasible, with short sections remaining exposed where

burial is not practical. The pipeline route largely follows existing roads and railway lines within already disturbed and modified areas. Furthermore, from the railway underpass onwards, the final section of the outfall pipeline and the discharge point are located entirely within an artificial environment, comprising a service road and a constructed breakwater made up of rock armour and dolosse (Figure 8.5).

8.2 General

8.2.1 Biogeography and Climate

East London falls within the warm temperate Agulhas Ecoregion (and specifically, the Agulhas inshore ecoregion), which is characterised by high levels of endemism—species with distributions restricted to the bioregion—and is a breeding area for many marine species.

8.2.2 Climate

Climate (rainfall, temperature, humidity, etc) has a profound influence on species distribution and ecological processes that drive ecosystems. The climate of East London is considered mild and subtropical, with predominantly summer rainfall, but substantial frontal winter rain is common. The summers are warm with average temperatures of 25˚C, but which can reach upwards of 38˚C. The winter temperatures are mild reaching lows of 15˚C.

8.3 Marine Environment

8.3.1 Regional Oceanography

The oceanography of East London is influenced by both the strong-flowing Agulhas current that moves down the east coast of South Africa as well as by localised oceanographic processes. It is the interaction of the warm Agulhas current with cooler temperate waters that is the principal reason for the diverse range of coastal and marine flora and fauna for which South Africa is famous. In addition to the Agulhas, the marine ecology along the Eastern Cape Coastline is also strongly influenced by both the semi-diurnal (twice daily) tidal regime, as well as seasonal fluctuations in wave action.

8.3.2 Ecosystem types

The shoreline in the vicinity of the proposed development, is classified by the 2018 National Biodiversity Assessment (NBA) as Agulhas Exposed Rocky Shore, while the habitat further offshore is Agulhas Inner Shelf Mosaic (Figure 8.6)(Sink et al. 2019a, and Sink et al. 2026).

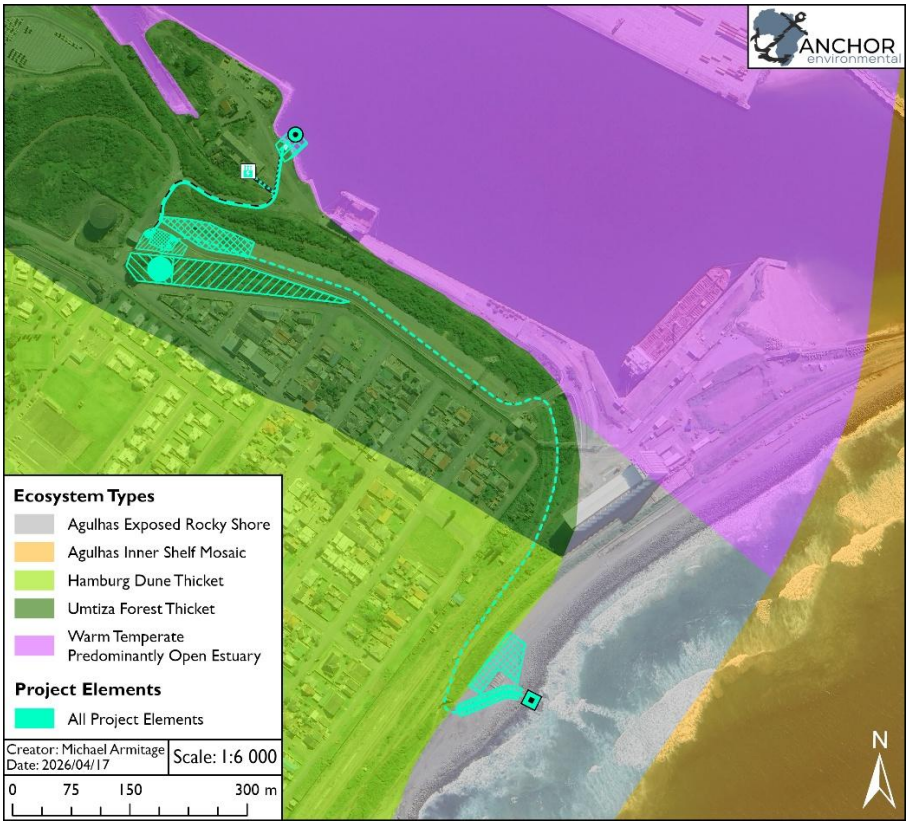

Figure 8.6. Ecosystem Types in the vicinity of the proposed development, as per the 2018 National Biodiversity Assessment (Sink et al. 2019a, Skowno et al. 2019, Sink et al. 2025).

8.3.3 Rocky Shore Habitats

While the coastal habitat in the vicinity of the proposed marine are classified as Agulhas Exposed Rocky Shore, the area lies to the south of the Port and comprises mostly artificial concrete dolosse habitat (Figure 8.7). While environmental conditions prevented an assessment of the communities inhabiting these dolosse, it is likely that they provide similar habitats, and are home to similar communities, when compared to natural rocky shore habitat along the Eastern Cape coastline.

Figure 8.7. The beach to the south of the Port of East London entrance is comprised almost entirely of artificial dolosse habitat.

8.3.4 Subtidal Habitats

Subtidal habitats within the broader study area are likely to comprise of a mixture of patchy reef and sand, with exposed rock becoming less common with distance offshore. Subtidal habitat in the area comprises high profile reef, with interspersed with pebbles and larger boulders, and some hard consolidated sandy patches. The shallow subtidal rocky shore is likely to host a range of seaweed species. As well as sessile (stationary) filter feeders, such as mussels, oysters. Abalone and Rock lobster species are also likely to occur in the area. Subtidal reefs support a wide variety of longer-lived large finfish species. Fish species occurring within the mixed rock and sand surf zone in the Eastern Cape include several species of mullet and klipfish, black tail, silver and black sea catfish, banded galjoen, poenskop, evil eye puffer fish, bronze bream, stone bream, bellman, wildeperd, musselcracker, dusky kob, elf, leervis, white stumpnose, spotted grunter, Cape stumpnose, Natal stumpnose, Cape knifejaw, sand steenbras, moonys, streepies , steentjies, Sand soldiers, cat sharks, dogfish, spotted gully sharks, smooth hound sharks and sand sharks.

8.3.5 Pelagic Habitats

Based on historic sightings or strandings records, as well as habitat projections of known species parameters, an estimated 21 species of cetaceans (whales and dolphins) are thought to occur (or are likely to occur) inshore of the shelf edge off the South Coast. Dolphins have been reported near the estuary mouth, and one resident species of coastal pinniped is present in the area, namely the Cape fur seal *Arctocephalus pusillus pusillus*. The Buffalo River Estuarine Management Plan (2018) notes that the "transformed nature of the estuary mouth provides a sheltered habitat for mammals such as the resident bottle nosed dolphins (*Tursiops sp.*) and humpback dolphins (*Sousa sp.*)"(Department of Environmental Affairs 2018).

8.3.6 Species of Conservation Concern

The DFFE Environmental Screening Tool (DFFE 2026) found one Species of Conservation Concern (SCC) that may occur within the project area: the rocky kurper fish *Sandelia bainsii*, which is listed as Endangered on the IUCN Red List (IUCN 2025). However, this species only occurs in freshwater habitats (Mayekiso 1986, Skelton 2001), and as such is highly unlikely to be present in the estuarine or marine habitats within which the project area falls.

8.4 Estuarine Environment

An "estuary" or "estuarine system" is defined in terms of the Integrated Coastal Management Act (ICMA; Act 24 of 2008) as "a body of surface water that (a) is permanently or periodically open to the sea; (b) in which a rise and fall of the water level as a result of the tides is measurable at spring tides when the body of surface water is open to the sea; or (c) in respect of which the salinity is higher than fresh water as a result of the influence of the sea, and where there is a salinity gradient between the tidal reach and the mouth of the body of surface water.'' The NBA defines the Estuarine Functional Zone (EFZ) as "the area that not only encapsulates the estuary waterbody, but also the supporting physical and biological processes and habitats necessary for estuarine function and health". Estuaries are extremely productive ecosystems due to the

combination of high nutrient river water with a shallow, sheltered habitat. They are also valued for their importance as nursery grounds for juvenile marine fish and invertebrates, which recruit to these protected and nutrient rich areas during their developmental stages. Despite their importance, estuaries are impacted by poor catchment management upstream including erosion, pollution and water abstraction. This, along with the development of harbours, has resulted in the majority of these estuarine ecosystems becoming severely degraded, leading to concern about the biota within the systems and the loss of ecosystem services estuaries provide. The Buffalo River Estuary is defined as a Warm Temperate, Predominantly Open system. The EFZ of the Buffalo River estuary extends some 7.5 km from the mouth and encompasses the Port of East London, which falls within the lower 2 km of the system and is the only estuarine Port in the country (Figure 8.8). The estuary mouth is dredged regularly for maintenance, keeping the mouth open permanently. There are also "no estuarine banks per se in the lower part of the estuary, as the margins are given over to port infrastructure". Furthermore, there are no intertidal sand and mudflats and associated salt marshes in the lower system, because of the typography as well as the Port development.

8.4.1 Water Quality and Pollution

Water quality is a primary driver influencing estuarine function and characteristics, with water quality, as well as sediment quality in the estuary, having been studied extensively through the CSIR's Long-Term Ecological Monitoring Programme for the Port of East London. Natural water quality fluctuations in the Buffalo River Estuary are known to occur seasonally. However, the estuary has been subject to frequent pollution events in recent years, with high to very high levels of faecal contamination in the system over the monitoring period. These high levels have been linked to sewage contaminated water inflow from the catchment of the Buffalo River. In a similar manner, long term monitoring has noted frequent elevated nutrient concentrations, which again has been linked to upstream runoff, such as nutrient discharges from some wastewater treatment works in the catchment.

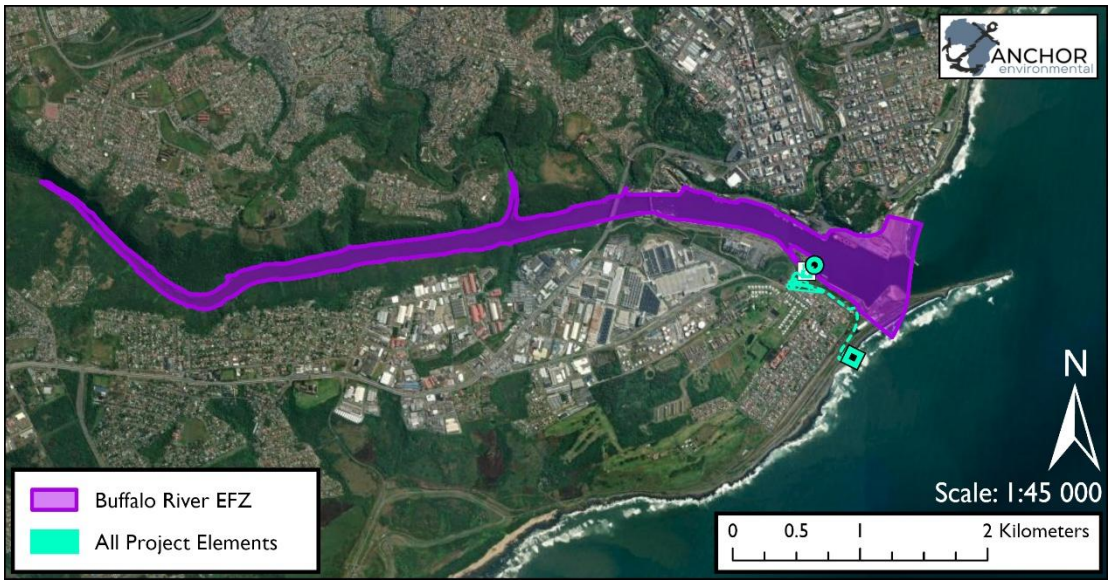

Figure 8.8. The Buffalo River Estuarine Functional Zone (EFZ) in the context of the proposed development.

Beyond bacterial and nutrient pollution, the estuary has also been found to be sufficiently contaminated with Specific polycyclic aromatic hydrocarbons (PAHs), to the extent that it poses some elevation in lifetime cancer risk for recreational uses. These PAHs have been linked to industrial effluent discharges (both treated and untreated), leachate from landfills, stormwater runoff from the highways and Port activities, incomplete combustion of organic materials, and release of non-combusted vehicle emissions.

8.4.2 Estuarine Plants (Macrophytes)

The Port development, and repeated dredging, means that the estuary mouth area no longer sustains suitable habitat for macrophytes (water plants)

8.4.3 Benthic Macrofauna

Benthic macrofaunal (invertebrate) communities are generally considered to be between moderately and extremely disturbed, due to alterations to the system.

8.4.4 Estuarine Avifauna

Given the lack of sand/mudflats, the bird species that typically inhabit such systems (such as migratory waders) are also, for the most part, "excluded from the estuary. Water bird species that have been recorded in the system include the African fish eagle Haliaeetus vocifer and goliath heron Ardea goliath, cormorants, gannets and terns (feeding in the lower estuary) as well as seagulls, heron, several species of kingfishers, and oyster catchers.

8.4.5 Ichthyofauna (Fish)

Estuaries in this region (including the Buffalo River Estuary) are important spawning/nursery areas for various oceanic and estuarine fish species, including white steenbras, dusky kob, ladyfish, blue spotted stingray, ragged tooth shark, white sea-catfish, estuarine roundherring, leervis, various mullet species, spotted grunter, elf, and Cape stumpnose.

8.4.6 Estuarine Health

The most recent NBA (2018) rated the condition or Present Ecological State (PES) of the Buffalo River Estuary as a "D" or "Heavily Modified", the same as the previous 2011 NBA, which indicates that the system is not declining, but neither is it improving. The estuary is heavily impacted by changes to hydrology, habitat loss and modification, and poor water quality. Biotic elements of the estuary have been affected by changes to the physical components, with birds being the most affected aspect, followed by invertebrates, fish and microalgae.

The Recommended Ecological Category (REC) (the desired state of the estuary) is a category "D" (Table 8.1). Thus, at a minimum, the current state of this system must be maintained, and human activities must be managed to prevent further degradation.

Table 8.1. Present Ecological State of the Buffalo River Estuary (Van Niekerk et al. 2019b a).

NBA 2018 Condition Status			
Present Ecological State (2018)	D	Microalgae	D
Hydrology	F	Macrophytes	C
Hydrodynamics	B	Invertebrates	D
Water Quality	D	Fish	D
Physical habitat	E	Birds	E

8.5 Terrestrial Ecology and Habitats

8.5.1 Geology and Soils

The geology of an area influences the soil formation, the pH and mineral content of soil, and in turn influences vegetation composition and structure, and is therefore a factor that is considered when describing the vegetation type(s) and the species that it supports. The project area is located on alluvium/sand/calcrete associated with the deposits along the coastline (Figure 8.9).

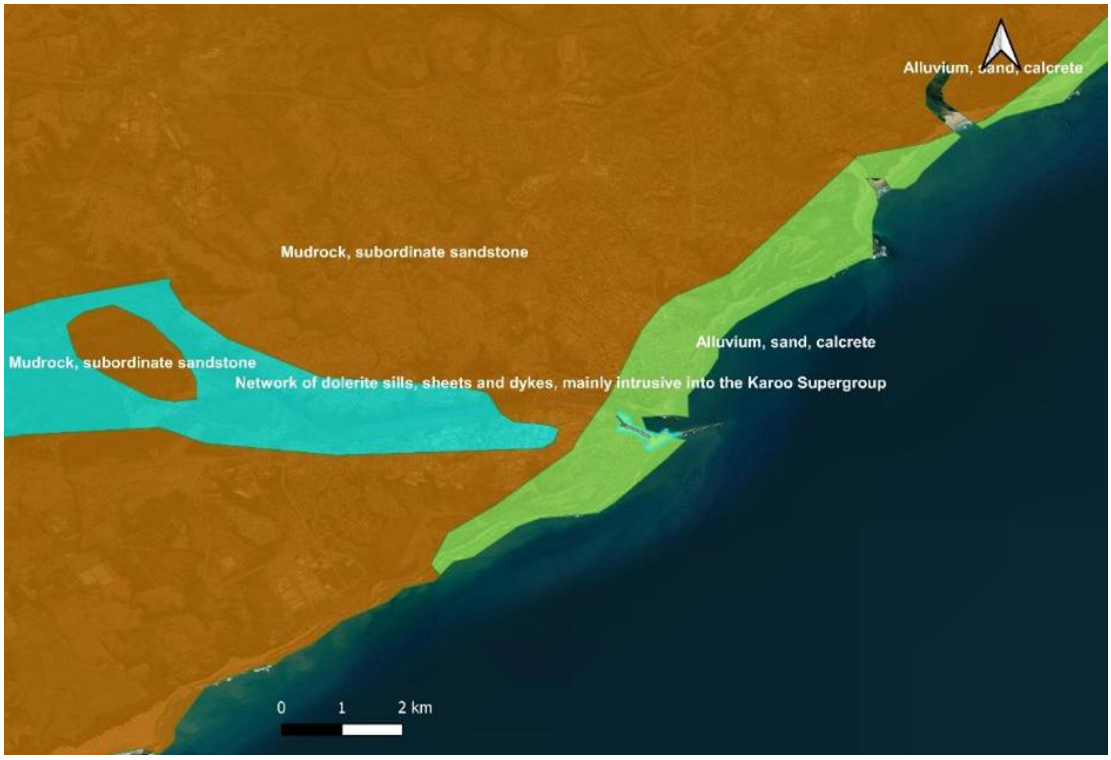

Figure 8.9. Geology of the project area. Project area comprises Alluvium, sand, calcrete. Figure source: Hawley & Balmer, (2026).

8.5.2 Hydrology and Topography

The two relevant hydrological features included the Buffalo River Estuary (endangered) and a section of (vulnerable) coastline (further detailed in Section 8.6). The proposed facility is not located in a Strategic Water Source Area.

8.5.3 SITE FLORISTICS

According to the South African Vegetation Map (Mucina & Rutherford 2006, SANBI 2018, South African National Biodiversity Institute (SANBI) 2024) the project area (blue polygon) includes portions of Umtiza Forest Thicket (Figure 8.10), which is Critically Endangered (Hawley & Balmer 2026). However, the proposed development footprint (yellow polygon) and potential alternatives are located in areas that have been historically modified, as has been mapped in the gazetted Red List of Ecosystems (2023).

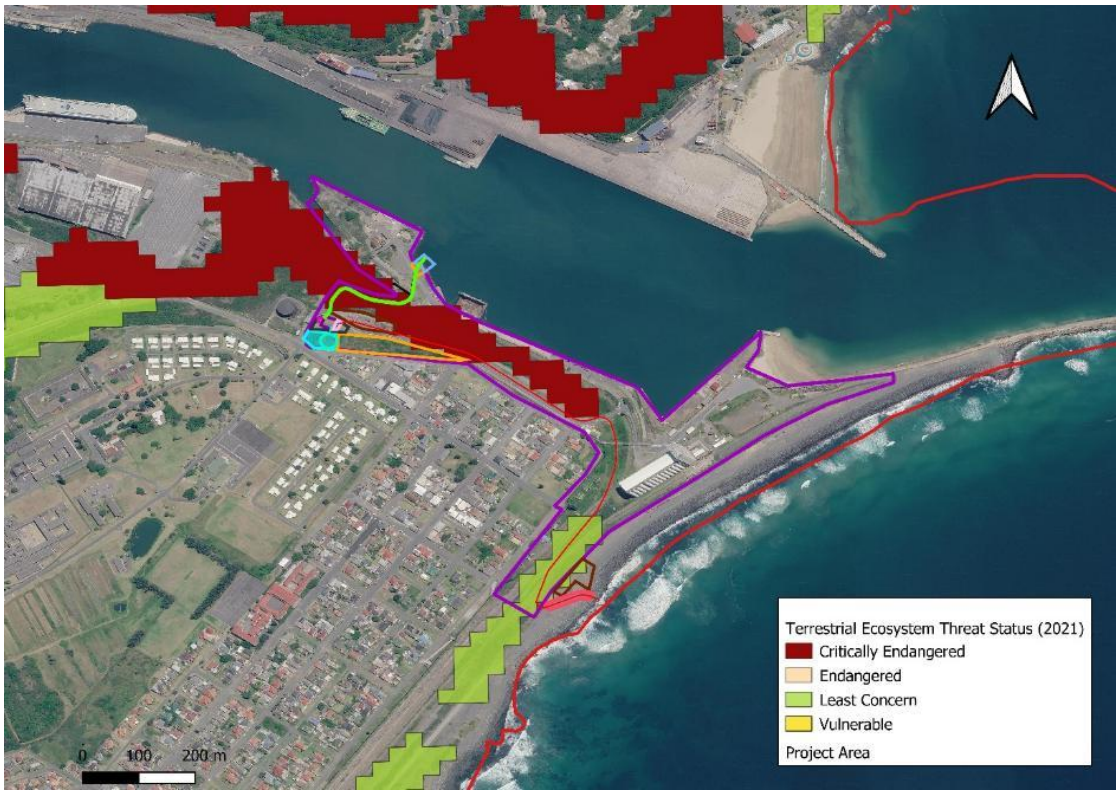

Figure 8.10. Vegetation map (Mucina & Rutherford 2006, SANBI 2018, South African National Biodiversity Institute (SANBI) 2024) and the ecosystem threat status of the wider landscape (RLE, 2021). The proposed solar, desal and intake development areas are outlined in yellow. Figure source Hawley & Balmer (2026).

8.5.4 THE HISTORICAL REFERENCE CONDITION

The preferred site for the Solar Photovoltaic (PV) and Desalination plants has been historically modified by previous developments, with and all existing natural vegetation removed and destroyed. This is affirmed through the following aerial imagery from 1966, showing the presence of permanent structures on the proposed sites.

Figure 8.11. Imagery from 1966, indicating that the site was already disturbed from the natural condition at the point. Figure source Hawley & Balmer (2026).

8.6 Habitat Sensitivity and Environmental Spatial Constraints

8.6.1 Ecosystem Threat Status

Ecosystem Threat Status: developed by the South African National Biodiversity Institute (SANBI; 2018) is an indicator of how threatened ecosystems are, specifically the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function, or composition. Ecosystem types are categorised as “Critically Endangered”, “Endangered”, “Vulnerable”, “Near Threatened” or “Least Concern”, based on the proportion of the original extent of each ecosystem type that remains in good ecological condition relative to a series of biodiversity thresholds (Figure 8.12).

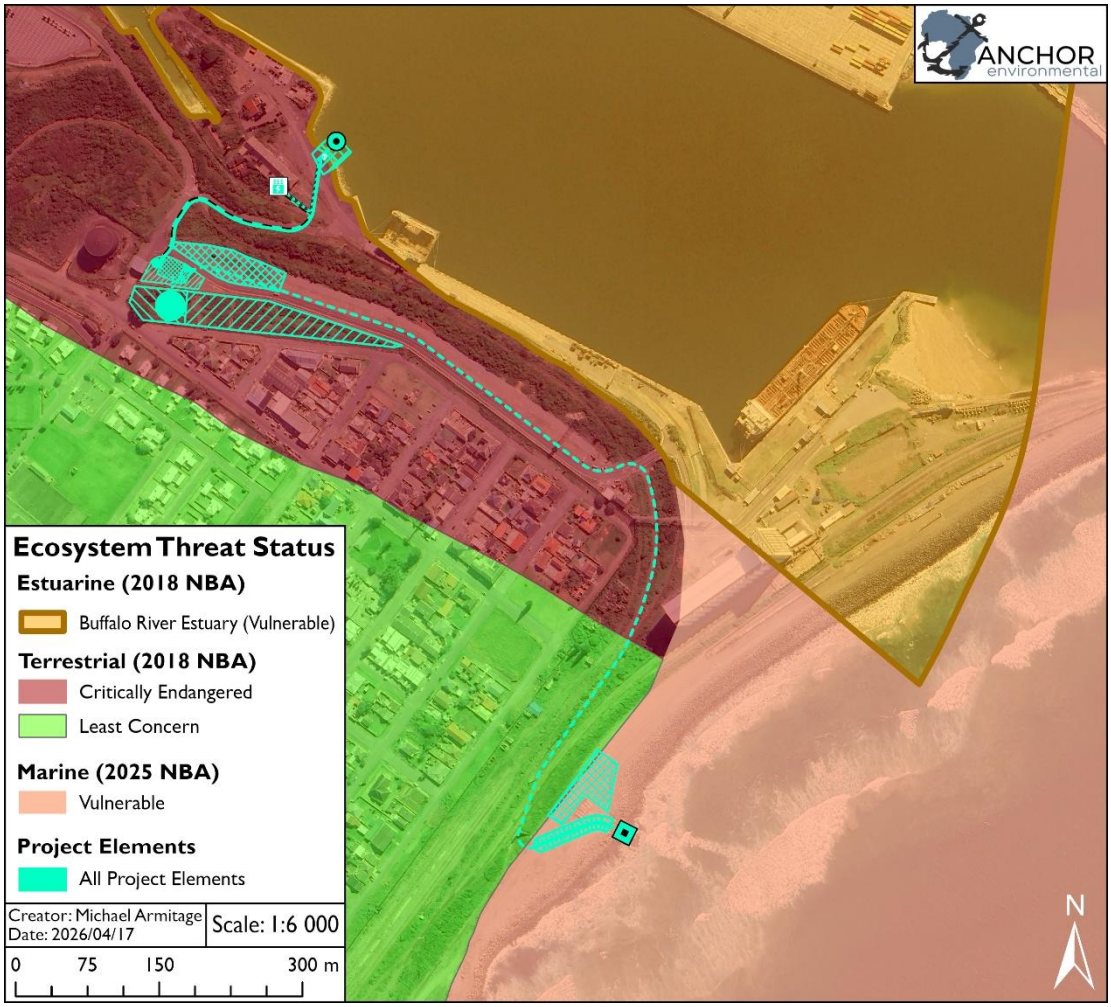

Figure 8.12. Ecosystem Threat Status of estuarine, terrestrial and marine habitats in the vicinity of the proposed development (Sink et al. 2019b, Sink et al. 2025, Van Niekerk et al. 2019c, Van Niekerk et al. 2025).

MARINE AND ESTUARINE ECOSYSTEMS

The marine ecosystems in which the proposed development lies (Agulhas Exposed Rocky Shore and Agulhas Inner Shelf Mosaic) are categorised as "Vulnerable", while the Buffalo River Estuary has an Estuarine Threat Status of "Vulnerable". "Vulnerable" ecosystems are "ecosystems that have a high risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems or endangered ecosystems".

TERRESTRIAL ECOSYSTEMS

The Terrestrial Environment is classified as a "Critically Endangered" Umtiza Forest Thicket Ecosystem. Any development occurring in a critically endangered or endangered ecosystem requires, at minimum, a Basic Assessment in accordance with the Environmental Impact Assessment (EIA) regulations. As this project is already undergoing a Scoping and Environmental Impact Assessment (S&EIA), these regulations are being adhered to. However, the presence of Umtiza Forest Thicket was disputed by the Terrestrial Specialist (further detailed in Section 8.5.3 and Section 9.1.3).

8.6.2 Protected Areas, Critical Biodiversity and Ecological Support Areas

Biodiversity Spatial Plans (BSPs) identify priority terrestrial and aquatic areas important for biodiversity conservation, ecological processes, and ecosystem functioning. These include Critical Biodiversity Areas (CBAs), subdivided into CBA 1 (biodiversity conservation) and CBA 2 (biodiversity restoration), as well as Ecological Support Areas (ESAs), Protected Areas (PAs), and Other Natural Areas (ONAs). These categories are mapped to guide planning and decision-making in support of sustainable development and biodiversity conservation.

Within the Eastern Cape, PAs, CBAs and ESAs, are managed under the Eastern Cape Biodiversity Conservation Plan (ECBCP). According to the ECBCP, most of the development on land overlaps with a Terrestrial CBA 1, while a section of the outfall pipeline, and the intake pipeline itself, overlaps with an aquatic (estuarine) ESA 1 (Figure 8.13). The actual marine outfall is situation within a marine ESA. No intersections with PAs are associated with the proposed development.

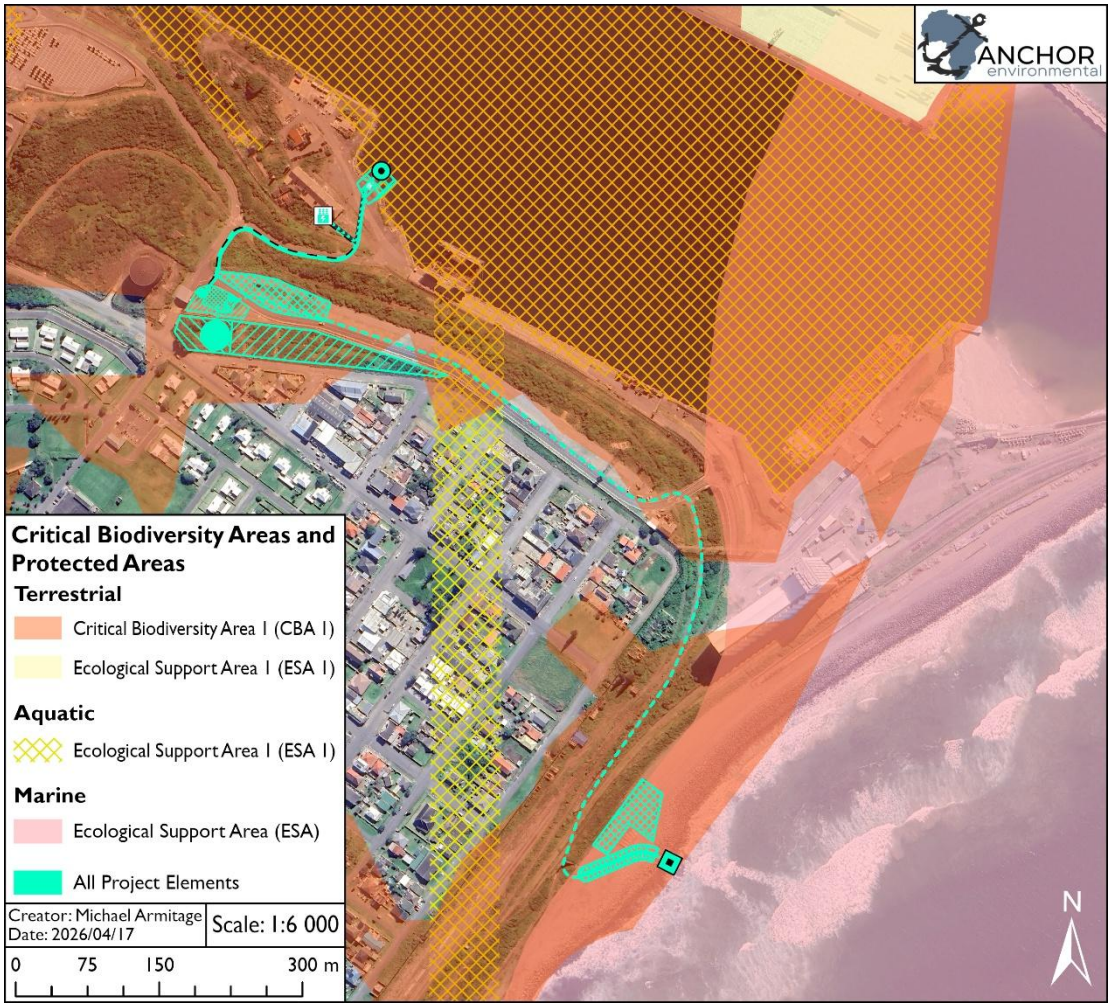

Figure 8.13. Terrestrial, aquatic and marine Critical Biodiversity Areas and Ecological Support Areas in the vicinity of the proposed development (ECBCP 2019, Harris et al. 2019, 2022).

MARINE PROTECTED AREAS AND ECOLOGICAL OR BIODIVERSITY SIGNIFICANT AREAS

The nearest Marine Protected Area (MPA) to the Port of East London is the Amathole MPA. The Eastern Cape Parks and Tourism Agency is the governing body of this MPA. The Gonubie section of the MPA is approximately 5 km from the Port.

The Port of East London is located within the Algoa to Amathole Ecological or Biologically Significant Area (EBSA, Figure 8.14), which spans the Eastern Cape shoreline between the Sardinia Bay MPA and the Amathole MPA at the Kei River mouth, up to the continental shelf break (MARISMA EBSA Workstream 2020). This EBSA encompasses what is likely the biggest single collection of special marine features in South Africa that also support key ecological processes. The proposed development is situated within a section of EBSA zoned for 'Impact Management'.

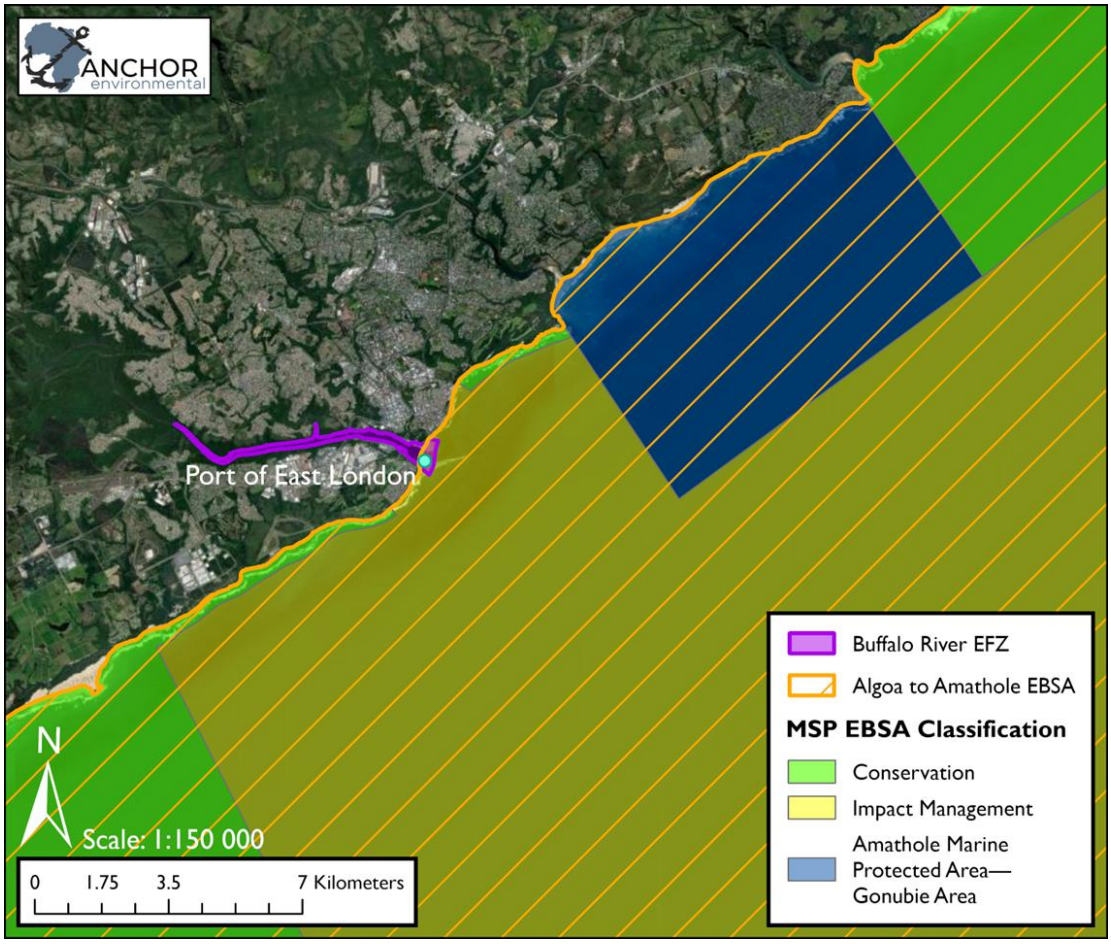

Figure 8.14. The location of the proposed development within the Algoa to Amathole EBSA (MARISMA EBSA Workstream 2020).

8.6.3 KEY BIODIVERSITY AREAS

Key Biodiversity Areas (KBAs) are internationally recognised sites identified as areas that contribute significantly to the global persistence of biodiversity. The project site falls within the broad "Buffalo City Coast" KBA (Figure 8.15; South African KBA NCG (2024)). However, KBA boundaries typically represent broad, landscape-scale ecological importance and do not necessarily indicate that all areas within them have equal ecological sensitivity or value. In this context, the inclusion of the site within the KBA is

unlikely to materially affect the area's local ecological integrity or the overall conservation objectives of the area.

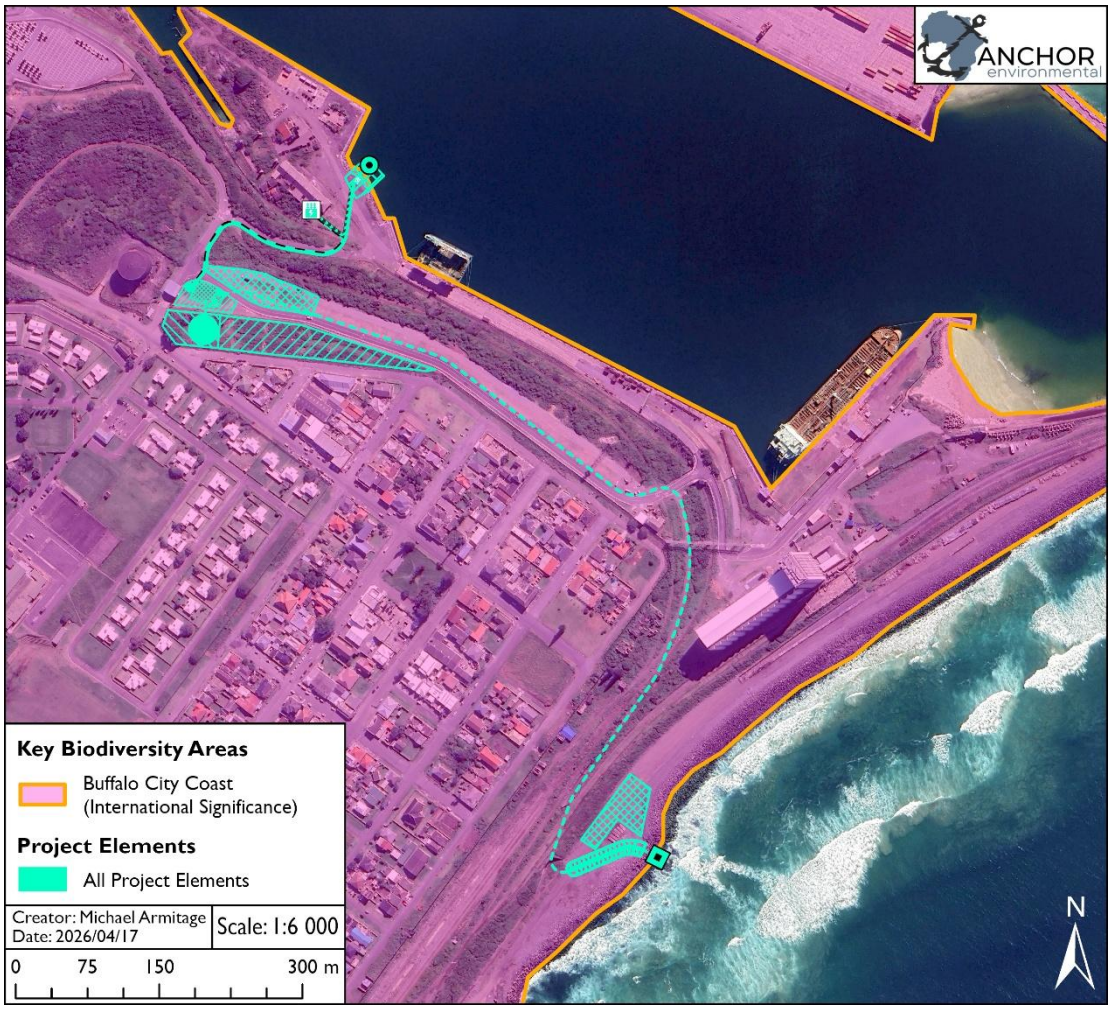

Figure 8.15. Top: South Africa's 263 KBA Sites. Bottom: Location of the proposed development, relative to the Buffalo City Coast KBA (South African KBA NCG 2024).

8.6.4 Implications for Management

Impact Management Zones are spatially defined areas within biodiversity planning frameworks (such as EBSAs, CBAs, and ESAs) that guide the management of land- and sea-use activities based on ecological sensitivity and conservation priorities. These zones are informed by the underlying biodiversity features and are used to determine whether activities are compatible, conditionally compatible, or incompatible with conservation objectives.

The Impact Management Zones of EBSAs, CBAs, and ESA areas are intended to be managed through place-based regulations informed by the ecological reasons for their classification. Activities assessed as compatible with the management objectives of CBAs and EBSAs may be permitted in these areas in accordance with applicable rules and regulations. Conversely, activities considered incompatible or inappropriate are generally discouraged or prohibited. Where activities are deemed potentially inappropriate, a detailed specialist assessment is required to demonstrate compelling reasons why such activities may be considered for authorisation.

The proposed development sea-use area lies entirely within an ESA, where activities are generally regarded as compatible, with the exception of new land-based coastal developments, which are considered to have restricted compatibility. In these cases, a robust site- and context-specific assessment is required to determine activity compatibility based on the biodiversity features for which the site was identified.

The land use areas fall within a CBA 1, which typically implies that areas should be maintained in a natural state and that proposed activities are generally considered inappropriate. However, this classification has been challenged by Hawley & Balmer (2026), who note that: "The land use objective for CBA1 areas is to maintain them in a natural state. The ECBCP (2019) was modelled using an integrated land cover map (based on the National 2014 landcover map available at the time). The National land cover map was used to identify areas that were still in a natural state. The scale and resolution of the mapping does not always reflect the conditions on the ground, and for this reason all Biodiversity Spatial Plans should be ground-truthed. In this instance, historical aerial imagery from 1966 shows the land uses in the Port of East London at the time, and is evidence that the sites proposed for development were historically modified (Figure 7.3). **The sites therefore do not comply with the requirements of CBAs in terms of 26 the Technical Guidelines for CBA mapping (SANBI 2017) and the associated land use recommendations/guidelines of the (ECBCP 2019) therefore do not apply. In addition, the discharge pipeline route follows exiting roads and crosses railway lines to the coastline."**

8.7 Socio-Economic Context

The following section has largely been quoted directly, or abbreviated from, from the Socio-Economic Assessment prepared for this study (Armitage et al. 2026).

8.7.1 Population Trends

The coastal and port city of East London falls within the Buffalo City District Municipality (BCMM), with the BCMM government overseeing management and governance within the areas broadly falling within the catchment of the Buffalo River. The BCMM is also home to the administrative centre, the "Seat" of the Eastern Cape Provincial Government, in the City of Bhisho, which is located in the upper catchment, approximately 48 km northwest of East London. East London is the administrative seat of the BCMM, which reflects the key role the city plays in driving governance and the economy within the municipality.

The BCMM had a total population of 975 255 people in 2022, a 24.7% increase from 781 853 people in 2011 (Stats SA 2011, South African National Department of Statistics 2025). This population is divided into a total of 268 438 households with an average household size of 3.6 people, a slight increase from the 3.4 people per household in 2011. The percentage of the population of working age (between 15 and 64 years of age) remained stable between 2011 and 2022, at 67.4%. The same is true for the age dependency ratio (the ratio of "dependents" to working age individuals), which was 48.3% in 2022 and 48.4% in 2011: which was very similar to the national average of 48.8% in 2022. However, the relative proportion of this dependent population saw a decrease in the young children cohort, and an increase in the elderly cohort, thus potentially indicating an aging population. Positively, the BCMM saw progress in education metrics, access to improved sanitation and disposal services, access to improved water sources, and access to electricity for the purposes of lighting. These metrics all improved over the 2011-2022

period, a trend that also occurred in both the Eastern Cape Province, and South Africa as a whole.

Unfortunately, despite the recorded improvement in living conditions, other metrics highlight concerning trends within the BCMM. The most concerning trend is that of unemployment, which has increased significantly at a national, provincial, and municipal level. In fact, the BCMM experienced a higher increase in its unemployment rate than both the provincial and national average, with a rise from 26.5% in 2012, to 45.3% in 2022 (an 80.2% increase). This equates to an increase in the unemployed population from ~80 000 individuals in 2012, to ~185 000 in 2022. While rising unemployment is consistent with other sub-metros, the rate seen in East London was slightly lower than those in the other major sub-metros, such as Macleantown, Sandisiwe, and Qonce.

8.7.2 Economic Context

There have been pronounced changes in Buffalo City's economy in recent years, as demonstrated by fluctuations in its Gross Domestic Product (GDP; BCMM 2024). A considerable economic decline was experienced between 2019 and 2020, likely due to the onset of the COVID-19 pandemic. This was followed by economic recovery between 2020 and 2021, with growth rates exceeding pre-Covid conditions. However, this was predicted to stabilise to an average growth rate of 1.32% between 2022 and 2027, which is lower than the predicted growth rates for the Eastern Cape (1.47%) and South Africa (1.76%). BCMMs GDP is further broken down at the sub-metro level, with data indicating that the East London sub-metro contributed the most to the BCMMs GDP, with a 35.93% share as of 2022. This equated to a total city-wide GDP of R26.29 billion in 2022, which was predicted to grow to R48.95 billion in 2027. This further highlights the economic importance of East London within the metro. Gross Value Added (GVA) is a measure of economic output which tells us how much value an industry or region is contributing to the economy. When broken down by sector, Community Services are the largest contributor to the economy within the BCMM, contributing 37.3% to GVA, followed by Financial Services (19.3%), and Trade (17.0%). Therefore, the BCMM economy is dominated by services of the tertiary sector.

Given that the proposed desalination plant will most likely have an impact on the Trade Sector in East London and BCMM, this sector was the focus of the assessment. As of 2022, the BCMM contributed 1.9% towards South Africa’s total Trade Sector value, and 20.4% to the Trade Sector value of the Eastern Cape. This relatively large contribution is a product of the presence of key cities within the BCMM, as well as the influence of the Port of East London as a trade hub. The BCMM Trade sector experienced a significant 11.5% decline in 2019 during the onset of the COVID-19 pandemic. However, this was followed by an economic rebound in 2020, peaking at 6.6% growth. This growth rate then slowed between 2021 and 2022 (~3% growth), which was predicted to decline further to an average annual growth rate of 1.15% between 2022 and 2027.

Another useful metric is the “location quotient” which is defined as the relative competitive advantage that one regional economy has over other regional economies with respect to producing the same good/service. The BCMMs location quotient indicates that, besides Community Services and Manufacturing, the Trade sector exhibited the highest competitive advantage, relative to the other sectors. This metric was higher than the national average for the Trade sector. This competitive advantage is

likely due to the presence of the Port of East London, which enables trade efficiencies and opportunities not available for areas without international port facilities.

The Trade sector contributes significantly to employment in the BCMM, providing the second-highest number of jobs in 2022 (after Community Services). Only the Nelson Mandela Bay Metropolitan Municipality (NBMM) supported a higher number of Trade Sector jobs in 2022, than the BCMM which is explained by the combined influence of the Port of Port Elizabeth and the Port of Ngqura, both of which are large international ports. However, when looking at the percentage of total jobs within the Trade sector, the BCMM actually had a slightly higher percentage than the NBMM, which again speaks to the considerable importance of the trade sector within the BCMM. Trade sector jobs within BCMM in 2022, consisted of 60.1% formal jobs, and 39.9% informal jobs. Consequently, most jobs directly resulting from port-related activities likely fall within the "formal trade" cohort. The trajectory of imports and exports indicates that most trade in the BCMM was derived from imports (bringing goods into the municipality), rather than exports (delivering goods out of the municipality) in 2022. In summary, the BCMM appears to be in a tenuous state with respect to unemployment, yet the Trade sector plays an important role in maintaining the base of the metro's economy. Since the proposed Desalination plant will supply fresh water for use within the Port of East London, the resultant improvement in the port's operational efficiency/capacity could increase the value of the Trade sector and strengthen the metro's economy as a whole.

8.7.3 Human Uses and Influence within the Coastal and Marine Environment

East London offers a diverse range of marine and estuarine recreational activities that are influenced by its rich aquatic environment. The city's beaches, including Eastern Beach and Nahoon Beach, are well-suited for bathing, surfing, and a variety of water sports. The warm waters of the Indian Ocean provide favourable conditions for activities, such as kayaking, windsurfing, and stand-up paddleboarding, while the consistent waves attract surfers from both local and international communities. Additionally, East London is recognized as a destination for recreational Self-Contained Underwater Breathing Apparatus (SCUBA) diving, with several dive sites in the surrounding waters that feature diverse marine life. The sheltered environment of the Buffalo River Estuary is ideal for more tranquil activities, including boat cruises, kayaking, recreational fishing, and birdwatching. Furthermore, sailing is a popular activity in both the ocean and estuarine waters, with sailing clubs, such as the Buffalo River Yacht Club, in the area. Six fisheries were identified to be potentially relevant to this development, and include the Commercial/Traditional Line fishery, the Large Pelagic Longline fishery, the South Coast Rock Lobster fishery, the Small Scale and Recreational Fishers fishery, and Aquaculture/Mariculture. However, only the Commercial/Traditional Line fishery and Small Scall Scale and Recreational fisheries were identified to have perceivable overlap with the development's area of influence. These fisheries are assessed in great depth as part of the Marine and Fisheries Impact Assessment (See Bovim *et al.*,2026).

8.7.4 Users of the Area in Close Proximity of the Development

Given the proposed location of the plant within a functional port, which is subject to access control, most of the people exposed to the development during both the construction and operational phases, will be port employees. However, given the proximity of the site to the transparent perimeter fence at the edge of the port's property, residents/workers within the neighbouring West Bank mixed use suburb, located to the south of the site (in addition to users of the supporting road infrastructure), are likely to be exposed to the development. The properties located along Dale Street, running

parallel to the site, are characterised by a mixture of residential and business developments, including two vehicle bodywork shops, a hardware pawn shop, a vehicle finishes/body shop supply store, and at least one small hotel/guesthouse (Figure 8.16).

Figure 8.16. Google Maps views of the mixed use “West Bank” suburb, directly adjacent to the project site. Top: View looking southeast to Bank and Dale Street, with the development site to the left. Row 2: View looking east to Dale Street, with properties on the right and the project site on the left. Row 3: View looking

west, up Aldred and Dale Street, with the project site on the right. Row 4: View looking East Down Dale Street towards several commercial buildings, with the project site on the left. Bottom: View looking west across the Hildyard Street green space, with the project site in the far right of the image. Source: Google Earth.

These commercial/industrial developments are interspersed with residential accommodation/houses. When looking slightly further away from the site deeper into the West Bank Area, although still within 200–300 metres of the site, along Bank Street and High Street, the property uses becomes more varied (Figure 8.17). Here, there is a mixture of residential houses, several small supermarkets, a liquor store, a church, a medical practice, a tearoom, a post office, and two additional vehicle bodywork/repair shops. Finally, in addition to the West Bank Suburb, the area to the southwest of the site, running along the south side of Bank Street, consists of a relatively large, uniform, residential settlement, which likely houses the workers of the East London Department of Correctional Services. These two areas are discussed in further detail in the following section (Figure 8.18).

Figure 8.17. Google Maps views of the mixed-use area in West Bank Suburb in vicinity of Bank Street (all located within ~300 m of the proposed site). Top: View looking east down bank Street towards the sea.

Row 2: View looking northwards down Bank Street and High Street, in the general direction of the project site. Row 4: View from Hood Street with Bank Street visible to the right, and the St Andrews Presbyterian Church visible in the foreground. Row 5: View looking northeast down Hood Street, with High Street in the foreground. Source: Google Maps.

Figure 8.18. View looking southwards, way from the project site, across Dr Zahn Road/ Bank Street, towards the Department of Correctional Services accommodation. Source: Google Maps.

8.7.5 SUBPLACE STATISTICS (2011 CENSUS)

Given the absence of data available at the suburb (Sub Place) level for the 2022 census, the 2011 data have been used (Stats SA 2011, South African National Department of Statistics 2025). The two relevant sub places are the West Bank Village and Fort Glamorgan (the area in which the East London Department of Correctional Services falls.

WEST BANK VILLAGE SUB PLACE

- Population & Demographics: 2 069 people in 616 households. Predominantly White (57%), followed by Black African (36%) and Coloured (6%). Main languages: English (41%), isiXhosa (32%), Afrikaans (24%).
- Housing & Services: Over 98% of dwellings were formal, with near-universal access to water, sanitation, electricity, refuse removal, and cooking facilities. About half of households had electrical heating, but over a third had no winter heating.
- Education: Most residents had some or completed secondary education; 10% had some higher education.
- Employment & Income: Unemployment rate was 23%. Most households (65%) earned a middle-income range (R38 201–R307 600 in 2011, ~R78 000–R630 000 in 2025 terms). Around 11% had no income.
- Overall Character: A well-established, serviced, middle-income area with good infrastructure and high levels of formal housing.

FORT GLAMORGAN

- Population & Demographics: 2 511 residents, but largely influenced by the East London Department of Correctional Services. Majority Black African (87%), with a small Coloured (6%) and White (6%) population.
- Housing & Services: Almost all dwellings were formal, with near-total access to water, sanitation, electricity, and heating.
- Education: Data limited because most residents are inmates. Of recorded individuals, over half had completed secondary school and 27% had some higher education.

- Employment & Income: Very low unemployment (11.7%), largely reflecting employment at the correctional facility. Most households earned middle to upper-middle incomes (R76 401–R614 400 in 2011, ~R156 000–R1.26 million in 2025 terms).
- Overall Character: Economically stable area dominated by the correctional facility, with a demography shaped by employees and inmates rather than a typical residential suburb.

8.8 Heritage, Archaeological, and Palaeontological Considerations

8.8.1 Geological Context

Geologically, the Port of East London desalination plant project area lies on the southeastern margin of the Karoo Basin where the Adelaide Subgroup rocks of the Beaufort Group are exposed (Bamford 2024). The rocks of the Beaufort Group have been divided into the lower Adelaide Subgroup for the Upper Permian strata, and the Tarkastad Subgroup for the Early to Middle Triassic strata. In this part of the basin, east of 24°E, three formations are recognised in the Adelaide Subgroup, the basal Koonap Formation, the Middleton Formation and the thick Balfour Formation (Smith 2020). The rocks of the Beaufort Group have been divided into the lower Adelaide Subgroup for the Upper Permian strata, and the Tarkastad Subgroup for the Early to Middle Triassic strata. In this part of the basin, east of 24°E, three formations are recognised in the Adelaide Subgroup, the basal Koonap Formation, the Middleton Formation and the thick Balfour Formation (Smith 2020). Overlying the Beaufort Group, the Cenozoic Algoa Group extends along the entire Eastern Cape coast and has been divided into six formations (Roberts et al. 2006). The basal Bathurst Formation, centred around the town of Bathurst, comprises a soft marine limestone at its base, with overlying pebbly coquina. It is Eocene in age and rests unconformably on Karoo Supergroup bedrock (ibid). The next formation is the Alexandria Formation that is composed of three strata: a basal conglomerate with scattered oyster shell, a pebbly coquinite, and an overlying calcareous sandstone with horizontal lamination and herringbone cross-bedding. The Alexandra Formation is Miocene to Pliocene in age and is overlain by the very thick Nanaga Formation that is composed of semi-consolidated calcareous sandstone with aeolian cross-bedding (Roberts et al. 2006, Hassan et al. 2022). The Salnova Formation is much thinner and sporadic with the incorporation of some of the underlying reworked Alexandra Formation materials. The Nahoon Formation aeolianites rests on Mesozoic rocks or disconformably on the Salnova Formation. It has some very high dunes and represents the lithification of aeolian sands prior to the Eemian highstand (Roberts et al. 2006). The topmost layer, the Skelm Hoek Formation, represents the most recent phase of aeolian sedimentation and occurs extensively along the Eastern Cape Coast.

8.8.2 Palaeontology

The southern half of proposed Port of East London desalination plant project site is located mainly on the Nanaga Formation aeolianites which are given a very high sensitivity rating (red) on the South African Heritage Resources Agency's (SAHRAs) palaeo-sensitivity map. This sensitivity rating is based on rare occurrences of oyster beds, invertebrate marine shells recorded from road-cuttings farther inland (Hattingh & Goedhart 1997). In practice, according to Bamford (2024, 2026) the fossil occurrences

within this formation are very rare and frequently very weathered due to extensive post-depositional diagenesis, the result of such as dissolution and re-precipitation of carbonate by groundwater (Roberts et al. 2006, Almond 2010). Bamford (2024, 2026) therefore supports Almond's (2010) recommendation that a low palaeosensitivity rating for this formation is more appropriate, with mitigation not required unless rich fossil accumulations are exposed during excavations. The northern half of the project site is underlain by the Permian Middelton Formation that is also indicated as very highly sensitive (red) on South African Heritage Resources Information Systems (SAHRIS), but according to Bamford (2024, 2026), this sensitivity rating is more applicable to the central Karoo Basin where the formation has not been impacted by sea-level rise. Bamford (2024, 2026) further indicates that there are no records of Permian vertebrates or plants from this area.

8.8.3 Terrestrial Archaeology

There has been relatively little formal pre-colonial archaeological research conducted in the East London area, apart from Robin Derricourt's early attempt at synthesising the known prehistory of the region (Derricort 1977). In a Masters thesis dealing with the development of East London as a port, however, Gordon (1932), reports a number of occurrences of pre-colonial archaeological sites and material on the east bank of the Buffalo River. Citing a paper by George McKay dated 1887, Gordon writes that "some years ago, in opening a quarry, a very large mound of shells was discovered on the left bank of the Qigney River at its junction with the Buffalo, where the mound formed a rounded bluff. The Harbour works engineers have removed upwards of 375,000 cubic feet of these shells to fill up the lagoon behind the Eastern Training Wall. Anyone examining what remains of this mound will find it composed principally of limpet, mussel oyster, bones of fish and birds, of antelopes, hippopotamus and other mammalia, layers of ashes, fragments of charcoal, and pieces of coarse pottery. There can be no doubt that this spot was occupied by many successive generations of human beings to permit the accumulation of so large a mass of refuse" (Gordon 1932).

A collection of material from "the "kitchen midden" where the Quigney River ran into the Buffalo", probably the same midden as described above, was presented to the East London Museum by Dr Bruce Bays (Gordon 1932). According to Gordon (1932), McKay also found pre-colonial archaeological material in the valley behind the prison/convict station, where a railway cutting exposed a gravel layer containing "stone implements, spearheads, and some fragments of stone pottery". Further pre-colonial archaeological material was reported by a Mr Gately, at his property on a small hillock east of the centre of East London, near where two streams flowed into First Creek. A thick layer of black mud was present on the site, and from this "Mr Gately has dug up many implements and bones ... pierced round stones, ... spear heads, coarse pottery, teeth and other bones of the hippopotamus" (Gordon 1932)

. Lastly, a number of the early historical maps of East London indicate the presence of a Xhosa village and garden on the West Bank, almost directly opposite the mouth of the Qigney stream. The site of this settlement is probably in the area now occupied by the Car Terminal. More recently, there have been several heritage assessments carried out in the East London Industrial Development Zone (IDZ), south of the area proposed for the desalination plant (Binneman & Webley 1996, Anderson 2009, 2013). These studies

indicate a widespread and general occurrence of pre-colonial archaeological material in the West Bank area of East London.

No Early Stone Age archaeological material has been reported from the area, and the reported archaeology is dominated by a "litter" of Middle Stone Age lithic material that is present almost everywhere (Derricort 1977, Binneman & Webley 1996, Anderson 2009, 2013). Further evidence of early modern human presence in the East London area during the Middle Stone Age (MSA) was found in 1964, when the footprints of a young human child and the tracks of a bird and two mammal species were discovered preserved in sandstone at Nahoon Point, north of the Buffalo River. The tracks are estimated to be approximately 124 000 years old ago and their presence is an indicator of the antiquity of a human presence in the area around East London. The scatters of MSA artefacts reported around East London are, in the main, in secondary context (i.e. not where they were originally deposited) and cannot generally be said to form discrete archaeological sites. This material is generally considered to be of low archaeological significance and sensitivity. By contrast, Later Stone Age (LSA) archaeological material, also widely recorded in the area (Derricort 1977, Binneman & Webley 1996, Anderson 2009, 2013), most often as coastal shell middens, generally occurs as definable sites, sometimes in sealed contexts and accompanied by bone and other archaeological material. These sites are generally of moderate and sometimes high, local archaeological significance.

8.8.4 Historical Development of East London

The proposed desalination plant, solar PV facility, and associated infrastructure, will be constructed on the west bank of the Buffalo River where the original port facilities and village of East London were established in the first half of the nineteenth century. The site was first claimed by Lieutenant Baillie, formerly of the Royal Navy, when he hoisted the Union Jack at Signal Hill in 1836, having persuaded the Governor of the Cape, Sir Benjamin D'Urban, that the Buffalo River might serve as a suitable harbour from which to support military operations during the Frontier Wars (Knox-Johnston 1989). The site on which the PV facility is proposed was previously occupied by a row of four houses, probably built for harbour personnel. This site did not form part of the original East London township grid plan and these buildings, which are visible in early aerial photographs of East London dated 1935 and 1938, appear to have been built after the beginning of the twentieth century (Figure 8.19). Google Earth satellite imagery indicates that they were demolished between August 2004 and August 2009 (Figure 8.20) and the remains of their foundations and floor slabs are all that are visible on the site (Figure 8.21).

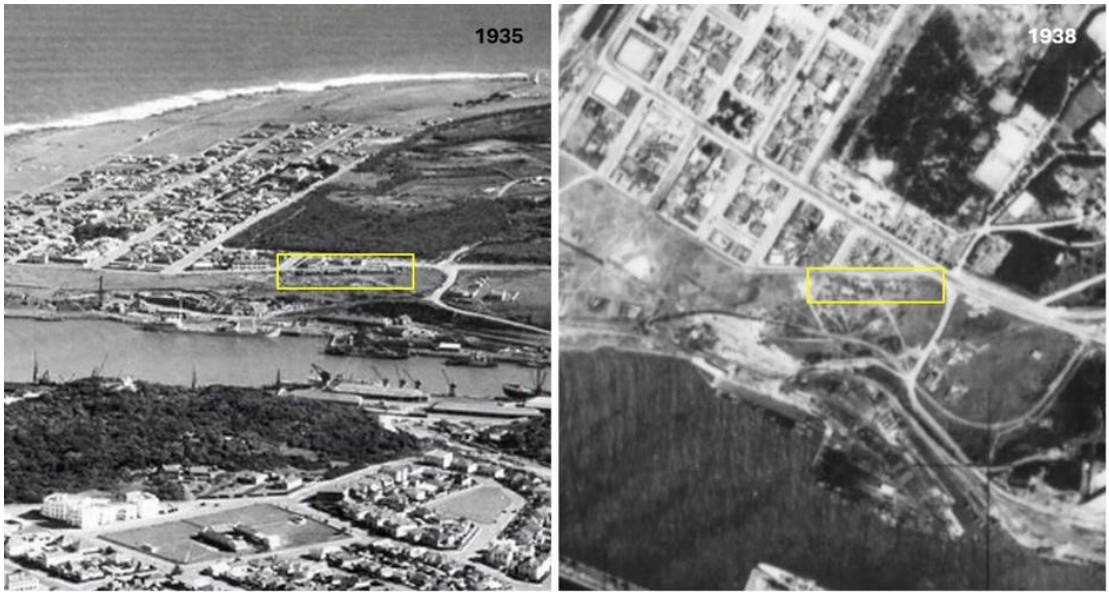

Figure 8.19. : Early aerial photographs dated 1935 (left) and 1938 (right) which indicate the row of three, now demolished houses on the proposed PV facility sites (Source: Hilton T on Flickr (https://www.flickr.com/photos/hilton-t/) (left), National Geospatial Information (http://www.cdngiportal.co.za/cdngiportal/) (right)).

Figure 8.20. Consecutive Google Earth satellite images dated August 2004 (left) and August 2009 (right) showing the four houses on the proposed PV site, pre- and post-demolition (Source: Google earth).

Figure 8.21. Examples of the remains of the demolished houses on the proposed PV site. The red brick walling visible in the images is typical of much 1930's South African residential housing (Source: Anchor Environmental).

8.8.5 SUBMERGED PREHISTORY

Since the start of the Quaternary, approximately 2.6 million years ago, the world has been subject to a series of cooling and warming climatic cycles and sea level was mainly lower than it is today. During the last 900,000 years, during which our tool-making ancestors were colonising much of the world, global sea levels have fluctuated substantially on at least three occasions, the result of increased and decreased polar glaciation. The dropping of sea levels was caused by the locking up in the polar ice caps of huge quantities of seawater as global temperatures cooled. Each of these low stands would have "added a large coastal plain to the South African land mass" (van Andel 1989) where parts of the continental shelf were exposed as dry land (see Cawthra et al. (2016)). The exposure of the continental shelf would have been most pronounced on the wide Agulhas Bank off the southern Cape coast, and it is estimated that a new area of land, as much as 80,000 km^2 in extent, was exposed during the successive glacial maxima (Fisher et al. 2010). Until relatively recently there was little or no global understanding of the potential for, or access to, submerged prehistoric landscapes and sites on the continental shelf. Increasingly frequent discoveries in various parts of the world of drowned, formerly terrestrial landscapes, often as a result of development-led seabed surveys and sampling, is, however, providing increasing evidence for the survival of prehistoric archaeological sites on and within the current seabed. In South Africa there is concrete archaeological evidence for a prehistoric human presence in what is now Table Bay where three Early Stone Age (ESA) handaxes were recovered from the seabed during the excavation of two Dutch East India Company shipwrecks.

SUBMERGED PREHISTORY POTENTIAL OF EAST LONDON

The seabed of the East London nearshore environment is, according to (Proposed Development of the West Bank WWTW Marine Outfall Pipeline, East London, South Africa: Underwater Heritage Impact Assessment) quoting the Council for Scientific and Industrial Research (CSIR 2016), "controlled by the prevailing surf conditions [and] is typically devoid of notable sediment accumulations with exposed rock outcrops dominating". de Wet & Compton (2021) support this view, stating that there is generally no significant sediment accumulation on the Eastern Cape continental shelf due to the narrowness of the shelf and the influence of the Agulhas Current. This suggests that the survival of in situ submerged archaeological deposit is unlikely in this area, except possibly in isolated contexts within incised valleys on the continental shelf which were cut during sea level low stands when river courses extended onto the shelf and which are described by a number of studies for the East Coast (see for example, (Green & Garlick 2011, Dladla 2013). Such palaeo-rivers on the exposed shelf would have been attractive resource foci for our human ancestors for nearly 70% of the last 200,000 years, covering ~65 000 years during the MIS 6 ice age, and the period between the start of the Marine Isotope Stage (MIS) 5a marine incursion at 80,000 years ago and about 9,000 years ago. And just as on land, archaeological sites and material, like the Table Bay handaxes referred to above, can be expected to have been deposited within and along the edges of these river valleys.

Along most of the South African coast, however, as the rising sea during post-glacial marine transgression eroded terrestrial sediments, including the fluvial sediments in palaoe-river channels, and prehistoric archaeological sites present within such deposits are likely to have been destroyed and the artefacts they contained reworked into seabed gravel. Of this material, stone artefacts are most likely to have survived, and ex situ lithic

artefacts may thus be present within the coarse gravels and surficial river- and seabed sediments within the estuarine and marine portions of the Port of East London desalination project area. The marine outfall for the Port of East London desalination plant project will be installed in the current surf zone east of an artificial rock revetment and boulder beach constructed within the last decade to halt a 40 m regression of the reclaimed land between the grain elevator and the sea. The aggressively erosive surf environment indicated by the need for the revetment and boulder beach suggests that survival of submerged prehistoric archaeological material – either in or ex situ - is extremely unlikely. The installation of the proposed marine outfall pipes on the surface of the constructed rocky beach also suggests that even were archaeological material present, impacts on it are unlikely. Similarly, within the Buffalo River, the intake pipeline will also be laid on the surface of the riverbed, which itself has been subject to nearly 150 years of dredging and human interference. The survival of submerged prehistoric archaeological material here is also unlikely.

8.8.6 Maritime History of the South African Coast

As with many ports at river mouths there was, historically, always an element of risk involved in entering and leaving the Port of East London. The sand bar across the mouth meant that initially only vessels smaller than 80 tons could enter the river. Larger vessels were forced to anchor in the roadstead offshore and goods and people were transported to and from the ships in lighters (see Plate 8 above). The first maritime casualty at the Buffalo River was the coasting schooner, Ghika which was wrecked in 1847 (Denfield 1965). Steam propelled vessels were at less risk of grounding when entering the river, but it wasn't until June 1872 that the German steamer Bismarck made the first successful entry into the river by a steamship (Ingpen 1979).

As indicated above, the construction of what was to become the formal harbour that now exists in the Buffalo River began in 1872 (Ingpen & Pabst 1985, Knox-Johnston 1989; https://www.sahistory.org.za/places/east-london). Despite these harbour works, which continued until well into the 20th century, the many shipping casualties which occurred in and around the Buffalo River, bear out Denfield's statement that "wrecks have always been a strong feature of the East London seascape" (Denfield 1965). Records consulted for this study – a shipwreck database maintained by TerraMare Archaeology and a shipwreck database compiled by Fedde Van den Bosch in 2014 – indicate the potential for approximately 90 wrecks within a 1 km radius of the intake and outfall pipelines associated with the proposed desalination plant. The bulk of the wrecks occurred within, or close to the Buffalo River, particularly north of the mouth where the historical anchorage was located (Denfield 1965, Gribble, 2018), but a number are clustered south of the western breakwater in the vicinity of the marine outfall, and there are a number south of this along the coast between the harbour and Hood Point.

It is important to be aware that the positions of very few of South Africa's recorded historical wrecks are accurately known. The positions for most of the wrecks given in the various databases and indicated in the vicinity of the Buffalo River in Figure 8.22 below are, therefore, approximate, and are based on the descriptions of their loss in the historical records, rather than physical, identifiable wreckage on the seabed. That said, the presence of the remains of most of these vessels should be assumed within the general vicinity of where they are marked on the figure. It is extremely unlikely that there will be any wrecks present in the vicinity of the water intake pipe because of the widening

of the Buffalo River and the major changes to the morphology of the West Bank made since major harbour works commenced in the 1870s.

Figure 8.22. Recorded shipwrecks in the vicinity of the maritime elements (intake and outfall pipeline) of the proposed Port of East London desalination plant (Source: TerraMare Archaeology Shipwreck Database).

Figure 8.23 shows an overlay of an 1887 plan for the development of the harbour, and Figure 8.24 shows a 1942 plan of the harbour following the creation of the Turning Basin in the 1930s. While not absolutely accurate, the overlay nevertheless indicates that the West Bank was cut back by up to 100 m in places to create the Turning Basin and what's indicated as the Oil Tanker Wharf. Since 1942, there has been further cutting back of the West Bank to its current alignment, as indicated in Figure 8.24.

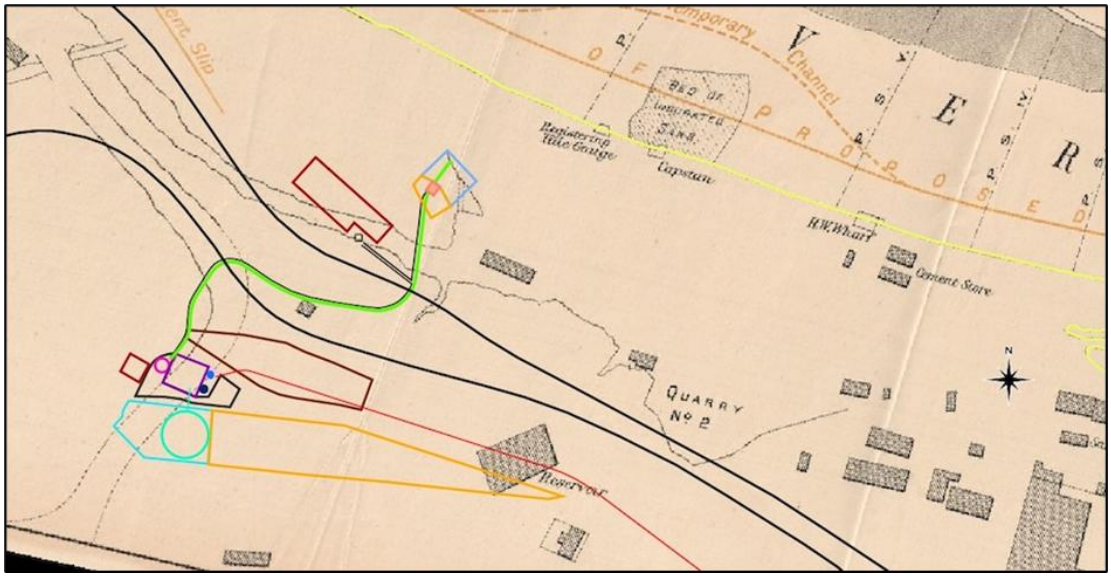

Figure 8.23. Overlay of the 1887 map of the Buffalo River showing the original alignment of the west bank of the river (yellow line). The infrastructure associated with the proposed desalination plant is located well inland of the original riverbank.

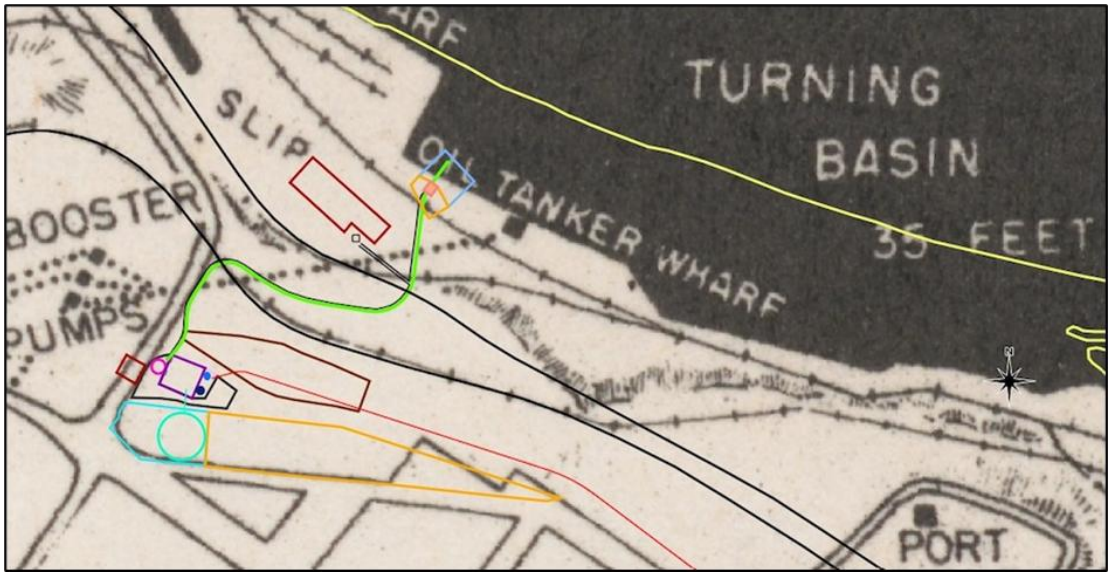

Figure 8.24. Overlay of the 1942 harbour map with the current alignment of the West Bank, showing the further cuts made in the last 80 years.

This therefore means that the proposed water intake pipe is between 65 and 85 m inland of the original, late 19th century alignment of the west bank of the Buffalo River and there is thus no possibility, prior to the 1930s, of there being wrecks present in the area. Furthermore, there have been no recorded casualties within the Buffalo River since the 1930s so there is no likelihood of new wreckage being present on the widened portion of the riverbed within which the intake pipeline will be installed.

In respect of the area of the proposed marine outfall, historical records indicate several 19th century maritime casualties on the rocks of the West Bank, which is assumed to refer to the rocky coast south of what was formerly Castle Point. The historical

descriptions of these events are, however, vague and unreliable, and the positions given for the seven wrecks shown within 300 m of the marine outfall in Figure 8.22 are highly speculative.

Since the late 19th century, there has been substantial alteration to the coastline from Castle Point at the mouth of the river, south towards Hood Point. The development of breakwater resulted in land reclamation with the creation of coastal defences around Castle Point and south of the river mouth.

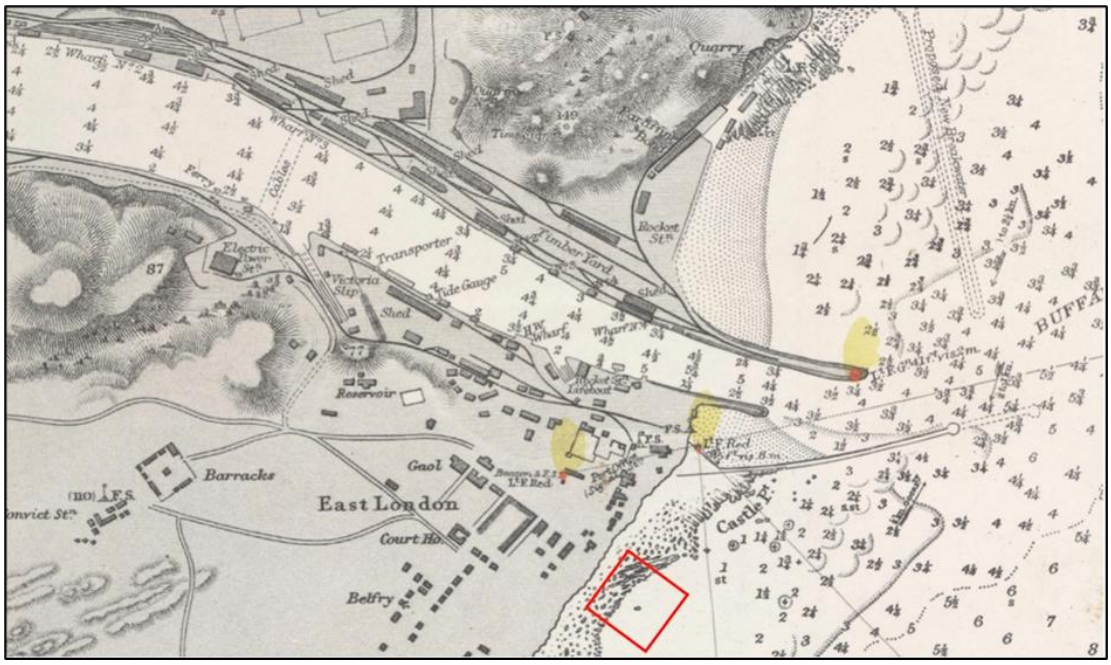

Figure 8.25. Detail from 1869 Admiralty Chart No. 1843 showing Castle Point and the rocky south of it with the approximate location of the proposed marine outfall indicated by the red square (Source: https://itoldya420.getarchive.net/amp/topics/buffalo+river+eastern+cape).

As indicated earlier, these coastal defences were substantially strengthened within the last decade by the renewal of the artificial rocky beach and revetment. The construction of the coastal defences has changed the historical alignment of the coastline and buried it and the adjacent seabed, including any shipwreck remains, within its footprint, under the revetment and adjacent rocky beach. Further offshore, and beyond the coastal defences, the remains of wrecks may be present on the seabed where the marine outfall will be installed.

9 SPECIALIST STUDY FINDINGS

9.1 SPECIALIST STUDIES

Several specialist studies were conducted as part of the Scoping and Environmental Impact Assessment (S&EIA) to describe the status of the current environment and assess potential impacts of the development on environmental, heritage, and socio-economic receptors. These assessments also identified mitigation measures to minimise negative impacts and other management and monitoring requirements for inclusion in the Environmental Management Programme Report (EMPr). Specialist Studies and/or Compliance Statements were undertaken as identified by the Screening Tool, the Environmental Assessment Practitioner (EAP) during the Site Sensitivity Verification (SSV), and as recommended by the Competent Authority (CA). These studies were conducted in accordance with the protocols set out in the relevant Government Notices (GN 1150 in Government Gazette (GG) 43855, GN 320 in GG 43110), Appendix 6 of the EIA Regulations, 2014, and the "Species Environmental Assessment Guidelines" (SANBI 2020).

Sections 9.1.1 to Section 9.1.7 below summarise the key findings of the specialist reports. Recommendations, mitigation measures and conditions of authorisation are provided in Section 10. All recommendations, mitigation measures, impact management objectives, and outcomes have been incorporated into the EMPr (Annexure 1). The specialist study findings, impact assessments and recommendations were used by the EAP to inform the overall conclusion and recommendation for the project.

9.1.1 MARINE AND ESTUARINE

Given the project's proximity to the marine environment and the planned effluent discharge, a Marine Specialist Study is required. As the site falls within the Estuarine Functional Zone (EFZ) and the estuary connects directly to the ocean, a combined Marine and Estuarine Biodiversity Impact Assessment has been prepared (Bovim et al. 2026). This assessment also incorporates a Dispersion Modelling Study to support the Coastal Waters Discharge Permit (CWDP) application and is based on desktop analysis, field sampling, and near-field dispersion modelling, focusing on water quality impacts during operations.

Data Sources

Project-specific information was gathered through consultation with the applicant and engineers.

To collect baseline and site-specific environmental information, an in-situ survey was conducted on 23–25 July 2024. This survey included:

- The deployment of an Acoustic Doppler Current Profiler (ADCP) to measure current speed and direction in the receiving environment. This instrument captured 37 days of data.
- The deployment of an Aqua Troll CTD to the harbour wall near the proposed desalination plant intake pipeline to collect data on salinity, temperature and water level. This instrument captured 100 days of data.

- The collection and assessment of:
    - Water quality, including temperature (°C), conductivity (mS/cm), salinity (PSU), dissolved oxygen (mg/L and % saturation), turbidity (NTU), fluorescence, pH, Total Suspended Solids, Chlorophyll-a;
    - Sediment, including trace heavy metal content, Total Organic Content (TOC), Particle Size Distribution (PSD) and the concentrations of trace metals; and,
    - Benthic macrofaunal communities.

Additional Data sources included:

- Water quality as well as sediment quality in the estuary has been studied extensively through the CSIR's Long-Term Ecological Monitoring Programme for the Port of East London (CSIR 2014, 2016, 2018, 2020, 2023c a). This data was used to supplement the data collected by Anchor Environmental Consultants (Pty) Ltd. (Anchor) in the field.
- SANBI's Biodiversity GIS (BGIS) online portal was used for the download of important biodiversity features, reports, and spatial datasets.

All collected information contributed to establishing the environmental baseline for future monitoring.

Description of Affected Environment

The marine and estuarine environment surrounding the proposed Port of East London development is characterised by a mix of natural and heavily modified habitats. The East London coastline is predominantly sandy, with rocky shores and wave-cut platforms forming the remaining habitat.

The marine environment is classified as Vulnerable, due to the area's susceptibility to degradation of ecological structure, function, or composition as a result of human activities. The area further lies within a marine Ecologically or Biologically Significant Area (EBSA) and is partly associated with an Ecological Support Area (ESA), due to the regions' ecological importance. However, the southern section of the Port breakwater (marine side), onto which the outfall pipeline will extend is for example already artificial and heavily modified comprising of an artificially constructed "rocky beach." The construction and presence of the outfall is therefore not expected to have significant impacts on the marine environment.

Rocky shores include outcrops, boulders, low rocky platforms, and artificial dolosse near the port, creating heterogeneous habitats that support diverse intertidal communities. Key organisms include barnacles, limpets, mussels, grazers, seaweeds, sea urchins, starfish, crabs, and intertidal fish. The marine outfall area comprises mainly artificial dolosse, originally installed to protect the harbour walls.

The shallow subtidal near the East London outfall comprises a mix of patchy reefs, boulders, pebbles, and sandy areas, with algae-dominated communities similar to the intertidal. Key species include seaweeds (e.g., *Gelidium*), mussels, oysters, ascidians, abalone, octopus, and spiny lobsters. These habitats also support a diverse array of finfish and serve as important feeding and nursery grounds, while reef structures influence the distribution of organisms in adjacent sandy areas.

Soft subtidal habitats at the proposed desalination outfall comprise unconsolidated sediments (sand, gravel, mud) supporting benthic macrofauna communities dominated by invertebrates. This environment was sampled during the survey in July 2024.

A total of 23 benthic macrofaunal taxa were identified, spanning five phyla, three classes, nine orders, 17 families, 14 genera, and 11 species. Benthic macrofauna serve as indicators of sediment quality and environmental health due to their close association with sediments and ability to bioaccumulate pollutants. The community was dominated by Arthropoda (12 taxa), Annelida (4), and Mollusca (3). Overall, the community is depauperate, with low abundance and biomass, reflecting the high-energy, sand-dominated environment with low organic content. Comparison between control and impact sites showed no significant differences (PRIMER, ANOSIM, $R = -0.035$, $p = 0.629$), confirming that control sites are appropriate for future monitoring. Annual sediment and macrofauna sampling is recommended to maintain consistent baseline data. Sediment samples were predominantly sandy with minimal mud content (<3%), resulting in low total organic content. No trace metal concentrations exceeded ERL thresholds. This composition reflects a high-energy environment with strong currents and large waves, limiting the accumulation of organic matter and contaminants, which are typically associated with finer sediments. The low organic content and lack of elevated trace metals indicate that sediments are unlikely to concentrate pollutants from brine discharge, supporting a low potential impact on the soft subtidal environment.

The pelagic environment offshore of the South Coast supports an estimated 21 cetacean species (whales and dolphins), based on historic sightings, strandings, and habitat projections. Dolphins have been observed near the Buffalo River estuary mouth. The area also hosts a resident pinniped species, the Cape fur seal (*Arctocephalus pusillus pusillus*). The transformed estuary mouth provides a sheltered habitat for mammals, including bottlenose dolphins (*Tursiops* sp.) and humpback dolphins (*Sousa* sp.).

The Buffalo River Estuary forms the estuarine component of the study area and is classified as a warm temperate, predominantly open system. The EFZ extends approximately 7.5 km from the mouth, with the lower 2 km encompassing the Port, where natural intertidal habitats such as mudflats, sandflats, and salt marshes are largely absent due to infrastructure and repeated dredging. The estuary provides important nursery and sheltering functions for juvenile fish and other estuarine organisms, though its current condition has been rated as “heavily modified” and Vulnerable, due to historical habitat loss, hydrological alteration, and chronic water quality pressures from upstream pollution and nutrient inputs. Benthic macrofauna are moderately to highly disturbed, estuarine plants are largely absent in the lower system, and avifauna are limited to species capable of utilising the modified estuary margins. Despite these pressures, the system retains ecological function and any new developments must ensure that current conditions are not further degraded.

The DFFE Environmental Screening Tool (DFFE 2026) found one Species of Conservation Concern (SCC) that may occur within the project area: the rocky kurper fish *Sandelia bainsii*, which is listed as Endangered on the IUCN Red List (IUCN 2025). However, this species only occurs in freshwater habitats (Mayekiso 1986, Skelton 2001), and as such is highly unlikely to be present in the estuarine or marine habitats within which the project area falls.

Overall, the broader marine environment supports a diverse assemblage of species, while the estuary, although degraded, continues to provide nursery and refuge functions. The marine and estuarine ecosystems in the vicinity of the proposed development could therefore be sensitive to disturbance, pollution, and habitat modification, particularly in the estuary, where anthropogenic pressures have already heavily altered the environment. With appropriate management and mitigation, impacts can be minimised while maintaining the ecological integrity of both marine and estuarine systems and ensuring that activities are compatible with conservation objectives of Critical Biodiversity Areas (CBAs), ESAs and the EBSA.

Dispersion Modelling Results

The potential effects of the discharge of brine to the marine environment was assessed using a Cornell Mixing Zone expert system (CorMIX) modelling study. Model set up was informed by existing literature as well as in situ data collected during the field survey.

Dispersion modelling estimates 1) effluent and associated contaminants' dilution rates and 2) the footprint of the plume after effluent discharge. These outputs inform the assessment of potential environmental impacts and compliance with permit conditions. For a facility to receive a CWDP for effluent discharge, it must be able to demonstrate that the effluent will sufficiently dilute by the time it reaches a set distance from the outfall/ discharge point, known as "the recommended mixing zone" (RMZ). The RMZ is a defined portion or volume of the receiving water where the discharged effluent is permitted to mix and dilute before water quality standards must be achieved. In practice, it may occur within the near field or far field of a hydrodynamic mixing process and therefore depends on source, ambient, and regulatory constraints. The following recommendations have been proposed for South Africa (Anchor Environmental Consultants 2015): 300 m in an offshore environment, 100 m in a nearshore open coast environment, 30 m in sheltered coastal environments and special management areas, 0 m for outfalls in estuaries. A conservative 30 m RMZ was applied in this study.

Calculated Concentrations: The calculated constituent concentrations after initial cross-shore dilution (dilution into the surf zone cell) indicate that salinity Water Quality Guidelines (WQG) concentrations exceed the threshold at 60 m when the swell height is 1-1.5 m under extremely small surf zone widths (10 m) but were compliant across all other conditions. From available satellite imagery, it is exceedingly rare for the surf zone width to be > 10 m wide, and it is likely that this noncompliance will be temporary and limited to the immediate discharge area. Note that these calculations do not account for effluent volume directly, and there is no differentiation made between the Initial Phase and Full capacity discharge volumes.

Modelled Concentrations: Numerical modelling was performed using the (CorMIX) to predict the geometry and dilution characteristics of the discharge and to determine the outfall design/effluent quality requirements to achieve compliance with these WQGs. All results at specific locations in the near field were determined according to the worst-case concentration of effluent exiting the pipe end. Dilutions were calculated through CORMIX and applied to the outlet concentration to find concentrations at the 30 m RMZ and the Zone of Initial Dilution (ZID). The model predicts that the plume will interact with the bank at 38.7 m and 57.3 m downstream from the outfall for the Initial Phase and Full Capacity phase respectively, which is well beyond the RMZ and ZID. Compliance to WQG limits at the edge of the ZID is considered to be the gold standard — this is the most

mathematically 'stable' result, leading to increased confidence in predicted compliance at the RMZ. Sufficient dilutions in the near-field (ZID) are likely to translate to similar, sufficient dilutions in the far-field (at the RMZ), with a higher degree of confidence in the result at the 30 m RMZ. The model results suggest that compliance at the ZID is achieved under both the Initial Phase and Full Capacity phases for salinity, Total Suspended Solids (TSS) and NaOCl.

Impacts

The construction of the proposed desalination plant and associated infrastructure could result in temporary, localised disturbances to subtidal marine and estuarine habitats, as well as mortality of macrofaunal and floral communities. Pelagic habitats may also be briefly disturbed, though mobile species are expected to move to adjacent areas. Seabird colonies are also not expected to be disturbed as no sensitive seabird colonies occur nearby. Additional potential impacts include litter generation, hazardous substance spills, and minor sediment disturbance, which could affect marine and estuarine organisms if not properly managed. However, construction within the EFZ will be limited to already modified areas, with no removal of existing vegetation anticipated. Moreover, the construction of the outfall pipeline are not expected to cause significant marine impacts, given the already artificial and heavily modified nature of the southern breakwater, which comprises an artificially constructed "rocky beach." Overall, the development footprint is confined to disturbed areas, and any potential effects on surrounding natural habitats are expected to be minimal. Impacts are therefore small in spatial extent, reversible, and will not result in a net loss of habitat. General mitigation measures for the construction phase include restricting activities to the approved footprint, careful handling of materials, rehabilitation of disturbed areas, responsible waste management, and prevention or rapid response to spills. In addition, the intake must be installed to ensure that water is not drawn from the upper or the bottom one meter of the water column and to ensure the horizontal intake of water. The intake head must further include a strainer barrier to prevent fish and other organisms from being drawn into the pipe. Overall, construction-phase impacts are rated from "Medium" to "Very Low" before mitigation and are reduced to "Low" to "Insignificant" after mitigation.

During the operational phase, impacts are primarily associated with seawater intake and brine discharge. Seawater abstraction may cause entrainment or impingement of marine organisms, but careful intake design, including low intake velocities and positioning away from sensitive habitats, limits these effects. Brine discharge increases local salinity, potentially affecting organism physiology, distribution, and productivity, but dilution in the receiving environment and strategic discharge placement mitigate these impacts. Other operational impacts include minor reductions in dissolved oxygen or changes in pH from treatment chemicals, as well as the release of co-pollutants such as biocides and anti-scalants. General mitigation measures include adequate brine dilution, neutralisation of chemicals, effluent monitoring, and avoidance of sensitive habitats. In addition, the intake must be designed to ensure intake velocities remain below 0.15 m/s to reduce the risk of debris entrainment and marine life impingement (to ensure that fish and other mobile organisms can escape the intake current), as per international best practise (Fedorenko 1991).

Overall, operational-phase impacts are rated "Low" to "Very Low" before mitigation and "Very Low" after mitigation, with all effects expected to be reversible upon decommissioning. Furthermore, the area of proposed discharge is typically subject to

significant wave action, as evidenced by the presence of extensive sea defence structures (dolosse) in the area. This wave action results in significant energy and associated mixing. The dispersion modelling results did indeed indicate that there is sufficient mixing within the first few meters after discharge to meet water quality guideline limits for salinity and other components of the effluent that may be of concern. It should also be noted that there is little to no risk that brine effluent will be entrained into the nearby estuary at concentrations that may result in environmental harm.

During operation, ongoing environmental monitoring is required to ensure that the desalination plant's brine discharge (end-of-pipe concentrations) complies with the conditions of the CWDP and to detect and manage any potential environmental impacts over the life of the plant. Monitoring requirements, including the frequency of monitoring and the specific parameters to be measured, will be set out in the CWDP. These requirements are expected to apply for the full operational life of the plant. Typically, this will involve both point source measurements (for example CTD profiling of the water in line with ongoing environmental monitoring requirements) and continuous water quality monitoring through deployment of a suitable instrument, which measures specific parameters, at the edge of the RMZ to measure compliance with permitted discharge limits and parameters.

It also includes collecting sediment and biotic samples at the edge of the RMZ to assess sediment characteristics and benthic macrofaunal communities. Monitoring data will be compared to the baseline data collected as part of the Marine Specialist Assessment to determine impact over time. The results will provide an ongoing assessment of the influence of the outfall structure and brine discharge on biodiversity and ecosystem health.

The dispersion modelling confirmed that brine will dilute rapidly and meet water quality standards within the RMZ. During operation, ongoing monitoring must be done to ensure brine discharge complies with the CWDP, meets water quality guidelines, and that any impacts are promptly detected and managed for the life of the plant. The specialist recommended that the development be granted Environmental Authorisation and a CWDP, on the condition that all stipulated mitigation measures be implemented.

9.1.2 Socio-economic, Visual and Noise

East London serves as an administrative and economic hub for the region, with the city and its port playing a central role in governance and trade. Improvements have been recorded in education, access to water, sanitation, and electricity, although unemployment has risen sharply from 26.5% in 2012, to 45.3% in 2022. The Buffalo City Metropolitan Municipality (BCMM) economy is dominated by the tertiary sector, particularly Community Services, Financial Services, and Trade. East London contributes the largest share of the metro's Gross Domestic Product (GDP), and the Trade sector benefits significantly from the Port of East London, which provides a competitive advantage relative to other regions. Trade sector activity, largely formal, is a major source of employment and underpins the local economy. While COVID-19 caused temporary declines, the port and trade sector are expected to remain key drivers of economic stability, with potential gains from improved port efficiency associated with the proposed desalination plant. The coastal and estuarine environment supports a range of

recreational activities, including surfing, kayaking, SCUBA diving, sailing, and birdwatching, with the Buffalo River Estuary providing a sheltered setting. Several fisheries are present, though only the Commercial/Traditional Line fishery and small-scale/recreational fisheries overlap with the development area. Across the BCMM, the economy relies heavily on the port and trade sector. The proposed desalination plant is expected to support port operations, contributing indirectly to economic stability and trade-related employment in the BCMM.

Potential visual, noise, social and economic impacts on people were assessed as part of the Socio-Economic, Visual and Noise Impact Assessment. Noise impacts on ecological receptors were addressed in the ecological specialist studies. During construction, the proposed development may cause negative impacts such as visual and noise disturbance, dust and emissions, and health and safety risks. These impacts arrange from "Medium" to "Insignificant" before mitigation and can be reduced to "Very Low" to "Insignificant" after mitigation through measures such as dust suppression, stockpile management, careful handling of materials, noise control in line with relevant legislation (BCMM Noise By-Law (2010) and the Draft Noise Control By-Law (2024)), and robust health and safety protocols including worker training, inductions, use of personal protective equipment, and first aid provision. Construction activities may also have minor potential effects on fisheries, but given the highly disturbed port environment and minimal overlap with recreational fishing, these are expected to be negligible. On the positive side, construction will provide local employment and stimulate economic activity in East London. Without targeted enhancement measures, the positive impact is "Very Low", but can be increased to "Low" through strategies such as prioritising local hiring and sourcing materials from local suppliers.

During operation, visual and noise impacts are minimal owing to the already noisy, visually altered industrial setting and the use of low-noise equipment. Fisheries and recreational fishing are unlikely to be affected by the brine discharge as rapid dispersion and dilution is expected. Operational impacts are rated "Low" to "Insignificant" before mitigation and can be reduced to "Very Low" to "Insignificant" after mitigation. Positive impacts stem from providing a reliable water supply for port operations, which will enhance efficiency and capacity. Although few new jobs are anticipated and skilled operators may come from outside the area, improved port functionality could generate broader economic benefits. These positive impacts are rated "Low" but could increase to "Medium" with measures that prioritise local employment and promote port-related economic opportunities.

In conclusion, the negative socio-economic, visual, and noise impacts of the proposed development are expected to be minor with mitigation and are outweighed by the potential benefits. Developing within the already highly-disturbed port environment is preferable to less developed or sensitive areas. The development is therefore recommended for approval.

9.1.3 Terrestrial Biodiversity, Plants and Animals

A Terrestrial Biodiversity, Plant, and Animal Compliance Statement was conducted as part of the S&EIA. A site survey was conducted in May 2025 to assess habitats and ecological condition within the project area. Nine indigenous plant species were recorded, none of which are Species of Conservation Concern (SCC) or protected. The

vegetation is dominated by alien and invasive plants (over 80% cover), which should be removed. No threatened or protected plant species are expected due to historical modification and degradation of the sites.

Only bird species and SCC were observed during the site survey. No amphibian, reptile or mammal species or SCC were noted. While a number of invertebrates species were noted, there is no suitable habitat in the development sites for the threatened invertebrate SCC. Several threatened avifaunal species potentially occur within the project area and wider landscape. Of these, 11 species have a moderate likelihood and three a high likelihood of occurrence. Three of these were directly observed (Cape Cormorant *Phalacrocorax capensis* (Endangered; EN), Caspian Tern *Hydroprogne caspia* (VU) and African Darter *Anhinga rufa* (NT)). Most species are waterbirds associated with coastal, estuarine, or freshwater habitats and are unlikely to be affected by land-based development in the Port. Four terrestrial species may occur in the wider landscape (Crowned Eagle *Stephanoaetus coronatus*, Forest Buzzard *Buteo trizonatus*, Black-winged Kite *Elanus caeruleus*, and Knysna Warbler *Bradypterus sylvaticus*), but only Crowned Eagles have been recorded roosting near the port, and the remaining species are unlikely to use the site frequently, given its transformed nature and disturbance levels. The port environment is highly modified and subject to ongoing disturbance from industrial and shipping activities. Bird populations that do occur within the area are considered to have adapted to these conditions and to the urban settlement. Existing rooftop solar installations indicate that the proposed development does not introduce novel disturbance. Given the already highly modified nature of the Port, the proposed desalination plant is unlikely to result in significant impacts on bird populations.

The Site Ecological Importance (SEI) of the area has been assessed and is based on its conservation importance, functional integrity, and receptor resilience for plants and animals. Most of the project area has been assessed as “Very Low”, while a small portion of natural vegetation, which may support mobile threatened species (e.g. birds), classified as “Low”. The site has been historically modified, isolated from natural areas, and affected by urban, residential, and industrial edge effects, limiting its value for species movement or connectivity. The site has been historically transformed, and natural ecological drivers and processes are no longer present. Although the area falls within a Terrestrial CBA1 in the Eastern Cape Biodiversity Conservation Plan (2019), historical land use indicates that it does not meet CBA criteria, and associated land-use guidelines are not applicable. The site is not located within a Strategic Water Source Area. Nearby protected areas, including Potters Pass Nature Reserve (1.3 km away) and the Protected Area Expansion Strategy site (2.6 km upstream), are unlikely to be affected by the development.

The specialist assessments for plants, animals, and terrestrial biodiversity indicated no significant ecological sensitivity within the area and the proposed development is not expected to result in significant impacts. It is the opinion of the specialists that the development may be authorised with the recommended mitigation measures incorporated into the EMPr.

9.1.4 Archaeology, Cultural Heritage and Palaeontology

A Heritage Impact Assessment (HIA) was conducted and provides an assessment of the palaeontological, terrestrial archaeological, submerged prehistoric archaeological and

maritime cultural heritage potential of the proposed desalination plant and its associated infrastructure, within a study area which encompasses both the terrestrial and marine elements of the project. The HIA included an archaeological site visit and walkover survey of the terrestrial portion of the project area—with the area covered being reflective of the previous project layout (as of June 2025). **Note**: The updated 2026 outfall pipeline alignment, from the crossing of the railway line to its terminus on the beach, is outside the area covered by the archaeological survey. This area is, however, either made ground, in the case of the beach, or heavily altered by the construction of the railway lines. Consequently, the specialist identified the potential for the survival of archaeological material in both of these contexts to be considered unlikely, and the lack of coverage in the survey was not considered a material issue.

A palaeontological site visit was not required based on the assessment of the specialist and as confirmed by the Eastern Cape Provincial Heritage Authority (ECPHRA) (Appendix 4 and Appendix 5).

Palaeontology

The southern half of proposed Port of East London desalination plant project site is located mainly on the Nanaga Formation aeolianites which are given a very high sensitivity rating on the South African Heritage Resource Agency (SAHRA's) palaeo-sensitivity map. In practice, however, according to the palaeontological impact assessment conducted for this project, the fossil occurrences within this formation are very rare and frequently very weathered due to extensive post-depositional diagenesis. Bamford (2024, 2026) recommends that a low palaeosensitivity rating for this formation is more appropriate, with mitigation not required unless rich fossil accumulations are exposed during excavations. The northern half of the project site is underlain by the Permian Middelton Formation that is also indicated as very highly sensitive on SAHRIS, but according to Bamford (2024, 2026), this sensitivity rating is more applicable to the central Karoo Basin where the formation has not been impacted by sea-level rise. Bamford (2024, 2026) further indicates that there are no records of Permian vertebrates or plants from this area.

The significance of impacts is expected to be "Very Low" and negative before mitigation. With the implementation of mitigation measures, the impact is anticipated to shift to a positive outcome, still rated as "Very Low" in significance. Mitigation measures include monitoring construction activities for heritage discoveries, immediate reporting to SAHRA, and engaging qualified specialists if resources are found.

Terrestrial Archaeology

No Early Stone Age archaeological material has been reported from the East London area, and the known archaeology is dominated by a "litter" of Middle Stone Age lithic material that is present almost everywhere. Further evidence of early modern human presence in the East London area during the Middle Stone Age was found in 1964 when the footprints of a young human child and the tracks of a bird and two mammal species, estimated to be approximately 124 000 years old, were discovered preserved in sandstone at Nahoon Point, north of the Buffalo River. The scatters of Middle Stone Age artefacts reported around East London are, in the main, in secondary context (i.e. not where they were originally deposited) and cannot generally be said to form discrete archaeological sites. This material is generally considered to be of low archaeological significance and

sensitivity. By contrast, Later Stone Age archaeological material, also widely recorded in the area, most often as coastal shell middens, generally occurs as definable sites, sometimes in sealed contexts and accompanied by bone and other archaeological material. These sites are generally of moderate and sometimes high, local archaeological significance.

The archaeological survey reported no pre-colonial archaeological sites or material within the Port of East London desalination project footprint, and aside from the foundations of the now demolished 20th century harbour houses, there is also no indication on the ground or on the historical mapping consulted, of historical archaeological remains in the project footprint. This, and the disturbed nature of the receiving environment for the project, suggests that the survival of significant in situ pre-colonial and historical archaeological sites and material, within the footprint of the proposed desalination project and it associated infrastructure, is unlikely and these receptors **were therefore scoped out of the specialist assessment**. However, should pre-colonial or historical archaeological material, or human remains be encountered during the construction of project, work must immediately cease in that area. The area must be cordoned off and the material made safe but left in situ. A suitably qualified archaeologist must be called to site to assess the significance of the find and SAHRA and the ECPHRA must be notified of the find.

Submerged Prehistory

The seabed of the East London nearshore environment is typically devoid of notable sediment accumulations with exposed rock outcrops dominating. This suggests that the survival of in situ submerged archaeological deposit is unlikely in this area, except possibly in isolated contexts within incised valleys on the continental shelf which were cut during sea level low stands when river courses extended onto the shelf and which are described by a number of studies for the East Coast. The marine outfall for the Port of East London desalination plant will be installed in the current surf zone east of a recently upgraded artificial rock revetment and boulder beach. The aggressively erosive surf environment indicated by the need for the revetment and boulder beach suggests that survival of submerged prehistoric archaeological material – either in or ex situ – is extremely unlikely. The installation of the proposed marine outfall pipes on the surface of the constructed rocky beach also suggests that even were archaeological material present, impacts on it are unlikely. Similarly, within the Buffalo River, the intake pipeline will also be laid on the surface of the riverbed, which itself has been subject to nearly 150 years of dredging and human interference. The survival of submerged prehistoric archaeological material here is also unlikely. Consequently, Impacts to submerged prehistoric archaeological material, arising from the installation of water intake and marine outfall systems are, thus, not expected and this receptor were **scoped out** of the specialist assessment.

Maritime Archaeology

As with many ports at river mouths there was, historically, always an element of risk involved in entering and leaving the Port of East London. Records consulted for this study indicate the potential for approximately 90 wrecks within a 1 km radius of the intake and outfall pipelines associated with the proposed desalination plant. The historical widening of the Buffalo River by cutting back the West Bank means that it is extremely unlikely there were or are any wrecks, or related artefacts, present on what is a new

riverbed in the vicinity of the water intake pipe. In the area of the marine outfall, historical records describe several maritime casualties south of what used to be Castle Point at the mouth of the river. The historical descriptions of these events are, however, vague and positions given unreliable. The presence of any wrecks within the impact footprint of the marine outfall is, thus, highly speculative. If wrecks are present in the marine outfall area, any remains close onshore are likely to have been buried under the rocky beach and revetment and will not be impacted by the proposed surface deployment of the outfall pipelines. Beyond the rocky beach the local surf zone regime, which does not favour the accumulation of seabed sediment, suggests that any wreck material in the area would lie on the exposed rocky seabed and would be subject to impacts from the outfall pipelines should their positions intersect.

The physical extent of impacts on any maritime archaeological resources will be local and relate directly to the extents of disturbance occasioned by construction and installation activities. The intensity is expected to be low. Should impacts to maritime archaeological resources occur, the non-renewable nature of the resource means that the duration of impacts will be permanent. The imprecise historical information about the location of the wrecks in the Castle Point area, and the small footprint of the marine outfall infrastructure indicates that impacts on maritime archaeology are improbable. Based on the above, the significance of impacts on maritime archaeological resources arising from the Port of East London desalination plant, is assessed to be "Very Low", and will improve to "Very Low" positive, with mitigation.

Conclusion

The assessment of the heritage resources of the Port of East London desalination plant indicated that there is some limited potential for palaeontological material and maritime archaeological sites or material within the project footprint. Terrestrial and submerged prehistoric archaeological sites and materials are not expected. The proposed development could therefore impact on palaeontological and maritime archaeological heritage resources, while impacts on terrestrial and submerged prehistoric archaeological resources are not anticipated. Because of the non-renewable nature of heritage resources, avoidance during development is the preferred mitigation option. While this is usually possible in the case of shipwreck sites, it is unlikely to be possible to achieve in respect of palaeontological material within the footprint of project impacts because the location and extent of this material cannot be predicted. Mitigation measures to reduce possible impacts and enhance positive impacts were therefore recommended for inclusion in the EMPr and for implementation during the life of the project—and particularly during the construction phase as no impacts are expected during the operational phase. These include monitoring construction activities for heritage discoveries, immediate reporting to SAHRA, and engaging qualified specialists if resources are found. **Provided the recommendations to mitigate and offset any potential impacts are implemented under the EMPr, the specialists' assessment that the proposed development can be considered to be archaeologically and paleontologically acceptable and can be authorised.**

***HIA Inputs from Relevant Authorities*.**

The draft HIA was submitted to SAHRA and the ECPHRA on 16 September 2025.

A final comment dated 22 October 2025, the ECPHRA indicated that "there are no objections to the proposed development. It may proceed as planned provided that the recommendations by specialists and ECPHRA, are adhered to".

These additional requirements are set out as follows:

ECPHRA:

- Pre-construction:
    - The project proponent/representative must notify ECPHRA of the date of commencement of the project or share the project schedule and (EA).
    - The project proponent/representative must submit a detailed heritage chance finds procedure for ECPHRA to approve before development starts.
    - Heritage induction and training for ground crew (including the ECO) must be conducted, in identifying heritage resources.
    - SAHRA and ECPHRA must be notified of any shipwreck finds.
    - A palaeontologist must be on site, to monitor, during excavations
    - Heritage monitoring and reports to be shared with ECPHRA.
- Post Construction:
    - Upon completion of the project, a final heritage compliance report must be submitted to ECPHRA.

In its Final Comment issued on 28 November 2025, SAHRA stated the following:

"The following comments are made as a requirement in terms of section 3(4) of the NEMA Regulations and section 38(8) of the NHRA in the format provided in section 38(4) of the NHRA and must be included in the Final BAR:

38(4)a – The SAHRA Development Application Unit (DAU) has no objections to the proposed development;

- 38(4)b – The recommendations provided by the heritage specialists are supported and must be adhered to. These further additional comments apply:
- If any shipwrecks and/or artefacts related to shipwrecks in the region are uncovered, the findings must be reported to a maritime archaeologist appointed to inspect potential finds. A report on this inspection must be submitted to SAHRA for further recommendations;
- The Fossil Chance Finds Procedure must be included in the EMPr;
- 38(4)c(i) – If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich

eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA DAU (Nokukhanya Khumalo/Natasha Higgitt 021 202 8660) must be alerted as per section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offence in terms of section 51(1)e of the NHRA and item 5 of the Schedule;

- 38(4)c(ii) – If unmarked human burials are uncovered, the SAHRA DAU (Nokukhanya Khumalo/Natasha Higgitt 021 202 8660), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offence in terms of section 51(1)e of the NHRA and item 5 of the Schedule;
- 38(4)d – See section 51(1) of the NHRA;
- 38(4)e – The following conditions apply with regards to the appointment of specialists:
- If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA;
- The Final BAR and EMPr must be submitted to SAHRA for record purposes;
- The decision regarding the EA Application must be communicated to SAHRA and uploaded to the SAHRIS Case application".
- In addition to any other identified Interested and Affected Parties (I&APs), the final HIA must be submitted to SAHRA, the ECPHRA and the Buffalo City Metropolitan Municipality for comment as part of this public participation process for the Final BAR.

9.1.5 AGRICULTURE

An Agricultural Compliance Statement was conducted as part of the S&EIA. The screening tool initially classified the site as having medium to very high agricultural sensitivity, primarily due to its land capability rating. However, an assessment indicates that, despite potentially suitable climate and terrain, the site is entirely surrounded by urban development, isolating it from other farmland and making any agricultural activity impractical. Consequently, the site has no realistic potential for agricultural production. Based on this field assessment, the site's true sensitivity is considered medium rather than high. Importantly, an agricultural impact is defined as a change to future agricultural production potential. Since the site has no agricultural production potential, development will not alter its agricultural value. Micro-siting adjustments, as required by the agricultural protocol, will have no material effect on agricultural outcomes. Overall, the proposed development will result in zero loss of future agricultural production potential. **The agricultural assessment concludes that the development is acceptable and recommends approval, with no conditions required.**

9.1.6 GEOTECHNICAL ASSESSMENT

A Geotechnical Assessment was undertaken by the project engineers to investigate the underlying soil and geological conditions and determine suitable locations, foundations, and construction methods for the proposed development. The study focused on identifying and avoiding unsuitable, structurally unsound or sensitive areas during the feasibility stage, thereby reducing the risk of environmental or structural impacts during and after construction. Test pit analyses were completed for the desalination plant, solar plant, and reservoir sites to guide the selection of appropriate positions and minimise disturbance to the receiving environment. The study directly supports avoidance and mitigation by informing infrastructure placement and design in a way that prevents failure and limits unnecessary environmental disturbance. No additional management or mitigation measures specific to environmental impacts were identified as necessary by the engineer, other than that the recommendations of the geotechnical report should be implemented in full to ensure that construction is aligned with the identified feasibility constraints. Due to the nature of the study, formal impact ratings (via assessment tables) were not considered applicable and have therefore not been included in the impact assessment section. **The geotechnical engineer concluded that the proposed development is feasible and can proceed, subject to adherence to the engineering specifications.**

9.1.7 HYDROLOGY ASSESSMENT

A Hydrology Assessment was undertaken by the project engineers. For this project, the purpose of this study was to assess the suitability of beachwells and boreholes as the intake method and to confirm technical parameters required to finalise the design (including borehole locations, depths, and pipeline lengths). Test boreholes were drilled as part of the geotechnical and geohydrology investigations. However, drilling results showed that the borehole intake was not viable due to low yield and poor water quality, and the intake method was subsequently revised to a direct intake. A Hydrology assessment was not deemed necessary for the direct intake or above ground project components. Due to the nature of the study, formal impact ratings (via assessment tables) were not considered applicable and have therefore not been included in the impact assessment section.

10 IMPACT ASSESSMENT

10.1 INTRODUCTION

The following section discusses the potential impacts (both positive and negative) of the proposed development on various receptors (e.g. marine environment, economic conditions, etc). The impacts identified in this report could be considered 'worst case scenario' impacts.

Potential impacts were identified, described, and assessed in terms of their significance, with significance determined using the following criteria:

- The extent and location of the potential impact (i.e. local, regional, national);
- The duration of the potential impact (i.e. short term, medium term, long term);
- The intensity (or magnitude) of the potential impact (i.e. low, medium, high); and
- The likelihood or probability of the impact occurring (improbable, possible, probable, definite).

This methodology addresses the effects and consequences of the impact on the environment rather than the cause or initial disturbance alone. The full impact assessment methodology has been included in Appendix 14.

Impacts were first assessed without mitigation and then re-assessed assuming that effective mitigation and/or optimisation measures are implemented. Impacts that remain after mitigation measures have been implemented are referred to residual impacts.

To reduce the significance of negative impacts, precautions referred to as 'mitigation measures' are prescribed. The proposed mitigation measures are based on the mitigation hierarchy which allows for consideration of five different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and No-Go in that order. When project impacts are considered, the first option should be to avoid or prevent the impacts from occurring in the first place if possible. If such avoidance is not attainable, the impacts must be minimised as far as possible by the implementation of recommended, applicable mitigation measures.

Mitigation / impact management measures were classified as either:

- **Essential: Mandatory:** Measures that must be implemented and are non-negotiable. These measures are assumed to be implemented in the "with mitigation" impact scenario and are therefore incorporated into the post mitigation impact assessment significance rating; or

- **Best Practice / Recommended:** Non-mandatory measures that should be implemented where feasible and appropriate. Alternative measures or approaches may be adopted, provided that the required environmental outcome is still achieved and a clear and defensible motivation is provided for not implementing the recommended measure. These do not affect the overall impact rating if not implemented.

Optimisation measures aimed at enhancing potential benefits are generally considered Best Practice / Recommended and are non-mandatory.

Potential impacts were assessed in terms of:

- **Construction phase impacts**: impacts associated with the pre-construction and construction phases of the project, including site establishment, vegetation clearance, construction of the desalination plant, seawater intake, and brine outfall infrastructure.;
- **Operational phase impacts**, which includes impacts resulting from the operational activities of the Reverse Osmosis (RO) plant (e.g., discharge of brine).

In addition, the No-Go alternative (Section 10.4) as well as was cumulative impacts (Section 10.4) were also assessed. Where relevant, these were assessed using the impact assessment methodology. As no detailed decommissioning procedures or restoration plans have been compiled at this stage or are planned for this development in the foreseeable future, impacts associated with decommissioning on the various receptors have not been assessed.

10.2 Potential Construction Phase Impacts

10.2.1 Marine and Estuarine Environment

DISTURBANCE OF INTERTIDAL AND SUBTIDAL MARINE HABITAT

Outfall infrastructure will be constructed intertidally, mostly across rocky shore and artificial breakwater habitats. The communities in the vicinity of proposed construction are likely to be typical of Eastern Cape intertidal rocky shores and reflect the predominantly marine influence in the lower system (CSIR 2022). The construction of these pipelines will result in disturbance of the rocky intertidal surfaces, and the associated macrofauna and flora will experience displacement and direct mortality. Therefore, it is expected that a significant, short-term decrease in macrofaunal abundance and biomass will occur as a result of the proposed construction operations. Pipeline construction may involve some traffic on the breakwater by heavy vehicles and machinery. These activities will be localised and confined to within a few hundred metres of the construction footprint. The relatively small footprint of the discharge pipes and 'short-term' nature of construction activities will result in the impact being felt over a very limited spatial scale and will not noticeably influence the ecology of the area as a whole. Since this disturbance will not result in a net loss of habitat, the significance of this impact is rated as "Very Low" (Table 10.1). Mitigation measures should include rehabilitation of the disturbed area immediately following construction by removing all artificial materials not related to the permanent fixture of the pipeline. If these tasks are actioned, the impact is considered to be '"Insignificant"' (Table 10.1). The reversibility of this impact is considered to be high.

Table 10.1. Disturbance of intertidal and subtidal marine habitat.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Short term 1	Very Low 3	Probable	**VERY LOW**	-ve	High
Essential mitigation measures: • Rehabilitate the disturbed area in the intertidal area immediately following construction by removing all artificial materials not related to the permanent fixture of the pipeline • Construction activities within the coastal zone should be planned and undertaken as efficiently as practicable to avoid unnecessary delays and prolonged disturbance. • Constrain spatial extent of impacts to the minimum required.								
With mitigation	Local 1	Low 1	Short term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	High

DISTURBANCE OF PELAGIC OPEN WATER HABITAT

Construction of the proposed intake infrastructure may result in the temporary disturbance of pelagic habitat within the construction footprint and surrounds. However, mobile fish and elasmobranchs (sharks, rays and skates) that utilise the habitat will be able to move to adjacent areas. There are no seabird colonies of particular concern in the vicinity of the proposed expansion. As such, this impact is considered "Insignificant" (Table 10.2).

Table 10.2. Disturbance of pelagic open water habitat.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Short term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	High
Mitigation measures: • Not considered necessary due to "Low" significance.								

DISTURBANCE AND LOSS OF ESTUARINE HABITAT

Construction of the proposed infrastructure will result in the temporary disturbance and loss of Estuarine Functional Zone (EFZ) habitat within the construction footprint and surrounds. Construction may involve traffic within the EFZ or within 20 m of the EFZ at the intake site by heavy vehicles and machinery, earth moving work and hardening of surfaces. The proposed pipeline routing options mostly follow existing corridors, or within the Port area, with no removal of any estuarine vegetation. The intake pipeline from the intake point to the RO Plant will be approximately 300 m in length. The portion of the EFZ within the area of the proposed intake site is already a highly transformed site, with no little to no connectivity to the estuarine system (due to the Port quay development itself and the modified, artificial bank). As such, the area of proposed development itself has little environmental significance to the functioning of the surrounding estuarine system. Therefore, the proposed development is not anticipated to cause direct disturbance of the estuary or cause loss of estuarine function, because the development site is effectively isolated by the breakwater from the rest of the EFZ and the Buffalo River Estuary itself and is no longer functionally linked with the estuary. As such, it is unlikely that the construction of intake infrastructure will result in significant or long-term impacts on the estuarine system. The relatively small footprint and 'short-term' nature of construction activities will result in the impact being felt over a very limited spatial scale and will not noticeably influence the ecology of the estuary in question. As such, the significance of this impact is assessed to be "Very Low" prior to mitigation.

Table 10.3. Disturbance and loss of estuarine habitat.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Short term 1	Very Low 3	Probable	**VERY LOW**	-ve	High
Essential mitigation measures: • Rehabilitate the disturbed area in the estuarine area immediately following construction by removing all artificial materials not related to the permanent fixture of the pipeline. • Limit duration and spatial extent of construction activities in the EFZ to the minimum required. • Ensure suitable stormwater management is in place to minimise run-off to the estuarine system.								
With mitigation	Local 1	Low 1	Short term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	High

POLLUTION DUE TO WASTE GENERATION AND INCORRECT DISPOSAL AND LITTERING

During the construction and initiation phase of the reverse osmosis system, offcuts and fragments of piping and other materials used or bought to site during construction, may enter the sea. The problem of litter entering the marine environment has escalated dramatically in recent decades, with an ever-increasing proportion of litter consisting of non-biodegradable plastic materials. South Africa has laws against littering, both on land and in the coastal zone, but unfortunately these laws are seldom rigorously enforced. Objects which are particularly detrimental to aquatic fauna include plastic bags and bottles, pieces of rope and small plastic particles. Large numbers of aquatic organisms are killed or injured daily by becoming entangled in debris or as a result of the ingestion of small plastic particles (Gregory 2009, Wright et al. 2013). If allowed to enter the ocean, solid waste may be transported by currents for long distances out to sea and around the coast. Therefore, unlike fuel or sewage contamination, the extent of the damage caused by solid waste is potentially large. The impact of floating or submerged solid materials on aquatic life (especially birds and fish) can be lethal and can affect rare and endangered species. In order to reduce this, all domestic and general waste generated must be disposed of responsibly. All reasonable measures must be implemented to ensure there is no littering and that construction waste is adequately managed. Staff must be regularly reminded about the detrimental impacts of pollution on aquatic species and suitable handling and disposal protocols must be clearly explained and sign boarded. The 'reduce, reuse, recycle' policy must be implemented. This impact is rated as "Low" without mitigation for the intake and both outfall options and is reduced to "Very Low" by implementing the actions outlined in Table 10.4.

Table 10.4. Pollution due to waste generation and incorrect disposal and littering.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Regional 2	Low 1	Medium term 2	Low 5	Probable	**LOW**	-ve	High
Essential mitigation measures: • Suitable handling and disposal protocols must be clearly explained, and sign boarded. • A "reduce, reuse, recycle" approach must be followed. • Provide suitable containers for the disposal of all waste, including recycling. • Regular litter sweeps should be carried out around the construction site. • Intentional disposal of any litter into the environment is strictly prohibited, while accidental spillage must be prevented, contained and reported to the responsible Environmental Officer, Environmental Control Officer or other relevant party immediately. • Inform and train all staff about sensitive estuarine species and the responsible disposal of construction waste. This training must be integrated into toolbox talks or onsite awareness sessions to ensure that waste management practices are understood and followed diligently. Additionally, contractors must prepare a method statement outlining specific waste management procedures, which must be approved by the resident engineer before construction activities commence. • Waste disposal at licensed landfill sites by qualified contractors is mandatory, with proof of disposal submitted to the appointed Environmental Officer. Waste management certification must be obtained, and detailed records of all stored and disposed waste, including quantity, nature, and fate, must be maintained for auditing purposes. • Adequate sanitary facilities and ablutions must be provided for all personnel throughout the project area. Enforcement of facility usage and cleanliness is crucial.							
With mitigation	Regional 2	Low 1	Medium term 2	Low 5	Possible	**VERY LOW**	-ve	High

THE EFFECT OF SPILLAGE OF HAZARDOUS SUBSTANCES ON MARINE BIOTA

The risk of spillage of a variety of hazardous substances may occur during the use of heavy machinery, construction vehicles and construction vessels. For example, spillage may occur as a result of fuel leaks, refuelling, or collision. Hydrocarbons are toxic to aquatic organisms and precautions must be taken to prevent them from contaminating the environment. This impact can be mitigated successfully if authorities implement a rigorous environmental management and control plan to limit ecological risks from accidents. All fuel and oil must be stored with adequate spill protection and no leaking vehicles should be permitted on site. Intentional disposal of any substance into the aquatic environment is strictly prohibited, while accidental spillage must be prevented, contained and reported immediately. After mitigation, the impact of accidental spillage is considered to be of "Low" significance (Table 10.5).

Table 10.5. The effect of the spillage of hazardous substances on marine biota

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	High 3	Medium-term 2	Medium 6	Probable	**MEDIUM**	-ve	Medium
Essential mitigation measures: • All fuel and oil is to be stored with adequate spill protection. • No leaking vehicles are permitted on site. • All hazardous substances must be accompanied by a permit, a hazard report sheet, and may only be handled by suitably trained operators. • Intentional disposal of any substance into the environment is strictly prohibited, while accidental spillage must be prevented, contained and reported to the responsible Environmental Officer, Environmental Control Officer or other relevant party immediately. • Implementation of a rigorous environmental management and control plan (including procedures for remediation). • Implement leak detection and maintenance programmes for valves, flanges, fittings, seals, hydraulic systems, hoses, etc. All hydraulic systems should be adequately maintained, and hydraulic hoses should be frequently inspected. All process areas should be bunded to ensure drainage water flows into the closed drainage system. Drip trays should be used to collect run-off from equipment that is not contained within bunded areas and the contents routed to the closed drainage system. • Low-toxicity biodegradable detergents should be used in the cleaning of all spillages.								
With mitigation	Local 1	High 3	Medium-term 2	Medium 6	Improbable	**LOW**	-ve	Medium

10.2.2 Terrestrial Biodiversity, Plants and Animals

The proposed development site has been historically modified and is largely degraded. Most of the project area is of Very Low ecological sensitivity, with only a small portion of natural vegetation classified as Low, potentially supporting mobile threatened species. No areas of High sensitivity were identified. Indigenous plant species diversity is Low, while alien and invasive species are abundant. No threatened or protected plant species are expected due to past modification and degradation. The site is isolated from natural areas and strongly influenced by urban, residential, and industrial edge effects, limiting its value for species movement or connectivity. Natural ecological processes and drivers are no longer present. Only bird species, including Species of Conservation Concern (SCCs), were observed. No amphibians, reptiles, mammals, or invertebrate SCC were recorded. Based on these findings, the proposed development is not expected to result in significant terrestrial biodiversity impacts. Accordingly, a detailed impact assessment table has not been prepared, and this impact has been screened out. The following recommendations have, however, been included for incorporation into the Environmental Management Programme:

- Conduct a search and rescue prior to clearing to ensure that nests, small reptiles and mammals are moved out of the area.
- Rehabilitate/re-vegetate construction areas with indigenous plant species where possible/ feasible.
- During construction and for 6 months post-construction, monitor and eradicate AIPs from the construction site.

10.2.3 Agricultural Resources

An Agricultural Compliance Statement is not required to formally rate agricultural impacts by way of impact assessment tables. An agricultural impact must by definition cause a change to the future agricultural production potential of land. If there is no change, there is no impact. Because the site has no agricultural production potential due to the limitations of its location, the occupation of the site by the development cannot change its agricultural production potential. The development will therefore have zero agricultural impact and is therefore assessed as acceptable. Impacts on Agriculture have therefore been **scoped out.**

10.2.4 Heritage Resources

Heritage resources are fragile, finite and non-renewable, and unlike living resources cannot recover if damaged by activities such as development. The identification, assessment and, where necessary, the mitigation of impacts on such resources that arise from human activity is therefore an essential part of managing such activities. Any impact to heritage resources is deemed unacceptable until such time as the resource has been assessed by a suitable specialist, and mitigated or studied further, if necessary. The impact assessment therefore assesses worst case scenarios.

This impact assessment aims to:

- Identify those project activities and components of the proposed Port of East London desalination plant which may pose risks to heritage resources.
- Identify and define the likely footprint of these risks and impacts.

- Identify and describe the likely project risks and impacts (negative and/or positive, including cumulative impacts if relevant) and their significance, during the construction, operation and decommissioning phases of the project.
- Makes recommendations for measures to manage and mitigate any negative impacts on heritage resources.

Section 38(3)(d) of the National Heritage Resources Act (NHRA; Act 25 of 1999) requires that a heritage impact assessment must "evaluate the impact of [a] development on heritage resources relative to the sustainable social and economic benefits to be derived from the development". These impacts can be mitigated through the implementation of the mitigation measures. Therefore, while there may be impacts on heritage resources arising from the project, it is likely that these will be outweighed by the sustainable social and economic benefits accruing from the Port of East London desalination plant. Project activities which disturb the ground, whether on land and related to the construction of the solar array or the desalination plant, for example, or in the marine environment and related to the installation of the intake or outfall pipelines, have the potential to impact heritage resources.

Note: The draft HIA has already been subject to review and comment by SAHRA and the ECPHRA, in September 2025, and prescribed additional mitigation measures to be included in this EIR, and as well as the EMPr. These measures are included in Sections 4.5 and 0.

DIRECT IMPACT (DISTURBANCE AND/ OR DESTRUCTION) OF PALAEONTOLOGICAL RESOURCES (FOSSILS)

Fossils are rare objects, often preserved due to unusual circumstances and under very particular conditions. This is especially the case with vertebrate fossils, which tend to be sporadically preserved and have high value with respect to palaeoecological and biostratigraphic (dating) information. The southern portion of the terrestrial project site is underlain by potentially very highly sensitive sands of the Nanaga Formation, that might preserve fossil marine shells while in the northern half of sites and offshore in the areas of the water intake and marine outfall pipelines, potentially very highly sensitive Permian Middelton Formation bedrock is present. Construction-related activities which disturb the ground underlying the project footprint may result in direct impacts on the fossil heritage. The physical extent of impacts on any palaeontological resources will be local and relate directly to the extents of soil disturbance occasioned by construction and installation activities. The intensity is expected to be low. Should impacts to palaeontological resources occur, the non-renewable nature of this heritage resource means that the duration of impacts will be permanent. Specialist experience, and the lack of any previously recorded fossils from the area, leads Bamford to the conclusion that it is extremely unlikely that any fossils will be preserved in the overlying soils of the Quaternary, while there is a very small chance that fossils may occur in the aeolianites of the Quaternary Nanaga Formation. Project-related impacts to the underlying fossiliferous Middelton Formation bedrock are unlikely. Overall, therefore, impacts to fossil heritage are improbable. Based on the above, the significance of impacts on palaeontological resources arising from the Port of East London desalination plant, is assessed to be "Very Low", negative. However, this can be raised to "Very Low" positive, with mitigation. The level of confidence in this assessment of the impact is medium.

Table 10.6 Direct impact (disturbance and/ or destruction) of palaeontological resources (fossils)

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Long Term (Irreversible) 3	Low 5	Improbable	**VERY LOW**	-ve	Medium
Essential mitigation measures: • Monitoring of earthworks by the Environmental Compliance Officer (ECO), Environmental Officer (EO) or another designated responsible person. • Implementation of Palaeontological Fossil Chance Find Protocol by the ECO/ EO to ensure the identification, recovery, curation and reporting to the South African Heritage Resource Agency (SAHRA)/ the Eastern Cape Provincial Heritage Resources Agency (ECPHRA) of any fossil finds. If fossils are found by the EO/ ECO, or other responsible person once excavations for foundations have commenced, these should be rescued and SAHRA and ECPHRA notified to determine whether a palaeontologist should be called to assess and collect a representative sample. Any recovered fossils or artefacts are the property of the State will need to be deposited in a suitable curatorial institution. Information on the sources or contexts of the collected items must accompany them, as far as can be determined.							
With mitigation	Local 1	Low 1	Long Term (Irreversible) 3	Low 5	Improbable	**VERY LOW**	**+ve**	Medium

DISTURBANCE AND / OR DESTRUCTION OF TERRESTRIAL PRE-COLONIAL & HISTORICAL ARCHAEOLOGY

The archaeological survey reported no pre-colonial archaeological sites or material within the Port of East London desalination project footprint, and aside from the foundations of the now demolished 20th century harbour houses, there is also no indication on the ground or on the historical mapping consulted, of historical archaeological remains in the project footprint. This, and the disturbed nature of the receiving environment for the project, suggests that the survival of significant in situ pre-colonial and historical archaeological sites and material, within the footprint of the proposed desalination project and it associated infrastructure, is unlikely and these receptors were therefore **scoped out** of the specialist assessment. However, should pre-colonial or historical archaeological material, or human remains be encountered during the construction of project, work must immediately cease in that area. The area must be cordoned off and the material made safe but left in situ. A suitably qualified archaeologist must be called to site to assess the significance of the find and SAHRA and the ECPHRA must be notified of the find.

DISTURBANCE AND / OR DESTRUCTION OF SUBMERGED PREHISTORY

The water intake pipe and marine outfall pipes will be laid on the river- and seabed respectively, supported by 800 mm^3 discrete mass concrete collars. These collars will act as mass anchorage and fixing points for the structural steelwork of the pipe and will be placed on the river- and seabed after some surface preparation to create a flat base for the supports. According to the record of the development of the port, the riverbed where the water intake will be installed is an artefact of the creation of the Turning Basin in the 1930s, and there will be no in situ submerged archaeological material in or on it. Offshore, where the marine outfall will be installed, seabed is reported to be devoid of notable sediment accumulations, with exposed rock outcrops dominating. This suggests that the potential for the presence in the active surf zone of sediments which could contain submerged prehistoric archaeological artefacts is limited. In addition, the recent renewal and strengthening of the artificial rocky beach and revetment, east of the grain silo, has buried at least a portion of the original seabed that will be impacted by the marine outfall under modern rock fill. Consequently, Impacts to submerged prehistoric archaeological material, arising from the installation of water intake and marine outfall systems are, thus, not expected and this receptor were **scoped out** of the specialist assessment.

DISTURBANCE AND / OR DESTRUCTION OF MARITIME ARCHAEOLOGY

Based on the discussion above of the development of the Port of East London, and particularly the widening of the Buffalo River by cutting back the West Bank, it is extremely unlikely that there were or are any wrecks, or related artefacts, present on what is a new riverbed in the vicinity of the water intake pipe. Maritime archaeology as a receptor for the water intake is, therefore, scoped out of this assessment. In the area of the marine outfall, historical records describe several maritime casualties south of what used to be Castle Point at the mouth of the river. As indicated above, the historical descriptions of these events are vague and positions given unreliable. The presence of any wrecks within the impact footprint of the marine outfall is, thus, highly speculative. If wrecks are present in the marine outfall area, any remains close onshore are likely to have been buried under the rocky beach and revetment and will not be impacted by the proposed surface deployment of the outfall pipelines. Beyond the rocky beach the local surf zone regime, which does not favour the accumulation of seabed sediment, suggests that any wreck material in the area would lie on the exposed rocky seabed and would be subject to impacts from the outfall pipelines should their positions intersect. Marine outfall construction-related activities which affect the seabed offshore of the rocky beach and revetment may result in direct impacts on the shipwrecks and related artefacts.

The physical extent of impacts on any maritime archaeological resources will be local and relate directly to the extents of disturbance occasioned by construction and installation activities. The intensity is expected to be low. Should impacts to maritime archaeological resources occur, the non-renewable nature of the resource means that the duration of impacts will be permanent. The imprecise historical information about the location of the wrecks in the Castle Point area, and the small footprint of the marine outfall infrastructure indicates that impacts on maritime archaeology are improbable. Based on the above, the significance of impacts on maritime archaeological resources arising from the Port of East London desalination plant, is assessed to be “Very Low”, negative, and will improve to “Very Low” positive, with mitigation. The level of confidence in this assessment of the impact is medium.

Table 10.7: Disturbance and / or destruction of maritime archaeology.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Permanent 3	Low 5	Improbable	**VERY LOW**	-ve	Medium
Essential mitigation measures: • Measures can be taken in advance of installation activities to avoid the site or material. Any wreck or related artefacts identified during any pre-construction ground-truthing of the marine outfall site must be flagged and the information shared with a suitably qualified maritime archaeologist and SAHRA. • A suitably defined construction exclusion zone may be required around any such site or material to ensure that it is not impacted by the installation of the marine outfall. The project maritime archaeologist's advice must be sought on the appropriate size and extent of any such exclusion zone. Any such exclusion zones must be marked on all project mapping as No-Go areas for construction contractors. • If seabed debris or a previously unknown wreck are encountered during the installation of the marine outfall, the project maritime archaeologist and SAHRA must be notified immediately and work must cease in the immediate vicinity until the maritime archaeologist and SAHRA have assessed the significance of the site and a decision has been taken as to how to deal with it.								
With mitigation	Local 1	Low 1	Long Term (Irreversible) 3	Low 5	Improbable	**VERY LOW**	**+ve**	Medium

10.2.5 SOCIO-ECONOMIC

GENERATION OF NOISE AND POTENTIAL IMPACTS ON PEOPLE

Noise impacts have been assessed in relation to people, while any potential effects on ecological receptors (animals) are addressed in the ecological specialist studies. Construction activities such as bulk earthworks, operation of heavy machinery and vehicles, and the use of hand tools generates noise. This has the potential to create nuisance to and nearby residents and port users. Port users could include employees, visitors, tenants, etc. The highest exposure is expected for individuals working directly on-site, particularly construction workers and equipment operators and port users.

However—given that the proposed development is located within an active port environment that is already subject to near-continuous operational noise from cranes, vehicles, and machinery—additional noise generated during construction is unlikely to elevate levels significantly above the existing ambient baseline. The West Bank suburb adjacent to the port also hosts several noise-producing businesses, including vehicle bodywork shops, which further reduces the likelihood of the project generating perceptibly higher levels of disturbance. Moreover, the desalination plant, where the bulk of construction noise is expected, is located further from the West Bank residential area than the solar farm and reservoir, which will provide additional insulation from potential impacts. Nevertheless, noise impacts can be cumulative, and unnecessary noise should be avoided. Port users, while likely to experience greater exposure to noise impacts than individuals outside of port limits, are already accustomed to working in close proximity to loud ambient port noise—including the use of cranes and other heavy machinery; loading and unloading of metal shipping containers; operation of heavy vehicles, noise from vessel horns; etc. Furthermore, the relatively isolated location of the proposed plant, with respect to other port infrastructure, is anticipated to further mitigate and minimise potential noise impacts on port users.

Noise control within Buffalo City Metropolitan Municipality (BCMM) is currently regulated under the Noise By-Law (2010), and is anticipated to transition to the Draft Noise Control By-Law (2024) once in force. When assessing the significance of potential noise impacts on port users, and residents/users within the surrounding suburbs—without mitigation—the extent is rated as Local, the intensity Medium (due to the potential noise disturbances/harm experienced by site workers, port users, and nearby members of the public), and the duration as Medium Term (due to the potential impacts of hearing damage potential lasting longer than two years). This results in a potential consequence rating of Low which, when combined with the Probable likelihood of this impact occurring, results in a pre-mitigation significance of "Low" negative. However, with the employment of appropriate essential mitigation measures, the intensity can be reduced to Low, and the duration to Short-Term—which results in a post-mitigation significance of "Very Low" negative.

Table 10.8. Generation of noise and potential impacts on people.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Medium 2	Medium Term 2	Low 5	Probable	**LOW**	-ve	High
Essential mitigation measures: • Efforts must be made to limit noise during the construction phase (including all unnecessary noise production). • Construction phase noise must comply with any relevant noise legislation, including the BCMM Noise By-Law and Draft BCMM Noise By-Law.								
With mitigation	Local 1	Low 1	Short Term 1	Very Low 3	Probable	**VERY LOW**	-ve	High

POTENTIAL IMPACTS ON THE VISUAL CHARACTER OF THE AREA

Construction and related activities can modify the visual characteristics of the area. Construction phase visual disruptions include the presence of construction vehicles and other heavy machinery, scaffolding structures, and laydown areas which would typically be out of place in a "natural" area. However, it is important to note that the port area is highly altered from its natural condition, and normal port operations consist of many activities that closely resemble those on a construction site, such as the use of cranes, heavy vehicles, scaffolding, workers wearing personal protective equipment, etc. Furthermore, any potential construction phase visual impacts will be temporary, and only persist for the duration of the actual activities. Consequently, this impact has been rated as "Very Low" with no mitigation measures required (Table 10.9).

Table 10.9. Potential impacts on the visual character of the area.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
With and Without mitigation	Local 1	Low 1	Short Term 1	Very Low 3	Probable	**VERY LOW**	-ve	High
• **No mitigation required**								

REDUCTION IN AIR QUALITY DUE TO THE SUSPENSION OF DUST AND RELEASE OF FUMES AND POTENTIAL IMPACT ON PEOPLE

While no Atmospheric Emission License (AEL) is required for this development—since the plant will not produce emissions during operation—construction activities involving earthworks and the transport of construction materials, have the potential to cause air quality impacts. In particular, there is a risk that fine sediment/ dust/ soil will become suspended in the air (either during the transport of raw materials on trucks, or during physical earth-moving/ construction activities). Suspension of fine particulate matter can also negatively impact human respiratory health. Furthermore, dust can be transported away from the immediate vicinity of the development site, therefore resulting in impacts being experienced at a distance away. Beyond issues of dust suspension, construction activities also have the potential of polluting the nearby atmosphere with fumes from construction vehicles and equipment, if not properly controlled. These fumes can be harmful to the health of individuals in proximity of the activities. The issue of air pollution is likely to be most emphasized for the construction workers who are physically working with the machinery and conducting the earth moving activities, yet also has the potential to impact other people working within the port, or in the nearby West Bank Suburb. Without mitigation, the intensity of this impact is rated as "Medium", the duration is also rated as "Medium Term" (due to the potential adverse health effects of dust/ emission pollution potentially lasting longer than a 2-year period), which results in an impact significance of "Low" when combined with the probability of the impact occurring. However, with the implementation of rigorous mitigation measures (largely pertaining to stockpile management, dust control, and emissions monitoring) this impact can be reduced to a significance of "Insignificant".

Table 10.10. Reduction in air quality due to suspended dust and fumes and potential impact on people.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Medium 2	Medium Term 2	Low 5	Probable	**LOW**	-ve	High
Essential mitigation measures: • Implement dust suppression techniques such as covering stockpiles with shade netting/ geotextile, should they be left exposed for prolonged periods of time. • Where possible, construction using large volumes of sand should occur during clear weather, and loose sand should be cleared or covered during breaks in construction. • If dispersal of dust/ soil during vehicle transit is unavoidable, then water spraying trucks must be deployed in tandem, in order to keep this dust out of the atmosphere. • Erosion control measures, such as silt fences, should be employed in areas at risk of erosion/runoff. • Monitor construction areas post rainfall events and repair any erosion damage that may have occurred. • Monitor air quality and implementing measures to minimize soil disturbance. • Workers must be provided with all appropriate Personal Protective Equipment (PPE), such as correctly rated masks, when working in/ around areas where dust pollution/ emissions are unavoidable • Implementation of a rigorous environmental management and control plan (including procedures for remediation). • Only vehicles and equipment that are suitably maintained and compliant with emission regulations may be allowed on site. • Vehicles must be subject to a daily Environmental Health and Safety (EHS) checklist. • An Environmental Control Officer must monitor the site for vehicle fumes and dust suspension. Additionally, the ECO must monitor all vehicles and equipment transiting the site, in order to identify obviously non-compliant vehicles.								
With mitigation	Local 1	Low 1	Short Term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	High

POTENTIAL HEALTH AND SAFETY CONCERNS OF WORKERS

Construction operations are fundamentally dangerous processes, with heavy machinery, dangerous equipment, and many other hazards present on the job site. Consequently, it is important that individuals are adequately trained; the development staff consists of members tasked with ensuring that the health and safety of all workers is overseen; and that a rigorous Health and Safety (H&S) plan/ programme, and protocol are drafted; in order to both reduce the chance of an incident occurring, as well as reduce the likely severity of an incident (should it occur). In practical terms, this should involve preventing incidents entirely or, at worst, should ensure that workers only get injured, rather than permanently maimed/ killed, etc., should an unavoidable accident occur. Furthermore, it is considered essential that all workers are sufficiently trained; undergo adequate inductions to both the port environment and the specific project site; and are equipped with all essential Personal Protective Equipment (PPE), such as hard hats, steel-toe shoes, high-visibility equipment, etc. Furthermore, the construction team must have individuals on-site with adequate first aid training to be a first responder in the event of an incident, and the H&S programme must include a detailed plan for how to treat workers in the event of an emergency. Despite being of "High" significance before mitigation, it is estimated that this can be reduced to "Low" with the employment of suitable mitigation measures.

Table 10.11. Potential health and safety concerns of workers.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	High 3	Long Term (Irreversible) 3	High 7	Possible	**MEDIUM**	-ve	High
Essential mitigation measures: • Construction activities must be conducted in accordance with the Occupational Health and Safety Act (OHSA), and Transnet National Ports Authority's (TNPAs) own health and safety protocols.								
With mitigation	Local 1	Medium 2	Medium Term 2	Low 5	Possible	**VERY LOW**	-ve	High

POTENTIAL IMPACTS ON FISHERIES

Given the Buffalo Estuaries' potential role as a nursery for important fishery species, and the small amount of overlap with the recreational shore-based fishery, there is a possibility of this development having negative impacts on the fisheries/ fisheries species. However, given the highly disturbed nature of the port environment, and intensity of existing activities, impacts on fisheries from this development are expected to be negligible, with no specific mitigation measures being required (Table 10.12).

Table 10.12. Potential impacts on fisheries.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
No mitigation required	Local 1	Low 1	Short Term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	High
No mitigation required								

POTENTIAL ECONOMIC BENEFITS

Construction of the proposed RO plant, solar facility and associated infrastructure will require a range of skilled and semi-skilled workers, contractors, suppliers and service providers. As a result, the project is expected to contribute to the local economy through the appointment of contractors and procurement of materials, goods and services, thereby supporting existing businesses and employment opportunities within East London.

However, these benefits are expected to be limited, as the construction phase will be relatively short-term (less than two years), the workforce requirements are not substantial, and much of the specialised work will likely be undertaken by existing contractors and personnel, some potentially from outside East London. Consequently, while the construction phase project will support economic activity and help sustain existing businesses and jobs, it is not expected to result in significant long-term economic growth or substantial new employment opportunities. The significance of this positive impact is therefore assessed as "Very Low" without enhancement measures.

The benefits could be increased through the preferential appointment of local labour, contractors and suppliers, thereby retaining a greater proportion of project expenditure within the East London economy. With the implementation of such enhancement measures, the intensity and duration of the positive impact are expected to increase, resulting in a "Low" positive significance.

Table 10.13. Potential economic benefits.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without enhancement measures	Local 1	Low 1	Short Term 1	Very Low 3	Probable	**VERY LOW**	**+ve**	Medium
Recommended/Best Practice Optimisation Measures • While the construction phase is not expected to result in many new job opportunities (as workforce requirements are small, and much of the specialised work will be undertaken by existing contractors and personnel—some potentially from outside East London), should new job opportunities arise, then a local labour procurement policy should be employed (where feasible). This can be demonstrated through employment, payroll, procurement, and supplier records. • Source construction materials, goods and services from local suppliers wherever practical, as demonstrated through procurement documentation and supplier databases. Engage with local authorities and business associations to source construction materials, goods, and services from local suppliers wherever practical.								
With enhancement measures	Local 1	Medium 2	Medium Term 2	Low 5	Probable	**LOW**	**+ve**	Medium

10.3 Potential Operational Phase Impacts

10.3.1 Marine and Estuarine Environment

DISTURBANCE AND/OR MORTALITY OF MARINE LIFE DUE TO THE INTAKE OF SEAWATER

The impacts of seawater abstraction on marine life can include entrainment and impingement. Entrainment occurs when organisms pass through intake structures and into the processing equipment (Pankratz 2004). Impingement occurs when larger marine organisms are trapped against intake screens by the velocity of the water flow (Bamber & Seaby 2004, California Coastal Commission 2004). While the significance of both impingement and entrainment is related to the location of an intake, impingement is primarily a function of intake velocity, and entrainment depends largely on the overall volume of water drawn into plant. Intake structures should be positioned away from sensitive environments or areas with high species diversity or abundance, like rocky reefs, and should not draw in water from the upper one metre of the water column, as planktonic organisms tend to concentrate in this zone. The intake should also avoid the bottom one metre of the water column to minimise intake of suspended sediment. Impingement and entrainment can be mitigated through optimal designs to open water intakes. The horizontal extraction of water should aid in reducing fish entrainment as fish have been shown to avoid rapid changes in horizontal flow (Pankratz 2004). There is a broadly accepted rule that water extraction velocities should not exceed 0.15 m/s to minimize debris and marine life impingement (Fedorenko 1991). Intake velocities can be reduced to the requisite 0.15 m/s through the use of footer valves, which increase the area of intake, resulting in a decrease in intake velocity to safe levels. The impacts are expected to last for the duration that the plant is in operation for the lifetime of the plant. Predicted impacts are rated as “Low” significance before mitigation and “Very Low” following mitigation (Table 10.14).

Table 10.14. Disturbance and/or mortality of marine life due to the intake of seawater.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Medium 2	Medium term 2	Low 5	Probable	**LOW**	-ve	High
Essential mitigation measures: • Intake velocities should be kept below 0.15 m/s to ensure that fish and other mobile organisms can escape the intake current. • Intake structures should ensure the horizontal intake of water. This can be achieved through use of footer valves. • Intake structures should be positioned away from sensitive environments or areas with high species diversity or abundance, like rocky reefs, and should not draw in water from the upper meter of the water column.								
With mitigation	Local 1	Low 1	Medium term 2	Very Low 4	Probable	**VERY LOW**	-ve	High

EFFECTS OF INCREASED SALINITY ON SYSTEM FUNCTION AND BIOTA

The primary purpose of desalination is the separation of dissolved salts and other solutes from the fresh product water. As such, the primary impacts on marine environments associated with desalination plants are associated with negatively buoyant, highly saline brine discharge. All marine organisms have a range of tolerance to salinity, which is related to their ability to regulate the osmotic balance of their individual cells and organs to maintain positive turgor pressure. Aquatic organisms are commonly classified in relation to their range of tolerance as stenohaline (able to adapt to only a narrow range of salinities) or euryhaline (able to adapt to a wide salinity range), with most organisms falling into the first category. Salinity changes may affect aquatic organisms through direct toxicity, which initiates physiological changes (particularly osmoregulation), and indirect toxicity by modifying species distributions. Salinity changes can also cause changes to water column structure (e.g., stratification) and water chemistry (e.g., dissolved oxygen saturation and turbidity). For example, fluctuation in the salinity regime has the potential to influence dissolved oxygen concentrations, and changes in water stratification could result in shifts in the distribution of organisms in the water column and sediments. Behavioural responses to changes in the salinity regime can include escaping in the case of mobile animals such as fish and macrocrustaceans, or avoidance by sessile animals (e.g., barnacles and mussels) by closing shells or by retreating deeper into sediments. In marine ecosystems, a reduction (rather than an increase) in salinity is expected to have adverse effects in species distribution (ANZECC 2000). Very little information exists on the effect of an increase in salinity on organisms in coastal marine systems, with most studies being done either on the effects of a decline in salinity due to an influx of freshwater, or on salinity fluctuations in estuarine environments where most of the fauna are euryhaline.

Sub-lethal effects of salinity stress can include modification of metabolic rate, change in activity patterns, or alteration of growth rates (McLusky 1981). The limited data available include a reported tolerance of adults of the mussel *Mytilus edulis* of up to 60 Practical Salinity Units (PSU), and successful fertilization and development of its larvae at a salinity of up to 40 PSU (see Barnabe 1989 and Bayne 1965, respectively). The alga *Gracilaria verrucosa* can tolerate salinity ranges from 9 to 45 PSU (Engledow & Bolton 1994). The shrimp *Penaeus indicus* was capable of tolerating a salinity range of 1 to 75 PSU if allowed an acclimation time of around 48 hours, the oyster *Crassostrea gigas* tolerated salinities as high as 44 PSU, and the shrimp *Penaeus monodon* survived in 40 PSU saline water (McClurg 1974, King 1977, Kungvankij & Chua 1986, Kungvankij et al. 1986). A higher moulting frequency in juveniles of the prawn *Penaeus chinensis* at a salinity of 40 PSU has been reported (Chen et al. 1992). Lethal effects were reported for seagrass species: for example, salinities of 50 PSU caused 100% mortality of the Mediterranean seagrass *Posidonia oceanica*, 50% mortality at 45 PSU, and 27% at 40 PSU. Salinity concentrations above 40 PSU also stunted plant growth and no-growth occurred at levels exceeding 48 PSU (Latorre 2005).

High salinity can also lead to an increase in water turbidity, which is likely to reduce light penetration, an effect that can disrupt photosynthetic processes and reduce the production of plankton, particularly of invertebrate and fish larvae (Miri & Chouikhi 2005). One of the main factors of a change in salinity is its influence on osmoregulation, which in turn affects uptake rates of chemical or toxins. Indeed, metal toxicity generally increases with decreasing salinity, while the toxicity of organophosphate insecticides increases with increasing salinity (Heugens et al. 2001). For other chemicals, no clear

relationship between toxicity and salinity has been observed. Some evidence, however, exists for an increase in the uptake of certain trace metals with an increase in salinity (Rainbow & Black 2002). Various ecological studies have been undertaken to examine the effects of high salinity discharges from desalination plants on the receiving communities. A study on the sandy macrobenthic community off the coast of Blanes in Spain, adjacent to a desalination plant discharging brine at 33 707 m^3/day, showed no significant variation between communities within and outside of the impact area both before and after the plant start up and operation (Raventos et al. 2006). This was partly attributable to high natural variability as well as to the rapid dilution of the hypersaline brine upon leaving the discharge pipe. Other studies, however, indicated that large volume brine discharges have led to reductions in fish populations and to die-offs of plankton and coral in the Red Sea; and to mortalities in mangrove and marine angiosperms in the Ras Hanjurah Lagoon in the United Arab Emirates (Mabrook 1994 and Vries et al. 1997 respectively). Model results show that salinity limits are met at both the 30 m Recommended Mixing Zone (RMZ) and at the edge of the Zone of Initial Dilution (ZID) under both Initial Phase and Full Capacity flows. The impact can be fully reversed once operations cease, and decommissioning is completed. Given some uncertainty around discharge into a surf zone, this impact is conservatively assessed as of "Very Low" significance prior to mitigation (Table 10.15).

Table 10.15. Effects of increased salinity on system function and biota.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Medium term 2	Low 5	Possible	**VERY LOW**	-ve	High
Essential mitigation measures: • Effluent discharged must meet end of pipe concentrations modelled in the Marine Specialist Study. • Monitoring of end of pipe concentrations must be conducted and dosing levels should be adjusted should adverse effects be detected by the monitoring program.								
With mitigation	Local 1	Low 1	Medium term 2	Low 5	Possible	**VERY LOW**	-ve	High

REDUCED PHYSIOLOGICAL FUNCTIONING OF SYSTEM AND BIOTA DUE TO DECREASED DISSOLVED OXYGEN

Dissolved oxygen (DO) is an essential requirement for most heterotrophic marine organisms. Natural levels in seawater are largely governed by local temperature and salinity regimes, as well as by organic content. Coastal upwelling regions are frequently exposed to hypoxic conditions owing to extremely high primary production and subsequent oxidative degeneration of organic matter. Hypoxic water (defined as concentrations of less than 2 millilitres of oxygen per litre) has the potential to cause mass mortalities of benthos and fish (Diaz & Rosenberg 1995). Marine organisms respond to hypoxia by first attempting to maintain oxygen delivery by increasing respiration rates, by increasing the number of red blood cells, or by increasing the oxygen binding capacity of haemoglobin. They then start conserving energy through metabolic depression, down regulation of protein synthesis and modification of certain regulatory enzymes and eventually resort to anaerobic respiration upon exposure to prolonged hypoxia (Wu 2002). As a result, hypoxia reduces growth and supresses feeding, which

may eventually affect individual fitness. The effects of hypoxia on the reproduction and development of marine animals remains almost unknown. Many fish and marine organisms can detect and actively avoid hypoxia as seen during rock lobster "walk-outs" and migration of macrobenthos from their burrows to the sediment surface, rendering them more vulnerable to predation. Hypoxia may eliminate sensitive species, thereby causing changes in species composition of benthic fish and phytoplankton communities. Decreases in species diversity and species richness are well documented, and changes in trophodynamics and functional groups have also been reported. Under hypoxic conditions, there is a general tendency for suspension feeders to be replaced by deposit feeders, demersal fish by pelagic fish and macrobenthos by meiobenthos (Wu 2002). Further anaerobic degradation of organic matter by sulphate-reducing bacteria may additionally result in the production of hydrogen sulphide, which is detrimental to marine organisms (Brüchert et al. 2003).

Because oxygen is a gas, its solubility in seawater is dependent on salinity and temperature. Increases in these parameters result in a decline of dissolved oxygen levels. The 1995 South African Water Quality Guidelines for Coastal Marine Waters state that the south and east coasts, the dissolved oxygen should not fall below 5 mg/L (99% of the time) and below 6 mg/L (95% of the time). A critical factor that also needs to be observed is that oxygen depletion in the effluent might also occur through the addition of sodium metabisulfite, an oxygen scavenger, should it be used as a neutralizing agent for chlorine to protect the RO membranes (Hoepner & Lattemann 2003). In this case, aeration of the effluent is recommended prior to discharge should effluent oxygen values fall below 6 mg/L 95% of the time. Indirect changes in dissolved oxygen content of the water column and sediments due to changes in hydrodynamic and ecosystem functioning may also occur if chemicals that can act as nutrients are added to the effluent (i.e. sodium tripolyphosphate and trisodium phosphate). As these chemicals are not expected in the co-discharge, this source of DO alteration is not applicable. Given the achievable dilutions suggested by the modelling study, the high wave energy characteristic of the discharge site, the impact is expected to be of "Low" significance prior to mitigation. The impact can be fully reversed once operations cease and decommissioning is completed.

Table 10.16. Reduced physiological functioning due to decreased dissolved oxygen.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Medium term 2	Low 5	Probable	**LOW**	-ve	High
Essential mitigation measures: • Effluent discharged must meet end of pipe concentrations modelled in the Marine Specialist Study. • Aeration of the effluent prior to discharge must be undertaken if oxygen scavengers (such as sodium metabisulphite) are utilised. • Monitoring of end of pipe concentrations must be conducted and adjust dosing levels should adverse effects be detected by the monitoring program.								
With mitigation	Local 1	Low 1	Medium term 2	Low 5	Possible	**VERY LOW**	-ve	High

REDUCED PHYSIOLOGICAL FUNCTIONING OF SYSTEM AND BIOTA DUE CHANGES IN WATER PH

The pH of the discharged seawater will be impacted by the addition of cleaning chemicals, which may include highly alkaline (pH 11–12) or acidic (pH 2–3) solutions with additives such as detergents. Alkaline cleaning solutions are used for removal of silt deposits and biofilms, whereas acidified solutions are used to remove metal oxides and scales. Other chemicals that may be added to improve cleaning efficiency are detergents, oxidants, complexing agents or biocides for membrane disinfection. Neutralisation of extremely alkaline or acidic solutions and treatment of additional cleaning agents is recommended before discharge to the ocean to remove any potential toxicity (Burger & Du Plessis 2010). For example, spent cleaning-in-place (CIP) solutions are either acidic or alkaline and must be neutralized within the CIP system before discharge. It must also be noted that seawater is also highly buffered and has a strong neutralising effect on acids. As such, the significance of the impact regarding the reduction in the physiological functioning of biota as a result of a reduction in pH through the release of co-discharges is assessed in Table 10.17. The effects are considered to be of "Very Low" intensity, will likely remain localised, and will persist for the duration of plant operation. As a result, the impact is assessed to be "Insignificant" with mitigation (Table 10.17).

Table 10.17. Reduced physiological functioning of system and biota due to changes in water pH.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Medium term 2	Low 5	Possible	**LOW**	-ve	High
Essential mitigation measures: • Effluent discharged must meet end of pipe concentrations modelled in the Marine Specialist Study. • Neutralization of extremely alkaline or acidic solutions and treatment of additional cleaning agents is required prior to discharge. • Monitoring of end of pipe concentrations must be conducted and adjust dosing levels should adverse effects be detected by the monitoring program.								
With mitigation	Local 1	Low 1	Medium term 2	Low 5	Possible	**VERY LOW**	-ve	High

THE EFFECT OF DISCHARGED CO-POLLUTANTS ON MARINE BIOTA

Co-pollutants are often discharged to the receiving environment as a result of the extensive pre-treatment of source water required to prevent clogging and biofouling of plant infrastructure. Pre-treatment typically includes filtration (aided by the addition of coagulants), pH control, the addition of anti-scalants, biocide, CIP chemicals (weak acids and detergents) as well as neutralizer (if an oxidizing biocide is used). Any residual chemicals or other additives used in pre-treatment are frequently co-discharged after dilution with the brine into the receiving environment (usually the sea). Provided that the brine is discharged into a suitable area with adequate mixing and offshore dilution, and a sufficient distance from sensitive habitats (reefs, estuaries, surf zones etc), impacts on the marine environment should be spatially limited and can be mitigated to some extent by discharge design. Another critical factor that also needs to be observed is that oxygen depletion in the effluent might also occur through the addition of sodium metabisulfite, an oxygen scavenger, should it be used as a neutralizing agent for chlorine to protect the

membranes used in the desalination process (Hoepner & Lattemann 2003). In general, the toxicity of the various chemicals most likely to be used in the pre-treatment and CIP process (with the exception of any chorine biocides) is relatively low. Model results show that sodium hypochlorite (NaOCl) limits are met at both the 30 m RMZ and at the edge of the ZID under both Initial Phase and Full Capacity flows (Table 10.18). The impact can be fully reversed once operations cease, and decommissioning is completed. Suitable mitigation measures, including the removal of particulates from the backwash sludge, neutralization of strong acidic and alkaline solutions, and properly considered dousing regimes are likely to result in the "Low" significance of impacts on the marine environment (Table 10.18). Mitigation measures reduce the potential impact to "Very Low" significance (Table 10.18).

Table 10.18. The effect of discharged co-pollutants on marine biota.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Low 1	Medium 2	Medium term 2	Medium 6	Possible	**LOW**	-ve	Medium
Essential mitigation measures: • Effluent discharged must meet end of pipe concentrations modelled in the Marine Specialist Study. • Aeration of the effluent prior to discharge must be undertaken if oxygen scavengers (such as sodium metabisulphite) are utilised. • Corrosion resistant materials should be used. • Strong acidic and alkaline solutions must be neutralised prior to discharge. • There must be continual release of small volumes of chemicals used during the Clean-in-Place (CIP) process with the brine discharge to allow for maximum dilution before release into the environment. • Monitoring of end of pipe concentrations must be conducted and adjust dosing levels should adverse effects be detected by the monitoring program.								
With mitigation	Low 1	Low 1	Medium term 2	Low 5	Possible	**VERY LOW**	-ve	High

10.3.2 Terrestrial Biodiversity, Plants and Animals

The normal operation of the Port of East London desalination plant is not anticipated to result in impacts to terrestrial environment, plants or animals. resources. These activities are, therefore, **scoped out** of this assessment.

10.3.3 Agricultural Resources

As discussed above, the development will have no impact on agriculture during operation. It has therefore been **scoped out.**

10.3.4 Heritage Resources

The normal operation of the Port of East London desalination plant is not anticipated to result in impacts to heritage resources. Where repairs to already installed plant are required, such work will take place in areas already subject to disturbance during the installation of the plant, and the likelihood of significant new impacts to heritage resources is low. These activities are, therefore, **scoped out** of this assessment.

10.3.5 Social, Visual, Noise and Economic Receptors/ Resources

GENERATION OF NOISE AND POTENTIAL IMPACTS ON PEOPLE

The operational phase of the proposed plant is likely to result in near-negligible sound levels. The only anticipated operational phase noise will be derived from the various pumps within the RO plant itself, as well as the pump operating withing the pumphouse at the intake site. However, all pumps and other sound-producing infrastructure, will be located inside closed structures, and are unlikely to produce noise levels equivalent to the ambient noise within the active port environment. Furthermore, the actual RO plant is buffered from the nearest private properties by ~60 metres. The intake pumphouse is located even further from the any private property, with the closest being ~175 m from the pumphouse. Consequently, the operational phase noise impacts associated with this development are rated as "Insignificant", with no mitigation measures required (Table 10.9).

Table 10.19. Generation of noise and potential impacts on people.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
No mitigation required	Local 1	Low 1	Short Term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	High
No mitigation required								

POTENTIAL IMPACTS ON THE VISUAL CHARACTER OF THE AREA

Given that, once constructed, the proposed RO/solar plant (and all supporting infrastructure) will be a permanent feature within the port, it is anticipated to result in a permanent change to the visual landscape of the port. The port is already characterised by large industrial structures, large buildings, etc., so the construction of this plant will not substantially change the "character" of the port. However, it is possible that minor visual impacts will be experienced by individuals living on Dale street, who presently have views across the site, towards signal hill on the north/east bank, as a well as the harbour, through Transnet's permeated perimeter fence. The structures with the greatest potential to impact these users visually (the actual RO plant and reservoir) will be located in the far-western portion of the site, in close proximity to the existing large reservoir/silo structure (as well as a stand of dense , relatively tall, vegetation), thus this is unlikely to have a marked effect on the visual landscape. Consequently, these structures will have a negligible impact on existing views/sight lines. The structures most likely to cause a degree of visual disturbance are the solar panels making up the solar plant. These panels will cover most of the central and eastern portions of the site. However, these panels will only be approximately 2 m tall, relative to ground level. Consequently, these panels should fall below the height of the fence itself, and should therefore only obstruct ground-level views across the site. The landscape views of double-story structures should therefore only be minimally altered. Potential visual impacts are further mitigated by the fact that many of the adjacent properties have high perimeter walls: which already disrupt sight lines for those residents. The development will therefore largely only disrupt views of the existing (rather degraded) vegetated area upon which the site is located, as well as some ground-level disruption to site lines towards the Buffalo River Estuary mouth, and signal hill on the far side of the river. The development will also not substantially degrade

the character of the site. However, it is important that light absorbent/ matt scattering coatings are used for the solar panels, in order to avoid harmful light reflections. Additionally, all structures must be painted in colours that do not cause these structures to unnecessarily reflect light, or stand out too starkly, relative to the surrounding landscape. Beyond potential impacts on residents in the West Bank area, there is also the potential for some visual disturbance for people living and working on the elevated areas to the north of the estuary, given the natural intervisibility occurring between these two elevated areas, with the greatest concern being around light reflection. However, this can be effectively mitigated using light absorbent/matt/scattering coatings for the solar panels, and the use of non-reflective and appropriate colours for all proposed buildings. Consequently, this impact has been rated as "Low" significance before mitigation, and "Very Low" following the adoption of suitable mitigation measures (Table 10.20).

Table 10.20. Potential impacts on the visual character of the area.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Long Term 3	Low 5	Probable	**LOW**	-ve	High
Essential mitigation measures • Non-reflecting (matt)/ scattering solar panels must be used, in order to reduce the potential harm or disturbance associated with sunlight reflecting off the panels. • If possible, neutral/ earth colours should be used for buildings, so as not to overly reflect sunlight and cause disturbance/ harm to observers. This will also help to preserve the overall character and sense of place of the area.								
With mitigation measures	Local 1	Low 1	Long Term 3	Low 5	Possible	**VERY LOW**	-ve	High

POTENTIAL IMPACTS ON FISHERIES

Given that the only potential impact on local fisheries relates to the release of a relatively small volume of brine into the marine environment, and that this brine will disperse very rapidly within the highly active coastal environment adjacent the port, no negative impacts on fisheries are anticipated during operation, despite the small amount of recreational shore-based fishing effort in the area (Table 10.21).

Table 10.21. Potential impacts on fisheries.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
No mitigation required	Local 1	Low 1	Short Term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	High
No mitigation required								

POTENTIAL ECONOMIC BENEFITS DUE TO INCREASED AND RELIABLE WATER SUPPLY IN THE PORT

Given that the purpose of the project is to provide an additional, reliable water supply to the Port of East London, positive knock-on economic benefits are anticipated. By improving the port's resilience to disruptions in municipal water and electricity supply—arising from drought, power failures, and infrastructure constraints—the project is expected to support more consistent port operations. This, in turn, may improve operational efficiency and capacity, including the potential to handle greater cargo volumes and a wider range of cargo types.

Broader (Indirect) Economic Benefits

As the Port of East London—and the East London trade sector more broadly—is a major economic driver for the city and the wider BCMM, the above operational improvements may support increased trade revenues and profitability. Higher profitability could, in turn, generate additional revenue for the city, as well as the broader regional and national economies, through increased tax contributions and the creation of new indirect employment opportunities outside the port.

Potential Employment Opportunities within the Port

It is unlikely that operation of the desalination plant will directly create more than a small number of employment opportunities for local workers in East London and the surrounding area over its operational lifespan. This is because initial operations will be undertaken by Sunwater, the appointed operator for the first four years of operation. Sunwater's operational specialists are primarily based in Cape Town and will largely operate the plant remotely, travelling to site only when required. Furthermore, should additional operational expertise or capacity be required beyond Sunwater's internal team, such personnel are also likely to be sourced from outside East London, given the highly specialised and niche skills required, and the limited likelihood that these skills are available locally. This is expected to also apply to plant operations from Year 5 onwards.

However, some indirect knock-on employment opportunities may be created in other groups or divisions within the port as a result of improved port functioning, operational efficiency and capacity, and associated revenue increases enabled by access to the new, reliable water supply.

Overall, this positive impact is rated as having "Low" positive significance prior to the implementation of enhancement measures, but could potentially be increased to "Medium" positive significance with appropriate enhancement measures (Table 10.22). These measures include TNPA implementing a "Local-First" employment policy for general port hiring processes, where feasible, to increase the local socio-economic benefits associated with potential indirect employment opportunities within the port. In addition, the potential positive economic impact of the development is strongly dependent on the strategic and optimised use of the new water supply by TNPA, with effective utilisation further increasing the significance of the positive impact.

Finally, earlier sections of this report have demonstrated the economic challenges facing BCMM and East London. This highlights the importance of investing in the efficiency and economic viability of sectors with established geographic advantages, such as an existing, functional riverine port with room for expansion, as a means of improving socio-economic conditions within the city.

Table 10.22. Potential economic benefits due to increased and reliable water supply in the port.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without enhancements	Regional 2	Low 1	Long Term 3	Medium 6	Possible	**LOW**	**+ve**	Medium
Recommended/Best Practice Optimisation Measures • While plant operation will not result in the direct creation of any new job opportunities (all plant operations will be conducted by the existing appointed specialists), it is possible that indirect employment opportunities may be created within the port, due to improved port functioning/capacity. Should TNPA utilise a "Local-First" employment policy (if and where possible) for general port hiring processes, then the potential local socio-economic benefits realised through the creation of these indirect employment opportunities would increase. • Water Resource Management: TNPA to utilise the new water supply provided by the desalination plant strategically, to strengthen the port's resilience against fluctuations or interruptions in municipal water and electricity services. This includes optimising storage, scheduling use during peak demand or supply constraints, and ensuring efficient distribution to reduce reliance on external utilities.							
With enhancement measures	Regional 2	Low 1	Long Term 3	Medium 6	Probable	**MEDIUM**	**+ve**	Medium

10.4 Potential Decommissioning Phase Impacts

As no detailed decommissioning procedures or restoration plans have been compiled at this stage or are planned for this development in the foreseeable future, impacts associated with decommissioning on the various receptors have been **scoped out** of this study. Should decommissioning become relevant in the future, activities are anticipated to mirror those of the construction phase and will largely be confined to areas already disturbed during the installation of the desalination plant. However, impacts are expected to be less significant than those identified for the construction phase and their likelihood is low. The mitigation measures outlined for construction should similarly be applied during decommissioning to manage any residual impacts.

10.5 Assessment of the No-go Alternative

The No-Go Alternative refers to the potential impacts associated with not pursuing the proposed development, or "doing nothing". It therefore considers the implications of not proceeding with the proposed desalination plant at the Port of East London. Under this scenario, the project area would remain in its current state, with only natural environmental processes and the current port operations continuing to influence the site.

While this alternative would avoid the "Low", "Very Low", or "Insignificant" negative impacts associated with construction and operation (as identified and assessed in the EIA), it would also result in the loss of the associated positive outcomes of the project. These include limited but nonetheless meaningful short-term socio-economic benefits such as temporary employment opportunities, local procurement, and support for existing contractors and service providers in the East London area, even where many of these benefits are assessed as "Low" to "Very Low" in significance.

More importantly, the No-Go Alternative would not address the underlying need and desirability of the project, namely the provision of a reliable and independent freshwater

supply to support efficient and uninterrupted port operations. The absence of such a supply would maintain continued reliance on constrained municipal systems, leaving port operations vulnerable to supply interruptions and water restrictions.

The primary consequence of the No-Go Alternative would therefore be the forfeiture of both the limited socio-economic benefits associated with construction and operation, and, more significantly, the strategic benefit of securing a reliable water source for the Port of East London and its tenants.

In addition, the absence of the project would exclude potential cumulative benefits associated with improved port efficiency and resilience, including synergies with other planned infrastructure upgrades such as the Proposed Replacement of Quay Wall 3 and 4. This would, in turn, limit the port's broader contribution to economic activity and growth within East London and the Buffalo City Metropolitan Municipality.

Overall, while the No-Go Alternative would avoid the identified minor environmental impacts, it would also prevent the realisation of both direct and strategic benefits associated with improved water security and port functionality, and is therefore considered the less preferable option.

10.6 Potential Cumulative Impacts Associated with this Development

Anthropogenic activities can result in numerous and complex effects on the natural environment. While many of these are direct and immediate, the environmental effects of individual activities or projects can interact with each other in time and space to cause incremental or aggregate effects. Impacts from unrelated activities may accumulate or interact to cause additional effects that may not be apparent when assessing the activities individually. Cumulative effects are 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). Cumulative impacts have been assessed across the Marine and Estuarine Environment, the Terrestrial Environment, Heritage Resources, and Socio-economic Conditions.

10.6.1 Marine and Estuarine Environment

By definition, cumulative marine environmental impacts emanating from the proposed project are related to the overlap with various other sources of anthropogenic disturbance in the vicinity of the impact proposed project activities, under normal operating conditions. In this case, these impacts would include 1) disturbance of estuarine/marine habitat, 2) other systems of estuarine water intake and 3) cumulative effects of other brine discharges. Intertidal and subtidal impacts related to construction will not result in a net loss of habitat, and affect an already transformed communities that area already subject to high levels of disturbance (though wave energy), resulting in an impact of "Very Low" significance without mitigation. In a similar way, impacts to estuarine habitat resulting from the proposed development are limited in scale, and are not expected to noticeably influence the ecology of the estuary. There are no other known developments in the area of impact that would result in any cumulative effects of greater significance. There may be cumulative impacts of waste generated (especially litter), should strict project controls to control the generation and management of such waste

not be implemented. These include being cognisant of the significant amount of litter already on site, actively cleaning-up the Port environment, with weekly beach clean ups undertaken by TNPA.

Finally Cumulative impacts related to intake and brine discharge are only relevant should similar operations exist within the impacted 'area of influence'. As no such developments exist, there are no anticipated cumulative effects of concern.

Table 10.23. Cumulative impacts of the development on the Marine and Estuarine Environment

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Short term 1	Very Low 3	Probable	**VERY LOW**	-ve	High

10.6.2 Terrestrial Biodiversity, Plants and Animals

The relevance of cumulative impacts on terrestrial environmental and ecological receptors, primarily pertains to the progressive degradation of small pieces of land, over time, which ultimately has the potential to lead to substantial loss of habitat and the associated decline in local species who rely on these habitats.

However, the ecological cumulative impacts pertaining to this development have been rated as "Very Low" negative significance, primarily because all of the proposed development sites are already highly developed and altered, such that little natural habitat and plant/ animal species still exist in these areas. Consequently, it is much more advantageous to pursue developments such as this, in areas that are already highly degraded, rather than developing in areas where the initial degree of disturbance is lower.

Table 10.24. Cumulative impacts of the development on the Terrestrial Biodiversity, Plants and Animals.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Long Term 3	Low 6	Possible	**VERY LOW**	-ve	Low

10.6.3 Archaeological, Palaeontological, and Culture Heritage Receptors

In terms of Heritage receptors, for the most part, cumulative effects are too uncertain to be quantifiable, due in the main to data availability and accuracy issues. This is particularly true of cumulative effects arising from possible future projects, the design or details of which may not be finalised or available and the direct and indirect impacts of which have not yet been assessed. Except for the proposed Umoja Subsea Fibre-Optic Cable project currently undergoing an EIA process, there is no information about other current or future projects in the vicinity of the proposed Port of East London desalination plant. The assessment below of the cumulative impacts of current and future terrestrial and marine projects in on heritage resources in the area around the Port of East London are, therefore, qualitative and descriptive.

PALAEONTOLOGY

In respect of palaeontology, the cumulative result of future terrestrial and marine development in the vicinity of the proposed Port of East London desalination plant will be the inevitable and permanent loss of fossils, which is a negative impact. The relative spatial rarity and weathered nature of both the Nanaga and Middleton Formation fossils in the East London area indicates that the cumulative impact significance on fossils sequestered in the seabed is likely to be "Low" negative—which the rating used for this assessment. However, if, during current and future developments, due attention is given to mitigation and the successful rescue of a representative sample of fossils where they occur; the accumulation of scientific evidence and knowledge about the stratigraphy of the continental shelf seabed formations (including their palaeoenvironments, past faunas and their ages, and sea-level history) has the potential to outweigh the negative cumulative impacts.

TERRESTRIAL ARCHAEOLOGY

Cumulative impacts on terrestrial archaeological sites and/or materials are difficult to assess because of the variable distribution of sites and materials across the landscape and because of the differences in the quality of surveys and reporting on different projects. Field observations made in previous archaeological assessments in the vicinity of the Port of East London desalination plant indicate that significant archaeological sites and materials are not common in the area. The most common archaeological material reported has tended to be Middle Stone Age (MSA) lithic scatters which are of limited archaeological significance due to their generally occurring in secondary contexts. For the purposes of this assessment, the significance of Cumulative Impacts on terrestrial archaeological resources in the area surrounding the proposed development, is rated as "Low" negative. However, should appropriate mitigation measures be implemented for individual projects, this significance could be reduced (potentially to the point of being "Insignificant".

SUBMERGED PREHISTORY

Although there is, as yet, very little concrete evidence for the distribution of submerged prehistoric sites and materials in and on the seabed around the South African coast, it is clear these sites and material will exist. Using the spatial distribution of terrestrial archaeology as a proxy for the likely distribution of sites on the now inundated continental shelf, it is also clear that significant archaeological sites and material will be highly localised and most of the seabed will not contain such material. The repeated marine transgressions which have inundated the continental shelf within the last million years have also reworked much of the terrestrial sediment laid down during periods of lower sea levels. Much of the archaeological record within these sediments is thus likely to have been destroyed in the process, and surviving archaeological material is generally likely to now be found in secondary contexts. Consequently, while current and future activities which disturb the seabed have the potential to impact submerged prehistoric sites and materials, such impacts are unlikely and rated to be of "Low" negative cumulative significance.

MARITIME ARCHAEOLOGY

With respect to potential cumulative impacts on historical shipwrecks, the discussion above indicates that there is a high concentration of shipping casualties around East London and the Buffalo River because of its history as a port. Generally, historical wrecks and related maritime archaeological debris are avoidable through the prior collection and analysis of geophysical data and other survey techniques, and can be, and are actively avoided during seabed development. Impacts on historical shipwrecks arising from seabed activities are likely to be accidental where they do occur, and once a site has been encountered on the seabed it is likely to be excluded from the area of activities as an operational obstruction or risk. The potential for cumulative impacts on maritime archaeological resources, principally historical shipwrecks, arising out of current and future seabed activities in the area surrounding the Port of East London desalination plant are, therefore, unlikely and thus the cumulative impact significance is assessed to be "Very Low".

10.6.4 SOCIO-ECONOMIC CONDITIONS

Economic benefits relating from the proposed development are expected to largely be indirect (knock-on), stemming from provision of the new water supply to the Port of East London. While direct job creation will be limited—indirect employment opportunities may arise, both within TNPA and more broadly within East London, through improved port performance and increased economic activity. Overall, the development is expected to contribute to port profitability, revenues, and the broader implications on the economies of East London, and BCMM, more broadly.

Consequently, this development is aligned well with other developments, such as the Proposed Replacement of Quay Wall 3 & 4 (located on the north side of the port; Abantu Environmental Consultants 2023)—which should similarly increase port profitability of the port, and have similar indirect economic benefits to those predicated for the desal plant.

Additionally, the pursuit of industrial/infrastructural developments that are "greener" such as the proposed solar development, may also have some positive benefits with respect to the framing of future industrial developments in East London. The successful implementation of renewable infrastructure solutions may encourage future developments of a similar nature in the area, as well as other potential positive impacts.

Furthermore, the negative socio-economic impacts resulting from the intense development/industrialisation of the East London area, such as reduced access to open space, restricted access to the port and adjacent marine/coastal area, water pollution, etc. are all existing issues. Therefore, by pursuing such developments, within an already greatly altered or environmentally degraded area, which is not in close proximity to vulnerable communities or relatively undisturbed areas, minimises the potential socio-economic impacts. Finally, the demonstrated importance of the Trade sector within the Buffalo City Metropolitan Municipality (and East London in particular), indicates the importance that the port of East London (a major trade driver in the region) is already contributing substantially to the economic success in the region. Consequently, any additional measures to strengthen this sector are likely to lead to improved socio-economic conditions within the region.

Consequently, the cumulative socio-economic impact of the proposed Solar Powered Desalination Plant, has been rated to be of “Medium” positive significance.

Table 10.25. Cumulative impacts of the development on Socio-Economic Conditions.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation/ enhancement measures	Regional 2	Medium 2	Long Term 3	High 7	Possible	**MEDIUM**	**+ve**	Low

11 CONCLUSION AND ENVIRONMENTAL IMPACT STATEMENT

11.1 SUMMARY OF THE KEY FINDINGS OF THE ENVIRONMENTAL IMPACT ASSESSMENT

The proposed solar-powered reverse osmosis (RO) desalination plant by TNPA within the Port of East London, Buffalo City Metropolitan Municipality, has been assessed through a Scoping and Environmental Impact Assessment (S&EIA) process. Several specialist studies informed the evaluation of potential impacts and benefits on the environment, surrounding community, port operations, heritage and palaeontological resources, and the broader economic context. Various alternative layouts were considered and assessed during the scoping phase while the final development layout was assessed as part of the Environmental Impact Assessment (EIA) phase. The final development layout, to which the recommended impact management, avoidance, and mitigation measures as identified during the EIA is applicable, is shown in Figure 11.1 below.

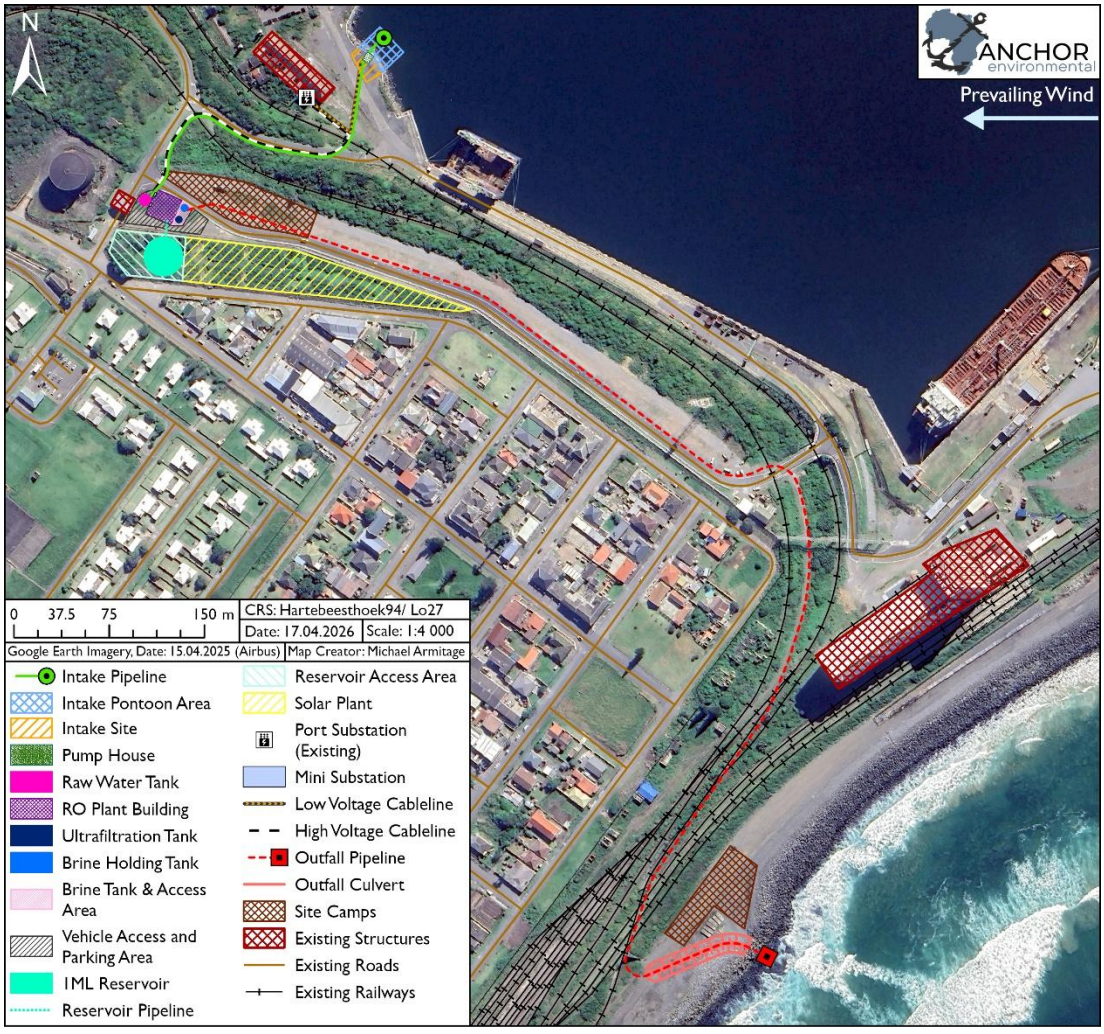

Figure 11.1. Preferred development layout for the Solar & RO Desalination Plant and Intake and Outfall Pipelines and associated Infrastructure/ Structures.

The marine and estuarine environment comprises a mix of natural and heavily modified habitats. While these areas have been altered, they continue to provide important habitat and nursery grounds for certain species. Construction activities may cause temporary, localised disturbance to marine and estuarine habitats through noise, sediment disturbance, or accidental spills, but negative impacts are expected to be small in extent, reversible, and "Medium" to "Very Low" before mitigation, reducing to "Low" to "Insignificant" with mitigation measures such as careful material handling, waste management, spill prevention, and limiting work to already modified areas. During operation, potential impacts relate to seawater intake and brine discharge, which could affect salinity and water quality. However, careful intake design, low intake velocities, strategic brine discharge, and effluent monitoring are expected to keep impacts "Low" to "Very Low" before mitigation and all "Very Low" after mitigation. **Overall, impacts can be kept minimal with proper mitigation measures. Dispersion modelling confirmed that brine will dilute rapidly and meet water quality standards within the recommended mixing zone. During operation, ongoing monitoring must be done to ensure brine discharge complies with the Coastal Waters Discharge Permit (CWDP), meets water quality guidelines, and that any impacts are promptly detected and managed for the life of the plant.**

East London's economy is centred on the port and trade sector, which supports local employment and provides a competitive advantage for the Buffalo City Metro. The proposed desalination plant is expected to provide water security, supporting port operations and indirectly strengthening economic stability.

Construction phase employment opportunities are expected to be limited, as the duration will be relatively short-term (less than two years), the workforce requirements are not substantial, and much of the specialised work will likely be undertaken by existing contractors and personnel, some potentially from outside East London. However, benefits can be enhanced by sourcing construction materials, goods and services from local suppliers, where possible; and by implementing a "local first" employment policy, should new employment opportunities be created. Economic benefits during construction are therefore rated to be of "Very Low" positive significance before recommended enhancement/optimisation measures, improving to "Low" positive with implementation of these measures.

Economic benefits during the operational phase are expected to largely be indirect (knock-on) benefits in terms of revenues and profitability, stemming from the provision of an additional, reliable water supply to the Port of East London. This water supply should improve the port's resilience to disruptions in water and electricity supply, thus supporting more consistent port operations; potentially improving operational efficiency; and potentially increasing overall trade capacity (by improving TNPAs ability to handle greater cargo volumes, a wider range of cargo types, etc.). Local economic benefits relating to direct employment opportunities during operation are expected to be minimal, as specialised operational roles will primarily be filled by personnel based outside East London throughout the plant's operational lifespan. However, some indirect knock-on employment opportunities may be created in other groups or divisions within the port, due to improved port functioning, operational efficiency and capacity, and associated revenue increases enabled by access to the new, reliable water supply. Overall, this positive of enhancement measures, but could potentially be increased to "Medium" positive significance with appropriate recommended enhancement measures, including:

TNPA implementing a “Local-First” employment policy for general port hiring processes, where feasible, and TNPA utilising the new water supply optimally, and strategically, to maximise economic benefits.

Recreational use of the coast and estuary, including fishing and boating, occurs in the wider area but overlaps only minimally with the development site and is not expected to be significantly affected by construction or operational activities. Operational phase brine discharges will dilute rapidly, and are therefore unlikely to negatively impact fisheries. While construction activities may cause short-term visual and noise disturbance, dust, emissions, and health and safety risks—with impact significance ranging from “Medium” to “Very Low” before mitigation—these can be reduced to between “Low” and “Insignificant”, with the implementation of appropriate mitigation measures, such as dust suppression, noise control, and strict health and safety protocols. During operation, noise and visual impacts are expected to remain minimal, as the port is already an industrial setting and the facilities will not generate notable noise. **The negative socio-economic, visual, and noise impacts of the proposed development are expected to be minor with mitigation and are outweighed by the potential benefits. Developing within the already highly disturbed port environment is preferable to less developed or sensitive areas.**

The terrestrial environment within the project area is highly degraded, with more than 80% of the plant cover consisting of alien species and no threatened or protected plant species recorded. Although the site falls within a mapped terrestrial Critical Biodiversity Area (CBA)1, it is historically transformed and lacks the ecological characteristics required to meet CBA criteria, with natural processes and connectivity largely lost. The Site Ecological Importance (SEI) is rated Very Low across most of the area, with only a small Low-rated portion of natural vegetation. Nearby protected areas, including Potters Pass Nature Reserve, will not be impacted. The site supports no amphibian, reptile, or mammal species or Species of Conservation Concern (SCC). While several insect species were observed, the development sites provide no suitable habitat for threatened invertebrate SCC. Several threatened bird species may occur in the wider landscape, but only three waterbirds, the Endangered Cape Cormorant, Vulnerable Caspian Tern, and Near Threatened African Darter, were recorded, all of which are adapted to the disturbed port environment and unlikely to be affected by the development. **Overall, the development will not cause significant terrestrial biodiversity impacts.**

Within the development footprint there is some, but limited, potential for palaeontological material such as fossils, and maritime archaeological sites such as shipwrecks. Terrestrial and submerged prehistoric archaeological sites and materials are not expected. The development could therefore affect palaeontological and maritime heritage resources, although any impacts are likely to be of “Very Low” negative significance, while impacts on terrestrial and submerged prehistoric resources are not anticipated. As heritage resources are non-renewable, avoidance is the preferred form of mitigation. While avoidance is generally feasible for shipwrecks, it may not be possible for palaeontological material, as its presence and extent cannot be predicted. Mitigation measures to reduce possible impacts would include monitoring construction activities for heritage discoveries, immediate reporting to the South African Heritage Resources Agency (SAHRA), and engaging qualified specialists if resources are found. If heritage resources are discovered and properly managed, the outcome would be positive as their preservation and documentation could provide valuable records for research, education,

and heritage conservation. Consequently, should mitigation measures be applied, impacts relating to both palaeontological resources and maritime archaeological resources will improve to "Very Low" positive significance. **Furthermore, in addition to the mitigation measures proposed by the specialist, a number of additional measures were prescribed by Eastern Cape Provincial Heritage Resources Agency (ECPHRA) and SAHRA, respectively, for inclusion in the Environmental Management Programme (EMPr).**

11.2 Summary of the positive and negative impacts and risks of the proposed activity

The impact assessment considered all potential positive and negative impacts and risks associated with the construction and operation of the proposed development on the marine and estuarine environment, terrestrial environment, heritage resources, and socio-economic conditions. It also assessed the consequences of the No-Go alternative (not proceeding with the development) as well as the cumulative impacts on the various receptors. Cumulative impacts arise when individual activities interact over time and space, producing combined effects that may not be evident when assessed separately. These impacts were evaluated for their significance both before and after the implementation of mitigation (for negative impacts) or enhancement measures (for positive impacts). Decommissioning impacts were excluded as they are not anticipated in the foreseeable future. Potential impacts arising from the triggering of Listed Activities have been addressed through the EIA process and the supporting specialist studies.

Section 11.2.1 provides an overview of the key impacts, while Section 11.2.2 to Section 11.2.5 present detailed summary tables for each phase and receptor that was assessed.

11.2.1 Overview

The assessment found that, before mitigation/optimisation, construction of the development could result in 12 negative impacts, and one positive impact—which shifts to 10 negative, 3 positive, with mitigation/optimisation. In addition, during operation, the development could lead to eight potential negative impacts and one positive impact (both pre-and-post mitigation/optimisation). As the development will only have a slight overlap with other disturbances, and will impact already transformed land/habitats, it is therefore not expected to generate significant negative cumulative effects—with the nature and significance of negative cumulative impacts being similar to those identified for individual activities. Furthermore, the spatially appropriate nature of the development, coupled with the existing (and anticipated) economic contributions of surrounding developments, is anticipated to result in positive cumulative socio-economic impacts that greatly outweigh the negatives.

Negative Impacts

Negative impacts relate primarily to disturbance, habitat alteration, the release of pollutants or other substances into the surrounding marine and estuarine environment, changes to water quality, as well as disturbance to people from noise, visual changes, destruction to heritage resources and worker-related risks. No significant terrestrial impacts are anticipated, as the development footprint is located within a highly modified port environment with limited natural habitat. The most significant potential impacts are

the spillage of hazardous substances affecting marine biota as well as health and safety risks to workers. These were both rated as "Medium" before mitigation. With the recommended mitigation measures, these and all other impacts can be reduced to "Low", "Very Low", or "Insignificant" levels. None of the identified impacts are considered a fatal flaw to the development or a constraint to authorisation.

Positive Impacts/Benefits

Water security for TNPA

The desalination plant will provide a reliable source of freshwater for port operations, improving efficiency and capacity. This increased reliability will enhance the resilience of the port and indirectly support economic activity within the Buffalo City Metropolitan Municipality.

Local economic growth and job creation:

While construction phase employment opportunities are expected to be limited—due to much of the specialised work likely being undertaken by existing contractors and personnel (some of whom reside outside of East London)—construction works are expected to stimulate the local economy (particularly if goods, materials, and services are sourced locally). This impact is assessed as "Very Low" positive without recommended enhancement/optimisation measures, and "Low" positive, with employment of these measures.

Economic benefits during the operational phase are expected to largely be indirect (knock-on) in nature—stemming from provision of the new water supply to the Port of East London. While direct job creation relating to the plant during operation will likely to be limited—due to the specialised nature of operational roles—indirect employment opportunities may arise, both within TNPA and more broadly within East London, through improved port performance and increased economic activity. This impact was assessed as "Low" positive without recommended enhancement/optimisation measures, and "Medium" positive, with employment of these measures.

Heritage value if discoveries occur:

If fossils or maritime artefacts are uncovered during construction and properly preserved and documented, they could provide valuable records for research, education, and heritage conservation, turning a potential risk into a positive outcome. Consequently, impacts on both palaeontological and maritime archaeological resources were found to be of "Very Low" positive significance, with the implementation of appropriate mitigation.

11.2.2 Summary of Construction Phase Impacts

Table 11.1. Summary of potential impacts of the proposed development on various receptors/ resources during the construction phase, along with their impact ratings before and after mitigation/recommended optimisation measures have been implemented.

CONSTRUCTION PHASE					
Impact identified	**Consequence**	**Probability**	**Significance**	**Status**	**Confidence**
Potential Impacts on the Marine and Estuarine Environment					
Impact 1: Disturbance of intertidal and subtidal marine habitat					
Without mitigation	Very Low	Probable	**VERY LOW**	-ve	High
With mitigation	Very Low	Possible	**INSIGNIFICANT**	-ve	High
Impact 2: Disturbance of pelagic open water habitat					
Without mitigation	Very Low	Possible	**INSIGNIFICANT**	-ve	High
Impact 3: Disturbance and loss of estuarine habitat					
Without mitigation	Very Low	Probable	**VERY LOW**	-ve	High
With mitigation	Very Low	Possible	**INSIGNIFICANT**	-ve	High
Impact 4: Pollution due to waste generation and incorrect disposal and littering					
Without mitigation	Low	Probable	**LOW**	-ve	High
With mitigation	Low	Possible	**VERY LOW**	-ve	High
Impact 5: The effect of spillage of hazardous substances on marine biota					
Without mitigation	Medium	Probable	**MEDIUM**	-ve	Medium
With mitigation	Medium	Improbable	**LOW**	-ve	Medium
Potential Impacts on Terrestrial Biodiversity, Plants and Animals: (Scoped Out)					
Potential Impacts on Agricultural Resources (Scoped Out)					
Potential Impacts on the Heritage Resources					
Impact 6: Direct impact (disturbance and/ or destruction) of palaeontological resources (fossils)					
Without mitigation	Low	Improbable	**VERY LOW**	-ve	Medium
With mitigation	Low	Improbable	**VERY LOW**	**+ve**	Medium
Disturbance and / or destruction of terrestrial pre-colonial & historical archaeology (Scoped Out)					
Disturbance and / or destruction of submerged prehistory (Scoped Out)					
Impact 7: Disturbance and / or destruction of maritime archaeology					
Without mitigation	Low	Improbable	**VERY LOW**	-ve	Medium
With mitigation	Low	Improbable	**VERY LOW**	**+ve**	Medium
Potential Impacts on Social, Visual, Noise and Economic Receptors/ Resources					
Impact 8: Generation of noise and potential impacts on people					
Without mitigation	Low	Probable	**LOW**	-ve	High
With mitigation	Very Low	Probable	**VERY LOW**	-ve	High
Impact 9: Potential impacts on the visual character of the area					
Without mitigation	Very Low	Probable	**VERY LOW**	-ve	High
Impact 10: Impact of reduced air quality due to release of dust and suspension of dust on people					
Without mitigation	Low	Probable	**LOW**	-ve	High
With mitigation	Very Low	Possible	**INSIGNIFICANT**	-ve	High
Impact 11: Potential health and safety concerns of workers					
Without mitigation	High	Possible	**MEDIUM**	-ve	High
With mitigation	Low	Possible	**VERY LOW**	-ve	High
Impact 12: Potential impacts on fisheries					
Without mitigation	Very Low	Improbable	**INSIGNIFICANT**	-ve	High
Impact 13: Potential economic benefits					
Without optimisation	Very Low	Probable	**VERY LOW**	**+ve**	Medium
With optimisation	Low	Probable	**LOW**	**+ve**	Medium

11.2.3 Summary of Operational Phase impacts

Table 11.2. Summary of potential impacts, of the proposed development on various receptors/ resources during the operational phase, along with their impact ratings before and after mitigation/recommended optimisation measures have been implemented.

OPERATIONAL PHASE					
Impact identified	**Consequence**	**Probability**	**Significance**	**Status**	**Confidence**
Potential Impacts on the Marine and Estuarine Environment					
Impact 1: Disturbance and/or mortality of marine life due to the intake of seawater					
Without mitigation	Low	Probable	**LOW**	-ve	High
With mitigation	Very Low	Probable	**VERY LOW**	-ve	High
Impact 2: Effects of increased salinity on system function and biota					
Without mitigation	Low	Possible	**VERY LOW**	-ve	High
With mitigation	Low	Possible	**VERY LOW**	-ve	High
Impact 3: Reduced physiological functioning of system and biota due to decreased dissolved oxygen					
Without mitigation	Low	Probable	**LOW**	-ve	High
With mitigation	Low	Possible	**VERY LOW**	-ve	High
Impact 4: Reduced physiological functioning of system and biota due changes in water pH					
Without mitigation	Low	Possible	**LOW**	-ve	High
With mitigation	Low	Possible	**VERY LOW**	-ve	High
Impact 5: The effect of discharged co-pollutants on marine biota					
Without mitigation	Medium	Possible	**LOW**	-ve	Medium
With mitigation	Low	Possible	**VERY LOW**	-ve	High
Potential Impacts on Terrestrial Biodiversity, Plants and Animals (Scoped Out)					
Potential Impacts on Agricultural Resources (Scoped Out)					
Potential Impacts on the Heritage Resources (Scoped Out)					
Potential Impacts on Social, Visual, Noise and Economic Receptors/ Resources					
Impact 6: Generation of noise and potential impacts on people					
Without mitigation	Very Low	Improbable	**INSIGNIFICANT**	-ve	High
Impact 7: Potential impacts on the visual character of the area					
Without mitigation	Low	Probable	**LOW**	-ve	High
With mitigation	Low	Possible	**VERY LOW**	-ve	High
Impact 8: Potential impacts on fisheries					
Without mitigation	Very Low	Improbable	**INSIGNIFICANT**	-ve	High
Impact 9: Potential economic benefits due to increased and reliable water supply in port					
Without optimisation	Medium	Possible	**LOW**	+ve	Medium
With optimisation	Medium	Probable	**MEDIUM**	+ve	Medium

11.2.4 Decommissioning Phase Impacts

No decommissioning is expected in the near future. Should it occur, it is expected to mirror construction activities and be confined to already disturbed areas. Impacts are anticipated to be less significant and of low likelihood. Construction-phase mitigation measures should be applied where needed. Given the limited extent and significance, formal assessment of decommissioning impacts has been **scoped out**.

11.2.5 No-go Alternative

The No-Go Alternative would avoid minor negative impacts but would also prevent the creation of jobs, local economic opportunities, and improved port efficiency, resulting in the loss of significant socio-economic benefits and making it the less favourable option.

11.2.6 Summary of Cumulative impacts

Table 11.3. Summary of potential cumulative impacts of the proposed development on various receptors/ resources.

CUMULATIVE IMPACTS					
Impact identified	**Consequence**	**Probability**	**Significance**	**Status**	**Confidence**
Potential Impacts on the Marine and Estuarine Environment					
Without mitigation	Very Low	Probable	**VERY LOW**	-ve	High
Potential Impacts on Terrestrial Biodiversity, Plants and Animals					
Without mitigation	Very Low	Probable	**VERY LOW**	-ve	High
Potential Impacts on Heritage Resources					
Palaeontological resources					
Without mitigation	**LOW NEGATIVE**				
Terrestrial archaeology					
Without mitigation	**LOW NEGATIVE**				
Submerged prehistory					
Without mitigation	**LOW NEGATIVE**				
Maritime Archaeology					
Without mitigation	**VERY LOW NEGATIVE**				
Potential Socio-Economic Benefits					
Without mitigation or enhancement	High	Possible	**MEDIUM**	+ve	Low

11.3 Summary of Mitigation/ Enhancement Measures

Mitigation / impact management measures to reduce negative impacts were classified as either:

- **Essential:** Mandatory measures that must be implemented and are non-negotiable. These measures are assumed to be implemented in the "with mitigation" impact scenario and are therefore incorporated into the post mitigation impact assessment significance rating; or
- **Best Practice / Recommended:** Non-mandatory measures that should be implemented where feasible and appropriate. Alternative measures or approaches may be adopted, provided that the required environmental outcome is still achieved and a clear and defensible motivation is provided for not implementing the recommended measure. These do not affect the overall impact rating if not implemented.

Optimisation measures aimed at enhancing potential benefits are generally considered **Best Practice / Recommended** and are non-mandatory.

Mitigation and optimisation measures prescribed to reduce the negative impacts and enhance positive outcomes of the development, are listed below:

11.3.1 Construction Phase

MARINE AND ESTUARINE ENVIRONMENT

Essential Mitigation Measures:

- Rehabilitate the disturbed area in the intertidal area immediately following construction by removing all artificial materials not related to the permanent fixture of the pipeline
- Construction activities within the coastal zone should be planned and undertaken as efficiently as practicable to avoid unnecessary delays and prolonged disturbance.
- Constrain spatial extent of impacts to the minimum required.
- Rehabilitate the disturbed area in the estuarine area immediately following construction by removing all artificial materials not related to the permanent fixture of the pipeline
- Ensure suitable stormwater management is in place to minimize run-off to the estuarine system.
- Suitable handling and disposal protocols must be clearly explained, and sign boarded.
- A “reduce, reuse, recycle” approach must be followed.
- Provide suitable containers for the disposal of all waste, including recycling.
- Regular litter sweeps should be carried out around the construction site.
- Intentional disposal of any litter into the environment is strictly prohibited, while accidental spillage must be prevented, contained and reported to the responsible Environmental Officer, Environmental Control Officer or other relevant party immediately.
- Inform and train all staff about sensitive estuarine species and the responsible disposal of construction waste. This training must be integrated into toolbox talks or onsite awareness sessions to ensure that waste management practices are understood and followed diligently. Additionally, contractors must prepare a method statement outlining specific waste management procedures, which must be approved by the resident engineer before construction activities commence.
- Waste disposal at licensed landfill sites by qualified contractors is mandatory, with proof of disposal submitted to the appointed Environmental Officer. Waste management certification must be obtained, and detailed records of all stored and disposed waste, including quantity, nature, and fate, must be maintained for auditing purposes.
- Adequate sanitary facilities and ablutions must be provided for all personnel throughout the project area. Enforcement of facility usage and cleanliness is crucial.
- Implementation of a rigorous environmental management and control plan (including procedures for remediation).
- All fuel and oil is to be stored with adequate spill protection.
- No leaking vehicles are permitted on site.
- All hazardous substances must be accompanied by a permit, a hazard report sheet, and may only be handled by suitably trained operators.

- Implement leak detection and maintenance programmes for valves, flanges, fittings, seals, hydraulic systems, hoses, etc. All hydraulic systems should be adequately maintained, and hydraulic hoses should be frequently inspected. All process areas should be bunded to ensure drainage water flows into the closed drainage system. Drip trays should be used to collect run-off from equipment that is not contained within bunded areas and the contents routed to the closed drainage system.
- Low-toxicity biodegradable detergents should be used in the cleaning of all spillages.
- Intentional disposal of any substance into the environment is strictly prohibited, while accidental spillage must be prevented, contained and reported to the responsible Environmental Officer, Environmental Control Officer or other relevant party immediately.

TERRESTRIAL BIODIVERSITY, PLANTS AND ANIMALS

Essential Mitigation Measures:

- Conduct a search and rescue prior to clearing to ensure that nests, small reptiles and mammals are moved out of the area.
- Rehabilitate/revegetate construction areas with indigenous plant species.
- During construction and for 6 months post-construction, monitor and eradicate AIPs from the construction site.

HERITAGE, ARCHAEOLOGICAL, AND PALAEONTOLOGICAL RESOURCES

Palaeontological Resources

Essential Mitigation Measures:

- Monitoring of earthworks by the Environmental Compliance Officer (ECO), Environmental Officer (EO) or another designated responsible person.
- Implementation of a Palaeontological Fossil Chance Find Protocol by the ECO/ EO to ensure the identification, recovery, curation and reporting to SAHRA/ECPHRA of any fossil finds. If fossils are found by the EO/ ECO, or other responsible person once excavations for foundations have commenced, these should be rescued and SAHRA and ECPHRA notified to determine whether a palaeontologist should be called to assess and collect a representative sample. Any recovered fossils or artefacts are the property of the State will need to be deposited in a suitable curatorial institution. Information on the sources or contexts of the collected items must accompany them, as far as can be determined.

Maritime Archaeological Resources

Essential Mitigation Measures:

- Shipwrecks/ shipwreck remains are generally large and visible on the seabed and therefore measures can be taken in advance of installation activities to avoid the site or material
- Any wreck or related artefacts identified during any pre-construction ground-truthing of the marine outfall site must be flagged and the information shared with a suitably qualified maritime archaeologist and SAHRA.

- A suitably defined construction exclusion zone may be required around any such site or material to ensure that it is not impacted by the installation of the marine outfall. The project maritime archaeologist's advice must be sought on the appropriate size and extent of any such exclusion zone. Any such exclusion zones must be marked on all project mapping as No-Go areas for construction contractors.
- If seabed debris or a previously unknown wreck are encountered during the installation of the marine outfall, the project maritime archaeologist and SAHRA must be notified immediately and work must cease in the immediate vicinity until the maritime archaeologist and SAHRA have assessed the significance of the site and a decision has been taken as to how to deal with it.

Terrestrial Pre-Colonial & Historical Archaeological Resources

Essential Mitigation Measures:

- Should pre-colonial or historical archaeological material, or human remains be encountered during the construction of project, work must immediately cease in that area. The area must be cordoned off and the material made safe but left in situ. A suitably qualified archaeologist must be called to site to assess the significance of the find and SAHRA and the ECPHRA must be notified of the find.

Additional Essential Measures Prescribed by ECPHRA (Essential Mitigation)

Pre-Construction

- The project proponent/representative must notify ECPHRA of the date of commencement of the project or share the project schedule and (EA).
- The project proponent/representative must submit a detailed heritage chance finds procedure for ECPHRA to approve before development starts.
- Heritage induction and training for ground crew (including the ECO) must be conducted, in identifying heritage resources.
- SAHRA and ECPHRA must be notified of any shipwreck finds.
- A palaeontologist must be on site, to monitor, during excavations
- Heritage monitoring and reports to be shared with ECPHRA.

Post-Construction

- Upon completion of the project, a final heritage compliance report must be submitted to ECPHRA.

Additional Measures Prescribed by SAHRA (Essential Mitigation)

- If any shipwrecks and/or artefacts related to shipwrecks in the region are uncovered, the findings must be reported to a maritime archaeologist appointed to inspect potential finds. A report on this inspection must be submitted to SAHRA for further recommendations.
- The Fossil Chance Finds Procedure must be included in the EMPr;
- 38(4)c(i) – If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA DAU (Nokukhanya Khumalo/Natasha Higgitt 021 202 8660) must be alerted as per

section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offence in terms of section 51(1)e of the NHRA and item 5 of the Schedule;

- 38(4)c(ii) – If unmarked human burials are uncovered, the SAHRA DAU (Nokukhanya Khumalo/Natasha Higgitt 021 202 8660), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offence in terms of section 51(1)e of the NHRA and item 5 of the Schedule;
- 38(4)d – See section 51(1) of the NHRA;
- 38(4)e – The following conditions apply with regards to the appointment of specialists:
- If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA;
- The Final BAR and EMPr must be submitted to SAHRA for record purposes;
- The decision regarding the EA Application must be communicated to SAHRA and uploaded to the SAHRIS Case application".
- In addition to any other identified Interested and Affected Parties (I&APs), , this final HIA must be submitted to SAHRA, the ECPHRA and the Buffalo City Metropolitan Municipality for comment as part of this public participation process for the Final BAR.

SOCIO-ECONOMIC

Essential Mitigation Measures

- Efforts must be made to limit noise during the construction phase (including all unnecessary noise production).
- Construction phase noise must comply with any relevant noise legislation, including the Buffalo City Metropolitan Municipality (BCMM) Noise By-Law and Draft BCMM Noise By-Law.
- Implement dust suppression techniques such as covering stockpiles with shade netting/ geotextile, should they be left exposed for prolonged periods of time.
- Where possible, construction using large volumes of sand should occur during clear weather, and loose sand should be cleared or covered during breaks in construction.
- If dispersal of dust/ soil during vehicle transit is unavoidable, then water spraying trucks must be deployed in tandem, in order to keep this dust out of the atmosphere.
- Erosion control measures, such as silt fences, should be employed in areas at risk of erosion/runoff.
- Monitor air quality and implementing measures to minimize soil disturbance.
- Workers must be provided with all appropriate Personal Protective Equipment (PPE), such as correctly rated masks, when working in/ around areas where dust pollution/ emissions are unavoidable
- Implementation of a rigorous environmental management and control plan (including procedures for remediation).
- Only vehicles and equipment that are suitably maintained and compliant with emission regulations may be allowed on site.

- Vehicles must be subject to a daily Environmental Health and Safety (EHS) checklist.
- An Environmental Control Officer must monitor the site for vehicle fumes and dust suspension. Additionally, the ECO must monitor all vehicles and equipment transiting the site, in order to identify obviously non-compliant vehicles.
- Monitor construction areas post rainfall events and repair any erosion damage that may have occurred.
- Construction activities must be conducted in accordance with the Occupational Health and Safety Act (OHSA), and Transnet National Port Authority's (TNPAs) own health and safety protocols.

Recommended/Best Practice Optimisation Measures

- While the construction phase is not expected to result in many new job opportunities (as workforce requirements are small, and much of the specialised work will be undertaken by existing contractors and personnel—some potentially from outside East London), should new job opportunities arise, then a local labour procurement policy should be employed (where feasible). This can be demonstrated through employment, payroll, procurement, and supplier records.
- Source construction materials, goods and services from local suppliers wherever practical, as demonstrated through procurement documentation and supplier databases. Engage with local authorities and business associations to source construction materials, goods, and services from local suppliers wherever practical.

11.3.2 Operational Phase

MARINE AND ESTUARINE ENVIRONMENT

Essential Mitigation Measures:

- Intake velocities should be kept below 0.15 m/s to ensure that fish and other mobile organisms can escape the intake current.
- Intake structures should ensure the horizontal intake of water. This can be achieved through use of footer valves.
- Intake structures should be positioned away from sensitive environments or areas with high species diversity or abundance, like rocky reefs, and should not draw in water from the upper meter of the water column.
- Effluent discharged must meet modelled end of pipe concentrations.
- Monitoring of end of pipe concentrations must be conducted and dosing levels should be adjusted should adverse effects be detected by the monitoring program.
- Aeration of the effluent prior to discharge must be undertaken if oxygen scavengers (such as sodium metabisulphite) are utilised.
- Neutralization of extremely alkaline or acidic solutions and treatment of additional cleaning agents is required prior to discharge.
- Corrosion resistant materials should be used.
- Strong acidic and alkaline solutions must be neutralised prior to discharge.
- There must be continual release of small volumes of chemicals used during the Clean-in-Place (CIP) process with the brine discharge to allow for maximum dilution before release into the environment.

TERRESTRIAL BIODIVERSITY, PLANTS AND ANIMALS

- During construction and for 6 months post-construction, monitor and eradicate AIPs from the construction site.

SOCIO-ECONOMIC

Essential Mitigation Measures:

- Non-reflecting (matt)/ scattering solar panels must be used, in order to reduce the potential harm or disturbance associated with sunlight reflecting off the panels.
- Buildings must be painted a neutral colour (dark green/ grey), so as not to overly reflect sunlight and cause disturbance/ harm to observers. This will also help to preserve the overall character and sense of place of the area.

Recommended/best practice optimisation measures

- While plant operation will not result in the direct creation of any new job opportunities (all plant operations will be conducted by the existing appointed specialists), it is possible that indirect employment opportunities may be created within the port, due to improved port functioning/capacity. Should TNPA utilise a "Local-First" employment policy (if and where possible) for general port hiring processes, then the potential local socio-economic benefits realised through the creation of these indirect employment opportunities would increase.
- Water Resource Management: TNPA to utilise the new water supply provided by the desalination plant strategically, to strengthen the port's resilience against fluctuations or interruptions in municipal water and electricity services. This includes optimising storage, scheduling use during peak demand or supply constraints, and ensuring efficient distribution to reduce reliance on external utilities.

11.4 Impact Management Outcomes for Inclusion in the Environmental Management Programme (EMPr)

The mitigation and optimisation measures described above were developed to achieve specific impact management outcomes, which are incorporated into the EMPr. Although the specialist studies assessed impacts primarily during the construction and operational phases, the EMPr distinguishes between Planning and Design/Pre-construction, Construction, and Operational phases. This approach ensures that measures requiring implementation before construction commences are clearly identified and implemented at the appropriate stage. The impact management outcomes applicable to each project phase are provided below.

11.4.1 Planning and Design/Pre-construction phase:

- Maintain a clear record of the site's pre-construction condition and any environmental changes or incidents using photographic record.
- Notify all registered and relevant I&APs of the commencement of the project and construction activities to allow increased stakeholder awareness and transparency, allowing affected parties to anticipate and respond to construction activities.

- Reduce environmental impacts on surrounding habitats and species due to disturbances, increased turbidity and sedimentation, increase salinity, and potential injury of displacement, through appropriate intake and outfall design and placement.
- Minimise visual impacts emanating from light reflections off solar panels/ buildings and disruption to the general visual landscape, through appropriate design controls and solar panel material selection.
- Minimise unnecessary disturbance or destruction of vegetation and disruption of the visual landscape, due to the establishment of site camps and laydown areas.
- Minimise impacts associated with damage to/loss of/destruction of heritage resources, and enhance the preservation of heritage resources.

11.4.2 Construction phase:

- Provide environmental awareness training to ensure all onsite staff are aware and understands the individual responsibilities in terms of this EMPr to ensure effective implementation and compliance.
- Ensure overall Environmental Management to ensure compliance with the EMPr, EA and legislation and enable effective monitoring of compliance.
- Maintain earthworks and dust management practices in a manner that ensures that public health and safety are assured and environmental, air and water quality degradation are minimised.
- Minimise erosion, sedimentation, dust emission and degradation of water quality by implementing good soil, earthwork, erosion and stockpile management.
- Undertake responsible water usage to reduce pressure on local water supply resources and support sustainable water use.
- Minimise water, stormwater and silt/ soil run-off into estuarine and any other freshwater systems to preserve water quality within affected resources such that their integrity is assured.
- Implement waste hierarchy principles to ensure waste generation is reduced; reuse and recycling is promoted; all waste streams receive responsible treatment; safe disposal is assured; and pollution is prevented.
- Preserve the receiving environment, well-being of staff and local communities through appropriate hazardous substance storage, handling, disposal and pollution prevention.
- Prevent and control fires to the extent that public health; safety; property and environmental protection are assured.
- Prevention of pollution of soil, surface water, marine and estuarine environment, and groundwater, through properly managed batching plant operations.
- Minimise disturbance, degradation, and pollution of the terrestrial environment which could lead to reduced ecological functioning, species mortality, and loss of habitat/biodiversity.
- Minimise impacts on surrounding habitats and species due to the spread of alien invasive plant species, habitat disturbance and destruction, and contamination due to pesticides.
- Minimise destruction and contamination of marine and estuarine environment and disturbance and mortality of species.
- Ensure the Health and Safety of Staff by complying with the Occupational Health and Safety Act (OHSA) and through proper awareness, training and materials and equipment skills.

- Ensure clean and well-maintained toilet/ sanitation facilities are available to all staff in an effort to minimise the risk of disease and impact on the environment.
- Prevention of environmental risks through proper workshop, equipment maintenance, and storage practices.
- Minimise excessive/ additional road traffic to ensure public health and safety.
- Minimise impacts associated with damage to/loss of/destruction of heritage resources, and enhance the preservation of heritage resources.
- Preserve good relations with neighbouring communities to ensure maximum social benefits, and minimum negative impacts.
- Maximise the economic benefits and minimise economic impacts associated with the construction of the plant.
- Ensure that general site cleanliness and order are maintained throughout the construction phase, and that “Good Housekeeping" practices are implemented to minimise undue visual impacts and disturbance.
- Minimise noise and associated disturbance and nuisance to surrounding communities, workers, and wildlife.
- Reinstate impacted areas to an extent that commercial, recreational and environmental protection are assured and no environmental degradation occurs as a result of development.

11.4.3 Operational phase

- Provide environmental awareness training to ensure all onsite staff are aware and understands the individual responsibilities in terms of this EMPr to ensure effective implementation and compliance.
- Ensure overall Environmental Management to ensure compliance with the EMPr, EA and legislation and enable effective monitoring of compliance.
- Prevent erosion and water and silt/ soil run-off into estuarine environment by controlling soil loss and habitat degradation with the implementation of proper management actions, with the aim of protecting water quality, maintaining soil stability and productivity, minimising disturbance to adjacent terrestrial, estuarine, and marine environments and minimising safety risks.
- Implement waste hierarchy principles to ensure waste generation is reduced; reuse and recycling is promoted; all waste streams receive responsible treatment; safe disposal is assured; and pollution is prevented.
- Prevent spillages and pollution of hazardous substances to preserve the receiving environment, well-being of staff and local communities through implementing appropriate mitigation measures.
- Prevent and control fires to the extent that public health; safety; property and environmental protection are assured.
- Reduce environmental degradation, protect water quality, and minimise impacts on surrounding habitats and species.
- Prevent environmental contamination, reduce harm to marine life, and ensure continuous and safe system functioning, through inspections, maintenance, and cleaning, of intake and outfall pipelines, intake strainer, and any other equipment.
- Prevent environmental contamination, reduce harm to marine life, and ensure continuous and safe system functioning, through inspections, maintenance, and cleaning, of intake and outfall pipelines, intake strainer, and any other equipment.

- Ensure that effluent/ brine discharges comply with the CWDP to minimise degradation, disturbance, and impacts on marine habitats and species, thereby protecting the marine environment.
- Control the spread of alien and invasive plant species.
- Ensure the Health and Safety of Staff by complying with the Occupational Health and Safety Act (OHSA) and through proper awareness, training and materials and equipment skills.
- Ensure that potable water meets SANS 241 standards and is managed to protect human health and prevent environmental harm.
- Preserve good relations with neighbouring communities to ensure maximum social benefits, and minimum negative impacts.
- Strengthen port operations and functioning as well as local economic benefits through optimal use of new water supply and prioritization of local employment.
- Minimise visual impacts emanating from light reflections off solar panels/ buildings and disruption to the general visual landscape, through appropriate design controls and solar panel material selection.

11.5 REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD BE AUTHORISED AND CONDITIONS OF APPROVAL

TNPA is applying for Environmental Authorisation (EA) for the construction and operation of a reverse osmosis (RO) desalination plant within the Port of East London, Eastern Cape Province, for the production of potable water. The proposed development was assessed through a S&EIA process. Several specialist studies informed the evaluation of potential impacts and benefits on the environment, surrounding community, port operations, heritage and palaeontological resources, and the broader economic context.

The proposed solar-powered desalination plant is needed to address increasing water security risks in East London, where municipal supply is constrained by overexploited catchments, drought conditions, and climate variability. By providing a reliable, on-site source of freshwater, the project will enhance the operational resilience of the Port of East London and reduce dependence on already stressed municipal systems. The use of solar energy further improves desirability by reducing exposure to load shedding and lowering greenhouse gas emissions associated with fossil-fuel-based electricity. The project supports national priorities for sustainable infrastructure, economic resilience, and climate change adaptation. Overall, the development is considered both necessary and appropriate within the context of securing critical port operations and supporting regional economic stability.

From an ecological perspective, no significant terrestrial biodiversity impacts are anticipated. The broader terrestrial environment is of “Very Low” ecological sensitivity, as the site is located within a highly transformed, built-up port environment, dominated by alien vegetation, with no confirmed presence of threatened flora or fauna and lacking natural ecological and habitat functioning.

From a marine and estuarine perspective, the site is located within a heavily modified port environment with limited ecological connectivity to surrounding marine systems. Potential construction impacts, such as localised sediment disturbance, noise, and accidental spills, are expected to be small, temporary, and reversible. Operational impacts associated with seawater intake and brine discharge are expected to be low,

with dispersion modelling confirming rapid dilution and compliance with relevant water quality guidelines within the mixing zone. With appropriate mitigation and monitoring, no significant marine or estuarine impacts are anticipated.

From a socio-economic perspective, the proposed development is expected to generate positive benefits through improved water security for port operations, supporting economic stability within the Buffalo City Metro. Local procurement may arise during construction, while operational benefits include sustained support for port efficiency and resilience, which should lead to improvements to profitability and improve the port's economic contribution in East London. Potential negative impacts, including short-term noise, dust, traffic, and visual disturbance, are localised and of low significance, and can be effectively managed through standard mitigation measures.

In terms of heritage resources, the potential for impacts on palaeontological and maritime archaeological resources exists within the broader study area. However, these impacts are expected to be "Very Low" and can be effectively managed through chance-find procedures, monitoring during construction, and implementation of prescribed mitigation measures. No significant impacts on terrestrial or submerged prehistoric archaeological resources are anticipated.

Although the development may have potential impacts on palaeontological and maritime archaeological resources, these impacts are expected to be "Very Low" negative and can be effectively managed through chance-find procedures, construction monitoring, and prescribed mitigation measures—resulting in a "Very Low" positive rating. No significant impacts on terrestrial or submerged prehistoric archaeological resources are anticipated.

Overall, the specialist studies confirm that all potential negative impacts associated with the construction and operation of the development can be effectively avoided, managed, or mitigated and that residual impacts could be reduced to "Low", "Very Low", and "Insignificant" levels. The specialists therefore conclude that these negative impacts do not present a barrier to authorisation.

More importantly, the potential benefits of the development are expected to outweigh the negative impacts. The desalination plant will provide a reliable source of freshwater for port operations, improving efficiency and capacity, and enhancing the resilience of the port while indirectly supporting economic activity within the Buffalo City Metropolitan Municipality. This water security benefit was assessed as "Medium" positive significance with optimisation measures. Construction of the plant and its supporting infrastructure will stimulate the local economy in East London, and was assessed as having "Low" positive significance with the implementation of recommended optimisation measures. During operation, fewer jobs will be created, but the project will continue to support long-term economic stability by securing water supply for port activities.

Should the development not proceed (No-Go option), the port would remain exposed to ongoing water supply constraints, increasing the risk of operational disruptions, reduced efficiency, and potential economic losses. These findings further support the desirability of proceeding with the development.

In summary, the proposed development is expected to provide significant water security and operational resilience (and thus economic) benefits for the Port of East

London, which outweigh the potential negative impacts, all of which can be effectively managed through appropriate mitigation.

Based on the findings of the specialist studies and the EIA process, it is the EAP's reasoned opinion that the proposed development is acceptable from an environmental, social, economic, and heritage perspective. No significant adverse impacts are anticipated, while meaningful positive benefits are expected to be realised. It is therefore recommended that Environmental Authorisation and the CWDP be granted. This recommendation is subject to the condition that all mitigation, monitoring, and management measures outlined in the EMPr, as well as any additional conditions imposed by the competent authority, are fully implemented to ensure that potential impacts are avoided, minimised, or managed to acceptable levels. Furthermore, the plant may not operate without a valid CWDP, and all conditions of the CWDP must be adhered to.

11.6 Cumulative impact environmental statement:

Based on the assessment, negative cumulative impacts are expected to be minimal and should not prevent the project from proceeding. Positive cumulative socio-economic impacts further greatly outweigh any adverse impacts. Consequently, provided all essential mitigation and management measures are implemented in accordance with the EMPr, it is the EAP's reasoned opinion that the proposed development is environmentally acceptable, and in some ways desirable, from a cumulative impact perspective and is not expected to result in significant negative impacts. The development can therefore be authorised and a CWDP granted.

11.7 Map of Proposed Development Superimposed on Environmental Sensitivities

The maps below show the proposed development footprint and associated infrastructure superimposed on the identified environmental sensitivities within the immediate environment. The key sensitivities include Critical Biodiversity Areas (CBAs) and ecosystems classified as Critically Endangered and Vulnerable. Although these sensitivity designations have been identified, they do not accurately reflect the current on-site conditions. As detailed in the EIA, the site is highly modified and largely artificial, and the remaining natural areas are already degraded. As such, the development is not expected to cause new or significant impacts or to compromise the management requirements associated with these designations, provided the project remains within the approved footprint and the recommended mitigation measures are fully implemented. Furthermore, the proposed development footprint does not overlap with any areas that require avoidance, and no formal No-Go zones or ecological buffers have been delineated. Even in areas immediately adjacent to the footprint, no additional No-Go constraints have been identified. Refer to Appendix 15 for all the site sensitivity maps.

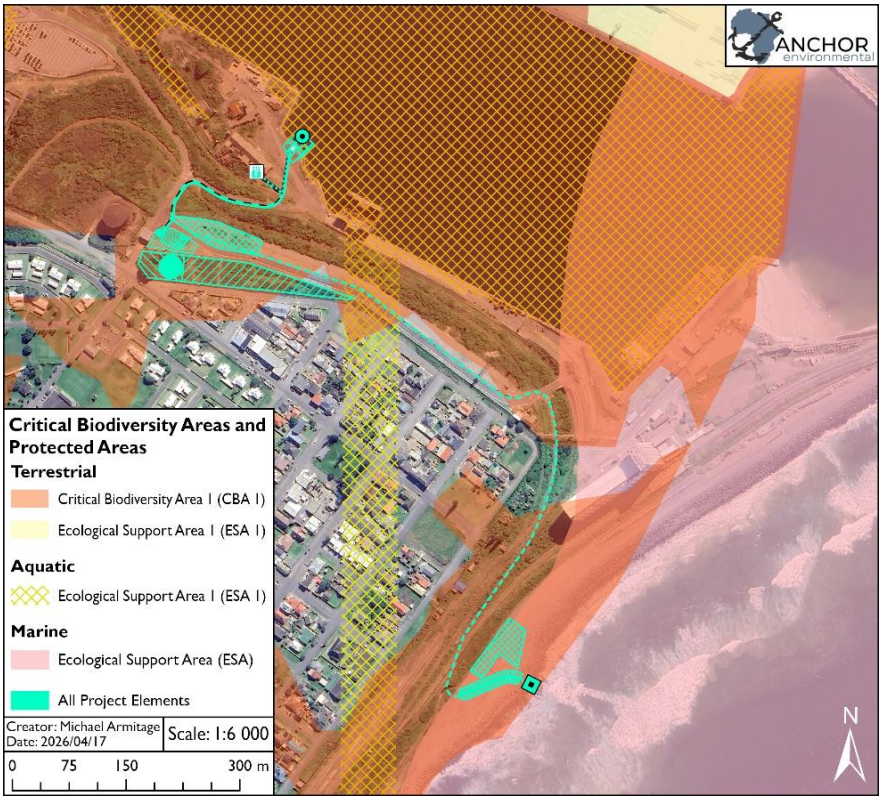

Figure 11.2. Terrestrial, aquatic and marine Critical Biodiversity Areas and Ecological Support Areas in the vicinity of the proposed development (ECBCP 2019, Harris et al. 2022(b)).

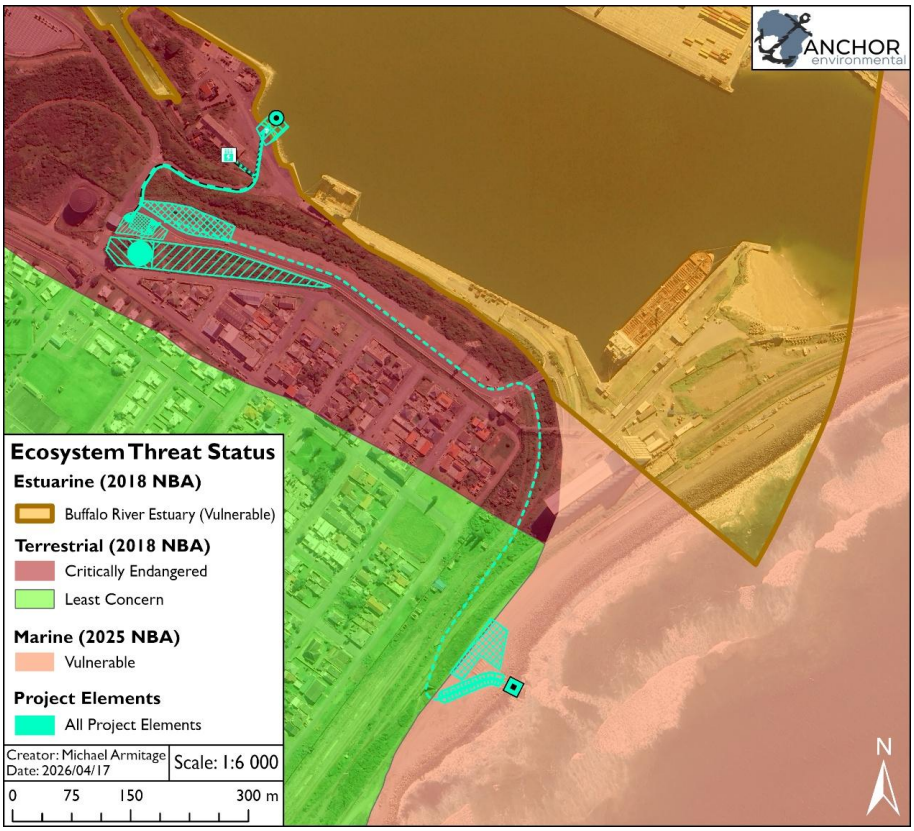

Figure 11.3. Ecosystem Threat Status of estuarine, terrestrial and marine habitats in the vicinity of the proposed development (Sink et al. 2019b, Sink et al. 2025, Van Niekerk et al. 2019c,Van Niekerk et al. 2025).

12 ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

12.1 General Assumptions, Uncertainties and Gaps in Knowledge

The Environmental Impact Assessment (EIA) is based on the best available data, specialist studies, and stakeholder engagement. However, as with all environmental assessments, certain assumptions, uncertainties, and gaps in knowledge exist. This should not influence the impact assessment process and final decision-making.

Project layout and Description - The study is based on details provided by the client as they pertain to planned infrastructures design, proposed activities and sites etc.

Baseline Data Accuracy – Existing environmental data, specialist reports, and stakeholder inputs provide an accurate representation of the receiving environment and its sensitivities. The accuracy and confidence of this study is dependent on the data available for the environment.

Engineering and Design – The desalination plant and solar facility will be constructed and operated according to the design specifications provided in the feasibility and engineering studies. Any significant design changes may require additional assessment.

Renewable Energy Efficiency – The solar plant's generation capacity and efficiency have been estimated based on average solar radiation data for the site, assuming minimal shading and optimal placement of Photovoltaic (PV) panels.

Regulatory Compliance – The project will adhere to all regulations and ensure that mitigation measures are effectively implemented.

Stakeholder Engagement – The concerns raised during public participation will accurately reflect the views of Interested and Affected Parties (I&Aps), and no major unforeseen objections will arise later in the process.

Climate and Hydrological Conditions – The predicted climatic conditions, including sea level rise and extreme weather events, will remain within the anticipated range, and no unforeseen climatic anomalies will significantly alter the project's feasibility or impact.

Project Activities - The assessment of the significance of impacts of the Project on the affected environment is based on the assumption that the activities are limited to those described in this report. If any substantial changes are made to the project description, impacts may need to be reassessed.

Palaeontological assessment - Existing geological maps and datasets used to assess site sensitivity are correct and reliable. However, the geological maps were not intended for fine scale planning work and are largely based on aerial photographs alone, without ground-truthing. There is also an inadequate database of fossil heritage for much of South Africa, and most development study areas have never been surveyed by a palaeontologist. These factors may give rise to either an underestimation or overestimation of the palaeontological significance of a given study area.

Terrestrial Archaeology - The archaeological site visit and walkover survey was carried out at the surface only and any completely buried archaeological sites or material will not have been recorded. The updated 2026 outfall pipeline alignment, from the crossing of the railway line to its terminus on the beach, is outside the area covered by the archaeological survey. This area is, however, either made ground, in the case of the beach, or heavily altered by the construction of the railway lines. The potential for the survival of archaeological material in both of these contexts is considered unlikely, and the lack of coverage in the survey is not considered a material issue. With respect to previous archaeological assessments in the vicinity, although we believe that most of the relevant reports have been located and reviewed, it is acknowledged that some may not have been identified for review.

Seabed Prehistory - Direct evidence for submerged pre-colonial archaeological sites and materials on the South African continental shelf is extremely limited. However, submerged archaeological sites and materials found in offshore contexts elsewhere in the world and the known terrestrial archaeology of the South African coastal strip, indicate that there is potential for such submerged sites and materials around our coast.

Maritime Archaeology - South Africa's record of maritime and underwater cultural heritage resources is based on a mix of information derived in the main from historical documents and secondary sources and from very limited primary sources such as geophysical data and other field-based observations and site recordings. While every effort has been made to ensure the accuracy of the information presented below, the reliance on secondary data sources means that there are considerable gaps and inaccuracies in this record and the locations of any wrecks referred to in the following sections and are, for the most part, approximate. The potential also exists for currently unknown and/or unrecorded maritime heritage sites to be encountered within the marine footprint of the Port of East London desalination plant project although this is considered unlikely.

Long-Term Environmental Impacts – The full extent of cumulative and long-term environmental impacts, particularly on marine ecosystems due to brine discharge, remains uncertain. While dispersion modelling provides an estimate, real-world conditions may differ.

Marine Ecosystem Response – The potential response of marine organisms and ecosystems to increased salinity, temperature changes, and chemical constituents from the desalination process is not fully predictable.

Water Quality Variability – Natural fluctuations in seawater quality, including temperature, turbidity, and biological load, could impact desalination efficiency and variability in terms of brine composition.

Energy Yield Variability – The actual power output of the solar plant may be influenced by factors such as cloud cover, dust accumulation, and panel degradation over time.

Climate Change Effects – The rate and extent of sea-level rise, changes in precipitation patterns, and increased frequency of extreme weather events may alter project feasibility and operational resilience.

Long-Term Monitoring Data – Limited long-term data on the cumulative impact of desalination brine discharge in South African coastal waters, particularly in the Port of East London area.

Potential Socio-Economic Impacts – While economic benefits have been identified, further engagement with local stakeholders may be necessary to better understand indirect socio-economic effects, including job creation and community access to water.

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14 ANNEXURES AND APPENDICES

14.1 List of Annexures Accompanying the EIAr

1) **ANNEXURE 1**: Environmental Management Programme

14.1 List of Appendices Accompanying the EIAr

2) **APPENDIX 1**: CVs of EAP and Key Team Members

3) **APPENDIX 2**: Declarations, Undertaking of Oaths and Affirmations

4) **APPENDIX 3**: Coordinates for the Development and All Associated Components

5) **APPENDIX 4**: Comments and Responses Report

6) **APPENDIX 5:** Public Participation Process

   - **Appendix 5A:** Notification email to I&APs: Resubmission of Application (April 2026)
   - **Appendix 5B:** Proof of Public Participation: Scoping Phase and First Submission Draft EIA (emails sent, notices displayed, public meeting, availability of documents— 2025)
   - **Appendix 5C:** Emails Received: Scoping Phase and First submission Draft EIA Comments (2025)

7) **APPENDIX 6**: Updated Site Sensitivity Verification Report

8) **APPENDIX 7**: Marine and Estuarine (Aquatic) Biodiversity Specialist Assessment

9) **APPENDIX 8**: Botanical, Faunal (terrestrial) and Terrestrial Biodiversity Compliance Statement

10) **APPENDIX 9**: Agriculture Compliance Statement

11) **APPENDIX 10**: Socio-Economic, Visual and Noise Assessment

12) **APPENDIX 11**: Heritage Impact Assessment (Maritime, Archaeology, Cultural Heritage and Palaeontology)

13) **APPENDIX 12**: Palaeontology Impact Assessment

14) **APPENDIX 13**: Geotechnical Assessment

15) **APPENDIX 14**: Impact Assessment Methodology

16) **APPENDIX 15**: Site Maps

17) **APPENDIX 16:** Interested and Affected Party (I&AP) Database

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