NAMIBIA WATER CORPORATION LIMITED
BACKGROUND INFORMATION DOCUMENT

ESIA AND ESMP FOR SUPPLY SCENARIO 1 OF THE DESALINATION PLANT AND WATER CARRIAGE SYSTEM TO SECURE WATER SUPPLY TO THE CENTRAL COAST, NAMIBIA
JULY 2023

1. INTRODUCTION

The Namibia Water Corporation Limited (NamWater) is the national water utility of Namibia. NamWater has undertaken a Feasibility Study for the development of a desalination plant and a water carriage system to supply water to the Central Coast, Windhoek and en-route users (Arandis, Usakos, Karibib and Okahandja). The primary objective of the Feasibility Study was to investigate feasible and affordable water supply options and concepts that would diversify and secure supply alternatives to the target areas. One of the options considered was a climate-independent supply of water via the process of desalination.

The objective of the proposed Desalination Plant and Water Carriage System is to supply potable water, derived from seawater desalinated at the coast, through a pipeline system to various supply areas as indicated below:

- **Supply Scenario SS1**: Supply additional potable water for the Central Coastal Area only (CCA);
- **Supply Scenario SS2**: Supply additional potable water for the CCA, the area around Windhoek (CAN) and for en-route Users along the transmission pipeline;
- **Supply Scenario SS3**: Supply additional potable water for the CCA, the area around Windhoek (CAN) and for users along the supply pipeline as well as an additional 20 Mm^3/a to Gaborone from 2029. This scenario was not considered during the execution of the Environmental Scoping Study.

Following the feasibility study NamWater has decided to proceed with the preferred water supply scenario referred to as Supply Scenario 1 (SS1), comprised of the proposed Desalination Plant and Water Carriage System to supply water to the CCA of Namibia only.

NamWater has appointed SLR Environmental Consulting (Namibia) Pty (Ltd) (SLR) to undertake the Environmental and Social Impact Assessment (ESIA) for SS1 of the Desalination Plant and Water Carriage System.

2. AUTHORISATION REQUIREMENTS

The Environmental Management Act, 2007 (Act No. 7 of 2007) ("EMA") and associated EIA Regulations sets out that, activities listed in terms of the Act that may not be undertaken without undertaking an EIA and obtaining an Environmental Clearance Certificate (ECC) from the Ministry of Environment, Forestry and Tourism (MEFT). Several of these activities would be triggered by the Project and as a result, NamWater has made an application to the Ministry of Agriculture Water and Land Reform (MAWLR), as the Competent Authority, for listed activities relating to the proposed Project. The application was made to MAWLR for the Scoping Phase (APP- 00687).

The Scoping Phase of this project has been completed and the Scoping Report has been accepted by the Competent Authority and Directorate of Environmental Affairs at the MEFT. The ESIA will be carried out in terms of the Environmental Management Act, 2007 EMA (Act No. 7 of 2007) and associated EIA Regulations.

PURPOSE OF THIS DOCUMENT

This document has been prepared to inform you about:

- The proposed project and associated activities;
- The baseline environment of the project area;
- The ESIA process being followed for this project;
- Potential impacts and related specialist input; and
- How you can have input into the ESIA process.

WHO ARE THE ENVIRONMENTAL CONSULTANTS?

SLR Environmental Consulting (Namibia) (Pty) Ltd (SLR), an independent firm of environmental consultants, has been appointed by NamWater to manage the ECC Application and undertake an ESIA for the proposed project.

YOUR ROLE AND HOW CAN YOU BE INVOLVED?

You can be involved by:

- Registering as an interested and/or affected party (I&AP) on the stakeholder database.
- Reviewing this document and providing your initial comments to SLR to ensure all potential environmental and social impacts that need to be addressed during the ESIA process are identified. Initial comments should reach SLR by **11 August 2023.**

Registered I&APs will also be given the opportunity to review and comment on the Draft Environmental and Social Impact Assessment Report (ESIAR) and Environmental and Social Management Plan (ESMP).

HOW TO REGISTER AND COMMENT

Responses to this document can be submitted by means of the attached comments sheet and/or through communication with the SLR contact person listed below. All comments received will be recorded and responded to in the Draft ESIA Report.

WHO TO CONTACT?

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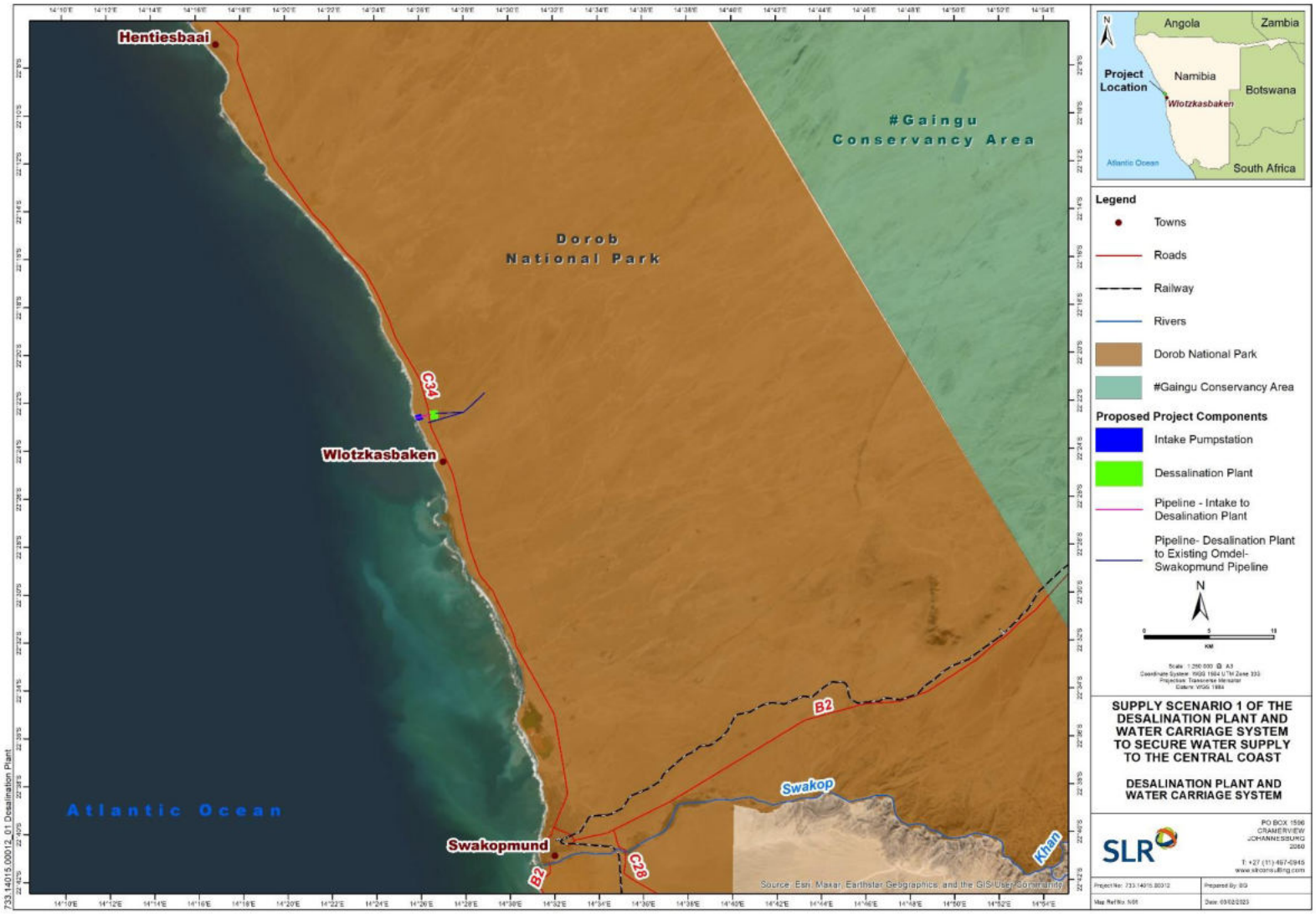

Figure 1: Proposed Desalination Plant

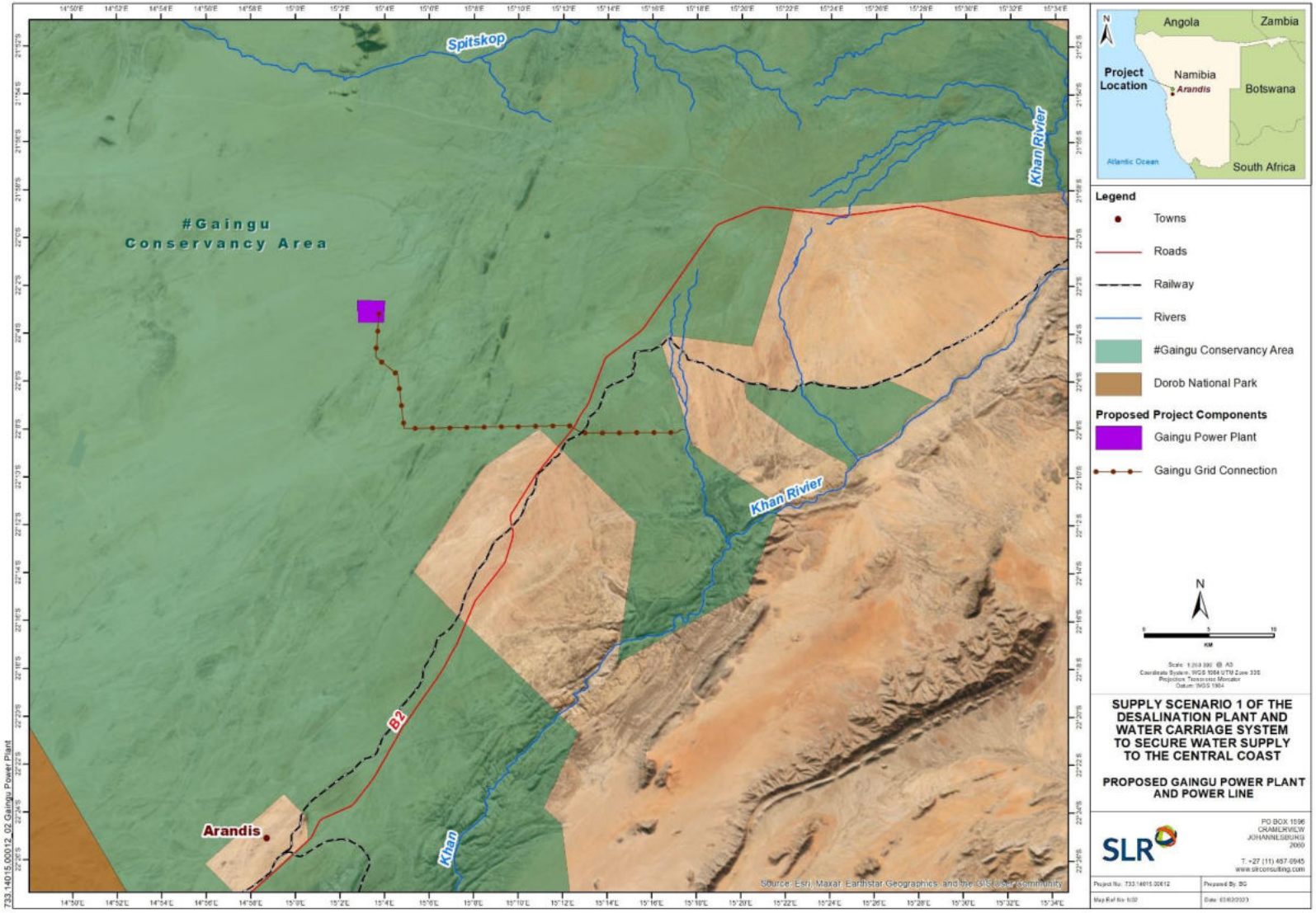

Figure 2: Proposed PV Plant

3. NEED AND DESIRABILITY

Access to water and sanitation are both human rights and goals of the 2030 Agenda for Sustainable Development. Namibia is the most arid country in Southern Africa, with the driest climate in Africa south of the Sahara. Rainfall is low (averaging 272 mm per annum) and it is estimated that on average, only about 2% of the rainfall ends up as surface run-off and a mere 1% becomes available to recharge groundwater. Rainfall in Namibia is also unpredictable, unreliable, erratic and spatially unevenly distributed across the country. The coefficient of variation is the highest in Africa, ranging between 30% in some areas and over 100% in others. Low and variable rainfall is further compounded by high rates of evaporation, resulting in a water deficit which varies between 1,300 mm and more than 2,500 mm per annum across the country (summarised from (ILF, November 2019)).

Namibia's water sources are unevenly distributed across the country, with perennial rivers only located along the country's northern and southern borders, some 700 km to 800 km away from major demand centres such as Windhoek and Walvis Bay. Although most areas of the country are regarded as "water-stressed", the Central Coastal Area (CCA) and the Central Area of Namibia (CAN) are of strategic importance due to their contribution to the national economy. The CCA, with the Walvis Bay harbour, represents a major gateway, transportation and logistics hub for Namibia and neighbouring countries. The CAN, specifically Windhoek, represents the commercial, economic, political and administrative hub of the country. The Hosea Kutako International Airport outside Windhoek is the main point of entry for international and many regional visitors to the country.

Water demand in both these areas has surpassed the capacity of the local conventional water sources and various unconventional water sources have been part of the supply mix for some time already. In Windhoek all of the economically viable, conventional water sources (surface and groundwater) within a 350 km radius are already developed (ILF, November 2019). Further increases in water demands (e.g. due to general population increase and urbanisation) will require further supply capacity in the future.

NamWater, as the national water utility of Namibia, has been assigned as the Project Executing Agency, to undertake a Feasibility Study for the development of a Desalination Plant and Water Carriage System, to secure water supply to the CCA and CAN, as well as en-route users (i.e. towns such as Arandis, Usakos, Karibib and Okahandja). The primary objective of the Feasibility Study is to establish a comprehensive concept that would secure and diversify the sources of Namibia's water supply by combining the conventional water resources with a climate-independent supply of water and thus contribute to increased resilience in the project area up to the year 2050. Following the completion of the feasibility study NamWater decided to proceed with the proposed Desalination Plant and Water Carriage System for Supply Scenario 1, which aims to supply water to the CCA of Namibia only.

4. OVERVIEW

The proposed Desalination Plant and Water Carriage System project for Supply Scenario 1 will consist of the following key components as shown in Figures 1 and 2:

- The Desalination Plant and Pump Station 1 (Desalination Plant proposed area);
- The Intake works and Intake Pump Station;
- A pipeline linking the two places mentioned above;
- An approximate 4 km pipeline connecting the desalination plant to the existing 1200 mm diameter pipeline; and
- The #Gaingu PV Power Plant and power line connecting to the new Khan 33 kV substation.

The new desalination facility is proposed at a suitable location in the vicinity of the existing Orano Desalination Plant on the central coast of Namibia. The proposed #Gaingu Power Plant is proposed to be located within the #Gaingu Conservancy. NamWater is negotiating with the relevant authorities about the acquisition of land for the proposed developments.

4.1 Desalination Plant and Associated Infrastructure

The new desalinisation plant will be constructed approximately 1.4 km inland of the shoreline, near the existing Orano Desalinisation Plant.

The plant will likely be developed in phases, with a total capacity of 36.2 million m^3 per annum (Mm^3/a). The proposed phasing is as follows:

- Phase 1: 20 Mm^3/a by 2024.
- Phase 2: Additional 8 Mm^3/a by 2026.
- Phase 3: Additional 8 Mm^3/a by 2037.

The maximum footprint of the desalination plant (140 000 m^2), including intake and outfall infrastructure (15 000 m^2), is approximately 155 000 m^2. The proposed desalination plant will consist of the following main components:

- Marine seawater intake and brine discharge system;
- Pre-treatment system;
- Reverse osmosis treatment;
- Post-treatment; and
- Various buildings and ancillary infrastructure.

The main inputs to the desalination plant are:

- Supply of up to 260 Mm^3/d of seawater for Supply Scenario 1, resulting in the production of up to 36.2 Mm^3/yr of treated water to the Central Coastal Area, while the remaining ~154 656 m^3/d is returned to the sea as brine; and
- Power supply, totalling approximately 35.10MWp for SS1 by 2037.

The water transmission system consists of the following key components including:

- Water pipeline transmission system; and
- Pump station.

The desalinated water will be transferred from the desalination plant via the existing water transmission system to the central coastal area. A new DN900 ductile iron pipeline (approximately 4 km) will be constructed to connect the desalination plant to the existing Omdel-Swakopmund pipeline.

4.2 Power Supply and Associated Infrastructure

The two demand centres (desalination plant and Pump Station 1 (PSS-1)) will be supplied by a combination of solar Photovoltaic (PV), Li-Ion Battery Energy Storage System (BESS) and utility supplied power.

Power will be wheeled using the national utilities´ (NamPower´s) network infrastructure to provide the supply at the lowest cost of energy.

A solar PV and Li-ion BESS power plant will be constructed in the #Gaingu Conservancy (#Gaingu Power Plant) to wheel power to the desalination plant and PSS-1.

A new 33 kV transmission line will be constructed to connect the solar PV plant to the existing New Khan substation. The routing of the transmission line will initially be to the south, before turning east, where it will run in parallel with the existing transmission line corridor of the New Khan – Trekkopje and Khan – Hentiesbay lines. The total length of the transmission line will be approximately 35 km. The existing NamPower transmission and distribution network will be used to wheel the electricity generated by the solar PV facility to the desalinisation plant.

The main components of the #Gaingu Power Plant are:

- Mono-crystalline bi-facial half-cell Passivated Emitter Rear Contact (PERC) with a nominal rate capacity of 530 W_p.
- String inverters with a nominal output power of 195kW@45°C.
- Single-axis tracker module mounting structure.
- Containerised NMC Lithium-Ion Battery Energy Storage solution.

The #Gaingu Power Plant will be installed in incremental steps to increase the Renewable Energy (RE) power supply in line with the step increases of the expansion of the desalination plant. Each plant will be brought into commercial operation in the years as described in Table 1 below. The total power demand for SS1 up to 2050 is 18.23 MW (ILF, 2021). The total maximum area for the Solar PV and BESS facilities is 141 ha.

Table 1: Capacity Expansion of Gaingu Power Plant

Description	Step 1 (2024)	Step 2 (2026)	Step 3 (2037)
PV Power Plant Additional Capacity (MWp)	16	6.13	12.97
PV Power Plant Cumulative Capacity (MWp)	16.00	22.13	35.10
Li-ion BESS Additional Capacity(kW/kWh)	-	125/500	4375/17 500
Li-ion BESS Cumulative Capacity (kW/kWh)	-	125/500	4500/18 000

5. ESIA PROCESS

The EIA Regulations 2012 set out the procedures and documentation that need to be complied with when undertaking an ESIA process. The anticipated tasks and timing for the current ESIA process are presented in **Figure 3** (**note: opportunities to participate in the process are highlighted in blue**).

This ESIA process has the following objectives:

- To provide the opportunity for I&APs to comment and make input into the ESIA process.
- To identify potential impacts that could result from the proposed project.
- To identify feasible alternatives related to the project proposal.
- To assess potential impacts during the different phases of the proposed project and associated alternatives.
- To define feasible mitigation or optimisation measures to avoid or minimise potential impacts or enhance potential benefits.
- To ensure, through the above, informed, transparent and accountable decision-making by the relevant authorities, as well as the presentation of the results to the public.

6. IMPACT ASSESSMENT FOCUS AREA

Due to the proposed activities and the sensitivities of the affected environment, several environmental and social impacts of potential significance have been identified during the Scoping Phase of the ESIA and are summarised below. Potential impacts of relevance to the proposed project will be assessed in detail during the ESIA process with inputs derived from specialist studies. Management and mitigation measures for all of the significant impacts identified will be included in the Environmental and Social Management Plan (ESMP), which will be presented with the ESIA Report.

6.1 Potential Impacts on the physical environment

Physical disturbance and destruction of dry and ephemeral watercourses and drainage lines
Construction activities, including site clearance, trenching, blasting, and drilling, as well as supporting infrastructure such as service roads, may cause physical disturbance and destruction of dry and ephemeral watercourses and drainage lines. Disturbance and destruction of ephemeral rivers and drainage lines may in turn affect plants and animals utilising these features as habitat or for foraging, and may lead to altered hydrological patterns, increased runoff, erosion and sedimentation of surrounding ecosystems, especially during and /or following high rainfall events.

Physical impact on groundwater
It is unlikely that the proposed surface infrastructure associated with the desalination facility, solar PV facilities and associated infrastructure will pose significant risk to groundwater resources in the proposed project area.

Physical damage / destruction of soil crusts and soil horizons
The construction of the desalination facility, solar PV facilities and associated infrastructure (including site clearance, trenching, blasting, and drilling where the proposed water carrier pipeline is buried) may cause physical damage to / destruction of soil crusts and horizons.

6.2 Potential Impacts on terrestrial ecology

Physical terrestrial habitat disturbance, alteration and loss
Physical habitat disturbance, alteration and loss may be caused by the arrival and movement of construction and operations personnel, vehicles and heavy equipment, and construction activities (including site clearance, trenching, blasting, and drilling where the proposed water carrier pipeline is buried).

Establishment and spread of alien invasive plants
Machinery, people and material used during construction and operation can actively introduce and spread alien invasive plant propagules on site. The establishment and spread of alien invasive plants can result in alteration, reduction and loss of the effective habitat of a number of indigenous rare or endangered species.

Restriction of animal movement and entrapment of animals
Entrapment of animals in open trenches can have fatal consequences as a result of drowning in pools of collected water, dehydration, or starvation. Above-ground infrastructure, especially linear infrastructure (e.g. pipeline) which can fragment extensive sections of the landscape, can act as barrier to animal movement and migration.

Bird electrocution and collision
Power lines and electrical infrastructure pose electrocution and collision risks to avifauna.

Conflict with conservation initiatives
The proposed desalination facility, solar PV facilities and associated infrastructure are all likely to cross or be situated in conservation areas. Consultation with the relevant conservation area stakeholders as it pertains to landownership, tourism economy and environmental management is important in the ESIA process.

6.3 Potential Impacts on marine ecology

Altered coastal physical processes and dynamics
The establishment of marine infrastructure may alter water flows and sediment dynamics. This can ultimately lead to shoreline erosion and / or accretion, and changes

to the beach profile, which will cause knock-on effects to marine and coastal biodiversity and ecology.

Marine and coastal habitat disturbance, alteration and loss

Disturbance, alteration and loss of marine and coastal habitat may occur during the construction of new marine infrastructure where blasting and trenching will eliminate the natural substrate and generate local suspended sediments. Accidental spillage of fuels or other hazardous materials during construction and operations can result in contaminated sand, sediments and seawater.

During operations, discharged brine effluent from the desalination facility may lead to elevated levels of salinity in the direct vicinity of the discharge. Effluent may also contain biocides, chlorine and lower levels of dissolved oxygen, which will influence water chemistry and quality. Furthermore, the desalination process removes particulate matter from the water column where it is a food source for various marine biota.

Direct disturbance to and mortality of marine biota

During construction of new marine intake and outfall pipelines, blasting may directly affect surf-zone and nearshore species.

6.4 Potential Impact on heritage

Damage to and destruction of heritage features and sites

Heritage resources (including sites and landscape setting / sense of place) may be damaged or destroyed during various construction activities.

Removal of heritage features

People on-site during construction and operation of infrastructure (including maintenance work) presents a risk of damage to heritage resources in the form of removal of artefacts from archaeological sites, theft of fossil material, graffiti or other damage to rock art.

6.5 Potential Impact on air quality, visual and noise

Air quality

The construction of the desalination facility, solar PV facilities and associated infrastructure is anticipated to generate dust and fumes that may adversely affect air quality. No significant direct emissions that may negatively affect air quality are anticipated from operating the desalination facility, solar PV facilities and associated infrastructure.

Visual

Various components of the proposed project could change the character of the landscape and the sense of place due to their physical presence in an otherwise natural environment. The combination of these features in natural settings, where the landscape quality is high and the sense of place important, could result in impacts of significance to sensitive viewers. The significance of the impact would be influenced by the nature of the activities, the visual environment and the sensitivity of the viewers.

Noise

Construction phase noise activities would be over a relatively short duration. During operations, the desalination plant (i.e. high-pressure pumps, energy recovery systems, air compressors, etc.) and pump stations would be the only potential noise source that could cause noise disturbance to third parties or animals.

6.6 Potential Impacts on the socio-economic environment

Increased water costs and tariffs

Access to affordable water is a basic human right. It is known that desalinated water is much more costly to produce than other sources and under current water policies NamWater will need to pass these costs on to the consumers. This is likely to impact all consumers – domestic, commercial and industrial. Although government does currently subsidize water to poor communities, there is a risk that increased water tariffs will disproportionately affect people already living in poverty.

Job creation and disruption of livelihoods

Water is a basic necessity for almost all economic activities. The project is designed to provide a long-term sustainable source of water for the growing population in the project areas and to reduce the risk that the project areas will run short of water, negatively impacting most livelihood-generating activities.

The construction of the project in the short term will create jobs and some permanent jobs will be created to maintain and operate the desalination plant, power and pumping stations.

There may be temporary disruption and inconvenience to livelihoods during construction of the pipeline. The location of the solar power plants and pipeline route may change or disturb the current land use at a localised level and there needs to be a careful alignment of pipeline and location of solar plants to minimise land access disruption and costly expropriation of land.

Potential impacts on Community Health and Safety

Namibia is well on the path to ending its HIV/AIDS epidemic, largely through widely accessible and affordable antiretroviral treatment. As construction workers carry a larger risk of carrying and spreading the virus, mitigation measures in the form of health and wellness workplace programmes are well known. The desalination plant and

its pipelines do not carry or induce any other human health risks.

There may be some influx of jobseekers to the coast at the start of the construction phase. Namibia has experience in giving job preferences to local people to minimise influx and to have recruitment centres in nearby towns rather than at the project site.

Impact on tourism
Namibia has a coastline of nearly 1,600 km. The cumulative impact on tourism of an additional new or expanded desalination plant is unlikely to have any impact on tourism. This opinion is taken in the context of the continuing linear development along the shoreline between Walvis Bay and Henties Bay, in terms of the port expansion, housing and holiday apartments. Security of supply will likely have a positive impact on tourism.

6.7 Potential Climate change impact

Greenhouse gas emissions
With regards to greenhouse gas emissions, the emissions during both the construction and operational phase of the project are unlikely to have a major negative impact on the per capita GHG emissions of Namibia. This is primarily due to the fact that the construction phase of the project is considered to be relatively short when compared to the design life of the project and emissions during this time will primarily result for the tail pipe emissions of construction vehicles and equipment. For the operational phase, most emissions may be attributed to the electricity required to drive the desalination plant and the pump station for the pipeline. A large portion of this electricity is likely to be supplied from the solar PV plant.

Climate change adaptation
With regards to adapting to climate change, climate change has been identified as a critical threat to sustainable development and general welfare of society in Namibia. Namibia has the most arid climate of all southern African countries and has recently experienced a severe drought that has been referred to as the worst drought in a century. Its economy is therefore exposed to difficult and harsh conditions, with water accessibility a significant challenge. This project forms a core component of the adaptation strategy for Namibia.

However, the project itself may be vulnerable to changes in the environment due to climate change. For example, the sea water intake of the desalination plant would need to be designed to account for changes in sea state that may become worse because of higher intensity storm events. The location of the desalination plant should consider sea-level rise and its possible implications. Any change in ocean temperatures and circulation patterns may also change the frequency of red tide events that will impact the water intake of operations of the desalination plant.

7. HOW WILL THE IMPACTS BE ASSESSED?

The below specialist studies will be undertaken as part of the ESIA to assess the key potential impacts and identify mitigation:

- Terrestrial Ecology Impact Assessment;
- Avifauna Impact Assessment;
- Socio-economic Impact Assessment;
- Hydrological Impact Assessment;
- Coastal Physical Processes and dynamics;
- Brine Dispersion Modelling;
- Heritage Impact Assessment;
- Visual Impact Assessment;
- Marine and Coastal Biodiversity and Ecology;
- Noise Impact Assessment; and
- Climate Change Risk Assessment.

These studies will involve a reconnaissance site survey of the proposed site and associated infrastructure, as well as a review of other available data relevant to identifying and assessing environmental impacts that may occur as a result of the proposed project.

Specialists will also recommend appropriate mitigation or optimisation measures to avoid / minimise potential impacts or enhance potential benefits, respectively.

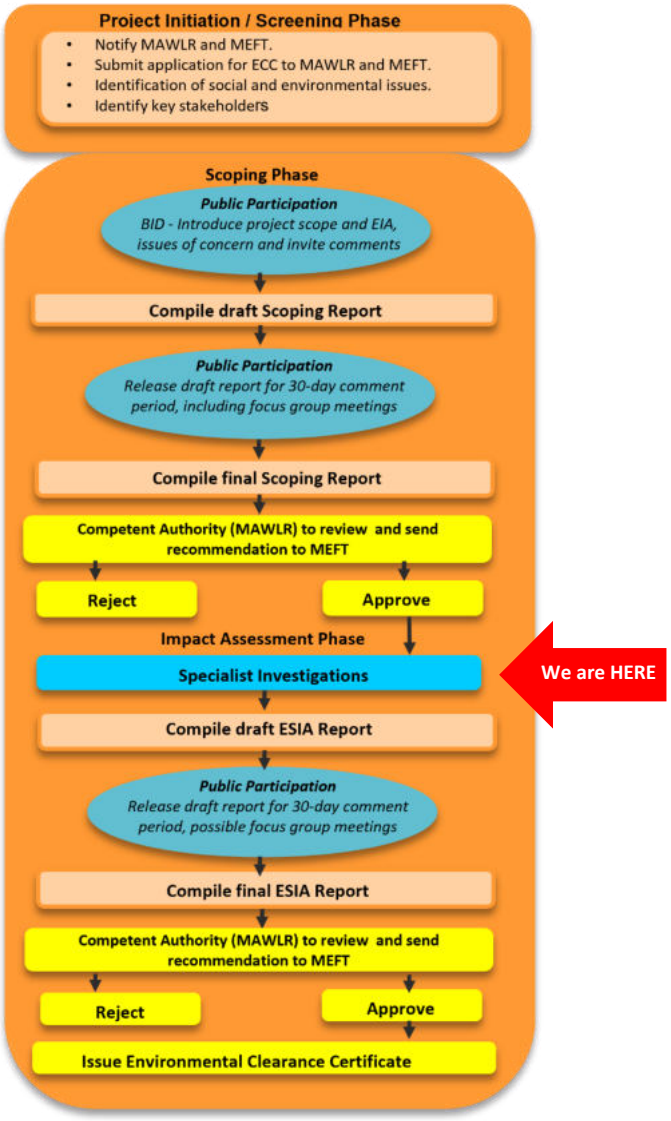

Figure 3: ESIA Process

WHAT WILL HAPPEN NEXT?

- Please register on the Project Database or submit initial comments by **no later than 11 August 2023**.
- All comments received will be addressed in the draft ESIA Report.
- **If you are registered on the project database, you will be notified of the next round of public engagement, including the review of the draft ESIA Report and associated public meetings (in August/September 2023)**.

PLEASE CONTACT SLR SHOULD YOU HAVE ANY QUERIES OR REQUIRE ANY PROJECT INFORMATION

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SLR website: https://www.slrconsulting.com/public-documents/namwater-esia-for-supply-scenario-1-of-the-desalination-plant-and-water-carriage-system-to/

NAMIBIA WATER CORPORATION LIMITED
STAKEHOLDER REGISTRATION / COMMENT FORM

ESIA AND ESMP FOR SUPPLY SCENARIO 1 OF THE DESALINATION PLANT AND WATER CARRIAGE SYSTEM TO SECURE WATER SUPPLY TO THE CENTRAL COAST, NAMIBIA

28 JULY TO 11 AUGUST 2023

DATE				
NAME / CONTACT PERSON				
ORGANISATION/COMPANY				
POSTAL ADDRESS				
		POSTAL CODE		
TELEPHONE NUMBER				
CELL NUMBER				
E-MAIL ADDRESS				
HOW WOULD YOU LIKE TO RECEIVE FUTURE NOTIFICATIONS? (please indicate with an "X")		**EMAIL:**	**POST:**	**SMS:**

PLEASE WRITE YOUR COMMENTS AND QUESTIONS HERE (please use separate sheets if you wish)

NOTE: The current EIA process only deals with the supply scenario 1 of the proposed desalination plant and water carriage project

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PLEASE INCLUDE THE FOLLOWING OF MY COLLEAGUES/FRIENDS/NEIGHBOURS AS I&APS FOR THIS PROJECT:

Please return completed forms to:

SLR contact: Stephanie Strauss
Tel: +264 61 231 28 Email: namwater-desal@slrconsulting.com WhatsApp: +264 81 357 2109

It is assumed that in providing your Personal Information to be registered as an I&AP for this Project you authorise SLR to (1) retain and use your Personal Information as part of a contact database for this and/or other EIAs, (2) contact you regarding this and/or other EIA processes, (3) disclose the database to other authorised parties for lawful purposes, (4) process it for lawful purposes, and (5) include correspondence received in EIA Reports. SLR warrants that it will not process your Personal Information, other than as permitted or required by EIA processes or as required by Law or public policy. SLR will use reasonable, appropriate security safeguards in order to protect Personal Information, and to reasonably prevent any damage to, loss of, or unauthorised access or disclosure of Personal Information, other than as required for environmental authorisation processes or as required by any Law or public policy. You may request for your Personal Information to be deleted from the I&AP database or comments to be excluded from EIA Reports at any time by contacting SLR.

THANK YOU FOR YOUR CONTRIBUTION