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REPORT:

DRAFT SCOPING REPORT FOR THE CONSTRUCTION OF A GREEN AMMONIA PIPELINE FROM FARM 58 TO THE WALVIS BAY PORT AREA, ERONGO REGION, NAMIBIA

PROJECT NUMBER: ECC-145-480(a)-REP-30-C

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EXECUTIVE SUMMARY

Environmental Compliance Consultancy (Pty) Ltd (ECC) has been appointed by Cleanergy Solutions (Pty) Ltd (the Proponent) as the environmental assessment practitioner (EAP) to conduct an environmental and social impact assessment (ESIA) for the proposed construction of an ammonia pipeline (12.7 km) from Farm 58 to the Walvis Bay port area, in the Erongo Region, Namibia. Cleanergy Solutions Namibia (Pty) Ltd is a joint venture between Ohlthaver & List (O&L) Group and CMBTech. The Ohlthaver & List (O&L) Group is the largest privately owned consortium in Namibia, with an operational track record spanning over a century and covering a diverse number of industries. CMB.TECH, is a Belgium based company specialising in the design, construction and operations of large marine and industrial modes of transportation that utilise hydrogen and ammonia.

As part of the bigger intended hydrogen and ammonia infrastructure development and operation, the proposed project involves the construction of the ammonia pipeline from Farm 58 to the ammonia terminal at the Walvis Bay port area. Liquid ammonia with a mass flow between 20 to 60 tons/h will be transported 12.7 km from the ammonia production plant on Farm 58 to the ammonia terminal near the Walvis Bay port area for storage. The proposed ammonia pipeline corridor is bounded by the D1984 and the B2 road between Walvis Bay and Swakopmund.

In terms of the Namibian Environmental Management Act, 2007 and its 2012 regulations, the Ministry of Mines and Energy (MME) is the competent authority for the proposed Project. The proposed project trigger listed activities in terms of the EMA, and as such, requires an environmental clearance certificate.

SCREENING PHASE

The first step in the ESIA process is to register the Project with the Department of Environmental Affairs (DEA)/Ministry of Environment, Forestry and Tourism (MEFT) (completed) followed by a screening exercise to determine which listed activities under the Environmental Management Act, No. 7 of 2007 and associated regulations are triggered, and if significant impacts may arise from the Project. The location, scale, and duration of Project activities will be considered against the receiving environment.

The screening phase determined that the most likely potential environmental and social impacts could include:

- Noise impacts
- Air quality, including dust emissions
- Visual impacts affecting the sense of place
- Traffic impacts off-site
- Impacts on biodiversity
- Archaeological/heritage impacts

- Economic and socio-economic impacts, e.g., employment opportunities, contribute to green fuel economy and reduction of greenhouse gas emissions

SCOPING PHASE

The objective of the scoping phase was to obtain a thorough understanding of the biophysical and socioeconomic environment in which the Project is located, using baseline and specialist studies. It also provided an opportunity for the public to have input into the scope of the assessment. The technical inputs combined with the inputs from the I&APs led to the development of the Terms of Reference (ToR) for the assessment phase. A desktop and literature research and specialists' input were considered during the preparation of the scoping report.

TERMS OF REFERENCE

The ToR within the scoping report was proposed for the assessment phase and covered the following:

Socio-economic assessment

A socio-economic study will be conducted to assess the impact of the project on the current socio-economic state of the locals and impacts on a regional and national scale.

Visual assessment

The assessment to be conducted will include a study of the visual impacts considered, such as pipeline visibility, infrastructure, and construction activities and its effects on the local tourist businesses and residential areas. The assessment will also take into consideration the landscape impacts.

Health and Safety assessment

The objective is to assess potential health and safety impacts associated with the construction and operation of the ammonia pipeline project. The assessment will identify hazards, evaluate risks associated with hydrogen handling and pipeline operations (e.g., flammability, leaks), and recommend measures to mitigate and manage health and safety concerns.

Climate change assessment

A climate change assessment will assess the emission baseline of the biophysical environment and formulate recommendations for the management or mitigation of any potential impacts that the Project may contribute to climate change. Additionally, contribute to the potential benefits of the project to the set climate change objectives/goals.

Air quality

The assessment will include a study of the legal requirements pertaining to air quality applicable to international legal guidelines, limits and dust control regulations.

Noise quality

The objective is to assess the potential noise impacts of the proposed project on surrounding sensitive receptors, including residents, businesses, and the tourism sector.

Traffic assessment

A traffic assessment will be commissioned to assess the implications relevant to the project regarding additional vehicles on the current D1984 and B2 road.

Biodiversity assessment

The objective of the biodiversity assessment will be to assess the bio-physical (vertebrate fauna & flora) issues relevant to the project and assess the significance of development and environmental impact that the project may have on the vertebrate fauna and flora at the proposed site including general comment. A visit to the proposed project area (applicable portions only) will be conducted to assess the development site. Sensitive areas and species within the Walvis Bay municipal land will be identified.

Heritage assessment

A heritage assessment will be required to comply with the Namibian national legislature, including the National Heritage Act, 2004 (Act No 27 of 2004) and the National Heritage Regulations (if applicable), Government Notice (GN) 3490 of 2005.

Groundwater and surface water assessment

To assess the potential hydrology and hydrogeological issues relevant to the Project and assess the significance of the operational and environmental impacts that the Project may have on the hydrological and hydrogeological systems along the proposed pipeline. This study will give recommendations so that the final pipeline design does not disrupt the natural surface and groundwater flow regimes.

Additionally, the scoping report defines the impact methodology for the impact assessment phase of the ESIA, the method to be used for the impact assessment is detailed in Chapter 6 of this report. The evaluation and identification of the environmental and social impacts require the assessment of the Project characteristics against the baseline characteristics, ensuring that all potentially significant and cumulative impacts are identified and assessed.

The next stage of this assessment is to conduct the impact assessment, incorporating the specialist impact assessments as well as updating the preliminary ESMP. All I&APs comments will be responded to, by providing an explanation or further information in the response table, which will be attached as an addendum report to this final scoping report. Public participation throughout the ESIA process and stakeholder feedback is a critically importance part of an ESIA process and as such will be incorporated throughout the ESIA process.

Once finalised, prior to formal submission, the final ESIA report and appendices, including relevant specialist reports, will be made available to all registered I&APs and stakeholders for review and commentary.

The ESIA report and appendices will be formally submitted to the competent authorities, first the MME and then to the MEFT as part of the application for an environmental clearance certificate for the Green Ammonia Pipeline Project. The phases of the ESIA are provided in Figure 1.

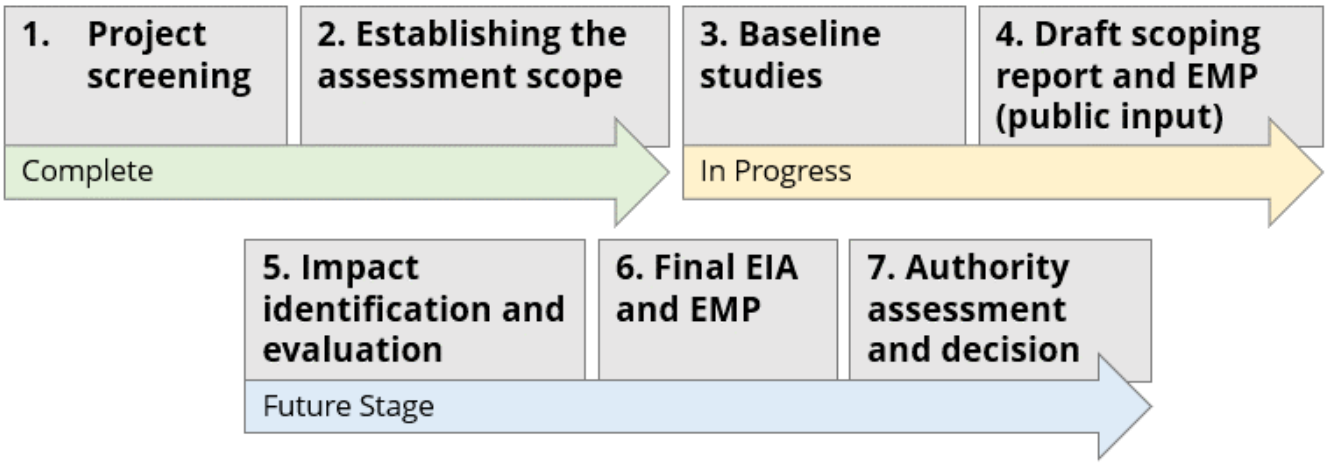

Figure 1 – Simplified phases of the Green Ammonia Pipeline Project ESIA process.

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ABBREVIATIONS

Abbreviation	Description
%	percentage
~	approximately
°C	degree celcius
BID	background information document
Cleanergy Solutions	Cleanergy Solutions Namibia (Pty) Ltd
CMB.TECH	Compagnie Maritime Belge
COVID	Coronavirus
DEA	Directorate of Environmental Affairs
EAP	environmental assessment practitioner
ECC	Environmental Compliance Consultancy (Pty) Ltd
EEZ	Exclusive Economic Zone
e.g.	for example
EMA	Environmental Management Act, No. 7 of 2007
ENE	east northeast
EPC	engineering, procurement and construction
ESMP	Environmental and social management plan
ESIA	environmental and social impact assessment
ErongoRED	Erongo Regional Electricity Distributor Company (Pty) Ltd
GDP	gross domestic product
GHGs	greenhouse gases
GIS	geographic information system
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GN	government notice
ha	hectares
HDD	horizontal directional drilling
HIV	human immunodeficiency virus
I&APs	interested and affected parties
i.e.	that is
IFC	International Finance Corporation
JV	joint venture
Km^2	square kilometre
km	kilometre
Km/h	kilometre per hour
kg/h	Kilogram per hour
Ltd	limited
m^3	cubic metres

Abbreviation	Description
m	metre
mm	millimetre
MAOP	maximum average operating pressure
MEFT	Ministry of Environment, Forestry and Tourism
MFMR	Ministry of Fisheries and Marine Resources
MME	Ministry of Mines and Energy
MPa	megapascal
MoHSS	Ministry of Health and Social Services
MURD	Ministry of Urban and Rural Development
NACSO	Namibian Association of CBNRM Support Organisation
NPC	National Planning Commission
NamPower	Namibia Power Corporation
NAMCOR	National Petroleum Corporation of Namibia
NamPort	National Port Authority
NCCSAP	National Policy Climate Change Strategy and Action Plan
NDC	Nationally Determined Contribution
NDP	National Development Plan
O&L	Ohlthaver & List Group
PHC	primary healthcare
PS	performance standard
Pty	proprietary
QGIS	Quantum Geographic Information System
RH	relative humidity
RoD	Record of Decision
ROW	right-of-way
SADC	Southern African Development Community
SDGs	sustainable development goals
SOP	standard operating procedures
SW	southwest
TB	tuberculosis
ToR	Terms of Reference
UNCLOS	United Nations Law of the Sea Convention
UNFCCC	United Nations Framework Convention on Climate Change
WWF	World Wide Fund

1 INTRODUCTION

1.1 COMPANY BACKGROUND

Environmental Compliance Consultancy (Pty) Ltd (ECC) has been appointed by Cleanergy Solutions Namibia (Pty) Ltd (hereinafter referred to as the Proponent or Cleanergy Solutions) as the environmental assessment practitioner (EAP) to conduct an environmental and social impact assessment (ESIA) and develop an environmental and social management plan (ESMP) for the proposed construction of a green ammonia[1] pipeline from Farm 58 to the Walvis Bay port area, Erongo Region, Namibia.

Cleanergy Solutions Namibia (Pty) Ltd is a joint venture between Ohlthaver & List (O&L) Group and CMB.TECH, the Ohlthaver & List (O&L) Group is the largest privately owned consortium in Namibia, with an operational track record spanning over a century and covering a diverse number of industries. CMB.TECH, a Belgium company specialising in the design, construction and operations of large marine and industrial modes of transportation that utilise hydrogen and ammonia. It forms an integral part of Compagnie Maritime Belge which is a family-owned shipping group, founded in 1895.

Cleanergy Solutions Namibia intends on becoming a driving force in the growth of the Namibia's hydrogen economy, while contributing to the global shift for industrial decarbonisation. The organisation is in the process of finalising the construction of the first hydrogen production plant in Namibia, with first production intended for the latter part of 2024.

As part of the bigger intended hydrogen and ammonia infrastructure development and operation, which Cleanergy Solutions are actively pursuing, the proposed construction of a green ammonia pipeline is envisioned and will be constructed from Farm 58 to the Walvis Bay port area, in the Erongo Region, Namibia (refer to Figure 2). The proposed pipeline can be accessed via the D1984 road and the B2 road between Swakopmund and Walvis Bay.

[1] Green ammonia production replaces the fossil fuel-based hydrogen source with green hydrogen (hydrogen produced from renewable energy sources through electrolysis). This significantly reduces the carbon footprint of ammonia production. Green ammonia is considered a potential carbon-neutral energy carrier and an essential ingredient in green fertilizers.

Figure 2 – Locality map of the project.

1.2 PURPOSE OF THE SCOPING REPORT

An environmental and social impact assessment (ESIA) has commenced in compliance with the requirements of the Environmental Management Act, No. 7 of 2007 (EMA), and its 2012 regulations. This report aims to present the findings of the scoping study phase that forms part of the larger ESIA process.

The scoping report summarises the prescribed ESIA process, provides information on the baseline biophysical and socio-economic environments, details the project description, outlines the terms of reference for the assessment phase, and presents a preliminary ESMP (Appendix A).

Public participation is a critical aspect of the ESIA process. The scoping report and appendices will be made available for public review and comment, allowing stakeholders to provide valuable input. The revised scoping report with public input will be submitted to the Ministry of Mines and Energy (MME) as the competent authority for the Project, after which it will be submitted to the Ministry of Environment, Forestry and Tourism (MEFT) - Directorate of Environmental Affairs (DEA) for a record of decision (ROD). The ROD will determine the next stage of the project, if it can proceed or otherwise, and if conditions are to be attached to the ROD.

1.3 THE PROPONENT OF THE PROPOSED PROJECT

Cleanergy Solutions Namibia (Pty) Ltd is the Proponent for the proposed Project. The Proponent holds a landowner lease agreement with Walvis Bay Municipality for portion 7 of Farm 58 for a period of 25 years. This area will be used for the ammonia production plant, from which the ammonia pipeline will transport green ammonia to the ammonia terminal near the Walvis Bay port area. A servitude will need to be registered for the pipeline once all the necessary approvals has been granted and the route finalised.

Cleanergy Solutions Namibia (Pty) Ltd was formed in 2021 and duly registered in Namibia. It is a joint venture between the Olthaver & List Group of Companies and CMB.TECH with the latter holding 49% shares and the former holding 51%. The company is already in the process of constructing a hydrogen production plant on Farm 58 outside Walvis Bay. The JV has interests in the proposed pipeline projects, i.e. a 12.7 km green ammonia pipeline and 80 km green hydrogen pipeline. The projects are subject to separate ESIA processes, which are being conducted simultaneously. The Proponent details are provided in Table 1.

Table 1 – The Proponent's contact details.

Company Representative:	Contact Details:
Ms Gloudi De Beer Group Manager: Environment and Sustainability	Ohlthaver & List Group: P O Box 16, Windhoek 7th floor, South Block 23-33 Fidel Castro Street

	Windhoek, Namibia Gloudi.DeBeer@ol.na +264 (61) 207 5382

1.4 ENVIRONMENTAL SOCIAL ASSESSMENT PRACTITIONER

Environmental Compliance Consultancy (Pty) Ltd (ECC) (Reg. No. 2022/0593) has prepared this draft scoping report and the preliminary ESMP following relevant national regulations and international best practises on behalf of the Proponent.

This report has been authored by employees of ECC, who have no material interest in the outcome of this report, nor do any of the ECC team have any interest that could be reasonably regarded as being capable of affecting their independence in the preparation of this report. ECC is independent from the proponent and has no vested or financial interest in the project, except for fair remuneration for professional fees rendered based upon agreed commercial rates. Payment of these fees is in no way contingent on the results of this report, the assessment, or a record of decision issued by the Government. No member or employee of ECC is, or is intending to be, a director, officer, or any other direct employee of Cleanergy Solutions Namibia (Pty) Ltd. No member or employee of ECC has, or has had, any shareholding in Cleanergy Solutions Namibia (Pty) Ltd.

All compliance and regulatory requirements regarding this report should be forwarded by email or posted to the address as set out in Table 2.

Table 2 – The EAP contact details.

Environmental and Social Impact Assessment Practitioner	Contact Details
Environmental Compliance Consultancy (Pty) Ltd	P O Box 91193, Klein Windhoek, Namibia Tel: +264 81 669 7608 Email: info@eccenvironmental.com

1.5 ENVIRONMENTAL REQUIREMENTS

The Environmental Management Act, No. 7 of 2007, and its regulations promulgated in 2012, stipulate that an environmental clearance certificate is required before undertaking any of the listed activities that are identified in the Act and its regulations. Table 3 lists the potential activities associated with the Project that are subject to the requirements of the Environmental Management Act.

Table 3 – Activities potentially triggered by the proposed Project.

Source: Environmental Management Act, 2007, and its 2012 regulations.

Listed activity	As defined by the regulations of the Act	Relevance to the project
Energy generation, transmission and storage activities	(1.a) The construction of facilities for the generation of electricity. (1.b) The construction of facilities for the transmission and supply of electricity	– Power supply may be required for basic needs of temporary facilities during the project such as office space, toilets and changing. – Power supply may be obtained from a local electricity distributor for basic needs during the construction phase.
Waste management, treatment, handling and disposal activities	(2.3) The import, processing, use and recycling, temporary storage, transit or export of waste.	– During construction, waste may be produced and temporarily stored on-site. – General construction waste will be produced and will be handled and disposed of appropriately. – A waste management plan will be developed and followed on-site.
Hazardous substance treatment, handling and storage	(9.1) The manufacturing, storage handling, or processing of a hazardous substance defined in the Hazardous Substances Ordinance, 1974. (9.2) Any process of activity which requires a permit, licence or other form of authorisation, or the modification of or changes to existing facilities for any process or activity which requires an amendment of an existing permit, licence or	– The ammonia pipeline will transport ~800 metric tonnes of green ammonia per day to the ammonia terminal. – There will be constant monitoring with a fibre optic cable of possible leakages points, pressure switches and vibrations (external digging). These

Listed activity	As defined by the regulations of the Act	Relevance to the project
	authorisation or which requires a new permit, licence or authorisation in terms of a law governing the generation or release of emissions, pollution, effluent or waste. (9.4) The storage and handling of dangerous goods, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 cubic meters at any one location.	systems will be monitored from Farm 58 to the Ammonia Terminal. – Ammonia, when in large amounts, is deemed hazardous. Therefore, the relevant permits relating to the handling of ammonia will be acquired from the National Radiation Protection Authority, under the Ministry of Health and Social Services (MoHSS).
Infrastructure	10.1 (a) The construction of oil, water, gas and petrochemical and other bulk supply pipelines	– The 12.7 km ammonia pipeline will be constructed from Farm 58 to the Walvis Bay port area.

2 APPROACH TO THE ASSESSMENT

2.1 PURPOSE AND SCOPE OF THE ASSESSMENT

This assessment aims to determine which impacts are likely to be significant, to scope the available data and identify any gaps that need to be filled, to determine the spatial and temporal scope, and to identify the detailed assessment methodology.

The scope of the assessment was determined by undertaking a preliminary assessment of the proposed Project against the receiving environment, obtained through a desktop review and available site-specific literature. The initial assessment findings were that the proposed project may be associated with visual impacts, potential disturbance to faunal habitats, potential removal of flora species likely to be encountered within the pipeline corridor, potential disturbance to objects of heritage significance and health and safety concerns to the workforce/receiving environment should there be leakages from the pipeline.

The public consultation process commenced in March 2024 and public meetings were held in Walvis Bay, Swakopmund and Arandis. Inputs raised by I&APs and key stakeholders within the region will be considered in determining the scope of the assessment.

2.2 THE ASSESSMENT PROCESS

The ESIA methodology applied to this assessment is compliant with Namibia's EMA 2007 which is applicable to all projects including marine areas located within Namibia's Territorial Waters and Exclusive Economic Zone (EEZ) (Territorial Sea and Exclusive Economic Zone of Namibia Act 3 of 1990). The ESIA methodology has been developed using the International Finance Corporation (IFC) standards and models Performance Standard (PS) 1: 'Assessment and management of environmental and social risks and impacts' (International Finance Corporation, 2012 and 2017) as a guideline, as well as Namibian Draft Procedures and Guidance for EIA and EMP (Republic of Namibia 2008); international and national best practice guidelines and combined relevant ESIA experience from the core project team.

This assessment is a formal process whereby the potential positive and negative effects that the Project may have on the biophysical, social and economic environments are identified, assessed and reported, so that the significance of potential impacts can be taken into account when considering a record of decision for the proposed Project. Final mitigation measures and recommendations are based on the cumulative experience of the consulting team and the client, taking into consideration the potential environmental and social impacts. The process followed, through the assessment, is illustrated in Figure 3 and is detailed further in the following sections.

2.3 SCREENING OF THE PROJECT

The first stages in the ESIA process are to register the Project with the DEA/MEFT (completed) and undertake a screening exercise to determine whether it is considered a listed activity under the Environmental Management Act, No. 7 of 2007 and associated regulations, and if significant impacts may arise from the Project. The location, scale, and duration of Project activities will be considered against the receiving environment. The ESIA process is shown in Figure 3.

The screening phase determined that the project would likely trigger or associated with impacts such as visual impacts, traffic impacts (likely during the construction phase), potential contamination or pollution of surface and groundwater resources, noise impacts (during construction), dust generation, impacts on faunal habitats and pristine flora species of the desert environment, health and safety to the occupational workforce and socioeconomic environment. These are significant impacts and trigger listed activities of the EMA and thus a full ESIA study is required.

1. Project screening

Complete

The first stages of the ESIA process are to undertake a screening exercise to determine whether the Project triggers listed activities under the Environmental Management Act No.7 of 2007 and its 2012 regulations. The screening phase of the Project is a preliminary analysis, to determine ways in which the Project might interact with the biophysical and economic environments.

Stakeholder engagement:
- Registration of the project
- Preparation of the BID

2. Establishing the assessment scope

Complete

Where an ESIA is required, the second stage is to scope the assessment. The main aim of this stage is to determine which impacts are likely to be significant; to scope the available data and any gaps that need to be filled; to determine the spatial and temporal scope; and to identify the assessment methodology.

The scope of this assessment was determined through undertaking a preliminary assessment of the proposed Project against the receiving environment. Feedback from consultation with the public and the Proponent informs this process. The following environmental and social topics were scoped into the assessment, as there was the potential for significant impacts to occur. Impacts that are identified as potentially significant during the screening and scoping phase are taken forward for further assessment in the ESIA process. These are:

SOCIOECONOMIC ENVIRONMENT
- Employment
- Community health, safety and security on-site and off site
- Positive socioeconomic impacts- green energy
- Visual impacts on sense of place

BIOPHYSICAL ENVIRONMENT
- Noise and air quality, including dust emissions
- Road traffic
- Biodiversity
- Heritage and culture
- Mine waste characterisation
- Climate change

3. Baseline studies

In Progress

A robust baseline is required, in order to provide a reference point against which any future changes associated with a Project can be assessed, and to allow suitable mitigation and monitoring to be identified.

The region and general area has been surveyed and studied for various projects and assessments. This literature was available to be referenced. The Project site-specific area has been studied as part of the ESIA process, and the following has been conducted as part of this assessment:
- Field surveys (on-going)
- Desktop studies
- Consultation with stakeholders
- Specialist field visits, monitoring, and studies (on-going)

The environmental and social baselines are provided in this scoping study.

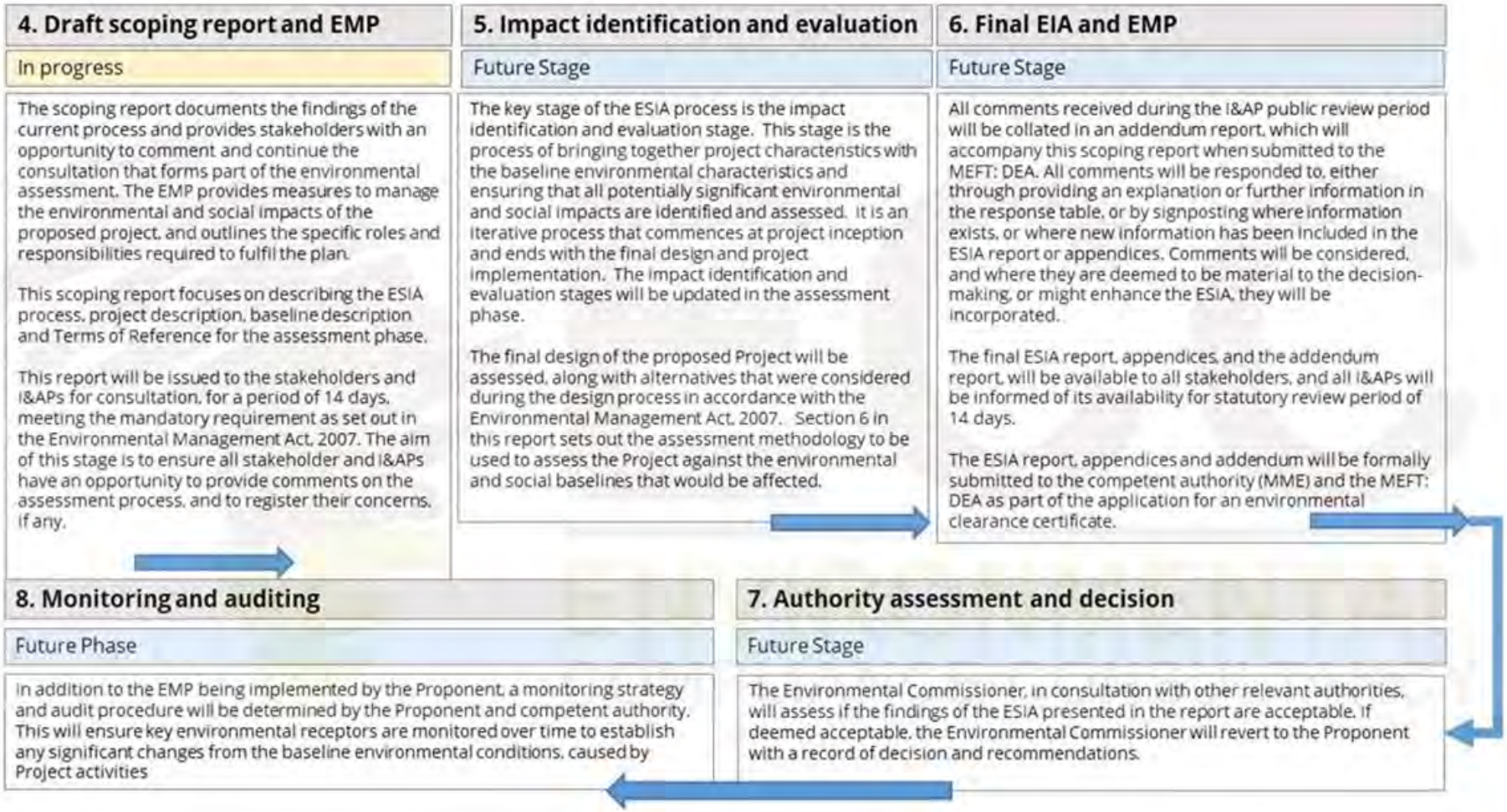


Figure 3 – ESIA process and stages completed.

2.4 STUDY AREA

This ESIA study area has been defined according to the geographic scope of the receiving environment and potential impacts that could arise because of the Project. The geographical boundaries of the study area span from areas under communal supervision of the locals to exclusive and pristine environments that are under government supervision and management. A 1 km buffer was set to determine the extent of study area of the proposed pipeline route. Additionally, the pristine desert environment, ecological features, community locations, and other corridors of development were guiding tools employed in determining the study area boundaries. This will aid in sourcing out direct, indirect and cumulative impacts likely to be triggered by the project.

The receiving environment is a summary term for the biophysical and socioeconomic environment that is described in chapter 5 of this report. Alternative pipeline routes are being investigated to the desired option has the least adverse impacts on the environment. The study area is presented in Figure 4.

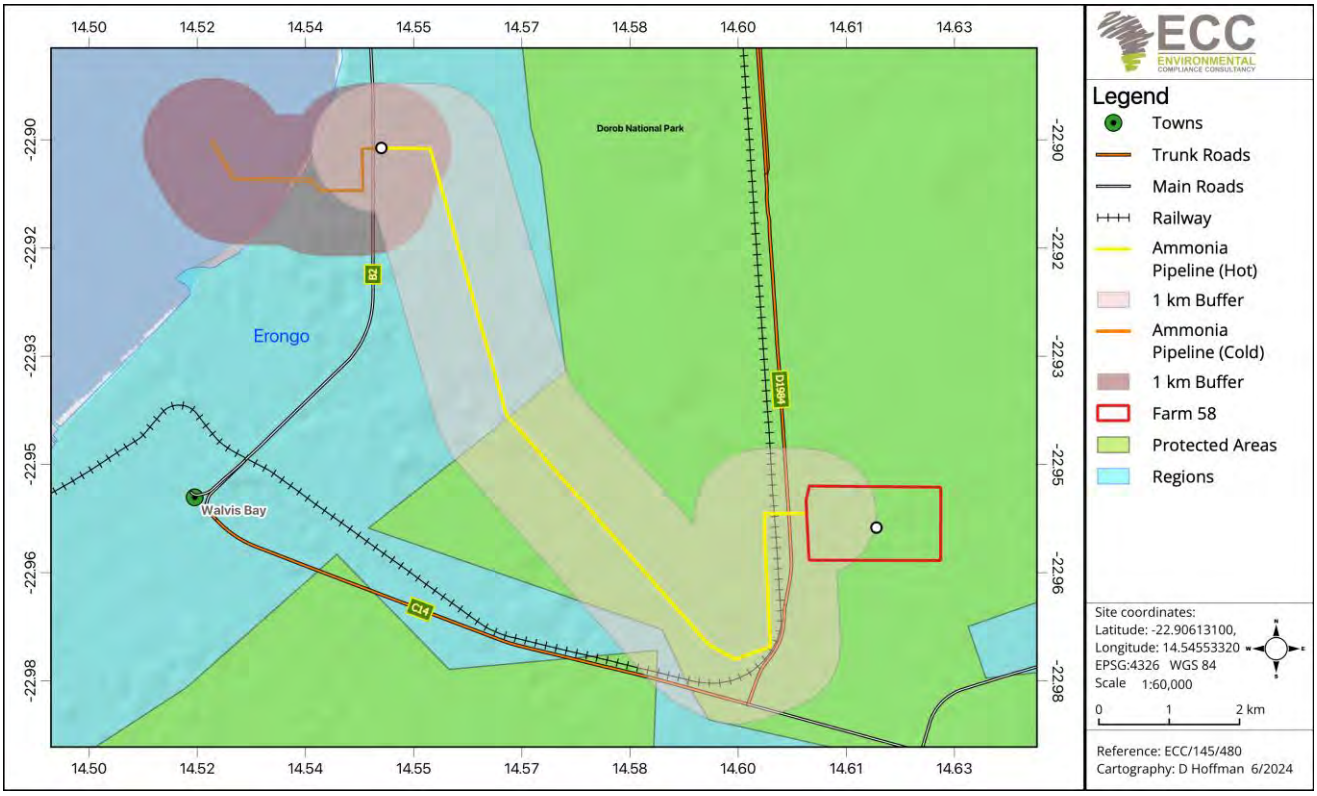


Figure 4 – The Project study area map.

2.5 PUBLIC CONSULTATION

Public participation and consultation are a requirement as stipulated in the Environmental Impact Assessment Regulations (Regulations 21 and 23) of the EMA, No.7 of 2007 for any project undertaking

a listed activity and of which an environmental clearance certificate is sought. Consultation is a compulsory and critical component of the assessment process for achieving transparent decision-making and can provide a better public perception and reception on the Project. Consultation is ongoing during the ESIA process.

The objectives of the public participation and consultation process are to:

- Identify and engage the relevant government, regional, and local regulating authorities (key stakeholders) to gain insights and increase support- leading to better Project outcomes;
- Provide Project information to the public and competent authorities, introducing the overall project concept and planning in the form of a background information document (BID);
- Capture community issues, record concerns and questions for inclusion in the ESIA study; and
- To explain the ESIA process, the timeframes involved and establish a platform for ongoing consultation.

Public consultation for the Project commenced on 04 March 2024 when stakeholder letters were distributed to focus groups and identified key stakeholders and potentially interested and affected parties (IAPs). Public meetings were deemed necessary by the EAP and the Proponent in order to broaden the scope of the impact assessment. Public meetings were held in Walvis Bay, Swakopmund and Arandis from the 12th - 14th of March 2024. These towns were chosen based on the current scope of influence of the project. The EAP will maintain a high level of engagement throughout the ESIA process as more public and stakeholder engagement meetings will be scheduled during the impact assessment phase.

Matters raised by registered I&APs in relevant stakeholder consultations and the public meetings in Walvis Bay, Swakopmund and Arandis are considered typical for the nature, location and scale of project. The concerns raised relevant to the proposed hydrogen pipeline project are such as:

- Potential safety hazards, safety measures and emergency preparedness plans.
- Potential visual impacts on surrounding residents and tourism.
- Potential risk of ammonia leakages on the biophysical environment.
- Impacts on sensitive and national protected areas.
- Potential risks associated with pipeline material, design and proximity to other pipelines.
- Lack of national legislation, standards and local regulations to guide various elements of the Project.
- Potential local, regional and national socioeconomic benefits.

The Project adverts and public meetings invitations were placed in local newspapers on the 29th of February and 07 March 2024. The notice and adverts (refer to the public consultation document provided in Appendix B) were places in the following local newspapers:

- The Republikein;
- The Namibian Sun; and
- Allgemeine Zeitung.

2.5.1 IDENTIFICATION OF KEY STAKEHOLERS AND INTERESTED AND AFFECTED PARTIES

A stakeholder mapping exercise was undertaken to identify individuals or groups of stakeholders and the method by which they will be engaged during the ESIA process.

Stakeholders were approached through direct communication (i.e. letters and phone calls), indirectly through the national press, and directly by email. A summarised list of stakeholders for this project is given below:

- Neighbouring businesses;
- Affected and surrounding conservancies
- The general public with an interest in the Project;
- Ministry of Environment, Forestry, and Tourism (MEFT);
- Ministry of Mines and Energy (MME);
- Ministry of Urban and Rural Development (MURD)
- Ministry of Agriculture, Water and Land Reform (MAWLR);
- Ministry of Industrialisation and Trade;
- Ministry of Defense and Veteran Affairs;
- Walvis Bay International Airport;
- National Planning Commission (NPC);
- NAMCOR;
- NamPort;
- NACSO;
- Erongo Regional Council;
- Walvis Bay Town Council;
- Walvis Bay Municipality;
- Swakopmund Town Council;
- TransNamib;
- Swakopmund Municipality; and
- Arandis Town Council.

The records of the public consultation process in the form of a summary report are provided in Appendix B and include a list of interested and affected parties (I&APs'), evidence of consultation, including notes of public meetings, advertisements in national newspapers, and a summary of the comments or questions raised by the public.

3 REVIEW OF THE LEGAL ENVIRONMENT

This chapter outlines the regulatory framework applicable to the proposed Project. As stated in Chapter 1, an environmental clearance certificate is required for any activity listed in the Government Notice No. 29 of 2012 of the EMA. The proposed Project is within Namibia's maritime zones and bounded by environmental protected areas (i.e. Dorob National Park and Namib-Naukluft Park). Therefore, a comprehensive scoping and impact assessment will need to be undertaken to assess the significance of potential impacts that may be triggered by the project and recommend feasible practical mitigation, management and monitoring systems for adoption during different phases of the project.

International best practises, engineering codes and standards will be adopted into the various architectural designs and structural elements of the project to provide opportunities for streamlined operations that would warrant safety, reliability and best performance of the engineered systems.

A thorough review of relevant legislation has been conducted for the proposed Project. Table 4 below identifies relevant legal requirements specific to the Project. Table 5 provides the national policies and plans. Table 6 specifies permits relevant for the Project and Table 7 identifies the international policies and plans relevant to the Project. International codes and standards that will be applied in the design of various project elements are provided in Table 8.

3.1 NATIONAL REGULATORY FRAMEWORK

Table 4 - Details of the regulatory framework as it applies to the proposed Project.

National regulatory regime	Summary	Applicability to the Project
Constitution of the Republic of Namibia (1990)	The constitution defines the country's position in relation to sustainable development and environmental management. The constitution refers that the state shall actively promote and maintain the welfare of the people by adopting policies aimed at the following: "Maintenance of ecosystems, essential ecological processes and biological diversity of Namibia, and the utilisation of living, natural resources on a sustainable basis for the benefit of all Namibians, both present, and future." Article 100 stipulates that "Land, water and natural resources below and above the surface of the land and in the continental shelf and within the territorial waters and the exclusive economic zone of Namibia shall belong to the State if they are not otherwise lawfully owned". This defines the Government position in requiring licences for activities within these operational areas and facilitate control over them.	The proposed project will ensure the sustainable use of the environment, and has aligned its corporate mission, vision, and objectives with the Constitution of the Republic of Namibia (1990). The Proponent is also obligated to ensure its activities do not in any way interfere with any basic human rights as described under the constitution. The government is the ultimate accountable institution for ensuring that policies are put in place to protect natural resources for the benefit of all. This is achieved through the three organs of state: Executive, Judiciary and Legislative.

National regulatory regime	Summary	Applicability to the Project
Territorial Sea and Exclusive Economic Zone Act No.3 of 1990	The Act defines and determine the territorial sea, internal waters, exclusive economic zone and continental shelf of Namibia and activities associated herewith. The continental shelf is defined as State land and the Exclusive Economic Zone (EEZ) extends to 200 nautical miles (~370.4 km offshore).	The Project falls within the Namibian Exclusive Economic Zone (EEZ). The Namibian coast is governed as a national asset for the benefit of current and future generations. The Proponent is committed to conduct its operations in line with standards that complement long-term national policies on the conservation and management of coastal environments. The Project will commit to boost coastal economics, social development opportunities, coastal ecosystems and processes that maintain them.
Environmental Management Act, 2007 (Act No. 7 of 2007) and its regulations (2012), including the Environmental Impact Assessment Regulation, 2007 (No. 30 of 2011)	The Act aims to promote sustainable management of the environment and the use of natural resources. The Act requires certain activities to obtain an environmental clearance certificate prior to Project development. The Act states that an EIA should be undertaken and submitted as part of the environmental clearance certificate application process. The MEFT is responsible for the protection and management of Namibia's natural environment. The Department of Environmental Affairs (DEA), under the	This environmental scoping report documents the findings of the scoping phase of the environmental assessment undertaken for the proposed Project. The process has been undertaken in line with the requirements under the Act, its regulations, and international standards such as IFC.

National regulatory regime	Summary	Applicability to the Project
	MEFT, is responsible for the administration of the ESIA process.	
The Regional Councils Act (No. 22 of 1992)	This Act sets out the conditions under which Regional Councils must be elected and administer each delineated region. From a land use and project planning point of view, their duties include, as described in section 28 "to undertake the planning of the development of the region for which it has been established with a view to physical, social, and economic characteristics, urbanisation patterns, natural resources, economic development potential, infrastructure, land utilisation pattern and sensitivity of the natural environment. The main objective of this Act is to initiate, supervise, manage, and evaluate development.	The ammonia pipeline will be constructed adjacent to the Walvis Bay municipal townland masterplan area. The Municipality of Walvis Bay and the Erongo Regional Council office are mandated to uphold and authorise any developmental works in the town and the overall Erongo Region. These are key stakeholders and will be engaged at various levels during the ESIA process.
The Namibian Ports Authority Act, 1994 (Act 2 of 1994)	The Act provides for the establishment of the Namibian Ports Authority to undertake the management and control of ports and lighthouses in Namibia, and the provisions of facilities and services related thereto. The Act gives provisions for licence to undertake activities in any port (including entry to a port).	Construction materials may not be available in the local market. Should there be any delivery ship or vessel(s) entering NamPort waters during the construction phase of project and mobilisation, it will be required that all nautical safety requirements are complied with, and all relevant permissions or licences are acquired.
Soil Conservation Act, No. 76 of 1969	The Act makes provision for the prevention and control of soil erosion, and for the protection, improvement, and conservation of soil and vegetation.	The construction phase of the ammonia pipeline will cause minimal disturbances to soil structure, soil horizons of the desert environment.

National regulatory regime	Summary	Applicability to the Project
Water Resource Management Regulations of 2023, Water Resources Management Act No. 11 of 2013	This Act provides for the control, conservation and use of water for domestic, agricultural, urban, and industrial purposes; and to make provision for the control of certain activities on or in water. The Act stipulates obligations to prevent the pollution of surface and groundwater resources. The Department of Water Affairs, within the Ministry of Agriculture, Water and Land Reform (MAWLR), is the custodian responsible for the administration of the Act.	The Proponent is to acquire water required for the construction phase through a local water service provider (i.e. Walvis Bay Municipality). All waste generated, particularly during the construction phase will be handled appropriately by means of the wastewater system and disposed of at the waste disposal site. Measures to prevent potential surface and groundwater pollution are contained in the ESMP.
Hazardous Substances Ordinance, No. 14 of 1974	This Ordinance provides for the control of toxic substances and can be applied in conjunction with the Atmospheric Pollution Prevention Ordinance, No. 11 of 1976. This applies to the manufacture, sale, use, disposal, and dumping of hazardous substances, as well as their import and export.	Approximately 800 metric tonnes of ammonia will be transported daily from Farm 58 to the ammonia terminal at the Walvis Bay port area. The Proponent is obligated to ensure that safe handling, transfer, storage, and disposal protocols are developed, implemented and audited throughout the construction and operation phase of the ammonia pipeline. Leakage detection systems will be in place and inspections will be conducted routinely to timely address any leakages. Monitoring frequencies are outlined in the ESMP.

National regulatory regime	Summary	Applicability to the Project
		The Proponent is obliged to ensure a licence to operate as a Group I hazardous substance supplier is in place prior to the project commencement.
National Heritage Act 27 of 2004	The act provides for the protection and conservation of places and objects of heritage significance and the registration of such places and objects. It also makes provision for archaeological "impact assessments".	A heritage impact assessment will be conducted during the full ESIA process. The heritage impact assessments will include mitigation measures should heritage objects or artifacts be encountered during Project construction or operation.
Labour Act (No. 6 of 1992)	The Ministry of Labour, Industrial Relations and Employment is aimed at ensuring harmonious labour relations through promoting social justice, occupational health and safety and enhanced labour market services for the benefit of all Namibians. This ministry insures effective implementation of the Labour Act No. 6 of 1992.	The Proponent will implement the necessary measures to ensure the safety and welfare of employees throughout the project development phases by developing and occupational health and safety plans and standards operating procedures (SOPs)

3.2 NATIONAL POLICIES AND PLANS

Table 5 - National policies and plans applicable to the Ammonia Pipeline Project.

Policy or plan	Description	Relevance to the Ammonia Pipeline Project
Vision 2030	Vision 2030 sets out the nation's development targets and strategies to achieve its long-term national objectives. Vision 2030 states that the overall goal is to improve the quality of life of the Namibian people aligned with the developed world.	The proposed project embraces Namibia's long-term development goals. The national development goals are aimed at achieving a statutory prosperous and industrialised nation, developed by Namibia's own natural and human resources.

Policy or plan	Description	Relevance to the Ammonia Pipeline Project
		The project will further build on the achieving the goals through continued employment creation and ongoing contributions to gross domestic product (GDP).
Fifth National Development Plan (NDP5)	The NDP5 is the fifth in a series of seven five-year national development plans that outline the objectives and aspirations of Namibia's long-term vision. The NDP5 pillars are economic progression, social transformation, environmental sustainability, and good governance.	The proposed Project will complement efforts towards achieving the set targets through creating of employment opportunities, where and when required. The design of different Project's elements will ensure that triggered significant impacts towards the biophysical and social environment are reduced to the greatest extent feasible.
The Harambee Prosperity Plan ii (2021 – 2025)	Second Pillar: Economic advancement – ensuring increasing productivity of priority key sectors and the development of additional engines of growth, such as new employment opportunities.	The proposed Project meet government efforts in addressing high unemployment rate through the generation of employment within the regional and national landscape.
Namibia's Green Plan, 1992	Namibia has developed a 12-point plan for integrated sustainable environmental management to ensure a safe and healthy environment and to maintain a viable economy. Clause 2 (f) makes specific mention to guidelines related to sustainable development.	The Proponent is in full cognisance of the clauses under the Green Plan to ensure that best industrial practises are implemented to sustain the country's renewable resources, secure a safe and healthy environment and a prosperous economy for present and future generations.
Draft Gas Bill, 2001	The draft Gas Bill aims to promote the establishment of a gas transportation and distribution network in Namibia for the purpose of domestic supply and for	Although not enacted, the Proponent will take note of the draft bill requirements regarding the safe transport and handling of ammonia gas. The bill

Policy or plan	Description	Relevance to the Ammonia Pipeline Project
	export; to establish a framework of licensing of the gas industry and a national gas regulator to monitor the performance of licence conditions and promote reliability of services; to ensure safety, efficiency and environmental responsibility in the transportation and distribution of natural gas; to facilitate investment in pipeline infrastructure by private, public, municipal and mixed owned enterprises. The draft bill also aims to promote a competitive market in gas in the long term, and to stimulate cross-border trade in gas between Namibia and its neighbours.	promotes the emergence of a green economy through the gas energy industry.
Pollution Control and Waste Management Bill (draft), 1999	This draft Act aims to promote sustainable development by regulating the discharge of pollutants into the air, land and sea. Additionally, to ensure Namibia has an integrated waste management approach and complies with international legislation.	The Proponent to take note of the draft bill requirements and ensure conditions are adhered to with regards to containment of pollutants. Pollution control protocols and monitoring frequencies will be developed for the Project.
The Green Paper for the Coastal Policy of Namibia	The Green Paper provides an outline of the key findings of a long-term study on the conservation and management of the Namibian coast. It sets out the coastal policy and the vision for the coast, as well as principals, goals and objectives for coastal governance. It also presents the options for institutional and legal arrangements towards implementing the emerging Namibia Coastal Policy options for coastal governance in Namibia.	The principles of Integrated Coastal Zone Management will be used as guidance in the ESIA and will be considered and included where applicable in the ESMP.

Policy or plan	Description	Relevance to the Ammonia Pipeline Project
The National Policy on Coastal Management for Namibia	The National Policy on Coastal Management for Namibia aims to provide a framework to strengthen governance of Namibia's coastal areas to realise long-term national goals defined in Vision 2030 and specific targets of the National Development Plans, namely: sustainable economic growth, employment creation and reduced inequalities in income. Overall, the policy aims to ensure that our coastal resources are protected, used and developed for increases livelihood security and sustainable economic development for all Namibians.	The Proponent shall be guided by the strategic recruitment plan to ensure fair recruitment of competent locals as the Project requires.

3.3 RELEVANT PERMITS AND LICENCES

Table 6 - Relevant permits and licences required for the project.

Permit/Licence	Act/Regulation	Related activities requiring permits	Relevant Authority
Environmental clearance certificate	Environmental Management Act, No. 7 of 2007	Required for all listed activities as stipulated in the EMA Regulations of 2012.	Ministry of Environment, Forestry and Tourism
Written approval for the development of private property on municipal land	The Standard Building Regulations and amendment, 1995	Required for the development of bulk/industrial infrastructure within Walvis Bay municipal land.	Municipality of Walvis Bay
Letter of no objection for the construction an ammonia pipeline within a national park	A procedural requirement of the MEFT to guide the record of decision (RoD) process.	Required of any industrial infrastructure to be developed within the Dorob National Park.	Dorob National Park Management Committee

Permit/Licence	Act/Regulation	Related activities requiring permits	Relevant Authority
A licence required to operate as a supplier of Group I hazardous substances	Hazardous Substances Ordinance No.14 of 1974	Required for the Proponent to supply of Group I hazardous substances.	The National Radiation Protection Authority under the Ministry of Health and Social Services (MoHSS).
Waste water discharge permit	Water Act No.11 of 2013	Required for waste disposal activities.	Ministry of Agriculture, Water and Land Reform

3.4 INTERNATIONAL CONVENTIONS

Table 7 - International policies and plans applicable to the Project.

Policy or plan	Description	Relevance to the Ammonia Pipeline Project
United Nations Law of the Sea Convention (UNCLOS), 1982	The UNCLOS provides an international legal framework to govern the seas and oceans of the world. Namibia as the designated State is required to administer exploitation, protection and preservation of the marine environment and natural resources on the Namibian Continental Shelf and Exclusive Economic Zone.	This is achieved though the EMA Act. The manufacturing, storage, handling or processing of hazardous substances is a listed activity under the EMA Act and requires an environmental clearance certificate. An environmental impact assessment study is conducted in this regard, and mitigation management measures will be provided in the ESMP. It is not envisaged that any hazardous waste will be generated or will be required to be disposed of or moved across Namibian borders.

Policy or plan	Description	Relevance to the Ammonia Pipeline Project
The International Finance Corporation Standards (IFC), 2012	Through eight (8) Performance Standards, the standards draw a framework and strategic commitments for Proponents to promote sustainable development through integrated environmental and social risks assessments, and setting standards and management techniques to avoid, minimise and where residual impacts remain, to compensate/offset for risks and impacts to workers and affected communities. Performance Standard 3 recognises that consumption of finite resources, threats to air, water, land and projected atmospheric concentrations of greenhouse gases (GHG) threatens the public health and welfare of current and future generations at the local, regional and global level.	The potential impacts to be triggered by the proposed project are assessed thoroughly as part of the ESIA and management mitigation measures to essentially guide standards of operation. These are provided in the ESMP. The Proponent is committed to adopt where applicable, international best practises to ensure economic growth efforts are aligned to Namibia's conservation and environmental management systems.
Paris Agreement, 2015	The Paris Agreement's main aim is to strengthen the global responses to climate change threats by maintaining a global temperature rise well below 2°C above pre-industrial levels. Namibia is a Non-Annex 1 Party to the Paris Agreement, ratified in 2016. The government is actively engaged in addressing climate change and works in collaboration with international organisations and partners to boost the nation's capacity to meet its climate-related objectives.	Namibia's approach to climate change regulation is closely drawn to commitments made through the sustainable development goals (SDGs) programs, particularly at community level.

Policy or plan	Description	Relevance to the Ammonia Pipeline Project
The United Nation Convention for the Protection of the Ozone Layer, 1985	The overarching objective of the convention is to protect human health and the environment against adverse effects resulting from modification of the ozone layer. Parties commit to cooperate in research concerning substances and processes that modify the ozone layer on human health and environmental effects of such modifications, and on alternative substances and technologies and systematic observations. Currently Namibia isn't signatory to the convention, however best practises are key parameters towards the country's effort in meeting its climate-related objectives.	Namibia is a net carbon sink at present. However, continued commitments are drawn to achieve national climate change objectives through sustainable development goals (SDGs) programs.
United Nations Framework Convention on Climate Change (UNFCCC), 1992	The objective of the convention is to reduce and stabilize greenhouse gases at an atmosphere level to reduce impacts on climate systems, to allow ecosystems time to adapt to these changes, reduce food shortages and promote economies to develop in sustainable manners. Namibia ratified the UNFCCC in 1995 and thus is obligated to prepare and submit national communications, biennial update reports and NDCs (a climate action plan to cut emissions and adapt to climate impacts).	Although Namibia is classified as a net carbon sink country at present, the country developed the National Policy Climate Change Strategy and Action Plan (NCCSAP) to facilitate and enhance energy efficiency and promote sustainable low carbon development and sustainable energy through technology and innovations. This is relevant to the project as the innovative scope of work proposed builds on an emerging green hydrogen/ammonia industry in the country.
The Stockholm Declaration on the Human Environment, Stockholm 1972	Namibia has adopted the declaration in 1996 with the following Principle 3 and 21 most relevant to the proposed Ammonia Pipeline Project. Principle 3 states that the earth has capacity to produce, maintain, restore and improve	Namibia has shown support to newly developed green hydrogen pilot projects. Across southern Africa, Namibia is one of the countries with abundance renewable energy resources and has

Policy or plan	Description	Relevance to the Ammonia Pipeline Project
	vital renewable resources, wherever practicable. Principle 21 states Namibia has the right to explore her own resources but to ensure that there are effective policies to regulate these activities as to not cause detrimental harm to the environment.	potential to lead the transition into green economy.

3.5 INTERNATIONAL CODES AND STANDARDS

Table 8 - Relevant international codes and standards applicable to the Project

International standard/code	Description	Relevance to the project
IEC 60079 Hazardous Area Classification Standard	The IEC 60079 series is a compilation of standards that cover all permitted protection techniques for equipment in potentially hazardous areas. It is maintained by the International Electrotechnical Commission (IEC) and has been generally adopted worldwide.	The Project involves the transportation of ammonia. Ammonia is much less flammable than hydrogen, however at certain concentrations and temperatures it could cause an explosion. The Proponent will ensure apparatus to be used in the construction of various project elements meet these standards.
IEC 61508 Functional Safety of electrical, electronic and programmable electronic (E/E/PE) safety-related systems	This standard allows for the development of a uniform technical approach that can be applied to all safety systems in electronics and related software. The standard requires the analysis of the potential risks or hazards of a given system or device. It provides categories to determine the level of likelihood of a potential hazard and the consequences should it occur.	Similarly, the Proponent is committed to ensuring that advanced electronics and software's are in place to timely detect potential hazards and launch the necessary remediations.

International standard/code	Description	Relevance to the project
IEC 61511 Functional safety - Safety instrumented systems for the process industry sector	The standard provides the benchmark for the management of functional safety in the process industries. It defines the safety lifecycle and describes how functional safety should be managed throughout that lifecycle. It also defines requirements for management processes (plan, assess, verify, monitor and audit) and for the competence of people and organisations engaged in functional safety. An important management process is Functional Safety Assessment (FSA) which is used to make a judgement as to the functional safety and safety integrity achieved by the safety instrumented system.	The standards allow for periodic monitoring of functional systems for malfunctions. This allows for streamlined and efficient operations various system units.
AS 1940 Storage and Handling of Flammable liquids and combustible liquids	Australian Standard 1940 (Storage and Handling of Flammable and Combustible Liquids) was formally updated in August 2017. This change is important, because the standard forms an important reference for the State and Territory fuel storage legislation. AS 1940-2017 provides requirements for the planning, design, construction, and safe operation of all installations in which flammable or combustible liquids are stored or handled.	Ammonia may be flammable and under certain concentrations and temperatures; therefore, these standards and the associated handling guidelines are applicable and would be integrated in different departments of the project as required.
American Society of Mechanical Engineers (ASME)		

International standard/code	Description	Relevance to the project
ASME B31.3 Process Piping (1922)	American Society of Mechanical Engineers (ASME) B31.3 contains requirements for piping typically found in petroleum refineries; chemical, pharmaceutical, textile, paper, semiconductor, and cryogenic plants; and related processing plants and terminals. It covers materials and components, design, fabrication, assembly, erection, examination, inspection, and testing of piping. This Code applies to piping for all fluids including: • raw, intermediate, and finished chemicals; • petroleum products; • gas, steam, air and water; • fluidized solids; • refrigerants; and • cryogenic fluids.	The piping specifications as may be deemed appropriate for the local desert environment would be considered. This specification allows to corrosion resistance etc.
South African Bureau of Standards		
SANS 10260-2	The South Africa National Standards (SANS) deals use of verified equipment for industrial distribution of hydrogen.	The standards allow for the use of verified, best available technologies. This ensures streamlined, efficient and modernized operations.

4 PROJECT DESCRIPTION

4.1 NEED FOR THE PROJECT

Global economies are still largely reliant on carbon-based fossil fuels. However, with the ever-present risk of climate change, industries and governments are embracing a drive for economic decarbonisation. While Namibia can still be considered a net-carbon sink, all aspects of life in the country are vulnerable to the short, medium and long-term impacts of climate change. According to WWF (2023), climate change is experienced through intensified droughts and floods. Within Namibia, these impacts threaten ecological resources, ecosystems functions and economic and social sustainability and development. Climate change is expected to affect the annual rainfall patterns and seasonality, likely adding to water scarcity and threatening food security.

Namibia has abundant solar and wind energy resources. These renewable energy sources can be leveraged in the development of a local green economy. Sustainable energy provides an opportunity for new career paths, creating new jobs through green energy production plants and contributing to the economy whilst reducing reliance on non-renewable resources, (Constellation, 2024). Green hydrogen is produced by splitting water through electrolysis using renewable energy. The process does not generate carbon dioxide as a by-product (only oxygen). Green hydrogen is often converted to green ammonia, which has a higher energy density, is less costly to transport, and presents fewer technical obstacles, hence it is much easily stored in bulk (Amelang, 2023). Green ammonia is viewed as a key energy vector to accomplish global decarbonisation supporting Vision 2030 goals of reducing greenhouse gas emissions (Acciona, 2020).

Currently, limited national policies and legislation regulate the green hydrogen and/green ammonia industry in Namibia. This project, along with lessons learned from similar ongoing green hydrogen pilot projects in the country, would serve as a foundation for developing and refining these policies and regulations.

This project is proposed to develop the skills, competence, and standards of the Namibian market. It presents a significant opportunity for growth and development within the country. In the future, the project aims to export green ammonia.

During the ammonia pipeline project, the proponent proposes that the liquid ammonia be transported from the ammonia production plant via the green ammonia pipeline to the ammonia terminal for storage and future exporting purposes. The ammonia pipeline and other associated components builds on a significant emerging green ammonia industry in Namibia.

4.2 CONSTRUCTION PHASE

The activities for the proposed pipeline construction phase are discussed in the section below.

4.2.1 CONSTRUCTION OF STAGING AREAS AND STORAGE YARDS

Staging areas and storage yards will be strategically located along the planned right-of-way (ROW) and cleared of vegetation (if required). These areas are used to stockpile the pipes, store fuel tanks, sandbags, silt fencing, stakes, and equipment parts. They will also provide parking for construction equipment and employee vehicles.

4.2.2 RIGHT OF WAY CLEARING

Once the site has been established, the ROW will be cleared of vegetation and obstacles. Sensitive, rare and important vegetation may be removed and relocated to a suitable environment.

4.2.3 TRENCH EXCAVATION

The trench for the pipeline will be excavated in segments where the pipeline will be buried. If rocks ledges are encountered, track hoes equipped with jackhammers will be used to excavate the trench. Sandbags will be placed within the trench to support the pipe during installation.

4.2.4 PIPE TRANSPORT, STRINGING AND ASSEMBLY

After trench excavation, 12 metre pipe segments will be transported from the staging area to the ROW. Pipes will be laid either above ground beside the trench or within the trench, supported by sandbags in steep terrain. The final placement will be determined through the ESIA process. Pipe sections will be bent using a pipe bending tool to allow the pipeline to follow the planned route and the terrain. Pipe sections will be welded together, potentially sandblasted, and the weld joints coated to prevent corrosion. For added protection against corrosion, Denso™ wrapping and cathodic protection will be applied. Cathodic protection wire must be foreseen in the same trench of the pipeline. X-ray inspection will be used to ensure the quality of each weld joint. Finally, connected pipe lengths of pipe will be carefully lowered into the trench.

4.2.5 OBSTACLES: ROADS AND STREAMS

The pipelines route crosses existing roads, highways, streams, rivers and wetlands. Pipelines will be constructed underneath these obstacles using techniques like boring for shallow depth or using horizontal directional drilling (HDD) for deeper placement. Each obstacles requires a unique construction method and order of operations to minimise negative impacts.

4.2.6 TESTING AND RESTORATIONS

After the pipe installation and inspection, the trench is carefully backfilled. Pipeline integrity will be verified using hydrostatic testing before project completion. This process involves pumping water through the pipeline at a pressure exceeding the maximum operational level. If the pipeline

remains intact, it is deemed operational. Following testing, the ROW will be seeded, fertilized, and marked with above-ground markers. An additional safeguard measure is to tape along the pipeline route positioned 500 mm above the pipeline. This to indicate the approach of an underground line while excavating a trench in future situations.

4.2.7 SUPPORTING INFRASTRUCTURE

Supporting infrastructure will be required and constructed during the ammonia pipeline project. Valve stations will be built above the pipeline allowing operators to shut off sections of the pipeline due to either maintenance or emergency response to a potential leakage of incident. A fiber optic cable will be following along the pipe route (secured to the pipe) to ensure the monitoring of all parameters such as temperature, pressure and vibrations.

To ensure pipeline integrity, welds must be x-rayed and the pipe hydrotested. This process involves pumping in clean water, pressured above the expected maximum average operating pressure (MAOP). Then, all water is removed, and pipeline intervention gadgets (pigs) may be inserted into the pipe to clean it out. Pigs are devices used to inspect and remove dirt and other construction debris while pipelines are being assembled. When the pigs eventually exit the far end of the pipe, the line will be filled with dry air. However, the pigging system is optional and cleaning the line is not necessary in the case of the ammonia pipeline. Air compressors pump up the air, and the air is run through a drier. The air will be sampled and tested for moisture content. When those parameters get low enough, the complete pipeline is filled with nitrogen to absorb more of the remaining moisture. The pipeline is then deemed fit to transport ammonia.

Valve stations, pig sender/receiver will be incorporated for security where required for potential above ground installations.

4.2.8 EQUIPMENT AND MATERIALS

The equipment listed below will be used during the construction phase though this list is comprehensive at the time of writing, operational requirements may result in the introduction of additional equipment and materials during construction):

- Trenchers
- Skid steer loaders
- Rock grinders
- Backhoe loaders
- Dozers
- Excavators
- Articulated trucks
- Trackhoe with Jackhammer
- Weld Decks
- Pipelayers

- Directional drilling equipment
- Weldings stations
- Transportation trucks
- Truck to load and transport pipes to designated locations

The ammonia pipeline will consist of approximately 6-inch carbon steel pipe with a 75 mm insulation layer. It will be painted and wrapped with Denso™ wrapping tape which is used to prevent corrosion should the pipeline be constructed underground. If the pipeline is constructed above ground, the Denso™ wrapping tape will provide protection against the saline environment. Table 9 provides the specifications and design details of the ammonia pipeline.

Table 9 - Ammonia pipeline design specifications.

Parameter	Unit	Ammonia pipeline
Transported fluid	-	Ammonia
Design pressure	barg	Preliminarily 50
Design/operating temperature	°C	5
Material	-	Carbon steel
Line pipe type	-	SMLS
Material grade	-	API 5L X60
Specified minimum yield	MPa	415
Insulation layer	mm	75
Corrosion allowance	mm	1.0

4.2.9 POWER SUPPLY

Power supply may be provided by a local electricity distributor for the Erongo Region. Power supply will be used for temporary facilities during the project such as office space, toilets and changing areas during the construction phase.

4.3 OPERATIONAL PHASE

During the operational phase, liquid ammonia with a mass flow between 20 to 60 ton/h will be transported 12.7 km from the proposed ammonia production plant on Farm 58 to the ammonia terminal near the Walvis Bay north port area for storage. Trained personnel will continuously monitor operations and ensure safety procedures are followed.

There will be constant monitoring with a fibre optic cable of possible leakages points, pressure switches and vibrations (external digging). These systems will be monitored from Farm 58. Infield surveys will also be conducted on a regular basis and/or when required.

4.3.1 WATER SUPPLY

Water for construction and operational needs (worker facilities) may be sourced from the local municipality/town council, however no such agreements have been made as of yet. The Project's water requirements are not anticipated to impact local water supply.

4.3.2 WORKERS AND ACCOMMODATION

Approximately 30 to 100 semi-skilled workers will be hired during the construction of the ammonia pipeline, with two security guards on night duty. Employees will likely reside in Arandis, Walvis Bay, or Swakopmund; no on-site accommodation is planned.

4.3.3 WASTE MANAGEMENT

A waste management plan will be developed and overseen by the engineering, procurement and construction (EPC) contractor. Temporary waste bins will be available on-site varying in waste categories such as general household waste, plastic, steel, concrete and hazardous waste. The waste management plan will include:

- On-site waste separation and collection (general waste, plastic, steel, concrete, hazardous waste).
- Proper waste disposal procedures.
- Regular toolbox talks to keep workers informed about waste management requirements.
- Mitigation measures will be further detailed in the environmental and social management plan (ESMP).

4.4 DECOMMISSIONING STAGE

The ESMP will outline auditable decommissioning and rehabilitation procedures and actions for the Proponent to ensure careful and sustainable management measures are implemented. The proponent will have to implement rehabilitation measures at the Project decommissioning stage as outlined in the ESMP.

4.5 ALTERNATIVES CONSIDERED

In terms of the Environmental Management Act, No. 7 of 2007 and its regulations, alternatives considered should be analysed and presented in the EIA report. This requirement ensures that during the design evolution and decision-making process, potential environmental impacts, costs, and technical feasibility have been considered, which leads to the best option(s) being identified.

Potential alternatives that have been identified during the ESIA process so far is whether the pipeline should be designed to be placed above or below ground. Stakeholder suggestions and specialist studies will inform the decisions made for the benefit of all parties involved. Additionally, different pipeline routing options have been considered. It has been proposed that the ammonia

pipeline be constructed underground between Farm 58 and the North port area. More alternatives may be proposed and will be assessed.

4.6 NO-GO ALTERNATIVES

Should the project not occur, the socio-economic and environmental benefits associated with the green hydrogen initiative in Namibia will be lost. Namibia has the opportunity to be a leader in the emerging green energy markets and be an international exporter of green ammonia, which may be a vital source of foreign investment. The green hydrogen vision leads to the creation of career paths, employment, contribution to the economy in terms of reducing energy reliance and income generation and provides a solution to present environmental concerns. According to the Nationally Determined Contribution (NDC) registry, Namibia has set bold goals to reduce greenhouse gas emissions by 2030 and pursuing green energy projects locally will strategically allow Namibia to reach milestones.

5 ENVIRONMENTAL AND SOCIAL BASELINE

5.1 BASELINE DATA COLLECTION

This section sets out the findings from the desktop study, which involved reviewing existing literature, spatial data, and publicly available reports, on the biophysical and socio-economic environments of the receiving environment in the project area. It is an important part of the scoping component of the assessment, as it determines whether there are any knowledge gaps that require additional information prior to the assessment phase, where it will serve as the foundation for impact analysis and mitigation planning. Preliminary findings suggest that further investigation is required regarding endangered species in the project area, heritage artifacts in the project area, traffic flow on the B2 road and regional hydrology and hydrogeology flow patterns intercepting the project area. This chapter will be expanded with specialist baseline information (including hydrological modelling, biodiversity surveys, and socioeconomic assessments) once all field studies have been completed.

5.2 LAND USE

The proposed ammonia pipeline will be located between Farm 58 and the Walvis Bay North port area, defined by Namport, to connect the ammonia production plant to the ammonia terminal for storage. Farm 58 is ~3 000 ha in extent and is situated east of Dune 7. The piece of land was rezoned from a conservation area to industrial site and is currently divided into portions which is granted to several businesses including Cleanergy Solutions Namibia (Pty) Ltd. The Port of Walvis Bay is located along the central western coast of Namibia with access to principal shipping route. The Walvis Bay port consist of different facilities such as container terminal, privately operated bulk cargo terminal and tugboats. The area is a highly disturbed and is continuously expanding.

Figure 5 provides a visual representation of the proposed green ammonia pipeline route in proportion to surrounding local and national conservation areas.

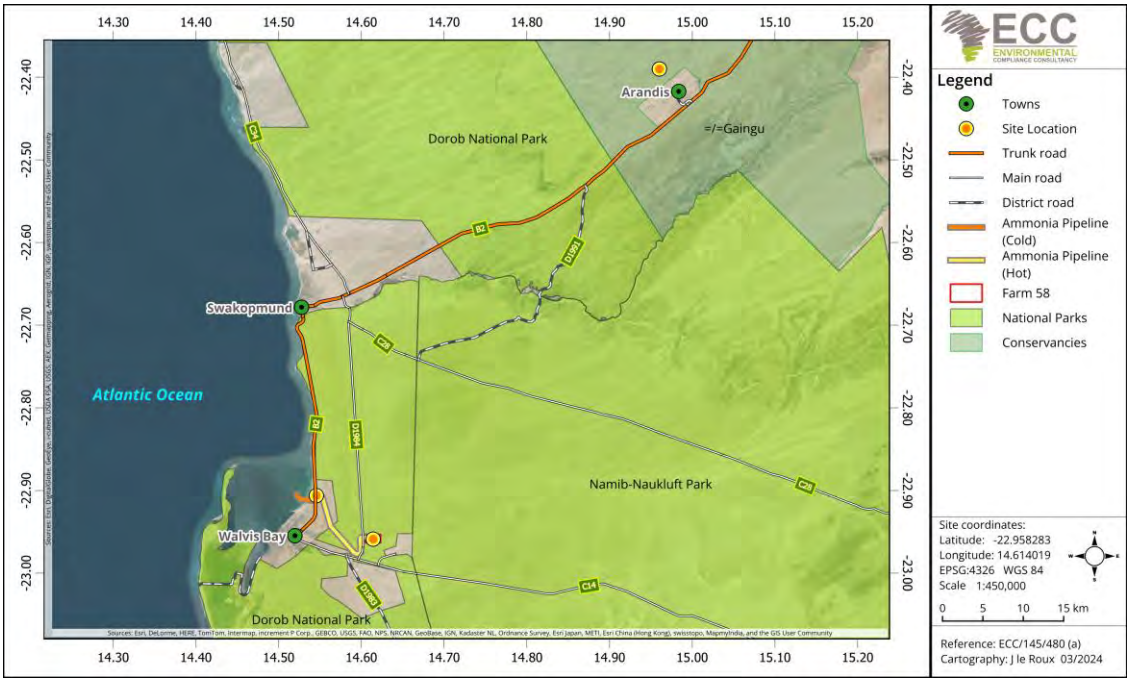


Figure 5 - The proposed green ammonia pipeline route in proportion to local conservation and municipal residential areas.

5.3 CLIMATE

Climate and weather data from Meteoblue (2024) along with desktop QGIS data for the site has been used to provide the climate data for the project area. Summer months are characterised by warm temperatures with an average maximum temperature of 29˚C and average minimum temperature of 15˚C (Figure 6). The warmest months are generally between November and May while winter months with minimum temperatures reaching 8˚C span from June and September. The overall annual temperatures are stable and steady. During the winter months, the coastal towns (i.e. Swakopmund and Walvis Bay) experience fiery blasts of strong, hot air that are referred to as east winds. These strong winds from the eastern direction descend over the great escarpment, get picked up and carried with sand particles towards to coast and over and into the Atlantic Ocean (Atlas of Namibia Team, 2022).

The annual average solar radiation is between 5.4 to 5.6 which is low due to the frequent cloud and fog cover experienced along the coast. Fog defines much of the Namib Desert's climate (Atlas of Namibia Team, 2022). The approximate number of days that this area receives fog are more than 125 days which is the most compared to the inland and eastern areas of Namibia (Mendelsohn, Jarvis, Roberts, & Robertson, 2002). Majority of the summer days are partly cloudy whereas in winter, there are more sunny days, as shown in Figure 7. The months with the highest humidity, have relative humidity (RH) of ~90% while the driest months have a humidity between 40 and 50%. The area is located within the Desert biome that is predominated by erratic rainfall pattern and receives on average annual rainfall of <50 mm.

Potential evaporation is between 1680 and 1820 mm per year (Mendelsohn, Jarvis, Roberts, & Robertson, 2002). Maximum wind speeds reach up to 38 km/h, with dominant southwest (SW) and east-northeast winds (ENE) (Figure ***8***).

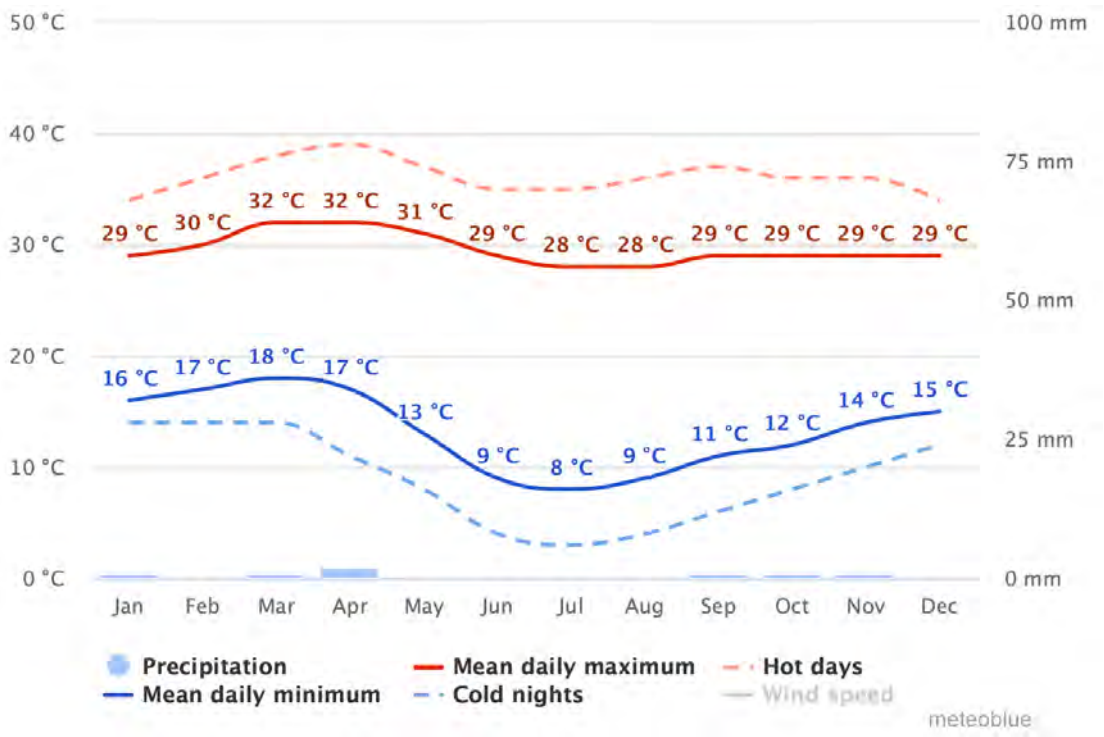


Figure 6 - Average temperature and precipitation (Meteoblue, 2024).

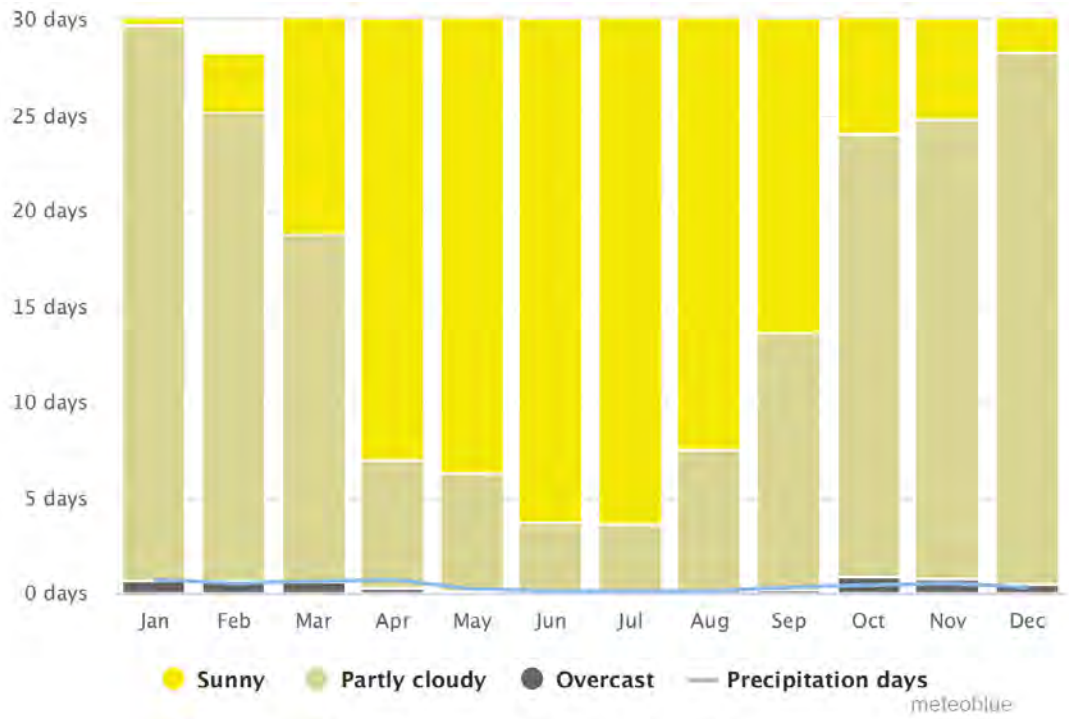


Figure 7 - Annual cloud cover (Meteoblue, 2024).

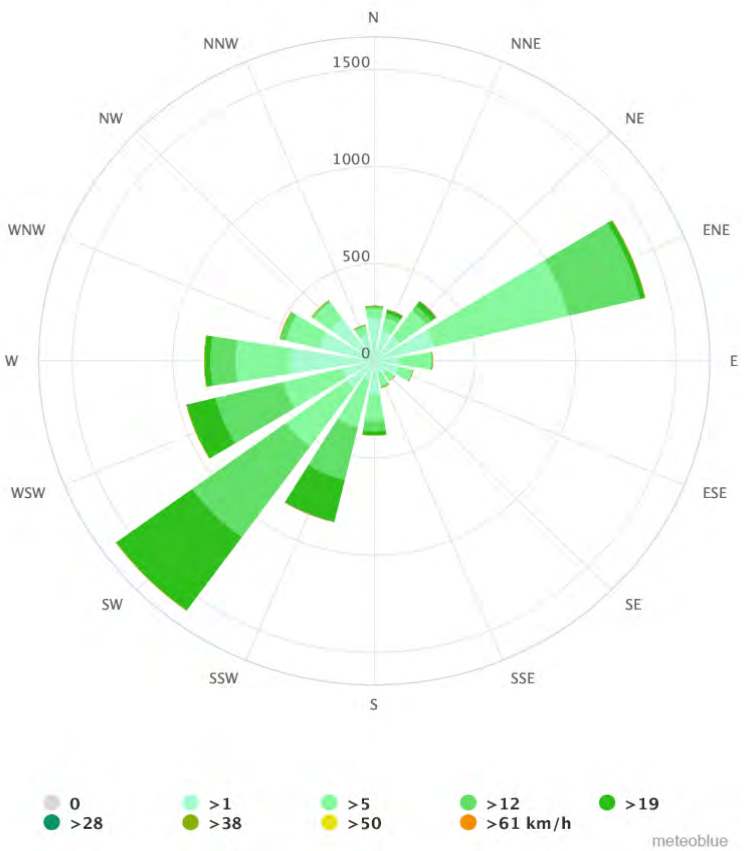


Figure 8 - Average wind speed and direction in this area (Meteoblue, 2024).

5.4 SOILS, GEOLOGY AND TOPOGRAPHY

The regional geology of this area consists mainly of the Kalahari Group with the rock type characterised as Kalahari and Namib Sands (Figure 9). The Kalahari Group covers an extensive section along the southern part of Africa and form a low-relief landscape dominated by considerable unconsolidated sand (Matomon, et al., 2014). The proposed pipeline is located on the Dune Belt, bounded between the D1984 road to the B2 road between Walvis Bay and Swakopmund. The main rock types for this area are dune sand and calcrete. Calcrete is commonly found in arid to semi-arid regions and are described as a calcium-rich duricrust - a hardened layer in of soil (Britannica, 2008).

The ammonia pipeline borders an area dominated by rock outcrops and gypsisol soils as illustrated in Figure 10. Rocky outcrops areas are covered with large, hard rocks and may include a wide variety of physical landscapes, including escarpments, overhangs, cliffs, tors, boulder-heaps and inselbergs (Fitzsimons & Michael, 2017). Large rocky outcrops play a vital role in conserving specialised plants and animals that inhabit these rocks, producing small water puddles, contributing to soil nutrients and providing livestock with protection for wind and sun (Australian National University Sustainable

Farms, 2024). Rocky outcrops provide micro-habitats supporting species diversity, endemism and nesting sites. Gypsisols are soils with a significant secondary accumulation of gypsum rich in nutrients, which develop on alluvial, colluvial and aeolian sediment commonly found on flat and rocky areas in arid conditions (Jordan, 2023). Calcium sulphate is dissolved out of the rock and soil, carried by percolating water beneath the surface, where it remains in various forms such as powder, pebbles, stone or gypsum crystals (Mendelsohn, Jarvis, Roberts, & Robertson, 2002). Theses soils form where evaporation is much higher than precipitation, therefore indicating poor moisture in soil (Atlas of Namibia Team, 2022).

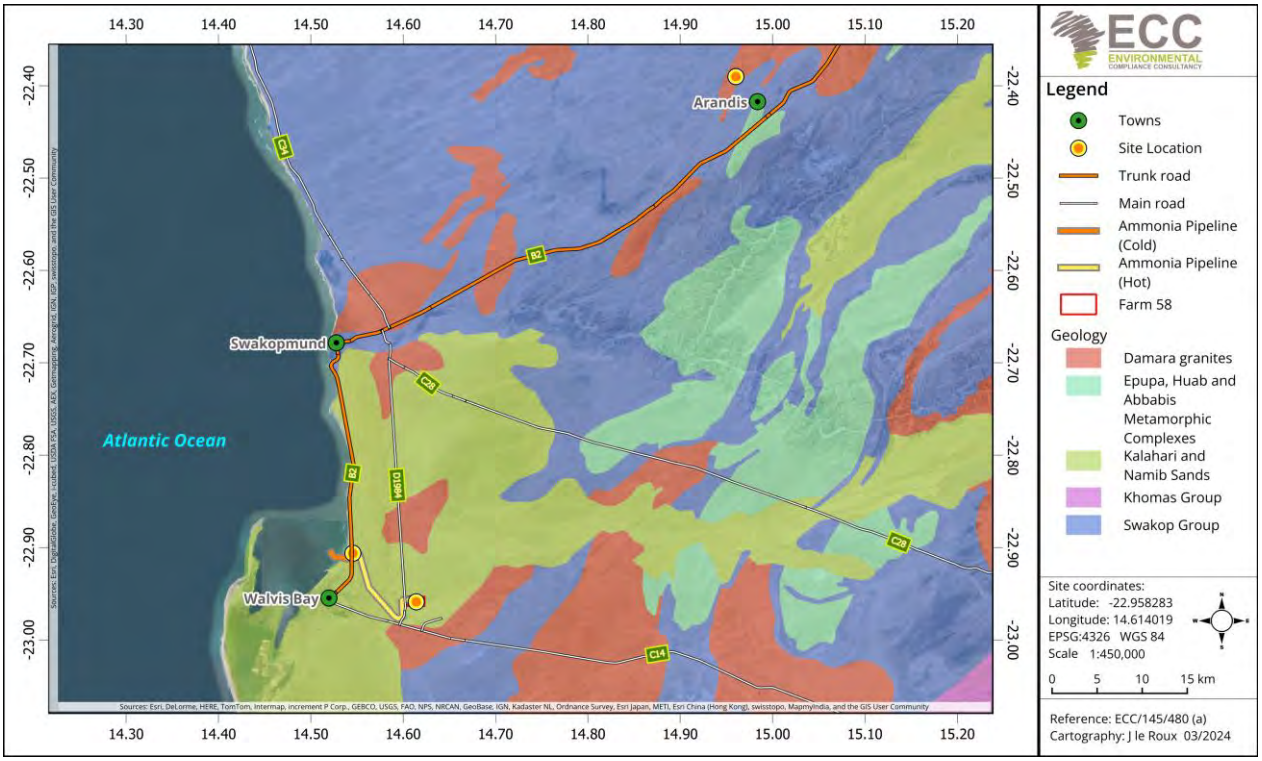


Figure 9 - Geology of the Project area.

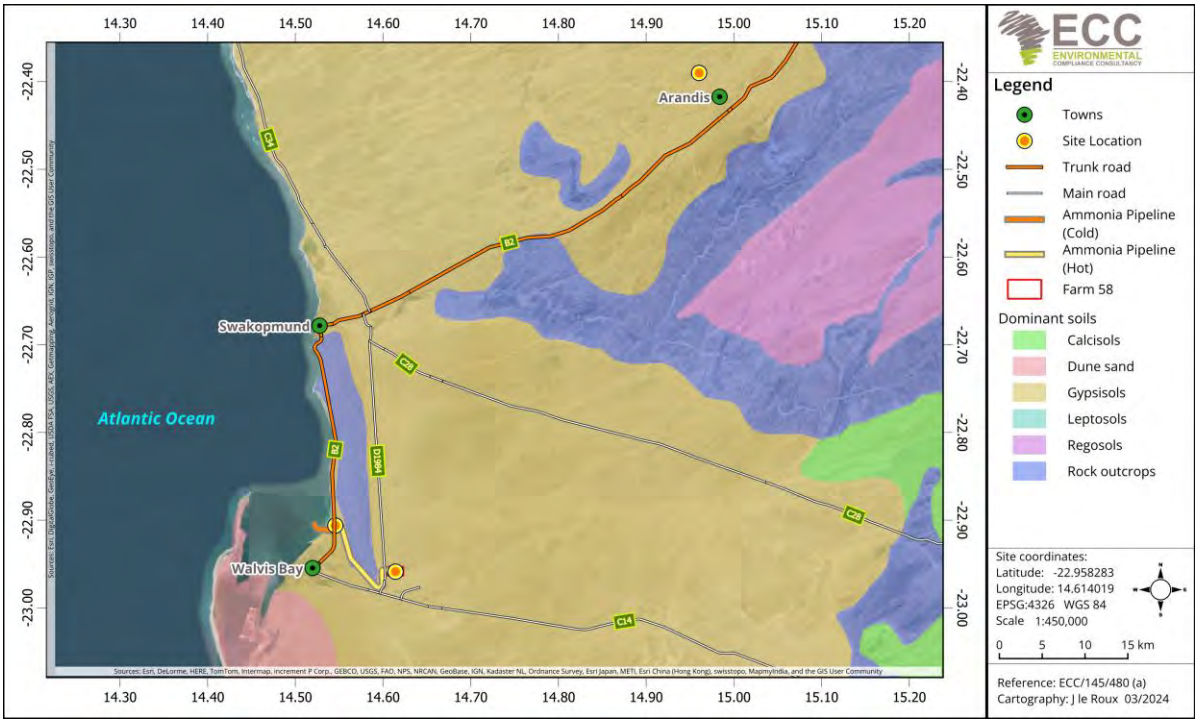


Figure 10 - Soil composition in the Project area.

The topography of the Project site is relatively flat. The elevation increases toward the eastern direction of Namibia. The overall elevation of the proposed site varies between 25 and 200 m (Figure 11).

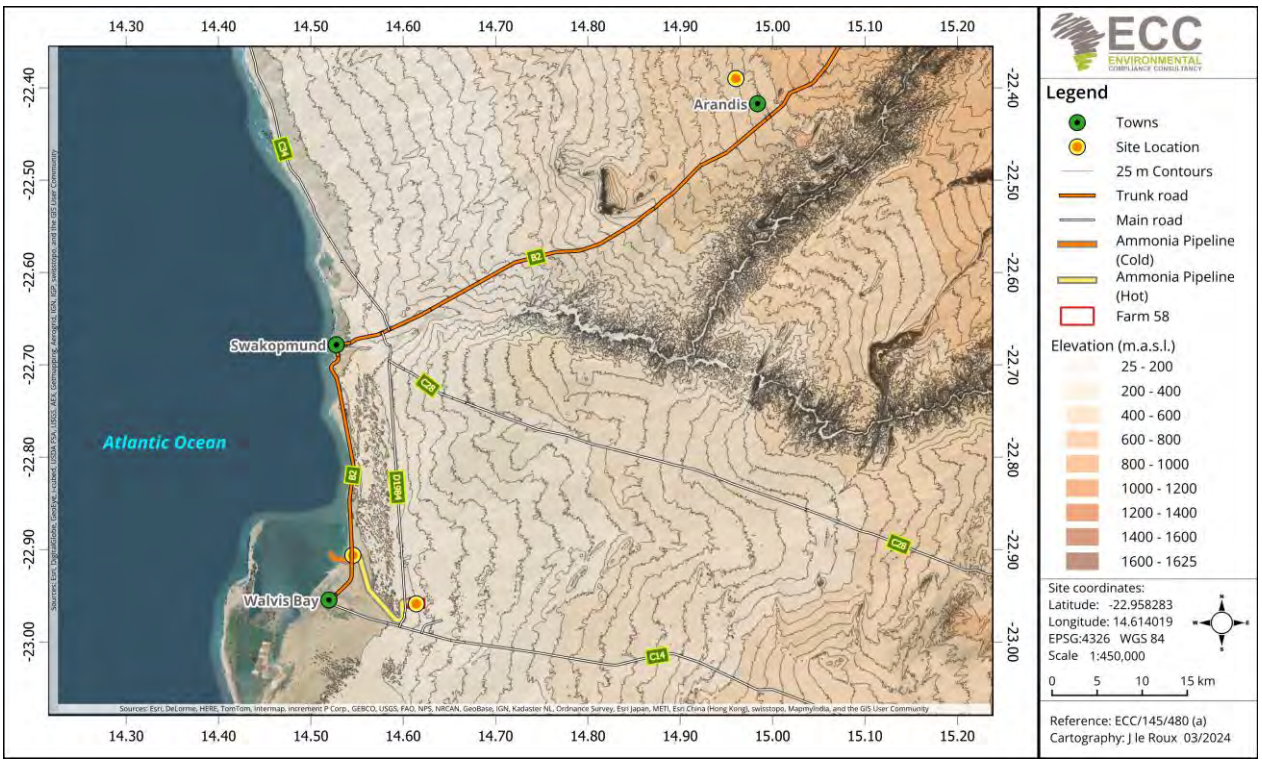


Figure 11 - Elevation in the Project area.

5.5 HYDROLOGY AND HYDROGEOLOGY

The 'hot' (ambient temperature) ammonia pipeline may cross or move along certain drainage areas. The proposed project site covers the Erongo groundwater basin as shown in Figure 12. The rock body over which the site falls contains very limited groundwater potential, yielding less than 0.5 m^3 of water per hour. This water may be explored as an emergency water supply; however, it is highly unlikely that water will be found in this area. The groundwater quality along these areas is unknown or limited information may be available (Atlas of Namibia Team, 2022).

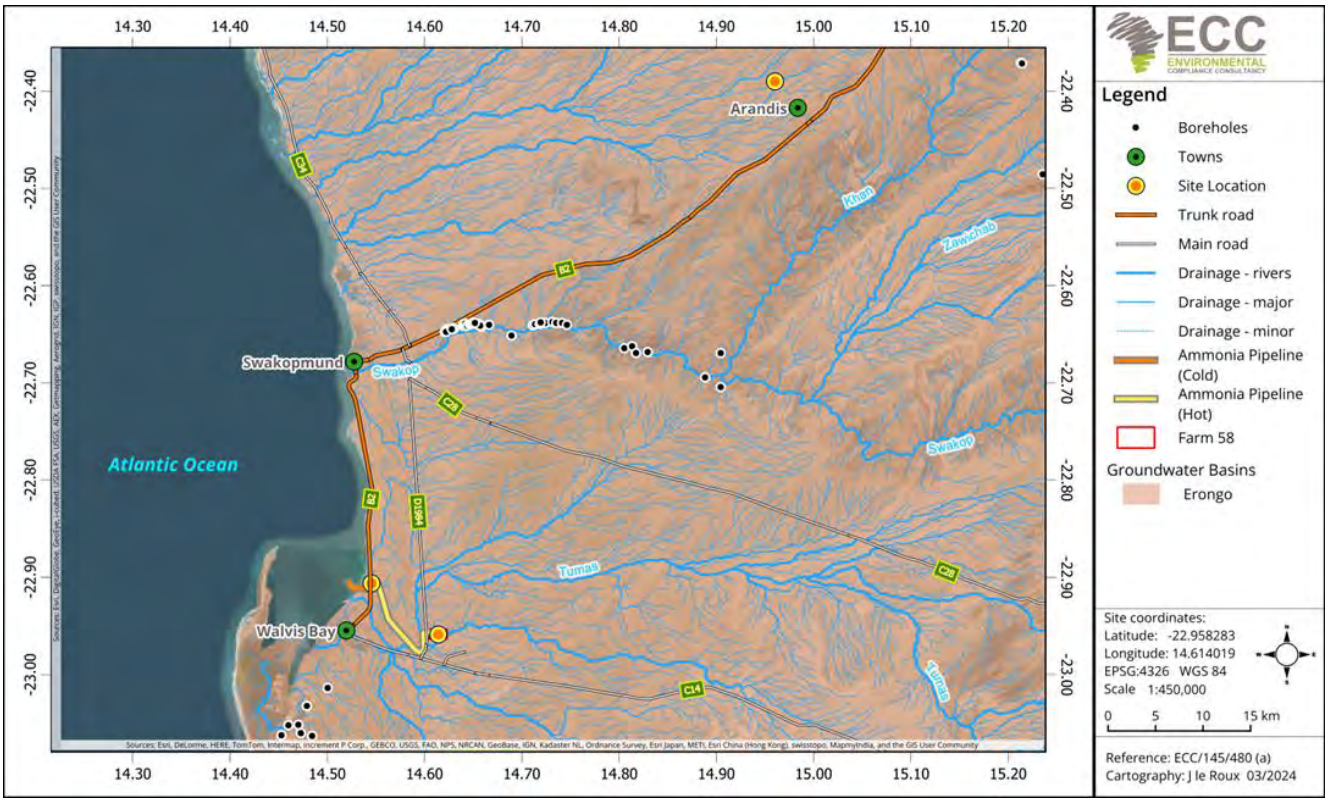


Figure 12 – Surface water flows showing ephemeral rivers, drainage line and groundwater boreholes in the project area

5.6 BIODIVERSITY BASELINE

5.6.1 GENERAL BIOME CHARACTERISTICS AND FLORA

The proposed project location is within the central desert area of the Namib Desert. Despite the arid and unfavourable climatic conditions, the Namib Desert's biotic communities are extraordinarily appealing and unique (Wassenaar, et al., 2013). The dominant structure around the site area is grassland and dwarf shrublands. The plant diversity is characterised as extremely low with less than 50 species. The plant endemism rate is low with ~2 to 9 species. Tree cover is extremely low, and the dominant vegetation are *Brownanthus arenosus* and *Othonna cylindrica*. *Brownanthus arenosus* is characterised as a succulent subshrub adapted to the dry conditions of the desert and the drier sections of the shrubland biome in Namibia and South Africa. *Othonna cylindrica*, similarly to

Brownanthus arenosus, is a succulent sub-shrub with bright yellow flowers and is classified as near-endemic to Namibia. The vegetation cover in the general project area is shown in Figure 13.

The floristic group refers to the geographical distribution of seemingly unrelated vegetation species overlap in such a way that suggests that they have an origin in common – similar evolutionary history (Atlas of Namibia Team, 2022). The floristic group of the proposed area is the Welwitschia Desert where up to 200 species are co-inhabitants.

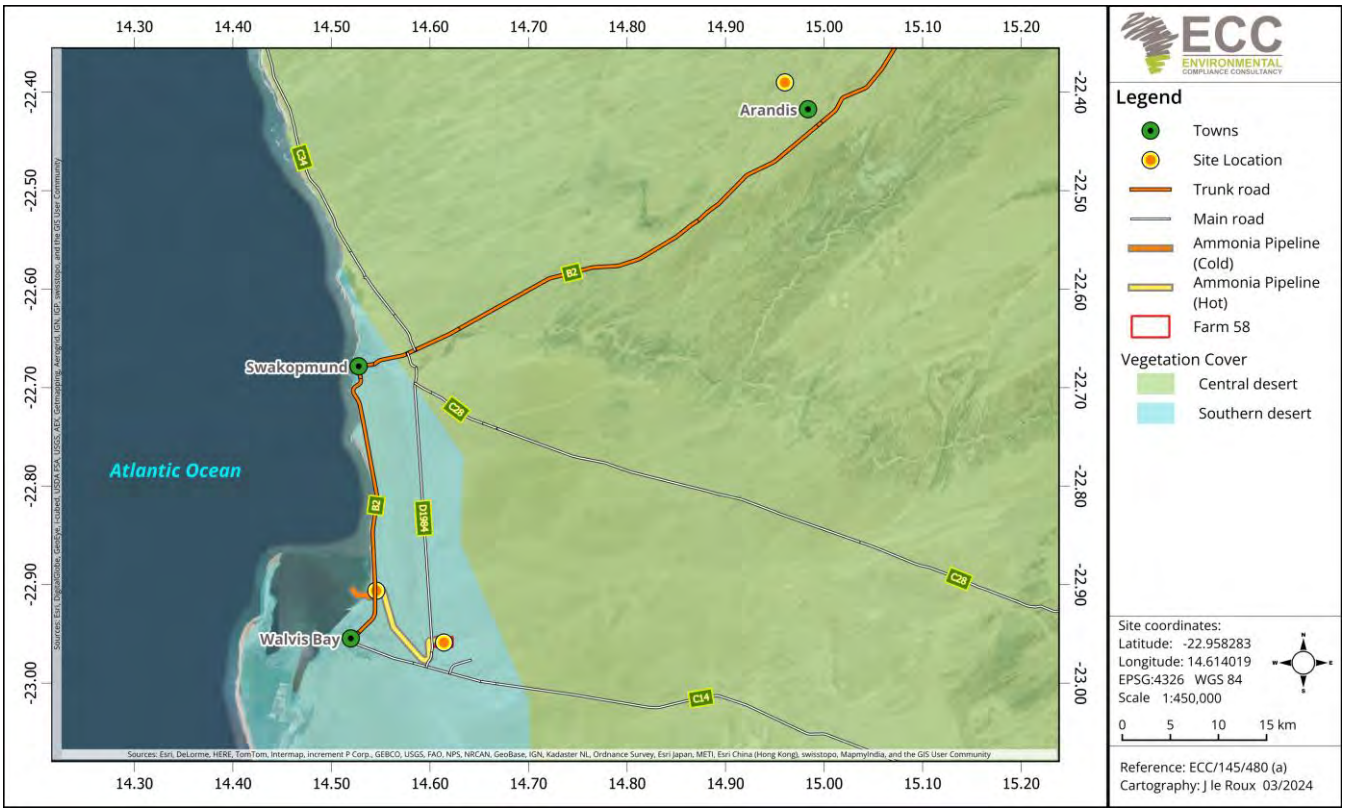


Figure 13 - Vegetation cover in the general Project area.

5.6.2 FAUNA

The overall terrestrial diversity in the proposed area is low in comparison to the central and northeastern highlands of the country. The overall bird diversity is moderate with ~141 to 170 species (residents and migratory birds). The Walvis Bay area tends to be a hotspot for bird life, as birds are attracted to the species richness and abundance because of the high nutrients cycle brought by the highly productive upwelling system of the Benguela Current (BirdLife International, 2024). The diverse and unique bird life presents a huge attraction for tourists with ~100 000 birds, e.g., flamingos and pelicans. The reptile diversity is described as low (41-50 species) of which snakes make up 10 to 14 of the species and lizards making up majority of the reptile species with ~24 to 31 species.

Amphibian patterns are closely related to rainfall patterns due to the breeding habits in water and the reliance on moist habitats during the frog lifecycle. Due to the low average rainfall in this area,

amphibians are quite scarce with 1-3 species. The overall mammal diversity is low with 16 to 30 species of which half is endemic.

5.7 SOCIAL AND SOCIO-ECONOMIC BASELINE

The proposed project is located on the outskirt portion, northeast of Walvis Bay in the Erongo Region. The Erongo Region is situated in the central western area of Namibia and covers a land area of ~63586 km^2 which makes up 7.7% of Namibia's total area. Walvis bay has an active micro economic model, with 81% of the total population active in the Walvis Bay Urban Constituency. The general Walvis Bay Rural Constituency has an area of ~9134 km^2 (Erongo Regional Council, 2022).

Walvis Bay, being a port city, fits in as an integral part of Namibia's vision to become a logistics hub for the SADC region. Namport is amongst the largest employers in Walvis Bay Urban Constituency and therefore a main driver for growth and development (Erongo Regional Council, 2022). Namibian waters are highly productive with a rich and unique diversity of marine and coastal species. Namibia's fishing industry is among the top export earners of foreign currency (Erongo Regional Council, 2015). The tourism industry also plays a vital role in the economy of the Walvis Bay-Swakopmund area. Along the central coast, Swakopmund, a resort town, and Walvis Bay, offer an oasis where the sea meets the desert (Namibia Tourism Board, 2024).

Walvis Bay has the potential for future sustainable development and growth. Industries such as manufacturing, mining and agriculture are expected to shift to more sustainable practices and reduce the carbon footprint on a global scale (Shiwayu & Hartmann, 2023).

5.7.1 POPULATION AND GROWTH RATE

In 1991, the Namibian population stood at 1.4 million people and the Erongo Region had a population of 55 470 (Iipumbu, 2024). The preliminary population and housing census reported that Namibia's population after 32 years has doubled to 3 022 401 with Erongo Region making up 240 206 (Namibia Statistic Agency, 2023). The first main population increase in 1994 was noted due to the inclusion of Walvis Bay into Namibia from South Africa. The increase between 2001 and 2011 can be attributed to the increase in industrialisation in the coastal towns and mining activities. Currently Erongo Region is the fifth most populated region in the country with a population density of 3.8 persons per km^2 and the average household size of 3.1 persons per household which is below average of 3.8 (Namibia Statistic Agency, 2023).

The growth rate in the Erongo increased greatly in the past decades, with more males residing in the Erongo than females, with a difference of ~4 400. This is mainly attributed to job availability in the industrialised market at the coast, whereby traditionally certain skill sets were not associated to be "female jobs". Moreover, a high rate of urbanisation is experienced in the Erongo Region and is directed towards the Walvis Bay-Swakopmund area.

5.7.2 POVERTY AND UNEMPLOYMENT

The industries in which most Namibian citizens are employed are Agriculture, forestry and fishing; Accommodation and food services activities; and Wholesale and retail trade. In 2018 it was reported that 53.4% of employed Namibians work in the private sector and 21.5% by the state (Namibia Statistics Agency, 2019). State-owned enterprises provide jobs for 7.6% of Namibians and private individuals - 16.6%. Wages and salaries were reported as the main income source of 47.4% of households in Namibia.

It has been reported that the overall unemployment rate is ~35%, with youth unemployment rate estimated at 50% (Shikololo, 2023). The highest education obtained by most of the country (~32%) is Junior secondary level of secondary school (Namibia Statistics Agency, 2019).

The Labour Force Survey conducted in 2019 stated that Erongo region has the lowest unemployment rate (~21.9%) in the country (Namibia Statistics Agency, 2019). Approximately 80% of Walvis Bay Urban constituency residents' main source of incomes are derived through monthly salaries and weekly wages, and other earnings gained through non-farming businesses (at 9% and cash remittance at 5%).

5.7.3 ECONOMIC ENVIRONMENT

5.7.3.1 Infrastructure - Namport

The Namibian Ports Authority (also referred to as 'Namport' or the 'Authority') was established by the Namibian Ports Authority Act, No. 2 of 1994 (Namport, 2023). Namport manages Namibia's ports in Walvis Bay and Lüderitz. The Walvis Bay Port is Namibia's largest commercial port and receives ~3,000 vessel calls yearly and handles about 5 million tonnes of cargo. The Port of Walvis Bay handles container imports, exports and transshipments, as well as bulk and break-bulk of various commodities and serve a wide range of industries such as the petroleum, salt, mining and fishing industries (Namport, 2023). Both bulk and bagged salt are exported from the Port of Walvis Bay.

According to Namport's integrated annual report for the financial period from 1 April 2022 to 31 March 2023, Namport has recorded a revenue increase of N$1.5 billion or 22% compared to the N$1.2 billion increase recorded in 2022 (Endjala, 2024). The profit was set against a target of N$1.2 billion while the ports authority announced an operating profit of N$411 million compared to the 2022 financial year which recorded N$375 million (Endjala, 2024).

5.7.3.2 Fisheries

The central Namibian coast is characterised by its nutrient-rich cold Benguela Current and upwelling system in the Atlantic Ocean, which supports a highly productive fishing industry. More than 20 species of fish, lobsters and crabs are commercially harvested in these waters (Erongo Regional Council, 2015).

The fishing industry is the third largest economic sector contributing ~3.5% of GDP since 2007. It is administered by the Ministry of Fisheries and Marine Resources (MFMR) and is regarded as an

important sector because (i) it is the fourth-largest foreign currency earner (as of 2012); (ii) it is a big employer, especially in the Erongo Region – employed ~25,000 people in 2012; and (iii) it has potential to contribute to the country's food security and livelihood diversification (Chiripanhura & Teweldemedhin, 2016). The value of fishing, onshore and offshore processing accounted for N$3,410 million in 2008 (Erongo Regional Council, 2015). The industry at Walvis Bay, and Lüderitz in the ǁKaras Region, employs about 14,000 workers, of which about 43% work on vessels at sea while 57% are involved in onshore processing (Erongo Regional Council, 2015).

5.7.3.3 Tourism

The hospitality and tourism industry in Namibia contributed N$5.2 billion directly to the GDP, which is equivalent to 3.5% of the total GDP and is responsible for 44,700 of direct employment in the sector, including over 2,900 tourism-based jobs created in community conservation areas in 2018. (GIZ, 2022).

The Erongo Region recorded an occupancy rate of 59.36%, in the fourth quarter of 2022, compared to 50.01% in 2019, showing significant recovery post the COVID pandemic (Nangolo, 2023). There are a wide range of tourist hot spots in the Erongo Region, with Swakopmund and Walvis Bay being key attractions on a national and international scale. A variety of tourist attractions include Dune 7, Sandwich Harbour and Walvis Bay Lagoon (proclaimed Ramsar sites), Welwitschia Plains, Atlantic coastline and the Namib Desert, Cape Cross Seal Reserve, Dead Sea and the wider skeleton coastline (Nangolo, 2023). Furthermore, the Walvis Bay's Lagoon and the Sandwich Harbour are two of the five designated Ramsar sites in Namibia and provide pristine environments for various birdlife populations (Erongo Regional Council, 2022).

5.7.3.4 Energy and sustainable practices

Energy demand is continuously increasing and plays a vital role in economies of all developed and developing countries. From a local perspective, fossil fuels are heavily relied on and accounts for ~63% of the total national energy consumption (WWF Namibia, 2023).

Currently, Namibia is not an oil-producing country and at present does not possess the capacity to refine crude oil for petrol and fuel production (Institute for Public Policy Research, 2023). Fuels are transported internationally, and lubricants are imported from South African refineries via the Walvis Bay harbour. However, Namibia is continuously encouraging for transformation and progression into the gas industry to increase economic growth and lessen reliance on imports (WWF Namibia, 2023). Oil and gas explorations in Namibia are currently underway and are mandated by the National Petroleum Corporation (NAMCOR). Recent discoveries of large crude oil reserves off the Namibian coast have been reported and could potentially double the gross domestic product (GDP) by 2040 (Mathekga, 2022).

Green hydrogen is an emerging fuel industry in Namibia. Green hydrogen, similar to what is proposed by Cleanergy Solutions Namibia (Pty) Ltd, include the separation of hydrogen molecules from water through the electrolysis process powered entirety by (solar or wind resources) renewable energy sources. Green hydrogen has the potential to reduce dependence on fossil fuels especially in the

transport sector while mitigating climate change; reduce reliance on fuels through imports and secure a market and economic growth for Namibia (WWF Namibia, 2023).

Cleanergy Solutions Namibia launched the construction of Africa's first green hydrogen plant, refueling station and hydrogen academy in Walvis Bay in 2023. The main goal of the hydrogen academy is to provide the skills and training related to the production and usage of hydrogen as fuel for heavy duty and mining equipment. This provides a new exciting field locals to learn and develop new skills sets for career paths within the green economy industry (Cleanegy Solutions Namibia (Pty) Ltd, 2023).

5.7.4 COMMUNITY HEALTH

Namibia's health services are twofold: private (serving ~18% of the population with medical aid) and public (serving the remaining 82%) (Christians, 2020). Public health falls under the Ministry of Health and Social Services (MoHSS), which operates a four-tiered health system, consisting of primary healthcare (PHC) sites, district hospitals, intermediate hospitals and a referral hospital (Christians, 2020). Overcrowding is common at hospitals due to higher quality of care compared to rural clinics. (Namibia Ministry of Health and Social Services , 2017). Health care facilities in the project area include the Swakopmund District Hospital, Mondesa Clinic, Tamariskia Clinic (Swakopmund), Arandis Clinic (Arandis) Walvis Bay District Hospital, Walvis Bay Clinic, Kuisebmund clinic and Narravile Clinic (Walvis Bay).

Despite relatively good health infrastructure, Walvis Bay currently has the highest rate of tuberculosis (TB) infections in Namibia. This was also the first town during the COVID-19 pandemic where cluster infections were occurring. This can be seen as contributions from the international harbour, various trucking companies and overcrowding in townships, whereby airborne diseases travel faster. In 2015 it was reported that in the Erongo Region the HIV prevalence in women between ages of 15 and 49 was 14.6% and men between the same ages 10.4% (Namibia Ministry of Health and Social Services, 2015). The 2016 Ministry of Health Centennial Surveillance Survey confirmed Walvis Bay had a HIV/AIDS prevalence rate estimated at 17.6% and Swakopmund at 18.6%. The national prevalence rate average stands at 17.2%. Both Swakopmund and Walvis Bay are above the national average; however, Walvis Bay has shown a noted decrease from previous surveys (29% in 2009) and Swakopmund has shown a significant increase from the 2015 survey (10.5%). The age group 45-49 group had the highest prevalence rate, whereby in rural areas the age group 35-39 had the highest prevalence rate.

Best practises should be employed during construction and operational activities to prioritise the safety and health of the occupational workforce and sensitive receptors. This includes measures such as water spraying during construction to control dust, covering trucks, scheduling noisy activities to minimise disturbance, using quieter equipment and providing information to workers and communities on project related safety, hygiene, the spread of communicable diseases, exposure to hazardous materials due to pipe leaks or accidents and disease prevention.

5.8 CULTURAL HERITAGE

Information from the Namibian GIS data, Atlas of Namibia and other sources, suggests that although the Walvis Bay town is rich in history, the project area itself shows no evidence of heritage sites. A chance finds plan will be incorporated into the ESMP, should objects of heritage significance be discovered or unearthed during the project activities.

6 IMPACT IDENTIFICATION AND EVALUATION METHODOLOGY

6.1 INTRODUCTION

Chapter 2 provides an overview of the approach used in this ESIA process, and details each of the steps undertaken to date. Prediction and evaluation of impacts is a key step in the ESIA process. This chapter outlines the methods that will be followed, to identify and evaluate the impacts arising from the proposed Project. The findings of the assessment will be presented in the full assessment report.

This chapter provides comprehensive details of the following:

- The assessment guidance that will be used to assess impacts.
- The limitations, uncertainties, and assumptions regarding the assessment methodology.
- How impacts will be identified and evaluated, and how the level of significance will be derived.
- How mitigation will be applied in the assessment, and how additional mitigation will be identified.
- The cumulative impact assessment (CIA) method that will be used.

This assessment will aim to determine which impacts are likely to be significant; to scope the available data and identify any gaps that need to be filled; to determine the spatial and temporal scope; and to identify the assessment methodology.

The scope of the assessment was determined by undertaking a preliminary assessment of the proposed Project against the receiving environment, and was obtained through a desktop review, available site-specific literature, monitoring data, and site reports, as set out in this scoping report.

6.2 ASSESSMENT GUIDANCE

The following principal documents will be used to inform the assessment method:

- International Finance Corporation standards and models, in particular performance standard 1: 'Assessment and management of environmental and social risks and impacts' (International Finance Corporation, 2012 and 2017).
- International Finance Corporation Cumulative Impact Assessment (CIA) and Management Good Practice Handbook (International Finance Corporation, 2013).
- Namibian Draft Procedures and Guidance for EIA and EMP (Republic of Namibia, 2008).

6.3 LIMITATIONS, UNCERTAINTIES AND ASSUMPTIONS

Table 10 below shows the potential limitations, uncertainties and assumptions associated with the Project.

Table 10 - Limitations, uncertainties and assumptions.

Topic	Limitation/uncertainty/assumption
Project Design and Technology	– Above-ground vs. below-ground pipeline construction – Pipeline materials and their environmental interactions – ammonia production methods and their environmental footprints – Potential for leaks and safety measures
Environmental and Social Baseline Data	– Data gaps in specific environmental or social indicators – Spatial and temporal variability of baseline data – Accuracy and reliability of existing data sources
Green Hydrogen Industry and Regulations	– Lack of established regulatory frameworks (elaborate on specific gaps) – Uncertainties in market demand and project viability – Evolving technologies and best practices for green ammonia/hydrogen
Climate Change	– Potential impacts of climate change on project infrastructure and operations (e.g., extreme weather events, sea-level rise) – Uncertainty in climate projections and their influence on long-term assessments

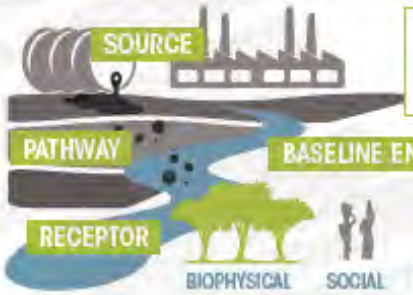
6.4 ASSESSMENT METHODOLOGY

The ESIA methodology applied to this assessment has been developed by ECC using the International Finance Corporation (IFC) standards and models, in particular performance standard 1: 'Assessment and management of environmental and social risks and impacts' (International Finance Corporation, 2017); Namibian Draft Procedures and Guidance for EIA and EMP (Republic of Namibia, 2008); international and national best practice; and over 25 years of combined ESIA experience. The methodology is set out in Figure 14.

The evaluation and identification of the environmental and social impacts require the assessment of the Project characteristics against the baseline characteristics, ensuring that all potentially significant impacts are identified and assessed.

The significance of an impact is determined by taking into consideration the combination of the sensitivity and importance/value of environmental and social receptors that may be affected by the proposed Project, the nature and characteristics of the impact, and the magnitude of any potential change. The magnitude of change (the impact) is the identifiable changes to the existing environment that may be negligible, low, minor, moderate, high, or very high; temporary/short-term, long-term or permanent; and either beneficial or adverse.

ECC IMPACT PREDICATION AND EVALUATION METHODOLOGY



ECC ESIA METHOD

- Predication and evaluation of impacts is a key step in the EIA process.
- The methods ECC follows to identify and evaluate the impacts arising from projects is outline in this diagram.

THE FOLLOWING PRINCIPLES ARE USED BY ECC FOR ASSESSMENTS

- International Finance Corporation standards and models, in particular Performance Standard 1, 'Assessment and management of environmental and social risks and impacts' (International Finance Corporation, 2017) (International Finance Corporation, 2012);
- International Finance Corporation CIA and Management Good Practice Handbook (International Finance Corporation, 2013) and,
- Namibian Draft Procedures and Guidance for EIA and EMP (Republic of Namibia, 2008).

DETERMINE THE SIGNIFICANCE OF AN IMPACT

SENSITIVITY AND VALUE OF A RECEPTOR

The sensitivity and value of a receptor is determined by identifying how sensitive and vulnerable a receptor is to change, and the importance of a receptor (internationally, nationally, locally)

NATURE AND CHARACTERISTICS OF THE IMPACT

The nature and characteristics of the impact is determined through consideration of the frequency, duration, reversibility and probability of the impact occurring.

MAGNITUDE OF CHANGE

The magnitude of change measures the scale or extent of the change from the baseline condition, irrespective of the value. The magnitude of change may alter over time, therefore temporal variation is considered (short-term, medium-term, long-term; reversible, irreversible environmental assessment methodology

ECC – NATURE OF IMPACT

BENEFICIAL (POSITIVE)
An impact that is considered to represent an improvement on the baseline or introduces a positive change.

ADVERSE (NEGATIVE)
An impact that is considered to represent an adverse change from the baseline or introduces a new undesirable factor.

ECC – TYPE OF IMPACT

DIRECT
Impacts causing an impact through direct interaction between a planned project activity and the receiving environment/ receptors.

INDIRECT
Impacts that result from other activities that are encouraged to happen as a result / consequence of the Project. Associated with the project and may occur at a later time or wider area

CUMULATIVE
Impacts that arise as a result of an impact and effect from the project interacting with those from another activity to create an additional impact and effect

REVERSIBILITY

REVERSIBLE
Impacts are reversible and recoverable in the future

PARTLY REVERSIBLE
Some parts of the impact can be reversed while others remain

IRREVERSIBLE
Impacts which are not reversible and are permanent

DURATION

TEMPORARY
Transient; a period of less than 1 year

SHORT TERM
Impacts that are likely to last for the duration of the activity causing the impact and are recoverable (1-5 years)

MEDIUM TERM
Impacts that are likely to continue after the activity causing the impact and are recoverable (5-15 years)

LONG TERM
Impacts that are likely to last far beyond the end of the activity causing the damage (greater than 15 years with impact ceasing after decommissioning of the project)

PERMANENT

MAGNITUDE OF CHANGE

VERY HIGH / UNKNOWN	Loss of resource, significantly affecting the long term quality and integrity of a resource; irreparable damage or loss of key characteristics, features or elements; or the magnitude is too great to quantify as it is unknown.
HIGH / MAJOR	Loss of resource, and quality and integrity of resource; severe damage to key characteristics, features or elements; or Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality.
MODERATE	Loss of resource, but not adversely affecting its integrity; partial loss of/damage to key characteristics, features or elements; or Benefit to, or addition of, key characteristics, features or elements; improvements of attribute quality.
LOW / MINOR	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (or maybe more) key characteristic, feature or element; or Minor benefit to, or addition of, one (or maybe more) key characteristic, feature or element; some beneficial effect on attribute quality or a reduced risk of a negative effect occurring.
NONE / NEGLIGIBLE	Very minor loss or detrimental alteration to one (or maybe more) characteristic, feature or element; or Very minor benefit to, or positive addition of, one (or maybe more) characteristic, feature or element.

SCALE OF CHANGE - EXTENT / GEOGRAPHIC SCALE

ON-SITE
Impacts that are limited to the boundaries of the proposed project site

LOCAL
Impacts that occur in the local area of influence, including around the proposed site and within the wider community

REGIONAL
Impacts that affect a receptor that is regionally important by virtue of scale, designation, quality or rarity.

NATIONAL
Impacts that affect a receptor that is nationally important by virtue of scale, designation, quality or rarity.

INTERNATIONAL
Impacts that affect a receptor that is nationally important by virtue of scale, designation, quality or rarity.

PROBABILITY

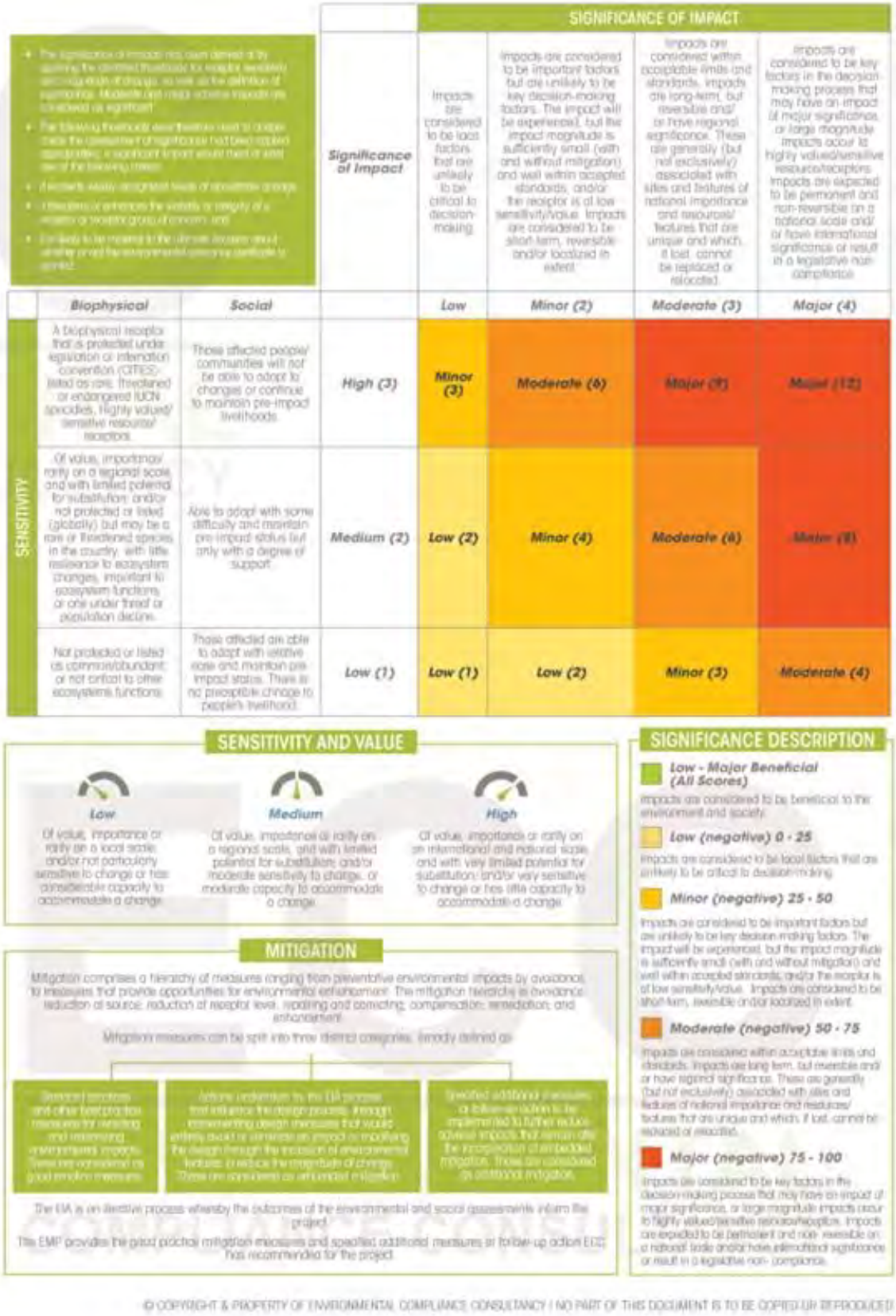
IMPROBABLY (RARE)
The event may occur in exceptional circumstances yet, rarely occurs in the industry. The event could occur once every 100 years

LOW PROBABILITY (UNLIKELY)
The event has happened elsewhere yet, is unlikely to occur. The event could occur once every 10 years

MEDIUM PROBABILITY (POSSIBLE)
The event could occur under some circumstances. The event could occur once every 5 years.

HIGH PROBABILITY (LIKELY)
The event is expected to occur. The event could occur twice per year

DEFINITE (ALMOST CERTAIN)
The event will occur. The event could occur once per month



				SIGNIFICANCE OF IMPACT			
			Significance of Impact	Impacts are considered to be local factors that are unlikely to be critical to decision-making	Impacts are considered to be important factors but are unlikely to be key decision-making factors. The impact will be experienced, but the impact magnitude is sufficiently small (with and without mitigation) and well within accepted standards, and/or the receptor is of low sensitivity/value. Impacts are considered to be short-term, reversible and/or localized in extent	Impacts are considered within acceptable limits and standards. Impacts are long-term, but reversible and/or have regional significance. These are generally (but not exclusively) associated with sites and features of national importance and resources/features that are unique and which, if lost, cannot be replaced or relocated	Impacts are considered to be key factors in the decision-making process that may have an impact of major significance, or large magnitude impacts occur to highly valued/sensitive resources/receptors. Impacts are expected to be permanent and non-reversible on a national scale and/or have international significance or result in a legislative non-compliance
	Biophysical	Social		Low	Minor (2)	Moderate (3)	Major (4)
SENSITIVITY	A biophysical receptor that is protected under legislation or international convention (CITES), listed as rare, threatened or endangered (IUCN species), Highly valued/sensitive resource/receptor.	These affected people/communities will not be able to adapt to changes or continue to maintain pre-impact livelihoods.	High (3)	Minor (3)	Moderate (6)	Major (9)	Major (12)
	Of value, importance/rarity on a regional scale and with limited potential for substitution; and/or not protected or listed (globally) but may be a rare or threatened species in the country, with little resilience to ecosystem changes, important to ecosystem functions, or one under threat or population decline.	Able to adapt with some difficulty and maintain pre-impact status but only with a degree of support.	Medium (2)	Low (2)	Minor (4)	Moderate (6)	Major (8)
	Not protected or listed as common/abundant; or not critical to other ecosystems functions.	These affected are able to adapt with relative ease and maintain pre-impact status. There is no perceptible change to people's livelihood.	Low (1)	Low (1)	Low (2)	Minor (3)	Moderate (4)

Figure 14 - ECC ESIA methodology based on IFC standards.

6.5 CUMULATIVE IMPACTS

6.5.1 CUMULATIVE IMPACT ASSESSMENT METHOD

Cumulative impacts may arise as a result of other Project activities, or due to the combination of two or more projects in the Project area. A cumulative impact assessment (CIA) will be undertaken by applying the IFC CIA Good Practice Handbook (International Finance Corporation, 2013), which recommends that a rapid CIA is undertaken.

A rapid CIA takes into consideration the challenges associated with a good CIA process, which include a lack of basic baseline data, uncertainty associated with anticipated development, limited government capacity, and the absence of strategic regional, sectoral, or integrated resource planning schemes.

The following five-step rapid CIA process will be followed:

Step 1: Scoping – Determine spatial and temporal boundaries
Step 2: Scoping – Identify valued environmental and social receptors and identify reasonably foreseeable developments
Step 3: Determine the present condition of valued environmental and social receptors (The baseline)
Step 4: Evaluate the significance of the cumulative impacts
Step 5: Identify mitigation measures to avoid or reduce cumulative impacts

The following information will be applied to the assessment in line with the above steps and IFC guidance:

- The spatial and temporal boundaries of the CIA are the extent of the Project boundaries and the duration of the construction and operation phases of the proposed Project.
- Valued environmental and social receptors that may be affected.
- A review of existing and reasonable, anticipated and/or planned developments has been undertaken, which is based on the information presented in chapter 4.
- The predicted future conditions of sensitive and common environmental and social receptors have been taken into consideration in the assessment.
- The assessment findings will be presented in the assessment report and will have the CIA applied in combination with professional judgment and published environmental assessment reports.
- A review of mitigation and monitoring measures will be undertaken, with any additional ones identified.

6.6 MITIGATION

Impacts that are identified throughout the ESIA process will be subjected to a process of impact mitigation, which is inherent in all aspects of the ESIA system. Embedded mitigation and good practice mitigation will be considered in the assessment. Additional mitigation measures will be identified when the significance of an impact requires it and causes the impact to be further reduced.

The principal of impact mitigation comprises a hierarchy of measures ranging from preventative environmental impacts by avoidance, to measures that provide opportunities for environmental enhancement and will be applied to all impacts associated with the proposed Ammonia Pipeline Project. The mitigation hierarchy is avoidance; reduction at source; reduction at receptor level; repairing and correcting; compensation; remediation; and enhancement. The environmental and social management plan (ESMP) for the Project provides good practice measures of the impact mitigation and specifies additional measures or follow-up action where required. The preliminary ESMP is appended to this report (Appendix A – ESMP). On completion of the impact assessment, the mitigation measures from the impact assessment and recommendations from the specialist studies are then incorporated into the Final ESMP, which forms an appendix of the Final ESIA (Appendix A – ESMP).

Mitigation measures can be split into three distinct categories, broadly defined as:

- Actions undertaken by the ESIA process that influence the design process, through implementing design measures that would entirely avoid or eliminate an impact, or, modifying the design through the inclusion of environmental features to reduce the magnitude of change. These are considered embedded mitigation;
- Standard practices or other best practice measures for avoiding and minimising environmental impacts. These are considered good practice measures;
- Specified additional measures or follow up actions to be implemented, to further reduce adverse impacts that remain after the incorporation of embedded mitigation. These are considered additional mitigation measures.

Where additional mitigation is identified, a final assessment of the significance of impacts (residual impacts) will be carried out, taking into consideration the additional mitigation.

The ESIA is an iterative process whereby the outcomes of the environmental assessments inform the environmental management of the proposed Ammonia Pipeline Project through the ESMP .

The preliminary ESMP in Appendix A provides an outline of the good practice measures and specified additional measures or follow-up actions to be undertaken. The project ESMP will be finalised on completion of the impact assessment process and included in the final ESIA report.

7 ASSESSMENT TERMS OF REFERENCE

7.1 TERMS OF REFERENCE FOR THE APPOINTED ENVIRONMENTAL ASSESSMENT PRACTITIONER

The EAP has the responsibility to submit an application for an environmental clearance certificate in accordance with the Environmental Management Act, Act No. 7 of 2007. Additionally, the EAP is to prepare an Environmental and Social Impact Assessment (ESIA) and an Environmental and Social Management Plan (ESMP) that reflect the current state of the biophysical and social environmental baselines, in compliance with the Environmental Management Act 2007, associated regulations, and applicable international best practices.

7.2 TERMS OF REFERENCE FOR THE SCOPING REPORT

The TOR for the scoping report involves:

1. Providing the public and authorities with the background information document (BID) on the Project.
2. Consulting with I&AP's and the relevant stakeholders and authorities about the proposed Project.
3. Conducting public and stakeholder meetings with relevant authorities via invitations and notices in national newspapers.
4. Registering interest in the Project and recording concerns and issues.
5. Ensuring transparency in the process.
6. Allowing adequate opportunities for comments from I&APs and the authorities during the participation process.
7. Including appropriate specialist studies in the scope of the impact assessment report to address key concerns raised during consultations.
8. Completing and submitting the application and scoping report to the Competent Authority in the prescribed manner.

A full environmental and social impact assessment (ESIA) will be completed, taking into account inputs raised by stakeholders and IAPs during the public participation phase. The ESIA aims to:

- To address the issues and concerns raised by authorities, the public (both interested and affected parties) and the specialist consultants through the public consultation and scoping process.
- To identify and evaluate actual and potential impacts resulting from the Project that potentially may influence the receiving environment.
- To recommend management, mitigation and monitoring programmes to be implemented before and during construction, operations and decommissioning.

- To define an appropriate environmental and social management plan for the proposed construction of the green ammonia pipeline.

The scope of the ESIA report that will be developed will comprise an updated impact assessment in two primary components based on both existing and new data from related specialist studies as noted below. The terms of reference (ToR) for the various studies are described within this chapter.

7.3 SOCIOECONOMIC ASSESSMENT

A socio-economic study will be conducted in-house to assess the impact of the project on the current socio-economic state of the locals and impacts on a regional and national scale.

Scope of work:
The assessment will look at the impact of the project associated with the potential increase in foreign investment that comes with exportation of green energy, potential emerging green career opportunities and increase in revenue.

The deliverables include:

- Receptor identification
- Baseline socio-economic assessment
- Mitigation recommendations
- Alternative options

7.4 VISUAL ASSESSMENT

The assessment will be conducted in-house and should include a study of the visual impact and its effects on the local tourist businesses, industrial businesses and residential areas. The assessment will also take into consideration the landscape impacts.

Scope of work:
The following should be assessed during the visual study:

- Visual receptors
- Existing visual landscapes
- Potential impacts on the local residents and businesses
- Mitigation and recommendations

7.5 HEALTH AND SAFETY ASSESSMENT

The objective is to assess potential health and safety impacts associated with the construction and operation of the ammonia pipeline project. The assessment will identify hazards, evaluate risks, and recommend measures to mitigate and manage health and safety concerns.

Scope of Work:
The assessment will include:

- Identification of potential health and safety hazards related to construction and operation activities.
- Evaluation of risks to workers, nearby communities, and the environment.
- Review of relevant health and safety regulations and guidelines.
- Assessment of emergency response plans and procedures.
- Consultation with stakeholders, including workers and local communities.
- Cumulative risk associated with neighbouring activities.

7.6 CLIMATE CHANGE ASSESSMENT

A climate change assessment will be commissioned to assess the emission baseline of the biophysical environment and formulate recommendations for the management or mitigation of any potential impacts that the Project may contribute to climate change. Additionally, contribute to the potential benefits of the project to set climate change goals.

Scope of work:
- Study of the impacts the project may have on the receiving biophysical and socio-economic environment due to current and project climate scenarios.
- The impacts on international markets, national and international policies and carbon pricing policies
- The use of a standard scenario to assess the resilience of their strategies to climate change and make recommendations for improvement.
- Recommendation of a process for identifying, assessing and managing climate-related risks and integrating such risks into existing processes.
- Recommendations of ways in which the Project can best mitigate and adapt to climate-related risks.

7.7 AIR QUALITY ASSESSMENT

The assessment should include a study of the legal requirements pertaining to air quality applicable to international legal guidelines, limits and dust control regulations.

Scope of work:
To prepare a comprehensive air impact assessment report that will include:

- A review of available technical project information or any existing information related to air quality in the Project area.
- A review of the air quality legislative and regulatory context, including ambient air quality guidelines.

- A study of the baseline environment which includes determining the potential air quality receptors, existing sources of dust emissions at and around the site.
- Air quality impacts will be reported, and suitable mitigation measures and monitoring requirements will form part of the recommendations.
- Likely pollution pathways in the event of a leak.

7.8 Noise assessment

The objective is to assess the potential noise impacts of the proposed project on surrounding sensitive receptors, including residents, businesses, and the tourism sector.

Scope of work:
To prepare a comprehensive noise impact assessment report that will include:

- Study of current baseline noise levels and impacts in the project area.
- Identification of affected receptors and their exposure levels.
- Assistance with monitoring site selection and baseline data analysis.
- Analysis of topography and emissions inventory.
- Attenuation modelling to predict noise propagation.
- Assessment of impacts using ECC's methodology.
- Provision of mitigation recommendations and alternatives.

7.9 Traffic assessment

A traffic assessment will be commissioned to assess the implications relevant to the project with regard to additional vehicles on the current D1984 and B2 road.

Scope of Work:
The increase in traffic volume from the proposed project also to be evaluated, to see whether the route would be able to manage an increase in traffic volume from the proposed Project and existing surrounding receptors. The deliverables include:

- Receptor identification
- Baseline traffic assessment
- Mitigation and control recommendations
- Alternative options

7.10 Biodiversity assessment

The objective of the biodiversity assessment will be to assess the bio-physical (vertebrate fauna & flora) issues relevant to the project and assess the significance of development and environmental impact that the project may have on the vertebrate fauna and flora at the proposed site including

general comment. A visit to the proposed project area (applicable portions only) will be conducted to assess the development site. Sensitive areas and species will be identified within the Walvis Bay – Farm 58 area.

Scope of work:
The necessary verification fieldwork for the project site will include the following:

- Small mammal transects to determine small mammal diversity in the area;
- Larger mammal presence will be determined in the area;
- Reptile & amphibian transects (diurnal & nocturnal) to determine reptile & amphibian diversity in the area;
- Bird transects to determine avian diversity in the area; and
- Flora transects to determine plant diversity in the area.
- Surveying the proposed Project footprint considering alternative layouts
- Propose mitigation measures which will be included in the drafted reports.

7.11 HERITAGE ASSESSMENT

A heritage assessment will be required to comply with the Namibian national legislature, including the National Heritage Act, 2004 (Act No 27 of 2004) and the National Heritage Regulations (if applicable), Government Notice (GN) 3490 of 2005.

Additionally, the proposed assessment process will comply with the requirements of IFC PS 8.

Scope of work:

- Receptor identification, nearby infrastructure and users, residents, tourist hot spots, other receptors susceptible to impacts from the project raised in the study.
- Baseline assessment (including a minimum site visit and physical data collection if the consultant proposes additional monitoring/data collection locations
- The study must assess the impacts on project receptors,
- The assessment must provide suggested mitigation and control recommendations or inclusion in the EIA.
- Provide alternatives and options if the proposed project options are not viable to reduce impacts
- Applicable mitigation and management measures should be recommended subject to the significance of the impact,
- A site survey may need to be conducted if baseline data is not available.

7.12 GROUNDWATER AND SURFACE WATER ASSESSMENT

To assess the potential hydrology and hydrogeological issues relevant to the Project and assess the significance of the operational and environmental impacts that the Project may have on the hydrological and hydrogeological environments at and beyond the proposed site.

Scope of Work:
To prepare a detailed surface and groundwater assessment report that will entail:

- A review of the existing information on the revised site layout and associated surface and groundwater documents, including a review of design recommendations for ground and surface water control measures.
- A study on the surface and groundwater flow regimes and potential interception with the proposed pipeline route.
- To prepare detailed surface water and groundwater impact assessment along with recommended mitigation (where required), to be incorporated into the ESMP.
- To include potential alternatives and recommendations in the final report that may reduce potential impacts on the environment and local communities.

8 CONCLUSION

This scoping report has established the baseline data, project description, impact assessment methodology, and scope of studies required for a thorough Environmental and Social Impact Assessment (ESIA). The study identified that the terrestrial landscape, biodiversity, tourism, and the health and safety of the community as potentially vulnerable to project activities, highlighting the need for detailed impact analysis in the ESIA. ECC is committed to undertaking a rigorous assessment to identify and mitigate potential impacts. Public comments received during this scoping period will be carefully considered and incorporated into the subsequent ESIA to address community concerns. The ESIA will culminate in the development of a detailed environmental and social management plan (ESMP) designed to minimise negative impacts and maximise social and environmental benefits. This scoping report represents the first step in a continuous assessment and engagement process. ECC is dedicated to working collaboratively with stakeholders and employing adaptive management throughout the project lifecycle to ensure responsible and sustainable development.

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APPENDIX A – PRELIMINARY ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

APPENDIX B – PUBLIC CONSULTATION DOCUMENT

APPENDIX C – EAPS CVS