PROPOSED OSHIVELA PILOT PROJECT
ON PORTION 4 OF FARM BLOEMHOF 109
ERONGO REGION

ENVIRONMENTAL IMPACT ASSESSMENT SCOPING (INCLUDING IMPACT ASSESSMENT) REPORT

Prepared for: Hylron Green Technologies (Pty) Ltd

February 2024

DOCUMENT CONTROL

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EXECUTIVE SUMMARY

1. GENERAL INTRODUCTION

Hylron Green Technologies (Pty) Ltd (Hylron), a partnership of Namibian and German companies, has developed a technology to produce iron at zero emissions[1]. In an airtight rotary kiln, hydrogen reacts with the oxygen contained in iron ore to produce "Direct Reduced Iron (DRI)". "Green hydrogen" is used for this process, meaning that the hydrogen is fully generated from renewable resources.

Hylron intends to develop the Oshivela Pilot Project, which will be the world's first industrial production of iron at zero emissions, on their farm (i.e. Portion 4 of Farm Bloemhof 109), which is located ~75 km north-east of Swakopmund, in the Erongo Region (refer to Figure 1).

Hylron considered acquiring the Shiyela Iron Project, thereby becoming the majority owner of Shiyela Iron (Pty) Ltd (Shiyela)[2]. However, due to increasing global interest in the Hylron technology and many requests to test the feasibility to use iron ores from different origins, Hylron did not yet further proceed with the acquisition and development of the Shiyela Project and now considers developing the Oshivela Pilot Project on Portion 4 of Farm Bloemhof 109, where Oshivela can be supplied with different iron ores.

Hylron's proposed Oshivela Pilot Project on the above-mentioned farm is the topic of this Environmental Impact Assessment (EIA) Scoping (including Impact Assessment) Report. This report has been compiled as part of the Environmental Clearance Certificate (ECC) application and associated Environmental Impact Assessment (EIA) process for the proposed Pilot Project. It includes an assessment of the environmental impacts that the proposed Project activities are likely to have. The proposed management and mitigation measures relating to the proposed Pilot Project are documented in an Environmental Management Plan (EMP) attached as Appendix G.

[1] Note: The production of iron at zero emissions relates specifically to the "processing" (see section 4.2.2) step in the value chain and not the full value chain with all the associated elements. Hylron, however, aims to further research and develop additional steps in the value chain to further reduce emissions (i.e. the transport of the ore concentrate and the final product and zero emissions iron mining).

[2] Shiyela is the holder of the Mining Licence (ML) 176, which is located within the Namib-Naukluft National Park (NNNP), approximately 35 km northeast of Walvis Bay. Reptile Uranium Namibia (Pty) Ltd (RUN) is currently the majority owner of Shiyela Iron (Pty) Ltd. ML 176 contains the Shiyela Iron deposit, a magnetite-rich resource which has been discovered in 2008. Hylron, undertook an EIA (amendment) process in 2022 for the Shiyela Iron Project, aiming to mine the iron ore deposit and to 'build the Oshivela project at the Shiyela Mine' to utilize their proprietary technology, together with renewable energy, to produce a final product at zero emissions, i.e. DRI.

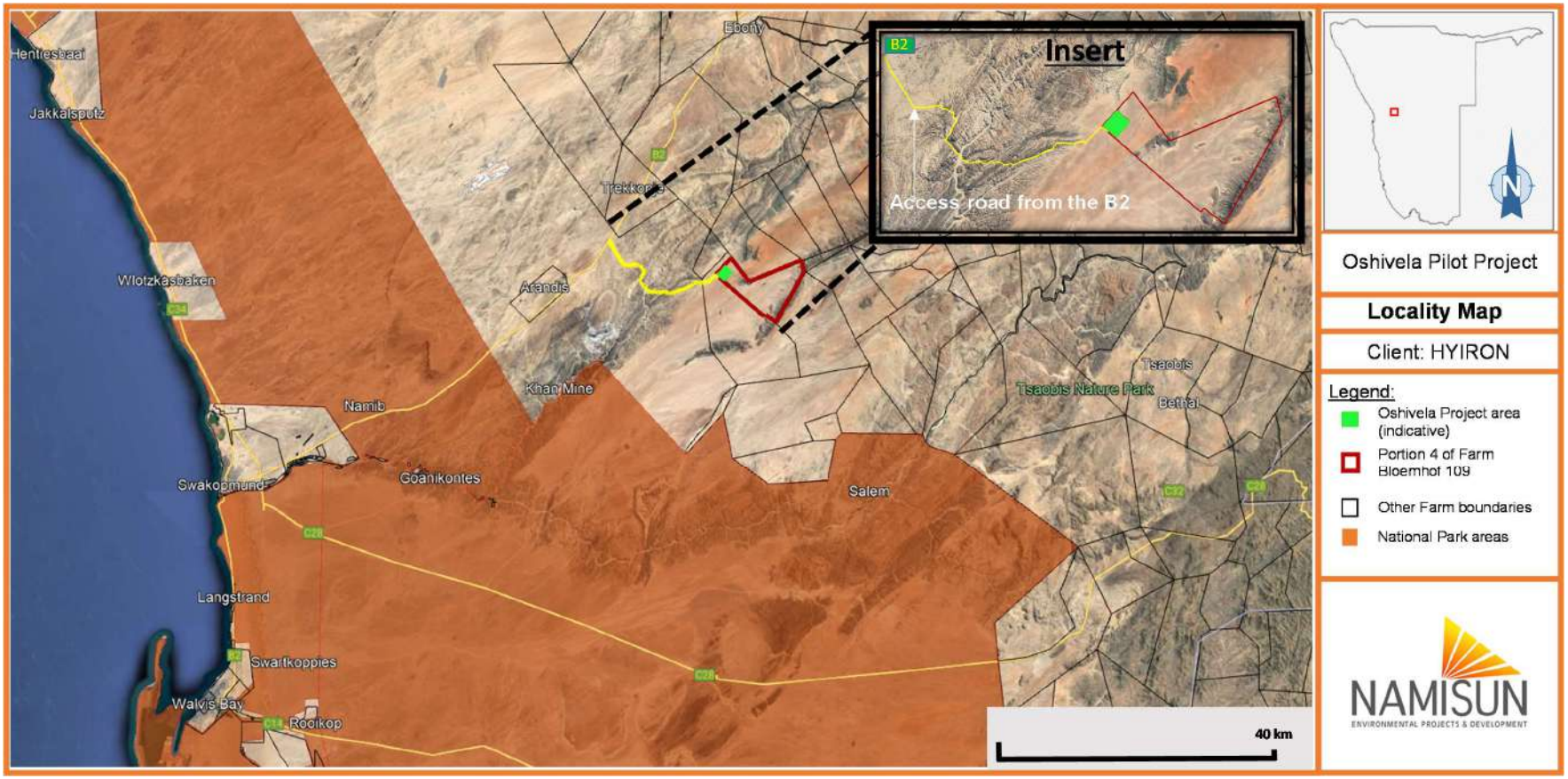

FIGURE 1: LOCATION OF THE PROPOSED OSHIVELA PILOT PROJECT ON PORTION 4 OF FARM BLOEMHOF 109 (Ref: Google Earth)

(Note: Boundaries of Farms Jakalswater, Geluk and Jakalsdans have been slightly modified and are not accurately shown on the above mentioned map. See Figure 23 for the location of these Farms, which are located ~ 20 to 25 km south / south-east of the Pilot Project area)

2. ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

EIAs are regulated by the Directorate of Environmental Affairs (DEA) of the Ministry of Environment, Forestry and Tourism (MEFT) in terms of the Environmental Management Act, No. 7 of 2007. This Act was gazetted on 27 December 2007 (Government Gazette No. 3966) and its associated regulations were promulgated in January 2012 (Government Gazette No. 4878) in terms of the above-mentioned Act. Prior to the commencement of the proposed Oshivela Pilot Project activities, an application for an environmental clearance will be submitted in terms of this Act and the associated EIA Regulations to the Ministry of Mines and Energy (MME) (Energy Directorate), as the competent authority. MME will review the application and relevant reports and submit their comments to the MEFT for their final review and decision.

The above-mentioned EIA application and this report focuses only on the proposed Pilot Project to prove various concepts and the feasibility of a possible bigger project. Furthermore, ongoing monitoring of relevant environmental aspects will be undertaken during the pilot stage. Should HyIron find all relevant aspects of the Oshivela Pilot Project to be feasible, they will consider upscaling to a production of 40 tons per hour of sponge iron (with the final product being between 90 and 99% purity), generated with net zero CO_2 emissions. However, a separate EIA (application) process will have to be conducted for any future upgrades.

It is thought that this report and EMP (attached in Appendix G of the EIA Scoping (including Impact Assessment) Report) will provide sufficient information for MEFT to make an informed decision regarding the proposed Oshivela Pilot Project, and whether an ECC can be issued or not.

The EIA process includes an internal screening phase; a scoping phase, which includes an impact assessment; and an EMP. During the internal screening exercise, Namisun identified the need for various specialist studies, also taking the assessments (where relevant) that have been completed for the proposed Shiyela Project[3] into consideration. Information in this report has therefore been augmented by considering the aspects and potential impacts assessed for the Shiyela Project[2]; various site visits to the proposed Oshivela Pilot Project Site on Portion 4 of Farm Bloemhof 109 and surroundings; specialist studies; and input from comments gathered because of consultations with key stakeholders during focus group meetings. The potential impacts of the activities associated with the Oshivela Pilot Project could therefore be assessed.

[3] With reference to Section 1, the EIA for the proposed Shiyela Project included mining of the iron ore deposit, which is not relevant to the proposed Pilot Project on Portion 4 of Farm Bloemhof 109 and the related assessments.

The EIA process and corresponding activities include the following:

- Project initiation and screening phase (September – October 2023):
    - Project initiation meetings and site visits with the HyIron team to discuss the proposed Pilot Project and EIA / ECC Application process.
    - Early identification of environmental aspects and potential impacts associated with the proposed project and determine legal requirements.
    - Decision on EIA process to be followed and specialists to be used in the process.
    - Identify key stakeholders and compose Interested and / or Affected Parties (I&AP) database.
- Scoping (including assessment) phase (October 2023 – February 2024):
    - Notify authorities and I&APs of the proposed EIA process (distribute background information document (BID), e-mails, telephone calls, newspaper advertisements and site notice).
    - I&AP registration and initial comments.
    - Key stakeholder (focus group) meetings and include I&AP issues and concerns in the studies and assessments.
    - Conduct specialist studies, including field work.
    - Compilation of EIA Scoping (including Impact Assessment) Report and EMP.
    - Distribute EIA Report and EMP to relevant authorities and I&APs for review.
    - Update and finalise EIA Report with EMP, considering comments received.
    - Online submission of the final report onto the MEFTs portal.
    - Submit Application and finalised EIA Scoping Report with EMP and I&APs comments to MME and MEFT for decision-making.

2.1 EIA Team

Namisun is an independent environmental consultancy firm appointed by HyIron to undertake the EIA process. Werner Petrick, the EIA project manager, has more than twenty-four years of relevant experience in conducting / managing EIAs, compiling EMPs and implementing EMPs and Environmental Management Systems (EMSs). Werner has a B. Eng (Civil) degree and a master's degree in environmental management and is certified as lead environmental assessment practitioner (EAP) and reviewer under the Environmental Assessment Professionals Association of Namibia (EAPAN). Dr Pierré Smit, the EIA project assistant, holds a PhD in Landscape Ecology and has more than twenty-eight years of experience in environmental management, managing environmental assessment, the implementation of EMPs and EMSs in Namibia.

The environmental project team and proponent details for the EIA process relating to the Oshivela Pilot Project is outlined in Table 1.

TABLE 1: EIA TEAM AND PROPONENT DETAILS

Team	Name	Designation	Tasks and roles	Company
Project proponent	Johannes Michels	Managing Director	Technical input Implementation of the EMP	Hylron
EIA Project Management Team	Werner Petrick	Lead EIA Practitioner	Management of the EIA process and reporting	Namisun
	Pierré Smit	EIA Project Assistant Ecology input		
Avifauna	Ann and Mike Scott	Avifauna specialists	Specialist input incorporated into this report: Avifauna study and assessment General biodiversity input	African Conservation Services cc
Groundwater and surface water	Sandra Müller	Hydrogeological Specialist	Specialist input incorporated into this report: Hydrogeological and hydrological study and assessment	S Muller Hydrogeological consultant
Archaeology	John Kinahan	Archaeological specialist	Specialist input incorporated into this report: Archaeological study (Phase 1 and 2)	J. Kinahan, Archaeologist
Air Quality and Noise	Nicolette von Reiche	Noise and Air Quality specialist	Specialist input incorporated into this report: Air Quality and noise	Soundscape Consulting (Pty) Ltd

2.2 Steps in the public participation process

All comments, questions and issues that have been raised throughout the process by authorities and I&APs are provided in Appendix C of the EIA Scoping (including Impact Assessment) Report. A summary Issues and Response Report (I&RR) is also attached in Appendix C. Various I&APs provided positive comments relating to the proposed project.

The steps that were followed as part of the consultation process are summarised below:

- Notification - regulatory authorities and I&APs:
    - The stakeholder database was developed. This database is updated as and when required.
    - Compile a Background Information Document (BID). Copies of the BID were distributed via email to relevant authorities and I&APs on the stakeholder database and copies were made available on request. The purpose of the BID was to inform I&APs and authorities about the proposed activities, the assessment process being followed, possible environmental impacts and ways in which I&APs could provide input / comments to Namisun.

- A Site Notice was placed at the access to the Project Site (i.e. access gate to Portion 4 of Farm Bloemhof 109) to notify I&APs of the proposed project, and the EIA process being following.
- Block advertisements were placed in the Market Watch (on 23 October and 30 October 2023) as part of the following newspapers:
  - The Namibian Sun; Die Republikein; and Allgemeine Zeitung.
- During the report review period, 'Die Republikein' published a front page article about the proposed Oshivela Pilot Project and the availability of the EIA report (with contact details of Namisun).

- Key stakeholder and focus group meetings:
  - The above-mentioned notifications and adverts stated the following: "Focus Group meetings are planned within the comments and registration period. Should you like to be invited to one of the Focus Group meetings, please contact Namisun".
  - EIA Focus group meetings were held as follows:
    - Neighbour (Farm Bloemhof (Remainder)): Mr and Mrs De Man on 30 October 2023
    - Neighbour (Farm Nelsville, Vlakteplaas Portion 1): Mr S Kleeman on 30 October 2023.
    - Forsys Metals Corporation (Forsys) (Mr Oliver Krappmann) on 31 October 2023.
    - Neighbour (Farm Valencia): Mr Horn on 7 November 2023.
    - Dr Detlof Von Oertzen on 10 November 2023.
    - Farm owners (farms Jakalswater, Modderfaontein and Jakkalsdans) on 17 January 2024.
    - MEFT: Directorate of Wildlife and National Parks (DWNP), Mr. D Masen - Chief Warden of the NNNP.
- Various emails were sent and telephone discussions conducted with numerous I&APs to share further information, the BID and to offer Focus Group meetings. These I&APs included, amongst others, other nearby farm owners.
- Review of EIA Scoping (including Impact Assessment) Report by I&APs and authorities and submission of Application to MME and MEFT.

2.3 *Opportunity to Comment*

The EIA Scoping (including Impact Assessment) Report was distributed for public / authority review. I&APs were invited to comment on these documents, which were available for a review and comment period from **8 January 2024 to 2 February 2024**. Comments had to be sent to Namisun at the telephone number, or e-mail address shown below by no later than **2 February 2024**.

Namisun
Attention: Werner Petrick
E-mail address: wpetrick@namisun.com
Cell number: +264 (0)81 739 4591

3. PROJECT DESCRIPTION

As stated in Section 1, HyIron plans to develop the world's first industrial production of iron at zero emissions, i.e. using hydrogen for the production process and therefore no greenhouse gasses emitted, planned to be implemented in the framework of their Oshivela Pilot Project on Portion 4 of Farm Bloemhof 109.

In the conventional processes of iron processing, carbon from largely coking coals, but also other sources like natural gas, is burnt at very high temperatures so that the carbon is oxidizing to become carbon monoxide. The carbon monoxide, again at high temperatures and in absence of other oxygen, draws the oxygen from the iron ore (Fe_2O_3 or Fe_3O_4). After this reaction (i.e. the reduction of iron oxide) the elemental iron (Fe) is obtained and as a waste product, vast amounts of carbon dioxide (CO_2) released. It is estimated that this reduction process is responsible for ~ 9% of global CO_2 emissions and approximately 1,8 Tons of CO_2 per ton of iron.

To the contrary, HyIron therefore intends to produce iron without any CO_2 emissions, by using renewable energy only and applying its proprietary technology. In an airtight rotary kiln, hydrogen reacts with the oxygen contained in iron ore to produce DRI. Here again elemental Iron (Fe) is the product while the only "waste product" (i.e. "by-product") is water (H_2O). "Green hydrogen" is used for this process, meaning that the hydrogen is fully generated from renewable sources, i.e. solar. The proposed Oshivela Pilot Project is planned in the north-western Section of Portion 4 of Farm Bloemhof 109 (see Figure 1 and Figure 2) and includes the following key activities:

- Production of 5 tons direct reduced iron per hour (~ 3 000 hours per year), using hydrogen as a reduction agent during the product beneficiation, in a specialised industrial (airtight) furnace.
- Hydrogen will be produced by means of electrolysis (i.e. breaking down water molecules (H2O) into oxygen (O2) and hydrogen (H2)).
- Renewable energy supply (i.e. 25 MWp) in the form of Photovoltaic (PV) power to supply energy for the above-mentioned electrolysis process. The PV power plant will cover an area of ~ 30 hectares (ha).

During the Pilot phase of the Oshivela Project, 5 tons of direct reduced iron will be produced per hour. At an average of nine hours sunshine per day, production time is estimated at approximately 3,000 hours per year and at an estimated production of 5 tons per hour, a total of 15,000 tons of direct reduced iron (i.e. Sponge Iron) can be produced per year.

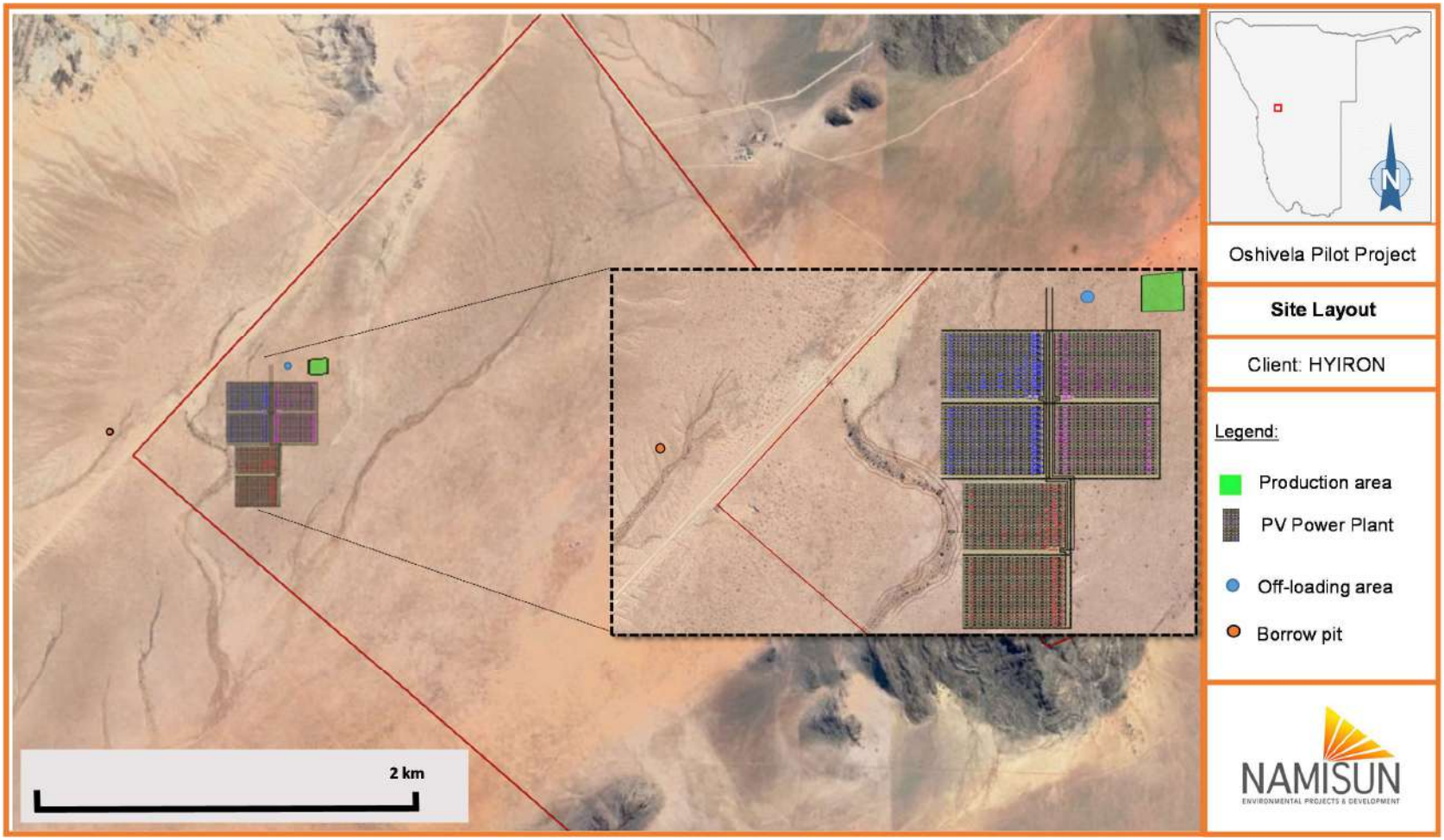

FIGURE 2: PROPOSED LAYOUT OF THE OSHIVELA PILOT PROJECT (REF: GOOGLE EARTH)

3.1 Sources of Iron ore concentrate and transportation of the Iron ore concentrate to site

During the pilot phase, 27 000 tons of iron ore concentrate will be required per annum. HyIron plans to obtain iron ore concentrate from various sources / suppliers, both locally (i.e. from within Namibian borders) and internationally for processing at their pilot plant. HyIron has received a lot of international attention with a number of countries already expressing keen interest to test their iron ores at the Oshivela plant to assess their potentials for the industrial transition towards zero emission productions. Some of these countries include Brazil, Urugay, Canada, Australia and South Africa (amongst others). While it is part of HyIron´s objectives to scale the technology worldwide and proof the potential of different countries at the Oshivela Pilot Project in Namibia, it is the medium- and long- term objective to use the majority of local (i.e. Namibian) iron ores.

HyIron estimates that ~ 2.5 truck trips (on average) will be required daily to transport the iron ore concentrate to the Project Site. The trucks will follow an existing access road (i.e. the Norasa Uranium Project private access road) from the B2 Road. Other options for access to the Project Site are also being considered by HyIron, depending on the supplier. The options include the following:

Iron ore concentrate that will be sourced from international suppliers will likely be brought in by shipping vessels through the port of Walvis Bay. From Walvis Bay trucks will transport the iron ore concentrate via the existing road network along the D1984 (i.e. road behind the dunes (i.e. east of the dunes) and the B2. Another option for the transport of the ore to site is following a route along the C28 road turning north onto the 'Welwitschia Drive' and then the D1914. This route cuts through the NNNP in a north-easterly direction.

Iron ore sourced from within Namibia (i.e. Khomas Region or possible Erongo, Otjozondjupa or Kunene Region) would either be transported by rail[4] to Arandis from where it will be loaded onto trucks for transporting to site; or trucks following the existing road network, including the B2.

HyIron is also investigating the possibility to use tractors for the hauling of the ore along the Norasa Uranium Project access road. The ore would then be transferred from the truck to a tractor with a wagon in a dedicated area next to the access road.

A maximum of ~ 3 000 m^3 ore concentrate will be stockpiled near the furnace (Refer to Figure 2). The ore concentrate delivered to site will be dry, fine grained (< 2mm) iron ore.

[4] Details regarding the rail transport option(s) still need to be further developed by HyIron, in consultation with relevant stakeholders.

3.2 *Processing / Beneficiation*

Depending on the purity of the ore, HyIron might need to mill the ore, either after or before the reduction process. Milling of the ore would entail the breaking and milling into finer grain sizes with the objective to further separate 'waste material' from the Fe. Due to the changed physical attributes of the "sponge iron", comparably little pressure would be required, therefore, only small scaled machinery would be necessary - should this process step be necessary. This would be done inside the warehouse. The ore will be further concentrated by means of a gravity and magnetic separation process.

The potential 'waste material' (i.e. the 'non-iron bearing material') would consist almost exclusively of silica (i.e. sand). Depending on the input quality of the iron ore, a maximum volume of 1,000 to 2,000 tons of this silica material will be produced per year.

The (milled) iron ore concentrate will be transported, using a front-end loader, to a specialised industrial furnace, where hydrogen produced on-site (see below) is also introduced. In this airtight furnace, the Hydrogen reacts with the Oxygen contained in the Iron Oxide (Iron ore concentrate as Fe_2O_4 or Fe_3O_4). The following reaction is taking place:

$$3H_2 + Fe_2O_3 = 2Fe + 3H_2O$$

As a result, an Iron product (i.e. "sponge iron") of between 90 and 99 % purity is produced. No chemicals are required in the process.

This sponge-iron is produced in the furnace, generating net zero CO_2 emissions and has 30% less weight than iron ore. A by-product from the furnace would be water, which would be recycled for hydrogen production. The rotary kiln for Iron reduction and the hydrogen processing as well as the briquetting will be covered in a steel structure with shade netting.

The entire processing facility will cover an area of maximum 10,000 m^2. The maximum height of the facilities will be ~ 15 m.

Figure 3 illustrates the processing of sponge iron envisaged by HyIron.

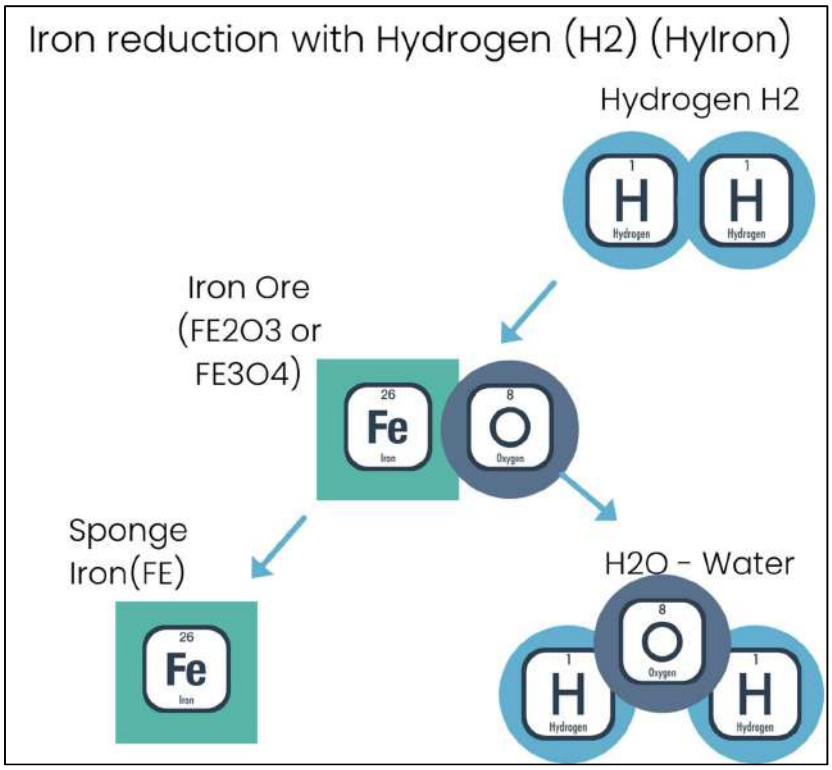

FIGURE 3: PROCESSING SPONGE IRON

A by-product from the furnace would be water (H_2O), which would be recycled for hydrogen production. The process plant for the pilot phase includes the following key infrastructure:

- Steel structure with shade netting for the shaft furnace for Iron reduction and the hydrogen processing as well as the briquetting.
- Water Electrolysis building, which will cover an area of ~ 1 000 m^2.
- Another warehouse (i.e. ~ 500 m^2 area) will be constructed adjacent to the process plant, which will include ablutions, offices, staff kitchen and a meeting room.

The final product – Sponge Iron – will be transported to Walvis Bay for export. Approximately 2 truck trips would be required from site to Walvis Bay daily for the transportation of the ~ 15 000 tons Sponge Iron per annum, following a similar route for the transport of the Iron ore concentrate.

3.3 Hydrogen Production and Water Cycle

Renewable energy will be produced onsite. This energy will also be used to split water into hydrogen and oxygen by means of electrolysis (see Figure 4). During electrolysis water molecules (H_2O) are broken down into oxygen (O_2) and hydrogen (H_2) and in the reaction of the hydrogen

with the oxygen of the iron ore concentrate (which could be Fe_2O_3 or Fe_3O_4), water is again produced.

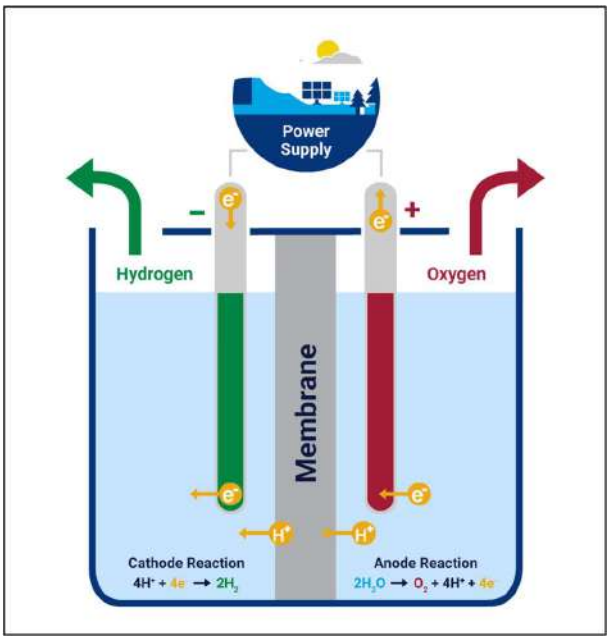

FIGURE 4: ELECTROLYSIS PROCESSING TO PRODUCE HYDROGEN

Therefore, even though water is split into hydrogen and oxygen in the electrolysis process, there is limited water use in the overall process because water will be recycled. Figure 5 illustrates the water cycle proposed by Hylron. In addition to the water formed during reduction, only small volumes of water (less than ~ 15 m^3 / week) will be required to make up process losses.

In addition, some low-quality water will be required for dust suppression on the roads around the plant, which could either be untreated borehole water or brine from the reverse osmosis (RO) plant, or a mix of these two sources.

A maximum of ~40 m^3 water would be required on average per week (i.e. ~ 2,000 m^3 / annum) during the pilot phase, which includes potable water use. The water will be supplied by abstracting from an existing borehole(s) (i.e. groundwater) on site that will either be conveyed through a pipeline between the borehole(s) and the site or transported with a water bowser. A water storage tank with a size of 40 m^3 would be required on site. A small reverse osmosis (RO) desalination plant will be set up to produce pure demineralised water for hydrogen production and for mixing with untreated water to produce less mineralised drinking water.

Hylron also considers to truck the initial volume of water intake for the processing in to the site.

3.4 *Power Supply*

The proposed project will receive its power exclusively from renewable energy sources, i.e. PV power onsite. No grid power will be required onsite and therefore no transmission lines will be installed. All cabling will be underground or on the ground, and electric installations will be bundled in the main process area. PV power is generated by converting solar radiation into direct current electricity. This is done by using semiconductors that exhibit the photovoltaic effect. The photovoltaic effect is the generation of voltage and electric current in a material upon exposure to light. Photovoltaic power generation uses solar panels composed of several solar cells connected in series containing a photovoltaic material (see Figure 5).

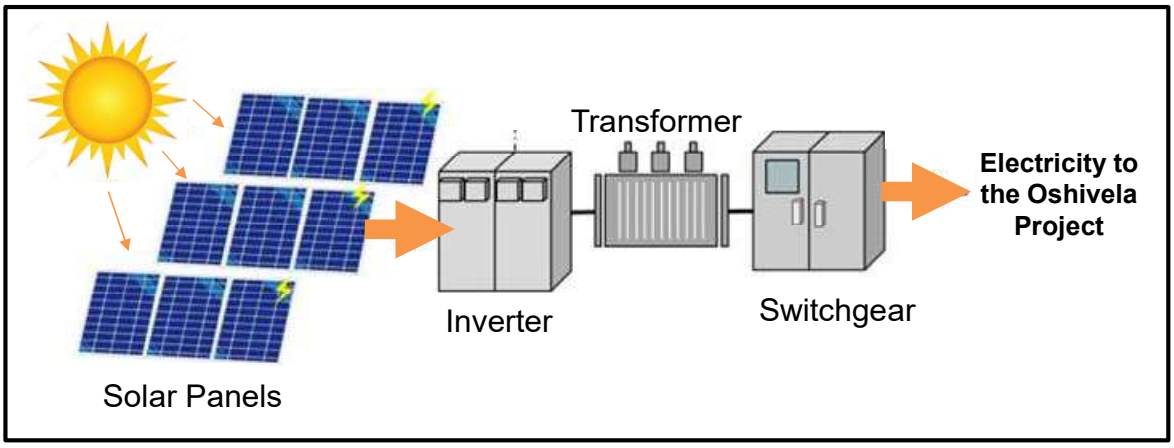

FIGURE 5: DIAGRAMMATIC ILLUSTRATION OF A TYPICAL PV POWER PLANT

Hylron proposes to use monocrystalline bi-facial technology for their PV Power Plant. Hylron proposes to install 25 MWp of Solar power. The PV panels are planned to be built in a north-facing alignment at a tilt of 25° and will need a maximum of 30 Ha of space (see Figure 2). The panels will each be ~ 2.3 m high and 1 m wide. A total of 44,000 panels / modulus will be installed. There will be Battery Storage on site to compensate for fluctuations from the PV Power plant, storing comparably small amounts of energy.

3.5 *Associated Support Structures / infrastructure and services*

Within the proposed Project area internal roads, internal power lines, pumps, pipes, water storage, sewage treatment system (septic tank) and other associated infrastructure and services, process and non-process plant buildings, product handling and loading areas, fuel storage facilities, general waste handling and storage facilities, etc. would need to be constructed.

The fuel storage facilities will entail a 10,000 litre above ground tank with the required bunding.

3.6 Employment and accommodation

The required staff during operations will be at a maximum ~ 20 people at a time. Up to 50 people will be employed as there will be at least two to three shifts. The staff will be accommodated on the farm(s) belonging to the Hylron group. Accommodation will be provided in already existing fully furnished flats and in newly build flats. On and off times will be organised in blocks to allow family visits and time for entertainment. Some staff might choose accommodation in Arandis or Swakopmund to travel to site for the shifts.

3.7 Waste Management during operations

a) Sanitation

Onsite biotreatment plants will be installed on site which will process sewage waste from operations ablutions. Treatment plants will be installed during early stages of the project. The septic tanks will be emptied on a regular basis and the effluent disposed in the plant site treatment plants. Treated effluent water from the treatment plants may be reused onsite for plant road dust suppression.

b) Other waste (hazardous and non-hazardous)

The types of waste that could be generated during operations include hazardous industrial waste, general industrial waste, medical waste from the staff medical station, and domestic waste. Waste will be sorted at source, stored in a manner that there can be no discharge of contamination to the environment and recycled or reused where possible. The remainder will be transported off site to appropriate recycling or disposal facilities (Swakopmund or Walvis Bay for general waste and Walvis Bay for hazardous waste).

c) Mineralised waste

A maximum volume of 1,000 to 2,000 tons of silica material (i.e. waste sand) will be produced per year, which would either be used for road maintenance (i.e. access road) or backfilling of borrow pits (where Forsys potentially use material for the access road maintenance). Any remaining silica material could ultimately be trucked back to the mine (i.e. local supplier of the iron ore concentrate) or used to backfill / rehabilitate the proposed new borrow pit (see below).

3.8 Construction phase activities and infrastructure

Construction activities will be undertaken for the process plant, which will be inside a steel structure with shade netting; the adjacent warehouse as well as the associated support structures

/ infrastructure. The following (key) activities are expected to take place during the construction of the above-mentioned facilities:

- Appoint contractors, labours, etc.
- Limited earth moving activities to create flat surfaces.
- Foundation excavations.
- Setting up contractors' laydown areas.
- Maintaining the Norasa Uranium Project access road as and when require – in liaison with Forsys.
- Digging of foundations and trenches.
- Delivery of materials – storage and handling of material such as sand, rock, cement, etc.
- General building / construction activities including, amongst others: mixing of concrete; operation of construction vehicles and machinery; refuelling of machinery; civil, mechanical and electrical works; painting; grinding; welding; etc.
- Handling and storage of hazardous material, including lubricants, paints, gas (welding), cement, chemical additives for cement, diesel and petrol.
- Handling, storage and disposal of hazardous waste, including empty paint containers, cements bags, chemical additives (for cement) containers, contaminated PPE and other (with oil, etc.).
- Handling, storage and disposal of non-hazardous waste, including steel off-cuts, domestic waste, wood off-cuts, grinding wheels, other construction waste, redundant concrete packaging, e.g. plastic wrapping, styrofoam.

Based on the geotechnical investigations carried out on the site, the uprights for the PV panels can be installed following the methodology described below:

- 'Hammer' holes with a modified excavator / jack hammer for each of the upright structures.
- Auger holes in some parts of the project area for the upright structures.
- Drill holes in some parts of the project area for the upright structures.

Hylron plans to create a relatively small borrow pit on the north-western side of the Norasa Uranium Project Private access road, which is on Portion 4 of Farm Bloemhof 109. The borrow pit will have the following (maximum) dimensions:

- Area: ~2,500 m^2.
- Depth: ~2 m.

The borrow material will be used for road maintenance / construction (i.e. onsite access road).

During construction there will be up to maximum ~ 80 people on site at a time. The core team of the construction workers will be accommodated on the farm(s) belonging to HyIron and neighbouring (guest-) farms. For some of the workers, HyIron will build fixed housing with own kitchens, bathrooms etc. on their farm(s). Day labourers will also be brought in from Arandis and Swakopmund.

4. IDENTIFICATION AND DESCRIPTION OF POTENTIAL ENVIRONMENTAL IMPACTS AND ASSESSMENT FINDINGS

The environmental aspects and potential impacts associated with the development and implementation of the proposed Oshivela Pilot Project were identified during the scoping process, in consultation with I&APs and the project team.

An understanding of the environment and the sensitivity of the site and surroundings is important to ensure the potential impacts of the proposed Pilot Project activities and infrastructure can be identified and then assessed. A general overview of the current baseline conditions associated with the proposed Pilot Project were therefore first established. The following baseline conditions were therefore described in section 6 of the EIA Scoping (including Impact Assessment) Report: Climate; geology; topography and soils; biodiversity; surface water and groundwater; visual / sense of place, land use, surrounding build environment and sensitive receptors; noise; air quality; archaeology; and socio-economic aspects.

A summary of the activities associated with the proposed Oshivela Pilot Project and the associated key environmental aspects and potential impacts that were identified as part of the EIA process are summarised in Table 2 below. The relevance of the potential impacts ("screening") is also presented in Table 2 to determine which aspects / potential impacts needed to be assessed in further detail.

TABLE 2: KEY ENVIRONMENTAL ASPECTS AND POTENTIAL IMPACTS ASSOCIATED WITH THE PROPOSED OSHIVELA PILOT PROJECT

ACTIVITY / FACILITY	ASPECT	POTENTIAL IMPACT AND RELEVANCE (SCREENING) OF POTENTIAL IMPACT
Construction phase: • Clearing, site preparation, use of earthmoving equipment and machinery. • Establishing of working areas and laydown areas, waste handling facilities and construction staff amenities. • Materials delivery and laydown / storage. • Drilling, excavation. • Establish new infrastructure / facilities, including: Processing plant, access tracks, offices, PV plant, and related infrastructure. *Operations phase*: • Processing. • Operating of solar fields.	Activities disturbing/ destroying **biodiversity** and habitats	In the broadest sense, biodiversity provides value for ecosystem functionality, aesthetic, spiritual, cultural, and recreational reasons. The development of the process plant and associated activities and infrastructure (including the proposed PV power plant) could cumulatively cause a loss of natural vegetation and could lead to habitat fragmentation and degradation. Various important species and sensitive habitats have been identified. Furthermore, the habitats of animal life and ecosystems may be impacted in a negative manner as a result of construction and operational activities. The natural movement of animals in the Project area and beyond, taking the movement of animals in the wider landscape into consideration, can be disturbed as a result of the processing facilities as well as the PV panels. Due to the overall project layout, specifically because of the proposed PV power plant the potential impacts on biodiversity have been assessed as part of this EIA process. The potential impacts on biodiversity (physical impacts and general disturbance), therefore include: • Loss of vegetation and associated biota due to construction activities. • Impact on animal movement. • Change of habitat. • Spread of alien invasive plants (operational phase). Potential impacts relating to Biodiversity were therefore assessed as part of this EIA process.
	Activities and infrastructure disturbing / killing **Avifauna**	Due to the overall project layout and activities / infrastructure, specifically as a result of the proposed PV power plant the potential impacts on avifauna had to be assessed as part of this EIA process. Potential impacts on avifauna include: • Disturbance of birds during construction (resulting in avoidance / displacement / barrier effects); this could include road mortalities and/or poaching during construction. • Direct and indirect modification / loss / destruction of bird habitat (resulting in voidance / displacement / barrier effects).

ACTIVITY / FACILITY	ASPECT	POTENTIAL IMPACT AND RELEVANCE (SCREENING) OF POTENTIAL IMPACT
		• Attraction of birds to novel (artificial) habitats and resources; this impact could lead to negative impacts on infrastructure, caused by bird nesting, perching and other activities • Bird collisions with infrastructure such as solar panel arrays and other associated infrastructure.
	Clearing of **topsoil** and spillages that pollute soil	Potential impacts on soil include: • Pollution because of leakages and spills. • Loss of soil due to disturbance and erosion. Topsoil (and subsoil) will be disturbed during the construction phase when the footprint areas for surface infrastructure will be stripped (i.e. processing facilities). Topsoil could further be impacted through accidental spills of hydrocarbon, paint, etc., movement of vehicles and machinery which could result in a loss of topsoil through contamination, erosion and compaction. Potential impacts on soil are cumulative considered as part of the surface water and groundwater and biodiversity assessments. Measures relating to topsoil management are included in the EMP (Appendix G).
	Infrastructure contributing to the overall **visual** impacts	Negative visual (and sense of place) impacts are expected because of the visual intrusion by the proposed infrastructure. Visual impacts on this receiving environment may be caused by activities and infrastructure during both construction and operational phases. Potential visual impacts therefore include: • General visual impacts and sense of place. The potential visual (and sense of place) impacts were therefore assessed as part of this EIA process.
	PV Power Plant infrastructure causing **glint and glare**	Glint and Glare – Arandis Aerodrome There is a general concern for the potential of PV glare in aerodrome environments. Part 139.01.13 of the Namibia Civil Aviation Regulations (NAMCARs) of 2001, as amended in 2018, and the Namibia Civil Aviation Technical Standards – Aerodromes and Heliports (NAMCATS -AH), stipulates the requirements for lights that may endanger the safety of aircraft. Therefore, a glint and glare assessment are required prior to the construction of a Solar PV Plant, where relevant.

ACTIVITY / FACILITY	ASPECT	POTENTIAL IMPACT AND RELEVANCE (SCREENING) OF POTENTIAL IMPACT
		Although, the NCAA has not yet domesticated the technical guidance material for glint and glare assessments, industry best practice is to be adhered to. In this regard, the South African Civil Aviation Authority (SACAA) obstacle notice 3/2020[5] Additional Requirements for Solar Project Applications states that a Glint and Glare Assessment would not be required if the solar PV facility is not within a 3 km radius of the aerodrome (Part 139.01.30 (3). Using the SACAA guideline and the NCAA note suggesting 'industry best practice is to be adhered to', and because the solar PV facility of the proposed Oshivela Pilot Project is ~25 km to the arrays, a glint and glare analysis is not required. It is therefore assumed that the potential for glint and glare caused by the Pilot Project would not influence the operation of the Arandis Aerodrome and no further assessment is required.
	Various spillages that could pollute **groundwater and surface water**.	As a result of the proposed project activities and infrastructure, the potential impacts on groundwater and surface water in the surrounding need to be assessed. The potential impacts that were identified, requiring assessment, based on the proposed overall project activities and infrastructure include the following: • Abstraction of groundwater for the project could deplete the limited stored resources. Neighbouring farmers may think that pumping will lower the regional water table and affect the yield of their boreholes. • Project infrastructure impacting surface water flow / drainage. • Spills from the RO plant and disposal of brine mixed with water treatment chemicals could affect soil and water quality. • Disposal of untreated sewage causes soil and water pollution. • Soil, surface and groundwater pollution from domestic sewage effluent, hydrocarbon spills or improperly managed waste negatively affects the soil, groundwater and surface water quality and could reduce the availability of water resources. The above-mentioned groundwater and surface water impacts were therefore assessed as part of this EIA process.
	Abstraction of groundwater.	
	The infrastructure area (including the process plant and PV panels with all associated infrastructure etc.) causing reduced **storm water flow**.	

[5] **Obstacle Notice 3/2020 (Replacement for 17/11/2017): Additional Requirements for Solar Project Applications**
Kindly note that with immediate effect, A Glint & Glare Assessment will be required as soon as the proposed site is located on the extended runway centreline within the ICAO Annex 14 Approach Surface, Take-Off Climb Surface & Departure Surface, and within 3km radius around an Aerodrome/helistop as per Part 139.01.30 (3).

ACTIVITY / FACILITY	ASPECT	POTENTIAL IMPACT AND RELEVANCE (SCREENING) OF POTENTIAL IMPACT
	Noise and air emissions from various construction activities, vehicles, processing and associated activities	There are a range of construction and operational activities relating to the proposed Oshivela Pilot Project that will generate noise, which could potentially be heard from surrounding areas. The increase in ambient noise levels could cause disturbance or nuisance impacts to sensitive receptors (third parties) or animals. There are also various activities or sources relating to the proposed Project that can pollute the air and cause resultant potential impacts (i.e. nuisance impacts and / or health) on third parties. Pollution sources relating to dust generation include: Land clearing activities, materials handling and stockpiling, wind erosion of stockpiles, disturbed areas and vehicle movement (i.e. transport) along unpaved roads. Sources of gaseous emissions will mainly be from the vehicles. “Sponge-iron” of between 90% and 99% purity is produced with net zero carbon dioxide (CO_2) emissions. In the construction and decommissioning phases these activities are temporary in nature while the operational phase will present more long-term activities. There are a number of farms with homesteads in the area, the closest to the Pilot Project facilities being two houses on Farm Valencia. As a result of the proposed project activities and its location, the potential noise disturbance to third parties and air pollution, dust nuisance and increased risk of health impact to third parties (i.e. closest receptors) need to be assessed. The potential noise and air quality impacts were therefore assessed as part of this EIA process.
	Construction, land clearing; use of machinery, vehicles, equipment, etc. that could damage **archaeological** / heritage sites	The construction activities and movement of vehicles associated with the Oshivela Pilot Project have the potential to encroach upon, disturb, damage or destroy archaeological remains protected under the National Heritage Act (27 of 2004). The proposed Project Site lies in a part of the Namib Desert which has revealed several important archaeological sites which have provided new insights into the archaeology of the desert. A total of thirteen seed digging sites were identified in and adjacent to the Oshivela Project Area of Interest (AoI) during a detailed survey, carried out by the Archaeologist in January 2024. Due to the proposed activities and the overall project layout the potential archaeological impacts were assessed as part of this EIA process. In addition, a standard chance find procedure will be developed for the managing of discoveries made in the course of civil works on the Project Site.

ACTIVITY / FACILITY	ASPECT	POTENTIAL IMPACT AND RELEVANCE (SCREENING) OF POTENTIAL IMPACT
Construction phase: • Transport of equipment, building supplies, etc. during construction. • Transport of workers to site during construction. *Operations phase:* • Transport of iron ore concentrate to site and final product to the port of Walvis Bay for shipment to the end client.	Increased **traffic impacts** and impacts on the **road condition**.	Various access routes to the Oshivela site (and other transport options), for the transport of the iron ore concentrate (to site) and the final product (to the Walvis Bay Port) are being considered. Both road and rail[6] options are considered by Hylron. The road option 1, following the B2 and the Norasa Uranium Project Private access road is preferred over road option 2, through the NNNP. This route option requires further agreements between Hylron and the DWNP before this could be considered and the current commitments in the EMP (see Appendix G) might need further actions, depending on conditions set by DWNP. Construction related traffic will follow the B2 and the Norasa Uranium Project Private access road to site. The construction phase is for a limited period of time. The key potential traffic-related impacts are associated with the following: • Road capacity issues. • Road maintenance issue (i.e. road condition), relating to the Norasa Uranium Project Private access road. • Third party (i.e. public) road safety. These traffic-related impacts were qualitatively assessed as part of this EIA process.
General activities, offices and buildings, ablution facilities, domestic waste generation, maintenance activities: • Waste handling, management, recycling and disposal.	**Emissions** to land, impact on **biodiversity**, environmental **degradation**, **visual** and **nuisance** impacts	Waste management practices will be implemented by Hylron. Hylron will further develop waste management procedures. Waste will be separated at source and stored in a manner that there can be no discharge of contamination to the environment. Some waste types will be recycled or reused where possible. Where recycling/re-using is not possible, non-hazardous, non-recyclable waste will be disposed of offsite at the nearest licenced landfill site. Hazardous waste that is non-recyclable will be transported off site to an appropriate disposal facility. The related management and mitigation measures are stipulated in the EMP (refer to Appendix G). No further assessment is required.
Construction activities and general operations: • Employment of people. • Construction workers.	Employment of people, onsite accommodation and	A maximum of ~ 80 will be required over the ~ 7 - 8 months construction period and 20 people at a time (i.e. up to 50 employees working on shifts) for the operational phase of the project. The proposed Oshivela Pilot Project will therefore bring economic benefits, jobs and new skills to Namibia. With the high unemployment numbers in the region (and country) this will be a positive impact.

[6] Details regarding the rail transport option(s) still need to be further developed by Hylron, in consultation with relevant stakeholders.

ACTIVITY / FACILITY	ASPECT	POTENTIAL IMPACT AND RELEVANCE (SCREENING) OF POTENTIAL IMPACT
• Staff accommodation on site.	related **socio-economic** impacts: • Impacts to local, regional and national economy. • Jobs creation and skills development. • In-migration • Impacts to community (i.e. surrounding farmers) health, safety and security.	Operating with a relatively small workforce, it is unlikely to induce negative social impacts such as in-migration and significant additional pressures on government's services such as education and health. The potential positive impacts that were identified, requiring assessment include the following: • Economic impacts during construction and operations. • Job creation and skills development during construction and operations. However, various potential negative social impacts could be associated with the construction workers, permanent employees and the accommodation on HyIron's Farm(s) in the area, as was raised during the public participation process by I&APs. The potential socio-economic impacts were therefore assessed as part of this EIA process.

The issues that were identified as requiring further assessment; and the assessment findings are summarised in Table 3. Some of the issues (based on the assessment findings and issues raised by I&APs) are further described in the sections below.

Management and mitigation measures and monitoring requirements are presented in the EMP.

TABLE 3: SUMMARY OF POTENTIAL IMPACTS ASSOCIATED WITH THE PROPOSED PROJECT (L = LOW; M = MODERATE; H = HIGH)

Potential Impact	Significance	
	Before mitigation	After mitigation
Biodiversity (fauna and flora):		
Loss of vegetation and associated biota due to construction activities	**M**	**L-M**
Disturbance of large mammal movements	**L-M**	**L**
Change of habitat due to the construction and operation of the process plant, solar plant modules and associated infrastructure	**M**	**L-M**
Spread of alien invasive plants (operational phase)	**M**	**L**
Avifauna:		
Physical/human disturbance of birds	**M-H**	**M**
Direct and indirect modification / loss / destruction of bird habitat	**M**	**L-M**
Attraction of birds to novel (artificial) habitats and resources; this impact could also lead to negative impacts on infrastructure, caused by bird perching, nesting and other activities	**L**	**L**
Bird collisions with infrastructure such as solar panel arrays, fencing and other associated structures	**L**	**L**
Visual:		
General visual impacts and sense of place	**L-M**	**L-M**
Groundwater and Surface Water:		
Biophysical and Social Aspects of Groundwater Abstraction	**L**	**L**
Infrastructure impacting surface water flow / drainage	**L**	**L**
Desalination Plant Operation and Brine Discharge	**L**	**L**
Sewage Disposal	**L**	**L**
Water and Soil Pollution	**M**	**L**
Air Quality:		
Air pollution, dust nuisance and increased risk of health impact to third parties (closest receptors)	**L-M**	**L**
Noise:		
Noise disturbance to third parties (closest sensitive noise receptors)	**L**	**L**

Potential Impact	Significance	
	Before mitigation	After mitigation
Archaeology:		
Damage or destruction of archaeological sites	**M**	**L**
Socio-economic:		
Economic impacts – construction and operational phases	**H+**	**H+**
Job Creation And Skills Development	**H+**	**H+**
Potential negative social impacts associated with the construction workers, permanent employees and the accommodation on Hylron's Farm(s) in the area	**H**	**L**
Traffic related impacts	**H**	**L-M**

4.1 Biodiversity (fauna and flora)

a) Issue: Loss of vegetation and associated biota due to construction activities

The Oshivela Pilot Project will be constructed in mostly undisturbed area on the north-western Section of Portion 4 of Farm Bloemhof 109. The following needs to be taken into consideration in the assessment of potential impacts:

- The process plant with supplementary infrastructure will be constructed with an overall footprint of ~10,000 m^2. Minor change to natural habitats are expected, but no densely vegetated areas on any rocky outcrops / hills or in the drainage lines or other environmentally sensitive areas are affected. With reference to Figure 6, the process plant and associated infrastructure is located to the west of the marble outcrop, on the gravel plains with limited vegetation. Similarity, the proposed borrow pit will be located on the gravel plains, outside the more distinct drainage line (i.e. shallow wash) with small tributaries that drains southwest towards the Khan River.
- The PV power plant (i.e. solar panels and associated infrastructure) will eventually require a relatively large area, but the solar modules do not entirely sterilise the ground. Vegetation and associated fauna can thrive in between the structures. Some vegetation would need to be cleared, some natural area will be affected and natural processes therefore altered. The PV power plant will largely be constructed on the gravel plains, except for a small section of the panels overlapping the marble outcrop extension (with very little vegetation) (see Figure 6).

- Construction workers inadvertently disturb vegetation and sensitive habitats. Without controls, people will not avoid sensitive areas and more vegetation may be cleared than necessary.
- There is an existing access track to the site, within the farm boundaries, however, this track will require upgrading. The traffic volumes are expected to be low and no conventional haul road is necessary. Without controls people will not avoid all sensitive areas.
- Artificial lighting attracts night-active animals and may result in their death by collision with vehicles or lighting fixtures. However, the Pilot phase of the Oshivela Project, will be operational solely in daytime. A few lights will however be installed for security purposes and for unscheduled services on the machines, which would be comparable to lights of existing households in the area.
- Noise may drive animals away thus changing their behaviour and possibly keeping them away from established den, roosting and nesting sites, this will affect all animals inhabiting the area and may lead to animals avoiding the Project area, or a reduction in population numbers where avoidance is not possible.

Taking all of the above into consideration, the cumulative impact intensity is rated as moderate in the unmitigated scenario. With mitigation, the intensity is rated as low to moderate as natural processes remain altered in some areas.

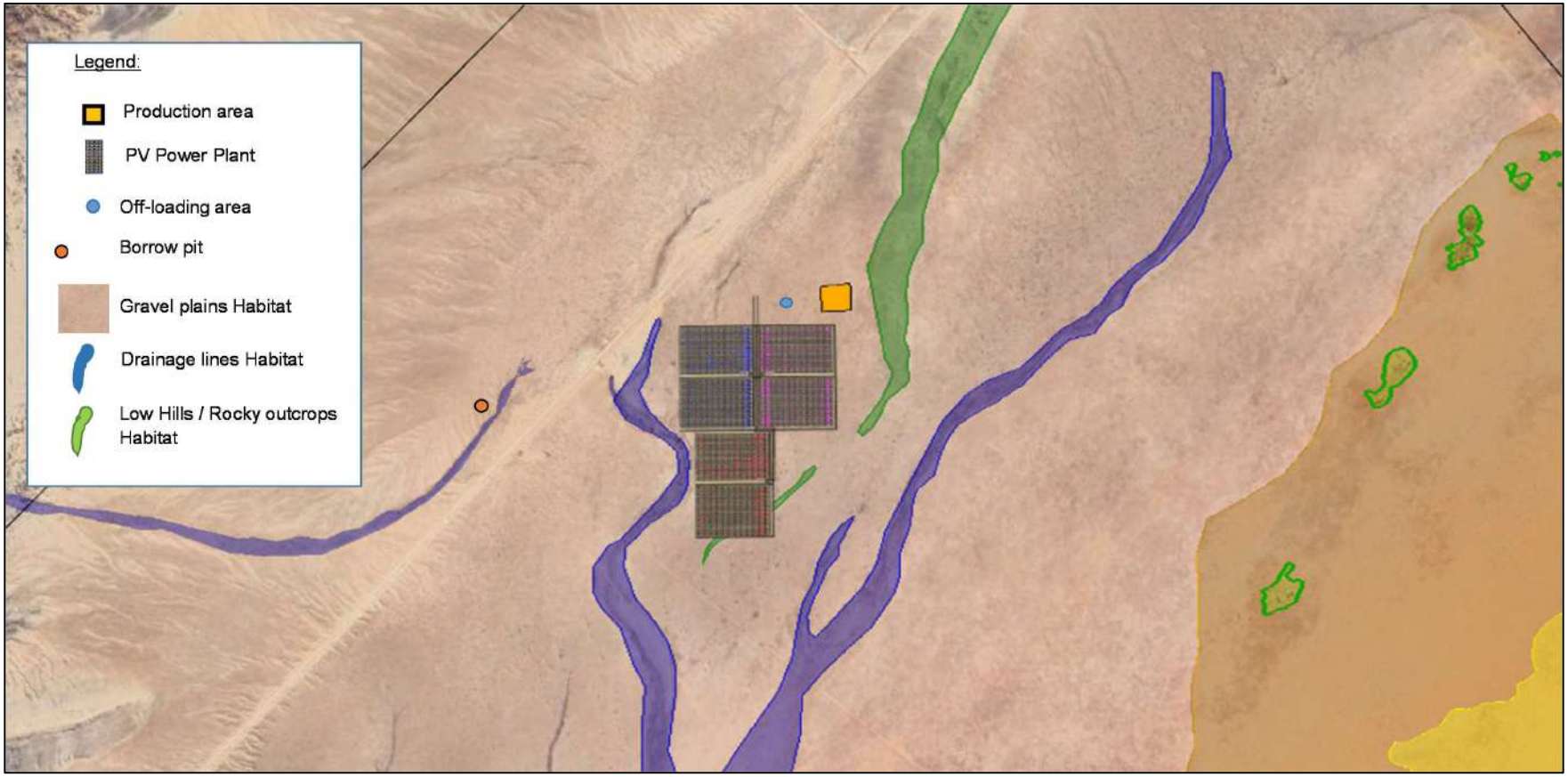

FIGURE 6: OSHIVELA PILOT PROJECT LAYOUT IN RELATION TO NATURAL HABITATS

b) Issue: Disturbance of large mammal movements

The proposed Pilot Project area is located within a fenced farm from which big mammals are largely absents due to the persistent drought of the last years. However, large mammals periodically frequent the area and more animals could be attracted after rains. They could be disturbed along their customary routes by traffic on the access roads, the construction activities, and maintenance inspections of the solar panels as well as the activities near the operational area of the process plant. Regular animal movements are, however, currently limited and only expected during exceptional vegetation seasons. Also, large animals would still be able to move freely around the proposed infrastructure.

c) Issue: Change of habitat due to the construction and operation of the process plant, solar plant modules and associated infrastructure

The process plant with supplementary infrastructure will be constructed on the least sensitive habitat, i.e. gravel plains and will have a relatively small footprint compared to remaining similar habitat in the region. The solar modules are above-ground and will thus not sterilise the soil. However shading by the panels will alter the natural habitat. The effects on biodiversity are unknown at present and could be negative (e.g. less light for photosynthesis) as well as positive (e.g. run-off from panels, shaded habitat). If the main drainage lines are avoided for the position of infrastructure, no major alteration of water flow is expected. With reference to Figure 6, the more distinct drainage line (i.e. shallow wash) with small tributaries that drains southwest towards the Khan River is well outside the PV Project area. The proposed borrow pit will also be outside of the wash on the western side of the access road. The two more distinct drainage lines on the site where the Process plant and PV power plant are planned will be kept open. Also, the outcrops and hills habitats are largely avoided. Only a small section of the panels will overlap the marble outcrop extension (see Figure 6). The impact intensity is rated as moderate in the unmitigated scenario as some natural areas would be affected and natural processes altered, but whether positive or negative with regards the habitat affected by the installation if the solar modules cannot be determined presently.

d) Issue: Spread of alien invasive plants (operational phase)

Invasive alien plants can establish near artificial water sources such as the desalination plant, water tanks and sewage plant. The most likely candidates in this area are Mexican poppy *Argemone mexicana*, thorn apple *Datura* species, mesquite *Prosopis* species, wild tobacco *Nicotiana glauca* and castor oil *Ricinus communis*. The intensity of impacts is rated high in the unmitigated scenario as Natural processes could be altered, because indigenous vegetation is

suppressed or replaced, for example Prosopis species use more water than indigenous trees and thus deprive vegetation nearby of water. With mitigation the intensity is low.

4.2 Avifauna

a) Issue: Physical/human disturbance of birds (resulting in avoidance/displacement/barrier effects); this could include road mortalities and/or poaching during construction

Physical / human disturbance from solar developments can potentially impact on birds during both the construction and operational phases, thereby affecting the presence or foraging and/or breeding success of key species. During the construction phase, vehicle and human activity on the site is at a peak, with high levels of disturbance. Further forms of disturbance include road mortality and poaching of birds (and of eggs). Once operational, the amount of disturbance should decrease to some extent (although not cease). The results of disturbance may be indirect or direct. The proposed development area is relatively undisturbed, except for some geotechnical investigatory work undertaken by Hylron and their technical Team. The intensity of potential impacts is rated as moderate as disturbance may cause displacement and barrier effects; birds may leave the study site and surrounding areas, either temporarily or permanently; in some cases disturbance may result in decreased breeding success; individuals affected but not populations.

b) Issue: Direct and indirect modification / loss / destruction of bird habitat (resulting in avoidance/displacement/barrier effects)

Solar developments can potentially affect birds by destroying or degrading large areas of habitat, thereby displacing sensitive species. In many cases, PV facilities have involved the complete removal of vegetation from the inclusive footprint of the installed plant. It is this tendency to destroy, degrade, fragment or otherwise displace birds from large areas of natural habitat that has stimulated most concern to date about the implications for avifauna of large-scale solar PV development, particularly in relation to species with restricted ranges and very specific habitat requirements. Habitat loss may also occur through off-road driving (e.g. in sensitive wash areas or the rocky outcrop / hills) during construction. Such habitat loss is usually permanent. Indirect habitat loss (and consequent displacement) may also occur, because the habitat used by birds is exploited or changed in a way that makes it less attractive to them, or (due to barrier effects) the birds avoid the area near the development, resulting in lower densities locally. A large concentration of solar plant developments may also lead to increased levels of fragmentation and barrier effects to terrestrial species, particularly if the sites are fenced. This would apply to species such as Common Ostrich, and possibly Rüppell's Korhaan, in the present study.

It must however be noted that there is already an existing farm boundary fence and it is unlikely that other fences are planned around the PV power plant. Also Hylron will not completely clear the area underneath the panels. Hill/outcrop habitats in the area are sensitive for several priority bird species, including Ludwig's Bustard (for roosting and display areas) and Rüppell's Korhaan; and for Stark's Lark. These habitats are limited in the study area, and birds displaced by such habitat loss would not be accommodated easily in the existing, remaining outcrop habitats, especially where territorialism is involved. Any removal or disturbance of natural vegetation will result in a change to the habitat available to the birds in the area, potentially impacting on their ability to breed, forage and roost in the vicinity. The sparsely vegetated drainage lines in the study area are limited, and particularly vulnerable to habitat destruction.

4.3 Visual impacts

a) Issue: General visual impacts and sense of place

The nature and intensity of visual impacts is determined by assessing the change to the visual landscape as a result of the proposed new Pilot Project with its related infrastructure and activities. The (existing) visual landscape is determined by considering: landscape character, sense of place, aesthetic value, sensitivity of the visual resource and sensitive views. The landscape is rated as sensitive to change in general and when viewed from the perspective of a land owner or their guests / visitors, the natural landscape is associated with a serene and tranquil sense of place. The area in which the proposed Pilot Project is situated is therefore considered to have a significant visual landscape. When considering the potential change to the visual landscape the key issues are: visual exposure, visual intrusion, and sensitivity of receptors. Each of these issues is discussed below. The main visual receptors and sensitive viewers of the Project would be:

- Two residential homesteads on the Farm Valencia. The one house is located ~ 2.6 km north-east of the Pilot Project site and the second house is located ~ 6 km north-east of the site, along the edge of the sand dune. It must however be noted that this homestead is on the north-eastern side of an outcrop (hill) and the site will not be visible from this house.
- The house on the Farm Namibplaas west located ~ 9.5 km north-east of the Pilot Project site. It must however be noted that this homestead is on the north-eastern side of an outcrop (hill) and the site will not be visible from this house.

- Surrounding Farm owners and their guests using the Norasa Uranium Project Access Road. It must however be noted that the Project site would only be visible for a relatively short distance from this road.
- People working at the Norasa Uranium Project or at the farms, travelling along local roads whose attention may be focused on their work or activity and who therefore may be potentially less susceptible to changes in the view.

The other farms' houses are too far away and therefore fall outside the zone of potential influence, also taking the topography of the study area into account.

Visual exposure is the extent to which Project infrastructure and activities will appear in the various views. It follows that the closer the infrastructure and activities, the greater the visual exposure. The study area (i.e. the proposed Oshivela Pilot Project site and surroundings) is characterised by sandy gravel plains that are flat to undulating, occasionally interspersed with isolated ridges, hills (inselbergs) and mountains. Transitions between landforms are often abrupt. Each of the sensitive viewer locations, taking their respective exposure into consideration, are described in more detail below:

- House on the Farm Valencia is located ~ 2.6 km north-east of the Pilot Project site:

  The Pilot Project infrastructure would largely be hidden behind the Marble outcrop. The highest infrastructure at the process plant would be ~15 m, meaning that a small part of the infrastructure would possible be visible above the outcrop area. However at a distance of ~ 2.6 km it would not be clear.

- House on the Farm Valencia located ~ 6 km north-east of the site:

  The Pilot Project infrastructure would completely be hidden behind the hill with red sand dune adjacent (west) to the house. Furthermore, with the house being ~ 6 km from the Project development area, and the topographical features in-between, the visual exposure is relatively small.

- The house on the Farm Namibplaas west located ~ 9.5 km north-east of the Pilot Project site:

The Pilot Project infrastructure would completely be hidden behind the hills. Furthermore, with the house being ~ 9.5 km from the Project development area, the visual exposure is insignificant.

- Third parties using the Norasa Uranium Project Access Road:

The Pilot Project infrastructure would be visible from the road (as it will be very close to the road). However, the project infrastructure would be visible for only a ~ 2.5 km Section when traveling along the access road (i.e. a very small percentage of the full length of the road from the B2). Also, only a few sensitive viewer receptors (i.e. farm owners and their guests) make use of this access road, as other access roads to the surrounding farms exist.

Visual intrusion is the extent to which the infrastructure and activities will contrast with the visual landscape and can/cannot be absorbed by the landscape. The visual intrusion of the proposed Project is considered to be low to moderate as infrastructure would be absorbed in the landscape at some distance and very few sensitive viewer locations will be affected.

Taken together, the unmitigated cumulative intensity of visual and landscape disturbance is low to moderate, specifically taking the Norasa Uranium Project Access Road, used by some of the surrounding farm owners and their guests into consideration.

4.4 Groundwater and Surface Water

a) Issue: Biophysical and Social Aspects of Groundwater Abstraction

The availability of groundwater is limited by the dry climate, especially the fact that groundwater recharge only takes place in years with exceptionally good rainfall that occur at random intervals, though local sources often refer to an average of every ten years. Individual boreholes may yield considerable volumes of water but the aquifer size is usually limited and the stored reserves could soon be depleted through continuous pumping.

The proposed Pilot Project will use the existing borehole no. 61617 on Farm Bloemhof that lies on the banks of a major drainage line and is recharged through infiltration of rainwater and runoff into the alluvium. The former owner of farm Bloemhof determined the optimum pumping rate for borehole no. 61617 of 2.4 m^3/h and the borehole's sustainable yield of 7,900 m^3/annum through long term observation. Further information on the aquifer parameters is not required at this stage because the Pilot Project will use very little water, less than the farmer's continuous consumption. However, a more detailed hydrogeological investigation should be carried out before implementing the possible next project phase, i.e. upscaling.

The available data indicate general groundwater flow directions from north-east to south-west, which means that the neighbouring farms are upstream of this borehole and will not be affected by water abstraction for the project. One sometimes hears the opinion that the cone of depression around a borehole will draw in water from upstream at a higher rate than the normal flow. This

only applies in case of a single aquifer, while the boreholes around Bloemhof are situated on widely spaced discrete fractured rock aquifers. Also, contrary to another common misperception, these water sources are topped up by recharge from rainfall and runoff, not by groundwater flowing in from upstream.

Though the water analyses that were provided showed the quality to be unsuitable for human consumption the previous farm owners reported no health effects 'if one is used to it'. To supply drinking water to the employees at the plant, the borehole water should be mixed with desalinated water so that it meets the Namibian Group B water quality standard as a minimum.

With the low volume to be abstracted it should not be necessary to apply for a groundwater abstraction permit but, if necessary, this will be done. A licence to operate a water treatment plant to produce potable water and a wastewater discharge exemption permit from the Ministry of Agriculture, Water & Land Reform will be required.

A potential negative impact on the groundwater resources at Bloemhof can be expected but it is very unlikely that it will spread beyond the borders of the farm and affect other users. The physical intensity of the impact will be LOW, even if the water table is drawn down, because once the previous sheep farming has ended, there are few other uses for the water on the farm and hardly any negative effects on the biophysical environment, e. g. trees drawing water from the aquifer. The naturally brackish water does not have any economic value apart from the potential utilisation in project operations. Effects of pumping on the local groundwater on the farm may arise within a short time and persist in the medium- to long-term as groundwater recharge is a highly localized and rare event. Neighbours and other stakeholders may however perceive water as a sensitive issue and ask the company to demonstrate the low impact beyond doubt during the EIA process through monitoring.

b) Issue: Water and Soil Pollution

Pollution due to careless waste management and hydrocarbon spills is one of the main environmental risks experienced at all industrial sites. It requires continuous management and awareness training. Hydrocarbons will be present in vehicles (diesel, oil) and a fuel storage tank.

Waste types at the Pilot Project may include domestic waste, general and hazardous industrial waste and medical waste from the first aid station. Waste will be sorted and transported off site to appropriate recycling or landfill facilities (Swakopmund for general waste and Walvis Bay for hazardous waste). Prior to removal, it will be stored on site in suitable containers to prevent littering and contamination of the environment.

The impact intensity is expected to be moderate in the worst case because hydrocarbon spills can easily pollute surface water and soil and even seep down to the water table, though this is unlikely under the local circumstances. The risk of hydrocarbon spills will be present for the duration of the project, but potential spills will only affect a very small area.

4.5 Air Quality

a) Issue: Air pollution, dust nuisance and increased risk of health impact to third parties (closest receptors)

During the operational phase, sources of air pollution are likely to include:

- Vehicle entrained dust from unpaved roads because of trucks transporting materials to, from, and on-site including iron ore concentrate, waste (silica), and sponge iron.
- Windblown dust from the iron ore concentrate stockpile.
- Dust from on-site handling and transfer of materials to various processing and beneficiation steps and unloading/loading of trucks, including.
- Exhaust emissions from haul trucks, and mobile diesel equipment such as front-end loaders. Exhaust emissions from trucks and mobile equipment will include e.g. nitrogen oxides (NOx), fine PM, sulphur dioxide (SO_2), unburned hydrocarbons, carbon monoxide (CO), carbon dioxide (CO_2), and volatile organic compounds (VOC).

The milling and separation of concentrate and briquetting (if applicable) are generally high moisture processes with little to no fugitive dust emissions expected. Emissions from the PV plant will be mostly limited to the construction phase.

Fugitive dust emissions, or particulate matter (PM), comprise a mixture of organic and inorganic substances, ranging in size and shape and can be divided into coarse and fine particulate matter. Total Suspended Particulates (TSP) represents the coarse fraction greater than 10 µm, with particulate matter with an aerodynamic diameter of less than 10 µm (PM_{10}) and particulate matter with an aerodynamic diameter of less than 2.5 µm ($PM_{2.5}$) falling into the finer inhalable fraction. TSP is associated with dust fallout (nuisance dust) whereas exposure to PM_{10} and $PM_{2.5}$ are a health concern. The project's technology, activities, and scale of operations are such that, while it will contribute to the atmospheric load of particulate matter and gases in the area during the operational phase, its impact is anticipated to be localized and within acceptable air quality standards off-site and at sensitive receptors. This is contingent upon the effective management of dust from especially unpaved haul routes and other fugitive emission sources.

4.6 Noise

a) Issue: Noise disturbance to third parties (closest sensitive noise receptors)

Noise levels as a result of sources associated with operational phase of the Shiyela Project were conservatively estimated by assuming simple hemispherical propagation (i.e. source close to ground level). Applying these noise sources to the Oshivela Pilot Project make it even more conservative, due to a smaller scale Project and less activities planned (for Oshivela).

The calculation does not account for atmospheric noise attenuation, meteorological, ground absorption and other mitigating effects. Expected (worst case) noise levels as a function of distance from specific operational activities are presented in Figure 7. During the operational phase, noise emitted will reduce to levels comparable to those found in rural areas within 1 km from the source during the day. Night time levels were not taken into consideration, due to the fact that the Pilot Phase activities will only be conducted during the day. The IFC noise level guidelines of 55 dBA and 45 dBA will be met within 400 m from the source.

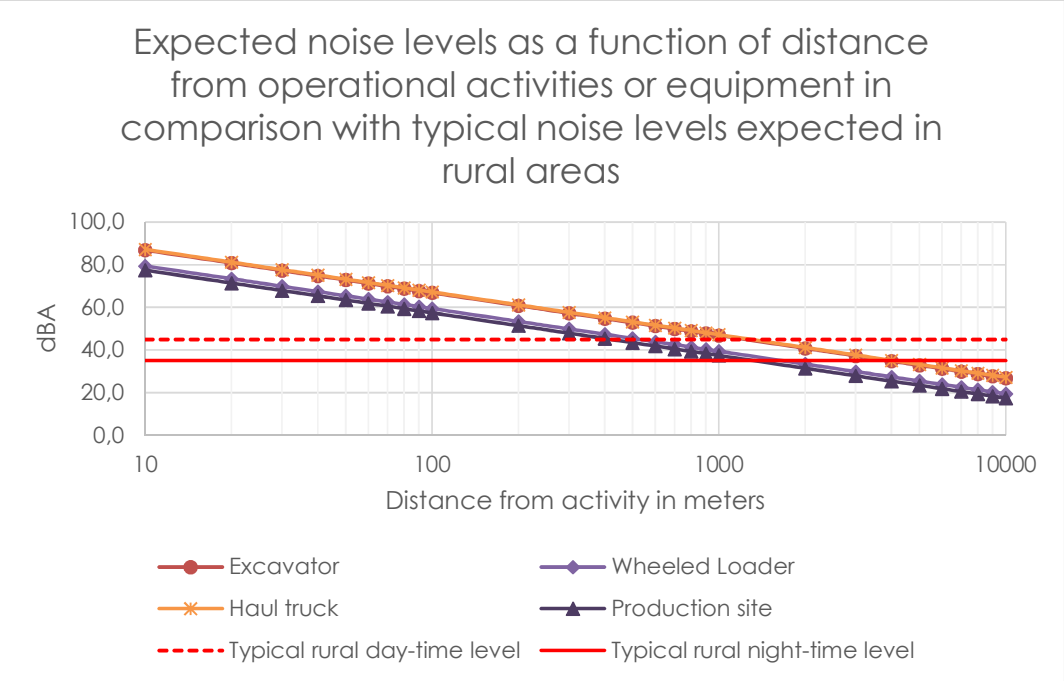

FIGURE 7: EXPECTED NOISE LEVELS AS A FUNCTION OF DISTANCE FROM OPERATIONAL AREAS OR EQUIPMENT IN COMPARISON WITH TYPICAL NOISE LEVELS EXPECTED IN RURAL AREAS

The noise impact of operational phase activities is presented in Figure 8. Reference is made to the 3 dBA increase guideline by the IFC for human receptors. On average operational phase activities and equipment will result an increase of 3 dBA over residual noise levels up to 850 m from the source during the day. Night time values are also reflected in the figure below, however, the Pilot Phase activities will only be conducted during the day.

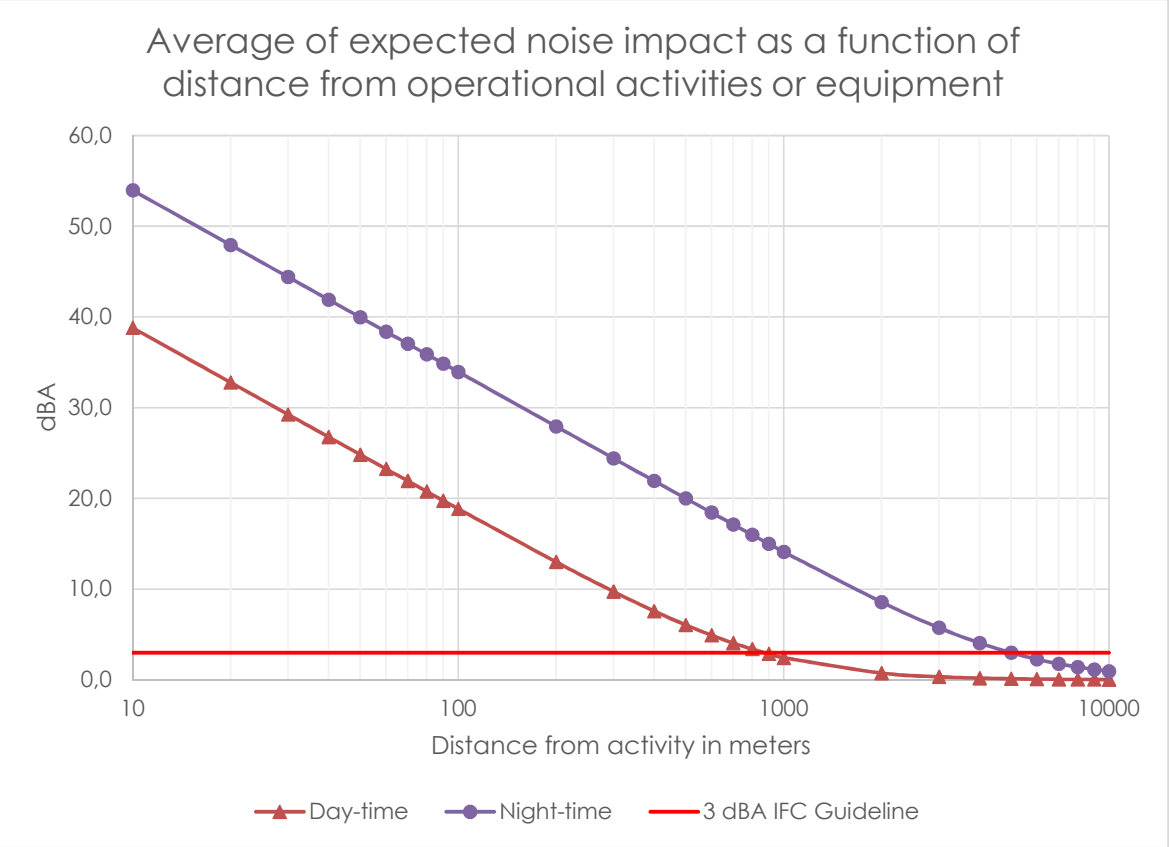

FIGURE 8: AVERAGE OF EXPECTED NOISE IMPACT AS A FUNCTION OF DISTANCE FROM OPERATIONAL ACTIVITIES OR EQUIPMENT

Taking all of the above into consideration, as well as the fact that the Pilot Project will be developed to the west and south-west of a marble outcrop, which will form a natural screen (i.e. noise barrier) between the Project activities and the closest noise sensitive receptor, the impact intensity for the operations phase is rated as low.

4.7 Socio-economic impacts

a) Issue: Economic impacts; Job Creation and Skills Development

Given the scale of the capital investment, the operating costs, and assuming an acceptable private rate of return, it can be crudely calculated that the positive financial net present value of the project is significant. Direct economic benefits will include the sale of sponge iron, the wages and salaries of the ~ 80 construction workers and up to ~ 50 persons employed during operations, the taxes paid, and profits earned. Indirect economic benefits are derived from the goods and services used to construct and operate project's components. Further induced economic benefits will result from the spending power of the construction and operations workforce, especially when wages are used to buy Namibian goods and services. Government will gain revenue from royalties, corporate taxes, from the employees, and from those up and down the supply chain who will pay personal income tax and Value Added Tax (VAT) on goods and services they purchase. To conclude, the project will generate new and positive contributions to national income and employment during construction and operations, and these positive impacts are rated high in terms of intensity.

The proposed Shiyela Iron Project will create about 80 medium term construction jobs and up to 50 permanent jobs. It will also build skills in maintaining renewable energy power plants and for metal workers and machine operators. The positive nature and intensity is high.

b) Issue: Potential negative social impacts associated with the construction workers, permanent employees and the accommodation on HyIron's Farm(s) in the area

Community health, safety and security are issues of concern with the neighbouring community (i.e. surrounding farms) due to the workers at the proposed Pilot Project, as well as the staff that will be accommodated on the farm(s) belonging to HyIron, likely near the proposed project site. The presence of the Pilot Project, with associated construction workers and employees (during operations) could lead to an increase in crime such as theft, poaching, prostitution and rape, drug dealing and HIV among farmworkers. These issues were also raised as concerns by the neighbouring farmers. The higher risk stems from an increase in strangers coming into the area, who are off duty for 15 hours/day/night and their friends/relatives wanting to visit them.

The Oshivela Pilot Project is, a relatively small scale operation with relatively small numbers of people (both construction and operation). The Project Site is far away from any town / village and not easily accessible, i.e. a permanently locked gate is installed on the Norasa Uranium Project private access road from the B2 Road (south of the Kahn River) and access from other directions

are though various farms mostly with locked gates. Therefore, on the inward migration would likely not occur. Taking all the above mentioned into consideration, the intensity is therefore high in the unmitigated scenario but can be reduced to low with the implementation of proper management measures.

c) Issue: Traffic related impacts

Impacts because of traffic could occur during the construction and operational phases when Project-related trucks, busses and private vehicles make use of the private and public transport network in and adjacent to the Pilot Project site. The key potential traffic-related impacts are associated with road capacity and third party (i.e. public) road safety. Another associated issue relates to the road maintenance issue (i.e. road condition) of to the Norasa Uranium Project Private access road. The proposed increase in traffic from the Oshivela Pilot Project has the potential to add to the above mentioned issues and lead to additional road accidents. The Pilot Project's contribution to the overall increase in traffic numbers and associated road capacity issues (i.e. cumulative) is however small compared the existing traffic on the B2, specifically during the operations phase. The C28 road is not frequently used by tourists and locals and the D1984, which was recently upgraded to a double lane road with various significant bridges, etc. means that the increase in road traffic (i.e. Pilot Project's contribution) should not significantly affect the capacity of these roads.

The additional Project traffic making use of the Norasa Uranium Project Private access road will likely deteriorate the road condition, which could cause safety impacts to third parties using this road. Trucks making using of the route through the NNNP will drive (amongst others along the Welwitschia drive) which will have negative impacts on tourists driving along this route, for the scenic experience of the park. The Project related traffic could also cause the additional risk of animal killings in the park.

Taking the above mentioned into consideration, in the unmitigated scenario, the potential for injury and death to road users and impacts relating to the route through the NNNP, give this a high intensity. With mitigation, the potential accident rate associated with the Project development and impacts on tourists should be reduced, and therefore the intensity reduces to moderate.

5. WAY FORWARD

All the comments received from I&APs during the review period have been considered and the reports updated (where relevant).

The way forward is as follows:

- MME and MEFT review the final documentation and provide record of decision regarding the application for an Environmental Clearance.

6. ENVIRONMENTAL IMPACT STATEMENT AND CONCLUSIONS

It is Namisun's opinion that the environmental aspects and potential impacts relating to the proposed Oshivela Pilot Project activities and the associated facilities have been successfully identified.

The results of this impact assessment present the potential for negative environmental impacts and positive socio-economic benefits that can all be mitigated to acceptable levels, by implementing the EMP.

Furthermore, Namibia should gain international praise for introducing a novel process of producing iron which does not emit carbon dioxide, and which will contribute to reducing the negative socio-economic impacts of climate change.

Taking the above-mentioned into consideration, Namisun believes that all environmental aspects and potential impacts associated with the proposed Oshivela Pilot Project were identified, described and appropriately assessed.

It is recommended that, if MEFT provides a positive decision on the application for the proposed Pilot Project, they should include a condition to the clearance that Hylron must implement all commitments in the EMP.

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EIA SCOPING (INCLUDING IMPACT ASSESSMENT) REPORT FOR THE PROPOSED OSHIVELA PILOT PROJECT

CONTENTS

List of Figures

List of Tables

ACRONYMS AND ABBREVIATIONS

The list of acronyms and abbreviations used in this report are summarized in the table below:

Acronyms / Abbreviations	Definition
amsl	Above mean sea level
AoI	Area of Interest
AQG	Air Quality Guideline
AQO	Air Quality Objectives
ARD	Acid Rock Drainage
ATC	Arandis Town Council
C	Carbon
CITES	Convention on International Trade in Endangered Species
CMS	Convention on Migratory Species
CO	Carbon monoxide
CO_2	Carbon dioxide
CV	Curriculum vitae
DEA	Department Environmental Affairs
EAP	Environmental Assessment Practitioner
EAPAN	Environmental Assessment Professionals Association of Namibia
EC	European Community
ECC	Environmental Clearance Certificate
EIA	Environmental Impacts Assessment
EMP	Environmental Management Plan
Fe	Iron
Fe_2O_4 or Fe_3O_4.	Iron ore (concentrate)
GHG	Greenhouse gas
GmbH	Gesellschaft mit beschränkter Haftung
H_2	Hydrogen
H_2O	Water
ha	Hectares
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
I&APs	Interested and / or affected parties
IBA	Important Bird Area
IFC	International Finance Corporation
IPP	Independent Power Producer
km	kilometres
kPa	Kilopascal
kWh/m^2/a	kilowatt hours per square meter per annum
m^3/h	cubic metres per hour
MEFT	Ministry of Environment, Forestry and Tourism
mg/L	Milligrams per litre
mg/Nm^3	Milligrams per normal cubic metre
MME	Ministry of Mines and Energy

MPE	Ministry of Public Enterprises
m/s	Meter per second
MTPA	Million tons per annum
MURD	Ministry of Urban and Rural Development
MW	Megawatt
MWp	Megawatt peak
MWT	Ministry of Works and Transport
NAAQS	South African National Ambient Air Quality Standards
NAMREP	Namibian Renewable Energy Program
NDP	National Development Plan
NGO	Non-governmental organisation
NIRP	National Integrated Resource Plan
NNNP	Namib-Naukluft National Park
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
NPC	National Planning Commission
NSA	Namibia Statistics Agency
O_2	Oxygen
PM	Particulate matter
PPA	Power Purchase Agreements

1 INTRODUCTION

This Chapter describes the purpose of the report, briefly describes the background and proposed project activities, summarizes the legislative requirements, explains the report structure, summarize assumptions and limitations of the study, and explains how the input from Interested and Affected Parties (I&APs) was included.

1.1 PURPOSE OF THIS REPORT

This Scoping (including Impact Assessment) Report has been compiled as part of the Environmental Clearance Certificate (ECC) application and associated Environmental Impact Assessment (EIA) process for the proposed Oshivela Pilot Project. It includes an assessment of the environmental impacts that the proposed project activities are likely to have. The proposed management and mitigation measures relating to the proposed project are documented in an Environmental Management Plan (EMP), see Appendix G.

Registered Interested and Affected Parties (I&APs) were being provided with the opportunity to comment on this Scoping (including impact assessment) Report (see Section 1.4.1). After the comment period closed, the report was updated to a final report with due consideration of the comments received, for submission to the Ministry of Mines and Energy (MME) (i.e. Competent Authority) and the Ministry of Environment, Forestry and Tourism (MEFT) for decision-making.

1.2 BACKGROUND AND INTRODUCTION TO THE PROPOSED PROJECT

The decarbonization of the steel industry, which is responsible for up to 9 % of annual greenhouse gases globally, is a formidable challenge in the fight against climate change considering the ever-increasing carbon costs and energy prices and developing climate-friendly technologies to stay competitive.

Hylron Green Technologies (Pty) Ltd (Hylron), a partnership of Namibian and German companies, has developed a technology to effectively address some of these challenges by producing iron at zero emissions[7]. In an airtight rotary kiln, hydrogen reacts with the oxygen contained in iron ore to produce “Direct Reduced Iron (DRI)”. “Green hydrogen” is used for this process, meaning that the hydrogen is fully generated from renewable resources.

[7] Note: The production of iron at zero emissions relates specifically to the “processing” (see section 4.2.2) step in the value chain and not the full value chain with all the associated elements. Hylron, however, aims to further research and develop additional steps in the value chain to further reduce emissions (i.e. the transport of the ore concentrate and the final product and zero emissions iron mining).

Hylron intends to develop the Oshivela Pilot Project, which will be the world's first industrial production of iron at zero emissions, on their farm (i.e. Portion 4 of Farm Bloemhof 109), which is located ~75 km north-east of Swakopmund, in the Erongo Region (refer to Figure 1).

Hylron considered acquiring the Shiyela Iron Project, thereby becoming the majority owner of Shiyela Iron (Pty) Ltd (Shiyela)[8]. However, due to increasing global interest in the Hyiron technology and many requests to test the feasibility to use iron ores from different origins, Hylron did not yet further proceed with the acquisition and development of the Shiyela Project and now considers developing the Oshivela Pilot Project on Portion 4 of Farm Bloemhof 109, where Oshivela can be supplied with different iron ores.

Hylron's proposed Oshivela Pilot Project on the above-mentioned farm is the topic of this report and the activities planned for this project forms the basis of a new Application for an ECC.

[8] Shiyela is the holder of the Mining Licence (ML) 176, which is located within the Namib-Naukluft National Park (NNNP), approximately 35 km northeast of Walvis Bay. Reptile Uranium Namibia (Pty) Ltd (RUN) is currently the majority owner of Shiyela Iron (Pty) Ltd. ML 176 contains the Shiyela Iron deposit, a magnetite-rich resource which has been discovered in 2008. Hylron, undertook an EIA (amendment) process in 2022 for the Shiyela Iron Project, aiming to mine the iron ore deposit and to build the Oshivela project at the Shiyela Mine to utilize their proprietary technology, together with renewable energy, to produce a final product at zero emissions, i.e. DRI.

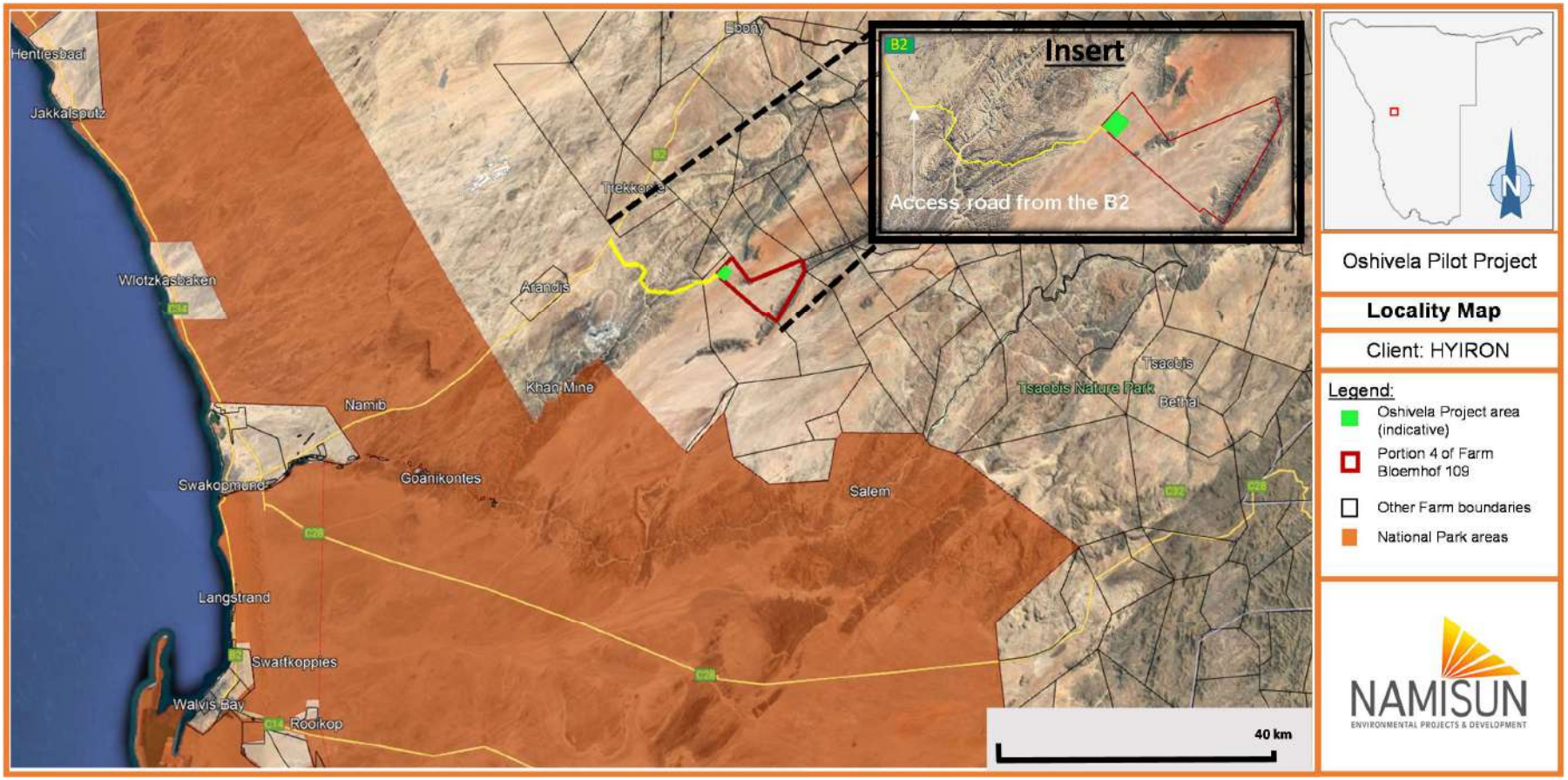

FIGURE 1: LOCATION OF THE PROPOSED OSHIVELA PILOT PROJECT ON PORTION 4 OF FARM BLOEMHOF 109 (REF: GOOGLE EARTH)

(Note: Boundaries of Farms Jakalswater, Geluk and Jakalsdans have been slightly modified and are not accurately shown on the above mentioned map. See Figure 23 for the location of these Farms, which are located ~ 20 to 25 km south / south-east of the Pilot Project area)

The proposed pilot production phase is planned in the north-western Section of Portion 4 of Farm Bloemhof 109 – see Figure 1) and includes the following:

- Production of 5 tons direct reduced iron per hour (~ 3 000 hours per year), using hydrogen as a reduction agent during the product beneficiation, in a specialised industrial (airtight) furnace.
- Hydrogen will be produced by means of electrolysis (i.e. breaking down water molecules (H_2O) into oxygen (O_2) and hydrogen (H_2)).
- Renewable energy supply (i.e. 25 Megawatt peak (MWp)) in the form of Photovoltaic (PV) power to supply energy for the above-mentioned electrolysis process. The PV power plant will cover an area of ~ 30 hectares (ha).

1.3 Motivation (Need and Desirability) for the Project and Project

In the conventional process of iron production from iron ore concentrate, coals are burned at very high temperatures in blast furnaces and the main component of the coals, i.e. Carbon, draws the Oxygen from the iron ore (Fe_xO_y). The waste product is CO_2, an airborne pollutant, which accounts for ~ 9% of the global CO_2 emissions and ~1,8 Tons of CO_2 per ton of reduced iron.

In sharp contrast with the conventional process, Hylron intends to generate renewable energy by making use of the sun, and use this energy together with its proprietary technology to produce a final iron product at zero emissions.

It is therefore the aim of Hylron to lay a cornerstone and to establish a 'lighthouse project' to prove that climate-neutral technologies in heavy industries are available and economically competitive. So far in the heavy industries very little has been done towards decarbonisation. With Hylron's technology of replacing fossil fuels as energy source in the production of iron with renewable energy, it is likely that already in the proposed pilot production phase (i.e. comparably small), the Oshivela Project would be the biggest production of climate-neutral iron in the world.

In the development of their technology, Hylron has received a lot of international attention. More and more countries express keen interest to test their iron ores at the Oshivela plant to assess their potentials for the industrial transition towards zero-emission productions.

Next to the positive effects in emission reductions, the Hylron technology has positive effects along the full value chain. Some examples thereof are that fine grained iron ores can be used in

the production process, which enables a dry beneficiation at the potential iron ore mines, i.e. reduced need in water. Also, it allows modular growth alongside the availability of (green) energy.

Furthermore, the weight of the materials transported can be significantly reduced. Transporting Fe rather than Fe_3O_4 means a reduction in weight of ~30% which again has a significant impact on energy use and CO_2 emissions.

The traditional (reduction) process in blast furnaces requires several large-scale industrial developments (such as coking plants and blast furnaces) and the widespread and constant availability of coals or natural gas. The new process of the proposed Oshivela project in rotary furnaces is scalable and can be adjusted to the supply of iron ore, renewable energy and on the other side demand. The final product (Fe) can directly be used in steel factories (with electric arc furnaces) and foundries and therefore is the basis of further industrial development and manufacturing.

1.3.1 NEED FOR RENEWABLE ENERGY

Energy is vital to the economic and social development of Namibia. There is a constant need to contribute to Namibia's ability to generate electricity from its own sources, thus reducing its dependency on external suppliers and to take advantage of the good solar resource in Namibia. NamPower, the national power utility, continues to negotiate Power Purchase Agreements (PPAs) and Transmission Connection Agreements with Independent Power Producers (IPPs). In addition, several mechanisms encourage the generation of renewable energy in Namibia:

- Vision 2030: One of the objectives of Vision 2030 is to *"ensure the development of Namibia's 'natural capital' and its sustainable utilization, for the benefit of the country's social, economic and ecological well-being"*.
- White Paper on Energy Policy of 1998: Over the years several initiatives to explore the renewable energy potential of Namibia have been guided by this policy. In addition, the Namibian Renewable Energy Program (NAMREP) was developed to increase affordability and access to renewable energy services and accelerate market development for renewable energy technologies by reducing existing barriers to solar energy, including human capacity, financial, technical, awareness and other market limitations.
- Regulatory framework for renewable energy and energy efficiency: This is one of the projects implemented by NAMREP, which promotes two strategic objectives – supporting environmentally sustainable technologies and attaining greater energy security through a steady increase of electricity production in Namibia using fuels or energy sources that are available in Namibia, e.g., solar, biomass and wind.
- National Integrated Resource Plan (NIRP): The goal of this plan is to identify the mix of resources for meeting short- and long-term consumer energy needs in Namibia in an

efficient and reliable manner, at the lowest reasonable cost. The plan focuses on electricity supply, but also considers the impact of developing other energy sources and demand management measures capable of reducing electricity demand in the country. One of the objectives of the NIRP is to increase the diversification, security, reliability and efficiency of electricity supply, including the substitution of electricity by other energy sources such as oil, gas, biofuels and solar in order to improve efficiency.

- National emission targets: Namibia is signatory to numerous conventions and is striving to maintain climate change as a priority within its development framework. Against this background, Namibia aims at a reduction of about 89% of its Greenhouse Gas (GHG) emissions compared to the business-as-usual scenario at the 2030-time horizon. One of the proposed measures to achieve this relates to a shift from fossil fuels to renewable energy sources, to improve energy efficiency and to reduce fossil fuel consumption. Accordingly, the percentage of renewable energy (hydro, solar, wind and biomass) must increase from 33% in 2010 to 70% in 2030.

1.3.2 OPPORTUNITIES TO GENERATE RENEWABLE ENERGY

There is a growing worldwide awareness about environmental degradation, global warming and potential climate change, which forces the energy sector to find alternative sources for the generation of electricity.

Namibia continues to render great opportunity for energy generation through solar technology, with an average high direct insolation of 2 200 kilowatt hours per square meter per annum ($kWh/m^2/a$) and limited cloud cover.

Generating renewable electricity can imply cost savings and the opportunity to participate and adhere to the principles of sustainable development. However, the assessment of associated potential impacts and the implementation of appropriate management and mitigation measures and monitoring requirements to avoid / minimise such impacts, linked to proposed project activities, are essential.

1.4 INTRODUCTION TO THE EIA PROCESS

EIAs are regulated by the Directorate of Environmental Affairs (DEA) of the MEFT in terms of the Environmental Management Act, No. 7 of 2007. This Act was gazetted on 27 December 2007 (Government Gazette No. 3966) and its associated regulations were promulgated in January 2012 (Government Gazette No. 4878) in terms of the above-mentioned Act.

Prior to the commencement of the proposed Oshivela Pilot Project activities, an application for an environmental clearance will be submitted in terms of this Act and the associated EIA Regulations to the MME (Energy Directorate), as the competent authority. MME will review the

application and relevant reports and submit their comments to the Ministry of Environment, Forestry and Tourism (MEFT) for their final review and decision.

The above-mentioned EIA application and this report focuses only on the proposed Pilot Project to prove various concepts and the feasibility of a possible bigger project. Furthermore, ongoing monitoring of relevant environmental aspects will be undertaken during the pilot stage.

The overall objectives of this assessment process are to:

- Provide information on the activities and infrastructure (i.e. facilities) associated with the proposed Oshivela Pilot Project.
- Describe the current environment (i.e. baseline) in which the project will be situated.
- Identify in consultation with interested and affected parties (I&APs) the potential environmental (and social) aspects associated with the proposed project.
- Assess the potential impacts associated with the proposed project.
- Develop management and mitigation measures required to avoid impacts or to mitigate such impacts to acceptable levels by developing an EMP.

Hylron appointed Namisun Environmental Projects and Development (Namisun), as an independent environmental consulting company to undertake the required EIA process, to compile the EIA Scoping (including Impact Assessment) Report and the accompanying EMP as part of the application process for an ECC.

It is thought that this report and EMP (attached in Appendix G) will provide sufficient information for MEFT to make an informed decision regarding the proposed Oshivela Pilot Project, and whether an ECC can be issued or not.

Should Hylron find all relevant aspects of the Oshivela Pilot Project to be feasible, they will consider upscaling to a production of 40 tons per hour of sponge iron (with the final product being between 90 and 99% purity), generated with net zero CO_2 emissions. However, a separate EIA (application) process will have to be conducted for any future upgrades.

1.4.1 Opportunity to Comment

This EIA Scoping (including Impact Assessment) Report was distributed for public / authority review. I&APs were invited to comment on these documents, which were available for a review and comment period from 8 January 2024 to 2 February 2024. Comments had to be sent to Namisun at the telephone number, or e-mail address shown below by no later than 2 February 2024.

Namisun
Attention: Werner Petrick
E-mail address: wpetrick@namisun.com
Cell number: +264 (0)81 739 4591

1.5 Assumptions and Limitations

Refer to the Specialist Studies in Appendices E and F for specific assumptions and limitations. Some general assumptions are described below.

1.5.1 Technical Information

It is assumed that the technical / design (project) information provided by Hylron and their Technical Team is accurate.

1.5.2 Environmental Assessment Limit

The EIA process focuses on the proposed Oshivela Pilot Project only. Potential impacts associated with other proposed facilities and activities are not considered in this report. Furthermore, as described in Section 1.4, upscaling of the Project, if feasible, would require a separate EIA (application) process to be conducted.

The EIA focused on third parties only and did not assess health and safety impacts on workers because the assumption was made that these aspects are separately regulated by labour acts, health and safety legislation, policies and standards, which Hylron will adhere to.

Reference to the “study area” in the report refers to the proposed Oshivela Pilot Project Site and greater surrounding landscape. Reference to the “Oshivela Pilot Project Site” refers to the (smaller) project footprint and the location options considered.

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1.5.3 BIODIVERSITY

The project area is located within an area of Namibia with a rainfall coefficient of variation that exceed 90%. Since 2012 no substantial seasonal rainfall was received, meaning that the project area and surrounds were consequently very dry and denuded of vegetation at the time of field visits. This limited the assessment of flora and fauna diversity, as well as assessing the ecology of the study area.

1.6 REPORT CONTENT

Table 1 provides a summary of the report content.

TABLE 1: SCOPING REPORT STRUCTURE

Chapter	Objective
Chapter 1: Introduction	Describes the purpose of the report, briefly describes the background and proposed project activities, summarizes the legislative requirements, explains the report structure, summarize assumptions and limitations of the study, and explains how the input from I&APs was included.
Chapter 2: EIA process and Methodology	Outlines the approach and methodology for the EIA (Scoping and impact assessment) process, including the public participation process.
Chapter 3: Legal Framework	Provides an overview of relevant Namibian policies and applicable Namibian legislation and international conventions / treaties applicable to the proposed Oshivela Pilot Project.
Chapter 4: Project description	Provides a description of the proposed Oshivela Pilot Project and the associated facilities and activities.
Chapter 5: Alternatives	Describes the various alternatives that were considered as part of the planning of the proposed Oshivela Pilot Project.
Chapter 6: Description of the current environment	Provides a general overview of the current baseline conditions (i.e. existing biophysical and social environment) that could potentially be affected by the proposed Oshivela Pilot Project. The link to relevant environmental aspects and potential impacts are also explained.
Chapter 7: Identification and Description of potential impacts	Outlines the environmental aspects and potential impacts associated with the development and implementation of the proposed Oshivela Pilot Project. It reasons potential cumulative impacts, and which environmental aspects and potential impacts need further assessment (Chapter 8).
Chapter 8: Impact Assessment	Assesses the key potential impacts (as identified in Chapter 7), relating to the proposed Oshivela Pilot Project and associated activities and infrastructure.

Chapter	Objective
Chapter 9: Way forward	Explain the way forward in term of completing the EIA process and final submission of the Application.
Chapter 10: Conclusion and Recommendations	EIA Conclusion and impact statement.
References	Reference list.

2 EIA PROCESS (SCOPING AND ASSESSMENT) METHODOLOGY

This Chapter outlines the approach and methodology for the EIA (Scoping and impact assessment) process, including the public participation process.

2.1 EIA TEAM

Namisun is an independent environmental consultancy firm appointed by Hylron to undertake the EIA process.

Werner Petrick, the EIA project manager, has more than twenty-four years of relevant experience in conducting / managing EIAs, compiling EMPs and implementing EMPs and Environmental Management Systems (EMSs). Werner has a B. Eng (Civil) degree and a master's degree in environmental management and is certified as lead environmental assessment practitioner (EAP) and reviewer under the Environmental Assessment Professionals Association of Namibia (EAPAN).

Dr Pierré Smit, the EIA project assistant, holds a PhD in Landscape Ecology and has more than twenty-eight years of experience in environmental management, managing environmental assessment, the implementation of EMPs and EMSs in Namibia.

The relevant curriculum vitae (CV) documentation is attached as Appendix A.

The environmental project team and proponent details for the EIA process relating to the Oshivela Pilot Project is outlined in Table 2.

TABLE 2: EIA TEAM AND PROPONENT DETAILS

Team	Name	Designation	Tasks and roles	Company
Project proponent	Johannes Michels	Managing Director	Technical input Implementation of the EMP	Hylron
EIA Project Management Team	Werner Petrick	Lead EIA Practitioner	Management of the EIA process and reporting	Namisun
	Pierré Smit	EIA Project Assistant Ecology input		
Avifauna	Ann and Mike Scott	Avifauna specialists	Specialist input incorporated into this report: Avifauna study and assessment General biodiversity input	African Conservation Services cc
Groundwater and surface water	Sandra Müller	Hydrogeological Specialist	Specialist input incorporated into this report: Hydrogeological and hydrological study and assessment	S Muller Hydrogeological consultant

Team	Name	Designation	Tasks and roles	Company
Archaeology	John Kinahan	Archaeological specialist	Specialist input incorporated into this report: Archaeological study (Phase 1 and 2)	J. Kinahan, Archaeologist
Air Quality and Noise	Nicolette von Reiche	Noise and Air Quality specialist	Specialist input incorporated into this report: Air Quality and noise	Soundscape Consulting (Pty) Ltd

Acknowledgements: Mrs Marie Herment provided key ecological information and input from numerous visits to the Project area, data collection and record keeping. She provided valuable comments to the draft report. Mrs Lourine de Man, the neighbouring farm owner, provided very useful information relating to historic sightings of flowers and other vegetation in the Project area and surrounds. Thank you for sharing this useful information which allowed a more comprehensive understanding of the biodiversity and sensitivities due to the area being dry and denuded of vegetation at the time of field visits by the EIA Team. A hearty 'thank you' to both.

2.2 Information Collection

Namisun obtained a description of the proposed project activities from Hylron to identify the environmental aspects associated with the proposed project; and to assess the potential impacts.

Information for the preparation of this EIA Scoping Report was sourced from[9]:

- The EIA Amendment Report and associated Specialist studies for the Shiyela Iron Project (Namisun, 2022a). The relevant specialist studies referred to include:
  - An ecology specialist study and assessment conducted by EnviroScience (2022).
  - A noise specialist study and assessment conducted by Soundscape Consulting (Pty) Ltd (2022).
  - A socio-economic specialist study and assessment conducted by Ashby Associates cc (2022).
  - An air quality specialist study and assessment conducted by Airshed (2022).
  - An Avifauna specialist study conducted by African Conservation Services cc.
- An avifauna specialist study and assessment for the proposed Oshivela Pilot Project with additional (general) biodiversity input by African Conservation Services cc (Dr Ann and Mike Scott) (refer to Appendix E).

[9] Various references were made in the respective Specialist Reports, which will not be repeated in this report. Reference is made only to the specialist reports (where relevant). For the detailed lists of references see the "reference Sections" in the various Specialist Reports in Appendices E and F).

- A groundwater and surface water specialist study and assessment conducted by Sandra Muller, incorporated in relevant Section of this Scoping Report.
- An archaeology specialist study (phase 1 and 2) for the proposed Oshivela Pilot Project conducted by Dr John Kinahan (refer to Appendix F for the Phase 2 Archaeology Specialist Report).
- Atlas of Namibia (Mendelsohn et al. 2002; Atlas of Namibia Team 2022).
- EIA Report for the RUN's proposed Tumas Project and associated Infrastructure (Namisun, 2023).
- EIA Amendment Report for the proposed Solar PV power plant of Rössing Uranium Limited (RUL) near Arandis (Namisun, 2022b).
- Other relevant EIAs conducted in the region.
- Technical information provided by Hylron.
- Site visits by Namisun, relevant specialists and technical team.
- Consultations and focus group meetings with I&APs.
- Google Earth.
- Additional reference in the Reference list (Chapter 11).

2.3 EIA PROCESS FOR THE PROPOSED PROJECT

Prior to the commencement of the proposed project activities, environmental clearance is required in terms of the Environmental Management Act, 7 of 2007 and the associated EIA Regulations (January 2012). An application for an ECC will be submitted to the regulating authority MEFT. This (EIA Scoping with Impact Assessment) Report will be submitted as part of the application. The EIA process includes an internal screening phase; a scoping phase, which includes an impact assessment; and an EMP. A final decision relating to the above-mentioned application will be made by MEFT: Directorate of Environmental Affairs (DEA).

During the internal screening exercise, Namisun identified the need for various specialist studies, also taking the assessments (where relevant) that have been completed for the proposed Shiyela Project[10] into consideration.

Information in this report has therefore been augmented by considering the aspects and potential impacts assessed for the Shiyela Project; various site visits to the proposed Oshivela Pilot Project Site and surroundings; the specialist studies and input from comments gathered because of

[10] With reference to Section 1.2, the EIA for the proposed Shiyela Project included mining of the iron ore deposit, which is not relevant to the proposed Oshivela Pilot Project and assessments.

consultations with key stakeholders during focus group meetings. The potential impacts of the activities associated with the Oshivela Pilot Project could therefore be assessed.

It is thought that this EIA Scoping (including Impacts Assessment) Report and the accompanying EMP will provide sufficient information for the DEA of the MEFT to make an informed decision regarding the proposed Project and whether an ECC for the Application can be issued or not.

The EIA process and corresponding activities which have been undertaken for this project are outlined in Table 1. The process that was followed was in accordance with the requirements outlined in the EIA Regulations of 2012.

TABLE 3: THE EIA PROCESS

Objectives	Corresponding activities
Project initiation and screening phase[11] (September – October 2023)	
• Information requirements • Initiate the EIA Scoping process	• Project initiation meetings and site visits with the Hylron team to discuss the proposed project and EIA / ECC Application process. • Early identification of environmental aspects and potential impacts associated with the proposed project and determine legal requirements. • Decision on EIA process to be followed and specialists to be used in the process. • Identify key stakeholders and compose I&AP database.
Scoping (including assessment) phase (October 2023 – February 2024)	
• Involve I&APs in the scoping process through information sharing. • Identify further potential environmental issues associated with the proposed Project. • Determine the terms of reference for assessment work. • Consider alternatives. • Provide details associated with the potentially affected environment. • Assessment of potential environmental impacts associated with the proposed project. • Develop management and mitigation measures.	• Notify authorities and I&APs of the proposed EIA process (distribute background information document (BID), e-mails, telephone calls, newspaper advertisements and site notice). • I&AP registration and initial comments. • Key stakeholder (focus group) meetings and include I&AP issues and concerns in the studies and assessments. • Conduct specialist studies, including field work. • Compilation of EIA Scoping (including Impact Assessment) Report and EMP. • Distribute EIA Report and EMP to relevant authorities and I&APs for review. • Update and finalise EIA Report with EMP, considering comments received.

[11] Note: The "actual Screening phase" for the proposed Oshivela Pilot Project commenced in September 2023. However, taking the EIA process for the (relatively similar) Shiyela Project activities into consideration (see Section 2.2), this assisted greatly with an understanding of the proposed activities and associated environmental aspects / potential impacts to be considered - bearing in mind that the Oshivela Pilot Project activities are planned at Portion 4 of Farm Bloemhof 109.

Objectives	Corresponding activities
• ECC application. • Receive feedback on the application.	• Online submission of the final report onto the MEFTs portal. • Submit Application and finalised EIA Scoping Report with EMP and I&APs comments to MME and MEFT for decision-making.

2.4 EIA SCOPING (INCLUDING IMPACT ASSESSMENT) REPORT

The main purpose of this EIA Scoping (including Impact Assessment) Report is to provide information relating to the proposed project activities and infrastructure; to indicate which environmental aspects have been identified during the internal screening and scoping phases; and to indicate which environmental aspects might have an impact on the environment. These potential impacts could also be assessed, and the findings presented in this report (refer to Chapters 7 and 8).

The structure of this EIA Scoping (including Impact Assessment) Report is outlined in Table 4, following largely the Scoping Report requirements as set out in Section 8 of the EIA Regulations (2012), promulgated under the Environmental Management Act, No. 7 of 2007.

TABLE 4: REPORT STRUCTURE

Component	Report reference
(a) Details of the Environmental Assessment Practitioner (EAP) who prepared the report	Section 2.1 and Appendix A
(b) A description of the proposed activity (i.e., proposed Oshivela Pilot Project)	Chapter 4
(c) A description of the environment that may be affected by the activity and the way the physical, biological, social, economic, and cultural aspects of the environment may be affected by the proposed activity	Chapters 6, 7 and 8
(d) A description of the need and desirability of the proposed listed activity and identified potential alternatives to the proposed listed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity	Section 1.3, Chapter 5, 7 and 8
(e) An identification of laws and guidelines that have been considered in the preparation of the Scoping Report.	Chapter 3
(f) Details of the public consultation process conducted in terms of Regulation 7(1) in connection with the application, including:	Section 2.5
(i) steps that were taken to notify potentially interested and affected parties of the proposed application;	Section 2.5 and Appendix B

Component	Report reference
(ii) proof that notice boards, advertisements and notices notifying potentially interested and affected parties of the proposed application have been displayed, placed or given;	
(iii) a list of all persons, organisations and organs of state that were registered in terms of Regulation 22 as interested and affected parties in relation to the application; and	Section 2.5.1 and Appendix D
(iv) a summary of the issues raised by interested and affected parties, the date of receipt of and the response of the EAP to those issues	Section 2.3.3 and Appendix C
(g) An indication of the methodology used in determining the significance of potential effects / A description and assessment of the significance of effects, including cumulative effects, that may occur as a result of the undertaking of the activity or identified alternatives or as a result of any construction, erection or decommissioning associated with the undertaking of the proposed listed activity	Chapters 7 and 8
(h) A description and comparative assessment of all alternatives identified during the assessment process	Chapter 5
(i) A description of all environmental issues that were identified during the assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures	Chapter 7 and 8
(j) An assessment of each identified potentially significant effect	
(k) A description of any assumptions, uncertainties and gaps in knowledge	Section 1.5
(l) A management plan	Appendix G
(m) An opinion as to whether the proposed listed activity must or may not be authorised, and if the opinion is that it must be authorised, any conditions that must be made in respect of that authorisation	Chapter 10
(n) A non-technical summary of the information	Executive Summary

2.5 PUBLIC PARTICIPATION

The public participation process for the proposed project was conducted to ensure (as far as possible) that all persons and or organisations that may be affected by, or interested in, the proposed activities and infrastructure, were informed (as far as possible) of the project and could register their views and concerns. By consulting with relevant authorities and I&APs (specifically the surrounding landowners), the range of environmental issues to be considered in this EIA Scoping Report has been given specific context and focus.

Section 2.3.1 provides a summary of I&APs consulted, Section 2.3.2 describes the process that was followed and the issues that were identified are summarized in Section 2.3.3.

2.5.1 INTERESTED AND AFFECTED PARTIES

The broad list of persons, group of persons or organisations that were informed about the project and were requested to register as I&APs, should they be interested and or affected, include:

- Government and parastatals – National, Regional and Local, including (amongst others) the following:
  - The Directorate of Energy and the Directorate of Mines at the MME.
  - The DEA at the MEFT.
  - The Directorate of Wildlife and National Parks at the MEFT.
  - National Heritage Council.
  - Erongo Regional Council and the local authorities of Arandis and Usakos.
  - NamPower.
- Industry (i.e. other mines in the region).
- Non-government organisation (i.e. Namibia Chamber of Environment and the Chamber of mines).
- Neighbouring farm owners.
- Owners of the Norasa Uranium Project (i.e. Valencia mine).
- Other I&APs that registered on the project.

These stakeholders were informed about the need for the proposed project activities, the EIA process (including the public consultation), as well as the outcomes of the assessment (see Appendix B).

The full stakeholder database for this project is included in Appendix D of this report.

2.5.2 STEPS IN THE CONSULTATION PROCESS

Table 5 sets out the steps that were followed as part of the consultation process.

TABLE 5: CONSULTATION PROCESS WITH I&APS

TASK	DESCRIPTION	DATE
Notification - regulatory authorities and I&APs		
I&AP identification	The stakeholder database was developed. This database is updated as and when required. A copy of the I&AP database is attached in Appendix D.	September 2023 – ongoing
Distribution of Background Information Document (BID)	Copies of the BID were distributed via email to relevant authorities and I&APs on the stakeholder database and copies were made available on request. The purpose of the BID was to inform I&APs and authorities about the proposed activities, the assessment process being followed,	October – November 2023

TASK	DESCRIPTION	DATE
	possible environmental impacts and ways in which I&APs could provide input / comments to Namisun. A copy of the notifications and BID are attached in Appendix B.	
Site Notice	A Site Notice was placed at the access to the Project Site (i.e. access gate to Portion 4 of Farm Bloemhof 109) to notify I&APs of the proposed project, and the EIA process being following. Photos of the Site Notice that were displayed are attached in Appendix B.	November 2023
Newspaper Advertisements	Block advertisements were placed in the Market Watch (on 23 October and 30 October 2023) as part of the following newspapers: • The Namibian Sun • Die Republikein • Allgemeine Zeitung During the report review period, 'Die Republikein' published a front page article about the proposed Oshivela Pilot Project and the availability of the EIA report (with contact details of Namisun). Copies of the advertisements are attached in Appendix B.	October 2023
Key stakeholder and focus group meetings and submission of comments		
Focus group meetings	The above-mentioned notifications and adverts stated the following: "Focus Group meetings are planned within the comments and registration period. Should you like to be invited to one of the Focus Group meetings, please contact Namisun". EIA Focus group meetings were held as follows: • Neighbour (Farm Bloemhof (Remainder)): Mr and Mrs De Man on 30 October 2023 • Neighbour (Farm Nelsville, Vlakteplaas Portion 1): Mr S Kleeman on 30 October 2023. • Forsys Metals Corporation (Forsys) (Mr Oliver Krappmann) on 31 October 2023. • Neighbour (Farm Valencia): Mr Horn on 7 November 2023. • Dr Detlof Von Oertzen on 10 November 2023. • Farm owners (farms Jakalswater, Modderfaontein and Jakkalsdans) on 17 January 2024. • MEFT: Directorate of Wildlife and National Parks (DWNP), Mr. D Masen - Chief Warden of the NNNP. The outcomes of these meetings are summarised and attached under Appendix C.	October 2023 – January 2024
Email correspondence, telephone discussions and other 'informal' correspondence	Various emails were sent and telephone discussions conducted with numerous I&APs to share further information, the BID and to offer Focus Group meetings. These I&APs include, amongst others, other nearby farm owners, including Mrs Valery Geldenhuys (Farm Jakalswater), Dr Engelbrecht (Farm Namibplaas – Eastern Portion), Mr Maletzki (Farm Geluk) and Mr Hans Kries (Farm Wulfskuppe / Wolfkoppe).	October 2023 – January 2024

TASK	DESCRIPTION	DATE
	During informal discussions with some of the farm owners, Hylron and Namisun were informed that the information regarding the proposed Project and the availability of the EIA report were also communicated on the "greater farmers' community" W-App group.	
Comments and responses	All comments received via e-mail are included in Appendix C. A summary of questions / comments / issues raised (with responses) during the meetings and received per email are documented in the Issues and response Report (see Appendix C) and were incorporated in this report, where relevant.	October – November 2023
Review of EIA Scoping (including Impact Assessment) Report by I&APs and authorities and submission of Application to MME and MEFT		
I&APs and authorities review of EIA Amendment Report with EMP (Addendum)	A hard copy and electronic copy of the EIA Scoping (including Impact Assessment) Report with the EMP were made available for review at the Swakopmund Public Library. Electronic copies of the report were also available on request from Namisun. Summaries of the report were distributed to all relevant authorities and I&APs on the I&AP database via e-mail (see Appendix B). Authorities and I&APs had the opportunity to review the draft report and submit comments in writing to Namisun. The comments period commenced on the 8th of January 2024 and the closing date for comments was 2 February 2024. During the review period of the report various discussions, email and W-App correspondence as well as focus group meetings were undertaken with neighbouring farms owners and others key stakeholders (refer to details above).	January – February 2024
MME and MEFT review of Final EIA Report and decision on Application	Namisun (and the appointed environmental specialists) considered all the comments from I&APs and regulatory authorities received during the review period. A copy of the final report with the Application Form, including comments from authorities and I&AP, will be submitted to the MME for their review and recommendation to MEFT who will do the final review for decision-making. The final report (including I&APs comments) and Application will be uploaded onto the MEFT portal.	February 2024

2.5.3 SUMMARY OF THE ISSUES RAISED

The comments received from I&APs (also during the focus group meetings) relate to the following key aspects:

- Overall footprint of the proposed Project.
- Technical questions relating to the infrastructure.
- Questions relating to the supply of the iron ore concentrate.
- Water sources, total volume of water required and associated impacts.

- Accommodation for workers.
- Project location options.
- Site access and impact on the roads and other road users.
- Effluent, waste and pollutants of the proposed activities and how each of these will be managed.
- Noise impacts to third parties.
- Visual and sense of place impacts.
- Dust related impacts.
- Biodiversity impacts.
- Safety and security of neighbouring farm owners.
- Positive socio-economic aspects, i.e. the proposed Project's contribution to the economy in Namibia and services; job creation and supplies to be procured from exclusively Namibian sources.
- Positive implication of producing green hydrogen with renewable energy to be used in Namibia and not exported to other countries.
- Benefit to Namibia from the project within the envisaged framework of the value chain.
- Questions relating to the use of the final product for its own steel industry.

Refer to Appendix C for the IRR which contains all questions / comments / issues raised (with responses) during the meetings and received per email.

3 LEGAL FRAMEWORK

This Chapter provides an overview of relevant Namibian policies and applicable Namibian legislation and international conventions / treaties applicable to the proposed Oshivela Project.

The Republic of Namibia has five tiers of law and a few guiding policies relevant to environmental assessment and protection, which include the Constitution of the Republic of Namibia, statutory law, common law, customary law and international law.

As the main source of legislation, the Constitution of the Republic of Namibia (1990) makes provision for the creation and enforcement of applicable legislation. Article 95 (1) of the Constitution says: *"The State is obliged to ensure maintenance of ecosystems, essential ecological processes and biological diversity and utilisation of living natural resources on a sustainable basis for the benefit of Namibians both present and future"*.

In this context and in accordance with the constitution, Namibia has passed numerous laws intended to protect the natural environment and mitigate against adverse environmental impacts.

3.1 RELEVANT ACTS

The following legislation are relevant to environmental assessments in Namibia and the proposed Oshivela Project:

- The Public Health Act 36 of 1919.
- The Water Act, No. 54 of 1956
- National Monuments Act 28 of 1969.
- Soil Conservation Act, No. 76 of 1969 and the Soil Conservation Amendment Act, No. 38 of 1971.
- Hazardous Substance Ordinance, No. 14 of 1974.
- Nature Conservation Ordinance, No.14 of 1975 (as amended).
- Atmospheric Pollution Prevention Ordinance, No. 11 of 1976.
- Petroleum Products and Energy Act, No. 13 of 1990.
- Foreign Investment Act No. 27 of 1990.
- The Constitution of the Republic of Namibia of 1990.
- Nature Conservation General Amendment Act of 1990, the Nature Conservation Amendment Act, No.5 of 1996, and the Nature Conservation Amendment Act, No. 3 of 2017.
- Road Traffic and Transport Act, 1999 (No. 22 of 1999).

- The Forestry Act, No. 12 of 2001 as amended by the Forest Amendment Act, No. 13 of 2005 and its regulations of 2015.
- Pollution Control and Waste Management Bill (3rd Draft September 2003).
- National Heritage Act, No. 27 of 2004.
- Electricity Act, No. 4 of 2007
- Labour Act, 2007 (No. 11 of 2007).
- Minerals (Prospecting and Mining) Amendment Act, 8 of 2008.
- Draft Protected Areas and Wildlife Management Bill (2009).
- Environmental Management Act, No. 7 of 2007 and Regulations promulgated in terms of the Act in 2012.
- Civil Aviation Act, No. 6 of 2016 and the Namibia Civil Aviation Regulations of 2001, as amended in 2018.
- Water Resources Management Act, No. 11 of 2013 and Regulations promulgated in terms of the Act in 2023.

3.1.1 APPLICABLE LISTED ACTIVITIES

The EIA Regulations promulgated in terms of the Environmental Management Act of 2007, identify certain activities which could have a substantially detrimental effect on the environment. These listed activities require environmental clearance from MEFT prior to commencing. The following activities identified in the regulations apply to the proposed Oshivela Project:

TABLE 6: LISTED ACTIVITIES TRIGGERED BY THE PROPOSED PROJECT[12]

LISTED ACTIVITY	PROJECT COMPONENT
Energy generation, transmission and storage activities	
1. The construction of facilities for - (a) the generation of electricity; (b) the transmission and supply of electricity.	• On site PV power supply. • On site power lines will be employed.
Waste management, treatment, handling and disposal activities	
2.1 The construction of facilities for waste sites, treatment of waste and disposal of waste. 2.2 Any activity entailing a scheduled process referred to in the Atmospheric Pollution prevention Ordinance, 1976. 2.3 The import, processing, use and recycling, temporary storage, transit or export of waste.	• Tailings storage facilities (TSFs) and waste rock dumps (WRDs) will be constructed on site. • The possible use of fossil fuel generators for power supply will generate emissions. The proposed processing and beneficiation might also be listed in future under the Atmospheric Pollution prevention Ordinance. • Waste would be generated by the proposed mining operation. General waste will be managed and stored on site and either disposed

[12] Numbering as per the EIA Regulations.

	of onsite (within the TSFs and WRDs) or off-site at licences facilities.
Mining and quarrying activities	
3.3 Resource extraction, manipulation, conservation and related activities.	• The objective of the proposed Oshivel Project is to process iron Ore concentrate. • No mining actviies are howver planned at the proposed Oshivel Proejct site.
Forestry activities	
4. The clearance of forest areas, deforestation, afforestation, timber harvesting or any other related activity that requires authorisation in term of the Forest Act, 2001 (Act No. 12 of 2001) or any other law.	• Site clearing for the pit, the WRDs, process plant, on site roads and office buildings may entail the removal of certain protected tree species.
Water resource development	
8.1 The abstraction of ground or surface water for industrial or commercial purposes. 8.6 Construction of industrial and domestic wastewater treatment plants and related pipeline systems.	• Groundwater abstraction for use for dust suppression, construction purposes or at the processing plant. • Construction of infrastructure within drainage lines. • Sewage treatment facility and associated infrastructure.

3.2 Relevant Policies

Policies and plans currently in force and relevant to this assessment include:

- The EIA Policy (1995).
- Namibia's Environmental Assessment Policy for Sustainable Development and Environmental Conservation (1995).
- White Paper on the Energy Policy, 1998.
- Namibia Vision 2030.
- National Development Plan, 2017/2018 – 2021/2022, guided by Vision 2030.
- Policy for the Conservation of Biotic Diversity and Habitat Protection, 1994.
- Namibia's Second National Biodiversity Strategy and Action Plan (2013-2022).
- SADC Environmental Policy and Regulatory Framework for Mining (2001).
- SADC: Protocol on Mining.
- SADC: Protocol on Energy.
- National Environmental Health Policy (2002).
- National Waste Management Policy (2010).
- The National Climate Change Policy of Namibia (September 2010).
- Equitable Economic Empowerment Framework Policy, 2011.

- National Agriculture Policy (2015).

MEFT developed a new Management Plan for the NNNP which provides guidelines in terms of revised management areas and management measures (MEFT, 2021). This Management Plan provides, amongst others, an overview of the NNNP; guidelines on the park management objectives, zonation and landscape-level conservation and development. It also describes conservation and management of biodiversity principles, cultural and historical, archaeological and paleontological assessments and refers to adaptive management concepts and relevant infrastructure in the park. Even though the proposed Oshivela Project falls outside the NNNP (i.e. ~20 km) one option for the transport of iron ore concentrate to the Project Site and final Product to the Walvis Bay Port being considered is through the park (refer to Section 5.4).

3.3 Other Guidance and Regulatory Frameworks

Some international legislation, treaties, standards and guidelines – some to which Namibia is a signatory – are also of relevance, including the following:

- The Stockholm Declaration on the Human Environment, Stockholm 1972.
- The Convention on International Trade in Endangered Species (CITES) of 1973 regulates the trade in endangered species – specifically species threatened with global extinction and species that may become extinct unless trade in them is strictly regulated.
- The Convention on Biological Diversity (CBD) of 1992 details the preservation of rare and endemic species and Article 14 of the convention requires that EIAs are carried out for projects that are likely to have an adverse effect on biodiversity.
- Vienna Convention for the Protection of the Ozone Layer (1985).
- Montreal Protocol on Substances that Deplete the Ozone Layer (1987).
- Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal (1989).
- United Nation Framework Convention on Climate Change, 1992 and the adoption of the Paris Climate Change Agreement (2015; under the above convention).
- Kyoto Protocol on the Framework Convention on Climate Change, 1998.
- SADC Protocol on Wildlife Conservation and Law Enforcement, 1999.
- The African Convention on the Conservation of Nature and Natural Resources (revised) 2003.
- SADC Protocol on Forestry, 2002 (entered into force within SADC on 1 September 2006).
- Convention to Combat Desertification.
- Convention on Migratory Species (CMS 2011).

- United Nations Sustainable Development Goals (SDGs) 2015.

3.3.1 IMPORTANT BIRD AREA

Several Important Bird and Biodiversity Areas (IBAs; initially known as Important Bird Areas) are found in the vicinity of the proposed Oshivela Project area. The BirdLife International IBA Programme aims to identify, monitor and protect a global network of IBAs for the conservation of the world's birds and other wildlife. IBAs are thus sites of international significance for the conservation of birds at the Global, Regional (Continental) or Sub-regional (southern African) level, selected according to a set of four criteria based on globally threatened species, restricted-range species, biome-restricted species and congregations. However, not all IBAs receive official protection. The nearest IBA to the project area is the NNNP (ACS, 2023).

3.3.2 ENVIRONMENTAL NOISE GUIDELINES AND / OR STANDARDS

In the absence of Namibian noise level guidelines and standards, reference is made to the guideline values for noise levels measured outdoors as set by the World Health Organisation (WHO) Guidelines for Community Noise, also contained in the 2007 International Finance Corporation (IFC) guidelines for noise, and the South African National Standard (SANS) code for outdoor noise – SANS 10103:2008. These guidelines are specifically for the protection of human receptors from noise (Soundscape, 2022 in Namisun, 2022a).

According to the IFC guidelines noise impacts should not exceed the levels presented in Table 7 or result in a maximum increase in noise levels of 3 dB at the nearest receptor location off-site (Soundscape, 2022 in Namisun, 2022a).

TABLE 7: NOISE LEVEL GUIDELINES (IFC)

	L_{Aeq}[13] (dBA)	
Receptor	**Daytime (07:00 – 22:00)**	**Night-time (22:00 – 07:00)**
Residential, institutional, educational	55	45
Industrial, commercial	70	70

Source: Soundscape, 2022

The guidelines for outdoor noise as per SANS 10103:2008 provide values and typical rating levels (LReq,T14) that should not be exceeded outdoors in the different districts listed. According to

[13] L_{Aeq} is the A-weighted equivalent sound pressure level in dBA
[14] $L_{Req,T}$ is the L_{Aeq} rated for impulsive sound, tonality, and time of day, in accordance with SANS 10103:2008.

Standards South Africa (SSA) it is probable that the noise is annoying or otherwise intrusive to the community or to a group of persons if the rating level of the ambient noise under investigation exceeds the applicable of the following (Soundscape, 2022):

a) the rating level of the residual noise (determined in the absence of the specific noise under investigation), or
b) the typical rating level for the ambient noise for the applicable environment listed in Table 8.

The guideline rating levels for urban areas are in line with the guideline values for residential, institutional, and educational areas adopted by IFC (Soundscape, 2022).

TABLE 8: TYPICAL RATING LEVELS FOR OUTDOOR NOISES

	Equivalent continuous rating level ($L_{Req,T}$) for outdoor noise, dBA (SSA, 2008)		
	Day/night rating level $L_{R,dn}$[15]	Daytime rating level $L_{Req,d}$[16]	Night-time rating level $L_{Req,n}$[17]
Rural districts	45	45	35
Suburban districts with little road traffic	50	50	40
Urban districts	55	55	45
Urban districts with one or more of the following: workshops; business premises; and main roads	60	60	50
Central business districts	65	65	55
Industrial districts	70	70	60

Source: Soundscape, 2022

The probable community or group response to the excess LReq,T is given in Table 9. The overlapping ranges for the excess values are given because a spread in community reaction might be anticipated. ΔLReq,T is LReq,T of ambient noise under investigation minus the LReq,T of the residual noise (determined in the absence of the specific noise under investigation) (Soundscape, 2022).

[15] $L_{Req,d}$, the **equivalent continuous daytime rating level**, is the A-weighted equivalent sound pressure level rated for impulsive sound and tonality in accordance with SANS 10103:2008 for the daytime period from 06:00 to 22:00.
[16] $L_{Req,n}$, the **equivalent continuous night-time rating level**, is the A-weighted equivalent sound pressure level rated for impulsive sound and tonality in accordance with SANS 10103:2008 for the night-time period from 22:00 to 06:00.
[17] $L_{R,dn}$, the **equivalent continuous day/night rating level**, is the A-weighted equivalent sound pressure level during a reference time interval of 24 h, plus specified adjustments for tonal character, impulsiveness of the sound and the time of day as per SANS 10103:2008.

TABLE 9: CATEGORIES OF COMMUNITY OR GROUP RESPONSES

	Estimated community or group response (SSA, 2008)	
Increase ($\Delta L_{Req,T}$) in dBA	**Category**	**Description**
0 to 10	Little	Sporadic complaints
5 to 15	Medium	Widespread complaints
15 to 20	Strong	Threats of community or group action
More than 20	Very strong	Vigorous community or group action

Source: Soundscape, 2022

3.3.3 RECOMMENDED AIR QUALITY GUIDELINES AND TARGETS

The IFC references the WHO (2005) guidelines but indicates that any other internationally recognized criteria can be used such as the United States (US) Environmental Protection agency (EPA) or the European Community (EC). It was, however, found that merely adopting the WHO guidelines would result in exceedances of these guidelines in many areas due to the arid environment in the country, and specifically in Namibia. The WHO states that these Air Quality Guidelines (AQGs) and interim targets should be used to guide standard-setting processes and should aim to achieve the lowest concentrations possible in the context of local constraints, capabilities, and public health priorities. These guidelines are also aimed at urban environments within developed countries (WHO, 2005). For this reason, the South African National Ambient Air Quality Standards (NAAQS) are also referenced since these were developed after a thorough review of all international criteria and selected based on the socio, economic and ecological conditions of the country. (Airshed, 2022 in Namisun, 2022a).

In the absence of guidelines on ambient air concentrations for Namibia, reference is made to the Air Quality Objectives (AQO) which are based on the WHO interim targets and SA NAAQSs as listed in Table 10.

TABLE 10: PROPOSED EVALUATION CRITERIA FOR THE OSHIVELA PILOT PROJECT

Pollutant	Averaging Period	Criteria	Reference
Particulate matter (PM_{10})	24-hour average (µg/m³)	75[(a)]	WHO IT3 & SA NAAQS (as per SEMP AQMP)
	Annual average (µg/m³)	40	SA NAAQS (as per SEMP AQMP)
Particulate matter ($PM_{2.5}$)	24-hour average (µg/m³)	37.5[(a)]	WHO IT3 (as per SEMP AQMP)
	Annual average (µg/m³)	15	WHO IT3 & SA NAAQS (as per SEMP AQMP)
Dustfall	30-day average (mg/m^2/day)	600[(b)]	SA NDCR & Botswana residential limit
		1 200[(b)]	SA NDCR & Botswana industrial limit
		2 400	Botswana Alert Threshold

Notes: [(a)] Not to be exceeded more than 4 times per year (SA)

[(b)] Not to be exceeded more than 3 times per year or 2 consecutive months

The criteria were selected on the following basis:

- The WHO IT3 was selected for particulates since these limits are in line with the SA NAAQSs, and the latter are regarded feasible limits for the arid environment of Namibia.
- Even though $PM_{2.5}$ (Particulate Matter <2.5 µm) emissions are mainly associated with combustion sources and mainly a concern in urban environments, it is regarded good practice to include as health screening criteria given the acute adverse health effects associated with this fine fraction. Also, studies found that desert dust with an aerodynamic diameter 2.5 µm cause premature mortality.
- The Botswana and South African criteria for dust fallout are the same and with limited international criteria for dust fallout, these were regarded applicable.

Given that the proposed technology for the iron production, which will utilise an airtight green hydrogen Rotary Furnace to produce sponge iron, is different from conventional production, which uses coal or natural gas fired shaft, blast and rotary furnaces, no (very little) emissions to air are expected.

4 PROJECT DESCRIPTION

This Chapter provides a description of the proposed Oshivela Pilot Project and the associated facilities and activities.

4.1 GENERAL PROJECT INFORMATION

4.1.1 DETAILS OF THE APPLICANT

Company name:	Hylron Green Technologies (Pty) Ltd
Contact (responsible) person:	Mr. Johannes Michels
Cell:	+264 81 616 5937
E-mail:	jmichels@kambaku.com

Hylron is a Namibian registered company who is the "Net Zero Iron Production Technology" owner with its sister companies, Co2Grab GmbH and Hylron GmbH based in Germany.

4.1.2 PROJECT OVERVIEW AND BACKGROUND

As stated in Section 1.2, Hylron plans to develop the world's first industrial production of iron at zero emissions[18], i.e. using hydrogen for the production process and therefore no greenhouse gasses emitted, planned to be implemented in the framework of their Oshivela Pilot Project on Portion 4 of Farm Bloemhof 109 (refer to Figure 1).

In the conventional processes of iron processing, carbon from largely coking coals, but also other sources like natural gas, is burnt at very high temperatures so that the carbon is oxidizing to become carbon monoxide. The carbon monoxide, again at high temperatures and in absence of other oxygen, draws the oxygen from the iron ore (Fe_2O_3 or Fe_3O_4). After this reaction (i.e. the reduction of iron oxide) the elemental iron (Fe) is obtained and as a waste product, vast amounts of carbon dioxide (CO_2) released. It is estimated that this reduction process is responsible for ~ 9% of global CO_2 emissions and approximately 1,8 Tons of CO_2 per ton of iron.

To the contrary, Hylron therefore intends to produce iron without any CO_2 emissions, by using renewable energy only and applying its proprietary technology. In an airtight rotary kiln, hydrogen reacts with the oxygen contained in iron ore to produce DRI. Here again elemental Iron (Fe) is the product while the only "waste product" (i.e. "by-product") is water (H_2O). "Green hydrogen" is used for this process, meaning that the hydrogen is fully generated from renewable sources, i.e. solar.

[18] Refer to footnote 7 in Section 1.2.

The proposed Oshivela Pilot Project is planned in the north-western Section of Portion 4 of Farm Bloemhof 109 (see Figure 1 and Figure 3) and includes the following key activities, which are further explained in the Sections below:

- Production of 5 tons direct reduced iron per hour (~ 3 000 hours per year), using hydrogen as a reduction agent during the product beneficiation, in a specialised industrial (airtight) furnace.
- Hydrogen will be produced by means of electrolysis (i.e. breaking down water molecules (H_2O) into oxygen (O_2) and hydrogen (H_2)).
- Renewable energy supply (i.e. 25 MWp) in the form of Photovoltaic (PV) power to supply energy for the above-mentioned electrolysis process. The PV power plant will cover an area of ~ 30 hectares (ha).

Currently the technology for Iron reduction is being implemented by HyIron in cooperation with the companies BENTELER and RWE as part of the "GEiSt - Green iron for steel production" project in a prototype plant in Lingen, Germany (see Figure 2). This is a prototype for process optimization with a production volume of up to 1 000 kg per hour.

During the Pilot phase of the Oshivela Project, 5 tons of direct reduced iron will be produced per hour. At an average of nine hours sunshine per day, production time is estimated at approximately 3,000 hours per year and at an estimated production of 5 tons per hour, a total of 15,000 tons of direct reduced iron (i.e. Sponge Iron) can be produced per year.

FIGURE 2: PROTOTYPE PLANT IN GERMANY

Hylron considers upscaling to a production of 40 tons per hour of sponge iron (with the final product being between 90 and 99% purity), generated with net zero CO_2 emissions.

Their proposed Oshivela Pilot Project will, however, first be implemented to prove various concepts and the feasibility of the “up-scaled project”. Furthermore, ongoing monitoring of relevant environmental aspects will be undertaken during the pilot stage.

A possible further upgrade beyond the current plans for the Piot Project would be subject to an EIA amendment application.

The following Sections provide a further details of the proposed Oshivela Pilot Project and associated infrastructure and activities.

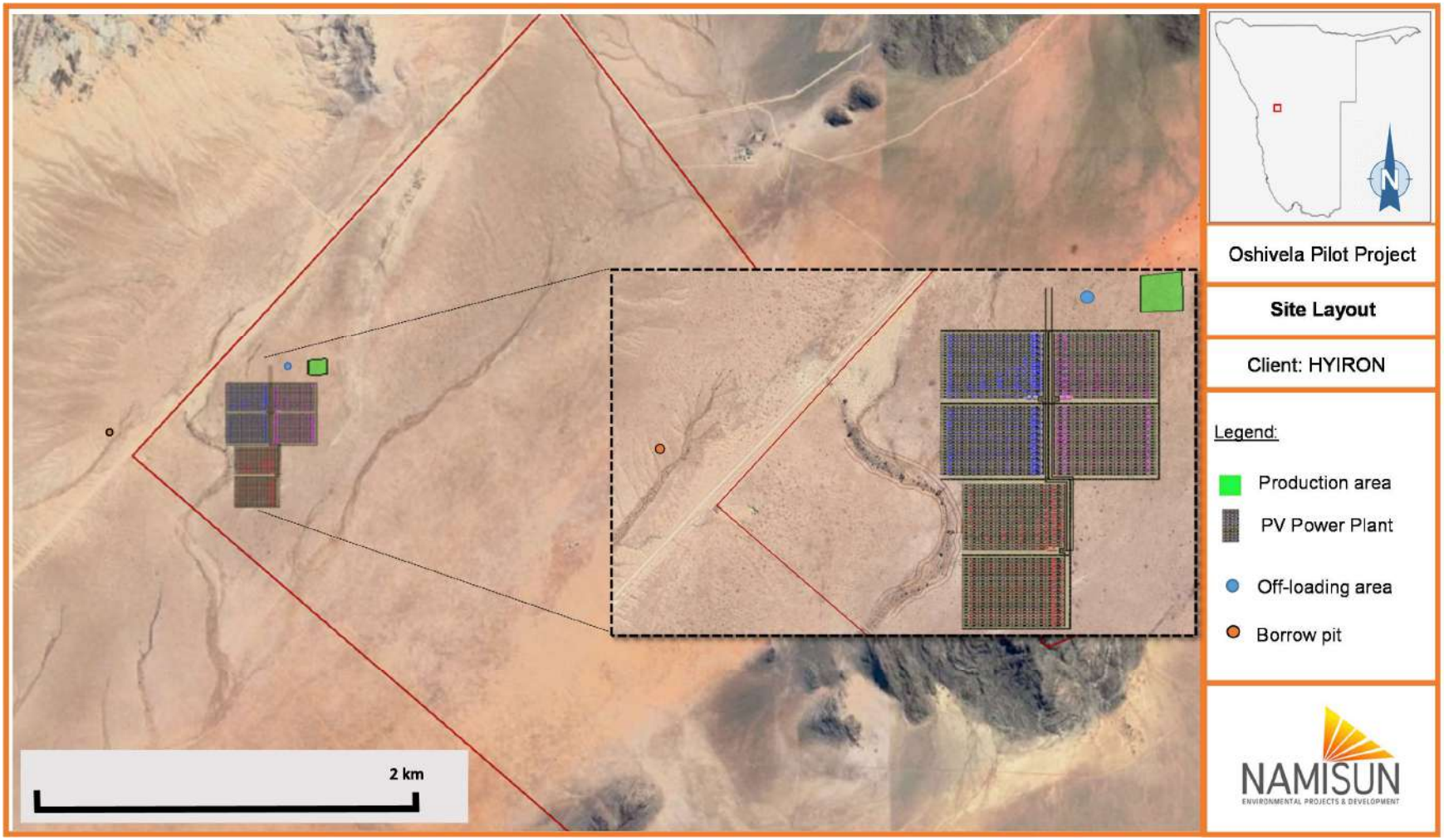

FIGURE 3: PROPOSED LAYOUT OF THE OSHIVELA PILOT PROJECT (REF: GOOGLE EARTH)

4.2 PROPOSED OSHIVELA PILOT PROJECT DESCRIPTION OF ACTIVITIES, FACILITIES AND INFRASTRUCTURE

The following Sections (i.e. 4.2.1 to 4.2.8) provide a description of the proposed activities, facilities and infrastructure, focusing on the operations phase of the Oshivela Pilot Project. The construction phase activities are described in Section 4.3.

4.2.1 SOURCES OF IRON ORE CONCENTRATE AND TRANSPORTATION OF THE IRON ORE CONCENTRATE TO SITE

4.2.1.1 IRON ORE SUPPLY

During the pilot phase, 27 000 tons of iron ore concentrate will be required per annum.

Hylron plans to obtain iron ore concentrate from various sources / suppliers, both locally (i.e. from within Namibian borders) and internationally for processing at their pilot plant.

As described in Section 1.3, in the development phase of their technology, Hylron has received a lot of international attention with a number of countries already expressing keen interest to test their iron ores at the Oshivela plant to assess their potentials for the industrial transition towards zero emissions productions. Some of these countries include Brazil, Urugay, Canada, Australia and South Africa (amongst others). While it is part of Hylron´s objectives to scale the technology worldwide and proof the potential of different countries at the Oshivela Pilot Project in Namibia, it is the medium- and long- term objective to use the majority of local (i.e. Namibian) iron ores.

Hylron is still busy with the agreements with various suppliers and is also active in some exploration projects. The details of these still need to be confirmed.

The following are possible sources / suppliers of Iron Ore concentrate locally:

- Lodestone's Dordabis Iron Ore Project.
- Proposed Shiyela Iron Ore Project (refer to Sections 1.2 and 5.1 for further details).
- Other possible iron ore deposits in the Erongo, Otjozondjupa and Kunene regions currently being investigated by Hylron.

4.2.1.2 TRANSPORTATION OF IRON ORE CONCENTRATE TO SITE

Hylron estimates that ~ 2.5 truck trips (on average) will be required daily to transport the iron ore concentrate to the Project Site. As described in Section 4.2.1.1, the iron ore concentrate will come from various sources / suppliers, therefore various locations - both locally and internationally.

The trucks will follow an existing access road (i.e. the Norasa Uranium Project private access road) from the B2 Road as indicted on Figure 1. Other options for access to the Project Site are also being considered by Hylron, depending on the supplier. The options are described in Section 5.4.

Iron ore concentrate that will be sourced from international suppliers will likely be brought in by shipping vessels through the port of Walvis Bay[19]. From Walvis Bay trucks will transport the iron ore concentrate via the existing road network along the D1984 (i.e. road behind the dunes (i.e. east of the dunes) and the B2 refer to Figure 14. Another option for the transport of the ore to site is following a route along the C28 road turning north onto the 'Welwitschia Drive' and then the D1914. This route cuts through the NNNP in a north-easterly direction, as shown in Figure 14.

Iron ore sourced from within Namibia (i.e. Khomas Region or possible Erongo, Otjozondjupa or Kunene Region) (see Section 4.2.1.1) would either be transported by rail[20] to Arandis from where it will be loaded onto trucks for transporting to site; or trucks following the existing road network, including the B2. Refer to Section 5.4 and Figure 14 for further details.

Hylron is also investigating the possibility to use tractors for the hauling of the ore along the Norasa Uranium Project access road. The ore would then be transferred from the truck to a tractor with a wagon in a dedicated area next to the access road (see Section 5.4 for further details).

4.2.1.3 STOCKPILING THE IRON ORE CONCENTRATE ON SITE

A maximum of ~ 3 000 m^3 ore concentrate will be stockpiled near the furnace (Refer to Figure 3).

The ore concentrate delivered to site will be dry, fine grained (< 2mm) iron ore.

4.2.2 PROCESSING / BENEFICIATION

4.2.2.1 MILLING AND SEPARATION OF THE ORE

Depending on the purity of the ore, Hylron might need to mill the ore, either after or before the reduction process. Milling of the ore would entail the breaking and milling into finer grain sizes with the objective to further separate 'waste material' from the Fe. Due to the changed physical attributes of the "sponge iron", comparably little pressure would be required, therefore, only small scaled machinery would be necessary - should this process step be necessary. This would be

[19] Note: The possible storage of Iron Ore concentrate in the port is excluded from this EIA application process. Depending the possible storage location inside the port, separate authorisation might be required.
[20] Details regarding the rail transport option(s) still need to be further developed by Hylron, in consultation with relevant stakeholders.

done inside the warehouse. The ore will be further concentrated by means of a gravity and magnetic separation process.

The potential 'waste material' (i.e. the 'non-iron bearing material') would consist almost exclusively of silica (i.e. sand). Depending on the input quality of the iron ore, a maximum volume of 1,000 to 2,000 tons of this silica material will be produced per year. Refer to Section 4.2.8.3 for further details.

4.2.2.2 PROCESSING THE IRON ORE CONCENTRATE

The (milled) iron ore concentrate will be transported, using a front-end loader, to a specialised industrial furnace, where hydrogen produced on-site (see below) is also introduced.

In this airtight furnace, the Hydrogen reacts with the Oxygen contained in the Iron Oxide (Iron ore concentrate as Fe_2O_4 or Fe_3O_4). The following reaction is taking place:

$$3H_2 + Fe_2O_3 = 2Fe + 3H_2O$$

As a result, an Iron product (i.e. "sponge iron") of between 90 and 99 % purity is produced.
No chemicals are required in the process.

This sponge-iron is produced in the furnace, generating net zero CO_2 emissions and has 30% less weight than iron ore. A by-product from the furnace would be water, which would be recycled for hydrogen production.

The rotary kiln for Iron reduction and the hydrogen processing (see Section 5.3) as well as the briquetting will be covered in a steel structure with shade netting.

The entire processing facility will cover an area of maximum 10,000 m^2. The maximum height of the facilities will be ~ 15 m.

Figure 4 illustrates the processing of sponge iron envisaged by Hylron.

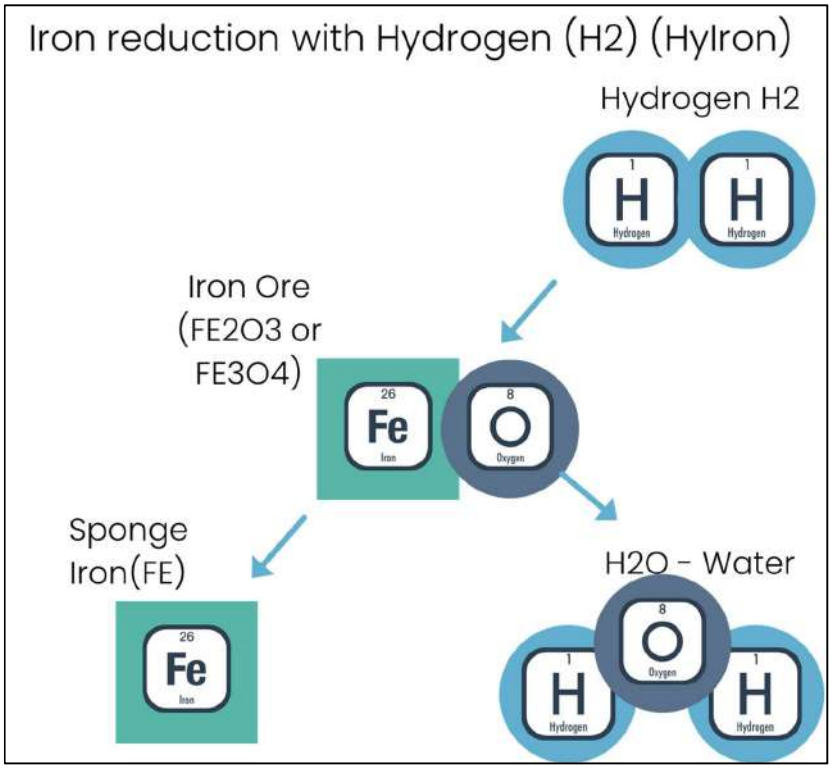

FIGURE 4: PROCESSING SPONGE IRON

A by-product from the furnace would be water (H_2O), which would be recycled for hydrogen production – as can be seen in Figure 4. The process of hydrogen production is discussed further in Section 4.2.3 and the water use and cycle is discussed in Section 4.2.4.

The layout of the process plant for the pilot phase is illustrated in Figure 5, illustrating the following key infrastructure:

- Steel structure with shade netting for the shaft furnace for Iron reduction and the hydrogen processing as well as the briquetting.
- Water Electrolysis building, which will cover an area of ~ 1 000 m^2.

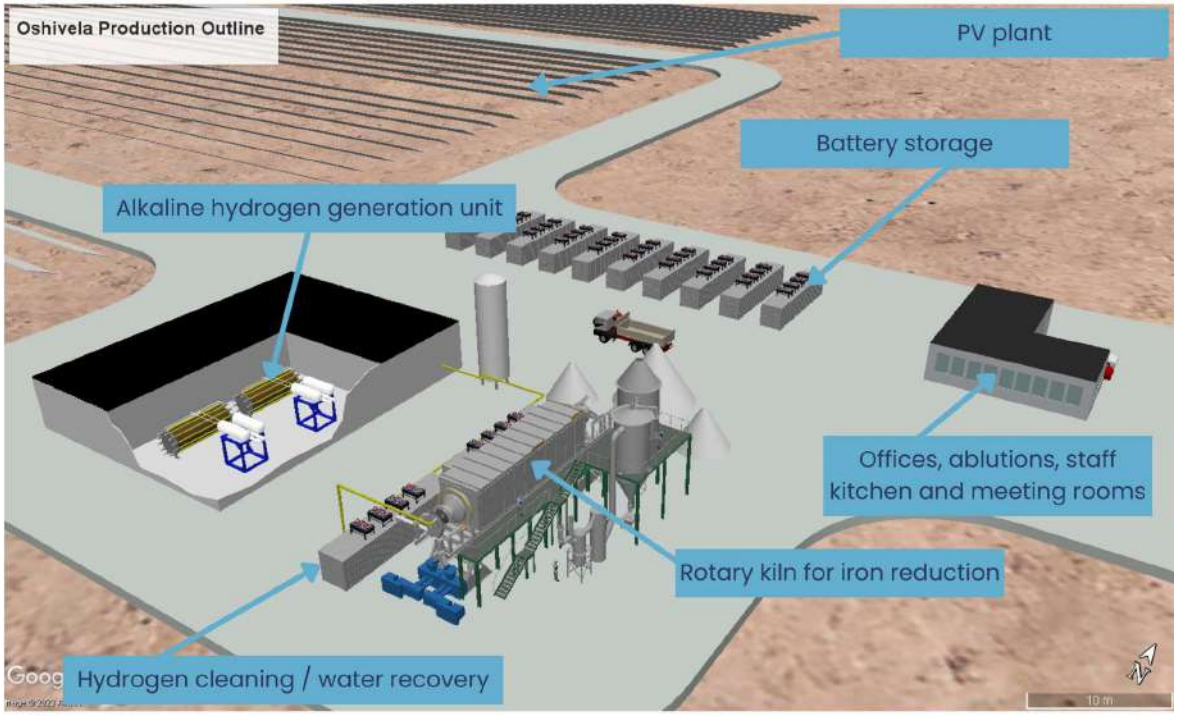

FIGURE 5: ILLUSTRATION OF THE LAYOUT OF THE PROCESS PLANT

Another warehouse (i.e. ~ 500 m^2 area) will be constructed adjacent to the process plant, which will include ablutions, offices, staff kitchen and a meeting room.

4.2.2.3 FINAL PRODUCT AND TRANSPORT

The final product – Sponge Iron – will be transported to Walvis Bay for export. Approximately 2 truck trips would be required from site to Walvis Bay daily for the transportation of the ~ 15 000 tons Sponge Iron per annum, following a similar route for the transport of the Iron ore concentrate.

4.2.3 HYDROGEN PRODUCTION

Renewable energy will be produced onsite (see Section 4.2.5). This energy will also be used to split water into hydrogen and oxygen by means of electrolysis (see Figure 6). During electrolysis water molecules (H_2O) are broken down into oxygen (O_2) and hydrogen (H_2) and in the reaction of the hydrogen with the oxygen of the iron ore concentrate (which could be Fe_2O_3 or Fe_30_4), water is again produced.

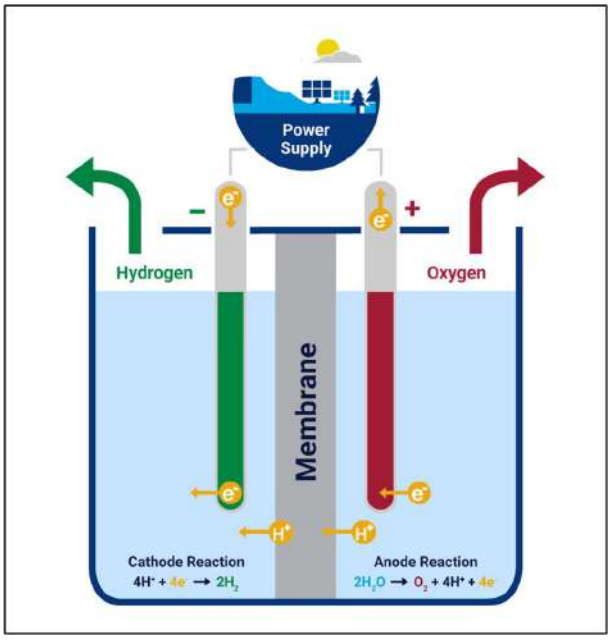

FIGURE 6: ELECTROLYSIS PROCESSING TO PRODUCE HYDROGEN

4.2.4 WATER USE AND THE WATER CYCLE

With reference to Section 4.2.3, water is produced in the reaction of the Hydrogen with the Oxygen of the Iron Ore. Therefore, even though water is split into hydrogen and oxygen in the electrolysis process, there is limited water use in the overall process because water will be recycled. Figure 7 illustrates the water cycle proposed by Hylron.

In addition to the water formed during reduction, only small volumes of water (less than ~ 15 m^3 / week) will be required to make up process losses.

In addition, some low-quality water will be required for dust suppression on the roads around the plant, which could either be untreated borehole water or brine from the reverse osmosis (RO) plant, or a mix of these two sources.

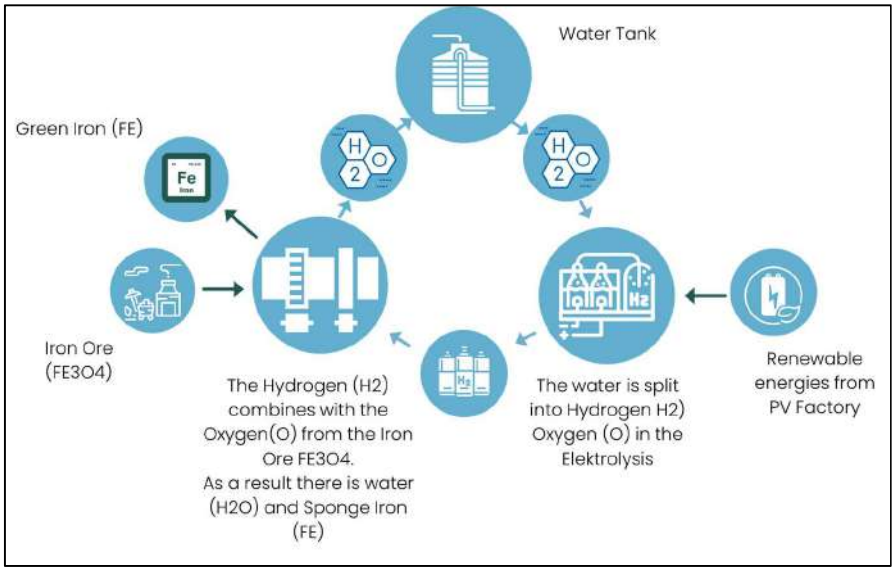

FIGURE 7: THE PROPOSED WATER CYCLE AT THE OSHIVELA PILOT PROJECT

A maximum of ~40 m^3 water would be required on average per week (i.e. ~ 2,000 m^3 / annum) during the pilot phase, which includes potable water use. The water will be supplied by abstracting from an existing borehole(s) (i.e. groundwater) on site that will either be conveyed through a 50 mm diameter (above ground) pipeline between the borehole(s) and the site or transported with a water bowser. A water storage tank with a size of 40 m^3 would be required on site. The existing borehole locations are shown in Figure 8. More details regarding existing boreholes on the area are provided in Section 6.5.3.

Hylron also considers to truck the initial volume of water intake for the processing in to the site.

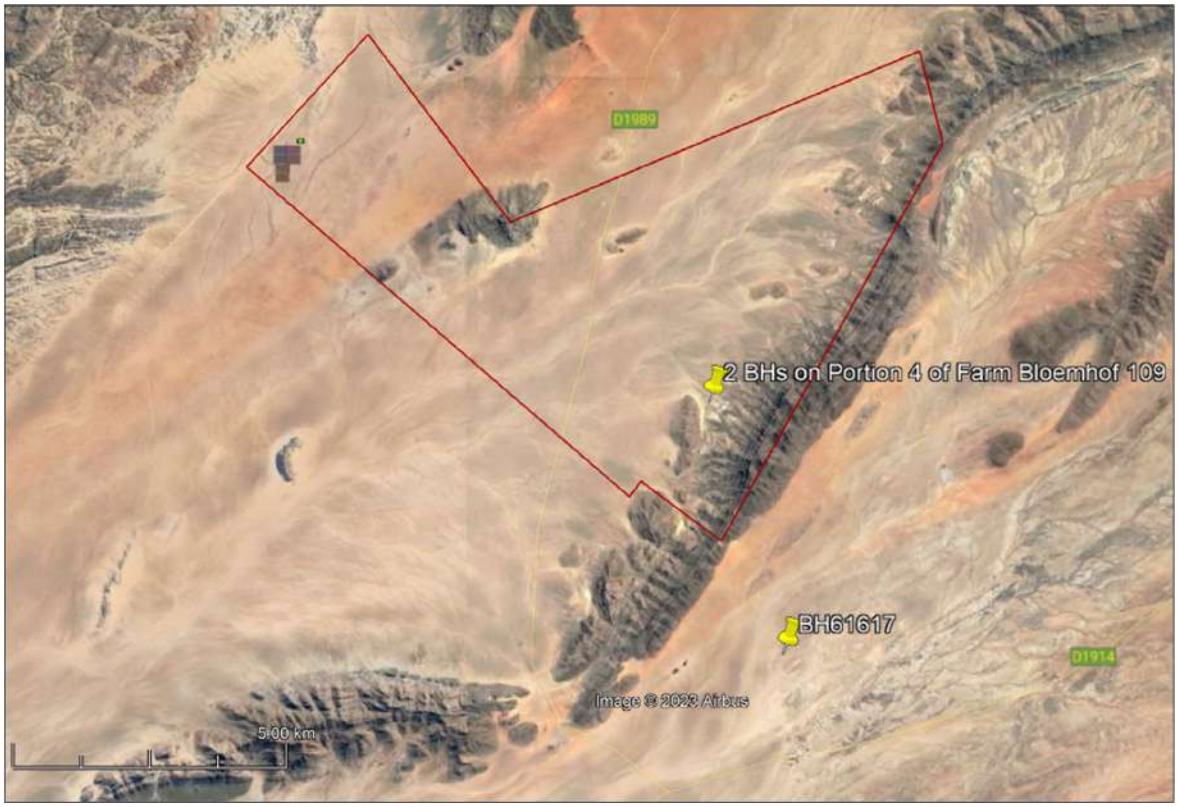

FIGURE 8: EXISTING BOREHOLE LOCATIONS CONSIDERED FOR THE WATER SUPPLY

As the local groundwater tends to be highly mineralised (>2 000 milligrams per litre total dissolved solids), a small reverse osmosis (RO) desalination plant will be set up to produce pure demineralised water for hydrogen production and for mixing with untreated water to produce less mineralised drinking water.

A volume of approximately 14 - 15 m^3 per week is envisaged to make up for process water losses during the pilot phase and a similar volume will be required for mixing with brackish borehole water to meet the standard for potable water. A small modular system with a capacity of about 5 m^3 per day will provide sufficient water for both purposes. Such a desalination plant typically includes the following features:

- A sand filter to remove fine suspended particles if the borehole is not fitted with filter screens. The filter is backwashed periodically to clean off particulate material.
- An antiscalant dosing system to remove silica and prevent scaling and inorganic precipitation.
- Clean-in-place RO membrane cleaning using low-toxicity, biodegradable chemicals (weak acids and detergents) to dissolve encrustations on the outside of the membranes.

Desalination plants typically split the feed water into 60-70% pure water and 30-40% brine containing all the removed salts, i. e. up to three times the original TDS concentration. At a ratio of about 70:30, the plant would require a groundwater input of 3 000 m^3 to produce the desired product water volume of 2 000 m^3 per annum. The desalination process would generate a brine volume of up to 1 000 m^3 per annum, which could be used for dust suppression.

4.2.5 POWER SUPPLY

The proposed project will receive its power exclusively from renewable energy sources, i.e. PV power onsite. No grid power will be required onsite and therefore no transmission lines will be installed. All cabling will be underground or on the ground, and electric installations will be bundled in the main process area.

4.2.5.1 PHOTOVOLTAIC POWER GENERATION

PV power is generated by converting solar radiation into direct current electricity. This is done by using semiconductors that exhibit the photovoltaic effect. The photovoltaic effect is the generation of voltage and electric current in a material upon exposure to light.

Photovoltaic power generation uses solar panels composed of several solar cells connected in series containing a photovoltaic material (see Figure 9).

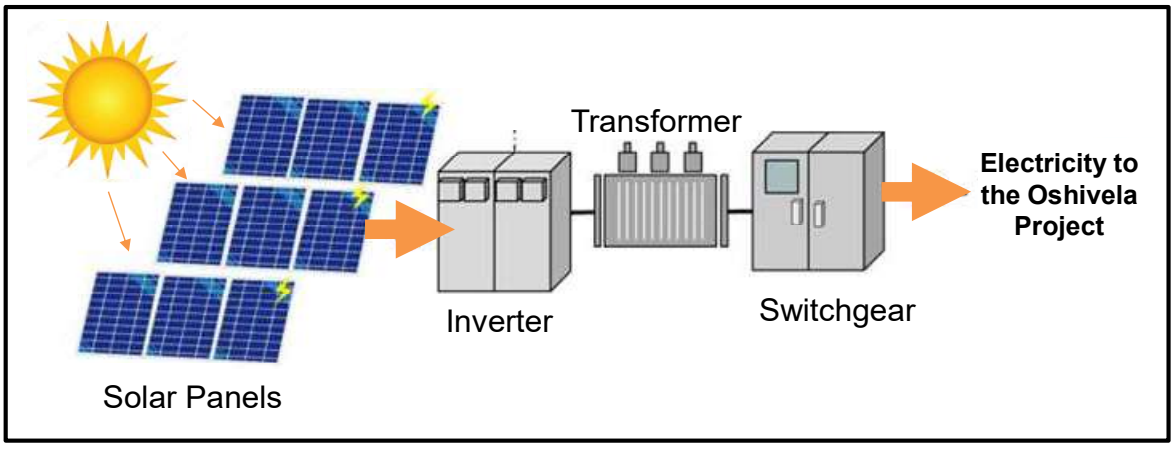

FIGURE 9: DIAGRAMMATIC ILLUSTRATION OF A TYPICAL PV POWER PLANT

Hylron proposes to use monocrystalline bi-facial technology for their PV Power Plant.

Hylron proposes to install 25 MWp of Solar power. The PV panels are planned to be built in a north-facing alignment at a tilt of 25° and will need a maximum of 30 Ha of space (see Figure 3). The panels will each be ~ 2.3 m high and 1 m wide.

A total of 44,000 panels / modulus will be installed.

There will be Battery Storage on site to compensate for fluctuations from the PV Power plant storing comparably small amounts of energy (see Figure 5).

4.2.6 ASSOCIATED SUPPORT STRUCTURES / INFRASTRUCTURE AND SERVICES

Within the proposed Project area internal roads, internal power lines, pumps, pipes, water storage, sewage treatment system (septic tank) and other associated infrastructure and services, process and non-process plant buildings, product handling and loading areas, fuel storage facilities, general waste handling and storage facilities, etc. would need to be constructed.

The fuel storage facilities will entail a 10,000 litre above ground tank with the required bunding.

4.2.7 EMPLOYMENT AND ACCOMMODATION

The required staff during operations will be at a maximum ~ 20 people at a time. Up to 50 people will be employed as there will be at least two to three shifts.

A summary of the skill levels is shown in Table 11.

TABLE 11: BREAKDOWN OF JOBS AND SKILL LEVELS REQUIRED

Positions	Processing	Admin	Total
Managerial	2	2	4
Technical	10	2	12
Skilled	10	3	13
Semi-Skilled	10	1	11
Unskilled	5	5	10
Total	37	13	50

The staff will be accommodated on the farm(s) belonging to the Hylron group. Accommodation will be provided in already existing fully furnished flats and in newly build flats. On and off times will be organised in blocks to allow family visits and time for entertainment. Some staff might choose accommodation in Arandis or Swakopmund to travel to site for the shifts.

4.2.8 WASTE MANAGEMENT DURING OPERATIONS

4.2.8.1 SANITATION

Onsite biotreatment plants will be installed on site which will process sewage waste from operations ablutions. Treatment plants will be installed during early stages of the project.

The septic tanks will be emptied on a regular basis and the effluent disposed in the plant site treatment plants.

Treated effluent water from the treatment plants may be reused onsite for plant road dust suppression.

4.2.8.2 OTHER WASTE (HAZARDOUS AND NON-HAZARDOUS)

The types of waste that could be generated during operations include hazardous industrial waste, general industrial waste, medical waste from the staff medical station, and domestic waste. Waste will be sorted at source, stored in a manner that there can be no discharge of contamination to the environment and recycled or reused where possible. The remainder will be transported off site to appropriate recycling or disposal facilities (Swakopmund or Walvis Bay for general waste and Walvis Bay for hazardous waste).

Waste management practices are presented in the EMP (Appendix G). In summary, the types of waste expected to be generated during the operational phase of the proposed Oshivela Pilot Project is provided in Table 12.

TABLE 12: PROPOSED WASTE MANAGEMENT FOR OPERATIONS

Waste type	Waste specifics (example of waste types)
Non-hazardous solid waste	During maintenance and possible replacements of panels and equipment: Broken panels, pallets and wooden crates, rubber, cardboard, paper, cable drums, metal cut-offs, scrap metal, general domestic waste such as food and packaging
	Building rubble and waste concrete
Hazardous solid waste (non-mineralised).	Treated timber crates, printer cartridges, batteries, fluorescent bulbs, paint, solvents, tar, empty hazardous (i.e. reagents, paint, etc.) material containers etc.
	Hydrocarbons (oils, grease).
	Sewage.
Medical waste	Syringes, material with blood stains, bandages, etc.

4.2.8.3 MINERALISED WASTE

With reference to Section 4.2.2.1, a maximum volume of 1,000 to 2,000 tons of silica material (i.e. waste sand) will be produced per year, which would either be used for road maintenance (i.e. access road) or backfilling of borrow pits (where Forsys potentially use material for the access road maintenance). Any remaining silica material could ultimately be trucked back to the mine (i.e. local supplier of the iron ore concentrate) or used to backfill / rehabilitate the borrow pit.

4.3 CONSTRUCTION PHASE ACTIVITIES AND INFRASTRUCTURE

4.3.1 PROCESS PLANT, WAREHOUSE AND ASSOCIATED SUPPORT STRUCTURES

Construction activities will be undertaken for the process plant, which will be inside a steel structure with shade netting; the adjacent warehouse as well as the associated support structures / infrastructure (see Sections 4.2.2.2 and 4.2.6).

The following (key) activities are expected to take place during the construction of the above-mentioned facilities:

- Appoint contractors, labours, etc.
- Limited earth moving activities to create flat surfaces.
- Foundation excavations.
- Setting up contractors' laydown areas.
- Maintaining the Norasa Uranium Project access road as and when require – in liaison with Forsys.
- Digging of foundations and trenches.
- Delivery of materials – storage and handling of material such as sand, rock, cement, etc.
- General building / construction activities including, amongst others: mixing of concrete; operation of construction vehicles and machinery; refuelling of machinery; civil, mechanical and electrical works; painting; grinding; welding; etc.
- Handling and storage of hazardous material, including lubricants, paints, gas (welding), cement, chemical additives for cement, diesel and petrol.
- Handling, storage and disposal of hazardous waste, including empty paint containers, cements bags, chemical additives (for cement) containers, contaminated PPE and other (with oil, etc.).
- Handling, storage and disposal of non-hazardous waste, including steel off-cuts, domestic waste, wood off-cuts, grinding wheels, other construction waste, redundant concrete packaging, e.g. plastic wrapping, styrofoam.

The following facilities are expected to be placed at the site (mainly in the immediate area of the processing plant site:

- Contractors lay-down areas
- Workshops, maintenance areas, stores, wash bays, lay-down areas, batch plant, fuel handling and storage area, offices, change houses.
- Ablution facilities such as chemical toilets or septic tanks.
- Handling and storage area for construction materials (paints, solvents, oils, grease) and waste.

- Generators for temporary power supply.
- Stockpiles.
- Waste collection and storage areas.

These facilities would either be removed at the end of the construction phase or incorporated into the layout of the operational mine.

4.3.2 PV POWER PLANT

Similar type activities will be conducted, as described above, however not all being relevant to the installation of the PV Power Plant. Onsite 'general construction activities' include limited trenching for cables, laying of cables and pipes, storage, handling and use of building material, the use of construction vehicles and equipment, transport of materials and equipment, the handling, storage and transportation of non-hazardous and hazardous goods and waste.

Based on the geotechnical investigations carried out on the site, the uprights for the PV panels can be installed following the methodology described below:

- 'Hammer' holes with a modified excavator / jack hammer for each of the upright structures.
- Auger holes in some parts of the project area for the upright structures.
- Drill holes in some parts of the project area for the upright structures.

An indication of the holes created by the excavator is illustrated in Figure 10.

FIGURE 10: EXAMPLE OF HOW THE HOLES FOR THE UPRIGHTS WILL BE CREATED BY HAMMERING HOLES WITH A MODIFIED EXCAVATOR / JACK HAMMER

No blasting is considered during the construction phase.

Building material, equipment and all components will be transported to the site and a temporary storage area with a contractors' laydown area onsite is planned. Other temporary facilities proposed previously include waste collection and storage areas, temporary change houses and sanitation facilities, water and electricity supply and a parking area for vehicles and equipment.

Concrete will be mixed and poured onsite; subsequently all concrete constituents (crushed stone, cement, water, and sand) must be transported to and stored onsite. Ready mix concrete trucks will also be allowed where the plant requires continuous pouring, and a certain standard must be maintained.

4.3.3 BORROW MATERIAL / BORROW PIT

Hylron plans to create a relatively small borrow pit on the north-western side of the Norasa Uranium Project Private access road (see Figure 3), which is on Portion 4 of Farm Bloemhof 109. The borrow pit will have the following (maximum) dimensions:

- Area: ~2 500 m^2.
- Depth: ~2 m.

The borrow material will be used for road maintenance / construction (i.e. onsite access road).

4.3.4 WASTE MANAGEMENT DURING CONSTRUCTION

4.3.3.1 SANITATION

The onsite biotreatment plants (see Section 4.2.8.1) will be installed during the early stages of the project (i.e. construction phase) which will process sewage waste from construction activities.

Portable toilets with associated septic tanks may be used for construction. The septic tanks will be emptied on a regular basis and the effluent disposed in the plant site treatment plants.

Treated effluent water from the treatment plants may be reused onsite for plant road dust suppression.

4.3.3.2 OTHER WASTE (HAZARDOUS AND NON-HAZARDOUS)

The types of waste that could be generated during construction include hazardous industrial waste, general industrial waste, medical waste from the staff medical station, and domestic waste. Waste will be sorted at source, stored in a manner that there can be no discharge of contamination to the environment and recycled or reused where possible. The remainder will be transported off site to appropriate recycling or disposal facilities (Swakopmund or Walvis Bay for general waste and Walvis Bay for hazardous waste).

Waste management practices are presented in the EMP (Appendix G). In summary, the types of non-mineralised waste expected to be generated during the construction phase include (see Table 13):

- General waste (domestic waste and other non-hazardous waste).
- Industrial waste.
- Hazardous waste.

TABLE 13: WASTE MANAGEMENT FOR CONSTRUCTION PHASE

Waste type	Waste specifics (example of waste types)
Non-hazardous solid waste	General domestic waste such as food and packaging, pallets, wooden crates, cable drums and scrap metal.
	Waste concrete and building rubble
Hazardous solid waste	Printer cartridges, treated timber crates, batteries, fluorescent bulbs, paint, tar, solvents, empty hazardous material containers etc.
	Hydrocarbons (oils, grease)
	Hydrocarbon contaminated soil
Medical waste	Syringes, material with blood stains, bandages, etc.

4.3.5 WATER USE FOR CONSTRUCTION

It is estimated that roughly the same volume of water would be required per week (on average) during the construction phase of the proposed Pilot Project (i.e. ~40 m^3 on average per week), compared to the operations phase. However during certain stages of the construction period, more water might be required because of the machines and the compaction without cement (i.e. the holes need to be watered to achieve a good compaction) and the construction of the roads.

For both these activities, water will be supplied by abstracting from an existing borehole(s) (i.e. groundwater) on site. This water will not be treated (i.e. it can remain brackish). To ensure a sustainable use of the groundwater (see assessment in section 8.4.2), Hylron will also consider the use of treated sewage water from Arandis for road construction purposes.

Potable water would be supplied from Arandis (i.e. municipal water will be trucked in).

The volumes of water to be abstracted from the existing borehole(s) on site will therefore be approximately the same than for the operations phase (see section 4.2.4).

4.3.6 CONSTRUCTION WORKFORCE AND ACCOMMODATION

During construction there will be up to maximum ~ 80 people on site at a time.

The core team of the construction workers will be accommodated on the farm(s) belonging to Hylron and neighbouring (guest-) farms. For some of the workers, Hylron will build fixed housing with own kitchens, bathrooms etc. on their farm(s).

Day labourers will also be brought in from Arandis and Swakopmund.

4.4 PROJECT SCHEDULE

The implementation of the project is dependent on the approval of the EIA process by MEFT (i.e. issuing of an ECC) as well as the obtaining of the necessary licensing by MME (power generation permit, etc.), where required. Provided the necessary authorizations, construction is planned to commence in Q2 of 2024 and will take ~ 7 to 8 months to complete, where after the plant will be commissioned.

5 ALTERNATIVES

This Chapter describes the various alternatives that were considered as part of the planning of the proposed Oshivela Pilot Project.

5.1 ALTERNATIVE SUPPLY OF ELECTRICITY

During recent years, renewable energy (especially PV power), has reduced in price and has become a feasible and attractive alternative to power generated from fossil fuels. Nowadays PV power is widely used, has a low operational cost and has the notion of being easily financed. Although power from wind turbines is not common in Namibia, it is used extensively at many other places in the world.

Hylron considers to operate all activities at the Oshivela Pilot Project with renewable energy (i.e. PV power supply) only, and no power from the national grid. The significance of this initiative is that the project has the potential to become the first production of iron at zero emissions in the world and therewith indicating that the industrial transition towards climate-neutral and sustainable industrial productions is feasible.

With reference to Section 4.1.2, Hylron considers upscaling the Oshivela Project. During the next phases of development, power generation from wind turbines will be considered and be further investigated. A possible further upgrade beyond the current plans for the Piot Project would be subject to an EIA amendment application, including various longer term monitoring requirements, re-assessment of impacts, etc. (see Section 4.1.2).

5.2 ALTERNATIVE SITE OPTIONS

5.2.1 SHIYELA IRON PROJECT

With reference to Section 1.2, Hylron considered acquiring the Shiyela Iron Project, located within the NNNP approximately 35 km northeast of Walvis Bay and ~ 70 km south-west of the Oshivela Pilot Project Site (refer to Figure 11). Hylron undertook an EIA (amendment) process in 2022 for the Shiyela Iron Project, aiming to mine the iron ore deposit and utilize their proprietary technology, together with renewable energy, to produce “green” iron”. Hylron could not yet proceed further with the acquisition and development of the Shiyela Project and now considers developing the Oshivela Pilot Project on Portion 4 of Farm Bloemhof 109. The Shiyela Iron Project, or components thereof, might however still be developed in future by Hylron, depending further agreements and investigations. Also, the development of the Shiyela Iron Project (and associated amendment Application) is dependent on the approval from MEFT (DEA).

Environmental aspects and potential impacts that could change because of the proposed changes to the Shiyela Iron Project (i.e. amendment to the approved EIA due to Hylron's proposed activities) were identified and (re-assessed) as part of the EIA (Amendment) process and final report for the Shiyela Iron Project. (Namisun, 2022a).

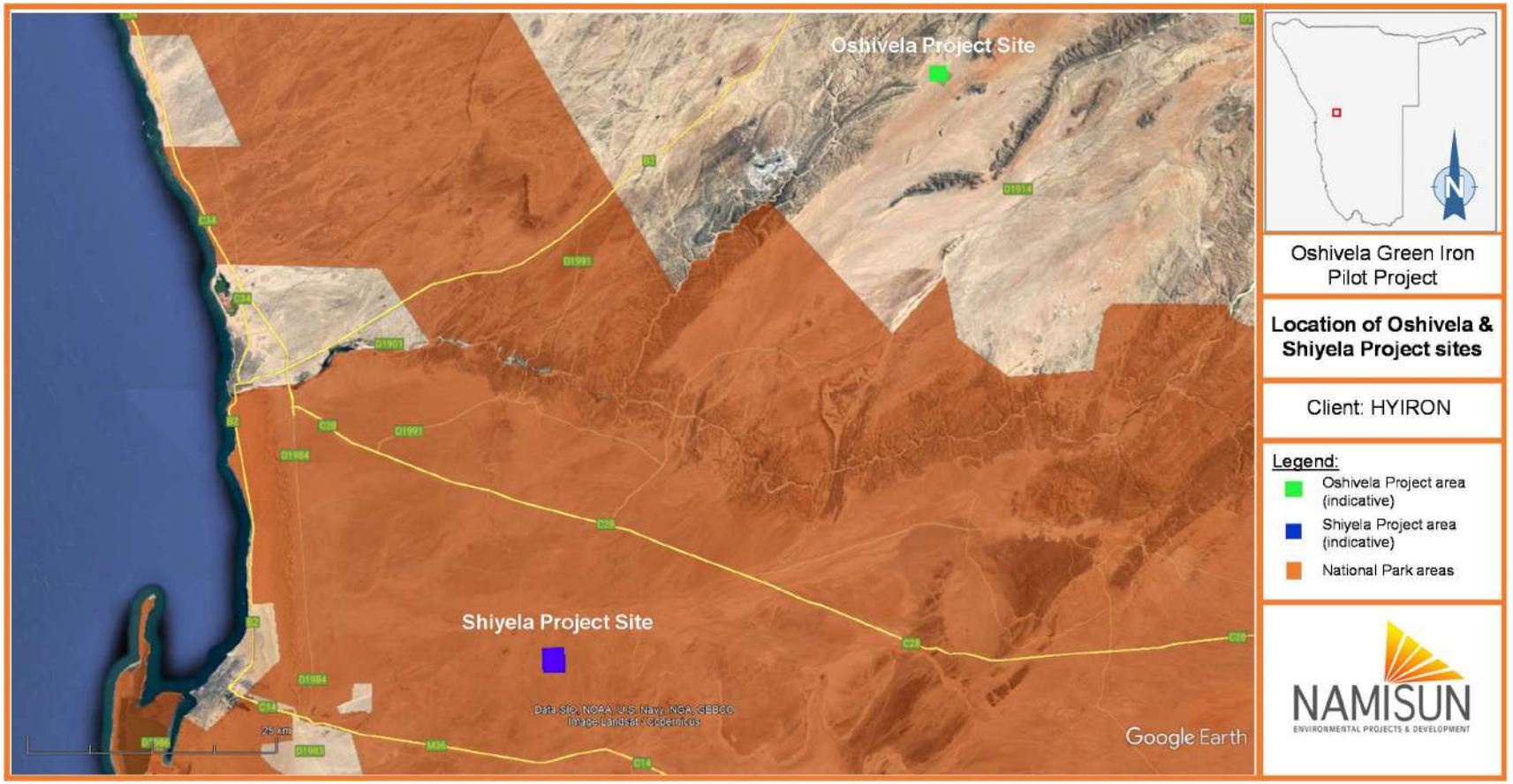

FIGURE 11: LOCATION OF ML 176 WHERE THE SHIYELA IRON PROJECT IS PROPOSED IN RELATION TO THE OSHIVELA PILOT PROJECT

5.2.2 PORTION 4 OF FARM BLOEMHOF 109 AND OTHER SITES CONSIDERED

Due to the fact that Hylron did not (yet) further proceed with the acquisition and development of the Shiyela Project, they now consider developing the Oshivela Pilot Project on Portion 4 of Farm Bloemhof 109, where iron ores from different sources could be tested in the pilot phase.

Hylron considered various options for the development of their Oshivela Pilot Project on Portion 4 of Farm Bloemhof 109, taking the following aspects into consideration:

- Location of the site in relation to the Port of Walvis Bay.
- Access to the site from the B2.
- Location of the site in relation to the Shiyela Project, for the option of possible links in further (future) development.
- Space for the development of the infrastructure for the supply of renewal energy (i.e. PV Power Plant) for the Oshivela Pilot Project and possible future expansions (see Section 4.1.2 for further details).
- The possibility to test different iron ores.
- The possibility to showcase that areas that are already impacted by climate change in the form of extended draughts, that make agricultural use difficult or even impossible, can form part of the activities countering climate change.
- Environmental impacts (i.e. the identification and assessment of potential impacts – i.e. Chapters 7 and 8).

Hylron bought the remainder of Farm Vlakteplaas in 2022, considering to develop a proposed “direct air capturing” Project on this Farm. The feasibility of this Project still needs to be further developed. Hylron, then considered developing the Oshivela Pilot Project on their portion of Vlakteplaas (see Figure 12 for an indicative area for the proposed Oshivela Pilot Project considered by Hylron on Vlakteplaas).

During this time, Hylron also started negotiations to purchase Portion 4 of Farm Bloemhof 109, as well as the remainder of Farm Bloemhoef 109.

The option of developing the Oshivela Pilot Project on the remainder of Farm Vlakteplaas was compared with the (now preferred) option on the north-western Section of Portion 4 of Farm Bloemhof 109. The following were key considerations:

- Access to Portion 4 of Farm Bloemhof 109 is easier and shorter from the Norasa Uranium Project Private access road (i.e. preferred access).
- The remainder of Farm Vlakteplaas has numerours (well defined) drainage lines, which are sensitive from an Environmental point of view.

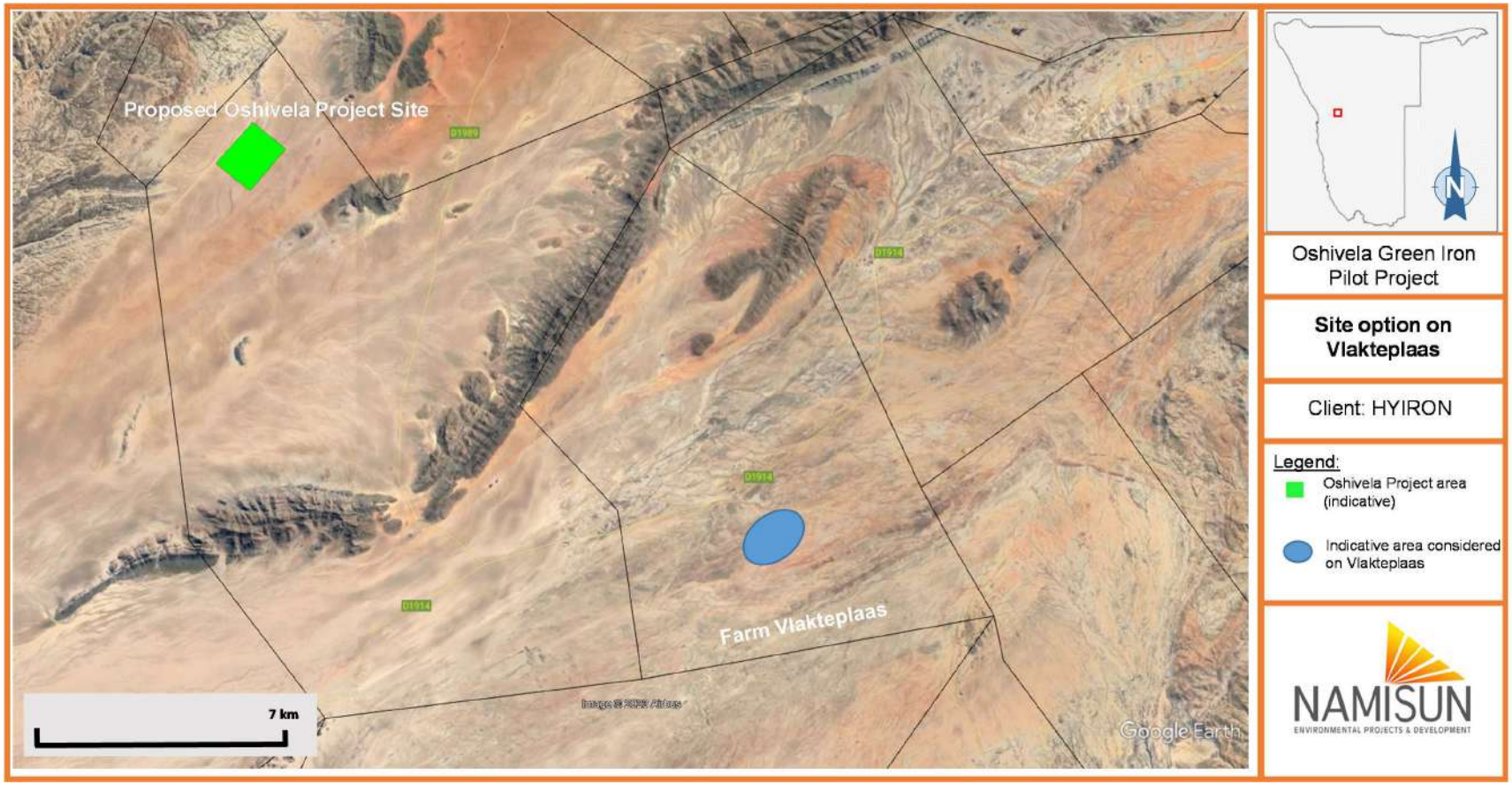

FIGURE 12: INDICATIVE AREA CONSIDERED FOR THE DEVELOPMENT OF THE OSHIVELA PILOT PROJECT ON REMAINDER OF FARM VLAKTEPLAAS

The HyIron group is the co-owner of Portion 4 of Farm Bloemhof 109 and based on the above-mentioned, plan to develop the Oshivela Pilot Project on the north-western Section of the farm (refer to Figure 3 and Figure 12).

The development of the Project (on any site), and the associated activities can however cause environmental impacts, which need to be assessed. See Chapters 7 and 8 of this report for further details. Potential negative impacts need to be avoided / minimised and possible positive impacts enhanced, through the development of the management and mitigation measures and monitoring requirements in the EMP.

5.3 Alternative Layouts / locations of the Oshivela Pilot Project on Portion 4 of Farm Bloemhof 109 because of Sensitive Biodiversity

Various (conceptual) project layouts / location options on Portion 4 of Farm Bloemhof 109 were considered by HyIron and the Environmental Team. Refer to Figure 13 for the initial locations considered.

Drainage channels in the Namib Desert are sensitive because they support critical ecological processes, stores moisture in its sandy aquifers, and supports a relatively higher biomass and a more complex food web. In addition, the placement of infrastructure in the drainage lines of the Namib Desert can be at risk during a storm event. Similar, rocky outcrop areas are sensitive as they also (often) support critical ecological processes, shelter for animals, etc.

Another sensitive area / habitat was identified onsite, i.e. aeolian sand area with various “fairy circles” (refer to Section 1.4).

Therefore, after the initial screening, including site visits by the Environmental Team, the proposed location / layout was reconsidered in terms of sensitive biodiversity / habitats areas (see Section 1.4 and Chapter 6 for further details) and the placement of the proposed infrastructure was moved into a less sensitive area.

Refer to Figure 13 for the initial indicative areas for the proposed pilot project infrastructure, compared to the preferred area, which is further assessed in Chapters 7 and 8. The updated proposed layout is shown in Figure 3.

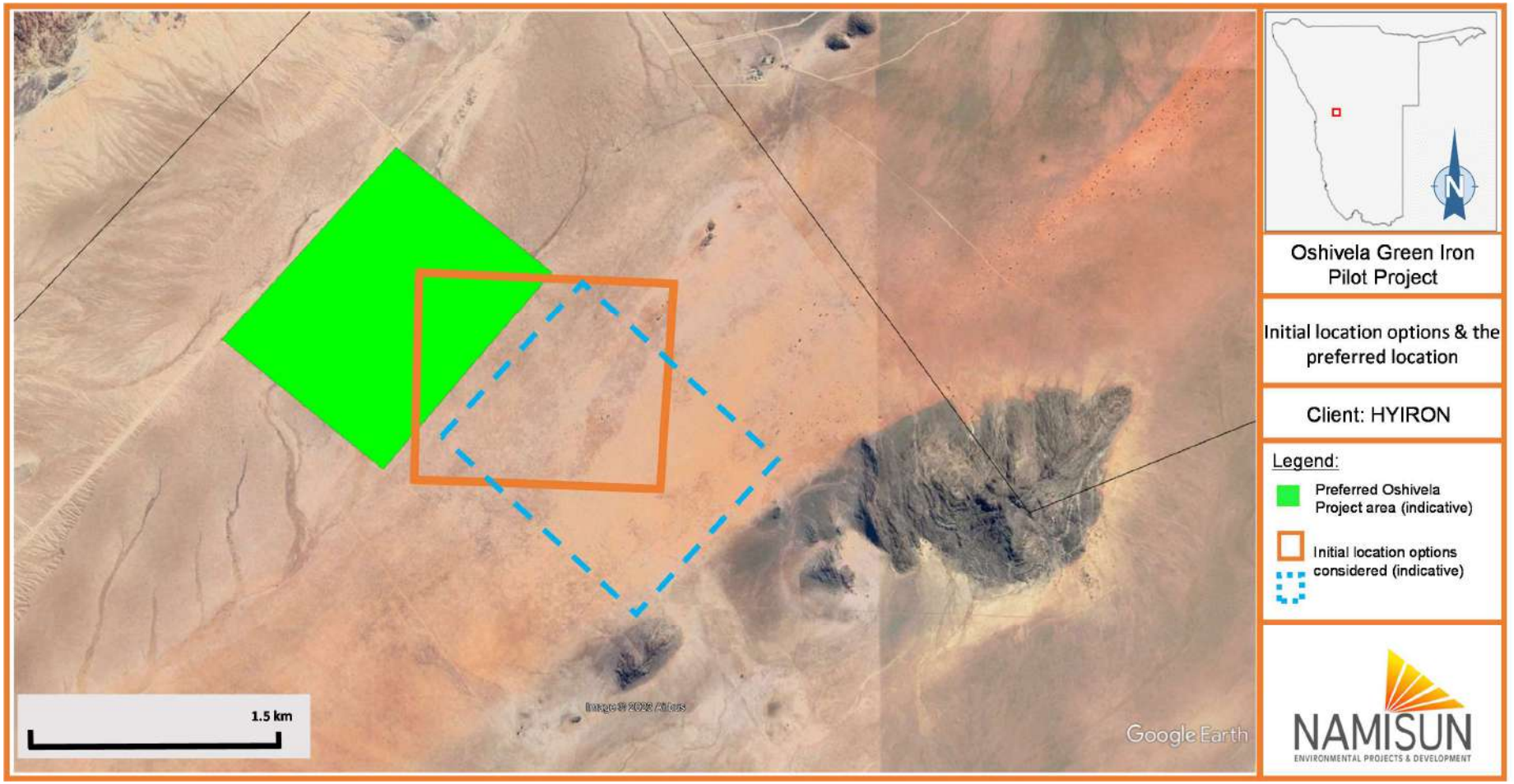

FIGURE 13: THE INITIAL (INDICATIVE) PROPOSED OSHIVELA PILOT PROJECT LOCATIONS

5.4 SITE ACCESS AND ROUTE OPTIONS (I.E. TRANSPORT OPTIONS FOR IRON ORE CONCENTRATE AND THE FINAL PRODUCT)

With reference to Section 4.2.1.2, various access routes to the Oshivela site (and other transport options), for the transport of the iron ore concentrate (to site) and the final product (to the Walvis Bay Port) are being considered.

These options are summarised in Table 14 and illustrated in Figure 14. The Pros and Cons for each option are also summarised in the Table below.

TABLE 14: TRANSPORT OPTIONS WITH PROS AND CONS

Route option	Comments	Pros	Cons
Road option 1: Trucks follow the B2 and Norasa Uranium Project Private access road	• Iron Ore concentrate brought to site from various areas / regions. • Final product transported to Walvis Bay port	• Mostly tarred roads used and less maintenance required. • Less cumulative dust. • No transport through the NNNP and no related permits required. • No transport through ≠Gaingu Communal Conservancy (see Figure 14). • Avoid possible impacts of transport in the NNNP (i.e. poaching, etc.). • Potential (later) usage of railroad hub.	• Longer route (however, the travelling time could be relatively similar). • More traffic on the B2. • Additional traffic on the Norasa Uranium Project Private access road would require more maintenance and impacting other road users. • Dust generation on the above-mentioned road.
Road option 2: Trucks follow a route along the C28 road, the Welwitschia Drive and the D1914.	• Iron Ore concentrate brought to site through the port or possibly the Shiyela Project if further developed and • final product transported to Walvis Bay port	• Shorter route (i.e. distance). • Less traffic on the B2. • No additional traffic on the Norasa Uranium Project Private access road.	• Transport through the NNNP and permits are required • Possible impacts of transport through the NNNP (i.e. poaching, impacts to tourists visiting the park including the popular Welwitschia Drive, etc.). • Transport through the ≠Gaingu Communal Conservancy. • Dust generation on longer Sections of gravel roads. • Longer Sections of gravels roads to be maintained.
Rail Option: Iron ore transported per rail to Arandis from where it will be loaded onto trucks traveling along the B2 and Norasa Uranium Project Private	• Iron Ore concentrate brought to site from various areas / regions. • Final product transported to Walvis Bay port	• No increase of traffic (cumulatively) on the regional road network. • Less cumulative dust. • No transport through the NNNP and no related permits required. • No transport through ≠Gaingu Communal Conservancy.	• Additional traffic on the Norasa Uranium Project Private access road would require more maintenance. • Dust generation on the above-mentioned road. • Double handling. • Further details regarding the rail transport option(s) still need to be developed by Hylron, in consultation with relevant

Route option	Comments	Pros	Cons
access road to site		• Avoid possible impacts of transport in the NNNP (i.e. poaching, etc.). • Better energy efficiency in transporting high density products (like iron and iron ore on rail). • Potential direct supply of iron ore products from Upington area in South Africa.	stakeholders. Depending the future activities, further assessments and authorisations might be required.
Combinations of the above	• Transport from both sides depending on supply origin	• Positive reasons of both solutions can be realised.	• Both negative impacts might come into effect. • Double maintenance costs.

As discussed in Section 4.2.1.2, Hylron is also investigating the possibility to use tractors for the hauling of the ore along the Norasa Uranium Project access road. The ore would then be transferred from the truck to a tractor with a wagon in a dedicated area next to the access road. This activity would require a further transfer point of the ore, meaning additional handling. However, using tractors on the road would cause less impact to the gravel access road and less maintenance required and increase safety.

Taking the above-mentioned options for transporting of the iron ore concentrate (Table 14) into account, it is clear that there are pros and cons for each of the options being considered. No fatal flaws were identified for either one of the options, however, a significant Section of the route for “road option 2” intersects the NNNP leading to potential significant negative impacts associated with the park management and tourism in the park. Hylron would also likely require permission from the MEFT (DWNP) for this activity through the NNNP along the Welwitschia Drive. This route option therefore requires further agreements between Hylron and the DWNP before this could be considered and the current commitments in the EMP (see Appendix G) might need further actions, depending on conditions set by DWNP.

Road option 1 is therefore preferred over road option 2. The rail option would minimise road related impacts and would be preferred, depending on agreements between Hylron and TransNamib.

Potential negative impacts associated with the any of the respective routes / options need to be avoided / minimised through the implementation of the EMP (Appendix G).

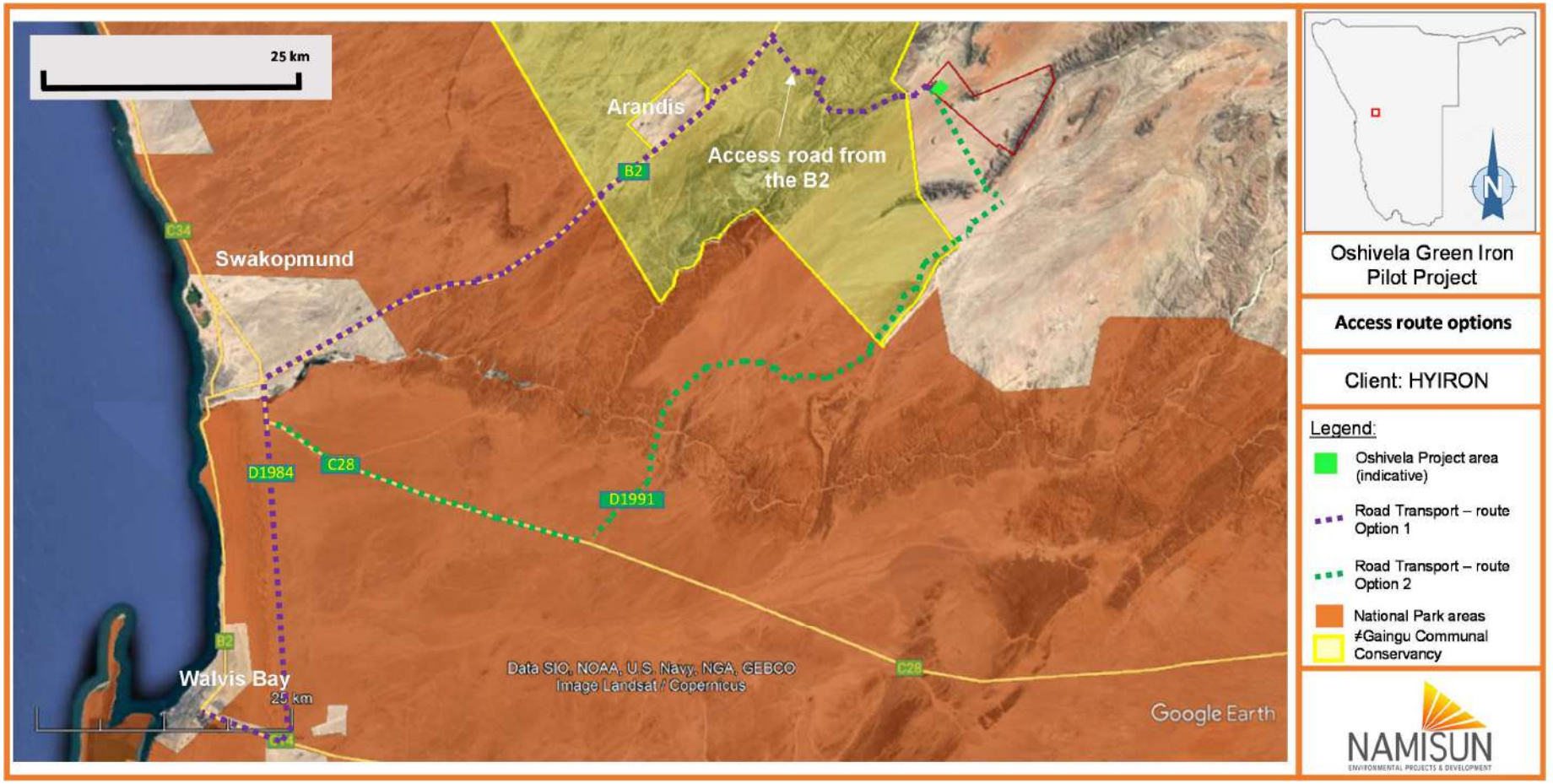

FIGURE 14: ACCESS ROUTE OPTIONS FOR ROAD TRANSPORT BEING CONSIDERED BY HYIRON

5.5 WATER SUPPLY OPTIONS

With reference to Section 4.2.5, the water (i.e. maximum of ~40 m^3 per week) will be supplied by abstracting from an existing groundwater borehole(s) on site. Refer to Chapter 8 for the assessment of impacts relating to the water abstraction.

Two options for conveying the water from the boreholes to the site are investigated, as the boreholes are ~ 4.6 km and ~ 5.3 km from the site (in a straight line), respectively, as follows:

- Pipe the water to site.
- Use a water bowser to transport the water to the site daily.

Since the pipeline would have a small diameter (i.e. 50 mm) it will have an insignificant impact to animal movement (i.e. above ground pipeline). Also, by placing the pipeline above ground, very limited disturbance will be caused to the soil and fauna & flora along the route. Any leaks along the pipeline will also be easily detected through visual monitoring. The pipeline will however, deteriorate quicker from lying directly in sunlight or get damaged by animals and would need replacing more often.

Transporting the water by means of a water bowser (daily) is less preferable as this would cause additional dust on the gravel roads and require a vehicle daily with additional costs associated with manpower, fuel usage, road maintenance, etc.

Hylron is, however also investigating the possibility of drilling another borehole closer to the site for water supply to the process. This is depended on the availability of (sufficient) groundwater in the specific location.

5.6 NO-GO OPTION

The No-Go alternative relates to the option of not developing the proposed Oshivela Pilot Project. In this case, the residual impacts (i.e. impacts after implementation of mitigation measures) of the proposed activities would not occur (refer to Chapters 7 and 8).

Implications in case Hylron does not go ahead with the proposed project are listed as follows:

- The investment by Hylron in Namibia will be lost, except if the proposed Shiyela Iron Project is further pursued (refer to Section 1.2 and 5.2.1 for further details).
- The renewable energy industry in Namibia will not benefit from the investment, also relating to the transfer of skills.
- Without this project, an innovation opportunity to generate renewable (clean) energy and to apply Hylron's proprietary technology is lost.

- Hylron's aim to lay a cornerstone and to establish a 'lighthouse project' to prove that climate-neutral technologies in heavy industries are available and economically competitive, will not materialize. At the same time an important strategic opportunity for Namibia will be lost.
- The potential job creation will not happen.
- The potential value creation will not happen.
- The potential development of the value chain before and after the iron reduction will not be established.

6 DESCRIPTION OF THE CURRENT ENVIRONMENT AND LINK TO ENVIRONMENTAL ASPECTS AND IMPACTS

An understanding of the environment and the sensitivity of the site and surroundings is important to ensure the potential impacts of the Project can be identified and assessed. This Chapter provides a general overview of the current baseline conditions (i.e. existing biophysical and social environment) that could potentially be affected by the proposed Oshivela Pilot Project. The link to relevant environmental aspects and potential impacts, which are further described and assessed in Chapters 7 and 8, are also explained.

This Chapter was compiled by utilizing the following sources of information[21]:

- An avifauna specialist study and assessment with additional (general) biodiversity input by African Conservation Services cc (ACS) (Dr Ann and Mike Scott) (refer to Appendix E).
- A groundwater and surface water specialist study and assessment conducted by Sandra Muller, incorporated in Sections 6.1, 6.2 and 6.5.
- An archaeology specialist study conducted by Dr John Kinahan (refer to Appendix F for the Phase 2 Archaeology Specialist Report).
- Atlas of Namibia (Mendelsohn et al. 2002; Atlas of Namibia Team 2022).
- The EIA Amendment Report and associated Specialist studies for the Shiyela Iron Project (Namisun, 2022a). The relevant specialist studies referred to include:
    - An ecology specialist study and assessment conducted by EnviroScience.
    - A noise specialist study and assessment conducted by Soundscape Consulting (Pty) Ltd.
    - A socio-economic specialist study and assessment conducted by Ashby Associates cc.
    - An air quality specialist study and assessment conducted by Airshed.
    - An Avifauna specialist study conducted by African Conservation Services cc.
- EIA Report for the RUN's proposed Tumas Project and associated Infrastructure (Namisun, 2023).
- EIA Amendment Report for the proposed Solar PV power plant of Rössing Uranium Limited near Arandis (Namisun, 2022b).
- Site visits by Namisun, relevant specialists and technical team.
- Consultations and focus group meetings with I&APs.

[21] Various references were made in the respective Specialist Reports, which will not be repeated in the Sections below. Reference is made only to the relevant specialist reports in the following Sections (where relevant). For the detailed lists of references refer to "reference Sections" in the various Specialist Reports in Appendices E and F).

6.1 CLIMATE

6.1.1 INTRODUCTION AND LINK TO IMPACTS

As a whole, the various aspects of the climate that are discussed influence the potential for environmental impacts and related infrastructure design. Specific issues are listed below:

- Rainfall could influence erosion, evaporation, vegetation growth, dust and surface water and groundwater management planning.
- Flashfloods because of heavy, sudden downpours can damage infrastructure and interrupt operational activities[22].
- Temperature could influence air dispersion through impacts on atmospheric stability and mixing layers, vegetation growth and evaporation which could influence future rehabilitation planning.
- Wind could influence noise, erosion and the dispersion of potential atmospheric pollutants.

6.1.2 BASELINE DESCRIPTION

The study area lies on the edge of the Namib Desert Biome, with the Nama Karoo Biome to the north-east (Mendelsohn et al. 2022), characterised by hyper arid (i.e. hot and dry) conditions.

The average annual temperature measured at Trekkopje Mine, which lies ~ 42 km northwest of Portion 4 of Farm Bloemhof 109 at a relatively similar distance from the coast is 19°C with a maximum of 38.4°C and a minimum of 2.3°C (Muller, 2022). According to the Atlas of Namibia, the average minimum temperature ranges between 6°C to 8°C and the average maximum ranges between 34°C to 36°C, In an arid and hyper arid environment the diurnal ranges and temperature extremes are important to understand the stress on biota.

Rain usually falls in late summer; mostly as heavy thunderstorms of short duration that are highly variable over space and time, the most recent being ~ 3 mm in 2023 and ~ 50 mm in 2022. Before that the area had almost no rainfall for ~ 8 years (pers comms. Mr A De Mann, 30 October 2023). Some light showers or drizzle from fog banks that move over 80 km inland from the coast can occur during the winter. The Project areas is located ~80 km from the coast and the number of fog days per year, according to the Atlas of Namibia, is 10 – 25.

[22] Impact from rain on operational activities are not assessed in this report but need to be considered by the Hylron Management / Technical Team.

At Trekkopje, the annual rainfall varies between 0 and 160 mm with an average of 32 mm, while the maximum rainfall within a 24-hour period measured was 80 mm in April 2011 (Muller, 2022). The long-term rainfall records at Rössing Mine (i.e. ~20 km south-west of the proposed Oshivela Project Site) also indicate a mean annual rainfall of ~30 mm (RUL, 2020). Extremes are important though, as episodic events of heavy, sudden downpours can have a lasting ecological impact while at the same time it can have effects on infrastructure.

The potential evaporation in the general area far exceeds the annual rainfall with an A-pan evaporation rates of ~3 000 mm/a measured at the Rössing and Trekkopje mines.

Winds in the Namib Desert are influenced mainly by two high-pressure systems: The Subcontinental (Kalahari) High; and the South Atlantic High. Although winds are predominantly south-westerly, hot easterly to north-easterly bergwinds, often associated with sandstorms, are common during the winter months. They occur between April to September for up to 50 days per year. The annual average windspeed at Trekkopje is remarkably constant at 3.4 metres per second, while maximum speeds of over 20 metres per second have been recorded during bergwind events (Muller, 2022).

Based on the climatic properties of the area, described above and other existing documents, the following general remarks are relevant as background information (Namisun, 2022b):

- Annual average precipitation – in the form of rain or fog – is low, potential evaporation is high, and the range of temperatures (diurnal as well as seasonal) are wide. Combined, these factors result in a water stressed environment with adapted vegetation growth and implications for water supply where relevant.
- Due to the erratic nature of rainfall in the area, there is a potential for episodic flash floods. This means that stormwater events and flood and erosion control measures need to be considered, where relevant, despite the long dry periods in between.
- The wide diurnal ranges in temperature and the contrast between stable and windy periods determine the airborne dispersion of dust and other atmospheric impurities. During stable periods the ground level concentrations are the greatest onsite, which may have impacts on workers and vegetation, while it is mobilized and dispersed during windy periods, which may impact third parties (e.g. residents of nearby farms) and lead to wind erosion.

6.2 GEOLOGY

6.2.1 INTRODUCTION AND LINK TO IMPACTS

Geology could have physical implications for the proposed Oshivela Pilot Project. The geology could determine the design / layout and specific location of infrastructure. It also determines the underlying aquifer regime and it has significant influence on groundwater flow through features such as dykes, channels, faults and fractures.

6.2.2 BASELINE DESCRIPTION

Precambrian rocks of the 850-550 million years old Damara Orogen characterise the regional geology. The Damara Belt with its southwest-northeast trending rock formations stretches from the central Namibian coast towards Zambia. A sequence of tectonic and deformational periods followed by erosion produced the strongly zoned remnants of the former mountain chain that are visible today.

In the area of interest, including the Portion 4 of Farm Bloemhof 109, Namibplaas and Valencia, the geology west of the Khan Mountains is dominated by a large synclinorium (a vast elongated syncline with its layered rock formations further folded into ridges and troughs) that extends parallel to the Khan River for over 50 km from the Rössing Mine in the southwest almost up to Usakos in the northeast. The entire Damara stratigraphic sequence is represented in the area. The oldest Etusis and Khan Formations crop out along the outer rims, followed by the intermediate Rössing, Chuos and Karibib Formations up to the youngest Kuiseb Formation that occupies the centre of the synclinorium (Amec Foster Wheeler, 2015).

During and after the formation of the Damara Orogen, granites intruded into the older metamorphic sediments along structural weakness zones. Many of these granites and associated pegmatites contain uranium ore and are locally known as alaskites. Such deposits are being mined at Rössing Uranium and have been explored on the farms Valencia and Namibplaas.

6.3 TOPOGRAPHY AND SOILS

6.3.1 INTRODUCTION AND LINK TO IMPACTS

Changes to the current topography through the development of the Project components may impact on surface water drainage, visual aspects, and the safety of both people and animals.

Furthermore, terrain features, i.e. topography and land cover, affect the way noise is propagated and air pollution is dispersed.

6.3.2 BASELINE DESCRIPTION

The dominant landscape is typified by the Atlas of Namibia (Mendelsohn et al. 2002) as Central-Western Plains.

Accordingly, the proposed Project Site and surroundings) consists mostly of sandy gravel plains that are flat to undulating, occasionally interspersed with isolated ridges, hills (inselbergs) and mountains. Some ephemeral drainage lines are found within the area. (Refer to Figure 15 for the key topographical features of the greater study area and surroundings and Figure 16 for the topographical features at the proposed Project Site). The proposed Project Site is ~770 meters above sea level (m.a.s.l.), located ~ 80 km east of the coast with a longitudinal profile that generally dips from north-east to south-west.

The Chuosberge is a prominent mountain range (reaching ~1,600 m) running from north-east to south-west of the Pilot Project Site.

A flat, low, aeolian sandy area lies in a parallel direction, to the west of the mountain range and north-east to south-east of the proposed Pilot Project Site (see Figure 15 and Figure 16). Several low hills/rocky outcrops are found in this sandy area. The occurrence of “fairy circles” is common.

Smaller ephemeral drainage lines are a common and important feature of the landscape. In both large and small drainage lines, the runoff and relatively higher moisture, as well as the linear concentration of organic debris, mineral nutrients and loose fertile sediments enable increased vegetation growth and micro-habitats for associated animal life.

Vegetation is evenly distributed over the plains but get denser in the drainage lines and more diversified on and around the hills.

A major topographical feature in the greater area is the deeply incised, ephemeral Khan River and its tributaries, running some 8 km west of the proposed Project Site. The river flows from the interior (east), to confluent with the Swakop River, which ends in the Atlantic Ocean in the west (see Figure 15). The surrounding catchment has rocky cliff habitats that are high in places.

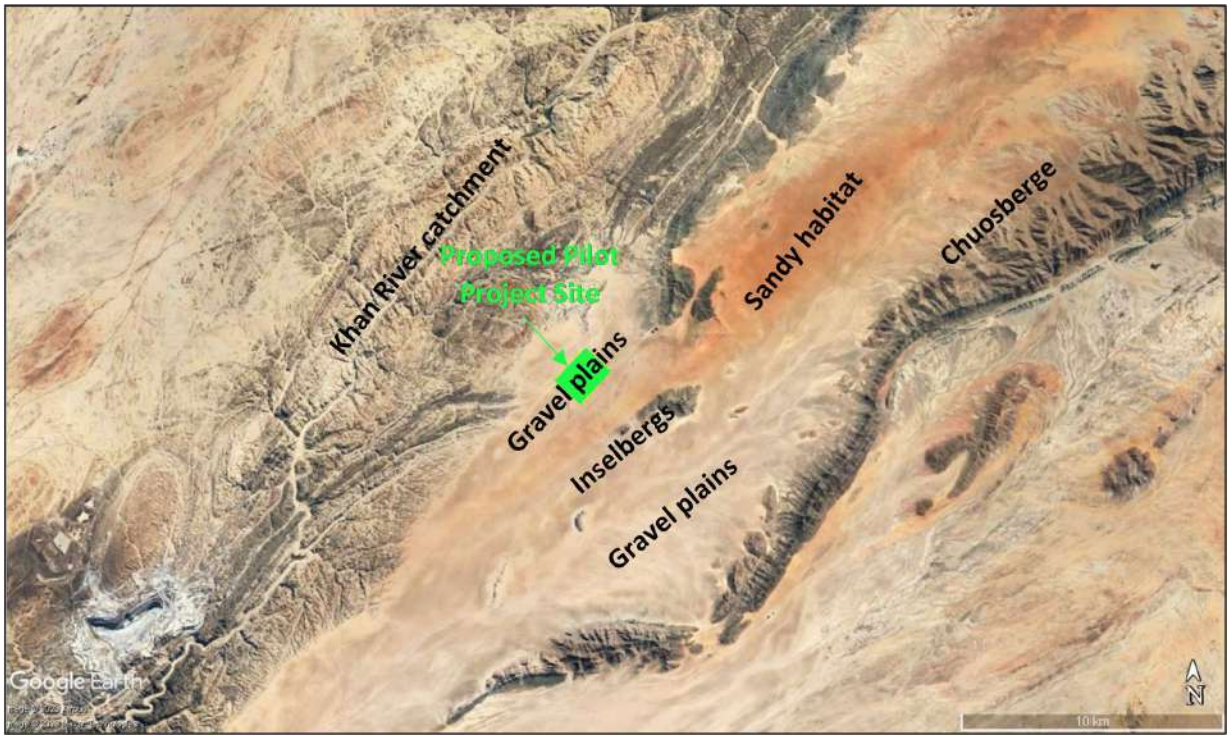

FIGURE 15: KEY TOPOGRAPHICAL FEATURES OF THE WIDER LANDSCAPE OF THE PROPOSED OSHIVELA PILOT PROJECT, SHOWING THE MAIN EPHEMERAL RIVER SYSTEMS, THE SANDY HABITAT, ROCKY RIDGES AND MOUNTAIN RANGES (ACS, 2023)

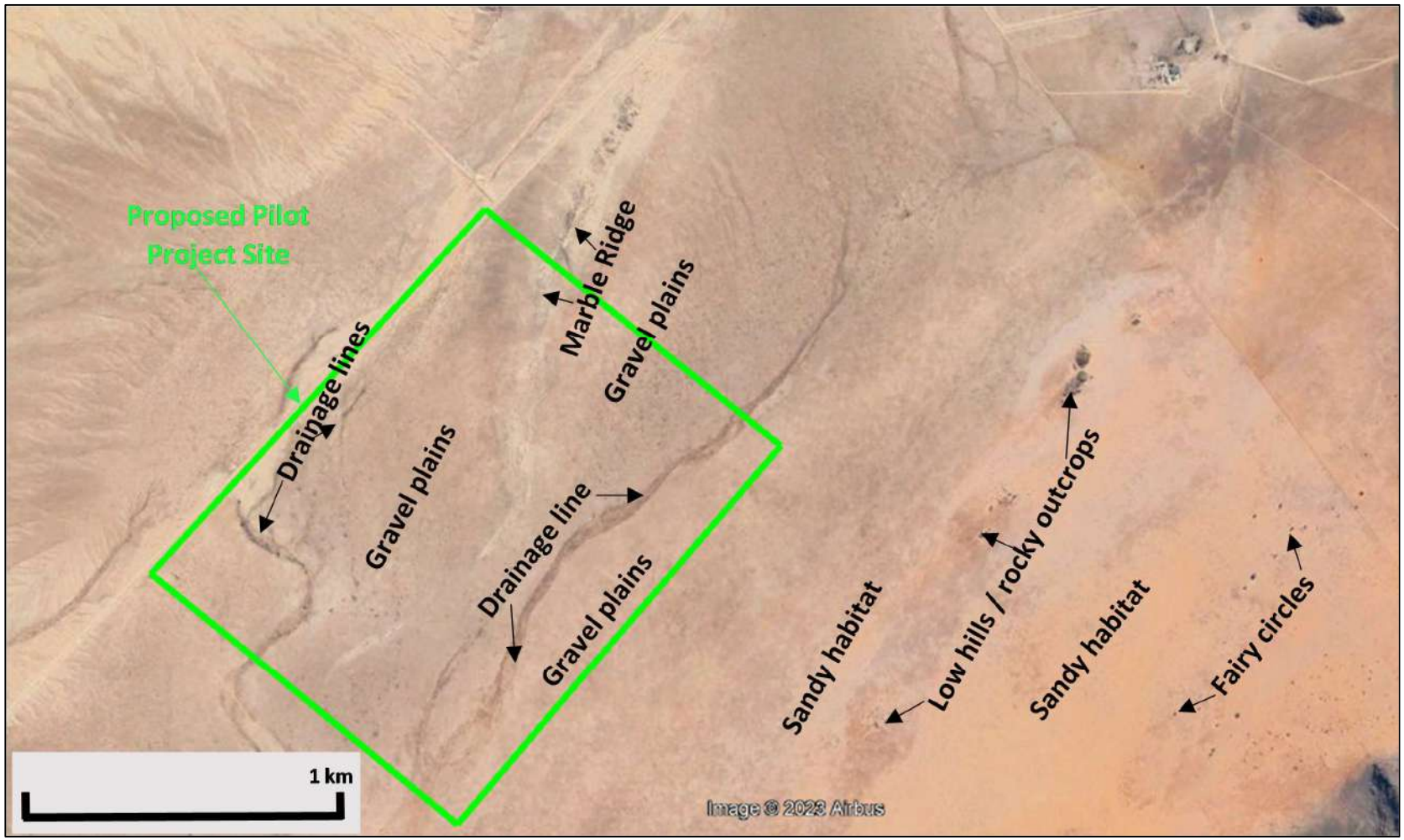

FIGURE 16: KEY TOPOGRAPHICAL FEATURES AT THE PROJECT STUDY AREA (REF: GOOGLE EARTH)

Changes in terrain around an air pollution source can significantly influence the way a (dust) plume is dispersed. In addition, hills or rough terrain influence wind speed, wind direction and turbulence characteristics while significant valleys can cause persistent descending flows and restrict horizontal movement whereas sloping terrain may help provide katabatic or anabatic flows (Airshed, 2022).

The dominant soil types at the proposed project site are petric gypsisols and petric calcisols (Mendelsohn et al, 2002).

The importance of soil is highlighted here because soil plays an indirect but critical role as it provides important ecosystem services. Soil is a filtering medium for water and a growth medium for plants, and it constitutes shelter and a habitat for specialist vertebrate and invertebrates.

As the soils do not retain water well and the nutrient levels are generally low, vegetation cover is sparse, and the organic content is low. The scarcity of vegetation cover and further restriction of plant growth because of disturbance reduces the amount of organic matter that is added to the soil, which results into a lower fertility causing, in turn, a lower ability to harbour plants. Moreover, the removal, displacement, and compaction of soil restricts its ecological functionality as a filter and growth medium, resulting into a reduced infiltration and recharge rate of water on the one hand and compromising the rooting ability of plants on the other hand. Compaction may also result into a lack of aeration, an increased likelihood to erode and a reduced ability to harbour plants. Avoiding of large-scale earthworks (through selective clearing and grubbing) is the best form of mitigation, especially to minimize impacts such as erosion, compaction and the loss of the soils' ecological functionality.

Based on the most recent information relevant to the proposed Oshivela Pilot Project, potential disturbances on the soil onsite through construction activities can be summarized as follows:

- Excavations and trenching can loosen soil, albeit temporary and localized, which may result into a loss of soil in the form of wind erosion as well as potential enhancing of water erosion over a short period (during construction).
- Soil can be compacted by heavy equipment, vehicles or when it is overlain by heavy structures.
- Construction activities have the potential to cause contamination of soil through leaks and spills from equipment and vehicles, thereby impacting on the soils' ability to sustain vegetation. Contamination is also closely related to the potential contamination of surface and groundwater.
- Excavations, trenching and the building of new structures and infrastructure might create a temporary danger to people and animals.

6.4 BIODIVERSITY

6.4.1 INTRODUCTION AND LINK TO IMPACTS

A unique array of biodiversity exists in the Namib, in general, with high levels of plant endemism and numerous advanced adaptations to arid conditions. Many of these endemic and near endemic plant species have restricted distribution or habitat, making the species as well as their habitats and the various ecological links extremely vulnerable to disturbance. A contributing factor to the inherent sensitivity of the wider landscape is that, due to the limited moisture supplies, the recovery period of disturbances in the desert environment is very slow.

In the broadest sense, biodiversity provides value for ecosystem functionality, aesthetic, spiritual, cultural, and recreational reasons. The known value of biodiversity and ecosystems, in general is as follows:

- Soil formation and fertility maintenance.
- Primary production through photosynthesis, as the supportive foundation for all life.
- Provision of food and fuel.
- Provision of shelter and building materials.
- Regulation of water flows and water quality.
- Regulation and purification of atmospheric gases.
- Moderation of climate and weather.
- Control of pests and diseases.
- Maintenance of genetic resources.

The establishment of infrastructure as well as certain supportive activities have the potential to result in the loss of vegetation, habitat and related ecosystem functionality through physical disturbance and / or contamination of soil and/or water resources.

As a baseline, this section provides an outline of the type of biodiversity and habitats occurring on the site where the proposed project activities will be undertaken. The baseline also describes the status of the biodiversity, highlights its sensitivity and identifies the habitats that require protection and / or additional mitigation, should they be disturbed.

6.4.2 VEGETATION

The vegetation type in the study area is classed as Central Desert, with the dominant structure comprising sparse shrubs and grasses. The site is however near the transition zone of the "Central-western Escarpment and Inselbergs" vegetation type (Mendelsohn et al. 2022). Transitional features are thus characteristic.

As described above, vegetation is usually concentrated along the more sheltered drainage lines and large trees are scarce.

According to Amec Foster Wheeler (2015), the baseline flora study for the Norosa Project found that annuals are the dominating plants with *Stipagrostis* grasses occurring widely on the aeolian plains. Vegetation surveys for the Norosa Project found some endemic and near-endemic species on rocky outcrops in the area, including aloes, *Commiphoras* and Elephant's foot (*Adenia pechuelii*).

During recent surveys by the Environmental Team, with input from Mrs Herment (see Section 2.1), at least 21 different plant species were recorded in the Project Study Area. These plant species are found in various habitats (see Section 6.4.5 for more information on the habitats), which are presented in Table 15. With reference to section 1.5.3, the Project Site and its surroundings were very dry and denuded of vegetation at the time of field visits. Therefore, there is a possibility that there are more plant species (specifically incidental and cryptic species) that would become more visible after sufficient rains in the area.

TABLE 15: PLANT SPECIES RECORDED IN THE PROJECT STUDY AREA DURING SURVEYS CONDUCTING IN OCTOBER & NOVEMBER 2023

PLANTS SPECIES	OUTCROPS & HILLS	DRAINAGE LINES	GRAVEL PLAINS	CONSERVATION CONCERNS[23]
Boscia foetida	X	X		LC
Calicorema capitata	X	X	X	
Sesamum capensis	X	X	X	LC
Salsola tuberculata	X	X	X	DD
Blepharis grossa	X	X	X	NE
Stipagrostis sp.	X	X	X	
Acanthopsis Disperma		X	X	LC
Euphorbia virosa	X			LC
Monechma cleomoides	X			LC
Commiphora virgata	X			LC
Commiphora glaucescens	X			NE
Petalidium pilosi-bracteolatum	X			E LC
Hoodia currori	X			P LC
Sesuvium sesuvioides	X		X	
Aloe namibensis	X			E
Cleome carnosa		X		E LC
Kissenia capensis		X		
Citrullus ecirrhosus		X		NE LC
Parkinsonia Africana		X		FP
Tetraena giessi		X		
Acacia erioloba		X		FP

NOTES:

- E – Endemic
- NE – Near-endemic
- LC – Least Concern
- DD – Data Deficient
- FP - Forestry Protected
- P - Nature Conservation Ordinance
- NT - Near Threatened

[23] Species names follow Klaassen & Kwembeya 2013; E= endemic, cN= central Namib, N= Namib).

The Environmental Team found during their site visits that dwarf shrubs and grasses are the dominant vegetation and are denser along the drainage lines. Also, plant diversity, in general, increases towards the isolated ridges and hills and the dry drainage lines. Areas containing the least plant species and diversity are the gravel plains with the following species recorded: *Calicorema capitate; Sesamum capensis; Salsola tuberculate; Blepharis grossa; Stipagrostis sp.; and Sesuvium sesuvioides*.

Most of the shrubs are smaller than 0.5 m. The following dwarf shrubs are the dominant species: *Calicorema capitata, Boscia foetida* and *Salsola tuberculata*.

Three protected species (i.e. *Acacia erioloba*, *Hoodia currori* and *Parkinsonia Africana*) occur and three endemic plants occur (i.e. *Cleome carnosa*. *Petalidium pilosi-bracteolatum and Aloe namibiensis).*

No lichens were found during the site visits. According to the Atlas of Namibia (2022), it is possible to find lichens in the wider landscape, but since the Project Site is on the edge of the fog zone, the likelihood of lichens is small. No Lithops were found during the site visit either. However, with reference section 6.4.5.1, Lithops might occur in the general area, which are protected by Nature Conservation legislation.

During the Focus Group meeting with the owner of the neighbouring farm, i.e. Farm Bloemhof (Remainder) (see Section 2.5.2) in October 2023, the presence of lilies in the Study Area was mentioned. These lilies are only visible for a short period of time after rains and are impossible to detect when they are not flowering. They are well-adapted to disturbance and drought through forming large underground storage organs (Burke, 2003). The experience and knowledge of the locals, witnessing the flowering of lilies after historic rain events, as well as their (approximate) distribution in the surrounds of the Project Site is invaluable. Lilies found during previous years (i.e. after rains), in the wider landscape were largely confined to the sand plains area, which is located outside the proposed Project Site (i.e. it lies in a parallel direction, to the west of the mountain range and north-east to south-east of the proposed Project Site) (refer to Section 6.3 and Figure 15, Figure 16 and Figure 18).

6.4.3 FAUNA

Note: Avifauna is described separately in Section 6.4.3.

Some 21 mammal species are known to occur in the surrounding area. At least 76 species of reptiles were known, reported or expected to occur during the study for the proposed Valencia

Mine (Amec Foster Wheeler, 2015). At Trekkopje, a considerable richness in insect, reptile, mammal and bird species diversity was reported (Turgis, 2008).

Compared to reptiles and arthropods, mammals are generally not well represented in true derts environments for a number of reasons, but most importantly, because of a lack of moisture. An estimated 63 species of reptile, 6 amphibian, 52 mammal and 126 bird species are likely to occur, of which a high proportion is endemic. The Namib Desert is also known for its high species richness of beetles, particularly those belonging to the family *Tenebrionidae* (Turgis, 2008).

Faunal occurrences within the area are largely determined by the vegetation communities present, and subsequently the availability of food. t. Plant species increase in diversity and abundance towards drainage lines and rocky outcrops / hills. Subsequently, these habitats are important sources of both food and shelter for animals, and they will host comparatively more fauna than the surrounding gravel plains. Animals are uniquely adapted to the habitats of the Namib Desert.

Only a few individual animals (excluding invertebrates) were spotted during the site visits by the Environmental Team but signs of wildlife activity were evident, i.e. burrows (likely rodents), ostrich faeces, bustards faeces and tracks, hare faeces, jackals faeces and tracks, remains of an oryx carcass and snake eggs.

The following fauna were observed and recorded on the Project Study Area:

Invertebrates:

- Ants and harvester ants.
- Termites.
- *Seothyra* buckspoor / bokspoor spider (sand).
- *Seothyra* buckspoor / bokspoor spider (gravel).
- Beetles.

Reptiles:

- *Meroles suborbitalis* (Spotted desert lizard / Spotted sand lizard)
- *Pedioplanis husabensis* (Plain sand lizard)
- *Pedioplanis namaquensis* (Namaqua sand lizard)
- Agama lizard

Mammals:

- Hare.
- Oryx.
- Jackal.
- Klipspringer.

The proposed Project Site is located within a fenced farm on which big mammals are largely absents due to the persistent drought of the last couple of years.

Various signs of insect and spider activity were found, including ants, termites and beetles. A relatively big density of Buckspoor spiders (*Seothyra*) were found on (and adjacent to) the isolated ridges and hills and the sandy area / habitat, described in Sections 6.3 and 6.4.5.

Lizards were also observed during site visits, on the ridges and hills.

There is currently one active water hole within the fenced area, located near the borehole on Portion 4 of Farm Bloemhof 109 (see Section 4.2.4), ~9 km south-east of the Project Site. It seems to attract birds such as Namaqua sandgrouse, ostriches and bustards (feathers and tracks have been found around) and a troop of baboons.

Signs of (seemingly old) hyena activities have been found along one of the drainage lines (i.e. old scats and latrine area) in the Project area.

Surrounding farm owners indicated during the consultations that some of the farms have reintroduced various animals onto their respective farms as part of their 'conservation initiatives'. These include amongst others, Oryx and Springbok. Hartman's Mountain Zebra and Aardvark are also found in the area. Some of the surrounding farm owners also indicated that the following predators (or signs) are often found on their respective farms: Leopard, Cheetah, Spotted Hyena and Brown Hyena.

6.4.4 AVIFAUNA

Information presented in this Section has been sourced from the avifauna specialist study (ACS, 2023). See Appendix E for the specialist study.

Sensitive bird species

A total of 163 bird species has been recorded in the study area, representing 24% of the 676 species currently recorded in Namibia. This species richness is regarded as relatively moderate, but noteworthy in view of the arid environment.

The bird checklist for the study area includes 11 (7%) species that are currently classed as “threatened” in Namibia, of which five (46% of the total) are also “globally threatened”. The checklist also includes five species that are “near-endemic” to Namibia, and at least five species with migrant status (including four Red Data species). Other migrant species have also been recorded in the area.

Lappet-faced Vultures are known to breed in the wider landscape.

Priority bird species

Risk assessment and mitigation efforts are directed towards priority species, namely those that have a high biological significance, i.e. primarily Red Data species (including any with migrant status) and / or endemic or near-endemic species.

Sixteen priority species have been identified as being potentially at higher risk in terms of the proposed project, as follows:

- Four Red Data species, including two migrants; and two Namibian near-endemic species.
- Ten other, non-Red Data species, including eight raptors.

The 16 priority species may be divided into the following groups, with the local abundance (and hence the degree of risk) indicated, as follows:

- **Four Namibian Red Data species (two of which are also Globally Threatened)**
    - Large terrestrial / cursorial species (1)
        - **Ludwig's Bustard**: Endangered, Globally Endangered; partial migrant; near-endemic to southern Africa (40% of population in Namibia); nomadic, with local movements; large terrestrial bird; polygynous (more than one female mate), with dispersed "leks" (regularly used sites where males display); local abundance high (but likely to be erratic).
    - Raptors (3)
        - **Lappet-faced Vulture**: Endangered, Globally Endangered; resident, with extensive movements in younger birds; raptor; local abundance high (breeding in greater study area; past breeding in study area).
        - **Booted Eagle**: Endangered; Palearctic migrant; resident; raptor; local abundance medium.
        - **Verreaux's Eagle**: Near Threatened; resident, raptor; local abundance low (but recorded in cliff habitats in the greater area).

- **Two Namibian near-endemic species (90% of population):**
    - **Rüppell's Korhaan:** near-endemic to Namibia; sedentary; ground nester; large terrestrial bird; thought to be group-territorial; local abundance (very) high; breeding suspected in study area.
    - **Gray's Lark:** near-endemic to Namibia; nomadic; ground-nester; local abundance not known, but commonly recorded in the greater area.
- **Ten other, non-Red Data species of concern (including eight raptors):**
    - Black-chested Snake Eagle: raptor; local abundance high.
    - Rock Kestrel: raptor; local abundance high.
    - Greater Kestrel: raptor; local abundance high.
    - Southern Pale Chanting Goshawk: near-endemic to southern Africa (30% of population in Namibia); raptor; local abundance high.
    - Lanner Falcon: raptor; local abundance high.
    - Gabar Goshawk: raptor; local abundance medium.
    - Jackal Buzzard: raptor; local abundance medium.
    - Augur Buzzard: raptor; local abundance medium.
    - Namaqua Sandgrouse: near-endemic to southern Africa (45% of population in Namibia); resident, nomadic/ migratory; large terrestrial bird, ground nester; local abundance high.
    - Common Ostrich: large terrestrial bird, ground nester; collision-prone; local abundance high.

Several other (non-priority) bird species have the potential to impact on infrastructure, including on solar PV arrays and associated infrastructure, through their perching, nesting and other activities. Examples are:

- Cape Sparrow (local abundance high).
- Pied Crow (local abundance low), Cape Crow (local abundance very low).
- Sociable Weaver (local abundance low).

6.4.5 HABITATS, ENVIRONMENTALLY SENSITIVITY AND THE LINK TO POSSIBLE IMPACTS

6.4.5.1 REGIONAL CONTEXT

Apart from the wider landscape features (described in Section 6.3) such as river valleys (i.e. Khan River), the key landscape components for biodiversity in this hyper-arid region (i.e. regional setting of the proposed Project Site) are rocky outcrops (which tend to trap moisture from (rare) rain events and from fog) and drainage lines within the gravel plains. The available moisture in these components supports higher plant biomass than any other habitats. Rocky outcrops are important for biodiversity in some way. In relatively level areas, the drainage lines can spread out, forming sheet drainages, often with lower density of vegetation of smaller stature. Although gravel plains are an extensive biotype in the central Namib, they support patchy populations of species with exceptionally small geographic ranges, with the various lithops species being the most celebrated examples, but it may extend to a few reptile and invertebrate species as well. (SLR, 2014).

The Strategic Environmental Assessment (SEA) for the central Namib Uranium Rush (SAIEA, 2010) developed mapping to determine “areas of high biodiversity value in the central Namib in the context of the Uranium Rush”. The proposed Project Site lies on the edge of the Biodiversity Yellow flag Area #31 (i.e. “Broken plains”). Refer to Figure 17. The SEA referred to the following sensitivities in this area: “Dense populations of *Adenia pechuelli* and *Aloe dtchotomo* on granite broken plains”.

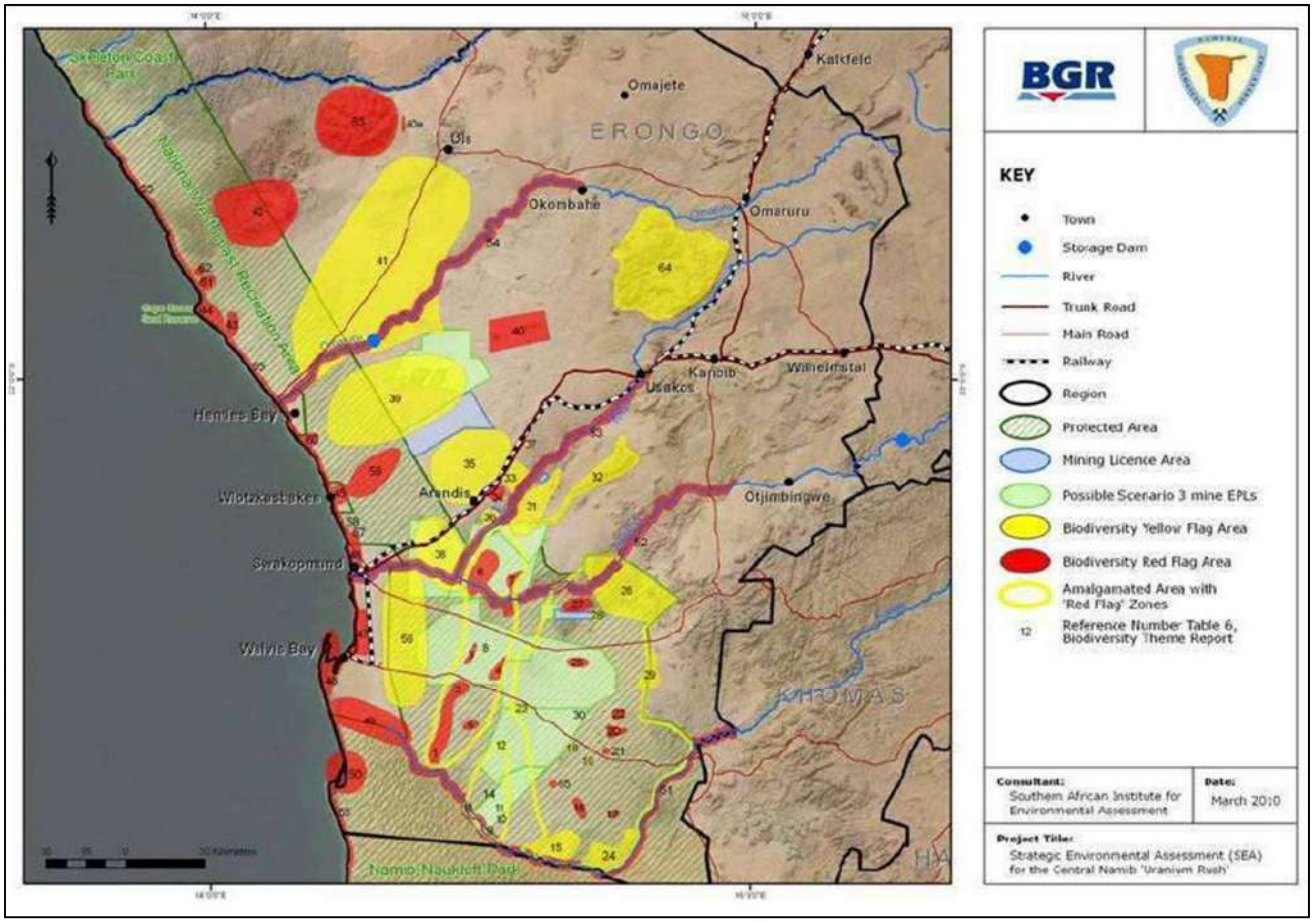

FIGURE 17: AREAS OF BIODIVERSITY VALUE IN THE CENTRAL NAMIB IN THE CONTEXT OF THE URANIUM RUSH (SOURCE: SAIEA, 2010

6.4.5.2 HABITATS IN THE VICINITY OF THE PROPOSED PROJECT SITE

Any development in a desert environment can have direct or indirect impacts on biodiversity composition (due to physical destruction, or pollution) – on species and their abundance, specifically on the protected species. There might be a change in numbers, which may have a disproportionate effect on the ecosystem's stability or resilience. Although none of the protected species are known to be restricted in distribution to the Project Site / area, these impacts may have wider relevance than the site alone.

With reference to the information presented in Section 6.3, 6.4.1, 6.4.2 and 6.4.3, the following general habitats can be distinguished in the proposed Project Site / area and are presented in Figure 18:

Low hills / rocky outcrops habitat:

Rocky outcrops and ridges are preferred habitats for a variety of wildlife and small fauna such as invertebrates and birds because they provide shelter and are sources of food (and occasionally water / moisture). Fauna and flora diversity is higher, compared to the plains.

The sensitivity of this habitat is rated very high.

Drainage lines habitat:

The drainage lines in the Project Site /area are relatively small. However, fauna and flora diversity is also higher, compared to the plains. The vegetation is also more concentrated along the drainage lines.

Key biodiversity processes and the functional linkages of parts in the ecosystem in an arid environment is closely related to surface runoff because flowing water dictates many of the spatial arrangements and scale of ecological processes. Drainage lines are therefore important to maintain the natural water flow and the distribution of soil nutrients. The drainage lines in the Project Site / area are therefore more sensitive to disturbance than the gravel plains.

The sensitivity of this habitat is rated high.

Gravel plains habitat:

Most of the area where the infrastructure of the proposed Project Site is planned, consists of gravel plains. These gravel plains are largely free of plants and although the plains are sensitive to vehicle tracks, they show low levels of species diversity and abundance.

The sensitivity of this habitat is rated low to moderate.

Sand plains habitat:

The flat, low-lying, (aeolian) sand plains area (see Section 6.3 and Figure 18), include several of the low hills / rocky outcrops, and contain also the fairy circles. Generally, the diversity and abundance of species is more in comparison with the gravel plains.

The sensitivity of this habitat is rated high with the rocky outcrops and area where the fairy circles occur (within the sand area) rated as very high.

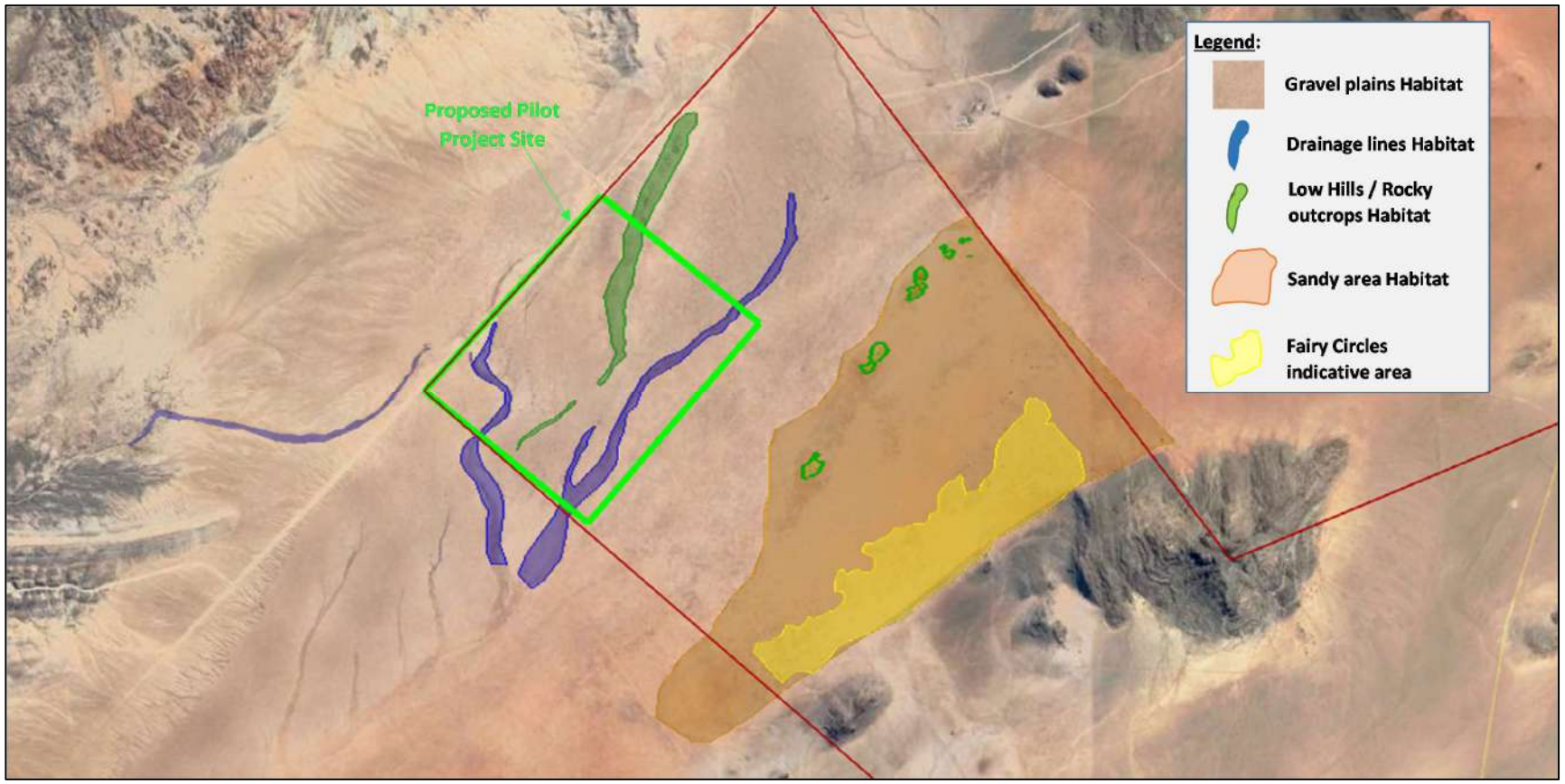

FIGURE 18: GENERAL HABITATS IN THE PROPOSED PROJECT AREA WITH SENSITIVITIES (GOOGLE EARTH)

6.4.6 PROTECTED AREAS

The Project Site lies some 20 km to the north of the large NNNP, with the Dorob National Park even further (about 30 km) to the west (Figure 19). The large ≠Gaingu Communal Conservancy lies almost adjacent to the north-west.

Several Important Bird and Biodiversity Areas (IBAs; initially known as Important Bird Areas are found in the vicinity of the Project Site (Figure 19). The NNNP itself is classified as an IBA and to the west, six more IBAs lie on the coast, the nearest being 75 km away (Figure 19). Walvis Bay has also been designated as a Ramsar site, or Wetland of International Importance, in 1995 (ACS, 2023).

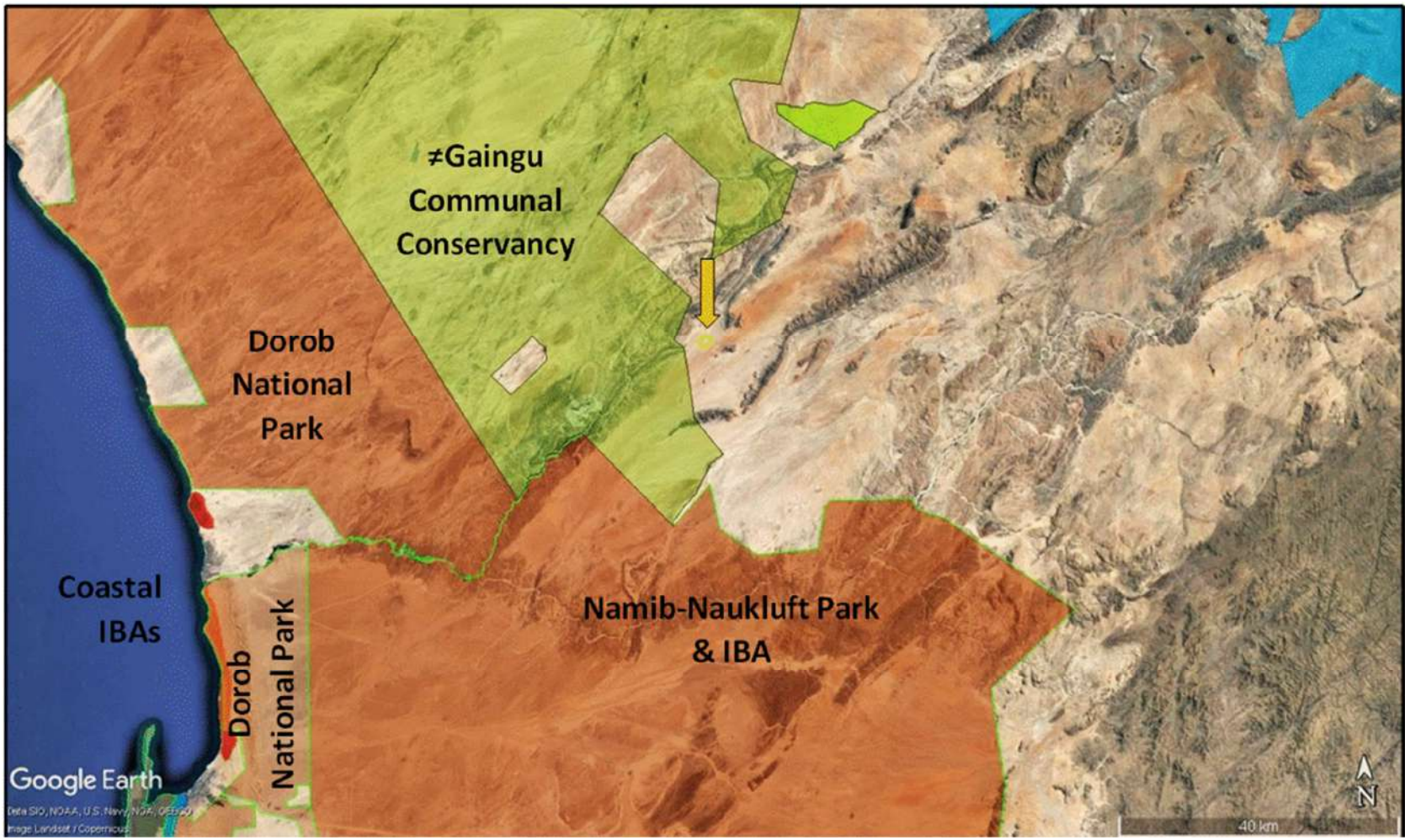

FIGURE 19: LOCATION OF THE STUDY AREA IN RELATION TO CONSERVATION AREAS (BROWN = NATIONAL PARKS; GREEN = COMMUNAL CONSERVANCIES; RED AND BLUE = IMPORTANT BIRD AREAS AND RAMSAR SITES (ACS, 2023)

6.5 SURFACE WATER AND GROUNDWATER

6.5.1 INTRODUCTION AND LINK TO IMPACTS

Information for this Section was compiled by S Müller (hydrogeological specialist).

Surface water resources include drainage lines, paths of preferential flow of stormwater runoff as well as the channelling and / or collection of water on the surface such as irrigation canals and dams. The proposed activities and infrastructure associated with the project have the potential to alter the drainage of surface water through the placement of both temporary and permanent infrastructure and / or result in the contamination of the surface water resources through seepage and / or spillage of waste.

The groundwater in the area is a valuable resource. Groundwater abstraction has the potential to impact on water supply. The hydrogeological regime therefore needs to be understood to be able to assess potential impacts relating to water abstraction, on other groundwater users in the surrounding area. Furthermore, activities such as the handling and storage of hazardous materials have the potential to result in the loss of groundwater resources, both to the environment and third-party users, through pollution.

6.5.2 HYDROLOGY

Farm Bloemhof 109 straddles the Chuosberge, a rugged mountain range that forms the watershed between the Swakop River and its major tributary, the Khan River. These ephemeral rivers run from the central highlands of Namibia towards the Atlantic Ocean at Swakopmund. The Project Site, as well as the neighbouring farms Valencia 122 and Namibplaas 93, lie north-west of the watershed in the Khan River catchment, so that any surface runoff from rainfall, as well as groundwater, will drain towards the Khan River in a south-westerly direction. The remainder of Bloemhof and the farms Vlakteplaas 110, Geluk, Jakalsdans and Jakalswater are situated within the Swakop River catchment.

The rainfall characteristics described in Section 6.1 indicate that flash floods may occur in the narrow gorges with their steeper elevations on the eastern banks of the Khan River, while runoff is less likely to occur on the flatter, desert plains where rainwater tends to soak into the permeable sandy sediments and fractured marble banks.

The Khan River is largely dry, but there are a few perennial pools. Inland open-water habitats are limited in this arid environment. Potential artificial wetland habitats in the greater area include the tailings storage facilities (TSFs) and other related smaller dams at the Rössing Uranium Mine

(~20 km south-west of the site) and the Husab Uranium Mine (~32 km south-west of the site) in the surrounding areas.

The Project area occupies a slightly dipping plain covered with sheetwash deposits that will soak up all but the most intense rainfall without creating much surface runoff. With reference to Section 6.3 small ephemeral drainage lines are found within the area. Two drainage lines cross the proposed Project Site, as shown in Figure 16.

6.5.3 HYDROGEOLOGY

Groundwater is mainly found in the alluvium of the Khan River and to a lesser extent in fractured rock aquifers fed by direct infiltration of rainfall into the sand and gravel deposits of the desert plains and runoff in ephemeral washes on farmland. Information was obtained for wells and fountains within a radius of 20 km around Bloemhof and for the immediate surroundings of the farm (refer to Figure 20 and Figure 21).

The rock formations in the wider landscape have an extremely low permeability and storage capacity, while the arid climate severely limits groundwater recharge from rainfall. Many boreholes listed in the database were dry or had low yields of 1-2 cubic metres per hour (m^3/h). Somewhat higher yields of 3-5 m^3/h are typical for boreholes drilled into the marbles of the Rössing or Karibib Formations. Only borehole 61617 at the Bloemhof farmhouse (Figure 21) showed a high yield of 27 m^3/h. The data for the boreholes in Figure 21 are summarised in Table 16.

Most boreholes intersected a shallow water table at 10-25 m below the surface, while elsewhere water levels were recorded at 40-60 m depth. Very deep water levels are the exception, i. e. 129 m at borehole 61614 on Farm Valencia and 124 m at one of the boreholes on Bloemhof (measured by the farm owner).

The water table at boreholes 62096, 62097 and 5673 adjacent to the Project Site was 719-722 metres above mean sea level (mamsl) at the time of drilling (1958 and 1975), indicating that the present water table at Oshivela could be similar or somewhat deeper. The water table in the southern part of Farm Namibplaas was encountered at 800-814 mamsl. On the southern side of the watershed, the water table was at 826-848 mamsl on Bloemhof and 894-909 mamsl at boreholes 62124 and 61613 on Vlakteplaas, the eastern neighbour. The few available datasets indicate general groundwater flow directions from east to west or north-east to south-west in accordance with the gradient of the land surface. This means that the neighbouring farms are upstream of Bloemhof and will not be affected by water abstraction for the project.

Not much information is available on the sustainable yield of the aquifers in the area or more specifically, the three boreholes on the eastern border of Farm Bloemhof. The former owner of farm Bloemhof mainly used one borehole, no. 61617, to meet the farm's water demand. By trying various pumping rates over the years he established that the water level remained stable at a rate of 2.4 m^3/h for about 9 hours per day, while the water level would drop when he increased the pumping capacity to 2.6 or 2.8 m^3/h. This indicates a sustainable yield of at least 7,900 m^3/annum (i.e. 2.4 m^3/h X 9 hours/day X 365 days) (pers. comm A de Man, January 2024. The borehole is installed with a solar powered pump, so the actual daily pumping time varies over the year, the annual average assumed for the Pilot Project is 9 hours of sunshine per day).

The proposed Oshivela Pilot Project will only consume ~2 000 m^3 per annum of desalinated water and therefore need to abstract 3 000 m^3 per annum of groundwater, which is far below the sustainable yield established through long term observation. For comparison, a hydrogeological investigation in a similar geological setting at the Trekkopje Mine found high yields of 20-100 m^3 per hour in karstified marbles of the Karibib Formation. Water balance modelling and long-term water level monitoring indicated a safe yield of around 50 000 m^3 per annum (Pers. comm. S Müller).

Groundwater on the farms and in the lower Khan River contains high levels of dissolved salts, predominantly chloride and sodium, which renders it unsuitable for human consumption (Group D) without treatment such as desalination. A recent analysis of the groundwater from a borehole at the foot of the Chuosberge (see Figure 8) on Portion 4 of Farm Bloemhof 109 is attached as Appendix H.

TABLE 16: BOREHOLE DATA FOR THE AREA OF FIGURE 21 (DWA, 2023)

Borehole no	Latitude	Longitude	Elevation	Drilled	Depth (m)	Yield (m^3/h)	Water level (m)	WL (mamsl)
62096	-22.3707	15.2138	735	1975	76	0.1	13	722
62097	-22.3712	15.2148	736		52	0.1	14	722
62098	-22.4275	15.2395	744					
62099	-22.4852	15.2361	750					
5673	-22.3860	15.2525	778	1958	110	5.0	59	719
5674	-22.3540	15.3316	856	1958	80	1.3	42	814
5675	-22.3338	15.2866	815	1958	71	3.2	15	800
12573	-22.4916	15.3177	875	1972	91	2.3	49	826
18496	-22.3876	15.2558	780	1975	79			
61613	-22.4853	15.3645	921		43	4.6	12	909
61614	-22.3827	15.3125	814	1976	160	3.6	129	685
61615	-22.4907	15.3257	855	1971	40	0.9	24	831
61616	-22.4991	15.3207	855		40	0.9	18	837

Borehole no	Latitude	Longitude	Elevation	Drilled	Depth (m)	Yield (m^3/h)	Water level (m)	WL (mamsl)
61617	-22.4826	15.3137	865	1975	52	27.0	17	848
62101	-22.3674	15.3483	868	1975	84	0		
62102	-22.3472	15.3018	865	1975	46	0		
62103	-22.3420	15.3171	846	1975	99	0		
62104	-22.3570	15.3316	848	1975		0		
62105	-22.3400	15.3612	886		72	0.7		
62113	-22.3840	15.3817	1025		98			
62123	-22.4488	15.3739	941		104			
62124	-22.4506	15.3441	918		45	4.0	24	894
62125	-22.4879	15.3632	919		16	4.0		
62172	-22.5371	15.2577	759					
62176	-22.5397	15.3496	880					
62190	-22.5068	15.3460	891		44	4.0		
62191	-22.5215	15.3564	901		46	2.3		

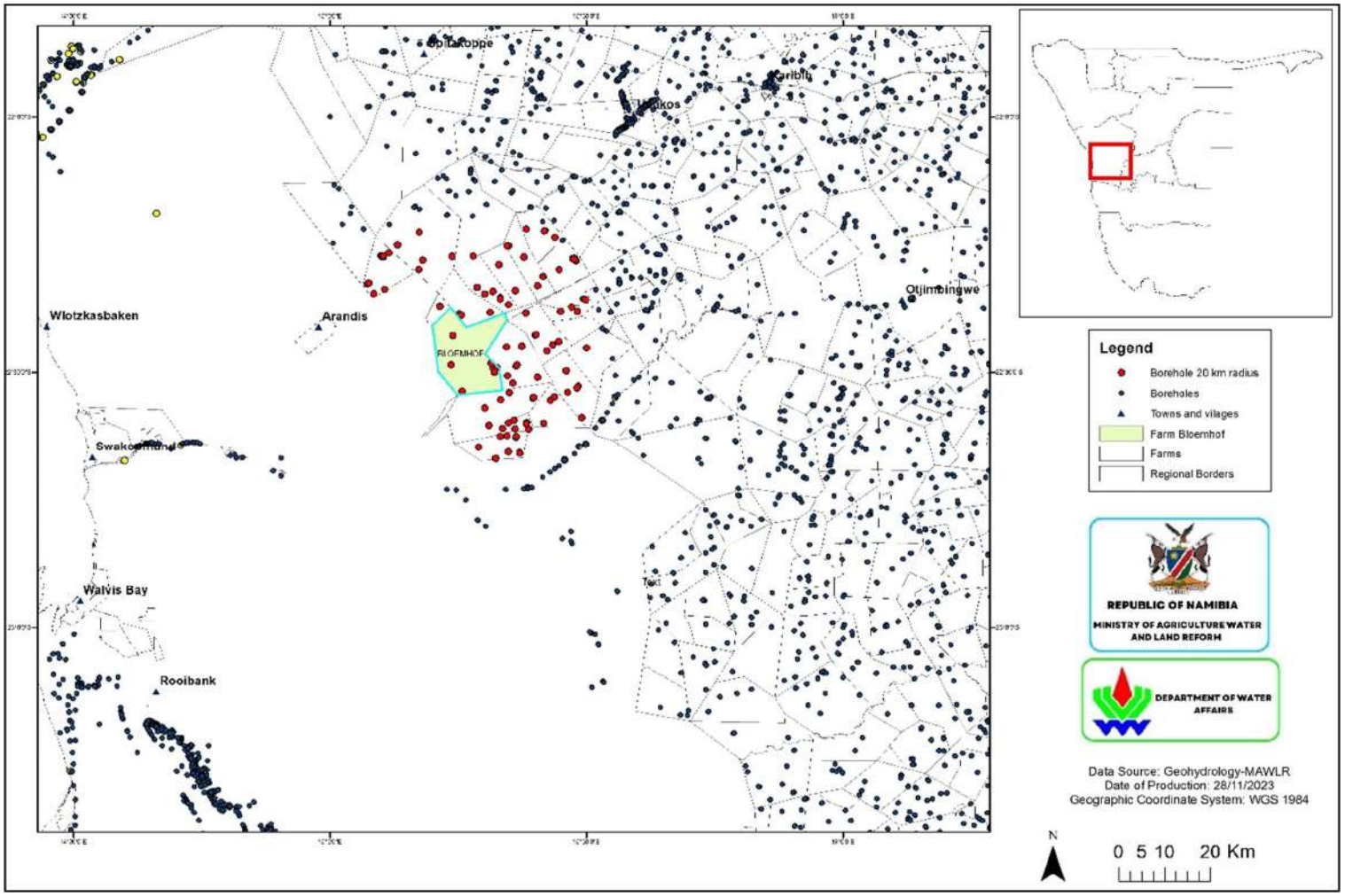

FIGURE 20: BOREHOLES IN THE WIDER LANDSCAPE AROUND FARM BLOEMHOF (DWA, 2023)

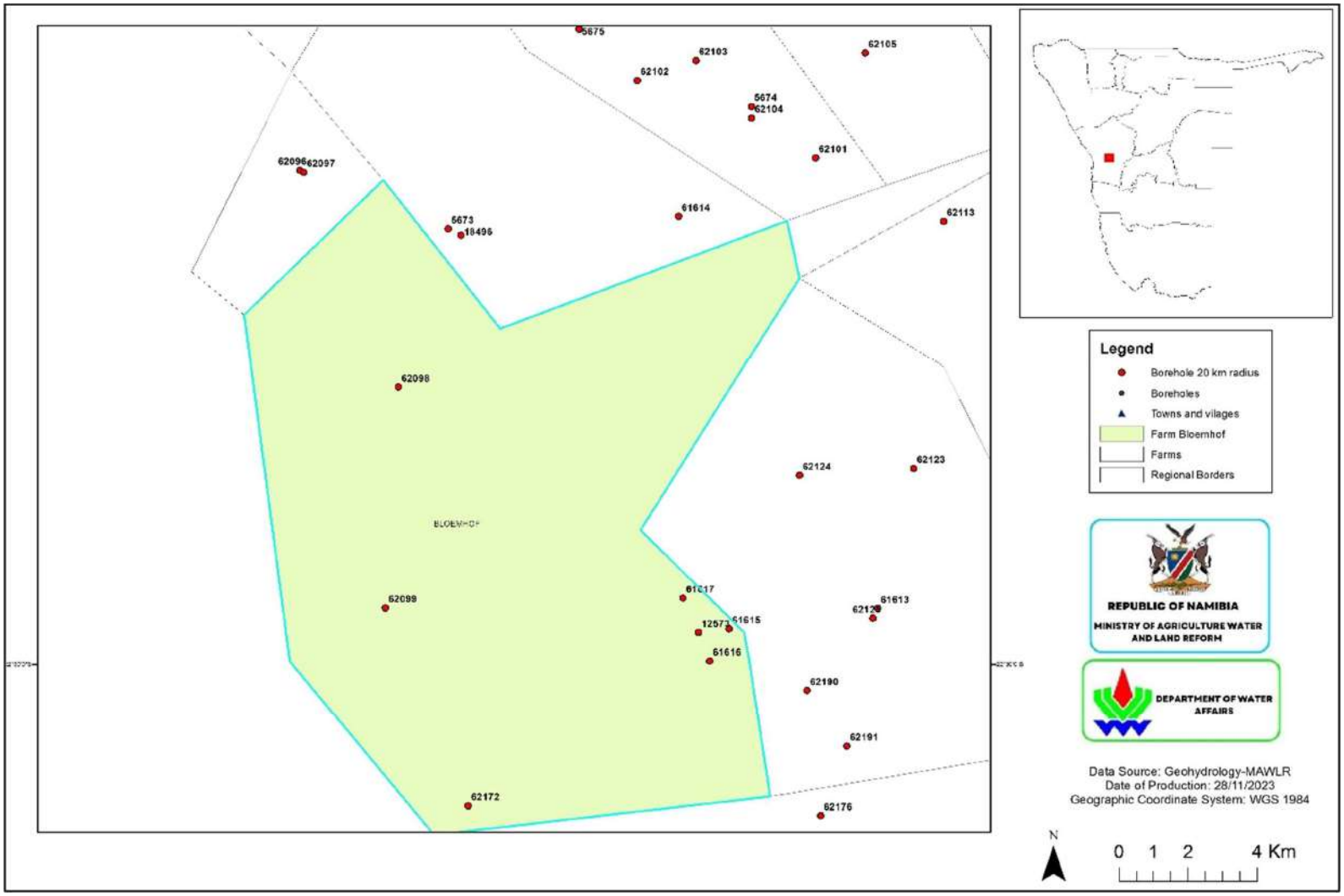

FIGURE 21: BOREHOLES ON AND AROUND FARM BLOEMHOF (DWA, 2023)

6.6 VISUAL / SENSE OF PLACE, LAND USE, SURROUNDING BUILD ENVIRONMENT AND SENSITIVE RECEPTORS

6.6.1 INTRODUCTION AND LINK TO IMPACTS

One of the major attractions to tourists visiting the Namib Desert in general is its scenic beauty. This is predominantly based on the limited human activities and structures in most parts of the NNNP as well as the Project Site (and farms located north of the park), coupled to the sense of remoteness.

The proposed Oshivela Pilot Project is located in an area with a special sense of place and unique and valuable visual resource. Changes to the current topography through the development of the proposed project may impact on visual aspects.

The following sections provide the visual baseline at the Project Site and surroundings. These descriptions and the above-mentioned explanation are considered in the impact assessment in Chapter 7.

6.6.2 LAND USE AND SURROUNDING BUILD ENVIRONMENT

The Project area lies on private farmland (co-owned by Hylron) between various other farms (see Figure 23), with limited farming, tourism and recreational land uses. Refer to section 6.4.3, regarding the reintroduction of animals by surrounding farms owners, linked to their 'conservation initiatives'.

Portion 4 of Farm Bloemhof 109 is located in a remote part of the Namib, accessible by either the Norasa Uranium Project Private access road (from the north) or via the informal farm tracks.

Various exploration activities have, however, been conducted near the proposed Project Site. Forsys owns the Norasa Uranium Project, which includes the wholly owned Valencia project (Mining Licence (ML) 149) on the Farm Valencia 122, as well as a 100% interest in the Namibplaas Project (i.e. Exclusive Prospecting License (EPL) 3638), which is located 4.5 km north east of Valencia. (Refer to Figure 23). Both projects have uranium resources and reserves. (ref: Forsys Mertals website: https://www.forsysmetals.com/norasa/).

Zhonge Resources (Namibia) Development (Pty) Ltd holds EPL 3602 which is ~ 16 500 ha in size. This EPL, which expires in July 2024, overlaps the proposed Pilot Project Site at a north-eastern boundary of the EPL. (Ref: Namibia Mines and Energy Cadastre Map Portal). Hylron, being the owner of the farm (see section 1.2) is not aware of any known target areas, in terms of exploration activities, located in the specific Pilot Project location.

There are no townlands in the immediate vicinity of the Project Site. The nearest towns / cities are:

- Arandis – approximately 25 km from the proposed Project Site.
- Usakos - approximately 56 km from the proposed Project Site.
- Swakopmund– approximately 75 km from the proposed Project Site.

The surrounding farms (i.e. privately owned farms) in the area are shown in Figure 23. The closest farms to the Project Site (i.e. within the 10 km radius) is Gaudeamus Farm (north), Valencia Farm (east) and remainder of Farm Bloemhof (west) (see Section 6.4.1 for further details about the closest sensitive receptors).

Roads in the area include:

- The Norasa Uranium Project Private Access (gravel) road, adjacent to the proposed Project Site.
- Various unnamed gravel tracks on the farms.
- The B2 road that links Windhoek with the central coastal towns of Namibia is located 18 km from the Project Site.

Hylron has commenced with some geotechnical investigations and related activities in the project area which caused some level of disturbance. These activities were undertaken to determine the soil conditions and the preferred site from a technical perspective. Refer to section 6.9 for more information.

6.6.3 Landscape Character and Nature of the Study Area

For the purposes of this report, the visual study area, (i.e. “zone of potential influence”) is determined as ~10 km radius surrounding the proposed Project Site. This is based on the topography of the landscape, scale (i.e. size and specifically height) of the proposed infrastructure and the fact that operations will solely be undertaken in the daytime (i.e. lighting issues are not considered significant).

Within a 10 km radius from the proposed Project Site the surrounding landscape is flat to undulating, occasionally interspersed with isolated ridges, hills (inselbergs) and mountains (see Section 6.3), red sand dunes to the north-east, some ephemeral drainage lines, the Chuosberge to the south and south-east of the Project Site as well as the impressive ephemeral Khan River and its tributaries, running some 8 km west of the proposed Project Site. The proposed Project infrastructure, i.e. process plant, buildings as well as the PV Power Plant is located to the west

and south-west of a marble outcrop (i.e. hill), which is ~ 30 m high at its highest point (see Figure 16).

Manmade structures in the greater study area include fences, a few farmhouses and limited linear infrastructure (i.e. small water pipelines and gravel roads) as well as prospecting at the Norasa Uranium Project (i.e. Valencia mine and Namibplaas).

Figure 22 indicates the nature of the landscape (i.e. photos taken from the Norasa Uranium Project access road. Figure 23 provides the location of the viewpoints (i.e. photos) as well as sensitive visual receptor locations and the surrounding farms.

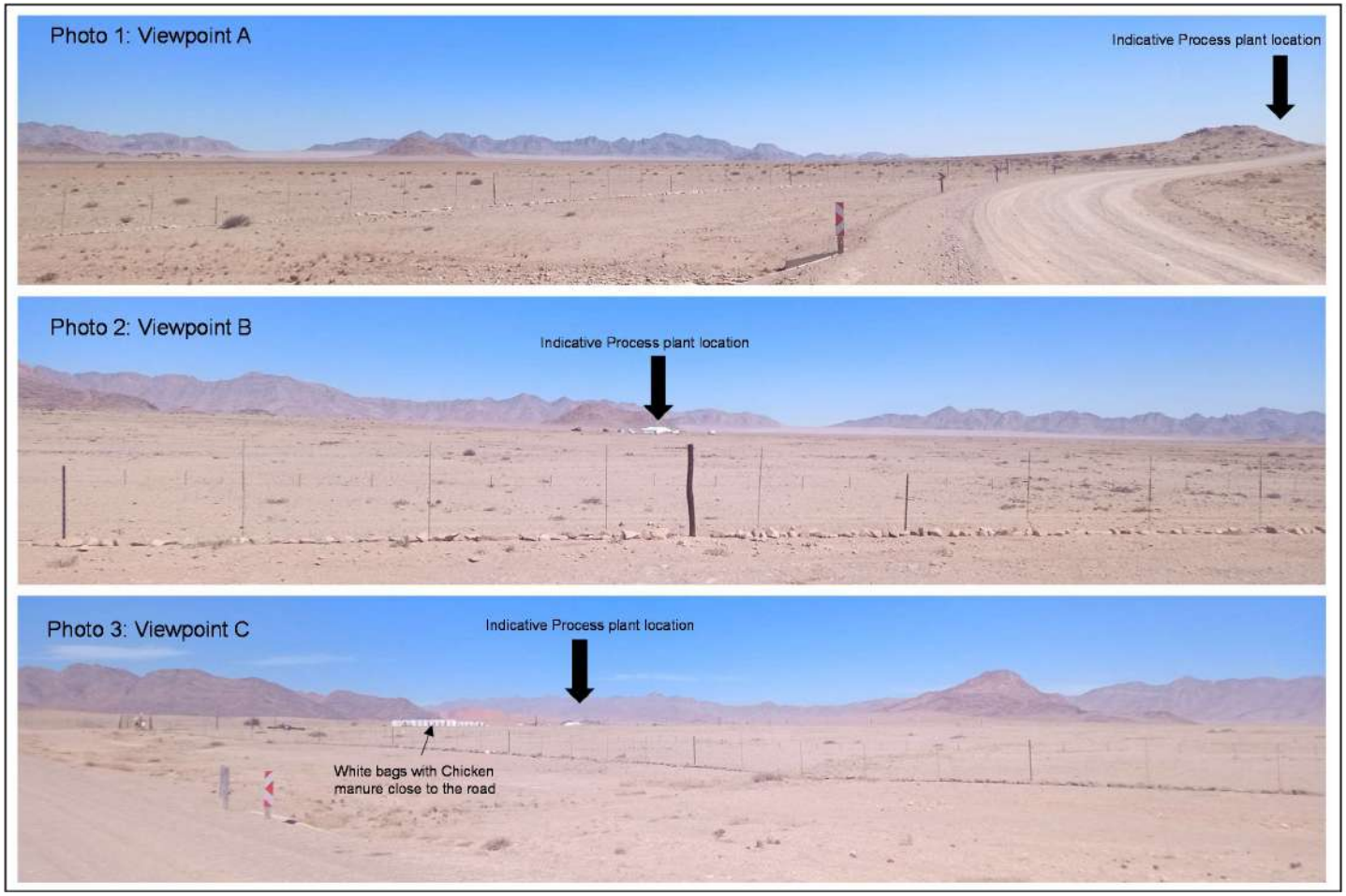

FIGURE 22: PHOTOS OF THE LANDSCAPE FROM THE NORASA URANIUM PROJECT ACCESS ROAD TO THE SITE

Note: The white 'shade-netted structure" provides an indication of the approximate location of the proposed Pilot Project process plant. However, the shade net is not the same size (i.e. smaller) than the future infrastructure (see Section 4.2 for the Project infrastructure dimensions).

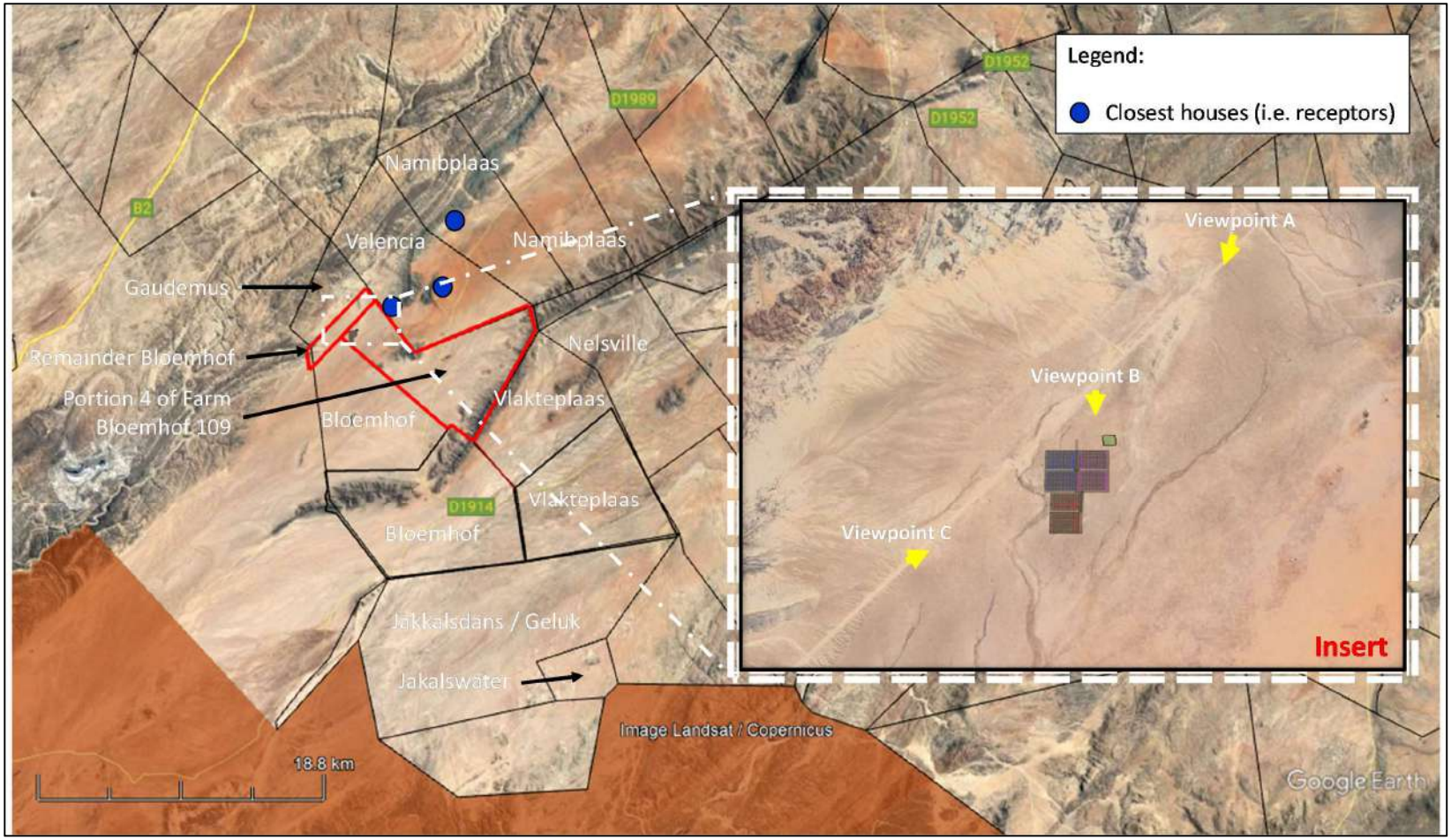

FIGURE 23: VIEWPOINTS, RECEPTOR LOCATIONS AND SURROUNDING FARMS

(Note: Boundaries of Farms Jakalswater, Geluk and Jakalsdans have been slightly modified and are not accurately shown on the above mentioned map)

6.6.4 VISUAL RESOURCE VALUE, SCENIC QUALITY AND LANDSCAPE SENSITIVITY

Visual resource ratings (scenic quality) are dependent on a landscape's character (GYLA, 2022):

- How well does it contribute to the area's sense of place, distinctiveness and visual and aesthetic quality?
- In what condition is the landscape?
- Is the landscape valued by people, local community, visitors, and is the landscape recognised, locally, regionally or nationally?
- What scope is there for positive change in the existing landscape character?

With reference to the descriptions provided in Sections 6.3 and 6.6.1 to 6.6.3, the background visual resource of the Project area is high, even though there are some existing infrastructure in the regional area. This is primarily due to the vast expanse of a perceived undisturbed landscape, which is a feature that is valued by the current surround landowners (see IRR in Appendix C).

The landscape is therefore rated as sensitive to change in general.

6.6.5 SENSE OF PLACE

The sense of place results from the combined influence of the landscape on all the viewers subjective senses. A sense of place is the extent to which a person can recognise or recall a place as being distinct from other places - as having a vivid, unique, or at least particular, character of its own. (GYLA, 2022).

The sense of place for the Project area derives from the landscape as described above and its impact on the senses. The activities and land use in the Project area are common within the region, (i.e. NNNP to the south and surrounding farms). Some if these areas have been impacted to a certain extend by mining and exploration (i.e. Norasa Uranium Project nearby, Husab Uranium mine in the NNNP, 32 km to the south-west) and associated activities.

However, it does evoke a consolidated, distinct sense of place due mostly to its vast, open nature and the stillness of dark night skies. The natural landscape is therefore associated with a serene and tranquil sense of place.

6.6.6 VISUAL RECEPTORS AND SENSITIVE VIEWERS

Visual receptors include people staying, working in, visiting, or travelling through the Project area on the Norasa Uranium Project access road or the relevant private farm tracks, not associated with the Project.

In broad terms two types of visual receptors have been identified, as follows:

1) Sensitive private farm owners and their guests' - oriented viewers: It follows that the sensitive viewer locations are only three residential homesteads, which are located within the 10 km radius from the Project Site, both on the Farm Valencia.
2) 'Low to moderate-sensitive road user' - oriented viewers: These viewer locations are from the Norasa Uranium Project access road and one private Farm track (i.e. remainder of Farm Bloemhof).

The Norasa Uranium Project access road is used by the mine personnel (currently for visiting the ML area for exploration and related activities, etc.). The only other likely users of the road are a number of the farm owners in the area (including amongst others, Portion 4 of Farm Bloemhof (i.e. Hylron) remainder of Farm Bloemhof, Valencia Farm, NamibPlaas, Gaudeamus (no homestead), Vlakteplaas, etc. Access is restricted with a gate and lock, only accessible by the mine personnel and the relevant farm owners, as per agreements between the relevant parties.

Table 17 summarizes the potentially sensitivity of visual receptors to the proposed Oshivela Pilot Project development. Figure 23 identifies the location of these areas relative to the Project Site.

TABLE 17: POTENTIAL SENSITIVITY OF VISUAL RECEPTORS

High	Moderate	Low
• The house on the Farm Valencia located ~ 2.6 km north-east of the Project Site. • The second house on Farm Valencia is located ~ 6 km north-east of the site, along the edge of the sand dune. It must however be noted that this homestead is on the north-eastern side of an outcrop (hill) and the site will not be visible from this house. • The house on the Farm Namibplaas located ~ 9.5 km north-east of the Pilot Project site. It must however be noted that this homestead is on the north-eastern side of an outcrop (hill) and the site will not be visible from this house.	• Surrounding farm owners and their guests using the Norasa Uranium Project access road. It must however be noted that the Project Site would only be visible for a relatively short distance from this road.	• People working at the Norasa Uranium Project or at the farms, travelling along local roads whose attention may be focused on their work or activity and who therefore may be potentially less susceptible to changes in the view.

6.7 NOISE

6.7.1 INTRODUCTION AND LINK TO IMPACTS

To facilitate the assessment of noise impacts to third parties, current noise levels need to be considered. Reference was made to data from similar areas and literature. The existing acoustic

climate in the study area is likely to be very quiet, affected only by occasional traffic along the Norasa Uranium Project access road and farm tracks, occasional exploration activities and natural sounds such as the wind, birds and insects. Very few other sources of noise could be identified. However, certain noise generating activities associated with the proposed Oshivela Pilot Project activities can cause an increase in ambient noise levels in and around the site. This may cause a disturbance to nearby receptors around the Project Site, specifically sensitive residences on the nearby Valencia Farm.

6.7.2 NOISE SENSITIVE RECEPTORS

Potentially sensitive receptors in terms of noise typically include places of residence and permanent community locations such as schools, hospitals, and places of worship but can also include commercial and industrial facilities (Soundscape, 2022). There are however no schools, hospitals and places of worship in close proximity to the Project Site.

There are currently two homesteads (houses) in relatively proximity to the proposed Project Site. Both houses are on the Valencia Farm and are ~ 2.6 km and ~ 6 km north-east of the proposed processing plant area, respectively. The closest house is currently occupied by people leasing from the Farm owners. The house further away is currently only used during occasional visits.

In addition to human receptors, wildlife may also be impacted by the project.

6.7.3 EXISTING SOURCES OF NOISE AND RESIDUAL NOISE LEVELS

With reference to Section 1.2, Hylron undertook an EIA (amendment) process in 2022 for the proposed Shiyela Iron Project, which is located in the NNNP, ~ 70 km south-west of the Project Site. Reference to the Shiyela EIA and Noise Study (Soundscape, 2022 within Namisun, 2022a) is made in the Section below, seeing that the noise climate is relatively similar for the two sites.

The acoustic climate of the study area is generally very quiet and undisturbed by human activity. It is to some extent currently affected by:

- Occasional light vehicle traffic along the Norasa Uranium Project access road and farm tracks used by the land owners and their visitors / guests.
- Limited heavy vehicle traffic along Norasa Uranium Project access road by Forsys for exploration activities.
- Limited farming activities on the farms.
- Occasional explorations activities conducted by Forsys (i.e. exploration drilling, sampling, etc. on their ML (refer to Section 6.6.2).
- Natural sources, especially wind, birds, and insects at night.

Given the above observations it is likely that the noise rating levels corresponding to rural districts would be applicable to the project area, similar to the findings of the Shiyela Project.

To confirm residual noise levels at the Shiyela Project, a noise survey was conducted. The survey found that, as expected in arid, remote areas with no human activity, the difference in day and night-time noise levels is attributed to calmer wind conditions (which also effects the noise).

The residual noise levels will vary somewhat given weather conditions and the observer's location within the Project area. However, the average noise measurements presented for the Shiyela Project would be considered sufficiently representative of the existing acoustic climate (baseline conditions) for the Oshivela Pilot Project, with the average day- and night-time equivalent continuous rating levels of residual noise being ~ approximately 44.9 dBA and 29.8 dBA respectively.

The above noise levels are comparable with those of rural districts i.e. 45 dBA during the day and 35 dBA at night, in accordance with SANS 10103:2008.

6.8 Air Quality

6.8.1 Introduction and Link to Impacts

To facilitate the assessment of air quality impacts to third parties, current ambient air pollution levels need to be considered

The quality of air is directly influenced by the surrounding natural environment, the presence of industry in the immediate area, and the environmental conditions experienced. The introduction of the proposed Oshivela Pilot Project can contribute to impacts on the air quality in the wider landscape if not properly managed.

The potential impacts to people (i.e. third parties) relating to air emissions are health and nuisance, relating to the nearby receptors around the Project Site, specifically sensitive residences on the Valencia Farm.

Monitoring data reported in the Strategic Environmental Management Plan (SEMP) for the Central Namib Uranium Province prepared by the Geological Survey of Namibia (Geologial Survey in Namibia, 2018) are referred to below (Soundscape Consulting (Pty) Ltd, 2019), as well as the air quality study for the Shiyela Project (Airshed Planning Professional, 2022 in Namisun, 2022a). The report includes data on ambient PM levels within the Erongo Region and specifically data from background monitoring stations which may be indicative of PM_{10} levels in the Project area.

6.8.2 AIR QUALITY SENSITIVE RECEPTORS

From an air quality perspective, all sensitive receptors primarily relate to where people reside.

With reference to Section 6.6.2 and 6.6.6, there are a number of surrounding farms (i.e. privately owned farms) in the area, of which some have houses. The closest farmhouses to the Pilot Project Site are on Valencia Farm, remainder of Farm Bloemhof, Vlakteplaas and Namibplaas west. The closest townlands to the Project Site is Arandis, approximately 25 km to the west.

The identified sensitive receptors are listed in Table 18 also summarising the distance and direction from the proposed Oshivela Pilot Project processing plant, shown in Figure 23.

TABLE 18: IDENTIFIED AIR QUALITY SENSITIVE RECEPTORS IN RELATION TO THE PROPOSED PROCESS PLANT LOCATION

Air quality sensitive receptor	Distance and direction from the Oshivela Pilot Project
1. Arandis	**~ 25 km west**
2. Valencia Farm house (1)	**~2.6 km north-east**
3. Valencia Farm house (2)	**~6 km north-east**
4. Remainder of Farm Bloemhof	**~14 km south-east**
4. Vlakteplaas Farm house	**~17 km south-east**
5. Namibplaas west	**~9.5 km north-east**

6.8.3 EXISTING SOURCES OF ATMOSPHERIC EMISSIONS AND AMBIENT AIR POLLUTANT CONCENTRATIONS IN THE PROJECT AREA

With reference to Section 6.6.2, the Project Site lies on private farmland (owned by Hylron) between various other farms, with limited farming, tourism and recreation land uses.

Various gravel roads and tracks exist in and around the proposed Project Site, but with limited traffic.

From visual observations and desktop studies, the main sources of air quality impacts in the project surroundings include the following:

- It is expected that fugitive dust may be present during dry, windy conditions. These would originate from relatively small scale ‘farming’ activities, vehicles travelling on dirt roads and wind erosion of exposed areas.
- Current exploration activities and exploration vehicles generating dust related to the Norasa Uranium Project.

The Jakalswater monitoring station located within the Erongo Region was installed as part of the SEA for the Central Namib uranium province, to record background PM_{10} concentrations without the influence of emissions from uranium mining activities. Jakalswater Farm lies ~ 25 km south-east of the proposed Oshivela Pilot Project Site (see Figure 23). Data recorded here may provide an indication of typical ambient PM_{10} concentrations in arid areas mostly affected by natural dust sources. This would be a "best case scenario" for the proposed Project area during times of no activities (as described above). From the 2016 and 2017 annual reports the average PM_{10} concentration appears to be in the order of 20 µg/m^3 with only one exceedance of the 24-hour assessment criterion of 75 µg/m^3.

At a regional scale, the main air pollution sources, include current mining operations, exploration activities, public roads (paved, unpaved and salt / treated), and natural exposed areas prone to wind erosion. The main pollutant of concern would be particulate matter total suspended particles (TSP), PM_{10} and $PM_{2.5}$ resulting from vehicle entrainment on roads (paved, unpaved, and treated surfaces), windblown dust, and mining and exploration activities. Airborne PM comprises a mixture of organic and inorganic substances, varying in size, shape and density (Airshed, 2022).

Vehicle entrained emissions from the unpaved gravel roads (i.e. Norasa Uranium Project access road and farm tracks) are likely to be the most significant (current) background source of PM_{10} and $PM_{2.5}$ concentrations at the proposed Project Site.

Windblown particulates from natural exposed surfaces, especially under high wind speed conditions (>10 m/s), can result in significant dust emissions with high particulate concentrations near the source locations, potentially affecting both the environment and human health.

Baseline dust fall measured at the Shiyela Iron Project site, albeit for a short period, indicates rates less than 100 mg/m²/day at all locations, and thus well below the industrial limit 1 200 mg/m²/day (Airshed, 2022). The dust fall measurements would be comparably (low) at the Oshivela Pilot Project area. According to Amec Foster Wheeler (2015), the baseline Air Quality Survey (i.e. dust) conducted for the Norosa Project during 2012 showed generally low dust levels.

6.9 ARCHAEOLOGY

6.9.1 INTRODUCTION AND LINK TO IMPACTS

Various natural and cultural assets collectively constitute what can be described as heritage. Heritage resources include all human-made phenomena and intangibles that are the result of the human mind. Natural, technological or industrial features may also be part of heritage resources, as places that have made an outstanding contribution to the cultures, traditions and lifestyles of

the people or groups of people of Namibia. Any new project development has the potential to disturb surface heritage resources through the establishment of infrastructure and activities.

Information for this Section was extracted from the Archaeology Specialist (Phase 2) Report (J. Kinahan 2024). See also Appendix F. With reference to section 1.5.3, this report presents a Phase 2 assessment of the proposed Oshivela Pilot Project based on previous work in the same area and a site visit to the surrounding area by Dr Kinahan in October 2023. A Phase 2 field survey and assessment was then undertaken in January 2024. The results of the Phase 2 field survey was used to further augment this Final EIA Scoping (including Impact Assessment) Report for submission to the relevant Ministries for their review and decision-making of the ECC Application.

6.9.2 BASELINE DESCRIPTION

Detailed archaeological surveys have been carried out on the adjacent properties of Farm Gaudeamus, Valencia Farm and Farm Namibplaas (see Figure 24). These surveys confirm that the western parts of Namibia have a rich archaeological record of human settlement spanning the last one million years. Within the central Namib Desert which includes the proposed Oshivela Pilot Project area, archaeological remains occur as a thinly scattered distribution of stone artefacts and related material dating mainly to within the last 150 000 years, the last Interglacial (130 000 to 115 000 years BP) being particularly well represented. This was a period of elevated humidity in the Namib and was followed by consistently unstable climatic conditions. During the last few thousand years human occupation of the central Namib was characterized by the use of small basecamps at temporary water sources, more sustained residence being possible only at the coast and at a small number of sites.

The proposed Oshivela Pilot Project site occupies mainly calcrete gravel terrain which previous surveys show to have a relatively low density of archaeological sites.

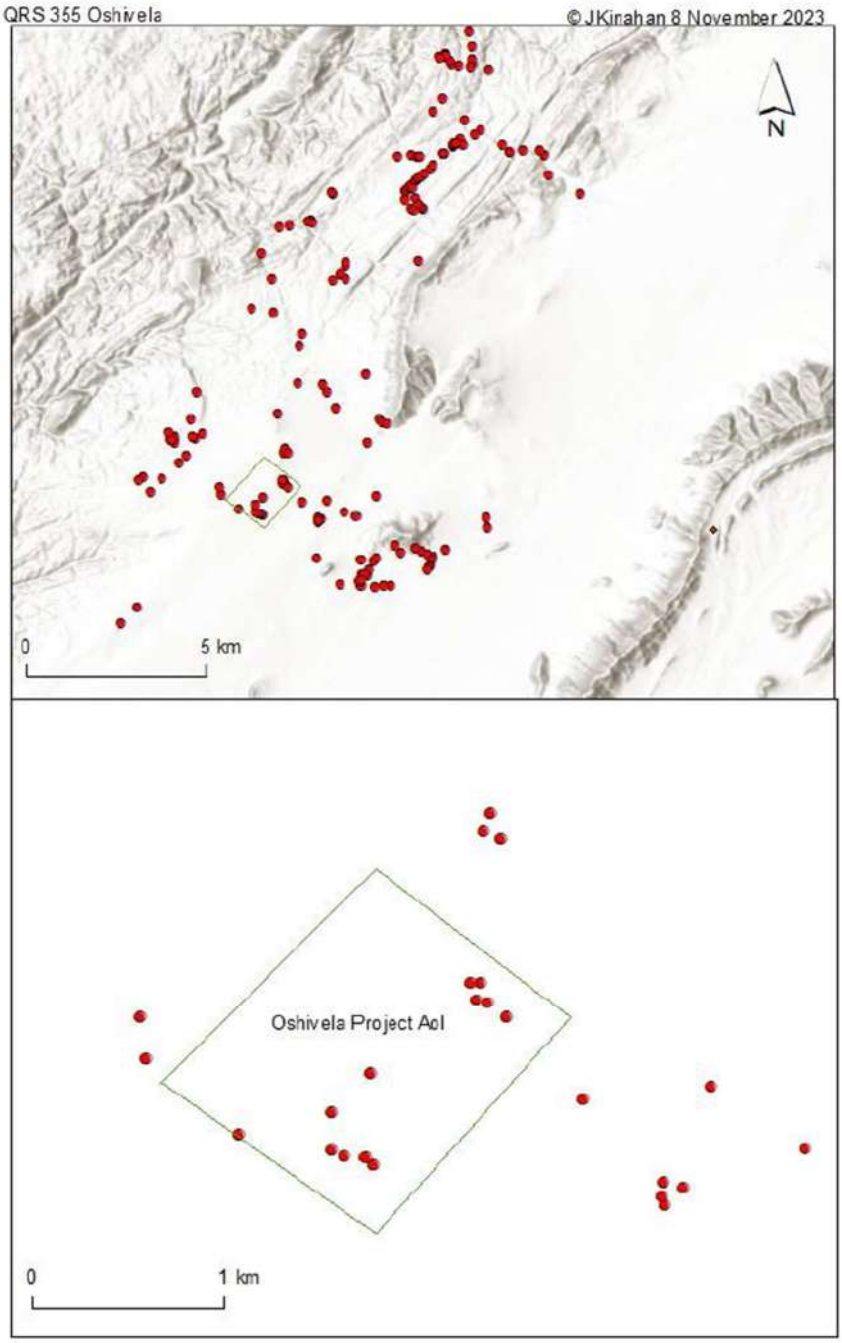

FIGURE 24: THE LOCATION OF THE PROPOSED OSHIVELA PILOT PROJECT AOI IN RELATION TO THE KNOWN DISTRIBUTION OF ARCHAEOLOGICAL SITES IN THE SAME AREA BASED ON PREVIOUS SURVEYS (KINAHAN, 2024)

The last one thousand years in the central Namib saw the rise of highly specialized adaptations to desert conditions, with intensive exploitation of food plants in particular. This exploitation focussed on the !nara *Acanthosicyos horridus* close to the Atlantic coast and on wild grass seed,

mainly *Stipagrostis uniplumis* in the desert interior. The processing and storage of these plant foods required the use of pottery which was very widely available in the Namib at this time. Processed plant foods could be stored for extended periods of time and this provided a buffer against famine in the months preceding summer rainfall in the desert. As a consequence, improved infant survival would have eventually led to an increased human population in the Namib, reflected in the greater density of archaeological remains from this period.

The settlement pattern associated with recent human occupation in the Namib consists of small basecamp sites located close to natural rainwater catchments and seepages. The basecamps which could only be occupied when water was available in the near vicinity comprised groups of stone hut circles associated with storage cairns used for processed plant foods. The sites are generally surrounded by large numbers of diggings within a radius of about 5 km of the camp. These diggings are areas of disturbed ground up to 2 m in diameter where people excavated and removed caches of wild grass seed from the underground nests of harvester ants, commonly *Messor denticornis.*

On the basis of the relative abundance of various archaeological site types in the Oshivela Pilot Project area (based on previous surveys) it was expected that seed diggings (i.e. any) will be the predominant site type.

The detailed survey of the Oshivela project AoI was carried out in January 2024, covering the project site and some adjacent ground including a borrow pit site. All archaeological sites were individually ranked according to their archaeological Significance and Vulnerability, following accepted assessment criteria.

A total of thirteen seed digging sites were identified in and adjacent to the Oshivela Project AoI. In terms of the assessment criteria these sites have a Significance ranking of 2, or “isolated minor find in undisturbed primary context, with diagnostic material”. The sites have a Vulnerability ranking of 4, “high likelihood of partial disturbance or destruction due to close proximity of development”. Seed digging sites are generally given a low Significance ranking because they are extremely numerous indicators of human activity rather than sites of occupation. Seed diggings are used as a means to locate occupation sites which usually occur within a distance of approximately 5 km of any dense concentration of such diggings and are therefore helpful in locating important sites of human occupation in the Namib Desert. In the case of the Oshivela Pilot Project sites listed in the Archaeology Report (see Appendix F) all are afforded a high level of Vulnerability due to their location within the narrowly defined project AoI. It is anticipated that any significant development within the AoI will result in the disturbance or possible destruction of

the sites. With reference to section 6.6.2, it should be noted that Hylron has undertaken some geotechnical investigations and associated activities causing some level of disturbance, prior to the field survey by the Archaeologist.

6.10 SOCIO-ECONOMIC

6.10.1 INTRODUCTION AND LINK TO IMPACTS

The Erongo Region, where the proposed Oshivela Pilot Project is planned, has a well-developed infrastructure, second to the Khomas Region. Mining, fishing, tourism, transportation and storage comprise the principal economic activities in the Erongo Region, with most of these taking place in the western and coastal parts (RUL, 2021). Each region in Namibia is governed by a regional council, elected during regional elections per constituency. The Erongo Region is subdivided into seven constituencies, of which Arandis forms one. Towns are governed through local authorities, in the case of Arandis by a town council.

Arandis was established by Rössing Uranium Limited in 1976 to provide housing for workers and their families. Up until 1990 the company managed the town, while building schools, houses, sport fields and a hospital. In 1994, Arandis was proclaimed as a town with the Arandis Town Council (ATC) taking of the administrative functions of the town (RUL, 2021).

Information for this Section was retrieved from previous reports used by Namisun as well as the Socio-economic Baseline and Impact Assessment Report for the Shiyela Iron Project (Ashby and Associates, 2022 in Namisun, 2022a).

6.10.2 DEMOGRAPHIC PROFILE

Namibia is one of the least densely populated countries in the world (2.8 persons per km^2). Vast areas of the country are without people, in contrast to some fairly dense concentrations, such as the central-north and along the Kavango River. The last national census was conducted in 2011 and counted 2.1 million Namibians.

Windhoek, the capital, functions as a primate city – not only is it the urban area with the biggest population, but the concentration of private and public head offices attracts Namibians from all parts of the country in search for a better live. National population growth rate is estimated at less than 2%, lower than most African countries. Namibia's population is young - although 57% falls in the age group 15 – 59, 37% of the total population is younger than 15.

An inter-censal demographic survey was conducted in 2016 and estimated the total population of the country at 2.3 million and for the Erongo Region at 182,402, i.e., 7.8% of the national

population total. The population is largely urban with over 87% residing in the urban areas of Swakopmund and Walvis Bay and the inland towns of Usakos, Karibib and Omaruru.

In 2018 it was estimated that 50% of all Namibians are urbanized, in other words living in an urban settlement. The Erongo Region covers a great part of the central Namib Desert, the main reason why this region has a small rural population and is the region with the second highest percentage of people living in an urban area – 92%. Only the Khomas Region (95%) has a more urbanized population, but due to the bigger size of the Erongo Region the population density is low and only marginally higher (2.9) than the national figure in 2016.

Living in an urban environment implies better living conditions – 98% of all households have access to safe water, only 13% have no toilet facility, 76% have electricity for lighting and only 15% of all household make use of open fires to prepare food. Oshiwambo is the most spoken language (44% of all households) in the region, followed by Afrikaans (19%). Average household size is 3.1 and the literacy rate is 96% for people older than 15 (NSA, 2017).

Compared to other regions in Namibia, the Erongo Region has the second highest level of development and the second lowest rate of human poverty. About 72% of the region's population aged 15 and above are estimated to have attained secondary education – the highest level in the country. The region is also estimated to have the second highest proportion (7.4%) of individuals with tertiary qualifications (RUL, 2021).

Although Walvis Bay is the biggest urban area in the Erongo Region, and the industrial hub of the region, the administrative capital of the region is Swakopmund and host most of the administrative and governmental headquarters of the region. Arandis is much smaller – even though the total population of Arandis was estimated at 6,500 people in 2011, the national census in the same year only counts 5,100 (NPC, 2011). At an estimated annual growth rate of 3.8% for the region, the expected total population of Arandis was 6,145 in 2016 (NSA, 2017).

6.10.3 ECONOMIC PROFILE

The Erongo Region, where the project is located, has a well-developed infrastructure, is the second most prosperous region in Namibia and includes Namibia's largest coastal towns of Walvis Bay and Swakopmund. Mining, fishing, tourism, transportation, and storage comprise the principal economic activities in the Erongo Region, with most of these taking place in the western and coastal parts.

Mining plays a pivotal role in the economy of Namibia. Since independence, it has consistently been the biggest contributor to Namibia's economy in terms of revenue and accounts for 25% of

the country's income. Mining is a pronounced industry in the Erongo Region and the main commodities are uranium, gold, salt and dimension stones. Two of Namibia's large uranium mines – Rössing and Husab – are in proximity of Arandis. The Langer Heinrich Uranium Mine is in the process of restarting and one other uranium mine is currently under Care-and-Maintenance (i.e. Trekkopje) while ongoing exploration and feasibility studies are done by Forsys, Reptile Uranium Namibia and Bannerman Resources – all in the Erongo Region.

As a mining town, the local economy of Arandis was always closely coupled to the mining industry. Of lately many initiatives have been launched to diversify the town's economic base by marketing and attracting investments and as a result several new industries and businesses established in the town recently.

Since 2016 Namibia recorded slow economic growth, registering an estimated growth of only 1.1% in 2016. The primary and secondary industries contracted by 2.0 and 7.8% respectively.

During 2017 the economy contracted by 1.7, 0.7 and 1.9% in the first, second and third quarters respectively (NSA, 2019). Despite the more positive expectations, the economy retracted to an average growth of not more than 1% annually since 2017.

Fishing is another prominent economic sector in the Erongo Region, while tourism almost fully recovered after the impacts of the global pandemic COVID-19.

Walvis Bay is about 95 km southwest from the Project Site. The town is the principal home of Namibia's fishing industry and boasts also the only deep seaport of the country, with world-class port facilities and linkages with the rest of Namibia and its neighbours via the Trans-Kalahari and Trans-Caprivi Highways as a well as a railway. The Walvis International Airport ensures a direct link to the rest of the world. Key economic activities of Walvis Bay include fishing, fish processing, manufacturing, logistics, marine engineering, and storage.

The Port of Walvis Bay is Namibia's largest commercial port, receiving between 1,800 and 2,500 vessel calls each year and handling about 5 million tonnes of cargo, prior to the COVID-19 pandemic. Namport handles container imports, exports and trans-shipments, as well as bulk and breakbulk volumes of various commodities. The port serves a wide range of industries such as mining, petroleum, salt, and fishing. Namport is a major employer in the region, employing most of its 965 staff in Walvis Bay. The expanded container harbour at the port was in response to growth in port related activity serving the SADC region. Unfortunately, the growth has not been sustained, partly due to the impact of COVID-19 on world trade and perhaps over-ambitious targets.

Swakopmund is about 75 km south-west from the Project Site. It is Namibia's second largest coastal town with an estimated population of 66,000 in 2020 and a growth rate of 5.3%. Like Walvis Bay, most of the population live in low-income neighbourhoods, reflecting the severe income inequality in the country as a whole and highlight the need to explore different housing typologies to close the gap between the urban poor and middle-high income groups (Ashby, 2022). Mining and mining-related activities employ the highest proportion of the population, but Swakopmund is also a main tourism attraction, and this industry also employs a substantial proportion of the town's people.

6.10.4 EMPLOYMENT

The labour force participation rate is the proportion of the economically active population, given as a percentage of the working age portion of the population (i.e., older than 15 years of age). More people aged between 15 and 65 years are active in the region's labour force than in any other region in Namibia (Ashby, 2022). The rate of labour force participation for the region was 80.9% compared to the average of 71.2% for Namibia in 2018.

In 2018, 53.4% of all working Namibians were employed in the private sector and 21.5% by the state. State-owned enterprises employ a further 7.6% and private individuals 16.6%. Agriculture (combined with forestry and fishing) is the economic sector with the most employees – 23% of all employed persons in Namibia work in this sector. Wages and salaries represented the main income source of 47.4% of households in Namibia.

Low education levels affect employability and prevents many households to earn a decent income. Of all employed people in Namibia, 63.5% are not higher qualified than junior secondary level (Grade 10 and lower). In total 11.8% of all employed people had no formal education. In total 29.1% of all employed people fall in the category "elementary occupation" and 15.2% in the category "skilled agriculture. Overall, the rate for unemployment is estimated at 33.4% for Namibia, using the broad definition of unemployment. The highest unemployment rates are found amongst persons with education levels lower that junior secondary. The unemployment rate of persons with no formal education is 28.6%, with primary education 34.6% and with junior secondary education 32.7%.

Although declining over time, the primary sector (agriculture, mining and fishing) employs most Namibians (23%) and is also the sector with the most employers. It is also the sector that employs the most informal workers in Namibia, calculated at 87.6%. Wages of employees in this sector are lower than all other sectors except for workers in accommodation and food services and domestic work in private households.

In the Erongo Region 67.5% of all households depend on salaries and wages as the main income. Exact figures do not exist, but this high percentage can be ascribed to the dominance of the mining, fishing and manufacturing and processing sectors together with the prominence of state departments and the administrative sectors in the Erongo Region. A total of 12.6% of households receive their income from business activities (Ashby, 2022).

While unemployment remains a significant challenge in the region, with 22.6% of the labour force estimated to be jobless, this figure is lower than the rest of the country. Poverty levels are on the lower side of the scale, with only 5.1% of all households in Erongo being considered poor, the lowest in the country. Households in the region spend about 17% on food and beverages (2nd lowest in the country), 23% on housing (3rd highest), 20% on transport and communication (2nd highest) and other unspecified items (RUL, 2021).

No official figure exists, but there is good reason to believe that most of the workforce in Arandis is employed by the mines and the contractors working at the mines.

6.10.5 DEVELOPMENT CONTEXT

In 2017, Namibia was classified as a high middle-income country with a per capita GDP of N$74,489, yet this status is somewhat deceptive owing primarily to Namibia's level of income inequality, which is the third highest in the world (with South Africa) with a Gini coefficient of 76, according to the World Bank. The top 10% of the population hold 65.6% of financial assets. Socio-economic inequalities inherited from pre-independence remain extremely high and structural constraints to growth have hampered job creation. Economic advantage remains in the hands of a relatively small segment of the population and the large disparities of income have led to a dual economy – a highly developed modern sector co-existing with an informal subsistence-oriented one. The duality of the labour market, combined with slow job creation and low primary-sector productivity, results in very high unemployment (Ashby, 2022).

The economy grew between 2010 and 2015 by an average of 5.3% per annum, but since 2016, it has not come out of recession. The primary and secondary industries contracted by 2.0 and 7.8% respectively. During 2017 the economy contracted by 1.7, 0.7 and 1.9% in the first, second and third quarters respectively (Ashby, 2022).

As of the beginning of 2020 COVID-19 caused illness in humans at a pandemic scale. The viral outbreak adversely affected various socio-economic activities globally, and with reports of the increasing number of people testing positive, it has significant impacts on the operations of various economic sectors in Namibia too. The disease caused many countries to enter a state of emergency and lockdown mode, with dire economic consequences. COVID-19 negatively

impacted commodity export markets, tourism and local consumption patterns and service industries and these resulted in a further 8.5% contraction of the economy in 2020. The World Bank predicts that the rebound will be slower than initially expected, with growth projected at 2.4% in 2022 (Ashby, 2022).

Before the COVID-19 pandemic, tourist arrivals to Namibia reached 1,681,000 people in 2019. Swakopmund estimated 300,000 foreign tourists and 100,000 Namibian tourists annually, in 2016. There is much relief that tourism is recovering from the catastrophic blow of Covid-19 which affected 96% of businesses due to border closure, quarantine restrictions and fears surrounding virus contraction during travel. In March 2022, hospitality establishments at the coast recorded an occupancy rate of 45% (Ashby, 2022).

As tourism involves so many different activities from handicraft manufacturing to a wide variety of retail, travel, hospitality and leisure activities, it was estimated that tourism's direct and indirect contribution to the economy amounted to N$15.1 billion in 2015 or 10.2% of GDP. The sector recorded a significant contribution to employment, recording direct employment of 44,700 which directly and indirectly generated employment for over 100,000 people in 2015. By 2018, over 80,000 Namibians, 11.4% of all those employed, worked in the accommodation and food service activities and more than three quarters of them were women. The mean monthly wage for employees in this sector was N$2,819 per month. This hides a huge gender disparity as the average male monthly wage was N$4,810 compared to N$2,143 for females (Ashby, 2022).

Tertiary industries have always been the most significant contributor to Namibia's GDP in recent years, contributing 58%, in 2019. These industries include the public sector, retail and wholesale, transport and services sectors. Secondary industries contributed 18% to GDP and include manufacturing such as meat and other food processing, beverages, mineral processing, electricity generation and construction. The primary industries, such as mining and agriculture, contributed 16% to GDP (Ashby, 2022).

In 2018, the construction industry in Namibia employed over 45,000 people, which was 6.2% of all those employed nationally. Of those construction workers, 65% (29,400) were informally employed and less than 6% were unionised. It is a very male dominated sector with average monthly wages in 2018 of N$5,441. Over 50% of those employed were under 34 years of age, so it is a valuable contributor to youth employment. The 2014 Labour Force Survey details that the Erongo Region had the second highest number of people employed in the construction sector after the Khomas Region, 7,400 and 15,500 respectively (Ashby, 2022).

The fisheries sector plays a significant role in terms of production, employment, foreign exchange earnings and government revenue. The marine fishery sector consists of a primary sub-sector that harvests fish which is landed at the Port of Walvis Bay and the Port of Lüderitz. The manufacturing sub-sector processes fish for both the local and export markets and is exclusively industrial, dominated by private enterprises with no direct government financial support and is internationally competitive. The sector employed about 15,600 people in 2019, and is a significant employer in Walvis Bay (Ashby, 2022).

The value of fish exports increased by more than 500% in 20 years, from N$1.6 billion in 1998 and provided on average about N$10 billion annually in forex earnings during the 2012- 2016 period, which makes the sector the second most important forex earner for Namibia after mining. The contribution to GDP has increased from 2.1% at independence to 3.4% of GDP by 2018 or an average of 4.3% between 1991 and 2018 (Ashby, 2022).

The mining sector has contributed significantly to the national economy over the years with an average of >10% to GDP since 1990. In 2021, the sector contributed 9%, compared to the highest recording in 2008 of 17%. In March 2020, Namibia had 38 mines in production. The main commodities mined in the Erongo Region are uranium, gold, salt and dimension stones. The only operating iron ore mine in the country is at Dordabis. The mine is owned by Lodestone, began production in 2021 and exported 52,000 tonnes of iron ore in the same year - the first export of iron ore in Namibia's history (Ashby, 2022).

Mining provides upstream, downstream, and side stream linkages for the Namibian economy. Upstream linkages are the supply chains of mining inputs and services required to build and run a mine and processing plant. Examples of side stream linkages include transport services, power, water, skills, research and development, logistics, communications, and financial services. Downstream linkages are the value additions to the raw ore, which in this case will be processing the magnetite. These linkages contributed to an estimated 106,000 indirect jobs in 2021 (based on the Chamber of Mines conservative mining multiplier of 7 times the direct jobs in mining) (Ashby, 2022).

The country has good mineral resources, some remaining fish stocks, widespread livestock production, an increasingly urban population and high school attendance of both girls and boys up to Grade 11. However, the governing political party, South West Africa People's Organisation (SWAPO), is under more pressure than ever before to improve the lives of Namibians. There is widespread rural and urban poverty, low educational attainment, few technical skills, a major housing back-log and deepening unemployment (Ashby, 2022).

The Fifth National Development Plan 2017/18 – 2021/22 (NDP5) aims to achieve rapid industrialisation while adhering to the four integrated pillars of sustainable development: Economic Progression, Social Transformation, Environmental Sustainability and Good Governance. NDP5 recognises that mining can contribute to Namibia's transformation into an industrialized economy. It supports value added industrialisation, creating value-chains of production, and to accelerate Small and Medium Enterprise (SME) development (Ashby, 2022).

6.11 AERONAUTICAL BASELINE IN THE REGION

The Arandis Aerodrome is located approximately 25 km south-west of the proposed Oshivela Pilot Project Site. The runway is aligned in the direction of the proposed Project, therefore aircraft departing and approaching the airport could fly directly over the Project Site and the proposed infrastructure, however, the site is quite a far distance from the aerodrome.

7 IDENTIFICATION AND DESCRIPTION OF POTENTIAL ENVIRONMENTAL IMPACTS

This Chapter outlines the environmental aspects and potential impacts associated with the development and implementation of the proposed Oshivela Pilot Project. It reasons potential cumulative impacts, and which environmental aspects and potential impacts need further assessment (Chapter 8).

7.1 ASPECT AND IMPACT IDENTIFICATION

Table 19 provides a summary of the activities associated with the proposed Oshivela Pilot Project and the associated key environmental aspects and potential impacts that were identified as part of the EIA process.

The potential impacts were identified during the scoping process, in consultation with I&APs and the project team. For context, the description of the potential impacts should be read with the corresponding descriptions of the current environment in Chapter 6 of this report.

The relevance of the potential impacts ("screening") is presented in Table 19 to determine which aspects / potential impacts need to be assessed in further detail (Chapter 8 of this report).

TABLE 19: KEY ENVIRONMENTAL ASPECTS AND POTENTIAL IMPACTS ASSOCIATED WITH THE PROPOSED OSHIVELA PILOT PROJECT

ACTIVITY / FACILITY	ASPECT	POTENTIAL IMPACT AND RELEVANCE (SCREENING) OF POTENTIAL IMPACT
Construction phase: • Clearing, site preparation, use of earthmoving equipment and machinery. • Establishing of working areas and laydown areas, waste handling facilities and construction staff amenities. • Materials delivery and laydown / storage. • Drilling, excavation. • Establish new infrastructure / facilities, including: Processing plant, access tracks, offices, PV plant, and related infrastructure. *Operations phase*: • Processing. • Operating of solar fields.	Activities disturbing/ destroying **biodiversity** and habitats	In the broadest sense, biodiversity provides value for ecosystem functionality, aesthetic, spiritual, cultural, and recreational reasons. The development of the process plant and associated activities and infrastructure (including the proposed PV power plant) could cumulatively cause a loss of natural vegetation and could lead to habitat fragmentation and degradation. Various important species and sensitive habitats have been identified (see Section 6.4). Furthermore, the habitats of animal life and ecosystems may be impacted in a negative manner as a result of construction and operational activities. The natural movement of animals in the Project area and beyond, taking the movement of animals in the wider landscape into consideration, can be disturbed as a result of the processing facilities as well as the PV panels. Due to the overall project layout, specifically because of the proposed PV power plant the potential impacts on biodiversity have been assessed as part of this EIA process. The potential impacts on biodiversity (physical impacts and general disturbance), therefore include: • Loss of vegetation and associated biota due to construction activities. • Impact on animal movement. • Change of habitat. • Spread of alien invasive plants (operational phase). Refer to Section 8 for the assessment of the potential impacts relating to Biodiversity.
	Activities and infrastructure disturbing / killing **Avifauna**	Due to the overall project layout and activities / infrastructure, specifically as a result of the proposed PV power plant the potential impacts on avifauna have to be assessed as part of this EIA process. Potential impacts on avifauna include: • Disturbance of birds during construction (resulting in avoidance / displacement / barrier effects); this could include road mortalities and/or poaching during construction. • Direct and indirect modification / loss / destruction of bird habitat (resulting in voidance/displacement/barrier effects). • Attraction of birds to novel (artificial) habitats and resources; this impact could lead to negative impacts on infrastructure, caused by bird nesting, perching and other activities

ACTIVITY / FACILITY	ASPECT	POTENTIAL IMPACT AND RELEVANCE (SCREENING) OF POTENTIAL IMPACT
		• Bird collisions with infrastructure such as solar panel arrays and other associated infrastructure. Refer to Section 8 for the assessment of the potential impacts on avifauna.
	Clearing of **topsoil** and spillages that pollute soil	Potential impacts on soil include: • Pollution because of leakages and spills. • Loss of soil due to disturbance and erosion. Topsoil (and subsoil) will be disturbed during the construction phase when the footprint areas for surface infrastructure will be stripped. Topsoil could further be impacted through accidental spills of hydrocarbon, paint, etc., movement of vehicles and machinery which could result in a loss of topsoil through contamination, erosion and compaction. Potential impacts on soil are cumulative considered as part of the surface water and groundwater and biodiversity assessments (Section 8). Measures relating to topsoil management are included in the EMP (Appendix G).
	Infrastructure contributing to the overall **visual** impacts	Negative visual (and sense of place) impacts are expected because of the visual intrusion by the proposed infrastructure. Visual impacts on this receiving environment may be caused by activities and infrastructure during both construction and operational phases. Potential visual impacts therefore include: • General visual impacts (including glare from the PV panels) and sense of place. Refer to Section 8 for the assessment of the potential visual impacts.
	PV Power Plant infrastructure causing **glint and glare**	Glint and Glare – Arandis Aerodrome There is a general concern for the potential of PV glare in aerodrome environments. Part 139.01.13 of the Namibia Civil Aviation Regulations (NAMCARs) of 2001, as amended in 2018, and the Namibia Civil Aviation Technical Standards – Aerodromes and Heliports (NAMCATS -AH), stipulates the requirements for lights that may endanger the safety of aircraft. Therefore, a glint and glare assessment are required prior to the construction of a Solar PV Plant, where relevant. Although, the NCAA has not yet domesticated the technical guidance material for glint and glare assessments, industry best practice is to be adhered to. In this regard, the South African Civil Aviation

ACTIVITY / FACILITY	ASPECT	POTENTIAL IMPACT AND RELEVANCE (SCREENING) OF POTENTIAL IMPACT
		Authority (SACAA) obstacle notice 3/2020[24] Additional Requirements for Solar Project Applications states that a Glint and Glare Assessment would not be required if the solar PV facility is not within a 3 km radius of the aerodrome (Part 139.01.30 (3). Using the SACAA guideline and the NCAA note suggesting 'industry best practice is to be adhered to', and because the solar PV facility of the proposed Oshivela Pilot Project is ~25 km to the arrays, a glint and glare analysis is not required. It is therefore assumed that the potential for glint and glare caused by the Project would not influence the operation of the Arandis Aerodrome and no further assessment is required.
	Various spillages that could pollute **groundwater and surface water**. **Abstraction** of groundwater. The infrastructure area (including the process plant and PV panels with all associated infrastructure etc.) causing reduced **storm water flow**.	As a result of the proposed project activities and infrastructure, the potential impacts on groundwater and surface water in the surrounding need to be assessed. The potential impacts that were identified, requiring assessment, based on the proposed overall project activities and infrastructure include the following: • Abstraction of groundwater for the project could deplete the limited stored resources. Neighbouring farmers may think that pumping will lower the regional water table and affect the yield of their boreholes. • Project infrastructure impacting surface water flow / drainage. • Spills from the RO plant and disposal of brine mixed with water treatment chemicals could affect soil and water quality. • Disposal of untreated sewage causes soil and water pollution. • Soil, surface and groundwater pollution from domestic sewage effluent, hydrocarbon spills or improperly managed waste negatively affects the soil, groundwater and surface water quality and could reduce the availability of water resources. Refer to Section 8 for the assessment of the above-mentioned groundwater and surface water impacts.

[24] **Obstacle Notice 3/2020 (Replacement for 17/11/2017): Additional Requirements for Solar Project Applications**
Kindly note that with immediate effect, A Glint & Glare Assessment will be required as soon as the proposed site is located on the extended runway centreline within the ICAO Annex 14 Approach Surface, Take-Off Climb Surface & Departure Surface, and within 3km radius around an Aerodrome/helistop as per Part 139.01.30 (3).

ACTIVITY / FACILITY	ASPECT	POTENTIAL IMPACT AND RELEVANCE (SCREENING) OF POTENTIAL IMPACT
	Noise and air emissions from various construction activities, vehicles, processing and associated activities	There are a range of construction and operational activities relating to the proposed Oshivela Pilot Project that will generate noise, which could potentially be heard from surrounding areas. The increase in ambient noise levels could cause disturbance or nuisance impacts to sensitive receptors (third parties) or animals. There are also various activities or sources relating to the proposed Project that can pollute the air and cause resultant potential impacts (i.e. nuisance impacts and / or health) on third parties. Pollution sources relating to dust generation include: Land clearing activities, materials handling and stockpiling, wind erosion of stockpiles, disturbed areas and vehicle movement (i.e. transport) along unpaved roads. Sources of gaseous emissions will mainly be from the vehicles. “Sponge-iron” of between 90% and 99% purity is produced with net zero carbon dioxide (CO_2) emissions. In the construction and decommissioning phases these activities are temporary in nature while the operational phase will present more long-term activities. There are a number of farms with homesteads in the area, the closest to the Pilot Project facilities being two houses on Farm Valencia. As a result of the proposed project activities and its location, the potential noise disturbance to third parties and air pollution, dust nuisance and increased risk of health impact to third parties (i.e. closest receptors) need to be assessed. Refer to Section 8 for the assessment of the noise and air quality impacts.
	Construction, land clearing; use of machinery, vehicles, equipment, etc. that could damage **archaeological** / heritage sites	The construction activities and movement of vehicles associated with the Oshivela Pilot Project have the potential to encroach upon, disturb, damage or destroy archaeological remains protected under the National Heritage Act (27 of 2004). With reference to Section 6.9 the proposed Project Site lies in a part of the Namib Desert which has revealed several important archaeological sites which have provided new insights into the archaeology of the desert. A total of thirteen seed digging sites were identified in and adjacent to the Oshivela Project AoI during a detailed survey, carried out by the Archaeologist in January 2024. Due to the proposed activities and the overall project layout the potential archaeological impacts were assessed as part of this EIA process. Refer to Section 8 for the assessment of the potential impacts associated with the damage or destruction of archaeological sites. In addition, a standard chance find procedure will be developed for the managing of discoveries made in the course of civil works on the Project Site.
Construction phase:	Increased **traffic impacts** and impacts	With reference to Sections 4.2.1.2 and 5.4, various access routes to the Oshivela site (and other transport options), for the transport of the iron ore concentrate (to site) and the final product (to the Walvis Bay Port) are

ACTIVITY / FACILITY	ASPECT	POTENTIAL IMPACT AND RELEVANCE (SCREENING) OF POTENTIAL IMPACT
• Transport of equipment, building supplies, etc. during construction. • Transport of workers to site during construction. *Operations phase:* • Transport of iron ore concentrate to site and final product to the port of Walvis Bay for shipment to the end client.	on the **road condition**.	being considered. Both road and rail options are considered by Hylron. The road option 1 (see Section 5.4), following the B2 and the Norasa Uranium Project Private access road is preferred over road option 2, through the NNNP. With reference to Section 5.4, this route option requires further agreements between Hylron and the DWNP before this could be considered and the current commitments in the EMP (see Appendix G) might need further actions, depending on conditions set by DWNP. Construction related traffic will follow the B2 and the Norasa Uranium Project Private access road to site. The construction phase is for a limited period of time (see Section 4.4). The key potential traffic-related impacts are associated with the following: • Road capacity issues. • Road maintenance issue (i.e. road condition), relating to the Norasa Uranium Project Private access road. • Third party (i.e. public) road safety. These traffic-related impacts are qualitatively assessed in Chapter 8.
General activities, offices and buildings, ablution facilities, domestic waste generation, maintenance activities: • Waste handling, management, recycling and disposal.	**Emissions** to land, impact on **biodiversity**, environmental **degradation**, **visual** and **nuisance** impacts	Waste management practices will be implemented by Hylron, as described in Sections 4.2.8 and 4.3.3. Hylron will further develop waste management procedures. Waste will be separated at source and stored in a manner that there can be no discharge of contamination to the environment. Some waste types will be recycled or reused where possible. Where recycling/re-using is not possible, non-hazardous, non-recyclable waste will be disposed of offsite at the nearest licenced landfill site. Hazardous waste that is non-recyclable will be transported off site to an appropriate disposal facility. The related management and mitigation measures are stipulated in the EMP (refer to Appendix G). No further assessment is required.
Construction activities and general operations: • Employment of people. • Construction workers. • Staff accommodation on site.	Employment of people, onsite accommodation and related **socio-economic** impacts: • Impacts to local, regional and national economy.	With reference to Sections 4.2.7 and 4.3.4, a maximum of ~ 80 will be required over the ~ 7 - 8 months construction period and 20 people at a time (i.e. up to 50 employees working on shifts) for the operational phase of the project. The proposed Oshivela Pilot Project will therefore bring economic benefits, jobs and new skills to Namibia. With the high unemployment numbers in the region (and country) this will be a positive impact. Operating with a relatively small workforce, it is unlikely to induce negative social impacts such as in-migration and significant additional pressures on government's services such as education and health. The potential positive impacts that were identified, requiring assessment include the following:

ACTIVITY / FACILITY	ASPECT	POTENTIAL IMPACT AND RELEVANCE (SCREENING) OF POTENTIAL IMPACT
	• Jobs creation and skills development. • In-migration • Impacts to community (i.e. surrounding farmers) health, safety and security.	• Economic impacts during construction and operations. • Job creation and skills development during construction and operations. However, various potential negative social impacts could be associated with the construction workers, permanent employees and the accommodation on Hylron's Farm(s) in the area, as was raised during the public participation process by I&APs. Refer to Section 8 for the assessment of the socio-economic impacts.

7.2 Summary of Environmental and Social Aspects and Potential Impacts that Require Assessment

Based on the discussions in Table 19, the following aspects / potential impacts require further assessment (see Chapter 8):

- Biodiversity:
  - Loss of vegetation and associated biota due to construction activities.
  - Impact on animal movement.
  - Change of habitat due to the construction and operation of the process plant, solar plant modules and associated infrastructure.
  - Spread of alien invasive plants (operational phase).
- Avifauna:
  - Disturbance of birds during construction (resulting in avoidance / displacement / barrier effects); this could include road mortalities and / or poaching during construction.
  - Direct and indirect modification / loss / destruction of bird habitat (resulting in voidance / displacement / barrier effects).
  - Attraction of birds to novel (artificial) habitats and resources; this impact could lead to negative impacts on infrastructure, caused by bird nesting, perching and other activities
  - Bird collisions with infrastructure such as solar panel arrays and other associated infrastructure.
- Visual:
  - General visual impacts and sense of place.
- Groundwater and surface water:
  - Abstraction of groundwater for the project could deplete the limited stored resources.
  - Project infrastructure impacting surface water flow / drainage.
  - Spills from the RO plant and disposal of brine mixed with water treatment chemicals could affect soil and water quality.
  - Disposal of untreated sewage causes soil and water pollution.
  - Soil, surface and groundwater pollution from domestic sewage effluent, hydrocarbon spills or improperly managed waste negatively affects the soil, groundwater and surface water quality and could reduce the availability of water resources.
- Noise:
  - Noise disturbance to third parties.

- Air quality:
    - Air pollution, dust nuisance and increased risk of health impact to third parties.
- Archaeology:
    - Damage or destruction of archaeological sites.
- Socio-economic:
    - Economic impacts during construction and operations (positive).
    - Job creation and skills development during construction and operations (positive).
    - Potential negative social impacts associated with the construction workers, permanent employees and the accommodation on Hylron's Farm(s) in the area.
    - Traffic related impacts:
        - Road capacity issues.
        - Road maintenance issue (i.e. road condition), relating to the Norasa Uranium Project Private access road.
        - Third party (i.e. public) road safety.

8 ENVIRONMENTAL IMPACT ASSESSMENT

This Chapter assesses the key potential impacts (as identified in Chapter 7), relating to the proposed Oshivela Pilot Project and associated activities and infrastructure.

The environmental (and social) issues that require further assessment, as identified in Chapter 7, relate to:

- Biodiversity.
- Avifauna.
- Visual.
- Groundwater.
- Surface water.
- Noise.
- Air quality.
- Archaeology.
- Socio-economic.

The activities that are summarised in this Chapter are linked to the descriptions provided in Chapters 4 and 7 (Table 19). This Section must further be read in the context of the baseline conditions described in Chapter 6.

Management and mitigation measures to address the identified (potential) impacts are presented in the Amended EMP (see Appendix G).

The approach and criteria used to assess the impacts and the method of determining the significance of the impacts complies with the Environmental Management Act, No. 7 of 2007 and its regulations. Table 20 provides the impact assessment criteria and the approach for determining impact consequence (combining nature and intensity, extent and duration) and significance (the overall rating of the impact). Impact consequence and significance are determined from Table 21 and Table 22 respectively.

The potential impacts are cumulatively assessed, where relevant, taking the existing environment into consideration.

TABLE 20: IMPACT ASSESSMENT CRITERIA

IMPACT ASSESSMENT CRITERIA		
SIGNIFICANCE determination	**Significance = consequence x probability**	
CONSEQUENCE	**Consequence is a function of:** • **Nature and Intensity of the potential impact** • **Geographical extent should the impact occur** • **Duration of the impact**	
Ranking the NATURE and INTENSITY of the potential impact		
Negative impacts		
Low (L)	The impact has no / minor effect/deterioration on natural, cultural and social functions and processes. No measurable change. Recommended standard / level will not be violated. (Limited nuisance related complaints).	
Moderate (M)	Natural, cultural and social functions and processes can continue, but in a modified way. Moderate discomfort that can be measured. Recommended standard / level will occasionally be violated. Various third party complaints expected.	
High (H)	Natural, cultural or social functions and processes are altered in such a way that they temporarily or permanently cease. Substantial deterioration of the impacted environment. Widespread third party complaints expected.	
Very high (VH)	Substantial deterioration (death, illness or injury). Recommended standard / level will often be violated. Vigorous action expected by third parties.	
Positive impacts		
Low (L) +	Slight positive effect on natural, cultural and social functions and processes Minor improvement. No measurable change.	
Moderate (M) +	Natural, cultural and social functions and processes continue but in a noticeably enhanced way. Moderate improvement. Little positive reaction from third parties.	
High (H) +	Natural, cultural or social functions and processes are altered in such a way that the impacted environment is considerably enhanced /improved. Widespread, noticeable positive reaction from third parties.	
Very high (VH) +	Substantial improvement. Will be within or better than the recommended level. Favourable publicity from third parties.	
Ranking the EXTENT		
Low (L)	Local (confined to within the project concession area and its nearby surroundings).	
Moderate (M)	Regional (confined to the region, e.g. coast, basin, catchment, municipal region, district, etc.).	
High (H)	National (extends beyond district or regional boundaries with national implications).	
Very high (VH)	International (Impact extends beyond the national scale or may be transboundary).	
Ranking the DURATION		
Low (L)	Temporary / short-term. Quickly reversible. (Less than the life of the project).	
Moderate (M)	Medium Term. Impact can be reversed over time. (Life of the project).	
High (H)	Long Term. Impact will only cease after the life of the project.	
Very high (VH)	Permanent	
Ranking the PROBABILITY		
Low (L)	Unlikely	
Moderate (M)	Possibly	
High (H)	Most likely	
Very high (VH)	Definitely	
SIGNIFICANCE Description		
	Positive	**Negative**
Low (L)	Supports the implementation of the project	No influence on the decision.
Moderate (M)	Supports the implementation of the project	It should have an influence on the decision and the impact will not be avoided unless it is mitigated.
High (H)	Supports the implementation of the project	It should influence the decision to not proceed with the project or require significant modification(s) of the project design/location, etc. (where relevant).
Very high (VH)	Supports the implementation of the project	It would influence the decision to not proceed with the project.

TABLE 21: DETERMINING THE CONSEQUENCE

DETERMINING THE CONSEQUENCE					
INTENSITY OF IMPACT = LOW					
DURATION	VH	Moderate	Moderate	High	High
	H	Moderate	Moderate	Moderate	Moderate
	M	Low	Low	Low	Moderate
	L	Low	Low	Low	Moderate
INTENSITY OF IMPACT = MODERATE					
DURATION	VH	Moderate	High	High	High
	H	Moderate	Moderate	High	High
	M	Moderate	Moderate	Moderate	Moderate
	L	Low	Moderate	Moderate	Moderate
INTENSITY OF IMPACT = HIGH					
DURATION	VH	High	High	Very High	Very high
	H	High	High	High	Very High
	M	Moderate	Moderate	High	High
	L	Moderate	Moderate	High	High
INTENSITY OF IMPACT = VERY HIGH					
DURATION	VH	Very high	Very High	Very High	Very high
	H	High	High	Very High	Very high
	M	High	High	High	Very High
	L	Moderate	High	High	Very High
		L	M	H	VH
		EXTENT			

TABLE 22: DETERMINING THE SIGNIFICANCE

DETERMINING THE SIGNIFICANCE					
PROBABILITY	VH	Moderate	High	High	Very high
	H	Moderate	Moderate	High	Very high
	M	Low	Moderate	High	High
	L	Low	Low	Moderate	High
		L	M	H	VH
		CONSEQUENCE			

8.1 BIODIVERSITY (FAUNA AND FLORA)

8.1.1 INTRODUCTION

The biodiversity and, more particularly, the sensitive habitats and species, have been discussed in Section 6.4.

There are a number of activities/infrastructure in both the construction and operations phases that have the potential to destroy / disturb biodiversity in the broadest sense. In this regard, the discussion relates to the physical destruction or general disturbance of specific biodiversity areas, of linkages between biodiversity areas, and of related species which are considered to be significant because of their status, and/or the role that they play in the ecosystem.

The following assessments are made, making reference to proposed Project activities and facilities in Chapter 4, the baseline descriptions in Section 6.4, the field work and investigations

by the Environmental Team as well as reference to the ecology specialist study for the proposed Shiyela Project (EnviroScience, 2022).

8.1.2 ISSUE: LOSS OF VEGETATION AND ASSOCIATED BIOTA DUE TO CONSTRUCTION ACTIVITIES

Assessment of Impact

Nature and intensity, duration of impact and geographical extent

The Oshivela Pilot Project will be constructed in mostly undisturbed area on the north-western Section of Portion 4 of Farm Bloemhof 109. The following needs to be taken into consideration in the assessment of potential impacts:

- The process plant with supplementary infrastructure will be constructed with an overall footprint of ~10,000 m^2. Minor change to natural habitats are expected, but no densely vegetated areas on any rocky outcrops / hills or in the drainage lines or other environmentally sensitive areas are affected. With reference to Figure 25, the process plant and associated infrastructure is located to the west of the marble outcrop, on the gravel plains with limited vegetation. Similarity, the proposed borrow pit will be located on the gravel plains, outside the more distinct drainage line (i.e. shallow wash) with small tributaries that drains southwest towards the Khan River.
- The PV power plant (i.e. solar panels and associated infrastructure) will eventually require a relatively large area, but the solar modules do not entirely sterilise the ground. Vegetation and associated fauna can thrive in between the structures. Some vegetation would need to be cleared, some natural area will be affected and natural processes therefore altered. The PV power plant will largely be constructed on the gravel plains, except for a small section of the panels overlapping the marble outcrop extension (with very little vegetation) (see Figure 25).
- Construction workers inadvertently disturb vegetation and sensitive habitats. Without controls, people will not avoid sensitive areas and more vegetation may be cleared than necessary.
- There is an existing access track to the site, within the farm boundaries, however, this track will require upgrading. The traffic volumes are expected to be low and no conventional haul road is necessary. Without controls people will not avoid all sensitive areas.

- Artificial lighting attracts night-active animals and may result in their death by collision with vehicles or lighting fixtures. However, with reference to Section 4.1.2, the Pilot phase of the Oshivela Project, will be operational solely in daytime. A few lights will however be installed for security purposes and for unscheduled services on the machines, which would be comparable to lights of existing households in the area.
- Noise may drive animals away thus changing their behaviour and possibly keeping them away from established den, roosting and nesting sites, this will affect all animals inhabiting the area and may lead to animals avoiding the Project area, or a reduction in population numbers where avoidance is not possible.

Taking all of the above into consideration, the cumulative impact intensity is rated as moderate in the unmitigated scenario. With mitigation, the intensity is rated as low to moderate as natural processes remain altered in some areas. The duration of the impact (unmitigated) will be moderate for some of the activities and high (i.e. long-term) for activities and infrastructure that would remain for the life of the Pilot Project. Although influences might be beyond the footprint area, the extent of the impact remains local and minor change to natural habitats are expected, therefore the extent is low.

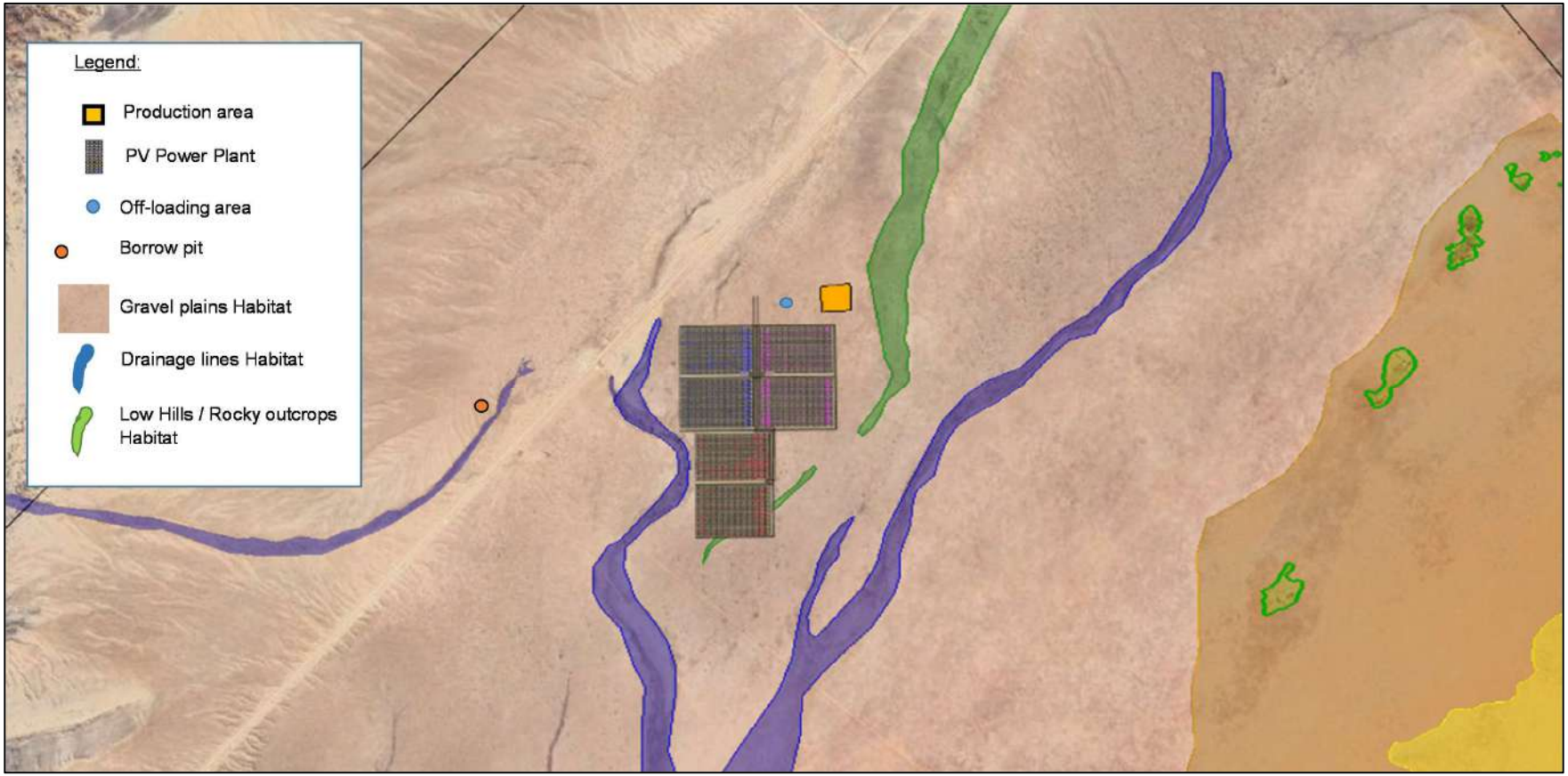

FIGURE 25: OSHIVELA PILOT PROJECT LAYOUT IN RELATION TO NATURAL HABITATS

Consequence

The consequence of the impact is therefore moderate, for the unmitigated scenario and low to moderate for the mitigated scenario.

Probability

The probability is high for the unmitigated scenario as sensitive areas may be affected, which could cause the footprint to be larger than necessary. With mitigation, the probability is rated as low to moderate as mitigation reduces impacts to some extent.

Significance

The significance of the impact is rated as **moderate** for the unmitigated scenario and **low to moderate** with mitigation.

Tabulated summary of the assessed impact – Loss of vegetation and associated biota due to construction activities

Mitigation	Intensity	Duration	Extent	Consequence	Probability of Occurrence	Significance
Unmitigated	**M**	**M-H**	**L**	**M**	**H**	**M**
Mitigated	**L-M**	**L-M**	**L**	**L-M**	**L-M**	**L-M**

Management and mitigation measures

Refer to Section 6.4.2 in the EMP (Appendix G). Key action include the following:

- Identify all sensitive areas as described in section 6.4 prior to construction and clearly demarcate all sensitive areas where activities are planned. Therefore, map areas to be avoided as far as possible. Demarcate these areas to guide detail designs.
- Clear vegetation only where necessary (e.g. not below solar modules, if plants are not in the way).
- Ensure that drainage lines are not blocked by solar panel supports.
- On the ground clearly demarcate movement areas and environmentally sensitive areas near activity zones.

8.1.3 ISSUE: DISTURBANCE OF LARGE MAMMAL MOVEMENTS

Assessment of Impact

Nature and intensity, duration of impact and geographical extent

With reference to Section 6.4.3, the proposed Pilot Project area is located within a fenced farm from which big mammals are largely absents due to the persistent drought of the last years. However, large mammals periodically frequent the area and more animals could be attracted

after rains. They could be disturbed along their customary routes by traffic on the access roads, the construction activities, and maintenance inspections of the solar panels as well as the activities near the operational area of the process plant.

As described above, regular animal movements are, however, currently limited and only expected during exceptional vegetation seasons. Also, large animals would still be able to move freely around the proposed infrastructure. The intensity is therefore rated as low.

The duration of the impact will be long-term and the extent of the any impact caused would remain local, however, movement of animals from outside the project area could be disturbed.

Consequence

The consequence of the impact is considered as moderate for the unmitigated scenario and low for the mitigated scenario.

Probability

The likelihood of impacts occurring is low to moderate. However, with mitigation the potential for impacts occurring is further reduced.

Significance

The significance of the impact is rated as **low to moderate** for the unmitigated scenario and **low** with mitigation.

Tabulated summary of the assessed impact – Disturbance of large mammal movements

Mitigation	Intensity	Duration	Extent	Consequence	Probability of Occurrence	Significance
Unmitigated	**M**	**H**	**M**	**M**	**L-M**	**L-M**
Mitigated	**L**	**L**	**L**	**L**	**L**	**L**

Management and mitigation measures

Refer to Section 6.4.2 in the EMP (Appendix G). Key action include the following:

- Ensure that drainage lines are not blocked by solar panel supports.
- On the ground clearly demarcate movement areas and environmentally sensitive areas near activity zones.
- Avoid traffic at night to prevent disturbance and the killing of animals (on the road). Keep record of road kills, and use these records to develop management measures, should certain areas emerge as prone to road kills.

- With reference to any potential disturbance of large mammal movement, keep records of wildlife incidents.

8.1.4 ISSUE: CHANGE OF HABITAT DUE TO THE CONSTRUCTION AND OPERATION OF THE PROCESS PLANT, SOLAR PLANT MODULES AND ASSOCIATED INFRASTRUCTURE

Assessment of Impact

Nature and intensity, duration of impact and geographical extent

The process plant with supplementary infrastructure will be constructed on the least sensitive habitat, i.e. gravel plains and will have a relatively small footprint compared to remaining similar habitat in the region.

The solar modules are above-ground and will thus not sterilise the soil. However shading by the panels will alter the natural habitat. The effects on biodiversity are unknown at present and could be negative (e.g. less light for photosynthesis) as well as positive (e.g. run-off from panels, shaded habitat). If the main drainage lines are avoided for the position of infrastructure, no major alteration of water flow is expected. With reference to Figure 25, the more distinct drainage line (i.e. shallow wash) with small tributaries that drains southwest towards the Khan River is well outside the PV Project area. The proposed borrow pit will also be outside of the wash on the western side of the access road. The two more distinct drainage lines on the site where the Process plant and PV power plant are planned will be kept open. Also, the outcrops and hills habitats are largely avoided. Only a small section of the panels will overlap the marble outcrop extension (see Figure 25).

The impact intensity is rated as moderate in the unmitigated scenario as some natural areas would be affected and natural processes altered, but whether positive or negative with regards the habitat affected by the installation if the solar modules cannot be determined presently.

The duration of the impact will moderate as the infrastructure will remain during the duration of the Project. However, the construction activities related to the PV modules is such that the area could be rehabilitated at the end of the life of the Project.

The extent of the impacts is rated as low as it is local, confined to project area and affects only relatively small areas.

Consequence

The consequence of the impact is considered as moderate for the unmitigated scenario and low for the mitigated scenario.

Probability

In the unmitigated scenario, impacts will occur, but direction of change is not known. Development of appropriate monitoring requirements and mitigation measures, if necessary, will reduce the impact.

Significance

The significance of the impact is rated as **moderate** for the unmitigated scenario and **low** with mitigation (whether positive or negative cannot be determined presently).

Tabulated summary of the assessed impact – Change of habitat due to the construction and operation of the process plant, solar plant modules and associated infrastructure

Mitigation	Intensity	Duration	Extent	Consequence	Probability of Occurrence	Significance
Unmitigated	**M**	**M**	**L**	**M**	**H**	**M**
Mitigated	**L-M**	**M**	**L**	**L-M**	**L-M**	**L-M**

Management and mitigation measures

Refer to Section 6.4.2 in the EMP (Appendix G). Key action include the following:

- See section 8.1.2.
- Keep the Pilot Project development footprint as small as practically possible.
- Avoid disturbance and placement of infrastructure and the borrow pit on the sensitive habitat areas, as identified in the EIA Scoping (including Impact Assessment) Report. These include the low hills / rocky outcrops, drainage lines, and sand plains areas. Therefore, implement the proposed layout as presented in Figure 3.

8.1.5 ISSUE: SPREAD OF ALIEN INVASIVE PLANTS (OPERATIONAL PHASE)

Assessment of Impact

Nature and intensity, duration of impact and geographical extent

Invasive alien plants can establish near artificial water sources such as the desalination plant, water tanks and sewage plant. The most likely candidates in this area are Mexican poppy *Argemone mexicana*, thorn apple *Datura* species, mesquite *Prosopis* species, wild tobacco *Nicotiana glauca* and castor oil *Ricinus communis*.

The intensity is rated high in the unmitigated scenario as Natural processes could be altered, because indigenous vegetation is suppressed or replaced, for example Prosopis species use

more water than indigenous trees and thus deprive vegetation nearby of water. With mitigation the intensity is low.

The duration is rated as moderate, i.e. during the life of the project. However, appropriate management can reverse this impact.

The extent is confined to the project area and rated as low in both the unmitigated and mitigated scenarios.

With mitigation (including monitor sites where additional water could potentially lead to the establishment of invasive alien plants and eradicating the emerging invasive alien plants), both the intensity and duration of impacts would be reduced and the appropriate management can reverse potential impacts.

Consequence

The consequence of the impact is considered as moderate for the unmitigated scenario and low for the mitigated scenario.

Probability

The probability of spreading of alien invasive plants is moderate, without controls. With mitigation it is low.

Significance

The significance of the impact is rated as **Moderate** for the unmitigated scenario, reducing to **Low** with mitigation.

Tabulated summary of the assessed impact – Spread of alien invasive plants (operational phase)

Mitigation	Intensity	Duration	Extent	Consequence	Probability of Occurrence	Significance
Unmitigated	**H**	**M**	**L**	**M**	**M**	**M**
Mitigated	**L**	**L**	**L**	**L**	**L**	**L**

Management and mitigation measures

Refer to Section 6.4.2 in the EMP (Appendix G). Key action include the following:

- Regularly check for leaks near artificial water sources, monitor sites for invasive alien plants and eradicate immediately.

8.2 AVIFAUNA

8.2.1 INTRODUCTION

The following Sections are extracts from the Avifauna Specialist Report (ACS, 2023) (see Appendix E).

The impacts of disturbance on plants, residential animals and habitats are assessed in Section 8.1. In this Section the specific impacts of disturbance on avifauna are assessed.

Human-induced climate change is increasingly recognised as a significant threat to the natural environment. Renewable energy has the potential to play a significant role in mitigating global climate change and can therefore make a positive contribution to the conservation of birds and other biodiversity. However, even "clean" energy sources can have significant unintended impacts on the environment, including direct and indirect impacts on avifauna. In order to be sustainable as far as possible, the transition to "green energy" must therefore be carefully planned and managed, with appropriate mitigation and monitoring, so that it does not come at an unacceptable cost to nature. (ACS, 2023).

During construction, vehicle movements and human activity are at a peak and the possibility of disturbance and habitat destruction the highest, albeit short-term, site-specific and of a general lower significance. Disturbance is expected to decrease in the operational phase. In the case of birds, the results from disturbance are mainly indirect – temporary displacement of birds and a reduction in breeding success.

Solar energy

The overall environmental impacts of solar energy developments globally are poorly understood. Potential direct impacts of a solar PV plant development include, but are not limited to, bird mortalities or injuries due to collisions with PV panels, fencing, masts and other infrastructure; and collisions and/or electrocutions on associated energy infrastructure (see below). Potential indirect impacts include human disturbance (during both the construction and operational phases) that may affect the presence and/or foraging and breeding success of key species; the destruction, degradation or alteration of habitat; and the displacement of sensitive species from preferred habitat. Some solar technologies may also deplete and/or pollute ground water. On the other hand, solar panels may create novel habitats that may attract species not normally present in an area.

There is presently no clear pattern in the types of birds that are negatively affected by solar plants, and solar collision casualties recorded to date include a wide variety of avian guilds. However,

there are growing indications that waterbirds may be attracted to solar PV facilities in mistaking the hardware for expanses of open water, and that at least some of the larger, more mobile bird species considered prone to collision.

8.2.2 ISSUE: PHYSICAL/HUMAN DISTURBANCE OF BIRDS (RESULTING IN AVOIDANCE/DISPLACEMENT/BARRIER EFFECTS); THIS COULD INCLUDE ROAD MORTALITIES AND/OR POACHING DURING CONSTRUCTION

Assessment of Impact

Nature and intensity, duration of impact and geographical extent

Physical/human disturbance from solar developments can potentially impact on birds during both the construction and operational phases, thereby affecting the presence or foraging and/or breeding success of key species. During the construction phase, vehicle and human activity on the site is at a peak, with high levels of disturbance. Further forms of disturbance include road mortality and poaching of birds (and of eggs). Once operational, the amount of disturbance should decrease to some extent (although not cease).

The results of disturbance may be indirect or direct, and could include:

- Displacement of birds from areas suitable for them before development, either temporarily or permanently; this may occur during both the construction and operational phases; it may be caused by the presence of the solar panel arrays through visual impacts, or as a result of ongoing vehicle and personnel movements related to site maintenance.
- Barrier effects due to visual intrusion and disturbance, in which birds are deterred from using normal flight paths, or even migration flyways, to feeding or roosting grounds (or water sources) to avoid a solar development.
- Unnatural stress in the case of territorial species (e.g. Ludwig's Bustard – polygynous (more than one female mate); raptors) and/or breeding birds, and a reduction in bird breeding success.
- Unnatural mortalities or injuries of birds (adults and chicks) due to road collisions or poaching.
- Reduced breeding success due to poaching of birds' eggs.
- Mortalities of dependent chicks, indirectly, due to mortalities of adults.

The proposed development area is relatively undisturbed, except for some geotechnical investigatory work undertaken by Hylron and their technical Team.

Priority bird species in the study area that may potentially be impacted by disturbance as a result of the construction of the new solar PV development include:

- High probability:
    - Ludwig's Bustard
    - Rüppell's Korhaan
- Moderate probability:
    - Common Ostrich (barrier effects)
    - Lappet-faced Vulture (breeding to the south of the project site)
    - Rock Kestrel
    - Lanner Falcon
    - Booted Eagle
    - Gray's Lark
    - Namaqua Sandgrouse
- Low/very low probability:
    - Black-chested Snake Eagle
    - Pale Chanting Goshawk
    - Greater Kestrel
    - Augur Buzzard
    - Verreaux's Eagle

Taking the above mentioned in to account, and the baseline information presented in Section 4 (and the Avifauna Specialist Report, Appendix E), the intensity of potential impacts is rated as moderate as disturbance may cause displacement and barrier effects; birds may leave the study site and surrounding areas, either temporarily or permanently; in some cases disturbance may result in decreased breeding success; individuals affected but not populations.

The extent of the impact confined to the Pilot Project area and its nearby surroundings; however, road traffic to the greater area will also increase and cause disturbance.

The duration of impacts is rated as moderate (i.e. life of the project), however impacts can be reversed over time (construction and operational phases); however, very high (permanent) in the case of death of birds.

Consequence

The determining consequence of the impact is moderate to high in the unmitigated scenario and moderate with mitigation.

Probability

The probability that birds (see priority bird species above) will be disturbed is moderate. It is expected that mitigation measures can reduce the impacts.

Significance

The significance of the impact in the unmitigated scenario is rated as **moderate to high** and **moderate i**n the mitigated scenario.

Tabulated summary of the assessed impact – Disturbance of birds during construction

Mitigation	Intensity	Duration	Extent	Consequence	Probability of Occurrence	Significance
Unmitigated:	**M**	**M-H**	**L**	**M-H**	**M**	**M-H**
Mitigated	**M**	**M**	**M**	**M**	**M**	**M**

Management and mitigation measures

Refer to Section 6.5.2 in the EMP (Appendix G). Key actions include the following:

- Before construction starts, the proposed solar PV site and surroundings should be inspected for any signs of bird nesting activity. Disturbance of nesting birds, in particular of Ludwig's Bustard, Rüppell's Korhaan or raptors, should be avoided.
- Introduce operational controls to manage and regulate contractor activity, such as exclusion fencing / barricading around sensitive areas.
- Enforce speed limits and off-road driving.
- Strict enforcement of anti-poaching measures, with zero tolerance, and this should be emphasised during induction / general awareness to contractors and employees.
- Ongoing training and awareness to promote the value of biodiversity and the negative impacts of disturbance.

8.2.3 ISSUE: DIRECT AND INDIRECT MODIFICATION / LOSS / DESTRUCTION OF BIRD HABITAT (RESULTING IN AVOIDANCE/DISPLACEMENT/BARRIER EFFECTS)

Assessment of Impact

Nature and intensity, duration of impact and geographical extent

Solar developments can potentially affect birds by destroying or degrading large areas of habitat, thereby displacing sensitive species. In many cases, PV facilities have involved the complete removal of vegetation from the inclusive footprint of the installed plant. It is this tendency to destroy, degrade, fragment or otherwise displace birds from large areas of natural habitat that has stimulated most concern to date about the implications for avifauna of large-scale solar PV development, particularly in relation to species with restricted ranges and very specific habitat requirements. Habitat loss may also occur through off-road driving (e.g. in sensitive wash areas or the rocky outcrop / hills) during construction. Such habitat loss is usually permanent.

Indirect habitat loss (and consequent displacement) may also occur, because the habitat used by birds is exploited or changed in a way that makes it less attractive to them, or (due to barrier effects) the birds avoid the area near the development, resulting in lower densities locally. A large concentration of solar plant developments may also lead to increased levels of fragmentation and barrier effects to terrestrial species, particularly if the sites are fenced. This would apply to species such as Common Ostrich, and possibly Rüppell's Korhaan, in the present study.

It must however be noted that there is already an existing farm boundary fence and it is unlikely that other fences are planned around the PV power plant. Also Hylron will not completely clear the area underneath the panels.

Hill/outcrop habitats in the area are sensitive for several priority bird species, including Ludwig's Bustard (for roosting and display areas) and Rüppell's Korhaan; and for Stark's Lark. These habitats are limited in the study area, and birds displaced by such habitat loss would not be accommodated easily in the existing, remaining outcrop habitats, especially where territorialism is involved.

Any removal or disturbance of natural vegetation will result in a change to the habitat available to the birds in the area, potentially impacting on their ability to breed, forage and roost in the vicinity. The sparsely vegetated drainage lines in the study area are limited, and particularly vulnerable to habitat destruction.

The results of habitat destruction/modification may be indirect or direct, and could include:

- Displacement of birds from areas suitable for them before development, either temporarily or permanently.
- A reduction in bird breeding success due to displacement (including of territorial bird species).
- Permanent modification/destruction of sensitive (and limited) habitats; impacts likely to be cumulative.

Priority bird species in the study area that may potentially be impacted by habitat destruction as a result of the construction of the new solar PV and wind development include:

- High probability
    - Rüppell's Korhaan
    - Ludwig's Bustard
- Moderate probability
    - Gray's Lark
    - Common Ostrich

Taking the above mentioned in to account, and the baseline information presented in Section 4 (and the Avifauna Specialist Report, Appendix E), the intensity of potential impacts is rated as moderate as habitat modification/loss may cause displacement, in particular of territorial/breeding birds, and barrier effects may create stress; birds may leave the study site and surrounding areas, either temporarily or permanently, which may result in decreased breeding success; individuals affected but not populations.

The extent of the impact would be confined to the site and its nearby surroundings (i.e. local).

The duration of impacts mostly permanent although species such as Rüppell's Korhaan and Gray's Lark may eventually return to the novel habitats created beneath the solar PV arrays; see Section 8.2.4 below).

Consequence

The determining consequence of the impact is moderate.

Probability

The probability of direct and indirect modification / loss / destruction of bird habitat is moderate in the unmitigated scenario and low to moderate with mitigation measures can reduce the impacts.

Significance

The significance of the impact in the unmitigated scenario is rated as **moderate**. In the mitigated scenario the overall significance of the impact is rated as **low to moderate**.

Tabulated summary of the assessed impact – Direct and indirect modification / loss / destruction of bird habitat

Mitigation	Intensity	Duration	Extent	Consequence	Probability of Occurrence	Significance
Unmitigated:	**M**	**H**	**L**	**M**	**M**	**M**
Mitigated	**L-M**	**H**	**L**	**M**	**L-M**	**L-M**

Management and mitigation measures

Refer to Section 6.5.2 in the EMP (Appendix G). Key actions include the following:

- Micro-siting: where possible, the unnecessary destruction of habitat or degradation of the environment, including sensitive habitats such as ephemeral drainage/wash systems, and hill/outcrop habitats, should be avoided. The final layout of project infrastructure should thus avoid the above designated sensitive areas.
- The solar PV arrays will not be fenced, which is a primary mitigation against barrier effects to the movement of terrestrial bird species.

8.2.4 ISSUE: ATTRACTION OF BIRDS TO NOVEL (ARTIFICIAL) HABITATS AND RESOURCES; THIS IMPACT COULD ALSO LEAD TO NEGATIVE IMPACTS ON INFRASTRUCTURE, CAUSED BY BIRD PERCHING, NESTING AND OTHER ACTIVITIES

Assessment of Impact

Nature and intensity, duration of impact and geographical extent

A further potential (habitat-related) impact of solar PV developments is the attraction of bird species to a novel area by the artificial provision of otherwise scarce resources – for example perches, nest sites, shade and shelter. Potentially positive impacts of solar energy projects on birds include the use of the various raised structural components of these developments as artificial perching, nesting and roosting sites. Raptors may also attempt to perch on and hunt from such structures. The effects of this impact would be more marked in a relatively treeless environment, such as the study area.

Habitat modifications such as the provision of large areas of shade beneath solar PV panel arrays in a hot, arid habitat, such as in the proposed Pilot Project area, could prove to be attractive to

species such as Rüppell's Korhaan, which spends much of its time on the ground, and to other smaller species. Increased water run-off (from precipitation, or from panel cleaning methods – which is likely going to be dry methods though) and resultant vegetation flush could also attract nomadic species such as the near-endemic Gray's Lark, or Common Ostrich. This impact is potentially positive, but could also have negative indirect impacts, including entrapment in fences, predation or road kills.

Solar PV structures could prove to be attractive as a perching and/or nesting site to Cape Crow and Pied Crow, and possibly to Greater Kestrel. Tractrac Chat is likely to perch on the solar structures. The above activities could result in pollution from faeces on solar PV panels.

The construction of buildings and other infrastructure could attract species such as owls to such sites, and expose them to impacts such as collision on infrastructure. Artificial lighting could increase insect activity, and attract avian predators.

Scavenging species could be attracted to construction sites in search of food waste, in particular Pied Crow.

The results of the impacts of the attraction of birds to novel (artificial) habitats and resources are more likely to be positive than negative. Some nuisance value may arise to the developer, e.g. in the form of fouling of the panels. It is considered that the ultimate impact of this phenomenon – in terms of the effect of inflated numbers of some species on the overall species composition in the vicinity of the development area, and the possible need for management or removal of these nests by the developer – is difficult to predict. An adaptive management approach is therefore required.

Taking the above mentioned in to account, the intensity of potential impacts is rated as low and is more likely to have positive effects; some nuisance value may arise to Hylron.

The extent of the impact would be confined to the site and its nearby surroundings (i.e. local).

The duration of impact is rated as moderate, i.e. life of the Project.

Consequence

The determining consequence of the impact is Low.

Probability

The probability of these impacts occurring is possible.

Significance

The significance of the impact in is rated **low**.

Tabulated summary of the assessed impact – Attraction of birds to novel (artificial) habitats and resources

Mitigation	Intensity	Duration	Extent	Consequence	Probability of Occurrence	Significance
Unmitigated:	**L**	**M**	**L**	**L**	**M**	**L**
Mitigated	**L**	**M**	**L**	**L**	**M**	**L**

Management and mitigation measures

Refer to Section 6.5.2 in the EMP (Appendix G). Key actions include the following:

- Ensure strict and effective waste management (including of food and kitchen waste), to discourage an unnatural increase in scavenging species such as Pied Crow
- Prevent bird perching or nesting activities on solar infrastructure through adaptive management measures.

8.2.5 ISSUE: BIRD COLLISIONS WITH INFRASTRUCTURE SUCH AS SOLAR PANEL ARRAYS, FENCING AND OTHER ASSOCIATED STRUCTURES

Assessment of Impact

Nature and intensity, duration of impact and geographical extent

Birds may be injured or killed by colliding with solar PV panels or other infrastructure, including fencing or masts (including guy wires).

Recent research has highlighted the fact that the most susceptible groups to collision mortality (as documented extensively on power line structures) are large, long-lived and slow-reproducing birds, often habitat specialists with hazardous behavioural traits (especially flight height and flocking flight), with high spatial exposure to collision risk with overhead structures such as power lines, and with unfavourable conservation status. The collision risk is believed to be increased by factors that include a large wingspan and low manoeuvrability (e.g. bustards, pelicans), nomadic/migrant habits, flying in groups, flying in low light (e.g. flamingos and other waterbirds), territorial or courtship behaviour (e.g. in raptors), juvenile inexperience and predation. Predominantly, the above collision-prone group comprises large terrestrial or wetland species, as well as raptors. Bustards (and some other groups of birds) are visually compromised when flying forwards. The concern about bustard collisions is particularly high, both regionally and globally.

Gregarious species (such as vultures) are generally thought to be more vulnerable than species with solitary habits.

Recent findings at solar PV facilities in North America suggest that collision mortality impacts at such plants may be underestimated, particularly in terms of collision trauma with solar PV panels; this could possibly be associated with polarised light pollution and/or with waterbirds mistaking large arrays of solar PV panels for wetlands (the so-called "lake effect"). Due to this misperception, such birds may land on the hard panel surfaces and die on impact, become injured, or are unable to take off from terrestrial surfaces and ultimately die of exposure, or become preyed upon. This effect has emerged as a significant impact factor at one solar site in the United State where mortality monitoring is on-going. Collisions are also possible on associated fencing or masts (including guy cables), especially if a bird is startled.

Artificial lighting may impact on night-flying or migrant birds, especially in terms of causing disorientation and/or collisions on structures. Flamingos usually fly at night, and fall into this group. New forms of lighting in areas that were previously unlit may exacerbate the problem of collisions, and also affect movement patterns and corridors. It has been found that nocturnally migrating birds (small passerines, in this case) may become attracted to an isolated pool of diffused light. When there is no moon, plus low fog, the birds could also become attracted to an illuminated, reflective array of solar panels, perhaps becoming disorientated because they are used to following visual clues such as the moon. Predatory birds (e.g. owls) may also, indirectly, become attracted to infrastructure should lighting sources attract prey items such as insects. However, with reference to Section 4.1.2, the Pilot phase of the Oshivela Project, will be operational solely in daytime. A few lights will however be installed for security purposes and for unscheduled repairs or maintenance, which would be comparable to lights of existing households in the area.

Although there are few studies of the impacts of utility-scale photovoltaic (PV) facilities on birds, especially in the region, a recent study that assessed the impacts of such a facility on birds in the Northern Cape, South Africa reported only eight fatalities during three months of surveys of the solar field for bird carcasses and other signs of collisions. The extrapolated mortality for the facility was 435 (95% CI 133–805) birds per year (4.5 bird fatalities·MW^{-1}·yr^{-1}; 95% CI, 1.5–8.5). No threatened species were impacted by the PV facility, but it was concluded that further data are required to better understand the risk of PV solar energy developments on birds. This finding is supported by other studies that observed no obvious evidence for bird casualty in terms of collision risk caused by solar panels, despite conducting 515 bird surveys at solar PV sites at United States airports.

However, in terms of the present assessment, open water bodies in an arid environment would be a source of attraction for any waterbirds. The same behaviour could also apply to solar arrays that give the effect of a water body, especially at night. Bird collisions of Greater Flamingo, Lesser Flamingo and Great White Pelican on overhead power lines have already been reported in the broader area (see above). Waterbirds, including Lesser Flamingo and Great White Pelican, have been recorded landing as early as during construction at the Husab Mine water bodies such as the Mine Run-off Ponds, SX Pond and Tailings Storage Facility as an overnight roosting site during occasional flight movements across the area (i.e. Swakop Uranium Environmental Section pers. comm. 2022).

The results of the impact of bird collisions are direct and negative, usually resulting in injury or mortality. Indirect impacts resulting from such collisions, and/or entrapment in surrounding fences, could include predation if the bird is unable to fly or take off.

Collisions on fencing as less likely, given that the developer proposes to leave the solar PV area unfenced.

Bird species at risk:

- Collisions on solar PV structures: low probability

Aquatic bird species are considered to be at higher risk to collisions on solar PV arrays. Open-water aquatic habitats are limited in the study area, and no associated bird species were recorded during the present site visits. However, the potential priority list includes at least three aquatic species that could potentially be impacted by collisions with solar PV panels in the above way through their already recorded movements in the greater area, namely:

    - Lesser Flamingo (Vulnerable; Globally Near Threatened; nomadic movements, [partial] intra-African migrant; collision-prone on power lines in greater area; local abundance: low)
    - Greater Flamingo (Vulnerable; nomadic movements, [partial] intra-African migrant; collision-prone on power lines in greater area; local abundance: low)
    - Great White Pelican (Vulnerable; sedentary, nomadic movements; collision-prone on power lines in greater area; local abundance: low)

- Collisions on other infrastructure, including masts/guy wires: low probability
    - Raptors
    - Ludwig's Bustard

- Rüppell's Korhaan
- Namaqua Sandgrouse
- Common Ostrich

Taking the above mentioned in to account, the intensity of impacts is rated low.

The extent of the impact would be confined to the project area.

The duration of impacts is rated as moderate, i.e. life of the project.

Probability

The probability of bird collisions occurring is rated as low to moderate in the unmitigated scenario and low with mitigation.

Consequence

The determining consequence of the impact is low.

Significance

The significance of the impact in the unmitigated and mitigated scenarios is **low**.

Tabulated summary of the assessed impact – Bird collisions with infrastructure such as solar panel arrays, fencing and other associated structures

Mitigation	Intensity	Duration	Extent	Consequence	Probability of Occurrence	Significance
Unmitigated	**L**	**M**	**L**	**L**	**L-M**	**L**
Mitigated	**L**	**M**	**L**	**L**	**L**	**L**

Management and mitigation measures

Refer to Section 6.5.2 in the EMP (Appendix G). Key actions include the following:

- Careful siting of the solar panel arrays has ensured that sensitive habitats and potential flyways, such as drainage lines, hills/outcrops and ridges, have been avoided at an early stage.
- Avoid unnecessary disturbance to birds near solar PV infrastructure.
- If monitoring results indicate that bird collisions are taking place on the solar panels, adaptive mitigations could include the retrofitting of visual cues to existing panels.

8.3 VISUAL IMPACTS

8.3.1 INTRODUCTION

With reference to Table 19, visual impacts on this receiving environment may be caused by activities and infrastructure during both construction and operational phases.

Negative visual (and sense of place) impacts are expected as a result of the visual intrusion by the proposed infrastructure, specifically when viewed from the Norasa Uranium Project Private access road located adjacent to the proposed Pilot Project area. This road is also used by surrounding farm owners and their guests.

The visual aspects that could cause potential impacts therefore include the following:

- Potential visual impacts to third parties (i.e. sensitive visual receptors) and landscape disturbance to the environment - further assessed below.

The following is a qualitative assessment of the potential visual impacts and assessment of the sense of place, associated with the development of the proposed Oshivela Pilot Project.

8.3.2 ISSUE: GENERAL VISUAL IMPACTS AND SENSE OF PLACE

Infrastructure and PV power projects could cause visual and landscape disturbance to the environment. The Oshivela Pilot Project includes PV solar facilities, which would cover a maximum of 30 Ha of space, which along with the proposed process plant and associated infrastructure and activities can cause change to the fabric and character of the study area and possible visual intrusion (including possible glare from the panels) in a sensitive landscape (refer to Section 6.6).

Typical issues are the following (GYLA, 2022):

- Who will be able to see the new development?
- What will it look like, and will it contrast with the receiving environment?
- Will the development affect sensitive views in the area, and if so, how?
- What will be the impact of the development during the day and at night?
- What will the cumulative impact be, if any?

Assessment of Impact

Nature and intensity, duration of impact and geographical extent

The nature and intensity of visual impacts is determined by assessing the change to the visual landscape as a result of the proposed new Pilot Project with its related infrastructure and

activities. The (existing) visual landscape is determined by considering: landscape character, sense of place, aesthetic value, sensitivity of the visual resource and sensitive views.

With reference to Section 6.6, the landscape is rated as sensitive to change in general and when viewed from the perspective of a land owner or their guests / visitors, the natural landscape is associated with a serene and tranquil sense of place. The area in which the proposed Pilot Project is situated is therefore considered to have a significant visual landscape.

When considering the potential change to the visual landscape the key issues are: visual exposure, visual intrusion, and sensitivity of receptors. Each of these issues is discussed below.

With reference to Section 6.6.6, the main visual receptors and sensitive viewers of the Project would be:

- Two residential homesteads on the Farm Valencia. The one house is located ~ 2.6 km north-east of the Pilot Project site and the second house is located ~ 6 km north-east of the site, along the edge of the sand dune. It must however be noted that this homestead is on the north-eastern side of an outcrop (hill) and the site will not be visible from this house (see below).
- The house on the Farm Namibplaas west located ~ 9.5 km north-east of the Pilot Project site. It must however be noted that this homestead is on the north-eastern side of an outcrop (hill) and the site will not be visible from this house (see below).
- Surrounding Farm owners and their guests using the Norasa Uranium Project Access Road. It must however be noted that the Project site would only be visible for a relatively short distance from this road.
- People working at the Norasa Uranium Project or at the farms, travelling along local roads whose attention may be focused on their work or activity and who therefore may be potentially less susceptible to changes in the view.

The other farms' houses are too far away and therefore fall outside the zone of potential influence, also taking the topography of the study area into account.

Visual exposure is the extent to which Project infrastructure and activities will appear in the various views. It follows that the closer the infrastructure and activities, the greater the visual exposure. According to GYLA (2022), the impact of an object in the foreground (0 – 800m) is greater than the impact of that same object in the middle ground (800 m – 5 km) which, in turn is greater than the impact of the object in the background (greater than 5 km) of a particular scene.

Distance from a viewer to a viewed object or area of the landscape influences how visual changes are perceived in the landscape. Generally, changes in form, line, colour, and texture in the landscape become less perceptible with increasing distance. Areas seen from 0 to 800 m are considered foreground; foliage and fine textural details of vegetation are normally perceptible within this zone. Areas seen from 800 m to 5 km are considered middle ground; vegetation appears as outlines or patterns. Depending on topography and vegetation, middle ground is sometimes considered to be up to 8 km. Areas seen from 5 km to 8 km and sometimes up to 16 km and beyond are considered background. Landforms become the most dominant element at these distances. Seldom seen areas are those portions of the landscape that, due to topographic relief or vegetation, are screened from the viewpoint or are beyond 16 km from the viewpoint. Landforms become the most dominant element at these distances.

With reference to Section 6.3, the study area (i.e. the proposed Oshivela Pilot Project site and surroundings) is characterised by sandy gravel plains that are flat to undulating, occasionally interspersed with isolated ridges, hills (inselbergs) and mountains. Transitions between landforms are often abrupt. Each of the sensitive viewer locations, taking their respective exposure into consideration, are described in more detail below:

- House on the Farm Valencia is located ~ 2.6 km north-east of the Pilot Project site:

  Refer to Figure 26 for the elevation profile between the process plant location and House 1 on Farm Valencia. From the Figure it is evident that the Pilot Project infrastructure would largely be hidden behind the Marble outcrop. The highest infrastructure at the process plant would be ~15 m, meaning that a small part of the infrastructure would possible be visible above the outcrop area. However at a distance of ~ 2.6 km it would not be clear.

FIGURE 26: ELEVATION PROFILE BETWEEN THE PROCESS PLANT LOCATION AND HOUSE 1 ON VALENCIA FARM

- House on the Farm Valencia located ~ 6 km north-east of the site:

  Refer to Figure 27 for the elevation profile between the process plant location and House 2 on Farm Valencia. From the Figure it is evident that the Pilot Project infrastructure would completely be hidden behind the hill with red sand dune adjacent (west) to the house. Furthermore, with the house being ~ 6 km from the Project development area, and the topographical features in-between, the visual exposure is relatively small.

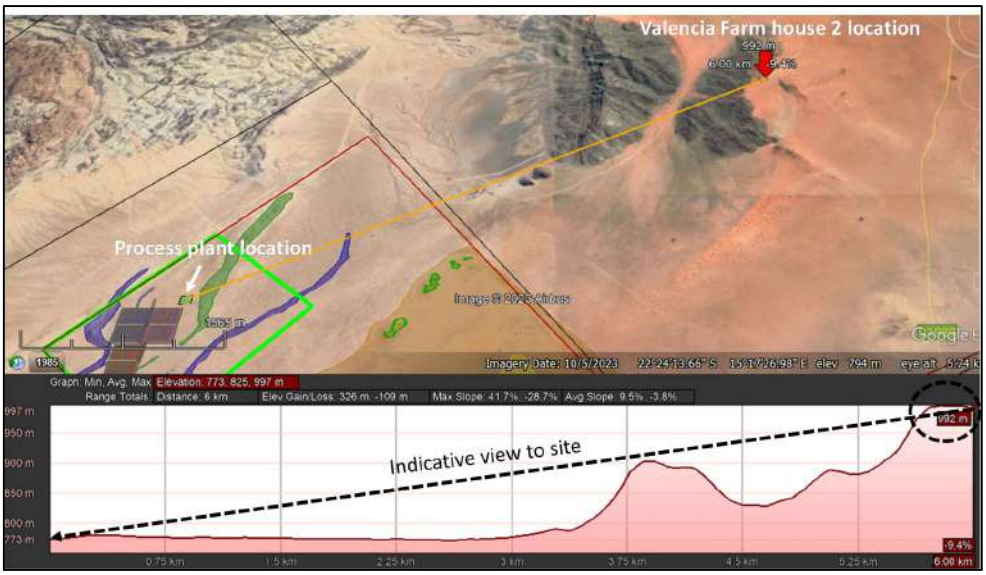

FIGURE 27: ELEVATION PROFILE BETWEEN THE PROCESS PLANT LOCATION AND HOUSE 2 ON VALENCIA FARM

- <u>The house on the Farm Namibplaas west located ~ 9.5 km north-east of the Pilot Project site:</u>

Refer to Figure 28 for the elevation profile between the process plant location and House on Farm Namibplaas west. From the Figure it is evident that the Pilot Project infrastructure would completely be hidden behind the hills. Furthermore, with the house being ~ 9.5 km from the Project development area, the visual exposure is insignificant.

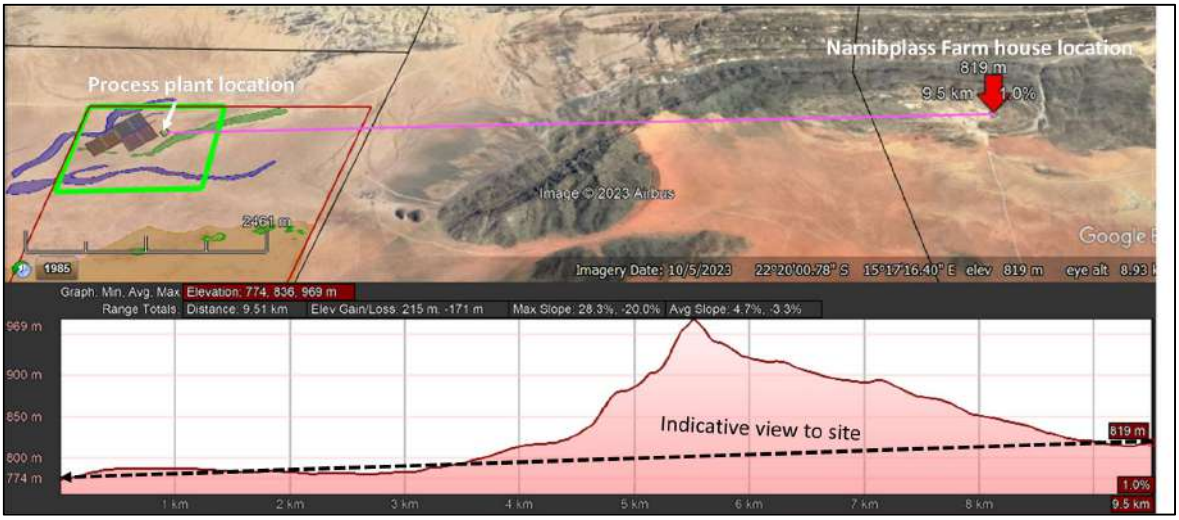

FIGURE 28: ELEVATION PROFILE BETWEEN THE PROCESS PLANT LOCATION AND HOUSE ON FARM NAMIBPLAAS WEST

- Third parties using the Norasa Uranium Project Access Road.

With reference to Section 6.6.3 and the photos taken from the Norasa Uranium Project access road (see Figure 22) it is evident that the Pilot Project infrastructure would be visible from the road (as it will be very close to the road). However, the project infrastructure would be visible for only a ~ 2.5 km Section when traveling along the access road (i.e. a very small percentage of the full length of the road from the B2). Also, only a few sensitive viewer receptors (i.e. farm owners and their guests) make use of this access road, as other access roads to the surrounding farms exist.

Visual intrusion is the extent to which the infrastructure and activities will contrast with the visual landscape and can/cannot be absorbed by the landscape. The visual intrusion of the proposed Project is considered to be low to moderate as infrastructure would be absorbed in the landscape at some distance and very few sensitive viewer locations will be affected.

Taken together, the unmitigated cumulative intensity of visual and landscape disturbance is low to moderate, specifically taking the Norasa Uranium Project Access Road, used by some of the

surrounding farm owners and their guests into consideration.

The duration of the impacts is moderate, i.e. for the life of the Project. The extent is low to moderate.

Consequence

The determining consequence is low to moderate for both the unmitigated and mitigated scenarios.

Probability

With reference to the discussions above, the proposed new Pilot Project infrastructure would be visible for a short Section along the Norasa Uranium Project access road and possibly only small Sections of the infrastructure from the closest house on Farm Valencia. Therefore a moderate to high rating.

Significance

The significance of impact is low to moderate in the unmitigated and mitigated scenarios.

Tabulated summary of the assessed impact – General visual impacts and sense of place

Mitigation	Intensity	Duration	Extent	Consequence	Probability of Occurrence	Significance
Unmitigated	**L-M**	**M**	**L-M**	**L-M**	**M-H**	**L-M**
Mitigated	**L-M**	**M**	**L-M**	**L-M**	**M-H**	**L-M**

Management and mitigation measures

Refer to Section 6.10.2 in the EMP (Appendix G). Key actions include the following:

- Adopt responsible construction practices that strictly contain the construction / establishment activities to demarcated areas.
- Avoid contrasting colours of paint on all structures; instead colours that reflect and compliment the colours of the surrounding landscape are recommended.
- "Housekeeping" procedures should be developed for the project to ensure that the project site and lands adjacent to it are kept clean of debris, litter, or waste generated on-site.
- Construction and operational activities must be limited to daylight hours.

8.4 GROUNDWATER AND SURFACE WATER

8.4.1 INTRODUCTION

With reference to Table 19, various activities and site infrastructure / facilities relating to the proposed Pilot Project pose potential impacts to groundwater and surface water that needed to be assessed. Each of these potential impacts (i.e. "issues") are separately considered and assessed in the Sections below. This Section was compiled by S Müller (hydrogeological specialist).

8.4.2 ISSUE: BIOPHYSICAL AND SOCIAL ASPECTS OF GROUNDWATER ABSTRACTION

The availability of groundwater is limited by the dry climate, especially the fact that groundwater recharge only takes place in years with exceptionally good rainfall that occur at random intervals, though local sources often refer to an average of every ten years. Individual boreholes may yield considerable volumes of water but the aquifer size is usually limited and the stored reserves could soon be depleted through continuous pumping.

The proposed Pilot Project will use the existing borehole no. 61617 on Farm Bloemhof that lies on the banks of a major drainage line and is recharged through infiltration of rainwater and runoff into the alluvium. With reference to section 6.5.3, the former owner of farm Bloemhof determined the optimum pumping rate for borehole no. 61617 of 2.4 m^3/h and the borehole's sustainable yield of 7,900 m^3/annum through long term observation. Further information on the aquifer parameters is not required at this stage because the Pilot Project will use very little water (refer to section 4.2.4), less than the farmer's continuous consumption. However, a more detailed hydrogeological investigation should be carried out before implementing the possible next project phase, i.e. upscaling (see Sections 1.4 and 1.5.2).

As described in Section 6.5.3, the available data indicate general groundwater flow directions from north-east to south-west, which means that the neighbouring farms (in the same catchment) are upstream of this borehole and will not be affected by water abstraction for the project. One sometimes hears the opinion that the cone of depression around a borehole will draw in water from upstream at a higher rate than the normal flow. This only applies in case of a single aquifer, while the boreholes around Bloemhof are situated on widely spaced discrete fractured rock aquifers. Also, contrary to another common misperception, these water sources are topped up by recharge from rainfall and runoff, not by groundwater flowing in from upstream.

Though the water analyses that were provided showed the quality to be unsuitable for human consumption the previous farm owners reported no health effects 'if one is used to it'. To supply

drinking water to the employees at the plant, the borehole water should be mixed with desalinated water so that it meets the Namibian Group B water quality standard as a minimum.

With the low volume to be abstracted it should not be necessary to apply for a groundwater abstraction permit but, if necessary, this will be done. A licence to operate a water treatment plant to produce potable water and a wastewater discharge exemption permit from the Ministry of Agriculture, Water & Land Reform will be required.

Assessment of Impact

Nature and intensity, duration of impact and geographical extent

A potential negative impact on the groundwater resources at Bloemhof can be expected but it is very unlikely that it will spread beyond the borders of the farm and affect other users. The physical intensity of the impact will be LOW, even if the water table is drawn down, because once the previous sheep farming has ended, there are few other uses for the water on the farm and hardly any negative effects on the biophysical environment, e. g. trees drawing water from the aquifer. The naturally brackish water does not have any economic value apart from the potential utilisation in project operations. Effects of pumping on the local groundwater on the farm may arise within a short time and persist in the medium- to long-term as groundwater recharge is a highly localized and rare event.

Neighbours and other stakeholders may however perceive water as a sensitive issue and ask the company to demonstrate the low impact beyond doubt during the EIA process through monitoring.

Consequence

The consequence of the impact is therefore low for both the unmitigated and mitigated scenarios.

Probability

Effects of pumping on the local groundwater on the farm itself may arise within a short time and persist in the medium- to long-term as groundwater recharge is a highly localized and rare event. Due to the disjointed nature of the aquifers and the distances between farms it is very unlikely that abstraction at the project site will affect neighbouring properties. The probability of impacting third parties is therefore rated as low.

Significance

The significance of the impact is rated as **low** for both the unmitigated and mitigated scenarios.

Tabulated summary of the assessed impact – Biophysical and Social Aspects of Groundwater Abstraction

Mitigation	Intensity	Duration	Extent	Consequence	Probability of Occurrence	Significance
Unmitigated	**L**	**M-H**	**L**	**L-M**	**L**	**L**
Mitigated	**L**	**M-H**	**L**	**L**	**L**	**L**

Management and mitigation measures

Refer to Section 6.3 in the EMP (Appendix G). Key actions include the following:

- For the biophysical impact, the only mitigation is the drilling and installation of additional boreholes on site, spreading the load to other aquifers or trucking in water from elsewhere.
- If new boreholes are drilled for the project in future, they should be test pumped to establish the aquifer parameters and sustainable pumping rates. Testing can also determine the extent of the area that will be affected by water level drawdown, so that the potential effect on boreholes in the vicinity can be assessed.

Monitoring Recommendations

- Monitor the water level of the existing borehole for early detection of excessive drawdown. Establish new boreholes, if required.

8.4.3 ISSUE: INFRASTRUCTURE IMPACTING SURFACE WATER FLOW / DRAINAGE

Assessment of Impact

Nature and intensity, duration of impact and geographical extent

The Project Site occupies a slightly dipping rocky plain covered with sheetwash deposits that will soak up all but the most intense rainfall without creating much surface runoff. The only distinct drainage line (i.e. shallow wash) with small tributaries that drains south-west towards the Khan River, is located outside the proposed project activities / infrastructure (see Figure 18 and Figure 25). The borrow pit is planned on the north-western side of the Norasa Uranium Project Private access road, outside another small wash (see Figure 25).

The 1 in 100-year rainfall intensity could range between 80 mm in 24 hours as measured at Trekkopje Mine and 160 mm in 24 hours, the maximum modelled for the Rössing Uranium Mine area.

Infrastructure, as well as the borrow pit, will therefore be placed away from the more distinct drainage line as well as the other smaller drainage lines identified in the Project area so that it

will not interfere with the drainage pattern or be exposed to stormwater damage risks. No or very little impact is expected, the extent of the impact is local and the damage, if any, can be reversed at the end of the project. The intensity, duration and extend are rated as LOW.

Consequence

The consequence of the impact is therefore Low for the unmitigated and mitigated scenarios.

Probability

Major rainfall events causing storm damage could occur during any rainy season, the average probability is however unlikely.

Significance

The significance of the impact is rated as **low** for the unmitigated and mitigated scenarios.

Tabulated summary of the assessed impact – Infrastructure impacting surface water flow / drainage

Mitigation	Intensity	Duration	Extent	Consequence	Probability of Occurrence	Significance
Unmitigated	**L**	**L**	**L**	**L**	**L**	**L**
Mitigated	**L**	**L**	**L**	**L**	**L**	**L**

Management and mitigation measures

Refer to Section 6.3 in the EMP (Appendix G). Key actions include the following:

- No mitigation measures are required except for the sturdy anchoring of the PV panels to withstand storms and local runoff as well as the location of the borrow pit to be placed well outside the drainage line.

8.4.4 ISSUE: DESALINATION PLANT OPERATION AND BRINE DISCHARGE

Assessment of Impact

Nature and intensity, duration of impact and geographical extent

Construction of the Desalination Plant

Small package plants are usually delivered in a container and placed on a concrete slab. The plant is connected to a feed water tank containing borehole water on the upstream side and a brine storage tank on the downstream side. The latter should be fitted with a pump and a gooseneck for discharge into a water tanker. No adverse effects on the environment are expected to arise from the construction of the RO plant.

Operation of the Desalination Plant and Discharge of Brine

The main environmental issue that could arise from the operation of the RO desalination plant are effects on soil quality due to the elevated salinity of the brine used for dust suppression and the presence of low-toxicity, biodegradable treatment chemicals in the brine (antiscalants, clean-in-place acid solutions).

The treatment of the feed-water includes the removal of suspended solids, the control of scaling, and the periodical cleaning of the RO membranes. As different chemicals are suited for different types of membranes, exact specifications for the additives will only be known once the membrane type has been decided on. Manufacturers of RO membranes will provide relevant information regarding treatment and clean-in-place chemicals.

This Section describes the use and effects of cleaning chemicals that are used conventionally in desalination plants. Common scale-control additives are organic, carboxylic-rich polymers with a low toxicity that are added at a rate of 1-2 milligrams per litre.

Despite feed-water pretreatment, RO membranes may become fouled by biofilms, suspended matter and scale deposits, necessitating periodic cleaning. The cleaning intervals will depend on the quality of the plant's feed-water. The chemicals used are mainly weak acids and detergents. Alkaline cleaning solutions (pH 11-12) are used for removal of silt deposits and biofilms, whereas acidified solutions (pH 2-3) remove metal oxides and scales. Further chemicals such as detergents, oxidants, complexing agents or non-oxidising biocides for membrane disinfection, are often added to improve the cleaning process. Other commonly applied cleaning chemicals include sulphuric acid, ethylene-diamine-tetra-acetic acid (EDTA) and sodium tripolyphosphate. The toxicity of the various chemicals is relatively low and none of the products are listed as tainting substances (DWAF, 1995).

After the cleaning agents have been circulated through the membranes, the membranes are rinsed with product water several times. The flow volume of the wastewater stream is usually below 1% of the brine volume. The CIP chemicals should be blended with the brine waste stream to achieve an acceptable dilution and neutralisation of acids and alkalis. The resulting brine mix can be sprayed on the roads for dust suppression on the gravel roads constructed from soil that is naturally saline and contains gypsum.

Since chemicals will only be discharged intermittently for short periods, adding them to the brine mix is likely to have negligible effects on the receiving environment, i. e. the roads around the plant and a small area bordering the roads where more saline dust will be dispersed. A LOW impact intensity is expected, the extent of the impact will be highly localised and limited by the

project duration. Salts deposited on the roads will be dispersed by dust storms in the short to medium-term.

Consequence

The consequence is LOW because the salt composition of the brine will resemble the natural groundwater, albeit more concentrated with minute concentrations of cleaning chemicals.

Probability

The probability of negative water-related impacts occurring is UNLIKELY because brine-derived salts leached from the soil by rain will most probably not reach the deep water table. The water level in a newly drilled borehole on a hillside east of to the project area was 94 m in November 2023, while the water table at the nearest borehole on Farm Tevrede was below 100 m.

Significance

The impact of antiscalants and cleaning chemicals is thus deemed to be of LOW significance without mitigation, and the same applies to the use of brine for dust suppression. Any slight negative impact will be offset by the positive fact that the reuse of wastewater will reduce the groundwater abstraction.

Tabulated summary of the assessed impact – Desalination Plant Operation and Brine Discharge

Mitigation	Intensity	Duration	Extent	Consequence	Probability of Occurrence	Significance
Unmitigated	**L**	**L**	**L**	**L**	**L**	**L**
Mitigated	**L**	**L**	**L**	**L**	**L**	**L**

Management and mitigation measures

Refer to Section 6.3 in the EMP (Appendix G). Key actions include the following:

- Limit the use of treatment chemicals to minimum practicable quantities.
- Use low-toxicity chemicals.
- Ensure compliance with wastewater discharge permit conditions, especially effluent sampling and analysis requirements.
- Use the brine from the desalination plant on the project access road for dust suppression. When the brine is not used for dust suppression it needs to be discharged into a (plastic) lined evaporation pond constructed adjacent to the desalination plant.

Recommended Monitoring

- Monitor the product and brine water quality as specified in the DWA permit.

8.4.5 ISSUE: SEWAGE DISPOSAL

The disposal of untreated effluents from ablution facilities at the office and process plant could cause soil and water pollution and expose employees and wildlife to infectious diseases. It is therefore important that effluent is piped into a properly constructed septic tanks (as per DWA specifications) during early stages of the project at some distance from the plant and away from any boreholes to avoid contamination of the aquifer. Because proper disinfection of the treated effluent cannot be guaranteed it should rather not be reused for road dust suppression but channelled into a soak-away (french drain). The sludge that forms at the bottom of the tanks must be pumped out from time to time.

Assessment of Impact

Nature and intensity, duration of impact and geographical extent

Improper management of sewage can pollute the soil and groundwater, posing a threat to the environment, especially if surface water interacts with sewage and infiltration into the soil is not prevented. The intensity of this impact will be LOW because the brackish groundwater is not suitable for consumption and there are no other aquifer users around the project site. Though the extent of the impact depends on the volume of the discharge it will not exceed the local scale. The risk of spills will persist for the duration of the project, but it is reversible by flushing and dilution with fresh water.

Consequence

The consequence of sewage treatment in a septic tank system is rated as LOW.

Probability

A properly constructed and maintained septic tank is unlikely to pose a risk to the environment. In the absence of high-intensity rainfall, transportation of spilled effluent into the aquifer is considered UNLIKELY too.

Significance

The significance of the impact is rated as **low**.

Tabulated summary of the assessed impact – Sewage Disposal

Mitigation	Intensity	Duration	Extent	Consequence	Probability of Occurrence	Significance
Unmitigated	**L**	**L**	**L**	**L**	**L**	**L**
Mitigated	**L**	**L**	**L**	**L**	**L**	**L**

Management and mitigation measures

Refer to Section 6.3 in the EMP (Appendix G). Key actions include the following:

- Construct the septic tanks according to DWA specifications.
- Apply for a wastewater discharge permit and comply with its conditions.
- For health and safety reasons do not spray treated sewage on the roads.

Recommended Monitoring

- Monitor the build-up of sludge in the tanks and have it pumped out when necessary.

8.4.6 ISSUE: WATER AND SOIL POLLUTION

Pollution due to careless waste management and hydrocarbon spills is one of the main environmental risks experienced at all industrial sites. It requires continuous management and awareness training. Hydrocarbons will be present in vehicles (diesel, oil) and a fuel storage tank.

Waste types at the Pilot Project may include domestic waste, general and hazardous industrial waste and medical waste from the first aid station. Waste will be sorted and transported off site to appropriate recycling or landfill facilities (Swakopmund for general waste and Walvis Bay for hazardous waste). Prior to removal, it will be stored on site in suitable containers to prevent littering and contamination of the environment.

Assessment of Impact

Nature and intensity, duration of impact and geographical extent

The impact intensity is expected to be MODERATE in the worst case because hydrocarbon spills can easily pollute surface water and soil and even seep down to the water table, though this is unlikely under the local circumstances. The risk of hydrocarbon spills will be present for the duration of the project, but potential spills will only affect a very small area.

Consequence

The consequence of major hydrocarbon spills can be MODERATE, though pollution from other waste types has a LOW consequence rating.

Probability

The probability of major spills occurring at least once or twice during the pilot project duration is POSSIBLE without mitigation.

Significance

The **moderate** impact significance of unmitigated soil and water pollution can be reduced to **low** provided that the recommended mitigation measures are implemented.

Tabulated summary of the assessed impact – Water and Soil Pollution

Mitigation	Intensity	Duration	Extent	Consequence	Probability of Occurrence	Significance
Unmitigated	**M**	**M**	**L**	**M**	**H**	**M**
Mitigated	**L**	**M**	**L**	**L**	**L**	**L**

Management and mitigation measures

Refer to Section 6.3 in the EMP (Appendix G). Key actions include the following:

- Follow the waste management hierarchy with emphasis on avoidance and recycling.
- Store hydrocarbons in bunded areas able to accommodate 110% of the largest container or tank, equip parked vehicles and generators with spill trays.
- Train employees in the importance of waste management and spill emergency response to avoid littering and to clean up spills immediately.
- Establish a bioremediation facility to treat hydrocarbon-contaminated soil on site.

Recommended Monitoring

- Carry out regular inspections to detect spills and improper waste management.
- Keep a record of the various waste volumes (recycled, disposed, hydrocarbons, hazardous) and disposal certificates.

8.5 AIR QUALITY

8.5.1 INTRODUCTION

With reference to Table 19, there are various air pollution sources (i.e. largely dust) from the proposed Pilot Project activities. The qualitative assessment below referred to the baseline descriptions provided in Sections 6.1, 6.3 and 6.8, as well as the Air Quality Impact Assessment undertaken for the Shiyela Project (Airshed, 2022). Similar type of construction and operational activities are planned for the Oshivela Pilot Project (however at a smaller scale) to that planned at Shiyela and comparisons are therefore possible.

8.5.2 ISSUE: AIR POLLUTION, DUST NUISANCE AND INCREASED RISK OF HEALTH IMPACT TO THIRD PARTIES (CLOSEST RECEPTORS)

Assessment of Impact

Nature and intensity, duration of impact and geographical extent

Construction phase

Development of the processing plant and associated infrastructure, road infrastructure and solar PV sites as well as the borrow pit are likely to have the most significant impact on air quality during construction due to some level of land clearing (dozing and scraping activities), and trucks on freshly graded roads. Windblown dust from stockpiles and cleared areas will typically only occur when winds exceed 5.4 m/s, and since wind speeds can be high at times, especially under east-wind conditions, there is a possibility for higher impacts towards the west-southwest and southwest, but also to the east-northeast and northeast during westerly winds (see Section 6.1). On average, air quality impacts from construction activities are likely to be localised and limited to the Pilot Project Site area. Gaseous emission from the construction equipment and trucks are also likely to be localised impacting mainly on-site. Restricting construction activities to daytime hours, from 6:00 AM to 6:00 PM, reduces the risk of increased ground level concentrations, which are more likely to occur during the stable atmospheric conditions prevalent at night.

Operational phase

During the operational phase, sources of air pollution are likely to include:

- Vehicle entrained dust from unpaved roads because of trucks transporting materials to, from, and on-site including iron ore concentrate, waste (silica), and sponge iron:
    - ~2.5 trips per day for the transport of concentrate
    - ~2 trips per day for the transport of sponge iron
- Windblown dust from the iron ore concentrate stockpile
    - ~3 000 m^3 open stockpile of dry concentrate with particles generally less than 2 mm in diameter
- Dust from on-site handling and transfer of materials to various processing and beneficiation steps and unloading/loading of trucks, including:
    - ~27 000 tons per annum (t/a) concentrate (9 t/h)
    - ~15 000 t/a sponge iron (5 t/h)
    - ~2 000 t/a mineralised waste (e.g. silica) (less than 1 t/h)

- Exhaust emissions from haul trucks, and mobile diesel equipment such as front-end loaders. Exhaust emissions from trucks and mobile equipment will include e.g. nitrogen oxides (NOx), fine PM, sulphur dioxide (SO_2), unburned hydrocarbons, carbon monoxide (CO), carbon dioxide (CO_2), and volatile organic compounds (VOC).

The milling and separation of concentrate and briquetting (if applicable) are generally high moisture processes with little to no fugitive dust emissions expected. Emissions from the PV plant will be mostly limited to the construction phase.

Fugitive dust emissions, or particulate matter (PM), comprise a mixture of organic and inorganic substances, ranging in size and shape and can be divided into coarse and fine particulate matter. Total Suspended Particulates (TSP) represents the coarse fraction greater than 10 µm, with particulate matter with an aerodynamic diameter of less than 10 µm (PM_{10}) and particulate matter with an aerodynamic diameter of less than 2.5 µm ($PM_{2.5}$) falling into the finer inhalable fraction. TSP is associated with dust fallout (nuisance dust) whereas exposure to PM_{10} and $PM_{2.5}$ are a health concern.

For scale, and comparison with emissions from the Shiyela Iron Ore Project, high level emission estimates of fugitive dust emissions are included.

The transport of concentrate, sponge iron, mineralised etc. along the unpaved road network options toward site is likely to be the most significant source of air pollution. It was estimated that if unmitigated, TSP emissions in the order of 17 t/a-km (*ton per annum per km*) may be expected, with 9 t/a-km PM_{10}, and 1 t/a-km $PM_{2.5}$. Mitigation in the form of water and/or salt treatment could reduce emissions by 70% to 90% depending on the effectiveness of application. Note that the emissions estimate is based on the US EPA emission factor for unpaved roads (US EPA, 2006) with the following inputs/assumptions; 2.5 trips per day for the transport of concentrate; 2.5 trips per day for the transport of sponge iron; less than one trip per day for the transport of mineralised waste, average truck weight 34 t, road surface silt loading 20%.

The handling and transfer of materials are not likely to be a significant source of dust given the relatively low handling rates (concentrate 9 t/h, sponge iron 5 t/h, and mineralised waste less than 1 t/). Using the US EPA emission factor for miscellaneous handling and transfer operations (US EPA, 2006) it was estimated that unmitigated handling operations would result in less than 5 t/a of TSP emissions, 2 t/a PM_{10} and 1 t/a $PM_{2.5}$. The estimate assumes low moisture content (2%), and average wind speed of 4.7 m/s (Airshed, 2022), and about 10 handling steps each per material. Note that emissions from handling and conveyor transfers are wind speed dependent and may increase notably under stronger wind speed conditions causing dust particles to be

entrained by the wind. Dust suppression and/or enclosure/wind breaks may reduce emissions by 50% or more (NPI, 2012).

Dust may be generated from concentrate stockpile during strong wind conditions at a rate of approximately 0.4 kg/ha-h (NPI, 2012). Assuming a maximum stockpile footprint area of 3 000 m^2, less that 1 t/a of TSP will be released.

Fugitive dust and gaseous exhaust emissions and impacts from the Pilot Project are anticipated to be significantly lower, approximately one-tenth, compared to those estimated for the Shiyela Iron Ore Project (Airshed, 2022). This difference is mainly due to the Shiyela Iron Ore Project encompassing not only the iron ore reduction process (at a higher production rate) but also opencast mining activities.

The project's technology, activities, and scale of operations are such that, while it will contribute to the atmospheric load of particulate matter and gases in the area during the operational phase, its impact is anticipated to be localized and within acceptable air quality standards off-site and at sensitive receptors. This is contingent upon the effective management of dust from especially unpaved haul routes and other fugitive emission sources.

Taking all the above into consideration, the impact intensity for the operations phase is rated as low to moderate in the unmitigated scenario. With mitigation, the intensity is rated low. The duration of the impact (unmitigated) will be moderate, the project life. The extent is rated as low.

Consequence

The consequence of the impact is therefore low to moderate, for the unmitigated scenario and low for the mitigated scenario.

Probability

The probability of increased $PM_{2.5}$ and PM_{10} GLCs at AQSRs is possible without mitigation. With mitigation the potentials for dust generation reduces.

Significance

The significance of the impact is rated as **low to moderate** for the unmitigated scenario and **low** with mitigation.

Tabulated summary of the assessed impact – Air pollution, dust nuisance and increased risk of health impact to third parties (closest receptors)

Mitigation	Intensity	Duration	Extent	Consequence	Probability of Occurrence	Significance
Unmitigated	**L-M**	**L**	**M**	**L-M**	**L-M**	**L-M**
Mitigated	**L**	**L**	**M**	**L**	**L-M**	**L**

Management and mitigation measures

Refer to Section 6.8.2 in the EMP (Appendix G). Key actions include the following:

- Visually inspect the dust generation sources regularly. Keep photographic record.
- Apply dust suppression on the (gravel) access road to the site, within the farm boundaries as a minimum.
- Depending the visual monitoring and any complaints received, further dust suppression need to be implemented on sections of the Norasa Uranium Project private access road close to the Oshivela Pilot Project Site. Dust monitoring, through the placement of dust buckets must also then be considered.

8.6 NOISE

8.6.1 INTRODUCTION

With reference to Table 19, there are various processing and associated activities that will cause noise.

The qualitative assessment below made reference to the baseline descriptions provided in Sections 6.1, 6.3 and 6.7, as well as the Noise Impact Assessment (Soundscape, 2022) undertaken for the Shiyela Project. Similar type of construction and operational activities are planned for the Oshivela Pilot Project (however at a smaller scale) to that planned at Shiyela and comparisons are therefore possible.

8.6.2 ISSUE: NOISE DISTURBANCE TO THIRD PARTIES (CLOSEST SENSITIVE NOISE RECEPTORS)

Assessment of Impact

Nature and intensity, duration of impact and geographical extent

Construction phase

Several activities associated with the construction of infrastructure and installation of equipment will generate noise. Detailed information relating to the specific equipment and activities during construction is limited, however, with reference to Section 4.3, the construction phase will involve the establishment of all facilities and infrastructure needed for operation including the process plant and PV arrays and borrow pit establishment. Noise will be emitted by construction equipment used for the fabrication and erection of infrastructure including all related activities such as land clearing, site preparation, excavation, clean-up and landscaping. Noise generated during construction will be highly variable given variations in the power expended by construction equipment. Besides having daily variations in activities, construction projects are generally

executed in several different phases where each phase has a specific equipment mix depending on the phase.

In the absence of source specific sound levels, SANS 10328 allows for the use of information from proven data or from publications such as British Standard BS 5228-1, the 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise'. (Soundscape, 2022).

The noise impact is defined as the difference between expected cumulative noise levels and existing noise levels for the area. Reference is made to the 3 dBA increase guideline by the IFC for human receptors (see Section 3.3.2). A person with average hearing acuity may be able to detect an increase of 3 dBA in ambient noise. This high-level estimate of construction phase impacts yielded average day-time impact areas of 610 m. No night-time activities are planned by Hylron. It could however in rare occasions be necessary to complete unplanned repairs or maintenance after hours. With the closest noise sensitive receptor being ~ 2.6 km north-east of the proposed processing plant area, i.e. construction activities, the cumulative significance of construction activities is rated low.

Operational phase

Main sources of noise at the Pilot Project during its operational phase will include:

- Diesel driven equipment:
    - Truck noise, including but not limited to delivery and off-loading construction and raw materials, the transport of the iron ore concentrate to site and final product off-site, staff transport.
    - Materials handling equipment e.g. front-end loaders and excavators.
- Installing of the uprights for the PV panels (i.e. Hammer holes with a modified excavator / jack hammer, auger holes and / or drill holes in some parts – see Section 4.3.2).
    - Processing plant equipment
    - Mills and vibratory screens.
    - Shaft drive equipment e.g. electric motors, gearboxes.
    - Electric motor driven fans, pumps, compressors etc.
    - Conveyors
- Power supply equipment, including:

- PV panel actuators
- Transmission equipment i.e. inverters, transformers, switchgears, power lines, etc.
- Plant signals e.g. mobile equipment reverse warning signals, shift change and emergency signals.

Noise generating equipment can be divided into distinct categories. These are:

a. Earthmoving equipment.

b. Materials handling equipment.

c. Stationary equipment.

d. Impact equipment.

e. Other types of equipment.

The first few categories include machines that are powered by internal combustion engines. Machines in the latter two categories are powered pneumatically, hydraulically, or electrically. Exhaust noise tends to account for most of the noise emitted by machines in the first three categories (those that use internal combustion engines) whereas engine-related noise is usually secondary to the noise produced by the impact between impact equipment and the material on which it acts. Noise generated by mechanical equipment, including electric motors (drive units), gearboxes, pumps, fans etc. is dependent on the portion of total mechanical or electrical energy that is transformed into acoustical energy. (Soundscape, 2022).

Noise levels as a result of sources associated with operational phase of the Shiyela Project were conservatively estimated by assuming simple hemispherical propagation (i.e. source close to ground level). Applying these noise sources to the Oshivela Pilot Project make it even more conservative, due to a smaller scale Project and less activities planned (for Oshivela).

The calculation does not account for atmospheric noise attenuation, meteorological, ground absorption and other mitigating effects.

Expected (worst case) noise levels as a function of distance from specific operational activities are presented in Figure 29. During the operational phase, noise emitted will reduce to levels comparable to those found in rural areas within 1 km from the source during the day. Night time levels were not taken into consideration, due to the fact that the Pilot Phase activities will only be conducted during the day. The IFC noise level guidelines of 55 dBA and 45 dBA will be met within 400 m from the source.

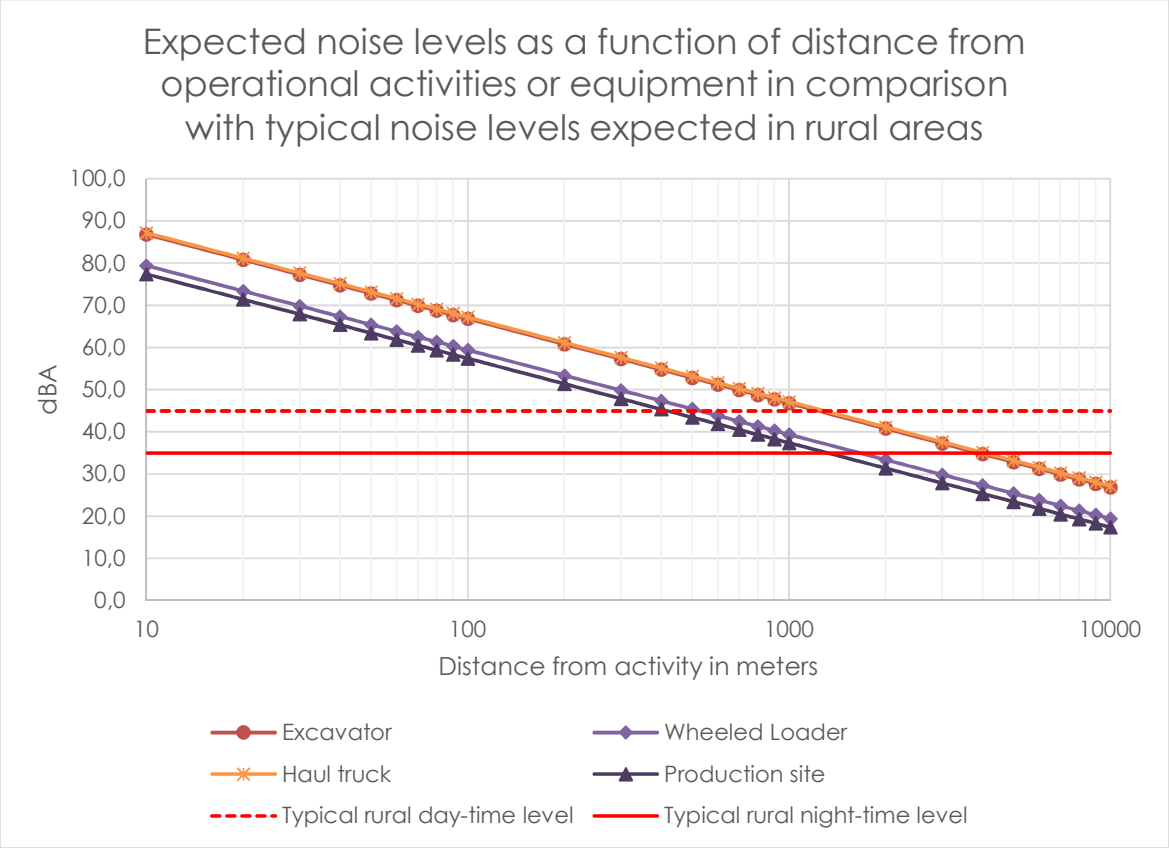

FIGURE 29: EXPECTED NOISE LEVELS AS A FUNCTION OF DISTANCE FROM OPERATIONAL AREAS OR EQUIPMENT IN COMPARISON WITH TYPICAL NOISE LEVELS EXPECTED IN RURAL AREAS (SOUNDSCAPE, 2022)

The noise impact of operational phase activities is presented in Figure 30. Reference is made to the 3 dBA increase guideline by the IFC for human receptors. On average operational phase activities and equipment will result an increase of 3 dBA over residual noise levels up to 850 m from the source during the day. Night time values are also reflected in the figure below, however, the Pilot Phase activities will only be conducted during the day.

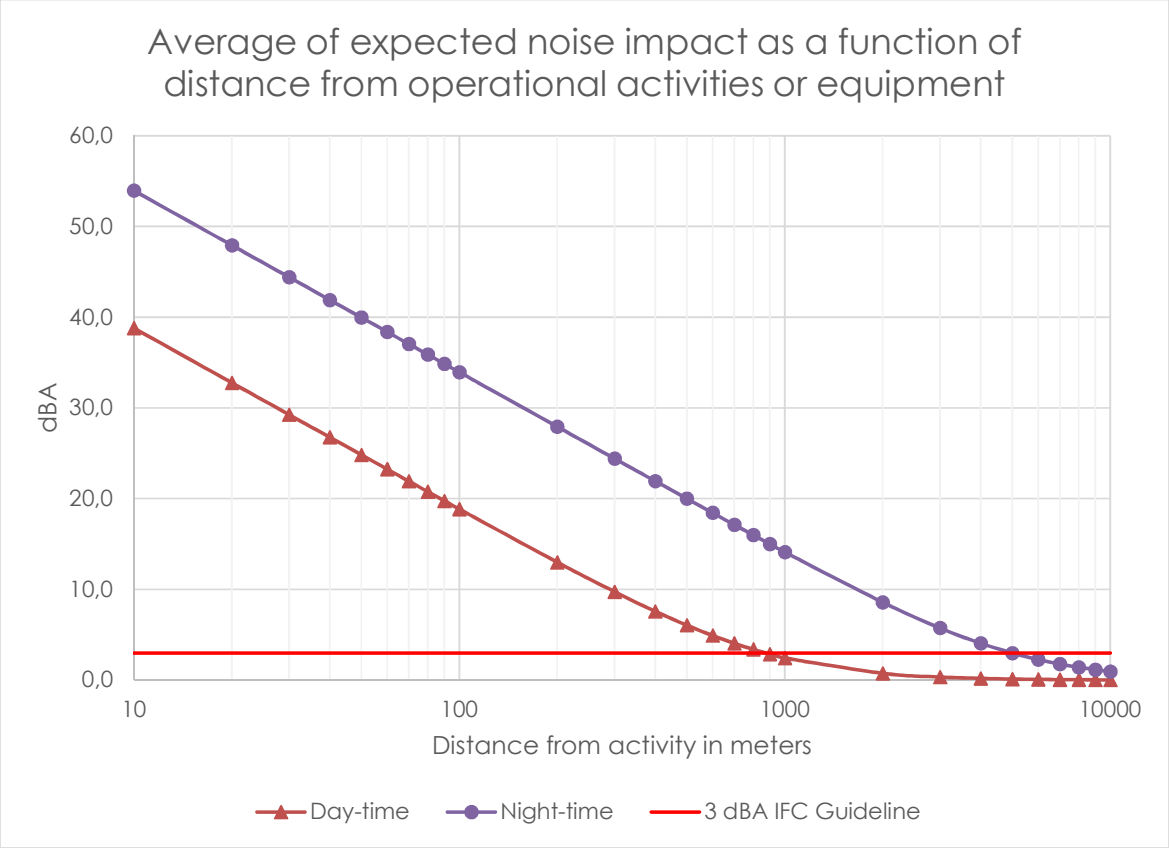

FIGURE 30: AVERAGE OF EXPECTED NOISE IMPACT AS A FUNCTION OF DISTANCE FROM OPERATIONAL ACTIVITIES OR EQUIPMENT (SOUNDSCAPE, 2022)

Taking all of the above into consideration, as well as the fact that the Pilot Project will be developed to the west and south-west of a marble outcrop, which will form a natural screen (i.e. noise barrier) between the Project activities and the closest noise sensitive receptor), the impact intensity for the operations phase is rated as low. The duration of the impacts is considered to be moderate (i.e. life of the Project). The extent of the impacts would be confined to within the project area and its nearby surroundings and is rated as low.

Consequence

The determining consequence of the impact is therefore low.

Probability

Although noise will be generated during both the construction and operational phase, it is unlikely that it will impact on human receptors.

Significance

The significance of the impact is rated as **low**.

Tabulated summary of the assessed impact – Noise disturbance to third parties (closest receptors)

Mitigation	Intensity	Duration	Extent	Consequence	Probability of Occurrence	Significance
Unmitigated	**L**	**M**	**L**	**L**	**L**	**L**
Mitigated	**L**	**M**	**L**	**L**	**L**	**L**

Management and mitigation measures

Refer to Section 6.9.2 in the EMP (Appendix G). Key actions include the following:

- Establish and maintain a complaint register where interested and affected parties can lodge noise related complaints.
- In response to a complaint, investigate possible causes and if required make use of a specialist to determine the likely source through monitoring and or a site inspection. Remedial actions to prevent such events in future should then be taken.
- No construction and operations activities during night time that can generate noise.

8.7 ARCHAEOLOGY

8.7.1 INTRODUCTION

With reference to Table 19, the construction activities and movement of vehicles associated with the Pilot Project have the potential to encroach upon, disturb, damage or destroy archaeological remains protected under the National Heritage Act (27 of 2004).

Information in this section was sourced from the Archaeology Specialist (Phase 2) Report (Appendix F) with a qualitative assessment provided below. With reference to Section 6.9, a Phase 2 field survey and assessment was undertaken by the Archaeologist in January 2024. The results of the Phase 2 field survey was used to further augment this section as part of the finalisation of this EIA Scoping (including Impact Assessment) Report for submission to the relevant Ministries for their review and decision-making of the ECC Application.

8.7.2 ISSUE: DAMAGE OR DESTRUCTION OF ARCHAEOLOGICAL SITES

Assessment of Impact

Nature and intensity, duration of impact and geographical extent

With reference to Section 6.9 the proposed Oshivela Pilot Project site occupies mainly calcrete gravel terrain which previous surveys show to have a relatively low density of archaeological sites. Furthermore, thirteen seed digging sites were identified in and adjacent to the Oshivela

Project AoI. Seed digging sites are generally given a low Significance ranking because they are extremely numerous indicators of human activity rather than sites of occupation.

The Pilot Project Area is therefore of generally low archaeological significance, however, the small number of specific sites (i.e. seed diggings) are considered to be vulnerable to disturbance from Project activities.

Taking the above into consideration, the impact intensity is rated as low. The duration of the impacts is considered to be long term (high). The extent is local, mostly within the Pilot Project area (i.e. AoI) and is rated as low.

Consequence

The determining consequence of the impact is therefore moderate.

Probability

With reference to the above, seed diggings are considered to be vulnerable to disturbance, however, due to the fact that these sites are not considered significant, the probability of significant historical remains being disturbed or destructed, is unlikely. The probability for damage to significant heritage sites is therefore low. However, due to the fact that a number of the identified seed digging sites will most likely be disturbed, the probably rating is increased to **High**. In the 'mitigated scenario' the rating is **Low**.

Significance

The significance of the impact is rated as **moderate** in the unmitigated scenario and **low** in the mitigated scenario.

Tabulated summary of the assessed impact – Damage or destruction of archaeological sites

Mitigation	Intensity	Duration	Extent	Consequence	Probability of Occurrence	Significance
Unmitigated	**L**	**H**	**L**	**M**	**H**	**M**
Mitigated	**L**	**H**	**L**	**M**	**L**	**L**

Management and mitigation measures

Refer to Section 6.11 in the EMP (Appendix G). Key actions include the following:

- Apply for consent from the National Heritage Council of Namibia, based on the recommendations by the Archaeologist.
- In the unlikely event that significant archaeological resources are discovered during construction, a chance find emergency procedure will be implemented

8.8 SOCIO-ECONOMIC IMPACTS

8.8.1 INTRODUCTION

Positive economic benefits will arise from the direct investment of the proposed Oshivela Pilot Project, creating revenue for the company, for its employees and contractors, and for government in royalties and taxes. In addition, Namibia should gain international praise for introducing a novel process of producing iron which does not emit carbon dioxide, and which will contribute to reducing the negative socio-economic impacts of climate change.

Furthermore, in a country with high unemployment, any investment which creates jobs makes a positive contribution to society. Hylron is already developing an exchange system with its German project partners to train maintenance personnel for renewable energy power plants, metal workers and machine operators.

The information in this Section made reference to the baseline description provided in Section 6.10, the Socio-economic Impact Assessment (Ashby Associates cc, 2022) undertaken for the Shiyela Project as well as reference from the other EIAs (i.e. (I.N.K. Enviro Solutions, 2019 in Namisun, 2019).

8.8.2 ISSUE: ECONOMIC IMPACTS – CONSTRUCTION AND OPERATIONAL PHASES

Assessment of Impact

Nature and intensity, duration of impact and geographical extent

The proposed Oshivela Pilot Project is capital intensive. The profitability of the operations largely depends on the pricing of the CO_2 emissions in the export countries. The estimated profits (Table 23) consider the current CO_2 pricing and Hylron state they are therefore conservative.

TABLE 23: ANNUAL OPEX AND EXPECTED PROFIT

	Oshivela Pilot Project phase
Annual Turnover	150 Mio N$
Expenses (Wages & Salaries, Staff development)	30 Mio N$
Expenses (Operating capital, material & transport costs)	110 Mio N$
Profit/Loss (Euros) /annum	10 Mio N$
Profit / Loss N$ /annum	**N$ 10 million**

Given the scale of the capital investment, the operating costs, and assuming an acceptable private rate of return, it can be crudely calculated that the positive financial net present value of the project is significant.

Direct economic benefits will include the sale of sponge iron, the wages and salaries of the ~ 80 construction workers and up to ~ 50 persons employed during operations, the taxes paid, and profits earned. Indirect economic benefits are derived from the goods and services used to construct and operate project's components. Further induced economic benefits will result from the spending power of the construction and operations workforce, especially when wages are used to buy Namibian goods and services. Government will gain revenue from royalties, corporate taxes, from the employees, and from those up and down the supply chain who will pay personal income tax and Value Added Tax (VAT) on goods and services they purchase. To conclude, the project will generate new and positive contributions to national income and employment during construction and operations, and these positive impacts are rated high in terms of intensity. The duration is for the LoM (i.e. moderate) and the extent is high.

Some cumulative impacts on the economy are expected through the project boosting upstream, downstream and sideways linkages. Every job counts in a country with high unemployment, and employment provides incomes to the employees, their immediate household members and to others living elsewhere in Namibia who depend on cash remittances.

Consequence

Based on the above assessment the determining consequence is high (positive).

Probability

The probability of the impacts occurring are most likely, should the Project go ahead.

Significance

The significance of this potential impact is **high positive**.

Tabulated summary of the assessed impact – Economic impacts

Mitigation	Intensity	Duration	Extent	Consequence	Probability of Occurrence	Significance
Unmitigated	**H+**	**M**	**H**	**H+**	**H**	**H+**
Mitigated (Enhancement)	**H+**	**M**	**H**	**H+**	**H**	**H+**

Enhancement measures

Refer to Section 6.12.2 in the EMP (Appendix G). Key actions include the following:

- Implement a procurement policy which promotes the use of small and medium enterprises (SMEs), owned and / or managed by previously disadvantaged Namibians.
- Purchase Namibian-made goods and services whenever possible or those from businesses within the South African Development Community.
- Promote local recruitment.
- Support service providers which demonstrate their use of the local labour force.

8.8.3 ISSUE: JOB CREATION AND SKILLS DEVELOPMENT

Assessment of Impact

Nature and intensity, duration of impact and geographical extent

Direct jobs: With reference to Section 4.2, a maximum of ~ 80 people during construction and ~ 50 people during operations will be employed. In addition to the direct jobs created, some jobs will be created in the supply chain, especially where goods are manufactured locally or supplied by local companies (as opposed to South African or any other country).

The ***indirect jobs*** which might be created through the project include:

- Services such as transport, catering, security, auditing.
- Off-site repair and maintenance of equipment.
- Trainers of workers (engineers, Green Hydrogen production).

Induced jobs will be created resulting from the increased consumption and spending by employees and contractors. Induced jobs are usually in the service and retail industries used by

the project's employees. The Namibian Chamber of Mines and BDO South Africa (a member of one of the world's largest accounting and consulting networks) both estimate that for each mining employee, about 7 other jobs are supported. Using this ratio, the ~20 permanent jobs created by the Project could support about 140 additional jobs.

Skills Development: The project will be using highly mechanised technology and relatively few people will be employed. Some solar installation skills already exist in Namibia but producing green hydrogen is a new technology, as is iron production using hydrogen.

Hylron is currently developing an exchange system with its German project partners for the training of maintenance personnel for renewable energy power plants and for metal workers and machine operators. The system follows the dual vocational training approach. In this approach the trainees will learn the theory based on Namibia's National Qualification Framework (through a distance learning approach) and receive their practical training, in the most parts, in Germany. Hylron's aim is to train sufficient people to enable the staged development process. In the first phase of this training system (before the project starts), personnel in a "Train the Trainer" approach will be trained. The yearly budget for training is set to ~N$ 1 Million for the Pilot Project.

Hylron commits to promote gender equality and should it be required, will consider it in the selection process for trainees.

To summarise, the proposed Shiyela Iron Project will create about 80 medium term construction jobs and up to 50 permanent jobs. It will also build skills in maintaining renewable energy power plants and for metal workers and machine operators. The positive nature and intensity is high, the extent is high as it will build a national skills base and the duration is high as such skills live beyond the life of the project.

Cumulative impacts of creating jobs and skills contribute to Namibia's Vision 2030 – by building a skilled and industrialised nation. A skilled workforce is likely to ensure the next generation is better educated than the last. Skills are often transferable from one job to another so building skills can provide resilience against unemployment, such as on project closure.

Consequence

The determining consequence is high positive.

Probability

The mine and beneficiation process cannot operate without a skilled workforce, so the probability is high.

Significance

The overall significance of the impact is thus assessed as **very high** positive.

Tabulated summary of the assessed impact – Job Creation and Skills Development

Mitigation	Intensity	Duration	Extent	Consequence	Probability of Occurrence	Significance
Unmitigated	**H+**	**H**	**H**	**H+**	**H**	**H+**
Mitigated (Enhancement)	**H+**	**H**	**H**	**H+**	**H**	**H+**

Management and mitigation measures

Refer to Section 6.12.2 in the EMP (Appendix G). Key actions include the following:

- Refer to section 8.8.2.
- Pay fair salaries and wages.
- Be gender sensitive and select women for interview, training and recruitment, where possible.

8.8.4 ISSUE: POTENTIAL NEGATIVE SOCIAL IMPACTS ASSOCIATED WITH THE CONSTRUCTION WORKERS, PERMANENT EMPLOYEES AND THE ACCOMMODATION ON HYLRON'S FARM(S) IN THE AREA

Assessment of Impact

Nature and intensity, duration of impact and geographical extent

With reference to Table 19, community health, safety and security are issues of concern with the neighbouring community (i.e. surrounding farms) due to the workers at the proposed Pilot Project, as well as the staff that will be accommodated on the farm(s) belonging to Hylron, likely near the proposed project site (see Sections 4.2.7 and 4.3.5).

The presence of the Pilot Project, with associated construction workers and employees (during operations) could lead to an increase in crime such as theft, poaching, prostitution and rape, drug dealing and HIV among farmworkers. These issues were also raised as concerns by the neighbouring farmers. The higher risk stems from an increase in strangers coming into the area, who are off duty for 15 hours/day/night and their friends/relatives wanting to visit them.

Hylron should conform to the IFC's Performance Standard PS-4: Community Health, Safety and Security which recognises that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, it addresses the client's responsibility to

avoid or minimize the risks and impacts to community health, safety and security that may arise from project related-activities, with particular attention to vulnerable groups. (I.N.K. Enviro Solutions. 2019 in Namisun, 2019).

The objectives of PS-4 are:

- To anticipate and avoid adverse impacts on the health and safety of the potentially Affected Community during the project life from both routine and non-routine circumstances.
- To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Affected Communities.

The Project design and management plan must be compliant with health and safety regulations. Of relevance here is the need to minimise community and employee exposure to disease – particularly HIV. PS-4 states "The client will avoid or minimize transmission of communicable diseases that may be associated with the influx of temporary or permanent project labour" (I.N.K. Enviro Solutions. 2019 in Namisun, 2019).

The Oshivela Pilot Project is, however, a relatively small scale operation with relatively small numbers of people (both construction and operation). The Project Site is far away from any town/village and not easily accessible, i.e. a permanently locked gate is installed on the Norasa Uranium Project private access road from the B2 Road (south of the Kahn River) and access from other directions are though various farms mostly with locked gates. Therefore, on the inward migration would likely not occur.

Taking all the above mentioned into consideration, the intensity is therefore high in the unmitigated scenario but can be reduced to and low with the implementation of proper management measures.

The impact of the mine and its accommodation on site and the surrounding area could last after the life of the project, therefore high in the unmitigated scenario. With mitigation the impacts area avoided.

In the unmitigated scenario, impacts could extend to the community (i.e. farms) surrounding the Pilot Project. Therefore, the extent is moderate in the unmitigated scenario but low in the mitigated scenario.

Consequence

Based on the above assessment the determining consequence of the impact is high in the unmitigated scenario and low in the mitigated scenario.

Probability

The possibility of negative impacts occurring is ranked as moderate (i.e. possible) in the unmitigated scenario and low in the mitigated scenario.

Significance

The significance of the potential impacts on community health, safety and security is **high** in the unmitigated scenario and **low** in the mitigated scenario.

Tabulated summary of the assessed impact – Community Health, safety and security

Mitigation	Intensity	Duration	Extent	Consequence	Probability of Occurrence	Significance
Unmitigated	**H**	**M**	**H**	**H**	**M**	**H**
Mitigated (Enhancement)	**L**	**L**	**L**	**L**	**L**	**L**

Management and mitigation measures

Refer to Sections 6.2.2 and 6.12.2 in the EMP (Appendix G). Key actions include the following:

- The Project cannot lock workers in but it must inform all employees / contractors of the detailed consequences of anyone found in breach of the security measures. It must include a contingency plan to protect the local community if labours goes on strike.
- Occupants of the employee camp / village will remain within the area after working hours.
- No workers will be allowed to visit neighbouring / surrounding farms.
- Ensure that the infrastructure used for the housing of the workers are suitable and conform to Namibian Labour regulations and relevant standards on workers' housing.
- Install video surveillance cameras at strategic access roads.

8.8.5 ISSUE: TRAFFIC RELATED IMPACTS

Assessment of Impact

Nature and intensity, duration of impact and geographical extent

Impacts because of traffic could occur during the construction and operational phases when Project-related trucks, busses and private vehicles make use of the private and public transport network in and adjacent to the Pilot Project site. The key potential traffic-related impacts are associated with road capacity and third party (i.e. public) road safety. Another associated issue relates to the road maintenance issue (i.e. road condition) of to the Norasa Uranium Project Private access road.

With reference to Sections 4.2.1.2 and 5.4, various access routes to the Oshivela site (and other transport options), for the transport of the iron ore concentrate (to site) and the final product (to

the Walvis Bay Port) are being considered. Both road and rail options are considered by Hylron. The road option 1 (see Section 5.4), following the B2 and the Norasa Uranium Project Private access road is preferred over road option 2, through the NNNP, which would require further agreements between Hylron and the DWNP.

Construction related traffic will follow the B2 and the Norasa Uranium Project Private access road to site. The construction traffic is for a limited period of time (see Section 4.4).

The Project transport requirements are summarised in Table 24. These numbers include light vehicles, trucks, busses and mini busses.

TABLE 24: SUMMARY OF THE OSHIVELA PILOT PROJECT TRANSPORT REQUIREMENTS

Project phase	Transport requirements	Trips
Construction phase	Light Vehicle and smaller mini-buses used to transport some of the workers between Arandis, Swakopmund and the Project.	Maximum of 2 return trips per day at peak times
	Trucks transporting construction materials between Arandis, Swakopmund or Walvis Bay to the Project site	~5 trips per day during peak of construction period.
	Heavy vehicle escorts used to transport heavy and over gauge equipment to site	~10
Operational phase	Operations light vehicle movements to and from the Project site	Occasionally
	Transportation of Iron Ore Concentrate to site.	~ 2.5 truck trips (on average) per day.
	Final product transport	2 truck trips per day (however, the same trucks bring in the Iron ore Concentrate is likely to transport the final product back out.
	Some of the permanent employees to be transported to the site from Arandis / Swakopmund.	

Traffic impacts associated with additional vehicle numbers on the B2, D1984, C28, D1914 roads and the Welwitschia Drive are summarised in the Table 25.

TABLE 25: POTENTIAL TRAFFIC IMPACT ON RELEVANT ROAD SECTIONS

POTENTIAL TRAFFIC RELATING IMPACT	B2 (Tar)	D1984 (Tar)	C28 (Tarmac / gravel)	D1914 (Gravel)	Welwitschia Drive (Gravel)	Norasa Uranium Project Private access road (Gravel)
Road traffic accidents	X	X	X	X	X	X
Increase in road capacity affecting other road users	X	X	X			
Safety risk to people who are not familiar with driving on gravel roads as dust can affect visibility and the gravel surface can present traction problems when vehicles drive quickly and/or attempt to pass other vehicles				X	X	X
Uneven road surfaces cause vibration				X	X	X
Loose gravel can lead to cracked windscreens				X	X	X
Impact on tourists				X	X	
Road maintenance issues				X	X	X
Crossing NNNP (i.e. Park Management issues)				X	X	
Crossing Communal Conservancy				X		

The proposed increase in traffic from the Oshivela Pilot Project has the potential to add to the above mentioned issues and lead to additional road accidents. The Pilot Project's contribution to the overall increase in traffic numbers and associated road capacity issues (i.e. cumulative) is however small compared the existing traffic on the B2, specifically during the operations phase. The C28 road is not frequently used by tourists and locals and the D1984, which was recently upgraded to a double lane road with various significant bridges, etc. means that the increase in road traffic (i.e. Pilot Project's contribution) should not significantly affect the capacity of these roads.

The additional Project traffic making use of the Norasa Uranium Project Private access road will likely deteriorate the road condition, which could cause safety impacts to third parties using this road.

Trucks making using of the route (i.e. option 2) through the NNNP will drive (amongst others along the Welwitschia drive) which will have negative impacts on tourists driving along this route, for the scenic experience of the park. The Project related traffic could also cause the additional risk of animal killings in the park.

Taking the above mentioned into consideration, in the unmitigated scenario, the potential for injury and death to road users and impacts relating to the route through the NNNP, give this a

high intensity. With mitigation, the potential accident rate associated with the Project development and impacts on tourists should be reduced, and therefore the intensity reduces to moderate.

Any serious injury or death is considered a long term impact, which means the duration of the impact is rated as high in both the unmitigated and mitigated scenarios. In both the unmitigated and mitigated scenarios, the impact will be experienced beyond the boundary of the Project, with regional impacts, i.e. a moderate rating.

Consequence

The determining consequence of the impact is therefore high for the unmitigated scenario and moderate for the mitigated scenario.

Probability

Taking the Pilot Project transport requirements into account, the additional traffic that will be generated as a result of the Project activities will most likely cause some of the impacts mentioned above, without any mitigation (depending the chosen transport option). With ongoing management / mitigation / maintenance measures it is considered that the probability could reduce to low to moderate.

Significance

The significance of this potential impact is **high** for the unmitigated scenario and reduces to **low to moderate** with mitigation.

Tabulated summary of the assessed impact – Traffic impacts

Mitigation	Intensity	Duration	Extent	Consequence	Probability of Occurrence	Significance
Unmitigated	**H**	**H**	**M**	**H**	**H**	**H**
Mitigated	**L**	**H**	**M**	**M**	**L-M**	**L-M**

Management and mitigation measures

Refer to Section 6.12.2 in the EMP (Appendix G). Key actions include the following:

- Promote basic road safety behaviour for all Hylron employees and contractors through training and awareness.
- Hyiron to liaise with the relevant representatives of the Norasa Uranium Project to ensure agreement is reached between both parties regarding the Norasa Uranium Project private access road.

- Hyiron to liaise with the MEFT: Directorate of Wildlife and National Parks to obtain their consent for using the roads though the NNNP to the Project Site and adhere to any conditions stipulated by them. This would include maintenance requirements, speed control measures, all Park Rules and Regulations and avoiding impacts to third parties (i.e. tourists) using section of the same gravel road(s).
- Hylron to ensure ongoing road maintenance of the access road to the Project Site within their farm boundaries.
- All standard safety protocols relating to working within public roads to be adhered to.

8.9 CUMULATIVE IMPACTS

With reference to the introduction to Chapter 8, the potential impacts are cumulatively assessed in the various sections above, where relevant, taking the existing environment into consideration.

Section 6.6.2 provides information on the current land use and surrounding build environment. Reference is made to, amongst others the various exploration activities that have been conducted near the proposed Oshivela Project Site and the ML (149). In this regard, Forsys plans to further develop the Norasa Uranium Project within their ML area which would include various mining, processing and associated activities.

Furthermore, Elof Hansson Hydrogen Namibia (Pty) Ltd is proposing the construction and operation of a “Green Hydrogen Electrolysis Plant and Green Ammonia Synthesis and associated Infrastructure on the Remainder of Farm Geluk No.116 and Portion 7 of Farm 58, Walvis Bay”. These activities would include, amongst others, a solar (PV) power plant “located on a 7, 100 ha desert land on Remainder of Farm Geluk No.116”, an Electrolysis Plant and water storage at the PV power plant site. A water pipeline and hydrogen pipeline is proposed between the site at farm Geluk and the various Project infrastructure planned near Walvis Bay. (Environmental Consulting Trading, 2023).

The above mentioned mining, processing and associated activities as well as the ‘Green Hydrogen Electrolysis Plant and Green Ammonia Synthesis’ and associated activities are all planned in relatively close proximity to Hylron’s proposed Pilot Project. It must however, be noted that these Project are totally unrelated to each other.

These other projects, described above, would likely have similar aspects and cause similar environmental (and social) impacts to the ones identified in Chapter 7 and their respective potential impacts need to be assessed in detail by the relevant proponents. Should the implementation of all these projects coincide, most of these aspects could have cumulative

potential impacts. Seeing that these “other projects” have not been implemented and the timing of their further development and whether they will actually be implemented or not is unknown.

These potential cumulative impacts can therefore not be assessed. However, considering the scale of activities and the assessment of the proposed Pilot Project’s potential impacts, it is unlikely that the contribution of most of these impacts (associated with the Pilot Project) would significantly contribute to these overall cumulative impacts, in the mitigated scenario (i.e. with the implementation of the various management and mitigation measure and monitoring requirements in the EMP).

9 WAY FORWARD

All the comments received from I&APs during the review period have been considered and the reports updated (where relevant).

The way forward is as follows:

- MME and MEFT review the final documentation and provide record of decision regarding the application for an Environmental Clearance.

10 ENVIRONMENTAL IMPACT STATEMENT AND CONCLUSION

It is Namisun's opinion that the environmental aspects and potential impacts relating to the proposed Oshivela Pilot Project activities and the associated facilities have been successfully identified. The following environmental aspects and their overall cumulative impacts associated with the proposed Project had to be assessed, taking the baseline environmental conditions and the proposed project activities (amongst others) into consideration:

- Biodiversity:
  - Loss of vegetation and associated biota due to construction activities.
  - Impact on animal movement.
  - Change of habitat due to the construction and operation of the process plant, solar plant modules and associated infrastructure.
  - Spread of alien invasive plants (operational phase).
- Avifauna:
  - Disturbance of birds during construction (resulting in avoidance / displacement / barrier effects); this could include road mortalities and / or poaching during construction.
  - Direct and indirect modification / loss / destruction of bird habitat (resulting in voidance / displacement / barrier effects).
  - Attraction of birds to novel (artificial) habitats and resources; this impact could lead to negative impacts on infrastructure, caused by bird nesting, perching and other activities
  - Bird collisions with infrastructure such as solar panel arrays and other associated infrastructure.
- Visual:
  - General visual impacts and sense of place.
- Groundwater and surface water:
  - Abstraction of groundwater for the project could deplete the limited stored resources.
  - Project infrastructure impacting surface water flow / drainage.
  - Spills from the RO plant and disposal of brine mixed with water treatment chemicals could affect soil and water quality.
  - Disposal of untreated sewage causes soil and water pollution.

- Soil, surface and groundwater pollution from domestic sewage effluent, hydrocarbon spills or improperly managed waste negatively affects the soil, groundwater and surface water quality and could reduce the availability of water resources.

- Noise:
  - Noise disturbance to third parties.
- Air quality:
  - Air pollution, dust nuisance and increased risk of health impact to third parties.
- Archaeology:
  - Damage or destruction of archaeological sites.
- Socio-economic:
  - Economic impacts during construction and operations (positive).
  - Job creation and skills development during construction and operations (positive).
  - Potential negative social impacts associated with the construction workers, permanent employees and the accommodation on HyIron's Farm(s) in the area.
  - Traffic related impacts:
    - Road capacity issues.
    - Road maintenance issue (i.e. road condition), relating to the Norasa Uranium Project Private access road.
    - Third party (i.e. public) road safety.

The results of this impact assessment present the potential for negative environmental impacts and positive socio-economic benefits that can all be mitigated to acceptable levels, by implementing the EMP. Refer to Table 26 for a summary of the impact assessment findings.

Furthermore, Namibia should gain international praise for introducing a novel process of producing iron which does not emit carbon dioxide, and which will contribute to reducing the negative socio-economic impacts of climate change.

TABLE 26: SUMMARY OF IMPACT ASSESSMENT FINDINGS

Potential Impact	Significance	
	Before mitigation	After mitigation
Biodiversity (fauna and flora):		
Loss of vegetation and associated biota due to construction activities	**M**	**L-M**
Disturbance of large mammal movements	**L-M**	**L**
Change of habitat due to the construction and operation of the process plant, solar plant modules and associated infrastructure	**M**	**L-M**
Spread of alien invasive plants (operational phase)	**M**	**L**
Avifauna:		
Physical/human disturbance of birds	**M-H**	**M**
Direct and indirect modification / loss / destruction of bird habitat	**M**	**L-M**
Attraction of birds to novel (artificial) habitats and resources; this impact could also lead to negative impacts on infrastructure, caused by bird perching, nesting and other activities	**L**	**L**
Bird collisions with infrastructure such as solar panel arrays, fencing and other associated structures	**L**	**L**
Visual:		
General visual impacts and sense of place	**L-M**	**L-M**
Groundwater and Surface Water:		
Biophysical and Social Aspects of Groundwater Abstraction	**L**	**L**
Infrastructure impacting surface water flow / drainage	**L**	**L**
Desalination Plant Operation and Brine Discharge	**L**	**L**
Sewage Disposal	**L**	**L**
Water and Soil Pollution	**M**	**L**
Air Quality:		
Air pollution, dust nuisance and increased risk of health impact to third parties (closest receptors)	**L-M**	**L**
Noise:		
Noise disturbance to third parties (closest sensitive noise receptors)	**L**	**L**
Archaeology:		
Damage or destruction of archaeological sites	**M**	**L**
Socio-economic:		
Economic impacts – construction and operational phases	**H+**	**H+**
Job Creation And Skills Development	**H+**	**H+**

Potential Impact	Significance	
	Before mitigation	After mitigation
Potential negative social impacts associated with the construction workers, permanent employees and the accommodation on Hylron's Farm(s) in the area	**H**	**L**
Traffic related impacts	**H**	**L-M**

Taking the above-mentioned into consideration, Namisun believes that all environmental aspects and potential impacts associated with the proposed Oshivela Pilot Project were identified, described and appropriately assessed.

It is recommended that, if MEFT provides a positive decision on the application for the proposed Pilot Project, they should include a condition to the clearance that Hylron must implement all commitments in the EMP.

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Note: Various references were made in the respective Specialist Reports, which were not all repeated in this report. For the detailed lists of references see the “reference Sections” in the Specialist Reports in Appendices E and F.

APPENDIX A – CURRICULUM VITAE

APPENDIX B – INFORMATION SHARING RECORD

APPENDIX C – MINUTES OF MEETINGS, COMMENTS RECEIVED AND IRR

APPENDIX D – STAKEHOLDER DATABASE

APPENDIX E – AVIFAUNA SPECIALIST REPORT

APPENDIX F – ARCHAEOLOGY SPECIALIST (PHASE 2) REPORT

APPENDIX G – EMP

APPENDIX H – WATER ANALYSIS OF A BOREHOLE AT THE FOOT OF THE CHUOSBERGE ON PORTION 4 OF FARM BLOEMHOF 109